DeltaSpan™

Pressure Level Transmitter

FLOWLINE™ LEVEL BEST

Addendum for LD30, LD31, LD32, LD34 & LD35 Series

PRESSURE TRANSMITTER BASICS

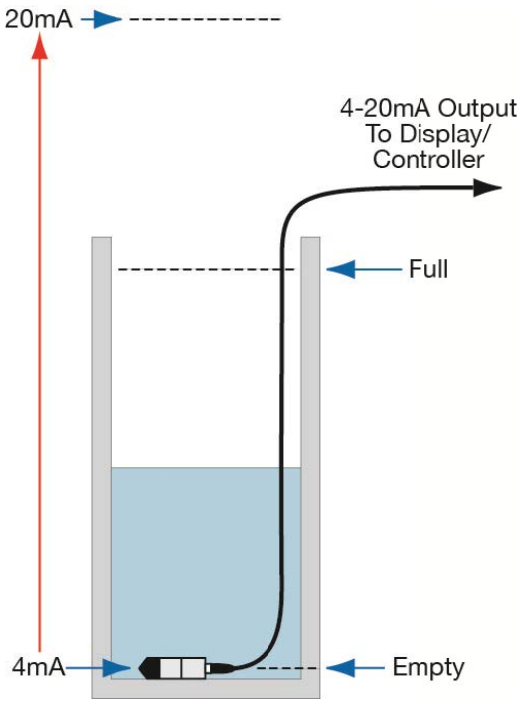
DeltaSpan pressure level transmitter's are all fixed span devices. The 4-20mA output cannot be changed or adjusted. Because of this fact, **ALL CONFIGURATIONS** are performed within the local display or controller and are designed to match the span of the pressure sensor. This document will assist in configuring the Flowline DataView™ (LI55 series) or DataLoop™ (LI23 and LI24 series) with a pressure transmitter.

DataView™ LI55 series

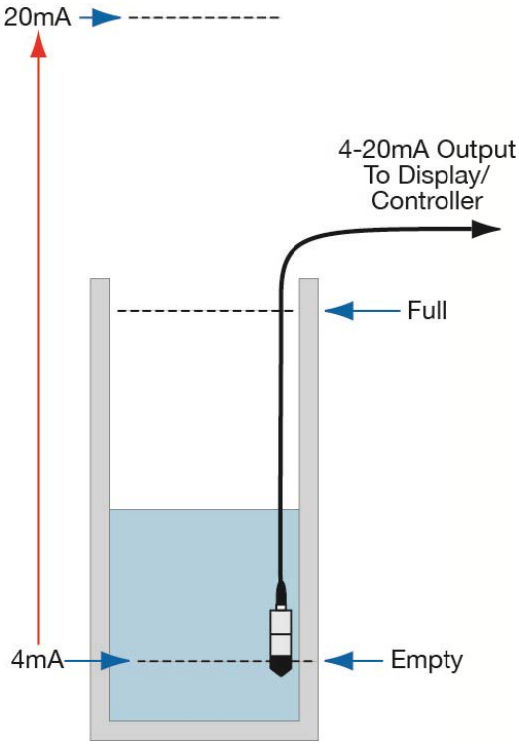
DataLoop™ LI23 or LI24 series

If a pressure transmitter is properly selected, then the 20mA output of the sensor will be above the Full liquid level (see below). 4mA will always be where the sensor is placed. If the sensor rests on the bottom of the tank, then the centerline of the sensor will be where the 4mA is located.

Sensor Resting on Bottom of Tank



Sensor offset from Botton of Tank



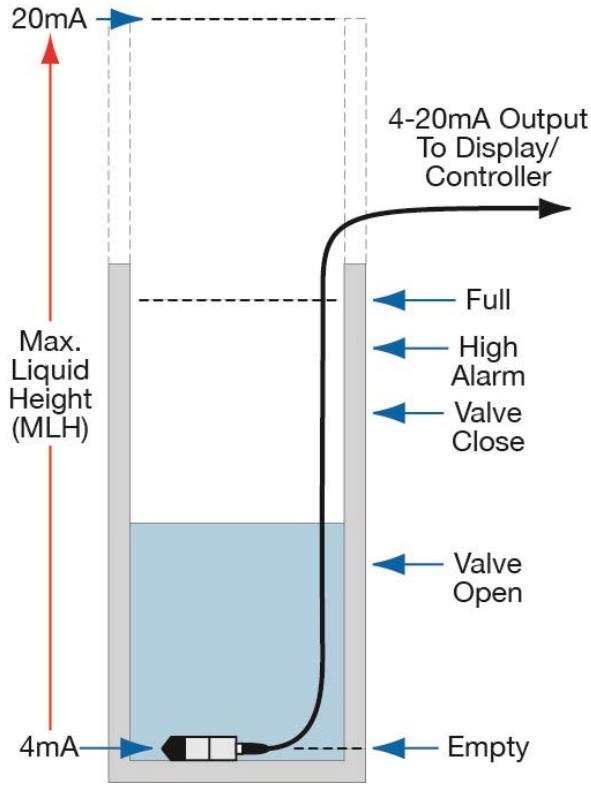
METHODS TO CONFIGURE WITH DISPLAY/CONTOLLER

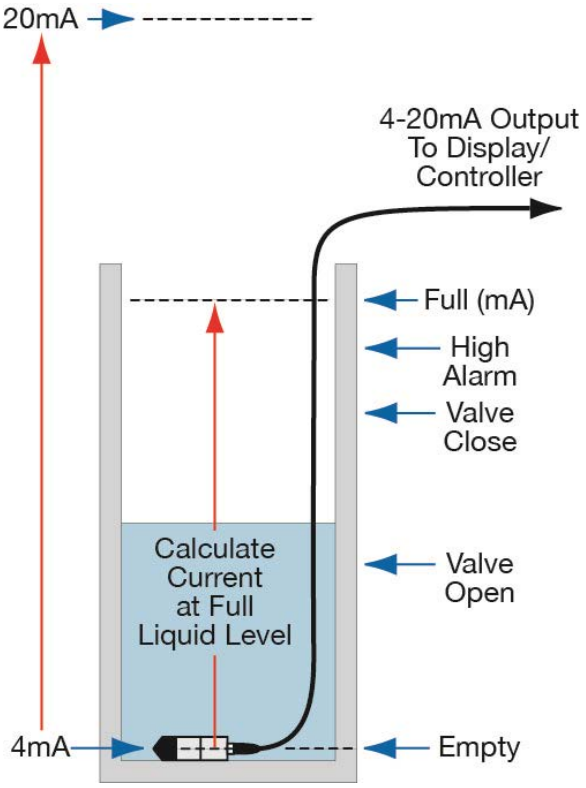
There are two methods to configure the DeltaSpan™ to a local Display or local Controller

Method #1 – Use the existing span of the Pressure Transmitter to match a virtual tank that extends above a Full Tank. Even though this implies a much taller tank, as long as all of your controls for any pumps, valves or alarms are set within the actual Full level of the tank, then you will not see any difference in tank level performance.

Method #2 – Ignore the fixed 4-20mA span of the Pressure Transmitter and Calculate the Current at a Full Liquid Level. This current will be the new full span for the Display or Controller. All controls for any pumps, valves or alarms are also set within the actual Full level of the tank. You will not loose any accuracy when spaning to a smaller current range.

This Method is the easiest to configure.





Flammable, Explosive or Hazardous Applications:

DeltaSpan™ is available in both General Purpose and Intrinsically Safe configurations. This addendum is solely designed to show how to configure DeltaSpan™ with a Flowline DataView™ (LI55 series) or DataLoop™ (LI23 and LI24 series) Display / Controller. Refer to the product manual for information pertaining to all electrical wiring of the transmitter in accordance with applicable NEC codes and safety requirements.

HOW TO CONFIGURE TO A DATAVIEW™ LI55 SERIES (METHOD #1)

To span DataView™ to the full span of the pressure sensor, you will need the following information:

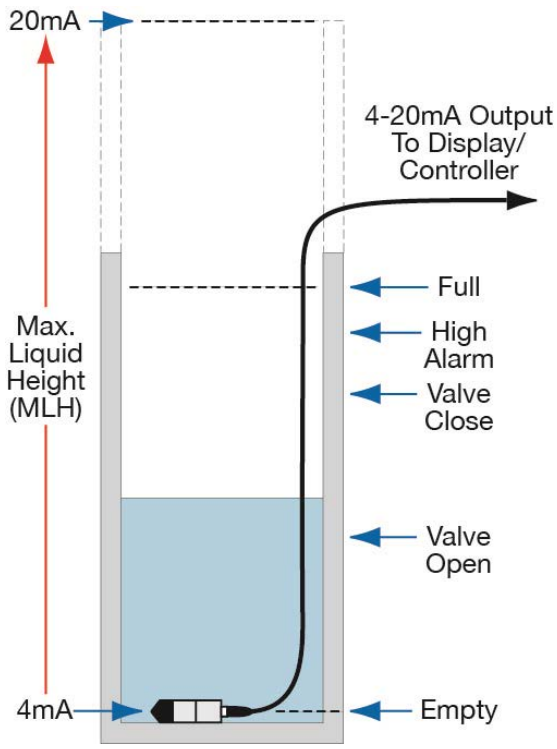
- Maximum Pressure (**MP**) of the sensor in psi
- Specific Gravity (**SG**) of the liquid
- Units of operation (**Feet** or **Meters**)
- Maximum Liquid Height (**MLH**)
    - This is the equivalent height of liquid (in a virtual tank) at the full span of the transmitters (at 20mA)
    - To calculate MLH in Feet
        - **MLH** = (**MP** x 2.31) / **SG**

*Example: If **MP** = 15 psi and **SG** = 0.9, then **MLH** = 15 x 2.31 / 0.9 = 38.50 ft...**MLH** = 0038.50 feet full*

    - To calculate MLH in Meters
        - **MLH** = (**MP** x 0.704) / **SG**

*Example: If **MP** = 15 psi and **SG** = 0.9, then **MLH** = 15 x 0.704 / 0.9 = 11.73 m...**MLH** = 0011.73m full*

- Pump, Valve and Alarm setpoints
    - All set points are in either Feet of Meters of liquid and are measure from the location of the Pressure Transmitter.



Configure the DataView™:

Use the following steps to configure the DataView™ to match the DeltaSpan™ transmitter:

1. Set UNITS (**unitS**) to Feet or Meters
2. Set DECIMAL POINT (**dEc Pt**) to dddd.dd
3. Set SCALE to the following:
    a. Set Empty (**EmPtY**) to 0 feet (or 0 meters) of liquid.
    b. Set Full (**FuLL**) to the Maximum Liquid Height (**MLH**).
4. Set RELAYS (**rELAY**) to liquid levels where the relay will close and open
    a. Each relay will have a setting where the relay will energize (**SEt 1** for relay 1, etc.) and a setting where the relay will de-energize (**RSt 1** for relay 1, etc.).
        i. High alarms – Set **SEt #** at the level for the high alarm and set **RSt #** to a level slightly below the SEt #. This will create a small hysteresis to prevent chatter (i.e. SEt 2 = 8.00‘ and RSt 2 = 7.90‘...this creates a 0.10‘ hysteresis).
        ii. Low alarms – Set **SEt #** at the level for the low alarm and set **RSt #** to a level slightly above the SEt #. This will create a small hysteresis to prevent chatter (i.e. SEt 3 = 2.00‘ and RSt 3 = 2.15‘...this creates a 0.15‘ hysteresis).
        iii. Valve or Pump Fill - Set **SEt #** at the level for the Valve to Open or the Pump to Start Filling and set **RSt #** at the level above where the valve will Close or the pump will Stop Filling. This will create a unique ON and OFF span (i.e. SEt 4 = 3.00‘ and RSt 3 = 7.50‘...this creates a fill span of 4.50‘).
        iv. Valve or Pump Empty - Set **SEt #** at the level for the Valve to Open or the Pump to Start Emptying and set **RSt #** at the level below where the valve will Close or the pump will Stop Emptying. This will create a unique ON and OFF span (i.e. SEt 1 = 7.00‘ and RSt 1 = 4.00‘...this creates a empty span of 3.00‘).

HOW TO CONFIGURE TO A DATALOOP™ LI23 OR LI24 SERIES (METHOD #1)

To span DataView™ to the full span of the pressure sensor, you will need the following information:

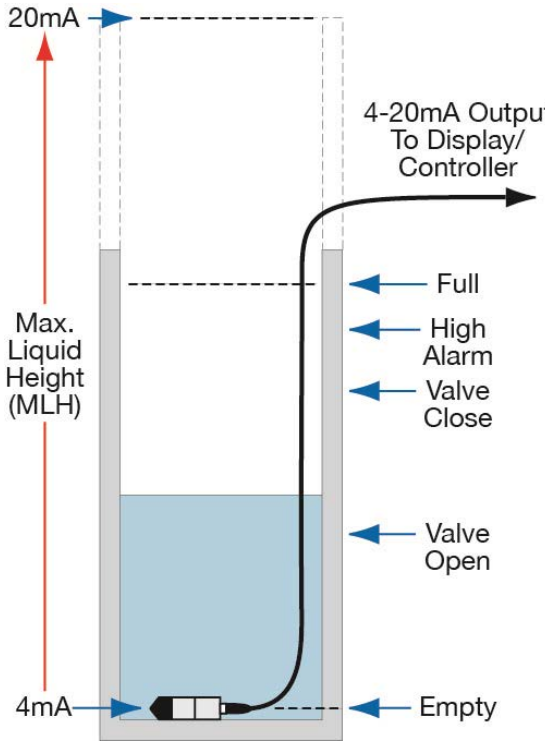
- Maximum Pressure (**MP**) of the sensor in psi
- Specific Gravity (**SG**) of the liquid
- Units of operation (**Feet** or **Meters**)
- Maximum Liquid Height (**MLH**)
    - This is the equivalent height of liquid (in a virtual tank) at the full span of the transmitters (at 20mA)
    - To calculate MLH in Feet
        - **MLH** = (**MP** x 2.31) / **SG**

Example: If **MP** = 15 psi and **SG** = 0.9, then **MLH** = 15 x 2.31 / 0.9 = 38.50 ft...**MLH** = 0038.50 feet full

    - To calculate MLH in Meters
        - **MLH** = (**MP** x 0.704) / **SG**

Example: If **MP** = 15 psi and **SG** = 0.9, then **MLH** = 15 x 0.704 / 0.9 = 11.73 m...**MLH** = 0011.73m full

- Pump, Valve and Alarm setpoints
    - All set points are in either Feet of Meters of liquid and are measure from the location of the Pressure Transmitter.



Configure the DataLoop™:

Use the following steps to configure the DataLoop™ to match the DeltaSpan™ transmitter:

1. Set UNITS (**unitS**) to Feet or Meters
2. Set DECIMAL POINT (**dEc Pt**) to dddd.dd
3. Set SCALE to the following:
    a. Set Input 1 (**InPt 1**) to 04.000 mA (*default is 04.000, so no changes are required*).
    b. Set Display 1 (**DSPY 1**) to +00,000.00 (*default is +00,000.00, so no changes are required*).
    c. Set Input 2 (**InPt 2**) to 20.000 mA (*default is 20.000, so a change is required*).
    d. Set Display 2 (**DSPY 2**) to Maximum Liquid Height **(MLH)** value (*default is +00,100.00, so a change is required*).
4. Set RELAYS (**rELAY**) to liquid levels where the relay will close and open
    a. Each relay will have a setting where the relay will energize (**SEt 1** for relay 1, etc.) and a setting where the relay will de-energize (**RSt 1** for relay 1, etc.).
        i. High alarms – Set **SEt #** at the level for the high alarm and set **RSt #** to a level slightly below the SEt #. This will create a small hysteresis to prevent chatter (i.e. SEt 2 = 8.00‘ and RSt 2 = 7.90‘...this creates a 0.10‘ hysteresis).
        ii. Low alarms – Set **SEt #** at the level for the low alarm and set **RSt #** to a level slightly above the SEt #. This will create a small hysteresis to prevent chatter (i.e. SEt 3 = 2.00‘ and RSt 3 = 2.15‘...this creates a 0.15‘ hysteresis).
        iii. Valve or Pump Fill - Set **SEt #** at the level for the Valve to Open or the Pump to Start Filling and set **RSt #** at the level above where the valve will Close or the pump will Stop Filling. This will create a unique ON and OFF span (i.e. SEt 4 = 3.00‘ and RSt 3 = 7.50‘...this creates a fill span of 4.50‘).
        iv. Valve or Pump Empty - Set **SEt #** at the level for the Valve to Open or the Pump to Start Emptying and set **RSt #** at the level below where the valve will Close or the pump will Stop Emptying. This will create a unique ON and OFF span (i.e. SEt 1 = 7.00‘ and RSt 1 = 4.00‘...this creates a empty span of 3.00‘).

HOW TO CONFIGURE TO A DATAVIEW™ LI55 SERIES (METHOD #2)

To span DataView™ to match the physical span of tank, you will need the following information:

- Maximum Pressure (**MP**) of the sensor in psi
- Specific Gravity (**SG**) of the liquid
- Units of operation (**Feet** or **Meters**)
- Maximum Liquid Height (**MLH**)
    - This is the equivalent height of liquid (in a virtual tank) at the full span of the transmitters (at 20mA), see below.
    - To calculate MLH in Feet
        - **MLH** = (**MP** x 2.31) / **SG**

Example: If **MP** = 15 psi and **SG** = 0.9, then **MLH** = 15 x 2.31 / 0.9 = 38.50 ft...**MLH** = 0038.50 feet full

    - To calculate MLH in Meters
        - **MLH** = (**MP** x 0.704) / **SG**

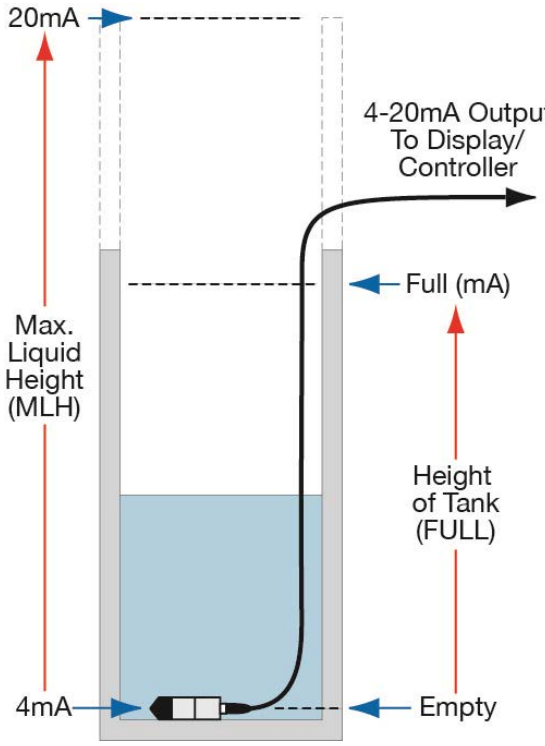
Example: If **MP** = 15 psi and **SG** = 0.9, then **MLH** = 15 x 0.704 / 0.9 = 11.73 m...**MLH** = 0011.73m full

- Height of the Tank (**FULL**).
    - For best results, select the highest level of liquid possible in the tank even though you may never reach this level in the tank.
- Current at FULL Level (**CFL**)
    - To calculate the Current at FULL level (**CFL**)
        - **CFL** = (**FULL** / **MLH**) x 16mA + 4mA

Example: if FULL = 10 ft and MLH = 38.50 ft, then CFL = (10 / 38.50) x 16mA + 4mA = 8.1558mA

Example: if FULL = 8.0 m and MLH = 11.73 m, then CFL = (8 / 11.73) x 16mA + 4mA = 14.9122mA

- Pump, Valve and Alarm setpoints
    - All set points are in either Feet of Meters of liquid and are measure from the location of the Pressure Transmitter.



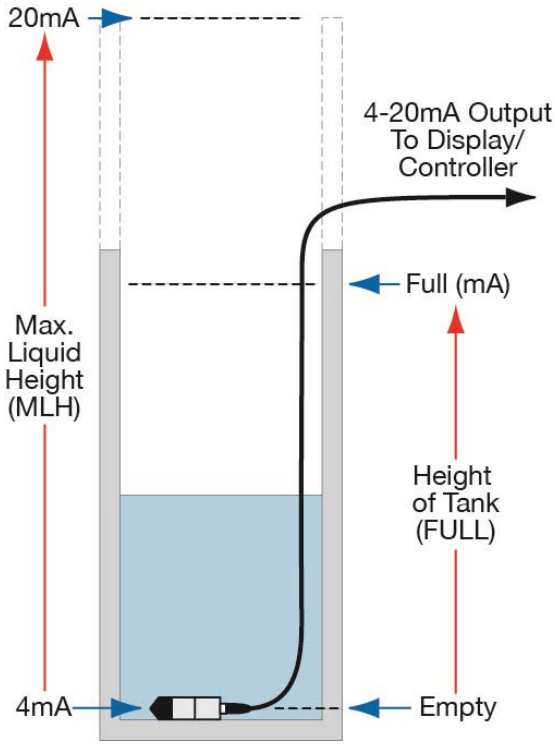
Configure the DataView:

Use the following steps to configure the DataView™ to match the DeltaSpan™ transmitter:

1. Set UNITS (**unitS**) to Feet or Meters
2. Set DECIMAL POINT (**dEc Pt**) to dddd.dd
3. Set PROGRAM / SCALE to the following:
    a. To access all functions for rescaling the current input, you will need to access the display's Full Menu.
    b. Set Input 1 (**InPt 1**) to 04.000 mA.
        i. Default for Input 1 is 04.000, so no changes are required.
    c. Set Display 1 (**DSPY 1**) to 0000.00.
        i. Default for Display 1 is 0000.00, so no changes are required.
    d. Set Input 2 (**InPt 2**) to **CFL** value (in mA).
        i. Default for Input 2 is 20.000, so a change is required.
    e. Set Display 2 (**DSPY 2**) to **FULL** value (in Feet or Meters).
        i. Default for Display 2 is 0200.00, so a change is required.
4. Set RELAYS (**rELAY**) to liquid levels where the relay will close and open
    a. Each relay will have a setting where the relay will energize (**SEt 1** for relay 1, etc.) and a setting where the relay will de-energize (**RSt 1** for relay 1, etc.).
        i. High alarms – Set **SEt #** at the level for the high alarm and set **RSt #** to a level slightly below the SEt #. This will create a small hysteresis to prevent chatter (i.e. SEt 2 = 8.00‘ and RSt 2 = 7.90‘...this creates a 0.10‘ hysteresis).
        ii. Low alarms – Set **SEt #** at the level for the low alarm and set **RSt #** to a level slightly above the SEt #. This will create a small hysteresis to prevent chatter (i.e. SEt 3 = 2.00‘ and RSt 3 = 2.15‘...this creates a 0.15‘ hysteresis).
        iii. Valve or Pump Fill - Set **SEt #** at the level for the Valve to Open or the Pump to Start Filling and set **RSt #** at the level above where the valve will Close or the pump will Stop Filling. This will create a unique ON and OFF span (i.e. SEt 4 = 3.00‘ and RSt 3 = 7.50‘...this creates a fill span of 4.50‘).
        iv. Valve or Pump Empty - Set **SEt #** at the level for the Valve to Open or the Pump to Start Emptying and set **RSt #** at the level below where the valve will Close or the pump will Stop Emptying. This will create a unique ON and OFF span (i.e. SEt 1 = 7.00‘ and RSt 1 = 4.00‘...this creates a empty span of 3.00‘).

HOW TO CONFIGURE TO A DATALOOP™ LI23 OR LI24 SERIES (METHOD #2)

To span DataLoop™ to match the physical span of tank, you will need the following information:



- Maximum Pressure (**MP**) of the sensor in psi
- Specific Gravity (**SG**) of the liquid
- Units of operation (**Feet** or **Meters**)
- Maximum Liquid Height (**MLH**)
    - This is the equivalent height of liquid (in a virtual tank) at the full span of the transmitters (at 20mA), see below.
    - To calculate MLH in Feet
        - **MLH** = (**MP** x 2.31) / **SG**

Example: If **MP** = 15 psi and **SG** = 0.9, then **MLH** = 15 x 2.31 / 0.9 = 38.50 ft...**MLH** = 0038.50 feet full

    - To calculate MLH in Meters
        - **MLH** = (**MP** x 0.704) / **SG**

Example: If **MP** = 15 psi and **SG** = 0.9, then **MLH** = 15 x 0.704 / 0.9 = 11.73 m...**MLH** = 0011.73m full

- Height of the Tank (**FULL**).
    - For best results, select the highest level of liquid possible in the tank even though you may never reach this level in the tank.
- Current at FULL Level (**CFL**)
    - To calculate the Current at FULL level (**CFL**)
        - **CFL** = (**FULL** / **MLH**) x 16mA + 4mA

Example: if FULL = 10 ft and MLH = 38.50 ft, then CFL = (10 / 38.50) x 16mA + 4mA = 8.1558mA

Example: if FULL = 8.0 m and MLH = 11.73 m, then CFL = (8 / 11.73) x 16mA + 4mA = 14.9122mA

- Pump, Valve and Alarm setpoints
    - All set points are in either Feet of Meters of liquid and are measure from the location of the Pressure Transmitter.

Configure the DataView:

Use the following steps to configure the DataView™ to match the DeltaSpan™ transmitter:

1. Set UNITS (**unitS**) to Feet or Meters
2. Set DECIMAL POINT (**dEc Pt**) to dddd.dd
3. Set SCALE to the following:
    a. Set Input 1 (**InPt 1**) to 04.000 mA.
        i. Default for Input 1 is 04.000, so no changes are required.
    b. Set Display 1 (**DSPY 1**) to +00,000.00.
        i. Default for Display 1 is +00,000.00, so no changes are required.
    c. Set Input 2 (**InPt 2**) to **CFL** value (in mA).
        i. Default for Input 2 is 20.000, so a change is required.
    d. Set Display 2 (**DSPY 2**) to **FULL** value (in Feet or Meters).
        i. Default for Display 2 is +00,100.00, so a change is required.
4. Set RELAYS (**rELAY**) to liquid levels where the relay will close and open
    a. Each relay will have a setting where the relay will energize (**SEt 1** for relay 1, etc.) and a setting where the relay will de-energize (**RSt 1** for relay 1, etc.).
        i. High alarms – Set **SEt #** at the level for the high alarm and set **RSt #** to a level slightly below the SEt #. This will create a small hysteresis to prevent chatter (i.e. SEt 2 = 8.00‘ and RSt 2 = 7.90‘...this creates a 0.10‘ hysteresis).
        ii. Low alarms – Set **SEt #** at the level for the low alarm and set **RSt #** to a level slightly above the SEt #. This will create a small hysteresis to prevent chatter (i.e. SEt 3 = 2.00‘ and RSt 3 = 2.15‘...this creates a 0.15‘ hysteresis).
        iii. Valve or Pump Fill - Set **SEt #** at the level for the Valve to Open or the Pump to Start Filling and set **RSt #** at the level above where the valve will Close or the pump will Stop Filling. This will create a unique ON and OFF span (i.e. SEt 4 = 3.00‘ and RSt 3 = 7.50‘...this creates a fill span of 4.50‘).
        iv. Valve or Pump Empty - Set **SEt #** at the level for the Valve to Open or the Pump to Start Emptying and set **RSt #** at the level below where the valve will Close or the pump will Stop Emptying. This will create a unique ON and OFF span (i.e. SEt 1 = 7.00‘ and RSt 1 = 4.00‘...this creates a empty span of 3.00‘).