

HighPROTEC-2

PROTECTION TECHNOLOGY
MADE SIMPLE

MRI4-2

COMBINED NON-DIRECTIONAL
OVERCURRENT AND EARTH-FAULT RELAY

**New
Features**

- DNP 3.0
- Multiple Communication with One Device
- ANSI Menu Structure
- Page Editor
- IEC 61850 with LC Interface
- Enhanced Security Features



APPLICATION

The MRI4 is a protection relay which uses the latest Dual-Core-Processor Technology to provide precise and reliable protective functions and is very easy to operate. The MRI4 provides a number of three phase protection elements to safeguard against overcurrent, short-circuit and earth fault, all with inverse time (INV) and definite time (DEFT) tripping characteristics.

The MRI4 is also ideal for the protection of isolated, resonant, resistive and solidly earthed neutral systems. It is designed to be used in both radial networks and single fed open ring main systems. It can also serve as backup protection for differential protection systems on generators, transformers, bus bars and electrical lines. For overhead line protection the MRI4 is also available with an optional auto reclosing function.

ALL INCLUSIVE:

- All protection features without extra charge
- Parameter setting and evaluation software
- Disturbance record analysis software

SIX ELEMENTS PHASE OVER-CURRENT PROTECTION ⁽¹⁾

- Non-directional overcurrent/short-circuit protection (DEFT/INV)
- Tripping characteristics:
DEFT
ANSI: MINV, VINV, EINV
IEC: NINV, VINV, LINV, EINV
Thermal Flat, IT, I2T, I4T

FOUR ELEMENTS EARTH FAULT PROTECTION ⁽²⁾

- Non-directional earth fault protection (DMT/IMDT)
- Tripping characteristics:
DEFT
ANSI: MINV, VINV, EINV
IEC: NINV, VINV, LINV, EINV
Thermal Flat, IT, I2T, I4T
RXIDG

RECORDERS

- Disturbance recorder: 120 s non volatile
- Fault recorder: 20 faults
- Event recorder: 300 events
- Trend recorder: 4000 non volatile entries

TWO ELEMENTS UNBALANCED LOAD PROTECTION

- Supervision by definite time or inverse tripping characteristic

DEMAND MANAGEMENT/ PEAK VALUES

- Current (peak values) and average current

POWER QUALITY

- THD protection

SUPERVISION

- Current transformer supervision
- Circuit breaker failure protection
- Trip circuit supervision
- Cold load pickup
- Switch onto fault

ADDITIONAL HIGHLIGHTS

- Automatic reclosing
- Inrush
- Thermal replica
- Plausibility checks
- Adaptive parameter sets
- Status display
- Comprehensive RMS and DFT measured values and statistics
- Masking of unused functions
- Multi-Password-Level

LOGIC

- Up to 80 logic equations for protection, control and monitoring

COMMISSIONING SUPPORT

- USB connection
- Customizable Display (Single-Line, ...)
- Customizable Inserts
- Copy and compare parameter sets
- Configuration files are convertible
- Forcing and disarming of output relays
- Fault simulator
- Graphical display of tripping characteristics
- 8 languages selectable within the relay

COMMUNICATION OPTIONS

- IEC 61850
- Profibus DP
- Modbus RTU and/or Modbus TCP
- IEC 60870-5-103
- DNP 3.0 (RTU, TCP, UDP)

IT SECURITY

- Menu for the activation of BDEW-Whitepaper-compliant security settings (e.g. hardening of interfaces)

CONTROL

- one breaker
- Breaker wear

TIME SYNCHRONISATION

- SNTP, IRIG-B00X, Modbus, DNP 3.0, IEC60870-5-103

PC TOOLS

- Setting and analyzing software
Smart view for free
- Including page editor to design own pages

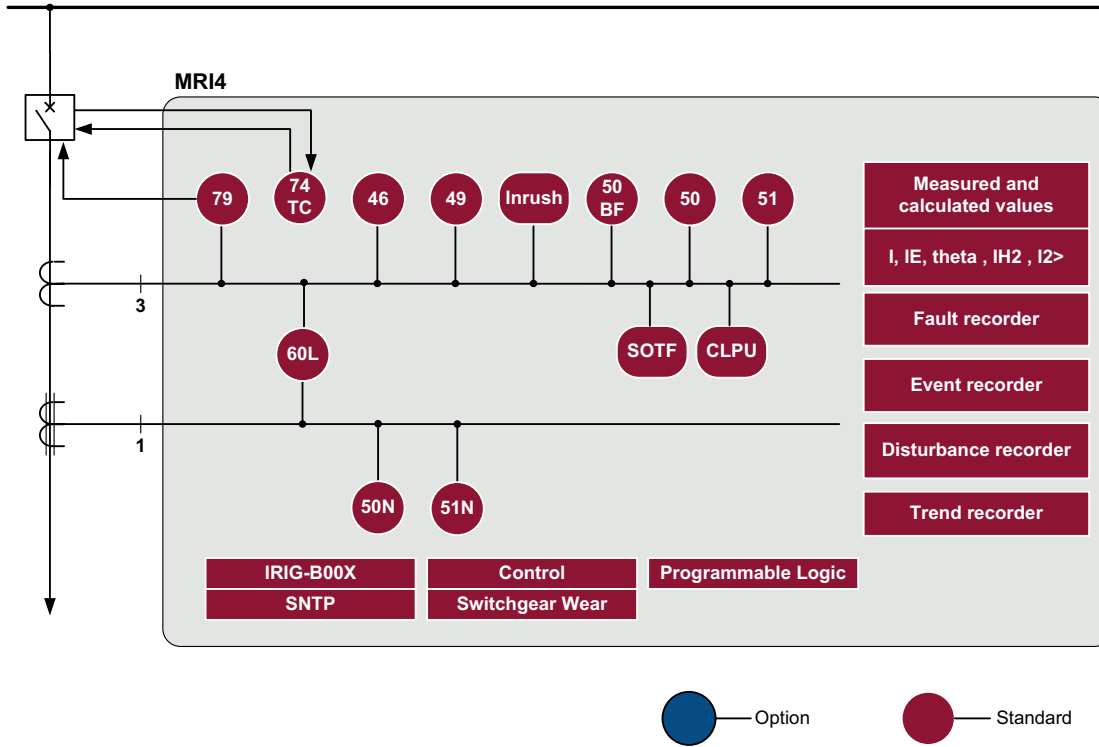
⁽¹⁾ DFT, True RMS or I2 based

⁽²⁾ DFT or True RMS based

FUNCTIONAL OVERVIEW

	Elements	ANSI
Protective Functions		
I, time overcurrent and short circuit protection, multiple reset options (instantaneous, definite time, reset characteristics according to IEC and ANSI)	6	50P, 51P, 67P
Negative phase sequence overcurrent protection		51Q
I _{2>} , unbalanced load protection with evaluation of the negative phase sequence currents	2	46
ThA, overload protection with thermal replica and separate pick-up values for alarm and trip functions	1	49
IH ₂ /In, inrush detection with evaluation of the 2nd harmonic	1	Inrush
IG, earth overcurrent and short circuit protection	4	50N, 51N
AR, automatic reclosing	1	79
ExP, External alarm and trip functions	4	
Control and Logic		
Control, Position indication, supervision time management and interlockings for 1 breaker		
Logic: Up to 80 logic equations, each with 4 inputs, selectable logical gates, timers and memory function		
Supervision Functions		
CBF, circuit breaker failure protection	1	50BF
TCS, trip circuit supervision	1	74TC
CTS, current transformer supervision	1	60L
CLPU, cold load pickup	1	
SOTF, switch onto fault	1	
Demand management and peak value supervision		
THD supervision		
Breaker wear with programmable wear curves		
Recorders: Disturbance recorder, fault recorder, event recorder, trend recorder		

FUNCTIONAL OVERVIEW IN ANSI FORM



APPROVALS



certified regarding UL508 (Industrial Controls)



certified regarding CSA-C22.2 No. 14 (Industrial Controls)



certified by EAC (Eurasian Conformity)

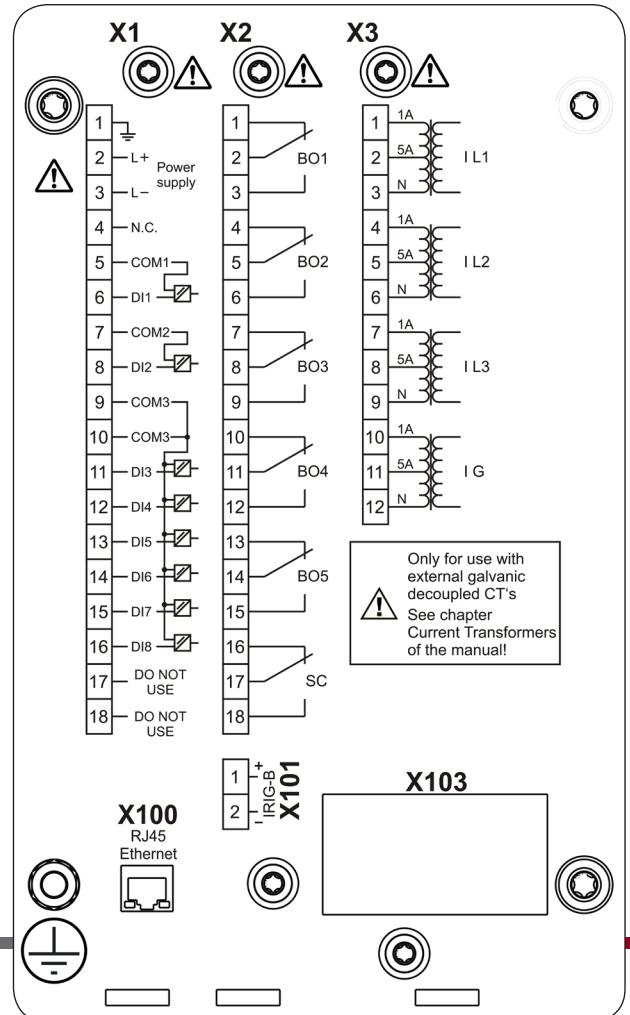


Type tested (and certified) regarding IEC60255-1

complies with IEEE 1547-2003 amended by IEEE 1547a-2014

complies with ANSI C37.90-2005

CONNECTIONS (EXAMPLE)



MRI4-2 | COMBINED NON-DIRECTIONAL OVERCURRENT AND EARTH-FAULT RELAY

ORDER FORM MRI4-2

Non-directional Feeder Protection				MRI4 -2				
Version 2 with USB, enhanced communication and user options								
Digital Inputs	Binary output relays	Housing	Large display					
8	6	B1	-				A	
Hardware variant 2								
Phase Current 5 A/1 A, Ground Current 5 A/1 A								0
Phase Current 5 A/1 A, Sensitive Ground Current 5 A/1 A								1
Housing and mounting								
Door mounting								A
Door mounting 19" (flush mounting)								B
Communication protocol								
Without protocol								A
Modbus RTU, IEC60870-5-103, DNP3.0 RTU <i>RS485/terminals</i>								B*
Modbus TCP, DNP3.0 TCP/UDP <i>Ethernet 100 MB/RJ45</i>								C*
Profibus-DP <i>optic fiber/ST-connector</i>								D*
Profibus-DP <i>RS485/D-SUB</i>								E*
Modbus RTU, IEC60870-5-103, DNP3.0 RTU <i>optic fiber/ST-connector</i>								F*
Modbus RTU, IEC60870-5-103, DNP3.0 RTU <i>RS485/D-SUB</i>								G*
IEC61850, Modbus TCP, DNP3.0 TCP/UDP <i>Ethernet 100MB/RJ45</i>								H*
IEC60870-5-103, Modbus RTU, DNP3.0 RTU <i>RS485/terminals</i>								I*
Modbus TCP, DNP3.0 TCP/UDP <i>Ethernet 100 MB/RJ45</i>								J*
IEC61850, Modbus TCP, DNP3.0 TCP/UDP <i>Optical Ethernet 100MB/LC duplex connector</i>								K*
Modbus TCP, DNP3.0 TCP/UDP <i>Optical Ethernet 100MB/LC duplex connector</i>								L*
IEC60870-5-103, Modbus RTU, DNP3.0 RTU <i>RS485/terminals</i>								M*
IEC61850, Modbus TCP, DNP3.0 TCP/UDP <i>Ethernet 100 MB/RJ45</i>								T*
Harsh Environment Option								
None								A
Conformal Coating								B
Available menu languages (in every device)								
English / German / Spanish / Russian / Polish / Portuguese / French / Romanian								

* Within every communication option only one communication protocol is usable.
Smart view can be used in parallel via the Ethernet interface (RJ45).

The parameterizing- and disturbance analyzing software *Smart view* is included in the delivery of HighPROTEC devices.

Current inputs	4 (1 A and 5 A) with automatic CT Disconnect
Digital Inputs	Switching thresholds adjustable via software
Power supply	Wide range power supply 24 V _{DC} – 270 V _{DC} / 48 V _{AC} – 230 V _{AC} (–20/+10%)
Terminals	All terminals plug type
Type of enclosure	IP54
Mounting	Door mounting or 19" flush mounting
Dimensions of housing (W × H × D)	19" flush mounting: 141.5 mm × 173 mm × 209 mm 5.571 in. × 6.811 in. × 8.228 in. Door mounting: 141.5 mm × 183 mm × 209 mm 5.571 in. × 7.205 in. × 8.228 in.
Weight (max. components)	approx. 2.9 kg / 6.393 lb

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