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, overfrequency, and combined under/overfrequency units are available. BE3 frequency relays operate when the adjustable trip point is reached. A reset control is provided with an adjustment of 0.3 to 3.0% on 50 or 60 hertz units and 3 to 30% on 400 hertz units. Reset ensures that the measured parameter returns to the percent set above or below the trip point before the relay returns to the original state. 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 goes 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

Over/Underfrequency Reset Range

50 Hz Nominal:	Adjustable 0.3 to 3.0 Hz
60 Hz Nominal:	Adjustable 0.3 to 3.0 Hz
400 Hz Nominal:	Adjustable 3.0 to 30 Hz

Setpoint range accuracy is ±3%.

Repeatability

Greater than 0.5% of full span

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

BE3-81O and BE3-81U frequency relays have two user-adjustable controls marked SET and RESET. The BE3-81O/U has four controls: UNDER SET, OVER SET, UNDER RESET, and OVER RESET. 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. The RESET control adjusts the difference between the nominal input frequency and the reset frequency. An overfrequency reset occurs when the frequency decreases below the RESET setting. The overfrequency RESET setting is set as the percentage above F_{nom} where the relay will reset. An underfrequency reset occurs when the frequency increases above the RESET setting. The underfrequency RESET setting is set as the percentage below F_{nom} where the relay will reset. Refer to the setpoint specifications for the underfrequency and overfrequency RESET setting ranges.

Setting Example

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

- SET - 65 Hz
- RESET - 2 Hz

A trip occurs when the sensed frequency rises above 65 Hz. The relay resets when the frequency decreases below 63 Hz.

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 BE3-81O, BE3-81U, and BE3-81O/U 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 and RESET controls fully clockwise.
2. Apply the desired trip frequency to the relay.
3. Slowly adjust the SET control counterclockwise until the relay trips.
4. Reduce the applied frequency to the desired reset level.
5. Slowly adjust the RESET control counterclockwise until the relay resets.

Underfrequency

1. Adjust the SET control fully counterclockwise and the RESET control fully clockwise.
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. Increase the applied frequency to the desired reset level.
5. Slowly adjust the RESET control counterclockwise until the relay resets.

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

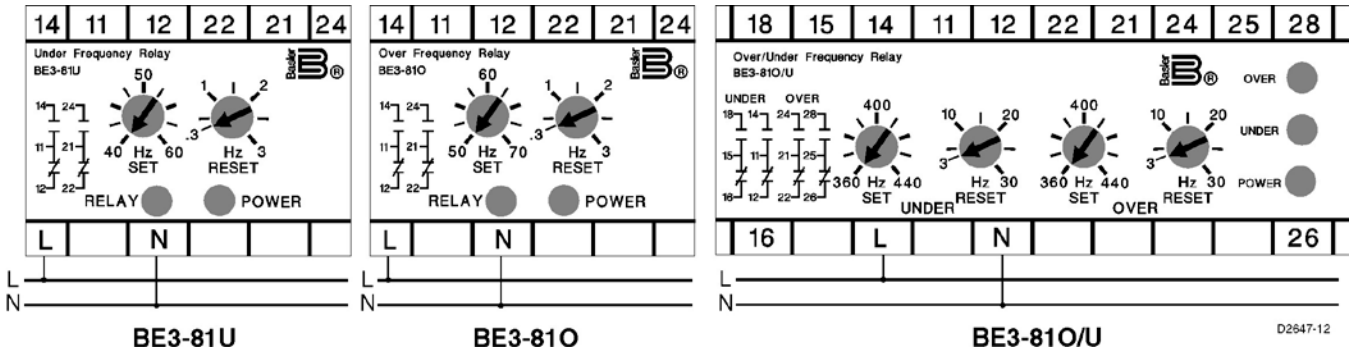

Figure 1. BE3-81O, BE3-81U, and BE3-81O/U Input Connections

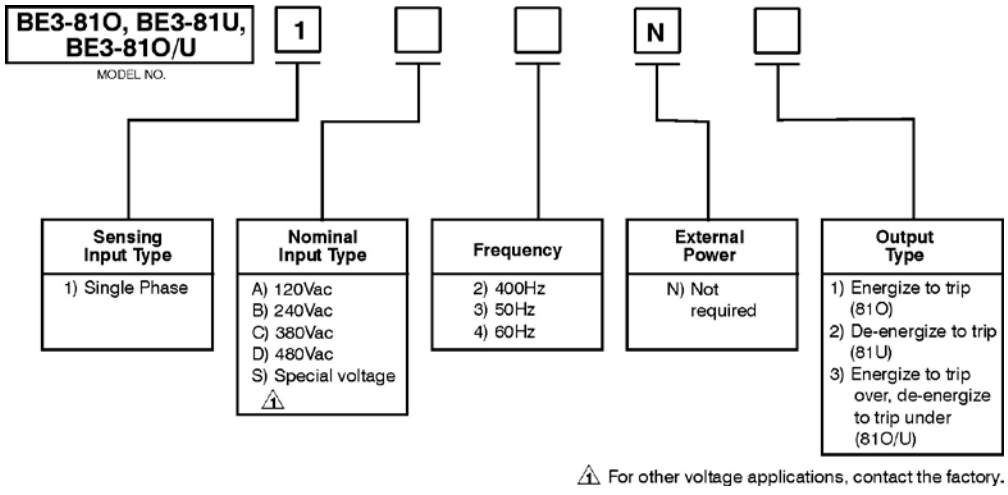

Figure 2. BE3-81O, BE3-81U, and BE3-81O/U Style Number Identification Chart