Quick Start Guide
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Rosemount™ 3107 Level and 3108 Flow Transmitters

Ultrasonic

ROSEMOUNT

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Contents

1 About this guide

This installation guide provides basic guidelines for the Rosemount 3107 Level Transmitter and Rosemount 3108 Flow Transmitter. It does not provide instructions for detailed configuration, diagnostics, maintenance, service, troubleshooting, or installations. Refer to the Rosemount 3107 and 3108 Reference Manual for more instructions. Manuals are available electronically on Emerson.com/Rosemount.

⚠ WARNING

Failure to follow these installation guidelines could result in death or serious injury.

- The Rosemount 3107 and Rosemount 3108 are ultrasonic transmitters. They must be installed, connected, commissioned, operated, and maintained by suitably qualified personnel only, observing any national and local requirements that may apply.
- Use the equipment only as specified. Failure to do so may impair the protection provided by the equipment.

Explosions could result in death or serious injury.

- Installation of the transmitters in a hazardous environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the Product Certifications section for any restrictions associated with a safe installation.
- Before connecting a handheld communicator in an explosive atmosphere, ensure the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

External surface may be hot. Care must be taken to avoid possible burns.

Process leaks could result in death or serious injury.

- Install and tighten process connectors before applying pressure.
- Do not attempt to loosen or remove process connectors while the transmitter is in service.

Electrical shock could cause death or serious injury.

- Ensure that the transmitter is not powered when making connections.
- If the liquid level switch is installed in a high voltage environment and a fault condition or installation error occurs, high voltage may be present on leads and terminals.

⚠ WARNING

Physical access

Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and needs to be protected against.

Physical security is an important part of any security program and fundamental to protecting your system. Restrict physical access by unauthorized personnel to protect end users' assets. This is true for all systems used within the facility.

2 Overview of Rosemount 3107 and 3108

The Rosemount 3107 and 3108 are sealed 4–20 mA loop-powered liquid level transmitters, specifically designed for use in waste water and effluent treatment plant on aqueous applications.

These rugged UPVC transmitters are certified Intrinsically Safe for use in Zone 0 areas, and factory fitted with up to 165 ft. (50 m) of two-core cable for simple low cost installation in sumps, wet-wells and over open channel flow structures.

The transmitter may be mounted in a hazardous area if powered from a protected power supply. They can be connected directly to a plant control system, or used with a Rosemount 3490 Series Control Unit for programmable control functionality.

Theory of operation

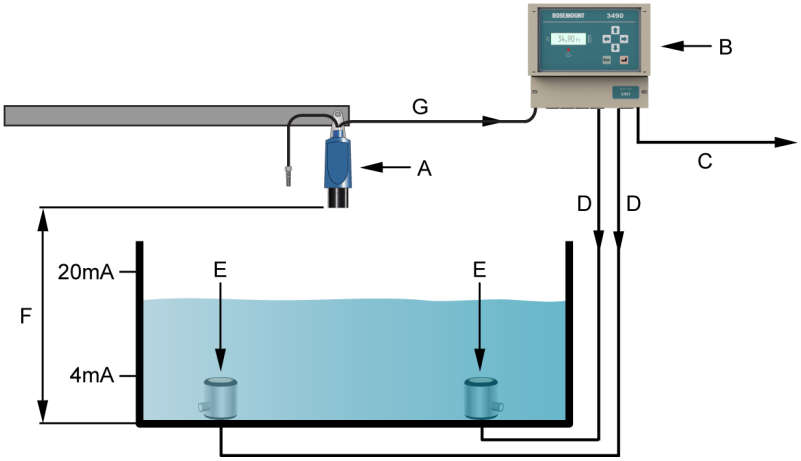
Each transmitter is designed to be mounted above a liquid, and uses ultrasonic pulses to continuously measure the distance to the liquid surface. The microprocessor-controlled electronics calculates distance to the liquid level from the time delay between the transmitting and receiving of signals.

When programmed with the bottom reference of the application – usually the bottom of a tank – the transmitter will calculate the liquid depth (level), and output the level (Figure 2-1) as a 4–20 mA signal and a digital HART® signal.

The Rosemount 3107 and 3108 can also calculate contents (volume) or open channel flow, and then output the result as a 4–20 mA signal and a digital HART signal.

Programming is achieved by remote communication using HART.

Figure 2-1: Typical Application



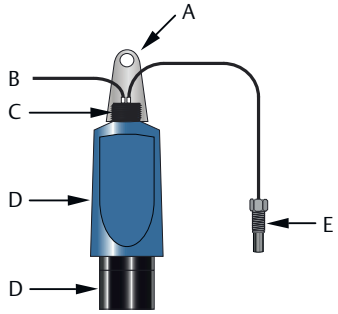
A. Rosemount 3108 Flow Transmitter
B. Rosemount 3490 Series Control Unit
C. 4–20 mA signal output
D. Relay
E. Pump
F. Transmitter Bottom Reference
G. 4–20 mA and HART signal input

Components of the transmitter

The transmitter has a housing containing advanced electronics to generate ultrasonic pulses, process the resultant signals, and provide a 4–20 mA and HART output.

There is a factory-fitted cable for the signal output and connecting an external power supply. The Rosemount 3108 has a factory-fitted remote temperature sensor.

Figure 2-2: Transmitter Components



A. Mounting bracket
B. Two-core cable
C. 1-in. mounting thread
D. UPVC wetted parts
E. Remote temperature sensor (Rosemount 3108 only)

3 Considerations before you install

Install the transmitter where it is protected from ultraviolet radiation to prevent long-term degradation of the plastics used in its construction (e.g. shrouded from direct sunlight).

Note
See also Product Certifications for special conditions for safe use.

General

- Installation must be carried out by suitably trained personnel in accordance with the applicable code of practice.
- If the equipment is likely to come into contact with aggressive substances, it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.
- Aggressive substances are acidic liquids or gases that may attack metals or solvents that may affect polymeric materials.
- Suitable precautions are regular checks as part of routine inspections, or establishing, from the material's data sheet, that it is resistant to specific chemicals.
- The equipment should only be cleaned with a damp cloth; do not use solvents.
- The transmitter is double insulated, and therefore protective earthing is not required. However, the cable screen should be connected (see Figure 5-1).
- Note that if the equipment is used in a manner not specified by the manufacturer, the protection afforded by the equipment may be impaired.
- This transmitter is classified Type A in accordance with the European EMC directive 2004/108/EC. To ensure electro-magnetic compatibility, in any member state, it should not be installed in a residential area.

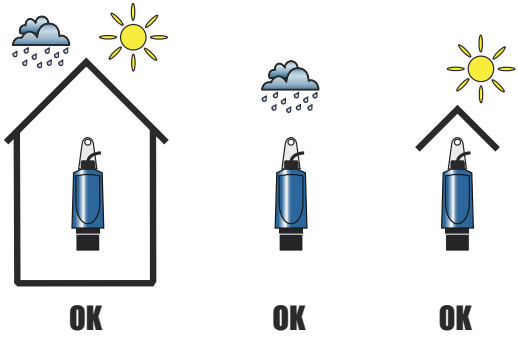
Note
It is not advisable to mount the transmitter in close proximity to a source of electrical noise such as a variable-speed drive, or other high-powered electrical device.

Environmental

The Rosemount 3107 and 3108 ultrasonic transmitters are Intrinsically Safe (IS) approved for hazardous area installations.

- The Rosemount 3107 is designed for open or closed tank installation. It is weatherproof and protected against the ingress of dust
- The Rosemount 3108 is designed for open channel flow measurement. It is weatherproof and protected against the ingress of dust
- Avoid installing the Rosemount 3107 and 3108 transmitters near heat sources

Figure 3-1: Environmental Considerations



4 Installation

- Mount the transmitter above the liquid using the 1-in. threaded connection provided, but no closer than 13.8 in. (0,35 m) to the surface. The transmitter does not detect any liquid surface closer than 12 in. (0,3 m) to the transmitter face.
- The transmitter should be mounted vertically to ensure a good echo from the liquid surface. The beam half angle of the transmitter is 6 degrees (Figure 4-2).
- Obstructions in the tank, or well, may generate echoes which can be confused with the real liquid surface echo. Obstructions within the beam angle generate strong false echoes. Wherever possible, the transmitter should be positioned to avoid false echoes.
- To avoid detecting unwanted objects in the tank or well, it is advisable to maintain a distance of at least 1.3-in (33.02 mm). from the center line of the transmitter for every foot (11 cm per meter) range to the obstruction. (See Figure 4-2).
- No false echoes are generated if the transmitter is located near the side of the tank or well and the wall is smooth and free of protrusions. However, there will still be a reduction in the echo size. It is recommended that the transmitter be mounted no closer than 12 in. (0,3 m) to the wall to avoid a large reduction in the echo size.
- If the transmitter is mounted in an enclosed tank with a domed top, avoid mounting the transmitter in the center of the tank roof because this could act as a parabolic reflector and create unwanted echoes.
- Avoid applications where heavy condensation could form on the transmitter face.
- If the transmitter is mounted in a stand-off or nozzle, the transmitter face should protrude at least 0.2 in. (5 mm) into the tank.
- If the transmitter is used in environments where direct sunlight can cause high surface temperatures on exposed instruments, a sun-shade is recommended.

4.1 Mounting the transmitter above the liquid surface

A one-inch threaded process connection is provided to mount the transmitter (Figure 4-1). The thread form is either BSPP (G1) or NPT, and is marked below the mounting thread.

Mounting bracket

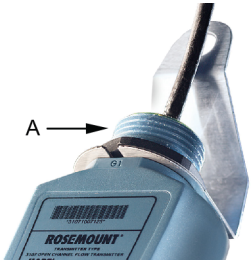
The transmitter is supplied with a purpose made 316 Stainless Steel mounting bracket (Figure 4-1), which should be used to mount the

transmitter over the liquid surface. The bracket is designed to fit over the threaded neck of the transmitter and is retained by a locknut.

Use a chain or wire through the hole provided in the bracket, which is shaped to ensure that the transmitter will hang perpendicular to the water surface. Never suspend the transmitter by the cable. Check that the material of the chain or wire is corrosion resistant to the liquids and any vapors present.

The bracket may be bolted to a suitable crossmember above the liquid surface. Ensure the transmitter is perpendicular to the surface to maximize the return echo size.

Figure 4-1: Mounting Thread and Supplied Bracket



A. 1-in. threaded process connection

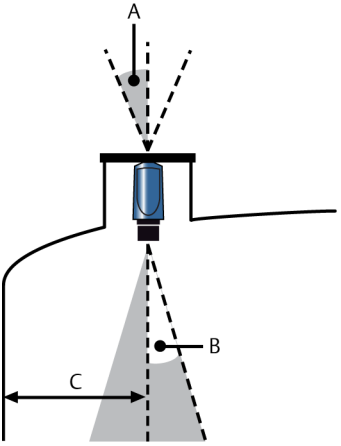
Note

To help with alignment, the echo size (signal strength) can be indicated on the Rosemount 3490 Series Control Unit or a Field Communicator.

Flange mounting

The instrument (accessory) flanges supplied by Emerson are manufactured from PVC and are a full face design. Care must be taken when installing to a raised face mating flange on the tank or vessel to prevent distortion of the PVC flange by overtightening the bolts. See Product Data Sheet for a list of all accessories and their part numbers.

Figure 4-2: Recommended Mounting Position



A. Transmitter is mounted vertically (maximum deviation of 3°).
B. 6° beam half angle.
C. 1.3 in./ft. (11 cm/m). Minimum of 12 in. (0.3 m).

Mounting from a conduit

The transmitters can be mounted from a conduit using the optional adaptor accessory. See Product Data Sheet for a list of all accessories and their part numbers.

4.2 Open channel flow installations

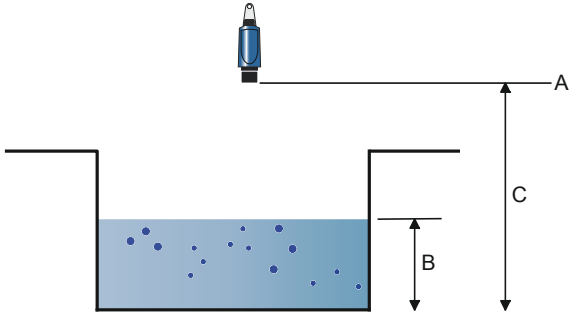
Mount an ultrasonic transmitter over an area of clear liquid. Avoid mounting the transmitter directly over any inlet stream. Never suspend the transmitter by the cable.

The positioning is critical, and should be the correct distance upstream from the flow structure as stated in the relevant standard for your country. For example, in the ISO standards, the distance should be four to five times the maximum height of the water (Hmax) for a thin plate weir, or three to four times Hmax for a flume. For optimum accuracy, position the transmitter's front face at a height equal to the sum of the maximum flow depth plus the transmitter deadband of 12.2 in. (300 mm) plus an extra 2 in. (50 mm).

It is important that the bottom reference of the transmitter should be related to the datum of the primary measuring device (Figure 4-4).

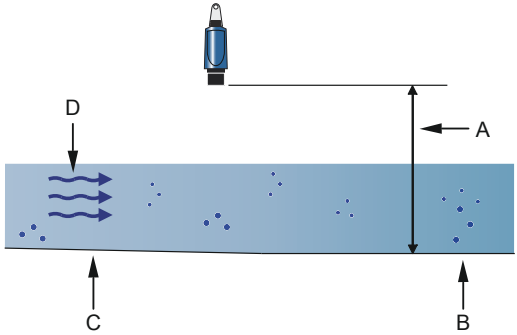
When setting the bottom reference on a 'V'- notch weir, it is important the true invert is used (Figure 4-5) and not the meniscus level.

Figure 4-3: Choosing the Height Position Above a Flow



A. *Transmitter front face*
B. *Hmax*
C. *Transmitter bottom reference = Hmax + 12.2 in. (300 mm) + 2 in. (50 mm)*

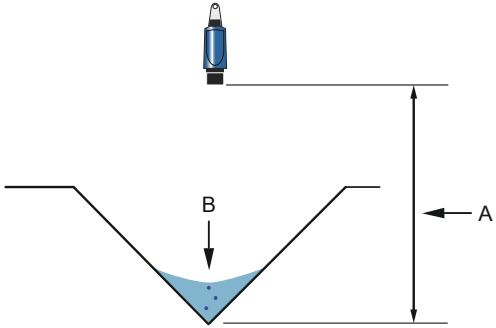
Figure 4-4: Bottom Reference of a Flume or Weir



A. *Transmitter bottom reference*
B. *Primary element (e.g. flume, weir) invert*
C. *Approach channel*
D. *Flow*

Note
The transmitter should be free from a situation where it is likely to "drown" (refer to the relevant standard for further information)

Figure 4-5: Bottom Reference of a 'V' Notch Weir



A. Transmitter bottom reference (i.e. true invert)
B. Meniscus level

The Rosemount 3108 transmitter has a factory fitted remote temperature sensor. The temperature sensor is enclosed in a M8 × 1.5 threaded stainless steel body, and can be installed in a suitable plastic conduit box and clamped in place using a suitable compression-type cable gland.

4.3 Open weir chamber

Mount the remote temperature sensor so that it is representative of the mean air temperature in the chamber and is in a shaded area away from direct sunlight and solar radiation.

4.4 Enclosed or partially-covered flume chamber

Mount the remote temperature sensor in the approach channel, in a shaded area away from direct sunlight and solar radiation. The temperature sensor should be positioned in the weir chamber or flume approach channel so the average air temperature can be accurately measured. The temperature sensor must be protected at all times from direct sunlight and any radiated heat.

In extreme high temperatures, for the best accuracy and stability of level measurement reading, the transmitter should be shrouded to prevent the incidence of direct sunlight and solar radiation. If the flow structure permits, mount the transmitter within the flow channel or chamber.

Note
For some installations, the use of a calibration device is mandatory. Emerson offers the Rosemount Head Verification Device (HVD) for this purpose. See theQuick Installation Guide for more information.

5 Connecting the transmitter

Note
To comply with the Canadian Standards Association (CSA) requirements, the transmitters must be powered from a Rosemount 3490 Series Control Unit, or a class 2 or separate extra-low voltage (SELV) source. Other devices may reset if connecting the transmitter to a multi-drop system while the loop is powered. De-energize loop to avoid devices being reset.

The Rosemount 3107 and 3108 are two-wire, loop-powered transmitters accepting external power supplies as follows:

- 12 to 40 Vdc in a non-hazardous area
- 12 to 30 Vdc in a hazardous area

Each transmitter is supplied with a factory-fitted PVC sheathed, two-core, shielded cable for communications and external power supply connections. There are no cable conduit entries or covers to remove. The cable may be cut to length on site or may be extended using a junction box and suitable extension cable.

5.1 Installation in a non-hazardous area

Procedure

1. Make sure that the power supply is disconnected.
2. Connect the cable wires (Figure 5-1), taking note of the required voltage of 12 to 40 Vdc for non-hazardous applications.

5.2 Installation in a hazardous area

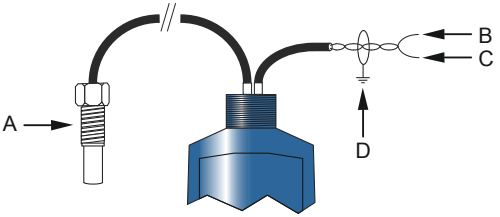
When the transmitters are used with a Rosemount 3490 Series Control Unit, no additional safety barriers are required. If powering the transmitter from any other source, ensure a suitable Intrinsically Safe barrier is fitted in the non-hazardous (safe) area.

To connect the transmitter:

Procedure

1. Make sure that the power supply is disconnected.
2. Connect the cable wires (Figure 5-1), taking note of the restricted voltage of 12 to 30 Vdc for hazardous applications.

Figure 5-1: Wiring



A. Remote temperature sensor (Rosemount 3108 only)
B. Black: 0 Vdc
C. Red: 12 to 40 Vdc (non-hazardous area), 12 to 30 Vdc from protective barrier (hazardous area)
D. Non-hazardous area: connect cable screen to standard ground (Earth) or hazardous area: connect cable screen to I.S. ground (Earth)

6 Configuration

The transmitter can be configured and verified using a Field Communicator or a Rosemount 3490 Series Control Unit.

The parameters in this section are sufficient for a basic level, contents (volume), or open channel flow application. For a more advanced application, refer to the Rosemount 3107 Level and 3108 Flow Transmitters Reference Manual.

6.1 Transmitter base units

When the transmitter is shipped from the factory, the default factory setting for Base Units is “metric” or “imperial ft” depending on the model order code.

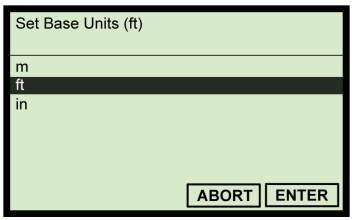
Note
Keep a record of your programmed settings. Changing the base units will reset parameters to their default factory settings in the appropriate units.

6.1.1 Selecting Base Units (Field Communicator or AMS)

To change the transmitter base units:

Procedure

1. From the *Home* screen, select **3: Service Tools**.
2. Select **4: Maintenance**.
3. Select **3: Utilities**.
4. Select **3: Set Base Units**.
5. Select new base units.



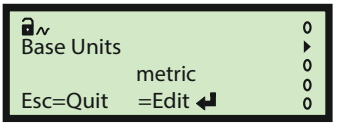
Note
When on-screen messages appear, take action if needed and press “**OK**”.

6.1.2 View or change the transmitter base units (Rosemount 3490 Series Control Unit)

To view or change the transmitter base units:

Procedure

1. From the *Main Menu* screen, select **SETUP**.
2. Select the transmitter (e.g. "**Tx1: 3107**").
3. Select **SYSTEM**, and then select **Base Units**.
4. Select new base units.



Note
To get the same base units on the control unit, switch the power off and then on again. The control unit prompts for the transmitter's Bottom Reference value in the new base units.

6.2 Transmitter bottom reference

This is the transmitter's *Bottom Reference* setting. It is the distance measured vertically along the ultrasonic beam path from the User Preferred Sensor Reference Point (UPSRP) to the Zero Level of a tank or an open channel (Figure 6-4).

The zero level establishes where the transmitter starts to measure the process value. It is not necessary to have the 4 mA output start at the zero level, and the 4 mA starting pointing can be any liquid height above or below this zero level.

Note
This parameter is important for calibrating and configuring the transmitter.

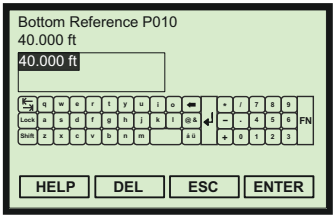
6.2.1 Viewing of changing P010 (Field Communicator or AMS)

To view or change the bottom reference:

Procedure

1. From the *Home* screen, select **2: Configure**.
2. Select **2: Manual Setup**.
3. Select **1: Basic Setup**.
4. Select **2: Bottom Reference P010**.
5. Input the new bottom reference, and press "**ENTER**" to save it.

6. Press **"SEND"** to update the transmitter.

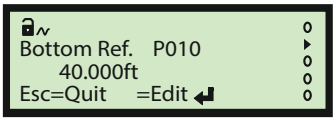


6.2.2 Viewing of changing P010 (Rosemount 3490 Series Control Unit)

To view or change the bottom reference:

Procedure

1. From the *Main Menu* screen, select **SETUP**.
2. Select the transmitter (e.g. **"Tx1: 3107"**).
3. Select **DUTY**, and then select **Bottom Ref**.
4. Follow the on-screen instructions to input and save the new setting.



6.3 Transmitter primary variable units (P012)

This selects alternative display units for the HART Primary Variable (PV), which is reported to a HART Master Device e.g. a Rosemount 3490 Series Control Unit.

Note
Selecting alternative display units does not automatically re-scale the PV value. Use the parameter *Transmitter Scale Factor* (Transmitter scale factor/K-factor (P013)) to manually re-scale the value (or base units) into appropriate units.

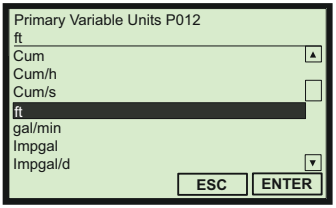
6.3.1 Field Communicator or AMS

To view or change the PV Units:

Procedure

1. From the *Home* screen, select **2: Configure**.
2. Select **2: Manual Setup**.
3. Select **3: Profiling**.
4. Select **1: Primary Variable Units P012**.

5. Select new units, and then press **"Enter"** to save the selection.



6. Press **"SEND"** to update the transmitter.

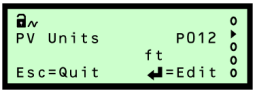
Note
If the HART PV has no units, select and confirm the **"None"**, **"Unknown"**, or **"Not Used"** option as appropriate for the HART Master Device (host).

6.3.2 Viewing or changing P012 (Rosemount 3490 Series Control Unit)

To view or change the existing setting:

Procedure

1. From the *Main Menu* screen, select **SETUP**.
2. Select the transmitter (e.g. **"Tx1: 3107"**).
3. Select **UNITS**, and then select **PV Units**.
4. Follow the on-screen instructions to select and confirm the new setting. If the HART PV has no units, select and confirm the **"None"** option.



5. Select **Quit** to exit to the previous menu.

6.4 Transmitter tank shape/non-linear profile (P011)

This selects the shape of a tank or an open channel, and establishes the linear or non-linear relationship between the live liquid level (height) and the process value (PV) derived from that level. The transmitter is pre-programmed with popular profiles that are mathematical formulas to convert a linear level reading to a flow or volumetric process value (PV). The Current Output is then driven by the flow or volumetric PV.

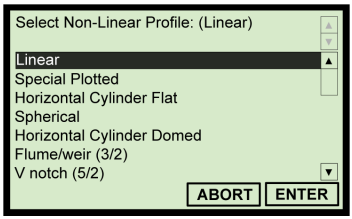
Note
Select "Linear" if the process value (PV) is a level measurement.

6.4.1 Changing P011 (Field Communicator or AMS)

To change the tank shape / non linear profile:

Procedure

1. From the *Home* screen, select **2: Configure**.
2. Select **2: Manual Setup**.
3. Select **3: Profiling**.
4. Select **2: Set Non-Linear Profile**.
5. Select a new profile, and then press **"Enter"** to save the selection.



6. Press **"SEND"** to update the transmitter.

   The selected profile can be viewed at Fast Key sequence 2, 2, 3, 3.

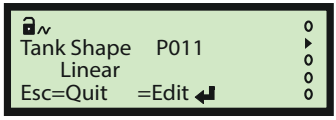
Note
When on-screen messages appear, take action if needed and press **"OK"**.

6.4.2 Viewing or changing P011 (Rosemount 3490 Series Control Unit)

To change the tank shape/non linear profile:

Procedure

1. From the *Main Menu* screen, select **SETUP**.
2. Select the transmitter (e.g. **"Tx1: 3107"**).
3. Select **DUTY**, and then select **Tank Shape**.
4. Follow the on-screen instructions to select and save the new setting.



6.5 Transmitter scale factor/K-factor (P013)

Level measurement

When the process value (PV) is a level measurement in meters, feet, or inches, this parameter converts the level measurement into alternative units before being output. Enter a value of 1.0 if alternative units are not required.

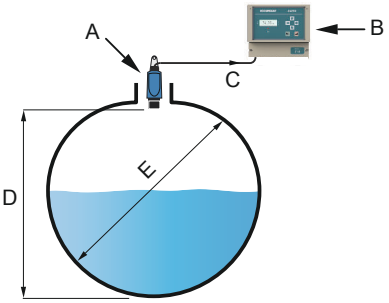
Volume measurement

When the PV is a volume measurement from a *standard non-linear-shaped tank* (e.g. cylinder or sphere), use this parameter to enter the volume of the ideal shaped tank (Figure 6-1).

When the PV is a volume measurement from a *regular-shaped* tank (e.g. square or rectangular), use this parameter to enter the volume change per unit of the base unit.

When the PV is a volume measurement from an *irregular-shaped* tank, use this parameter to enter the maximum volume relating to the Profile Height (Profile height/Power factor (P014)). See also Procedure for P011="Special Plot" for defining the *irregular-shaped* tank.

Figure 6-1: Volume from a Cylinder/Sphere



P013 = Full Volume of Ideal Cylindrical or Spherical Tank of Constant Diameter P014

A. *Rosemount 3107 or 3108*
B. *Rosemount 3490 Series Control Unit*
C. *4–20mA/HART*
D. *Bottom reference (P010)*
E. *Profile height (P014)*

Open channel measurement

When the PV is the flow rate in a *standard* open channel, use this parameter to enter the scale factor ("k" term) in a flow rate calculation. See Transmitter tank shape/non-linear profile (P011) for selecting a flow profile.

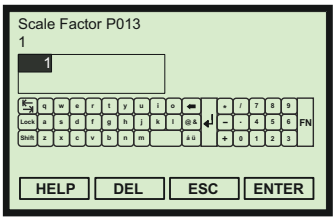
When the PV is the flow rate in an *irregular-shaped* open channel, use this parameter to enter the maximum flow rate. See also Procedure for P011="Special Plot" for defining the *irregular-shaped* channel.

6.5.1 Viewing or changing P013 (Field Communicator or AMS)

To view or change the scale factor/k-factor:

Procedure

1. From the *Home* screen, select **2: Configure**.
2. Select **2: Manual Setup**.
3. Select **3: Profiling**.
4. Select **4: Scale Factor P013** or **4: k-factor P013**, depending on the Non-Linear Profile selected.
5. Input the factor, and press **"ENTER"** to save it.



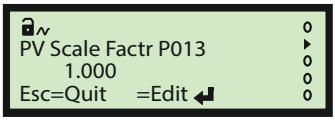
6. Press **"SEND"** to update the transmitter.

6.5.2 Viewing or changing P013 (Rosemount 3490 Series Control Unit)

To view or change the scale factor/k-factor:

Procedure

1. From the *Main Menu* screen, select **SETUP**.
2. Select the transmitter (e.g. **"Tx1: 3107"**).
3. Select **DUTY**, and then select **PV Scale Factor**.



4. Follow the on-screen instructions to edit and save the new setting.

Note
Some flow profiles automatically populate this parameter, and do not allow editing.

6.6 Profile height/Power factor (P014)

Level measurement

This is not used for level measurements. It does not appear on the Field Communicator unless required for volume or flow measurements.

Volume measurement

When the process value (PV) is a volume measurement from a *standard non-linear-shaped* tank (e.g. an ideal horizontal cylinder or a sphere), use this parameter to enter the diameter (see Figure 6-1).

When the PV is a volume measurement from a *regular-shaped* tank (e.g. square or rectangular), this parameter is not used.

When the PV is a volume measurement from an *irregular-shaped* tank, use this parameter to enter the maximum height. See also Procedure for P011="Special Plot" for defining the *irregular-shaped* tank.

Open channel measurement

When the PV is a flow rate in a *standard* open channel, this parameter is used as the power factor ("pwr" term) in a flow rate calculation. See Transmitter tank shape/non-linear profile (P011) for selecting a flow profile.

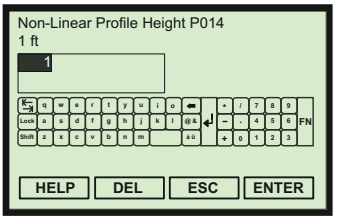
When the PV is the flow rate in an *irregular-shaped* open channel, use this parameter to enter the maximum height. See also Procedure for P011="Special Plot" for defining the *irregular-shaped* channel.

6.6.1 Viewing or changing P014 (Field Communicator or AMS)

To view or change the diameter, maximum height, or power factor:

Procedure

1. From the *Home* screen, select **2: Configure**.
2. Select **2: Manual Setup**.
3. Select **3: Profiling**.
4. Select **5: Non-Linear Profile Height P014** or **5:Power Factor P014**, depending on the Non-Linear Profile selected.
5. Input a new value, and press **"ENTER"** to save it.



6. Press “**SEND**” to update the transmitter.

6.6.2 Viewing or changing P014 (Rosemount 3490 Series Control Unit)

To view or change the diameter, maximum height, or power factor:

Procedure

1. From the *Main Menu* screen, select **SETUP**.
2. Select the transmitter (e.g. “**Tx1: 3107**”).
3. Select **DUTY**.
4. Select **Profile Height**.

5. Follow the on-screen instructions to edit and save the new setting. (Press the **Enter** (↵) key if prompted to change the mode to “off-line”).
6. Select “**Quit**” to exit to the previous menu.

Note
Some flow profiles automatically populate this parameter, and do not allow editing.

6.7 Profile points 1 to 10 (P030 to P039)

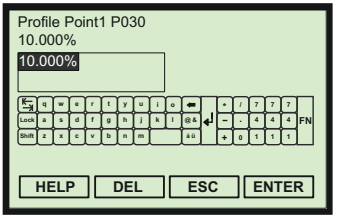
These parameters are used to define an *irregular-shaped* profile for calculating the process value (PV) from a live level reading. See Figure 6-2 and Figure 6-3 for an example of how these parameters are used.

6.7.1 Viewing or changing P030-P039 (Field Communicator or AMS)

To view or change the profile point:

Procedure

1. From the *Home* screen, select **2: Configure**.
2. Select **2: Manual Setup**.
3. Select **3: Profiling**.
4. Select **6: Plot Non-Linear Profile Points**.
5. Select a profile point e.g. **1: Profile Point1 P030**.
6. Input a new value, and then select “**ENTER**” to save it.



7. Press “**SEND**” to update the transmitter.

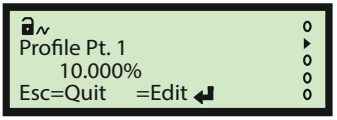
Note
The profile point parameters are only accessible on a Field Communicator if they are required for a selected profile. The points can be changed only if the “Special Plotted” profile has been selected.

6.7.2 Viewing or changing P030-P039 (Rosemount 3490 Series Control Unit)

To view or change a profile point:

Procedure

1. From the *Main Menu* screen, select **SETUP**.
2. Select the transmitter (e.g. “**Tx1: 3107**”).
3. Select **DUTY**, and then **NLP CURVE**.
4. Select a profile point e.g. “**Profile Pt. 1**”.



5. Follow the on-screen instructions to edit and save the new setting. (Press the **Enter** (↵) key if prompted to change the mode to “off-line”).
6. Select “**Quit**” to exit to the previous menu.

6.7.3 Procedure for P011=“Special Plot”

Procedure

1. Draw the graph of process value (PV) versus liquid height, and note the maximum points (Figure 6-3).
2. Enter the maximum volume or flow into Transmitter scale factor/K-factor (P013).

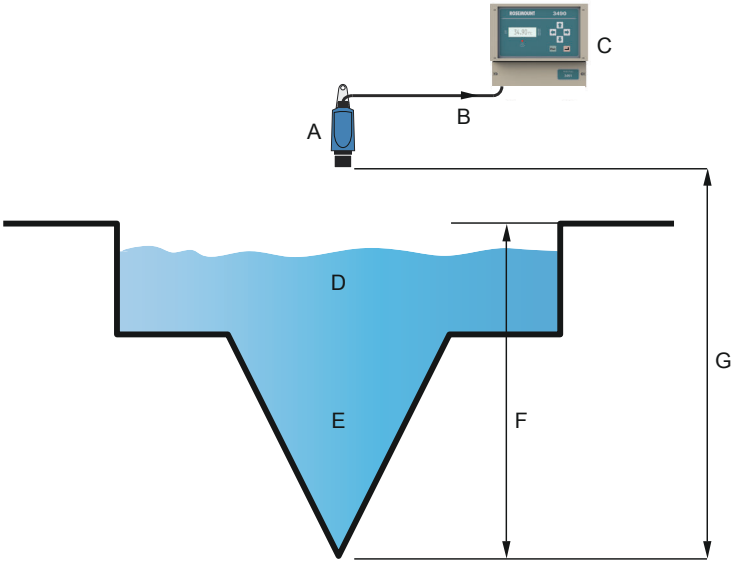
3. Enter the maximum liquid height into Profile height/Power factor (P014).
4. Use parameters Profile points 1 to 10 (P030 to P039) to enter the Y-axis percentages that relate to the X-axis fixed percentages and produce the curve.

Example

In the example, 60 percent of the maximum height (on the X-axis) relates to a percentage of the maximum PV on the Y-axis. The related percentage on the Y-axis, say 55 percent, is entered into parameter Profile Point 6 (P035).

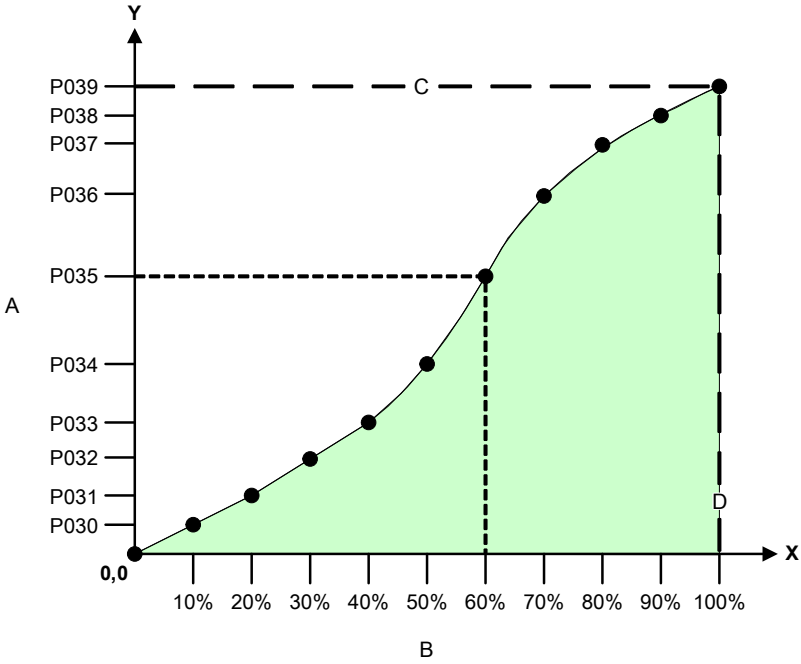
The transmitter interpolates linearly between the plotted points to give an accurate curve fit, which will determine the output process value (PV) from the live level (height) measurement.

Figure 6-2: Volume or Flow from 2-stage Weir



A. Rosemount 3107 or 3108
B. 4–20 mA/HART
C. Rosemount 3490 Series control unit
D. Rectangular weir
E. V-notch weir
F. Profile height (P014)
G. Bottom reference (P010)

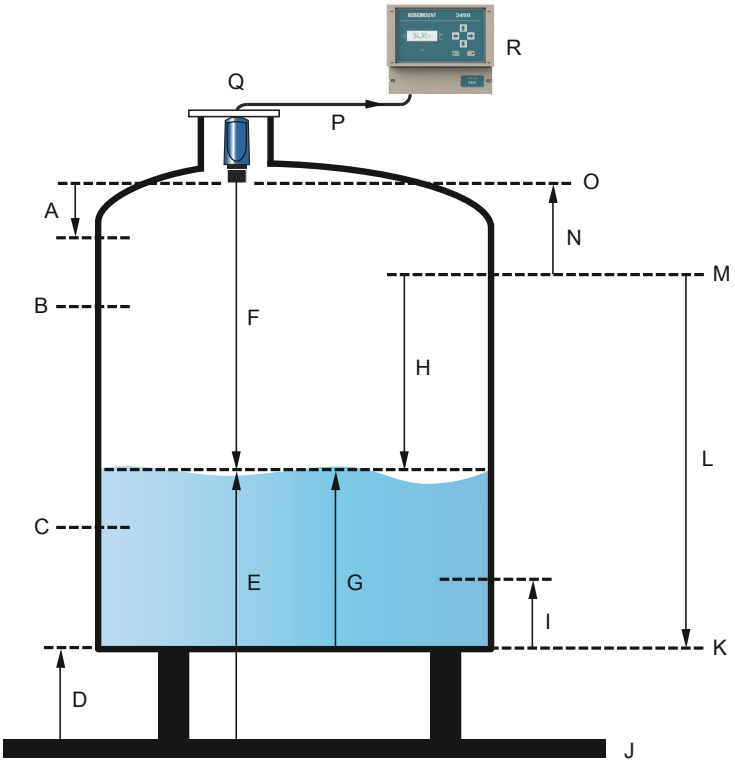
Figure 6-3: Graph of PV versus Height



A. (Entered percentages relating output PV to maximum PV)
B. (Fixed percentages relating height to maximum height)
C. P013 = Maximum volume or flow; P039 = Maximum process value (PV)
D. Maximum height (P014)

6.8 Tank geometry

Figure 6-4: Tank Geometry



A. Upper blanking (P023)
B. 20 mA point
C. 4 mA point
D. Level offset (P069)
E. Level SV (D901)
F. Distance (D910)
G. Liquid Level
H. Distance TV (D902)
I. Lower blanking (P063)
J. Tank Reference Point (TRP)
K. Zero level
L. Bottom reference (P010)
M. User Preferred SRP (UPSRP)
N. Distance offset (P060)
O. Sensor Reference Point (SRP)
P. 4–20 mA/HART
Q. Rosemount 3107 or 3108
R. Rosemount 3490 Series control unit

6.9 Rosemount 3107 and 3108 parameters on the Rosemount 3490

The process value (e.g. liquid level) is indicated in the HART Primary Variable (D900), which drives the 4–20 mA output signal.

Parameter	Fast key	3490 Series menu navigation
Lower blanking (P063)	2, 2, 5, 6	SETUP,[Tag], ENGINEERING, Lower blanking
Upper blanking (P023)	2, 2, 5, 5	SETUP,[Tag], ENGINEERING, Upper blanking
Distance offset (P060)	2, 2, 2, 2	SETUP,[Tag], DUTY, Distance offset
Level offset (P069)	2, 2, 2, 4	SETUP,[Tag], DUTY, Level offset
20mA point (1)	2, 2, 1, 3	SETUP, [Tag], OUTPUT, CURRENT, Upper range val.
4mA point(1)	2, 2, 1, 4	SETUP, [Tag], OUTPUT, CURRENT, Lower range val.
Primary variable (D900)	1, 2, 1	MONITOR,[Tag], READINGS, VARIABLES, Primary variable
Level SV (D901)	1, 2, 2	MONITOR,[Tag], READINGS, VARIABLES, Level SV
Distance TV (D902)	3, 2, 1, 3	MONITOR,[Tag], READINGS, VARIABLES, Distance TV
Distance (D910)	3, 1, 2, 1, 1	MONITOR,[Tag], DIAGNOSTICS, Distance

(1) Configure this parameter if not communicating HART variables (PV, SV, TV, and FV) to a host.

7 Product Certifications

7.1 Approved manufacturing locations

Rosemount Inc. – Chanhassen, Minnesota, USA

Rosemount Measurement Limited – Slough, Berkshire, United Kingdom

Emerson Asia Pacific Private Limited – Singapore

7.2 European Union directive information

The EU Declaration of Conformity begins on page 35, and the most recent revision can be found at Emerson.com/Rosemount.

ATEX directive (94/9/EC)

Emerson complies with the ATEX directive.

Pressure Equipment Directive (PED) (97/23/EC)

The Rosemount 3107 and 3108 are outside the scope of PED directive.

Electro Magnetic Compatibility (EMC) (2004/108/EC)

EN 61326-1:2006

7.3 MCERTS certification

MCERTS certification (Rosemount 3108 only)

Sira certificate number: MC080131

7.4 Hazardous locations certificates

Note
Refer to the housing label to identify the approvals for your transmitter.

7.4.1 American and Canadian certifications
I5 Factory Mutual (FM) Approval Intrinsically Safe

Markings:	Intrinsically Safe for Class I, Division 1, Groups A, B, C, and D Zone Marking: Class I, Zone 0, AEx ia IIC Intrinsically Safe when installed in accordance with Rosemount drawing 71097/1300 IP66, IP68
Temperature Codes:	T6 (T_a = 55 °C) T4 (T_a = 60 °C)
Entity Parameters:	VMax = 30 V, IMax = 120 mA, Pi = 0.82 W Li = 27 µH, Ci = 5 nF

Special Condition for Safe Use (X):

1. To protect against UV exposure when installed outdoors, the transmitter shall be installed in accordance with the section Environmental.

I6 Canadian Standards Association (CSA)

Certificate Number:	02 CSA 1352094 X
Markings:	Ex ia IIC Intrinsically Safe when installed with certified barrier meeting transmitter
Temperature Codes:	T4 at Ta = –40 to 60 °C T6 at Ta = –40 to 55 °C
Entity parameters:	Ui=30V, Ii=120mA, Pi=0.82W, Ci=5nF, Li=27uH

Special Condition for Safe Use (X):

1. Risk of electrostatic charge build up on plastic surfaces. Clean only with a damp cloth.

7.4.2 European certifications

I1 ATEX Intrinsic Safety

Certificate number:	Sira 09ATEX2299X
Markings:	II 1G, Ex ia IIC Ga T6 (Ta = –40 to 55 °C), T4 (Ta = –40 to 60 °C) Ui = 30V, Ii = 120mA, Pi = 0.82W, Li = 27µH, Ci = 5nF IP66, IP68

7.4.3 Rest of the world certifications

I7 IECEx Intrinsic Safety

Certificate No.:	IECEx SIR 09.0124X
Markings:	Ex ia IIC Ga T6 (Ta = –40 to 55 °C), T4 (Ta = –40 to 60 °C) Ui = 30V, Ii = 120mA, Pi = 0.82W, Li = 27µH, Ci = 5nF IP66, IP68

Special Conditions for Safe Use (X):

Model numbers covered: 3107*****I1****, 3108*****I1****, 3107*****I7****, and 3108*****I7****

('*' indicates options in construction, function and materials).

The following instructions apply to equipment covered by certificate number Sira 09ATEX2299X:

1. The equipment may be used with flammable gases and vapors with apparatus groups IIA, IIB, and IIC, and with temperature classes T1, T2, T3, T4, T5, and T6.
2. Installation of this equipment shall be carried out by suitably trained personnel, in accordance with the applicable code of practice.
3. The equipment is not intended to be repaired by the user and is to be replaced by an equivalent certified unit. Repairs should only be carried out by the manufacturer or approved repairer.
4. If the equipment is likely to come into contact with aggressive substances, it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.
   Aggressive Substances e.g. acidic liquids or gases that may attack metals or solvents that may affect polymeric materials.
   Suitable Precautions e.g. regular checks as part of routine inspections or establishing from the material's data sheet that it is resistant to specific chemicals.
5. The apparatus electronics is only certified for use in ambient temperatures in the range of –40 to 60 °C for T4 or –40 to 55 °C for T6. It should not be used outside this range.
6. It is the responsibility of the user to ensure the voltage and current limits for this equipment are not exceeded.
7. Technical Data:
   a. Materials of construction:
      UPVC moulded body and front face. PVC sheathed 2 core shielded cable. Glass filled nylon lock nut. 316SS hanging bracket. Epoxy adhesive sealant.
   b. Coding:
      ATEX: II 1 G, Ex ia IIC Ga, T6 (Ta = –40 to 55 °C), T4 (Ta = –40 to 60 °C)
      IECEx: Ex ia IIC Ga, T6 (Ta = –40 to 55 °C), T4 (Ta = –40 to 60 °C)
      Ui = 30V, Ii = 120mA, Pi = 0.82W, Li = 27µH, Ci = 5nF
8. Special conditions for safe use:
   a. The equipment must not be installed directly in any process where the enclosure might be charged by the rapid flow of non-conductive media.

b. The equipment must only be cleaned with a damp cloth.

c. Do not mount the 3107/3108 on a structure that is subject to vibration, or in a position where damage may be caused by impact or thermal stress.

d. The equipment is not intended to be used in areas exposed to dust.

9. Manufacturer:
   Rosemount Measurement Limited
   158 Edinburgh Avenue, Slough, Berkshire, SL1 4UE, UK

7.5 EU Declaration of Conformity

Figure 7-1: EU Declaration of Conformity

EMERSON

EU Declaration of Conformity

No: RMD 1086 Rev. C

CE

We,

Rosemount Measurement Limited
158 Edinburgh Avenue
Slough, Berkshire, SL1 4UE
United Kingdom

declare under our sole responsibility that the product,

Rosemount™ 3100 Series Ultrasonic Level Transmitter
(3107, 3108)

manufactured by,

Rosemount Measurement Limited
158 Edinburgh Avenue
Slough, Berkshire, SL1 4UE
United Kingdom

to which this declaration relates, is in conformity with the provisions of the European Union Directives, including the latest amendments, as shown in the attached schedule.

Assumption of conformity is based on the application of the harmonized standards and, when applicable or required, a European Union notified body certification, as shown in the attached schedule.

(signature)	Technical Director (function)
Timothy Hill (name)	7-May-19; Slough, GB (date of issue & place)

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EMERSON

EU Declaration of Conformity

No: RMD 1086 Rev. C

CE

EMC Directive (2014/30/EU)

3107HP*PI1****, 3108HP*PI****

Harmonized Standards: EN 61326-1:2013, EN 61326-2.3:2013

ATEX Directive (2014/34/EU)

3107HP*PI1****, 3108HP*PI****

Sira 09ATEX2299X – Intrinsically safe

Equipment Group II, Category 1 G (Ex ia IIC T4/T6 Ga)

Harmonized Standards: EN 60079-0:2012/A11:2013, EN 60079-11:2012, EN 60079-26:2015

ATEX Directive Notified Body

Sira Certification Service [Notified Body Number: 0518]
Unit 6, Hawarden Industrial Park,
Hawarden, CH5 3US, United Kingdom

(Minor variations in design to suit the application and/or mounting requirements are identified by alpha/numeric characters where indicated * above)

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7.6 China RoHS

含有China RoHS管控物质超过最大浓度限值的部件型号列表 Rosemount 3107/8
List of Rosemount 3107/8 Parts with China RoHS Concentration above MCVs

部件名称 Part Name	有害物质 / Hazardous Substances					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr +6)	多溴联苯 Polybrominated biphenyls (PBB)	多溴联苯醚 Polybrominated diphenyl ethers (PBDE)
电子组件 Electronics Assembly	X	O	O	O	O	O
壳体组件 Housing Assembly	O	O	O	O	O	O
传感器组件 Sensor Assembly	X	O	O	O	O	O

本表格系依据SJ/T11364的规定而制作.
This table is proposed in accordance with the provision of SJ/T11364.

O: 意为该部件的所有均质材料中该有害物质的含量均低于GB/T 26572所规定的限量要求.
O: Indicate that said hazardous substance in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

X: 意为在该部件所使用的所有均质材料里，至少有一类均质材料中该有害物质的含量高于GB/T 26572所规定的限量要求.
X: Indicate that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.

Quick Start Guide
00825-0200-4840, Rev. BC
August 2019

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