Multi-phase Programmable AC/DC Power Source

ASR-6000 Series

QUICK START GUIDE

ISO-9001 CERTIFIED MANUFACTURER

GW INSTEK

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Table of Contents

INTRODUCTION 4
ASR-6000 Series Overview 4
Appearance 5

SET UP 13
Input Terminal Connection 13
Copper Plate Introduction 13
Single Phase Connection 14
Delta Connection 15
Y Connection 16
Output Terminal Connection 17
1P2W Output Connection 17
1P3W Output Connection 19
3P4W Output Connection 20

MISCELLANEOUS 21
Firmware Update 21
Specifications 23
Information of Name Order 25
ASR-6000 Dimensions 26
Declaration of Conformity 27

INTRODUCTION

ASR-6000 Series Overview

Series lineup

The ASR-6000 series consists of 2 models, the ASR-6450 and ASR-6600, differing in capacity. Note that throughout the user manual, the term "ASR-6000" refers to any of the models, unless stated otherwise.

1P Output Condition

Model Name	Power Rating	Max. Output Current	Max. Output Voltage
ASR-6450	4500 VA	45 / 22.5 A	350 Vrms / 500 Vdc
ASR-6600	6000 VA	60 / 30 A	350 Vrms / 500 Vdc

1P3W Output Condition

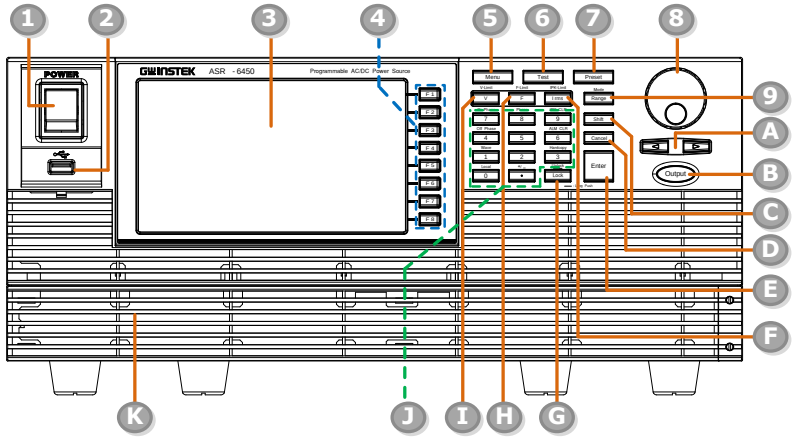
Model Name	Power Rating	Max. Output Current	Max. Output Voltage
ASR-6450	3000 VA	15 / 7.5 A	700 Vrms / 1000 Vdc
ASR-6600	4000 VA	20 / 10 A	700 Vrms / 1000 Vdc

3P Output Condition (Pre phase)

Model Name	Power Rating	Max. Output Current	Max. Output Voltage
ASR-6450	1500 VA	15 / 7.5 A	350 Vrms / 500 Vdc
ASR-6600	2000 VA	20 / 10 A	350 Vrms / 500 Vdc

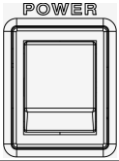
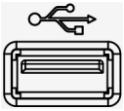
Appearance

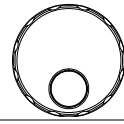
Front Panel

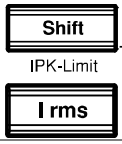
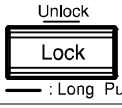
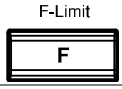
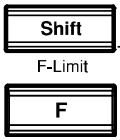
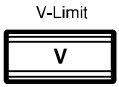
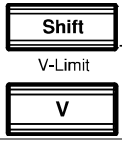


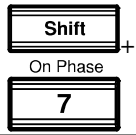
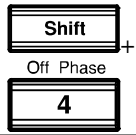
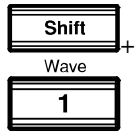
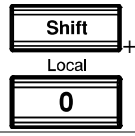
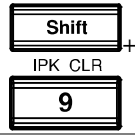
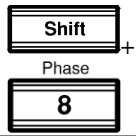
Item Index	Description
1	Power switch button
2	USB interface connector (A Type)
3	LCD screen
4	Function keys (blue zone)
5	Menu key
6	Test key
7	Preset key
8	Scroll wheel
9	Range key/Output mode key
A	Arrow keys
B	Output key
C	Shift key

D	Cancel key
E	Enter key
F	Irms/IPK-Limit button
G	Lock/Unlock button
H	F/F-Limit button
I	V/V-Limit button
J	Numerical Keypad with additional “Shift + key” shortcut functions (green zone)
K	Air inlet

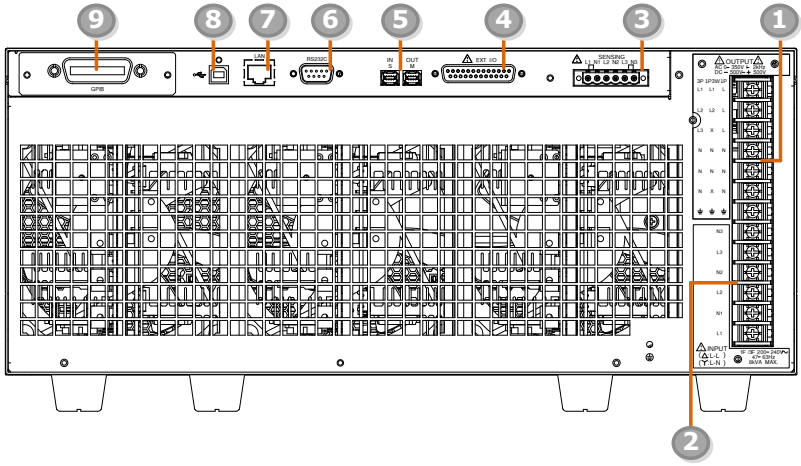
Item	Description
Power Switch	 Turn on the mains power
USB A Port	 The USB port is used for data transfers and upgrading software. Also, it is available for screenshot hardcopy. It supports FAT32 format with maximum 32G storage.
LCD Screen	Displays the setting and measured values or menu system
Function Keys	Assigned to the functions displayed on the right side of the screen.

Menu Key	Menu	Enters the Main menu or goes back to one of the display modes.
Test Key	Test	Puts the instrument into the Sequence and Simulation control mode.
Preset Key	Preset	Puts the instrument into Preset mode.
Arrow Keys	◁ ▷	The arrow keys are used to select the digit power of a value that is being edited.
Range Key	Mode Range	Switches between the 100V, 200V and AUTO ranges
Output Mode	Shift + Mode Range	Selects between the AC+DC-INT, AC-INT, DC-INT, AC+DC-EXT, AC-EXT, AC+DC-ADD, AC-ADD, AC+DC-Sync, AC-Sync and AC-VCA modes.
Scroll Wheel		Used to navigate menu items or for increment/decrement values one step at a time.
Output Key	Output	Turns the output on or off.
Shift Key	Shift	Turns on the shift state, which enables shortcut operations with an icon Shift indicated on the top status bar. The shift state, which allows continuous shortcut operations, is kept until another press on shift key again.
	⚠	When performing shortcut operations, press shift key followed by another shortcut function key. Do Not press both shift key and shortcut function key simultaneously.
Cancel Key	Cancel	Used to cancel function setting menus or dialogs.

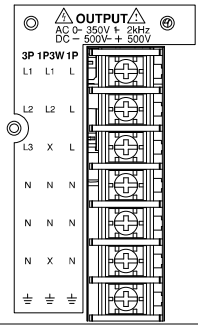
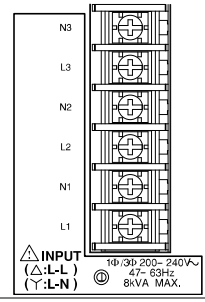
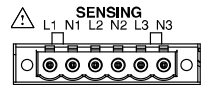
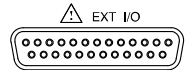
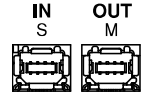
Enter Key		Confirms selections and settings.
Irms		Used for setting the maximum output current.
IPK-Limit		Used to set the peak output current limit value.
Lock/Unlock Key		Used to lock or unlock the front panel keys except output key. Simply press to lock, whilst long press to unlock.
F		Used for setting the output frequency (DC mode N/A).
F-Limit		Used for setting the output frequency limit value (DC mode N/A).
V		Used for setting the output voltage.
V-Limit		Used for setting the output voltage limit value.
Keypad		Used to input power of a value directly. The ±/. key is used to input decimal / plus or minus.

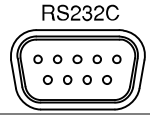
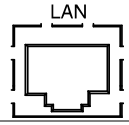
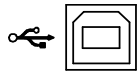
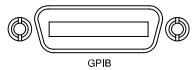
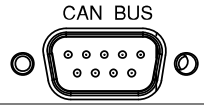
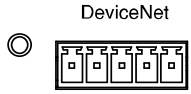
On Phase		Sets the on phase for the output voltage.
Off Phase		Sets the off phase for the output voltage.
Output Waveform		Selects between the Sine, Square, Triangle and ARB 1~16 waveforms (not available for DC-INT, AC+DC-EXT and AC-EXT).
Local Mode		Switches operation back to local mode from remote mode.
IPK CLR		Used to clear peak output current value.
ALM CLR		Clears alarms.
Hardcopy Key		Used to take a screenshot. Make sure an USB flash disk in well inserted before the action.
Output Phase		Used to prompt the output phase window where 1P2W, 1P3W and 3P4W modes are available for selection.

Rear Panel



Item Index	Description
1	Output terminal
2	AC power input terminal
3	Remote sensing input terminal
4	External I/O connector
5	External IN/OUT connection in parallel function
6	RS232 connector
7	Ethernet (LAN) connector
8	USB interface connector (B Type)
9	Optional interface Slot ▪ GPIB card (ASR-003) ▪ DeviceNet card (ASR-004) ▪ CAN BUS card (ASR-005)

Item	Description	
Output Terminal		Output terminal (M4 screw type, 8 ~ 18 AWG) (Screw torque value:18kgf-cm)
AC Power Input Terminal		AC inlet (M4 screw type, 8 ~ 18 AWG) (Screw torque value:18kgf-cm)
Remote Sensing Input Terminal		Remote sensing input terminal is for compensation of load wire voltage drop. (M2.5 screw type, 12 ~ 30 AWG) (Screw torque value: 0.5N*m) (Strip length: 7 ~ 8mm)
External Control I/O Connector		Used to control ASR-6000 externally by using the logic signal and monitor Sequence function status.
External IN/OUT Connection in Parallel Function		The IN (Slave) and OUT (Master) ports are used for connection with external unit in parallel function.

RS232C Connector		The RS232C connector for controlling the ASR-6000 remotely.
Ethernet LAN Port		The Ethernet port is used for remote control.
USB B-type Port		USB port for controlling the ASR-6000 remotely.
Optional GPIB Connector		The optional GPIB connector for controlling the ASR-6000 remotely.
Optional CAN BUS Connector		The optional CAN BUS connector for controlling the ASR-6000 remotely.
Optional DeviceNet Connector		The optional DeviceNet connector for controlling the ASR-6000 remotely.

SET UP

Input Terminal Connection

Background

Basically, the input terminal, which is located in the rear panel of ASR unit, can be connected through 3 methods: Single Phase, Delta and Y Connection. Depending on varied input connections, use the corresponding cooper plates and power cords for connection. Refer to the following chapters for details of each connection.

Copper Plate Introduction

Voltage Range of Input Connections

Input Connection	Voltage Range
Single	Single Phase 200 - 240V: L, N and G
Delta	Three Phase 200 - 240V: L1, L2, L3 and G
Y	Three Phase 200 - 240V: L1, L2, L3, N and G

Copper Plate Description

Copper Plate	Description
62SR-6K0CP101	Copper plate for delta connection input
62SR-6K0CP201	Copper plate for single phase and Y connection input
62SR-6K0CP301	Copper plate for delta connection input

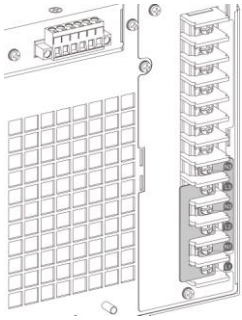
Copper Plate Quantity of Input Connections

Input Connection	Quantity of Copper Plate
Single	62SR-6K0CP201*2pcs
Delta	62SR-6K0CP101*1pcs, 62SR-6K0CP301*2pcs
Y	62SR-6K0CP201*1pcs

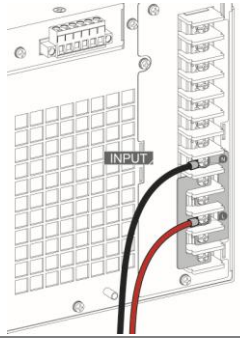
Single Phase Connection

Steps

1. Assemble the two copper plates specific for Single phase input connection with the AC input terminals. The first plate is for L1, L2 and L3 terminals, while the other plate is for N1, N2 and N3 terminals.



2. Connect the AC power cords to the AC input terminals.
   - Red → Line (L)
   - Black → Neutral (N)



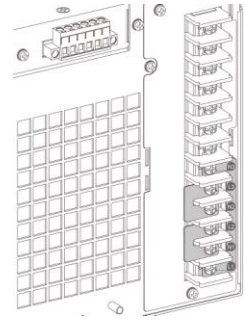
Note

- Power input cords are not included in this product.
- For the specific installation on protective lid of input terminal, please refer to User Manual.

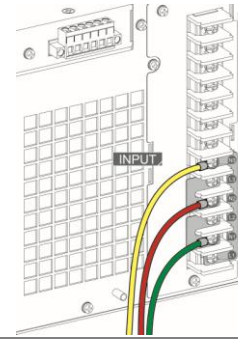
Delta Connection

Steps

1. Assemble the three copper plates specific for Delta input connection with the AC input terminals. The 1st plate is for N3 and L1 terminals. The 2nd second plate is for L3 and N2 terminals, while the 3rd plate is for L2 and N1 terminals.



2. Connect the AC power cords to the AC input terminals.
   - Red → Line (N2)
   - Green → Neutral (N1)
   - Yellow → Neutral (N3)



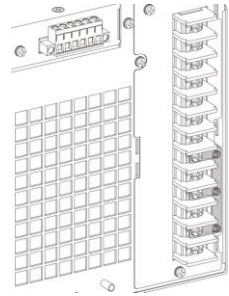
Note

- Power input cords are not included in this product.
- For the specific installation on protective lid of input terminal, please refer to User Manual.

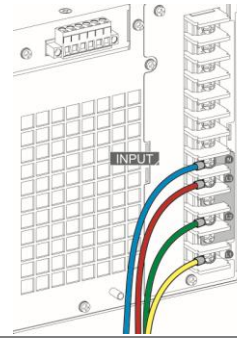
Y Connection

Steps

1. Assemble the copper plate specific for Y input connection with the AC input terminals. The copper plate is for N1, N2 and N3 terminals.



2. Connect the AC power cords to the AC input terminals.
   - Red → L3
   - Green → L2
   - Yellow → L1
   - Blue → Neutral



Note

- Power input cords are not included in this product.
- For the specific installation on protective lid of input terminal, please refer to User Manual.

Output Terminal Connection

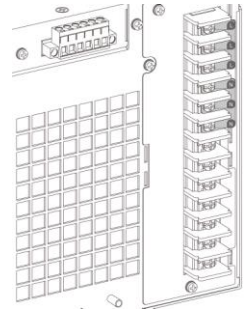
Background	The output terminal can output power in three mode: 1P2W, 1P3W and 3P4W. Select applicable output mode, via panel configurations, in accordance with varied applications.
⚠ WARNING	Be aware of dangerous voltages. Ensure that the power to the instrument is disabled before handling the power supply output terminals. Failing to do so may lead to electric shock.
⚠ CAUTION	After configuring phase settings via the front panel, please make sure the cords connection on the rear panel is corresponding to the set configuration.

1P2W Output Connection

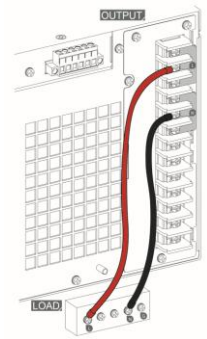
Steps

1. Disconnect the unit from the mains power socket and turn the power switch off.

2. Assemble the two copper plates specific for 1P2W output connection with the AC output terminals. The first plate is for N*3 terminals, while the other plate is for L*3 terminals.



3. Connect the output wires to the AC output terminals as follows:
   - Red → Line (L)
   - Black → Neutral (N)



Note

- The input & output terminals necessitate connectivity through ring-type connectors.
- For the specific installation on protective lid of output terminal, please refer to User Manual.
- Grounded Neutral Output for 1P2W output only: ASR-6000 allows for a grounded return on the neutral output. It is suit for the medical industry that required between ground with neutral is 0 V essentially. And possible to mitigate ground loops that is ideal for reduce ground noise and isolate sensitive equipment from the effects of ground loops.

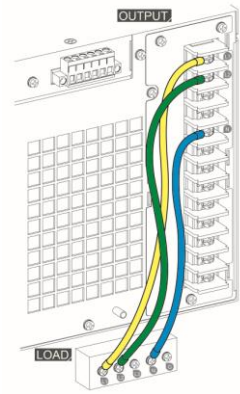
WARNING Because the neutral has been referenced to the chassis ground, be careful electric shock by yourself.

1P3W Output Connection

Steps

1. Disconnect the unit from the mains power socket and turn the power switch off.

2. Connect the output wires to the AC output terminals as follows:
   - Yellow → Line (L1)
   - Green → Line (L2)
   - Blue → Neutral (N)



Note

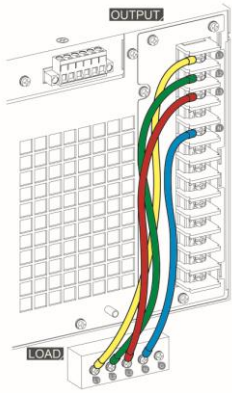
- The input & output terminals necessitate connectivity through ring-type connectors.
- For the specific installation on protective lid of output terminal, please refer to User Manual.

3P4W Output Connection

Steps

1. Disconnect the unit from the mains power socket and turn the power switch off.

2. Connect the output wires to the AC output terminals as follows:
   - Yellow → Line (L1)
   - Green → Line (L2)
   - Red → Line (L3)
   - Blue → Neutral (N)



Note

- The input & output terminals necessitate connectivity through ring-type connectors.
- For the specific installation on protective lid of output terminal, please refer to User Manual.

MISCELLANEOUS

Firmware Update

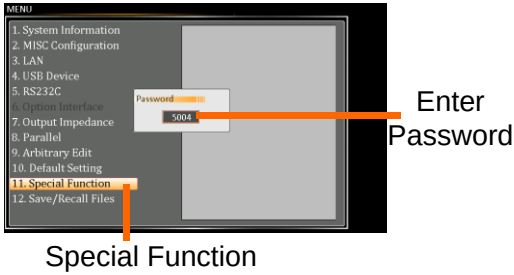
Background	The ASR series firmware can be upgraded using the USB A port on the front panel. See your local distributor or the GW Instek website for the latest firmware information.
⚠ Note	• Ensure the DUT is not connected. • Ensure the output is off.

Steps

1. Insert a USB Flash Drive into the USB port on front panel of the ASR.
   The USB drive should include the **gw_sb6.upg** file in a directory name "gw"(USB\gw:).

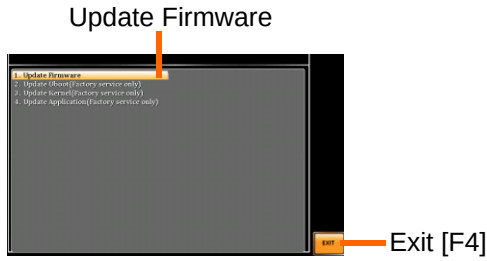
2. Press the *Menu* key. The Menu setting will appear on the display.

3. Use the scroll wheel to go to item 11, *Special Function* and press *Enter*.



4. Key in the password when prompted and then press *Enter*.
   The password is "5004".

5. Go to Item 1, *Update Firmware* and press *Enter*.



6. Wait for the unit to update. Upon completion the unit will automatically reboot.

Specifications

The specifications apply when the ASR-6000 is powered on for at least 30 minutes.

Electrical specifications

Model	ASR-6450	ASR-6600
Input ratings		
Power type	Single-phase Three-phase, Delta or Y connection selectable	
Voltage range[*1]	200 Vac to 240 Vac ±10 % phase voltage (Delta: L-L, Y: L-N)	
Frequency range	47 Hz to 63 Hz	
Power factor[*2]	0.95 or higher (typ.)	
Efficiency[*2]	80 % or higher	
Maximum power consumption	6 kVA or lower	8 kVA or lower

General Specifications

Model			ASR-6450 ASR-6600
Interface	Standard	USB	Type A: Host, Type B: Slave, Speed: 1.1/2.0, USB-CDC / USB-TMC
		LAN	MAC Address, DNS IP Address, User Password, Gateway IP Address, Instrument IP Address, Subnet Mask
		External	External Signal Input External Control I/O V/I Monitor Output
		RS-232C	Complies with the EIA-RS-232 specifications
	Optional 1	GPIB	SCPI-1993, IEEE 488.2 compliant interface
	Optional 2	CAN Bus	Complies with CAN 2.0A or 2.0B based protocol
	Optional 3	Device Net	Complies with CAN 2.0A or 2.0B based protocol
Insulation resistance	Between input and chassis, output and chassis, input and output		DC 500 V, 30 MΩ or more
Withstand voltage	Between input and chassis, output and chassis, input and output		AC 1500 V or DC 2130 V , 1 minute
EMC			EN 61326-1 (Class A) EN 61326-2-1/-2-2 (Class A)

		EN 61000-3-2/-3-12 (Class A, Group 1) EN 61000-3-3/-3-11 (Class A, Group 1) EN 61000-4-2/-4-3/-4-4/-4-5/-4-6/-4-8/-4-11/-4-34 (Class A, Group 1) EN 55011 (Class A, Group1)
Safety		EN 61010-1
Vibration, Shock and Transportation Integrity		ISTA 2A Test Procedure
Environment	Operating environment	Indoor use, Overvoltage Category II
	Operating temperature range	0 °C to 40 °C
	Storage temperature range	-10 °C to 70 °C
	Operating humidity range	20 %rh to 80 % RH (no condensation)
	Storage humidity range	90 % RH or less (no condensation)
	Altitude	Up to 2000 m
Dimensions (mm)		430(W)×176(H)×590(D) (not including protrusions)
Weight		Approx. 40 kg

- A value with the accuracy is the guaranteed value of the specification. However, an accuracy noted as reference value shows the supplemental data for reference when the product is used, and is not under the guarantee. A value without the accuracy is the nominal value or representative value (shown as typ.).
- Product specifications are subject to change without notice.

Information of Name Order

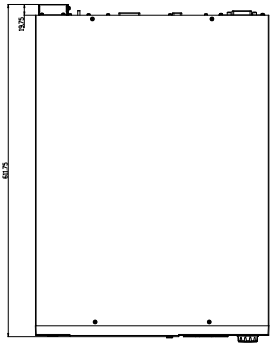
The name order of ASR-6000 series has its rules in definition for each character by order. Refer to the following contents for details.

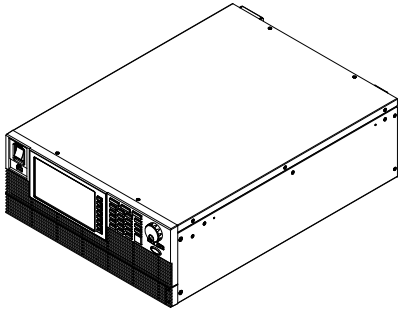
Background	The definitions below describe the meanings behind each group of alphanumeric characters, in varied colors, of naming code for ASR series models.	
Naming Definition	**ASR**	Switching Mode AC Power Source
	6	Series Name
	XX	Output Capacity **45**: 4500VA **60**: 6000VA
	0	Fixed number
	-XX	Maximum Output Capacity of Parallel Models
Lineup of ASR Series Models	**ASR-6450**	
	ASR-6600	
	ASR-6450-09	(release soon)
	ASR-6600-12	(release soon)
	ASR-6450-13.5	(release soon)
	ASR-6600-18	(release soon)
	ASR-6450-22.5	(release soon)
	ASR-6600-24	(release soon)
	ASR-6450-27	(release soon)
	ASR-6600-30	(release soon)
	ASR-6600-36	(release soon)

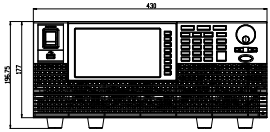
ASR-6000 Dimensions

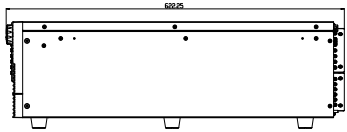
ASR-6450/6600

Scale = mm









Declaration of Conformity

We

GOOD WILL INSTRUMENT CO., LTD.

declare that the below mentioned product

satisfies all the technical relations application to the product within the scope of council:

Directive: EMC; LVD; WEEE; RoHS

The product is in conformity with the following standards or other normative documents:

◎ **EMC**	
EN 61326-1 :	Electrical equipment for measurement, control and laboratory use — EMC requirements
Conducted & Radiated Emission EN 55011 / EN 55032	Electrical Fast Transients EN 61000-4-4
Current Harmonics EN 61000-3-2 / EN 61000-3-12	Surge Immunity EN 61000-4-5
Voltage Fluctuations EN 61000-3-3 / EN 61000-3-11	Conducted Susceptibility EN 61000-4-6
Electrostatic Discharge EN 61000-4-2	Power Frequency Magnetic Field EN 61000-4-8
Radiated Immunity EN 61000-4-3	Voltage Dip/ Interruption EN 61000-4-11 / EN 61000-4-34
◎ **Safety**	
EN 61010-1 :	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements

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