INTRODUCTION

BE3 frequency relays provide frequency monitoring and protection in both single- and three-phase systems. They are used in applications such as utility mains failure, regulation of power supplies, and to protect generators against over or underspeed. Underfrequency, over-frequency, and combined under/overfrequency units are available. BE3 frequency relays operate when the adjustable trip point is reached. A time delay control is provided with an adjustment of 0 to 10 seconds (relay operating time is typically 200 ms). This time delay may be used to prevent false tripping when there are slight variations in the voltage supply. On overfrequency units, the output relay energizes when the input signal exceeds the trip point. On underfrequency 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 are self powered.

Nominal Voltage:	120 Vac, 240 Vac, 380 Vac, or 480 Vac
Frequency:	50 Hz, 60 Hz, or 400 Hz
Burden:	<2.5 VA per phase
Overload:	1.25 times nominal continuously. 2 times nominal for 3 s.

Setpoint

Over/Underfrequency Set Range

50 Hz Nominal:	Adjustable 40 to 60 Hz
60 Hz Nominal:	Adjustable 50 to 70 Hz
400 Hz Nominal:	Adjustable 360 to 440 Hz

Setpoint range accuracy is ±3%.

Time Delay

Adjustable 0 to 10 s

Repeatability

Greater than 0.5% of full span

Differential

Fixed at 1% of nominal

Operating Time

200 ms typical

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

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 94VO

Weight

Single Function:	0.88 lb (0.4 kg)
Multiple Function:	1.32 lb (0.6 kg)

Size

Single Function:	2.17” wide (55 mm)
Multiple Function:	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

BE3-81OT and BE3-81UT frequency relays have two user-adjustable controls marked SET and DELAY. The BE3-81OT/UT has four controls: UNDER SET, OVER SET, UNDER DELAY, and OVER DELAY. Each SET control adjusts a relay trip point. An overfrequency trip causes the relay output to energize when the frequency rises above the SET threshold. An underfrequency trip causes the relay output to de-energize when the frequency decreases below the SET threshold. Refer to the setpoint specifications for overfrequency and underfrequency adjustment ranges. Time delay is the amount of time that elapses after the trip point is reached and when the output relay operates.

Setting Example

A BE3-81OT relay with a nominal input rating of 60 Hz has the following settings:

- SET - 65 Hz
- DELAY - 2 s

A trip occurs when the sensed frequency rises above 65 hertz and 2 seconds elapse. The relay resets when the frequency decreases below 64.4 hertz (1% of nominal below the setpoint).

INSTALLATION

BE3 frequency 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 terminal connections for the BE3-81OT, BE3-81UT, and BE3-81OT/UT 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 frequency meter in parallel with the input signal. Use the following procedure to calibrate your relay.

Overfrequency

1. Adjust the SET control fully clockwise and the DELAY control fully counterclockwise.
2. Apply the desired trip frequency to the relay.
3. Slowly (allow for the 20 ms operating time) adjust the SET control counterclockwise until the relay trips.
4. Set the DELAY control to the desired time delay and apply nominal frequency to the relay.
5. Apply trip frequency to the relay and measure the time to trip.
6. Adjust the DELAY and repeat Steps 4 and 5 until the desired time delay is achieved.

Underfrequency

1. Adjust the SET and DELAY controls fully counterclockwise.
2. Decrease the applied frequency from the nominal value until the desired tripping frequency is reached.
3. Slowly adjust the SET control clockwise until the relay trips.
4. Set the DELAY control to the desired time delay and apply nominal frequency 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 frequency relay style number identification chart.

FIGURES

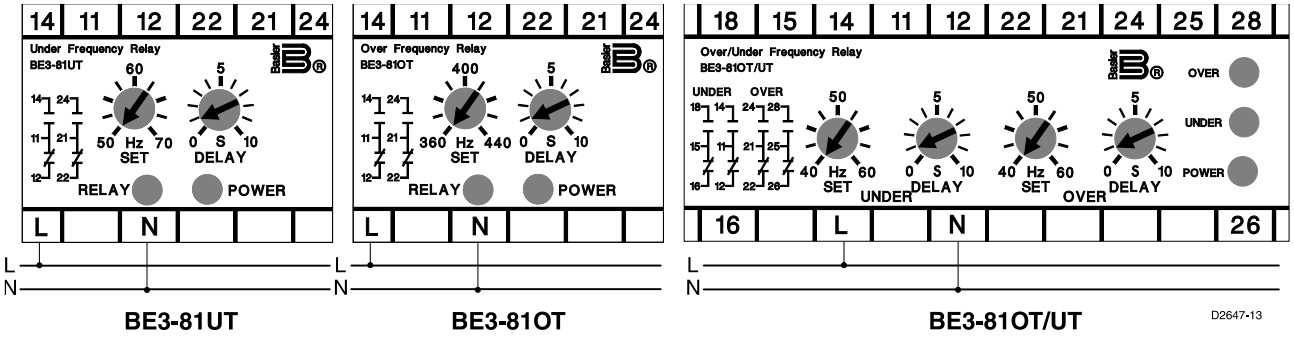

Figure 1. BE3-81O, BE3-81U, and BE3-81O/U Input Connections

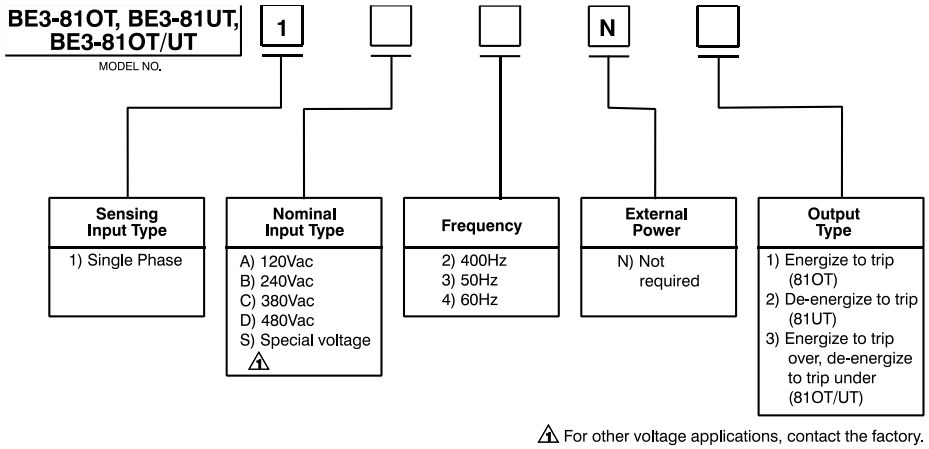

Figure 2. BE3-81O, BE3-81U, and BE3-81O/U Style Number Identification Chart