Power-Tronics, Inc. Electrical Power Control Systems

P.O. Box 291509 Kerrville, Texas 78029 Phone: 830.895.4700 Fax: 830.895.4737 Email: pti@power-tronics.com Website: www.power-tronics.com

PC2000B-3P

Phase control

The Power-Tronics PC2000B-3P Phase control is a self-contained complete Phase control. The PC2000B-3P Phase control is designed for continuous operation at up to 250vdc at 200adc!

The PC2000B-3P is uniquely designed to sit in a compact footprint while being passively convection cooled for a long service life. Because of its unique modular design, the PC2000B-3P minimizes downtime should a repair ever be necessary! The PC2000B-3P's compact design allows a wide variety of installation methods, including installations where space is at a premium.

The PC2000B-3P is a time-proven design, utilizing high-reliability components and a unique modular design to simplify repair. The PC2000B-3P is designed to provide a lifetime of service and is specifically built to minimize failures and potential downtime!

The PC2000B-3P is specifically designed to be operated by external controls such as PLC and computerized control equipment. The PC2000B-3P can be configured for +/-10vdc, +/- 5vdc, or 0-10vdc control input to allow control by a wide variety of control systems on the market.

Specifications

Input Voltage:	190-240vac, 3 phase
Frequency:	50 or 60 Hz
Control Range:	0-100%
Output Voltage:	0-250vdc @ 240vac input
Maximum Continuous Output:	200adc
Minimum Field Resistance:	1.25Ω @ 250vdc output
Physical Size:	24 x 36 x 12 in.
Weight:	60 lb.
Phase control:	PC250-9
Firing Module:	FM4
Control Voltage:	+/-10vdc, +/-5vdc, 0-10vdc
Repairable:	Yes
Internal Protection:	Fuses, cartridge type
External Voltage Adjustment:	Yes

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Introduction and Functional Description

Caution: Read This Installation Manual Carefully and Entirely!

Warning: Do not use digital equipment to read voltage, Hz, or amperage during this installation. Use only Analog sensing equipment! Failure to do so may result in damage to equipment or in personal injury!

ALWAYS perform all setup procedures off-line
ALWAYS wear eye protection
ALWAYS strip wire insulation properly or use insulated connectors
ALWAYS use analog metering equipment when setting up the phase control
ALWAYS ensure the phase control receives ample airflow
ALWAYS use adequate fusing
NEVER hold the phase control in your hand or lap when energized
NEVER install the phase control in a place it can get wet or is exposed to the elements
NEVER mount the phase control over a screw, bolt, rivet, seam, or other fastener
NEVER insert a screwdriver or other object under the regulator cover
NEVER touch any exposed part of the PC2000B-3P during operation ***(LIVE HEATSINKS)***
NEVER install a switch in the DC portion of the phase control's wiring
NEVER USE A DIGITAL FREQUENCY METER (It *can give a false reading*!)

Functional Description

The PC2000B-3P Phase Control is the result of over 20 years of engineering efforts and offers high-demand features at a competitive price point. The PC2000B-3P is a proven design and is engineered to greatly simplify setup while offering extreme reliability. When properly installed, the PC2000B-3P Phase Control is designed to provide a lifetime of service.

An automatic phase control has several automated tasks it must perform in order to provide reliable, clean, and regulated electricity. It must maintain a preset setpoint and protect both itself and the connected load should a fault situation arise.

The PC2000B-3P uses field-replaceable cartridge fuses to protect its internal circuitry should a fault occur and the load current exceeds what the phase control is capable of delivering. It also contains reliable circuitry that is designed to maintain a setpoint regardless of outside influences or ambient temperature.

The PC2000B-3P is designed to accept +/-10vdc, +/-5vdc, or 0-10vdc input signals from a wide variety of PLC and computerized control systems. The PC250-9 control module has adjustments for both gain and current limit to allow a customized setup for any installation.

Due to its extreme simplicity, the PC2000B-3P Phase Control is uncommonly reliable and offers features and accuracy usually only offered by much more complicated and often much more expensive phase controls.

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Determining Correct Application Sizing

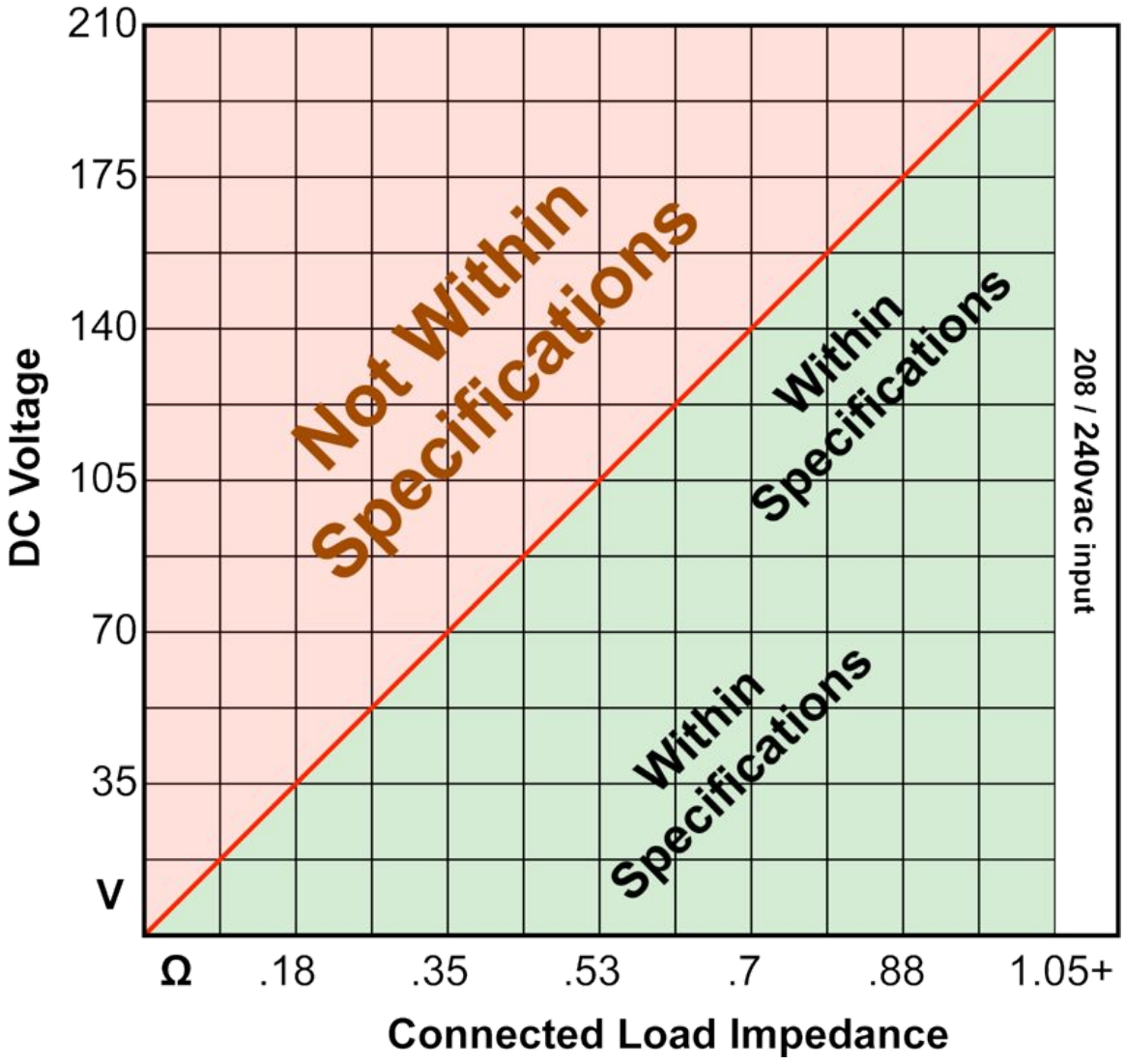
The PC2000B-3P Phase control is designed for use with 190-240VAC 3-phase input. It contains internal suppression for use with brush-type loads such as synchronous motors. Before installation, it is necessary to verify that the PC2000B-3P is the correct product for your application.

To determine if the PC2000B-3P is the correct product for your load you need to know any two of the following 3 specifications from the rating plate of your load:

1: Control Field Voltage (in DC Volts) [Generally given in full load Voltage on nameplates]
2: Control Field Resistance (in Ohms) **[See Note Below]**
3: Connected Load Amperage (in DC Amps) [Generally given in full load Amps on nameplates]

Using the specifications obtained from your connected load, verify that your load fits the specifications from the chart or graph below:

- Connected load full load voltage is 200VDC or less, and your control field resistance is 1.25Ω or greater.



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Note about Field Resistance

When measuring field resistance on a brush-type device, such as a synchronous motor, measure the resistance through both the field leads as well as directly on the slip rings themselves.

The readings you obtain should ideally be the same, but *no more than 1% difference.*

If you show more than 1% difference in reading your device has brush and ring contact problems and will need cleaning or maintenance before installing the PC2000B-3P.

Failure to correct brush and ring contact problems will result in severe damage to the phase control as well as possible PERMANENT damage to the slip rings themselves!

NEVER use emery cloth, carborundum stones, "comm sticks", or Tuner cleaner to dress or clean slip rings! They will make a bad problem much, much worse! Only use Garnet or Flint sandpaper and clean with a clean rag soaked with Acetone for best results!

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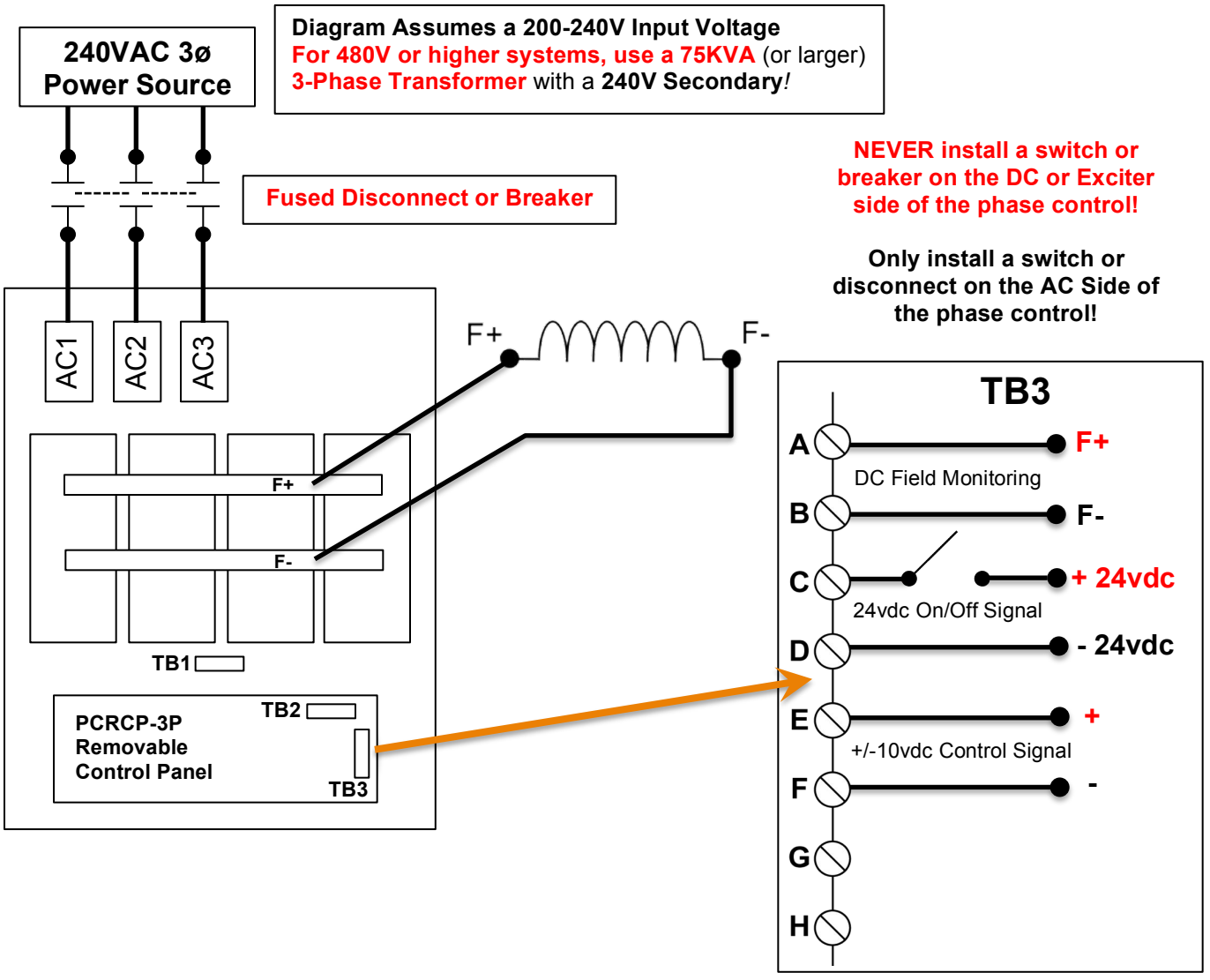
Connection Diagram

WARNING: The PC2000B-3P Phase Control is NOT a regulated static exciter for use on Electrical Generators!!!

The PC2000B-3P is a Half-Controlled Full-Wave rectified 3-phase phase control, which allows a maximum of 250VDC at 200 ADC continuous with an input voltage of 240VAC 3-phase.

This product is typically used on slip-ring synchronous motors or on inductive loads with full load control field voltages of 200VDC or less and full load exciter field amperages between 100 and 190ADC.

Note that the maximum input voltage to the PC2000B-3P Phase control is 240VAC! DO NOT input 277VAC into the PC2000B-3P! Severe damage to the unit will result!



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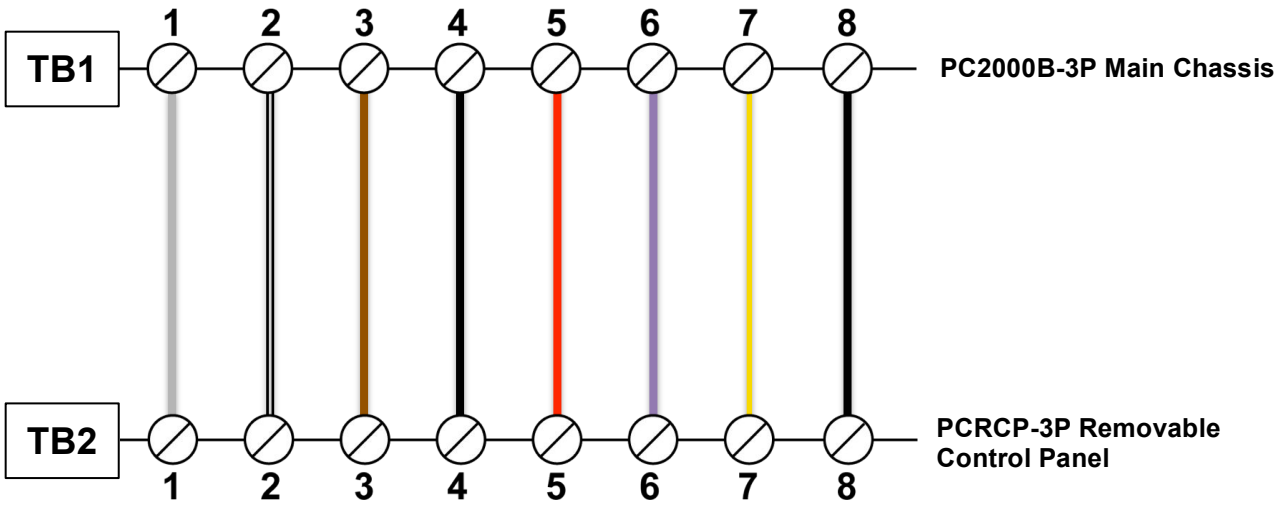
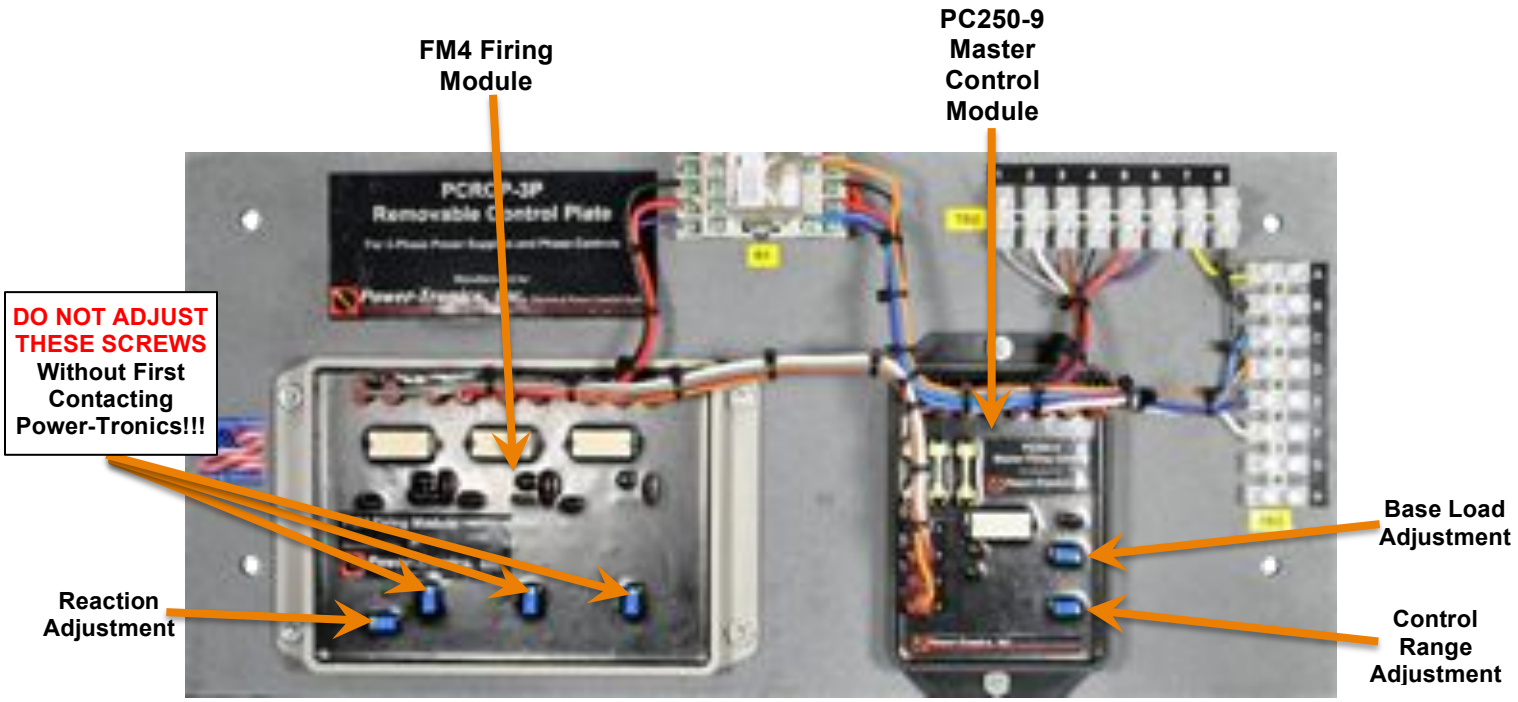
PCRCP-3P Removable Control Panel

The PC2000B-3P Phase Control features a removable control panel for convenient relocation of the control module and firing module to a location closer to the main switchboard.

To detach the removable control panel from the PC2000B-3P Phase Control, simply remove the 4 1/4-20 nuts that hold it to the main chassis and remove the wires from TB1 and TB2.

Install the control panel in the desired location, and then reconnect the wiring as originally shown. The original wires are color coded for quick and easy hookup. See the diagram below for further details.





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Initial Setup and Commissioning

1. Install the PC2000B-3P and wire up according to the wiring diagram on page 6.

2. If installing the PC2000B-3P on a load containing slip rings and brushes, verify that the brushes and brush riggings are isolated, ungrounded, and connected ONLY to the PC2000B-3P.

3. Verify that the control voltage produced by the PLC or control equipment is set to 0vdc or its 0-output position.

4. Apply a 24vdc signal to terminals C and D on TB3 to energize the PC2000B-3P.

5. Adjust the control voltage produced by the PLC or control equipment to obtain the desired output voltage from the PC2000B-3P**.

6. Observe operating performance of the PC2000B-3P. If satisfactory operation is observed, installation and commissioning is complete

**** NOTE: The default control voltage configuration of the PC2000B-3P is 0-10vdc. If you are using a +/-10vdc or +/-5vdc configuration, please contact Power-Tronics for adjustment procedures!**

NEVER adjust ANY internal controls on the PC2000B-3P or PCRCP-3P without first contacting Power-Tronics for adjustment procedures!!!

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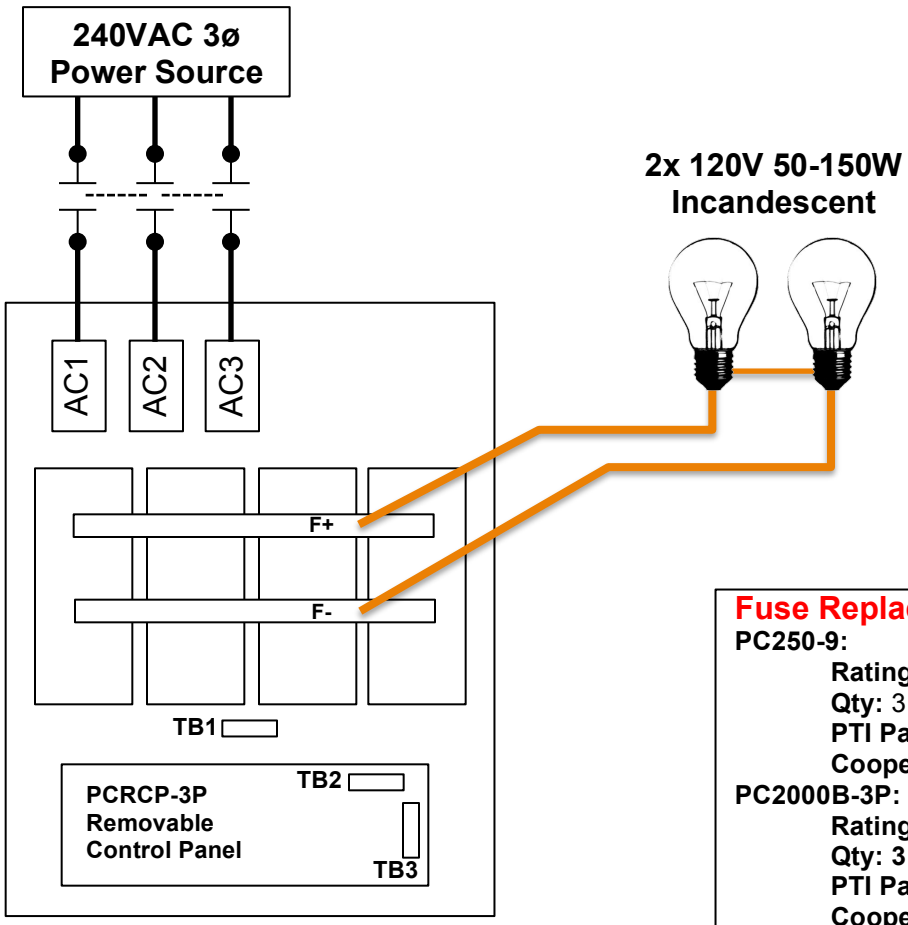
Bench Check Procedures

1. Wire up the PC2000B-3P as shown in the figure below.
2. Connect up two 120 volt 50 to 150 watt light bulbs in series to the F+ and F- Terminals.
3. Connect a switched 24vdc power source to terminals C and D on TB3 Terminal Board. **(Shown on Page 6)**.
4. Connect the control signal wires from your PLC or automatic controller to terminals E and F on TB3 Terminal Board. **(Shown on Page 6)**.
5. Set your PLC or automatic controller to "0" output, then Input 208-240VAC, 3ø fused at no more than 5A into the PC2000B-3P. Supply 24vdc to terminals C and D on TB3. **The test light should be OFF**.
6. Slowly increase the output of your PLC or automatic controller until the lights glow, then continue increasing output to 100%. The test light should light to FULL Brightness. **NOTE: Refer to your PLC or controller instructions!**
7. Slowly decrease the output of your PLC or automatic controller until the lights go dark, then continue decreasing output to "0". **The test light should be OFF**. **NOTE: Refer to your PLC or controller instructions!**
8. Turn off power and disconnect the PC2000B-3P from your power source, 24vdc power source, and PLC or automatic controller. Inspect all electronic components on the PC2000B-3P to ensure they are isolated from touching any part of the PC2000B-3P housing.
9. **If you were able to successfully perform all of these tests, the PC2000B-3P is good.**



Fuse Replacement Information:

PC250-9:
- **Rating: 5A @ 250VAC**
- **Qty:** 3
- **PTI Part #** 5R3-403
- **Cooper–Bussman Part #** BK/GDB-5A

PC2000B-3P:
- **Rating: 200A @ 250VAC**
- **Qty: 3**
- **PTI Part #** 5R3-231
- **Cooper–Bussman Part #** JJN-200

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Installation Warranty Form

It is very important that you fill out this form completely when installing a phase control. This form serves as a history record on the application. This form also contains the information needed by Power-Tronics, Inc., for repair and troubleshooting of any product you may be having problems with.

Failure to fill out this form during installation will result in a cancellation of your warranty coverage! Filling out this form takes only minutes but will save hours or days later on if your product should require service!

Product			Other options			
Serial Number						
Date of Installation						
Type of Generator				Model #		
	Brush type	[ ]				
	Brushless	[ ]				
AC Stator Information						
Wired for	Volts	Phase	Hz			
Generator Configuration: Lead						
Exciter/Rotor Information						
Exciter field resistance	Ω		@	F+ / F-	Ω	
Exciter field volts	vdc		@	Slip Rings	Ω	
Description of problem with product or generator						
Your phone number			Name:			
Your fax number			Ship to Address:			
Your email address			Ship to City, State, Zip:			

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PRODUCT WARRANTY

Power-Tronics, Inc., assumes no liability for damages due to incorrect voltage or other voltage related damages resulting from either output of the generator or input to the generator exciter system. These problems should be protected with external devices provided by the customer such as ***fuses, surge suppressors, over/under voltage and frequency controls.***

Power-Tronics, Inc., warranties **only parts and workmanship** of this product for a **period of 2 years from the original date of purchase from Power-Tronics, Inc.** Under warranty, Power-Tronics, Inc. will replace, exchange or repair the defective product **without labor or parts cost to the customer.** Remaining warranty of the original product will be transferred to the replaced or repaired product. To obtain warranty, a copy of the original Installation Warranty Form must be sent in with the defective product, which clearly shows the purchase date and serial number of the defective part. A repair request form must be sent in with the product before repairs will begin. You can obtain this form by contacting Power-Tronics, Inc.

Send repairs to: Power-Tronics, Inc., 2802 Cobbler Ln., Kerrville Texas USA 78028.

Send in repairs only by UPS or FedEx. **USPS will NOT deliver to our facility!**

Any *one* of the following conditions will void the warranty:

- Overheating of the power supply resistor on the printed circuit card.
- Overheating of the SCR or freewheeling diode.
- Physical damage to the printed circuit card, housing or components.
- Unauthorized repair or alteration of printed circuit card.
- Installation by anyone other than a qualified professional generator service technician.
- Conductive or corrosive contamination of the circuit card.
- Removal of our company identification from the product.
- Removal of any conformal coating of the printed circuit card or components.
- Overheating of foil on the printed circuit card.
- Inappropriate or infeasible application.
- Use with any external device other than manufactured by Power-Tronics, Inc.
- Failure to fill out the attached warranty card during installation

No other warranty is expressed or implied.