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DMM-5T-2

Multifunctional three-
-phase multimeter



Do not dispose of this device in the trash along with other waste!

According to the Law on Waste, electro coming from households free of charge and can give any amount to up to that end point of collection, as well as to store the occasion of the purchase of new equipment (in accordance with the principle of old-for-new, regardless of brand). Electro thrown in the trash or abandoned in nature, pose a threat to the environment and human health.



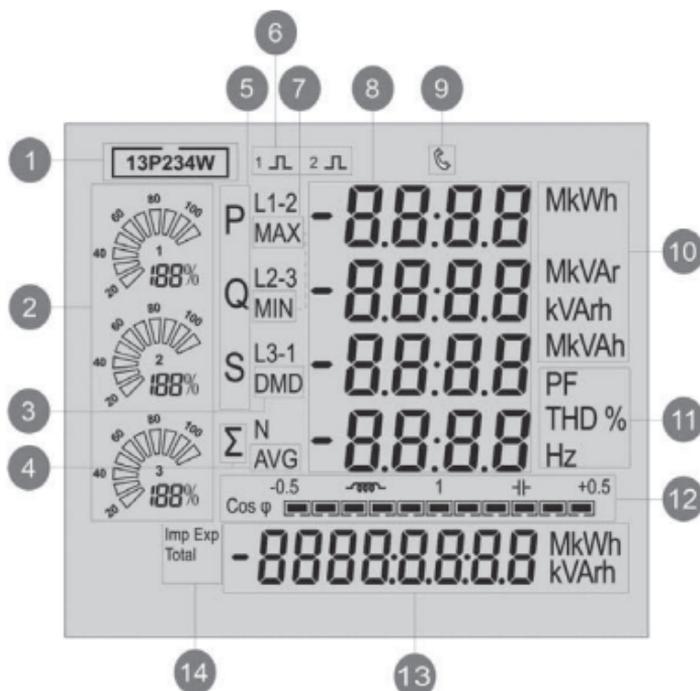
Accordance

MID Directive 2014/32/EU
Certificate number 0120/SGS0473

Purpose

The DMM-5T-2 is a multifunctional, universal panel indicator designed for versatile monitoring of parameters of a single- or three-phase power supply line. The multimeter allows for high accuracy measurements of all relevant network parameters, such as phase voltages and currents, phase-to-phase voltages, active, reactive, apparent power, power factor. In addition, the multimeter provides a full four-quadrant measurement of energy (both imported and exported) and analyses the distribution of voltage and current harmonics up to and including 63-harmonic.

Description of the display



No.	Description
1	Indicator of the selected network type: » 1P2W – 1-phase, 2-wire installation » 3P3W – 3-phase, 3-wire installation » 3P4W – 3-phase, 4-wire installation
2	A bar graph indicating the power consumption of each phase
3	DMD – displays the demand indication

4	AVG – displays the average value from all of the phases
5	Power display indicator: <ul style="list-style-type: none">» P – active power» Q – reactive power» S – apparent power
6	Signalling of the operation of the pulse outputs
7	Displaying values: <ul style="list-style-type: none">» MIN – minimum value» MAX – maximum value
8	Indicators of measured values
9	Indicators of RS-485 communication
10	Indicates the units of displayed measured values
11	Indicators: <ul style="list-style-type: none">» PF – power factor» THD % – the percentage of total harmonic distortion» Hz – frequency
12	Graphical power factor indicator
13	Energy consumption indicator including unit
14	Indicates the type of energy displayed in field 13: <ul style="list-style-type: none">» TOTAL – total energy consumption» IMP – energy imported» EXP – energy exported

Security measures



Installation and connection of the multimeter should be carried out by the qualified personnel. All available protection requirements must be taken into account.



Power supply voltage. The DMM-5T-2 Multimeter is powered via the V1, V2, V3, N voltage terminals and does not require an auxiliary power supply. It is recommended to protect the power supply and voltage circuits of the meter with a 1 A fuse-link.



Measuring voltage. The maximum value of the measuring voltage must not exceed 280 V AC (phase voltage between the L-N terminals) or 500 V AC (phase voltage between the L-L terminals). Exceeding the maximum value of the measuring voltage may damage the device.



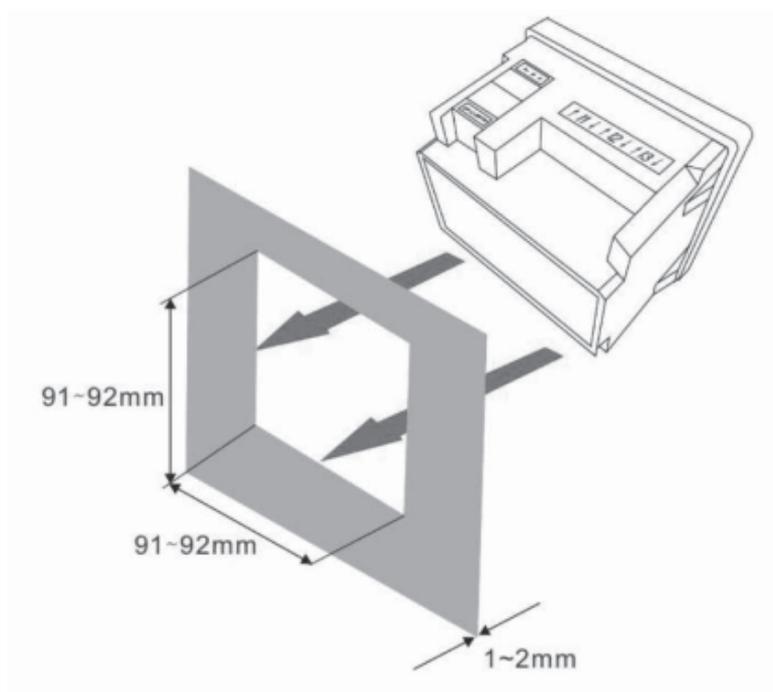
Measuring current. The multimeter is designed for indirect current measurement using current transformers with a 5 A secondary current. If the measuring current exceeds 6 A, it may damage the device.



Environmental conditions. The device is designed to operate at a temperature of $-25\div 55^{\circ}\text{C}$ with air humidity below 90%. Exceeding the operating limits may result in incorrect operation or damage to the multimeter.

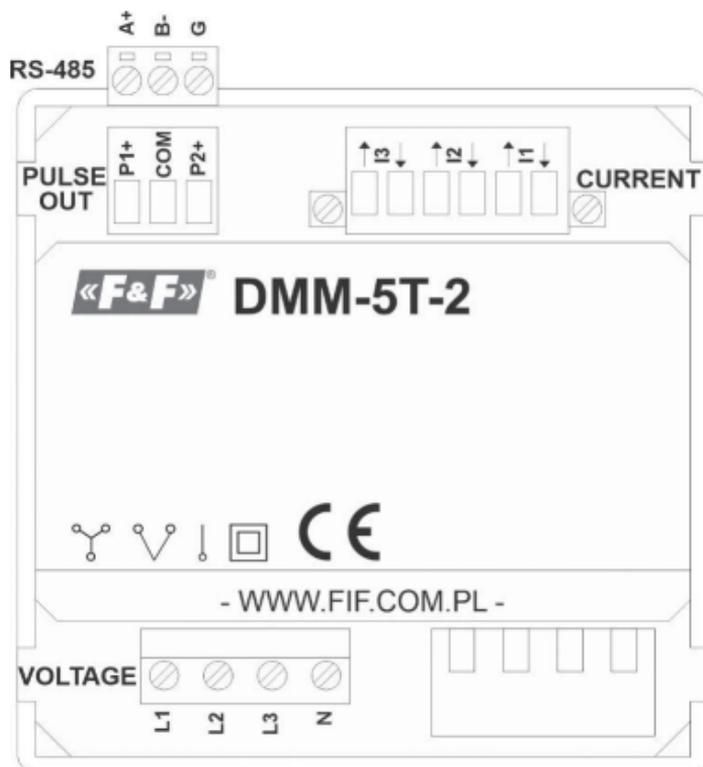
Installation

An opening of 92×92 mm should be made in the panel, and the thickness of the material used to make the panel should not exceed 5 mm.



Insert the multimeter from the front of the panel with all wires disconnected and press it against the surface of the panel. After mounting the multimeter on the panel, the cabling can be connected.

Terminal arrangement diagram



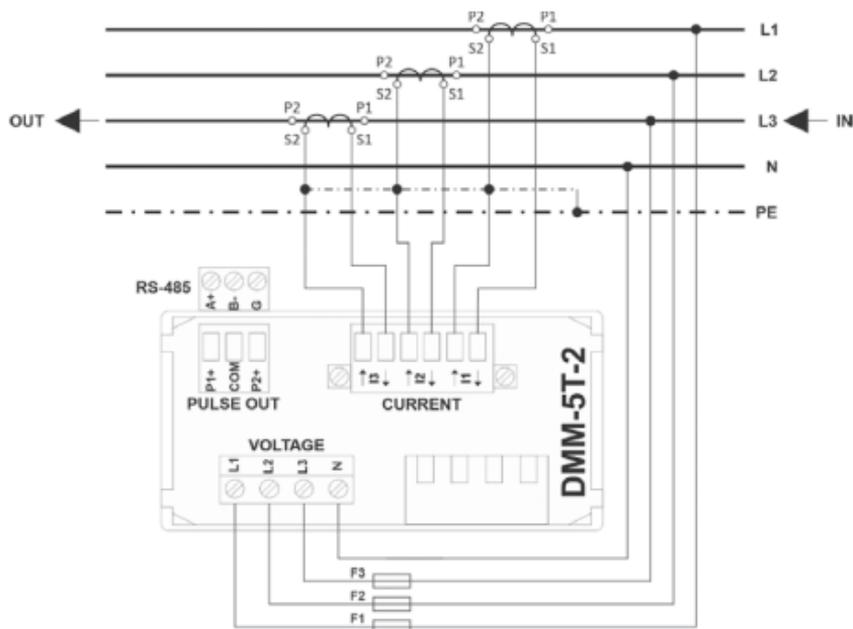
View of the multimeter from the side of the connector plates

Terminal block	Terminal	Function	Notes
VOLTAGE	L1	Voltage measurement chain, power supply of the meter	The method of connecting voltage terminals to the measured installation must be adapted to the type of measured network, in accordance with the diagrams on pages 10, 11, 12.
	L2		
	L3		The voltage circuits of the meter should be protected with a 1 A slow blow fuse-link.
	N		
CURRENT	I1↑ I1↓	Current measurement chain	The current measuring chain is adapted to connect current transformers with 5 A secondary current and minimum power of 0.5 VA.
	I2↑ I2↓		The current input of the meter marked with the ↓ symbol should be connected to the S1 terminal of the current transformer. The current input of the meter marked with the ↑ symbol should be connected to the S2 terminal of the current transformer.

Terminal block	Terminal	Function	Notes
cont. CURRENT	I3↑ I3↓	Current measurement chain	To prevent high potentials from occurring at the transformer terminals, all S2 terminals of the transformers should be earthed.
PULSE	P1+ COM P2+	Pulse outputs	<p>Passive pulse outputs (open collector), Class A compliant IEC 62053-31</p> <p>P1 – programmable pulse output (function and number of pulses)</p> <p>P2 – energy consumption indication (3200 pulse/kWh)</p> <p>COM – common ground of P1 and P2 outputs.</p> <hr/> <p>Maximum load of a single output pulse: voltage ≤ 30 V current ≤ 20 mA</p>

Terminal block	Terminal	Function	Notes
RS-485	A+		It is recommended to use shielded cables dedicated to RS-485 communication.
	B-	Communication interface	Terminating resistors with a value of 120Ω must be connected at the ends of the bus.
	G		Up to 32 devices can be connected in one branch of the RS-485 bus.

Connection diagram



3P4W system - 3-phase, 4-wire network, semi-indirect measurement



Connection diagrams for other network systems and measurement variants are available in the full device manual that can be downloaded from www.fif.com.pl from the product page.

Button	Short press	Long press (2 seconds)
	<ul style="list-style-type: none"> » Voltage, current, active and reactive power for individual phases; » In configuration mode, return to the previous menu by pressing the ESC. 	<ul style="list-style-type: none"> » Enabling/disabling of the automatic view switching mode with measured values.
	<ul style="list-style-type: none"> » Phase voltages; » Phase-to-phase voltage; » Phase currents; » Voltage and current harmonics (sum) by phase; » Phase sequence; » In configuration mode or value selection mode– button Left. 	<ul style="list-style-type: none"> » Voltage harmonics (from 1 to 63), change of the displayed harmonics using the Up or Down buttons.
	<ul style="list-style-type: none"> » Frequency and total power factor; » Power factor by phase; 	<ul style="list-style-type: none"> » Current harmonics (from 1 to 63), change of the displayed harmonics using the Up or Down buttons.

Button	Short press	Long press (2 seconds)
	<ul style="list-style-type: none"> » Maximum and average current consumption; » While in configuration or value selection mode - the Up button (increasing the value). 	<ul style="list-style-type: none"> » Current harmonics (from 1 to 63), change of the displayed harmonics using the Up or Down buttons.
	<ul style="list-style-type: none"> » Active power by phase; » Reactive power by phase; » Apparent power by phase; » Total active, reactive and apparent power; » While in configuration or value selection mode – the DOWN button (decreasing the value) 	<ul style="list-style-type: none"> » Operating time of the device

Button	Short press	Long press (2 seconds)
	<ul style="list-style-type: none"> » Total active energy; » Total reactive energy; » Imported active energy; » Imported reactive energy; » Exported active energy; » Exported reactive energy; » While in configuration or value selection mode – the Right button. 	<ul style="list-style-type: none"> » Entering configuration mode; » Confirming parameter value.

Technical data

Measuring system

network

1P2W – 1-phase, 2-wire

3P3W – 3-phase, 3-wire

3P4W – 3-phase, 4-wire

Current measurement

rated current I_n

0.25÷5 (6) A*

* *the actual value of the measured current will depend on the size of the current transformers used*

Technical data cont.

Current measurement cont.

power consumption 0,5 VA/phase

Voltage measurement

measurement range 58÷276 V AC (phase voltage L-N)

100÷480 V AC (phase-to-phase voltage L-L)

frequency 45÷55 Hz

Operating conditions

total power consumption

typical ≤ 2 VA

temporary ≤ 15 VA

operating temperature $-25\div 55^{\circ}\text{C}$

storing temperature $-40\div 70^{\circ}\text{C}$

relative humidity 0÷95%

(without condensation or aggressive gases)

class of contamination 2

housing flammability UL94-V0

ingress protection

front IP54

back IP20

case size 96×96×62 mm

size of the mounting hole 92×92 mm

panel thickness 1÷5 mm

Communication

pulse outputs 2

RS-485 Modbus RTU

baud-rate 2400/4800/9600/19200/38400 bps

parity BRAK/EVEN/ODD

stop bits 1, 2

Parameter	Displayed value	Accuracy
Voltage	0÷9999.9 kV	0,2 %
Current	0÷9999.9 kA	0,2 %
Power factor	-1÷1	1 %
Frequency	45÷65 Hz	0,2 %
Active power	0÷3600 MW	0,5 %
Reactive power	0÷3600 MVar	1 %
Apparent power	0÷3600 MVA	1 %
Active energy	0÷9999999.9 kWh	Class C (EN50470-1/3), Class 0.5 S (IEC62053-22)
Reactive energy	0÷9999999.9 kVarh	Class 2 (IEC62053-23)
Phase angle		2 %
Total harmonic distortion of current and voltage (total or individual from 2÷63 harmonic)	0÷100%	2 %

Warranty

F&F products are covered by a 24-month warranty from the date of purchase. The warranty is only valid with proof of purchase. Contact your dealer or contact us directly.

CE declaration

F&F Filipowski sp. j. declares that the device is in conformity with the essential requirements of The Low Voltage Directive (LVD) 2014/35/EU and the Electromagnetic Compatibility (EMC) Directive 2014/30/UE. The CE Declaration of Conformity, along with the references to the standards in relation to which conformity is declared, can be found at www.fif.com.pl on the product page.