High**PRO**TEC | PROTECTION TECHNOLOGY MADE SIMPLE

MRMV4 | MOTOR PROTECTION DEVICE

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 trending recorders.

APPLICABLE FOR:

→ Low and high voltage asynchronous motors

ALL INCLUSIVE:

→ All protection features without extra charge
→ Para. setting and evaluation software
→ Disturbance record analysis software

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)

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

CONTROL

→ of a switchgear

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
→ Used thermal capacity
→ Successful starts
→ Temperature profile (optional)

TRENDING RECORDER

→ Up to 10 selectable values with a selectable time window like IL1RMS, IL2RMS, IL3RMS, Thermal capacity…

ADDITIONAL RECORDERS

→ Disturbance Recorder
→ Fault Recorder
→ Event Recorder
→ Statistic Recorder

COUNTERS

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

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.
→ Sine wave generator for testing and fault simulation.

SETTING SUPPORT

→ Copy parameter sets
→ Compare parameter sets
→ Setting files are up and down convertible (across versions)

LOGIC

→ Up to 80 logic equations

COMMUNICATION OPTIONS

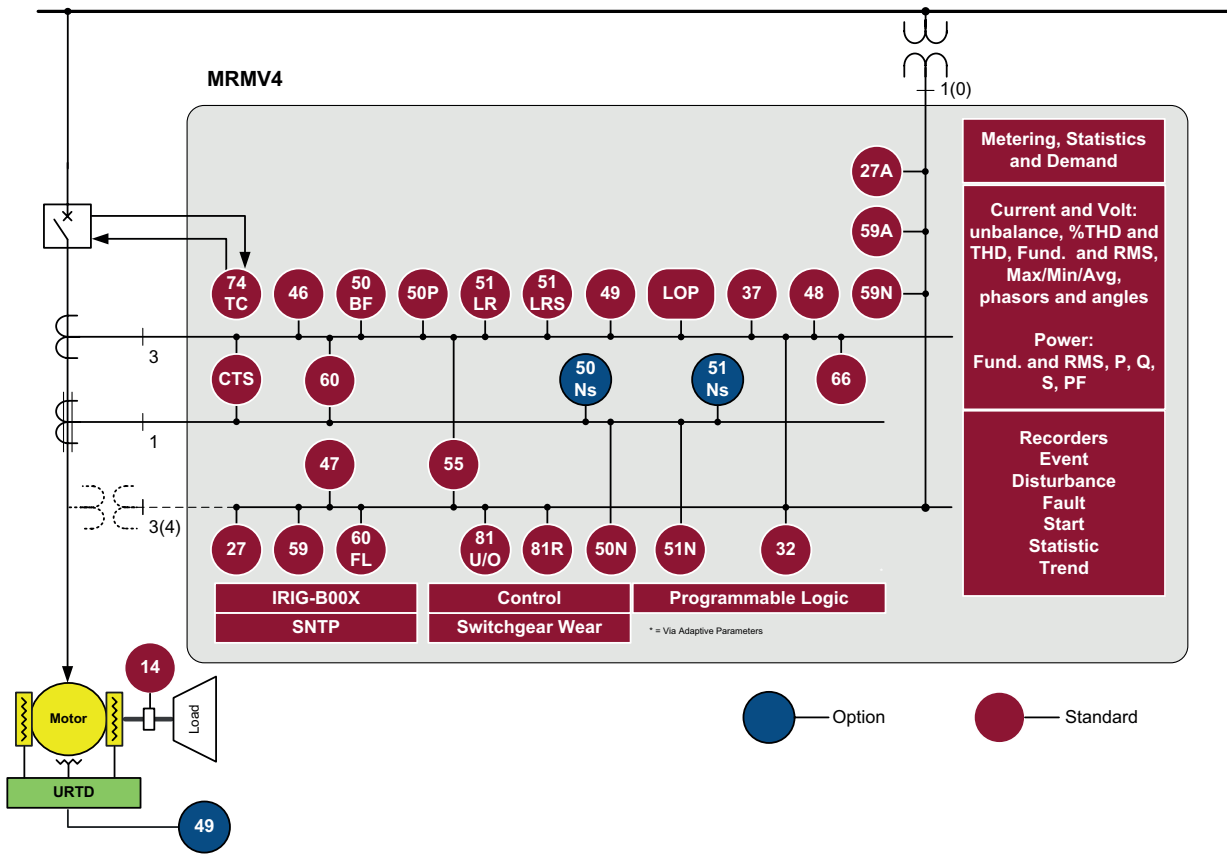→ IEC61850, Profibus DP, Modbus RTU, Modbus TCP, IEC60870-5-103

TIME SYNCHRONISATION

→ SNTP or IRIG-B00X

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, 51N
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 stages 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 switchgears		
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
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		
Switchgear wear with programmable wear curves		
Recorders: Disturbance, fault, event, trend, start and statistic recorders		

FUNCTIONAL OVERVIEW IN ANSI FORM

MRMV4

1(0)

Function blocks	
74 TC	46	50 BF	50P	51 LR	51 LRS	49	LOP	37	48	59N
CTS	60			50 Ns		51 Ns		66		
47		55						
27	59	60 FL	81 U/O	81R	50N	51N	32

27A
59A

Metering, Statistics and Demand

Current and Volt: unbalance, %THD and THD, Fund. and RMS, Max/Min/Avg, phasors and angles

Power: Fund. and RMS, P, Q, S, PF

Recorders Event Disturbance Fault Start Statistic Trend

| IRIG-B00X | Control | Programmable Logic |
| SNTP | Switchgear Wear | * = Via Adaptive Parameters |

Motor
Load
URTD
14
49

● — Option ● — Standard

APPROVALS

CE

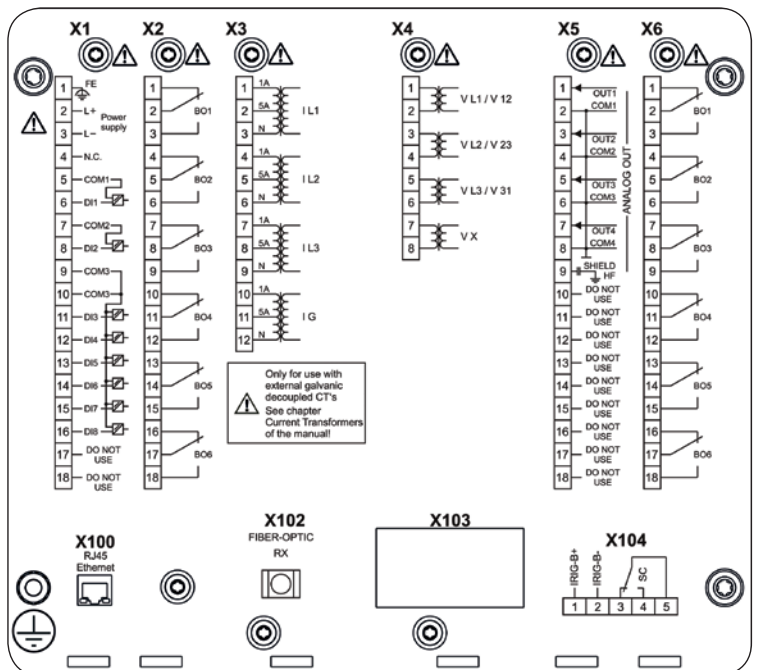UL ® certified regarding UL508 (Industrial Controls)

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

EAC certified by EAC (Eurasian Conformity)

Type tested according to IEC60255-1

CONNECTIONS

ORDER FORM MRMV4

Motor Protection					MRMV4				
Analog output	**RTD remote interface**	**Digital inputs**	**Output relays**	**Housing**					
4	X	8	7	B2	A				
4	X	8	13	B2	C				

Hardware variants

Phase current 1 A/5 A, earth current 1 A/5 A	0
Phase current 1 A/5 A, sensitive earth current 1 A/5 A	1

Housing and mounting

Door mounting	A
Door mounting 19" (flush mounting)	B

Communication protocol

Without protocol	A
Modbus RTU, IEC60870-5-103, IRIG-B (terminals), RS485/terminals	B
Modbus TCP, IRIG-B (terminals), Ethernet 100MB/RJ45	C
Profibus-DP, IRIG-B (terminals), optic fibre	D
Profibus-DP, IRIG-B (terminals), RS485/D-SUB	E
Modbus RTU, IEC 60870-5-103, IRIG-B (terminals), optic fibre	F
Modbus RTU, IEC 60870-5-103, IRIG-B (terminals), RS485/D-SUB interface	G
IEC 61850, Ethernet 100MB/RJ45	H

Available menu languages

Standard English/German/Russian/Polish/Portugiesisch/French

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 short-circuiters
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 (Front)	IP54
Dimensions of housing (W x H x D)	19" flush mounting: 212.7 mm x 173 mm x 209 mm
	8.374 in. x 7.205 in. x 8.228 in.
	Door mounting 212.7 mm x 183 mm x 209 mm
	8.374 in. x 7.205 in. x 8.228 in.
Weight (max. components)	approx. 4.2 kg