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WOODWARD

HighPROTEC | PROTECTION TECHNOLOGY MADE SIMPLE

MRMV4 | MOTOR PROTECTION DEVICE

NEW FEATURES – Release 3.6

- VDE-AR-N 4110
- G99 Issue 1 Amendment 3
- Wattmetric Ground Fault Protection
- IEC 60870-5-104
- SCADApter for Retrofit
- Usability improvements
- IT Security
- Improved Frequency and ROCOF precision*

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, under-current 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
- 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

PC TOOLS

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

*5 mHz from 45-55 Hz

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)

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

COUNTERS

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

COMMUNICATION OPTIONS

- IEC 61850, IEC 60870-5-103, IEC60870-5-104, Profibus DP
- Modbus RTU and/or Modbus TCP
- DNP 3.0 (RTU, TCP, UDP)
- SCADApter for Retrofit

IT SECURITY

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

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-B00X, Modbus, DNP 3.0, IEC 60870-5-103/-104

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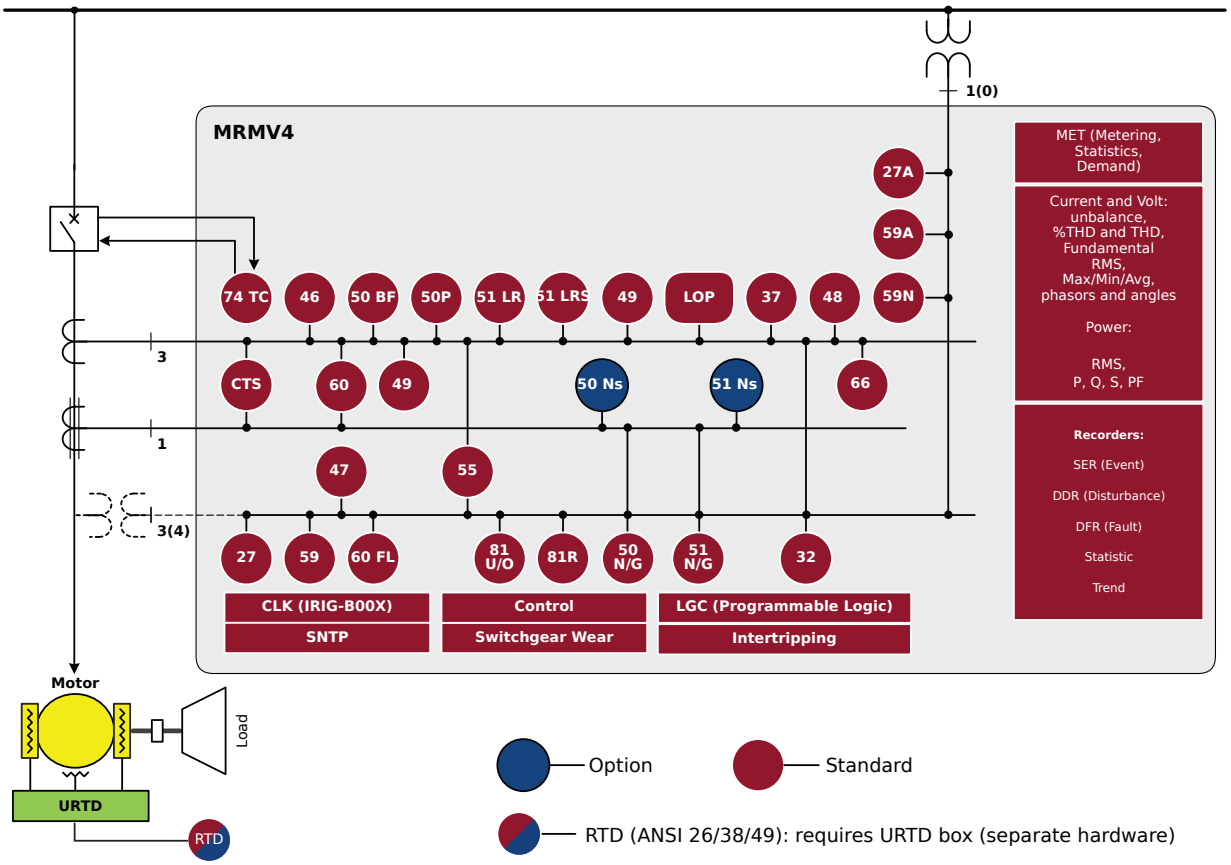
FUNCTIONAL OVERVIEW

	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 FORM



APPROVALS

certified regarding UL508
(Industrial Controls)

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

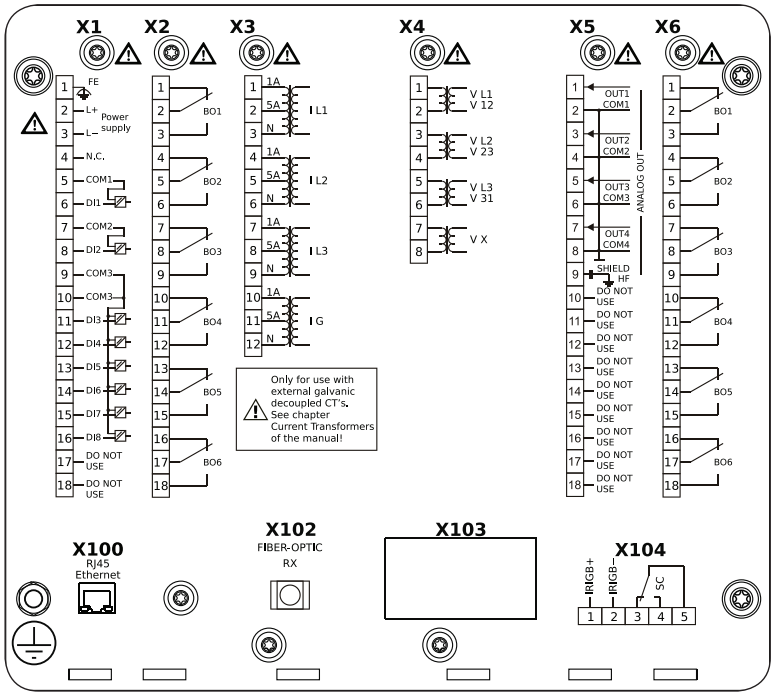
Type tested according to
IEC60255-1

certified by EAC
(Eurasian Conformity)

KESCO
동일성 선언서
(Declaration of Identity)

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

CONNECTIONS *(EXAMPLE)*



Complies with "Engineering Recommendation G59 Issue 3 Amendment 4 – July 2018".

Complies with "Engineering Recommendation G99 Issue 1 Amendment 3 – May 2018 ".

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MRMV4 | MOTOR PROTECTION DEVICE

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
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 × H × 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 / 9.259 lb

19" Variants Available! **

http://wwdmanuals.com/hpt-2

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