

			Feeder protection	Transformer protection		Machine protection	Line protection			Busbar protection
Protection functions	IEC	ANSI	AQ F350	AQ T352	AQ T393	AQ G 357	AQ L350	AQ L357	AQ L359	AQ B398
Three-phase instantaneous overcurrent protection	I >>>	50	✓	✓	✓	✓	✓	✓	✓	
Three-phase time overcurrent protection	I >, I >>	51	✓	✓	✓	✓	✓	✓	✓	
Residual instantaneous overcurrent protection	I0 >>>	50N	✓	✓	✓	✓	✓	✓	✓	
Residual time overcurrent protection	I0 >, I0 >>	51N	✓	✓	✓	✓	✓	✓	✓	
Directional three-phase overcurrent protection	I Dir >, I Dir >>	67	✓			✓	✓	✓	✓	
Directional residual overcurrent protection	I0 Dir >, I0 Dir >>	67N	✓			✓	✓	✓	✓	
Line differential	3I _d L >	87L					✓		✓	
5-zone distance protection	Z <	21						✓	✓	
Teleprotection		85						✓	✓	
Out-of step	ΔZ/Δt	78						✓	✓	
Power swing block	ΔZ/Δt	68						✓	✓	
Inrush detection and blocking	I _{2h} >	68	✓	✓	✓	✓	✓	✓	✓	
Current unbalance protection	I _{ub} >	46	✓	✓	✓	✓	✓	✓	✓	
Thermal protection	T >	49	✓	✓	✓	✓	✓	✓	✓	
Transformer differential	3I _d T >	87T		✓ (2 winding)	✓ (3 winding)					
Generator differential	3I _d T >	87G				✓				
Restricted earth fault	REF	87N		✓	✓					
Definite time overvoltage protection	U >, U >>	59	✓	option	option	✓	✓	✓	✓	
Definite time undervoltage protection	U <, U <<	27	✓	option	option	✓	✓	✓	✓	
Residual voltage protection	U0 >, U0 >>	59N	✓	option	option	✓	✓	✓	✓	
Overfrequency protection	f >, f >>	81O	✓	option	option	✓	✓	✓	✓	
Underfrequency protection	f <, f <<	81U	✓	option	option	✓	✓	✓	✓	
Rate of change of frequency protection	df/dt	81R	✓	option	option	✓	✓	✓	✓	
Overexcitation	V/Hz	24		option	option	✓				
Loss of field	X <	40				✓				
Reverse/under/overpower protection	P	32				✓				
Synchrocheck	SYNC	25	✓			✓	✓	✓	✓	
Auto-reclose	0 -> 1	79	✓				✓	✓	✓	
Fuse failure	VTS	60	✓	option	option	✓	✓	✓	✓	
Switch onto fault logic	SOTF		✓				✓	✓	✓	
Breaker failure protection	CBFP	50BF	✓	✓	✓	✓	✓	✓	✓	✓
Busbar protection main unit	3I _d B >	87B								✓
Distributed busbar protection sub-unit feature	3I _d B >	87B	option	option	option	option	option	option	option	
Current (I1, I2, I3, Io)			✓	✓	✓	✓	✓	✓	✓	✓
Voltage (U1, U2, U3, U12, U23, U31, Uo) and frequency			✓	option	option	✓	✓	✓	✓	✓
Power (P, Q, S, pf) and Energy (E+, E-, Eq+, Eq-)			✓	option	option	✓	✓	✓	✓	✓
Circuit breaker wear			✓	✓	✓	✓	✓	✓	✓	✓
Supervised trip contacts (TCS)			4	4	4	4	4	4	4	8
Controllable objects			6	6	6	6	6	6	6	
Status indications			2	2	2	2	2	2	2	
Automatic voltage regulator (AVR) / tap change control				option	option					
Current inputs			4	8	12	8	4	4	4	Max 24
Voltage inputs			4	4 (optionally)	4	4	4	4	4	Max 8
Digital inputs			12 (24/36)	12 (24/36)	12 (24...168)	12 (16/36)	12 (24/36)	12 (24/36)	12 (24/36)	32
Digital outputs			8 (16/24)	8 (16/24)	8 (16...112)	8 (16/24)	8 (16/24)	8 (16/24)	8 (16/24)	16
Fast trip outputs			4	4	4	4	4	4	4	8
Non-volatile disturbance records			100	100	100	100	100	100	100	100
Non-volatile event records			10000	10000	10000	1000	10000	10000	10000	10000
Ethernet over board (front port)			✓	✓	✓	✓	✓	✓	✓	✓
IEC 61850			option	option	option	option	option	option	option	option
IEC 60870-5-101, 103, 104			✓	✓	✓	✓	✓	✓	✓	✓
Modbus RTU and Modbus TCP/IP			✓	✓	✓	✓	✓	✓	✓	✓
DNP 3.0 and DNP 3.0 over TCP/IP			✓	✓	✓	✓	✓	✓	✓	✓