DMTME

2CSM170040R1021
M429757

DMTME-I-485

2CSM180050R1021
M429758

(GB) Operation and assembly instructions

ABB
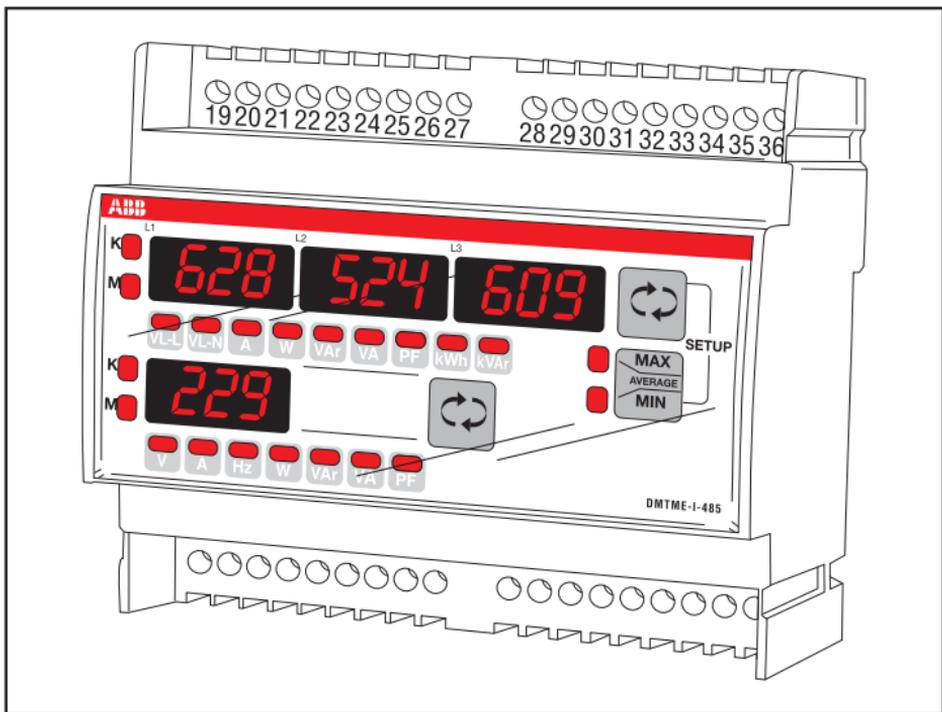
DMTME: three-phase multimeter, used also in single-phase networks, with 4 red LED's displays for the measurement of the main electric quantities (including max/min/mean values of some electrical parameters). All the electric quantities can be displayed by pressing the corresponding scan keys.

DMTME-I-485: multimeter with the same characteristics *as the previous model, but with a RS485 serial interface* (with galvanic insulation) and *two outputs* for use either to generate pulses proportional to the count of active and reactive energy consumption, or to generate alarms on the main electrical parameters being measured. This instrument is ideal for the realization of monitoring networks and for the storage of the different consumption levels.

Main functions

- Scan of the measures and indication of the electric quantity, displayed by the switching on of the corresponding LED
- Dimensions: 6 DIN modules
- True RMS measurements
- High accuracy of the measurements thanks to "oversampling" techniques and automatic calibration processes
- 68 total measurements with power analyzer functions
- Possibility to select from the setup menu the "default displayed page", visualized after about 1 minute of inactivity
- Automatic detection of CTs current flow direction

Only for the DMTME-I-485 model

- Two outputs, for use either to generate pulses proportional to the count of active and reactive three-phase energy and proportional to an energy consumption which can be selected by the user, or to generate single-threshold alarms on the main electrical parameters being measured.
- RS485 serial interface

Assembly instructions
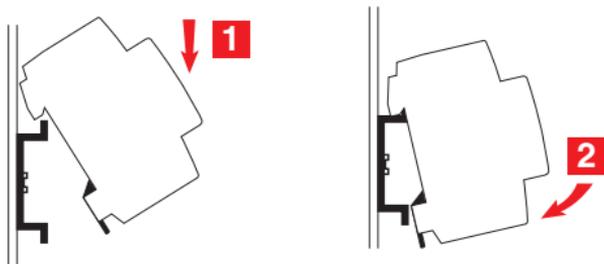
DIN EN 50022 (35 mmq)

Examples of connections

LV three-phase connection with neutral

DMTME-I-485

RS485

A B

C

OUT

COM

0 115 230

01 02

19 20 21 22 23 24 25 26 27

28 29 30 31 32 33 34 35 36

POWER SUPPLY

DMTME
DMTME-I-485

1 2 3 4 5 6 7 8 9

10 11 12 13 14 15 16 17 18

S2   S1
  I1

N V_{L1} V_{L2} V_{L3}

L
O
A
D

L

N
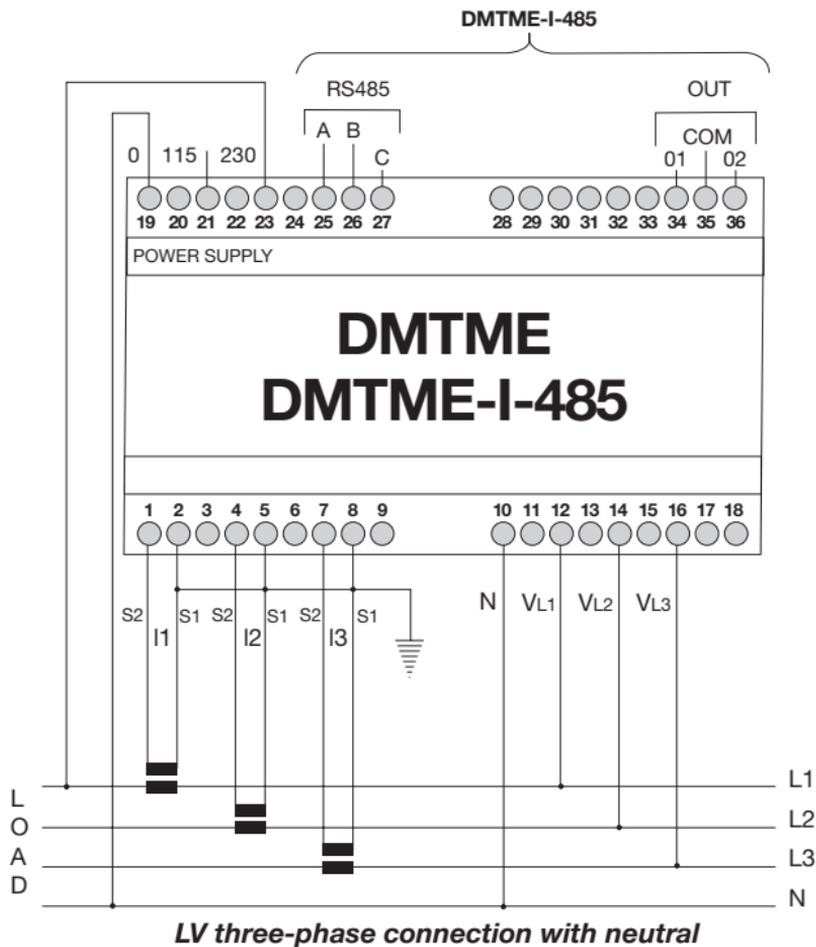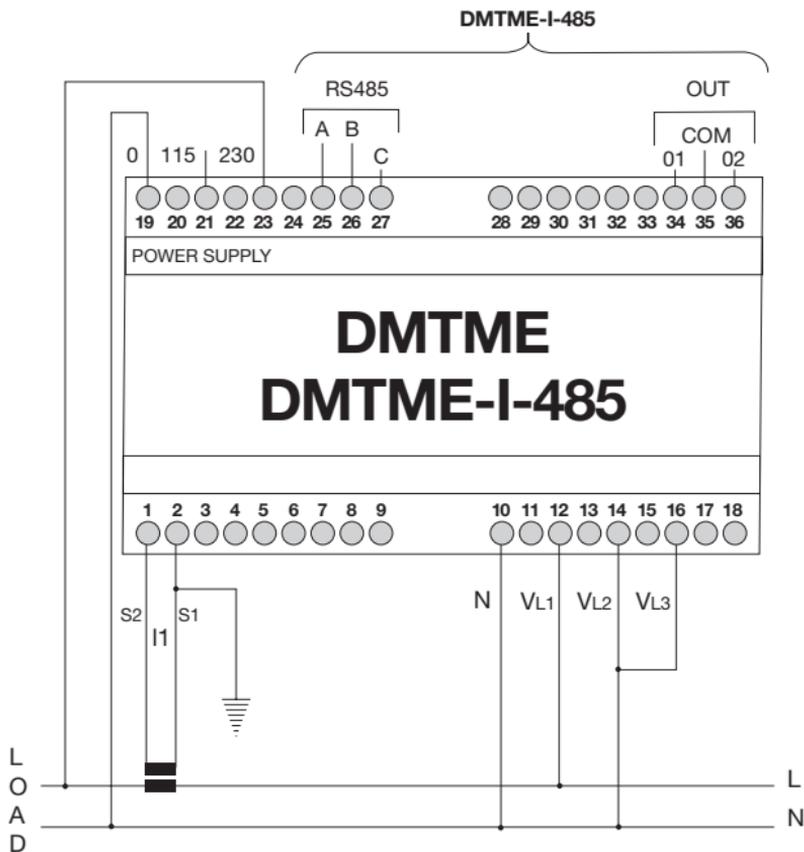
LV single-phase connection with neutral
NOTE: in single-phase connections the phase-to-phase
quantities are not significant.
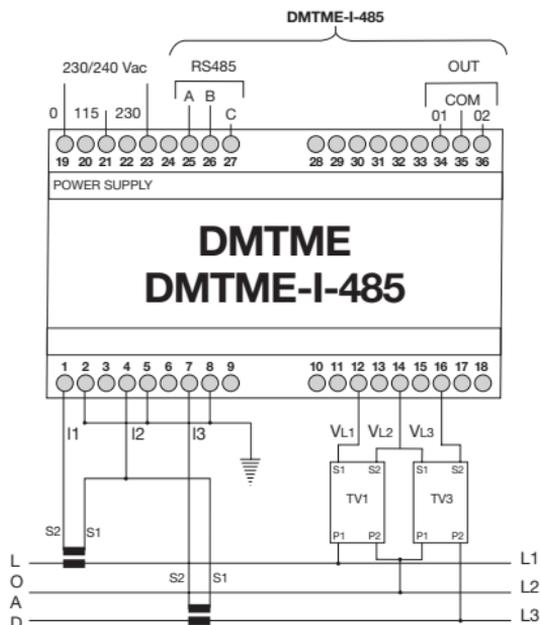
*Three-phase connection without neutral, with 2TA and 2TV*

Terminal board connections

Terminal	Description	Terminal	Description	Terminal	Description
19	0 ~ power sup.	1	S2 – input I1	10	N – Voltmeter inp.
21	115 ~ power sup.	2	S1 – input I1	12	L1 – Voltmeter inp.
23	230 ~ power sup.	4	S2 – input I2	14	L2 – Voltmeter inp.
25 [(*)]	A (+) RS485	5	S1 – input I2	16	L3 – Voltmeter inp.
26 [(*)]	B (-) RS485	7	S2 – input I3	34 [(*)]	Digital Out 1 (pulse kWh/ alarm 1)
27 [(*)]	Shield RS485	8	S1 – input I3	35 [(*)]	Digital Out common
[(*)] Terminals 25, 26, 27, 34, 35 and 36 are meaningful only for the DMTME-I-485 model.				36 [(*)]	Digital Out 2 (pulse kVArh/alarm 2)

Size of terminals: 2,5 mm^2

Instrument description
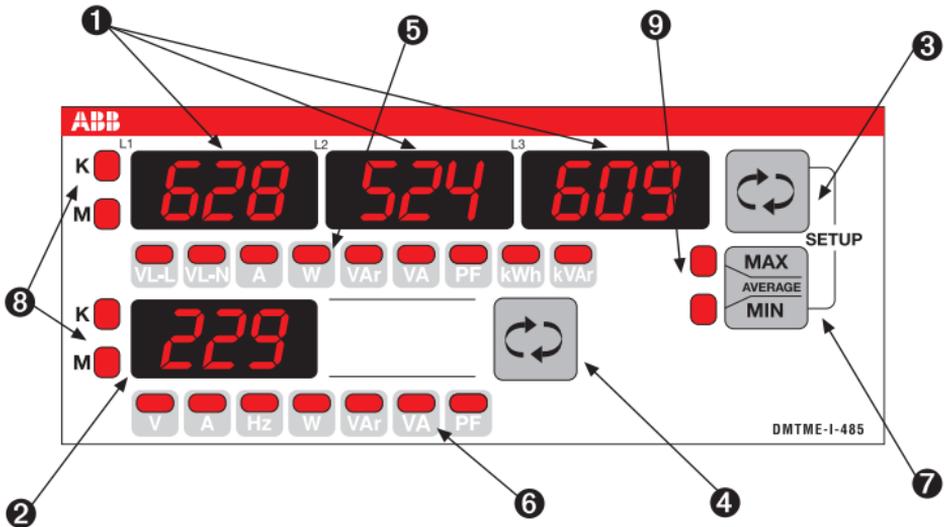
- ❶ L1, L2, L3 Display for the visualization of the electrical parameters of each single phase, of the energy counters and time counters. The lighting point, on the right of the third display (L3), flashes during the RS485 communication (only for the DMTME-I-485 model)

- ❷ 4th display for the visualization of the electrical parameters of the three-phase system

- ❸ Key for the scan of the electrical parameters of each single phase and of the energy counters, visualized on the L1, L2, L3 displays (❶), if you press it and hold down, the previous page will be displayed

- ❹ Key for the scan of the three-phase electrical parameters, visualized on the 4th display (❷) and of the time counters, if you press it and hold down, the previous page will be displayed

- ❺ 9 LEDs for the identification of the electrical parameters displayed on the first three L1, L2, L3 displays (❶)

- ❻ 7 LEDs for the identification of the electrical parameters displayed on the 4th display (❷)

- ❼ Key for the set up of the display of the electrical parameters maximum values (LED MAX ❾ switched on), minimum values (LED MIN ❾ switched on) and mean values ñ calculated on a time interval of 15 minutes - (AVERAGE, LED MIN and MAX ❾ switched on simultaneously). When the LED showing the selected type of visualization is switched on, it will be possible to scan in sequence the different electrical parameters by pressing ❸ and ❹ keys

- ❽ LED for the identification of the electrical parameters scale displayed on both instrumentís displays ❶ and ❷ (K factors = kilo, parameter x 1.000, M = mega, parameter x 1.000.000)

- ❾ LED for the identification of the max/min/mean values visualized on the displays ❶ and ❷

- ❸ + ❼ By pressing these keys together, it will be possible to enter the configuration menu (setup)

Instrument configuration menu (setup)

To enter the instrument configuration menu press ❸ and ❼ keys simultaneously, when the writing *"SETUP"* is visualized on the first three displays, press the ❹ key.

- In the configuration menu the keys have the following function:

- ❸ **Increases** the selected parameter (fast scroll if hold down); in the reset pages it allows the reset of the selected parameters

- ❼ **Decreases** the selected parameter (fast scroll if hold down)

- ❹ Confirms the modification and **steps to the next page**; if you press it and hold down the previous page will be displayed

The displayed pages (in sequence) in the configuration menu are the following:

- **"Ct rAt"**: setting of the CTs (KA) transformation ratio, variable in the range 1 ÷ 1250, factory default value 1. For example if you have a 800/5A CT, you must enter the value 160

- **"Ut rAt"**: setting of the VTs (KV) transformation ratio, variable in the range 1 ÷ 500, factory default value 1

- **"PULSE"** *only for DMTME-I-485 model:* possible values 10, 100, 1.00K (1000) or 10.0K (10000)Wh/pulse (VARh/pulse), factory default value 10. Output O1 = kWh count, output O2 = kVArh count. *Active pulses only on outputs where the alarms function is disabled (dO1 = OFF, dO2 = OFF)*

- **"dO1 ALr"**: *only for DMTME-I-485 model:* selection of the quantity for the alarm relating to output O1; OFF = alarm disabled (default). Selected quantities also identified by corresponding led coming on. HI = top threshold exceeded, LO = bottom threshold exceeded. Example: dO1 HI L1 (led VL-N on) = alarm tripped on phase voltage L1 (VL1-N) when value measured is higher than preset threshold
  - **"dO1 th"**: threshold setting for selected quantity
  - **"dO1 dLy"**: setting for delay in seconds for enabling (and resetting) output O1 after an alarm has occurred, default 10

- **"dO2 ALr"**: *only for DMTME-I-485 model:* selection of the quantity for the alarm relating to output O2; OFF = alarm disabled (default). Selected quantities also identified by corresponding led coming on. HI = top threshold exceeded, LO = bottom threshold exceeded. Example: dO2 HI L1 (led VL-N on) = alarm tripped on phase voltage L1 (VL1-N) when value measured is higher than preset threshold
  - **"dO2 th"**: threshold setting for selected quantity
  - **"dO2 dLy"**: setting for delay in seconds for enabling (and resetting) output O2 after an alarm has occurred, default 10

- **"PrOt"** *only for DMTME-I-485 model:* selection of the communication protocol for the RS485 serial interface; 0 = ASCII protocol (reserved for internal use only), 1 = Modbus-RTU protocol, factory default value 1

- **"Id Adr"** *only for DMTME-I-485 model:* instrument address for the communication with the RS485 serial interface, variable in the range 1 ÷ 247 (Modbus-RTU protocol) and 1 ÷ 98 (ASCII protocol), factory default value 31

- **"bAUd"** *only for DMTME-I-485 model:* communication speed of the RS485 serial interface; it is possible to set the following values: 2.4, 4.8, 9.6, 19.2, where the numeric values correspond respectively to 2400bps, 4800bps, 9600bps and 19200bps, factory default value 9600bps (8 bit)

- **"PArItY"** *only for DMTME-I-485 model:* it is possible to set the following values: O = odd, E = even, n = none; factory default value n

- **"StOP"** *only for DMTME-I-485 model:* stop bits; it is possible to set the following values: 1, 2 (with Parity = n), 1 (with Parity = O, E, n); factory default value 1

- **"PAG 1.2.3."** and **"PAG 4."**: setting of the default displayed page number, 0 ÷ 15 on the first three displays, factory default value 1 and 0 ÷ 7 on the 4th display, factory default value 1; 0 = it remains the last selected page

- **"t2"**: setting (in hours) of the count-down value of the t2 hours counter, factory default value 8760.00 (1 year)

- **"rESEt PEA"** *(PEAK = Peak Values):* reset of the maximum and minimum values (to reset see note below)

- **"rESEt AUG"** *(AVG = Average):* reset of the mean values (to reset see note below)

- **"rESEt En"** *(En = Energies):* reset of the energy counters (to reset see note below)

- **"rESEt t1"**: reset of the t1 hours counter (to reset see note below)

- **"rESEt ALL"**: restores the default configurations and resets all parameters (min/max values, mean values, energies, t1 counter) - to reset see note below -

- **"rEL"**: revision of the instrument firmware

NOTE:
- **to perform the** above mentioned **resets**, on the corresponding page, press and hold down for some seconds the ❸ key until the **"-C- -L- -r-"** writing appears on the first three displays.
- the peak values, the mean values, the energy counters value and the value of the t1 and t2 counters are stored in the instrumentís memory also in case of power failure.

Measured electric quantities

(The indication Σ is referred to the three-phase measurement of the considered electric quantity)

Voltage between phases (**VL-L**)	VL1-L2, VL2-L3, VL3-L1
Phase and three-phase system voltage (**VL-N** and **ΣV**)	VL1-N, VL2-N, VL3-N, ΣV
Phase and three-phase system current (**A** and **ΣA**)	I1, I2, I3, ΣI
Frequency	Hz
Phase and three-phase system active power (**W** and **ΣW**)	W1, W2, W3, ΣW
Phase and three-phase system reactive power (**VAr** and **ΣVAr**)	VAr1, VAr2, VAr3, ΣVAr
Phase and three-phase system apparent power (**VA** and **ΣVA**)	VA1, VA2, VA3, ΣVA
Power factor/phase and three-phase system cosφ, with relevant conventional sign (+ = Inductive, - = Capacitive)	PF1, PF2, PF3, ΣPF
Phase and 3-phase system active and reactive energy counters (phase-to-phase view on displays L1, L2 and L3)	KWh-L1, KWh-L2, KWh-L3, ΣkWh-3P, KVARh-L1, KVARh-L2, KVARh-L3, ΣkVArh-3P
DISPLAYED MAX. VALUES	
Phase voltage (**VL-N**)	VL1-N, VL2-N, VL3-N (MAX)
Phase current (**A**)	I1, I2, I3 (MAX)
Phase and three-phase system active power (**W** and **ΣW**)	W1, W2, W3, ΣW (MAX)
Phase and three-phase system reactive power (**VAr** and **ΣVAr**)	VAr1, VAr2, VAr3, ΣVAr (MAX)
Phase and three-phase system apparent power (**VA** and **ΣVA**)	VA1, VA2, VA3, ΣVA (MAX)
DISPLAYED MIN. VALUES	
Phase voltage (**VL-N**)	VL1-N, VL2-N, VL3-N (MIN)
Phase current (**A**)	I1, I2, I3 (MIN)
Three-phase active power (**ΣW**)	ΣW (MIN)
Three-phase reactive power (**ΣVAr**)	ΣVAr (MIN)
Three-phase apparent power (**ΣVA**)	ΣVA (MIN)
DISPLAYED MEAN VALUES (INTEGRATION PERIOD 15 MINUTES)	
Phase and three-phase system active power (**W** and **ΣW**)	W1, W2, W3, ΣW (AVG)
Phase and three-phase system reactive power (**VAr** and **ΣVAr**)	VAr1, VAr2, VAr3, ΣVAr (AVG)
Phase and three-phase system apparent power (**VA** and **ΣVA**)	VA1, VA2, VA3, ΣVA (AVG)
TIME COUNTERS *(continuous viewing on L1, L2 and L3 displays)*	
"Free-running" hours counter (hours and minutes); it can be reset from the setup menu	
"Count-down" hours counter (hours and minutes) for maintenance reminder (when the counter reaches zero, it shows negative values, indicating the delay time from the programmed expiry time).	
QUANTITIES SELECTABLE FOR ALARMS *(only applicable to DMTME-I-485)*	
Phase-to-phase voltage (**VL-L**)	VL1-L2, VL2-L3, VL3-L1
Phase and 3-phase system voltage (**VL-N** and **ΣV**)	VL1-N, VL2-N, VL3-N, ΣV
Phase and 3-phase system current (**A** and **ΣA**)	I1, I2, I3, ΣI
Phase and 3-phase system active power (**W** and **ΣW**)	W1, W2, W3, ΣW
Phase and 3-phase system reactive power (**VAr** and **ΣVAr**)	VAr1, VAr2, VAr3, ΣVAr
Phase and 3-phase system apparent power (**VA** and **ΣVA**)	VA1, VA2, VA3, ΣVA
Phase and 3-phase system power factor (cosφ)	PF1, PF2, PF3, ΣPF
"Count-down" hour counter	

NOTE: In case, on the first installation or further to wrong operations or particular events or due to a faulty non-volatile memory (E2prom), the instrument should stop and show a page visualizing, on the first three displays, the "INI" writing followed by an internal identification code, press any key to reset the default parameters, which may be changed by the user as required.

Technical characteristics

DIMENSIONS AND WEIGHT	
6 DIN modules model	105 mm x 90 mm x 63 mm (LxHxW), System Pro M box with transparent Plexiglas cover
Weight	About 350 g

PROTECTION	
	IP50 on the front panel, IP20 on the terminal boards

POWER SUPPLY

Voltage	Frequency	Power Consumption	Fuse
230V rms (+15% -10%)	45 ÷ 65Hz	< 6VA	Fit external fuse 0,1A
240V rms (+10% -15%)			
115V rms (+15% -10%)			
120V rms (+10% -15%)			

VOLTMETER INPUTS	
Range	10 ÷ 500V rms (L-N)
Max non-destructive value	550V rms
L-N input impedance	Greater than 8MΩ

AMMETER INPUTS (USE ALWAYS EXTERNAL CTs)	
Range	50mA ÷ 5A rms
Overload	1,1 permanent
Max dispersed power	1,4VA (with Imax = 5A rms, for each phase input)
Type of measurement	Current measurement by internal shunts, using **external CTs**
Direction of CTs current	Detection and automatic adjustment at power up, independent for each phase

DIGITAL OUTPUTS	
Pulse duration: 50ms OFF (min)/50ms ON	Max frequency: 10 pulses/sec
Vmax on contact: 48V (peak DC or AC)	Imax on contact: 100mA (peak DC or AC)
Wmax dissipatable: 450mW	Isolation: 750Vmax

ACCURACY OF THE MEASUREMENT		
Voltage	±0,5% F.S. ±1 digit in the range 10Vac÷500Vac rms VL-N	
Current	±0,5% F.S. ±1 digit in the range 50mA÷5A rms	
Active power	±1% ±0,1% F.S. (from cosφ= 0,3 Ind. to cosφ= -0,3 Cap.)	
Frequency	40.0 ÷ 99.9Hz:	±0,2% ±0,1Hz
	100 ÷ 500Hz:	±0,2% ±1Hz

ENERGY COUNT	
Maximum value for the single-and three-phase energy	4294,9 MWh (MVArh) with KA = KV = 1
Accuracy	Class 1

OPERATIVE CONDITIONS	
Operating temperature	0°C ÷ 50°C
Storage temperature	-10°C ÷ 60°C
Relative humidity	90% max. (without condense) at 40°C

NORMATIVE REFERENCES

ELECTRICAL SAFETY
EC directive No. 73/23/CEE regarding ''Low Voltage" (Low-Voltage Directive)

ELECTROMAGNETIC COMPATIBILITY
EC directive No. 89/336/CEE regarding the "Electromagnetic Compatibility'"

Configuration menu

PARAMETERS	POSSIBLE VALUES	FACTORY DEFAULT
VT transformation ratio	1 ÷ 500	1
CT transformation ratio	1 ÷ 1250	1
Pulses programming value [1]	10, 100, 1.000, 10.000 Wh/imp (VArh/imp)	10
Quantities selectable for alarm on output O1 and/or O2 [1]	OFF, V12, V23, V31, VL1-N, VL2-N, VL3-N, ΣV, I1, I2, I3, ΣI, W1, W2, W3, ΣW, VAr1, VAr2, VAr3, ΣVAr, VA1, VA2, VA3, ΣVA, PF1, PF2, PF3, ΣPF, counter t2 (OFF = alarm disabled)	OFF
Alarm threshold for outputs O1 and/or O2 relating to the selected quantity [1]	Depending on measurement range of selected quantity	Approx. half the full scale of the selected quantity
Delay for enabling output O1 and/or O2 in the event of an alarm [1]	1 ÷ 900 (seconds)	10
Type of serial protocole [1]	0 = ASCII reserved for internal use only 1 = Modbus-RTU	1
Analyzer's address [1]	ASCII Prot.: 1 ÷ 98 Modbus-RTU Prot.: 1 ÷ 247	31
Baud rate for the RS485 serial interface line [1]	2.4, 4.8, 9.6, 19.2 (es. 9.6 is related to 9600bit/s)	9.6
Parity for the RS485 serial interface line [1]	O = odd, E = even, n = none	n
Stop bits for the RS485 serial interface line [1]	1, 2 (with Parity = n), 1 (with Parity = O, E, n)	1
PAG 1.2.3. (default page of the first three displays)	0 ÷ 15 (0 = it remains the last displayed page)	1
PAG 4. (default page of the 4th display)	0 ÷ 7 (0 = it remains the last displayed page)	1
"Free-running" counter hours and minutes - t1	The counter can be reset from the configuration menu	The counter works in the range: 0 ÷ 10000000 (hours) (about 1140 years)
"Count-down" counter hours and minutes - t2	Starting setting in hours: 1 ÷ 32000 (3,5 anni circa)	8760 hours (1 year)
Calculation period for mean values	-	15 minutes

[1] only for DMTME-I-485 model

Rev. D (for Firmware rel. 1.13 and higher)

In consideration of the evolution of the standards and products, the company reserves the right to modify at any time the features of the product described in this literature, we recommend therefore to always verify them beforehand.

CE

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