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

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 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)

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 *5mHz from 45-55 Hz
- CB-Intertropping
- 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)
- Security Logger
- Self-monitoring; Syslog
- Encrypted connection with smart view

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/-104
- IEC 60870-5-104
- DNP 3.0 (RTU, TCP, UDP)
- SCADApter for Retrofit

LOGIC

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

TIME SYNCHRONISATION

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

PC TOOLS

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

### Protective Functions

<table>
<thead>
<tr>
<th>Elements</th>
<th>ANSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>87L</td>
</tr>
<tr>
<td>1</td>
<td>87T</td>
</tr>
<tr>
<td>6</td>
<td>50P, 51P, 67P</td>
</tr>
<tr>
<td>51C</td>
<td>51V</td>
</tr>
<tr>
<td>51Q</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>81U/O, 81R, 78</td>
</tr>
<tr>
<td>25 or 59N</td>
<td></td>
</tr>
<tr>
<td>79</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>32, 37</td>
</tr>
<tr>
<td>2</td>
<td>55</td>
</tr>
<tr>
<td>27 (t)</td>
<td>27 (t, AR)</td>
</tr>
<tr>
<td>81U/O, 81R, 78</td>
<td></td>
</tr>
</tbody>
</table>

### 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

<table>
<thead>
<tr>
<th>Elements</th>
<th>ANSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50BF</td>
</tr>
<tr>
<td>1</td>
<td>74TC</td>
</tr>
<tr>
<td>1</td>
<td>60FL</td>
</tr>
<tr>
<td>1</td>
<td>60FL</td>
</tr>
<tr>
<td>1</td>
<td>60L</td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1 / Bkr</td>
<td></td>
</tr>
</tbody>
</table>

### Recorders

- Disturbance recorder, fault recorder, event recorder, trend recorder
FUNCTIONAL OVERVIEW IN ANSI FORM

MCDLV4 [1 / 2]

CLP (MIC-508R) | Control | LDC (Programmable Logic) | Interlocking

* = Via Adaptive Parameters

Option
Standard

MCDLV4 [2 / 2]

Data from/to Remote End
(via dedicated Communication)

CONNECTIONS (EXAMPLE)

X1

X2

X3

X4

X5

X6

Only for use with external galvanic decoupled CF
See chapter Current Transformers of the manual

APPROVALS

certified regarding UL508 (Industrial Controls)
certified regarding CSA-C22.2 No. 14 (Industrial Controls)
certified by EAC (Eurasian Conformity)
Type tested regarding IEC 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 4, July 2018“
# MCDLV4 | Cable and Line Differential Protection System

## Order Form MCDLV4

### Line differential protection MCDLV4-2

<table>
<thead>
<tr>
<th>Voltage measuring</th>
<th>Digital Inputs</th>
<th>Binary output relays</th>
<th>Housing</th>
<th>Large display</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>8</td>
<td>7</td>
<td>B2</td>
<td>X</td>
</tr>
<tr>
<td>X</td>
<td>16</td>
<td>13</td>
<td>B2</td>
<td>X</td>
</tr>
<tr>
<td>X</td>
<td>24</td>
<td>20</td>
<td>B2</td>
<td>X</td>
</tr>
</tbody>
</table>

**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, IEC 60870-5-104 | Ethernet 100 MB/RJ45: C*
- Profinet-IP | optic fiber/ST-connector: D*
- Profinet-IP | 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 100 MB/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: J*
- IEC61850, Modbus TCP, DNP3.0 TCP/UDP, IEC 60870-5-104 | Optical Ethernet 100 MB/LC duplex connector: K*
- Modbus TCP, DNP3.0 TCP/UDP, IEC 60870-5-104 | Optical Ethernet 100 MB/LC duplex connector: L*
- IEC60870-5-103, Modbus RTU, DNP3.0 RTU | RS485/terminals: T*
- IEC61850, Modbus TCP, DNP3.0 TCP/UDP, IEC 60870-5-104 | 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.

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_{cc} = 270 V_{cc} / 48 V_{cc} – 230 V_{cc} (~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 6.811 in. x 8.189 in.
- Door mounting: 212.7 mm x 183 mm x 208 mm
- 8.374 in. x 7.205 in. x 8.189 in.

### Weight (max. components)
- approx. 4.2 kg / 9.259 lb

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