



Relion® 620 series

Advanced Recloser Protection and Control RER620 PG&E 2179 Protocol Point List Manual



Document ID: 1MAC303451-MB
Issued: 8/12/2014
Revision: B
Product version: 1.2

© Copyright 2014 ABB. All rights reserved.

Copyright

This document and parts thereof must not be reproduced or copied without written permission from ABB, and the contents thereof must not be imparted to a third party, nor used for any unauthorized purpose.

The software or hardware described in this document is furnished under a license and may be used, copied, or disclosed only in accordance with the terms of such license.

Trademarks

ABB and Relion are registered trademarks of ABB Group. All other brand or product names mentioned in this document may be trademarks or registered trademarks of their respective holders.

Warranty

Please inquire about the terms of warranty from your nearest ABB representative.

ABB Inc.
Distribution Automation
4300 Coral Ridge Drive
Coral Springs, FL 33065, USA
Toll-free: 1 (800) 523-2620
Phone: +1 954-752-6700
Fax: +1 954 345-5329
<http://www.abb.com/substationautomation>

Disclaimer

The data, examples and diagrams in this manual are included solely for the concept or product description and are not to be deemed as a statement of guaranteed properties. All persons responsible for applying the equipment addressed in this manual must satisfy themselves that each intended application is suitable and acceptable, including that any applicable safety or other operational requirements are complied with. In particular, any risks in applications where a system failure and/or product failure would create a risk for harm to property or persons (including but not limited to personal injuries or death) shall be the sole responsibility of the person or entity applying the equipment, and those so responsible are hereby requested to ensure that all measures are taken to exclude or mitigate such risks.

This document has been carefully checked by ABB but deviations cannot be completely ruled out. In case any errors are detected, the reader is kindly requested to notify the manufacturer. Other than under explicit contractual commitments, in no event shall ABB be responsible or liable for any loss or damage resulting from the use of this manual or the application of the equipment.

Conformity

This product complies with the directive of the Council of the European Communities on the approximation of the laws of the Member States relating to electromagnetic compatibility (EMC Directive 2004/108/EC) and concerning electrical equipment for use within specified voltage limits (Low-voltage directive 2006/95/EC). This conformity is the result of tests conducted by ABB in accordance with the product standards EN 50263 and EN 60255-26 for the EMC directive, and with the product standards EN 60255-6 and EN 60255-27 for the low voltage directive. The IED is designed in accordance with the international standards of the IEC 60255 series and ANSI C37.90. The DNP protocol implementation in the IED conforms to PG&E 2179 Protocol specification dated 3/18/96

Section 1	Introduction	3
	This manual	3
	Intended audience	3
	Product documentation	4
	Product documentation set	4
	Document revision history	5
	Related documentation	5
	Symbols and conventions	5
	Safety indication symbols	5
	Manual conventions	6
	Functions, codes and symbols	7
Section 2	PG&E 2179 Protocol data mappings	11
	Overview	11
	Point list for RER620 Ver. 1.2	12
Section 3	Glossary	19

Section 1 Introduction

1.1 This manual

The point list manual describes the outlook and properties of the data points specific to the IED. The manual should be used in conjunction with the corresponding communication protocol manual.

1.2 Intended audience

This manual addresses the communication system engineer or system integrator responsible for pre-engineering and engineering for communication setup in a substation from an IED perspective.

The system engineer or system integrator must have a basic knowledge of communication in protection and control systems and thorough knowledge of the specific communication protocol.

1.3 Product documentation

1.3.1 Product documentation set

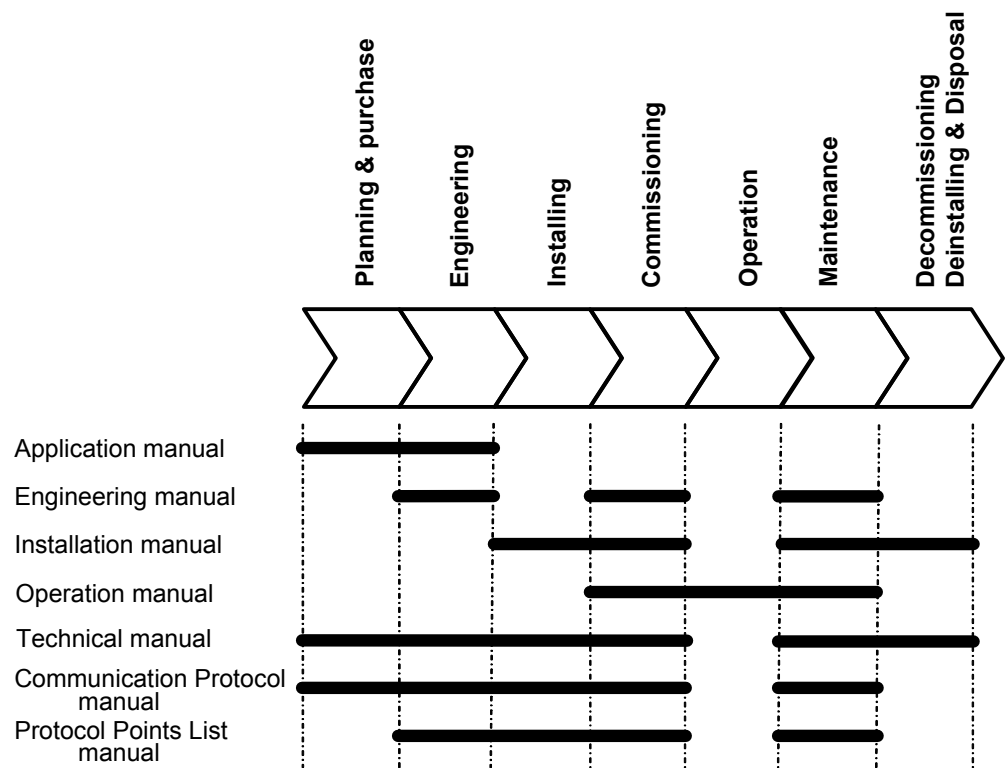


Figure 1: The intended use of manuals in different lifecycles

The engineering manual contains instructions on how to engineer the IEDs using the different tools in PCM600. The manual provides instructions on how to set up a PCM600 project and insert IEDs to the project structure. The manual also recommends a sequence for engineering of protection and control functions, LHMI functions as well as communication engineering for IEC 61850 and PG&E 2179 Protocol.

The installation manual contains instructions on how to install the IED. The manual provides procedures for mechanical and electrical installation. The chapters are organized in chronological order in which the IED should be installed.

The operation manual contains instructions on how to operate the IED once it has been commissioned. The manual provides instructions for monitoring, controlling and setting the IED. The manual also describes how to identify disturbances and how to view calculated and measured power grid data to determine the cause of a fault.

The application manual contains application descriptions and setting guidelines sorted per function. The manual can be used to find out when and for what purpose a typical protection function can be used. The manual can also be used when calculating settings.

The technical manual contains application and functionality descriptions and lists function blocks, logic diagrams, input and output signals, setting parameters and technical data

sorted per function. The manual can be used as a technical reference during the engineering phase, installation and commissioning phase, and during normal service.

The communication protocol manual describes a communication protocol supported by the IED. The manual concentrates on vendor-specific implementations. The point list manual describes the outlook and properties of the data points specific to the IED. The manual should be used in conjunction with the corresponding communication protocol manual.

1.3.2 Document revision history

Document revision/date	Product version	History
A/31/10/2011	1.1	First release
B/12/8/2014	1.2	Update



Download the latest documents from the ABB web site
<http://www.abb.com/substationautomation>.

1.3.3 Related documentation

Name of the document	Document ID
PG&E 2179 Communication Protocol Manual	1MAC303451-MB

1.4 Symbols and conventions

1.4.1 Safety indication symbols



The caution icon indicates important information or warning related to the concept discussed in the text. It might indicate the presence of a hazard which could result in corruption of software or damage to equipment or property.



The information icon alerts the reader to important facts and conditions.



The tip icon indicates advice on, for example, how to design your project or how to use a certain function.

Although warning hazards are related to personal injury, it should be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process performance leading to personal injury or death. Therefore, comply fully with all warning and caution notices.

1.4.2

Manual conventions

Conventions used in IED manuals. A particular convention may not be used in this manual.

- Abbreviations and acronyms in this manual are spelled out in the glossary. The glossary also contains definitions of important terms.
- Push button navigation in the LHMI menu structure is presented by using the push button icons, for example:
To navigate between the options, use  and .
- HMI menu paths are presented in bold, for example:
Select **Main menu > Settings**.
- LHMI messages are shown in Courier font, for example:
To save the changes in non-volatile memory, select `Yes` and press .
- Parameter names are shown in italics, for example:
The function can be enabled and disabled with the *Operation* setting.
- Parameter values are indicated with quotation marks, for example:
The corresponding parameter values are "Enabled" and "Disabled".
- IED input/output messages and monitored data names are shown in Courier font, for example:
When the function picks up, the `PICKUP` output is set to `TRUE`.
- Dimensions are provided both in inches and mm. If it is not specifically mentioned then the dimension is in mm.

1.4.3 Functions, codes and symbols

Table 1: *RER620 functions, codes and symbols*

Function	IEC61850	IEC60617	ANSI/C37.2
<i>Current Protection</i>			
Single-phase non-directional time overcurrent protection with 1-ph trip option, low stage	SPHLPTOC1	3I>(1)	51P
Single-phase non-directional time overcurrent protection with 1-ph trip option, high stage 1	SPHLPTOC2	3I>(2)	50P-1
Single-phase non-directional time overcurrent protection with 1-ph trip option, high stage 2	SPHHPTOC1	3I>>(1)	50P-2
Single-phase non-directional instantaneous overcurrent protection with 1-ph trip option	SPHIPTOC1	3I>>>(1)	50P-3
Non-directional time overcurrent ground-fault protection, low stage	XEFLPTOC2	Io>(2)	51N
Non-directional time overcurrent ground-fault protection, high stage 1	XEFLPTOC3	Io>(3)	50N-1
Non-directional time overcurrent ground-fault protection, high stage 2	XEFHPTOC3	Io>>(3)	50N-2
Non-directional instantaneous time overcurrent ground-fault protection	XEFIPTOC2	Io>>>(2)	50N-3
Non-directional sensitive earth-fault	EFLPTOC3	Io>(3)	50SEF
Negative sequence non-directional time overcurrent protection 1	XNSPTOC1	I2 >(1)	46-1
Negative sequence non-directional time overcurrent protection 2	XNSPTOC2	I2 >(2)	46-2
Phase discontinuity protection	PDNSPTOC1	I2/I1 >	46PD
Three-phase inrush detector	INPHAR	3I2f >	INR
<i>Directional Protection</i>			
Single-phase directional overcurrent protection, low stage 1	SDPHLPDOC1	3I >->(1)	67/51P-1
Single-phase directional overcurrent protection, low stage 2	SDPHLPDOC2	3I >->(2)	67/51P-2
Directional ground-fault protection, low stage 1	XDEFLPDEF1	Io>->(1)	67/51N-1
Directional ground-fault protection, low stage 2	XDEFLPDEF2	Io>->(2)	67/51N-2
<i>Cold Load Timers</i>			
Cold load timer 1 Phase A (in seconds)	TPSGAPC1	TPS(1)	62CLD-1
Cold load timer 2 Phase A (in minutes)	TPMGAPC1	TPM(1)	62CLD-2
Cold load timer 1 Phase B (in seconds)	TPSGAPC2	TPS(2)	62CLD-3
Cold load timer 2 Phase B (in minutes)	TPMGAPC2	TPM(2)	62CLD-4
Cold load timer 1 Phase C (in seconds)	TPSGAPC3	TPS(3)	62CLD-5
Cold load timer 2 Phase C (in minutes)	TPMGAPC3	TPM(3)	62CLD-6
<i>Voltage Protection</i>			
Single-phase overvoltage 1, source 1 low stage	SPHPTOV1	3U >(1)	59-1
Single-phase overvoltage 2, source 1 high stage	SPHPTOV2	3U >(2)	59-2
Single-phase overvoltage 3, source 2 low stage	SPHPTOV3	3U >(3)	59-3
Single-phase undervoltage 1, source 1 low stage	SPHPTUV1	3U <(1)	27-1
Single-phase undervoltage 2, source 1 high stage	SPHPTUV2	3U <(2)	27-2
Single-phase undervoltage 3, source 2 low stage	SPHPTUV3	3U <(3)	27-3
Positive sequence overvoltage protection, source 1	PSPTOV1	U1>(1)	59PS-1
Positive sequence overvoltage protection, source 2	PSPTOV2	U1>(2)	59PS-2
Negative sequence overvoltage protection, source 1	NSPTOV1	U2>(1)	47
Negative sequence overvoltage protection, source 2	NSPTOV2	U2>(2)	47-2
Zero sequence overvoltage protection, source 1	ROVPTOV1	Uo>(1)	59N-1

Section 1

Introduction

1MAC303451-MB B

Function	IEC61850	IEC60617	ANSI/C37.2
Zero sequence overvoltage protection, source 2	ROVPTOV2	Uo>(2)	59N-2
Frequency Protection			
Underfrequency, Overfrequency, Frequency rate of change, Source 1, Stage 1	FRPFRQ1	f</f>,df/dt(1)	81-1
Underfrequency, Overfrequency, Frequency rate of change, Source 1, Stage 2	FRPFRQ2	f</f>,df/dt(2)	81-2
Load Shed & Restoration, Source 1, Stage 1	LSHDPFRQ1	UFLS/R(1)	81S-1
Load Shed & Restoration, Source 1, Stage 2	LSHDPFRQ2	UFLS/R(2)	81S-2
Other Protection			
High Impedance Fault Detector	PHIZ1	PHIZ1	HIZ
Circuit breaker failure protection	SCCBRBRF1	3I>/Io>BF	50BFT
Circuit breaker close failure protection	SCCBRBCF1	SCCBRBCF1	50BFC
Directional positive sequence power protection	DPSRDIR1	P>->	32P
Directional negative/zero sequence power protection	DNZSRDIR1	Q>->	32N
Control			
Autoreclosing, 1ph and/or 3ph	SDARREC1	O -> I	79
Synch-check/voltage check (Source 1 is defined as bus, Source 2 as line)	SECRSYN1	SYNC	25
Circuit Breaker 1 (3 state inputs / 3 control outputs)	SCBXCBR1	I<->O CB	52
Loop control	DLCM	LCM	LCM
Supervision and Monitoring			
CB condition monitoring	SPSCBR1	CBCM	52CM
Fuse failure supervision, Source 1	SEQRUFUF1	FUSEF	60
Measurement <i>Note: If PT/CT primary setting is changed, the IED has to be rebooted to show the correct measurements for PG&E communication</i>			
Three-phase current	CMMXU1	3I	IA,IB,IC
Demand metering, Max/Min metering	CSMTA1		
Sequence current	CSMSQI1	I1,I2,I0	I1, I2, I0
Ground current	RESCMMXU1	Io	IG
Three-phase voltage, Source 1	VMMXU1	3U	VA,VB,VC
Three-phase voltage, Source 2	VMMXU2	3U(B)	VA,VB,VC(2)
Sequence voltages, Source 1	VSMSQI1	U1,U2,U0	V1,V2,V0
Sequence voltages, Source 2	VSMSQI2	U1,U2,U0(B)	V1,V2,V0(2)
Single and Three-phase power, Power factor and three phase energy, Source 1	APEMMXU1	P,SP,E	P,SP,E
Frequency, Source 1	FMMXU1	f	f
Recorders			
Digital fault recorder (DFR)	RDRE1	DR	DFR
Sequence of Events (SER)	SER	SER	SER
Fault Recorder	FLTMSTA	FLTMSTA	FLTMSTA
Fault Locator (FLOC)	DRFLO1	FLO	FLO
Other Functions			
Battery voltage, current. Test the battery	ZBAT1	UPS	UPS
Universal Power Drive	XGGIO115	X115(UPD)	X115(UPD)
Programmable buttons (16 buttons)	FKEYGGIO1	FKEYGGIO1	FKEYGGIO1

Function	IEC61850	IEC60617	ANSI/C37.2
Move function block (8 outputs)	MVGAPC1	MVGAPC1	MVGAPC1
Move function block (8 outputs)	MVGAPC2	MVGAPC2	MVGAPC2
Pulse timer (8 timers)	PTGAPC1	PTGAPC1	PTGAPC1
Pulse timer (8 timers)	PTGAPC2	PTGAPC2	PTGAPC2
Generic control points (16 outputs)	SPCGGIO1	SPCGGIO1	SPCGGIO1
Generic control points (16 outputs)	SPCGGIO2	SPCGGIO2	SPCGGIO2
Set reset flip flops (8 outputs)	SRGAPC1	SRGAPC1	SRGAPC1
Set reset flip flops (8 outputs)	SRGAPC2	SRGAPC2	SRGAPC2
Time delay off timers (8 timers)	TOFGAPC1	TOFGAPC1	TOFGAPC1
Time delay off timers (8 timers)	TOFGAPC2	TOFGAPC2	TOFGAPC2
Time delay on timers (8 timers)	TONGAPC1	TONGAPC1	TONGAPC1
Time delay on timers (8 timers)	TONGAPC2	TONGAPC2	TONGAPC2
Multipurpose generic up-down counter	UDFCNT1	UDFCNT1	UDFCNT1
Multipurpose generic up-down counter	UDFCNT2	UDFCNT2	UDFCNT2
Multipurpose generic up-down counter	UDFCNT3	UDFCNT3	UDFCNT3
Multipurpose generic up-down counter	UDFCNT4	UDFCNT4	UDFCNT4
Multipurpose generic up-down counter	UDFCNT5	UDFCNT5	UDFCNT5
Multipurpose generic up-down counter	UDFCNT6	UDFCNT6	UDFCNT6
Multipurpose generic up-down counter	UDFCNT7	UDFCNT7	UDFCNT7
Multipurpose generic up-down counter	UDFCNT8	UDFCNT8	UDFCNT8
Multipurpose generic up-down counter	UDFCNT9	UDFCNT9	UDFCNT9
Multipurpose generic up-down counter	UDFCNT10	UDFCNT10	UDFCNT10
Multipurpose generic up-down counter	UDFCNT11	UDFCNT11	UDFCNT11
Multipurpose generic up-down counter	UDFCNT12	UDFCNT12	UDFCNT12

Section 2 PG&E 2179 Protocol data mappings

2.1 Overview

This document describes the PG&E 2179 Protocol data points and structures available in RER620 Ver. 1.2.

The point tables show all the available PG&E 2179 Protocol data points in this IED. The data objects in the point tables are listed in alphabetical order based on the objects' IEC61850 names. The PG&E 2179 Protocol points are 'hard' coded into the IED.

This list represents the superset of PG&E 2179 Protocol points. The actual set of available points is determined by the IED's ordercode.

2.2 Point list for RER620 Ver. 1.2

Table 2: *Binary inputs,*

Index	61850 Path	Inversion	PG&E Description	ABB Description
0	LD0.MVGAPC1.Q2.stVal		Lr position	3-Phase Recloser Closed (52B)
1	LD0.MVGAPC1.Q1.stVal		Lr position b	3-Phase Recloser Open (52A)
2	LD0.LEDGGIO1.SPCSO9.stVal		Lr lockout	Led 9 On (Lockout Alarm)
3	LD0.XGGIO115.Health2.stVal	*	sys alarm	System Health Status
4	LD0.LEDPTRC1.Str.general		curr above mtt	Pick Up Alarm
5	CTRL.LLN0.Loc.stVal		scada	Local / Remote
6	LD0.FKEYGGIO1.SPCSO10.stVal		rcl rly	Key 10 Reclose Blocked
7	LD0.FKEYGGIO1.SPCSO9.stVal		grd rly	Key 9 Ground Block
8	LD0.FKEYGGIO1.SPCSO12.stVal		sgf rly	Key 12 50Sef Blocked
9	LD0.FKEYGGIO1.SPCSO13.stVal		Cold load pickup	Cold Load Pickup Blocked
10	LD0.FKEYGGIO1.SPCSO1.stVal		Norm profile	Key 1 Setting Group 1 Enabled
11	LD0.FKEYGGIO1.SPCSO2.stVal		Alt profile 1	Key 2 Setting Group 2 Enabled
12	LD0.FKEYGGIO1.SPCSO6.stVal		Sw mode	Key 6 Switch Mode Enabled
13	LD0.FKEYGGIO1.SPCSO14.stVal		Trip tcc2 only mode	50P-1 or 50N-1 Blocked
14	LD0.FKEYGGIO1.SPCSO8.stVal		Hot line tag	Key 8 Hot Line Tag On
15	LD0.SPHPTOV1.Op.phsA		A ph volts	59-1 Phase-A Operate
16	LD0.SPHPTOV1.Op.phsB		B ph volts	59-1 Phase-B Operate
17	LD0.SPHPTOV1.Op.phsC		C ph volts	59-1 Phase-C Operate
18	LD0.DPSRDIR1.Dir.general		pwr flow	32P-1 Direction Operate
19	LD0.TOFGAPC2.Q5.stVal		Batt test	Battery Test
20	LD0.ZBAT1.AC Loss.stVal		AC pwr fail	Loss Of Ac
21	LD0.ZBAT1.TestRsl.stVal	*	Batt alarm	Battery Test Result
22	LD0.FKEYGGIO1.SPCSO1.stVal		Setting Group 1 Active	Setting Group 1 Active
23	LD0.FKEYGGIO1.SPCSO2.stVal		Setting Group 2 Active	Setting Group 2 Active
24	LD0.FKEYGGIO1.SPCSO3.stVal		Setting Group 3 Active	Setting Group 3 Active
25	LD0.LLN0.Act4SG.stVal		Setting Group 4 Active	Setting Group 4 Active
26	LD0.LLN0.Act5SG.stVal		Setting Group 5 Active	Setting Group 5 Active
27	LD0.LLN0.Act6SG.stVal		Setting Group 6 Active	Setting Group 6 Active
28-39	Reserved			
40	LD0.LEDGGIO1.SPCSO1.stVal		A ph tgt	Led 1 On (Phase A Trip)
41	LD0.LEDGGIO1.SPCSO2.stVal		B ph tgt	Led 2 On (Phase B Trip)
42	LD0.LEDGGIO1.SPCSO3.stVal		C ph tgt	Led 3 On (Phase C Trip)
43	LD0.LEDGGIO1.SPCSO4.stVal		grd tgt	Led 4 On (Ground Trip)
44	LD0.EFLPTOC3.Op.general		sgf tgt	50 Sef Operate
45	LD0.XGGIO120.Ind1.stVal		rem trip lockout	X120-Input 1 Aim (Remote Trip Lockout)
46	LD0.XGGIO120.Ind2.stVal		comm stat	X120-Input 2 Aim (Comm Status)

Index	61850 Path	Inversion	PG&E Description	ABB Description
47	LD0.XGGIO120.Ind3.stVal		external rcl block	X120-Input 3 Aim (External Recl. Block)
48	Reserved			
49	Reserved			
50	Reserved			
51	Reserved			
52	LD0.LEDGGIO1.SPCSO5.stVal		grd oc stat	Ground Overcurrent Trip
53	LD0.MVGAPC2.Q4.stVal		ph oc stat	Phase Overcurrent trip
54	LD0.XNSPTOC1.Op.general		neg seq stat	Negative Sequence OC trip
55	Reserved			
56	Reserved			
57	LD0.FKEYGGIO1.SPCSO8.stVal		hotline tag stat	Hot Line Tag ON
58	LD0.XGGIO120.Ind4.stVal		control circuit interrupted	General Purpose BI4(Control Circuit Interrupted)
59	LD0.XGGIO115.Health2.stVal		control stat	IED Healthy
60	LD0.FRPFQR1.Op.general		freq trip	Frequency Trip
61	LD0.LEDGGIO.SPCSO6.stVal		voltage trip	Voltage trip
62	LD0.MVGAPC2.Q6.stVal		snyc check rly	25 Element Enabled
63	LD0.FKEYGGIO1.SPCSO10.stVal		rcl block	Reclose Block
64	LD0.MVGAPC2.Q8.stVal		Inst trip lockout	Instantaneous Trip Lockout
65	LD0.LEDGGIO1.SPCSO11.stVal		Pole fail	Breaker Open and Current > 0
66	LD0.TOFGAPC2.Q3.stVal		Fail to trip	Fail to Trip
67	LD0.TOFGAPC2.Q4.stVal		Fail to close	Fail to Close
68	Reserved			
69	LD0.FRPTUF1.Op.general		uf tgt	81-1 U Under-Frequency Operate
70	LD0.FRPTOF1.Op.general		overfreq tgt	Over-frequency Trip
71	LD0.SPHPTUV1.Op.general		Undervoltage tgt	27-1 3-Phase Operate
72	LD0.SPHPTOV1.Op.general		Overvoltage tgt	59-1 3-Phase Operate
73	Reserved			
74	LD0.MVGAPC2.Q5.stVal		Loss of sensing	All three phases dead
75	Reserved			
76	Reserved			
77	LD0.ZBAT1.ACloss.stVal	*	control pwr OK	Loss of AC (Alarm LED 10)
78	LD0.FEYGGIO1.SPCSO15.stVal		tt stat	Transfer Trip Status
79	Reserved			
80	Reserved			
81	LD0.SDARREC1.SucRec.stVal		79 - successful reclose	79 Successful reclose status
82	LD0.SDARREC1.PrgRec.stVal		79 - In progress status	79 In Progress status
83	LD0.LEDGGIO1.SPCSO6.stVal		Voltage/Freq trip (Alarm Led6)	Voltage/Freq trip (Alarm LED 6)
84	LD0.LEDGGIO1.SPCSO7.stVal		Maintenance required (Alarm Led 7)	Maintenance Required (Alarm LED 7)
85	LD0.VMMXU2.HiWrn.stVal		S2 - A ph Volts	S2- A Phase bus voltage present

Section 2

PG&E 2179 Protocol data mappings

1MAC303451-MB B

Index	61850 Path	Inversion	PG&E Description	ABB Description
86	LD0.VMMXU2.HiWrn.stVal		S2 - B ph Volts	S2- B Phase bus voltage present
87	LD0.VMMXU2.HiWrn.stVal		S2 - C ph Volts	S2-C Phase bus voltage present
88	LD0.SPHLPTOC1.Op.general		51P-1 3phs operate	51P-1 3Phs Operate
89	LD0.SPHLPTOC2.Op.general		50P-1 3phs operate	50P-1 3Phs Operate
90	LD0.SPHHPTOC1.Op.general		50P-2 3phs operate	50P-2 3Phs operate
91	LD0.SPHIPTOC1.Op.general		50P-3 3phs operate	50P-3 3phs operate
92	LD0.XEFLPTOC2.Op.general		51N-1 operate	51N-1 Operate
93	LD0.XEFLPTOC3.Op.general		50N-1 operate	50N-1 operate
94	LD0.XEFHPTOC3.Op.general		50N-2 operate	50N-2 operate
95	LD0.XEFIPTOC2.Op.general		50G-3 operate	50G-3 operate

Table 3: Binary outputs

Index	61850 Path	On Value	Off Value	PG&E Description	ABB Description
0	CTRL.SCBCSWI1.Pos.Oper.ctlVal	1	0	Close	3phs close
1	CTRL.SCBCSWI1.Pos.Oper.ctlVal	0	1	Open	3phs trip
2	LD0.SPCGGIO1.SPCSO12.Oper.ctlVal	0	1	sgf rly c/in	50sef enable
3	LD0.SPCGGIO1.SPCSO12.Oper.ctlVal	1	0	sgf rly c/ou	50sef disable
4	LDO.SPCGGIO2.SPCSO1.Oper.ctlVal	1	0	cold load pickup c/out	CLPU disable
5	LDO.SPCGGIO2.SPCSO1.Oper.ctlVal	0	1	cold load pickup c/in	CLPU enable
6	Reserved				
7	Reserved				
8	LD0.SPCGGIO1.SPCSO1.Oper.ctlVal	1	0	norm mode	Setting group 1 enabled
9	LD0.SPCGGIO1.SPCSO1.Oper.ctlVal	1	0	alt profile 1 disable	Setting group 2 disabled
10	LD0.SPCGGIO1.SPCSO6.Oper.ctlVal	0	1	switch mode disable	switch mode disabled
11	LD0.SPCGGIO1.SPCSO2.Oper.ctlVal	1	0	alt profile 1 enable	Setting group 2 enabled
12	LD0.SPCGGIO1.SPCSO6.Oper.ctlVal	1	0	switch mode enable	switch mode enabled
13	LDO.SPCGGIO1.SPCSO14.Oper.ctlVal	1	0	trip tcc2 only c/out	51P-1 and 51N-1 disabled
14	LDO.SPCGGIO1.SPCSO14.Oper.ctlVal	0	1	trip tcc2 only c/in	51P-1 and 51N-1 enabled
15	LD0.LLN0.LEDRs1.Oper.ctlVal	1	0	reset targets	reset targets
16	LD0.CMSTA1.RecRs.Oper.ctlVal	1	0	reset demand	reset demand
17	LD0.LLN0.LEDRs2.Oper.ctlVal	1	0	reset alarms	reset alarms
18	LD0.ZBAT1.BatTest.Oper.ctlVal	1	0	batt test	Test Battery
19	LD0.SPCGGIO1.SPCSO8.Oper.ctlVal	1	0	hot line tag ON	HLT enabled
20	LD0.SPCGGIO1.SPCSO8.Oper.ctlVal	0	1	hot line tag OFF	HLT disabled
21	Reserved				
22	Reserved				
23	CTRL.SCBCSWI1.Pos.Oper.ctlVal	0	1	open and lockout	3phs trip
24	LDO.SPCGGIO2.SPCSO3.Oper.ctlVal	1	0	sync check rly c/in	25 element enabled
25	LDO.SPCGGIO2.SPCSO3.Oper.ctlVal	0	1	sync check rly c/out	25 element disabled
26	Reserved				
27	LD0.SPCGGIO1.SPCSO4.Oper.ctlVal	1	0	rcl block temp disable	Reclose block temp disabled
28	LD0.SPCGGIO1.SPCSO9.Oper.ctlVal	1	0	grd rly c/out	ground relay disable
29	LD0.SPCGGIO1.SPCSO9.Oper.ctlVal	0	1	grd rly c/in	ground relay enable
30	LD0.SPCGGIO1.SPCSO10.Oper.ctlVal	1	0	rcl rly c/out	reclose relay disable
31	LD0.SPCGGIO1.SPCSO10.Oper.ctlVal	0	1	rcl rly c/in	reclose relay enable
32	LD0.SPCGGIO1.SPCSO15.Oper.ctlVal	1	0	tt c/out	transfer trip disable
33	LD0.SPCGGIO1.SPCSO15.Oper.ctlVal	0	1	rcl rly c/in	transfer trip enable
34	LD0.LPHD1.RsDev.Oper.ctlVal	1	0	Reset Device	Reset Device
35	LD0.SPCGGIO1.SPCSO3.Oper.ctlVal	1	0	Alt profile 2	Alt profile 2 (Button 3)
36	LD0.SPCGGIO2.SPCSO5.Oper.ctlVal	1	0	Alt Profile 3	Alt Profile 3 (Button 4)
37	LD0.SPCGGIO1.SPCSO7.Oper.ctlVal	1	0	Sectionalizer Mode	Sectionalizer Mode (Button 7)
38	LD0.ZBAT1.ResetUps.Oper.ctlVal	1	0	Reset UPS processor	Reset UPS processor

Index	61850 Path	On Value	Off Value	PG&E Description	ABB Description
39	LDO.SPCGGIO2.SPCS04.Oper.ctlval	1	0	Reset target counters	Reset target counters

Table 4: *Counters*

Index	61850 Path	Scaling Factory	Counter Name	PG&E Description	ABB Description
64	Reserved				
65	Reserved				
66	LD0.SCBXZCBR1.OpCnt.stVal	1	res1	Operation counter	3- Phase Trip Operations
67	LD0.UDFCNT1.CntRs.actVal	1	res1	A ph tgt counter	A Phase Trip Operations
68	LD0.UDFCNT2.CntRs.actVal	1	res1	B ph tgt counter	B Phase Trip Operations
69	LD0.UDFCNT3.CntRs.actVal	1	res1	C ph tgt counter	C Phase Trip Operations
70	LD0.UDFCNT5.CntRs.actVal	1	res1	grd tgt counter	Ground Trip Counter
71	LD0.UDFCNT4.CntRs.actVal	1	res1	sgf tgt counter	SEF Trip Counter

Table 5: Analog inputs

No Events	61850 Path	Scale factor	PG&E Description	ABB Description
0	Reserved			
1	Reserved			
2	LD0.CMMXU1.A.phsA.instCVal.mag.f	1	Amps A	Ia-Mag (Rms)
3	LD0.CMMXU1.A.phsB.instCVal.mag.f	1	Amps B	Ib-Mag (Rms)
4	LD0.CMMXU1.A.phsC.instCVal.mag.f	1	Amps C	Ic-Mag (Rms)
5	LD0.RESCMMXU1.A.res.instCVal.mag.f	1	Amps grd	In-Mag (Rms)
6	LD0.VMMXU1.PhV.phsA.cVal.mag.f	1	Volts A	Voltage Source 1-Phase A Mag
7	LD0.VMMXU1.PhV.phsB.cVal.mag.f	1	Volts B	Voltage Source 1-Phase B Mag
8	LD0.VMMXU1.PhV.phsC.cVal.mag.f	1	Volts C	Voltage Source 1-Phase C Mag
9	LD0.APEMMXU1.WA.mag.f	1	Kwatts A	Phase A Active Power (P)
10	LD0.APEMMXU1.WB.mag.f	1	Kwatts B	Phase B Active Power (P)
11	LD0.APEMMXU1.WC.mag.f	1	Kwatts C	Phase C Active Power (P)
12	LD0.APEMMXU1.TotW.instMag.f	1	Kwatts total	Total Active Power (P)
13	LD0.APEMMXU1.VarA.mag.f	1	Kvars A	Total Reactive Power (Q)
14	LD0.APEMMXU1.VarB.mag.f	1	Kvars B	Phase A Reactive Power (Q)
15	LD0.APEMMXU1.VarC.mag.f	1	Kvars C	Phase B Reactive Power (Q)
16	LD0.APEMMXU1.TotVAr.instMag.f	1	Kvars total	Phase C Reactive Power (Q)
17	LD0.APEMMXU1.TotPF.instMag.f	1	pf total	Average Power Factor (P _f)
18	LD0.FMMXU1.Hz.instMag.f	1	freq	Frequency
19	LD0.CMSTA1.AvAmps1.mag.f	1	Demand amps A	Ia-Mag Average Demand
20	LD0.CMSTA1.AvAmps2.mag.f	1	Demand amps B	Ib-Mag Average Demand
21	LD0.CMSTA1.AvAmps3.mag.f	1	Demand amps C	Ic-Mag Average Demand
22	Reserved	1		
23	LD0.ZBAT1.Vol.mag.f	1	Batt volts	Battery Voltage
24	LD0.ZBAT1.Amp.mag.f	100	Batt amps	Battery Charging Current
25	LD0.DRFLO1.FltDisKm.mag.f	1	Fault distance	Distance To Fault Measured In Km/Miles
26	LD0.FLTMSTA1.StrDur.mag.f	1	Fault duration	Fault Duration
27	LD0.FLTMSTA1.AmpsA.mag.f	1	Fault amps A	Last Fault: Phase A Current Magnitude
28	LD0.FLTMSTA1.AmpsB.mag.f	1	Fault amps B	Last Fault: Phase B Current Magnitude
29	LD0.FLTMSTA1.AmpsC.mag.f	1	Fault amps C	Last Fault: Phase C Current Magnitude
30	LD0.FLTMSTA1.AmpsN.mag.f	1	Fault neutral amps	Last Fault: Neutral Current Magnitude
31	LD0.FLTMSTA1.MaxAmpsA.mag.f	1	Faults Max phs A amps	Last Fault: Max Phase A Current Magnitude
32	LD0.FLTMSTA1.MaxAmpsB.mag.f	1	Faults Max phs B amps	Last Fault: Max Phase B Current Magnitude
33	LD0.FLTMSTA1.MaxAmpsC.mag.f	1	Faults Max phs C amps	Last Fault: Max Phase C Current Magnitude
34	LD0.FLTMSTA1.MaxAmpsN.mag.f	1	Fault Max amps grd	Last Fault: Max Phase Neutral Current Magnitude

Section 2

PG&E 2179 Protocol data mappings

1MAC303451-MB B

No Events	61850 Path	Scale factor	PG&E Description	ABB Description
35	LD0.LDPHD1.WacTrg.stVal	1	Number of watchdog device resets	Number of watchdog device resets
36	LD0.SPSCBR1.RmnLifPhA.stVal	1	Recloser remaining life Phs A	Recloser Remaining life Phs A
37	LD0.SPSCBR1.RmnLifPhB.stVal	1	Recloser remaining life Phs B	Recloser Remaining life Phs B
38	LD0.SPSCBR1.RmnLifPhC.stVal	1	Recloser remaining life Phs C	Recloser Remaining life Phs C
39	LD0.SPSCBR1.AccAPwrPhA.mag.f	1	Accumulated currents power (I ² t) Phs A	Accumulated Currents Power (I ² t) Phs A
40	LD0.SPSCBR1.AccAPwrPhB.mag.f	1	Accumulated currents power (I ² t) Phs B	Accumulated Currents Power (I ² t) Phs B
41	LD0.SPSCBR1.AccAPwrPhC.mag.f	1	Accumulated currents power (I ² t) Phs C	Accumulated Currents Power (I ² t) Phs C
42	LD0.VMMXU2.PhV.phsA.cVal.mag.f	1	S2 - Volts A	S2-Va Mag
43	LD0.VMMXU2.PhV.phsB.cVal.mag.f	1	S2 - Volts B	S2-Vb Mag
44	LD0.VMMXU2.PhV.phsC.cVal.mag.f	1	S2 - Volts C	S2-Vc Mag
45	LD0.LPHD1.PhyHealth.stVal	1	General device status	General Device State
46	LD0.ZBAT1.AcInputVol.mag.f	1	AC Input voltage	AC Input voltage

Section 3 Glossary

615/620 series Series of numerical IEDs for basic, inexpensive and simple protection and supervision applications of utility substations, and industrial switchgear and equipment

AIM Analog input module

ANSI American National Standards Institute

AR Autoreclosing

BIO Binary input and output

CB Circuit breaker

CBB Cycle building block

CBFP Circuit-breaker failure protection

CROB Control relay output block

CTO Common time of occurrence. The time and date CTO object is an information object that represents the absolute time of day.

CTRL Control logical device

DFR Digital fault recorder

PG&E 2179 Protocol A protocol developed by PG&E to provide universal platform for performing Supervisory Control and Data Acquisition (SCADA) in their system

DR Disturbance recorder

EMC Electromagnetic compatibility

HMI Human-machine interface

IEC 61850 International standard for substation communication and modelling

IED Intelligent electronic device

LD0 Logical device zero (0)

LED Light-emitting diode

LHMI Local human-machine interface

LLN0 Logical node zero (0)

PCM600 Protection and Control IED Manager

PSM Power supply module

SBO Select-before-operate

stVal	Status value
Val	Value

Contact us

ABB Inc.

Distribution Automation

4300 Coral Ridge Drive

Coral Springs, FL 33065, USA

Phone: +1 (800) 523-2620

Phone: +1 954-752-6700

Fax: +1 954 345-5329

www.abb.com/substationautomation