RELION® PROTECTION AND CONTROL

REX640
Functions

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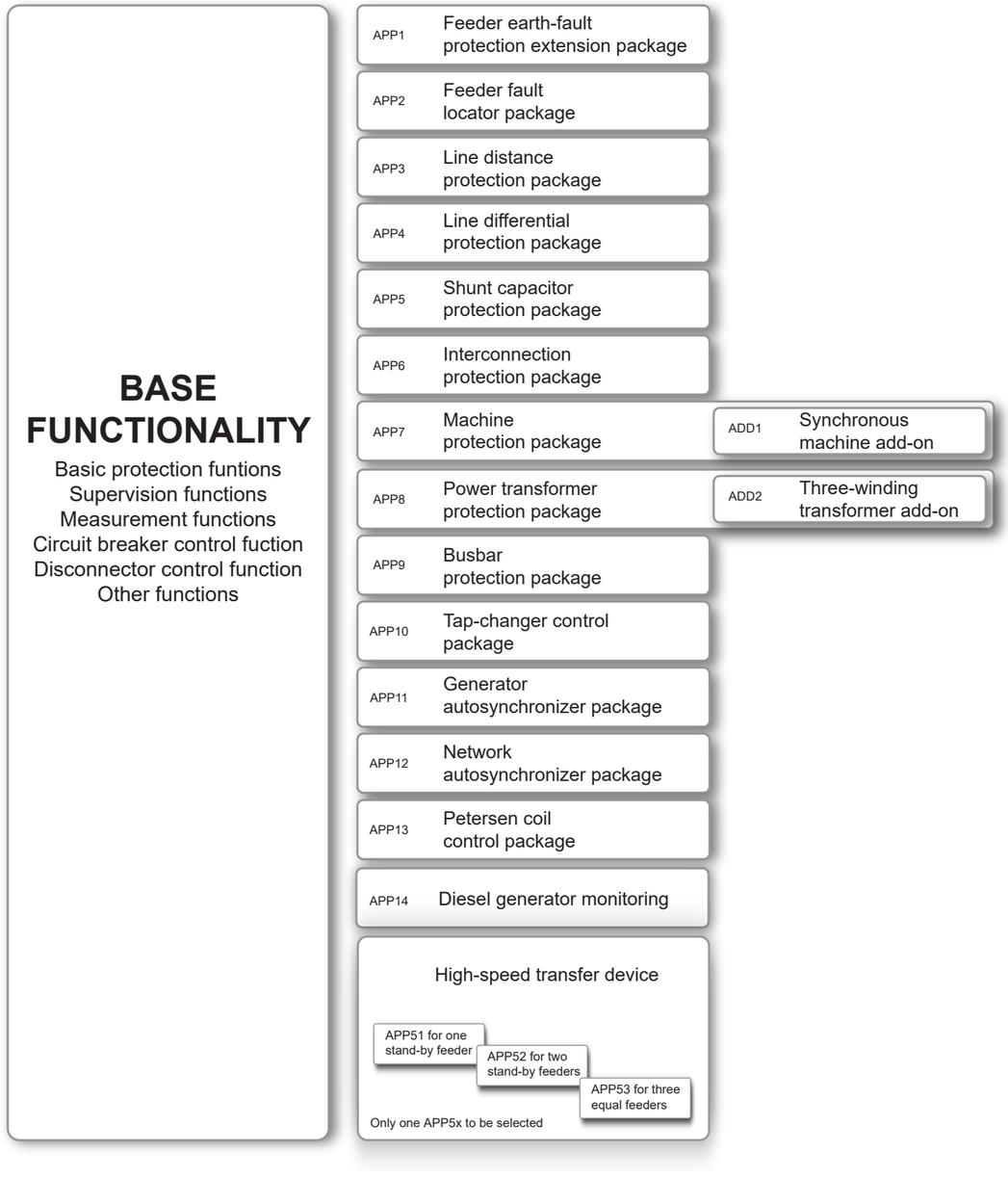

Function description	IEC 60617	ANSI	IEC 61850	Pcs in total	Base	APP 1	APP 2	APP 3	APP 4	APP 5	APP 6	APP 7	APP 8	APP 9	APP 10	APP 11	APP 12	APP 13	APP 14	APP 51	APP 52	APP 53	ADD 1	ADD 2
Protection																								
Distance protection	Z<	21P,21N	DSTPDIS	1				●																
Local acceleration logic	LAL	21LAL	DSTPLAL	1				●																
Scheme communication logic	CL	85 21SCHLGC	DSOCPSCH	1				●																
Current reversal and weak-end infeed logic	CLCRW	85 21CREV,WEI	CRWPSCH	1				●																
Communication logic for residual overcurrent	CLN	85 67G/N SCHLGC	RESCPSCH	1				●																
Current reversal and weak-end infeed logic for residual overcurrent	CLCRWN	85 67G/N CREV,WEI	RCRWPSCH	1				●																
Power swing detection	Zpsb	68	DSTRPSB	1				●																
Line differential protection with in zone power transformer	3Id/I>	87L	LNPLDF	1					●															
Binary signal transfer	BST	BST	BSTGAPC	4				●	●															
Switch-onto-fault protection	CVPSOF	SOTF	CVPSOF	1	●																			
Three-phase non-directional overcurrent protection, low stage	3I>	51P-1	PHLPTOC	5	●																			
Three-phase non-directional overcurrent protection, high stage	3I>>	51P-2	PHHPTOC	5	●																			
Three-phase non-directional overcurrent protection, instantaneous stage	3I>>>	50P	PHIPTOC	5	●																			
Three-phase directional overcurrent protection, low stage	3I>->	67P/51P-1	DPHLPDOC	5	●																			
Three-phase directional overcurrent protection, high stage	3I>>->	67P/51P-2	DPHHPDOC	5	●																			
Non-directional earth-fault protection, low stage	Io>	51G/51N-1	EFLPTOC	5	●																			
Non-directional earth-fault protection, high stage	Io>>	51N-2	EFHPTOC	5	●																			
Non-directional earth-fault protection, instantaneous stage	Io>>>	50G/50N	EFIPTOC	5	●																			
Directional earth-fault protection, low stage	Io>->	67G/N-1 51G/N-1	DEFLPDEF	5	●																			
Directional earth-fault protection, high stage	Io>>->	67G/N-1 51G/N-2	DEFHPDEF	5	●																			
Three-phase power directional element	I1->	67P-TC	DPSRDIR	4							●				●									
Neutral power directional element	I2->, Io->	67N-TC	DNZSRDIR	2		●																		
Admittance-based earth-fault protection	Yo->	21YN	EFPADM	3		●																		
Multifrequency admittance-based earth-fault protection	Io>->Y	67NYH	MFADPSDE	3		●																		
Wattmetric-based earth-fault protection	Po>->	32N	WPWDE	3		●																		
Transient/intermittent earth-fault protection	Io>->IEF	67NTEF/NIEF	INTRPTEF	2		●																		
Harmonics-based earth-fault protection	Io>HA	51NH	HAEFPTOC	1		●																		
Touch voltage based earth-fault current protection	IF>/UT>	46SNQ/59N	IFPTOC	3		●																		
Negative-sequence overcurrent protection	I2>M	46M	NSPTOC	3	●																			
Phase discontinuity protection	I2/I1>	46PD	PDNSPTOC	1	●																			
Residual overvoltage protection	Uo>	59G/59N	ROVPTOV	4	●																			
Three-phase undervoltage protection	3U<	27	PHPTUV	5	●																			
Three-phase overvoltage variation protection	3Urms>	59.S1	PHVPTOV	2							●													
Three-phase overvoltage protection	3U>	59	PHPTOV	4	●																			
Positive-sequence overvoltage protection	U1>	59PS	PSPTOV	4	●																			
Positive-sequence undervoltage protection	U1<	27PS	PSPTUV	4	●																			
Negative-sequence overvoltage protection	U2>	47, 59NS	NSPTOV	4	●																			
Frequency protection	f>/f<,df/dt	81	FRPFRQ	12	●																			
Three-phase voltage-dependent overcurrent protection	3I(U)>	51V	PHPVOC	5	●																			
Overexcitation protection	U/f>	24	OEPVPH	2									●										●	
Three-phase thermal protection for feeders, cables and distribution transformers	3Ith>F	49F	T1PTTR	1	●																			
Three-phase thermal overload protection, two time constants	3Ith>T/G/C	49T/G/C	T2PTTR	1									●										●	
Three-phase overload protection for shunt capacitor banks	3I>3I<	51,37,86C	COLPTOC	1						●														
Current unbalance protection for shunt capacitor banks	dI>C	60N	CUBPTOC	3						●														
Three-phase current unbalance protection for shunt capacitor banks	3dI>C	60P	HCUBPTOC	2						●														
Shunt capacitor bank switching resonance protection, current based	TD>	55ITHD	SRCPTOC	1						●														
Compensated neutral unbalance voltage protection	CNU>	59NU	CNUPTOV	2						●														
Directional negative-sequence overcurrent protection	I2>->	67Q	DNSPDOC	2	●																			
Low-voltage ride-through protection	UU	27RT	LVRTPTUV	3							●													
Voltage vector shift protection	VS	78VS	VVSPPAM	3							●													
Directional reactive power undervoltage protection	Q>->,3U<	32Q,27	DQPTUV	2							●													
Reverse power/directional overpower protection	P>/Q>	32R/32O	DOPPDPR	3							●	●	●											
Underpower protection	P<	32U	DUPPDPR	3									●										●	
Three-phase underimpedance protection	ZZ	21G	UZPDIS	3									●										●	
Directional negative sequence impedance protection	Z2->	Z2Q	DNZPDIS	3	●																			

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Three-phase underexcitation protection	X<	40	UEXPDIS	2																			●	
Third harmonic-based stator earth-fault protection	dUo>/Uo3H	64TN	H3EFPSEF	1																			●	
Rotor earth-fault protection (injection method)	Io>R	64R	MREFPTOC	2																			●	
Generator shaft leakage current	I>,GS	38, 51	GSLPTOC	1																			●	
Thermal overload protection for rotors	3Ith>R	49R	RPTTR	1								●												
High-impedance or flux-balance based differential protection	3dIHi>M	87HIM	MHZPDIF	1								●												
Out-of-step protection with double blinders	OOS	78PS	OOSRPSB	1				●															●	
Negative-sequence overcurrent protection for machines	I2>M	46M	MNSPTOC	2								●												
Loss of phase, undercurrent	3I<	37	PHPTUC	3	●																			
Loss of load supervision	3I<	37	LOFLPTUC	1								●												
Motor load jam protection	Ist>	50TDJAM	JAMPTOC	2								●												
Motor start-up supervision	Is2t n<	49,66,48,50TDLR	STTPMSU	1								●												
Motor start counter	n<	66	MSCPMRI	1								●												
Phase reversal protection	I2>>	46R	PREVPTOC	1								●												
Thermal overload protection for motors	3Ith>M	49M	MPTTR	1								●												
Stabilized and instantaneous differential protection for machines	3dI>M/G	87M/87G	MPDIF	1								●												
Underpower factor protection	PF<	55U	MPUPF	2							●												●	
Stabilized and instantaneous differential protection for two- or three-winding transformers	3dI>3W	87T3	TR3PTDF	1																				●
Stabilized and instantaneous differential protection for two-winding transformers	3dI>T	87T	TR2PTDF	1									●											
Numerical stabilized low-impedance restricted earthfault protection	dIoLo>	87NLI	LREFPNDF	2	●																			
High-impedance based restricted earth-fault protection	dIoHi>	87NHI	HREFPDIF	2	●																			
High-impedance differential protection for phase A	dHi_A>	87_A	HIAPDIF	3								●	●	●										
High-impedance differential protection for phase B	dHi_B>	87_B	HIBPDIF	3								●	●	●										
High-impedance differential protection for phase C	dHi_C>	87_C	HICPDIF	3								●	●	●										
Circuit breaker failure protection	3I>/Io>BF	50BF	CCBRBRF	3	●																			
Three-phase inrush detector	3I2f>	68HB	INRPHAR	2	●																			
Master trip	Master Trip	94/86	TRPPTRC	6	●																			
Arc protection	ARC	AFD	ARCSARC	4	●																			
High-impedance fault detection	HIF	HIZ	PHIZ	1		●																		
Cable Fault Detection	CFD	CFD	RCFD	3	●																			
Fault locator	FLOC	FLOC	SCEFRFLO	1			●																	
Load-shedding and restoration	UFLS/R	81LSH	LSHDPFRQ	6	●																			
Multipurpose protection	MAP	MAP	MAPGAPC	24	●																			
Accidental energization protection	U<,I>	50/27	GAEPVOC	1																			●	
Load blinder	LB	21LB	LBRDOB	1	●																			
Control																								
Circuit-breaker control	I <-> O CB	52	CBXCBR	3	●																			
Circuit-breaker control	I <-> O CB	52	CBXCBR	5																●	●	●		
Three-state disconnector control	I<->O P3S	29DS/GS	P3SXSWI	6	●																			
Disconnector control	I <-> O DCC	29DS	DCXSWI	8	●																			
Earthing switch control	I <-> O ESC	29GS	ESXSWI	3	●																			
Three-state disconnector position indication	I<->O P3SS	29DS/GS	P3SSXSWI	6	●																			
Disconnector position indication	I <-> O DC	29DS	DCSXSWI	8	●																			
Earthing switch position indication	I <-> O ES	29GS	ESSXSWI	3	●																			
Motor controlled earthing switch and disconnector supervision	ESDCCM	29CM	ESDCSSWI	11	●																			
Emergency start-up	ESTART	EST,62	ESMGAPC	1								●												
Autoreclosing	O->I	79	DARREC	2	●																			
Autosynchronizer for generator breaker	AUTOSYNCG	25AUTOSYNCG	ASGCSYN	1												●								
Autosynchronizer for network breaker	AUTOSYNC	25AUTOSYNCBT/T	ASNSCSYN	3													●							
Autosynchronizer co-ordinator	AUTOSYNC	25AUTOSYNC	ASCGAPC	1	●																			
Synchronism and energizing check	SYNC	25	SECRSYN	4	●																			
Tap changer control with voltage regulator	COLTC	90V	OL5ATCC	1											●									
Transformer data combiner	OLGAPC	OLGAPC	OLGAPC	5											●									
Petersen coil controller	ANCR	90	PASANCR	1														●						
High speed bus transfer	I<->O BT	HSBT	HSABTC	1																●				

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High speed bus transfer	I<->O BT	HSBT	HSABTC	2																	●			
High speed bus transfer	I<->O BT	HSBT	HSABTC	3																		●		
Condition monitoring and supervision																								
Circuit-breaker condition monitoring	CBCM	52CM	SSCBR	3	●																			
Hot-spot and insulation ageing rate monitoring for transformers	3Ihp>T	26/49HS	HSARSPTR	1									●											
Trip circuit supervision	TCS	TCM	TCSSCBR	6	●																			
Current circuit supervision	MCS 3I	CCM	CCSPVC	5	●																			
Current circuit supervision for transformers	MCS 3I,I2	CCM 3I,I2	CTSRCTF	1									●											
Current transformer supervision for high-impedance protection scheme for phase A	MCS I_A	CCM_A	HZCCASPVC	3										●										
Current transformer supervision for high-impedance protection scheme for phase B	MCS I_B	CCM_B	HZCCBSPVC	3										●										
Current transformer supervision for high-impedance protection scheme for phase C	MCS I_C	CCM_C	HZCCCSPVC	3										●										
Fuse failure supervision	FUSEF	VCM, 60	SEQSPVC	7	●																			
Protection communication supervision	PCS	PCS	PCSITPC	2				●	●															
Runtime counter for machines and devices	OPTS	OPTM	MDSOPT	2	●																			
Three-phase remanent undervoltage supervision	3U<R	27R	MSVPR	3	●																			
Diesel Generator Monitoring	P><, U/f ><	32/40G	DGMGAPC	1															●					
Measurement																								
Three-phase current measurement	3I	IA, IB, IC	CMMXU	8	●																			
Sequence current measurement	I1, I2, I0	I1, I2, I0	CSMSQI	8	●																			
Residual current measurement	Io	IG	RESCMMXU	8	●																			
Three-phase voltage measurement	3U	VA, VB, VC	VMMXU	8	●																			
Single-phase voltage measurement	U_A	V_A	VAMMXU	4	●																			
Phase voltage measurement	3UL	VL	VPHMMXU	1	●																			
Residual voltage measurement	Uo	VG/VN	RESVMMXU	8	●																			
Sequence voltage measurement	U1, U2, U0	V1, V2, V0	VSMSQI	8	●																			
Three-phase power and energy measurement	P, E	P, E	PEMMXU	3	●																			
Load profile recorder	LOADPROF	LOADPROF	LDPRLRC	1	●																			
Frequency measurement	f	f	FMMXU	5	●																			
Tap changer position indication	TPOSM	84T	TPOSYLTC	1									●		●									
Power quality																								
Current total demand, harmonic distortion, DC component (TDD, THD, DC) and individual harmonics	PQM3IH	PQM ITHD,IDC	CHMHAI	1	●																			
Voltage total harmonic distortion, DC component (THD, DC) and individual harmonics	PQM3VH	PQM VTHD,VDC	VHMHAI	1	●																			
Voltage variation	PQMU	PQMV SWE,SAG,INT	PHQVVR	2	●																			
Voltage unbalance	PQUUB	PQMV UB	VSQVUB	2	●																			
Traditional LED indication																								
LED indication control	LEDPTRC	LEDPTRC	LEDPTRC	1	●																			
Virtual programmable LED control	LED	LED	LED	66	●																			
Logging functions																								
Disturbance recorder (common functionality)	DR	RDRE	RDRE	1	●																			
Disturbance recorder, analog channels 1...12	A1RADR	A1RADR	A1RADR	1	●																			
Disturbance recorder, analog channels 13...24	A2RADR	A2RADR	A2RADR	1	●																			
Disturbance recorder, binary channels 1...32	B1RBDR	B1RBDR	B1RBDR	1	●																			
Disturbance recorder, binary channels 33...64	B2RBDR	B2RBDR	B2RBDR	1	●																			
Fault recorder	FAULTREC	FR	FLTRFRC	1	●																			
Other functionality																								
Parameter setting groups	PROTECTION	PROTECTION	PROTECTION	1	●																			
Time master supervision	TSYNC	TSYNC	GNRLLTMS	1	●																			
Serial port supervision	SERLCCH	SERLCCH	SERLCCH	2	●																			
IEC 61850-1 MMS	MMS	MMS	MMSLPRT	1	●																			
IEC 61850-1 GOOSE	GSE	GSE	GSELPRT	1	●																			
IEC 60870-5-103 protocol	I3C	I3C	I3CLPRT	2	●																			
IEC 60870-5-104 protocol	I5C	I5C	I5CLPRT	5	●																			
DNP3 protocol	DNP 3.0	DNP 3.0	DNPLPRT	5	●																			
Modbus protocol	MBS	MBS	MBSLPRT	5	●																			

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OR gate with two inputs	OR	OR	OR	400	●																			
OR gate with six inputs	OR6	OR6	OR6	400	●																			
OR gate with twenty inputs	OR20	OR20	OR20	**20**	●																			
AND gate with two inputs	AND	AND	AND	400	●																			
AND gate with six inputs	AND6	AND6	AND6	400	●																			
AND gate with twenty inputs	AND20	AND20	AND20	20	●																			
XOR gate with two inputs	XOR	XOR	XOR	400	●																			
NOT gate	NOT	NOT	NOT	400	●																			
Real maximum value selector	MAX3R	MAX3R	MAX3R	20	●																			
Real minimum value selector	MIN3R	MIN3R	MIN3R	20	●																			
Rising edge detector	R_TRIG	R_TRIG	R_TRIG	10	●																			
Falling edge detector	F_TRIG	F_TRIG	F_TRIG	10	●																			
Real switch selector	SWITCHR	SWITCHR	SWITCHR	30	●																			
Integer 32-bit switch selector	SWITCHI32	SWITCHI32	SWITCHI32	30	●																			
SR flip-flop, volatile	SR	SR	SR	30	●																			
RS flip-flop, volatile	RS	RS	RS	30	●																			
Minimum pulse timer, two channels	TP	62TP	TPGAPC	4	●																			
Minimum pulse timer second resolution, two channels	TPS	62TPS	TPSGAPC	2	●																			
Minimum pulse timer minutes resolution, two channels	TPM	62TPM	TPMGAPC	2	●																			
Pulse counter for energy measurement	PCGAPC	PCGAPC	PCGAPC	4	●																			
Pulse timer, eight channels	PT	62PT	PTGAPC	10	●																			
Time delay off, eight channels	TOF	62TOF	TOFGAPC	10	●																			
Time delay on, eight channels	TON	62TON	TONGAPC	10	●																			
Daily timer	DTM	DTM	DTMGAPC	4	●																			
Calendar function	CAL	CAL	CALGAPC	4	●																			
SR flip-flop, eight channels, nonvolatile	SR	SR	SRGAPC	4	●																			
Boolean value event creation	MV	MV	MVGAPC	16	●																			
Integer value event creation	MVI4	MVI4	MVI4GAPC	4	●																			
Analog value event creation with scaling	SCA4	SCA4	SCA4GAPC	24	●																			
Generic control points	SPC	SPCG	SPCGAPC	6	●																			
Generic up-down counter	UDCNT	UDCNT	UDFCNT	12	●																			
Local/Remote control	CONTROL	CONTROL	CONTROL	1	●																			
External HMI wake-up	EIHMI	EIHMI	EIHMI	1	●																			
Real addition	ADDR	ADDR	ADDR	10	●																			
Real subtraction	SUBR	SUBR	SUBR	10	●																			
Real multiplication	MULR	MULR	MULR	10	●																			
Real division	DIVR	DIVR	DIVR	10	●																			
Real equal comparator	EQR	EQR	EQR	10	●																			
Real not equal comparator	NER	NER	NER	10	●																			
Real greater than or equal comparator	GER	GER	GER	10	●																			
Real less than or equal comparator	LER	LER	LER	10	●																			
Voltage switch	VSWI	VSWI	VMSWI	3	●																			
Current sum	CSUM	CSUM	CMSUM	1	●																			
Current switch	CMSWI	CMSWI	CMSWI	3	●																			
Phase current preprocessing	ILTCTR	ILTCTR	ILTCTR	8	●																			
Residual current preprocessing	RESTCTR	RESTCTR	RESTCTR	8	●																			
Phase and residual voltage preprocessing	UTVTR	UTVTR	UTVTR	8	●																			
Residual current preprocessing, current measured as voltage	Io(U)	Io(U)	RESUTCTR	1	●																			
SMV stream receiver (IEC 61850-9-2LE)	SMVRCV	SMVRCV	SMVRCV	4	●																			
SMV stream sender (IEC 61850-9-2LE)	SMVSENDER	SMVSENDER	SMVSENDER	1	●																			
Redundant Ethernet channel supervison	RCHLCCH	RCHLCCH	RCHLCCH	1	●																			
Ethernet channel supervision	SCHLCCH	SCHLCCH	SCHLCCH	5	●																			
HMI Ethernet channel supervision	HMILCCH	HMILCCH	HMILCCH	1	●																			
Received GOOSE binary information	GOOSERCV_BIN	GOOSERCV_BIN	GOOSERCV_BIN	200	●																			
Received GOOSE double binary information	GOOSERCV_DP	GOOSERCV_DP	GOOSERCV_DP	100	●																			
Received GOOSE measured value information	GOOSERCV_MV	GOOSERCV_MV	GOOSERCV_MV	50	●																			

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Received GOOSE 8-bit integer value information	GOOSERCV_INT8	GOOSERCV_INT8	GOOSERCV_INT8	50	●																			
Received GOOSE 32-bit integer value information	GOOSERCV_INT32	GOOSERCV_INT32	GOOSERCV_INT32	50	●																			
Received GOOSE interlocking information	GOOSERCV_INTL	GOOSERCV_INTL	GOOSERCV_INTL	100	●																			
Received GOOSE measured value (phasor) information	GOOSERCV_CMV	GOOSERCV_CMV	GOOSERCV_CMV	9	●																			
Received GOOSE enumerator value information	GOOSERCV_ENUM	GOOSERCV_ENUM	GOOSERCV_ENUM	100	●																			
Bad signal quality	QTY_BAD	QTY_BAD	QTY_BAD	20	●																			
Good signal quality	QTY_GOOD	QTY_GOOD	QTY_GOOD	20	●																			
GOOSE communication quality	QTY_GOOSE_COMM	QTY_GOOSE_COMM	QTY_GOOSE_COMM	100	●																			
GOOSE data health	T_HEALTH	T_HEALTH	T_HEALTH	100	●																			
Fault direction evaluation	T_DIR	T_DIR	T_DIR	50	●																			
Enumerator to boolean conversion	T_TCMD	T_TCMD	T_TCMD	100	●																			
32-bit integer to binary command conversion	T_TCMD_BIN	T_TCMD_BIN	T_TCMD_BIN	100	●																			
Binary command to 32-bit integer conversion	T_BIN_TCMD	T_BIN_TCMD	T_BIN_TCMD	100	●																			
Switching device status decoder - CLOSE position	T_POS_CL	T_POS_CL	T_POS_CL	150	●																			
Switching device status decoder - OPEN position	T_POS_OP	T_POS_OP	T_POS_OP	150	●																			
Switching device status decoder - OK status	T_POS_OK	T_POS_OK	T_POS_OK	150	●																			
Controllable gate, 8 Channels	GATEGAPC	GATEGAPC	GATEGAPC	1	●																			
Security application	GSAL	GSAL	GSAL	1	●																			
Hotline tag	HLTGAPC	HLTGAPC	HLTGAPC	1	●																			
16 settable 32-bit integer values	SETI32GAPC	SETI32GAPC	SETI32GAPC	2	●																			
16 settable real values	SETRGAPC	SETRGAPC	SETRGAPC	2	●																			
Boolean to integer 32-bit conversion	T_B16_TO_I32	T_B16_TO_I32	T_B16_TO_I32	10	●																			
Integer 32-bit to boolean conversion	T_I32_TO_B16	T_I32_TO_B16	T_I32_TO_B16	10	●																			
Integer 32-bit to real conversion	T_I32_TO_R	T_I32_TO_R	T_I32_TO_R	10	●																			
Real to integer 8-bit conversion	T_R_TO_I8	T_R_TO_I8	T_R_TO_I8	10	●																			
Real to integer 32-bit conversion	T_R_TO_I32	T_R_TO_I32	T_R_TO_I32	10	●																			
Constant FALSE	FALSE	FALSE	FALSE	10	●																			
Constant TRUE	TRUE	TRUE	TRUE	10	●																			

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Additional information
We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

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