HighPROTEC-2 | PROTECTION TECHNOLOGY MADE SIMPLE
MRM4-2 | MOTOR PROTECTION DEVICE

FUNCTIONS
The MRM4 is a protection relay which uses the latest Dual-Core-Processor Technology to provide precise and reliable protective functions and is very easy to operate. The MRM4 provides all necessary functions to protect low and medium voltage motors at all power levels. The protection functions are based on current measurement. They supervise the motor start sequence (motor start), they detect a stall or locked rotor condition and they monitor the thermal condition of the motor. Overcurrent and earth overcurrent protection as well as unbalanced load protection are included in the protection package. The status and operation of the motor will also be monitored by means of the statistic and trend recorder. All important events and measuring values will be logged by means of the start, event, failure and disturbance recorder.

APPLICABLE FOR:
- Low and high voltage asynchronous motors. Protection based on current measurement values

MOTOR PROTECTION FUNCTIONS
- Thermal overload protection 49M
- Locked rotor protection 51LRS
- JAM 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 external temperature box 26 (type MRM4-2B, on request)

SYSTEM SUPERVISION FUNCTIONS
- CBF, circuit breaker failure 50BF
- TCS, trip circuit supervision via digital inputs 74TC
- CTS, current transformer supervision 60

HISTORY COUNTER
- Motor starts, numbers of alarms and trips of all important protection functions like I, IG, thermal supervision, JAM, undercurrent and negative phase sequence

TOTAL COUNTER
- Breaker wear values
- Motor run time
- Motor operation counter
- History

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

STATISTICAL RECORDER
- Number of successful starts
- Average I2T values
- Average max. start current

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

COMMUNICATION OPTIONS
- IEC61850
- Profibus DP
- Modbus RTU and/or Modbus TCP
- DNP 3.0 (RTU, TCP, UDP)

PC TOOLS
- Setting and analyzing software
- Smart view for free
- Including page editor to design own customized pages

COMMISSIONING SUPPORT
- USB connection
- Customizable Display (Single-Line, ..)
- Customizable Inserts
- Copy and compare parameter sets
- Forcing and disarming of output relays
- Fault simulator: current and voltage
- Graphical display of tripping characteristics
- 8 languages selectable within the relay

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

TIME SYNCHRONISATION
- SNTP, IRIG-B00X, Modbus, DNP 3.0, IEC60870-5-103

IT SECURITY
- Menu for the activation of BDEW-Whitepaper-compliant security settings (e.g. hardening of interfaces)

ADDITIONAL HIGHLIGHTS
- 20 mA output (Type MRM4-2B)
- 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 detection (stall) via digital input
- Motor stop inputs
- External alarm and trip inputs
## Functional Overview

### Protective Functions

<table>
<thead>
<tr>
<th>Elements</th>
<th>ANSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>IB, thermal overload protection</td>
<td>49M</td>
</tr>
<tr>
<td>I, time overcurrent and short circuit protection (non direction) (instantaneous, definite time, characteristics according to IEC60255, ANSI)</td>
<td>6 50P, 51P</td>
</tr>
<tr>
<td>I2, unbalanced load protection with evaluation of the negative phase sequence current</td>
<td>2 46</td>
</tr>
<tr>
<td>IG, earth time overcurrent and short circuit protection (non direction) (instantaneous, definite time, characteristics according to IEC60255, ANSI)</td>
<td>4 50N, 51N</td>
</tr>
<tr>
<td>I&lt; underload protection</td>
<td>2 37</td>
</tr>
<tr>
<td>Reclosing lockout</td>
<td>49R</td>
</tr>
<tr>
<td>Incomplete sequence</td>
<td></td>
</tr>
<tr>
<td>JAM protection</td>
<td>51LR</td>
</tr>
<tr>
<td>Locked rotor Protection</td>
<td>51LRS</td>
</tr>
<tr>
<td>Motor start</td>
<td>48</td>
</tr>
<tr>
<td>Starts per Hour</td>
<td>66</td>
</tr>
<tr>
<td>Start control input</td>
<td></td>
</tr>
<tr>
<td>Reversing mode</td>
<td></td>
</tr>
<tr>
<td>Emergency start</td>
<td></td>
</tr>
</tbody>
</table>

### Control and Logic

Control: Position indication, supervision time management and interlockings for 1 breaker

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</td>
<td>50BF/62BF</td>
</tr>
<tr>
<td>TCS, trip circuit supervision via digital inputs</td>
<td>74TC</td>
</tr>
<tr>
<td>CTS, current transformer supervision</td>
<td>60L</td>
</tr>
<tr>
<td>Demand management and peak value supervision (current)</td>
<td></td>
</tr>
<tr>
<td>Breaker wear with programmable wear curves</td>
<td></td>
</tr>
</tbody>
</table>

Recorders: Disturbance Recorder, Fault recorder, Event recorder, Trend recorder, Motor Start recorder, Statistic recorder

### Dimensions

![Image of dimensions](image)

- **Units:** mm [inch]
- **Width:** 141.50 [5.57]
- **Height:** 182 [7.20]
- **Max. Height:** 206.50 [8.13]
- **Max. Depth:** 9.64 [0.38]

---

**www.woodward.com**
FUNCTIONAL OVERVIEW IN ANSI FORM

APPROVALS

- 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)
- Meets IEEE 1547-2003 amended by IEEE 1547a-2014
- Complies with ANSI C37.90-2005

CONNECTIONS (EXAMPLE)

- Measured and calculated values:
  - RMS Values, Max/Min/Av.
  - Theta, Sequence currents, I, IE, THD
- Recorders:
  - Event
  - Disturbance
  - Fault
  - Start
  - Statistic
  - Trend
- Device type: MRM4-2Bxxx
- Standard

- Device type: MRM4-2Bxxx
- Standard
## ORDER FORM MRM4-2

**Motor Protection**

<table>
<thead>
<tr>
<th>Version 2 with USB, enhanced communication and user options</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Digital Inputs</th>
<th>Binary Output relays</th>
<th>Analog Inputs/Outputs</th>
<th>RTD-Box</th>
<th>Housing</th>
<th>Large display</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>6</td>
<td>0/0</td>
<td>-</td>
<td>B1</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>0/1</td>
<td>✓</td>
<td>B1</td>
<td>-</td>
</tr>
</tbody>
</table>

**Hardware variant 2**

| Phase Current S/A/1 A, Ground Current S/A/1 A | 0 |
| Phase Current S/A/1 A, Sensitive Ground Current S/A/1 A | 1 |

**Housing and mounting**

<table>
<thead>
<tr>
<th>Door mounting</th>
<th>Door mounting 19&quot; (flush mounting)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
</tbody>
</table>

**Communication protocol**

- Without protocol: A
- Modbus RTU, IEC60870-5-103, DNP3.0 RTU | RS485/terminals: B*
- Modbus TCP, DNP3.0 TCP/UDP | 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 | Ethernet 100 MB/RJ45: H*
- IEC61850, Modbus TCP, DNP3.0 TCP/UDP | Ethernet 100 MB/RJ45: I*
- Modbus TCP, DNP3.0 TCP/UDP | Optical Ethernet 100 MB/LC duplex connector: K*
- Modbus TCP, DNP3.0 TCP/UDP | Optical Ethernet 100 MB/LC duplex connector: L*
- IEC60870-5-103, Modbus RTU, DNP3.0 RTU | RS485/terminals: M*
- IEC61850, Modbus TCP, DNP3.0 TCP/UDP | Ethernet 100 MB/RJ45: N*

**Harsh Environment Option**

- None: A
- Conformal Coating: B

**Available menu languages**

- 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 is included in the delivery of HighPROTEC devices.

---

**CONTACT:**

**North & Central America**
Phone: +1 970 962 7272
+1 208 278 3370
E-mail: SalesPGD_NAandCA@woodward.com

**South America**
Phone: +55 19 3708 4760
E-mail: SalesPGD_SA@woodward.com

**Europe**
Phone (Kempen): +49 2152 145 331
Phone (Stuttgart): +49 711 78954 510
E-mail: SalesPGD_EMEA@woodward.com

**Middle East & Africa**
Phone: +971 2 678 4424
E-mail: SalesPGD_EMEA@woodward.com

**Russia**
Phone: +49 711 78954 515
E-mail: SalesPGD_EMEA@woodward.com

**China**
Phone: +86 512 8818 5515
E-mail: SalesPGD_CHINA@woodward.com

**India**
Phone: +91 124 4399 500
E-mail: Sales_India@woodward.com

**ASEAN & Oceania**
Phone: +49 711 78954 510
E-mail: SalesPGD_ASEAN@woodward.com

© Woodward
All Rights Reserved | 02/2018