

PROTECTION MADE SIMPLE.

High PROTEC

MCDLV4 LINE DIFFERENTIAL PROTECTION

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

The protection functions of the MCDLV4 have been adapted to comply with the requirements of the VDE-AR-N-4110:2018.

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)
- ▶ Wattmetric Ground Fault Protection
- ▶ Two elements unbalanced load protection
- ▶ Voltage protection ⁽²⁾ six elements selectable: V<, V>
- ▶ Six elements unbalanced voltage supervision
- ▶ Flexible 4th Voltage measuring input ⁽²⁾ 2 elements VE> or VX (for synchro-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 Transformers within the line/cable

Transfer Signals and Transfer Trips

- ▶ Up to 16 digital signals and 4 trips can be transferred via the inter-device communication. Copper wiring is no longer required this way.

Interconnection Mains Decoupling

- ▶ 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: 6 elements configurable as f<, f>, df/dt (ROCOF), vector surge
- ▶ CB-Intertripping
- ▶ Synchro-check (Generator to mains, mains-to-mains), options e.g. to switch onto dead bus

Recorders

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

PC Tools

- ▶ Setting and analyzing software Smart view free of charge
- ▶ Including page editor to design own Control pages
- ▶ SCADAptor to re-assign datapoints for Retrofit projects: Modbus, Profibus, IEC 60870-5-103/-104

Control

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

Communication Options

- ▶ IEC 61850, Profibus DP
- ▶ Modbus RTU and/or Modbus TCP
- ▶ IEC 60870-5-103/-104
- ▶ DNP 3.0 (RTU, TCP, UDP)
- ▶ SCADAptor for Retrofit



New Features - Release 3.7

- ▶ VDE-AR-N 4110: VDE-AR-N 4120
- ▶ G99 Issue 1 Amendment 6
- ▶ Improved frequency and ROCOF precision
- ▶ Improved CT Saturation Stabilization
- ▶ Improved design of the PC tools
- ▶ Configurable SCADA protocols: Modbus, Profibus, IEC 60870-5-103/-104, DNP3

All HighPROTEC devices have been type tested and fully certified by KEMA Laboratories (IEC 60255-1:2009).

Commissioning Support

- ▶ Unmanned remote end settings
- ▶ 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, voltage
- ▶ Graphical display of tripping characteristics
- ▶ 8 languages selectable within the relay

Cyber Security

- ▶ Menu for the activation of security settings (e.g. hardening of interfaces)
- ▶ Security Logger
- ▶ Centralized Security Logs (Syslog)
- ▶ Encrypted Connection Smart view - Device
- ▶ Device specific certificates (No man in the middle attacks)
- ▶ Multi-Password-Level

Logic

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

Time Synchronisation

- ▶ SNTP, IRIG-B00X, Modbus, DNP 3.0, IEC 60870-5-103/-104

⁽¹⁾ DFT, True RMS or I2 based

⁽²⁾ DFT or True RMS based

Functional Overview

Protective Functions	ANSI	IEC 61850
Cable and Line differential protection	1	87L PDIF
In-Zone Transformer differential protection	1	87T PDIF
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 PTOC
Voltage controlled overcurrent protection by means of adaptive parameters		51C
Voltage dependent overcurrent protection		51V
Negative phase sequence overcurrent protection		51Q
I2>, unbalanced load protection with evaluation of the negative phase sequence currents	2	46 PTOC
IB, overload protection with thermal replica and separate pick-up values for alarm and trip functions	1	49 PTTR
IH2/In, inrush detection with evaluation of the 2nd harmonic	1	Inrush PHAR
IG, earth overcurrent and short circuit protection, all elements can be configured for directional (multi-polarising) or non-directional supervision. Various reset options (instantaneous, definite time, reset characteristics according to IEC and ANSI).	4	50N/G, 51N/G, 67N/G PTOC
V<, V>, V(t)<, under- and overvoltage protection, time dependent undervoltage protection	6	27, 59 PTOV, PTUV
Voltage asymmetry supervision (V012)		
V1, under and overvoltage in positive phase sequence system	6	47 PTOV, PTUV
V2, overvoltage in negative phase sequence system		
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 PFRC, PPAM
VX, residual voltage protection or bus bar voltage for Synch Check	2	27A/N, 59A/N PTOV, PTUV
AR, automatic reclosing	1	79 RREC
ExP, External alarm and trip functions	4	GAPC
PQS, Power protection	6	32, 37 PDOP, PDUP
PF, Power factor	2	55 PUPF
FRT (optional coordination with AR-feature)	27(t)	27 (t, AR)
Q(V) Protection (undervolt. dep. directional reactive power protection)	1	PTUV
Reconnection Module	2	
UFLS (non-discriminating active power direction depending load shedding)	1	PFRC
10-Minutes-Mean-Square-Sliding Supervision: adjustable according to VDE-AR 4105	1	
Synch Check	1	25 RSYN
V/f (Overexcitation)	2	24 PVPH
Control and Logic		
Control: Position indication, supervision time management and interlockings for up to 6 breakers		CILO, CSWI, XCBR, XSWI
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 RBRF
TCS, trip circuit supervision	1	74TC SCBR
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	PSOF
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	RDRE

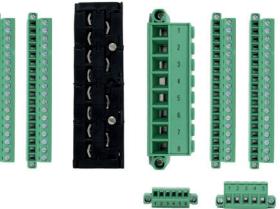
19 "Variants Available!"

See Order Form on page 4,
housing type "rack mounting"



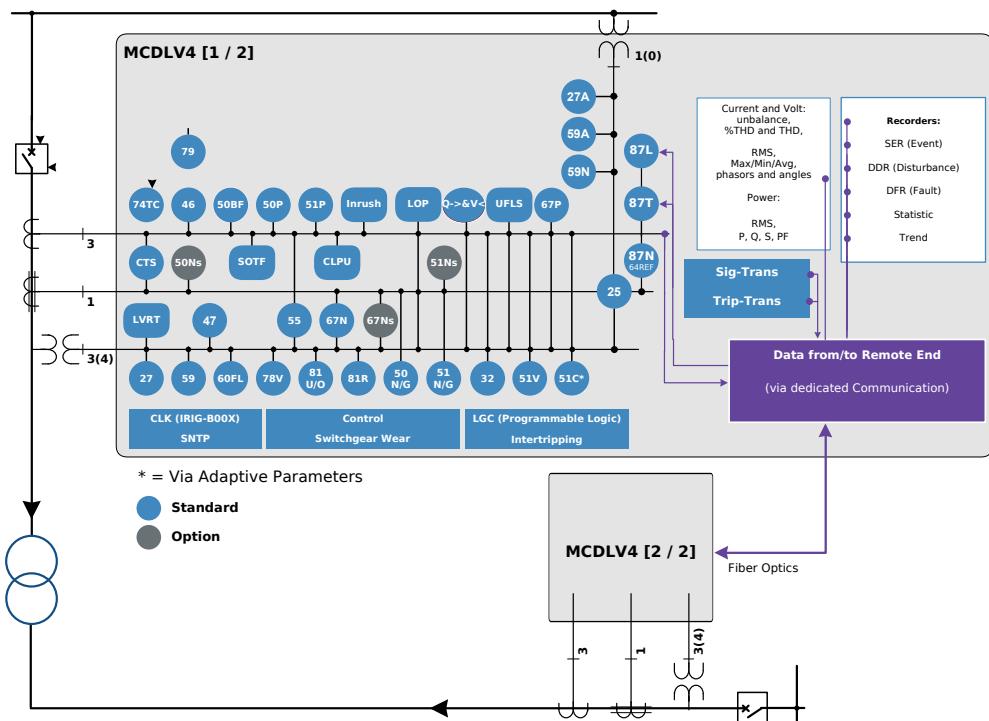
<https://docs.SEGelectronics.de/hpt-2>

Terminals Available Separately!

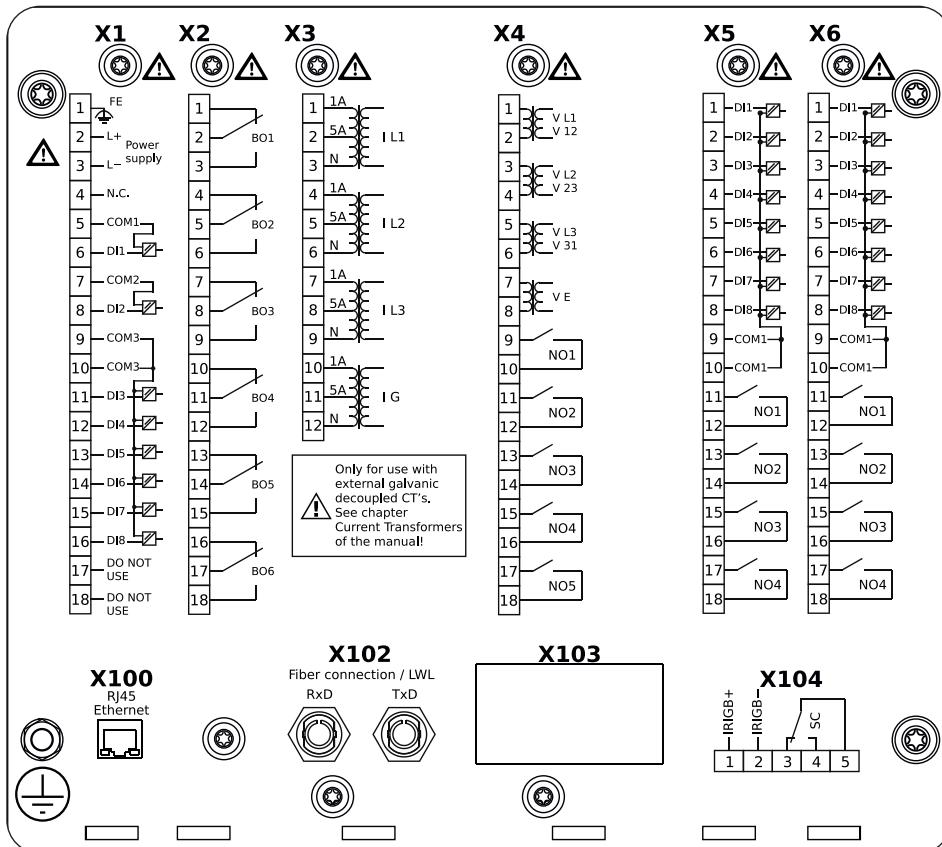


Order codes HPTTERMKIT-1 ... -5
For MCDLV4-2A/D: HPTTERMKIT-3
The terminal kits allow for making all required wirings in advance, thus speeding up the installation and commissioning work.

Functional Overview in ANSI / IEEE C37.2 Form



Connections (Example)



Approvals / Standards



certified regarding UL508
(Industrial Controls)



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



certified by EAC
(Eurasian Conformity)
Type tested and certified by KEMA
Laboratories in accordance with the
complete type test requirements of
IEC 60255-1:2009.

KEMA Labs



Component certificate regarding the
German grid code standard
VDE-AR-N 4110 (2018-11)

Complies with G99 Issue 1 Am. 6.

Complies with IEEE 1547-2003.

Amended by IEEE 1547a-2014.

Complies with ANSI C37.90-2005.

PROTECTION MADE SIMPLE.

Order Form MCDLV4

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
X	16	13	B2	X
X	24	20	B2	X
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				
Housing suitable for door mounting				A
Housing suitable for 19" rack 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, 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				I*
Modbus TCP, DNP3.0 TCP/UDP, IEC60870-5-104 Ethernet 100 MB/RJ45				
IEC61850, Modb. TCP, DNP3.0 TCP/UDP, IEC 60870-5-104 Opt. Eth. 100MB/LC duplex conn.				K*
Modbus TCP, DNP3.0 TCP/UDP, IEC 60870-5-104 Opt. Ethernet 100MB/LC duplex connector				L*
IEC60870-5-103, Modbus RTU, DNP3.0 RTU RS485/terminals				T*
IEC61850, Modbus TCP, DNP3.0 TCP/UDP, IEC60870-5-104 Ethernet 100 MB/RJ45				
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 can be used without extra costs.

Current inputs

4 (1 A and 5 A) with automatic CT Disconnect

Voltage inputs

4 (0 ... 800 V, for variants MCDLV4-2A and MCDLV4-2D)

or 4 (0 ... 300 V, for variant MCDLV4-2E)

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

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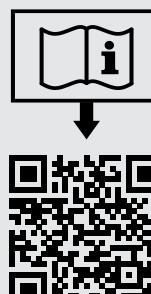
E-Mail: support@SEGelectronics.de

Find Your Local Distributor on

<http://www.SEGelectronics.de>

Technical Documents:

<https://docs.SEGelectronics.de/mcdlv4-2>



For more information please contact: