PRODUCT SPECIFICATION AND MODEL SELECTION GUIDE

DESCRIPTION

Automat Displacement type Level Transmitter is designed to sense Liquid level, Interface and Specific Gravity. The output of the Instrument is proportional and is designed to measure and transmit electrical signal proportional to changes in Liquid level or Specific Gravity.

The V. Automat series 401E measures changes in Liquid Level, Specific Gravity or interface Level and transmits a current output signal proportional to the change in the process parameter. The change in the process parameter causes a change in the displacer position, which is transferred to the Torque Tube (Fig-1) producing a rotary motion. This rotary motion is transferred through bellow to lever assembly that is supported by flexure strips. Magnets attached to the lever assembly move past a Hall effect position sensor that converts the magnetic field signal to an electrical 4-20mA signal.

The Transmitter has been provided with magnet setting knob which can be used to adjust setting of magnet in relation to hall effect sensor. Magnet setting knob can also be used to check for fault finding between Mechanical system & electronic system. The magnet sensing knob allows to find out problem without removing the transmitter or field wiring cover or the signal Conditioner Cover. The above adjustment does not require raising or lowering of the level. This facility is only available in Automat displacement type level transmitter.

INTRODUCTION

Automat Displacement level transmitter consist of certified electronic. This assembly along with hall effect sensor makes complete level transmitter. SMART displacement level transmitters are microprocessor based instruments that combine the analog signal advantages (4-20mA) together with the flexibility of digital communication using HART® protocol/Foundation Field Bus (FF). Displacement level Transmitter can be configured by using universal Hand Held HART communicator (HHC) or by Computer (PC) with dedicated software. The facility of Automat design is easy calibration by any of the three different methods i.e. HHC as well as by PC with Dedicated software and by push button.

PRINCIPLE OF OPERATION

A Level density, or interface level change in the measured fluid causes a change in displacer position. This change is transferred to the Torque Tube assembly. As the measured fluid changes, the Torque Tube assembly rotates upto 3.7 degrees changing the transmitter output between 4 and 20mA.

The rotary motion is transferred to transmitter lever assembly (via a bellow) supported by flexure strips.
The rotary motion moves a magnet attached to the lever assembly, changing the magnetic field that is sensed by Hall effect position sensor. The sensor then converts the magnetic field signal to an electronic signal. The electronic signal is ambient, temperature compensated and amplified by the differential amplifier. The low pass filter dampens the effects of process turbulence and prevents saturation of the dc amplifier and the current driver.

The current driver circuit develops 4 to 20mA current output signal proportional to the dc amplifier voltage output. The voltage regulator provides the regulated voltage needed by the transmitter. Circuits within the transmitter provides Reverse polarity protection, Transient power surge protection, and Electromagnetic interference (EMI) protection.

**Note:** Both the Series/Model No. i.e 401ES and 401E are for displacement type level Transmitter smart with HART protocol.

**SPECIFICATIONS:**

- **Displacer length:** Refer ordering information on page 3
- **Input Signal:** Liquid level or liquid to interface level: From 0 to 100% of Displacer length
- **Min. Differential:** 0.3 to 1.2 (with Standard Displacer) & 0.2 (with special displacer)
- **Output Signal:** Two Wire 4-20mA dc.
- **Output Action:** **Direct**- increasing input increases output: or **Reverse**- increasing input decreases output
- **Display:** LCD Display Meter
- **Reference Accuracy:** (+/-0.1% of full scale (better on request)
- **Linearity Adjustment:** 8 points through software
- **Damping:** 32sec.
- **Calibration facility:** By three methods i.e. Hand Held Communicator (HHC), push button & PC
- **Power Supply:** a) 35 V dc For explosion proof b) 30 V dc For intrinsically safe
- **Power Supply effect:** Negligible between 13 and 35 V dc
- **Load Resistance:** 600 ohm at 24 V dc
- **Span Adjustability:** 30 to 100% of Displacer length for level application using a standard volume displacer.
- **Zero Adjustability:** 15% of sensing element range.
- **Diagnostic of Mechanical & Electronic:** Provided
- **Cages Sensor:** Cages can be furnished in a variety of end connection style to facilitate mounting on vessels.
- **Operative Amb. Temp.:** 65°C
- **Elect. Connection:** 1/2" NPT
- **Elect. Classification:** 1. Weather proof IP 66 2. Explosion proof for group IIA & IIB cum Weather proof 3. Intrinsically safe

Fig. 1
SENSOR/CAGE SPECIFICATION

MOC: External: Carbon Steel, 304SS, 316SS, 304L & 316L.
Internal: 316SS.
Torque Tube: 316SS, 316L, Inconel, K Monel & Hastelloy.
Process Connections: S.W or Flanged.
Max. Working Pressure: 150kg/cm²
Rated Process Temp: (-)50°C to (+)350°C (Cooling fins are provided for Process Temperatures above 150°C)

Ordering Information

401E

Electrical Classification
- Weather proof
- Explosion proof
- Intrinsically Safe
- Transmitter Action
- Transmitter Direct
- Transmitter Reverse
- Style/Process Connection
  - Top Bottom
  - Top Side
  - Side Side
  - Side Bottom
  - Top Internal
  - Side Internal
- Material Of Construction

<table>
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<tr>
<th>Parts</th>
<th>CS</th>
<th>SS304</th>
<th>SS316</th>
<th>Teflon Coated</th>
<th>Inconel</th>
<th>Hastelloy</th>
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<td>B</td>
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<td>F</td>
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<td>J</td>
<td>K</td>
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Size of the Process Connection

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Displacer Length

Range: 100mm (Minimum 100 mm & Maximum 6 meter)

MODEL DESCRIPTION WITH EXAMPLE - 401E- I -II -III - IV -VI

401E-E-D-III-B-F-J-N-6-356mm
401E-Smart type Displacer Level transmitter with explosion proof housing, direct action, with side-side mounting, cage, cage head, Process connection & torque tube housing of SS304 with Inconel torque tube & 316SS displacer with 2"300# process connection with range 356mm.
Replacement of only Electronic / Pneumatic unit keeping the following manufacturers: Displacement type level transmitter as it is:

HALL EFFECT SENSOR BASED TECHNOLOGY

Drawing shows that M/s. Fisher, M/s. Parcol, M/s. Motoyama, M/s. Masoneilan, M/s. Yamatake Transmitter etc. Electronic Head can be replaced with M/s. VAutomat's Electronic Head Keeping the Chamber etc as it is.

- Substitution of V. Automat Level Transmitter (Electronic) with Transmitter of above manufacturers (Electronic / Pneumatic).
- Range, Process Connection, Cage Design can be Synchronized with the Existing system and Service Conditions.

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