

The main protection functions are listed with a brief definition in the table below. They are listed in numerical order by ANSI C37.2 code.

ANSI code	Name of function	Definition
12	Overspeed	Detection of rotating machine overspeed
14	Underspeed	Detection of rotating machine underspeed
21	Distance protection	Impedance measurement detection
21B	Underimpedance	Back-up phase-to-phase short-circuit protection for generators
24	Flux control	Overfluxing check
25	Synchro-check	Check before paralleling two parts of the power system
26	Thermostat	Protection against overloads
27	Undervoltage	Protection for control of voltage sags
27D	Positive sequence undervoltage	Protection of motors against operation with insufficient voltage
27R	Remanent undervoltage	Check on the disappearance of voltage sustained by rotating machines after the power supply is disconnected
27TN	Third harmonic undervoltage	Detection of stator winding insulation earth faults (impedant neutral)
32P	Directional active overpower	Protection against active overpower transfer
32Q	Directional reactive overpower	Protection against reactive overpower transfer
37	Phase undercurrent	3-phase protection against undercurrent
37P	Directional active underpower	Protection against active underpower transfer
37Q	Directional reactive underpower	Protection against reactive underpower transfer
38	Bearing temperature monitoring	Protection against overheating of rotating machine bearings
40	Field loss	Protection of synchronous machines against faults or field loss
46	Negative sequence / unbalance	Protection against unbalanced phase current
47	Negative sequence overvoltage	Negative sequence voltage protection and detection of reverse rotation of rotating machines
48 - 51LR	Excessive starting time and locked rotor	Protection of motors against starting with overloads or reduced voltage, and for loads that can block
49	Thermal overload	Protection against overloads
49T	RTDs	Protection against overheating of machine windings
50	Instantaneous phase overcurrent	3-phase protection against short-circuits
50BF	Breaker failure	Checking and protection if the circuit breaker fails to trip after a tripping order
50N or 50G	Instantaneous earth fault	Protection against earth faults: 50N: residual current calculated or measured by 3 CTs 50G: residual current measured directly by a single sensor (CT or core balance CT)
50V	Instantaneous voltage-restrained phase overcurrent	3-phase protection against short-circuits with voltage-dependent threshold
50/27	Inadvertent generator energization	Detection of inadvertent generator energization
51	Delayed phase overcurrent	3-phase protection against overloads and short-circuits
51N or 51G	Delayed earth fault	Protection against earth faults: 51N: residual current calculated or measured by 3 CTs 51G: residual current measured directly by a single sensor (CT or core balance CT)
51V	Delayed voltage-restrained phase overcurrent	3-phase protection against short-circuits with voltage-dependent threshold
59	Overvoltage	Protection against excessive voltage or sufficient voltage detection
59N	Neutral voltage displacement	Insulation fault protection
63	Pressure	Detection of transformer internal faults (gas, pressure)
64REF	Restricted earth fault differential	Earth fault protection for star-connected 3-phase windings with earthed neutral
64G	100% generator stator earth fault	Detection of stator winding insulation earth faults (impedant neutral power systems)
66	Successive starts	Protection function that monitors the number of motor starts
67	Directional phase overcurrent	3-phase short-circuit protection according to current flow direction
67N/67NC	Directional earth fault	Earth fault protection depending on current flow direction (NC: Neutral compensated)
78	Vector shift	Vector shift disconnection protection
78PS	Pole slip	Detection of loss of synchronization of synchronous machines
79	Recloser	Automated device that recloses the circuit breaker after transient line fault tripping
81H	Overfrequency	Protection against abnormally high frequency
81L	Underfrequency	Protection against abnormally low frequency
81R	Rate of change of frequency (ROCOF)	Protection for fast disconnection of two parts of the power system
87B	Busbar differential	3-phase protection against busbar internal faults
87G	Generator differential	3-phase protection against internal faults in AC generators
87L	Line differential	3-phase protection against line internal faults
87M	Motor differential	3-phase protection against internal faults in motors
87T	Transformer differential	3-phase protection against internal faults in transformers