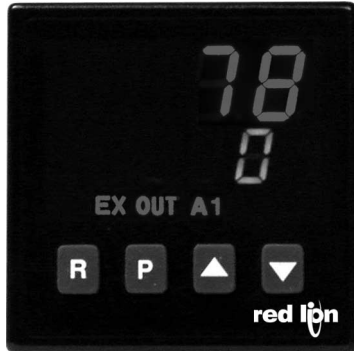


## MODEL TLA - TEMPERATURE LIMIT ALARM



- FM APPROVED, UL RECOGNIZED
- 2-LINE BY 4-DIGIT DISPLAY
- EXCEED, OUTPUT, AND ALARM ANNUNCIATORS
- FOUR BUTTON SILICONE RUBBER KEYPAD
- THERMOCOUPLE OR RTD SENSOR INPUT
- REMOTE RESET INPUT
- MAIN LIMIT OUTPUT: 5A RELAY. SELECTABLE FOR HIGH OR LOW TRIP ACTIVATION
- OPTIONAL ALARMS: 5A RELAY(S)
- OPTIONAL NEMA 4X/IP65 SEALED FRONT BEZEL
- PARAMETER SECURITY VIA PROGRAMMABLE LOCKOUTS



UL Recognized Component,  
File # E179259

### GENERAL DESCRIPTION

The TLA is a Factory Mutual approved temperature limit alarm, intended to provide an independent shutdown for thermal processes. The TLA accepts signals from a variety of temperature sensors (thermocouple or RTD elements), and its comprehensive programming allows it to meet a wide variety of application requirements.

Dual 4-digit displays allow viewing of the process temperature and limit setpoint simultaneously. Front panel indicators inform the operator of the process and output status. The main limit output and alarm outputs are field replaceable.

The limit output is selectable for high or low trip activation. If the process temperature goes above the limit setpoint for a high trip, or below the limit setpoint for a low trip, the limit relay will de-energize to initiate a process shutdown. The limit output cannot be reset until the process temperature returns to the proper operating range; manual reset is required (local or remote). Sensor failure will initiate a process shutdown.

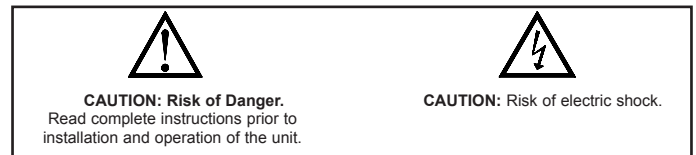
Relay alarm(s) can be configured to activate according to a variety of actions (Absolute HI or LO, Deviation HI or LO, and Band IN or OUT) with adjustable hysteresis. A standby feature suppresses the alarm during power-up until the process stabilizes outside the alarm region.

The unit is constructed of a lightweight, high impact plastic case with a tinted front panel. The front panel meets NEMA 4X/IP65 specifications when properly installed. Multiple units can be stacked horizontally or vertically. Modern surface-mount technology, extensive testing, plus high immunity to noise interference makes the TLA extremely reliable in industrial environments.

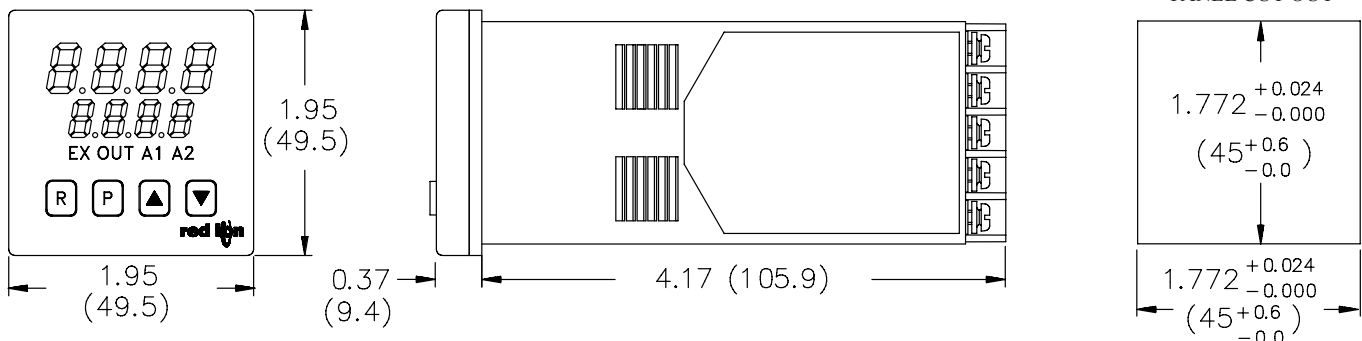
### SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use the TLA to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the unit.



### DIMENSIONS In inches (mm)



## GENERAL SPECIFICATIONS

### 1. DISPLAY: 2 line by 4-digit LED

**Upper (Main) Display:** 0.4" (10.2 mm) high red LED

**Lower (Secondary) Display:** 0.3" (7.6 mm) high green LED

#### Display Messages:

“OLOL” - Appears when measurement exceeds + sensor range.

“ULUL” - Appears when measurement exceeds - sensor range.

“OPEN” - Appears when open sensor is detected.

“SHrt” - Appears when shorted sensor is detected (RTD only)

“...” - Appears when display values exceed + display range.

“-...” - Appears when display values exceed - display range.

#### LED Status Annunciators:

EX - Temperature exceeds limit setpoint

OUT - Limit output is de-energized

A1 - Alarm #1 is active

A2 - Alarm #2 is active

### 2. POWER:

**Line Voltage Models:** 85 to 250 VAC, 50/60 Hz, 8 VA.

#### Low Voltage Models:

**DC Power:** 18 to 36 VDC, 7 W.

**AC Power:** 24 VAC +/-10%, 50/60 Hz, 9 VA

### 3. CONTROLS: Four rubber push buttons: R, P, Up, Down

### 4. MEMORY: Nonvolatile EPROM retains all programmable parameters and values.

### 5. ENVIRONMENTAL CONDITIONS:

**Operating Range:** FM rated @ 0 to 65°C, UL rated @ 0 to 55°C

**Storage Range:** -40 to 80°C

**Operating and Storage Humidity:** 85% max. relative humidity (non-condensing) from 0°C to 65°C.

**Altitude:** Up to 2000 meters

### 6. ISOLATION BREAKDOWN RATINGS:

**AC line with respect to all inputs and outputs:** 2300 V for 1 minute (250 V working)

**Relay contacts to all other inputs and outputs:** 2300 VAC

**DC Power with respect to sensor input:** 50 V working (500 V for 1 minute)

### 7. CERTIFICATIONS AND COMPLIANCES:

#### SAFETY

Factory Mutual Approved, Report #3014646, FM 3545, FM 3810

UL Recognized Component, File #E156876, UL 873, CSA C22.2 No. 24

Recognized to U.S. and Canadian requirements under the Component Recognition Program of Underwriters Laboratories, Inc.

Type 4X Enclosure rating (Face only), UL 50

IEC 61010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.

IP65 Enclosure rating (Face only), IEC 529

## ELECTROMAGNETIC COMPATIBILITY

### Emissions and Immunity to EN 61326

#### Immunity:

Electrostatic discharge	EN 61000-4-2	Criterion A	4 kV contact discharge 8 kV air discharge
Electromagnetic RF fields	EN 61000-4-3	Criterion A	10 V/m
Fast transients (burst)	EN 61000-4-4	Criterion A	2 kV power 1 kV signal
Surge	EN 61000-4-5	Criterion A	1 kV L-L, 2 kV L&N-E power 1 kV signal
RF conducted interference	EN 61000-4-6	Criterion A	3 V/rms
Voltage dip/interruptions	EN 61000-4-11	Criterion A	0.5 cycle

#### Emissions:

Emissions	EN 55011	Class A
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#### Notes:

1. *Criterion A: Normal operation within specified limits.*

### 8. CONNECTION: Wire clamping screw terminals

**Wire Gage Capacity:** Two 14 AWG (2.55 mm), four 18 AWG (1.02 mm), or four 20 AWG (0.61 mm).

**Terminal Torque:** 1.0Nm (8.9 in-lbs.).

1.4Nm (12.4 in-lbs.) max.

### 9. CONSTRUCTION: Black plastic alloy case and collar style panel latch. Panel latch can be installed for vertical or horizontal instrument stacking. One piece tinted plastic bezel. Bezel assembly with circuit boards can be removed from the case to change the output board without removing the case from the panel or disconnecting wiring. Unit meets NEMA 4X/IP65 requirements for indoor use, when properly installed. Flame resistant. Installation Category II, Pollution Degree 2.

### 10. WEIGHT: 0.38 lbs (0.17 kgs)

## INPUT SPECIFICATIONS

### 1. SENSOR INPUT:

**Sample Period:** 100 msec

**Step Response Time:** Less than 300 msec typ., 400 msec max. (to within 99% of final value)

**Normal Mode Rejection:** Greater than 40 dB @ 50/60 Hz

**Common Mode Rejection:** Greater than 120 dB, DC to 60 Hz

**Overvoltage Protection:** Input overload 120 VAC for 15 seconds max.

### 2. Failed Sensor Response:

**Main Output:** Sensor failure will initiate a process shutdown

**Display:** “OPEN”

**Alarms:** Upscale

### 3. INDICATION ACCURACY: ±(0.3% of Span +1°C) at 23°C ambient after 20 minute warm-up. (Includes NIST conformity, cold junction effect, A/D conversion errors and linearization conformity.)

**Span Drift (maximum):** 130 PPM/°C

### 4. RTD INPUT: 2 or 3 wire, 100 Ω platinum, alpha = 0.00385 (DIN 43760), alpha = 0.0039162

**Excitation:** 150 μA typical

**Resolution:** 1 or 0.1 degree

**Lead Resistance:** 15 Ω max. per input lead

RTD TYPE	RANGE
385	-200 to +600°C -328 to +1100°F
392	-200 to +600°C -328 to +1100°F
OHMS	2.0 to 320.0

### 5. THERMOCOUPLE INPUT:

**Types:** T, E, J, K, R, S, B, N, Linear mV, software selectable

**Input Impedance:** 20 MΩ all types

**Lead resistance effect:** 0.25 μV/Ω

**Cold junction compensation:** Less than ±1°C typ., (±1.5°C max), error over 0 to 65°C max. ambient temperature range. Defeated for Linear mV indication mode.

**Resolution:** 1° for all types, or 0.1° for T, E, J, K, and N only.

TC TYPE	RANGE	WIRE COLOR	
		ANSI	BS 1843
T	-200 to +400°C -328 to +752°F	blue (+)	white (+)
		red (-)	blue (-)
E	-200 to +750°C -328 to +1382°F	violet (+)	brown (+)
		red (-)	blue (-)
J	-200 to +760°C -328 to 1400°F	white (+)	yellow (+)
		red (-)	blue (-)
K	-200 to +1250°C -328 to +2282°F	yellow (+)	brown (+)
		red (-)	blue (-)
R	0 to 1768°C +32 to +3214°F	black (+)	white (+)
		red (-)	blue (-)
S	0 to 1768°C +32 to 3214°F	black (+)	white (+)
		red (-)	blue (-)
B	+149 to +1820°C +300 to +3308°F	grey (+)	no standard
		red (-)	no standard
N	-200 to +1300°C -328 to +2372°F	orange (+)	orange (+)
		red (-)	blue (-)
mV	-5.00 to +56.00	no standard	no standard

### 6. REMOTE RESET INPUT: Internally pulled up to +5 VDC (1MΩ).

V<sub>IL</sub>: 0.85 V max., V<sub>IH</sub>: 3.65 V min., V<sub>IN</sub> MAX: 5.25 VDC, I<sub>OFF</sub>: 1μA max.

## OUTPUT SPECIFICATIONS

### 1. LIMIT AND ALARM OUTPUT RELAYS:

**Contact Rating:** 5 A @ 250 VAC or 30 VDC (resistive load) 1/10 HP @ 120 VAC (inductive load)

**Life Expectancy:** 100,000 cycles at max. load rating. (Decreasing load increases life expectancy.)

2. **LIMIT OUTPUT:** TLA21000: Form-C relay; TLA11100: Form-A relay. Selectable for high or low trip activation. If the process temperature goes above the limit setpoint for a high trip, or below the limit setpoint for a low trip, the limit relay will de-energize to initiate a process shutdown. The limit output cannot be reset until the process temperature returns to the proper operating range; manual reset is required (local or remote).

**Annunciators:**

“EX” - Lit when the process temperature exceeds the limit setpoint.

“OUT” - Lit when the limit output is de-energized.

3. **ALARM OUTPUTS (Optional):** One or two Form-A relays.

**Modes:**

Absolute High Acting	Absolute Low Acting
Deviation High Acting	Deviation Low Acting
Inside Band Acting	Outside Band Acting

**Reset Action:** Programmable; automatic or latched. Latched alarms can be reset regardless of limit exceed condition.

**Standby Mode:** Programmable; enable or disable.

**Hysteresis:** Programmable.

**Annunciator:** “A1” and “A2” programmable for normal or reverse acting.

## ORDERING INFORMATION

### 85 to 250 VAC

LIMIT OUTPUT	ALARM 1 OUTPUT	ALARM 2 OUTPUT	REPLACEMENT OUTPUT BOARD	PART NUMBERS
Form-C Relay	Form-A Relay		RBDLA210	TLA21000
Form-A Relay	Form-A Relay	Form-A Relay	RBD48111	TLA11100

### 18 to 36 VDC / 24 VAC

LIMIT OUTPUT	ALARM 1 OUTPUT	ALARM 2 OUTPUT	REPLACEMENT OUTPUT BOARD	PART NUMBERS
Form-C Relay	Form-A Relay		RBDLA210	TLA21010
Form-A Relay	Form-A Relay	Form-A Relay	RBD48111	TLA11110

## EMC INSTALLATION GUIDELINES

Although this unit is designed with a high degree of immunity to Electro Magnetic Interference (EMI), proper installation and wiring methods must be followed to ensure compatibility in each application. The type of the electrical noise, source or coupling method into the unit may be different for various installations. Listed below are some EMC guidelines for successful installation in an industrial environment.

- The unit should be mounted in a metal enclosure, which is properly connected to protective earth.
- Use shielded (screened) cables for all Signal and Control inputs. The shield (screen) pigtail connection should be made as short as possible. The connection point for the shield depends somewhat upon the application. Listed below are the recommended methods of connecting the shield, in order of their effectiveness.
  - Connect the shield only at the panel where the unit is mounted to earth ground (protective earth).
  - Connect the shield to earth ground at both ends of the cable, usually when the noise source frequency is above 1 MHz.
  - Connect the shield to common of the unit and leave the other end of the shield unconnected and insulated from earth ground.
- Never run Signal or Control cables in the same conduit or raceway with AC power lines, conductors feeding motors, solenoids, SCR controls, and heaters, etc. The cables should be run in metal conduit that is properly grounded. This is especially useful in applications where cable runs are long and portable two-way radios are used in close proximity or if the installation is near a commercial radio transmitter.
- Signal or Control cables within an enclosure should be routed as far away as possible from contactors, control relays, transformers, and other noisy components.

- In very electrically noisy environments, the use of external EMI suppression devices, such as ferrite suppression cores, is effective. Install them on Signal and Control cables as close to the unit as possible. Loop the cable through the core several times or use multiple cores on each cable for additional protection. Install line filters on the power input cable to the unit to suppress power line interference. Install them near the power entry point of the enclosure.

The following EMI suppression devices (or equivalent) are recommended:

Ferrite Suppression Cores for signal and control cables:

Fair-Rite # 0443167251 (RLC #FCOR0000)

TDK # ZCAT3035-1330A

Steward #28B2029-0A0

Line Filters for input power cables:

Schaffner # FN610-1/07 (RLC #LFIL0000)

Schaffner # FN670-1.8/07

Corcom #1VR3

Note: Reference manufacturer’s instructions when installing a line filter.

- Long cable runs are more susceptible to EMI pickup than short cable runs. Therefore, keep cable runs as short as possible.
- Switching of inductive loads produces high EMI. Use of snubbers across inductive loads suppresses EMI.
 

Snubbers:  
RLC #SNUB0000