The MRMV4 is a protection relay which uses the latest Dual-Core Processor Technology to provide precise and reliable protective functions. Also it is very easy to operate. The MRMV4 provides all necessary functions to protect low and medium voltage motors at all power levels. The protection functions are based on current and voltage measurement and supervise all thermal conditions, motor start sequence, stall and locked rotor, undercurrent and incomplete sequence. Overcurrent functions and earth fault functions are also available as power protection, frequency and voltage elements. The motor operation can be monitored by statistic and trending recorders.

APPLICABLE FOR:

→ Low and high voltage asynchronous motors

ALL INCLUSIVE:

→ All protection features without extra charge
→ Para. setting and evaluation software
→ Disturbance record analysis software

MOTOR PROTECTION

→ Thermal overload protection 49M
→ Locked rotor Protection 51LRS
→ JA1 or Stall protection 51LR
→ Underload protection 37
→ Motor start 48
→ Starts per Hour 66
→ Negative phase sequence (current unbalance) 46
→ Overcurrent/short circuit prot. 50P/51P
→ Earth overcurrent- and short circuit protection 50N/51N
→ Reclosing lockout 86
→ RTD supervision via optional external temperature box (Type MRMV4-B)

ADDITIONAL PROTECTION

→ 6 Overcurrent elements (nondir)
→ 4 Earth Overcurrent elements (nondir)
→ 2 Elements Residual Voltage
→ 4 Over-/Undervoltage elements
→ 6 Frequency elements
→ 6 Power protection elements
→ 2 Power Factor elements
→ Demand Management
→ THD Protection

CONTROL

→ of a switchgear

SUPERVISION FUNCTIONS

→ Breaker Failure, Trip Circuit Superv.
→ Loss of Potential, Switch onto Fault

MOTOR START RECORDER

→ Max. RMS values of phase currents
→ Negative phase sequence currents
→ Start duration
→ Used thermal capacity
→ Successful starts
→ Temperature profile (optional)

TRENDING RECORDER

→ Up to 10 selectable values with a selectable time window like IL1RMS, IL2RMS, IL3RMS, Thermal capacity…

ADDITIONAL HIGHLIGHTS

→ 4 Analog Outputs (Type MRMV4-B)
→ Long starting time for reduced voltage starts
→ Emergency Start
→ Incomplete sequence
→ Anti-backspin time delay
→ Permitted number of cold starts
→ Supervision of starts per hour
→ Mechanical load shedding
→ Zero speed indication via input
→ Motor stop inputs
→ External alarm and trip inputs
→ 4 setting groups.
→ Sine wave generator for testing and fault simulation.

SETTING SUPPORT

→ Copy parameter sets
→ Compare parameter sets
→ Setting files are up and down convertible (across versions)

LOGIC

→ Up to 80 logic equations

COMMUNICATION OPTIONS

→ IEC61850, Profibus DP, Modbus RTU, Modbus TCP, IEC60870-5-103

TIME SYNCHRONISATION

→ SNTP or IRIG-B00X
### Functional Overview

<table>
<thead>
<tr>
<th>Protective Functions</th>
<th>Elements</th>
<th>ANSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>IB, thermal overload protection</td>
<td></td>
<td>49M</td>
</tr>
<tr>
<td>I, time overcurrent and short circuit protection (non-direction)</td>
<td></td>
<td>50P, 51P</td>
</tr>
<tr>
<td>(instantaneous, definite time, characteristics according to IEC60255, ANSI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage controlled overcurrent protection by means of adaptive parameters.</td>
<td>6</td>
<td>51C</td>
</tr>
<tr>
<td>Voltage dependent overcurrent protection</td>
<td></td>
<td>51V</td>
</tr>
<tr>
<td>Negative phase sequence overcurrent protection</td>
<td></td>
<td>51Q</td>
</tr>
<tr>
<td>I2, unbalanced load protection with evaluation of the negative phase sequence current</td>
<td>2</td>
<td>46</td>
</tr>
<tr>
<td>IG, earth time overcurrent and short circuit protection (non-direction)</td>
<td>4</td>
<td>50N, 51N</td>
</tr>
<tr>
<td>(instantaneous, definite time, characteristics according to IEC60255, ANSI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I&lt; underload protection</td>
<td>2</td>
<td>37</td>
</tr>
<tr>
<td>Reclosing lockout</td>
<td></td>
<td>49R</td>
</tr>
<tr>
<td>Incomplete sequence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JAM protection</td>
<td>2</td>
<td>51LR</td>
</tr>
<tr>
<td>Locked rotor Protection</td>
<td></td>
<td>51LR</td>
</tr>
<tr>
<td>Motor start</td>
<td></td>
<td>48</td>
</tr>
<tr>
<td>Starts per Hour</td>
<td></td>
<td>66</td>
</tr>
<tr>
<td>Start control input</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reversing mode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency start</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V&lt;, V&gt;, 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></td>
<td></td>
</tr>
<tr>
<td>V1, 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></td>
<td></td>
</tr>
<tr>
<td>Each of the six frequency protection stages can be used as:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>→ f&lt; or f&gt; (over- or under frequency supervision)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>→ df/dt rate of change of frequency (ROCOF)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>→ (f&lt; and df/dt) or (f&gt; and df/dt) combination of over- and ROCOF)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>→ (f&lt; and DF/DT) or (f&gt; and DF/DT) combination of over- and increase of frequency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>→ Delta Phi (Vector surge)</td>
<td></td>
<td>78</td>
</tr>
<tr>
<td>VX, residual voltage protection</td>
<td>2</td>
<td>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>
</tbody>
</table>

### Control and Logic

#### Control
- Position indication, supervision time management and interlockings a switchgear

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

### Supervision Functions

<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>1</td>
<td>50BF</td>
</tr>
<tr>
<td>TCS, trip circuit supervision</td>
<td>1</td>
<td>74TC</td>
</tr>
<tr>
<td>LOP, loss of potential</td>
<td>1</td>
<td>60FL</td>
</tr>
<tr>
<td>CTS, current transformer supervision</td>
<td>1</td>
<td>60L</td>
</tr>
<tr>
<td>SOTF, switch onto fault</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Demand management and peak value supervision (current and power)</td>
<td></td>
<td></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, fault, event, trend, start and statistic recorders</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**FUNCTIONAL OVERVIEW IN ANSI FORM**

- **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

**APPROVALS**

- CE
- UL
- CSA
- EAC

**CONNECTIONS**

- Metering, Statistics and Demand
- Current and Volt: unbalance, %THD and THD, Fund. and RMS, Max/Min/Avg, phasors and angles
- Power: Fund. and RMS, P, Q, S, PF
- Recorders
- Event
- Disturbance
- Fault
- Start
- Statistic
- Trend

Optional parameters:

- Unbalance, %THD and THD, Fund. and RMS, Max/Min/Avg, phasors and angles
- Power: Fund. and RMS, P, Q, S, PF
- Recorders
- Event
- Disturbance
- Fault
- Start
- Statistic
- Trend

**Standard**

- Option

**PROGRAMMABLE LOGIC**

- SNTP
- Switchgear Wear
- Control

**TYPE TESTED**

- IEC60255-1

**CURRENT AND VOLTAGE MEASUREMENTS**

- Current and voltage measurements
- Power factor
- Active, reactive, and apparent power
- Energy consumption

**METERING AND STATISTICS**

- Metering
- Statistics
- Demand recorders
- Event disturbance fault statistic trend

**PROGRAMMABLE LOGIC**

- SNTP
- Switchgear wear
- Control

**APPENDIX**

- UL508 (Industrial Controls)
- CSA-C22.2 No. 14 (Industrial Controls)
- EAC (Eurasian Conformity)

**APPENDIX**

- Option
- Standard
## ORDER FORM MRMV4

<table>
<thead>
<tr>
<th>Motor Protection</th>
<th>MRMV4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Analog output</strong></td>
<td><strong>RTD remote interface</strong></td>
</tr>
<tr>
<td>4 X</td>
<td>8</td>
</tr>
<tr>
<td>4 X</td>
<td>8</td>
</tr>
</tbody>
</table>

### Hardware variants
- Phase current 1 A/5 A, earth current 1 A/5 A: 0
- Phase current 1 A/5 A, sensitive earth current 1 A/5 A: 1

### Housing and mounting
- Door mounting: A
- Door mounting 19" (flush mounting): B

### Communication protocol
- Without protocol: A
- Modbus RTU, IEC60870-5-103, IRIG-B (terminals), RS485/terminals: B
- Modbus TCP, IRIG-B (terminals), Ethernet 100MB/RJ45: C
- Proibus-DP, IRIG-B (terminals), optic fibre: D
- Proibus-DP, IRIG-B (terminals), RS485/D-SUB: E
- Modbus RTU, IEC 60870-5-103, IRIG-B (terminals), optic fibre: F
- Modbus RTU, IEC 60870-5-103, IRIG-B (terminals), RS485/D-SUB interface: G
- IEC 61850, Ethernet 100MB/RJ45: H

### Available menu languages
- Standard English/German/Russian/Polish/Portugiesisch/French

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 short-circuiters

### Voltage inputs
- 4 (0–800 V)

### Digital inputs
- Switching thresholds adjustable via software

### Power supply
- Wide range power supply
- 24 $V_{ac}$ - 270 $V_{ac}$ / 48 $V_{dc}$ - 230 $V_{dc}$ (-20/+10%)
- All terminals plug type

### Terminals
- IPS4

### Type of enclosure (Front)
- 19" flush mounting
- Door mounting

### Dimensions of housing (W x H x D)
- 212.7 mm x 173 mm x 209 mm
- 8.374 in. x 7.025 in. x 8.228 in.
- 212.7 mm x 183 mm x 209 mm
- 8.374 in. x 7.025 in. x 8.228 in.

### Weight (max. components)
- approx. 4.2 kg

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