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 an interconnection package that 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.

**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
  - Considerably 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

**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

**COMMUNICATION OPTIONS**
- IEC 61850
- Profinet
- Modbus RTU and/or Modbus TCP
-Assignable registers e.g. for Retrofit
- IEC 60870-5-103
- IEC 60870-5-104
- DNP 3.0 (RTU, TCP, UDP)
- SCADApert 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
### Protective Functions

<table>
<thead>
<tr>
<th>Elements</th>
<th>ANSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformer differential protection, Id&gt;, Id&gt;&gt;</td>
<td>2</td>
</tr>
<tr>
<td>Restricted earth fault IdE&gt;, IdE&gt;&gt;</td>
<td>4</td>
</tr>
<tr>
<td>I, time overcurrent and short circuit protection</td>
<td>6</td>
</tr>
<tr>
<td>Tremendous reset options (instantaneous, definite time, reset characteristics according to IEC and ANSI)</td>
<td>6</td>
</tr>
<tr>
<td>Voltage controlled overcurrent protection by means of adaptive parameters</td>
<td>5</td>
</tr>
<tr>
<td>Voltage dependent overcurrent protection</td>
<td>5</td>
</tr>
<tr>
<td>Negative phase sequence overcurrent protection</td>
<td>5</td>
</tr>
<tr>
<td>I2&gt;, unbalanced load protection with evaluation of the negative phase sequence currents</td>
<td>2</td>
</tr>
<tr>
<td>ThR, overload protection with thermal replica and separate pick-up values for alarm and trip functions</td>
<td>1</td>
</tr>
<tr>
<td>IH2/Iin, inrush detection with evaluation of the 2nd harmonic</td>
<td>2</td>
</tr>
<tr>
<td>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)</td>
<td>4</td>
</tr>
<tr>
<td>IE, sensitive wattmetric earth overcurrent- and short circuit trip, all steps directional or non-directional</td>
<td>4</td>
</tr>
<tr>
<td>Vc, V&gt;, V(t)&lt;, under- and overvoltage protection, time dependent undervoltage protection</td>
<td>6</td>
</tr>
<tr>
<td>Voltage asymmetry supervision (V012)</td>
<td>6</td>
</tr>
<tr>
<td>V1, under and overvoltage in positive phase sequence system</td>
<td>6</td>
</tr>
<tr>
<td>V2, overvoltage in negative phase sequence system</td>
<td>6</td>
</tr>
<tr>
<td>Each of the six frequency protection elements can be used as: f&lt;, f&gt;, df, dt, ROCOF, DF/DT, vector surge, ...</td>
<td>6</td>
</tr>
<tr>
<td>VX, residual voltage protection or bus bar voltage for Synch Check</td>
<td>2</td>
</tr>
<tr>
<td>ExtP, External alarm and trip functions</td>
<td>4</td>
</tr>
<tr>
<td>Ext Temp Superv: Embedding external temperature supervision via Digital Input</td>
<td>3</td>
</tr>
<tr>
<td>Ext Oil Temp: Embedding external oil temperature via Digital Input</td>
<td>1</td>
</tr>
<tr>
<td>PQS, Power protection</td>
<td>6</td>
</tr>
<tr>
<td>PF, Power factor</td>
<td>2</td>
</tr>
<tr>
<td>LVRT (FRT-Low Voltage Ride Through including optional controlled by AR-feature)</td>
<td>27 (t)</td>
</tr>
<tr>
<td>Q(V) Protection (undervolt. dep. directional reactive power protection with reclosing disengaging)</td>
<td>27 (t)</td>
</tr>
<tr>
<td>UFLS (non-discriminating active power direction depending load shedding)</td>
<td>27 (t)</td>
</tr>
<tr>
<td>10-Minutes-Mean-Square-Sliding Supervision: adjustable according to VDE-AR 4105</td>
<td>27 (t)</td>
</tr>
<tr>
<td>Synch Check</td>
<td>25</td>
</tr>
<tr>
<td>Volts / Hertz</td>
<td>2</td>
</tr>
<tr>
<td>RTD temperature supervision via optional RTD-Box with 12 sensors</td>
<td>26</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>CBF, circuit breaker failure protection</td>
<td>2</td>
</tr>
<tr>
<td>TCS, trip circuit supervision</td>
<td>2</td>
</tr>
<tr>
<td>LOP, loss of potential</td>
<td>1</td>
</tr>
<tr>
<td>FF, fuse failure protection via digital input</td>
<td>1</td>
</tr>
<tr>
<td>CTS, current transformer supervision</td>
<td>2</td>
</tr>
<tr>
<td>CLPU, cold load pickup</td>
<td>1</td>
</tr>
<tr>
<td>SOTF, switch onto fault</td>
<td>1</td>
</tr>
<tr>
<td>THD supervision</td>
<td>1</td>
</tr>
</tbody>
</table>

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.
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
# Directional Transformer Differential Protection

<table>
<thead>
<tr>
<th>Digital Inputs</th>
<th>Binary output relays</th>
<th>Analog Inputs/Outputs</th>
<th>Housing</th>
<th>Large Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>11</td>
<td>0/0</td>
<td>B2</td>
<td>X</td>
</tr>
<tr>
<td>8</td>
<td>11</td>
<td>2/2</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, 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, EIC60870-5-103, DNP3.0 RTU | RS485/terminals: B*
- Modbus TCP, DNP3.0 TCP/UDP, IEC 60870-5-104 | Ethernet 100 MB/RAJ45: C*
- Profinbus-DP | optic fiber/ST-connector: D*
- Profinbus-DP | RS485/D-SUB: E*
- Modbus RTU, EIC60870-5-103, DNP3.0 RTU | optic fiber/ST-connector: F*
- Modbus RTU, EIC60870-5-103, DNP3.0 RTU | RS485/D-SUB: G*
- EIC61850, Modbus TCP, DNP3.0 TCP/UDP, IEC 60870-5-104 | Ethernet 100 MB/RAJ45: H*
- EIC60870-5-103, Modbus RTU, DNP3.0 RTU | RS485/terminals: I*
- Modbus TCP, DNP3.0 TCP/UDP, IEC60870-5-104 | Ethernet 100 MB/RAJ45: J*
- EIC61850, 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*
- EIC60870-5-103, Modbus RTU, DNP3.0 RTU | RS485/terminals: M*
- EIC61850, Modbus TCP, DNP3.0 TCP/UDP, IEC60870-5-104 | Ethernet 100 MB/RAJ45: N*

## 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
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

### Terminals
- 24 Vcc – 270 Vcc / 48 Vcc – 230 Vcc (~20/+10%)
- All terminals plug type

### Type of enclosure
IP54

### Dimensions of housing

<table>
<thead>
<tr>
<th>(W x H x D)</th>
<th>mm</th>
<th>in</th>
</tr>
</thead>
<tbody>
<tr>
<td>19&quot; flush mounting</td>
<td>212.7 x 173 x 208</td>
<td>8.374 x 6.811 x 8.189</td>
</tr>
<tr>
<td>Door mounting</td>
<td>212.7 x 183 x 208</td>
<td>8.374 x 7.205 x 8.189</td>
</tr>
</tbody>
</table>

### Weight (max. components)
approx. 4.7 kg / 10.36 lb

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