

## DKM-409 NETWORK ANALYSER WITH HARMONIC MEASUREMENT AND SCOPEMETER

The DKM-409 is a precision instrument designed for displaying various AC parameters in 3-phase distribution panels.

Thanks to its isolated RS-485 Modbus RTU communication port, the device is free from ground potential difference issues and measured parameters are safely transferred to automation systems.

Various display screens can be scrolled automatically. The user configurable screen where any measured parameter set can be displayed, transforms the unit to a custom designed measurement panel.



**SAFETY NOTICE**  
Failure to follow below  
instructions will result in  
death or serious injury

\* Electrical equipment should be installed only by qualified specialist. No responsibility is assured by the manufacturer or any of its subsidiaries for any consequences resulting from the non-compliance to these instructions.

\* Check the unit for cracks and damages due to transportation. Do not install damaged equipment.

\* Do not open the unit. There is no serviceable parts inside.

\* Fuses of fast type (FF) with a maximum rating of 6A must be connected to the power supply and phase voltage inputs, in close proximity of the unit.

\* Disconnect all power before working on equipment.

\* When the unit is connected to the network do not touch terminals.

\* Short circuit terminals of unused current transformers.

\* Any electrical parameter applied to the device must be in the range specified in the user manual.

\* Do not try to clean the device with solvent or the like. Only clean with a dry cloth.

\* Verify correct terminal connections before applying power.

\* Only for front panel mounting.

## INSTALLATION

### Before installation:

- Read the user manual carefully, determine the correct connection diagram.
- Remove all connectors and mounting brackets from the unit, then pass the unit through the mounting opening.
- Put mounting brackets and tighten. Do not tighten too much, this can brake the enclosure.
- Make electrical connections with plugs removed from sockets, then place plugs to their sockets.
- Note that the power supply terminal is separated from measurement terminals.

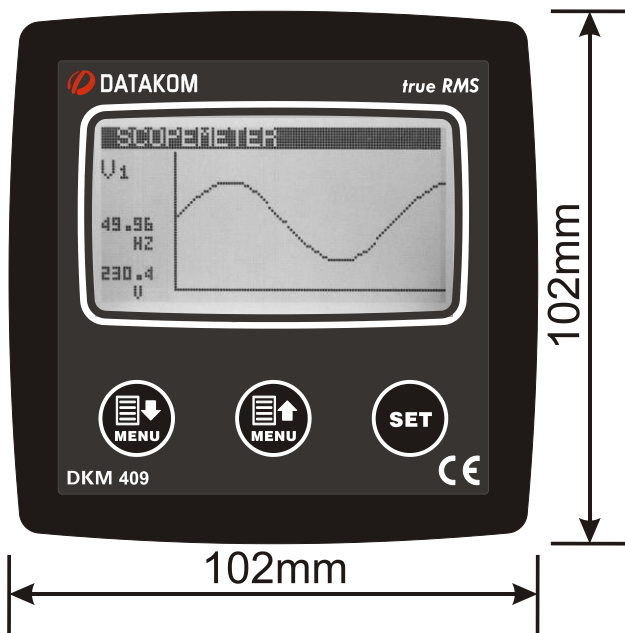
### Below conditions may damage the device:

- Incorrect connections.
- Incorrect power supply voltage.
- Voltage at measuring terminals beyond specified range.
- Current at measuring terminals beyond specified range.
- Connecting or removing data terminals when the unit is powered-up.
- Overload or short circuit at relay outputs
- Voltage applied to digital inputs over specified range.
- High voltage applied to communication port.

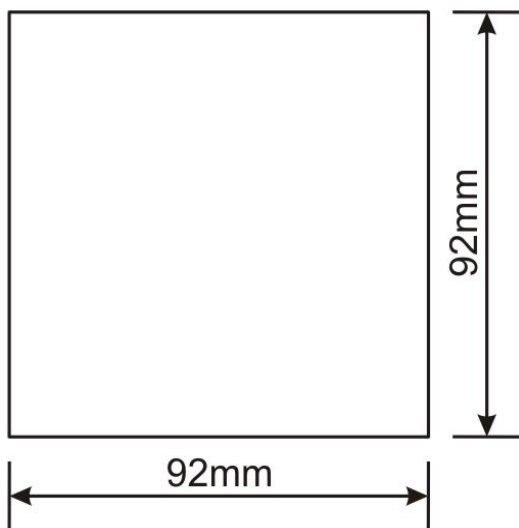
### Below conditions may cause abnormal operation:

- Power supply voltage below minimum acceptable level.
- Power supply frequency out of specified limits
- Phase order of voltage inputs not correct.
- Current transformers not matching related phases.
- Current transformer polarity incorrect.

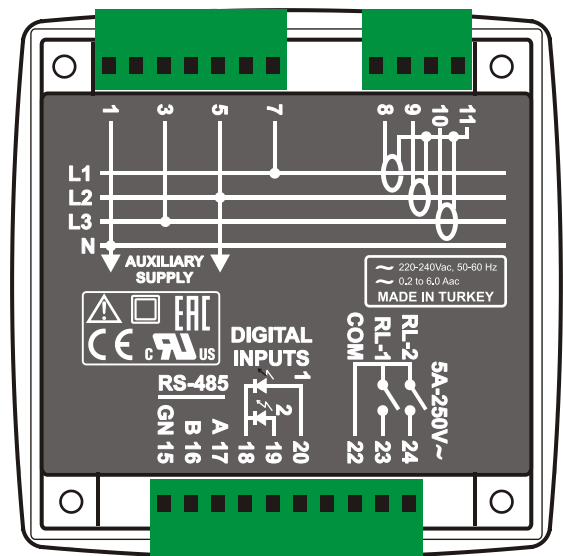
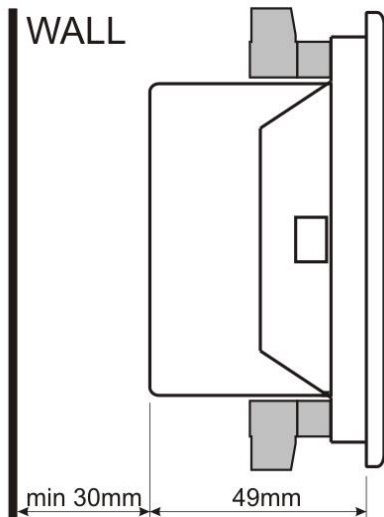
Detailed user manual of this product  
may be downloaded at:  
[www.datakom.com.tr](http://www.datakom.com.tr)



### PANEL CUTOUT



### REQUIRED PANEL DEPTH



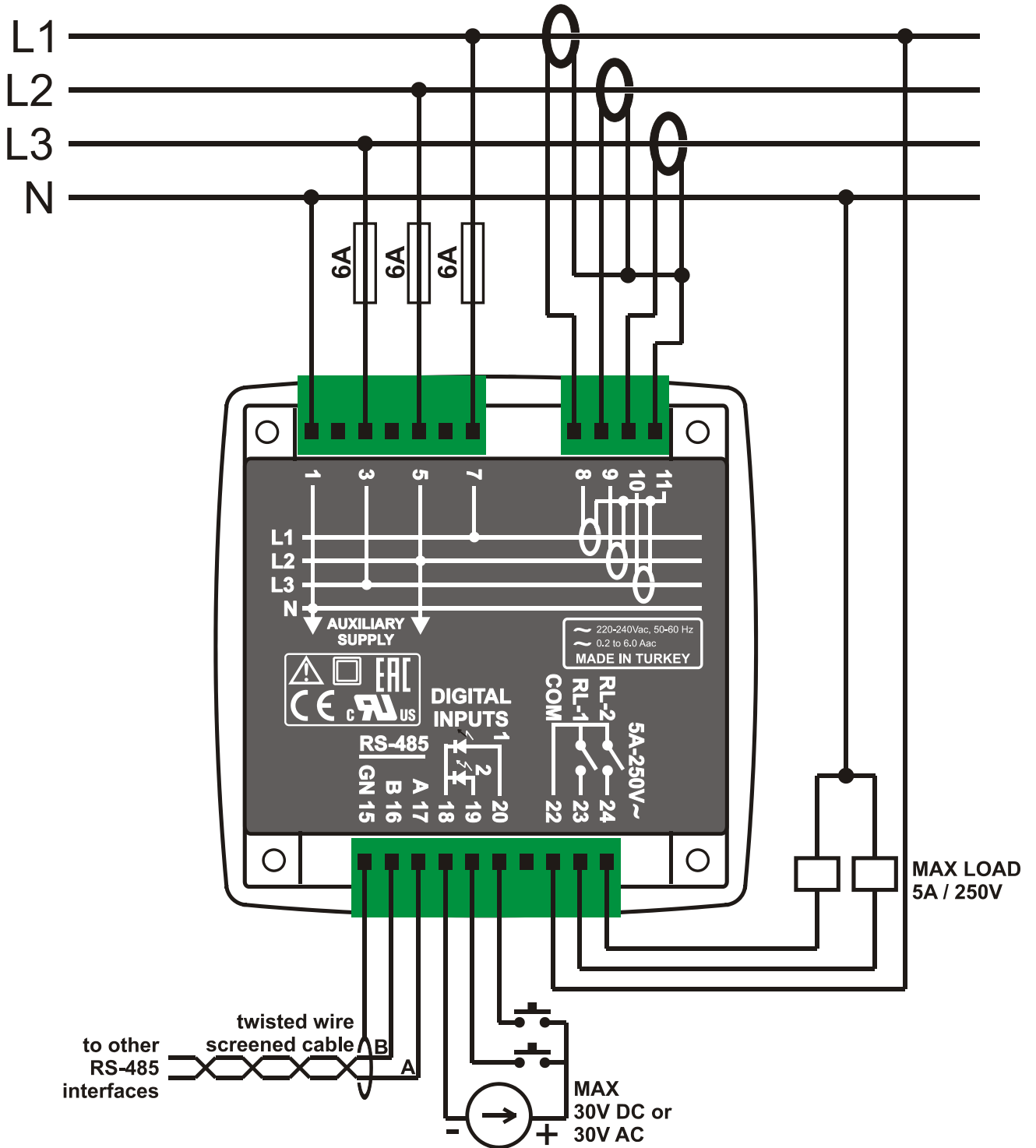
### ELECTRICAL INSTALLATION

 Do not install the unit close to high electromagnetic noise emitting devices like contactors, high current busbars, switchmode power supplies and the like.

Although the unit is protected against electromagnetic disturbance, excessive disturbance can affect the operation, measurement precision and data communication quality.






- Use cables of appropriate temperature range.
- Use adequate cable section, at least 0.75mm<sup>2</sup> (AWG18).
- For current transformer inputs, use at least 1.5mm<sup>2</sup> section (AWG15) cable.
- The current transformer cable length should not exceed 1.5 meters. If longer cable is used, increase the cable section proportionally.
- Current transformers must have 5A output.
- For the RS-485 connection, use appropriate shielded twisted wire cable. Communication quality will depend highly on the cable used.

# CONNECTION DIAGRAM FOR 230/400V NETWORK



## PUSHBUTTON FUNCTIONS


Three buttons on the front panel provide access to configuration and measurement screens.

BUTTON	FUNCTION
	Previous screen or Decrease related value (configuration mode)
	Next screen or Increase related value (configuration mode)
	<u>Changes voltage and current channels for</u> <ul style="list-style-type: none"> <li>• scopemeter display</li> <li>• harmonic display</li> <li>• digital harmonic display</li> </ul> Available channels: U12-U23-U31 V1-V2-V3 I1-I2-I3
	<u>HELD PRESSED FOR 3 SEC:</u> enable/disable auto-scroll function
	<u>HELD PRESSED TOGETHER FOR 3 SEC:</u> <ul style="list-style-type: none"> <li>• Clears visual warning condition if any.</li> <li>• If no warning condition, enters configuration mode.</li> </ul>

## SETTING AUTO-SCROLL MODE




The unit offers the possibility of automatically scanning of all display screens.

  In order to enable auto-scroll function hold the SET button pressed for 3 seconds.

 In order to disable auto-scroll function hold the SET button pressed for 3 seconds.

When the auto-scroll is enabled, the unit will switch to the next screen every 5 seconds.

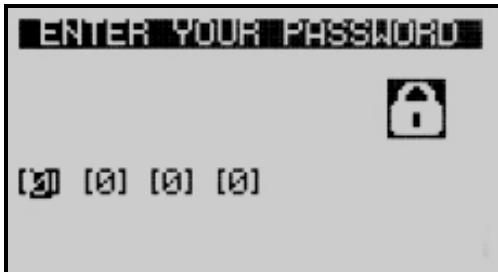
## RESETTING VISUAL WARNINGS

   In order to reset visual warnings, hold both MENU buttons pressed for 3 seconds. If no fault conditions exists this will enable the configuration menu.

## DEVICE CONFIGURATION



In order to enable the configuration menu, hold both **MENU** buttons pressed for 3 seconds.



When the configuration mode is entered, the password entry screen will be displayed.

A 4 digit password must be entered using buttons. The factory default password is “9876”. Each digit is adjusted with **MENU** buttons and the next digit is selected with **SET** button.



In order to exit the configuration menu, hold both **MENU** buttons pressed for 3 seconds. If no button is pressed, the unit will automatically close the configuration menu after 30 seconds.

When the configuration mode is entered, a list of available configuration topics will be displayed as in the below screen.



Navigation on the list is made with **MENU** buttons. Selected configuration topic is shown in reverse video (black on white). In order to enter inside a configuration topic, please press **SET** button.

## ADJUSTING THE LCD CONTRAST

Select “**LCD CONTRAST**” on “**CONFIGURATION MENU**”. Change the contrast value with **MENU** buttons until best visibility is obtained and then press **SET** to save new LCD contrast value and return back to “**CONFIGURATION MENU**”.

## LANGUAGE SELECTION

Select “**LANGUAGE**” on “**CONFIGURATION MENU**”. Select language with **MENU** buttons then press **SET** to save the new language and return to “**CONFIGURATION MENU**”.

## CURRENT TRANSFORMER RATIO

For the correct current measurement, the current transformer ratio has to be set properly.

The secondary of the current transformer is always supposed to be 5 Amps. Only the primary value is set.

Select “**CRNT TRF RATIO**” on “**CONFIGURATION MENU**”.

Then adjust the current transformer ratio with **MENU** buttons until required value then press **SET** button to save the new current transformer ratio and return to “**CONFIGURATION MENU**”.

## VOLTAGE TRANSFORMER RATIO

If a voltage transformer is used, then its ratio needs to be set to the unit.

The voltage transformer ratio is defined as primary voltage / secondary voltage. The secondary is always supposed 1.0. Thus only the primary is programmed.

Select “**VOLT TRF RATIO**” on “**CONFIGURATION MENU**”.

Adjust the voltage transformer ratio with **MENU** buttons until required value then press **SET** button to save new voltage transformer ratio and return to “**CONFIGURATION MENU**”.

## TECHNICAL SPECIFICATIONS

### Power Supply Input:

170 - 275VAC, 50 - 60Hz nominal ( $\pm 10\%$ )

### Measurement Input Range:

#### Voltage inputs:

10 - 300 V AC (L-N)

20 - 520 V AC (L-L)

**Current inputs:** 0.2 – 5.5 A AC

**Frequency:** 30 - 100 Hz

### Accuracy:

**Voltage:** 0.5%+1digit

**Current:** 0.5%+1 digit

**Frequency:** 0.5%+1 digit

**Power(kW,kVAr):** 1.0%+2digit

**Power factor:** 2.0%+2digit

### Measurement Range:

**CT range:** 5/5A to 5000/5A

**VT range:** 1.0/1 to 5000.0/1

**kW range:** 1.0 kW to 50.0 MW

**Power Consumption:** < 4 VA

**Voltage burden:** < 0.1VA per phase

**Current burden:** < 1VA per phase

**Relay Outputs:** 5A @ 250VAC

### Digital Inputs:

**Active level:** 5 to 30V-DC or AC

**Min pulse duration:** 250ms.

**Isolation:** 1000V AC, 1 minute

### Serial Port:

**Signal level:** RS-485

**Communication:** Modbus RTU

**Data Rate:** 9600 b, no parity, 1 bit stop.

**Isolation:** 500V AC, 1minute

**Serial port cable:** 2 wires twisted, shielded cable. Max 60pF/meter

### Operating Temperature:

-20°C to +70°C (-4 to +158 °F).

### Maximum humidity:

95% non-condensing.

### Degree of Protection:

IP 54 (Front Panel) ,

IP 30 (Back panel)

### Enclosure:

Non-flammable, ROHS compliant, ABS/PC (UL94-V0)

### Installation:

Flush mounting with rear retaining brackets

### Dimensions:

102x102x53mm (WxHxD)

### Panel Cutout:

92x92mm

**Weight:** 350 gr

### EU Directives Conformity:

2006/95/EC (low voltage)

2004/108/EC (EMC)

### Norms of reference:

EN 61010 (safety requirements)

EN 61326 (EMC requirements)

## PACKAGING INFORMATION

**Pieces per Package:** 12 pieces

### Package Size:

280 x 170 x 215mm (LxWxH)

**Package Weight:** 4.4 kg

