

Flowing Temperature Transducers, -50°F. to +150°F.

- (1) Computers Incorporated Model 30707-10 using Charles Ingelhard Inc. resistance thermometer No. 30707-10A, 50.0 ohms resistance at 32°F., or
- (2) West Instrument Corporation resistance thermometers, Models AA-0070, AA-0071, AA-0072 with explosion-proof housing, Models AA-0073, AA-0074, AA-0075 with non-explosion-proof housing. Resistance of all models 120 ohms at 32°F. Changing from one to the other requires that two resistors be changed in the Computer plug-in adapter unit.

Description: The type D2T differential pressure transducer consists of a diaphragm of stainless steel or teflon-coated glass fabric mechanically coupled to the movable core of a differential transformer, the output of which is connected to the computer.

The static pressure transducer is a potentiometer, the arm being connected to a Bourdon tube so that changes in pressure cause changes in the position of the movable arm. The output is connected to the computer.

The flowing temperature transducer is a resistance thermometer in a housing or probe inserted in the flowing fluid so that changes in temperature are reflected as changes in the resistance of the element, which are fed into the computer.

The computer is designed to receive the outputs from 1) the differential pressure transducer, 2) the static pressure transducer, and 3) the flowing temperature transducer and combine them electronically to solve the flow equation -

$$\text{Flow} = C'' F_{tf} \sqrt{h_w P_f}$$

where F_{tf} is the flowing temperature compensation factor, h_w is the differential pressure across the orifice, P_f is the static pressure in the line. The flow coefficient C'' is inserted into the computation by means of a plug-in adapter unit and is the product of the basic orifice factor, Reynolds number factor, expansion factor, pressure base factor, temperature base factor, specific gravity factor and super-compressibility factor. For a single orifice installation, the value of C'' is supplied by a standard plug-in adapter unit. A universal adapter unit is available for measurement problems requiring the use of different sizes of orifice plates. With this unit, a computer factor F_c is provided for each particular orifice installation and is obtained from a set of curves. This factor F_c is set on a dial on the front of the computer. The "Flow" solution of the equation is indicated on a small meter on the computer as a percentage of maximum flow, and also appears as an electrical pulse for a pre-selected volume in standard cubic feet, which pulse operates a mechanical counter on the front of the computer to give a visual indication, and a telemetering reading by up to 4 sets of electrical contacts.

Approval is granted for 18 variations of Model 257 Flow Measuring System available for operation from either AC or DC. The varieties of

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