HighPROTEC Features Overview

(✔ = Standard, ○ = Option)

Protection functions	ANSI	MCA4-2	MRA4-2	MRI4-2	MRU4-2	MCDTV4-2	MRDT4-2	MCDGV4-2	MCDLV4-2	MRMV4-2	MRM4-2
Phase Distance Protection	21P							✔			
Overexcitation V/Hz	24					✔		✔	✔		
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<	✔	✔			✔		✔	✔		
I< underload protection steps	37									✔	✔
Loss of excitation	40							✔			
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			✔			✔		✔		
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	✔	✔			✔		✔	✔	✔	✔
Motor - JAM protection	50J									✔	✔
Motor - Locked rotor protection	51 LRS / 51 LR									✔	✔
Power factor cos (φ)	55	✔	✔			✔		✔	✔	✔	
Overvoltage	59	✔	✔		✔	✔		✔	✔	✔	
Residual voltage elements	59N	✔	✔		✔	✔		✔	✔	✔	
100% stator earth fault protection	59TN / 27TN							✔			
Voltage transformer supervision	60FL	✔	✔		✔	✔		✔	✔	✔	
Current transformer supervision	60L	✔	✔	✔		✔	✔	✔	✔	✔	✔
Rotor earth fault	64										
Generator Rotor Protection	64N, 40 / 76										
Motor - Start supervision	66									✔	✔
Out of Step Tripping / Power Swing Blocking (Pole Slip Protection)	68 / 78							✔			
Trip circuit supervision	74TC	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Vector surge	78	✔	✔		✔	✔		✔	✔	✔	
Auto reclosing	79	✔	✔	✔					✔		
Underfrequency / Overfrequency	81 O/U	✔	✔		✔	✔		✔	✔	✔	
Frequency gradient (ROCOF)	81R	✔	✔		✔	✔		✔	✔	✔	
Lockout function	86	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Generator differential protection	87G					✔	✔	✔	✔		
Transformer differential protection	87T					✔	✔	✔	✔		
Cable / Line differential protection	87L								✔		
Restricted earth fault elements	87N (64REF)					✔	✔	✔			
Breaker Wear Monitor	BKM	✔	✔	✔		✔	✔	✔	✔	✔	✔
Protection parameter sets		4	4	4	4	4	4	4	4	4	4
Reverse interlocking		✔	✔	✔		✔	✔	✔	✔	✔	✔
Event, failure and disturbance recorder		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Trend recording		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Control											
Control function for 1 / up to 6 switchgear(s)		6	1	1	1	6	2	6	6	1	1
Logic (up to 80 equations)		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Measuring functions											
Currents		✔	✔	✔		✔	✔	✔	✔	✔	✔
Thermal overload θ		✔	✔	✔		✔	✔	✔	✔	✔	✔
Voltages		✔	✔		✔	✔		✔	✔	✔	
Frequency		✔	✔		✔	✔		✔	✔	✔	
Hardware											
Number of binary output relays (depends on type of device)		7/13	7/13	6	6	11/11	7/13	11/11/11/16	7/13/20	7/13	6/4
Number of digital inputs (depends on type of device)		8/16	8/16	8	8	16/8	8/16	16/8/24/16	8/16/24	8/8	8/4
Number of analog inputs and outputs (depends on type of device)						0/2+2		0/2+2/0/0		0+4	0+1
Communication											
IEC61850 (RJ45 or fiber optic [FO] LC)		○	○	○	○	○	○	○	○	○	○
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)		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔