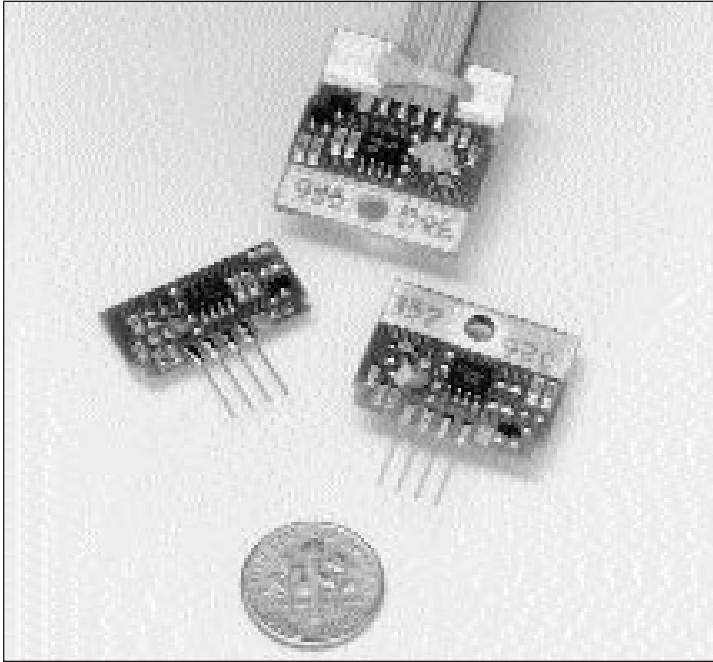


# TP SERIES

## Precision Temperature Switches



Developed for precise monitoring of ambient air temperature, these all solid-state switches are a highly reliable alternative to mechanical thermostats. Featuring either SIP or stand-alone packaging, the TP Series Precision Temperature Switches from Cambridge AccuSense, Inc. can be mounted virtually anywhere in the cooling airflow and are compatible with most logic, relays and indicators. To provide greater design flexibility, the TP Series is built with a very small footprint. Standard operating temperature range extends from 0°C to 70°C (TP Series) and from -20°C to 85°C (TPH Series).

Capable of tripping at either one or two specified temperature trip points with  $\pm 1^\circ\text{C}$  accuracy and hysteresis-free performance, the Cambridge AccuSense TP Series is available in three standard mounting options. Custom ver-

sions with hysteresis, special terminations and other characteristics can be developed to solve special monitoring challenges.

The TP Series Precision Board – Mountable Switches (Options B and D) feature a 12.2 mm x 25.4 mm (0.480" x 1.00") SIP package that can be mounted perpendicular to the host board. Built-in 2.54 mm (0.100") center-to-center headers can be soldered directly into a PC board. The output signal is the open collector of an NPN transistor.

The Stand-Alone Mounting configuration (Option E) is designed for the utmost flexibility in local air temperature monitoring, and can become an integral part of fans and blowers. Typical applications include plenum or cooling air intake and duct work, upstream or downstream of card-cages, power supplies and filters.

## KEY FEATURES

- Accuracy is  $\pm 1^\circ\text{C}$  for each trip point.
- All solid-state technology.
- Hysteresis-free for greater precision.
- Choice of normally-open or normally-closed outputs.
- Unobtrusive design.
- Flexible mounting options.
- Compatible with TTL, CMOS and other logic.
- Available in standard or customized versions.

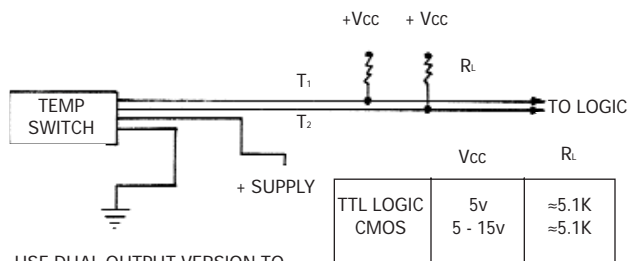
**CAMBRIDGE ACCUSENSE, INC.**

1000 Mount Laurel Circle  
Shirley, Massachusetts 01464 U.S.A.  
Tel: 978-425-2090 Fax: 978-425-4062



# SUGGESTED APPLICATIONS AND ELECTRICAL ARRANGEMENTS

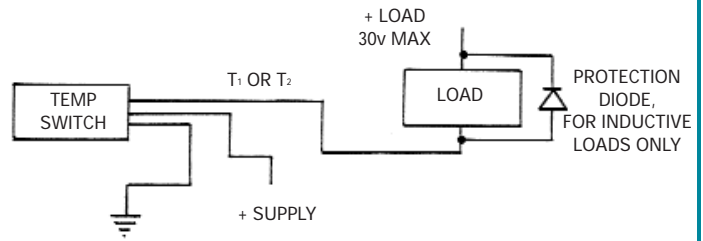
(1) To Drive Logic



USE DUAL OUTPUT VERSION TO PROVIDE 2 LEVELS OF WARNING

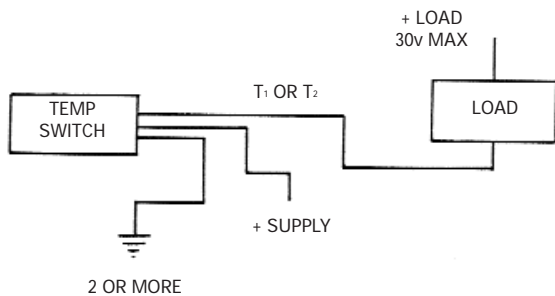
APPROX. VALUES ONLY

(2) To Drive Circuit Breakers, Relays, Alarms



- (1) LOAD CAN BE INCANDESCENT LAMP OR LED LAMP.
- (2) + SUPPLY CAN ALSO SUPPLY + LOAD.
- (3) ENSURE THAT LOAD CURRENT IS LESS THAN MAX. SINK CURRENT.

(3) To Drive Warning Lamp, or LED Indicator

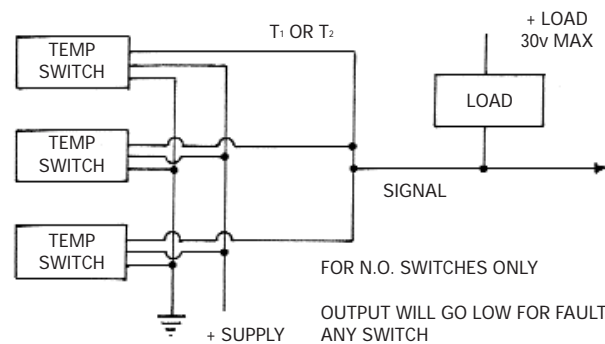


2 OR MORE

- (1) LOAD CAN BE CIRCUIT BREAKER, RELAY, ETC.
- (2) + SUPPLY CAN ALSO SUPPLY + LOAD.
- (3) ENSURE THAT LOAD CURRENT IS LESS THAN MAX. SINK CURRENT.

(4) Multiple Switches

(only 3 shown - more may be used)

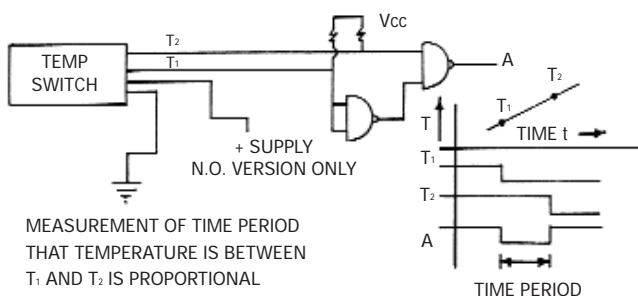


FOR N.O. SWITCHES ONLY

OUTPUT WILL GO LOW FOR FAULT ON ANY SWITCH

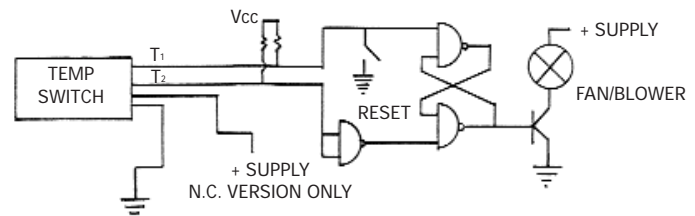
USE THIS ARRANGEMENT SUBJECT TO RULES IN EXAMPLES 1 AND 2.

(5) Early Warning of Danger Conditions from  $dT/t$



MEASUREMENT OF TIME PERIOD THAT TEMPERATURE IS BETWEEN  $T_1$  AND  $T_2$  IS PROPORTIONAL TO  $dT/t$  AND CAN BE USED FOR EARLY WARNING OF RAPIDLY RISING TEMPERATURE.

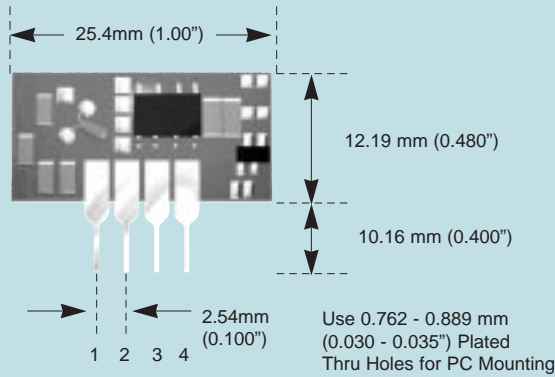
(6) DC Fan/Blower Control with PRECISE Hysteresis



FAN TURNS ON WHEN TEMPERATURE INCREASES PAST  $T_2$ .  
FAN TURNS OFF WHEN TEMPERATURE FALLS BELOW  $T_1$ .

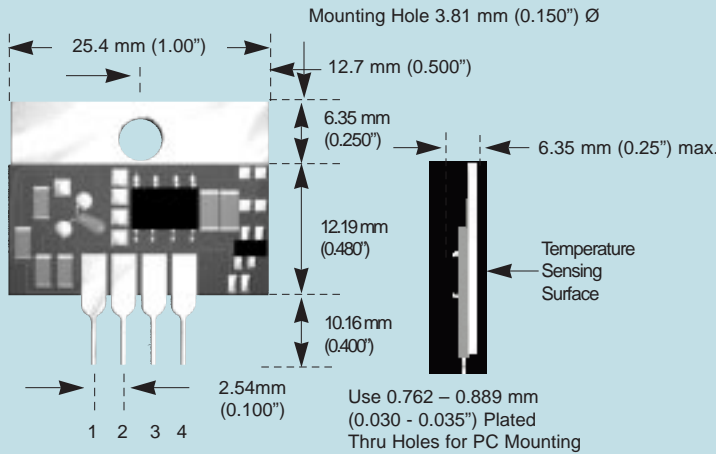
# TP SERIES MOUNTING OPTIONS

Series TP: Mounting Option B  
Printed Circuit Board Mount for Airflow Temperature Measurement

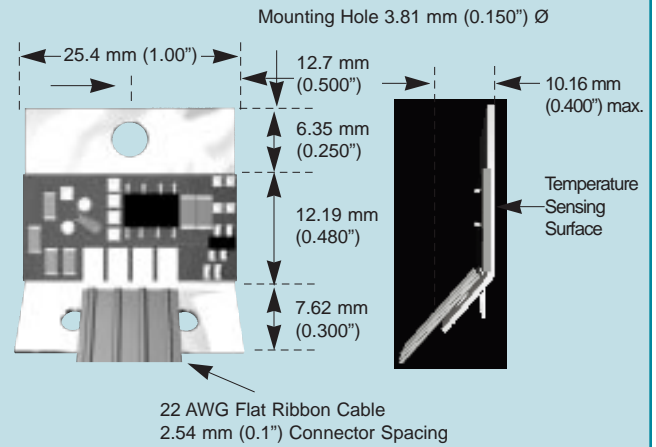


Option E Wire Color	Option B, D Pin Position	Open Collector Output	
		Normally-Open*	Normally-Closed*
Red	1	+VDC	+VDC
Gray	2	T <sub>2</sub>	T <sub>1</sub>
Gray	3	T <sub>1</sub>	T <sub>2</sub>
Gray	4	Return Supply	Return Supply

Series TP: Mounting Option D  
Printed Circuit Board Mount for Surface Temperature Measurement



Series TP: Mounting Option E



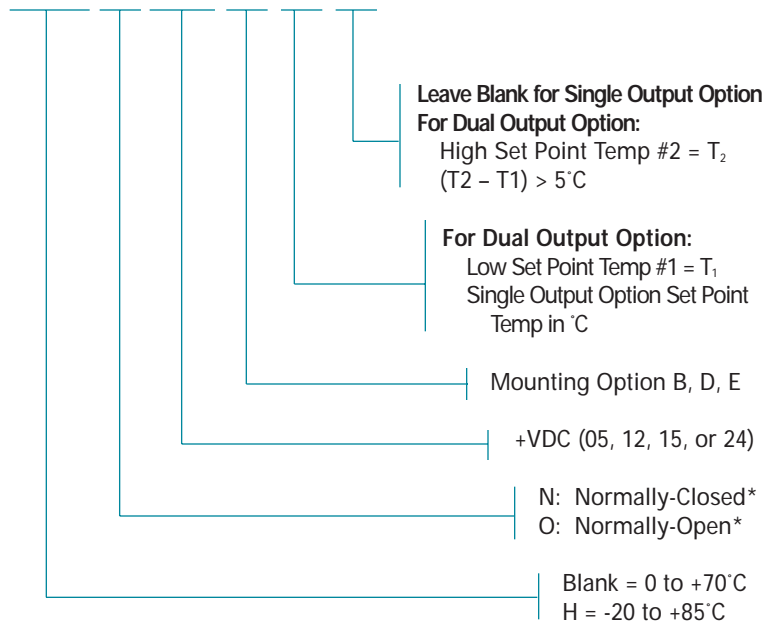
## PERFORMANCE SPECIFICATIONS

	Units	Minimum	Nominal	Maximum
Trip Point Selection Range Model TP	°C	+2		+68
Model TP Tolerance	°C			±1
Trip Point Selection Range Model TPH	°C	-10		+80
T <sub>2</sub> -T <sub>1</sub> , where T <sub>2</sub> and T <sub>1</sub> are the 2 Trip Points Selected	°C	5		
Supply Voltage Tolerance (5, 12, 15, 24 VDC)	%			±20
Power Dissipation	W	.1		.7
Output Signal: Open Collector, Emitter GND, NPN Transistor Pull up Voltage	VDC	3		30
Output High Leakage Current	uA			1
Output Low — Max. Sink Current Model TP	mA			100
Model TPH	mA			50
Output Low Voltage Collector to emitter	VDC		0.2	1
Operating Temp. Range Model TP	°C	0		+70
Model TPH	°C	-20		+85
Storage Temp. Range	°C	-40		+125

## ORDERING INFORMATION

Part Number Scheme

TPX-X-XX-X-T<sub>1</sub>-T<sub>2</sub>

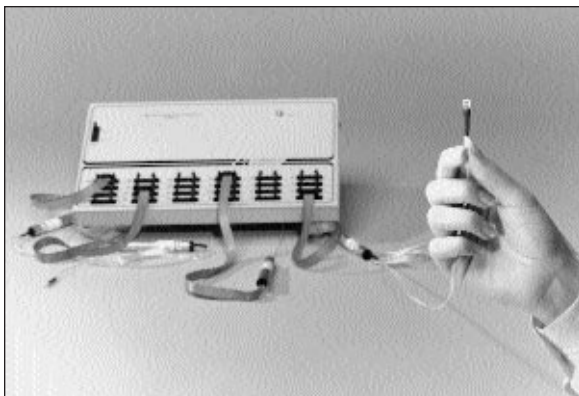


\* Note: Normally-Closed: Closed if Temp. < Set Point  
Normally-Open: Open if Temp. < Set Point

Cambridge AccuSense, Inc. specializes in the development of multi-channel airflow and temperature instrumentation, pressure sensors, airflow and temperature switches and sensors for the electronics, health, biomedical, HVAC, and process control industries.

An experienced development team supports and implements the demands of our customers, while our proprietary calibration method ensures the accuracy and reliability of all Cambridge AccuSense products.

*You can rely on us for cost-effective solutions to your design and performance concerns.*

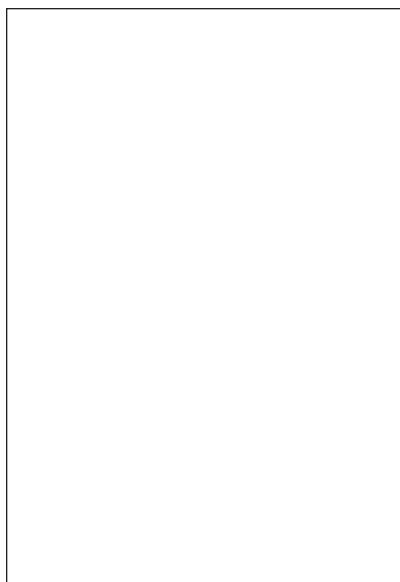


### **ATM-24 Multi-Channel Airflow and Temperature Monitor**

A thermal design and validation tool that performs simultaneous, multi-point, real time airflow and temperature measurements. As many as 24 low-profile, remote probes allow access to hard-to-reach locations and highly-populated electronic systems.

### **300T Series of Airflow Switches**

Solid-state, highly reliable electronic switches used to monitor cooling airflow in confined spaces. These compact units offer unparalleled sensitivity and resistance to shock and vibration.



*For more extensive technical information please call our sales department.*

*Cambridge AccuSense is committed to continuous improvement of its products. All specifications listed here are subject to change without notice.*

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