

Switchboards and Switchgear



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Transparent Ready® Equipment

Switchboards and switchgear with Powerlogic® circuit monitors and Web-enabled ethernet communication devices are a part of Schneider Electric's Transparent Ready power equipment family.

When specified as Transparent Ready, the power equipment is provided with a factory- configured "plug and play" communications system that allows the authorized user access to equipment status and monitoring information using only a standard Web browser. Ask your nearest Schneider Electric sales office for details about Transparent Ready power distribution equipment.



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QED-S Switchboard
(Class 2741)

Power-Style® QED-S Switchboard (UL Listed)

- Front accessible load connections
- Front and rear alignment standard
- Switchboard fed by cable
- Switchboard ratings through 4000 A, 200 kA
- Thermal-magnetic, electronic, and Micrologic® fixed-mounted circuit breaker mains and feeders
- Stored energy fixed-mounted mains
- Fixed-mounted fusible switch mains and feeders
- Group-mounted circuit breaker and fusible switch mains and feeders
- Main devices in six sub-division or single main configurations
- Main and branch devices in single section configuration
- Multiple individual devices in single section configurations
- Main lugs in separate section in lineup or behind devices
- Thermal-magnetic circuit breakers with standard, high, extra-high, or current-limiting capability
- Electronic circuit breakers with standard, high, or extra-high capability
- Exclusive Micrologic microprocessor trip circuit breakers, 80% or 100% rated
- Selected utilities and Powerlogic® customer metering
- Selected options on circuit breakers and fusible switches
- Internally mounted SurgeLogic® Transient Voltage Surge Suppression (TVSS) optional



QED-2 Switchboard
(Class 2742)

Power-Style® QED-2 Switchboard (UL Listed)

- Front accessible load connections
- Front and rear alignment standard
- Switchboard fed by cable, busway, transformer, or QED switchboard
- Switchboard ratings through 5000 A, 200 kA; higher amperages available
- Thermal-magnetic, electronic, and Micrologic, or stored energy fixed- and drawout-mounted, circuit breaker mains and feeders
- Fixed-mounted fusible switch mains and feeders
- Group-mounted circuit breaker and fusible switch mains and feeders
- Main devices in six sub-division or single main configurations
- Main and branch devices in single section configuration
- Multiple individual devices in single section configurations
- Main lugs in separate section in lineup or behind devices
- Group-mounted mains and branches
- Thermal-magnetic circuit breakers with standard, high, extra-high or current-limiting capability
- Electronic circuit breakers with standard, high, or extra-high capability
- Exclusive Micrologic microprocessor trip circuit breakers, 80% or 100% rated
- All utilities
- Powerlogic customer metering, including custom communications capability and interwiring
- Transparent Ready® Equipment communications
- Zone selective interlocking on Micrologic circuit breakers, and group mounted 100/250 A thermal-magnetic circuit breakers with add-on ground-fault and bolted pressure fusible switches
- All options available on circuit breakers and fusible switches
- Custom engineering including main-tie-mains, multiple sets of thru-bus, reduced heights, and engineered houses
- Internally mounted SurgeLogic TVSS option

Power-Style® Switchboards

Power-Style® QED-6 Switchboard (UL Listed)

Masterpact® NW and NT, and PowerPact® H, J, and D Circuit Breakers

The QED-6 switchboard is designed to provide excellent distribution, protection, and power quality management in commercial electrical equipment. The circuit protective components of the switchboard are the Masterpact NW and NT circuit breakers in 800–5000 A frame sizes, as well as the PowerPact H, J, and D circuit breakers in 15–600 A frame sizes. These circuit breakers deliver maximum system uptime, system selectivity, ease of maintenance, and reliable circuit protection.

QED-6 switchboard features include: Masterpact NW UL 489 Listed circuit breakers for main and feeder devices, Masterpact NT UL 489 Listed circuit breakers for feeder devices, PowerPact H, J, and D UL 489 Listed circuit breakers for feeder devices, and a wide range of designs and options. Highly flexible drawout/plug-in circuit breakers can meet a wide variety of power distribution requirements. Choices include plug-in or drawout construction in PowerPact H, J, and D circuit breakers, and prepared drawout or plug-in spaces that are equipped with all specified control functions. This capability allows quick additions for load upgrades.

- QED-6 switchboards are designed, listed, and built to UL 891; Masterpact and PowerPact circuit breakers are designed, listed, and built to UL 489
- Circuit breakers are individually mounted, rear connected; Masterpact NW and NT circuit breakers are drawout; PowerPact H, J, and D breakers are plug-in as standard, drawout as an option
- Family of field installable and upgradeable Micrologic® trip units with optional Powerlogic® data communications features
- QED-6 switchboards can offer optional Transparent Ready® Web-enabled communications capability
- Switchboard ratings up to 150 kA short-circuit current rating for services 1600–5000 A
- Up to (12) 250 A PowerPact H and J circuit breakers in a single 30-inch wide section
- Up to (8) 600 A frame PowerPact D or (8) 1200 A frame Masterpact NT circuit breakers in a single 30-inch wide section
- Flexible branch circuit breaker locations: Masterpact NW and NT and PowerPact H, J, and D circuit breakers can be mixed in a single 30-inch wide section (15–2000 A)
- Compartmentalization: separate compartments for circuit breakers, bussing, and load cabling
- Available in 54-inch, 60-inch, and 72-inch deep construction
- Available in NEMA 3R outdoor walk-in enclosures
- Masterpact and PowerPact circuit breakers are field maintainable

Table 11.1: Circuit Breaker Selection

Rating (A) (Frame)	Circuit Breakers
150–250	PowerPact H, J
400–600	PowerPact D
800–1200	Masterpact NT
800–5000	Masterpact NW

QED-6 switchboards are reliable power protection equipment when working with telecommunication facilities, e-business servers, or mainframes that perform critical business transactions. These types of facilities cannot afford downtime.

QED-6 rear-connected switchboards are designed as standalone switchboards or as an integral part of the low voltage equipment lineup in a user's power unit substation.

Specify QED-6 Switchboards

When drawout construction is required for quick circuit breaker changeout; system requirements call for circuit breakers to close within five cycles; stored energy circuit breakers are required; front access to control wires is desired; ease of installation, maintenance, and upgrade of circuit breaker compartmentalization is required; system integrity and segregation of circuit breaker compartments from bus and cable compartments is required; equipment isolation is required.

QED-6 (UL Listed); Commercial Multi-Metering

Classes 2746, 2755, 2756 / Refer to Catalog 2746CT0101

Benefits/Values of Circuit Breaker Performance

Masterpact NW and NT circuit breakers are designed to provide maximum protection and reliable operation with a long service life. They exceed all UL 489 endurance testing requirements and are certified to a minimum of 10,000 operations through the 3000 A frame.

System Coordination

Short-time ratings are high, giving users excellent system coordination and selectivity with downstream breakers.

High Short-Circuit Current Ratings (SCCR)

Up to 150 k AIR at 480 V and 200 k AIR at 240 V, which allows customers to design systems with high fault current and paralleling schemes.

Arc Flash Limiting Feeder Breakers

High speed operation of Masterpact NW and NT circuit breakers (150 k AIR) help reduce arc flash incident energy (cal/cm²) on downstream equipment.

Ease of Installation and Maintenance

Thru-the-door construction, an easy to operate drawout mechanism, and front access to all control wiring make this equipment easy to install, maintain, and upgrade. Load connections in the cable compartment are easily accessible in the rear of the switchboard.

Ability to Upgrade

UL Listed, field-installable accessories include: motor operators, shunt trips, under voltage devices, trip units, and communication modules for trip units. Manually operated circuit breakers are field convertible to electrical operation.

Open Communication System

The Masterpact NW and NT circuit breakers' Micrologic trip units use Modbus® RTU protocol. This is a widely accepted protocol, which allows QED-6 to be integrated into new or many existing communication systems including Transparent Ready Web-enabled communications.

Adaptable

Drawout and bolt-in circuit breakers, front access control wiring, and expandable lineups are quickly adaptable to changing load and control requirements.

Expandable

Masterpact NW and NT circuit breakers have many control termination points, giving the equipment extensive flexibility and expandability for sophisticated control schemes.

Power-Style® Commercial Multi-Metering Switchboards

- UL Listed
- Lever bypass and EUSERC non lever bypass
- Hot sequence metering—EUSERC, NEMA, LOCAL
- Front and rear alignment standard
- Switchboard ratings through 4000 A, 100 kA
- Meter sections in either three- or six-socket section configuration
- Tenant mains either circuit breaker or fusible
- 60–200 A without lever bypass with self-contained meter sockets, 5- or 7-jaw, ring type and test block where required
- 60–200 A lever bypass with self-contained meter sockets, 7-jaw, ringless
- Factory-installed devices with completely wired from meter socket to disconnect
- Provisions for adding future tenants available, as well as future sections
- Sections in either NEMA 1 or NEMA 3R construction
- For use on 120/240, 120/208, and 277/480 volt systems
- Integrated, front-accessible wireway for top exiting load cables
- Customer access area for top exiting load cables



QED-6 Switchboard
(Class 2746)



Commercial
Multi-Metering Switchboard
(Classes 2755, 2756)

Speed-D® SB/SF Switchboards (UL Listed)

- UL Listed
- Hot sequence utility compartment per EUSERC requirements
- Two types:
 - Utility–Service disconnect–distribution
 - Utility–Up to six service disconnects
- Single service disconnect, either circuit breaker or fusible rated 400, 600, or 800 A with either type of distribution interiors, NQOD up to 240 Vac, I-Line® through 480 Vac
- Six service disconnects, group-mounted fusible, QMB/QMJ, 30–400 A; utility compartment—400, 600, and 800 A
- Meter doors can be 15 inches high with one meter socket and test block, or 30 inches high with two meter sockets and test block
- Meter sockets can be 6-, 8-, 13-, or 15-jaw meter sockets with test block, based on application
- Accessories include:
 - Underground pull sections with and without lug landing
 - Loadside wireway
 - Bus links for donut-type current transformers
 - Double padlock hasp attachments
 - Plug-on distribution panel
 - Subfeed circuit breakers
- Full height add-on I-Line distribution section
- Stand-alone I-Line distribution section



EUSERC UCT,
Single Main Circuit Breaker with
I-Line Distribution Panel



EUSERC UCT,
Fusible Multiple Mains

Application

Suitable for use as service entrance equipment on ac systems. Sections contain metering compartment, barriers, main disconnects, distribution panel, neutral bus, and grounding provisions.

Metering

C/T compartment with two 15-inch blank meter doors. (Order doors with meter socket from Table 11.6 on page 11-5.) Incoming cable lugs are for top feed with one twin conductor 2 AWG–600 kcmil lug per phase and neutral, suitable for aluminum or copper cables. Optional single conductor lug is available. Refer to Table 11.7 on page 11-5.

Mains

Main circuit breaker types are either LH or MH. Main fusible device is supplied with Class T fuses. Multiple main devices use plug-on fusible switches.

Branches

NQOD distribution bus is rated 400 A and provides mounting space for QO®/QOB Type (150 A maximum) circuit breakers. Panel provides space for mounting 42 single pole circuit breakers. One or two individually mounted 225 A maximum circuit breakers can be added with bus connectors. (Order subfeed circuit breakers from Table 11.8 on page 11-5.)

I-Line® distribution bus is rated 400, 600, or 800 A and will accept 27 inches of I-Line circuit breakers on the left side maximum frame size of “J” or “K”. The right side will accept either a QO plug-on distribution panel (240 V only) or LA or LH I-Line circuit breaker.

Enclosure

Totally enclosed front accessible with ANSI 49 gray baked enamel finish. Dimensions are 90 in. (H) x 36 in. (W) x 14 in. (D) for indoor and 90 in. (H) x 36 in. (W) x 24.5 in. (D) for outdoor enclosures.

EUSERC Utility Metering, Main Disconnects and Distribution Panel (UL Listed)

Table 11.2: Single Main Circuit Breaker with Distribution

System	Service Voltage	Mains Ratings (A)	Distribution Interior	SCCR 240 V Max.	SCCR 480 V	Circuit Breaker			
						Indoor		Outdoor	
						Catalog No.	\$ Price	Catalog No.	\$ Price
1Ø3W	120/240	400	NQOD I-Line None	65	—	SB124QS	6597.00	SB124QR	9395.00
				65	—	SB124IS	6680.00	SB124IR	9770.00
				65	—	SB124WS	5778.00	SB124WR	8870.00
3Ø4W▲	208Y/120 240/120	400	NQOD	65	—	SB126IS	7421.00	SB126IR	11132.00
				65	—	SB126WS	6519.00	SB126WR	10232.00
3Ø4W▲	208Y/120 240/120	400	None	65	—	SB324QS	7491.00	SB324QR	11168.00
3Ø4W▲	208Y/120 240/120	400	None	65	—	SB324WS	6927.00	SB324WR	10604.00
3Ø4W▲	208Y/120 240/120 480Y/277	400	I-Line	65	35	SB344IS	8555.00	SB344IR	12185.00
3Ø4W▲	208Y/120 240/120 480Y/277	400	None	65	35	SB344WS	7653.00	SB344WR	11283.00
3Ø4W▲	208Y/120 240/120 480Y/277	600	I-Line	65	50	SB346IS	10761.00	SB346IR	14130.00
3Ø4W▲	208Y/120 240/120 480Y/277	600	None	65	65	SB346WS	9860.00	SB346WR	13229.00
3Ø4W▲	208Y/120 240/120 480Y/277	800	I-Line	65	50	SB348IS	19569.00	SB348IR	22038.00
3Ø4W▲	208Y/120 240/120 480Y/277	800	None	65	65	SB348WS	18669.00	SB348WR	21137.00

▲ Can be used on 3Ø3W Delta voltage systems (for example, 240 V Delta or 480 V Delta).

Table 11.3: Single Main Fusible Disconnect with Distribution

System	Service Voltage	Mains Ratings (A)	Distribution Interior	SCCR 240 V Max.	SCCR 480 V	Fusible Disconnect			
						Indoor		Outdoor	
						Catalog No.	\$ Price	Catalog No.	\$ Price
1Ø3W	120/240	400	NQOD I-Line None	65	—	SF124QS	5814.00	SF124QR	9116.00
				100	—	SF124IS	6935.00	SF124IR	9732.00
				200	—	SF124WS	6035.00	SF124WR	8831.00
3Ø4W■	208Y/120 240/120	400	NQOD	65	—	SF126IS	7422.00	SF126IR	11085.00
				200	—	SF126WS	6521.00	SF126WR	10184.00
3Ø4W■	208Y/120 240/120	400	None	200	—	SF324QS	7476.00	SF324QR	11157.00
3Ø4W■	208Y/120 240/120	400	None	200	—	SF324WS	6912.00	SF324WR	10593.00
3Ø4W■	208Y/120 240/120 480Y/277	400	I-Line	100	65	SF344IS	8564.00	SF344IR	12189.00
3Ø4W■	208Y/120 240/120 480Y/277	400	None	200	200	SF344WS	7662.00	SF344WR	11288.00
3Ø4W■	208Y/120 240/120 480Y/277	600	I-Line	100	65	SF346IS	10761.00	SF346IR	14387.00
3Ø4W■	208Y/120 240/120 480Y/277	600	None	200	200	SF346WS	9860.00	SF346WR	13485.00
3Ø4W■	208Y/120 240/120 480Y/277	800	I-Line	100	65	SF348IS	25401.00	SF348IR	28782.00
3Ø4W■	208Y/120 240/120 480Y/277	800	None	200	200	SF348WS	24501.00	SF348WR	27881.00

■ Can be used on 3Ø3W Delta voltage systems (for example, 240 V Delta or 480 V Delta).

Table 11.4: Multiple Mains (Fusible)♦

System	Service Voltage	Mains Rating (A)	240 V or 480 V Max. ★	Multiple Mains (6) Fusible			
				Indoor		Outdoor	
				Catalog No.	\$ Price	Catalog No.	\$ Price
1Ø3W	120/240	400	200	SF124FS	5565.00	SF124FR	8478.00
1Ø3W	120/240	600	200	SF126FS	5934.00	SF126FR	8966.00
3Ø4W▼	208Y/120 240/120 480Y/277	400	200	SF344FS	7025.00	SF344FR	10050.00
3Ø4W▼	208Y/120 240/120 480Y/277	600	200	SF346FS	7319.00	SF346FR	10233.00
3Ø4W▼	208Y/120 240/120 480Y/277	800	200	SF348FS	8283.00	SF348FR	11199.00

♦ Multiple mains—provisions for mounting 30 inches of fusible devices. No more than six main devices permitted per NEC.

★ QMB/QMJ fusible switches, maximum 400 A, SCCR based on Class J, R, or T fuses. QMB plug-in circuit breaker rating is equal to the lowest rating of the circuit breaker.

▼ Can be used on 3Ø3W Delta voltage systems (for example, 240 V Delta or 480 V Delta).

Table 11.5: I-Line® Distribution Section

System	Service Voltage	Mains Ratings (A)	Distribution Interior	SCCR 240 V Max.	SCCR 480 V Max.	Distribution Type	Indoor		Outdoor	
							Catalog No.	\$ Price	Catalog No.	\$ Price
3Ø4W	208Y/120 240/120 480Y/277	800	I-Line	65 k	65 k	Add-on distribution section, must be connected to an SB UCT and main section without distribution panel, such as SB348WS. An I-Line plug-on subfeed lug kit must be ordered to terminate the distribution section.	SBAD800	10260.00	SBAD800R	13305.00
3Ø4W	208Y/120 240/120 480Y/277	800	I-Line	125 k	100 k	Stand-alone distribution section not connected to an SB section. A back-fed main circuit breaker or I-Line plug-on subfeed lug kit must be ordered to terminate the distribution section. (Non-ULSE)	SBSAD800	10620.00	SBSAD800R	13770.00

Table 11.6: Meter Door Selection

Meter Socket Jaws	15-inch High Door With One Meter Socket and Test Block		30-inch High Door With Two Meter Sockets and Test Blocks	
	Catalog No.	\$ Price	Catalog No.	\$ Price
6▲	SBA15D6MS	923.00	—	—
8	SBA15D8MS	984.00	—	—
13	SBA15D13MS	1230.00	SBA30D13MS	2093.00
15	SBA15D15MS	1358.00	SBA30D15MS	2217.00
Blank	SBA15DBC	495.00	—	—
■	SBA15DMS	617.00	—	—

▲ 6-jaw meter socket can also be used on 4- and 5-jaw applications.
 ■ Door with provisions for mounting meter socket.
 Note: To order structure with meter door factory-installed, add door catalog number as suffix to structure (e.g. SF344IS-15D13MS).

Table 11.7: Accessories

Description	Catalog No.	\$ Price			
Indoor underground pull section (w/o lug landing)—26-in. (W) Order separate SA8LL lug kit below if required.	SA26PS	2217.00			
Outdoor (3R) underground pull section (w/o lug landing)—26 in. (W) x 24.5 in. (D) Order separate SA8LL lug landing kit below when required.	SA26PSR	4559.00			
Lug landing kit —800 A max. For terminating utility service cables in indoor or outdoor underground pull sections.	SA8LL♦	753.00			
Single barrel lug kit —Kit provides single barrel lugs and pad in lieu of twin barrel lug provided with service section. Mechanical lugs provided are sized to fit 1-3/0–750 kcmil cable. Two lugs per phase are supplied.	SA7PL	395.00			
Loadside wireway —11.5 in. (W) x 14 in. (D)—indoor only	SA10LW	1052.00			
Bus link kit —800 A max.—Order one kit per phase for 400, 600, and 800 A.	SA10BL	246.00			
Double padlock hasp attachment —For mounting two padlocks on door handle of rainproof enclosure. Padlocks not included.	SS2PL	113.00			
Plug-On Distribution Panel —mounts on right side of I-Line interior. Cannot be used with LA/LH branch circuit breaker. Panel rated 225 A for 240 V applications. For QO® type plug-on circuit breakers only.	System 1Ø 3Ø 3Ø	Phase AC ABC AB	Pole Spaces 12	SS212AC SS312 SS212AB★	2339.00 2957.00 2339.00

♦ All EUSERC Utilities (except Arizona Public Service and Salt River Project) require a lug landing kit SA8LL.
 ★ To be used on 120/240 V, 3Ø4W delta applications.

Table 11.8: Subfeed Circuit Breakers ▼

Description	Rating (A)	2-Pole△		\$ Price	3-Pole		\$ Price
		Catalog No.			Catalog No.		
		Left	Right		Left	Right	
Subfeed Circuit Breaker Kit — Price includes circuit breaker, connectors and mounting hardware. The complete kit, mounting hardware, circuit breaker and connectors will be shipped direct from plant. Delivery is stock to three days.	100	SASFB100L()	SASFB100R()	1148.00	SASFB100L	SASFB100R	2055.00
	110	SASFB110L()	SASFB110R()	1148.00	SASFB110L	SASFB110R	2055.00
	125	SASFB125L()	SASFB100R()	1148.00	SASFB125L	SASFB125R	2055.00
	150	SASFB150L()	SASFB150R()	1148.00	SASFB150L	SASFB150R	2055.00
	175	SASFB175L()	SASFB175R()	1148.00	SASFB175L	SASFB175R	2055.00
	200	SASFB200L()	SASFB200R()	1148.00	SASFB200L	SASFB200R	2055.00
	225	SASFB225L()	SASFB225R()	1148.00	SASFB225L	SASFB225R	2055.00

▼ Cannot use subfeed circuit breaker kit with multiple mains service section switchboards.
 △ Two pole circuit breaker catalog numbers are completed by adding required phase connection letters as suffix (e.g. SASFB100LAC).

Ordering Information

- Service section:** Order service section from either Table 11.2 on page 11-4 (single main circuit breaker with distribution), Table 11.3 on page 11-4 (single main fusible with distribution), or Table 11.4 on page 11-4 (multiple mains fusible), as determined by mains rating, voltage, and system.
- Meter doors:** Order meter door from Table 11.6 (meter door selection) as determined by the height and utility metering requirements.
- Accessories and subfeeds:** Order as required from Table 11.7 (accessories) and/or Table 11.8 (subfeed circuit breakers).
- Circuit breakers and switches:** Order devices from pages listed below as determined by voltage, trip rating, AIR, and mounting space.

Multiple Mains and Branch Devices

- QO, QOB, QO-VH, QOB-VH: pages 7-10 and 9-10
- I-Line: pages 9-23 to 9-27
- QMB Switches: page 9-34



Power-Zone 4 Low Voltage Switchgear (Class 6037)

Power-Zone® 4 Low Voltage Switchgear with Masterpact® Circuit Breakers

Square D® brand Power-Zone® 4 low voltage, metal-enclosed, drawout switchgear is designed to provide superior electrical distribution, protection, and power quality management. The prime components of the switchgear are the Masterpact® NW and NT ANSI rated circuit breaker. Power-Zone 4 switchgear is designed to maximize the functionality of the Masterpact circuit breakers, which, in turn, deliver maximum uptime, system selectivity, ease of maintenance, and reliable circuit protection. All of these features are packed into the smallest footprint available for low voltage drawout switchgear.

- Power-Zone 4 is designed and built to ANSI® C37.20.1 and is Listed to UL® 1558
- Masterpact NW and NT drawout low voltage power circuit breakers are designed and built to ANSI C37.13 and C37.16. Listed to UL 1066
- Short-circuit current rating up to 200 kA without fuses
- High short-time withstand ratings up to 100 kA for 30 cycles, minimum
- Arc flash limiting Masterpact NW feeder breakers available in 800, 1600, and 2000 A ratings
- Family of field installable and upgradeable Micrologic® trip units with optional Powerlogic® data communications features
- Power-Zone 4 switchgear can offer optional Transparent Ready® Web-enabled data communications capability
- Smallest equipment footprint available in this product class
- Front access to control and communications wire connections
- Bolted copper bus provided as standard (up to 5000 A maximum)
- Large rear cable compartment pull area allowing maximum room for power cables
- Bus provision for future equipment expansion
- System designed for maximum uptime with low maintenance
- Modular circuit breaker designed for easy addition of control accessories
- Available in NEMA 3R outdoor walk-in enclosures

Masterpact NW circuit breakers are available in various levels of interrupting ratings from 42–200 kA at 480 V and 130 kA at 600 V.

The Masterpact NT circuit breaker is available in an 800 A frame size and 42 kA at 480 V interrupting rating. Up to 8 Masterpact NT circuit breakers can be mounted in a 30-inch wide section. (Not available for 600 V.)

Circuit breakers of like frame sizes and interrupting ratings are interchangeable.

Table 11.9: Masterpact Circuit Breaker Selection

Rating (A)	Catalog No.
Masterpact® NW	
800	NW08N1
	NW08H1
	NW08H2
	NW08H3
	NW08L1
	NW08L1F
1600	NW16N1
	NW16H1
	NW16H2
	NW16H3
	NW16L1
	NW16L1F
2000	NW20H1
	NW20H2
	NW20H3
	NW20L1
	NW20L1F
3200	NW32H1
	NW32H2
	NW32H3
	NW32L1
4000	NW40H2
	NW40H3
	NW40L1
5000	NW50H2
	NW50H3
	NW50L1
Masterpact NT	
800	NT08N1

Micrologic® Trip Units

A modern family of field-installable trip units is available with Masterpact NW and NT circuit breakers. The circuit breaker overcurrent protection consists of a microprocessor-based tripping device that requires no external power source. The complete tripping system has three main components: the air-core sensors, the trip device (with rating plug), and the trip actuator. The microprocessor-based trip unit uses true RMS current level sensing.

The Powerlogic® system is used in conjunction with Micrologic Type A, Type P, and Type H trip units (See DIGEST Pages 7-43 & 7-44) for the Masterpact NW and NT circuit breakers. Modbus® industry standard data communications allow the Powerlogic system to replace discrete meters, multiple transducers, analog wires, and analog-to-digital conversion equipment. Extensive information can be transmitted over a single communications cable to a Powerlogic system display, a personal computer, programmable logic controller, or other host system.

Basic circuit information, such as amperes, can be monitored using Micrologic Type A trip unit. Circuit breaker remote operation is available using the Micrologic Type P and Type H trip units with Powerlogic functionality. In addition to its metering capabilities, the Micrologic trip unit system is available with optional status inputs and relay outputs for monitoring discrete contacts and remote control of devices by way of the data communications channel.

Micrologic trip unit metering functions include:

- Amperes and volts
- Frequency
- Power
- Power demand
- Energy
- Energy demand
- Power factor
- Power quality measurements
- Communications
- Fault waveform capture
- Waveform capture
- Data logging
- Programmable contacts
- Current unbalance
- Over/under voltage
- Over/under frequency
- Voltage unbalance
- Phase loss
- Phase sequence
- Reverse power
- Long time imaging
- Contact wear indicator
- Temperature indication
- Masterpact circuit breaker maintenance information

**MiniBreak™ Compact Height Switches—
5.5 kV, 200 A**

The Square D® brand MiniBreak compact height switch enclosure is only 66-inches high and contains a single 3-pole load interrupter switch, rated 5.5 kV and 200 A. Enclosures are free-standing and suitable for both indoor (NEMA 1) and outdoor (NEMA 3R) applications. These switches are available unfused or with provisions for Square D® brand current-limiting fuses rated from 10E A to 200E A. Factory-installed accessories include an auxiliary switch, strip heaters, and provisions for a “lock open” only key interlock. The door is mechanically interlocked with the switch operating handle. Set screw cable lugs for #14 solid—2/0 stranded aluminum or copper cable are provided for two line and one load connections. **Fuses are not furnished with this equipment. For fuse information and pricing, see Table 11.12. The Fused switches and many of the fuses listed in Table 11.12 are available from stock.**



MiniBreak™ Switch Enclosure with Door (Class 6042)



MiniBreak Switch Enclosure with Fuses (Class 6042)



Listed Metal-enclosed Interrupter Switchgear

Table 11.10: Ratings

Max. design voltage (kV)	5.5
BIL (kV)	60
Frequency (Hz)	60
Continuous amperes	200
Interrupting amperes	200
Momentary (amperes asymmetrical)	20,000
Fault close (amperes asymmetrical)	20,000
Capacitor switching (kVAR)	None
Short time, 2 seconds (amperes symmetrical)	12,500
Low frequency withstand (kV)	19
Fuse integrated (symmetrical)	63,000

NOTE: 1200 hp maximum.

Ordering Information

Table 11.11: 5 kV—200 A Switch

Type	Switch Catalog No.	\$ Price
Unfused	HVMB305200U	10274.00
Fused	HVMB305200	11844.00

1. Select switch catalog number based on fused or unfused.
2. Select catalog numbers for modifications from Factory Modifications table.
3. If fused, select 5 kV, 200 A maximum current-limiting fuse from table below.
4. Price switch and fuses separately. Switches are furnished with provisions only for fuses.
5. Weight 450 lbs (204 kg).

Table 11.12: Current-Limiting Fuses, Non-Disconnect Type (Extended Travel Blown Fuse Indicator)

Continuous Current	Fuse Mounting Clip		Catalog Number▲	\$ Price■
	Size	Centers		
5 kV Fuse				
10E 15E 20E 25E	D	12"	5GS010 5GS015 5GS020 5GS025	954.00
30E 40E 50E 65E 80E 100E	D	12"	5GS030 5GS040 5GS050 5GS065 5GS080 5GS100	1980.00
125E 150E 175E 200E	D	12"	5GS125 5GS150 5GS175 5GS200	3326.00

- ▲ Contact your Schneider Electric representative for current stock quantities.
- Price includes one set of three fuses, packed in a single box.

Table 11.13: Factory Modifications

Catalog No.	Description	\$ Price
HVMX1	Auxiliary switch, 1-N.O. and 1-N.C. contacts	152.00
HVMK1	Provisions for lock open only key interlock (does not include the key cylinder—order separately)	341.00
HVMH1	Strip heater 100 W @ 120 V	1150.00
HVMH2	Strip heater with thermostat 100 W @ 120 V	1772.00
HVMSA3	Distribution class surge arrester (set of three arresters) 3 kV, 2.55 MCOV♦	1618.00
HVMSA6	Distribution class surge arrester (set of three arresters) 6 kV, 5.10 MCOV♦	1926.00

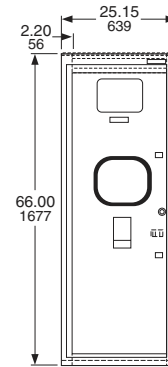
♦ Arresters are line side connected.

Pricing Example

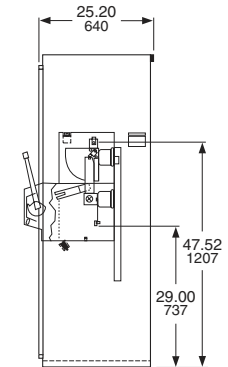
Price one (1), 5 kV, 200 A switch with 65E current-limiting fuses. Provide one auxiliary switch with 1-N.O. and 1-N.C. contact and with provision for installing a “lock open” key interlock on the switch operating mechanism.

Order:	Catalog No.	\$ Price
Switch with enclosure	HVMB305200	11844.00
Auxiliary switch	HVMX1	152.00
Key interlock adapter	HVMK1	340.00
Fuses (set of three, from page 11-14)	5GS065	1980.00

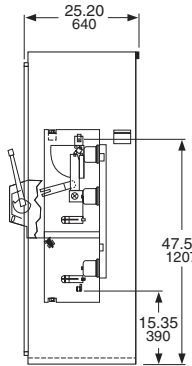
Total Price 14316.00



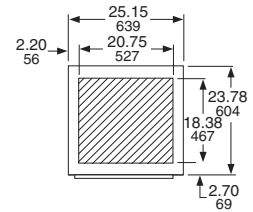
Front view



Section view (unfused)



Section view (fused)



Top view selected area recommended (bottom conduit entrance)

HVL/cc Metal-Enclosed Load Interrupter Switchgear—Full Range

Square D® brand HVL/cc metal-enclosed load interrupter switchgear provides HVL switching, metering, and interrupting capabilities for medium voltage electrical power distribution systems and is designed and tested per applicable ANSI/IEEE and NEMA standards.

Made up of modular units, the HVL/cc is easy to expand. Two main bus positions allow future extensions and connections to existing equipment.

HVL/cc switchgear is available in either single or multiple bay units. The design is compact, with front accessibility.

The HVL/cc switch can be equipped with either an over-toggle mechanism (OTM), which is standard, or an optional stored energy mechanism (SEM). An option with both mechanisms is the Fuselogic™ system. The Fuselogic system offers fuse tripping (with SEM) to provide protection against single phasing loads when a fuse has blown. It also has a mechanical interlock to prevent inadvertent switching until fuses have been installed or blown fuses have been replaced.

The HVL/cc enclosure is designed for front access only and can be positioned against walls, in small rooms or in pre-fabricated buildings. The small footprint can result in considerable cost savings from the reduction of building or room sizes.

Table 11.14: HVL/cc Load Interrupter Switches— Full Range 600/1200 A Ratings

	5.5	17.5	17.5	25.8	38
Switch (kV)— maximum design	5.5	17.5	17.5	25.8	38
BIL (kV)	60	95	110	125	150
Frequency (Hz)	50/60	50/60	50/60	50/60	50/60
Withstand (kV)	19	36	36	50	80
Continuous current (A)	600/1200	600/1200	600/1200	600	600
Interrupting current (A)	600/1200	600/1200	600/1200	600	600
Fault close (kA asymmetrical)	40	40	40	32	32
Momentary current (kA asymmetrical)	40	40	40	32	32
Short time current (kA symmetrical)	25	25	25	25	25
Electrical endurance (number of operations at 80% P.F.)	100/600 A 26/1200 A	100/600 A 26/1200 A	100/600 A 26/1200 A	100	100
Mechanical endurance (number of operations)	1000	1000	1000	1000	1000

Switch Standard Features

- Switch Positions: Closed, open, and internally grounded (optional) (connects switch contacts to ground)
- Enclosure: Epoxy
- Medium: Sulphur hexafluoride
- Maintenance: Maintenance free sealed for life
- Pressure:
 - 5.8 PSI (≤17.5 kV)
 - 22 PSI (25.8–38 kV)
- View ports to show switch blade position

Options

- Internal ground switch: Has full fault making capability
- Fuselogic™ system
- Infrared viewing windows
- Class I, Division 2
- Fast auto transfers
- Duplex configurations
- Protective relaying
- Powerlogic® metering
- 20-inch or 29.5-inch wide enclosures

Fuselogic™

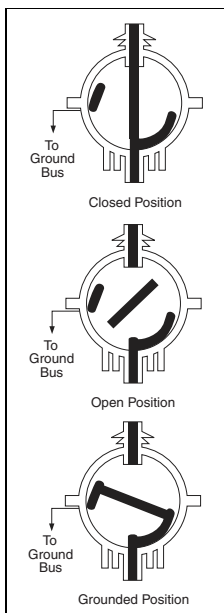
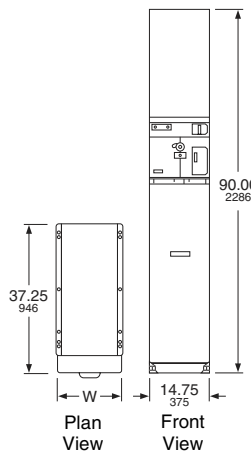
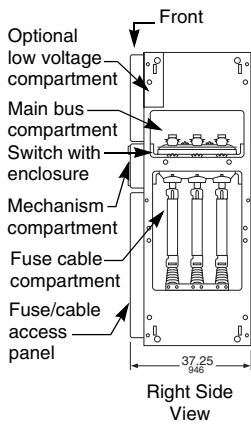
Fuselogic is a protection system that provides the ultimate in medium voltage fuse protection. This patented system utilizes Square D® brand current-limiting fuses with mechanical sensors that function without any auxiliary power requirements. Several combinations of Fuselogic functions can be combined to provide simple blown fuse indication contacts with mechanical lockout to anti-single phasing protection. Anti-single phasing requires the optional stored energy mechanism (SEM). Fuselogic is available on both HVL/cc and HVL switches.

Switchgear Standard Features

- Compartments: Switch, bus, fuse/cable, mechanism, and optional low voltage/control
- 11 gauge steel enclosure
- Epoxy insulators
- Fuse/cable access panel interlocked with switch
- Front access only
- Animated mechanism mimic bus
- Padlocking open or closed provision
- Top or bottom cable entry
- UL/CUL Listed
- Live line indicators on all incoming switch bays and outgoing feeder circuits
- Cable lugs included for one cable per phase
- Tin plated copper bus for lineups

Table 11.15: Surge Arresters

System L-L Voltage kV		Arrester MCOV-kV	
Nominal	Maximum	Effectively Grounded Neutral Circuits	Impedance Grounded and Ungrounded Circuits
2.4	2.54	—	2.55
4.16	4.4	2.55	5.1
4.8	5.08	—	5.1
6.9	7.26	—	7.65
12.0	12.7	7.65	12.70
12.47	13.2	7.65	12.70
13.2	13.97	8.4	—
13.8	14.52	8.4	—



Switch Contact Positions



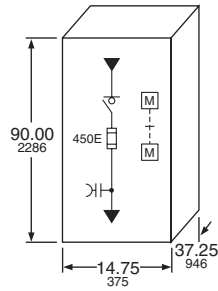
Listed Metal-enclosed Interrupter Switchgear

11 SWITCHBOARDS AND SWITCHGEAR



by Schneider Electric
www.schneider-electric.us

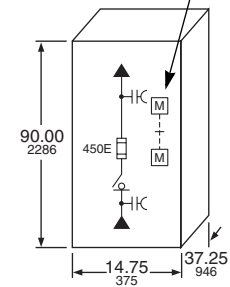
NOTE: Cable entry and exit must be opposite to maintain the minimum sections shown.



5 kV Indoor N1
Top Cable In/Bottom Cable
Out Switch in Position A

Mechanical interlock between switch and fuse access panel.

NOTE: Mechanical interlock is standard on switches.



5 kV Indoor N1
Top Cable In/Bottom Cable
Out Switch in Position B

Switchgear

HVL/cc Switchgear—Quick Ship Program—5–15 kV, 600 A

The HVL/cc quick ship program provides basic fused and unfused load interrupter switch configurations for stand-alone or transformer primary applications. The Quick Ship program offers faster delivery, but with fewer options.

Three-pole, 600 A individual HVL/cc switches are available in free-standing indoor (NEMA 1) enclosures. These switches are available unfused or with provisions for Square D® brand current-limiting DINE fuses. Factory optional accessories include auxiliary bays, main bus, auxiliary switches, extra cable terminating lugs, and distribution class surge arresters. The fuse access panel is mechanically interlocked with the switch mechanism. Key interlocks are not an available option with Digest-listed HVL/cc switches. (1) Set screw type lugs for (2) #2–350 kcmil copper or aluminum cables are provided for line and load connections. **Fuses are not furnished with this equipment. For fuse information and pricing refer to page 11-10.**

Provisions for Future Expansion

All “single” HVL/cc switches have provisions for future expansion on either side.

Order main bus kits for copper 600 A bus. Include sketch for factory-assembled parts or lineups.

600 A Single Switch Unfused

Manual over-toggle mechanism, no grounding switch

Includes (1) set screw lug for (2) #2–350 kcmil Cu or Al conductor per phase

Application A = Top entry (incoming—cable or main bus), bottom exit (load—cable or main bus)

Application B = Bottom entry (incoming—cable or main bus), top exit (load—cable or main bus)

Table 11.16: Unfused Switch Selection

Catalog No.	kV Rating	Fuse Range	Application	Width		\$ Price
				in	mm	
HVLCCA14305N	4.76	—	A	14.75	375	17500.00
HVLCCA20305N	4.76	—	A	20.00	508	18024.00
HVLCCA14315N	15	—	A	14.75	375	19244.00
HVLCCA20315N	15	—	A	20.00	508	19770.00
HVLCCB14305N	4.76	—	B	14.75	375	17500.00
HVLCCB20305N	4.76	—	B	20.00	508	18024.00
HVLCCB14315N	15	—	B	14.75	375	19244.00
HVLCCB20315N	15	—	B	20.00	508	19770.00

600 A Single Switch Fused

(Provisions only for Square D® brand current-limiting DINE fuses—order fuses separately)

Manual over-toggle mechanism, no grounding switch

Includes (1) set screw lug for (2) #2–350 kcmil Cu or Al conductor per phase

Application A = Top entry (incoming—cable or main bus), bottom exit (load—cable or main bus)

Application B = Bottom entry (incoming—cable or main bus), top exit (load—cable or main bus)

Table 11.17: Fused Switch Selection

Catalog No.	kV Rating	Fuse Range	Application	Width		\$ Price
				in	mm	
HVLCCA14305D	4.76	10–450E	A	14.75	375	19392.00
HVLCCA20305D	4.76	10–450E	A	20.00	508	19916.00
HVLCCA14315D	15	10–200E	A	14.75	375	19858.00
HVLCCA20315D	15	10–200E	A	20.00	508	20382.00
HVLCCB14305D	4.76	10–450E	B	14.75	375	19392.00
HVLCCB20305D	4.76	10–450E	B	20.00	508	19916.00
HVLCCB14315D	15	10–200E	B	14.75	375	19858.00
HVLCCB20315D	15	10–200E	B	20.00	508	20382.00



Listed Metal-enclosed
Interrupter Switchgear

Medium Voltage Metal-Enclosed —HVL/cc™

Class 6045 / Refer to Catalog 6045CT9801

600 A Incoming Line Auxiliary Bay

For bottom incoming cable to application A (bottom cable exit) switch(es), order 600 A tin plated Cu main bus to adjacent section from bus table. Includes (1) set screw lug for (2) #2–350 kcmil Cu or Al conductor per phase.

Table 11.18: Bays for Bottom Entry/Exit Cables

Catalog No.	kV Rating	Fuse Range	Application	Width		\$ Price
				in	mm	
HVLCCA14A	4.76/15	—	A	14.75	375	1968.00
HVLCCA20A	4.76/15	—	A	20.00	508	2492.00

For top incoming cable to application B (top cable exit) switch(es), order 600 A tin plated Cu main bus to adjacent section from main bus kits table. Includes (1) set screw lug for (2) #2–350 kcmil Cu or Al conductor per phase.

Table 11.19: Bays for Top Entry/Exit Cables

Catalog No.	kV Rating	Fuse Range	Application	Width		\$ Price
				in	mm	
HVLCCB14A	4.76/15	—	B	14.75	375	1968.00
HVLCCB20A	4.76/15	—	B	20.00	508	2492.00

600 A Tin Plated Copper Main Bus Kits

Table 11.20: Bus Kits

Catalog No.	Left (From) Application	Width		Right (To) Application	Width		\$ Price
		in	mm		in	mm	
		HVLCCMBA14A14	A		14.75	375	
HVLCCMBA14A20	A	14.75	375	A	20.00	508	946.00
HVLCCMBA20A14	A	20.00	508	A	14.75	375	946.00
HVLCCMBA20A20	A	20.00	508	A	20.00	508	1008.00
HVLCCMBB14B14	B	14.75	375	B	14.75	375	882.00
HVLCCMBB14B20	B	14.75	375	B	20.00	508	946.00
HVLCCMBB20B14	B	20.00	508	B	14.75	375	946.00
HVLCCMBB20B20	B	20.00	508	B	20.00	508	1008.00

Ratings

HVL/cc Switch with manually operated type OTM mechanism in cubicle enclosure (does not include internal ground switch). Ratings are based on an X/R ratio of 1.6.

Table 11.21: HVL/cc Switch Ratings

Switch (kV)—maximum design	5.5	17.5
BIL (kV)	60	95
Frequency (Hertz)	50/60	50/60
Withstand (kV)	19	36
Continuous current (amperes)	600	600
Interrupting current (amperes)	40,000	40,000
Fault close (amperes asymmetrical)	65,000	65,000
Integrated switch and fuse rating (amperes symmetrical)▲	40,000	40,000
Momentary current (amperes asymmetrical)	25,000	25,000
Short time current, 2 seconds (amperes symmetrical)	100	100
Operations at Full Load	1000	1000
Mechanical Endurance (number of operations)	50,000	for 630 A fuse.

Factory Modifications

Table 11.22: Factory Modifications

Catalog No.	Description	\$ Price
HVLCX-X3	Auxiliary switch 2 N.O.—2 N.C. contact	762.00

Distribution Class Surge Arresters

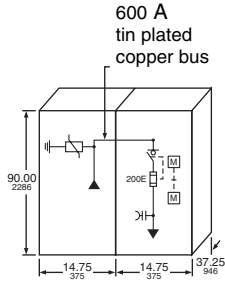
(One Set of Three) Switch Load Side Connected or Incoming Line Bay)

Table 11.23: Surge Arresters

Catalog No.	kV Rating	Section Width Minimum Required		\$ Price
		in	mm	
HVLCDSA3	3 kV, 2.55 kV MCOV	14.75	375	1618.00
HVLCDSA6	6 kV, 5.10 kV MCOV	14.75	375	1926.00
HVLCDSA9	9 kV, 7.65 kV MCOV	14.75	375	2248.00
HVLCDSA10	10 kV, 8.40 kV MCOV	14.75	375	2446.00
HVLCDSA12	12 kV, 10.20 kV MCOV	14.75	375	2836.00
HVLCDSA15	15 kV, 12.70 kV MCOV	20.00	508	3424.00
HVLCDSA18	18 kV, 15.3 kV MCOV	20.00	508	3948.00

600 A “Single” HVL/cc Switch with PROVISIONS ONLY for Square D® brand Current-Limiting, Non-Disconnect Type Fuses for Cable Connection to Power-Dry™, Power-Cast®, and Uni-Cast® Transformers (FLC = 300 A MAXIMUM)
RH—Transformer on right, LH—Transformer on Left
Application A = Top Entry (Incoming Cables)
Application B = Bottom Entry (Incoming Cables)

600 A “Duplex” HVL/cc Switch with PROVISIONS ONLY for Square D® brand Current-Limiting, Non-Disconnect Type Fuses for Cable Connection to Power-Dry, Power-Cast, and Uni-Cast Transformers (FLC = 300 A MAXIMUM)
RH—Transformer on Right, LH—Transformer on Left Includes Mechanical Interlock to Prevent Paralleling of Sources
Application A = Top Entry (Incoming Cables)
Application B = Bottom Entry (Incoming Cables)



Listed Metal-enclosed Interrupter Switchgear

Table 11.24: 600 A “Single” HVL/cc Switch Selection

Catalog No.	kV Rating	Fuse Range	Application	Width		RH / LH	\$ Price
				in	mm		
HVLC A14405DGR	4.76	10-450E	A	14.75	375	RH	20134.00
HVLC A20405DGR	4.76	10-450E	A	20.00	508	RH	20660.00
HVLC A14405DGL	4.76	10-450E	A	14.75	375	LH	20134.00
HVLC A20405DGL	4.76	10-450E	A	20.00	508	LH	20660.00
HVLC A14415DGR	15	10-200E	A	14.75	375	RH	20614.00
HVLC A20415DGR	15	10-200E	A	20.00	508	RH	21138.00
HVLC A14415DGL	15	10-200E	A	14.75	375	LH	20614.00
HVLC A20415DGL	15	10-200E	A	20.00	508	LH	21138.00
HVLC B14405DGR	4.76	10-450E	B	14.75	375	RH	20134.00
HVLC B20405DGR	4.76	10-450E	B	20.00	508	RH	20660.00
HVLC B14405DGL	4.76	10-450E	B	14.75	375	LH	20134.00
HVLC B20405DGL	4.76	10-450E	B	20.00	508	LH	20660.00
HVLC B14415DGR	15	10-200E	B	14.75	375	RH	20614.00
HVLC B20415DGR	15	10-200E	B	20.00	508	RH	21138.00
HVLC B14415DGL	15	10-200E	B	14.75	375	LH	20614.00
HVLC B20415DGL	15	10-200E	B	20.00	508	LH	21138.00

NOTE: Switches with transformer connections are painted ANSI 49. Standalone switches are painted ANSI 61. Transformer connections in HVL/cc switches are based on standard Square D® brand transformer connections. If these switches are used to connect to other manufacturers' transformers, then connections must match standard Square D® brand transformer connections. (Cable connections are furnished with the transformer.)

Table 11.26: 600 A “Duplex” HVL/cc Switch Selection

Catalog No.	kV Rating	Fuse Range	Application	Width		RH / LH	\$ Price
				in	mm		
HVLC A14505DGR	4.76	10-450E	A	14.75	375	RH	54174.00
HVLC A20505DGR	4.76	10-450E	A	20.00	508	RH	56068.00
HVLC A14505DGL	4.76	10-450E	A	14.75	375	LH	54174.00
HVLC A20505DGL	4.76	10-450E	A	20.00	508	LH	56068.00
HVLC A14515DGR	15	10-200E	A	14.75	375	RH	57428.00
HVLC A20515DGR	15	10-200E	A	20.00	508	RH	59322.00
HVLC A14515DGL	15	10-200E	A	14.75	375	LH	57428.00
HVLC A20515DGL	15	10-200E	A	20.00	508	LH	59322.00
HVLC B14505DGR	4.76	10-450E	B	14.75	375	RH	54174.00
HVLC B20505DGR	4.76	10-450E	B	20.00	508	RH	56068.00
HVLC B14505DGL	4.76	10-450E	B	14.75	375	LH	54174.00
HVLC B20505DGL	4.76	10-450E	B	20.00	508	LH	56068.00
HVLC B14515DGR	15	10-200E	B	14.75	375	RH	57428.00
HVLC B20515DGR	15	10-200E	B	20.00	508	RH	59322.00
HVLC B14515DGL	15	10-200E	B	14.75	375	LH	57428.00
HVLC B20515DGL	15	10-200E	B	20.00	508	LH	59322.00

General Purpose E-Rated Current-Limiting Fuses: Type DIN/E for HVL/cc Switches

Integrated rating for 600 A HVL/cc switches with Square D® brand DIN/E fuses listed below is 65 kA rms symmetrical amperes. (50 kA rms for 630 A fuse.)
Current-limiting fuses increase the integrated short-circuit current rating because of their energy-limiting capabilities.
To increase the short-circuit current rating of the entire lineup of switchgear, current-limiting fuses must be used in the entrance sections.

Table 11.25: Fuse Selection

Catalog No.	kV Rating	Fuse Rating	Set of Fuses ▲	Fuse Size	Section Width Required		\$ Price
					in	mm	
55DE010	5.5	10E	1	Actual	14.75	375	954.00
55DE015	5.5	15E	1	Actual	14.75	375	954.00
55DE020	5.5	20E	1	Actual	14.75	375	954.00
55DE025	5.5	25E	1	Actual	14.75	375	954.00
55DE030	5.5	30E	1	Actual	14.75	375	1980.00
55DE040	5.5	40E	1	Actual	14.75	375	1980.00
55DE050	5.5	50E	1	Actual	14.75	375	1980.00
55DE065	5.5	65E	1	Actual	14.75	375	1980.00
55DE080	5.5	80E	1	Actual	14.75	375	1980.00
55DE100	5.5	100E	1	Actual	14.75	375	3326.00
55DE125	5.5	125E	1	Actual	14.75	375	3326.00
55DE150	5.5	150E	1	Actual	14.75	375	3326.00
55DE175	5.5	175E	1	Actual	14.75	375	3326.00
55DE200	5.5	200E	1	Actual	14.75	375	3326.00
55DE250	5.5	250E	1	Actual	14.75	375	5742.00
55DE300	5.5	300E	1	Actual	14.75	375	5742.00
55DE350	5.5	350E	1	Actual	14.75	375	5742.00
55DE400	5.5	400E	1	Actual	14.75	375	6430.00
55DE450	5.5	450E	1	Actual	14.75	375	6430.00
175DE010	15.5	10E	1	Actual	14.75	375	3214.00
175DE015	15.5	15E	1	Actual	14.75	375	3214.00
175DE020	15.5	20E	1	Actual	14.75	375	3214.00
175DE025	15.5	25E	1	Actual	14.75	375	3214.00
175DE030	15.5	30E	1	Actual	14.75	375	3290.00
175DE040	15.5	40E	1	Actual	14.75	375	3290.00
175DE050	15.5	50E	1	Actual	14.75	375	3290.00
175DE065	15.5	65E	1	Actual	14.75	375	4446.00
175DE080	15.5	80E	1	Actual	14.75	375	4446.00
175DE100	15.5	100E	1	Actual	14.75	375	4446.00
175DE125	15.5	125E	1	Actual	14.75	375	6878.00
175DE150	15.5	150E	1	Actual	14.75	375	6878.00
155DE175	15.5	175E	1	Actual	14.75	375	6878.00
155DE200	15.5	200E	1	Actual	14.75	375	6878.00

▲ Each (1) set of fuses contains three fuses. (E.g., (2) sets of fuses yield a total of six fuses.)

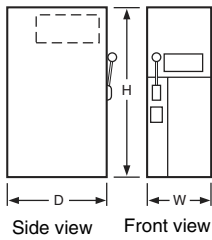
Ordering Information

- Select switch catalog number based on fused or unfused and cable entry locations (top or bottom) from Table 11.16 or Table 11.17 on page 9.
- Select incoming line auxiliary bay from Table 11.18 or Table 11.19 on page 9, if required.
- Select main bus from Table 11.20 on page 9, if required.
- Select catalog numbers for factory modifications from Table 11.22 on page 9, if required.
- If fused, select DIN/E fuses from Table 11.25.

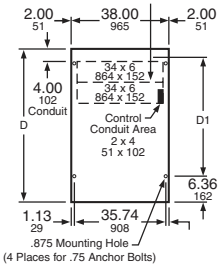
Pricing Example

Order indoor 600 A, 5 kV, HVL/cc switch with bottom incoming and bottom outgoing cables (1) #2 AWG per phase, (1) set 200E fuses, and (1) set 6 kV surge arresters.

Order:	Catalog No.	\$ Price
Switch w/fuse provisions and bottom exit load cables	HVLC A14305D	19392.00
600 incoming line auxiliary bay (Application A—bottom entry)	HVLC A14A	1968.00
Main Bus (Application A—14 in. to Application A—14 in.)	HVLC C M B A14A14	882.00
6 kV LAs	HVLC C D S A6	1926.00
Set 200E fuses	55DE200	3326.00
Total Price		13747.00



Recommended power cable conduit area



HVL Metal-Enclosed Load Interrupter Switchgear—Full Range

HVL™ 5–38 kV Load Interrupter is the most popular ANSI-rated switchgear in its class in America. Among medium voltage interrupter switchgear, both the switch and the enclosure stand as industry benchmarks in the areas of design, manufacturing, and performance. Load interrupter switchgear must perform a number of critical functions in a unit substation - protecting equipment and disconnecting faulted lines and transformers. Designed and tested to the latest applicable standards, HVL has been engineered to provide superior protection for your distribution system.

HVL switchgear is available for various applications and configurations, including:

- Individual service entrance bays
- Multiple-bay lineups incorporating HVL load interrupters and optional Visi/Vac® circuit interrupters
- Substation primaries

Square D® brand metal-enclosed switchgear has become an industry standard for its better system performance, lower maintenance cost, easier system expansion, and reduced system expense.

A full range of ratings and options are available but not listed in this publication. Contact your nearest Schneider Electric sales office or your local Schneider Electric distributor.

Table 11.27: Ratings

Maximum design voltage (kV)	4.76	15	17	25.8	29	38
BIL (kV)	60	95	95	125	125	150
Frequency (Hz)	50/60	50/60	50/60	50/60	50/60	50/60
Continuous amperes	600/1200	600/1200	600	600/1200	600/1200	600
Interrupting amperes	600/1200	600/1200	600	600	400	400
Momentary (kA asymmetrical)	40/61/80	40/61/80	61	40/61	40/61	40
Fault close (kA asymmetrical)	40/61	40/61	40	40	40	20
Capacitor switching (kVAR)	2400	2400	—	—	—	—
Short time rating 2 seconds (kA symmetrical)	25/38/50	25/38/50	25	25	25	25
Low frequency withstand (kV)	19	36	36	60	60	60



Listed Metal-enclosed Interrupter Switchgear

Standard Features

- 11 gauge steel enclosure
- Direct drive mechanism
- Permanently attached operating handle
- Visible isolation viewing window
- Mechanical interlocked fuse access door
- Provision for padlock and key interlock
- Highly flexible design
- ANSI 61 paint

Options

- Outdoor construction
- Square D® brand DIN-style current-limiting fuses
- Boric acid fuses
- Silver or tin plated copper bus
- 600, 1200, or 2000 A main bus
- Heat shrink insulated bus
- Motor operator
- Shunt trip
- Fuselogic™ tripping system
- Automatic load transfer schemes
- Roof bushings
- Key interlocks
- Surge arresters
- Utility metering bays
- Line selector switch
- Duplex switch
- Transformer connections
- Infrared windows for thermal scanning of connections

Fuselogic™

Fuselogic is a protection system that provides the ultimate in medium voltage fuse protection. This patented system utilizes the Square D® brand current-limiting fuses with mechanical sensors that function without any auxiliary power requirements. Several combinations of Fuselogic functions can be combined to provide simple blown fuse indication contacts with mechanical lockout to anti-single phasing protection. Anti-single phasing requires the optional stored energy mechanism (SEM). Fuselogic is available on both HVL/cc™ and HVL switches.

HVL Switchgear—Quick Ship Program—5 kV–15 kV, 600 A Features

The HVL quick ship program provides basic fused and unfused load interrupter switch configurations for stand-alone or transformer primary applications. The Quick Ship program offers faster delivery, but with fewer options.

Three-pole, 600 A individual HVL switches are available in free-standing indoor (NEMA 1) or outdoor (NEMA 3R) enclosures. The switches used in these enclosures are UL Recognized and are listed under Category WIQG2 in File E140591(M). These switches are available unfused or with provisions for 3-inch diameter Square D® brand current-limiting fuses or for boric acid fuses. Factory optional accessories include auxiliary switches, extra cable terminating lugs and distribution class surge arresters. The door is mechanically interlocked with the switch operating handle and provisions for key interlocks are standard. Set screw type lugs for one #2 solid—600 kcmil copper or aluminum cables are provided for line and load connections. Other standard features include a bolted enclosure with a viewing window, ground pad, and space heater (NEMA 3R only). Control power for heater must be from external source. **Fuses are not furnished with this equipment. For fuse information and pricing, refer to page 11-14. Switches are listed on pages 11-11 and 11-12, and many of the fuses listed on page 11-14 are available from stock.**

Table 11.28: 600 A “Single” Switch Unfused

Catalog No.	kV Rating	Fuse Range	Enclosure Type	\$ Price
HVL305NG	4.76	—	NEMA 1	17500.00
HVL305NW	4.76	—	NEMA 3R	21524.00
HVL315NG	15	—	NEMA 1	19244.00
HVL315NW	15	—	NEMA 3R	23478.00

Table 11.29: 600 A “Single” Switch with PROVISIONS ONLY for Square D® brand Current-Limiting, Non-Disconnect Type Fuses

Catalog No.	kV Rating	Fuse Range	Enclosure Type	\$ Price
HVL305DEG	4.76	10–450E	NEMA 1	19392.00
HVL305DEW	4.76	10–450E	NEMA 3R	21636.00
HVL315DEG1	15	10–100E	NEMA 1	19858.00
HVL315DEG2	15	125–200E	NEMA 1	19858.00
HVL315DEW1	15	10–100E	NEMA 3R	23978.00
HVL315DEW2	15	125–200E	NEMA 3R	23978.00

Table 11.30: 600 A “Single” Switch with PROVISIONS ONLY for S&C Boric Acid Non-Disconnect Type Fuses

Catalog No.	kV Rating	Fuse Range	Enclosure Type	\$ Price
HVL305BG	4.76	10E–400E	NEMA 1	24936.00
HVL305BW	4.76	10E–400E	NEMA 3R	28606.00
HVL315BG	15	10E–400E	NEMA 1	26650.00
HVL315BW	15	10E–400E	NEMA 3R	30688.00
HVL317BG	17	10E–400E	NEMA 1	29610.00
HVL317BW	17	10E–400E	NEMA 3R	34098.00

11 SWITCHBOARDS AND SWITCHGEAR

Table 11.31: Ratings

Max. Design Voltage (kV)	4.76	15.0
BIL (kV)	60	95
Frequency (Hz)	50/60	50/60
Continuous amperes	600	600
Interrupting amperes	600	600
Momentary (amperes asymmetrical)	40,000	40,000
Fault close (amperes asymmetrical)	40,000	40,000
Capacitor switching (kVAR)	2,400	2,400
Short-time rating, 2 seconds (amperes symmetrical)	25,000	25,000
Low frequency withstand (kV)	19	36

Table 11.32: Distribution Class Surge Arresters

System L-L Voltage kV		Arrester MCOV-kV		
Nominal	Maximum	Effectively Grounded Neutral Circuits	Impedance Grounded and Ungrounded Circuits	
2.4	2.54	—	2.55	
4.16	4.4	2.55	5.1	
4.8	5.08	—	5.1	
6.9	7.26	—	7.65	
12.0	12.7	7.65	12.70	
12.47	13.2	7.65	12.70	
13.2	13.97	8.4	—	
13.8	14.52	8.4	—	

Table 11.33: Enclosure Type

Type	W		D		H		Weight	
	in	mm	in	mm	in	mm	lbs	kg
Indoor	38.00	965	54.50	1384	90.00	2286	1200	545
Outdoor	38.00	965	60.00	1524	97.50	2477	1400	636

Provisions for Future Expansion

All “single” Digest switches have provisions for future expansion on either side. Order kits HVMB for top crossover copper 600 A bus and HVLc for line connections to the top bus. (Refer to the Factory Modifications table on page 11-13.) Include sketch for factory-assembled parts or lineups.

HVL Switches for Power-Dry II™, Power-Cast II®, and Uni-Cast II® Transformer Connections

HVL switches can be configured for close coupling cable connections to listed dry type transformers for primary main switches of unit substations. These are listed in the tables below with current-limiting or boric acid fuses. Both single and duplex switch mains are included in this selection. Transformers are listed on page 14-20 and may not be suitable for close coupling. For transformer availability and specific configurations, contact your local Schneider Electric sales office. All connections in this digest are based on standard Square D® brand transformer connections. If these switches are used to connect to other manufacturers’ transformers, then connections must coordinate with standard Square D® brand transformer connections. (Cable connections are furnished with the transformer.)

Table 11.34: 600 A “Single” Switch with PROVISIONS ONLY for Square D® brand Current-Limiting, Non-Disconnect Type Fuses for Cable Connection to Power-Dry II, Power-Cast II, and Uni-Cast II Transformers (FLC = 300 A max.) RH—Transformer on Right, LH—Transformer on Left

Catalog No.	kV Rating	Fuse Range	Enclosure Type	RH / LH	\$ Price
HVL405DEGR	4.76	10–450E	NEMA 1	RH	20134.00
HVL405DEGL	4.76	10–450E	NEMA 1	LH	20134.00
HVL405DEWRH	4.76	10–450E	NEMA 3R	RH	25322.00
HVL405DEWLH	4.76	10–450E	NEMA 3R	LH	25322.00
HVL415DEGR1	15	10–100E	NEMA 1	RH	20614.00
HVL415DEGR2	15	125–200E	NEMA 1	RH	20614.00
HVL415DEGL1	15	10–100E	NEMA 1	LH	20614.00
HVL415DEGL2	15	125–200E	NEMA 1	LH	20614.00
HVL415DEWR1H	15	10–100E	NEMA 3R	RH	28070.00
HVL415DEWR2H	15	125–200E	NEMA 3R	RH	28070.00
HVL415DEWL1H	15	10–100E	NEMA 3R	LH	28070.00
HVL415DEWL2H	15	125–200E	NEMA 3R	LH	28070.00

Table 11.35: 600 A “Duplex” Switch with PROVISIONS ONLY for Square D® brand Current-Limiting, Non-Disconnect Type Fuses for Cable Connection to Power-Dry II, Power-Cast II, and Uni-Cast II Transformers (FLC = 300 A max.) RH—Transformer on Right, LH—Transformer on Left

Catalog No.	kV Rating	Fuse Range	Enclosure Type	RH / LH	\$ Price
HVL505DEGR	4.76	10–450E	NEMA 1	RH	42028.00
HVL505DEGL	4.76	10–450E	NEMA 1	LH	42028.00
HVL505DEWRH	4.76	10–450E	NEMA 3R	RH	49484.00
HVL505DEWLH	4.76	10–450E	NEMA 3R	LH	49484.00
HVL515DEGR1	15	10–100E	NEMA 1	RH	43084.00
HVL515DEGR2	15	125–200E	NEMA 1	RH	43084.00
HVL515DEGL1	15	10–100E	NEMA 1	LH	43084.00
HVL515DEGL2	15	125–200E	NEMA 1	LH	43084.00
HVL515DEWR1H	15	10–100E	NEMA 3R	RH	54904.00
HVL515DEWR2H	15	125–200E	NEMA 3R	RH	54904.00
HVL515DEWL1H	15	10–100E	NEMA 3R	LH	54904.00
HVL515DEWL2H	15	125–200E	NEMA 3R	LH	54904.00

Table 11.36: 600 A “Single” Switch with PROVISIONS ONLY for S&C Boric Acid Non-Disconnect Type Fuses for Cable Connection to Power-Dry II, Power-Cast II, and Uni-Cast II Transformers (FLC = 300 A max.) RH—Transformer on Right, LH—Transformer on Left

Catalog No.	kV Rating	Fuse Range	Enclosure Type	RH / LH	\$ Price
HVL405BGR	4.76	10E–400E	NEMA 1	RH	25666.00
HVL405BGL	4.76	10E–400E	NEMA 1	LH	25666.00
HVL405BWRH	4.76	10E–400E	NEMA 3R	RH	30674.00
HVL405BWLH	4.76	10E–400E	NEMA 3R	LH	30674.00
HVL415BGR	15	10E–400E	NEMA 1	RH	27390.00
HVL415BGL	15	10E–400E	NEMA 1	LH	27390.00
HVL415BWRH	15	10E–400E	NEMA 3R	RH	32476.00
HVL415BWLH	15	10E–400E	NEMA 3R	LH	32476.00

▲ Includes fuse holder only. See table on page 11-14 for fuse refills.

Table 11.37: 600 A “Duplex” Switch with PROVISIONS ONLY for S&C Boric Acid Non-Disconnect Type Fuses for Cable Connection to Power-Dry II, Power-Cast II, and Uni-Cast II Transformers (FLC = 300 A max.) RH—Transformer on Right, LH—Transformer on Left

Catalog No.	kV Rating	Fuse Range	Enclosure Type	RH / LH	\$ Price
HVL505BGR	4.76	10E–400E	NEMA 1	RH	47470.00
HVL505BGL	4.76	10E–400E	NEMA 1	LH	47470.00
HVL505BWRH	4.76	10E–400E	NEMA 3R	RH	57742.00
HVL505BWLH	4.76	10E–400E	NEMA 3R	LH	57742.00
HVL515BGR	15	10E–400E	NEMA 1	RH	49540.00
HVL515BGL	15	10E–400E	NEMA 1	LH	49540.00
HVL515BWRH	15	10E–400E	NEMA 3R	RH	60514.00
HVL515BWLH	15	10E–400E	NEMA 3R	LH	60514.00

■ Includes fuse holder only. See table on page 11-14 for fuse refills.

NOTE: Switches with transformer connections are painted ANSI 49. Standalone switches are painted ANSI 61.

Fuse Selection

The rule of thumb method for selecting fuses for transformer protection is 1.33 times the self-cooled full load current of the transformer or the next higher fuse rating. Selection of the fuse is the customer's responsibility and should be based on transformer and system characteristics.

- **Maximum Fuse Size:**
Maximum fuse size should be determined by comparing the fuse total clearing curve to the transformer damage curve. Contact Schneider Electric for transformer overload and short-circuit withstand capability.
- **Minimum Fuse Size:**
Minimum fuse size shall carry the transformer magnetizing inrush current of 12 times full load amperes for 0.1 second.

Table 11.38: Factory Modifications

Catalog No.	Description	\$ Price
HVMB	Main Bus Kit, 600 A copper	2288.00
HVLC	Line side connector kit (main bus) 600 A with 2-1/0-500 MCM lugs (bottom entry only)	1282.00
	Provisions for key interlocks (does not include key cylinders—order separately)	0.00
HVLX3	Auxiliary switch 2 N.O.—2 N.C. contact	762.00
HVLC2	Set screw type lugs 1/0—500 kcmil (qty. 3)	196.00
Distribution Class Surge Arresters ▲		
HVDSA3	3 kV, 2.55 MCOV	1618.00
HVDSA6	6 kV, 5.10 MCOV	1926.00
HVDSA9	9 kV, 7.65 MCOV	2248.00
HVDSA10	10 kV, 8.40 MCOV	2446.00
HVDSA12	12 kV, 10.20 MCOV	2836.00
HVDSA15	15 kV, 12.70 MCOV	3424.00

▲ Load side connected

Standard Features

- Switches for transformer primaries are cable connected only.
- Key interlocks must be ordered and coordinated by customer.
- Standard color is ANSI 61 for standalone units; ANSI 49 for switches connecting to transformers.
- If switches are purchased to coordinate with Square D® brand transformers, composite drawings and shipment coordination will not be available.
- Switches are not designed for any special dimensions for retrofit purposes. For dimensions other than shown, contact your nearest Schneider Electric sales office or your local Schneider Electric distributor.

Ordering Information

1. Select switch catalog number based on fused or unfused and enclosure type.
2. Select catalog numbers for factory modifications from the table above.
3. If fused, select fuse from table on page 11-14.
4. Price switch and fuses separately. Switches are furnished with provisions only for current-limiting fuse or boric acid fuse.

Pricing Example

Price one (1) indoor (NEMA 1), 15 kV, 600 A switch with 80E SM-5S boric acid fuses and 10 kV distribution class surge arresters for a 7.62/13.2 kV grounded wye system.

Order:	Catalog No.	\$ Price
Switch with indoor enclosure	HVL315BG	26650.00
Surge arrester, 10 kV	HVDSA10	2446.00
Boric acid fuse (set of three, from page 11-14)	15SM5080	1508.00
Total Price		30634.00

Square D® Brand DIN/E Fuse Selection Tables—HVL

Table 11.39: DIN/E Current-Limiting Fuses, Non-Disconnecting Type ▲■◆ (Extended Travel Blown Fuse Indicator)

Continuous Current	Fuse Mounting Clip ★		Catalog No. ▼	\$ Price ▲
	Centers (in)	Diameter (mm)		
5 kV Fuse				
10E	17.4	51	55DE010	954.00
15E	17.4	51	55DE015	
20E	17.4	51	55DE020	
25E	17.4	51	55DE025	
30E	17.4	51	55DE030	
40E	17.4	51	55DE040	1980.00
50E	17.4	51	55DE050	
65E	17.4	51	55DE065	
80E	17.4	51	55DE080	
100E	17.4	51	55DE100	
125E	17.4	76	55DE125	3326.00
150E	17.4	76	55DE150	
175E	17.4	76	55DE175	
200E	17.4	76	55DE200	
250E	17.4	76	55DE250	
300E	17.4	76	55DE300	5742.00
350E	17.4	76	55DE350	
400E	17.4	76	55DE400	6430.00
450E	17.4	76	55DE450	
15 kV Fuse				
10E	17.4	51	175DE010	3214.00
15E	17.4	51	175DE015	
20E	17.4	51	175DE020	
25E	17.4	51	175DE025	
30E	17.4	51	175DE030	
40E	17.4	76	175DE040	3290.00
50E	17.4	76	175DE050	
65E	17.4	76	175DE065	
80E	17.4	76	175DE080	4446.00
100E	17.4	88	175DE100	
125E	21.14	88	175DE125	
150E	21.14	88	175DE150	6878.00
175E	21.14	88	175DE175	
200E	21.14	88	175DE200	
250E	21.14	88	175DE250	

- ▲ Square D® brand DIN/E fuses are shown in this table. For fuses produced by other manufacturers, contact your nearest Schneider Electric sales office or your local Schneider Electric distributor.
- Current-limiting fuses will increase the integrated short-circuit ratings beyond the non-fusible units. Contact your nearest Schneider Electric sales office or your local Schneider Electric distributor.
- ◆ Caution—These fuses will not work for the MiniBreak. See page 11-7 for the appropriate MiniBreak fuses.
- ★ All fuses are single barrel arrangement with ferrule diameters per the chart.
- ▼ Contact your Schneider Electric representative for current stock quantities.
- ▲ Price includes one set of three fuses, packed in a single box.

Boric Acid Fuse Selection Tables—HVL

Table 11.40: Boric Acid Fuses

Continuous Current	Fuse Type ◇	Catalog No.	\$ Price	Fuse Type ★	Catalog No. ▼	\$ Price ●
5 kV Fuse Refill						
10E	SM-5S	5SM5010	1472.00	RBA400	405WBAF010	1692.00
15E	SM-5S	5SM5015		RBA400	405WBAF015	
20E	SM-5S	5SM5020		RBA400	405WBAF020	
25E	SM-5S	5SM5025		RBA400	405WBAF025	
30E	SM-5S	5SM5030		RBA400	405WBAF030	
40E	SM-5S	5SM5040		RBA400	405WBAF040	
50E	SM-5S	5SM5050		RBA400	405WBAF050	
65E	SM-5S	5SM5065		RBA400	405WBAF065	
80E	SM-5S	5SM5080		RBA400	405WBAF080	
100E	SM-5S	5SM5100		RBA400	405WBAF100	
125E	SM-5S	5SM5125	RBA400	405WBAF125	1758.00	
150E	SM-5S	5SM5150	RBA400	405WBAF150		
175E	SM-5S	5SM5175	—	—		
200E	SM-5S	5SM5200	RBA400	405WBAF200		
250E	SM-5S	5SM5250	1528.00	RBA400	405WBAF250	1758.00
300E	SM-5S	5SM5300		RBA400	405WBAF300	
400E	SM-5S	5SM5400		RBA400	405WBAF400	
400E	SM-5S	5SM5400		RBA400	405WBAF400	
15 kV Fuse Refill						
10E	SM-5S	15SM5010	1508.00	RBA400	415WBAF010	1732.00
15E	SM-5S	15SM5015		RBA400	415WBAF015	
20E	SM-5S	15SM5020		RBA400	415WBAF020	
25E	SM-5S	15SM5025		RBA400	415WBAF025	
30E	SM-5S	15SM5030		RBA400	415WBAF030	
40E	SM-5S	15SM5040		RBA400	415WBAF040	
50E	SM-5S	15SM5050		RBA400	415WBAF050	
65E	SM-5S	15SM5065		RBA400	415WBAF065	
80E	SM-5S	15SM5080		RBA400	415WBAF080	
100E	SM-5S	15SM5100		RBA400	415WBAF100	
125E	SM-5S	15SM5125	RBA400	415WBAF125	1788.00	
150E	SM-5S	15SM5150	RBA400	415WBAF150		
175E	SM-5S	15SM5175	—	—		
200E	SM-5S	15SM5200	RBA400	415WBAF200		
250E	SM-5S	15SM5250	1554.00	RBA400	415WBAF250	1788.00
300E	SM-5S	15SM5300		RBA400	415WBAF300	
400E	SM-5S	15SM5400		RBA400	415WBAF400	
400E	SM-5S	15SM5400		RBA400	415WBAF400	

- S&C Boric Acid Fuses
Type SM-5S fuses are manufactured by the S&C Electric Company. SM-5S has a 25.0 kA symmetrical short-circuit rating from 2.4 kV to 17.0 kV. For 16.5 kV ratings, only S&C boric acid fuses can be used.
- ◇ Cutler-Hammer - Westinghouse Fuses
Type RBA-400 fuses are manufactured by Cutler-Hammer - EATON Corporation. RBA-400 has a 37.5 kA symmetrical ampere short-circuit rating from 2.4 kV to 4.8 kV and 29.4 kA symmetrical from 12 kV to 13.8 kV.
- ★ Caution—These fuses will not work for the MiniBreak. See page 11-7 for the appropriate MiniBreak fuses.
- ▼ Contact your Schneider Electric representative for current stock quantities.
- Price includes one set of three fuses, packed in a single box.

Masterclad® Medium Voltage Metalclad™ Switchgear (UL Listed)

The Reliability of a Quality Design

The quality of Square D® brand Masterclad medium voltage Metalclad switchgear stems from a design and manufacturing process that focuses on long-term switchgear performance with the highest degree of reliability.

Based on specific customer application needs, Schneider Electric engineers and technicians select the appropriate standard sections and bus configurations, with the ability to customize where needed. After the specified circuit breakers, instrument and control power transformers, relays, meters and other components are selected and approved. All are factory-assembled, wired, and tested as a complete assembly.



Two-high Masterclad 5–27 kV Metalclad Switchgear



Vacuum VR Circuit Breaker for Masterclad Switchgear



Two-high Masterclad 5–27 kV Metalclad Switchgear



Arc-Terminator™ Arc Extinguishing System



Listed Metalclad Switchgear

Table 11.41: Ratings

Nominal voltage (kV)	4.16	7.2	13.8	24.9
Maximum voltage (kV)	4.76	8.25	15.0	27.0
BIL (kV)	60	95	95	125
Frequency (Hz)	50/60	50/60	50/60	50/60
Continuous amperes (A)	1200–3000	1200–3000	1200–3000	1200–2000
MVA (reference only)	250–350	500	500–750–1000	1250–2000
Short-time rating (kA) 3 seconds	36 49	41	23 36 48	25 40
Close and latch rating (kA) (peak)	97 132	111	62 97 130	68 108

Type VR Vacuum Circuit Breaker

The VR breaker is a horizontal drawout type designed to provide long life, reduced maintenance, and ease of handling. The Type RI advanced design motor-charged stored energy mechanism is a model of reliability with simplicity-with an operating life exceeding ANSI requirements. The VR circuit breaker is UL labeled and includes a permanently mounted manual charging handle.

Switchgear Construction

- Floor mounted breaker racking mechanism
- Standard epoxy supports or optional porcelain supports
- Aluminum or copper main bus
- Indoor NEMA 1
- Outdoor NEMA 3R
- Walk-in
- Non walk-in

Arc Terminator™ Arc Extinguishing System

Active system detects and controls the effects of internal arcing faults. It complies with ANSI C37.20.7 requirements for arc resistant switchgear for Type 1, Type 2, and Type 2A.

Benefits

- Prevents pressure buildup
- Reduces release of toxic materials
- Eliminates need for reinforced switchgear
- Eliminates special requirements for buildings or plenums
- Minimizes equipment damage
- Reduces operating downtime

Unit Substations



Unit Substation

Table 11.42: Complete Close Coupled Unit Substations Available

Product Type	Class Nos.	Product Section No.
Primary Section		
Medium voltage load interrupter switchgear	6040, 6045	11-1
Metalclad switchgear	6055	
Low voltage Power-Style® QED switchboard	2741-2744	
Air terminal chamber	7421-23, 7310, 7240, 7320	
Transformer Section		
Open, ventilated dry—Power-Dry™	7421-23	14-1
Open, ventilated dry/cast resin combination—Uni-Cast®	7320	
Open, ventilated cast resin—Power-Cast®	7310	
Mineral oil or high fire point fluid—liquid	7240	
Secondary Section		
Medium voltage load interrupter switchgear	6040	11-1
Metalclad switchgear	6055	
Medium voltage motor control center	8198	
Low voltage Power-Style QED switchboard	2741-2744	
Air terminal chamber	7421,23, 7310, 7240, 7320	
Low voltage drawout switchgear	6037	
Low voltage Model 6 motor control centers	8998	17-1

Power-Zone® Model III Package Unit Substations

General

Model III Power-Zone package unit substations combine a primary switch, dry-type transformer and I-Line® distribution section into a single compact unit. All components are engineered, manufactured and tested by Schneider Electric. The substation is available with UL listing.

The Model III is only 36-inches deep and 85-inches high, which allows passing the entire substation through standard size doorways and narrow hallways.

Ventilation is toward the front, at the top of the transformer section, so the unit can be installed against a wall or in a corner without altering or derating.

Model IIIs are ideal for renovations and high rise applications requiring increased customer electrical demand as well as new construction requiring multiple zones and a small footprint.

75–1000 kVA at 480 V; 75–500 kVA at 240 V

Available with primary voltages of 2400–13800 V. Forced air cooling (AA/FA) provides an additional 33%. Features 220 °C insulation and 150 °C, 115 °C, or 80 °C temperature rise. Largest 80 °C or 115 °C rise unit available is 750 kVA.

The secondary circuit breaker distribution section may be equipped with an individually mounted secondary main breaker or an I-Line® distribution panelboard. Branch circuit breakers from 15 A FY to PowerPact® RLC 1200 A may be installed. PowerPact® molded case circuit breakers M, P, and R frame are available with electronic trip units.

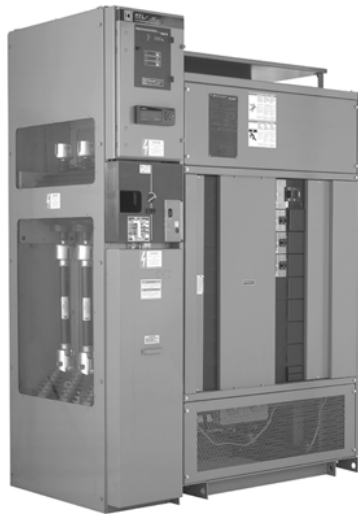
Additional options include CM 3000 and CM 4000 series circuit monitors, PM-800 series power meters, surge arresters, and I-Line plug-on unit with SurgeLogic® Transient Voltage Surge Suppression (TVSS).

Incoming Line Section

Most Model IIIs are supplied with a Square D® brand fused HVL/cc 600 A load interrupter switch. The HVL/cc offers the smallest footprint in the industry and is an exclusive sealed interruption type compartmentalized switch. Where switching and overcurrent protection are provided elsewhere, a full-height air-filled terminal chamber can be provided in place of the switch.

Table 11.43: Primary Switch Ratings, Type HVL/cc

Nominal Voltage	4.16	13.8
BIL	60	95
Continuous amperes	600	600
Interrupting amperes	600	600
Fault close (kA asymmetrical)	40	40
Momentary current (kA asymmetrical 10 cycles)	40	40
Duty-cycle-fault-close (number of operations)	4	4
Grounding switch fault close (kA asymmetrical)	40	40
Short-time rating (kA asymmetrical 2 seconds)	25	25
Dielectric withstand (kV 1 minute)	19	36
Electrical endurance (close-open)	100	100
Mechanical endurance (close-open)	1000	1000



Model III Shown with HVL/cc Load Interrupter Switch

11 SWITCHBOARDS AND SWITCHGEAR

Transformer Section

Special barrel wound dry-type transformers employing resin encapsulated VPI (Vacuum Pressure Impregnation) techniques are used to achieve the low-loss, compact design necessary for the space-saving package substation concept. Class H, 220°C insulation is used throughout. Temperature rise is 150°C as standard, although 80°C or 115°C low temperature premium transformers are available through 750 kVA. Aluminum windings are standard with copper as an option. Four full capacity 2-1/2 percent taps are provided—two above nominal voltage and two below.

Fan cooling is optional. When selected, it increases the capacity rating of the transformer an additional 33 percent. The Model 98 digital controller is employed. This system provides precision control through the use of three high accuracy thermocouple type sensors—one in each phase of the windings.

The controller has a membrane front panel for displaying the temperature of all three phases with individual readings. The hottest phase is automatically displayed. The Model 98 features simple three-button operation with fan, alarm and trip function settings and is Powerlogic® compatible.

Table 11.44: Transformer Basic Insulation Levels

KV Class	Primary Voltages	BIL	600 Hz Test
1.2	< 600 V Secondary	10	4 kV
2.5	2400	20	10 kV
5.0	4160, 4800	30	12 kV
7.2	6900, 7200	30	12 kV
8.7	8320	45	19 kV
15.0	12, 12.47, 13.2, 13.8	60	31 kV

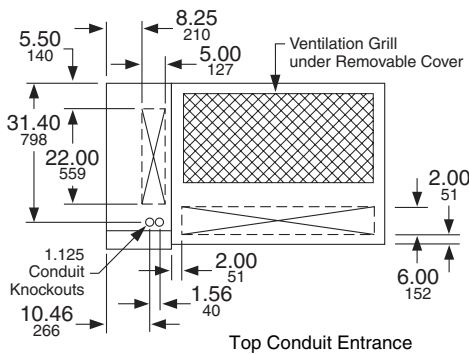
Distribution Section

I-Line® Mounted Molded Case Circuit Breakers

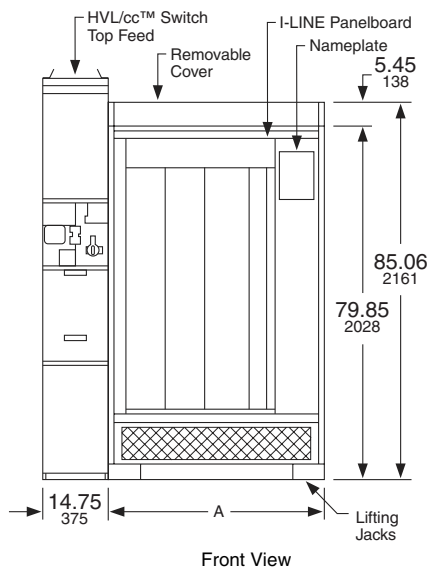
Molded case circuit breakers are group mounted in an I-Line panelboard section offering the inherent ease of installation for which the plug-on I-Line circuit breaker has become known. All circuit breakers are quick-make, quick-break, thermal magnetic, permanent trip type and are factory-calibrated and sealed for accurate overcurrent response and maximum short-circuit strength. PowerPact® P and R circuit breakers are available with solid-state Micrologic® trip units. Current limiting high interrupting capacity FI, KI, and LI circuit breakers are also available. Circuit breakers may be safely back-fed for use as main circuit breakers. All circuit breakers are UL listed and carry integrated equipment rating when used exclusively with other Square D® brand circuit breakers in intended assemblies.

I-Line panel is available in 1200 A. Maximum mounting space is 108 inches. Tin-plated copper bus is standard.

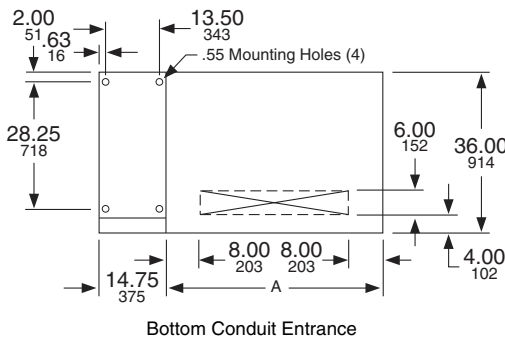
HCR-U 1200 A I-Line panelboards can be used for up to 600 Vac. They are Underwriters Laboratories® (UL®) Listed under File E33139.



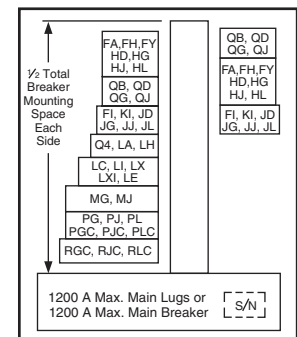
Top Conduit Entrance



Front View



Bottom Conduit Entrance



HCR-U

Table 11.45: Substation Dimensions and Approximate Weights

kVA	Temperature Rise °C	Dimension "A"	Estimated Weight
75	80, 115, 150	48	3600
112.5	80, 115, 150	48	3600
150	80, 115, 150	48	3600
225	80, 115, 150	48	4500
300	80, 115, 150	48	4500
500	150	48	6000
500	80, 115	60	6200
750	80, 115, 150	60	6700
1000	150	60	7500

Contact your nearest Schneider Electric sales office for pricing assistance.



Motorpact™ Medium Voltage Motor Controllers (UL Listed)

Square D® brand Motorpact medium voltage motor controllers are designed and manufactured to tackle the toughest power and process control challenges. Our motor controllers feature industry-first innovations that provide unmatched performance, high reliability, low maintenance and exclusive technologies. Motorpact medium voltage motor controllers are designed to provide the most efficient means to control and protect a wide range of applications and may be configured for motor starting, transformer feeders, capacitor feeders or future spaces.

Motorpact controllers are designed to meet or exceed the standards for NEMA ICS3 Part 2, UL Standard 347, and IEC 60470. UL and cULus labels are standard.

Starting application for squirrel cage induction motors:

- Full voltage non-reversing
- Full voltage reversing
- Reduced voltage non-reversing
 - Auto transformers
 - Solid state soft start

Enclosures are available in Type 1, 1A, and 3R and feature the smallest footprint in the industry at 14.75 inches wide. Enclosures that are 20-inches and 29.5-inches wide are also available for FVNR.

Optional arc resistant Type 2 enclosures are also available.

Units are designed as one-high construction for ease of use with a optimum height for the operator controls and isolation switch disconnect handle.

Full front and or front and rear accessibility are provided. A full height cable pulling area is standard.

Controller voltage ratings range from 2.3–7.2 kV vacuum contactors feature a drawout design and have ratings of 200, 400, 450, and 720 A.

Options include live line indicators, blown fuse tripping, solid state protective relays, power factor correction capacitors, surge arresters, surge capacitors and a cable grounding switch.

Powersub® Vacuum Substation Circuit Breaker Type FVR (Not UL Listed)

By combining the latest developments in circuit breaker technology with world-renowned quality, Powersub vacuum substation circuit breakers are the most advanced medium voltage circuit breakers available. The Type FVR Powersub circuit breakers include arc-resistant construction and are built to comply with ANSI standards.

Features and Ratings

- Voltage—15–38 kV
- 110–200 kV BIL
- Ampere Ratings—600, 800, 1200, 2000, 3000, 3500, and 4000
- Interrupting amperes—12.5–40 kA (rms symmetrical)
- Arc resistant enclosure construction, 2000 A and below, based on EEMAC and IEC test standards
- No fans required for 3000 A ratings
- Interrupting time of three (3) cycles
- Hermetically sealed vacuum interrupters

The arc-resistant design takes safety to the next level. In the event of an arc, the arc-resistant construction provides increased safety for personnel working in proximity of the breaker by venting resultant arc by-products and ionized gases upward and away from exterior panels that otherwise may not remain intact and in place. The Powersub circuit breakers also provide superior protection as a result of their high speed operation. You can expect long life from the product as the vacuum interrupter contacts are protected from corroding elements and contamination.

