molex

Brad automation catalog
# Table of Contents

## Passive Media

<table>
<thead>
<tr>
<th>Section/Connector Type</th>
<th>Page Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ultra-Lock® (US)</strong></td>
<td></td>
</tr>
<tr>
<td>Cordsets</td>
<td>20 to 24</td>
</tr>
<tr>
<td>Receptacles</td>
<td>25 to 26</td>
</tr>
<tr>
<td>Field Attachable Connectors</td>
<td>27</td>
</tr>
<tr>
<td>Splitter Cordsets</td>
<td>28</td>
</tr>
<tr>
<td>Distribution Boxes</td>
<td>29 to 36</td>
</tr>
<tr>
<td><strong>Micro-Change® (M12) (US)</strong></td>
<td></td>
</tr>
<tr>
<td>Cordsets</td>
<td>38 to 48</td>
</tr>
<tr>
<td>Receptacles</td>
<td>49 to 50</td>
</tr>
<tr>
<td>Field Attachable Connectors</td>
<td>51</td>
</tr>
<tr>
<td>Solid Body Splitter and Tees</td>
<td>52</td>
</tr>
<tr>
<td>Splitter Cordsets</td>
<td>53</td>
</tr>
<tr>
<td>Distribution Boxes</td>
<td>54 to 61</td>
</tr>
<tr>
<td>Dual Key Cordsets</td>
<td>62 to 65</td>
</tr>
<tr>
<td>Dual Key Receptacles</td>
<td>66 to 67</td>
</tr>
<tr>
<td>Dual Key Field Attachables</td>
<td>68</td>
</tr>
<tr>
<td><strong>Nano-Change® (M8) (US)</strong></td>
<td></td>
</tr>
<tr>
<td>Cordsets</td>
<td>70 to 72</td>
</tr>
<tr>
<td>Receptacles</td>
<td>73 to 74</td>
</tr>
<tr>
<td>Field Attachable Connectors</td>
<td>75</td>
</tr>
<tr>
<td>SNAP Cordsets</td>
<td>76 to 78</td>
</tr>
<tr>
<td><strong>Ultra-Lock (EUROPE)</strong></td>
<td></td>
</tr>
<tr>
<td>Cordsets</td>
<td>82 to 86</td>
</tr>
<tr>
<td>Receptacles</td>
<td>87 to 88</td>
</tr>
<tr>
<td>Field Attachable Connectors</td>
<td>89</td>
</tr>
<tr>
<td>Splitter Cordsets</td>
<td>90</td>
</tr>
<tr>
<td>Distribution Boxes</td>
<td>91 to 98</td>
</tr>
<tr>
<td><strong>Micro-Change (M12) (EUROPE)</strong></td>
<td></td>
</tr>
<tr>
<td>Cordsets</td>
<td>100 to 110</td>
</tr>
<tr>
<td>Receptacles</td>
<td>111 to 112</td>
</tr>
<tr>
<td>Field Attachable Connectors</td>
<td>113</td>
</tr>
<tr>
<td>Solid Body Splitter and Tees</td>
<td>114</td>
</tr>
<tr>
<td>Splitter Cordsets</td>
<td>115</td>
</tr>
<tr>
<td>Distribution Boxes</td>
<td>116 to 123</td>
</tr>
<tr>
<td><strong>Nano-Change (M8) (EUROPE)</strong></td>
<td></td>
</tr>
<tr>
<td>Cordsets</td>
<td>126 to 128</td>
</tr>
<tr>
<td>Receptacles</td>
<td>129 to 130</td>
</tr>
<tr>
<td>Field Attachable Connectors</td>
<td>131</td>
</tr>
<tr>
<td>Distribution Boxes</td>
<td>132 to 134</td>
</tr>
<tr>
<td>SNAP Cordsets</td>
<td>135</td>
</tr>
</tbody>
</table>
Mini-Change®

A-Size
Cordsets ................................................................. 138 to 143
Receptacles ............................................................. 144 to 148
Bulkheads ............................................................... 149
Field Attachable Connectors ................................... 150
Plugs ........................................................................ 151
Tee Connectors ....................................................... 152
Adaptors .................................................................. 153
Accessories ............................................................ 153
Distribution Boxes .................................................. 154 to 157

B-Size
Cordsets ................................................................. 158 to 160
Receptacles ............................................................. 161 to 162
Accessories ............................................................ 163

C-Size
Cordsets ................................................................. 164 to 166
Receptacles ............................................................. 167 to 168
19-Pole Single and Double-Ended Cordsets ............ 169
19-Pole Receptacles ................................................. 170
Accessories ............................................................ 171

M23

Signal
Connectors ............................................................. 174 to 175
Receptacles ............................................................. 176 to 179
Cordsets .................................................................. 180

Power
Connectors ............................................................. 181 to 182
Receptacles ............................................................. 183 to 184
Tools and Accessories ............................................. 185

mPm™ DIN
Field Attachables .................................................... 188 to 192
Molded Cables ......................................................... 193 to 197
Technical Features ................................................ 198
Available Circuit Sizes .......................................... 199 to 202

Power Products

Trunk/Feeder
Cordsets ................................................................. 207 to 209
Tees ........................................................................ 210
Reducers .................................................................. 211
Receptacles ............................................................. 212
Field Attachable Connectors .................................. 213

Drop/Branch
Cordsets ................................................................. 214 to 216
Receptacles ............................................................. 217
Field Attachable Connectors .................................. 218

Accessories
Closure Caps and Locking Clips .............................. 219
Emergency Stop Cordsets and Tees ....................... 220
Emergency Stop Receptacles and Terminators ......... 221
## Network Solutions

**DeviceNet**
- Remote Scanners .................................................................................................................. 228
- Diagnostic Tools ................................................................................................................... 229
- Interface Cards ..................................................................................................................... 230
- Common Industrial Safety Software Kits ......................................................................................... 231
- I/O Modules .......................................................................................................................... 232 to 233
- Bus Extenders ....................................................................................................................... 234
- Bulk Cables ........................................................................................................................... 235 to 238

**Mini-Change®**
- Cordsets .................................................................................................................................. 239 to 245
- Receptacles ............................................................................................................................ 246 to 248
- Field Attachable Connectors ................................................................................................... 249
- Terminator Resistors ............................................................................................................... 250
- Tees and Adapters .................................................................................................................. 251 to 254
- Passive Multi-Ports ................................................................................................................... 255 to 256

**Micro-Change® (M12)**
- Cordsets ................................................................................................................................ 257 to 262
- Receptacles ............................................................................................................................ 263 to 264
- Field Attachable Connectors ................................................................................................... 265
- Terminators ............................................................................................................................ 266
- Tees and Splitters .................................................................................................................... 267
- Passive Multi-Ports ................................................................................................................... 268 to 269

**Open Style**
- Cordsets ................................................................................................................................ 270 to 271
- Receptacle Assemblies ............................................................................................................. 272

**Nano-Change® (M8)**
- Cordsets ................................................................................................................................ 273 to 277
- Passive Multi-Ports ................................................................................................................... 278

**Auxiliary Power Media**
- **Mini-Change®**
  - Cordsets ................................................................................................................................ 279
  - Adapters ................................................................................................................................ 280
  - Field Attachable Connectors ................................................................................................... 281
  - Power Taps .............................................................................................................................. 282
  - Machine Stop Tees .................................................................................................................. 283
- **Micro-Change® (M12) and Ultra-Lock®**
  - Cordsets ................................................................................................................................ 284 to 285
  - Receptacles ............................................................................................................................ 286
  - Field Attachable Connectors ................................................................................................... 287

**PROFIBUS**
- Adapters .................................................................................................................................. 290
- Interface Cards .......................................................................................................................... 291 to 297
- Communication Modules ......................................................................................................... 298 to 299
- Industrial Gateways .................................................................................................................. 300 to 301
- I/O Modules ............................................................................................................................. 302 to 303
- Cables .................................................................................................................................... 304

---

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA).*

†PROFIBUS is a trademark of PROFIBUS International.
**Micro-Change® (M12)**
- Cordsets: 305 to 307
- Receptacles: 308 to 310
- Field Attachable Connectors: 311
- Terminators: 312
- Tees: 313

**D-Sub**
- Field Attachable Connectors: 314
- Cordsets: 315 to 319

**Auxiliary Power Media**

**Mini-Change®**
- Cordsets: 320
- Receptacles: 321
- Field Attachable Connectors: 322
- Tees: 323

**Micro-Change® (M12) and Ultra-Lock®**
- Cordsets (US): 324 to 325
- Cordsets (Europe): 326 to 327
- Receptacles (US): 328
- Receptacles (Europe): 329
- Field Attachable Connectors: 330

**Ethernet**
- Development Kits: 334 to 335
- Windows® Compatible Drivers: 336 to 337
- Network Interface Cards: 338 to 339
- Communication Modules: 340
- Industrial Gateways: 341
- I/O Modules: 342 to 344
- Common Industrial Safety Software Kits: 345
- In-Cabinet Ethernet Switches: 346

**RJ-Lnxx® RJ-45 and Standard RJ-45**
- Cordsets: 347 to 351
- Receptacles: 352 to 356
- Field Attachable Connectors: 357
- Accessories: 357

**Sealed RJ-45**
- Cordsets: 358 to 360
- Receptacles: 361
- Field Wireable Connectors: 362
- Dust Caps: 362

**Micro-Change® (M12)**
- Cordsets: 363 to 366
- Field Attachable Connectors: 367

**Ultra-Lock®**
- Cordsets: 368 to 369
- Receptacles: 370 to 373
- Adapters: 374

*Windows is a registered trademark of Microsoft Corporation.*
Other Networks
Communication Modules ................................................................. 378 to 379
Interface Cards .................................................................................. 379 to 381
Industrial Gateways ............................................................................... 382
Windows Compatible Protocol Drivers .................................................. 383
I/O Modules .......................................................................................... 384
PICS Simulation Software ........................................................................ 385

NMEA 2000®
Bulk Cables .......................................................................................... 388

Micro-Change® (M12)
Cordsets ................................................................................................. 389 to 391
Receptacles .............................................................................................. 392
Field Attachable Connectors ................................................................. 393
 Terminator Resistors ................................................................................. 394
Tees ............................................................................................................. 395 to 396
 Junction Boxes ........................................................................................ 397

Mini-Change®
Cordsets ................................................................................................. 398
Field Attachable Connectors ................................................................. 399
 Terminator Resistors ................................................................................. 400
Tees ............................................................................................................. 401
Power Tap ................................................................................................. 402
Auxiliary Power Media Cordsets ............................................................ 403

Micro-Change® (M12) and Mini-Change®
Receptacles .............................................................................................. 404
Closure Caps ............................................................................................ 404

Industrial USB
Cordsets ................................................................................................. 406 to 407
Receptacles .............................................................................................. 408
Dust Cap ..................................................................................................... 409

Cable Chemical Resistance Chart/Specifications and Wire Diameters .......... 410

Standard Wire Cross Reference ............................................................. 411

Approval Codes ........................................................................................ 412 to 414

Glossary ...................................................................................................... 415 to 420

*NMEA 2000 is a trademark of the National Marine Electronics Association*
Brad® Micro-Change® (M12) A-Code
Single-Ended Cordsets (US)

120065 Male, Pigtail Straight, Right Angle

Features and Benefits
- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
- 3, 4, and 5-pole versions are intermateable for added flexibility
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells, cable is weld slag resistant

Physical
- Connector Body: PUR (TPE for K05)
- Contact Carriers: Polyamide
- O-rings: Viton (EPDM for A09 cables)
- Coupling Nut: Nickel-plated Brass (Teflon coated for K05)
- Contacts: Copper alloy with Gold over Nickel plating
- Cables: A09—Yellow PVC jacket, 22 AWG PVC conductors, 300V, UL AWM2661
  - Purple—Yellow PVC jacket, 22 AWG PVC conductors, 300V, UL 2661 PVC (A09)
  - TPE jacket, 22 AWG PVC conductors, +10M flex life (tension and bending)

Environmental
- Protection: IP67
- NEMA Rating: NEMA 6

Specifications

<table>
<thead>
<tr>
<th>Poles</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 3661</td>
<td>PVC (A09)</td>
<td>22</td>
<td>2.0m</td>
</tr>
<tr>
<td>4 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 3661</td>
<td>PVC (A09)</td>
<td>22</td>
<td>2.0m</td>
</tr>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 3661</td>
<td>PVC (A09)</td>
<td>22</td>
<td>2.0m</td>
</tr>
</tbody>
</table>

Reference Information
- UL File No.: E152210 (A09 and K05 cable assemblies)
- CSA File No.: LR6837 (A09 and K05 cable assemblies)

Note: Sales drawings for all standard order numbers are available on molex.com
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Molex is a leading one-source supplier of interconnect products. Our team of highly skilled experts is focused on the design, development and distribution of innovative product solutions that touch virtually every walk of life. The Molex product portfolio is among the world’s most extensive, with over 100,000 reliable products. Because our product line includes automation products for passive media, network media and power applications, Molex can interconnect an entire automation infrastructure—one total system solution from a global company dedicated to meeting your total system needs. Molex utilizes extensive worldwide resources to meet customer needs on a local, regional and global level. Molex offers well-established sales, product development, manufacturing and logistics resources in Asia, Europe and the Americas.
If you’re designing or engineering an automation infrastructure, Molex will provide a system that includes passive media, network solutions and power products bearing the Brad® name.

If you’re installing an automation infrastructure, you’ll appreciate how simply and precisely the Brad components go together—and stay together—thanks to quick-connect convenience, including our exclusive Ultra-Lock® Connection System.

If system maintenance is your responsibility, Brad products are built to help—and endure. Features like epoxy-coated couplings, palladium/nickel plating, female contacts that maintain constant pressure on the male contacts, moisture-resistant design and seal construction, ultra-tough cable materials, anti-vibration technology, quick-connects, and many others help maintain system performance, minimize downtime, maximize product life, even simplify maintenance.
Brad Components are Everywhere

With Brad components, you only need one convenient source to spec all of your industrial connectors and applications. Standardize with Brad products and watch your design, installation, and maintenance processes become vastly simplified—a total system solution.

SERVING THESE AND OTHER MARKETS

- Industrial Device Manufacturing
- Automotive
- Robotics
- Food/Beverage
- Material Handling
- Alternative Energy (e.g. solar, wind)
- Commercial Vehicle

**connectivity**
Connectors, cordsets and distribution boxes for sensor, actuator and bus network applications

**power**
Modular, flexible wiring systems for machine power distribution and motor control

**control**
Network I/O for on-machine and in-cabinet applications

**communications**
Network interface cards, PLC backplanes, switches, gateways, simulation software and diagnostic tools

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### Passive Media

<table>
<thead>
<tr>
<th>Section</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ultra-Lock® (US)</strong></td>
<td>19</td>
</tr>
<tr>
<td>Cordsets</td>
<td>20 to 24</td>
</tr>
<tr>
<td>Receptacles</td>
<td>25 to 26</td>
</tr>
<tr>
<td>Field Attachable Connectors</td>
<td>27</td>
</tr>
<tr>
<td>Splitter Cordsets</td>
<td>28</td>
</tr>
<tr>
<td>Distribution Boxes</td>
<td>29 to 36</td>
</tr>
<tr>
<td><strong>Cordsets</strong></td>
<td>38 to 48</td>
</tr>
<tr>
<td><strong>Receptacles</strong></td>
<td>49 to 50</td>
</tr>
<tr>
<td><strong>Field Attachable Connectors</strong></td>
<td>51</td>
</tr>
<tr>
<td><strong>Solid Body Splitter and Tees</strong></td>
<td>52</td>
</tr>
<tr>
<td><strong>Splitter Cordsets</strong></td>
<td>53</td>
</tr>
<tr>
<td><strong>Distribution Boxes</strong></td>
<td>54 to 61</td>
</tr>
<tr>
<td><strong>Dual Key Cordsets</strong></td>
<td>62 to 65</td>
</tr>
<tr>
<td><strong>Dual Key Receptacles</strong></td>
<td>66 to 67</td>
</tr>
<tr>
<td><strong>Dual Key Field Attachables</strong></td>
<td>68</td>
</tr>
<tr>
<td><strong>Micro-Change® (M12) (US)</strong></td>
<td>70 to 72</td>
</tr>
<tr>
<td>Cordsets</td>
<td>38 to 48</td>
</tr>
<tr>
<td>Receptacles</td>
<td>49 to 50</td>
</tr>
<tr>
<td>Field Attachable Connectors</td>
<td>51</td>
</tr>
<tr>
<td>Solid Body Splitter and Tees</td>
<td>52</td>
</tr>
<tr>
<td>Splitter Cordsets</td>
<td>53</td>
</tr>
<tr>
<td>Distribution Boxes</td>
<td>54 to 61</td>
</tr>
<tr>
<td>Dual Key Cordsets</td>
<td>62 to 65</td>
</tr>
<tr>
<td>Dual Key Receptacles</td>
<td>66 to 67</td>
</tr>
<tr>
<td>Dual Key Field Attachables</td>
<td>68</td>
</tr>
<tr>
<td><strong>Nano-Change® (M8) (US)</strong></td>
<td>73 to 74</td>
</tr>
<tr>
<td>Cordsets</td>
<td>70 to 72</td>
</tr>
<tr>
<td>Receptacles</td>
<td>73 to 74</td>
</tr>
<tr>
<td>Field Attachable Connectors</td>
<td>75</td>
</tr>
<tr>
<td>Distribution Boxes</td>
<td>76 to 78</td>
</tr>
<tr>
<td>SNAP Cordsets</td>
<td>79</td>
</tr>
<tr>
<td><strong>Ultra-Lock (EUROPE)</strong></td>
<td>82 to 86</td>
</tr>
<tr>
<td>Cordsets</td>
<td>82 to 86</td>
</tr>
<tr>
<td>Receptacles</td>
<td>87 to 88</td>
</tr>
<tr>
<td>Field Attachable Connectors</td>
<td>89</td>
</tr>
<tr>
<td>Splitter Cordsets</td>
<td>90</td>
</tr>
<tr>
<td>Distribution Boxes</td>
<td>91 to 98</td>
</tr>
<tr>
<td><strong>Micro-Change (M12) (EUROPE)</strong></td>
<td>100 to 110</td>
</tr>
<tr>
<td>Cordsets</td>
<td>100 to 110</td>
</tr>
<tr>
<td>Receptacles</td>
<td>111 to 112</td>
</tr>
<tr>
<td>Field Attachable Connectors</td>
<td>113</td>
</tr>
<tr>
<td>Solid Body Splitter and Tees</td>
<td>114</td>
</tr>
<tr>
<td>Splitter Cordsets</td>
<td>115</td>
</tr>
<tr>
<td>Distribution Boxes</td>
<td>116 to 123</td>
</tr>
<tr>
<td><strong>Nano-Change (M8) (EUROPE)</strong></td>
<td>129 to 130</td>
</tr>
<tr>
<td>Cordsets</td>
<td>126 to 128</td>
</tr>
<tr>
<td>Receptacles</td>
<td>129 to 130</td>
</tr>
<tr>
<td>Field Attachable Connectors</td>
<td>131</td>
</tr>
<tr>
<td>Distribution Boxes</td>
<td>132 to 134</td>
</tr>
<tr>
<td>SNAP Cordsets</td>
<td>135</td>
</tr>
<tr>
<td><strong>Mini-Change®</strong></td>
<td>138 to 143</td>
</tr>
<tr>
<td>A-Size Cordsets</td>
<td>138 to 143</td>
</tr>
<tr>
<td>Receptacles</td>
<td>144 to 148</td>
</tr>
<tr>
<td>Bulkheads</td>
<td>149</td>
</tr>
<tr>
<td>Field Attachable Connectors</td>
<td>150</td>
</tr>
<tr>
<td>Plugs</td>
<td>151</td>
</tr>
<tr>
<td>Tee Connectors</td>
<td>152</td>
</tr>
<tr>
<td>Adaptors</td>
<td>153</td>
</tr>
<tr>
<td>Accessories</td>
<td>153</td>
</tr>
<tr>
<td>Distribution Boxes</td>
<td>154 to 157</td>
</tr>
<tr>
<td><strong>B-Size</strong></td>
<td>158 to 160</td>
</tr>
<tr>
<td>Cordsets</td>
<td>158 to 160</td>
</tr>
<tr>
<td>Receptacles</td>
<td>161 to 162</td>
</tr>
<tr>
<td>Accessories</td>
<td>163</td>
</tr>
<tr>
<td><strong>C-Size</strong></td>
<td>164 to 166</td>
</tr>
<tr>
<td>Cordsets</td>
<td>164 to 166</td>
</tr>
<tr>
<td>Receptacles</td>
<td>167 to 168</td>
</tr>
<tr>
<td><strong>19-Pole Single and Double-Ended Cordsets</strong></td>
<td>169</td>
</tr>
<tr>
<td><strong>19-Pole Receptacles</strong></td>
<td>170</td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td>171</td>
</tr>
<tr>
<td><strong>M23</strong></td>
<td>174 to 175</td>
</tr>
<tr>
<td>Signal Connectors</td>
<td>174 to 175</td>
</tr>
<tr>
<td>Receptacles</td>
<td>176 to 179</td>
</tr>
<tr>
<td>Cordsets</td>
<td>180</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>181 to 182</td>
</tr>
<tr>
<td>Connectors</td>
<td>181 to 182</td>
</tr>
<tr>
<td>Receptacles</td>
<td>183 to 184</td>
</tr>
<tr>
<td>Tools and Accessories</td>
<td>185</td>
</tr>
<tr>
<td><strong>mPm® DIN</strong></td>
<td>188 to 192</td>
</tr>
<tr>
<td>Field Attachables</td>
<td>188 to 192</td>
</tr>
<tr>
<td>Molded Cables</td>
<td>193 to 197</td>
</tr>
<tr>
<td>Technical Features</td>
<td>198</td>
</tr>
<tr>
<td>Available Circuit Sizes</td>
<td>199 to 202</td>
</tr>
</tbody>
</table>
Passive media

Molex provides a wide variety of passive media products and solutions under the Brad® name. Every connector can be trusted to perform in the most rugged, harsh-duty industrial application. Each component is designed with you in mind: field connections, quick-connect speed and simplicity, unlimited combinations of performance/power/speed/size, engineering part number system, simplified wire management products, and so much more. Molex can also provide the network and power products you need for a total system solution, each bearing the trusted Brad logo. When the infrastructure is done, you’ll be glad you chose Brad, the world’s leading industrial connector brand.
Built to meet the toughest industry codes and standards

Choose from five circular form factors and over four hundred application-specific cables. A three-tiered cable material solution provides welcome choices, with each material designed to meet specific application requirements. Quick-connect features save valuable time, yet fasten securely. You also have the flexibility to custom-design your own cordsets using our configuration code or standard order numbering. Our product breadth offers a complete passive media solution that includes cordsets, connectors, and distribution boxes for sensors, actuators, and bus network applications.

Performance right where it should be

The average, harsh-duty industrial environment is no place for average connectivity solutions. All Brad® automation products are designed for maximum performance and reliability in ultra-tough environments. And they’re backed by the knowledge, experience and support of Molex Incorporated, a 70-year-old global manufacturer of innovative industrial communication, control and connectivity solutions.

Six circular form factors that are used globally:
- Brad Ultra-Lock® Connection System (M12)
- Brad Micro-Change® (M12)
- Brad Nano-Change® (M8)
- Brad Mini-Change® (A, B and C sizes)
- Brad M23
- Brad DIN Connectors
Brad® Ultra-Lock® (M12)

The standard for compact, push-to-lock, IP69 sealed connections for signal and communication applications

Brad Micro-Change® (M12)

Rugged Micro-Change® connectors and receptacles provide a high-pin-density M12 solution and are ideal for use in harsh commercial and industrial environments

Brad Nano-Change® (M8)

For extremely compact, rigorous connection requirements. 3, 4 and 5 pole available

Brad Mini-Change® (A, B and C sizes)

The industry standard for rugged, sealed, signal and low-power applications. 2 to 12 and 19 poles

Brad M23

Tough, metal shelled connectors for signal and power

Brad mPm® DIN Cordset Family

Field attachable and Molded cable versions

molex
The Right Cable For Your Application

Selecting the right cable for your application is very important to ensure a reliable, problem-free installation. Careful consideration of mechanical abrasion, fluid/chemical exposure, flexibility (drag chain, C-track, torsion), temperature rating and flame retardancy is required to select the cable that will provide performance and reliability in service. The Brad® line offers a complete range of cables, including five standard cable types satisfying most applications as well as 400+ application-specific cables for special performance requirements. In all cases, Brad cordsets are available in standard and non-standard lengths.

Brad PVC, PUR and TPE cordsets are manufactured with high performance materials and include UL/CSA approvals to ensure compatibility with both European and North American market requirements.

If you need assistance selecting the right cable, please contact our technical support team at your local Molex office.

<table>
<thead>
<tr>
<th>PVC</th>
<th>LIGHT INDUSTRIAL ENVIRONMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For use in static, less demanding environments, such as: light assembly equipment, packaging machines, conveyors</td>
</tr>
<tr>
<td></td>
<td>UL/CSA approved</td>
</tr>
<tr>
<td></td>
<td>Good chemical resistance</td>
</tr>
<tr>
<td></td>
<td>Fair resistance to abrasion</td>
</tr>
<tr>
<td></td>
<td>Fair oil and lubricants resistance</td>
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<tr>
<td></td>
<td>Inexpensive cable solution</td>
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<table>
<thead>
<tr>
<th>PVC</th>
<th>EXTRA HARD Service Cord</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>For use in outdoor lighting, portable tools, multi-use plant equipment, portable power and control systems</td>
</tr>
<tr>
<td></td>
<td>UL/CSA type ST00W, 500W or TC-ER</td>
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<table>
<thead>
<tr>
<th>PUR/PVC</th>
<th>MORE ROBUST ENVIRONMENT</th>
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<tbody>
<tr>
<td></td>
<td>For use in assembly and production lines such as machine tools and metal-cutting production requiring higher cut, abrasion and chemical resistance</td>
</tr>
<tr>
<td></td>
<td>UL/CSA approved</td>
</tr>
<tr>
<td></td>
<td>Very good resistance to oils, chemicals and coolants</td>
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<tr>
<td></td>
<td>High abrasion resistance</td>
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<tr>
<td></td>
<td>Halogen free, flame retardant</td>
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<tr>
<td></td>
<td>Drag chain suitability (slower motion)</td>
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<table>
<thead>
<tr>
<th>PUR</th>
<th>DEMANDING ENVIRONMENTS</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>For use in machine tools, swivel tables and metal-cutting production with harsh fluid, mechanical or continuous flex requirements</td>
</tr>
<tr>
<td></td>
<td>UL/CSA approved</td>
</tr>
<tr>
<td></td>
<td>High temperature resistance</td>
</tr>
<tr>
<td></td>
<td>High abrasion resistance</td>
</tr>
<tr>
<td></td>
<td>Halogen free, flame retardant</td>
</tr>
<tr>
<td></td>
<td>Drag chain suitability</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TPE</th>
<th>CONTINUOUS FLEX/DEMANDING AREAS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For use in robots, special welding equipment, high speed drag chains, machine tools, assembly lines, metal cutting manufacturing</td>
</tr>
<tr>
<td></td>
<td>UL/CSA approved</td>
</tr>
<tr>
<td></td>
<td>Very good weld slag resistance</td>
</tr>
<tr>
<td></td>
<td>High temperature resistance (±105°C)</td>
</tr>
<tr>
<td></td>
<td>High abrasion resistance</td>
</tr>
<tr>
<td></td>
<td>Drag chain suitability</td>
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<table>
<thead>
<tr>
<th>APPLICATION AREA</th>
<th>CHARACTERISTICS</th>
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<tbody>
<tr>
<td>PVC</td>
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</tr>
<tr>
<td>LIGHT INDUSTRIAL ENVIRONMENT</td>
<td>For use in static, less demanding environments, such as: light assembly equipment, packaging machines, conveyors</td>
</tr>
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<td>PVC</td>
<td></td>
</tr>
<tr>
<td>PUR</td>
<td></td>
</tr>
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<td>PVC</td>
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<tr>
<td>PUR</td>
<td></td>
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</table>

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
Brad® Ultra-Lock® Connection System

UNITED STATES (also includes Canada, Mexico and South America)

The performance and reliability of the revolutionary new Ultra-Lock® connection system surpass those of traditional threaded connectors, delivering increased productivity and cost savings.

Ultra-Lock connectors incorporate a unique radial seal and mechanical-locking design that deliver unsurpassed performance. The patented push-to-lock technology provides a fast, simple and secure operator-independent connection.

Ultra-Lock connectors are designed to eliminate connector-related intermittent signals in the harshest environments. Fewer intermittent signals mean less downtime and better productivity.

Ultra-Lock technology can be used on Ultra-Lock connectors as well as threaded connectors, including Brad M12 connectors from Molex and Micro-Push® (IP64) connections.

Molex offers Ultra-Lock in 3-, 4-, 5-, 8- and 12-pin configurations for an extensive assortment of cordsets, receptacles, and molded junction boxes. The Ultra-Lock receptacles and multiports can be used with conventional threaded M12 and Micro-Push products to provide backward compatibility to legacy screw-down connectors.

Features and Benefits
• Push-to-lock technology provides a simple, secure, operator-independent connection for fast mating and reduced installation time
• Radial O-ring provides an IP69K seal to protect against moisture
• Receptacles accept either the Ultra-Lock connector or standard M12 threaded cordsets, giving users a variety of connection options

Applications
• Proximity switches, photo eyes, safety switches and other I/O connectivity
• Connector interface for IP69-rated devices
• Connectivity for devices in high-vibration environments
• Connections requiring blind-mating
Brad® Ultra-Lock® (M12) Single-Ended Cordsets (US)

120079 Female Pigtail Straight, Right Angle

Features and Benefits
- Push-to-lock technology assures fast, reliable connections every time
- Reliable performance in high vibration environments due to positive locking mechanism
- Ideal for wash-down and temporary submersion applications due to improved sealing design
- Ergonomic push to lock mechanism reduces fatigue and user errors when a high number of connections need to be made
- 3, 4, and 5 pole versions are intermateable for added flexibility
- IP67/68/69K rated for harsh environments
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells, cable is weld slag resistant

Reference Information
CSA File No.: LR6837 (3, 4, and 5-pole assemblies)

Physical
Connector Body: PUR (TPE for K05)
Contact Carries: Polyamide
O-ring: Viton (EPDM for E03 cables)
Coupling Nut: Nickel-plated Brass (Teflon coated for K05)
Contacts: Copper alloy with Gold over Nickel plating
Cables: A09—Yellow PVC jacket, 22 AWG PVC conductors, 300V, UL AWM2661
K05—Yellow TPE jacket, 22 AWG PVC conductors, 300V, UL PLTC-ER, +10M flex life (torsion and bending)
PO2—Black PUR/PVC jacket, 24 AWG PVC conductors, 300V, 80C
H45—Black PUR jacket, 26 AWG PVC conductors, 300V, 80C UL AWM20549

Environmental
Protection: IP67/IP68/IP69K
NEMA rating: NEMA 6

<table>
<thead>
<tr>
<th>Poles</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type (Cable Code)</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2464 Portsmouth PVC (A09)</td>
<td>PVC (A09)</td>
<td>22</td>
<td>2.0m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PLTC-ER TPE (K05)</td>
<td>TPE (K05)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2464 Portsmouth PVC (A09)</td>
<td>PVC (A09)</td>
<td>22</td>
<td>2.0m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PLTC-ER TPE (K05)</td>
<td>TPE (K05)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2464 Portsmouth PVC (A09)</td>
<td>PVC (A09)</td>
<td>22</td>
<td>2.0m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PLTC-ER TPE (K05)</td>
<td>TPE (K05)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Pole</td>
<td>2.0A</td>
<td>30V AC/36V DC</td>
<td>PUR/PVC (PO2)</td>
<td>PUR/PVC (PO2)</td>
<td>24</td>
<td>2.0m</td>
</tr>
<tr>
<td>12 Pole</td>
<td>1.5A</td>
<td>30V AC/DC</td>
<td>UL 20549 Portsmouth PUR (H45)</td>
<td>PUR (H45)</td>
<td>26</td>
<td>2.0m</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
Brad® Ultra-Lock® (M12) Single-Ended Cordsets (US)

120079
Male, Pigtail Straight, Right Angle

Features and Benefits
- Push-to-lock technology assures fast, reliable connections every time
- Reliable performance in high vibration environments due to positive locking mechanism
- Ideal for wash-down and temporary submersion applications due to improved sealing design
- Ergonomic push to lock mechanism reduces fatigue and user errors when a high number of connections need to be made
- 3, 4, and 5 pole versions are intermateable for added flexibility
- IP67/68/69K rated for harsh environments
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells, cable is weld slag resistant

Reference Information
CSA File No.: LR6837 (3, 4, and 5-pole assemblies)

Physical
Connector Body: PUR (TPE for K05)
Contact Carriers: Polyamide
O-ring: Viton (EPDM for E03 cables)
Coupling Nut: Nickel-plated Brass
(Cerfion coated for K05)
Contacts: Copper alloy with Gold over Nickel plating
Cables: A09—Yellow PVC jacket, 22 AWG PVC conductors, 300V, UL AWM2661
K05—Yellow TPE jacket, 22 AWG PVC conductors, 300V, UL PLTC-ER, +10M flex life (torsion and bending)
P02—Black PUR/PVC jacket, 24 AWG PVC conductors, 300V, 80C
H45—Black PUR jacket, 26 AWG PVC conductors, 300V, 80C UL AWM20549

Environmental
Protection: IP67/IP68/IP69K
NEMA rating: NEMA 6

<table>
<thead>
<tr>
<th>Poles (Male View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2464</td>
<td>PVC (A09)</td>
<td>22 AWG</td>
<td>2.0m</td>
</tr>
<tr>
<td>4 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2464</td>
<td>PVC (A09)</td>
<td>22 AWG</td>
<td>2.0m</td>
</tr>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2464</td>
<td>PVC (A09)</td>
<td>22 AWG</td>
<td>2.0m</td>
</tr>
<tr>
<td>8 Pole</td>
<td>2.0A</td>
<td>30V AC/36V DC</td>
<td>UL 2464</td>
<td>PVC (A09)</td>
<td>22 AWG</td>
<td>2.0m</td>
</tr>
<tr>
<td>12 Pole</td>
<td>1.5A</td>
<td>30V AC/DC</td>
<td>UL 20549</td>
<td>PUR (H45)</td>
<td>22 AWG</td>
<td>2.0m</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

<table>
<thead>
<tr>
<th>Length Code</th>
<th>Meters</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>M010</td>
</tr>
<tr>
<td>2</td>
<td>M020</td>
</tr>
<tr>
<td>5</td>
<td>M050</td>
</tr>
<tr>
<td>10</td>
<td>M100</td>
</tr>
</tbody>
</table>

Coupling Nut Option
Stainless Steel . . . . . . 8

Cable Code
W03006A09M0208

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Ultra-Lock® (M12) Double-Ended Cordsets (US)

120080
Female Straight-to-Male Straight, Female Right Angle-to-Male Straight

**Features and Benefits**
- Push-to-lock technology assures fast, reliable connections every time
- Reliable performance in high vibration environments due to positive locking mechanism
- Ideal for wash-down and temporary submersion applications due to improved sealing design
- Ergonomic push to lock mechanism reduces fatigue and user errors when a high number of connections need to be made
- 3, 4, and 5-pole versions are intermateable for added flexibility
- IP67/68/69K rated for harsh environments
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells, cable is weld slag resistant

**Reference Information**
CSA File No.: LR6837 (3, 4, and 5-pole assemblies)

### Physical
- Connector Body: PUR (TPE for K05)
- Contact Carries: Polyamide
- O-ring: Viton (EPDM for E03 cables)
- Coupling Nut: Nickel-plated Brass (Teflon coated for K05)
- Contacts: Copper alloy with Gold over Nickel plating
- Cables: A09—Yellow PVC jacket, 22 AWG PVC conductors, 300V, UL AWM2661
  - K05—Yellow TPE jacket, 22 AWG PVC conductors, 300V, UL PLTC-ER, +10M flex life (torsion and bending)
  - P02—Black PUR/PVC jacket, 24 AWG PVC conductors, 300V, 80C
  - H45—Black PUR jacket, 26 AWG PVC conductors, 300V, 80C UL AWM20549

### Environmental
- Protection: IP67/IP68/IP69K
- NEMA rating: NEMA 6

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length Meters</th>
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</thead>
<tbody>
<tr>
<td>3 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2464</td>
<td>PVC (A09)</td>
<td>22</td>
<td>1.0m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PLTC-ER</td>
<td>TPE (K05)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
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<td>UL 20549</td>
<td>PUR (H45)</td>
<td>26</td>
<td>1.0m</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

**Configuration Code**

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Ultra-Lock® (M12) Double-Ended Cordsets

(US)

120080
Female Straight-to-Male Right Angle, Female Right Angle-to-Male Right Angle

Features and Benefits
- Push-to-lock technology assures fast, reliable connections every time
- Reliable performance in high vibration environments due to positive locking mechanism
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  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells, cable is weld slag resistant

Physical
- Connector Body: PUR (TPE for K05)
- Contact Carries: Polyamide
- O-ring: Viton (EPDM for E03 cables)
- Coupling Nut: Nickel-plated Brass (Teflon coated for K05)
- Contacts: Copper alloy with Gold over Nickel plating
- Cables: A09—Yellow PVC jacket, 22 AWG PVC conductors, 300V, UL AWM2661
  - K05—Yellow TPE jacket, 22 AWG PVC conductors, 300V, UL PLTC-ER, +10M flex life (torsion and bending)
  - P02—Black PUR/PVC jacket, 24 AWG PVC conductors, 300V, 80C
  - H45—Black PUR jacket, 26 AWG PVC conductors, 300V, 80C UL AWM20549

Environmental
- Protection: IP67/IP68/IP69K
- NEMA rating: NEMA 6

Reference Information
CSA File No.: LR6837 (3, 4, and 5-pole assemblies)

### Features and Benefits

<table>
<thead>
<tr>
<th>Pole Numbers</th>
<th>Current</th>
<th>Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Wire Size</th>
<th>Length</th>
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<td>UL 2464</td>
<td>PVC (A09)</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

**Configuration Code**

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**Coupling Nut Option**
- Stainless Steel . . . . . . 8

**Cable Code**
- WW3032A09M010
- WW3032A09M020
- WW3032A09M050
- WW3032A09M100
**Features and Benefits**
- Push-to-lock technology assures fast, reliable connections every time
- Reliable performance in high vibration environments due to positive locking mechanism
- Ideal for wash-down and temporary submersion applications due to improved sealing design
- Ergonomic push to lock mechanism reduces fatigue and user errors when a high number of connections need to be made
- Shielding thru coupling offers complete EMI protection to electrical noise
- IP67/68/69K rated for harsh environments

**Physical**
- Connector Body: PUR
- Contact Carries: Polyamide
- O-ring: Viton
- Coupling: Nut Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Shielding: Braid Shield on cable connected to coupler, providing complete shielding thru connector interface
- Cables: P19—Black PUR jacket with Braid Shield, 85% coverage, 24 AWG PVC conductors, 300V, 90C
  - P45—Black PUR jacket with Braid Shield, 80% coverage, 26 AWG PVC conductors, 300V, 80C, UL AWM 20549

**Environmental**
- Protection: IP67/IP68/IP69K
- NEMA rating: NEMA 6

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<th>Male Straight</th>
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Note: Sales drawings for all standard order numbers are available on molex.com

**Configuration Code**
- Build-a-Part Number
- WW8S30P19M010
- WW8S30P45M010

**Coupling Nut Option**
- Stainless Steel...8

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Ultra-Lock® (M12) Receptacles
(US)

120084 Female Front Panel Mount, Back Panel Mount

Features and Benefits
- M12 single keyway (A-Coded) IEC compliant panel mount receptacles with Ultra-Lock feature
- Mates with standard threaded M12 and Ultra-Lock cordsets
- Available in 4, 5, 8 and 12-pole configurations
- Fully potted assemblies provide IP67/68 protection for harsh environments
- Available in an array of configurations to fit your needs:
  - Various mounting thread sizes, including pipe threads for direct mounting on pipe fittings
  - Front panel mounts for installing from the outside of the enclosure
  - Back panel mount from inside the enclosure
  - Wire leads for terminating to terminal strips or PCB tails to incorporate with electronics

Reference Information
- cCSAus Certified LR6837 (4-5 pole)

Physical
- Shell Material: Nickel-plated Brass
- Contact Carries: Poliamide
- O-Ring: M12—Red Viton, Panel—Black Viton
- Contacts: Copper alloy with Gold over Nickel plating
- Wire PVC Insulation: 300V, 80°C, UL1061

Environmental
- Protection: IP67
- NEMA Rating: NEMA 6

Configuration

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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*

Build-a-Part Number

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Ultra-Lock® (M12) Receptacles (US)

120084 Male Front Panel Mount, Back Panel Mount

Features and Benefits
- M12 single keyway (A-Coded) IEC compliant panel mount receptacles with Ultra-Lock feature
- Mates with standard threaded M12 and Ultra-Lock cordsets
- Available in 4, 5, 8 and 12-pole configurations
- Fully potted assemblies provide IP67/68 protection for harsh environments
- Available in an array of configurations to fit your needs:
  - Various mounting thread sizes, including pipe threads for direct mounting on pipe fittings
  - Front panel mounts for installing from the outside of the enclosure
  - Back panel mount from inside the enclosure
  - Wire leads for terminating to terminal strips or PCB tails to incorporate with electronics

Reference Information
- cCSAus Certified LR6837 (4-5 pole)
- Physical
  - Shell Material: Nickel-plated Brass
  - Contact Carriers: Polyamide
  - O-Ring: Panel—Black Viton
  - Contacts: Copper alloy with Gold over Nickel plating
  - Wire PVC Insulation: 300V, 80°C, UL1061
  - 4, 5 pole—22 AWG
  - 8 pole—24 AWG
  - 12 pole—26 AWG

Environmental
- Protection: IP67
- NEMA Rating: NEMA 6

Configuration Code
Build-a-Part Number

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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code: WR4006A18C3003
**Features and Benefits**
- Allows field termination of cables to Ultra-Lock, push-to-lock connector
- Preassembled contact carries with screw terminals provides easy field termination of conductors
- Available in 4 and 5-pole versions
- Back end housing and cable gland provides IP67 protection and strain relief

**Physical**
- Connector Body: PA
- Contact Carries: PA
- O-ring: Viton
- Coupling Nut: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Termination: Screw down terminals, accepts conductors up to 18 AWG (0.75mm²)

**Environmental**
- Protection: IP67/IP68/IP69K
- NEMA Rating: NEMA 6

### Female Connectors

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<th>Poles</th>
<th>Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Diameter Range</th>
<th>Female Straight</th>
<th>Female Right Angle</th>
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Note: Sales drawings for all standard order numbers are available on molex.com

### Male Connectors

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Brad® Ultra-Lock® (M12) Splitter Cordsets

(US)

120080

Female Straight-to-Male Right Angle
Female Right Angle-to-Male Straight

Features and Benefits
- Splitters permit the connection of two I/O devices to a Brad Ultra-lock port on dual-wired distribution boxes
- Push-to-lock technology assures fast, reliable connections every time
- IP67/68 rated for harsh environments
- Reliable performance in high vibration environments due to positive locking mechanism
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Ultra-Lock-to-Ultra-Lock Splitters

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<tr>
<th>Wiring Schematic</th>
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<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
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<td>PCTC-ER TPE (K05)</td>
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Ultra-Lock-to-Micro-Change® Splitters

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<th>Wiring Schematic</th>
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<th>Max. Voltage</th>
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<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
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Note: Sales drawings for all standard order numbers are available on molex.com
*Teflon is a trademark of DuPont

Physical
Connector Body: PUR (TPE for K05)
Contact Carries: Polyamide
O-ring: Viton (EPDM for A09 cables)
Coupling Nut: Nickel-plated Brass (Teflon® coated for K05)
Contacts: Copper alloy with Gold over Nickel plating
Cables: A09—Yellow PVC jacket, 22 AWG PVC conductors, 300V, UL AWMA2661
K05—Yellow TPE jacket, 22 AWG PVC conductors, 300V, UL PCTC-ER, +10M flex life (torsion and bending)

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Configuration Code* Build-a-Part Number

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Ultra-Lock® (M12) Distribution Boxes
(US)
120119/130008
Top Mount, Single-Wired Ports
With Brad® Mini-Change® HR Connector

Features and Benefits
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Accepts Ultra-Lock and threaded M12 cordsets
- One input/output per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Mini-Change home run connector for easy replacement

Electrical
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

Physical
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Home Run Connector: Mini-Change 12-pole male connector
Wiring Configuration: Single I/O, M12 4-pole female port

Environmental
Protection: IP67
NEMA Rating: NEMA 6

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<th>Box Configuration</th>
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Suggested Home Run Cordset
Mini-Change 12-pole Female Cordset

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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Ultra-Lock® (M12) Distribution Boxes (US)

120119/130008
Top Mount, Dual-Wired Ports
With Brad® Mini-Change®
HR Connector

**Features and Benefits**
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Accepts Ultra-Lock and threaded M12 cordsets
- Two input/outputs per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Mini-Change home run connector for easy replacement

**Electrical**
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

<table>
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<th>Part Configuration</th>
<th>Box Configuration</th>
<th>Parts</th>
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<th>For Sensor</th>
<th>Top Mount</th>
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**Physical**
- Housing: PBT
- Port Shell Material: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Home Run Connector: Mini-Change 19-pole male connector
- Wiring Configuration: Dual I/O, M12 5-pole female port

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

**Suggested Home Run Cordset**
Brad Mini-Change 19-pole Female Cordset

<table>
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<tr>
<th>Use With</th>
<th>Cable Jacket</th>
<th>No. of Conductors</th>
<th>Construction</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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<tbody>
<tr>
<td>4 and 6 port blocks</td>
<td>PUR</td>
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<td>12 × 0.34mm² + 3 × 0.75mm²</td>
<td>10.0m</td>
<td>303201P80M100</td>
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<td>19</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

**Configuration Code**
*Build-a-Part Number*

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*Once an engineering number is created using the configuration code, consult Molex Tech Support for information regarding any part numbers.*
Brad® Ultra-Lock® (M12) Distribution Boxes (US)

120094
Top Mount, Single-Wired Ports With M23 HR Connector

Features and Benefits
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Accepts Ultra-Lock and threaded M12 cordsets
- One input/output per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- M23 home run connector for easy replacement

Electrical
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

Physical
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Home Run Connector: M23 12-pole male connector
Wiring Configuration: Single I/O, M12 4-pole female port

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
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<th>Box Configuration</th>
<th>Parts</th>
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<th>For Sensor</th>
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Suggested Home Run Cable Assemblies
M23 12-pole Female Cordset and Field Attachable Connector

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<th>Use With</th>
<th>Cable Jacket</th>
<th>No. of Conductors</th>
<th>Construction</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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<tbody>
<tr>
<td>4 port</td>
<td>PUR</td>
<td>7</td>
<td>4 × 0.34mm² + 3 × 0.75mm²</td>
<td>10.0m</td>
<td>K02301P80M100</td>
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<tr>
<td>6 port</td>
<td></td>
<td>9</td>
<td>6 × 0.34mm² + 3 × 0.75mm²</td>
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<td>120094-8013</td>
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<tr>
<td>8 port</td>
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<td>11</td>
<td>8 × 0.34mm² + 3 × 0.75mm²</td>
<td></td>
<td>K02101P80M100</td>
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<tr>
<td>All</td>
<td>M23 12p Female Field Attachable Kit</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

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K02101P80M100

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Ultra-Lock® (M12) Distribution Boxes (US)
120119/120055
Top Mount, Dual-Wired Ports With M23 HR Connector

Features and Benefits
• Fully potted, factory assembled boxes simplify on machine wiring installations
• Accepts Ultra-Lock and threaded M12 cordsets
• Two input/outputs per port
• Indicating LEDs for power and sensor trigger indication
• Versions available for use with PNP and NPN sensors
• M23 home run connector for easy replacement

Electrical
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

Physical
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Home Run Connector: M23 19-pole male connector
Wiring Configuration: Dual I/O, M12 5-pole female port

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Port Configuration | Box Configuration | Ports | LED Indicator | For Sensor | Top Mount Engineering No. | Standard Order No.
--- | --- | --- | --- | --- | --- | ---
| | | | | | | 
4 | No | BKY4030-FBC | 120119-0038 |
8 | | BKY8030-FBC | 120055-0925 |
4 | Yes | BKY403P-FBC | 120119-0006 |
8 | | BKY803P-FBC | 120119-0021 |

Suggested Home Run Cable Assemblies M23 19-pole Female Cordset and Field Attachable Connector

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<th>Cable Jacket</th>
<th>No. of Conductors</th>
<th>Construction</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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<tr>
<td>4 port</td>
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<td>11</td>
<td>(8 \times 0.34\text{mm}^2 + 3 \times 0.75\text{mm}^2)</td>
<td>10.0m</td>
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<td>120094-8045</td>
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<td>15</td>
<td>(12 \times 0.34\text{mm}^2 + 3 \times 0.75\text{mm}^2)</td>
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<td>120094-8027</td>
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<tr>
<td>8 port</td>
<td></td>
<td>19</td>
<td>(16 \times 0.34\text{mm}^2 + 3 \times 0.75\text{mm}^2)</td>
<td></td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code
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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**Features and Benefits**
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Accepts Ultra-Lock and threaded M12 cordsets
- Two input/outputs per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Home run terminal strip provides greatest flexibility for cable choices and trimming to length on machine

**Electrical**
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

**Physical**
- Housing: PBT
- Port Shell Material: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Home Run Connector: Terminal strip
- Wiring Configuration: Dual I/O, M12 5-pole female

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

---

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Box Configuration</th>
<th>Ports</th>
<th>LED Indicator</th>
<th>For Sensor</th>
<th>Top Mount</th>
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</table>
Brad® Ultra-Lock® (M12) Distribution Boxes (US)

120119
Top Mount, Single-Wired Ports With PUR HR Cable

Features and Benefits

- Fully potted, factory assembled boxes simplify on machine wiring installations
- Accepts Ultra-Lock and threaded M12 cordsets
- One input/output per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Integral home run cable eliminates need for purchase of additional component for installation

Electrical

Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

Physical

Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Wiring Configuration: Single I/O, M12 4-pole female port
Home Run Cable: Black PUR cable, conductors:
- 4 port—4 x 0.34mm² + 3 x 0.75 mm²
- 6 port—6 x 0.34mm² + 3 x 0.75 mm²
- 8 port—8 x 0.34mm² + 3 x 0.74 mm²

Environmental

Protection: IP67
NEMA Rating: NEMA 6

<table>
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<th>Port Configuration</th>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*

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</table>

BKY800P-FBP-05

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Features and Benefits
• Fully potted, factory assembled boxes simplify on machine wiring installations
• Accepts Ultra-Lock and threaded M12 cordsets
• Two input/outputs per port
• Indicating LEDs for power and sensor trigger indication
• Versions available for use with PNP and NPN sensors
• Integral home run cable eliminates need for purchase of additional component for installation

Electrical
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
          Port—4.0A max.

Physical
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Wiring Configuration: Dual I/O, M12 5-pole female port
Home Run Cable: Black PUR cable, conductors:
  4 port—8 × 0.34mm² + 3 × 0.75 mm²
  6 port—12 × 0.34mm² + 3 × 0.75 mm²
  8 port—16 × 0.34mm² + 3 × 0.74 mm²

Environmental
Protection: IP67
NEMA Rating: NEMA 6

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<th>Port Configuration</th>
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<th>Cable Length</th>
<th>Top Mount</th>
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Note: Sales drawings for all standard order numbers are available on molex.com

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Ultra-Lock® (M12) Distribution Boxes (US)

120119

Top Mount, Dual-Wired Ports with Molded Brad® Mini-Change® HR Cordset

Features and Benefits
• Fully potted, factory assembled boxes simplify on machine wiring installations
• Accepts Ultra-Lock and threaded M12 cordsets
• Two input/outputs per port
• Indicating LEDs for power and sensor trigger indication
• Versions available for use with PNP and NPN sensors
• Integral home run cordset with Mini-Change 19-pole male connector provides easy replacement

Electrical
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

Physical
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Wiring Configuration: Dual I/O, M12 5-pole female port
Home Run Cable: Black PUR cable, conductors:
  4 port—8 × 0.34mm² + 3 × 0.75 mm²
  6 port—12 × 0.34mm² + 3 × 0.75 mm²
  8 port—16 × 0.34mm² + 3 × 0.74 mm²

Environmental
Protection: IP67
NEMA Rating: NEMA 6

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<tr>
<th>Port Configuration</th>
<th>Box Configuration</th>
<th>Ports</th>
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BKY4010-FBP-01

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Micro-Change® (M12) Connectors

UNITED STATES (also includes Canada, Mexico and South America)

Rugged Micro-Change® connectors provide a high-pin-density, M12 solution that is ideal for use in industrial and harsh commercial environments.

Brad Micro-Change products are Molex’s offering of rugged, high-circuit density, industry-standard M12 circular connectors for industrial automation applications.

Micro-Change connectors are designed to withstand harsh industrial environments and their superior quality assures a very reliable connection for control elements in automated equipment. These IEC 61076-2-101-compliant connectors allow fast and simple connections to 12.00 and 18.00mm sensors, encoders, switches and other input and output devices in industrial machinery.

Brad’s complete line of M12 connectivity provides a quick-connect wiring system that eliminates field-install cabinets and minimizes field wiring termination errors.

Features and Benefits

Cordsets
- Available in 3, 4, 5, 8 and 12 poles; in single and dual-key configurations; with or without LEDs; in straight and 90 degrees; and with different coupling nut materials to provide a wide variety of options to meet application requirements
- Internmates with industry standard M12 devices that comply with IEC 61076-2-101
- Rugged, IP68 rated watertight connector is well suited for harsh, wet environments
- Patented, anti-vibration feature prevents back-out in applications that experience high vibration and mechanical shock
- Gold-over-nickel-plated contacts provide a durable, corrosion-resistant plating that maintains low electrical resistance throughout the life of the connector

Receptacles, Field Attachables and Accessories
- Large selection of configurations to fit your panel or device design, including front- and back-panel-mount receptacles in a variety of materials, with PCB or wire leads
- Epoxy potted receptacles are IP67- and IP68-rated, and are ideal for rugged industrial environments
- 3-5p field-attachable connectors with screw-down terminals for easy field installation, allow users to make their own cable assemblies for a custom fit to a machine or application

Distribution Boxes
- Available in 4-, 6- and 8-port distribution boxes; single and dual I/O versions. These pre-wired junction boxes comprise the Molex quick-connect wiring system for I/O devices. They eliminate the need for field-installed junction boxes, providing improved wire management
- Fully potted housing ensures performance in high vibration and wet environment applications
- Rugged and compact to allow placement in tight places

Applications
- Proximity switches, photo eyes, safety switches and other I/O connectivity
- Connector interface for IP69-rated devices
- Connectivity for devices in high-vibration environments
- Connections requiring blind-mating
Brad® Micro-Change® (M12) A-Code Single-Ended Cordsets (US)

**120065**

Female, Pigtail Straight, Right Angle

**Features and Benefits**
- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
- 3, 4, and 5-pole versions are intermateable for added flexibility
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

**Reference Information**
UL File No.: E152210
CSA File No.: LR6837

**Physical**
Connector Body: PUR (TPE for K05)
Contact Carriers: Polyamide
O-ring: Viton (EPDM for A09 cables)
Coupling Nut: Nickel-plated Brass (Teflon coated for K05)
Contacts: Copper alloy with Gold over Nickel plating
Cables: A09—Yellow PVC jacket, 22 AWG PVC conductors, 300V, UL AWM2661
  K05—Yellow TPE jacket, 22 AWG PVC conductors, 300V, UL PLTC-ER, +10M flex life (torsion and bending)

**Environmental**
Protection: IP67
NEMA Rating: NEMA 6

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**Coupling Nut Option**
Stainless Steel . . . . . 8

**Note:** Sales drawings for all standard order numbers are available on molex.com

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
# Brad® Micro-Change® (M12) A-Code

**Single-Ended Cordsets (US)**

**120065 Female, Pigtail Straight, Right Angle**

**Features and Benefits**
- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
- 3, 4, and 5-pole versions are intermateable for added flexibility
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

## Physical
- Connector Body: PUR
- Contact Carries: Polyamide
- O-ring: Viton
- Coupling Nut: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Cables: P02—Black PUR/PVC jacket, 24 AWG PVC conductors, 300V
  - H45—Black PUR jacket, 26 AWG PVC conductors, 300V, UL AWM20549

## Environmental
- Protection: IP67
- NEMA Rating: NEMA 6

### Cable Specifications

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<th>Poles</th>
<th>Max. Current per Contact (A)</th>
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<th>Wire Size AWG</th>
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<th>Standard Order No.</th>
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**Note:** Sales drawings for all standard order numbers are available on molex.com

**Configuration Code**

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**Cable Code**

808000P02M020

**Coupling Nut Option**

Stainless Steel . . . . 8

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.*
Brad® Micro-Change® (M12) A-Code Single-Ended Cordsets (US)

120065 Male, Pigtail Straight, Right Angle

Features and Benefits
- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
- 3, 4, and 5-pole versions are intermateable for added flexibility
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

Reference Information
UL File No.: E152210 (A09 and K05 cable assemblies)
CSA File No.: LR6837 (A09 and K05 cable assemblies)

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<tr>
<th>Poles</th>
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<th>Max. Voltage</th>
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<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
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<th>Male Right Angle</th>
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<td>PVC (A09)</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

Physical
Connector Body: PUR (TPE for K05)
Contact Carries: Polyamide
O-ring: Viton (EPDM for A09 cables)
Coupling Nut: Nickel-plated Brass (Teflon coated for K05)
Contacts: Copper alloy with Gold over Nickel plating
Cables: A09—Yellow PVC jacket, 22 AWG PVC conductors, 300V, UL AWM2661
K05—Yellow TPE jacket, 22 AWG PVC conductors, 300V, UL PLTC-ER, +10M flex life (torsion and bending)

Environmental
Protection: IP67
NEMA Rating: NEMA 6
Features and Benefits
- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
- 3, 4, and 5-pole versions are intermateable for added flexibility
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

Physical
- Connector Body: PUR
- Contact Carries: Polyamide
- O-ring: Viton
- Coupling Nut: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Cables: P02—Black PUR/PVC jacket, 24 AWG PVC conductors, 300V
  - H45—Black PUR jacket, 26 AWG PVC conductors, 300V, UL AWM20549

Environmental
- Protection: IP67
- NEMA Rating: NEMA 6

<table>
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<tr>
<th>Poles</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Male Straight</th>
<th>Male Right Angle</th>
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<tbody>
<tr>
<td>8 Pole</td>
<td>2.0A</td>
<td>30V AC / 36V DC</td>
<td>PUR/PVC (P02)</td>
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<td>12 Pole</td>
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<td>PUR (H45)</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

**Configuration Code**

Build-a-Part Number

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<td>M100</td>
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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Features and Benefits
- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
- 3, 4, and 5-pole versions are intermateable for added flexibility
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

Reference Information
UL File No.: E152210
CSA File No.: LR6837

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<th>Poles (Female View)</th>
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<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Female Straight-to-Male Straight</th>
<th>Female Right Angle-to-Male Straight</th>
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<tbody>
<tr>
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<td>4.0A</td>
<td>250V AC/DC</td>
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<td>UL 2661 PVC (A09)</td>
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<td>2.0m</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Environmental Protection: IP67
NEMA Rating: NEMA 6

Configuration Code*
Build-a-Part Number

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<td>5</td>
<td>M050</td>
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</table>

Coupling Nut Option
Stainless Steel . . . . 8

Cable Code
883030A09M0108

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Micro-Change® (M12) A-Code
Double-Ended Cordsets (US)

120066
Female Straight-to-Male Straight, Female Right Angle-to-Male Straight

Features and Benefits
- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
- 3, 4, and 5-pole versions are intermateable for added flexibility
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

Physical
- Connector Body: PUR
- Contact Carries: Polyamide
- O-ring: Viton
- Coupling Nut: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Cables:
  - PD02—Black PUR/PVC jacket, 24 AWG PVC conductors, 300V
  - HD5—Black PUR jacket, 26 AWG PVC conductors, 300V, UL AWM20549

Environmental
- Protection: IP67
- NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Female Straight-to-Male Straight</th>
<th>Female Right Angle-to-Male Straight</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 Pole</td>
<td>2.0A</td>
<td>30V AC / 36V DC</td>
<td>PUR/PVC (P02)</td>
<td>24</td>
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<tr>
<td>12 Pole</td>
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Configuration Code*
Build-a-Part Number

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  - 1 M010
  - 2 M020
  - 3 M030
  - 4 M040
  - 5 M050

- Cable Code
  - 888030P02

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**Features and Benefits**
- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
- 3, 4, and 5-pole versions are intermateable for added flexibility
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

**Reference Information**
UL File No.: E152210
CSA File No.: LR6837

**Physical**
- Connector Body: PUR (TPE for K05)
- Contact Carries: Polyamide
- O-ring: Viton (EPDM for A09 cables)
- Coupling Nut: Nickel-plated Brass (Teflon coated for K05)
- Contacts: Copper alloy with Gold over Nickel plating
- Cables: A09—Yellow PVC jacket, 22 AWG PVC conductors, 300V, UL AWM2661
- K05—Yellow TPE jacket, 22 AWG PVC conductors, 300V, UL PLTC-ER, +10M flex life (torsion and bending)

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

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<th>Poles (Female View)</th>
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<th>Max. Voltage</th>
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<th>Cable Jacket (Code)</th>
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<th>Female Straight-to-Male Right Angle</th>
<th>Female Right Angle-to-Male Right Angle</th>
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Note: Sales drawings for all standard order numbers are available on molex.com

**Configuration Code**
Build-a-Part Number

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**Cable Code**
883032A09M0108

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Features and Benefits

- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
- 3, 4, and 5-pole versions are intermateable for added flexibility
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

Physical

- Connector Body: PUR
- Contact Carries: Polyamide
- O-ring: Viton
- Coupling Nut: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Cables: P02—Black PUR/PVC jacket, 24 AWG PVC conductors, 300V
  - H45—Black PUR jacket, 26 AWG PVC conductors, 300V, UL AWM20549

Environmental

- Protection: IP67
- NEMA Rating: NEMA 6

### Table: Brad® Micro-Change® (M12) A-Code Double-Ended Cordsets (US)

<table>
<thead>
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<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Female Straight-to-Male Right Angle</th>
<th>Female Right Angle-to-Male Right Angle</th>
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<td>8 Pole</td>
<td>2.0A</td>
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<td>PUR/PVC (P02)</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

### Configuration Code

**Build-a-Part Number**

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</table>

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.*
Brad® Micro-Change® (M12)  
A-Code  
Single-Ended Cordsets (US)  
120067  
Female, Pigtail  
Straight, Right Angle  
With LEDs

Features and Benefits
• M12 single keyway (A-Coded) IEC compliant cordset assemblies  
• LEDs for power and signal trigger indicator for PNP sensors (for NPN sensors also available)  
• IP67/68 rated for harsh environments  
• Patented anti-vibration feature to prevent loosening under high vibration applications  
• Wide selection of cables to fit applications  
  - PVC cables for light, cost sensitive industrial applications  
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils  
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

Reference Information  
UL File No.: E152210  
CSA File No.: LR6837

Physical
Connector Body: PUR (TPE for K05)  
Contact Carriers: Polyamide  
O-ring: Viton (EPDM for A09 cables)  
Coupling Nut: Nickel-plated Brass (Teflon coated for K05)  
Contacts: Copper alloy with Gold over Nickel plating  
LEDs: Green—Power  
Yellow—Sensor/output trigger  
Cables: A09—Yellow PVC jacket, 22 AWG PVC conductors, 300V, UL AW2661  
B03—Black PUR jacket, 22 AWG PVC conductors, 300V, UL AW21198  
K05—Yellow TPE jacket, 22 AWG PVC conductors, 300V, UL PLTC-ER, +10M flex life (torsion and bending)

Environmental  
Protection: IP67  
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Poles</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size</th>
<th>Length</th>
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<tbody>
<tr>
<td>3 Poles/1 LED</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2661</td>
<td>PVC (A09)</td>
<td>22</td>
<td>2.0m</td>
</tr>
<tr>
<td>4 Poles/1 LED</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2661</td>
<td>PVC (A09)</td>
<td>22</td>
<td>2.0m</td>
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<th>Cable Jacket (Cable Code)</th>
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<tr>
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<td>PUR (B03)</td>
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<td>PUR (B03)</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code  
Build-a-Part Number

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<td>10</td>
<td>M100</td>
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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Micro-Change® (M12) A-Code
Double-Ended Cordsets (US)

120067
Female Straight-to-Male Straight with LEDs, Female Right Angle-to-Male Straight with LEDs

Features and Benefits
- M12 single keyway (A-Coded) IEC compliant cordset assemblies
- LEDs for power and signal trigger indicator for PNP sensors (for NPN sensors also available)
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Physical
Connector Body: PUR (TPE for K05)
Contact Carries: Polyamide
O-ring: Viton (EPDM for A09 cables)
Coupling Nut: Nickel-plated Brass (Teflon coated for K05)
Contacts: Copper alloy with Gold over Nickel plating
LEDs: Green—Power
Yellow—Sensor/output trigger

Cables: A09—Yellow PVC jacket, 22 AWG PVC conductors, 300V, UL AWM2661
B03—Black PUR jacket, 22 AWG PVC conductors, 300V, UL AWM 21198
K05—Yellow TPE jacket, 22 AWG PVC conductors, 300V, UL PLTC-ER, +10M flex life (torsion and bending)

Environmental
Protection: IP67
NEMA Rating: NEMA 6

### Poles (Female View)

<table>
<thead>
<tr>
<th>Poles/LED</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Female Straight-to-Male Straight</th>
<th>Female Right Angle-to-Male Straight</th>
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</thead>
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<tr>
<td>3 poles/1 LED</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2661 PVC (A09)</td>
<td>PVC (A09)</td>
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<td>PUR (B03)</td>
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<td>120067-5233</td>
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<td>PLTC-ER TPE (K05)</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Environmental Protection: IP67
NEMA Rating: NEMA 6
Features and Benefits
- M12 single keyway (A-Coded) IEC compliant cordset assemblies
- LEDs for power and signal trigger indicator for PNP sensors (for NPN sensors also available)
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Environmental
Protection: IP67
NEMA Rating: NEMA 6

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<th>Cable Jacket (Cable Code)</th>
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<th>Female Right Angle-to-Male Right Angle</th>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

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<td>5</td>
<td>M050</td>
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8830P8A09M0108

Coupling Nut Option
Stainless Steel . . . . . 8

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Micro-Change® (M12) A-Code
Receptacles
(US)
120070/120011
Female
Front Panel Mount, Back Panel Mount

Features and Benefits
• M12 Single Keyway (A-Coded) IEC compliant panel mount receptacles
• Available in 3, 4, 5 and 8-pole configurations
• Fully potted assemblies provide IP67/68 protection for harsh environments
• Available in an array of configurations to fit your needs:
  - Various mounting thread sizes, including pipe threads for direct mounting on pipe fittings
  - Front panel mounts for installing from the outside of the enclosure
  - Back panel mount from inside the enclosure
  - Wire leads for terminating to terminal strips or PCB tails to incorporate with electronics

Reference Information
UL File No.: E1 52210
CSA File No.: LR6837

Physical
Shell Material: Nickel-plated Brass (PG9 style)
Zinc/Nickel-plated (1/2" style)
Anodized Alum (1/4" style)
Contact Carriers: Polyamide
O-Ring: M12—Red Viton
Panel—Black Viton
Contacts: Copper alloy with Gold over Nickel plating
Wire PVC Insulation: 300V, 80C, UL1061, 22 AWG (3-5 pole)
and 24 AWG (8 pole)

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Configuration</th>
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<th>Wire Size</th>
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<td>PVC leads, UL1061</td>
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<td>1/4-18 NPT, Front Panel Mount</td>
<td>PVC leads, UL1061</td>
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<td>PG9, Front Panel Mount</td>
<td>PVC leads, UL1061</td>
<td>24 AWG</td>
<td>0.3m</td>
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<td>PG9, Back Panel Mount</td>
<td>PCB Pins</td>
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Table:

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<tbody>
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<td>3 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>8R3000A18A120</td>
<td>120070-5200</td>
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<td>120070-5203</td>
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<td>4 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>8R4000A18A120</td>
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<td>BR400A18A120</td>
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<td>8R4J400013</td>
<td>120011-0237</td>
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<td>5 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>8R5000A18A120</td>
<td>120070-5206</td>
<td>BR500A18A120</td>
<td>120070-0201</td>
<td>8R5J400013</td>
<td>120011-0238</td>
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<td>8 Pole</td>
<td>2.0A</td>
<td>30V AC / 36V DC</td>
<td>8R8J20E02C3003</td>
<td>120070-5210</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code
Build-a-Part Number
8R3000A18A120

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

www.molex.com
Brad® Micro-Change® (M12) A-Code Receptacles (US)

120070/120011
Male
Front Panel Mount, Back Panel Mount

**Features and Benefits**
- M12 Single Keyway (A-Coded) IEC compliant panel mount receptacles
- Available in 3, 4, 5 and 8-pole configurations
- Fully potted assemblies provide IP67/68 protection for harsh environments
- Available in an array of configurations to fit your needs:
  - Various mounting thread sizes, including pipe threads for direct mounting on pipe fittings
  - Front panel mounts for installing from the outside of the enclosure
  - Back panel mount from inside the enclosure
  - Wire leads for terminating to terminal strips or PCB tails to incorporate with electronics

**Physical**
- Shell Material: Nickel-plated Brass (PG9 style)
  - Anodized Alum (1/2" style)
- Contact Carriers: Polyamide
- O-Ring: Panel—Black Viton
- Contacts: Copper alloy with Gold over Nickel plating
- Wire PVC Insulation: 300V, 80°C, UL1061, 22 AWG (3-5 pole) and 24 AWG (8 pole)

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

**Reference Information**
- UL File No.: E152210
- CSA File No.: LR6837

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### Configuration Chart

**Configuration**
- 1/2-14NPT, Front Panel Mount PG9, Front Panel Mount PG9, Back Panel Mount

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<td>3 Pole 2</td>
<td>4.0A</td>
<td>250V AC/DC</td>
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<td>4.0A</td>
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<td>22 AWG</td>
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<td>5 Pole 2</td>
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<td>24 AWG</td>
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<tr>
<td>8 Pole 1</td>
<td>2.0A</td>
<td>30V AC / 36V DC</td>
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<td>120070-5209</td>
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<td>8 Pole 2</td>
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<td>24 AWG</td>
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**Note:** Sales drawings for all standard order numbers are available on molex.com

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### Configuration Code*

**Build-a-Part Number**

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Micro-Change® (M12) A-Code
Field Attachable Connectors (US)

120071
Female, Male Straight, Right Angle

Features and Benefits
- Allows field termination of cables to IEC complaint M12 A-coded connector
- Preassembled contact carries with screw terminals provides easy field termination of conductors
- Available in 4 and 5-pole versions
- Back end housing and cable gland provides IP67 protection and strain relief

Physical
Connector Body: PA
Contact Carries: PA
O-ring: Viton
Coupling Nut: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Termination: Screw down terminals, accepts conductors up to 18 AWG (0.75mm²)

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Female Connectors

<table>
<thead>
<tr>
<th>Poles</th>
<th>Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Diameter Range</th>
<th>Female Straight</th>
<th>Female Right Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>4.0A</td>
<td>250V AC 300V DC</td>
<td>3.30-6.60mm (.130-.260&quot;)</td>
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<td>8A4001-31 120071-0037</td>
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<td>4</td>
<td>4.0A</td>
<td>30V AC 36V DC</td>
<td>4.10-8.10mm (.161-.319&quot;)</td>
<td>8A5000-31 120071-0041</td>
<td>8A5001-31 120071-0044</td>
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Male Connectors

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<tr>
<th>Poles</th>
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<th>Max. Voltage</th>
<th>Cable Diameter Range</th>
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<th>Male Right Angle</th>
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<td>3.30-6.60mm (.130-.260&quot;)</td>
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Note: Sales drawings for all standard order numbers are available on molex.com
**Features and Benefits**

- Solid body splitters allow you to create a customized wiring scheme, either by combining two 3 conductor cables into a 5 conductor cable or implementing a trunk-and-drop wiring topology.
- Splitters permit the connection of two I/O devices to a port on dual-wired distribution boxes.
- Parallel wired tees allows for tapping into a cable run or implementing a trunk and drop wiring scheme.

**Electrical**

Voltage: 30V  
Amperage: 4.0A

**Physical**

Connector Body: PUR (PVC for grey or yellow splitters)  
Contact Carries: PUR  
O-ring: Viton  
Coupling Nut: Nickel-plated Brass  
Contacts: Copper alloy with Gold over Nickel plating

**Environmental**

Protection: IP67  
NEMA Rating: NEMA 6

---

**M12 Splitters**

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**Paralleled Wired Tees/Splitters**

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</table>
Brad® Micro-Change® (M12) A-Code Splitter Cordsets (US)

120068 Female Straight-to-Male Straight, Female Right Angle-to-Male Straight

Features and Benefits

- Features and Benefits
- Splitters permit the connection of two I/O devices to an Ultra-Lock® port on dual-wired distribution boxes
- Push-to-lock technology assures fast, reliable connections every time
- IP67/68 rated for harsh environments
- Reliable performance in high vibration environments due to positive locking mechanism
- Wide selection of cables to fit applications
  - PVC cables for light, cost-sensitive industrial applications
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

Reference Information

UL File No.: E152210
CSA File No.: LR6837

Physical

Connector Body: PUR (TPE for K05)
Contact Carries: Polyamide
O-ring: Viton (EPDM for A09 cables)
Coupling Nut: Nickel-plated Brass (Teflon® coated for K05)
Contacts: Copper alloy with Gold over Nickel plating
Cables: A09—Yellow PVC jacket, 22 AWG PVC conductors, 300V, UL AWM2661
K05—Yellow TPE jacket, 22 AWG PVC conductors, 300V, UL PVT-ER, +10M flex life (torsion and bending)

Environmental

Protection: IP67
NEMA Rating: NEMA 6

Wiring Schematic

<table>
<thead>
<tr>
<th>Wiring Schematic</th>
<th>Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Female Straight-to-Male Straight</th>
<th>Female Right Angle-to-Male Straight</th>
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<tbody>
<tr>
<td></td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2661</td>
<td>PVC (A09)</td>
<td>22</td>
<td>0.3m</td>
<td>884A30A09M003</td>
<td>884A31A09M003</td>
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<td></td>
<td></td>
<td></td>
<td>PLTC-ER</td>
<td></td>
<td>0.6m</td>
<td>884A30K05M003</td>
<td>884A31K05M003</td>
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Note: Sales drawings for all standard order numbers are available on molex.com
*Teflon is a trademark of DuPont

Configuration Code
Build-a-Part Number

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<td>M010</td>
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<td>3.0</td>
<td>M030</td>
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<td>5.0</td>
<td>M050</td>
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</tbody>
</table>

Coupling Nut Option
Stainless Steel . . . . 8

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**Brad® Micro-Change® (M12) Distribution Boxes (US)**

**120114**

Top Mount, Single Wired Ports With Brad® Mini-Change® HR Connector

---

**Features and Benefits**
- Fully potted, factory assembled boxes simplify on-machine wiring installations
- One input/output per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Mini-change home run connector for easy replacement

**Reference Information**
- UL File No.: E152210
- CSA File No.: LR6837

**Electrical**
- Voltage: 10-30V DC max.
- Amperage: Module—12.0A max.
- Port—4.0A max.

---

**Port Configuration** | **Box Configuration** | **Ports** | **LED Indicator** | **For Sensor** | **Engineering No.** | **Standard Order No.**
---|---|---|---|---|---|---
4 | | | | | | 
8 | | | | | | 
4 | | | | | | 
8 | | | | | | 
4 | | | | | | 
8 | | | | | |

---

**Suggested Home Run Cable Assemblies**

**Brad® Mini-Change® 12-pole Female Cordsets**

---

**Configuration Code**

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<tr>
<th>Length</th>
<th>Code</th>
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<td>10</td>
<td>100</td>
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<tr>
<td>15</td>
<td>150</td>
</tr>
</tbody>
</table>

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

---

**Physical**
- Housing: PBT
- Port Shell Material: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Home Run Connector: Mini-Change 12-pole male connector
- Wiring Configuration: Single I/O, M12 4-pole female port

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6
Features and Benefits
• Fully potted, factory assembled boxes simplify on machine wiring installations
• One input/output per port
• Indicating LEDs for power and sensor trigger indication
• Versions available for use with PNP and NPN sensors
• M23 home run connector for easy replacement

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Physical
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Home Run Connector: M23 12-pole male connector
Wiring Configuration: Single I/O, M12 4-pole female port

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Electrical
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

Port Configuration | Box Configuration | Ports | LED Indicator | For Sensor | Engineering No. | Standard Order No.
--- | --- | --- | --- | --- | --- | ---
1 2 3 4 | 4 | No | | | BTY4010-FBC | 120055-0308
1 2 3 4 | 8 | | | | BTY8010-FBC | 120055-0321
1 2 3 4 | 4 | Yes | NPN | | BTY401N-FBC | 120114-0211
1 2 3 4 | 8 | | | | BTY801N-FBC | 120114-0060
1 2 3 4 | 4 | Yes | PNP | | BTY401P-FBC | 120114-0020
1 2 3 4 | 8 | | | | BTY801P-FBC | 120114-0066

Note: Sales drawings for all standard order numbers are available on molex.com

Suggested Home Run Cable Assemblies
M23 12-pole Female Cordsets and Field Attachable Connector

<table>
<thead>
<tr>
<th>Use With</th>
<th>Cable Jacket</th>
<th>No. of Conductors</th>
<th>Cable Construction</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 port block</td>
<td>PUR</td>
<td>2</td>
<td>4 x 0.34mm² + 3 x 0.75mm²</td>
<td>10.0m</td>
<td>K02301P80M100</td>
<td>120094-5023</td>
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<tr>
<td>6 port block</td>
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<td>6 x 0.34mm² + 3 x 0.75mm²</td>
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<td>K02201P80M100</td>
<td>120094-8013</td>
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<tr>
<td>8 port block</td>
<td>PUR</td>
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<td>8 x 0.34mm² + 3 x 0.75mm²</td>
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<td>K02101P80M100</td>
<td>120094-0125</td>
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<tr>
<td>All</td>
<td>M23 12-pole Female Field Attachable Kit</td>
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<td>KASG00-02S</td>
<td>120230-0032</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code
Build-a-Part Number

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K02101P80M100

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

www.molex.com
Brad® Micro-Change® (M12) Distribution Boxes (US)

120114
Top Mount, Dual Wired Ports
With Brad® Mini-Change® HR Connector

Features and Benefits
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Two input/outputs per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Mini-change home run connector for easy replacement

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Electrical
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

Physical
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Home Run Connector: Mini-Change 19-pole male connector
Wiring Configuration: Dual I/O, M12 5-pole female port

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Box Configuration</th>
<th>Ports</th>
<th>LED Indicator</th>
<th>For Sensor</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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<td>BTY803P-FBB</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Suggested Home Run Cable Assemblies
Brad® Mini-Change® 19-pole Female Cordsets

<table>
<thead>
<tr>
<th>Use With</th>
<th>Cable Jacket</th>
<th>No. of Conductors</th>
<th>Cable Construction</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 port block</td>
<td>PUR</td>
<td>15</td>
<td>12 x 0.34mm² + 3 x 0.75mm²</td>
<td>10.0m</td>
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<td>8 port block</td>
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<td></td>
<td>303001P80M100</td>
<td>130008-0316</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

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<td>15</td>
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</table>

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
## Features and Benefits
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Two input/outputs per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- M23 home run connector for easy replacement

## Reference Information
UL File No.: E152210
CSA File No.: LR6837

## Electrical
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

## Physical
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Home Run Connector: M23 19-pole male connector
Wiring Configuration: Dual I/O, M12 5-pole female port

## Environmental
Protection: IP67
NEMA Rating: NEMA 6

---

### Port Configuration Box Configuration Ports LED Indicator For Sensor Engineering No. Standard Order No.

<table>
<thead>
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<th>Ports</th>
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Note: Sales drawings for all standard order numbers are available on molex.com

### Suggested Home Run Cable Assemblies

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<th>Cable Jacket</th>
<th>No. of Conductors</th>
<th>Cable Construction</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
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<tbody>
<tr>
<td>4 port block</td>
<td>PUR</td>
<td>11</td>
<td>8 x 0.34mm² + 3 x 0.75mm²</td>
<td>10.0m</td>
<td>K03301P80M100</td>
<td>120094-8045</td>
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<tr>
<td>6 port block</td>
<td>PUR</td>
<td>15</td>
<td>12 x 0.34mm² + 3 x 0.75mm²</td>
<td>10.0m</td>
<td>K03201P80M100</td>
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<tr>
<td>8 port block</td>
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<td>16 x 0.34mm² + 3 x 0.75mm²</td>
<td>10.0m</td>
<td>K03001P80M100</td>
<td>120094-8044</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

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<table>
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* Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**Features and Benefits**
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Two input/outputs per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Home run terminal strip provides greatest flexibility for cable choices and trimming to length on machine

**Reference Information**
UL File No.: E152210
CSA File No.: LR6837

**Electrical**
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

**Physical**
Housing: PBT
Port Shell Material: Nickel Plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Home Run Connector: Terminal strip
Wiring Configuration: Dual I/O, M12 5-pole female port

**Environmental**
Protection: IP67
NEMA Rating: NEMA 6

---

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Box Configuration</th>
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<th>LED Indicator</th>
<th>For Sensor</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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<td><img src="image3.png" alt="Port Configuration 2" /></td>
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<td>6</td>
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<td><img src="image7.png" alt="Port Configuration 4" /></td>
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<td></td>
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<td>120114-0082</td>
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Brad® Micro-Change® (M12)
Distribution Boxes
(US)
120055/120114
Top Mount, Single Wired Ports
With PUR HR Cable

Features and Benefits
- Fully potted, factory assembled boxes simplify on machine wiring installations
- One input/output per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Integral home run cable eliminates need for purchase of additional component for installation

Electrical
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

Physical
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Wiring Configuration: Single I/O, M12 4-pole female port
Home Run Cable: Black PUR cable, conductors:
4 port—4 x 0.34mm² + 3 x 0.75mm²
6 port—6 x 0.34mm² + 3 x 0.75mm²
8 port—8 x 0.34mm² + 3 x 0.74mm²

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
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<th>Parts</th>
<th>LED Indicator</th>
<th>For Sensor</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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<tr>
<td><img src="image1.png" alt="Part Configuration" /></td>
<td><img src="image2.png" alt="Box Configuration" /></td>
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<td>No</td>
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<td><img src="image3.png" alt="Part Configuration" /></td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

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</tr>
<tr>
<td>15</td>
<td>150</td>
</tr>
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</table>

BTY800P-FBP-05

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**Features and Benefits**
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Two input/outputs per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Integral home run cable eliminates need for purchase of additional component for installing

**Reference Information**
UL File No.: E152210  
CSA File No.: LR6837

**Electrical**
Voltage: 10-30V DC max.  
Amperage: Module—12.0A max.  
Port—4.0A max.

**Physical**
Housing: PBT  
Port Shell Material: Nickel-plated Brass  
Contacts: Copper alloy with Gold over Nickel plating  
Wiring Configuration: Dual I/O, M12 5-pole female port  
Home Run Cable: Black PUR cable, conductors:
  4 port—8 x 0.34mm² + 3 x 0.75mm²  
  6 port—12 x 0.34mm² + 3 x 0.75mm²  
  8 port—16 x 0.34mm² + 3 x 0.74mm²

**Environmental**
Protection: IP67  
NEMA Rating: NEMA 6

<table>
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<th>Box Configuration</th>
<th>Ports</th>
<th>LED Indicator</th>
<th>For Sensor</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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Note: Sales drawings for all standard order numbers are available on molex.com

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
# Brad® Micro-Change® (M12) Distribution Boxes (US)

## 120114
Top Mount, Dual Wired Ports with Molded Brad® Mini-Change® HR Cordset

### Features and Benefits
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Single input/output per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Integral home run cordset with Mini-change 19-pole male connector provides easy replacement

### Reference Information
UL File No.: E152210
CSA File No.: LR6837

### Electrical
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

### Physical
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Wiring Configuration: Dual I/O, M12 5-pole female port
Home Run Cable: Black PUR cable, conductors:
- 4 port—8 x 0.34mm² + 3 x 0.75mm²
- 6 port—12 x 0.34mm² + 3 x 0.75mm²
- 8 port—16 x 0.34mm² + 3 x 0.74mm²

### Environmental
Protection: IP67
NEMA Rating: NEMA 6

### Port Configuration Box Configuration Parts LED Indicator For Sensor Length Engineering No. Standard Order No.

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<th>Box Configuration</th>
<th>Parts</th>
<th>LED Indicator</th>
<th>For Sensor</th>
<th>Length</th>
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### Note:
Sales drawings for all standard order numbers are available on molex.com

**Configuration Code**

**Build-a-Part Number**

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**BTY812P-FBP-05**

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.*
**Features and Benefits**
- Dual-Key connectors with 1/2-20 UNF threaded couplers
- Traditionally used with AC powered sensors
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications:
  - Oil resistant PVC with metallic braid for added mechanical robustness
  - Oil resistant PVC with 18 AWG conductors

**Reference Information**
UL File No.: E152210
CSA File No.: LR6837

**Physical**
- Connector Body: PVC
- Contact Carries: Nylon
- O-ring: Viton
- Coupling Nut: Zinc diecast, black epoxy coated, 1/2-20UNF thread
- Contacts: Copper alloy with Gold over Nickel plating
- Cables: D02—Yellow PVC jacket with 70% metallic braid and 22 AWG PVC conductors, 300V, UL AWM2661
  - A03—Yellow PVC jacket and 18 AWG PVC conductors, 300V, UL AWM2661
- Operating Temperature: -20 to +105°C

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

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<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
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<th>Female Right Angle</th>
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**Configuration Code**
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-Coupling Nut Option

Stainless Steel . . . . . 1

Note: Sales drawings for all standard order numbers are available on molex.com
Brad® Micro-Change®
Dual Key (1/2"-20 UNF)
Single-Ended Cordsets (US)

120072
Male, Pigtail
Straight, Right Angle

Features and Benefits
- Dual-Key connectors with 1/2-20 UNF threaded couplers
- Traditionally used with AC powered sensors
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications:
  - Oil resistant PVC with metallic braid for added mechanical robustness
  - Oil resistant PVC with 18 AWG conductors

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Physical
Connector Body: PVC
Contact Carries: Nylon
O-ring: Viton
Coupling Nut: Zinc diecast, black epoxy coated, 1/2-20UNF thread
Contacts: Copper alloy with Gold over Nickel plating
Cables: D02—Yellow PVC jacket with 70% metallic braid and 22 AWG PVC conductors, 300V, UL AWM2661
A03—Yellow PVC jacket and 18 AWG PVC conductors, 300V, UL AWM2661
Operating Temperature: -20 to +105°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

www.molex.com

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
**Brad® Micro-Change®**
**Dual Key (1/2”-20 UNF)**
**Double-Ended Cordsets (US)**

120073

**Female Straight-to-Male Straight, Female Right Angle-to-Male Straight**

### Features and Benefits
- Dual-Key connectors with 1/2-20 UNF threaded couplers
- Traditionally used with AC powered sensors
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications:
  - Oil resistant PVC with metallic braid for added mechanical robustness
  - Oil resistant PVC with 18 AWG conductors

### Reference Information
- UL File No.: E152210
- CSA File No.: LR6837

### Physical
- Connector Body: PVC
- Contact Carries: Nylon
- O-ring: Viton
- Coupling Nut: Zinc diecast, black epoxy coated, 1/2-20UNF thread
- Contacts: Copper alloy with Gold over Nickel plating
- Cables: D02—Yellow PVC jacket with 70% metallic braid and 22 AWG PVC conductors, 300V, UL AWM2661
  - A03—Yellow PVC jacket and 18 AWG PVC conductors, 300V, UL AWM2661
- Operating Temperature: -20 to +105°C

### Environmental
- Protection: IP67
- NEMA Rating: NEMA 6

### Engineering
- Standard Order No.: 772030D02F030
- Standard Order No.: 772031D02F030

### Cables
- **D02**—Yellow PVC jacket with 70% metallic braid and 22 AWG PVC conductors, 300V, UL AWM2661
- **A03**—Yellow PVC jacket and 18 AWG PVC conductors, 300V, UL AWM2661

### Operating Temperature
- -20 to +105°C

### Configuration Code

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<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
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Note: All standard order numbers are available on molex.com

### Additional Information
- **Cable Code**
  - Length Code
    - 3: F030
    - 6: F060
    - 12: F120
    - 20: F200
- **Coupling Nut Option**
  - Stainless Steel

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

www.molex.com
Brad® Micro-Change®
Dual Key (1/2”-20 UNF)
Double-Ended Cordsets
(US)
120073
Female Straight-to-Male Right Angle, Female Right Angle-to-Male Right Angle

Features and Benefits
- Dual-Key connectors with 1/2-20 UNF threaded couplers
- Traditionally used with AC powered sensors
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications: - Oil resistant PVC with metallic braid for added mechanical robustness - Oil resistant PVC with 18 AWG conductors

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Physical
Connector Body: PVC
Contact Carries: Nylon
O-ring: Viton
Coupling Nut: Zinc diecast, black epoxy coated, 1/2-20UNF thread
Contacts: Copper alloy with Gold over Nickel plating
Cables: D02—Yellow PVC jacket with 70% metallic braid and 22 AWG PVC conductors, 300V, UL AWM2661
A03—Yellow PVC jacket and 18 AWG PVC conductors, 300V, UL AWM2661
Operating Temperature: -20 to +105°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Poles (Female View) Max. Current per Contact Max. Voltage Cable Type Cable Jacket (Cable Code) Wire Size AWG Length Female Straight-to-Male Right Angle Female Right Angle-to-Male Right Angle

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<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Female Straight-to-Male Right Angle</th>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code* Build-a-Part Number

**Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

Configuration Code
Length Code
3 F030
6 F060
12 F120
20 F200

www.molex.com
**Features and Benefits**
- Dual-Key receptacles with 1/2"-20 UNF threaded couplers
- Available in 2 to 5-pole configurations
- Fully potted assemblies provide IP67/68 protection for harsh environments
- Receptacles with wired leads to be used in control panels, junction boxes and sensors. Other configurations also available.

**Reference Information**
UL File No.: E152210
CSA File No.: LR6837

---

**Physical**
Shell Material: Anodized Alum
Contact Carries: Nylon 6/6
O-Ring: M12—Red Viton
Panel—Black Viton
Contacts: Copper alloy with Gold over Nickel plating
Wire PVC insulation: 300V, 80C, UL1061, 22 AWG

**Environmental**
Protection: IP67
NEMA Rating: NEMA 6

---

### Reference Information
- UL File No.: E152210
- CSA File No.: LR6837

---

<table>
<thead>
<tr>
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<tbody>
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<td>2 Pole</td>
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<td>250V AC/DC</td>
<td>7R2A00A19A120</td>
<td>120074-0014</td>
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1 - Brown  2 - Blue

<table>
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<td>120074-0058</td>
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1 - Green gnd  3 - Red-white  2 - Red-black

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<td>120074-0122</td>
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1 - Red-black  3 - Red  2 - Red-white  4 - Green gnd

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<td>7R5A00A19A120</td>
<td>120074-0178</td>
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1 - Red-white  4 - Red-yellow  2 - Red  5 - Red-black  3 - Green gnd

---

**Configuration Code**

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.*

---

**Configuration Code**

Build-a-Part Number

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*Note: Sales drawings for all standard order numbers are available on molex.com*
**Features and Benefits**
- Dual-Key receptacles with 1/2"-20 UNF threaded couplers
- Available in 2 to 5-pole configurations
- Fully potted assemblies provide IP67/68 protection for harsh environments
- Receptacles with wired leads to be used in control panels, junction boxes and sensors. Other configurations also available.

**Reference Information**
- UL File No.: E152210
- CSA File No.: LR6837

**Physical**
- Shell Material: Anodized Alum
- Contact Carries: Nylon 6/6
- O-Ring: Panel—Black Viton
- Contacts: Copper alloy with Gold over Nickel plating
- Wire PVC insulation: 300V, 80C, UL1061, 22 AWG

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6
Brad® Micro-Change®
Dual Key (1/2"-20 UNF)
Field Attachable Connectors
(US)

120075
Female, Male
Straight, Right Angle

Features and Benefits
- Allows field termination of cables to 1/2-20 UNF—Dual Key Connector
- Preassembled contact carries with screw terminals provides easy field termination of conductors
- Back end housing and cable gland provides IP67 protection and strain relief

Physical
Connector Body: PA
Contact Carries: PA
O-ring: Viton
Coupling Nut: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Termination: Screw down terminals, accepts conductors up to 18 AWG (0.75mm²)

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Female Connectors</th>
<th>Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Diameter Range</th>
<th>Female Straight</th>
<th>Female Right Angle</th>
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<td>4.0A</td>
<td>250V AC</td>
<td>3.30-6.60mm (.130-.260&quot;)</td>
<td>7A3000-31</td>
<td>120075-0014</td>
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<td>4.0A</td>
<td>250V AC</td>
<td>4.10-8.10mm (.161-.319&quot;)</td>
<td>7A3000-32</td>
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<table>
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<th>Current per Contact</th>
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<th>Cable Diameter Range</th>
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<td>Poles</td>
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<tr>
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<td>4.0A</td>
<td>250V AC</td>
<td>3.30-6.60mm (.130-.260&quot;)</td>
<td>7A3006-31</td>
<td>120075-0017</td>
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<tr>
<td>1</td>
<td>4.0A</td>
<td>250V AC</td>
<td>4.10-8.10mm (.161-.319&quot;)</td>
<td>7A3006-32</td>
<td>120075-0018</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
Brad® Nano-Change® (M8) Connectors

UNITED STATES (also includes Canada, Mexico and South America)

Brad® Nano-Change® (M8) compact connectors and cordsets from Molex are part of a broad selection of rugged, space-saving cordsets, receptacles, inserts, splitters and molded junction boxes.

Nano-Change connectors meet IEC 61076-2-104 standards and are built “industrial tough” to ensure flexibility, interoperability and rugged performance in tight spaces while minimizing downtime, maintenance and wiring time.

Molex Nano-Change offerings include 3-, 4- and 5-pin designs. The cordsets are available with threaded and snap coupling options. A wide array of cable types provides flexibility to accommodate multiple applications.

The molded junction boxes feature a compact, space-saving design that allows simplification of control wiring systems, providing the opportunity for machine builders to design more modular devices. The Nano-Change cable system provides a way to reduce cable bundling expenses by reducing field install cabinets and field wire terminations.

Features and Benefits

Cordsets
- Available with snap or threaded coupler; single- and double-ended cordsets; 3-, 4- and 5-pole configurations; straight and 90 degrees; with and without LED to give users a wide variety of options to meet their requirements
- Compliant with IEC 61076-2-104, allowing inter mating with industry-standard M8 devices
- IP67 (threaded) and IP65 (snap)-rated connector interfaces provide rugged, watertight connectors that are suited for harsh, wet environments
- Patented anti-vibration feature prevents backout in high-vibration and mechanical shock applications
- Gold-over-nickel-plated contacts feature a durable, corrosion-resistant plating that maintains low electrical resistance through the mate/unmate cycles

Features of Brad® Nano-Change® (M8) Connectors:
- Epoxy-potted, IP67-rated receptacles are ideal for rugged industrial environments
- Field attachable connectors with solder cup terminals allow users to customize their application

Distribution Boxes
- Available in 4-, 6-, 8- and 10-port distribution boxes. Single and dual I/O versions with vertical or horizontal mounting available, giving users a wide variety of options to meet application requirements
- Fully potted housing ensures performance in vibration and fluid environments by providing rugged IP67 (IP68 cabled) rating
- Rugged, compact design allows placement in tight places anywhere on the machine

Applications
- 8.00mm proximity switches
- Miniature photo eyes
- Reed and hall effect switches
- Other miniature I/O devices and sensors
- Robotic end-of-arm tooling
- Specialty sensors semiconductor assembly equipment

Threaded coupler for high degree of environmental protection or snap version for fast mating and unmating
Gold-over-nickel-plated contacts ensure low resistance for reliable electrical contact
PVC and PUR cabling options for a wide variety of heavy-duty and chemical/abrasion-resistant applications
Overmold materials designed for industrial environments; provides stress relief
Nickel-plated brass coupling nut for corrosion resistance
Viton® O-ring prevents harsh chemicals from destroying the integrity of connector seal

Viton® O-ring prevents harsh chemicals from destroying the integrity of connector seal

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123  www.barr-thorp.com
Brad® Nano-Change® (M8) Single-Ended Cordsets (US)

120086 Female, Pigtails Straight, Right Angle Threaded

Features and Benefits
- IEC compliant M8 cordset assemblies with threaded couplers
- Small, compact design for miniature sensors and space-sensitive applications
- Available in 3, 4, and 5-pole versions
- Patented anti-vibration feature to prevent loosening under high vibration applications
- IP67 rated for harsh environments
- LED version provides power and signal trigger indication for PNP sensors (NPN versions available upon request)
- Wide selection of cables to fit applications:
  - PVC cables for light, cost-sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - Other types available upon request

Reference Information
UL File No.: E152210

Physical
Connector Body: TPE (PVC for LED version)
Contact Carries: PBT
O-ring: Viton
Coupling Nut: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Cables: A10—Yellow PVC jacket, 24 AWG PVC conductors, 300V, UL AWM 2661
B09—Black PUR jacket, 24 AWG PVC conductors, 300V, 80°C, UL AWM 20549 (3 conductor) / AWM 21198 (5 conductor)

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Cordset without Indicating LEDs

<table>
<thead>
<tr>
<th>Poles</th>
<th>Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size</th>
<th>Length</th>
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<tbody>
<tr>
<td>3 Pole</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>UL 2661</td>
<td>PVC (A10)</td>
<td>24 AWG</td>
<td>2.0m</td>
</tr>
<tr>
<td>1 - Brown</td>
<td>4 - Black</td>
<td></td>
<td>UL 20549</td>
<td>PUR (B09)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Pole</td>
<td></td>
<td></td>
<td>UL 2661</td>
<td>PVC (A10)</td>
<td>24 AWG</td>
<td>2.0m</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>UL 20549</td>
<td>PUR (B09)</td>
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</tr>
<tr>
<td>1 - Brown</td>
<td>3 - Blue</td>
<td>2 - White</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Pole</td>
<td></td>
<td></td>
<td>UL 2661</td>
<td>PVC (A10)</td>
<td>24 AWG</td>
<td>2.0m</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>UL 2119B</td>
<td>PUR (B09)</td>
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</table>

Cordset with Indicating LEDs

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<tr>
<th>Poles</th>
<th>Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size</th>
<th>Length</th>
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<td>30V AC/DC</td>
<td>UL 2661</td>
<td>PVC (A10)</td>
<td>24 AWG</td>
<td>2.0m</td>
</tr>
<tr>
<td>1 - Brown</td>
<td>3 - Blue</td>
<td></td>
<td>UL 20549</td>
<td>PUR (B09)</td>
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</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

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<td>M050</td>
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<tr>
<td>10</td>
<td>M100</td>
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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Nano-Change® (M8) Single-Ended Cordsets (US)

120086
Male, Pigtailed Straight, Right Angle Threaded

Features and Benefits
- IEC compliant M8 cordset assemblies with threaded couplers
- Small, compact design for miniature sensors and space sensitive applications
- Available in 3, 4, and 5-pole versions
- Patented anti-vibration feature to prevent loosening under high vibration applications
- IP67 rated for harsh environments
- Wide selection of cables to fit applications:
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - Other types available upon request

Reference Information
UL File No.: E152210

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<th>Current per Contact</th>
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<th>Cable Type</th>
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<th>Wire Size</th>
<th>Length</th>
<th>Male Straight</th>
<th>Male Right Angle</th>
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</thead>
<tbody>
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</tr>
<tr>
<td>4 Pole</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4.0A</td>
<td>60V AC / 75V DC</td>
<td>UL 2661 PVC (A10)</td>
<td>24 AWG</td>
<td>2.0m</td>
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<td>2.0m</td>
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<tr>
<td>3.0A</td>
<td>60V AC / 75V DC</td>
<td>UL 2661 PVC (A10)</td>
<td>24 AWG</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

Length | Code
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2 | M020
5 | M050
10 | M100

403006A10M020

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

Physical
- Connector Body: TPE
- Contact Carries: PBT
- O-ring: Viton
- Coupling Nut: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Cables: A10—Yellow PVC jacket, 24 AWG PVC conductors, 300V, UL AWM2661
  - B09—Black PUR jacket, 24AWG PVC conductors, 300V, 80°C, UL AWM 20549 (3 conductor)/AWM 21198 (5 conductor)

Environmental
- Protection: IP67
- NEMA Rating: NEMA 6
Brad® Nano-Change® (M8) Double-Ended Cordsets (US)

**120087**

**Female Straight-to-Male Straight, Female Right Angle-to-Male Straight, Female Straight-to-Male Right Angle, Female Right Angle-to-Male Right Angle**

**Threaded**

---

**Features and Benefits**

- IEC compliant M8 cordset assemblies with threaded couplers
- Small, compact design for miniature sensors and space sensitive applications
- Available in 3, 4, and 5-pole versions
- Patented anti-vibration feature to prevent loosening under high vibration applications
- IP67 rated for harsh environments
- Wide selection of cables to fit applications:
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - Other types available upon request

---

**Reference Information**

UL File No.: E152210

---

**Physical**

- Connector Body: TPE
- Contact Carries: PBT
- O-ring: Viton
- Coupling Nut: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Cables: A10—Yellow PVC jacket, 24 AWG PVC conductors, 300V, UL AWM 2661
  - B09—Black PUR jacket, 24 AWG PVC conductors, 300V, 80°C, UL AWM 20549 (3 conductor)/AWM 21198 (5 conductor)

---

**Environmental**

- Protection: IP67
- NEMA Rating: NEMA 6

---

**Poles (Female View)**

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<tr>
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<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Female Straight-to-Male Straight</th>
<th>Female Right Angle-to-Male Straight</th>
<th>Female Straight-to-Male Right Angle</th>
<th>Female Right Angle-to-Male Right Angle</th>
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<td>1 - Brown</td>
<td>3 - Blue</td>
<td>4 - Black</td>
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<td>120087-0074</td>
<td>443031A10M010</td>
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<td>444030A10M010</td>
<td>120087-0093</td>
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**Configuration Code**

**Build-a-Part Number**

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**Length Code Meters**

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<tr>
<td>5</td>
<td>M050</td>
</tr>
</tbody>
</table>

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Nano-Change® (M8) Receptacles (US)
120031/120090 Female
Front Panel Mount, Back Panel Mount

Features and Benefits
• IEC compliant M8 panel mount receptacles
• Available in 3, 4, and 5-pole versions
• Fully potted assemblies provide IP67/68 protection for harsh environments
• Available in an array of configurations to fit your needs:
  - Various mounting thread sizes, including pipe threads for direct mounting on pipe fittings
  - Front panel mount for installing from the outside of the enclosure
  - Back panel mount from inside the enclosure
  - Wire leads for terminating to terminal strips or PCB tails to incorporate with electronics

Reference Information
UL File No.: E152210

Physical
Shell Material: Nickel-plated Brass
Contact Carries: PBT
O-Ring: M8—Red Viton, Panel—Black Viton
Contacts: Copper alloy with Gold over Nickel plating
Wire PVC Insulation: 300V, 80°C, UL1007/1569, 24 AWG

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Wire Type</th>
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<th>Length</th>
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<tbody>
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<td>PVC Lead, UL1007/1569</td>
<td>24 AWG</td>
<td>0.3m</td>
</tr>
<tr>
<td>PG7, Back Panel Mount</td>
<td>PVC Lead, UL1007/1569</td>
<td>24 AWG</td>
<td>0.3m</td>
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</table>

<table>
<thead>
<tr>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code
Build-a-Part Number
4R3P00A27C300

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Nano-Change® (M8) Receptacles (US)

120090
Male
Front Panel Mount

Features and Benefits
- IEC compliant M8 panel mount receptacles
- Mates with Threaded and Snap M8 cordsets
- Available in 3, 4, and 5-pole versions
- Fully potted assemblies provide IP67/68 protection for harsh environments
- Receptacles with wired leads to be used in control panels, junction boxes and sensors. Other configurations also available.

Reference Information
UL File No.: E152210

Physical
Shell Material: Nickel-plated Brass
Contact Carries: PBT
O-Ring: Panel—Black Viton
Contacts: Copper alloy with Gold over Nickel plating
Wire PVC Insulation: 300V, 80°C, UL1007/1569, 24 AWG

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th></th>
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<tr>
<td>3 Pole</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**Brad® Nano-Change® (M8)**

**Threaded Field Attachable Connectors (US)**

**120091**

**Female, Male**
**Straight, Right Angle**

---

**Features and Benefits**
- Allows field termination of cables to IEC compliant, M8 circular connector
- Preassembled contact carrier with solder cup contacts for easy conductor termination
- Small, compact design for miniature sensors and space sensitive applications
- Available in 3 and 4-pole versions
- Back end housing and cable gland provides IP67 protection and strain relief

**Physical**
- Connector Body: PA
- Contact Carries: PA
- O-ring/Gaskets: NBR
- Coupling Nut: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Termination: Contacts with solder cups, accepts conductors up to 24 AWG (0.25mm²)

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

---

**Female Connectors**

<table>
<thead>
<tr>
<th>Poles</th>
<th>Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Diameter Range</th>
<th>Female Straight</th>
<th>Female Right Angle</th>
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**Male Connectors**

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</table>

Note: Sales drawings for all standard order numbers are available on molex.com
Brad® Nano-Change® (M8) Distribution Boxes (US)

120113
Single Wired Ports with M16 HR Connector

**Features and Benefits**
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Compact—small footprint for tight spaces
- Can be mounted in two orientations for added flexibility
- One input/output per port
- Indicating LEDs for power and sensor trigger indication
- M16 home run connector for easy replacement

**Electrical**
- Voltage: 10-30V DC max.
- Amperage: Module—6.0A max.
  Port—2.0A max.

<table>
<thead>
<tr>
<th>Part Configuration</th>
<th>Box Configuration</th>
<th>Parts</th>
<th>LED Indicator</th>
<th>for Sensor</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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</table>

**Physical**
- Housing: PBT
- Port Shell Material: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Home Run Connector: M16 14-pole male connector
- Wiring Configuration: Single U/O, M8 3-pole female port
- Operating Temperature: -25 to +90°C

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

**Suggested Home Run Cable Assemblies**

<table>
<thead>
<tr>
<th>Use With</th>
<th>Cable Jacket</th>
<th>No. conductors</th>
<th>Cable Construction</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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<tbody>
<tr>
<td>4port Block</td>
<td>PUR</td>
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<td>Black PUR, 6x0.34mm²</td>
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Note: Sales drawings for all standard order numbers are available on molex.com
Brad® Nano-Change® (M8) Distribution Boxes (US)

120113
Single Wired Ports with PUR HR Cable

Features and Benefits
• Fully potted, factory assembled boxes simplify on machine wiring installations
• Compact—small footprint for tight spaces
• Can be mounted in two orientations for added flexibility
• One input/output per port
• Indicating LEDs for power and sensor trigger indication
• Integral home run cable eliminates need for purchase of additional component for installing

Electrical
Voltage: 10-30V DC max.
Amperage: Module—6.0A max.
Port—2.0A max.

Physical
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Wiring Configuration: Dual I/O, M8 4-pole female port
Home Run Cable: Black PUR cable, conductors:
  4 port—8x0.34mm² + 2x0.75mm²
  6 port—12x0.34mm² + 2x0.75mm²
  8 port—16x0.34mm² + 2x0.74mm²
  10 port—20x0.25mm² + 2x0.50mm²

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Box Configuration</th>
<th>HR Cable Exit</th>
<th>Ports</th>
<th>LED Indicator</th>
<th>For Sensor</th>
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<th>Engineering No</th>
<th>Standard Order No</th>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Features and Benefits
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Compact—small footprint for tight spaces
- Can be mounted in two orientations for added flexibility
- One input/output per port
- Indicating LEDs for power and sensor trigger indication
- Integral home run cable eliminates need for purchase of additional component for installing

Electrical
Voltage: 10-30V DC max.
Amperage: Module—6.0A max.
Port—2.0A max.

Physical
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Wiring Configuration: Single I/O, M8 3-pole female port
Home Run Cable: Black PUR cable, conductors:
4 port—4x0.34mm² + 2x0.75mm²
6 port—6x0.34mm² + 2x0.75mm²
8 port—8x0.34mm² + 2x0.74mm²
10 port—10x0.34mm² + 2x0.74mm²

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Box Configuration</th>
<th>HR Cable Exit</th>
<th>Parts</th>
<th>LED Indicator</th>
<th>for Sensor</th>
<th>Length</th>
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<th>Standard Order No</th>
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Note: Sales drawings for all standard order numbers are available on molex.com

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Suggested Tee Splitter to Connect Two I/O per Port in Above Boxes

<table>
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<tr>
<th>Wiring Schematic</th>
<th>Description</th>
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<th>Standard Order No.</th>
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<tr>
<td></td>
<td>Brad Nano-Change 'Y' Splitter</td>
<td>444430</td>
<td>120089-S002</td>
</tr>
</tbody>
</table>

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Features and Benefits
- IEC compliant M8 cordset assemblies with friction fit coupler design (‘SNAP’ design)
- Small, compact design for miniature sensors and space sensitive applications
- Available in 3, 4, and 5 pole versions
- Push on to make connection, friction fit of snap feature keeps connection
- IP67 rated for harsh environments
- LED version provide power and signal trigger indication for PNP sensors (NPN versions available upon request)
- Wide selection of cables to fit applications:
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - Other types available upon request

Physical
Connector Body: TPE (PVC for LED version)
Contact Carries: PBT
O-ring: Viton
Coupling Nut: Nickel-plated Brass (male only)
Contacts: Copper alloy with Gold over Nickel plating
Cables: A10—Yellow PVC jacket, 24 AWG PVC conductors, 300V, UL AWM2661
  BD9—Black PUR jacket, 24 AWG PVC conductors, 300V, 80°C, UL AWM 20549 (3 conductor)/
  AWM 21198 (5 conductor)

Environmental
Protection: IP67
NEMA Rating: NEMA 6

---

Female Pigtails

<table>
<thead>
<tr>
<th>Poles</th>
<th>Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type (Cable Code)</th>
<th>Wire Size</th>
<th>Length</th>
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<tbody>
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<td>24 AWG</td>
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Male Pigtails

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<th>Cable Type (Cable Code)</th>
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**Note:** Sales drawings for all standard order numbers are available on molex.com

Configuration Code* Build-a-Part Number

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<td>M100</td>
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</tbody>
</table>

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www.molex.com
Brad® Ultra-Lock® Connection System

The performance and reliability of the revolutionary new Ultra-Lock® connection system surpass those of traditional threaded connectors, delivering increased productivity and cost savings.

Ultra-Lock connectors incorporate a unique radial seal and mechanical-locking design that deliver unsurpassed performance. The patented push-to-lock technology provides a fast, simple and secure operator-independent connection.

Ultra-Lock connectors are designed to eliminate connector-related intermittent signals in the harshest environments. Fewer intermittent signals mean less downtime and better productivity.

Ultra-Lock technology can be used on Ultra-Lock connectors as well as threaded connectors, including Brad M12 connectors from Molex and Micro-Push® (IP64) connections.

Molex offers Ultra-Lock in 3-, 4-, 5-, 8- and 12-pin configurations for an extensive assortment of cordsets, receptacles, and molded junction boxes. The Ultra-Lock receptacles and multiports can be used with conventional threaded M12 and Micro-Push products to provide backward compatibility to legacy screw-down connectors.

Features and Benefits

- Push-to-lock technology provides a simple, secure, operator-independent connection for fast mating and reduced installation time
- Radial O-ring provides an IP69K seal to protect against moisture
- Receptacles accept either the Ultra-Lock connector or standard M12 threaded cordsets, giving users a variety of connection options

Applications

- Proximity switches, photo eyes, safety switches and other I/O connectivity
- Connector interface for IP69-rated devices
- Connectivity for devices in high-vibration environments
- Connections requiring blind-mating
Features and Benefits
- Push-to-lock technology assures fast, reliable connections every time.
- Reliable performance in high vibration environment due to positive locking mechanism.
- Ideal for wash-down and temporary submersion applications due to improved sealing design.
- Ergonomic push to lock mechanisms reduces fatigue and user errors when a high number of connections need to be made.
- 3, 4, and 5 pole versions are intermateal for added flexibility.
- IP67/68/69K rated for harsh environments.
- Wide selection of cables to fit applications: PVC cables for light, cost sensitive industrial applications, PUR cables for moderate flexing and for environments encountering cutting fluids and oils, TPE cables for moderate flex applications. Also ideal for welding cells, cable is weld slag resistant.

Reference Information
CSA File No.: LR6837 (3, 4, and 5-pole assemblies)

Physical
Connector Body: PUR (TPE for K05)
Contact Carriers: Polyamide
O-Ring: Viton (EPDM for E03 cables)
Coupling Nut: Nickel-plated Brass (Teflon coated for K05)
Contacts: Copper alloy with Gold over Nickel plating
Cables: E03—Yellow PVC jacket, 0.34mm² PVC conductors, 300V, 80C, UL AWM 2464
P03—Black PUR/PVC jacket, 0.34mm² PVC conductors, 300V, 80C
K05—Yellow TPE jacket, 22 AWG PVC conductors, 300V, UL PLTC-ER, +10M flex file (torsion and bending)
P02—Black PUR/PVC jacket, 0.25mm² PVC conductors, 300V, 80C
H45—Black PUR jacket, 26 AWG PVC conductors, 300V, 80C UL AWM20549

Environmental
Protection: IP67/IP68/IP69K
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Poles</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Wire Size</th>
<th>Length</th>
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<tbody>
<tr>
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<td>PLTC-ER</td>
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<td></td>
<td>PUR/PVC (P03)</td>
<td>PUR/PVC (P03)</td>
<td>0.34mm²</td>
<td>2.0m</td>
</tr>
<tr>
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<td></td>
<td>PLTC-ER</td>
<td>TPE (K05)</td>
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<tr>
<td>8 Pole</td>
<td>2.0A</td>
<td>30V AC/36V DC</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
# Features and Benefits
- Push-to-lock technology assures fast, reliable connections every time.
- Reliable performance in high vibration environment due to positive locking mechanism.
- Ideal for wash-down and temporary submersion applications due to improved sealing design.
- Ergonomic push to lock mechanisms reduces fatigue and user errors when a high number of connections need to be made.
- 3, 4, and 5 pole versions are intermateable for added flexibility.
- IP67/68/69K rated for harsh environments.
- Wide selection of cables to fit applications:
  - PVC cables for light, cost sensitive industrial applications.
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils.
  - TPE cables for moderate flex applications. Also ideal for welding cells, cable is weld slag resistant.

# Physical
- Connector Body: PUR (TPE for K05)
- Contact Carries: Polyamide
- O-Ring: Viton (EPDM for E03 cables)
- Coupling Nut: Nickel-plated Brass (Teflon coated for K05)
- Contacts: Copper alloy with Gold over Nickel plating.
- Cables: E03—Yellow PVC jacket, 0.34mm² PVC conductors, 300V, 80°C, UL AWM 2464
  - P03—Black PUR/PVC jacket, 0.34mm² PVC conductors, 300V, 80°C
  - K05—Yellow TPE jacket, 22 AWG PVC conductors, 300V, UL PLTC-ER, +10M flex file (torsion and bending)
- P02—Black PUR/PVC jacket, 0.25mm² PVC conductors, 300V, 80°C
- H45—Black PUR jacket, 26 AWG PVC conductors, 300V, 80°C UL AWM20549

# Environmental
- Protection: IP67/IP68/IP69K
- NEMA Rating: NEMA 6

## Reference Information
- CSA File No.: LR6837 (3, 4, and 5-pole assemblies)

## Physical Connector Body
- PUR (TPE for K05)

## Contact Carries
- Polyamide

## O-Ring
- Viton (EPDM for E03 cables)

## Coupling Nut
- Nickel-plated Brass (Teflon coated for K05)

## Contacts
- Copper alloy with Gold over Nickel plating

## Cables
- E03—Yellow PVC jacket, 0.34mm² PVC conductors, 300V, 80°C, UL AWM 2464
- P03—Black PUR/PVC jacket, 0.34mm² PVC conductors, 300V, 80°C
- K05—Yellow TPE jacket, 22 AWG PVC conductors, 300V, UL PLTC-ER, +10M flex file (torsion and bending)
- P02—Black PUR/PVC jacket, 0.25mm² PVC conductors, 300V, 80°C
- H45—Black PUR jacket, 26 AWG PVC conductors, 300V, 80°C UL AWM20549

## Environmental Protection
- IP67/IP68/IP69K

## NEMA Rating
- NEMA 6

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### Male Straight

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</tr>
<tr>
<td>12 Pole</td>
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<th>Cable Jacket</th>
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<td>PVC (E03)</td>
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<td>2.0m</td>
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<td>2.0m</td>
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<tr>
<td>12 Pole</td>
<td>0.5A</td>
<td>30V AC/DC</td>
<td>UL 20549</td>
<td>PUR (H45)</td>
<td>26 AWG</td>
<td>2.0m</td>
</tr>
</tbody>
</table>

**Note:** Sales drawings for all standard order numbers are available on molex.com
**Features and Benefits**
- Push-to-lock technology assures fast, reliable connections every time.
- Reliable performance in high vibration environment due to positive locking mechanism.
- Ideal for wash-down and temporary submersion applications due to improved sealing design.
- Ergonomic push to lock mechanisms reduces fatigue and user errors when a high number of connections need to be made.
- 3, 4, and 5-pole versions are intermateable for added flexibility.
- IP67/68/69K rated for harsh environments.
- Wide selection of cables to fit applications:
  - PVC cables for light, cost sensitive industrial applications.
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils.
  - TPE cables for moderate flex applications. Also ideal for welding cells, cable is weld slag resistant.

**Reference Information**
CSA File No.: LR6837 (3, 4, and 5-pole assemblies)

<table>
<thead>
<tr>
<th>Physical</th>
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<td>Connector Body: PUR (TPe for K05)</td>
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<td>Contact Carries: Polyamide</td>
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<tr>
<td>O-Ring: Viton (EPDM for E03 cables)</td>
</tr>
<tr>
<td>Coupling Nut: Nickel-plated Brass (Teflon coated for K05)</td>
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<tr>
<td>Contacts: Copper alloy with Gold over Nickel plating</td>
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<tr>
<td>Cables: E03—Yellow PVC jacket, 0.34mm² PVC conductors, 300V, 80C, UL AWM 2464</td>
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<tr>
<td>P03—Black PUR/PVC jacket, 0.34mm² PVC conductors, 300V, 80C</td>
</tr>
<tr>
<td>K05—Yellow TPE jacket, 22 AWG PVC conductors, 300V, UL PLTC-ER, +10M flex file (torsion and banding)</td>
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</table>

| Environmental |
| Protection: IP67/IP68/IP69K |
| NEMA Rating: NEMA 6 |

**Configuration Code**
Build-a-Part Number

**Note:** Sales drawings for all standard order numbers are available on molex.com
Brad® Ultra-Lock® (M12) Double-Ended Cordsets (Europe)

120080
Female Straight-to-Male Right Angle, Female Right Angle-to-Male Right Angle

Features and Benefits
• Push-to-lock technology assures fast, reliable connections every time
• Reliable performance in high vibration environment due to positive locking mechanism
• Ideal for wash-down and temporary submersion applications due to improved sealing design
• Ergonomic push to lock mechanisms reduce fatigue and user errors when a high number of connections need to be made
• 3, 4, and 5-pole versions are intermateable for added flexibility
• IP67/68/69K rated for harsh environments
• Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for moderate flex applications. Also ideal for welding cells, cable is weld slag resistant

Reference Information
CSA File No.: LR6837 (3, 4, and 5-pole assemblies)

Physical
Connector Body: PUR (TPE for K05)
Contact Carries: Polyamide
O-Ring: Viton (EPDM for E03 cables)
Coupling Nut: Nickel-plated Brass (Teflon coated for K05)
Contacts: Copper alloy with Gold over Nickel plating
Cables:
- E0—Yellow PVC jacket, 0.34mm² PVC conductors, 300V, 80C, UL AWM 2464
- P03—Black PUR/PVC jacket, 0.34mm² PVC conductors, 300V, 80C
- K05—Yellow TPE jacket, 22 AWG PVC conductors, 300V, 80C
- H45—Black PUR jacket, 26 AWG PVC conductors, 300V, 80C, UL AWM20549

Environmental
Protection: IP67/IP68/IP69K
NEMA Rating: NEMA 6

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<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Wire Size</th>
<th>Length</th>
<th>Female Straight-to-Male Right Angle</th>
<th>Female Right Angle-to-Male Right Angle</th>
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<tbody>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code
Build-a-Part Number

Length | Code
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0.6    | M006
1      | M010
2      | M020
3      | M030
4      | M040
5      | M050

Coupling Nut Option
Stainless Steel . . . . 8

Cable Code
WWW8030P02M0108

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
### Features and Benefits
- Push-to-lock technology assures fast, reliable connections every time.
- Reliable performance in high vibration environment due to positive locking mechanism.
- Ideal for wash-down and temporary submersion applications due to improved sealing design.
- Ergonomic push-to-lock mechanisms reduces fatigue and user errors when a high number of connections need to be made.
- Shielding thru coupling offer complete EMI protection to electrical noise.
- IP67/68/69K rated for harsh environments.

### Physical
- **Connector Body:** PUR
- **Contact Carries:** Polyamide
- **O-Ring:** Viton
- **Coupling Nut:** Nickel-plated Brass
- **Contacts:** Copper alloy with Gold over Nickel plating
- **Shielding:** Braid shield on cable connected to coupler, providing complete shielding thru connector interface.
- **Cables:**
  - P19—Black PUR jacket with Braid shield, 85% coverage, 0.34mm² PVC conductors, 300V, 90C
  - P45—Black PUR jacket with Braid shield, 80% coverage, 26 AWG PVC conductors, 300V, 80C, UL AWM 20549

### Environmental
- **Protection:** IP67/IP68/IP69K
- **NEMA Rating:** NEMA 6

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<th>Max. Voltage</th>
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<th>Length</th>
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<th>Male Straight</th>
<th>Female Straight-to-Male Straight</th>
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**Note:** Sales drawings for all standard order numbers are available on molex.com.

**Configuration Code**

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</table>

**Cable Code**

**Coupling Nut Option**

- Stainless Steel . . . . 8

---

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.*
Brad® Ultra-Lock® (M12) Receptacles (Europe)

120084 Female Front Panel Mount, Back Panel Mount

Features and Benefits
- M12 single keyway (A-coded) IEC compliant panel mount receptacles with Ultra-Lock feature
- Mates with standard threaded M12 and Ultra-Lock cordsets
- Available in 4, 5, 8 and 12-pole configurations
- Fully potted assemblies provide IP67/68 protection for harsh environments
- Available in an array of configurations to fit your needs:
  - Various mounting thread sizes, including pipe threads for direct mounting on pipe fittings
  - Front panel mounts for installing from the outside of the enclosure
  - Back panel mount from inside the enclosure
  - Wire leads for terminating to terminal strips or PCB tails to incorporate with electronics

Reference Information
- cCSAus Certified LR6837 (4-5 pole version)
- Physical
  - Shell Material: Nickel-plated Brass
  - Contact Carriers: Polyamide
  - O-Ring: Panel—Black Viton
  - Contacts: Copper alloy with Gold over Nickel plating
- Wire PVC Insulation: 300V, 80°C, UL1061
  - 4, 5 poles—0.34mm²
  - 8 poles—0.25mm²
  - 12 poles—0.14mm²

Environmental
- Protection: IP67
- NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>WR4U20E03C3003</td>
<td>120084-5154</td>
</tr>
<tr>
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<td>4.0A</td>
<td>250V AC/DC</td>
<td>WR5U20E03C3003</td>
<td>120084-5159</td>
</tr>
<tr>
<td>8 Pole</td>
<td>2.0A</td>
<td>30V AC / 36V DC</td>
<td>WR8U20E02C3003</td>
<td>120084-5095</td>
</tr>
<tr>
<td>12 Pole</td>
<td>1.5A</td>
<td>30V AC/DC</td>
<td>WR12U20E01C3003</td>
<td>120084-5013</td>
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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

Note: "Configuration Code* Build-a-Part Number" is a placeholder for the actual configuration code. The actual code is not provided in the text. The diagram and table are meant to show how the configuration code is used to create a part number.

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Ultra-Lock® (M12) Receptacles
(Europe)

120084
Male
Front Panel Mount,
Back Panel Mount

Features and Benefits

- M12 single keyway (A-coded) IEC compliant panel mount receptacles with Ultra-Lock feature
- Mates with standard threaded M12 and Ultra-Lock cordsets
- Available in 4, 5, 8 and 12-pole configurations
- Fully potted assemblies provide IP67/68 protection for harsh environments
- Available in an array of configurations to fit your needs:
  - Various mounting thread sizes, including pipe threads for direct mounting on pipe fittings
  - Front panel mounts for installing from the outside of the enclosure
  - Back panel mount from inside the enclosure
  - Wire leads for terminating to terminal strips or PCB tails to incorporate with electronics

Reference Information

cCSAus Certified LR6837 (4-5 pole version)

Physical

Shell Material: Nickel-plated Brass
Contact Carrier: Polyamide
O-Ring: M12—Red Viton Panel—Black Viton
Contacts: Copper alloy with Gold over Nickel plating
Wire PVC Insulation: 300V, 80°C, UL1061
- 4, 5 poles—0.34mm²
- 8 poles—0.25mm²
- 12 poles—0.14mm²

Environmental

Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Wire Type</th>
<th>Wire Size</th>
<th>Length</th>
<th>PCB Pins</th>
</tr>
</thead>
<tbody>
<tr>
<td>M16x1.5, Front Panel Mount</td>
<td>PVC leads, UL1061</td>
<td>0.34mm²</td>
<td>0.3m</td>
<td></td>
</tr>
<tr>
<td>M16x1.5, Back Panel Mount</td>
<td>PVC leads, UL1061</td>
<td>0.34mm²</td>
<td>0.3m</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>WR4J26E03C3003</td>
<td>120084-5103</td>
</tr>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>WR5J26E03C3003</td>
<td>120084-5109</td>
</tr>
<tr>
<td>8 Pole</td>
<td>2.0A</td>
<td>30V AC/36V DC</td>
<td>WR8U26E02C3003</td>
<td>120084-5096</td>
</tr>
<tr>
<td>12 Pole</td>
<td>1.5A</td>
<td>30V AC/DC</td>
<td>WRCU26E01C3003</td>
<td>120084-5015</td>
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</tbody>
</table>

Configuration Code*

Build-a-Part Number

<table>
<thead>
<tr>
<th>Length</th>
<th>Code</th>
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<tr>
<td>0.3</td>
<td>C300</td>
</tr>
<tr>
<td>1.0</td>
<td>M010</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Ultra-Lock® (M12) Field Attachable Connectors (Europe)

120085 Female, Male Straight, Right Angle

Features and Benefits
- Allows field termination of cables to Ultra-Lock, push-to-lock connector
- Preassembled contact carries with screw terminals provides easy field termination of conductors
- Available in 4 and 5 pole versions
- Back end housing and cable gland provides IP67 protection and strain relief

Physical
- Connector Body: PA
- Contact Carries: PA
- O-ring: Viton
- Coupling Nut: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Termination: Screw down terminals, accepts conductors up to 18 AWG (0.75mm²)

Environmental
- Protection: IP67/IP68/IP69K
- NEMA Rating: NEMA 6

### Female Connectors

<table>
<thead>
<tr>
<th>Poles</th>
<th>Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Diameter Range</th>
<th>Female Straight</th>
<th>Female Right Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>4.0A</td>
<td>250V AC 300V DC</td>
<td>3.30-6.00mm (.130-.260&quot;)</td>
<td>WA4000-31 120085-0011</td>
<td>WA4001-31 120085-0015</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.10-8.10mm (.161-.319&quot;)</td>
<td>WA4000-32 120085-0013</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4.0A</td>
<td>30V AC 36V DC</td>
<td>3.30-6.00mm (.130-.260&quot;)</td>
<td>WA5000-31 120085-0012</td>
<td>WA5001-31 120085-0016</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.10-8.10mm (.161-.319&quot;)</td>
<td>WA5000-32 120085-0014</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Male Connectors

<table>
<thead>
<tr>
<th>Poles</th>
<th>Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Diameter Range</th>
<th>Male Straight</th>
<th>Male Right Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>4.0A</td>
<td>250V AC 300V DC</td>
<td>3.30-6.00mm (.130-.260&quot;)</td>
<td>WA4006-31 120085-0003</td>
<td>WA4007-31 120085-0007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.10-8.10mm (.161-.319&quot;)</td>
<td>WA4006-32 120085-0005</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4.0A</td>
<td>30V AC 36V DC</td>
<td>3.30-6.00mm (.130-.260&quot;)</td>
<td>WA5006-31 120085-0004</td>
<td>WA5007-31 120085-0008</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.10-8.10mm (.161-.319&quot;)</td>
<td>WA5006-32 120085-0006</td>
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<td></td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
Brad® Ultra-Lock® (M12) Splitter Cordsets

**Europe**

**120080**

Female Straight-to-Male Straight, Female Right Angle-to-Male Straight

**Features and Benefits**

- Splitters permit the connection of two I/O devices to a Brad Ultra-Lock port on dual-wired distribution boxes.
- Push-to-lock technology assures fast, reliable connections every time.
- IP67/68 rated for harsh environments.
- Reliable performance in high-vibration environments due to positive locking mechanism.
- Wide selection of cables to fit applications.
  - PVC cables for light, cost-sensitive industrial applications.
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils.
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant.

**Reference Information (K05 cable assemblies)**

- UL File No.: E152210
- CSA File No.: LR6837

**Physical**

- Connector Body: PUR (TPE for K05)
- Contact Carries: Polyamide
- O-ring: Viton (EPDM for E03 cables)
- Coupling Nut: Nickel-plated Brass (Teflon* coated for K05)
- Contacts: Copper alloy with Gold over Nickel plating
- Cables: E03—Black PVC jacket, 0.34mm² PVC conductors, 300V, 80C, UL AWM 2464
- P03—Black PUR/PVC jacket, 0.34mm² PVC conductors, 300V, 80C
- K05—Yellow TPE jacket, 22 AWG PVC conductors, 300V, UL PLTC-ER, +10M flex life (torsion and bending)

**Environmental**

- Protection: IP67
- NEMA Rating: NEMA 6

**Ultra-Lock-to-Ultra-Lock Splitters**

<table>
<thead>
<tr>
<th>Wiring Schematic</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type (Cable Code)</th>
<th>Wire Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leg A: 3 1 2 4</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2464 (P03)</td>
<td>0.34mm²</td>
<td>0.3m</td>
</tr>
<tr>
<td>Leg B: 5 6</td>
<td></td>
<td></td>
<td>PUR/PVC (P03)</td>
<td>0.34mm²</td>
<td>0.3m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PLTC-ER (K05)</td>
<td>0.34mm²</td>
<td>0.3m</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Female Straight-to-Male Straight</th>
<th>Female Right Angle-to-Male Straight</th>
</tr>
</thead>
<tbody>
<tr>
<td>WW4A30E03M003</td>
<td>120080-5072</td>
</tr>
<tr>
<td>WW4A30P03M003</td>
<td>120080-5073</td>
</tr>
<tr>
<td>WW4A30K05M003</td>
<td>120080-0081</td>
</tr>
</tbody>
</table>

**Ultra-Lock-to-Micro-Change® Splitters**

<table>
<thead>
<tr>
<th>Wiring Schematic</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type (Cable Code)</th>
<th>Wire Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leg A: 3 1 2 4</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2464 (P03)</td>
<td>0.34mm²</td>
<td>0.3m</td>
</tr>
<tr>
<td>Leg B: 5 6</td>
<td></td>
<td></td>
<td>PUR/PVC (P03)</td>
<td>0.34mm²</td>
<td>0.3m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PLTC-ER (K05)</td>
<td>0.34mm²</td>
<td>0.3m</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Female Straight-to-Male Straight</th>
<th>Female Right Angle-to-Male Straight</th>
</tr>
</thead>
<tbody>
<tr>
<td>WW4A30E03M003</td>
<td>120080-5092</td>
</tr>
<tr>
<td>WW4A30P03M003</td>
<td>120080-5093</td>
</tr>
<tr>
<td>WW4A30K05M003</td>
<td>120080-0108</td>
</tr>
</tbody>
</table>

**Configuration Code**

- Build-a-Part Number: WW4A30E03M0038
- Coupling Nut Option: Stainless Steel . . . . 8

**Note:** Sales drawings for all standard order numbers are available on molex.com.

*Teflon is trademark of DuPont

www.molex.com

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
**Brad® Ultra-Lock® (M12) Distribution Boxes**

**Top Mount, Single-Wired Ports With Brad® Mini-Change® HR Connector**

**120119/130008**

**Features and Benefits**
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Accepts Ultra-Lock and threaded M12 cordsets
- One input/output per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Mini-Change home run connector for easy replacement

**Electrical**
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Box Configuration</th>
<th>Ports</th>
<th>LED Indicator</th>
<th>For Sensor</th>
<th>Top Mount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Engineering No.</td>
</tr>
<tr>
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<td>PNP</td>
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<td>PNP</td>
<td>BKY801P-FBB</td>
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<table>
<thead>
<tr>
<th>Suggested Home Run Cordset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brad Mini-Change 12-pole Female Cordset</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use With</th>
<th>Cable Jacket</th>
<th>No. of Conductors</th>
<th>Construction</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 port block</td>
<td>PUR</td>
<td>7</td>
<td>4 × 0.13mm² + 3 × 0.75mm²</td>
<td>10.0m</td>
<td>302301P80M100</td>
<td>130008-8009</td>
</tr>
<tr>
<td>6 port block</td>
<td>PUR</td>
<td>8</td>
<td>6 × 0.24mm² + 3 × 0.75mm²</td>
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<td>302201P80M100</td>
<td>130008-8006</td>
</tr>
<tr>
<td>8 port block</td>
<td>PUR</td>
<td>9</td>
<td>8 × 0.34mm² + 3 × 0.75mm²</td>
<td></td>
<td>302101P80M100</td>
<td>130008-0476</td>
</tr>
</tbody>
</table>

**Physical**
- Housing: PBT
- Port Shell Material: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Home Run Connector: Mini-Change 12-pole male connector
- Wiring Configuration: Single I/O, M12 4-pole female port
- Protection: IP67
- NEMA Rating: NEMA 6

**Environmental**

**Note:** Sales drawings for all standard order numbers are available on molex.com

**Configuration Code**

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.*
**Brad® Ultra-Lock® (M12) Distribution Boxes**
*(Europe)*

**120119/130008**

**Top Mount, Dual-Wired Ports With Brad® Mini-Change® HR Connector**

### Features and Benefits
- Fully potted, factory assembled boxes simplify on-machine wiring installations
- Accepts Ultra-Lock and threaded M12 cordsets
- Two input/outputs per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Mini-Change home run connector for easy replacement

### Electrical
- Voltage: 10-30V DC max.
- Amperage: Module—12.0A max.
  Port—4.0A max.

### Physical
- Housing: PBT
- Port Shell Material: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickle plating
- Home Run Connector: Mini-Change® 19-pole male connector
- Wiring Configuration: Dual I/O, M12 5-pole female port
- Environmental Protection: IP67
- NEMA Rating: NEMA 6

### Electrical Voltage
- Module: 10-30V DC max.
- Port: 4.0A max.

### Physical Housing
- PBT

### Port Shell Material
- Nickel-plated Brass

### Contacts
- Copper alloy with Gold over Nickel plating

### Home Run Connector
- Mini-Change® 19-pole male connector

### Wiring Configuration
- Dual I/O, M12 5-pole female port

---

**Port Configuration**

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Box Configuration</th>
<th>Parts</th>
<th>LED Indicator</th>
<th>For Sensor</th>
<th>Top Mount</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td></td>
<td>Yes</td>
<td>PNP</td>
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<td>Yes</td>
<td>PNP</td>
<td></td>
<td>120119-0020</td>
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</tbody>
</table>

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### Suggested Home Run Cordset

**Brad Mini-Change 19-pole Female Cordset**

<table>
<thead>
<tr>
<th>Use With</th>
<th>Cable Jacket</th>
<th>No. of Conductors</th>
<th>Construction</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 and 6 port blocks</td>
<td>PUR</td>
<td>15</td>
<td>12 × 0.34mm² + 3 × 0.75mm²</td>
<td>10.0m</td>
<td>303001P80M100</td>
<td>130008-0866</td>
</tr>
<tr>
<td>8 port block</td>
<td>PUR</td>
<td>19</td>
<td>16 × 0.34mm² + 3 × 0.75mm²</td>
<td>10.0m</td>
<td>303001P80M100</td>
<td>130008-0316</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

---

**Configuration Code**

<table>
<thead>
<tr>
<th>Build-a-Part Number</th>
<th>Length</th>
<th>Code</th>
</tr>
</thead>
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<tr>
<td></td>
<td>15</td>
<td>150</td>
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</tbody>
</table>

303001P80M100

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.*
Brad® Ultra-Lock® (M12) Distribution Boxes (Europe)

120119/120094/120230
Top Mount, Single-Wired Ports With M23 HR Connector

**Features and Benefits**
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Accepts Ultra-Lock and threaded M12 cordsets
- One input/output per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- M23 home run connector for easy replacement

**Electrical**
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Box Configuration</th>
<th>Ports</th>
<th>LED Indicator</th>
<th>For Sensor</th>
<th>Top Mount</th>
</tr>
</thead>
<tbody>
<tr>
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<td>4</td>
<td>Yes</td>
<td>PNP</td>
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</tr>
<tr>
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<td></td>
<td>6</td>
<td>Yes</td>
<td>PNP</td>
<td>120119-0011</td>
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<tr>
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<td>8</td>
<td>Yes</td>
<td>PNP</td>
<td>120119-0018</td>
</tr>
</tbody>
</table>

**Physical**
- Housing: PBT
- Port Shell Material: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Home Run Connector: M23 12-pole male connector

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Use With</th>
<th>Cable Jacket</th>
<th>No. of Conductors</th>
<th>Construction</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 port</td>
<td>PUR</td>
<td>7</td>
<td>4 x 0.34mm² + 3 x 0.75mm²</td>
<td>10.0m</td>
<td>KO23101P80M100</td>
<td>120994-5023</td>
</tr>
<tr>
<td>6 port</td>
<td></td>
<td>9</td>
<td>6 x 0.34mm² + 3 x 0.75mm²</td>
<td></td>
<td>KO22101P80M100</td>
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Build-a-Part Number

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*K02101P80M100*

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.*
Brad® Ultra-Lock® (M12) Distribution Boxes (Europe)
120119/120055
Top Mount, Dual-Wired Ports With M23 HR Connector

Features and Benefits
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Accepts Ultra-Lock and threaded M12 cordsets
- Two input/outputs per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- M23 home run connector for easy replacement

Electrical
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

Physical
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Home Run Connector: M23 19-pole male connector
Wiring Configuration: Dual I/O, M12 5-pole female port

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Box Configuration</th>
<th>Parts</th>
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<th>For Sensor</th>
<th>Top Mount</th>
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Suggested Home Run Cable Assemblies M23 19-pole Female Cordset and Field Attachable Connector

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<tr>
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<th>Cable Jacket</th>
<th>No. of Conductors</th>
<th>Construction</th>
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<th>Standard Order No.</th>
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K03301P80M100

Note: Sales drawings for all standard order numbers are available on molex.com

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**Brad® Ultra-Lock® (M12) Distribution Boxes**

**Europe**

**120119**

Top Mount, Dual-Wired Ports with Field Attachable HR Terminal Strip

### Features and Benefits
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Accepts Ultra-Lock and threaded M12 cordsets
- Two input/outputs per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Home run terminal strip provides greatest flexibility for cable choices and trimming to length on machine

### Electrical
- Voltage: 10-30V DC max.
- Amperage: Module—12.0A max.
  Port—4.0A max.

### Physical
- Housing: PBT
- Port Shell Material: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Home Run Connector: Terminal strip
- Wiring Configuration: Dual I/O, M12 5-pole female

### Environmental
- Protection: IP67
- NEMA Rating: NEMA 6

### Table: Port Configuration and Box Configuration

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Box Configuration</th>
<th>Parts</th>
<th>LED Indicator</th>
<th>For Sensor</th>
<th>Top Mount</th>
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Brad® Ultra-Lock® (M12) Distribution Boxes (Europe)

120119 Top Mount, Single-Wired Ports With PUR HR Cable

Features and Benefits
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Accepts Ultra-Lock and threaded M12 cordsets
- One input/output per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Integral home run cable eliminates need for purchase of additional component for installation

Electrical
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

Physical
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Wiring Configuration: Single I/O, M12 4-pole female port
Home Run Cable: Black PUR cable, conductors:
4 port—4 × 0.34mm² + 3 × 0.75 mm²
6 port—6 × 0.34mm² + 3 × 0.75 mm²
8 port—8 × 0.34mm² + 3 × 0.74 mm²

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
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<tr>
<th>Port Configuration</th>
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<th>Parts</th>
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Note: Sales drawings for all standard order numbers are available on molex.com.

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Features and Benefits
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Accepts Ultra-Lock and threaded M12 cordsets
- Two input/outputs per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Integral home run cable eliminates need for purchase of additional component for installation

Electrical
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

Physical
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Wiring Configuration: Dual I/O, M12 5-pole female port
Home Run Cable: Black PUR cable, conductors:
- 4 port—8 \times 0.34mm^2 + 3 \times 0.75 mm^2
- 6 port—12 \times 0.34mm^2 + 3 \times 0.75 mm^2
- 8 port—16 \times 0.34mm^2 + 3 \times 0.74 mm^2

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Port Configuration | Box Configuration | Ports | LED Indicator | For Sensor | Cable Length | Top Mount |
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Note: Sales drawings for all standard order numbers are available on molex.com

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*BKY405P-FBP-05

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Ultra-Lock® (M12) Distribution Boxes (Europe)

120119
Top Mount, Dual-Wired Ports with Molded Brad® Mini-Change® HR Cordset

**Features and Benefits**
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Accepts Ultra-Lock and threaded M12 cordsets
- Two input/outputs per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Integral home run cordset with Mini-Change® 19-pole male connector provides easy replacement

**Electrical**
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

**Physical**
- Housing: PBT
- Port Shell Material: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Wiring Configuration: Dual I/O, M12 5-pole female port
- Home Run Cable: Black PUR cable, conductors:
  - 4 port—$8 \times 0.34\text{mm}^2 + 3 \times 0.75\text{mm}^2$
  - 6 port—$12 \times 0.34\text{mm}^2 + 3 \times 0.75\text{mm}^2$
  - 8 port—$16 \times 0.34\text{mm}^2 + 3 \times 0.74\text{mm}^2$

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

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Note: Sales drawings for all standard order numbers are available on molex.com

*BKY4010-FBP-01*

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.*
Brad® Micro-Change® (M12) Connectors

Rugged Micro-Change® connectors provide a high-pin-density, M12 solution that is ideal for use in industrial and harsh commercial environments.

Brad Micro-Change products are Molex’s offering of rugged, high-circuit density, industry-standard M12 circular connectors for industrial automation applications.

Micro-Change connectors are designed to withstand harsh industrial environments and their superior quality assures a very reliable connection for control elements in automated equipment. These IEC 61076-2-101-compliant connectors allow fast and simple connections to 12.00 and 18.00mm sensors, encoders, switches and other input and output devices in industrial machinery.

Brad’s complete line of M12 connectivity provides a quick-connect wiring system that eliminates field-install cabinets and minimizes field wiring termination errors.

Features and Benefits

Cordsets

- Available in 3, 4, 5, 8 and 12 poles; in single and dual-key configurations; with or without LEDs; in straight and 90 degrees; and with different coupling nut materials to provide a wide variety of options to meet application requirements
- Internmates with industry standard M12 devices that comply with IEC 61076-2-101
- Rugged, IP68 rated watertight connector is well suited for harsh, wet environments
- Patented, anti-vibration feature prevents back-out in applications that experience high vibration and mechanical shock
- Gold-over-nickel-plated contacts provide a durable, corrosion-resistant plating that maintains low electrical resistance throughout the life of the connector

Receptacles, Field Attachables and Accessories

- Large selection of configurations to fit your panel or device design, including front- and back-panel-mount receptacles in a variety of materials, with PCB or wire leads
- Epoxy potted receptacles are IP67- and IP68-rated, and are ideal for rugged industrial environments
- 3-5p field-attachable connectors with screw-down terminals for easy field installation, allow users to make their own cable assemblies for a custom fit to a machine or application

Distribution Boxes

- Available in 4-, 6- and 8-port distribution boxes; single and dual I/O versions. These pre-wired junction boxes comprise the Molex quick-connect wiring system for I/O devices. They eliminate the need for field-installed junction boxes, providing improved wire management
- Fully potted housing ensures performance in high vibration and wet environment applications
- Rugged and compact to allow placement in tight places

Applications

- Proximity switches, photo eyes, safety switches and other I/O connectivity
- Connector interface for IP69-rated devices
- Connectivity for devices in high-vibration environments
- Connections requiring blind-mating
**Features and Benefits**
- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
- 3, 4, and 5-pole versions are intermateable for added flexibility
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

**Reference Information**
UL File No.: E152210 (K05 cable assemblies)
CSA File No.: LR6837 (K05 cable assemblies)

### Tables

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<th>Connector Body:</th>
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<tr>
<td>O-ring:</td>
<td>Viton (EPDM for E03 cables)</td>
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<td>Coupling Nut:</td>
<td>Nickel-plated Brass (Teflon coated for K05)</td>
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<tr>
<td>Contacts:</td>
<td>Copper alloy with Gold over Nickel plating</td>
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<tr>
<td>Cables:</td>
<td>E03—Yellow PVC jacket, 0.34mm² PVC conductors, 300V, 80C, UL AWM 2464</td>
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<table>
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#### Engineering

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<td>UL 2464</td>
<td>PVC (E03)</td>
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**Note:** Sales drawings for all standard order numbers are available on molex.com

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**Features and Benefits**
- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
- 3, 4, and 5-pole versions are intermateable for added flexibility
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

**Physical**
- Connector Body: PUR
- Contact Carries: Polyamide
- O-ring: Viton
- Coupling Nut: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Cables: P02—Black PUR/PVC jacket, 0.25mm² PVC conductors, 300V
  - H45—Black PUR jacket, 26AWG PVC conductors, 300V, UL AWM20549

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

**Reference Information**
- UL File No.: E152210
- CSA File No.: LR6837

---

### Technical Specifications Table

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**Female Straight**
- Engineering No.: 808000P02M020
- Standard Order No.: 120065-0951

**Female Right Angle**
- Engineering No.: 808001P02M020
- Standard Order No.: 120065-0960

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<th>Max. Current per Contact</th>
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<td>PUR (H45)</td>
<td>26 AWG</td>
<td>2.0m</td>
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**Female Straight**
- Engineering No.: 80C000H45M020
- Standard Order No.: 120065-5040

**Female Right Angle**
- Engineering No.: 80C001H45M020
- Standard Order No.: 120065-5099

---

**Note:** Sales drawings for all standard order numbers are available on molex.com

---

**Configuration Code**

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**Coupling Nut Option**
- Stainless Steel: . . . . . 8

**Cable Code**

- 808000P02M020

---

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Micro-Change® (M12)  
A-Code  
Single-Ended Cordsets  
(Europe)

120006/120065  
Male, Pigtail  
Straight, Right Angle

Features and Benefits
- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies  
- 3, 4, and 5-pole versions are intermatable for added flexibility  
- IP67/68 rated for harsh environments  
- Patented anti-vibration feature to prevent loosening under high vibration applications  
- Wide selection of cables to fit applications  
  - PVC cables for light, cost sensitive industrial applications  
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils  
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

Reference Information
UL File No.: E152210 (K05 cable assemblies)  
CSA File No.: LR6837 (K05 cable assemblies)

Physical
Connector Body: PUR (TPE for K05)  
Contact Carriers: Polyamide  
Coupling Nut: Nickel-plated Brass (Teflon coated for K05)  
Contacts: Copper alloy with Gold over Nickel plating  
Cables: E03—Yellow PVC jacket, 0.34mm² PVC conductors, 300V, 80°C, UL AWM 2464  
P03—Black PUR/PVC jacket, 0.34mm² PVC conductors, 300V  
K05—Yellow TPE jacket, 22AWG PVC conductors, 300V, UL PLTC-ER, ±10M flex life (torsion and bending)

Environmental
Protection: IP67  
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Poles (Male View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Wire Size</th>
<th>Length</th>
<th>Male Straight</th>
<th>Male Right Angle</th>
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<tbody>
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<td>UL 2464</td>
<td>PVC (E03)</td>
<td>0.34mm²</td>
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<td>PUR/PVC (P03)</td>
<td>0.34mm²</td>
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<td>PLTC-ER</td>
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<td>804006K05M020</td>
<td>804007K05M020</td>
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<td>4.0A</td>
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<td>UL 2464</td>
<td>PVC (E03)</td>
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<td>805006E03M020</td>
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<td>PUR/PVC (P03)</td>
<td>0.34mm²</td>
<td>2.0m</td>
<td>805006P03M020</td>
<td>805007P03M020</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code
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Coupling Nut Option
Stainless Steel . . . . . 8

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Features and Benefits
- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
- 3, 4, and 5-pole versions are intermateable for added flexibility
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Physical
Connector Body: PUR
Contact Carries: Polyamide
Coupling Nut: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Cables: P02—Black PUR/PVC jacket, 0.25mm² PVC conductors, 300V
  H45—Black PUR jacket, 26AWG PVC conductors, 300V, UL AWM20549

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Poles (Male View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size</th>
<th>Length</th>
<th>Male Straight</th>
<th>Male Right Angle</th>
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<tbody>
<tr>
<td>6 Pole</td>
<td>2.0A</td>
<td>30V AC/36V DC</td>
<td>PUR/PVC (P02)</td>
<td>0.25mm²</td>
<td>2.0m</td>
<td>808006P02M020</td>
<td>808007P02M020</td>
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<tr>
<td>12 Pole</td>
<td>1.5A</td>
<td>30V AC/DC</td>
<td>UL 20549</td>
<td>PUR (H45)</td>
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Configuration Code*
Build-a-Part Number

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**Note:** Sales drawings for all standard order numbers are available on molex.com

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Micro-Change® (M12) A-Code Double-Ended Cordsets (Europe)

120006/120007/120066 Female Straight-to-Male Straight, Female Right Angle-to-Male Straight

Features and Benefits
- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
- 3, 4, and 5-pole versions are intermateable for added flexibility
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

Reference Information
UL File No.: E152210 (K05 cable assemblies)
CSA File No.: LR6837 (K05 cable assemblies)

Physical
Connector Body: PUR (TPE for K05)
Contact Carries: Polyamide
O-ring: Viton (EPDM for E03 cables)
Coupling Nut: Nickel-plated Brass (Teflon coated for K05)
Contacts: Copper alloy with Gold over Nickel plating
Cables: E03—Yellow PVC jacket, 0.34mm² PVC conductors, 300V, 80C, UL AWM 2464
P03—Black PUR/PVC jacket, 0.34mm² PVC conductors, 300V
K05—Yellow TPE jacket, 22AWG PVC conductors, 300V, UL PLTC-ER, +10M flex life (torsion and bending)

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2464</td>
<td>PVC (E03)</td>
<td>0.34mm²</td>
<td>2.0m</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td>PUR/PVC (P03)</td>
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<td>PLTC-ER</td>
<td>TPE (K05)</td>
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<td>3 - Black</td>
<td></td>
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| 4 Pole             | 4.0A                     | 250V AC/DC   | UL 2464    | PVC (E03)                 | 0.34mm²   | 2.0m   |
|                    |                          |              |            | PUR/PVC (P03)             |           |        |
|                    |                          |              |            | PLTC-ER                   | TPE (K05) |        |
| 1 - Brown          |                          |              |            |                          |           |        |
| 2 - White          |                          |              |            |                          |           |        |
| 3 - Blue           |                          |              |            |                          |           |        |
| 4 - Black          |                          |              |            |                          |           |        |

| 5 Pole             | 4.0A                     | 250V AC/DC   | UL 2464    | PVC (E03)                 | 0.34mm²   | 2.0m   |
|                    |                          |              |            | PUR/PVC (P03)             |           |        |
| 1 - Brown          |                          |              |            |                          |           |        |
| 2 - White          |                          |              |            |                          |           |        |
| 3 - Black          |                          |              |            |                          |           |        |
| 4 - Black          |                          |              |            |                          |           |        |

| 5 - Grey           |                          |              |            |                          |           |        |

Configuration Code®
Build-a-Part Number

**Note:** Sales drawings for all standard order numbers are available on molex.com

Configuration Code*

Build-a-Part Number

883030E03M010

Meters

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<td>M040</td>
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<td>5</td>
<td>M050</td>
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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Micro-Change® (M12) A-Code Double-Ended Cordsets (Europe)
120006/120007/120066
Female Straight-to-Male Straight, Female Right Angle-to-Male Straight

Features and Benefits
• M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
• 3, 4, and 5-pole versions are intermateable for added flexibility
• IP67/68 rated for harsh environments
• Patented anti-vibration feature to prevent loosening under high vibration applications
• Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

Physical
Connector Body: PUR (TPE for K05)
Contact Carriers: Polyamide
O-ring: Viton
Coupling Nut: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Cables: P02—Black PUR/PVC jacket, 0.25mm² PVC conductors, 300V
H45—Black PUR jacket, 26AWG PVC conductors, 300V, UL AWM20549

Environmental
Protection: IP67
NEMA Rating: NEMA 6

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<thead>
<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size</th>
<th>Length</th>
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<td>2.04</td>
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<td>PUR/PVC (P02)</td>
<td>0.25mm²</td>
<td>2.0m</td>
<td>888030P02M010 120066-0579 888031P02M010 120066-1626</td>
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<tr>
<td>12 Pole</td>
<td>1.5A</td>
<td>30V AC/DC</td>
<td>UL 20549</td>
<td>PUR (H45)</td>
<td>26 AWG</td>
<td>2.0m</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code* Build-a-Part Number
888030P02M0108

Length Code
0.3 M003
0.6 M006
1 M010
2 M020
3 M030
4 M040
5 M050

 Coupling Nut Option Stainless Steel . . . . . . 8

Coupling Nut Option Stainless Steel . . . . . . 8

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

www.molex.com

This document provided by Barr-Thorp Electric Co., Inc.  800-473-9123   www.barr-thorp.com
Features and Benefits
- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
- 3, 4, and 5-pole versions are intermateable for added flexibility
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
  - P03—Black PUR/PVC jacket, 0.34mm² PVC conductors, 300V, 80C, UL AWM 2464
  - P03—Black PUR/PVC jacket, 0.34mm² PVC conductors, 300V
  - K05—Yellow TPE jacket, 22AWG PVC conductors, 300V, UL PLTC-ER, +10M flex life (torsion and bending)

Reference Information
UL File No.: E152210 (K05 cable assemblies)
CSA File No.: LR6837 (K05 cable assemblies)

Physical
Connector Body: PUR (TPE for K05)
Contact Carries: Polyamide
O-ring: Viton (EPDM for E03 cables)
Coupling Nut: Nickel-plated Brass (Teflon coated for K05)
Contacts: Copper alloy with Gold over Nickel plating
Cables: E03—Yellow PVC jacket, 0.34mm² PVC conductors, 300V, 80C, UL AWM 2464
P03—Black PUR/PVC jacket, 0.34mm² PVC conductors, 300V
K05—Yellow TPE jacket, 22AWG PVC conductors, 300V, UL PLTC-ER, +10M flex life (torsion and bending)

Environmental
Protection: IP67
NEMA Rating: NEMA 6

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<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
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<th>Wire Size</th>
<th>Length</th>
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<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2464</td>
<td>PVC (E03)</td>
<td>0.34mm²</td>
<td>2.0m</td>
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<tr>
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<td>PUR/PVC (P03)</td>
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<td>250V AC/DC</td>
<td>UL 2464</td>
<td>PVC (E03)</td>
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<td>PUR/PVC (P03)</td>
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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**Features and Benefits**
- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
- 3, 4, and 5-pole versions are intermateable for added flexibility
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

**Physical**
- Connector Body: PUR
- Contact Carries: Polyamide
- O-ring: Viton
- Coupling Nut: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Cables: P02—Black PUR/PVC jacket, 0.25mm² PVC conductors, 300V
  - H45—Black PUR jacket, 26AWG PVC conductors, 300V, UL AWM20549

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

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**Configuration Code**

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<tr>
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**Coupling Nut Option**
- Stainless Steel . . . . . . 8

**Cable Code**
- 888032P02M010

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Note: Sales drawings for all standard order numbers are available on molex.com

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.*
### Features and Benefits
- M12 single keyway (A-Coded) IEC compliant cordset assemblies
- LEDs for power and signal trigger indicator for PNP sensors (for NPN sensors also available)
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

### Reference Information
- UL File No.: E152210 (K05 cable assemblies)
- CSA File No.: LR6837 (K05 cable assemblies)

### Physical
- Connector Body: PUR (TPE for K05)
- Contact Carries: Polyamide
- O-ring: Viton
- Coupling Nut: Nickel-plated Brass (Teflon coated for K05)
- Contacts: Copper alloy with Gold over Nickel plating
- LEDs: Green—Power
  - Yellow—Sensor/output trigger

### Environmental
- Protection: IP67
- NEMA Rating: NEMA 6

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### Table

<table>
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<th>Max. Current per Contact</th>
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<th>Cable Type (Cable Jacket)</th>
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<td>2.0m</td>
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<td></td>
<td></td>
<td>PUR/PVC (P03)</td>
<td></td>
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<td></td>
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### Configuration Code

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### Cable Code

8030P0E03M0208

*Coupling Nut Option

Stainless Steel . . . . . 8

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**Features and Benefits**
- M12 single keyway (A-Coded) IEC compliant cordset assemblies
- LEDs for power and signal trigger indicator for PNP sensors (for NPN sensors also available)
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

**Reference Information**
UL File No.: E152210 (K05 cable assemblies)
CSA File No.: LR6837 (K05 cable assemblies)

**Physical**
- Connector Body: PUR (TPE for K05)
- Contact Carries: Polyamide
- O-ring: Viton
- Coupling Nut: Nickel-plated Brass (Teflon coated for K05)
- Contacts: Copper alloy with Gold over Nickel plating
- LEDs: Green—Power
  - Yellow—Sensor/output trigger

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

---

### Table: Brad® Micro-Change® (M12) A-Code Double-Ended Cordsets (Europe)

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size</th>
<th>Length</th>
<th>Female Straight-to-Male Straight</th>
<th>Female Right Angle-to-Male Straight</th>
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</thead>
<tbody>
<tr>
<td>3 Pole/1 LED</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2464</td>
<td>PVC (E03)</td>
<td>0.34mm²</td>
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<td>0.34mm²</td>
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**Note:** Sales drawings for all standard order numbers are available on molex.com

**Configuration Code**

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**Coupling Nut Option**
- Stainless Steel . . . . . . 8

---

**Table: Brad® Micro-Change® (M12) A-Code Double-Ended Cordsets (Europe)**

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<td>M050</td>
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</tbody>
</table>

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This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
**Features and Benefits**
- M12 single keyway (A-Coded) IEC compliant cordset assemblies
- LEDs for power and signal trigger indicator for PNP sensors (for NPN sensors also available)
- IP67/68 rated for harsh environments
- Patented anti-vibration feature to prevent loosening under high vibration applications
- Wide selection of cables to fit applications
- PVC cables for light, cost sensitive industrial applications
- PUR cables for moderate flexing and for environments encountering cutting fluids and oils
- TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant

**Reference Information**
UL File No.: E152210 (K05 cable assemblies)
CSA File No.: LR6837 (K05 cable assemblies)

**Physical**
Connector Body: PUR (TPE for K05)
Contact Carries: Polyamide
O-ring: Viton
Coupling Nut: Nickel-plated Brass (Teflon coated for K05)
Contacts: Copper alloy with Gold over Nickel plating
LEDs: Green—Power
Yellow—Sensor/output trigger

Cables:
- E03—Yellow PVC jacket, 0.34mm² PVC conductors, 300V, 80°C, UL AWM 2464
- P03—Black PUR/PVC jacket, 0.34mm² PVC conductors, 300V
- K05—Yellow TPE jacket, 22AWG PVC conductors, 300V, UL PLTC-ER, +10M flex life (torsion and bending)

**Environmental**
Protection: IP67
NEMA Rating: NEMA 6

---

### Configuration Code* Build-a-Part Number

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<td>M050</td>
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</tbody>
</table>

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

---

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**Brad® Micro-Change® (M12) A-Code Receptacles (Europe)**

**120070/120011 Female**

Front Panel Mount, Back Panel Mount

---

**Features and Benefits**

- M12 single keyway (A-coded) IEC compliant panel mount receptacles
- Available in 3, 4, 5 and 8-pole configurations
- Fully potted assemblies provide IP67/IP8 protection for harsh environments
- Available in an array of configurations to fit your needs:
  - Various mounting thread sizes, including pipe threads for direct mounting on pipe fittings
  - Front panel mounts for installing from the outside of the enclosure
  - Back panel mount from inside the enclosure
  - Wire leads for terminating to terminal strips or PCB tails to incorporate with electronics

**Physical**

- Shell Material: Nickel-plated Brass
- Contact Carries: Polyamide
- O-Ring: M12—Red Viton Panel—Black Viton
- Contacts: Copper alloy with Gold over Nickel plating
- Wire PVC Insulation: 300V, 80C, UL1061, 0.34mm² (3-5 poles) and 0.25mm² (8 poles)

**Environmental**

- Protection: IP67
- NEMA Rating: NEMA 6

---

### Configuration Code

- **Build-a-Part Number**
- **Meters**
  - 0.3: C000
  - 1.0: M010

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**Note:** Sales drawings for all standard order numbers are available on molex.com

---

**Configuration Code**

**Build-a-Part Number**

- 8R3J20E03C3003

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**Table: Max. Current per Contact**

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<td>120070-5210</td>
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**Note:** Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Micro-Change® (M12) A-Code Receptacles (Europe)

120070/120011 Male
Front Panel Mount, Back Panel Mount

Features and Benefits
- M12 single keyway (A-coded) IEC compliant panel mount receptacles
- Available in 3, 4, 5 and 8-pole configurations
- Fully potted assemblies provide IP67/68 protection for harsh environments
- Available in an array of configurations to fit your needs:
  - Various mounting thread sizes, including pipe threads for direct mounting on pipe fittings
  - Front panel mounts for installing from the outside of the enclosure
  - Back panel mount from inside the enclosure
  - Wire leads for terminating to terminal strips or PCB tails to incorporate with electronics

Physical
- Shell Material: Nickel-plated Brass
- Contact Carriers: Polyamid
- O-Ring: Panel—Black Viton
- Contacts: Copper alloy with Gold over Nickel plating
- Wire PVC Insulation: 300V, 80C, UL1061, 0.34mm² (3-5 poles) and 0.25mm² (8 poles)

Environmental
- Protection: IP67
- NEMA Rating: NEMA 6

Configuration

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<tbody>
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Note: Sales drawings for all standard order numbers are available on molex.com

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Micro-Change® (M12) A-Code
Field Attachable Connectors (Europe)

120071
Female, Male
Straight, Right Angle

Features and Benefits
- Allows field termination of cables to IEC complaint M12 A-coded connector
- Preassembled contact carries with screw terminals provides easy field termination of conductors
- Available in 4 and 5-pole versions
- Back end housing and cable gland provides IP67 protection and strain relief

Physical
Connector Body: PA
Contact Carries: PA
O-ring: Viton
Coupling Nut: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Termination: Screw down terminals, accepts conductors up to 18 AWG (0.75mm²)

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Female Connectors

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<th>Poles</th>
<th>Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Diameter Range</th>
<th>Female Straight</th>
<th>Female Right Angle</th>
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Male Connectors

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<th>Male Straight</th>
<th>Male Right Angle</th>
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Note: Sales drawings for all standard order numbers are available on molex.com
Brad® Micro-Change® (M12) A-Code
Solid Body Splitter and Tees (Europe)
120068

Features and Benefits
- Solid body splitters allow you to create a customized wiring scheme, either by combining (2) 3 conductor cables into a 5 conductor cable or implementing a trunk-and-drop wiring topology
- Splitters permit the connection of two I/O devices to a port on dual-wired distribution boxes
- Parallel wired tees allows for tapping into a cable run or implementing a trunk and drop wiring scheme

Electrical
Voltage: 30V
Amperage: 4.0A

Physical
Connector Body: PUR (PVC for grey or yellow splitters)
Contact Carries: PUR
O-ring: Viton
Coupling Nut: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating

Environmental
Protection: IP67
NEMA Rating: NEMA 6

M12 Splitters

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<td>Yellow</td>
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<td>Leg B</td>
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<td>Leg A</td>
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<td>Leg A</td>
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Paralleled Wired Tees/Splitters

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Features and Benefits

- Splitters permit the connection of two I/O devices to a port on dual-wired distribution boxes.
- IP67/68 rated for harsh environments.
- Patented anti-vibration feature to prevent loosening under high vibration applications.
- Wide selection of cables to fit applications.
  - PVC cables for light, cost-sensitive industrial applications.
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils.
  - TPE cables for continuous flex applications. Also ideal for welding cells; cable is weld slag resistant.

Reference Information (K05 cable assemblies)
UL File No.: E152210
CSA File No.: LR6837

Physical

Connector Body: PUR (TPE for K05)
Contact Carriers: Polyamide
O-ring: Viton (EPDM for E03 cables)
Coupling Nut: Nickel-plated Brass (Teflon® coated for K05)
Contacts: Copper alloy with Gold over Nickel plating
Cables: E03—Black PVC jacket, 0.34mm² PVC conductors, 300V, 80C, UL AWM 2464
P03—Black PUR/PVC jacket, 0.34mm² PVC conductors, 300V, 80C
K05—Yellow TPE jacket, 22 AWG PVC conductors, 300V, UL PLTC-ER, +10M flex life (torsion and bending)

Environmental
Protection: IP67
NEMA Rating: NEMA 6
Brad® Micro-Change® (M12) Distribution Boxes (Europe)

120114
Top Mount, Single Wired Ports With Brad® Mini-Change® HR Connector

- Fully potted, factory assembled boxes simplify on machine wiring installations
- One input/output per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Mini-change home run connector for easy replacement

**Features and Benefits**

**Reference Information**
UL File No.: E152210
CSA File No.: LR6837

**Electrical**
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

**Physical**
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Home Run Connector: Mini-change 12-pole male connector
Wiring Configuration: Single I/O, M12 4-pole female port

**Environmental**
Protection: IP67
NEMA Rating: NEMA 6

**Port Configuration**

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**Suggested Home Run Cable Assemblies**
Brad® Mini-Change® 12-pole Female Cordsets

<table>
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<tr>
<th>Use With</th>
<th>Cable Jacket</th>
<th>No. of Conductors</th>
<th>Cable Construction</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 port block</td>
<td>PUR</td>
<td>7</td>
<td>4 x 0.34mm² + 3 x 0.75mm²</td>
<td>10.0m</td>
<td>302301P80M100</td>
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<td>6 port block</td>
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**Configuration Code**
Build-a-Part Number

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

Note: Sales drawings for all standard order numbers are available on molex.com
Features and Benefits
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Two input/outputs per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Mini-change home run connector for easy replacement

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Electrical
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

Physical
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Home Run Connector: Mini-change 19-pole male connector
Wiring Configuration: Dual I/O, M12 5-pole female port

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Box Configuration</th>
<th>Parts</th>
<th>LED Indicator</th>
<th>For Sensor</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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Note: Sales drawings for all standard order numbers are available on molex.com

Suggested Home Run Cable Assemblies
Brad® Mini-Change® 19-pole Female Cordsets

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<tr>
<th>Use With</th>
<th>Cable Jacket</th>
<th>No. of Conductors</th>
<th>Cable Construction</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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<tbody>
<tr>
<td>4 port block</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**Brad® Micro-Change® (M12) Distribution Boxes (Europe)**

**120055/120114**

**Top Mount, Single Wired Ports With M23 HR Connector**

### Features and Benefits
- Fully potted, factory assembled boxes simplify on machine wiring installations
- One input/output per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- M23 home run connector for easy replacement

### Reference Information
- UL File No.: E152210
- CSA File No.: LR6837

### Electrical
- Voltage: 10-30V DC max.
- Amperage: Module—12.0A max.
- Port—4.0A max.

### Physical
- Housing: PBT
- Port Shell Material: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Home Run Connector: M23 12-pole male connector
- Wiring Configuration: Single I/O, M12 4-pole female port

### Environmental
- Protection: IP67
- NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Box Configuration</th>
<th>Parts</th>
<th>LED Indicator</th>
<th>For Sensor</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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**Note:** Sales drawings for all standard order numbers are available on molex.com

### Suggested Home Run Cable Assemblies

**M23 12-pole Female Cordsets and Field Attachable Connector**

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<tr>
<th>Use With</th>
<th>Cable Jacket</th>
<th>No. of Conductors</th>
<th>Cable Construction</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 port block</td>
<td>PUR</td>
<td>7</td>
<td>4 x 0.34mm² + 3 x 0.75mm²</td>
<td>10.0m</td>
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<tr>
<td>6 port block</td>
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<td></td>
<td>KO2301P80M0100</td>
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<td></td>
<td></td>
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**Note:** Sales drawings for all standard order numbers are available on molex.com

### Configuration Code*

**Build-a-Part Number**

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</table>

**K02101P80M100**

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Micro-Change® (M12) Distribution Boxes (Europe)

120055/120114
Top Mount, Dual Wired Ports With M23 HR Connector

Features and Benefits
• Fully potted, factory assembled boxes simplify on machine wiring installations
• Two input/outputs per port
• Indicating LEDs for power and sensor trigger indication
• Versions available for use with PNP and NPN sensors
• M23 home run connector for easy replacement

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Electrical
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

Physical
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Home Run Connector: M23 19-pole male connector
Wiring Configuration: Dual I/O, M12 5-pole female port

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Box Configuration</th>
<th>Ports</th>
<th>LED Indicator</th>
<th>For Sensor</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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</table>

Note: Sales drawings for all standard order numbers are available on molex.com

Suggested Home Run Cable Assemblies
M23 19-pole Female Cordsets

<table>
<thead>
<tr>
<th>Use With</th>
<th>Cable Jacket</th>
<th>No. of Conductors</th>
<th>Cable Construction</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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<tbody>
<tr>
<td>4 port block</td>
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<tr>
<td>8 port block</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

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</tr>
</tbody>
</table>

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

www.molex.com
**Features and Benefits**
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Two input/outputs per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Home run terminal strip provides greatest flexibility for cable choices and trimming to length on machine

**Reference Information**
UL File No.: E152210
CSA File No.: LR6837

**Electrical**
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

**Physical**
- Housing: PBT
- Port Shell Material: Nickel Plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Home Run Connector: Terminal strip
- Wiring Configuration: Dual I/O, M12 5-pole female port

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

---

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Box Configuration</th>
<th>Ports</th>
<th>LED Indicator</th>
<th>For Sensor</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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<td>![Diagram 1]</td>
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<td>![Diagram 5]</td>
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*Note: Sales drawings for all standard order numbers are available on molex.com*
### Features and Benefits
- Fully potted, factory assembled boxes simplify on machine wiring installations
- One input/output per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Integral home run cable eliminates need for purchase of additional component for installation

### Electrical
- **Voltage:** 10-30V DC max.
- **Amperage:**
  - Module — 12.0A max.
  - Port — 4.0A max.

### Physical
- **Housing:** PBT
- **Port Shell Material:** Nickel-plated Brass
- **Contacts:** Copper alloy with Gold over Nickel plating
- **Wiring Configuration:** Single I/O, M12 4-pole female port
- **Home Run Cable:** Black PUR cable, conductors:
  - 4 port — $4 \times 0.34\text{mm}^2 + 3 \times 0.75\text{mm}^2$
  - 6 port — $6 \times 0.34\text{mm}^2 + 3 \times 0.75\text{mm}^2$
  - 8 port — $8 \times 0.34\text{mm}^2 + 3 \times 0.74\text{mm}^2$

### Environmental
- **Protection:** IP67
- **NEMA Rating:** NEMA 6

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<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Box Configuration</th>
<th>Parts</th>
<th>LED Indicator</th>
<th>For Sensor</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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<td><img src="image" alt="4 Port Diagram" /></td>
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<td>NPN</td>
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**Note:** Sales drawings for all standard order numbers are available on molex.com

**Configuration Code**

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.*
**Brad® Micro-Change® (M12) Distribution Boxes**

**120114**
Top Mount, Dual Wired Ports
With PUR HR Cable

### Features and Benefits
- Fully potted, factory assembled boxes simplify on
  machine wiring installations
- Two input/outputs per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Integral home run cable eliminates need for purchase of additional component for installing

### Reference Information
- UL File No.: E152210
- CSA File No.: LR6837

### Electrical
- Voltage: 10-30V DC max.
- Amperage: Module—12.0A max.
  Port—4.0A max.

### Physical
- Housing: PBT
- Port Shell Material: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Wiring Configuration: Dual I/O, M12 5-pole female port
- Home Run Cable: Black PUR cable, conductors:
  - 4 port—8 x 0.34mm² + 3 x 0.75mm²
  - 6 port—12 x 0.34mm² + 3 x 0.75mm²
  - 8 port—16 x 0.34mm² + 3 x 0.74mm²

### Environmental
- Protection: IP67
- NEMA Rating: NEMA 6

### Port Configuration

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Box Configuration</th>
<th>Ports</th>
<th>LED Indicator</th>
<th>For Sensor</th>
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<th>Standard Order No.</th>
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Note: Sales drawings for all standard order numbers are available on molex.com

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* Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

---

BTY805P-FBP-05
**Features and Benefits**
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Single input/output per port
- Indicating LEDs for power and sensor trigger indication
- Versions available for use with PNP and NPN sensors
- Integral home run cordset with Mini-change 19-pole male connector provides easy replacement

**Reference Information**
UL File No.: E152210
CSA File No.: LR6837

**Electrical**
Voltage: 10-30V DC max.
Amperage: Module—12.0A max.
Port—4.0A max.

**Physical**
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Wiring Configuration: Dual I/O, M12 5-pole female port
Home Run Cable: Black PUR cable, conductors:
  - 4 port—8 x 0.34mm² + 3 x 0.75mm²
  - 6 port—12 x 0.34mm² + 3 x 0.75mm²
  - 8 port—16 x 0.34mm² + 3 x 0.74mm²

**Environmental**
Protection: IP67
NEMA Rating: NEMA 6

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

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Note: Sales drawings for all standard order numbers are available on molex.com
Brad® Nano-Change® (M8) Connectors

EUROPE

Brad® Nano-Change® (M8) compact connectors and cordsets from Molex are part of a broad selection of rugged, space-saving cordsets, receptacles, inserts, splitters and molded junction boxes.

Nano-Change connectors meet IEC 61076-2-104 standards and are built “industrial tough” to ensure flexibility, interoperability and rugged performance in tight spaces while minimizing downtime, maintenance and wiring time.

Molex Nano-Change offerings include 3-, 4- and 5-pin designs. The cordsets are available with threaded and snap coupling options. A wide array of cable types provides flexibility to accommodate multiple applications.

The molded junction boxes feature a compact, space-saving design that allows simplification of control wiring systems, providing the opportunity for machine builders to design more modular devices. The Nano-Change cable system provides a way to reduce cable bundling expenses by reducing field install cabinets and field wire terminations.

Features and Benefits

Cordsets

- Available with snap or threaded coupler; single- and double-ended cordsets; 3-, 4- and 5-pole configurations; straight and 90 degrees; with and without LED to give users a wide variety of options to meet their requirements
- Compliant with IEC 61076-2-104, allowing intermating with industry-standard M8 devices
- IP67 (threaded) and IP65 (snap)-rated connector interfaces provide rugged, watertight connectors that are suited for harsh, wet environments
- Patented anti-vibration feature prevents backout in high-vibration and mechanical shock applications
- Gold-over-nickel-plated contacts feature a durable, corrosion-resistant plating that maintains low electrical resistance through the mate/unmate cycles
- Epoxy-potted, IP67-rated receptacles are ideal for rugged industrial environments
- Field attachable connectors with solder cup terminals allow users to customize their application

Distribution Boxes

- Available in 4-, 6-, 8- and 10-port distribution boxes. Single and dual I/O versions with vertical or horizontal mounting available, giving users a wide variety of options to meet application requirements.
- Fully potted housing ensures performance in vibration and fluid environments by providing rugged IP67 (IP68 cabled) rating
- Rugged, compact design allows placement in tight places anywhere on the machine

Applications

- 8.00mm proximity switches
- Miniature photo eyes
- Reed and hall effect switches
- Other miniature I/O devices and sensors
- Robotic end-of-arm tooling
- Specially sensors semiconductor assembly equipment
Brad® Nano-Change® (M8)  
Single-Ended Cordsets 
(Europe)  
120027/120086  
Female, Pigtail  
Straight, Right Angle  
Threaded

Features and Benefits
- IEC compliant M8 cordset assemblies with threaded couplers
- Small, compact design for miniature sensors and space sensitive applications
- Available in 3, 4, and 5 pole versions
- Patented anti-vibration feature to prevent loosening under high vibration applications
- IP67 rated for harsh environments
- LED version provide power and signal trigger indication for PNP sensors (NPN versions available upon request)
- Wide selection of cables to fit applications:
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - Other types available upon request

Reference Information
UL File No.: E152210 (PVC versions)

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Note: Sales drawings for all standard order numbers are available on molex.com

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Nano-Change® (M8) Single-Ended Cordsets (Europe)

120027/120086 Male, Pigtail Straight, Right Angle Threaded

Features and Benefits
• IEC compliant M8 cordset assemblies with threaded couplers
• Small, compact design for miniature sensors and space sensitive applications
• Available in 3, 4, and 5-pole versions
• Patented anti-vibration feature to prevent loosening under high vibration applications
• IP67 rated for harsh environments
• Wide selection of cables to fit applications:
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - Other types available upon request

Reference Information
UL File No.: E152210 (PVC versions)

Physical
Connector Body: PUR
Contact Carries: PUR
O-ring: Viton
Contacts: Copper alloy with Gold over Nickel plating
Cables: E03—Black PVC jacket, 0.34mm² PVC conductors, 300V, 80°C, UL AWM 2464
E02—Black PVC jacket, 0.25mm² PVC conductors, 300V, 80°C, UL AWM 2464
P03—Black PUR/PVC jacket, 0.34mm² PVC conductors, 300V, 80°C
P02—Black PUR/PVC jacket, 0.25mm² PVC conductors, 300V, 80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

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Note: Sales drawings for all standard order numbers are available on molex.com

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
Features and Benefits
- IEC compliant M8 cordset assemblies with threaded couplers
- Small, compact design for miniature sensors and space sensitive applications
- Available in 3, 4, and 5-pole versions
- Patented anti-vibration feature to prevent loosening under high vibration applications
- IP67 rated for harsh environments
- Wide selection of cables to fit applications:
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - Other types available upon request

Physical
- Connector Body: PUR
- Contact Carries: PUR
- O-ring: Viton
- Coupling Nut: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Cables: E03—Black PVC jacket, 0.34mm² PVC conductors, 300V, 80°C, UL AW2 2464
  - P03—Black PUR/PVC jacket, 0.34mm² PVC conductors, 300V, 80°C

Environmental
- Protection: IP67
- NEMA Rating: NEMA 6

Reference Information
- UL File No.: E152210 (PVC versions)

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*Note: Sales drawings for all standard order numbers are available on molex.com
Brad® Nano-Change® (M8) Receptacles (Europe)

120031/120090 Female
Front Panel Mount, Back Panel Mount

Features and Benefits
- IEC compliant M8 panel mount receptacles
- Available in 3, 4, and 5-pole versions
- Fully potted assemblies provide IP67/68 protection for harsh environments
- Available in an array of configurations to fit your needs:
  - Various mounting thread sizes, including pipe threads for direct mounting on pipe fittings
  - Front panel mounts for installing from the outside of the enclosure
  - Back panel mount from inside the enclosure
  - Wire leads for terminating to terminal strips or PCB tails to incorporate with electronics

Physical
Shell Material: Nickel-plated Brass
Contact Carriers: PBT
O-Ring: M8—Red Viton, Panel—Black Viton
Contacts: Copper alloy with Gold over Nickel plating
Wire PVC Insulation: 300V, 80°C, UL1007/1569, 0.25mm²

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Reference Information
UL File No.: E152210

Physical Specifications
- Shell Material: Nickel-plated Brass
- Contact Carriers: PBT
- O-Ring: M8—Red Viton, Panel—Black Viton
- Contacts: Copper alloy with Gold over Nickel plating
- Wire PVC Insulation: 300V, 80°C, UL1007/1569, 0.25mm²

Specifications Table

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Note: Standard order numbers are available on molex.com

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

www.molex.com

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
Brad® Nano-Change® (M8) Receptacles (Europe)

120090 Male Front Panel Mount

Features and Benefits
• IEC compliant M8 panel mount receptacles
• Mates with threaded and snap M8 cordsets
• Available in 3, 4, and 5-pole versions
• Fully potted assemblies provide IP67/68 protection for harsh environments
• Receptacles with wired leads to be used in control panels, junction boxes and sensors. Other configurations also available

Reference Information
UL File No.: E152210

Physical
Shell Material: Nickel-plated Brass
Contact Carriers: PBT
O-Ring: Panel—Black Viton
Contacts: Copper alloy with Gold over Nickel plating
Wire PVC Insulation: 300V, 80°C, UL1007/1569, 0.25mm²

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Configuration
M8x0.5, Front Panel Mount

Wire Type
PVC Lead, UL1007/1569

Wire Size
0.25mm²

Length
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</tr>
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<td>2 - White</td>
<td>3 - Blue</td>
<td></td>
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<td>2 - White</td>
<td>3 - Blue</td>
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<td></td>
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<td>3 - Blue</td>
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<th>3.0A</th>
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<th>4R5P06A27C300</th>
<th>120090-0038</th>
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<td>3 - Black</td>
<td>5 - Gray</td>
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<tr>
<td>1 - Brown</td>
<td>2 - White</td>
<td>3 - Black</td>
<td>5 - Gray</td>
<td></td>
</tr>
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<td>1 - Brown</td>
<td>2 - White</td>
<td>3 - Black</td>
<td>5 - Gray</td>
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</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code *
Build-a-Part Number

Length Code
0.3 C300
1.0 M010

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Nano-Change® (M8) 
Threaded 
Field Attachable Connectors 
(Europe)

120091 
Female, Male 
Straight, Right Angle

**Features and Benefits**
- Allows field termination of cables to IEC compliant, M8 circular connector
- Preassembled contact carrier with solder cup contacts for easy conductor termination
- Small, compact design for miniature sensors and space sensitive applications
- Available in 3 and 4-pole versions
- Back end housing and cable gland provides IP67 protection and strain relief

**Physical**
- Connector Body: PA
- Contact Carries: PA
- O-ring/Gaskets: NBR
- Coupling Nut: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Termination: Contacts with solder cups, accepts conductors up to 24 AWG (0.25 mm²)

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

---

### Female Connectors

<table>
<thead>
<tr>
<th>Poles</th>
<th>Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Diameter Range</th>
<th>Female Straight</th>
<th>Female Right Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Pole</td>
<td>3</td>
<td>4.0A</td>
<td>60V AC 75V DC</td>
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### Male Connectors

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<th>Cable Diameter Range</th>
<th>Male Straight</th>
<th>Male Right Angle</th>
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<tbody>
<tr>
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<td>3</td>
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</tbody>
</table>

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Note: Sales drawings for all standard order numbers are available on molex.com
Brad® Nano-Change® (M8) Distribution Boxes (Europe)

120113
Single Wired Ports with M16 HR Connector

Features and Benefits
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Compact—small footprint for tight spaces
- Can be mounted in two orientations for added flexibility
- One input/output per port
- Indicating LEDs for power and sensor trigger indication
- M16 home run connector for easy replacement

Electrical
Voltage: 10-30V DC max.
Amperage: Module—6.0A max.
Port—2.0A max.

Physical
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Home Run Connector: M16 14-pole male connector
Wiring Configuration: Single I/O, M8 3-pole female port
Operating Temperature: -25 to +90°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Box Configuration</th>
<th>Parts</th>
<th>LED Indicator</th>
<th>for Sensor</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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</thead>
<tbody>
<tr>
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<td>BN100P-FBC</td>
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Suggested Home Run Cable Assemblies
M16 14-pole Female Cordsets

<table>
<thead>
<tr>
<th>use with</th>
<th>Cable Jacket</th>
<th>No. conductors</th>
<th>Cable Construction</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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</thead>
<tbody>
<tr>
<td>4port Block</td>
<td>PUR</td>
<td>6</td>
<td>Black PUR, 6x0.34mm²</td>
<td>10.0m</td>
<td>L04501M78W100</td>
<td>130023-0063</td>
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<tr>
<td>6port Block</td>
<td>PUR</td>
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<td>Black PUR, 8x0.34mm²</td>
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<td>130023-0059</td>
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<td>Black PUR, 10x0.34mm²</td>
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<td>130023-0055</td>
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<td>L04601M78W100</td>
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</table>

Note: Sales drawings for all standard order numbers are available on molex.com
**Features and Benefits**
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Compact—small footprint for tight spaces
- Can be mounted in two orientations for added flexibility
- One input/output per port
- Indicating LEDs for power and sensor trigger indication
- Integral home run cable eliminates need for purchase of additional component for installing

**Electrical**
Voltage: 10-30V DC max.
Amperage: Module—6.0A max.
Port—2.0A max.

**Physical**
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Wiring Configuration: Dual I/O, M8 4-pole female port
Home Run Cable: Black PUR cable, conductors:
- 4 port—8x0.34mm² + 2x0.75mm²
- 6 port—12x0.34mm² + 2x0.75mm²
- 8 port—16x0.34mm² + 2x0.74mm²
- 10 port—20x0.25mm² + 2x0.50mm²

**Environmental**
Protection: IP67
NEMA Rating: NEMA 6

---

**Port Configuration**

<table>
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<tr>
<th>Box Configuration</th>
<th>HR Cable Exit</th>
<th>Port</th>
<th>LED Indicator</th>
<th>for Sensor</th>
<th>Length</th>
<th>Engineering No</th>
<th>Standard Order No</th>
</tr>
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<tbody>
<tr>
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<td><img src="image2" alt="End Exit" /></td>
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</table>

**Note:** Sales drawings for all standard order numbers are available on molex.com

---

**Configuration Code**

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**Cable Code**

BNYA01P-FBP-05

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.*
Brad® Nano-Change® (M8) Distribution Boxes
(Europe)
120054/120113
Dual Wired Ports with PUR HR Cable

Features and Benefits
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Compact—small footprint for tight spaces
- Can be mounted in two orientations for added flexibility
- One input/output per port
- Indicating LEDs for power and sensor trigger indication
- Integral home run cable eliminates need for purchase of additional component for installing

Electrical
Voltage: 10-30V DC max.
Amperage: Module—6.0A max.
Port—2.0A max.

Physical
Housing: PBT
Port Shell Material: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Wiring Configuration: Single I/O, M8 3-pole female port
Home Run Cable: Black PUR cable, conductors:
   4 port—4x0.34mm² + 2x0.75mm²
   6 port—6x0.34mm² + 2x0.75mm²
   8 port—8x0.34mm² + 2x0.74mm²
   10 port—10x0.34mm² + 2x0.74mm²

Environmental
Protection: IP67
NEMA Rating: NEMA 6

---

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Box Configuration</th>
<th>HR Cable Exit</th>
<th>Ports</th>
<th>LED Indicator</th>
<th>for Sensor</th>
<th>Length</th>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

Suggested Tee Splitter to Connect Two I/O per Port in Above Boxes

<table>
<thead>
<tr>
<th>Wiring Schematic</th>
<th>Description</th>
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<th>Standard Order No.</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Brad Nano-Change 'Y' Splitter</td>
<td>444430</td>
<td>120809-5002</td>
</tr>
</tbody>
</table>

www.molex.com

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
Brad® Nano-Change® (M8) Single-Ended Cordsets (Europe)

120029/120086/120088
Female, Male Pigtails
SNAP
Straight, Right Angle

Features and Benefits
- IEC compliant M8 cordset assemblies with friction fit coupler design (’SNAP’ design)
- Small, compact design for miniature sensors and space sensitive applications
- Available in 3 and 4 pole versions
- Push on to make connection, friction fit of snap feature keeps connection
- IP67 rated for harsh environments
- Wide selection of cables to fit applications:
  - PVC cables for light, cost sensitive industrial applications
  - PUR cables for moderate flexing and for environments encountering cutting fluids and oils
  - Other types available upon request

Physical
- Connector Body: PUR
- Contact Carries: PUR
- O-ring: Viton
- Coupling Nut: Nickel-plated Brass (male only)
- Contacts: Copper alloy with Gold over Nickel plating
- Cables: E03—Black PVC jacket, 0.34mm² PVC conductors, 300V, 80°C, UL AWM 2464
  - P03—Black PUR/PVC jacket, 0.34mm² PVC conductors, 300V, 80°C

Environmental
- Protection: IP67
- NEMA Rating: NEMA 6

Female Pigtails

<table>
<thead>
<tr>
<th>Poles</th>
<th>Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Pole</td>
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<td>4.0A</td>
<td>60V AC, / 75V DC</td>
<td>UL 2464 PVC (E03)</td>
<td>0.34mm²</td>
<td>2.0m</td>
</tr>
<tr>
<td>4 Pole</td>
<td>4</td>
<td>4.0A</td>
<td>60V AC, / 75V DC</td>
<td>UL 2464 PVC (E03)</td>
<td>0.34mm²</td>
<td>2.0m</td>
</tr>
</tbody>
</table>

Male Pigtails

<table>
<thead>
<tr>
<th>Poles</th>
<th>Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size</th>
<th>Length</th>
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<tr>
<td>3 Pole</td>
<td>4</td>
<td>4.0A</td>
<td>60V AC, / 75V DC</td>
<td>UL 2464 PVC (E03)</td>
<td>0.34mm²</td>
<td>2.0m</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

<table>
<thead>
<tr>
<th>Meters</th>
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<td>M100</td>
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</table>

5030000E03M020

*Cable Code

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Mini-Change® Connectors

The Brad® Mini-Change® connector family from Molex is the standard by which all industrial sealed connectors are measured.

With the introduction of the Mini-Change in 1968, Brad pioneered miniature connectors by offering the first quick-connect alternative to hardwiring. Today, Brad connectors from Molex continue to be recognized as the industry’s leading connectors for their quality, durability and the widest selection in the market.

The Brad Mini-Change connector family from Molex includes molded cordsets and receptacles available in 2- through 12-pole and 19-pole configurations, straight or right angle. Field-installed connectors are available in 3-, 4- and 5-pole configurations. Hardware choices include epoxy-coated zinc die-cast, stainless steel and nylon. A large selection of custom configurations is also available.

To ensure a reliable, low-resistance connection, Molex uses the patented Quad Beam™ female contact with gold-over-nickel plating and a stainless steel sleeve. The sealed construction provides IP67 protection. An anti-vibration feature prevents the coupler from loosening, even under extreme conditions.

Brad Mini-Change connectors from Molex continue to evolve, providing the best, most cost-effective solution for tough connector applications.

Features and Benefits

- Patented, Quad Beam™ socket contact with stainless steel sleeve maintains consistent pressure on the male pin to ensure optimum conductivity
- Gold-over-nickel-plated contacts are corrosion-resistant and help maintain low electrical resistance through high mate/unmate cycles
- Molded key indicator allows for quick and easy alignment and mating of the connector
- Integral strain relief provides 100 pounds minimum cable strain relief and radiates stress in side-loaded conditions
- Sealed to an IP67 rating to prevent the entry of water during temporary submersion

Applications

- Limit switches
- Proximity switches
- Photoelectric sensors
- Pumps
- Solar panel wiring systems
- Industrial heaters
- Commercial and industrial lighting
- Float switches on commercial sump pumps
- Industrial refrigeration systems
- Load cells
- Power connector to streetlight accessories
- Solenoid-operated valves
- Test equipment
- Portable/mobile light towers
### Brad® Mini-Change® A-Size Single-Ended Cordsets

**130006**

**Female**

**Straight, Right Angle**

**Internal Thread**

---

#### Features and Benefits
- Patented Quad Beam™ contact provides high reliability and low resistance
- Epoxy coated coupling nut is corrosion and weld slag resistant
- Cable is oil, water and abrasion resistant

#### Reference Information
- UL File No.: E152210
- CSA File No.: LR6837

#### Physical
- Connector Face: PVC
- Connector Body: PVC
- Contacts: Brass with Gold over Nickel plating
- Coupling Nut: Black epoxy coated Zinc
- Cable: A01, A02—UL Type STOOW, Hard Service Cord
- A03, A05, A06, A07—UL 2661, AWM
- C01—UL Type SOOW, Hard Service Cord
- Cable Jacket Color: Yellow
- Operating Temperature: A03, A05, A06, A07—-20 to +80°C
- A01, A02, C01—-20 to +105°C

#### Environmental
- Protection: IP67

---

**Brass® Mini-Change® A-Size Single-Ended Cordsets**

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Current</th>
<th>Voltage</th>
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<th>Cable Jacket (Cable Code)</th>
<th>Wire Size</th>
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#### Configuration Code

**Build-a-Part Number**

- **Length Code**
  - 3 = F030
  - 6 = F060
  - 12 = F120
  - 20 = F200
- **Orientation Code**
  - 2 = M020
  - 5 = M050
  - 10 = M100

- **Coupling Nut Option**
  - Stainless Steel . . . . . 1
  - Nonmetallic . . . . . . . . . . 2

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.*
### Brad® Mini-Change®
#### A-Size Single-Ended Cordsets

**130006**
**Female**
**Straight, Right Angle**
**Internal Thread**

#### Features and Benefits
- Patented Quad Beam™ contact provides high reliability and low resistance
- Epoxy coated coupling nut is corrosion and weld slag resistant
- Cable is oil, water and abrasion resistant

#### Reference Information
- UL File No.: E152210
- CSA File No.: LR6837

#### Physical
- Connector Face: PVC
- Connector Body: PVC
- Contacts: Brass with Gold over Nickel plating
- Coupling Nut: Black epoxy coated Zinc
- Cable: A01, A02—UL Type STOOW, Hard Service Cord
  - A03, A05, A06, A07—UL Type 2661, AWM
  - C01—UL Type SOOW, Hard Service Cord
- Cable Jacket Color: Yellow
- Operating Temperature: A03, A05, A06, A07—
  - -20 to +80°C
  - A01, A02, C01—-20 to +105°C
- Protection: IP67

#### Environmental

#### Configuration Code*

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
### Brad® Mini-Change®
**A-Size Single-Ended Cordsets**

**130006**
**Female**  
**Straight, Right Angle**  
**Internal Thread**

#### Features and Benefits
- Patented Quad Beam™ contact provides high reliability and low resistance
- Epoxy coated coupling nut is corrosion and weld slag resistant
- Cable is oil, water and abrasion resistant

#### Reference Information
UL File No.: E152210  
CSA File No.: LR6837

#### Environmental Protection
- IP67

#### Physical
- Connector Face: PVC
- Connector Body: PVC
- Contacts: Brass with Gold over Nickel plating
- Coupling Nut: Black epoxy coated Zinc

#### Cable Specifications
- **Cable Type**: STOOW, Hard Service Cord
- **A03, A05, A06, A07**: UL Type 2661, AWM
- **C01**: UL Type SOOW, Hard Service Cord

#### Cable Jacket Color
- **Yellow**

#### Operating Temperature
- A03, A05, A06, A07: -20 to +105°C
- A01, A02, C01: -20 to +80°C

---

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<tr>
<th>Poles (Female View)</th>
<th>Current</th>
<th>Voltage</th>
<th>Cable Type</th>
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**Note:** Sales drawings for all standard order numbers are available on molex.com

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#### Configuration Code*  
**Build-a-Part Number**

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

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**www.molex.com**

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This document provided by Barr-Thorp Electric Co., Inc.  800-473-9123  www.barr-thorpelectric.com
Brad® Mini-Change®
A-Size Single-Ended Cordsets

130006
Male
Straight, Right Angle
Internal Thread

Features and Benefits
• Low-resistance contact design with Gold over Nickel plating
• Epoxy coated coupling nut is corrosion and weld slag resistant
• Cable is oil, water and abrasion resistant

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Electrical
Voltage: 600V AC/DC

Mechanical
Wire Size: 16 AWG
Cable Type: UL Type ST00W

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Note: Sales drawings for all standard order numbers are available on molex.com

Physical
Connector Face: PVC
Connector Body: PVC
Contact: Brass with Gold over Nickel plating
Coupling Nut: Black epoxy coated Zinc
Cable: UL Type ST00W, 105C
Hard Service Cord (A01)

Environmental
Protection: IP67
Brad® Mini-Change®
A-Size Double-Ended Cordsets

130010
Female-to-Male
Straight
Internal Thread

Features and Benefits
- Patented Quad Beam™ contact provides high reliability and low resistance
- Epoxy coated coupling nut is corrosion and weld slag resistant
- Cable is oil, water and abrasion resistant

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Electrical
Voltage: 600V AC/DC

| Poles (Female View) | Current | Cable Type | Cable Jacket (Cable Code) | Wire Size AWG | Length | Female-to-Male Straight
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code* Build-a-Part Number

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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

Physical
Connector Face: PVC
Connector Body: PVC
Contact: Brass with Gold over Nickel plating
Coupling Nut: Black epoxy coated Zinc
Cable: A01—UL Type STOOW, Hard Service Cord
     C01—UL Type SOOW, Hard Service Cord
Cable Jacket Color: Yellow
Operating Temperature: -20 to +105°C

Environmental
Protection: IP67

www.molex.com

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Brad® Mini-Change®
A-Size Double-Ended Cordsets

130010
External Thread Male-to-Internal Thread Female

Features and Benefits
- Patented Quad Beam™ contact provides high reliability and low resistance
- Epoxy coated coupling nut is corrosion and weld slag resistant
- Cable is oil, water and abrasion resistant

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Electrical
Voltage: 600V AC/DC

Mechanical
Wire Size: 16 AWG

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Current</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Female-to-Male Straight</th>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

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Physical
Connector Face: PVC
Connector Body: PVC
Contact: Brass with Gold over Nickel plating
Coupling Nut: Black epoxy coated Zinc
Cable: K12, K13—UL TC-ER Continuous flex rated
A38—UL Type ST00W, Hard Service Cord
Cable Jacket Color: Yellow
Operating Temperature: -20 to +105°C

Environmental
Protection: IP67

-20 to +105°C

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**Brad® Mini-Change®**

**A-Size Receptacles With Leads**

**130013**

**Female**

**Internal Thread**

---

### Features and Benefits
- Patented Quad Beam™ contact provides high reliability and low resistance

### Reference Information
- UL File No.: E152210
- CSA File No.: LR6837

### Electrical
- Voltage: 600V AC/DC

### Mechanical
- Wire Size: 16 AWG
- Wire Type: UL 1015

---

#### Physical
- Connector Face: PVC
- Shell Material: Zinc with Nickel plate
- Mounting Thread Size: 1/2" - 14 NPT
- Cable Length: 2.0m (6.56')
- Panel Mount: Front
- Operating Temperature: -20 to +105°C

### Environmental
- Protection: IP67

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<td>130013-0426</td>
</tr>
</tbody>
</table>

---

**Note:** Sales drawings for all standard order numbers are available on molex.com

---

**Configuration Code**

*Build-a-Part Number*

<table>
<thead>
<tr>
<th>Length Code</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inches</td>
<td>A120</td>
</tr>
<tr>
<td>Meters</td>
<td>M020</td>
</tr>
</tbody>
</table>

**Coupling Nut Option**

Stainless Steel . . . . . 1

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.*
Brad® Mini-Change®
A-Size Receptacles
With Leads

130013
Female
Straight, Right Angle
Front Mount
External Thread

<table>
<thead>
<tr>
<th>Configuration Code*</th>
<th>Build-a-Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1R2004A20A1201</td>
<td>1R2004A20A1201</td>
</tr>
</tbody>
</table>

Features and Benefits
- Patented Quad Beam™ contact provides high reliability and low resistance

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Physical
Connector Face: PVC
Shell Material:
- Zinc with black epoxy coat or anodized Aluminum
- Contact: Brass with Gold over Nickel plate
- Operating Temperature: -20° to +105°C

Environmental
Protection: IP67

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration:
- Straight, Front Mount, 1/2-14 NPT
- Right Angle, Front Mount, 1/2-14 NPT
- Straight, Front Mount, Flange

Wire Type
- PVC, UL1061
- PVC, UL1061
- PVC, UL1061

Wire Size AWG
- 16
- 16
- 16

Length
- 12"
- 12"
- 12"

Poles (Female View)
- 2 Pole
- 3 Pole
- 4 Pole
- 5 Pole
- 6 Pole

Current
- 13.0A
- 13.0A
- 10.0A
- 8.0A
- 8.0A

Voltage
- 600V AC/DC
- 600V AC/DC
- 600V AC/DC
- 600V AC/DC
- 600V AC/DC

Engineering No.
- 1R2004A20A120
- 1R3004A20A120
- 1R4004A20A120
- 1R5004A20A120
- 1R6004A20A120

Standard Order No.
- 130013-0060
- 130013-0160
- 130013-0314
- 130013-0442
- 130013-0567

Orientation Code
- Stainless Steel . . . . . . . . 1†
- Nonmetallic . . . . . . . . . . . 2‡

1† Stainless steel available only with straight, 1/2-14 NPT shell or flange shell.
2‡ Nonmetallic available only with straight, 1/2-14 NPT shell.

Environment Protection: IP67

Configuration Code:
- Build-a-Part Number

Length Code
- 12 A120
- 6 F060

www.molex.com

This document provided by Barr-Thorp Electric Co., Inc.  800-473-9123    www.barr-thorp.com
Brad® Mini-Change®
A-Size Receptacles
With Leads
130013
Male
Straight, Right Angle
External Thread

Features and Benefits
- Low-resistance contact design with Gold over Nickel plating

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Physical
Connector Face: PVC
Shell Material:
- Zinc with black epoxy coat or anodized Aluminum
Contact: Brass with Gold over Nickel plate
Operating Temperature: -20 to +105°C

Environmental
Protection: IP67

<table>
<thead>
<tr>
<th>Poles (Male View)</th>
<th>Current</th>
<th>Voltage</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Configuration Code*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Pole</td>
<td>13.0A</td>
<td>600V AC/DC</td>
<td>16</td>
<td>12&quot;</td>
<td>1R2006A20A120</td>
<td>1R2007A20A120</td>
<td>1R2506A20A120</td>
</tr>
<tr>
<td>1 - White</td>
<td>2 - Black</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Pole</td>
<td>13.0A</td>
<td>600V AC/DC</td>
<td>16</td>
<td>12&quot;</td>
<td>1R3006A20A120</td>
<td>1R3007A20A120</td>
<td>1R3506A20A120</td>
</tr>
<tr>
<td>1 - Green-gnd</td>
<td>3 - White</td>
<td>2 - Black</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3 Pole</td>
<td>13.0A</td>
<td>600V AC/DC</td>
<td>16</td>
<td>12&quot;</td>
<td>1R3006A24A120</td>
<td>1R3007A20A120</td>
<td>1R3506A20A120</td>
</tr>
<tr>
<td>1 - Green-gnd</td>
<td>2 - Red with black trace</td>
<td>3 - Red with white trace</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Pole</td>
<td>10.0A</td>
<td>300V AC/DC</td>
<td>18</td>
<td>12&quot;</td>
<td>1R3006AJA120</td>
<td>1R3007A15A120</td>
<td>1R3506A17A120</td>
</tr>
<tr>
<td>1 - Green-gnd</td>
<td>2 - Red with black trace</td>
<td>3 - Red with white trace</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number
1R2006A20A120

Length Code
12 A120
6 F060
2 M020

Cable Code
A120
A150
A170

Orientation Code
PVC, UL1061
PVC, UL1061
PVC, UL1061

Coupling Nut Option
Stainless Steel . . . . . 1
Nonmetallic . . . . . . 2

* Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
† Stainless steel available only with straight, 1/2-14" NPT shell or flange shell.
‡ Nonmetallic available only with straight, 1/2-14" NPT shell.
Features and Benefits
- Low resistance contact design with Gold over Nickel plating

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Physical
Connector Face: PVC
Shell Material:
Zinc with black epoxy coat or anodized Aluminum
Contact: Brass with Gold over Nickel plate
Operating Temperature: -20 to +105°C

Environmental
Protection: IP67

Brad® Mini-Change®
A-Size Receptacles
With Leads
130013
Male
Straight, Right Angle
External Thread

11 Pole Configuration

Wire Type
2 Pole
3 Pole
4 Pole

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Pole</td>
<td>10.0A</td>
<td>300V AC/DC</td>
<td>18</td>
<td>1R3006A25A120</td>
<td>130013-0238</td>
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<tr>
<td>3 Pole</td>
<td>10.0A</td>
<td>600V AC/DC</td>
<td>16</td>
<td>1R4006A20A120</td>
<td>130013-0353</td>
<td>1R4007A20A120</td>
<td>130013-0386</td>
<td>1R4G06A20A120</td>
<td>130013-0409</td>
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<tr>
<td>4 Pole</td>
<td>7.0A</td>
<td>300V AC/DC</td>
<td>18</td>
<td>1R4006A16A120</td>
<td>130013-0341</td>
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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code®
Build-a-Part Number

1R2006A20A1201

Coupling Nut Option
Stainless Steel . . . . . . 1†
Nonmetallic . . . . . . . . . . . . . 2‡

*Coupling Nut Option
†Stainless steel available only with straight, 1/2"-14 NPT shell or flange shell.
‡Nonmetallic available only with straight, 1/2"-14 NPT shell.

Configuration Code
Build-a-Part Number

1R2006A20A1201

Coupling Nut Option
Stainless Steel . . . . . . 1†
Nonmetallic . . . . . . . . . . . . . 2‡

*Coupling Nut Option
†Stainless steel available only with straight, 1/2"-14 NPT shell or flange shell.
‡Nonmetallic available only with straight, 1/2"-14 NPT shell.
### Features and Benefits
- Low resistance contact design with Gold over Nickel plating

### Reference Information
- UL File No.: E152210
- CSA File No.: LR6837

### Physical
- Connector Face: PVC
- Shell Material: Zinc with black epoxy coat or anodized Aluminum
- Contact: Brass with Gold over Nickel plate
- Operating Temperature: -20 to +105°C
- Environmental Protection: IP67

### 130013 Male
- Straight, Right Angle
- External Thread

### Configuration

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12&quot;</td>
<td>PVC, UL1061</td>
<td>16</td>
<td>5 Pole</td>
<td>8.0A</td>
<td>600V AC/DC</td>
<td>1R5006A20A120</td>
<td>130013-0493</td>
<td>1R5007A20A120</td>
<td>130013-0534</td>
<td>1R5G06A20A120</td>
<td>130013-0557</td>
</tr>
<tr>
<td>12&quot;</td>
<td>PVC, UL1061</td>
<td>16</td>
<td>5 Pole</td>
<td>6.6A</td>
<td>300V AC/DC</td>
<td>1R5006A24A120</td>
<td>130013-0515</td>
<td>1R5006A17A120</td>
<td>130013-0489</td>
<td>1R5D06A25A120</td>
<td>130013-0548</td>
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<tr>
<td>12&quot;</td>
<td>PVC, UL1061</td>
<td>16</td>
<td>6 Pole</td>
<td>8.0A</td>
<td>600V AC/DC</td>
<td>1R6006A20A120</td>
<td>130013-0593</td>
<td>1R6007A20A120</td>
<td>130013-0612</td>
<td>1R6G06A20A120</td>
<td>130013-0620</td>
</tr>
</tbody>
</table>

### Notes:
- Sales drawings for all standard order numbers are available on molex.com
- Stainless steel available only with straight, 1/2"-14 NPT shell or flange shell.
- Nonmetallic available only with straight, 1/2"-14 NPT shell.
**Brad® Mini-Change® A-Size Bulkhead Pass-Through Receptacles**

**130013 Straight**

**Features and Benefits**
- Patented Quad Beam™ contact provides high reliability and low resistance
- Allows through-panel quick connection

**Reference Information**
- CSA File No.: LR6837

**Mechanical**
- Voltage: 600V AC/DC

**Physical**
- Connector Face: PVC
- Contacts: Brass with Gold over Nickel plating
- Shell: Nickel-plated Brass
- Protection: IP67

### Features and Benefits

- Patented Quad Beam™ contact provides high reliability and low resistance.
- Allows through-panel quick connection.

### Reference Information

- **CSA File No.**: LR6837

### Mechanical

- **Voltage**: 600V AC/DC

### Physical

- **Connector Face**: PVC
- **Contacts**: Brass with Gold over Nickel plating
- **Shell**: Nickel-plated Brass
- **Protection**: IP67

### Engineering and Standard Order Numbers

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Mounting Thread Size</th>
<th>Current</th>
<th>Straight</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Pole</td>
<td>7/8&quot; - 16 UN-2A</td>
<td>10.0A</td>
<td>1R4030</td>
</tr>
<tr>
<td>5 Pole</td>
<td>7/8&quot; - 14 UN-2A</td>
<td>8.0A</td>
<td>1R5030</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com.
**Brad® Mini-Change®**

**A-Size**

**Field Attachable Connectors With Screw Termination**

**130017**

**Female, Male**

**Straight**

**Internal/External Thread**

---

**Features and Benefits**

- Patented Quad-Beam™ contact design for reliability and low resistance
- Allows easy conversion to quick-connect or the repair of damaged, molded connectors

**Reference Information**

CSA File No.: LR6837

**Electrical**

Voltage: 600V AC/DC

**Mechanical**

Wire Size: 15 to 24 AWG
Cable Range: 5.08 to 11.43mm (.200 to .450")

---

**Technical Specifications**

**Physical**

Connector Face: Polyurethane
Connector Body: Nylon
Contact: Brass with Gold over Nickel plating
Coupling Nut: Nickel-plated Brass
Operating Temperature: -20 to +80°C

**Environmental**

Protection: IP67

---

**Table of Connectors**

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Coupling Type</th>
<th>Current</th>
<th>Female Straight</th>
<th>Male Straight</th>
<th>Male Straight</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Pole</td>
<td>Internal Thread</td>
<td>13.0A</td>
<td>1A3000-34</td>
<td>130017-0004</td>
<td>1A3002-34</td>
</tr>
<tr>
<td></td>
<td>External Thread</td>
<td></td>
<td>1A3006-34</td>
<td>130017-0011</td>
<td></td>
</tr>
<tr>
<td>4 Pole</td>
<td>Internal Thread</td>
<td>10.0A</td>
<td>1A4000-34</td>
<td>130017-0015</td>
<td>1A4002-34</td>
</tr>
<tr>
<td></td>
<td>External Thread</td>
<td></td>
<td>1A4006-34</td>
<td>130017-0020</td>
<td></td>
</tr>
<tr>
<td>5 Pole</td>
<td>Internal Thread</td>
<td>8.0A</td>
<td>1A5000-34</td>
<td>130017-0023</td>
<td>1A5002-34</td>
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<tr>
<td></td>
<td>External Thread</td>
<td></td>
<td>1A5006-34</td>
<td>130017-0029</td>
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</tbody>
</table>

**Note:** Sales drawings for all standard order numbers are available on molex.com

**Configuration Code**

```
1A3000-348
```

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

---

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123  www.barr-thorp.com
# Brad® Mini-Change® A-Size Plugs for Liquid-Tight Conduit

## 130006/130018 Female, Male

**Features and Benefits**
- Patented Quad Beam™ contact design for reliability and low resistance
- Fits standard 1/2” liquid-tight conduit

**Reference Information**
- UL File No.: E152210
- CSA File No.: LR6837

**Electrical**
- Voltage: 600V AC/DC

**Mechanical**
- Wire Size: 16 AWG
- Wire Type: UL 1015

**Physical**
- Connector Face: PVC
- Contact: Brass with Gold over Nickel plating
- Connector Body: Zinc-plated Steel
- Coupling Nut: Anodized Aluminum
- Operating Temperature: -20 to +80°C
- Protection: IP67

---

### Pole Configurations

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Current</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3 Pole</strong></td>
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<td></td>
</tr>
<tr>
<td>1 - Green-gnd</td>
<td>13.0A</td>
<td>40925</td>
<td>130006-2099</td>
</tr>
<tr>
<td>2 - Black</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 - White</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4 Pole</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 - Black</td>
<td>10.0A</td>
<td>41132</td>
<td>130006-2103</td>
</tr>
<tr>
<td>2 - White</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3 - Red</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 - Green-gnd</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>5 Pole</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1 - White</td>
<td>8.0A</td>
<td>41344</td>
<td>130006-2107</td>
</tr>
<tr>
<td>2 - Orange</td>
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<tr>
<td>3 - Black</td>
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<td>4 - Orange</td>
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</tr>
<tr>
<td>5 - Black</td>
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<td></td>
</tr>
</tbody>
</table>

---

*Note: Sales drawings for all standard order numbers are available on molex.com*
**Features and Benefits**
- Patented Quad Beam™ contact design for reliability and low resistance

**Reference Information**
UL File No.: E152210

**Electrical**
Voltage: 600V AC/DC

**Physical**
Connector Face: PVC
Connector Body: TPE
Contact: Brass with Gold over Nickel plating
Coupling Nut: Zinc with black epoxy coat
Operating Temperature: -20 to +105°C

**Environmental**
Protection: IP67

---

**Tees**

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Current</th>
<th>Female Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Pole</td>
<td>13.0A</td>
<td>61056</td>
<td>130018-0217</td>
</tr>
<tr>
<td>4 Pole</td>
<td>10.0A</td>
<td>DNETAUXPT</td>
<td>130035-0085</td>
</tr>
<tr>
<td>5 Pole</td>
<td>8.0A</td>
<td>PBAPT</td>
<td>120101-0001</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
Brad® Mini-Change®
A-Size Adaptors

130018
Right Angle

Features and Benefits
- Patented Quad Beam™ contact design for reliability and low resistance

Reference Information
UL File No.: E159210
CSA File No.: LR6037

Physical
Connector Face: PVC
Connector Body: PVC
Contact: Brass Gold over Nickel plating
Coupling Nut: Zinc with black epoxy coat
Operating Temperature: -20 to +105°C

Environmental
Protection: IP67

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Pole</td>
<td>13.0A</td>
<td>40761</td>
<td>130018-0204</td>
</tr>
<tr>
<td>3 Pole</td>
<td>13.0A</td>
<td>41048</td>
<td>130018-0206</td>
</tr>
<tr>
<td>4 Pole</td>
<td>10.0A</td>
<td>41212</td>
<td>130018-0207</td>
</tr>
<tr>
<td>5 Pole</td>
<td>8.0A</td>
<td>41481</td>
<td>130018-0210</td>
</tr>
</tbody>
</table>

Brad® Mini-Change®
A-Size Accessories

130201
Caps and Threaded Unions

Features and Benefits
- Protects connector from dust and moisture

Physical
Material: Anodized Aluminum
Chain: Zinc-plated Steel

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closure Cap</td>
<td>A-size with 7/8&quot;-14NPT-24 Internal Thread</td>
<td>65-0004</td>
<td>130201-1111</td>
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<tr>
<td></td>
<td>A-size with 7/8&quot;-16NPT-2A-External Thread</td>
<td>65-0085</td>
<td>130201-1109</td>
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<tr>
<td>Threaded Union</td>
<td>Adapter 7/8&quot; External Thread</td>
<td>55-0426</td>
<td>130201-1224</td>
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</tbody>
</table>
**Features and Benefits**
- Patented Quad Beam™ contact provides high reliability and low resistance
- Fully potted, factory assembled boxes simplify on machine wiring installations
- One input or output per port
- Brad® Mini-Change Home-run connector for easy replacement

**Reference Information**
UL Recognized—E152210
CSA Certified—LR6837

**Electrical**
Voltage: 600V AC/DC
Current: Module—7.0A max.
Port—10.0A max.

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Parts</th>
<th>Box Configuration</th>
<th>Wiring Schematic</th>
<th>LED Indicator</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>4-port block</td>
<td>PVC</td>
<td>6 x 16 AWG</td>
<td>6'</td>
<td>No</td>
<td>409P401</td>
</tr>
<tr>
<td>6</td>
<td>6-port block</td>
<td>PVC</td>
<td>8 x 16 AWG</td>
<td>6'</td>
<td>No</td>
<td>409P601</td>
</tr>
<tr>
<td>8</td>
<td>8-port block</td>
<td>PVC</td>
<td>10 x 16 AWG</td>
<td>6'</td>
<td>No</td>
<td>409P801</td>
</tr>
</tbody>
</table>

For connection to ports, see Brad Mini-Change 3-pole female internal double-ended cordsets

**Physical**
Housing: PET
Port Shell Material: Epoxy coated Zinc
Connector Face: PVC
Contacts: Brass with Gold over Nickel plating
Home Run Connector: Brad Mini-Change male connector
Wiring Configuration: Single I/O, Brad Mini-Change 3-pole female port
Operating Temperature: -20 to +80°C

**Environmental**
Protection: IP67

**Suggested Home Run Cable Assemblies**
Brad Mini-Change Female Cordsets

<table>
<thead>
<tr>
<th>Use With</th>
<th>Cable Jacket</th>
<th>No. of Conductors</th>
<th>Cable Construction</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-port block</td>
<td>PVC</td>
<td>6</td>
<td>6 x 16 AWG</td>
<td>6'</td>
<td>1060004011120</td>
<td>130066-1590</td>
</tr>
<tr>
<td>6-port block</td>
<td>PVC</td>
<td>8</td>
<td>8 x 16 AWG</td>
<td>6'</td>
<td>2080004011120</td>
<td>130007-0145</td>
</tr>
<tr>
<td>8-port block</td>
<td>PVC</td>
<td>10</td>
<td>10 x 16 AWG</td>
<td>6'</td>
<td>3010004011120</td>
<td>130008-0028</td>
</tr>
</tbody>
</table>
Brad® Mini-Change® A-Size MPIS Distribution Boxes

**130006**
Side Mount
Single-Wired Ports with LEDs

---

**Features and Benefits**
- Patented Quad Beam™ contact provides high reliability and low resistance
- Fully potted, factory assembled boxes simplify on machine wiring installations
- One input or output per port
- Indicating LEDs for power and sensor trigger indication
- Brad Mini-Change Home-run connector for easy replacement

**Reference Information**
UL Recognized—E152210
CSA Certified—LR6837

---

**Port Configuration** | **Parts** | **Box Configuration** | **Wiring Schematic** | **LED Indicator** | **Engineering No.** | **Standard Order No.**
---|---|---|---|---|---|---
4 | 3 Pole | 1 - Ground 2 - Load | | Yes | 410P401 | 130060-0023
6 | | | | Yes | 410P601 | 130060-0024
8 | | | | Yes | 410P801 | 130060-0026

For connection to ports, see Brad Mini-Change 3-pole female-male internal double-ended cordsets

---

**Suggested Home Run Cable Assemblies**
Brad Mini-Change Female Cordsets

<table>
<thead>
<tr>
<th>Use With</th>
<th>Cable Jacket</th>
<th>No. of Conductors</th>
<th>Cable Construction</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-port block</td>
<td>PVC</td>
<td>7</td>
<td>7 x 16 AWG</td>
<td>6'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-port block</td>
<td>PVC</td>
<td>9</td>
<td>9 x 16 AWG</td>
<td>6'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-port block</td>
<td>PVC</td>
<td>12</td>
<td>12 x 16 AWG</td>
<td>6'</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Electrical**
Voltage: 600V AC/DC
Current: Module—7.0A max.
Port—10.0A max.

**Physical**
Housing: PET
Port Shell Material: Epoxy coated Zinc
Connector Face: PVC
Contacts: Brass with Gold over Nickel plating
Home Run Connector: Brad Mini-Change male connector
Wiring Configuration: Single I/O, Brad Mini-Change 3-pole female port
Operating Temperature: -20 to +80°C

**Environmental**
Protection: IP67

---

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
Brad® Mini-Change® A-Size
MPIS Distribution Boxes

130060
Side Mount
Series-Wired Ports

Features and Benefits
- Patented Quad Beam™ contact provides high reliability and low resistance
- Fully potted, factory assembled boxes simplify on machine wiring installations
- Series wired ports for AND or NOR wiring logic
- Brad Mini-Change Home-run connector for easy replacement

Reference Information
UL Recognized—E152210
CSA Certified—LR6837

Electrical
Voltage: 600V AC/DC
Amperage: Module—7.0A max.
   Port—10.0A max.

Physical
Housing: PET
Port Shell Material: Epoxy coated Zinc
Connector Face: PVC
Contacts: Brass with Gold over Nickel plating
Home Run Connector: Brad Mini-Change male connector
Wiring Configuration: Single I/O, Brad Mini-Change 3-pole female port
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67

<table>
<thead>
<tr>
<th>Port Configuration</th>
<th>Ports</th>
<th>Box Configuration</th>
<th>Wiring Schematic</th>
<th>LED Indicator</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Pole</td>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
<td>40PP403</td>
<td>130060-0002</td>
</tr>
</tbody>
</table>

1 - Ground
2 - Load (L2)
3 - Common

For connection to ports, see Brad Mini-Change 3-pole female male internal double-ended cordsets

Suggested Home Run Cable Assemblies
Brad Mini-Change Female Cordsets

<table>
<thead>
<tr>
<th>Use With</th>
<th>Cable Jacket</th>
<th>No. of Conductors</th>
<th>Cable Construction</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-port block</td>
<td>PVC</td>
<td>3</td>
<td>3 x 16 AWG</td>
<td>6'</td>
<td>10300040111029</td>
<td>130006-2232</td>
</tr>
</tbody>
</table>

This document provided by Barr-Thorp Electric Co., Inc.  800-473-9123  www.barr-thorp.com
# Brad® Mini-Change® A-Size MPIS Distribution Boxes

## 130060
**Side Mount**  
**Parallel-Wired Ports**

### Features and Benefits
- Patented Quad Beam™ contact provides high reliability and low resistance
- Fully Potted, factory assembled boxes simplify on machine wiring installations
- Each pole parallel-wired throughout the block for easy power or signal distribution
- Brad Mini-Change Home-run connector for easy replacement

### Electrical
- Current: 3 Pole—13.0A  
  4 Pole—10.0A  
- Voltage: 600V AC/DC

### Physical
- Housing: PET  
- Port Shell Material: Epoxy coated Zinc  
- Connector Face: PVC  
- Contacts: Brass with Gold over Nickel plating  
- Home Run Connector: Brad Mini-Change male connector  
- Wiring Configuration: Parallel-wired  
- Operating Temperature: -20 to +80°C

### Environmental
- Protection: IP67

### Suggested Port and Home Run Cable Assemblies

#### Brad Mini-Change Female-Male Double Ended Cordsets

<table>
<thead>
<tr>
<th>Use With</th>
<th>Cable Jacket</th>
<th>No. of Conductors</th>
<th>Cable Construction</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-port block</td>
<td>TPE</td>
<td>3</td>
<td>3 x 16 AWG</td>
<td>2.0m</td>
<td>113030K13M020</td>
<td>130010-0468</td>
</tr>
<tr>
<td>8-port block</td>
<td>TPE</td>
<td>4</td>
<td>4 x 16 AWG</td>
<td>2.0m</td>
<td>114030K12M020</td>
<td>130010-0865</td>
</tr>
</tbody>
</table>

---

[www.molex.com](http://www.molex.com)
**Features and Benefits**
- Patented Quad Beam™ contact provides high reliability and low resistance
- Epoxy coated coupling nut is corrosion and weld slag resistant
- Cable is oil, water and abrasion resistant

**Reference Information**
- UL File No.: E152210
- CSA File No.: LR6837

**Electrical**
- Voltage: 600V AC/DC

**Mechanical**
- Wire Size: 16 AWG
- Cable Type: UL Type ST00W

**Physical**
- Connector Face: PVC
- Connector Body: PVC
- Contact: Brass with Gold over Nickel plating
- Coupling Nut: Black epoxy coated Zinc
- Cable: A01—UL Type ST00W, Hard Service Cord
- Cable Jacket: PVC
- Cable Jacket Color: Yellow
- Operating Temperature: -20 to +105°C
- Protection: IP67

---

### Pole Counts

<table>
<thead>
<tr>
<th>Poles</th>
<th>Current</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Pole</td>
<td>8.0A</td>
<td>ST00W</td>
<td>PVC (A01)</td>
<td>16</td>
<td>6'</td>
<td>206000A01F060</td>
<td>130007-0024</td>
</tr>
<tr>
<td>7 Pole</td>
<td>8.0A</td>
<td>ST00W</td>
<td>PVC (A01)</td>
<td>16</td>
<td>6'</td>
<td>207000A01F060</td>
<td>130007-0073</td>
</tr>
<tr>
<td>8 Pole</td>
<td>7.0A</td>
<td>ST00W</td>
<td>PVC (A01)</td>
<td>16</td>
<td>6'</td>
<td>208000A01F060</td>
<td>130007-0142</td>
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</table>

**Configuration Code**
- Build-a-Part Number

<table>
<thead>
<tr>
<th>Foot</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>F030</td>
</tr>
<tr>
<td>6</td>
<td>F060</td>
</tr>
<tr>
<td>12</td>
<td>F120</td>
</tr>
<tr>
<td>20</td>
<td>F200</td>
</tr>
</tbody>
</table>

**Coupling Nut Option**
- Stainless Steel . . . . . 1

Note: Sales drawings for all standard order numbers are available on molex.com

---

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.*
Brad® Mini-Change®
B-Size Single-Ended Cordsets

130007
Male
Straight
Internal Thread

Features and Benefits
- Low-resistance contact design with Gold over Nickel plating
- Epoxy coated coupling nut is corrosion and weld slag resistant
- Cable is oil, water and abrasion resistant

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Electrical
Voltage: 600V AC/DC

Mechanical
Wire Size: 16 AWG
Cable Type: UL Type ST00W

<table>
<thead>
<tr>
<th>Poles</th>
<th>Current</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size</th>
<th>Length</th>
<th>Male Straight</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Pole</td>
<td>8.0A</td>
<td>ST00W</td>
<td>PVC (A01)</td>
<td>16</td>
<td>6'</td>
<td>206002A01F060</td>
</tr>
<tr>
<td>7 Pole</td>
<td>8.0A</td>
<td>ST00W</td>
<td>PVC (A01)</td>
<td>16</td>
<td>6'</td>
<td>207002A01F060</td>
</tr>
<tr>
<td>8 Pole</td>
<td>7.0A</td>
<td>ST00W</td>
<td>PVC (A01)</td>
<td>16</td>
<td>6'</td>
<td>208002A01F060</td>
</tr>
</tbody>
</table>

Environmental
Protection: IP67

Physical
Connector Face: PVC
Connector Body: PVC
Contact: Brass with Gold over Nickel plating
Coupling Nut: Black epoxy coated Zinc
Cable: A01—UL Type ST00W, Hard Service Cord
Cable Jacket: PVC
Cable Jacket Color: Yellow
Operating Temperature: -20 to +105°C

Configuration Code
Build-a-Part Number

<table>
<thead>
<tr>
<th>Feet</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>F030</td>
</tr>
<tr>
<td>6</td>
<td>F060</td>
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<tr>
<td>12</td>
<td>F120</td>
</tr>
<tr>
<td>20</td>
<td>F200</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Mini-Change®
B-Size Double-Ended Cordsets

130011
Female Straight-to-Male Straight
Internal Thread

Features and Benefits
• Patented Quad Beam™ contact provides high reliability
and low resistance
• Epoxy coated coupling nut is corrosion and weld slag
resistant
• Cable is oil, water and abrasion resistant

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Electrical
Voltage: 600V AC/DC

Mechanical
Wire Size: 16 AWG
Cable Type: UL Type STOOW

Physical
Connector Face: PVC
Connector Body: PVC
Contact: Brass with Gold over Nickel plating
Coupling Nut: Black epoxy coated Zinc
Cable: A01—UL Type STOOW hard service cord
Cable Jacket: PVC
Cable Jacket Color: Yellow
Operating Temperature: -20 to +105°C

Environmental
Protection: IP67

**Female Straight-to-Male Straight**

<table>
<thead>
<tr>
<th>Pole (Female View)</th>
<th>Current</th>
<th>Cable Type</th>
<th>Cable Jacket (Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Pole</td>
<td>8.0A</td>
<td>STOOW</td>
<td>PVC (A01)</td>
<td>16</td>
<td>6’</td>
<td>226020A01F060</td>
<td>130011-0010</td>
</tr>
<tr>
<td>7 Pole</td>
<td>8.0A</td>
<td>STOOW</td>
<td>PVC (A01)</td>
<td>16</td>
<td>6’</td>
<td>227020A01F060</td>
<td>130011-0051</td>
</tr>
<tr>
<td>8 Pole</td>
<td>7.0A</td>
<td>STOOW</td>
<td>PVC (A01)</td>
<td>16</td>
<td>6’</td>
<td>228020A01F060</td>
<td>130011-0119</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

<table>
<thead>
<tr>
<th>Feet</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>F030</td>
</tr>
<tr>
<td>6</td>
<td>F060</td>
</tr>
<tr>
<td>12</td>
<td>F120</td>
</tr>
<tr>
<td>20</td>
<td>F200</td>
</tr>
</tbody>
</table>

Coupling Nut Option
Stainless Steel . . . . . . 1

Cable Code
Orientation Code

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**Brad® Mini-Change®**

**B-Size Receptacles**

**With Leads**

**130014**

**Female**

**External Thread**

---

**Features and Benefits**
- Patented Quad Beam™ contact provides high reliability and lower resistance

**Reference Information**
- UL File No.: E152210
- CSA File No.: LR6837

**Electrical**
- Voltage: 600V AC/DC

**Mechanical**
- Wire Size: 16 AWG
- Wire Type: UL 1015

---

### Physical
- Connector Face: PVC
- Shell Material: Zinc with black epoxy coat
- Mounting Thread Size: 1/2" - 14 NPT
- Panel Mount: Front
- Cable Length: 0.305m (1.0')
- Operating Temperature: -20 to +105°C

### Environmental
- Protection: IP67

---

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Pole</td>
<td>1 - White-Black</td>
<td>1 - Black; 2 - White</td>
<td>2R6004A20A120 130014-0015</td>
</tr>
<tr>
<td>5 Pole</td>
<td>1 - White-Black</td>
<td>1 - Blue; 2 - White</td>
<td>2R7004A20A120 130014-0037</td>
</tr>
<tr>
<td>8 Pole</td>
<td>1 - White-Black</td>
<td>1 - Orange; 2 - Blue</td>
<td>2R8004A20A120 130014-0061</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

---

**Coupling Nut Option**
- Stainless Steel . . . . . 1

**Configuration Code**
- Build-a-Part Number

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.*
Brad® Mini-Change®
B-Size Receptacles
With Leads
130014
Male
External Thread

Features and Benefits
- Low resistance contact design with Gold over Nickel plating

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Electrical
Voltage: 600V AC/DC

Mechanical
Wire Size: 16 AWG
Wire Type: UL 1015

Physical
Connector Face: PVC
Shell Material: Zinc with black epoxy coat
Mounting Thread Size: 1/2" - 14 NPT
Panel Mount: Front
Cable Length: 0.305m (1.0')
Operating Temperature: -20 to +105°C
Environmental
Protection: IP67

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>6 Pole</td>
<td>8.0A</td>
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<td>130014-0025</td>
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<tr>
<td>7 Pole</td>
<td>8.0A</td>
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<td>130014-0050</td>
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<td>8 Pole</td>
<td>7.0A</td>
<td>2R806A20A120</td>
<td>130014-0078</td>
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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

**Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

www.molex.com
**Brad® Mini-Change®**

**B-Size Accessories**

**130201**

**Threaded**

### Features and Benefits
- Protects connector from dust and moisture

### Physical
- **Material:** Anodized Aluminum
- **Chain:** Zinc-plated Steel


<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Closure Cap</td>
<td>1&quot;-16UN-2A Internal Thread, Anodized Aluminum with Steel Bead Chain</td>
<td>65-0103</td>
<td>130201-1116</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1&quot;-16UN-2B External Thread, Anodized Aluminum with Steel Bead Chain</td>
<td>65-0102</td>
<td>130201-1115</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Threaded Union</td>
<td>Adapter, 1&quot;-16UN-2A External Thread, Anodized Aluminum</td>
<td>55-0466</td>
<td>130201-1326</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Brad® Mini-Change®
C-Size Single-Ended Cordsets

130008
Female
Straight, Right Angle
Internal Thread

Features and Benefits
- Patented Quad Beam™ contact provides high reliability and low resistance
- Epoxy coated coupling nut is corrosion and weld slag resistant
- Cable is oil, water and abrasion resistant

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Electrical
Voltage: 600V AC/DC

Mechanical
Wire Size: 16 AWG
Cable Type: UL Type STOW

Physical
Connector Face: PVC
Connector Body: PVC
Contact: Brass with Gold over Nickel plating
Coupling Nut: Black epoxy coated Zinc
Cable: A01—UL Type STOW hard service cord
Cable Jacket: PVC
Cable Jacket Color: Yellow
Operating Temperature: -20 to +105°C
Environmental
Protection: IP67

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9 Pole</td>
<td>7.0A</td>
<td>STOW</td>
<td>PVC (A01)</td>
<td>16 AWG</td>
<td>6'</td>
<td>309000A01F060</td>
<td>130008-0325</td>
<td>309001A01F060</td>
<td>130008-0351</td>
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<td>10 Pole</td>
<td>7.0A</td>
<td>STOW</td>
<td>PVC (A01)</td>
<td>16 AWG</td>
<td>6'</td>
<td>301000A01F060</td>
<td>130008-0025</td>
<td>301001A01F060</td>
<td>130008-0098</td>
</tr>
<tr>
<td>12 Pole</td>
<td>5.0A</td>
<td>STOW</td>
<td>PVC (A01)</td>
<td>16 AWG</td>
<td>6'</td>
<td>302000A01F060</td>
<td>130008-0157</td>
<td>302001A01F060</td>
<td>130008-0212</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code
Build-a-Part Number

<table>
<thead>
<tr>
<th>Feet</th>
<th>Length</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
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<td>F020</td>
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</tr>
<tr>
<td>6</td>
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<tr>
<td>12</td>
<td>F120</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>F200</td>
<td></td>
</tr>
</tbody>
</table>

309000A01F060

Coupling Nut Option
Stainless Steel . . . . . 1

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**Brad® Mini-Change® C-Size Single-Ended Cordsets**

**130008**

- Male
- Straight
- Internal Thread

### Features and Benefits
- Low-resistance contact design with Gold over Nickel plating
- Epoxy coated coupling nut is corrosion and weld slag resistant
- Cable is oil, water and abrasion resistant

### Reference Information
- UL File No.: E152210
- CSA File No.: LR6837

### Electrical
- Voltage: 600V AC/DC

### Mechanical
- Wire Size: 16 AWG
- Cable Type: UL Type STOOW

### Physical
- Connector Face: PVC
- Connector Body: PVC
- Contact: Brass with Gold over Nickel plating
- Coupling Nut: Black epoxy coated Zinc
- Cable: A01—UL Type STOOW hard service cord
- Cable Jacket: PVC
- Cable Jacket Color: Yellow
- Operating Temperature: -20 to +105°C

### Environmental
- Protection: IP67

---

**Features and Benefits**
- Low-resistance contact design with Gold over Nickel plating
- Epoxy coated coupling nut is corrosion and weld slag resistant
- Cable is oil, water and abrasion resistant

**Reference Information**
- UL File No.: E152210
- CSA File No.: LR6837

**Electrical**
- Voltage: 600V AC/DC

**Mechanical**
- Wire Size: 16 AWG
- Cable Type: UL Type STOOW

**Physical**
- Connector Face: PVC
- Connector Body: PVC
- Contact: Brass with Gold over Nickel plating
- Coupling Nut: Black epoxy coated Zinc
- Cable: A01—UL Type STOOW hard service cord
- Cable Jacket: PVC
- Cable Jacket Color: Yellow
- Operating Temperature: -20 to +105°C

**Environmental**
- Protection: IP67

---

**Male Straight**

<table>
<thead>
<tr>
<th>Poles</th>
<th>Current</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 Pole</td>
<td>7.0A</td>
<td>STOOW</td>
<td>PVC (A01)</td>
<td>16</td>
<td>6'</td>
<td>309003A01F060</td>
<td>130008-0366</td>
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<tr>
<td></td>
<td>1 - Orange</td>
<td>2 - Blue</td>
<td>3 - Red-Black trace</td>
<td>4 - Green-Black trace</td>
<td>5 - White</td>
<td>6 - Red</td>
<td>7 - Green</td>
</tr>
<tr>
<td>10 Pole</td>
<td>7.0A</td>
<td>STOOW</td>
<td>PVC (A01)</td>
<td>16</td>
<td>6'</td>
<td>309003A01F060</td>
<td>130008-0117</td>
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<tr>
<td></td>
<td>1 - Orange</td>
<td>2 - Blue</td>
<td>3 - White-Black trace</td>
<td>4 - Green-Black trace</td>
<td>5 - Orange-Black trace</td>
<td>6 - Orange-Black trace</td>
<td>7 - Red</td>
</tr>
<tr>
<td>12 Pole</td>
<td>5.0A</td>
<td>STOOW</td>
<td>PVC (A01)</td>
<td>16</td>
<td>6'</td>
<td>309003A01F060</td>
<td>130008-0231</td>
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**Configuration Code**

<table>
<thead>
<tr>
<th>Feet</th>
<th>Code</th>
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<td>F050</td>
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<tr>
<td>6</td>
<td>F060</td>
</tr>
<tr>
<td>12</td>
<td>F120</td>
</tr>
<tr>
<td>20</td>
<td>F200</td>
</tr>
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</table>

**Coupling Nut Option**
- Stainless Steel . . . . . 1

**Cable Code**
- Orientation Code

---

*Note: Sales drawings for all standard order numbers are available on molex.com*

---

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
Features and Benefits
- Patented Quad Beam™ provides high reliability and low resistance
- Epoxy coated coupling nut is corrosion and weld slag resistant
- Cable is oil, water and abrasion resistant

Reference Information
UL File No.: E152210  
CSA File No.: LR6837

Electrical
Voltage: 600V AC/DC

Mechanical
Wire Size: 16 AWG  
Cable Type: UL Type STOOW

Physical
Connector Face: PVC  
Connector Body: PVC  
Contact: Brass with Gold over Nickel plating  
Coupling Nut: Black epoxy coated Zinc  
Cable: A01—UL Type STOOW extra hard service cord  
Cable Jacket: PVC  
Cable Jacket Color: Yellow  
Operating Temperature: -20 to +105°C

Environmental
Protection: IP67

<table>
<thead>
<tr>
<th>Pole (Female View)</th>
<th>Current</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 Pole</td>
<td>7.0A</td>
<td>STOOW</td>
<td>PVC (A01)</td>
<td>16</td>
<td>6'</td>
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<td>130012-0385</td>
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<td>10 Pole</td>
<td>7.0A</td>
<td>STOOW</td>
<td>PVC (A01)</td>
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<td>12 Pole</td>
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<td>STOOW</td>
<td>PVC (A01)</td>
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<td>6'</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

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<td>12</td>
<td>F120</td>
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<tr>
<td>20</td>
<td>F200</td>
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</table>

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Mini-Change®
C-Size Receptacles
With Leads
130015
Female
External Thread

Features and Benefits
• Patented Quad Beam™ contact provides high reliability and low resistance

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Electrical
Voltage: 600V AC/DC

Mechanical
Wire Size: 16 AWG
Wire Type: UL 1015

Physical
Connector Face: PVC
Shell Material: Zinc with black epoxy coat
Mounting Thread Size: 1/2" - 14 NPT
Panel Mount: Front
Cable Length: 0.305m (1.0')
Operating Temperature: -20 to +105°C

Environmental
Protection: IP67

<table>
<thead>
<tr>
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<td>9 Pole</td>
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<td>3R9004A20A120</td>
<td>130015-0117</td>
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<td>130015-0024</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code®
Build-a-Part Number

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<td>6</td>
<td>F069</td>
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</table>

3R9004A20A120

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Mini-Change®
C-Size Receptacles
With Leads

130015
Male
External Thread

Features and Benefits
• Low resistance contact design with Gold over Nickel plating

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Electrical
Voltage: 600V AC/DC

Mechanical
Wire Size: 16 AWG
Wire Type: UL 1015

Physical
Connector Face: PVC
Shell Material: Zinc with black epoxy coat
Mounting Thread Size: 1/2" - 14 NPT
Panel Mount: Front
Cable Length: 0.305m (1.0')
Operating Temperature: -20 to +105°C
Environmental
Protection: IP67

<table>
<thead>
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<tbody>
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<td>9 Pole</td>
<td>7.0A</td>
<td>3R9006A20A120</td>
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<td>10 Pole</td>
<td>5.0A</td>
<td>3R1006A20A120</td>
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<td>3R2006A20A120</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

3R9006A20A120

Coupling Nut Option
Stainless Steel . . . . . 1

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**Features and Benefits**
- 18 AWG power and 22 AWG control conductors
- Oil and abrasion resistant polyurethane (PUR) jacket

**Electrical**
- Current per Contact: 3.0A/2.0A
- Voltage: 300V AC/DC

**Mechanical**
- Wire Size: 18/22 AWG

**Physical**
- Connector Face: PVC
- Connector Body: PVC
- Contact: Brass with Gold over Nickel plating
- Coupling Nut: Black epoxy coated Zinc
- Cable Jacket Color: Black
- Cable Jacket Material: PUR
- Operating Temperature: -20 to +80°C

**Environmental**
- Protection: IP67

---

### Female Single-Ended

<table>
<thead>
<tr>
<th>19 Pole (Female View)</th>
<th>Female Straight</th>
<th>Female Right Angle</th>
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</thead>
<tbody>
<tr>
<td>303000P80M050</td>
<td>130008-0303</td>
<td>303001P80M050</td>
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</table>

**Note:** Sales drawings for all standard order numbers are available on molex.com

### Female-to-Male Double-Ended

<table>
<thead>
<tr>
<th>19 Pole (Female View)</th>
<th>Straight-to-Straight</th>
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<tbody>
<tr>
<td>Engineering No.</td>
<td>Standard Order No.</td>
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<td>333003P80M050</td>
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**Configuration Code**

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<th>Meters</th>
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<td>M020</td>
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<td>M100</td>
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**Coupling Nut Option**
- Stainless Steel

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

---

www.molex.com
Brad® Mini-Change® C-Size
19-pole Receptacles

130015
Female, Male
Threaded

Features and Benefits
- 18 AWG power and 22 AWG control conductors
- Oil and abrasion resistant polyurethane (PUR) jacket

Electrical
Current per Contact: 3.0A/2.0A
Voltage: 300V AC/DC

Mechanical
Wire Size: 18/22 AWG

Physical
Connector Face: PVC
Connector Body: PVC
Contact: Brass with Gold over Nickel plating
Coupling Nut: Black epoxy coated Zinc
Cable Jacket Color: Black
Cable Jacket Material: PUR
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67
Brad® Mini-Change®
C-Size Accessories

130201
Closure Cap and Threaded Union

<table>
<thead>
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<tbody>
<tr>
<td>Closure Cap</td>
<td>1 1/8&quot;-16UN-2b Internal Thread, Anodized Aluminum, with Steel Bead Chain</td>
<td>65-0105</td>
<td>130201-1120</td>
<td>130201-1120</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 1/8&quot;-16UN-2A External Thread, Anodized Aluminum, with Steel Bead Chain</td>
<td>65-0104</td>
<td>130201-1118</td>
<td></td>
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<tr>
<td>Threaded Union</td>
<td>Adapter, 1 1/8&quot;-16UN-2A External Thread, Anodized Aluminum</td>
<td>55-0496</td>
<td>130201-1228</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
Brad® M23 Signal and Power Connectors

Brad® M23 connectors and receptacles for signal and power applications meet stringent requirements for reliability and performance in the harshest of industrial environments.

M23 Signal Connectors include field-attachable, male and female cable connectors and receptacles from 6-pole to 19-pole in both straight and right-angled versions. Designed to accommodate a broad range of cable outer diameters and receptacles, M23 connectors guarantee high flexibility in front- and back-mounting applications.

Inserts are available with solder or crimp contacts. The integrated locking clip secures the contacts in the inserts. Assembly and disassembly are easily performed without the need for special assembly tools.

M23 Power Connectors are designed for power applications up to 28.0A. Molex offers field-attachable cable connectors and receptacles in 6-pole (5+PE) and 8-pole (4+3+PE) versions. Applying the same modular design as the signal connectors, both pole counts can be used in straight and right-angled versions that are easy to assemble and disassemble with no special tools required.

Crimp contacts are available with different crimp ranges. Female contacts with integrated springs assure exceptional electrical performance with ultimate contact reliability in both signal and power product ranges.

Features and Benefits

Signal Connector
- Cable assembly and shielding are performed in one simple step for user-friendly assembly
- Clipped-on, strain-relief insert prevents cable rotation
- Flexible, EMC O-ring guarantees reliable EMC protection
- Radial-encompassing spring contacts assure low plug-in resistance and high mating cycles
- Integrated locking clip secures the contact in the insert and allows for easy assembly and disassembly

Power Connector
- Modular design means the same insert is used for all housings
- Integrated locking clip allows for quick assembly and disassembly
- Plug-and-play design allows complete assembly and disassembly without special tools
- Gold-plated contact area features durable, corrosion-resistant plating that maintains low electrical resistance through the mate/unmate cycles
- Integrated strain-relief fitting prevents cable rotation

Applications
- Servo drives
- Encoders
- Resolvers
- Active and passive I/O boxes
- Safety applications
- Safety switches
- Safety door handles
- Harsh commercial
- Solar panel wiring systems
- Home run connectivity for MPIS

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
Brad®
M23 Signal
Field Attachable Connectors
120230
Female Crimp Style Contacts
Straight, Right Angle

Features and Benefits
- Cable assembly and shielding in one assembly step
- Clipped-on strain-relief insert prevents cable rotation
- Flexible EMC-O-Ring guarantees reliable EMC-protection
- Radial-encompassing spring contacts assure low plug-in resistance and high mating cycles
- Integrated locking clip secures the contact in the insert and allows easy assembly and disassembly

Physical
Housing: Copper-Zinc alloy, die-casting
Housing Surface: Nickel-plated Brass
Cable Diameter Range: 3.00 to 17.00mm (0.12 to 0.55"
Inserts (for contacts):
Thermoplastic polyamide PA 6 (Nylon 6/6), PBT fire protection class V-0
Contacts: Brass alloy
Contact Type: Crimp, solder, dip-solder (PCB)
Contact Surface at Point of Contact:
Nickel- and Gold-plated (0.25μm)
Minimum Mating Cycles: >1000
Seals/O-Rings: Buna-N standard
Operating Temperature: -40 to +125°C

Environmental
Protection: IP67 per EN 60625 (connected)
NEMA Rating: 4x

<table>
<thead>
<tr>
<th>Poles</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Diameter*</th>
<th>Crimp Range</th>
<th>Female Straight</th>
<th>Female Right Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Pole</td>
<td>20.0A</td>
<td>300V</td>
<td>7.00-12.00mm (276-472&quot;)</td>
<td>0.75-2.5mm²</td>
<td>KAS6S00-405</td>
<td>102300-0005</td>
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<tr>
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<td>8.0A</td>
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<td>KAS6S00-409</td>
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<td>7 Pole</td>
<td>20.0A</td>
<td>300V</td>
<td>7.00-12.00mm (276-472&quot;)</td>
<td>0.75-2.5mm²</td>
<td>KAS7S00-405</td>
<td>102300-0014</td>
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<td></td>
<td>KAS7S00-409</td>
<td>102300-0072</td>
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<td>9 Pole</td>
<td>8-8.0A, 1-20.0A</td>
<td>300V</td>
<td>7.00-12.00mm (276-472&quot;)</td>
<td>0.34-1.00mm²/0.75-2.5mm²</td>
<td>KAS9S00-405</td>
<td>102300-0023</td>
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<td>KAS9S00-409</td>
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<td>12 Pole</td>
<td>8.0A</td>
<td>300V</td>
<td>7.00-12.00mm (276-472&quot;)</td>
<td>0.34-1.00mm²</td>
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<td>KASC5S00-029</td>
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<tr>
<td>16 Pole</td>
<td>8.0A</td>
<td>150V</td>
<td>7.00-12.00mm (276-472&quot;)</td>
<td>0.34-1.00mm²</td>
<td>KASHS00-025</td>
<td>102300-0041</td>
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<td>KASHS00-029</td>
<td>102300-0090</td>
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<tr>
<td>17 Pole</td>
<td>8.0A</td>
<td>150V</td>
<td>7.00-12.00mm (276-472&quot;)</td>
<td>0.34-1.00mm²</td>
<td>KASJS00-025</td>
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<td>16-8.0A, 3-10.0A</td>
<td>150V</td>
<td>7.00-12.00mm (276-472&quot;)</td>
<td>0.34-1.00mm²/0.56-1.00mm²</td>
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</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*Cable diameters 3.00-7.00mm and 11.00-17.00mm also available. Contact Molex for more information.
Brad® M23 Signal Field Attachable Connectors

120230 Male Crimp Style Contacts Straight

Features and Benefits
- Cable assembly and shielding in one assembly step
- Clipped-on strain-relief insert prevents cable rotation
- Flexible EMC O-Ring guarantees reliable EMC protection
- Radial-encompassing spring contacts assure low plug-in resistance and high mating cycles
- Integrated locking clip secures the contact in the insert and allows easy assembly and disassembly

Physical
- Housing: Copper-Zinc alloy, die-casting
- Housing Surface: Nickel-plated Brass
- Cable Diameter Range: 3.00 to 17.00mm (0.12 to 0.55”)
- Inserts (for contacts):
  - Thermoplastic polyamide PA 6 (Nylon 6/6), PBT fire protection class V-0
  - Contacts: Brass alloy
  - Contact Type: Crimp, solder, dip-solder (PCB)
  - Contact Surface at Point of Contact:
    - Nickel- and Gold-plated (0.25μm)
  - Minimum Mating Cycles: >1000
  - Seals/O-Rings: Buna-N standard
  - Operating Temperature: -40 to +125°C

Environmental
- Protection: IP67 per EN 60625 (connected)
- NEMA Rating: 4x

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Pole</td>
<td>20.0A</td>
<td>300V</td>
<td>7.00-12.00mm (0.276-0.472”)</td>
<td>0.75-2.50mm²</td>
<td>KAS6S06-405</td>
<td>120230-0110</td>
</tr>
<tr>
<td>7 Pole</td>
<td>20.0A</td>
<td>300V</td>
<td>7.00-12.00mm (0.276-0.472”)</td>
<td>0.75-2.50mm²</td>
<td>KAS7S06-405</td>
<td>120230-0119</td>
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<tr>
<td>9 Pole (8+1)</td>
<td>8=8.0A, 1=20.0A</td>
<td>300V</td>
<td>7.00-12.00mm (0.276-0.472”)</td>
<td>0.14-1.00mm²/0.75-2.50mm²</td>
<td>KASP9S06-415</td>
<td>120230-0128</td>
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<td>12 Pole</td>
<td>8.0A</td>
<td>300V</td>
<td>7.00-12.00mm (0.276-0.472”)</td>
<td>0.14-1.00mm²</td>
<td>KASCS06-015</td>
<td>120230-0127</td>
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<tr>
<td>16 Pole</td>
<td>8.0A</td>
<td>150V</td>
<td>7.00-12.00mm (0.276-0.472”)</td>
<td>0.14-1.00mm²</td>
<td>KASHS06-015</td>
<td>120230-0146</td>
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<td>17 Pole</td>
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<td>150V</td>
<td>7.00-12.00mm (0.276-0.472”)</td>
<td>0.14-1.00mm²</td>
<td>KASJS06-015</td>
<td>120230-0155</td>
</tr>
<tr>
<td>19 Pole (16+3)</td>
<td>16=8.0A, 3=10.0A</td>
<td>150V</td>
<td>7.00-12.00mm (0.276-0.472”)</td>
<td>0.14-1.00mm²/0.14-1.00mm²</td>
<td>KASLS06-115</td>
<td>120230-0164</td>
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Note: Sales drawings for all standard order numbers are available on molex.com
*Cable diameters 3.00-7.00mm and 11.00-17.00mm also available. Contact Molex for more information.
Brad® M23 Signal Receptacles

120231

Female Crimp Style Contacts
Straight
Front Panel Mount

**Features and Benefits**
- Cable assembly and shielding in one assembly step
- Clipped-on strain-relief insert prevents cable rotation
- Flexible EMC-O-Ring guarantees reliable EMC-protection
- Radial-encompassing spring contacts assure low plug-in resistance and high mating cycles
- Integrated locking clip secures the contact in the insert and allows easy assembly and disassembly

**Physical**
- Housing: Copper-Zinc alloy, die-casting
- Housing Surface: Nickel-plated Brass
- Cable Diameter Range: 3.00 to 17.00mm (0.12 to 0.55”)
- Inserts (for contacts): Thermoplastic polyamide PA 6 (Nylon 6/6), PBT fire protection class V-0
- Contacts: Brass alloy
- Contact Type: Crimp, solder, dip-solder (PCB)
- Contact Surface at Point of Contact:
  - Nickel- and Gold-plated (0.25 μm)
- Minimum Mating Cycles: >1000
- Seals/O-Rings: Buna-N standard
- Operating Temperature: -40 to +125°C

**Environmental**
- Protection: IP67 per EN 60625 (connected)
- NEMA Rating: 4x

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<td>300V</td>
<td>Flange-Mount</td>
<td>Flange 4x 3.2mm</td>
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<td>150V</td>
<td>Flange-Mount</td>
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<td>0.34-1.8mm²</td>
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<td>150V</td>
<td>Flange-Mount</td>
<td>Flange 4x 3.2mm</td>
<td>0.34-1.8mm²</td>
<td>KRS17G20-023</td>
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<tr>
<td>19 Pole (16+3)</td>
<td>16 = 8.0A 3 = 10.0A</td>
<td>150V</td>
<td>Flange-Mount</td>
<td>Flange 4x 3.2mm</td>
<td>0.34-1.8mm²/0.56-1.0mm²</td>
<td>KRS19G20-223</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

www.molex.com

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
Features and Benefits
- Cable assembly and shielding in one assembly step
- Clipped-on strain-relief insert prevents cable rotation
- Flexible EMC-O-Ring guarantees reliable EMC-protection
- Radial-encompassing spring contacts assure low plug-in resistance and high mating cycles
- Integrated locking clip secures the contact in the insert and allows easy assembly and disassembly

Physical
- Housing: Copper-Zinc alloy, die-casting
- Housing Surface: Nickel-plated Brass
- Cable Diameter Range: 3.00 to 17.00 mm (0.12 to 0.55")
- Contact Inserts:
  - Thermoplastic Polyamid PA 6 (Nylon 6/6),
  - PBT fire protection class V-0
- Contacts: Brass alloy
- Contact Type: Crimp, solder, dip-solder (PCB)
- Contact Surface at Point of Contact:
  - Nickel- and Gold-plated (0.25 μm)
- Minimum Mating Cycles: >1000
- Seals/O-Rings: Buna-N standard
- Operating Temperature: -40 to +125°C

Environmental
- Protection: IP67 per EN 60625 (connected)
- NEMA Rating: NEMA 4x

### Physical Data
- **Housing**: Copper-Zinc alloy, die-casting
- **Housing Surface**: Nickel-plated Brass
- **Cable Diameter Range**: 3.00 to 17.00 mm (0.12 to 0.55")
- **Contact Inserts**:
  - Thermoplastic Polyamide PA 6 (Nylon 6/6)
  - PBT fire protection class V-0
- **Contacts**: Brass alloy
- **Contact Type**: Crimp, solder, dip-solder (PCB)
- **Contact Surface at Point of Contact**: Nickel- and Gold-plated (0.25 μm)
- **Minimum Mating Cycles**: >1000
- **Seals/O-Rings**: Buna-N standard
- **Operating Temperature**: -40 to +125°C

### Environmental Data
- **Protection**: IP67 per EN 60625 (connected)
- **NEMA Rating**: NEMA 4x

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<td>Flange Mount</td>
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<td>120231-0023</td>
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<td>Flange Mount</td>
<td>0.75-2.50 mm²</td>
<td>120231-0026</td>
<td>KRS7G26-4031</td>
<td>120231-0047</td>
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<td>300V</td>
<td>Flange Mount</td>
<td>0.14-1.00 mm²/0.75-2.50 mm²</td>
<td>120231-0029</td>
<td>KRS9G26-4131</td>
<td>120231-0050</td>
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<td>300V</td>
<td>Flange Mount</td>
<td>0.14-1.00 mm²/0.75-2.50 mm²</td>
<td>120231-0032</td>
<td>KRS12G26-0131</td>
<td>120231-0053</td>
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<td>150V</td>
<td>Flange Mount</td>
<td>0.14-1.00 mm²/0.75-2.50 mm²</td>
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<td>150V</td>
<td>Flange Mount</td>
<td>0.14-1.00 mm²/0.75-2.50 mm²</td>
<td>120231-0038</td>
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<td><strong>19 Pole (16+3)</strong></td>
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<td>Flange Mount</td>
<td>0.14-1.00 mm²/0.14-1.00 mm²</td>
<td>120231-0041</td>
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<td>120231-0062</td>
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*Note: Sales drawings for all standard order numbers are available on molex.com*
### Brad® M23 Signal Receptacles

**120231**  
**Male Crimp Style Contacts**  
**Straight**  
**Back Panel Mount**

#### Features and Benefits
- Cable assembly and shielding in one assembly step
- Clipped-on strain-relief insert prevents cable rotation
- Flexible EMC-O-Ring guarantees reliable EMC-protection
- Radial-encompassing spring contacts assure low plug-in resistance and high mating cycles
- Integrated locking clip secures the contact in the insert and allows easy assembly and disassembly

#### Physical
- Housing: Copper-Zinc alloy, die-casting
- Housing Surface: Nickel-plated Brass
- Cable Diameter Range: 3.00 to 17.00mm (0.12 to 0.55"
- Contact Inserts: Thermoplastic Polyamid PA 6 (Nylon 6/6), PBT fire protection class V-0
- Contacts: Brass alloy
- Contact Type: Crimp, solder, dip-solder (PCB)
- Contact Surface at Point of Contact: Nickel- and Gold-plated (0.25μm)
- Minimum Mating Cycles: >1000
- Seals/O-Rings: Buna-N standard
- Operating Temperature: -40 to +125°C

#### Environmental
- Protection: IP67 per EN 60625 (connected)
- NEMA Rating: NEMA 4x

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#### Table

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<td>6 Pole</td>
<td>20.0A</td>
<td>300V</td>
<td>Flange Mount</td>
<td>Flange 4xM3</td>
<td>0.75-2.50mm²</td>
<td>KR6G46-4041</td>
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<td>7 Pole</td>
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<td>300V</td>
<td>Flange Mount</td>
<td>Flange 4xM3</td>
<td>0.75-2.50mm²</td>
<td>KR7G46-4041</td>
<td>120231-0070</td>
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</table>
| 9 Pole (8+1)     | 8 = 8.0A  
1 = 20.0A | 300V         | Flange Mount  | Flange 4xM3     | 0.14-1.00mm²/ 0.25-2.50mm² | KR9G46-4141 | 120231-0074      |
| 12 Pole           | 8.0A                     | 300V         | Flange Mount  | Flange 4xM3     | 0.14-1.00mm² | KR12G46-0141    | 120231-0078      |
| 16 Pole           | 8.0A                     | 150V         | Flange Mount  | Flange 4xM3     | 0.14-1.00mm² | KR16G46-0141    | 120231-0082      |
| 17 Pole           | 8.0A                     | 150V         | Flange Mount  | Flange 4xM3     | 0.14-1.00mm² | KR17G46-0141    | 120231-0086      |
| 19 Pole (16+3)    | 16 = 18.0A  
3 = 10.0A | 150V         | Flange Mount  | Flange 4xM3     | 0.14-1.00mm²/ 0.14-1.00mm² | KR19G46-1141 | 120231-0090      |

**Note:** Sales drawings for all standard order numbers are available on molex.com.
Brad® M23
Signal Receptacles
120231
Male Crimp Style Contacts
Straight Back Panel Mount

Features and Benefits
- Cable assembly and shielding in one assembly step
- Clipped-on strain-relief insert prevents cable rotation
- Flexible EMC-O-Ring guarantees reliable EMC-protection
- Radial-encompassing spring contacts assure low plug-in resistance and high mating cycles
- Integrated locking clip secures the contact in the insert and allows easy assembly and disassembly

Physical
- Housing: Copper-Zinc alloy, die-casting
- Housing Surface: Nickel-plated Brass
- Cable Diameter Range: 3.00 to 17.00mm (0.12 to 0.55"
- Contact Inserts:
  - Thermoplastic Polyamid PA 6 (Nylon 6/6),
  - PBT fire protection class V-0
- Contacts: Brass alloy
- Contact Type: Crimp, solder, dip-solder (PCB)
- Contact Surface at Point of Contact:
  - Nickel- and Gold-plated (0.25μm)
- Minimum Mating Cycles: >1000
- Seals/O-Rings: Buna-N standard
- Operating Temperature: -40 to +125°C

Environmental
- Protection: IP67 per EN 60625 (connected)
- NEMA Rating: NEMA 4x

<table>
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<tr>
<th>Poles (Male View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Mounting Type</th>
<th>Mounting Thread</th>
<th>Crimp Range</th>
<th>Straight</th>
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<tr>
<td>6 Pole</td>
<td>20.0A</td>
<td>300V</td>
<td>Flange Mount</td>
<td>Single Hole</td>
<td>0.75-2.50mm²</td>
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<td>8 Pole (8+1)</td>
<td>8 = 8.0A, 1 = 20.0A</td>
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<td>Flange Mount</td>
<td>M25x1.5</td>
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Note: Sales drawings for all standard order numbers are available on molex.com
*Receptacle flange mount rotatable

www.molex.com
Brad® M23
Signal Single-Ended
Molded Cordsets
120094
Female Straight
Female Right Angle-to-Pigtail

Features and Benefits
- 12 and 19 pole versions available
- IP67 rated for harsh environments
- Offered with PUR cables for moderate flexing and for environments encountering cutting fluids and oils

Electrical
Voltage: 63V AC/DC max.
Current: 6.0A max.

Mechanical
Wire Size: 18/22 AWG

Physical
Connector Body: TPU
Connector End A: M23
Connector End B: Pigtail
Contact: Copper with Gold over Nickel plating
Coupling Nut: Nickel-plated Brass
Cable Length: 10.0m (32.81’)
Cable Jacket Color: Black
Operating Temperature: -25 to +90°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

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<th>Poles (Female View)</th>
<th>Female Straight</th>
<th>Female Right Angle-to-Pigtail</th>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code* Build-a-Part Number

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<td>M050</td>
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<td>10</td>
<td>M100</td>
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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® M23  
Power Field Attachable Connectors

120233  
Female Crimp Style Contacts  
Straight, Right Angle

**Features and Benefits**
- Modularity—Same insert for all housings
- The integrated locking clip allows quick assembly
- Complete assembly and disassembly without special tools
- Lowest contact resistance as a result of a Gold-plated contact area
- Integrated strain-relief fitting

**Physical**
- **Housing:** Copper-Zinc alloy, die-casting
- **Housing Surface:** Nickel-plated Brass
- **Contact Inserts:** Thermoplastic Polyamid PA 6 (Nylon 6/6), PBT fire protection class 94V-0
- **Contacts:** Brass alloy
- **Type of Contacts:** Crimp
- **Contact Surface at Point of Contact:** Nickel- and Gold-plated (0.25 μm)
- **Minimum Mating Cycles:** >1000
- **Seals/O-Rings:** Buna-N standard
- **Operating Temperature:** -40 to 125°C

**Environmental**
- **Protection:** IP67 per EN 60625 (connected)
- **NEMA Rating:** NEMA 4x

**Table: Poles, Max. Current per Contact, Max. Voltage, Crimp Range**

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<tbody>
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<td>6 (5+PE)</td>
<td>28.0A</td>
<td>800V</td>
<td>0.75-2.50mm²</td>
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<td>4×8.0A, 4×28.0A</td>
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<td>0.25-1.00mm²/0.75-2.5mm²</td>
<td>KAP8S00-115</td>
<td>120233-0005</td>
<td>KAP8S01-115</td>
<td>120233-0013</td>
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</table>

**Note:** Sales drawings for all standard order numbers are available on molex.com
### Features and Benefits

- **Modularity** — same insert for all housings
- The integrated locking clip allows quick assembly
- Complete assembly and disassembly without special tools
- Lowest contact resistance as a result of a Gold-plated contact area
- Integrated strain-relief fitting

### Physical

- **Connector Body:** Nylon
- **Keyway:** None
- **Contact:** Brass with Gold over Nickel plating
- **Operating Temperature:** -40 to +125°C
- **Environmental Protection:** IP67

### Table: Brad® M23 Power Field Attachable Connectors

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<td>28.0A</td>
<td>800V</td>
<td>7.00-12.00mm (0.276-.472&quot;)</td>
<td>0.25-1.00mm</td>
<td>KAPS606-105</td>
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<td>8 Pole (4+3+PE)</td>
<td>4 = 8.0A</td>
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<td>7.00-12.00mm (0.276-.472&quot;)</td>
<td>0.75-2.50mm</td>
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Note: Sales drawings for all standard order numbers are available on molex.com.
Brad® M23
Power Connectors
Receptacles

120234
Female Crimp Style Contacts
Straight
Front Panel Mount

Features and Benefits
- Modularity—same insert for all housings
- The integrated locking clip allows quick assembly
- Complete assembly and disassembly without special tools
- Lowest contact resistance as a result of a Gold-plated contact area
- Integrated strain-relief fitting

Physical
Housing: Copper-Zinc alloy, die-casting
Housing Surface: Nickel-plated Brass
Inserts (for contacts):
Thermoplastic polyamide PA 6 (Nylon 6/6), PBT fire protection class 94V-0
Contacts: Brass alloy
Type of Contacts: Crimp
Contact Surface at Point of Contact:
Nickel- and Gold-plated (0.25μm)
Minimum Mating Cycles: >1000
Seals/O-Rings: Buna-N standard
Operating Temperature: -40 to 125°C

Environmental
Protection: IP67 per EN 60625 (connected)
NEMA Rating: 4x

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<td>800V</td>
<td>Front Panel</td>
<td>Flange-Mount</td>
<td>Flange 4x0 3.2mm</td>
<td>0.75-2.5mm²</td>
<td>KRP6G00-103</td>
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<td>4-300V, 6-800V</td>
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<td>120234-0003</td>
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Note: Sales drawings for all standard order numbers are available on molex.com
### Brad® M23 Power Receptacles

#### 120234

**Male Crimp Style Contacts**
- **Straight, Right Angle**
- **Front, Back Panel Mount**

#### Features and Benefits
- Modularity—same insert for all housings
- The integrated locking clip allows quick assembly
- Complete assembly and disassembly without special tools
- Lowest contact resistance as a result of a Gold-plated contact area
- Integrated strain-relief fitting

#### Physical
- **Housing:** Copper-Zinc alloy, die-casting
- **Housing Surface:** Nickel-plated Brass
- **Inserts (for contacts):** Thermoplastic polyamide PA 6 (Nylon 6/6), PBT fire protection class 94V-0
- **Contacts:** Brass alloy
- **Type of Contacts:** Crimp
- **Contact Surface at Point of Contact:** Nickel- and Gold-plated (0.25 μm)
- **Minimum Mating Cycles:** >1000
- **Seals/O-Rings:** Buna-N standard
- **Operating Temperature:** -40 to 125°C

#### Environmental
- Protection: IP67 per EN 60625 (connected)
- **NEMA Rating:** 4x

---

<table>
<thead>
<tr>
<th>Poles</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Panel Mount Style</th>
<th>Mounting Type</th>
<th>Mounting Thread</th>
<th>Crimp Range</th>
<th>Rotatable</th>
<th>Straight</th>
<th>Right Angle</th>
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<tbody>
<tr>
<td>6 Pole (5+PE)</td>
<td>28.0A</td>
<td>800V</td>
<td>Front Panel</td>
<td>Flange-Mount</td>
<td>Flange Ø 3.20mm</td>
<td>0.75-2.50mm²</td>
<td>No</td>
<td>KRP6G06-103</td>
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<td>4=8.0A, 4=28.0A</td>
<td>4=300V, 4=800V</td>
<td>Front Panel</td>
<td>Flange-Mount</td>
<td>Flange Ø 3.20mm</td>
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<td>Front Panel</td>
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<td>Flange Ø 2.70mm</td>
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<td>Front Panel</td>
<td>Flange 25.00 x 25.00mm</td>
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<td>Front Panel</td>
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<tr>
<td>6 Pole (5+PE)</td>
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<td>Back Panel</td>
<td>Flange-Mount</td>
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<td>0.75-2.50mm²</td>
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<td>4=300V, 4=800V</td>
<td>Back Panel</td>
<td>Flange-Mount</td>
<td>Flange Ø 3.20mm</td>
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<td>800V</td>
<td>Back Panel</td>
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**Note:** Sales drawings for all standard order numbers are available on molex.com.
Brad® M23
Power and Signal
Tools and Accessories
120155

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<tr>
<th>Description</th>
<th>Power/Signal</th>
<th>Gender</th>
<th>Engineering No.</th>
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<td>KP-LOC-02</td>
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<td>Signal</td>
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<td>120155-0013</td>
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<td>Female</td>
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mPm® DIN Cordset Family

FIELD ATTACHABLE

The mPm range of connectors conform to Industry Standard EN 175301-803 (formerly DIN 43650). This is the standard for a series of electrical connectors, which are commonly used with solenoid valves (especially those used on hydraulic and pneumatic valves). The new generation of Molex DIN connectors provides customers with unsurpassed sealing performance, easier assembly and mounting and lower applied costs.

The connector has an external nut to provide greater and consistent torque which ensures good cable retention and high reliability. Together with the integrated front gasket, Molex DIN connectors achieve a sealing performance from dust and water to IP67. Cable retention force is increased by up to 115% when compared with traditional internal nut designs. This innovative new design reduces the number of components in the connector, making customer assembly and secure mounting, easier and quicker.

Traditional mPm connectors are supplied to the customer pre-assembled, requiring disassembly before terminating the cable. The new generation of connectors is supplied in single set, or bulk components reducing disassembly time and reducing cost. The connectors can accommodate PG9 and PG11 cable and up to 9.00mm cable outer diameter and since one size fits all the customer can reduce their connector inventory. The result is a higher performance and lower overall cost solution. To further reduce labor, pre-terminated and overmolded DIN connectors are also available in stand lengths.

MOLDED CABLE

Our connectors with molded in cable are suitable for use with most types of solenoid. They offer a fast and efficient method of connection resulting in greatly reduced installation time and cost. They can be supplied with or without integral LED indicators and suppression circuits. A diagram is printed on each connector with circuit to allow for easy user identification.

Overmolded With LED

Overmolded w/o LED
Brad® mPm®
Field Attachable
DIN Valve Connectors
121201/121207
Form A
External Thread
Non-Electronic, Electronic

Features and Benefits
• IP67 rated for waterproofing
• Conforms to industry standard EN175301-803
• Accommodates a range of cable diameters
• Product supplied in ready-to-use condition
• Integrated gaskets within housing

Reference Information
UL Listed, File E218123 (available upon request)

Electrical
Max. Current: 16.0A
Contact Resistance: ≤ 4 milliohms max.
Insulation Resistance: 100 Megaohms min.
Max. Conductor: 1.50mm²/16 AWG

Physical
Durability (min.): 50 cycles
Contact Area: Silver
Solder Tail Area: Silver
Operating Temperature:
Nitrile Rubber (NBR) Gasket — -40 to +90°C
Silicone Gasket — -40 to +125°C
Cable Range: 4.00-9.00mm
Contact Distance: C28 (Non-Electronic)—18.00mm (.709")
S28 (Electronic)—18.00mm (.709")
Poles: 2—2 pole
3—3 pole
Material and Housing Color: G—PA6, Gray
N—PA6, Black
T—Transparent
Ground Position: 0—Unmounted
2—H12
3—H3
6—H6
9—H9

Screw and Gasket:
R—Integrated NBR Gasket and IP67 Screw
S—Integrated Silicon Gasket and IP67 Screw
Non-Standard Packaging:
CN—Bulk Pack Unmounted
SN—Bulk Pack Mounted
Voltage, LED Color (Electronic):
Red LED: 1—12V
2—24V
3—48V
4—115V
5—230V
Green LED: A—12V
B—24V
C—48V
D—115V
E—230V
Amber LED: G—12V
H—24V
K—48V
L—115V
M—230V
Circuit (Electronic): See Circuit Options on mPm Available Circuits page

Environmental
Protection: IP67

Electronic
Circuit (Electronic): See Circuit Options on mPm Available Circuits page

Configuration Code*
Build-a-Part Number

Non-Electronic
C28200NORXX

Electronic
S28200NC41ORXX

For all Electronic part numbers, please use the Electronic Build-a-Part Number system in the Configuration Code below.

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® mPm®
Field Attachable
DIN Valve Connectors
121203/121209
Form B
External Thread
Non-Electronic, Electronic

Features and Benefits
• IP67 rated for waterproofing
• Conforms to industry standard EN175301-803
• Accommodates a range of cable diameters
• Product supplied in ready-to-use condition
• Integrated gaskets within housing

Reference Information
UL Listed, File E218123 (available upon request)

Electrical
Max. Current: 16.0A
Contact Resistance: ≤4 milliOhms max.
Insulation Resistance: 100 MegaOhms min.
Max. Conductor: 1.50mm²/16 AWG

Physical
Durability (min.): 50 cycles
Contact Area: Silver
Solder Tail Area: Silver
Operating Temperature:
  Nitrile Rubber (NBR) Gasket — -40 to +90°C
  Silicone Gasket — -40 to +125°C
Cable Range: 4.00-9.00mm
Contact Distance: C92 (Non-Electronic)—10.00mm (.394”)
  S92 (Electronic)—10.00mm (.394”)
Poles: 2—2 pole + Ground
Material and Housing Color: G—Pa6, Grey
  N—Pa6, Black
  T—Transparent
Ground Position: 0—Unmounted
  2—H12
  3—H3
  6—H6
  9—H9

Physical (continued)
Non-Standard Packaging:
  CN—Bulk Pack Unmounted
  SN—Bulk Pack Mounted
Voltage, LED Color (Electronic):
  Red LED: 1—12V
  2—24V
  3—48V
  4—115V
  5—230V
  Green LED: A—12V
  B—24V
  C—48V
  D—115V
  E—230V
  Amber LED: G—12V
  H—24V
  K—48V
  L—115V
  M—230V
Circuit (Electronic): See Circuit Options on
  mPm Available Circuits page
Environmental
Protection: IP67

Configuration Code*
Build-a-Part Number

Non-Electronic

Electronic

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® mPm®
Field Attachable
DIN Valve Connectors
121203/121209
Form C
External Thread
Non-Electronic, Electronic

Features and Benefits
• IP67 rated for waterproofing
• Conforms to industry standard EN175301-803
• Accommodates a range of cable diameters
• Product supplied in ready-to-use condition
• Integrated gaskets within housing

Reference Information
UL Listed, File E218123 (available upon request)

Electrical
Max. Current: 10.0A
Contact Resistance: ≤4 milliohms max.
Insulation Resistance: 100 Megaohms min.
Max. Conductor: 1.50mm²/16 AWG

Mechanical
Insertion and Withdrawal Force: 2+PE ≤ 60N

Physical
Durability (min.): 50 cycles
Contact Area: Silver
Solder Tail Area: Silver
Operating Temperature:
  Nitrile Rubber (NBR) Gasket — -40 to +90°C
  Silicone Gasket — -40 to +125°C
Cable Range: 4.00-9.00mm
Contact Distance: C25—Non-Electronic 8.00mm (.315")
  S25—Electronic 8.00mm (.315")

Environmental
Protection: IP67 Poles: 2—2 pole
  3—3 pole
Material and Housing Color: G—PA6, Gray
  N—PA6, Black
  T—Transparent
Ground Position: 0—Unmounted
  2—H12
  3—H3
  6—H6
  9—H9

Drawing Pitch Poles Max. Current per Contact Max. Voltage Connector Base Type

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<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
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<tbody>
<tr>
<td>8.00mm</td>
<td>2</td>
<td>10.0A</td>
<td>250V AC</td>
<td>C252000N0R</td>
<td>121204-0001</td>
<td>121012-0009</td>
<td>Non-Electronic</td>
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<tr>
<td></td>
<td>3</td>
<td>10.0A</td>
<td>300V DC</td>
<td>C253000N0R</td>
<td>121204-0005</td>
<td>121012-0010</td>
<td>Non-Electronic</td>
</tr>
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</table>

For all Electronic part numbers, please use the Electronic Build-a-Part Number system in the Configuration Code below.

Non-Electronic
C25200NOTXX

Electronic
S25200NC41ORXX

Configuration Code *
Build-a-Part Number

Non-Electronic

Electronic

Molex offers a wide range of additional related components such as adapters, splitters and dual-din overmolded connectors. For information regarding these products, please contact your local sales representative for more information.

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® mPm®
Field Attachable
DIN Valve Connectors
121205/121211
Form Micro
External Thread
Non-Electronic, Electronic

Features and Benefits
• IP67 rated for waterproofing
• Conforms to industry standard EN175301-803
• Accommodates a range of cable diameters
• Product supplied in ready-to-use condition
• Integrated gaskets within housing

Reference Information
UL Listed, File E218123 (available upon request)

Electrical
Max. Current: 10.0A
Contact Resistance: ≤4 milliohms max.
Insulation Resistance: 100 Megohms min.
Max. Conductor: 1.50mm²/16 AWG

Mechanical
Insertion and Withdrawal Force: 2+PE ≤ 60N

Physical
Durability (min.): 50 cycles
Contact Area: Silver
Solder Tail Area: Silver
Operating Temperature:
  • Nitrile Rubber (NBR) Gasket — -40 to +90°C
  • Silicone Gasket — -40 to +125°C
Cable Range: 4.00-9.00mm
Contact Distance: C29 (Non-Electronic)—9.40mm (.370”)
  • S29 (Electronic)—9.40mm (.370”)
Poles: 2—2 pole
  • 3—3 pole
Material and Housing Color:
  • G—PA6, Gray
  • N—PA6, Black
  • T—Transparent
Ground Position:
  • 0—Unmounted
  • 2—H12
  • 3—H3
  • 6—H6
  • 9—H9

Physical (continued)
Non-Standard Packaging:
  • CN—Bulk Pack Unmounted
  • SN—Bulk Pack Mounted
Voltage, LED Color (Electronic):
  • Red LED: 1—12V
  • 2—24V
  • 3—48V
  • 4—115V
  • 5—230V
  • Green LED: A—12V
  • B—24V
  • C—48V
  • D—115V
  • E—230V
  • Amber LED: G—12V
  • H—24V
  • J—48V
  • K—115V
  • L—230V
Circuit (Electronic): See Circuit Options on mPm Available Circuits page

Environmental
Protection: IP67

<table>
<thead>
<tr>
<th>Drawing Pitch</th>
<th>Poles</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Connector</th>
<th>Base Type</th>
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<tr>
<td></td>
<td>3</td>
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<td>300V DC</td>
<td>C29300N0R</td>
<td>Non-Electronic</td>
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For all Electronic part numbers, please use the Electronic Build-a-Part Number system in the Configuration Code below.

Configuration Code®
Build-a-Part Number

Non-Electronic
C29200NOTXX

Electronic
S29200NC41ORXX

Molex offers a wide range of additional related components such as adapters, splitters and dual-din overmolded connectors. For information regarding these products, please contact your local sales representative for more information.

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® mPm®
Field Attachable
DIN Valve Connectors
121202/121208
Form Industrial
External Thread
Non-Electronic, Electronic

Features and Benefits
• IP67 rated for waterproofing
• Conforms to industry standard EN175301-803
• Accommodates a range of cable diameters
• Product supplied in ready-to-use condition
• Integrated gaskets within housing

Reference Information
UL Listed, File E218123 (available upon request)

Electrical
Max. Current: Form A, B and Industrial—16.0A
Form C, Micro—10.0A
Contact Resistance: ≤4 milliohms max.
Insulation Resistance: 100 Megohms min.
Max. Conductor: 1.50mm²/16 AWG

Physical
Durability (min.): 50 cycles
Contact Area: Silver
Solder Tail Area: Silver
Operating Temperature:
  Nitrile Rubber (NBR) Gasket — -40 to +90°C
  Silicone Gasket — -40 to +125°C
Cable Range: 4.00-9.00mm
Contact Distance: C22—Non-Electronic 11.00mm (.433")
  S22—Electronic 11.00mm (.433")
Poles: 2—2 pole + Ground
Material and Housing Color: G—PA6, Gray
  N—PA6, Black
  T—Transparent
  B—White (Electronic)
Ground Position: 0—Unmounted
  2—H12
  3—H3
  6—H6
  9—H9

Mechanical
Insertion and Withdrawal Force: 2+PE ≤ 60N

Physical (continued)
Screw and Gasket:
  R—Integrated NBR Gasket and IP67 Screw
  S—Integrated Silicone Gasket and IP67 Screw
Non-Standard Packaging:
  CN—Bulk Pack Unmounted
  SN—Bulk Pack Mounted
Voltage, LED Color (Electronic):
  Red LED: 1—12V
  2—24V
  3—48V
  4—115V
  5—230V
  Green LED: A—12V
  B—24V
  C—48V
  D—115V
  E—230V
  Amber LED: G—12V
  H—24V
  K—48V
  L—115V
  M—230V
Circuit (Electronic): See Circuit Options on mPm Available Circuits page

Environmental
Protection: IP67

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Pitch</th>
<th>Poles</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
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For all Electronic part numbers, please use the Electronic Build-a-Part Number system in the Configuration Code below. Electronic

Configuration Code* Build-a-Part Number

Non-Electronic
C22200NORXX

Electronic
S22200NC41ORXX

Molex offers a wide range of additional related components such as adapters, splitters and dual-din overmolded connectors. For information regarding these products, please contact your local sales representative for more information.

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**Brad® mPm®**
**Molded Cable**
**DIN Valve Connectors**

**121040**
**Form A**
**Non-Electronic, Electronic**

**Features and Benefits**
- DIN overmolded connector according to UNI EN 175301-803
- Available in Form A, Form B, Form C, Industrial and Micro
- Fully overmolded provides IP65 as standard but available with IP67
- Protection for harsh environments
- Available in array of configurations:
  - Large variety of cable types
  - H12 ground position standard (more orientations available upon request)
  - Black head standard (gray available upon request)
  - UL listed versions available
  - Large variety of integrated electronic circuit versions available
  - Different gasket available (flat, profile, self-retain)

**Physical**
- Overmolding Material: Polypropylene
- Gasket: NBR black (silicon gasket available upon request)
- Contacts: Brass with Silver plating
- Wire: PVC (more available upon request)
- No. of Wires: 1—2 Wires
  - 2—2 Wires plus Earth
  - 3—3 Wires plus Earth
- Head Color: G—Gray
  - N—Black
  - A—Black (UL)
  - B—Gray (UL)
- Cable Length (cm): 0.50—0.50cm
  - 3.00—3.0m
  - 10K—10.0m
- Earth Pin Location: 1—H6/12 Double Earth
  - 6—H6
  - 2—H12
- Gasket Screws:
  1—NBR Profile Gasket Plus Fixing Screw
  2—NBR Flat Gasket Plus Fixing Screw
  3—Silicon Profile Gasket Plus Fixing Screw
  4—Silicon Flat Gasket Plus Fixing Screw
  R—Integrated Gasket Plus Fixing Screw (IP67)

**Physical (continued)**
- Voltage, LED Color (Electronic):
  - Red LED: 1—12V
  - 2—24V
  - 3—48V
  - 4—115V
  - 5—230V
- Green LED: A—12V
  - B—24V
  - C—48V
  - D—115V
  - E—230V
- Amber LED: G—12V
  - H—24V
  - K—48V
  - L—115V
  - M—230V

**Environmental**
- Protection: IP65 (IP67 available upon request)
- Certifications: UL Listed, File E218123 (available upon request)

**Configuration Code**
**Build-a-Part Number**

**Non-Electronic**

**Electronic**

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.*

www.molex.com
Features and Benefits

- DIN overmolded connector according to UNI EN 175301-803
- Available in Form A, Form B, Form C, Industrial and Micro
- Fully overmolded provides IP65 as standard but available with IP67
- Protection for harsh environments
- Available in array of configurations:
  - Large variety of cable types
  - H12 ground position standard (more orientations available upon request)
  - Black head standard (gray available upon request)
  - UL listed versions available
  - Large variety of integrated electronic circuit versions available
  - Different gasket available (flat, profile, self-retain)

Configuration Code*

Build-a-Part Number

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Electronic

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<tr>
<td>Color</td>
</tr>
<tr>
<td>Length (cm)</td>
</tr>
<tr>
<td>Pin Location</td>
</tr>
<tr>
<td>Screw and Gasket</td>
</tr>
<tr>
<td>Internal Circuit</td>
</tr>
<tr>
<td>Supply Voltage and LED Color</td>
</tr>
</tbody>
</table>

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® mPm®
Molded Cable
DIN Valve Connectors
121040
Form C
Non-Electronic, Electronic

Features and Benefits
- DIN overmolded connector according to UNI EN 175301-803
- Available in Form A, Form B, Form C, Industrial and Micro
- Fully overmolded provides IP65 as standard but available with IP67
- Protection for harsh environments
- Available in array of configurations:
  - Large variety of cable types
  - H12 ground position standard (more orientations available upon request)
  - Black head standard (gray available upon request)
  - UL listed versions available
  - Large variety of integrated electronic circuit versions available
  - Different gasket available (flat, profile, self-retain)

Lighting and Color Options
- Red LED: 1—12V
- Green LED: A—12V
- Amber LED: G—12V
- Basic LED: H—24V
- Standard LED: K—48V
- Standard LED: L—115V
- Standard LED: M—230V

Environmental Protection
- IP65 (IP67 available upon request)
- Certifications: UL Listed, File E218123 (available upon request)

Electronic
- Voltage, LED Color (Electronic):
  - Red LED: 1—12V
  - Green LED: A—12V
  - Amber LED: G—12V
  - Basic LED: H—24V
  - Standard LED: K—48V
  - Standard LED: L—115V
  - Standard LED: M—230V

Configuration Code*
Build-a-Part Number

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Poles</th>
<th>Cable Type</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>1.0m</th>
<th>2.0m</th>
<th>5.0m</th>
<th>10.0m</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>PVC H03</td>
<td>0.50mm²</td>
<td>3.0A</td>
<td>250V AC 300V DC</td>
<td>E432N2N10011</td>
<td>121040-0491</td>
<td>E432N2N10021</td>
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<td>PVC H03</td>
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<td>250V AC 300V DC</td>
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For all Electronic part numbers, please use the Electronic Build-a-Part Number system in the Configuration Code below.

Electronic

Non-Electronic

Electronic

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® mPm®
Molded Cable
DIN Valve Connectors
121040
Form Micro
Non-Electronic, Electronic

Features and Benefits
• DIN overmolded connector according to UNI EN 175301-803
• Available in Form A, Form B, Form C, Industrial and Micro
• Fully overmolded provides IP65 as standard but available with IP67
• Protection for harsh environments
• Available in array of configurations:
  - Large variety of cable types
  - H12 ground position standard (more orientations available upon request)
  - Black head standard (gray available upon request)
  - UL listed versions available
  - Large variety of integrated electronic circuit versions available
  - Different gasket available (flat, profile, self-retain)

Physical
- Overmolding Material: Polypropylene
- Gasket: NBR black (silicon gasket available upon request)
- Contacts: Brass with Silver plating
- Wire: PVC (more available upon request)
- No. of Wires: 1—Need description
- 2—Need description
- 3—4 Wires
- 5—2 Wires (SMC Compatible)
- 6—3 Wires (SMC Compatible)
- 7—4 Wires (SMC Compatible)
- Head Color: G—Gray
  - N—Black
  - A—Black (UL)
  - B—Gray (UL)
- Cable Length (cm): 050—.050cm
  - 300—3.0m
  - 10K—10.0m
- Earth Pin Location: 1—H12/12 Double Earth
  - 6—H6
  - 2—H12

Physical (continued)
- Voltage, LED Color (Electronic):
  - Red LED: 1—12V
    - 2—24V
    - 3—48V
    - 4—115V
    - 5—230V
  - Green LED: A—12V
    - B—24V
    - C—48V
    - D—115V
    - E—230V
  - Amber LED: G—12V
    - H—24V
    - K—48V
    - L—115V
    - M—230V

Environmental
- Protection: IP65 (IP67 available upon request)
- Certifications: UL Listed, File E218123 (available upon request)

**Non-Electronic**

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Pitch</th>
<th>Poles</th>
<th>Cable Type</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>1.0m Engineering No.</th>
<th>2.0m Engineering No.</th>
<th>5.0m Engineering No.</th>
<th>10.0m Engineering No.</th>
<th>Type</th>
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</thead>
<tbody>
<tr>
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<td>PVC H03 0.50mm²</td>
<td>3.0A</td>
<td>250V AC 300V DC</td>
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<tr>
<td>9.40mm</td>
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<td>PVC H03 0.50mm²</td>
<td>3.0A</td>
<td>250V AC 300V DC</td>
<td>E333N2N10021</td>
<td>121040-1260</td>
<td>E333N2N10021</td>
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</table>

For all Electronic part numbers, please use the Electronic Build-a-Part Number system in the Configuration Code below.

**Electronic**

<table>
<thead>
<tr>
<th>No. of Wires</th>
<th>Cable Type</th>
<th>Cable Cross Section Area</th>
<th>Head Color</th>
<th>Cable Length (cm)</th>
<th>Earth Pin Location</th>
<th>Internal Circuit</th>
<th>Supply Voltage and LED Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>E392N2N30021C42</td>
<td>Non-Electronic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**Features and Benefits**

- DIN overmolded connector according to UNI EN 175301-803
- Available in Form A, Form B, Form C, Industrial and Micro
- Fully overmolded provides IP65 as standard but available with IP67
- Protection for harsh environments
- Available in array of configurations:
  - Large variety of cable types
  - H12 ground position standard (more orientations available upon request)
  - Black head standard (gray available upon request)
  - UL listed versions available
  - Large variety of integrated electronic circuit versions available
  - Different gasket available (flat, profile, self-retain)

### Physical

- Overmolding Material: Polypropylene
- Gasket: NBR black (silicon gasket available upon request)
- Contacts: Brass with Silver plating
- Wire: PVC (more available upon request)
- No. of Wires: 1—2 Fill/Wires
  - 2—2 Fill plus Terra/2 Wires Plus Earth
- Head Color: G—Gray, N—Black, T—Clear, A—Black (UL), B—Gray (UL)
- Cable Length (cm): 050—.050cm
  - 300—3.0m
  - 10K—10.0m
- Earth Pin Location: 6—H6
  - 2—H12
- Gasket Screws:
  1—NBR Profile Gasket Plus Fixing Screw
  2—NBR Flat Gasket Plus Fixing Screw
  3—Silicon Profile Gasket Plus Fixing Screw
  4—Silicon Flat Gasket Plus Fixing Screw
  R—Integrated Gasket Plus Fixing Screw (IP67)

### Physical (continued)

- Voltage, LED Color (Electronic):
  - Red LED: 1—12V
    - 2—24V
    - 3—48V
    - 4—115V
    - 5—230V
  - Green LED: A—12V
    - B—24V
    - C—48V
    - D—115V
    - E—230V
  - Amber LED: G—12V
    - H—24V
    - M—230V
- Cable Cross Section Area: See Cable Options on Technical Features page
- Cable Type: See Cable Options on Technical Features page
- Internal Circuit (Electronic): See Circuit Options on Circuits Available page
- Environmental
  - Protection: IP65 (IP67 available upon request)
  - Certifications: UL Listed, File E218123 (available upon request)

### Configuration Code*

<table>
<thead>
<tr>
<th>Build-a-Part Number</th>
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<th>Electronic</th>
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<tr>
<td>E162N2N30021</td>
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<td>E462N2N30021C42</td>
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</tbody>
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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

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**www.molex.com**
mPm®
Technical Features

Cable Types

<table>
<thead>
<tr>
<th>Cable Type</th>
<th>Code</th>
<th>Features</th>
<th>Stranding</th>
<th>Bending Radius</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC</td>
<td>N</td>
<td>Application general purpose cable which has good resistance to water, but usually poor oil resistance.</td>
<td>0.5mm² = 15 x 0.20 0.75mm² = 21 x 0.20 1mm² = 28 x 0.20</td>
<td>15X outside diameter</td>
</tr>
<tr>
<td>CEI</td>
<td>I</td>
<td>Approved to IEC 332-2A, flame retardant and self extinguishing. Limited resistant to mineral oils.</td>
<td>0.5mm² = 28 x 0.15 0.75mm² = 42 x 0.15 1mm² = 32 x 0.20</td>
<td>10X outside diameter</td>
</tr>
<tr>
<td>PUR</td>
<td>P</td>
<td>Offers good resistance to oil and chemicals. Can swell when constantly immersed in water.</td>
<td>0.5mm² = 28 x 0.15 0.75mm² = 42 x 0.15 1mm² = 32 x 0.20</td>
<td>10X outside diameter</td>
</tr>
<tr>
<td>PVC CSA-UL</td>
<td>A</td>
<td>Approved to CSA-UL 2661, application general purpose cable which has good resistance to water, but usually poor oil resistance.</td>
<td>20 AWG = 32 x 0.15 18 AWG = 32 x 0.15</td>
<td>10X outside diameter</td>
</tr>
<tr>
<td>PUR CSA-UL</td>
<td>B</td>
<td>Approved to CSA-UL 20668. Very good resistance to oil and chemicals.</td>
<td>20 AWG = 32 x 0.15 18 AWG = 32 x 0.15</td>
<td>10X outside diameter</td>
</tr>
</tbody>
</table>

Technical Features

<table>
<thead>
<tr>
<th>mPm Code</th>
<th>Material</th>
<th>Color</th>
<th>Conductors</th>
<th>Section</th>
<th>External Diameter</th>
<th>Temperature Range</th>
<th>DIN A-B</th>
<th>DIN C</th>
</tr>
</thead>
<tbody>
<tr>
<td>I 2</td>
<td>PVC CEI 2022 II O.R.</td>
<td>Gray RAL7035</td>
<td>2</td>
<td>0.5mm²</td>
<td>5.5±0.2mm</td>
<td>-5 to +70</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>I 2</td>
<td>PVC CEI 2022 II O.R.</td>
<td>Gray RAL7035</td>
<td>3</td>
<td>0.5mm²</td>
<td>5.5±0.2mm</td>
<td>-5 to +70</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>I 2</td>
<td>PVC CEI 2022 II O.R.</td>
<td>Gray RAL7035</td>
<td>4</td>
<td>0.5mm²</td>
<td>6.5±0.2mm</td>
<td>-5 to +70</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>I 2</td>
<td>PVC CEI 2022 II O.R.</td>
<td>Gray RAL7035</td>
<td>5</td>
<td>0.5mm²</td>
<td>7±0.2mm</td>
<td>-5 to +70</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>P 2</td>
<td>PUR - BLEND</td>
<td>Black</td>
<td>2</td>
<td>0.5mm²</td>
<td>5.5±0.2mm</td>
<td>-5 to +70</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>P 2</td>
<td>PUR - BLEND</td>
<td>Black</td>
<td>3</td>
<td>0.5mm²</td>
<td>5.5±0.2mm</td>
<td>-5 to +70</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>P 2</td>
<td>PUR - BLEND</td>
<td>Black</td>
<td>5</td>
<td>0.5mm²</td>
<td>7±0.2mm</td>
<td>-5 to +70</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>F 2</td>
<td>CNOMO</td>
<td>Gray RAL7000</td>
<td>3</td>
<td>0.5mm²</td>
<td>5.5±0.2mm</td>
<td>-5 to +70</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>A 2</td>
<td>PVC CSA/UL 2661</td>
<td>Black</td>
<td>2</td>
<td>20 AWG</td>
<td>5.6±0.2mm</td>
<td>-15 to +105</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>A 2</td>
<td>PVC CSA/UL 2661</td>
<td>Black</td>
<td>3</td>
<td>20 AWG</td>
<td>6.2±0.2mm</td>
<td>-15 to +105</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>A 2</td>
<td>PVC CSA/UL 2661</td>
<td>Black</td>
<td>4</td>
<td>20 AWG</td>
<td>7±0.2mm</td>
<td>-15 to +105</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>A 2</td>
<td>PVC CSA/UL 2661</td>
<td>Black</td>
<td>5</td>
<td>20 AWG</td>
<td>7±0.2mm</td>
<td>-15 to +105</td>
<td>x</td>
<td>x</td>
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<tr>
<td>A 7</td>
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<td>Yellow</td>
<td>3</td>
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<td>5.6±0.2mm</td>
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<tr>
<td>B 2</td>
<td>PUR CSA/UL 20668</td>
<td>Black</td>
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<td>20 AWG</td>
<td>5.5±0.2mm</td>
<td>-25 to +90</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>B 2</td>
<td>PUR CSA/UL 20668</td>
<td>Black</td>
<td>3</td>
<td>20 AWG</td>
<td>6.2±0.2mm</td>
<td>-25 to +90</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>B 2</td>
<td>PUR CSA/UL 20668</td>
<td>Black</td>
<td>4</td>
<td>20 AWG</td>
<td>7±0.2mm</td>
<td>-25 to +90</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>B 2</td>
<td>PUR CSA/UL 20668</td>
<td>Black</td>
<td>5</td>
<td>20 AWG</td>
<td>7±0.2mm</td>
<td>-25 to +90</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>P 3</td>
<td>PUR - BLEND</td>
<td>Black</td>
<td>2</td>
<td>0.75mm²</td>
<td>6.5±0.2mm</td>
<td>-5 to +70</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>P 3</td>
<td>PUR - BLEND</td>
<td>Black</td>
<td>3</td>
<td>0.75mm²</td>
<td>6.5±0.2mm</td>
<td>-5 to +70</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>P 3</td>
<td>PUR - BLEND</td>
<td>Black</td>
<td>4</td>
<td>0.75mm²</td>
<td>7±0.2mm</td>
<td>-5 to +70</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>A 3</td>
<td>PVC CSA/UL 2661</td>
<td>Black</td>
<td>2</td>
<td>18 AWG</td>
<td>6.5±0.2mm</td>
<td>-15 to +105</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>A 3</td>
<td>PVC CSA/UL 2661</td>
<td>Black</td>
<td>3</td>
<td>18 AWG</td>
<td>6.5±0.2mm</td>
<td>-15 to +105</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>A 3</td>
<td>PVC CSA/UL 2661</td>
<td>Black</td>
<td>4</td>
<td>18 AWG</td>
<td>7±0.2mm</td>
<td>-15 to +105</td>
<td>x</td>
<td>x</td>
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<tr>
<td>A 3</td>
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<td>18 AWG</td>
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<td>x</td>
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<tr>
<td>B 3</td>
<td>PUR CSA/UL 20668</td>
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<td>3</td>
<td>18 AWG</td>
<td>6.5±0.2mm</td>
<td>-25 to +90</td>
<td>x</td>
<td>x</td>
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<tr>
<td>B 3</td>
<td>PUR CSA/UL 20668</td>
<td>Black</td>
<td>4</td>
<td>18 AWG</td>
<td>7±0.2mm</td>
<td>-25 to +90</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>B 3</td>
<td>PUR CSA/UL 20668</td>
<td>Black</td>
<td>5</td>
<td>18 AWG</td>
<td>7.8±0.2mm</td>
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<tr>
<td>I 4</td>
<td>PVC CEI 2022 II O.R.</td>
<td>Gray RAL7035</td>
<td>2</td>
<td>1mm²</td>
<td>7.1±0.2-0mm</td>
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<tr>
<td>I 4</td>
<td>PVC CEI 2022 II O.R.</td>
<td>Gray RAL7035</td>
<td>3</td>
<td>1mm²</td>
<td>7.1±0.2-0mm</td>
<td>-5 to +70</td>
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<tr>
<td>F 4</td>
<td>CNOMO</td>
<td>Gray RAL7000</td>
<td>4</td>
<td>1mm²</td>
<td>7.1±0.2-0mm</td>
<td>-5 to +70</td>
<td>x</td>
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<tr>
<td>N 2</td>
<td>PVC03</td>
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<td>5.1±0.2-0mm</td>
<td>-5 to +70</td>
<td>x</td>
<td>x</td>
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<tr>
<td>N 2</td>
<td>PVC03</td>
<td>Black</td>
<td>3</td>
<td>0.5mm²</td>
<td>5.6±0.2-0mm</td>
<td>-5 to +70</td>
<td>x</td>
<td>x</td>
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<td>0.5mm²</td>
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<td>x</td>
<td>x</td>
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<tr>
<td>N 3</td>
<td>PVC03</td>
<td>Black</td>
<td>2</td>
<td>0.75mm²</td>
<td>6±0.2-0mm</td>
<td>-5 to +70</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>N 3</td>
<td>PVC03</td>
<td>Black</td>
<td>3</td>
<td>0.75mm²</td>
<td>6.6±0.2-0mm</td>
<td>-5 to +70</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>N 3</td>
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<td>Black</td>
<td>4</td>
<td>0.75mm²</td>
<td>7.15±0.2-0mm</td>
<td>-5 to +70</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
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<td>PVC03</td>
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<td>5</td>
<td>0.75mm²</td>
<td>8±0.2-0mm</td>
<td>-5 to +70</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>N 4</td>
<td>PVC03</td>
<td>Black</td>
<td>2</td>
<td>1mm²</td>
<td>6.5±0.2-0mm</td>
<td>-5 to +70</td>
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<tr>
<td>N 4</td>
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<td>3</td>
<td>1mm²</td>
<td>6.9±0.2-0mm</td>
<td>-5 to +70</td>
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<td>N 5</td>
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<td>3</td>
<td>1.5mm²</td>
<td>8.3±0.2-0mm</td>
<td>-5 to +70</td>
<td>x</td>
<td>x</td>
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# mPm® Available Circuits

<table>
<thead>
<tr>
<th>Input</th>
<th>Circuit Schematic</th>
<th>Load</th>
<th>Circuit Description</th>
<th>Product Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>V AC-DC</td>
<td><img src="image1" alt="Circuit A0 Diagram" /></td>
<td>Circuit A0</td>
<td>With filament lamp for 12 or 24V or with neon lamp for 115 or 230V</td>
<td>Electronic 022, 052, 112, 182, 192, 532, 542, 552, 562, 622 Non-Electronic 022, 052, 112, 182, 192, 532, 542, 552, 562, 622</td>
</tr>
<tr>
<td>V AC-DC</td>
<td><img src="image2" alt="Circuit A1 Diagram" /></td>
<td>Circuit A1</td>
<td>With bipolar LED</td>
<td>Electronic 022, 052, 182, 192, 532, 542, 552, 562, 622 Non-Electronic 022, 052, 182, 192, 532, 542, 552, 562, 622</td>
</tr>
<tr>
<td>V AC-DC</td>
<td><img src="image3" alt="Circuit B0 Diagram" /></td>
<td>Circuit B0</td>
<td>With 2 filament lamps for 12 or 24V or with 2 neon lamps for 115 or 230V</td>
<td>Electronic 022, 052, 182, 192, 532, 542, 552, 562, 622 Non-Electronic 022, 052, 182, 192, 532, 542, 552, 562, 622</td>
</tr>
<tr>
<td>V AC-DC</td>
<td><img src="image4" alt="Circuit B1 Diagram" /></td>
<td>Circuit B1</td>
<td>With 2 bipolar LEDs</td>
<td>Electronic 022, 052, 182, 192, 532, 542, 552, 562, 622 Non-Electronic 022, 052, 182, 192, 532, 542, 552, 562, 622</td>
</tr>
<tr>
<td>V AC-DC</td>
<td><img src="image5" alt="Circuit C0 Diagram" /></td>
<td>Circuit C0</td>
<td>With filament lamp (for 12 or 24V) or neon lamp (for 115 or 230V) plus VDR to protect supply and switch from overvoltage (the energy in the coil is limited by the VDR). For type 192 only 12-24 and 115V</td>
<td>Electronic 022, 052, 182, 192, 532, 542, 552, 562, 622 Non-Electronic 022, 052, 182, 192, 532, 542, 552, 562, 622</td>
</tr>
<tr>
<td>V DC</td>
<td><img src="image6" alt="Circuit C1 Diagram" /></td>
<td>Circuit C1</td>
<td>With filament lamp (for 12 or 24V) or neon lamp (for 115 or 230V) plus blocking diode to protect against overvoltage when switching off. For type 192 only 12-24 and 115V</td>
<td>Electronic 022, 052, 182, 192, 532, 542, 552, 562, 622 Non-Electronic 022, 052, 182, 192, 532, 542, 552, 562, 622</td>
</tr>
<tr>
<td>Input</td>
<td>Circuit Schematic</td>
<td>Load</td>
<td>Circuit Description</td>
<td>Product Form</td>
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<td>----------</td>
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<tr>
<td>V DC</td>
<td><img src="image1" alt="Circuit C3 schematic" /></td>
<td>Circuit C3</td>
<td>With LED plus blocking diode to protect against overvoltage when switching off. Voltage 12 to 230V. For type 192 only 12-24V and 115V.</td>
<td>Electronic 022, 052, 112, 182, 192, 532, 542, 552, 562, 622 Non-Electronic 452, 462, 472, 392, 492</td>
</tr>
<tr>
<td>V AC-DC</td>
<td><img src="image2" alt="Circuit C4 schematic" /></td>
<td>Circuit C4</td>
<td>Bipolar LED and VDR to protect supply and switch. (The energy in the coil is limited by the VDR). Voltage 12 to 230V. For type 192 only 12-24 and 115V.</td>
<td>Electronic 022, 052, 112, 182, 192, 532, 542, 552, 562, 622 Non-Electronic 452, 462, 472, 392, 492</td>
</tr>
<tr>
<td>V DC</td>
<td><img src="image3" alt="Circuit C7 schematic" /></td>
<td>Circuit C7</td>
<td>With LED, overvoltage blocking diode, inversion polarity protection.</td>
<td>Electronic 113 Non-Electronic 452</td>
</tr>
<tr>
<td>V AC-DC</td>
<td><img src="image4" alt="Circuit D0 schematic" /></td>
<td>Circuit D0</td>
<td>With VDR to protect supply and switch from overvoltage. (The energy in the coil is limited by the VDR). Voltage 12 to 230V. For type 192 only 12-24 and 115V.</td>
<td>Electronic 022, 052, 112, 182, 192, 532, 542, 552, 562, 622 Non-Electronic 452, 462, 472, 392, 492</td>
</tr>
<tr>
<td>V DC</td>
<td><img src="image5" alt="Circuit E0 schematic" /></td>
<td>Circuit E0</td>
<td>With blocking diode to protect against overvoltage when switching off. For type 192 only 12-24 and 115V.</td>
<td>Electronic 022, 052, 112, 182, 192, 532, 542, 552, 562, 622 Non-Electronic 452, 462, 472, 392, 492</td>
</tr>
<tr>
<td>V AC</td>
<td><img src="image6" alt="Circuit E1 schematic" /></td>
<td>Circuit E1</td>
<td>Half-wave rectifier plus blocking diode to protect against overvoltage when switching off.</td>
<td>Electronic 112, 182, 192, 622 Non-Electronic 452, 392, 492</td>
</tr>
<tr>
<td>V AC-DC</td>
<td><img src="image7" alt="Circuit G0 schematic" /></td>
<td>Circuit G0</td>
<td>RC decay circuit to dissipate high energy generated in highly inductive loads. The energy in the coil is absorbed by the capacitor and dissipated by the resistor. R = 100 Ω, C = 0.47μF - 400V.</td>
<td>Electronic 142 Non-Electronic</td>
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<tr>
<td>V AC-DC</td>
<td><img src="image8" alt="Circuit G1 schematic" /></td>
<td>Circuit G1</td>
<td>With filament lamp (for 12 or 24V) or neon lamp (for 115 or 230V) plus RC decay circuit to dissipate high energy generated in highly inductive loads. The energy in the coil is absorbed by the capacitor and dissipated by the resistor. R = 100 Ω, C = 0.47μF - 400V.</td>
<td>Electronic 142 Non-Electronic</td>
</tr>
<tr>
<td>V AC-DC</td>
<td><img src="image9" alt="Circuit G2 schematic" /></td>
<td>Circuit G2</td>
<td>Bipolar LED plus RC decay circuit to dissipate high energy generated in highly inductive loads. The energy in the coil is absorbed by the capacitor and dissipated by the resistor. Voltage 12-230V R = 100 Ω, C = 0.47μF - 400V. R = 150 Ω, C = 0.33μF - 250V.</td>
<td>Electronic 142, 532, 552 Non-Electronic</td>
</tr>
<tr>
<td>Input</td>
<td>Circuit Schematic</td>
<td>Load</td>
<td>Circuit Description</td>
<td>Product Form</td>
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</tr>
<tr>
<td>V AC</td>
<td><img src="image1" alt="Image" /></td>
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<td>Circuits R0</td>
<td>Electronic</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Full-wave bridge rectifier plus VDR to protect against supply overvoltage.</td>
<td>112 532 542 562 with diode of 1.0A 142 with diode of 3.0A</td>
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<tr>
<td>V AC</td>
<td><img src="image2" alt="Image" /></td>
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<td>Circuits R1</td>
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<td></td>
<td>Full-wave bridge rectifier plus filament lamp (for 12-24V) or neon lamp (for 115 or 230V) to confirm presence of the supply at the connector, plus VDR to protect against supply overvoltage.</td>
<td>112 with diode of 1.0A 142 with diode of 3.0A</td>
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<td><img src="image3" alt="Image" /></td>
<td></td>
<td>Circuits R2</td>
<td>Electronic</td>
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<td></td>
<td>Full-wave bridge rectifier with LED to confirm presence of the supply at the connector, plus two VDR's to protect load and supply from overvoltage.</td>
<td>112 532 542 552 562 with diode of 1.0A 142 with diode of 3.0A</td>
</tr>
<tr>
<td>V AC</td>
<td><img src="image4" alt="Image" /></td>
<td></td>
<td>Circuits R4</td>
<td>Electronic</td>
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<td>Full-wave bridge rectifier with two VDR's to protect load and supply from overvoltage.</td>
<td>112 with diode of 1.0A 142 with diode of 3.0A</td>
</tr>
<tr>
<td>V AC</td>
<td><img src="image5" alt="Image" /></td>
<td></td>
<td>Circuits R5</td>
<td>Electronic</td>
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<tr>
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<td></td>
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<td>Full-wave bridge rectifier with filament lamp (for 12-24V) or neon lamp (for 115 or 230V) to confirm presence of the rectified DC voltage, plus two VDR's to protect load and supply from overvoltage.</td>
<td>112 with diode of 1.0A 142 with diode of 3.0A</td>
</tr>
<tr>
<td>V AC</td>
<td><img src="image6" alt="Image" /></td>
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<td>Circuits R6</td>
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<tr>
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<td></td>
<td>Full-wave bridge rectifier with LED to confirm presence of the rectified DC voltage, plus two VDR's to protect load and supply from overvoltage.</td>
<td>112 with diode of 1.0A 142 with diode of 3.0A</td>
</tr>
<tr>
<td>V AC</td>
<td><img src="image7" alt="Image" /></td>
<td></td>
<td>Circuits R7</td>
<td>Electronic</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Full wave bridge rectifier with LED to confirm presence of the rectified DC voltage, plus VDR to protect against supply overvoltage and smoothing capacitor in DC output circuit.</td>
<td>142</td>
</tr>
<tr>
<td>Input</td>
<td>Circuit Schematic</td>
<td>Lead</td>
<td>Circuit Description</td>
<td>Product Form</td>
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<td>---------------------</td>
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</tr>
<tr>
<td>V AC-DC</td>
<td><img src="image1" alt="Circuit Q0" /></td>
<td>4</td>
<td>Circuit incorporating red/green LED to show position of changeover contact e.g. with pressure switches etc.</td>
<td>Electronic 113 Non-Electronic 453</td>
</tr>
<tr>
<td>V AC-DC</td>
<td><img src="image2" alt="Circuit Q1" /></td>
<td>2</td>
<td>Circuit incorporating amber/green LED to show position of changeover contact e.g. with pressure switches etc.</td>
<td></td>
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<tr>
<td>V AC-DC</td>
<td><img src="image3" alt="Circuit Q2" /></td>
<td>1</td>
<td>With transient suppressor (Transil) to provide blocking of input and output overvoltage, plus LED indicator to confirm voltage presence.</td>
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<tr>
<td>V AC-DC</td>
<td><img src="image4" alt="Circuit Q3" /></td>
<td>2</td>
<td>With transient suppressor (Transil) to provide blocking of input and output overvoltage.</td>
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</tr>
<tr>
<td>V AC-DC</td>
<td><img src="image5" alt="Circuit Q4" /></td>
<td>1</td>
<td>Circuit incorporating a green LED which confirms presence of the supply and load continuity, and a red LED to indicate possible load discontinuity, plus a VDR to protect supply and switch. (The energy in the coil is limited by the VDR). Voltage: 24 to 230V. Current: 1.0A max.</td>
<td></td>
</tr>
</tbody>
</table>

**Connector Terminal Positions**

How the terminals are numbered, and their relationship to the circuit shown in this catalogue:

- Symbol:
  - `---` = Supply leads
  - `---` = Connector terminals

---

202  
This document provided by Barr-Thorp Electric Co., Inc.  800-473-9123  www.barr-thorp.com
Power Products

Trunk/Feeder
- Cordsets ................................................................. 207 to 209
- Tees ............................................................................. 210
- Reducers ....................................................................... 211
- Receptacles .................................................................... 212
- Field Attachable Connectors ........................................... 213

Drop/Branch
- Cordsets ....................................................................... 214 to 216
- Receptacles .................................................................... 217
- Field Attachable Connectors ........................................... 218

Accessories
- Closure Caps and Locking Clips ..................................... 219
- Emergency Stop Cordsets and Tees ................................. 220
- Emergency Stop Receptacles and Terminators ................ 221
Pipe and wire is how we used to distribute power to machine outputs. Today, more design engineers are choosing Brad® Power modular, flexible power wiring systems from Molex. Beginning with machine assembly, Brad power solutions save money and time.
Modular power for everyone

Brad® Power modular components make installation faster, easier and more reliable. Where multiple machines are involved, assembling the systems is consistent and repeatable.

Compared to traditional hard wiring, Brad Power solutions provide reduced labor costs, simplified connections, increased plant flexibility and reduced commission time. They also deliver rapid return on capital equipment investments.

Cut your total installed cost

Brad quick-connect, modular wiring solutions install easily and make commissioning simple. In fact, electrical installation and commissioning times can be slashed by as much as 80%. And that can translate into a total installed cost (TIC) reduction of 20% to 50% vs. conventional hard-wiring thanks to:
- No specialized tools
- No pipe bending
- No wire pulling
- No conduit or raceways required
- Reduced labor time
- Minimized testing and troubleshooting

Reduce your total cost of ownership

The Brad Power system delivers a higher return on investment (ROI) because the total cost of ownership (TCO) continues to drop the longer the system is owned, used and maintained. Benefits include:
- Increased machine uptime
- Faster, easier maintenance of failed machine devices
- Simplified scalability
- Parts that can be reused over and over
NFPA 79-2007 Compliant

It took a 2002 electrical code revision (and further refinements in 2007) to enable system designers and users to experience this practical alternative to hard-wired power distribution and motor control on industrial equipment and machine tools. Compare the codes:

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Conductor Sizing for Power Circuits</strong></td>
<td>Section 15.3 (a): Conductors shall not be smaller than 14 AWG.</td>
<td>Section 12.6.1 Conductors shall not be smaller than 14 AWG for power circuits unless otherwise permitted in 12.6.1.1 (16 AWG) and 12.6.1.2 (18 AWG).</td>
</tr>
<tr>
<td><strong>Wiring Methods and Practices Regarding Connectors</strong></td>
<td>Section 16.1.4: Conductors and cables shall be run without splices from terminal to terminal.</td>
<td>Section 13.1.2.2 Factory-applied connectors, molded onto cables, shall be permitted. Such connectors shall not be considered as splices or joints.</td>
</tr>
<tr>
<td><strong>Wiring Methods and Practices Regarding Exposed Cable</strong></td>
<td>Section 16.3.1: Conductors and their connections, external to the control panel, shall be totally enclosed in suitable raceways or enclosures.</td>
<td>Section 13.1.5.1 Exposed cables, installed along the structure of the equipment or system or in the chases of the machinery, shall be permitted. Exposed cables shall be installed to closely follow the surface and structural members of the machinery.</td>
</tr>
</tbody>
</table>

UL 2237 (PVVA) Listed

Brad® Power products are designed to interconnect high-energy devices, such as motors, heaters, and pumps to their power source. In such applications, there is a high potential for extreme electrical transients to occur during a fault condition before the over-current protection device (i.e. fuse or breaker) trips. Brad® Power products have been tested and proven to withstand these fault conditions under UL 2237.

UL 2237 covers interconnect systems intended for use in power branch circuits, including motor branch circuits in industrial machinery.

The UL 2237 Listing assures that our wiring system integrity and safety is preserved, even after a fault has occurred in the installation. Just reset, or eliminate the fault condition, and continue operating.

Applications

Power distribution and motor control in:
- Complex automated assembly equipment
- Material handling and conveying equipment
- Food/beverage processing and packaging
- Pharmaceutical process equipment
- Petrochemical plants

Design and Quality

- UL 2237 (PVVA) approved
- Rugged, factory-applied connectors over-molded
- Strong, crush-resistant TC-ER cable
- Convenient, field-attachable connectors

A Complete System

There are no holes in the Brad® Power solution. It’s all here, including: receptacles, trunk/feeder cordsets and connectors, drop/branch cordsets and connectors, tees, reducers, and accessories (locking clips, closure caps, field-attachable connectors, etc.). Stainless steel hardware is available as an option.

Machine builders will appreciate the increased worker productivity, reduced manufacturing costs, quicker time to market and improved profit margins. System designers, integrators and plant engineers will enjoy the faster commissioning times, lower installation costs and simplified maintenance and repair. And everyone will appreciate the fact that Brad Power solutions are from Molex, a leading single-source supplier of interconnect products. Backed by a firm commitment to research and development, the Molex team of skilled experts is passionate about designing, developing and distributing innovative connection solutions for you.
### Brad® Power Trunk/Feeder Single-Ended Cordsets

**130063**

**Female Straight, Right Angle**

**Threaded**

---

#### Features and Benefits
- Meets NFPA 79-2007 standards for motor and branch circuits
- UL 2237 listed

#### Reference Information
- UL File No.: E258922

#### Electrical
- Voltage: 600V AC/DC

#### Mechanical
- Wire Size: 10 AWG

---

### Table: Engineering and Standard Order Numbers

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Current</th>
<th>Keyway</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Female Straight</th>
<th>Female Right Angle</th>
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<tbody>
<tr>
<td>3 Pole</td>
<td>30.0A</td>
<td>Single</td>
<td>PVC (A48)</td>
<td>10</td>
<td>2.0m</td>
<td>C03000A48M020</td>
<td>C03001A48M020</td>
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<td>130063-0037</td>
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<td>C03101A48M020</td>
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<td></td>
<td>130063-0056</td>
<td>130063-0199</td>
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<td>4 Pole</td>
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<td>130063-0089</td>
<td>130063-0135</td>
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<td>2.0m</td>
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<td>130063-0181</td>
<td>130063-0183</td>
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**Note:** Sales drawings for all standard order numbers are available on molex.com

### Configuration Code

**Build-a-Part Number**

- **Length (Meters)**
  - 2: **M020**
  - 5: **M050**
  - 10: **M100**

**Configuration Code**

- **CO3000A48M020**

**Coupling Nut Option**

- Stainless Steel . . . . . 8

---

### Physical
- Connector Face: PVC
- Connector Body: PVC
- Cable: A48—UL Type STOW/TC-ER
- Cable Jacket: PVC
- Cable Jacket Color: Gray
- Contact: Copper alloy with Gold over Nickel plating
- Operating Temperature: -20 to +105°C

### Environmental
- Protection: IP67, IP68 and IP69K (with Stainless Steel)
Brad® Power
Trunk/Feeder
Single-Ended Cordsets
130063
Male
Straight, Right Angle
Threaded

Features and Benefits
• Meets NFPA 79-2007 standards for motor and branch circuits
• UL 2237 listed

Reference Information
UL File No.: E258922

Electrical
Voltage: 600V AC/DC

Mechanical
Wire Size: 10 AWG

Physical
Connector Face: PVC
Connector Body: PVC
Cable: A48—UL Type STOOW/TC-ER
Cable Jacket: PVC
Cable Jacket Color: Gray
Contact: Copper alloy with Gold over Nickel plating
Operating Temperature: -20 to +105°C

Environmental
Protection: IP67, IP68 and IP69K (with Stainless Steel)

<table>
<thead>
<tr>
<th>Poles</th>
<th>Current</th>
<th>Keyway</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
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<tr>
<td>3 Pole</td>
<td>30.0A</td>
<td>Single</td>
<td>PVC (A48)</td>
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<td>2.0m</td>
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<tr>
<td>3 Pole</td>
<td></td>
<td>Alternate</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4 Pole</td>
<td>25.0A</td>
<td>Single</td>
<td>PVC (A48)</td>
<td>10</td>
<td>2.0m</td>
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<tr>
<td>4 Pole</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

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<thead>
<tr>
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<td>10</td>
<td>M100</td>
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Coupling Nut Option
Stainless Steel . . . . . . 8

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Power Trunk/Feeder Double-Ended Cordsets

130064 Female Straight-to-Male Straight Threaded

**Features and Benefits**
- Meets NFPA 79-2007 standards for motor and branch circuits
- UL 2237 listed

**Reference Information**
UL File No.: E258922

**Electrical**
Voltage: 600V AC/DC

**Mechanical**
Wire Size: 10 AWG

**Physical**
- Connector Face: PVC
- Connector Body: PVC
- Contact: Copper alloy with Gold over Nickel plating
- Cable: A48—UL Type STOOW/TC-ER
- Cable Jacket: PVC
- Cable Jacket Color: Gray
- Coupling Nut: Anodized Aluminum
- Operating Temperature: -20 to +105°C

**Environmental**
Protection: IP67, IP68, IP69K (with Stainless Steel)

---

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Current</th>
<th>Keyway</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size</th>
<th>Length</th>
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<tbody>
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<td>3 Pole</td>
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<td>2.0m</td>
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**Configuration Code**
Build-a-Part Number

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<td>10</td>
<td>M100</td>
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</table>

**Coupling Nut Option**
Stainless Steel . . . . . . 8

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Power
Trunk Tees
130068
Trunk-to-Trunk and Trunk-to-Drop

Features and Benefits
- Meets NFPA 79-2007 standards for motor and branch circuits
- UL 2237 listed

Reference Information
UL File No.: E235922

Electrical
Voltage: 600V AC/DC

Physical
Connector Face: PVC
Connector Body: PVC
Contact: Copper alloy with Gold over Nickel plating
Coupling Type: Anodized Aluminum/Epoxy coated Zinc
Cable Type: TC-ER
Cable Jacket: PVC
Cable Jacket Color: Gray
Operating Temperature: -20 to +105°C

Environmental
Protection: IP67, IP68, IP69K (with Stainless Steel)

<table>
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<th>Poles (Female View)</th>
<th>Current</th>
<th>Keyway</th>
<th>Trunk-to-Trunk</th>
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<td>TC30C30-200</td>
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<th>Trunk-to-Drop</th>
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<th>Keyway</th>
<th>Cable AWG</th>
<th>Trunk-to-Drop</th>
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<tr>
<td>3 Pole</td>
<td>30.0A Trunk / 15.0A Drop</td>
<td>Single</td>
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<td>3 Pole</td>
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<td>25.0A Trunk / 15.0A Drop</td>
<td>Single</td>
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<td>4 Pole</td>
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Configuration Code*
Build-a-Part Number

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<td>3</td>
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<td>10</td>
<td>MO100</td>
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</table>

Coupling Nut Option
Stainless Steel . . . . . 8

Note: Sales drawings for all standard order numbers are available on molex.com

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Power
Truck-to-Drop Reducers
130068
Male-Female
Straight
Threaded

Features and Benefits
• Meets NFPA 79-2007 standards for motor and branch circuits
• UL 2237 listed

Reference Information
UL File No.: E258922

Electrical
Voltage: 600V AC/DC

Physical
Connector Face: PVC
Connector Body: PVC
Contact: Copper alloy with Gold over Nickel plating
Coupling Nut: Anodized Aluminum/epoxy coated Zinc
Operating Temperature: -20 to +90°C

Environmental
Protection: IP67, IP68, IP69K (with Stainless Steel)

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>3 Pole</td>
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<td>Single</td>
<td>1C3030-001</td>
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<td>Alternate</td>
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</table>

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number
1C3030-0018

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**Brad® Power Trunk/Feeder Receptacles**

130066
Female, Male
Straight

**Features and Benefits**
- Special design contacts provide high reliability
- Meets NFPA 79-2007 standards for motor and branch circuits

**Reference Information**
UL 2237 (PVVA) Listed E258922

**Electrical**
Voltage: 600V AC/DC

**Mechanical**
Wire Size: 10 AWG
Wire Type: UL Type THHN

**Physical**
Connector Face: PVC
Shell: Anodized Aluminum
Contact: Copper alloy with Gold over Nickel plating
Panel Mount: Front

**Environmental**
Protection: IP67, IP68 (IP69K with Stainless Steel)

---

<table>
<thead>
<tr>
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<td>Single</td>
<td>1/2&quot; - 14 NPT</td>
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<td>1/2&quot; - 14 NPT</td>
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<td>CR4106A30M005</td>
<td>130066-0262</td>
</tr>
</tbody>
</table>

**Note:** Sales drawings for all standard order numbers are available on molex.com
Brad® Power
Trunk/Feeder
Field Attachable Connectors

130070
Internal Thread Female
External Thread Male

Features and Benefits
• Special contact design for reliability and low resistance
• Allows easy field conversion to quick-connect or repair of damaged, molded connectors

Reference Information
UL File No.: E258922

Electrical
Voltage: 600V AC/DC

Mechanical
Wire Size: 14 to 8 AWG
Cable Range:.43” to .82” (11mm to 21mm)

Physical
Connector Face: PVC
Connector Body: Nylon
Contact: Copper alloy with Gold over Nickel plating
Coupling Nut: Anodized Aluminum
Grommet: Neoprene
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67, IP68, IP69K

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Current</th>
<th>Coupling Type</th>
<th>Female Straight</th>
<th>Male Straight</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Pole</td>
<td>30.0A</td>
<td>Internal Thread</td>
<td>CA3000-39</td>
<td>130070-0021</td>
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<tr>
<td></td>
<td></td>
<td>External Thread</td>
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</tr>
<tr>
<td>4 Pole</td>
<td>25.0A</td>
<td>Internal Thread</td>
<td>CA4000-39</td>
<td>130070-0023</td>
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<tr>
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<td></td>
<td>External Thread</td>
<td></td>
<td></td>
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</tbody>
</table>
Brad® Power Drop/Branch Single-Ended Cordsets

130061
Female
Straight, Right Angle
Threaded

Features and Benefits
- Meets NFPA 79-2000 standard for motor and branch circuits
- UL 2237 listed

Reference Information
UL File No.: E258922

Electrical
Voltage: 600V AC/DC

Features and Benefits
- Meets NFPA 79-2000 standard for motor and branch circuits
- UL 2237 listed

Reference Information
UL File No.: E258922

Electrical
Voltage: 600V AC/DC

Physical
Connector Face: PVC
Connector Body: PVC
Contact: Brass with Gold over Nickel plating
Cable: A45—UL Type STOOW/TC-ER 16 AWG
A46—UL Type STOOW/TC-ER 14 AWG
Cable Jacket: PVC
Cable Jacket Color: Gray
Coupling Nut: Black epoxy coated Zinc
Operating Temperature: -20 to +105°C

Environmental
Protection: IP67, IP68 and IP69K (with Stainless Steel)

<table>
<thead>
<tr>
<th>Poles</th>
<th>Current</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Female Straight</th>
<th>Female Right Angle</th>
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<tr>
<td>3 Pole</td>
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<td>STOOW/TC-ER</td>
<td>PVC (A45)</td>
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<tr>
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<td>2.0m</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code* Build-a-Part Number

<table>
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<tr>
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<th>Code</th>
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<tbody>
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<td>M100</td>
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</table>

103000A45M020

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
### Features and Benefits
- Meets NFPA 79-2000 standard for motor and branch circuits
- UL 2237 listed

### Reference Information
UL File No.: E258922

### Electrical
Voltage: 600V AC/DC

### Physical
- Connector Face: PVC
- Connector Body: PVC
- Contact: Brass with Gold over Nickel plating
- Cable: A45—UL Type STOOW/TC-ER 16 AWG
  - A46—UL Type STOOW/TC-ER 14 AWG
- Cable Jacket: PVC
- Coupling Nut: Black epoxy coated Zinc
- Cable Jacket Color: Gray
- Operating Temperature: -20 to +105°C

### Environmental
- Protection: IP67, IP68 and IP69K (with Stainless Steel)

### Table: Connectors
<table>
<thead>
<tr>
<th>Poles</th>
<th>Current</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Male Straight</th>
<th>Male Right Angle</th>
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</thead>
<tbody>
<tr>
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<td>STOOW/TC-ER</td>
<td>PVC (A45)</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

### Configuration Code*

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<td>M100</td>
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</table>

**Note:** Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

![Diagram of connector configurations](image-url)
# Brad® Power Drop/Branch Double-Ended Cordsets

**130062**

**Threaded**

**Female Straight-to-Male Straight**

## Features and Benefits
- Meets NFPA 79-2000 standard for motor and branch circuits
- UL 2237 listed

## Reference Information
UL File No.: E258922

## Electrical
Voltage: 600V AC/DC

## Physical
- Connector Face: PVC
- Connector Body: PVC
- Contact: Brass with Gold over Nickel plating
- Cable: A45—UL Type STOOW/TC-ER 16 AWG
  - A46—UL Type STOOW/TC-ER 14 AWG
- Cable Jacket: PVC
- Cable Jacket Color: Gray
- Coupling Nut: Black epoxy coated Zinc
- Operating Temperature: -20 to +105°C
- Environmental Protection: IP67, IP68 and IP69K (with Stainless Steel)

## Reference Information
UL File No.: E258922

### Electrical
- **Voltage**: 600V AC/DC

### Physical
- **Connector Face**: PVC
- **Connector Body**: PVC
- **Contact**: Brass with Gold over Nickel plating
- **Cable**: A45—UL Type STOOW/TC-ER 16 AWG
  - A46—UL Type STOOW/TC-ER 14 AWG
- **Cable Jacket**: PVC
- **Cable Jacket Color**: Gray
- **Coupling Nut**: Black epoxy coated Zinc
- **Operating Temperature**: -20 to +105°C
- **Environmental Protection**: IP67, IP68 and IP69K (with Stainless Steel)

## Table: Poles, Current, Cable Type, Wire Size, Length, Female Straight-to-Male Straight

<table>
<thead>
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<th>Poles (Male View)</th>
<th>Current</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Female Straight-to-Male Straight</th>
</tr>
</thead>
<tbody>
<tr>
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<td>STOOW/TC-ER</td>
<td>PVC (A45)</td>
<td>16</td>
<td>2.0m</td>
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<tr>
<td></td>
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<tr>
<td>4 Pole</td>
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<td>PVC (A45)</td>
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<td>2.0m</td>
<td>114030A45M020</td>
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<tr>
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<td>PVC (A46)</td>
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<td>114030A46M020</td>
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</tbody>
</table>

**Note:** Sales drawings for all standard order numbers are available on molex.com

## Configuration Code
**Build-a-Part Number**

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<thead>
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<th>Build-a-Part Number</th>
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</thead>
<tbody>
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<td></td>
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</tbody>
</table>

**Coupling Nut Option**
- Stainless Steel . . . . . . 8

- Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Power Drop/Branch Receptacles

130066
Female, Male Straight

Features and Benefits
- Patented Quad Beam™ contact provides high reliability and low resistance
- Meets NFPA 79-2007 standards for motor and branch circuits
- UL 2237 listed

Reference Information
UL File No.: E258922

Electrical
Voltage: 600V AC/DC

Mechanical
Wire Type: THHN

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Current</th>
<th>Wire Size AWG</th>
<th>Female Straight</th>
<th>Male Straight</th>
</tr>
</thead>
<tbody>
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<td>14</td>
<td>130066-0069</td>
<td>130066-0090</td>
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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

Physical
Connector Face: PVC
Shell: Black epoxy coated zinc or anodized Aluminum
Mounting Thread Size: 1/2" - 14 NPT
Panel Mount: Front

Environmental
Protection: IP67, IP68 (IP69K with Stainless Steel)

Configuration Code
Build-a-Part Number
1R3006A20M0058

<table>
<thead>
<tr>
<th>Length</th>
<th>Code</th>
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<tr>
<td>Meters</td>
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<tr>
<td>0.5</td>
<td>M005</td>
</tr>
<tr>
<td>2</td>
<td>M020</td>
</tr>
</tbody>
</table>

Coupling Nut Option
Stainless Steel . . . . . 8

Cable Code
Configuration Code

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Brad® Power
Mini-Change® Drop/Branch
Field Attachable Connectors

130017
Female, Male
Straight

Features and Benefits
- Patented Quad-Beam™ contact design for reliability and low resistance

Reference Information
UL File No.: E258922

Electrical
Voltage: 600V AC/DC

Mechanical
Wire Size: 15 to 24 AWG
Cable Range: 5.08 to 11.43mm (.200-.450”)

Physical
Connector Face: Polyurethane
Connector Body: Nylon
Contact: Brass with Gold over Nickel plating
Coupling Nut: Nickel plated Brass
Operating Temperature: -20 to +80°C
Environmental
Protection: IP67

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>3 Pole</td>
<td>15.0A</td>
<td>1A3000-34PWR</td>
<td>130017-0007</td>
<td>1A3006-34PWR</td>
<td>130017-0014</td>
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<tr>
<td>4 Pole</td>
<td>15.0A</td>
<td>1A4000-34PWR</td>
<td>130017-0017</td>
<td>1A4006-34PWR</td>
<td>130017-0022</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
### Brad® Power Trunk/Feeder Accessories

**130070**

**Closure Cap/Locking Clip**

#### Features and Benefits
- Protects connector from dust and moisture

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Description</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
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<tbody>
<tr>
<td>Closure Cap</td>
<td>7/8&quot; - 16 UN-2A External Thread, Anodized Aluminum</td>
<td>55-0198</td>
<td>130070-0018</td>
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<td>Closure Cap</td>
<td>7/8&quot; - 16 UN-2B Internal Thread, Anodized Aluminum</td>
<td>55-0298</td>
<td>130070-0019</td>
</tr>
<tr>
<td>Locking Clip</td>
<td>Snap Lock, Tool to Release (Pkg of 10)</td>
<td>66200A-10</td>
<td>130070-0020</td>
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</table>

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### Brad® Power Drop/Branch Accessories

**130201/130070**

**Closure Cap/Locking Clip**

#### Features and Benefits
- Protects connector from dust and moisture

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Description</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
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<tbody>
<tr>
<td>Closure Cap</td>
<td>7/8&quot; - 14 UN-2A External Thread, Anodized Aluminum with Steel Bead Chain</td>
<td>65-0085</td>
<td>130201-1109</td>
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<tr>
<td>Closure Cap</td>
<td>7/8&quot; - 16 UN-2B Internal Thread, Anodized Aluminum with Steel Bead Chain</td>
<td>65-0086</td>
<td>130201-1111</td>
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<tr>
<td>Locking Clip</td>
<td>Snap Lock, Tool to Release (Pkg of 10)</td>
<td>11400A-10</td>
<td>130070-0012</td>
</tr>
</tbody>
</table>
**Features and Benefits**

- Patented Quad Beam™ contact with Gold over Nickel plating provides high reliability and low resistance
- Compatible with Allen-Bradley ArmorStart drives

**Reference Information**

UL File No. E152210
CSA File No. LR6837

**Physical**

- Connector Face: TPE
- Connector Body: TPE
- Contacts: Brass with Gold over Nickel plating
- Hardware: Black epoxy coated Zinc
- Operating Temperature: -20 to +80°C

**Environmental**

Protection: IP67

---

### E-stop Cordset (Mini-Change-to-Mini-Change)

<table>
<thead>
<tr>
<th>Male</th>
<th>Schematic</th>
<th>Female</th>
<th>Current</th>
<th>Voltage</th>
<th>Cable Type</th>
<th>Male Straight-to-Female Straight</th>
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</thead>
<tbody>
<tr>
<td>6 Pole</td>
<td><img src="image1" alt="Male Schematic" /></td>
<td>6 Pole</td>
<td>8.0A</td>
<td>600V</td>
<td>TC-ER</td>
<td>51180-M020</td>
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</table>

### E-stop Adapter Cordset (Mini-Change-to-Micro-Change)

<table>
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<tr>
<th>Male</th>
<th>Schematic</th>
<th>Female</th>
<th>Current</th>
<th>Voltage</th>
<th>Cable Type</th>
<th>Male-Female Right Angle-to-Right Angle</th>
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<tbody>
<tr>
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<td><img src="image2" alt="Male Schematic" /></td>
<td>5 Pole</td>
<td>4.0A</td>
<td>300V</td>
<td>ITC-ER</td>
<td>41627-M010</td>
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### Tee for E-stop In (Mini-Change®)

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<td>600V</td>
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### Tee for E-stop Out (Mini-Change®)

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<td>61451-ESOUT</td>
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</table>

**Configuration Code**

- **Build-a-Part Number**: 51180-M020
  - Length Code
    - M020
    - M050
    - M100

---

*Note: Sales drawings for all standard order numbers are available on molex.com

*Allen-Bradley and ArmorStart are trademarks of Rockwell Automation Inc.
Brad® Mini-Change®
Emergency Stop
Receptacles and Terminators

130010/130018
Special Wired

Features and Benefits
- Patented Quad Beam™ contact with Gold over Nickel plating provides high reliability and low resistance
- Compatible with Allen-Bradley ArmorStart drives*

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Physical
Connector Face: TPE
Connector Body: TPE
Contacts: Brass with Gold over Nickel plating
Hardware: Zinc die-cast with black epoxy
Mounting Thread Size: 1/2" - 14 NPT
Panel Mount: Front
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67

Female Receptacle

<table>
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<tr>
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<th>Wire Type</th>
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| E-stop In Terminator |

<table>
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| E-stop Out Terminator |

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<thead>
<tr>
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</table>

*Allen-Bradley and ArmorStart are trademarks of Rockwell Automation Inc.

www.molex.com
Network Solutions

**DeviceNet**
- Remote Scanners .................................................. 228
- Diagnostic Tools ....................................................... 229
- Interface Cards .......................................................... 230
- Common Industrial Safety Software Kits .................. 231
- I/O Modules ................................................................. 232 to 233
- Bus Extenders ................................................................. 234
- Bulk Cables ................................................................. 235 to 238

**Mini-Change**
- Cordsets ................................................................. 239 to 245
- Receptacles ................................................................. 246 to 248
- Field Attachable Connectors ........................................ 249
- Terminator Resistors .................................................. 250
- Tees and Adapters ......................................................... 251 to 254
- Passive Multi-Ports ....................................................... 255 to 256

**Micro-Change** (M12)
- Cordsets ................................................................. 257 to 262
- Receptacles ................................................................. 263 to 264
- Field Attachable Connectors ........................................ 265
- Terminator Resistors .................................................. 266
- Tees and Splitters ........................................................... 267
- Passive Multi-Ports ....................................................... 268 to 269

**Open Style**
- Cordsets ................................................................. 270 to 271
- Receptacle Assemblies .................................................. 272

**Nano-Change** (M8)
- Cordsets ................................................................. 273 to 277
- Passive Multi-Ports ....................................................... 278

**Auxiliary Power Media**

**Mini-Change**
- Cordsets ................................................................. 279
- Adapters ........................................................................ 280
- Field Attachable Connectors ........................................ 281
- Power Taps ..................................................................... 282
- Machine Stop Tees ......................................................... 283

**Micro-Change** (M12) and Ultra-Lock
- Cordsets ................................................................. 284 to 285
- Receptacles ................................................................. 286
- Field Attachable Connectors ........................................ 287

**PROFIBUS**
- Adapters ................................................................. 290
- Interface Cards .............................................................. 291 to 297
- Communication Modules .............................................. 298 to 299
- Industrial Gateways .......................................................... 300 to 301
- I/O Modules ................................................................. 302 to 303
- Cables ............................................................................. 304

**Micro-Change** (M12)
- Cordsets ................................................................. 305 to 307
- Receptacles ................................................................. 308 to 310
- Field Attachable Connectors ........................................ 311
- Terminator Resistors .................................................. 312
- Tees ............................................................................. 313

**D-Sub**
- Field Attachable Connectors ........................................ 314
- Cordsets ........................................................................ 315 to 319

**Auxiliary Power Media**

**Mini-Change**
- Cordsets ................................................................. 320
- Receptacles ................................................................. 321
- Field Attachable Connectors ........................................ 322
- Tees ............................................................................. 323

**Micro-Change** (M12) and Ultra-Lock
- Cordsets (US) .............................................................. 324 to 325
- Cordsets (Europe) ............................................................. 326 to 327
- Receptacles (US) .............................................................. 328
- Receptacles (Europe) ........................................................... 329
- Field Attachable Connectors ........................................ 330

**Ethernet**
- Development Kits .......................................................... 334 to 335
- Windows® Compatible Drivers ...................................... 336 to 337
- Network Interface Cards ................................................. 338 to 339
- Communication Modules ............................................... 340
- Industrial Gateways .......................................................... 341
- I/O Modules ................................................................. 342 to 344
- Common Industrial Safety Software Kits ........................ 345
- In-Cabinet Ethernet Switches .......................................... 346

**RJ-11xx RJ-45 and Standard RJ-45**
- Cordsets ................................................................. 347 to 351
- Receptacles ................................................................. 352 to 356
- Field Attachable Connectors ........................................ 357
- Accessories ................................................................. 357

**Sealed RJ-45**
- Cordsets ................................................................. 358 to 360
- Receptacles ................................................................. 361
- Field Wireable Connectors .............................................. 362
- Dust Caps ..................................................................... 362

**Micro-Change** (M12)
- Cordsets ................................................................. 363 to 366
- Field Attachable Connectors ........................................ 367

**Ultra-Lock**
- Cordsets ................................................................. 368 to 369
- Receptacles ................................................................. 370 to 373
- Adapters ..................................................................... 374

**Other Networks**
- Communication Modules ............................................... 378
- Interface Cards .............................................................. 379 to 381
- Industrial Gateways .......................................................... 382
- Windows® Compatible Protocol Drivers .......................... 383
- I/O Modules ................................................................. 384
- PICS Simulation Software ............................................... 385

**NMEA 2000**
- Bulk Cables ................................................................. 388

**Micro-Change** (M12)
- Cordsets ................................................................. 389 to 391
- Receptacles ................................................................. 392
- Field Attachable Connectors ........................................ 393
- Terminator Resistors .................................................. 394
- Tees ............................................................................. 395 to 396
- Junction Boxes ............................................................... 397

**Mini-Change**
- Cordsets ................................................................. 398
- Field Attachable Connectors ........................................ 399
- Terminator Resistors .................................................. 400
- Tees ............................................................................. 401
- Power Tap .................................................................. 402
- Auxiliary Power Media Cordsets .................................. 403

**Micro-Change** and Mini-Change
- Receptacles ................................................................. 404
- Closure Caps ............................................................... 402
- Dust Caps ................................................................. 409

**Industrial USB**
- Cordsets ................................................................. 406 to 407
- Receptacles ................................................................. 408
- Dust Caps ................................................................. 409

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†PROFIBUS is a trademark of PROFIBUS International.

‡Windows is a registered trademark of Microsoft Corporation.

§NMEA 2000 is a trademark of the National Marine Electronics Association.
Our line of Brad® communication and control products is designed to support and facilitate the networks that automate today’s and tomorrow’s premier global industrial applications. Molex supports the most popular industrial networks and fieldbuses—Ethernet, DeviceNet*, PROFIBUS† and legacy with a variety of products and solutions. Through its leading connectivity brands, Brad products give the user and designer a complete communication and connectivity solution—from network interface cards for PC-based HMI/supervision, PLC communication modules for fieldbus control up to IP67 infrastructure to connect on-machine I/O devices. Molex brings the flexibility which is scalable based on your needs and applications. Upgrade to a total system solution by incorporating Brad communications and Brad control products.

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
†PROFIBUS is a trademark of PROFIBUS International
Brad® and DeviceNet
Brad® automation products give the designers and users of a DeviceNet™ system a complete communication and connectivity solution—from scanner through media infrastructure to IP67 I/O connections and diagnostics. No other supplier provides a comprehensive backbone of connectivity while giving you the power to choose other elements of the control system. You select which control engine you want, whether it be PC- or PLC-based. You choose which control architecture—centralized or distributed—which type of motor controllers, valve banks or sensors you want. Brad insures connectivity to all these devices.

Brad® and PROFINET
Brad® products give the user and designer of a PROFINET system a complete communication and connectivity solution—from scanner card to media infrastructure to IP67 I/O connections. You can select which control engine you want, whether it is PC- or PLC-based; we get you onto the network. You can choose which control architecture—centralized or distributed—that makes the most sense to you. Whether you are connecting motor controllers, valve banks or sensors, we ensure that connectivity to those points are there.

Brad® and Ethernet
Brad® ethernet products provide solutions that enable the world’s most popular Local Area Network to be reliably utilized on the factory floor or in harsh commercial environments. The Brad line offers a large choice of products including physical media, IP67 I/O modules, unmanaged and managed switches, powerful network interfaces, industrial gateways and protocol development kits to connect the most popular Ethernet industrial networks and fieldbuses. Brad Ethernet products give the user a complete communication and connectivity solution to design a large scope of industrial applications—PC-Based control, supervision, data storage, protocol bridging, etc.—to suit all industry sectors.

Brad® and Other Networks
The Brad® product portfolio covers more than 40 industrial protocols including current and legacy networks such as Modbus, CANopen, Serial, AS-interface, and CC-Link. Brad products offer users a complete communication and connectivity solution - from software drivers, interface cards, PLC communication modules, industrial gateways, IP67 digital I/O modules and network media. With over 20 years of experience and technical expertise in industrial communication and control, Molex is a dependable partner. Brad systems are installed around the world in sectors as varied as petrochemical, automotive, food processing and building management. Brad product lines are developed in compliance with the standards and specifications published by international organizations to guarantee a high level of performance, reliability and availability.
Brad® automation products give the designer and users of a DeviceNet system a complete communication and connectivity solution—from scanner through media infrastructure to IP67 I/O connections and diagnostics. No other supplier provides a comprehensive backbone of connectivity while giving you the power to choose other elements of the control system. You select which control engine you want, whether it be PC- or PLC-based. You choose which control architecture—centralized or distributed—which type of motor controllers, valve banks or sensors you want. Brad insures connectivity to all these devices.

* DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA).
Components and Elements of DeviceNet System

- Controller
- Thick Media
- I/O Devices
- Thin Media
- IP67 I/O Modules
- Power Media
- Media
- Cordsets
- Network Interface
- I/O Connections
Brad® SST™
DeviceNet Remote Scanner
112034
DeviceNet Control over Ethernet

**Features and Benefits**
- High performance DeviceNet protocol executed via up to 16 Remote DeviceNet™ Scanners
- User interface DLL/API is completely backward compatible with existing applications and local DeviceNet interface cards
- Diagnostic LEDs
- UCMM (Unconnected Message Manager) capable; Group 1, 2, and 3 dynamic explicit connections supported
- Provides simultaneous execution of Group 2 Client (Master) and Server (Slave) operation
- Supports all DeviceNet standard baud rates: 125, 250, and 500 Kbaud
- Supports Poll, Strobe, Change of State (COS) and Cyclic I/O messaging
- Provides Client (Master) explicit messaging to slave devices
- Backward compatible DLL preserves existing investment
- DIN rail mount allows distribution to machine level
- Frees up PC slots by placing scanner cards remotely
- Manage your DeviceNet application across an Ethernet LAN
- Capable of updating DeviceNet I/O faster than a PCI version
- Reduce infrastructure costs by using cheaper Ethernet cable and fewer and/or less expensive PCs

**OS and Drivers Supported**
- Microsoft® Windows 2000/XP drivers
- Diagnostic tools
- Example C source code and Windows 32-bit DLLs for custom driver development

**Software Tools**
Diagnostic and test tools are available that enable fast integration of industrial communication into your application.

**Hardware Specifications**
- Diagnostic LEDs:
  - Remote Scanner—Power, system status
  - DeviceNet—Power, communication, health
  - Ethernet—Link, 10/100 Mbaud, activity
- Remote Scanner Power: 10–30VDC, 330mA typical
- RoHS Compliant: Yes
- Approvals: CE

**Environmental**
- Humidity: 5% to 95% non-condensing

**Network Specifications**
- Protocol:
  - DeviceNet Master—Group 2 Client, Group 2 only Client
  - DeviceNet Slave—Group 2 Server
  - Isolated CAN physical layer on each channel
- Cable:
  - DeviceNet—shielded twisted pair, compatible with target network
  - Ethernet—Cat 5e shielded
- DeviceNet Power: 11-24 VDC, 50 mA typical
- Isolation: 500 V
- Data Rate:
  - DeviceNet—125 Kbps, 250 Kbps and 500 Kbps
  - Ethernet—10/100 Mbps

**Physical**
- Operating Temperature: 0°C up to +50°C
- Storage Temperature: -40°C up to +85°C

---

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Product Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SST-EDN-1</td>
<td>112034-0021</td>
<td>Remote DeviceNet Scanner (without cables)</td>
</tr>
<tr>
<td>SST-EDN-1-C2</td>
<td>112034-0026</td>
<td>Remote DeviceNet Scanner with cable kit (DeviceNet and Power)</td>
</tr>
</tbody>
</table>

Single-ended power cable: 3-pole, M8 connector on one end, 2 meters (6.6ft), UL/CSA cable, Cat. No. 403000A10M020

Single-ended DeviceNet cable: 5-pole, M12 connector on one end, 2 meters (6.6ft), UL/CSA cable, Cat. No. DND30A-M020

---
DeviceNet Diagnostic Tools

112008 eNetMeter™ DN
112008 NetAlytix™
112008 NetMeter®

Quickly identify problems relating to network power, data errors and excessive bandwidth consumption for your DeviceNet network.

eNetMeter DN and NetAlytix
eNetMeter DN is a passive device that continuously monitors a DeviceNet network and sends the information over Ethernet to a PLC or PC monitoring system. The information can be used to proactively respond to out-of-tolerance parameters before network failure occurs. Optionally, data can be accessed through NetAlytix software, an OPC server or a DLL.

NetMeter
NetMeter cuts troubleshooting time by providing technical details, yet it simplifies and summarizes, allowing both a DeviceNet expert and novice to effectively identify and diagnose network problems. It summarizes DeviceNet bus health by displaying a happy face icon, indicating a healthy network; a sad face, indicating a serious problem; or a neutral face, indicating nominal performance (a good indication to repair things before they actually fail). NetMeter then walks the user through each fault condition and its potential source.

Features and Benefits
- Continuously monitors a DeviceNet network in a passive state
- Provides feedback to an Ethernet/IP™ master or one of three methods to a personal computer (PC) residing on Ethernet:
  - NetAlytix™ software
  - OPC server
  - DLL interface
- High-speed sampling of network parameters
- Signals are sampled millions of times per second providing accurate values
- Information captured includes:
  - Overall network status and measurements
  - Individual node status and measurements
  - Detailed measurements of power (V+, V-), signal (CANH, CANL) and shield parameters
- Warning and fault flags indicate when a value has exceeded a set tolerance (levels are customizable)
- NetAlytix software enables quick graphical access to network issues including CAN and power waveform details

Electrical
Input Power (Aux. or DeviceNet)
11 to 25V DC, 250 mA (typical at 24 VDC)
Data Rate: DeviceNet: 125K, 250K and 500K baud
Ethernet: 10/100 M baud

Mechanical
Diagnostic LEDs and Control: Ready, System/Boot, Power & Comm; Reset (recessed)

Physical
Connectors: DeviceNet® Standard “Sealed Micro”
Adapter cable included for DeviceNet Standard “Sealed Mini”

Environmental
Approvals: CE, cULus
RoHS Compliant: Yes

Product Description Engineering No. Standard Order No.
eNetMeter™ DN diagnostic tool for DeviceNet SST-ENA-DN1 112008-0008
NetAlytix™ software for eNetMeter DN (includes full application, DLL/API, OPC Server) SST-NAS-DN1 112008-0011
Bundle of eNetMeter DN (1120080008) and NetAlytix (1120080011), with a limit of one per partner or end-customer site SST-ENA-SKT 112008-0012
Bundle of eNetMeter DN (1120080008) and NetAlytix (1120080011) in portable test case (IP54) with DC power and external ports for network as well as AC power connections SST-ENA-PTU 112008-0016
NetMeter for DeviceNet DN-MTR (E) 112008-0013
NetMeter Kit for DeviceNet (includes carrying case, PowerMonitor T and LED Termination Resistor) DN-MTR-KIT (E) 112008-0014
NetMeter carrying case DN-MTR-BAG 112008-0003
NetMeter ISO calibration DN-MTR-CAL 112008-0004

Warning and fault flags indicate when a value has exceeded a set tolerance (levels are customizable).
SST™ Network Interface Cards

**112005 DeviceNet PC/104 Cards**
**112027 OPC Software Tools**
**112113 DeviceNet PCI Cards**
**112030 DeviceNet Software Tools**

### Features and Benefits
- Enhanced FPGA-based design
- Lower component count for higher reliability
- Extended product lifecycle
- Diagnostic LEDs
- Provides Quick-Connect functionality (Master mode)
- Allows devices to be accessed on power-up in under 500 milliseconds
- Flexible communication support:
  - UCMM (Uncoupled Message Manager) capable; Group 1, 2, and 3 dynamic explicit connections supported
  - Provides simultaneous execution of Group 2 Client (Master) and Server (Slave) operation
  - Supports all DeviceNet standard baud rates: 125, 250, and 500 Kbaud
  - Supports Poll, Strobe, Change of State (COS) and Cyclic 1/0 messaging
  - Provides Client (Master) explicit messaging to slave devices
  - Supports fragmented Explicit and 1/0 messages
- Support for CAN 2A and 2B (both 11 and 29 bit identifiers)
- Windows XP, Vista and 7 (32-bit) drivers provided
- Form-fit-function replacements for the DN3 family of NICs for DeviceNet
- Compatible with CIP Safety Stack from Molex (provided separately)
- Multi Slave versions available (optional) to aid in system simulation (PCU format only)
- Software tools enable faster network commissioning and diagnosis of faults

### Electrical
**External Power:** 11-24 VDC, 50 mA typical
**Isolation:** 500 V
**Data Rate:** Up to 1 Mbaud for CAN 125K, 250K and 500K baud for DeviceNet

### Protocol
**DeviceNet Master—**
- Group 2 Client, Group 2 only Client
**DeviceNet Slave—**
- Group 2 Ser
- DeviceNet Master—Group 2 Client, Group 2 only Client
- CAN 2.0 B
- Isolated CAN physical layer on each channel
- Flexible communication support
- Provides Quick-Connect functionality (Master mode)
- 1 channel, half-height bracket SST-DNMS4-PCU-H
- 1 channel, full-height bracket SST-DN4-PCU
- 2 channels SST-DN4-PCU-2
- 2 five-bit CAN identifiers
- Provides simultaneous execution of Group 2 Client (Master) and Server (Slave) operation
- Supports Poll, Strobe, Change of State (COS) and Cyclic 1/0 messaging
- Provides Client (Master) explicit messaging to slave devices
- Support for CAN 2A and 2B (both 11 and 29 bit identifiers)
- Windows XP, Vista and 7 (32-bit) drivers provided
- Form-fit-function replacements for the DN3 family of NICs for DeviceNet
- Compatible with CIP Safety Stack from Molex (provided separately)
- Multi Slave versions available (optional) to aid in system simulation (PCU format only)
- Software tools enable faster network commissioning and diagnosis of faults

### Physical
**Dimensions—**
- PCI (PCU): 125, 250, 500K baud for DeviceNet
- Supports Poll, Strobe, Change of State (COS) and Cyclic 1/0 messaging
- Provides Client (Master) explicit messaging to slave devices
- Support for CAN 2A and 2B (both 11 and 29 bit identifiers)
- Windows XP, Vista and 7 (32-bit) drivers provided
- Form-fit-function replacements for the DN3 family of NICs for DeviceNet
- Compatible with CIP Safety Stack from Molex (provided separately)
- Multi Slave versions available (optional) to aid in system simulation (PCU format only)
- Software tools enable faster network commissioning and diagnosis of faults

### Environmental
**RoHS Compliant**
**Humidity:** 5% to 95% non-condensing

### Mechanical
- **PCI (PCU):**
  - Bus Interface: 32-bit, 33 MHz, PCI universal 3.3/5V interface (compliant with PCI v2.2 and v2.3)
  - Processor: 64 MHz NIOS Processor
  - Memory: 128 bytes for PCI configuration
  - Diagnostics: Bi-color LEDs showing card status, power, communication
  - Interrupts: Hardware Plug and Play (32 Kbytes used per card)
- **DeviceNet card, Universal PCI bus (3.3V / 5V), 1 channel, half-height bracket:** SST-DN4-PCU-H
  - 125, 250, and 500 Kbaud
  - Supports Poll, Strobe, Change of State (COS) and Cyclic 1/0 messaging
  - Provides Client (Master) explicit messaging to slave devices
  - Supports fragmented Explicit and 1/0 messages
  - Support for CAN 2A and 2B (both 11 and 29 bit identifiers)
  - Windows XP, Vista and 7 (32-bit) drivers provided
  - Form-fit-function replacements for the DN3 family of NICs for DeviceNet
  - Compatible with CIP Safety Stack from Molex (provided separately)
  - Multi Slave versions available (optional) to aid in system simulation (PCU format only)
  - Software tools enable faster network commissioning and diagnosis of faults

### Table

<table>
<thead>
<tr>
<th>Product Description</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DeviceNet card, Universal PCI bus (3.3V / 5V), 1 channel, full-height bracket</td>
<td>SST-DN4-PCU</td>
<td>112113-0007</td>
</tr>
<tr>
<td>DeviceNet card, Universal PCI bus (3.3V / 5V), 1 channel, half-height bracket</td>
<td>SST-DN4-PCU-H</td>
<td>112113-0001</td>
</tr>
<tr>
<td>DeviceNet card, Universal PCI bus (3.3V / 5V), Multi-Slave, 1 channel</td>
<td>SST-DN4M-PCU</td>
<td>112113-0009</td>
</tr>
<tr>
<td>DeviceNet card, Universal PCI bus (3.3V / 5V), Multi-Slave, 1 channel, half-height bracket</td>
<td>SST-DN4M-PCU-H</td>
<td>112113-0010</td>
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<tr>
<td>DeviceNet card, Universal PCI bus (3.3V / 5V), 2 channels</td>
<td>SST-DN4-PCU-2</td>
<td>112113-0005</td>
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<tr>
<td>DeviceNet software console with USB key (includes network analyzer)</td>
<td>SST-DN3-CHF-U</td>
<td>112030-0007</td>
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<tr>
<td>DeviceNet software console with parallel port key (includes network analyzer)</td>
<td>SST-DN3-CHF-P</td>
<td>112030-0006</td>
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<tr>
<td>OPC Data Server software (must purchase at least one SST-DN3-CNF)</td>
<td>DRL-SIE-SWF-S</td>
<td>112027-5014</td>
</tr>
<tr>
<td>DeviceNet card, PC/104, 1 channel</td>
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<td>112005-0040</td>
</tr>
<tr>
<td>DeviceNet card, PC/104, 2 channels</td>
<td>SST-DN4-104-2</td>
<td>112005-0048</td>
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</tbody>
</table>
Molex demonstrates market leadership with the comprehensive CIP* Safety Stack software solution, allowing industrial-device manufacturers to embed CIP Safety Stack technology quickly and economically within their products.

Common Industrial Protocol (CIP) Safety is a protocol extension developed by the ODVA. The CIP Safety protocol offers a set of highly-integrated safety services which leverage the underlying communications stacks of the standard CIP networks to transport data from a source to a destination. CIP Safety allows end-users to implement safety systems in a more integrated, cost-effective manner. The Molex CIP Safety Software Kit (also called Stack) is offered as a tool kit, with the stack provided as modular “C” code that is pre-tested. The software allows a manufacturer of intelligent industrial products to implement the necessary safety-application layer that enables products to comply with the CIP Safety specification (Edition 2.1) from ODVA. The Molex CIP Safety Stack is available for both DeviceNet* and EtherNet/IP*, and both are endorsed by Rockwell Automation under the Value Added Design Partner program.

The CIP Safety Stack is approved by TUV for SIL3 applications and it has been conformance tested using the ODVA Conformance Test. Molex can support customers that request assistance with design implementation and/or guidance through TUV approval.

**Features and Benefits**
- Meets IEC 61508, SIL3 ensuring international market acceptance
- Approved by TUV and tested by ODVA means a high-quality solution for minimal project risk and faster time-to-market
- Pre-tested modular ANSI C code is easy to compile using standard compilers; faster time-to-market
- Molex engineers can support protocol-integration requests minimizing investment required for in-house resources
- Designed for use with other Molex/Brad offerings: Hardware (DN4 network interface cards), Software (DeviceNet or EtherNet/IP software stacks) which results in a complete CIP communication solution

**Specifications**
- ANSI C code is provided for the safety portion of the Stack (Compliant with CIP Safety Specification 2.1)
- ANSI C code for black-channel components (NET_CTRL_IO)
- Interface specification for high-integrity and black-channel environments
- Safety integration manual (including safety measure requirements)
- Optionally, modified standard CIP stacks (software/firmware) for DeviceNet (Slave) or EtherNet/IP (Adapter)
- Optionally, ANSI C code for the Platform Adaptation Layers (both safety and non-safety)
- Documentation required by certification bodies (TUV, ODVA)
- Support during certification process of vendor’s final product

**Markets and Applications**
- Industrial Device Manufacturers
  - I/O blocks
  - Valves
  - Drives
  - Complex machines (OEM)
- End-Users
  - Automotive
  - Consumer goods
  - Heavy industries

---

### Engineering No. Standard Order No. Device Type Network Description

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Device Type</th>
<th>Network</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDK-DNS-SAF</td>
<td>112115-0001</td>
<td>Slave</td>
<td>DeviceNet</td>
<td>Stack Development Kit (Standard Source Code)</td>
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<tr>
<td>SDK-DNS-SAF-O</td>
<td>112115-0002</td>
<td>Slave</td>
<td>DeviceNet</td>
<td>Stack Development Kit (Source Code Obfuscation†)</td>
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<td>SDK-DNS-SAF-L</td>
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<td>Royalty</td>
<td>per device</td>
<td>Royalty (per device)</td>
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<td>SDK-EIP-ADP-SAF</td>
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<td>Adapter</td>
<td>EtherNet/IP</td>
<td>Stack Development Kit (Standard Source Code)</td>
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<tr>
<td>SDK-EIP-ADP-SAF-O</td>
<td>112117-0002</td>
<td>Adapter</td>
<td>EtherNet/IP</td>
<td>Stack Development Kit (Source Code Obfuscation†)</td>
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<td>SDK-EIP-ADP-SAF-L</td>
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<td>Royalty (per device)</td>
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<td>SDK-DEP-SAF-SAFE</td>
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<td>Slave and Adapter</td>
<td>DeviceNet and EtherNet/IP</td>
<td>Stack Development Kit (Standard Source Code)</td>
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<td>SDK-DEP-SAF-SAFE-O</td>
<td>112115-0004</td>
<td>Slave and Adapter</td>
<td>DeviceNet and EtherNet/IP</td>
<td>Stack Development Kit (Source Code Obfuscation†)</td>
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<tr>
<td>SDK-CIP-EDS-SAFE</td>
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<td>N/A</td>
<td>N/A</td>
<td>Engineering Support</td>
</tr>
</tbody>
</table>

†Note: Source code obfuscation means that the “C” code is protected, but the compiler can process it.

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*®CIP, DeviceNet and EtherNet/IP are trademarks of ODVA, Inc.*
Brad® HarshIO 600

112092
Digital IP67 IO Module
Classic Format

Features and Benefits
• Reliable solution for connecting industrial controllers to IO devices in harsh duty environments.
• Accepts M12 threaded connectors or Brad Ultra-Lock® Push-Pull connection system
• Standard hole housing pattern allows for interchangeability with popular IO modules
• Visible LEDs provide maintenance personnel with the ability to easily determine IO, module and network status
• Support of QuickConnect (Fast Boot) for robot tool changer application

Description
• Rated IP67 for harsh environments
• Designed for direct machine mount applications
• Sixteen digital input/output per module
• Supports PNP and NPN input devices
• Watchdog with output reply state

Compatible Protocols
• DeviceNet® Slave
• Supports ODVA Group 2 Server Slave functionality
• Supports ADR and Quick-Connect

Conformance
• IP67 according to IEC 60529
• Vibration: IEC 60068-2-6 conformance
• Mechanical Shock: 10G, 11ms, 3 axis
• CE
• UL
• cUL
• RoHS compliant
• ODVA certified

Technical Data
• IO Configurations:
  - 16 inputs
  - 8 inputs + 8 outputs
• IO Connectors: 8x M12 ports, Ultra-Lock M12 female 5-pole, internally threaded
• DeviceNet Connectors:
  - 1x Mini-Change male, 5-pole
  - 1x Mini-Change female, 5-pole
• Power Connectors:
  - Power In—Male Mini-Change, 4-pole
  - Power Out—Female Mini-Change, 4-pole
• Power Requirements:
  - Module Input Power—24V DC
  - Module Output Power—24V DC, 2.0A max. per channel, 8.0A max. per module
• Input Type:
  - Compatible with dry contact and PNP or NPN 3-wire switches
  - Electronic short circuit protection
• DeviceNet Address: 0–63 by rotary switches
• Input Device Supply: 140mA per port at 25°C
• Output Load Current: 1.0A max. per channel, electronic short circuit protection
• Maximum Switching Frequency: 200 Hz
• Housing Dimensions:
  - 60.00mm (2.36") by 220.00mm (8.66") by 20.00mm (.780")
• Mounting Dimensions:
  - 37.50mm (1.480") horizontal on centers
  - 210.00mm (8.270") vertical on centers
• Center hole
• Operating Temperature: -25 to +70°C
• Storage Temperature: -40 to +85°C

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>No. of Power Pin</th>
<th>IO Configuration</th>
<th>Input Channel Type</th>
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<tr>
<td>TCDDN-8D0N-10U</td>
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<td>Output</td>
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<td>112092-0020</td>
<td>8</td>
<td>PNP</td>
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</table>

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
Brad® HarshIO 600

112092
Digital IP67 IO Module
Compact Format

Features and Benefits
• Reliable solution for connecting industrial controllers to IO devices in harsh duty environments.
• Accepts M12 threaded connectors or Brad Ultra-Lock® Push-Pull connection system
• Standard hole housing pattern allows for interchangeability with popular IO modules
• Visible LEDs provide maintenance personnel with the ability to easily determine IO, module and network status
• Support of QuickConnect (Fast Boot) for robot tool changer application

Description
• Rated IP67 for harsh environments
• Designed for direct machine mount applications
• Eight digital input/output per module
• Supports PNP and NPN input devices
• Watchdog with output reply state

Compatible Protocols
• DeviceNet® Slave
• Supports ODVA Group 2 Server Slave functionality
• Supports ADR and Quick-Connect

Conformance
• IP67 according to IEC 60529
• Vibration: IEC 60068-2-6 conformance
• Mechanical Shock: 10G, 11ms, 3 axis
• CE
• UL
• cUL
• RoHS compliant
• ODVA certified

Included Hardware/Software
• IO Configurations:
  - 8 inputs
  - 4 inputs + 4 outputs
• IO Connectors:
  - 4x ports, Ultra-Lock M12 female 5-pole, internally threaded
  - 8x ports, M8 female 3-pole threaded
• DeviceNet Connectors:
  - 1x M12 male, 5-pole
  - 1x M12 female, 5-pole
• Power Connectors: M12 Male, 5-pole, A-coded
• Power Requirements:
  - Module Input Power—24V DC
  - Module Output Power—24V DC, 4.0A max.
• Input Type:
  - Compatible with dry contact and PNP or NPN
  - Electronic short circuit protection
• DeviceNet Address: 0-63 by rotary switches
• Input Delay: 3ms default or configurable (through EDS)
• Input Device Supply: 140mA per port at 25°C
• Output Load Current: 1.0A max. per channel, electronic short circuit protection
• Maximum Switching Frequency: 200 Hz
• Housing Dimensions: 30.00mm (1.18”) by 175.00mm (6.89”) by 20.00mm (.78”)
• Mounting Dimensions:
  - 23.00mm (0.91”) horizontal on centers
  - 168.00mm (6.61”) vertical on centers
• Operating Temperature: -25 to +70°C
• Storage Temperature: -40 to +85°C

Compact—M8

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>No. of Power Pin</th>
<th>IO Configuration</th>
<th>Input Channel Type</th>
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Compact—M12

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<th>No. of Power Pin</th>
<th>IO Configuration</th>
<th>Input Channel Type</th>
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<tr>
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<td>TBDDN-444N-804</td>
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<td>TBDDN-444P-804</td>
<td>112092-0006</td>
<td>4</td>
<td>4</td>
<td>PNP</td>
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</tbody>
</table>
DeviceNet* Brad® Bus Extenders
130039

Features and Benefits
• Extends the allowable drunk or drop line length of a DeviceNet system
• Isolates electrically noisy sections of the bus line from other bus line section
• Allows “star” and other topologies to be constructed while using the DeviceNet protocol

Specifications
Device Conformance: Designed to conform to the ODVA DeviceNet specification version 2.0
Baud Rate: 125k, 250k, 500k, 1M; automatic selection
Status Indicators: Module Status—Green/Red bi-color LED
Network A Status—Green/Red bi-color LED
Network B Status—Green/Red bi-color LED
Diagnostic Data—Green/Red bi-color LED
Voltage Isolation—2500V
Latency—75US per Extender
Connectivity: Left/Network—“A” Male Mini-Change®
Right/Network—“B” Female Mini-Change

Electrical
Voltage: 11-25V DC
Current: Network A—140mA at 11V DC, 60mA at 25V DC
Network B—20mA at 11V DC, 10mA at 25V DC
Power: 1.8W
Power Supply: Powered by 24V DC Bus-line
Mounting: DeviceNet Extender—Panel Mount, 4 screws
Size: Length—130.00mm (5.11”)
Depth—57.70mm (2.27”)
Height—94.00mm (3.70”)

Physical
Operating Temperature: 0 to 70°C

Environmental
Humidity: 0-95% RH, non-condensing
Protection: IP67

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
DeviceNet®
Brad®
Bulk Cable
130039
Thick Cable

Features and Benefits
• Meets or exceeds ODVA specifications for highest system reliability

Reference Information
UL: Type C2, VL 1581 flame resistance
CSA: AWM 1/II and A/B FT4

Overall
Rating: 300V, 80°C
Materials: Power—Gray PVC outer jacket, PVC with nylon skin inner insulation
Data—PE foam inner insulation
Construction: Two shielded pairs with 18 AWG (19x30 AWG) drain wire between pairs

Power Pair
Wire: Two 15 AWG (19x28 AWG) stranded tinned Copper Shielding: Aluminum outside/polyester tape 25% overlap DC resistance: 3.6 ohms/1000ft max. at 20°C Current: 8.0A
Color Code: Red/Black

Data Pair
Wire: Two 18 AWG (19x28 AWG) stranded tinned Copper Shielding: Aluminum outside/polyester tape 25% overlap DC Resistance: 6.92 ohms/1000ft max. at 20°C Capacitance: 12pf/ft Color Code: White/Blue

---

DeviceNet®
Brad®
Bulk Cable
130039
Thick Flex Rated Cable

Features and Benefits
• Meets or exceeds ODVA for highest system reliability
• Rated over 1.4M flex cycles—40% greater than most flex rated DeviceNet cabling

Reference Information
UL: CL3, AWM 20626, UL 1581
CSA: AWM 1/II A/B 80°C 300V FT1

Overall
Rating: 300V, 80°C
Materials: Power—TPE outer jacket, PVC with nylon skin inner insulation
Data—PE foam inner insulation
Flexure: Rolling flex >1.4m cycles at 10x bend radius
Construction: Two shielded pairs with 18 AWG (19x30 AWG) drain wires between pairs

Power Pair
Wire: Two 15 AWG (19x28 AWG) individually-tinned Copper Shielding: Aluminum outside/polyester tape 25% overlap DC Resistance: 3.6 ohms/1000ft max. at 20°C Current: 8.0A
Color Code: Red/Black

Data Pair
Wire: Two 18 AWG (19x30 AWG) individually-tinned Copper Shielding: Aluminum outside/polyester tape 25% overlap DC Resistance: 6.9 ohms/1000ft max. at 20°C Capacitance: 12pf/ft Color Code: White/Blue
DeviceNet* Brad® Bulk Cable
130039 Thick Tray Rated Cable

Features and Benefits
- Designated for tray-rating usage per NEC guidelines or where 600V cable requirements need to be met
- Meets or exceeds ODVA for highest system reliability

Reference Information
UL: Type TC-ER
CSA: I/II A/B

Overall
Rating: 600V UL type TC
Materials: Power—PVC outer jacket, PP inner insulation, Data—PVC with nylon skin
Construction: Two shielded pairs, with one 18 AWG (19x30 AWG) Copper drain wire

Power Pair
Wire: Two 16 AWG (19x29 AWG) individually tinned Copper
Shielding: Aluminum outside with polyester tape overlap
DC Resistance: 4.9 ohms/1000ft max. at 20°C
Current: 8.0A
Color Code: Red/Black

Data Pair
Wire: Two 18 AWG (19x30 AWG) individually tinned Copper
Shielding: Aluminum outside/polyester tape 25% overlap
DC Resistance: 6.9 ohms/1000ft max. at 20°C
Capacitance: 14.7pF/ft
Color Code: White/Blue
Velocity of Propagation: 64% NOM
Cable Jacket Color: Gray

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<thead>
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<tbody>
<tr>
<td>50.0m (164.04')</td>
<td>8.0A</td>
<td>600V</td>
<td>DNE00A-M500</td>
<td>130039-0347</td>
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<tr>
<td>100.0m (328.08')</td>
<td>8.0A</td>
<td>600V</td>
<td>DNE00A-T100</td>
<td>130039-0348</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)

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DeviceNet* Brad® Bulk Cable
130039 Mid Cable

Features and Benefits
- Meets or exceeds ODVA specifications for thin or drop cable for the highest system reliability
- Allows for cleaner, tighter cable rating of trunk cable for smaller length networks

Reference Information
UL: AWM: Style 1569
CSA: AWM: I/II A/B 300V FT1, 80°C

Overall
Rating: 300V, 80°C
Materials: Power—Gray PVC outer jacket, PVC inner insulation
Data—PE foam inner insulation
Construction: Two shielded pairs, 20 AWG tinned Copper drain wire between pair

Power Pair
Wire: Two 16 AWG (65x34 AWG) tinned Copper
Shielding: Aluminum outside/polyester tape 25% overlap
Velocity of Propagation: 75%
DC Resistance: 4.1 ohms/1000ft max. at 20°C
Current: 8.0A
Color Code: Red/Black

Data Pair
Wire: Two 20 AWG (19x36 AWG) stranded Copper
Shielding: Aluminum outside/polyester tape 25% overlap
DC Resistance: 10.4 ohms/1000ft max. at 20°C
Capacitance: 12.35pF/ft
Color Code: White/Blue
Cable Jacket Color: Gray

<table>
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<tbody>
<tr>
<td>50.0m (164.04')</td>
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<td>300V</td>
<td>DNH00A-M500</td>
<td>130039-0339</td>
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<td>300V</td>
<td>DNH00A-T100</td>
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</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
DeviceNet®
Brad®
Bulk Cable
130039
Thin Cable

Features and Benefits
- Meets and exceeds ODVA specifications for the highest reliability
- Standard Thin or drop line cable
- Thin High Flex is rated over 1.4M flexcycles—40% greater than most DeviceNet Flex-rated cabling

Reference Information
UL: CL2, AWM 2464
CSA: FT4 rated

Overall
Rating: 300V 80°C
Materials: Power—PVC outer jacket with semi-rigid PVC inner insulation (power) PE foam inner insulation
Data—PE foam inner insulation
Construction: Two shielded pairs, 22 AWG Tin-Copper drain wire between pairs
Cable Jacket Color: Gray

Power Pair
Wire: Two 22 AWG individually tinned stranded Copper Shielding: Aluminum foil shield, 25% overlap
DC resistance: 16.5 ohms/1000 ft max. at 20°C
Current: 4.0A
Color Code: Red/Black

Data Pair
Wire: Two 22 AWG individually tinned stranded Copper Shielding: Aluminum foil shield, 25% overlap
DC resistance: 16.5 ohms/1000 ft max. at 20°C
Velocity of Propagation: 75%
Capacitance: 11pF/ft
Color Code: White/Blue

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<td>300V</td>
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</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)

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DeviceNet®
Brad®
Bulk Cable
130039
Thin Flex Rated Cable

Features and Benefits
- Meets and exceeds ODVA specifications for the highest reliability
- Standard Thin or drop line cable
- Thin High Flex is rated over 1.4M flexcycles—40% greater than most DeviceNet Flex-rated cabling

Reference Information
UL: CL3 AWM 20626, flame UL 1581
CSA: AWM: I/II A/B, 80°C, 300V FT1

Overall
Rating: 300V 80°C
Materials: Power—TPE outer jacket PVC with nylon skin skin inner insulation
Data—PE foam inner insulation
Flexture: Rolling flex > 1m cycles at 10x bend radius
Construction: Two foil shielded pairs, 26 AWG Tin-Copper drains between pairs
Cable Jacket Color: Gray

Power Pair
Wire: Two 22 AWG individually tinned stranded Copper Shielding: Aluminum outside/polyester tape, 25% overlap
DC resistance: 17.5 ohms/1000 ft max. at 20°C
Current: 4.0A
Color Code: Red/Black

Data Pair
Wire: Two 24 AWG individually tinned stranded Copper Shielding: Aluminum outside/polyester tape, 25% overlap
DC resistance: 28 ohms/1000 ft max. at 20°C
Velocity of Propagation: 75%
Capacitance: 12pF/ft
Color Code: White/Blue

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<td>300V</td>
<td>DND00A-1100</td>
<td>130039-0344</td>
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Note: Sales drawings for all standard order numbers are available on molex.com
*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
DeviceNet®
Brad®
Bulk Cable
130039
Thin Tray Rated Cable

**Features and Benefits**
- Designed for tray-rating usage per NEC guidelines or where 300V cable requirements need to be met
- Meets or exceeds ODVA specification for the highest system reliability

**Reference Information**
UL: CMG, CL2 AWM, flame 1581
CSA : AWM: I/II A, flame FT4

**Overall**
Rating: 300V UL type CL2 80°C
Materials: Power—PVC outer jacket, PVC with nylon skin inner insulation  
Data—FPE insulation
Construction: Two foil shielded pairs with one 22 AWG copper drain wire between pairs
Cable Jacket Color: Gray

**Power Pair**
Wire: Two 22 AWG individually tinned Copper
Shielding: Aluminum outside with polyester tape overlap DC Resistance: 17.5% ohms/1000 ft max. at 20°C  
Current: 4.0A  
Color Code: Red/Black

**Data Pair**
Wire: Two 24 AWG individually tinned stranded Copper
Shielding: Aluminum outside/polyester tape, 25% overlap DC Resistance: 28 ohms/1000 ft max. at 20°C  
Velocity of Propagation: 75%
Capacitance: 12pF/ft
Color Code: White/Blue

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Note: Sales drawings for all standard order numbers are available on molex.com
*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
DeviceNet®
Brad® Mini-Change®
Single-Ended Cordsets
130024
Female
Straight, Right Angle
Threaded
Thick and Mid Media

Features and Benefits
• Phosphor-Bronze contacts for greatest reliability
• Variety of cable types, cable exit, coupling nut and length options for maximum system flexibility

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Mechanical
Connector Face: PVC-UL STD 94-V
Molded Body: PVC-UL STD 94-V
Coupling Nut: Zinc diecast with black epoxy coat
optional Stainless Steel or Nickel-plated Brass

Physical
Connector Body: PVC
Contact: Brass with Gold plating
Coupling Nut: Diecast Zinc
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Cables
DN — DeviceNet Thick (Trunk)
Rating: 300V, 80°C
Materials: Power — Gray PVC outer jacket, PVC with Nylon skin inner insulation
Data — PE Foam inner insulation
Construction: Two shielded pairs, 18 AWG (19x30 AWG)
drain wire between pairs
UL: UL type CL2, VL 1581 flame resistance
CSA: AWM I/II A/B 80°C 300V FTI

DNF — DeviceNet Thick Flex-Rated
Rating: 300V, 80°C
Materials: Power — TPE outer jacket, PVC with Nylon skin inner insulation
Data — PE Foam inner insulation
Flexure: Rolling flex > 1.4m cycles at 10x bend radius
Construction: Two shielded pairs, 20 AWG Tin Copper drain wire between pair
UL: UL AWM — Style 1569
CSA: AWM I/II A/B 80°C 300V FTI

DNE — DeviceNet Thick Tray-Rated
Rating: 600V UL type TC
Materials: Power — PVC outer jacket, PP inner insulation
Data — PVC with Nylon skin
Construction: Two shielded pairs, with one 18 AWG (19x30 AWG), Copper drain wire
UL: Type TC-ER
CSA: I/II A/B

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Note: Sales drawings for all standard order numbers are available on molex.com
*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
DeviceNet®
Brad® Mini-Change®
Single-Ended Cordsets

130024
Female
Straight, Right Angle
Thin Media
Threaded

Features and Benefits
• Over-molded open style of DeviceNet connector provides for environmental protection and cable integrity strain relief
• Variety of form factor, cable type and length options available for maximum flexibility

Mechanical
Body: Molded PVC
Insert: PVC

Physical
Contact: Phosphor Bronze
Contact Plating: Gold over Nickel
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Cables
DND—Thin Standard
Rating: 300V 80°C
Outer Jacket: PVC
Inner Insulation: Semi-rigid PVC
Data: PE foam
Construction: Two shielded pairs, 22 AWG Tin-Copper drain wire between pairs
Cable Jacket Color: Gray
UL: CL2, AWM 2464
CSA: FT4 Rated

DNDF—Thin High-Flex
Rating: 300V 80°C
Outer Jacket: PVC
Inner Insulation: Semi-rigid PVC
Data: PE foam
Flexure: Rolling Flex > 1 million cycles at 10x bend radius
Construction: Two foil shielded pairs, 26 AWG Tin-Copper drains between pairs
Cable Jacket Color: Gray
UL: CL3 AWM 20626, Flame UL 1581
CSA: AWM: I/II A/B, 80°C, 300V FT1

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<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Wire Size AWG</th>
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<td>250V AC/DC</td>
<td>Thin Cable</td>
<td>PVC</td>
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Note: Sales drawings for all standard order numbers are available on molex.com
*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)

Configuration Code*
Build-a-Part Number

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Coupling Nut Option
Epoxy-Coated Zinc . . . . A
Nickel-Brass . . . . . . . . . NB
Stainless Steel . . . . . . . SS

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
DeviceNet®
Brad® Mini-Change®
Single-Ended Cordsets
130024/130025
Male
Straight, Right Angle
Thick and Mid Media
Threaded

Features and Benefits
- Phosphor-Bronze contacts for greatest reliability
- Variety of cable types, cable exit, coupling nut and length options for maximum system flexibility

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Mechanical
Connector Face: PVC-UL Std 94-V
Molded Body: PVC-UL Std 94-V
Coupling Nut: Zinc diecast with black epoxy coat

Physical
Contacts: Phosphor-Bronze base material
Contact Plating: Gold over Nickel per ODVA specs
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Cables
DNB—Mid Trunk
Rating: 300V, 80°C
Materials: Power—Gray PVC outer jacket, PVC inner insulation
Data—PE foam inner insulation
Construction: Two shielded pairs, 20 AWG Tin Copper drain wire between pair
UL: UL AWM: Style 1569
CSA: CSA AWM: 1/II A/B 300V FTI, 80°C

DNF—Thick Flex-Rated
Rating: 300V, 80°C
Materials: Power—TPE outer jacket, PVC with nylon skin inner insulation
Data—PE foam inner insulation
Flexure: Rolling Flex >1.4m cycles at 10x bend radius
Construction: Two shielded pairs with 18 AWG (19x30 AWG), drain wire between pair
UL: CL3: AWM 20626, UL 1581
CSA: AWM: 1/II A/B 300V FTI, 80°C

DNE—Thick Tray-Rated
Rating: 600V UL Type TC
Materials: Power—PVC outer jacket, PP inner insulation
Construction: Two shielded pairs with one 18 AWG (19x30 AWG), drain wire between pair
UL: Type TC-ER
CSA: I/II A/B

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<th>Poles (Male View)</th>
<th>Max. Current Per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Cable Diameter</th>
<th>Wire Size AWG</th>
<th>Length</th>
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DN—Thick Trunk
Rating: 300V, 80°C
Materials: Power—Gray PVC outer jacket, PVC with nylon skin inner insulation
Data—PE foam inner insulation
Construction: Two shielded pairs with 18 AWG (19x30 AWG), drain wire between pairs
UL: UL Type CL2, VL 1581 flame resistance
CSA: CSA AWM: 1/II and A/B FT4

Note: Sales drawings for all standard order numbers are available on molex.com
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**DeviceNet®**
**Brad® Mini-Change®**
**Single-Ended Cordsets**

**DeviceNet**
**Brad® Mini-Change®**
**Single-Ended Cordsets**

**130024/130027**

**Male**
**Straight, Right Angle**
**Thin Media**
**Threaded**

---

### Features and Benefits
- Phosphor-Bronze contacts for greatest reliability
- Variety of cable types, cable exit, coupling nut and length options for maximum system flexibility

---

### Reference Information
- UL File No.: E152210
- CSA File No.: LR6837

---

### Mechanical
- Connector Face: PVC-UL Std 94-V
- Molded Body: PVC-UL Std 94-V
- Coupling Nut: Zinc diecast with black epoxy coat

---

### Physical
- Contacts: Phosphor-Bronze base material
- Contact Plating: Gold over Nickel per ODVA specs
- Operating Temperature: -20 to +80°C

---

### Environmental
- Protection: IP67
- NEMA Rating: NEMA 6

---

### Cables
**DND—Thin**
- Rating: 300V, 80°C
- Materials: Power—PVC outer jacket with semi-rigid PVC inner insulation
- Data—PE foam inner insulation
- Construction: Two shielded pairs, 22 AWG Tin-Copper drain wire between pairs
- Cable Jacket Color: Gray

**DNDF—Thin High Flex**
- Rating: 300V, 80°C
- Materials: Power—TPE outer jacket, PVC with nylon skin inner insulation
- Data—PE foam PE foam inner insulation
- Flexure: Rolling Flex >1m cycles at 10x bend radius
- Construction: Two foil shielded pairs, 26 AWG Tin-Copper drains between pairs
- Cable Jacket Color: Gray

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<tr>
<th>Poles (Male View)</th>
<th>Max. Current Per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Cable Diameter</th>
<th>Wire Size AWG</th>
<th>Length</th>
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<th>Male Right Angle</th>
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**Configuration Code†**
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<td>10 Meters</td>
<td>M100</td>
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*Note: Sales drawings for all standard order numbers are available on molex.com*

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)*
DeviceNet®
Brad® Mini-Change®
Double-Ended Cordsets

130025
Female Straight-to-Male Straight
Right Angle Female-to-Straight Male
Right Angle Female-to-Right Angle Male
Thick and Mid Media Threaded

**Features and Benefits**
- Phosphor-Bronze contacts for greatest reliability
- Variety of cable types, cable exit, coupling nut and length options for maximum system flexibility

**Reference Information**
UL File No.: E152210
CSA File No.: LR6837

**Electrical**
Voltage: 300V AC/DC
Max. Current per Contact: 4.0A

**Mechanical**
Connector Face: PVC-UL Std 94-V
Molded Body: PVC UL Std 94-V
Coupling Nut: Zinc diecast with black epoxy coat
Optional stainless Steel or Nickel-coated

**Physical**
Connector Body: PVC
Cable Jacket: PVC
Cable Jacket Color: Gray
Connector End A: Mini-Change
Connector End B: Mini-Change
Contact: Brass with Gold plating
Copper with Gold over Nickel plating
Coupling Nut: Diecast Zinc
Keyway: Single
LED Indicator: No
Operating Temperature: -20 to +80°C

**Environmental**
Protection: IP67
NEMA Rating: NEMA 6

**Cables**

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<th>Cable Jacket</th>
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<td>PVC</td>
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**DN—DeviceNet Mid (Trunk)**
Rating: 300V, 80°C
Materials: Power—Gray PVC outer jacket, PVC inner insulation
Data—PE Foam inner insulation
Construction: Two shielded pairs, 20 AWG Tin-Copper drain wire between pair
UL: UL AWM—Style 1569
CSA: CSA AWM-1/II A/B 300V FY1, 80°C

**DNF—DeviceNet Thick Flex-Rated**
Rating: 300V, 80°C
Materials: Power—TPE outer jacket, PVC with Nylon skin inner insulation
Data—PE Foam inner insulation
Flexure: Rolling flex > 1.4m cycles at 10x bend radius
Construction: Two shielded pairs, 18 AWG (19x30 AWG), drain wire between pair
UL: C13; AWM 20626, UL 1581
CSA: AWM 1/II A/B 80°C 300V FT1

**DNE—DeviceNet Thick Tray-Rated**
Rating: 600V UL type TC
Materials: Power—PVC outer jacket, PP inner insulation
Data—PVC with Nylon skin
Construction: Two shielded pairs, with one 18 AWG (19x30 AWG) Copper drain wire
UL: Type TC-ER
CSA: 1/II A/B

**Meters**
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<td>10</td>
<td>M100</td>
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**Configuration Code†**
Build-a-Part Number

**Coupling Nut Option**
- Epoxy-Coated Zinc . . . A
- Nickel-Brass . . . . NB
- Stainless Steel . . . SS

**DN 11A-MXXX**

Note: Sales drawings for all standard order numbers are available on molex.com

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)*

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
DeviceNet*  
Brad® Mini-Change®  
Double-Ended Cordsets  

**130025**  
**Female, Male**  
**Straight, Right Angle**  
**Thin Media**  
**Threaded**

### Features and Benefits
- Phosphor-bronze contacts for greatest reliability
- Variety of cable types, cable exit, coupling nut and length options for maximum system flexibility

### Reference Information
**UL File No.:** E152210  
**CSA File No.:** LR6837

### Mechanical
**Connector Face:** PVC UL Std 94-V  
**Molded Body:** PVC UL Std 94-V  
**Coupling Nut:** Zinc diecast with black epoxy coat

### Physical
**Contacts:** Phosphor-Bronze base material  
**Contact Plating:** Gold over Nickel per ODVA Specs  
**Operating Temperature:** -20 to +80°C

### Environmental
**Protection:** IP67  
**NEMA Rating:** NEMA 6

### Cables
**DND—DeviceNet Thin**  
**Rating:** 300V 80°C  
**Materials:** Power—PVC outer jacket with semi-rigid PVC inner insulation  
**Data—PE foam inner insulation**

**Construction:** Two shielded pairs, 22 AWG Tin-Copper drain wire between pairs  
**Cable Jacket Color:** Gray

**DNDF—DeviceNet Thin High-Flex**  
**Rating:** 300V 80°C  
**Materials:** Power—TPE outer jacket, PVC with nylon skin inner insulation  
**Data—PE foam inner insulation**

**Flexure:** Rolling Flex > 1m cycles at 10x bend radius  
**Construction:** Two foil shielded pairs, 26 AWG Tin-Copper drains between pairs  
**Cable Jacket Color:** Gray

### Tables

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<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
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<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
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<td>DND11A-M010 130025-0287 DND19A-M010 130025-0313</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Thin</td>
<td>PVC</td>
<td>0.24mm</td>
<td>22/22</td>
<td>1.0m</td>
<td>DND11A-M010</td>
<td>DND19A-M010</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thin/Flex Rated</td>
<td>TPE</td>
<td>0.62mm</td>
<td>22/24</td>
<td></td>
<td>DNDF11A-M010 130025-0502 DNDF19A-M010 130025-0513</td>
<td></td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com  
*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)*
DeviceNet®
Brad® Mini-Change®
Back Panel Mount
Double-Ended Cordsets

130039
Male-to-Female Straight
Female Straight-to-Male Right Angle
Male-to-Female Straight
Female Right Angle-to-Male Straight
Back Panel Mount
Thick Media

Features and Benefits
- Back panel mount receptacles are used to bring connectivity from inside to outside the control panel
- A variety of configurations are available for maximum flexibility

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Electrical
Voltage Rating: 300V AC/DC
Current: 4.0A

Mechanical
Connector Face: PVC-UL STD 94-V
Molded Body: PVC-UL STD 94-V
Coupling Nut: Zinc diecast with black epoxy coating
Shell: Nickel-Brass
Shell Inserts: PVC-UL STD 94-V

Physical
Contacts: Phosphor-Bronze base material
Contact Plating: Gold over Nickel per ODVA specifications
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Cables
DN—Thick Trunk
Rating: 300V, 80°C
Materials: Power—Gray PVC outer jacket, PVC with Nylon skin inner insulation
Data—PE foam inner insulation
Construction: Two shielded pairs with 18 AWG (19x30) drain wire between pairs
UL: UL type CL2, VL 1581 flame resistance
CSA: CSA AWM I/II and A/B FT4

Note: Sales drawings for all standard order numbers are available on molex.com
*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)

<table>
<thead>
<tr>
<th>Back Panel Face View (Female)</th>
<th>Male-to-Female Straight</th>
<th>Female Straight-to-Male Right Angle</th>
<th>Male-to-Female Straight</th>
<th>Female Right Angle-to-Male Straight</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN5201A-M010</td>
<td>130039-0096</td>
<td>DN5290A-M010</td>
<td>130039-0098</td>
<td>DN5301A-M010</td>
</tr>
<tr>
<td>1 - Drain</td>
<td>4 - CAH_H</td>
<td>2 - V+</td>
<td>5 - CAH_L</td>
<td>3 - V-</td>
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</table>

Configuration Code†
Build-a-Part Number

<table>
<thead>
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<th>Meters</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>M020</td>
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<tr>
<td>5</td>
<td>M050</td>
</tr>
<tr>
<td>10</td>
<td>M100</td>
</tr>
</tbody>
</table>

Coupling Nut Option
Epoxy-Coated Zinc . . . A
Nickel-Brass . . . . . . HB
Stainless Steel . . . . SS

†Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
DeviceNet®
Brad® Mini-Change®
Trunk Receptacles

130039
Female, Male
Straight
Thick and Mid Media

Features and Benefits
- Receptacles offered with a variety of cable and length options for maximum flexibility
- Receptacles allow for the trunk line to come into an enclosure and make connection to inside of the panel components
- Male or female receptacles are mounted to the enclosure and the back end trunk cabling can be wired to the open terminal strip of a motor controller, the master scanner or a power supply for the network

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Physical
Shell (Receptacle): Gray anodized Aluminum
Insert: PVC—UL STD 94V
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Cables
DNB—DeviceNet Mid Trunk
Rating: 300V, 80°C
Materials: Power—Gray PVC outer jacket, PVC inner insulation
Data—PE foam inner insulation
Construction:
Two shielded pairs, 20 AWG Tin-Copper drain wire between pairs
UL: UL AWM Style 1569
CSA: CSA AWM I/II A/B 300V FT1, 80°C
Outside Diameter: 0.34” (8.60mm)

DN—DeviceNet Thick Trunk
Rating: 300V, 80°C
Materials: Power—Gray PVC outer jacket, PVC with Nylon skin inner insulation
Data—PE foam inner insulation
Construction:
Two shielded pairs with 18 AWG (19x30 AWG) drain wire between pairs
UL: UL Type CL2, VL 1581 flame resistance
CSA: CSA AWM I/II and A/B 300V FT4
Outside Diameter: 0.48” (12.10mm)

Configuration

<table>
<thead>
<tr>
<th>Face View (5 Pole)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Configuration Code†</th>
<th>Build-a-Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female View</td>
<td>4.0A</td>
<td>300V AC/DC</td>
<td>Trunk (DN)</td>
<td>PVC</td>
<td>15/18</td>
<td>1.0m</td>
<td>DNB5000-M010</td>
<td>DNB5000-M010</td>
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<tr>
<td>Male View</td>
<td>4.0A</td>
<td>300V AC/DC</td>
<td>Mid (DNB)</td>
<td>PVC</td>
<td>16/20</td>
<td>1.0m</td>
<td>DNB5000-M010</td>
<td>DNB5000-M010</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
DeviceNet®
Brad® Mini-Change®
PCB Mount Receptacles

130188
Female, Male
Straight
Thick Media
Threaded, PCB Pins

Features and Benefits
- Receptacles offered with PCB mount options for maximum flexibility

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Physical
Shell: Gray anodized Aluminum
Insert: PVC—UL STD 94V
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pole Female</td>
<td>8.0A</td>
<td>300V AC/DC</td>
<td>67-0075</td>
<td>130188-0034</td>
</tr>
<tr>
<td>1 - Drain</td>
<td>2 - Red</td>
<td>3 - Black</td>
<td>4 - White</td>
<td>5 - Blue</td>
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<tr>
<td>5 Pole Male</td>
<td>8.0A</td>
<td>300V AC/DC</td>
<td>67-0065</td>
<td>130188-0033</td>
</tr>
<tr>
<td>1 - Drain</td>
<td>2 - Red</td>
<td>3 - Black</td>
<td>4 - White</td>
<td>5 - Blue</td>
</tr>
</tbody>
</table>

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
DeviceNet*  
Brad® Mini-Change®  
Bulkhead Feed-Through  
Receptacles

130013  
Female-Male  
Straight  
Thick Media

Features and Benefits
- Receptacles offered with a variety of cable and length options for maximum flexibility
- Bulkhead version features rugged keyways for positive alignment of connections

Reference Information
CSA File No.: LR6837

Physical
Shell: Nickel-plated Brass  
Gasket Material: Neoprene  
Thrust Washer: Nylon  
Locknut Material: Nickel-plated Brass  
Insert: PVC—UL STD 94V  
Operating Temperature: -20 to +60°C

Environmental
Protection: IP67  
NEMA Rating: NEMA 6

---

<table>
<thead>
<tr>
<th>Face View (Female)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Mounting</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pole</td>
<td>8.0A</td>
<td>600V</td>
<td>Front Panel Mount</td>
<td>1R5030</td>
<td>130013-0541</td>
</tr>
</tbody>
</table>

1 - Drain  2 - Red  3 - Black  4 - White  5 - Blue

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
DeviceNet®
Brad® Mini-Change®
Field Attachable Connectors

130034
Female, Male
Straight
Thick and Mid Media
Threaded

Features and Benefits
- Color-coded screw terminators make for error-free field installation
- Accepts a wide range of DeviceNet cables for maximum installation flexibility

Reference Information
CSA File No: LR6837

Physical
Connector Face: Polyurethane
Connector Body: Polyamide
Contact: Gold-plated Brass
Coupling Nut: Nickel-plated Brass
Grommet: Neoprene
Cable Range OD: 0.20 to 0.48" (5.00 to 12.00 mm)
Acceptable Wire Gauges:
  24 AWG (0.25 mm²) to 15 AWG (2.0 mm²)
Color Coding: Per ODVA standards
Operating Temperature: -20 to +80°C
Environmental
Protection: IP67

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pole</td>
<td>8.0A</td>
<td>600V AC/DC</td>
<td>0.20&quot;–0.48&quot; (5.00–12.00mm) OD (Thick and Mid Cables)</td>
<td>1A5006-34DN</td>
<td>130034-0006</td>
<td>1A5000-34DN</td>
<td>130034-0005</td>
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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
**DeviceNet®**
**Brad® Mini-Change®**
**Terminator Resistors**

130039

Female, Male

Straight

Threaded

Thick Media

---

### Features and Benefits

- Phosphor Bronze contacts for maximum reliability
- Diagnostic versions indicate correct polarity at a glance to ensure power connections have been made and made properly

### Physical

- **Connector Face**: PVC
- **Molded Body**: Diagnostic—clear PVC
  STD—gray PVC
- **Coupling Nut**: Zinc diecast, black e-coat optional
  302 stainless
- **Contact Material**: Phosphor Bronze alloy
- **Contact Plating**: Gold over Copper alloy
- **LED**: Green—Proper polarity
  Red—Improper polarity
- **Operating Temperature**: 0 to 60°C

### Environmental

- **Protection**: IP67
- **NEMA Rating**: NEMA 6

### Specifications

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>5 Pole</td>
<td>121 Ω</td>
<td>8.0A</td>
<td>PVC</td>
<td>LED Diagnostic - Clear</td>
<td>DN150L</td>
<td>130039-0072</td>
<td>DN100L</td>
<td>130039-0371</td>
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<td></td>
<td></td>
<td>50V AC/DC</td>
<td></td>
<td>Molded Gray</td>
<td>DN150</td>
<td>130039-0376</td>
<td>DN100</td>
<td>130039-0370</td>
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</tbody>
</table>

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)*
DeviceNet®
Brad® Mini-Change®
Diagnostic Power Monitor®
Tees

130035
Male/Female
Thick Media

Features and Benefits
• Minimizes maintenance repair and downtime by analyzing bus power quality
• Predicts power faults by logging outside of specification power conditions thereby increasing uptime
• Helps quickly certify new installations

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Electrical
Power Supply: 7–30V DC, < 50mA
Basic Analog Accuracy: ± 100mV
Minimum “Low” Voltage Threshold: <12.96V
Nominal “OK” Voltage Range: 12.96V–24.78V
Maximum “High” Voltage Threshold: >24.78V
Glitch/Ripple Threshold (AV/AT): Var 75 V/S at 16mS to 640 V/S at 1.0mS
Reset: Magnet at drop “reset” changes mag reed switch state

Physical
Connector Face: Thermo plastic elastomer
Molded Body: Thermo plastic elastomer
Coupling Nut: Zinc diecast black e-coat
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Diagnostic Type

<table>
<thead>
<tr>
<th>Indicator</th>
<th>LED Display</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK</td>
<td>Green</td>
<td>Normal</td>
</tr>
<tr>
<td>HI</td>
<td>Red</td>
<td>Overvoltage</td>
</tr>
<tr>
<td>LO</td>
<td>Blue</td>
<td>Undervoltage</td>
</tr>
<tr>
<td>HI</td>
<td>Flashing Red</td>
<td>Surge within last 24 hours</td>
</tr>
<tr>
<td>LO</td>
<td>Flashing Blue</td>
<td>Brown out within last 24 hours</td>
</tr>
<tr>
<td>AC</td>
<td>Flashing Yellow</td>
<td>Power glitch within last 24 hours</td>
</tr>
</tbody>
</table>

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
DeviceNet®
Brad® Mini-Change®
Diagnostic Power Monitor®
In-Line Adapters

130035
Male/Female
Thick Media

Features and Benefits
- Minimizes maintenance repair and downtime by analyzing bus power quality
- Predicts power faults by logging outside of specification power conditions thereby increasing uptime
- Helps quickly certify new installations

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Electrical
Power Supply: 7–30V DC, < 50mA
Basic Analog Accuracy: ±100mV
Minimum “Low” Voltage Threshold: < 12.96V
Nominal “OK” Voltage Range: 12.96V–24.78V
Maximum “High” Voltage Threshold: > 24.78V
Glitch/Ripple Threshold (AV/AT):
Var 75 V/S at 16mS to 640 V/S at 1mS
Reset: Magnet at drop “Reset” changes mag reed switch state

Physical
Connector Face: Thermoplastic elastomer
Molded Body: Thermoplastic elastomer
Coupling Nut: Zinc diecast black e-coat
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Diagnostic Type
Left Trunk Gender
Right Trunk Gender
Engineering No.
Standard Order No.

<table>
<thead>
<tr>
<th>Diagnostic Type</th>
<th>Left Trunk Gender</th>
<th>Right Trunk Gender</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
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<tbody>
<tr>
<td>Male</td>
<td>Female</td>
<td>115011A-PM-1</td>
<td>130035-0007</td>
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<td>Female</td>
<td>Male</td>
<td>115011A-PM-3</td>
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</table>

In-Line Adaptor with Power Diagnostics

Note: Sales drawings for all standard order numbers are available on molex.com

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)

Diagnostic Tee

<table>
<thead>
<tr>
<th>Indication</th>
<th>Led Display</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK</td>
<td>Green</td>
<td>Normal</td>
</tr>
<tr>
<td>HI</td>
<td>Red</td>
<td>Overvoltage</td>
</tr>
<tr>
<td>LO</td>
<td>Blue</td>
<td>Undervoltage</td>
</tr>
<tr>
<td>HI</td>
<td>Flashing Red</td>
<td>Surge within last 24 hours</td>
</tr>
<tr>
<td>LO</td>
<td>Flashing Blue</td>
<td>Brown out within last 24 hours</td>
</tr>
<tr>
<td>AC</td>
<td>Flashing Yellow</td>
<td>Power glitch within last 24 hours</td>
</tr>
</tbody>
</table>
## DeviceNet* Brad® Mini-Change® Tees

**130035/130039**

**Bus Drop Tees**  
**Thick Media**

---

### Features and Benefits

- Phosphor bronze contacts for greatest reliability
- Variety of Mini-Change and Micro-Change configurations for maximum installation flexibility

### Reference Information

- UL File No.: E152210
- CSA File No.: LR6837

### Electrical

- **Voltage Rating**:  
  - Mini-Change — 600V AC/DC  
  - Micro-Change — 250V AC/DC
- **Current**:  
  - Mini-Change Drop — 8.0A  
  - Micro-Change Drop — 4.0A

### Physical

- **Connector Face**: Brad Micro-Change Drop Tee — PCV  
- **Molded Body**: Brad Micro-Change Drop Tee — TPE  
- **Coupling Nut**: Zinc diecast Black E-Coat  
- **Contact Material**: Phosphor Bronze alloy  
- **Contact Plating**: Gold over Nickel alloy  
- **Operating Temperature**: -20 to +80°C

### Environmental

- **Protection**: IP67  
- **NEMA Rating**: NEMA 6

---

### View | Wiring Schematic | Face View (Left Trunk Female) | Face View (Right Trunk Male) | Face View (Drop Gender Female) | Engineering No. | Standard Order No.
---|---|---|---|---|---|---

**Mini-Change**

<table>
<thead>
<tr>
<th>1 - Drain</th>
<th>2 - V+</th>
<th>3 - V–</th>
<th>4 - CAN_H</th>
<th>5 - CAN_L</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Drain</td>
<td>2 - V+</td>
<td>3 - V–</td>
<td>4 - CAN_H</td>
<td>5 - CAN_L</td>
</tr>
<tr>
<td>1 - Drain</td>
<td>2 - V+</td>
<td>3 - V–</td>
<td>4 - CAN_H</td>
<td>5 - CAN_L</td>
</tr>
</tbody>
</table>

**Micro-Change**

<table>
<thead>
<tr>
<th>1 - Drain</th>
<th>2 - V+</th>
<th>3 - V–</th>
<th>4 - CAN_H</th>
<th>5 - CAN_L</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Drain</td>
<td>2 - V+</td>
<td>3 - V–</td>
<td>4 - CAN_H</td>
<td>5 - CAN_L</td>
</tr>
<tr>
<td>1 - Drain</td>
<td>2 - V+</td>
<td>3 - V–</td>
<td>4 - CAN_H</td>
<td>5 - CAN_L</td>
</tr>
</tbody>
</table>

**Note**: Sales drawings for all standard order numbers are available on molex.com

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)*
DeviceNet®
Brad® Mini-Change®
Gender Changers
130035/130039
Straight Female-to-Male
Straight Male-to-Female
Right Angle Male-to-Female
Thick Media
Threaded

Features and Benefits
- Phosphor Bronze contacts for greatest reliability
- Variety of male-to-female and female-to-male connection options for maximum installation flexibility

Physical
Connector Face: Thermoplastic elastomer
Molded Body: Thermoplastic elastomer
Coupling Nut: Zinc diecast, black e-coat; Stainless Steel, Nickel-plated Brass optional
Contact Material: Phosphor Bronze alloy
Contact Plating: Gold over Nickel
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6P

<table>
<thead>
<tr>
<th>Poles</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Female-to-Male</th>
<th>Male-to-Female</th>
<th>Right Angle Male-to-Female Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pole Female</td>
<td>8.0A</td>
<td>600V AC/DC</td>
<td>115060A</td>
<td>130035-0015</td>
<td>115010A</td>
</tr>
<tr>
<td>5 Pole Male</td>
<td>8.0A</td>
<td>600V AC/DC</td>
<td>115060A</td>
<td>130035-0015</td>
<td>115010A</td>
</tr>
</tbody>
</table>

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)

*Coupling Nut Options
- Epoxy-Coated Zinc: . . . . EP
- Nickel-Brass: . . . . NB
- Stainless Steel: . . . . SS

115060A

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
DeviceNet*
Brad® Mini-Change®
Passive Multi-Ports

130036
Side Mount Bus-In Connection
Thick and Mid Media

Features and Benefits
- A family of configurations from 4- to 8-port for maximum installation flexibility
- Rugged enclosure for reliable connectors in an industrial environment

Reference Information
UL File No.: E46237
CSA File No.: LR6837

Electrical
Voltage Rating: 120V AC/DC
Current: 7.0A total per MPIS unit

Mechanical
Insert: PVC
Housing: Pet (Polyester)
Receptacle Housing: Zinc diecast with black epoxy coat
ID Label: ABS

Physical
Operating Temperature: 0 to 60°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Reference Information
UL File No.: E46237
CSA File No.: LR6837

Electrical
Voltage Rating: 120V AC/DC
Current: 7.0A total per MPIS unit

Mechanical
Insert: PVC
Housing: Pet (Polyester)
Receptacle Housing: Zinc diecast with black epoxy coat
ID Label: ABS

Physical
Operating Temperature: 0 to 60°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Face View | Parts | Box Configuration | Wiring Schematic | Engineering No. | Standard Order No.
---|---|---|---|---|---
Female drop | 4 |  |  | DN4000 | 130036-0005
1 - Drain  2 - GND  3 - V+  4 - CAN_H  5 - CAN_L
Mole bus in | 6 |  |  | DN6000 | 130036-0006
1 - Drain  2 - GND  3 - V+  4 - CAN_H  5 - CAN_L
8 | 8 |  |  | DN8000 | 130036-0010
1 - Drain  2 - GND  3 - V+  4 - CAN_H  5 - CAN_L

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
### DeviceNet*
Brad® Mini-Change®
Passive Multi-Ports

**130036**
Side Mount
Bus-In-Bus-Out Connection
Thick and Mid Media

**Features and Benefits**
- Family of configurations for maximum flexibility
- Simple Bus-In/Bus-Out connections for connection convenience
- Rugged housing and connectors designed to withstand tough industrial environments

**Reference Information**
UL File No.: E46237
CSA File No.: LR6837

**Electrical**
Voltage Rating: 120V AC/DC
Current: 7.0A total per MPIS unit

### Mechanical
- Insert: PVC
- Housing: PET (Polyester)
- Receptacle Shell: Zinc diecast with black epoxy coat
- ID Label: ABS

### Physical
- Operating Temperature: 0 to 60°C
- Protection: IP67
- NEMA Rating: NEMA 6

### Electrical Reference Information
- Electrical Voltage Rating: 120V AC/DC
- Current: 7.0A total per MPIS unit

### Mechanical Reference Information
- Insert: PVC
- Housing: PET (Polyester)
- Receptacle Shell: Zinc diecast with black epoxy coat
- ID Label: ABS

### Physical Reference Information
- Operating Temperature: 0 to 60°C
- Protection: IP67
- NEMA Rating: NEMA 6

---

<table>
<thead>
<tr>
<th>Face View</th>
<th>Parts</th>
<th>Box Configuration</th>
<th>Wiring Schematic</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women Pass Through</td>
<td>2</td>
<td><img src="image" alt="Wiring Diagram" /></td>
<td><img src="image" alt="Wiring Diagram" /></td>
<td>DN2100</td>
<td>130039-0336</td>
</tr>
<tr>
<td>Male Bus-In</td>
<td>4</td>
<td><img src="image" alt="Wiring Diagram" /></td>
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<td>DN4100</td>
<td>130036-0006</td>
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<tr>
<td>Female Bus-Out</td>
<td>6</td>
<td><img src="image" alt="Wiring Diagram" /></td>
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<td>DN6100</td>
<td>130036-0009</td>
</tr>
</tbody>
</table>

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)*

---

This document provided by Barr-Thorp Electric Co., Inc.  800-473-9123  www.barr-thorp.com
Features and Benefits
• Rugged, IP67 rated connectors for continued connection integrity in industrial environments
• Variety of cable types, cable exit, form factor, coupling nut and length options for maximum flexibility

Physical
Body: Molded PVC
Insert: Nylon 6/6
Contacts: Phosphor Bronze
Contact Plating: Gold over Nickel
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Cables

<table>
<thead>
<tr>
<th>DND—Thin Standard</th>
<th>DND—Thin High-Flex</th>
</tr>
</thead>
</table>
Rating: 300V 80°C | Rating: 300V 80°C |
Outer Jacket: PVC | Outer Jacket: PVC |
Inner Insulation: Power—Semi-rigid PVC | Inner Insulation: Power—Semi-rigid PVC |
Data—PE foam | Data—PE foam |
Construction: Two shielded pairs, 22 AWG Tin-Copper drain wire between pairs | Construction: Two foil shielded pairs, 26 AWG Tin-Copper drains between pairs |
Cable Jacket Color: Gray | Cable Jacket Color: Gray |
UL: CL2, AWM 2464 | UL: CL3 AWM 20626, Flame UL 1581 |
CSA: FT4 Rated | CSA: AWM: I/II A/B, 80°C, 300V FT1 |

Cable Type

<table>
<thead>
<tr>
<th>Type</th>
<th>Jacket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thin Cable</td>
<td>PVC</td>
</tr>
<tr>
<td>Thin, High-Flex</td>
<td>TPE</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
Features and Benefits
- Rugged, IP67 rated connectors for continued connection integrity in industrial environments
- Variety of cable type, cable exit, form factor, coupling nut and length options for maximum flexibility

Mechanical
Body: Molded PVC
Insert: PVC

Physical
Contact: Phosphor Bronze
Contact Plating: Gold over Nickel
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Cables
DND—Thin Standard
Rating: 300V 80°C
Outer Jacket: PVC
Inner Insulation: Power—Semi-rigid PVC
Data—PE foam
Construction: Two shielded pairs, 22 AWG Tin-Copper drain wire between pairs
Cable Jacket Color: Gray
UL: CL2, AWM 2464
CSA: FT4 Rated

DNDF—Thin High-Flex
Rating: 300V 80°C
Outer Jacket: PVC
Inner Insulation: Power—Semi-rigid PVC
Data—PE foam
Flexure: Rolling flex > 1 million cycles at 10x bend radius
Construction: Two foil shielded pairs, 26 AWG Tin-Copper drains between pairs
Cable Jacket Color: Gray
UL: CL3 AWM 20626, Flame UL 1581
CSA: AWM I/II A/B, 80°C, 300V FT1

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</thead>
<tbody>
<tr>
<td></td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>Thin PVC</td>
<td>PVC</td>
<td>7.24mm</td>
<td>22/22</td>
<td>1.0m</td>
<td>DND02A-M010</td>
<td>130027-0012</td>
<td>DND03A-M010</td>
<td>130027-0037</td>
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<tr>
<td>1 - Drain</td>
<td>4 - CAN_H</td>
<td></td>
<td>Flex Rated</td>
<td>TPE</td>
<td>7.62mm</td>
<td>22/24</td>
<td>1.0m</td>
<td>DND02F-M010</td>
<td>130027-0103</td>
<td>DND03F-M010</td>
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<td>2 - V+</td>
<td>5 - CAN_L</td>
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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
DeviceNet®
Brad® Micro-Change® (M12)
Double-Ended Cordsets

130028
Female, Male
Straight, Right Angle
Thin Media
Threaded

Features and Benefits
• Rugged, IP67 rated connectors for continued connection integrity in industrial environments
• Variety of cable, cable exit, form factor, coupling nut and length options for maximum flexibility

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Physical
Connector Face: Nylon 6/6
Molded Body: PVC
Coupling Nut: Zinc diecast with black epoxy coat
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Cables
DND—DeviceNet Thin
Rating: 300V, 80°C
Materials: Power—PVC outer jacket with semigrid PVC inner insulation
Data—PE foam inner insulation
Construction: Two shielded pairs, 22 AWG Tin-Copper drain wire between pairs
Cable Jacket Color: Gray

DNDF—DeviceNet Thin High Flex
Rating: 300V, 80°C
Materials: Power—TPE outer jacket PVC with Nylon skin inner insulation
Data—PE foam inner insulation
Flexure: Rolling flex > 1m cyles at 10x bend radius
Construction: Two foil shielded pairs, 26 AWG Tin-Copper drains between pairs
Cable Jacket Color: Gray

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Cable Diameter</th>
<th>Wire Size</th>
<th>Length</th>
<th>Female Straight-to-Male Straight</th>
<th>Female Straight-to-Male Right Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>250V</td>
<td>Thin PVC</td>
<td>0.24mm (.285)</td>
<td>22/22</td>
<td>1m (3.28')</td>
<td>DND22A-M010 130028-0028</td>
<td>DND23A-M010 130028-0070</td>
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<tr>
<td></td>
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<td>Thin/Flex Rated TPE</td>
<td>0.62mm (.300)</td>
<td>22/24</td>
<td></td>
<td>DNDF22A-M010 130028-0132</td>
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<table>
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<th>Cable Jacket (Cable Code)</th>
<th>Cable Diameter</th>
<th>Wire Size</th>
<th>Length</th>
<th>Female Right Angle-to-Male Straight</th>
<th>Female Right Angle-to-Male Right Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>250V</td>
<td>Thin PVC</td>
<td>0.24mm (.285)</td>
<td>22/22</td>
<td>1m (3.28')</td>
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<td>DND33A-M010 130028-0104</td>
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<tr>
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<td></td>
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<td>0.62mm (.300)</td>
<td>22/24</td>
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<td>DNDF32A-M010 130028-0172</td>
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*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)

Configuration Code† Build-a-Part Number

<table>
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<tr>
<th>Length Code</th>
<th>Meters</th>
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<tbody>
<tr>
<td>2</td>
<td>M020</td>
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<tr>
<td>5</td>
<td>M050</td>
</tr>
<tr>
<td>10</td>
<td>M100</td>
</tr>
</tbody>
</table>

†Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

Coupling Nut
Epoxy-Coated Zinc . . . A
Stainless Steel . . . SS
Nickel-Brass . . . . . . NB

www.molex.com
DeviceNet®
Brad® Micro-Change (M12)-to-Mini-Change Double-Ended Cordsets
130039
Female, Male Straight, Right Angle Thin Media Threaded

Features and Benefits
• Rugged, IP67 rated connectors for continued connection integrity in industrial environments
• Variety of cable, cable exit, form factor, coupling nut and length options for maximum flexibility

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Physical
Connector Face: Brad Micro-Change—Nylon 6/6
Brad Mini-Change—PVC
Molded Body: PVC
Coupling Nut: Zinc diecast with black epoxy coat
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Cables
DND—DeviceNet Thin
Rating: 300V 80°C
Materials: Power—PVC outer jacket with semigrid
PVC inner insulation
Data—PE foam inner insulation
Construction: Two shielded pairs, 22 AWG Tin-Copper drain wire between pairs
Cable Jacket Color: Gray

DNDF—DeviceNet Thin High-Flex
Rating: 300V 80°C
Materials: Power—TPE outer jacket, PVC with nylon skin
inner insulation
Data—PE foam inner insulation
Flexure: Rolling Flex > 1m cycles at 10x bend radius
Construction: Two foil shielded pairs, 26 AWG Tin-Copper drain wire between pairs
Cable Jacket Color: Gray

<table>
<thead>
<tr>
<th>Face View (Female)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Cable Diameter</th>
<th>Wire Size</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Drain   4 - CAH_H 2 - V+ 5 - CAH_L 3 - V-</td>
<td>4.0A</td>
<td>250V</td>
<td>Thin</td>
<td>PVC</td>
<td>0.24mm</td>
<td>22/22</td>
<td>1.0m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Thin/Flex-Rated</td>
<td>TPE</td>
<td>0.62mm</td>
<td>22/24</td>
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<table>
<thead>
<tr>
<th>Face View (Female)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Cable Diameter</th>
<th>Wire Size</th>
<th>Length</th>
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</thead>
<tbody>
<tr>
<td>1 - Drain   4 - CAH_H 2 - V+ 5 - CAH_L 3 - V-</td>
<td>4.0A</td>
<td>250V</td>
<td>Thin</td>
<td>PVC</td>
<td>0.24mm</td>
<td>22/22</td>
<td>1.0m</td>
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<td>Thin/Flex-Rated</td>
<td>TPE</td>
<td>0.62mm</td>
<td>22/24</td>
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</tbody>
</table>

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
Note: Sales drawings for all standard order numbers are available on molex.com
DeviceNet®
Brad® Mini-Change®-to-
Micro-Change® (M12)
Double-Ended Cordsets

130039
Female, Male
Straight, Right Angle
Thin Media
Threaded

**Features and Benefits**
- Rugged, IP67 rated connectors for continued connection integrity in industrial environments
- Variety of cable, cable exit, form factor, coupling nut and length options for maximum flexibility

**Reference Information**
UL File No.: E152210
CSA File No.: LR6837

**Physical**
Connector Face: Brad Micro-Change—Nylon 6/6
Brad Mini-Change—PVC
Molded Body: PVC
Coupling Nut: Zinc diecast with black epoxy coat
Operating Temperature: -20 to +80°C

**Environmental**
Protection: IP67
NEMA Rating: NEMA 6

### Cables

**DND—DeviceNet Thin**
Rating: 300V, 80°C
Materials: Power—PVC outer jacket with semigrid PVC inner insulation
Data—PE foam inner insulation
Construction: Two shielded pairs, 22 AWG Tin-Copper drain wire between pairs
Cable Jacket Color: Gray

**DNDF—DeviceNet Thin High Flex**
Rating: 300V, 80°C
Materials: Power—TPE outer jacket PVC with Nylon skin inner insulation
Data—PE foam inner insulation
Flexure: Rolling flex > 1m cycles at 10x bend radius
Construction: Two foil shielded pairs, 26 AWG Tin-Copper drains between pairs
Cable Jacket Color: Gray

---

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Cable Diameter</th>
<th>Wire Size</th>
<th>Length</th>
<th>Female Straight-to-Male Straight</th>
<th>Female Straight-to-Male Right Angle</th>
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<tbody>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>250V</td>
<td>Thin</td>
<td>PVC</td>
<td>0.24mm</td>
<td>22/22</td>
<td>1.0m</td>
<td>DND12A-M010 130039-0145</td>
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<td>Thin/Flex Rated</td>
<td>TPE</td>
<td>0.62mm</td>
<td>22/24</td>
<td></td>
<td>DNDF12A-M010 130039-0523</td>
<td>DNDF13A-M010 130039-0245</td>
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<table>
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<th>Max. Current per Contact</th>
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<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Cable Diameter</th>
<th>Wire Size</th>
<th>Length</th>
<th>Female Right-Angle to Male Straight</th>
<th>Female Right-Angle to Male Right Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>250V</td>
<td>Thin</td>
<td>PVC</td>
<td>0.24mm</td>
<td>22/22</td>
<td>1.0m</td>
<td>DND92A-M010 130039-0209</td>
<td>DND93A-M010 130039-0216</td>
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<td>Thin/Flex Rated</td>
<td>TPE</td>
<td>0.62mm</td>
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<td></td>
<td>DNDF92A-M010 130039-0266</td>
<td>DNDF93A-M010 130039-0551</td>
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**Note:** Sales drawings for all standard order numbers are available on molex.com

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)*

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Configuration Code
Build-a-Part Number

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<thead>
<tr>
<th>Meters</th>
<th>Length</th>
<th>Code</th>
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</thead>
<tbody>
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<td>M020</td>
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</tr>
<tr>
<td>5</td>
<td>M050</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>M100</td>
<td></td>
</tr>
</tbody>
</table>

**Coupling Nut**
- Epoxy-Coated Zinc . . . A
- Stainless Steel . . . . SS
- Nickel-Brass . . . . NB

---

www.molex.com
DeviceNet®
Brad® Micro-Change®
Double-Ended Cordsets

130031/130039
Straight, Right Angle,
Female, Male
Thin Media
Panel Mount
Threaded

Features and Benefits
• Back panel mount receptacles are used to couple
  connectivity from the inside to the outside of the
  control panel
• A variety of configurations are available for
  maximum flexibility

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Physical
Connector Face: Nylon 6/6
Molded Body: PVC
Coupling Nut: Zinc diecast with black epoxy coating
  optional Stainless Steel or Nickel-Brass
Shell: Nickel-Brass
Shell Insert: Nylon 6/6
Contacts: Phosphor Bronze alloy
Contact Plating: Gold over Nickel per ODVA specifications
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Cables
DND—DeviceNet Thin
Rating: 300V 80°C
Materials: Power——PVC outer jacket with semi-rigid PVC
  insulation
Data——PE foam inner insulation
Construction: two shielded pairs, 20 AWG Tin Copper drain
  wire between pairs
Cable Jacket Color: Gray

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Voltage</th>
<th>Maximum Voltage</th>
<th>Cable Type</th>
<th>Wire Size</th>
<th>Length</th>
<th>Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>250V</td>
<td>Thin PVC</td>
<td>6.9mm</td>
<td>0.5m</td>
<td>Two shielded pairs, 20 AWG Tin Copper drain wire between pairs</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)

Configuration Code† Build-a-Part Number

<table>
<thead>
<tr>
<th>Length (Meters)</th>
<th>Code</th>
</tr>
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<tr>
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<td>M020</td>
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<tr>
<td>5</td>
<td>M050</td>
</tr>
<tr>
<td>10</td>
<td>M100</td>
</tr>
</tbody>
</table>

†Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
DeviceNet*
Brad® Micro-Change (M12)
Single-Ended
Panel Mount Receptacles

130031
Female, Male
Straight
Thin Media

Features and Benefits
- A variety of options allows for maximum flexibility in connecting device nodes
- DeviceNet color coded wiring coming from the back of the receptacle
- The length of wiring can be varied

Physical
Shell: Anodized Aluminum
Insert: Nylon 6/6
Panel Nut: Steel, Zinc plated
Contact Pin: Copper alloy, Gold over Nickel plating
O-Ring: Nitrile
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6P

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<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Straight, Front Panel Mount</td>
<td>PVC, UL 1061</td>
<td>22</td>
<td>12.00&quot;</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>81611</td>
<td>130031-0023</td>
</tr>
<tr>
<td>Male Straight, Front Panel Mount</td>
<td>PVC, UL 1061</td>
<td>22</td>
<td>12.00&quot;</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>81612</td>
<td>130031-0026</td>
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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
DeviceNet®
Brad® Micro-Change® (M12)
Bulkhead Feed-Through

120070
Female Straight-to-Male Straight
Thin Media

**Features and Benefits**
- Bulkhead version features keyways for positive alignment of connections

**Physical**
- Shell: Nickel over Brass
- Insert: Nylon 6/6
- Gasket Material: Neoprene
- Lock Washer: Steel alloy
- Operating Temperature: -20 to +80°C

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

---

### Features and Benefits
- Bulkhead version features keyways for positive alignment of connections.

### Physical
- Shell: Nickel over Brass
- Insert: Nylon 6/6
- Gasket Material: Neoprene
- Lock Washer: Steel alloy
- Operating Temperature: -20 to +80°C

### Environmental
- Protection: IP67
- NEMA Rating: NEMA 6

---

#### Table of Specifications

<table>
<thead>
<tr>
<th>Poles</th>
<th>Female (Max. Current per Contact)</th>
<th>Female (Max. Voltage)</th>
<th>Mounting Style</th>
<th>Standard Order No.</th>
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<td>4.0A</td>
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<td>Front Panel Mount</td>
<td>120070-0237</td>
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<tr>
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<td>4.0A</td>
<td>250V AC/DC</td>
<td>Front Panel Mount</td>
<td>120070-0237</td>
</tr>
</tbody>
</table>

---

**Notes:**
- Sales drawings for all standard order numbers are available on molex.com
- *DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)*

---

This document provided by Barr-Thorp Electric Co., Inc.  800-473-9123    www.barr-thorp.com
**DeviceNet* Brad® Micro-Change® (M12) Field Attachable Connectors**

130034  
Female, Male  
Straight  
Thin Media  
Threaded

---

**Features and Benefits**
- Color-coded screw terminals make for error-free field installation
- Rugged housing material designed to withstand industrial environments

**Reference Information**
CSA File No.: LR6835

---

**Physical**
- Connector Face: Polyamide
- Molded Body: Polyamide
- Contact: Silver-plated Brass
- Coupling Nut: Nickel-plated Brass
- Grommet: Nitrite Rubber
- Cable Range OD: 0.16 to 32.00” OD (4.10 to 8.10 mm)
- Acceptable Cable Types: Thin, Thin-Flex, Thin-600V
- Color Coding: Per DeviceNet standards
- Operating Temperature: -25 to +90°C

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

---

**Poles**

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<tbody>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>30V AC</td>
<td>0.16”-0.32” OD Cable (Thin) (4.06-8.13mm)</td>
<td>8A5000-32DN</td>
<td>130034-0008</td>
<td>8A5000-32DN</td>
<td>130034-0007</td>
</tr>
</tbody>
</table>

1. Silver (drain)  
2. Red  
3. Black  
4. White  
5. Blue

---

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)*

Note: Sales drawings for all standard order numbers are available on molex.com
DeviceNet*  
Brad® Micro-Change® (M12)  
Terminators  
120039/130039  
Female, Male  
Straight  
Thin Media  
Threaded

Features and Benefits
- Phosphor Bronze contacts for maximum reliability
- Diagnostic versions indicate correct polarity at a glance
to ensure power connections have been made and made properly

Physical
Connector Face: Nylon  
Molded Body: Diagnostic—Clear PVC  
STD—Grey PVC  
Coupling Nut: Zinc diecast, black e-coat  
Contact Material: Phosphor Bronze alloy  
Contact Plating: Gold over Copper alloy  
LED: Green—Proper polarity  
Red—Improper polarity  
Operating Temperature: 0 to 60°C

Environmental
Protection: IP67  
NEMA Rating: NEMA 6

<table>
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<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>30V</td>
<td>Nylon</td>
<td>LED Diagnostic-Clear</td>
<td>DND150L</td>
<td>120039-0003</td>
<td>DND100L</td>
<td>120039-0001</td>
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<td></td>
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<td></td>
<td>Molded Gray</td>
<td>DND150</td>
<td>130039-0385</td>
<td>DND100</td>
<td>130039-0382</td>
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<td>Molded Gray-Jumpered*</td>
<td>DND151</td>
<td>130039-0386</td>
<td>DND101</td>
<td>130039-0125</td>
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</table>

*Jumpered terminators are used during network installation for continuity verification.

DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA).
**DeviceNet**
**Brad® Micro-Change® (M12)**

**Tees and Splitters**

130035/130039

**Bus Drop**

**Thin Media**

**Features and Benefits**
- Phosphor Bronze contacts for greatest reliability
- Tees enable tapping into trunk line to add drop lines or devices
- Splitters allow service to two devices through just one connection

**Tee**

**Electrical**
- Voltage: 250V AC/DC
- Current: 4.0A
- Contact Material: Phosphor Bronze Alloy
- Contact Plating: Gold over Nickel Alloy

**Physical**
- Connector Face: Drop Tee—PVC
- Molded Body: Drop Tee—PVC
- Coupling Nut: Nickel-plated Brass
- Operating Temperature: -20 to +80°C

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

**Splitter**

**Reference Information**
- UL File No.: E152210
- CSA File No.: LR6337

**Electrical**
- Voltage: 250V AC/DC
- Current: 4.0A

**Physical**
- Connector Face: Nylon 6/6
- Molded Body: PVC
- Coupling Nut: Zinc diecast with black epoxy coat, Stainless Steel type 303 Nickel-plated Brass
- Operating Temperature: -20 to +105°C

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

---

**Tee**

<table>
<thead>
<tr>
<th>Face View (Female)</th>
<th>Type</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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<tbody>
<tr>
<td>5 Pole</td>
<td>Drop Tee</td>
<td>MICT555</td>
<td>130035-0090</td>
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1: Drain 4: CAN_H
2: V+ 5: CAN_L
3: V-

**Splitter**

<table>
<thead>
<tr>
<th>Face View (Male)</th>
<th>Type</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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<td>5 Pole</td>
<td>Splitter Cordset</td>
<td>DNYG001</td>
<td>130039-0396</td>
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</table>

1: Drain 4: CAN_H
2: V+ 5: CAN_L
3: V-

---

Note: Sales drawings for all standard order numbers are available on molex.com

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)*
Features and Benefits
- Versions with Home Run connectors and with molded Home Run cable available for maximum system design flexibility
- Rugged housing and connectors designed to withstand harsh industrial environments

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Electrical
Voltage Rating: 10 to 30V DC
Current: 4.0A per port

Physical
Insert: PA
Housing: Glass-filled PBT
Receptacle Housing: Nickel-plated Brass
ID Label: ABS
Operating Temperature: -20 to +90°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Drop Cable Configuration

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<tbody>
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<td>Female Drop Micro-Change</td>
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<td>1, Drain 4, CAN_H 2, V+ 5, CAN_L 3, V-</td>
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<td>2.0m</td>
<td>DND4500-02</td>
<td>130037-0006</td>
<td>DND4300-02</td>
<td>130037-0005</td>
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<tr>
<td>Male Bus-In Micro-Change</td>
<td>8</td>
<td>1, Drain 4, CAN_H 2, V+ 5, CAN_L 3, V-</td>
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<td>2.0m</td>
<td>DND8500-02</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)*
DeviceNet®
Brad® Micro-Change®
Passive Multi-Ports
130036/130037
Mini-Change®
Homerun Connectors

Features and Benefits
• Versions with Home Run connectors and with molded home run cable available for maximum system design flexibility
• Rugged housing and connectors designed to withstand harsh industrial environments

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Electrical
Voltage Rating: 10 to 30V DC
Amperage: 4.0A per port

Physical
Insert: PA
Housing: Glass-filled PBT
Receptacle Housing: Nickel-plated Brass
ID Label: ABS
Home Run Connectors: Brad Mini-Change
Operating Temperature: -20 to +90°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

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<td>DND8200</td>
<td>130037-0008</td>
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</table>

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
DeviceNet®
Brad® Open Style
Single-Ended Cordsets

130039
Female
Straight
Thin Media

Features and Benefits
• Over-molded open style of DeviceNet connector provides for environmental protection and cable integrity strain relief
• Variety of form factor, cable type and length options available for maximum flexibility

Physical
Contacts: Bronze
Contact Plating: Gold
Body: Polyamide
Operating Temperature: 0 to 60°C

Environmental
Protection: IP20

---

Cables

**DND—Thin Standard**
Rating: 300V 80°C
Outer Jacket: PVC
Inner Insulation: Power—Semi-rigid PVC
Data—PE foam
Construction: Two shielded pairs, 22 AWG Tin-Copper drain wire between pairs
Cable Jacket Color: Gray
UL: CL2, AWM 2464
CSA: FT4 Rated

**DNDF—Thin High-Flex**
Rating: 300V 80°C
Outer Jacket: PVC
Inner Insulation: Power—Semi-rigid PVC
Data—PE foam
Flexure: Rolling Flex > 1 million cycles at 10X bend radius
Construction: Two foil shielded pairs, 26 AWG Tin-Copper drains between pairs
Cable Jacket Color: Gray
UL: CL3 AWM 20626, Flame UL 158
CSA: AWM: I/II A/B, 80°C, 300V FT1

---

### Table: Face View (Female)

<table>
<thead>
<tr>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Wire Size AWG</th>
<th>Cable Diameter</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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<tbody>
<tr>
<td>10 A</td>
<td>300V AC/DC</td>
<td>Thin Cable</td>
<td>PVC</td>
<td>22/22</td>
<td>7.24mm</td>
<td>1.0m</td>
<td>DND40-M010</td>
<td>130039-0127</td>
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<td></td>
<td>Thin, High-Flex</td>
<td>TPE</td>
<td>22/24</td>
<td>7.62mm</td>
<td>1.0m</td>
<td>DNDF40-M010</td>
<td>130039-0545</td>
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Note: Sales drawings for all standard order numbers are available on molex.com
*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)*

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**Configuration Code†**

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<th>Length</th>
<th>Code</th>
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<tr>
<td>5</td>
<td>M050</td>
</tr>
<tr>
<td>10</td>
<td>M100</td>
</tr>
</tbody>
</table>

**DND40A-M010**

Coupling Nut Option
- Epoxy-Coated Zinc: A
- Nickel-Brass: NB
- Stainless Steel: SS

---

Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

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www.molex.com

This document provided by Barr-Thorp Electric Co., Inc.  800-473-9123  www.barr-thorp.com
DeviceNet®
Open Style-to-Brad®
Mini-Change® and Micro-Change® (M12)
Double-Ended Cordsets

130039

Features and Benefits
- Over-molded open style of DeviceNet connector provides for environmental protection and cable integrity strain relief
- Variety of form factor, cable type and length options available for maximum flexibility

Electrical
Contacts: Mini-Change—Phosphor Bronze
Open—Bronze
Contact Plating: Mini-Change—Gold over Nickel
Open—Gold

Physical
Body: Mini-Change—Molded PVC
Micro-Change—Molded PVC
Open—Polyamide
Insert: Mini-Change—PVC
Micro-Change—Nylon 6/6
Operating Temperature: Mini-Change—-20 to +80°C
Micro-Change—-20 to +80°C
Open—0 to 60°C

Environmental
Protection: Mini-Change—IP67
Micro-Change—IP67
Open—IP20

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<tr>
<th>Face View Connector</th>
<th>Max. Current per Voltage</th>
<th>Maximum Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Cable Diameter</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Open-to-Male Straight Mini</th>
<th>Open-to-Male Right Angle Mini</th>
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<tbody>
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<td>Open</td>
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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)

Cables
DND—DeviceNet Thin
Rating: 300V 80°C
Materials: Power—PVC outer jacket with semi-rigid PVC inner insulation
Data—PE Foam inner insulation
Construction: Two shielded pairs, 22 AWG Tin Copper drain wire between pairs
Cable Jacket Color: Gray

DNDF—DeviceNet Thin High Flex
Rating: 300V, 80°C
Materials: Power—TPE outer jacket, PVC with Nylon skin inner insulation
Data—PE foam PE foam inner insulation
Flexure: Rolling flex >1m cycles at 10x bend radius
Construction: Two foil shielded pairs, 26 AWG Tin-Copper drains between pairs
Cable Jacket Color: Gray
DeviceNet*  
Open Style-to-Brad®  
Mini-Change® and  
Micro-Change® (M12)  
Receptacle Assemblies  
130031/130033/130039  
Open-to-Back Panel Mount  
Thin Media

Features and Benefits
- Over-molded open style of DeviceNet connector provides for environmental protection and cable integrity strain relief
- Variety of form factor, cable type and length options available for maximum flexibility

Reference Information
UL File No.: E152210  
CSA File No.: LR6837

Electrical
Contacts: Mini-Change—Phosphor Bronze  
Micro-Change—Phosphor Bronze  
Open—Bronze  
Contact Plating: Mini-Change—Gold over Nickel  
Micro-Change—Gold over Nickel  
Open—Gold

Physical
Body: Mini-Change—molded PVC  
Micro-Change—molded PVC  
Open—Polyamide  
Insert: Mini-Change—PVC  
Micro-Change—Nylon 6/6
Operating Temperature: -20 to +80°C

Environmental
Protection: Mini-Change—IP67  
Micro-Change—IP67  
Open—IP20

Cables
DND—Thin  
Rating: 300V 80°C  
Materials: Power—PVC outer jacket with semi-rigid PVC insulation  
Data—PE foam inner insulation  
Construction: two shielded pairs, 20 AWG Tin Copper drain wire between pairs  
Cable Jacket Color: Gray

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</thead>
<tbody>
<tr>
<td>Open</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>Thin</td>
<td>Polyamide</td>
<td>6.90mm</td>
<td>22/22</td>
<td>1.0m</td>
<td>DND5304-M010</td>
<td>130039-0087</td>
<td>DND304-M005</td>
<td>130033-0003</td>
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<tr>
<td>Male Mini-Change</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>Thin</td>
<td>Polyamide</td>
<td>6.90mm</td>
<td>22/22</td>
<td>0.5m</td>
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<tr>
<td>Male Micro-Change</td>
<td>4.0A</td>
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<td>Thin</td>
<td>Polyamide</td>
<td>6.90mm</td>
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<td>0.5m</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)

Configuration Code†  
Build-a-Part Number

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<th>Meters</th>
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<td>5</td>
<td>M050</td>
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<tr>
<td>10</td>
<td>M100</td>
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</tbody>
</table>

†Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
DeviceNet®
Brad® Nano-Change® (M8)
Single-Ended Cordsets

130029
Female
Straight, Right Angle
Ultra-Thin Media
Threaded

Features and Benefits
- Rugged IP67 rated connectors for continued connection integrity in industrial environments
- Variety of cable type, connector configuration and cable length options available for maximum flexibility

Physical
Connector Face: PBT
Molded Body: TPE
O-Ring: Viton
Coupling Nut: Zinc diecast with black epoxy coat
Operating Temperature: PVC——20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Face View (Female)</th>
<th>Current</th>
<th>Voltage</th>
<th>Cable Jacket (Cable Type)</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Female Straight</th>
<th>Female Right Angle</th>
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</thead>
<tbody>
<tr>
<td>5 Pole</td>
<td>1.68A</td>
<td>60V AC/75V DC</td>
<td>Ultra-Thin</td>
<td>26</td>
<td>1.0m</td>
<td>405000D12M010</td>
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<td>130029-0002</td>
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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)

Cables
D12—Ultra-Thin
Rating: 300V
Materials: Individually Thinned—PVC outer jacket, 26 AWG (19 x 38 AWG) Copper
Power——Semi-rigid PVC insulation
Data—PE foam inner insulation
Construction: Two shielded pairs, 26 AWG Tin Copper drain wire between pairs
Cable Jacket Color: Gray
UL: AWM Style 2095
CSA: AWM I/II A/B, FT4

Configuration Code†
Build-a-Part Number

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<th>Meters</th>
<th>Length Code</th>
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405000D12M010

Cable Option
†Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
DeviceNet®
Brad® Nano-Change® (M8)
Single-Ended Cordsets

130029
Male
Straight, Right Angle
Ultra-Thin Media
Threaded

Features and Benefits
- Rugged IP67 rated connectors for continued connection integrity in industrial environments
- Variety of cable type, connector configuration and cable length options available for maximum flexibility

Physical
Connector Face: PBT
Molded Body: TPE
O-Ring: Viton
Coupling Nut: Zinc diecast with black epoxy coat
Operating Temperature: PVC—-20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Cables
D12—Ultra-Thin
Rating: 300V
Materials: Individually Thinned—PVC outer jacket, 26 AWG (19 x 38 AWG) Copper
Power—Semi-rigid PVC insulation
Data—PE foam inner insulation
Construction: Two shielded pairs, 26 AWG Tin Copper drain wire between pairs
Cable Jacket Color: Gray
UL: AWM Style 2095
CSA: AWM I/II A/B, FT4

<table>
<thead>
<tr>
<th>Poles</th>
<th>Current</th>
<th>Voltage</th>
<th>Cable Jacket (Cable Type)</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Straight</th>
<th>Right Angle</th>
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<tbody>
<tr>
<td>5 Pole</td>
<td>1.68A</td>
<td>60V AC/75V DC</td>
<td>Ultra-Thin</td>
<td>26</td>
<td>1.0m</td>
<td>405000D12M010</td>
<td>130029-0003</td>
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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
†Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
### DeviceNet®
**Brad® Nano-Change® (M8)**
**Double-Ended Cordsets**

#### 130030
**Female, Male**
**Straight, Right Angle**
**Ultra-Thin Media**
**Threaded**

#### Features and Benefits
- Rugged IP67 rated connectors for continued connection integrity in industrial environments
- Variety of cable type, connector configuration and cable length options available for maximum flexibility

#### Physical
**Connector Face:** PBT
**Molded Body:** TPE
**O-Ring:** Viton
**Coupling Nut:** Zinc diecast with black epoxy coat
**Operating Temperature:** PVC—-20 to +80°C

#### Environmental
**Protection:** IP67
**NEMA Rating:** NEMA 6

#### Cables
**D12—Ultra-Thin**
**Rating:** 300V
**Materials:** Individually Thinned—PVC outer jacket, 26 AWG (19x38 AWG) Copper
**Power:** Semi-rigid PVC insulation
**Data:** PE Foam inner insulation
**Construction:** Two shielded pairs, 26 AWG Tin Copper drain wire between pairs
**Cable Jacket Color:** Gray
**UL:** AWM Style 2095
**CSA:** AWM: I/II A/B, FT4

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<table>
<thead>
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<th>Face View (Female)</th>
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#### Configuration Code†
**Build-a-Part Number**

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<td>5</td>
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<td>10</td>
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†Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**DeviceNet**
**Brad® Micro-Change® (M12)-to-Nano-Change® (M8)**
**Double-Ended Cordsets**

**130030**
Female, Male
Straight, Right Angle
Ultra-Thin Media
Threaded

**Features and Benefits**
- Rugged IP67 rated connectors for continued connection integrity in industrial environments
- Variety of cable type, connector configuration and cable length options available for maximum flexibility

**Physical**
- Connector Face: PBT
- Molded Body: TPE
- O-Ring: Viton
- Coupling Nut: Zinc diecast with black epoxy coat
- Operating Temperature: PVC—-20 to +80°C

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

**Cables**

**D12—Ultra-Thin**
- Rating: 300V
- Materials: Individually Thinned—PVC outer jacket, 26 AWG (19x38 AWG) Copper
- Power—Semi-rigid PVC insulation
- Data—PE Foam inner insulation
- Construction: Two shielded pairs, 26 AWG Tin Copper drain wire between pairs

**D12**
- Cable Jacket Color: Gray
- UL: AWM Style 2095
- CSA: AWM: I/II A/B, FT4

---

**Double-Ended Connector Face View**

<table>
<thead>
<tr>
<th>Female Straight-to-Male Straight</th>
<th>Female Straight-to-Male Right Angle</th>
<th>Female Right Angle-to-Male Straight</th>
<th>Female Right Angle-to-Male Right Angle</th>
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<tr>
<td>Max. Current</td>
<td>Max. Voltage</td>
<td>Cable Type</td>
<td>Cable Code</td>
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<td>5 Pole Nano-Change (Female)</td>
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<td>5 Pole Micro-Change (Female)</td>
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<td>Ultra-Thin PVC</td>
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**Configuration Code**

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Note: Sales drawings for all standard order numbers are available on molex.com

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)

---

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
DeviceNet®
Brad® Nano-Change® (M8)-to-
Micro-Change® (M12)
Double-Ended Cordsets

130030
Female, Male
Straight, Right Angle
Ultra-Thin Media
Threaded

Features and Benefits
- Rugged IP67 rated connectors for continued connection integrity in industrial environments
- Variety of cable type, connector configuration and cable length options available for maximum flexibility

Physical
Connector Face: PBT
Molded Body: TPE
O-Ring: Viton
Coupling Nut: Zinc diecast with black epoxy coat
Operating Temperature: PVC—20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Cables
D12—Ultra-Thin
Rating: 300V
Materials: Individually Thinned—PVC outer jacket, 26 AWG (19x38 AWG) Copper
Power—Semi-rigid PVC insulation
Data—PE foam inner insulation
Construction: Two shielded pairs, 26 AWG Tin Copper drain wire between pairs
Cable Jacket Color: Gray
UL: AWM Style 2095
CSA: AWM I/II A/B, FT4

Note: Sales drawings for all standard order numbers are available on molex.com

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
DeviceNet®
Brad® 14-Port
Nano-Change® (M8)
Passive Multi-Port

130038
Ultra-Thin Media

Features and Benefits
- Up to 60% space savings over functionally equivalent M12 drop boxes
- Mates with Straight and 90° M8 connectors allowing user to route cable as needed
- Designed to accept Ultra-Thin DeviceNet cabling: Ideal for tight routings and space and for applications requiring small footprints

Physical
Insert: PUR
Housing: Grey, thermo formed ABS
Receptacle Shell: Nickel-plated Brass
Connector Configuration: Periphery Connectors—45°
Center Connectors—90°
Operating Temperature: -0 to +60°C

Electrical
Voltage: 36V DC
Current: 8.0A total per drop box
Grounding: Grounding through mounting holes
LED Indication for Network: Voltage Status
Green—Within DeviceNet Voltage Spec (13-24V)
Red—Overvoltage (>24V)
Yellow—Undervoltage (<13V)

Environmental
Protection: IP65
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Connector Face View</th>
<th>Parts</th>
<th>Box Configuration</th>
<th>Wiring Schematic</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
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<td>Female Nano-Change Connector</td>
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<td>Male Mini-Change Bus-In</td>
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<tr>
<td>Female Mini-Change Bus-Out</td>
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</table>

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
DeviceNet®
Auxiliary Power
Brad® Mini-Change®
A-Size Double-Ended Cordset

130010
Internal Thread Female
External Thread Male
Straight, Right Angle

Features and Benefits
- Patented QuadBeam™ contact design for reliability and low resistance
- Flex-rated TC-ER cable

Electrical
Voltage: 600V AC/DC

Mechanical
Wire Size: 16 AWG

Physical
Connector Face: PVC
Connector Body: PVC
Contact: Brass with Gold over Nickel plating
Coupling Nut: Black epoxy coated Zinc
Cable Jacket Color: Yellow
Cables: K12 and K13—UL Type TC-ER, Flex rated A38 and A01—UL Type STOOW, extra hard service cord

Environmental
Protection: IP67

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Current</th>
<th>Wire Cable Type</th>
<th>Cable Jacket (Code)</th>
<th>Length</th>
<th>Female Straight-to-Male Straight</th>
<th>Female Right Angle-to-Male Right Angle</th>
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</thead>
<tbody>
<tr>
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<td>10.0A</td>
<td>TC-ER</td>
<td>PVC (K12)</td>
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<td>114033K12M020 130010-1744</td>
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<td>STOOW</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

*DeviceNet is a trademark of Open DeviceNet Vendor Association

Configuration Code†
Build-a-Part Number

115030K13M0201

Meters
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<td>10</td>
<td>M100</td>
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</tbody>
</table>

†Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
DeviceNet®
Auxiliary Power
Brad® Mini-Change®
Bulkhead Adapters

130013
Female-Male Straight

**Features and Benefits**
- Patented QuadBeam™ contact design for reliability and low resistance
- Facilitates through-panel connections

**Reference Information**
UL File No.: E152210
CSA File No.: LR6837

**Electrical**
Voltage: 600V AC/DC

**Physical**
Connector Face: PVC
Contact: Brass with Gold over Nickel plating
Shell Material: Nickel-plated Brass
Mounting Thread: 7/8”-16 UN-2A
Operating Temperature: -20 to +105°C

**Environmental**
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Poles</th>
<th>Current</th>
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<th>Engineering No.</th>
<th>Standard Order No.</th>
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<tr>
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<td>Internal Female</td>
<td>1R40301</td>
<td>130013-1001</td>
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**Configuration Code**
Build-a-Part Number

1R40301

**Note:** Sales drawings for all standard order numbers are available on molex.com

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)

Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
DeviceNet®
Auxiliary Power
Brad® Mini-Change®
Field Attachable
Connectors

130017
Internal Thread Female
External Thread Male

Features and Benefits
• Patented Quad-Beam™ contact design for reliability and low resistance

Reference Information
CSA File No.: LR6837

Electrical
Voltage: 600V AC/DC

Physical
Connector Face: Polyurethane
Connector Body: Nylon
Contact: Brass with Gold over Nickel plating
Coupling Nut: Nickel-plated Brass
Wire Size: 1.5 to 24 AWG
Cable Range: 5.08-11.43mm (.200”-.450”)
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67

<table>
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<td>8.0A</td>
<td>Internal Thread</td>
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</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
DeviceNet®
Auxiliary Power
Brad® Mini-Change®
Power Taps

130039
Fused Power
Tap Blocks

Features and Benefits
- Connects power supply to DeviceNet trunk line in convenient plug/play fashion
- Easily replaceable fuses protect bus and connected components from over-current
- Provides LED indication of power and polarity for simple diagnostics

Electrical
Fuse Protection: 4.0A
Voltage: 50V DC

Physical
Housing: PBT
Port Shell Material: Epoxy-coated Zinc
Contacts: Brass with Gold over Nickel plating
Environmental
Protection: IP67

<table>
<thead>
<tr>
<th>Left Port Configuration</th>
<th>Drop Port Configuration</th>
<th>Right Port Configuration</th>
<th>LED Indicator</th>
<th>Box Configuration</th>
<th>Schematic</th>
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<td>D6-PT3</td>
<td>130039-0393</td>
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Note: Sales drawings for all standard order numbers are available on molex.com
*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
DeviceNet*  
Auxiliary Power  
Brad® Mini-Change®  
Machine E-Stop Tees  
130035

**Features and Benefits**
- Patented Quad Beam™ contact provides high reliability and low resistance
- Provides quick connection of auxiliary power for networks
- Provides interruption to auxiliary power for safe installation

**Electrical**
- Current: 8.0A  
- Voltage: 50V

**Physical**
- Connector Face: PVC  
- Connector Body: TPE  
- Contacts: Brass with Gold over Nickel plate  
- Couplers: Epoxy-coated Zinc  
- Operating Temperature: -20 to +105°C

**Environmental**
- Protection: IP67

### Poles (Female View)

|---------------|-----------|-----------------|-------------------|
| 4 Pole  
[Image of 4 Pole Configuration]  
[4 Pole Schematic] |  
[4 Pole Schematic] | DNETAUXPT | 130035-0085 |
| 4 Pole  
[Image of 4 Pole Configuration]  
[4 Pole Schematic] |  
[4 Pole Schematic] | DNEST | 130035-0081 |
| 4 Pole  
[Image of 4 Pole Configuration]  
[4 Pole Schematic] |  
[4 Pole Schematic] | DNESJ | 130035-0077 |

Note: Sales drawings for all standard order numbers are available on molex.com  
*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
DeviceNet* 
Auxiliary Power
Brad® Micro-Change® and 
Ultra-Lock® (M12) 
Single-Ended Cordsets
120079
Female, Pigtailed 
Straight, Right Angle

Features and Benefits
• M12 single keyway (A-Coded) IEC compliant cordset assemblies
• 5-pole version for auxiliary power to devices in DeviceNet installations
• Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - TPE cables for continuous flex applications. Also ideal for welding cells, cable is weld slag resistant
  - Other versions available

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Micro-Change Cordsets

<table>
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<th>Poles</th>
<th>Max. Current per Contact</th>
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<td>PVC (A09)</td>
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<td>TPE (K03)</td>
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Ultra-Lock Cordsets

<table>
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<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Wire Size</th>
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</table>

Environmental Protection: IP67
NEMA Rating: NEMA 6

Configuration Code: W05000AO9M020

Note: Sales drawings for all standard order numbers are available on molex.com

*DeviceNet is a trademark of Open DeviceNet Vendors Association (ODVA)
DeviceNet* Auxiliary Power Brad® Micro-Change® and Ultra-Lock® (M12) Double-Ended Cordsets

120080
Female Straight-to-Male Straight, Female Right Angle-to-Male Right Angle

Features and Benefits
- M12 single keyway (A-Coded) IEC compliant cordset assemblies
- 5-pole version for auxiliary power to devices in DeviceNet installations
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - TPE cables for continuous flex applications. Also ideal for welding calls, cable is weld slag resistant
  - Other versions available

Reference Information
UL File No.: E1S2210
CSA File No.: LR6837

Physical
Connector Body: PUR (TPE for K03)
Contact Carries: Polyamide
O-ring: Viton (EPDM for A09 cables)
Coupling Nut: Nickel plated Brass (Teflon coated for K03)
Contacts: Copper alloy with Gold over Nickel plating
Cables: A09—Yellow PVC jacket, 22 AWG PVC conductors, 300V, UL AWG2661
K03—Yellow TPE jacket, 18 AWG PVC conductors, 300V, UL PLTC-ER, +SM flex life (torsion and bending)

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Micro-Change Cordsets

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<tbody>
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<td>PVC (A09)</td>
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Ultra-Lock Cordsets

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Note: Sales drawings for all standard order numbers are available on molex.com
*DeviceNet is a trademark of Open DeviceNet Vendors Association (ODVA)

Configuration Code†

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<td>M040</td>
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<td>M050</td>
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</table>

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DeviceNet®
Auxiliary Power
Brad® Micro-Change® and
Ultra-Lock® (M12)
Receptacles

120070
Front Panel Mount
Bulkhead Pass-Through

Features and Benefits
• M12 single keyway (A-Coded) IEC compliant panel
  mount receptacles
• 5-pole version for auxiliary power to devices in
  DeviceNet installations
• Fully potted assemblies provide IP67/68 protection for
  harsh environments

Physical
Shell: Nickel-plated Brass
Contact Carries: Polyamide
O-ring: M12—Red Viton
Panel—Black Viton
Contacts: Copper alloy with Gold over Nickel plating
Wire PVC Insulation: 300V, 80C, UL1061, 22 AWG
(3-5 poles) and 24 AWG (8 poles)

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Configuration

<table>
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<th>Wire Size</th>
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<td>1/2&quot;</td>
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<tr>
<td>Ultra-Lock Enabled, 1/2-14NPT, Front Panel Mount</td>
<td>PVC, UL1061</td>
<td>22 AWG</td>
<td>1/2&quot;</td>
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<tr>
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<td>22 AWG</td>
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<td>120070-0201</td>
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Configuration Code†
Build-a-Part Number

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<td>Feet</td>
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</tr>
<tr>
<td>1.0</td>
<td>A120</td>
</tr>
<tr>
<td>3.0</td>
<td>F030</td>
</tr>
<tr>
<td>Meters</td>
<td></td>
</tr>
<tr>
<td>0.3</td>
<td>C030</td>
</tr>
<tr>
<td>1.0</td>
<td>M010</td>
</tr>
</tbody>
</table>

†Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
DeviceNet®
Auxiliary Power
Field Attachable
Brad® Micro-Change® and
Ultra-Lock® (M12)
Connectors

120085
Female, Male
Straight

Features and Benefits
• Allows field termination of cables to IEC complaint
  M12 A-coded connector
• Contact carries with screw terminals provide easy field
  termination of conductors
• 5-pole version for auxiliary power to devices in
  DeviceNet installations
• Back end housing and cable gland provides IP67
  protection and strain relief

Physical
- Connector Body: PA
- Contact Carries: PA
- O-ring: Viton
- Coupling Nut: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Termination: Screw down terminals, accepts conductors up to
  18 AWG (0.75mm²)

Environmental
- Protection: IP67
- NEMA rating: NEMA 6

Micro-Change

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Diameter Range</th>
<th>Female Straight</th>
<th>Male Straight</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>4.10-8.10mm (.161-.319&quot;)</td>
<td>BAS000-32</td>
<td>120071-0043</td>
</tr>
</tbody>
</table>

Ultra-Lock

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Diameter Range</th>
<th>Female Straight</th>
<th>Male Straight</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>4.10-8.10mm (.161-.319&quot;)</td>
<td>WAS000-32</td>
<td>120085-0014</td>
</tr>
</tbody>
</table>

*DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)
Brad® PROFIBUS®

Brad products give the user and designer of a PROFIBUS system a complete communication and connectivity solution—from scanner card to media infrastructure to IP67 I/O connections and diagnostics. You can select which control engine you want, whether it is PC- or PLC-based; we get you onto the network. You can choose which control architecture—centralized or distributed—that makes the most sense to you. Whether you are connecting motor controllers, valve banks or sensors, we ensure that connectivity to those points are there.

Components and Elements of PROFIBUS System

- Controller
- Network Interface
- IP67 I/O Modules
- Data Media
- Power Media
- I/O Connectivity
Molded DIN Connector

Data Line Receptacles

D-Sub Cordsets

PROFIBUS

Active I/O Module

PC-Based Control / HMI / SCADA

Network Interface Card (USB, ISA, PC/104, PCI, PCI Express, CompactPCI, VME form factor)

* PROFIBUS is a trademark of PROFIBUS International.
Brad® Direct-Link® Network Interface Card
112035
PROFIBUS Adapter for Scada/HMI

Features and Benefits
• Allow to communicate with Siemens Simatic® S5 and S7 PLC series
• All PROFIBUS protocols run simultaneously
• Fast data acquisition between PC-based applications and industrial devices connected to Profibus
• All protocols included in the package
• Best choice for HMI/SCADA applications

Description
• Engineering Tools:
  - Engineering console
  - Test and diagnostic tools
• Compatible Data Servers:
  - OPC DA v3.0, 2.0S and 1.0a
  - Wonderware® DAServer (XP only)
  - Wonderware IO (SuiteLink/FastDDE) (XP only)
• Includes Development Libraries

Included Hardware/Software
• High-speed USB Adapter, version 2.0 or 1.1
• 1 PROFIBUS port, DB9 female, Galvanic insulation 500V
• Speed: 9.6 Kbps up to 12 Mbps
• Power Supply: 5V through USB (no external supply required)

Compatible Protocols
• Master DP-V0 DP-V1, Class-1 and Class-2
• S7/MPI Master for S7-300 and S7/400
• S7/MPI Slave for S7-200
• S5 for Simatic S5 (95U, 115U, 135U, 155U)

Conformance
• RoHS compliant
• CE
• UL
• cUL

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRL-MPI-USB</td>
<td>112035-0001</td>
<td>Direct-Link™ USB Adapter for MPI, Full access (DLL/OPC/WW IO)</td>
</tr>
<tr>
<td>DRL-MPI-USE-DLL</td>
<td>112035-0002</td>
<td>Direct-Link™ USB Adapter for MPI, Library access only (DLL)</td>
</tr>
<tr>
<td>DRL-PFB-USB</td>
<td>112026-0014</td>
<td>Direct-Link™ USB Adapter for all PROFIBUS, Full access (DLL/OPC/WW IO)</td>
</tr>
<tr>
<td>DRL-PFB-USE-DLL</td>
<td>112026-0015</td>
<td>Direct-Link™ USB Adapter for PROFIBUS, Library access only (DLL)</td>
</tr>
<tr>
<td>DRL-UDS-USB</td>
<td>112026-0016</td>
<td>Direct-Link™ Data Servers license update (DLL → DLL/OPC/WW IO)</td>
</tr>
</tbody>
</table>

Brad® SST™ Network Interface Card
112026
PROFIBUS DP-V1 Adapter for FDT

Features and Benefits
• Allows configuration and monitoring of FDT compliant PROFIBUS devices
• Connects your laptop/desktop to PROFIBUS DP-V1
• CommDTM driver; Easy access to DP-V1 devices from any FDT frame applications

Description
• Compatible with all FDT frame applications conform to FDT specifications v1.2
  - PACTware™
  - FieldCare®
  - FieldMate®
  - Others

Included Hardware/Software
• High-speed USB Adapter, version 2.0 or 1.1
• 1 PROFIBUS port, DB9 female, Galvanic insulation 500V
• Speed: 9.6 Kbps up to 12 Mbps
• Power Supply: 5V through USB (no external supply required)

Compatible Protocols
Master DP-V1, Class-1 and Class-2

Conformance
• RoHS compliant
• CE
• UL
• cUL
• FDT certified

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SST-PFB-USB-DTM</td>
<td>112026-0025</td>
<td>USB Adapter for PROFIBUS DP-V1, CommDTM driver</td>
</tr>
</tbody>
</table>
Brad® applicom®
Network Interface Card
112013
PROFIBUS-DP for PC-Based Control and Scada/HMI

Features and Benefits
- Deterministic data acquisition for real time PC-based control applications
- On board co-processor eliminates data bottlenecks, ensuring delivery of time critical information
- Very easy-to-use; no knowledge of protocol required
- Remote access via serial connection; enables configuration and diagnostic when using real time OS (VxWorks, QNX, etc)
- Run Master and Slave modes simultaneously

Description
Auto mapping of IO in card DPRAM
- IO exchange up to 14 Kbytes
- Hardware and software Watchdog
- Auto-Boot (Configuration stored in Flash)
- Engineering Tools:
  - Engineering console with automatic test and diagnostic tools
  - Compatible Data Servers:
    - OPC DA v3.0, 2.05 and 1.0a
    - Wonderware® DAServer (XP only)
    - Wonderware IO (SuiteLink/FastDDE) (XP only)
  - Includes Development Libraries
  - Supported OS:
    - Windows (32-bit and 64-bit); Seven, 2008 Server, Windows Vista®, 2003 Server, Windows XP®/XP Embedded
    - Others: Linux, VxWorks, RTX VenturCom

Included Hardware/Software
- PC/104 bus
- 8 Mb SDRAM; 512 Kb Flash Memory
- 1 Digital Input + 1 Digital Output
- 1 PROFIBUS port, Galvanic insulation 500V
- Connector: HE13 2x5 pins or DB9 female
- Speed: 9.6 Kbps up to 12 Mbps
- LEDs for system status and communications status

Compatible Protocols
- Master DP-V0 Class-1 and Class-2
- Master DP-V1 Class-1 and Class-2
- Slave DP-V0 (passive)

Conformance
- RoHS compliant
- CE
- OPC certified

---

Brad® SST™
Network Interface Card
112013
PROFIBUS-DP for High-Speed PC-Based Control

Features and Benefits
- High speed deterministic communication for control applications
- OEM ready, hardware and software components provided separately
- CommDIM driver for FDT Frame engineering software (PACTware™, FieldCare™, FieldMate™, etc)
- On board FPGA eliminates data bottlenecks, ensuring delivery of time critical information

Description
- Highly customizable Profibus access via Direct DPRAM services
- Configuration
- Diagnostic
- Process Data
- Manage DP Master and Slave modes simultaneously
- Auto-Boot (Configuration stored in Flash)
- Engineering Tools:
  - Configuration console (optional)
  - Test and diagnostic tools (optional)
  - OPC DA Server v3.0 (optional)
  - Supported OS:
    - Windows (32-bit); Windows Vista®, 2003 Server, Windows XP®
    - Others: Open, documented memory map interface with C source code samples and Windows 32-bit DLLs for custom driver development

Included Hardware/Software
- PC/104 bus
- 1 PROFIBUS port, DB9 female, Galvanic insulation 1000V
- Speed: 9.6 Kbps up to 12 Mbps
- LEDs for system status and communications status

Compatible Protocols
- Master DP-V0 Class-1 and Class-2
- Master DP-V1 Class-1 and Class-2
- Slave DP-V0
- FDL Send/Receive

Conformance
- RoHS compliant
- CE
- FDT certified
Brad® Direct-Link®
Network Interface Card
112034
PROFIBUS for Scada/HMI

Features and Benefits
• Economical solution
• Dedicated for communication with Siemens Simatic® S7 PLC series
• Ideal for OEM applications
• Best choice for light HMI/SCADA applications

Description
• Engineering Tools:
  - Engineering console
  - Test and diagnostic tools
• Compatible Data Servers:
  - OPC DA v3.0, 2.05 and 1.0a
  - Wonderware® DAServer (XP only)
  - Wonderware 10 (SuiteLink/FastDDE) (XP only)
• Includes Development Libraries

Included Hardware/Software
• PCI Universal bus 3.3V/5V (PCI-X compatible)
• Hardware Plug and Play
• 1 PROFIBUS port, DB9 female, Galvanic insulation 500V
• Speed: 9.6 Kbps up to 12 Mbps

Compatible Protocols
• S7/MPI Master for S7-300 and S7/400
• S7/MPI Slave for S7-200

Conformance
• RoHS compliant
• CE
• OPC certified

Brad® applicom®
Network Interface Card
112011
PROFIBUS for Scada/HMI

Features and Benefits
• Allow communication with Siemens Simatic® S5 and S7 PLC series
• All PROFIBUS protocols run simultaneously
• On board co-processor eliminates data bottlenecks, ensuring delivery of time critical information
• All protocols are included
• Best choice for HMI/SCADA applications
• Combo offer: PROFIBUS + Ethernet
• Economical version dedicated to Siemens Simatic S7 Series

Description
• Engineering Tools:
  - Engineering console
  - Test and diagnostic tools
• Compatible Data Servers:
  - OPC DA v3.0
  - Wonderware® DAServer (XP only)
  - Wonderware 10 (SuiteLink/FastDDE) (XP only)
• Includes Development Libraries
• Supported OS:
  - Others: Linux, VxWorks, RTX VenturCom

Included Hardware/Software
• Bus Format
  - PCI Universal bus 3.3V/5V (PCI-X compatible)
  - PCI Express Tx
• Hardware Plug and Play
• AMD SCS20
• 16 Mb SDRAM
• 4 Mb Flash Memory
• 1 PROFIBUS port, DB9 female, Galvanic insulation 500V
• Speed: 9.6 Kbps up to 1.5 Mbps

Compatible Protocols
• Master DP-V0, Class-1 and Class-2
• S7/MPI Client*
• FDL S5 Master
• PPI/PPI+ Master*
• Free FDL Send/Receive*

Conformance
• RoHS compliant
• CE
• OPC certified
• PCI Express certified

* Protocols compatible with PCU1500S7 and PCIE1500S7

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
Brad® applicom®
Network Interface Card
112011
PROFIBUS for PC-Based Control and Scada/HMI

Features and Benefits
- Deterministic data acquisition for real time control applications
- On board co-processor eliminates data bottlenecks, ensuring delivery of time critical information
- Very easy-to-use; no knowledge of protocol required
- Remote access via TCP/IP connection; enables configuration and diagnostic when using real time OS (VxWorks, QNX, etc)
- Run Master and Slave modes simultaneously

Description
- Auto mapping of IO in card DPRAM
- Hardware and software Watchdog
- Auto-Boot (Configuration stored in Flash)
- Engineering Tools:
  - Engineering console with automatic test and diagnostic tools
- Compatible Data Servers:
  - OPC DA v3.0, 2.05 and 1.0a
  - Wonderware® DAServer (XP only)
  - Wonderware IO (SuiteLink/FastDDE) (XP only)
- Includes Development Libraries
- Supported OS:
  - Others: Linux, VxWorks, RTX VenturCom

Included Hardware/Software
- Bus Format:
  - PCI Universal bus 3.3V/5V (PCI-X compatible)
  - PCI Express 1x
- Hardware Plug and Play
- AMD SC520
- 16 Mb SDRAM; 4 Mb Flash Memory
- 1 Digital Input + 1 Digital Output
- 1 PROFIBUS port, DB9 female, Galvanic insulation 500V
- Speed: 9.6 Kbps up to 12 Mbps

Compatible Protocols
- Master DP-V0 Class-1 and Class-2
- Master DP-V1 Class-1 and Class-2
- Slave DP-V0 (passive)

Conformance
- RoHS compliant
- CE
- OPC certified
- PCI Express certified

Included Hardware/Software
- Bus Format:
  - PCI Universal bus 3.3V/5V (PCI-X compatible)
  - PCI Express 1x
- Hardware Plug and Play
- AMD SC520
- 16 Mb SDRAM; 4 Mb Flash Memory
- 1 Digital Input + 1 Digital Output
- 1 PROFIBUS port, DB9 female, Galvanic insulation 500V
- Speed: 9.6 Kbps up to 12 Mbps

Compatible Protocols
- Master DP-V0 Class-1 and Class-2
- Master DP-V1 Class-1 and Class-2
- Slave DP-V0 (passive)

Conformance
- RoHS compliant
- CE
- OPC certified
- PCI Express certified

Included Hardware/Software
- Bus Format:
  - PCI Universal bus 3.3V/5V (PCI-X compatible)
  - PCI Express 1x
- Hardware Plug and Play
- AMD SC520
- 16 Mb SDRAM; 4 Mb Flash Memory
- 1 Digital Input + 1 Digital Output
- 1 PROFIBUS port, DB9 female, Galvanic insulation 500V
- Speed: 9.6 Kbps up to 12 Mbps

Compatible Protocols
- Master DP-V0 Class-1 and Class-2
- Master DP-V1 Class-1 and Class-2
- Slave DP-V0 (passive)

Conformance
- RoHS compliant
- CE
- OPC certified
- PCI Express certified

Configuration Console
Device Diagnostics

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRL. DPM-PCI</td>
<td>112011-0008</td>
<td>PCU-DPIO PCI Network Interface Card for PROFIBUS-DP</td>
</tr>
<tr>
<td>DRL. DPM-PCIE</td>
<td>112011-5028</td>
<td>PCIE-DPIO PCI Express Network Interface Card for PROFIBUS-DP</td>
</tr>
</tbody>
</table>
**Brad® SST™ Network Interface Card**

**112011**

**PROFIBUS-DP for High-Speed PC-Based Control**

---

### Features and Benefits
- High-speed deterministic communication for PC-Based control applications
- OEM ready, hardware and software components provided separately
- CommDTM driver for FDI Frame engineering software (PACware™, FieldCare™, FieldMate™, etc)
- On-board FPGA eliminates data bottlenecks, ensuring delivery of time critical information
- Available with 1 or 2 PROFIBUS channels
- Typical application:  
  - PC-Based control  
  - Network diagnostics  
  - Custom OEM system  
  - Monitoring  
  - Data storage

### Description
- Highly customizable PROFIBUS access via Direct DPRAM services  
  - Configuration  
  - Diagnostic  
  - Process Data
- Manage DP Master and Slave modes simultaneously
- Auto-Boot (Configuration stored in Flash)
- Engineering Tools:  
  - Configuration console (optional)  
  - Test and diagnostic tools (optional)  
  - OPC DA Server v3.0 (optional)
- Supported OS:  
  - Others: Open, documented memory map interface with C source code samples and Windows 32-bit DLLs for custom driver development

### Included Hardware/Software
- Bus Format  
  - PCI Universal bus 3.3V/5V (PCI-X compatible)  
  - PCI Express 1x
- 1x or 2x PROFIBUS ports, DB9 female, Galvanic insulation 1000V
- Speed: 9.6 Kbps up to 12 Mbps
- LEDs for system status and communications status

### Compatible Protocols
- Master DP-V0 Class-1 and Class-2
- Master DP-V1 Class-1 and Class-2
- Slave DP-V0
- FDL Send/Receive

### Conformance
- RoHS compliant
- CE
- PCI Express certified
- FDT Certified

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<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SST-PB3-PCU</td>
<td>112011-0021</td>
<td>PCI Network Interface Card for PROFIBUS-DP, 1 Channel, DLL+CommDTM</td>
</tr>
<tr>
<td>SST-PB3-PCU-2</td>
<td>112011-0022</td>
<td>PCI Network Interface Card for PROFIBUS-DP, 2 Channels, DLL+CommDTM</td>
</tr>
<tr>
<td>SST-PB3-PCU-2-B</td>
<td>112011-0027</td>
<td>PCI Network Interface Card for PROFIBUS-DP, 2 Channels, DLL+CommDTM, Bulk of 25</td>
</tr>
<tr>
<td>SST-PB3-PCE-1</td>
<td>112011-0031</td>
<td>PCI Express Network Interface Card for PROFIBUS-DP, 1 Channel, DLL+CommDTM</td>
</tr>
<tr>
<td>SST-PB3-PCE-2</td>
<td>112011-0032</td>
<td>PCI Express Network Interface Card for PROFIBUS-DP, 2 Channels, DLL+CommDTM</td>
</tr>
<tr>
<td>SST-PB3-CN-P</td>
<td>112030-0008</td>
<td>PROFIBUS Configuration and Diagnostic Console, Single license with Parallel key</td>
</tr>
<tr>
<td>SST-PB3-CN-U</td>
<td>112030-0009</td>
<td>PROFIBUS Configuration and Diagnostic Console, Single license with USB key</td>
</tr>
<tr>
<td>SST-PB3-OPC</td>
<td>112028-0030</td>
<td>PROFIBUS OPC DA Server, Single license code</td>
</tr>
</tbody>
</table>
Brad® SST™
Network Interface Card

112011
Multi-Slave PROFIBUS-DP for Simulation

Features and Benefits
• Emulates or monitors 1 to 125 DP Slaves using one physical PROFIBUS connection
• Ideal for full load network testing of DP Master
• Use to connect OI/HMI applications to Profibus-DP
• Reduced commissioning time; quickly differentiate between wiring, devices, and network problems by comparing real-world results with the emulation
• Passive PROFIBUS connection; network traffic is not affected

Description
• Monitor up to 125 devices
  - Avoids 244 bytes in and 244 bytes out limitation
  - Connects as a passive station, does not affect existing network traffic
  - View input and output data for each slave
  - View slave diagnostic and parameterization data for each slave
• Emulate up to 125 devices
  - Virtually any PROFIBUS DP slave device (e.g. drives, motors, I/O) can be emulated to any PROFIBUS master including DCS, PLC and PC control
  - Use with PICS Simulation™ software and other third party simulation software
  - Several DP Class-1 masters can communicate to one PROFIBUS multi-slave card
• Engineering Tools:
  - Configuration console
  - Test and diagnostic tools
• OPC DA Server v3.0
• Supported Operating System:
  - Windows 32-bit: NT, 2000, Windows XP®
  - Open, documented memory map interface with example C source code and Windows 32-bit DLLs for custom driver development

Included Hardware/Software
• PCI bus 5V
• Hardware plug and play
• 1 PROFIBUS port, DB9 female and 9-pin Phoenix, Galvanic insulation 1000V
• Speed: 9.6 Kbps up to 12 Mbps
• LEDs for system status and communications status

Compatible Protocols
• DP-V0 Slave

Conformance
• CE

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SST-PBUS-PCI</td>
<td>112011-0025</td>
<td>PCI Network Interface Card for PROFIBUS-DP Multi-Slave, 1 Channel</td>
</tr>
</tbody>
</table>
Features and Benefits
- Deterministic data acquisition for real time control applications
- On board co-processor eliminates data bottlenecks, ensuring delivery of time critical information
- Very easy-to-use; no knowledge of protocol required
- Remote access via TCP/IP connection; enables configuration and diagnostic when using real time OS (VxWorks, QNX, etc)
- Run Master and Slave modes simultaneously

Description
- Auto mapping of IO in card DPRAM
- Hardware and software Watchdog
- Auto-Boot (Configuration stored in Flash)
- Engineering Tools:
  - Engineering console with automatic test and diagnostic tools
- Compatible Data Servers:
  - OPC DA v3.0, 2.0 S and 1.0a
  - Wonderware® DAServer (XP only)
  - Wonderware IO (SuiteLink/FastDDE) (XP only)
- Includes Development Libraries
- Supported OS:
  - Others: Linux, VxWorks, RTX VenturCom

Included Hardware/Software
- CompactPCI bus 5V, 3U
- Hardware plug and play
- AMD SC520
- 8 Mb SDRAM; 512 Kb Flash Memory
- 1 Digital Input + 1 Digital Output
- 1 PROFIBUS port, DB9 female, Galvanic insulation 500V
- Speed: 9.6 Kbps up to 12 Mbps

Compatible Protocols
- Master DP-VO Class-1 and Class-2
- Master DP-V1 Class-1 and Class-2
- Slave DP-VO (passive)

Conformance
- RoHS compliant
- CE
- OPC certified
Brad® SST™
Network Interface Card
112014
PROFIBUS-DP for High-Speed
PC-Based control

Features and Benefits
• High-speed deterministic communication for VME-Based control applications
• High-speed deterministic communication for PC-Based control applications
• OEM ready, hardware and software components provided separately
• On-board FPGA eliminates data bottlenecks, ensuring delivery of time critical information
• Available with 1 or 2 PROFIBUS channels
• Typical application:
  - PC-Based control
  - Network diagnostics
  - Custom OEM system
  - Monitoring
  - Data storage

Description
• Highly customizable PROFIBUS access via Direct DPRAM services
  - Configuration
  - Diagnostic
  - Process Data
• Supports 16-bit transfers (VME D16) with both VME A24 (standard) and A16 (short IO) address transfers
• Redundancy feature; 2 channels version VME interface card provides the option of connecting to one or two independent PROFIBUS networks
• Manage DP Master and Slave modes simultaneously
• Auto-Boot (Configuration stored in Flash)
• Engineering Tools:
  - Configuration console (optional)
  - Test and diagnostic tools (optional)
• Supported OS: Open, documented memory map interface with C source code samples and library for custom driver development

Included Hardware/Software
• VME Bus, 6U double-eight
• 1 PROFIBUS port, DB9 female, Galvanic insulation 1000V
• Speed: 9.6 Kbps up to 12 Mbps
• LEDs for system status and communications status

Compatible Protocols
• Master DP-VO Class-1 and Class-2
• Master DP-V1 Class-1 and Class-2
• Slave DP-VO
• FDL Send/Receive

Conformance
• RoHS compliant
• CE

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard-Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SST-PB3-VME-1</td>
<td>112014-0004</td>
<td>VME Network Interface Card for PROFIBUS-DP 1 Channel</td>
</tr>
<tr>
<td>SST-PB3-VME-2</td>
<td>112014-0006</td>
<td>VME Network Interface Card for PROFIBUS-DP 2 Channels</td>
</tr>
<tr>
<td>SST-PB3-CNF-P</td>
<td>112030-0008</td>
<td>PROFIBUS Configuration and Diagnostic Console, Single license with Parallel key</td>
</tr>
<tr>
<td>SST-PB3-CNF-U</td>
<td>112030-0009</td>
<td>PROFIBUS Configuration and Diagnostic Console, Single license with USB key</td>
</tr>
</tbody>
</table>
Brad® SST™
Communication Module for
Rockwell SLC 500
112016
PROFIBUS-DP Master/Slave

Features and Benefits
• Connects your Allen-Bradley SLC 500 to a PROFIBUS network
• Target markets: Factory automation, Process control, Complex machines, etc
• Direct IO Mapping, no Ladder Logic to write for configuration and data transfer between module and SLC processor

Description
High speed deterministic communication
• Fast, easy set up into SLC backplane; PROFIBUS IO data is automatically mapped into the SLC processor’s I, O, MO and MI files
• Easy diagnostics: Built-in LEDs
• Manage DP Master and Slave modes simultaneously
• Auto-Boot (Configuration stored in Flash)
• Engineering Tools:
  - Configuration console
  - Test and diagnostic tools

Included Hardware/Software
• Acts as 1756 Input/Output module
• Support multiple modules in a chassis
• 1 PROFIBUS port, DB9 female, Galvanic insulation 1000V
• Speed: 9.6 Kbps up to 12 Mbps
• IO Mapping:
  - I and O Files—32 words in, 32 words out
  - M1 and M0 Files—1000 words in/out
• 1 serial port for configuration and diagnostic
• Firmware upgradeable

Compatible Protocols
• Master DP-V0 Class-1 and Class-2
• Master DP-V1 Class-1 and Class-2
• Slave DP-V0
• FDL Send/Receive

Conformance
• RoHS compliant
• CE
• Rockwell Encompass™

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SST-PB3-SLC</td>
<td>112016-0022</td>
<td>PROFIBUS Communication module for Rockwell SLC 500</td>
</tr>
</tbody>
</table>
Brad® SST™
Communication Module for
Rockwell ControlLogix
112016
PROFIBUS-DP Master/Slave

Features and Benefits
• Connects your Allen-Bradley® ControlLogix to a
  PROFIBUS network
• Target markets: Factory automation, Process control,
  Complex machines, etc.
• Fully integrated into the Rockwell Automation environment
  Remote configuration and monitoring via Rockwell RSLogix™
  Add-On-Profile for Rockwell RSLogix5000
• Direct I/O Mapping, no Ladder Logic to write for
  configuration and data transfer between module and
  CLX processor
• Conformal coating version:
  - Provide environmental and mechanical protection
    to significantly extend the life of the components
    and circuitry
  - Protect electronic boards from moisture and contaminants
• Typical applications:
  - Marine
  - Agro-Food
  - Mining
  - Harsh automotive, etc.

Description
• High-speed deterministic communication
• Easy diagnostics: Built-in LEDs and 4 characters display
• Manage DP Master and Slave modes simultaneously
• Allow to change PROFIBUS configuration with PLC in
  RUN mode
• Dynamically add/remove PROFIBUS slaves from the
  scan list
• CommDTM driver for FDT Frame engineering software
  (PACTware™, FieldCare™, FieldMate™, etc)
• Auto-Boot (Configuration stored in Flash)
• Engineering Tools:
  - Configuration console
  - Test and diagnostic tools

Included Hardware/Software
• Acts as Input/Output module
• Support multiple modules in a chassis; support Local and
  Remote chassis
• One PROFIBUS port, DB9 female, Galvanic insulation
  1000V
• Speed: 9.6 Kbps up to 12 Mbps
• LEDs for system, communication, and network status
• Up to 1984 Input Bytes and 1968 Output Bytes
• One Serial port for configuration and diagnostic
• Firmware upgradeable

Compatible Protocols
• Master DP-V0 Class-1 and Class-2
• Master DP-V1 Class-1 and Class-2
• Slave DP-V0

Conformance
• RoHS compliant
• CE
• UL
• cUL
• Class 1 Div 2
• Rockwell Encompass
• FDT Certified

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SST-PB3-CLX-RLL</td>
<td>112016-0018</td>
<td>PROFIBUS Communication module for Rockwell ControlLogix</td>
</tr>
<tr>
<td>SST-PB3-CLX-RLL-CC</td>
<td>112016-0023</td>
<td>PROFIBUS Communication module for Rockwell ControlLogix, Conformal Coating version</td>
</tr>
<tr>
<td>SST-PB3-CLX-DTM</td>
<td>112016-0019</td>
<td>PROFIBUS Communication module for Rockwell ControlLogix, CommDTM License</td>
</tr>
<tr>
<td>SST-PB3-CLX-DTS</td>
<td>112016-0020</td>
<td>CommDTM License update for SST-PB3-CLX-RLL module</td>
</tr>
</tbody>
</table>
Brad® applicom®
Industrial Multi-Protocol Gateway

112034
PROFIBUS to Ethernet and Serial

Features and Benefits
- Allows simultaneous communication between industrial devices using up to 20 different Ethernet TCP/IP, PROFIBUS and Serial protocols
- Typical architectures: Data translator, Data concentrator, Industrial firewall
- No programming, just configuring (tools included)
- Supports unsolicited data exchange from Client device

Description
- Real-Time data exchange through internal database (32 Kbits/32 Kwords)
- Upload/Download configuration and diagnostic through Remote TCP/IP
- Up to 128 PLCs on Ethernet TCP and 126 PROFIBUS devices
- Full management of Read/Write cyclic access through word status commands
- Engineering Tools:
  - Configuration console
  - Test and diagnostic tools

Included Hardware/Software
- RAM 32 Mbytes; Flash Disk 32 Mbytes
- Diagnostic LEDs
- Communication Ports
  - 1 x Serial, 2400 bps up to 115.2 Kbps, RS485/422 (2-wire or 4-wire), DB9 male
  - 1 x Ethernet, 10/100 Mbps, RJ45
  - 1 x PROFIBUS, 9.6 Kbps up to 12 Mbps, DB9 female
- Embedded 6 Digital Inputs/2 Digital Outputs
- Desktop or DIN Rail mounting

Compatible Protocols
- Ethernet TCP/IP (Client/Server modes)
  - Altus® Alnet II (AL 200x, Webgate)
  - Alstom® SRTP (CBO-35, CBO-75)
  - Allen-Bradley® EtherNet/IP (Logix, PLC-5 and SLC 500)
  - GE Fanuc® SRTP (90-30, 90-70)
  - Mitsubishi® Melsec (A, Q)
  - Omron® FINS (C, CV, CS)
  - Schneider Electric® Open Modbus TCP and UDP
  - Schneider Electric® Uni-TE (Premium and Micro)
  - Siemens® Industrial Ethernet (S5, S7, TI)
- Profibus
  - DP-VO Master
  - DP-VO Slave
  - S7/MPI Client
  - FDL S5 Client
- Serial
  - Allen-Bradley® DF1 Master
  - GE Fanuc® SNP-X Master
  - Modbus Master/Slave (ASCII and RTU)
  - Schneider Electric® Uni-Telway Slave
  - Siemens® AS511 Master
  - Siemens® TI-Dir Master

Conformance
- CE
- RoHS compliant

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>APP ESP-67W</td>
<td>112034-0001</td>
<td>PROFIBUS to Ethernet/Serial Gateway</td>
</tr>
</tbody>
</table>
Brad® Direct-Link®
Industrial Gateway

112034
PROFIBUS to Serial

Features and Benefits
- Connects PROFIBUS controller to Master/Slave Serial devices
- Quick and cost effective solution
- Serial free send/receive; allow user to implement custom protocol (bar code reader, scale, operator display, etc)
- Typical uses:
  - Connecting Serial devices to PROFIBUS networks
  - Integration of legacy devices such as in the machine tool industry
  - Well suited for simple network extensions

Description
- Easy-to-use configuration by GSD file (no configuration tool needed)
- Automatic reconfiguration after replacement by the PROFIBUS Master (Set_Param command)
- Rotary switches for PROFIBUS Address
- Full diagnostic through LEDs, dedicated RS232 port and PROFIBUS Slave_Diag information

Included Hardware/Software
- IP20
- DIN rail mounting
- Up to 244 Input bytes and 244 Output bytes on PROFIBUS
- Up to 20 Modbus Read and Write commands with Cyclic, Change of State or trigger working modes
- Communication Ports
  - 1x Serial, 600 bps up to 57.6 Kbps, RS232/RS485
  - 1x PROFIBUS, 9.6 Kbps up to 12 Mbps, DB9 female

Compatible Protocols
- PROFIBUS
  - DP-V0 Slave
- Serial
  - Modbus Master (ASCII/RTU)
  - Modbus Slave (ASCII/RTU)
  - Free Send/Receive Master/Slave

Conformance
- RoHS compliant
- CE

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRL-DPS-SRM</td>
<td>112026-0013</td>
<td>Gateway PROFIBUS-DP slave to Serial Master/Slave, RS232/485</td>
</tr>
</tbody>
</table>
### Features and Benefits
- Reliable solution for connecting industrial controllers to IO devices in harsh duty environments
- Accepts M12 threaded connectors or Brad Ultra-Lock® Push-Pull connection system
- Standard hole housing pattern allows for interchangeability with popular IO modules
- Visible LEDs provide maintenance personnel with the ability to easily determine IO, module and network status

### Description
- Rated IP67 for harsh environments
- Designed for direct machine mount applications
- 16 digital input/output per module
- Supports PNP and NPN input devices
- Watchdog with output reply state

### Compatible Protocols
PROFIBUS Slave DP-V0

### Conformance
- IP67 according to IEC 60529
- Vibration: IEC 60068-2-6 conformance
- Mechanical Shock: 10G, 11ms, 3 axis
- CE
- UL
- cUL
- RoHS compliant
- PNO certified

---

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>No. of Power Pin</th>
<th>Input Channel Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCDBP-80D0N-B1U</td>
<td>112038-0030</td>
<td>5</td>
<td>NPN</td>
</tr>
<tr>
<td>TCDBP-80C2N-B1U</td>
<td>112038-0028</td>
<td>16</td>
<td>NPN</td>
</tr>
<tr>
<td>TCDBP-80B4N-B1U</td>
<td>112038-0026</td>
<td>12</td>
<td>NPN</td>
</tr>
<tr>
<td>TCDBP-80B4N-B1U</td>
<td>112038-0024</td>
<td>8</td>
<td>NPN</td>
</tr>
<tr>
<td>TCDBP-80D0P-B1U</td>
<td>112038-0031</td>
<td>16</td>
<td>PNP</td>
</tr>
<tr>
<td>TCDBP-80C2P-B1U</td>
<td>112038-0029</td>
<td>14</td>
<td>PNP</td>
</tr>
<tr>
<td>TCDBP-80B4P-B1U</td>
<td>112038-0027</td>
<td>12</td>
<td>PNP</td>
</tr>
<tr>
<td>TCDBP-80B4P-B1U</td>
<td>112038-0025</td>
<td>8</td>
<td>PNP</td>
</tr>
<tr>
<td>TCDBP-80B4P-B1U</td>
<td>112038-5004</td>
<td>8 Inputs + 8 Universal (inputs or outputs)</td>
<td>PNP</td>
</tr>
</tbody>
</table>
Brad® HarshIO 600

112038

Digital IP67 IO Module
Compact Format

Features and Benefits
- Reliable solution for connecting industrial controllers to IO devices in harsh duty environments.
- Accepts M12 threaded connectors or Brad Ultra-Lock® Push-Pull connection system.
- Visible LEDs provide maintenance personnel with the ability to easily determine IO, module and network status.

Description
- Rated IP67 for harsh environments.
- Designed for direct machine mount applications.
- Eight digital input/output per module.
- Supports PNP and NPN input devices.
- Watchdog with output reply state.

Compatible Protocols
PROFIBUS Slave DP-V0

Conformance
- IP67 according to IEC 60529
- Vibration: IEC 60068-2-6 conformance
- Mechanical Shock: 10G, 11ms, 3 axis
- CE
- UL
- cUL
- RoHS compliant
- PNO certified

Included Hardware/Software
- IO Configurations:
  - 8 inputs
  - 6 inputs + 2 outputs
  - 4 inputs + 4 outputs
  - 8 outputs
- IO Connectors:
  - 4x ports, Ultra-Lock® M12 female 5-pole, internally threaded
  - 8x ports, M8 female 3-pole threaded
- PROFIBUS Connectors:
  - 1x M12 male, 5-pole, B-coded
  - 1x Ultra-Lock® M12 female, 5-pole, B-coded
- Power Connectors: M12 male, 5-pole, A-coded
- Power Requirements:
  - Module Input Power—24V DC
  - Module Output Power—24V DC, 4.0A max.
- Input Type:
  - Compatible with dry contact and PNP or NPN
  - Electronic short circuit protection
- PROFIBUS Address: 1–99 by rotary switches or 1–125 by Set_Slave_Address command
- Input Delay: 3ms default or configurable (through GSD)
- Input Device Supply: 140mA per port at 25°C
- Output Load Current: 1.4A max. per channel, electronic short circuit protection
- Maximum Switching Frequency: 200 Hz
- Housing Dimensions: 30.00mm (1.18") by 175mm (6.89") by 20.00mm (.78")
- Mounting Dimensions:
  - 23.00mm (0.91") horizontal on centers
  - 168.00mm (6.61") vertical on centers
- Operating Temperature: -25 to +70°C
- Storage Temperature: -40 to +85°C

Compact—M8

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>No. of Power Pin</th>
<th>IO Configuration</th>
<th>Input Channel Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBDPB-880N-B84</td>
<td>112038-0019</td>
<td>5</td>
<td>8</td>
<td>NPN</td>
</tr>
<tr>
<td>TBDPB-862N-B84</td>
<td>112038-0017</td>
<td>6</td>
<td>2</td>
<td>NPN</td>
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<tr>
<td>TBDPB-844N-B84</td>
<td>112038-0015</td>
<td>4</td>
<td>4</td>
<td>NPN</td>
</tr>
<tr>
<td>TBDPB-880P-B84</td>
<td>112038-0021</td>
<td>8</td>
<td>8</td>
<td>PNP</td>
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<tr>
<td>TBDPB-862P-B84</td>
<td>112038-0018</td>
<td>6</td>
<td>2</td>
<td>PNP</td>
</tr>
<tr>
<td>TBDPB-844P-B84</td>
<td>112038-0016</td>
<td>4</td>
<td>4</td>
<td>PNP</td>
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<tr>
<td>TBDPB-808P-B84</td>
<td>112038-0014</td>
<td>8</td>
<td>8</td>
<td>PNP</td>
</tr>
</tbody>
</table>

Compact—M12

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>No. of Power Pin</th>
<th>IO Configuration</th>
<th>Input Channel Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBDPB-480N-B8U</td>
<td>112038-0009</td>
<td>5</td>
<td>8</td>
<td>NPN</td>
</tr>
<tr>
<td>TBDPB-462N-B8U</td>
<td>112038-0007</td>
<td>6</td>
<td>2</td>
<td>NPN</td>
</tr>
<tr>
<td>TBDPB-444N-B8U</td>
<td>112038-0005</td>
<td>4</td>
<td>4</td>
<td>NPN</td>
</tr>
<tr>
<td>TBDPB-480P-B8U</td>
<td>112038-0011</td>
<td>8</td>
<td>8</td>
<td>PNP</td>
</tr>
<tr>
<td>TBDPB-462P-B8U</td>
<td>112038-0008</td>
<td>6</td>
<td>2</td>
<td>PNP</td>
</tr>
<tr>
<td>TBDPB-444P-B8U</td>
<td>112038-0006</td>
<td>4</td>
<td>4</td>
<td>PNP</td>
</tr>
<tr>
<td>TBDPB-408P-B8U</td>
<td>112038-0003</td>
<td>8</td>
<td>8</td>
<td>PNP</td>
</tr>
</tbody>
</table>
PROFIBUS* Brad® Solid Core Bulk Cables

130211

Features and Benefits
• Provides field installation flexibility
• Used with field-attachables to provide plug-and-play solution

Overall
Voltage Rating: 300V
Operating Temperature: -40 to +60° C
Maximum O.D.: 0.331" (8.40 mm)

Construction
Jacket Material: PUR
Inner Material Insulation: Polyethylene
Shield Type: Aluminum Foil 100%
Tinned Copper braid 80%
Conductors: Twisted Pair 22 AWG solid wire

Electrical
DC Resistance: 186 W/K OHMS
Nominal Impedance: 150 ± 15 OHMS
Effective Capacitance (1 KHZ): 28.5 nF/KW
Approvals: UL, CSA

Cable Flex Information
Torsion:
Survived more than 2 million cycles at 360° over 1.0m
C-Track: Survived more than 3 million cycles at acceleration
to 10.0m/s² and process speed of 5.0m/s
Bend Radius: 10 X cable diameter

<table>
<thead>
<tr>
<th>Cable Length</th>
<th>Max. Current</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Wire Size</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>76.2m (250')</td>
<td>4.0A</td>
<td>300V</td>
<td>Twisted Pair</td>
<td>PUR</td>
<td>22</td>
<td>85-0001</td>
<td>130211-0032</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*PROFIBUS is a trademark of PROFIBUS International
**PROFIBUS**
**Brad® Micro-Change® (M12)**
**Single-Ended Cordsets**

**120039/120098**
Female
Straight, Right Angle
Threaded

---

**Features and Benefits**
- PUR jacketed for chemical and oil resistance
- Low-resistance contact design
- Leaded end allows for easy field termination
- 360° shielded head design to reduce RFI/EMI

**Physical**
Connector Face: Nylon 6/6
Molded Body: PUR
O-Ring: Nitrile rubber
Coupling Nut: Nickel-plated Brass (360° shielded)
Operating Temperature: -20 to +80°C

**Environmental**
Protection: IP67
NEMA Rating: NEMA 6

---

**Cable**
Outside Diameter: 8 ± 0.20mm

**Cable Construction**
Jacket Material: PUR
Inner Material Insulation: PE insulation
Shield Type: PETP/AV foil, Tinned Copper braid 65%
Conductor: Twisted pair 22 AWG

**Cable Flex Information**
Torsion:
Survived more than 2 million cycles at 360° over 1.0m
C-Track: More than 3 million cycles at acceleration 10.0m/s² and process speed of 5.0m/s
Bend Radius: 7.5 x cable diameter (static)

---

**Table:**

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Straight</th>
<th>Right Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>Twisted Pair</td>
<td>PUR</td>
<td>22</td>
<td>1.0m</td>
<td>B05500PP4M010</td>
<td>B05501PP4M010</td>
</tr>
<tr>
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<td></td>
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<td></td>
<td>120098-0084</td>
<td>120039-0132</td>
</tr>
</tbody>
</table>

**Note:** Sales drawings for all standard order numbers are available on molex.com
*Profibus is a trademark of Profibus International

---

**Configuration Code†**

<table>
<thead>
<tr>
<th>Meters</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>M020</td>
</tr>
<tr>
<td>5</td>
<td>M050</td>
</tr>
<tr>
<td>10</td>
<td>M100</td>
</tr>
</tbody>
</table>

**Build-a-Part Number**

<table>
<thead>
<tr>
<th>Length</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B05501PP4M010</td>
</tr>
</tbody>
</table>

†Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
PROFIBUS*
Brad® Micro-Change® (M12)
Single-Ended Cordsets
120039/120098
Male
Straight, Right Angle
Threaded

Features and Benefits
• PUR jacketed for chemical and oil resistance
• Low-resistance contact design
• Leaded end allows for easy field termination
• 360° shielded head design to reduce RFI/EMI

Physical
Connector Face: Nylon 6/6
Molded Body: PUR
O-Ring: Nitrile Rubber
Coupling Nut: Nickel-plated Brass (360° shielded)
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Cable
Outside Diameter: 8.00 ± 0.20mm

Cable Construction
Jacket Material: PUR
Inner Material Insulation: PE insulation
Shield Type: PETP/AV foil, Tinned Copper braid 65%
Conductor: Twisted pair 22 AWG

Cable Flex Information
Torsion:
Survived more than 2 million cycles at 360° over 1.0m
C-Track: Survived more than 3 million cycles at acceleration 10.0m/s² and process speed of 5.0m/s
Bend Radius: 7.5 x cable diameter (static)

<table>
<thead>
<tr>
<th>Poles</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Straight</th>
<th>Right Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>Twisted Pair</td>
<td>PUR</td>
<td>22</td>
<td>1.0m</td>
<td>B05507PP4M010</td>
<td>B05506PP4M010</td>
</tr>
<tr>
<td>1 - Not used</td>
<td>2 - Green</td>
<td>(Bus A)</td>
<td>3 - Not used</td>
<td>4 - Red</td>
<td>(Bus B)</td>
<td>5 - Shield</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*Profibus is a trademark of Profibus International

Configuration Code†
Build-a-Part Number

<table>
<thead>
<tr>
<th>Meters</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>M020</td>
</tr>
<tr>
<td>5</td>
<td>M050</td>
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<tr>
<td>10</td>
<td>M100</td>
</tr>
</tbody>
</table>

*B05S01PP4M010

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**PROFIBUS**
Brad® Micro-Change® (M12) Double-Ended Cordsets

120098
Female, Male
Straight-to-Straight
Straight-to-Right Angle
Right Angle-to-Right Angle
Right Angle-to-Straight
Threaded

---

**Features and Benefits**
- PUR jacketed for chemical and oil resistance
- Low-resistance contact design for repeated mating
- Provides a plug-and-play solution for quick field installation
- 360° shielded head design to reduce RFI/EMI

**Mechanical**
Connector Face: Nylon 6/6
Molded Body: PUR
Coupling Nut: Nickel-plated Brass (360° shielded)

**Physical**
Operating Temperature: -20 to +80°C

**Environmental**
Protection: IP67
NEMA Rating: NEMA 6

---

**Cable**
Outside Diameter: 8.00 ± 0.20mm

**Cable Construction**
- Cable Type: Twisted pair
- Cable Jacket: PUR
- Jacket Material: PUR
- Inner Material Insulation: PE insulation
- Shield Type: PETP/AV foil, Tinned Copper braid 65%
- Conductor: Twisted pair 22 AWG

**Cable Flex Information**
- Torsion: Survived more than 2 million cycles at 360° over 1.0m
- C-Track: Survived more than 3 million cycles at acceleration of 10.0m/s² and process speed of 5.0m/s
- Bend Radius: 7.5 x cable diameter (static)

---

### Pole (Female View)

<table>
<thead>
<tr>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Wire Size</th>
<th>Length</th>
<th>Length Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>350V AC/DC</td>
<td>22</td>
<td>M020</td>
</tr>
</tbody>
</table>

**Notes:**
- Sales drawings for all standard order numbers are available on molex.com
- Profibus is a trademark of Profibus International

---

**Configuration Code†**
Build-a-Part Number

<table>
<thead>
<tr>
<th>Build-a-Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>BB5S30PP4M010</td>
</tr>
</tbody>
</table>

**Meters**

<table>
<thead>
<tr>
<th>Length</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>M020</td>
</tr>
<tr>
<td>5</td>
<td>M050</td>
</tr>
<tr>
<td>10</td>
<td>M100</td>
</tr>
</tbody>
</table>

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

---

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123  www.barr-thorp.com
## PROFIBUS®
Brad® Micro-Change® (M12) Single-Ended Data Line Receptacles

**120099**  
Female, Male  
Back Panel Mount  
Cable

### Features and Benefits
- Epoxy potted for durability
- Provides a quick disconnect solution to control panels
- Enables plug-and-play to junction boxes

### Physical
- Shell: Nickel-plated Brass  
- Insert: Nylon 6/6  
- O-Ring: Nitrile Rubber  
- Operating Temperature: -20 to +80°C

### Environmental
- Protection: IP67  
- NEMA Rating: NEMA 6

### Cable Construction
- Jacket Material: PUR  
- Inner Material Insulation: PE insulation  
- Shield Type: Petp/Av Foil, Tinned Copper braid 65%  
- Conductor: Twisted pair 22 AWG

### Cable Flex Information
- Torsion: Survived more than 2 million cycles at 360° over 1.0m  
- C-Track: Survived more than 3 million cycles at acceleration of 10.0m/s² and process speed up to 5.0m/s  
- Bend Radius: 7.5 x cable diameter (static)

### Cable
- Outside Diameter: 8.00 ± 0.20mm

#### Configuration

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pole Female</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>Twisted Pair</td>
<td>PUR</td>
<td>22</td>
<td>1.0m</td>
<td>BR5U70PP4M0103</td>
<td>120099-0005</td>
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</tr>
<tr>
<td>5 Pole Male</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>Twisted Pair</td>
<td>PUR</td>
<td>22</td>
<td>1.0m</td>
<td>BR5U70PP4M0103</td>
<td>120099-0013</td>
<td></td>
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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

*PROFIBUS is a trademark of PROFIBUS International

---

Note on Configurations:

Configuration Code**:  
Build-a-Part Number: BR5U70PP4M010

<table>
<thead>
<tr>
<th>Meters</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>1</td>
<td>M010</td>
</tr>
<tr>
<td>2</td>
<td>M020</td>
</tr>
</tbody>
</table>

Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
PROFIBUS* Brad® Micro-Change® (M12) Data Line Receptacles

120099
Female, Male
Front Panel Mount
Wire Leads

Features and Benefits
- Epoxy potted for industrial environments
- Used in control panels and junction boxes
- Used to feed through panels
- Can be used with Siemens™ ET 200 I/O block to provide a quick disconnect solution

Physical
Shell: Nickel-plated Brass
Insert: Nylon 6/6
O-Ring: Nitrile rubber
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Female, PG11 Mounting Thread, Front Panel Mount</th>
<th>Male, PG11 Mounting Thread, Front Panel Mount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire Type</td>
<td>PVC Leads</td>
<td>PVC Leads</td>
</tr>
<tr>
<td>Wire Size AWG</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Length</td>
<td>3&quot;</td>
<td>3&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pole Female</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>81689-030</td>
<td>120099-0024</td>
<td>81688-030</td>
<td>120099-0025</td>
</tr>
<tr>
<td>1 - Not used</td>
<td>4 - Red</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 - Green</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 - Not used</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 - Shield</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 5 Pole Male | 4.0A | 250V AC/DC | 81689-030 | 120099-0024 | 81688-030 | 120099-0025 |
| 1 - Not used | 4 - Red |         |          |            |          |            |
| 2 - Green    |         |          |          |            |          |            |
| 3 - Not used |         |          |          |            |          |            |
| 5 - Shield   |         |          |          |            |          |            |

Note: Sales drawings for all standard order numbers are available on molex.com
*PROFIBUS is a trademark of PROFIBUS International
**PROFIBUS**
Brad® Micro-Change® (M12) Data Line Bulkhead Pass-Through Receptacle

120099
Female Straight-to-Male Straight Front Panel Mount

---

### Features and Benefits
- Epoxy potted for industrial environments
- Used in control panels and junction boxes
- Used to feed through panels
- Can be used with Siemens™ ET 200 I/O block to provide a quick disconnect solution

### Environmental
- Protection: IP67
- NEMA Rating: NEMA 6

### Physical
- Shell: Nickel-plated Brass
- Insert: Nylon 6/6
- Conductors: Bulkhead Feed-Through—Solid phosphor Bronze
- O-Ring: Nitrile rubber
- Operating Temperature: -20 to +80°C

---

**Poles** | **Max. Current per Contact** | **Max. Voltage** | **Mounting** | **Female Straight-to-Male Straight M12 Mounting Thread**
---|---|---|---|---
5 Pole Female | | | |  
1 - Not used | 4 - Red | 250V AC/DC | Front Panel Mount | BR5L30 120099-0001  
2 - Green (Box A) | 3 - Not used | | |  
4 Pole Male | 1 - Not used | 4.0A | |  
2 - Green | 3 - Not used | | |  
4 - Red | 5 - Grey | | |  
5 - Shield |  

**Note:** Sales drawings for all standard order numbers are available on molex.com

*PROFIBUS is a trademark of PROFIBUS International*
**Features and Benefits**
- Screw terminal connection for 22 AWG conductors
- Easy field installation of quick-disconnect design
- For use with all reverse keyway M12 designs
- Shielded to reduce RFI/EMI

**Physical**
- Connector Face: Polyamide
- Body: Nickel-plated Brass
- Contact: Silver-plated Brass
- Coupling Nut: Nickel-plated Brass
- Grommet: Nitrile rubber
- Conductor Size: 22 AWG
- Operating Temperature: -25 to +90°C

**Environmental**
- Protection: IP67

---

**Table: Poles, Max. Current per Contact, Max. Voltage, Cable Diameter Range**

<table>
<thead>
<tr>
<th>Poles</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Diameter Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Straight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>4.10 - 8.10mm</td>
</tr>
<tr>
<td>5 Pole Male</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>4.10 - 8.10mm</td>
</tr>
</tbody>
</table>

**Engineering No.**
- Female Straight: BA5S00-32
- Male Straight: BA5S06-32

**Standard Order No.**
- Female Straight: 120100-0001
- Male Straight: 120100-0002

Note: Sales drawings for all standard order numbers are available on molex.com

*PROFIBUS is a trademark of PROFIBUS International*
## PROFIBUS®
### Brad® Micro-Change® (M12) Bus Terminators

**120102**
**Male**
**Straight**
**External Thread**

### Features and Benefits
- Shielded to reduce RFI/EMI and improve signal integrity
- Male reverse key Brad® Micro-Change® terminator
- M12 threads
- Used with remote active I/O modules
- Used to terminate end of data line

### Electrical
**Voltage:** 250V AC/DC
**Current:** 4.0A

### Physical
**Connector Face:** Nylon 6/6
**Molded Body:** PVC
**O-Ring:** Terminators—Nitrile rubber
**Coupling Nuts:** Nickel-plated Brass
**Protection:** IP67

### Environmental

### Notes
- Sales drawings for all standard order numbers are available on molex.com
- *PROFIBUS* is a trademark of PROFIBUS International

<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>5 Pole</td>
<td><img src="image" alt="Wiring Schematic" /></td>
<td>B05006</td>
<td>120102-0002</td>
</tr>
</tbody>
</table>

1 - 5V DC 4 - Bus B
2 - Bus A 5 - Shield
3 - Ground

---

**Note:**

*PROFIBUS* is a trademark of PROFIBUS International
PROFIBUS*  
Brad® Micro-Change® (M12)  
Data Line Tees  
120101

Features and Benefits
- Shielded to reduce RFI/EMI and improve signal integrity
- M12 threads
- Provides quick disconnection of bus line
- Allows disconnection of node without shutting down the network
- Used with remote active I/O modules

Electrical
Voltage: 30V AC/36V DC  
Current: 4.0A

Physical
Connector Face: Nylon 6/6  
Molded Body: PVC  
O-Ring: Viton  
Coupling Nuts: Nickel-plated Brass  
Shielding Sleeves: Nickel-plated Brass

Environmental
Protection: IP67

General
Coupling nuts, pin 5 and PCB all connected to provide full shielding; Reverse key for PROFIBUS circuitry includes line balancing inductors

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pole</td>
<td><img src="image" alt="5 Pole Wiring Schematic" /></td>
<td>120101-0002</td>
<td></td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

*PROFIBUS is a trademark of PROFIBUS International

Recommended Use of Drop Lines

<table>
<thead>
<tr>
<th>TOTAL MAXIMUM DROP LENGTH (M)</th>
<th>NETWORK SPEED (KBAUD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>500</td>
</tr>
<tr>
<td>1</td>
<td>450</td>
</tr>
<tr>
<td>1.5</td>
<td>400</td>
</tr>
<tr>
<td>2</td>
<td>350</td>
</tr>
<tr>
<td>2.5</td>
<td>300</td>
</tr>
<tr>
<td>3</td>
<td>250</td>
</tr>
<tr>
<td>3.5</td>
<td>200</td>
</tr>
<tr>
<td>4</td>
<td>150</td>
</tr>
<tr>
<td>4.5</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>50</td>
</tr>
</tbody>
</table>

This document provided by Barr-Thorp Electric Co., Inc.  800-473-9123  www.barr-thorp.com
PROFIBUS*
Brad® D-Sub
Field Attachable
Connectors
120100/120103
9-pin D-Sub
Plastic Housing
Metal Housing
Diagnostic

Features and Benefits
• All metal construction for harsh environments
• Fully shielded for high noise immunity
• IDC connections for fast and reliable installations
• Captive single-screw mechanism—no loose parts
• High transfer rate—12 MBaud
• 4 LEDs for fast diagnostics and health status of the bus and device (diagnostic versions only)
• Terminator monitor indicates if terminator is missing (diagnostics versions only)
• Integrated switchable terminators
• Transparent cable slots and covers for high visibility
• Integrated programming/diagnostic port (on 90°/45° formats)
• Available in 0°, 45° and 90° formats making connections to various devices easier

Mechanical
PROFIBUS: 9 pole SubD pin headers
Programming/Diagnostics: 9 pole SubD socket
Insertion (withdrawal) Cycles: min. 200
Cable Type: Solid core PROFIBUS Type A, EN50170
Cable Diameter: 8.00mm
Screw/Tightening Torque: 4-40 UNC/0.4Nm
Enclosure Material: Die-cast Zinc
Temperature Range: -20 to +75°C
Cable Connector: IDC technology
Terminating Resistor: Build-in switchable
Bus Signals: Dual, in and out

Insulation Stripping Lengths
Outer Sheath: 17.00mm
Shield: 11.00mm

9 Pin D-Sub Plastic Housing Field Attachable

<table>
<thead>
<tr>
<th>Face View</th>
<th>Housing Material</th>
<th>Termination Switch</th>
<th>Programming/Diagnostics Port</th>
<th>Diagnostic LEDs</th>
<th>Configuration (D-Sub)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5</td>
<td>ABS</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>MA9D00-32</td>
</tr>
<tr>
<td>6 7 8 9</td>
<td>1 - Not used</td>
<td>6 - Not used</td>
<td>2 - Not used</td>
<td>7 - Not used</td>
<td>3 - Red (Bus B)</td>
</tr>
</tbody>
</table>

9 Pin D-Sub Metal Housing Diagnostic Field Attachable

<table>
<thead>
<tr>
<th>Face View</th>
<th>Housing Material</th>
<th>Termination Switch</th>
<th>Programming/Diagnostics Port</th>
<th>Diagnostic LEDs</th>
<th>Configuration (D-Sub)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5</td>
<td>Die-cast Zinc</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>IDC Technology</td>
</tr>
<tr>
<td>6 7 8 9</td>
<td>1 - Not used</td>
<td>6 - Not used</td>
<td>2 - Not used</td>
<td>7 - Not used</td>
<td>3 - Red (Bus B)</td>
</tr>
</tbody>
</table>

LED Color | LED Off | LED On | LED Flashing at 5Hz
---|---|---|---
PWR | Yellow | No 5 Vdc Power Supply from Device | Self Testing Completed Device Power OK |
TxO | Green | No Bus Activity | PB Master Failed or Short Circuit of Line |
Term | Yellow | No Termination | Data Transfer in Progress |
ERR | Red | No Errors | Internal Terminating Resistors Faulty |

*PROFIBUS is a trademark of PROFIBUS International
PROFIBUS®
Brad® D-Sub
Single-Ended Cordsets
120098
Male
Horizontal, Vertical, Vertical with Programming Port

**Features and Benefits**
- PUR jacketed for chemical and oil resistance
- D-Sub connector enables interface card connection
- D-Sub connector provides termination circuitry
- D-Sub includes termination switch for field installation flexibility

**Mechanical**
- Material: ABS

**Physical**
- Operating Temperature: 0 to 60°C
- Protection: IP40

**Cable**
- Outside Diameter: 8.00 ± 2.00mm

**Cable Construction**
- Jacket Material: PUR
- Inner Material Insulation: PE insulation
- Shield Type: PETP/AV foil, Tinned Copper braid 65%
- Conductor: Twisted pair 22 AWG

**Cable Flex Information**
- Torsion: Survived more than 2 million cycles at 360° over 1.0m
- C-Track: Survived more than 3 million cycles at acceleration of 10.0 m/s² and process speed of 5.0 m/s
- Bend Radius: 7.5 x cable diameter (static)

---

**Notes:**
Sales drawings for all standard order numbers are available on molex.com

*Profibus is a trademark of Profibus International

---

**Configuration Code†**
Build-a-Part Number

<table>
<thead>
<tr>
<th>Length</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>M020</td>
</tr>
<tr>
<td>5</td>
<td>M050</td>
</tr>
<tr>
<td>10</td>
<td>M100</td>
</tr>
</tbody>
</table>

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**PROFIBUS**
**Brad®**
**D-Sub-to-D-Sub Double-Ended Cordsets**

**120098**
**Horizontal, Vertical Vertical with Programming Port**

**Features and Benefits**
- PUR jacketed for chemical and oil resistance
- D-Sub connector enables interface card connection
- D-Sub connector provides termination circuitry
- D-Sub includes termination switch for field installation flexibility

**Mechanical**
Material: ABS

**Physical**
Operating Temperature: 0 to 60°C

**Environmental**
Protection: IP40

---

**Configuration (D-Sub)**

<table>
<thead>
<tr>
<th>Face View (Male)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Length</th>
<th>Configuration (D-Sub)</th>
<th>Horizontal</th>
<th>Vertical</th>
<th>Vertical with Programming Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>1.0m</td>
<td>MM3560PP4M010</td>
<td>MM3562PP4M010</td>
<td>MM3563PP4M020</td>
<td>MM3563PP4M020</td>
</tr>
<tr>
<td>1 - Not used</td>
<td>2 - Not used</td>
<td>3 - Red (Bus B)</td>
<td>4 - Not used</td>
<td>5 - Not used</td>
<td>6 - Not used</td>
<td>7 - Not used</td>
<td>8 - Green (Bus A)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Cable**
Outside Diameter: 8.00 ± 0.20 mm

**Cable Construction**
- Cable Type: Twisted pair
- Cable Jacket: PUR
- Wire Size: 22 AWG
- Jacket Material: PUR
- Inner Material Insulation: PE insulation
- Shield Type: PETP/AV Foil, Tinned Copper braid 65%
- Conductor: Twisted pair 22 AWG

**Cable Flex Information**
- Torsion: Survived more than 2 million cycles at 360° over 1.0m
- C-Track: Survived more than 3 million cycles at acceleration of 10.0m/s² and process speed of 5.0m/s
- Bend Radius: 7.5 x cable diameter (static)

---

**Configuration Code**
Build-a-Part Number

<table>
<thead>
<tr>
<th>Meters</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>MD20</td>
</tr>
<tr>
<td>5</td>
<td>MD50</td>
</tr>
<tr>
<td>10</td>
<td>M100</td>
</tr>
</tbody>
</table>

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
PROFIBUS* Brad® D-Sub-to(2)-D-Sub Connectors Double-Ended Cordsets

120098 Horizontal, Vertical Vertical with Programming Ports

Features and Benefits
- PUR jacketed for chemical and oil resistance
- D-Sub connector enables interface card connection
- D-Sub connector provides termination circuitry
- D-Sub includes termination switch for field installation flexibility

Mechanical
Material: ABS

Physical
Operating Temperature: 0 to 60°C

Environmental
Protection: IP40

Cable
Outside Diameter: 8.00 ± 0.20 mm

Cable Construction
Cable Type: Twisted pair
Cable Jacket: PUR
Wire Size: 22 AWG
Jeton Material: PUR
Inner Material Insulation: PE insulation
Shield Type: PETP/AV Foil, Tinned Copper braid 65%
Conductor: Twisted pair 22 AWG

Cable Flex Information
Torsion:
Survived more than 2 million cycles at 360° over 1.0m
C-Track: Survived more than 3 million cycles at acceleration of 10.0m/s² and process speed of 5.0m/s
Bend Radius: 7.5 x cable diameter (static)

Features and Benefits
- PUR jacketed for chemical and oil resistance
- D-Sub connector enables interface card connection
- D-Sub connector provides termination circuitry
- D-Sub includes termination switch for field installation flexibility

Features and Benefits
- PUR jacketed for chemical and oil resistance
- D-Sub connector enables interface card connection
- D-Sub connector provides termination circuitry
- D-Sub includes termination switch for field installation flexibility

Cable
Outside Diameter: 8.00 ± 0.20 mm

Cable Construction
Cable Type: Twisted pair
Cable Jacket: PUR
Wire Size: 22 AWG
Jeton Material: PUR
Inner Material Insulation: PE insulation
Shield Type: PETP/AV Foil, Tinned Copper braid 65%
Conductor: Twisted pair 22 AWG

Cable Flex Information
Torsion:
Survived more than 2 million cycles at 360° over 1.0m
C-Track: Survived more than 3 million cycles at acceleration of 10.0m/s² and process speed of 5.0m/s
Bend Radius: 7.5 x cable diameter (static)

Configuration (D-Sub)

<table>
<thead>
<tr>
<th>Face View (Male)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Length</th>
<th>Configuration (D-Sub)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 - Not used</td>
<td>2 - Not used</td>
<td>3 - Red (Bus B)</td>
<td>4 - Not used</td>
</tr>
<tr>
<td></td>
<td>5 - Not used</td>
<td>6 - Not used</td>
<td>7 - Green (Bus A)</td>
<td>8 - Not used</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9 - Not used</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>1.0m</td>
<td>(2) Horizontal</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MM3G60PP4M010</td>
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<tr>
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<td></td>
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<td>120098-0204</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td>MM3G62PP4M010</td>
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<td></td>
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<td>120102-0013</td>
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Configuration Code†
Build-a-Part Number

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<td>10</td>
<td>M100</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

*PROFIBUS is a trademark of PROFIBUS International
**PROFIBUS**
Brad® Micro-Change® (M12)-to-D-Sub Double-Ended Cordsets

**120098**
Micro-Change Male Straight/Right Angle-to-D-Sub
Micro-Change Female Straight/Right Angle-to-D-Sub Threaded

---

**Features and Benefits**

**Double-Ended Cordset**
- Double ended straight and 90°
- Used in a variety of configurations where a complete daisy-chain plug-and-play solution is desired

**D-Sub Cordset**
- Shielded D-Sub connector maintains signal integrity in noisy environments
- D-Sub includes termination switch for field installation flexibility
- Plug and play connection between PROFIBUS interface cards and modules
- D-Sub to single or dual ended M12
- Horizontal, vertical, straight or 90° configurations
- Standard and application specific lengths

---

**Physical**
Brad Micro-Change Connector
Connector Face: Nylon 6/6
Molded Body: PUR
Coupling Nut: Nickel-plated Brass (360° Shielded)
Operating Temperature: -20 to +80°C

**9-pin D-Sub Connector**
Material: ABS
Operating Temperature: 0 to 60°C

---

**Environmental**
Brad Micro-Change Connector
Protection: IP67
NEMA Rating: NEMA 6
Operating Temperature: -20 to +80°C

**9-pin D-Sub Connector**
Protection: IP40
Operating Temperature: 0 to 60°C

**Cable**
Outside Diameter: 8.00 ± 0.20mm

**Cable Construction**
- Cable Type: Twisted pair
- Cable Jacket: PUR
- Inner Material Insulation: PE insulation
- Shield Type: PETP/AV foil, Tinned Copper braid 65%
- Conductor: Twisted pair 22 AWG

**Cable Flex Information**
- Torsion: Survived more than 2 million cycles at 360° over 1.0m
- C-Track: Survived more than 3 million cycles at acceleration of 10.0m/s² and process speed of 5.0m/s
- Bend Radius: 7.5 x cable diameter (static)

**Electrical**
- Voltage: 250V AC/DC max.
- Current: 4.0A max.

---

<table>
<thead>
<tr>
<th>Pole (Female View)</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Configuration (D-Sub)</th>
<th>Male Straight</th>
<th>Male Right Angle</th>
<th>Female Straight</th>
<th>Female Right Angle</th>
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<td>22</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

*Profibus is a trademark of Profibus International
PROFIBUS®
Brad® Micro-Change®
(M12)-to-D-Sub
Double-Ended Cordsets
120098
(2) Straight Male-to-Micro-Change
(2) Male Right Angle-to-Micro-Change
(2) Female Straight-to-Micro-Change
(1) Male Straight, (1) Female Straight
Threaded

**Features and Benefits**
- PUR jacketed for chemical and oil resistance
- D-Sub connector enables interface card connection
- The shielded D-Sub connector maintains signal integrity in noisy environments
- 360° shielded Micro-change head design to reduce RFI/EMI
- D-Sub includes termination switch for field installation flexibility

**Micro-Change Connector**

**Physical**
- Connector Face: Nylon 6/6
- Molded Body: PUR
- Coupling Nut: Nickel-plated Brass (360° Shielded)
- Operating Temperature: -20 to +80°C

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

**9-Pin D-Sub Connector**

**Electrical**
- Voltage Rating: 250V AC/DC

**Mechanical**
- Material: ABS

**Physical**
- Operating Temperature: 0 to 60°C

**Environmental**
- Protection: IP40

**Cable**
- Outside Diameter: 8.00 +/- 0.20mm

**Cable Construction**
- Cable Type: Twisted pair
- Cable Jacket: PUR
- Wire Size: 22 AWG
- Inner Material: PE insulation
- Shield Type: PETP/AV Foil, Tinned Copper braid 65%
- Conductor: Twisted pair 22 AWG

**Cable Flex Information**
- Torsion: Survived more than 2 million cycles at 360° over 1.0m
- C-Track: Survived more than 3 million cycles at acceleration of 10.0m/s² and process speed of 5.0m/s
- Bend Radius: 7.5 x cable diameter (static)

<table>
<thead>
<tr>
<th>Face View (Male)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Configuration (D-Sub)</th>
<th>(2) Straight Male-to-Micro-Change</th>
<th>(2) Male Right Angle-to-Micro-Change</th>
<th>(2) Female Straight-to-Micro-Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>Horizontal</td>
<td>BM5G60PP4M010</td>
<td>BM5G61PP4M010</td>
<td>BM5G30PP4M010</td>
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<tr>
<td>6 7 8</td>
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<td></td>
<td>Vertical</td>
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<td>BM5G63PP4M010</td>
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<table>
<thead>
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<th>Face View (Male)</th>
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<th>Max. Voltage</th>
<th>Configuration (D-Sub)</th>
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<th>(1) Male Straight, (1) Female Straight</th>
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<tbody>
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<td>4.0A</td>
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**Configuration Code**

BM5G60PP4M010

- **Build-a-Part Number**

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<td>5</td>
<td>M050</td>
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<tr>
<td>10</td>
<td>M100</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

*PROFIBUS is a trademark of PROFIBUS International

†Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

www.molex.com
Features and Benefits
- Patented QuadBeam™ contact design for reliability and low resistance
- Flex-rated TC-ER cable

Electrical
Voltage: 600V AC/DC

Mechanical
Wire Size: 16 AWG

Physical
Connector Face: PVC
Connector Body: PVC
Contact: Brass with Gold over Nickel plating
Coupling Nut: Black epoxy coated Zinc
Cable Jacket Color: Yellow
Cables: K12 and K13—UL Type TC-ER, Flex rated
A38 and A01—UL Type STOOW, extra hard service cord

Environmental
Protection: IP67

130010
Internal Thread Female
External Thread Male
Straight, Right Angle

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Current</th>
<th>Wire Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Length</th>
<th>Female Straight-to-Male Straight</th>
<th>Female Right Angle-to-Male Right Angle</th>
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Note: Sales drawings for all standard order numbers are available on molex.com

*Profibus is a trademark of Profibus International

Configuration Code†
Build-a-Part Number

115030K13M020

†Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
PROFIBUS®
Brad® Mini-Change
Auxiliary Power A-Size
Receptacles
130013
Female
Internal Thread

Features and Benefits
- Patented Quad Beam™ contact design for reliability and low resistance

Reference Information
UL File No.: E152210

Electrical
Voltage: 600V AC/DC

Mechanical
Wire Size: 16 AWG
Wire Type: UL 1015

Physical
Connector Face: PVC
Shell: Anodized Aluminum
Contact: Brass with Gold over Nickel plating
Mounting Thread: 1/2" - 14 NPT
Operating Temperature: -20 to +105°C

Environmental
Protection: IP67

Note: Sales drawings for all standard order numbers are available on molex.com
*PROFIBUS is a trademark of PROFIBUS International

Poles (Female View) | Current | Length | Engineering No. | Standard Order No.
--- | --- | --- | --- | ---
3 | 8.0A | 6.0' | 1R5000A06F060 | 130013-0423

Configuration Code†
Build-a-Part Number

Length Code
Inches 12 A120
Feet 6 F060
Meters 2 M020

1R5000A20F060

†Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**PROFIBUS**
**Brad® Mini-Change®**
**Auxiliary Power**
**Field Attachable Connectors**

130017

---

**Features and Benefits**
- Patented Quad Beam™ contact provides high reliability

**Reference Information**
- CSA File No.: LR6837

**Electrical**
- Current: 8.0A max.
- Voltage: 600V AC/DC

**Mechanical**
- Wire Size: 15 to 24 AWG

---

**Physical**
- Connector Face: Polyurethane
- Connector Body: Nylon
- Contact: Brass with Gold over Nickel plating
- Coupling Nut: Nickel-plated Brass
- Cable Diameter: 5.08-11.43mm (.200-.450“)
- Operating Temperature: -20 to +80°C

**Environmental**
- Protection: IP67

---

<table>
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<tr>
<th>Poles (Female View)</th>
<th>Coupling Type</th>
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<td>External Threads</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

*PROFIBUS is a trademark of PROFIBUS International*
PROFIBUS®
Brad® Mini-Change®
Auxiliary Power Tap Tee
120101
Data Line

Features and Benefits
- Phosphor bronze contacts for high reliability
- Can be connected directly to a Brad® Profibus I/O module
- Allows you to drop power from the main power trunk

Electrical
Voltage Rating: 600V
Amperage: 8.0A
Contact Material: Phosphor Bronze alloy
Contact Plating: Gold over Nickel

Physical
Connector Face: Thermo Plastic Elastomer
Molded Body: Thermo Plastic Elastomer
Coupling Nut: Zinc die cast, Black e-coat
Operating Temperature: -4 to +176°F (-20 to +80°C)

Environmental
Protection: IP67

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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*PROFIBUS is a trademark of PROFIBUS International

120065/120079 Female, Pigtails Straight, Right Angle

Features and Benefits
- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
- 5-pole version for auxiliary power to devices in PROFIBUS installations
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - TPE cables for continuous flex applications. Also ideal for welding cells, cable is weld slag resistant
  - Other versions available

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Micro-Change

<table>
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<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
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<tbody>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2661</td>
<td>PVC (A09)</td>
<td>22</td>
<td>2.0m</td>
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<td></td>
<td>PLTC-ER</td>
<td>TPE (K03)</td>
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</tbody>
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Note: Sales drawings for all standard order numbers are available on molex.com

*PROFIBUS is a trademark of PROFIBUS International

Physical
Connector Body: PUR (TPE for K03)
Contact Carries: Polyamide
O-ring: Viton (EPDM for A09 cables)
Coupling Nut: Nickel plated Brass (Teflon coated for K03)
Contacts: Copper alloy with Gold over Nickel plating
Cables: A09—Yellow PVC jacket, 22 AWG PVC conductors, 300V, UL AWM2661
K03—Yellow TPE jacket, 18 AWG PVC conductors, 300V, UL PLTC-ER, +5M flex life (torsion and bending)

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Ultra-Lock

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
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<tbody>
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<td>5 Pole</td>
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<td>PVC (A09)</td>
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<td>2.0m</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

*PROFIBUS is a trademark of PROFIBUS International

Configuration Code† Build-a-Part Number

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<td>M100</td>
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</table>

Coupling Nut Option
Stainless Steel . . . . . 8

Cable Code
W05000A09M0208

†Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
PROFIBUS* (M12) Auxiliary Power Brad Micro-Change® and Ultra-Lock® Double-Ended Cordsets (US)

120065/120079 Female Straight-to-Male Straight, Female Right Angle-to-Male Right Angle

Features and Benefits
- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
- 5-pole version for auxiliary power to devices in PROFIBUS installations
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - TPE cables for continuous flex applications. Also ideal for welding cells, cable is weld slag resistant
  - Other versions available

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Micro-Change

<table>
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<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
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<tbody>
<tr>
<td>5 Pole</td>
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<td>250V AC/DC</td>
<td>UL 2661</td>
<td>PVC (A09)</td>
<td>22</td>
<td>1.0m</td>
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<td></td>
<td>PLTC-ER</td>
<td>TPE (K03)</td>
<td>18</td>
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Ultra-Lock

<table>
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<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket (Cable Code)</th>
<th>Wire Size AWG</th>
<th>Length</th>
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</thead>
<tbody>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2661</td>
<td>PVC (A09)</td>
<td>22</td>
<td>1.0m</td>
</tr>
</tbody>
</table>

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Physical
Connector Body: PUR (TPE for K03)
Contact Carries: Polyamide
O-ring: Viton (EPDM for A09 cables)
Coupling Nut: Nickel plated Brass (Teflon coated for K03)
Contacts: Copper alloy with Gold over Nickel plating
Cables: A09—Yellow PVC jacket, 22 AWG PVC conductors, 300V, UL AWM2661
K03—Yellow TPE jacket, 18 AWG PVC conductors, 300V, UL PLTC-ER, +5M flex life (torsion and bending)

Configuration Code†
Build-a-Part Number

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<td>M040</td>
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<td>5</td>
<td>M050</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

*PROFIBUS is a trademark of PROFIBUS International

†Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
### Micro-Change

<table>
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<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
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<th>Cable Jacket (Cable Code)</th>
<th>Wire Size</th>
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<tbody>
<tr>
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<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2661</td>
<td>PVC (E03)</td>
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<td>2.0m</td>
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<td></td>
<td>PLTC-ER</td>
<td>TPE (K03)</td>
<td>18 AWG</td>
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</tr>
</tbody>
</table>

**Features and Benefits**
- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
- 5-pole version for auxiliary power to devices in PROFIBUS installations
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - TPE cables for continuous flex applications. Also ideal for welding cells, cable is weld slag resistant
  - Other versions available

**Reference Information**
- UL File No.: E152210
- CSA File No.: LR6837

### Ultra-Lock

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<tbody>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>UL 2661</td>
<td>PVC (E03)</td>
<td>0.34mm²</td>
<td>2.0m</td>
</tr>
</tbody>
</table>

**Features and Benefits**
- M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
- 5-pole version for auxiliary power to devices in PROFIBUS installations
- Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - TPE cables for continuous flex applications. Also ideal for welding cells, cable is weld slag resistant
  - Other versions available

**Reference Information**
- UL File No.: E152210
- CSA File No.: LR6837
PROFIBUS* (M12) Auxiliary Power Brad® Micro-Change® and Ultra-Lock® Double-Ended Cordsets (Europe)

120065/120079
Female Straight-to-Male Straight, Female Right Angle-to-Male Right Angle

Features and Benefits
• M12 Single Keyway (A-Coded) IEC compliant cordset assemblies
• 5-pole version for auxiliary power to devices in PROFIBUS installations
• Wide selection of cables to fit applications
  - PVC cables for light, cost sensitive industrial applications
  - for welding cells, cable is weld slag resistant
  - Other versions available

Reference Information
UL File No.: E152210
CSA File No.: LR6837

Micro-Change

<table>
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<tr>
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<td>PLTC-ER</td>
<td>TPE (K03)</td>
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Ultra-Lock

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<td>120000-5081</td>
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</table>

Note: Sales drawings for all standard order numbers are available on molex.com

Physical
Connector Body: PUR (TPE for K03)
Contact Carries: Polyamide
O-ring: Viton (EPDM for A09 cables)
Coupling Nut: Nickel plated Brass (Teflon coated for K03)
Contacts: Copper alloy with Gold over Nickel plating
Cables: E03—Yellow PVC jacket, 0.34mm² PVC conductors, 300V, UL AWM2664
K03—Yellow TPE jacket, 18 AWG PVC conductors, 300V, UL PLTC-ER, +SM flex life (torsion and bending)

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Configuration Code†
Build-a-Part Number

<table>
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<tr>
<th>Meters</th>
<th>Code</th>
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<td>4</td>
<td>M040</td>
</tr>
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<td>5</td>
<td>M050</td>
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</tbody>
</table>

† Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

*PROFIBUS is a trademark of PROFIBUS International
**Features and Benefits**
- M12 Single Keyway (A-Coded) IEC compliant panel mount receptacles
- 5-pole version for auxiliary power to devices in PROFIBUS installations
- Fully potted assemblies provide IP67/68 protection for harsh environments

**Physical**
- Shell: Nickel-plated Brass
- Contact Carriers: Polyamide
- O-Ring: M12—Red Viton, Panel—Black Viton
- Contacts: Copper alloy with Gold over Nickel plating
- Wire: PVC insulation 300V, 80C, UL1061
  - 3 to 5 poles—22 AWG
  - 8 poles—24 AWG

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

### Configuration Code

1. **Configuration Code**
   - Build-a-Part Number: 8R5A00A18A120

2. **Configuration Code**
   - Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

<table>
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<td>120070-0201</td>
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<td>8R5L30</td>
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### Length Code

<table>
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<td>F120</td>
<td>12</td>
</tr>
<tr>
<td>F200</td>
<td>20</td>
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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

*PROFIBUS is a trademark of PROFIBUS International*
### PROFIBUS* (M12) Auxiliary Power Brad® Ultra-Lock® and Micro-Change® Receptacles (Europe)

120070/120084

Female

Front Panel Mount

Bulkhead Pass-Through

---

**Features and Benefits**
- M12 Single Keyway (A-Coded) IEC compliant panel mount receptacles
- 5-pole version for auxiliary power to devices in PROFIBUS installations
- Fully potted assemblies provide IP67/68 protection for harsh environments

**Physical**
- Shell: Nickel-plated Brass
- Contact Carries: Polyamide O-Ring: M12—Red Viton Panel—Black Viton
- Contacts: Copper alloy with Gold over Nickel plating
- Wire: PVC insulation 300V, 80C, UL1061, 3 to 5 poles—22 AWG 8 poles—24 AWG

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

---

### Configuration

<table>
<thead>
<tr>
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<th>Build-a-Part Number</th>
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</thead>
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<td>8R5J20E03C3003</td>
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- †Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

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### Configuration Code†

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<td>120070-0237</td>
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### Wire Type

<table>
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<tr>
<th>Configuration</th>
<th>Micro-Change (M12), PG9, Front Panel Mount</th>
<th>Ultra-Lock Enabled, PG9, Front Panel Mount</th>
<th>Micro-Change (M12), Bulkhead Pass-Through Receptacle</th>
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</thead>
<tbody>
<tr>
<td>Wire Type</td>
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<td>PVC leads, UL1061</td>
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<td>Wire Size</td>
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### Length Code

<table>
<thead>
<tr>
<th>Length</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
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<td>F060</td>
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<tr>
<td>12</td>
<td>F120</td>
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<tr>
<td>20</td>
<td>F120</td>
</tr>
</tbody>
</table>

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Note: Sales drawings for all standard order numbers are available on molex.com

*PROFIBUS is a trademark of PROFIBUS International*
PROFIBUS*  
(M12) Auxiliary Power  
Field Attachable  
Brad® Ultra-Lock® and  
Micro-Change® Connectors  
120071/120085  
Female, Male  
Straight

Features and Benefits
- Allows field termination of cables to IEC compliant M12 A-coded connector  
- Preassembled contact carries with screw terminals provides easy field termination of conductors  
- 5-pole version for auxiliary power to devices in PROFIBUS installations  
- Back end housing and cable gland provides IP67 protection and strain relief

Physical
Connector Body: PA  
Contact Carries: PA  
O-ring: Viton  
Coupling Nut: Nickel-plated Brass  
Contacts: Copper alloy with Gold over Nickel plating  
Termination: Screw down terminals, accepts conductors up to 18 AWG (0.75mm²)

Environmental
Protection: IP67  
NEMA Rating: NEMA 6

Micro-Change

<table>
<thead>
<tr>
<th>Pole (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Diameter Range</th>
<th>Female Straight</th>
<th>Male Straight</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>4.10-8.10mm (.161-.319&quot;)</td>
<td>120071-0043</td>
<td>120085-0006</td>
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Ultra-Lock

<table>
<thead>
<tr>
<th>Pole (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Diameter Range</th>
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<td>120085-0014</td>
<td>120085-0006</td>
</tr>
</tbody>
</table>

*PROFIBUS is a trademark of PROFIBUS International
**Brad® Ethernet**

Brad® ethernet products provide solutions that enable the world’s most popular Local Area Network to be reliably utilized on the factory floor or in harsh commercial environments. The Brad line offers a large choice of products including physical media, IP67 I/O modules, unmanaged and managed switches, powerful network interfaces, industrial gateways and protocol development kits to connect the most popular Ethernet industrial networks and fieldbuses. Brad Ethernet products give the user a complete communication and connectivity solution to design a large scope of industrial applications—PC-Based control, supervision, data storage, protocol bridging, etc.—to suit all industry sectors.
Brad® Ethernet Software Development Kit for PROFINET IO

112106
IO-Controller and IO-Device

Features and Benefits
- Master and slave protocol stacks can address both controller (master) or device (slave) manufacturers who want to implement PROFINET networks
- Brad stacks have no hardware and OS dependencies and can be easily implemented on a large range of hardware system platforms or software operating systems
- Sample applications with source codes are provided and can be quickly and easily implemented
- Brad stacks are successfully tested with PNO conformance test tools
- Molex can provide stack training, technical support and engineering development for both hardware and software design

Description
- PROFINET IO Class-A/Class-B (RT Class-1, RT Class-2)
- Portable on any real time or not operating systems implementing multithread (Windows, VxWorks, Linux, QNX, ThreadX, eCOS, etc)
- Hardware: Compatible with 32-bit microprocessors
- Multiplatform (Intel, ARM, PowerPC, Fido, Texas DSP, etc)
- Support of Intel and Motorola formats
- Consistent IO data access through shared memory (configurable or automatic) or messaging access (API)

Conformance
- Conforms to PROFINET IO specifications v2.2
- Molex is an active member of PROFINET technical working groups

Included Hardware/Software

PROFINET IO—Controller Stack
- Supported Services: Context management, configuration, IO data, alarm, and diagnostic
- Manage up to 128 IO-Devices
- Cyclic Data Exchange: Up to 1440 Input bytes and 1440 Output bytes per IO-Device slot
- IP Device Configuration: DCP or Local
- LLDP (PROFINET MIB)
- SDK initialization via XML file
- CD Deliverable: Single product line licensing (with royalties), ANSI C source code, electronic documentation, application samples

PROFINET IO Device Stack
- IO Data: Up to 1440 Input bytes and 1440 Output bytes per IO-Device slot
- GSD File: Yes
- IP Device Configuration: DCP or Local
- LLDP (PROFINET MIB)
- Allows design of fixed and modular device

OEM Engineering Console
- Generate IO-Controller stack configuration files (XML format)
- Automatic IO-Device network detection including module configuration
- GSD device library management
- IO-Device commissioning (Set Name, Device blinking, etc.)
- Integrated diagnostic
- Windows 32-bit (XP/Vista)
- OEM customization
- USB dongle protection

MRP Client/Manager Stack
- Manage media redundancy for Ethernet ring topology according PROFINET Class-B
- CD Deliverable: Single product line licensing (no royalty), ANSI C source code, electronic documentation
- Does not include PNO MRP patent

Ordering Information

<table>
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<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>SDK-PFN-DEV</td>
<td>112106-5001</td>
<td>PROFINET IO-Device Software Development Kit</td>
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<td>SDK-PFN-DEV-UPD</td>
<td>112106-5002</td>
<td>PROFINET IO-Device SDK Maintenance Update</td>
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<td>SDK-PFN-COR</td>
<td>112106-5005</td>
<td>PROFINET IO-Controller Software Development Kit—1 License Fee included</td>
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<tr>
<td>SDK-PFN-COR-UPD</td>
<td>112106-5006</td>
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<td>SDK-PFN-COR-CNFG-U</td>
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<td>PROFINET IO-Controller OEM Configuration Console, USB Dongle, 1 license</td>
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<td>SDK-PFN-MRP</td>
<td>112106-5007</td>
<td>Client/Manager Media Redundancy Protocol SDK for PROFINET IO</td>
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Support/Training Information

<table>
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<td>Engineering Development Support for PROFINET stock</td>
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<tr>
<td>SDK-PFN-TRN</td>
<td>860000-0144</td>
<td>Training Support for PROFINET stock</td>
</tr>
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</table>
Brad® Ethernet Software Development Kit for EtherNet/IP
112106
Scanner and Adapter

Features and Benefits
- Master and slave protocol stacks can address both controller (master) or device (slave) manufacturers who want to implement EtherNet/IP networks
- Brad stacks have no hardware and OS dependencies and can be easily implemented on a large range of hardware system platforms or software operating systems
- Sample applications with source codes are provided and can be quickly and easily implemented
- Brad stacks are successfully tested with ODVA conformance test tools
- Molex can provide stack training, technical support and engineering development for both hardware and software design

Description
- Portable on any real time or not operating systems implementing multithread (Windows, VxWorks, Linux, QNX, ThreadX, eCOS, etc)
- Hardware: Compatible with 32-bit microprocessors
- Multi platform (Intel, ARM, PowerPC, etc)
- Support of Intel and Motorola formats
- Consistent process data image access through messaging access (API)

Conformance
- Conforms to ODVA specifications v1.4 and CIP v3.3
- Fully compatible with EtherNet/IP Conformance Test Suite Version A7
- Molex is an active member of ODVA technical working groups

Included Hardware/Software
EtherNet/IP Scanner and Adapter
- CIP Features:
  - IO messaging (process data)
  - Explicit messaging (configuration/diagnostic)
- Supported Objects according to CIP Standard
  - Identity Object
  - Message Router Object
  - Assembly Object
  - Connection Manager Object
  - Connection Configuration Object
  - TCP/IP Interface Object
  - Ethernet Link Object
- Stack Resolution: Timing resolution in microseconds
- Application Watchdog
- Rack Optimization for best performances with PointIO and FlexIO devices
- CD Deliverable: single product line licensing (no royalty), ANSI C source code, electronic documentation, application samples

EtherNet/IP Adapter
- CIP Features:
  - IO messaging (process data)
  - Explicit messaging (configuration/diagnostic)
- Supported Objects according to CIP Standard
  - Identity Object
  - Message Router Object
  - Assembly Object
  - Connection Manager Object
  - Connection Configuration Object
  - TCP/IP Interface Object
  - Ethernet Link Object
- Stock Resolution: Timing resolution in microseconds
- Application Watchdog
- Generic EDS file
- CD Deliverable: single product line licensing (no royalty), ANSI C source code, electronic documentation, application samples

Ordering Information

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<tr>
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<td>SDK-EIP-CNF-U</td>
<td>112106-5011</td>
<td>EtherNet/IP Scanner OEM Configuration Console, USB Dongle, 1 license</td>
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Support/Training Information

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<tr>
<td>SDK-EIP-TRN</td>
<td>860000-0143</td>
<td>Training Support for EtherNet/IP stack</td>
</tr>
</tbody>
</table>
Brad®
Windows Compatible Multi-Slave Driver for PROFINET
112027
PROFINET Multi IO-Device

Features and Benefits
• Connect a PC under Windows to PROFINET controller
• Use standard Ethernet card
• Support PROFINET IO Real-Time communication
• Support multi-slave functionality on single PC by using multiple Ethernet ports
• Typical applications:
  - HMI/Operator panel
  - Workbench
  - IO simulation

Description
• Conform to PROFINET IO v2.2 specifications
• Support up to 32 IO-Device connections in a single PC
• Support PROFINET Alarms
• Engineering Tools:
  - Configuration console
  - Test and diagnostic tools
• Includes Windows Library (DLL)
• Windows (32-bit): Seven, 2008 Server, Windows Vista®
  2003 Server, Windows XP®

Included Hardware/Software
• Supports connected and unconnected messages
• Supports synchronous and asynchronous modes
• Support of ListIdentify service to detect all EtherNet/IP stations connected to the network
• DLL library for Windows 32-bit (Seven/XP/Vista)
  - Designed to be used in multi-threaded applications
  - Several applications can use the EIP_Driver simultaneously
• DLL library can be statically or dynamically linked with the target application
• CD Deliverable: single product line licensing (no royalty), ANSI C source code, electronic documentation, application samples

Conformance
• Conform to PROFINET IO conformance test tool (PN Tester)
• Molex is an active member of PROFINET technical working groups

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>DRL-EPM-JMH-S</td>
<td>112027-5007</td>
<td>Windows PROFINET Multi IO-Device Driver, Software protection key</td>
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</table>

Brad®
Windows Compatible Explicit Messaging Driver for EtherNet/IP
112106
EtherNet/IP EM Driver

Features and Benefits
• Fastest and easiest solution to implement EtherNet/IP Explicit Messaging communication on PC-based systems
• User friendly library, no EtherNet/IP knowledge required
• Typical applications:
  - Engineering tool
  - Commissioning console
  - Diagnostic and Monitoring tools
  - HMI/Scada applications
  - Custom software

Description
• EIP_Driver provides an Application Programming Interface (API) that simply send/receive buffer of data on the network with remote EtherNet/IP EM Server devices
• The EIP_Driver manages the complete CIP communication (connection/reconnection, etc) so the developer needs no special expertise in the EtherNet/IP protocol.

Included Hardware/Software
• IO Data: Up to 1440 Input bytes and 1440 Output bytes per IO-Device slot
• Automatic generation of GSD file based on user configuration ready to use in PROFINET I/O-Controller engineering software
• Allows design of fixed and modular device
• IP Device configuration: DCP or Local
• Software Protection

Conformance
• Fully compatible with EtherNet/IP Conformance Test Suite Version A7
• Molex is an active member of ODVA (Open DeviceNet® Vendor Association) technical working groups

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>SDK-EIP-EML</td>
<td>112106-5008</td>
<td>EtherNet/IP Explicit Messaging DLL library, Client mode</td>
</tr>
</tbody>
</table>
Features and Benefits

- Direct-Link™ SW1000 provides data acquisition between Windows PC-based applications and industrial devices connected to Ethernet TCP/IP
- Economic solution; well suited for embedded and light architecture (laptop, panel PC, MMI)
- 100% software solution; use PC COM port or integrated Ethernet interface (3COM, NE2000)
- Wide variety of open and vendor specific industrial protocols
- 1000 tags, full tags and Siemens (S5, S7, TI) versions

Description

- Based on Windows TCP/IP socket
- All Ethernet protocols can run simultaneously
- All Ethernet protocols can run Client and Server modes
- Database (32 Kbits, 32 Kwords) for Server mode to exchange data with applications

Included Hardware/Software

- Engineering Tools:
  - Engineering console
  - Test and diagnostic tools
- Compatible Data Servers:
  - OPC DA v3.0, 2.0.5 and 1.0a
  - Wonderware® DAServer (XP only)
  - Wonderware I/O (SuiteLink/FastDDE) (XP only)
- Includes Development Libraries
- Software or Dongle (Parallel or USB) Protection

Compatible Protocols

- Ethernet TCP/IP
  - Altus® Alnet II (AL200x, webgate); Client/Server
  - Alstom® SRTP (C80-35, C80-75); Client/Server
  - Allen-Bradley® Logix5000 (ControlLogix and FlexLogix); Client/Server
  - GE Fanuc® SRTP (C90-30, C90-70); Client/Server
  - Mitsubishi® Melsec (A and Q); Client/Server
  - Omron® FINS (C, CV, CS); Client/Server
  - Schneider® Modbus TCP and UDP; Client/Server
  - Schneider® UNI-TE (Premium and Micro); Client/Server
  - Siemens® Industrial Ethernet (S5, S7, TI); Client/Server

Serial

- Modbus Master (ASCII and RTU)
- Modbus Slave (ASCII and RTU)
- GE Fanuc® SNPX Master (90-xx and 80-xx Series)
- Schneider® Uni-Telway Slave (TSX 7 Series)
- Siemens® AS511 Master (Simatic S5 Series)
- Siemens® PPI/PPI+ Master (Simatic S7-200 Series)
- Siemens® Ti-Dir Master (Simatic TI-505 Series)

### Engineering No. | Standard Order No. | Description
--- | --- | ---
DRL-ALL-SW-S | 112027-0005 | SW1000 software drivers, 1000 tags, Software key protection.
DRL-ALL-SW-S | 112027-0002 | SW1000 software drivers, Full tags, Software key protection.
DRL-SIE-SW-S | 112027-5014 | SW1000 for Siemens (S5, S7, TI), Full tags, Software key protection.
DRL-ALL-SW-P | 112027-0004 | SW1000 software drivers, 1000 tags, Parallel dongle protection.
DRL-ALL-SW-P | 112027-0001 | SW1000 software drivers, Full tags, Parallel dongle protection.
DRL-SIE-SW-P | 112027-5013 | SW1000 for Siemens (S5, S7, TI), Full tags, Software key protection.
DRL-ALL-SW-U | 112027-0006 | SW1000 software drivers, 1000 tags, USB dongle protection.
DRL-ALL-SW-U | 112027-0003 | SW1000 software drivers, Full tags, USB dongle protection.
DRL-SIE-SW-U | 112027-5015 | SW1000 for Siemens (S5, S7, TI), Full tags, Software key protection.
DRL-UPE-SWF | 112027-0010 | SW1000 upgrade from 1000 tags to Full tags.
Brad® applicom®
Network Interface Card

112000
Industrial Ethernet

Features and Benefits
- Fast data acquisition between PC-based applications and industrial devices connected to Ethernet TCP/IP
- On-board co-processor eliminates data bottlenecks, ensuring delivery of time critical information
- All protocols are included
- Best choice for Supervision/HMI/SCADA applications
- Equipment redundancy via OPC server
- Combo offer:
  - Ethernet + PROFIBUS (1.5 Mbps)
  - Ethernet + Serial (38.4 Kbps)

Description
- Engineering Tools:
  - Engineering console
  - Test and diagnostic tools
- Compatible Data Servers:
  - OPC DA v3.0
  - Wonderware® DAServer (XP only)
  - Wonderware IO (SuiteLink/FastDDE) (XP only)
- Includes Development Libraries
- Supported OS:
  - Others: Linux, VxWorks, RTX VenturCom

Included Hardware/Software
- Bus Format
  - PCI Universal bus 3.3V/5V (PCI-X compatible)
  - PCI Express 1x
- Hardware plug and play
- AMD SC520
- 16 MB SDRAM
- 4 MB Flash Memory
- One Ethernet port
  - Fast Ethernet 10/100 Mbps, auto negotiating
  - Base-T (RJ45), 4 LEDs (Rx, Tx, Link, 10/100)

Compatible Protocols
- Ethernet TCP/IP (Client/Server modes)
  - Altus® Alnet II (AL 200x, Webgate)
  - Alstom® SRTP (C80-35, C80-75)
  - Allen-Bradley® EtherNet/IP (PCCC) (Logix, PLC-5 and SLC 500)
  - GE Fanuc® SRTP (90-30, 90-70)
  - Mitsubishi® Melsec (A, Q)
  - Omron® FINS (C, CV, CS)
  - Schneider Electric® Open Modbus TCP
  - Schneider Electric® UNI-TE (Premium and Micro)
  - Siemens® Industrial Ethernet (S5, S7, TI)
  - UDP Send/Receive (Free messaging)

Ethernet ISO
- Schneider Electric® Ethway
- Siemens® Industrial Ethernet ISO (S5, S7, TF and TI)

Conformance
- RoHS compliant
- CE
- OPC certified
- Rockwell Encompass™
- Schneider Collaborative

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Description</th>
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<td>PCI2000ETH PCI Network Interface Card for Ethernet</td>
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<td>PCI2000ETH PCI Express Network Interface Card for Ethernet</td>
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<td>PCI2000ETH PCI Network Interface Card for Ethernet + Profibus</td>
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<td>APP-ESR-PCI-C</td>
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</table>
Brad® applicom®
Network Interface Card
112000
Ethernet Fieldbus

Features and Benefits
• Deterministic data acquisition for real time PC-based control applications
• On board co-processor eliminates data bottlenecks, ensuring delivery of time critical information
• Very Easy-to-Use; no knowledge of protocol required
• Remote Access via TCP/IP connection; to able configuration and diagnostic when using real time OS (VxWorks, QNX, etc)

Description
• Auto mapping of IO in card DPRAM
• IO exchange up to 14 Kbytes
• Hardware and software Watchdog
• Auto-Boot (Configuration stored in Flash)
• Engineering Tools:
  - Engineering console with automatic test and diagnostic tools
• Compatible Data Servers:
  - OPC DA v3.0, 2.05 and 1.0a
  - Wonderware® DAServer
  - Wonderware IO (SuiteLink/FastDDE)
• Includes Development Libraries
• Supported OS:
  - Windows (32-bit and 64-bit); Seven, 2008 Server, Windows Vista®, 2003 Server, Windows XP®/
  - XP Embedded
  - Others: Linux, VxWorks, RTX VenturCom

Included Hardware/Software
• PCI Universal bus 3.3V/5V (PCI-X compatible)
• Hardware plug and play
• AMD SC520
• 16 Mb SDRAM; 4 Mb Flash Memory
• 1 Digital Input + 1 Digital Output
• 1 Ethernet port
  - Fast Ethernet 10/100 Mbps, auto negotiating
  - Base-T (RJ45), 4 LEDs (Rx, Tx, Link, 10/100)

Compatible Protocols

EtherNET/IP
• Scanner and adapter
• Explicit messaging (Client/Server)
• Up to 128 simultaneous CIP connections
• EtherNet/IP Devices supported: Generic and Rockwell IO through EDS files (FlexIO, CompactLogix, etc)
• IP address settings configurable via the console or DHCP/BOOTP server
• Client DNS Supported

PROFINET IO-Controller
• RT Class-1
• Up to 127 IO-Devices; max. IO size 14K
• Cyclic Data Exchange (IO); up to 1437 In and 1437 Out per device
• Acyclic Data Exchange (for Configuration + Diagnostic)
• Minimum cycle time 1 ms
• Alarm handling
• IP Address manager
• Commissioning tool (set name, set IP address, device blinking, etc)

PROFINET IO-Device
• RT Class-1
• Up to 1437 In and 1437 Out; 1 slot for Inputs + 1 slot for Outputs
• Instructions and Maintenance 0, 1, 2, 3
• 1 x Record for user custom diagnostics
• Process- and Diagnostic Alarm
• GSD file

Conformance
• RoHS compliant
• CE
• OPC certified
• ODVA conformance tested
• Rockwell Encompass™

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Configuration Console

Device Diagnostics
Features and Benefits
- Connects your Allen-Bradley® ControlLogix to a Modbus Ethernet or Serial network
- Direct IO Mapping, no Ladder Logic to write for configuration and data transfer between module and CLX processor
- Fully integrated into the Rockwell® Automation environment
- User-friendly configuration tool with intuitive graphical interface

Description
- RLL support: remote configuration and monitoring via RSLinx
- Add-On-Profile for Rockwell® RSLogix5000
- USB port for user configuration and firmware upgrade
- Engineering console simplified user configuration and diagnostic
- Support multiple modules in a chassis
- Support Local and Remote chassis
- Easy diagnostics: Built-in LEDs and 4 characters display

Included Hardware/Software
- 128 MB of onboard memory
- 8 MB of flash memory (user configuration data and firmware)
- CPU Data exchange:
  - 496 Inputs bytes + 496 Output bytes
  - 32.000 Words Registers (CIP messaging)
- Type A, USB 2 and 1.1 compatible
- Communication Ports
  - 1x Ethernet, 10/100 Mbps, RJ45
  - 2x Serial, 110 bps to 115.2 kbps, RS232/RS485/RS422, RJ45 (DB9 male supplied cable)

Compatible Protocols
- Modbus Master (RTU or ASCII)
- Modbus Slave (RTU or ASCII)
- Modbus TCP and UDP Client and Server

Conformance
- RoHS compliant
- CE, UL, cUL
- Class 1 Div 2
- Rockwell Encompass™
Brad® Applicom®
Industrial Multi-Protocol Gateway

112034
Ethernet, Serial and PROFIBUS

Features and Benefits
• Allows simultaneous communication between industrial devices using up to 20 different Ethernet TCP/IP, PROFIBUS and Serial protocols.

• Typical architectures: data translator, data concentrator, Industrial firewall

• No programming, just configuring (tools included)

Description
• Real-Time data exchange through internal database (32 Kbits/32 Kwords)

• Upload/Download configuration and diagnostic through Remote TCP/IP

• Up to 128 PLCs on Ethernet TCP and 126 PROFIBUS devices

• Full management of Read/Write cyclic access through word status commands

• Engineering tools:
  - Configuration console
  - Test and diagnostic tools

Included Hardware/Software
• RAM 32 Mbytes
• Flash Disk 32 Mbytes
• Diagnostic LEDs

Communication Ports
• 1x Serial 2300 bps up to 115.2 Kbps
• 1x Ethernet 10/100 Mbps, RJ45
• 1x PROFIBUS, 9.6 Kbps up to 12 Mbps, DB9 female

• Up to 128 Providers (Dallas, Lumen, Phoenix/Telecom, etc.)
• Embedded 6 Digital Inputs/2 Digital Outputs

Compatible Protocols
• Ethernet TCP/IP (Client/Server modes)
  - Altus® Alnet II (AL 200x, Webgate)
  - Alstom® SRTP (C80-35, C80-75)
  - Allen-Bradley® EtherNet/IP (Logix, PLC-5 and SLC 500)
  - GE Fanuc® SRTP (90-30, 90-70)
  - Mitsubishi® Melsec (A, Q)
  - Omron® FINS (C, CV, CS)
  - Schneider Electric® Open Modbus TCP and UDP
  - Schneider Electric® Uni-TE (Premium and Micro)
  - Siemens® Industrial Ethernet (S5, S7, 505)

• PROFIBUS
  - DP-V0 Master
  - DP-V0 Slave
  - S7/MPI Client
  - FDL S5 (CP 243, CP 243-1, CP 243-2)

• Serial
  - GE Fanuc® DF1 Master
  - Schneider Electric® Uni-TE Master
  - Siemens® S7/400 Master
  - Siemens® S7/300 Master
  - ABB® Robotics

Conformance
• RoHS compliant
• CE

Engineering No. Standard Order No. Description
APP-ESP-GTW 112034-0001 Ethernet to PROFIBUS/Ethernet/Serial Gateway
APP-ESR-GTW 112034-0002 Ethernet to Ethernet/Serial Gateway
Features and Benefits
- Reliable solution for connecting industrial controllers to IO devices in harsh duty environments.
- Accepts M12 threaded connectors or Brad Ultra-Lock® Push-Pull connection system
- Standard hole housing pattern allows for interchangeability with popular IO modules
- User configurable versions; user can set up each digital channel as either an input or output
- Scrolling 4 characters and visible LEDs provide maintenance personnel with the ability to easily determine IO, module and network status

Description
- Rated IP67 for harsh environments
- Designed for direct machine mount applications
- Sixteen digital input/output per module
- Supports PNP and NPN input devices
- IP addressing via BootP, DHCP or static (through web interface, push button and PLC Scanner command)
- Built-in 2-port Ethernet switch for daisy chain topology
- Configurable IO capability (through webinterface and PLC Scanner commands)
- Watchdog with output reply state
- Built-in web server for remote configuration and diagnostics

Compatible Protocols
- Modbus TCP and UDP Server
- EtherNet/IP Adapter
- PROFINET IO-Device

Conformance
- IP67 according to IEC 60529
- NEMA 6P
- Vibration: MIL-STD-202F, method 204D, condition A
- Thermal Shock: MIL-STD-1344A
- CE, UL, cUL
- RoHS compliant
- FWO certified

Included Hardware/Software
- IO Configurations:
  - 16 inputs
  - 14 inputs + 2 outputs
  - 12 inputs + 4 outputs
  - 8 inputs + 8 outputs
  - Universal
  - User configurable
- IO Connectors: 8x M12 ports, Ultra-Lock® M12 female 5-pole, internally threaded
- Ethernet Connectors: Ultra-Lock M12 female, 4-pole D-coded acting as a switch, crossover capability
- Power Connectors:
  - Power In—Male Mini-Change®, 4- or 5-pole
  - Power Out—Female Mini-Change, 4- or 5-pole
- Power Requirements:
  - Module Input Power—24V DC
  - Module Output Power—24V DC, 2.0A max. per channel, 8.0A max. per module
- Communication Rate: 10/100 Mbps auto-sensing, auto-crossing, half/full duplex
- Input Type:
  - Compatible with dry contact and PNP or NPN 3-wire switches.
  - Electronic short circuit protection
- Input Delay: 2.5ms default or configurable (through web interface and PLC Scanner commands)
- Input Device Supply: 200mA per port at 25°C
- Output Load Current: 2.0A max. per channel, electronic short circuit protection
- Maximum Switching Frequency: 200 Hz
- Housing Dimensions: 60.00mm (2.36") by 220.00mm (8.66") by 20.00mm (.78")
- Mounting Dimensions:
  - 37.50mm (1.48") horizontal on centers
  - 210.00mm (8.27") vertical on centers
  - Center hole
- Operating Temperature: -25 to +70°C
- Storage Temperature: -40 to +85°C

Modbus TCP

<table>
<thead>
<tr>
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<th>No. of Power Pins</th>
<th>IO Configuration</th>
<th>Input Channel Type</th>
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This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123  www.barr-thorp.com
### EtherNet/IP

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<th>Engineering No.</th>
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<th>No. of Power Pins</th>
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<th>Input Channel Type</th>
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### PROFINET IO

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</table>
As our world becomes more connected, an increasing number of manufacturers and installers are specifying Ethernet devices for their harsh applications. The Brad family of rugged connectivity products is a leading product line provider of Ethernet infrastructure for Molex.

The Molex Direct-Link, harsh-duty, Ethernet switches have been developed to allow customers to convert from traditional in-cabinet to on-machine mounting, moving the switch closer to the machine and thereby reducing cabling.

The Molex Ultra-Lock® system of connectors and cordsets complete the Direct-Link Harsh-Duty Switches line.

**Features and Benefits**

- **Ultra-Lock® Connection system**—faster, simpler and more secure connections than any other system on the market
- **NEMA 6 and IP69K rated environmental Protection**—withstands dust, pressure-wash and submersion in water
- **Class 1, Division 2 rated**—suitable for Oil and Gas markets where hazardous gases may be present
- **Operating temperature -20 to +75°C** enables installation in extreme temperature applications
- **30mm and 60mm formats with standard hole patterns**—allows use of standard machine extrusion members
- **Auto-learning with no software or configuration required**—plug-and-play capabilities means less-skilled labor is able to install systems

**Characteristics and Performance**

<table>
<thead>
<tr>
<th>Switch Type</th>
<th>Ports</th>
<th>Power Input</th>
<th>Dimensions</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unmanaged (Store and Forward)</td>
<td>5 M12</td>
<td>Redundant input terminals</td>
<td>176 x 30 x 34 (DRL-750)</td>
<td>230g (DRL-750)</td>
</tr>
<tr>
<td></td>
<td>8 Mini-Change® (5-pin)</td>
<td>2.0W max. (DRL-750), 2.4W max. (DRL-78x)</td>
<td>220 x 60 x 37 (DRL-78x)</td>
<td>580g (DRL-78x)</td>
</tr>
</tbody>
</table>

**Environmental**

**Humidity:** 5–95% RH non condensing

**References**

- **Vibration:** 7g (IEC68-2-29)
- **Shock:** 50g (IEC68-2-29)
- **Electrical Safety:** EN61010-1 (IEC61010)
- **EMI Emissions:** FCC part 15, ICES 003, EN55011 Class A (DRL-78x), Class B (DRL-750)
- **EMC Immunity:** EN61326, EN61000-4-4, EN61000-4-5, EN61000-4-2; 8Kv contact/16Kv Air (DRL-750) 4Kv contact/8Kv Air (DRL-78x)
- **UL:** File number pending

**Physical**

- **Operating Temperature:** -20 to +75°C
- **Storage Temperature:** -40 to +85°C

---

**Engineering No.** | **Standard Order No.** | **Description** | **Ports** | **Power** |
--- | --- | --- | --- | --- |
DRL-750 | 112111-5001 | IP67 Fast Ethernet Unmanaged Switch | 5 | M12 |
DRL-780 | 112105-5002 | IP67 Fast Ethernet Unmanaged Switch | 8 | Mini-Change® (5-pin) |
DRL-781 | 112105-5004 | IP67 Fast Ethernet Unmanaged Switch | 8 | Mini-Change (4-pin) |
Molex demonstrates market leadership with the comprehensive CIP Safety Stack software solution, allowing industrial-device manufacturers to embed CIP Safety Stack technology quickly and economically within their products.

Common Industrial Protocol (CIP) Safety is a protocol extension developed by the ODVA. The CIP Safety protocol offers a set of highly-integrated safety services which leverage the underlying communications stacks of the standard CIP networks to transport data from a source to a destination. CIP Safety allows end-users to implement safety systems in a more integrated, cost-effective manner. The Molex CIP Safety Software Kit (also called Stack) is offered as a tool kit, with the stack provided as modular "C" code that is pre-tested. The software allows a manufacturer of intelligent industrial products to implement the necessary safety-application layer that enables products to comply with the CIP Safety specification (Edition 2.1) from ODVA. The CIP Safety Stack is available for both DeviceNet* and EtherNet/IP*, and both are endorsed by Rockwell Automation under the Value Added Design Partner program.

The CIP Safety Stack is approved by TUV for SIL3 applications and it has been conformance tested using the ODVA Conformance Test. Molex can support customers that request assistance with design implementation and/or guidance through TUV approval.

### Features and Benefits
- Meets IEC 61508, SIL3 ensuring international market acceptance
- Approved by TUV and tested by ODVA means a high-quality solution for minimal project risk and faster time-to-market
- Pre-tested modular ANSI C code is easy to compile using standard compilers; faster time-to-market
- Molex engineers can support protocol-integration requests minimizing investment required for in-house resources
- Designed for use with other Molex/Brad offerings: Hardware (DN4 network interface cards), Software (DeviceNet or EtherNet/IP software stacks) which results in a complete CIP communication solution

### Specifications
- ANSI C code is provided for the safety portion of the Stack (Compliant with CIP Safety Specification 2.1)
- ANSI C code for black-channel components (NET_CTRL_IO)
- Interface specification for high-integrity and black-channel environments
- Safety integration manual (including safety measure requirements)
- Optionally, modified standard CIP stacks (software/firmware) for DeviceNet (Slave) or EtherNet/IP (Adapter)
- Optionally, ANSI C code for the Platform Adaptation Layers (both safety and non-safety)
- Documentation required by certification bodies (TÜV, ODVA)
- Support during certification process of vendor’s final product

### Markets and Applications
- Industrial Device Manufacturers
  - I/O blocks
  - Valves
  - Drives
  - Complex machines (OEM)
- End-Users
  - Automotive
  - Consumer goods
  - Heavy industries

---

**Engineering No.** | **Standard Order No.** | **Device Type** | **Network** | **Description** |
---|---|---|---|---|
SDK-DNS-SAF | 112115-0001 | Slave | DeviceNet | Stack Development Kit (Standard Source Code) |
SDK-DNS-SAF-L | 112115-0002 | Royalty (per device) |
SDK-EIP-ADP-SAF | 112117-0001 | Adapter | EtherNet/IP | Stack Development Kit (Standard Source Code) |
SDK-EIP-ADP-SAF-O | 112117-0002 | Royalty (per device) |
SDK-EIP-ADP-SAF-L | 112116-0002 | | |
SDK-DEP-SAF-SAF | 112115-0003 | Slave and Adapter | DeviceNet and EtherNet/IP | Stack Development Kit (Standard Source Code) |
SDK-DEP-SAF-SAF-O | 112115-0004 | Royalty (per device) |
SDK-DEP-SAF-SAF-L | 112116-0003 | Royalty (per device) |
SDK-CIP-EDS-SAF | 112115-0005 | N/A | N/A | Engineering Support |

*CIP, DeviceNet and EtherNet/IP are trademarks of ODVA, Inc.
†Note: Source code obfuscation means that the "C" code is protected, but the compiler can process it.

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Brad® Direct-Link®
In-Cabinet Ethernet Switches

112036
Series 200 and 300

A complete line of industrial Ethernet switches for managed or unmanaged applications.

Features and Benefits
• 5-, 8- and 9-port configurations support both Copper and fiber wiring
• Unique ergonomic design with DIN rail or panel mount option using a dual-clip system for quick and easy installation
• Small footprint in IP30 industrial package
• Supports all standard IEEE 802.3 protocols
• Redundant, dual-DC power inputs

Series 200—Unmanaged Switches
• Direct-Link Industrial Ethernet unmanaged switches provide enhanced performance allowing you to achieve real-time deterministic operation of your Ethernet network
• Plug and play—no configuration required
• Best value for reducing network collisions

Series 300—Managed Switches
• Direct-Link Industrial Ethernet managed switches offer many features to meet your network management and diagnostic needs
• Advanced Network Management
  - Rapid Spanning Tree Protocol (RSTP) for fault-tolerant loops
  - VLAN (port and tag based) for traffic segregation
  - Message filtering to stop multi-cast storms (IGMP snooping)
  - Priority queuing for real-time performance (QoS)
  - Web browser interface
• Comprehensive Network Diagnostics
  - RMON and port mirroring
  - SNMP agent v1, v2 and v3 (for extra security)

Specifications
Ethernet protocols supported:
IEEE 802.3 protocols (IEEE 802.3, 802.3u, 802.3x)
10/100BaseT(x) Ports: Shielded RJ45
Auto-negotiating:
10/100 Mbps auto-negotiation
UL Approval:
- UL 508 (E205563)
- UL 1604 (E314891)
Class 1, Div 2
Group A, B, C, D hazardous locations
Auto-crossover (Auto-mdi/mdi-x): Supported on all ports
Flow Control: Half or full duplex
Ethernet Isolation: 1500 VRMS 1 minute
Forwarding Mode: Store and forward
Latency (Typical): 5 usec (time to route a message from one port to another internally at 100 Mps)
MAC Addresses: 1K or 2K
Address Learning: Automatic
Illegal Frames: Dropped per 802.3
Late Collisions: Dropped after 512 bit times
Supply Voltage: 10–30V DC
Power Consumption (Typical): 2–5 W (dependent on model)
Power Saving: Automatic
Mounting: DIN rail or panel direct
Dimensions:
  - Height—142.24mm (5.60"
  - Depth—102.36mm (4.03"
  - Width—5-port: 27.18mm (1.07"
  - 8- and 9-port: 38.74mm (1.525"

Environmental
Humidity: 5 to 95% (non-condensing)

Certification
Vibration: IEC68-2-6
Electrical Safety: EN61010-1
EMI Emissions: FCC part 15, ICES 003, EN55011 (Class A)
EMC Immunity: EN61326
Packaging: IP30 protection

Physical
Operating Temperature: -10 to +60°C
Storage Temperature: -40 to +85°C

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Product Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRL 241-MSC</td>
<td>112036-0006</td>
<td>Industrial 5-port Ethernet switch, unmanaged, 4 RJ-45, 1 fiber, multi-mode, SC connector</td>
</tr>
<tr>
<td>DRL 241-MST</td>
<td>112036-0007</td>
<td>Industrial 5-port Ethernet switch, unmanaged, 4 RJ-45, 1 fiber multi-mode, ST connector</td>
</tr>
<tr>
<td>DRL 25D</td>
<td>112036-0010</td>
<td>Industrial 5-port Ethernet switch, unmanaged, 5 RJ-45</td>
</tr>
<tr>
<td>DRL 28D</td>
<td>112036-0011</td>
<td>Industrial 8-port Ethernet switch, unmanaged, 8 RJ-45</td>
</tr>
<tr>
<td>DRL 281-MST</td>
<td>112036-0013</td>
<td>Industrial 9-port Ethernet switch, unmanaged, 8 RJ-45, 1 fiber multi-mode, ST connector</td>
</tr>
<tr>
<td>DRL 352-MSC</td>
<td>112036-0016</td>
<td>Industrial 5-port Web-managed Ethernet switch, 5 RJ-45, 2 fiber, multi-mode, SC connector</td>
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<tr>
<td>DRL 352-MST</td>
<td>112036-0017</td>
<td>Industrial 5-port Web-managed Ethernet switch, 5 RJ-45, 2 fiber, multi-mode, ST connector</td>
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<tr>
<td>DRL 350</td>
<td>112036-0020</td>
<td>Industrial 5-port Ethernet switch, managed, 5 RJ-45, redundant power supply</td>
</tr>
<tr>
<td>DRL 362-MSC</td>
<td>112036-0021</td>
<td>Industrial 8-port Web-managed Ethernet switch, 8 RJ-45, 2 fiber, multi-mode, SC connector</td>
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<tr>
<td>DRL 362-MST</td>
<td>112036-0022</td>
<td>Industrial 8-port Web-managed Ethernet switch, 8 RJ-45, 2 fiber, multi-mode, ST connector</td>
</tr>
<tr>
<td>DRL 362-SSC</td>
<td>112036-0023</td>
<td>Industrial 8-port Web-managed Ethernet switch, 8 RJ-45, 2 fiber, single-mode, SC connector</td>
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<tr>
<td>DRL 38D</td>
<td>112036-0025</td>
<td>Industrial 8-port Ethernet switch, managed, 8 RJ-45</td>
</tr>
<tr>
<td>DRL 3F0</td>
<td>112036-0026</td>
<td>Industrial 16-port Ethernet Switch, RJ-45, Managed, Redundant Power</td>
</tr>
<tr>
<td>DRL 3H0</td>
<td>112036-1127</td>
<td>Industrial 18-port Ethernet Switch, RJ-45, Managed, Redundant Power</td>
</tr>
</tbody>
</table>
Industrial Ethernet
Brad® RJ-Lnxx® RJ-45
Single-Ended Cordsets
130050
Male, Pigtail
Straight

Features and Benefits
• RJ-45 plug, combined with industrially proven form factor provides a secure robust connection that protects against the effects of vibration and accidental disconnection
• Category 5e compliant
• Several cable options available

ENS—Solid Core Cable
Physical
Cable: Solid core
Conductors: 24 AWG solid bare Copper,
0.020" (0.510 mm)
Insulation: 0.009" (0.229 mm) of Cellular Polyethylene
0.04" (1.00mm) nominal diameter
Pair: Two insulated conductors twisted together, lay lengths varied between pairs to minimize cross talk
Core: Four pairs cabled together
Binder: Polyester tape, 20% overlay minimum
Shield: Aluminum/Polyester tape, 20% overlay minimum
Drain Wire: 24 AWG stranded (7/32") Tin-plated Copper
Jacket:
Black Polyurethane 0.025" (.635 mm) nominal thickness
Operating Temperature: -20 to +80°C
Wiring Sequence: Choice of TIA/EIA, 568A/B, or 10 Base-T
Electrical at 20°C
TIA/EIA Rating: Category 5e

ENP—Kevlar Wrapped Cable
Physical
Cable: Proplex Kevlar wrapped
Conductors: 26 AWG stranded bare Copper
Insulation: Color coded HFFR, halogen free,
0.035" (0.90mm) nominal diameter
Pair: Cabled with Kevlar strength member and tape wrapped
Core: Four pairs cabled together
Shield: Inner—Aluminum mylar, 100% coverage
Outer—Tinned Copper
Operating Temperature: -70 to +105°C
Jacket: Black Urethane 0.059" (1.50mm) nominal thickness
Diameter: 0.287" (7.30 mm) nominal
Wiring Sequence: Choice of TIA/EIA, 568A/B, or 10 Base-T
Electrical at 20°C
TIA/EIA Rating: Category 5

<table>
<thead>
<tr>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Wiring</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shielded Stranded Proplex™ Kevlar* Wrapped (ENP)</td>
<td>PUR</td>
<td>10 Base-T (4 wire)</td>
<td>1.0m</td>
<td>ENP1305M010</td>
<td>130050-0105</td>
</tr>
<tr>
<td>Shielded Solid Core (ENS)</td>
<td>PVC</td>
<td>568A (8 wire)</td>
<td>1.0m</td>
<td>ENS2305M010</td>
<td>130050-0392</td>
</tr>
<tr>
<td></td>
<td></td>
<td>568B (8 wire)</td>
<td></td>
<td>ENS3305M010</td>
<td>130050-0436</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*Kevlar is a trademark of DuPont

Configuration Code†
Build-a-Part Number

<table>
<thead>
<tr>
<th>Length</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>M020</td>
</tr>
<tr>
<td>5</td>
<td>M050</td>
</tr>
<tr>
<td>10</td>
<td>M100</td>
</tr>
</tbody>
</table>

ENP1305M010
Wiring Option
Cable Option

†Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
**Industrial Ethernet**

**Brad® RJ-Lnxx RJ-45 Double-Ended Cordsets**

**130050**

**Male-Male Straight Standard RJ-45**

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**Features and Benefits**

- RJ-45 plug, combined with industrially proven form factor provides a secure robust connection that protects against the effects of vibration and accidental disconnection
- Category 5e compliant
- Several cable options available

---

**ENP**—Shielded Standard Proplex™ Kevlar Wrapped Cable

**Physical**

- Cable: Proplex Kevlar wrapped
- Conductors: 26 AWG stranded bare Copper
- Insulation: Cored HFFR, halogen free, 0.035” (0.90mm) nominal diameter
- Pair: Cabled with Kevlar strength member and tape wrapped
- Core: Four pairs cabled together
- Shield: Inner—Aluminum mylar, 100% coverage
  - Outer—Tinned Copper braid, 80% coverage
- Operating Temperature: -70 to +105°C
- Jacket: Black polyurethane UV stable, 0.024” (0.620mm) nominal thickness
- TIA/EIA Rating: Category 5e

---

**ENQ**—Unshielded Stranded Cable

**Physical**

- Cable: Stranded
- Conductors: 24 AWG stranded tinned Copper
- Insulation: Polyolefin 0.037” (0.94mm) nominal diameter
- Pair: Two insulated conductors twisted together, lay lengths varied between pairs to minimize cross talk
- Core: Four pairs cabled together
- Binder: Polyester tape, 20% overlay minimum
- Shield: Aluminum/polyester tape, 20% overlay minimum
- Drain Wire: 24 AWG stranded (7/32”) Tin-plated Copper
- Jacket: Black polyolefin 0.025” (.635mm) nominal thickness
- Operating Temperature: -20 to +80°C
- Diameter: 0.245” (6.223mm) nominal
- TIA/EIA Rating: Category 5e

---

**Table**

<table>
<thead>
<tr>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Wire Size</th>
<th>Wiring</th>
<th>Length</th>
<th>Male Straight-to-Male Straight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shielded Stranded Proplex™ Kevlar Wrapped (ENP)</td>
<td>PUR With Kevlar Wrap</td>
<td>24</td>
<td>10 Base-T (4 wire)</td>
<td>1.0m</td>
<td>ENP1335M010 130050-0107</td>
</tr>
<tr>
<td>Shielded Solid Core (ENS)</td>
<td>PUR</td>
<td>24</td>
<td>10 Base-T (4 wire)</td>
<td>1.0m</td>
<td>ENS1335M010 130050-0324</td>
</tr>
<tr>
<td>Shielded Solid Core (ENS)</td>
<td>PUR</td>
<td>24</td>
<td>568A (8 wire)</td>
<td>1.0m</td>
<td>ENS1335M010 130050-0394</td>
</tr>
<tr>
<td>Unshielded Stranded (ENQ)</td>
<td>PVC</td>
<td>24</td>
<td>568B (8 wire)</td>
<td>1.0m</td>
<td>ENQ1335M010 130050-0503</td>
</tr>
</tbody>
</table>

NOTE: Sales drawings for all standard order numbers are available on molex.com

---

**Configuration Code**

<table>
<thead>
<tr>
<th>Length</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>M010</td>
</tr>
<tr>
<td>5</td>
<td>M050</td>
</tr>
<tr>
<td>10</td>
<td>M100</td>
</tr>
</tbody>
</table>

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Industrial Ethernet
Brad® Standard
RJ-45 to RJ-45
Cable Assembly
Unshielded PVC

130048
Male Plug-to-Male Plug
Straight-Wired

Features and Benefits
- RJ-45 plug combined with industrially proven form factor provides a secure robust connection that protects against the effects of vibration and accidental disconnection
- Category 5e compliant

Reference Information
UL File No.: E200650

Physical
RJ-45 Plug: Clear Polycarbonate
Boot: PVC
Operating Temperature: -20 to +75°C

Environmental
Protection: IP20

Cable
03—Unshielded PVC
Conductors: 24 AWG stranded tinned Copper wire
Pair: Two pair UTP patch cable
Outside Diameter: 0.250” (6.4mm) nominal
Jacket Material: Teal PVC
Cable Properties: Sun and oil resistant
Inner Material Insulation: HDPE
Certification: UL type CMR, Ccc C(UL) type CMR
TIA/EIA Rating: Category 5e
Operating Temperature: -40 to +75°C

<table>
<thead>
<tr>
<th>Wiring</th>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Wire Size AWG</th>
<th>Length</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Base-T (4 wire)</td>
<td>Unshielded Stranded</td>
<td>PVC</td>
<td>4/24</td>
<td>1.0m (3.28’)</td>
<td>E66A06003M010</td>
<td>130048-0031</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Industrial Ethernet
Brad® RJ-Lnxx® RJ-45
Single-Ended Cordsets

130050
Threaded
Male
Straight

Features and Benefits
- RJ-45 plug, combined with industrially proven form factor provides a secure robust connection that protects against the effects of vibration and accidental disconnection
- Category 5e compliant
- Several cable options available
- Achieves IEC IP67 rates seal when mated with an RJ-Lnxx<sup>®</sup> receptacle

### ENP—Shielded Standard Proplex™ Kevlar<sup>®</sup> Wrapped Cable

**Physical**
- Cable: Proplex Kevlar wrapped
- Conductors: 26 AWG stranded bare Copper
- Insulation: Color coded HFFR, Halogen free, 0.035" (0.90mm) nominal diameter
- Pair: Cabled with Kevlar strength member and tape wrapped
- Core: Four pairs cabled together
- Shield: Inner—Aluminum Mylar, 100% coverage
- Outer—Tinned Copper braid, 80% coverage
- Operating Temperature: 70 to +105°C
- Jacket: Black Polyurethane 0.059" (1.50mm) nominal thickness
- Diameter: 0.287" (7.30mm) nominal
- TIA/EIA Rating: Category 5e

### ENS—Shielded Solid Core Cable

**Physical**
- Cable: Solid Core
- Conductors: 24 AWG solid bare Copper, 0.020" (0.510mm)
- Insulation: Polyethylene 0.042" (1.07mm) nominal diameter
- Pair: Two insulated conductors twisted together, lay lengths varied between pairs to minimize cross talk
- Core: Four pairs cabled together
- Binder: Polyester tape, 20% overlay minimum
- Shield: Aluminum/Polyester tape
- Operating Temperature: -20 to 60°C
- Diameter: 0.245" (6.223mm) nominal
- TIA/EIA Rating: Category 5e

<table>
<thead>
<tr>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Wire Size AWG</th>
<th>Wiring</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shielded Solid Core (ENS)</td>
<td>PUR</td>
<td>24</td>
<td>10 Base-T (4 wire)</td>
<td>1.0m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>26 AWG (8 wire)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>26 AWG (8 wire)</td>
<td></td>
</tr>
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<td>Shielded Solid Core (ENS)</td>
<td>PUR</td>
<td>24</td>
<td>10 Base-T (4 wire)</td>
<td>1.0m</td>
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<tr>
<td></td>
<td></td>
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<td>26 AWG (8 wire)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>24</td>
<td>26 AWG (8 wire)</td>
<td></td>
</tr>
<tr>
<td>ENP—Shielded Standard Proplex™ Kevlar® Wrapped Cable</td>
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</table>

<table>
<thead>
<tr>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Wire Size AWG</th>
<th>Wiring</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shielded Stranded Proplex™ Kevlar Wrapped (ENP)</td>
<td>PUR Kevlar Wrapped</td>
<td>26</td>
<td>10 Base-T (4 wire)</td>
<td>1.0m</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>568A (8 wire)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td>568B (8 wire)</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>568C (8 wire)</td>
<td></td>
</tr>
</tbody>
</table>

### ENQ—Unshielded Stranded Cable

**Physical**
- Cable: Stranded
- Conductors: 24 AWG stranded tinned Copper
- Insulation: Polyolefin 0.037" (0.94mm) nominal diameter
- Pair: Two insulated conductors twisted together, lay lengths varied between pairs to minimize cross talk
- Core: Four pairs cabled together
- Binder: Polyester tape, 20% overlay minimum
- Outer—Tinned Copper braid, 80% coverage
- Operating Temperature: -20 to +80°C
- Diameter: 0.220" (5.588mm) nominal
- TIA/EIA Rating: Category 5e

<table>
<thead>
<tr>
<th>Configuration Code†</th>
<th>Build-a-Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENP1105M010</td>
<td></td>
</tr>
</tbody>
</table>

<sup>†</sup>Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.

Note: Sales drawings for all standard order numbers are available on molex.com

<sup>*Kevlar is a trademark of DuPont</sup>
Double-Ended Cordsets

Features and Benefits

- RJ-45 plug, combined with industrially proven form factor provides a secure robust connection that protects against the effects of vibration and accidental disconnection
- Category 5e compliant
- Several cable options available
- Achieves IEC IP67 seals when mated with an RJ-Lnxx™ receptacle

### ENP—Shielded Standard Proplex™ Kevlar® Wrapped Cable

**Physical**
- Cable: Kevlar wrapped
- Conductors: 26 AWG stranded bare Copper
- Insulation: Color coded HFFR, Halogen free, 0.035" (0.90mm) nominal diameter
- Pair: Cabled with Kevlar strength member and tape wrapped
- Core: Four pairs cabled together
- Shield: Inner—Aluminum Mylar, 100% coverage
- Outer—Tinned Copper Braid, 80% coverage
- Operating Temperature: 70°C to +105°C
- Jacket: Black Polyurethane 0.059" (1.5mm) nominal thickness
- Diameter: 0.287" (7.3mm) nominal
- TIA/EIA Rating: Category 5e

<table>
<thead>
<tr>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Wire Size AWG</th>
<th>Wiring Option</th>
<th>Length Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENP1115M010</td>
<td>PUR</td>
<td>26</td>
<td>10 Base-T (4 wire)</td>
<td>2 Meters M020</td>
</tr>
<tr>
<td>ENP1125M010</td>
<td>PVC</td>
<td>24</td>
<td>568B (8 wire)</td>
<td>5 Meters M050</td>
</tr>
<tr>
<td>ENP1135M010</td>
<td>PVC</td>
<td>24</td>
<td>568B (8 wire)</td>
<td>10 Meters M100</td>
</tr>
</tbody>
</table>

**Configuration Code**

- Build-a-Part Number
- Length Code
- Wiring Option
- Cable Option

**ENP1115M010**

*Kevlar is a trademark of DuPont*
Industrial Ethernet
Brad® RJ-Lnxx® RJ-45
Sealed Receptacles
130053/130055
Female
Panel Mount
External Thread
Straight

Features and Benefits
• Simple field termination of cable using a standard punchdown tool
• Category 5e compliant
• Can be used with TIA 568A or 568B wiring sequences
• Color-coded block simplifies field wiring
• Achieves IEC IP67 rated seal when mated with RJ-Lnxx cordset—but also compatible with commercial RJ-45 patch cords

Environmental
Protection: IEC IP67
TIA/EIA Rating: Category 5e compliant

Physical
O-Ring Material: Viton
Insert Material: Acrylonitrile-Butadiene-Styrene (ABS)
Overmold Material: Polyurethane
Coupling Nut Material: Acrylonitrile-Butadiene-Styrene (ABS)
Shell Material: Acrylonitrile-Butadiene-Styrene (ABS)
Knockout Hole: 1.063
Thread Size: UNC 1"—14
Panel Thickness: .125" maximum with gasket,
.187" maximum without gasket,
.062" minimum
Operating Temperature: -20 to +80°C
Return Loss: 5 dB at 100 MHz

RJ-45 Jack
Plating: 50 μm of Gold over 100 μm of Nickel
Current Rating: 1.5A
Voltage Rating: 125V DC

Face View | Description | Female Straight
---|---|---
| RJ-45 Receptacle W/110 Punchdown Termination | ENDR2FB5 | 130053-0002

Note: Sales drawings for all standard order numbers are available on molex.com
Industrial Ethernet
Brad® RJ-Lnxx® RJ-45
Sealed Receptacles
130053/130055
Male
Straight
Panel Mount
External Thread

Features and Benefits
- Ideal for OEMs looking to incorporate a sealed, robust connection into their field device
- Category 5 compliant
- Short depths for space constrained applications
- Achieves IEC IP67 rated seal when mated with an RJ-Lnxx cordset—but also compatible with commercial RJ-45 patch cords

Environmental
Protection: IEC IP67
TIA/EIA Rating: Category 5 compliant

Physical
O-Ring Material: Viton
Insert Material: Acrylonitrile-Butadiene-Styrene (ABS)
Overmold Material: Polyurethane
Coupling Nut Material: Acrylonitrile-Butadiene-Styrene (ABS)
Shell Material: Acrylonitrile-Butadiene-Styrene (ABS)
Knockout Hole: 1.063
Thread Size: UNC 1"—14
Panel Thickness: .125" maximum with gasket,
.187" maximum without gasket,
.062" minimum
Operating Temperature: -20 to +80°C
Return Loss: 5 dB at 100 MHz

RJ-45 Jack
Plating: 50 μm of Gold over 100 μm of Nickel
Current Rating: 1.5A
Voltage Rating: 125V DC

<table>
<thead>
<tr>
<th>Face View</th>
<th>Description</th>
<th>Female Straight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Direct PC Board Mount Receptacle</td>
<td>ENPR1FF5</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
Industrial Ethernet
Brad® RJ-Lnxx® RJ-45
Sealed Receptacles
130053/130055
Female, Male
Straight
Panel Mount
External Thread

Features and Benefits

- Highly flexible solution for OEMs or end users looking to incorporate a sealed, robust receptacle into their field device or control panel
- Achieves IEC IP67 rated seal when mated with RJ-Lnxx cordset—but also compatible with commercial RJ-45 patch cords

Environmental
Protection: IEC IP67
TIA/EIA Rating: Not rated as additional customer termination is required

Physical
O-Ring Material: Viton
Insert Material: Acrylonitrile-Butadiene-Styrene (ABS)
Overmold Material: Polyurethane
Coupling Nut Material: Acrylonitrile-Butadiene-Styrene (ABS)
Shell Material: Acrylonitrile-Butadiene-Styrene (ABS)
Knockout Hole: 1.063
Thread Size: UNC 1"—14
Panel Thickness: .125" maximum with gasket,
.187" maximum without gasket,
.062" minimum
Operating Temperature: -20 to +80°C
Return Loss: 5 dB at 100 MHz

RJ-45 Jack
Plating: 50 μm of Gold over 100 μm of Nickel
Current Rating: 1.5A
Voltage Rating: 125V DC

<table>
<thead>
<tr>
<th>Face View</th>
<th>Description</th>
<th>Female Straight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receptacle with PC Board</td>
<td>ENSR1FB5</td>
<td>130055-0016</td>
</tr>
<tr>
<td>Receptacle with PC and 12&quot; of Cable (10 Base-T)</td>
<td>ENSR1FB5M010</td>
<td>130055-0020</td>
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</table>

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

<table>
<thead>
<tr>
<th>Length</th>
<th>Code</th>
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<tbody>
<tr>
<td>2</td>
<td>M020</td>
</tr>
<tr>
<td>5</td>
<td>M050</td>
</tr>
<tr>
<td>10</td>
<td>M100</td>
</tr>
</tbody>
</table>

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Features and Benefits
- Easy method for bringing an Ethernet connection in from a harsh environment to an industrial enclosure
- Category 5e compliant
- Achieves IEC IP67 rated seal when mated with RJ-Lnx® cordset—but also compatible with commercial RJ-45 patch cords

Environmental
Protection: IEC IP67
TIA/EIA Rating: Category 5e

Physical
O-Ring Material: Viton
Insert Material: ABS
Overmold Material: Polyurethane
Coupling Nut Material: ABS
Shell Material: ABS
Knockout Hole: 1.063
Thread Size: UNC 1”—14”
Panel Thickness: .125” max. with gasket, .187” max. without gasket, .062” min.
Operating Temperature: -20 to +80°C
Return Loss: 5 dB at 100 Mhz

RJ-45 Jack
Plating: 50 μm of Gold over 100 μm of Nickel
Current Rating: 1.5A
Voltage Rating: 125V DC

RJ-11 Jack
Plating: 50 μm of Gold over 100 μm of Nickel
Current Rating: 1.5A
Voltage Rating: 125V DC

Note: Sales drawings for all standard order numbers are available on molex.com
### Features and Benefits

- Allows either molded or field attachable male connectors to be mated together, extending overall system length.
- Two M40 nylon lock nuts and threaded barrel allow the interconnected to be positively fixed to a panel or enclosure wall.

### Threaded Interconnect

<table>
<thead>
<tr>
<th>Face View (Female)</th>
<th>Description</th>
<th>Female Straight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In-Line—Interconnect</td>
<td>RJBG16821</td>
</tr>
<tr>
<td></td>
<td></td>
<td>130058-0057</td>
</tr>
<tr>
<td></td>
<td>Threaded—Interconnect</td>
<td>RJBG16821</td>
</tr>
<tr>
<td></td>
<td></td>
<td>130058-0059</td>
</tr>
</tbody>
</table>
Industrial Ethernet
Brad® RJ-Lnxx®
RJ-45 Sealed
Field Attachable Connectors

130057
Female
Straight

Features and Benefits
- Create an industrial Ethernet cordset in the field using standard crimp tools
- Achieves IEC IP67 rated seal when mated with an RJ-Lnxx receptacle

Physical
O-Ring Material: Viton
Insert Material: Acrylonitrile-Butadiene-Styrene (ABS)
Overmold Material: Polyurethane
Coupling Nut Material: Acrylonitrile-Butadiene-Styrene (ABS)
Shell Material: Acrylonitrile-Butadiene-Styrene (ABS)
Thread Size: UNC 1.00–14.00"
Operating Temperature: -20 to +80°C

Environmental
Protection: IEC IP67

<table>
<thead>
<tr>
<th>Description</th>
<th>Engineering No.</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>RJ-45 Connector (for Stranded Cable)</td>
<td>ENQAM315</td>
<td>130057-0001</td>
</tr>
<tr>
<td>RJ-45 Connector (for Solid Cable)</td>
<td>ENSAM315</td>
<td>130057-0003</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

Industrial Ethernet
Brad® RJ-Lnxx®
RJ-45 Sealed
Accessories

130058
Female, Male
Closure Caps

Features and Benefits
- Attaches to RJ-Lnxx receptacles to provide an IEC IP65 rated seal for instances when a cordset is not mated

Physical
Material: Protective Cap—PA6 Nylon GF (UV Stabilized)
Lanyard—EPDM Rubber
Thread Size: UNC 1.00–14.00"
Operating Temperature: -20 to +80°C

Environmental
Protection: IEC IP65 (65-0300), IP67 (67-0300)

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cap</td>
<td>IP65 Rated</td>
<td>65-0300</td>
<td>65-0300</td>
</tr>
<tr>
<td>Cap and Lanyard</td>
<td>IP67 Rated</td>
<td>67-0300</td>
<td>67-0300</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
Industrial Ethernet
Brad® Sealed RJ-45
Overmolded
Single-Ended Cordsets
84702
Bayonet Style RJ-45 Plug

Features and Benefits
• One sealing surface reduces chance of failure
• IP67 and NEMA 6P ratings ensure cable assemblies for water and dust tight functional integrity
• Bayonet style latching provides audible and tactile confirmation of positive mating
• Category 5e specified provides high data transmission speeds
• Overmolded cable assemblies allow for faster installation

Reference Information
Packaging: Bag
Mates With: 84700 and 84702
Designed In: Inches

Electrical
Voltage: 150V AC
Current: 1.5A
Contact Resistance: 20 milliohms max.
Dielectric Withstanding Voltage:
Adjacent Contacts—1000V AC
Contacts to Ground—1500V AC
Insulation Resistance: 500 Megohms min.
Type: Category 5e
Transmission Performance: Category 5e
RJ-45 Connection Interface: TIA/EIA-568-B
Shielding Effectiveness: 20 dB min.

Mechanical
Durability: 200 mating cycles min.
Coupling Ring Destructive Torque: 2.26Nm (20 in. lb) or more

Physical
Overmolded Body: PVC, black
Coupling Ring: PBT, black
Holder: PBT, black
Wedge: PBT, black
Gasket Seal: Nitrile, black
Contact: Phosphor Bronze
Plating: Contact Area—1.27 μm (50 μ") Gold
Underplating—Nickel
Operating Temperature: -40 to +85°C

<table>
<thead>
<tr>
<th>Standard Order No.</th>
<th>Length</th>
<th>Lead-free</th>
</tr>
</thead>
<tbody>
<tr>
<td>84702-3001</td>
<td>0.30m (1.00’)</td>
<td></td>
</tr>
<tr>
<td>84702-3003</td>
<td>0.91m (3.00’)</td>
<td></td>
</tr>
<tr>
<td>84702-3006</td>
<td>1.83m (6.00’)</td>
<td></td>
</tr>
<tr>
<td>84702-3009</td>
<td>2.74m (9.00’)</td>
<td></td>
</tr>
<tr>
<td>84702-3012</td>
<td>3.64m (12.00’)</td>
<td></td>
</tr>
<tr>
<td>84702-3020</td>
<td>6.10m (20.00’)</td>
<td></td>
</tr>
<tr>
<td>84702-3050</td>
<td>15.20m (50.00’)</td>
<td></td>
</tr>
<tr>
<td>84702-3100</td>
<td>30.50m (100.00’)</td>
<td></td>
</tr>
</tbody>
</table>

This document provided by Barr-Thorp Electric Co., Inc.  800-473-9123    www.barr-thorp.com
### Industrial Ethernet

**Brad® Sealed RJ-45 Overmolded Double-Ended Cordsets**

#### 84702

**Bayonet Style RJ-45 Plug-to-Bayonet Style RJ-45 Plug**

### Features and Benefits
- One sealing surface reduces chance of failure
- IP67 and NEMA 6P ratings ensure cable assemblies are water and dust tight for functional integrity
- Bayonet style latching provides audial and tactile confirmation of positive mating
- Category 5e specified provides high data transmission speeds
- Overmolded cable assemblies allow for faster installation

### Reference Information

**Packaging:** Bag

**Mates With:** 84700 and 84702

**Designed In:** Inches

### Electrical

- **Voltage:** 150V AC
- **Current:** 1.5A
- **Contact Resistance:** 20 milliohms max.
- **Dielectric Withstanding Voltage:**
  - Adjacent Contacts—1000V AC
  - Contacts to Ground—1500V AC
- **Insulation Resistance:** 500 Megohms min.
- **Transmission Performance:** Category 5e
- **RJ-45 Connection Interface:** TIA/EIA-568-B
- **Shielding Effectiveness:** 20 dB min.

### Mechanical

- **Durability:** 200 mating cycles min.
- **Coupling Ring Destructive Torque:** 2.26Nm (20 in. lb) or more

### Physical

- **Overmolded Body:** PVC, black
- **Coupling Ring:** PBT, black
- **Holder:** PBT, black
- **Wedge:** PBT, black
- **Gasket Seal:** Nitrile, black
- **Contact:** Phosphor Bronze
- **Plating:** Contact Area—1.27μm (50μ") Gold
- **Underplating:** Nickel
- **Operating Temperature:** -40 to +85°C

### Order Information

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Length</th>
<th>Lead-Free</th>
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</thead>
<tbody>
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<td>84702-1003</td>
<td>0.91m (3.00')</td>
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</tr>
<tr>
<td>84702-1006</td>
<td>1.83m (6.00')</td>
<td></td>
</tr>
<tr>
<td>84702-1007</td>
<td>2.13m (7.00')</td>
<td></td>
</tr>
<tr>
<td>84702-1009</td>
<td>2.74m (9.00')</td>
<td></td>
</tr>
<tr>
<td>84702-1010</td>
<td>3.00m (10.00')</td>
<td></td>
</tr>
<tr>
<td>84702-1012</td>
<td>3.66m (12.00')</td>
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<tr>
<td>84702-1015</td>
<td>4.57m (15.00')</td>
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<td>84702-1020</td>
<td>6.10m (20.00')</td>
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<tr>
<td>84702-1021</td>
<td>6.40m (21.00')</td>
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<td>84702-1030</td>
<td>9.14m (30.00')</td>
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<td>84702-1002</td>
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<td>84702-1004</td>
<td>0.91m (3.00')</td>
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<tr>
<td>84702-1008</td>
<td>1.83m (6.00')</td>
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<tr>
<td>84702-1011</td>
<td>2.13m (7.00')</td>
<td>Yes</td>
</tr>
<tr>
<td>84702-1009</td>
<td>2.74m (9.00')</td>
<td>Yes</td>
</tr>
<tr>
<td>84702-1010</td>
<td>3.00m (10.00')</td>
<td>Yes</td>
</tr>
<tr>
<td>84702-1012</td>
<td>3.66m (12.00')</td>
<td>Yes</td>
</tr>
<tr>
<td>84702-1015</td>
<td>4.57m (15.00')</td>
<td>Yes</td>
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<tr>
<td>84702-1020</td>
<td>6.10m (20.00')</td>
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</tr>
<tr>
<td>84702-1021</td>
<td>6.40m (21.00')</td>
<td>Yes</td>
</tr>
<tr>
<td>84702-1030</td>
<td>9.14m (30.00')</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Industrial Ethernet
Brad® Sealed RJ-45
Overmolded Double-Ended
Cordsets

84702
Bayonet Style RJ-45
Plug-to-Standard RJ-45 Plug

Features and Benefits
• One sealing surface reduces chance of failure
• IP67 and NEMA 6P ratings ensure cable assemblies are water and dust tight for functional integrity
• Bayonet style latching provides audible and tactile confirmation of positive mating
• Category 5e specified provides high data transmission speeds
• Overmolded cable assemblies allow for faster installation

Reference Information
Packaging: Bag
Mates With: 84700 and 84702
Designed In: Inches

Order No. | Length | Lead-free |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>84702-2001</td>
<td>0.30m (1.00')</td>
<td>Yes</td>
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<td>84702-2003</td>
<td>0.91m (3.00')</td>
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<td>84702-2006</td>
<td>1.83m (6.00')</td>
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<td>84702-2007</td>
<td>2.13m (7.00')</td>
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<tr>
<td>84702-2009</td>
<td>2.74m (9.00')</td>
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</tr>
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<td>3.00m (10.00')</td>
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<td>3.64m (12.00')</td>
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<td>84702-2015</td>
<td>4.57m (15.00')</td>
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<td>84702-2020</td>
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</tr>
<tr>
<td>84702-2030</td>
<td>9.14m (30.00')</td>
<td></td>
</tr>
</tbody>
</table>

Electrical
Voltage: 150V AC
Current: 1.5A
Contact Resistance: 20 milliohms max.
Dielectric Withstanding Voltage:
  Adjacent Contacts—1000V AC
  Contacts to Ground—1500V AC
Insulation Resistance: 500 Megohms min.
Transmission Performance: Category 5e
RJ-45 Connection Interface: TIA/EIA-568-B
Shielding Effectiveness: 20 dB min.

Mechanical
Durability: 200 mating cycles min.
Coupling Ring Destructive Torque: 2.26Nm (20 in. lb) or more

Physical
Overmolded Body: PVC, black
Coupling Ring: PBT, black
Holder: PBT, black
Wedge: PBT, black
Gasket Seal: Nitrile, black
Contact: Phosphor Bronze
Plating: Contact Area—1.27μm (50μ") Gold
  Underplating—Nickel
Operating Temperature: -40 to +85°C
Industrial Ethernet
Brad® Sealed RJ-45
Receptacles

84702
Bayonet Style
PCB Mount and
Punchdown Panel Mount

**Features and Benefits**
- One sealing surface reduces chance of failure
- Bayonet style latching provides audible and tactile confirmation of positive mating
- Punchdown version supports simple IDC termination

**Reference Information**
Packaging: Bag
Mates With: 84700 and 84702
Designed in: Inches

**Standard Order No.** | **Description** | **Lead-free**
---|---|---
84702-0005 | PCB Mount Receptacle | Yes
84702-0006 | Punchdown Panel Mount Receptacle | 
84702-0007 | PCB Mount Receptacle, Potted | 
84702-0008 | Punchdown Panel Mount Receptacle, Potted | 
84702-0009 | Punchdown with 100 Ohm Resistors | 

**Industrial Ethernet**
Brad® Sealed RJ-45
Bulkhead Pass-Through
Receptacle

84700
Bayonet Style
Panel Mount

**Features and Benefits**
- Back-to-back RJ-45 pass-through brings ethernet connectivity into a control cabinet and eliminates need for conduit entry
- Bayonet style latching provides audible and tactile confirmation of positive mating
- Meets ODVA/EtherNet™ IP specification

**Reference Information**
Packaging: Bag
Mates With: 84700 and 84702
Waterproof: Meets requirements of IP67 and NEMA 6P for water tightness

**Standard Order No.** | **Description** | **Lead-free**
---|---|---
84700-0001 | Panel Mount Receptacle | Yes

*EtherNet IP and DeviceNet are trademarks of the Open DeviceNet Vendor Association.*
Industrial Ethernet
Brad® Sealed RJ-45
Field Wireable Connectors

84700

Features and Benefits
• One sealing surface reduces chance of failure
• IP67 and NEMA 6P ratings ensure cable assemblies are water and dust tight for functional integrity
• Bayonet style latching provides audible and tactile confirmation of positive mating
• Superior strain relief
• Easy termination allows custom length cable to be made in the field
• Compatible with shielded and unshielded cable
• Meets ODVA/EtherNet™ IP* specification

Reference Information
Packaging: Bag
Mates With: 84700 and 84702
Designed In: Inches
Waterproof: Meets requirements of IP67 and NEMA 6P for water tightness

*EtherNet IP is a trademark of the Open DeviceNet Vendor Association.

Industrial Ethernet
Brad® Sealed RJ-45
Tethered Dust Cap

84700
Bayonet Style

Features and Benefits
• One sealing surface means less likelihood of failure
• Attachable tether so cap never gets lost
• Maintains IP67 and NEMA 6P ratings for functional integrity when connector is not mated
• IP67 and NEMA 6P ratings ensure cable assemblies are water and dust tight for functional integrity

Reference Information
Packaging: Bag
Use With: 84700, 84702, 84729, 84730
Designed In: Inches

Standard Order No. Description Lead-free
84700-0002 Field Attachable Plug Yes

Standard Order No. Description Lead-free
84700-0003 Dust Cover Yes

Electrical
Voltage: 56.5V DC
150V RMS AC (ringing voltage only)
Current: 1.5A at 25°C (77°F)
Contact Resistance: 20 milliohms max.
Insulation Resistance: 500 Megohms min.
Transmission Performance: Category 5e
RJ-45 Connection Interface: TIA/EIA-568-B
Shielding Effectiveness: 20 dB min.

Mechanical
Durability: 500 mating cycles min.

Physical
Coupling Ring: PBT, black
O-Ring: Nitrile
Gasket Seal: Nitrile, black
Plug Holder: PBT, black
Retainer Wedge: PBT, black
Wire Gauge: 24 AWG (stranded or solid conductors)
Operating Temperature: -40 to +85°C
Cable Seal Assembly: Polyamide, TPE Gland, black

www.molex.com

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
Industrial Ethernet
Brad® Micro-Change® (M12)
Single-Ended Cordsets

130048
Male Threaded

Features and Benefits
- Familiar, proven M12 form factor provides robust connection
- Category 5e compliant
- IP67 rated, perfect for harsh industrial environments
- D-Code to ensure proper alignment/mating

Reference Information
UL File No.: E200650

Cables

03—Unshielded PVC
Conductors: 24 AWG stranded tinned Copper wire
Pair: Two pair UTP patch cable
Outside Diameter: 0.250" (6.50mm) nominal
Jacket Material: Tear PVC
Cable Properties: Sun and oil resistant
Inner Material Insulation: HDPE
Certification: UL Type CMR, CEC C(UUL) Type CMR
TIA/EIA Rating: Category 5e
Operating Temperature: -40 to 75°C

05—Shielded TPE
Conductors: 22 AWG stranded tinned Copper wire
Pair: Two pair UTP patch cable
Outside Diameter: 0.236" (5.99mm) nominal
Jacket Material: Teal TPE
Cable Properties: Sun and oil resistant
Inner Material Insulation: HDPE
Shield Type: Foil shield, 100% coverage, 25% minimum overlap
Flex Rating: Trailing cable, 5 million bending cycles
Certification: UL Listed CMX
TIA/EIA Rating: Category 5e
Operating Temperature: -20 to 75°C

10—Shielded PUR
Conductors: 22 AWG stranded tinned wire
Pair: Two pair UTP patch cable
Outside Diameter: 0.255" (6.50mm) nominal
Jacket Material: Green PUR
Cable Properties: Sun resistant
Inner Material Insulation: FRNC
Shield Type: Foil Shield—100% coverage
Braid Shield—85% coverage
Flex Rating: Trailing cable, 5 million bending cycles
Certification: UL Listed CMX
TIA/EIA Rating: Category 5e
Operating Temperature: -40 to 70°C

15—Shielded PVC
Conductors: 26 AWG stranded tinned Copper wire
Pair: Two pair UTP patch cable
Outside Diameter: 0.236" (5.99mm) nominal
Jacket Material: Teal PVC
Cable Properties: Sun and oil resistant
Inner Material Insulation: HDPE
Shield Type: Foil shield, 100% coverage, 25% minimum overlap
Flex Rating: Trailing cable, 5 million bending cycles
Certification: UL Type CMR, CEC C(UUL) Type CMR
TIA/EIA Rating: Category 5e
Operating Temperature: -20 to 75°C

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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

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<td>5</td>
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<tr>
<td>10</td>
<td>M100</td>
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Cable Options

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Double-Ended Cordsets

Sales drawings for all standard order numbers are available on molex.com

Note

Threaded
Straight, Right Angle
Male-to-Male
120049/120108/130048

Brad® Micro-Change® (M12) Industrial Ethernet

3 - Orange (TD-)
2 - White (RD+)
5 - D-Code
1 - Yellow (TD+)
4 - Blue (RD-)

Configuration Code*

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<thead>
<tr>
<th>Face View</th>
<th>Max. Current Per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Wire Size AWG</th>
<th>Length</th>
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<th>Male Straight-to-Male Right Angle</th>
<th>Male Right Angle-to-Male Right Angle</th>
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Note: Sales drawings for all standard order numbers are available on molex.com

E11A06003M010

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www.molex.com

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
Features and Benefits
- Familiar, proven M12 form factor provides robust connection
- Category 5e compliant
- D-Coded to ensure proper alignment/mating
- IP67 rated for harsh environments

Reference Information
UL File No.: E200650

Physical
Connector Body: PUR
O-Ring: Viton
Coupling Nut: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating

Environmental
Protection: IP67
NEMA Rating: NEMA 6
Operating Temperature: -20 to 75°C

130048
Female-to-Male
Straight
Threaded

Industrial Ethernet
Brad® Micro-Change® (M12)
Double-Ended Cordsets

Face View
Max. Current Per Contact
Max. Voltage
Cable Type
Cable Jacke
Wire Size
AWG
Length

Engineering No.
Standard Order No.

<table>
<thead>
<tr>
<th>Face View</th>
<th>Max. Current Per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacke</th>
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<td>1.0 m</td>
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<td>5 Pole</td>
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<td>PVC</td>
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</table>

Note: Sales drawings for all standard order numbers are available on molex.com

Cables
03—Unshielded PVC
Conductors: 24 AWG stranded tinned Copper wire
Pair: Two pair UTP patch cable
Outside Diameter: 0.250" (6.6mm) nominal
Jacket Material: Teal PVC
Cable Properties: Sun and oil resistant
Inner Material Insulation: HDPE
Certification: UL Type CMR, CEC C(UL) Type CMR
TIA/EIA Rating: Category 5e
Operating Temperature: -40 to +75°C

15—Shielded PVC
Conductors: 26 AWG stranded tinned Copper wire
Pair: Two pair UTP patch cable
Outside Diameter: 0.236" (5.99mm) nominal
Jacket Material: Teal PVC
Cable Properties: Sun and oil resistant
Inner Material Insulation: Foamed Polypropylene
Shield Type: Foil Shield, 100% coverage, 25% min. overlap
Certification: UL Type CMR, CEC C(UL) Type CMR
TIA/EIA Rating: Category 5e
Operating Temperature: -20 to 75°C
Industrial Ethernet
Brad® Micro-Change®-to-
RJ-45 Standard Plug
Double-Ended Cordsets

130048
Female-to-Male
Straight
Threaded to RJ-45

### Features and Benefits
- Familiar, proven M12 form factor provides robust connection
- Category 5e compliant
- D-Coded to ensure proper alignment/mating
- IP67 rated for harsh environments

### Connectors

<table>
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### Reference Information
UL File No.: E200650

### Physical
- Connector Body: PUR
- O-Ring: Viton
- Coupling Nut: Nickel-plated Brass
- Contacts: Copper alloy with Gold over Nickel plating
- Operating Temperature: -25°C to +75°C

### Environmental
- Protection: IP67
- NEMA Rating: NEMA 6

### Cables

<table>
<thead>
<tr>
<th>02—Unshielded PVC</th>
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</thead>
</table>

#### RJ-45

#### Reference Information
UL File No.: E200650

#### Physical
- RJ-45 Plug: Polycarbonate, clear
- Boot: PVC
- Operating Temperature: -20°C to +75°C

#### Environmental
- Protection: IP20

#### Wiring Option
- Pair: Two pair UTP Patch cable
- Outside Diameter: 0.250" (5.6 mm) nominal
- Jacket Material: Teal PVC
- Cable Properties: Sun and oil resistant
- Inner Material Insulation: HDPE
- Certification: UL Type CMR, CEC (UL) Type CMR
- TIA/EIA Rating: Category 5e
- Operating Temperature: -40°C to +75°C

### Table

<table>
<thead>
<tr>
<th>Face View</th>
<th>Max. Current Per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Wire Size AWG</th>
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<td>1.0 m</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
Industrial Ethernet
Brad® Micro-Change® (M12)
Field Attachable Connectors

130047
Female, Male
Straight
Threaded

Features and Benefits
- Fast field termination without special tooling
- D-Code to ensure proper alignment/mating

Mechanical
Coupling Nut: Zinc diecast
Shell Material: Zinc diecast
Contacts: Gold-plated Palladium Nickel

Cable
22 to 24 AWG
0.25 to 0.34mm²
Cable Diameter: 5.50 to 7.20mm

Environmental
Protection: IP67

Physical
Operating Temperature: -25 to +85°C

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<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Diameter Range</th>
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1 - Yellow (TD+) 3 - Orange (TD-)
2 - White (RD+) 4 - Blue (RD-)

Note: Sales drawings for all standard order numbers are available on molex.com

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<td>Engineering No.</td>
<td>130047-0017</td>
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www.molex.com
Industrial Ethernet
Brad® Ultra-Lock® (M12) Double-Ended Cordsets

120108
Male-to-Male
Straight, Right Angle
Push-to-Lock

Features and Benefits
• Push-to-Lock technology assures fast, reliable connections every time
• Reliable performance in high vibration environments due to positive locking mechanism
• Ideal for wash-down and temporary submersion applications due to improved sealing design
• Ergonomic push to lock mechanisms reduce fatigue and user errors when a high number of connections need to be made
• Category 5e compliant
• D-Code to ensure proper alignment/mating
• IP67/68/69K rated for harsh environments

Reference Information
UL File No.: E200650

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Configuration Code*
Build-a-Part Number

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<tr>
<td>10</td>
<td>M100</td>
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*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Industrial Ethernet
Brad® Ultra-Lock® (M12)
Double-Ended Cordset
130048
Female-to-Male
Straight
Push-to-Lock
Crossover-Wired

Features and Benefits
- Brad M12 Micro-Change® Threaded to Push-to-Lock Ultra-Lock® technology assures fast, reliable connections every time
- Reliable performance in high vibration environments due to positive locking mechanism
- Ergonomic push to lock mechanisms reduce fatigue and user errors when a high number of connections need to be made
- Category 5e compliant
- D-Code to ensure proper alignment/mating
- IP67 rated for harsh environments

Reference Information
UL File No.: E200650

Physical
Connector Body: PUR
O-Ring: Viton
Coupling Nut: Nickel-plated Brass
Contacts: Copper alloy with Gold over Nickel plating
Operating Temperature: -20 to +75°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

Cables
03—Unshielded PVC
Conductors: 24 AWG stranded tinned Copper wire
Pair: Two pair UTP patch cable
Outside Diameter: 0.250” (6.50mm) nominal
Jacket Material: Teal PVC
Cable Properties: Sun and oil resistant
Inner Material Insulation: HDPE
Certification: UL type CMR, CEC C(UL) type CMR
TIA/EIA Rating: Category 5e
Operating Temperature: -40 to +75°C

10—Shielded PUR
Conductors: 22 AWG stranded tinned wire
Pair: Two pair UTP patch cable
Outside Diameter: 0.255” (6.50mm) nominal
Jacket Material: Green PUR
Cable Properties: Sun resistant
Inner Material Insulation: FRNC
Shield Type: Foil Shield—100% coverage
Braid Shield—85% coverage
Flex Rating: Trailing cable, 5 million bending cycles
Certification: UL Listed CMX
TIA/EIA Rating: Category 5e
Operating Temperature: -40 to +70°C

15—Shielded PVC
Conductors: 26 AWG stranded tinned Copper wire
Pair: Two pair UTP patch cable
Outside Diameter: 0.236” (5.99 mm) nominal
Jacket Material: Teal PVC
Cable Properties: Sun and oil resistant
Inner Material Insulation: Foamed polypropylene
Shield Type: Foil Shield, 100% coverage, 25% min. overlap
Certification: UL type CMR, CEC C(UL) type CMR
TIA/EIA Rating: Category 5e
Operating Temperature: -20 to +75°C

<table>
<thead>
<tr>
<th>Face View</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Cable Type</th>
<th>Cable Jacket</th>
<th>Wire Size AWG</th>
<th>Length</th>
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<td>4 Pole</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
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<td>M100</td>
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</table>

Cable Option
Wiring Option

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Industrial Ethernet
Brad® Ultra-Lock® (M12) Receptacles

120109
Female
Front Panel Mount
Back Panel Mount
Internal Thread

Features and Benefits
- Mates with both threaded M12 and Ultra-Lock® M12 cordsets
- Category 5e compliant
- IP67 rated, perfect for harsh industrial environments
- D-Code to ensure proper alignment/mating

Reference Information
UL File No.: E200650

Physical
Shell: Nickel-plated Brass
Insert: PUR
Conductors: Brass Gold plated/Bronze selective Gold plated
O-Ring: Viton
Operating Temperature: -20 to +80°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

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<td>120109-5001</td>
<td>ERWAAU7000C050</td>
<td>120109-5002</td>
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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code* Build-a-Part Number
ERWAAJ3000C050

Configuration Code

<table>
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<tr>
<th>Centimeters</th>
<th>Meters</th>
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<td>Code</td>
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<td>5</td>
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<td>0.3</td>
<td>M03</td>
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<td>1</td>
<td>H01</td>
</tr>
<tr>
<td>2</td>
<td>M20</td>
</tr>
</tbody>
</table>

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Industrial Ethernet
Brad® Ultra-Lock® (M12) Receptacles

120109  
Female  
Back Panel Mount  
Front Panel Mount

**Features and Benefits**
- Mates with both threaded M12 and Brad Ultra-Lock® M12 cordsets
- Category 5e compliant
- IP67 rated, perfect for harsh industrial environments
- D-Coded to ensure proper alignment/mATING

**Mechanical**
- Shell: Nickel-plated Brass
- Insert: PUR
- Conductors: Brass Gold plated/Bronze selective Gold plated
- O-Ring: Viton

**Electrical**
- TIA/EIA Rating: Category 5e

**Environmental**
- Protection: IP67
- NEMA Rating: NEMA 6

### Configuration

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Front Panel Mount, PG9 Thread</th>
<th>Front Panel Mount, M16 Thread</th>
<th>Back-Panel Mount, M16 Thread</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PCB Mount</td>
<td>PCB Mount</td>
<td>PCB Mount</td>
</tr>
<tr>
<td>4 Pole</td>
<td>1.5A</td>
<td>125V</td>
<td>ERWD2U30</td>
</tr>
</tbody>
</table>

1. Yellow (TD+), 4. Blue (RD-)
2. White (RD+), 5. D-Code
3. Orange (TD-)

**Note:** Sales drawings for all standard order numbers are available on molex.com
Industrial Ethernet Brad® Ultra-Lock® (M12) Receptacles

120109
Female
Straight
Back Panel Mount

Features and Benefits

• Mates with both threaded M12 and Ultra-Lock® M12 cordsets
• Category 5e compliant
• IP67 rated, perfect for harsh industrial environments
• D-Coded to ensure proper alignment/mating

Mechanical
Shell: Nickel-plated Brass
Insert: PUR
Conductors: Brass Gold plated/Bronze selective Gold plated

Electrical
TIA/EIA Rating: Category 5e

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>4 Pole</td>
<td>1.5A</td>
<td>125V</td>
<td>ERWAAJ4002W002</td>
<td>130054-0012</td>
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<td>ERWAAJ4002W020</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

Configuration Code*
Build-a-Part Number

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<td>M050</td>
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<tr>
<td>10</td>
<td>M100</td>
</tr>
</tbody>
</table>

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Industrial Ethernet
Brad® Ultra-Lock® (M12) Double-Ended Receptacles

120109
M12 Panel Mount Female Receptacle-to-RJ-45 Male Plug

Features and Benefits
- Mates with both threaded M12 and Ultra-Lock M12 cordsets
- Category 5e compliant
- IP67 rated, perfect for harsh industrial environments
- D-Coded to ensure proper alignment/mating

Reference Information
UL File No.: E200650

Mechanical
Shell: Nickel-plated Brass
Insert: Nylon
Conductors: Brass Gold plated/Bronze selective Gold plated
O-Ring: Viton
Cable: PVC Jacket

<table>
<thead>
<tr>
<th>Pole (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Straight, Back Panel Mount, M16 Thread</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 · (TD+) 2 · (RD+) 3 · (TD-) 4 · (RD-)</td>
<td>1.5A</td>
<td>125V</td>
<td>ERWPAU7003M006 120109-0005</td>
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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

Electrical
TIA/EIA Rating: Category 5E

Environmental
Protection: IP67

Configuration Code*
Build-a-Part Number

<table>
<thead>
<tr>
<th>Length (Meters)</th>
<th>Code</th>
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</thead>
<tbody>
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<td>2</td>
<td>M020</td>
</tr>
<tr>
<td>5</td>
<td>M050</td>
</tr>
<tr>
<td>10</td>
<td>M100</td>
</tr>
</tbody>
</table>

*Once an engineering number is created using the configuration code, consult Molex tech support for information regarding any part numbers.
Industrial Ethernet
Brad® Micro-Change® (M12)
Bulkhead
Pass-Through Adapters
130054
Female Straight,
Female Straight-to-Right Angle
Threaded
Back Panel Mount

**Features and Benefits**
- Mates with both threaded M12 and (M12) cordsets
- Category 5e compliant
- IP67 rated, perfect for harsh industrial environments
- D-Coded to ensure proper alignment/mating

**Mechanical**
Shell: Nickel-plated Brass
Insert: PUR
Conductors: Brass Gold plated/Bronze selective Gold plated
O-Ring: Viton

**Electrical**
Voltage Rating: 215V
Current: 4.0A
TIA/EIA Rating: Category 5e

**Environmental**
Protection: IP67

---

### M12-to-RJ-45 Adapter with M16 Mounting Thread

<table>
<thead>
<tr>
<th>Poles</th>
<th>Female Straight</th>
<th>Female-Straight-to-Right Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Pole</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ER1PADAPTER</td>
<td>130054-0009</td>
<td>ER1PADAPTER90</td>
<td>130054-0010</td>
</tr>
</tbody>
</table>

Legend:
- **D-Code**
  - 1: Yellow (TD+)
  - 2: White (RD+)
  - 3: Orange (TD-)
  - 4: Blue (RD-)

Note: Sales drawings for all standard order numbers are available on molex.com
The Brad® product portfolio covers more than 40 industrial protocols including current and legacy networks such as Modbus, CANopen, Serial, AS-interface, and CC-Link. Brad products offer users a complete communication and connectivity solution - from software drivers, interface cards, PLC communication modules, industrial gateways, IP67 digital I/O modules and network media. With over 20 years of experience and technical expertise in industrial communication and control, Molex is a dependable partner. Brad systems are installed around the world in sectors as varied as petrochemical, automotive, food processing and building management. Brad product lines are developed in compliance with the standards and specifications published by international organizations to guarantee a high level of performance, reliability and availability.
Brad® SST™ Communication Module for Rockwell SLC 500

112019
AS-interface Scanner

Features and Benefits
• Connects your Allen-Bradley® SLC 500 to a AS-interface network
• Target markets: Factory automation, Process control, Complex machines, etc
• Direct IO Mapping Ladder Logic to write for configuration and data transfer between module and SLC processor
• Supports 2 independent AS-i networks with up to 124 AS-i slave devices

Description
• High speed determinisitc communication
• Fast, easy setup into SLC backplane
• AS-i IO data mapped into the SLC processor’s I/O files
• Status information is mapped into the M0 and M1 files
• Multiple SST-ASI-SLC modules can be used in one SLC rack
• Configures scanner with Rockwell RSLogix 500
• Flash memory for storage of AS-i master IO configuration
• Easy diagnostics: Built-in LEDs

Included Hardware/Software
• Acts as 1756 Input/Output module
• Support multiple modules in a chassis
• 2x AS-interface Master channels
• Maximum slave supported: Up to 62 slaves on each channel
• AS-i Cycle Time: 150 μsec* (number of slaves +2)
• AS-i connector: 4-pin combicon connector
• IO Mapping:
  - I and O files: 32 words in, 32 words out
  - M1 and M0 files: 461 words in/out
• 1 Serial port for configuration and diagnostic
• Firmware upgradeable

Compatible Protocols
AS-interface Scanner compliant with specification 3.0

Conformance
• RoHS compliant
• CE
• AS-interface certified
• Rockwell Encompass™

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SST-ASI-SLC</td>
<td>112019-0004</td>
<td>AS-interface Communication module for Rockwell SLC 500</td>
</tr>
</tbody>
</table>

---

Brad® SST™ Communication Module for Rockwell ControlLogix

112078
Serial and Ethernet TCP/IP

Features and Benefits
• Connects your Allen-Bradley ControlLogix to a Modbus Serial network
• Direct IO Mapping Ladder Logic to write for configuration and data transfer between module and CLX processor
• Fully integrated into the Rockwell Automation environment
• User-friendly configuration tool with intuitive graphical interface

Description
• RLL support: remote configuration and monitoring via RSLinx
• Add-On-Profile for Rockwell RSLogix5000
• USB port for user configuration and firmware upgrade
• Engineering console simplified user configuration and diagnostic
• Support multiple modules in a chassis
• Support Local and Remote chassis
• Easy diagnostics: Built-in LEDs and 4 characters display

Included Hardware/Software
• 128 MB of onboard memory
• 8 MB of flash memory (user configuration data and firmware)
• CPU Data exchange:
  - 496 Inputs bytes + 496 Output bytes
  - 32.000 Words Registers (CIP messaging)
• Type A, USB 2 and 1.1 compatible
• Communication Ports: 4x Serial, 110 bps to 115.2 kbps, RS232/RS485/RS422, RJ45 (DB9 male supplied cable)

Compatible Protocols
• Modbus Master (RTU or ASCII)
• Modbus Slave (RTU or ASCII)

Conformance
• RoHS compliant
• CE
• UL
• cUL
• Class 1 Div 2
• Rockwell Encompass™

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>SST-SR4-CLX-RLL</td>
<td>112078-0001</td>
<td>Modbus communication module for Rockwell ControlLogix</td>
</tr>
</tbody>
</table>

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123  www.barr-thorp.com
Brad® SST™
Network Interface Card
112079
CC-Link Slave

Features and Benefits
• Deterministic data exchange with CC-Link controller for real time control applications
• On board co-processor eliminates data bottlenecks, ensuring delivery of time critical information
• Best choice for Supervision/HMI/SCADA applications

Description
• Demo test software and sample source codes are available to enable fast integration of CC-Link into your application.
• Auto-Boot (Configuration stored in Flash)
• Includes Development Libraries
• Supported OS:
  - VxWorks
  - Windows 32-bit
  - Others: Open, documented memory map interface with C source code samples for custom driver development

Included Hardware/Software
• Bus Format
  - PCI Universal bus 3.3V/5V (PCI-X compatible)
• Hardware Plug and Play
• ColdFIRE
• 256 Kb RAM + 256 Kb Flash Memory
• One Digital Input + 1 Digital Output
• One CC-Link port
• Connector: CC-Link compliant 5 pin terminal block with screws
• External Power: Nil
• Isolation: 500 Volts
• Display LEDs: ERR, RUN, SD and RD
• Station Number: 1 to 64
• Occupied Stations: 1 to 4
• Speed: 156K, 625K, 2.5M, 5M and 10M baud

Compatible Protocols
CC-Link Slave according spec. v1.1

Conformance
• RoHS compliant
• CE
• CC-Link conformance tested

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>SST-CCS-PCU-B50</td>
<td>112079-7001</td>
<td>PCI Network Interface Card for CC-Link, Bulk of 50</td>
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<tr>
<td>SST-CCS-PCU</td>
<td>112079-7002</td>
<td>PCI Network Interface Card for CC-Link</td>
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</tbody>
</table>

Brad® applicom®
Network Interface Card
112023
CANopen for PC-Based Control and Scada/HMI

Features and Benefits
• Deterministic data acquisition for real time PC-based control applications
• On board co-processor eliminates data bottlenecks, ensuring delivery of time critical information
• Very easy-to-use, no knowledge of protocol required
• Remote access via serial connection; enables configuration and diagnostic when using real time OS (VxWorks, QNX, etc)
• Run Master and Slave modes simultaneously

Description
• Auto mapping of IO in card DPRAM
• IO exchange up to 14 Kbytes
• Hardware and software Watchdog
• Auto-Boot (Configuration stored in Flash)
• Engineering Tools:
  - Engineering console with automatic test and diagnostic tools
• Compatible Data Servers:
  - OPC DA v3.0, 2.05 and 1.0a
  - Wonderware® DAServer (XP only)
  - Wonderware IO (SuiteLink/FastDDE) (XP only)

Included Hardware/Software
• Includes Development Libraries
• Supported OS:
  - Others: Linux, VxWorks, RTX VenturCom

Conformance
• RoHS compliant
• CE
• OPC certified

<table>
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<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Description</th>
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<td>112023-0007</td>
<td>PC/104 Network Interface Card for CANopen, HE13 Connector</td>
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<tr>
<td>DRL-CN0-104-B25</td>
<td>112023-5001</td>
<td>PC/104 Network Interface Card for CANopen, Bulk of 25</td>
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</table>
Features and Benefits
- Deterministic data acquisition for real time Control applications
- On board co-processor eliminates data bottlenecks, ensuring delivery of time critical information
- Very easy-to-use; no knowledge of protocol required
- Remote Access via TCP/IP connection; enables configuration and diagnostic when using real time OS (VxWorks, QNX, etc)

Description
- High speed Auto mapping of IO in card DPRAM
- Hardware and software Watchdog
- Auto-Boot (Configuration stored in Flash)
- Engineering Tools:
  - Engineering console with automatic test and diagnostic tools
- Compatible Data Servers:
  - OPC DA v3.0, 2.05 and 1.0a
  - Wonderware® DAServer (XP only)
  - Wonderware IO (SuiteLink/FastDDE) (XP only)
- Includes Development Libraries
- Supported OS:
  - Others: Linux, VxWorks, RTX VenturCom

Included Hardware/Software
- Bus Format
  - PCI Universal bus 3.3V/5V (PCI-X compatible)
  - PCI Express 1x
- Hardware Plug and Play
- AMD SC520
- 16 Mb SDRAM; 4 Mb Flash Memory
- One Digital Input + 1 Digital Output
- One CANopen port, DB9 male
- Speed: 1 Kbps up to 1 Mbps

Conformance
- RoHS compliant
- CE
- OPC certified
- PCI Express certified

Configuration Console

Device Diagnostics
Brad® applicom®
Network Interface Card
112020
Serial Protocol for Scada/HMI

Features and Benefits
• Fast data acquisition between PC-based applications and industrial devices connected to Serial networks
• On board co-processor eliminates data bottlenecks, ensuring delivery of time critical information
• All protocols are included
• Best choice for Supervision/HMI/SCADA applications
• Equipment redundancy via OPC server
• Combo offer: Serial + Ethernet

Description
• Engineering Tools:
  - Engineering console
  - Test and diagnostic tools
• Compatible Data Servers:
  - OPC DA v3.0
  - Wonderware® DAServer (XP only)
  - Wonderware IO (SuiteLink/FastDDE) (XP only)
• Includes Development Libraries
• Supported OS:
  - Others: Linux, VxWorks, RTX VenturCom

Included Hardware/Software
• Bus Format
  - PCI Universal bus 3.3V/5V (PCI-X compatible)
  - PCI Express 1x
• Hardware: Plug and Play
• AMD SC520
• 16 Mb SDRAM
• 4 Mb Flash Memory
• One Ethernet port
  - Fast Ethernet 10/100 Mbps, auto negotiating
  - Base-T (RJ-45), 4 LEDs (Rx, Tx, Link, 10/100)

Compatible Protocols
• Allen Bradley® DF1 Master (PLC-5 and SLC Series)
• Elsag Bailey® Data Link Master (5000 and 2000 Series)
• GE Fanuc® SNPX Master (90-xx and 80-xx Series)
• Moeller Group® SucomA Master (PS32, PS316 Series)
• Modbus Master® (ASCII and RTU)
• Modbus Slave® (ASCII and RTU)
• Omron® Sysmac Way Master
• Saia Burgess® S-Bus Master (PCD Series)
• Schneider Electric® Uni-Telway Master/Slave (TSX 7 Series)
• Siemens® 3964/3964R Free or RK512 Master
• Siemens® AS511 Master (Simatic S5 Series)
• Siemens® PPI/PPI+ Master (Simatic S7-200 Series)
• Siemens® Ti-Dir Master (Simatic Ti-505 Series)

Conformance
• RoHS compliant
• CE
• OPC certified
• PCI Express certified
• Rockwell Encompass™
• Schneider Collaborative

<table>
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<tr>
<th>Engineering No.</th>
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<th>Description</th>
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<tbody>
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<td>APP SR1-PCU-C</td>
<td>112020-5017</td>
<td>PCU1000 PCI Network Interface Card for Serial</td>
</tr>
<tr>
<td>APP SR1-PCIE</td>
<td>112020-5018</td>
<td>PCIE1000 PCI Network Interface Card for Serial</td>
</tr>
<tr>
<td>APP ESR-PCU-C</td>
<td>112000-0003</td>
<td>PCI2000ETH PCI Network Interface Card for Serial + Ethernet</td>
</tr>
<tr>
<td>APP ESR-PCIE</td>
<td>112000-5027</td>
<td>PCI2000ETH PCI Express Network Interface Card for Serial + Ethernet</td>
</tr>
</tbody>
</table>
Features and Benefits
- Allows simultaneous communication between industrial devices using up to 20 different Ethernet TCP/IP, PROFIBUS and Serial protocols
- Typical architectures: Data translator, data concentrator, industrial firewall
- No programming, just configuring (tools included)
- Supports unsolicited data exchange from client device

Description
- Real-Time data exchange through internal database (32 Kb/32 Kw)
- Upload/download configuration and diagnostic through Remote TCP/IP
- Up to 128 PLCs on Ethernet TCP and 126 PROFIBUS devices
- Full management of Read/Write cyclic access through word status commands
- Engineering Tools:
  - Configuration console
  - Test and diagnostic tools

Included Hardware/Software
- RAM 32 MB; Flash Disk 32 MB
- Diagnostic LEDs
- Communication Ports
  - 1x Serial, 2400 bps up to 115.2 Kbps, RS485/422 (2-wire or 4-wire), DB9 male
  - 1x Ethernet, 10/100 Mbps, RJ45
  - 1x PROFIBUS, 9.6 Kbps up to 12 Mbps, DB9 female
- Embedded 6 Digital Inputs/2 Digital Outputs
- Desktop or DIN Rail mounting

Compatible Protocols
- Ethernet TCP/IP (Client/Server modes)
  - Altus® Alnet II (AL 200x, Webgate)
  - Alstom® SRTP (C80-35, C80-75)
  - Allen-Bradley® EtherNet/IP (Logix, PLC-5 and SLC 500)
  - GE Fanuc® SRTP (90-30, 90-70)
  - Mitsubishi® Melsec (A, Q)
  - Omron® FINS (C, CV, CS)
  - Schneider Electric® Open Modbus TCP and UDP
  - Schneider Electric® Uni-TE (Premium and Micro)
  - Siemens® Industrial Ethernet (S5, S7, TI)
- PROFIBUS
  - DP-VD Master
  - DP-VD Slave
  - S7/MPI Client
  - FDL S5 Client
- Serial
  - Allen-Bradley® DF1 Master
  - GE Fanuc® SNP-X Master
  - Modbus Master/Slave (ASCII and RTU)
  - Schneider Electric® Uni-Telway Slave
  - Siemens® AS511 Master
  - Siemens® TI-Dir Master

Conformance
- RoHS compliant
- CE
Brad® Direct-Link®
Windows Compatible
Protocol Drivers

112027
Serial and Ethernet TCP/IP

Features and Benefits
• Direct-Link® SW1000 provides data acquisition between Windows PC-based applications and industrial devices connected to Ethernet TCP/IP
• Economic solution; well suited for embedded and light architecture (laptop, panel PC, MMI)
• 100% software solution; use PC COM port or integrated Ethernet interface (3COM, NE2000)
• Wide variety of open and vendor specific industrial protocols
• 1000 tags, full tags and Siemens (S5, S7, TI) versions

Description
• Based on Windows TCP/IP socket
• All Ethernet protocols can run simultaneously
• All Ethernet protocols can run Client and Server modes
• Database (32 Kbits, 32 Kwords) for Server mode to exchange data with applications

Included Hardware/Software
• Engineering Tools:
  - Engineering console
  - Test and diagnostic tools
• Compatible Data Servers:
  - OPC DA v3.0, 2.05 and 1.0a
  - Wonderware® DAServer (XP only)
  - Wonderware 10 (SuiteLink/FastDDE) (XP only)
• Includes Development Libraries
• Software or Dongle (Parallel or USB) Protection

Compatible Protocols
• Serial
  - Modbus Master (ASCII and RTU)
  - Modbus Slave (ASCII and RTU)
  - GE Fanuc® SNPX Master (90-xx and 80-xx Series)
  - Schneider Electric® Uni-Telway Slave (TSX 7 Series)
  - Siemens® AS511 Master (Simatic S5 Series)
  - Siemens® PPI/PPI+ Master (Simatic S7-200 Series)
  - Siemens® Ti-Dir Master (Simatic TI-505 Series)
• Ethernet TCP/IP
  - Altus® Alnet II (AL200x, webgate); Client/Server
  - Alstom® SRTP (C80-35, C80-75); Client/Server
  - Allen-Bradley® Logix5000 (ControlLogix and FlexLogix); Client/Server
  - GE Fanuc® SRTP (C90-30, C90-70); Client/Server
  - Mitsubishi® Melsec (A and Q); Client/Server
  - Omron® FINS (C, CV, CS); Client/Server
  - Schneider Electric® Modbus TCP and UDP; Client/Server
  - Schneider Electric® UNI-TE (Premium and Micro); Client/Server
  - Siemens® Industrial Ethernet (S5, S7, TI); Client/Server

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRL-ALL-SW-S</td>
<td>112027-0005</td>
<td>SW1000 software drivers, 1000 tags, Software key protection</td>
</tr>
<tr>
<td>DRL-ALL-SWF-S</td>
<td>112027-0002</td>
<td>SW1000 software drivers, Full tags, Software key protection</td>
</tr>
<tr>
<td>DRL-SIE-SWF-S</td>
<td>112027-5014</td>
<td>SW1000 for Siemens (S5, S7, TI), Full tags, Software key protection</td>
</tr>
<tr>
<td>DRL-ALL-SW-P</td>
<td>112027-0004</td>
<td>SW1000 software drivers, 1000 tags, Parallel dongle protection</td>
</tr>
<tr>
<td>DRL-ALL-SWF-P</td>
<td>112027-0001</td>
<td>SW1000 software drivers, Full tags, Parallel dongle protection</td>
</tr>
<tr>
<td>DRL-SIE-SWF-P</td>
<td>112027-5013</td>
<td>SW1000 for Siemens (S5, S7, TI), Full tags, Software key protection, Parallel dongle protection</td>
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<td>DRL-ALL-SW-U</td>
<td>112027-0006</td>
<td>SW1000 software drivers, 1000 tags, USB dongle protection</td>
</tr>
<tr>
<td>DRL-ALL-SWF-U</td>
<td>112027-0003</td>
<td>SW1000 software drivers, Full tags, USB dongle protection</td>
</tr>
<tr>
<td>DRL-SIE-SWF-U</td>
<td>112027-5015</td>
<td>SW1000 for Siemens (S5, S7, TI), Full tags, Software key protection, USB dongle protection</td>
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<tr>
<td>DRL-UPG-SWF</td>
<td>112027-0010</td>
<td>SW1000 upgrade from 1000 tags to Full tags</td>
</tr>
</tbody>
</table>
Brad® HarshIO 600
112098
CANopen Digital IP67 I/O module—Compact format

Features and Benefits
• Reliable solution for connecting industrial controllers to IO devices in harsh duty environments
• Visible LEDs provide maintenance personnel with the ability to easily determine IO, module and network status

Description
• Rated IP67 for harsh environments
• Designed for direct machine mount applications
• Eight digital input/output module
• Supports PNP and NPN input devices

Compatible Protocols
CANopen Slave (DS401 Profile)

Conformance
• IP67 according to IEC 60529
• Vibration: IEC 60068-2-6 conformance
• Mechanical Shock: 10G, 11ms, 3 axis
• CE
• UL
• cUL
• RoHS compliant
• CANopen® certified

Included Hardware/Software
• IO Configurations:
  - 8 inputs
  - 6 inputs + 2 outputs
  - 4 inputs + 4 outputs
  - 8 outputs
  - 8 universal (inputs or outputs)
• IO Connectors: 8x ports, M8 female 3-pole threaded
• CANopen Connectors:
  - 1x M12 male, 5-pole A-coded
  - 1x Brad Ultra-Lock (M12) female, 5-pole, A-coded
• Power Requirements:
  Module input power—24V DC
  Module output power—24V DC, 4.0A max.
• Input Type:
  - Compatible with dry contact and PNP or NPN
  - Electronic short circuit protection
• CANopen Address: 1-100 by rotary switches
• Input Delay: 2.5ms default or configurable (through EDS)
• Input Device Supply: 200mA per port at 25°C
• Output Load Current: 2.0A max per channel, electronic short circuit protection
• Maximum Switching Frequency: 300 Hz
• Housing Dimensions:
  30.00mm (1.18”) by 175.00mm (6.89”) by 20.00mm (.78”)
• Mounting Dimensions:
  - 23.00mm (0.91”) horizontal on centers
  - 168.00mm (6.61”) vertical on centers
• Operating Temperature: -25 to +70°C
• Storage Temperature: -40 to +85°C

<table>
<thead>
<tr>
<th>Engineering No.</th>
<th>Standard Order No.</th>
<th>No. of Power Pins</th>
<th>IO Configuration</th>
<th>Input channel Type</th>
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<td>8 Universal (inputs or outputs)</td>
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PICS Simulation Software

112029

PICS PRO Software

PICS PRO Drivers

PICS PRO Software

PICS Simulation software simulates real-world systems and machines controlled by DCS, PLC and PC control systems. The entire system (communications, sequencing/interlocking, HMI/SCADA and alarms) can be tested, all emergency faults can be verified and operators trained, with minimal down-time.

PICS Simulation software enables you to identify and correct control system errors in the office, implement new processes quickly and accurately and avoid the high cost of production downtime before “flipping the switch.” PICS Simulation software provides your project team with a realistic and versatile testing and training environment.

How PICS Works

PICS Simulation software allows you to create a dynamic model on a PC that duplicates the behavior of the I/O devices, providing the control system with simulated device feedback.

PICS PRO can be used in Windows 2000, XP and Vista operating systems.

Features and Benefits

- Modern, customizable, visual development/debugging environment
- Ladder diagram editor for developing simulation logic (based on the IEC-61131-3 standard)
- Easy-to-use template editor for creating simulated devices and logic function blocks
- Device worksheets for graphically displaying the status of simulated devices and interacting with controls
- Importing I/O variables from popular PLC programming packages or from any delimited file format using the Import Wizard
- Editable scenarios for restoring or setting a simulation to a specific state greatly simplifies problem re-creation
- Faster startups—typically save up to 30% of the overall project programming, installation and debugging time
- Eliminate software bugs earlier in the project by locating and correcting software problems 10 to 20 times faster in a simulated environment
- Reduce downtime and project risk by installing tested and proven software

- Minimize project scheduling and cost uncertainties associated with debugging control logic problems
- Improved operator training because operators can gain valuable experience running production on the “live” control system in a simulated environment
- Training sessions can include emergency scenarios that would be too dangerous using the actual equipment

<table>
<thead>
<tr>
<th>Engineering No.</th>
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<td>SST-PICS-PRO-U</td>
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<td>PICS Simulation on CD and USB hardware key</td>
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<td>PICS-PRO-KB</td>
<td>112029-0008</td>
<td>Allen-Bradley® 1771 Remote I/O (requires SST-DHP-PCI card)</td>
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<td>PICS-PRO-PBMS</td>
<td>112029-0012</td>
<td>PROFIBUS DP I/O (requires SST-PBMS-PCI card)</td>
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<tr>
<td>PICS-PRO-GC</td>
<td>112029-0011</td>
<td>OPC Server (OPC client software ordered separately)</td>
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</table>
Molex enables the NMEA 2000 physical layer for marine data network communication.

Molex designs, manufactures and supports a complete line of open standard cables, cable assemblies, connectors, terminators and power products supporting the NMEA 2000 system. NMEA 2000 is a low-cost data network operating at 250 Kbps and utilizing the Controller Area Network (CAN) integrated circuit (IC). It allows multiple electronic devices to be connected together on a common channel for the purpose of easily sharing information.

The NMEA 2000 cables and connectors are available in two styles: the Mini-Change® for thick backbones and the Micro-Change® for thin backbones.

NMEA 2000 is a trademark of the National Marine Electronics Association.
NMEA 2000®
Brad®
Thick Bulk Cables
84695
Bulk Cable

Features and Benefits
• Meets or exceeds ODVA specifications for highest system reliability

Reference Information
UL: Type CL2, VL 1581 flame resistance
CSA: AWM I/II and A/B FT4

Overall
Rating: 300V, 80°C
Materials: Power—Gray PVC outer jacket, PVC with nylon skin inner insulation
Data—PE foam inner insulation
Construction: Two shielded pairs with 18 AWG (19x30 AWG) drain wire between pairs

Power Pair
Wire: Two 15 AWG (19x28 AWG) stranded tinned Copper Shielding: Aluminum outside/polyester tape 25% overlap
DC resistance: 3.6 ohms/1000ft max. at 20°C
Current: 8.0A
Color Code: Red/Black

Data Pair
Wire: Two 18 AWG (19x28 AWG) stranded tinned Copper Shielding: Aluminum outside/polyester tape 25% overlap
DC Resistance: 6.92 ohms/1000ft max. at 20°C
Capacitance: 12pF/ft
Color Code: White/Blue

---

NMEA 2000®
Brad®
Thin Bulk Cables
84854
Bulk Cable

Features and Benefits
• Meets and exceeds ODVA specifications for highest reliability
• Standard thin or drop line cable

Reference Information
UL: CL2, AWM 2464
CSA: FT4 rated

Overall
Rating: 300V 80°C
Materials: Power—PVC outer jacket with semirigid PVC inner insulation
Data—PE foam inner insulation
Construction: Two shielded pairs, 22 AWG Tin-Copper drain wire between pairs
Cable Jacket Color: Gray

Power Pair
Wire: Two 22 AWG individually tinned stranded Copper Shielding: Aluminum foil shield, 25% overlap
DC Resistance: 16.5 ohms/1000ft max. at 20°C
Current: 4.0A
Color Code: Red/Black

Data Pair
Wire: Two 22 AWG individually tinned stranded Copper Shielding: Aluminum foil shield, 25% overlap
DC Resistance: 16.5 ohms/1000ft max. at 20°C
Velocity of Propagation: 75%
Capacitance: 11pF/ft
Color Code: White/Blue

---
NMEA 2000®
Brad® Micro-Change® (M12)
Single-Ended Cordsets

84854
Female, Pigtail
Straight
Threaded

Reference Information
NMEA 2000 Approved
UL File No.: E81982

Electrical
Current: 4.0A max.

Physical
Molded Connector: PVC
Coupling Ring: Brass, Nickel
Contacts: Copper alloy, Gold plated
Cable: PVC jacket, Gray
Wire: Two shielded pair 22 and 24 AWG with Copper drain wire between pairs
Operating Temperature: -20 to +80°C

Environmental
Protection: Designed and tested to IEC IP67 standard
Vibration: Complies with MIL-STD 202F, Test Method 204, Test Condition B
Corrosion: 300 hour salt spray protection per MIL-STD 202 Method 101

NMEA 2000 is a trademark of the National Marine Electronics Association

<table>
<thead>
<tr>
<th>Face View</th>
<th>Length</th>
<th>Standard Order No.</th>
<th>Standard Order No.</th>
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<tbody>
<tr>
<td>5 Pole</td>
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<td>Straight Right Angle</td>
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<tr>
<td>1.0m (3.28')</td>
<td>B4854-7021</td>
<td>B4854-7020</td>
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<td>2.0m (6.60')</td>
<td>B4854-7022</td>
<td>B4854-7021</td>
<td></td>
</tr>
<tr>
<td>3.0m (9.84')</td>
<td>B4854-7023</td>
<td>B4854-7022</td>
<td></td>
</tr>
<tr>
<td>4.0m (13.12')</td>
<td>B4854-7024</td>
<td>B4854-7023</td>
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</tr>
<tr>
<td>5.0m (16.40')</td>
<td>B4854-7025</td>
<td>B4854-7024</td>
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<td>6.0m (19.69')</td>
<td>B4854-7026</td>
<td>B4854-7025</td>
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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

*This document provided by Barr-Thorp Electric Co., Inc.*
NMEA 2000®
Brad® Micro-Change® (M12)
Single-Ended Cordsets

84854
Male
Straight, Right Angle
Threaded

Reference Information
NMEA 2000 Approved
UL File No.: E81982

Electrical
Current: 4.0A max.

Physical
Molded Connector: PVC
Coupling Ring: Brass, Nickel
Contacts: Copper alloy, Gold plated
Cable: PVC jacket, Gray
Wire: Brad Micro-Change—Two shielded pair 22 and 24 AWG with Copper drain wire between pairs
Operating Temperature: -20 to +80°C

Environmental
Protection: Designed and tested to IEC IP67 standard
Vibration: Complies with MIL-STD 202F, Test Method 204, Test Condition B
Corrosion: Brad Micro-Change—300 hour salt spray protection per MIL-STD 202 Method 101

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Drain</td>
<td>.05m (1.64')</td>
<td>84854-8021</td>
<td>84854-8028</td>
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<tr>
<td>2 - V+</td>
<td>1.0m (3.28')</td>
<td>84854-8022</td>
<td>84854-8029</td>
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<tr>
<td>3 - V-</td>
<td>2.0m (6.56')</td>
<td>84854-8023</td>
<td>84854-8030</td>
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<tr>
<td>4 - CAN_H</td>
<td>3.0m (9.84')</td>
<td>84854-8024</td>
<td>84854-8031</td>
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<tr>
<td>5 - CAN_L</td>
<td>4.0m (13.12')</td>
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<td>84854-8031</td>
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<tr>
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<td>84854-8026</td>
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<td>6.0m (19.69')</td>
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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

*NMEA 2000 is a trademark of the National Marine Electronics Association
**NMEA 2000* Brad® Micro-Change® (M12) Double-Ended Cordsets**

84854  
Female-to-Male  
Straight  
Threaded

---

**Reference Information**

NMEA 2000 Approved  
UL File No.: E81982

**Electrical**

Current: 4.0A max.

**Physical**

Molded Connector: PVC  
Coupling Ring: Brass, Nickel  
Contacts: Copper alloy, Gold plated  
Cable: PVC jacket, gray  
Wire: Brad Micro-Change—Two shielded pair 22 and 24 AWG with Copper drain wire between pairs  
Operating Temperature: -20 to +80°C

---

**Environmental**

Protection: Designed and tested to IEC IP67 Standard  
Vibration: Complies with MIL-STD 202F, Test Method 204, Test Condition B  
Corrosion: 300 hour salt spray protection per MIL-STD 202 Method 101

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**Note:** Sales drawings for all standard order numbers are available on molex.com

*NMEA 2000 is a trademark of the National Marine Electronics Association

---

**Circuits**  
1 - Drain  
2 - V+  
3 - V−  
4 - CAN_H  
5 - CAN_L

**Connection Type**  
Male-to-Female

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<th>Connection Type</th>
<th>Length</th>
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<td>V−</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

---

This document provided by Barr-Thorp Electric Co., Inc. 800-473-9123 www.barr-thorp.com
NMEA 2000*
Brad® Micro-Change® (M12)
Receptacles

84864
Female
Internal Thread

Reference Information
NMEA 2000 Approved
UL File No.: E81982

Environmental
Protection: Designed and tested to IEC IP67 Standard
Vibration: Complies with MIL-STD 202F, Test Method 204,
Test Condition B
Corrosion: 300 hour salt spray protection per MIL-STD 202
Method 101

Physical
Molded Connector: PVC
Coupling Ring: Brass, Nickel
Contacts: Copper alloy, Gold plated
Cable: PVC jacket, gray
Wire: Brad Micro-Change—Two shielded pair 22 and
24 AWG with Copper drain wire between pairs
Operating Temperature: -20 to +80°C

<table>
<thead>
<tr>
<th>Poles</th>
<th>Panel Mount</th>
<th>Female Single Ended (Pigtail) Straight</th>
<th>Female PCB Mount Straight</th>
<th>Female PCB Mount Right Angle</th>
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<td>V+</td>
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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*NMEA 2000 is a trademark of the National Marine Electronics Association

NMEA 2000*
Brad® Micro-Change® (M12)
Receptacles

84864
Male
External Thread

Reference Information
NMEA 2000 Approved
UL File No.: E81982

Environmental
Protection: Designed and tested to IEC IP67 Standard
Vibration: Complies with MIL-STD 202F, Test Method 204,
Test Condition B
Corrosion: 300 hour salt spray protection per MIL-STD 202
Method 101

Physical
Molded Connector: PVC
Coupling Ring: Brass, Nickel
Contacts: Copper alloy, Gold plated
Cable: PVC jacket, gray
Wire: Brad Micro-Change—Two shielded pair 22 and
24 AWG with Copper drain wire between pairs
Operating Temperature: -20 to +80°C

<table>
<thead>
<tr>
<th>Poles</th>
<th>Panel Mount</th>
<th>Male Single Ended (Pigtail) Straight</th>
<th>Male PCB Mount Straight</th>
<th>Male PCB Mount Right Angle</th>
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<tbody>
<tr>
<td></td>
<td>Front</td>
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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*NMEA 2000 is a trademark of the National Marine Electronics Association
NMEA 2000*
Brad® Micro-Change® (M12) Field Attachable Connectors

084854
Female, Male Straight

Features and Benefits
- Accepts a wide range of DeviceNet cables for maximum installation flexibility
- Field termination for specific length or repair
- Internal and external threads
- Color-coded screw terminators make for error free field installation

Electrical
Voltage Rating: 36V DC
Current: 4.0A

Mechanical
Connector Face: Polyamide
Molded Body: Polyamide
Contact: Silver-plated Brass
Coupling Nut: Nickel-plated Brass
Grommet: Nitrite rubber
Cable Range OD: 0.160 to 32.00" OD (4.10 to 8.10mm)

Environmental
Protection: IP67

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<thead>
<tr>
<th>Poles</th>
<th>Coupling Type</th>
<th>Female Straight</th>
<th>Male Straight</th>
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<td>084854-9317</td>
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<td>5 Pole (Male View)</td>
<td>External Thread</td>
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<td>084854-9318</td>
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</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*NMEA 2000 is a trademark of the National Marine Electronics Association
NMEA® 2000
Brad® Micro-Change® (M12)
Terminator Resistors

84586/84854
Female, Male
Female-to-Male
Straight

Features and Benefits
- Phosphor bronze contacts for greatest reliability
- Used to terminate end of data line

Electrical
Voltage: 50V
Current: 4.0A

Physical
Connector Face: Micro-Change: Nylon
Molded Body: Diagnostic—Clear PVC
Standard—Gray PVC
Coupling Nut: Nickel-plated Brass
Contact Material: Phosphor Bronze alloy
Contact Plating: Gold over Copper alloy

Environmental
Protection: IP67

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Coupling Type</th>
<th>Female Straight</th>
<th>Male Straight</th>
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<td>3 - no connection</td>
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</tr>
<tr>
<td>4 - resistor</td>
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<td>5 - resistor</td>
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Note: Sales drawings for all standard order numbers are available on molex.com

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<tr>
<th>Poles (Female View)</th>
<th>Coupling Type</th>
<th>Female-to-Male</th>
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</thead>
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<td>In-line</td>
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<td>3 - no connection</td>
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<td>4 - Resistor</td>
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<tr>
<td>5 - Resistor</td>
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</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
NMEA 2000®
Brad® Micro-Change® (M12) Bus Drop Tee
84586

Features and Benefits
• Phosphor Bronze contacts for greatest reliability
• Tees enable tapping into trunk line to add drop lines or devices

Electrical
Voltage: 250V
Current: 4.0A

Physical
Connector Face: Black PUR
Molded Body: Gray PUR
Coupling Nut: Nickel-plated Brass
O-Ring: Red Nitrile Rubber
Contact Material: Phosphor Bronze Alloy
Contact Plating: Gold over Nickel Alloy
Operating Temperature: 0 to 60°C

Environmental
Protection: IP67

<table>
<thead>
<tr>
<th>Face View</th>
<th>Wiring Schematic</th>
<th>Standard Order No.</th>
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</thead>
<tbody>
<tr>
<td>5 Pole (Male View)</td>
<td><img src="image" alt="Wiring Schematic" /></td>
<td>84586-0017</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*NMEA 2000 is a trademark of the National Marine Electronics Association*
NMEA 2000®
Brad® Micro-Change® (M12)
Power Tap Tees
84863
Female, Pigtail

Features and Benefits
• Rugged IP67 rated connectors bring power to active I/O modules reliably
• Variety of cable type, connector configuration and cable length options available for maximum flexibility

Electrical
Voltage Rating: 250V AC/DC
Amperage: 4.0A

Physical
Connector Face: Nylon 6/6
Molded Body: PVC
O-Ring: Nitrile Rubber
Coupling Nut: Nickel-plated Brass
Cable: Yellow 22 AWG PVC jacket and PFC conductor insulation over 26x36 AWG Copper standing, 300V, UL style 2661, CSA AWM I/II A/B, optional 80% Metallic braid
Outside Diameter: Without Braid—.20" (5.10mm)
With Braid—.25" (6.40mm)
Operating Temperature: -20 to +105°C

Environmental
Protection: IP67
NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Drop Gender</th>
<th>Left Trunk Gender</th>
<th>Right Trunk Gender</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pole</td>
<td>Pigtail</td>
<td>Female</td>
<td>Female</td>
<td>84863-9001</td>
</tr>
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<td></td>
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<td>84863-9002</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>84863-9003</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*NMEA 2000 is a trademark of the National Marine Electronics Association*
NMEA 2000*
Brad® Micro-Change® (M12) Junction Boxes
84589
Top Mount, 4-Port with Molded Home Run Cable

**Features and Benefits**
- Versions with home run connectors and with molded home run cable available for maximum system design flexibility
- Rugged housing and connectors designed to withstand harsh industrial environments

**Electrical**
Voltage Rating: 30V AC/DC
Current: 4.0A per port
12.0A max. per unit

**Physical**
- Insert: PA
- Housing: Glass-filled PBT
- Housing (Receptacle): Nickel-plated Brass
- ID Label: ABS
- Home Run Cable: Brad Mini-Change, thin
- Home Run Connectors: Male, Brad Micro-Change
- Operating Temperature: -25 to +90° C
- Environmental Protection: IP67
- NEMA Rating: NEMA 6

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Parts</th>
<th>Home Run Cable Length</th>
<th>Top Mount</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Pole</td>
<td>4</td>
<td>0.050m (1.97&quot;)</td>
<td>84859-9001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.0m (3.28&quot;)</td>
<td>84859-9002</td>
</tr>
<tr>
<td>1 - Drain</td>
<td>4</td>
<td>2.0m (6.56&quot;)</td>
<td>84859-9003</td>
</tr>
<tr>
<td>2 - V+</td>
<td>5</td>
<td>3.0m (9.84&quot;)</td>
<td>84859-9004</td>
</tr>
</tbody>
</table>

*NMEA 2000 is a trademark of the National Marine Electronics Association*
NMEA 2000®
Brad® Mini-Change®
Double-Ended Cordsets
84856
Male-to-Female
Threaded

Reference Information
NMEA 2000® Approved
UL File No.: E81982

Electrical
Current: 4.0A
Voltage: 300V

Physical
Molded Connector: PVC
Coupling Ring: Brass, Nickel
Contacts: Copper alloy, Gold plated
Cable: PVC jacket, Gray
Wire: Brad Mini-Change — Two shielded pair 18 and
15 AWG with copper drain wire between pairs
Power Pair — Red/Black
Data Pair — Blue/White
Operating Temperature: -20 to +80°C

Environmental
Protection: Designed and Tested to IEC IP67 Standard
Vibration: Complies with MIL-STD 202F, Test Method 204,
Test Condition B
Corrosion: Brad Mini-Change — 300 hour salt spray
protection per MIL-STD 202 Method 101

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Connection Type</th>
<th>Length</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Drain</td>
<td>.05m (1.64')</td>
<td>B4856-1200</td>
</tr>
<tr>
<td>2</td>
<td>V+</td>
<td>1.0m (3.28')</td>
<td>B4856-1201</td>
</tr>
<tr>
<td>3</td>
<td>V-</td>
<td>1.0m (3.28')</td>
<td>B4856-1202</td>
</tr>
<tr>
<td>4</td>
<td>CAN_H</td>
<td>1.0m (3.28')</td>
<td>B4856-1203</td>
</tr>
<tr>
<td>5</td>
<td>CAN_L</td>
<td>1.0m (3.28')</td>
<td>B4856-1204</td>
</tr>
<tr>
<td>1</td>
<td>Drain</td>
<td>2.0m (6.56')</td>
<td>B4856-1205</td>
</tr>
<tr>
<td>2</td>
<td>V+</td>
<td>2.0m (6.56')</td>
<td>B4856-1206</td>
</tr>
<tr>
<td>3</td>
<td>V-</td>
<td>2.0m (6.56')</td>
<td>B4856-1207</td>
</tr>
<tr>
<td>4</td>
<td>CAN_H</td>
<td>2.0m (6.56')</td>
<td>B4856-1208</td>
</tr>
<tr>
<td>5</td>
<td>CAN_L</td>
<td>2.0m (6.56')</td>
<td>B4856-1209</td>
</tr>
<tr>
<td>1</td>
<td>Drain</td>
<td>3.0m (9.84')</td>
<td>B4856-1210</td>
</tr>
<tr>
<td>2</td>
<td>V+</td>
<td>3.0m (9.84')</td>
<td>B4856-1211</td>
</tr>
<tr>
<td>3</td>
<td>V-</td>
<td>3.0m (9.84')</td>
<td>B4856-1212</td>
</tr>
<tr>
<td>4</td>
<td>CAN_H</td>
<td>3.0m (9.84')</td>
<td>B4856-1213</td>
</tr>
<tr>
<td>5</td>
<td>CAN_L</td>
<td>3.0m (9.84')</td>
<td>B4856-1214</td>
</tr>
<tr>
<td>1</td>
<td>Drain</td>
<td>4.0m (13.12')</td>
<td>B4856-1215</td>
</tr>
<tr>
<td>2</td>
<td>V+</td>
<td>4.0m (13.12')</td>
<td>B4856-1216</td>
</tr>
<tr>
<td>3</td>
<td>V-</td>
<td>4.0m (13.12')</td>
<td>B4856-1217</td>
</tr>
<tr>
<td>4</td>
<td>CAN_H</td>
<td>4.0m (13.12')</td>
<td>B4856-1218</td>
</tr>
<tr>
<td>5</td>
<td>CAN_L</td>
<td>4.0m (13.12')</td>
<td>B4856-1219</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*NMEA 2000® is a trademark of the National Marine Electronics Association
**NMEA 2000®**  
**Brad® Mini-Change®**  
**Field Attachable Connectors**  

**084856**  
**Female, Male**  
**Straight**

### Features and Benefits
- Accepts a wide range of DeviceNet® cables for maximum installation flexibility
- Field termination for specific length or repair
- Internal and external threads
- Color-coded screw terminators make for error-free field installation

### Electrical
- **Voltage**: 600V AC/DC
- **Current**: 8.0A

### Mechanical
- **Connector Face**: Polyurethane
- **Connector Body**: Polyamide
- **Contact**: Gold-plated Brass
- **Coupling Nut**: Nickel-plated Brass
- **Grommet**: Neoprene
- **Cable Range OD**: 0.20-0.48" (5.00-12.00mm)
- **Acceptable Wire Gauges**: 24-15 AWG (0.25-2.0mm²)

### Environmental
- **Protection**: IP67

---

<table>
<thead>
<tr>
<th>Poles</th>
<th>Coupling Type</th>
<th>Male Straight</th>
<th>Female Straight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5 Pole</strong></td>
<td></td>
<td>Standard Order No.</td>
<td>Standard Order No.</td>
</tr>
<tr>
<td>(Male View)</td>
<td></td>
<td>84856-9101</td>
<td>84856-9102</td>
</tr>
<tr>
<td>1 - Drain silver</td>
<td>4 - White</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 - Red</td>
<td>5 - Blue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 - Black</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note**: Sales drawings for all standard order numbers are available on molex.com

*NMEA 2000 is a trademark of the National Marine Electronics Association  
DeviceNet is a trademark of OpenDeviceNet Vendor Association (ODVA)*
## NMEA® 2000
### Brad® Mini-Change®
### Terminator Resistors

#### 084856
- **Male, Female**
- **Straight**

### Features and Benefits
- Phosphor bronze contacts for greatest reliability
- Diagnostics versions indicate power connection and correct polarity
- Used to terminate end of data line
- Trunk and drop versions
- LED diagnostic versions

### Electrical
- **Voltage:** 50V
- **Current:** 8.0A

### Physical
- **Connector Face:** PVC
- **Molded Body:** Diagnostics—Clear PVC
  Standard—Gray PVC
- **Contact Nut:** Nickel-plated Brass
- **Contact Material:** Phosphor Bronze Alloy
- **Contact Plating:** Gold over Copper Alloy
- **LED:** Green—Proper polarity
  Red—Improper polarity

### Environmental
- **Protection:** IP67

### Table: Poles (Female View) Coupling Type Diagnostics/LEDs Male Straight Female Straight

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>121</td>
<td>N/A 084856-9108</td>
<td>N/A 084856-9109</td>
<td>084856-9110</td>
</tr>
<tr>
<td>1 - No connection</td>
<td>2 - No connection</td>
<td>3 - No connection</td>
<td>4 - Resistor</td>
</tr>
<tr>
<td>5 - Resistor</td>
<td>No</td>
<td>N/A</td>
<td>084856-9111</td>
</tr>
<tr>
<td>1 - No connection</td>
<td>2 - No connection</td>
<td>3 - No connection</td>
<td>4 - Resistor</td>
</tr>
<tr>
<td>5 - Resistor</td>
<td>Yes</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>1 - No connection</td>
<td>2 - No connection</td>
<td>3 - No connection</td>
<td>4 - Resistor</td>
</tr>
<tr>
<td>5 - Resistor</td>
<td>Yes</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Sales drawings for all standard order numbers are available on molex.com
**NMEA 2000**

**Brad® Mini-Change®**

**Bus Drop Tee**

084856

**Features and Benefits**
- Phosphor bronze contacts for greatest reliability
- Tees enable tapping into trunk line to add drop lines or devices

**Physical**
- Connector Face: TPE
- Molded Body: TPE
- Coupling Nut: Nickel-plated Brass
- Contact Material: Phosphor Bronze Alloy
- Contact Plating: Gold over Nickel Alloy

**Environmental**
- Protection: Mini-Change—IP67
  - Micro-Change—IP67

### Face View (Female)

<table>
<thead>
<tr>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Drop Connector</th>
<th>Left Trunk Connector</th>
<th>Right Trunk Connector</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.0A</td>
<td>600V</td>
<td>Mini-Change</td>
<td>Mini-Change</td>
<td>Mini-Change</td>
<td>84856-9104</td>
</tr>
</tbody>
</table>

*Note: Sales drawings for all standard order numbers are available on molex.com*

### Face View (Male)

<table>
<thead>
<tr>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Drop Connector</th>
<th>Left Trunk Connector</th>
<th>Right Trunk Connector</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0A</td>
<td>300V</td>
<td>Micro-Change (M12)</td>
<td>Mini-Change</td>
<td>Mini-Change</td>
<td>84856-9105</td>
</tr>
</tbody>
</table>

*Note: Sales drawings for all standard order numbers are available on molex.com*

*NMEA 2000 is a trademark of the National Marine Electronics Association*
NMEA 2000®
Brad® Mini-Change®
Power Tap
84856
Male Drop-to-Female/Female

Features and Benefits
- Connects power supply to trunk line in convenient plug/play fashion
- Easily replaceable fuses to protect bus and connected components from excessive current
- Provides LED status indication of power and correct polarity connection for simple diagnostics

Electrical
Voltage Rating: 50V DC
Fuse Protection: 4.0A
Grounding: 10-32 Screw

Physical
Insert: Nylon 6/6
Housing: PBT
Receptacle Housing: Zinc diecast with black epoxy coat
ID Label: ABS
Mounting: 2PTS, 0.290" (7.37mm)
Operating Temperature: -29 to +70°C

Environmental
Protection: IP67

Face View
(Female)

Left Bus-In Female
1 - Drain 2 - V+ 3 - V- 4 - CAH_H 5 - CAH_L

Right Bus-Out Female
1 - Drain 2 - V+ 3 - V- 4 - CAH_H 5 - CAH_L

Drop Power
1 - Vaux- 2 - no connection 3 - Vaux+ 4 - no connection

Note: Sales drawings for all standard order numbers are available on molex.com
*NMEA 2000 is a trademark of the National Marine Electronics Association
NMEA® 2000* Brad® Mini-Change®
Auxiliary Power
Single-Ended Cordsets
84856
Female

Features and Benefits
- Rugged IP68 rated connectors bring power to active I/O modules reliably
- Variety of cable type, connector configuration and cable length options available for maximum flexibility

Electrical
Voltage Rating: 600V AC/DC
Amperage: 10.0A

Physical
Connector Face: PVC-UL Std 94-VO
Molded Body: PV-UL Std 94-VO
Coupling Nut: Zinc diecast with black epoxy coat, optional stainless Steel type 303 or Nickel-plated Brass
Cable: Yellow, 16 AWG, PVC jacket, PVC conductor insulation over 65x34 AWG Copper stranding, UL STOW CSA ST
Cable Diameter: 0.42" (10.77 mm)
Operating Temperature: -20 to +105° C

Environmental
Protection: IP68
NEMA Rating: NEMA 6P

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Length</th>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Pole</td>
<td>1.0m</td>
<td>84856-9113</td>
</tr>
<tr>
<td></td>
<td>5.0m</td>
<td>84856-9114</td>
</tr>
<tr>
<td></td>
<td>10.0m</td>
<td>84856-9115</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com
*NMEA 2000 is a trademark of the National Marine Electronics Association
**Reference Information**

NMEA 2000 Approved
UL File No.: E81982

**Physical**
Molded Connector: PVC
Coupling Ring: Brass, Nickel
Contacts: Copper alloy, Gold plated
Cable: PVD jacket, gray
Wire: Brad Micro-Change—Two shielded pair 22 and 24 AWG with Copper drain wire between pairs
Operating Temperature: -20 to 80°C

**Environmental**
Protection: Designed and tested to IEC IP67 Standard
Vibration: Complies with MIL-STD 202F, Test Method 204, Test Condition B
Corrosion: Brad Micro-Change—300 hour salt spray protection per MIL-STD 202 Method 101

---

<table>
<thead>
<tr>
<th>Poles (Female View)</th>
<th>Max. Current per Contact</th>
<th>Max. Voltage</th>
<th>Mounting Thread Size</th>
<th>Coupling Type</th>
<th>Male-Female Brad Micro-Change (M12) Standard Order No.</th>
<th>Male-to-Female Brad Mini-Change Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Micro-Change</strong> 5 Pole</td>
<td>4.0A</td>
<td>250V AC/DC</td>
<td>M12 X 1.0</td>
<td>External Thread</td>
<td>84854-9300</td>
<td>84856-9103</td>
</tr>
<tr>
<td><strong>Micro-Change</strong> 5 Pole</td>
<td>8.0A</td>
<td>600V AC/DC</td>
<td>7/8” - 16 Un-2A</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Sales drawings for all standard order numbers are available on molex.com

*NMEA 2000 is a trademark of the National Marine Electronics Association

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**NMEA 2000**
Brad® Micro-Change® (M12) and Mini-Change® Closure Caps

84854, 84856
Female, Male
Straight, Threaded

---

**Micro-Change® (M12)**

<table>
<thead>
<tr>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Female Connector</td>
</tr>
</tbody>
</table>

**Mini-Change®**

<table>
<thead>
<tr>
<th>Standard Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Female Connector</td>
</tr>
<tr>
<td>For Male Connector</td>
</tr>
</tbody>
</table>

Note: Sales drawings for all standard order numbers are available on molex.com

*NMEA 2000 is a trademark of the National Marine Electronics Association
Industrial USB Plugs and Receptacles

Industrial USB connectors bring one of the most popular and convenient I/O connectors into harsh commercial and industrial environments

Many industrial devices and networks use a direct interface to a PC for programming, monitoring, data collection and diagnostics of the industrial bus. Molex’s sealed, industrial Universal Serial Bus (USB) connectors are ideal for industrial and harsh commercial applications, where a secure and robust connection is required. The rugged, plug and receptacle designs feature bayonet-style latches, encapsulated PCB receptacles and overmolded cable assemblies to help keep out dust, debris and water.

USB connectors are ideal for both short-term diagnostics that require simple and fast setup, and permanent installations for data acquisition systems. Once software has been installed, USB plugs and receptacles can be quickly connected and disconnected from various devices without having to turn off computers or equipment. High performance results and ease-of-use make industrial USB from Molex a valuable solution for a variety of harsh environment applications.

For more information on Industrial USB Plugs and Receptacles, please visit: www.molex.com/product/industrialusb.html.

Features and Benefits

• IP67 and NEMA 6P ratings ensure cord-sets are water and dust tight for functional integrity
• Overmolded cordsets allow for faster installation at customer site versus field-wireable designs
• Bayonet-style latch receptacle provides quick and easy connection and ensures proper insertion depth with mating
• Cordsets available in varied lengths up to 5.00m (16.40’) which allows customers to choose the length convenient for their specific application
• Fully shielded cable provides Electro Magnetic Interference/Radio Frequency Interference [EMI/RFI] protection

Applications

• Factory Automation
  – Industrial Computers
  – Industrial Controllers
  – Factory Peripherals
    – Printers
    – Barcode Scanners
• Robotics
• Vision Systems
• Motion and Process Controls
• Test and Measurement Equipment
• Medical Devices
• Factory Networking Installations
• Production Equipment
Industrial USB Brad® Shielded Overmolded Cordset

84732 Double Ended Bayonet Style Type-A Plug to Bayonet Style Type-B Plug

Features and Benefits
- Standard USB shielded I/O system in a rugged, industrial sealed package
- Fully shielded for EMI/RFI protection
- IP67 and NEMA 6P rated cable assemblies are water and dust tight for functional integrity
- Bayonet style latching provides audible and tactile confirmation of positive mating

Reference Information
Packaging: Bag
Mates With: 84729 and 84730
Designed In: Inches
Flammability: UL 94V-0
Performance: USB 2.0

Electrical
Voltage: 30V
Current: 1.0A
Contact Resistance: 30 milliohms max.
Dielectric Withstanding Voltage: 750V AC
Insulation Resistance: 1000 Megohms min.

Mechanical
Mating Force: 35N (7.87 lb) max.
Withdrawal Force: 10N (2.25 lb) min.
Durability: 1000 mating cycles

Physical
Overmolding: PVC, black
Coupling Ring: Polyester, black
Contact: Copper Alloy
Plating: Contact Area—0.75 μm (30 μ") Gold
Underplating—Nickel
Gasket Seal: Nitrile, black
Operating Temperature: 0 to +70°C

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Length</th>
<th>Lead-free</th>
</tr>
</thead>
<tbody>
<tr>
<td>84732-0001</td>
<td>0.80m (2.62')</td>
<td>Yes</td>
</tr>
<tr>
<td>84732-0002</td>
<td>1.50m (4.92')</td>
<td></td>
</tr>
<tr>
<td>84732-0003</td>
<td>2.0m (6.54')</td>
<td></td>
</tr>
<tr>
<td>84732-0004</td>
<td>3.0m (9.84')</td>
<td></td>
</tr>
<tr>
<td>84732-0005</td>
<td>5.0m (16.40')</td>
<td></td>
</tr>
</tbody>
</table>

Industrial USB Brad® Shielded Overmolded Cordset

84727 Bayonet Style Type-A Plug to Shielded Pigtail

Features and Benefits
- Standard USB shielded I/O system in a rugged, industrial sealed package
- Fully shielded for EMI/RFI protection
- IP67 and NEMA 6P rated cable assemblies are water and dust tight for functional integrity
- Bayonet style latching provides audible and tactile confirmation of positive mating
- Compliance with USB 2.0 specification

Reference Information
Packaging: Bag
Mates With: 84729
Designed In: Inches
Flammability: UL 94V-0
Performance: USB 2.0

Electrical
Voltage: 30V
Current: 1.0A
Contact Resistance: 30 milliohms max.
Dielectric Withstanding Voltage: 750V AC
Insulation Resistance: 1000 Megohms min.

Mechanical
Mating Force: 35N (7.87 lb) max.
Withdrawal Force: 10N (2.25 lb) min.
Durability: 1000 mating cycles

Physical
Overmolding: PVC, black
Coupling Ring: Polyester, black
Contact: Copper Alloy
Plating: Contact Area—0.75 μm (30 μ") Gold
Underplating—Nickel
Gasket Seal: Nitrile, black
Operating Temperature: 0 to +70°C

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Length</th>
<th>Lead-free</th>
</tr>
</thead>
<tbody>
<tr>
<td>84727-1005</td>
<td>0.15m (.49')</td>
<td>Yes</td>
</tr>
<tr>
<td>84727-1002</td>
<td>1.50m (4.92')</td>
<td></td>
</tr>
<tr>
<td>84727-1001</td>
<td>2.0m (6.54')</td>
<td></td>
</tr>
<tr>
<td>84727-1003</td>
<td>3.0m (9.84')</td>
<td></td>
</tr>
<tr>
<td>84727-1004</td>
<td>5.0m (16.40')</td>
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Industrial USB Brad® Shielded Overmolded Cordset

84728
Bayonet Style Type-B Plug-to-Pigtail

Features and Benefits
- Standard USB shielded I/O system in a rugged, industrial sealed package
- Fully shielded for EMI/RFI protection
- IP67 and NEMA 6P rated cable assemblies are water and dust tight for functional integrity
- Bayonet style latching provides audible and tactile confirmation of positive mating
- Compliance with USB 2.0 specification

Reference Information
Packaging: Bag
Mates with: 84730
Designed In: Inches
Flammability: UL 94V-0
Performance: USB 2.0

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<td>5.0m (16.40')</td>
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electrical

Voltage: 30V
Current: 1.0A
Contact Resistance: 30 milliohms max.
Dielectric Withstanding Voltage: 750V AC
Insulation Resistance: 1000 Megohms min.

Physical
Overmolding: PVC, black
Coupling Ring: Polyester, black
Contact: Copper Alloy
Plating: Contact Area—0.75μm (30μ") Gold
Underplating—Nickel
Gasket Seal: Nitrile, black
Operating Temperature: 0 to +70°C

Industrial USB Brad® Shielded Overmolded Cordset

84729
Bayonet Style Type-A Sealed Panel Mount Receptacle to Standard Type-A Plug

Features and Benefits
- Standard USB shielded I/O system in a rugged, industrial sealed package
- Fully shielded for EMI/RFI protection
- IP67 and NEMA 6P rated cable assemblies are water and dust tight for functional integrity
- Bayonet style latching provides audible and tactile confirmation of positive mating
- Compliance with USB 2.0 specification

Reference Information
Packaging: Bag
Mates With: 84727 and 84732
Designed In: Inches
Flammability: UL 94V-0
Performance: USB 2.0

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electrical

Voltage: 30V
Current: 1.0A
Contact Resistance: 30 milliohms max.
Dielectric Withstanding Voltage: 750V AC
Insulation Resistance: 1000 Megohms min.

Mechanical
Lock Nut Destructive Torque: 2.71Nm (24 in. lb) or more
Mating Force: 35N (7.87 lb) max.
Withdrawal Force: 10N (2.25 lb) min.
Durability: 1000 mating cycles

Physical
Overmolding: PVC, black
Receptacle Housing: PBT, black
Lock Nut: PBT, black
Contact: Copper Alloy
Plating: Contact Area—0.75μm (30μ") Gold
Underplating—Nickel
Panel Gasket: Neoprene, black
Operating Temperature: 0 to +70°C
Industrial USB Brad®
Panel Mount
PCB Receptacle
84729/84730
Bayonet Style

Features and Benefits
• Standard USB shielded I/O system in a rugged, industrial sealed package
• Fully shielded for EMI/RFI protection
• IP67 and NEMA 6P rated cable assemblies are water and dust tight for functional integrity
• Bayonet style latching provides audible and tactile confirmation of positive mating
• Compliance with USB 2.0 specification ensures compatibility with standard USB cables

Reference Information
Packaging: Bag
Mates With: Type A—84727 and 84732
Type B—84728 and 84732
Designed In: Inches
Flammability: UL 94V-0
Performance: USB 2.0

Order No. Description Lead-free
84729-0009 USB Type A Yes
84730-0010 USB Type B

Electrical
Voltage: 30V
Current: 1.0A
Contact Resistance: 30 milliohms max.
Dielectric Withstanding Voltage: 750V AC
Insulation Resistance: 1000 Megohms min.

Mechanical
Lock Nut Destructive Torque: 2.71Nm (24 in. lb) or more
Mating Force: 35N (7.87 lb) max.
Withdrawal Force: 10N (2.25 lb) min.
Durability: 1000 mating cycles

Physical
Receptacle Housing: PBT, black
Lock Nut: Polyamide 6/6, black
Contact: Copper Alloy
Plating: Contact Area—0.75μm (30μ") Gold
Underplating—Nickel
Gasket Seal: Neoprene, black
Operating Temperature: 0 to +70°C

Industrial USB Brad®
Type-A Panel Mount Receptacle
84729
Bayonet Style to
5-Circuit Pigtail

Features and Benefits
• Standard USB shielded I/O system in a rugged, industrial sealed package
• Fully shielded for EMI/RFI protection
• IP67 and NEMA 6P rated cable assemblies are water and dust tight for functional integrity
• Bayonet style latching provides audible and tactile confirmation of positive mating
• Compliance with USB 2.0 specification

Reference Information
Packaging: Bag
Mates With: 84727 and 84732
Designed In: Inches
Flammability: UL 94V-0
Performance: USB 2.0

Order No. Length Lead-free
84729-0001 0.15m (.49’) Yes

Electrical
Voltage: 30V
Current: 1.0A
Contact Resistance: 30 milliohms max.
Dielectric Withstanding Voltage: 750V AC
Insulation Resistance: 1000 Megohms min.

Mechanical
Lock Nut Destructive Torque: 2.71Nm (24 in. lb) or more
Mating Force: 35N (7.87 lb) max.
Withdrawal Force: 10N (2.25 lb) min.
Durability: 1000 mating cycles

Physical
Receptacle Housing: PBT, black
Lock Nut: Polyamide 6/6, black
Contact: Copper Alloy
Plating: Contact Area—0.75μm (30μ") Gold
Underplating—Nickel
Gasket Seal: Neoprene, black
Wire Gauge: 28 AWG
Operating Temperature: 0 to +70°C
Industrial USB Brad® Bayonet Style Tethered Dust Cap
84700

Features and Benefits
• One sealing surface means less likelihood of failure
• Attachable tether so cap never gets lost
• Maintains IP67 and NEMA 6P ratings for functional integrity when connector is not mated
• IP67 and NEMA 6P ratings ensure cable assemblies are water and dust tight for functional integrity

Reference Information
Packaging: Bag
Use With: 84700, 84702, 84729, 84730
Designed In: Inches

Order No. | Description | Lead-free
---|---|---
84700-0003 | Dust Cover | Yes

Physical
Dust Cap: PBT, black
Tether: PE or PP, black
Gasket Seal: Nitrile, black
Screw: Brass, #8-32
Plating: Screw—Nickel
Operating Temperature: -40 to +85°C
Cable Chemical Resistance Chart

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<th>Resistance To</th>
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<th>PUR</th>
<th>TPE</th>
<th>Rubber SJ- and SO</th>
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<td>O</td>
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<td>P</td>
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<td>P</td>
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<td>E</td>
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<td>P</td>
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<td>Benzol, Toluol (Aliphatic Hydrocarbons)</td>
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<td>P</td>
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P=Poor, F=Fair, G=Good, E=Excellent, O=Outstanding

NOTE: These relative ratings are based on average performance. Special selective compounding of the jacket can improve the performance.

Specifications and Wire Diameters

American Wire Gauge (AWG)

<table>
<thead>
<tr>
<th>AWG</th>
<th>Strands</th>
<th>Nominal OD of Strand (mm)</th>
<th>Approximate OD (mm)</th>
<th>Circular MIL Area</th>
<th>Weight LBS. per 1000 ft</th>
<th>Maximum Resistance OHMS per 1000 ft</th>
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## European Standards

The system for flexible conductors (columns 3 and 4 below) centers around the maximum strand diameter and the conductor resistance. In view of this, some cables may have fewer strands and smaller diameter than listed below but still conform to BS 6360: 1981, VDE 0295 and IEC 228 by having the correct conductor resistance.

### Cross Section (mm²)

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<th>Column 3</th>
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### Cable Cross Reference—AWG to mm²

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<td>0.34</td>
<td>8</td>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Standard Cable Length Tolerances

<table>
<thead>
<tr>
<th>Length of Assemblies (Feet)</th>
<th>Tolerance (Inches)</th>
<th>Length of Cable Assemblies (Meters)</th>
<th>Tolerance (CM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 1’</td>
<td>.75”</td>
<td>&gt; 3m</td>
<td>1.91cm</td>
</tr>
<tr>
<td>1’ - 3’</td>
<td>1.75”</td>
<td>3m - 9m</td>
<td>4.45cm</td>
</tr>
<tr>
<td>3’ - 6’</td>
<td>2.19”</td>
<td>9m - 18m</td>
<td>5.56m</td>
</tr>
<tr>
<td>6’ - 12’</td>
<td>3.50”</td>
<td>1.8m - 3.7m</td>
<td>8.89cm</td>
</tr>
<tr>
<td>12’ - 24’</td>
<td>6.50”</td>
<td>3.7m - 7.3m</td>
<td>16.51cm</td>
</tr>
<tr>
<td>24’ - 48’</td>
<td>12.50”</td>
<td>7.3m - 14.6m</td>
<td>31.75cm</td>
</tr>
<tr>
<td>48’ - 100’</td>
<td>24.50”</td>
<td>14.6m - 30.5m</td>
<td>62.22cm</td>
</tr>
<tr>
<td>over 100’</td>
<td>&gt;2% of finished length</td>
<td>Over 30m</td>
<td>&gt;2% of finished length</td>
</tr>
</tbody>
</table>

Note: Higher tolerance cable assemblies can be specified at additional cost.
Approval Codes and Applicable Protection Standards

Standards as defined in the following section may apply to products or components found within this catalog. The user should always use the original standards and documents for interpretation. It is the responsibility of the user to determine the suitability of use for the products represented in this catalog.

ANSI/(NFPA) T3.5.29 R1-2007 American National Standards Institute generally defines the geometry and connection scheme of the “mini” type connectors used in fluid power (valve) applications. Automotive standard conductor colors, which are widely used on sensors, is the basis for this specification. The Mini-Change type of connectors have their pins and conductor sizes defined for them for the 3 and 5 pin versions.

ASTM American Society of Testing and Materials, a standards organization which suggests test methods, definitions and practices.

AWM AWM cable is intended for the internal wiring factory-assembled, listed appliances such as computers, business machines, ranges, washers, dryers, radios, etc. In the past AWM cable was incorrectly used to wire buildings; this was never its intended use. In some cases AWM cable may be used for external connection. In these situations, the user should be aware that the AWM cable temperatures and voltage ratings may differ from the NEC ratings.

CENELEC EN 50 044

Section 1. Scope

This specification identifies connections for inductive proximity switches. It defines the conductor colors used on 2, 3 and 4 wire proximity switches. It also defines the numerical marking of the terminals, whether quick disconnect, or not.

Section 2. Execution of Proximity Switches

The proximity switches are distinguished by their execution: Proximity switches with integral connecting leads: the connection is identified by the color of the conductor. Proximity switches with connecting terminals for connection: the terminals are identified by numerical marking.

Section 3. Identification by color of the conductors

A protective conductor, if it exists, shall be identified according to IEC publication 446, i.e. green/yellow.

3.1 Unpolarized proximity switches for direct current or alternating current

The proximity switch is connected in series with the load: Unpolarized proximity switches, with two conductors, for direct current or alternating current, may have conductors of any color except green/yellow.

3.2 Polarized proximity switches for direct current supply

3.2.1. Proximity switches with two conductors

The proximity switch is connected in series with the load: The conductor for the plus (+) pole shall be BROWN, The conductor for the minus (-) pole shall be BLUE.

3.2.2. Proximity switches with three or four conductors

The conductors shall be identified as follows: Conductors for the supply voltage: BROWN for the plus (+) pole, BLUE for the minus (-) pole. Conductors for the load output: The output conductor for three conductor devices shall be BLACK, whichever the function. The output conductor for four conductor devices shall be: BLACK for make operation, WHITE for break operation.

Section 4. Identification by numerical marking of the terminals

The terminal for a protective conductor, if it exists, shall be marked according to IEC publication 445.

4.1. Unpolarized proximity switches for direct current or alternating current

The proximity switch is connected in series with the load. For unpolarized proximity switches with two terminals, for direct current or alternating current, the terminals shall be marked as follows:

- 3 and 4 for make operation,
- 1 and 2 for break operation

4.2 Polarized proximity switches for direct current supply

4.2.1. Proximity switches with two terminals

The proximity switch is connected in series with the load. The terminal for the plus (+) pole shall be marked 1, the terminal for the minus (-) pole shall be marked:

- 4 for make operation
- 2 for break operation

4.2.2. Proximity switch with three or four terminals

The terminals shall be marked as follows: Terminals for supply voltage:

- 1 for the plus (+) pole,
- 3 for the minus (-) pole

Terminals for the load output:

- 4 for make operation
- 2 for break operation

CE The CE mark cannot and must not be applied to electronic components of which cables, cordsets and connectors are a part. The latest rules for CE marking in accordance with the low-voltage Directive (73/23/EEC-July 1997) state that electronic components are exempted from the scope of application of the Low-voltage directive. Instead manufacturers of equipment must comply with the appropriate EC directives applicable to the machine and electrical subsystems as a whole for CE compliance.

CSA Government run laboratory that tests products to ensure conformity to a set of standard tests as defined by this body. Similar to UL standards in the US.

DIN 43560 Defines the mechanical geometry and other characteristics of the rectangular style of connectors most frequently found on hydraulic and pneumatic valves in the fluid power industry.

FT 1 Vertical Flame Test per CSA C22.2

No 0.3-92 Para 4.11.1 A finished cable shall not propagate a flame or continue to burn for more than (1) minute after five (5) fifteen (15) second applications of flame. There is an interval of fifteen (15) seconds between the flame applications. The flame test shall be performed in accordance with Para 4.11.1 of the CSA Standard C22.2 No.0.3. in addition, if more than 25% of the indicator flag is burned, the test cable fails.

FT 4 Vertical Flame Test - Cables in Cable Trays per CSA C22.2

No 0.3-92 Para 4.11.1 Similar to the UL 1581 Vertical Flame Test, but is more severe. The FT 4 Test has its burner mounted at 20 degrees from the horizontal with the burner post facing up. The UL-1581 Vertical Tray has its burner at 90 degrees from the horizontal. The FT 4 samples must be larger than the 13mm (0.512”) in diameter. If not, then the cable samples are grouped in units of at least (3) to obtain a grouped overall diameter of 13mm. The UL-1581 Vertical Tray does not distinguish on cable size. The FT 4 has a maximum char height of 1.5m (5’) measure from the lower edge of the burner face. The UL-1581 has a flame height allowable up to approximately 78” measured from the burner.

FT 6 Horizontal Flame and Smoke Test per CSA C22.2

No 0.3-92 Appendix 8 Cables passing the FT 6 Horizontal Flame and Smoke Test are designated FT 6 in the column where the trade number appears. This test is in accordance with ANSI/NFPA Standard 262-1985 (UL-910). The maximum flame spread shall be 1.50 meters (4.92 feet). The smoke density shall be 0.5 at peak optical density and 0.15 at maximum average optical density.
IEC Protection Classes  (See chart on page XXX)

IP 40  Protection against solid bodies larger than 1mm. No liquid protection defined.

IP 65  Dust tight. Protection against water spray from all directions at 43 PSI through a 12mm nozzle.

IP 67  Dust tight. Protection against the effects of immersion in water for 30 minutes at a depth of 1 meter.

IP 68  Dust tight. Protection against the effects of indefinite immersion in water at a pressure specified by the manufacturer. The manufacturer’s specifications must be known if a valid comparison is to be made.

IP 69K Dust tight. Protection against high-pressure (8-10MPa) and high-temperature (80°C) water spray (wash down).

National Electrical Code  Although the NEC covers wire and cable installed in factories, office buildings, etc as well all cable which pass through any floor, wall ceiling or which travel in ducts, plenums and other air handling spaces, each individual municipality, city, county or state can decide whether or not they wish to adopt the NEC as governing law.

NFPA (National Fire Protection Association)

NEMA (National Electrical Manufacturers Association)  Defines the degree of protection in the actual test specifications.

NEMA 1  Enclosures are intended for use primarily to provide a degree of protection against limited amounts of falling dirt.

NEMA 3  Enclosures are intended for outdoor use primarily to provide a degree of protection against windblown dust, rain, sleet and external ice formation.

NEMA 4  Enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against windblown dust, rain, sleet, splashing water, hosedown and external ice formation.

NEMA 6  Enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against the entry of water during occasional temporary submersion at a limited depth.

NEMA 6P  Enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against the entry of water during prolonged submersion at a limited depth.

UL and UR  Designated Underwriters Laboratories “UL Listed” and “UL Recognized,” respectively. UL is a nationally recognized laboratory that tests many products to meet safety standards that are defined in their own and other industry specifications.

VDE 0100  Defines the minimum creepage distances of the equipment to prevent hazardous electrical current and voltage for persons and objects. Isolation Class C includes the equipment mainly designed for industrial and agricultural applications in warehouses without heating, in workshops or machine tools.

VW-1  A flammability rating established by Underwriters Laboratories for wires and cables that pass a specially designed vertical flame test.

Pin Numbering Conventions
There are two conventions that determine which PIN numbers are located with respect to the keyway. These are CENELEC EN 50044 and SAE-J-1738A.

In almost every case, except for 4-pole Mini-Change® connections, these two conventions agree with one another. This affects DeviceNet™ installations where the 4-pole Mini-Change connector is used to bring auxiliary power to I/O modules and other devices.

<table>
<thead>
<tr>
<th>Cenelec En 50 44</th>
<th>SAE-J-1738A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td><img src="image1" alt="Female" /></td>
<td><img src="image2" alt="Male" /></td>
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</table>
## Approval Codes and Applicable Protection Standards

### IP Ratings Table—Definition

<table>
<thead>
<tr>
<th>INDEX FIGURE</th>
<th>DEGREE OF PROTECTION</th>
<th>INDEX FIGURE</th>
<th>DEGREE OF PROTECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No Protection</td>
<td>0</td>
<td>No protection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Protection against large foreign bodies</td>
<td>1</td>
<td>Drip-Proof</td>
</tr>
<tr>
<td></td>
<td>Protection against contact with any large area by hand and against large solid bodies with Ø&gt;50mm</td>
<td></td>
<td>Protection against vertical water drips</td>
</tr>
<tr>
<td>2</td>
<td>Protection against medium sized foreign bodies</td>
<td>2</td>
<td>Drip-Proof</td>
</tr>
<tr>
<td></td>
<td>Protection against contact with the fingers, protection against small foreign solid bodies with Ø&gt;12mm</td>
<td></td>
<td>Protection against water drips (up to a 15° angle)</td>
</tr>
<tr>
<td>3</td>
<td>Protection against small solid foreign bodies</td>
<td>3</td>
<td>Spray-proof</td>
</tr>
<tr>
<td></td>
<td>Protection against tools, or similar objects with Ø≤2.5mm. Protection against small foreign solid bodies with Ø≤2.5mm</td>
<td></td>
<td>Protection against water drips (up to a 60° angle)</td>
</tr>
<tr>
<td>4</td>
<td>Protection against granulated foreign bodies</td>
<td>4</td>
<td>Spray-proof</td>
</tr>
<tr>
<td></td>
<td>As 3 however Ø&gt;0.1mm</td>
<td></td>
<td>Protection against splashed water from all directions</td>
</tr>
<tr>
<td>5</td>
<td>Protection against deposits of dust</td>
<td>5</td>
<td>Hose-proof</td>
</tr>
<tr>
<td></td>
<td>Full protection against contact. Protection against interior equipment damage due to dust deposits</td>
<td></td>
<td>Protection against splashed water (out of a nozzle) from all directions</td>
</tr>
<tr>
<td>6</td>
<td>Protection against ingress of dust</td>
<td>6</td>
<td>Protected against flooding</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Protection against temporary flooding</td>
</tr>
<tr>
<td>7</td>
<td>Protected against immersion</td>
<td></td>
<td>Protected against temporary immersion</td>
</tr>
<tr>
<td>8</td>
<td>Water-tight</td>
<td></td>
<td>Protected against water pressure</td>
</tr>
<tr>
<td>9K</td>
<td>Protection against high-pressure and high-temperature water</td>
<td></td>
<td>Protection against high-pressure and high-temperature wash down</td>
</tr>
</tbody>
</table>

Ø=diameter of foreign body
Glossary

10Base-T (as a transmission medium) A network running at 10 Mbps, using baseband technology and twisted pair cabling.

10Base-T (as a wiring sequence) A variation of 568A wiring, omitting the two wire pairs used for voice transmission.

100Base-F A network running at 100 Mbps, using baseband technology and fiber-optic cabling.

100Base-T A network running at 100 Mbps, using baseband technology and twisted pair cabling.

110 Punchdown Block A standard Insulation Displacement Connection (IDC) used to field terminate cable to a receptacle.

802.3 The upper level IEEE working group responsible for the standards associated with Ethernet and other CSMA/CD networks.

1000Base-T A network running at 1000 Mbps, using baseband technology and twisted pair cabling.

A

Abrasion Resistance Ability of wire, cable or material to resist surface wear.

AC (Alternating Current) Current in which the charge-flow periodically reverses and is represented by I = I0 cos(2ƒ + Ø). Where, I is the current, I0 is the amplitude, f the frequency, Ø the phase angle.

Active or Intelligent Device Devices that can be connected as nodes, with unique MAC IDs, to a DeviceNet™ system. These devices can provide diagnostics including troubleshooting.

Ambient Temperature The temperature of a medium (gas or liquid) surrounding an object.

American Wire Gauge (AWG) The standard system used for designating wire diameter. The lower the AWG number, the larger the diameter. Also called the Brown and Sharpe (8 & 5) wire gauge.

Ampere (A) The unit of current. One ampere is the current flowing through one ohm of resistance at one volt potential.

Analog Representation of data by continuously variable quantities.

Anneal To soften and relieve strains in any solid material, such as metal or glass, by heating to just below its melting point and then slowly cooling it. Annealing generally lowers the tensile strength of the material, while improving its flex life and flexibility.

ANSI American National Standards Institute.

Appliance Wiring Material (AWM) A UL designation covering insulated wire and cable for internal wiring of appliances and equipment.

Application Layer The software portion of a bus which determines the system’s attributes. For DeviceNet™, defines how identifiers are assigned (controlling priorities) and how a CAN data field is used to specify services, move data and determine that data’s meaning.

Arbitration (mechanism) Resolves potential network conflicts between nodes without loss of data or bandwidth. For DeviceNet™, a bit wise, non-destructive arbitration method is used.

Armored Cable A cable provided with a wrapping of metal for mechanical protection.

ASIC Actuator Sensor Interface.

ASIC Application-Specific Integrated Circuit — A semiconductor designed to perform a particular function by defining the interconnection of a set of basic building blocks drawn from a library provided by the circuit manufacturer.

Assembly Object Differing application objects grouped into a single attribute which can be moved with a single message.

ASTM Abbreviation for the American Society for Testing and Materials, a non-profit industry-wide organization which publishes standards, methods of tests, recommended practices, definitions and other related material.

Attenuation Amplitude dissipation of an electrical signal as it travels over distance, expressed in decibels.

Auto-Negotiate (Auto-Sense) Part of the 802.3u specification which details how devices at either end of a link advertise to the other their connection mode (speed and duplex that can be supported). Should both devices be equipped with Auto-Negotiate (vendor optional), they will select the highest common protocol for communication. Also referred to as Auto-Sense.

Autobaud Feature on DeviceNet™ active devices that sets their data rate to the correct value when connected to an existing network.

AWG American Wire Gauge — A standard used to define the physical size of a conductor determined by its circular mil area (1 mil = .001).

AWM see Appliance Wiring Material.

Baseband A communication network that transmits data over a single carrier frequency.

Baud A data transmission measurement for modems.

Baud Rate Measurement of data transfer speed (1 baud = 1 bit per second).

Binder A spirally served tape or thread used for holding assembled cable components in place awaiting subsequent manufacturing operations.

Bit A single character of a language having just two characters, as either of the binary digits 0 or 1.

Bit Bus A bus architecture that communicates the minimum amount of information possible through a bus. Does not accommodate diagnostics.

Braid A fibrous or metallic group of filaments interwoven in cylindrical form to form a covering over one or more wires.

Breakdown (Puncture) A disruptive discharge through insulation.

Breakdown Voltage The voltage at which the insulation between two conductors breaks down.

Bus A parallel circuit that connects the major components of an architecture, allowing the transfer of electric impulses from one connected component to any other.

Byte A sequence of 8 bits (enough to represent one character of alphanumeric data) processed as a single unit of information.

C

Cable A stranded conductor with or without insulation and other coverings (single-conductor cable), or a combination of conductors (multiple-conductor cable).

Cable Filler The material used in multiple-conductor cables to occupy the interstices formed by the assembly of the insulated conductors, thus forming a cable core.

Cable Sheath The protective covering applied to cables.

Cabling Twisting together two or more insulated conductors by machine to form a cable. In fiber optics, a method by which a group or bundle of fibers is mechanically assembled.

CAN Controller Area Network — An ASIC used by DeviceNet™ and Smart Distributed Systems.

Capacitance Storage of electrically separated charges between two plates (or wires). Unbalance, in the case of a data wire pair, results in the transfer of unwanted signals.

Capacitance (C) The ability of dielectric material between conductors to store electricity when a difference of potential exists between the conductors. The unit of measure is the farad, which is the capacitance value that will store a charge of one coulomb when a one-volt potential difference exists between the conductors. In AC, one farad is the capacitance value which will permit one ampere of current when the voltage across the capacitor charges at a rate of one volt per second.

Category 5/5E/6 A TIA/EIA rating system that describes the physical properties of the communication channel in relation to its performance at specific communication speeds.
CENELEC European standards agency; European Committee for Electrotechnical Norms.

Change-of-State Type of messaging where the device produces data only when there is a change.

CL2 Designation of cable which meets the vertical tray flame test for class 2 systems.

Coaxial Cable A cylindrical transmission line comprised of a conductor centered inside a metallic tube or shield, separated by a dielectric material, and usually covered by an insulating jacket.

Collision Domain The group of nodes that are attached to the network in such a way that only one of those nodes can be transmitting at any one time. Nodes connected together using repeater hubs usually belong to a single collision domain, while those attached by a switching hub are generally isolated from the collision domain.

Color Code A color system for wire or circuit identification by use of solid colors, tracers, braids, surface printing etc.

Complementary Output A solid state sensor with one N.O. and N.C. output similar to a mechanical SPDT or DPST contact.

Composite Cable A cable consisting of two or more types or sizes of wire.

Compound An insulating or jacketing material made by mixing two or more ingredients.

Conductivity The ability of a material to allow electrons to flow, measured by the current per unit voltage applied. It is the reciprocal of resistivity.

Conductor A wire (or combination of wires not insulated from one another) suitable for carrying electric current.

Conduit A tube or trough in which insulated wires and cables are run.

Connector A device used to provide rapid connect/disconnect service for electrical cable and wire terminations.

Contact The part of a connector which actually carries the electrical current, and are touched together or separated to control the flow.

Control Cable A multiconductor cable made for operation in control of signal circuits.

Copolymer A compound resulting from the polymerization of two different monomers.

Cord A small, flexible insulated cable.

Cordset Portable cord fitted with a wiring device at one or both ends.

CRC Cyclic Redundancy Code — An error correction code that is recorded in each sector of a magnetic disk and used to catch errors in data.

Creepage The conduction of electricity across the surface of a dielectric.

Creepage Surface An insulating surface which provides physical separation as a form of insulation between two electrical conductors of different potential.

Crimp Termination Connection in which a metal sleeve is secured to conductor by mechanically crimping the sleeve with pliers, presses, or automated crimping machines.

Cross-linked Inter-molecular bonds between long chain thermoplastic polymers created by means of chemical or electron bombardment. The properties of the resulting thermo-setting materials are usually improved.

CSA Abbreviation for Canadian Standards Association, a non-profit independent organization which operates a listing service for electrical and electronic materials and equipment. The Canadian counterpart of the Underwriters Laboratories.

CSMA/CD Carrier Sense Multiple Access/Collision Detect — The media access method used in Ethernet architectures. All network nodes are able to detect the presence of a signal on the channel (Carrier Sense). Once the network is clear, all nodes with something to transmit vie equally for access to the channel (Multiple Access). If a node detects another signal during its transmission, the signals collide, both nodes back-off and retry at a random amount of time later (Collision Detect).

CSPE-Chlorosulfonated Polyethylene A rubbery polymer used for insulations and jackets. Manufactured by E. I. duPont under the trade name of Hypalon.

Current (I) The rate of transfer of electricity. Practical unit is the ampere which represents the transfer of one coulomb per second. In a simple circuit, current (I) produced by a cell or electromotive force (E) when there is an external resistance (R) and internal resistance (r) is I = E / (R + r).

Current Carrying Capacity The maximum current an insulated conductor can safely carry without exceeding its insulation and jacket temperature limitations.

Cut-Through Resistance The ability of material to withstand mechanical pressure, usually a sharp edge or small radius, without separation.

Cyclic Option The device set-up to report its data on a regular basis, consistent with the rate of change it can detect.

Daisy Chain A bus wiring scheme in which, for example, device A is wired to device B, device B is wired to device C, etc. All devices may receive identical signals or, in contrast to a simple bus, each device in the chain may modify one or more signals before passing them down the line.

DC-Direct Current An electric current which flows in only one direction.

Device Object A DeviceNet product will have a single instance of a DeviceNet object. The instance will have the following attributes node, address (MAC ID), baud rate, bus-off action, bus-off center, allocation choice and MAC ID.

Device Profile Fully defines the device as viewed from the network. DeviceNet specifications contain such profiles.

Diagnostics Relaying of information regarding the various states or conditions of certain controls back to the PLC or PC.

Dielectric An insulating medium which intervenes between two conductors and permits electrostatic attraction and repulsion to take place across it.

Dielectric Strength The voltage which an insulation can withstand before breakdown occurs. Usually expressed as a voltage gradient (such as volts per mil).

Drain Wire In a cable, the uninsulated wire laid over the component or components and used as a ground connection.

Drop Cable Cable that exits a trunk cable and runs to a control.

E Symbol for voltage. Usually used to represent direct voltage or the effective (Root-mean-square) value of an alternating voltage.

Earth British terminology for zero-reference ground.

EDS (Electronic Data Sheet) An electronic version of a device’s configurable parameters and public interfaces to the correct parameters.

EIA Electronic Industries Association (formerly RMA or RETMA).

Elastomer A rubber or rubber-like material which will stretch repeatedly to 200 percent or more and return rapidly and with force to its approximate original shape.

EPDM Ethylene-propylene-diene monomer rubber. A material with good electrical insulating properties.

EPR Ethylene-propylene copolymer rubber. A material with good electrical insulating properties.

Ethernet/IP A networking protocol which uses Ethernet for the physical and media access layer, and incorporates the CIP (Controller Information Protocol) from DeviceNet™ as the application layer.

Explicit Messages Provide a multi-purpose pt-pt commission path between two devices. These messages are typically used for low-priority identifiers and contain the specific meaning of the message right in the data field. This usually means the service to be performed, as well as the specific object attribute address, is imbedded herein.

Extruded Cable Cable with conductors which are uniformly insulated and formed by applying a homogeneous insulation material in a continuous extrusion process.

F

Fast Ethernet An Ethernet network operating at 100 Mbps.

FEP Fluorinated ethylene-propylene. A thermo-plastic material with good electrical insulating properties and chemical and heat resistance.

Fiber-Optic Cable A transmission medium using a central glass fiber which transmits digital signals, generated from a laser or LED, expressed as light pulses.
FILLERS Non-conducting components cabled with the insulated conductors or optical fibers to impart roundness, flexibility, tensile strength, or a combination of all three, to the cable.

FINE STRANDED WIRE Stranded wire with component strands of 36 AWG or smaller.

FLEXIBLE That quality of cable or cable component which allows for bending under the influence of outside force, as opposed to limpness which is bending due to the cable’s own weight.

FR-1 A flammability rating established by Underwriter’s Laboratories for wires and cables that pass a specially designed vertical flame test. This designation has been replaced by VW-1.

FT4 A vertical flammability rating for wires and cable developed by CSA.

FULL-DUPLEX MEDIA Supports both transmission and reception of a signal at the same time. These nodes effectively double their available bandwidth.

G

GAUGE A term used to denote the physical size of a wire.

GROUND An electrical connection to the earth, generally through a ground rod. Also a common return to a point of zero potential, such as the metal chassis in radio equipment.

GROUNDED LOOP A completed circuit between shielded pairs of a multiple pair created by random contact between shields. An undesirable condition in which interference is created by ground currents when grounds are connected at more than one point.

GROUND POTENTIAL The potential of the earth. A circuit, terminal, or chassis is said to be a ground potential when it is used as a reference point for other potentials in the system.

H

HERTZ (Hz) The unit of frequency, one cycle per second.

HI-POT A test designed to determine the highest voltage that can be applied to a conductor without breaking through the insulation.

HORIZONTAL CROSS-CONNECT A cabling system that extends from communications equipment to the work area outlet.

HUB The focal point in a messaging handling service, a number of local computers might exchange messages solely with a hub (or focal point) computer. Would be responsible for exchanging messages with other hubs and non-local computers.

HYGROSCOPIC Capable of absorbing moisture from the air.

HYPOPON A DuPont trade name for synthetic rubber (chlorosulfonated Polyethylene) used as insulating and jacketing material for wire and cable.

I

I/O INPUT/OUTPUT

I/O MESSAGES Apply to time-critical, control-oriented data. They provide a dedicated, special purpose commission path between producers and consumers of data on a network.

IDENTITY OBJECT Typically, a single instance for each DeviceNet product. Attributes will be vendor ID, device type, product code, revision, status, S/N, product name and statistics.

IEC European Standardization agency; International Electrotechnical Commission.

IEC INTERNATIONAL ELECTRO-TECHNICAL COMMISSION.

IEEE Abbreviation for Institute of Electrical and Electronics Engineers.

IMPEDANCE The apparent resistance in an electrical circuit to the flow of an alternating current, similar to the actual electrical resistance to a direct current, keeping the ratio of electromotive force to current constant.

IMPEDANCE (Ω) The total opposition that a circuit offers to the flow of alternating current of any other varying current at a particular frequency. It is a combination of resistance R and reactance X, measured in ohms.

INDUCTANCE (L) A property of a conductor or circuit which resists a change in current. It causes current changes to lag voltage changes and is measured in henrys.

INDUCTIVE PROXIMITY SENSOR A sensing device that is actuated by a metal object.

INPUT A signal (or power) which is applied to a piece of electrical apparatus or the terminals on the apparatus to which a signal or power is applied.

INSULATION A material having good dielectric properties which is used to separate close electrical components, such as cable conductors and circuit components.

INTEROPERABILITY The ability of two or more differing systems or controls to communicate.

IP INTERNET PROTOCOL — THE NETWORK LAYER, 24-BIT ADDRESSING SCHEME USED BY MOST ETHERNET NETWORKS

IR DROP The designation of a voltage drop in terms of current and resistance.

IRRADIATION In insulation, the exposure of the material to high energy emissions for the purpose of favorably altering the molecular structure.

ISO INTERNATIONAL STANDARDS ORGANIZATION.

J

JACKET Pertaining to wire and cable, the outer protective covering, may also provide additional insulation.

L

LEAKAGE The placement or routing of wiring and component leads in an electrical circuit.

LED Light emitting diode used to indicate device status.

LIMPSNESS The ability of a cable to lay flat or conform to a surface as with microphone cables (also see flexibility).

LINE VOLTAGE The value of the potential existing on a supply or power line.

LITZ WIRE Fine stranded cable or wire.

LOAD A device that consumes power from a source and uses that power to perform a function.

LONGITUDINAL WRAP Tape applied longitudinally with the axis of the core being covered.

MAC ID Assigned as the address of nodes on a DeviceNet network. DeviceNet uses a device address inside the CAN identifier field and it represents a mechanism for detecting duplicated addressed devices.

MASTER/SLAVE Stand-alone authorization to transmit belongs exclusively to one station (master), while other stations (slaves) transmit only upon request.

MCM One thousand circular mils.

MEDIA ACCESS CONTROL Layer two of the OSI model defines the mechanisms used to determine access to the communication channel.

MESSAGE A packet of information that is delivered to and from a control comprised of bits and/or bytes.

MESSAGE ROUTER OBJECT An element of a component that passes explicit messages to other objects.

MICROFARAD One-millionths of a farad (µF or mfd are common abbreviations).

MICRON One-millionth of a meter = 10^-6 m

MIL A unit used in measuring diameter of a wire or thickness of insulation over a conductor. One one thousandth of an inch (.001”).

MOISTURE RESISTANCE The ability of a material to resist absorbing moisture from the air or when immersed in water.

MOLDED PLUG A connector molded on either end of a cord or cable.

MTW THERMOPLASTIC INSULATED MACHINE TOOL WIRE. 600V RATING.

MULTIPLEX A technique for putting two or more signals into a single channel.

MUTUAL CAPACITANCE Capacitance between two conductors when all other conductors are connected together.

MYLAR DuPont trademark for polyester film.
NAMUR Sensor A 2-wire, analog DC sensor which requires a remote amplifier for operation (Normenausschuss Arbeitskreis Mess und Regeltechnik).

NEC (National Electric Code) A set of regulations governing construction and installation of electrical wiring and apparatus in the United States, established by the American National Board of Fire Underwriters.

NEMA National Electrical Manufacturers Association.

Neoprene A synthetic rubber with good resistance to oil, chemical, and flame, also called polychloroprene.

Network A system of computers and other devices interconnected by telephone wires or other means in order to share information.

NEXT Near End Cross Talk — The level of unwanted signal transferred from the transmitting wires to the receiving wires measured on the transmitting end. The specification is in decibels and refers to the maximum amount of signal that will be ignored, meaning the higher the decibel rating the better the specification. The same specification measured on the receiving end is referred to as Far End Cross Talk (FEXT).


Nodes Used to describe a single control or address and its supporting components.

Noise In a cable or circuit, any extraneous signal which tends to interfere with the signal normally present in or passing through the system.

PNP Output Transistor output that switches the positive supply to the load (current sinking). Load connected between output and common.

Polyethylene (PE) A thermoplastic material having excellent electrical properties.

Polymer A material of high molecular weight formed by the chemical union of monomers.

Polyolefin Any of the polymers and copolymers of the ethylene family of hydrocarbons.

Polypropylene A thermoplastic similar to polyethylene but stiffer and having higher softening point (temperature); excellent electrical properties.

Polyurethane (PUR) Broad class of polymers noted for good abrasion and solvent resistance. Can be in solid or cellular form.

Polyvinyl Chloride (PVC) A general purpose thermoplastic widely used for wire and cable insulations and jackets.

Potting The sealing of a cable termination or other component with a liquid which thermosets into an elastomer.

Power The amount of work per unit of time. Usually expressed in watts and equal to 12R.

PROFIBUS DP A polling PROFIBUS network, whereby the assigned master requests the status of each node.

PROFIBUS FMS A PROFIBUS network which supports both peer-to-peer and master-to-master messaging format.

PROFIBUS PA A PROFIBUS network that provides both data and power over the same two wires in accordance with IEC 1158-2. Typically used in intrinsically safe applications.

Protocol Language and logic utilized in software to address a control for communications between two devices or processes.

Proxy Switch A sensing device that detects the presence of an object without physical contact.

PVC Polyvinyl Chloride. A general purpose thermoplastic widely used in wire/cable jacketing.

Polyethylene (PE) A thermoplastic material having excellent electrical properties.

Polymer A material of high molecular weight formed by the chemical union of monomers.

Polyolefin Any of the polymers and copolymers of the ethylene family of hydrocarbons.

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**Rope Lay Conductor** A conductor composed of a central core surrounded by one or more layers of helically laid groups of wires.

**Round Media** Two twisted pair wires (24V DC power and signal) plus drain in one cable per DeviceNet™ standards.

**Rubber (Wire Insulation)** A general term used to describe wire insulations made of thermosetting elastomers, such as natural or synthetic rubbers, neoprene, hypalon, butyl rubber, and others.

**Shield** A metallic layer applied over a group of wires to prevent interference between the enclosed wires and external fields. A metallic layer applied over a group of wires to prevent interference between the enclosed wires and external fields or noise.

**Shield Percentage** The physical area of a circuit or cable actually covered by shielding material expressed as a percentage.

**Signal** Any visible or audible indication which can convey information. Also, the information conveyed through a communication system.

**Silicone** General Electric trademark for a material made from silicone and oxygen. Can be in thermosetting elastomer or liquid form. The thermosetting elastomer form is noted for high heat resistance.

**SJ** Junior hard service, rubber insulated pendant or portable cord. Same construction as type S, but 300V. Jacket thickness differs.

**SJO** Same as SJ, but Neoprene, oil-resistant compound outer jacket. Can also be made “water-resistant.” 300V, 60°C.

**SJT** Junior hard service thermoplastic or rubber insulation conductors with overall plastic jacket. 300V, 60°C.

**SJO** Same as SJT but oil-resistant plastic outer jacket. 60°C.

**Smart Sensors** Sensors that have an ASIC embedded directly in/on the control.

**SO** Hard service cord, same construction as Type S except oil-resistant rubber jacket. 600V, 60 to 90°C.

**Solid Conductor** A conductor consisting of a single wire.

**Solid State** Pertains to circuits and components using diodes, SCR, etc.

**ST** Hard service cord, jacketed, same as Type S except all plastic construction 600V, 60 to 105°C.

**Star Topology** A communication network based upon individual nodes connected to a central hub device that receives and directs all transmissions. (See Topology).

**STOOW** Same as ST but with oil and water-resistant, outdoor rated thermoplastic outer jacket and insulation. 600V.

**STP** Shielded Twisted Pair — a wire used in certain SAB applications.

**Stranded Conductor** A conductor composed of groups of wires twisted together.

**SV** Vacuum cleaner cord, two or three conductor, rubber insulated. Overall rubber jacket. For light duty in damp locations. 300V, 60°C.

**SVT** Same as SV except all plastic construction. With or without third conductor for grounding purposes only. 300V, 60 to 90°C.

**SVTO** Same as SVT except with oil-resistant jacket. 60°C.

**Switching Hub** A device that interconnects network segments at the data link layer.

**Temperature Rating** The maximum temperature at which an insulating material may be used in continuous operation without loss of its basic properties. 60°C.

**Thermoplastic** A material which will soften, flow, or distort appreciably when subjected to heat and pressure.

**Thermoset** A material which hardens or sets when heat is applied, and which, once set, cannot be resoftened by heating. The application of heat is called “curing.”

**THHN** 90°C 600V nylon jacketed building wire.

**THW** Thermoplastic vinyl insulated building wire. Flame retardant, moisture and heat resistant. 75°C. Dry and wet locations.

**THWN** Same as THW but with nylon jacket over. 75°C.

**TIA S68A/B** Standard 8-pin wiring sequences which defines the position of the individual transmit and receive pairs and the color code used for each wire.

**TIA/EIA** Telecommunications Industry Association/ Electronic Industry Association — A standards organization which sets guidelines for structured cabling systems used in commercial premises.

**Tinsel** A type of electrical conductor comprised of a number of tiny threads, each thread having a fine, flat ribbon of copper or other metal closely spiraled about it. Used for small size cables requiring limpness and extra-long flex life.

**Topology** The arrangement in which the nodes of a LAN are connected to each other.

**TPE** Thermoplastic elastomer. A thermoplastic compound with exceptional chemical, oil, and weld slag resistance used as a jacket material in multiconductor cables.

**Transceiver** The component in the node that is responsible for the interface to the network.

**Trunk Cable** Also known as Bus Cable, it is the main or power and communications cable.

**TW** Thermoplastic vinyl-jacketed building wire, moisture-resistant. 60°C.

**Twisted Pairs** A cable composed of two small insulated conductors twisted together without a common covering.
**U**

UL Underwriters Laboratories.

UTP Unshielded Twisted Pair — Wire used in certain SAB applications.

**V**

VA Volt-Ampere. A designation of power in terms of voltage and current.

VDE German approval agency.

VDR Voltage Dependent Resistor. A surge suppression circuit type where the resistance varies inversely with the applied voltage.

Velocity of Propagation A function of the dielectric constant, expressed as a percent of transmission speed of a signal down the wire as compared to free space.

**Volt (V)** A unit of electrical pressure. One volt is the electrical pressure that will cause one ampere of current to flow through one ohm of resistance.

Voltage The term most often used in place of electromotive force, potential difference, or voltage drop to designate the electric pressure that exists between two points and is capable of producing a current when a closed circuit is connected between two points.

Voltage Drop The voltage developed across a component or conductor by the current flow through the resistance or impedance of the component or conductor.

Voltage Rating The highest voltage that may be continuously applied to a wire in conformance with standards or specifications.

VW-1 A flammability rating established by Underwriters Laboratories for wires and cables that pass a specially designed vertical flame test, formerly designated FR-1.

**W**

Watt (W) A unit of electrical power. One watt is equivalent to the power represented by one ampere of current with a pressure of one volt in a DC circuit.

Weld Field Immune Devices carrying this designation will not false trigger in the presence of extreme electromagnetic fields produced by resistance welders.

Wicking The longitudinal flow of a liquid in a wire or cable due to capillary action.

**X**

XLPE Crosslinked polyethylene.
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