

























































































































The parameters in the SUP menu below can be modified with the motor stopped or running.

The factory setting displays the motor current (parameter LCr).

To save the chosen display:

- Press the ENT key once: the choice is temporary, it will be cleared at the next power up.
- Press the ENT key again for 2 seconds: the display flashes, the choice is permanent and cannot be modified.

**Table 25: Parameter Displayed Menu (SUP) Parameters**

Code	Parameter	Unit
CD5	<b>Power Factor</b>	0.01
tHr	<b>Motor thermal state</b> varies from 0 to 125%. 100% corresponds to the nominal thermal state for the current $I_N$ set.	%
LCr	<b>Motor current</b> In amperes up to 999 A (examples: 01.5 is 1.5 A, 15.0 is 15 A, 150 is 150 A) In kiloamperes starting at 1000 A (examples: 1.50 is 1500 A, 1.15 is 1150 A)	A or kA
rnk	<b>Operating time</b> in hours since the last reset. In hours up to 999 hrs (examples: 001 is 1 hr and 111 is 111 hrs) In kilo-hours from 1000 to 65535 (examples: 1.11 is 1110 hrs and 11.1 is 11100 hrs) Above 65535 hrs (65.5) the display resets to zero. Operating time is counted when the motor is not stopped, i.e. when the thyristors are fired (heating, acceleration, steady state, deceleration, braking) and in continuous bypass operation. The hour counter can be reset in line mode using the control word or via the keypad display with the motor stopped. When the power is removed from the 115 Vac control power supply the hour counter is saved in the EEPROM.	h or kh
LPr	<b>Active power</b> varies from 0 to 255%. 100% corresponds to the power at nominal current and at full voltage.	%
Ltr	<b>Motor torque</b> varies from 0 to 255%. 100% corresponds to the nominal torque.	%
LrP	<b>Active power in kW</b> This parameter requires configuration of the exact value of the line voltage ULn in the drC menu.	kW
EtR	<b>Display of the current state</b> <ul style="list-style-type: none"> <li>• nLP: soft starter without run command and power not supplied</li> <li>• rdY: soft starter without run command and power supplied</li> <li>• tbS: starting time delay not elapsed</li> <li>• ACC: acceleration in progress</li> <li>• dEC: deceleration in progress</li> <li>• rUn: steady state operation</li> <li>• brL: braking in progress</li> <li>• CLl: soft starter in current limiting mode</li> <li>• nSt: force to freewheel stop by serial link</li> </ul>	
LfE	<b>Last fault detected</b> (see page 63). If no faults have been saved, the display shows nDf.	

**Table 25: Parameter Displayed Menu (SUP) Parameters** *(continued)*

Code	Parameter	Unit
PHE	<p><b>Phase rotation direction</b> as viewed from the soft starter</p> <ul style="list-style-type: none"> <li>123: forward (L1 - L2 - L3)</li> <li>321: reverse (L3 - L2 - L1)</li> </ul>	
CDd	<p><b>Keypad display locking code</b> enables the soft starter configuration to be protected using an access code (password).</p> <p><b>OFF:</b> no access locking codes</p> <ul style="list-style-type: none"> <li><b>To lock access</b>, enter a code (2 to 999). The number displayed can be increased using the ▲ key. Now press ENT. On appears on the screen to indicate that the parameters have been locked.</li> </ul> <p><b>On:</b> a code is locking access (2 to 999)</p> <ul style="list-style-type: none"> <li><b>To unlock access</b>, enter the code (increasing the number displayed using the ▲ key) and press ENT. The code remains on the display and access is unlocked until the next power down. Parameter access will be locked again on the next power-up.</li> <li><b>If an incorrect code is entered</b>, On appears on the display and the parameters remain locked.</li> </ul> <p><b>XXX:</b> parameter access is unlocked (the code remains on the screen).</p> <ul style="list-style-type: none"> <li><b>To reactivate locking with the same code</b> when the parameters have been unlocked, return to On using the ▼ button and then press ENT. On appears on the screen to indicate that the parameters have been locked.</li> <li><b>To lock access with a new code</b> when the parameters have been unlocked, enter a new code (change the number displayed using the ▲ or ▼ keys) and press ENT. On appears on the screen to indicate that the parameters have been locked.</li> <li><b>To clear locking</b> when the parameters have been unlocked, return to OFF using the ▼ button and press ENT. OFF remains on the screen. The parameters are unlocked and will remain unlocked until the next restart.</li> </ul> <p><b>Remember to document your access code (password). Failure to do so could prevent use of the keypad in programming and configuration modes.</b></p>	

When access is locked using a code, only the monitoring parameters can be accessed, and with only a temporary choice of parameter displayed.

The choice of application functions can be limited by the incompatibility between certain functions. The functions that are not listed in this table are not incompatible with any other functions.

**Figure 32: Compatibility**

Functions	Soft stop	INTELE braking stop	Force freewheel stop	Thermal protection	Loss of a motor phase	Test on small motor	Cascade	Preheating
Soft stop								
INTELE braking stop								
Force freewheel stop								
Thermal protection								(2)
Loss of a motor phase								(1)
Test on small motor								
Cascade								
Preheating (3)				(2)	(1)			

	Compatible functions
	Incompatible functions
	Not significant

- (1) Motor phase loss not detected
- (2) While the motor is preheating, the thermal protection is disabled. Set the preheating current IPr.
- (3) In order for this feature to take effect, press ENT for 10 s (confirmed by flashing display). This parameter cannot be modified via the remote keypad display.



## SECTION 8— FAULT MANAGEMENT

As a general rule, if a problem arises when the soft starter is started, it is advisable to restore the factory settings and reprogram your settings one by one. If this does not fix the problem follow the instructions below.

### SOFT STARTER DOES NOT START, NO FAULT DISPLAYED

Determine whether or not the code displayed corresponds to the normal state of the soft starter (see Table 17 on page 38).

If no fault is displayed and the soft starter does not start:

- Check that the line supply is present on the control supply CL1/CL2 (see page 30).
- Check for the presence of the RUN/STOP commands (see Appendix A).

### NON-RESETTABLE FAULTS

When a non-resettable fault appears the soft starter locks and the motor switches to freewheel mode.

The following are signals that a non-reset fault has occurred:

- Relay R2 opens.
- After the soft starter locks, Relay R1 opens.
- The fault code flashes on the display.
- The last 5 faults are stored and viewable with the PowerSuite software workshop.

Do the following before restarting the soft starter:

- Remove the fault cause(s), see Table 26.
- disconnect and reconnect the control supply

**Table 26: Non-Reset Fault Correction**

Fault Displayed	Probable Cause	Corrective Action
<i>I n F</i>	<b>Internal fault</b>	Disconnect and reconnect the control supply. If the fault persists, contact Schneider Electric product support.
<i>D C F</i>	<b>Overcurrent:</b> <ul style="list-style-type: none"> <li>• impeding short-circuit on soft starter output</li> <li>• internal short-circuit</li> <li>• bypass contactor stuck</li> <li>• soft starter is overloaded</li> </ul>	Disconnect power to the soft starter, then: <ul style="list-style-type: none"> <li>• Check the connecting cables and the motor isolation.</li> <li>• Check the thyristors.</li> <li>• Check the bypass contactor for a stuck contact.</li> <li>• Check the parameter value bSt in the menu drC (page 49).</li> </ul>
<i>P I F</i>	<b>Phase inversion</b> The line phase inversion does not conform to the PHr, parameter setting in the Protection menu.	Invert two line phases or set PHr to no.
<i>E E F</i>	<b>Internal memory fault</b>	Disconnect and reconnect the control supply. If the fault persists, contact Schneider Electric product support.

## RESETTABLE FAULTS WHEN CAUSES DISAPPEAR

When a resettable fault appears the soft starter locks and the motor switches to freewheel mode.

The following are signals that a resettable fault has occurred:

- Relay R2 opens.
- If relay R1 is configured as an isolating relay, it opens.
- The fault code flashes on the display as long as the fault is present.
- The last 5 faults are stored and viewable with the PowerSuite software workshop.

Do the following before restarting the soft starter:

- Remove the cause of the fault, see Table 27.
- In 2-wire control, maintain the run command on the RUN input.
- In 3-wire control, initiate a new run command (rising edge) on the RUN input.

**Table 27: Resettable Fault Correction**

Fault Displayed	Probable Cause	Corrective Action
CF F	Invalid configuration on power-up	<ul style="list-style-type: none"> <li>• Revert to the factory setting in the drive menu drC.</li> <li>• Reconfigure the soft starter.</li> </ul>
CF I	<p><b>Invalid configuration</b></p> <p>The configuration loaded in the soft starter via the serial link is incompatible.</p>	<ul style="list-style-type: none"> <li>• Check the initial configuration.</li> <li>• Load a compatible configuration.</li> </ul>

## AUTO-RESET FAULTS (CUSTOMER CONFIGURABLE)

When an auto-reset fault appears the soft starter locks and the motor switches to freewheel mode. When an auto-reset fault occurs, the soft starter will automatically restart when the fault has cleared.

The following are signals that an auto-reset fault has occurred:

- Relay R2 opens.
- If relay R1 is configured as an isolating relay, it opens. R1 remains closed if it is configured as a fault relay, see page 53.
- The fault code flashes on the display as long as the fault is present.
- The last 5 faults are stored and viewable with the PowerSuite software workshop.

In 2-wire control, perform the following steps for any of the faults listed in Table 28 before restarting the soft starter:

- Remove the cause of the fault.
- Maintain the run command on the RUN input.

*NOTE: The soft starter attempts to restart six times at 60 second intervals. If the fault is still present at the 6th attempt it trips, requiring a manual reset (see "Manual-Reset Faults" on page 65). If relay R1 is configured as a fault relay it opens.*

**Table 28: Auto-Reset Fault Correction (2-wire control)**

Fault Displayed	Probable Cause	Corrective Action
P H F	<b>Loss of a line phase</b>	Check the line, the connection to the soft starter, and any isolating devices located between the line and the soft starter (such as contactors, fuses, and circuit-breakers).
	<b>Loss of a motor phase</b> If the motor current falls below an adjustable threshold PHL for 0.5 s (single phase) or for 0.2 s (3-phase). This fault can be configured in the Protection menu PrO, parameter PHL.	<ul style="list-style-type: none"> <li>Check the motor connection and any isolating devices located between the soft starter and the motor (such as contactors, fuses, and circuit-breakers).</li> <li>Check the motor state.</li> <li>Ensure that parameter PHL is compatible with the motor.</li> </ul>
F r F	<b>Line frequency is out of tolerance.</b> This fault can be configured in the Advanced settings menu drC, parameter FrC.	<ul style="list-style-type: none"> <li>Check the line.</li> <li>Ensure that parameter FrC is configured properly for the line used (generating set for example).</li> </ul>

For any of the faults listed in Table 29 perform the following steps before restarting the soft starter:

- Remove the cause of the fault.
- In 2-wire control, maintain the run command.

**Table 29: Auto-Reset Fault Correction**

Fault Displayed	Probable Cause	Corrective Action
U S F	<b>Power supply fault on a run command</b>	Check the power supply circuit and voltage.
C L F	<b>Control line failure</b>	Loss of CL1/CL2 for more than 200 ms

If the automatic restart function is not selected, see “Manual-Reset Faults” below for the indication of these faults and the restart instructions.

## MANUAL-RESET FAULTS

When a manual reset fault appears, the soft starter locks and the motor switches to freewheel mode.

The following are signals that a manual-reset fault has occurred:

- Relay R2 opens.
- Relay R1 opens.
- The fault code flashes on the display as long as the fault is present.
- The last 5 faults are stored and viewable with the PowerSuite software workshop.

Perform the following steps before restarting the soft starter:

- Remove cause of the fault.
- In 2-wire and 3-wire control, initiate a new run command (rising edge) on the RUN input to reset the fault.

*NOTE: A reset will not take place on a run command if LI is assigned to the fault reset (LIr) function.*

- In 2-wire and 3-wire control, initiate another new run command (rising edge) on the RUN input to reset the fault.

**Table 30: Manual-Reset Fault Correction**

Fault Displayed	Probable Cause	Corrective Action
<i>S L F</i>	<b>Serial link fault</b>	Check the RS-485 connection.
<i>E t F</i>	<b>External fault</b>	<ul style="list-style-type: none"> <li>• Check the custom fault.</li> <li>• Check the mechanism for wear, mechanical play, lubrication, blockages, etc..</li> <li>• Check the value of the tLs setting in the PrO menu, page 45.</li> <li>• Make sure the soft starter and motor are sized properly for the load and application.</li> </ul>
<i>O L C</i>	<b>Current overload</b>	<ul style="list-style-type: none"> <li>• Check the mechanism for wear, mechanical play, lubrication, blockages, etc..</li> <li>• Check the value of parameters LOC and tOL in the PrO menu, page 46.</li> </ul>
<i>O L F</i>	<b>Motor thermal fault</b>	<ul style="list-style-type: none"> <li>• Check the mechanism for wear, mechanical play, lubrication, blockages, etc..</li> <li>• Make sure the soft starter and motor are sized properly for the load and application.</li> <li>• Check the value of parameter tHP in the PrO menu (page 45) and that of parameter I<sub>N</sub> in the SEt menu, page 41.</li> <li>• Check the electrical isolation of the motor.</li> <li>• Wait for the motor to cool before restarting.</li> </ul>
<i>O t F</i>	<b>Motor thermal fault detected by the PTC probes</b>	<ul style="list-style-type: none"> <li>• Check the mechanism for wear, mechanical play, lubrication, blockages, etc..</li> <li>• Make sure the soft starter and motor are sized properly for the load and application.</li> <li>• Check the value of the PtC setting in the PrO menu, page 46.</li> <li>• Wait for the motor to cool before restarting.</li> </ul>
<i>U L F</i>	<b>Motor underload</b>	<ul style="list-style-type: none"> <li>• Check the hydraulic circuit.</li> <li>• Check the value of parameters LUL and tUL in the PrO menu, page 45.</li> </ul>
<i>L r F</i>	<p><b>Locked rotor in steady state</b></p> <p>This fault is only active in steady state with soft starter bypass contactor. It is detected if the current in a phase is greater than or equal to 5 I<sub>N</sub> for more than 0.2 s.</p>	Check the mechanism for wear, mechanical play, lubrication, blockages, etc..

## RESET FAULTS USING A LOGIC INPUT

If a logic input LI is configured to reset motor thermal fault, LI<sub>t</sub>, or any other resettable fault, LI<sub>r</sub>, for the motor to restart, the following conditions must be met:

- The soft starter must send a pulse on logic input LI.
- In 2-wire control, the run command must be maintained on the RUN input.
- In 3-wire control, a new run command (rising edge) must be initiated on the RUN input.

## **TROUBLESHOOTING PROCEDURE**

When troubleshooting the soft starter, discuss the symptoms of the reported problem with the operating personnel. Ask the operator to describe the problem and to identify when and where it first occurred. Then directly observe the controller and process. Copy the Troubleshooting Sheet on page 68 and use it to record the controller, motor, and peripheral equipment nameplate data.

## **TECHNICAL SUPPORT**

For more information, call, fax, or write:

Square D / Schneider Electric Technical Support  
8001 Highway 64 East  
Knightdale, NC 27545-9023

Telephone: 919-266-8600 or 1-888-SQUARED (1-888-778-2733)

Fax: 919-217-6508

e-Mail: [drivespsg@squared.com](mailto:drivespsg@squared.com)

## ALTISTART 48 TROUBLESHOOTING SHEET

When requesting after-sales service, it is important to disclose all conditions under which the Square D / Schneider Electric equipment currently operates. This will help in diagnosing the system quickly.

FAX to: **Technical Support @ 919-217-6508**

DATE:
CONTACT NAME:
COMPANY:
ADDRESS:
CITY:
STATE:
PHONE:
FAX:

### SOFT START CONFIGURATION

PART NUMBER: ATS48- SERIAL NUMBER: 6W-  
APPLICATION/EQUIPMENT DESIGNATION: \_\_\_\_\_

### MOTOR NAMEPLATE DATA

HORSEPOWER: \_\_\_\_\_ VOLTAGE (3 PHASE): \_\_\_\_\_ FREQUENCY: \_\_\_\_\_ POLES: \_\_\_\_\_ FLA: \_\_\_\_\_  
SERVICE FACTOR: \_\_\_\_\_ MOTOR TYPE/DESIGN:  NEMA A  NEMA B  NEMA C  NEMA D  
MOTOR CABLE TYPE: \_\_\_\_\_ APPROXIMATE CABLE LENGTH (IN FEET): \_\_\_\_\_

### POWER SOURCE AND ENVIRONMENT

VOLTAGE BETWEEN L1 AND L2: \_\_\_\_\_ VOLTAGE BETWEEN L2 AND L3: \_\_\_\_\_ VOLTAGE BETWEEN L3 AND L1: \_\_\_\_\_  
SERVICE TRANSFORMER RATING: \_\_\_\_\_ KVA, \_\_\_\_\_ % Z FREQUENCY:  60HZ OR  50 HZ  
AMBIENT TEMPERATURES: \_\_\_\_\_ MIN °C (°F) \_\_\_\_\_ MAX °C (°F) HUMIDITY: \_\_\_\_\_  
ALTITUDE IF GREATER THAN 3300 FEET ABOVE SEA LEVEL, SPECIFY: \_\_\_\_\_ FT

### SOFT START FAULT CODES

REFER TO TABLES 28 THROUGH 33 FOR POSSIBLE CAUSES & CORRECTIVE ACTION

<b>NON-RESET FAULTS</b>	<b>AUTO-RESET FAULTS (CUSTOMER CONFIGURABLE)</b>	<b>MANUAL RESET FAULTS</b>	<input type="checkbox"/> <b>OLF – MOTOR THERMAL FAULT</b>
<input type="checkbox"/> <b>INF – INTERNAL FAULT</b>	<input type="checkbox"/> <b>PHF – LOSS OF PHASE OR LOSS OF MOTOR PHASE</b>	<input type="checkbox"/> <b>SLF – SERIAL LINK FAULT</b>	<input type="checkbox"/> <b>OHF – STARTER THERMAL FAULT</b>
<input type="checkbox"/> <b>OCF - OVERCURRENT</b>	<input type="checkbox"/> <b>FRF – LINE FREQUENCY (OUT OF TOLERANCE)</b>	<input type="checkbox"/> <b>ETF – EXTERNAL FAULT</b>	<input type="checkbox"/> <b>OTF – MOTOR THERMAL FAULT VIA PTC PROBES</b>
<input type="checkbox"/> <b>PIF – PHASE INVERSION</b>	<input type="checkbox"/> <b>USF – POWER SUPPLY</b>	<input type="checkbox"/> <b>STF – EXCESSIVE STARTING TIME</b>	<input type="checkbox"/> <b>ULF – MOTOR UNDERLOAD</b>
<input type="checkbox"/> <b>EEF – INTERNAL MEMORY</b>	<input type="checkbox"/> <b>CLF – CONTROL LINE FAILURE (CL1/CL2)</b>	<input type="checkbox"/> <b>OLC – CURRENT OVERLOAD</b>	<input type="checkbox"/> <b>LRF – LOCKED ROTOR (IN STEADY STATE)</b>

RESETTABLE FAULTS WHEN CAUSES DISAPPEAR	<input type="checkbox"/> <b>CFF – INVALID CONFIGURATION (POWER UP)</b>	<input type="checkbox"/> <b>CFI – INVALID CONFIGURATION (COMM)</b>
---	--	--

DETAILED DESCRIPTION OF PROBLEM (ATTACH WIRING DIAGRAM/SCHEMATICS IF APPLICABLE):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## FACTORY SETTINGS

	Code	Designation	Factory Setting	Customer Setting	Parameter Range and Units
SET Menu Settings	<i>I<sub>n</sub></i>	Current setting	Depends upon starter rating.		0.5 to 1.3 I <sub>CL</sub> (A)
	<i>I<sub>L</sub></i>	Current limit	400		150 to 500% of I <sub>n</sub>
	<i>R<sub>CC</sub></i>	Acceleration ramp time	15		1 to 60 s
	<i>g<sub>0</sub></i>	Initial starting torque	20		0 to 100% of T <sub>N</sub>
	<i>S<sub>y</sub></i>	Type of stop	-F- (free wheel)		-d- deceleration -b- braked -F- free wheel
	<i>d<sub>EC</sub></i>	Deceleration ramp time	15		1 to 60 s
	<i>E<sub>dC</sub></i>	Final deceleration torque	20		0 to 100% of estimated torque
	<i>b<sub>rC</sub></i>	Internal braking torque level	50		0 to 100
<i>E<sub>bA</sub></i>	Injection time at the end of braking	20		20 to 100	
PRO Menu Protection	<i>t<sub>HP</sub></i>	Motor thermal protection	10		OFF, 2, 10A, 10, 20, 25 or 30
	<i>U<sub>LL</sub></i>	Activation of motor underload	OFF		OFF dEF: treated as fault ALA: treated as alarm
	<i>L<sub>UL</sub></i>	Motor underload threshold	60		20 to 100% of I <sub>N</sub>
	<i>t<sub>UL</sub></i>	Motor underload time	60		1 to 60 s
	<i>t<sub>LS</sub></i>	Excessive starting time	OFF		OFF - 10 to 999 s
	<i>D<sub>IL</sub></i>	Activation of current overload	OFF		ALA: treated as alarm dEF: treated as fault OFF: no protection
	<i>L<sub>OC</sub></i>	Current overload threshold	80		50 to 300% of I <sub>N</sub>
	<i>t<sub>OL</sub></i>	Current overload time	10		0.1 to 600 s
	<i>PH<sub>r</sub></i>	Protection against line phase inversion	no		321: reverse (L3-L2-L1) 123: forward (L1-L2-L3) no: no monitoring
	<i>t<sub>bS</sub></i>	Time before starting	2		0 to 999 s
	<i>PH<sub>L</sub></i>	Phase loss threshold	10		5 to 10%
	<i>P<sub>TC</sub></i>	Activation of motor monitoring by PTC probes	OFF		OFF dEF: treated as fault ALA: treated as alarm
	<i>R<sub>rS</sub></i>	Automatic restart	OFF		OFF - On
<i>r<sub>EH</sub></i>	Reset motor thermal state	No		No - YES	

**FACTORY SETTINGS** *(continued)*

	Code	Designation	Factory Setting	Customer Setting	Parameter Range and Units
drC Menu Advanced Settings	<i>t L l</i>	Torque limit	OFF		OFF - 10 to 200% of T <sub>N</sub>
	<i>b S t</i>	Voltage boost level	OFF		50 to 100% of mains voltage
	<i>S S t</i>	Tests on a small motor	OFF		On - OFF
	<i>l L P</i>	Torque control (type of control)	On		On - OFF
	<i>L S l</i>	Stator loss compensation	50		0 to 90%
	<i>t l G</i>	Deceleration gain (for torque control)	40		10 to 50%
	<i>l S l</i>	Activation of cascade function	OFF		On - OFF
	<i>U L n</i>	Line voltage	690		180 to 790 V
	<i>F r l</i>	Line frequency	AUt		50 - 60 - AUt
	<i>r P r</i>	Reset kWh or the operating time	no		No - APH - trE
	<i>F l S</i>	Return to factory settings	no		No - YES

**FACTORY SETTINGS** *(continued)*

	Code	Designation	Factory Setting	Customer Setting	Parameter Range and Units
IO Menu (Management of Inputs / Outputs)	L 13 L 14	Logic inputs	LIA LIL		No: not assigned LIA: forced free wheel LIE: external fault LIH: not implemented LIL: force to local control mode LII: inhibition of faults LI: reset motor thermal fault LIC: activate cascade function LIR: fault reset LIM: second configuration
	IPr	Preheating level	0%		0 to 100%
	tPr	Time delay before preheating	5 mn		0 to 999 minutes
	L 01 L 02	Logic outputs	tAl rnl		No: not assigned tAl: motor thermal alarm rnl: motor powered All: motor current alarm AUL: motor underload alarm APC: motor PTC sensor alarm AS2: second configuration active
	1	Relay R1	r1F		R1F: fault R1I: isolation relay
	3	Relay R3	rnl		No: not assigned tAl: motor thermal alarm rnl: motor powered All: motor current alarm AUL: motor underload alarm APC: motor PTC sensor alarm AS2: second configuration active
	RO	Analog output	OCr		No: not assigned OCr: motor current Otr: motor torque OtH: motor thermal state OC0: power factor OPr: active power
	04	Configuration of the analog output AO	020		020: 0 – 20 mA 420: 4 – 20 mA
	R5C	Scaling of the analog output	200		50 to 500%

**FACTORY SETTINGS** *(continued)*

	Code	Designation	Factory Setting	Customer Setting	Parameter Range and Units
<b>St2 Menu 2<sup>nd</sup> Motor Parameters</b>	<i>I n 2</i>	Nominal motor current	Depends upon starter rating.		0.5 -1.3 I <sub>CL</sub> (A)
	<i>I L 2</i>	Current limit	400		150 – 700% of I <sub>n</sub> , limited to 500% of I <sub>CL</sub>
	<i>R C 2</i>	Acceleration ramp time	15		1-60 s
	<i>t 9 2</i>	Initial starting torque	20		0 – 100% of T <sub>N</sub>
	<i>d E 2</i>	Deceleration ramp time	15		1 to 60 s
	<i>E d 2</i>	Threshold for changing to freewheel stop mode at end of deceleration	20		0 to 100% of estimated torque
	<i>t L 2</i>	Maximum torque limit	OFF		10 to 200%
	<i>t l 2</i>	Deceleration gain (for torque control)	40		10 to 50%
<b>COP Menu Communication</b>	<i>R d d</i>	Starter address	0		0 to 31
	<i>t b r</i>	Communication speed	19.2		4.8 – 9.6 – 19.2
	<i>F D r</i>	Communication format	8n1		8o1: 8 bits, odd, 1 stop bit 8E1: 8 bits, even, 1 stop bit 8n1: 8 bits, no parity, 1 stop bit 8n2: 8 bits, no parity, 2 stop bit
	<i>t L P</i>	Serial link timeout setting	5		0.1 to 60 s
	<i>P C t</i>	Configuration of serial link for communications with remote keypad display	OFF		On – OFF

## APPENDIX A—RECOMMENDED WIRING DIAGRAMS

Figures 33–35 illustrate circuit diagrams for typical non-reversing and reversing applications in 2-wire and 3-wire control. The recommended circuit diagrams include SCR fault isolation for optimal protection of the motor, driven machinery, and operating personnel.

**Table 31: Description of Logic for Recommended Wiring Diagrams**

Item	Name	Description
IC1 IC1A	Isolation Contactor (Fwd)	The isolation contactor logic closes IC1 upon a start command and opens IC1 after the stop is complete. The RCR (or RFR and RRR for reversing) are timed contacts that must have a time delay greater than the deceleration ramp time or the INTELE braking time. When a coast stop is selected, the time delay must be set for a time that will allow complete decay of the motor residual voltage. The isolation contactor opens immediately upon a fault. The pilot relay (IC1A) is required when the IC1 contactor coil exceeds the relay rating.
IC2 IC2A	Isolation Contactor (Rev)	Used for reversing applications only, the IC2 must be mechanically interlocked to IC1. A reversing contactor may be used for the combination of IC1 and IC2. In general, the operation of IC2 is identical to IC1. The pilot relay (IC1A) is required when the IC1 contactor coil exceeds the relay rating.
SC SCA	Shorting Contactor and Pilot Relay	The shorting contactor is used to reduce the heat dissipated by the controller when the motor is operating at full speed and voltage. The controller provides proper sequencing of this contactor by the "end-start-up" relay. When the start is completed, the shorting contactor will be commanded to close. The controller will continue to monitor the motor thermal state and provide motor overload protection. Upon a stop command, the SC contactor will open, transferring the motor current to the SCRs to allow for controlled deceleration if desired. The pilot relay (SCA) is required when the SC contactor coil exceeds the relay rating.
TS	Transient Suppressors	Transient suppression of all relay and contactor coils (except ST) is recommended to minimize the possibility of electrical interference with the controller electronics and to increase relay contact life.
RCR	Run Command Relay	Used in all non-reversing logic (optional in shunt trip) for proper sequencing of contactor logic. When energized, RCR initiates the start sequence. When de-energized, stopping is initiated. Operator controls can be either on/off selector switch, HOA selector switch or start/stop push buttons. RCR remains energized during a fault. Once the fault condition has been cleared, RCR must be de-energized by a "stop" command then re-energized to restart the controller.
RFR	Run Forward Relay	Used for reversing applications only, this coil duplicates the functionality of RCR for the forward direction and is interlocked with the RRR relay.
RRR	Run Reverse Relay	Used for reversing applications only, this coil duplicates the functionality of RCR for the reverse direction and is interlocked with the RFR relay.
ST	Shunt Trip Coil	This coil is attached to the shunt trip coil on the disconnect and will energize 2 seconds after a controller fault by the TR timer contact. The time delay is to prevent nuisance tripping of the circuit breaker during controller power-up or during line undervoltage conditions.
TR	Trip Relay	Used in shunt trip circuit breaker logic only; coil energized upon a controller fault.
FR	Fault Relay	Used with logic diagrams that use an isolation contactor. The fault relay is energized during normal operation and deenergizes if the controller fault contacts open or if the motor thermal switch (if supplied) opens. FR also provides additional contacts for the controller fault output.

To select control operators (push buttons, pilot lamps, and selector switches), control power transformers, and wire management devices (control and power terminal strips, wire terminations) indicated on the recommended wiring diagram configurations, refer to the latest editions of Square D / Schneider Electric's full line product catalogs.

Figure 33: Nonreversing with Shunt Trip Fault Isolation

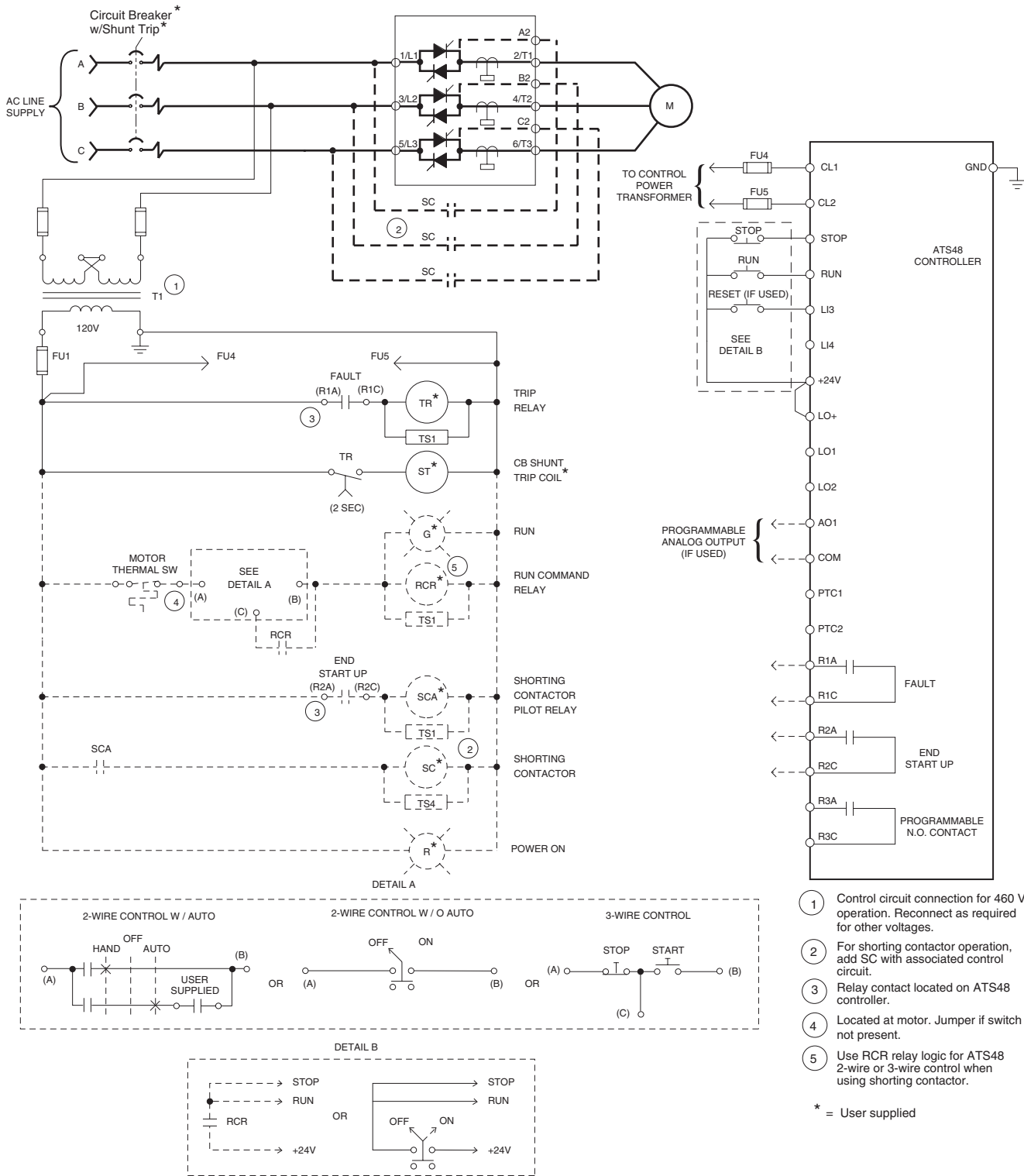


Figure 34: Nonreversing with Isolation Contactor

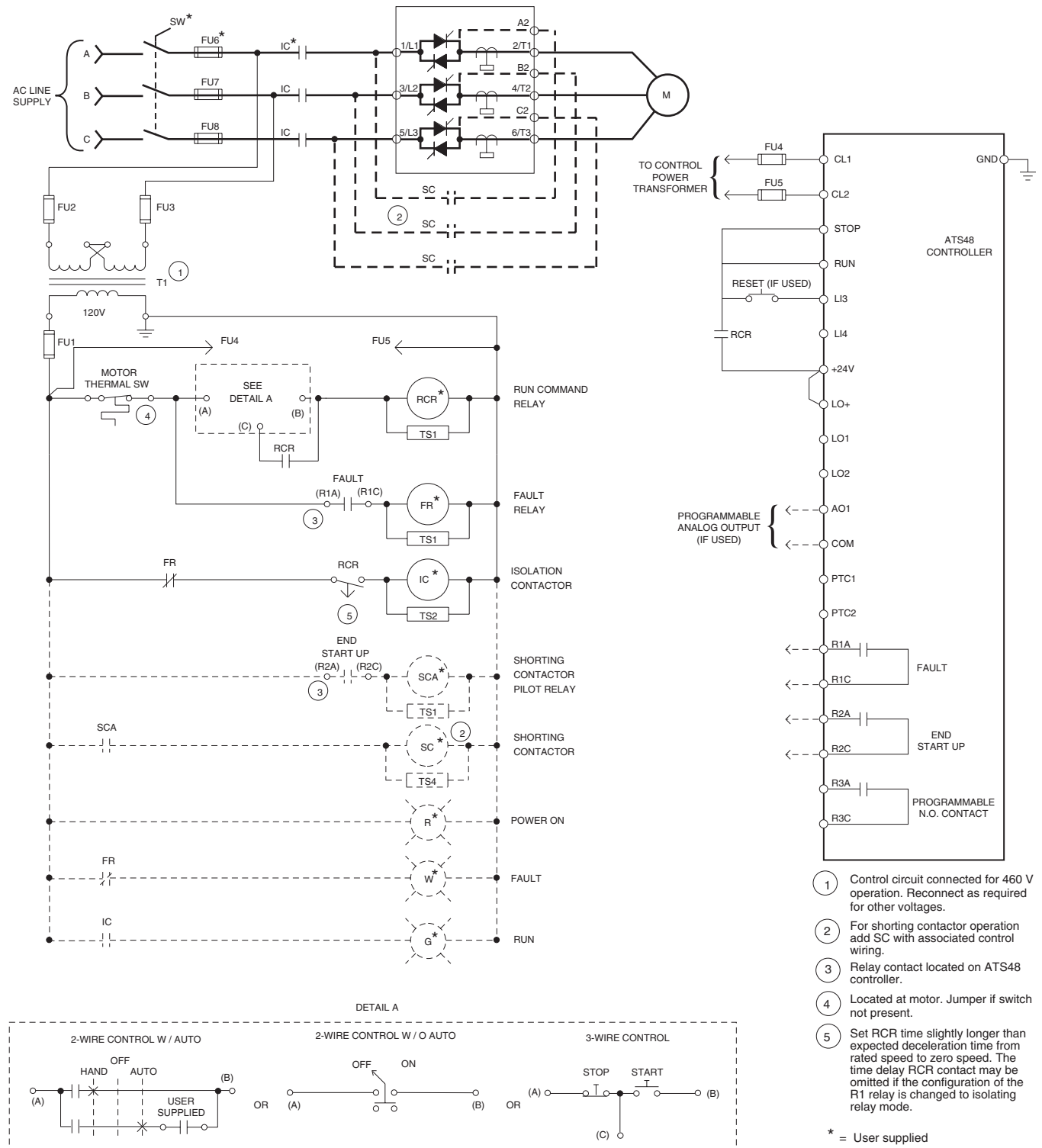
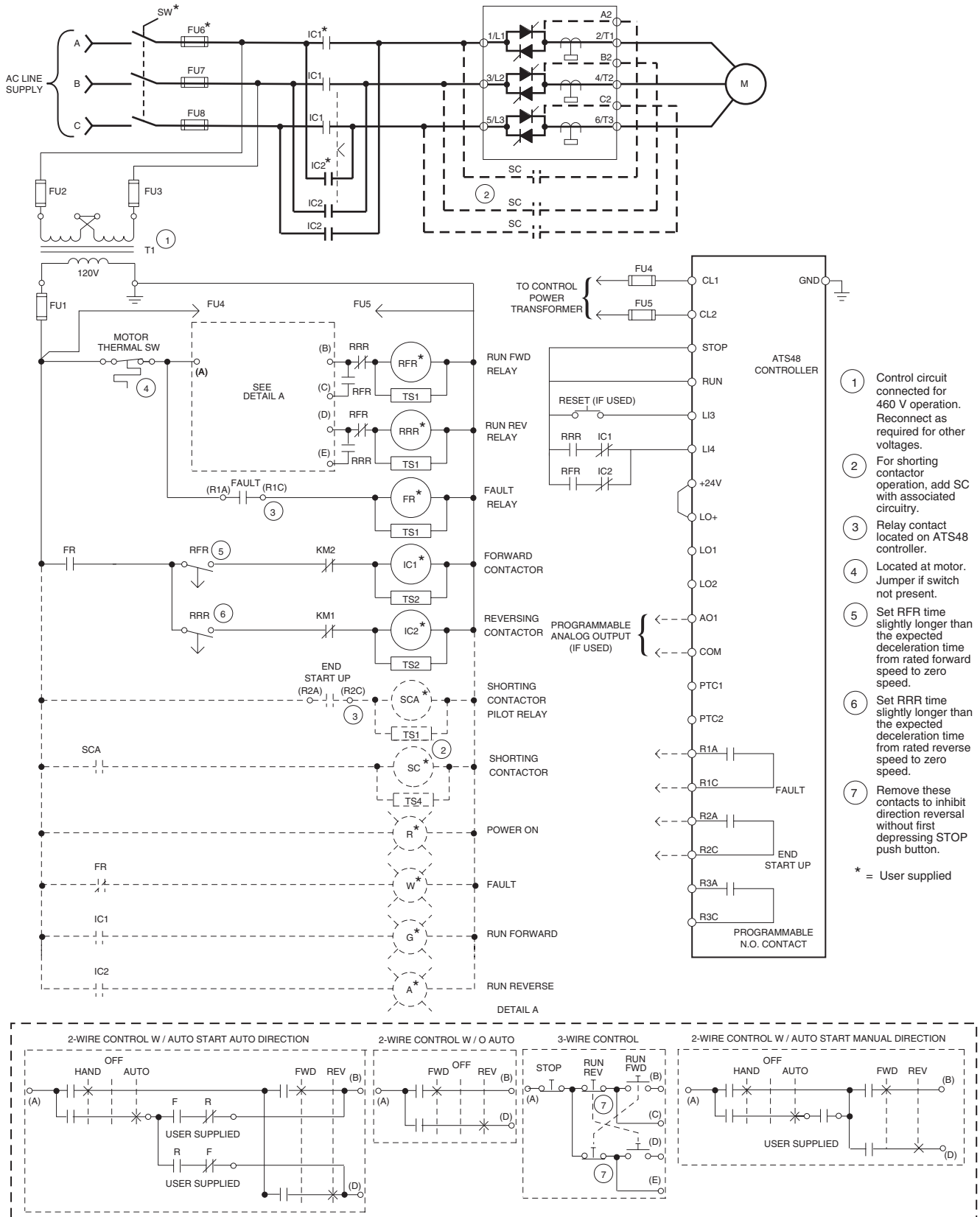


Figure 35: Reversing with Isolation Contactors



- 1 Control circuit connected for 460 V operation. Reconnect as required for other voltages.
  - 2 For shorting contactor operation, add SC with associated circuitry.
  - 3 Relay contact located on ATS48 controller.
  - 4 Located at motor. Jumper if switch not present.
  - 5 Set RFR time slightly longer than the expected deceleration time from rated forward speed to zero speed.
  - 6 Set RRR time slightly longer than the expected deceleration time from rated reverse speed to zero speed.
  - 7 Remove these contacts to inhibit direction reversal without first depressing STOP push button.
- \* = User supplied

## APPENDIX B—RECOMMENDED COMPONENT LISTS

To select control operators (push buttons, pilot lamps, and selector switches), control power transformers, and wire management devices (control and power terminal strips, wire terminations) indicated on the recommended wiring diagram configurations, refer to the latest editions of Square D / Schneider Electric's full line product catalogs.

**Table 32: Suggested Components for Standard Duty Applications**

Induction Motor (M) Rated hp <sup>1</sup>				ATS48 Controller Model	Device Rated Current @ 40 °C <sup>2</sup>	Power Burden (VA)	Class CC Control Fuse Size (FU4/FU5 Fuses)	
208 V	230 V	460 V	575 V				@ 208/230 V (A)	@ 460/575 V (A)
3	5	10	15	ATS48D17Y	17	25	0.25	
5	7.5	15	20	ATS48D22Y	22	25	0.25	
7.5	10	20	25	ATS48D32Y	32	25	0.25	
10	—	25	30	ATS48D38Y	38	25	0.25	
—	15	30	40	ATS48D47Y	47	25	0.25	
15	20	40	50	ATS48D62Y	62	25	0.25	
20	25	50	60	ATS48D75Y	75	25	0.25	
25	30	60	75	ATS48D88Y	88	25	0.25	
30	40	75	100	ATS48C11Y	110	25	0.25	
40	50	100	125	ATS48C14Y	145	25	0.25	
50	60	125	150	ATS48C17Y	170	25	0.25	
60	75	150	200	ATS48C21Y	210	25	0.25	
75	100	200	250	ATS48C25Y	250	25	0.25	
100	125	250	300	ATS48C32Y	320	25	0.25	
125	150	300	350	ATS48C41Y	410	25	0.25	
150	—	350	400	ATS48C48Y	480	25	0.25	
—	200	400	500	ATS48C59Y	590	25	0.25	
200	250	500	600	ATS48C66Y	660	25	0.25	
250	300	600	800	ATS48C79Y	790	25	0.25	
350	350	800	1000	ATS48M10Y	1000	25	0.25	
400	450	1000	1200	ATS48M12Y	1200	25	0.25	

<sup>1</sup> Motor full load currents through 500 hp @ 460/575 V, 250 hp @ 230 V, and 200 hp @ 208 V are taken from the National Electrical Code (NEC) (NFPA 70-2002, Table 430.150). Above these ratings, motor full load currents are calculated based upon 1.2 A/hp for 460 V and 2.4 A/hp for 230 V. Motors listed are for standard duty applications. For severe duty applications, select the next larger controller size.

<sup>2</sup> The ambient temperature indicated in the table represents the temperature of the air surrounding the ATS48 controller. Any additional temperature factors associated with the enclosure system or actual installation ambient temperature must be considered when determining the actual rated current (I<sub>CL</sub>) of the controller. For operating ambient above 40° C without a shorting/bypass contactor and 50° C with a shorting/bypass contactor but not exceeding 60° C, the rated current (I<sub>CL</sub>) of the controller must be de-rated by 2% per °C.

**Table 33: Additional Suggested Components for Standard Duty Applications**

ATS48 Controller Model	IC1 1, 2, 3	IC2 1, 2, 3		SC 1, 2, 3  Shorting Contactor (AC1)	Fusible Disconnect 4			Thermal Magnetic Circuit Breaker 4, 8, 5
	Isolation Contactor	Reversing Contactor 6	Mechanical Interlock		Power Fuses Class/Rating	Fuse Block 7	Molded Case Switch 8	
D17Y	LC1D18	LC1D18	9	LC1D18	J / 25	60308J	FHL36000M	FAL36030
D22Y	LC1D25	LC1D25	9	LC1D25	J / 30	60308J	FHL36000M	FAL36040
D32Y	LC1D32	LC1D32	9	LC1D32	J / 40	60608J	FHL36000M	FAL36050
D38Y	LC1D40	LC1D40	9	LC1D40	J / 50	60608J	FHL36000M	FAL36060
D47Y	LC1D50	LC1D50	9	LC1D50	J / 60	60608J	FHL36000M	FAL36080
D62Y	LC1D65	LC1D65	9	LC1D65	J / 80	61038J	FHL36000M	FAL36090
D75Y	LC1D80	LC1D80	9	LC1D80	J / 100	61038J	FHL36000M	FAL36100
D88Y	LC1D80	LC1D80	9	LC1D80	J / 120	62003J	KHL36000M	KAL36110
C11Y	LC1D115	LC1D115	9	LC1D115	J / 150	62003J	KHL36000M	KAL36150
C14Y	LC1D150	LC1D150	9	LC1D150	J / 200	62003J	KHL36000M	KAL36200
C17Y	LC1F185	LC1F185	LA9FF970	LC1F185	J / 225	64033J	LHL36000M	LAL36225
C21Y	LC1F265	LC1F265	LA9FG970	LC1F265	J / 300	64033J	LHL36000M	LAL36250
C25Y	LC1F265	LC1F265	LA9FJ970	LC1F265	J / 350	64033J	LHL36000M	LAL36350
C32Y	LC1F400	LC1F400	LA9FJ970	LC1F400	J / 400	64033J	LHL36000M	LAL36400
C41Y	LC1F400	LC1F400	LA9FJ970	LC1F400	J / 500	6633J	MHL36000M	MAL36500
C48Y	LC1F500	LC1F500	LA9FJ970	LC1F500	J / 600	6633J	MHL360006M	MAL36600
C59Y	LC1F630	LC1F630	LA9FJ970	LC1F630	L / 700	7	MHL360008M	MAL36800
C66Y	LC1F800	LC1F800	LA9FJ970	LC1F800	L / 900	7	MHL360008M	MAL36900
C79Y	LC1BL33	LC1BL33	LA9FL970	LC1BL33	L / 1100	7	MHL36000M	10
M10Y	LC1BL33	LC1BL33	LA9FL970	LC1BL33	L / 1350	7	MHL36000M	10
M12Y	LC1BP33	LC1BP33	LA9FX970	LC1BP33	L / 1600	7	NCL3600012M	10

<sup>1</sup> All coils are selected for 120 V, 60 Hz operation. Refer to the Square D *Digest* for additional coil voltages or auxiliary contact configurations. One block may be added to each contactor.

<sup>2</sup> Power terminals are not included with LC1-F contactors. Refer to the latest editions of Square D / Schneider Electric's full line product catalogs for additional ordering information.

<sup>3</sup> The use of transient suppressors across all contactor coils is recommended. Refer to the latest editions of Square D / Schneider Electric's full line product catalogs for selection of transient suppressors.

<sup>4</sup> According to the National Electrical Code, branch circuit overcurrent protection must be provided for each controller. Short circuit protective devices recommended in this table are within NEC requirements for Type 1 coordination.

<sup>5</sup> According to the National Electrical Code, branch circuit overcurrent protection must be provided for each controller. Short circuit protective devices recommended in this table are within NEC requirements for Type 1 coordination.

<sup>6</sup> Reversing contactors for C11 through M12 controllers must be assembled from components. Parts quantities for a basic contactor assembly, minus the power connection links and terminals, are indicated before each part number. Refer to the latest editions of Square D / Schneider Electric's full line product catalogs for power connector link and terminal kits. Reversing contactor interlock units used for the C79 through M12 controllers are designed for vertical interlocking of the individual contactors. Horizontally interlocked contactors are used for D17 through C59 controllers.

<sup>7</sup> Fuse holder part number references are for Class J fuses only based on Ferraz Shawmut spring reinforced with box type connectors acceptable for Al/Cu wiring. Class L fuses require bolt-on connections to user-supplied power bus work.

<sup>8</sup> The molded case switches and circuit breakers selected require the addition of operator mechanisms to allow operation from the exterior of an enclosure. Refer to the latest editions of Square D / Schneider Electric's full line product catalogs for operator mechanism information. When using a shunt trip relay for SCR fault isolation, order a disconnect switch with suffix -1021 for addition of shunt trip coil.

<sup>9</sup> The D Line contactor is available as a reversing configuration. For these applications, change the IC1 part number prefix from LC1- to LC2- to order the IC1 and IC2 combination complete with mechanical interlocks.

<sup>10</sup> Devices rated above 660 A have not been coordinated with circuit breakers. You must use a Class L fuse for overcurrent protection with ATS48 controller models C79, M10, and M12.

## APPENDIX C—OPTIONS AND ACCESSORIES

Tables 34–36 show the accessories available for ATS48 soft start controllers.

**Table 34: Documentation**

VVDED302023	MODBUS Protocol User's Manual (multilingual)
DCICD398111	Communications: Ethernet, FIPIO, DeviceNet, Profibus DP User's Manual (CD-ROM version only)

**Table 35: Remote Keypad Display**

VW3G48101	<p>Remote mounting kit for keypad display (IP54).</p> <ul style="list-style-type: none"> <li>• 7-segment remote keypad display</li> <li>• Mounting kit containing cover, screws, and an IP54 seal on the front panel.</li> <li>• 9.8 ft (3 m) cable with a 9-way SUB-D connector for keypad display and an RJ-45 connector for connecting to an ATS48 controller.</li> </ul>
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**Table 36: Protective Covers for Power Terminals**

LA9F702	Set of six protective covers for ATS48C14Y to ATS48C17Y.
LA9F703	Set of six protective covers for ATS48C21Y, ATS48C25Y, and ATS48C32Y

*NOTE: The ATS48 controller has 9 unprotected power terminals.*

### PowerSuite Advanced Dialogue Solutions

PowerSuite solutions are compatible with software version 1.30, build 5.

**Table 37: Pocket PC/PDA Kits**

<p>VW3A8108EN (English) VW3A8108FR (French) VW3A8108SP (Spanish)</p>	<p>Complete PowerSuite Pak includes:</p> <ul style="list-style-type: none"> <li>• Palm size HP JORNADA 525 (Palm size PC terminal) with operating system, PC synchronization cable and power supply.</li> <li>• PowerSuite CD-ROM setup software [VW3A8014]</li> <li>• Connection cable [VW3A8111].</li> </ul>
VW3A8102	<p>Pocket PC/PDA setup kit includes:</p> <ul style="list-style-type: none"> <li>• CD-ROM containing setup software.</li> <li>• Connection kit for the Palm size PC terminal.</li> </ul> <p>Available in English, French, and Spanish operating systems.</p>
VW3A8111	<p>Cable connection kit for the Palm size PC terminal to an ATS48 controller includes:</p> <ul style="list-style-type: none"> <li>• (2) connection cables, 9.8 ft (3 m) each with two RJ-45 connectors.</li> <li>• (1) RJ-45/9-way SUB-D adaptor.</li> <li>• (1) converter marked "RS-232/RS-485 PPC" with one 9-way male SUB-D connector and 1-RJ-45 connector.</li> </ul>

**Table 38: PowerSuite Software for Personal Computers**

VW3A8104	PowerSuite Test and Commissioning Software on CD for use with Microsoft® Windows 95, 98, and NT™ and Windows CE v3.0 for Pocket PCs/PDA.
VW3A8106	<p>Cable connection kit for the Personal Computer to an ATS48 controller.</p> <ul style="list-style-type: none"> <li>• two connection cables, 9.8 ft (3 m) each with two RJ-45 connectors.</li> <li>• one RJ-45/9-way SUB-D adaptor.</li> <li>• one converter marked "RS-232/RS-485 PPC" with one 9-way male SUB-D connector and one RJ-45 connector.</li> </ul>

Factory repaired ATS48 controllers are available within 24 hours from a factory exchange pool, or your ATS48 controller can be factory repaired and returned. Contact your local Square D / Schneider Electric Distributor or

Square D / Schneider Electric Customer Service Representative at  
919-266-8666 for availability.

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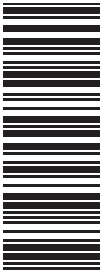
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**ALTISTART® 48 Soft Start Controllers**

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