

SINGLE PHASE POWER LIMITER

OM-110



OPERATING MANUAL



The quality management system of development and production complies with the requirements of ISO 9001:2015

Review the Operating manual before using the unit.

Dear Customer,

NOVATEK-ELECTRO Ltd. Company thanks you for purchasing our products.
You will be able to use properly the device after carefully studying the Operating Manual.
Store the Operating Manual throughout the service life of the device.

ATTENTION! ALL REQUIREMENTS OF THIS OPERATING MANUAL ARE COMPULSORY TO BE MET!



WARNING! – PRODUCT TERMINALS AND INTERNAL COMPONENTS ARE UNDER POTENTIALLY LETHAL VOLTAGE TO ENSURE THE DEVICE SAFE OPERATION IT IS STRICTLY FORBIDDEN THE FOLLOWING:

- TO CARRY OUT MOUNTING WORKS AND MAINTENANCE WITHOUT DISCONNECTING THE DEVICE FROM THE MAINS;
- TO OPEN AND REPAIR THE PRODUCT INDEPENDENTLY;
- TO OPERATE THE DEVICE WITH MECHANICAL DAMAGES OF THE CASE.

IT IS NOT ALLOWED WATER PENETRATION ON TERMINALS AND INTERNAL ELEMENTS OF THE DEVICE.

During operation and maintenance the regulatory document requirements must be met, namely:

- Regulations for Operation of Consumer Electrical Installations;
- Safety Rules for Operation of Consumer Electrical Installations;
- Occupational Safety when in Operation of Electrical Installations.

Installation, adjustment and maintenance of the device must be performed by qualified personnel having studied this Operating Manual.

In compliance with the requirements of this Operating Manual and regulations the device is safe for use.

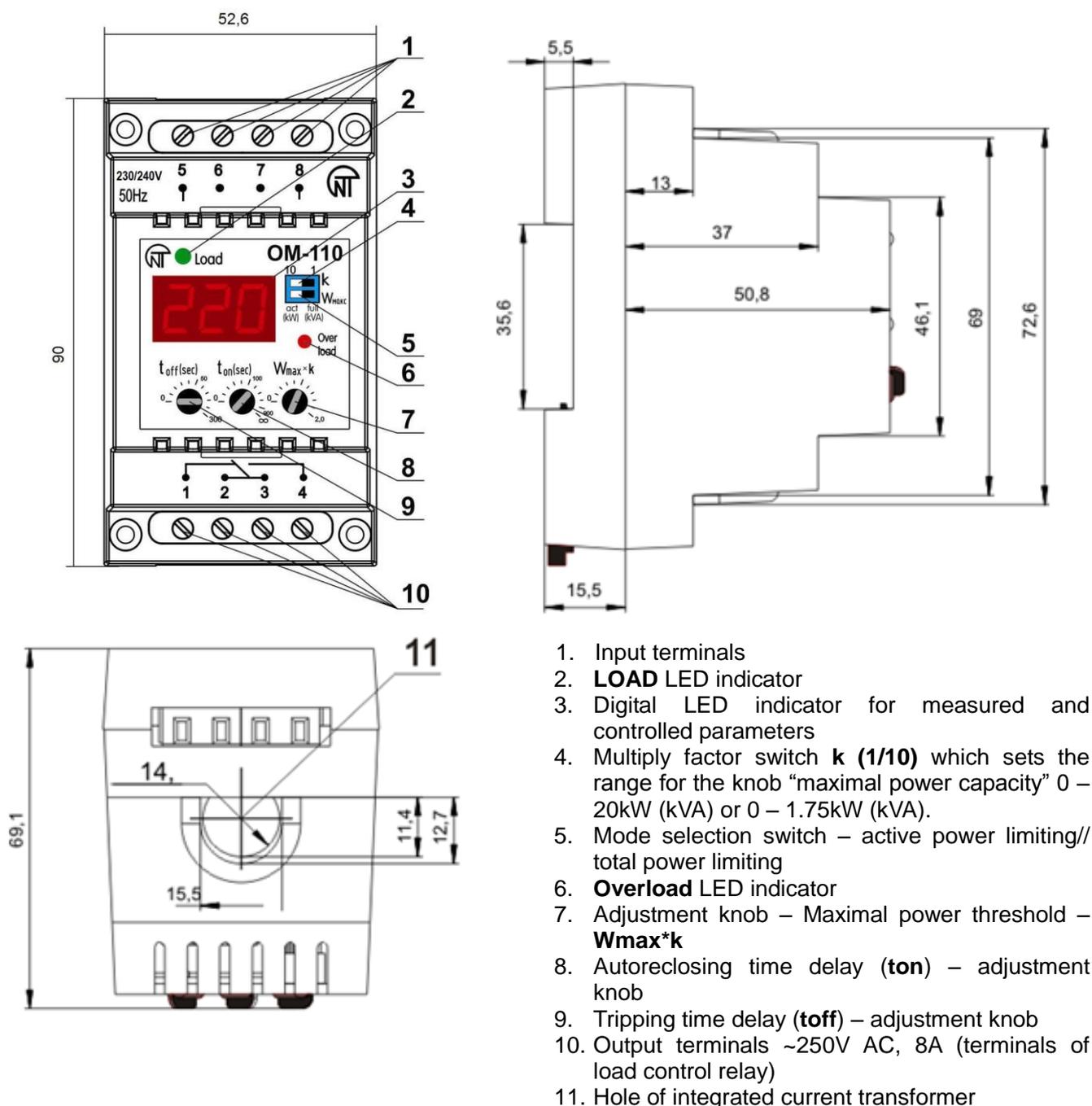


Figure 1 – Front panel and main knobs and controls

Terms and abbreviations:

- ATR** – autoreclosing time delay;
- MS** – magnetic starter;
- AB** – automatic circuit breaker;
- SC** – short circuit;
- CT** – current transformer.

OM-110 complies with requirements IEC 60947-1, IEC 60947-6-2, CISPR 11, IEC 61000-4-2. Harmful substances in concentration more than allowed are absent.

1 APPLICATION

1.1 Single phase power limiter OM-110 (hereinafter **OM-110**) is designed for the continuous control over active or total power capacity for the single phase loads. Measured range is from 0 to 20 kVA.

The function of **OM-110** is to cut off the power load in case of exceeding the preset threshold for maximal level of permitted power load consumed by the user (with user defined time delay) and automatic autoreclosing with adjusted time delay or prohibited restart.

At load power up to 1.75 kVA, the power is connected directly through OM-110. If load power exceeds 1.75 kVA (but no more than 20 kVA), the power is connected through magnetic starter (MS) of the corresponding power (the magnetic starter is not included in the set).

User sets the threshold values for power, tripping time delay and autoreclosing time delay using the knobs and DIP switches on the front panel of the **OM-110**.

Device can be applied as:

- digital wattmeter (to measure active or total power capacity);
- Relay which limits the consumed power as per the user defined settings;
- load priority relay.

OM-110 allows to control the level of power consumption and the state of the load with help of LED indicators located on the front panel. OM-110 doesn't require any additional power supply sources and is powered by the controlled circuit from the input terminals.

1.2 Operating Conditions

OM-110 is designed for operation in the following conditions:

- ambient temperature: from minus 20 to +45°C;
- atmospheric pressure: from 84 to 106.7 kPa;
- relative air humidity (at temperature of +25°C): 30 ... 80%.

ATTENTION!

The device is not intended for use:

- in conditions of significant vibration and shocks;
- in high humidity conditions;
- in corrosion environments with content in the air of acids, alkalis, etc., as well as severe contamination (grease, oil, dust, etc.).

2. TECHNICAL SPECIFICATIONS

The general technical specifications are provided in the Table 1.

Table 1

Purpose of device	Control and distribution equipment
Rated power supply voltage, V	230/240
Typical operation	Continued
Rated voltage frequency, Hz	47 – 53
Harmonical configuration (nonsinusoidality) of power supply voltage	EN 50160
Measurement range of power, , kW (kVA)	0 – 20.0
Power measurement accuracy is not less than	2.5%
Adjustable range for setting maximal power	
a) k=1; Wmax, kW(kVA)	0 – 1.75
Absolute deviation for power measurement not more than, kW (kVA)	±0.05
b) k=10; Wmax, kW(kVA)	0 – 20
Absolute deviation for current measurement not more than, kW, kVA	±0.5
Adjustable time range for autoreclosing time delay - ton, sec	0 – 900, ∞
Adjustable time range for tripping time delay – toff, sec	0 – 300
Readiness time after turn ON, not more than, sec*	0.8

Maximal commutation current on the output terminals, A, not less	8
Minimum voltage when safe operating (effective value), V **	130
Maximal voltage when safe operating (effective value), V	300
Maximum permissible voltage, V,	400
Protection degree: - device - terminal block	IP40 IP10
Index protection of electrical shock	II
Permissible degree of pollution	II
Overvoltage category	II
Nominal voltage of insulation, V	450
Rated impulse withstand voltage, kV	2.5
Power consumption (when load is disconnected), kW	to 3.5
Commutation lifetime for the output contacts: - under the load of 8A, not less than - under the load of 1A, not less than	100 000 1 000 000
Torque for terminal screws, N*m	0.4
Weight, kg, not more than	0.200
Dimensions (3 way standard DIN module thickness for DIN rail mounting), mm	90 x 52.6 x 69.1
Positioning - free	
The wire cross section of connecting terminals is 0.5 - 2.0 mm ²	
Mounting to standard 35 mm DIN-rail	
<p>*In the extreme right position of the knob, turn-off time of 295 s is allowed. **Reaction time on turn ON is not more than 2 seconds. This time includes device selftesting, turning ON the power load, measuring power consumption and tripping the power load OFF in case fault situation is detected. *** To increase operational range to low voltage OM-110 has function to disable LED digital indicator if voltage level gets lower than 130V. If voltage level is less than 110V then OM-110 automatically opens its output terminals to initial cold state position and thus turns OFF.</p>	

3 INTENDED USE

3.1 Preparation for operation

3.1.1 Preparation for connection:

- Unpack the product (we recommend to keep the original packing for the entire warranty period of the product operation);
- Check the product for damage after transportation; in case of such damages detection, contact the supplier or manufacturer;
- Check for components (it.2), in case of detection of incomplete product, contact the supplier or manufacturer;
- Carefully study the Operating Manual (**pay special attention to the connection diagram to power the product**);
- If you have any questions regarding the installation of the product, please contact the manufacturer by telephone number indicated at the end of this Operating Manual.

3.1.2. General

If the temperature of the device after transportation or storage differs from the ambient temperature at which it is supposed to be operated, then before connecting to the mains keep the device under the operating conditions within two hours (because of condensation may be on the device elements).

THE DEVICE IS NOT INTENDED FOR THE LOAD COMMUTATION IN CASE OF SHORT CIRCUIT. THEREFORE THE DEVICE SHOULD BE OPERATED IN THE ELECTRICAL MAINS PROTECTED BY THE CIRCUIT BREAKER WITH INTERRUPTING CURRENT OF 10 A MAXIMUM.

ATTENTION! ALL CONNECTIONS MUST BE PERFORMED WHEN THE DEVICE IS DE-ENERGIZED.

To ensure the reliability of electrical connections, the flexible (stranded) wires with insulation for voltage of at least 450 V should be used, the ends of which it is necessary to be striped of insulation for 5±0.5 mm and tightened with bootlaces. The cross-section of the wire for connecting the protected equipment depends on the current (power) of the load. For example, for current of 10 A it should be no less than 1 mm². Wires fastening should exclude mechanical damage, twisting and abrasion of the wire insulation.

IT IS NOT ALLOWED TO LEAVE EXPOSED PORTIONS OF WIRE PROTRUDING BEYOND THE TERMINAL BLOCK.

For a reliable contact, tighten the terminal screws with the force indicated in Table 1.

When reducing the tightening torque, the junction point is heated, the terminal block may be melted and wire can burn. If you increase the tightening torque, it is possible to have thread failure of the terminal block screws or the compression of the connected wire.

To improve the performance of the device, it is recommended to install the fuse (fuse element) or its equivalent in the OM-110 supply circuit for current of 1 A.

3.1.3 In accordance to all safety regulations connect OM-110 as shown on the scheme above (Figure 2a or 2b). If the product is used as the load priority relay, connect the product according to the scheme given in Fig.3 (Fig.3a or 3b depending on the load value).

ATTENTION!

WHEN USING OM-110 AS LOAD PRIORITY RELAY, THE USER SELECTS WHICH LOAD WILL BE THE PRIORITY WHEN THE LIMITER IS CONNECTED.

3.1.4 The wire of the circuit which should be under the device control must be inserted through the hole in the case of OM-110 (item 11; Figure 1). If the limiter is used as the load priority relay, pass the wire that supplies power to both loads (priority and non-priority) through the hole CT (it.11 Fig.1).

3.1.5 Next step is to set up the type of measured power using DIP-switch (item 5; Figure 1) and adjust the range for maximal power threshold values using the knob «10/1» (item 4; Figure 1).

3.1.6 Then set up the tripping time delay and reclosing time and value of overcurrent using adjustment knobs «Wmax*k», «toff», «ton» (items 7, 8, 9; Figure 1).

ATTENTION!! According safety regulations all the connections must be performed only on fully deenergized device!

3.1.7 After all the connections are done it's necessary to turn ON the power supply and make precise adjustment of all the knobs according to the values shown on the digital LED display (item 3; Figure 1). OM-110 is ready for operation.

3.1.8 For the convenience the scales for time delays are split for some ranges:

Autoreclosing time delay scale (item 8; Figure 1) is divided to the ranges 0-100 and 100-900 seconds

Tripping time delay scale (item 9; Figure 1) is divided to the ranges 0-50 and 50-300 seconds.

During twisting of any adjustment knob (items 7, 8, 9; Fig.1) value of adjusted parameter is showed on the digital indicator, in this case decimal dot will be in the low order.

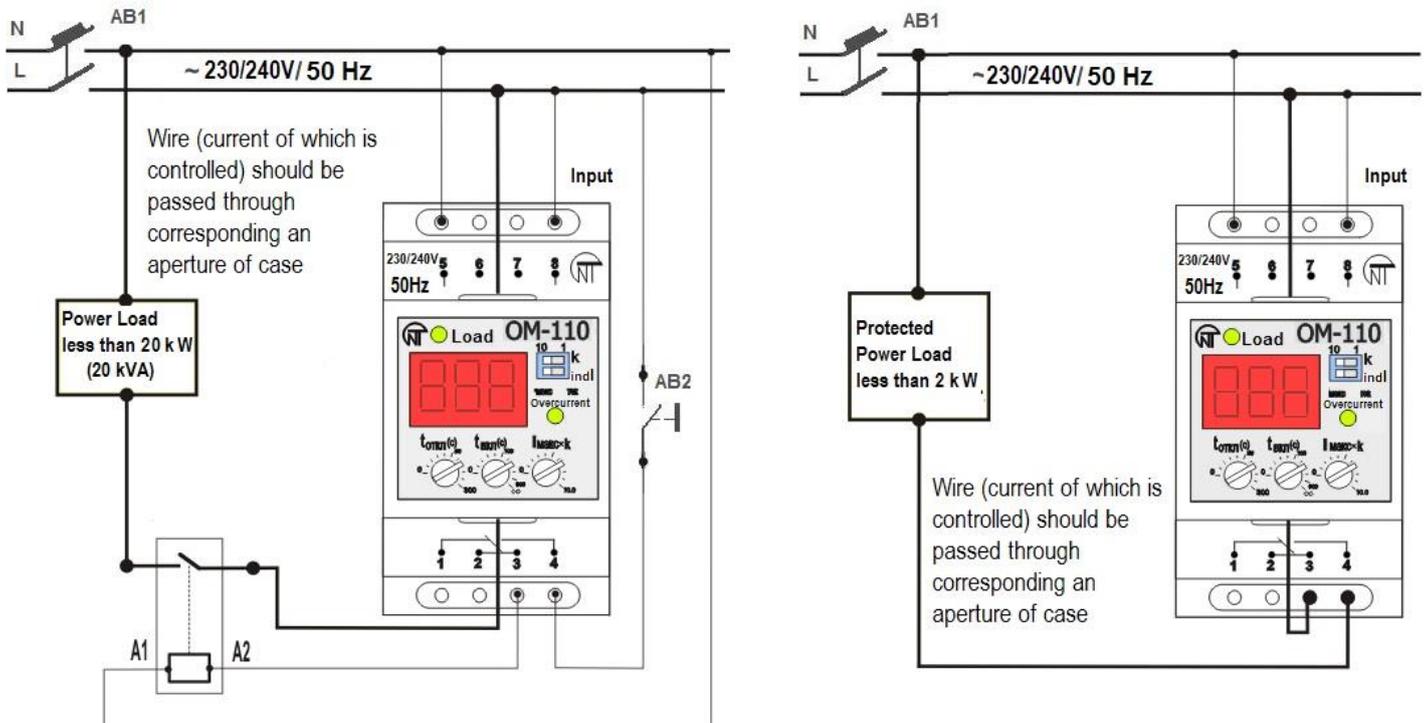


Figure 2 – Wiring diagram for OM-110

3.2 OM-110 operation

3.2.1 Use of a product as digital active power meter and relay of restriction of power consumption.

On giving the power supply to the input terminals 230/240V 50Hz (item 1; Figure 1) within the readiness time of 0,8 sec the power load must be turned ON: output contacts 1-2 open, and contacts 3-4 close.

Simultaneously turns on LED indicator “LOAD” (item 2; Figure 1) and digital LED indicator (item 3; Figure 1) starts displaying power load being consumed by the load.

As soon as the power load reaches user adjusted threshold value for maximal power (kW or kVA) using the knob on the front panel and the range selector switch (item 4; Figure 1) then the red color LED “Overload” (item 6; Figure 1) and the tripping time delay - toff (item 9; Figure 1) countdown (adjustable from 0 to 300 seconds) starts, and the indicator in turns displaying the value of consumed power and the remaining time to cut off the load (in seconds).

If after turning the power load off the power consumption doesn't decrease lower than the value of W_{max} then the countdown of the autoreclosing time delay doesn't start and the digital LED indicator (item 3; Figure 1) will display “Err” and the current value of the power being consumed.

After the expiration of the autoreclosing time delay the power load turns ON automatically: contacts 1-2 open and contacts 3-4 close and the LED indicator “Load” turns ON and the digital LED indicator will display current value of the power load.

3.2.2. Use of the limiter as the load priority relay

Upon supplying power to the terminals of OM-110 (it.1 Fig.1) within the readiness time (no more than 0.8 s), the power load should be turned on:

- contacts 1-2 are open;
- contacts 3-4 are close; LED indicator LOAD (it.2 Fig.1) turns on;
- non-priority load is turned on; the indicator (it.3, Fig.1) shows the load power.

If the load power has reached a value exceeding the threshold of maximum power:

- red LED Overload is on;
- load off-delay time countdown starts; and the indicator (it.3 Fig.1) in turns displays the value of load power (in kW or kVA) and the remaining time to cut off the load (in seconds).

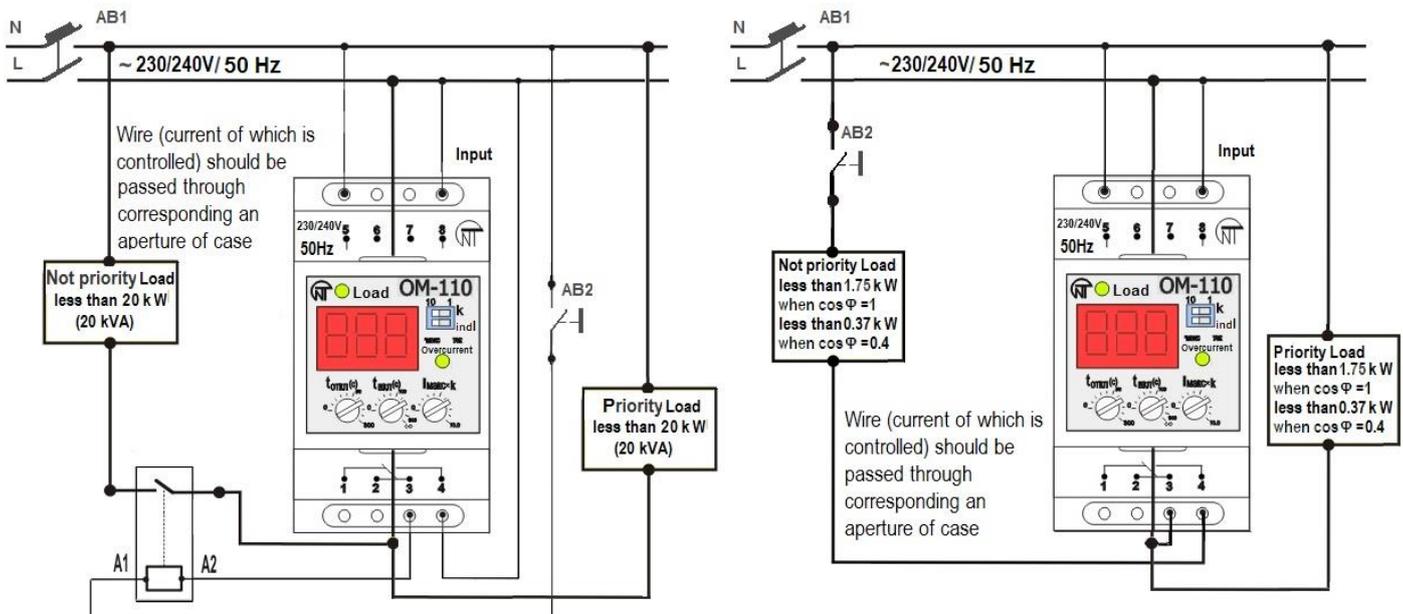
When off-delay time is finished, non-priority load is turned off: contacts 3-4 are open; contacts 1-2 are close (it.10 Fig.1); green LED Load is off.

If the consumed power value decreases lower than the threshold before the off-delay time is finished:

- LED Overload is off;
- time countdown stops;
- cut off the load does not occur.

If the consumed power value decreases lower than the threshold:

- LED Overload is off;
- time countdown for load automatic reclosing (if the automatic reclosing is enabled) starts, and the indicator (it.3 Fig.1) displays the time (in seconds) remaining to turning on.



Note – AB1 as the main circuit breaker should be installed for operating current not exceeding 8 A at load power up to 1.75 kW. When load power up to 20 kW, AB1 should be installed for current no more than 100 A. AB2 is circuit breaker for non-priority load, it protects both the load and OM-110 against short-circuit (SC).

Figure 3 – Wiring diagram for OM-110 as the load priority relay

3.2.3 If the autoreclosing time delay knob is set up to position inF (mark «∞» on the knob scale, item 8; Figure 1) then there will be no automatic restart of the power load and the digital LED display will show in turns inF

(autoreclosing prohibited) and current value of power. To turn ON the power load it's necessary to take OFF the power supply for the input terminals of **OM-110** or to change the position of the autoreclosing time delay (adjustment knob (item 8; Figure 1) to another value different from inF. When moving the autoreclosing time delay knob to the position of prohibited autoreclosing (inF) then on the digital LED indicator is being displayed "inF" within 4 seconds.

There is a possibility to select one of two modes of operation of **OM-110**:

- Measurement and control over the active power
- Measurement and control over total power

To select the required mode it's necessary to set the DIP-switch (item 5; Figure 1) to the corresponding position.

Position "Act.kW" – measurement and control over active power;

Position "Total kVA" – measurement and control over total power.

4 STORAGE AND SHIPPING CONDITIONS

The OM-110 product in original manufacturer packing should be stored in enclosed rooms at the temperature in the range from -45°C to +60°C and exposed to no more than 80% of relative humidity when there are no fumes in the air that exert a deleterious effect on package and the switch material.

5 MAINTENANCE

5.1 Safety precautions



THE TERMINALS AND THE PRODUCT INTERNAL ELEMENTS CONTAINS POTENTIALLY LETHAL VOLTAGE.

DURING MAINTENANCE IT IS NECESSARY TO DISABLE THE PRODUCT AND CONNECTED DEVICES FROM THE MAINS.

Maintenance of the unit should be performed by persons admitted to the operation and have the appropriate permission.

The recommended frequency of maintenance is **every six months**.

5.2. Maintenance procedure:

- 1) check the wires connection reliability, if necessary – clamp with force as specified in Table 2;
- 2) check visually the housing integrity;
- 3) if necessary, wipe with cloth the front panel and the unit housing.

It is not allowed to clean the unit with abrasive materials or organic compounds (alcohol, gasoline, solvents, etc.).

6 TERMS OF SERVICE AND MANUFACTURER'S WARRANTY

6.1 Product lifetime is 10 years. Contact the manufacturer upon service term expiration.

6.2 Shelf life is 3 years.

6.3 Warranty period of the product is 5 years from date of sale.

During warranty period manufacturer is responsible for free product repair, if Consumer has complied with the requirements of this Manual.

IF THE UNIT HAS BEEN OPERATED WITH VIOLATION OF THE REQUIREMENTS OF THIS OPERATING MANUAL, THE MANUFACTURER HAS THE RIGHT TO REFUSE WARRANTY SERVICE.

6.4 Warranty service is performed at purchase place or by product manufacturer.

6.5 Post-guarantee service is performed by manufacturer at current rates.

6.6 Before sending for repair product must be packed in original or other packaging excluding mechanical damage.

7 ACCEPTANCE CERTIFICATE

Single phase power limiter OM-110 was produced and accepted in accordance with the requirements of effective technical documentation and was recognized as suitable for operation.

SEAL

Quality control department

Production date

9 NOTICES OF CLAIMS

Earnest request: indicate the reason for return in the notice of faults field at the return of the device or in case of submitting for warranty service or post-warranty service.

Manufacturer is grateful to you for the information about the product quality as well as comments and proposals concerning the unit operation.



With questions and comments, please contact manufacturer at the following address:

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Date of purchase _____