BE2-40 Relay

Current Transducer (Typical)

CLASS 200 EQUIPMENT BE 2-40 EXCITATION RELAYS

DEVICE NUMBER: 40

APPLICATION:

The BE2-40 Excitation Relays protect a generator against overexcitation, underexcitation, or loss of excitation, preventing damage to the generator and/or to other generators in the system. The relays, applicable to both ac and dc generators, offer high reliability at low cost, providing fast, precise response to all predetermined excitation current abnormalities.

FEATURES:

- Solid-state design.
- Separate current transducer can be installed in any area convenient to field leads.
- Adaptable to a wide range of dc currents and machine sizes.
- Pull-in and Dropout points independently adjustable.
- Optional adjustable time delay.
- Three models: for loss of excitation protection, overexcitation protection, underexcitation protection.
- Automatic reset.
- Mechanically rugged.
- Available from stock.

ADDITIONAL INFORMATION

INSTRUCTION MANUAL

Request Publication 9099800XXX

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DESCRIPTION:

See Figure 1 for an example of pull-in and dropout points with resultant outputs for all relay models and Figure 2 for a typical interconnection.

The BE2-40 consists of eight models: the BE2-40-1 and -2 Loss of Excitation Relays offer two available nominal sensing input ranges (200A and 800A) and no time delay; the BE2-40-3 Under Excitation Relay, BE2-40-4 Over Excitation Relay have one nominal sensing input range (200A) and an adjustable time delay of 0.2 to 60 seconds; the BE2-40-5 Under Excitation Relay, BE2-40-6 Over Excitation Relay have a nominal sensing input range (800A) and an adjustable time delay of 0.2 to 60 seconds; and the BE2-40-11 Over Excitation Relay, BE2-40-12 Under Excitation Relay have a nominal sensing input range (10A) and an adjustable time delay of 0.2 to 60 seconds. The time delays prevent transient current conditions from activating the output relay. Power for the relays is provided by a separate ac source. All models consist of a behind-the-panel mounted module and a separate current sensor which allows the module to be isolated from the field. The pull-in setting is adjustable between 2 to 10 ampere-turns, 90 to 200 ampere-turns or 360 to 800 ampere-turns, depending on the model number (See Table 1). The dropout setting (always set below the pull-in setting) is adjustable between 40% and 90% of the pull-in setting.

Over Excitation Relay. When the field current exceeds the pull-in adjust setting, the output relay will energize after the preselected time delay. When the current decreases below the dropout setting, the relay de-energizes instantaneously.

Under Excitation Relay. When the field current drops below the dropout adjust setting, the output relay de-energizes after the preselected time delay. When the current increases above the pull-in adjust setting, the output relay energizes instantaneously.

Loss of Excitation Relay. Operation is identical to the Under Excitation Relay, but with no intentional time delay.

SPECIFICATIONS:

- **POWER INPUT:** Power is provided by an external ac source.
- **VOLTAGE:** 1 phase, 50/60 Hz, nominal 100/120 Vac ±10%. Voltage Burden: 30 VA.
- **CURRENT SENSING INPUT:** (See Table 1).
- **OUTPUT:** DPDT relay contacts rated to make 30 amps at 250 Vdc and break 1 amp at 125 Vdc.
- **ADJUSTMENT RANGES:**
  Current Sensing: (See Table 1).
  Timing Adjust: (See Table 1).
- **OPERATING RANGE:** -40°C to +70°C (-40°F to +158°F).
- **SHOCK:** Withstand up to 15 Gs in each direction.
- **VIBRATION:** Withstand the following vibration spectrum:

Frequency	Acceleration
5-26 Hz	1.36G
26-52 Hz	0.036 in. displacement
52-260 Hz	5G

- **WEIGHT:**

Sensing Module:	4 lbs. net (1.8 kg), 6 lbs. shipping (2.7 kg)
Transducer: 10 Amp-turn	7.26 lbs. net (3.3 kg), 8.5 lbs. shipping (3.9kg)
Transducer: 200 Amp-turn	2 lbs. net (0.9 kg), 4 lbs. shipping (1.8 kg)
Transducer: 800 Amp-turn	3.25 lbs. net (1.5 kg), 5 lbs. shipping (2.3 kg)

TABLE 1. CURRENT SENSING/ADJUSTMENT RANGES

Relay	Current Sensing Input	Current Sensing Adjustment Range		Timing Adjust Range
		Pull-in Adjust	Dropout Adjust	
BE2-40-1 (Loss of Exc.)	200 amp-turns nom., 600 amp-turns cont.	90 to 200 amp-turns	40% to 90% of pull-in	---
BE2-40-2 (Loss of Exc.)	800 amp-turns nom., 2400 amp-turns cont.	360 to 800 amp-turns	40% to 90% of pull-in	---
BE2-40-3 (Under Exc.)	200 amp-turns nom., 600 amp-turns cont.	90 to 200 amp-turns	40% to 90% of pull-in	0.2 to 60 sec.
BE2-40-4 (Over Exc.)	200 amp-turns nom., 600 amp-turns cont.	90 to 200 amp-turns	40% of 90% of pull-in	0.2 to 60 sec.
BE2-40-5 (Under Exc.)	800 amp-turns nom., 2400 amp-turns cont.	360 to 800 amp-turns	40% to 90% of pull-in	0.2 to 60 sec.
BE2-40-6 (Over Exc.)	800 amp-turns nom., 2400 amp-turns cont.	360 to 800 amp-turns	40% to 90% of pull-in	0.2 to 60 sec.
BE2-40-11 (Over Exc.)	10 amp-turns nom., 15 amp-turns cont.	2 to 10 amp-turns	40% to 90% of pull-in	0.2 to 60 sec.
BE2-40-12 (Under Exc.)	10 amp-turns nom., 15 amp-turns cont.	2 to 10 amp-turns	40% to 90% of pull-in	0.2 to 60 sec.

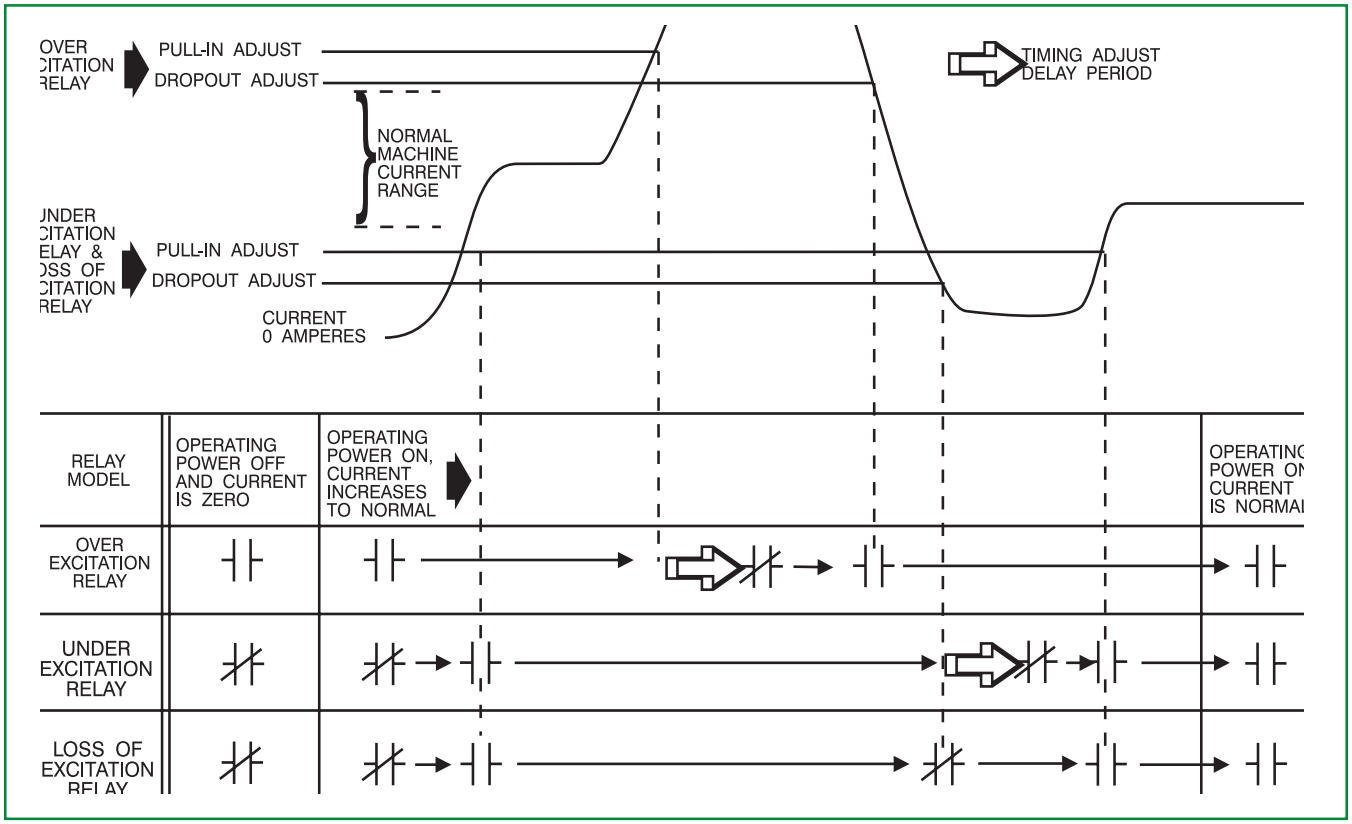

FIGURE 1. EXAMPLE OF PULL-IN AND DROPOUT POINTS WITH RESULTANT OUTPUTS

SAMPLE SPECIFICATION:

Protection from low excitation, and resulting abnormal output of a dc generator, shall be provided by an Under Excitation Relay. The relay shall incorporate excitation field sensing via a remote dc transducer to detect abnormally low excitation and remove the generator from the bus. Operating power for the relay shall be from a separate nominal 120 volt, single phase, 60 hertz external power source. The relay shall provide adjustable pull-in between 90 and 200 ampere-turns and adjustable dropout between 40% and 90% of pull-in. An adjustable time delay between 0.2 and 60 seconds after dropout shall prevent transient currents from activating the relay. The relay shall automatically reset when excitation exceeds the pull-in setting.

The Under Excitation Relay shall be Basler Electric Company Model BE2-40-3 Under Excitation Relay, Part No. 9099800103.

HOW TO ORDER:

When Excitation Field Current Is	And the Expected Excitation Abnormality Is	And the Desired Time Delay Is	Order
200 ampere-turns	Loss of Excitation	(none)	Model BE2-40-1, Part No. 9 0998 00 100
800 ampere-turns	Loss of Excitation	(none)	Model BE2-40-2, Part No. 9 0998 00 101
200 ampere-turns	Under Excitation	0.2 - 60 sec.	Model BE2-40-3, Part No. 9 0998 00 102
200 ampere-turns	Over Excitation	0.2 - 60 sec.	Model BE2-40-4, Part No. 9 0998 00 103
800 ampere-turns	Under Excitation	0.2 - 60 sec.	Model BE2-40-5, Part No. 9 0998 00 104
800 ampere-turns	Over Excitation	0.2 - 60 sec.	Model BE2-40-6, Part No. 9 0998 00 105
10 ampere-turns	Over Excitation	0.2 - 60 sec.	Model BE2-40-11, Part No. 9 0998 00 110
10 ampere-turns	Under Excitation	0.2 - 60 sec.	Model BE2-40-12, Part No. 9 0998 00 111

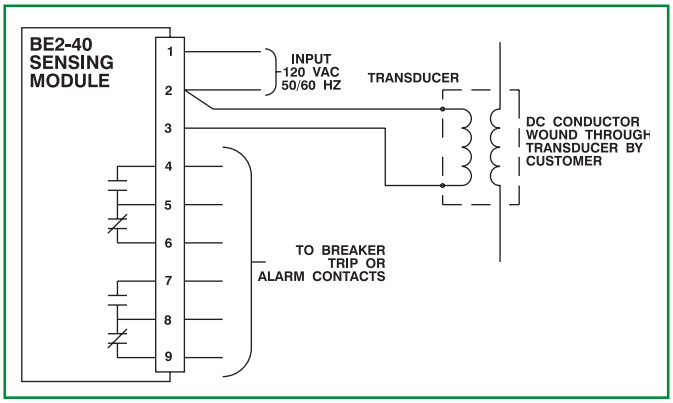

FIGURE 2. TYPICAL INTERCONNECTION DIAGRAM

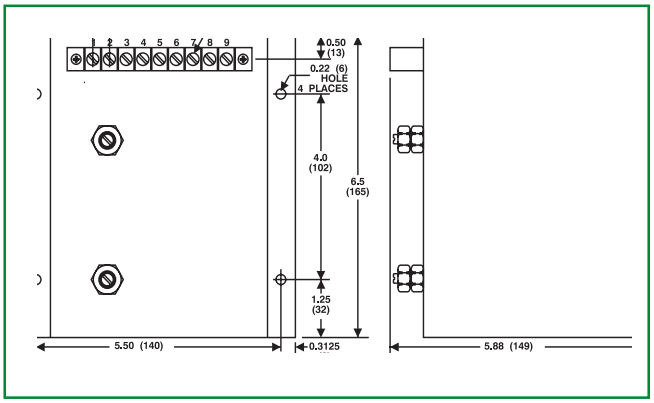

FIGURE 3. SENSING MODULE OUTLINE DRAWING

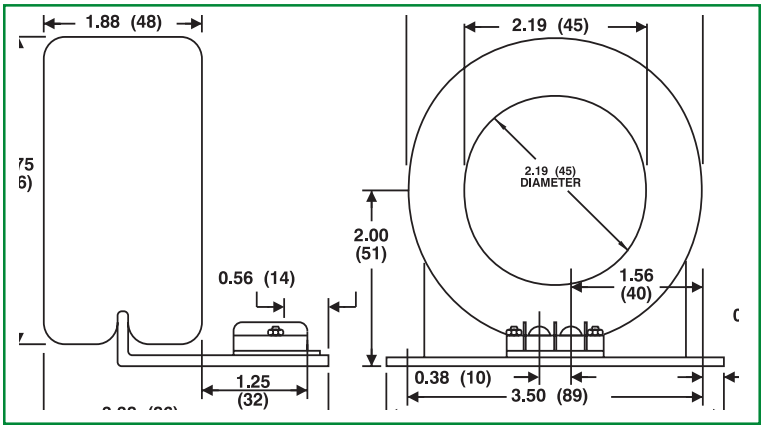

FIGURE 4. 200 AMP-TURN TRANSDUCER OUTLINE DRAWING

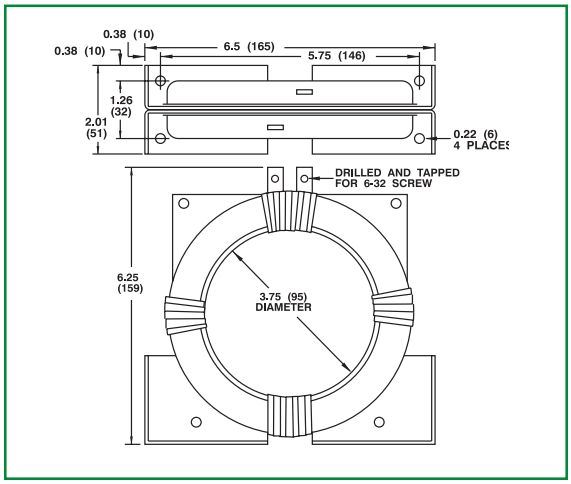

FIGURE 5. 800 AMP-TURN TRANSDUCER OUTLINE DRAWING

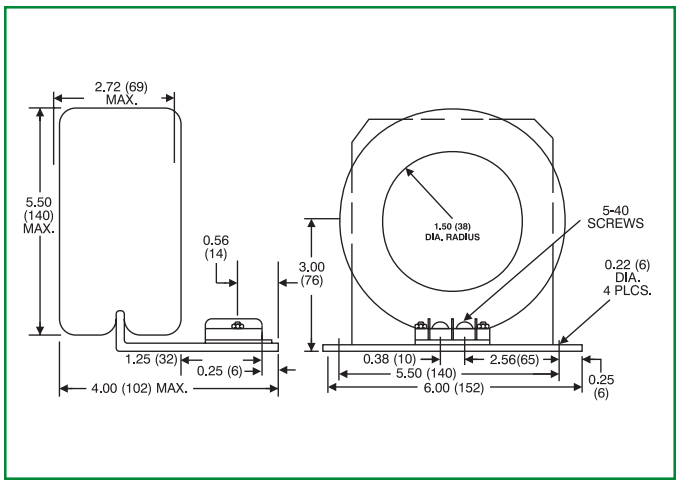

FIGURE 6. 10 AMP-TURN TRANSDUCER OUTLINE DRAWING

NOTES: 1. Dimensions in parentheses are in millimeters.
2. All drawings and data subject to change without notice.

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