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PRODUCT**



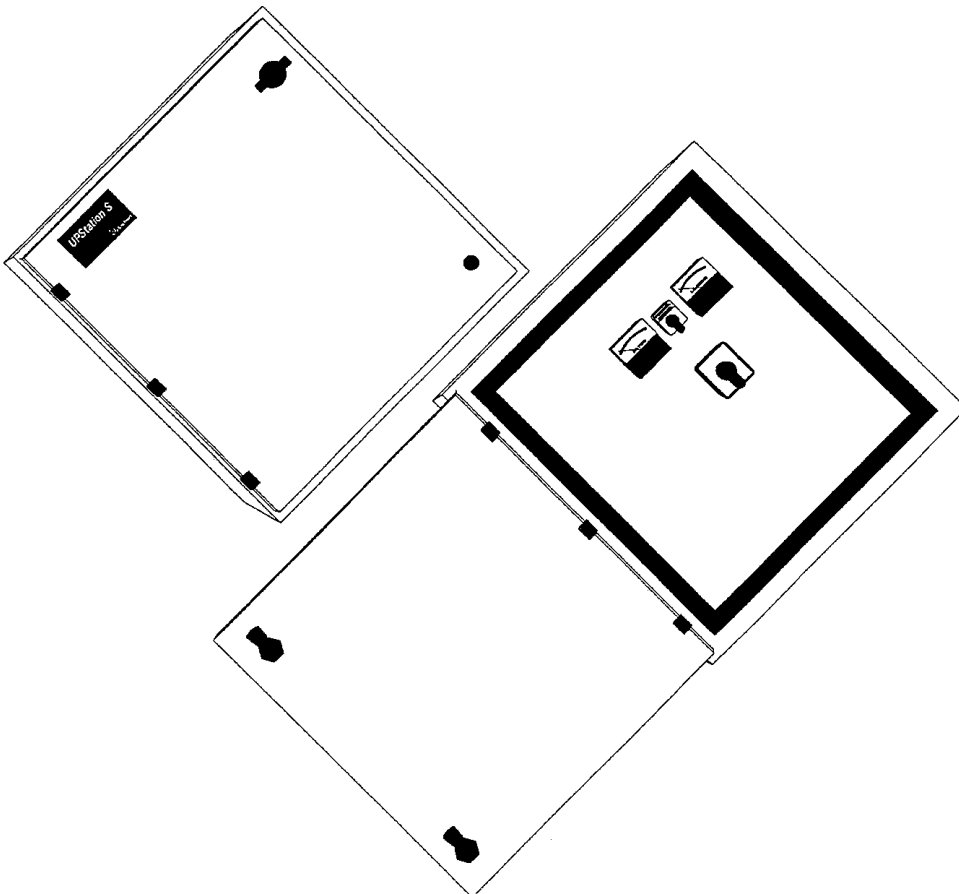
**POWER PROTECTION**

# **UPStation<sup>®</sup> S**

## **Rotary Maintenance Bypass**

### **3.5 kVA through 18 kVA**

**Installation & Instruction  
Manual**



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## IMPORTANT SAFETY INSTRUCTIONS

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This manual contains important instructions that should be followed during the installation and maintenance of the UPStation S Maintenance Bypass option.



### WARNING

**LETHAL VOLTAGES MAY BE PRESENT WITHIN THE MAINTENANCE BYPASS CABINET AND THE UPSTATION S EVEN WHEN IT IS APPARENTLY NOT OPERATING. OBSERVE ALL CAUTIONS AND WARNINGS IN THIS MANUAL AS WELL AS THE UPSTATION S USER MANUAL. FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY OR DEATH.**

**REFER UPSTATION S UNIT TO QUALIFIED SERVICE PERSONNEL IF MAINTENANCE IS REQUIRED. DO NOT WORK ON THIS EQUIPMENT UNLESS YOU ARE FULLY QUALIFIED TO DO SO. NEVER WORK ALONE.**

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## 1.0 INTRODUCTION

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### 1.1 Description

The UPStation S Maintenance Bypass Cabinet allows the customer to completely isolate the UPStation S for repair and/or preventive maintenance. A rotary switch provides a make-before-break system that enables a transfer to and from maintenance bypass without interruption to the load.

There are many different varieties of the maintenance bypass cabinet. The base cabinet comes with the rotary switch only. Meters can be added as an option to provide input and output voltage monitoring as well as output current monitoring. Also available as options are the Kirk-Key™ and solenoid interlock systems. These two options prevent the maintenance bypass from being operated with the UPStation S in the on-line (inverter) mode. Options cannot be installed in the field. Units must be ordered with the necessary options.

There are three sizes available: the VM06000 series for the 3.5 - 6 kVA units, the VM12000 series for the 8 - 12 kVA units, and the VM18000 series for the 15 - 18 kVA units. Please refer to **Table 1** to determine which system you have.

**Table 1 Model Number Chart**

Example: VM18MKD		
Character	Description	Meaning
V	Product	V = UPStation S
M	Maintenance Bypass	M = MBP
18	Nominal kVA Rating	06 = 3.5 - 6 kVA 12 = 8 - 12 kVA 18 = 15 - 18 kVA
M	Meters	M = With Meters 0 = Without Meters
K	Kirk-Key Interlock	K = With Kirk-Key Interlocks S = With Solenoid Interlock 0 = Without Interlocks
D	Dual Input	D = With Dual Input 0 = Without Dual Input

## 1.2 Cabinet

### 1.2.1 Weights / Dimensions

The maintenance bypass cabinet is a wall-mount system. Dimensions and weights depend on the kVA rating and options installed. Use **Table 2** to determine the weight of your maintenance bypass. Dimensions can be found in **Figure 7**.

**Table 2 Maintenance Bypass Cabinet Weight Chart**

Model Number	Approximate Weight in Pounds																	
	65	70	110	115	120	125	130	135	145	150	155	175	180	190	195	200	205	
VM06000	•																	
VM06M00		•																
VM06MK0				•														
VM06MS0					•													
VM060K0			•															
VM060S0, VM12000						•												
VM12M00, VM1200D							•											
VM12MK0, VM120K0									•									
VM12MKD, VM12MS0, VM120KD, VM120S0										•								
VM12M0D								•										
VM12MSD, VM120SD											•							
VM18000, VM1800D												•						
VM18M00, VM18M0D													•					
VM18MK0, VM180KD, VM180S0															•			
VM18MSD, VM180K0														•				
VM18MKD, VM180SD																•		
VM18MS0																		•

### 1.2.2 Standard Features

- A locking handle prevents unauthorized access.
- A holder for the User's Manual and any site documentation is provided on the inside cover of the door. This enables the customer to keep all documentation relating to their UPStation S and maintenance bypass with the unit.
- Auxiliary contacts, rated at 15 amps and 600 volts, are available if the customer requires remote monitoring of the maintenance bypass.
- Conduit knock-outs for power wiring and control wiring are prefabricated into the enclosure, allowing for top or bottom entrance.

### 1.2.3 Options

- Input/output voltage and output current analog meters.
- Kirk-Key™ Interlock - insures UPStation S is in bypass prior to transfer.
- Solenoid - insures UPStation S is in bypass prior to transfer.
- Dual Input - for use with dual input UPStation S units (8 - 18 kVA only).

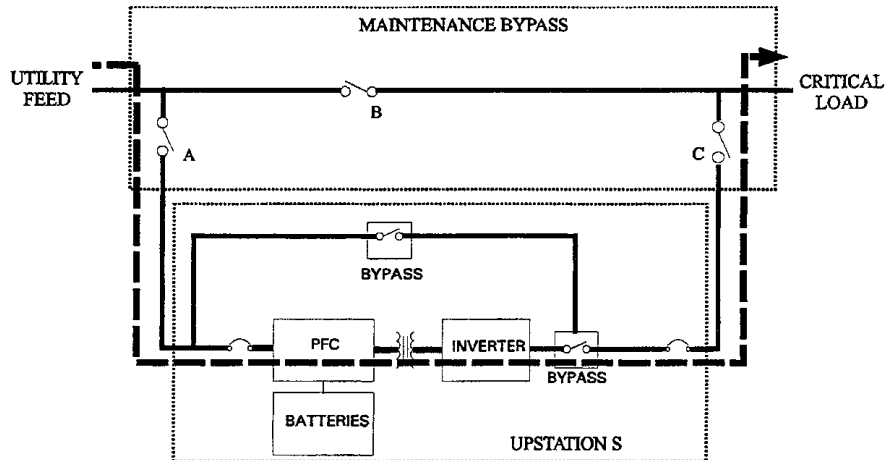
### 1.3 Modes of Operation

There are three modes of operation on the maintenance bypass: On-Line, Test, and Maintenance Bypass. There are two major types of maintenance bypass cabinets and UPStation S units when referring to the one-line diagrams and power flows: standard and dual input.

#### 1.3.1 On-Line

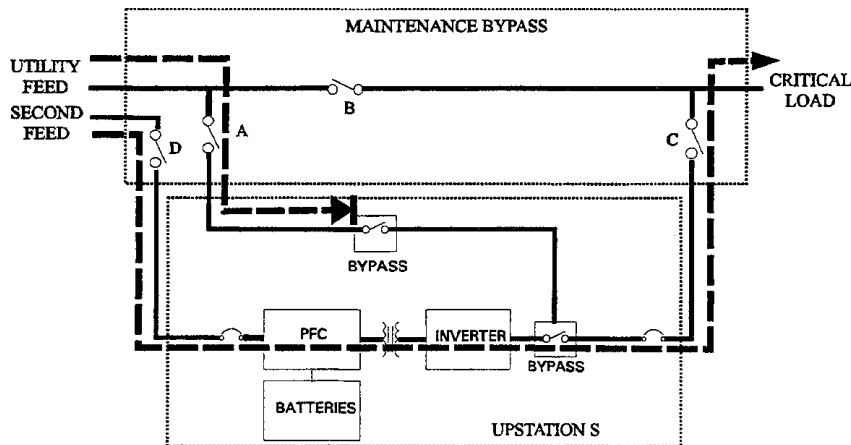
When the rotary switch is placed in the On-Line position, contacts A and C are closed with contact B open. The standard UPStation S is powering the critical load as illustrated in **Figure 1**.

**Figure 1 On-Line Power Flow Diagram**



The dual input system has a somewhat different power flow when in the on-line mode as illustrated in **Figure 2**. Contacts A, C, and D are closed while contact B is open. The input to the UPS is coming from a second source. The input to the dynamic bypass is coming from the same source as the maintenance bypass. The inverter is in-sync with the bypass input so that an in-phase transfer can occur if a transfer is requested.

**Figure 2 On-Line Power Flow (Dual Input) Diagram**

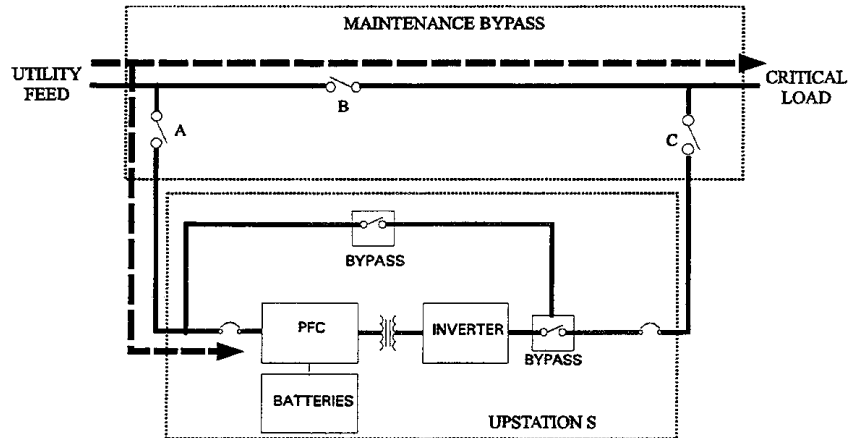




### 1.3.2 Test

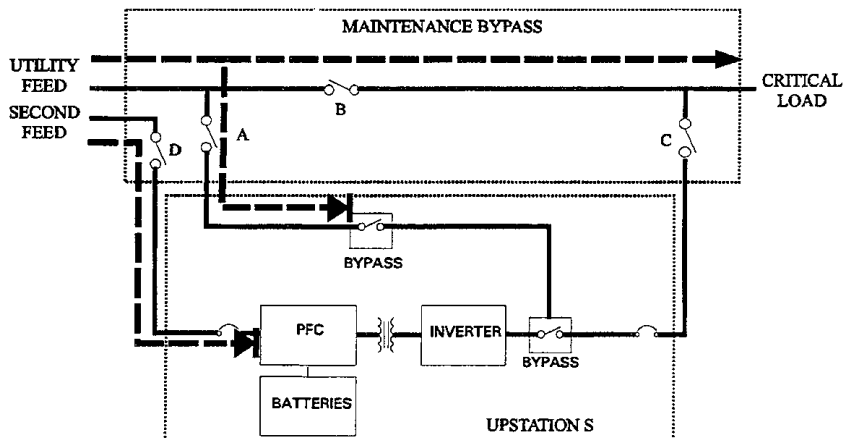
When the rotary switch is placed in the Test position, contacts A and B are closed and C is open. The power for the load is now coming from the maintenance bypass source, as illustrated in **Figure 3**. The connection from the output of the UPStation S is open. Input power to the UPStation S is still available for testing and troubleshooting purposes.

**Figure 3 Test Power Flow Diagram**



For dual input units, power is still flowing to the bypass input and PFC input during the test mode as illustrated in **Figure 4**. Contacts A, D, and B are closed while contact C is open.

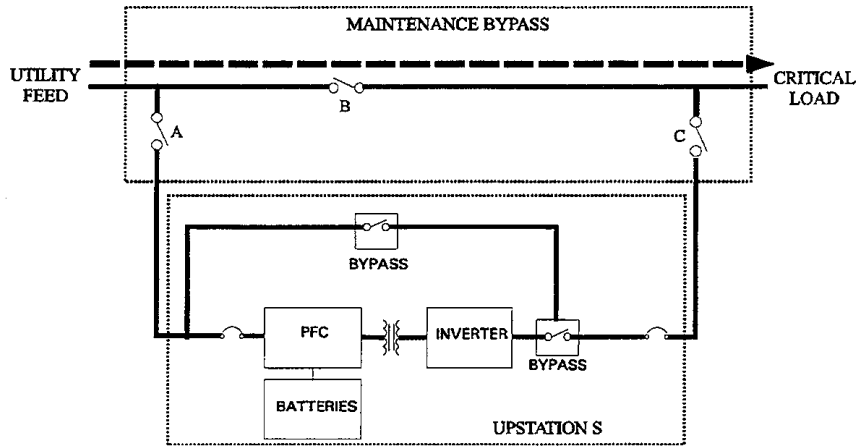
**Figure 4 Test Power Flow (Dual Input) Diagram**



### 1.3.3 Maintenance

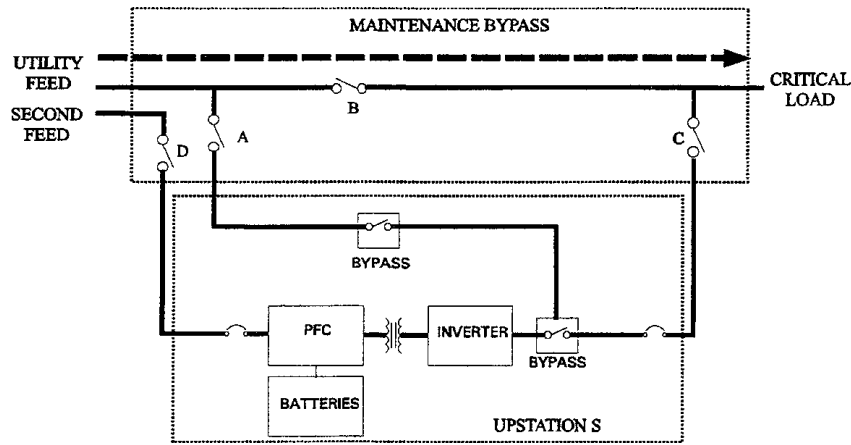
When the rotary switch is placed in the Maintenance position, contacts A and C are open and B is closed. The power for the load is coming from the maintenance bypass source, as illustrated in **Figure 5**. The UPStation S is now completely isolated from the source as well as the critical load.

**Figure 5 Maintenance Bypass Power Flow Diagram**



For dual input units, the power flow for the dual input when on maintenance bypass is the same as the standard unit as illustrated in **Figure 6**. Contacts A, D, and C are open, while contact B is closed.

**Figure 6 Maintenance Bypass Power Flow (Dual Input) Diagram**



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## 2.0 INSTALLATION

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This section includes unloading, inspection, mounting, and connections for the maintenance bypass cabinets. Reading this section in its entirety before you begin is a good preparation for your start-up.



**WARNING**  
**DANGER — HIGH VOLTAGE**

**PRIOR TO MAKING OR TOUCHING ANY CONNECTIONS, INSURE ALL POWER HAS BEEN REMOVED FEEDING ANY CONNECTION WITH THE RMBP OR THE UPSTATION S. POWER CONNECTIONS SHOULD BE PERFORMED BY A LICENSED ELECTRICIAN ONLY.**

**INSURE THAT THE UPSTATION S IS OFF, INPUT TOWER REMOVED AND ALL BREAKERS ARE OPEN.**

**NEVER WORK ALONE.**

### 2.1 Unloading / Mounting

#### 2.1.1 Unloading

The unit is shipped on a box that is banded down to a pallet. To unload the maintenance bypass cabinet:

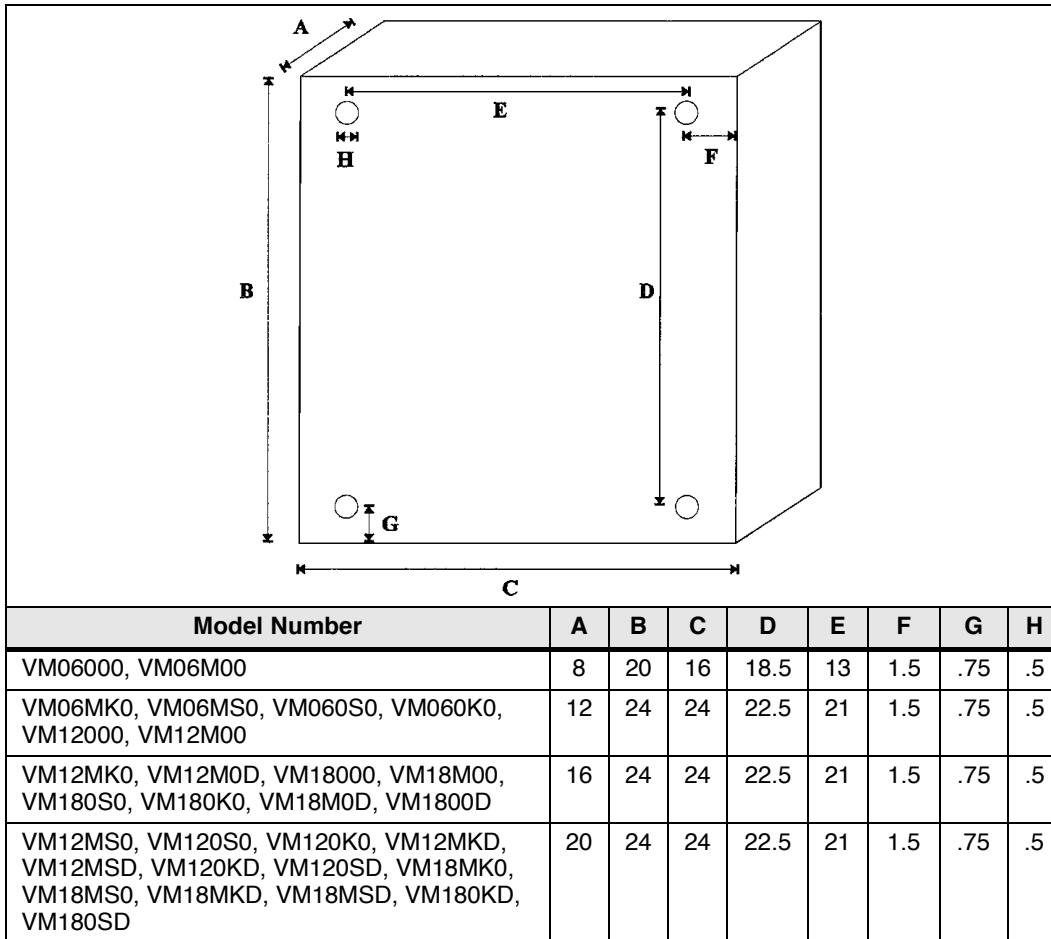
- Remove the banding from the container.
- Open box and remove maintenance bypass.
- Inspect for any damage to the unit. Report any damage to the shipping carrier and complete a freight damage claim form. Insure that the system ordered is what was received prior to mounting.

## 2.1.2 Mounting

The Liebert UPStation Maintenance Bypass Cabinet is designed for wall mount only. Prior to installation, verify that the wall can support the weight of the bypass cabinet. Weights can be found in **Table 2**.

The dimensions required for mounting of the maintenance bypass are illustrated in **Figure 7**. All dimensions are in inches.

**Figure 7 Mounting Dimensions Chart**



Note: All dimensions are in inches

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## 2.2 Connections

There are four basic styles of the maintenance bypass cabinets for the UPStation S units:

- The **VMxxx00** is the very basic unit with or without meters. No special hardwire connections are necessary with the standard or meter option. Available on all size units.
- The **VMxxxK0** includes the Kirk-Key™ Interlock option. A communication cable between the UPStation S and the maintenance bypass is required for correct operation. Available on all size units.
- The **VMxxxS0** includes the Solenoid option. A communication cable between the UPStation S and the maintenance bypass is required for correct operation. Available on all size units.
- The **VMxxxxD** includes the Dual Input option. The dual input requires additional wiring from a secondary source and to the UPStation S. Available on the 8 - 18 kVA only.

With the exception of the dual input units, all of the maintenance bypass cabinets have four basic power connections: Maintenance Bypass Input, To UPS Rectifier Input, To UPS Output, and To Critical Load.

## 2.2.1 UPStation S Connections for 3.5 - 6 kVA



### NOTE

1. Input and Output Power wiring must be run in separate conduit.
2. Control and Power wiring must be run in separate conduit.
3. Wire and breaker sizing must be in accordance with NEC and local electrical codes.
4. RMBP units are designed to be mounted on the wall. Insure that wall can support weight prior to installation. RMBP weights can be found in **Table 2**.
5. The UPStation S must have an internal bypass for system to operate according to specifications.

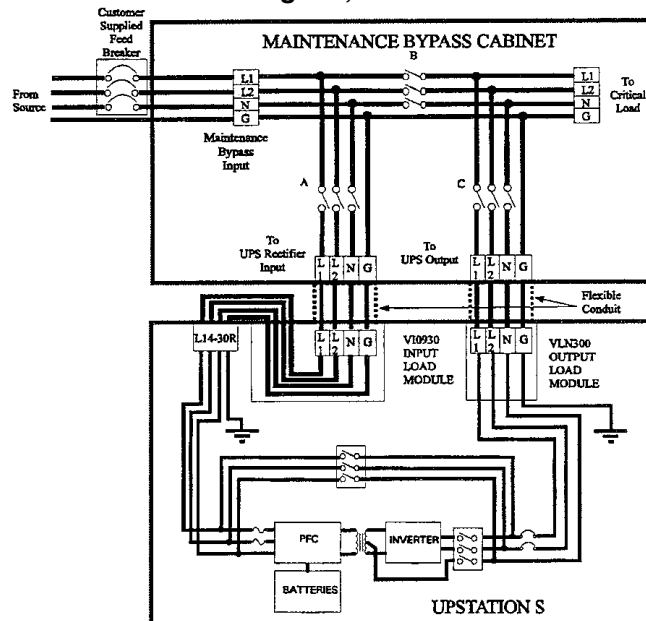
Installation of a maintenance bypass requires hardwire connections between the UPS and the Maintenance Bypass. The 3.5 - 6 kVA UPStation S units require the hardwire input module (VI0930) and a hardwire output load module (VLN300). If phase to neutral loads are going to be connected on the output, an input and output neutral must be connected.

**Figure 8** is an illustration of how the 3.5 - 6 kVA system will look electrically once the installation is complete.

Connections between the maintenance bypass and the UPStation S must be run in separate conduit. Due to the clearance requirements for service on the UPStation S, it is recommended that flexible conduit be used.

The VM060K0, VM06MK0, VM060S0, and VM06MS0 cabinets require a signal from the UPStation S in order to operate according to specifications. When using these systems, the UPStation S must have the RS-232 option installed.

**Figure 8 Complete Electrical Connection Diagram, 3.5 - 6 kVA**

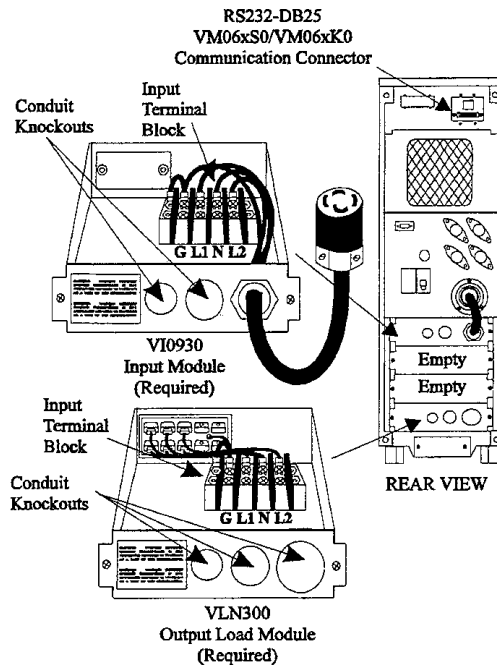


### NOTE

When the VI0930 and VLN300 load modules are installed, there will be two remaining load module slots open. Keep in mind that any load modules placed in these two slots will not have power when the RMBP is in the maintenance bypass mode. If the load module concept is still necessary, a configurable distribution cabinet must be ordered and placed on the output of the RMBP. Power management capabilities will no longer be available when the RMBP is used with the 3.5 - 6 kVA UPStation S units.

- As illustrated in **Figure 9**, the cable with the L14-30 plug, connects directly into the L14-30 receptacle on the back of the unit and the load module itself plugs into an empty load module slot. Connection to the hardwire terminal block on the VI0930 module comes from TB2, To UPS Input, on the maintenance bypass.
- As illustrated in **Figure 9**, the output hardwire load module plugs into an empty load module slot. Connection to the hardwire terminal block on the VLN300 comes from TB3, To UPS Output, on the maintenance bypass.
- A communication cable is required on the VM06xK0 and VM06xS0 models and is connected to pins 17 and 24 of the UPStation S RS-232 DB25 (female) connector as illustrated in **Figure 9**. **The cable and connector is customer supplied in order to obtain desired length between UPS & maintenance bypass cabinet. The connector can be found at any computer hardware store.**

**Figure 9 UPStation S Connections, 3.5 - 6 kVA**



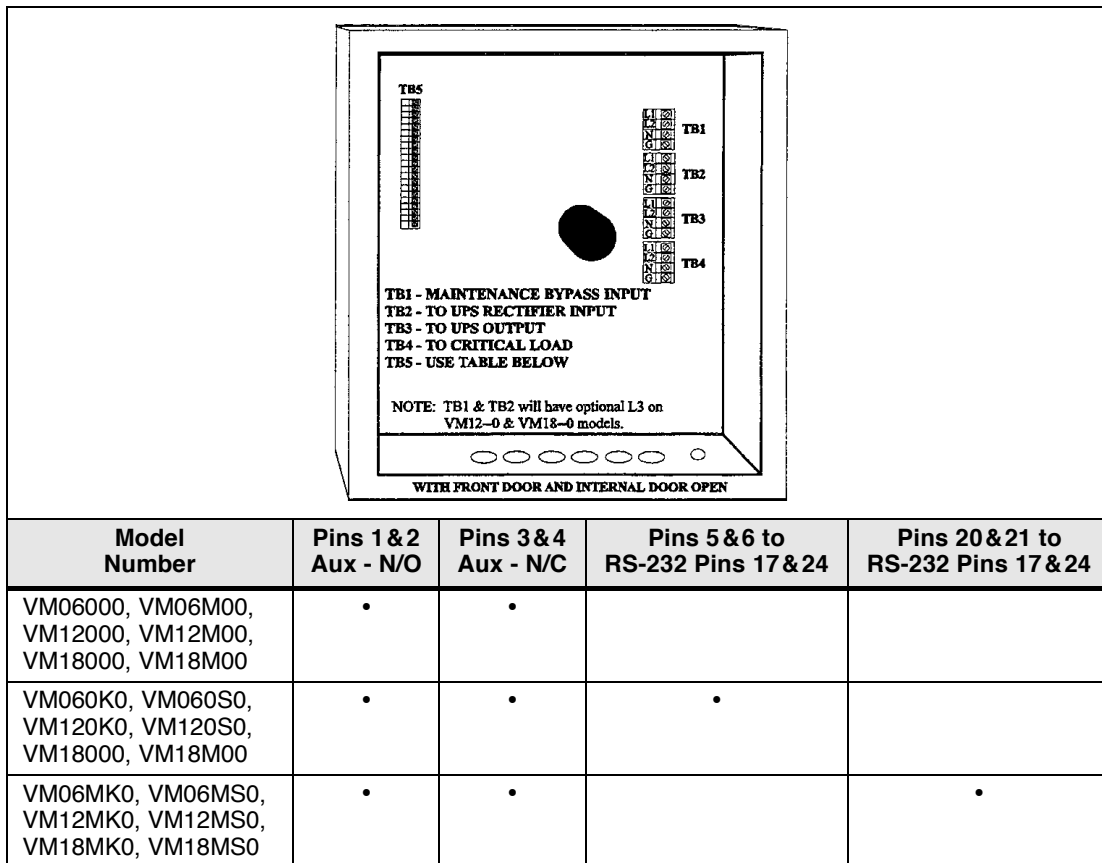
## 2.2.2 Maintenance Bypass Cabinet Connections for 3.5 - 6 kVA

The VM06xx0 have four basic power connections: Maintenance Bypass Input, To UPS Rectifier Input, To UPS Output, and To Critical Load.

The VM06xK0 and VM06xS0 require, in addition to the power connections, a communication signal between the UPStation S RS-232 board's DB25 connector and the maintenance bypass. The communication signals terminate at TB5 on the maintenance bypass cabinet. This communication signal must be connected in order for the maintenance bypass to operate according to specification.

- The input to the maintenance bypass comes from the utility source to the system. There must be a breaker feeding the system. Size the input feed breaker and wiring as per NEC. The total current into the maintenance bypass should not exceed 28 amps for the 6 kVA, 27 amps for the 4 kVA, and 21 amps for the 3.5 kVA.
- It is recommended that the site wiring and overcurrent protection be sized initially for the 6 kVA if the UPS (3.5 or 4 kVA) module is intended to be upgraded at a later date.
- The connections on the maintenance bypass cabinet are illustrated in **Figure 10**. All wire sizing should be in accordance with NEC and local codes. Wiring should be run in flexible conduit.
- Wire size range for TB5 terminal block is #10 to #22 AWG. Wire size range for TB1 through TB4 is #4 to #8 AWG. Terminal blocks have box type lug connections with slotted screw.

**Figure 10 Maintenance Bypass Cabinet (Without Dual Input) Connections, 3.5 - 18 kVA**





## 2.2.3 UPStation S Connections for 8 - 18 kVA Without Dual Input



### NOTE

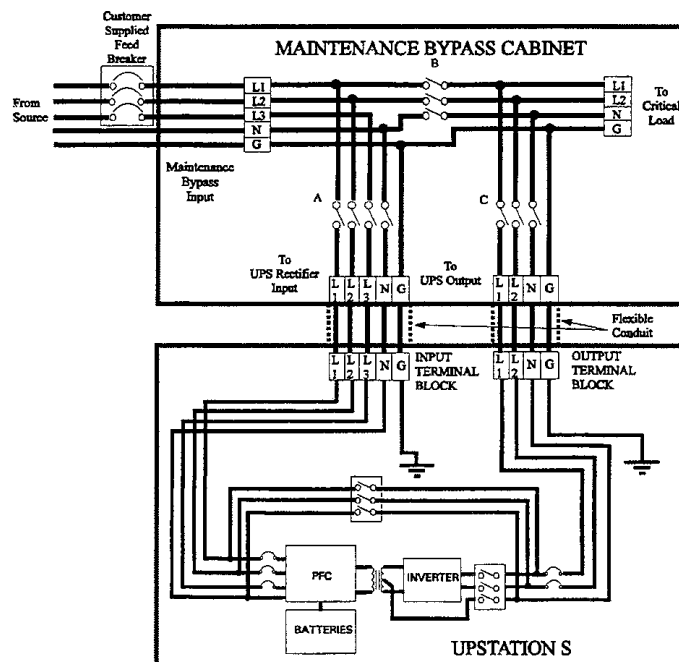
1. *Input and Output Power wiring must be run in separate conduit.*
2. *Control and Power wiring must be run in separate conduit.*
3. *Wire and breaker sizing must be in accordance with NEC and local electrical codes.*
4. *RMBP units are designed to be mounted on the wall. Insure that wall can support weight prior to installation. RMBP weights can be found in **Table 2**.*
5. *The UPStation S must have an internal bypass for system to operate according to specifications.*

The 8 - 18 kVA UPStation S allows the customer to connect a three phase input if desired. The only benefit to connecting a third phase is to balance a three phase feed transformer.

The 8 - 18 kVA UPStation S has two basic connections: UPS Input and UPS Output. **Figure 11** is an illustration of how the system will look electrically once the installation is complete.

Connections between the maintenance bypass and the UPStation S must be run in separate conduit. Due to the clearance requirements for service on the UPStation S, it is recommended that flexible conduit be used.

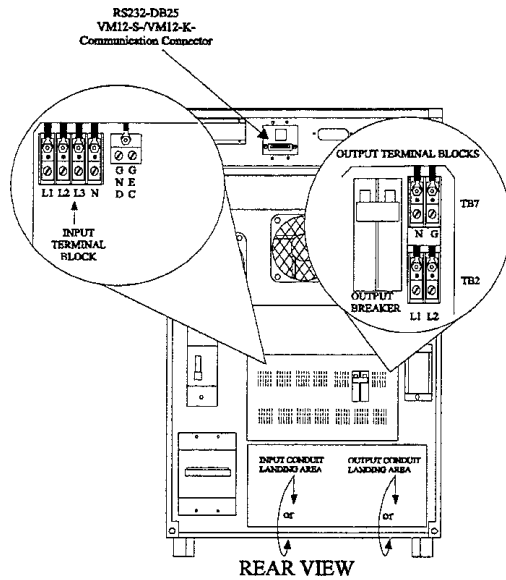
**Figure 11 Complete Electrical Connection Diagram, 8 - 18 kVA (Without Dual Input)**



The VM12xK0, VM12xS0, VM18xS0, and VM18xK0 cabinets require a signal from the UPStation S in order to operate according to specifications. When using these systems, the UPStation S must have the RS-232 option installed.

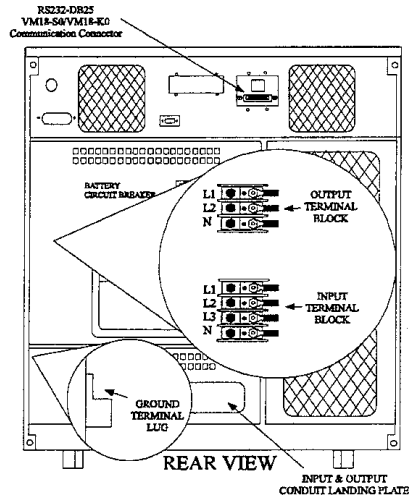
Input and output terminal blocks are provided on the back of the 8 - 12 kVA UPStation S as illustrated in **Figure 12**. Conduit can be landed on the rear or bottom of the UPStation S. Note that side, rear, front, and top access is required for service on all UPStation S product lines.

**Figure 12 UPStation S Connections, 8 - 12 kVA (Without Dual Input)**



Input and output terminal blocks are provided on the back of the 15- 18 kVA UPStation S as illustrated in **Figure 13**. Conduit can be landed on the rear or bottom of the UPStation S. Note that side, rear, front, and top access is required for service on all UPStation S product lines.

**Figure 13 UPStation S Connections, 15 - 18 kVA (Without Dual Input)**



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## 2.2.4 Maintenance Bypass Connections for 8 - 18 kVA Without Dual Input

The VM12xx0 and the VM18xx0 maintenance bypass have four basic connections: Maintenance Bypass Input, To UPS Rectifier Input, To UPS Output, and To Critical Load.

The VM12xK0, VM12xS0, VM18xK0, and VM18xS0 require, in addition to the power connections, a communication signal between the UPStation S RS-232 board's DB25 connector, pins 17 and 24 and the maintenance bypass. This communication signal must be connected in order for the maintenance bypass to operate according to specifications. Control and power wiring must be run in separate conduit.

- The input to the maintenance bypass comes from the utility source to the system. There must be a breaker feeding the system. Size the input feed breaker and wiring as per NEC. The total current into the maintenance bypass should not exceed 46A for the 8 kVA, 56A for the 10 kVA, 66A for the 12 kVA, 84.4A for the 15 kVA, and 94.4A for the 18 kVA.
- It is recommended that the site wiring and overcurrent protection be sized initially for 12 kVA if the UPS is an 8 or 10 kVA module, and 18 kVA if the UPS is a 15 kVA module and is intended to be upgraded at a later date.
- The connections on the maintenance bypass cabinet are illustrated in **Figure 10**.
- Wire size range for TB5 terminal block is #10 to #22 AWG. Wire size range for TB1 through TB4 is #4 to #8 AWG. Terminal blocks have box type lug connections with slotted screw.

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## 2.2.5 UPStation S Connections for 8 - 18 kVA With Dual Input



### NOTE

1. *Input and Output Power wiring must be run in separate conduit.*
2. *Control and Power wiring must be run in separate conduit*
3. *Wire and breaker sizing must be in accordance with NEC and local electrical codes.*
4. *RMBP units are designed to be mounted on the wall. Insure that wall can support weight prior to installation. RMBP weights can be found in **Table 2**.*
5. *The UPStation S must have an internal bypass for system to operate according to specifications.*

The 8 - 18 kVA UPStation S allows the customer to connect three phase input if desired. The only benefit to connecting a third phase is to balance a three phase feed transformer.

Dual input is available on the 8 - 12 kVA UPStation S units as an option. This option allows the UPS to recognize that a secondary source is available during “Front End Converter” outages, provided it is a separate feed. The UPS is always tracking the dual input (bypass input) and the inverter will remain in sync with it. The unit will transfer to the dual input (bypass input) source within 4 milliseconds for the following conditions:

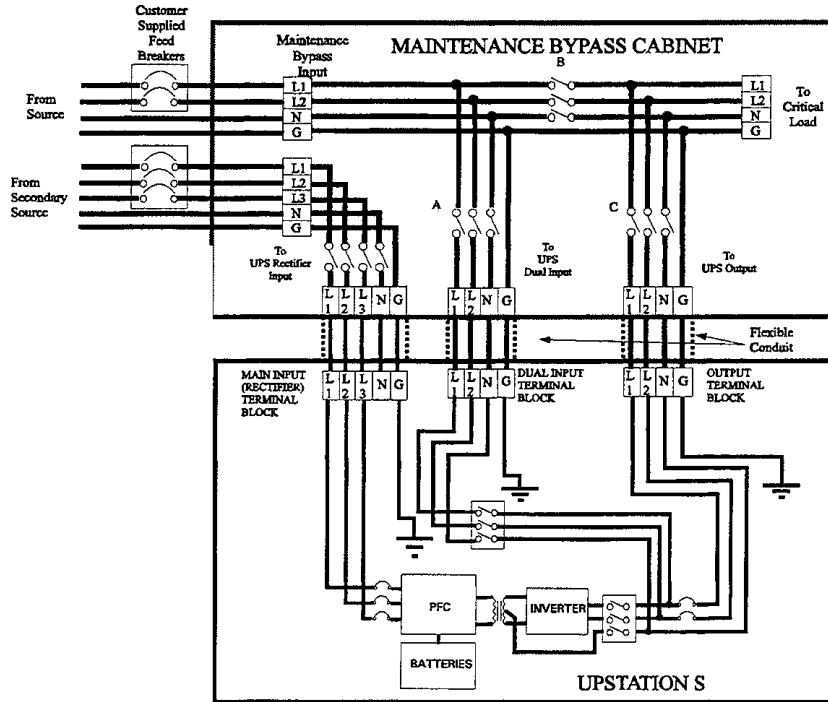
- At the end of battery time during a utility outage
- UPS failure mode
- Overload conditions
- Manual transfer request

The dual input maintenance bypass cabinet must be ordered if a maintenance bypass is required for a dual input 8 - 18 kVA UPStation S.

**Figure 14** is an illustration of how the system will look electrically once the installation is complete. Input and output connections between the maintenance bypass and the UPStation S must be run in separate conduit. Due to the clearance requirements for service on the UPStation S, it is recommended that flexible conduit be used.

- A communication cable is required on the VM12xKD, VM12xSD, VM18xSD, and VM18xKD and is connected to pins 17 and 24 of the UPStation S RS-232 DB25 (female) connector as illustrated in **Figure 15** and **Figure 16**. The cable and connector is customer supplied in order to obtain desired length between the UPS and the maintenance bypass cabinet. The connector can be found at any computer hardware store.

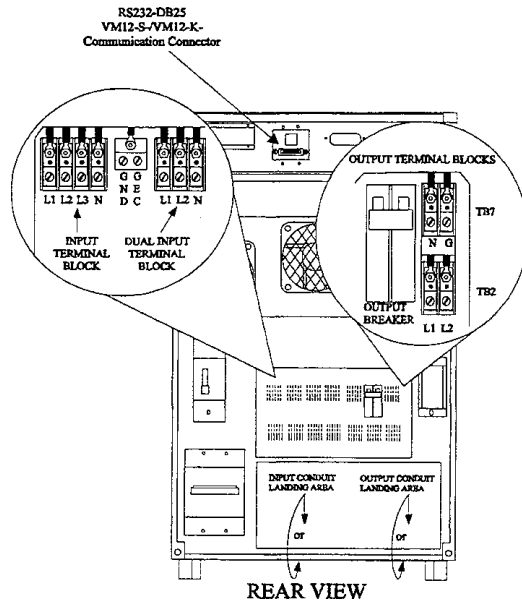
**Figure 14 Complete Electrical Connection Diagram, 8 - 18 kVA (With Dual Input)**



- There are no extra components required when installing the VM1200D, VM12M0D, VM1800D, and VM18M0D.

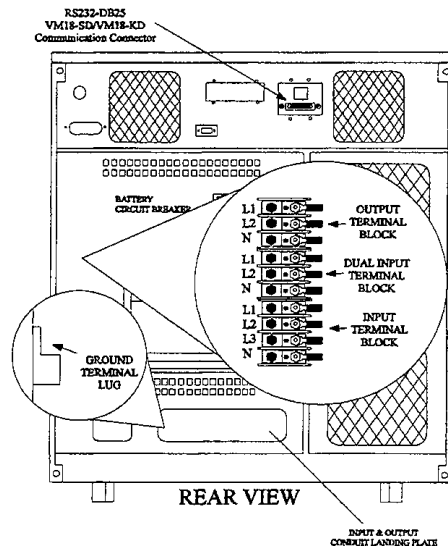
- Input and output terminal blocks are provided on the back of the 8 - 12 kVA UPStation S as illustrated in **Figure 15**. Conduit can be landed on the rear or bottom of the UPStation S. Note that side, rear, front, and top access is required for service on all UPStation S product lines.

**Figure 15 Connections, 8 - 12 kVA (With Dual Input)**



- Input and output terminal blocks are provided on the back of the 15 - 18 kVA UPStation S as illustrated in **Figure 16**. Conduit can be landed on the rear or bottom of the UPStation S. Note that side, rear, front, and top access is required for service on all UPStation S product lines.

**Figure 16 Connections, 15 - 18 kVA (With Dual Input)**



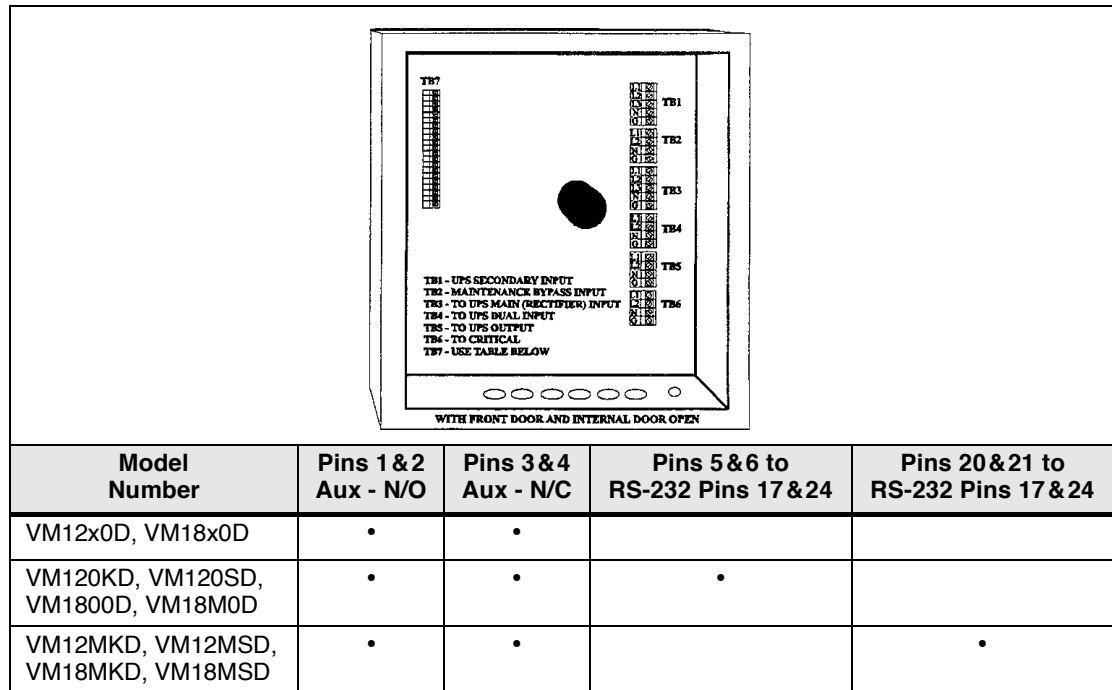
## 2.2.6 Maintenance Bypass Connections for 8 - 18 kVA With Dual Input

The VM12xxD and the VM18xxD have six basic connections: Maintenance Bypass Input, UPS Input, To UPS Rectifier Input, To Dual Input, To UPS Output, and To Critical Load. You will notice that a third phase has been added to To UPS Input and To UPS Rectifier Input. These are optional connections. If two phases are utilized on the input, only L1 and L2 are connected, L3 is left open. If L3 is connected, reconfiguring the unit through the LCD advanced configuration screen is necessary.

The VM12xKD, VM12xSD, VM18xKD, and VM18xSD require, in addition to the power connections, a communication signal between the UPStation S RS-232 board's DB25 connector, pins 17 and 24 and the maintenance bypass. This communication signal must be connected in order for the maintenance bypass to operate according to specifications. The communication signals terminate at TB7 on the maintenance bypass cabinet. Control and power wiring must be run in separate conduit.

- The Maintenance Bypass Input comes from one source while the UPS Input comes from a secondary source. There must be a breaker feeding both inputs. Size the input feed breakers and wiring as per NEC. The total current into the maintenance bypass should not exceed 46A for the 8 kVA, 56A for the 10 kVA, 66A for the 12 kVA, 84.4A for the 15 kVA, and 94.4A for the 18 kVA.
- It is recommended that the site wiring and overcurrent protection be sized initially for 12 kVA if the UPS is an 8 or 10 kVA module, and 18 kVA if the UPS is a 15 kVA module, and intended to be upgraded at a later date.
- The connections on the maintenance bypass cabinet are illustrated in **Figure 17**.
- Wire size range for TB5 terminal block is #10 to #22 AWG. Wire size range for TB1 through TB4 is #4 to #8 AWG. Terminal blocks have box type lug connections with slotted screw.

**Figure 17 Maintenance Bypass Cabinet (With Dual Input) Connections, 8 - 18 kVA**



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## 3.0 OPERATION

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The best way to initially test and start-up the unit is to do it without a load.



**WARNING**  
**DANGER — HIGH VOLTAGE**

**PRIOR TO APPLYING POWER TO THE UNITS CHECK ALL POWER CONNECTIONS TO VERIFY THAT NO SHORTS EXIST BETWEEN PHASES.**

**VERIFY THAT NO LOOSE HARDWARE IS INSIDE EITHER THE UPSTATION S OR THE MAINTENANCE BYPASS CABINET.**

**VERIFY LOCATION OF ALL FEED AND LOAD BREAKERS.**

**NEVER WORK ALONE.**

### 3.1 Initial System Start-Up: 3.5 - 18 kVA Standard With or Without Meters

- Set the maintenance bypass rotary switch to the maintenance position. Set the meter switch to the Input L1-L2 position (units with meters).
- Locate customer's critical load breakers. Verify that all load breakers are in the off position. Close customer supplied feed breaker. Power is now flowing through the maintenance bypass as illustrated in **Figure 5** and **Figure 6**.
- Verify the L1-L2, L1-N, and L2-N input voltages, with a digital voltmeter (DVM) and the maintenance bypass input meter (units with meters), are as per the customer's specifications. Verify that there is no current shown on the maintenance bypass output current meter (units with meters). **The UPStation S/maintenance bypass input and output voltages and frequency must be the same for the system to operate according to specifications.**
- Rotate the bypass switch to the Test position. Power is now flowing through the maintenance bypass as illustrated in **Figure 3** and **Figure 4**.
- Close the UPStation S battery breaker and input breaker, in that order. The UPStation S should now be going through its normal testing and start-up procedure. Follow UPStation S LCD screen instructions.
- After the output breaker is closed and the ON button is pressed, the unit should return to the Normal Operation screen. Proceed to the meter screen on the UPStation S LCD. Verify that the output voltage and frequency is the same as the input voltage and frequency.
- With a DVM, verify that there is no voltage difference between the following points in the bypass cabinet (units without dual input):
  - TB1 L1 to TB3 L1
  - TB1 L2 to TB3 L2
- Units with dual input, check the following points:
  - TB2 L1 to TB5 L1
  - TB2 L2 to TB5 L2
- Return the UPStation S LCD to the Normal Operation screen. Transfer the UPStation S to bypass by placing the bypass/UPS switch on the back of the unit in the bypass position.
- Again with a DVM, verify that there is no voltage difference between the following points in the bypass cabinet (units without dual input):
  - TB1 L1 to TB3 L1
  - TB1 L2 to TB3 L2
- Units with dual input, check the following points:
  - TB2 L1 to TB5 L1
  - TB2 L2 to TB5 L2
- Set the maintenance bypass meter switch (units with meters) to the Output L1-L2 position. Verify that the voltage does not drop to zero during on-line transfer sequence.



- 
- Rotate the bypass switch to the On-Line position. Transfer the UPStation S to the UPS mode by placing the bypass/UPS switch on the back of the unit in the UPS position and pressing the ON button on the front of the unit. Power is now flowing through the maintenance bypass as illustrated in **Figure 1** and **Figure 2**.
  - The bypass switch is operating according to specifications if no problems occurred during the previous start-up steps.
  - Transfer the UPStation S to bypass by placing the bypass/UPS switch on the back of the unit in the bypass position. Verify the L1-L2, L1-N, and L2-N output voltages, with a DVM and the maintenance bypass input meter (units with meters), are as per the customer's specifications.
  - Set the maintenance bypass meter switch (units with meters) to the Output Current L1 position.
  - The customer may now bring up their connected critical loads. **Always energize the load on bypass, either UPStation S internal bypass or maintenance bypass.**
  - After the load is up and operating, the UPStation S may now be transferred on-line. Transfer the UPStation S to the UPS mode by placing the bypass/UPS switch on the back of the unit in the UPS position and pressing the ON button on the front of the unit.
  - Power is now flowing through the maintenance bypass as illustrated in **Figure 1** and **Figure 2**. The load is protected by UPS power.

### 3.2 Transfer to Maintenance Bypass from On-Line: 3.5 - 18 kVA Standard With or Without Meters

- Prior to transferring the maintenance bypass to the bypass mode, the UPStation S must be in bypass. Verify that the UPStation S does not have a bypass out-of-sync or bypass voltage out-of-tolerance alarm prior to transferring.
- If no alarms are present, transfer the UPStation S to bypass by placing the bypass/UPS switch on the back of the UPStation in the bypass position. Verify the L1-L2, L1-N, and L2-N output voltages, with a DVM and the maintenance bypass input meter (units with meters), are as per the customer's specifications.
- Rotate the maintenance bypass switch counterclockwise to the test position. Open the UPStation S output breaker and silence the alarm. **Power is still being powered to the input of the UPStation S in the test position.**
- Continue rotating the maintenance bypass switch counterclockwise to the maintenance position. The UPStation S should now shut off and input power has been removed. Open the input, output, and battery breaker prior to servicing the unit.

### 3.3 Transfer to Test from Maintenance Bypass: 3.5 - 18 kVA Standard With or Without Meters

- After preventive maintenance or repairs have been performed, it is important to test the UPS prior to placing it on-line. Please use the following steps to test the UPS without transferring on-line.
- Close the Battery breaker on the UPStation S. Place the bypass/UPS switch on the back of the unit in the UPS position.
- Rotate the bypass switch on the maintenance bypass clockwise to the Test position. Close the input breaker on the UPStation S.
- The UPStation S should now be going through its normal testing and start-up procedure. Follow UPStation S LCD screen instructions.
- After the output breaker is closed and the ON button is pressed, the unit should return to the Normal Operation screen. Proceed to the meter screen on the UPStation S LCD. Verify that meters are within Operating specifications.
- Return the UPStation S LCD to the Normal Operation screen. Transfer the UPStation S to bypass by placing the bypass/UPS switch on the back of the unit in the bypass position.

### 3.4 Transfer to On-Line from Test: 3.5 - 18 kVA Standard With or Without Meters

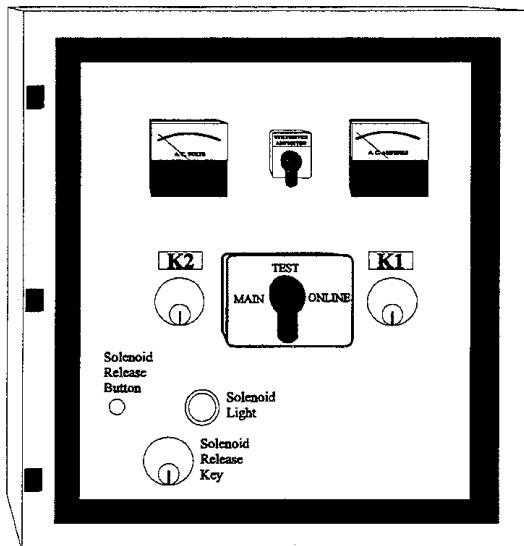
- Always verify that the UPStation S is in the bypass mode prior to transfer to On-Line position. Rotate the bypass switch to the On-Line position.
- The customer may now bring up their connected critical loads. **Always energize the load on bypass, either UPStation S internal bypass or maintenance bypass.**
- After the load is up and operating, the UPStation S may now be transferred on-line. Transfer the UPStation S to the UPS mode by placing the bypass/UPS switch on the back of the unit in the UPS position and pressing the ON button on the front of the unit.

### 3.5 Initial System Start-Up: 3.5 - 18 kVA Kirk-Key™ With or Without Meters

The Kirk-Key™ interlock system prevents the maintenance bypass from being transferred to bypass without the UPStation S being in bypass first.

This option insures that the UPStation S and the maintenance bypass are in sync prior to a make-before-break transfer. The inside door will include three keyholes, a release button, and a light, as illustrated in **Figure 18**.

**Figure 18 Kirk-Key™ Interlock Inner Door Illustration**



- The UPS system must be in the bypass mode of operation prior to the start of any transfers. Set the Bypass/UPS switch on the back of the UPStation S to the Bypass mode.
- Locate customers critical load breakers. Verify that all load breakers are in the off position. Close customer supplied feed breaker. Power is now flowing through the maintenance bypass as illustrated in **Figure 5** and **Figure 6**.
- When the Solenoid light on the front of the maintenance bypass is illuminated, depress the Solenoid Release button and remove the key by turning it.
- If the bypass switch on the maintenance bypass is in the On-Line position, insert the key into lock K1 and turn. Rotate the maintenance bypass rotary switch to the Test position.
- Take the key out of K1 and place the key in lock K2 and turn.
- Rotate the maintenance bypass rotary switch to the maintenance position. Set the meter switch to the Input L1-L2 position (units with meters).
- Verify the maintenance bypass TB1's L1-L2, L1-N, and L2-N input voltages, with a DVM and the maintenance bypass input meter (units with meters), are as per the customers specifications. Verify that there is no current on the maintenance bypass output current meter (units with meters). **The UPStation S/maintenance bypass input and output voltages and frequency must be the same for the system to operate according to specifications.**
- Turn the key in lock K2 and rotate the bypass switch to the Test position. Power is now flowing through the maintenance bypass as illustrated in **Figure 3** and **Figure 4**.

- 
- Close the UPStation S output breaker. Silence the alarm on the UPStation S LCD panel.
  - Proceed to the meter screen on the UPStation S LCD. Verify that the output voltage and frequency is the same as the input voltage and frequency.
  - With a DVM, verify that there is no voltage difference between the following points in the bypass cabinet (units without dual input):
    - TB1 L1 to TB3 L1
    - TB1 L2 to TB3 L2
  - Units with dual input, check the following points:
    - TB2 L1 to TB5 L1
    - TB2 L2 to TB5 L2
  - Transfer the UPStation S to UPS by placing the bypass/UPS switch on the back of the unit in the UPS position. Press ON to start system and follow the instructions on the front of the UPStation S.
  - Again with a DVM, verify that there is no voltage difference between the following points in the bypass cabinet (units without dual input):
    - TB1 L1 to TB3 L1
    - TB1 L2 to TB3 L2
  - Units with dual input, check the following points:
    - TB2 L1 to TB5 L1
    - TB2 L2 to TB5 L2
  - Set the maintenance bypass meter switch (units with meters) to the Output L1-L2 position. Verify that the voltage does not drop to zero during on-line transfer sequence.
  - Transfer the UPStation S to the bypass mode by placing the Bypass/UPS switch on the back of the unit in the bypass position. Silence the alarm on the UPStation S LCD display.
  - Take the key out of K2 and place the key in lock K1 and turn.
  - Rotate the bypass switch to the on-line position. Transfer the UPStation S to the UPS mode by placing the bypass/UPS switch on the back of the unit in the UPS position and pressing the ON button on the front of the unit. Power is now flowing through the maintenance bypass as illustrated in **Figure 1** and **Figure 2**.
  - Take the key out of K1 and return it back to its original position, the Solenoid Release Key Holder.
  - The bypass switch is operating according to specifications if no problems occurred during the previous start-up steps.
  - Transfer the UPStation S to bypass by placing the bypass/UPS switch on the back of the unit in the bypass position. Verify the maintenance bypass TB4's L1-L2, L1-N, and L2-N output voltages, with a DVM and the maintenance bypass input meter (units with meters), are as per the customer's specifications.
  - Set the maintenance bypass meter switch (units with meters) to the Output Current L1 position.
  - The customer may now bring up their connected critical loads. **Always energize the load on bypass, either UPStation S internal bypass or maintenance bypass.**
  - After the load is up and operating, the UPStation S may now be transferred on-line. Transfer the UPStation S to the UPS mode by placing the bypass/UPS switch on the back of the unit in the UPS position and pressing the ON button on the front of the unit. Power is now flowing through the maintenance bypass as illustrated in **Figure 1** and **Figure 2**. The load is protected by UPS power.

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### 3.6 Transfer to Maintenance Bypass from On-Line: 3.5 - 18 kVA Kirk-Key™ With or Without Meters

- Prior to transferring the maintenance bypass to the bypass mode, the UPStation S must be in bypass. Verify that the UPStation S does not have a bypass out-of-sync or bypass voltage out-of-tolerance alarm prior to transferring.
- If no alarms are present, transfer the UPStation S to bypass by placing the bypass/UPS switch on the back of the UPStation in the bypass position. Verify the L1-L2, L1-N, and L2-N output voltages, with a DVM and the maintenance bypass input meter (units with meters), are as per the customers specifications.
- The Solenoid Light in the maintenance bypass should now be illuminated. Press the Solenoid Release Button and remove the Key from the Solenoid Release key position.
- Place the Key in lock K1 on the maintenance bypass and turn.
- Rotate the maintenance bypass counterclockwise to the test position. Open the UPStation S output breaker and silence the alarm. **Power is still being powered to the input of the UPStation S in the test position.**
- Remove the Key in lock K1 and place it in lock K2 on the maintenance bypass and turn.
- Continue rotating the maintenance bypass counterclockwise to the maintenance position. The UPStation S should now shut off and input power has been removed. Open the input, output, and battery breaker prior to servicing the unit.

### 3.7 Transfer to Test from Maintenance Bypass: 3.5 - 18 kVA Kirk-Key™ With or Without Meters

- After preventive maintenance or repairs have been performed, it is important to test the UPS prior to placing it on-line. Please use the following steps to test the UPS without transferring on-line.
- Insert the battery fuses (3.5 - 6 kVA) or close the battery breaker (8 - 18 kVA) on the UPStation S. Place the bypass/UPS switch on the back of the unit in the UPS position.
- Rotate the bypass switch on the maintenance bypass clockwise to the Test position. Insert the input fuses (3.5 - 6 kVA) or close the input breaker (8 - 18 kVA) on the UPStation S.
- The UPStation S should now be going through its normal testing and start-up procedure. Follow UPStation S LCD screen instructions.
- After the output breaker is closed and the ON button is pressed, the unit should return to the Normal Operation screen. Proceed to the meter screen on the UPStation S LCD. Verify that meters are within operating specifications.
- Return the UPStation S LCD to the Normal Operation screen. Transfer the UPStation S to bypass by placing the bypass/UPS switch on the back of the unit in the bypass position.

### 3.8 Transfer to On-Line from Test: 3.5 - 18 kVA Kirk-Key™ With or Without Meters

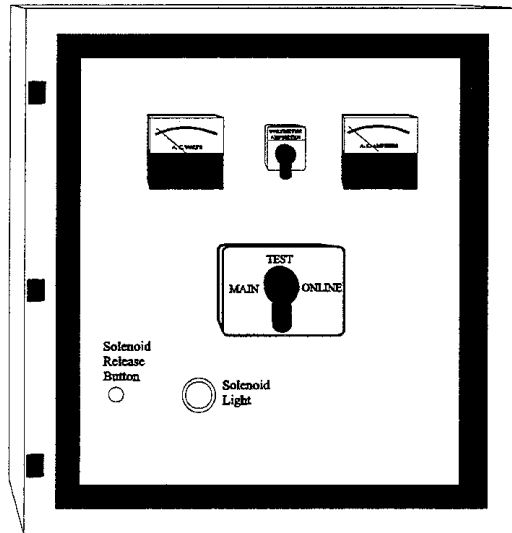
- Always verify that the UPStation S in the Bypass mode prior to transfer to On-Line position.
- Remove the key in lock K2 and place it in lock K1 on the maintenance bypass and turn.
- Rotate the bypass switch to the on-line position. Return the Key to the Solenoid Release Key position.
- The customer may now bring up their connected critical loads. **Always energize the load on bypass, either UPStation S internal bypass or maintenance bypass.**
- After the load is up and operating, the UPStation S may now be transferred on-line. Transfer the UPStation S to the UPS mode by placing the bypass/UPS switch on the back of the unit in the UPS position and pressing ON the front of the unit.

### 3.9 Initial System Start-Up: 3.5 - 18 kVA Solenoid Lock With or Without Meters

The solenoid lock system prevents the maintenance bypass from being transferred to bypass without the UPStation being in bypass first.

This option insures that the UPStation S and the maintenance bypass are in sync prior to a make-before-break transfer. The inside door will include a release button and a light as illustrated in **Figure 19**.

**Figure 19 Solenoid Lock Inner Door Illustration**



- Locate customer's critical load breakers. Verify that all load breakers are in the OFF position. Close customer supplied feed breaker. Power is now flowing from the utility through the maintenance bypass switch to the UPS.
- The UPS system must be in the bypass mode of operation prior to the start of any transfers. Set the Bypass/UPS switch on the back of the UPStation S to the bypass mode.
- When the solenoid light on the front of the maintenance bypass is illuminated, depress the solenoid release button and turn the maintenance bypass to the test position if it is in the on-line position.
- If the solenoid light is still lighted, depress the solenoid release button and rotate the switch to the maintenance position. Since all power is now off to the UPS, the solenoid light will not be illuminated. Set the meter switch to the input L1-L2 position (units with meters).
- Verify the maintenance bypass TB1's L1-L2, L1-N, and L2-N input voltages, with a DVM and the maintenance bypass input meter (units with meters) are as per the customer's specifications. Verify that there is no current on the maintenance bypass output current meter (units with meters). The UPStation S/maintenance bypass input and output voltages and frequency must be the same for the system to operate according to specifications.
- Depress the solenoid release push button and rotate the bypass switch to the test position (keep button depressed until switch is in test position). Power is now flowing through the maintenance bypass switch as illustrated in **Figure 3** and **Figure 4**.
- Close the UPStation S output breaker. Silence the alarm on the UPStation S LCD panel.
- Proceed to the meter screen on the UPStation S LCD. Verify that the output voltage and frequency are the same as the input voltage and frequency.
- With a DVM, verify that there is no voltage difference between the following points in the bypass cabinet (units without dual input):
  - TB1 L1 to TB3 L1
  - TB1 L2 to TB3 L2
- Units with dual input, check the following points:
  - TB2 L1 to TB5 L1
  - TB2 L2 to TB5 L2

- Transfer the UPStation S to UPS by placing the bypass/UPS switch on the back of the unit in the UPS position. Press ON to start system and follow the instructions on the front of the UPStation S.
- Again with a DVM, verify that there is no voltage difference between the following points in the bypass cabinet (units without dual input):
  - TB1 L1 to TB3 L1
  - TB1 L2 to TB3 L2
- Units with dual input, check the following points:
  - TB2 L1 to TB5 L1
  - TB2 L2 to TB5 L2
- Set the maintenance bypass meter switch (units with meters) to the Output L1-L2 position. Verify that the voltage does not drop to zero during on-line transfer sequence.
- Transfer the UPStation S to the bypass mode by placing the Bypass/UPS switch on the back of the unit in the bypass position. Silence the alarm on the UPStation S LCD display.
- Solenoid light should be lighted. Depress the solenoid release push-button and rotate the maintenance bypass switch to the “On-Line” position. Transfer the UPStation S to the UPS mode by placing the bypass UPS switch on the back of the unit in UPS position and pressing the ON button on the front of the unit. Power is now flowing through the maintenance bypass as illustrated in **Figure 1** and **Figure 2**.
- The maintenance bypass switch is operating according to specifications if no problems occurred during the previous start-up steps and is locked in the ON LINE position by the solenoid lock.
- Transfer the UPStation S to bypass by placing the bypass/UPS switch on the back of the unit in the bypass position. Verify the maintenance bypass input meter (units with meters) are as per the customers specifications.
- Set the maintenance bypass meter switch (units with meters) to the output current L1 position.
- The customer may now bring up their connected critical loads. Always energize the load on bypass, either UPStation S internal bypass or maintenance bypass.
- After the load is up and operating, the UPStation S may now be transferred on-line. Transfer the UPStation S to the UPS mode by placing the bypass/UPS switch on the back of the unit in the UPS position and pressing the ON button on the front of the unit. Power is now flowing through the maintenance bypass as illustrated in **Figure 1** and **Figure 2**. The load is protected by UPS power.

### 3.10 Transfer to Maintenance Bypass from On-Line: 3.5 - 18 kVA Solenoid Lock With or Without Meters

- Prior to transferring the maintenance bypass to the bypass mode, the UPStation S must be in bypass. Verify that the UPStation S does not have a bypass out-of-sync or bypass voltage out-of-tolerance alarm prior to transferring.
- If no alarms are present, transfer the UPStation S to bypass by placing the bypass/UPS switch on the back of the UPStation S in the bypass position. Verify the L1-L2, L1-N, and L2-N output voltages, with a DVM and the maintenance bypass input meter (units with meters), are as per the customers specifications.
- The solenoid light in the maintenance bypass should now be illuminated. Press the solenoid release push button and rotate the switch to the “TEST” position. Open the UPStation S output breaker and silence the alarm. Power is still being supplied to the input of the UPStation S in the test position and to the critical load from the customer power source.
- Press the solenoid release push button and rotate the maintenance bypass switch to the maintenance position. The UPStation S should now shut off and input power has been removed. Open the input, output and battery breaker (input and battery fuses on 3.5 - 6 kVA) prior to servicing the unit.

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### 3.11 Transfer to Test from Maintenance Bypass: 3.5 - 18 kVA Solenoid Lock With or Without Meters

After preventative maintenance or repairs have been performed, it is important to test the UPS prior to placing it on-line. Please use the following steps to test the UPS without transferring on-line.

- Insert the battery fuses (3.5 - 6 kVA) or close the battery breaker (8 - 18 kVA) on the UPStation S. Place the bypass/UPS switch on the back of the unit in the UPS position.
- Press the solenoid release push-button to rotate the maintenance bypass switch to the test position (keep button depressed until switch is in test position). Insert the input fuses (3.5 - 6 kVA) or close the input breaker (8 - 18 kVA) on the UPStation S.
- The UPStation should now be going through its normal testing and start-up procedure. Follow UPStation S LCD screen instructions.
- After the output breaker is closed and the ON button is pressed, the unit should return to the Normal Operation screen. Proceed to the meter screen on the UPStation S LCD. Verify that meters are within operating specifications.
- Return the UPStation S LCD to the Normal Operation screen. Transfer the UPStation to bypass by placing the bypass/UPS switch on the back of the unit in the bypass position.

### 3.12 Transfer to On-Line from Test: 3.5 - 18 kVA Solenoid Lock With or Without Meters

- Always verify that the UPStation S is in the Bypass mode prior to transfer to On-Line position.
- Press solenoid release push button and rotate the bypass switch to the On-Line position.
- If the customers critical loads were supplied with power in the Test position, the bypass power is now removed and is being supplied from the UPS only. Always energize the load on bypass, either UPStation S internal bypass or maintenance bypass.
- After the load is up and operating, the UPStation S may now be transferred on-line. Transfer the UPStation S to the UPS mode by placing the bypass/UPS switch on the back of the unit in the UPS position and pressing the "ON" button on the front of the unit.

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## 4.0 TROUBLESHOOTING / WARRANTY

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### 4.1 Troubleshooting

Troubleshooting should only be performed by a trained engineer authorized by Liebert Customer Service and Support. If you cannot resolve a problem, consult Customer Service and Support immediately at **1-800-543-2378**. Do not continue to use the maintenance bypass cabinet if it is not performing according to specifications.

### 4.2 Warranty

The manufacturer will warrant the maintenance bypass cabinet against defects in materials and workmanship for one (1) year from date of start-up (if commissioned by Liebert CS&S at time of UPStation S start-up) or one year from invoice if commissioned by sources other than Liebert CS&S. Warranty consists of one (1) year parts from date of purchase and (90) days labor for systems commissioned by sources other than Liebert CS&S or one (1) year parts and labor if commissioned by Liebert CS&S at time of UPStation S start-up.





## UPStation® S

Rotary Maintenance Bypass

3.5 kVA to 18 kVA

### Technical Support

U.S.A.	1-800-222-5877
Outside the U.S.A.	614-841-6755
U.K.	+44 (0) 1793 553355
France	+33 1 4 87 51 52
Germany	+49 89 99 19 220
Italy	+39 2 98250 1
Netherlands	+00 31 475 503333
E-mail	upstech@liebert.com
Web site	<a href="http://www.liebert.com">http://www.liebert.com</a>
Worldwide FAX tech support	614-841-5471

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With more than 500,000 installations around the globe, Liebert is the world leader in computer protection systems. Since its founding in 1965, Liebert has developed a complete range of support and protection systems for sensitive electronics:

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- Power conditioning and UPS with power ranges from 250 VA to more than 1000 kVA.
- Integrated systems that provide both environmental and power protection in a single, flexible package.
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