Capillary Fill Fluid Density Compensation

(Hart Communication)

Important

This ***Field Guide*** topic only applies to the EJX118A and the EJX438A.

For transmitters with diaphragm seals, *Capillary Fill Fluid Density Compensation* is used to compensate the zero shift caused by the ambient temperature effect on the capillary tubes. Unique among pressure transmitters, the EJX118A and EJX438A offer the customer the ability to do this compensation on site.

The following equation indicates the relationship between the calculated output value and the compensating constant K (expressed in %/DegC) with the measured ambient temperature at the capsule module.

Compensated output = output + K x T(amb)

Section 1.0 Setting the Compensation

Using a Brain Communicator, setting the Compensation requires two steps:

1. Temperature Compensation Mode Setup
2. Zero Shift Compensation Setup

Section 1.1 Temperature Compensation Mode Setup (E10: T. ZERO CMP)

The Temperature Compensation Mode needs to set to *ON*.

(See ***Figure 1***)

The Temperature Compensation function uses the built-in temperature sensor in the transmitter body to generate the T(amb)

needed in the Compensation equation. The temperature deviation between the transmitter body and capillaries should be minimized to achieve optimal performance of this function.

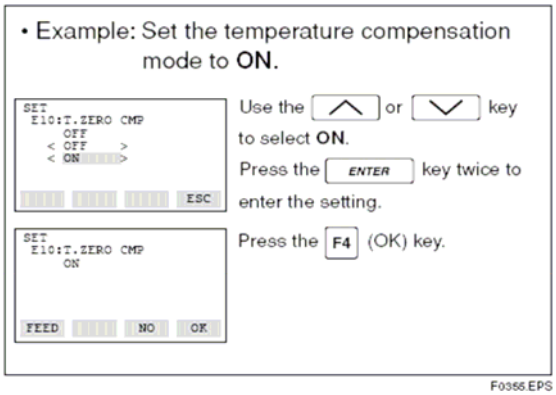

Figure 1

Section 1.2 Zero Shift Compensation Mode (E11: TEMP ZERO)

The other unit needed by the compensation equation is K (the compensating constant expressed in % / DegC). K is dependant on the installation, fill fluid, and Span. It is expressed

by the equation (a):

K = -((h x B)/Span) x 100

Where,

B = Constant value of fill fluid
(See ***Figure 2***)

Span = URV – LRV

h = Distance from the high pressure side to low pressure side (expressed in meters)

EJX118A: Distance from high-side diaphragm seal to the low-side diaphragm seal.
EJX438A: Distance from the diaphragm seal (high-side) to the position of the transmitter (low-side)
(See ***Figure 3***)

	Fill fluid code	A, C	B	D	E
Constant value [B]	mmH_2O	0.76	0.87	1.45	0.75
	kgf/cm^2	0.000076	0.000087	0.000145	0.000075
	kPa	0.00745	0.00853	0.01422	0.00736
	mBar	0.07453	0.08532	0.14220	0.07355
	atm	0.000074	0.000084	0.000140	0.000073
	inH_2O	0.02992	0.03425	0.05709	0.02953
	psi	0.00108	0.00124	0.00206	0.00167
	mmHg	0.05592	0.06401	0.10669	0.05518

T0304.EPS

Figure 2

Note

Select the unit of Constant Value (**B**) from the actual unit used for the transmitter in operation.

Obtain the K compensating value from the equation and enter the value in **E11: TEMP ZERO**.

(See ***Figure 4***)

Note

If the transmitter is re-spanned, a new K compensation value must be obtained and entered in **E11: TEMP ZERO**.

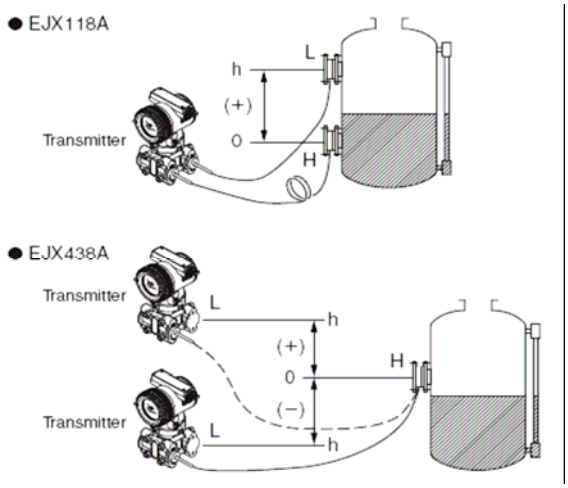

Figure 3

Note

EJX438A: When the transmitter is positioned lower than the diaphragm seal part, the value of 'h' must have a negative sign (-).

Section 2.0 Setting when shipped

The compensation is *Disabled* when shipped.

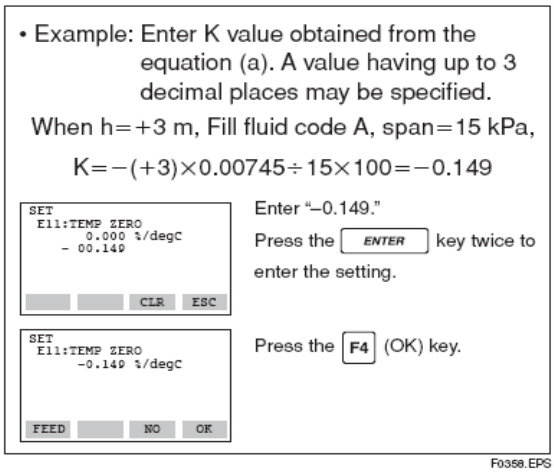
• Example: Enter K value obtained from the equation (a). A value having up to 3 decimal places may be specified.
When h=+3 m, Fill fluid code A, span=15 kPa,
K=−(+3)×0.00745÷15×100=−0.149
SET
E11:TEMP ZERO
0.000 %/degC
- 00.149
CLR
ESC
Enter "–0.149."
Press the ENTER key twice to enter the setting.
SET
E11:TEMP ZERO
-0.149 %/degC
FEED
NO
OK
Press the F4 (OK) key.
F0358.EPS

Figure 4