

# BE1-50/51B Self-Powered Time Overcurrent Relay



## Overview

A single-phase, self-powered, microprocessor-based time/instantaneous overcurrent relay that provides cost-saving overload and fault protection for generators, transformers, feeders, and motors. Available in multiple-rack, panel, and retrofit mounting options.

## Features

- Self powered from 50/60 Hz systems, available for 5-ampere or 1-ampere CT secondaries.
- Patented integrating reset characteristic, even when current goes to zero. Replicates electromechanical reset for all applications.
- Fifteen field-selectable, inverse, fixed time and British Standard (BS142) time overcurrent curves on 200 series relays (10 on 100 series).
- Wide setting ranges:
  - Time Overcurrent: 0.5 to 15.9 (5-ampere Unit)  
0.1 to 3.18 (1-ampere Unit)
  - Inst. Overcurrent: 1 to 99 (5-ampere Unit)  
0.2 to 19.8 (1-ampere Unit)
- Current pickup accuracy  $\pm 2\%$ .
- Timing accuracy  $\pm 2\%$ .
- Less than 10% transient overreach.
- 5 VA burden (at nominal) self powered from 50/60 Hz systems, utilizes standard 5-ampere or 1-ampere CT secondaries.

## Benefits

- Accurate, repeatable, and reliable operation.
- No additional power source required because relays are self-powered from 50/60 Hz systems. Available in 5-ampere or 1-ampere CT secondary models.
- Timings can be tailored to the application with multiple field-selectable curves.
- Flexible pickup is continuously adjustable over a wide range.
- Instantaneous protection can be set lower to provide more complete protection with a design that minimizes transient overreach.
- Models available to replicate decaying reset of electromechanical relay disks when current drops to zero.
- Reduce CT costs with low sensing and supply burdens.
- Reduce maintenance labor by eliminating the need for recalibration.
- Testing is easy with drawout construction and in-case testability.

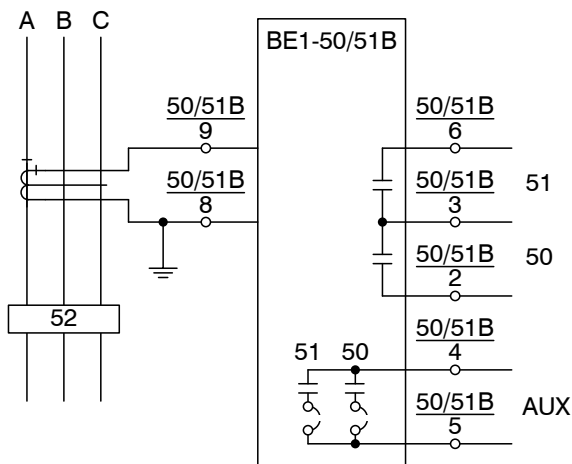


Figure 1 - BE1-50/51B Connection Diagram for a Typical Application

## Specifications

### Current Sensing

5 A Unit: 14 A continuous, 400 A 1-second  
 1 A Unit: 2.8 A continuous, 80 A 1-second

### Time Overcurrent (51) Element

Pickup:  
 5 A Unit: 0.5 to 15.9 A in 0.1 A steps  
 1 A Unit: 0.1 to 3.18 A in 0.02 A steps  
 Accuracy: ±2%  
 Dropout: 95% of pickup value  
 Timing:  
 Range: 0.0 to 9.9 s in 0.1 s steps  
 Accuracy: Sum of ±1 cycle, ±2%

### Curve Characteristics:

15 field selectable, inverse, fixed time and British Standard (BS142) time overcurrent curves on 200 series relays (10 on 100 series) can be selected by the front panel Curve switch.

### Integrating Reset:

An instantaneous or integrating reset characteristic can be selected by the front panel SW3-4 switch.

### Instantaneous Overcurrent (50) Element

Pickup:  
 5 A Unit: 1 to 99 A in 1 A steps  
 1 A Unit: 0.2 to 19.8 A in 0.2 A steps  
 Accuracy: ±2%  
 Dropout: 95% of pickup value

### Curve Characteristics:

To avoid nuisance trips, the time to trip for ground applications is slightly longer. Otherwise, instantaneous characteristic curves are similar to electromechanical instantaneous units.

### Frequency Response

<0.5% change in required pickup current with a ±5 Hz change from nominal 50/60 Hz current.

### Transient Response

<10% overreach with system time constants up to 40 ms.

### Harmonic Response

A relay set for 1 A pickup picks up at 0.96 A with a current containing 40% seventh harmonic. This corresponds to a 10:1 rejection ratio. Other conditions may be evaluated in the same manner.

### Outputs

Resistive:  
 120/240 Vac: Make and carry 30 A for 0.2 s, carry 7 A for 120 s, 3 A continuous, 5 A break  
 125/250 Vdc: Make and carry 30 A for 0.2 s, carry 7 A for 120 s, 3 A continuous, 0.3 A break  
 Inductive:  
 120/240 Vac, 125/250 Vdc: Make and carry 30 A for 0.2 s, carry 7 A for 120 s, 3 A continuous, 0.3 A break (L/R=0.04)

### Environmental

Operating Temp: -40°C to 70°C (-40°F to 158°F)  
 Storage Temp: -50°C to 70°C (-58°F to 158°F)  
 Isolation: IEEE C37.90  
 Transient Surge: IEEE C37.90.1  
 RFI: IEEE C37.90.2  
 ESD: IEEE C37.90.3  
 Vibration: IEC 255-21-1  
 Shock: IEC 255-21-2

### Agency/Certifications

UL (cURus) recognized for the USA and Canada, China RoHS compliant.

### Physical

Weight: 3.9 kg (8.6 lb)  
 Dimensions (WxHxD):  
 A1 Case, Semi-Flush Mount:  
 6.65 x 7.57 x 6.19 inches  
 (168.9 x 192.3 x 157.2 mm)  
 S1 Case, Semi-Flush Mount:  
 6.65 x 9.32 x 6.19 inches  
 (168.9 x 236.7 x 157.2 mm)  
 S1 Case, Projection Mount:  
 6.65 x 9.32 x 8.59 inches  
 (168.9 x 236.7 x 218.2 mm)

For complete specifications, download the instruction manual at [www.basler.com](http://www.basler.com).

## ORDERING

**How to Order:** Designate the Model Number from the table below to define the desired configuration.

	Model Number	Case Style	SW3-3 Selects	Sensing Input Range (Amps)	
				TIME	INST
5 A System CT Secondaries	BE1-50/51B-105	A1	0.2 second delay	0.5 to 15.9	1.0 to 99.0
	BE1-50/51B-205	A1	Curve set	0.5 to 15.9	1.0 to 99.0
	BE1-50/51B-106	S1 (projection mount)	0.2 second delay	0.5 to 15.9	1.0 to 99.0
	BE1-50/51B-206	S1 (projection mount)	Curve set	0.5 to 15.9	1.0 to 99.0
	BE1-50/51B-107	S1 (semi-flush mount)	0.2 second delay	0.5 to 15.9	1.0 to 99.0
	BE1-50/51B-207	S1 (semi-flush mount)	Curve set	0.5 to 15.9	1.0 to 99.0
1 A System CT Secondaries	BE1-50/51B-101	A1	0.2 second delay	0.1 to 3.18	0.2 to 19.8
	BE1-50/51B-201	A1	Curve set	0.1 to 3.18	0.2 to 19.8
	BE1-50/51B-102	S1 (projection mount)	0.2 second delay	0.1 to 3.18	0.2 to 19.8
	BE1-50/51B-202	S1 (projection mount)	Curve set	0.1 to 3.18	0.2 to 19.8
	BE1-50/51B-103	S1 (semi-flush mount)	0.2 second delay	0.1 to 3.18	0.2 to 19.8
	BE1-50/51B-203	S1 (semi-flush mount)	Curve set	0.1 to 3.18	0.2 to 19.8

## Related Products

### BE1-FLEX Protection, Automation and Control System

Designed to be configurable for nearly any Power System Application.

## Accessories

### Cases, Covers, Connectors, Mounting, Misc.

Designed for adaptive customization with your protective device.

### Test Plug

To allow testing of the relay without removing system wiring. Basler ElectricP/N 10095.