WOODWARD

NEW FEATURES - Release 3.6

· VDE-AR-N 4110
· Wattmetric Ground Fault Protection
· IEC 60870-5-104
· SCADApter for Retrofit
· Usability improvements
· IT Security

HighPROTEC | PROTECTION TECHNOLOGY MADE SIMPLE

MRM4 | 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.
The protection functions of the MRM4 have been adapted to comply with the requirements of the VDE-AR-N-4110:2018.

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)
→ Wattmetric Ground Fault Protection

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

LOGIC

→ Up to 80 logic equations for protection, control and monitoring

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)

STATISTIC 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
→ IEC 60870-5-103
→ IEC60870-5-104
→ DNP 3.0 (RTU, TCP, UDP)
→ SCADApter for Retrofit

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

TIME SYNCHRONISATION

→ SNTP, IRIG-B00X, Modbus, DNP 3.0, IEC60870-5-103/-104

IT SECURITY

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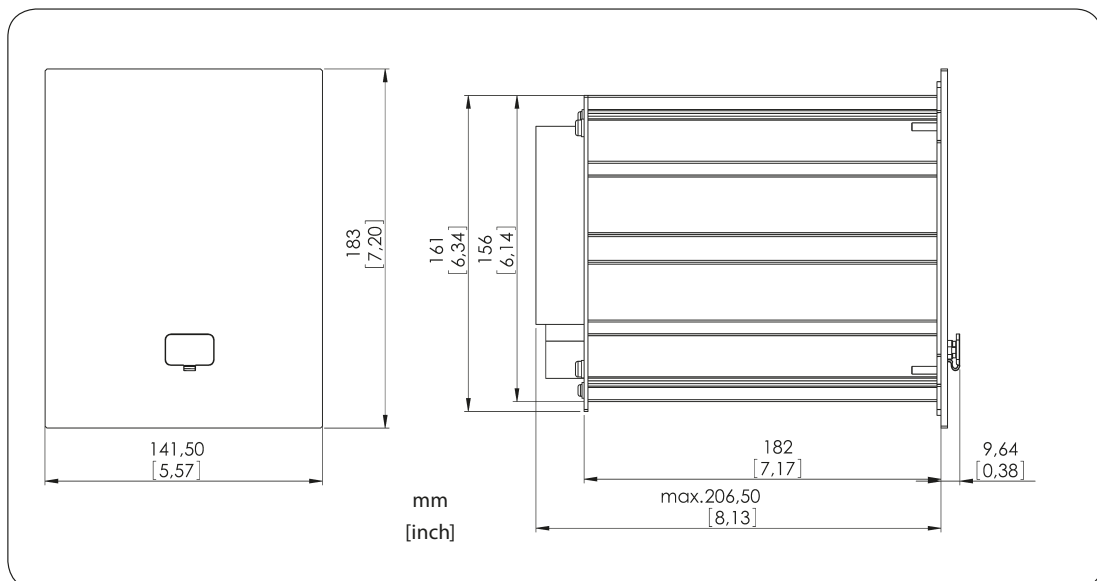→ Encrypted connection with Smart view

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
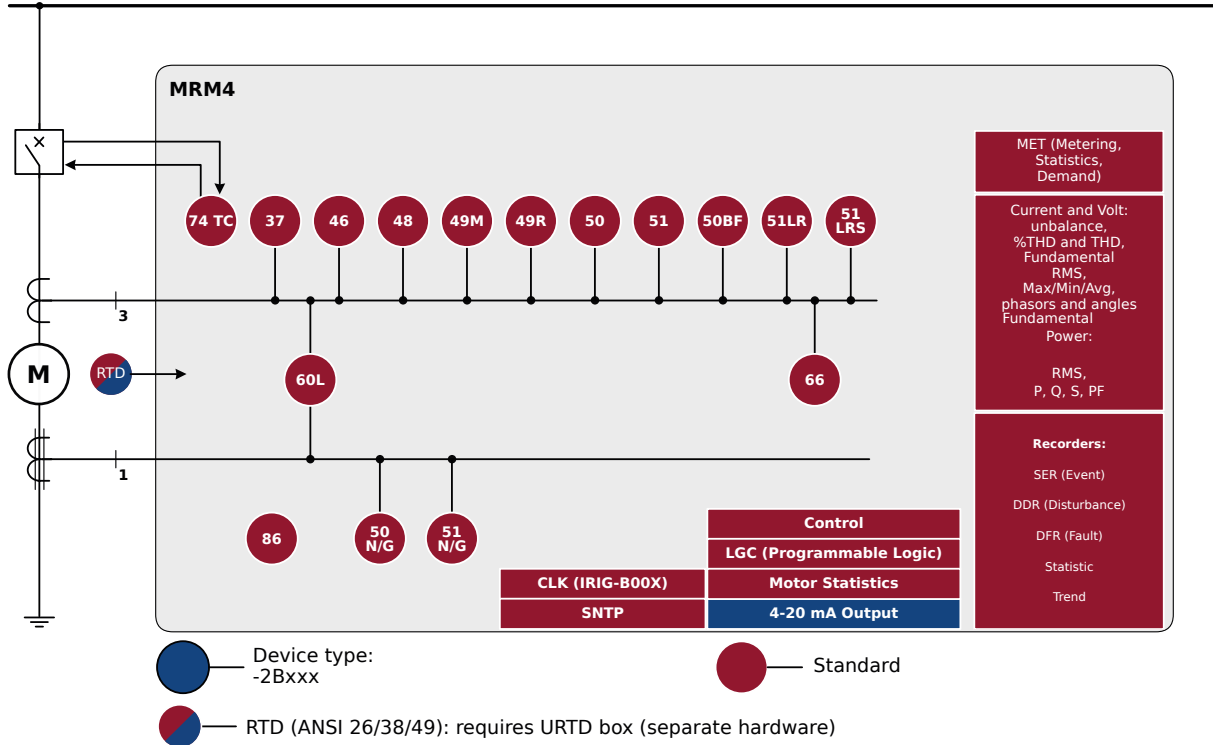→ External alarm and trip inputs

FUNCTIONAL OVERVIEW

	Elements	ANSI
Protective Functions		
IB, thermal overload protection		49M
I, time overcurrent and short circuit protection (non direction) (instantaneous, definite time, characteristicsaccording to IEC60255, ANSI	6	50P, 51P
I2, unbalanced load protection with evaluation of the negative phase sequence current	2	46
IG, earth time overcurrent and short circuit protection (non direction) (instantaneous, definite time, characteristics according to IEC60255, ANSI	4	50N/G, 51N/G
I< underload protection	2	37
Reclosing lockout		49R
Incomplete sequence		
JAM protection		51LR
Locked rotor Protection		51LRS
Motor start		48
Starts per Hour		66
Start control input		
Reversing mode		
Emergency start		
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		
CBF, circuit breaker failure	1	50BF/62BF
TCS, trip circuit supervision via digital inputs	1	74TC
CTS, current transformer supervision	1	60L
Demand management and peak value supervision (current)		
Breaker wear with programmable wear curves		
Recorders: Disturbance Recorder, Fault recorder, Event recorder, Trend recorder, Motor Start recorder, Statistic recorder		

DIMENSIONS

183 [7,20]
161 [6,34]
156 [6,14]
141,50 [5,57]
182 [7,17]
9,64 [0,38]
max.206,50 [8,13]
mm [inch]

FUNCTIONAL OVERVIEW IN ANSI FORM

MRM4

MET (Metering, Statistics, Demand)

Current and Volt: unbalance, %THD and THD, Fundamental RMS, Max/Min/Avg, phasors and angles Fundamental Power:

RMS, P, Q, S, PF

	Control
	LGC (Programmable Logic)
CLK (IRIG-B00X)	Motor Statistics
SNTP	4-20 mA Output

Recorders:

SER (Event)

DDR (Disturbance)

DFR (Fault)

Statistic

Trend

Device type: -2Bxxx

Standard

RTD (ANSI 26/38/49): requires URTD box (separate hardware)

APPROVALS

C E

certified regarding UL508 (Industrial Controls)

certified regarding CSA-C22.2 No. 14 (Industrial Controls)
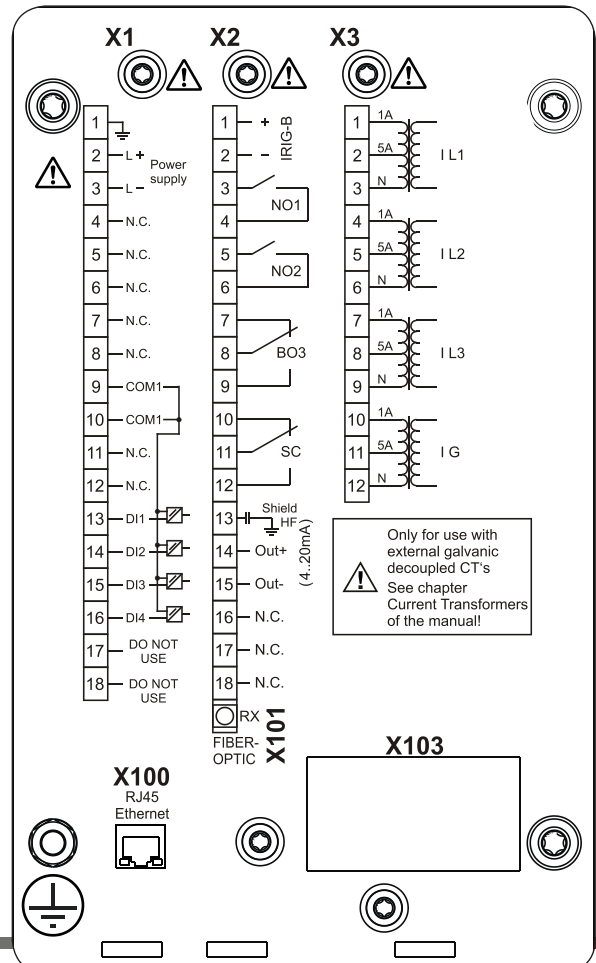
Type tested according to IEC60255-1

certified by EAC (Eurasian Conformity)

KE CO (Declaration of Identity)

Complies with IEEE 1547-2003
Amended by IEEE 1547a-2014
Complies with ANSI C37.90-2005

CONNECTIONS *(EXAMPLE)*

ORDER FORM MRM4

Motor Protection						MRM4	-2					
Version 2 with USB, enhanced communication and user options												
Digital Inputs	**Binary output relays**	**Analog Inputs/ Outputs**	**RTD-Box**	**Housing**	**Large display**							
8	6	0/0	-	B1	-			A				
4	4	0/1	✓	B1	-			B				
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, IEC60870-5-103, DNP3.0 RTU | *RS485/terminals*											B*	
Modbus TCP, DNP3.0 TCP/UDP, IEC 60870-5-104 | *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, IEC 60870-5-104 | *Ethernet 100MB/RJ45*											H*	
IEC60870-5-103, Modbus RTU, DNP3.0 RTU | *RS485/terminals* Modbus TCP, DNP3.0 TCP/UDP, IEC60870-5-104 | *Ethernet 100 MB/RJ45*											I*	
IEC61850, Modbus TCP, DNP3.0 TCP/UDP, IEC 60870-5-104 | *Optical Ethernet 100MB/LC duplex connector*											K*	
Modbus TCP, DNP3.0 TCP/UDP, IEC 60870-5-104 | *Optical Ethernet 100MB/LC duplex connector*											L*	
IEC60870-5-103, Modbus RTU, DNP3.0 RTU | *RS485/terminals* IEC61850, Modbus TCP, DNP3.0 TCP/UDP, IEC 60870-5-104 | *Ethernet 100 MB/RJ45*											T*	
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.

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
	$24\ V_{DC} – 270\ V_{DC} / 48\ V_{AC} – 230\ V_{AC}$ (−20/+10%)
Terminals	All terminals plug type
Type of enclosure (Front)	IP54
Dimensions of housing	19" flush mounting: 141.5 mm × 173 mm × 209 mm
(W × H × D)	5.571 in. × 6.811 in. × 8.228 in.
	Door mounting: 141.5 mm × 183 mm × 209 mm
	5.571 in. × 7.205 in. × 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

For more information please contact: