

# Selection table for Vamp protection relays

Type of fault	IEEE Device No.	IEC Symbol	Protection function/measurement	Feeder protection								Machine protection								Other									
				VAMP 40	VAMP 50	VAMP 51	VAMP 52	VAMP 55	VAMP 135	VAMP 140	VAMP 230	VAMP 245	VAMP 255	VAMP 257	VAMP 259	VAMP 40	VAMP 52	VAMP 150	VAMP 210	VAMP 230	VAMP 245	VAMP 255	VAMP 257	VAMP 259	VAMP 120	VAMP 121	VAMP 220	VAMP 221	VAMP 260
Short circuit	50/51	3I >	Three-phase non-directional overcurrent, low-set stage, definite or inverse time	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x							
	50/51	3I >>	Three-phase non-directional overcurrent, high-set stage, definite time	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x							
	50/51	3I >>>	Three-phase non-directional overcurrent, high-set stage, definite time	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x							
	67 or 50/51	3I > →	Three-phase directional or non dir. o/c, low-set stage, definite or inverse time								x	x	x	x	x	x	x	x	x	x	x	x							
	67 or 50/51	3I >> →	Three-phase directional or non dir. o/c, high-set stage, definite or inverse time								x	x	x	x	x	x	x	x	x	x	x	x							
	67 or 50/51	3I >>> →	Three-phase directional or non dir. o/c, high-set stage, definite time								x	x	x	x	x	x	x	x	x	x	x	x							
21/21N	Z <	Distance protection, 5 zones polygonal characteristic																											
Earth-fault	50N/51N	I <sub>0</sub> >/ SEF	Non-directional earth-fault, low-set stage, sensitive, definite or inverse time	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x	x								
	50N/51N	I <sub>0</sub> >>	Non-directional earth-fault, high-set stage, definite time	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x							
	50N/51N	I <sub>0</sub> >>>	Non-directional earth-fault, high-set stage, definite time	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x							
	50N/51N	I <sub>0</sub> >>>>	Non-directional earth-fault, high-set stage, definite time	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x							
	67N or 50N/51N	I <sub>0</sub> >/ SEF	Directional or non dir. earth-fault, low-set stage, sensitive, definite or inverse time	x							x	x	x	x	x	x	x	x	x	x	x	x							
	67N or 50N/51N	I <sub>0</sub> >>	Directional or non dir. earth-fault, high-set stage, definite or inverse time	x							x	x	x	x	x	x	x	x	x	x	x	x							
	59N	U <sub>0</sub> >	Residual overvoltage, low-set stage	x							x	x	x	x	x	x	x	x	x	x	x	x							
	59N	U <sub>0</sub> >>	Residual overvoltage, high-set stage	x							x	x	x	x	x	x	x	x	x	x	x	x							
	50N/51N	REF	Restricted earth fault	x	x	x	x				x	x	x	x	x	x	x	x	x	x	x	x							
	Overload	49M	T >	Three-phase thermal overload (motors & generators)																									
49F		T >	Three-phase thermal overload (feeders & cables)	x	x	x	x																						
Voltage	59	1U>/ 3U>	One-/Three-phase overvoltage, low-set stage	1			1	3	3		3		3	3	3														
	59	1U>>/ 3U>>	One-/Three-phase overvoltage, high-set stage	1			1	3	3		3		3	3	3														
	59	1U>>>/ 3U>>>	One-/Three-phase overvoltage, high-set stage	1			1	3	3		3		3	3	3														
	27	1U</ 3U<	One-/Three-phase undervoltage, low-set stage	1			1	3	3		3		3	3	3														
	27	1U<</ 3U<<	One-/Three-phase undervoltage, high-set stage	1			1	3	3		3		3	3	3														
	27	1U<<</ 3U<<<	One-/Three-phase undervoltage, instantaneous stage	1			1	3	3		3		3	3	3														
	27P	U <sub>1</sub> <, U <sub>2</sub> <<	Positive sequence undervoltage								x																		
47	U <sub>2</sub> >, U <sub>2</sub> >>	Negative sequence overvoltage								x																			
Arc protection	50ARC/50NARC	3I>/ I <sub>0</sub> >, L>	Electrical arc protection stage, point sensors, Optional	x	x	x	x																						
	50ARC/50NARC	3I>/ I <sub>0</sub> >, L>	Electrical arc protection with point sensor slave																										
	50ARC/50NARC	3I>/ I <sub>0</sub> >, L>	Electrical arc protection with point, fiber or current sensors slave																										
78	Dα	Vector jump																											
Other functions	79	O → I	Auto-reclosure	x																									
	68	I <sub>2</sub> >	Inrush and cold load detection	x	x	x	x																						
	46	I <sub>2</sub> >>	Phase unbalance / discontinuity protection (broken conductor)	x	x	x	x																						
	46	I <sub>2</sub> >	Phase unbalance protection																										
	47	I <sub>2</sub> >>	Phase sequence / reversal protection																										
	48	I <sub>ST</sub> >	Stall protection																										
	37	3I <	Loss of load / under current protection	x																									
	86		Latched trip	x	x	x	x																						
	87	3 d I >	Three-phase biased differential stage, low-set stage, 2nd harmonic blocking																										
	87	3 d I >>	Three-phase differential stage, high-set stage																										
	66	N>	Frequent start protection																										
	64F3	U <sub>0</sub> >	100 % stator earth fault protection																										
	40	Q <	Underexcitation protection																										
	40	X <, X <<	Loss of excitation protection																										
	32	P <, P <<	One-/Three-phase reverse power and underpower protection	1																									
	24	U <sub>1</sub> >	Volts/hertz overexcitation protection																										
	50BF	CBFP	Circuit breaker failure protection	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x							
	81H/81L	f ><, f >><<	Overfrequency and underfrequency protection																										
	81L	f <, f <<	Underfrequency protection																										
	81R	df/dt	Rate of change of frequency (ROCOF) protection																										
21	Z <, Z <<	Under-impedance protection, circle characteristic																											
51V	I <sub>v</sub> >	Voltage restrained or controlled overcurrent protection																											
25	df, dv	Synchrocheck																											
		Short circuit fault location																											
		8 Programmable stages	x																										
		Disturbance recorder	x	x	x	x																							
Type of measurement	Primary current	3I	Three-phase current	x	x	x	x																						
		3 d I >	Three-phase differential current																										
	Primary voltage	I <sub>0</sub>	Neutral current	x	x	x	x																						
		I <sub>2</sub>	Current unbalance	x	x	x	x																						
		IL	Average and maximum demand current	x	x	x	x																						
	Short-circuit fault reactance	U/3U	One-/Three-phase and line voltages	1			1	3	3		3		3	3	3														
		U <sub>0</sub>	Residual voltage	x																									
	Frequency	U <sub>2</sub>	Voltage unbalance																										
		X <sub>fault</sub>	Short-circuit fault reactance																										
	Power	f	System frequency	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x							
		P	Active power	(x)																									
	Energy	Q	Reactive power	(x)																									
		S	Apparent power	(x)																									
	Power factor	E+, E-	Active Energy, exported / imported	(x)																									
Eq+, Eq-		Reactive Energy, exported / imported	(x)																										
Harmonics	PF	Power factor	(x)																										
	i	2nd to 15th and THD of phase currents	x	x	x	x																							
Voltage sags / swells	U	2nd to 15th and THD of measured voltages																											
	U	Voltage sags / swells																											
Analog mA output, 1 channel	AO	Any measured or calculated value, freely scalable																											
	AO	Any measured or calculated value, freely scalable, Optional	x1	x1	x1	x1																							
Analog mA output, 4 channels	AO	Any measured or calculated value, freely scalable, Optional																											
	AO	Any measured or calculated value, freely scalable, Optional																											

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