INSTRUCTIONS
FOR
PHASE BALANCE RELAYS
BE3-47N and BE3-47N/27

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INTRODUCTION

BE3-47N phase balance relays protect three-phase lines, transformers, motors, and generators against phase unbalance, phase loss, and phase reversal. BE3-47N/27 relays have the added feature of undervoltage protection. The output relay energizes and the red RELAY LED lights when a balanced input with the proper phase sequence is sensed. The output relay de-energizes and the RELAY LED goes out when a fault condition is detected. The green POWER LED indicates the condition of the power supply. Two external controls are provided: UNBAL (unbalance) and DELAY. The UNBAL control adjusts the percentage of unbalanced voltage at which the relay trips. The DELAY control provides an adjustable time delay to prevent tripping on voltage transients.

ELECTRICAL SPECIFICATIONS

U.L. listed, CSA Certified, C.E. Compliant

INPUT

All units are self powered. Nominal voltage - 120 Vac, 240 Vac, 380 Vac, 480 Vac. For other nominal voltages, contact Basler Electric.

Frequency

50 Hz, 60 Hz or 400 Hz

Burden

Less than 2 VA

Overload

1.5 times nominal continuously. 2 times nominal for 3 seconds.

SETPOINT

Range	Adjustable 5% to 15% of nominal
Repeatability	Better than 0.5% of full span
Undervoltage (BE3-47N/27 only)	Preset at 85% of nominal
Time Delay	Adjustable 0 to 10 sec
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 watts
Mechanical Life	5 million operations

PHYSICAL SPECIFICATIONS

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 (200 ppm/°C)
Relative Humidity	95% noncondensing
Mounting	DIN rail 1.38“ by 0.29" (35 mm by 7.5 mm)
Case	Complies with IEC 529, DIN 40050, BS 5490
Weight	0.88 lbs. (0.4 kg)
Size	2.17" wide (55 mm)
Case Material	Complies with UL 94VO

OPERATION

The BE3-47N and BE3-47N/27 phase balance relays have two external, user adjustable controls marked UNBAL and DELAY. The UNBAL control adjusts the relay trip point. The relay will trip when the voltage becomes unbalanced by the percentage set by the UNBAL control. The trip point is adjustable from 5% to 15% of nominal input. The DELAY control adjusts the time from when a fault is detected until the output contacts change state. The delay is adjustable from zero to 10 seconds. The undervoltage feature of the BE3-47N/27 has no external adjustment and is fixed at 85% of the nominal input voltage. If all three phases stay balanced but decrease below 85% of nominal voltage, the relay will de-energize.

Setting Example

A BE3-47N/27 relay with a nominal input rating of 120 Vac has the following settings:

UNBAL - 10%
DELAY - 5 seconds

The relay will detect a phase unbalance when any one phase decreases to 108 Vac or increases to 132 Vac. The output relay will trip five seconds after the phase unbalance is detected. The output relay will also trip if all phases decrease to 85% of nominal, or 102 Vac.

INSTALLATION

BE3 phase balance 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 BE3-47N/27 relay. Connections for the BE3-47N relay are identical.

CALIBRATION

The calibration marks on the face plate have a maximum error of 10% and are provided only as guides. Proper calibration requires using an accurate voltmeter in parallel with the input signal. Use the following procedure to calibrate your relay.

UNBALANCE

1. Adjust the UNBAL control fully clockwise and the DELAY control fully counterclockwise.
2. Apply three-phase, nominal input voltage with the proper phase sequence to the relay. The output relay should energize.
3. Lower one phase of the applied voltage to the desired trip level. Slowly adjust the UNBAL control counter-clockwise until the relay trips.

DELAY

1. Set the DELAY control at the desired time setting.
2. Apply three-phase, nominal input voltage with the proper phase sequence to the relay.
3. Step down one phase of the applied voltage below the relay trip point. Using an appropriate timing device, measure the time from when the voltage is reduced until the relay trips.
4. Compare the measured time to the desired time delay and adjust the DELAY control accordingly.
5. Repeat Steps 3 and 4 as required.

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.

BE3 PHASE BALANCE RELAYS

Figure 2 shows the BE3 phase balance relay style numbers.

BE3-47N	Phase Balance
BE3-47N/27	Phase Balance/Undervoltage

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9 3203 00 990	A	Basler Electric	Revised	04/98	1998

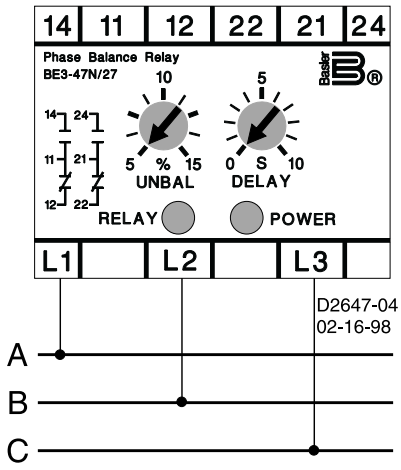

Figure 1. BE3-47N, BE3-47N/27 Phase Balance Relay Connections

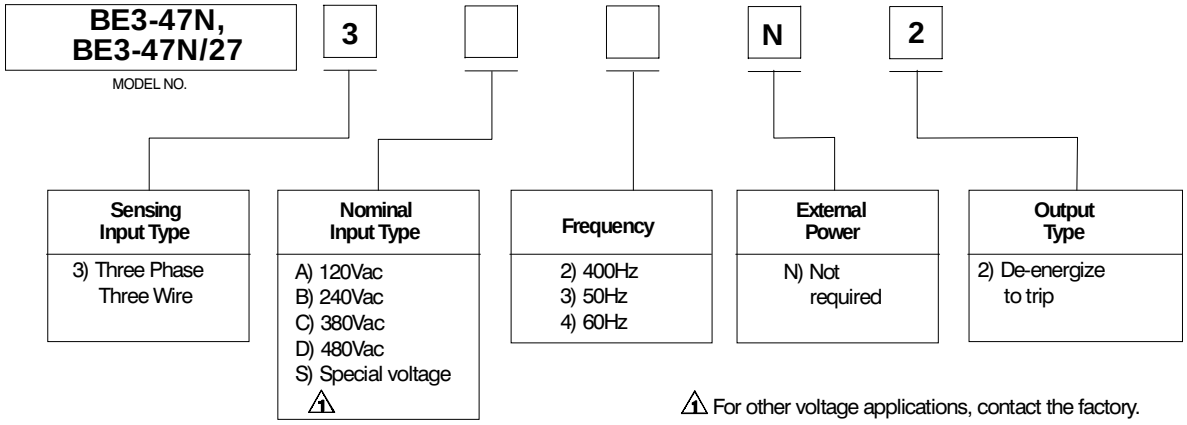

Figure 2. BE3-47N, BE3-47N/27 Style Number Identification Chart