RTD/Potentiometer to DC Converter

Description

The group 4003 accepts resistive input signals and produces voltage or current analog output signals. The input to the device may be any type of RTD, potentiometer or pair of differentially connected RTD's. Automatic lead length compensation is provided for 3 wire RTD's.

The circuits are encapsulated in a vacuum degassed compound and sealed within a module shell. The modules can be repaired at the factory.

Within the group 4003, there are options for 2-wire and 4-wire system requirements. These options are denoted by the number 4003 suffix as described under Product Description in the AGM 'Product Index'.

Operation

2-wire

It is a potted unit impervious to moisture within a metal case. Its ambient temperature range is from (-) 40 deg. C TO (+) 80 deg. C.

The input circuits feature extremely low drift and low power precision monolithic amplifiers. The circuits are temperature compensated under extreme laboratory conditions. Linearization is a standard feature for platinum RTD devices to be used. Linearization data is traceable to an NIST standard. The high performance isolation circuits (1,000 volts Peak to Peak) are extremely linear. (0.1% over the operating temperature range). The unit is insensitive to radio frequency interference since attenuation is in excess of 110 dB for HF, VHF,and UHF.

Extremely narrow (1 ohm) span input signals can be specified with any offset requirement for 4/20mADC output signals.

The isolation circuitry emphasizes extremely reliable integrated and hybrid circuit designs.

The input amplifier and output drivers circuits are protected from accidental 117 VAC connection.

RFI protection is provided inherently unique circuit designs and selected by-pass capacitor locations.

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Lift off voltage   : 11 VDC
Supply voltage     : 11 to 90 vdc
Excitation Current :  1 mADC
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4-Wire

Isolation between the prime power and both input and output signals is standard. Isolation between input and output is optional.

The module is powered by 24 VDC. An internal power supply isolates the input and output from the 24 VDC power. For 115 VAC operation, a separate 115 VAC/24 VDC power supply module is provided which mounts on the same chassis as the function module.

The precision constant current source used to excite the resistive device produces a current of less than 3 mA for a 100 ohm RTD which minimizes the effect of the excitation current (self heating) on the measured parameter.

For input/output isolated models, the output signals of the buffering and scaling amplifiers are converted to a frequency by a precision linear VCO over a very wide dynamic frequency range. The frequency is coupled to the output side through an optical isolator. The frequency is then converted to a corresponding analog signal and applied to the input of a line driver. For milli-amp outputs, automatic load compensation due to changes in loop resistance using a constant current differential operational amplifier circuit is standard.

The circuits on the input and output sides of the photo-coupler have independent +/- 15 VDC power supplies. These independent supplies are derived from a miniature power supply within the module. The miniature supply consists of a 3-winding transformer: one primary and two secondaries. The primary is driven by a 24 vdc input that is chopped at 30KHZ. The output of each secondary is rectified, filtered and regulated with a dual tracking IC regulator. One +/-15 supply operates all input circuits and the other +/-15vdc operates the output circuits.

General Specifications

Input 1. Any RTD (100,200,300 ohm Platinum, 5 ohm copper, 500 ohm nickle, etc.)
2. Any value of potentiometer

Output Any instrumentation signal specified. (4/20mA,10/50mA, 1/5 VDC, 0/10 VDC etc)

Accuracy 1. -0.2% of full-scale over -30° to +50° C temperature range.
2. Calibration to +/-0.1%. +
3. Repeatability better than -0.1%

Adjustability Screwdriver offset and span adjustments. Range of adjustment is contingent upon input signal span and offset requirements.

Power 4-wire only. Module power requirements are 24vdc +/- 10% regulation with a maximum of 3 watts. Input and output signals are isolated from 24vdc are provided by a DC/DC/DC power supply within the module.

Physical EIA rack, TA panel, PTA dust enclosure, HPM, DIN, AUX or NEM mounting options are available. Refer to the 'Enclosure/Assembly Data Sheet' for dimensions.