Motor Protection Features Overview

(✔ = Standard, ○ = Option)

Protection functions	ANSI	MRMV4-2	MRM4-2	MRM3-2-I	MRM3-2-IE	XM1
Overexcitation V/Hz	24					
Synchro check	25					
Undervoltage	27	✔				
Power protection: P, Q, Qr, S, Pr	32F, 37F, 32Q, 37Q, 37QR, 32S, 37S, 37R	✔				
I< underload protection steps	37	✔	✔	✔	✔	✔
Negative sequence elements (current/DEFT/INV)	46	✔	✔	✔	✔	✔
Negative/positive sequence elements (voltage)	47	✔				
Motor - Start supervision	48	✔	✔	✔	✔	
Overload protection with thermal replica	49	✔	✔	✔	✔	✔
Circuit breaker failure protection	50BF / 62BF	✔	✔	✔	✔	
Phase current elements (non-directional)	50/51			✔	✔	50
Earth current elements (non-directional)	50N / 51N	✔	✔		✔	✔
Negative sequence elements (current/IEC/ANSI curves)	51Q	✔	✔			
Motor - JAM protection	50J	✔	✔			
Motor - Locked rotor protection	51 LRS / 51 LR	✔	✔	✔	✔	✔
Power factor cos (φ)	55	✔				
Overvoltage	59	✔				
Residual voltage elements	59N	✔				
Voltage transformer supervision	60FL	✔				
Current transformer supervision	60L	✔	✔			
Motor - Start supervision	66	✔	✔	✔	✔	
Trip circuit supervision	74TC	✔	✔			
Vector surge	78	✔				
Underfrequency / Overfrequency	81 O/U	✔				
Frequency gradient (ROCOF)	81R	✔				
Lockout function	86	✔	✔			
Breaker Wear Monitor	BKM	✔	✔			
Protection parameter sets		4	4	2	2	
Reverse interlocking		✔	✔			
Event, failure and disturbance recorder		✔	✔	✔	✔	
Trend recording		✔	✔			

Control

		MRMV4-2	MRM4-2	MRM3-2-I	MRM3-2-IE	XM1
Control function for 1 / up to 6 switchgear(s)		1	1			
Logic (up to 80 equations)		✔	✔			

Measuring functions

		MRMV4-2	MRM4-2	MRM3-2-I	MRM3-2-IE	XM1
Currents		✔	✔			
Thermal overload θ		✔	✔			
Voltages		✔				
Frequency		✔				

Hardware

		MRMV4-2	MRM4-2	MRM3-2-I	MRM3-2-IE	XM1
Number of binary output relays (depends on type of device)		7/13	6/4	4	4	2
Number of digital inputs (depends on type of device)		8/8	8/4	7	7	
Number of analog inputs and outputs (depends on type of device)		0+4	0+1			

Communication

		MRMV4-2	MRM4-2	MRM3-2-I	MRM3-2-IE	XM1
IEC61850 (RJ45 or fiber optic [FO] LC)		○	○			
RS485 Open Data				✔	✔	○
MODBUS RTU (via fiber optic [FO] ST or RS485)		○	○	○	○	
Modbus TCP (RJ45 or fiber optic [FO] LC)		○	○			
IEC60870-5-103 (via fiber optic [FO] ST or RS485)		○	○			
Profibus DP (via fiber optic [FO] ST or RS485)		○	○			
DNP3.0 RTU (via fiber optic [FO] ST or RS485)		○	○			
DNP3.0 TCP (RJ45 or fiber optic [FO] LC)		○	○			
IRIG-B interface (time synchronization)		✔	✔			