



Model 340 Trip Amp



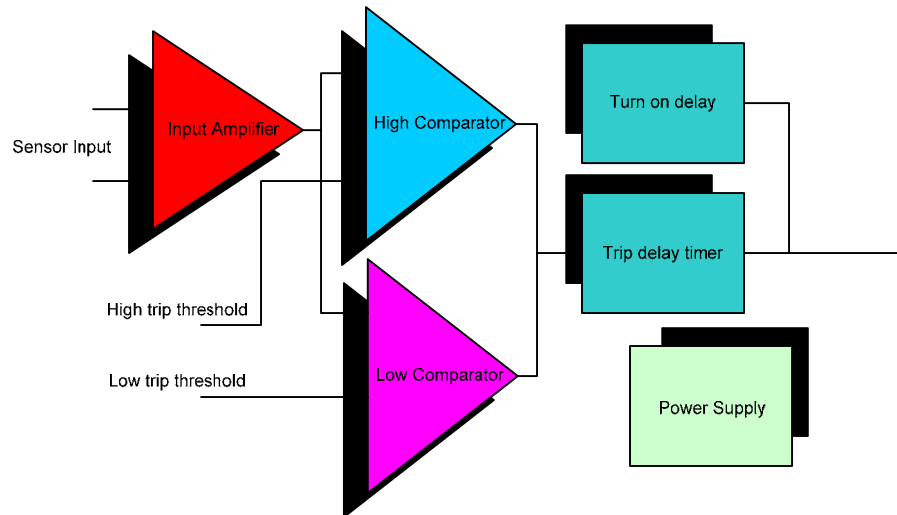
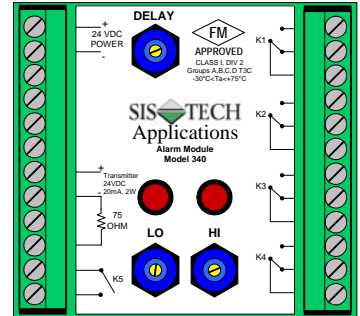
The Model 340 Trip Amp is SIL 2 Compliant according to IEC 61508. Rated for -30°C to $+75^{\circ}\text{C}$, it can be installed in the process unit even under the harshest conditions near the equipment under control, reducing implementation costs.

The Model 340 Trip Amp receives an analog or digital process signal. Two field-adjustable setpoints allow shutdown to be executed for high and low process signals. Serial or hardwired communications are used to remotely display process variables and system alarms.

With its 5 Amp output rating, the Model 340 Trip Amp can de-energize multiple final elements, including motor control circuits and/or solenoid operated valves.

Each Model 340 Trip Amp consists of the following elements:

- Power supply
- Current loop receiver (I/U converter, differential or single ended input)
- Low comparator
- High comparator
- Trip delay timer
- Turn-on delay timer
- Trip relay



Power Supply

The power supply uses the +24V field supply to generate the $\pm 15\text{V}$ voltages needed by the Trip Amp. A polarization protection diode and an over-current fuse protect the supply input.

Current Loop Receiver

The high precision, low compliance voltage current loop receiver converts a differential or single ended sensor current input (4-20 mA) into an equivalent voltage level. It also provides an external voltage reference for the comparators so that any shift in reference voltage will be ratiometric and will not influence the trip thresholds.

Characteristic	Nominal
1) Input impedance in signal range (in the ON or OFF state)	75 ohms
2) Analog input error:	
Maximum error at 25 °C	± 0.01% of span (16mA)
Temperature coefficient	± 0.02% of span/ deg C
3) Maximum error over full temperature range	± 0.02% of span/deg C
4) Maximum permanent allowed overload (no damage)	40mA
5) Output reading under overload condition	HI trip condition
6) Output reading under no-load condition	LO trip condition
6) Type of input	4-20mA – Powered or non-powered / Discrete
8) Maximum output current (resistive)	5 Amps each contact 15 Amps total
9) Maximum switched voltage (resistive)	120 V
10) Common mode characteristics (DC, AC 50 Hz, AC 60 Hz)	Differential
11) Operating modes	Continuous conversion
12) Type of protection	R – current limiter/ nonincendive
13) Isolation potentials under normal service conditions between channel and a) other circuits(including ground), b) between channels, c) power supply(s) and d) interface(s)	240 VAC
14) Nominal power voltage	24 VDC (20-30VDC)
15) Power consumption	2 W
16) Common points between channel if any	None
17) Type / length of cable / installation rules recommended to provide interference immunity	14 AWG / less than 1500 feet / Shielded twisted pair
18) Calibration or verification to maintain rated accuracy	Proof test
19) Terminal wire size	12 to 24 AWG
20) Typical example(s) of external output connections	Valve solenoids / Motor starters
21) Effect of incorrect input terminal connection	Inputs are polarity protected
22) Approvals: FM Approved	Class I, Div 2 Groups A,B,C,D TC3 -30°C<Ta<75°C

Comparator

The low comparator compares the I/U converted sensor signal with a preset trip threshold. The threshold voltage is adjusted via a high precision 10-turn potentiometer. If the sensor signal falls under the threshold, the comparator changes output and the trip delay circuit is triggered. The low comparator and high comparator outputs are diode wire-ORed combined at the input to the delay circuit.

High Comparator

The high comparator compares the I/U converted sensor signal with a preset trip threshold. The threshold voltage is adjusted via a high precision 10-turn potentiometer. If the sensor signal raises above the threshold, the comparator changes output and the trip delay circuit is triggered. The wire-or connection of low and high trip signals ensures that either trip is propagated into the delay circuit since both trip signals have identical polarity.

Trip Delay Circuit

The trip delay circuit delays the actuation of the output relay by an adjustable time (0.2 – 3 seconds). The delay time is adjusted via a high precision 10-turn potentiometer.

Turn on Delay

The turn on delay prevents relay flutter when the supply voltage to the channel electronic is applied. It holds the relay transistor in OFF state until the internal 15V supplies have stabilized. The Turn on Delay does not influence the trip delay time.

Trip Relay

If the sensor signal exceeds the low or high threshold longer than the trip delay time the trip relay is activated. If the sensor signal returns into the normal range before the delay time is expired, the trip is not asserted.