Tescom

AVR 11

User Manual

Automatic Voltage Regulator

1 phase In / 1 phase Out

1-15 kVA

SERVO MOTOR

Tescom HELLAS

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IMPORTANT NOTICES!

Dear user;

This manual contains information about features of Voltage Regulator (AVR), installation, operation and the loads connected to the AVR, safety information, use of the AVR, operation principles, settings and measurements (calibrations), detection and troubleshooting.

Read the instructions carefully before the installation.

Keep manual in case you need as an Application Source!

Reserves the right to change the contents and information in this document without notice.

Life span of the device is 10 years.

This Voltage Regulator is designed to meet the requirements specified in TS EN 60335-1 and TS EN 60335-1 / A11 Standards. This AVR complies with the norms of the following marking.

CE

MEANINGS OF SYMBOLS USED IN THE MANUAL

This symbol points out where to pay attention mostly.

This symbol shows instructions that may pose a life threatening hazard, such as an electric shock if not followed.

This symbol indicates instructions that may cause injury to the user and / or damage to the AVR if not followed.

This symbol indicates that the transport materials used for AVR are recyclable.

Abbreviations and Descriptions

AVR: Automatic Voltage Regulator

V:Volt(Voltage)

A:Amper(Current)

P:Watt(Power)

For Manual Bypass:

Mains (1): The bypass load thru Mains voltage.

Regulator (2): The load thru Regulator

MEANINGS OF SYMBOLS ON AVR

PE: Protective Earth

Electroshock Hazard (Black/Yellow)

Includes warning instructions

Recycle

Heavy load

CONTENTS

1.SAFETY INSTRUCTIONS

Human Safety 	Use the AVR where thereis restricted access.
	When AVR Line (Manual Bypass) is selected, device is deactivated and the load is sourced from the mains and the output is energized.
	AVR must be connected to earth appropriately.
	The AVR should only be turned on by authorized service personnel.
Device Safety 	The AVR must be protected by a circuit breaker that is easily accessible against overload and short-circuit conditions.
	Do not operate the AVR if the ambient temperature and the relative humidity are out of specified range in this manual.
	Do not operate the AVR in the presence of liquid or in extremely humid environments.
	Do not allow liquid or foreign objects to enter the AVR.
	Do not block the AVR ventilation holes.
	Lifespan of AVR is 10 years.
Recycling and Change 	Use insulated handled tools.
	To prevent occupational accidents, remove watches, metal accessories such as rings and use rubber shoes and gloves.
	Replaced semi-finished materials must be packed to be recycled.

2.GENERAL INSTRUCTIONS

2.1.Safe Handling

Be careful when handling loads. Do not carry heavy loads without help.

- Move wheeled devices on smooth and unobstructed surfaces.
- Do not use ramps that are more inclined at 10 ° angle.
- Follow the recommendations below for load weights.

- An adult can carry loads up to 18 kg.
- Two adults can carry loads up to 32 kg.
- Up to 55 kg can carry loads of three adults.
- Use pallet trucks, forklifts, etc. to transport heavy loads from 55 kg.

Save packing materials in case AVR is transported by technical service or to other place.

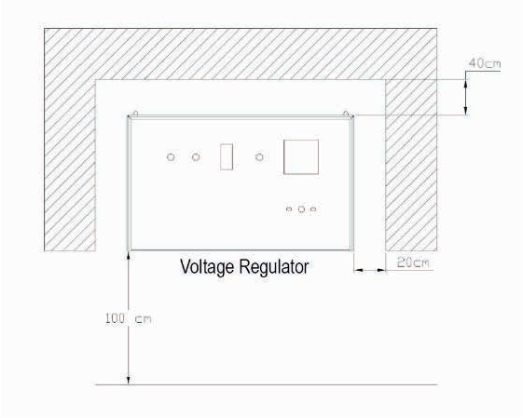
Since AVR is heavy, must be used a proper vehicle to handle.

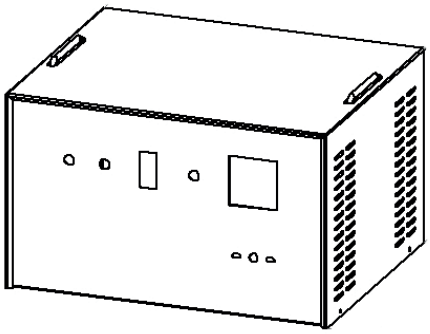
The AVR should be packed properly when it needs to be carried again. For this reason, it is recommended to save the original package.

All packaging materials must be dropped at the relevant collection points in accordance with recycling rules.

2.2.Location

This product complies with the restricted access and safety requirements specified in TS EN 60335-1 and TS EN 60335-1 / A11 safety standards. Users must meet the following requirements.





Non-Suitable Operating Enviroments for AVR
Harmful smoke, dust, abrasive dust.
Moisture, steam, rainy/bad weather conditions
Explosive powders and mixtures
Excessive temperature changes
Lack of ventilation
Direct/ indirect exposure to radiation heating thru any other sources
Severe electromagnetic field
Harmful radioactive level
Insects, fungus
AVR is not designed for outdoor use
The AVR can operate at ambient temperatures between -10 °C/ + 50°C. The relative humidity at ambient must be between 20%-95%.
Make sure the floor is strong enough to carry the system weight.

2.3.Storage

- AVR can be stored at a temperature of -25 ° C to +60 ° C, far away from heaters and in a dry environment.
- The relative humidity at ambient must be between 20%-95%.
- Check the AVR power compliance of total load to be connected to AVR and line.
- AThe AVR must be stored in a dry and moisture-proof environment before commissioning.

3.UNPACKING AND ASSEMBLY

The equipment damaged during transportation must be inspected by the Technical Service Personnel before the installation.

As AVR is delivered to you, please check the packaging firstly. Even device is packed carefully, it may have been damaged during the transportation. In case of any damage in the packaging, please contact the transportation company.

The output voltage and output frequency of the AVR are set to 220V / 50Hz as standard.(230 V/240 V as optional)

It is recommended to store AVR original packaging.

3.1.Unpacking

The cardboard box is removed from the top as held by the handles.

3.2.Assembly Procedures

The installation complies with national installation regulations.

• TS HD 384.4.42 S1: Electrical installation at the premises Part 4: Protection for safety Group 42: Protection against thermal effects

• TS HD 384.4.482.S1: Electrical installations in buildings, Part 4: Safety protection Group 48: Selection of protective measures due to external effects, Part 482: Protection against fire at special hazards or places whereas danger exists

The line and bypass inputs must have protection and circuit breaker systems in the power distribution panel. The breakers on the board will cut all conductors at the same time.

Connections must only be made by Authorized Technical Personnel. The user's attempt to make connections on his own can be life-threatening.

3.3. 1 KVA -50 KVA(1 Phase Input/1Phase Output)Front Panel View

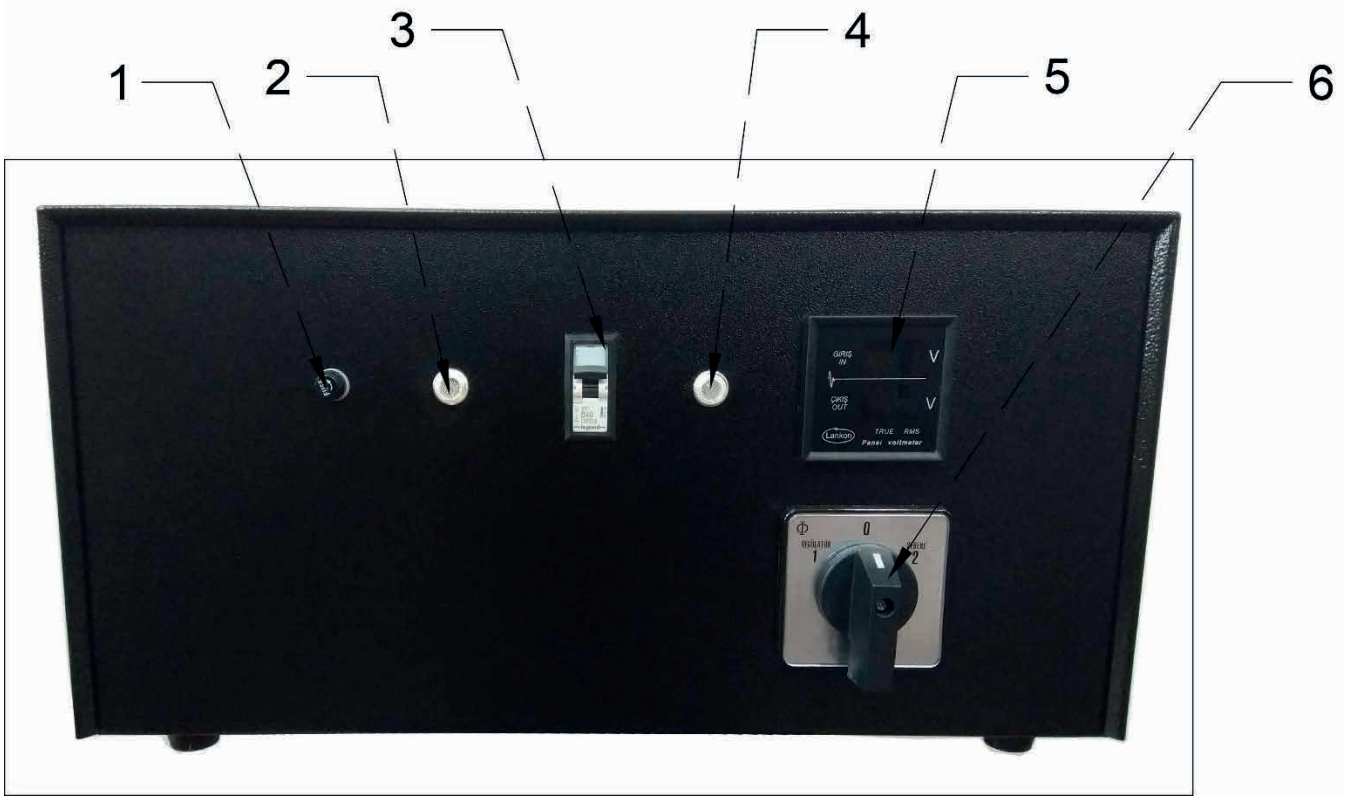


İmage-1

Image-1

1	Cartridge Fuse
2	Input Signal Light
3	Circuit Breaker B Type
4	Output Signal Light
5	Input/Output Voltmeter
6	Cam Switch(Line-Regulator)

3.4. 1 KVA - 50 KVA(1 Phase Input/ 1 Phase Output) Rear Panel View

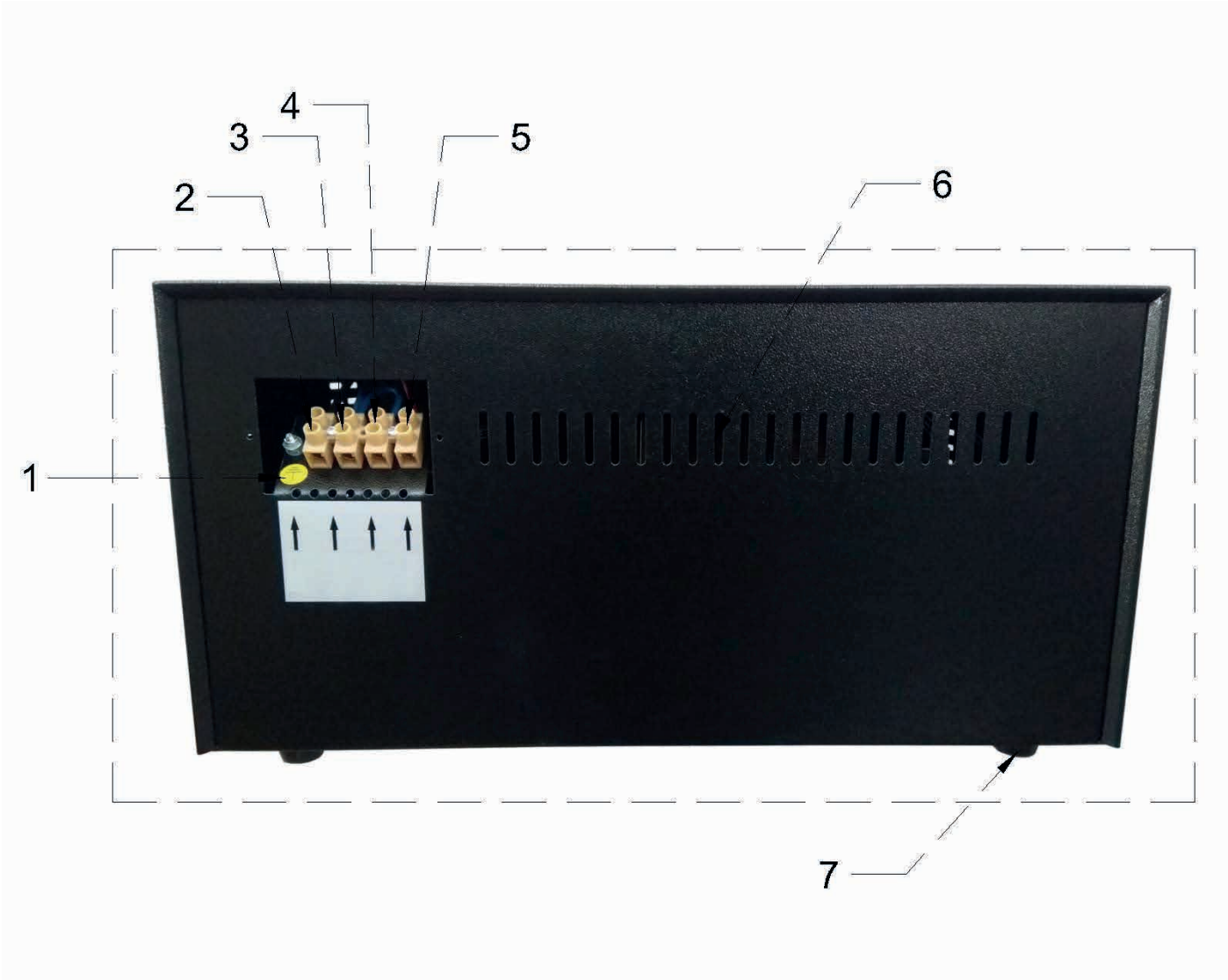


Image-2

Image-2

1	Earth Connection
2	Output Connection
3	Neutral Connection
4	Neutral Connection
5	Input Connection
6	Ventilation Holes
7	Device Carriage Legs

3.5. 1 KVA -50 KVA (1 Phase Input/1 Phase Output) Connection of Terminals

Feedback Risk

Firstly, separate the AVR from the circuit. Measure all terminals including the earth connection (PE) and check if there is dangerous voltage.

Check the AVR's input, output fuses and Mains Automatic Fuses are in the OFF position before connections of output.

Before installation, make sure that all circuit breakers in the panel are in the "OFF" position.

Connection terminals of the AVR located at rear side. Remove the rear cover with an instrument.

After removing the cover, route the earth, input and output cables through holes located below cable connection points.

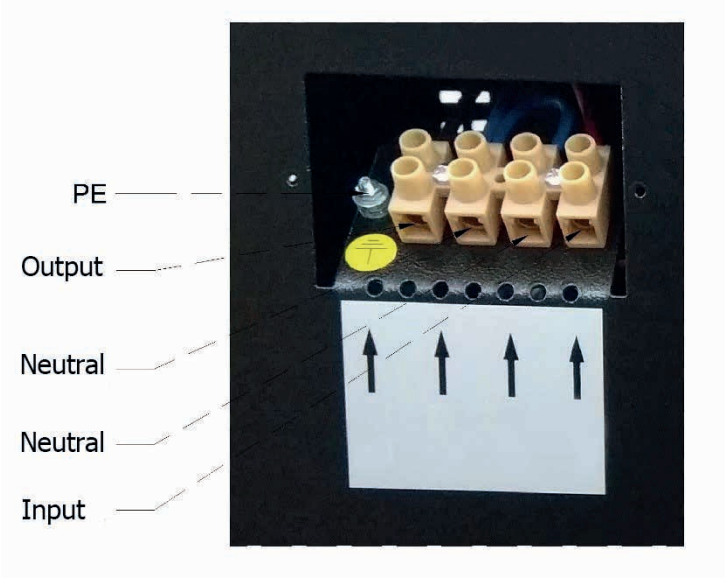


Image-3

3.5.1. Earth Connection

For safety, the ground connection of the device must be done. Perform PE ground connections before connecting any other cable.

AVR's PE (Earth) must be connected to high quality Earth line (low resistance)The connection of the load must be done through the output Earthing screw.

If the ground cable accompany with the input neutral cables, it should be cut long enough so that the ground cable does not come out even if the phase cables are come out.

3.5.2. Input-Output and Neutral Connections

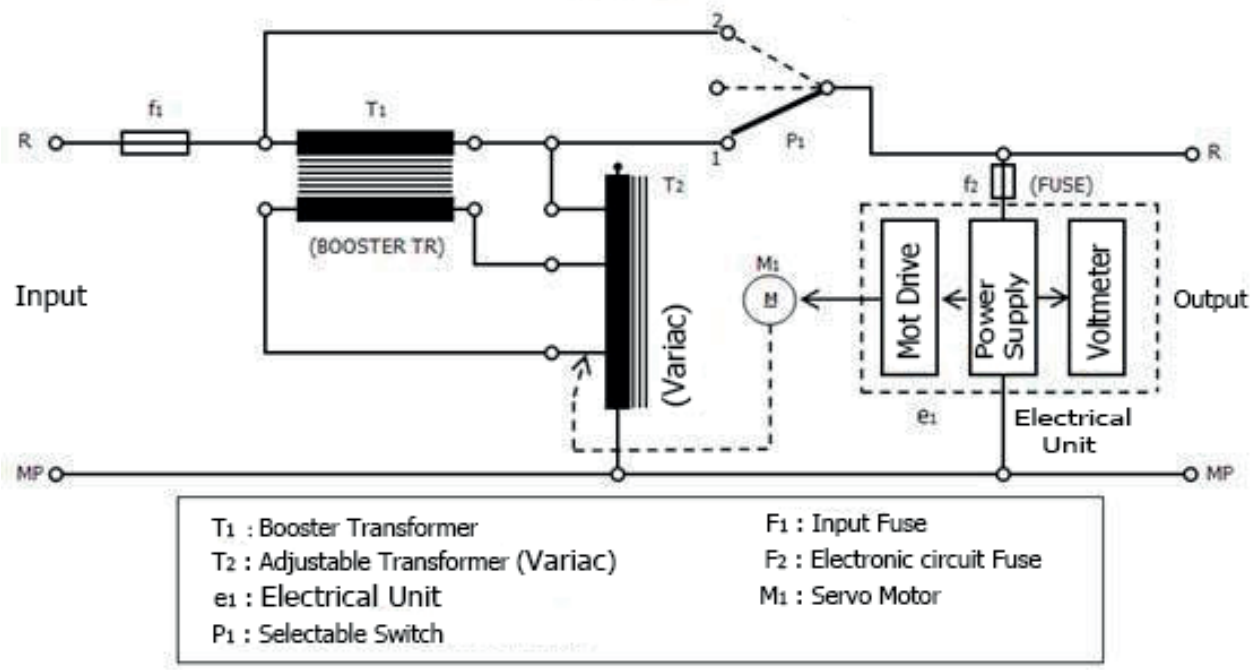
The modifications on the panel must be carried out by the authorized technical personnel.

Before connecting the input cables, make sure the Automatic fuse in the distribution panel at "OFF" position.

A residual current relay (min 300mA) must be connected to the distribution panel.

4.AVR (AUTOMATIC VOLTAGE REGULATOR) OPERATIONS

The AVR (Automatic Voltage Regulator) connected between the mains and the device protects the device / devices from line breakdowns, especially line outages.



AVR Block Diagram

Image-4

In case of drops or rises on main input voltage,the electronic control circuit senses the variation precisely and drives the servo motor quickly. With this signal, the motor moves the Variable Transformer (Variac) to the left or right which effects booster transfomer's primary winding as generating voltage plus or minus according to Mains voltage and source the voltage for secondary winding as addition or subtraction to the mains input voltage. Thus, keeps the output voltage precisely with determined tolerance against input voltage fluctuations and makes the system under safe operation. Due to fast response timing control system and high start-up torque DC motor, regulator corrects even small voltage changes very quickly.

If DC motor is out of input operating limits, the output voltage is automatically set to the required value by the limit switches and deactivated by the control circuit.

4.1. Device Specifications and Basic Information

4.1.1. Power Range

1 – 15 kVA single phase production.

4.1.2. Working Voltage Range

Standard:	%-25,%+15 -220/230/240 V Single Phase
Optional:	%±20 -220V/230/240 V Single Phase
	%±40-220/230/240 V Single Phase
	±30-220/230/240 V Single Phase
	%-35,%+15 -220/230/240 V Single Phase
	%-30,%+20 -220/230/240 V Single Phase
	%-35,%+15 -220/230/240 V Single Phase

4.1.3. Correction Speed

90 V/sec.

4.1.4. Output Deviation

As long as the regulator is not used over its power, there is no deviation from the output.

4.1.5. Efficiency

Regulators' efficiency is over 98% since the use of high quality transformer with silicon sheet and conductors .

4.1.6. Operational Temperature

Regulators shall be used up to 50 ° C unless there is acidic and humid environment. Extra cooling system also applied for the hot environments over this temperature.

4.1.7. By-Pass System

By-pass operation is realized thru high quality pako switches. In case of any fault, the regulator can be transferred to the Line with the 2x and 6x pole changeover switches without any operation.

4.2. Advantages of AVR

- High quality and Long Life Solution
- Safe and tested system
- Silent Operation and High Efficiency
- No Distortion at output
- Stable and uninterruptible supply
- Wide correction bandwidth, high accuracy

4.3 Application Fields

- CNC machines
- Heating, cooling and air conditioning devices,
- Radio&TV stations,
- Medical devices,
- Rectifiers
- Electrical motors,
- Telecommunication devices,
- Automatic welding machines,
- Magnetic devices,
- Lighting devices,
- Printing machines and precise typesetting machines,
- Precise photography studio tools,
- Induction heating devices,
- Electroplating systems,
- All kinds of electronic weaving looms,
- Laboratories with electrical and electronic equipment,
- Testing and research laboratories,
- Lifts, Elevators
- Factories, Hotels, Offices, Houses

5. .INPUT/OUTPUT DISPLAY

The input / output display on the front panel shows the voltage value at the input and the voltage at the output of the device.(Image-5)

Image-5

Input-Output connection scheme shown in Image-6.

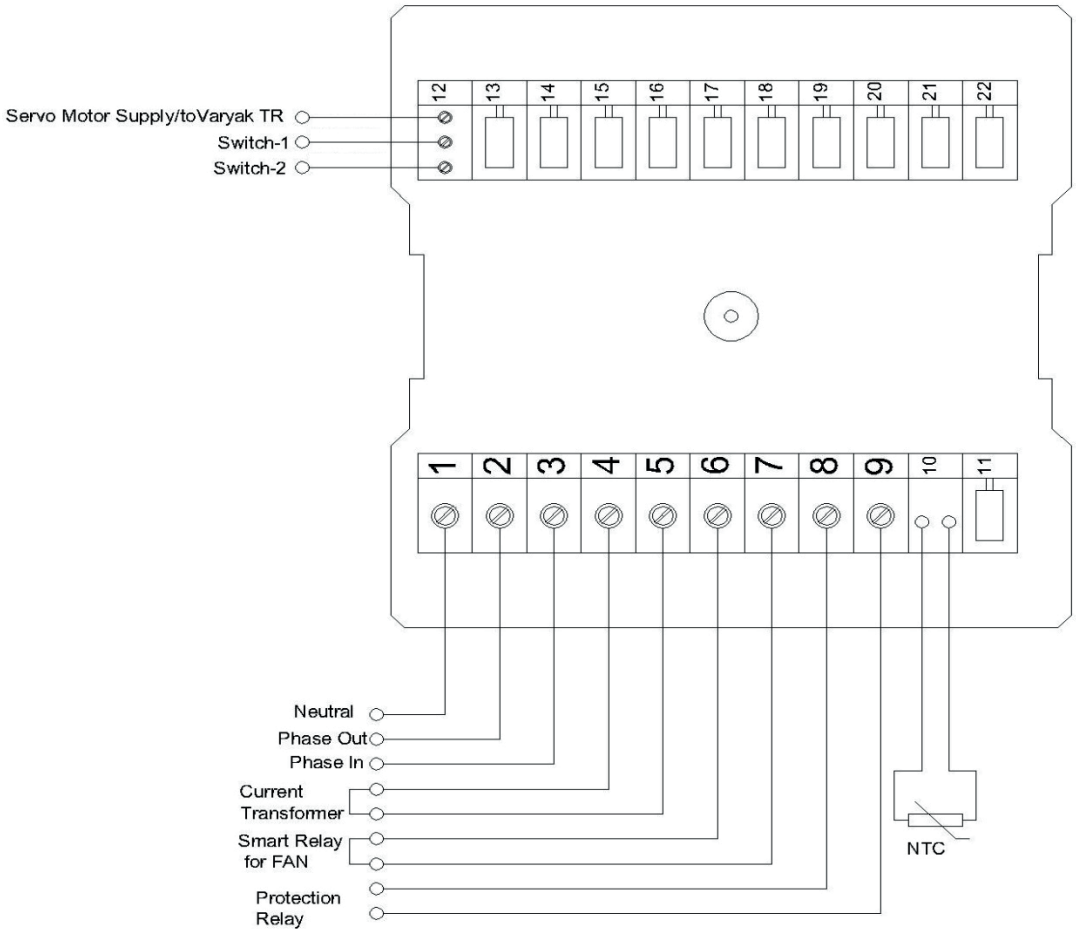


Image-6

6. AVR INTERNAL STRUCTURE AND TROUBLESHOOTINGS

6.1. AVR Internal Structure

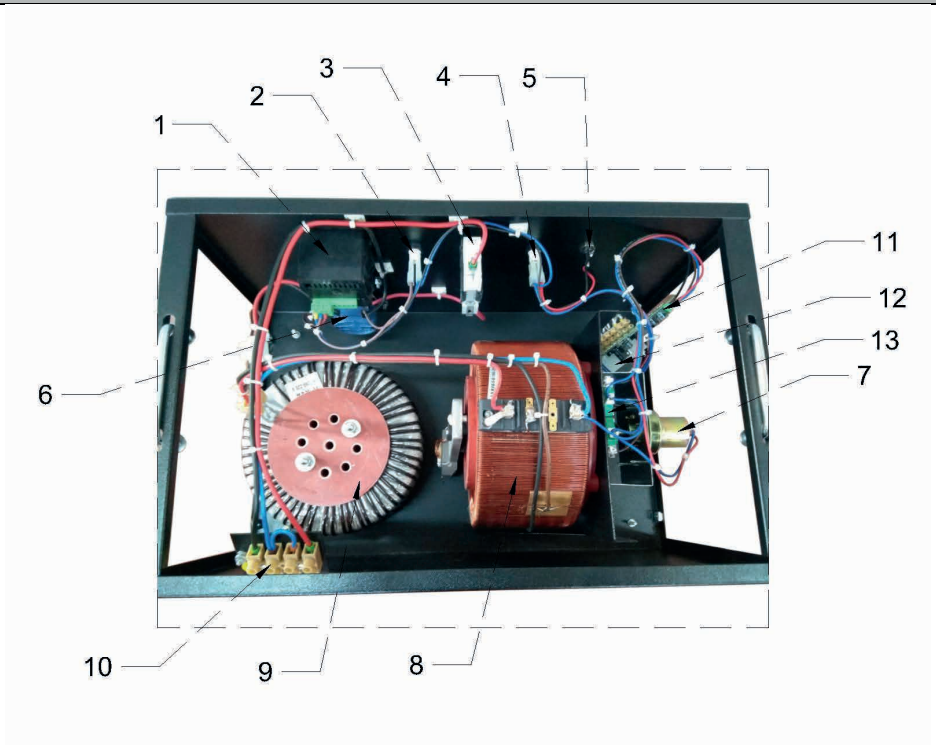


Image -7

Resim-7

1	Display(Input-Output Voltmeter)
2	Input Signal Light
3	Input Circuit Breaker
4	Output Signal Light
5	Cartridge Fuse
6	By-Pass/Regulator Switch (Cam Switch)
7	DC Motor
8	Variac Transformer
9	Booster Transformer (Toroidal type)
10	Input/Output Terminal
11	Control Board
12	Circuit Transformer
13	Limit Switch

6.2. Control Board and Assembly

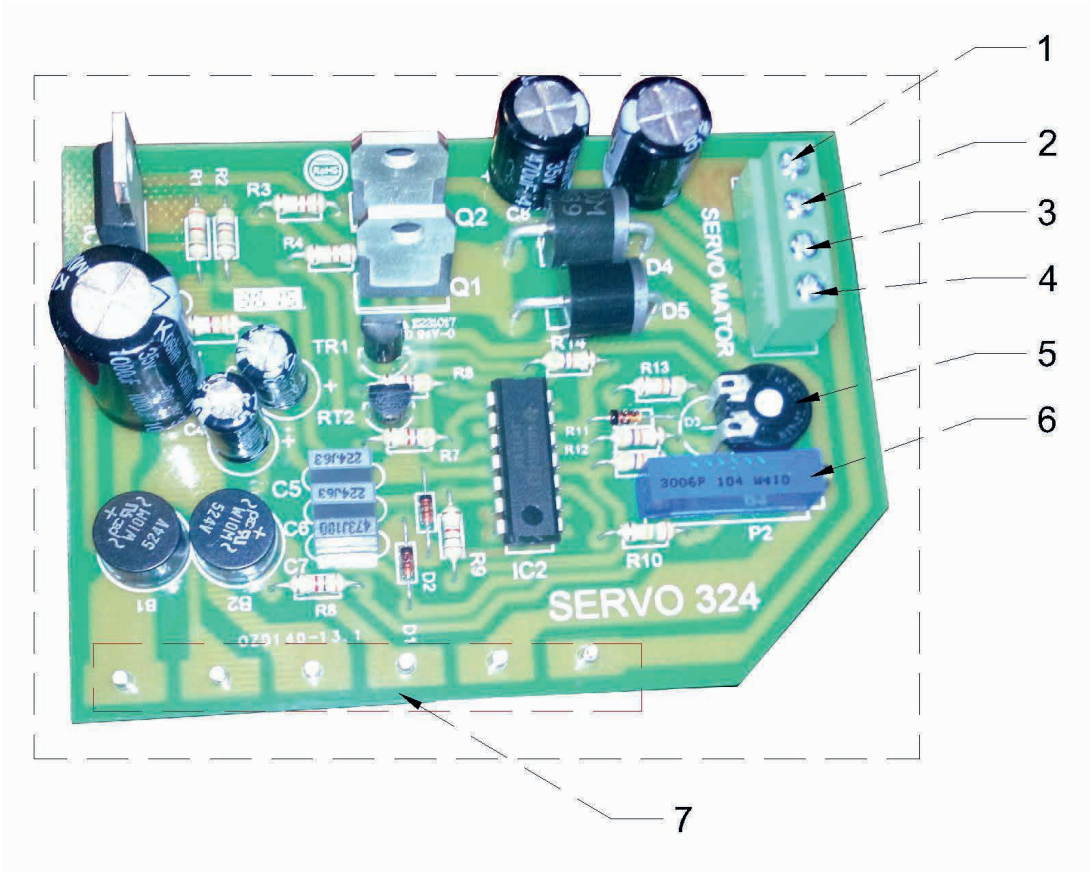


Image-8

Resim-8

1	Motor
2	Limit Switch(Common Pin)
3	Limit Switch-1
4	Limit Switch-2
5	Output Voltage Accuracy Setting
6	Output Voltage Setting
7	Circuit Transformer Connection Pins

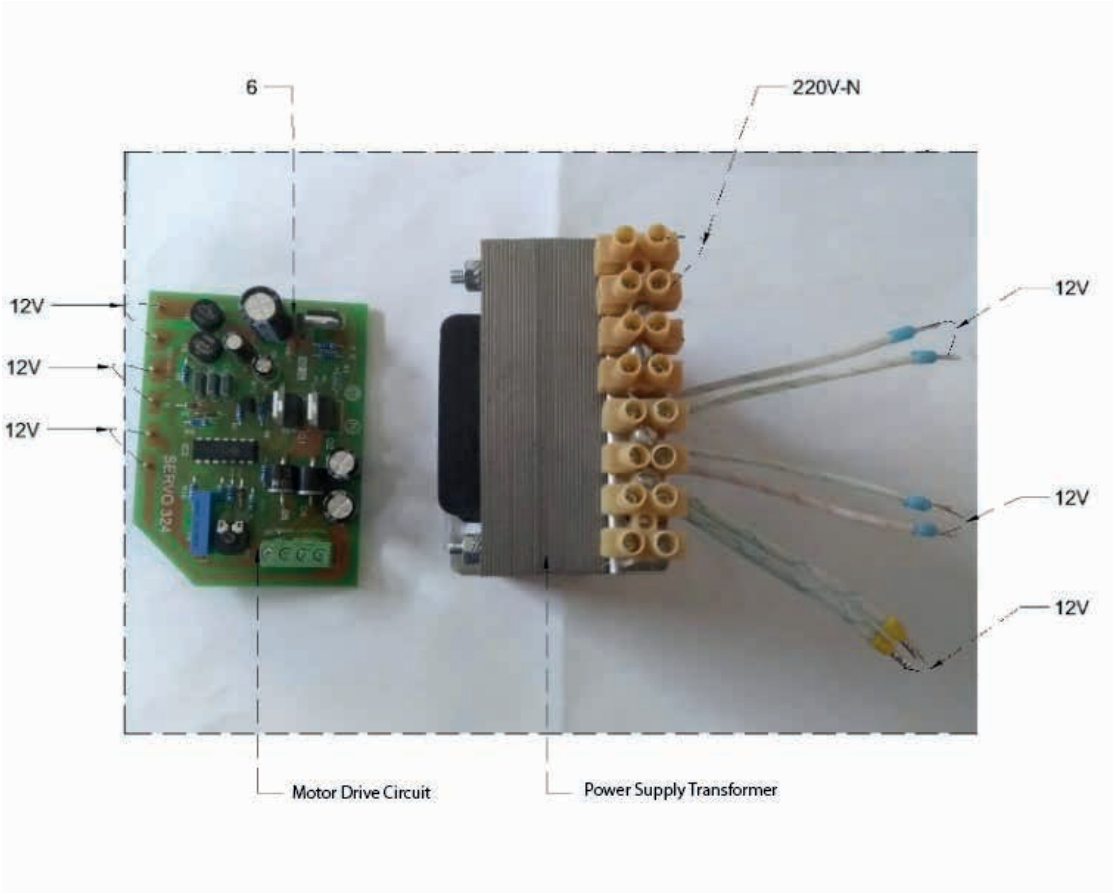


Image-9

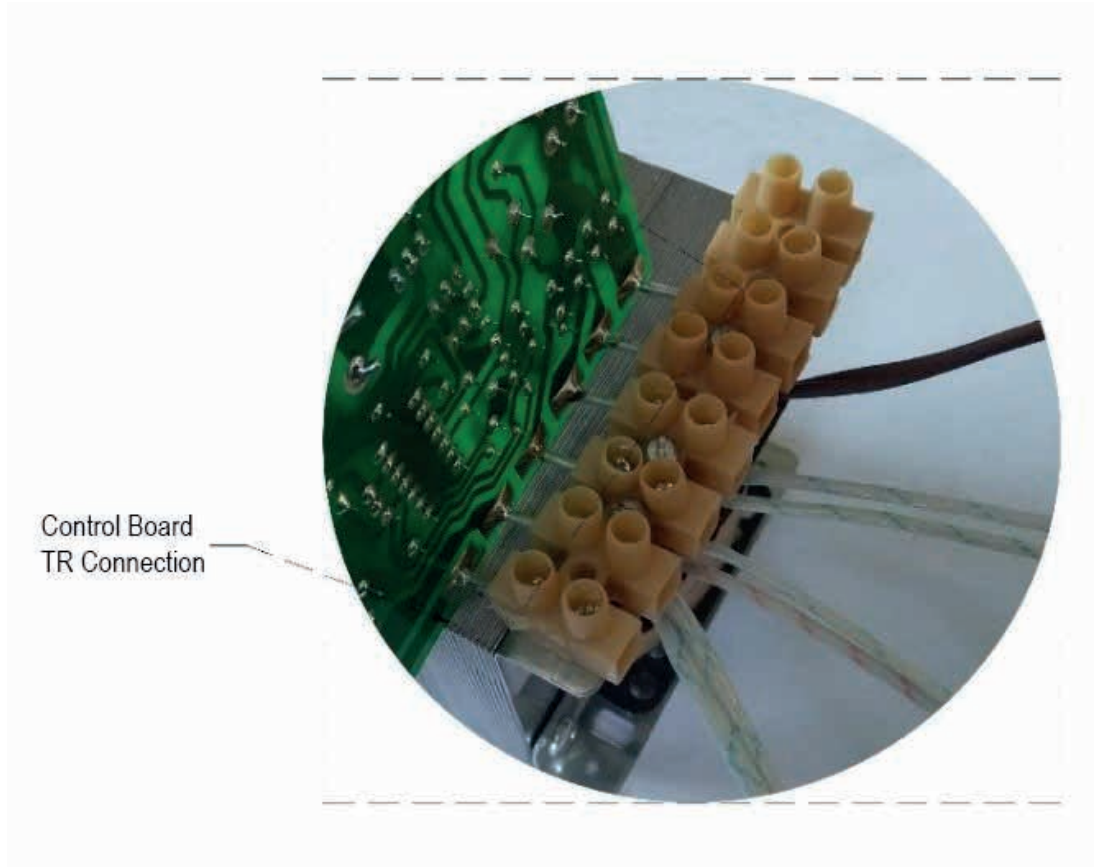


Image-10

6.3. Possible Malfunctions and Troubleshootings

Malfunction	Possible Causes	Troubleshooting
If voltmeter retrieves incorrectly	Voltmeter Malfunctioned	If voltmeter is digital, please check the socket. İf it is analogue, please replace with new one
	Control Board Malfunctioned	Check the neutral connections. If problem continues, please contact with technical service
If smell from device	Overloaded	Check the loads on phases. Switch the device to Line position and contact with technical service
If device retrieves Voltage incorrectly	If the device at protection position	Check the cartridge fuse. Phase would be lost or there is no Neutral connection or input voltage could be out of operation range
	If the device not at protection position	Cartridge fuse burnt or damaged. Voltmeter damaged. Please contact with technical service
If device automatically on and off	If the device at protection position	Please make sure the neutral and phase connections are correct
	If the device not at protection position	Overloaded or operational input voltage range is out of interval
If any noise from device	Oveloaded, Motor connections could be loosened	Switch the Pakoswitch to Line position and contact to your supplier or Technical service wit giving the required information below: -Serial No and Power -Malfunction Date
ATTENTION! Only authorized technical personnel should make an intervention to the equipment.		

7. TECHNICAL SPECIFICATIONS

MODEL	1101	1102	1103	1105	1107	1110	1115
Power(KVA)	1	2	3,5	5	7,5	10	15
INPUT of REGULATOR							
Input Voltage Correction Range	-25/+15 % Standard (other input bandwidth are optional)						
Working Frequency	47…65 Hz						
Line Input Protection	Low Voltage and Over Voltage Protection						
OUTPUT of REGULATOR							
Output Voltage	220/230/240 VAC RMS ±2						
Overload	10 sec %200 load						
Correction Speed	~90 Volt/sec						
Output Protection	At short circuit, overload or overvoltage situations contactor opens the circuit and protects the load						
OPERATIONAL PRINCIPAL							
	Servo motor, Micro controller unit, Full automatic						
GENERAL							
Cooling System	Smart Fan System						
Monitoring of Measured value	Monitoring the output and mains voltage with True RMS Panel Voltmeter						
Total Harmonic Distortion	-						
Efficiency	>%95						
Mechanical By-Pass	Manually controlled Line/Regulator Selectable Pako Switch						
Protection Level	IP 20 (others optional)						
ENVIRONMENT							
Operational Temperature	-10°C/+50°C						
Storage Temperature	-25°C/+60°C						
Relative Humidity	<%90 DIN(40040)						
Altitutde	<3000m						
Acoustic Level	<50Db(1m^2)						
Certificates	CE//Tüv Austria Hellas (ISO 9001)						
PHYSICAL FEATURES							
HxWxD(cm)	27x45x35				27x55x35		32x60x42
Weight(kg)	10	12	22	32	34	47	55

8. WARRANTY

8.1. Warranty Conditions

1.AVR's warranty period is 2 years from the date of delivery of product against defects in components, workmanship and production, if the product is used in the compliance with shown in the user manual.

2. Within the warranty period of the goods, spare parts will be supplied as free of charge if the device is malfunctioned due to components, workmanship and manufacturing defects.

3. Courrier/transportation costs occured during the supply of spare parts will be covered by buyer.

4.Defects resulting from unusual use of the products are out of warranty.

8.2. AVR's Out of Warranty Situations

This warranty does not cover the defects caused by improper use of the AVR which can be shown as following situations:

- Malfunction and failures due to user's improper use,
- Transportation damages after delivery/shipment,
- Damages due to the faulty electrical installation and/or use of other than the voltage indicated on the product label,
- Defects and damages caused by natural disasters such as fire and lightning and floods.

Warranty is void if the warranty document has been altered or original serial number on the product or on electronic cards has been removed or altered.

8.3. Device and Manufacturer's Information

Manufacturer

Name:	
Address:	
Tel / Fax	
e-mail	
Contact	
Sign&Stamp	

Device

Type	Regulator
Brand	
Model	
Label and Serial No	
Delivery Time/Place	
Warranty	
Min. Repair Period	

Seller

Company Name	
Address	
Tel/Fax	
Invoice Date&No	
Sign&Stamp	

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