Allen-Bradley

SMC PLUS™ Smart Motor Controller:

Soft Stop Option Manual

Wiring and Set-up Procedures
24-1000 Ampere
(Bulletin 150)

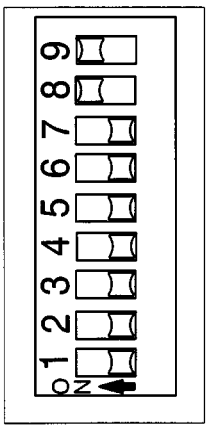
This is a supplementary guide for the Soft Stop Option, it is intended to be used with the Installation Manual. This guide contains the information pertaining to the wiring and customer adjustment set-up procedures for the Soft Stop Option. Other information specific to the operation and maintenance of the SMC PLUS is given in the following Installation Manuals:

150-811 (24, 35, 54, 97, 135 Amps)
150-812 (180, 240, 360 Amps)
150-813 (500, 650, 720, 850, 1000 Amps)

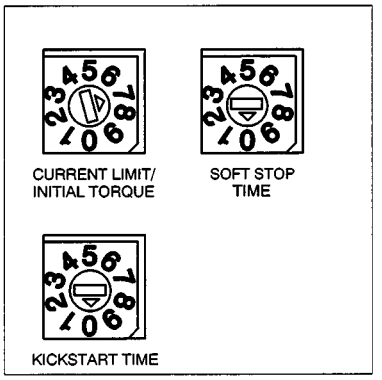
For Bulletin 150 SMC Smart Motor Controller technical support on start-up or existing installations, contact your Allen-Bradley representative. In the United States you can also call **1–800–765–SMCS** (765–7627) for assistance during the hours of 8:00 am to 12:00 noon and 1:00 pm to 4:30 pm (Central Time Zone) from Monday through Friday.

Soft Stop Option

Figure 1.1 - Soft Stop Option Factory Settings



Starting Time
Starting Time
Starting Time
Current Limit/Soft Start Select
Energy Saver Select (On/Off)
Auxiliary Contact Select (Up-to-Speed/Normal)
Stall Trip Select (On/Off)
Not Used
Not Used



Factory Settings

The conttroller has been factory-set for the following as shown in Figure 1.1 above:

- 10 second ramp
- Energy Saver "Off"
- Auxiliary Contacts "Off" (Normal)
- Stall feature "Off"
- Initial Torque 70%
- Kickstart "Off"
- Soft Stop "Off"

NOTE: Soft Stop feature is deactivated with factory settings.

Application Considerations

For multispeed, reversing and multimotor applications, consult your nearest Sales Offices or the Sales Department in Milwaukee

150-805

Soft Stop Option

With the soft stop option, pressing the soft stop pushbutton signals the controller to initiate a ramp down. The RUNNING LED turns off and the STOPPING LED turns on. When the logic completes the ramp down sequence, the latch circuit across terminals 30 and 40 is released, the form C auxiliary contacts reset (terminals 70, 80 and 90) and the STOPPING LED turns off. The controller logic resets. If "up-to-speed" auxiliaries are selected, the contacts reset when the motor begins to decelerate.

If the stop pushbutton is pressed, a normal (coast to rest) stop is initiated.

Figure 1.2 - Soft Stop Option

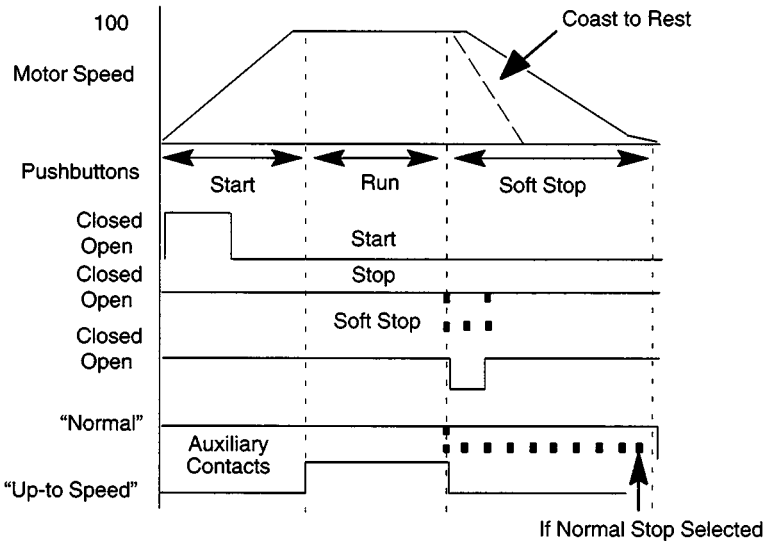
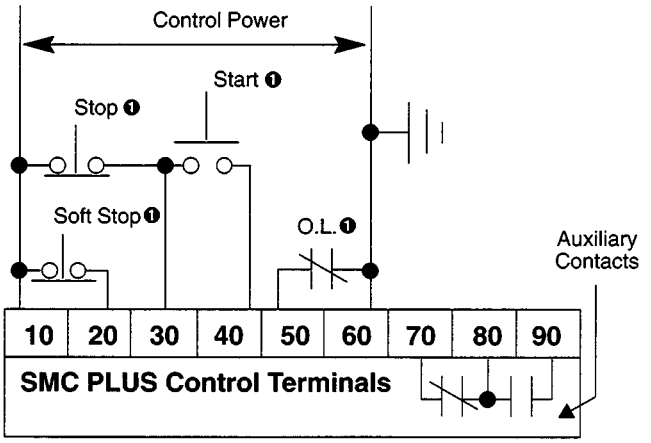


Figure 1.3 - Soft Stop Terminal Wiring

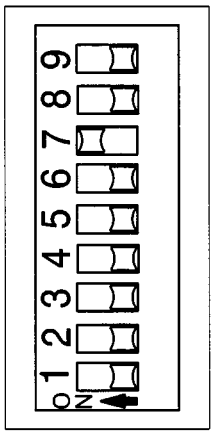


❶ Customer Supplied

ATTENTION: Soft Stop is not intended to be used as an emergency stop. Refer to the applicable standards for emergency stop requirements.

Soft Start Selection with Soft Stop Option

Figure 1.4 - Set Up Procedures - Soft Start Selection with Soft Stop Option



Starting Time

Starting Time

Starting Time

Current Limit/Soft Start Select

Energy Saver Select (On/Off)

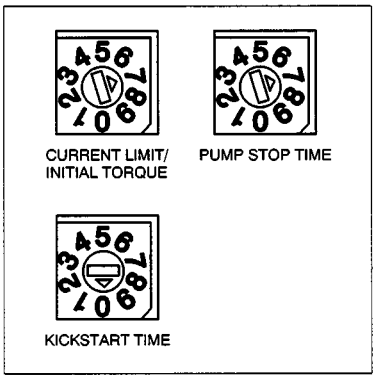
Auxiliary Contact Select (Up-to-Speed/Normal)

Stall Trip Select (On/Off)

Not Used

Not Used

EXAMPLE: Above DIP switch is set for 20 second ramp



1. **Starting Time** -
   Set switches 7-9 according to the period desired. For example, if you want a ramp of 20 seconds, switch 7 would be **ON** and switches 8 and 9 would be **OFF**.
2. **Kickstart Time** -
   Set Kickstart Time rotary digital switch to the kickstart time desired.
3. **Initial Torque** -
   Set Initial Torque rotary digital switch to the value desired.
4. **Current Limit/Soft Start** -
   For soft start operation, switch 6 must be **OFF**.
5. **Energy Saver Select** -
   Set switch 5 **ON** if you want the energy saver feature (of **OFF** if you do not want this feature active).
6. **Auxiliary Contact Selection** -
   Set switch 4 **OFF** if you want "normal" auxiliary contacts, **ON** if you want "up-to-speed" auxiliary contacts.
7. **Stall Select** -
   Set switch 3 **ON** if you want the stall feature (or **OFF** if you do not want this feature active) **NOTE:** For resistive load operation, switch 3 must be **OFF**.
8. **Soft Stop Time** -
   Set Soft Stop Time rotary digital switch according to the time desired. **For example**, if you want a soft stop of 30 seconds, set the rotary digital switch to 6.

ATTENTION: The user has the ultimate responsibility to determine which stopping mode is best suited to the application and will meet applicable standards for operator safety on a particular machine.

Soft Start Selection with Soft Stop Option

Switch Number	TIME (seconds)					
	2	5	10	20	25	30
9	ON	Off	ON	Off	ON	Off
8	Off	ON	ON	Off	Off	ON
7	Off	Off	Off	ON	ON	ON
6	Off					
5	ENERGY SAVER SELECT					
4	AUXILIARY CONTACT SELECT					
3	STALL SELECT					
2	NOT USED					
1	NOT USED					

Kickstart Time

Position	0	1	2	3	4	5	6	7	8	9
Time (seconds)	Off	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0

Initial Torque

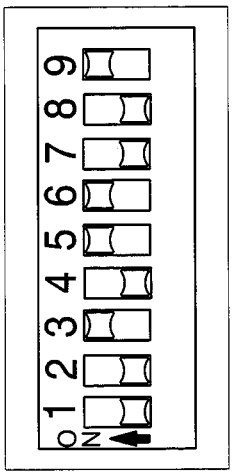
Position	0	1	2	3	4	5	6	7	8	9
% of Locked Rotor Torque	5	10	20	30	40	50	60	70	80	90

Soft Stop Time

Position	0	1	2	3	4	5	6	7	8	9
Time (seconds)	Off	2	5	10	20	25	30	40	50	60

Current Limit Selection with Soft Stop Option

Figure 1.5 - Set Up Procedures - Current Limit Selection with Soft Stop Option



EXAMPLE: Above DIP switch is set for 30 second ramp

Starting Time

Starting Time

Starting Time

Current Limit/Soft Start Select

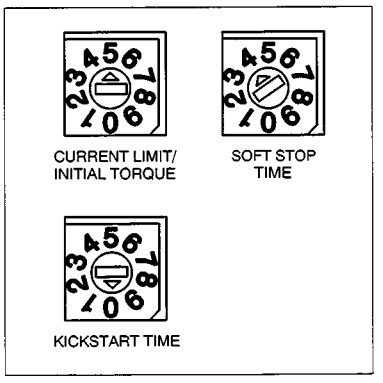
Energy Saver Select (On/Off)

Auxiliary Contact Select (Up-to-Speed/Normal)

Stall Trip Select (On/Off)

Not Used

Not Used



Current Limit Selection with Soft Stop Option

(continued)

1. **Starting Time** -
   Set switches 7-9 according to the time desired. **For example**, if you want current limit active for 30 seconds, switch 9 would be **ON** and switches 7 and 8 would be **OFF**.
2. **Kickstart Time** -
   Set Kickstart Time rotary digital switch to **OFF**.
3. **Current Limit/Soft Start** -
   Switch 6 must be **ON** in the current limit mode. Set Current Limit rotary digital switch accordingly. **For example**, if you want to restrict the starting current to 300% of full load amperes, set rotary switch to position 5.
4. **Energy Saver Select** -
   Set switch 5 **ON** if you want the energy saver feature (of **OFF** if you do not want this feature active).
6. **Auxiliary Contact Selection** -
   Set switch 4 **OFF** if you want "normal" auxiliary contacts, **ON** if you want "up-to-speed" auxiliary contacts.
7. **Stall Select** -
   Set switch 3 **ON** if you want the stall feature (or **OFF** if you do not want this feature active) **NOTE:** For resistive load operation, switch 3 must be **OFF**.
8. **Soft Stop Time** -
   Set Soft Stop Time rotary digital switch according to the time desired. **For example**, if you want a soft stop of 20 seconds, set rotary digital switch to 4.

Switch Number	TIME (seconds)			
		15	30	
9		Off	ON	
8	Off			
7	Off			
6	ON			
5	ENERGY SAVER SELECT			
4	AUXILIARY CONTACT SELECT			
3	STALL SELECT			
2	NOT USED			
1	NOT USED			

Kickstart Time

Position	0	1	2	3	4	5	6	7	8	9
Time (seconds)	Off	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0

Current Limit

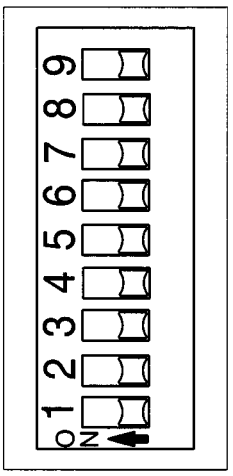
Position	0	1	2	3	4	5	6	7	8	9
% of Full Load Current	50	100	150	200	250	300	350	400	450	500

Soft Stop Time

Position	0	1	2	3	4	5	6	7	8	9
Time (seconds)	Off	2	5	10	20	25	30	40	50	60

Full Voltage Selection with Soft Stop Option

Figure 1.6 - Set Up Procedures - Full Voltage Selection with Soft Stop Option



Starting Time

Starting Time

Starting Time

Current Limit/Soft Start Select

Energy Saver Select (On/Off)

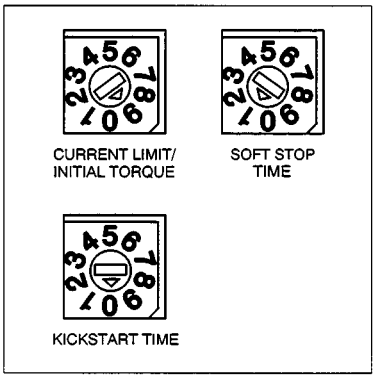
Auxiliary Contact Select (Up-to-Speed/Normal)

Stall Trip Select (On/Off)

Not Used

Not Used

EXAMPLE: Above DIP switch is set for full voltage start



1. **Starting Time** -
   Set dip switches 7-9 **OFF** and switch 6 **OFF**.
2. **Kickstart Time** -
   Set to 0.
3. **Initial Torque** -
   Set to 9.
4. **Current Limit** -
   For fully voltage operation, switch 6 must be **OFF**.
5. **Energy Saver Select** -
   Switch 5 must be **OFF**. Energy Saver not available with full voltage start.
6. **Auxiliary Contact Selection** -
   Set switch 4 **OFF** if you want "normal" auxiliary contacts, **ON** if you want "up-to-speed" auxiliary contacts.
7. **Stall Select** -
   Set switch 3 **ON** if you want the stall feature (or **OFF** if you do not want this feature active) **NOTE:** For resistive load operation, switch 3 must be **OFF**.
8. **Soft Stop Time** -
   Set Soft Stop Time rotary digital switch according to the time desired. **For example**, if you want a soft stop of 30 seconds, set rotary digital switch to 6.

ATTENTION: The user has the ultimate responsibility to determine which stopping mode is best suited to the application and will meet applicable standards for operator safety on a particular machine.

Full Voltage Selection with Soft Stop Option

(continued)

Switch Number	TIME (seconds)
	1/4
9	Off
8	Off
7	Off
6	Off
5	ENERGY SAVER SELECT
4	AUXILIARY CONTACT SELECT
3	STALL SELECT
2	NOT USED
1	NOT USED

Kickstart Time

Position	0	1	2	3	4	5	6	7	8	9
Time (seconds)	Off	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0

Initial Torque

Position	0	1	2	3	4	5	6	7	8	9
% of Locked Rotor Torque	5	10	20	30	40	50	60	70	80	90

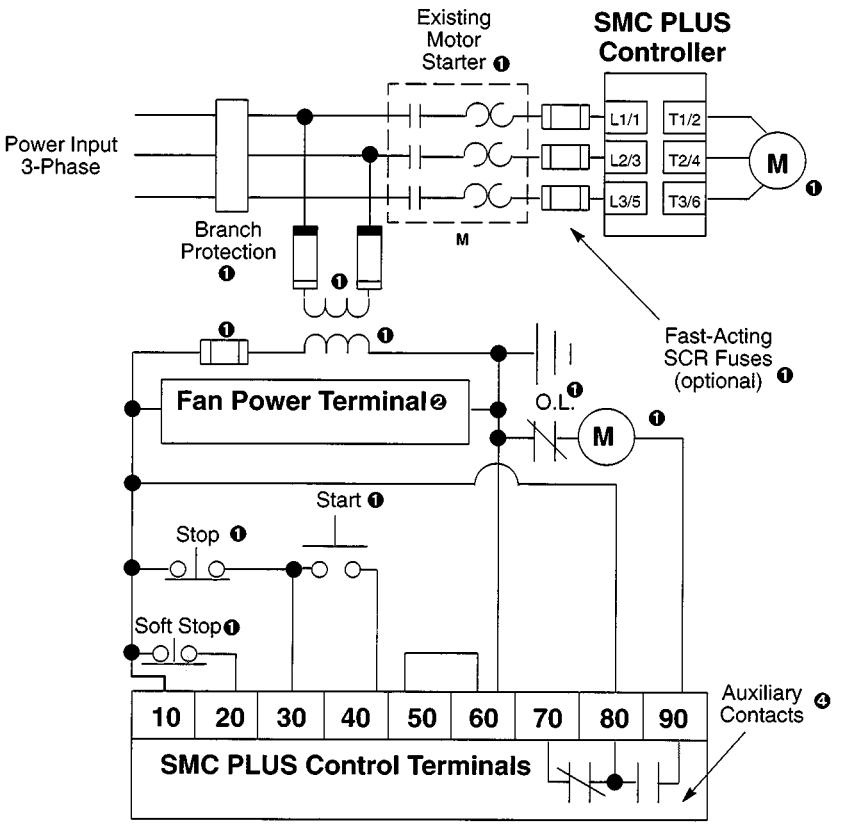
Soft Stop Time

Position	0	1	2	3	4	5	6	7	8	9
Time (seconds)	Off	2	5	10	20	25	30	40	50	60

Typical Connection for Retrofit Application

Typical connection diagram for retrofit application: Figure 1.7 shows the typical diagram to use when retrofitting a SMC PLUS with Soft Stop into an existing control scheme. Starting and stopping of the motor is handled by the controller. Be sure the incoming side of the starter coil is routed through terminals 80 and 90 to insure the starter stays on long enough to allow soft stopping to occur and that the auxiliary is configured for normal operation.

Figure 1.7 - Typical Connection Diagram Retrofit Application



NOTE: For two wire control, remove stop/start pushbuttons and hardwire terminals 10 and 40.

❶ Customer Supplied.

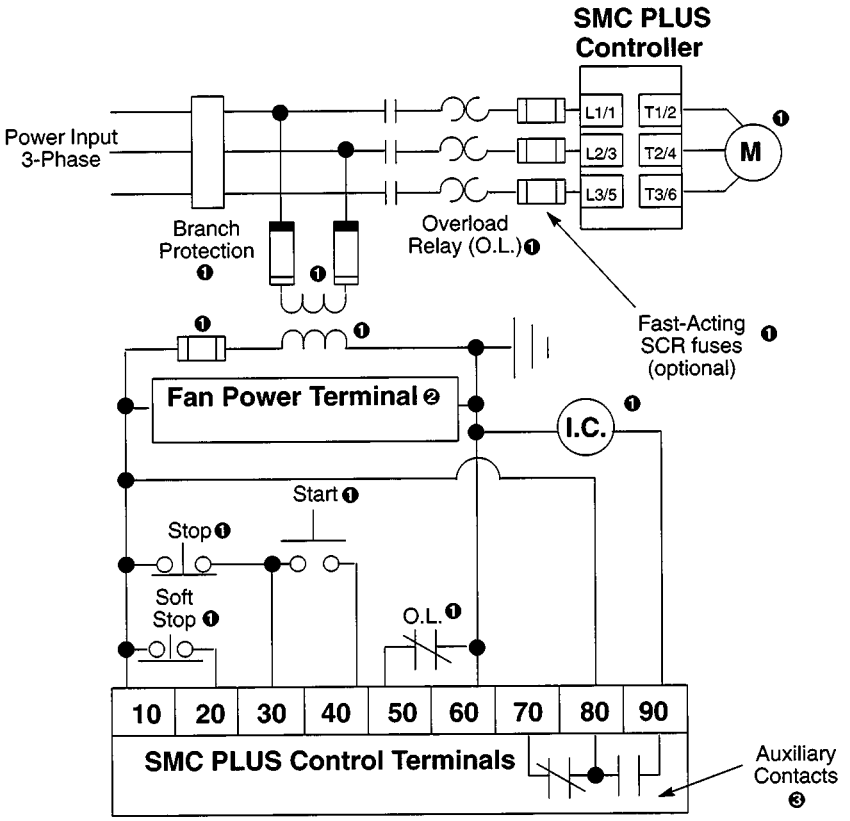
❷ Customer wires fan to control voltage supply. For 97A controllers and up, see installation manuals for jumper locations and wiring diagrams.

❸ Set auxiliary contacts for normal setting.

Typical Connection with Isolation Contactor

Typical connection diagram for Soft Stop with isolation contactor: Both starting and stopping of the motor is controlled by the controller. The controller also controls the electromechanical contactor. The contactor provides isolation between the motor and power lines when controller is OFF.

Figure 1.8 - Typical Connection Diagram with Isolation Contactor



NOTE:

❶ Customer Supplied.

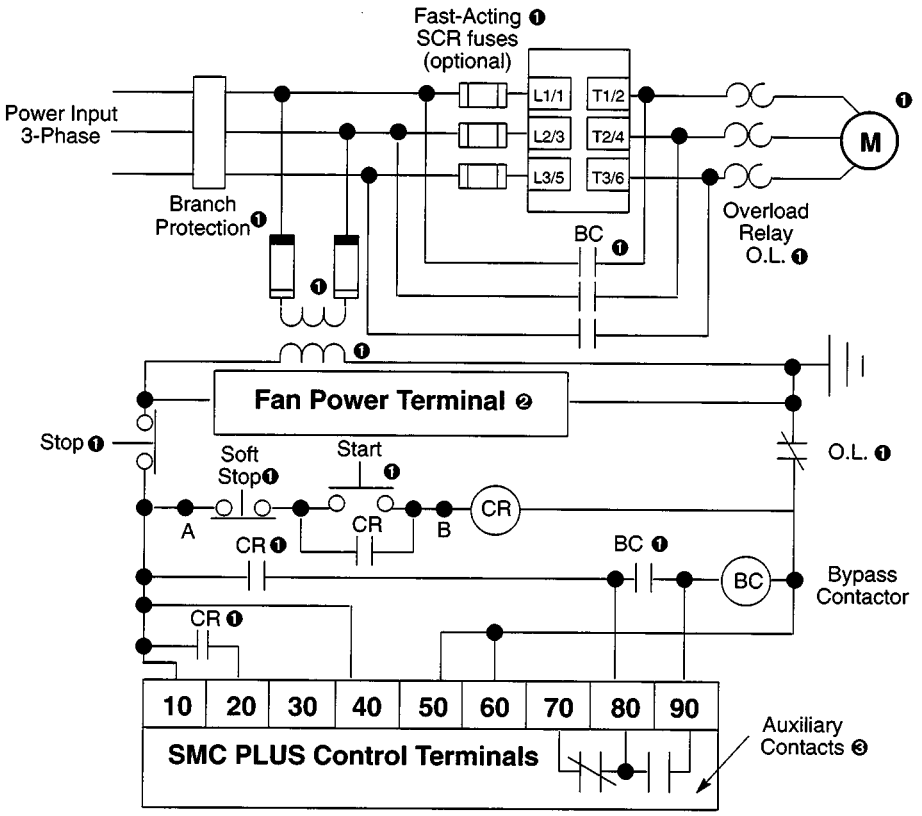
❷ Customer wires fan to control voltage supply. For 97A controllers and up, see installation manuals for jumper locations and wiring diagrams.

❸ Set auxiliary contacts for normal setting.

By-pass Mode

Typical connection diagram of a by-pass contactor: By using the following circuit a start and soft stop can be realized with the controller bringing the bypass contactor on for normal full speed operation.
NOTE: Because the controller is bypassed during this mode, controller features are not available when contactor is energized.

Figure 1.9 - Typical Application Diagram of a By-pass Contactor



NOTE: For two wire control, remove stop/start pushbuttons and connect two wire device between A and B.

❶ Customer Supplied.

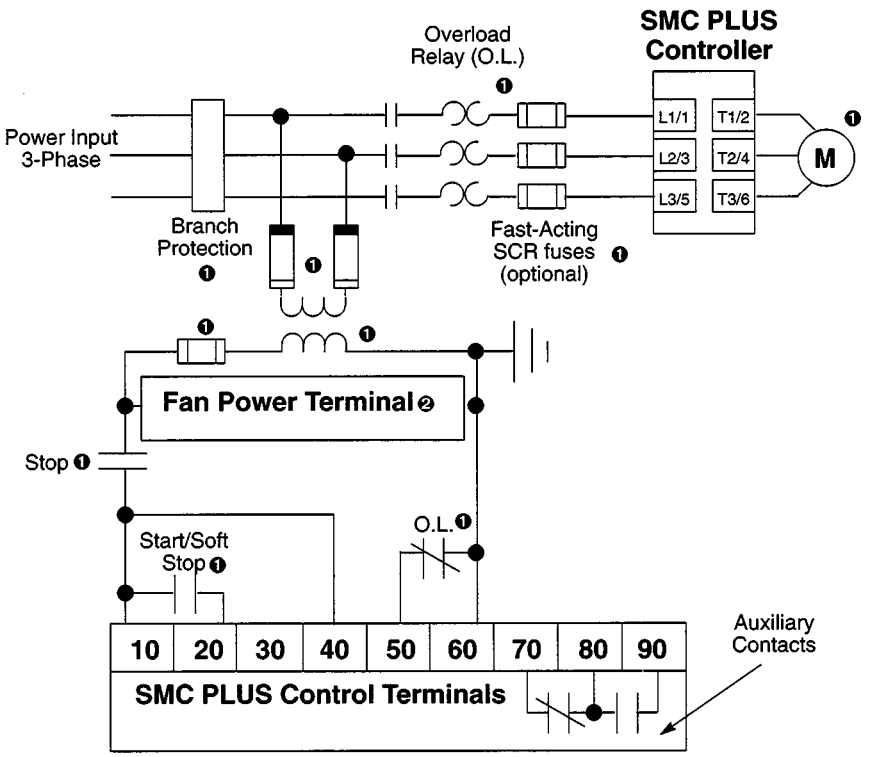
❷ Customer wires fan to control voltage supply. For 97A controllers and up, see installation manuals for jumper locations and wiring diagrams.

❸ Set auxiliary contacts for up-to-speed setting.

Programmable Controller and Sensor Interface

When using solid-state devices to operate the SMC PLUS controller the voltage and frequency range will be 100-240V, 50/60 Hz. The OFF state leakage current from the solid-state device must be less than 6 mA. The nominal input current is 25 mA at 120 VAC and 50 mA a 240 VAC.

Figure 1.10 - Typical Connection with PLC or other Logic Devices



NOTE:

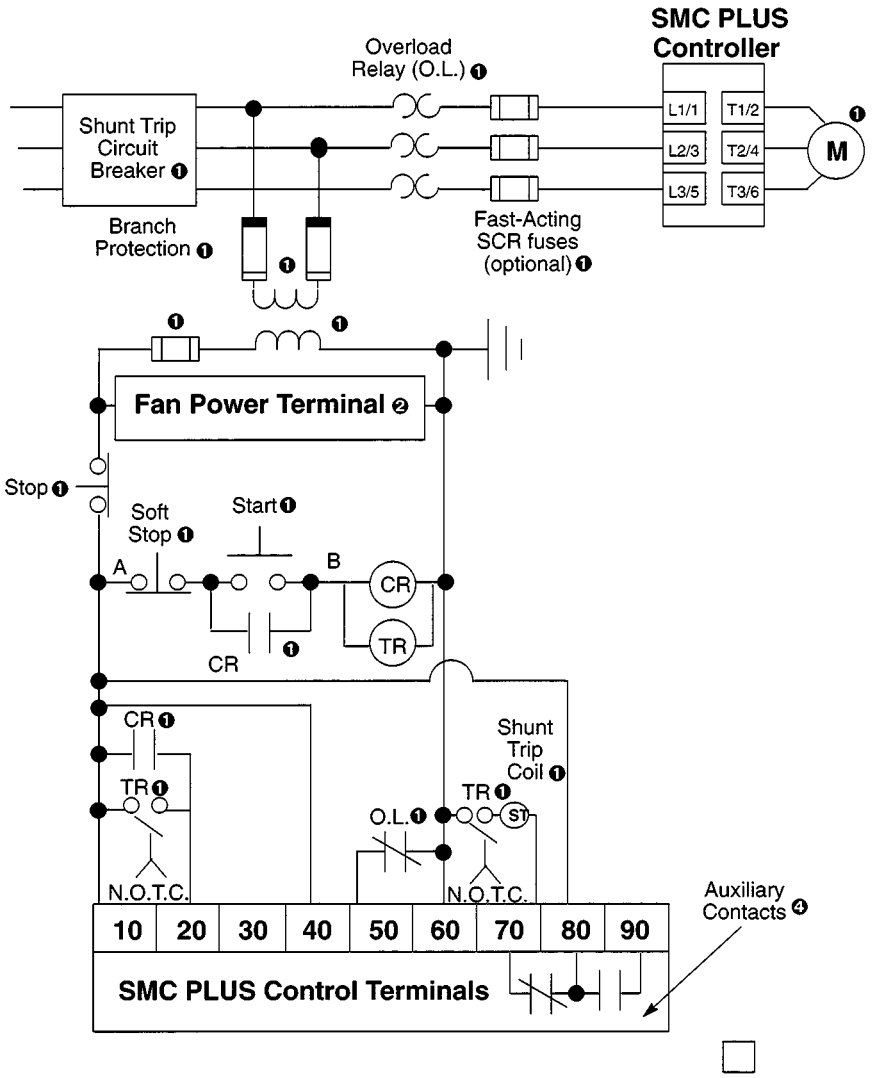
❶ Customer Supplied.

❷ Customer wires fan to control voltage supply. For 97A controllers and up, see installation manuals for jumper locations and wiring diagrams.

Typical Connection with Shunt Trip Circuit Breake

Typical connection diagram with shunt trip breaker. To use the Soft Stop Option with a shunt trip breaker, a control relay and a timing relay are required. The timing relay used to prevent tripping before the motor has had a chance to start and to prevent nuisance tripping of breaker for stopping.

Figure 1.11 - Typical Connection Diagram with Shunt Trip Circuit Breaker



❶ Customer Supplied.

❷ Customer wires fan to control voltage supply. For 97A controllers and up, see installation manuals for jumper locations and wiring diagrams.

❸ For two wire control, remove stop/start pushbuttons and connect two wire device between points A and B.

❹ Set auxiliary contacts for normal setting.

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