PROTECTION RELAY

Auxiliary Modules

— General

Hardware resources of XMore platform devices are easily upgradable by means internal additional boards and external Expansion Modules (up to 3 modules per XMore protection).
XMore protection relays BASE Configuration makes available 7 Digital Outputs ONLY which are ALWAYS EQUIPPED; in order to increase I/O availability it is possible equip Slot S1, Slot S2, Slot S4, present in the rear part of relay.

REMEMBER

S1 equips **7 Digital INPUTS** (***IN1F***), the default configuration module
S2 equips **7 Digital INPUTS** (***IN2G***) **or alternatevely 4 Digital OUTPUTS** (***OC2N***) **or alternatevely Arc-flash Module (uses Slot S2 and Slot S4)**
S4 equips **7 Digital INPUTS** (***IN3H***) **or alternatevely 4 Digital OUTPUTS** (***OC1L***)
Following table shows the relevant maximum number of available I/O versus all possible combinations without any external Expansion Modules

CODE	TOTAL DIGITAL INPUTS	TOTAL DIGITAL OUTPUTS	BASE	IN1F (S1)	IN2G (S2)	IN3H (S4)	OC2N (S2)	OC1L (S4)	Arc-flash (S2+S4)
XMR-....#xxxxx100xxx	7	7	X	X	—	—	—	—	—
XMR-....#xxxxx110xxx	14	7	X	X	X	—	—	—	—
XMR-....#xxxxx111xxx	21	7	X	X	X	X	—	—	—
XMR-....#xxxxx120xxx	7	11	X	X	—	—	X	—	—
XMR-....#xxxxx112xxx	14	11	X	X	X	—	—	X	—
XMR-....#xxxxx122xxx	7	15	X	X	—	—	X	—	—
XMR-....#xxxxx130xxx	7	7	X	X	—	—	—	—	X

Various installation requirements can be met by the inclusion of one or more of the following external modules:

- **XMRI** Module **8** relays + **16** digital inputs - This module cannot be used together neither XMR16 and XMID32.
- **XMR16** Module **16** relays
- **XMID32** Module **32** digital inputs
- **XMPT** Module **8** PT100
- **XMCI** Module **6** analogue outputs (**4÷20mA**)
- **M-REF** Rotor Earth Fault external Module

EXTERNAL MODULES - GENERAL TECHNICAL DATA

— Mechanical data

Mounting	External Module
Dimensions	87 x 178 x 250 (Max) mm
Maximum number of installable Expansion Modules	3

— Insulation tests

Reference standards	EN 60255-5
High voltage test 50 Hz	2 kV 60 s
Impulse voltage withstand (1.2/50 µs)	5 kV
Insulation resistance	>100 MΩ

— Voltage dip and interruption

Reference standards	EN 61000-4-29

— EMC tests for interference immunity

Electrostatic discharge EN 60255-22-2	8 kV
Fast transient burst (5/50 ns) EN 60255-22-4	4 kV
Conducted radio-frequency fields EN 60255-22-6	10 V
Radiated radio-frequency fields EN 60255-4-3	10 V/m
High energy pulse EN 61000-4-5	2 kV
Magnetic field 50 Hz EN 61000-4-8	1 kA/m
Damped oscillatory wave EN 61000-4-12	2.5 kV
Ring wave EN 61000-4-12	2 kV
Conducted common mode (0...150 kHz) EN 61000-4-16	10 V

— Emission

Reference standards	EN 61000-6-4 (ex EN 50081-2)
Conducted emission 0.15...30 MHz	Class A
Radiated emission 30...1000 MHz	Class A

— Climatic tests

Reference standards	IEC 60068-x, ENEL R CLI 01, CEI 50

— Mechanical tests

Reference standards	EN 60255-21-1, 21-2, 21-3

— Safety requirements

Reference standards	EN 61010-1
Pollution degree	3
Reference voltage	250 V
Overvoltage	III
Pulse voltage	5 kV

— Environmental conditions

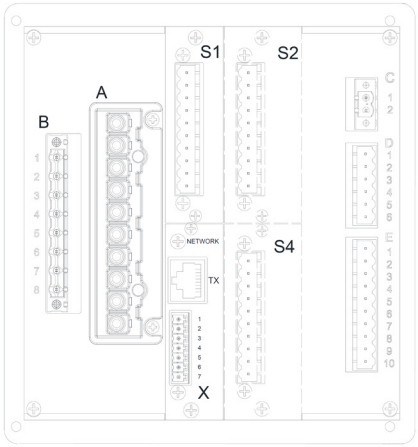
Ambient temperature	-25...+70 °C
Storage temperature	-40...+85 °C
Relative humidity	10...95 %
Atmospheric pressure	70...110 kPa

— Certifications

CE conformity

• EMC Directive	2014/30/EU
• Low Voltage Directive	2014/35/EU
• Type tests	IEC 60255-6

DIMENSIONS



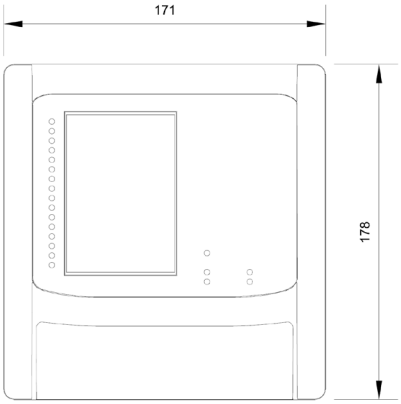
ONLY S1 EQUIPPED

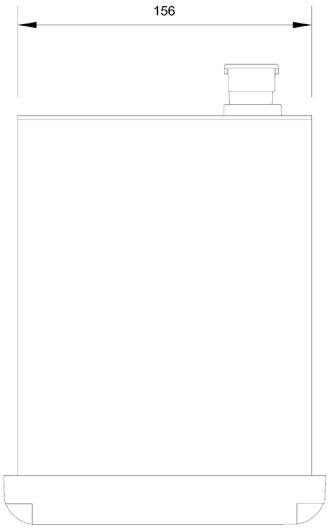
S1 + S2 + S4

S1 + ARC-FLASH (SLOT S2+S4)

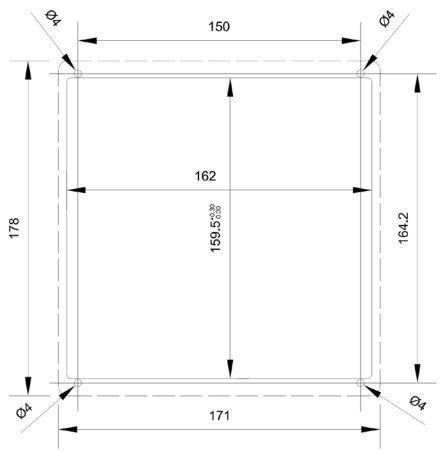
XMR-A, XMR-V, XMR-P

front view





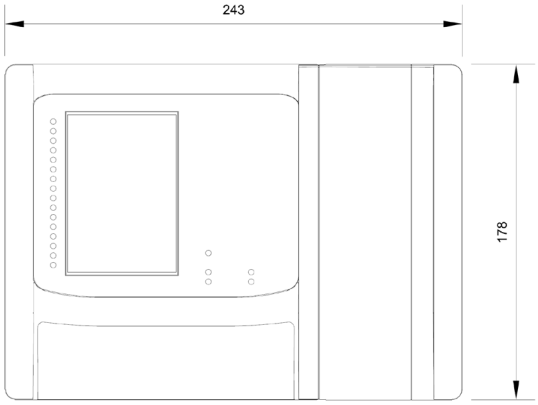
top view

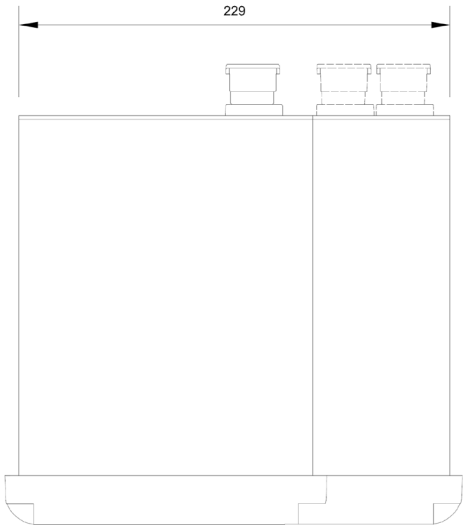


cutout

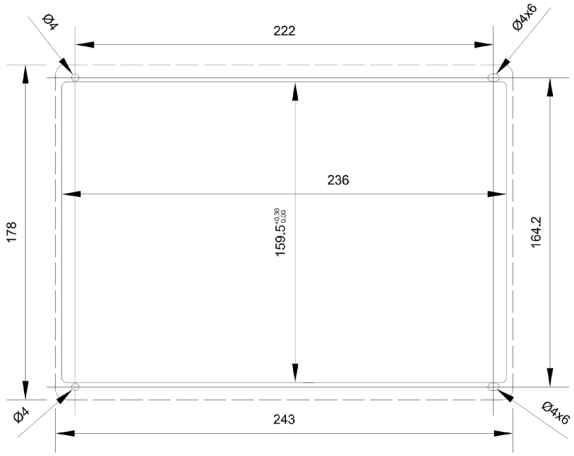
XMR with 1 EXTERNAL MODULE, including base types D and T without EXTERNAL MODULES

front view





top view



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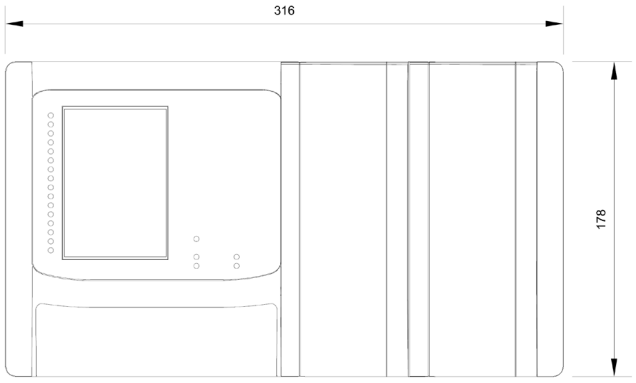
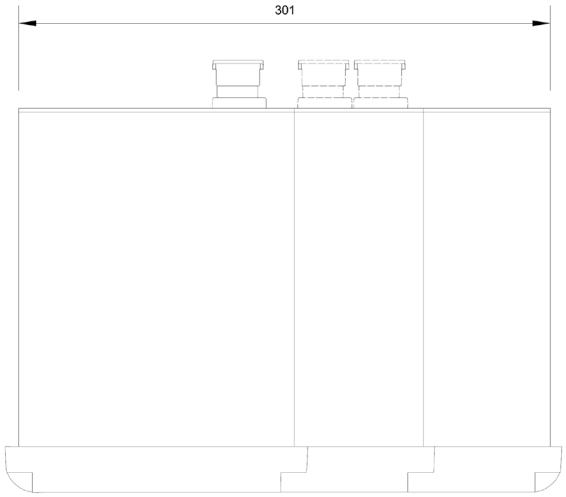
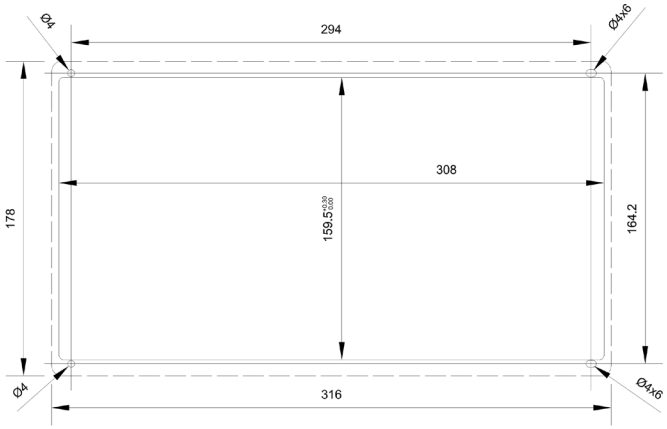
XMR with 2 EXTERNAL MODULES, including base types D and T with 1 EXTERNAL MODULE

front view





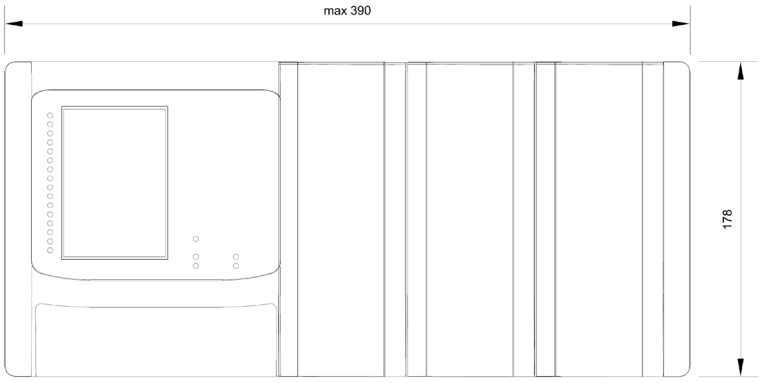
top view

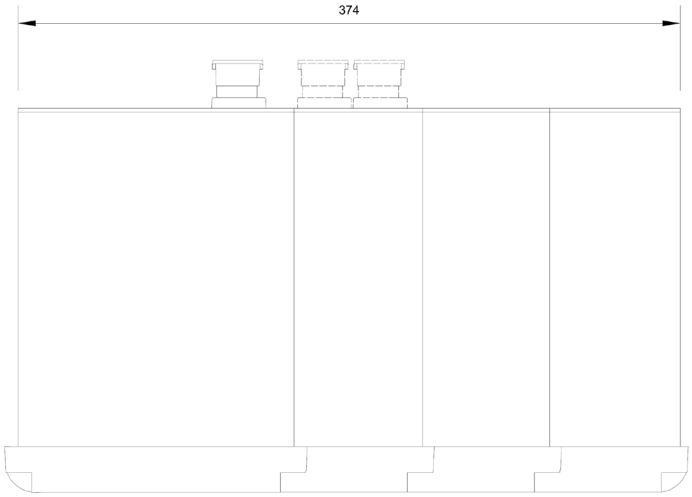


cutout

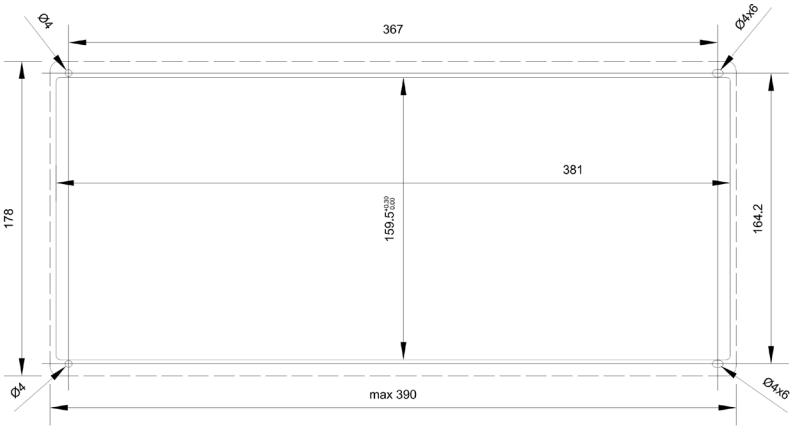
XMR with 3 EXTERNAL MODULES, including base types D and T with 2 EXTERNAL MODULES

front view





top view



cutout

XMRI Module 8 relays + 16 digital inputs

— General

In order to increase the number of digital I/O XMR-x protection relays can be equipped with the XMRI module.
- Eight output relays are available (KM1-1...KM1-8)
- Sixteen digital inputs are available (INM1-1 ...INM1-16)

OUTPUT CIRCUITS

— Output relays

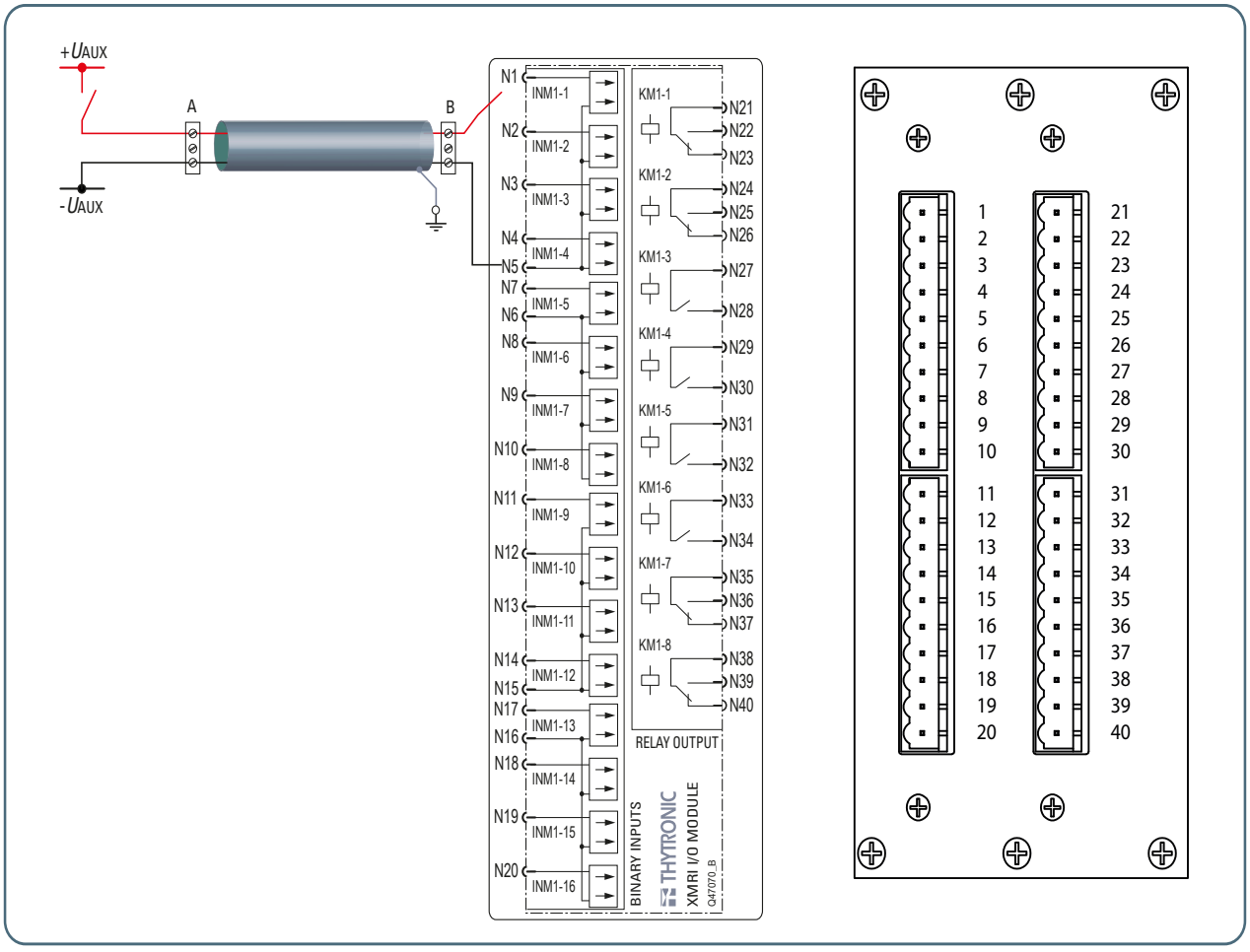
Quantity	8
Type of contacts	
n° 4	changeover (SPDT, type C)
n° 4	make (SPST-NO, type A)
Nominal current	8 A
Nominal voltage/max switching voltage	250 Vac/400 Vac
Breaking capacity:	
• Direct current (L/R = 40 ms)	50 W
• Alternating current (λ = 0,4)	1250 VA
• Make	1000 W/VA
Short duration current (0,5 s)	30 A

INPUT CIRCUITS

— Binary inputs

The input circuits are voltage-free; activation requires the application of a power source, preferably the same auxiliary voltage present in the switchboard.
The inputs are dimensioned for a wide range of operation and does not require any hw and / or sw programming; the switching threshold is 20 Vcc/15 Vac.

Quantity	16
Type	dry inputs
Max permissible voltage	19...265 Vac/19...300 Vdc
Max consumption, energized	3 mA



WARNING

For all connections longer than 5m or in environments particularly subject to disturbances due to power transmission, the use of shielded cables is **strictly** recommended, with the shield connected to earth on only one end.

In case of connections to power relays coils or contactors, it is **strictly** recommended install protection devices - like varistors, trapping diodes, etc. - directly on the coils in order to avoid overvoltage phenomena which can produce disturbances along the cables and/or damage the coils and/or control relays contacts.

XMR16 Module 16 relays

— General

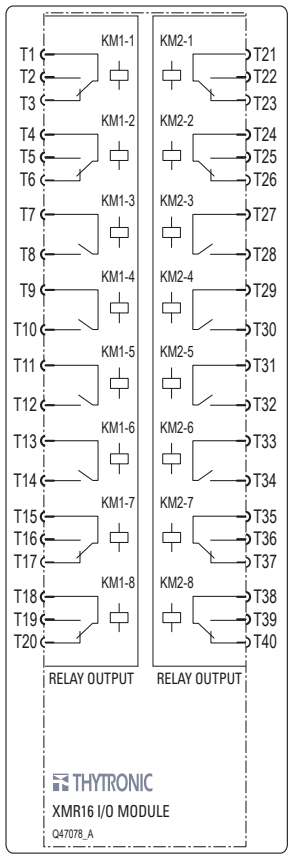
In order to increase the number of digital Output XMR-x protection relays can be equipped with the XMR16 module.

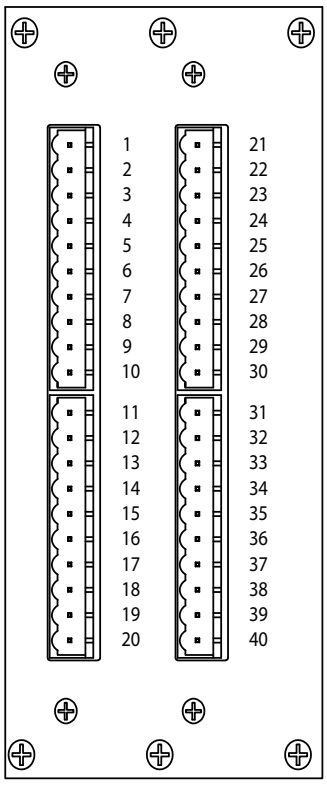
- Sixteen output relays are available (KM1-1...KM1-8 - KM2-1...KM2-8)

OUTPUT CIRCUITS

— Output relays

Quantity	16
Type of contacts:	
n° 8	changeover (SPDT, type C)
n° 8	make (SPST-NO, type A)
Nominal current	8 A
Nominal voltage/max switching voltage	250 Vac/400 Vac
Breaking capacity:	
• Direct current (L/R = 40 ms)	50 W
• Alternating current (λ = 0,4)	1250 VA
• Make	1000 W/VA
Short duration current (0,5 s)	30 A





WARNING

In case of connections to power relays coils or contactors, it is **strictly** recommended install protection devices - like varistors, trapping diodes, etc. - directly on the coils in order to avoid overvoltage phenomena which can produce disturbances along the cables and/or damage the coils and/or control relays contacts.

XMID32 Module 32 digital inputs

— General

In order to increase the number of digital Inputs XMR-x protection relays can be equipped with the XMID32 module.

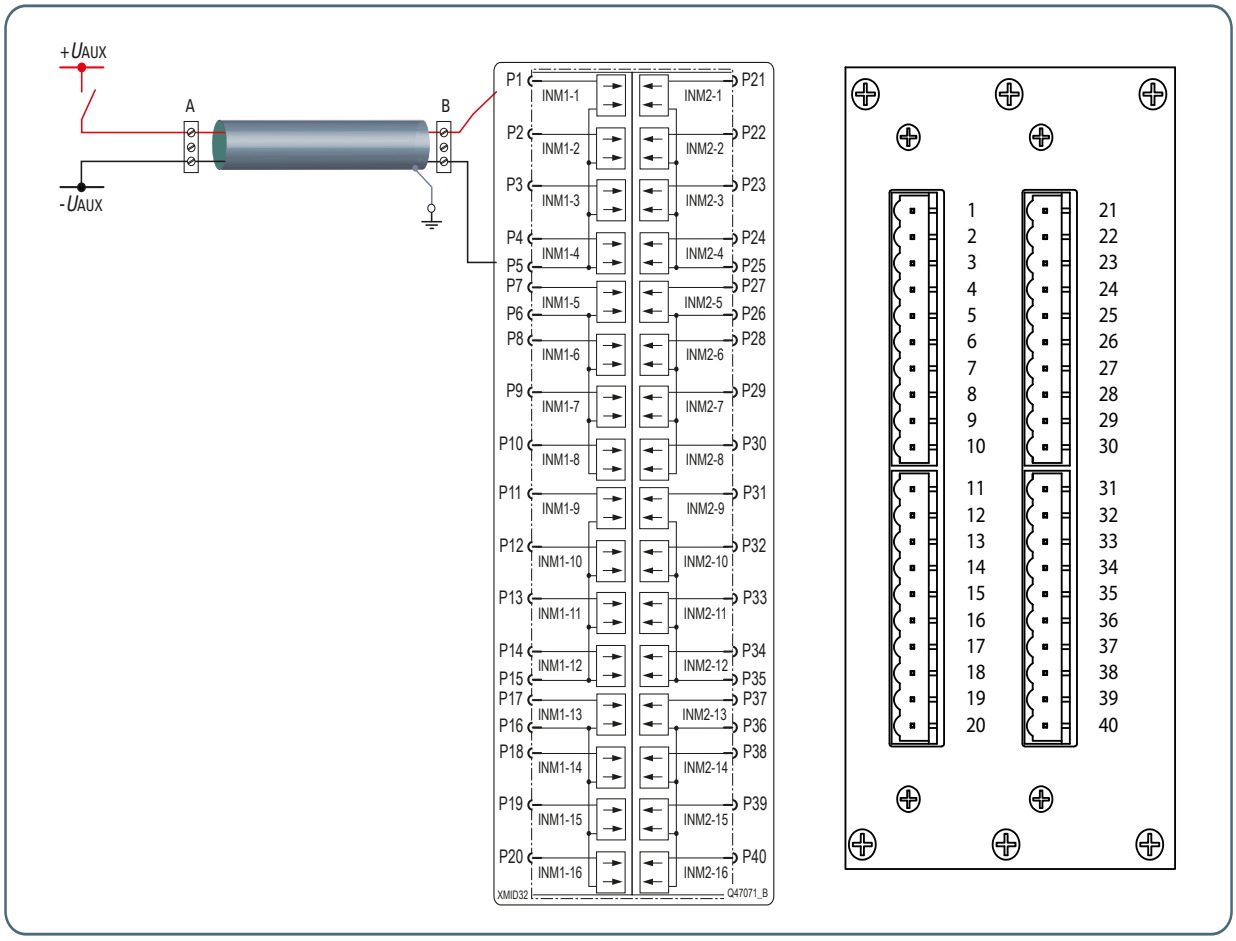
- Thirty-two digital inputs are available (INM1-1...INM1-16 - INM2-1 ...INM2-16)

INPUT CIRCUITS

— Binary inputs

The input circuits are voltage-free; activation requires the application of a power source, preferably the same auxiliary voltage present in the switchboard. The inputs are dimensioned for a wide range of operation and does not require any hw and / or sw programming; the switching threshold is 20 Vcc/15 Vac.

Quantity	32
Type	dry inputs
Max permissible voltage	19...265 Vac/19...300 Vdc
Max consumption, energized	3 mA



WARNING For all connections longer than 5m or in environments particularly subject to disturbances due to power transmission, the use of shielded cables is **strictly** recommended, with the shield connected to earth on only one end.

XMPT Module 8 PT100

— General

In order to direct-measurement of temperature the XMR-x relays can be customized through external auxiliary RTD odule. Eight Pt100 inputs are acquired to provide thermal protective functions.

The Pt100 sensors ('Pt' is the symbol for platinum) are the most common devices used in industry have a nominal resistance of 100 ohms at 0 °C.

In order to compensate the additional resistance introduced by the cables, three wires connection is recommended (example 3); with only two terminals, probes you must use a shielded cable with three conductors carrying the schematic example 2 (Pt100 connected to RTD2 in the above figure).

However it is essential that the link between Terminal A and Terminal B is made with cables of the same type (RL1 = RL2 = RL3).

For very short connections, two wires (Pt100 connected to RTD8 example 1) are permitted; the non-compensated resistance connections resulting in an error proportional to the value of introduced resistance.

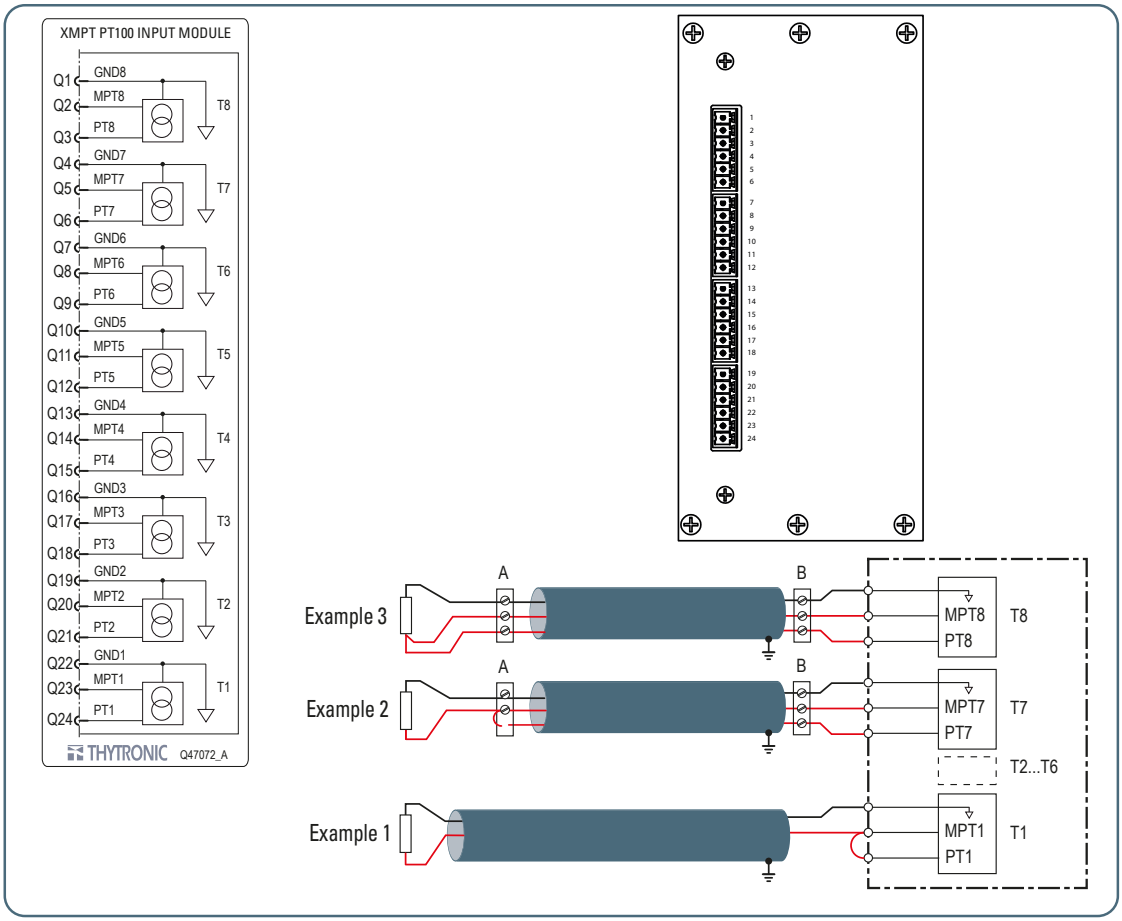
The connection to the probes must be made with three conductors shielded cables and the screen should be earthed only at one end, preferably on the relay; multiple connections may result in current circulation on the screen resulting noise on the measure and are therefore to avoid.

It is recommended to position connections to the probe away from power lines to avoid interference.

INPUT CIRCUITS

— RTD inputs

Quantity	8
Range	- 40...+ 240 °C
Measuring current	1 mA
Refresh interval	0.25 s
Pt100 lead resistance (max per lead)	10 Ω



XMCI Module 6 analogue outputs (4÷20mA)

— General

In order to extend output capability XMR-x relays can be customized through XCMI module which include 6 current loop converter outputs.
All the six converters are independently configurable in the following ranges:

- 0-5 mA, 0-20 mA
- 4-20 mA

The following settings are user programmable:

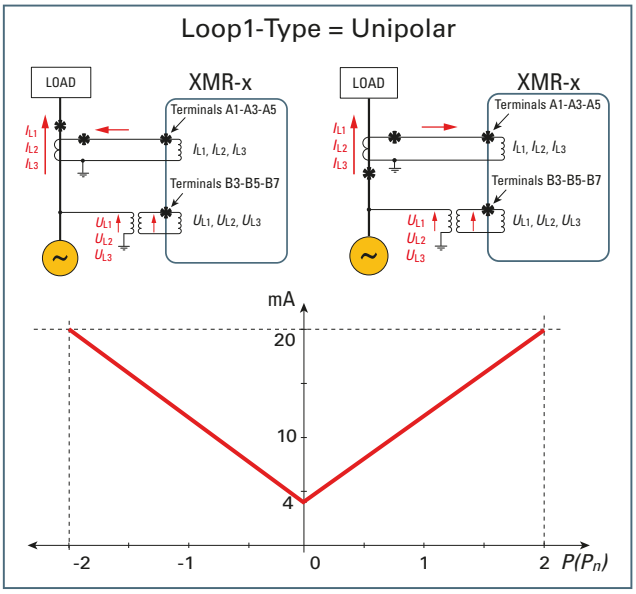
- Input measures coupling
- Output signals type (Unipolar - Bipolar - Unibipolar)
- Nominal multiplier (multiple of input, expressed as p.u. of nominal value whereby the converter output provides the full scalvalue set)
- Output signals polarity (Normal - Inverse)

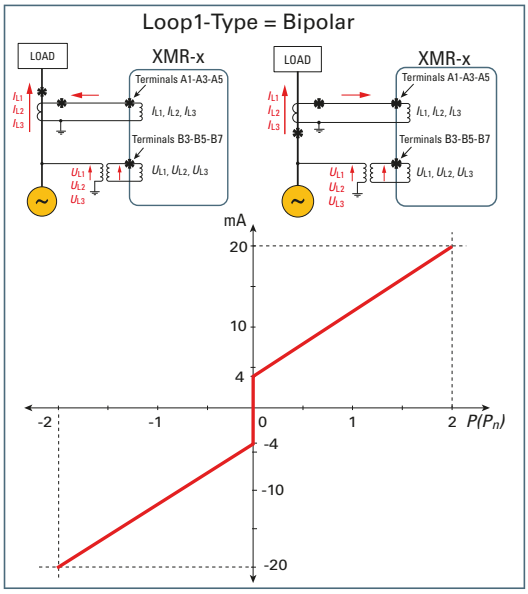
OUTPUT CIRCUITS

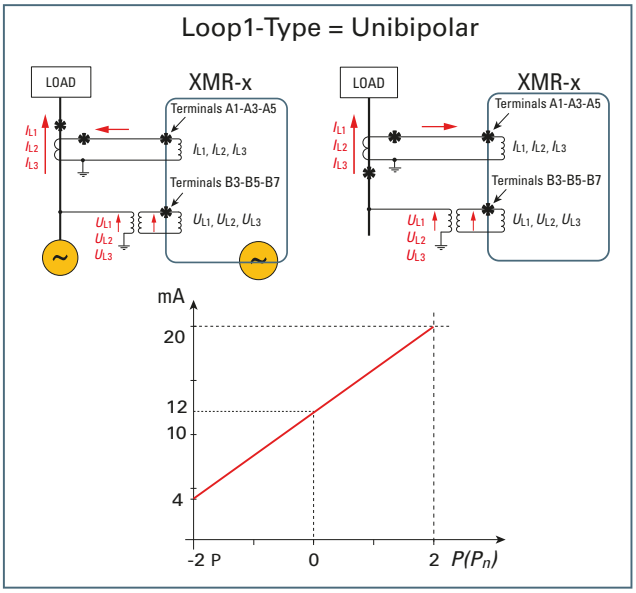
— Current converter

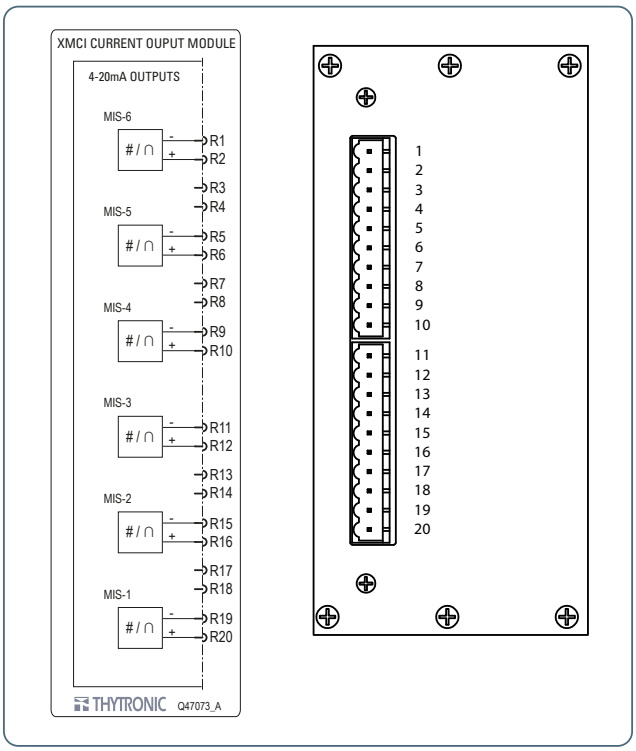
Quantity	6
Output range (Loop1-Range...Loop6-Range):	0-5 mA, 0-20 mA 4-20 mA
Max output current	± 22 mA
Type (Loop1-Type...Loop6-Type)	Unipolar - Bipolar - Unibipolar
Multiplier (Loop1-M... (Loop6-M)	0.01...100.00
Polarity (Loop1-Polarity...Loop6-Polarity)	Normal-Inverse
Resolution	2.5 µA
Accuracy	0.1% ± 5 µA

The following examples are valid in case of **OUTPUT RANGE is 4-20mA** and **MULTIPLIER FACTOR is 2**.









M-REF Rotor Earth Fault external Module

— General setting

A 50 Hz or 60 Hz voltage is applied in the field circuit of the alternator and a ground; in the absence of earth fault (RF = ∞) only a few mA current is established in the circuit through the capacities between the field circuit and the earth. In case of earth fault, the current increases in inverse proportion to the value of fault resistance.
Using the external M-REF module, connected to the protection relay, Rotor Earth Fault protection can be implemented.

— Mechanical data

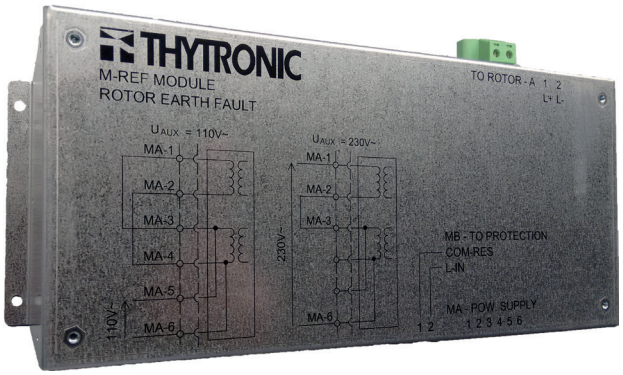
Mounting:	direct or DIN rail
Fixing	n°4 M4 screws
(for direct mounting, after disassembling the DIN clamps)	
Mass	2500 g

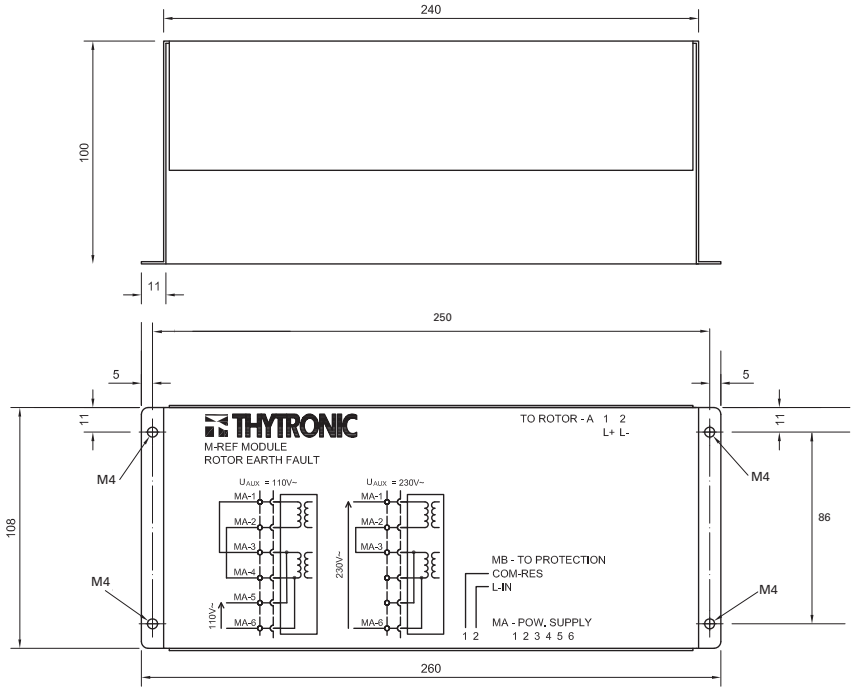
— Rotor earth fault input circuit

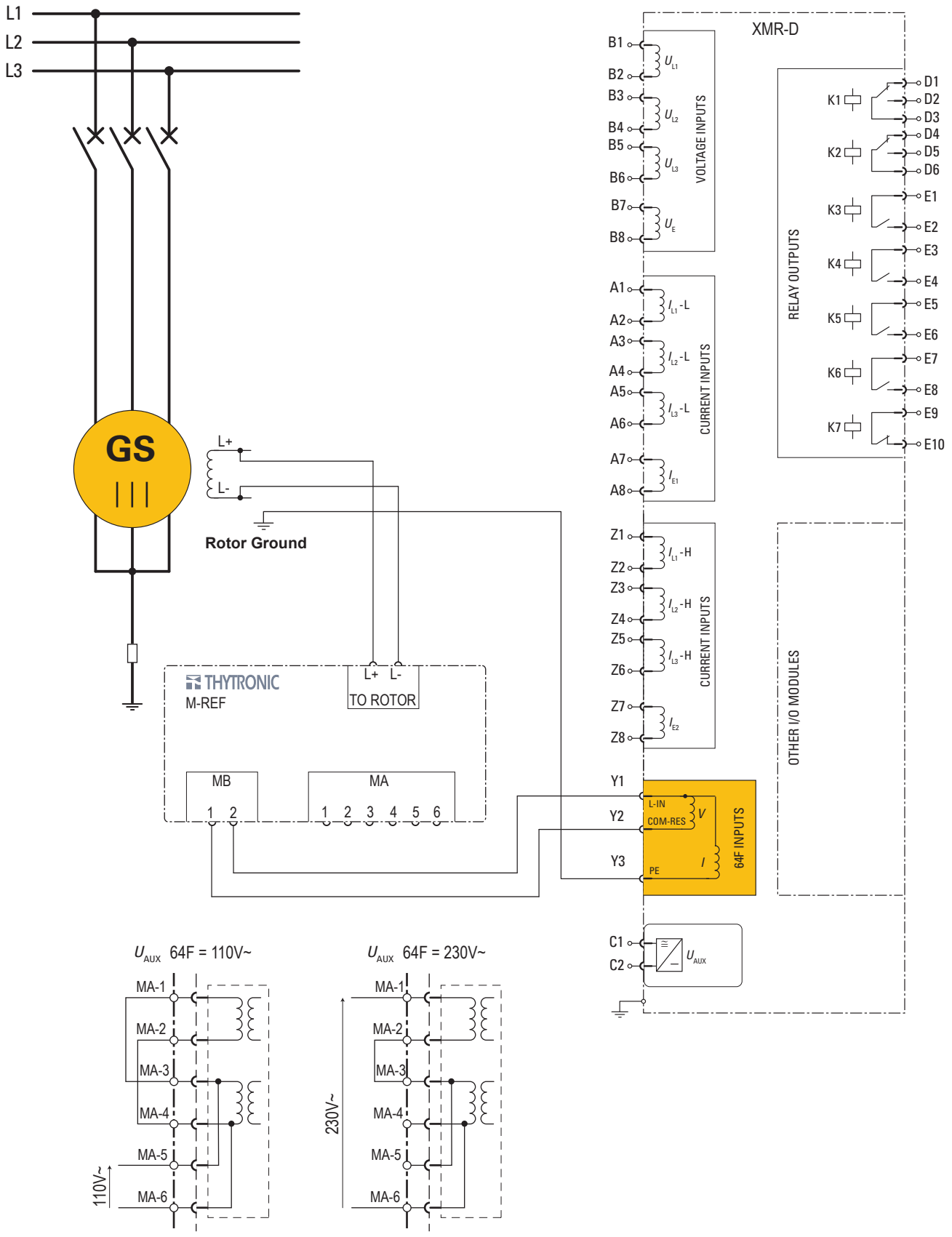
Max voltage	600 Vdc +10%
Max alternating component	100 Vac
Max rotor earth capacitance	2 µF
Auxiliary power supply	110, 230 Vac 50 Hz

— Rotor earth fault (64F)

Pickup RFAL<, RF<<	0.50...5.00 kΩ steps 0.01 kΩ
Time delays tRFAL<, tRF<< (definite time)	0.07...100.0 s (0.07...9.99 s steps 0.01 s, 10.0...100.0 s steps 0.1 s)
Pickup times	0.05 s
Dropout ratio	1.02...1.05
Dropout time	0.08 s
Overshoot time	0.03 s
Reference values	rest: R= ∞ operation: 2/3 R FAL<, R F<<
Pickups accuracy	± 3% + 20 Ω
Time delays accuracy	± 1% ± 8 ms







Wiring diagram of M-REF module related to the functions 64F in the XMR-D relay.
Wiring have to be made according to the Uaux voltage.

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