Released

WOODWARD

HighPROTEC-2 | PROTECTION TECHNOLOGY MADE SIMPLE

MCDLV4-2 | CABLE AND LINE DIFFERENTIAL PROTECTION SYSTEM

New Features

- Line Differential
- In-zone Transformer Differential
- Remote Parameter Setting
- Remote Monitoring
- Transfer Signals
- Transfer Trips
- Enhanced Security Features

APPLICATION

The MCDLV4 protection system protects cables and lines up to 24 km.
The system is able to replace up to six protection devices.

2 Cable and Line Differential Devices
+ 2 Directional Feeder Backup Devices
+ 1 In-Zone Transformer Differential Device
+ 1 Mains Decoupling Device

= 6 devices combined in one system

CABLE AND LINE DIFFERENTIAL

- Protection for cables and lines up to 24 km

DIRECTIONAL FEEDER BACKUP [1]

- Six elements phase overcurrent protection directional and non-directional (ANSI/IEC/51C/51V)
- Four elements earth fault protection [2] non-directional or directional (multi-polarising)
- Two elements unbalanced load protection
- Voltage protection [2] six elements selectable: V<, V>
- Six elements unbalanced voltage supervision
- Flexible Fourth Voltage measuring input [2] 2 elements VE> or VX (for synch-check)
- Each of the six elements frequency protection can be used as: f<, f>, ROCOF, vector surge...
- Six elements power protection each can be used as: P>, P<, Pr, Q>, Q<, Qr, S>, S<
- Two elements power factor (PF)

IN-ZONE TRANSFORMER DIFFERENTIAL

- Full Differential Protection for Transfomers within the line/cable

INTERCONNECTION/ MAINS DECOUPLING

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
- Frequency protection: Six elements configurable as f<, f>, df/dt (ROCOF), Vector Surge
- CB-Intertripping
- Synch Check (Generator to mains, mains-to-mains), options e.g. to switch onto dead bus

TRANSFER SIGNALS AND TRANSFER TRIPS

- Up to 16 digital signals and 4 trips can be transferred via the inter-device communication. Copper wiring is not longer required this way.

RECORDERS

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

IT SECURITY

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

LOCAL AND REMOTE COMMISSIONING SUPPORT

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

COMMUNICATION OPTIONS

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

LOGIC

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

TIME SYNCHRONISATION

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

PC TOOLS

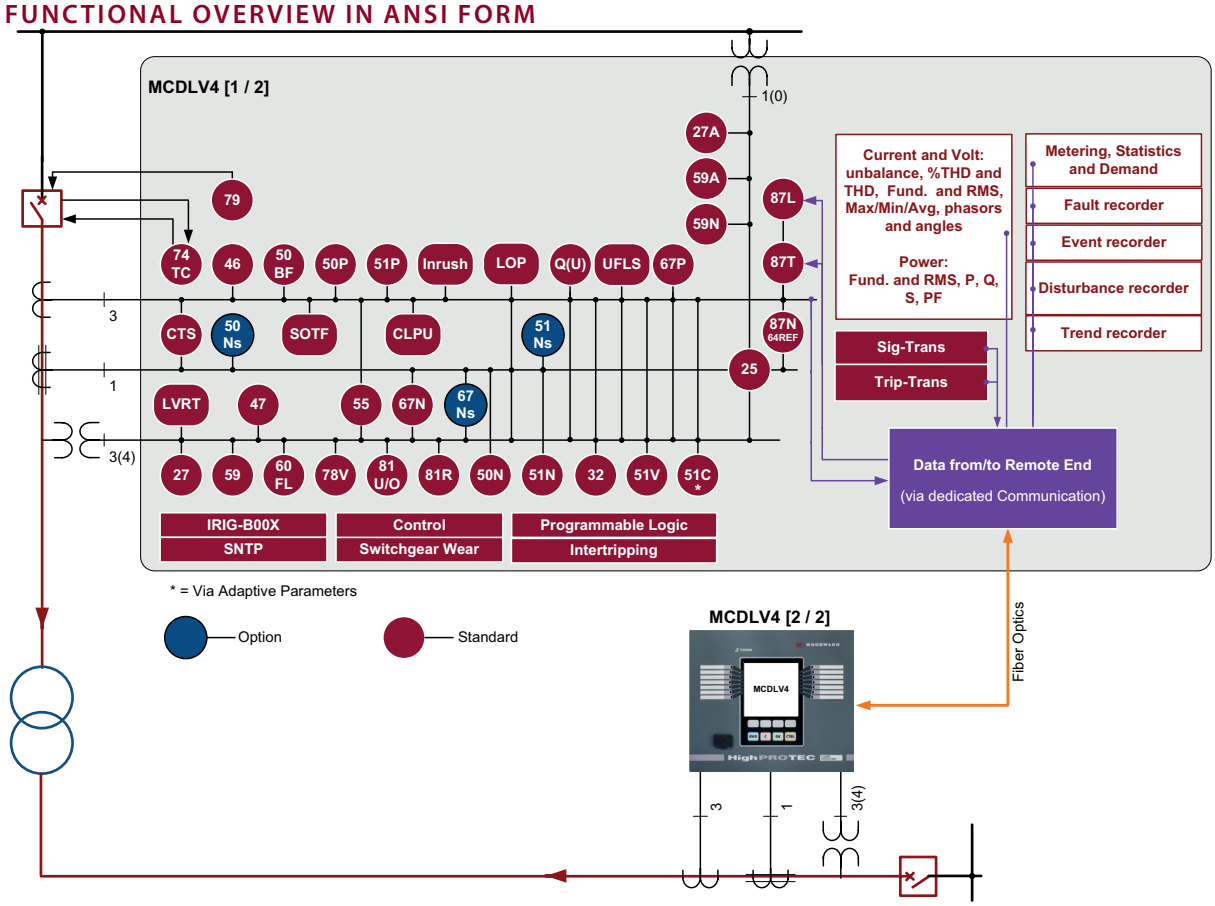
- Setting and analyzing software Smart view for free
- Including page editor to design own pages

[1] DFT, True RMS or I2 based
[2] DFT or True RMS based

FUNCTIONAL OVERVIEW

	Elements	ANSI
Protective Functions		
Cable and Line differential protection	1	87L
In-Zone Transformer differential protection	1	87T
I, time overcurrent and short circuit protection, all elements can be configured for directional or non-directional supervision. Multiple 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
IB, 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	1	Inrush
IG, earth overcurrent and short circuit protection, all elements can be configured for directional (multi-polarising) or non-directional supervision. Tremendous reset options (instantaneous, definite time, reset characteristics according to IEC and ANSI).	4	50N, 51N, 67N
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< fs, df, dt, ROCOF, DF/DT, vector surge, ...	6	81U/O, 81R, 78
VX, residual voltage protection or bus bar voltage for Synch Check	2	25 or 59N
AR, automatic reclosing	1	79
ExP, External alarm and trip functions	4	
PQS, Power protection	6	32, 37
PF, Power factor	2	55
FRT (optional coordination with AR-feature)	27 (t)	27 (t, AR)
Q(V) Protection (undervolt. dep. directional reactive power protection)	1	
Reconnection Module	2	
UFLS (non-discriminating active power direction depending load shedding)	1	
10-Minutes-Mean-Square-Sliding Supervision: adjustable according to VDE-AR 4105	1	
Synch Check	1	25
V/f (Overexitation)	2	24
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	1	50BF
TCS, trip circuit supervision	1	74TC
LOP, loss of potential	1	60FL
FF, fuse failure protection via digital input	1	60FL
CTS, current transformer supervision	1	60L
CLPU, cold load pickup	1	
SOTF, switch onto fault	1	
Demand management and peak value supervision (current and power)	1	
THD supervision	1	
Breaker wear with programmable wear curves	1 / Bkr	
Recorders: Disturbance recorder, fault recorder, event recorder, trend recorder	1	

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 regardingIEC 60255-1 and regarding IEC 61850

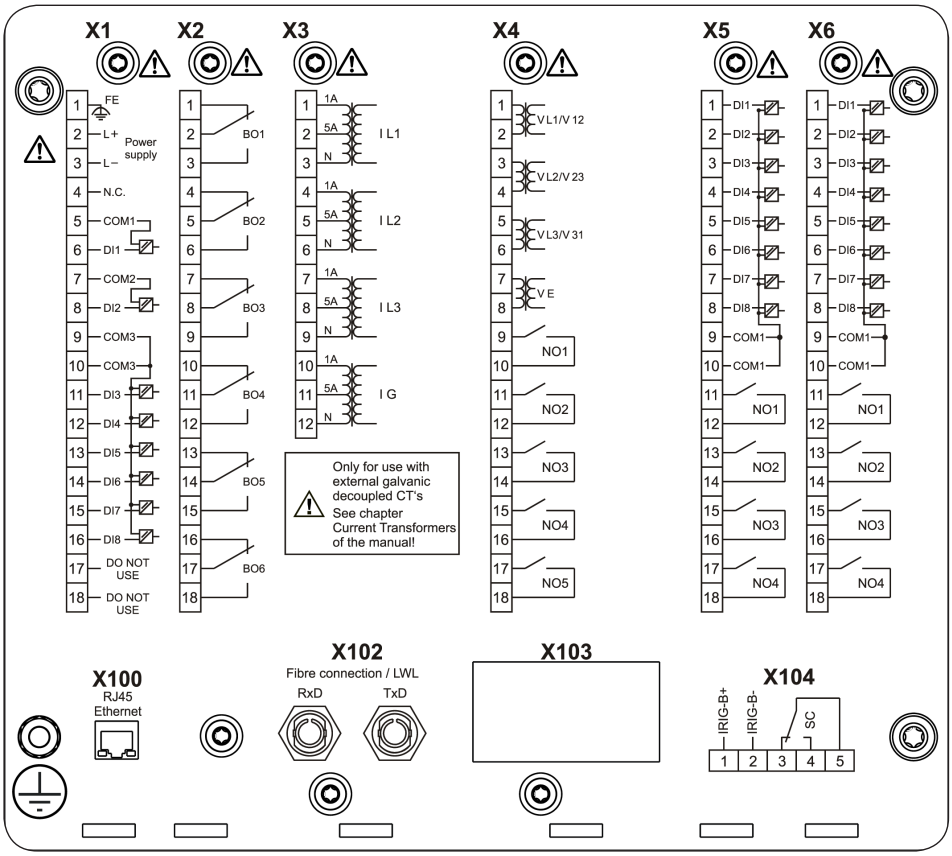
certified regarding „BDEW-Richtlinie für Erzeugungsanlagen am Mittelspannungsnetz", Ausgabe Juni 2008 (German grid code standard)

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

complies with ANSI C37.90-2005

complies with „Engineering Recommendation G59, Issue 3, Amendment 2, September 2015"

CONNECTIONS *(EXAMPLE)*



Released

ORDER FORM MCDLV4-2

Line differential protection					MCDLV4	-2				
Version 2 with USB, enhanced communication and user options										
Voltage measuring	**Digital Inputs**	**Binary output relays**	**Housing**	**Large display**						
X	8	7	B2	X		A				
X	16	13	B2	X		D				
X	24	20	B2	X		E				
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		
Interdevice Communication										
LC duplex connector, mono mode (up to 24 km), multi mode (up to 4 km)									0	
ST connector, BFOC2.5, multi mode (up to 2 km)									1	
Communication protocol										
Without protocol										A
Modbus RTU, IEC60870-5-103, DNP3.0 RTU | *RS485/terminals*										B*
Modbus TCP, DNP3.0 TCP/UDP | *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 | *Ethernet 100MB/RJ45*										H*
IEC60870-5-103, Modbus RTU, DNP3.0 RTU | *RS485/terminals* Modbus TCP, DNP3.0 TCP/UDP | *Ethernet 100 MB/RJ45*										I*
IEC61850, Modbus TCP, DNP3.0 TCP/UDP | *Optical Ethernet 100MB/LC duplex connector*										K*
Modbus TCP, DNP3.0 TCP/UDP | *Optical Ethernet 100MB/LC duplex connector*										L*
IEC60870-5-103, Modbus RTU, DNP3.0 RTU | *RS485/terminals* IEC61850, Modbus TCP, DNP3.0 TCP/UDP | *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	4 (1 A and 5 A) with automatic CT Disconnect
Voltage inputs	4 (0–800 V, or 0–300 V for Type "E" with enhanced digital inputs and outputs)
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 × 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. 4.2 kg / 9.259 lb

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:

© Woodward
All Rights Reserved | 02/2018