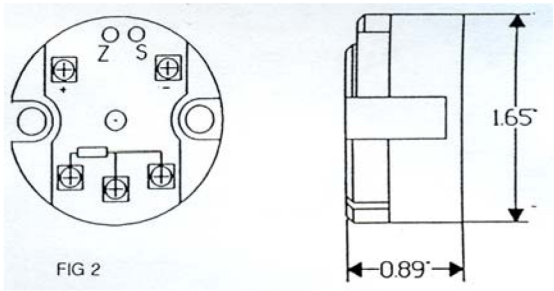
Series 651A Temperature Transmitter

Specifications - Installation and Operating Instructions



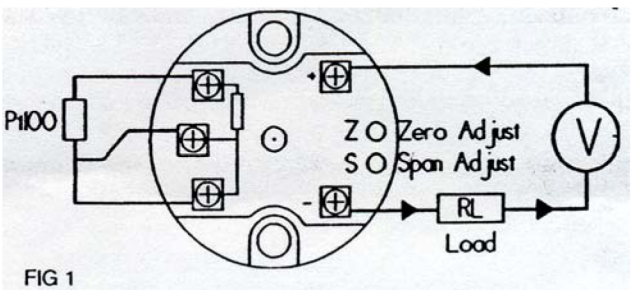
Mounting holes : 2 hole 0.22. 1.3 centers

Center-hole sensor wire entry : 0.16 diameter

The device is a low cost temperature transmitter designed to accept a standard platinum resistance sensor (Pt100 2 or 3 wire) to BS1904 or DIN 43760 and convert the temperature to an industrial 4-20mA current. It is housed in a DIN standard connecting block.

The transmitters are available in 3 standard factory calibrated ranges. The enclosure provides trim potentiometer access, allowing fine re-calibration adjustments to be made at both ends of the scale.

Fig 1 shows the method of connection to provide a 4-20 mA current loop output. the Pt100 sensor shown would normally take the form of a probe assembly with a three wire output. The output loop shows a 24V dc power supply, used to provide loop excitation, the transmitter, and a load all connected in series. the load symbol represents other equipment in the loop, normally indicators, loggers etc. Sometimes these instruments come with the 24V supply built in as standard, this simplifies wiring and reduces cost. Care must be taken when designing the 4-20mA circuit to ensure that the total burden of the loop, that is the total voltage requirements of all the equipment in the loop added together, does not exceed the power supply voltage. If a number of instruments are connected in the loop, ensure that only one instrument is tied to ground. Grounding the loop at two points will result in shorting out part of the loop and therefore any instruments in that part of the loop will not operate.



SPECIFICATION @ 20 deg C, (68 deg F)

Input	Pt100 sensor to BS1904 or DIN43760
	100 R @ 0 deg C (32 deg F)
	FI=38.5 R, 2 or 3 wire.
Output	4-20 mA Loop powered ,
	Max 30 mA
Loop Supply	10 to 32 V d.c.
Loop Resistance	700R @ 24 V
Loop Protection	Reverse connection protected
Loop Sensitivity	10 uA/volt
Accuracy	+/- 0.2 deg C, (0.36 deg F)
	plus +/-0.25% of reading
Temp Stability	Zero Drift Typ 0.05%/ deg C (0.09 deg F)
	Span Typ 0.002%/deg C (0.0036 deg F)
Ambient Temp	0 / 50 deg C (32 / 122 deg F) Operating
	-40 / 70 deg C (-40/158 deg F) Storage
Ambient Humidity	0 / 95% (Non Condensing)
Connection	Screw Terminal
Cable Size	Recommended max wire 2.5mm (0.1")sq

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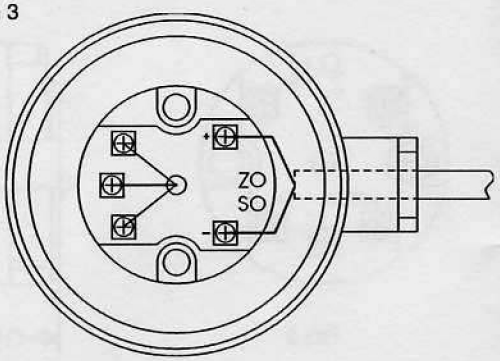
INSTALLATION

The transmitter is mounted using two 5.5mm , (0.22") diameter holes, on standard 33mm, (1.3") centers. this transmitter has been specifically designed to be mounted inside a DIN standard probe head enclosure, which should provide adequate protection from moisture, corrosive atmosphere etc. All cable entries should be sealed suing the correct size cable gland. Care must be taken when locating the transmitter to ensure the ambient temperature will remain inside the specified range of 0 to 50 deg C, (32 to 122 deg F). Figs 2&3 show the mechanical layout and a typical application of the transmitter mounted inside a probe head enclosure, with sensor wires entering through the transmitter body.

CAUTION : DO NOT EXCEED SPECIFIED SUPPLY VOLTAGE RATINGS. PERMANENT DAMAGE NOT COVERED BY WARRANTY WILL RESULT. THIS UNIT IS NOT DESIGNED FOR AC LINE VOLTAGE OPERATION.

FIG 3



Electrical

Connections to the transmitter are made to the screw terminals provided on the top face. No special wires are required for the output connections, but twisted pair cables are the most suitable for long runs. It is recommended that shielded cable be used for the three input signal wires, for cable runs greater than 3 feet. All three input wires must have the same core diameter to maintain equal lead resistance in each wire. A hole is provided through the center of the transmitter to allow sensor wires, (entering direct from the probe assembly via a base entry),to be threaded through the transmitter body, direct to the input screw terminals. The screw terminals have been designed to allow all connection wires to enter from either an inner or outer direction.

The transmitter is protected against reverse connection by means of a series diode, therefore incorrect connection of the output wires will result in near zero current flow in the loop. Incorrect connection of the sensor wires will result in the transmitter saturating at either its low or upper limits.

651A Supply Ohms/Volt Graph

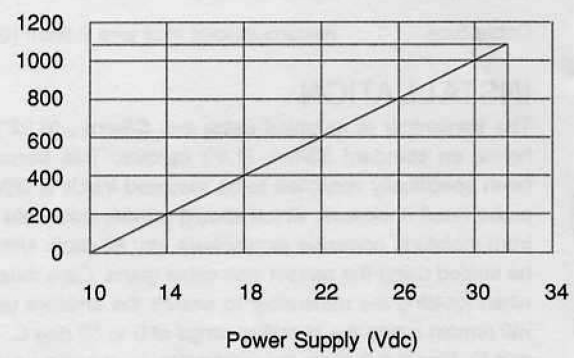
Maximum load resistor, RL, is calculated as follows :

RL = (v-10)/20 x 1000

For 24v supply :

RL = (24-10)/20 x 1000 = 700R

Max Load Resistance



RANGES

This transmitter is normally supplied as one of 3 standard ranges,

651A-10	0 / 100 deg C (32 / 212 deg F)
651A-20	0 / 200 deg C (32 / 392 deg F)
651A-40	0 / 400 deg C (32 / 752 deg F)

If you need to verify the transmitter operates over the range as listed above you may use the following calibration procedure , see Fig 4 below :

1) Connect a precision resistance box (or Pt100 calibrator) to the transmitter, in place of the Pt100 sensor, using three wire connection. Wire the transmitter output in series with a current meter and connect to a suitable 24v dc supply. Resistance box accuracy = 0.01 ohm, current meter accuracy +/- 0.05% 20m range. Switch power on.

2) Refer to Pt100 tables, set resistance box to the equivalent sensor resistance for the temperature you require for 4mA output. Adjust the "Z" zero trim potentiometer for 4mA output +/- 0.01mA.

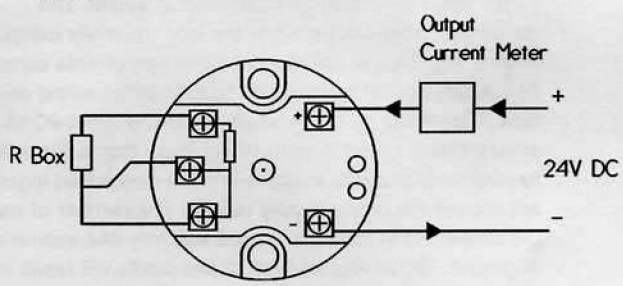
3) Refer to Pt100 tables, set resistance box to the equivalent sensor resistance for the temperature you require for 20mA output. Adjust the "S" span trim potentiometer for 20mA output +/- 0.01mA.

4) Repeat steps 2 and 3 until both points are in calibration. Note some interaction between adjustments will occur.

5) Switch off supply and remove wire.

Test and Calibration Circuit.

FIG 4



Maintenance

After final installation of the series 651A temperature transmitter, no routine maintenance is necessary. These transmitters are not field serviceable and should be returned, freight prepaid to the factory if repair is needed. Be sure to include a clear description of the problem plus any application information available.