![SEG electronics logo]

HighPROTEC | PROTECTION TECHNOLOGY MADE SIMPLE

MRM4 | MOTOR PROTECTION DEVICE

All HighPROTEC devices have been type tested and certified by KEMA Laboratories (IEC 60255-1:2009).

FUNCTION

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.

APPLICATION
‣ 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)

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

MOTOR START RECORDER
‣ Max. RMS values of phase currents
‣ Negative phase sequence currents

‣ Start duration
‣ Used thermal capacity
‣ Successful starts
‣ Temperature profile (optional)

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
‣ Breaker wear values
‣ Motor run time
‣ Motor operation counter, History

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

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

PC TOOLS
‣ Setting and analyzing software Smart view for free
‣ Including page editor to design own Control pages
‣ SCADApter to re-assign datapoints for Retrofit projects: Modbus, Profibus, IEC 60870-5-103/ -104

CONTROL
‣ 1 breaker, Breaker wear

COMMISSIONING SUPPORT
‣ Customizable Display (Single-Line)
‣ Customizable Inserts
‣ Copy and compare parameter sets
‣ Configuration files are convertible
‣ Forcing and disarming of output relays
‣ Integrated 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

CYBER SECURITY
‣ Menu for the activation of security settings (e. g. hardening of interfaces)
‣ Security Logger
‣ Centralized Security Logs (Syslog)
‣ Encrypted Connection Smart view – Device
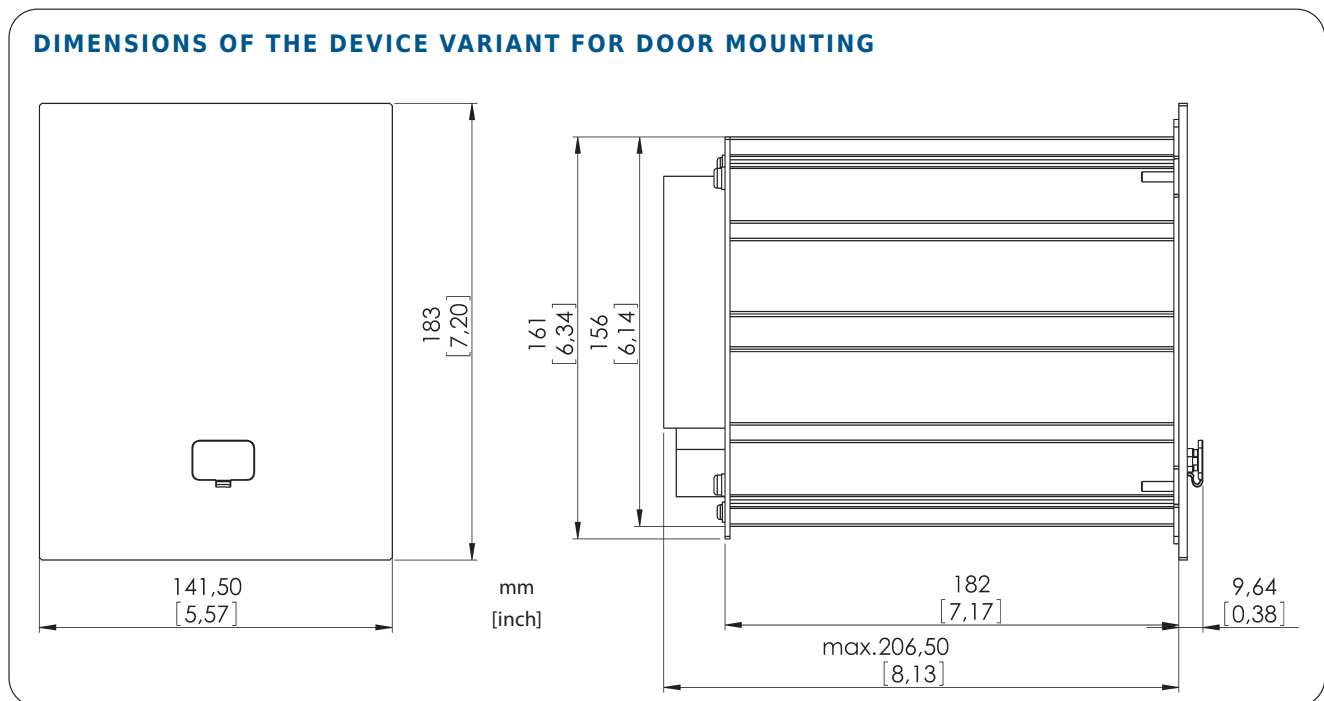‣ Device specific certificates (No man in the middle attacks)

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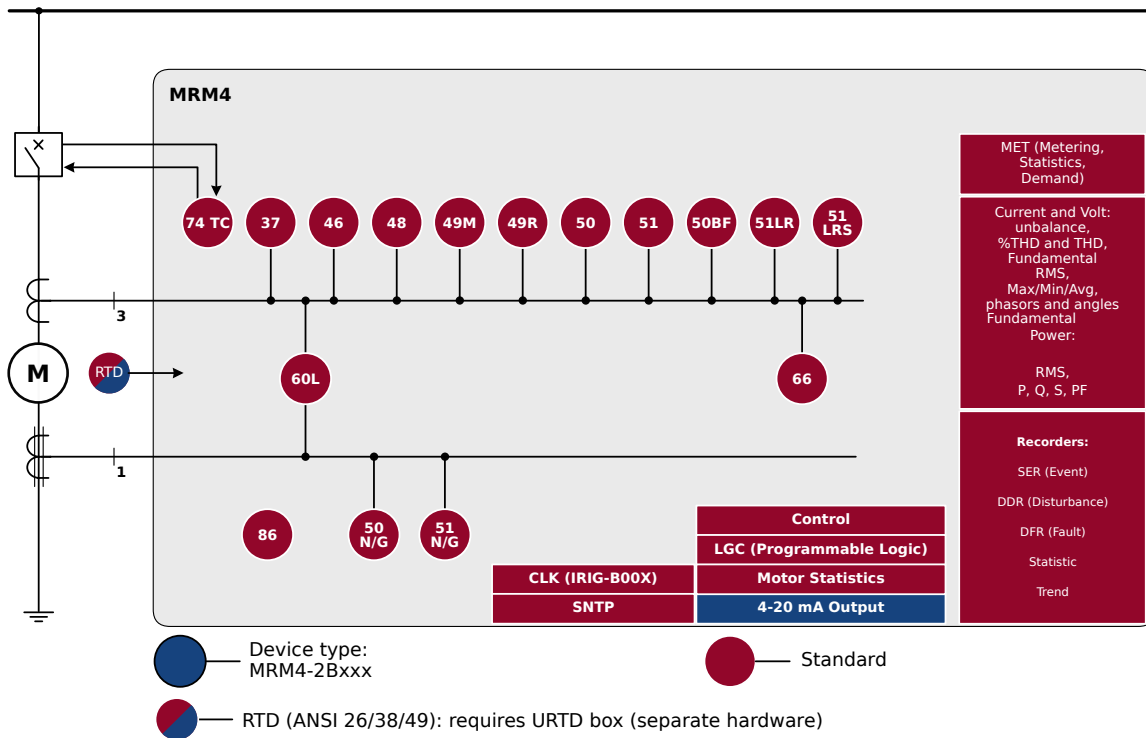‣ Up to 80 logic equations for protection, control and monitoring

TIME SYNCHRONISATION
‣ SNTP, IRIG-B00X, Modbus, DNP 3.0, IEC 60870-5-103/-104

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

DIMENSIONS OF THE DEVICE VARIANT FOR DOOR MOUNTING

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

FUNCTIONAL OVERVIEW IN ANSI / IEEE C37.2 FORM

MRM4

74 TC | 37 | 46 | 48 | 49M | 49R | 50 | 51 | 50BF | 51LR | 51 LRS

60L

66

86 | 50 N/G | 51 N/G

RTD

M

3

1

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

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

Recorders:

SER (Event)

DDR (Disturbance)

DFR (Fault)

Statistic

Trend

Device type: MRM4-2Bxxx

Standard

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

APPROVALS / STANDARDS

CE

certified regarding UL508 (Industrial Controls)

certified regarding CSA-C22.2 No. 14 (Industrial Controls)
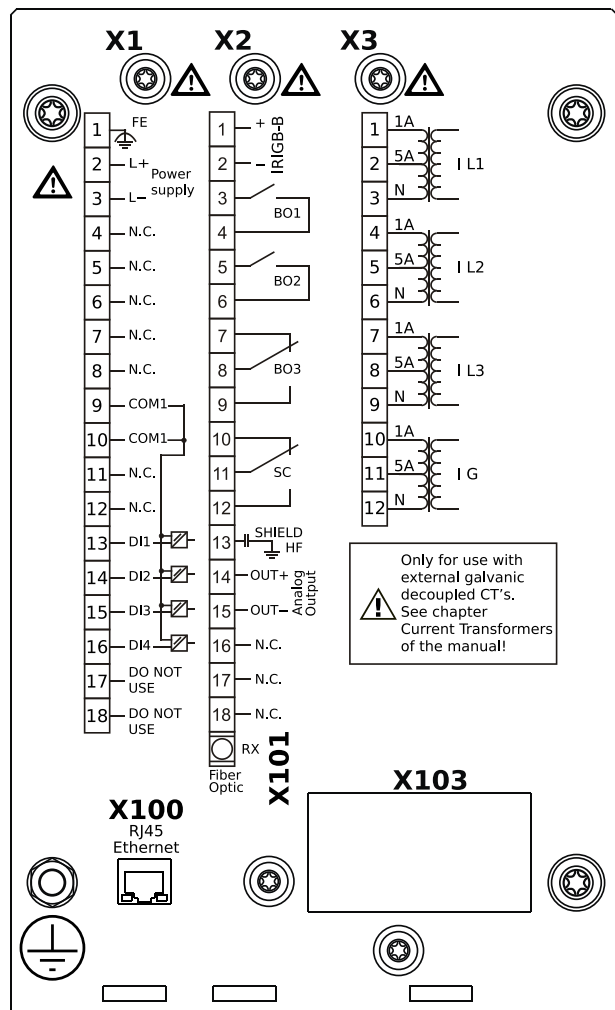
certified by EAC (Eurasian Conformity)

Type tested and certified by KEMA Laboratories in accordance with the complete type test requirements of IEC 60255-1:2009.

KEMA

KESCO
동일성 선언서
(Declaration of Identity)

Fulfills the requirements of the German grid code standard VDE-AR-N 4110 (2018-11)
Complies with IEEE 1547-2003.
Amended by IEEE 1547a-2014.
Complies with ANSI C37.90-2005.

CONNECTIONS (EXAMPLE)

X1

1	FE
2	L+
3	L−	Power supply
4	N.C.
5	N.C.
6	N.C.
7	N.C.
8	N.C.
9	COM1
10	COM1
11	N.C.
12	N.C.
13	DI1
14	DI2
15	DI3
16	DI4
17	DO NOT USE
18	DO NOT USE

X2

1	+
2	−	IRIGB-B
3	
4	BO1
5	
6	BO2
7	
8	BO3
9	
10	
11	SC
12	
13	SHIELD HF
14	OUT+
15	OUT−	Analog Output
16	N.C.
17	N.C.
18	N.C.

RX
Fiber Optic

X3

1	1A
2	5A	I L1
3	N
4	1A
5	5A	I L2
6	N
7	1A
8	5A	I L3
9	N
10	1A
11	5A	I G
12	N

Only for use with external galvanic decoupled CT's. See chapter Current Transformers of the manual!

X101

X100
RJ45 Ethernet

X103

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	
Housing suitable for door mounting	A
Housing suitable for 19" rack 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, IEC60870-5-104 | *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	IP54
Dimensions of housing (W x H x D)	19" flush mounting: 141.5 mm × 173 mm × 208 mm
	5.571 in. × 6.811 in. × 8.228 in.
	Door mounting: 141.5 mm × 183 mm × 208 mm
	5.571 in. × 7.205 in. × 8.228 in.
Weight (max. components)	approx. 2.9 kg / 6.39 lb

**19 " Variants Available! **

https://docs.SEGelectronics.de/hpt-2

CONTACT:

SEG Electronics GmbH
Krefelder Weg 47
D–47906 Kempen (Germany)
P.O.Box 10 07 55
D–47884 Kempen (Germany)

Sales
Telephone
+49 (0) 21 52 145 331
Telefax
+49 (0) 21 52 145 354
E-Mail
sales@SEGelectronics.de

Service & Support
Telephone
+49 (0) 21 52 145 614
Telefax
+49 (0) 21 52 145 354
E-Mail
support@SEGelectronics.de

For distributor information, visit
http://www.SEGelectronics.de

For more information please contact:

Subject to alterations, errors excepted.

DOK-FLY-MRM4-2E_Rev. P