USER'S GUIDE

LEONICS®

WiseHP11

SINGLE PHASE HIGH PRECISION AVR SERVO-MOTOR AUTOMATIC VOLTAGE ▫ STABILIZER

CONTENTS

SAFETY INSTRUCTIONS

Please read carefully and follow this LEONICS Wise HP11-series AVR guide.

<u>Important</u>:   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 trouble-shooting.

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 HP11-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 HP11-series AVR is automatic voltage regulator or stabilizer which is   controlled by servo motor. Wise HP11-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 . Audible alarm to alarm when the AVR has faults.

2.2 Features

- Pure sine wave output
- Overload and short circuit protection
- Automatic overload shutdown
- Surge protector
- Easy installation
- Display operating status and electrical data via LED display and LCD screen
- EMI/RFI filter or noise filter (option)

2.3 Operation
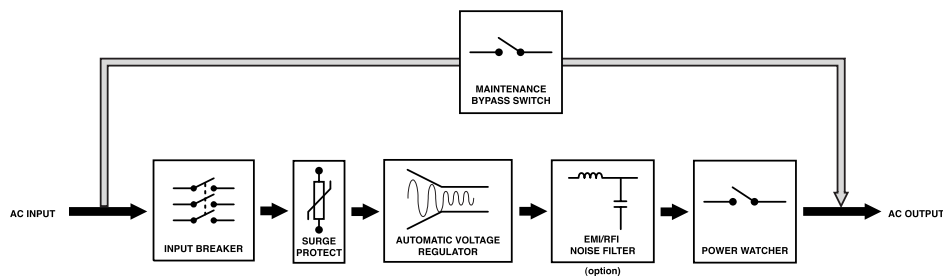
2.3.1   Normal operation mode: The AVR takes power from main electricity supply. Then, the current flows to automatic voltage regulator (AVR) circuit to regulate the voltage level. This process is controlled by servo motor. If the voltage is too high or too low, the AVR will regulate it to the level 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. The AVR will alarm when it is overloaded. 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 shutdown itself and restart automatically when it returns to normal (for automatic restart mode only).

2.3.2   Maintenance bypass mode: Turns off the INPUT BREAKER and turns MAINTENANCE BYPASS/AVR SELECTOR SWITCH to position "2" for selecting 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.
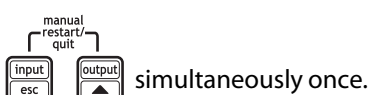
FRONT PANEL AND INSIDE PARTS

3.1 Front panel
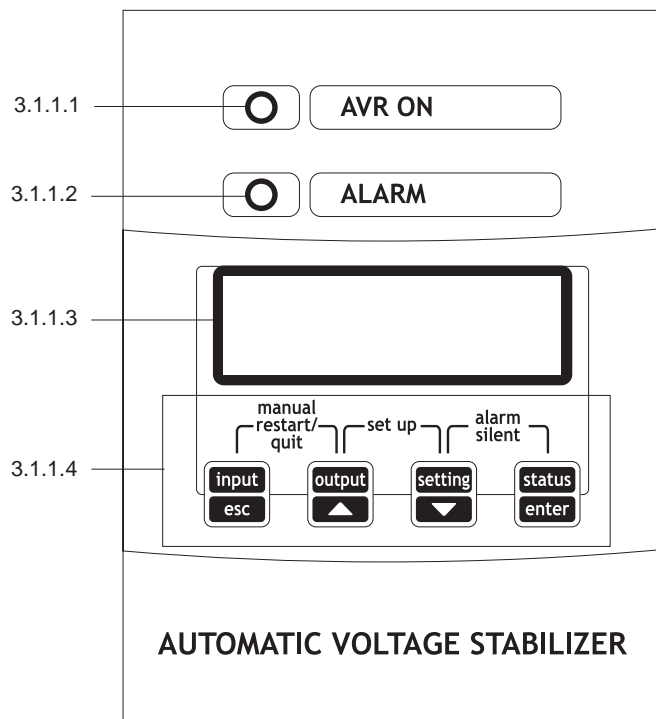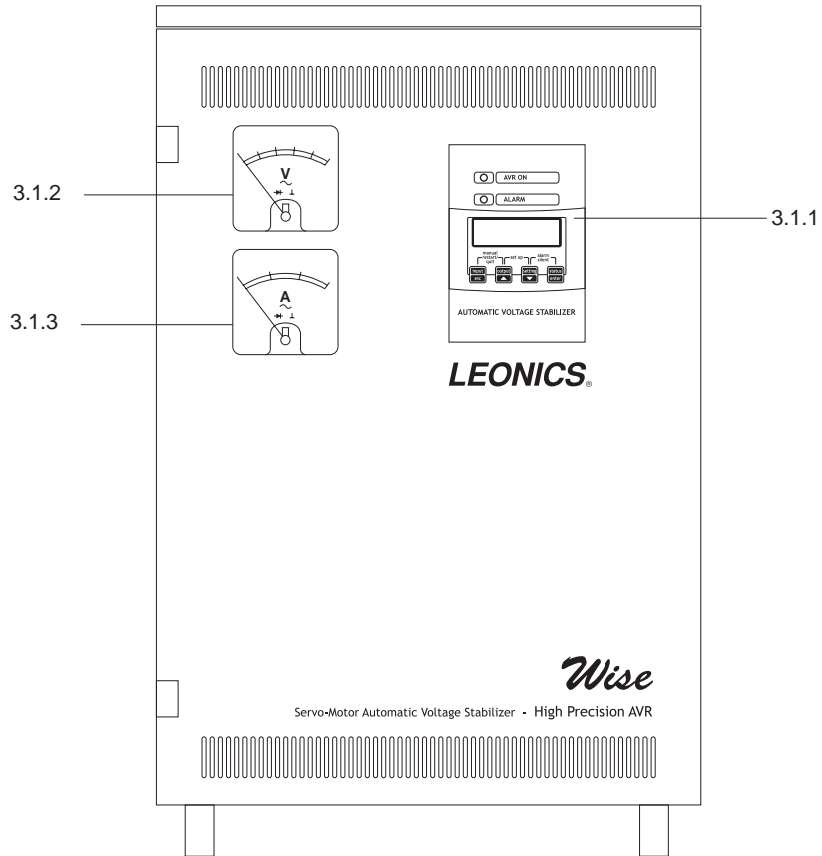
3.1.1 <u>DISPLAY:</u>

    3.1.1.1 <u>AVR ON:</u> The indicator shows that the AVR is operating under AVR mode.

    3.1.1.2 <u>ALARM:</u> The indicator shows the AVR has faults.

    3.1.1.3 <u>LCD DISPLAY:</u> 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 <u>CONTROL BUTTONS:</u> The buttons to select display on the LCD 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.

Table shows the relationship between LED indicator and AVR operation

LED Indicator	Status of LED indicator and AVR operation		
	OFF	**BLINK**	**LIT**
AVR ON (green)	The AVR is shutdown	-	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 <u>METER:</u> The analog meter for measure voltage and current (option).
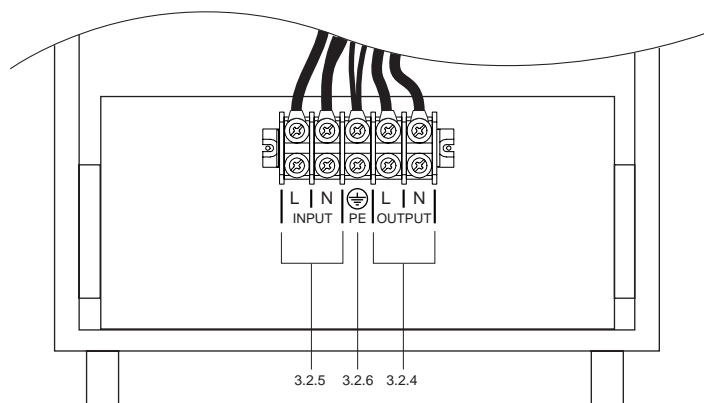
    3.1.2.1 <u>VOLT METER (option)</u>

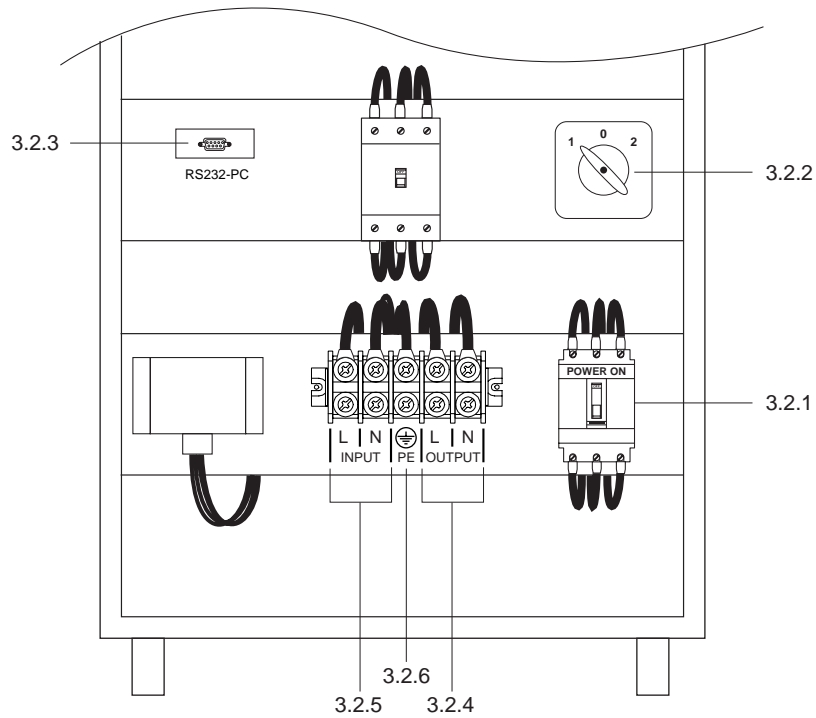   3.1.2.2 <u>AMP METER (option)</u>

3.2 Inside details.
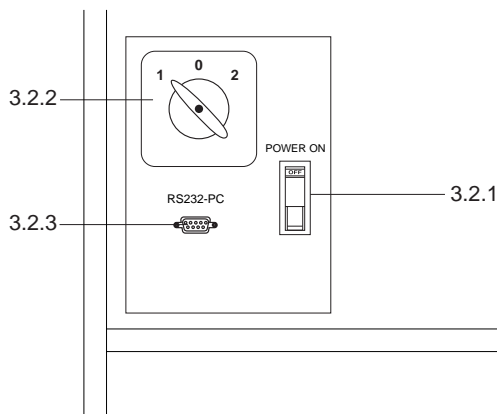
Wise HP 5kVA - 10 kVA

Wise HP 5kVA - 10 kVA

Wise HP 30 kVA

3.2.1 <u>INPUT BREAKER</u>: The circuit breaker to protect the AVR from input over current or short circuit.

3.2.2 <u>MAINTENANCE BYPASS/AVR SELECTOR SWITCH</u>: The selector switch to select operating mode; automatic voltage regulator mode (position 1) or maintenance bypass mode (position 2).
  - Position1; The AVR runs in automatic voltage regulator mode.
  - Position2; The AVR runs in maintenance bypass mode. The loads are transferred to take power directly from utility line for maintenance purpose.

3.2.3 <u>RS232-PC</u>: The port to connect computer or transceiver (if available).

3.2.4 <u>OUTPUT terminal</u>: The terminal for connecting the cables from the AVR to the equipment or loads.

3.2.5 <u>INPUT terminal</u>: The terminal for connecting the cables from main electricity supply to the AVR.

3.2.6 <u>PE/EARTH (⏚) terminal</u>: The terminal for connecting to ground system.

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.

4.1.60 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	5kVA	7.5kVA	10kVA	15kVA	20kVA	25kVA	30kVA
Input cable (mm²)	6	10	16	35	50	50	2 x 35 or 70
Output cable (mm²)	4	6	16	25	35	35	50
Earth cable (mm²)	4	4 to 6	6	10	10	16	25

> 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.

.2   Installation

4.2.2   Connect the cable from loads to OUTPUT terminal as following

- Connect PE/EARTH (⏚) terminal to ground system.
- Connect Neutral from loads to N pole of OUTPUT terminal.
- Connect Line from loads to L pole of OUTPUT terminal.

4.2.3   Connect the cable from main electricity supply to INPUT terminal as following

- Connect PE/EARTH (⏚) terminal to ground system.
- Connect Neutral from main electricity supply to N pole of INPUT terminal.
- Connect Line from main electricity supply to L pole of INPUT terminal.

> Note: Turn off distribution board before connecting INPUT terminal of the AVR to main electricity supply.

4.3   Start up procedure

    4.3.1   Turn off all connected loads.

    4.3.2   Turn on main distribution board.

    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 and then close the AVR door.

    4.3.5   If the restart mode setting is MANUAL, the AVR will alarm beep sound. Press [setting ▼] [status enter] simultaneously once to mute alarm .

    4.3.6   Turn on all connected loads.

4.4 Shutdown procedure

    4.4.1   Turn off all connected loads.

    4.4.2   Open the AVR door and turn off the INPUT BREAKER and then close the door.
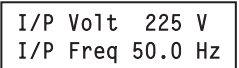
4.5   Operation when the AVR has faults (Maintenance bypass)

    4.5.1   Turn off all connected loads.

    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
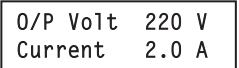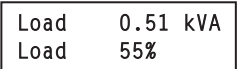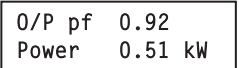
DATA DISPLAY

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

5.1 [input esc] **button :** Press to display input electrical data such as input voltage and frequency.

Press once	Shows input voltage and frequency.	I/P Volt 225 V I/P Freq 50.0 Hz

5.2 [output ▲] **button :** Press to display output electrical data..

Press once	Shows output voltage and current.	O/P Volt 220 V Current 2.0 A
Press twice	Shows apparent power in VA and load percentage comparing to the AVR rating.	Load 0.51 kVA Load 55%
Press 3 times	Shows output power factor and active power in Watt	O/P pf 0.92 Power 0.51 kW

5.3 [setting ▼] **button :** Press to display nominal phase voltage and output restart mode.
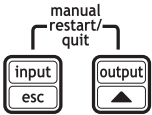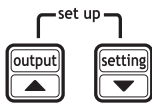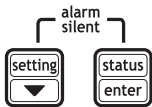
Press once	Shows output restart mode.	Output Restart Mode = MANUAL
Press twice	Shows nominal phase voltage.	Norminal Phase Voltage = 220.0
Press 3 times	Returns to the first screen.	Output Restart Mode = MANUAL

5.4 [status enter] **button :** Press to display system status such as operating status.

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

Note: When the AVR alarm beep sound, press [status enter] button until the fault message was shown on LCD.

See more information in section TROUBLESHOOTING.

5.5 Press two buttons simultaneously

manual restart/ quit [input esc] [output ▲]	Press to start the AVR (for manual restart mode only) or return to main menu during setting.
set up [output ▲] [setting ▼]	Press to access password input screen.
alarm silent [setting ▼] [status enter]	Press to mute the alarm.

SETTING

To return to main menu, press [input/esc] [output/▲] simultaneously once or wait for 30 seconds.

manual restart/quit

> Caution: Do not change any setting other than that mentioned in this section. It may cause this unit to malfunction. Please consult Leonics technicians before changing any parameter setting.

6.1 Password for access to setting menu (sample password is 2468.)

6.1.1 Press [output/▲] [setting/▼] simultaneously once to enter password input screen.

set up

```
ENTER PASSWORD
     0000
```

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] simultaneously once to confirm password entry.

alarm silent

```
SYSTEM CONTROL
   SETTING
```

6.1.7 Now, you reach main setting menu. Press [output/▲] or [setting/▼] to select item.

6.2 System control setting

After confirm the password entry, the screen shows SYSTEM CONTROL SETTING. Press [status/enter] once to enter system control setting screen and press [output/▲] or [setting/▼] to change parameter value. Then, press [status/enter] to confirm new parameter value or press [input/esc] to cancel and return to first screen.

6.2.1 Press [status/enter] once   to confirm to access system control setting.

The screen shows nominal phase voltage.

```
Nominal Phase
Voltage =  220.0
```

6.2.2 Press [setting/▼] once   the screen shows fast output voltage fault when

input and output voltage are out of range.

```
EN FAST OPV FLT
    = ON
```

6.2.3   Press [setting ▼] 2 times   the screen shows delay time setting for turning off the output magnetic contactor when output voltage fault, overload shutdown or low power supply are occured.

| DELAY FLT OFF MC |
| = 2 x 2 S |

6.2.4   Press [setting ▼] 3 times   the screen shows output voltage out of range fault integral delay setting. When the integral value is over than this setted value, it will alarm sound.

| O/P V FLT INTEGL |
| = 100 |

6.2.5   Press [setting ▼] 4 times   the screen shows restart mode setting

| SET RESTART MODE |
| = MANUAL |

When the AVR has fault, it reports fault message on the LCD display and also has audible alarm. To mute the alarm sound, press [setting ▼] [status enter] simultaneously once.

alarm silent

Note: "Technical Setup Require Key" is for technical setting only. User is not allowed to adjust.

TROUBLESHOOTING

If the Wise HP11-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.

Press the [status enter] button until the fault message was shown on the LCD. Press this button until the display returns to the first screen.

Item	Message on the LCD display	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 i nput 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.

Item	Message on the LCD display	Causes	Solutions
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 [input esc] [output] simultaneously once. AVR will restart when it detects no fault.
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 overloaded.	Disconnect some loads until the load level shows less than 100%.
7.11	ALARM : Overload Stop warning	The AVR is going to shutdown due to overload.	Disconnect some loads until the load level shows less than 100%.
7.12	System: ALARM Overload timeout	The AVR shutsdown itself due to running overload for long time.	Disconnect some loads until the load level shows less than 100% and press [input esc] [output] once.