**APPLICATION**

The MRI4 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 MRI4 provides a number of three phase protection elements to safeguard against overcurrent, short-circuit and earth fault, all with inverse time (INV) and definite time (DEFT) tripping characteristics.

The MRI4 is also ideal for the protection of isolated, resonant, resistive and solidly earthed neutral systems. It is designed to be used in both radial networks and single fed open ring main systems. It can also serve as backup protection for differential protection systems on generators, transformers, bus bars and electrical lines. For overhead line protection the MRI4 is also available with an optional auto reclosing function. The protection functions of the MRI4 have been adapted to comply with the requirements of the VDE-AR-N-4110:2018.

**ALL INCLUSIVE:**
- All protection features without extra charge
- Parameter setting and evaluation software
- Disturbance record analysis software

**SIX ELEMENTS PHASE OVERCURRENT PROTECTION**
- Non-directional overcurrent/short-circuit protection (DEFT/INV)
- Tripping characteristics:
  - DEFT
  - ANSI: MINV, VINV, EINV
  - IEC: NINV, VINV, LINV, EINV
  - Thermal Flat, IT, I2T, I4T

**FOUR ELEMENTS EARTH FAULT PROTECTION**
- Non-directional earth fault protection (DMT/IMDT)
- Tripping characteristics:
  - DEFT
  - ANSI: MINV, VINV, EINV
  - IEC: NINV, VINV, LINV, EINV
  - Thermal Flat, IT, I2T, I4T
  - RXIDG
- Wattmetric Ground Fault Protection

**TWO ELEMENTS UNBALANCED LOAD PROTECTION**
- Supervision by definite time or inverse tripping characteristic

**DEMAND MANAGEMENT/Peak VALUES**
- Current (peak values) and average current

**POWER QUALITY**
- THD protection

**SUPERVISION**
- Current transformer supervision
- Circuit breaker failure protection
- Trip circuit supervision
- Cold load pickup
- Switch onto fault

**ADDITIONAL HIGHLIGHTS**
- Automatic reclosing
- Inrush
- Thermal replica
- Plausibility checks
- Adaptive parameter sets
- Status display
- Comprehensive RMS and DFT measured values and statistics
- Masking of unused functions
- Multi-Password-Level

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

**COMMISIONING SUPPORT**
- USB connection
- Customizable Display (Single-Line, ...)
- Customizable Inserts
- Copy and compare parameter sets
- Configuration files are convertable
- Forcing and disarming of output relays
- Fault simulator
- Graphical display of tripping characteristics
- 8 languages selectable within the relay

**COMMUNICATION OPTIONS**
- IEC 61850
- Profibus DP
- Modbus RTU and/or Modbus TCP
- IEC 60870-5-103
- IEC 60870-5-104
- DNP 3.0 (RTU, TCP, UDP)
- SCADApter for Retrofit

**IT SECURITY**
- Menu for the activation of BDEW-Whitepaper-compliant security settings (e.g. hardening of interfaces)
- IT Security Logger
- Syslog (to centralized server)
- Encrypted connection with Smart view

**CONTROL**
- One breaker
- Breaker wear

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

**NEW FEATURES - Release 3.6**
- VDE-AR-N 4110
- Wattmetric Ground Fault Protection
- IEC 60870-5-104
- SCADApter for Retrofit
- Usability improvements
- IT Security
### Functional Overview

#### Protective Functions

<table>
<thead>
<tr>
<th>Description</th>
<th>Elements</th>
<th>ANSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>I, time overcurrent and short circuit protection, multiple reset options</td>
<td>6</td>
<td>50P, 51P, 67P</td>
</tr>
<tr>
<td>(instantaneous, definite time, reset characteristics according to IEC and ANSI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative phase sequence overcurrent protection</td>
<td></td>
<td>51Q</td>
</tr>
<tr>
<td>I2&gt;, unbalanced load protection with evaluation of the negative phase sequence currents</td>
<td>2</td>
<td>46</td>
</tr>
<tr>
<td>ThA, 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>IH2/In, inrush detection with evaluation of the 2nd harmonic</td>
<td>1</td>
<td>Inrush</td>
</tr>
<tr>
<td>IG, earth overcurrent and short circuit protection</td>
<td>4</td>
<td>50N/G, 51N/G</td>
</tr>
<tr>
<td>AR, automatic reclosing</td>
<td>1</td>
<td>79</td>
</tr>
<tr>
<td>Exp, External alarm and trip functions</td>
<td>4</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>Description</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>CTS, current transformer supervision</td>
<td>1</td>
<td>60L</td>
</tr>
<tr>
<td>CLPU, cold load pickup</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>SOTF, switch onto fault</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Demand management and peak value supervision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>THD supervision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breaker 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>
Funktionsübersicht in ANSI-Form

Zertifizierung:
- UL508 (Industrielle Steuerungen)
- CSA-C22.2 Nr. 14 (Industrielle Steuerungen)
- EAC (Eurasische Konformität)
- IEC60255-1 (Erkennungserklärung)
- IEEE 1547-2003
- IEEE 1547a-2014
- ANSI C37.90-2005

Zusätzliche Optionen:
- LGC (Programmierbare Logik)
- CLK (IRIG-B00X)
- SNTP
- switchgear wear control
- recorders: SER (Ereignis), DDR (Störung), DFR (Fehler)
- statistics
- trend

Zertifizierungen:
- CE
- UL
- SAA
- EAC
- KEMA

Verbindungen (Beispiel):
- X1
- X2
- X3
- X100
- X101
- X103

Erkennungserklärung: Complies with IEEE 1547-2003
Amendiert von IEEE 1547a-2014
Complies with ANSI C37.90-2005

Only for use with external galvanic coupled CTs. See chapter Current Transformers of the manual.
ORDER FORM MRI4

Non-directional Feeder Protection

<table>
<thead>
<tr>
<th>Digital Inputs</th>
<th>Binary output relays</th>
<th>Housing</th>
<th>Large display</th>
<th>Hardware variant 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>6</td>
<td>B1</td>
<td></td>
<td>Phase Current 5 A/1 A, Ground Current 5 A/1 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Phase Current 5 A/1 A, Sensitive Ground Current 5 A/1 A</td>
</tr>
</tbody>
</table>

Housing and mounting

- Door mounting
- Door mounting 19” (flush mounting)

Communication protocol

- Without protocol
- Modbus RTU, IEC60870-5-103, DNP3.0 RTU | RS485/terminals
- Modbus TCP, DNP3.0 TCP/UDP, IEC60870-5-104 | Ethernet 100 MB/RJ45
- Profibus-DP | optic fiber/ST-connector
- Profibus-DP | RS485/D-SUB
- Modbus RTU, IEC60870-5-103, DNP3.0 RTU | optic fiber/ST-connector
- Modbus RTU, IEC60870-5-103, DNP3.0 RTU | RS485/D-SUB
- IEC61850, Modbus TCP, DNP3.0 TCP/UDP, IEC60870-5-104 | Ethernet 100 MB/RJ45
- IEC60870-5-103, Modbus RTU, DNP3.0 RTU | RS485/terminals
- Modbus TCP, DNP3.0 TCP/UDP, IEC60870-5-104 | Ethernet 100 MB/RJ45
- IEC61850, Modbus TCP, DNP3.0 TCP/UDP, IEC60870-5-104 | Optical Ethernet 100 MB/LC duplex connector
- Modbus TCP, DNP3.0 TCP/UDP, IEC60870-5-104 | Optical Ethernet 100 MB/LC duplex connector
- IEC60870-5-103, Modbus RTU, DNP3.0 RTU | RS485/terminals
- IEC61850, Modbus TCP, DNP3.0 TCP/UDP, IEC60870-5-104 | Ethernet 100 MB/RJ45

Harsh Environment Option

- None
- Conformal Coating

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

Digital Inputs

- Switching thresholds adjustable via software

Power supply

- Wide range power supply
  - 24 V dc - 270 V ac / 48 V dc - 230 V ac (~20/+10%)

Terminals

- All terminals plug type

Type of enclosure

- IP54

Mounting

- Door mounting or 19” flush mounting

Dimensions of housing

- 19” flush mounting: 141.5 mm x 173 mm x 209 mm
- 5.571 in. x 6.811 in. x 8.228 in.
- Door mounting: 141.5 mm x 183 mm x 209 mm
- 5.571 in. x 7.205 in. x 8.228 in.

Weight (max. components)

- approx. 2.9 kg / 6.393 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: +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