Released

WOODWARD

HighPROTEC | PROTECTION TECHNOLOGY MADE SIMPLE

MCDTV4 | TRANSFORMER DIFFERENTIAL PROTECTION

NEW FEATURES – Release 3.6

- VDE-AR-N 4110; VDE-AR-N 4120
- G99 Issue 1 Amendment 3
- Wattmetric Ground Fault Protection
- IEC 60870-5-104
- SCADApter for Retrofit
- Usability improvements
- IT Security
- Improved Frequency and ROCOF precision*

APPLICATION

The MCDTV4 offers an all-in-one solution for HV, MV and LV transformers and it offers much more than just a differential protection package.
Furthermore it can detect critical operation states based on voltage measurement (e.g. Overexcitation). The MCDTV4 provides in addition to that an Interconnection package. This can be used for mains protection at the point of common coupling (e.g. for directional reactive power undervoltage protection). The integrated backup protection package enables the MCDTV4 to act as backup protection (e.g. for downstream breakers). Additional features like demand management are available without extra charge. The protection functions of the MCDTV4 have been adapted to comply with the requirements of the VDE-AR-N-4110:2018.

COMPREHENSIVE TRANSFORMATOR PROTECTION PACKAGE

- The Phase and Ground Differential protection package detects electrical faults within the transformer
- Two elements overexcitation protection (overfluxing)
- Overload / Thermal replica for detection of long lasting minor overcurrents
- Six elements (voltage dependent) time overcurrent protection (ANSI / IEC / 51C / 51V)
- Frequency measurement improved *5mHz from 45-55 Hz
- Multiple power elements (Pr, P, Q, S, PF…)
- Negative phase sequence protection
- Multi level overvoltage protection with settable reset ratio
- Multi level undervoltage protection with settable reset ratio
- Buchholz supervision via digital input
- Unbalanced voltage protection
- Multi-Password-Level
- Optional temperature supervision via external URTD-box with 12 sensors
- Wattmetric Ground Fault Protection

RECORDERS

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

LOGIC

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

INTERCONNECTION PACKAGE

The comprehensive interconnection package is summarized within one menu:

- Non-discriminating active power direction depending load shedding
- FRT (LVRT): Settable FRT-Profiles, optional AR coordinated
- QV-Protection: Undervoltage-Reactive Power protection
- Automatic Reconnection
- Considerabely frequency protection package: Six elements configurable as f<, f>, df/dt (ROCOF), Vector Surge
- CB-Intertripping
- Synch Check options (generator-to-mains, mains-to-mains)
- Active power flow direction based non-discriminating loadsharing

BACKUP PROTECTION

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

PC TOOLS

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

COMMISSIONING SUPPORT

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

COMMUNICATION OPTIONS

- IEC 61850
- Profibus DP
- Modbus RTU and/or Modbus TCP assignable registers e.g. for Retrofit
- IEC 60870-5-103
- IEC60870-5-104
- DNP 3.0 (RTU, TCP, UDP)
- SCADApter for Retrofit

IT SECURITY

- Menu for the activation of BDEW-Whitepaper-compliant security settings
- hardened interfaces
- encrypted communication
- IT Security Logger
- Syslog (to centralized server)
- Encrypted connection with Smart view

CONTROL

- Up to six breakers (or isolators/ grounding switches)
- Breaker wear

TIME SYNCHRONISATION

- SNTP, IRIG-B00X, Modbus, DNP 3.0, IEC60870-5-103/-104

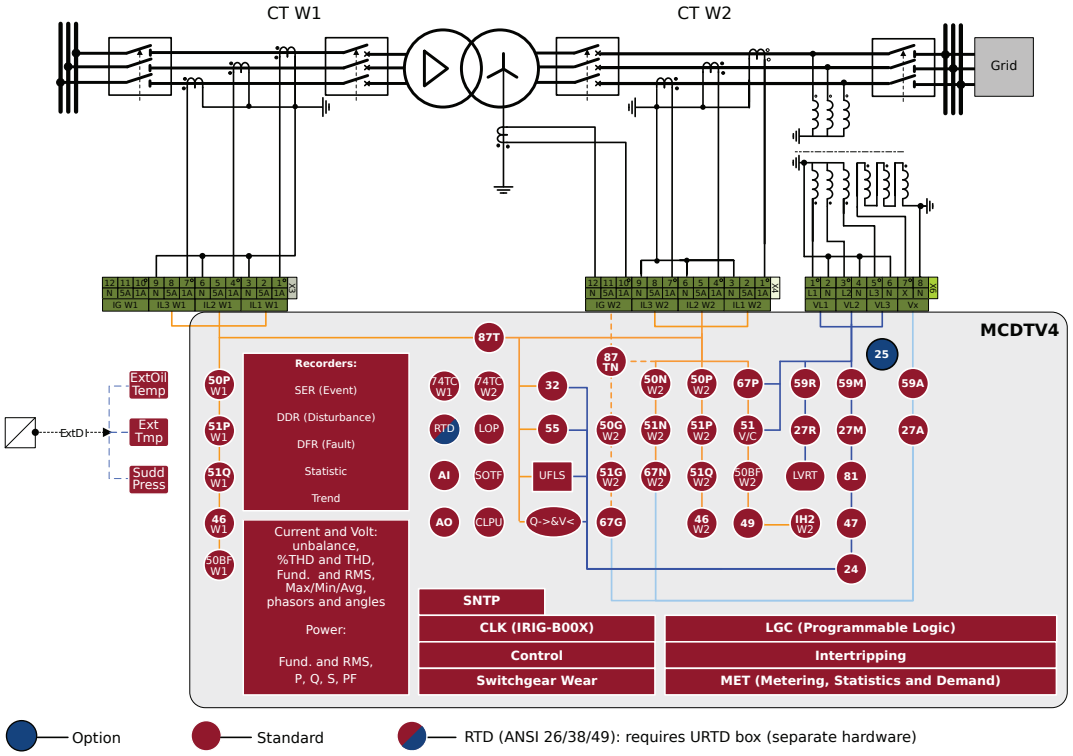
Released

FUNCTIONAL OVERVIEW

	Elements	ANSI
Protective Functions		
Transformator differential protection, Id>, Id>>	2	87T
Restricted earth fault IdE>, IdE>>	4	87TN / 64REF
I, time overcurrent and short circuit protection Tremendous reset options (instantaneous, definite time, reset characteristics according to IEC and ANSI)	6	50P, 51P, 67P
Voltage controlled overcurrent protection by means of adaptive parameters Voltage dependent overcurrent protection Negative phase sequence overcurrent protection		51C 51V 51Q
I2>, unbalanced load protection with evaluation of the negative phase sequence currents	2	46
ThR, overload protection with thermal replica and separate pick-up values for alarm and trip functions	1	49
IH2/In, inrush detection with evaluation of the 2nd harmonic	2	Inrush
IG, earth overcurrent and short circuit protection, all elements can be configured for directional (multi-polarising) or non-directional supervision. Multiple reset options (instantaneous, definite time, reset characteristics according to IEC and ANSI)	4	50N/G, 51N/G, 67N/G
IE, sensitive wattmetric earth overcurrent- and short circuit trip, all steps directional or non-directional	4	50Ns, 51Ns, 67Ns
V<, V>, V(t)<, under- and overvoltage protection, time dependent undervoltage protection	6	27, 59
Voltage asymmetry supervision (V012) V1, under and overvoltage in positive phase sequence system V2, overvoltage in negative phase sequence system	6	47
Each of the six frequency protection elements can be used as: f<, f>, df, dt, ROCOF, DF/DT, vector surge, ...	6	81U/O, 81R, 78
VX, residual voltage protection or bus bar voltage for Synch Check	2	27A, 59A, 59N
ExP, External alarm and trip functions	4	
Ext Sudd Press: Embedding sudden pressure via Digital Input	1	
Ext Temp Superv: Embedding external temperature supervision via Digital Input	3	
Ext Oil Temp: Embedding external oil temperature via Digital Input	1	
PQS, Power protection	6	32, 37
PF, Power factor	2	55
LVRT (FRT- Low Voltage Ride Through including optional controlled by AR-feature)	27 (t)	27 (t, AR)
Q(V) Protection (undervolt. dep. directional reactive power protection with reclosing disengaging)		
UFLS (non-discriminating active power direction depending load shedding)		
10-Minutes-Mean-Square-Sliding Supervision: adjustable according to VDE-AR 4105		
Synch Check		25
Volts / Hertz	2	24
RTD temperature supervision via optional RTD-Box with 12 sensors		26
Control and Logic		
Control: Position indication, supervision time management and interlockings for up to 6 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	2	50BF / 62BF
TCS, trip circuit supervision	2	74TC
LOP, loss of potential	1	60FL
FF, fuse failure protection via digital input	1	60FL
CTS, current transformer supervision	2	60L
CLPU, cold load pickup	1	
SOTF, switch onto fault	1	
THD supervision		
Breaker wear with programmable wear curves		
Recorders: Disturbance recorder, fault recorder, event recorder, trend recorder		

The protective functions of the MCDTV4 have been extended to meet the requirements of VDE-AR-N-4110:2018.

FUNCTIONAL OVERVIEW IN ANSI FORM



APPROVALS

certified regarding UL508 (Industrial Controls)

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

Type tested according to IEC60255-1

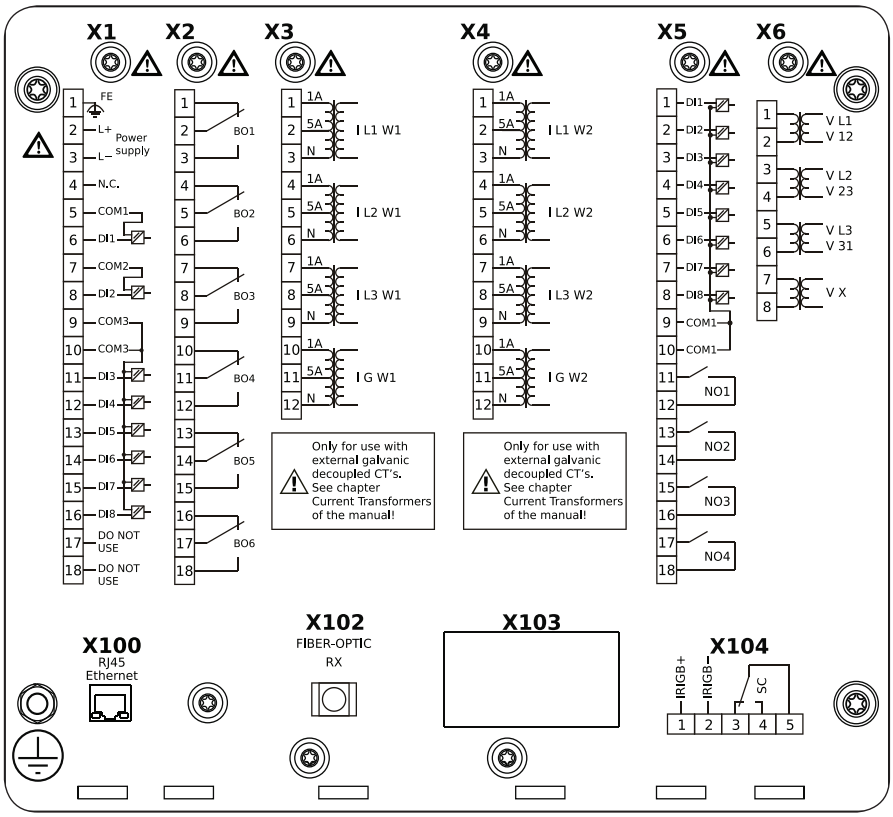
certified by EAC (Eurasian Conformity)

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

complies with ANSI C37.90-2005

complies with „Engineering Recommendation G99, Issue 1, Amendment 3, May 2018"

CONNECTIONS *(EXAMPLE)*



MCDTV4 | TRANSFORMER DIFFERENTIAL PROTECTION

ORDER FORM MCDTV4

Directional Transformer Differential Protection	MCDTV4	-2				
Version 2 with USB, enhanced communication and user options						
Digital Inputs	**Binary output relays**	**Analog Inputs/Outputs**	**Housing**	**Large Display**		
16	11	0/0	B2	X	A	
8	11	2/2	B2	X	B	
Hardware variant 2						
Phase Current 5 A/1 A, 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						
Housing suitable for door mounting						A
Housing suitable for 19" rack mounting **						B
Communication protocol						
Without protocol						A
Modbus RTU, IEC60870-5-103, DNP3.0 RTU | *RS485/terminals*						B*
Modbus TCP, DNP3.0 TCP/UDP, IEC 60870-5-104 | *Ethernet 100 MB/RJ45*						C*
Profibus-DP | *optic fiber/ST-connector*						D*
Profibus-DP | *RS485/D-SUB*						E*
Modbus RTU, IEC60870-5-103, DNP3.0 RTU | *optic fiber/ST-connector*						F*
Modbus RTU, IEC60870-5-103, DNP3.0 RTU | *RS485/D-SUB*						G*
IEC61850, Modbus TCP, DNP3.0 TCP/UDP, IEC 60870-5-104 | *Ethernet 100MB/RJ45*						H*
IEC60870-5-103, Modbus RTU, DNP3.0 RTU | *RS485/terminals* Modbus TCP, DNP3.0 TCP/UDP, IEC60870-5-104 | *Ethernet 100 MB/RJ45*						I*
IEC61850, Modbus TCP, DNP3.0 TCP/UDP, IEC 60870-5-104 | *Optical Ethernet 100MB/LC duplex connector*						K*
Modbus TCP, DNP3.0 TCP/UDP, IEC 60870-5-104 | *Optical Ethernet 100MB/LC duplex connector*						L*
IEC60870-5-103, Modbus RTU, DNP3.0 RTU | *RS485/terminals* IEC61850, Modbus TCP, DNP3.0 TCP/UDP, IEC60870-5-104 | *Ethernet 100 MB/RJ45*						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	8 (1 A and 5 A) with automatic CT Disconnect
Voltage inputs	4 (0 … 800 V) or 4 (0 … 300 V)
Digital Inputs	Switching thresholds adjustable via software
Analog Inputs (Type B)	0 … 20mA / 4 … 20mA / 0 … 10V
Analog Outputs (Type B)	0 … 20mA / 4 … 20mA / 0 … 10V
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 × 173 mm × 208 mm 8.374 in. × 6.811 in. × 8.189 in. Door mounting 212.7 mm × 183 mm × 208 mm 8.374 in. × 7.205 in. × 8.189 in.
Weight (max. components)	approx. 4.7 kg / 10.36 lb

19" Variants Available! **

http://wwdmanuals.com/hpt-2

CONTACT:

North & Central America
Phone: +1 970 962 7272
+1 208 278 3370
E-mail: SalesPGD_NAandCA@woodward.com

South America
Phone: +55 19 3708 4760
E-mail: SalesPGD_SA@woodward.com

Europe
Phone (Kempen): +49 2152 145 331
Phone (Stuttgart): +49 711 78954 510
E-mail: SalesPGD_EMEA@woodward.com

Middle East & Africa
Phone: +971 2 678 4424
E-mail: SalesPGD_EMEA@woodward.com

Russia
Phone: +49 711 78954 515
E-mail: SalesPGD_EMEA@woodward.com

China
Phone: +86 512 8818 5515
E-mail: SalesPGD_CHINA@woodward.com

India
Phone: +91 124 4399 500
E-mail: Sales_India@woodward.com

ASEAN & Oceania
Phone: +49 711 78954 510
E-mail: SalesPGD_ASEAN@woodward.com

For more information please contact:

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