

Messrs.

KAZANORGSINTEZ SC

Project

KBP, 3AKA3A / KAZAN RUSSIA

Title

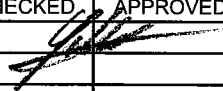
DP Transmitter (Level) Transmitter  
(Calibration Range Check List)

\* Please acknowledge receipt on the duplicate and return.

\* Please advise us of the tap position (and specific gravity) of Tank (or Vessel).

COPY	

**Azbil Europe NV**  
**Yamatake Corporation *azbil***  
 International Business Division

TOKYO		Total		XX	Sheets with Cover		
H/W ENG	REV.	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED	
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INST.							
TOTAL							

Project: KBP / 3AKA3A  
Proposal # : AEU-10-060 Rev1  
Apr. 20, 2010

Item	Index / Description	
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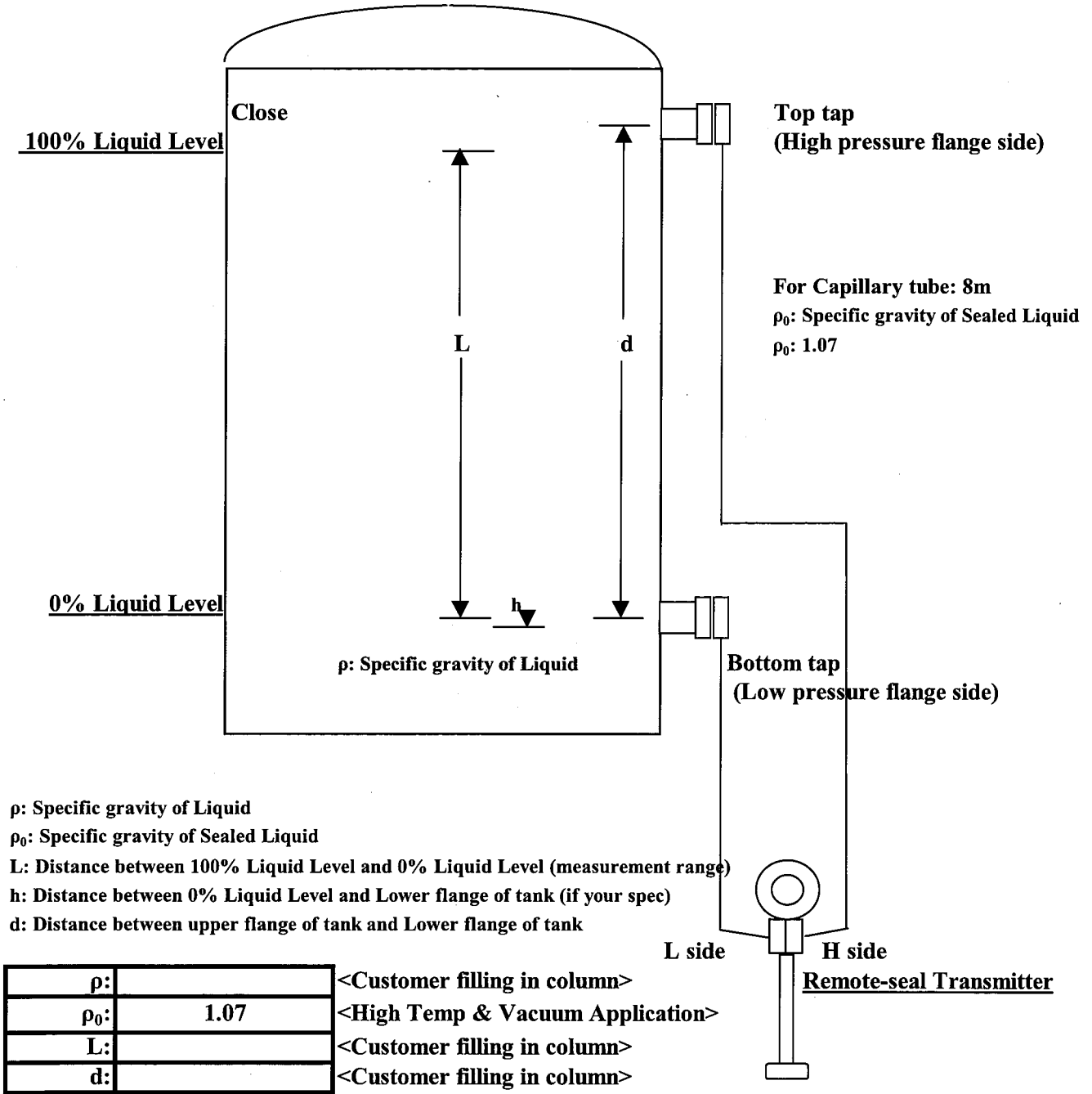
**< DP Transmitter >**

		LRV (0% Level)	URV (100% Level)
1	( 1 ) TAG. No.: B-LT-2404 ( 2 ) TAG. No.: B-LT-2405 ( 3 ) TAG. No.: B-LT2505 ( 4 ) TAG. No.: B-LT-2506		
2	( 1 ) TAG. No.: B-LT-4003 ( 2 ) TAG. No.: B-LT-4004		
3	( 1 ) TAG. No.: B-LT-4103 ( 2 ) TAG. No.: B-LT-4104		
4	( 1 ) TAG. No.: B-LT-4202		
5	( 1 ) TAG. No.: B-LT-6501		
6	( 1 ) TAG. No.: B-LT-7073 ( 2 ) TAG. No.: B-LT-7074		

**Clarification**

**\* H flange side of transmitter to upper flange mounting on tank wall.**

**(1) TAG. No.: B-LT-2404**



Differential pressure at 0% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - h \rho = \text{LRV}$

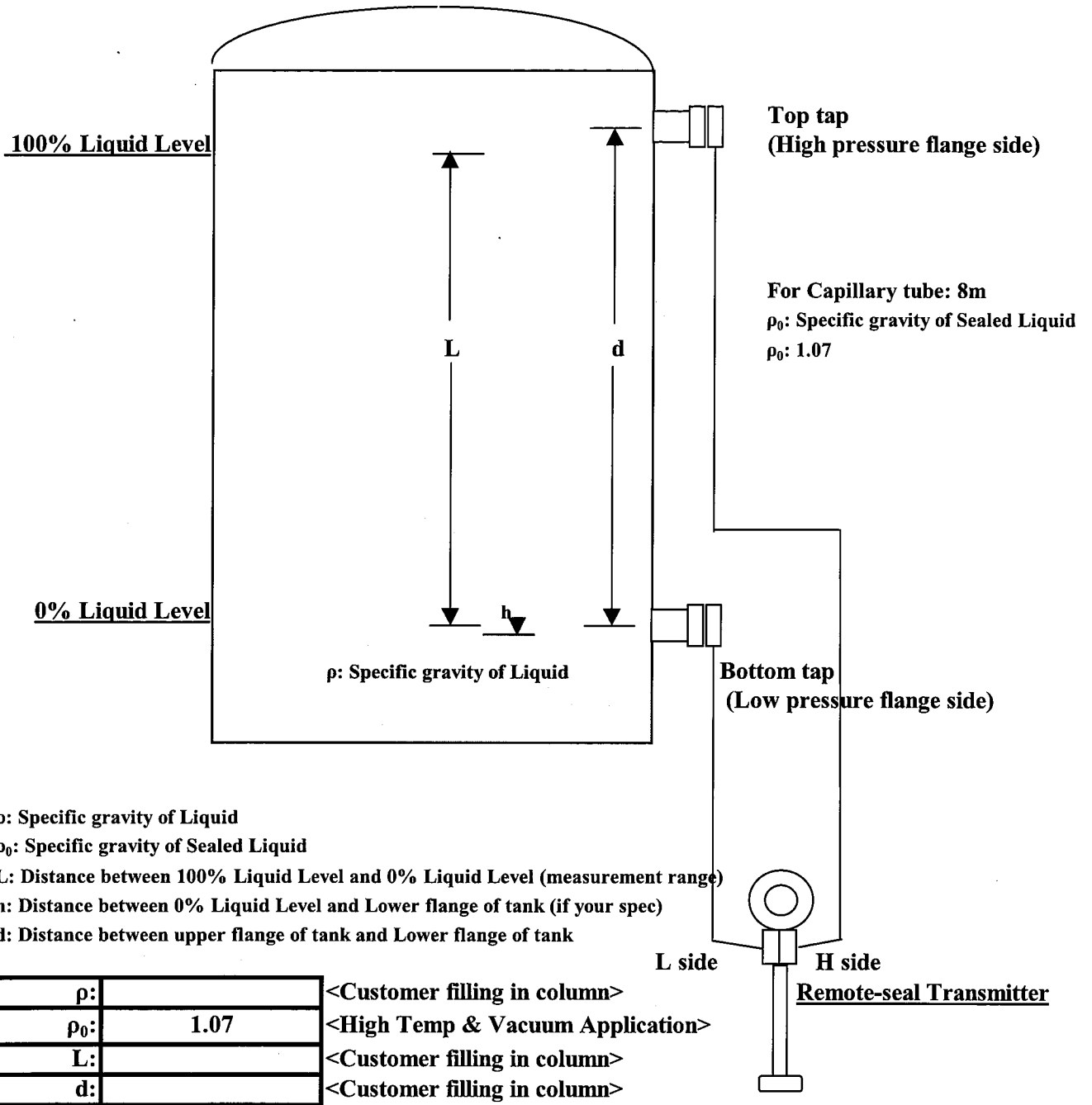
Differential pressure at 100% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - (L+h) \rho = \text{URV}$

Therefore, set range as follows

**LRV - URV =**

(For reference: 14.69kPa)

(1-2) TAG. No.: B-LT-2405



Differential pressure at 0% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - h \rho = LRV$

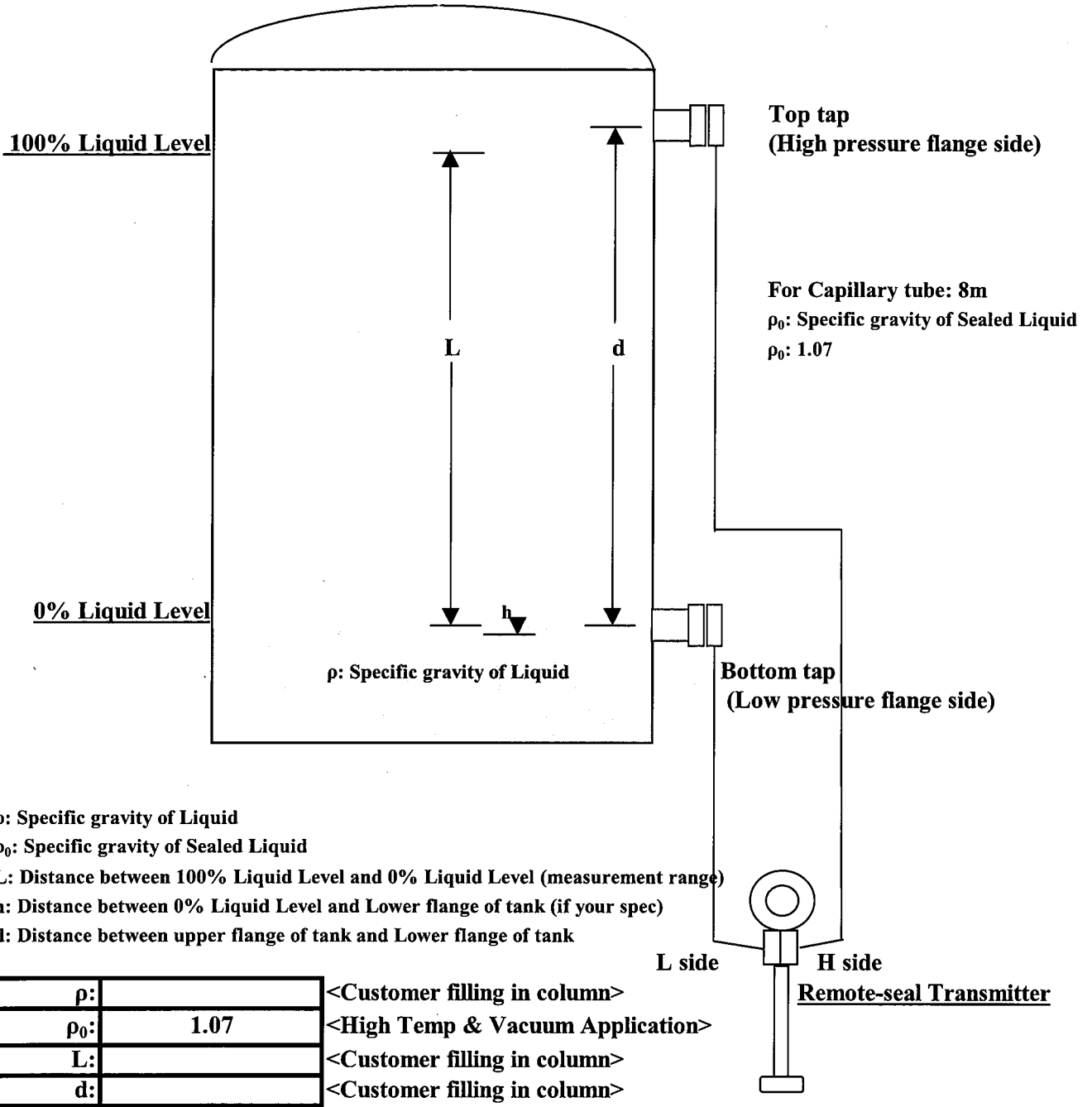
Differential pressure at 100% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - (L+h) \rho = URV$

Therefore, set range as follows

**LRV - URV =**

(For reference: 14.69kPa)

(1-3) TAG. No.: B-LT-2505



Differential pressure at 0% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - h \rho = LRV$

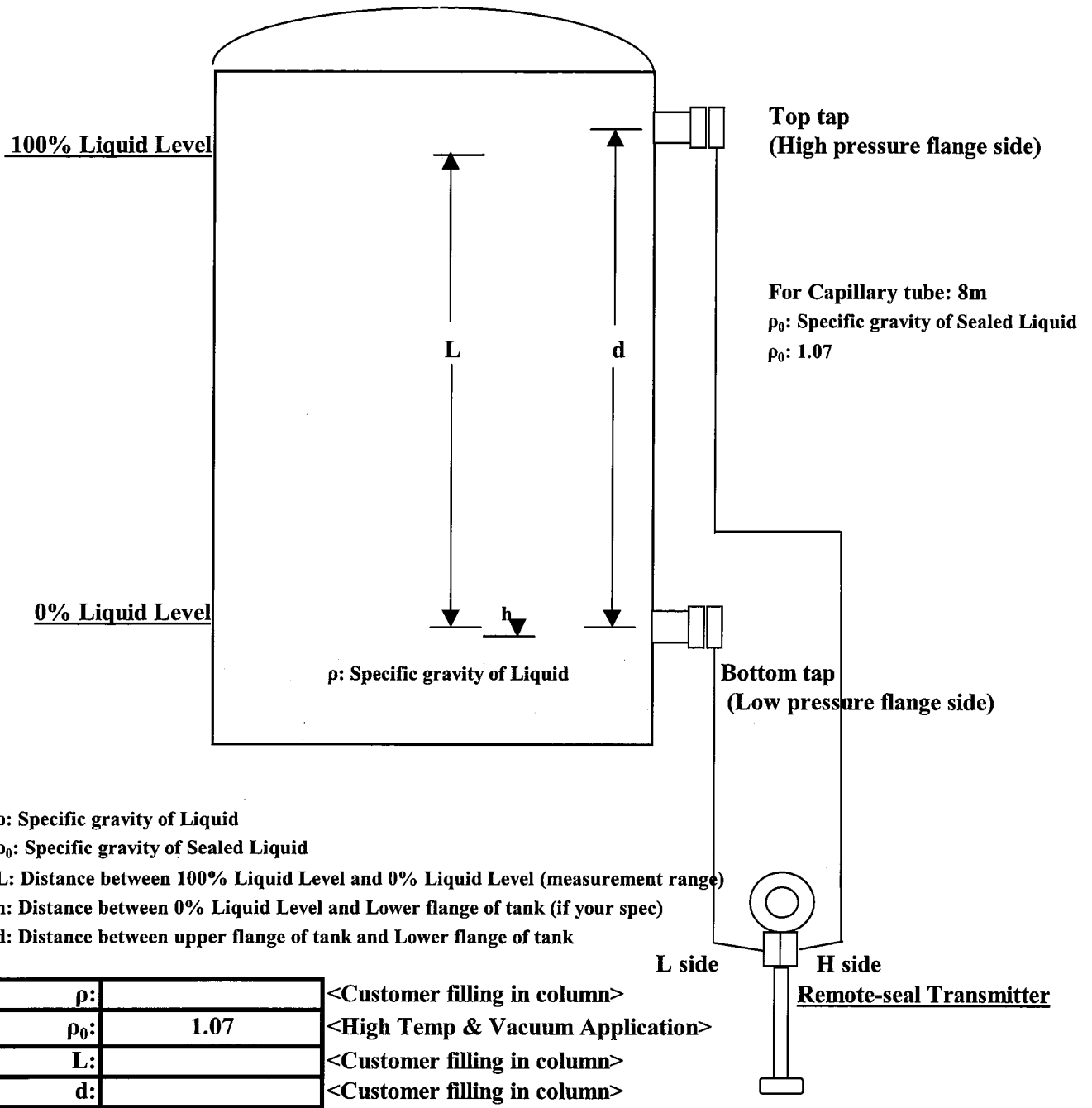
Differential pressure at 100% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - (L+h) \rho = URV$

Therefore, set range as follows

$LRV - URV =$

(For reference: 27.78kPa)

(1-4) TAG. No.: B-LT-2506



Differential pressure at 0% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - h \rho = LRV$

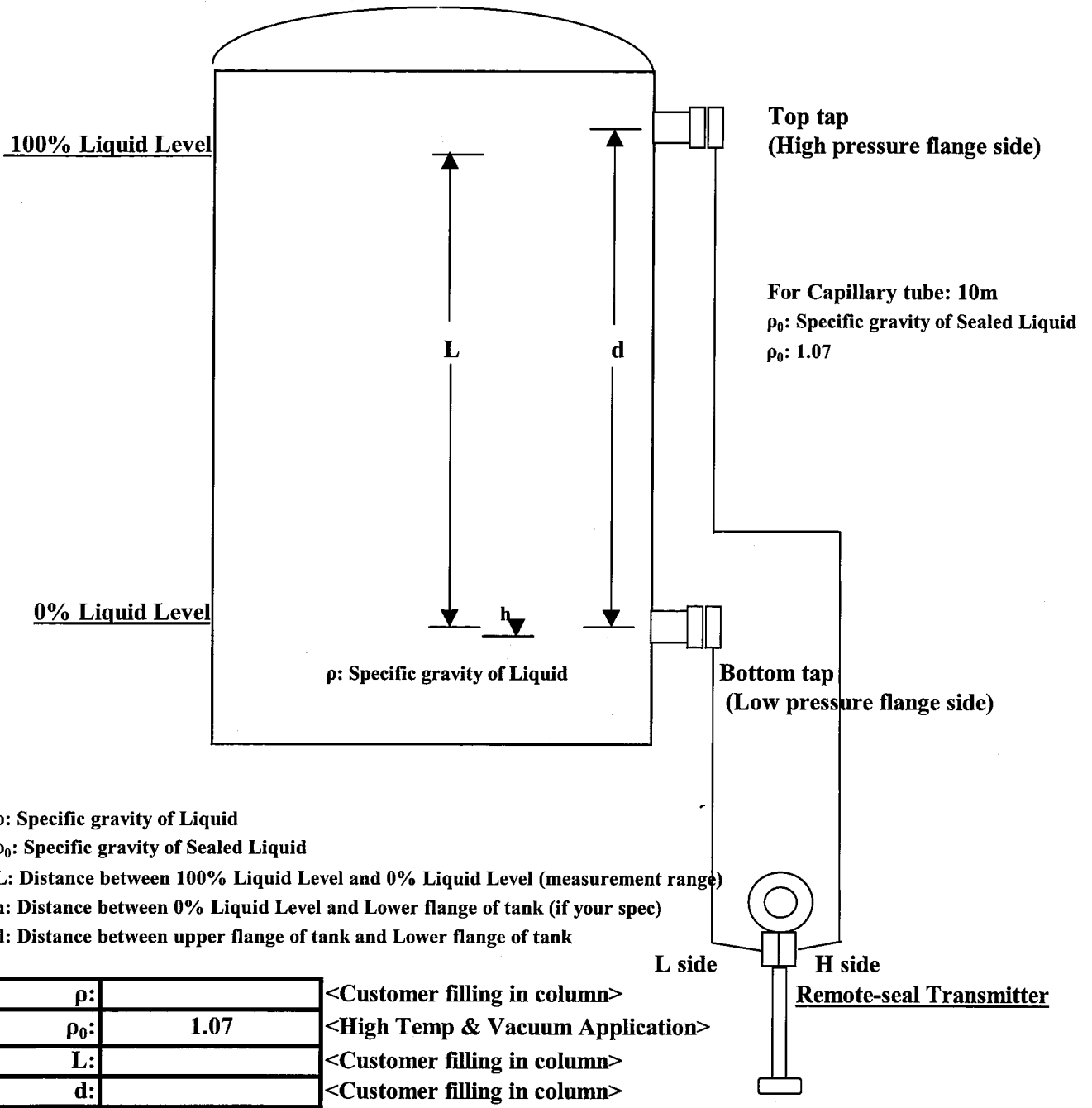
Differential pressure at 100% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - (L+h) \rho = URV$

Therefore, set range as follows

$LRV - URV =$

(For reference: 27.78kPa)

(2-1) TAG. No.: B-LT-4003



Differential pressure at 0% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - h \rho = LRV$

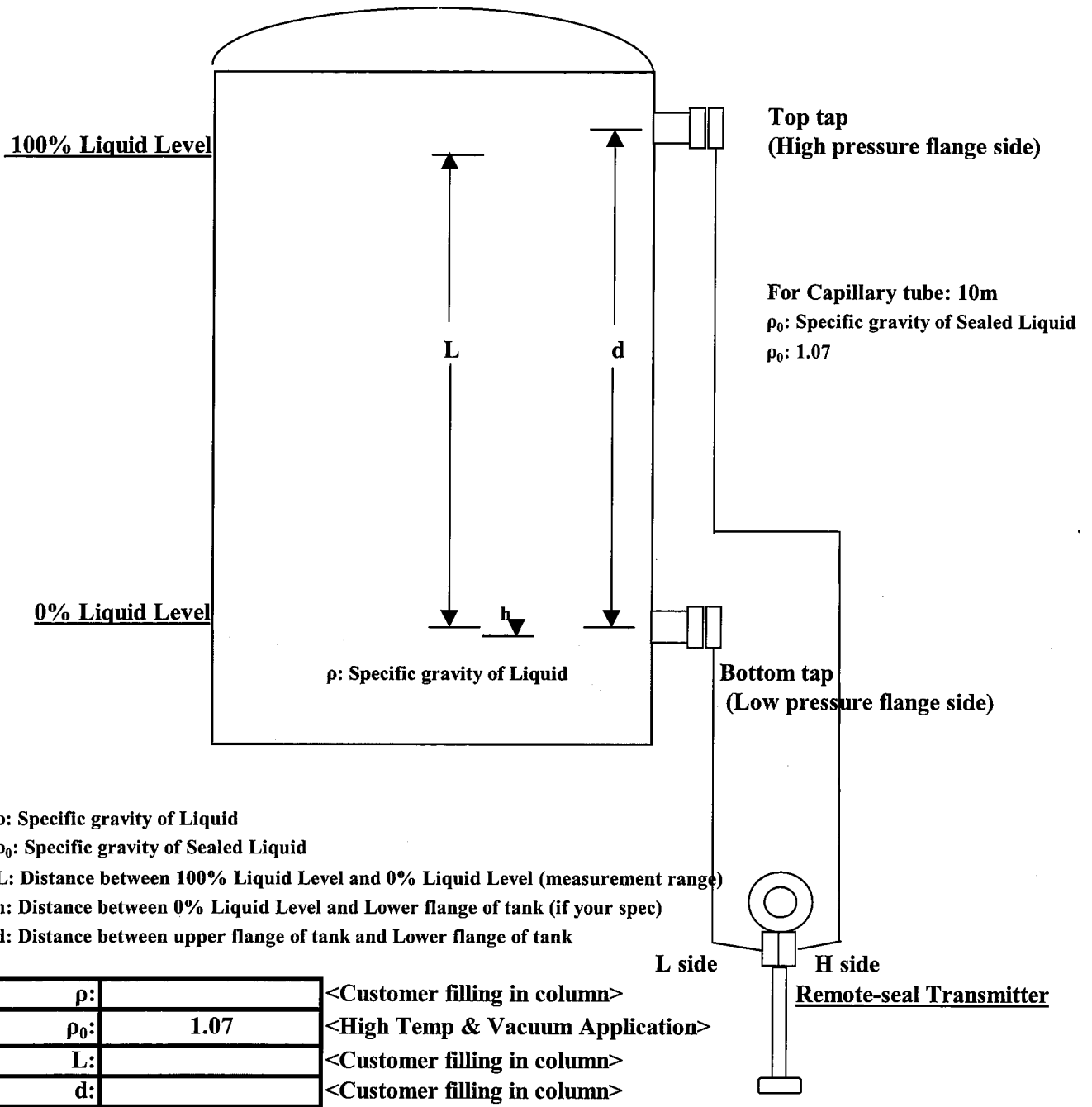
Differential pressure at 100% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - (L+h) \rho = URV$

Therefore, set range as follows

$LRV - URV =$

(For reference: 30.19kPa)

( 2-2 ) TAG. No.: B-LT-4004



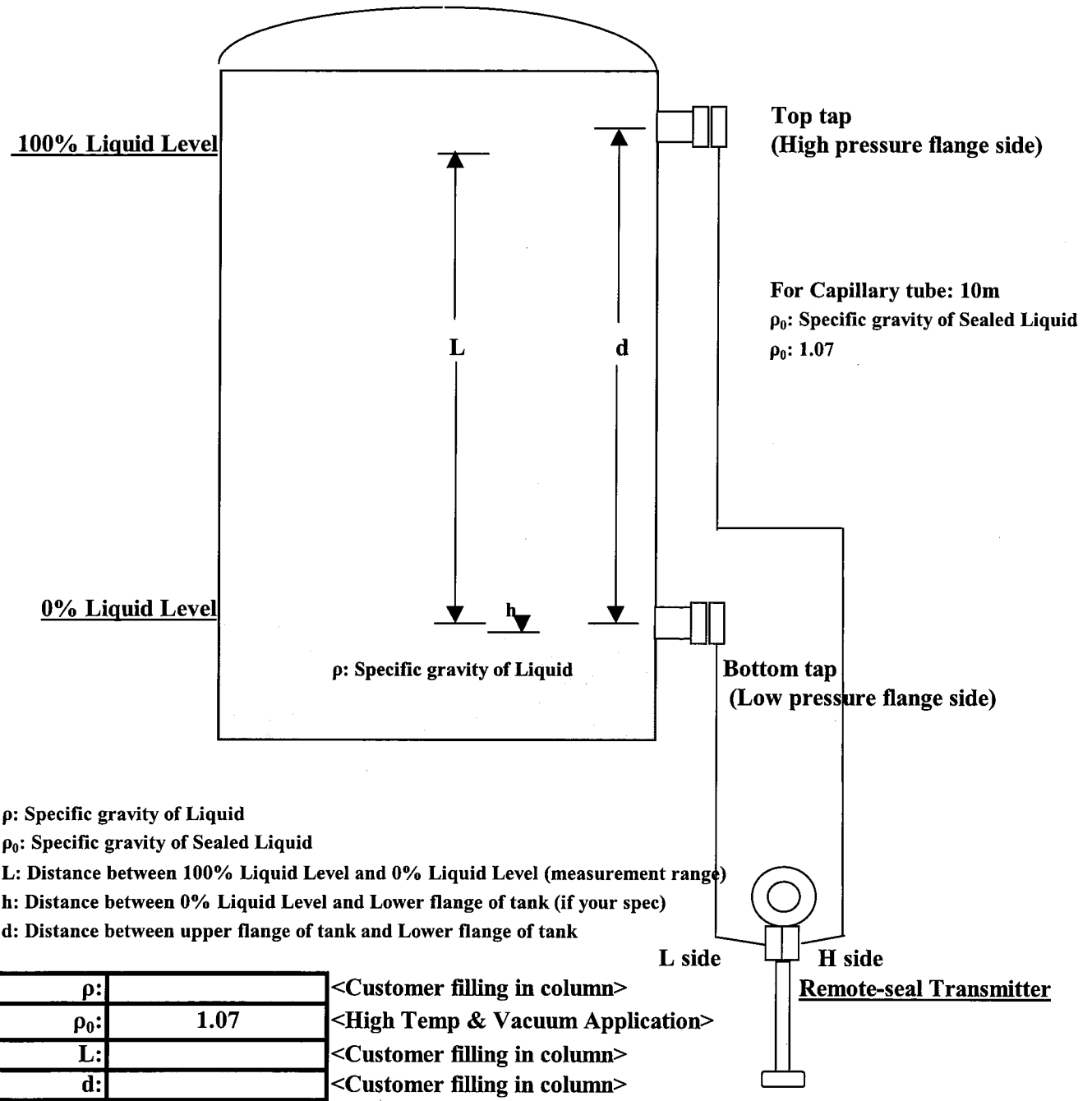
Differential pressure at 0% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - h \rho = \text{LRV}$

Differential pressure at 100% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - (L+h) \rho = \text{URV}$

Therefore, set range as follows

**LRV - URV =** (For reference: 30.19kPa)

(3-1) TAG. No.: B-LT-4103



Differential pressure at 0% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - h \rho = \text{LRV}$

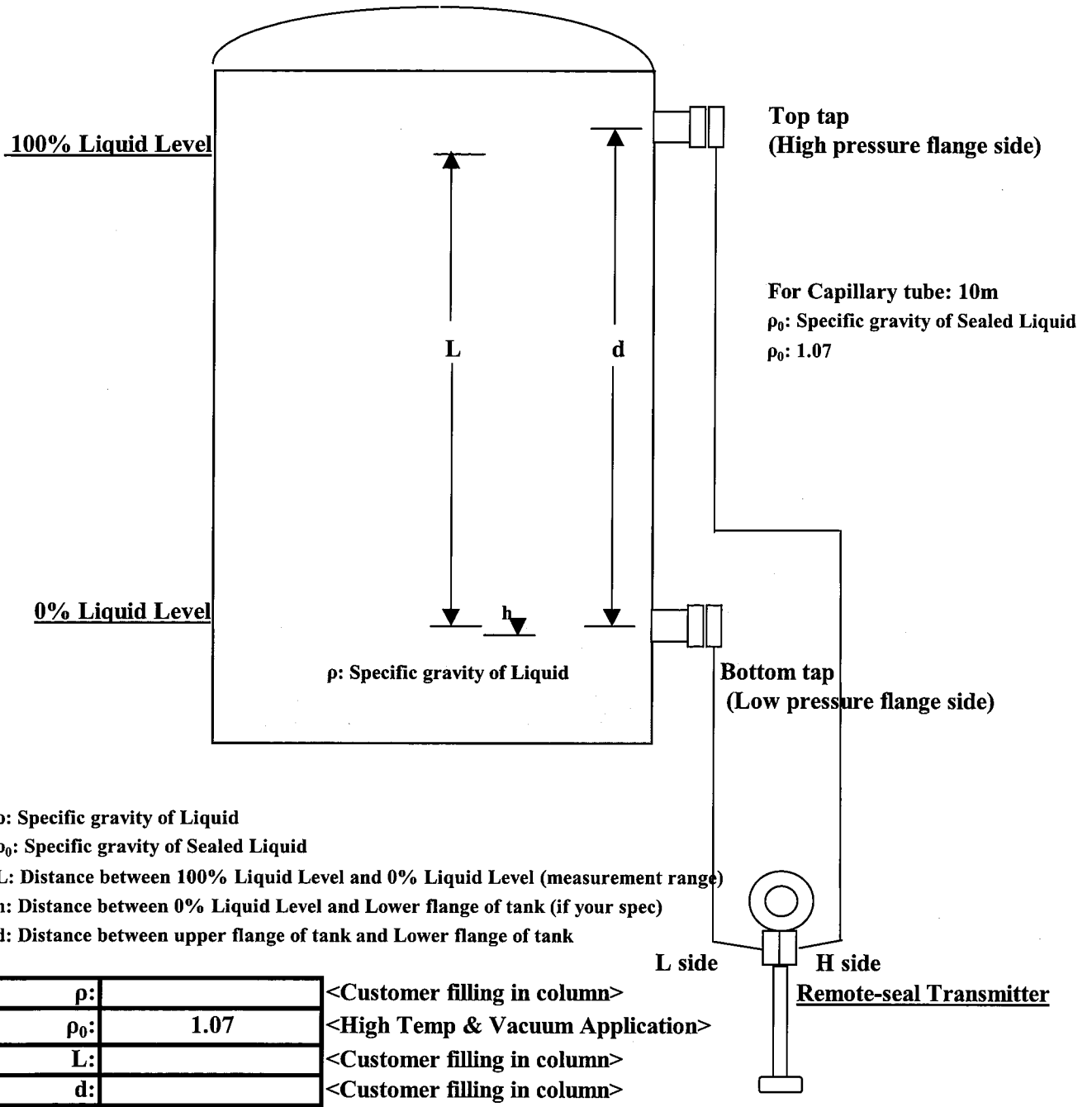
Differential pressure at 100% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - (L+h) \rho = \text{URV}$

Therefore, set range as follows

**LRV - URV =**

(For reference: 30.34kPa)

**(3-2) TAG. No.: B-LT-4104**



Differential pressure at 0% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - h \rho = \text{LRV}$

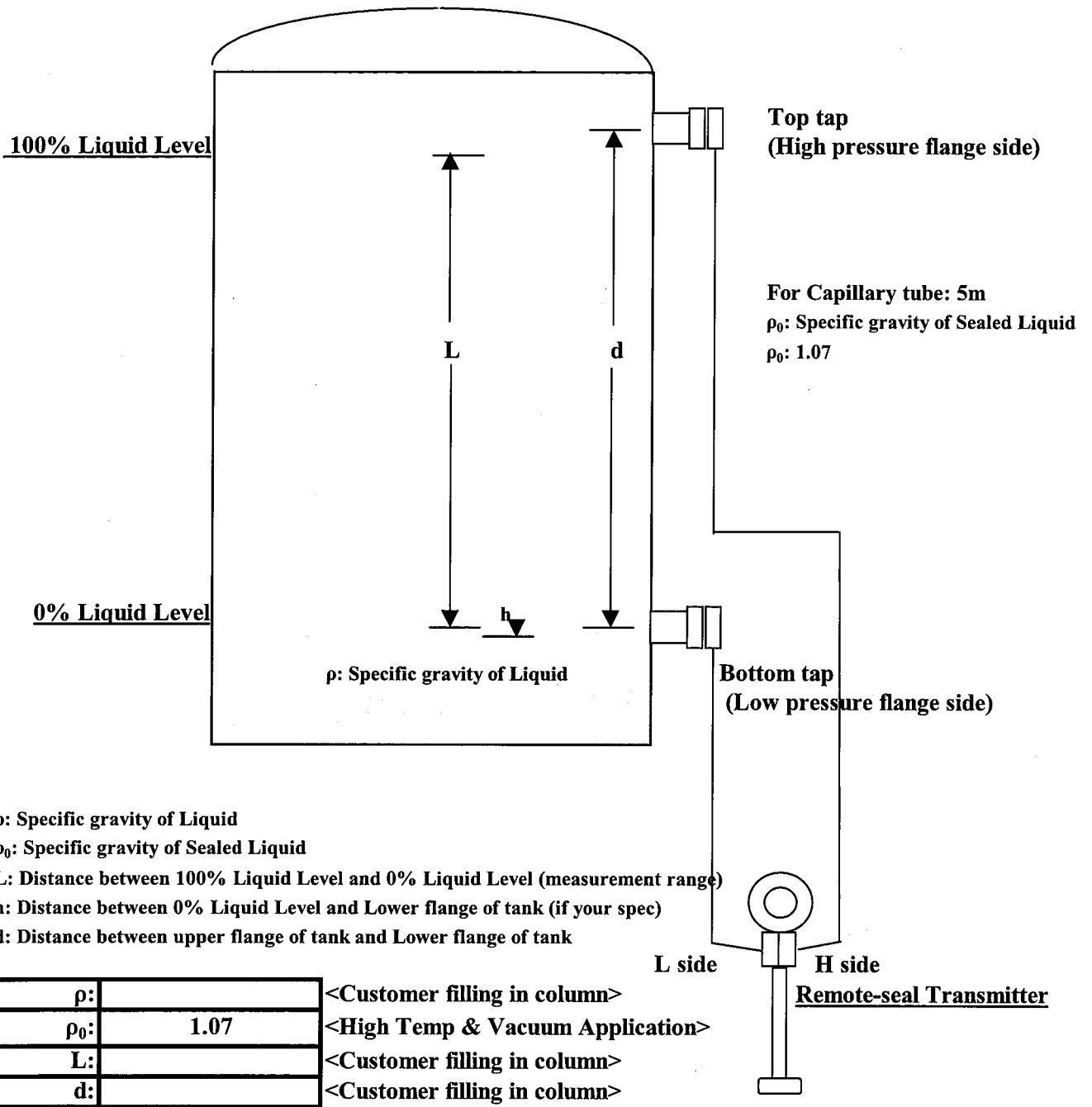
Differential pressure at 100% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - (L+h) \rho = \text{URV}$

Therefore, set range as follows

**LRV - URV =**

(For reference: 30.34kPa)

**( 4-1 ) TAG. No.: B-LT-4202**



Differential pressure at 0% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - h \rho = \mathbf{LRV}$

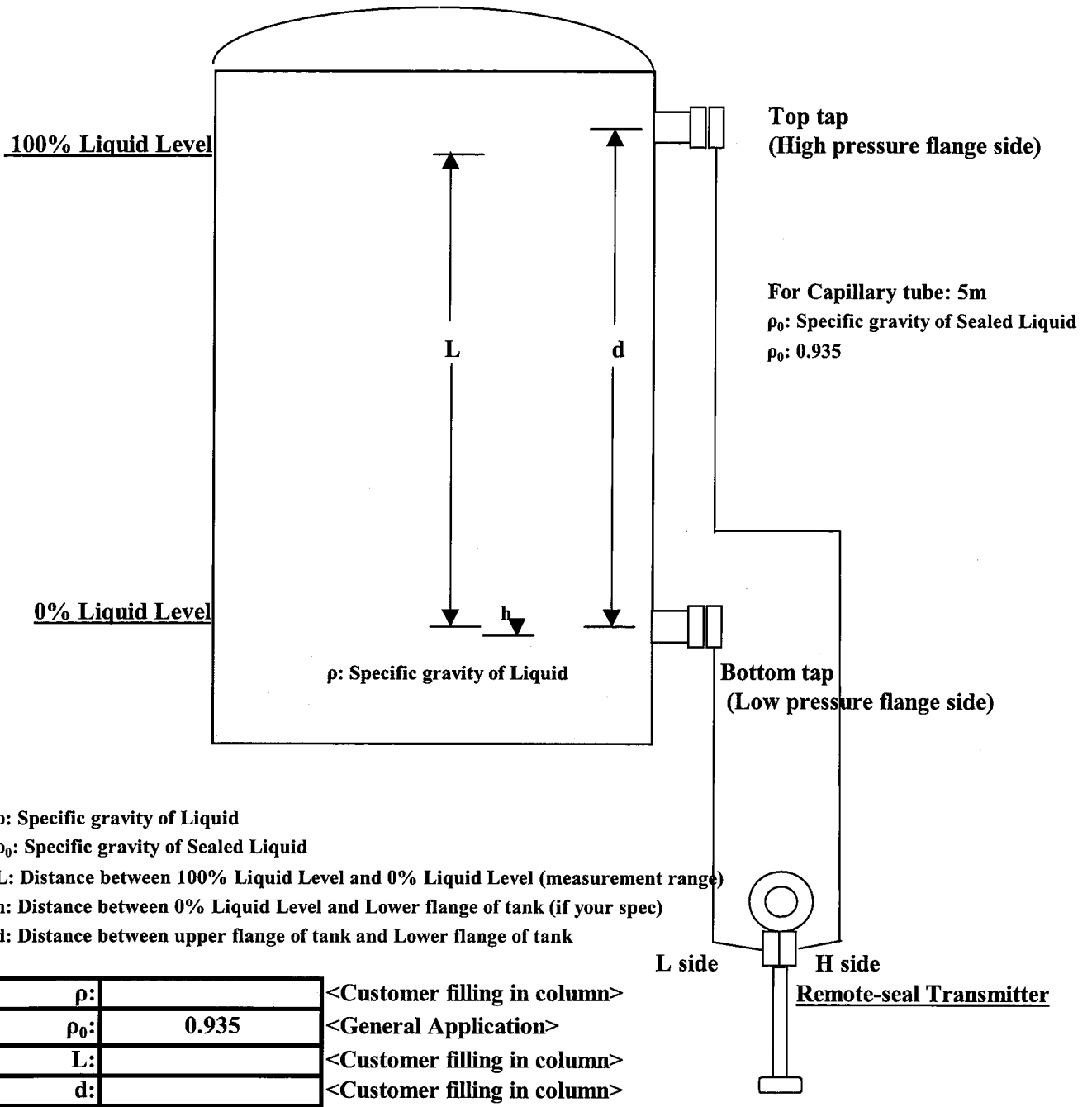
Differential pressure at 100% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - (L+h) \rho = \mathbf{URV}$

Therefore, set range as follows

**LRV - URV =**

(For reference: 14.04kPa)

( 5-1 ) TAG. No.: B-LT-6501



Differential pressure at 0% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - h \rho = LRV$

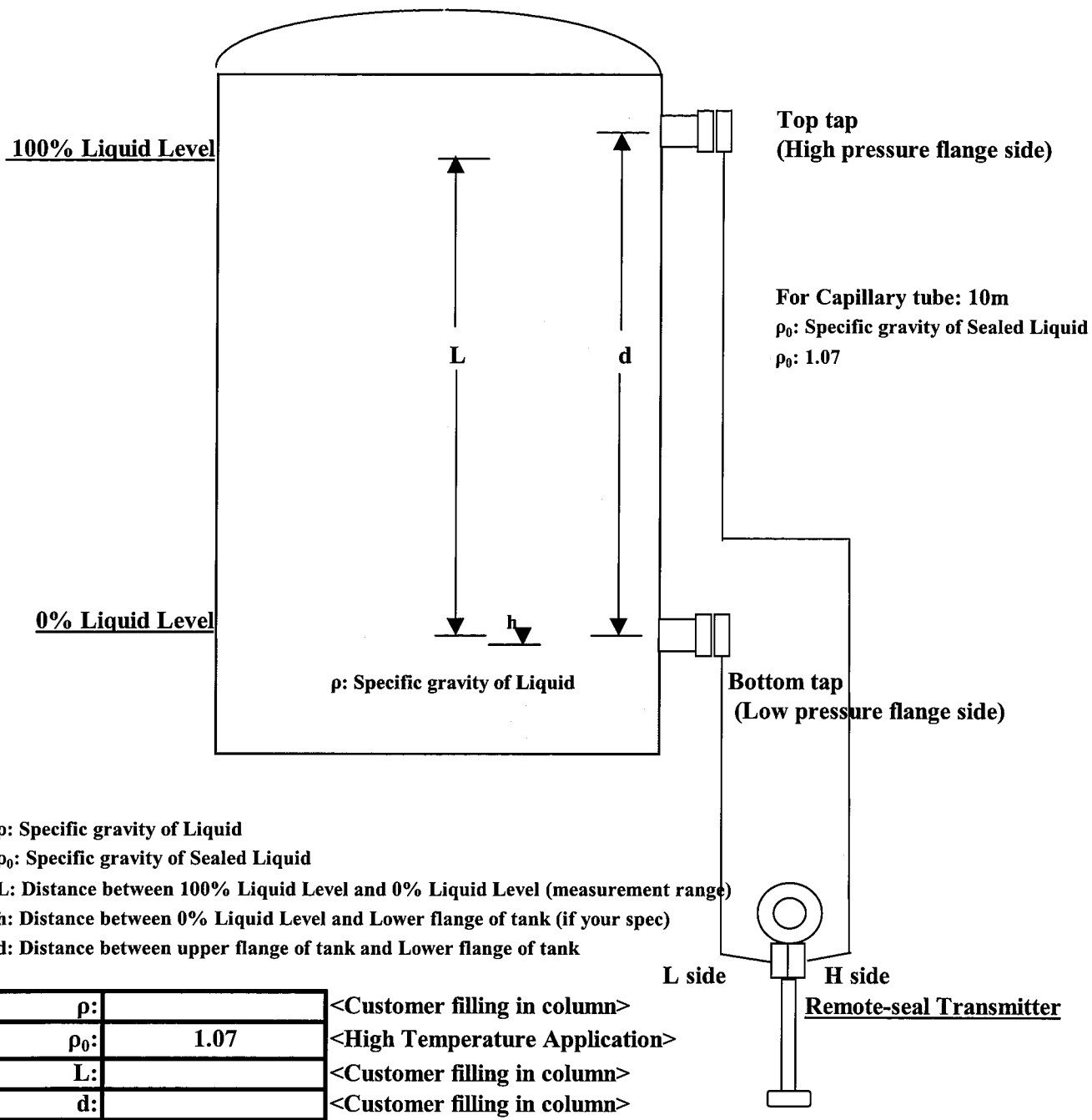
Differential pressure at 100% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - (L+h) \rho = URV$

Therefore, set range as follows

$LRV - URV =$

(For reference: 16.25kPa)

( 6-1 ) TAG. No.: B-LT-7073



Differential pressure at 0% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - h \rho = LRV$

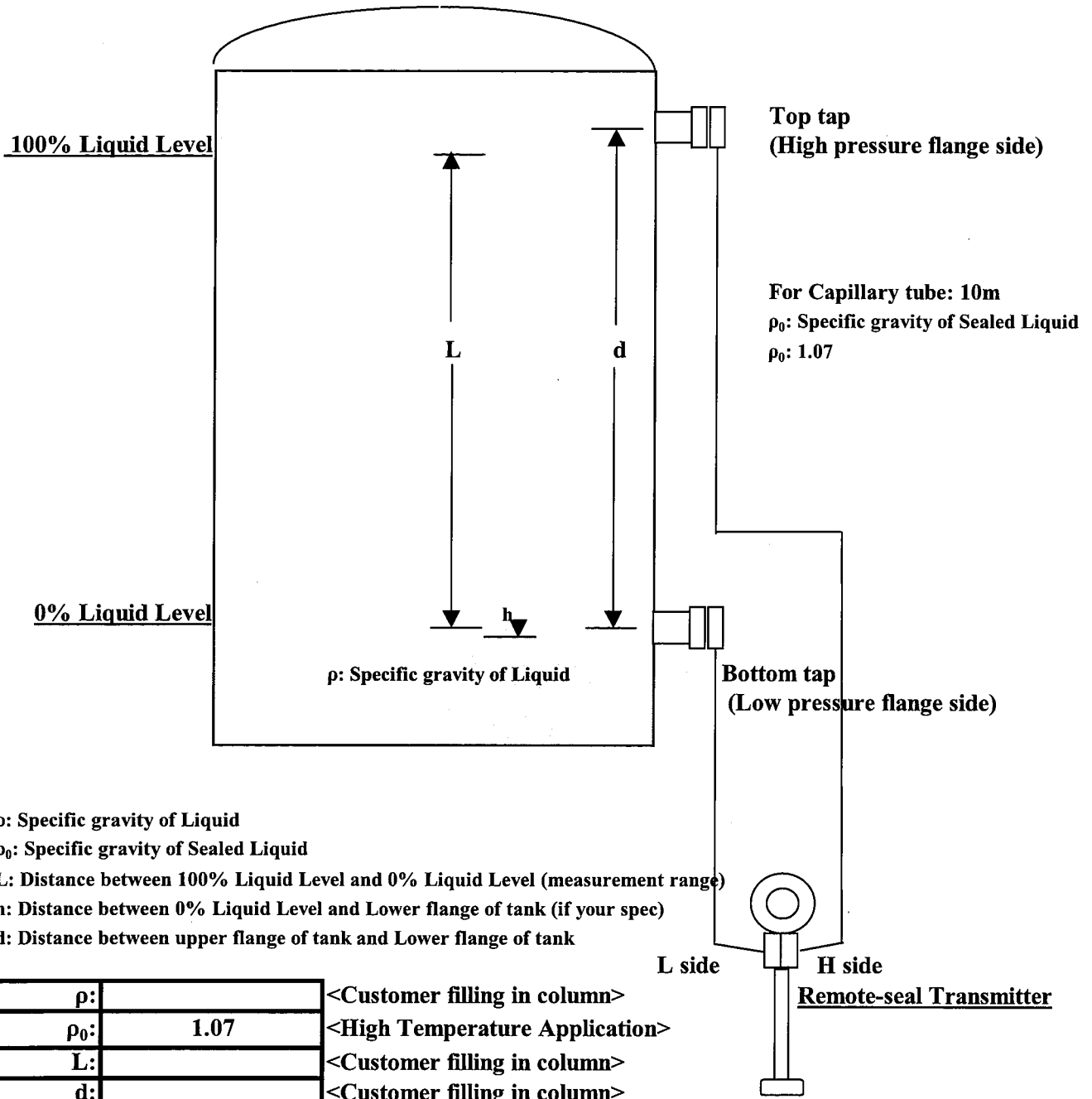
Differential pressure at 100% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - (L+h) \rho = URV$

Therefore, set range as follows

$LRV - URV =$

(For reference: 62.71kPa)

**( 6-2 ) TAG. No.: B-LT-7074**



Differential pressure at 0% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - h \rho = LRV$

Differential pressure at 100% Level <Pressure on high.pressure side> - <Pressure on low.pressure side>  
 $= d \rho_0 - (L+h) \rho = URV$

Therefore, set range as follows

**LRV - URV =**

(For reference: 62.71kPa)

**Remote seal mounting**

Use the procedure in "Table 2-1 Mounting Remote Diaphragm Seal Transmitter" to mount a remote diaphragm seal transmitter model. Figure 2-6 shows a typical installation for a remote diaphragm seal transmitter for reference.

**ATTENTION**

Mount the transmitter flanges within the limits stated here for the given fill-fluid in the capillary tubes with a tank at one atmosphere.

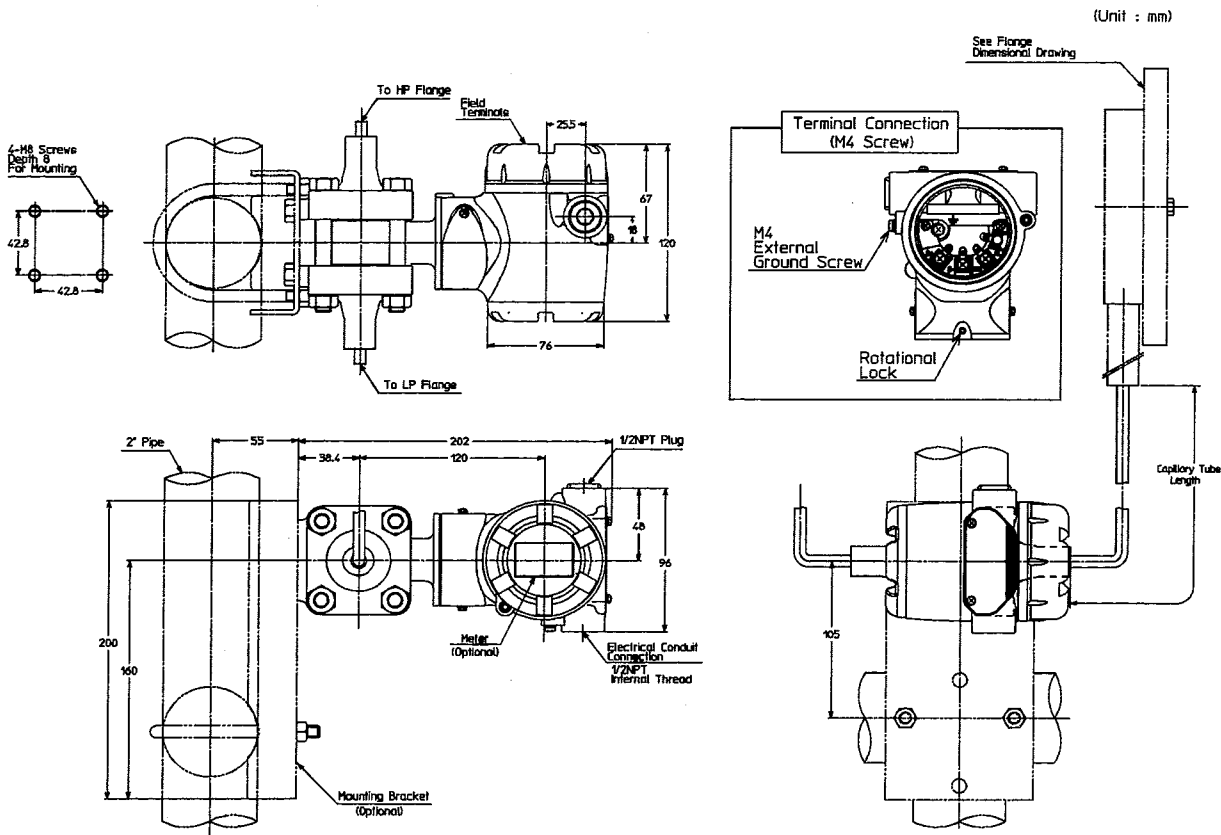
**Table 2-1 Mounting Remote Diaphragm Seal Transmitter**

Step	Action
1	Mount transmitter at a remote distance determined by length of capillary tubing.
2	<p><b>If Transmitter Model Number Is...</b>                      GTX35R                      GTX40R</p> <p><b>Then Connect Remote Seal on...</b>                      → H mark side of transmitter to upper flange mounting on tank wall.</p> <p><u>ATTENTION</u>                      On insulated tanks, remove enough insulation to accommodate the flange extension.</p>
3	<p><b>If Transmitter Model Number is...</b>                      GTX35R                      GTX40R</p> <p><b>Then Connect Remote Seal on...</b>                      Opposite side of transmitter to lower flange mounting on tank wall.</p> <p><u>ATTENTION</u>                      On insulated tanks, remove enough insulation to accommodate the flange extension.</p>
4	Tighten bolts to torque of SNB7: $20 \pm 1 N \cdot m$ , SUS304: $10 \pm 1 N \cdot m$ .

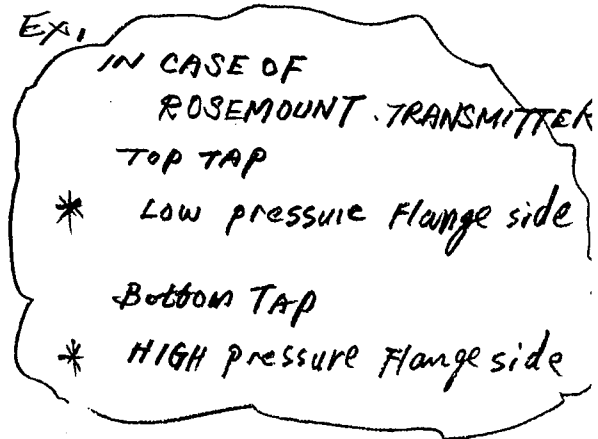
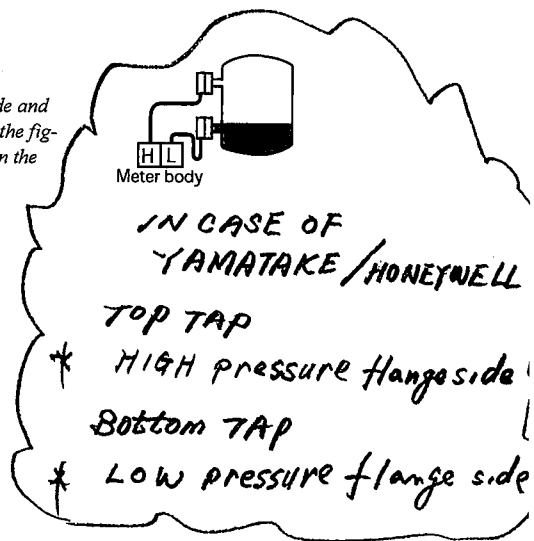
**DIMENSION**

**Model GTX35R / GTX40R**

(Unit : mm)



- Note)
1. To prevent vibration, you are recommended to fasten the capillary tube mid-length.
  2. Select a gasket that will not contact the diaphragm after it is tightened.
  3. When the suppression is larger than one half of the measuring span, the higher pressure side and the lower pressure side of the process connection end flange are opposite to those shown in the figure above. When using the transmitter to measure liquid levels, connect at H and L marks on the meter body as shown in the right figure.



**Set range calculation Ex. Model GTX\_ \_R**

Calculate the set range using these procedure:

The following symbols are used to express density and distance.

It is assumed that the density is fixed during liquid level measurement.

$\rho$  : Specific gravity of liquid in tank

$\rho_0$  : Specific gravity of sealed liquid

$l$  : Distance between 100% liquid level and 0% liquid level (measurement range)

$h$  : Distance between 0% liquid level and lower flange of tank

$d$  : Distance between upper flange of tank and lower flange of tank

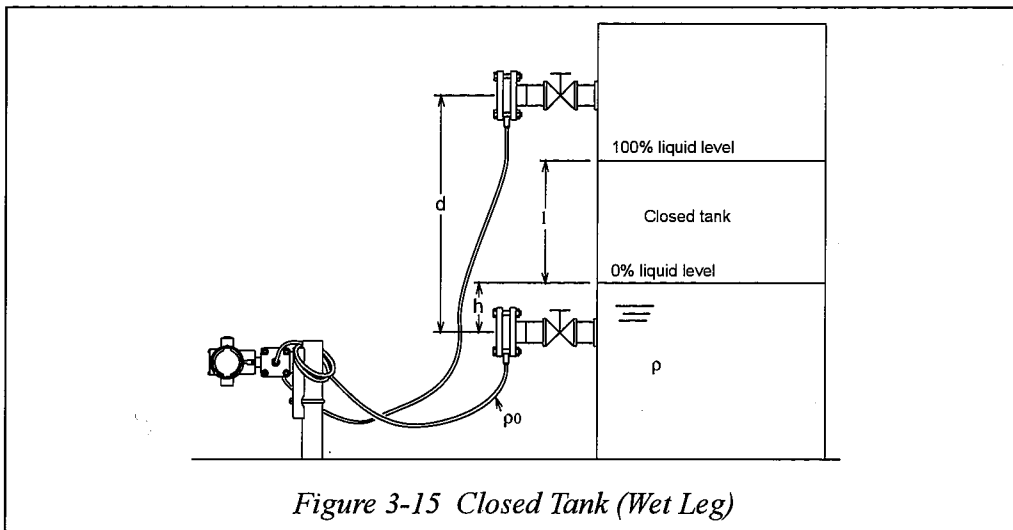


Figure 3-15 Closed Tank (Wet Leg)

Differential pressure at 0% liquid level (Pressure on high-pressure side - Pressure on low-pressure side) =  $d\rho_0 - h\rho = \text{LRV}$

Differential pressure at 100% liquid level (Pressure on high-pressure side - Pressure on low-pressure side) =  $d\rho_0 - (l+h)\rho = \text{URV}$

Therefore, set the range as follows:

Low limit (LRV):  $d\rho_0 - h\rho$ , High limit (URV):  $d\rho_0 - (l+h)\rho$

Example of calculation:

$l = 1500 \text{ mm}$ ,  $h = 250 \text{ mm}$ ,  $d = 2000 \text{ mm}$ ,  $\rho = 0.9$ ,  $\rho_0 = 0.935$

If the above conditions are assumed, the following results are obtained:

Differential pressure at 0% liquid level =  $(2000 \times 0.935) - (250 \times 0.9) = 1645 \text{ mmH}_2\text{O}$   
 = 16.13 kPa

Differential pressure at 100% liquid level =  $(2000 \times 0.935) + (1500 \times 250) \times 0.9 = 295 \text{ mmH}_2\text{O}$   
 = 2.893 kPa

Therefore, set the range as follows:

Low limit (LRV): 16.13 kPa {1645 mmH<sub>2</sub>O}, High limit (URV): 2.893 kPa {295 mmH<sub>2</sub>O}

This condition can be expressed with the following formula;

$$P_0 + ((\rho'h)/102) \geq P(1kPa = 102mmH_2O)$$

Therefore,  $h \leq (P_0 - P) \times 102 / (\rho')$

**Table 2-2**

	Specific gravity of sealed liquid $\rho'$	Low limit of allowable pressure P (kPa abs.)	Liquid contacting temperature range (°C)
General application (*1)	0.935	2	-40 to 40
High temperature application (*2)	1.07	2	-5 to 90
High temperature & vacuum application (*3)	1.07	0.1333	-5 to 50
High temperature & high vacuum application (*4)	1.09	0.1333	-10 to 250
Oxygen application, chlorine application (*5)	1.87	53	-10 to 40

**Remarks**

1. An application where the pressure in the tank  $P_0$  becomes a vacuum requires special caution.
2. If the above condition is not met, the pulling force applied to the diaphragm surface will exceed the specified range.

Foaming occurs because the pressure of sealed liquid exceeds the saturated vapour pressure and can cause zero point shifting. Negative pressure applied to the diaphragm can cause buckling and destroy the diaphragm.

3. When the liquid contacting temperature exceeds the levels shown in the table, the low limit of the allowable pressure also changes. Check the specifications.
4. \*1. GTX□□R-□A  
\*2. GTX□□R-□B  
\*3. GTX□□R-□C  
\*4. GTX□□R-□D  
\*5. GTX□□R-□H&J