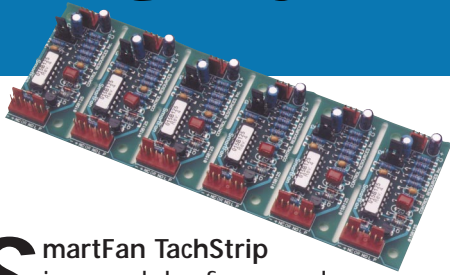


SmartFan®

TachStrip — Fan speed alarm

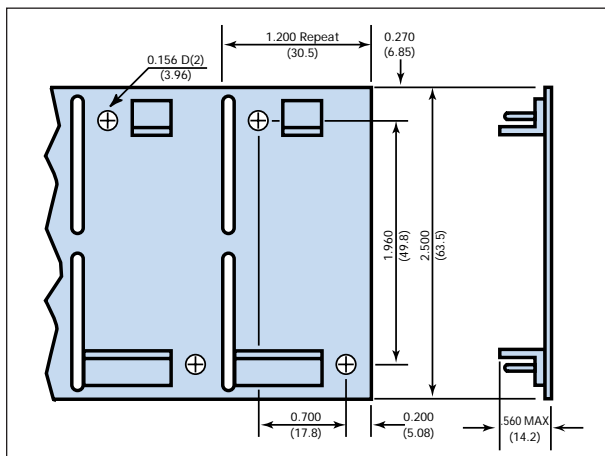


SmartFan TachStrip is a modular fan speed alarm that accepts tachometer (Hall Effect) pulses from DC or AC fans or blowers. TachStrip monitors these pulses and generates failure alarms if air mover speed drops below a preset trigger speed. TachStrip comprises a strip of 6 individual alarm units bused together. The web separating units can be cut to provide strips to handle any quantity of fans.

Each unit monitors one air mover and provides alarm outputs for that air mover. The bus distributes power to each unit and OR's alarm signals from each unit to provide a single alarm output if any air mover should fail. Each alarm unit has three outputs used to drive a logic circuit, LED, or piezo alarm.

FEATURES

- Accepts open collector or voltage source pulses from nearly any DC or AC fan or blower
- 6 alarm unit strips are easily separated to monitor any quantity of fans
- Distributes power to DC air movers through same connector used to sense pulses
- Separate alarm outputs are provided for each fan
- Alarm channels are OR'd providing a single alarm if any fan fails
- Trigger Speed is adjustable by jumper to 1500, 2500, or 4000 PPM
- Permissible power supply voltage is 5.0 VDC minimum to 25.0 VDC maximum



SPECIFICATIONS

Part Number	Supply Voltage Range	Alarm Units Per Strip
015B125	5 to 25 VDC	1
015B625		6
H109 ¹	Hardware Pack	

Note: Maximum operating temperature is 65°C
¹per alarm unit

Normally Closed (NC) Alarm Output Closed above trigger speed and will sink 4 mA at 0.4 VDC or less. Open below trigger speed and will accept up to 30 VDC. Referenced to fan negative terminal. Applies nominal 12 mA to an LED connected from NC to L.

Normally Open (NO) Alarm Output Open above trigger speed and will accept up to 30 VDC. Closed below trigger speed and will sink 4 mA at 0.4 VDC or less. Referenced to negative fan terminal. Applies nominal 12 mA to an LED connected from NO to L. Applies nominal power supply voltage to piezo alarm connected from NO to P.

OR'd (OR) Alarm Output OR'd with all other alarm units in TachStrip. Other characteristics identical to NO alarm output.

INSTALLATION

Mounting

For TachStrip part number 015B625 to be used as separate alarms, cut the web separating alarm units at the designed location with ordinary cutting pliers.

Connections/Jumpers

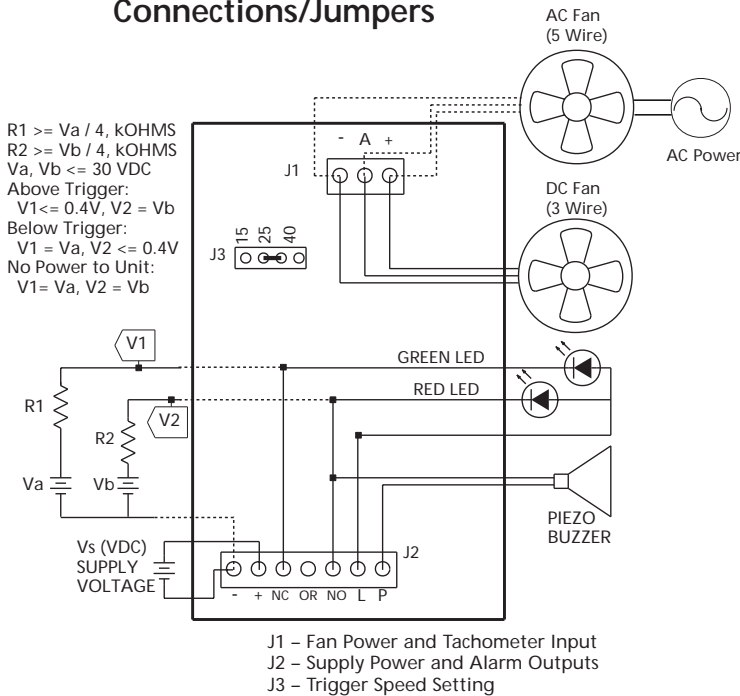


Figure 1
Wiring diagram. (Dotted lines represent connections to alternative wiring configurations)

DC Fan Connection

For three wire DC fans operating at supply voltages between 5.0 and 25.0 VDC, TachStrip distributes power to the fan in addition to accepting tachometer pulses from the fan. Connect the fan wires to J1. Fan wires are usually color coded with red for +, black for - and white or yellow for A (alarm).

The maximum current that can be distributed to the fan via header J1 is 2.5 Amps. Normally it is necessary to connect power to only one J2 header in a TachStrip (015B625). However, this connector is rated at 2.5 Amps maximum. If the total current used by all DC fans powered by TachStrip exceeds 2.5 Amps, power connections should be made at additional + and - pins.

DC Fan Tachometer Signal Compatibility

For most fans, the amplitude of tachometer pulses will be equal to the voltage applied to the fan (e.g. a 12 VDC fan usually generates 12 VDC tachometer pulses). However, some fans generate tachometer pulses at a lower voltage (e.g. 5 VDC pulses from a 12 VDC fan). In these cases, TachStrip must be powered with a voltage equal to or less than the amplitude of the pulses generated by the fan and it cannot therefore, distribute power to the fans.

DC Fans Operating Above 24 VDC

Though the maximum voltage that can be applied to TachStrip is 25 VDC, it can be used with fans operating at higher voltages. In this case, it does not distribute power to the fans. A supply voltage equal to or less than the amplitude of the pulses supplied by the fans is used to power TachStrip. Connect the negative fan lead to J1:- and the fan tachometer pulse lead to J1:A. No connection is made to J1:+.

AC Fan Alarm Monitoring

TachStrip cannot distribute AC power to an AC fan. AC fans usually have 5 wires, 2 for power and 3 for the tachometer pulse circuit. Connect the AC fan power leads to the rated source of power. Connect the three tachometer pulse leads to J1. TachStrip distributes power to run the tachometer pulse circuits within the fans. Apply a DC voltage as specified by the fan manufacturer for the tachometer pulse circuits at J2.

Suggested Connecting Hardware

Ref. Desc.	Header on Board ¹	Quantity	H109 Hardware Pack		
			Description	Manufacturer ¹	Part Number ¹
J1	22-29-2031	1	Housing	Molex	22-01-3037
		3	Terminal (gold)	Molex	08-55-0102
J2	22-29-2071	1	Housing	Molex	22-01-3077
		7	Terminal (gold)	Molex	08-55-0102
		2	PCB Support	Richco	CBS-4-19

¹or equivalent

OPERATION

Settings (J3)

Trigger Speed (W_A): Use this jumper to set the trigger speed. Select a trigger that is 40 to 50% of rated speed.

- Position 15 = 1500 PPM
- Position 25 = 2500 PPM (Factory Setting)
- Position 40 = 4000 PPM

Since fan tachometer circuits are designed with one, two, or even more pulse outputs per revolution, settings are listed in pulses per minute (PPM) rather than revolutions per minute (RPM). Given the fan's rated speed (W) and number of pulses per revolution (N), use the following formula to select the trigger speed (W_A):

$$W_A = W \times N \times 0.4$$

For example, a 3300 RPM fan with two pulses per revolution would have an trigger speed (W_A) of

$$W_A = 3300 \text{ RPM} \times 2 \text{ PPR} \times 0.4 = 2640 \text{ RPM}$$

Since the 2500 PPM trigger is closest, set jumper J3 to the "25" position. The alarm trigger accuracy is +/- 20%.

Alarm Outputs (J2)

Three alarm circuits are located on header J2. All circuits are non-isolated, have the same electrical ratings, and are referenced to board ground found at J2:

Alarm Output Logic

Alarm Output	Above Speed Trigger	Below Speed Trigger	Power Removed from Unit
NC	Short to Ground	Open Circuit	Open Circuit
NO	Open Circuit	Short to Ground	Open Circuit
OR	Open Circuit	Short to Ground	Open Circuit

Power for an LED alarm indication is provided by Pin J2:L via an internal 12 mADC constant current source. Power for logic gate alarm circuitry must be provided externally. For logic circuit alarm indication, each alarm output can sink up to 4 mA at ≤ 0.4 VDC. When open, a maximum of 30 VDC can be applied to each output. Pin J2:P and J2:OR can be used for a piezo buzzer alarm output. Below the alarm speed trigger, the board supply voltage (V_s) will be applied to the piezo.

Note: L and P are positive (+); NC, NO and OR are negative (-).