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SCX 102

Loop Isolator

Instruction Manual

1.0 INTRODUCTION

These instructions refer to the above model. Supplementary sheets are attached if the unit has special options or features. For detailed specifications, refer to page 4 or the Data Bulletin. All ADTECH instruments are factory calibrated. Unless otherwise marked the SCX 102 is calibrated for 4-20 mA input and 4-20mA output in 0-750 ohm range. Adjustments are normally not necessary. A simple check should be performed to verify calibration before installation to ensure that it matches the field requirement.

2.0 GENERAL DESCRIPTION

The ADTECH SCX 102 is a two wire input loop powered isolator that accepts a 4-20mA input signal and provides an isolated 4-20 mA output signal. The transmitted 4-20 mA signal is electrically isolated from the output receiving device, thus making it possible to interface instrumentation that is at different ground potential.

The SCX 102 derives its operating power from the input signal and does not need an external operating power supply.

The input connections are made on the top side and provide for alternate connection to facilitate input current monitoring by use of a milliammeter. Voltage output signals may be obtained by adding external output shunts e.g. 250Ω for 1-5 vdc. An output voltage clamp is provided as standard to protect against accidental open circuit on the output.

The standard mounting is din rail types 'G' and 'T' 32mm and 35mm respectively. Many optional mounting configurations are provided as shown in Section 10.0.

The primary features of the SCX 102 are:

- Lowest input voltage drop in its class
- No recalibration required over 0-750Ω
- Extremely high accuracy: ±0.1% including linearity, repeatability, hysteresis and resolution.
- Reverse polarity protection
- Convenient current monitoring on the input
- Extremely compact – less than 1 inch wide
- Din mount – standard
- Surface and snaptrack mount n/c optional

3.0 INSTALLATION

The instrument is supplied in a non-metallic general purpose Din rail mount enclosure as standard. NEMA 4, 7 or 12 enclosures are optionally available. Installation area/location must agree with the supplied instruments including operating temperature and ambient conditions. For detailed mounting and installation refer to page 4.

Electrical Connections

The wire used to connect the instrument to the control system I/O should be a twisted pair(s) and sized according to normal practice.

Six (6) position compression terminals are provided for I/O connections. Refer to the connection diagrams given below.

Controls

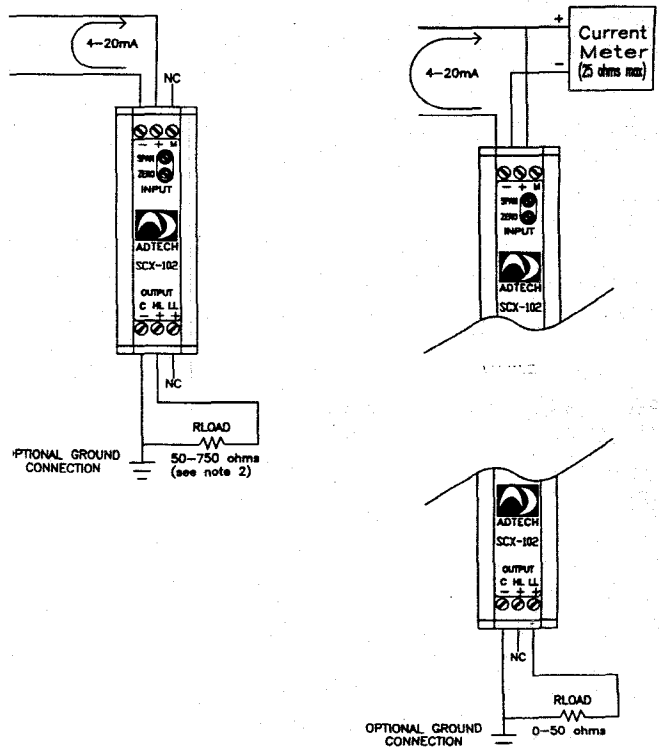
The SCX 102 is supplied with two multiturn controls. Multiturn ZERO and SPAN controls are provided to calibrate the SCX 102. The controls are accessible through the instrument front panel for ease of adjustment.

4.0 MAINTENANCE

These instruments are electronic and require no maintenance except periodic cleaning and calibration verification. If the unit appears to be mis-operating it should be removed and checked on the bench. If defective, it should be replaced with a known good spare and the defective one returned for factory test and service for total reliability check.

5.0 CONNECTIONS

Common standard connections are shown below and on the instrument face plate and also on the Data Bulletin.



CAUTION: The output load must be always connected.

6.0 SCX 102 CALIBRATION

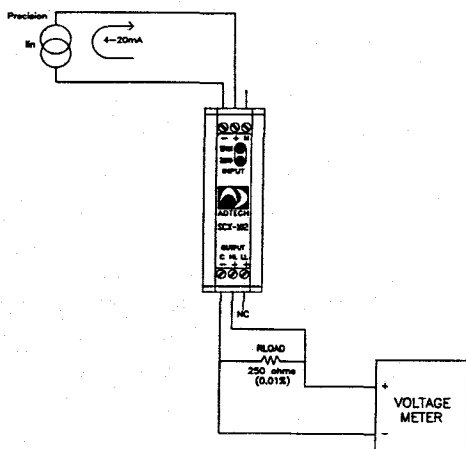
The calibration can be performed in two methods. Section 6.1 describes the procedure when high precision input source, 5 digit DVM and a 250 ohm $\pm 0.01\%$ shunt is available.

Section 6.2 describes an alternate method of differential measurement which is a bench test method and provides very high accuracy calibration. In this case the input and output are connected to provide differential error that must be nulled out. This procedure does not need high precision source or shunt.

6.1 CALIBRATION WITH PRECISION COMPONENTS

To perform a calibration check or recalibration of the instrument, follow the procedure below.

- A. Make sure the input output wiring is connected properly per diagram on front page.
- B. The input signal source must be adjustable from 0–100% in steps of at least 25%. The source must be either precalibrated or a precision milliammeter should be used to monitor the input.
- C. Monitor the output across a 250 $\Omega \pm 0.01\%$ shunt
- D. Set the input source to 4.000 mA and adjust the multi-turn control marked ZERO to provide 4.000 \pm mA (1.000 vdc) within desired accuracy.
- E. Set the input source to 20.000 mA and adjust the multi-turn potentiometer control marked SPAN to provide 20.000 mA (5.000 vdc across 250 ohm).
- F. Repeat steps D and E until desired accuracy is achieved.
- G. Check linearity at input of 8.000, 12.000 and 16.000 mA.
- H. This completes the calibration.



CALIBRATION CONNECTION
WITH PRECISION COMPONENTS

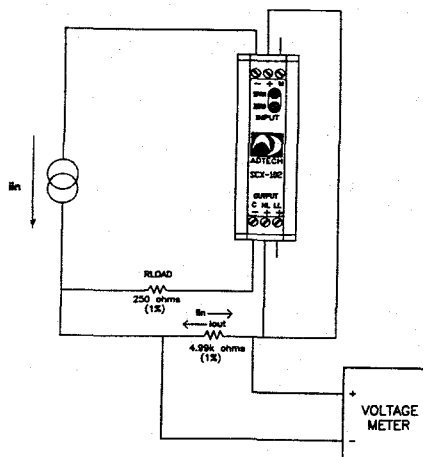
6.2 CALIBRATION WITHOUT PRECISION COMPONENTS

This method *cannot* be used when the isolator is connected in the actual circuits, because it needs connecting the input to the output which violates the I/O isolation.

- A. Remove the input/output wiring and connect the instrument per figure on right below.
- B. Set the input source to approximately 4 mdc and adjust the multi-turn potentiometer marked ZERO to provide 0.000 volt reading on the null meter.
- C. Set the input source to approximately 20 mdc and adjust multi-turn potentiometer marked SPAN to provide 0.000 vdc on the null meter.
- D. Repeat steps B and C until both readings provide 0.000 vdc on the null meter.
- E. Check at inputs of 8, 12 and 16 ma for error if any.

7.0 TROUBLESHOOTING

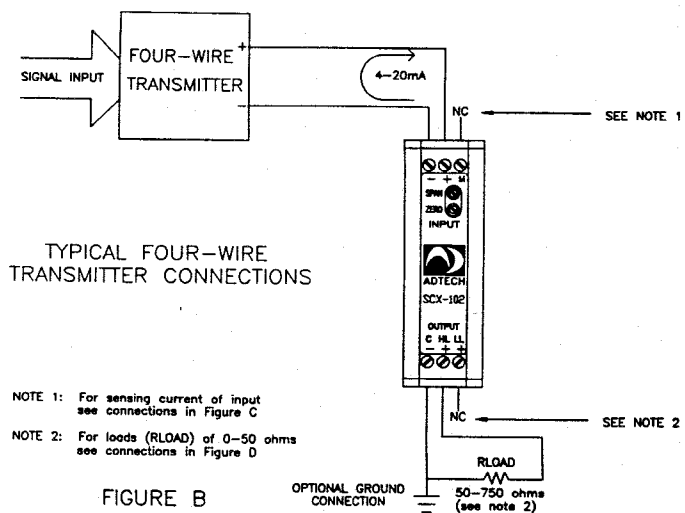
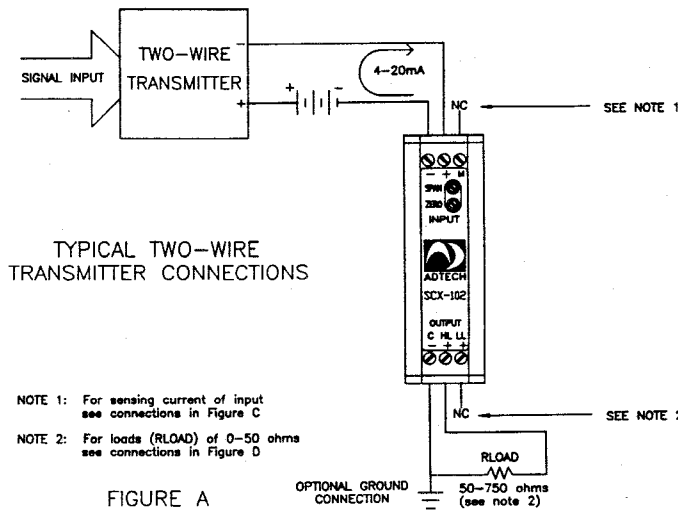
ADTECH does not recommend field trouble shooting of these device. Make sure the input and output connections are correctly made and recheck operation. Return a defective instrument to ADTECH factory for prompt check and recalibration.



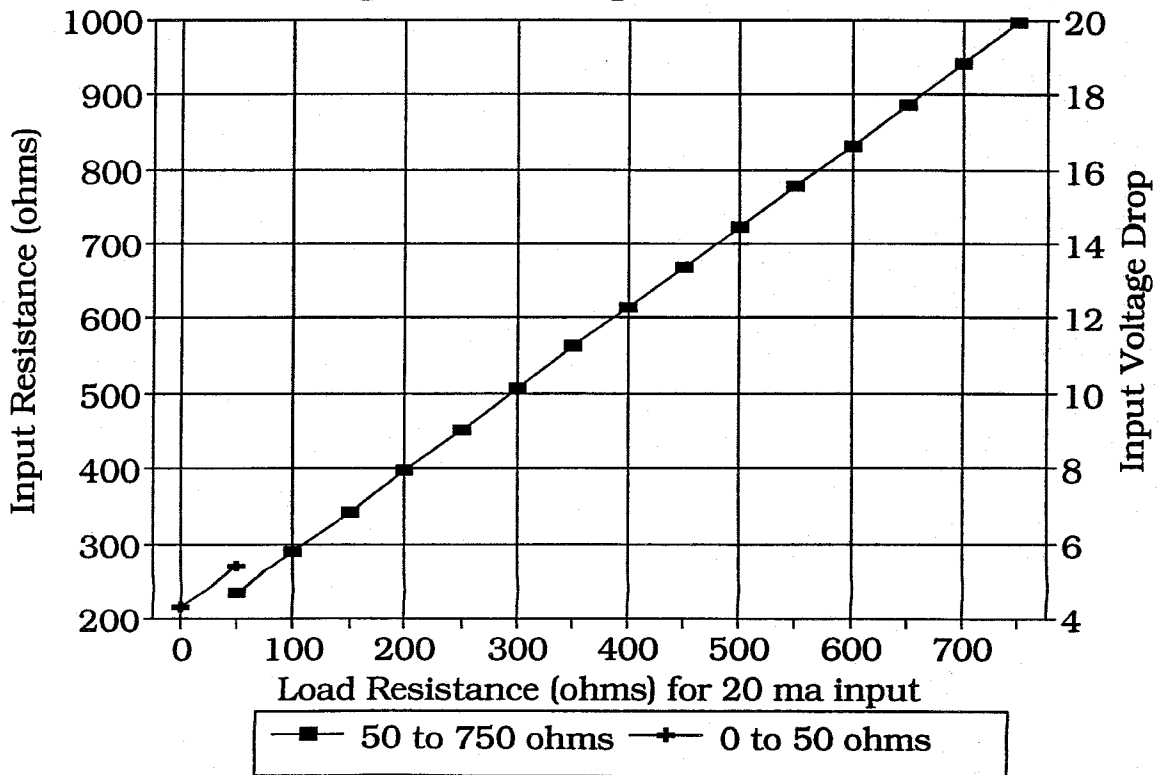
Note 1: Current source need not be a precision source
Note 2: Voltage at Meter = %Error (of 20mA) directly

CALIBRATION CONNECTIONS
WITH OUT PRECISION COMPONENTS

8.0 APPLICATION - FILED CONNECTIONS



Equivalent Input Resistance



9.0 SPECIFICATIONS

INPUT/OUTPUT

INPUT SIGNALS
4-20 mA DC

OUTPUT SIGNALS
4-20 mA DC into 0-750 ohm load.
(1-5 VDC type signals can be obtained by use of externally mounted precision shunts by the user)

MOUNTING

Standard: Din rails G & T
Options: Surface mount
Snap track mount
Consult factory for NEMA and Exp. housings.

PERFORMANCE

Calibrated Accuracy: $\pm 0.1\%$ including the combined effects of repeatability, hysteresis, adjustment resolution and terminal linearity.
Temperature Stability: $\pm 0.01\%/^{\circ}\text{C}$ max., $\pm 0.004\%/^{\circ}\text{C}$ typical.
Load Resistance Effect: $\pm 0.1\%$ of output span maximum over the entire load range.
Output Ripple: $\pm 0.1\%$ of output span max.
Response Time: 150 milliseconds (10% to 90% step input)
Temperature Range: -18°F to 185°F (-25°C to 85°C) operating;
 -40°F to 200°F (-40°C to 93°C) storage
Isolation: 250 VAC, 350 VDC common-mode voltage. (It will withstand 1,500 VDC dielectric strength test for 1 minute without breakdown).
Input Voltage Drop: $2.8 + 1.1 (\text{RL}+40)$ I-Input (where I-Input is in amps)

10.0 OUTLINE AND MOUNTING

