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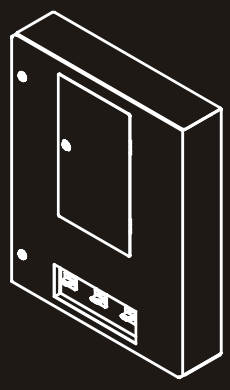
Smart-UPS® VT Service Bypass Panel with Power Distribution (wall)

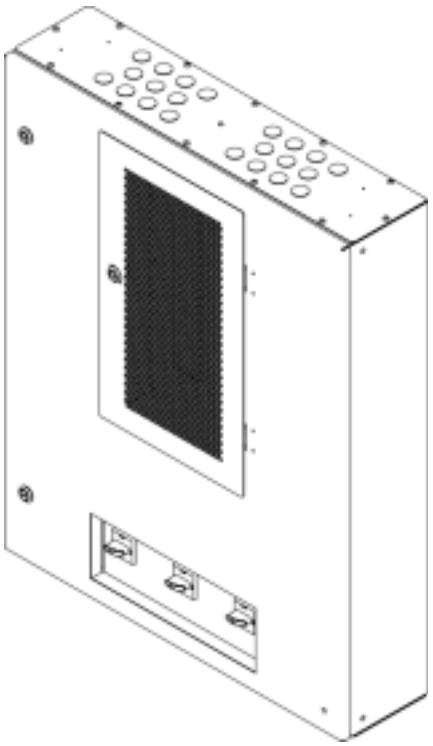
10-30kVA
208V

Installation and Operation Manual



Smart-UPS® VT Service Bypass Panel with Power Distribution (wall-mount)

Installation and Operation Manual



IMPORTANT SAFETY INSTRUCTIONS - SAVE THESE INSTRUCTIONS

This manual contains important instructions for the SUVT series that should be followed during installation and maintenance of the Service Bypass Panel (SBP) with Power Distribution.

Contents

Safety

SAVE THESE INSTRUCTIONS

This manual contains important instructions for the SUVT series that should be followed when handling the Service Bypass Panel (SBP) with Power Distribution (wall-mount).

Safety warnings

WARNING!

Only APC-trained personnel who are familiar with the construction and operation of this equipment, as well as the mechanical and electrical hazards involved, may perform this installation.

WARNING!

This installation must comply with the requirements of ANSI/NFPA 75 and NEC/ NFPA 79 Art. 645.

WARNING!

All safety codes, safety standards, and other regulations must be strictly observed during installation and ongoing maintenance of this equipment.

WARNING!

Prior to installing the Smart-UPS VT SBP with Power Distribution, de-energize all external power being supplied to the UPS!

WARNING!

Ensure that no electrical power is connected to the SBP, and that all switches are in the OFF position before installing or servicing this unit!

WARNING!

All wiring instructions must be followed precisely. Failure to comply could result in permanent damage to the equipment!

WARNING!

When installing this unit to a wall, avoid contact with previously installed electrical wires and other potential hazards that might be embedded in the wall!

Live maintenance precautions

APC does NOT recommend performing live maintenance to the SBP. However, APC is aware that due to the critical nature of data center loads, live maintenance may occur. If providing live maintenance, observe the following precautions to reduce the risk of electrical shock.

Caution

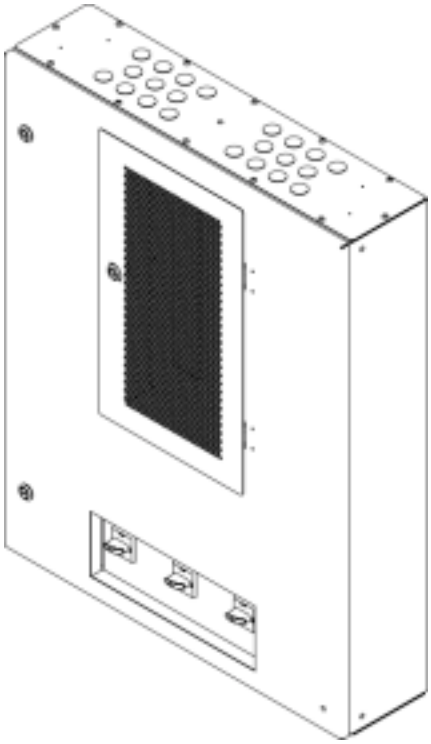
1. Never work alone.
2. Only a certified electrician who is trained in the hazards of live electrical installation should perform the maintenance.
3. Know the procedure for disconnecting electricity to the SBP and to the data center in the event of an emergency.
4. Use rubber-insulated gloves and rubber-insulated boots.
5. Use double-insulated tools. If double-insulated tools are not available, insulate all tools with electrical tape.
6. Use electrical tape to insulate any non-insulated conductive parts.

Introduction

This manual provides step-by-step instruction on how to install and operate the wall-mount version of the Smart-UPS® VT Service Bypass Panel (SBP) with Power Distribution. This UL-listed unit was designed to operate in conjunction with the Smart-UPS® VT 10-30kVA, 280V UPS.

The lower section of the SBP contains switches that facilitate the transfer of power from the UPS to bypass operation to allow maintenance to be performed on the UPS. The upper section houses a 42-position panel board for distributing power to load. The panel board can support 1-, 2-, and 3-pole breakers.

Read these instructions carefully, and observe all safety warnings and other precautions. Should you require any installation/operation supervision, service, parts, accessories, or maintenance, call the appropriate APC phone number (refer to the back cover of this manual).



See also

- **Refer to the Smart-UPS VT 10-30kVA, 208V Installation Manual (p/n 990-1598) for INSTALLATION-specific information relating to the SUVT series UPS.**
- **Refer to the Smart-UPS VT 10-30kVA, 208V Operation Manual (p/n 990-1599) for OPERATION-specific information relating to the SUVT series UPS.**

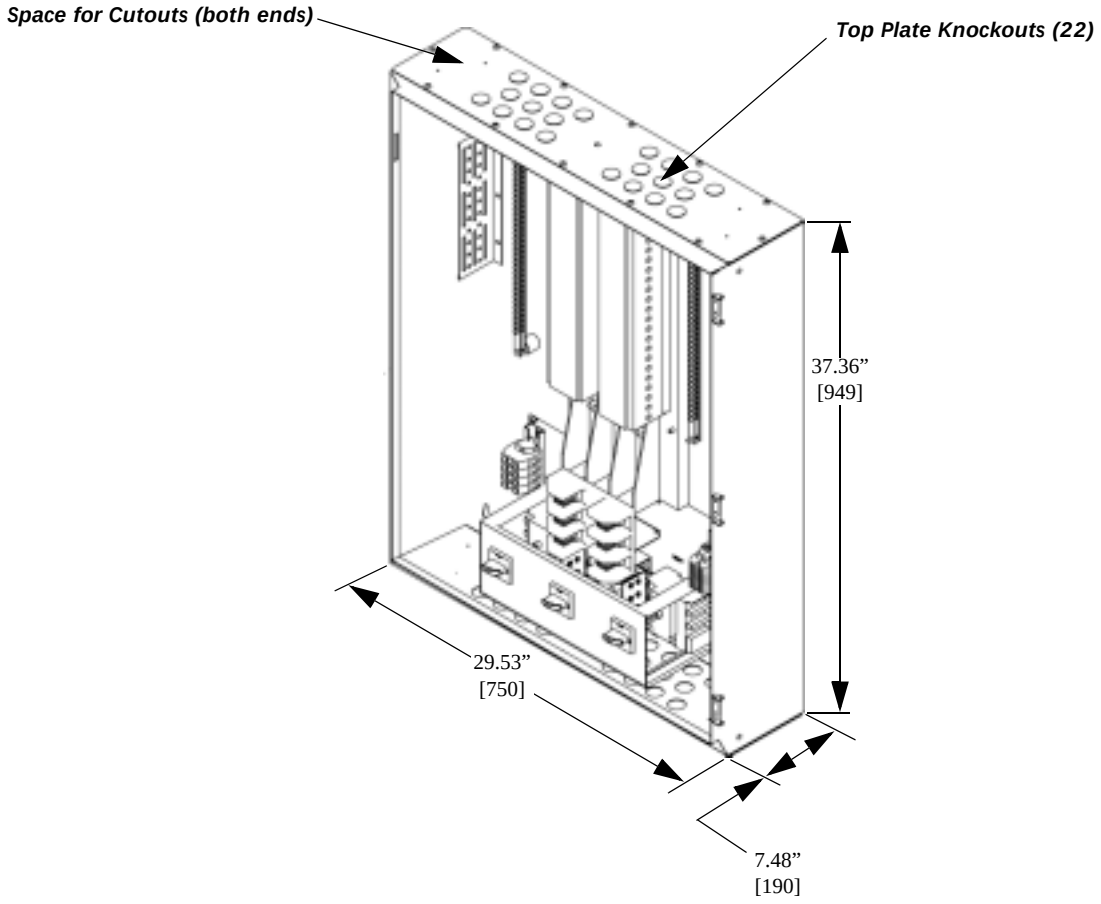
Product Overview

Features

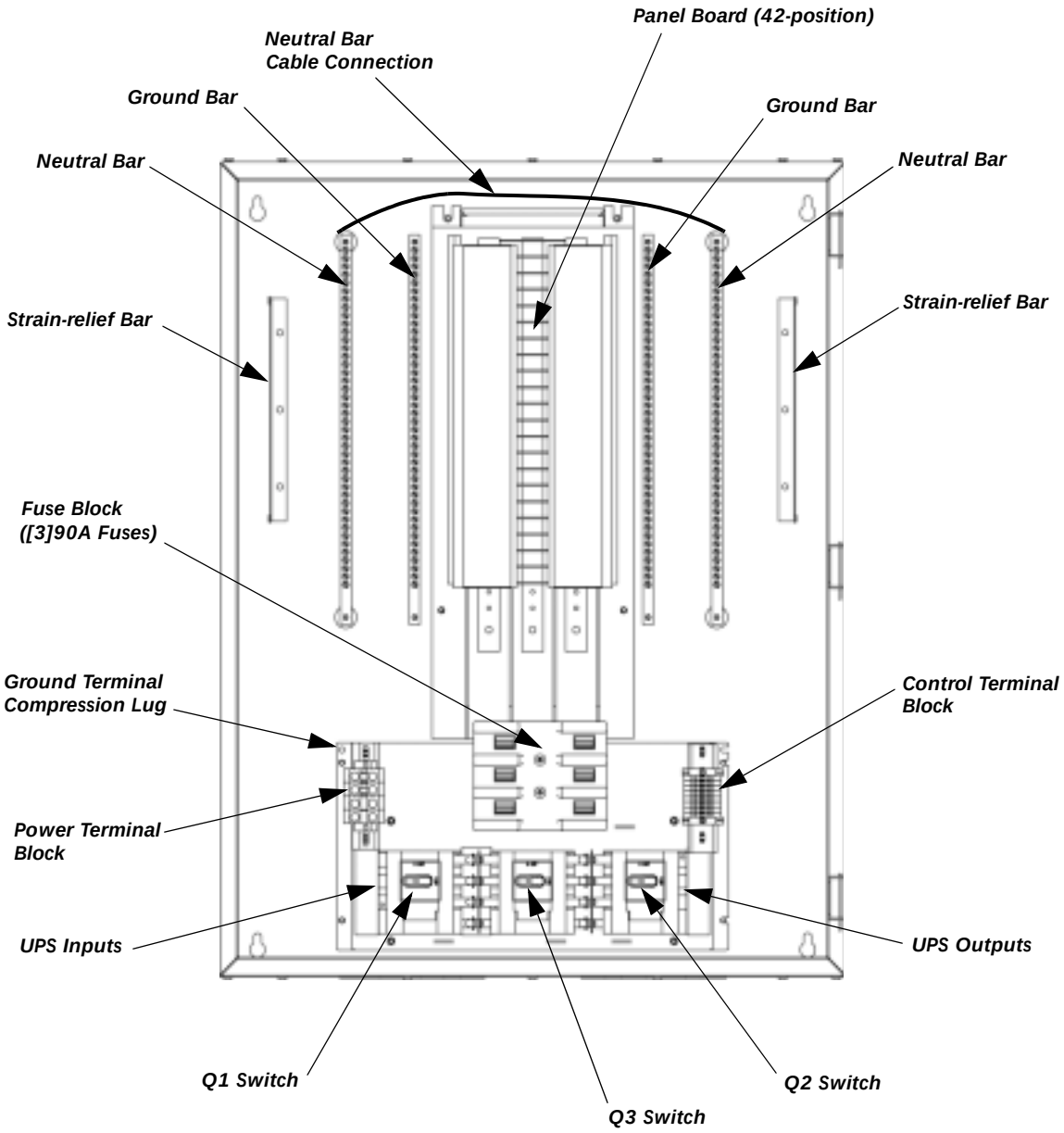
The wall-mount version of the Smart-UPS® VT Service Bypass Panel (SBP) with Power Distribution combines bypass functionality with power distribution capability in a common enclosure. The unit measures 37.36in [949mm] high x 29.53in [750mm] wide x 7.48in [190mm] deep, and weighs approximately 120lbs [54.5kg]. The SBP can be installed quickly and easily to almost any type of sturdy wall structure (refer to “Mounting the SBP” on page 10).

Product SKU	Input	Output
SBPSU10K30FC1M1-WP	81.3A, 208/120V, 3-Phase, 50/60Hz	83.3A, 208/120V, 3-Phase, 50/60Hz

The SBP enclosure supports both top and bottom cable entry. There are twenty-two (22) 1-inch [25.4mm] knockouts in the top and bottom plates (44 knockouts total). Space has additionally been provided at the far ends of these plates to accommodate larger cutouts. The unit also contains three (3) 90A fuses that provide over-current and short-circuit protection.



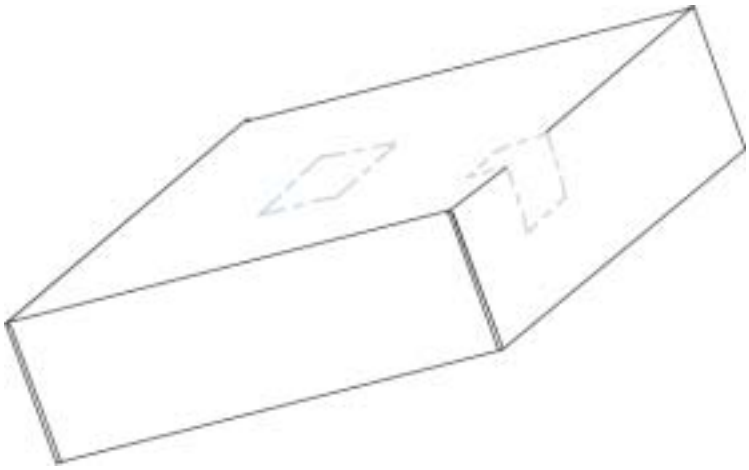
Internal components



Shipping and Receiving

Shipping

The wall-mount version of the Smart-UPS VT SBP with Power Distribution is shipped in a corrugated box, and protected during shipment by specially designed internal packaging. Front door keys and all appropriate documentation are stored in a plastic sleeve inside the box.



Receiving

1. Upon receipt, inspect the box for obvious signs of rough handling/external damage.
2. Transport the box to the installation site using a dolly or a hand-truck. The box is relatively heavy (weighing approx. 120lbs [54.5kg]), so DO NOT lift with less than three people.
3. At the installation site, open the box and remove the SBP enclosure.
4. Use the enclosed keys to open the front door, and then conduct an internal inspection of the unit.
5. Record any damages observed and call the carrier immediately to allow their personnel to conduct an equipment inspection, if necessary.
   - *Do NOT contact APC first — notify the carrier instead. Otherwise, APC may be unable to assist in recovering the realized amount of the claim.*
   - *All damage claims should be as specific as possible.*
   - *BE SURE to request a copy of the carrier's inspection report.*

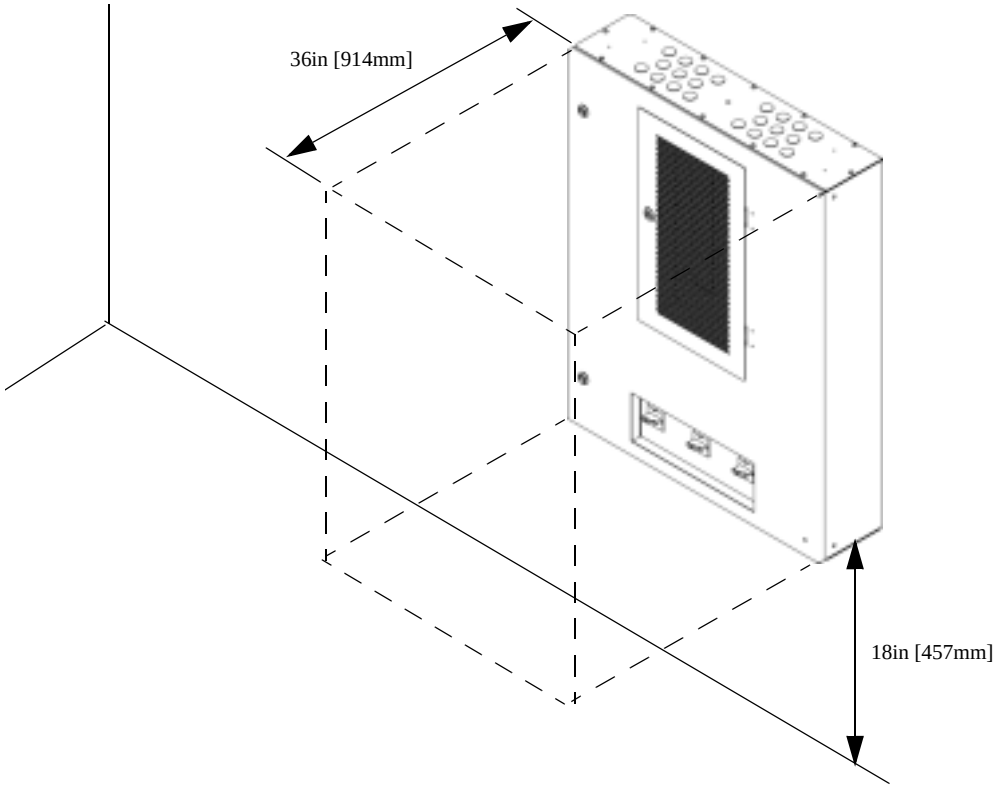
Considerations

Environmental

- The wall area selected for the SBP installation must be structurally sound and able to accommodate the size and weight of the unit. Refer to “Mounting the SBP” on page 10.
- The SBP should be kept in a climate-controlled environment having a temperature range of 0° to 40°C [32° to 104°F] and a relative humidity of 0% to 95%, non-condensing.
- The SBP must be protected at all times from excessive moisture, construction dirt, corrosive elements, and other contaminants.

Spacing

- The SBP should *ideally* be installed in the general vicinity of the UPS.
- There should be a minimum of 36 inches [914mm] clearance directly in FRONT of the SBP to accommodate installation, servicing, and access to the panel board.
- The BOTTOM of the SBP should be positioned at least 18 inches [457mm] from the floor. Consider also that the highest panel board breakers must be accessible.



Installation

Overview

WARNING!
Review "Safety" on page 1 before starting this installation. Pay strict attention to all safety warning and caution notices!

- ALL INTERNAL cable connections were made prior to shipment.
- EXTERNAL cable connections with the UPS need to be made on-site. EXTERNAL cable connections *from the utility* also need to be made on-site. EXTERNAL cable is *not supplied*.
- Control wire connections between the UPS and the SBP additionally need to be made on-site. Control wires are *not supplied.*
- Panel board breakers and tie-wraps are *not supplied*.

Tools

The following tools are required for this installation:

- Dolly/hand-truck
- Tape measure
- Pliers
- Level
- Marker
- Drill
- M10 nut driver
- Standard (flathead) screwdriver
- Phillips screwdriver
- T30 Torx screwdriver
- 4mm Allen wrench
- 1/2" socket with ratchet

Torque values

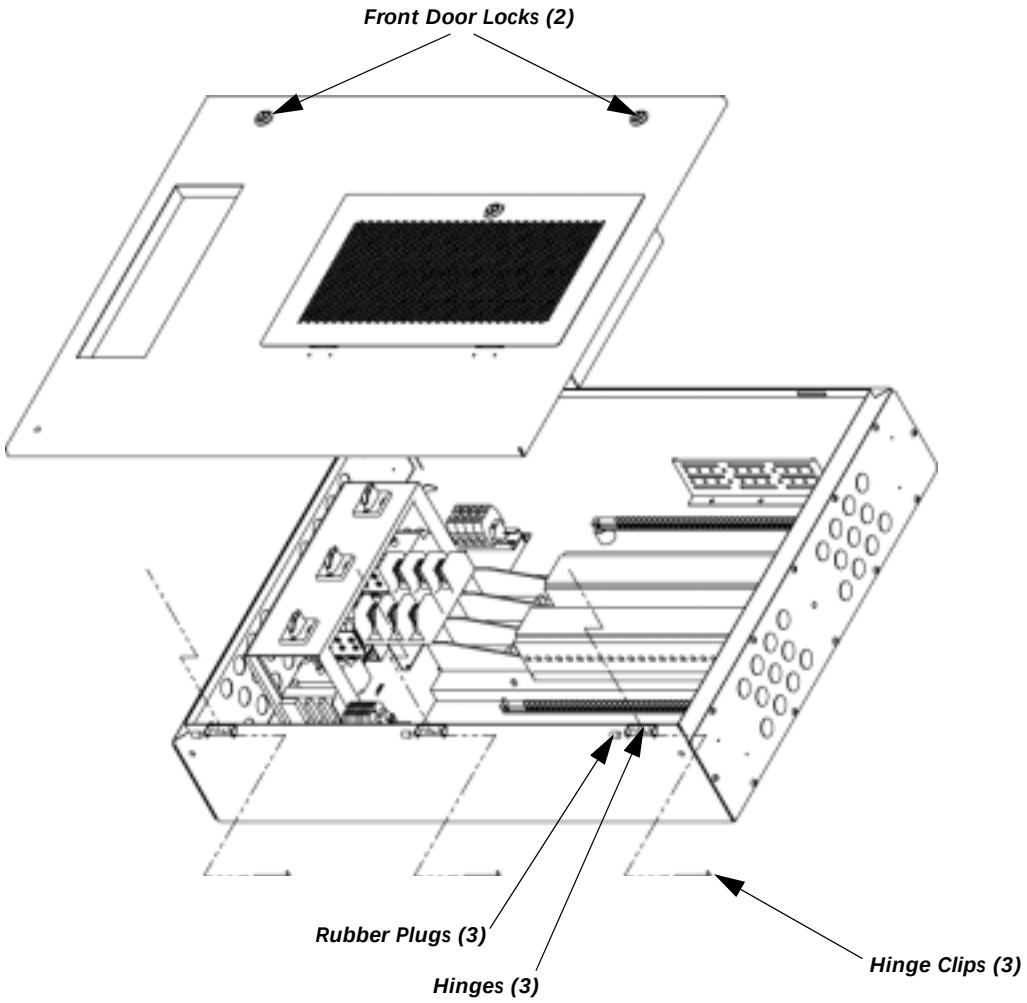
Proper torque values are specified throughout this manual.

Removing the front door (optional)

Note

Front door removal is NOT a requirement for this installation. However, removing the door will allow better access to the internal components.

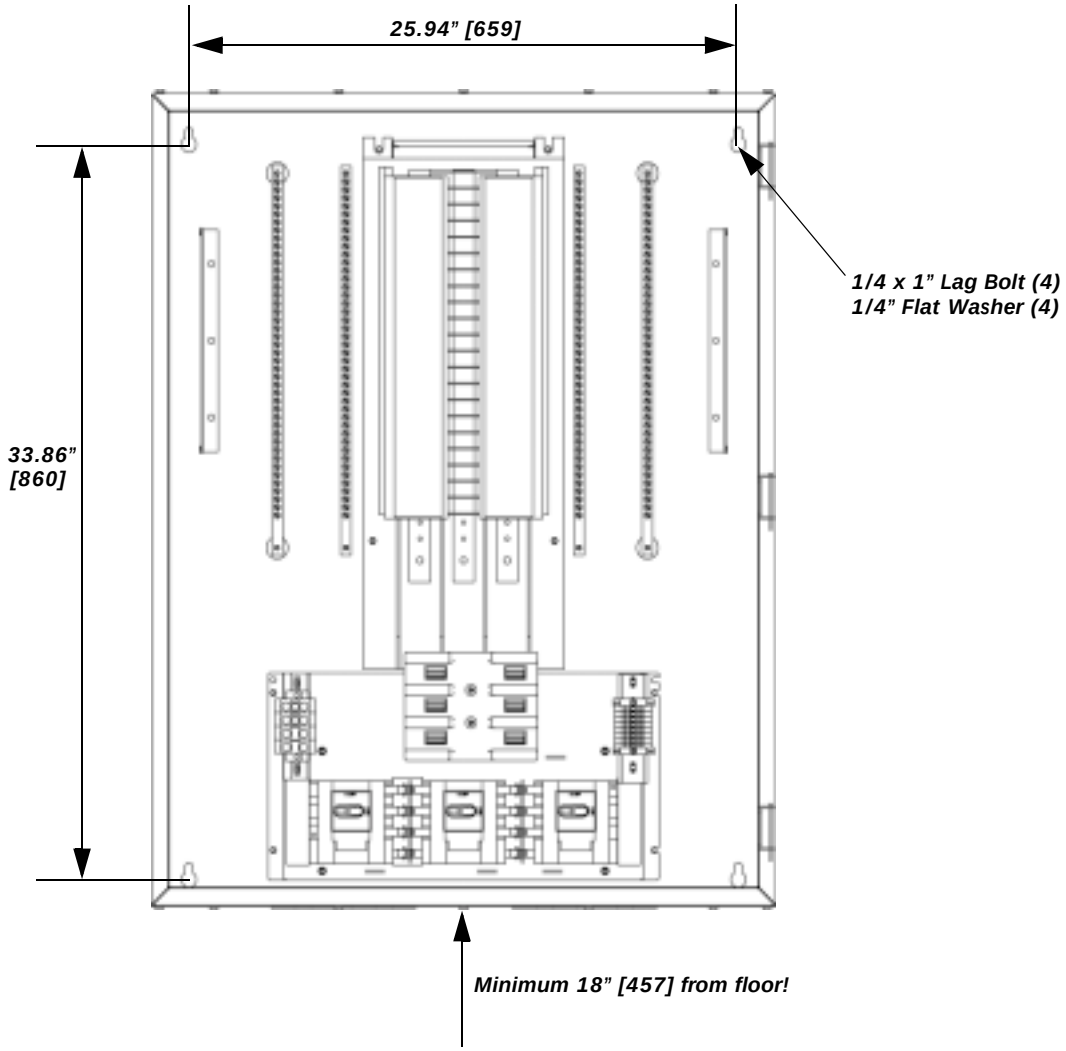
1. Place the SBP on its back such that its front door is facing straight up.
2. Use the enclosed keys to unlock and then open the front door.
3. Disconnect the internal ground cable from the ground stud on the door. Use an M10 nut driver to remove the M6 flange nut securing the cable to the stud.
4. Using your thumb and forefinger, pull the three (3) rubber plugs off the bottom ends of the three (3) hinge clips.
5. Using pliers, remove the three (3) hinge clips connecting the door to the enclosure.
6. Remove the door. Store the door and all hardware in a safe location for later re-attachment.



Mounting the SBP

APC recommends mounting the SBP to 3/4” plywood backing (36in [914mm] L x 28in [711mm] W).

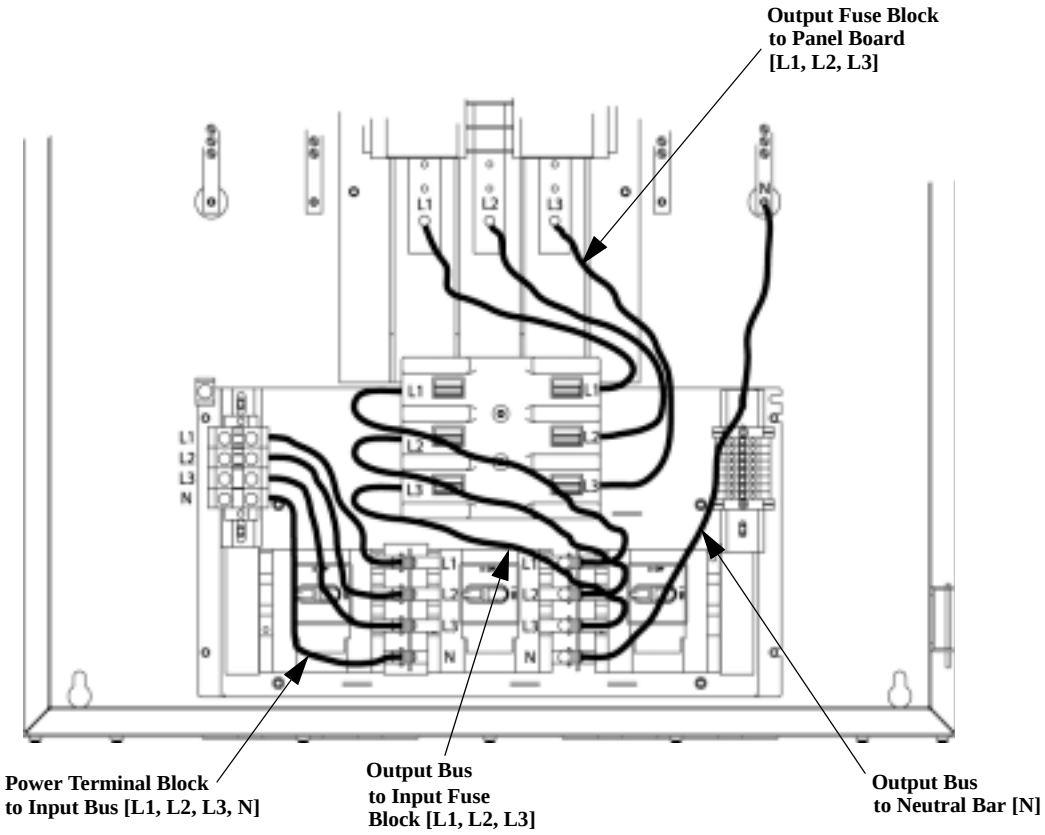
1. Attach the 3/4” plywood securely to the designated wall area. The wall should be strong enough to support the 120lb [54.5kg] SBP. Leave at least 18in [457mm] of space between the floor and the bottom of the plywood. Use appropriate hardware for the type of wall employed.
2. Measure and mark four (4) mounting-hole locations on the plywood backing. The locations will be in the shape of a rectangle measuring 25.94in [659mm] across and 33.86in [860mm] down.
3. Drill starter holes in each of the four (4) marked locations.
4. At least three (3) people are needed to lift the SBP and position it against the plywood backing. Line up the SBP’s four (4) mounting holes with the four (4) drilled starter holes.
5. Screw four (4) 1/4 x 1” hex-head lag bolts, along with four (4) 1/4” flat washers, into the holes. Use a 1/2” socket with ratchet and bind until rigid.



Internal cable connections

For the convenience of the installer, ALL internal SBP cable connections were made prior to shipment. Check to make certain the following internal cable connections were completed:

- Power Terminal Block [L1, L2, L3, N, top-to-bottom] to Input Bus [L1, L2, L3, N, top-to-bottom]
- Output Bus [L1, L2, L3, top-to-bottom] to Input Fuse Block [L1, L2, L3, top-to-bottom]
- Output Bus [N] to Neutral Bar [N]
- Output Fuse Block [L1, L2, L3, top-to-bottom] to Panel Board [L1, L2, L3, left-to-right]
- Neutral Bar [N] to Neutral Bar [N] (refer to “Internal components” on page 5)
- Control Terminal Block to Q1 contacts [1, 2], Q2 contacts [3, 4], Q3 contacts [5, 6], and Auxiliary contacts [7, 8] (refer to “Appendix A: SBP Schematic” on page 19)



Making external cable connections

External cables can enter the SBP through any of the available 1-inch [25.4mm] knockouts, or by making larger cutouts in the top or bottom plates of the enclosure. Each plate offers 22 knockouts and the ability to create up to four (4) 2-inch [50.8mm] cutouts.

Prior to making any of the following external cable connections, establish an appropriate point of access by knocking out a 1-inch hole or cutting a larger hole in the top or bottom plate. The plate can be removed using a Phillips screwdriver to loosen the 12 screws securing it to the frame. An M10 nut driver is needed to remove the M6 flange nut securing the ground cable to the plate's ground stud.

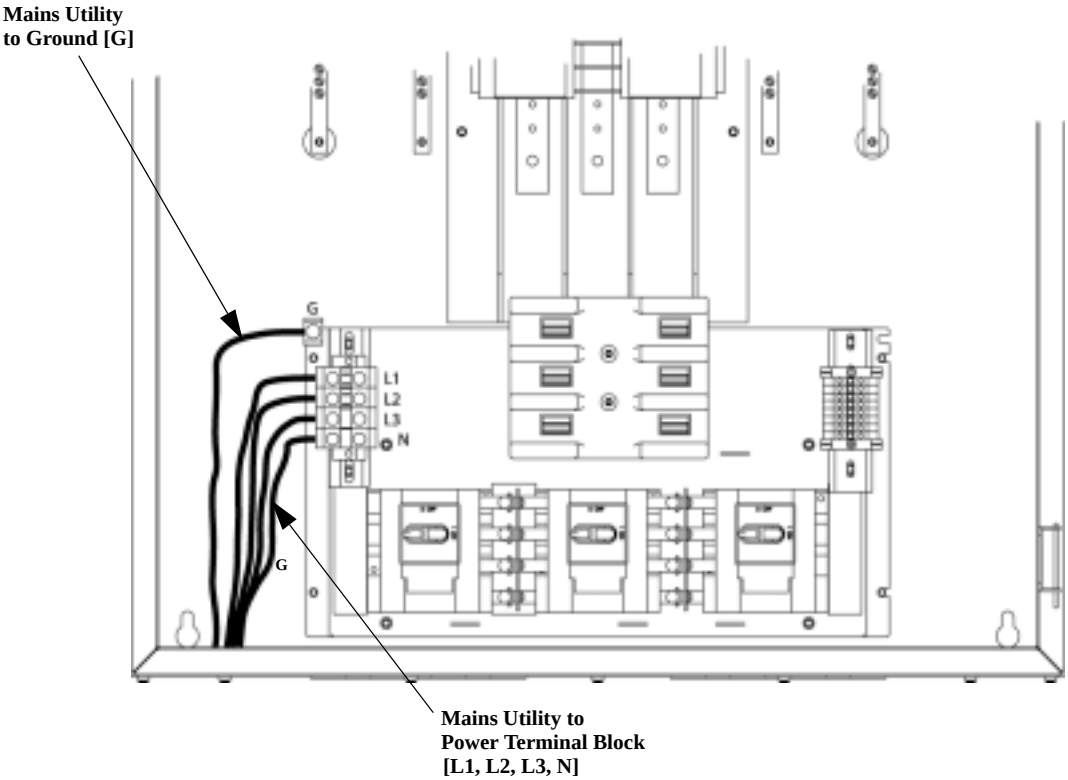
The cables are typically color coded: L1 = black, L2 = red, L3 = blue, N = white, and G = green.

Utility connections.

Note

Utility cables can enter through the top or the bottom of the SBP. However, BOTTOM is recommended.

1. Connect the four (4) inputs [L1, L2, L3, N, top-to-bottom] from the Mains Utility to the Power Terminal Block. Use a standard (flathead) screwdriver and torque to 60 in-lbs [6.78 Nm].
2. Connect the one (1) ground input [G] from the Mains Utility to the Ground Terminal Compression Lug. Place the cable end in the bottom section of the compression lug, and then use a standard (flathead) screwdriver and torque to 240 in-lbs [27.12 Nm].

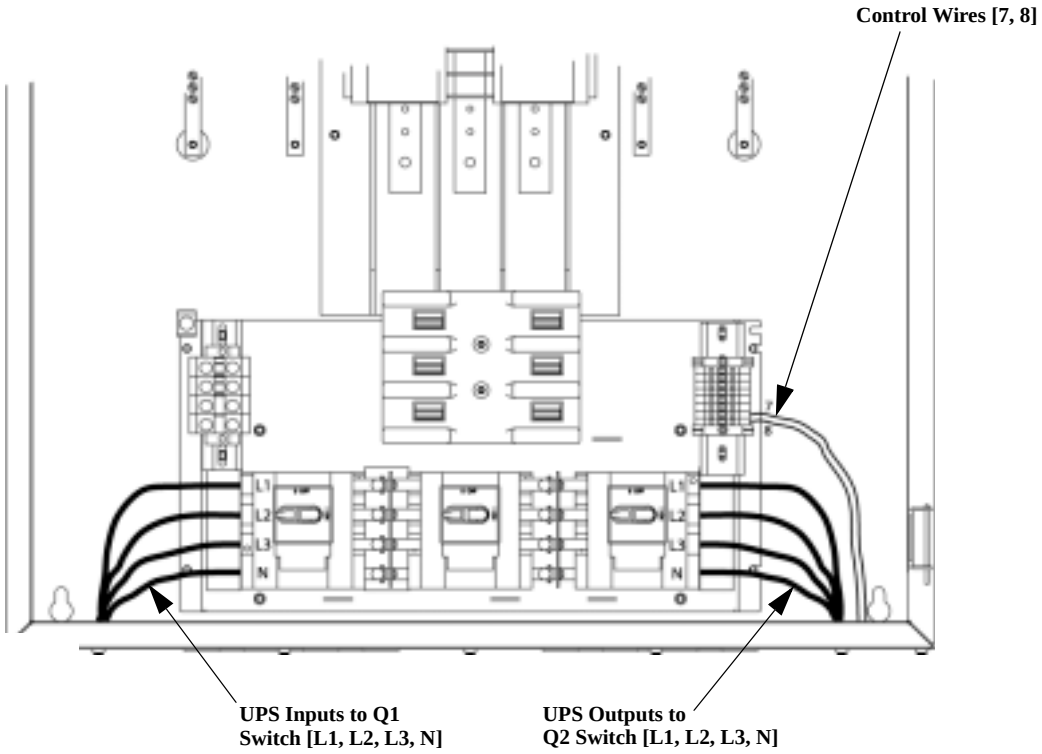


UPS connections.

Note

- **UPS cables can enter through the top or the bottom of the SBP. However, BOTTOM is recommended.**
- **Refer to the Smart-UPS VT 10-30kVA, 208V Installation Manual (p/n 990-1598) for SBP cable connections at the UPS.**

1. Connect the four (4) UPS inputs [L1, L2, L3, N, top-to-bottom] to the Q1 Switch in the SBP. Use a 4mm Allen wrench and torque to 24 in-lbs [2.71 Nm].
2. Connect the four (4) UPS outputs [L1, L2, L3, N, top-to-bottom] to the Q2 Switch in the SBP. Use a 4mm Allen wrench and torque to 24 in-lbs [2.71 Nm].
3. Connect the two (2) UPS control wires to Pins 7 and 8 in the SBP Control Terminal Block. Use a standard (flathead) screwdriver and make the screws hand-tight.

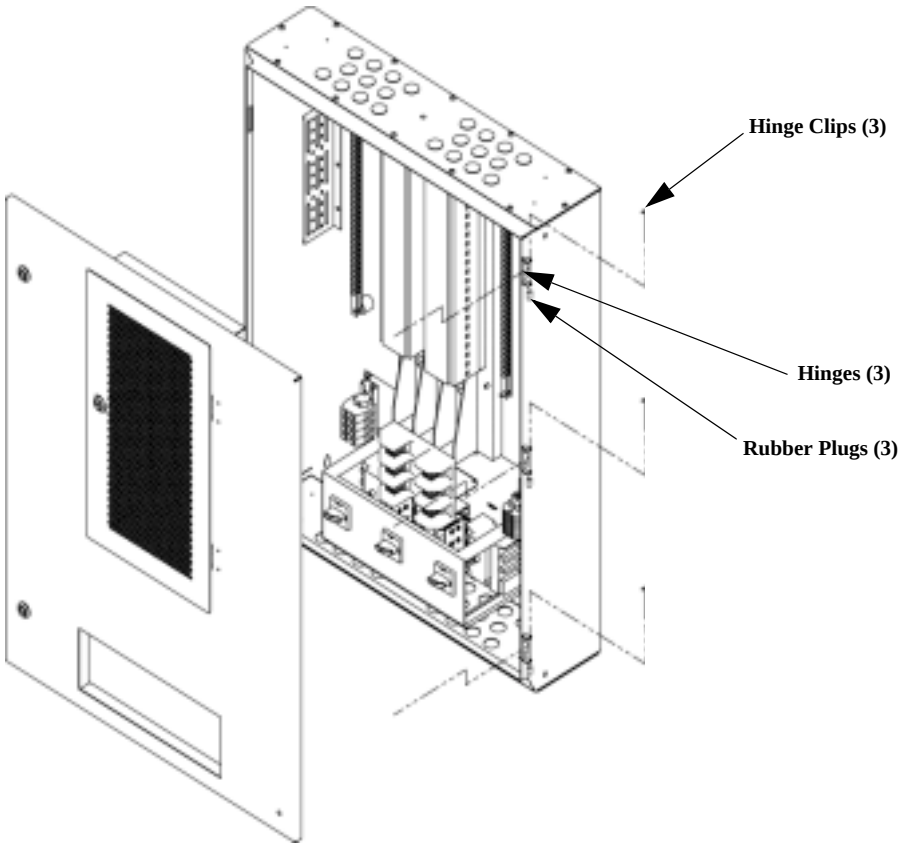


Re-attaching the front door

Note

- **This section applies only if the front door was removed at the start of the installation process. If you chose not to remove the door, ignore this section.**
- **Re-attaching the front door requires at least two people: one to hold the door in place, and the other to make the necessary hardware connections.**

1. Holding the door at an angle to the SBP enclosure, re-insert the three (3) hinge clips into the three (3) door hinges.
2. Using your thumb and forefinger, push the three (3) rubber plugs onto the bottom ends of the three (3) hinge clips.
3. Keeping the door open, re-connect the internal ground cable to the ground stud on the inside of the door. Place the M6 flange nut over the cable lug on the stud. Use an M10 nut driver and torque to 120 in-lbs [13.55 Nm].
4. Close and lock the front door.



Installing Panel Board Breakers

This section describes how to install breakers to the SBP's 42-position panel board.

Electrical Hazard

WARNING!

Before installing breakers, make sure ALL SBP switches are in the OFF position. From normal operation, first switch Q2 OFF, and then switch Q1 OFF.

1. Use the enclosed keys to unlock and open the front door of the SBP.
2. Select the next available breaker position(s) on the panel board, and then snap the new 1-, 2-, or 3-pole breaker into the appropriate guard rail.

Note

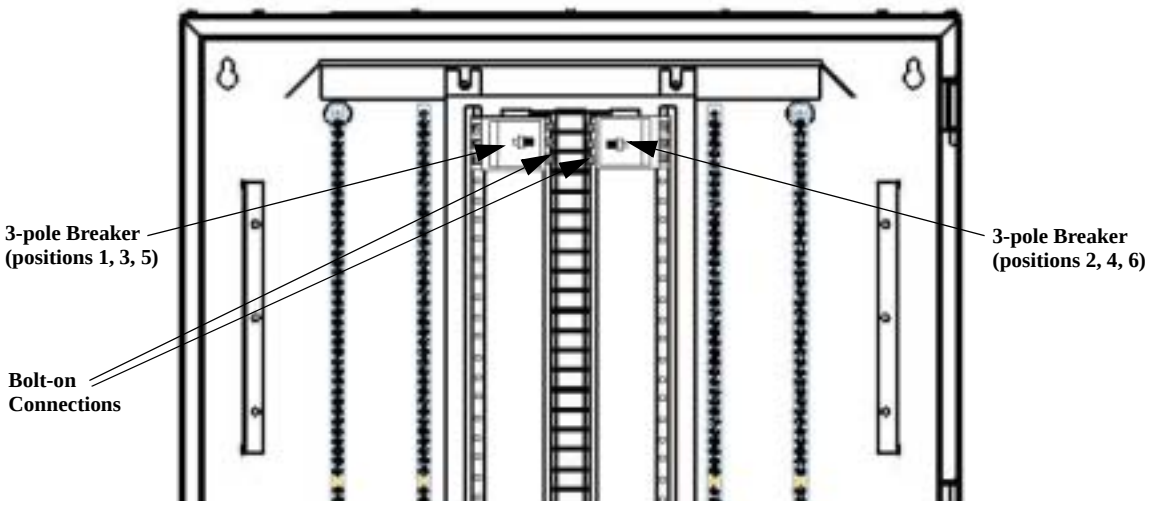
The top pole of a 3-pole breaker must always be placed in an L1 position on the panel board. Counting down from the top, these are positions 1, 7, 13, 19, etc. on the left side of the board and positions 2, 8, 14, 20, etc. on the right side of the board.

3. Make the bolt-on connections (those nearer the center of the panel board). Use a standard (flathead) screwdriver and torque to 24 in-lbs [2.71 Nm].

Note

There is one (1) bolt-on connection for a 1-pole breaker, two (2) bolt-on connections for a 2-pole breaker, and three (3) for a 3-pole breaker.

4. Remove the corresponding plastic blanking plate(s) located directly in front of the newly installed breaker. The blanking plates can be accessed through the smaller, hinged "panel board" door at the front of the SBP. Use one of the front door keys to open this door.



Note

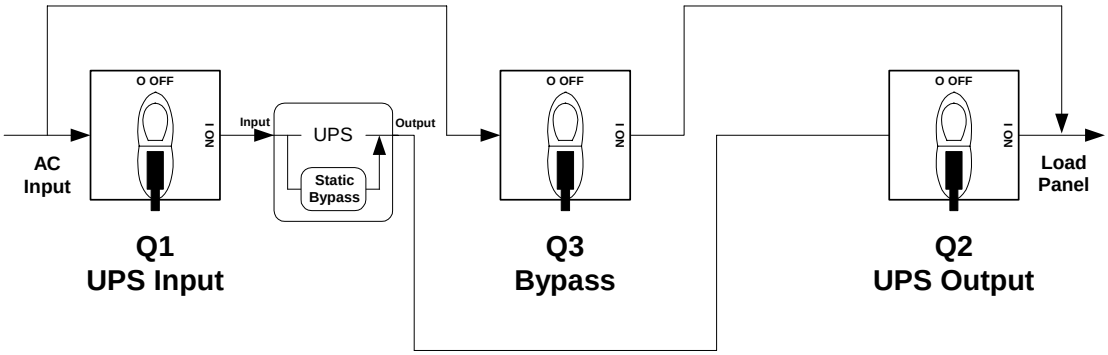
After installation, panel board breakers can be accessed by simply opening the panel board hinged door.

SBP Operation

The SBP with Power Distribution supports four (4) modes of UPS operation: 1) Normal, 2) Battery Back-up, 3) Static Bypass, and 4) Bypass.

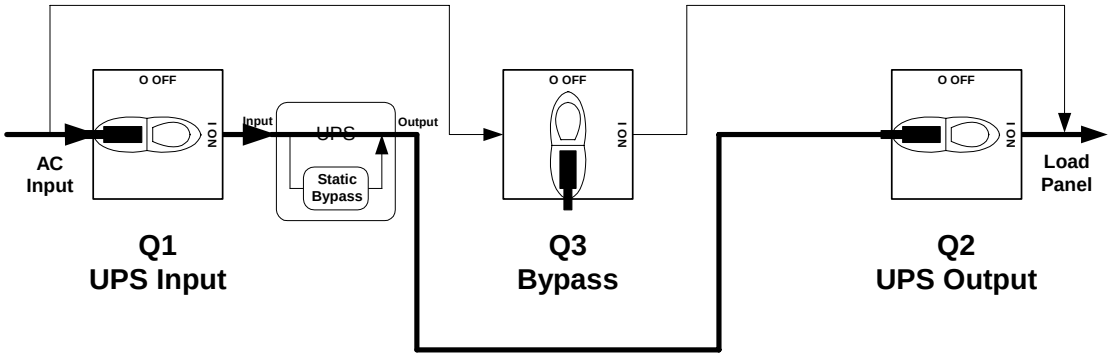
The process of changing from one operational mode to another requires a series of automated and manual tasks. Automated tasks are initiated from the user interface at the front of the UPS and may require switches on the SBP to be turned ON or OFF, depending on the operational mode. **Refer also to the Smart-UPS® VT 10-30kVA, 208V Operation Manual (p/n 990-1599).**

A switch can be locked in place by pressing down on its red lever and then applying a locking device to the exposed holes. The SBP is shipped with its switches in the OFF position (see below graphic).



Normal operating mode

To enter normal operating mode, first switch Q2 ON and then switch Q1 ON. Q3 remains OFF. The heavier line shows the flow of utility power through Q1, the UPS, and Q2.

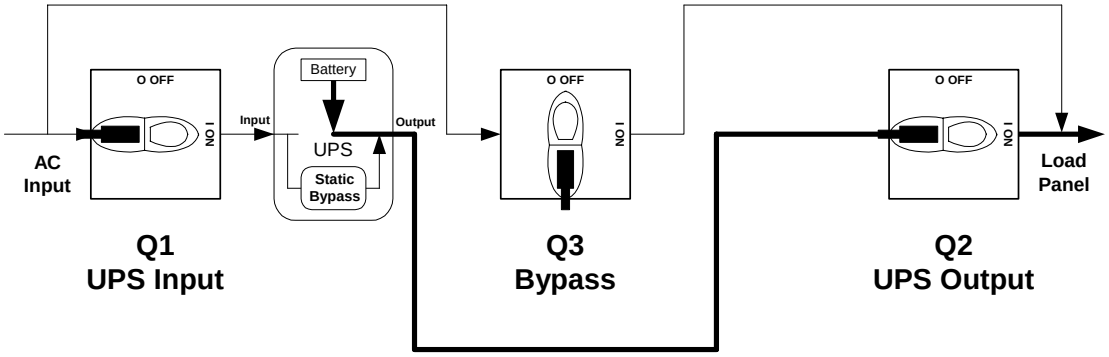


Battery back-up operation

The UPS will automatically transfer from normal operation to battery back-up operation in instances when utility power is lost or degraded. The heavier line shows the flow of battery-supplied power through the UPS and Q2. Be aware that this transfer of power CANNOT take place when the UPS is operating in static bypass mode or bypass mode.

Note

After transferring from normal operation to battery back-up operation, the SBP switch settings are unchanged: Q1 and Q2 are ON, and Q3 is OFF.

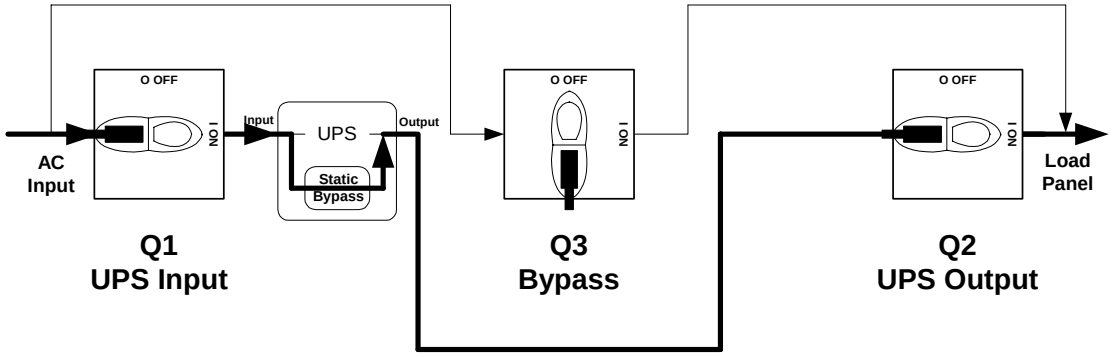


Static bypass mode

Static bypass is a temporary operating mode that becomes active during the process of transferring from normal operation to bypass operation, or from bypass operation to normal operation.

Note

The user interface on the UPS initiates static bypass mode during transfer from normal operation to bypass operation. The SBP switch settings remain unchanged: Q1 and Q2 are ON, and Q3 is OFF.

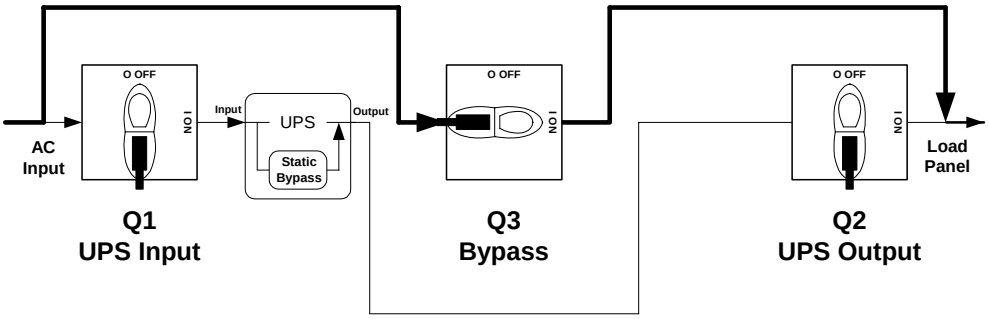


Bypass operation

Bypass operation allows the UPS to be serviced while the load is still being supported by the utility.

Note

To achieve bypass operation after attaining static bypass mode, the following actions must take place at the SBP: 1) Switch Q3 ON, 2) Switch Q2 OFF, and 3) Switch Q1 OFF.



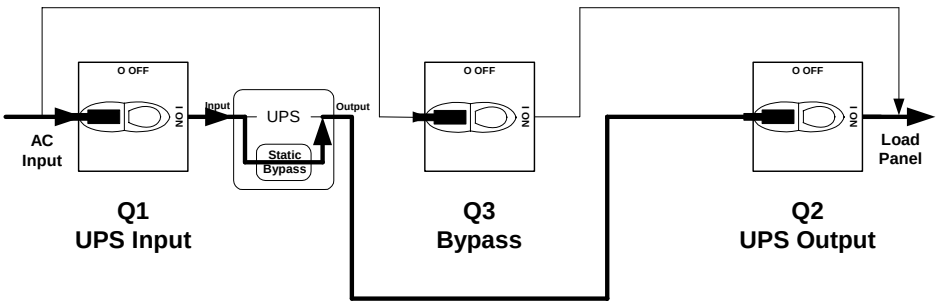
Returning to normal operation

To return to normal operation from bypass operation, the UPS must first be placed in static bypass mode.

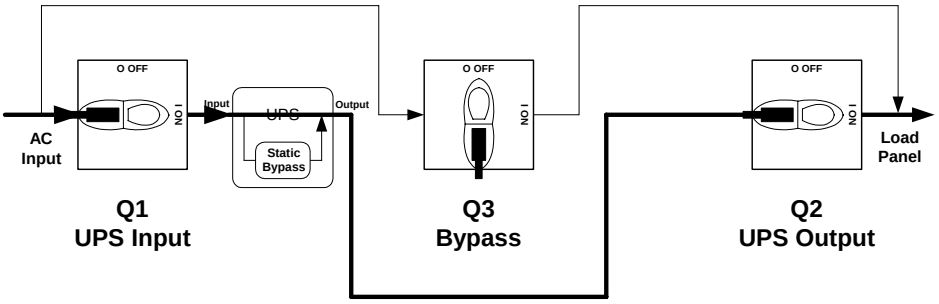
Note

- **The user interface on the UPS initiates static bypass mode (graphic A) during transfer from bypass operation to normal operation. The following actions must take place at the SBP: 1) Switch Q2 ON, and 2) Switch Q1 ON.**
- **To achieve normal operation (graphic B) after attaining static bypass, Switch Q3 OFF.**

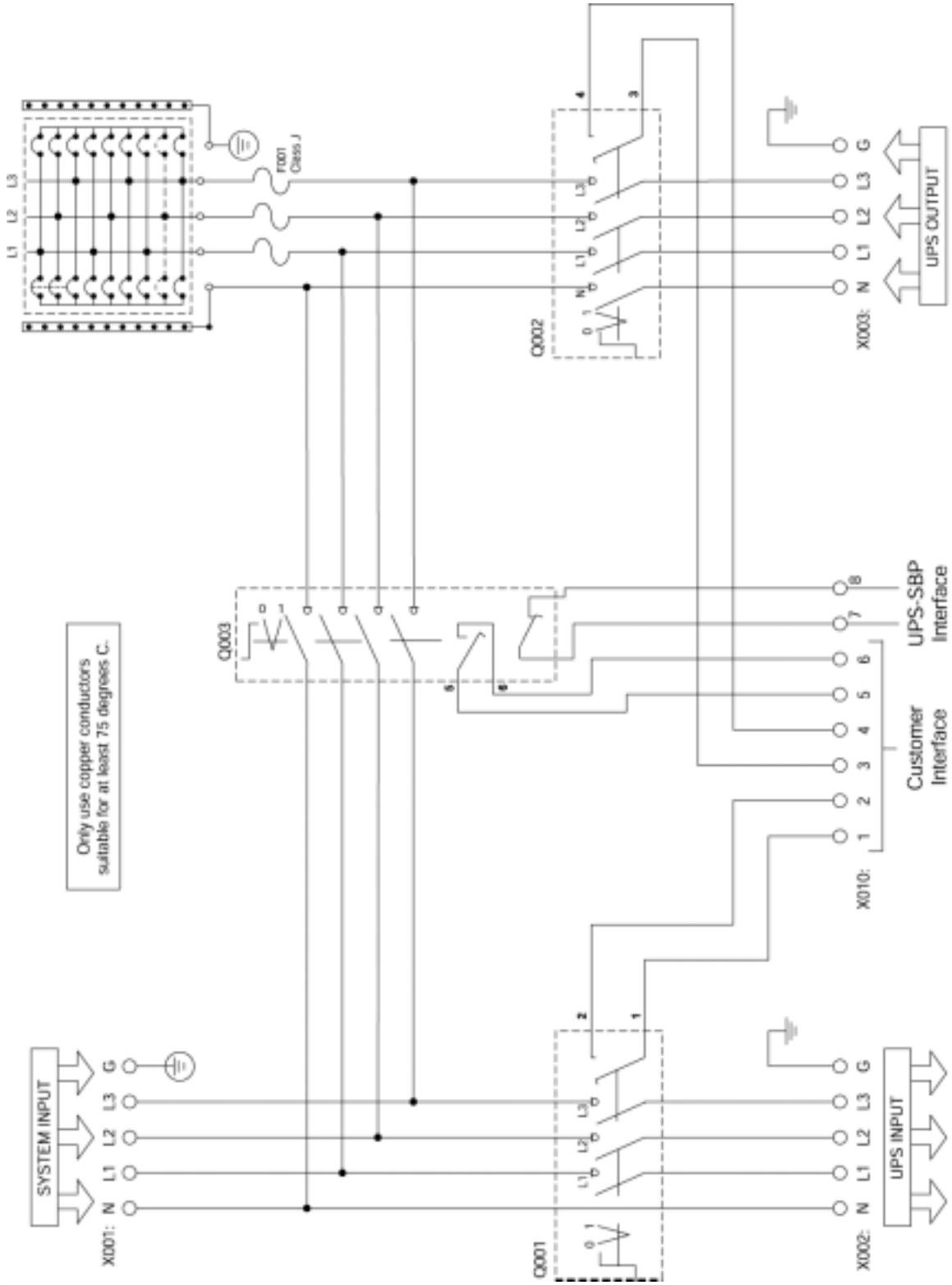
A



B



Appendix A: SBP Schematic



Appendix B: Changing Fuses

Electrical Hazard

WARNING!

Before changing fuses, make sure ALL SBP switches are in the OFF position. From normal operation, first switch Q2 OFF, and then switch Q1 OFF.

Note

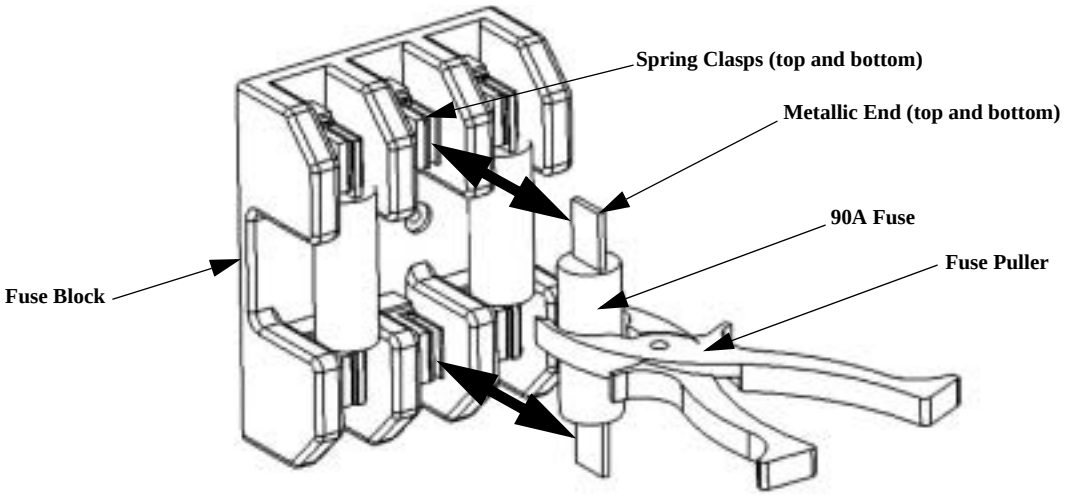
Replace ALL blown fuses with Bussmann "Class J" 90 Amp fuses (p/n JKS-90).

Removing fuses

1. Open the front door of the SBP to access the fuse block. Use the enclosed front door keys.
2. Using a plastic or insulated fuse puller, tightly grasp the center section of the blown fuse.
3. Pull the fuse toward you, forcing its release from the two (2) sets of spring clasps.

Replacing fuses

1. Using a plastic or insulated fuse puller, tightly grasp the center portion of the replacement fuse.
2. Align the fuse's metallic ends with the two (2) sets of spring clasps that will hold it in place.
3. Push the fuse into the two (2) sets of clasps until the clasps snap around the metallic ends.
4. Close and lock the front door.



Note

After changing fuses, the SBP can be returned to normal operation by first switching Q2 ON, and then switching Q1 ON. Q3 remains OFF.

Limited Factory Warranty

The limited warranty provided by American Power Conversion Corporation (“APC”) in this Statement of Limited Factory Warranty applies only to Products you purchase for your commercial or industrial use in the ordinary course of your business.

APC product covered

Smart-UPS® VT Service Bypass Panel (SBP) with Power Distribution (wall-mount)

Terms of warranty

APC warrants that the Product shall be free from defects in materials and workmanship for a period of one (1) year from the date of start-up when APC authorized service personnel performed the start-up of the Product, or a maximum of 18 months from the date of Product shipment from APC, when APC-authorized service personnel have not performed the start-up of the Product (“Warranty Period”). In the event that the Product fails to meet the foregoing warranty, APC shall repair or replace any defective parts, such repair or replacement to be without charge for on-site labor and travel if APC authorized personnel have conducted start-up of the Product. An APC Start-Up Service must be performed/completed by APC authorized service personnel or replacement of defective parts only will be covered. APC shall have no liability and no obligation to repair the installed Product if non-authorized personnel performed the start-up and such start-up caused the Product to be defective. Any parts furnished under this warranty may be new or factory-remanufactured. **Repair or replacement of a defective product or part thereof does not extend the original warranty period.**

Non-transferable warranty extends to first purchaser for use

This Warranty is extended to the first person, firm, association or corporation (herein referred to by “You” or “Your”) for whom the APC Product specified herein has been purchased. This Warranty is not transferable or assignable without the prior written permission of APC.

Assignment of warranties

APC will assign to you any warranties which are made by manufacturers and suppliers of components of the APC Product and which are assignable. Any such warranties are assigned “AS IS” and APC makes **no representations** as to the effectiveness or extent of such warranties, assumes NO RESPONSIBILITY for any matters which may be warranted by such manufacturers or suppliers and extends no coverage under this Warranty to such components.

Drawings, descriptions

APC warrants for the Warranty Period and on the terms of the Warranty set forth herein that the APC Product will substantially conform to the descriptions contained in the APC Official Published Specifications or any of the drawings certified and agreed to by an authorized APC representative, if applicable thereto ("Specifications"). It is understood that the Specifications are **not warranties of performance** and **not warranties of fitness for a particular purpose**.

Warranty claims procedure

To obtain service under Warranty, contact APC Customer Support (see rear cover). You will need the model number of the Product, the serial number, and the date purchased. A technician will ask you to describe the problem. If it is determined that the Product will need to be returned to APC you must obtain a returned material authorization (RMA) number from APC Customer Support. Products that must be returned must have the RMA number marked on the outside of the package, and be returned with transportation charges prepaid. If it is determined by APC Customer Support that on-site repair of the Product is allowed, APC will arrange to have APC authorized service personnel dispatched to the Product location to repair or replace the Product at the discretion of APC.

Exclusions

APC shall not be liable under the Warranty if its testing and examination discloses that the alleged defect in the product does not exist or was caused by your or any third person's misuse, negligence, improper installation or testing, unauthorized attempts to repair or modify, or any other cause beyond the range of the intended use, or by accident, fire, lightning or other hazard.

THERE ARE NO WARRANTIES, EXPRESSED OR IMPLIED, BY OPERATION OF LAW OR OTHERWISE, OF PRODUCTS SOLD, SERVICED OR FURNISHED UNDER THIS AGREEMENT OR IN CONNECTION HEREWITH. APC DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY, SATISFACTION AND FITNESS FOR A PARTICULAR PURPOSE. THE APC EXPRESS WARRANTIES WILL NOT BE ENLARGED, DIMINISHED, OR AFFECTED BY AND NO OBLIGATION OR LIABILITY WILL ARISE OUT OF APC RENDERING TECHNICAL OR OTHER ADVICE OR SERVICE IN CONNECTION WITH THE PRODUCTS. THE FOREGOING WARRANTIES AND REMEDIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES AND REMEDIES. THE WARRANTIES SET FORTH ABOVE, CONSTITUTE SOLE LIABILITY OF APC AND YOUR EXCLUSIVE REMEDY FOR ANY BREACH OF SUCH WARRANTIES. THE WARRANTIES EXTEND ONLY TO YOU AND ARE NOT EXTENDED TO ANY THIRD PARTIES.

IN NO EVENT SHALL APC, ITS OFFICERS, DIRECTORS, AFFILIATES OR EMPLOYEES BE LIABLE FOR ANY FORM OF INDIRECT, SPECIAL, CONSEQUENTIAL OR PUNITIVE DAMAGES ARISING OUT OF THE USE, SERVICE OR INSTALLATION OF THE PRODUCTS, WHETHER SUCH DAMAGES ARISE IN CONTRACT OR TORT, IRRESPECTIVE OF FAULT, NEGLIGENCE OR STRICT LIABILITY OR WHETHER APC HAS BEEN ADVISED IN ADVANCE OF THE POSSIBILITY OF SUCH DAMAGE.

APC Worldwide Customer Support

Customer support for this or any other APC product is available at no charge in any of the following ways:

- Visit the APC Web site to access documents in the APC Knowledge Base and to submit customer support requests.
  - **www.apc.com** (Corporate Headquarters)

    Connect to localized APC Web sites for specific countries, each of which provides customer support information.
  - **www.apc.com/support/**

    Global support searching APC Knowledge Base and using e-support.
- Contact an APC Customer Support center by telephone or e-mail.
  - Regional centers:

Direct InfraStruXure Customer Support Line	(1)(877)537-0607 (toll free)
APC headquarters U.S., Canada	(1)(800)800-4272 (toll free)
Latin America	(1)(401)789-5735 (USA)
Europe, Middle East, Africa	(353)(91)702000 (Ireland)
Japan	(0) 35434-2021
Australia, New Zealand, South Pacific area	(61) (2) 9955 9366 (Australia)

  - Local, country-specific centers: go to **www.apc.com/support/contact** for contact information.

Contact the APC representative or other distributor from whom you purchased your APC product for information on how to obtain local customer support.

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