# **BE1-11***g* Generator Protection System







The BE1-11*g* Generator Protection System is designed to address issues with reliability arising from the complexity of programming. With BESTspace<sup>m</sup> files, multiple BESTlogic<sup>m</sup>*Plus* preprogrammed logic schemes, and associated application notes, you can be confident that you have the complete generator system protection you need.

# BENEFITS

- **The Offline Simulator**, in BESTlogic<sup>™</sup>*Plus*, reduces commissioning errors by providing the ability to test and troubleshoot logic without the need for expensive physical hardware.
- **Complete generator protection** system for applications including large power generation, distributed generation, local backup generation, and intertie protection applications.
- BESTCOMSPlus<sup>®</sup> software, provided free of charge, makes it easy to enter protection settings with confidence with its intuitive settings, built-in error checking, and summary screens.
- Complex protection is easy to configure and understand with preprogrammed schemes, drag-and-drop logic, user labels, and notes provided by BESTlogic<sup>™</sup> Plus.
- Quick and reliable fault clearing with minimal false operations.
- Flexible package options provided by half rack case with drawout or J case (S1 sized) with plug out and additional CTs and I/O.
- **Easily navigate settings** and metering with the intuitive HMI menu and large LCD display.
- Customize displayed information to meet different application needs with user-defined indicators and labels.
- Select and Operate buttons on the front panel provide direct control of internal logic.
- **Optional remote RTD module** provides RTDs and analog input and output channels for expanded protection and control possibilities.

VISIT <u>WWW.BASLER.COM</u> FOR ADDITIONAL INFORMATION.

# **F**EATURES

- Proven algorithms based on more than 50 years of relaying experience and more than 30 years of reliable digital relaying design.
- One relay for most applications.
- One proven, stable firmware package for all BE1-11 series relays.
- **Differential protection** with dual slope for quick and selective protection against internal faults.
- Advanced differential protection with saturation detection algorithm.
- Choice of built-in sync-check or auto synchronizer provides flexible synchronizing solutions.
- 100% stator ground protection prevents expensive generator rewinds.
- Loss of Excitation protection prevents generator overheating due to underexcitation.
  - Out of Step protection detects pole slip to prevent expensive generator damage.
- Distance element provides backup for faults on transmission line.

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- Frequency tracking for backup and cogeneration applications.
- Three Communication Ports: Front USB, rear RS-485 and Ethernet RJ45 or fiber optic are available for BESTCOMSPlus<sup>®</sup>, BESTnet<sup>™</sup>Plus, Modbus<sup>®</sup>, DNP, and IEC 61850 protocols, also featuring user configurable email notifications.
- Enhanced I/O options available with the J-style case: 10 inputs with 5 outputs or 7 inputs with 8 outputs.



Figure 1 - BE1-11g Device Functions

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			SPECIFICATIONS			
Power Supply			SEF:	Metering:	0.01 to 3 Aac	
Option 1:	48/125 Vac/dc	dc range 35 to 150 V	•	Continuous:	4 Aac	
		ac range 55 to 135 V	•	One-second rating:	80 Aac	
Option 2:	125/250 Vac/dc	dc range 90 to 300 V	•			
		ac range 90 to 270 V	Communications			
Option 3:		dc range 17 to 32 V*	USB: 2.0, Type-B			
	*(as low as 8 V for momentary dips)		RS-485:			
Burden:	10 W continuous, 12 W max (all options)		Baud: Up to 115,200			
		<ul> <li>Protoco</li> </ul>	tocols: DNP, Modbus®, RTD Module			
Voltage Sensing (10 to 125 Hz)			Ethernet:			
Phase: Metering:		50 to 250 Vac	Speed:	10/100	10/100 Mbit Copper	
	Continuous:	300 V, Line to Line	•	100 Mbi	t Fiber	
	One-second rating:	-	Protoco	ls: BESTnet	BESTnet™ <i>Plus,</i>	
Vx:	Metering:	25 to 125 Vac	•	BESTCO	BESTCOMS <i>Plus®,</i> DNP, Modbus, IEC 61850™,	
	Continuous:	150 V, Line to Line	•	DNP, Mo		
	One-second rating:	600 V, Line to Neutral	•	RTD Mo		
Current Sensing (10 to 125 Hz)			Agency/Certifications			
5 A NOM:	5 A Nom: Metering: 0.5 to 15 Aac Continuous: 20 Aac One-second rating: 400 Aac 1 A Nom: Metering: 0.1 to 3 Aac		UL recognized			
			CSA certified per Standard C22.2 No. 14			
1 A Nom			DNP3-2009, V2.6 compliant KEMA certified per IEC 61850 Certificate Level A EAC certified, CE compliant - meets or exceeds			
TA NUIII.	Continuous: 4 Aac One-second rating: 80 Aac					
	one-second rainig.	OU Adu	standards for distribution in the European Community			
Style Chart						
Application Phase Ground RS-485 Port Inputs/Outputs Network 000 Latest release XX) Specific fixed release						
Application Current Current Protocol Current Current						

#### Physical Weight: H1 Rack Mount (H case): 5.9 lb (2.6 kg) H1 Panel Mount (P case): 6.2 lb (2.8 kg) Vertical Case (J case): 5.1 lb (2.3 kg) IP class: IP50 Dimensions (WxHxD): H case and P case: 10.50 x 3.49 x 9.17 inches with mounting flanges (266.7 x 88.65 x 232.92 mm) 8.64 x 3.49 x 7.92 inches behind panel (219.46 x 88.65 x 201.17 mm) J case: 7.00 x 9.12 x 7.91 inches with mounting flanges (177.8 x 231.65 x 200.91 mm) 5.33 x 8.41 x 7.29 inches behind panel (135.38 x 213.61 x 185.17 mm)

## For complete specifications, download the instruction manual at www.basler.com.

### **RELATED PRODUCTS**

- BE1-11 Protection System
  - Designed to address issues with reliability arising from the complexity of programming.
- BE1-64F Ground Fault Relay
  - Designed to detect unintentional grounding in field windings of a generator or motor.
- DECS-250 Digital Excitation Control System
  - Provides precise voltage, var and Power Factor regulation and exceptional system response, plus generator protection.
- DGC-2020 Digital Genset Controller
  - Provides genset and transfer switch control, metering, protection, and programmable logic in a simple, easy to use, reliable, rugged, and cost effective package.
- RTD Module
  - Provides up to 12 remote RTD inputs, four remote analog inputs, and four remote analog outputs. (p/n 9444100100 - Ethernet, Copper) (p/n 9444100101 - Dual Ethernet, Fiber & Copper)

### Accessories

- · Escutcheon plate to panel mount two dovetailed H1 systems (p/n 9289900016)
- · Adapter bracket to mount single H1 case in 19" rack (p/n 9289924100)
- · Adapter bracket with cutout for ABB FT test switch, to mount a single H1 case in a 19" rack (p/n 9289929100)
- Test terminal block assembly kit for J case systems (p/n 9424226100)

ISO 9001-2008 Highland, IL USA Suzhou, China Taylor, TX USA Basler Plastics, LLC

Current

<u>3 Phase</u> 1) 1A 5) 5A

Dual 3 Ph 2) 1A 6) 5A

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If Ground Current is A, D or F, Phase Current must be 5A.

4 If Option 1 is P or T. Phase Current must be 2 or 6.

5 If Ethernet Protocol is 5, RS-485 Port Protocol must be N.

Visit the BE1-11g mobile site!

Use your smartphone and scan the

QR code to gain quick access to our

support information you need.

m.basler.com/grs/BE1-11g

6 For communications with Remote RTD Module, RS-485 Protocol must be N or Ethernet Protocol must be 1, 2, 3, 4, or 5.

3 If Phase Current is 2 or 6. Case must be J.

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If Dual Phase Current Input or Dual Ground Current input choice is made, then both curren input types must be dual.

G) Generator

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Current

Ground A) 5A B) 1A C) SEF

 Dual Ground

 D) 5A 5A

 E) 1A 1A

 F) SEF 5A

 G) SEF 1A

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Connections

Option 1

N) None P) Current Differentia S) Auto Synchronizer

Auto Synchronize and Current Differentia

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If Option 1 is S or T, Sync-Check is replaced with Auto Synchronizer

When a DNP3 over Ethernet protocol (3 or 4) is purchased, a BESTCOMS*Plus*<sup>®</sup> selection box permits using DNP3 over Ethernel or over RS-485. RS-485 selection must be N.

If Inputs/Outputs is 1 or 3, the contact is open for the alarm condition. If Inputs/Outputs is 2 or 4, the contact is closed for the alarm condition

When Inputs/Outputs is 1 or 2, a J-style case has 7 inputs and 8 outputs; an H or P style case has 4 inputs and 5 outputs.

/7 If RS-485 protocol is D, Ethernet protocol cannot be 3 or 4.

8 If Option 1 is P or T, Case must be J.

10 If Option 2 is C, Case must be J.

13 If Inputs/Outputs is 3 or 4, Case must be J.

0) Copper Ethernet 1) Fiber Optic Ethernet

email:info@basler.com

www.basler.com

Option 2

0) None C) Conformal Coating

Option 3

E) None

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Protocol

5 6 7

Standard I/O, N.O. Alarm

N.O. Alarm 2) Standard I/O, N.C. Alarm 3) 10 Inputs/5 Outputs, N.O. Alarm 4) 10 Inputs/5 Outputs, N.C. Alarm

12 13 14

J) P)

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Case

H1 Rack Mount

Vertical Case H1 Panel Mount

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Ethernet

Protocol

No Ethernet BESTnet<sup>™</sup>Plus only Modbus TCP with BESTnetPlus

DNP3 with BESTnetPlus

Modbus TCP and DNP3 with BESTnetPlus

EC-61850 with BESTnetPlus

5 6 7

N) None M) Modbus<sup>®</sup> D) DNP3

Power Supply

1) 48/125 Vac/Vdc 2) 125/250 Vac/Vdc 3) 24 Vdc