UNISTAR VP
Wall-Mounted Parallel Cabinet with Maintenance Bypass Switch
120-230V 50/60Hz
Up to 40 kVA
USER MANUAL
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1. INTRODUCTION

1.1 Overview

The UNISTAR VP Wall-Mounted Maintenance Bypass Switch consists of a steel enclosure that contains circuit breakers and terminal blocks. All of these parts together provide a full, wrap-around, maintenance bypass switch for the UNISTAR VP Parallel UPS system.

1.2 Applicability

The Wall-Mounted MBS is available for use with UNISTAR VP UPS with ratings of 6 kVA and 10 kVA.

The UNISTAR VP UPS is designed for parallel operation. Up to 4 of each model can be paralleled together, providing up to 40kVA of power.

The Maintenance Bypass can be used with UPS that have the same input and output voltage. This includes products with part numbers:

<table>
<thead>
<tr>
<th>Systems with UPS and matching Battery Pack</th>
<th>Systems with UPS, matching Battery Pack and ISO Pack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Type</td>
</tr>
<tr>
<td>SCV-60022</td>
<td>6 kVA Single model</td>
</tr>
<tr>
<td>SCV-60022-P</td>
<td>6 kVA Parallel model</td>
</tr>
<tr>
<td>SCV-11022</td>
<td>10 kVA Single model</td>
</tr>
<tr>
<td>SCV-11022-P</td>
<td>10 kVA Parallel model</td>
</tr>
</tbody>
</table>
2. SAFETY WARNINGS

IMPORTANT SAFETY INSTRUCTIONS SAVE THESE INSTRUCTIONS

READ AND FOLLOW ALL SAFETY INSTRUCTIONS

- Do not use outdoors.
- Do not route wiring across or near hot surfaces.
- Do not install near gas or electric heaters.
- Equipment should be installed where it will not readily be subjected to tampering by unauthorized personnel.
- The use of accessory equipment not recommended by the manufacturer may cause an unsafe condition.
- Do not use this equipment for other than intended use.
- This equipment connects to the output of an uninterruptible power supply. Hazardous voltages may be present even when the electrical supply to this equipment is turned off.
- Read and follow the instructions that came with the associated UPS before operating this equipment.

DANGER

This equipment contains lethal voltages. All repairs and service should only be performed by authorized service personnel. There are no user serviceable parts inside this equipment.

WARNING

This equipment connects to the output of a UPS which contains its own energy source (batteries). The UPS output may carry live voltage even when the UPS is not connected to an AC supply.

To reduce the risk of fire and electric shock, install this equipment in a humidity controlled, indoor environment, free of conductive contaminants. Do not operate near water or excessive humidity (95% maximum). If condensation is present, the equipment must be allowed to completely dry before operation.

WARNING

The UPS associated with this equipment contains batteries. Batteries can present a risk of electrical shock or burn from high short circuit current. Observe proper precautions. Servicing should only be performed by qualified service personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries. Read, understand, and follow all instructions in the UPS manual before attempting any operations involving the battery.

SYMBOLS USED IN THE MANUAL

In this manual, some operations are shown by graphic symbols to alert the reader to the dangerous nature of the operations:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>⚡️</td>
<td>Danger / Risk of Electric Shock&lt;br&gt;This symbol indicates possibility of serious injury or substantial damage to the unit, unless adequate precautions are taken.</td>
</tr>
<tr>
<td>⚠️</td>
<td>Warning&lt;br&gt;This symbol indicates important information which must be understood and any stated precautions taken</td>
</tr>
<tr>
<td>🔴</td>
<td>Note</td>
</tr>
</tbody>
</table>

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3. EQUIPMENT SETUP

This section describes:
- Equipment inspection
- Wall loading
- Required Clearances
- Unloading the cabinet
- Moving the cabinet
- Removing and replacing the cabinet panels

3.1 Inspecting the Equipment
Before installation, please inspect the unit. Be sure that nothing inside the package is damaged during transportation. If there is any damage or lack of parts, do not turn on the unit and notify the carrier and factory immediately. Please keep the original package in a safe place for future use.

3.2 Wall Loading
The Wall-Mounted Maintenance Bypass Switch weighs 75 Lbs (34 kg). It is to be mounted to a wall capable of supporting the weight of the switch cabinet and the associated conduits. It must be mounted using six ¼ - 20 x 1.5 carriage bolts with 3/8" flat washer under the head and ¼" flat washer, ¼" split lock washer, and ¼ - 20 hex nut at cabinet mounting holes (see Figure 2). The wall surface must consist of ¾" plywood, or the plywood must be attached to the wall surface. Attachment of the plywood must be able to support 280 lbs (shear) and 140 lbs (pull).

Figure 2 - Mounting the Wall-Mounted MBS
3.3 Required Clearances
Except at the points where the conduits attach to the cabinet and the rear surface which is against the wall, 6 inch (15 cm) clearance is required from the cabinet to surrounding objects and/or surfaces. Local electrical codes specify limits on the allowable distances between the switch handles and the floor; be sure to plan accordingly.

3.4 Unloading the Cabinet
The following is required for unloading the cabinet:
- Two people capable of lifting 75Lbs (34 kg) between them.

3.4.1 Remove the cabinet from the shipping carton:
- Remove all banding, wrapping, and foam protectors.
- Carefully lift the cabinet from the carton and place on a cart or dolly for transportation to the installation site.
- The cabinet can be carted or carried to the installation site.

3.4.2 Removing and Replacing the Cabinet Covers
- Do not open the cabinet if power is applied or if the UPS is operating.
- Remove the six screws and washers retaining the front cover with a slotted screwdriver or a 5/16” hex wrench. Support the panel so that it does not fall while removing the last few screws.
- Lift the panel free.
- To replace the cover, position the cover so that it is properly flush with the face of the cabinet and that the switches nest in the openings in the panel. Support the panel and replace the six screws and washers.
- To remove the top panel, remove four screws and washers, and lift the panel free. Replacement is the reverse of removal.
4. ELECTRICAL INSTALLATION

4.1 Overview
Each of the pieces of equipment covered by this manual has four sets of power connections:

1. Input from the power source, typically, from the electric utility. The input source will be between 200-260V.
2. Power routed to the input of the UPS. This will be two wires plus a ground (3 wires).
3. Power from the output of the UPS. This will be either two wire or three wire with a neutral (2 or 3 wires). No ground needs to route with the output leads as the ground routed with the UPS input wires covers this need.
4. Power to the load. This is either a terminal block with a neutral and ground or circuit breakers with line voltages.

**WARNING**
Only qualified service personnel (such as a licensed electrician) should perform the installation and initial startup. There is a risk of electrical shock.

4.2 Wiring Preparation
1. Plan the locations of conduits. As noted above, there are a minimum of four sets of power connections that need to be accommodated. Allow for a set of control connections between the cabinet and the UPS. These control wires must be physically separated from any power wires. The length of the control wires is limited to 30 feet or 10 meters.
2. **Figure 3** shows the interior view of the Wall-Mounted Maintenance Bypass Switch. Conduits need to attach to holes drilled or punched through the top cover or sides of the cabinet.
3. Select wire size in compliance with NEC and local codes.
4. Refer to the manual for the UPS or Parallel Quick Installation Guide for requirements specific to the installation of the UPS.

![Figure 3 - Inside Front View](image)
4.3 Wiring Installation
Note: Refer to the UPS manual for details on wiring the UPS.

1. All terminals must be torqued in compliance with Table 3.
2. Switch off utility power to the distribution point where the UPS will be connected. Verify there are no hazardous voltages present.
3. Remove panels for access for wiring the cabinet. See 3.4.2 Removing and Replacing the Cabinet Covers for panel removal and replacement.
4. Connect wires from the "FROM UTILITY TO UPS INPUT" terminal block to the input terminal block in the UPS.
5. Connect wires from the "OUTPUT TO LOAD" terminal block to the output terminal block in the UPS.
6. Connect the load ground to the terminal labeled “G” on the “FROM UTILITY TO UPS INPUT” terminal block.
7. Connect load Neutral to the terminal labeled “N” on the “OUTPUT TO LOAD” terminal block.
8. Connect the load lines to the top of circuit breaker CB3.
9. Connect utility ground to the terminal labeled “G” on the “FROM UTILITY TO UPS INPUT”.
10. Connect utility neutral to the terminal labeled “N” on the “OUTPUT TO LOAD” terminal block.
11. Connect utility line wires to the circuit breaker CB2.
12. Check all work. Replace the panels that were removed for access.
13. Complete installation of the UPS in accordance with the manual for that equipment.

Figure 4 - 240V/120V System with ISO Module
Figure 5 - 208V/120V System with ISO Module

Figure 6 - 208V/240V System (No ISO Module)
5. OPERATION
Refer to the User’s Manual for the UPS for instructions on operating the UPS part of the system.

5.1 Maintenance Bypass Switch (MBS)
The MBS consists of three circuit breakers which are used as switches to provide make-before-break bypass capability so that the UPS can be serviced without removing power from the load. The three switches (Breaker 1, Breaker 2, and Breaker 3) have eight possible combinations or "States". Table 1 lists all of the possible states. Note that one possibility (Breaker 1 open, Breaker 2 and Breaker 3 closed) is forbidden as unexpected system behavior could result, including loss of power to the load. The Overlap State is a transient state. It is the "make" before the "break". Time spent in this state should be kept to a minimum as external events could lead to tripping Breaker 2, possibly interrupting power to the load. Also, please note that the UPS does not condition the power to the load while in bypass and that battery back-up is not available while in bypass.

To avoid damage to the UPS and to avoid interrupting power to the load, the procedures listed in Table 2 and section 5.3 Transfer Sequence must be used to change from one state to another.

5.2 Initial Startup
Performed in either of two ways:

5.2.1 Startup Method 1 (preferred)
1. Close Breaker 2 to apply power to the load
2. Close Breaker 1 to apply power to the input of the UPS.
3. Close breaker on rear panel at each paralleled UPS per UPS Parallel Quick Installation Guide.
4. Verify that the UPS is On Bypass by observing the front panel indicators (refer to Manual).
5. Close Breaker 3 to connect the UPS output to the load.
6. Open Breaker 2.
7. Turn each UPS on per UPS Parallel Quick Installation Guide.

5.2.2 Startup Method 2
1. Close Breaker 1 and breaker on rear panel of each UPS per UPS Parallel Quick Installation Guide to apply power to the UPS input.
2. Close Breaker 3 to connect the UPS output to the load.
3. Start the UPS (refer to the UPS Parallel Quick Installation Guide).

5.3 Transfer Sequence
5.3.1 Transfer load to Maintenance Bypass
1. Place UPS's into static bypass (or turn the UPS's OFF via their front panel switches).
2. Verify the UPS's are in bypass by checking the front panel display.
3. Close circuit breaker #2 (ON position).
4. Open circuit breaker #3 (OFF position).
5. Turn the UPS's OFF (if not already done in step 1) and open the circuit breakers on the back of the UPS's.
6. Open circuit breaker #1 (OFF position).
7. The Load is now supplied by the Utility. The UPS’s are now fully bypassed and can be safely serviced. Please refer to the UPS User’s Manual for servicing and follow all safety precautions and warnings.
5.3.2 Transfer load to UPS Output
1. Close circuit breaker #1 (OFF position).
2. Close the circuit breaker on the back of the UPS's. The UPS front panel display should show "OFF" and is operating in bypass.
3. Confirm output voltage of UPS matches Utility and that no errors are present on the UPS front panel display.
4. Close circuit breaker #3 (ON position).
5. Open circuit breaker #2 (OFF position).
6. The Load is now supplied by the UPS's internal bypass circuit.
7. Turn the UPS's ON per the UPS User's Manual.
8. The Load is now supplied by the UPS inverter circuit.

<table>
<thead>
<tr>
<th>State Name</th>
<th>Breaker 1</th>
<th>Breaker 2</th>
<th>Breaker 3</th>
<th>Adjacent State(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>closed</td>
<td>open</td>
<td>closed</td>
<td>Overlap, Test UPS, Test Battery</td>
</tr>
<tr>
<td>Overlap</td>
<td>closed</td>
<td>closed</td>
<td>closed</td>
<td>Normal, UPS Unloaded</td>
</tr>
<tr>
<td>UPS Unloaded</td>
<td>closed</td>
<td>closed</td>
<td>open</td>
<td>Overlap, Maintenance</td>
</tr>
<tr>
<td>Maintenance</td>
<td>open</td>
<td>closed</td>
<td>open</td>
<td>UPS Unloaded, Load Off</td>
</tr>
<tr>
<td>Load Off</td>
<td>open</td>
<td>open</td>
<td>open</td>
<td>Maintenance, Test UPS</td>
</tr>
<tr>
<td>Test UPS</td>
<td>closed</td>
<td>open</td>
<td>open</td>
<td>Load Off, Normal</td>
</tr>
<tr>
<td>Test Battery</td>
<td>open</td>
<td>open</td>
<td>closed</td>
<td>Normal</td>
</tr>
<tr>
<td>Not Allowed</td>
<td>open</td>
<td>closed</td>
<td>closed</td>
<td>(none)</td>
</tr>
</tbody>
</table>

Breaker 1 = Left hand breaker = UPS Input
Breaker 2 = Center breaker = Bypass
Breaker 3 = Right hand breaker = UPS Output

Table 1 - Maintenance Bypass Switch States
<table>
<thead>
<tr>
<th>From State</th>
<th>To State</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Overlap</td>
<td>1. Place each UPS in the static bypass by turning the UPS off or pressing the “TEST” switch on the left side of the bypass cabinet.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Verify load on bypass by observing front panel of UPS.</td>
</tr>
<tr>
<td>Overlap</td>
<td>Normal</td>
<td>1. Open Breaker 2.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Turn each UPS on per the UPS Parallel Quick Installation Guide.</td>
</tr>
<tr>
<td>Overlap</td>
<td>UPS Unloaded</td>
<td>Open Breaker 3.</td>
</tr>
<tr>
<td>UPS Unloaded</td>
<td>Overlap</td>
<td>1. Place each UPS in the static bypass by turning the UPS off or pressing the “TEST” switch on the left side of the bypass cabinet.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Verify load on bypass by observing front panel of UPS.</td>
</tr>
<tr>
<td>UPS Unloaded</td>
<td>Maintenance</td>
<td>1. Turn Off each UPS by opening breaker or back panel of each UPS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Open Breaker 1.</td>
</tr>
<tr>
<td>Maintenance</td>
<td>UPS Unloaded</td>
<td>1. Close Breaker 1 and Breaker on back panel of each UPS per the UPS Parallel Quick Installation Guide.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Turn On each UPS</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Load Off</td>
<td>Open Breaker 2. (This removes power from load!)</td>
</tr>
<tr>
<td>Load Off</td>
<td>Maintenance</td>
<td>Close Breaker 2.</td>
</tr>
<tr>
<td>Load Off</td>
<td>Test UPS</td>
<td>1. Close Breaker 1 and Breaker on back panel of each UPS per the UPS Parallel Quick Installation Guide.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Turn On each UPS, if desired.</td>
</tr>
<tr>
<td>Test UPS</td>
<td>Load Off</td>
<td>1. Turn Off each UPS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Open Breaker 1.</td>
</tr>
<tr>
<td>Test UPS</td>
<td>Normal</td>
<td>1. Turn Off each UPS (verify each UPS is “OFF” on front display).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Close Breaker 3.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Turn On UPS per the UPS Parallel Quick Installation Guide.</td>
</tr>
<tr>
<td>Normal</td>
<td>Test UPS</td>
<td>Open Breaker 3. (This removes power from load!)</td>
</tr>
<tr>
<td>Normal</td>
<td>Test Battery</td>
<td>Open Breaker 1. Battery will discharge while Breaker 1 is open.</td>
</tr>
<tr>
<td>Test Battery</td>
<td>Normal</td>
<td>Close Breaker 1.</td>
</tr>
</tbody>
</table>

(Refer to Table 1 for description of states)

**Table 2 - Maintenance Bypass Switch State Change Procedures**
6. MAINTENANCE
There are no wear items in the Wall-Mounted MBS that require periodic replacement. However, regular care will assure maximum availability of power.

Wipe the cabinet exterior with a soft cloth, slightly dampened with water, to remove dust.

If the system is powered down, consider removing accumulated dust from the cabinet interior using a vacuum cleaner.

7. TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Input/Output, Neutral and Ground Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire Size</td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td>#4 -- #14 AWG</td>
</tr>
<tr>
<td>300 KCMIL -- #6 AWG</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Circuit Breaker Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>¼ - 20 screw</td>
</tr>
</tbody>
</table>

Table 3 - Terminal Tightening Torques

<table>
<thead>
<tr>
<th>UPS</th>
<th>Input Voltage</th>
<th>Max. Rated Input Current (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 kVA</td>
<td>200-240</td>
<td>40</td>
</tr>
<tr>
<td>10 kVA</td>
<td>200-240</td>
<td>63</td>
</tr>
</tbody>
</table>

Table 4 – UNISTAR VP UPS Input Requirements

<table>
<thead>
<tr>
<th>Altitude</th>
<th>De-rate load capability above 1000 meters 1% per 100 meters.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature</td>
<td>40° C Maximum</td>
</tr>
</tbody>
</table>

Table 5 - Environmental Specifications