SEG electronics

HighPROTEC | PROTECTION TECHNOLOGY MADE SIMPLE

MRMV4 | MOTOR PROTECTION DEVICE

NEW FEATURES – RELEASE 3.7

- Improved frequency and ROCOF precision
- Improved design of the PC tools
- Configurable SCADA protocols:
- Modbus, Profibus, IEC 60870-5-103/-104, DNP3

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

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.
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 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 external temperature box 26 (type MRMV4-2B
- Wattmetric Ground Fault Protection

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

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

MOTOR START RECORDER

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

STATISTIC RECORDER

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

SUPERVISION FUNCTIONS

- Breaker Failure, Trip Circuit Superv.
- Loss of Potential, Switch onto Fault

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

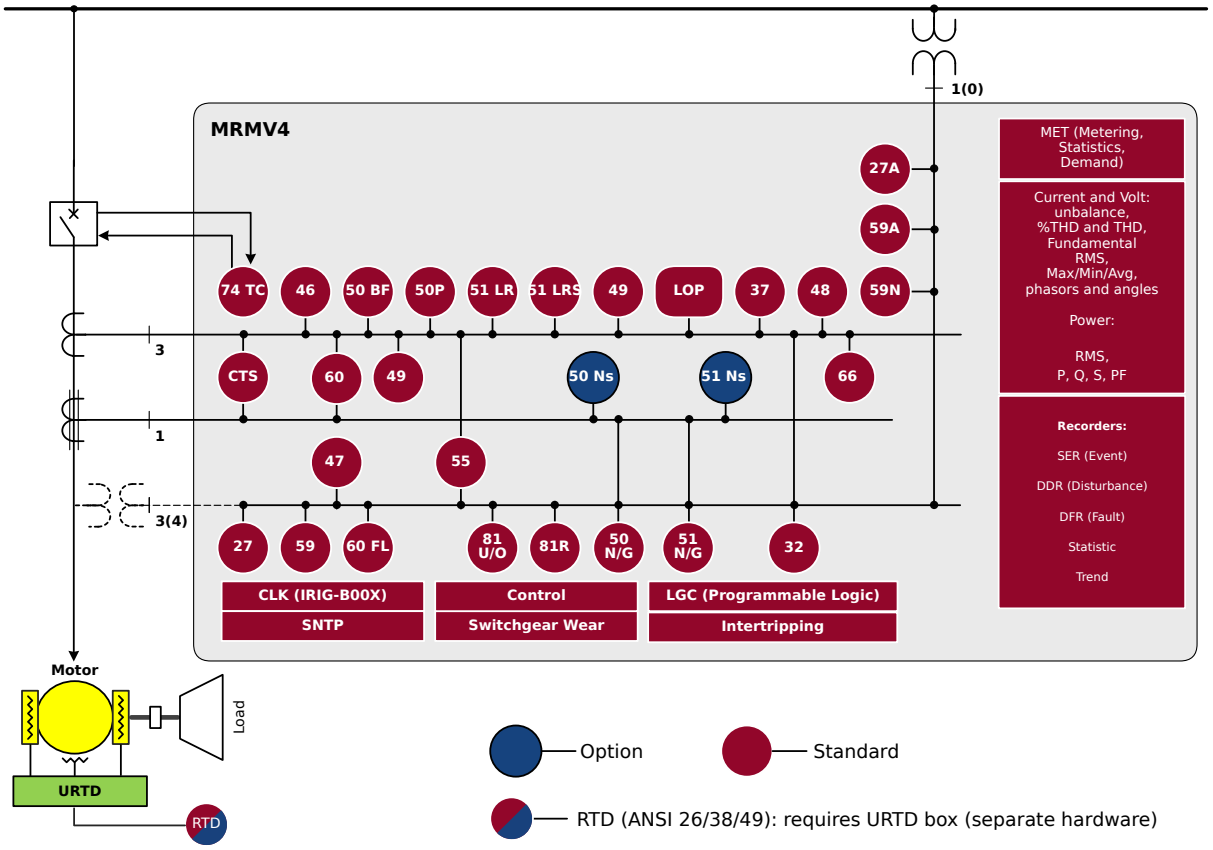
TIME SYNCHRONISATION

- 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		50P, 51P
Voltage controlled overcurrent protection by means of adaptive parameters. Voltage dependent overcurrent protection Negative phase sequence overcurrent protection	6	51C 51V 51Q
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	2	51LR
Locked rotor Protection		51LRS
Motor start		48
Starts per Hour		66
Start control input		
Reversing mode		
Emergency start		
V<, V>, V(t)<, under- and overvoltage protection, time dependent undervoltage protection	6	27, 59
Voltage asymmetry supervision (V012) V1, under and overvoltage in positive phase sequence system V2, overvoltage in negative phase sequence system	6	47
Each of the six frequency protection elements can be used as:	6	
→ f< or f> (over- or under frequency supervision)		81U/O
→ df/dt rate of change of frequency (ROCOF)		81R
→ (f< and df/dt) or (f> and df/dt) combination of over-, under- and ROCOF)		
→ (f< and DF/DT) or (f> and DF/DT) combination of over-, under- and increase of frequency		
→ Delta Phi (Vector surge)		78
VX, residual voltage protection	2	59N
PQS, Power protection	6	32, 37
PF, Power factor	2	55
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		
CBF, circuit breaker failure protection	1	50BF/62BF
TCS, trip circuit supervision	1	74TC
LOP, loss of potential	1	60FL
CTS, current transformer supervision	1	60L
SOTF, switch onto fault	1	
Demand management and peak value supervision (current and power)		
THD supervision		
Breaker wear with programmable wear curves		
Recorders: Disturbance, fault, event, trend, start and statistic recorders		

FUNCTIONAL OVERVIEW IN ANSI / IEEE C37.2 FORM



APPROVALS / STANDARDS

certified regarding UL508
(Industrial Controls)

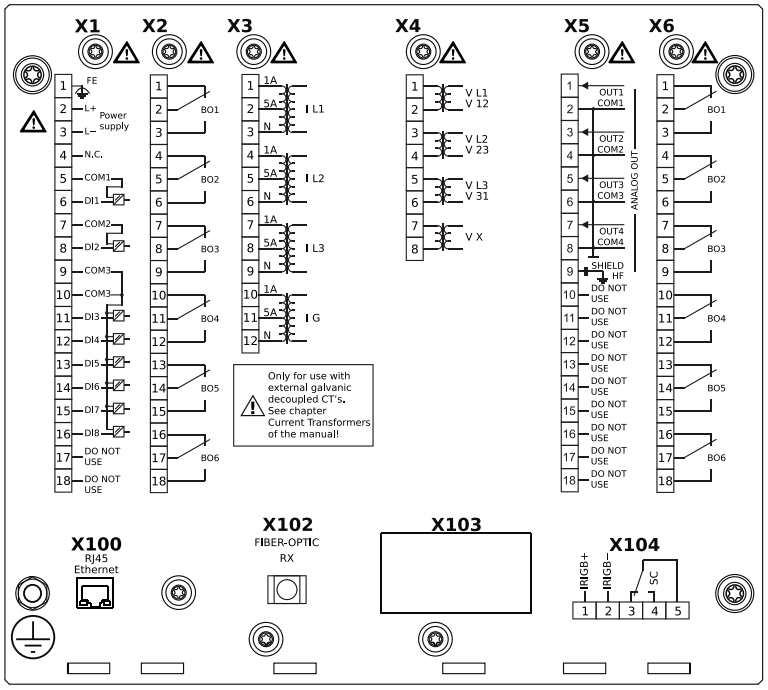
certified regarding
CSA-C22.2 No. 14
(Industrial Controls)

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.

KESCO
동일성 선언서
(Declaration of Identity)

CONNECTIONS (EXAMPLE)



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

ORDER FORM MRMV4

Motor Protection	MRMV4	-2					
Version 2 with USB, enhanced communication and user options							
Digital Inputs	**Binary output relays**	**Analog Inputs/ Outputs**	**Housing**	**Large display**			
8	7	0/4	B2	-	A		
8	13	0/4	B2	-	C		
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, IEC 60870-5-103, DNP 3.0 RTU | *RS485/terminals*							B*
Modbus TCP, DNP 3.0 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, 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, IEC 60870-5-104 | *Ethernet 100MB/RJ45*							H*
IEC 60870-5-103, Modbus RTU, DNP 3.0 RTU | *RS485/terminals* Modbus TCP, DNP 3.0 TCP/UDP, IEC 60870-5-104 | *Ethernet 100 MB/RJ45*							I*
IEC 61850, Modbus TCP, DNP 3.0 TCP/UDP, IEC 60870-5-104 | *Optical Ethernet 100MB/LC duplex connector*							K*
Modbus TCP, DNP 3.0 TCP/UDP, IEC 60870-5-104 | *Optical Ethernet 100MB/LC duplex connector*							L*
IEC 60870-5-103, Modbus RTU, DNP 3.0 RTU | *RS485/terminals* IEC 61850, Modbus TCP, DNP 3.0 TCP/UDP, IEC 60870-5-104 | *Ethernet 100 MB/RJ45*							T*
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	
Analog outputs (Type C)	0 ... 20mA / 4 ... 20mA / 0 ... 10V	
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:	212.7 mm × 173 mm × 208 mm 8.374 in. × 6.811 in. × 8.189 in.
	Door mounting:	212.7 mm × 183 mm × 208 mm 8.374 in. × 7.205 in. × 8.189 in.
Weight (max. components)	approx. 4.2 kg / 9.26 lb	

19 " Variants Available! **

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

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