

Intelli-Brake Option Manual

for Series PN Smart Motor Controller

Wiring and Set-Up Procedures 24-1000 Amps

Manual's Purpose

This is a supplementary guide for the Intelli-Brake Option and 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 Intelli-Brake Option. Other information specific to the operation and maintenance of the Series PN is given in the following Installation Manuals:

- TECH-PN24-135 (24, 35, 54, 97, 135 Amps)
- TECH-PN180-360 (180, 240, 360 Amps)

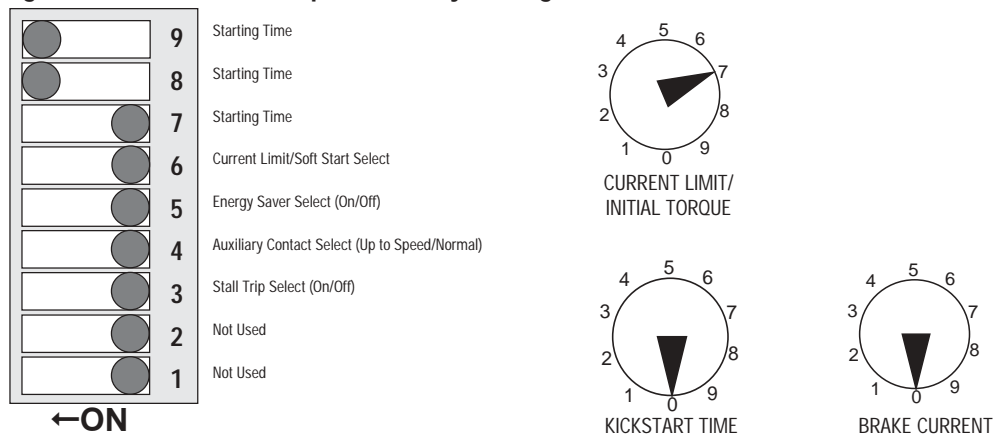
Intelli-Brake Option

Application Considerations

This function provides motor braking for applications which require the motor to stop faster than a coast to rest. It is a microcomputer based braking system which applies three phase braking current to a standard squirrel cage induction motor. The strength of the braking current is adjustable from 150% to 400% of full load current.

For multi-speed, reversing and multi-motor applications, consult your Sales Office.

Figure 1.1 - Intelli-Brake Option Factory Settings



Factory Settings

The controller 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”
- Brake Current “OFF”

NOTE: Motor braking feature is deactivated with factory settings.

WARNING: This option is used to decrease motor coasting time. It is not intended to be used as an emergency or safety stop. In case of power loss, the motor will coast to a stop.

NOTE: Depending on the application, the Intelli-Brake, Intelli-Stop and Slow Speed with Braking options may cause some vibration or noise during the stopping cycle and this may be minimized by lowering the braking current. If this is a concern in your application, consult the factory prior to applying these options.

With the Intelli-Brake option, pressing the brake pushbutton signals the controller to implement the brake. The RUNNING LED turns off and the STOPPING LED flashes. Braking will occur until the near-zero speed is detected, at which point the control will turn off and reset. This is accomplished without the use of a tachometer or zero speed switch or timer.

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

WARNING: Series PN Intelli-Brake is not intended to be used as an emergency stop. Refer to the applicable standards for emergency stop requirements.

CAUTION: Braking may cause motor heating depending on braking current, frequency of braking and duration of braking cycle. Therefore, select the lowest brake current setting that will brake satisfactorily.

Figure 1.2 - Intelli-Brake Option

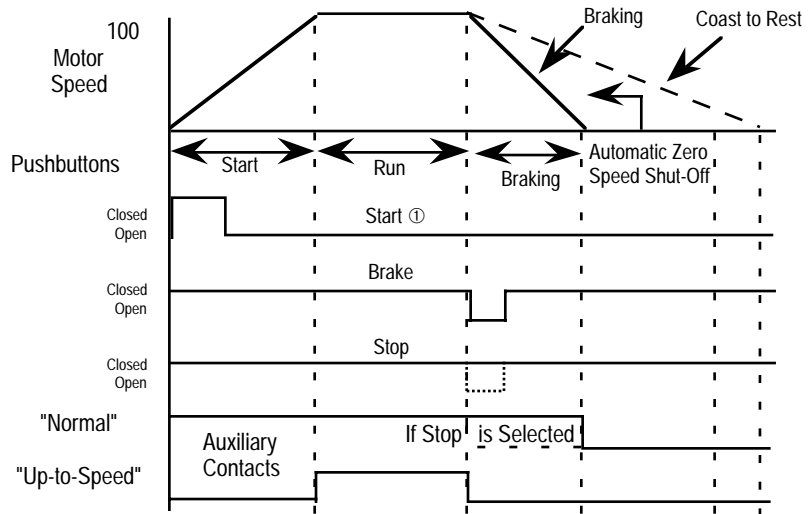
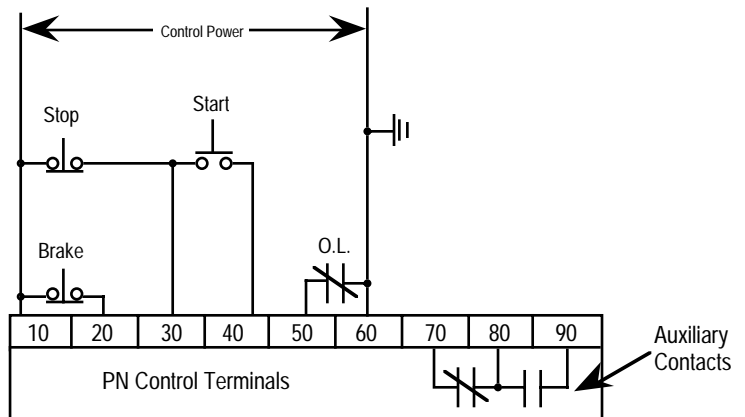


Figure 1.3 - Intelli-Brake Terminal Wiring

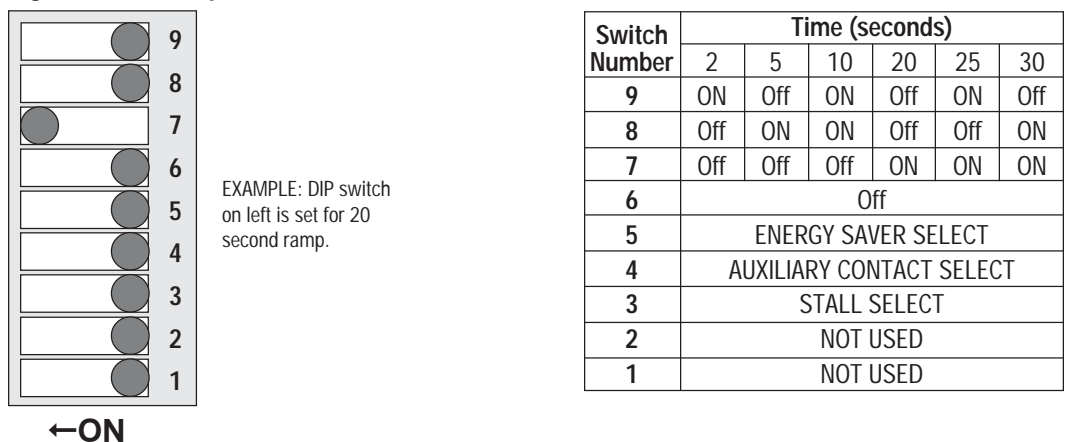


Soft Start Selection with Intelli-Brake Option

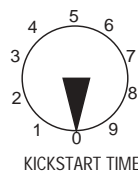
- Starting Time** - Set switches 7-9 according to the period desired. For example, if you want a ramp of 20 seconds, switch 7 would be ON and switches 8 and 9 would be OFF.
- Kickstart Time** - Set Kickstart Time rotary digital switch to the desired value.
- Initial Torque** - Set Initial Torque rotary digital switch to the desired value.
- Current Limit/Soft Start** - For soft start operation, switch 6 must be OFF.
- Energy Saver Select** - Set switch 5 ON if you want the energy saver feature (or OFF if you do not want this feature active).
- Auxiliary Contact Select** - Set switch 4 OFF if you want “normal” auxiliary contacts, ON if you want “up-to-speed” auxiliary contacts.
- 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.
- Brake Current** - Set Brake Current rotary digital switch according to the time desired. Start at 1 and increase until satisfied. For example, if you want brake current of 150% of full load current, set rotary digital switch to 1.

WARNING: The user has ultimate responsibility to determine which stopping mode is best suited for each application and meets applicable standards for operator safety on a particular machine.

Figure 1.4 - Set Up Procedures for Soft Start Selection with Intelli-Brake

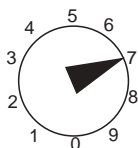


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Kickstart Time

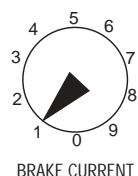
Position	0	1	2	3	4	5	6	7	8	9
Time (seconds)	Off	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	2.0



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

CURRENT LIMIT/INITIAL TORQUE



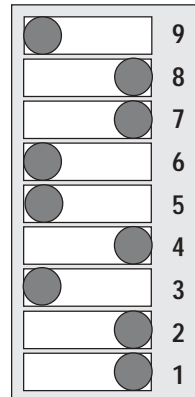
Brake Current

Position	0	1	2	3	4	5	6	7	8	9
% of Full Load Current	Off	150	175	200	225	250	275	300	350	400

Current Limit Selection with Intelli-Brake Option

- Starting Time** - Set switches 7-9 according to the period 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.
- Kickstart Time** - Set Kickstart Time rotary digital switch to OFF.
- 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.
- Energy Saver Select** - Set switch 5 ON if you want the energy saver feature (or OFF if you do not want this feature active).
- Auxiliary Contact Select** - Set switch 4 OFF if you want “normal” auxiliary contacts, ON if you want “up-to-speed” auxiliary contacts.
- 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.
- Brake Current** - Set Brake Current rotary digital switch to the desired setting. Start at 1 and increase until satisfied. For example, if you want brake current of 150% of full load current, set rotary digital switch to 1.

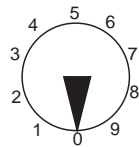
Figure 1.5 - Set Up Procedures for Current Limit Selection with Intelli-Brake Option



EXAMPLE: DIP switch on left is set for 30 second current limit.

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	

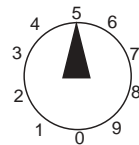
←ON



KICKSTART TIME

Kickstart Time

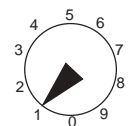
Position	0	1	2	3	4	5	6	7	8	9
Time (seconds)	Off	.4	.6	.8	1.0	1.2	1.4	1.6	1.8	2.0



CURRENT LIMIT/INITIAL TORQUE

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



BRAKE CURRENT

Brake Current

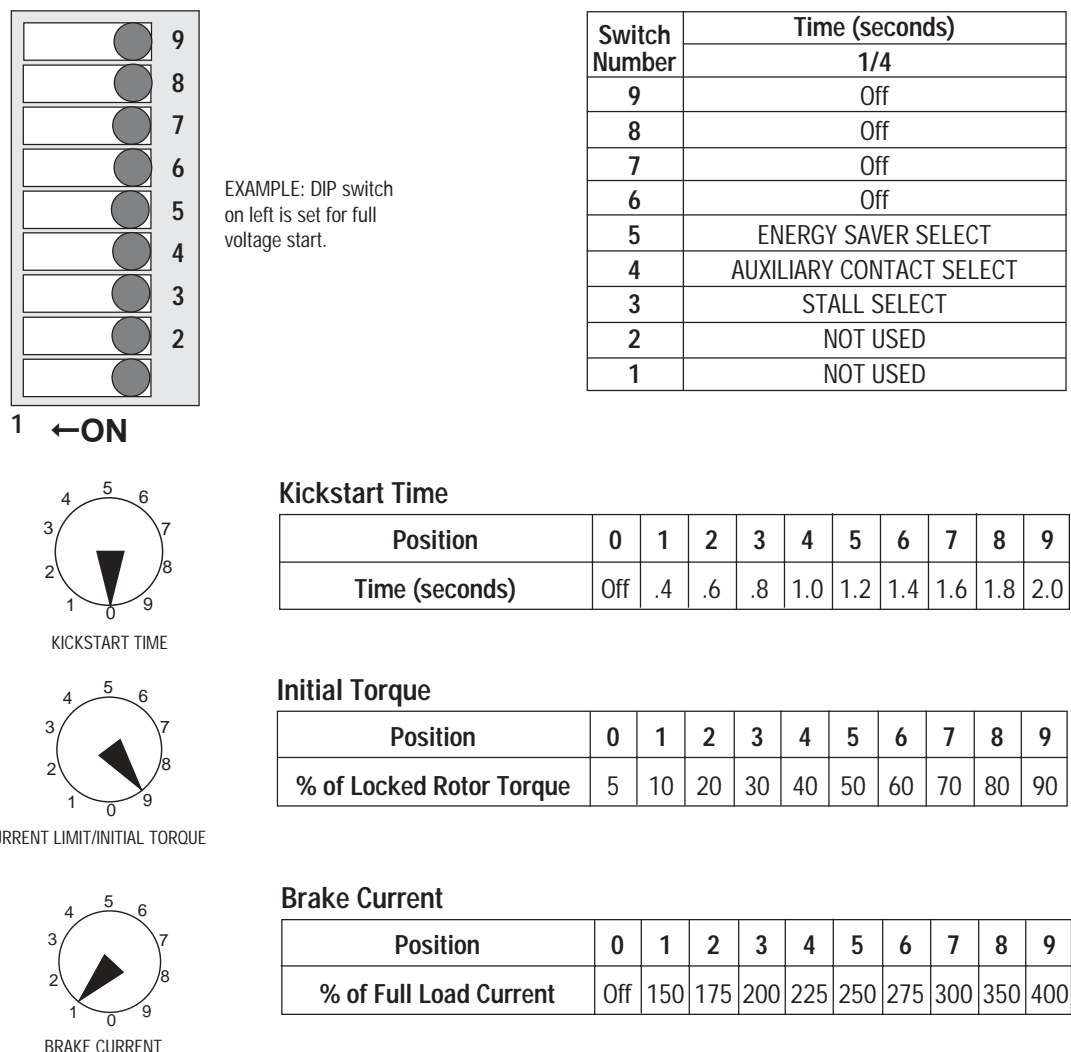
Position	0	1	2	3	4	5	6	7	8	9
% of Full Load Current	Off	150	175	200	225	250	275	300	350	400

Full Voltage Selection with Intelli-Brake Option

1. **Starting Time** - Set switches 7-9 OFF and switch 6 OFF.
2. **Kickstart Time** - Set Kickstart Time rotary digital switch to 0.
3. **Initial Torque** - Set Initial Torque rotary digital switch to 9.
4. **Current Limit/Soft Start** - For full voltage operation, switch 6 must be OFF.
5. **Energy Saver Select** - Switch 5 must be OFF. Energy Saver is not available with full voltage start.
6. **Auxiliary Contact Select** - 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. **Brake Current** - Set Brake Current rotary digital switch the desired setting. Start at 1 and increase until satisfied. For example, if you want brake current of 150% of full load current, set rotary digital switch to 1.

WARNING: The user has ultimate responsibility to determine which stopping mode is best suited for each application and meets applicable standards for operator safety on a particular machine.

Figure 1.6 - Set Up Procedures for Full Voltage Selection with Intelli-Brake Option

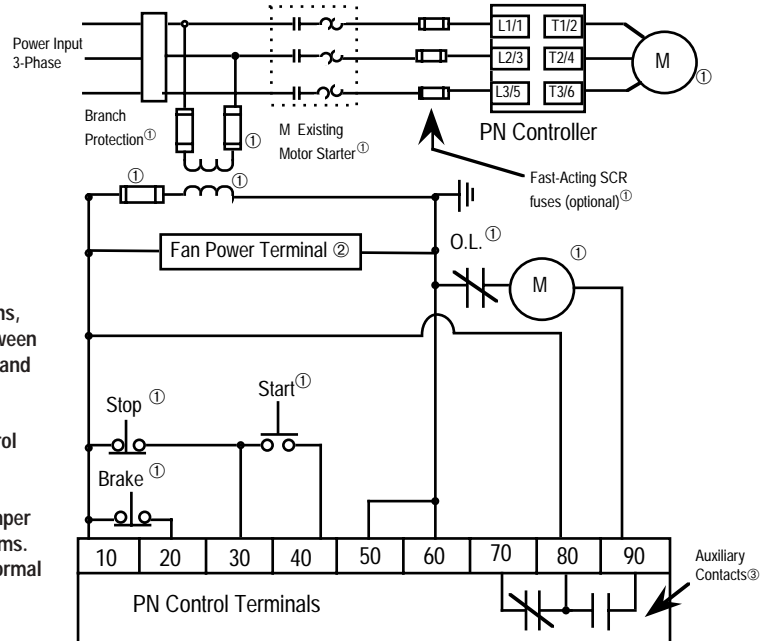


Typical Connection for Retrofit Application

Figure 1.7 shows the typical diagram to use when retrofitting Intelli-Brake 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 braking 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, connect two wire device between terminals 10 and 20, with 10 and 40 hard wired.
- ① Customer supplied.
 - ② Customer wires fan to control voltage supply. For 97A controllers and up, see installation manuals for jumper locations and wiring diagrams.
 - ③ Set auxiliary contacts for normal setting.

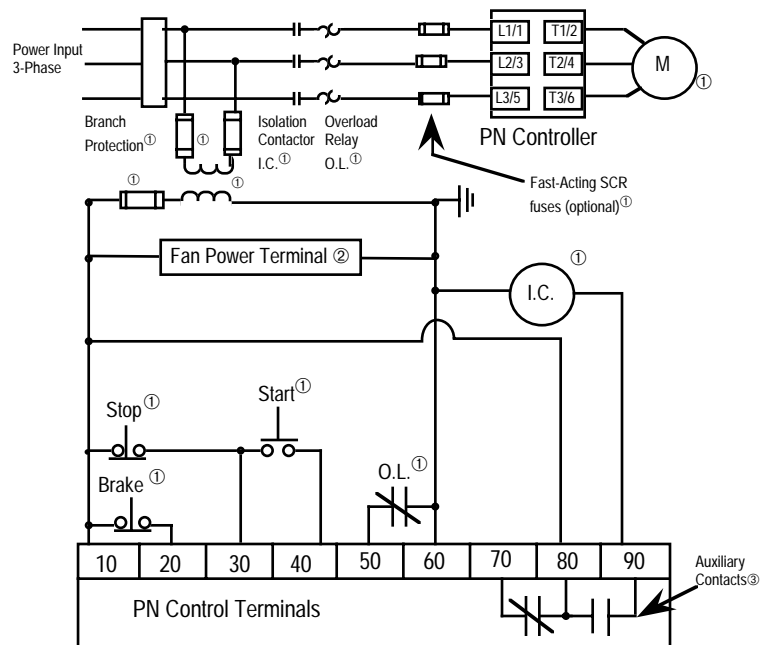


Typical Connection with Isolation Contactor

Typical connection diagram for Intelli-Brake 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

- ① Customer supplied.
- ② Customer wires fan to control voltage supply. For 97A controllers and up, see installation manuals for jumper locations and wiring diagrams.
- ③ Set auxiliary contacts for normal setting.

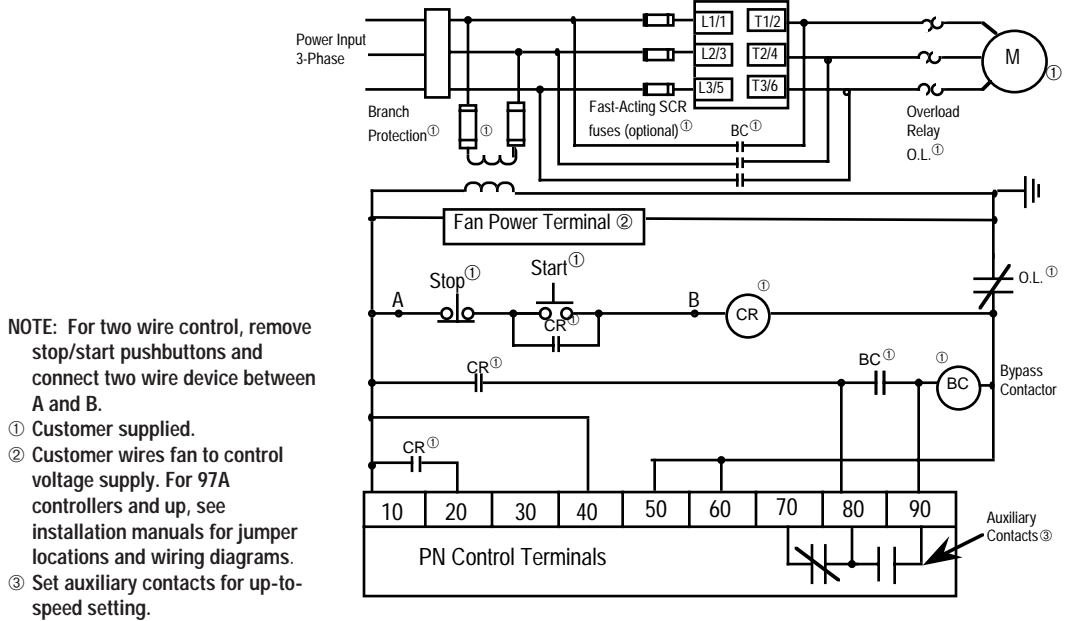


By-Pass Mode

By using the following circuit, a start and soft stop can be realized with the controller bringing the by-pass contactor on for normal full speed operation.

NOTE: Because the controller is by-passed during this mode, controller features are not available when contactor is energized.

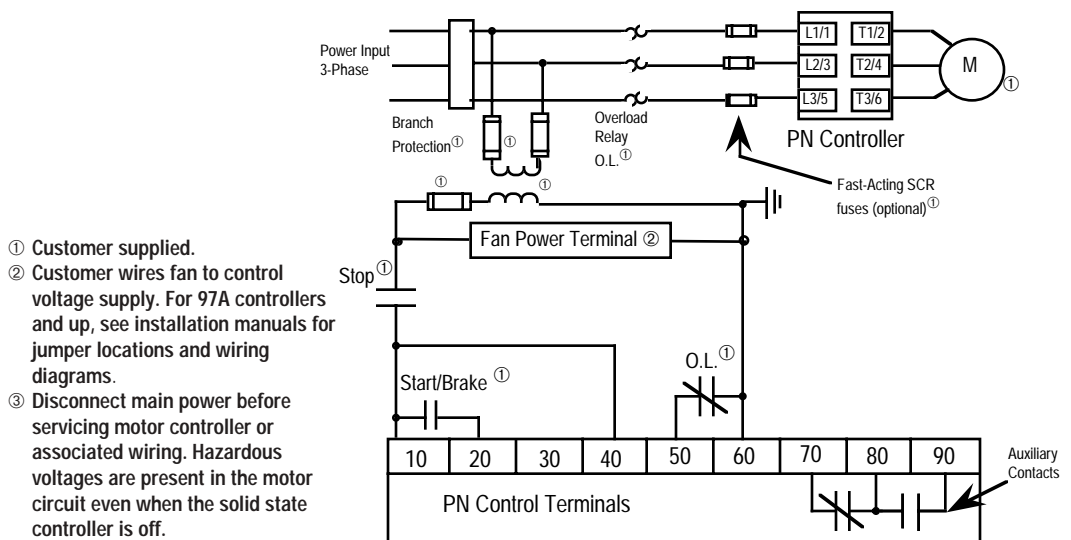
Figure 1.9 - Typical Application Diagram of a By-Pass Contactor



Programmable Controller and Sensor Interface

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

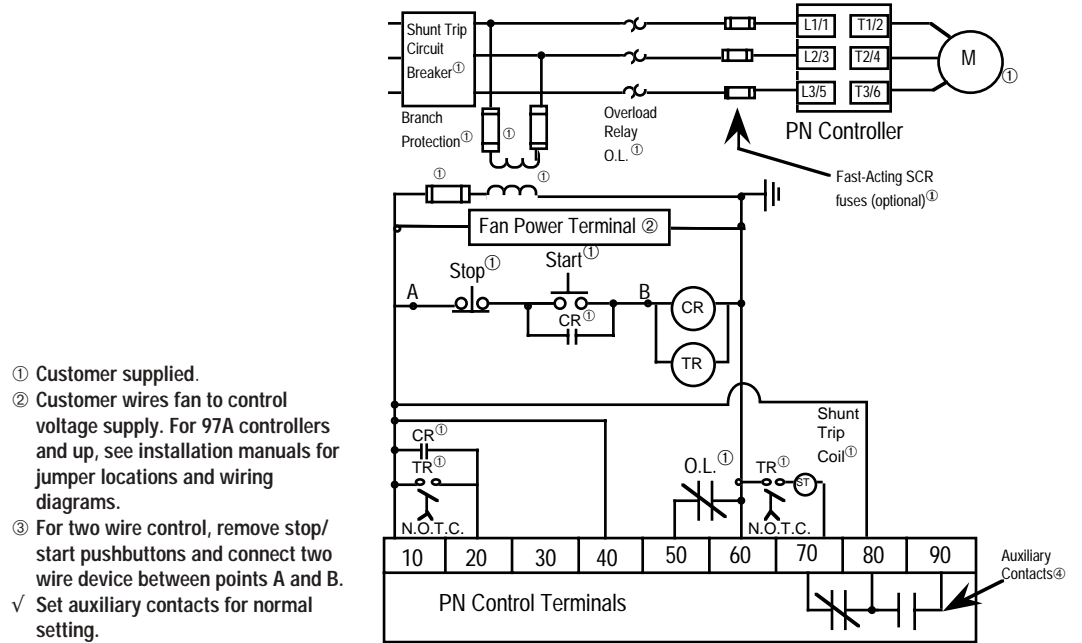
Figure 1.10 - Typical Connection with PLC or other Logic Device



Typical Connection with Shunt Trip Circuit Breaker

To use the Intelli-Brake option with a shunt trip breaker, a control relay and a timing relay are required. The timing relay is used to prevent tripping before the motor has had a chance to start and prevents nuisance tripping of breaker for braking and stopping.

Figure 1.11 - Typical Connection Diagram with Shunt Trip Circuit Breaker



- ① Customer supplied.
- ② Customer wires fan to control voltage supply. For 97A controllers and up, see installation manuals for jumper locations and wiring diagrams.
- ③ For two wire control, remove stop/start pushbuttons and connect two wire device between points A and B.
- ✓ Set auxiliary contacts for normal setting.

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