FUNCTIONS
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 trend recorders.

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

MOTOR PROTECTION
- 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 optional external
temperature box (Type MRMV4-B) 26

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

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

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, successful starts
- Used thermal capacity
- 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

COUNTERS
- History (e.g. Motor starts values,
  Alarms, Trips...)
- Total Counters (e.g. Run Time...)

COMMUNICATION OPTIONS
- IEC 61850, IEC 60870-5-103, Profinet DP
- Modbus RTU and/or Modbus TCP
- DNP 3.0 (RTU, TCP, UDP)

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

COMMISSIONING SUPPORT
- USB connection
- 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

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

CONTROL AND SUPERVISION
- of one breaker

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

TIME SYNCHRONISATION
- SNTP, IRIG-800X, Modbus,
  DNP 3.0, IEC 60870-5-103
# 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>50F, 51P</td>
</tr>
<tr>
<td>Voltage controlled overcurrent protection by means of adaptive parameters</td>
<td>6</td>
</tr>
<tr>
<td>Voltage dependent overcurrent protection</td>
<td>51C</td>
</tr>
<tr>
<td>Negative phase sequence overcurrent protection</td>
<td>51V</td>
</tr>
<tr>
<td>SIQ, earth time overcurrent and short circuit protection (non direction) (instantaneous, definite time, characteristics according to IEC60255, ANSI)</td>
<td>50N, 51N</td>
</tr>
<tr>
<td>l&lt; underload protection</td>
<td>2, 37</td>
</tr>
<tr>
<td>Reclosing lockout</td>
<td>49R</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>
<tr>
<td>V&lt;, V&gt;, V(0)&lt;, under- and overvoltage protection, time dependent undervoltage protection</td>
<td>6, 27, 59</td>
</tr>
<tr>
<td>Voltage asymmetry supervision (V012)</td>
<td></td>
</tr>
<tr>
<td>V1, under and overvoltage in positive phase sequence system</td>
<td>6, 47</td>
</tr>
<tr>
<td>V2, overvoltage in negative phase sequence system</td>
<td></td>
</tr>
<tr>
<td>Each of the six frequency protection elements can be used as:</td>
<td>6</td>
</tr>
<tr>
<td>f&lt; or f&gt; (over- or under frequency supervision)</td>
<td></td>
</tr>
<tr>
<td>df/dt rate of change of frequency (ROCOF)</td>
<td>81U/O</td>
</tr>
<tr>
<td>(f&lt; and df/dt) or (f&gt; and df/dt) combination of over-, under- and ROCOF</td>
<td>81R</td>
</tr>
<tr>
<td>(f&lt; and DF/DT) or (f&gt; and DF/DT) combination of over-, under- and increase of frequency</td>
<td></td>
</tr>
<tr>
<td>Delta Phi (Vector surge)</td>
<td>78</td>
</tr>
<tr>
<td>VX, residual voltage protection</td>
<td>2, 59N</td>
</tr>
<tr>
<td>PQS, Power protection</td>
<td>6, 32, 37</td>
</tr>
<tr>
<td>PF, Power factor</td>
<td>2, 55</td>
</tr>
</tbody>
</table>

## Control and Logic

Control: Position indication, supervision time management and interlockings a breaker

Logic: Up to 80 logic equations, 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>50BF, 62BF</td>
</tr>
<tr>
<td>TCS, trip circuit supervision</td>
<td>74TC</td>
</tr>
<tr>
<td>LOP, loss of potential</td>
<td>60FL</td>
</tr>
<tr>
<td>CTS, current transformer supervision</td>
<td>60L</td>
</tr>
<tr>
<td>SOTF, switch onto fault</td>
<td></td>
</tr>
<tr>
<td>Demand management and peak value supervision (current and power)</td>
<td></td>
</tr>
<tr>
<td>THD supervision</td>
<td></td>
</tr>
<tr>
<td>Breaker wear with programmable wear curves</td>
<td></td>
</tr>
<tr>
<td>Recorders: Disturbance, fault, event, trend, start and statistic recorders</td>
<td></td>
</tr>
</tbody>
</table>
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
ORDER FORM MRMV4-2

<table>
<thead>
<tr>
<th>Motor Protection</th>
<th>MRMV4-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version 2 with USB, enhanced communication and user options</td>
<td></td>
</tr>
</tbody>
</table>

<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>8</td>
<td>7</td>
<td>0/4</td>
<td>B2</td>
<td>A</td>
</tr>
<tr>
<td>8</td>
<td>13</td>
<td>0/4</td>
<td>B2</td>
<td>C</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

Communication protocol
- Without protocol: A
- Modbus RTU, IEC 60870-5-103, DNP 3.0 RTU | RS485/terminals: B
- Modbus TCP, DNP 3.0 TCP/UDP | Ethernet 100 MB/RJ45: C
- Proibus-DP | optic fiber/ST-connector: D
- Proibus-DP | RS485/D-SUB: E
- Modbus RTU, IEC 60870-5-103, DNP 3.0 RTU | optic fiber/ST-connector: F
- Modbus RTU, IEC 60870-5-103, DNP 3.0 RTU | RS485/D-SUB: G
- IEC 61850, Modbus TCP, DNP 3.0 TCP/UDP | Ethernet 100 MB/RJ45: H
- IEC 60870-5-103, Modbus RTU, DNP 3.0 RTU | RS485/terminals: I
- Modbus TCP, DNP 3.0 TCP/UDP | Ethernet 100 MB/RJ45: J
- IEC 61850, Modbus TCP, DNP 3.0 TCP/UDP | Optical Ethernet 100 MB/LC duplex connector: K
- Modbus TCP, DNP 3.0 TCP/UDP | Optical Ethernet 100 MB/LC duplex connector: L
- IEC 60870-5-103, Modbus RTU, DNP 3.0 RTU | RS485/terminals: M
- IEC 61850, Modbus TCP, DNP 3.0 TCP/UDP | Ethernet 100 MB/RJ45: 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.

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.

Current inputs
- 4 (1 A and 5 A) with automatic CT Disconnect

Voltage inputs
- 4 (0–800 V)

Digital inputs
- Switching thresholds adjustable via software

Power supply
- Wide range power supply
- 24 Vdc – 270 Vdc / 48 Vdc – 230 Vdc (−20/+10%)
- All terminals plug type

Terminals
- 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. 4.2 kg / 9.259 lb

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: +7 495 311 9111
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: +61 3 9510 1000
E-mail: SalesPGD_ASEAN@woodward.com

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