

INTRODUCTION

The BE3-76SH dc overcurrent relay provides overcurrent protection in dc circuits found in applications such as the excitation field of a synchronous machine, transit systems, and dc substation systems. The BE3-76SH utilizes a user-supplied 50 mV or 100 mV shunt to quickly detect excessive dc current. When the monitored current exceeds the user-adjustable setpoint and the user-adjustable inverse time delay expires, a set of DPDT output contacts changes state and the red RELAY LED lights. A green POWER LED indicates the presence of relay operating power.

SPECIFICATIONS

Operating Power

Voltage (Style xxxAx):	90 to 150 Vac
Voltage (Style xxxBx):	180 to 300 Vac
Frequency:	45 to 65 Hz
Burden:	<2 VA

Sensing Input

Rated Value:	50 mVdc (style xFxxx) 100 mVdc (style xGxxx)
Input Impedance:	50 k Ω
Source Impedance:	100 Ω maximum
Overload:	10 times input continuously

Setpoint

Overcurrent Range:	40 to 120% (\pm 3%) of nominal shunt input
Differential:	Fixed at 5%
Repeatability:	<0.5% of full span
Time Dial:	0.1 to 20

Relay Output

Relay Type:	D.P.D.T.
AC Rating:	250 V, 5 A, non-resistive, 1,200 VA
DC Rating:	125 V, 1 A, resistive, 120 W
Mechanical Life:	5 million operations

Environment

Temperature

Operating:	0°C (32°F) to 60°C (140°F)
Functional:	-25°C (-13°F) to 70°C (158°F)
Storage:	-40°C (-40°F) to 70°C (158°F)
Coefficient:	0.03% per °C (300 ppm/°C)

Humidity

Relative:	95% non-condensing
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Enclosure

Complies with DIN-EN 50022, BS 5584, any position. Case material complies with UL 94 VO.

Size:	55 mm (2.17 in)
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Weight:	400 g (14.1 oz)
Mounting:	DIN rail, 35 by 7.5 mm

Enclosure Code

Case:	IP 50
Terminals:	IP 30

Applicable Standards

General

IEC 144, BS 5420, VDE/VDI 0435, IEC 947, EN 60947

Safety

BS EN 61010, DIN 57411, VDE 0411, ANSI C37

Surge Withstand

IEC 801, EN 55020, ANSI C37-90a

Radio Frequency Interference

RFI degree N, complies with VDE 0875

cULus

cULus listed to UL 508 and CSA C22.2 No. 14

CE Compliance

This product meets or exceeds the standards required for distribution in the European Community.

GOST-R Certification

GOST-R certified per the relevant standards of Gosstandart of Russia.

OPERATION

BE3-76SH relays have two user-adjustable controls: SET and TIME DIAL.

The SET control defines the level of dc current that causes the BE3-76SH to trip. The SET control has an adjustment range of 40 to 120% (\pm 3%) of the nominal shunt rating.

The TIME DIAL control defines the time delay from when the monitored dc current reaches the trip point and the output contacts change state. The TIME DIAL control has an adjustment range of 0.1 to 20.

The settings of the SET and TIME DIAL controls are related by an inverse function. See Figure 1. This means that the higher the sensed current rises above the setting of the SET control, the shorter the time to a relay trip. The TIME DIAL setting is a linear multiplier for the time to a relay trip.

MOUNTING

BE3-76SH relays should be installed in a dry, vibration-free location where the ambient temperature does not exceed the operating temperature range.

BE3-76SH relays are designed for mounting on standard DIN rails that comply with DIN-EN 50022. Mounting involves hooking the top edge of the cutout on the base of the case over one edge of the DIN rail. The opposite side of the cutout containing the release clip is then pushed over the opposite side of the DIN rail. To remove or reposition the relay, lever the release clip and move the relay as required.

CONNECTIONS

Relay connections should be made using wire that meets applicable codes and is properly sized for the application. Figure 2 shows the input connections for the BE3-76SH.

CALIBRATION

The calibration marks on the faceplate have a maximum error of 10% and are provided only as guides. Proper calibration requires using an accurate millivolt meter in parallel with the input signal. When setting the relay, the following performance considerations should be made to determine the relay's response to the various conditions possible in a given application.

Multiple of Pickup (MoP)

The MoP ratio is determined by:

$$\frac{\text{Actual dc current}}{\text{Set control setting}}$$

For example, if the relay SET control setting is the equivalent of 100 Adc (the actual setting is expressed as a percentage of the rated, nominal sensing input) and the actual current is 125 Adc, the MoP is 125/100 or 1.25.

Calibration Procedure

1. Rotate the SET control fully clockwise to the 120% position and the TIME DIAL control fully counterclockwise to the 0.1 position.
2. Apply the desired trip voltage to the relay, allowing for a 1.03 MoP factor.

3. Slowly rotate the SET control counterclockwise until the RELAY LED starts flashing (allow for a 700 ms delay before the LED lights). Then, slowly rotate the SET control clockwise until the LED turns off.
4. Repeat Step 3 until the amount of rotation required between LED turn-on and turn-off is minimal. The MoP at this point will be 1.03.

Setting Example

The desired trip voltage in a 100 mV shunt application is 103 mVdc (103%).

When the SET control (expressed in %) is set above the level of trip voltage, the MoP is below 1 and the relay is not tripped.

When the setting value of the SET control equals the value of trip voltage, the MoP is 1 and the relay is not tripped.

When the SET control setting is 100% (2.91% below the trip voltage) the MoP is 1.03 so the relay time delay starts and the RELAY LED starts flashing, but the relay is not tripped. In this instance, the trip time delay is 244 seconds.

MAINTENANCE

BE3-76SH relays are solid-state devices that require no maintenance. In the event that your relay requires repair, contact Basler Electric.

STYLE CHART

The BE3-76SH style identification chart is illustrated in Figure 3.

FIGURES

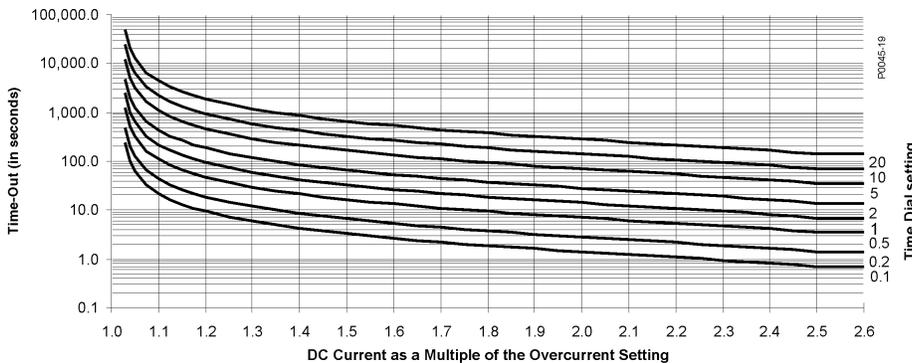


Figure 1. Inverse Time Characteristic Curves

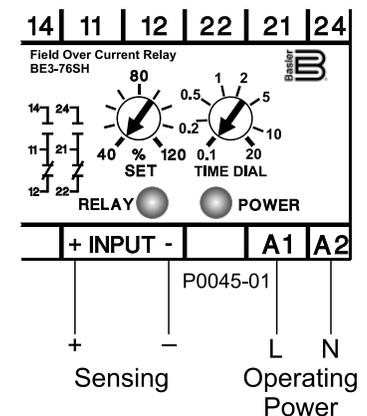


Figure 2. Front Panel View and Connections

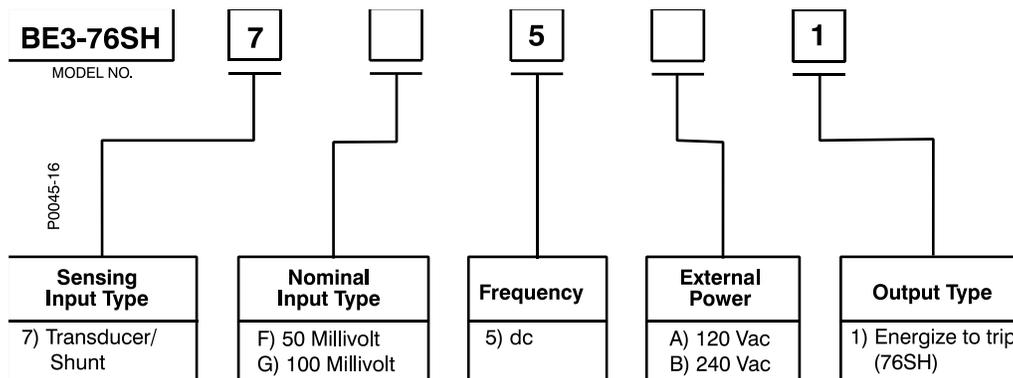


Figure 3. BE3-76SH Style Chart