



FAN PROTECTION MODULE

A00320
Version 1.4

Operation Manual

Fan Protection Module Manual

Part number: A00320

Date: July 2009

Version: 1.4

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1. Features

The Bramco Electronics Fan Protection Relay (order code A00320) includes:

- Matching Vibration and Temperature Sensors
- Local/Remote Display with the option of an I.S. battery to allow local and remote indication of Fan trip status and to allow latch reset when the fan is unpowered.
- Comprehensive protection against excessive vibration and high bearing temperatures in underground auxiliary ventilation fans.

1.1 Vibration Sensor Input (1 off)

Order Code A00321

- Vibration sensor not connected or shorted protection.
- Vibration test via external test button.
- This rugged Bramco solid state vibration sensor, simply mounted on a ventilation fan is capable of surviving 1000g shocks yet sensitive down to 0.1g. This 3wire sensor may be conveniently connected through a 2 pole I.S. zener barrier.
- Vibration: trip range 0.1 – 0.5g field adjustable
 warn range 0 – 100% of Trip level; field adjustable
 delay 10 secs. nominal. Can be factory set 5-30 secs

1.2 Temperature Sensor Input (up to 4 off)

Order Code A00378

- All temperature sensors open or shorted protection.
- Warn LED flashes for shorted sensor, warn LED on solid for open sensor or temperature above warning level. Forced latched trip when sensor is shorted or open. When open the temperature bar display will be at full scale.

Note: Any or all of the temperature inputs may be conveniently connected through an individual 2 pole I.S. Zenner Barrier using the Bramco 3 wire Temperature Sensors.

- Easy disable of unused temperature inputs, simply connect 100 ohm resistor in place of actual sensor. See typical wiring diagram.
- Temperature Sensors are interchangeable without individual temperature calibration checks being necessary.
- Temperature: trip range 60 - 120 degree Celsius.
 warn range 50 -100% of trip setting
 delay no delay > 50msec. Can be factory set up to 5 secs.

Note: The warn setting is a function of the trip setting from 60°, e.g. warn 50%, trip 100°C will result in a warning at 80°C (which represents 50% of the 60° - 100° trip range).

1.3 Failsafe Operation

- CR relay is only energised when the protection relay is healthy. Separate warning and latch relay contacts for Vibration and Temperature trip are available. These contacts are 24VDC 0.5A rated only.

1.4 External Reset

- External reset contact for latch relays is required.

1.5 Vibration Test

- Vibration test, activated via an external push button, will force an excess vibration level and after timeout will shut down the protection relay.

1.6 Power Supply

- 120 or 240v 50/60 hz V AC. normal factory set to 120v.

1.7 Remote Display on Ribbon Cable

Order Code A00323

- A power on LED
- A temperature trip LED
- Individual temperature sensor warning - trip LEDs
- A vibration trip LED
- A vibration warning LED
- Two 10 bar LED type displays are provided, one for vibration indication and one for temperature indication.

1.8 Optional 9.6v I.S. Battery

Order Code B00011

- The option of an I.S. battery will give local and remote indication of fan trip status and also allow latch reset when the fan is unpowered.
- The battery is charged from within the Fan Protection Relay.

2 Relay Specifications

- CR relay: 2 sets of changeover contacts rated 5A 240V AC resistive.
- Warning relays: 0.5A 120V AC resistive.
- Trip latch relays: 0.5A 120V AC resistive.

2.1 Dimensions

Fan Protection Relay - A00320

- Compact din rail mounting enclosure. 150mm long - 75mm wide - 110mm high. Supplied with display, see below.

Display – A00323

- 75mm square on 500mm ribbon cable allows viewing through 55mm diameter window.

Temperature Sensors – A00378 M6

- 3wire PT100 sensor mounted in m6 x 25mm stainless steel set screw with 1m of screened high temperature cable fitted.

Vibration sensor - A00321

- Solid state sensor in bronze heavy duty housing
- \varnothing70mm diameter barrel x 75mm high with 80mm mounting flange, 2 fixing holes pitch 57mm with 1m of screened cable fitted.

3. Installation Recommendations

3.1 Fan Protection Relay

1. Mount the Fan Protection Relay so that future access will be easy and convenient for testing/commissioning adjustments etc.
2. The Fan Protection Relay may be din rail mounted or screwed directly to a backplate.
3. Connect the rainbow ribbon from the display to the relay (see note).
4. Ensure both the Fan Protection Relay and the Remote Display are mounted so there is no strain on the rainbow ribbon connections or block the status LED's and set point pots on the front of the Fan Protection Relay.

NOTE: Rainbow ribbon is only unpluggable from the front of the Fan Protection Relay after careful removal of the front plate.

3.2 Remote Display

1. May be mounted in a way to allow convenient viewing of display functions and within reach of the fitted ribbon cable.

3.3 Vibration Sensor

1. The Vibration Sensor must be firmly mounted with 2 fixing screws.

Axis of Sensitivity

The axis of sensitivity is a line drawn through the 2 sensor fixing screws ie across the Vibration Sensor body in a line drawn through the two fixing holes.

The Vibration Sensor is mounted so that the axis of sensitivity is across the body of the ventilation fan.

- ie at 90 degrees to drive shaft.
- The sensor may be mounted on the bottom, rear or top (inside) of the rigidly mounted control enclosure or directly on the body of the fan housing.
- If the Vibration Sensor is connected through a 2pole I.S. zener barrier see wiring diagram (use same type barrier as used for Temperature Sensors and provide adequate mechanical protection for sensor and cable).

3.4 Temperature Sensors

1. The Temperature Sensors must be mounted in close contact with the bearing housing.
2. Drill and tap m6 metric thread at least 20mm deep and screw in sensor firmly.
3. Provide mechanical protection for each sensor and connecting cables.

NOTE: don't over-tighten or sensors may be damaged.

4. Wiring

1. Connect 120V AC control voltage to terminals 1 and 2 and an earth on terminal 3.
2. Connect the external reset push button to terminals 24 and 25. This is necessary as the Fan Protection Relay is failsafe.
3. Connect the Vibration Sensor, 3 wires and earth screen after carefully mounting it for the correct axis of vibration sensitivity. See wiring diagram for details.
4. Each of the four temperature inputs can be arranged in a range of ways to suit individual installation requirements. The use of sensors in a hazardous area is possible by using a 2 pole zener barrier for each sensor. Suitable barriers are Z665/EX and MTL 765.
5. See wiring diagram for alternative methods of connection.
6. Connect external control circuit to the CR relay contacts and any external monitoring to the warn and trip latch contacts for both vibration and temperature.
7. Plug in the Remote Display provided.

NOTE: Remember to disable any temperature input not used. See diagram for details.

5. Optional I.S. Battery

- Connect optional 9.6V I.S. Battery. We recommend that the battery be plugged in rather than be wired to terminals as this lessens the risk of blowing the battery internal fuse during handling. See wiring diagram for details.

6. Operation

- On power up if there are no trips the Fan Protection Relay should close the CR relay.
- Check operation of Fan Protection Relay after power up as follows.

6.1 Vibration

NOTE: The inbuilt vibration trip is delayed for up to 10 seconds and the vibration display will be at full scale.

1. First check the vibration trip by turning down the trip setting till a trip occurs (see note above).
2. Then test vibration sensor fault shutdown by disconnecting the sensor wire to term 46. Vibration trip should occur after about 10 seconds (see note above). Reconnect wire.
3. Disconnect the sensor wire to term 45. Vibration trip should occur (see note above). Reconnect wire.
4. Temporarily short terms 45 to 44. Vibration trip should occur (see note above). Remove temporary short.
5. If the Fan Protection Relay is powered up with any of the above vibration sensor faults or the vibration sensor not connected, the relay should trip and latch (see note above).

6.2 External Vibration Test

- An external vibration circuit test can be initiated by pressing the vibration test button connected across terms 34 and 35 (see note above).

6.3 Temperature

1. To test each temperature input, add a temporary 39 Ω resistor in series with the common sensor wire on each sensor in turn. Also test each temperature sensor input for open and shorted detection which shuts the module down and latches CR relay off.
2. Finally create a trip condition and then turn off the 120V AC. If an I.S. battery is plugged in, any fault status will still be shown on the local and remote LED's and note that any relay latched may now be reset (after the fault is removed).

6.4 Factory Settings

- Temperature trip: 100 degree for temperature trip.
- Temperature warn: 50% ie 80 degree for warning.
- Vibration trip: 0.5g for vibration trip.
- Vibration warn: 0.25g for warning.
- Vibration delay: with a nominal 5 -10 seconds of delay before trip.

These above protection settings may be adjusted as required over the full range available. The fan protection relay is now ready for service.

Summary of Test Report TR24752 issued on 27 November 2003



Equipment: Fan Protection Vibration Sensor A00321

Submitted by: Bramco Electronics Pty Ltd
47 Orlando Road
Lambton NSW

Manufactured by: As above

Group: I

Type of Protection: Ex ib

Degree of Ingress Protection: IP54

Standards applied: AS/NZS 60079.0:2000 Electrical apparatus for explosive gas atmospheres – Part 0: General requirements (including Amendment 1)
AS/NZS 60079.11:2000 Electrical apparatus for explosive gas atmospheres – Part 11: Intrinsic safety “i” (including Amendment 1)

Details of equipment: The Fan Protection Vibration Sensor A00321 consists of a single printed circuit board completely encapsulated within a brass housing. The housing has a cylindrical construction with a flanged mounting base. It has a total length 60 mm. It is supplied with an integral cable of approximately 1 m length.

The sensor is an accelerometer constructed as an electronic device mounted on the printed circuit board.

Conditions of safe use: The following parameters shall be taken into account during installation:

Input parameters	Integral cable (4-core) attached to the apparatus
U _i	16.5 V
I _i	165 mA
C _i	4 µF
L _i	0 mH

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7. Connection Diagram

