

## Three-phase multifunction instrument with 1 or 2 "Easy Connect" inputs

Codes: MFD41ORFCDT – MFD42ORFCDT  
MFD41ORFCMT – MFD42ORFCMT  
Model: NEMO D4-ec



ROG630M2	ROG1600M2	ROG3200M2	ROG6300M2
∅ 50mm	∅ 100mm	∅ 150mm	∅ 240mm



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### 1. USE

The multifunction instrument, 4 DIN modules, has a quick connector for the connection of the Rogowski type current coil trio (630A/ 1600A/ 3200A/ 6300A versions).

The measuring instrument with 4 dials, suitable for 3N-3E and 3-3E networks.

### 2. RANGE

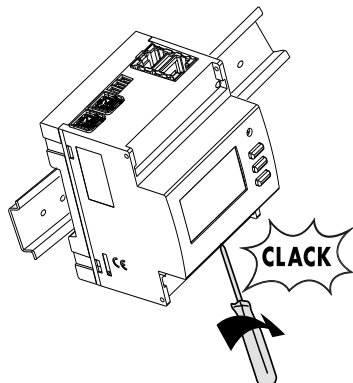
Item Code	I Inputs	Output	Digital Inputs	Voltage Range
MFD41ORFCDT	1	Modbus	4 Tariffs	V-N/V-V: 3x230/ 3x400±15% V-V: 3x230 ±15%
MFD42ORFCDT	2			
MFD41ORFCMT	1	Mbus		
MFD42ORFCMT	2			

Code	Rogowski Openable Coils				Cable length (m)	Diameter (mm)
	Input (A)	Min. Current (A)	Max. Current (A)			
ROG630M2	630	12,5	750	2	50	
ROG1600M2	1600	32,5	1950	2	100	
ROG3200M2	3200	65,0	3900	2	150	
ROG6300M2	6300	125,0	7500	2	240	
Code				Cable length (m)	Quantity	
ROGEXTM1	-	-	-	1	x 3 max.	
ROGETXM3	-	-	-	3	x 1 max.	

### 3. INSTALLATION

#### Fixing:

On EN/IEC 60715 symmetrical rail or DIN 35 rail.



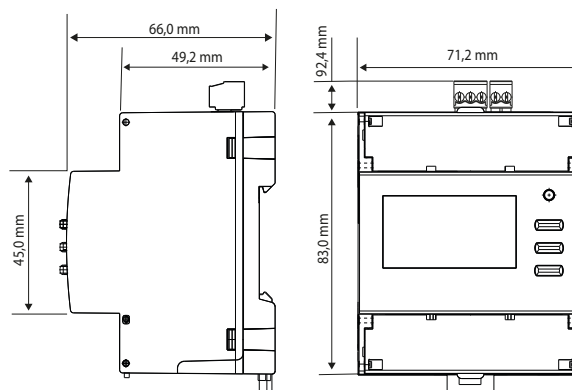
### Operating position:

Vertical, Horizontal, Upside down, On the side



### 4. DIMENSIONS

Housing: 4 DIN 43880 modules



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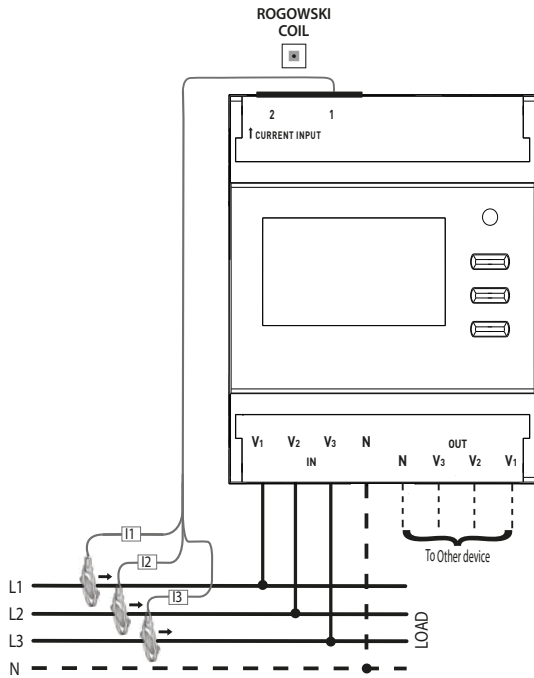
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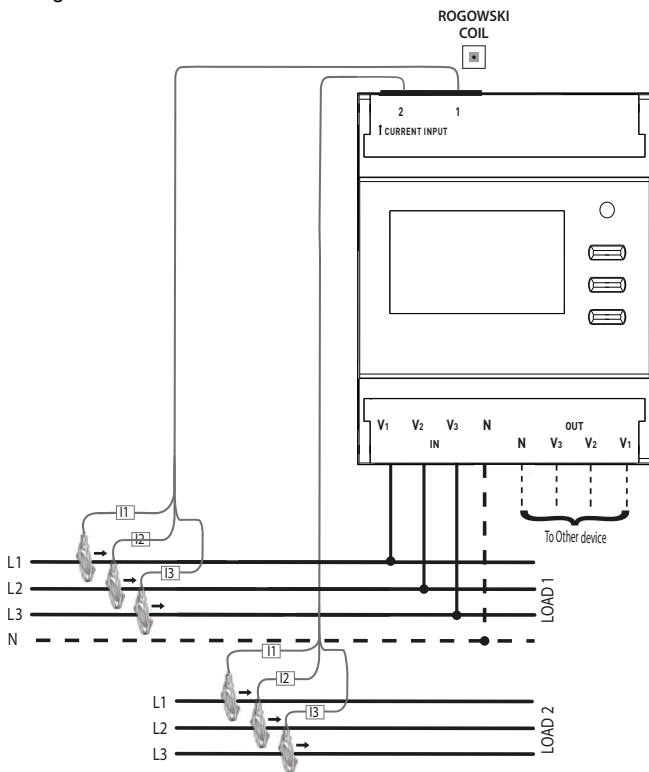
## 5. CONNECTIONS

### Connection diagrams:

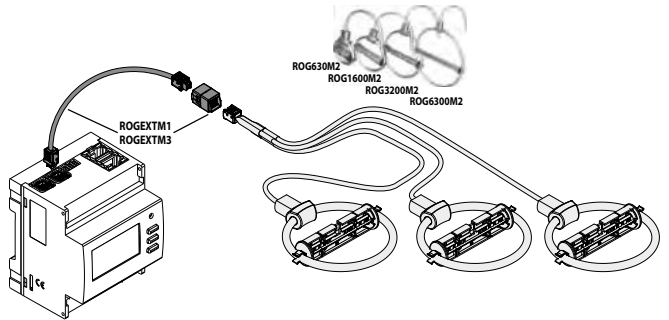
- 4-wire or 3-wire three-phase network ( 3N3E; 3-3E)



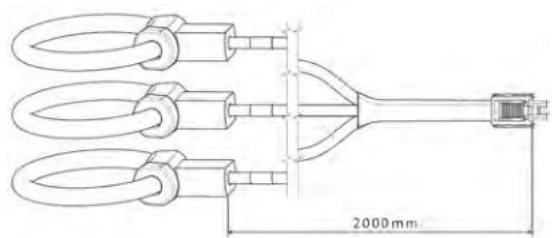
- Diagram with 2 coils:



## 5. CONNECTIONS



- Rogowski sensor – Cable length



This length can be extended to 5 metres maximum with the extension cable + connector (2 m Rogowski cable and up to 3 m extension cable)

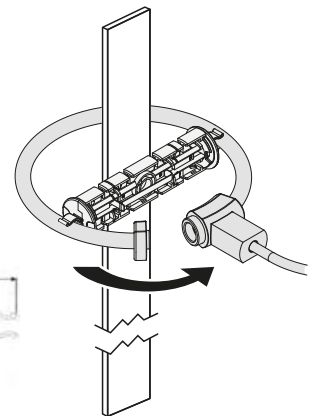
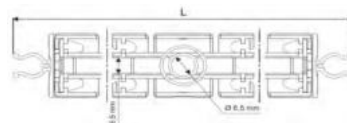
- **ROGEXTM1, ROGEXTM3:**

Extension cable for Rogowski coils

Item code	Length (mm)
ROGEXTM1	1000
ROGEXTM3	3000

Plastic centring support for Rogowski coils

Item code	Length (mm)
ROG630M2	79
ROG1600M2	123
ROG3200M2	173
ROG6300M2	263



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## 6. OPERATING DATA

### 6.1 ELECTRIC DATA

For all the MFD41ORFCDT – MFD42ORFCDT – MFD41ORFCMT - MFD42ORFCMT codes the reference capacity (I<sub>ref</sub>) can be programmed based on the selected Rogowski:

Current capacity	I <sub>min</sub>	I <sub>ref</sub>	I <sub>max</sub>
630	12,5A	250A	750A
1600	32,5A	650A	1950A
3200	65A	1300A	3900A
6300	125A	2500A	7500A

### V1,V2,V3,N voltages:

- Three-phase voltage: V-N/ V-V : 3x230 /3x400 ±15%
- V-V: 3x230 ±15%

### Maximum section of the cables that can be connected to the V1,V2,V3,N terminals:

Terminals	Without bush	With bush
Rigid wire	0,05 + 1,5 mm <sup>2</sup>	0,05 + 2,5 mm <sup>2</sup>
Flexible wire	0,05 + 1,5 mm <sup>2</sup>	0,05 + 2,5 mm <sup>2</sup>

### Self-powered (terminals V and N):

- Rated frequency: 50/60Hz
- Operating frequency: 45...65Hz
- Self consumption: ≤ 2.5VA @230 Vac

### Maximum dissipated thermal power for the thermal dimensioning of the panels: ≤ 5W

## 6.2 MECHANICAL DATA

### Screw terminals:

- Max external dimensions: 18mm
- Stripping lengths for input cable and bus 5mm; 7.5mm for in/out voltages

### Screw head:

- Voltage connection terminals (V1, V2, V3, N) with COMBI screws (slotted/ PH1 Phillips head); slotted head screws for terminals (N, V3, V2, V1) .
- Terminal boards in the upper part of the multifunction (input and bus): screws with countersunk head with hexagon socket

### Recommended torque:

- Voltage connection terminals (V1, V2, V3, N): 0.5Nm
- Voltage connection terminals (N, V3, V2, V1): 0.5Nm
- Tariff and communication terminal boards (Modbus or Mbus): 0.2 Nm

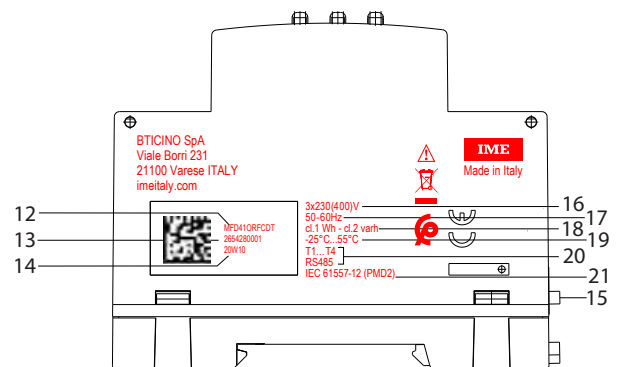
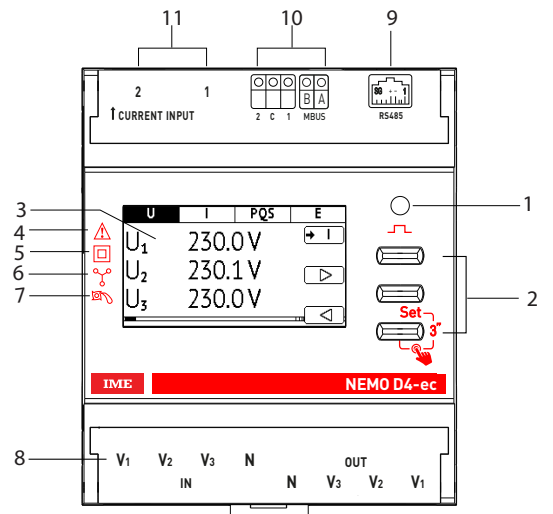
### Necessary tools:

- For BUS version terminals, use a 2.5mm flat screwdriver; for voltage terminals, use a 3.5mm slotted screwdriver and/or a PH1 Phillips screwdriver

## 7. GENERAL FEATURES (continues)

### Marking data:

Indelible marking



1. Metrological LED
2. Keypad with 3 multifunction pushbuttons
3. Graphic display
4. Consult the user manual before installation
5. Double insulation
6. Connection on 4-wire / 3-wire three-phase line
7. Anti-rotation device (anti-decreasing)
8. Voltages
9. RJ45 connection for Modbus RTU
10. Mbus communication and tariff input
11. 1 / 2 current input
12. Item code
13. Datamatrix for product traceability
14. Week and year of manufacture
15. Voltages
16. Rated voltages
17. Rated frequencies
18. Precision classes
19. Temperature of use
20. Inputs / Outputs
21. Reference standards

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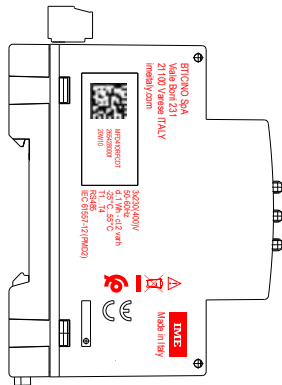
Model: NEMO D4-ec

## 7. GENERAL FEATURES

### Laser marking:

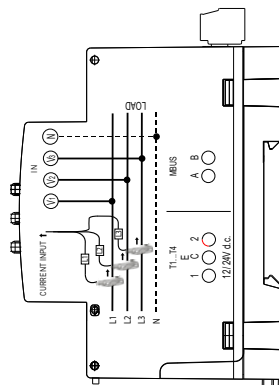
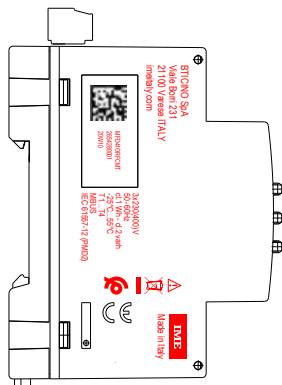
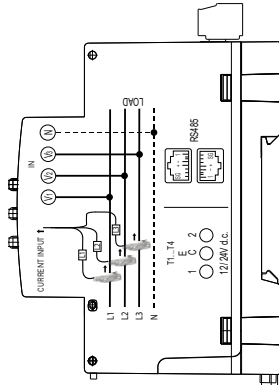
#### Left Side

Traceability information

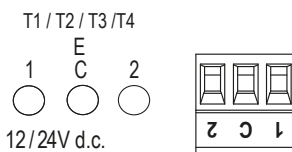


#### Right Side

Wiring diagrams



### Marking of communication outputs and tariff inputs:



## 7. GENERAL FEATURES GENERALI (continues)

### Display and metrological LED:

- Graphic, backlit, 1.8 inches (256x128).

Rogowski inputs	Energy Resolution	Wh/imp.
630A	1kWh/kvarh/kVAh	10
1600A	1kWh/kvarh/kVAh	25
3200A	1kWh/kvarh/kVAh	50
6300A	0,01MWh/Mvarh/MVAh	100

### Display of the value and programming:

- By means of the front keypad, 3 pushbuttons (see the user manual).
- Access protected by identification code (**predefined code 1000**)

### Measurements and precision in conformity with EN/IEC 61557-12

- Current: cl.1
- Voltage: cl.0.5
- Frequency:  $\pm 0,1$  Hz
- Instantaneous total active power, phase, average value and max. average value: cl.1
- Instantaneous total reactive power, phase, average value and max. average value: cl.2
- Instantaneous total apparent power, phase, average value and max. average value: cl.1
- Power Factor: cl.1
- Total and partial active energy, tariff, phase, positive and negative cl.1
- Total and partial reactive energy, tariff, phase, positive and negative cl.2
- Apparent energy cl.1

The above classes are guaranteed by maintaining the centring, between Rogowski sensor and primary conductor, with the appropriate accessories provided and a harmonic content within the limits of the EN/IEC 61557-12 standard

### Harmonic analysis (THD): value and graphic

- Up to the 15th harmonic

### Average power:

- Measurement: apparent, reactive, active power
- Calculation: moving average, on the selected period
- Average time: 3/5/8/10/15/20/30/60min
- Load Profile (power load curve), diagram of the last 24 recorded average power values

### Average time set | Curve interval

3 min	72 min
5 min	2 hours
60 min	24 hours

### Resettable meter:

- Counting of operating hours and minutes
- 8-figure resolution (6 for the hours + 2 for the minutes)
- Maximum display: 999999.99
- Programmable value: 0...50% Pn (Positive active power)

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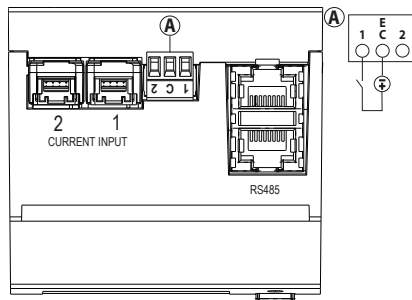
## 7. GENERAL FEATURES

### Digital input

- The digital input allows switching the energy counting on 4 tariffs
- 3 input terminals with common point (1 - C - 2)

Terminals	Without bush	Without bush
Rigid wire	0,05 + 1,5 mm <sup>2</sup>	0,05 + 2,5 mm <sup>2</sup>
Flexible wire	0,05 + 1,5 mm <sup>2</sup>	0,05 + 2,5 mm <sup>2</sup>

- Rated voltage: 12-24Vdc, 10mA Max.



### Features of the ModBus communication port

- Programmable addresses: from 1 to 247 (5\*)
- Communication speed: 4.8 – 9.6 – 19.2\* – 38.4 kbps
- Parity bit: none, even\*, odd
- Stop bit: 1
- Galvanically isolated with respect to the measurement inputs
- Standard RS485 3 wires, Half-Duplex on RJ45 connector –
- Modbus® RTU protocol
- Response time: ≤ 200ms
- 120Ω terminating resistor inside the instrument (it can be set in the SETUP menu, default value: none\*)
- **MFD41ORFCDT**: Programmable address from 1 to 247
- **MFD42ORFCDT**: Programmable address from n = 1 to n = 246 for first input measurements and address n+1 (automatically assigned) for second input measurements

### Features of the MBus communication port:

- Standard: EN 13757
- Transmission: serial asynchronous
- No. of bit: 8
- Parity bit: fixed even
- Communication speed: 300-600-1.200-2.400\*-4.800-9.600bit/s
- No. of primary address: 0\*...250
- **MFD41ORFCMT / MFD42ORFCMT**: Programmable primary address from 0 to 250
- **MFD41ORFCMT / MFD42ORFCMT**: Programmable secondary address from 0 to 99999999
- Load MBus: 1
- Galvanically isolated with respect to the measurement inputs
- Transferred measurements: see communication protocol

### \* Factory data

## 7. GENERAL FEATURES

### Recommendations:

**For the device protection against overloads and short circuits, it is recommended to use a thermal-magnetic circuit breaker**

### Protection class:

- Protection index of terminals against direct contacts: IP 20 (IEC/EN 60529);
- Protection index of the front face against direct contacts: IP 54 (IEC/EN 60529);
- Class II: front panel with cover plate;
- Protection class against mechanical impacts IK03 (IEC/EN 62262)

### Resistance to vibrations:

- Vibration: from 5 to 150Hz width 0,15mm/1g
- Shock: 19g / 16msec

### Housing material:

BLEND >PC + ABS<;

Identification according to ISO 11469: >PC<;

GWFI IEC 60965-2-12 (§1.6mm): 850°C;

Flame rating UL 94 / IEC 60695\_11\_10 (1.6/3.2 mm): V2;

### Operating temperatures:

- Tmin. = - 20 °C; Tmax. = + 60 °C.

### Room storage temperatures:

- Tmin. = - 25 °C; Tmax. = + 70 °C

**Weight:** 0,270Kg

**Packaged volume:** 1.5 dm3.

**Room:** mechanical M1 – electric E2

## 8. CONFORMITY AND CERTIFICATIONS

### Insulation:

- Measurement categories: III (according to EN-61010)
- Level of pollution: 2
- Insulation voltage,  $U_i$ : 300V, Phase-Neutral

### Dielectric rigidity:

- Power supplies/ Outputs: 3kV / 50Hz / 1min
- Housing / Terminals: 4kV / 50Hz / 1min

### Pulse:

- Power supplies: 6.3kV / 1.2 – 50µsec / 0.5J

### In compliance with the standards:

- Precision class: Class 1 active energy (IEC/EN62053-21)
- Precision class: Class 2 reactive energy (IEC/EN62053-23)
- Electromagnetic compatibility: Tests in accordance with EN/IEC 62052-11 / EN 61326-1
- Precision class according to IEC/EN61557-12
- 2014/35/UE 2014/30/UE

### Respecting the environment – Conformity with the CEE directives:

- Compliance with the 2002/95/EC Directive, as modified by the 2015/863 Directive (RoHS 2), on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
- Conformity with the REACH Regulation (1907/ 2006): at the date of publication of this document no substance in the annex XIV is found in these products.
- RAEE Directive (2012/19/EU: the sale of this product includes a contribution to the appointed environmental bodies of each European country in charge of handling, at the end of their life, the products falling within the scope of the EU Directive on Electric and Electronic Equipment Waste.

### Plastic materials:

- Plastic materials without Halogens.
- Part marking according to standards ISO 11469 and ISO 1043.

### Packaging:

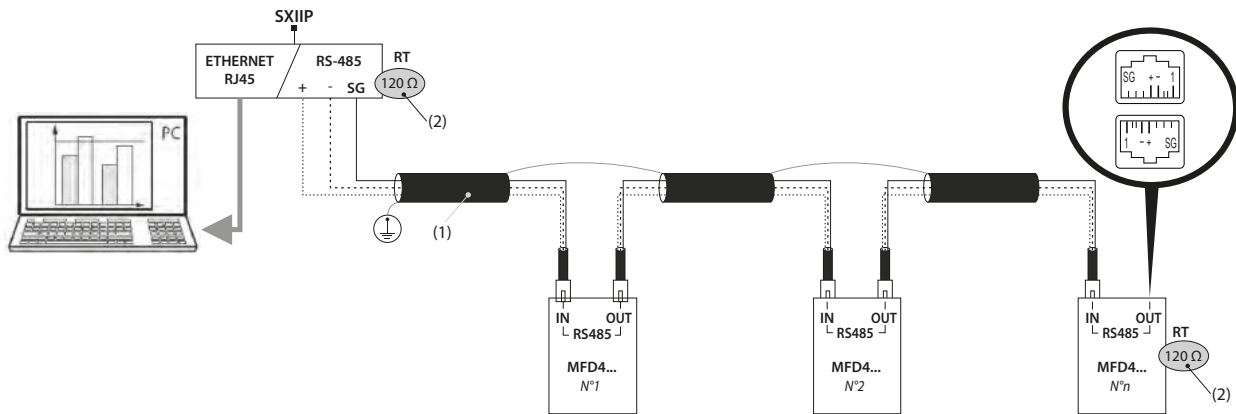
- Packaging designed and produced in accordance with Decree 98-638 of 20/07/1998 and directive 94/62/CE."

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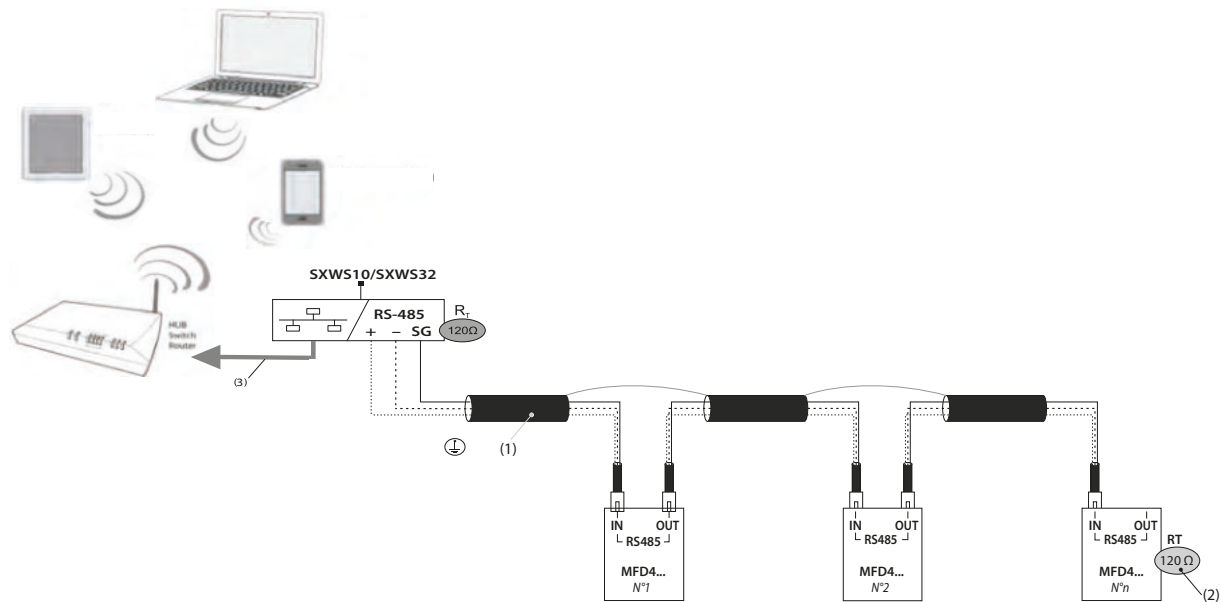
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## 9. COMMUNICATION

### RS485 Modbus wiring diagram:

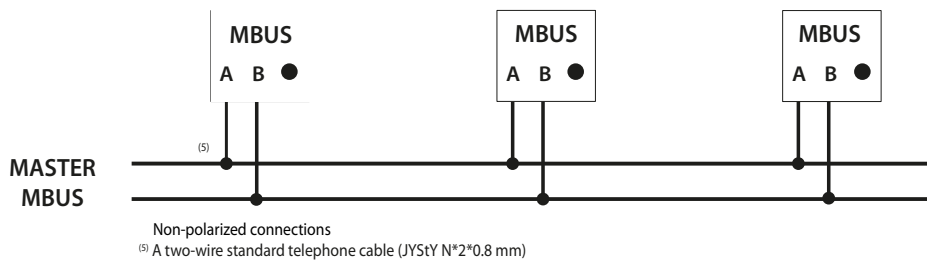


### RS485 Modbus wiring diagram with Mini Web Server:



- (1) RS485: Required use of Belden 9842 or Belden 3106A wire (or equivalent) for a maximum bus length of 1000 m, or Category 6 wire (FTP or UTP) for a maximum length of 50 m
- (2) 120Ω terminating resistor inside the instrument
- (3) Ethernet: Cat. 6 (FTP/UTP)
- (4) The "SG" terminal must not be connected to the earth

### Mbus wiring diagram:



### Communication tables:

- The MODBUS and MBUS communication protocols are available on the <http://www.imeitaly.com> site