Numerical relay selection table for MV power products

ABB Oy
Distribution Automation
P.O. Box 699
FI-65101 VAASA, Finland

Phone: +358 10 22 11
Fax: +358 10 22 41094
www.abb.com/substationautomation

Please note before using selection table!

number = Number of stages, shots, inputs or outputs
X = Function supported
O = Function available as option
S = Secondary function / application

Show Result = Hides relays that doesn't include needed function
Show all relays = Shows all relays available
Clear "My choices" = Clears all your selected functions

My Choice = Mark needed functions with "x"

User manual:

Show Result | Show all relays | Clear "My choices"

Columns: My choice

Basic Range: SPAM 150 C, SPAJ 140 C, SPAJ 160 C, REA 101, REF 610, REM 610, REU 610, REF611 (std conf A), REF611 (std conf B), REF611 (std conf C), REM611, REB611, REU611, REC615 (std conf A), REC615 (std conf B), REC615 (std conf C), RER615 (std conf A), RER615 (std conf D)

Middle Range: REF615 (std conf A), REF615 (std conf B), REF615 (std conf C), REF615 (std conf D), REF615 (std conf E), REF615 (std conf F), REF615 (std conf G), REF615 (std conf H), REF615 (std conf J), REF615 (std conf K), REF615 (std conf L), REF615 (std conf N), RED615 (std conf A), RED615 (std conf B), RED615 (std conf C), RED615 (std conf D), RED615 (std conf E), REM615 (std conf A), REM615 (std conf B), REM615 (std conf C), REM615 (std conf D), RET615 (std conf A), RET615 (std conf B), RET615 (std conf C), RET615 (std conf D), RET615 (std conf E), RET615 (std conf F), RET615 (std conf G), RET615 (std conf H), REU615 (std conf A), REU615 (std conf B), REV615 (std conf A), REV615 (std conf B), REG615 (std conf A), REG615 (std conf C), REG615 (std conf D), REF620, REM620, RET620

High Range: REF630, REM630, RET630, REG630, PML630, REF 54_ CONTROL, REF 54_ BASIC, REF 54_ MULTI, REM 543 MOTOR, REM 543 GENERATOR, REM 545 MOTOR, REM 545 GENERATOR, RET 54_ CONTROL, RET 54_ BASIC, RET 54_ MULTI, REC 523, REF 542plus - BASIC LOW, REF 542plus - BASIC, REF 542plus - MULTI LOW, REF 542plus - MULTI, REF 542plus - DIFFERENTIAL, REF 542plus - DISTANCE

ANSI Code	IEC Symbol	IEC 61850 LN Class	Definition
Applications			
			Arc protection
			Back-up protection
			Bay control and measurement
			Busbar Differential Protection
			Capacitor bank protection
			Feeder (incomer)
			Feeder (outgoing)
			Grid Automation
			Generator protection
			Measurement cubicle
			Motor protection
			Transformer protection
			Voltage regulation
			Power Management/load shedding
			Interconnection protection
Protection functions			
14		-	Speed switch support
21	Z <	PDIS	Distance protection
24	U/f>	OEPVPH	Overexcitation protection
25	SYNC	RSYN	Synchro-check/voltage check
27	3U <	PTUV	Three-phase undervoltage
32	P< / P> <-	PDUP	Three-phase directional underpower protection
37	3I<	PTUC	Three-phase non-directional undercurrent protection
40	X<	PDUP, UEXPDIS	Three-phase underexcitation protection
46	I2 >	PTOC	Negative-phase-sequence current protection
46PD	DI >	PTOC	Phase discontinuity
59	3U >	PTOV	Three-phase overvoltage
60	FUSEF	-	Fuse failure supervision
66		-	Cumulative start-up time counter
67	3I > ->	PTOC, PDIR	Three-phase directional overcurrent protection
68	3I2f >	PHAR	Three-phase inrush detector
79	O -> I	RREC	Auto-reclosure
86		-	Eletrically latched lockout relay
21FL	21FL	FLO	Fault locator
21G	Z<	UZPDIS	Three-phase underimpedance protection
21YN	Y_0> ->	EFPADM	Admittance based Earth-fault protection
27RT	U<RT	LVRTPTUV	Low-voltage ride-through protection
27, 47, 59	U1< & U2> & U1>	PTUV, PTOV, PTOV	Three-phase positive/negative sequence voltage protection
27/59THD	dUo(3H)>/Uo(3H)<	H3EFPSEF	Third harmonic based stator earth-fault protection
32N	Ie*cos(phi)	WPWDE	Wattmetric earth-fault protection
32P/32Q	P> -> / Q > ->	PDOP, DOPPDPR	Three-phase directional overpower protection
32Q/27	Q> ->, 3U<	DQPTUV	Directional reactive power undervoltage protection
46M	I2>M	PTOC	Negative-phase-sequence overcurrent protection for machines
46R		PTOC	Phase reversal protection
48/14		PMRI, PMSS	Motor start-up supervision, Is2 x ts
49/38		PTTR	Thermal protection by RTDs or thermistors
49/66/48/51LR		PMSU	Motor start-up supervision, Is2t n<
49F	3	PTTR	Three-phase thermal overload (feeders & cables)
49G	3	PTTR	Three-phase thermal overload protection for generators
49M	3	PTTR	Three-phase thermal overload protection for motors
49T	3	PTTR	Three-phase thermal overload protection for transformers
50/51/51B	3I >	PHLPTOC	Three-phase non-directional overcurrent
50L/50NL	ARC	ARCSARC	Arc protection
50N / 51N	I_0 >	EFxPTOC	Non-directional earth-fault
51BF/51NBF	3I>/Io>BF	RBRF	Circuit breaker failure
51C	3I> 3I<	CQLTPTOC	Three-phase overload protection for shunt capacitor banks
51LR		PMSS, PTOC	Locked rotor
51MS		PMRI	Motor start
51N	I_0 >	EFxPTOC	Non-directional earth-fault sensitive
51N-2	I_0 >>	EFxPTOC	Non-directional (cross country) earthfault, using calculated Io
51NC-1	dI>C	CUBPTOC	Current unbalance protection for shunt capacitor
51NC-2	3dI>C	HCUBPTOC	Three-phase current U/B protection for H-bridge shunt capacitors
51NHA	Io>HA	HAEFPTOC	Harmonics based earth-fault protection
51V	I(U) >	PVOC	Voltage dependent overcurrent
55TD	TD>	SRCPTO	Switching resonance protection
59N	U_0 >	PTOV	Residual overvoltage
62BF	CBFP	RBRF	Circuit breaker failure
64R	R<	MREFPTOC	Rotor earth-fault protection
67N	I_0 > SEF ->	PSDE	Directional earth-fault sensitive
67N/51N	I_0 > SEF ->	PTOC, PDIR	Directional earth-fault
67N-IEF	I_0 > -> IEF	INTRPTEF	Transient / intermittent earth-fault
67YN	io> ->Y	MFADPSDE	Multifrequency admittance-based earth-fault protection
78V	VS	VVSPPAM	Voltage vector shift protection
81LSH	UFLS/R	PFRQ	Load shedding
81R	df/dt>	PFRC	Frequency gradient
81U/81O	f< / f> / df/dt	PTUF, PTOF, PFRC	Underfrequency or overfrequency inc. rate of change
87A	dHi_A>	87A	High-impedance differential protection for phase A
87B	dHi_B>	87B	High-impedance differential protection for phase B
87C	dHI_C>	87C	High-impedance differential protection for phase C
87G/87M	3ΔI >	MHZPDIF	High-impedance/flux-balace based diff. protection for motors/generators
87G/87M	3ΔI >, 3ΔI >>	PDIF, MPDIF	Stabilized three-phase differential protection for generators
87L	3ΔI >	PLDF	Line differential protection with in-zone power transformer
87N	DI_0 >, REF	PDIF	High-impedance based restricted earth-fault protection
87N	DI_0 >, REF	PDIF	Low impedance based restricted earth-fault protection
87NH	DIo Hi >	PDIF	High impedance based restricted earth-fault
87NL	DIo Lo >	PNDF	Numerical stabilized low impedance restricted earth-fault
87T	3ΔI >, 3ΔI >>	PDIF, PHAR	Stabilized three-phase differential protection for transformers
BST	BST	BSTGGIO	Binary signal transfer
ESTART	ESTART	ESMGAPC	Emergency start
MAP	MAP	GAPC	Multi-purpose protection
SOTF	SOTF	RSOF	Automatic Switch onto fault logic
		-	High harmonic protection
		-	Pilot wire support
PHIZ	PHIZ	PHIZ	High impedance fault detection
		LSPTRC	Load -shedding trip command
		PPLSGGIO	Peer PML630 data sharing for load shedding
78	OOS	OOSRPSB	Out-of-step protection
Control functions			
		CSWI	Circuit Breaker 1 (2 state inputs / 2 control outputs)
		CSWI	Circuit Breaker 2 (2 state inputs / 2 control outputs)
		CSWI	Disconnector (2 state inputs / 2 control outputs)
		CSWI	Disconnector 3-state (3 state inputs / 4 control outputs)
		-	Object indication (2 state inputs)
		-	MIMIC dynamic data point on HMI (single-line diagram)
		-	Alarm LEDs on HMI (alarm view)
		-	On/Off switch on HMI (single-line diagram)
		-	Direct open CBs via HMI
		-	Local/remote selector
		-	Configurable Interlocking
		-	PLC logics (AND, OR, timers etc.)
		-	Number of setting groups
		-	Remote setting
		-	Self-supervision
		-	Annunciating, event generating and value recording
		-	Display size (S-small, M-medium, L-large size, check the comment)
		-	Programmable push buttons (physical on LHMI)
		ARCO	Power factor controller
90V		ATCC, OLATCC	Voltage regulator
		PSCSWI	Power source handling for load shedding
		NCBDCSWI	Network circuit breaker handling for load shedding
		LSCACLS	Load shedding core
Measurement functions			
	3I	MMXU	Three-phase current
	3I	MMXU	Three-phase current, B stage
	I_0	MMXU	Neutral current
	I_0	MMXU	Neutral current, B stage
			Differential current
			Current sequence components
	3U	MMXU	Three-phase voltage
	3U	MMXU	Three-phase voltage, B stage
	U_0	MMXU	Residual voltage
	U_0	MMXU	Residual voltage, B stage
			Voltage sequence components
	U_0	MMXU	Unbalance voltage measurement for capacitor bank
	E / P / Q / pf	MMXU	Three-phase power and energy (incl. cos j)
	f	MMXU	Frequency
		-	Measurement of RTD/Analog inputs, general measurement
		-	Measurement to Analog output
			Battery voltage
			Temperature
			Pulse counter for energy metering
		LDMMXU	Busbar-wise load feeder measurement handling for load shedding
		NPMMXU	Network power source measurement handling for load shedding
Data recorders			
			Audit trail recorder
DFR	DR	RDRE	Disturbance recorder
			Sequence Event recorder
		FLTMSTA	Fault recorder
LOADPROF (1)	LOADPROF (1)	LDPMSTA1	Load profile recorder
Condition monitoring functions			
	CBCM	-	CB electric wear 1
	CBCM	-	CB electric wear 2
	CBCM	-	CB Operate Time Counter 1
	CBCM	-	CB Operate Time Counter 2
	CBCM	SIMG	Gas pressure supervision
	CBCM	SIMG	Gas pressure supervision for three poles
	CBCM	-	Spring charging control 1
	CBCM	-	Breaker travel time 1
	CBCM	-	CB Scheduled maintenance
	TCS	-	Trip circuit supervision 1
	TCS	-	Trip circuit supervision 2
	TCS	-	Trip circuit supervision 3
	MCS 3I	-	Supervision of the energizing current input circuit
	MCS 3I, I2	-	Advanced supervision of the energizing current input circuit
	MCS 3U	-	Supervision of the energizing voltage input circuit
		-	Local and remote phase currents (protection co-ordinated)
PCS	PCS	-	Protection communication supervision
OPTM	OPTS	SOPT	Runtime counter for machines and devices
	U<>	U<>	Station battery supervision
	E	E	Energy monitoring
	TPOSM	TPOSM	Tap changer position indication
		SNWLRCLS	Subnetwork monitoring for load shedding
MCS I_A	MCS I_A	HZCCASPVC	Current transformer supervision for high-impedance protection scheme for phase A
MCS I_B	MCS I_B	HZCCBSPVC	Current transformer supervision for high-impedance protection scheme for phase B
MCS I_C	MCS I_C	HZCCCSPVC	Current transformer supervision for high-impedance protection scheme for phase C
26/49HS	3Ihp>T	HSARSPTR	Hot spot and insulation ageing rate monitoring for transformers
Power quality functions			
PQMV	PQMU	PHQVVR	Voltage sags and swells
		VSQUB	Voltage unbalance
PQM3I	PQM3I	MHAI, CMHAI	Current waveform distortion measurement
PQM3UV	PQM3U	MHAI, VPP-, VPH-	Voltage wafeform distortion measurement
PQVUB	PQUUB	VSQVUB	Voltage unbalance
Communication protocols			
			DNP 3.0 serial
			DNP 3.0 TCP/IP
			LON bus
			IEC 60870-5-101
			IEC 60870-5-103
			IEC 60870-5-104
			IEC 61850-8-1
			IEC 61850-9-2LE (voltage sharing)
			IRIG-B
			Modbus RTU/ASCII
			Modbus over TCP/IP
			PROFIBUS
			SPA bus
			SPA over TCP/IP
			IEEE 1588
Communication media			
		Serial	RS 232
		Serial	RS 485
		Serial	Glass fibre (ST connector)
		Serial	Plastic fibre (snap-in connector)
		Ethernet	RJ45
		Ethernet	LC
		Ethernet	MTRJ
		Ethernet	Self-healing ring support / RSTP
		Ethernet	Ethernet redundancy protocol / PRP
		Ethernet	Ethernet redundancy protocol / HSR
Inputs / Outputs			
			Sensor channels
			Analog input (1/5A)
			Analog input (0.2/1A)
			Analog input (100V)
			RTD/mA inputs (option)
			mA outputs (option)
			Digital inputs
			Trip circuit supervision
			Power outputs
			High-speed Power outputs (option)
			Signal outputs
			Self-supervision outputs (IRF)
			Battery Charger (24V)
Languages			
			English
			German
			French
			Italian
			Spanish
			Portugese
			Russian
			Polish
			Czech
			Swedish
			Finnish
			Chinese
Certifications			
			Det Norske Veritas (DNV)
			Registro Italiano Navale (RINA)
			Germanischer Lloyd (GL)
			Lloyd's Register of Shipping (LR)
			UL Recognition
			ATEX
			Russian Maritime Register of Shipping
			Bureau Veritas
			American Bureau of Shipping (ABS)
Other			
			Height (in units)
			Internet link (Click marker to access the link)

1MRS756179H