TRANSPAK™ T703

DC Input Isolating, Field Configurable Two-Wire Transmitter

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

- Field Configurable Input Ranges: 20mV to 200V, 1mA to 50mA
- Eliminates Ground Loops
- Wide Ranging Zero and Span
- Super Bright LED Provides Go/No-Go Loop Status
- FM and CSA Safety Approval for Hazardous Installations

Description

The T703 has 16 overlapping input ranges which are field selectable via top-accessed DIP switches (see Table 1). The T703can 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 ±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.

The T703 has 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 from the maximum (0 to 100V) down to any minimum (20V) span (e.g. 25V to 45V) within the selected 0 to 100V range. The same is true in any user-selectable range: all spans are field adjustable from 20% (minimum span) to 100% of the specified range.

Application

The 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 the elimination of ground loops. The output of the T703 can be used to drive a digital meter for direct display, or to interface with a computer for monitoring and control applications.

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.

Options

U Urethane coating of 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 the 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).

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

Example, Input: 0-10V

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

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

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

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

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

Example, Input: 0-10V

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

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

Eurotherm. by Schneider Electric

Table 1: T703-2000 Input Ranges

Input Range	Input Limits	Minimum Span	Selector Switch					
			S1	S2	S3	S4	S5	S6
1	0 to 100mV	20mV			■	■		
2	0 to 200mV	40mV			■			
3	0 to 316mV	65mV				■		
4	0 to 632mV	130mV						
5	0 to 1.78V	360mV	■		■	■		
6	0 to 3.56V	710mV	■		■		Unipolar OPEN	
7	0 to 5.62V	1.2V	■			■		
8	0 to 11.2V	2.3V	■					
9	0 to 31.6V	6.4V	■	■	■	■		
10	0 to 63V	12.6V	■	■	■		Bipolar CLOSED (■)	
11	0 to 100V	20V	■	■		■		
12	0 to 200V	40V	■	■				
13	0 to 20mA	4mA						■
14	4 to 20mA	3.2mA				■		■
15	0 to 50mA	10mA	■		■	■		■
16	0 to 5mA	1mA			■	■		■
Key: ■ = 1 = ON or Closed								

Table 2: Span Turn-Down Percent

Span Turn-Down	Position
0%	0
20%	1
40%	2, 3
60%	4, 5, 6, 7
80%	8, 9, A - F

Table 3: Zero Turn-Up Percent

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

NOTES:

1. To calibrate, use steps 1, 2, 7, 8 and 9. Adjust the coarse rotary switch before the fine potentiometer.

2. Bipolar span selection will move the unipolar range to reflect a negative offset (e.g., 20mA = ±10mA).

7. Connect the input to a calibrated DC voltage or current source. Connect the output loop to a voltage supply and monitor the 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.

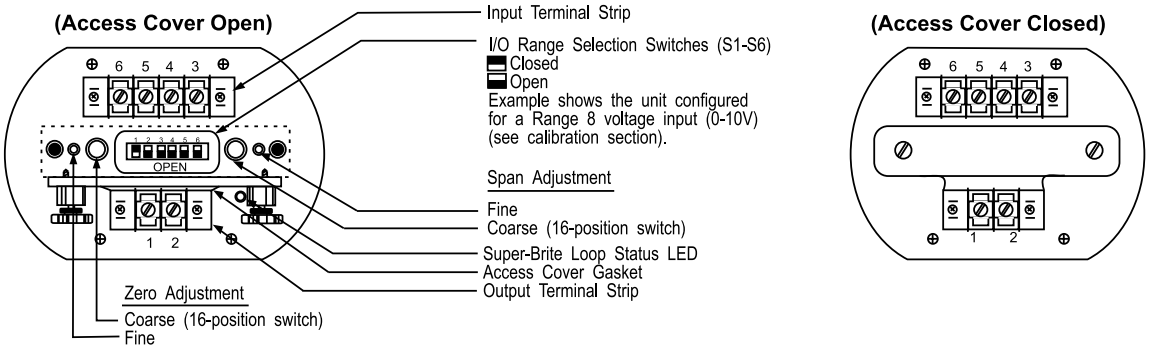
9. Set the calibrator to the desired maximum and adjust the fine span to obtain an output of 20mA. Repeat steps 8 and 9, if necessary, for maximum accuracy.

Field-Mounting

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

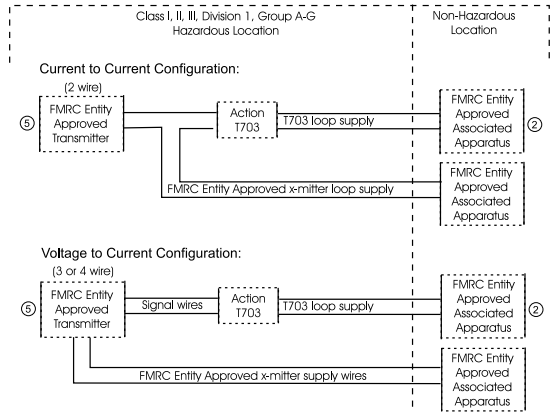
For protection against extreme moisture, hose-directed water (NEMA 4) or hazardous environments, use Action's FieldPak model F703. The F703 2-wire transmitter offers the same wide-ranging features of the TransPak T703, but includes a rugged EP/NEMA 4 enclosure with standard, 1/2" and 3/4" FPT ports for easy hook-up and operation in harsh process environments.

Top View Diagram



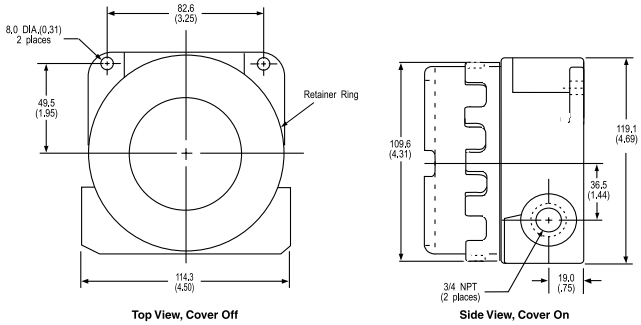
Installation (Drawing No. 790-0028-00)

1. *The T703 loop supply Entity parameters: Vmax - 33V, Imax - 178.5mA, Ci - 12, nF, Li - 0uH.*
2. *FMRC Entity Approved associated apparatus used in an Approved configuration with Voc or Vt less than Vmax (33V) and Isc or It less than Imax (178.5mA).*
3. *Ci of T703 (12 nF) plus total cable capacitance may not exceed Ca of associated apparatus.*
4. *Li of T703 (0uH) plus total cable inductance may not exceed La of associated apparatus.*
5. *Observe all requirements specified by the manufacturer's installation drawing for the Entity Approved x-mitter as well as the following requirements:*
   a. *Voc or Vt of associated apparatus supplying FMRC Entity Approved x-mitter may not exceed 30V or the Vmax of the x-mitter, whichever is lower.*
   b. *Isc or It of associated apparatus supplying FMRC Entity Approved x-mitter may not exceed 60mA of the Imax of the x-mitter, whichever is lower.*
   c. *Ci of FMRC Entity Approved x-mitter plus total cable capacitance may not exceed Ca of associated apparatus. T703 input terminals contribute 0uF.*
   d. *Li of FMRC Entity Approved x-mitter plus total cable inductance may not exceed La of associated apparatus. T703 terminals contribute 0uH.*
6. *Control room equipment may not use or generate over 250 VRMS.*
7. *Install in accordance with the NEC and local codes.*
8. *Run all wiring within separate cables or separate shields.*

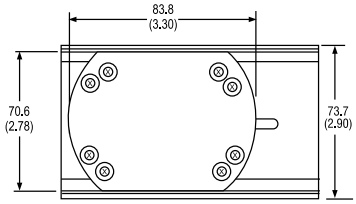


Mounting Hardware

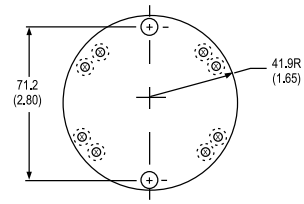
Dimensions in millimeters (inches)



T805 Field Mountable Housing (EP, NEMA 4 rated) 3/4" Hub
(Includes T903 Retainer Ring & NEMA 4 Gasket)



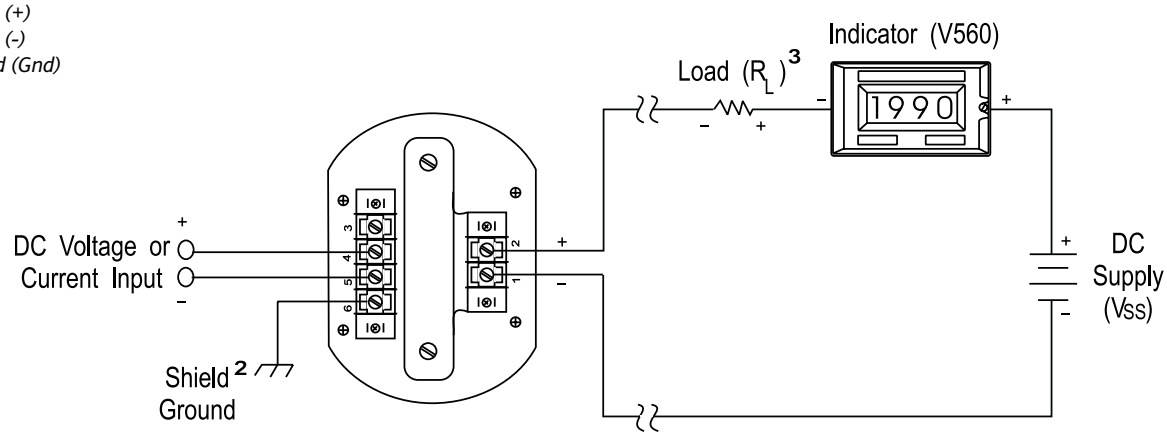
T902 MOUNTING PLATE
(For snap-track mounting; includes snap track)
Aluminum Alloy #6061 (0.06in, thick)



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

T703 Terminal Wiring

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



Note 2: *For best RF & common mode rejection, ground the case (pin 6).*
Note 3: *R_L represents any other device loads in the current loop.*

Specifications

Input Span Range (Min/Max)
See Table 1. Note: Bipolar span selection will move unipolar range to reflect negative offset (e.g., 20mA = ±10mA)

Input Inpedance:
Ranges 1-4: 5M Ohms, typical
Ranges 5-12: >200k Ohms, typical
Ranges 13-16: 20 Ohms, typical

Output Span (fixed):
4-20mA

Minimum Output Current:
3.3mA, typical

Maximum Output Current:
24mA, typical

Supply Voltage Range:
13 to 80VDC

Maximum Change In Supply Voltage Effect:
0.05% of Span

Maximum Changes In Load Effect:
0.05% of Span

Loop Voltage Drop:
13VDC @ 20mA

Output Current Limiting:
Active: 27mA
Fused (fixed): 0.25A

Entity Parameters:
V_{OC} = 33VDC, I_{SC} = 178.5mA,
C_I = 12nF, L_I = 0uH

Stability:
Zero: ± 0.02% of span/°C, max. (±0.05%, bipolar)
Span: ±0.03% of span/°C, max.

Accuracy:
Overall (Includes best straight line Linearity, Hysteresis & Repeatability @ 25°C):
±0.2% of any adjusted span, max.
Linearity: ±0.1% of range
Hysteresis & Repeatability: ±0.05% of range
Settability: ±0.05% of range

Zero Adjustability:
80% "turn-up" of span (max)

Span Adjustability:
80% "turn-down" of full-scale range (max)

Response Time (63% response):
100ms, max.

Output Ripple:
0.1% of span, rms, typical 0.5%, max.

Normal Mode Rejection:
16dB @ 60Hz

Common Mode Rejection:
60Hz: 80dB, DC: 120dB

Common Mode Range:
60Hz: 1000Vrms
DC: 1000VDC

RFI Effect (1.5W, 470MHz at 1.7 ft):
<1% of span error

Isolation:
1000Vrms maximum, input to output, input to case, output to case.

Temperature Range:
Operating : -40 to 80°C
Storage:(-40 to 176°F)

Weight:
0.58lbs

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).

Ordering Information

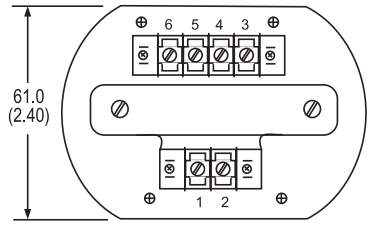
Models & Accessories
Specify:
1. Model **T703-2000**
2. Option: U (see text)
3. Optional Custom Factory Calibration: Specify **C620** with desired input and output range.

Accessories

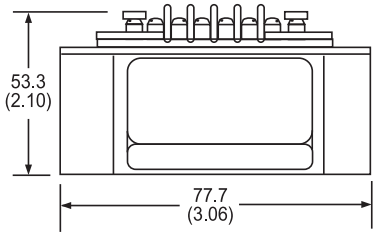
M004	Snap-in channel track, 4 ft. (non-conducting).
T902	Mounting plate for M004, includes 4" track.
T910	Bulkhead (flat surface) mounting plate.
T805	NEMA 4, explosion proof enclosure
AP9046	Action Pak 24/40VDC, 65mA power supply.
V565	3-1/2 digit remote loop-powered indicator, wide-ranging display, NEMA 4X enclosure.CSA & FM approval standard, specify Option C to house Transpak.

Dimensions

Dimensions in millimeters (inches)



Top View



Front View

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by Schneider Electric

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