

HighPROTEC-2 | PROTECTION TECHNOLOGY MADE SIMPLE

MRDT4-2 | TRANSFORMER DIFFERENTIAL PROTECTION RELAY

**NEW
FEATURES**

- DNP 3.0
- Multiple Communication with one device
- ANSI Menu structure
- Page Editor
- New front plate with USB
- IEC61850 with LC interface



APPLICATION

The various protective functions of the MRDT4 are specifically tailored to the protection of two winding transformers. The device offers in addition to the differential protection various communication and backup protection functions. Furthermore the MRDT4 can be used for generator differential protection.

ALL INCLUSIVE:

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

TRANSFORMER PHASE DIFFERENTIAL PROTECTION

- Stabilized phase differential protection with transients and C.T. saturation detection
- Various selectable transformer groups
- Zero sequence removal
- Three point slope characteristic
- High set element (non-restraint)

TWO ELEMENTS GROUND DIFFERENTIAL PROTECTION

- Three point slope characteristic
- High set element (non-restraint)

BACKUP PROTECTION

- 4 Elements Overcurrent/short-circuit protection (non-directional)
- 4 Elements Earth fault protection (non-directional)
- Tripping characteristics: DEFT
ANSI: NINV, VINV, EINV,
IEC: NINV, VINV, LINV, EINV, RXiDG
Thermal Flat, IT, I2T, I4T

TWO ELEMENTS UNBALANCED LOAD PROTECTION

- Supervision by definite time or tripping characteristic

RECORDERS

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

ADDITIONAL HIGHLIGHTS

- Inrush
- Thermal replica
- Four elements external protection
- Plausibility checks
- Adaptive parameter sets
- Status display
- Masking of unused functions
- Breaker Manager and Breaker wear

COMPREHENSIVE MEASURED VALUES AND STATISTICS

- THD (total harmonic distortion)
- Current phasors and angles
- RMS and fundamental
- Sequence currents
- Differential currents

TEMPERATURE PROTECTION

- Buchholz (sudden pressure), ext. oil temperature, and aux. temperature protection via digital input
- Temperature measurement via external RTD-box (option)

SUPERVISION

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

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
- 7 languages selectable within the relay

COMMUNICATION OPTIONS

- IEC61850
- Profibus DP
- Modbus RTU or Modbus TCP
- IEC60870-5-103
- DNP 3.0 (RTU, TCP, UDP)

CONTROL

- Two breakers (or isolators/grounding switches)
- Breaker wear

LOGIC

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

TIME SYNCHRONISATION

- SNTP or IIRIG-B00X

PC TOOLS

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

FUNCTIONAL OVERVIEW

	Elements	ANSI
Protective Functions		
Transformer differential protection (2 windings), Id: Curve with zero point and three settable slopes and highset element (Id>>), Inrush stabilisation / detection of 2nd, 4th and 5th harmonics	1	87T
Restricted earth fault IdG, IdG>>, characteristics similar to 87T	2	87TN
I, time overcurrent and short circuit protection (non-directional) Multiple reset options (instantaneous, definite time, reset characteristics according to IEC and ANSI)	4	50P, 51P
I2>, unbalanced load protection with evaluation of the negative phase sequence currents	2	46
ThR, overload protection with thermal replica for transformers IEC60255-8, alarm and trip threshold	1	49T
IH2/In, inrush detection with evaluation of the 2nd harmonic	2	Inrush
IG, earth overcurrent and short circuit protection (non-directional) Tremendous reset options (instantaneous, definite time, reset characteristics according to IEC and ANSI)	4	50N, 51N
ExP, External alarm and trip functions	4	
Control and Logic		
Control: Position indication, supervision time management and interlockings for 2 breakers		
Logic: Up to 80 logic equations, each with 4 inputs, selectable logical gates, timers and memory function		
Supervision Functions		
CBF, circuit breaker failure protection for both circuit breakers	2	50BF
TCS, trip circuit supervision	2	74TC
CTS, current transformer supervision	2	60L
CLPU, cold load pickup	1	
SOTF, switch onto fault	1	
BW, breaker wear	2	
Non volatile event recorder up to 120 s with 32 samples per cycles		
THD supervision		

APPROVALS



certified regarding UL508 (Industrial Controls)



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



certified by EAC (Eurasian Conformity)

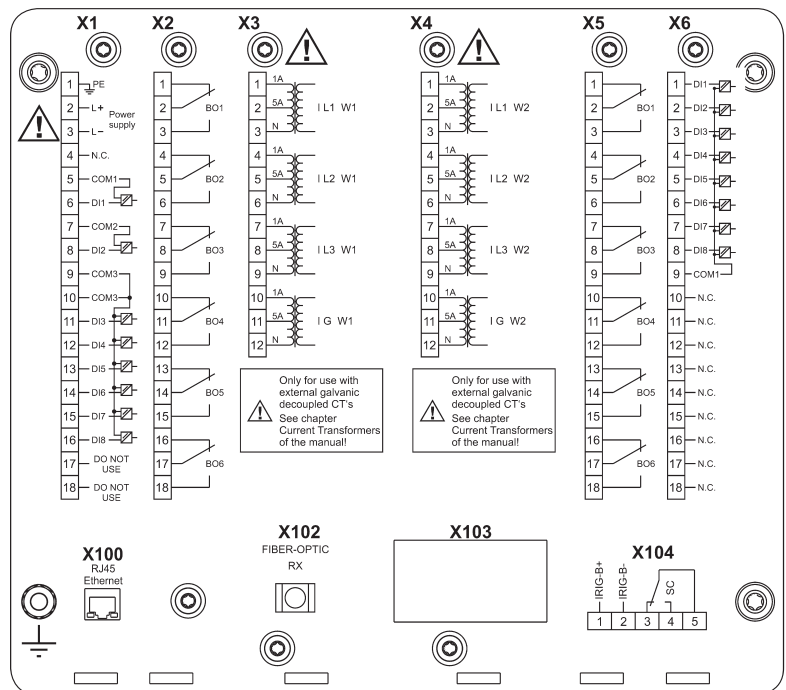


Type tested (and certified) regarding IEC60255-1

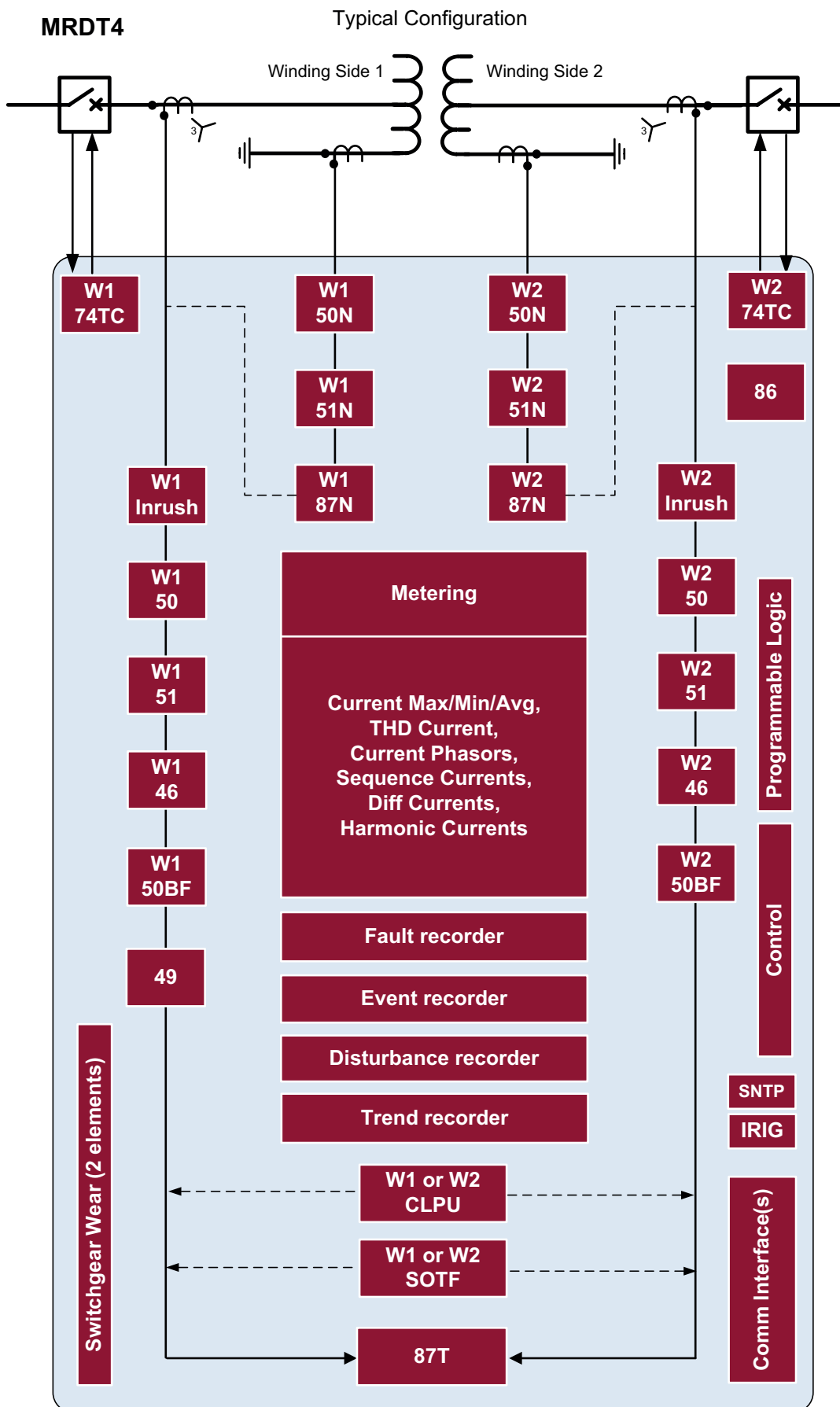
complies with IEEE 1547-2003 amended by IEEE 1547a-2014

complies with ANSI C37.90-2005

CONNECTIONS (EXAMPLE)



FUNCTIONAL OVERVIEW IN ANSI FORM



ORDER FORM MRDT4-2

Non-directional Transformer Differential Protection				MRDT4 -2				
Version 2 with USB, enhanced communication and user options								
Digital Inputs	Binary output relays	Housing	Large display					
8	7	B2	-			A		
16	13	B2	-			D		
Hardware variants								
Phase Current 5 A/1 A, W1/W2 Ground Current 5 A/1 A							0	
Phase Current 5 A/1 A, W1 Sen. Gr. Curr. 5 A/1 A, W2 Gr. Curr. 5 A/1 A							1	
Phase Current 5 A/1 A, W1 Gr. Curr. 5 A/1 A, W2 Sen. Gr. Curr. 5 A/1 A							2	
Phase Current 5 A/1 A, W1/W2 Sen. Gr. Curr. 5 A/1 A							3	
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*	
Harsh Environment Option								
None							A	
Conformal Coating							B	
Available menu languages (in every device)								
Standard English/German/Spanish/Russian/Polish/Portuguese/French								

* 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	8 (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
Dimensions of housing (W x H x D)	19" flush mounting: 212.7 mm x 173 mm x 208 mm 8.374 in. x 6.810 in. x 8.189 in. Door mounting: 212.7 mm x 183 mm x 208 mm 8.374 in. x 7.200 in. x 8.189 in.
Weight (max. components)	approx. 4 kg

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