

## INTRODUCTION

BE3 dc millivolt sensing relays provide voltage monitoring and protection for any application where dc voltage levels are critical. A common application is overcurrent protection for dc charging systems. Millivolt input signals from shunts, sensors, or transducers can provide the input signals. Undervoltage, overvoltage, and combined over/undervoltage units are available. A time delay control provides an adjustment of 0 to 10 seconds (operating time is typically 200 ms). This time delay may be used to prevent false tripping when there are slight variations in the input signal. BE3 dc millivolt sensing relays operate when the adjustable trip point is reached. On overvoltage units, the output relay energizes when the input signal exceeds the trip point. On undervoltage units, the output relay de-energizes when the input signal falls below the trip point. A red LED indicates the state of the relay. A green LED indicates the condition of the power supply.

## SPECIFICATIONS

### Operating Power

All units require external operating power.

Nominal Voltage: 120 Vac, 240 Vac, 380 Vac, 480 Vac, or 24 Vdc

Frequency: 45 to 65 Hz

Impedance: 100  $\Omega$  max

Overload: 10 times nominal continuously

### Burden

Vac: 2 VA

Vdc: <3 W

### Sensing Input

Nominal Voltage: 50 mVdc, 100 mVdc, and 10 to 99 mVdc (specify nominal range)

Impedance: 50 k $\Omega$

### Setpoint

Undervoltage Range: Adjustable 0 to 80% ( $\pm 3\%$ ) of nominal

Overvoltage Range: Adjustable 40 to 120% ( $\pm 3\%$ ) of nominal

Time Delay: Adjustable 0 to 10 s

Repeatability: Greater than 0.5% of full span

Differential: Fixed at 5% of nominal

Operating Time: 200 ms typical

### Output

Relay Type: D.P.D.T.

AC Rating: 250 V, 5 A, non-resistive, 1200 VA

DC Rating: 125 V, 1 A, resistive, 120 W

Mechanical Life: 5 million operations

### Temperature

Operating Temperature: 0°C (32°F) to 60°C (140°F)

Functional Temperature: -25°C (-13°F) to 70°C (158°F)

Storage Temperature: -40°C (-40°F) to 70°C (158°F)

Temperature Coefficient: 0.03% per °C (300 ppm/°C)

### Humidity

Relative Humidity: 95% non-condensing

### Physical

Mounting: DIN rail 1.38" by 0.29" (35 mm by 7.5 mm)

Case: Complies with IEC 529, DIN 40050, BS 5490

Case Material: Complies with UL 94V0

### Weight

Single Unit: 0.88 lb (0.4 kg)

Combined Unit: 1.32 lb (0.6 kg)

### Size

Single Unit: 2.17" wide (55 mm)

Combined Unit: 3.93" wide (100 mm)

### Agency

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

CE compliant

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

## OPERATION

BE3-74SH and BE3-74SL dc millivolt sensing relays have two user-adjustable controls marked SET and DELAY. The BE3-74SD has four controls: UNDER SET, UNDER DELAY, OVER SET, and OVER DELAY. The SET control adjusts the relay trip point. An overvoltage trip causes the relay output to energize when the voltage rises above the SET threshold. The overvoltage SET level is adjustable from 40 to 120% ( $\pm 3\%$ ) of nominal input ( $V_{nom}$ ). An undervoltage trip causes the relay output to de-energize when the voltage decreases below the SET threshold. The undervoltage SET level is adjustable from 0 to 80% ( $\pm 3\%$ ) of nominal input. The time delay is the amount of time that elapses after the trip point is reached and when the output relay operates.

### Setting Example

A BE3-74SH relay with a nominal input rating of 100 mVdc has the following settings:

- SET - 80%
- DELAY - 4 s

A trip occurs when the sensing voltage rises above 80 mVdc and 4 seconds elapse. Reset occurs when the voltage decreases below 75 mVdc (5% of nominal below the setpoint).

## INSTALLATION

BE3 dc millivolt sensing relays are designed for mounting on standard DIN rails that comply to 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. BE3 relays should be installed in a dry, vibration-free location where the ambient temperature does not exceed the operating temperature range. Connections to the relay should be made using wire that meets applicable codes and is properly sized for the application. Figure 1 shows the input connections for the BE3-74SH, BE3-74SL, and BE3-74SD relays.

## 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. Use the following procedure to calibrate your relay.

### Overvoltage

1. Adjust the SET control fully clockwise and the delay control fully counterclockwise.
2. Apply the desired trip voltage to the relay.
3. Slowly (allow for the 200 ms operating time) adjust the SET control counterclockwise until the relay trips.
4. Remove the applied voltage (do not change the voltage level) and set the DELAY control to the desired time delay.

5. Apply the trip voltage to the relay and measure the time to trip.
6. Adjust the DELAY and repeat Steps 4 and 5 until you have the desired time delay.

### Undervoltage

1. Adjust the SET and DELAY controls fully counterclockwise.
2. Decrease the applied sensing voltage from the nominal value until the desired tripping voltage is reached.
3. Slowly (allow for the 200 ms operating time) adjust the SET control clockwise until the relay trips.
4. Set the DELAY control to the desired time delay and apply nominal voltage to the relay.
5. Step down the applied voltage from nominal to a level just below the trip level set in Step 3 and measure the time delay.
6. Adjust the DELAY and repeat Steps 4 and 5 until the desired time delay is achieved.

## MAINTENANCE

BE3 relays are solid-state devices that require no maintenance. In the event that your relay requires repair, contact Basler Electric, Highland, IL, USA for return authorization.

## ORDERING INFORMATION

Figure 2 shows the BE3 relay style chart.

## FIGURES

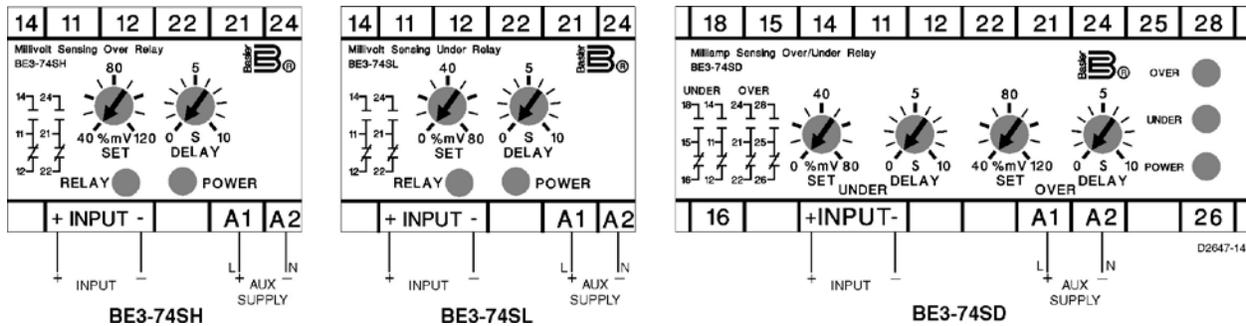


Figure 1. BE3-74SH, BE3-74SL, and BE3-74SD Input Connections

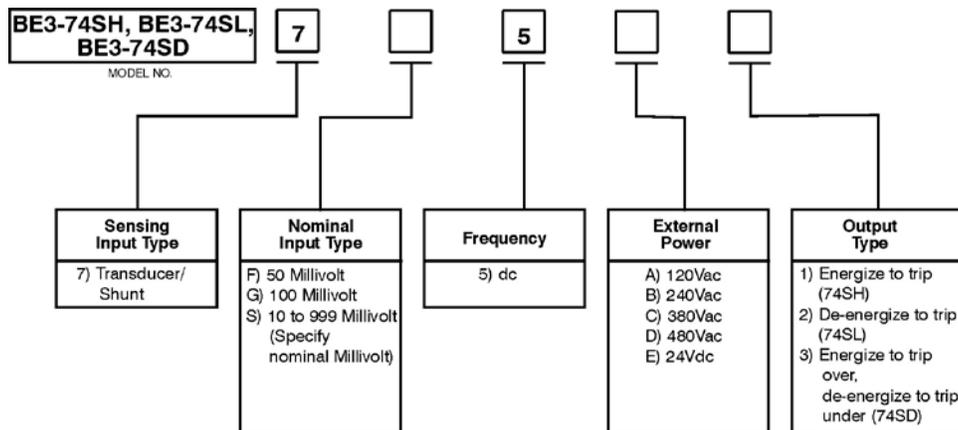


Figure 2. BE3-74SH, BE3-74SL, and BE3-74SD Style Number Identification Chart