

**MOTOR LOGIC™ Solid-State Overload Relay Assembly**  
**Class 9065 ST720 or ST7209**  
**Replacement Unit on Size 7 Type S Starter**

INTRODUCTION

This instruction bulletin illustrates, describes and contains installation instructions for the replacement of the existing MOTOR LOGIC™ NEMA Size 7 Solid-State Overload Relay (SSOLR).

The assembly consists of a Size 7, Class 10 or Class 20 selectable Feature Base unit MOTOR LOGIC SSOLR with four loops of wire through each MOTOR LOGIC window, ready for attachment to a Size 7, Type S starter. The looping wires are required to provide the proper response of overload functions and allow the setting of motor current directly on the MOTOR LOGIC dial.

The MOTOR LOGIC SSOLR, employed on the starter, is a self-powered device. The Feature Base MOTOR LOGIC SSOLR has selectable trip class, accepts optional communication modules, and has Class 2 ground fault detection. Refer to Table 1 for SSOLR available options.

Table 1: Solid-State Overload Relays and Available Options

MOTOR LOGIC SSOLR Type	NEMA Size	Full-Load Ampere (FLA) Range (A)	Class 10 or Class 20 Selectable	Remote Reset	Auxiliary Contact	Accepts Comm. Module
Feature Base ST720	7	270 - 810	31161-184-70	X	X	X
Feature Base ST7209	7	135-405	31161-184-73	X	X	X

Refer to Instruction Bulletin 30072-013-59 for more information on the Size 7 MOTOR LOGIC SSOLR or NEMA Size 7 starter.

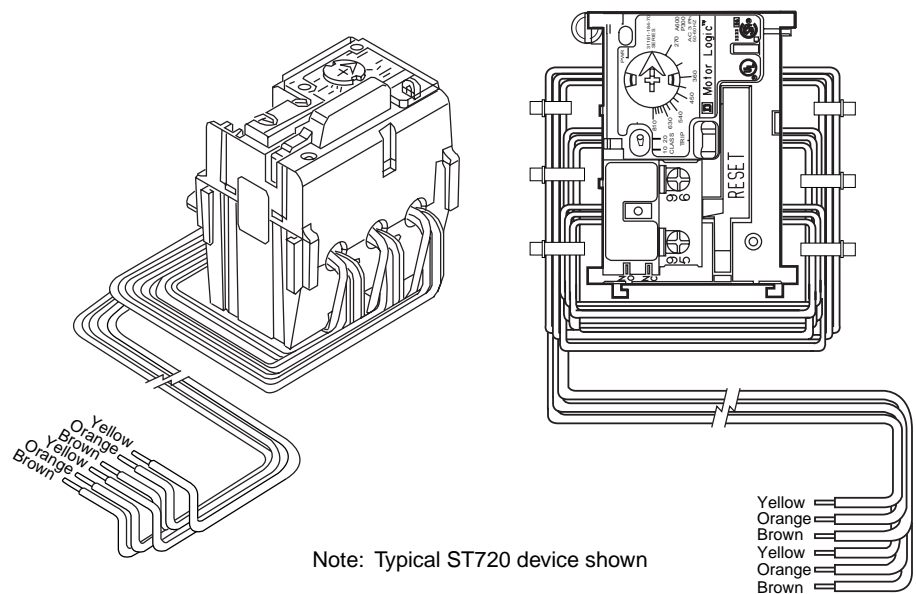


Figure 1: Relay Assembly

**KIT CONTENTS**

This kit contains a MOTOR LOGIC SSOLR to be used as a replacement for the existing MOTOR LOGIC SSOLR on a Size 7, Type S starter.

**SPECIFICATIONS**

The following specifications and ratings apply to the MOTOR LOGIC SSOLR attached to a Size 7, Type S starter:

<b>Operating Temperature Range</b>	-25 °C to +70 °C
<b>Short-Circuit Withstand Ratings</b>	≤ 30,000 amperes rms sym. 600 V
<b>Current Range: ST720</b>	270 - 810 A
<b>Current Range: ST7209</b>	135 - 405 A
<b>Wire Range (Motor Load)</b>	250 - 500 mcm (127 - 253 mm <sup>2</sup> ) max. of 4 in parallel
<b>Wire Type</b>	75 °C copper only
<b>Looping Turns Wire</b>	#16 (1.5 mm <sup>2</sup> ) TFFN stranded copper
<b>Trip Contact &amp; Aux Alarm Contact Rating</b>	See Table 2
<b>Trip Current</b>	See Figure 2
<b>UL Listed, CSA Certified</b>	

**Contact Ratings**

Table 2: Trip Contact and Auxiliary Alarm Contact Ratings

NEMA Rating	Maximum Voltage	Thermal Continuous Current	Maximum Current		VA Rating	
			Make	Break	Make	Break
A600	600 VAC	10 A	[1, 3]	[1, 3]	7200 VA	720 VA
P300	300 VDC	5 A	[2]	[2]	138 VA	138 VA

[1] For application voltages between 120 and 600 V, obtain the maximum make and break currents by dividing the VA rating by the application voltage. For application voltages below 120 V, the maximum make current is the same as for 120 V and maximum break current is obtained by dividing the break VA by the application voltage, but the current values are not to exceed the thermal unit continuous current.

[2] For application voltages of 300 V or less, obtain the maximum make and break currents by dividing the VA rating by the application voltage, but the current values are not to exceed the thermal unit continuous current.

[3] 35% Power Factor.

**Trip Current**

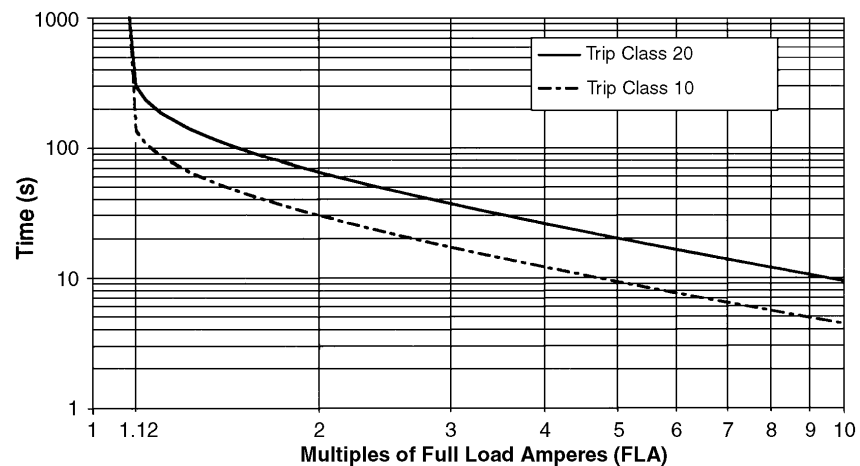


Figure 2: Trip Current Curve

INSTALLATION ON  
 NEMA SIZE 7 TYPE S  
 STARTER

**⚠ DANGER**

**HAZARDOUS VOLTAGE**

Turn off power before working on equipment. Use only electrically-insulated tools when servicing this equipment.

**HAZARDOUS VOLTAGE ON SECONDARY**

Do not energize starter without current transformer leads or looping turns connected to proper looping terminals or without 3-pole copper jumper connected to common terminals of looping terminal assembly. Current transformers that supply overload relay can develop dangerous voltage if energized without load on secondary. This voltage will be present at current transformer leads.

**Failure to observe these precautions will result in death, serious injury or equipment damage.**

1. The MOTOR LOGIC SSOLR is fully assembled and wired for installation on NEMA Size 7, Type S starters as a replacement. *Do not disconnect or remove wires through the MOTOR LOGIC SSOLR.*
2. This MOTOR LOGIC SSOLR must be used only in conjunction with a Size 7, Type S starter having a 900:5 current transformer to provide overload protection between 270 and 810 amperes motor current with the ST720, and between 135 and 405 amperes motor current with the ST7209.
3. Wires looping through the MOTOR LOGIC SSOLR windows are #16 AWG wire and are color-coded to provide easy recognition of phases and reduce the possibility of an open current transformer secondary.
4. Factory recommended tightening torques are listed in Table 3.

Table 3: Tightening Torques

	Torque	
	(lb-in)	(N•m)
Looping Terminal Screws	7 - 8	0.8 - 0.9
MOTOR LOGIC SSOLR Terminals 95 and 96	9 - 12	1.0 - 1.4
#8 - 32 MOTOR LOGIC SSOLR Mounting Screw	18 - 21	2.1 - 2.4

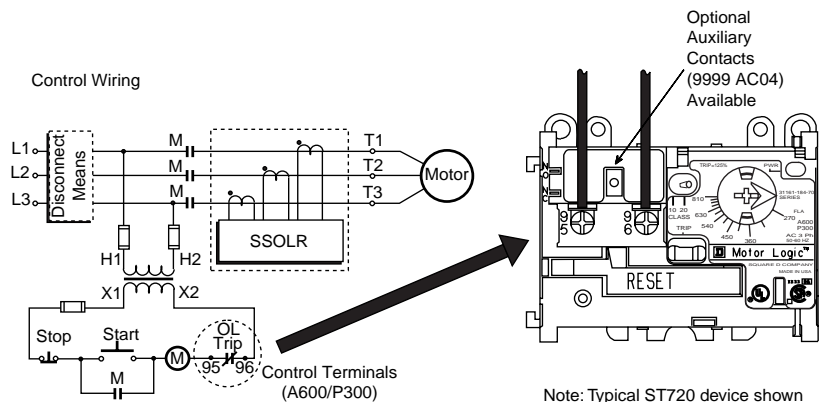


Figure 3: Overload Relay Control Wiring

## ⚠ DANGER

### HAZARDOUS VOLTAGE

Turn off power before working on equipment. Use only electrically-insulated tools when servicing this equipment.

### HAZARDOUS VOLTAGE ON SECONDARY

Do not energize starter without current transformer leads or looping turns connected to proper looping terminals or without 3-pole copper jumper connected to common terminals of looping terminal assembly. Current transformers that supply overload relay can develop dangerous voltage if energized without load on secondary. This voltage will be present at current transformer leads.

**Failure to observe these precautions will result in death, serious injury or equipment damage.**

### REMOVAL OF EXISTING MOTOR LOGIC SSOLR

To replace the MOTOR LOGIC SSOLR:

1. Remove all power.
2. Disconnect the control wires from the SSOLR terminals 95 & 96.
3. Disconnect the two brown, two orange and two yellow wires from the right side of the terminals.
4. Remove the left two SSOLR mounting screws holding the unit to the overload mounting plate.
5. Loosen the right screws holding the SSOLR to the overload mounting plate.
6. Remove the SSOLR.

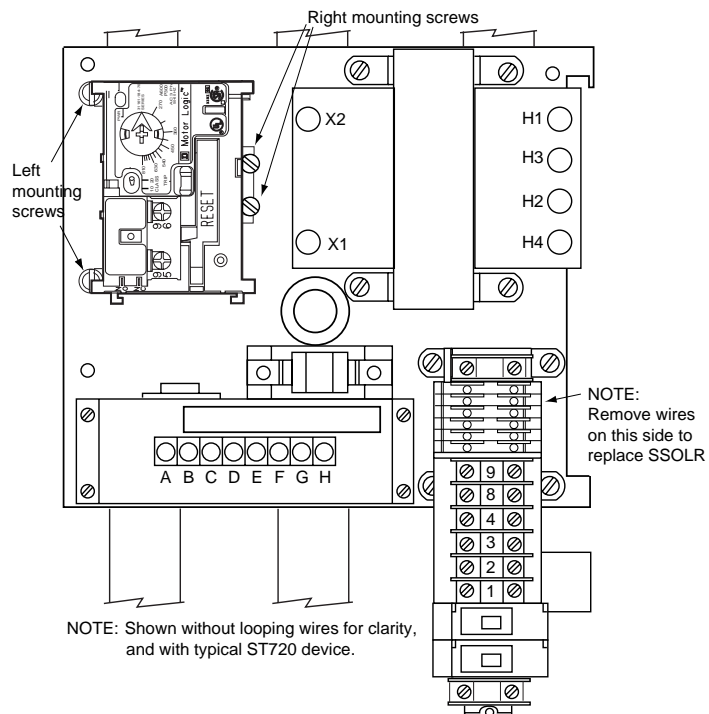


Figure 4: MOTOR LOGIC Mounting to Assembly

## ⚠ DANGER

### HAZARDOUS VOLTAGE

Turn off power before working on equipment. Use only electrically-insulated tools when servicing this equipment.

### HAZARDOUS VOLTAGE ON SECONDARY

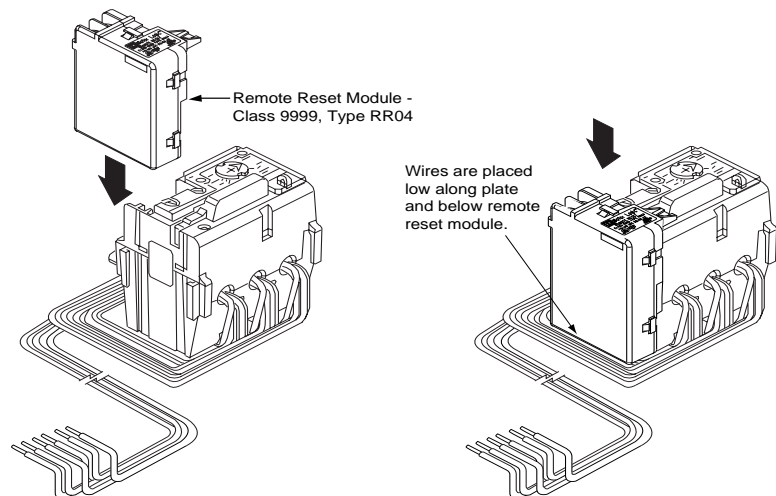
Do not energize starter without current transformer leads or looping turns connected to proper looping terminals or without 3-pole copper jumper connected to common terminals of looping terminal assembly. Current transformers that supply overload relay can develop dangerous voltage if energized without load on secondary. This voltage will be present at current transformer leads.

**Failure to observe these precautions will result in death, serious injury or equipment damage.**

## INSTALLATION OF NEW MOTOR LOGIC SSOLR

1. Install the new MOTOR LOGIC SSOLR by sliding the right side of the overload relay baseplate under the loosened right screws and reinstall the left two screws to hold the MOTOR LOGIC SSOLR to the mounting plate. Torque the mounting screws to the value shown in Table 3 on page 3.
2. Connect one end of the brown wire to the right side of the  $\phi 1$  terminal on the Size 7 saddle assembly.

*NOTE: This wire is looped through the Phase 1 window of the MOTOR LOGIC SSOLR from left to right with four conductors in the SSOLR window. The wire is routed along the bottom of the MOTOR LOGIC SSOLR and under the Remote Reset Module Class 9999 Type RR04, if used.*



**Figure 5: Remote Reset Module Option Attachment**

3. Connect the other end of the brown wire to the right side of the  $\phi 1$  COM terminal on the Size 7 assembly.
4. Repeat steps 1 and 2 with the orange wire and the  $\phi 2$  terminal.
5. Repeat steps 1 and 2 with the yellow wire and the  $\phi 3$  terminal.
6. Reconnect the control wires to the overload relay terminals 95 and 96.
7. Verify that the 3-pole copper jumper is in place on the three COM terminals.
8. Torque all terminal connections to the value shown in Table 3.
9. Verify wire insulation is not clamped under terminal screws and that there are no open circuits in the secondary of the 900:5 CT.

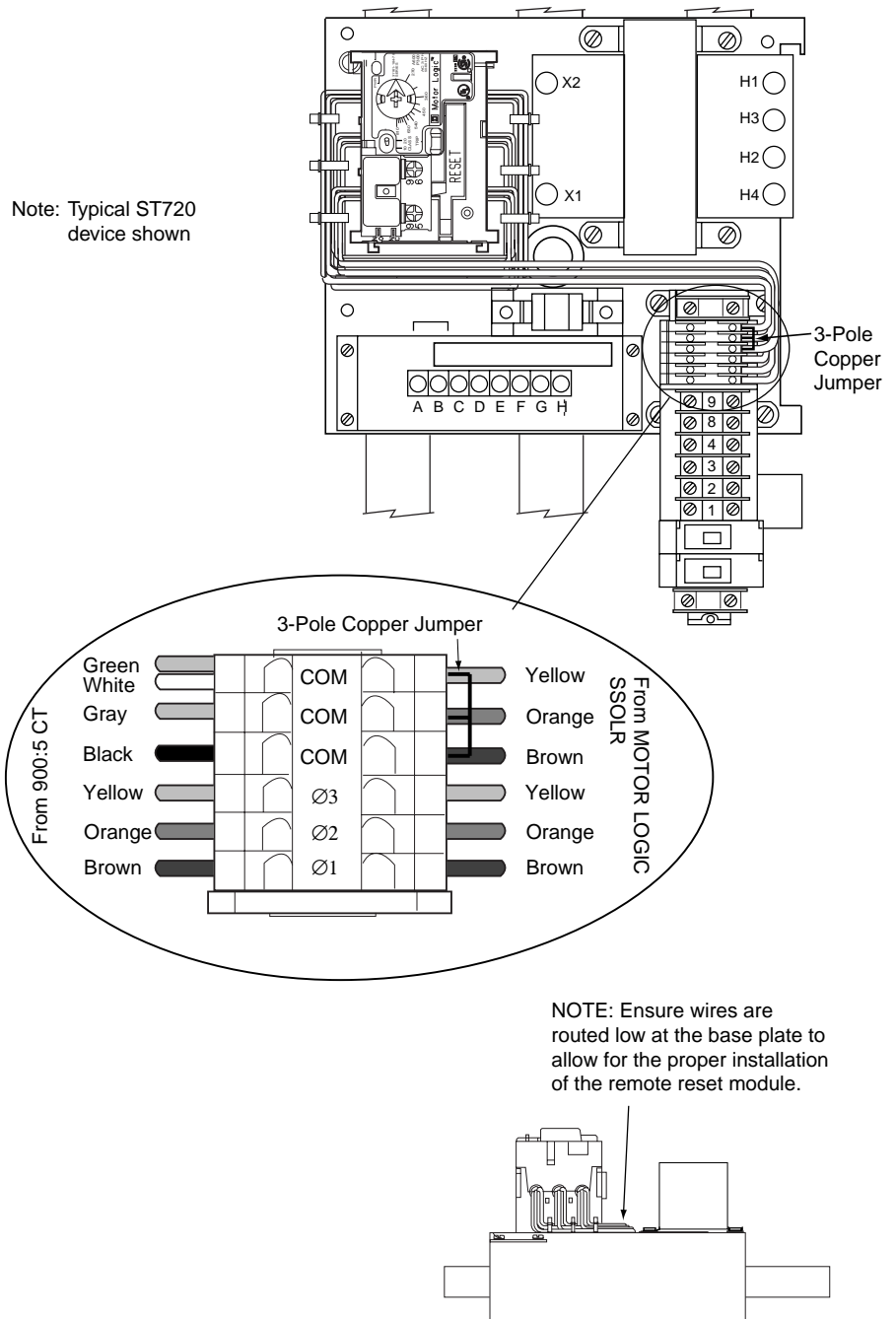


Figure 6: Wire Looping and Placement

SETTING THE FULL-LOAD AMPERE (FLA) ADJUSTMENT DIAL

**CAUTION**

**INADEQUATE MOTOR PROTECTION**

- Set FLA adjustment dial setting according to instructions before operating equipment.
  - Set Trip Class to appropriate Class 10 or Class 20 on Feature Base devices.
- Failure to observe this precaution can result in motor damage.**

1. Obtain the FLA from either the motor nameplate or the motor manufacturer.
2. Raise the transparent plastic tamper guard and with a flat-blade screwdriver, rotate the adjustment dial on the overload relay to the proper setting.
  - If the motor has a 1.15 to 1.25 service factor, set the adjustment dial to the motor FLA.
  - If the motor has a 1.0 service factor, multiply the motor FLA by 0.9 and adjust the dial to that number.

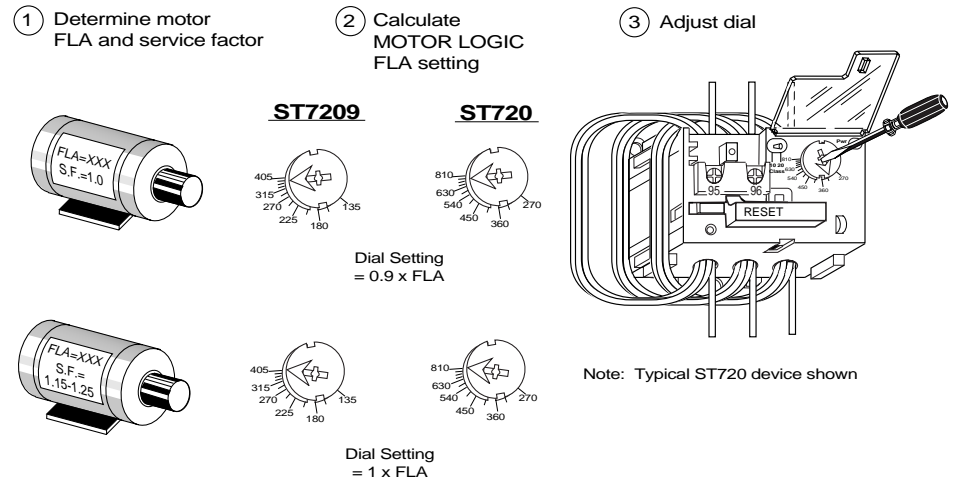


Figure 7: Setting the FLA Adjustment Dial

3. Reset the MOTOR LOGIC SSOLR by depressing the red lever marked RESET.

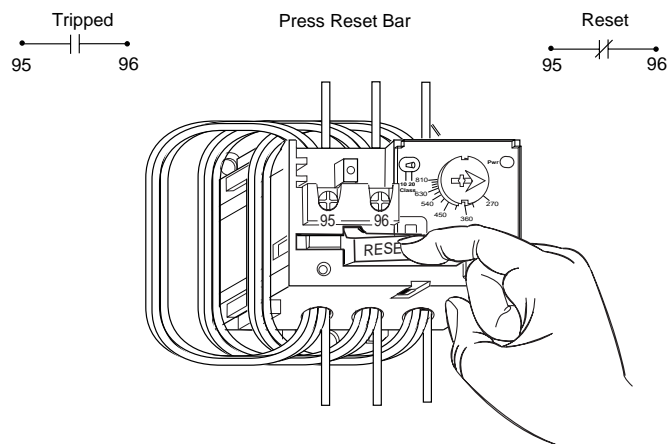


Figure 8: Resetting (typical ST720 device shown)

4. Select either Class 10 or Class 20 trip level.

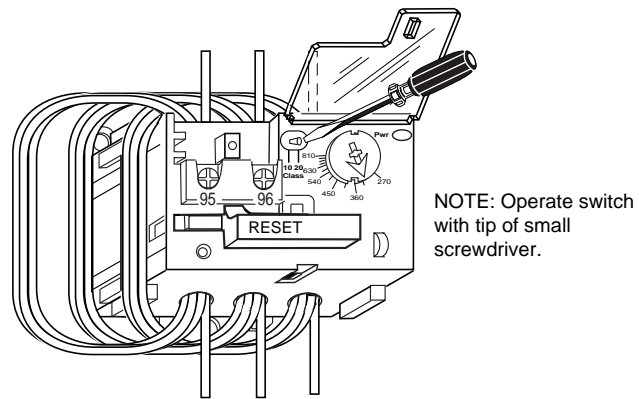


Figure 9: Trip Class Selection (Typical ST720 device shown)

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