

OPERATING MANUAL

PF DPM 72X144

Three Phase (3W/4W) / Single Phase (2W)



Installation & Operating Instructions

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1. Introduction

The PF *DPM* 72 x 144 is a panel mounted 72 x 144mm DIN Quadratic Digital Meter for the measurement of Power Factor.

The instrument integrates accurate measurement technology (All Voltage & Current measurements are True RMS upto 15th Harmonic) with 1 line 4 digits Ultra high brightness LED display.

It does accurate measurement of Power Factor by using micro controller & solid state devices.

It also gives Lead & Lag indication & operates in Four quadrant & shows “-” polarity in export mode (refer phaser diagram). Power facotor measuring range is 0.1 Lag ...1...0.1 Lead

PT Primary, CT Primary, CT Secondary (5A or 1A) and 3 phase 3W or 4W are all factory set. User needs to specify it while ordering.

26 mm Display



Front View of Power Factor indicator

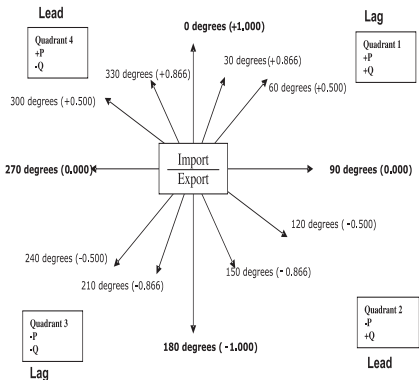
2. Phaser Diagram : Refer the diagram for explanation

Quadrant 1: 0° to 90°

Quadrant 2: 90° to 180°

Quadrant 3: 180° to 270°

Quadrant 4: 270° to 360°



Connections	Quadrant	Sign of Active Power (P)	Sign of Reactive Power (Q)	Sign of Power Factor (PF)	Lag /Lead
Import	1	+ P	+ Q	+	Lag
Import	4	+ P	- Q	+	Lead
Export	2	- P	+ Q	.	Lead
Export	3	- P	- Q	.	Lag

Lag (Inductive) means Current lags Voltage

Lead (Capacitive) means Current leads Voltage

3. Specification

Inputs

Nominal input voltage	$57.7 V_{L-N}$ to $277V_{L-N}$ ($100V_{L-L}$ to $480 V_{L-L}$)
Max continuous input voltage	120% of Rated Value
Max short duration input voltage	2x Rated Value (1s application repeated 10 times at 10s intervals)
Nominal input voltage burden	<0.2VA approx. per phase
Nominal input current	1A / 5A AC rms

Max continuous input current	120% of Rated Value
Nominal input current burden	<0.6VA approx. per phase
Max short duration current input	20 x Rated Value (1s application repeated 5 times at 5 min. intervals)

Auxiliary

Standard nominal	45 - 300V AC or DC
a.c. supply voltage tolerance	±10% of Rated Value
a.c. supply frequency range	45 to 66 Hz
a.c. supply burden	< 4.0 VA Approx.

Operating Ranges

Voltage	5 .. 120 % of Rated Value
Current	5 .. 120 % of Rated Value
Frequency	40 .. 70 Hz
Power Factor	0.1 Lag ... 1 ... 0.1 Lead

Accuracy

Power Factor $\pm 2^{\circ}$

Reference conditions for Accuracy :

Reference temperature	$23^{\circ}\text{C} \pm 2^{\circ}\text{C}$
Input frequency	50 or 60Hz $\pm 2\%$
Input waveform	Sinusoidal (distortion factor 0.005)
Auxiliary supply voltage	Rated Value $\pm 1\%$
Auxiliary supply frequency	Rated Value $\pm 1\%$
Power Factor	0.5 lag 1 0.5 lead (50... 100% of Nominal Voltage) (10... 100% of Nominal Current)

Nominal range of use of influence quantities for measurands

Voltage	50 .. 120 % of Nomial Value
Current	10 .. 120 % of Nominal Value
Input frequency	Rated Value $\pm 10\%$
Temperature	0 to 50 C _o
Auxiliary supply voltage	Rated Value $\pm 10\%$
Auxiliary supply frequency	Rated Value $\pm 10\%$

Temperature Coefficient (For Rated value range of use 0... 50 C)	0.025% / C for Voltage (50...120% of rated value) and 0.025% / C for Current (10...120% of rated value)
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Error change due to variation of an influence quantity	2 * Error allowed for the reference condition applied in the test.
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Display

LED	Single line 4 digits . Digit height 26mm
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Resolution	0.001
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Response Time to step input	1 sec approx
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Isolation

Dielectric voltage withstand test between circuits and accessible surfaces	2.2 kV RMS 50 Hz for 1 minute between all electrical circuits
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Standards

EMC Immunity	IEC 61326 10V/m min-Level 3 industrial low level electromagnetic radiation environment IEC 61000-4-3.
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Installation Category	III
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Safety	IEC 61010-1 , Year 2001
IP for water & dust	IEC 60529

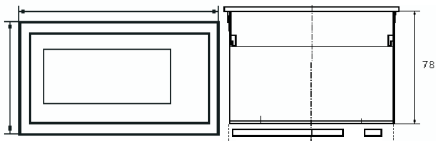
Environmental

Operating temperature	-10 to 55 ⁰ C
Storage temperature	-20 to +65 ⁰ C
Relative humidity	0 .. 90 % RH
Warm up time	3 minute (minimum)
Shock	15g in 3 planes
Vibration	10 .. 55 Hz, 0.15mm amplitude
Enclosure (front only)	IP 54 as per IEC 60529

Enclosure

Style	72mm x 144mm DIN Quadratic
Material	Polycarbonate Housing , Self extinguish & non dripping as per UL 94 V-0
Terminals	Screw-type terminals
Depth	< 80 mm
Weight	0.322 kg Approx. 8

4. Case Dimension and Panel Cut Out

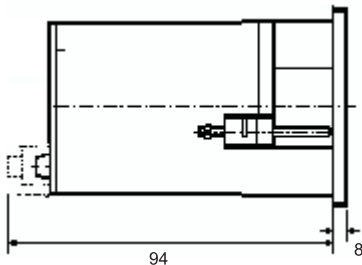


5. Installation

Mounting is by four side clamps, slide the side clamps through side slot till side clamp gets firmly locked in a groove and tight screw provided over clamp (Refer fig. on the page 12) Consideration should be given to the space required behind the instrument to allow for bends in the connection cables.

As the front of the enclosure conforms to IP54 it is protected from water spray from all directions, additional protection to the panel may be obtained by the use of an optional panel gasket. The terminals at the rear of the product should be protected from liquids.

The meter should be mounted in a reasonably stable ambient temperature and where the operating temperature is within the range -10 to 55 C . Vibration should be kept to a minimum and the product should not be mounted where it will be subjected to excessive direct sunlight.



Caution

1. In the interest of safety and functionality this product must be installed by a qualified engineer, abiding by any local regulations.
2. Voltages dangerous to human life are present at some of the terminal connections of this unit. Ensure that all supplies are de-energised before attempting any connection or disconnection.
3. These products do not have internal fuses therefore external fuses must be used to ensure safety under fault conditions.

5.1 Wiring

Input connections are made directly to screw-type terminals with indirect wire pressure. Numbering is clearly marked on the connector. Choice of cable should meet local regulations. Terminal for both Current and Voltage inputs will accept upto 4mm² (12AWG) solid or 2.5 mm² diameter cables.

Note : It is recommended to use wire with lug for connection with meter.

5.2 Auxiliary Supply

The meter should ideally be powered from a dedicated supply, however it may be powered from the signal source, provided the source remains within the limits of the chosen auxiliary voltage.

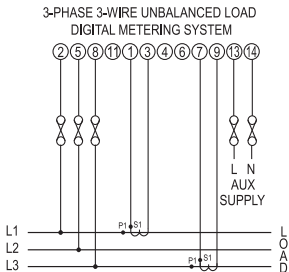
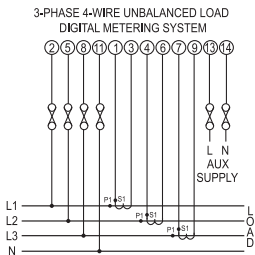
5.3 Fusing

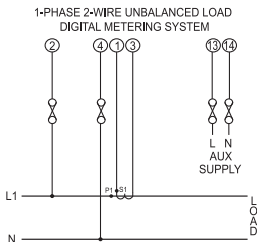
It is recommended that all voltage lines are fitted with 1 amp HRC fuses.

5.4 Earth/Ground Connections

For safety reasons, CT secondary connections should be grounded in accordance with local regulations.

6. Connection Diagrams





7. EMC Installation Requirements

This product has been designed to meet the certification of the EU directives when installed to a good code of practice for EMC in industrial environments, e.g.

1. Screened output and low signal input leads or have provision for fitting RF suppression components, such as ferrite absorbers, line filters etc., in the event that RF fields cause problems.

Note: It is good practice to install sensitive electronic instruments that are performing critical functions, in EMC enclosures that protect against electrical interference which could cause a disturbance in function.

2. Avoid routing leads alongside cables and products that are, or could be, a source of interference.
3. To protect the product against permanent damage, surge transients must be limited to 2kV pk. It is good EMC practice to suppress differential surges to 2kV at the source. The unit has been designed to automatically recover in the event of a high level of transients. In extreme circumstances it may be necessary to temporarily disconnect the auxiliary supply for a period of greater than 5 seconds to restore correct operation.
The Current inputs of these products are designed for connection in to systems via Current Transformers only, where one side is grounded.
4. ESD precautions must be taken at all times when handling this product.

The Information contained in these installation instructions is for use only by installers trained to make electrical power installations and is intended to describe the correct method of installation for this product. However, Manufacturer has no control over the field condition which influence product installation.

It is the user's responsibility to determine the suitability of the installation method in the user's field conditions. Manufacturer only obligations are those in manufacturer standard conditions of Sale for this product and in no case will Manufacturer be liable for any other Incidental, indirect or consequential damages arising from the use or misuse of the products.
