P290MV PNEUMATIC-TO-VOLTAGE TRANSMITTER

The P290MV is totally solid-state, Pneumatic-to Voltage Transmitter. Due to conservative design, extensive testing, and 100% burn-in these units may be expected to operate reliably with virtually no maintenance when properly installed and calibrated.

CAUTIONS

1. Only clean, dry instrument air should be used with this transmitter. Chemical corrosives can cause damage to the sensor if present in the input signal air.

2. These units can withstand an overpressure of three (3) times the rated full scale without recalibration and four (4) times the rated full scale without damage to the transmitter. Do not apply over four (4) times the rated full scale pressure to the P290MV.

3. A maximum of 100 VDC can be tolerated at the input terminals of the device indefinitely, although operation within published specifications is only guaranteed with power supplies between 10 VDC and 42 VDC.

4. The P290MV should not be subjected to ambient temperatures greater that 180 F or less than -40 F.

The above CAUTIONS represent virtually all of the usage constraints associated with the Model P290MV Pneumatic-to-Voltage Transmitter. There are very few conditions that can cause damage to these reliable units. Proper attention to the installation, wiring and calibration procedures which follow can insure years of trouble-free service from your P290 system.

FUNCTIONAL DESCRIPTION

Each P290MV module contains only thirteen (13) semiconductor components: One (1) linear integrated circuit, three (3) transistors, eight (8) diodes, and an integrated-circuit, strain gage transducer. Functionally, the circuit is composed of five (5) major segments and is shown in Figure 1. The low-power, precision voltage source supplies a stable and hightly regulated reference to the remainder of the circuit. A voltage source drives a strain gage transducer which has the configuration of a Wheatstone Bridge. Upon the application of pressure, a force and resultant strain is induced in the transducer, unbalancing the bridge. The differential voltage thus obtained is amplified before being summed with a zero reference voltage in the output voltage source amplifier. Span and Zero are adjustable by means of multiturn potentiometers and are substantially non-interactive.

WIRING

Figures 2 and 3 show the wiring connections to be made to the P290MV transmitter. The P290MV is a "floating" transmitter and consequently may tolerate a single ground anywhere in the 4-wire loop. An earth ground can be placed on either end of the load. Many users prefer to earth the negative terminal of the supply. Care must be taken to insure that the polarity of the input connections is correct regardless of where the ground is placed. An inadvertent reversal of wiring polarity will not damage the P290MV, but it will not function until wiring is correct. Any resistive load greater than 5000 ohms may be used across the output.

Shown in Figure 3 is the proper wiring of the optional alarm output. When powering with a P290S1 power supply, only 300 mA of total alarm current is available. Consequently alarm usage is not encouraged when powering with a P290S1 unless alarm load currents are quite low and do not total more than 300 mA when all are energized.

The alarm output is an open collector, PNP transistor which is current-limited to provide up to 100 mA of alarm signal to an alarm load returned to supply negative. The DC resistance in ohms of the alarm load must be greater than ten times the supply voltage. For example, if a 24VDC supply were used, the minimum alarm load would be 240 ohms. A leakage current of no greater than 120 microamps will always be sourced by the alarm output, even in the unactuated state. This current will flow in the alarm load but is not sufficient to cause confusion with actual alarm-condition current.

For proper setting of the trip point utilizing the LED to indicate alarm condition, the alarm output must be terminated in a load---otherwise the LED will be energized continuously. For an inductive load such as a relay or solenoid, a diode must be provided by the user as shown in Figure 2 to guarantee failure-free operation of the alarm circuitry. An inexpensive, industry-standard, rectifier diode such as one from the IN400X family (e.g. 1N4003) is adequate for this purpose.

CALIBRATION

All P290MV Pneumatic-to-Voltage Transmitters are fully calibrated at the factory to the conditions stipulated in the user's order. However, it may be advisable to recalibrate the unit after shipment to maintain the specified accuracy.

The P290MV has two (2) potentiometers, Span and Zero, to enable the user to effect calibration in the field. These controls are multiturn devices with slip clutches at the extremes of travel, and they nominally provide more that $\pm$ 10% of span adjustability. Both potentiometers cause the output voltage to increase when turned clockwise.

Once all wiring has been completed and the signal air connected, the unit is ready for calibration. Using an accurate voltmeter across the output-monitoring terminals or across the load, monitor the output for changes in input air pressure.

1. Apply zero-scale pressure to the input and adjust Zero until the output reads the desired zero-scale voltage.
2. Apply full-scale pressure to the input and adjust Span until the output reads the desired full-scale voltage.
3. Repeat Steps 1 and 2 once again only because a 1% interaction due to resistor tolerances may have affected the calibration slightly.