Selection Table for VAMP Protection Relays

VTEN017/05.12.2013					Feeder protection											Vacl	nine p	orote	ctior			Arc p	rotec	tion		
Protection and m	neasurement			VAMP 40	VAMP 50	VAMP 52	VAMP 55	VAMP 59	VAMP 230	VAMP 255	VAMP 257	VAMP 259	VAMP 300F, analog card B,C,D		VAMP 40		VAMP 210	VAMP 230	VAMP 255	VAMP 257	VAMP 265 (1	VAMP 265 M	VAMP 300M, analog card B, C, D	VAMP 120	MP 221	VAMP 321
Type of fault	ANSI	IEC Symbol	Protection function/measurement	×	∑	1	>	~	_ ∧	۸۷	_ ∧	_ ∧	B,C	L	\$ \$	\$	\$	2	Š	۸ ۷	Ž	_ ∧	ba de K	\$ \$: \$	8
Short circuit	50/51	3 >	Three-phase non-directional overcurrent, low- set stage, definite or inverse time	•	ŀ	•		•	•	•	•	•	•		• •	·	•	•	•	•	•	•	-			
	50/51	3l>>	Three-phase non-directional overcurrent, high-set stage, definite time	•	•	•		•	•	•	•	•	•		•	•	•	•	•	•	•	•	-			Π
	50/51	31'>	Three-phase non-directional overcurrent, high-set stage, definite or inverse time (secondary side)																		•	•				
	50/51	31'>>	Three-phase non-directional overcurrent, high-set stage, definite time (secondary side)																		•	•				
	50/51	3 >>>	Three-phase non-directional overcurrent, high-set stage, definite time	•	•	•		•	•	•	•	•			• •	•	•	•	•	•			•			
	67 or 50/51	$3 \ge \rightarrow$	Three-phase directional or non dir. o/c, low- set stage, definite or inverse time						-	-	•	•					•	-	•	•			-			
	67 or 50/51	3 >> →	Three-phase directional or non dir. o/c, high- set stage, definite or inverse time						•	•	•	•	÷.,				•	-	•	•			•			
	67 or 50/51	3 >>> →	Three-phase directional or non dir. o/c, high- set stage, definite time						•	•	•	•	•				•	•	•	•			-			
	67 or 50/51	3 >>>> →	Three-phase directional or non dir. o/c, high- set stage, definite time						•	•	•	•	÷.				•	-	•	•			•			
	21/21N	Ζ<	Distance protection, 5 zones polygonal characteristic									•		(1	also fo		ansfor	mer	differe	ential	protec	tion				
Earth-fault	50N/51N	I ₀ >/ SEF	Non-directional earth-fault, low-set stage, sensitive, definite or inverse time	•	•	•		•	•	•	•	•	•	Ĺ		Τ		•	•	•	•	•	-			
	50N/51N	I ₀ >>	Non-directional earth-fault, high-set stage, definite time	•	•	•		•	•	•	•	•			• •	·	•	•	•	•	•	•	-		Γ	
	50N/51N	l ₀ >>>	Non-directional earth-fault, high-set stage, definite time	•	•	•		•	•	•	•	•	\mathbf{r}		•	•	•	•	•	÷	•	•	-			
	50N/51N	l ₀ >>>>	Non-directional earth-fault, high-set stage, definite time	ŀ	ŀ	ŀ		•	•	•	•	•	•		·	•	•	•	•	•	·	·	-			
	67N-IEF	Ι _{ΟΤ}	Intermittent transient earth-fault protection	•	•	•		•	•	•	•															
	67N or 50N/51N	$I_{0\phi}$ >/ SEF	Directional or non dir. earth-fault, low-set stage, sensitive, definite or inverse time	•		•		•	-	•	•	•	•		• •	•	•	•	•	•			-			
	67N or 50N/51N	Ι _{0φ} >>	Directional or non dir. earth-fault, high-set stage, definite or inverse time	•		•		•	•	•	•	•	(\mathbf{r})		·	•	•	-	•	÷			•			
	59N 59N	U ₀ >	Residual overvoltage, low-set stage Residual overvoltage, high-set stage			-	•			•	•		•					•	-	÷					-	
	50N/51N	REF	Restricted earth fault (application)	•	•	•		•	•	•	•	÷						•	•	ł	•	•				
Overload	49M	T>	Three-phase thermal overload (motors & generators)												• •	•	•	•	•	•	•	•	-			
	49F	T>	Three-phase thermal overload (feeders & cables)	ŀ	ŀ	ŀ		•	•	•	•	•	•													
	49T	T>	Three-phase thermal overload (transformers)																		•					
Voltage	59	1U>/3U>	One-/Three-phase overvoltage, low-set stage	1		1	3		3	3	3	3	3		1 1		3	3	3	3			3			
	59	1U>>/3U>>	One-/Three-phase overvoltage, high-set stage	1		1	3		3	3	3	3	3		1 1		3	3	3	3			3			
	59	1U>>>/3U>>>	One-/Three-phase overvoltage, high-set stage	1		1	3		3	3	3	3	3		1 1		3	3	3	3			3			
	27	1U 3U<</td <td>One-/Three-phase undervoltage, low-set stage</td> <td>1</td> <td></td> <td>1</td> <td>3</td> <td></td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td></td> <td>1 1</td> <td></td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td></td> <td></td> <td>3</td> <td></td> <td></td> <td></td>	One-/Three-phase undervoltage, low-set stage	1		1	3		3	3	3	3	3		1 1		3	3	3	3			3			
	27	1U< 3U<<</td <td>One-/Three-phase undervoltage, high-set stage</td> <td>1</td> <td></td> <td>1</td> <td>3</td> <td></td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td></td> <td>1 1</td> <td></td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td></td> <td></td> <td>3</td> <td></td> <td></td> <td></td>	One-/Three-phase undervoltage, high-set stage	1		1	3		3	3	3	3	3		1 1		3	3	3	3			3			
	27	1U<< 3U<<<</td <td>One-/Three-phase undervoltage, instantaneous stage</td> <td>1</td> <td></td> <td>1</td> <td>3</td> <td></td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td></td> <td>1 1</td> <td></td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td></td> <td></td> <td>3</td> <td></td> <td></td> <td></td>	One-/Three-phase undervoltage, instantaneous stage	1		1	3		3	3	3	3	3		1 1		3	3	3	3			3			
	27P	U1<	1st positive sequence undervoltage stage for generator applications				•										•									
	27P	U1<<	2nd positive sequence undervoltage stage for generator applications				•										•									



								Feed	ler pro	otect	ion						Mad	chine	prote	ection			Ar	c pro	otec	tic
Protection and me	easurement			VAMP 40	VAMP 50	VAMP 52	VAMP 55	VAMP 59	VAMP 230	VAMP 255	VAMP 257	VAMP 259	VAMP 300F, analog card B,C,D	VAMP 40	VAMP 52	VAMP 210	VAMP 230	VAMP 255	VAMP 257	VAMP 265 (1	VAMP 265 M	VAMP 300M, analog card B, C, D	VAMP 120	VAMP 121	VAMP 221	
Type of fault	ANSI	IEC Symbol	Protection function/measurement	>	>	>	>	>	>	>	>	>	<u>صمر</u>	2	>	>	>	>	>	>	>	jag ≮		>		Т т
Arc protection	50ARC/ 50NARC	3 l> / l ₀ >, L>	Electrical arc protection stage; point sensors optional, (in VAMP 321 also fiber)	ŀ	•	•		•	•	•	•	•		•	•	•	•	•	•	•	•	\mathbf{r}				
	50ARC/ 50NARC	3 l> / l ₀ >, L>	Electrical arc protection with point sensor; I/O units																				•	-	•	
	50ARC/ 50NARC	3 l> / l ₀ >, L>	Electrical arc protection with fiber or current sensor I/O units																						-	
Other functions	79	$O \rightarrow I$	Auto-reclosure	•	•	•		•	•	•	•	•													Γ	1
	68		Inrush and cold load detection	•	•	•		•	•	•	•	•	•		•	•	•	•	•							
	68F2	l _{f2} >	Magnetising inrush	•	•	•		•	•	•	•	•		•	•	•	•	•	•	•	•	•				
	46	$I_2 / I_1 >$	Current unbalance protection (in feeder mode)	•	•	•		•	•	•	•	•	•													
	46	l ₂ >	Current unbalance protection (in motor mode)											•	•	•	•	•	•	•	•					
	46	l' ₂ >	Phase unbalance protection (secondary side)																	•	•					
	47	l ₂ >>	Phase sequence / incorrect phase sequence protection											•	•		•	•	•		•					
	48		Excessive starting time											•	•		•	•	•		•	•				
	37	3 <	Loss of load / under current protection	•		•			•	•	•	•			•	•	•	•	•		•					
	86		Latched trip	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	87	3 ∆l>	Three phase biased differential stage, low- set stage, 2nd harmonic blocking, 5th harmonic blocking					•				•								•	•					
	87	3 ∆l>>	Three phase differential stage, high-set stage					•				•								•	•					
	66		Restart inhibit												•		•	•	•		•					
	64F3	U _{of3} >	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		1			3	3	3	3	3	1	1	3	3	3	3			3				
	24	U _f	Volts / hertz overexcitation protection				•									•										
	50BF	CBFP	Circuit breaker failure protection	•	•	•	•	•	•	•	•	•			•	•	•	•	•	•	•	•			•	
	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 _V >	Voltage restrained or controlled overcurrent protection	Γ												•							Г			
	25	$\Delta f, \Delta U, \Delta \phi$	Synchrocheck				•		•	•	•	•							•							
	21FL		Incomer short circuit fault locator, Feeder fault locator						•	•	•	•	•				•	•	•						Γ	
	99		8 Programmable stages				•			•	•	•														
		DR	Disturbance recorder	•	•		•	•	•	•	•	•	•		•	•	•	•	•	•	•	•				
	68F5	l _{f5} >	Transformer overexcitation	•	•	•		•	•	•	•	•			•	•		•	•	•	•	•				
	50NC/51NC	locap>	Capacitor bank protection	•						•	•	•														
ype of measurement				_																					_	,
Primary current		31	Three-phase current	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	
		3dl>	Three-phase differential current					•	_	_		•								•	•					
		31 ₀	Zero sequence current Current balance											11		•									F	
		I ₂	Average and maximum demand current							÷							•	•			•					
Primary voltage		U/3U	one-/Three-phase and line voltages	1		1	3		3	3	3	3	3	1	1	3	3	3	3			3				
		U ₀	Zero sequence voltage				-		-	-	-	-	-									-				

02

	U _o	Zero sequence voltage	•		•	•	•	•	•		•		•	•	•	•	•	•						
	U ₂ /U ₁	Relative voltage unbalance				•		•		•	•				•		•	•						
Frequency	f	System frequency	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•				
Power	Р	Active power	(*)		(*)			•		•	•		(*)		•	•	•	•			-			
	Q	Reactive power	(*)		(*)					•	•		(*)		•	•	•	•						
	S	Apparent power	(*)		(*)			•		•	•		(*)		•	•	•	•				П		
Energy	E+, E-	Active energy	(*)		(*)			•	•	•	•		(*)		•	•	•	•						
	Eq+, Eq-	Reactive energy, exported/imported	(*)		(*)					•	•		(*)		•		•	•						
Power factor	PF	Power factor	(*)		(*)			•	•	•	•		(*)		•	•	•	•						
Harmonics	I	2nd to 15th and THD of phase currents	•	•	•		•	•		•	•		•		•		•	•		•	-			
	U	2nd to 15th and THD of measured voltages	1		1	3		3	3	3	3	3	1	1	3	3	3	3			3			
Voltage sags / swells	U	Voltage sags / swells	1		1	3		3	3	3	3	3	1	1	3	3	3	3			3			
Analog mA output, 1 channel	AO	Any measured or calculated value, freely scalable, Optional		•	•	•	•							•										
Analog mA output, 4 channels	AO	Any measured or calculated value, freely scalable, Optional							•							•	•							

(*) : Based on one-phase voltage measurement

Protection and measurement Market A Marke					Feeder protection									Machine protection Arc p													
Type (r) All Bit C Symbol Protection function functin functin function function functin function functin fu																	T										
Type (r) All Bit C Symbol Protection function functin functin function function functin function functin fu	Protection and measure	ement			VAMP 40	VAMP 50	VAMP 52	VAMP 55	VAMP 59	VAMP 230	VAMP 255	VAMP 257	VAMP 259	VAMP 300F, analog card B,C,D	VAMP 40	VAMP 52	VAMP 210	VAMP 230	VAMP 255	VAMP 257	VAMP 265 (1	VAMP 265 M	VAMP 300M, analog card B, C, D	VAMP 120	VAMP 121	VAMP 221	VAMP 321
Name Amme 2 7 </td <td>Type of fault</td> <td>ANSI</td> <td>IEC Symbol</td> <td>Protection function/measurement</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td>	Type of fault	ANSI	IEC Symbol	Protection function/measurement							-		-					-			-				-		
Number of atomy space data proposed on space data proposed data propose	Control																										
Name	Digital inputs			Number of digital inputs, max	2	7	7	7	7	8	20	28	28	40	2	7	6	8	20	28	6	8	40		Τ	Τ	6
Number of allow roles on the responsible frame of allow roles of				Number of binary inputs (arc protection)										3									3	1	1	3	3
Number of allow range 1	Outputs relays			Number of trip relays, max	4	5	5	5	5	2	4	8	8	20	4	5	2	2	4	8	2	2	20				4
Number dramsbandbrid outgate, fam. N				Number of alarm relays	1		1	1	1	5	5	5	5	2	1	1	5	5	5	5	5	5	2	3	3	2	1
Aurile or of house active to forme active to fo				Number of arc protection trip relays, < 7 ms										4									4	2	2 1	4	4
Operation Ships make allo control allo doped 8<				Number of semicontactor outputs, <1 ms																							2
Ander of convoluble defers D														3											1	3	3
Interdeding and logic Originality Image: Conjunction of the second of t	Object status indication			Single line diagram, 8 objects	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8				8
Introduction and logic Output Image <	Local and remote control			Number of controllable objects	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6				6
Trip Croad: Supervision Trip Croad: Supervision Trip Croad: Supervision No No <t< td=""><td>Interlocking and logic</td><td></td><td></td><td>Configurable</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>-</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td></td><td></td><td></td><td></td></t<>	Interlocking and logic			Configurable	•	•	•	•	•	•	•	•	•	-	•	•	•	•	•	•	•	•	•				
Tip Clickit Supervision with Di for 3573 I																											
TG Tip Circut Supervision I <td>Condition monitoring</td> <td></td>	Condition monitoring																										
C1 Supervision C1 Su	Trip circuit		TCS	Trip Circuit Supervision				-			•	•		-		•			•	•	•		-				
61 V1 Supervision 60 V1 Supervision 60 V 8 <			TCS	Trip Circuit Supervision with DI for T5T8		a (2	a (2	•	a (2			•	•			a (2				•							
Breaker wear Breaker wear <th< td=""><td>CT Supervision</td><td></td><td></td><td>CT Supervision</td><td></td><td>•</td><td>•</td><td></td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td></td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td></td><td></td><td></td><td></td></th<>	CT Supervision			CT Supervision		•	•		•	•	•	•	•	•		•	•	•	•	•	•	•	•				
2: option (TS) Communication EC 66070-5101 TOP EC 66070-5103 EC 66070-5103 Modbus RTU Profibus DP Profibus DP </td <td>VT Supervision</td> <td>60</td> <td></td> <td>VT Supervision/ Fuse failure supervision</td> <td></td> <td></td> <td></td> <td>•</td> <td></td> <td>•</td> <td>•</td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td>•</td> <td></td> <td>•</td> <td>•</td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td> <td></td>	VT Supervision	60		VT Supervision/ Fuse failure supervision				•		•	•			-			•		•	•			-				
Second 2-01 TCP N	CB Wear			Breaker wear					•	a (2	•		•	•	•	•	•	•	•	•	•	•	•				
IEC 00070-5101 I					(2 : c	option	(T5)																				
EC 08070-5-131 A <	Communication																										
IEC 60370-5-103 I	IEC 60870-5-101 TCP					•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•				•
Modbus CPU Modbus RTU Modbus RTU <td>IEC 60870-5-101</td> <td></td> <td></td> <td></td> <td></td> <td>•</td> <td>•</td> <td>•</td> <td></td> <td></td> <td>•</td> <td>•</td> <td></td> <td>-</td> <td></td> <td>•</td> <td></td> <td>•</td> <td>•</td> <td>•</td> <td>•</td> <td></td> <td>-</td> <td></td> <td></td> <td></td> <td></td>	IEC 60870-5-101					•	•	•			•	•		-		•		•	•	•	•		-				
modulo IL- modulo IL- <td>IEC 60870-5-103</td> <td></td> <td></td> <td></td> <td></td> <td>•</td> <td>•</td> <td>•</td> <td></td> <td>•</td> <td>•</td> <td>•</td> <td>•</td> <td>•</td> <td></td> <td>•</td> <td>•</td> <td>•</td> <td>•</td> <td>•</td> <td>•</td> <td>•</td> <td>•</td> <td></td> <td></td> <td></td> <td></td>	IEC 60870-5-103					•	•	•		•	•	•	•	•		•	•	•	•	•	•	•	•				
model and a	Modbus TCP				•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•				•
1000000000000000000000000000000000000	Modbus RTU					•	•	•		•	•	•	•	•		•	•	•	•	•	•	•	•				•
DN T TOP Ethemet IP Image: Second secon	Profibus DP					•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•				
Eherned IP I <tdi< td=""><td>DNP 3.0</td><td></td><td></td><td></td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td></td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td>•</td><td></td><td></td><td></td><td></td></tdi<>	DNP 3.0				•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•				
SPA-bus communication I	DNP TCP					•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			1	-
In the second of the second	Ethernet IP					•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•				
DeviceMet Image: Algorithm of the state of the sta	SPA-bus communication													•	•					•			•			1	
TCP / IP	IEC 61850					•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•				
Normalized for the communication, display Image: Second secon	DeviceNet										_															1	
Human-Machine Communication, PC General functions Selfsupervision Annunciating, event generating and value recording Masurement and parameter display Year, month, day, hour, minutes, seconds,	TCP / IP								_									_									
General functions Selfsupervision		olay																									
Selfsupervision Image: S	Human-Machine-Communication, PC				•	•	•	•	•	•	•		•		•	•	•	•	•	•	•	•	•				
Selfsupervision Image: S																											
Annunciating, event generating and value recording Measurement and parameter display Year, month, day, hour, minutes, seconds, Year, month, day, hour, minutes, year, month, day, hour, mo					_			_												_				_	_		
Measurement and parameter display Vear, month, day, hour, minutes, seconds, Year watch and the seconds, Year watch and the seconds of the second seco						-	•				•	•		•		•	•	•			•	_	•			•	
Real time clock Year, month, day, hour, minutes, seconds,		alue recording					_																				-
	Measurement and parameter display					•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•				
	Real time clock				•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•				•

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