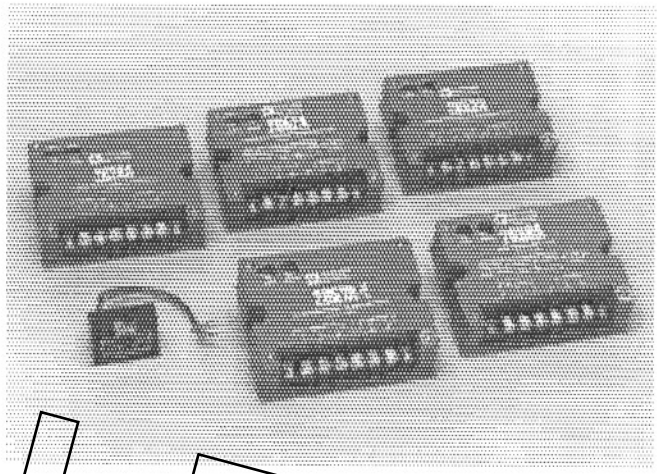
ANALOG DEVICES

Low Cost Two-Wire Transmitters

2B Series

FEATURES
- Low Cost
- Compatible with Standard 4–20 mA Loops
- Broad Family
  - Direct Sensor Interface to Thermocouples, RTDs and AD590s
  - Loop-Powered Isolator
- High Performance
- RFI Immunity

APPLICATIONS
- Monitoring and Control
- Factory Automation
- Energy Management



GENERAL DESCRIPTION

The 2B Series is a family of low cost, two-wire transmitters. These high performance transmitters were designed for industrial environments. They provide input protection, filtering and amplification, as well as isolation and cold junction compensation for thermocouples, and excitation and linearization for RTDs. They are true two-wire transmitters using the same wiring for power and output. The load resistance is connected in series with a dc power supply and the current drawn from the supply is the 4–20 mA output signal.

The 2B Series Transmitters

2B24	Loop-Powered Isolator
2B52/2B53	Thermocouple Temperature Transmitters
2B57A- 1	AD590 Temperature Transmitter
2B58	Linearized RTD Temperature Transmitter
2B59	Low Cost RTD Temperature Transmitter

APPLICATIONS

The 2B Series two-wire transmitters provide low cost, accurate and reliable measurement and transmission in a wide variety of industrial applications. These transmitters are especially useful in process control and monitoring applications where the process sensor is located remotely from the receiver. They may then be used to provide signal conditioning near the point of measurement and transmit an accurate, noise immune, high level current signal over conventional copper wires resulting in improved performance and reduced cost.

USER BENEFITS

Two-wire transmitters process information in the form of a 4–20 mA current. In this form, the analog signal information is unaffected by noise-induced voltages, by voltage drops or by contact potentials, and it may be transmitted 2,000 feet (610 meters) or more without degradation. Since the minimum output current is 4 mA, there is a clear distinction between a zero measurement and an open-circuit transmission line.

Low Cost: Two-wire transmitters minimize total system installation cost. Inexpensive, unshielded copper wire, usually in the form of a twisted wire pair, may be used for signal transmission. DC power is furnished to the transmitter over the same two-wire line by a power supply at the receiving end. Since the transmitter may be close to the sensor, long runs of expensive shielded sensor wire are unnecessary. In addition, a number of wire pairs may be bundled together in cables without cause for concern about crosstalk between channels.

High Noise Rejection: Internal filtering circuitry in the transmitter eliminates errors caused by RFI/EMI and line frequency pickup.

High Isolation (2B24 and 2B52): Input to output isolation eliminates ground loop errors in installations requiring grounded sensors and permits direct transmission of signal to receiver where high common-mode voltages may exist.

Environmental Protection: High quality electronic components, protective coating and mechanical packaging combine to provide a high degree of reliability and protection against temperature, humidity and noise interference.

REV. A

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2B Series–SPECIFICATIONS (typical @ +25°C, and I_{IN} = 20 mA or V_S = +24 V dc unless otherwise noted)

Model	2B24A	2B24B	2B52	2B53
INPUT SPECIFICATIONS				
Input Signal	4–20 mA	4–20 mA, 10–50 mA	Thermocouples J, K, T, E, R, S, B	**
Input Range	1–30 mA max	1–50 mA max	5 mV min, 100 mV max	**
Zero Adjustment Range	N/A	N/A	±5% of Span	**
Span Adjustment Range	±3% of Span	*	±5% of Span	**
OUTPUT SPECIFICATIONS				
Output Signal	4–20 mA	4–20 mA, 10–50 mA	*	*
Minimum Output Current	1 mA	*	3.3 mA, typ	2 mA, typ
Maximum Output Current	30 mA	55 mA	42 mA, typ	28 mA, typ
Load Resistance Equation	$(+V_S - 3.5\ V)/20\ mA$	$(+V_S - 3.5\ V)/50\ mA$	$(+V_S - 12\ V)/20\ mA$	**
ACCURACY[1]				
Total Output Error	See Note 2	See Note 2	±0.1%	**
Stability vs. Ambient Temperature				
Zero, for Ambient –30°C to +85°C	N/A	N/A	±0.038°C/°C[3]	**
Span, for Ambient –30°C to +85°C	±0.01%/°C	*	±0.005%/°C	**
ISOLATION				
CMV, Input to Output, Continuous	±1500 V pk	*	600 V rms	N/A
Common-Mode Rejection @ 60 Hz	120 dB @ R_L = 300 Ω	120 dB @ R_L = 120 Ω	160 dB	N/A
Normal-Mode Rejection @ 60 Hz	N/A	N/A	60 dB	N/A
POWER SUPPLY				
Voltage, Operating Range[4]	+3.5 V to +5.5 V dc	*	+12 V to +60 V dc	**
Supply Change Effect, % of Span				
on Zero	N/A	N/A	0.005%/V	**
on Span	N/A	N/A	0.001%/V	**
ENVIRONMENTAL				
Temperature Range, Rated Performance	–30°C to +85°C	*	*	*
Storage Temperature Range	–55°C to +125°C	*	*	*
Relative Humidity	±0.2%[5]	*	*	*
RFI Effect (5 W @ 470 MHz @ 3 ft.) Error	±0.5% of Span	*	±0.5% of Span	**
PHYSICAL				
Case Size	4″ × 3.25″ × 1.25″	*	*	*
Weight	8.5 oz (240 g)	*	*	8 oz (227 g)

NOTES

[1]Accuracy is specified as a percent of output span. Accuracy spec includes combined effects of transmitter repeatability, hysteresis and linearity (or linearization conformity). It does not include sensor error.

[2]For 2B24, total output error is comprised of a –0.3% offset error and a ±0.1% span error.

[3]2B52 and 2B53—includes combined effects of cold junction compensation and amplifier offset drift.

[4]2B24 includes 3.5 V plus voltage drop across output load. 2B52, 2B58 and 2B59 are protected for reverse polarity.

[5]MIL-STD-202E, Method 103B.

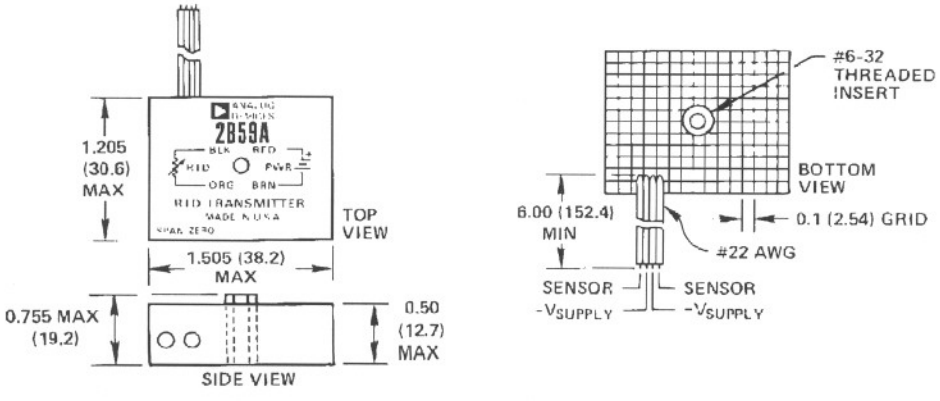
*Specifications same as 2B24A.

**Specifications same as 2B52.

Specifications subject to change without notice.

2B59 OUTLINE DIMENSIONS

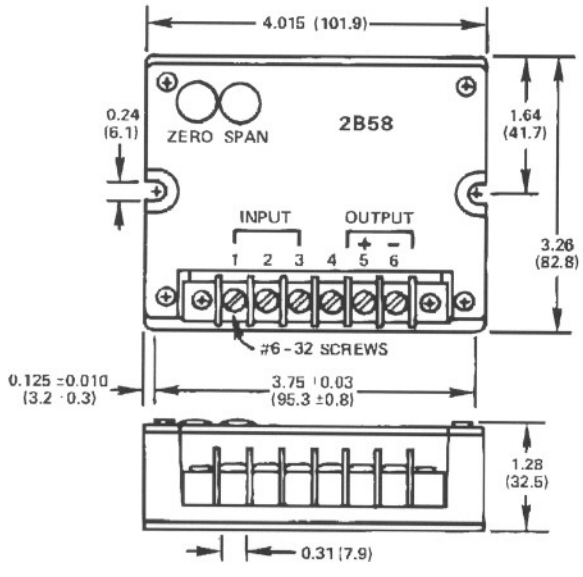
Dimensions shown in inches and (mm).

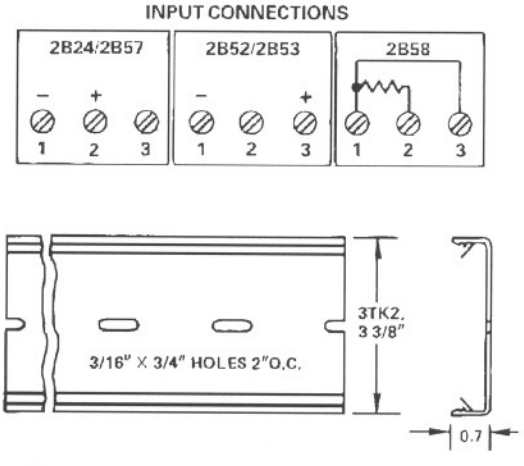


Model	2B57A-1	2B58	2B59
INPUT SPECIFICATIONS			
Input Signal	AD590 Temperature Sensor (1 µA/K)	2- or 3-Wire, Pt RTD 100 Ω @ 0°C, α = 0.00385	Pt RTD, 100 Ω @ 0°C, α = 0.00385 NiFe RTD, 100 Ω, 2000 Ω @ +21.1°C (+70°F), α = 0.00527
Input Range	−55°C to +150°C max (20°C min)	5 mV min, 100 mV max	−100°C to +400°C
Zero Adjustment Range	±5% of Span	±5% of Span	±3% of Span min
Span Adjustment Range	±5% of Span	±5% of Span	±3% of Span min
OUTPUT SPECIFICATIONS			
Output Signal	*	*	*
Minimum Output Current	2.5 mA	3.5 mA, typ	3.4 mA
Maximum Output Current	26 mA	40 mA, typ	35 mA
Load Resistance Equation	**	$(+V_S - 16\ V)/20\ mA$	$(+V_S - 10\ V)/20\ mA$
ACCURACY[1]			
Total Output Error[2]	±0.4% (±1.0% max)	±0.1%	±0.1%
Stability vs. Ambient Temperature			
Zero, for Ambient −30°C to +85°C	±0.005%/°C (0.01%/°C max)	±0.03°C/°C	±0.015%/°C
Span, for Ambient −30°C to +85°C	±0.001%/°C (±0.005%/°C max)	±0.05%/°C	±0.005%/°C
ISOLATION			
CMV, Input to Output, Continuous	N/A	N/A	N/A
Common-Mode Rejection @ 60 Hz	N/A	N/A	N/A
Normal-Mode Rejection @ 60 Hz	N/A	56 dB @ 60 Hz	N/A
POWER SUPPLY			
Voltage, Operating Range[4]	+12 V to +50 V dc	+16 V to +60 V dc	+10 V to +35 V dc
Supply Change Effect, % of Span			
on Zero	±0.005%/V	±0.005%/V	±0.005%/V
on Span	±0.001%/V	±0.01%/V	±0.001%/V
ENVIRONMENTAL			
Temperature Range, Rated Performance	*	*	−25°C to +85°C
Storage Temperature Range	−55°C to +100°C	*	*
Relative Humidity	0% to 90% (to +40°C)	±0.6%[5]	0% to 90% (to +40°C)
RFI Effect (5 W @ 470 MHz @ 3 ft.) Error	±0.5% of Span	±0.5% of Span	±0.5% of Span
PHYSICAL			
Case Size	*	*	1.2″ × 1.5″ × 0.5″ (Standoff 0.75″)
Weight	8.2 oz (234 g)	8 oz (227g)	1 oz (30 g)

2B24, 2B52, 2B53, 2B57 and 2B58 OUTLINE DIMENSIONS

Dimensions shown in inches and (mm).





The 2B24, 2B52, 2B53, 2B57 and 2B58 may be conveniently mounted in a standard relay mounting channel (3.25″ wide) such as Reed Devices Inc. (RDI) model 3TK2-6 or equivalent.

2B Series

MODEL 2B24 LOOP-POWERED ISOLATOR

Model 2B24 is a loop-powered isolator designed to eliminate ground loop problems and high common-mode noise interference, and to provide transient voltage protection. It accepts an input current in the range of 10–50 mA and provides an isolated output current proportional to the input.

Models 2B24A and 2B24B are available for 4–20 mA and 10–50 mA input ranges respectively. Both feature high accuracy (±0.1%), high input to output isolation (±1500 V pk, continuous), RFI/EMI immunity and high CMR (120 dB). Other features include low input signal loop burden, low sensitivity to variations in load, as well as excellent stability (±0.01%/°C) over a wide ambient temperature range (–30°C to +85°C).

OPERATION

The 2B24 is factory calibrated to accuracy of ±0.1% of span. A user-accessible span trim potentiometer providing ±3% adjustment range permits precise field calibration. This may be accomplished by connecting normal operating load resistance and adjusting SPAN for a 20 mA output when an input is 20 mA. A wide range of load resistance may be accommodated by the 2B24. The transmitter supplying power to the 2B24 must be capable of furnishing the necessary input voltage for the given load and the desired maximum output current. A metal enclosure offers environmental protection and screw terminal input and output connections. It may be either surface or relay track mounted.

Figures 1a and 1b illustrate 2B24 applications with two-wire and four-wire transmitters respectively.

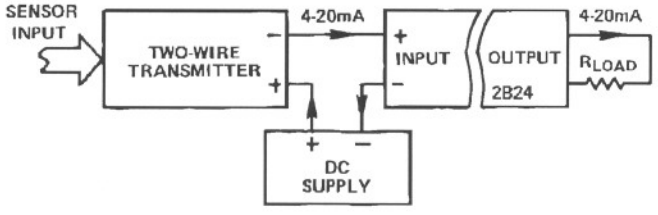


Figure 1a. Two-Wire Transmitter 2B24 Application

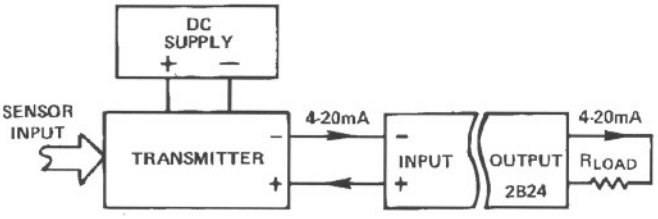


Figure 1b. Four-Wire Transmitter 2B24 Application

MODELS 2B52 AND 2B53 THERMOCOUPLE TEMPERATURE TRANSMITTERS

Models 2B52 and 2B53 accept a type J, K or T thermocouple input and provide a standard 4–20 mA output proportional to the input signal. The 2B52 features high input to output isolation (600 V rms) and high CMR (160 dB @ 60 Hz); it is approved by Factory Mutual for intrinsically safe use in hazardous locations. The 2B53 is a functionally equivalent design without the input to output isolation.

The 2B52 and 2B53 offer high noise rejection, RFI immunity and automatic cold junction compensation to assure accurate operation in noisy industrial environments over a wide ambient temperature range. Other features include open thermocouple detection, fast response time and a low bias current to minimize errors induced by thermocouple extension wires. A metal enclosure offers environmental protection and screw terminal input and output connections. It may be either surface or relay track mounted.

Please note: In addition to a number of standard ranges, special ranges of these transmitters are also available; order 2B52-CUSTOM or 2B53-CUSTOM and specify both thermocouple type and temperature range. CUSTOM modules can provide for thermocouple types J, K, T, E, R, S and B. There is an additional charge for custom ranging.

OPERATING INSTRUCTIONS

The connections shown in Figure 2 are common for both the 2B52 and 2B53. Note: The cold junction temperature sensor is mounted beneath Terminal 2, and therefore no user connection is to be made at this terminal. Terminal 4 (CAL COM) is only used for field calibration; see Figure 4.

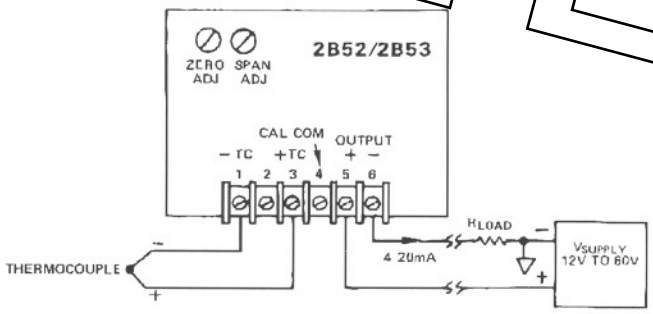


Figure 2. Model 2B52/2B53 Basic Application

INTRINSICALLY SAFE OPERATION

The 2B52 is approved by Factory Mutual for intrinsically safe use in Class I, Division I, Groups A, B, C and D Hazardous Locations when connected per Drawing 03-0884000, which is indicated in Figure 3. The 2B52 is approved with the MTL 188+ safety barrier as a system.

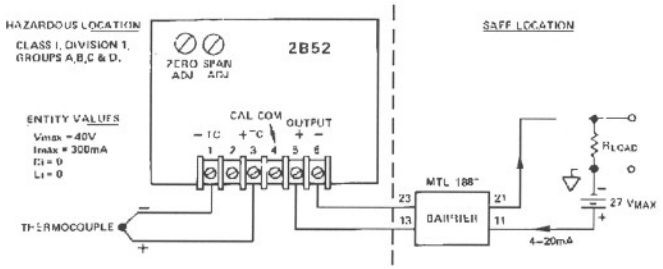


Figure 3. 2B52 Intrinsically Safe Operation

The 2B52 is approved under the entity concept and can be used with any entity-approved barrier that has a worst case open circuit voltage less than 40 V and a worst case short circuit current less than 300 mA. There is no restriction with respect to unprotected internal capacitance and unprotected internal inductance since these values are zero for the 2B52. The voltage drop across the barrier must be considered when choosing the load resistance. The entity approval provides the user with the flexibility to choose a barrier that best satisfies the requirements.

Warning: Substitution of components may impair intrinsic safety.

CALIBRATION

Factory Calibration: Models 2B52 and 2B53 may be factory or user calibrated. If factory calibration is desired, the thermocouple type and zero and span temperatures (in °C) must be specified. When specified temperature ranges are ordered, both span and zero calibration resistors are factory installed. Values indicated in Table I are for reference purposes only. Table I shows available factory ranges. Refer to Ordering Information Guide for range ordering codes.

Table I. Thermocouple Range Chart

Type	Range in °C	Total Span (in Millivolts)	Coarse Trim (Ω) 2B52 Zero	2B52 Span	2B53 Zero	2B53 Span
T	–100 to +300	18.238	102 k	1.4 k	90.9 k	1.27 k
	0 to +200	9.286	69.8 k	715 Ω	66.5 k	649 Ω
J	0 to +500	27.388	90.9 k	2.15 k	84.5 k	1.96 k
	–100 to +300	20.957	140 k	1.62 k	133 k	1.47 k
	0 to +750	42.283	200 k	3.32 k	180 k	3.09 k
K	–100 to +300	15.76	100 k	1.21 k	75 k	1.1 k
	0 to +600	24.902	169 k	1.96 k	140 k	1.78 k
	0 to +1000	41.269	237 k	3.24 k	200 k	3.01 k

Field Calibration: The following procedure is recommended for calibration. A precision voltage source is required.

1. Make connections as shown in Figure 4. Use a precision millivolt source.
2. With a precision DVM referenced to CAL COM, measure the CJC voltage from –TC to CAL COM points. This should be approximately –10 mV to –11 mV for types K and T, –14 mV for type J. With respect to ambient temperature, and referring to standard millivolt/temperature tables, determine the appropriate millivolt output for the thermocouple type being used. This number will be sign inverted and added to the measured CJC voltage. These combined voltages must be algebraically added to the millivolt span of the thermocouple being simulated.

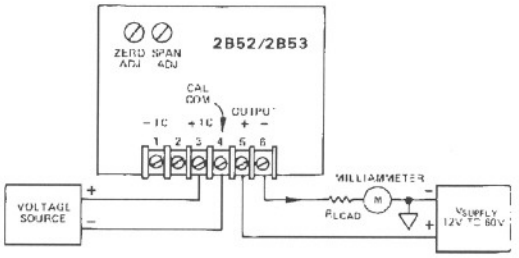


Figure 4. 2B52/2B53 Calibration Connections

3. Determine zero and span points for expected measurement for the thermocouple being used from standard millivolt/temperature tables.
4. Add the CJC voltage (from Step 2) to the zero and span millivolt values. For example:

Zero and span millivolt values	= 0 mV to +25 mV
Measured CJC voltage	= –10 mV
Output at ambient temperature	= 1.5 mV (invert sign)
Corrected zero and span values	= –11.5 mV to +13.5 mV

5. Set millivolt source for minimum input signal (determined in Step 4) and adjust zero potentiometer, if necessary, to obtain an output reading of 4 ±0.016 mA.
6. Set millivolt source for maximum input signal (determined in Step 4) and adjust span potentiometer, if necessary, to obtain an output reading of 20 ±0.016 mA.
7. Repeat Steps 5 and 6 until both readings are constant, since zero and span are slightly interactive.

MODEL 2B57 AD590 TEMPERATURE TRANSMITTER

The model 2B57 is a low cost, two-wire temperature transmitter designed to interface with Analog Devices' AD590 temperature transducer and produce a standard 4–20 mA output current proportional to the measured temperature. The 2B57 features a low span drift of ±0.005%/°C max, low nonlinearity (±0.05% max) and high noise immunity to assure measurement accuracy in harsh industrial environments.

The AD590 is a calibrated two-terminal temperature sensor producing a current in microamperes (1 μA/K) that is linearly proportional to absolute temperature for temperatures from –55°C to +150°C. The AD590 sensor is available in a hermetically sealed TO-52 transistor package, a miniature flat pack, chip form and stainless steel probes (AC2626). The sensor construction assures reliable isolation from ground.

The AD590 is available in linearity grades of 0.3°C, 0.4°C, 0.8°C, 1.5°C and 3.0°C. The grade selection will depend on whether the device is used uncalibrated or with calibration at a single value. For greater accuracy (in any grade), the device may be calibrated at two points.

The 2B57A-1 is mounted in an aluminum case including screw terminals for connecting an external sensor and power. This housing may be surface mounted in racks, cabinets, NEMA enclosures, etc., or snapped onto standard relay tracks.

2B Series

OPERATING INSTRUCTIONS

The 2B57 is factory calibrated to ±0.5% accuracy for the –55°C to +150°C measurement range. Sensor calibration error is the major contributor to maximum total error in all AD590 grades. User accessible zero and span trim potentiometers providing ±3% adjustment range permit sensor calibration trim.

To trim this error, the temperature of the AD590 is measured by a reference temperature sensor and ZERO is adjusted to the calculated value of the 2B57 output current at that temperature. A reference temperature near the midpoint of the span should be selected.

For best measurement accuracy over temperature, ZERO and SPAN should be trimmed with the AD590 at two known temperatures. With the AD590 at the lower temperature, ZERO is adjusted to the calculated value of the 2B57 output current at that temperature. With the AD590 at the higher temperature, SPAN is then adjusted so that the calculated value of the 2B57 output current corresponds to the higher temperature.

MODEL 2B58 LINEARIZED RTD TEMPERATURE TRANSMITTER

Model 2B58 accepts a platinum RTD (Resistance Temperature Detector) input and produces a 4–20 mA output current proportional to the measured temperature. The RTD signal is internally linearized to provide an output that is linear with temperature. Four precalibrated ranges are available for RTD measurements from –100°C to +400°C.

The 2B58A features high accuracy (±0.1%), low span drift (±0.05%/°C), high normal-mode rejection (56 dB @ 60 Hz) and RFI immunity. Both 2-wire and 3-wire 100 Ω sensors may be used. Lead wire compensation is provided for 3-wire RTDs. The 2B58A is approved by Factory Mutual for intrinsically safe use in hazardous locations. A metal enclosure offers environmental protection and screw terminal input and output connections. It may be either surface or relay track mounted.

Please note: In addition to the standard ranges, special ranges of the 2B58A are also available; order 2B58-CUSTOM and indicate the desired temperature range. Any temperature range within the standard range of the 100 Ω Platinum RTD (α = 0.00385) may be specified providing that the input range is at least 5 mV (which is provided by a 10 Ω span when using the 0.5 mA excitation current) and the span endpoints are a multiple of 10°C or 10°F. Consult a 100 Ω platinum RTD table to determine a range that will provide at least this minimum span. There is an additional charge for custom ranging.

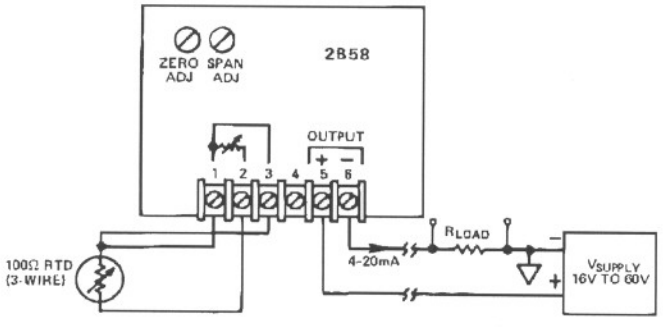


Figure 5. Model 2B58 Basic Application

OPERATING INSTRUCTIONS

The 2B58A is designed to operate with either 2-wire or 3-wire RTDs. The connections shown in Figure 5 are for 3-wire RTD operation. A dc power supply and a series load resistor to monitor the 4–20 mA output signal may be located remotely from the transmitter and connected by a simple twisted pair of copper wires. If a 2-wire RTD is used, a jumper must be installed between Terminals 1 and 3. The transmitter contains individual ZERO and SPAN adjustments which are readily accessible to permit ease of field calibrations.

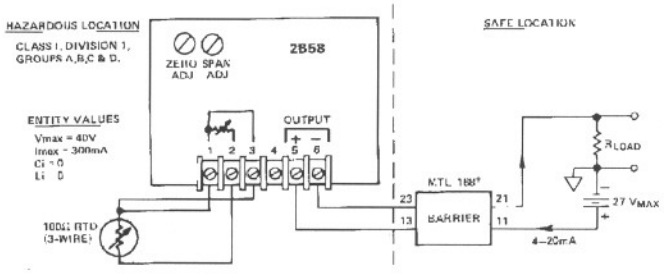


Figure 6. 2B58 Intrinsically Safe Installation Diagram

INTRINSICALLY SAFE OPERATION

The 2B58 is approved by Factory Mutual for intrinsically safe use in Class I, Division I, Groups A, B, C and D Hazardous Locations when connected per Drawing 03-0910200, which is indicated in Figure 6. The 2B58 is approved with the MTL 188+ safety barrier as a system.

The 2B58 is approved under the entity concept and can be used with any entity-approved barrier that has a worst case open circuit voltage less than 40 V and a worst case short circuit current less than 300 mA. There is no restriction with respect to unprotected internal capacitance and unprotected internal inductance since these values are zero for the 2B58. The voltage drop across the barrier must be considered when choosing the load resistance. The entity approval provides the user with the flexibility to choose a barrier that best satisfies the requirements.

Warning: Substitution of components may impair intrinsic safety.

CALIBRATION

Factory Calibration: Model 2B58 is calibrated for platinum RTD sensors with the resistance value of 100 Ω at 0°C and temperature coefficient of resistance change of 0.00385 ohm per ohm per °C (Standard DIN 43760).

As shipped, the 2B58 is factory calibrated to the specified measurement temperature range and meets its listed specifications without any user adjustments. The following standard ranges are available:

–100°C to +100°C (–148°F to +212°F)
0°C to +100°C (+32°F to +212°F)
0°C to +200°C (+32°F to +392°F)
0°C to +400°C (+32°F to +752°F)

Field Calibration: If field calibration of the 2B58 to the specified range is desired, the following procedure is recommended:

1. Connect the transmitter as shown in Figure 7. Substitute a resistance standard for the RTD and use a load resistor as specified for the appropriate power supply voltage (e.g., 400 Ω for a +24 V).

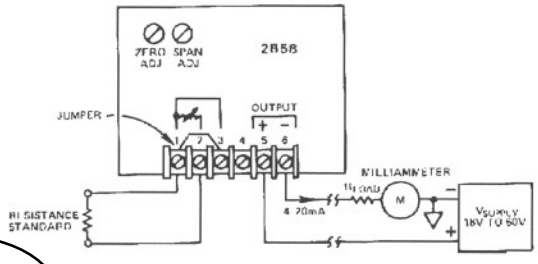


Figure 7. 2B58 Calibration Connections

2. Determine resistance range of input from temperature – resistance table (Table II). For example, a measurement range of 0°C to +200°C corresponds to the resistance range of 100.0 Ω to 175.84 Ω.

Table II. Temperature vs. Resistance Calibration Values for 100 Ω Platinum, α = 0.00385 RTD (Standard DIN 43760)

°C	Sensor Resistance (Ω)	°C	Sensor Resistance (Ω)
–150	39.65	+150	157.32
–100	60.20	+200	175.84
–50	80.25	+250	194.08
0	100.00	+300	212.03
+50	119.40	+350	229.69
+100	138.50	+400	247.06

3. Connect required minimum input resistance standard. Adjust ZERO potentiometer, if necessary, to obtain an output of 4 ±0.016 mA.
4. Connect required maximum input resistance standard. Adjust SPAN potentiometer, if necessary, to obtain an output of 20 ±0.016 mA.
5. Repeat Steps 3 and 4 until readings converge.

MODEL 2B59 LOW COST RTD TEMPERATURE TRANSMITTER

The model 2B59 accepts an RTD sensor input and produces a 4–20 mA output proportional to the measured temperature. The RTD signal is internally linearized to provide an output which is linear with temperature. The 2B59 is a true two-wire transmitter, with the same wiring used for power and output. The load resistance is connected in series with a dc power supply ($+V_S$) and the current drawn from the supply is the 4–20 mA output signal.

This transmitter features high calibration accuracy. Several factory calibrated temperature measurement ranges are available for standard platinum and nickel- iron RTDs. Both zero and span user accessible screwdriver adjustments are provided for fine calibration after installation if needed.

The 2B59 is packaged in a small (1.2″ × 1.5″ × 0.5″), rugged, epoxy encapsulated module and may be mounted with a single screw. Connections to the transmitter are made via four color coded leads using standard wire nuts. A basic 2B59 application is illustrated in Figure 8.

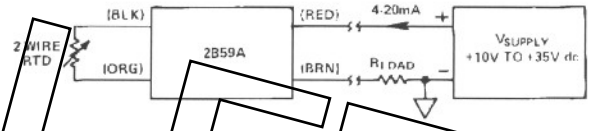


Figure 8. 2B59 Basic Application

CALIBRATION

1. Connect the transmitter as shown in Figure 8. Substitute a resistance standard for the RTD and use a load resistor for the appropriate power supply voltage, as specified by the load resistance equation.
2. Determine minimum and maximum resistance values of sensor being used from standard resistance/temperature tables. (For example, for a 100 Pt sensor, a measurement range of 0°C to +100°C corresponds to the resistance range of 100.0 Ω to 138.50 Ω.)
3. Connect required minimum input resistance standard. Adjust ZERO potentiometer, if necessary, to obtain an output of 4 ±0.016 mA.
4. Connect required maximum input resistance standard. Adjust SPAN potentiometer, if necessary, to obtain an output of 20 ±0.016 mA.
5. Repeat Steps 3 and 4 until readings converge.

2B Series

2B SERIES ORDERING INFORMATION

2B24 LOOP POWERED ISOLATOR	Model Number
4–20 mA input, 4–20 mA output, 1500 V isolation	2B24A
4–20 mA input to 4–20 mA output, or 10–50 mA input to10–50 mA output, 1500 V isolation	2B24B

2B52 AND 2B53 THERMOCOUPLE TEMPERATURE TRANSMITTER	
Two-wire, 4–20 mA output, isolated input	2B52A-1-X-XX 2B52-CUSTOM
Same as 2B52A, nonisolated input	2B53A-1-X-XX 2B53-CUSTOM

Ordering Convention: 2B52A and 2B53A

MODEL – 1 – X – XX

Select Model
- 2B52A
- 2B53A

Select Housing
- 1 - Standard Enclosure

Select Thermocouple Type
- J, K or T

Select Temperature Range
- 01 through 06

No.	Thermocouple	Temperature Range	
01	Types, J, K, T:	–100°C to +300°C	(–148°F to +572°F)
02	Type T:	0°C to +200°C	(+32°F to +392°F)
03	Type J:	0°C to +500°C	(+32°F to +932°F)
04	Type K:	0°C to +600°C	(+32°F to +1112°F)
05	Type J:	0°C to +750°C	(+32°F to +1382°F)
06	Type K:	0°C to +1000°C	(+32°F to +1832°F)

CUSTOM RANGING

ORDERING EXAMPLE:	2B52-CUSTOM
THERMOCOUPLE TYPE:	T
TEMPERATURE RANGE:	–50°C to +150°C

NOTES
When ordering a "_CUSTOM" range, it is necessary to consult the appropriate thermocouple table to determine a temperature span that provides at least 5 mV.

Custom ranges can be ordered for thermocouple types J, K, T, E, R, S and B.

2B57A-1 TWO-WIRE TEMPERATURE TRANSMITTER	
For use with AD590	2B57A-1

2B58 RTD LINEARIZED TEMPERATURE TRANSMITTER	Model Number
Two-wire, linearized, platinum RTD input, 4–20 mA output	2B58A-1-1-XX 2B58-CUSTOM

Ordering Convention: 2B58A

2B58A – 1 – X – XX

Select Housing
- 1 – Standard Enclosure

Select Sensor Type
- 1 – 100 Ω Platinum, α = 0.00385

Select Temperature Range
- 01 through 04

No.	Temperature Range	
01	–100°C to +100°C	(–148°F to +212°F)
02	0°C to +100°C	(+32°F to +212°F)
03	0°C to +200°C	(+32°F to +392°F)
04	0°C to +400°C	(+32°F to +752°F)

CUSTOM RANGING

ORDERING EXAMPLE:	2B58-CUSTOM
TEMPERATURE RANGE:	–50°C to +150°C

NOTE
When ordering a "_CUSTOM" range, it is necessary to consult a 100 Ω Platinum RTD table to determine a range that will provide at least a 5 mV minimum span. Also required is that the span endpoints are multiples of 10°C or 10°F, i.e., –20°C to +130°C.

2B59 RTD TEMPERATURE TRANSMITTER	Model Number
Two-wire, linearized, platinum and nickel iron RTD inputs, 4–20 mA output, surface mount	2B59A-0-X-XX

Ordering Convention: 2B59A

2B59A – 0 – X – XX

Select Enclosure
- 0 - Module

Select Sensor Type
- 1 – 100 Ω Platinum, α = 0.00385
- 2 – 1000 Ω NiFe, α = 0.00527
- 3 – 2000 Ω NiFe, α = 0.00527

Select Temperature Range
- 01 through 06

No.	Temperature Range		Sensor Types
01	–18°C to +38°C	(0°C to +100°F)	Sensor Types 1, 2
02	–7°C to +49°C	(+20°F to +120°F)	Sensor Types 1, 2, 3
03	+10°C to +66°C	(+50°F to +150°F)	Sensor Types 1, 2
04	0°C to +100°C	(+32°F to +130°F)	Sensor Types 1, 2, 3
05	–34°C to +54°C	(–30°F to +130°F)	Sensor Type 3
06	+93°C to +204°C	(+200°F to +400°F)	Sensor Type 3

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