Feeder Protection Features Overview

(✔ = Standard, ○ = Option)

Protection functions	ANSI	MCA4-2	MRA4-2	MRI4-2	MRI3-I	MRI3-IR	MRI3-IRE	MRI3-IRX	MRI3-IRER	MRI3-IRXR	MRI3-IRSR	MRI3-IE	MRI3-IX	MRI3-IER	MRI3-IXR	MRI3-ISR	MRI3-E	MRI3-X	MRI3-ER	MRI3-XR	MRI3-SR	MRI3-IT	MRI3-ITE	MRI3-ITER	MRI3-IHE	MRI3-IHX	XRI1-IE	XRI1-IR	XRI1-ER	XI1-I	XI1-E/-ER	XI1-S/-SR
Synchro check	25	✔	✔																													
Undervoltage	27	✔	✔																													
Power protection: P, Q, Qr, S, Pr	32F, 37F, 32Q, 37Q, 37QR, 32S, 37S, 37R	✔	✔																													
QU protection (undervoltage- directional reactive power protection)	27&32Q<	✔	✔																													
Negative sequence elements (current/DEFT/INV)	46	✔	✔	✔																												
Negative/positive sequence elements (voltage)	47	✔	✔																													
Overload protection with thermal replica	49	✔	✔	✔																												
Circuit breaker failure protection	50BF / 62BF	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔				
Phase current elements (non-directional)	50/51			✔	✔							✔	✔	✔	✔	✔					✔	✔	✔	✔	✔	✔	✔		✔			
Phase current elements (non-directional and directional)	67	✔	✔			✔	✔	✔	✔	✔	✔																	✔				
Earth current elements (non-directional)	50N / 51N			✔			✔					✔					✔					✔	✔	✔	✔					✔	✔
Earth current elements (non-directional and directional)	67N	✔	✔						✔	✔	✔			✔	✔	✔			✔	✔	✔							✔				
Inrush detection IH2 (2nd harmonic)		✔	✔	✔																					✔	✔						
Voltage controlled current protection	51C	✔	✔																													
Voltage restraint current protection	51V	✔	✔																													
Negative sequence elements (current/IEC/ANSI curves)	51Q	✔	✔																													
Power factor cos (φ)	55	✔	✔																													
Overvoltage	59	✔	✔																													
Residual voltage elements	59N	✔	✔																													
Voltage transformer supervision	60FL	✔	✔																													
Current transformer supervision	60L	✔	✔	✔																												
Trip circuit supervision	74TC	✔	✔	✔																												
Vector surge	78	✔	✔																													
Auto reclosing	79	✔	✔	✔																												
Underfrequency / Overfrequency	81 O/U	✔	✔																													
Frequency gradient (ROCOF)	81R	✔	✔																													
Lockout function	86	✔	✔	✔																												
Breaker Wear Monitor	BKM	✔	✔	✔																												
Protection parameter sets		4	4	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2						
Reverse interlocking		✔	✔	✔																												
Event, failure and disturbance recorder		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔						
Trend recording		✔	✔	✔																												
Control																																
Control function for 1 / up to 6 switchgear(s)		6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1						
Logic (up to 80 equations)		✔	✔	✔																												
Measuring functions																																
Currents		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔					✔	✔	✔	✔	✔							
Thermal overload θ		✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔						
Voltages		✔	✔																													
Frequency		✔	✔																													
Hardware																																
Sensitive Earth (Ground) Current		✔	✔	✔				✔		✔			✔		✔			✔		✔					✔			✔				
Number of binary output relays (depends on type of device)		7/13	7/13	6	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2				
Number of digital inputs (depends on type of device)		8/16	8/16	8	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Communication																																
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)		✔	✔	✔																												