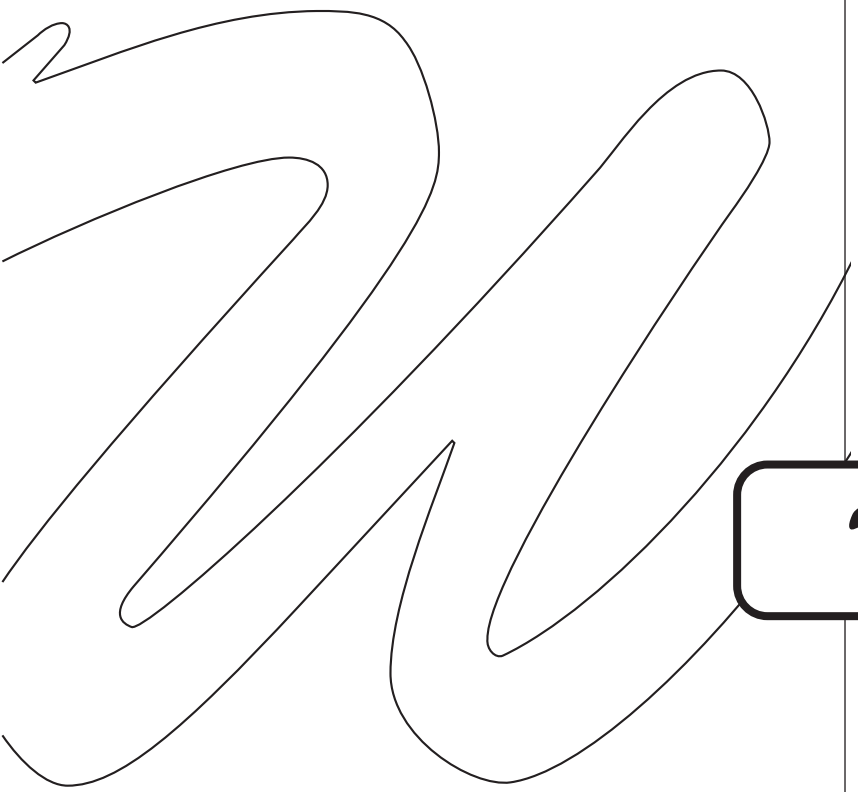
USER'S GUIDE

LEONICS®



Wise HP33

THREE PHASE HIGH PRECISION AVR

SURVO-MOTOR AUTOMATIC VOLTAGE STABILIZER

LEN.MAN.STA.111 Rev.4.00/2010

CONTENTS

SAFETY INSTRUCTIONS

Please read carefully and follow this LEONICS Wise HP33-series AVR guide.

Important: Please keep this user's guide for reference in order to use the LEONICS AVR properly and safety. This user's guide contains instructions for installation, operation, display, setting and troubleshooting.

For product safety, please check this product annually by our service qualified personnel or if there are any symptoms of problems which are not mentioned in this guide or an queries, please contact your Leonics local distributor, Leonics Service Center, send e-mail to support@leonics.com or visit www.leonics.com.

For your convenience and quick reference for our service, please fill the requested information in the blanks below.

Wise HP33-series model : _____

Serial number : _____

Purchased date : _____

Purchased from : _____

WARNING

Risk of electric shock, DO NOT remove cover. No user serviceable part inside, please refer servicing to qualified service personnel.

1.1 Electrical safety

1.1.1 Do not work alone where there are electrically hazardous conditions.

1.1.2 Contact with live conductors will cause burns and dangerous electric shock.

1.1.3 Only qualified electricians should install or service this unit, PV panel and batteries.

1.1.4 Properly install and ground (⏚) the equipment in accordance with the instruction manual.

1.1.5 To reduce risk from electric shock when you could not check building electric ground system, turn off the Input breaker of this unit before connecting the loads.

1.1.6 Periodically check your cable, terminal and power source to make sure that they are in good condition.

1.1.7 To reduce risk from electric shock , disconnect all power source before connecting / disconnecting the loads or when maintaining or servicing this unit.

1.1.8 Use ONLY one hand when connect and disconnect the cable from equipment to equipment in order to avoid electric shock from touching two surfaces with differential potential.

1.2 Safety instruction for installation and operation

1.2.1 Before installing or using this unit, read all instructions and caution markings on this unit or loads and all sections of this user guide.

1.2.2 Install this unit in a temperature and humidity controlled indoor area with adequate air flow and away from chemical particles or flammable substances. Avoid installing the unit near radio transmission station, heat dissipation equipment and direct sunlight.

1.2.3 This unit has ventilation grills. Ensure that sufficient ventilation is provided. DO NOT block the ventilation grills. Install this unit at least 20 cm. from the wall to the side of the unit for good ventilation and at least 30 cm. from the wall to the back of the unit for easy access when maintenance or repair.

1.2.4 Use insulated tools to reduce your risk of electric shock.

1.2.5 Remove all jewelry or other metal objects such as rings, necklace, bracelets and watches when installing this product.

1.2.6 Connect the wires to the terminals of this unit as mentioned in the diagram and installation procedure to prevent the damages.

1.3 Safety instruction for transport

1.3.1 Use forklift truck or stacker for transport this unit.
1.3.2 Keep this unit upright all the time.
1.3.3 Carry with its packaging to avoid damage.

INTRODUCTION

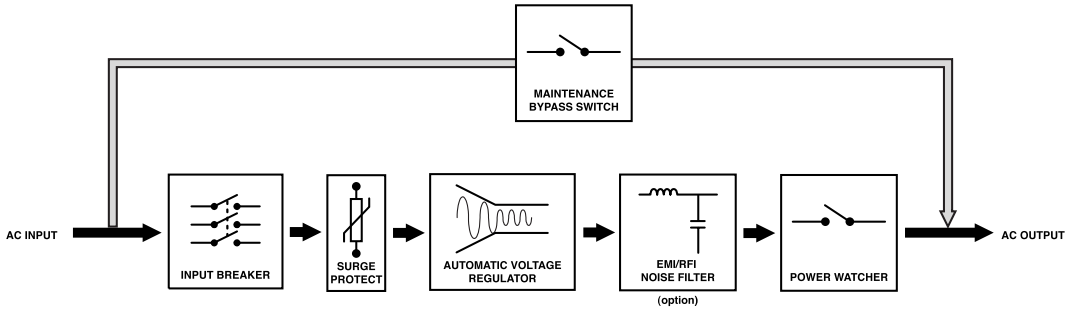
2.1 General

Wise HP33-series AVR is a 3 phase 4 wire automatic voltage regulator or stabilizer which each phase is controlled independently by servo motor or also called "3 phase 4 wire independent phase control". Wise HP33-series AVR supplies pure sine wave output with low harmonic distortion. It has LED display and LCD screen to display operating status and electrical data and audible alarm to alarm when the AVR has faults.

2.2 Features

- 3 phase 4 wire independent phase control
- Pure sine wave output
- Overload and short circuit protection
- Automatic shut down when main electricity supply is abnormal
- Easy installation
- Surge protection
- Display operating status and electrical data via LED display and LCD screen
- Volt meter and Amp meter
- EMI/RFI filter or noise filter (Option)

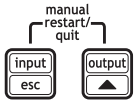
2.3 Principle



Normal operation mode: Wise HP33-series AVR takes power from main electricity supply. Then, the current flows to automatic voltage regulator (AVR) circuit to regulate the voltage level. This process is controlled by servo motor. If the voltage is too high or too low, the AVR circuit will regulate it to the level that is safe for the loads. Then, flows to EMI/RFI noise filter circuit (option) and check load level at Power watcher to protect overload. If the AVR is overloaded, it will alarm. You have to disconnect some loads. If the AVR is under these situations; output over/under voltage, overload, input frequency fault, over temperature (option), and etc., it will shut itself down and restart automatically when it returns to normal (for automatic restart mode only).

Maintenance bypass mode: When the AVR is stop and disconnected from main electricity supply for maintenance, user turns off the INPUT BREAKER and turns MAINTENANCE BYPASS/AVR SELECTOR SWITCH to position "2" (select maintenance bypass mode), the loads will take power directly from main electricity supply.

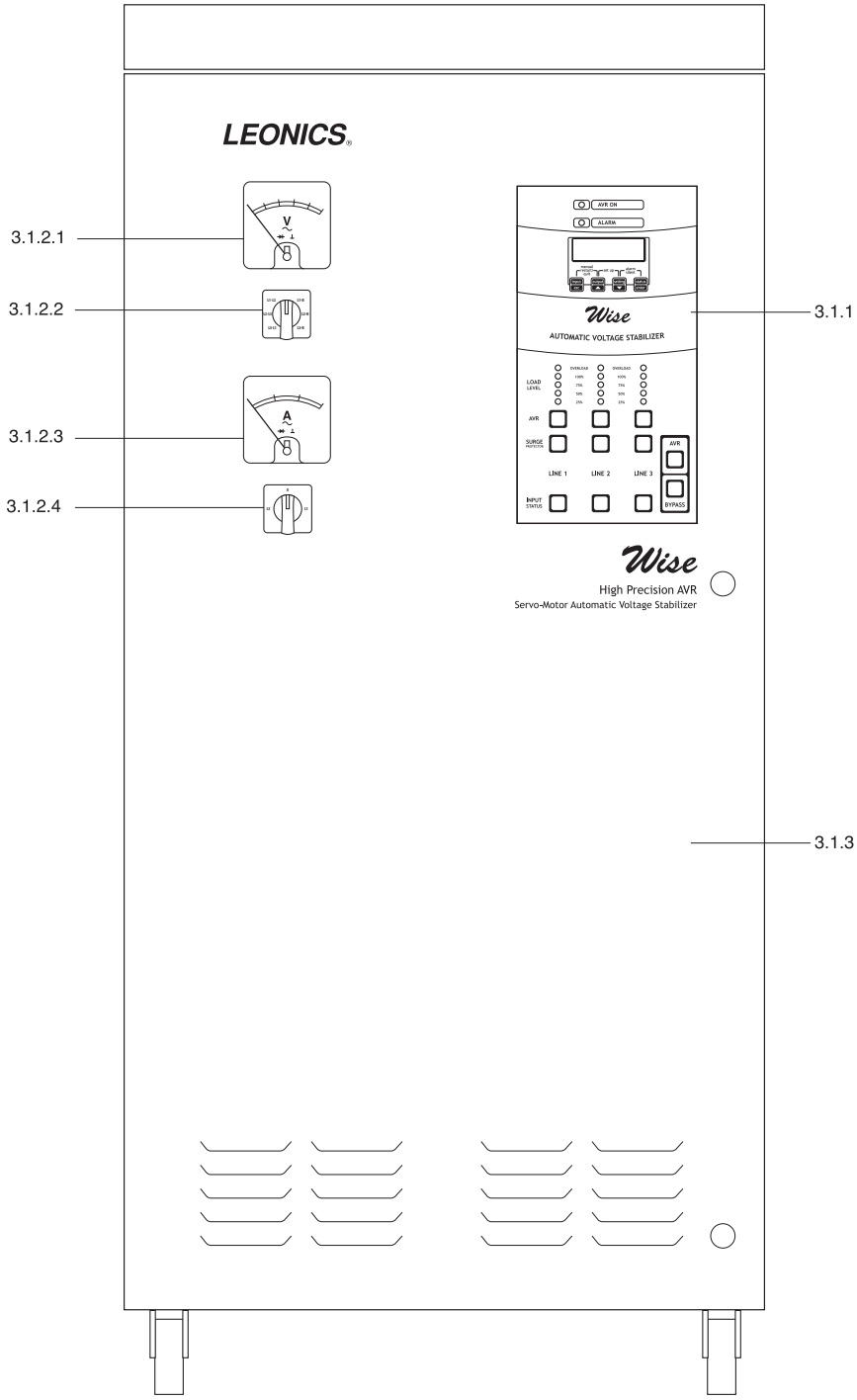
Note: There are 2 restart modes (automatic and manual restart). After the AVR shuts down and the restart mode is manual, once it detects no more faults, it will alarm. You can restart the AVR by pressing

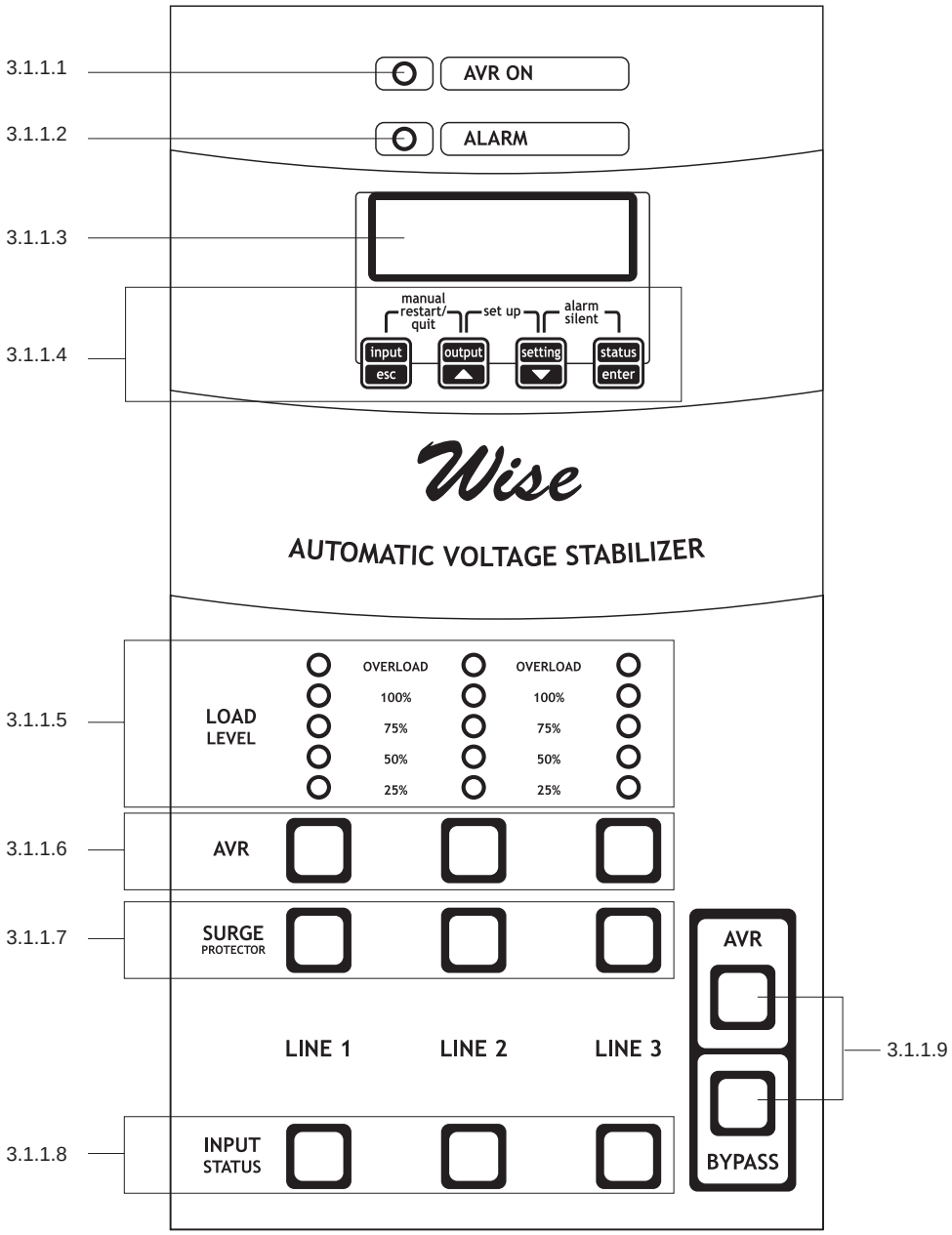


simultaneously once.

FRONT PANEL AND CONNECTION BOARD

3.1 Front panel





3.1.1 DISPLAY:

3.1.1.1 AVR ON: The lamp shows that the AVR is operating under AVR mode.

3.1.1.2 ALARM: The lamp shows that the AVR has faults.

3.1.1.3 LCD SCREEN: The screen displays electrical data such as voltage, current, frequency and the percentage of AVR capacity taken by loads, and etc.

3.1.1.4 CONTROL BUTTONS: The buttons to select display, change setting and control the AVR operation. There are input esc, output, setting and status enter. See more information in Section DATA DISPLAY and SETTING.

3.1.1.5 LOAD LEVEL: The lamps show how much power is being taken by the loads in each phase in percentage.

3.1.1.6 AVR: The lamps show that the AVR is operating under AVR mode. Each lamp represents each phase.

3.1.1.7 SURGE PROTECTOR: Each lamp shows the operating status of surge protector system in each phase.

3.1.1.8 INPUT STATUS: Each lamp shows the status of input voltage in each phase.

3.1.1.9 AVR/BYPASS: The lamps show that the AVR is operating under automatic voltage regulator mode or maintenance bypass mode (that means the loads are taking the power directly from main electricity supply).

Relationship between indicator lamps and AVR operation

Indicator lamp	Status of indicator lamps and AVR operation		
	OFF	**BLINK**	**BRIGHT**
AVR ON (green)	The AVR is OFF.	-	The AVR is operating under AVR mode.
ALARM (red)	The AVR is operating properly.	There is fault.	The voltage from main electricity supply is low or there is fault.

3.1.2 VOLT METER AND AMP METER:

3.1.2.1 Volt meter

3.1.2.2 Selector switch to select the display of Line-Neutral voltage value of each phase, or Line-Line voltage value.

3.1.2.3 Amp meter

3.1.2.4 Selector switch to select the display of current value of each phase.

3.1.3 Door

3.2 Connection Board

3.2.1 INPUT BREAKER: The circuit breaker for protecting the AVR from input over current or input short circuit.

3.2.2 MAINTENANCE BYPASS/AVR SELECTOR SWITCH: The selector switch to select operating mode;
position 0 : no power supply to load
postion 1 : automatic voltage regulator mode
position 2 : maintenance bypass mode .

3.2.3 INPUT terminal (N): The terminal for connecting the neutral cables from main electricity supply to the AVR.

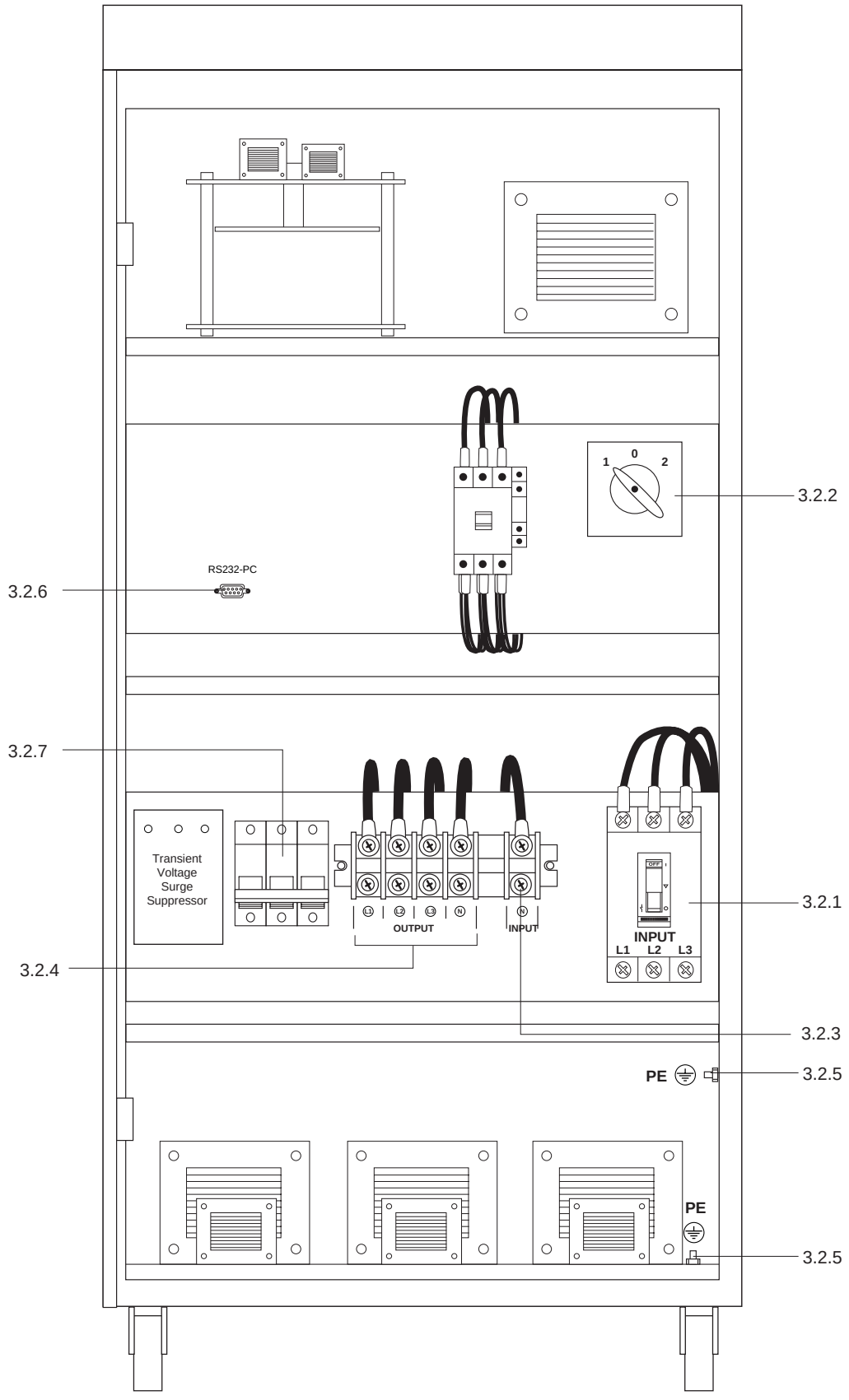
Note: The L1, L2 and L3 cables of AC Input connect to the INPUT BREAKER poles.

3.2.4 OUTPUT terminal (L1, L2, L3, N): The terminal for connecting the cables from the AVR to the equipment (or loads) or load panel.

3.2.5 PE: The EARTH terminal or screw for connecting to ground.

3.2.6 RS232-PC: The communication port for connecting computer or transceiver (if any).

3.2.7 SURGE BREAKER: The circuit breaker for protecting the transient voltage surge suppressor and the AVR from lightning surge damage.



Wise HP33-series AVR (when open the door)

INSTALLATION AND OPERATION

Caution: The warranty will be voided, if this product has been improper installation, not following the installation instruction that mentioned in this user's guide.

4.1 Preparation

4.1.1 Before you install the AVR, give it a through visual examination to ensure it has not been subjected to shipping damage. If it is not in perfect condition, please contact your local distributor or service center or e-mail to support@leonics.com.

4.1.2 Installation of the AVR must be done by professional technicians only. Before installing or using this unit, read all instructions, caution markings on the AVR and all connected load, and all sections of this user guide.

4.1.3 Check the mains input voltage and alll connected load power rating to suit for UPS power rating.

4.1.4 Transportation

4.1.4.1 UPS has been fitted with casters to allow ease of transportation. UPS must be moved vertically.

4.1.4.2 Transport the UPS with its packaging until it arrive the installation location to avoid shipping damages.

4.1.5 Location

4.1.5.1 Install this unit at least 20 cm. from the wall to the side of the unit for good ventilation and at least 30 cm. from the wall to the back of the unit for easy access when maintenance or repair.

4.1.5.2 Install at the floor that is capable of supporting the weight of the UPS.

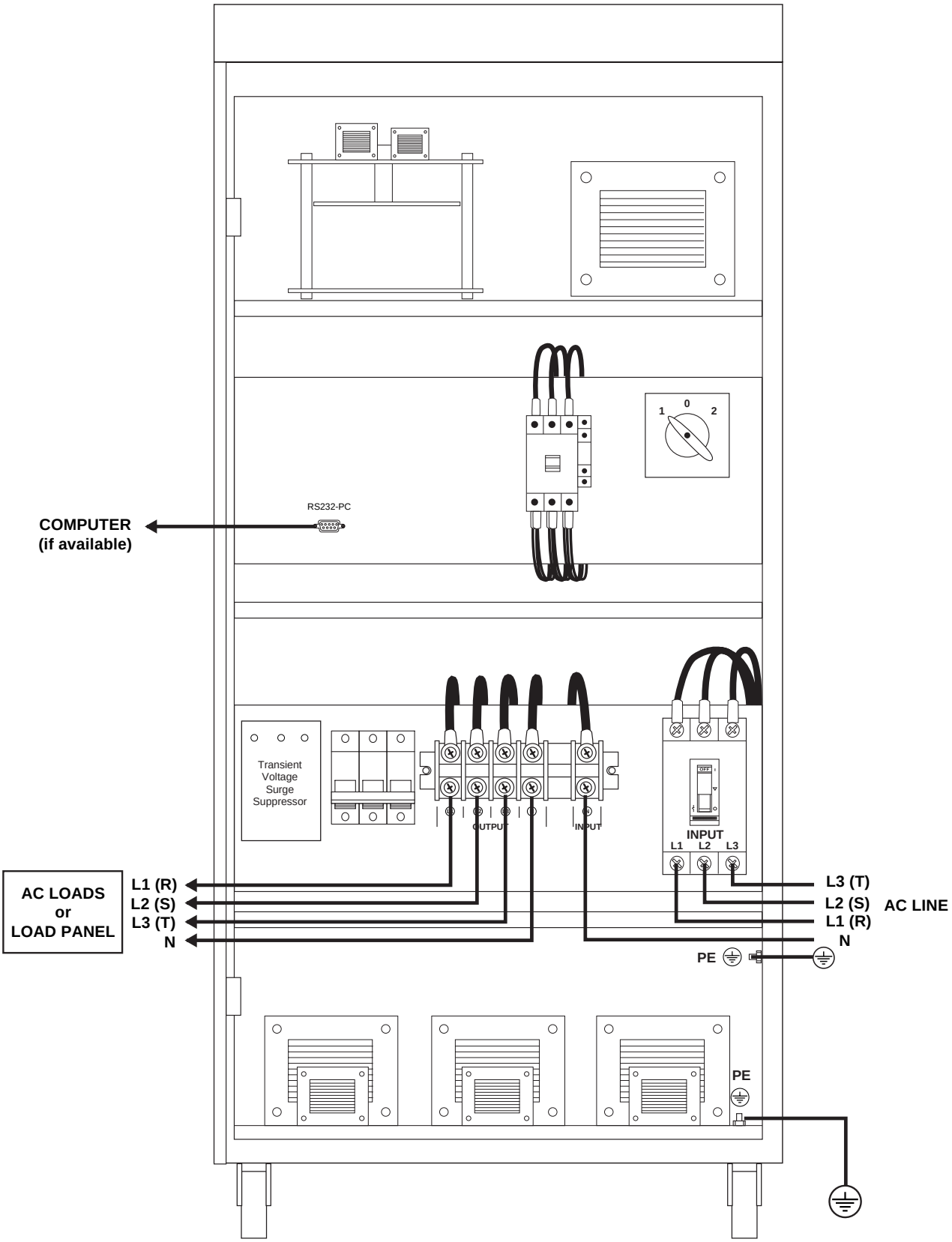
4.1.6 Cable sizing

- For your safety, all cables should be wire in the suitable size conduits.
- The cable sizes in the following table are calculated based on TIS 11-2531 PVC insulated copper wire, 70˚C conductor temperature, 750 Volts, 40˚C ambient temperature and maximum 3 wires per conduit.

Rating	3kVA	6kVA	10kVA	15kVA	24kVA	30kVA	40kVA	45kVA	50kVA	60kVA	75kVA	100kVA	125kVA	150kVA
Input wire (L1, L2, L3, N) (mm^2)	2.5	2.5	4	10	16	25	16 x 2	16 x 2	25 x 2	25 x 2	35 x 2	35 x 3	50 x 3	70 x 3
Output wire (L1, L2, L3, N) (mm^2)	2.5	2.5	4	10	16	25	25	35	16 x 2	16 x 2	25 x 2	35 x 2	25 x 3	35 x 3
Earth wire (mm^2)	2.5	2.5	2.5	6	16	16	16	25	25	25	25	35	50	50

Note: Maximum cable length must not exceed 5 metres. If in need of cable longer than 5 metres, properly increase cable size to accommodate excessive length.

4.2 Installation

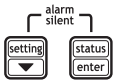


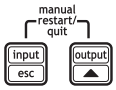
4.2.1 Cut off 3 phase main electricity supply which will connect to the AVR.
4.2.2 Open the AVR door and turn off INPUT BREAKER.
4.2.3 Remove the terminal cover.
4.2.4 Connect grounding cable at the PE terminal or screw of the AVR.
4.2.5 Connect the cable from INPUT TERMINAL (N) to Neutral of the main electricity supply as shown in the diagram.
4.2.6 Connect the cable from INPUT BREAKER (L1, L2, L3) to L1 (R), L2 (S), L3 (T) of the main electricity supply as shown in the diagram respectively.
4.2.7 Connect the cable from OUTPUT TERMINAL (N, L1, L2, L3) to N, L1 (R), L2 (S), L3 (T) of the load panel or loads as shown in the diagram respectively.

Note: The loads connecting to the AVR should not exceed the AVR capacity. It is recommended to utilize the AVR maximum at 75% of its capacity and spare 25% of its capacity for some loads that consume high power in some period.

4.2.8 Verify all connections.
4.2.9 Turn on the SURGE BREAKER.
4.2.10 Replace the terminal cover.

4.3 Start up procedure

4.3.1 Turn off all loads that connected to the AVR.
4.3.2 Turn on 3 phase main electricity supply to the AVR. 3 INPUT STATUS lamps at the front panel will lit.
4.3.3 Open the AVR door and turn MAINTENANCE BYPASS/AVR SELECTOR SWITCH to "AVR (position 1)".
4.3.4 Turn on the INPUT BREAKER.
4.3.5 If the AVR restart mode is MANUAL, you will hear the audible alarm. Press 

simultaneously once to mute the alarm. Then press 

simultaneously once to start the AVR. For more details, please refer to section 5.5 and 7.7.
4.3.6 Turn on the breaker at load panel and turn on the loads.

4.4 Shutdown procedure

4.4.1 Turn off all loads that connected to the AVR.
4.4.2 Open the AVR door.
4.4.3 Turn off the INPUT BREAKER and close the door.

Note: INPUT STATUS lamps at the front panel are still lit due to the AVR still takes power from main electricity power supply.

4.5 Operation when the AVR has faults (Maintenance bypass)

4.5.1 Turn off all loads that connected to the AVR.
4.5.2 Open the AVR door and turn off the INPUT BREAKER.
4.5.3 Turn MAINTENANCE BYPASS/AVR SELECTOR SWITCH to "MAINTENANCE BYPASS (position 2)".
4.5.4 Turn on the loads. Now, the loads are taking power directly from main electricity supply.

Caution: User must turn off all loads and INPUT BREAKER respectively before selecting the MAINTENANCE BYPASS/AVR selector switch.

DATA DISPLAY

You can check electrical data by pressing input/esc, output/▲, setting/▼ and status/enter.

5.1 input/esc is to display input electrical data such as input voltage and frequency.

Press once	Shows input voltage of each phase (Line-Neutral).	IN L1 L2 L3 V 220 220 220
Press twice	Shows input voltage of each phase (Line-Line).	L1-2 L2-3 L3-1 V 380 380 380
Press 3 times	Shows frequency of each phase.	FREQ(1 2 3)(Hz) 50.0 50.0 50.0
Press 4 times	Returns to the first screen.	IN L1 L2 L3 V 220 220 220

5.2 output/▲ is to display output electrical data such as output voltage, output frequency and load percentage.

Press once	Shows output voltage of each phase (Line-Neutral).	OP L1 L2 L3 V 220 220 220
Press twice	Shows output voltage of each phase (Line-Line).	O L1-2 L2-3 L3-1 V 380 380 380
Press 3 times	Shows output current of each phase (Line-Neutral).	OP L1 L2 L3 A 15 17 16
Press 4 times	Shows load percentage of each phase.	LOAD L1 L2 L3 % 10 12 11
Press 5 times	Returns to the first screen.	OP L1 L2 L3 V 220 220 220

5.3 

is to display nominal phase voltage and output restart mode.

Press once	Shows output restart mode.	Output Restart Mode = AUTO
Press twice	Shows nominal phase voltage.	Norminal Phase Voltage = 220.0
Press 3 times	Shows output control mode	O/P Control Mode =Line to Neutral
Press 4 times	Returns to the first screen.	Output Restart Mode = AUTO

5.4 

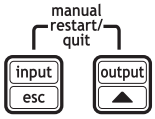
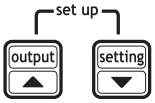
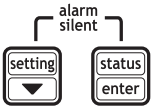
is to display system status such as operating status.

Press once	Shows present operating status.	System: RUNNING Status: NORMAL

Note: When you hear the audible alarm, you can press 

until you notice the fault shown on the LCD. Press this button until the display returns to the first screen. See more information in section TROUBLESHOOTING.

5.5 Press two buttons simultaneously

	Press to start the AVR (for manual restart mode only) or return to main menu during setting.
	Press to access password input screen.
	Press to mute the alarm.

SETTING

Do not change any setting before allowing from To return to main menu, press [input/esc] + [output ▲] (manual restart/quit) simultaneously once or wait for 30 seconds.

6.1 Input password to access to setting menu

6.1.1 Press [output ▲] + [setting ▼] (set up) simultaneously once to enter password input screen.

```
ENTER PASSWORD
     0000
```

(The password of the following sample is 2468.)

6.1.2 Press [input/esc] twice to input the first digit of the password. (Refer to the above sample, it is 2.)

```
ENTER PASSWORD
     2000
```

6.1.3 Press [output ▲] 4 times to input the second digit of the password. (Refer to the above sample, it is 4.)

```
ENTER PASSWORD
     2400
```

6.1.4 Press [setting ▼] 6 times to input the third digit of the password. (Refer to the above sample, it is 6.)

```
ENTER PASSWORD
     2460
```

6.1.5 Press [status/enter] 8 times to input the last digit of the password. (Refer to the above sample, it is 8.)

```
ENTER PASSWORD
     2468
```

6.1.6 Press [setting ▼] + [status/enter] (alarm silent) simultaneously once to confirm password entry.

```
SYSTEM CONTROL
    SETTING
```

6.1.7 Now, you reach main setting menu. Press [output ▲] + [setting ▼] (set up) to select setting item.

6.2 System control setting

6.2.1 Press [status/enter] once to enter system control setting screen. This screen displays the value of the nominal phase voltage of each Phase-Neutral.

```
Nominal Phase
Voltage =  220.0
```

6.2.2 Press [status/enter] once to edit the nominal voltage. The voltage value blinks.

Note: Press [output ▲] or [setting ▼] to change the voltage value. Then press [status/enter] to confirm the new setting or press [input/esc] to cancel the change and return to main menu.

6.2.3 Press [setting ▼] once to enter restart mode setting screen.

```
SET RESTART MODE
    = MANUAL
```

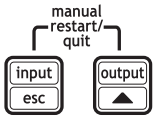
Note: Press [output ▲] or [setting ▼] to change the restart mode. Then press [status/enter] to confirm the new setting or press [input/esc] to cancel the change and return to main menu.

TROUBLESHOOTING

If the Wise HP33-series AVR does not operate properly and you cannot solve the problems using this troubleshooting information in this user's guide, please contact your Leonics local distributor, Leonics Service Center, send e-mail to support@leonics.com or visit www.leonics.com.

You can access the screen to view the fault by pressing status/enter until you notice the fault shown on the LCD. Press this button until the display returns to the first screen.

Item	Message on the LCD screen	Causes	Solutions
7.1	System: SHUTDOWN Status: ALARM	The AVR shuts itself down due to fault.	Find out the cause and solve. The AVR will restart automatically when it returns to normal (for automatic restart mode only).
7.2	Status: ALARM O/P Volt fault	The output voltage is fault.	Turn off the AVR and check the wiring at the behind whether it is correct. Turn on the AVR again. The AVR will restart automatically when it returns to normal.
7.3	ALARM : Input Voltage fault	The input voltage is fault.	Turn off the AVR and check the wiring at the behind whether it is correct. Turn on the AVR again. The AVR will restart automatically when it returns to normal.
7.4	ALARM : Input Frequency fault	The input frequency is fault.	Turn off the AVR and check the wiring at the behind whether it is correct. Turn on the AVR again. The AVR will restart automatically when it returns to normal.
7.5	Status: ALARM <Low Ctrl Power>	The voltage of main electricity supply is low.	The AVR will restart automatically when it returns to normal.
7.6	Status: ALARM <Internal fault>	There is fault.	Contact Leonics local distributors, Leonics Service Center, send e-mail to support@leonics.com or visit www.leonics.com.
7.7	ALARM : WAIT MANUAL RESTART	The AVR is waiting for restart command (for manual restart mode only).	Press manual restart/quit (input/esc + output) simultaneously once. AVR will restart when it detects no fault.

Item	Message on the LCD screen	Causes	Solutions
7.8	ALARM : SYSTEM High temperature (Availble in the AVR with temperature sensor only.)	The internal temperature is extremely high.	- Check the AVR ventilation whether anything is blocking. - Disconnect some loads due to the AVR is overload.
7.9	System: ALARM Over temperature (Availble in the AVR with temperature sensor only.)	The internal temperature is higher than the set point.	- Check the AVR ventilation whether anything is blocking. - Disconnect some loads due to the AVR is overload.
7.10	ALARM : System Overload	The AVR is overload.	Disconnect some loads until the load level shows less than 100%.
7.11	ALARM : Overload Stop warning	The AVR is going to shut down due to overload.	Disconnect some loads until the load level shows less than 100%.
7.12	System: ALARM Overload timeout	The AVR shuts itself down due to running overload for long time.	Disconnect some loads until the load level shows less than 100% and wait for 11 minutes. The AVR will restart automatically (for automatic restart mode) or press  simultaneously once (for manual restart mode).