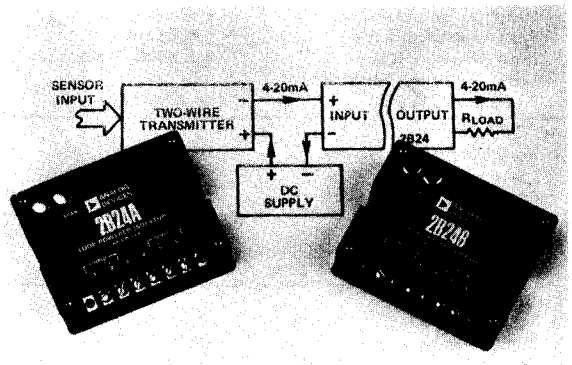
ANALOG DEVICES

Loop Powered Isolator

MODEL 2B24

FEATURES
Self-Powered
Wide Input Range: 1-50mA (2B24B)
High CMV Isolation: ±1500V pk; CMR: 120dB
High Accuracy: ±0.1%
RFI/EMI Immunity
Low Cost

APPLICATIONS
Ground Loop Elimination
Transient Voltage Protection



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GENERAL DESCRIPTION

The model 2B24 is a low cost, loop-powered isolator designed to accept input current in the range of 1-50mA and provide an isolated output current proportional to the input. The 2B24 is powered by the input signal and does not require an external power supply.

Two basic models are available for signal ranges of 4-20mA (2B24A) and 4-20mA or 10-50mA (2B24B). Both feature high accuracy (±0.1%), high input to output isolation (±1500V pk, continuous), and high CMR (120dB). 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).

A rugged metal enclosure, suitable for field mounting, offers environmental protection and screw terminal input and output connections. This enclosure may be either surface or relay track mounted.

APPLICATIONS

The 2B24 is designed to eliminate ground loop problems and high common mode noise interference in process control, monitoring and factory automation systems. It is especially useful for providing individual isolation of many current loop outputs operating from a common source of dc power.

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 20.00mA output when an input is 20.00mA.

A wide range of load resistance (up to 600Ω @ 20mA and 240Ω @ 50mA) 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 desired maximum output current.

DESIGN FEATURES AND USER BENEFITS

High Isolation: Input to output isolation eliminates ground loops and allows ±1500V potential difference between the input and the output.

Loop Powered: All power required for the 2B24 is derived from the process loop, eliminating the need for an external supply and therefore reducing installation cost.

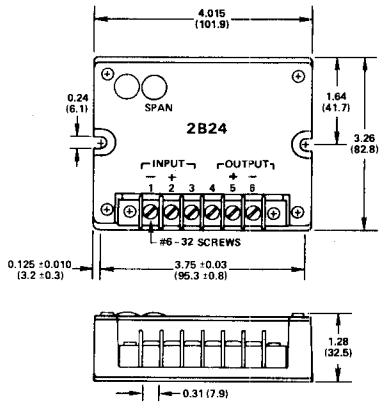
High Noise Rejection: The 2B24 features internal filtering to eliminate errors caused by EMI/RFI and line noise pickup.

SPECIFICATIONS (typical @ +25°C and I_{IN} = 20mA unless otherwise noted)

Model	2B24A	2B24B
INPUT SPECIFICATIONS		
Input Signal	4-20mA	4-20mA, 10-50mA
Maximum Input Range	1-30mA	1-50mA
Input Voltage Requirement[1]	3.5V+ I_{OUT} RL	*
OUTPUT SPECIFICATIONS		
Output Signal	4-20mA	4-20mA, 10-50mA
Maximum Output Range	1-30mA	1-50mA
Span Adjustment Range	±3% of Span	*
Load Resistance Range	0 to 600Ω @ 20mA	0 to 240Ω @ 50mA
Load Resistance Change Effect per 10Ω Change	±0.15% of Span	*
ACCURACY		
Total Output Error[2]	±0.1% @ R_L = 300Ω	±0.1% @ R_L = 120Ω
Linearity	±0.05% @ R_L = 300Ω	±0.05% @ R_L = 120Ω
Span Stability vs. Temperature	±0.01%/°C	*
ISOLATION		
CMV, Input to Output, Continuous	±1500V pk	*
Common Mode Rejection @ 60Hz	120dB @ R_L = 300Ω	120dB @ R_L = 120Ω
ENVIRONMENTAL		
Temperature Range, Operating	-30°C to +85°C	*
Storage Temperature Range	-55°C to +125°C	*
Humidity Effect, Span Error[3]	±0.2% of Span	*
RFI Effect (5W @ 470MHz @ 3 ft.) Error	±0.5% of Span	*
PHYSICAL		
Case Size	4" X 3.25" X 1.25"	*
Weight	8.5 oz (240g)	*

NOTES
[1] Includes 3.5V plus voltage drop across output load.
[2] Accuracy is specified as a percent of output span and includes combined effects of repeatibility, hysteresis, and linearity.
[3] Per MIL-STD-202, Method 103.
*Specifications same as 2B24A.
Specifications subject to change without notice.

OUTLINE DIMENSIONS (MAX)
Dimensions shown in inches and (mm).



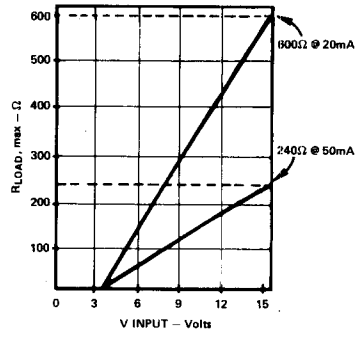


Figure 2. Required V_{INPUT} vs. R_{LOAD} (max) - 2B24A & B

BASIC APPLICATIONS

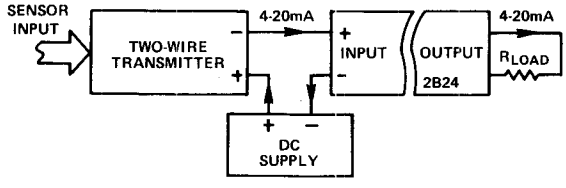


Figure 1a. Two-Wire Transmitter Application

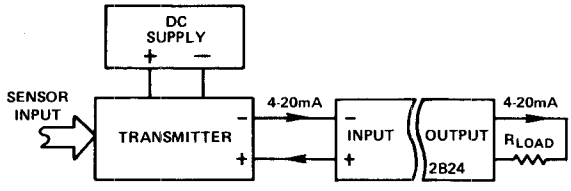


Figure 1b. Four-Wire Transmitter Application