INSTRUCTION MANUAL

SINGLE-PHASE ELECTROMECHANICAL VOLTAGE STABILIZER

SEM 05-13 EM

Elsist
UNINTERRUPTIBLE POWER SUPPLY

Important Notice!

Thank you for preferring us. Your product has been designed to protect your sensitive devices for years.

This manual contains very important information both as to specifications, installation, and operation of regulator and as to safety of regulator and related loads. It is essential to thoroughly read and understand the manual and follow instructions for proper and safe operation and maximum performance of product.

☞ Read completely and thoroughly the manual prior to installation!

☞ Keep the manual for future reference!

Symbols Used

☞ Indicates special attention in manual.

Indicates life-critical instructions.

Indicates damage to device and/or injury to user.

CE

1 Superior Performances Safety

Information relating to safety of Servo Regulator and devices connected thereto as well as the safety of user has been detailed as follows. However, installation shall not start before reading the entire manual.

- When device is switched from cold to hot, air humidity may concentrate inside. In such a case wait for at least two hours because operation will be highly dangerous.
- Device must be operated in an environment equipped with all specifications mentioned in “installation” section of manual.
- Make sure the spaces left around the device for ventilation are not blocked.
- Be careful not to allow any foreign substances (liquid or solid) penetrate into device.
- Device must be connected by authorized service technician.
- Earthing connections must be made.
- Connections against fire danger must be made with proper section of cables. All cables must be insulated and laid in a manner to prevent stumbling.
- No loads must be connected to output of device that exceed its power.
- Device may only be repaired by authorized service technician.
- In case of emergency, (damage to cabin, front panel or connections, penetration of foreign substances into device etc.) device must be shut down immediately and input voltage must be disconnected and authorized service must be informed.

Device must be properly packaged for transport

2 Description of System

15-50kVA version

Preventing any surges and drops and all irregularities in mains voltage and regulating the voltage, Servo Automatic Voltage Regulator electro-mechanically cuts off output voltage in any surges and drops outside setting zone thanks to electronically provided protection and prevents any related possible damages (cut-off option).

Regulator is used safely for computer system, fax, photocopy and laboratory devices, domestic and business illumination, complete flat and office feeds, manufacturing houses and workshops.

Servo Regulators, precisely, rapidly and safely regulate Output Voltage through serial booster transformers connected to the mains and precise variac and Microprocessor Controlled Digital Controlling Unit. In order to hold Output Voltage at desired level with the least error, Servo System provides DC motor by triggering with thristrs at suitable level.

Regulators also offer the user accurate and precise Input/output Voltage, Frequency and Current Values (option) with Digital Display feature.

Phase protection is produced upon demand (cut-off option) and output voltage is cut-off with contactor whenever no low input voltage, high input voltage and any phase is available. In order to prevent from any influence by spikes 2 seconds of delay is available between pulling and releasing times of contactor. Moreover, regulator is equipped with manual by-pass switch and on/off features.

Input Voltage, Output Voltage, Output Frequency and Output Current values are digitally shown on display. Front panel allows remote display on if any voltage occurs at output with available signal lamps and if output voltage is either high or low within limits and at the same time dry contact information (optional). Proper fuses have been used to protect both load and Digital EPM against Short Circuit and Over Currents. Device is internally cooled by fan. Some single-phase models are naturally cooled thanks to special internal structure.

Installation

☞ Examine the device once you receive. Although device is properly packed, it may get damaged during transportation. If there is any damage on packaging, contact transporter.

☞ Check if customizations you demanded upon ordering have been made before starting up the device.

2.1 Handling

Device must be properly packaged for handling. Therefore, it is highly recommended to keep the original packaging.

2.2 Storing

Device must be stored in a dry environment away from any heaters and direct sunlight at temperature between–25 °C and +55 °C.

Relative humidity in the environment must be between 20% and 95% (non-condensable).

2.3 Placement

Device must be placed in;

- With no direct sunlight
- Dry location
- Away from heating elements and in a well-ventilated place.

Moreover:

- Environment must not contain extreme dust and
- Surfaces of device containing vents must be at a distance of at least 20 cm. from any obstructions

Regulator may operate in environment temperatures between 0 °C and +50 °C.

2.4 Connections

Connections may only be made by authorized service technicians. Any attempts by user to make connections may threaten life.

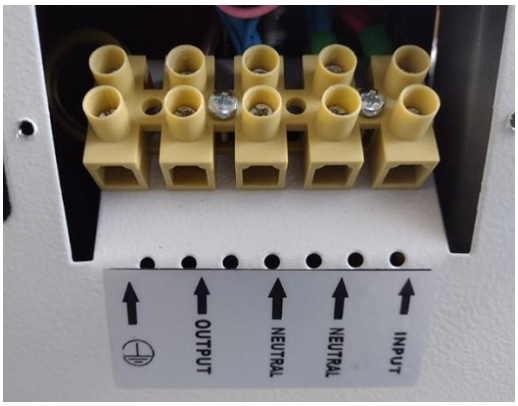
When device is switched from cold to hot, air humidity may concentrate inside. In such a case wait for at least two hours before making connections because it will be highly dangerous.

Connection terminals of device are either on front or back side. Cover on terminals must be removed to make connections and should be reassembled after the connection.

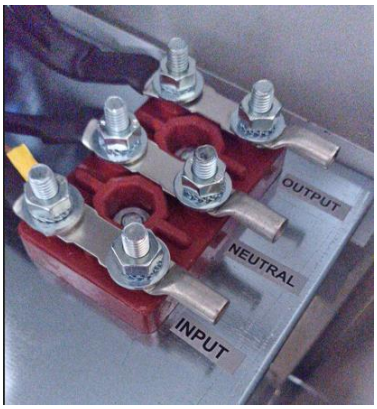
2.4.1 SINGLE-PHASE CONNECTION

Connections are described below. Please follow the order below while making the connections.

UP TO 10 KVA

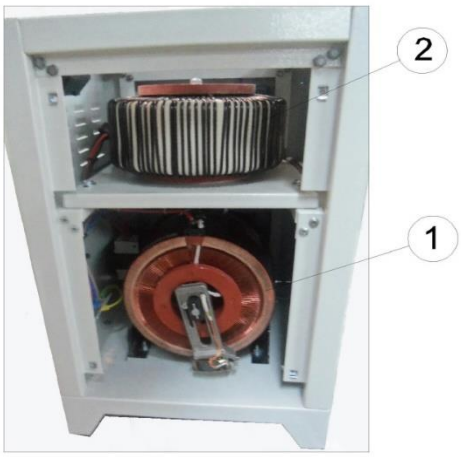


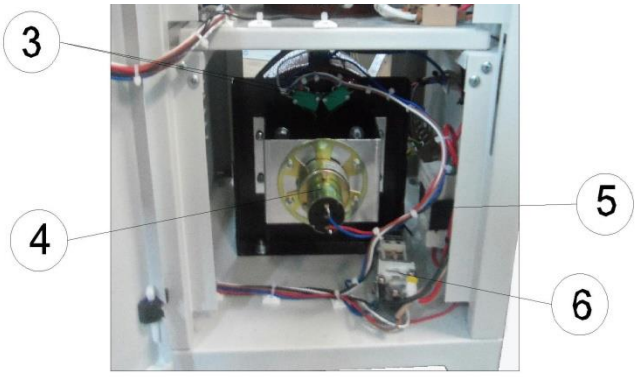
From 15kVA

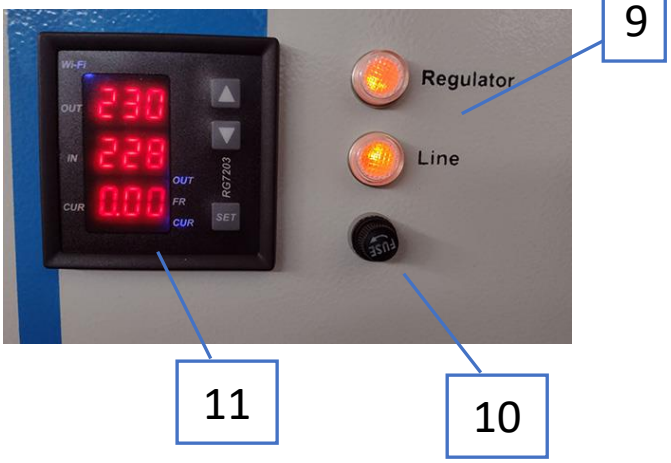


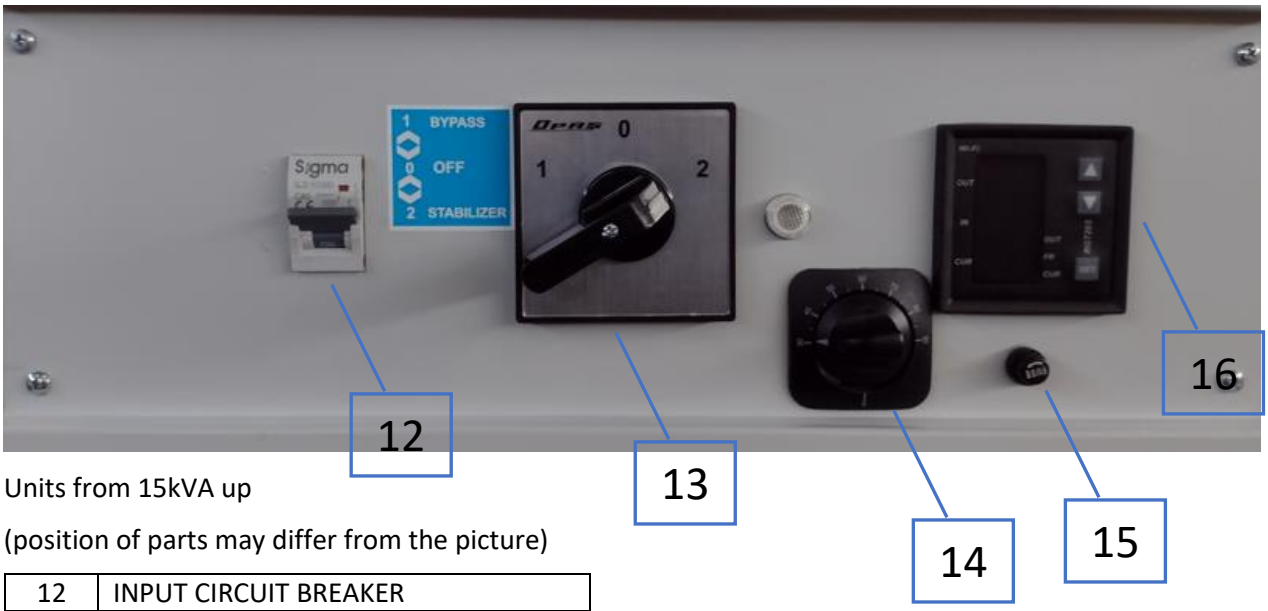
2.4.2 DESCRIPTION OF INTERNAL PARTS

NO	PART NAME
1	TOROIDAL TRANSFORMER
2	BOOSTER TRANSFORMER
3	LIMIT SWITCHES
4	DC MOTOR
5	DD CIRCUIT BREAKER
6	POWER RELAY
9	REG./LIN. SIGNAL LED
10	FUSE
11	DIGITAL VOLTMETER









Units from 15kVA up

(position of parts may differ from the picture)

12	INPUT CIRCUIT BREAKER
13	MANUAL BYPASS SWITCH
14	FAN THERMOSTAT
15	PROTECTION FUSE OF METER
16	METER / SETUP DISPLAY

2.4.3 Earth Connection

Servo Regulator must be connected to earth.

Servo regulator's input earth terminal must be connected to a high-quality (low resistance) earth line.

Loads must be earth connected via output earthing terminal.

2.4.4 Input Connection

A bipolar automatic circuit breaker connected on phase and neutral lines must be added to main switchboard to connect Servo Regulator and a residual current relay must be installed.

To install an automatic fuse at equivalent values with input fuse of device on switchboard will be appropriate.

Protection threshold value of residual current relay in the input of Servo Regulator must be the total of 30 mA and residual currents of loads connected to Servo Regulator output.

Current values recommended as above are given only considering Servo Regulator on the automatic fuse in question. Otherwise, both values must be recalculated considering all devices on the same fuse.

Any modifications on switchboard must be performed by an authorized service technician on electrical installations.

After necessary modifications, switch automatic fuse on switchboard to "0" position and connect phase to INPUT terminal through fuse on switchboard and neutral to NEUTRAL terminal.

Make sure to switch automatic fuse on switchboard to "0" before starting to connect input cables.

Minimum section of cables between switchboard and Servo Regulator must be selected according to the power of device. In case of selecting small sections, there may be a risk of fire.

2.4.5 Output Connection

In case Servo Regulators are to supply more than a few independent loads, it is recommended to use different fuses and residual current relays for each load. When each load is connected to Servo Regulator through each and every fuse according to its respective current, in case of a short circuit on any of the loads, short circuited fuse blows and other loads do not get affected by this case thanks to short circuit protection property of device.

Make sure input, output automations and automatic fuses on switchboards are in “0” position before starting to make output connections.

Loads are connected to OUTPUT, NEUTRAL and output earthing terminals on switchboard of Servo Regulator.

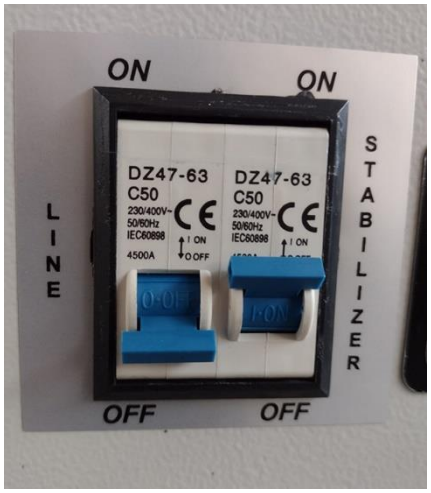
Sections of cables between Servo Regulator and loads must be selected according to its respective current.

Maximum power contracted by loads connected to Servo Regulator must not exceed nominal power of Servo Regulator.

3 Starting Up and Switching Off

3.1 Starting Up

After making the connections as described above, all you have to do to start up the device is to switch all fuses and automations on switchboard to “ON” position, switch on the circuit breaker marked “STABILIZER” and then device will automatically start if mains voltage is above a certain value.



3.2 Switching Off

Turn off the circuit breaker marked “STABILIZER”, Switches and Fuses to “0” position to switch off the device. If maintenance and etc. operations will be performed on Servo regulator without cutting the power of loads connected to the device, turn switch LINE to ON position

3.3 Operating the Device

3.3.1 Operating from Regulator

Operating from regulator is possible only if mains voltage is between certain limits. While Servo Regulator is operating in this mode, it processes mains voltage and supplies the loads with a voltage equal to mains nominal value. Detailed information about mains voltage range the device may operate within is given in section “Input Voltage Tolerance”.

3.3.2 Operating from Mains (BYPASS)

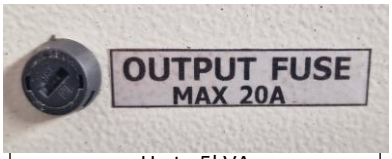
Transferring voltage on input to output through a mechanical switch on Servo Regulators is called “by-pass”. Bypass feature is generally used to separate Servo Regulator from input and output without deactivating the loads during maintenance.

To activate the manual bypass switch ON the “LINE” circuit breaker, at the same time the main “STABILIZER” circuit breaker will turn OFF as it is interlocked to it.

3.4 Operation under Abnormal Situations

3.4.1 Overload

Connecting loads exceeding nominal power of device output is called “overloading”.



Up to 5kVA

Device keeps powering the loads exceeding nominal power in regulator mode until input circuit breaker or the contactor opens or output fuse blows (BD versions only).

BD versions: the output current threshold is disabled on the display. In case of overcurrent the contactor doesn’t open. There is an additional output fuse located on the side (up to 5kVA), or inside behind the back side panel (7,5 and 10kVA) or on the front panel (from 15kVA). This fuse protects the device from overload and short circuit. In case the fuse blows, the output will be disabled, but no fault is displayed on the front panel. Therefore, is there is no output but no fault is shown on the front display, please check the output fuse. In case you need to replace the fuse, do not exceed the value indicated on the product label.


7.5kVA – 10kVA

☞ Be careful not to overload the device for safe operation.

3.4.2 Short Circuit on Output

Device forces the fuse on device to blow acting as a source of current upon any short circuits on output. Short circuit disappears upon blowing of fuse and other loads are protected against getting affected by this situation.

☞ Each and every load must be connected to circuit through different fuses selected according to nominal current to enable device properly perform short circuit protection function.

3.5 Indicators

RG7203W Voltage Regulator Control Unit

Technical Instructions and User Manual.

VER. 18032025

---------- General Information ----------

"RG7203W" is an embedded device designed for use in servo voltage regulators.

1. The regulator simultaneously displays the input voltage, output voltage, current value, and frequency on a 7-segment display.
2. It controls the DC motor to maintain a stable output voltage.
3. It protects the connected load from high/low voltage, high current, high/low frequency, and power interruptions.
4. It records the limits of all measured values, the reasons for shutdowns, and the number of occurrences.
5. Additionally, it allows for data monitoring via **WiFi**, emergency shutdown of the output voltage when necessary, forced activation, and deletion of records.

---------- Menu Usage ----------

*To enter the menu, briefly press the **«SET»** button. The upper display will show **"P.."**, and the lower display will show **"out"**. Use the **up/down** buttons to navigate through the menu parameters. To modify a parameter, press the **«SET»** button again when you reach the desired parameter. The upper display will flash **"P.."** along with the parameter number. Use the **up/down** buttons to change the value.*

To select another parameter, press the **«SET»** button again and use the **up/down** buttons to move to another parameter. To exit the menu, press the **«SET»** button when the upper display shows **"P.."** and the lower display shows **"out"**. If no button is pressed for **20 seconds**, the device will save the changes and return to the main screen.

---------- Menu Parameters ----------

Page	Description	On the screen
0	**Entering or Exiting the Menu**	***Pr*** ***0 out***
P.01	**Desired Output Voltage of the Regulator** **Factory Setting:** 230 V **Adjustment Range:** 1 V ... 300 V	***P.0 1*** ***2 3 0***
P.02	**Tolerance Value of the Regulator Output Voltage** **Factory Setting:** 3 V **Adjustment Range:** 1 V ... 30 V	***P.0 2*** ***0 0 3***
P.03	**Upper Protection Voltage of the Regulator Output** When the output voltage exceeds **242+5 V**, the device releases its relay. **Factory Setting:** 242 V **Adjustment Range:** 1 V ... 300 V	***P.0 4*** ***2 4 2***

P.04	**Lower Protection Voltage of the Regulator Output** When the output voltage falls below **198-10 V**, the device releases its relay. **Factory Setting:** 210 V (10% hysteresis) **Adjustment Range:** 1 V ... 300 V	***P.0 5*** ***210***
P.05	**Protection Mode Activation Time** The delay time for releasing the relay after the output voltage exceeds the specified upper or lower protection voltage. (If the voltage returns to normal within this time, the device will not release the relay.) **Factory Setting:** 5 seconds **Adjustment Range:** 1 second ... 25 seconds	***P.0 5*** ***0 0 5***
P.06	**Protection Mode Deactivation Time** When the output voltage is within the upper and lower protection voltage range, the device waits for this duration before re-engaging the output. **Factory Setting:** 5 seconds **Adjustment Range:** 1 second ... 25 seconds	***P.0 6*** ***0 0 5***
P.07	**Startup Count** **Factory Setting:** 9 **Adjustment Range:** 0 ... 98 If the parameter is set to **0**, the microprocessor will not engage the relay even if the voltage returns to normal after power is restored. The relay will only be engaged when the middle button is pressed for **5 seconds**	***P.0 7*** ***0 0 9***
P.08	**Current Transformer (CT) Value** **Value Range:** 5 ... 9000 If the value exceeds **999**, the display will show the **"H"** symbol (e.g., for 1000, it will show **"H1.0"**, and for 9000, it will show **"H9.0"**).	***P.0 8*** ***0 0 75***
P.9	**Current Protection Value** **Value Range:** 0.01 ... 9000 If the value exceeds **999**, the display will show the **"H"** symbol. *** factory setting according to rated power	***P.09*** ***
P.10	**Current Protection Delay Time** **Factory Setting:** 9 **Value Range:** 1 ... 999 seconds	***P.10*** ***0 5***
P.11	**Upper Frequency Protection Value** **Value Range:** 47.1 – 99.9 Hz	***P.11*** ***63.0***
	Note: This value cannot be lower than the value set in **P.12**	
P.12	**Lower Frequency Protection Value** **Value Range:** 47.1 – 99.9 Hz **Note:** This value cannot be greater than the value set in **P.11**	***P.12*** ***47.0***
P.13	**Menu Access Password** **Value Range:** 1-999 When the password is set to **773**, other menu parameters can be modified. Otherwise, if you attempt to change other parameters, the **P.13** value will automatically appear on the screen.	***P.13*** ***773***

P.14	**WiFi Module** WiFi Inactive (Off): **0** WiFi Active (On): **1**	***P.14*** ***0 0 1***
P.15	**Wi-Fi Connection Password** The last 3 digits of the 8-digit password can be changed via the menu. **Value Range:** 100 ... 999 The password consists of **8 digits**. The first 5 digits are fixed as **"12345"** at the factory. The last 3 digits are set by the user. **Factory Setting:** 678 If the password has not been changed, use **"12345678"** for the WiFi connection. Afterward, you can connect by typing **"192.168.4.1"** into your browser's address bar and pressing **Enter**.	***P.15*** ***678***
P.16	The speed at which data refreshes on the screen Range of value 0.....99 The smaller the value, the faster the values on the screen are refreshed.	***P.15*** ***0 19***
P.17	**Average Value of the Voltmeter Displaying Output Voltage** When this parameter is set to **1**, the voltmeter will display the **P.01** value at the output when the output voltage is within the range of **P.01 + P.02** and **P.01 - P.02**.	***P.15*** ***000***
P.18	**Software Version** At the time this technical manual and user guide was written, the software version was **25**.	***P.14*** ***0 25***

Error Handling During Device Operation

When errors occur while the device is operating, the device will cut off the voltage to the load and will not supply voltage to the load until the error is resolved. During this process, the error number will be displayed on the bottom screen. There are **8 different types of errors** that may occur.

Below, the error numbers and their causes are explained:

Errors encountered during use will be displayed on the bottom screen as **"Er1"** to **"Er8"**.

The errors that occur during use will be displayed at the bottom of the screen as "Er1" ... "Er8".

---------- **Errors and Solutions** . ----------

Errors and Solutions

Er1: Output voltage is lower than the output voltage protection value.

Solution: The input voltage is below the voltage correction lower limit. Check the input voltage.

Er2: Output voltage is higher than the output voltage protection value.

Solution: The input voltage is above the voltage correction upper limit. Check the input voltage.

Er3: The load current passing through the device exceeds the current protection value. **Solution:** Reduce the load current passing through the device.

Er4: Frequency is higher than the upper frequency protection value.
Solution: Check the upper frequency protection value.

Er5: Frequency is lower than the lower frequency protection value.
Solution: Check the lower frequency protection value.

Er6: The number of restarts exceeds the allowed restart limit.
Solution: Check the number of restarts.

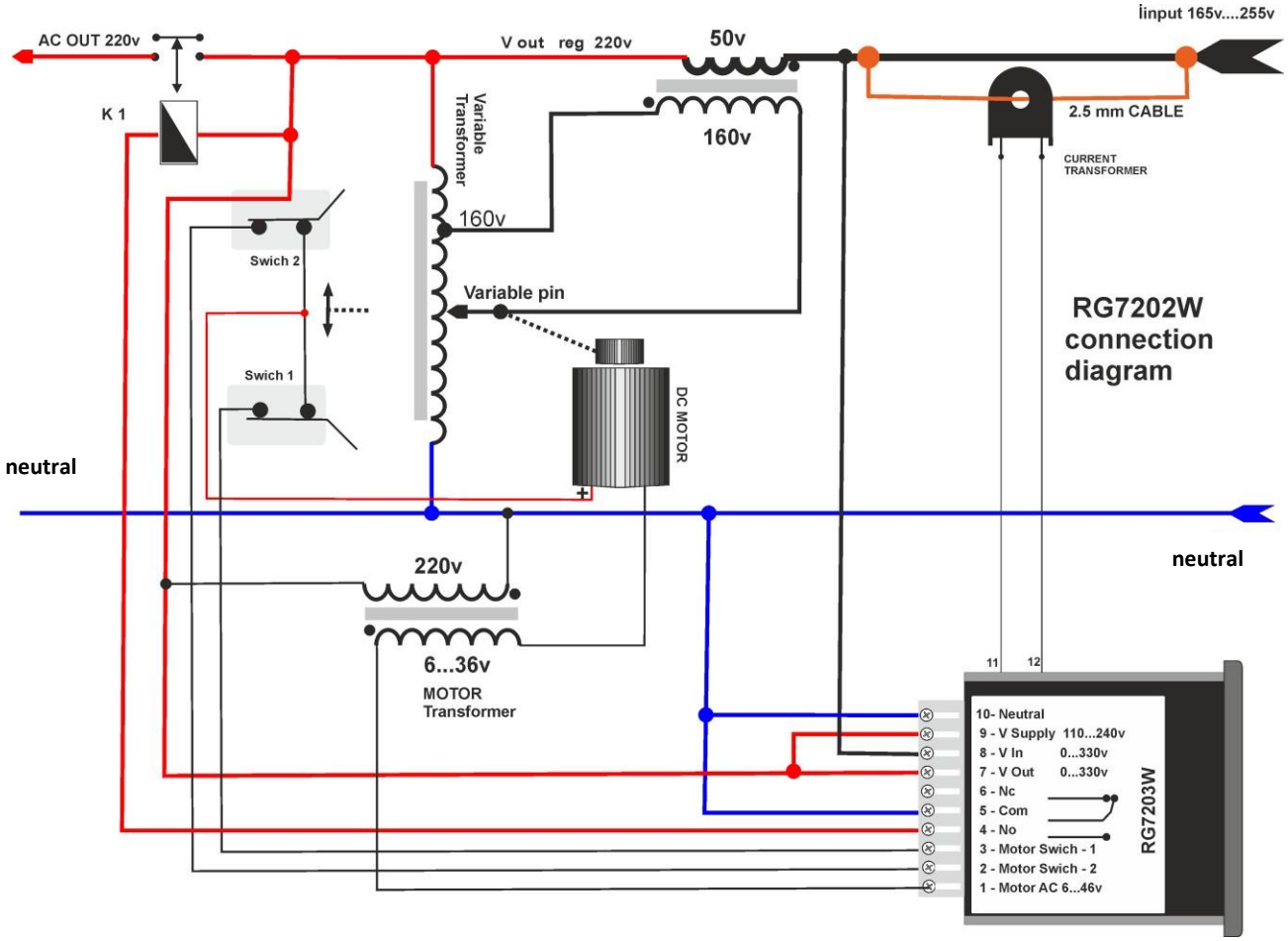
Er7: The current passing through the current transformer exceeds 5 amperes.
Solution:

- If an external current transformer is used, a higher-rated current transformer is required.
- The cable passing through the current transformer on the device is too thick.
- If a parallel cable is used for current measurement, choose a thinner cable to pass through the current transformer on the device.

Er8: The direction of the cable passing through the current transformer is reversed.

Solution: Change the direction of the cable passing through the current transformer.

---------- **Common issues and solutions in manufacturing and usage.** ----------



Attention!!!
If a separate transformer is not used for the DC motor, it is essential and mandatory to isolate the motor from the chassis.

(THİS TEXT CONTAINS AN IMPORTANT SAFETY WARNING. FAILURE TO PROPERLY ISOLATE DC MOTORS MAY LEAD TO ELECTRICAL ISSUES OR SAFETY RISKS)

Motor Reverse Rotation Issue

In this circuit, even though all components are identical, the motor may sometimes rotate in the reverse direction.

The actual reason for this is that the transformer's output voltage is connected with a 180-degree phase shift in the sine wave. This occurs due to the coil being wound in the opposite direction or the terminals being numbered incorrectly.

This issue can be resolved by switching either the input or output terminals of the transformer.

Frequent or Continuous Direction Change Issue in the Motor

This issue mostly occurs when the regulator output voltage is applied with a tolerance of less than 1% and when motorized loads cause voltage fluctuations.

The problem can be resolved by increasing the regulator output voltage tolerance to above 2%.

---------- **“ WiFi “** ----------

Unlike All Similar Embedded Devices, the “RG7203W” Module Uses a “WiFi” Communication Module

This feature allows the device to enable broader data monitoring, reset stored data, and control the load voltage (turning it off and on) directly through a web browser without needing any additional applications.

When leaving the factory, **Parameter 14 (P.14) is set to WiFi Active = 1 (On).**

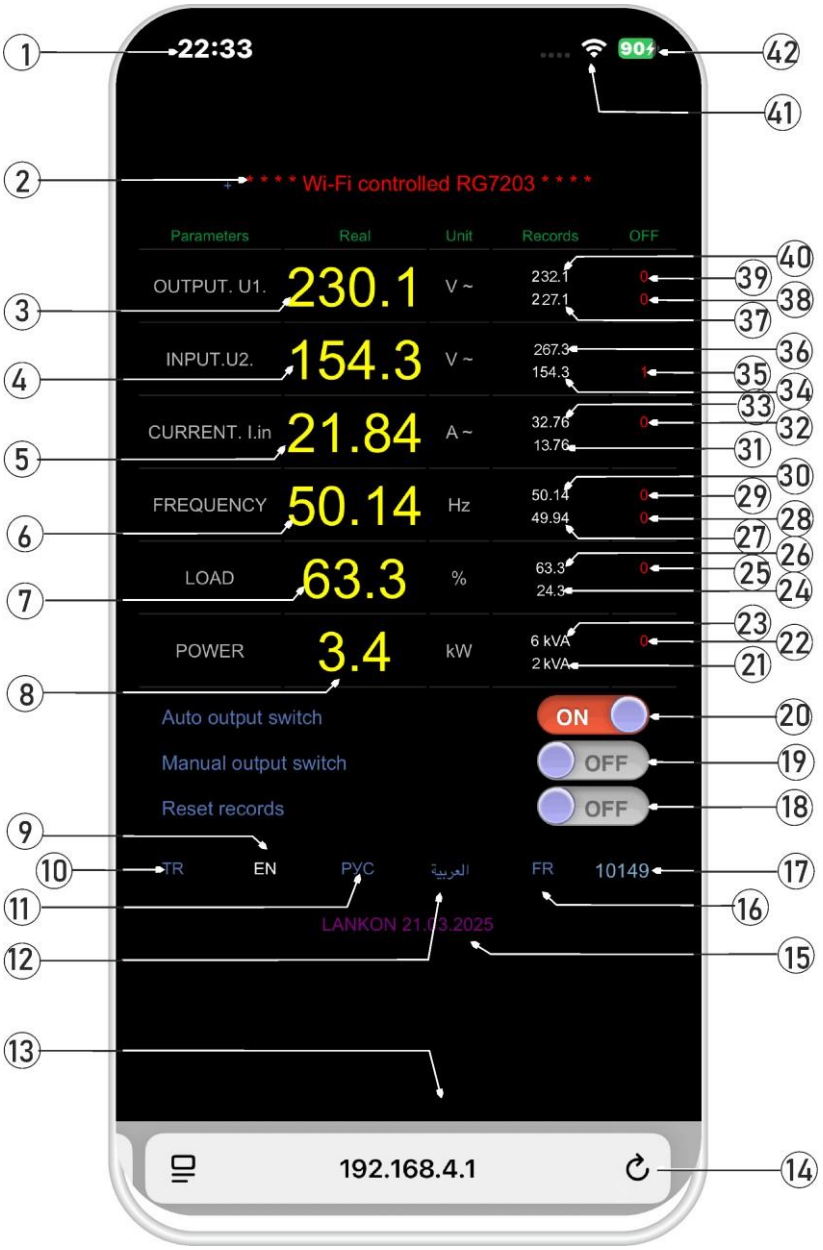
Setting Up “RG7203W” WiFi Connection on a Tablet, Computer, or Mobile Phone:

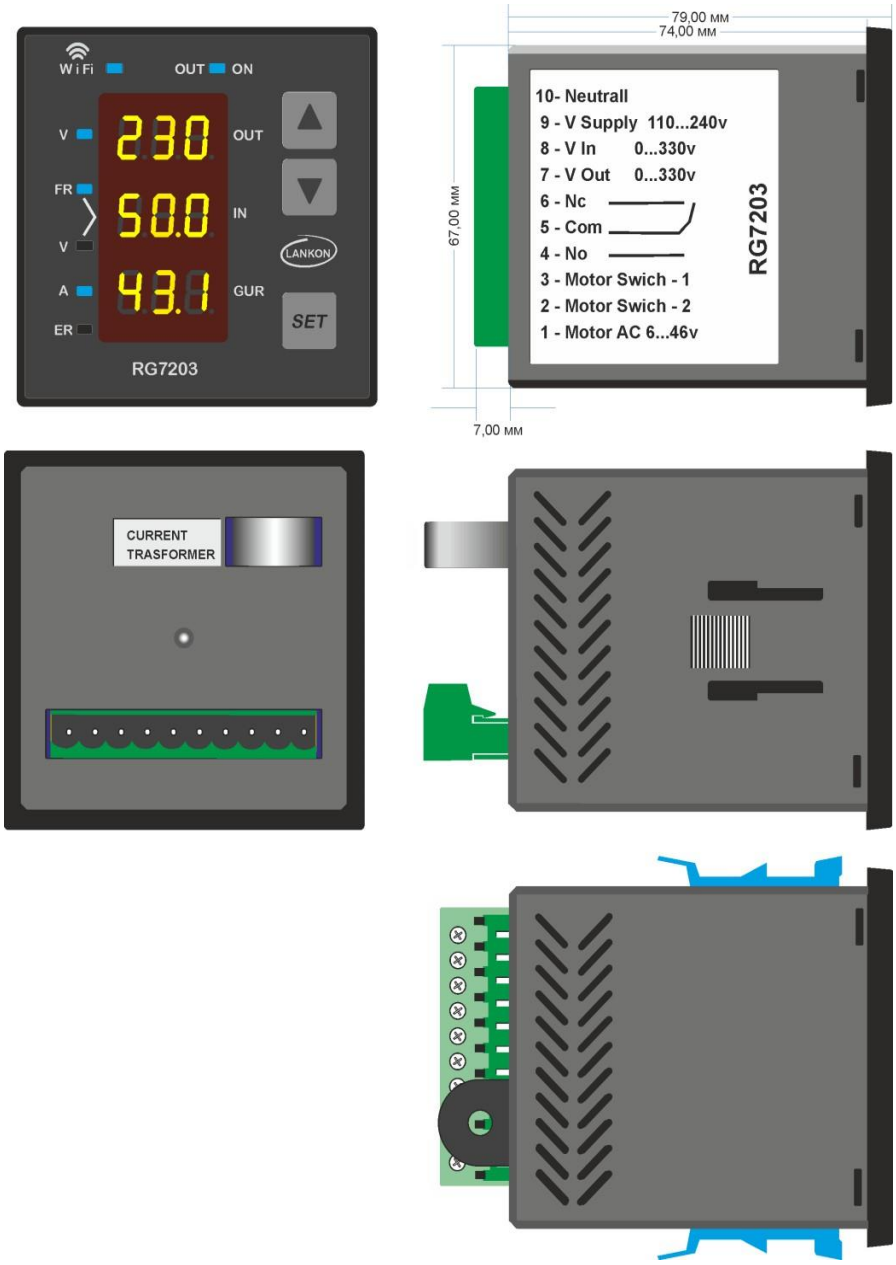
1. Go to **Settings > Wi-Fi** section.
2. A list of nearby Wi-Fi networks will be displayed.
3. Select **"RG7203_"** from the list and press **"Enter"**.
4. Wait for the Wi-Fi connection to establish successfully.
5. When prompted for a password, enter **"12345678"** and press **"Enter"**.
6. Open a web browser and type **"192.168.4.1"** into the address bar, then press **"Enter"** to access the **"RG7203W" Wi-Fi page**.

Explanation of Numbered Values on the "RG7203W" Wi-Fi Page

1. **Real-time:** The system's current time.
2. **Page title:** The name or title of the page.
3. **Actual output voltage value:** The real-time voltage measured at the output.
4. **Actual input voltage value:** The real-time voltage measured at the input.
5. **Actual current value:** The real-time current measured in the system.
6. **Actual frequency value:** The real-time frequency measured in the system.
7. **Loading percentage:** The real-time load percentage of the system.
8. **Load (in Watts):** The system load expressed in watts.
9. **English mode:** Button to switch the interface to English.
10. **Turkish mode:** Button to switch the interface to Turkish.

11. **Russian mode:** Button to switch the interface to Russian.
12. **Arabic mode:** Button to switch the interface to Arabic.
13. **Value to be entered in the browser's address bar:** Special value used for searching.
14. **Page refresh icon:** Icon to refresh the page.
15. **Software version:** The software version of the system.
16. **French mode button:** Button to switch the interface to French.
17. **Incoming page number:** The page number currently displayed in the system.
18. **Reset records button:** Button to reset stored records.
19. **Manual output activation button:** Button to manually activate the output.
20. **Automatic output activation button:** Button to automatically activate the output.
21. **Minimum power (recorded in kVA):** The minimum power value recorded in the system.
22. **Shutdown count due to high load (recorded):** Number of times the system shut down due to high load.
23. **Maximum load (recorded in kVA):** The maximum load value recorded in the system.
24. **Minimum load percentage (recorded):** The minimum load percentage recorded in the system.
25. **Shutdown count due to high load (recorded):** Number of times the system shut down due to high load.
26. **Maximum load percentage (recorded):** The maximum load percentage recorded in the system.
27. **Lowest frequency (recorded):** The lowest frequency value recorded in the system.
28. **Shutdown count due to low frequency (recorded):** Number of times the system shut down due to low frequency.
29. **Shutdown count due to high frequency (recorded):** Number of times the system shut down due to high frequency.
30. **Highest frequency (recorded):** The highest frequency value recorded in the system.
31. **Lowest current (recorded):** The lowest current value recorded in the system.
32. **Shutdown count due to high current (recorded):** Number of times the system shut down due to high current.
33. **Highest current (recorded):** The highest current value recorded in the system.
34. **Lowest input voltage (recorded):** The lowest input voltage value recorded in the system.
35. **Power supply interruption count (recorded):** The number of times the power supply was interrupted.
36. **Highest input voltage (recorded):** The highest input voltage value recorded in the system.
37. **Lowest output voltage (recorded):** The lowest output voltage value recorded in the system.
38. **Shutdown count due to low voltage at output (recorded):** Number of times the output shut down due to low voltage.
39. **Shutdown count due to high voltage at output (recorded):** Number of times the output shut down due to high voltage.
40. **Highest output voltage (recorded):** The highest output voltage value recorded in the system.
41. **Phone Wi-Fi status:** The Wi-Fi connection status of the phone.
42. **Phone battery status:** The battery level of the phone.


22:33
* * * * Wi-Fi controlled RG7203 * * * *
Parameters
Real
Unit
Records
OFF
OUTPUT. U1.
230.1
V ~
232.1
227.1
INPUT.U2.
154.3
V ~
267.3
154.3
CURRENT. I.in
21.84
A ~
32.76
13.76
FREQUENCY
50.14
Hz
50.14
49.94
LOAD
63.3
%
63.3
24.3
POWER
3.4
kW
6 kVA
2 kVA
Auto output switch
ON
Manual output switch
OFF
Reset records
OFF
TR
EN
PYC
العربية
FR
10149
LANKON 21.03.2025
192.168.4.1



Technical Specifications

- **Operating Voltage (V Supply):** 110V…230V
- **Operating Frequency (Automatic):** 47…99Hz
- **Measurement Range:** 1V…300V (L-N)
- **Measurement Accuracy:** ±1%
- **Measurement Speed:** 50Hz - 20ms
- **Operating Power:** < 2VA
- **Relay Contact Rating:** 250V/5A AC (1250W)
- **AC Motor Power Supply:** 6…36V **Operating Temperature:** +55°C to -25°C
- **Connection Type (Pluggable Terminal Block):** 10 x 5.08 mm
- **Mounting:** Front panel mounting
- **Panel Cutout Dimensions:** 68 x 68 mm
- **Overall Dimensions:** 72 x 72 x 82 mm
- **Weight:** RG7203W - 0.190 kg

4 Important Points in Regulator Use

Automatic Servo Voltage Regulators are used to prevent precise devices from failing under bad electrical network conditions. Users with such bad network conditions use Regulator to transfer to devices a regular electrical network.

An electrical network professionally installed within a building is installed by selecting proper quality and thickness of conductive and in accordance with necessary earthing and distribution principles. Any users willing to create regular electrical network with the use of a regulator must pay attention to certain points in making the connections between devices to be supplied by the Regulator. Otherwise, user's health and device's integrity may not be guaranteed.

- Regulator must be connected to electrical network by an authorized service technician using proper sections of cables and as described in installation section.
- Regulator must be connected to an "earthed" switchboard providing the current capacity written on the label on back panel.
- Any device supplied by a socket/switchboard, which is not or poorly earthed, pose a danger of electrical shock to user and the risk of failure of electronic circuits is high.
- Some building electrical installations may show earthed sockets but may contain two-lined (phase and neutral) sockets. Either earth terminals of such sockets may not have been connected to protection earth or connected to neutral terminal instead. In case where no current flows through neutral line, protection may be on earth level. Since neutral voltage will be more different than protection earth level as such sockets or any parallel sockets are loaded, human health and safety of supplied equipment are in danger.

5 Maintenance

If you would like to clean the device, please follow the instructions below:

- Switch off the loads
- Turn all fuses and switch on device to "0" position.
- Wipe the device with a damp-dry cloth.
- Do not keep any inflammable and heat affected materials around the device (under, above, in front, back or on sides of device).
- Device's environment must be at normal room temperature values and if possible device should not be exposed to direct sunlight and left or used in humid or damp environments.
- Operating environment must be free of any rodents and insects.
- Doors of device must not be opened other than in Authorized Service station.
- Device must not be exposed to any impacts or high temperature causing deformation on external box.
- Any later modifications on electrical installation of device must be suitable to device power.
- External appearance of device must be checked once a month.
- Painting of device must be checked once a year.
- Switches and cables of device must be checked once a month.

Make sure no liquid or solid foreign substances penetrate into device.

Do not use cleaning powder or any other substances that may damage plastic parts.

Servo-Controlled voltage regulators consist of regulating toroidal transformer (variac), auxiliary transformer and servo-motor commanding variable transformer and electronic circuits commanding such motor according to output voltage.

Thanks to its fast-responding time controlling system, DC motor sequence with high-startup torque rapidly regulates even small voltage changes on input. When input voltage is outside operating limits, output voltage is automatically adjusted to desired value by limit-control system and servo motor is deactivated by controlling circuit. Upon completion of regulation, motor is disconnected from energy through electronic braking circuit to enable silent operation.

1.**Wide power range**:, Single-phase production from 5 kVA up to 50KVA.

2.**Voltage field**:

Standard; 230 single-phase -25% + 15% (from 172V to 264V)

Special regulators:

3.**Regulation speed rate** : 80 V/sec.

4.**Output deviation**: Unless regulator is used over its own power, no deviations occur on output.

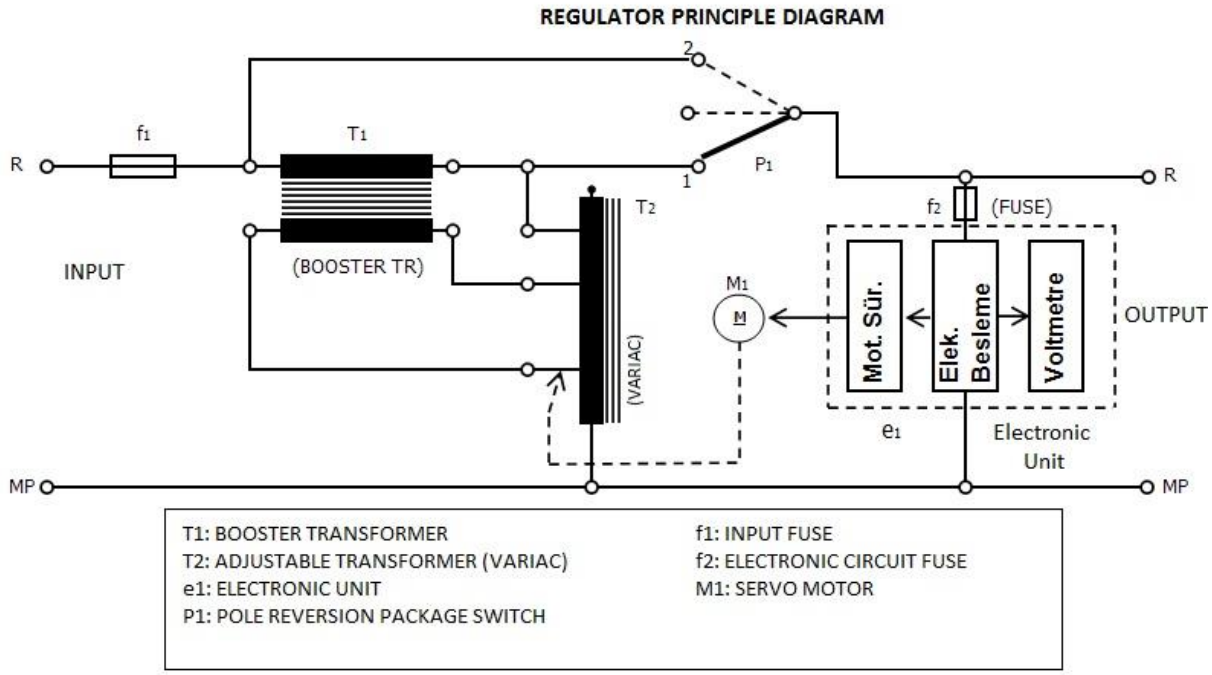
5.**Efficiency**: Efficiency is better than 95% since regulators and transformers consist of high-quality silicon sheet and B-F class conductive materials.

6.**Working temperature**: Unless regulators are used in acidic and humid environments, working temperature may be up to 50°C. Additional cooling system is applied for temperatures over such degree

7.**Over voltage and phase protection unit (optional)**: Cuts off the output in case where any of phases is gone during over voltage deviations (low-high) and allows output again upon finding the desired voltage. User may deactivate protection unit with its respective on device.

8.**By-Pass system**: Regulators provide by-pass through high-quality switches. In case of any failure, regulator may be transferred to the mains through switch without any operation on installation

8.1 Regulator Principle Diagram:



POSSIBLE PROBLEMS AND SOLUTIONS

Problem	**Possible Cause**	**Solution**
Voltmeter does not show right	Voltmeter is defective	If voltmeter is digital, check socket; if it is analog, replace.
	Electronic card is defective	Check neutral connection, if problem persists please inform Technical Service
Smell emanates from device	Overloading is available	Check loads on phase, switch device to Mains position and inform Technical Service.
Device does not indicate voltage	If device is protected	Check fuse switch. Phase may be cut off, may not be neutral or voltage is not within operating range.
	If device is not protected	Fuse switch may be burned off or defective, voltmeter may be defective. Report technical service
Device turns on and off sometimes	If device is protected	Make sure neutral and phases are correct.
	If device is not protected	There may be excessive ampere drawing. Voltage may be outside current limits.
Sounds coming from device	Overloading is available, motor connection may be loose	Turn device to mains positions, please contact your dealer or Service Center. Provide Service Center with following information: -Device Serial Nr. and KVA, -Date of occurrence of problem.
IMPORTANT NOTICE: Any interventions to device must only be made by qualified individuals.		

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6 Technical Specifications and Data

MODEL SEM-EM	**05**	**06**	**07**	**08**	**09**	**11**	**12**	**13**
Power (KVA/KW)	5/5	7.5/7.5	10/10	15/15	20/20	30/30	40/40	50/50
INPUT								
Input voltage	230Vac 1ph + N							
Voltage range	172Vac ~ 264Vac (-25%+15%) [altre gamme disponibili su richiesta, quali 110-240 e 180-280]							
Input frequency	47 : 64 Hz							
OUTPUT								
Output voltage	230Vac (adjustable 200:250V)							
Output accuracy	± 1%							
Output current (A)	22	32	43	65	86	130	173	217
Power factor	1							
Acceptable overload	200% load 10” – 101:150% load 2’							
Output frequency	47 : 64 Hz (same as input frequency)							
Resonse time	< 1.5/1000 sec							
Regulation speed	80V / sec							
Efficiency	min. 95%							
Display	Digital instrument with output voltage/current reading on each phase and status signals (mains, bypass)							
PROTECTIONS								
Input protection	Automatic circuit breaker							
Output protection	Short circuit, over current, low-high voltage, via output contactor							
By-Pass	Manual By-pass included							
MCB output	Optional							
OTHER DATA								
Cooling	Natural ventilation							
Protection	IP20 (other protection grades available on request)							
Max ambient temp.	-10° C ~ +50° C							
Altitude	Up to 1000 mt with no derating							
Relative humidity	96% (without condensation)							
Acoustic pressure	< 30dB				< 50dB			
PHYSICAL CHARACTERISTICS								
Color	RAL7035							
Dim. WxDxH cm	33x35x56		38x40x61	50x51x86			50x61x86	60x124x115
Weight kg.	35	38	50	55	110	140	150	260

Dimensions and weights are indicative only and can be changed at any time without notice

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