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# **PRG SERIES 400<sup>®</sup>** **400 AMP DISCONNECT**

**USER MANUAL**

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PRG Series 400® 400 Amp Disconnect User Manual

Version as of: October 25, 2010

PRG part number: 02.9680.0200 A

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# INTRODUCTION

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## About This Guide

This guide provides necessary information regarding product safety, installation, and operation for the following PRG equipment:

- + PRG Series 400® 400 Amp Disconnect (20.9680.0200)

Familiarizing yourself with this information will help you get the most out of your PRG product.



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**WARNING:** It is important to read ALL accompanying safety and installation instructions to avoid damage to the product and potential injury to yourself or others.

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The PRG Series 400® 400 Amp Disconnect is suitable for use in the U.S. and Canada, or any locality with a 5-wire, 120/208V power grid. It is intended for dry locations only and must be protected from moisture if used outdoors.

### **IMPORTANT INFORMATION REGARDING INSTALLATION. PLEASE READ!**

This equipment is intended for installation in accordance with the National Electrical Code® and local or Federal code specifications. To ensure full compliance with all codes and regulations, check with your local electrical inspector prior to installation. To prevent electrical shock, turn off power at mains before installation.

## Additional Documentation

For more information on the Series 400 system, refer to the following PRG manuals:

- + PRG Series 400® Power and Data Distribution System User Manual (02.9680.0001.xx)
- + PRG Series 400® Power and Data Distribution System Service Manual (02.9680.0010)



## Customer Service

For technical assistance, contact the PRG International Service Center or contact your nearest PRG office. Contact information for all PRG office locations can be found on our website at: [www.prg.com/about-us/locations/](http://www.prg.com/about-us/locations/)

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## OVERVIEW

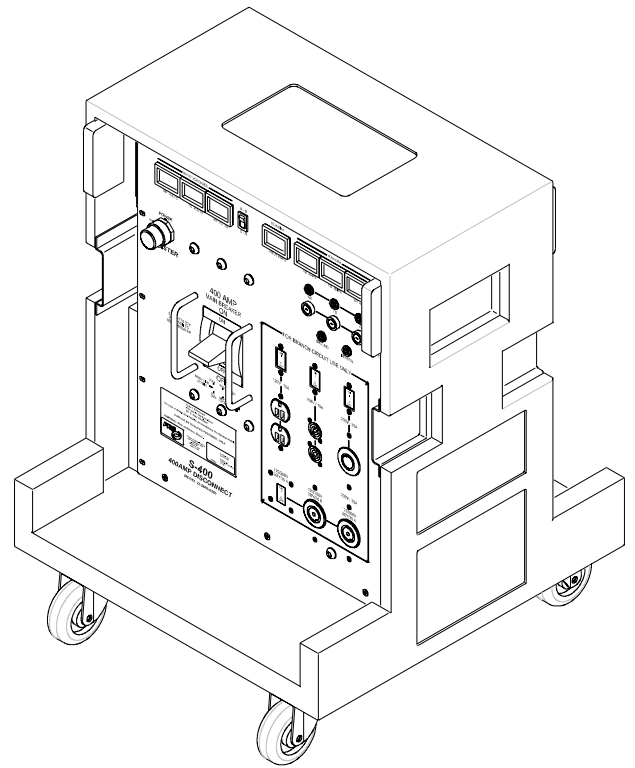
### Description

The PRG Series 400® 400 Amp Disconnect is a safety device containing a three-phase, 400 Amp circuit breaker serving as a Main Breaker for high current AC power distribution systems. A Disconnect unit is required when 5-wire, 4/0 AWG feeder cables greater than 10 feet in length are connected from a house service greater than 400 Amps per phase to a portable power distribution system.

The S400 Disconnect interrupts the 3-phase current flow under fault conditions, preventing dangerous overloads of the feeder cables. The S400 Disconnect may be used with the PRG Series 400 Power and Data Distribution System, other power distribution systems, and with portable power sources (generators) as long as its ratings are not exceeded and an adequate Earth ground has been established.

### Features:

- + Six Cam-Lok Series E1016 high-current connections for power input.
- + Two sets of six Cam-Lok Series E1016 high-current connections for power output.
- + Double Neutral connectors to handle excessive neutral current generated by low power factor loads.
- + Seven digital LED meters to monitor power flow - three voltmeters to measure phase voltages and four current meters to measure current flowing in each phase and the neutral.
- + Neon indicators to show when feed cable is energized.
- + Adjustable control for setting inrush limit.
- + Five color coded, insulated test points for metering output voltages.
- + Multiple local convenience outlets.
- + Solid copper rigid bus bars and two thermostatically controlled cooling fans allow operation at 100% of Rated current.
- + Suitable for use in the U.S. and Canada, or any locality with a 5-wire, 120/208V power grid.



### Proper Use and Operation

Please observe the following safety, use and operational guidelines:

- + The S400 Disconnect is intended for dry locations only and must be protected from rain and other moisture if used outdoors.
- + Two S400 Disconnect racks may be stacked on top of each other. The upper rack's casters will nest on top of the lower rack. When stacking racks, use a strap to tie them together for stability.
- + The S400 Disconnect may be operated with the front cover in place for security or weather protection. The fans draw and exhaust to the rear of the rack.
- + The cooling fans turn on automatically when the internal bus bar temperatures exceed 135°F. This only happens when the S400 Disconnect rack is in the sun on a hot day or when it is loaded to its maximum. The fan may cycle on and off during normal operation.

## Controls and Indicators

The S400 Disconnect contains the following connections and LED indicators.

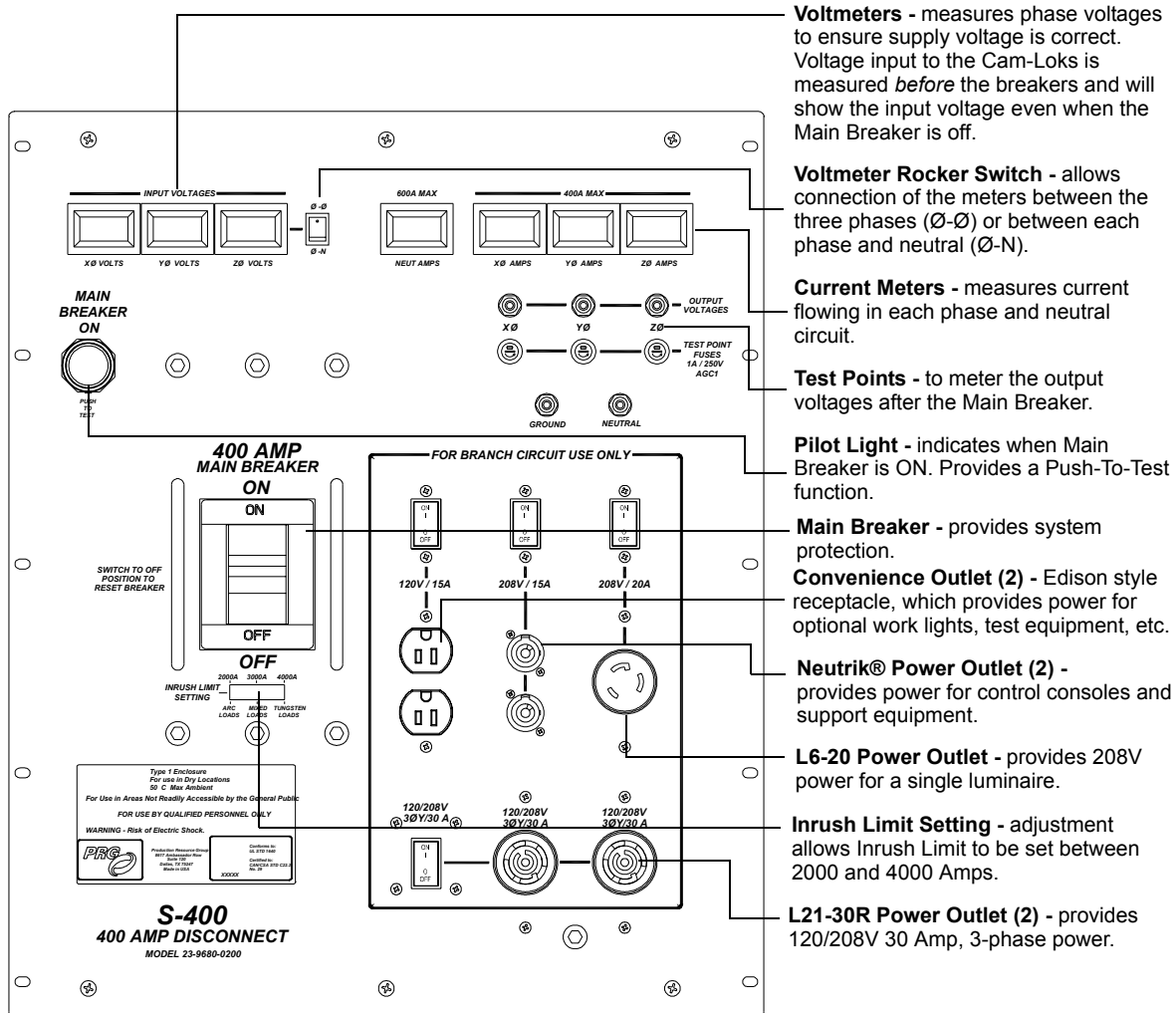


Figure 1: Series 400 Disconnect Front Panel

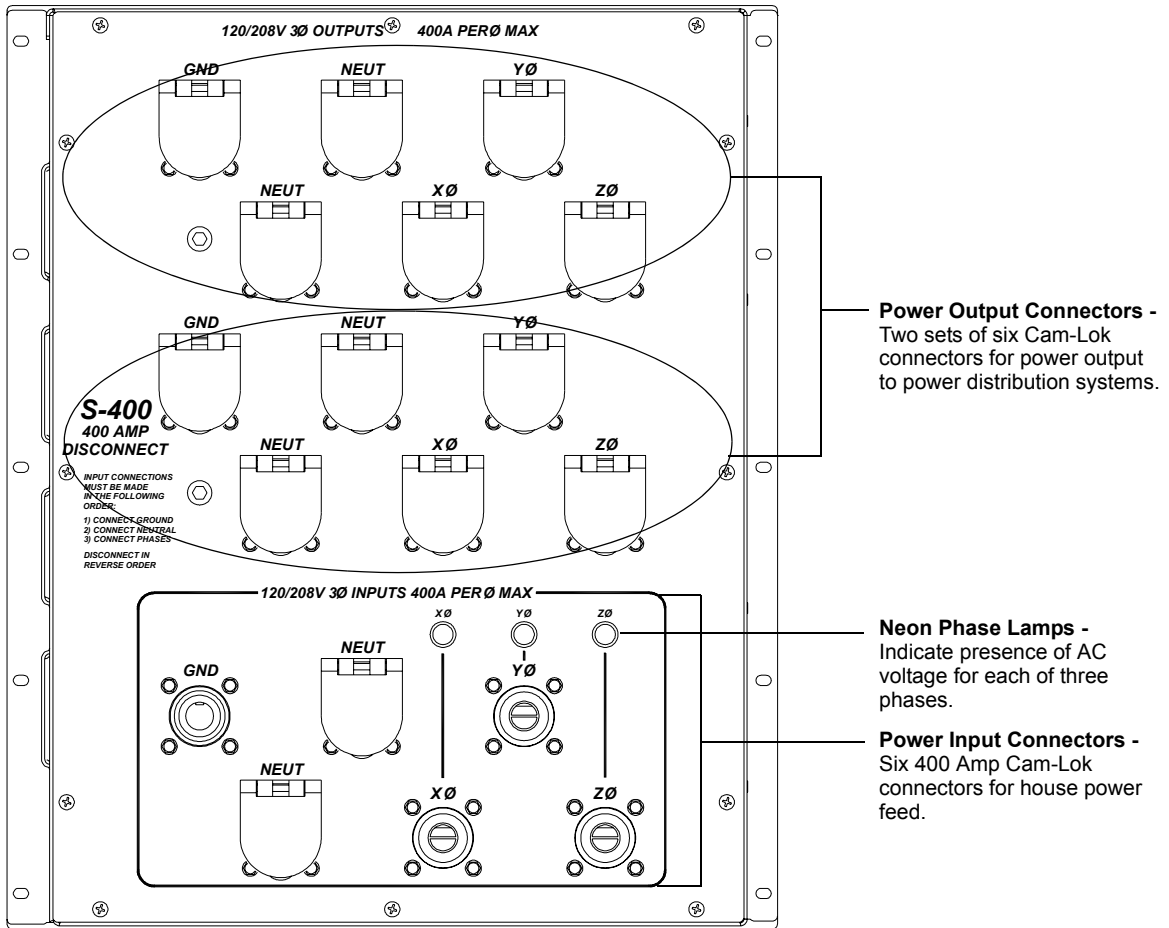


Figure 2: Series 400 Disconnect Rear Panel

# INSTALLATION

## Installing S400 Disconnect

The S400 Disconnect is installed between the house service and a portable power distribution system, such as the PRG Series 400 Power and Data Distribution System. It may also be used to protect a dimmer installation.



**CAUTION:** Before installing, refer to "Proper Use and Operation" on page 3.



**WARNING:** Ensure house service main breaker and S400 Disconnect breaker are OFF before connecting mains power cables. Ground should always be connected first.

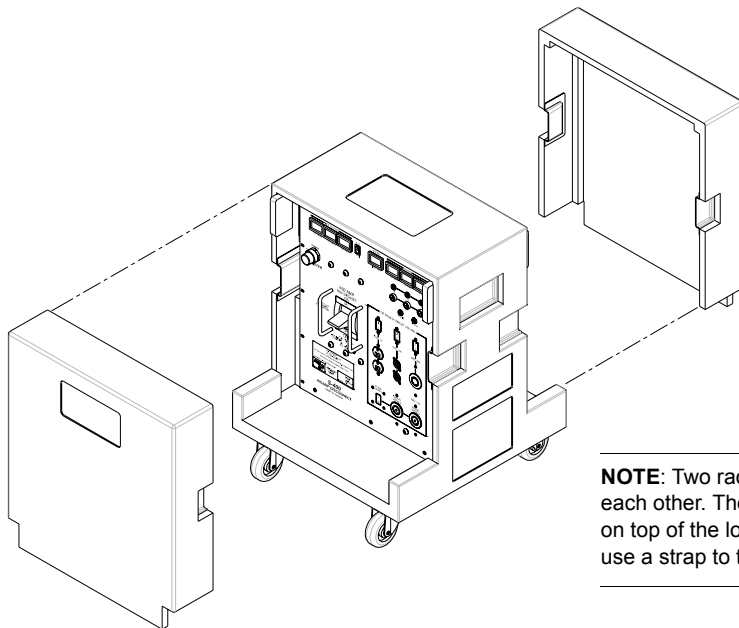
### To install:

- Step 1. At house service main breaker, turn power OFF.
- Step 2. Meter voltage at the input of the house disconnect to ensure that all voltages are correct. Phase-to-phase voltages should be 208 Volts +/- 8 Volts. The voltage between Neutral and Ground should be less than 5 Volts.



**CAUTION:** If the house breaker has a capacity greater than 400 Amps per phase, the pigtails connecting the S400 Disconnect cannot be longer than 10 feet.

- Step 3. Connect Cam-Lok 5-wire pigtails to house breaker output terminals. Ensure connections are tight to avoid heating of the connections.
- Step 4. Place S400 Disconnect in desired location and remove front and back covers (**Figure 3**).



**NOTE:** Two racks may be stacked on top of each other. The upper rack's casters will nest on top of the lower rack. When stacking racks, use a strap to tie them together for stability.

Figure 3: Removing Disconnect Rack Covers



- Step 5. Ensure that Main Breaker is switched OFF (**Figure 4**).
- Step 6. At INPUTS, connect input power cable Cam-Loks in the following order:  
 1) Ground, 2) Neutral 3) X Phase, 4) Y Phase, and 5) Z Phase.

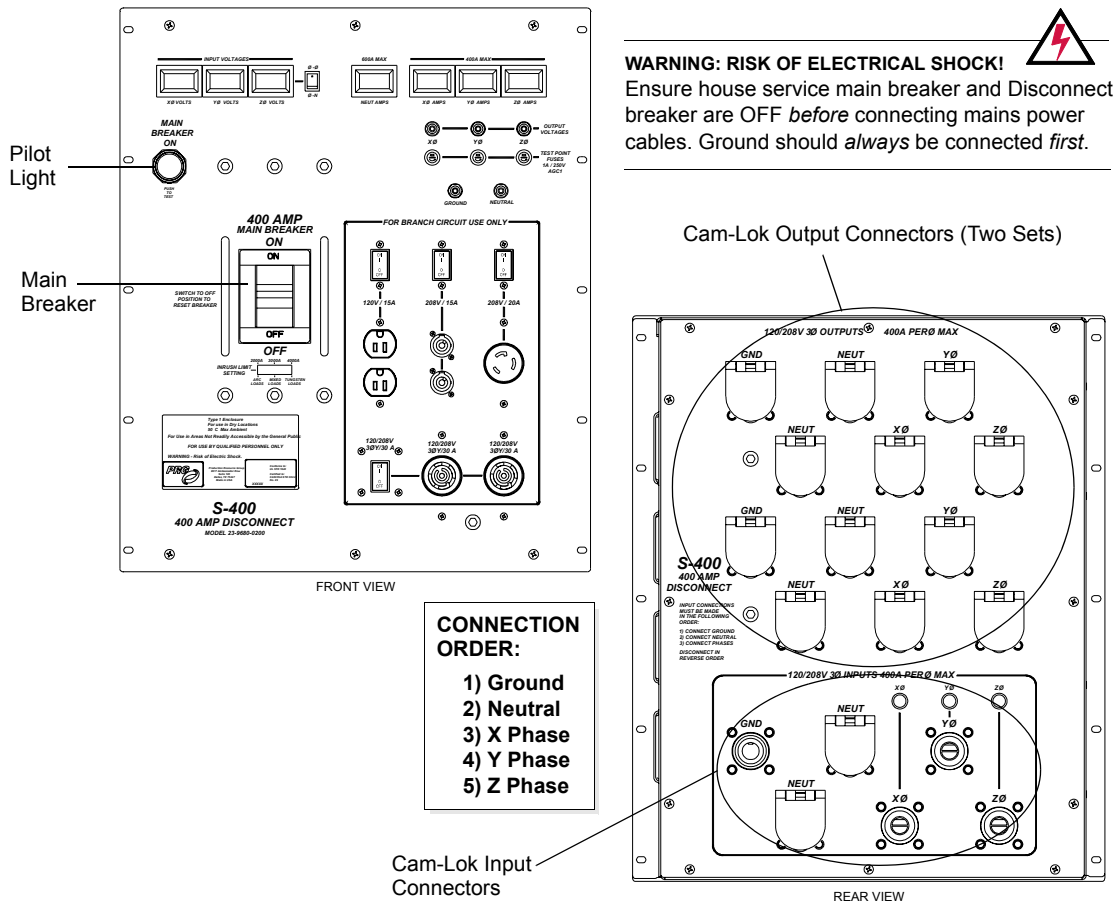


Figure 4: Turning Off Main Breaker and Connecting Cam-Loks

- Step 7. At OUTPUTS, connect output power cable Cam-Loks from power distribution equipment in the following order: 1) Ground, 2) Neutral 3) X Phase, 4) Y Phase, and 5) Z Phase.

**Note:** Two complete sets of OUTPUT Cam-Lok connectors are provided in order to connect two separate power distribution systems.

**Note:** A double set of Neutral connections are provided in the INPUT and OUTPUT Cam-Lok sets for use with low power factor loads, such as dimmers. Since low power factor loads cause large neutral currents, the Disconnect is designed to handle up to 600 Amps of Neutral current if the input and Output cable sets have two Neutral conductors each. The double set of Neutral cables must be 4/0.

## Set the Inrush Current Limit:

Some loads, such as incandescent lamps or electric motors, can draw a large surge of current through the Main Breaker when they are quickly energized with voltage. When the Inrush Current Limit of the Main Breaker is exceeded, the Breaker will trip within a half cycle of the AC line. It is important that the Inrush Current Limit be properly adjusted so that these normal, but large surges do not cause nuisance tripping of the Main Breaker.



**CAUTION:** 1) If the Inrush Current Limit is set too high, the Main Breaker may not respond quickly enough to a hard fault in the output cables feeding the load resulting in excessive damage to the cables. 2) DO NOT adjust the Inrush Setting while the unit is under load.

### Recommended Settings...

- + For loads consisting mainly of arc lamp power supplies, set the Inrush Limit to its minimum of 2000 Amps.
- + For loads consisting mainly of high wattage incandescent lamps, set the Inrush Limit to 4000 Amps.
- + For mixed loads, try an intermediate setting near 3000 Amps.

**Note:** It is important to note that this setting applies to INRUSH and not OVERALL amperage. For example, setting the inrush to 2000 amps does not mean that the switch will now trip at a normal load of 200 amps-per-leg instead of 400 amps-per-leg.

Once the load system is installed, connected and ready to test, "bump" the entire cold load to make sure the Main Breaker does not trip. If it trips, increase the Inrush setting moderately, then wait 5 minutes for the lamps to cool and "bump the system again.

Step 1. Set Inrush Current Limit considering the type of load that the Disconnect will be protecting (refer to guidelines above). The Inrush Current Limit adjustment is located directly below the Main Breaker handle (**Figure 5**) and is adjusted by inserting a flat blade screwdriver into the vertical slot of the curved, recessed control. Moving the control to the left reduces the Main Breaker's tolerance of inrush current and moving it to the right increases the Main Breaker's tolerance.

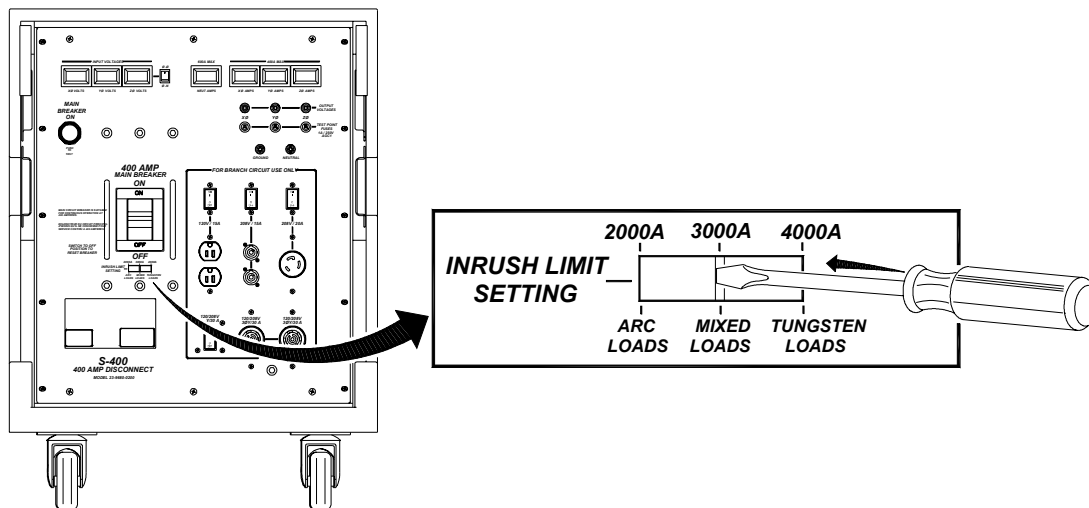


Figure 5: Inrush Limit Setting Switch

## Power Up Sequence

Use the following procedure to power up unit:

- Step 1. At house service main breaker, turn power ON.
- Step 2. At rear of Disconnect, verify all phase indicators are lit (**Figure 6**).

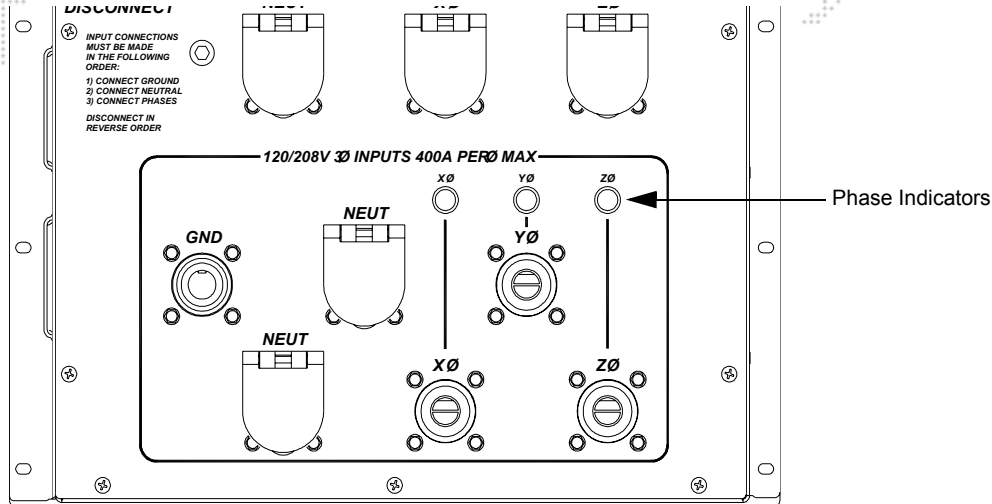


Figure 6: Phase Indicators Location

- Step 3. At front of Disconnect, check AC voltmeters. Voltages should read as follows:

Voltmeter Connection	Voltage
Neutral to X	120V ± 5V
Neutral to Y	120V ± 5V
Neutral to Z	120V ± 5V
X to Y	208V ± 8V
Y to Z	208V ± 8V
Z to X	208V ± 8V

- Step 4. If meter readings are nominal, switch Main Breaker to the ON position (**Figure 4**).
- Step 5. Verify that test point readings match LED meter readings for proper voltage. *Note:* Since the test points are *after* the Main Breaker, their voltages may be slightly lower than those indicated by the digital meters when the Disconnect is under load. This is due to the internal resistance of the breaker causing a slight voltage drop when current flows through it.

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**Note:** The Pilot Light indicates when Main Breaker is energized (**Figure 4**). Press to test LED before Main Breaker is "ON."

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## MAINTENANCE

### Cleaning/Replacing Rack Air Filters

The air filters, located in the interior rack assembly, will require periodic cleaning. The frequency will depend on the amount of use and/or exposure to dusty environments.

#### Parts:

40.7155.0120.0 FILTER, FAN 120MM, MESH ALUMINUM

#### Tools:

#2 slotted screwdriver



**WARNING:** Remove power from rack before performing any maintenance procedures.

#### To clean/replace rack air filters:

- Step 1. Disconnect ALL power from rack.
- Step 2. Remove rack assembly from rolling rack case by removing ten 10-32 x 1/2" PTB black zinc screws.
- Step 3. Using screwdriver, free filter from enclosure.
- Step 4. Clean filter with soap and water. Dry thoroughly.
- Step 5. Re-install filter.
- Step 6. Re-install rack assembly into rolling rack case.

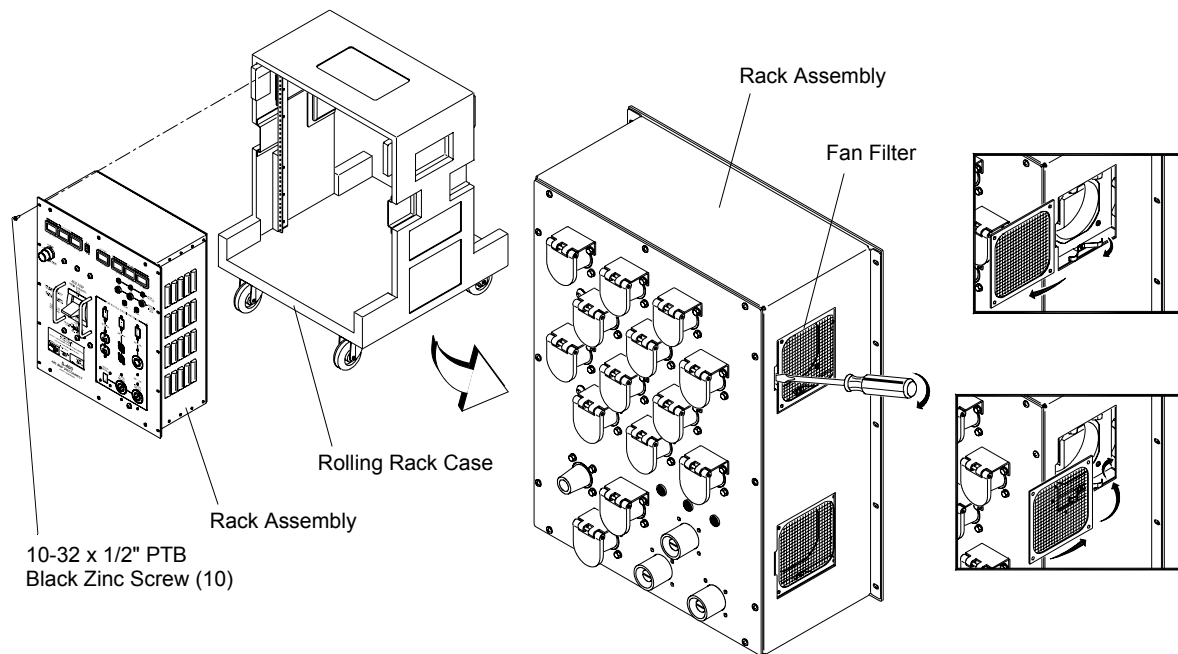


Figure 7: Removing Rack Air Filters



## SPECIFICATIONS

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### Technical Specifications

#### RATINGS and AMPACITY

Voltage Rating:	120/208V 3-phase wye with Neutral and Ground
Line Frequency:	50 - 60 Hz
Current Rating, Phases:	400 Amps per phase continuous
Current Rating, Neutral:	600 Amps continuous
Current Rating, Ground:	400 Amps
Fault Current Interrupting Capacity:	42,000 Amps
Fault Current Interrupt Time:	Circuit clears in less than one line cycle

#### MAIN BREAKER

Type:	Thermal-Magnetic, Square D Model LAL36400
Number of Poles:	3
Voltage Rating:	600V AC
Current Rating:	400 Amps
Inrush Overload Limit:	Adjustable from 2000A to 4000A

#### DIGITAL LED METERS (7)

Update Rate:	2.5 samples/sec.
Display:	3-digit reading

#### INPUT VOLTMETERS (3)

Accuracy:	$\pm 1$ Volt
Input Range:	85 - 264 Volts AC
Overload Protection:	300V AC

#### OUTPUT AMMETERS (4)

Phase Current Meters full scale reading:	400 Amps
Neutral Current Meter full scale reading:	600 Amps
Overcurrent Rating:	1.5X rated full scale reading
Accuracy (sine wave):	$\pm 0.15\%$ of full scale or $\pm 6$ counts

#### ENVIRONMENTAL

Operational Temp. Range:	-20° C to +50° C
Cooling:	Two thermostatically controlled fans
Installation:	For Dry Locations Only

#### DIMENSIONS and WEIGHT

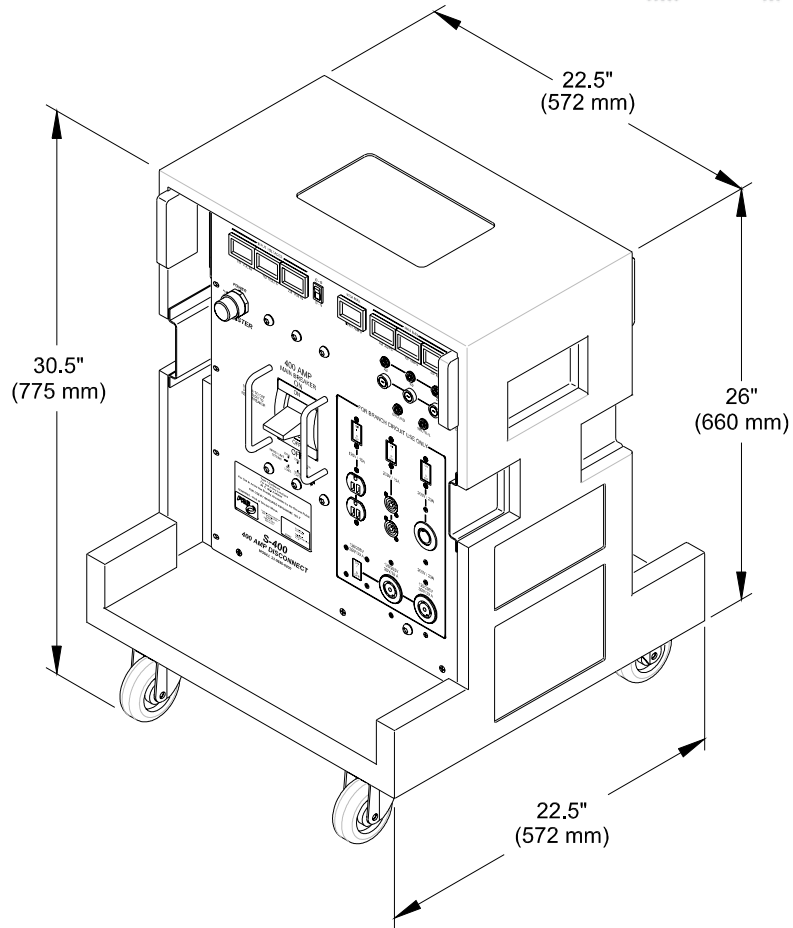
Unit in Rolling Rack:	22.5"(L) x 22.5"(W) x 30.5"(H)
Stand-Alone Panel w/o Rack:	8.5"(D) x 19"(W) x 23.5"(H)
Weight:	153 lbs. with Rack / 79 lbs. without Rack

**COMPLIANCE**

UL Standard 1640

Canadian Standard CAN/CSA STD C22.2 No.29

Intertek ETL Safety Mark





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