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.

**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/S1C/S1V)
- Multiple power elements (Pr,PQ,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

**INTERCONNECTION PACKAGE**

The comprehensive interconnection package is summarized within one menu:

- FRT (LVRT): Settable FRT-Profiles, optional AR coordinated
- QV-Protection: Undervoltage-Reactive Power protection
- Automatic Reconnection
- Considerably frequency protection package: Six elements configurable as \( f_1, f_2, df/dt \) (ROCOF), Vector Surge
- CB-Intertripping
- Synchro check options (generator-to-mains, mains-to-mains)

**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
- Event recorder
- Trend recorder: 4000 non volatile entries

**COMMISSIONING SUPPORT**

- Intergrated fault simulator: current and voltage
- Copy and compare parameter sets
- Configuration files are convertible
- Forcing and disarming of output relays

**COMMUNICATION OPTIONS**

- IEC61850
- Profibus DP
- Modbus RTU or Modbus TCP
- IEC60870-5-103

**CONTROL**

- Up to six switchgears
- Switchgear wear

**LOGIC**

- Up to 80 logic equations

**TIME SYNCHRONISATION**

- SNTP, IRIG-B00X, Modbus, IEC60870-5-103
FUNCTIONAL OVERVIEW

<table>
<thead>
<tr>
<th>Protective Functions</th>
<th>Elements</th>
<th>ANSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformer differential protection, Id&gt;, Id&gt;&gt;</td>
<td>2</td>
<td>87T</td>
</tr>
<tr>
<td>Restricted earth fault IdE&gt;, IdE&gt;&gt;</td>
<td>4</td>
<td>87TN / 64REF</td>
</tr>
<tr>
<td>I, time overcurrent and short circuit protection</td>
<td>6</td>
<td>50P, 51P, 67P</td>
</tr>
<tr>
<td>Tremendous reset options (instantaneous, definite time, reset characteristics according to IEC and ANSI)</td>
<td>6</td>
<td>51C, 51V, 51Q</td>
</tr>
<tr>
<td>Voltage controlled overcurrent protection by means of adaptive parameters</td>
<td>5</td>
<td>51C, 51V, 51Q</td>
</tr>
<tr>
<td>Voltage dependent overcurrent protection</td>
<td>5</td>
<td>51C, 51V, 51Q</td>
</tr>
<tr>
<td>Negative phase sequence overcurrent protection</td>
<td>5</td>
<td>51C, 51V, 51Q</td>
</tr>
<tr>
<td>Id&gt;, unbalanced load protection with evaluation of the negative phase sequence currents</td>
<td>2</td>
<td>46</td>
</tr>
<tr>
<td>ThR, overload protection with thermal replica and separate pick-up values for alarm and trip functions</td>
<td>1</td>
<td>49</td>
</tr>
<tr>
<td>I2H/In, inrush detection with evaluation of the 2nd harmonic</td>
<td>4</td>
<td>50N, 51N, 67N</td>
</tr>
<tr>
<td>IG, earth overcurrent and short circuit protection, all stages can be configured for directional (multi-polarising) or non-directional supervision. Tremendous reset options (instantaneous, definite time, reset characteristics according to IEC and ANSI)</td>
<td>4</td>
<td>50N, 51N, 67N</td>
</tr>
<tr>
<td>IE, sensitive earth overcurrent- and short circuit trip, all steps directional or non-directional</td>
<td>6</td>
<td>50Ns, 51Ns, 67Ns</td>
</tr>
<tr>
<td>Vc, Vs, V(t)&lt;, under- and overvoltage protection, time dependent undervoltage protection</td>
<td>6</td>
<td>27, 59</td>
</tr>
<tr>
<td>Voltage asymmetry supervision (V012)</td>
<td>6</td>
<td>27A, 59A/59N</td>
</tr>
<tr>
<td>VI, under and overvoltage in positive phase sequence system</td>
<td>6</td>
<td>47</td>
</tr>
<tr>
<td>V2, overvoltage in negative phase sequence system</td>
<td>6</td>
<td>47</td>
</tr>
<tr>
<td>Each of the six frequency protection stages can be used as: f&lt;, f&gt;, df, dr, ROCOF, DF/DT, vector surge, ...</td>
<td>6</td>
<td>81U/O, 81R, 78</td>
</tr>
<tr>
<td>ExP, External alarm and trip functions</td>
<td>2</td>
<td>27A/59A/59N</td>
</tr>
<tr>
<td>Ext Sudd Press: Embedding sudden pressure via Digital Input</td>
<td>2</td>
<td>27A/59A/59N</td>
</tr>
<tr>
<td>Ext Temp Superv: Embedding external temperature supervision via Digital Input</td>
<td>1</td>
<td>27A/59A/59N</td>
</tr>
<tr>
<td>Ext Oil Temp: Embedding external oil temperature via Digital Input</td>
<td>1</td>
<td>27A/59A/59N</td>
</tr>
<tr>
<td>PQS, Power protection</td>
<td>6</td>
<td>32, 37</td>
</tr>
<tr>
<td>PF, Power factor</td>
<td>2</td>
<td>55</td>
</tr>
<tr>
<td>LVRT (FRT- Low Voltage Ride Through including optional controlled by AR-feature)</td>
<td>27 (t)</td>
<td>27 (t, AR)</td>
</tr>
<tr>
<td>Q(V) Protection (undervolt. dep. directional reactive power protection with reclosing disengaging)</td>
<td>27 (t)</td>
<td>27 (t, AR)</td>
</tr>
<tr>
<td>10-Minutes-Mean-Square-Sliding Supervision: adjustable according to VDE-AR 4105</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Synchrocheck</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Volts / Hertz</td>
<td>2</td>
<td>24</td>
</tr>
<tr>
<td>RTD temperature supervision via optional RTD-Box with 12 sensors</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Control and Logic

Control: Position indication, supervision time management and interlockings for up to 6 switchgears

Logic: Up to 80 logic equations, each with 4 inputs, selectable logical gates, timers- and memory- function

<table>
<thead>
<tr>
<th>Supervision Functions</th>
<th>Elements</th>
<th>ANSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBF, circuit breaker failure protection</td>
<td>2</td>
<td>50BF/62BF</td>
</tr>
<tr>
<td>TCS, trip circuit supervision</td>
<td>2</td>
<td>74TC</td>
</tr>
<tr>
<td>LOP, loss of potential</td>
<td>1</td>
<td>60FL</td>
</tr>
<tr>
<td>FF, fuse failure protection via digital input</td>
<td>1</td>
<td>60FL</td>
</tr>
<tr>
<td>CTS, current transformer supervision</td>
<td>2</td>
<td>60L</td>
</tr>
<tr>
<td>CLPU, cold load pickup</td>
<td>1</td>
<td>60L</td>
</tr>
<tr>
<td>SOTF, switch onto fault</td>
<td>1</td>
<td>60L</td>
</tr>
<tr>
<td>THD supervision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switchgear wear with programmable wear curves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recorders: Disturbance recorder, fault recorder, event recorder, trend recorder</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
certified regarding UL508 (Industrial Controls)
certified regarding CSA-C22.2 No. 14 (Industrial Controls)
certified by EAC (Eurasian Conformity)

Type tested according to IEC60255-1
ORDER FORM MCDTV4

Transformer Differential Protection MCDTV4

<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>
<tr>
<td>16</td>
<td>7</td>
<td>4/4</td>
<td>B2</td>
<td>X</td>
</tr>
<tr>
<td>24</td>
<td>11</td>
<td>0/0</td>
<td>B2</td>
<td>X</td>
</tr>
</tbody>
</table>

Hardware variants
- Phase Current 5A/1A, W1/W2 Ground Current 5A/1A
- Phase Current 5A/1A, W1 Sen. Gr. Curr. 5A/1A, W2 Gr. Curr. 5A/1A
- Phase Current 5A/1A, W1 Gr. Curr. 5A/1A, W2 Sen. Gr. Curr. 5A/1A
- Phase Current 5A/1A, W1/W2 Sen. Gr. Curr. 5A/1A

Housing and mounting
- Door mounting
- Door mounting 19" (flush mounting)

Communication protocol
- Without protocol
- Modbus RTU, IEC60870-5-103, RS485/terminals
- Modbus TCP, Ethernet 100 MB / RJ45
- Profinet DP, optic fiber
- Profinet DP, RS485/D-SUB
- Modbus RTU, IEC60870-5-103, optic fiber
- IEC61850, Ethernet 100 MB / RJ45

Available menu languages
- English/German/Russian/Polish/Portuguese/French

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 short-circuiters

Voltage inputs
- 4 (0–800 V) or 4 (0–300 V)

Digital Inputs
- Switching thresholds adjustable via software

Analog Inputs (Version B)
- 0...20mA / 4...20mA / 0...10V

Analog Outputs (Version B)
- 0...20mA / 4...20mA / 0...10V

Power supply
- Wide range power supply
- 24 Vdc - 270 Vdc / 48 VAC - 230 Vdc (-20/+10%)

Terminals
- All terminals plug type

Type of enclosure
- IP54

Dimensions of housing
- 19" flush mounting: 212.7 mm x 173 mm x 208 mm
- Door mounting: 212.7 mm x 183 mm x 208 mm

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

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