

TRANSPAK™ T703 MODEL



Benefits

- Eliminates Ground Loops with 1000V Input-to-Output Isolation
- Field Configurable Input Ranges: 20mV to 200V, 1mA to 50mA
- Wide Ranging Zero and Span Adjustability
- Super Bright LED Provides Go/No-Go Loop Status
- RFI Filters Minimize Transmission Faults
- FM and CSA Entity Safety Approval for Hazardous Installations
- Three Year Warranty



DC Input Isolating, Field Configurable Two-Wire Transmitter

Provides an Isolated Current Loop in Proportion to a DC Current or Voltage Input

DESCRIPTION

The T703 offers the user a choice of 16 overlapping input ranges which are field selectable via top-accessed DIP switches (see Table 1). The T703 isolating two-wire transmitter can accept input voltage spans from 20mV to 200 volts and input current spans from 1mA to 50mA. Bipolar selection modifies the unipolar range to include a negative offset (e.g. 200V becomes $\pm 100V$). The T703 provides 1000Vrms of transformer-coupled isolation and 120VAC continuous input overload protection. The top-mounted super bright LED illuminates when the loop current is above 3.3mA. Standard surface mount RFI filters reject walkie-talkie interference and noise. Current output is in proportion to the selected voltage or current input.

A major advantage of the T703 is its truly wide-ranging capability. The T703 enables 80% zero “turn-up” and 80% span “turn-down” adjustments within any user-selected input range. For example, Range 11 of Table 1 specifies 0 to 100V with a minimum span of 20V ($100V - 20V = 80V$, or 80%). This 80% adjustability allows the user to field-calibrate the unit for the maximum (0 to 100V) down to any minimum (20V) span (e.g. 25V to 45V)--as long as that adjusted span remains within the selected 0 to 100V range. The same is true for any adjustable span, minimum or otherwise, in any user-selectable range: all spans are field adjustable from 20% (minimum span) to 100% of the specified range.

APPLICATION

Model T703 is useful in any application requiring an isolated two-wire loop current from a DC source. Typical applications include long distance signal transmission and eliminating ground loops. The output of the T703 can be used to drive a digital meter for direct display, or interface with a computer for monitoring and control applications.



*Protecting the
Integrity of
Industrial
Process Signals*



Table 1: T703-2000 Input Ranges ¹

Input Range	Input Limits	Minimum Span	To select range, position switch:					
			S1	S2	S3	S4	S5	S6
1	0 to 100mV	20mV	OPEN	OPEN	CLOSED	CLOSED	UNIPOLAR OPEN	OPEN
2	0 to 200mV	40mV	OPEN	OPEN	CLOSED	OPEN		OPEN
3	0 to 316mV	65mV	OPEN	OPEN	OPEN	CLOSED		OPEN
4	0 to 632mV	130mV	OPEN	OPEN	OPEN	OPEN		OPEN
5	0 to 1.78V	360mV	CLOSED	OPEN	CLOSED	CLOSED		OPEN
6	0 to 3.56V	710mV	CLOSED	OPEN	CLOSED	OPEN		OPEN
7	0 to 5.62V	1.2V	CLOSED	OPEN	OPEN	CLOSED		OPEN
8	0 to 11.2V	2.3V	CLOSED	OPEN	OPEN	OPEN		OPEN
9	0 to 31.6V	6.4V	CLOSED	CLOSED	CLOSED	CLOSED		OPEN
10	0 to 63V	12.6V	CLOSED	CLOSED	CLOSED	OPEN	BIPOLAR CLOSED	OPEN
11	0 to 100V	20V	CLOSED	CLOSED	OPEN	CLOSED		OPEN
12	0 to 200V	40V	CLOSED	CLOSED	OPEN	OPEN		OPEN
13	0 to 20mA	4mA	OPEN	OPEN	OPEN	OPEN		CLOSED
14	4 to 20mA	3.2mA	OPEN	OPEN	OPEN	CLOSED		CLOSED
15	0 to 50mA	10mA	CLOSED	OPEN	CLOSED	CLOSED		CLOSED
16	0 to 5mA	1mA	OPEN	OPEN	CLOSED	CLOSED		CLOSED

1. To calibrate, use steps 1, 2, 7, 8 and 9. Adjust coarse rotary switch before fine potentiometer.
2. Bipolar span selection will move unipolar range to reflect negative offset (e.g. 20mA = ±10mA).

The model T703 is FM approved for intrinsically safe operation, entity, Classes I, II, III, Division 1, Groups A-G and Nonincendive, Class I, Division 2, Groups A-D hazardous when installed per manufacturer’s drawing 790-0028-00.

The model T703 is CSA approved for intrinsically safe operation for Class 1, Division 1, temperature code T3C, Groups A, B, C and D hazardous locations when installed per manufacturer’s drawing 790-0025-00. Refer to model F703 for NEMA 4, FM/CSA/ CENELEC approved explosion-proof housing.

OPTION

U Urethane coating of internal circuitry for protection from corrosive atmospheres.

CALIBRATION

Note: Factory settings are: Input Range, 0/10V; Output, 4/20mA

1. Open the access lid on the top of the unit (see Top View Diagrams).

2. Select input range from Table 1 and configure switches S1 through S6. Bipolar span selection will divide the unipolar span in half (e.g., 20mA span = ±10mA bipolar span).

3. Determine the Span turn-down % (see Table 2).

$$\% = \frac{(\text{Limit Span}) - (\text{Desired Span})}{\text{Limit Span}} \times 100\%$$

Example, Input: 0-10V

$$\% = \frac{11.2V - 10V}{11.2V} \times 100\% = 10.7\%$$

4. Set the coarse Span rotary switch to the nearest span turn-down % setting (e.g., 10.7% = 20% position 1).

Table 2: Span Turn-Down%

Span Turn-Down%	Position
0%	0
≤20%	1
≤40%	2,3
≤60%	4-7
≤80%	8,9 A-F

5. Determine the Zero turn-up % (see Table 3).

$$\% = \frac{\text{Desired Min. Input}^*}{\text{Limit Span}} \times 100\%$$

**Note: On range 14, subtract 4mA from Desired Min. Input.*

Example, Input: 0-10V

$$\% = \frac{0V}{11.2V} \times 100\% = 0\%$$

6. Set the coarse step Zero turn-up switch to the nearest % setting (e.g., 0% = position 0).

Table 3: Zero Turn-Up%

Zero Turn-Up%	Position
0%	0
≤10%	1
≤20%	2
≤30%	3
≤40%	4
≤50%	5
≤60%	6
≤70%	7
≤80%	8

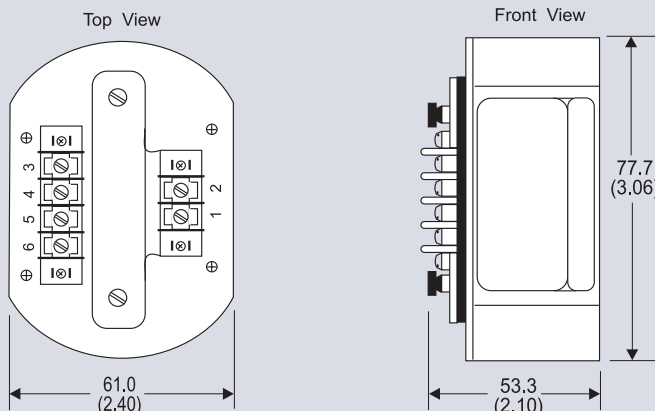
7. Connect the input to a calibrated DC voltage or current source. Connect the output loop to a voltage supply and monitor output current (refer to terminal wiring).

8. Set the calibrator to the desired minimum and adjust the fine zero to obtain an output of 4mA.

9. Set the calibrator to the desired maximum and adjust the fine span to obtain an output of 20mA. Repeat steps 8 and 9, if necessary, for maximum accuracy.

DIMENSIONS

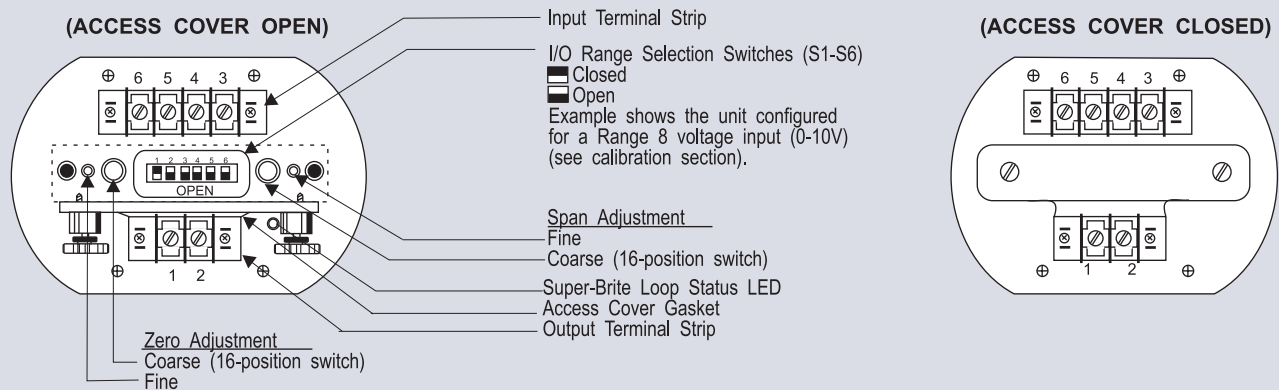
All dimensions are shown in millimeters (Inches)



SPECIFICATIONS

Input Span Range (Max/Min)	See Table 1 Note: Bipolar span selection will move unipolar range to reflect negative offset (e.g., 20mA = ±10mA)	Linearity: ±0.1% of range Hysteresis & Repeatability: ±0.05% of range Settability: ±0.05% of range
Input Impedance	Ranges 1-4: 5MΩ, typical Ranges 5-12: >200KΩ Ranges 13-16: 20Ω, typical	80% "turn-up" of span (max) 80% "turn-down" of full-scale range (Table 1) (max)
Output Span (fixed)	4-20mA	Response Time (63% response) 100ms, max.
Minimum Output Current	3.3mA, typical	Output Ripple 0.1% of span, rms, typical 0.5%, max.
Maximum Output Current	24mA, typical	Normal Mode Rejection 16dB @ 60Hz
Supply Voltage Range	13 to 80VDC	Common Mode Rejection 60Hz: 80dB, DC: 120dB
Maximum Change In Supply Voltage Effect	0.05% of Span	Common Mode Range 60Hz: 1000Vrms DC: 1000VDC
Maximum Changes In Load Effect	0.05% of Span	RFI Effect (1.5W, 470MHz at 1.7 ft) < 1% of span error
Loop Voltage Drop	13VDC @ 20mA	Isolation 1000Vrms maximum, input to output, input to case, output to case.
Output Current Limiting	Active: 27mA Fused (fixed): 0.25A	Temperature Range Operating: -40 to 80°C Storage: (-40 to 176F)
Entity Parameters	$V_{oc} = 33VDC$, $I_{sc} = 178.5mA$, $C_i = 12nF$, $L_i = 0\mu H$	Weight 0.58lbs
Stability	Zero: ± 0.02% of span/°C, max. (±0.05%, bipolar) Span: ±0.03% of span/°C, max.	Agency Approval FM approved intrinsically safe for hazardous locations, certificate No. J.I. 1V4A5.AX. CSA approved intrinsically safe for hazardous locations, Class I, Division I, Groups A-D, when connected in accordance with manufacturer's drawing 790-0025 (File No. LR42272-40).
Accuracy	Overall (Includes best straight line Linearity, Hysteresis & Repeatability @ 25°C): ±0.2% of any adjusted span, max.	

TOP VIEW DIAGRAM

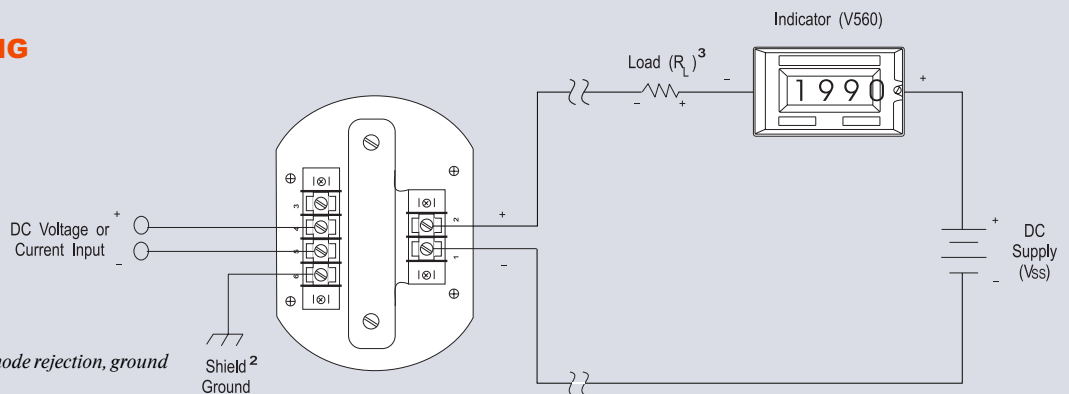


TERMINAL WIRING

Terminal Connections

T703

- 1 Loop Output (-)
- 2 Loop Output (+)
- 3 No Connection
- 4 Input (+)
- 5 Input (-)
- 6 Shield (Gnd)

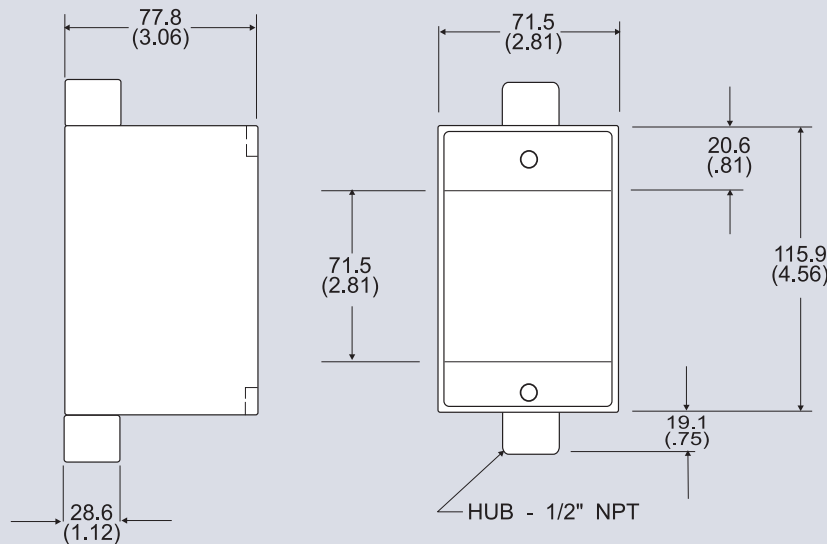


² Note: For best RF & common mode rejection, ground the case (pin 6).

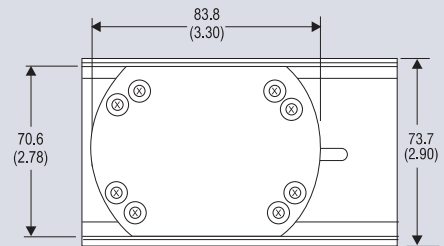
³ Note: R_L represents any other device loads in the current loop.

MOUNTING HARDWARE

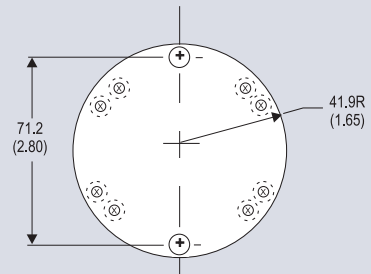
All dimensions are shown in millimeters (Inches)



T804 Conduit Device Housing



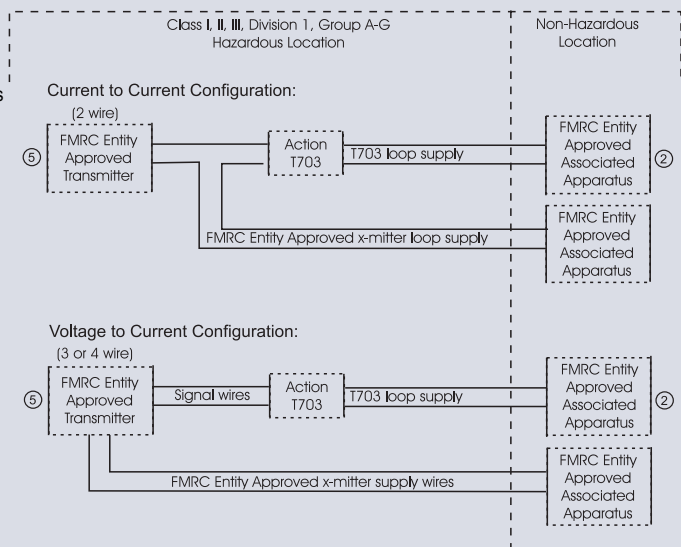
T902 MOUNTING PLATE
(For snap-track mounting;
includes snap track)
Aluminum Alloy #6061 (0.06in, thick)



T910 MOUNTING PLATE
(For bulkhead mounting)
Aluminum Alloy #6061 (0.06in, thick)

INSTALLATION (DRAWING NO. 790-0028-00)

- The T703 loop supply Entity parameters: V_{max} - 33V, I_{max} - 178.5mA, C_i - 12, nF, L_i - 0uH.
- FMRC Entity Approved associated apparatus used in an Approved configuration with V_{oc} or V_t less than V_{max} (33V) and I_{sc} or I_t less than I_{max} (178.5mA).
- C_i of T703 (12 nF) plus total cable capacitance may not exceed C_a of associated apparatus.
- L_i of T703 (0uH) plus total cable inductance may not exceed L_a of associated apparatus.
- Observe all requirements specified by the manufacturer's installation drawing for the Entity Approved x-mitter as well as the following requirements:
 - V_{oc} or V_t of associated apparatus supplying FMRC Entity Approved x-mitter may not exceed 30V or the V_{max} of the x-mitter, whichever is lower.
 - I_{sc} or I_t of associated apparatus supplying FMRC Entity Approved x-mitter may not exceed 60mA of the I_{max} of the x-mitter, whichever is lower.
 - C_i of FMRC Entity Approved x-mitter plus total cable capacitance may not exceed C_a of associated apparatus. T703 input terminals contribute 0uF.
 - L_i of FMRC Entity Approved x-mitter plus total cable inductance may not exceed L_a of associated apparatus. T703 terminals contribute 0uH.
- Control room equipment may not use or generate over 250 VRMS.
- Install in accordance with the NEC and local codes.
- Run all wiring within separate cables or separate shields.



FIELD-MOUNTING

The T703 is designed for installation in industrial field environments. A sealed, die-cast aluminum housing protects against corrosion, moisture, dust and electrical noise such as radio-frequency (RFI) and electromagnetic (EMI) interference.

For protection against extreme moisture, hose-directed water (NEMA 4) or hazardous environments, use Action's FieldPak model F703. The F703 2-wire transmitter offers the same wide-ranging features of the TransPak T703, but includes a rugged EP/NEMA 4 enclosure with standard, ready-to-install plumbing ports for easy hook-up and operation in harsh process environments.

MODELS & ACCESSORIES

Accessories

Model	Description
M004	Snap-in channel track, 4 feet (non-conducting).
T902	Mounting plate for M004, includes 4" track.
T910	Bulkhead (flat surface) mounting plate.
T804	Conduit device housing.
T805	NEMA 4, explosion proof enclosure
9046	Action Pak 24/40VDC, 65mA power supply.
T609	24V, 600mA loop power supply.
V565	3-1/2 digit remote loop-powered indicator, wide-ranging display, NEMA 4X enclosure. CSA & FM approval standard, specify Option C to house Transpak.

Ordering Information

Specify:

- Model **T703-2000**
- Option: U (see text)
- Optional Custom Factory Calibration:
Specify **C620** with desired input and output range.

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