Circuit Shield®
Type 32 Polyphase
High Speed
Directional Relay

Application

The Type 32 Relay is designed for two distinct applications: as the controlling element in directionally controlled time-overcurrent fault protection, or as a high speed reverse power relay.

For protection against phase-to-phase, or three phase faults, the Type 32 is used in conjunction with any of the Type 51 time-overcurrent relays. Various combinations of controlled time only, or time and instantaneous protection are available by selection of the connections between the 32 and 51 units. This combination represents Device Number 67.

The Type 32 can also be used to control the ABB MMCO or Micro-51 overcurrent relays when they are equipped with optional control inputs.

Since the Type 32 compares the direction of the positive-sequence voltage and current, in certain cases it may be used to provide ground fault as well as phase fault protection. The requirements for this application are that the minimum ground fault be greater than the phase overcurrent relay setting, and that the ratio of ground fault to load current be greater than three times.

If these requirements cannot be guaranteed, the application requires separate ground fault protection, such as a combination of Type 32Q (or 32D), controlling a residually connected Type 51.

The maximum torque angle of the relay is adjustable from 1, lag V, between 0 and 90 degrees. 45 degrees is an appropriate setting for most applications requiring fault protection. Either line-to-line, or line-to-ground P.T. connections may be used.

For reverse power, or anti-motoring protection, the Type 32 may be used as a sensitive, three phase power directional relay. For these applications, the maximum torque angle should be set at zero degrees for a watt characteristic, with line-to-ground, or line-to-line potential transformers, connected as shown in Figure 2. An external timer Type 62T is recommended in this application.

For special applications an optional sector width adjustment can be provided, allowing the trip sector to be set anywhere from 180° to 30° wide. Some of the applications are described in the application notes (see Further Information).

Features

- Adjustable torque angle
- Seismic capability to 6g ZPA
- Optional sector width control
- Transient immunity
- Low burden
- 2 year warranty
- Built-in test
Specifications

Input Circuit Ratings:
- Potential: 120V, nominal
  160V, maximum continuous
- Current: 5A, nominal
  10A, maximum continuous
  390A, one second

Burden:
- Potential: 0.3VA per phase, at 120V
- Current: 1.0VA, phases A and C at 5A
  2.0VA, phase B at 5A

Sensitivity:
- 0.02A at 1.0V
- 0.02 at 120V

Maximum Torque Angle:
- Adjustable 0° to 90°

Installation Settings (Typical):
- For line protection: 45°
- For reverse-power: 0°

Sector Control:
- Optional
  Adjustable 180° to 30°

Control Power:
- 48/125 Vdc at .035 Adc
- 48/110 Vdc at .035 Adc
- 24/32 Vdc, 250 Vdc

Output Circuit:
- 2 Normally-Open Contacts

Output Circuit Rating:
- Units with tripping contacts @ 125 Vdc
  - 30 amps, Tripping
  - 5 amps, Continuous
- 1 amp, Opening Resistive
- 0.3 amp, Opening Inductive

Other models available specifically for controlling
- Types 51, -50H, -50D, Micro-51, MMCO
- Overcurrent Relays.

Operating Time:
- Pickup: 1 cycle, typical at 60 Hz
- Dropout: 1 cycle, typical at 60 Hz

Operating Temperature:
- Minus 20°C to plus 70°C

Seismic Capability:
- More than 6g ZPA either AXIS biaxial multifrequency vibration without damage or malfunction ANSI/IEEE C37.98

Transient Immunity:
- More than 2500V, 1 MHz bursts at 400 Hz repetition rate, continuous (ANSI C37.90.1 SWC); Fast Transient Test; EMI Test.

Weight:
- Unboxed — 4.6 lbs. (2.1 kg)
- Boxed — 5.5 lbs. (2.4 kg)
- — 0.26 cubic feet

The Type 51 series of time-overcurrent relays are provided with a standard torque control feature. They are shipped with links between terminals 9 and 10, to control instantaneous, and between 10 and 11 to control time.

Removing either link allows control by an appropriate contact. Connections for directional time and instantaneous are shown in Figure 1. For non-directional instantaneous, do not remove the shorting link between 9 and 10, and omit the wired jumper from 9 to 11.

How to Order

For a complete listing of available directional relays, see TD 41-025. To place an order, or for further information, contact the nearest ABB Representative.

Further Information

List Prices: PL 41-020
Technical Data: TD 41-025
Instruction Book: IB 7.8.1.7-2
Application Notes: AN-2, AN-8, AN-9
Other Protective Relays:
- Application Selector Guide, TD 41-016

September, 1992
CIRCUIT SHIELD

Type 32 Polyphase
High Speed
Directional Relay

<table>
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<tr>
<th>Type</th>
<th>Protection</th>
<th>Maximum Torque Angle</th>
<th>Sector Width</th>
<th>Sensitivity</th>
<th>Contacts</th>
<th>Internal Connections</th>
<th>Control Voltage</th>
<th>Catalog Number</th>
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<tbody>
<tr>
<td>32</td>
<td>Three Phase Phase-to-Phase and Ground Fault</td>
<td>Adjustable 0 to 90°, 1 lag V1</td>
<td>30° - 180°</td>
<td>0.02A at 1V</td>
<td>①</td>
<td>16D425A</td>
<td>24/32 Vdc</td>
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<td>0.4A at 1V</td>
<td>③</td>
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<td>24/32 Vdc</td>
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<td>0.02A at 1V</td>
<td>⑤</td>
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<td>48/125 Vdc</td>
<td>425P0090</td>
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<td>250 Vdc</td>
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<td>24/32 Vdc</td>
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<td>48/125 Vdc</td>
<td>425P0078</td>
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</table>

① For 50 cycle applications, change letter in catalogue number from P to F for Type 32.
② This model preferred when directional relay will be used to control a Type 51 Relay as in directionally controlled overcurrent relay schemes. This model includes self-resetting indicator lamp.
③ This model required when directional relay will be used to operate lockout relay or trip circuit breaker, as in reverse power schemes. When specified, a normally closed contact between terminals 15 and 16 will be supplied in addition to the standard (2) normally open contacts. When wiring to terminal 16, observe proper clearance of the wire termination to the ground stud terminal “G”. This model includes manually reset target.
④ This model required when directional relay will be used to operate lockout relay or trip circuit breaker, as in reverse power schemes. When specified, a normally closed contact between terminals 15 and 16 will be supplied in addition to the standard (2) normally open contacts. When wiring to terminal 16, observe proper clearance of the wire termination to the ground stud terminal “G”. This model includes self-resetting indicator lamp.

To place an order, or for further information, contact the nearest District Office.

Internal Connection Diagram

16D425A Type 32 Directional Relays Drawout Test Case

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HE CONTACT 15-16 SUPPLIED ONLY ON UNITS WITH TRIPPING CONTACTS.