Quick Start Guide
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Rosemount™ 2130 Level Switch

Vibrating Fork



ROSEMOUNT™

EMERSON.

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1 About this guide

This Quick Start Guide provides basic guidelines for the Rosemount 2130. Refer to the Rosemount 2130 Reference Manual for more instructions. The manual and this guide are also available electronically at Emerson.com/Rosemount.

1.1 Safety messages

⚠ WARNING

Failure to follow safe installation and servicing guidelines could result in death or serious injury.

Ensure the level switch is installed by qualified personnel and in accordance with applicable code of practice.

Use the level switch only as specified in this manual. Failure to do so may impair the protection provided by the level switch.

The weight of a level switch with a heavy flange and extended fork length may exceed 37 lb. (18 kg). A risk assessment is required before carrying, lifting, and installing the level switch.

Repair, e.g. substitution of components, etc. may jeopardize safety and is under no circumstances allowed.

⚠ WARNING

Explosions could result in death or serious injury.

Verify the operating atmosphere of the level switch is consistent with the appropriate hazardous locations certifications.

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.

In explosion-proof/flameproof and non-incendive installations, do not remove the housing cover when power is applied to the level switch.

The housing cover must be fully engaged to meet flameproof/explosion-proof requirements.

⚠ WARNING

Electrical shock could cause death or serious injury.

Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

Ensure the power to the level switch is off, and the lines to any other external power source are disconnected or not powered while wiring the level switch.

Ensure the wiring is suitable for the electrical current and the insulation is suitable for the voltage, temperature, and environment.

⚠ WARNING

Process leaks could result in death or serious injury.

Ensure the level switch is handled carefully. If the process seal is damaged, gas might escape from the vessel (tank) or pipe.

⚠ 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.

⚠ CAUTION

Hot surfaces

The flange and process seal may be hot at high process temperatures. Allow to cool before servicing.

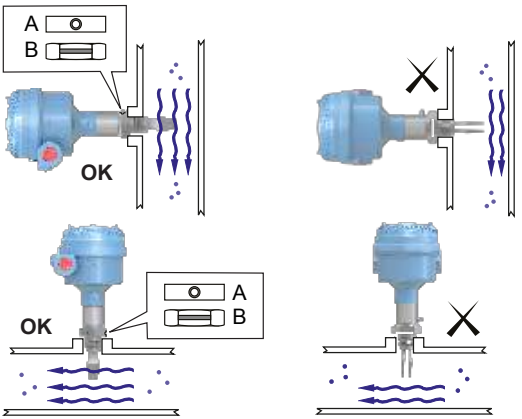


2 Installation

2.1 Fork alignment in a pipe installation

The fork is correctly aligned by positioning the groove or notch as indicated (Figure 2-1).

Figure 2-1: Correct Fork Alignment for Pipe Installation

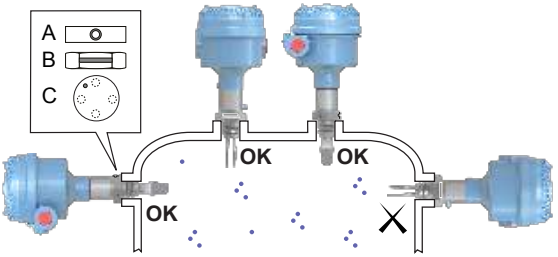


A. Tri Clamp process connections have a circular notch
B. Threaded process connections have a groove

2.2 Fork alignment in a vessel (tank) installation

The fork is correctly aligned by positioning the groove or notch as indicated (Figure 2-2).

Figure 2-2: Correct Fork Alignment for Vessel (Tank) Installation



A. Tri Clamp process connections have a circular notch
B. Threaded process connections have a groove
C. Flanged process connections have a circular notch

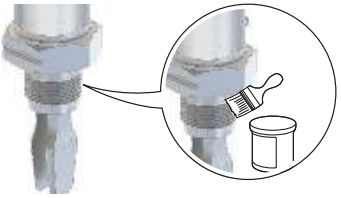
2.3 Mounting the threaded version

2.3.1 Threaded vessel (tank) or pipework connection

Procedure

1. Seal and protect the threads. Use anti-seize paste or PTFE tape according to site procedures.

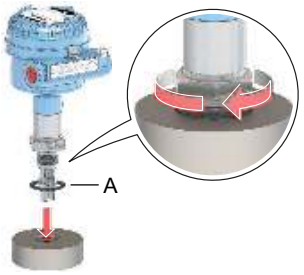
   A gasket may be used as a sealant for BSPP (G) threaded connections.



2. Screw the level switch into the process connection.

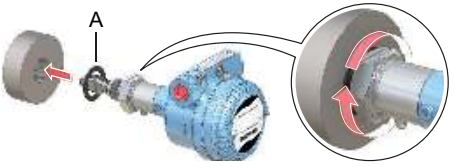
Note
Tighten using the hexagon nut only.

Figure 2-3: Vertical Installation



A. Gasket for BSPP (G) threaded connection

Figure 2-4: Horizontal Installation

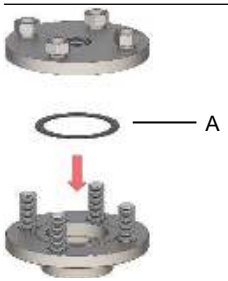


A. Gasket for BSPP (G) threaded connection

2.3.2 Threaded flange connection

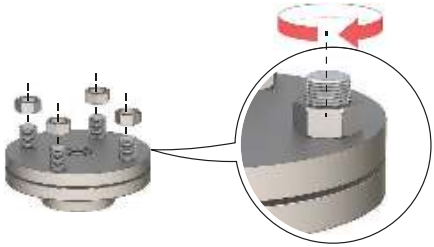
Procedure

1. Place the customer-supplied flange and gasket on the vessel (tank) nozzle.



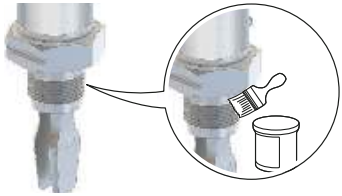
A. Gasket (customer supplied)

2. Tighten the bolts and nuts with sufficient torque for the flange and gasket.



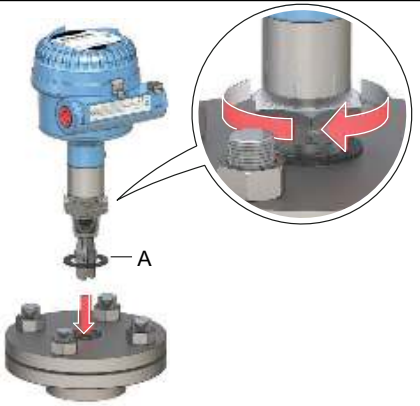
3. Seal and protect the threads. Use anti-seize paste or PTFE tape according to site procedures.

   A gasket may be used as a sealant for BSPP (G) threaded connections.



4. Screw the level switch into the flange thread.

Note
Tighten using the hexagon nut only.

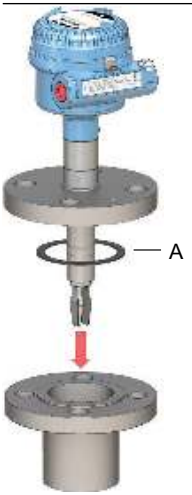


A. Gasket for BSPP (G) threaded connection

2.4 Mounting the flanged version

Procedure

1. Lower the level switch into the nozzle.



A. Gasket (customer supplied)

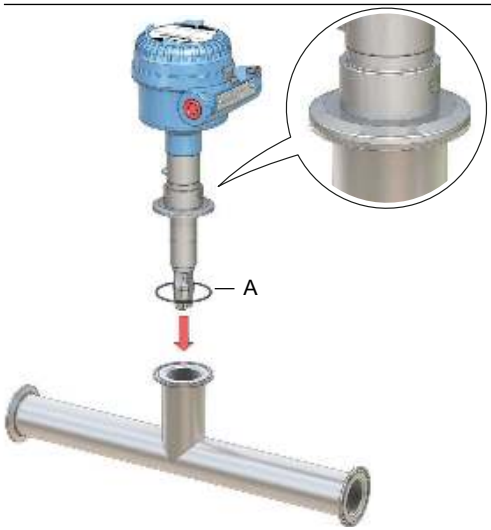
2. Tighten the bolts and nuts with sufficient torque for the flange and gasket.



2.5 Mounting the Tri Clamp version

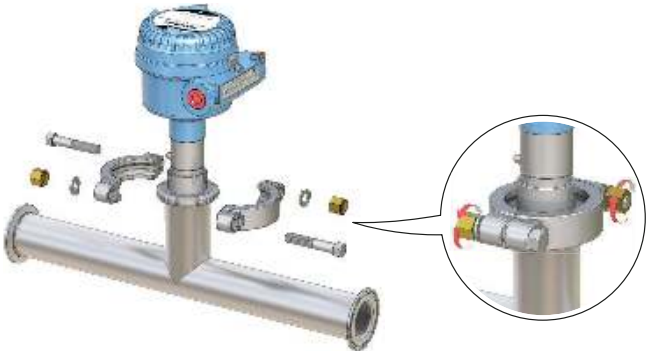
Procedure

1. Lower the level switch into the flange face.



A. Seal (supplied with Tri Clamp)

2. Fit the Tri Clamp.



3 Prepare the electrical connections

3.1 Cable selection

Use 26–14 AWG (0.13 to 2.5 mm^2) AWG wiring. Twisted-pairs and shielded wiring is recommended for environments with high EMI (electromagnetic interference). Two wires can be safely connected to each terminal screw.

3.2 Cable glands/conduits

For intrinsically safe, explosion-proof/flameproof, and dust-proof installations, only use certified cable glands or conduit entry devices. Ordinary location installations can use suitably rated cable glands or conduit entry devices to maintain the Ingress Protection (IP) rating.

Unused conduit entries must always be sealed with a suitably rated blanking/stopping plug.

Note
Do not run signal wiring in conduit or open trays with power wiring or near heavy electrical equipment.

3.3 Power supply

The power supply requirements are dependent on the electronics selected.

- Direct load switching electronics: 20 - 60 Vdc or 20 - 264 Vac (50/60 Hz)
- PNP/PLC electronics: 20 - 60 Vdc
- Relay DPCO (Double Pole Changeover) electronics: 20 - 60 Vdc or 20 - 264 Vac (50/60 Hz)
- Fault and alarm relays (2 x SPCO) electronics: 20 - 60 Vdc or 20 - 264 Vac (50/60 Hz)
- NAMUR electronics: 8 Vdc
- 8/16 mA electronics: 24 Vdc

3.4 Hazardous areas

When the device is installed in hazardous areas (classified locations), local regulations and the conditions-of-use specified in applicable certificates must be observed. Review the Rosemount 2130 Product Certifications document for information.

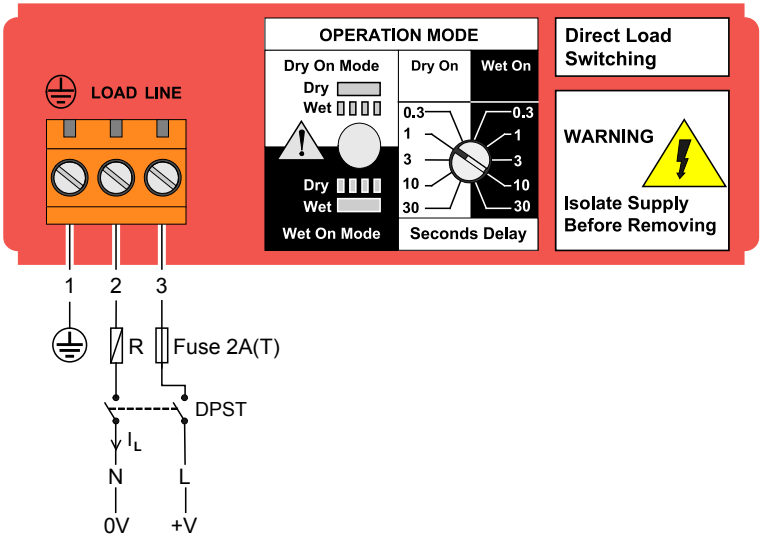
3.5 Wiring diagrams

⚠ CAUTION

- Before use, check the cable glands and blanking plugs are suitably rated.
- Isolate supply before connecting the switch or removing the electronics.
- The Protective Earth (PE) ⏚ terminal must be connected to an external earthing system.

3.5.1 Direct load switching cassette

Figure 3-1: Direct Load Switching (2-wire) Cassette (Red Label) – Code L



R = External load (must be fitted)

N = Neutral

L = Live

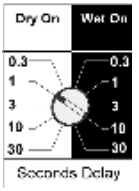
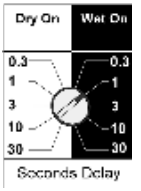
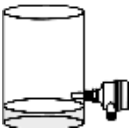
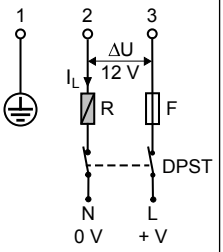
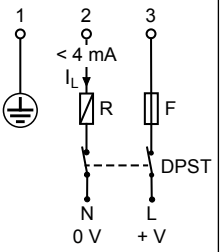
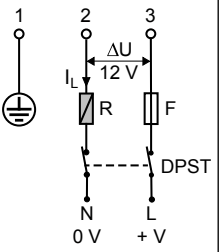
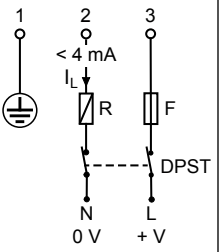
Note

A DPST (Double Pole, Single Throw) on/off switch must be fitted for safe disconnection of the power supply. Fit the DPST switch as near as possible to the level switch. Keep the DPST switch free of obstructions. Label the DPST switch to indicate it is the supply disconnection device for the level switch.

Table 3-1: Electrical Parameters

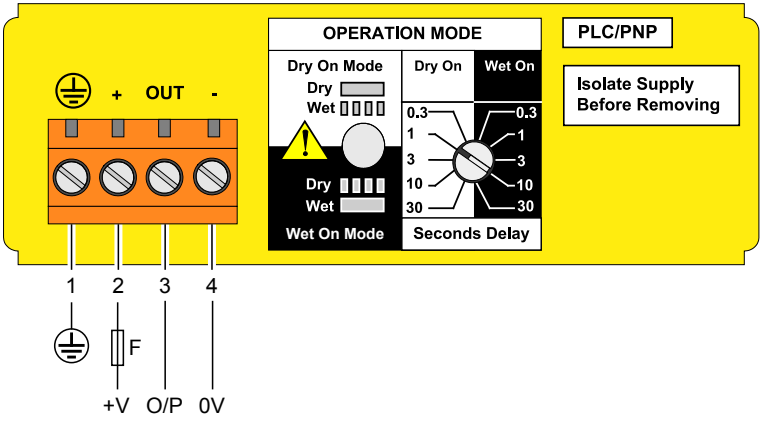
Parameter	Value
U	20 - 60 Vdc or 20 - 264 Vac (50/60 Hz)
I_{OFF}	< 4 mA
I_L	20 - 500 mA
I_{PK}	5 A, 40 ms (inrush)

Table 3-2: Direct Load Functions

Mode: dry on, high level alarm		Mode: wet on, low level alarm	
			
			
			
 LED on continuously	 LED flashes every second	 LED on continuously	 LED flashes every second
 = Load on  = Load off			

3.5.2 PNP/PLC cassette

Figure 3-2: PNP/PLC (3-wire) Cassette (Yellow Label) – Code P

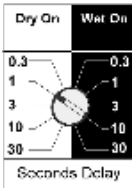
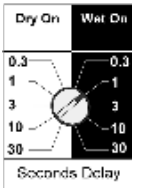
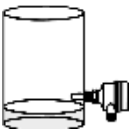
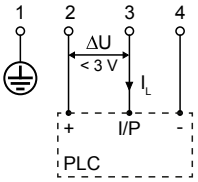
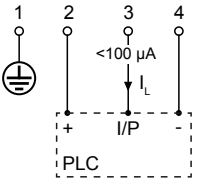
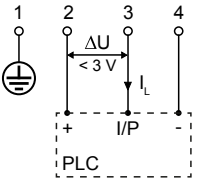
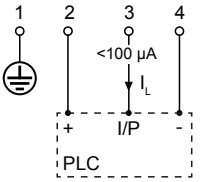
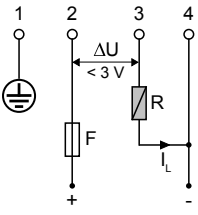
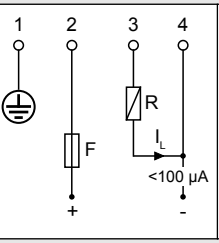
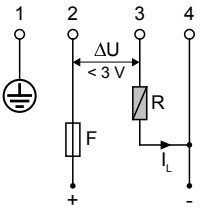
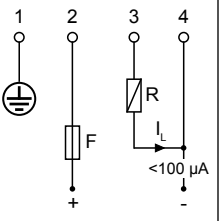


F = Fuse 2A(T)

Table 3-3: Electrical Parameters

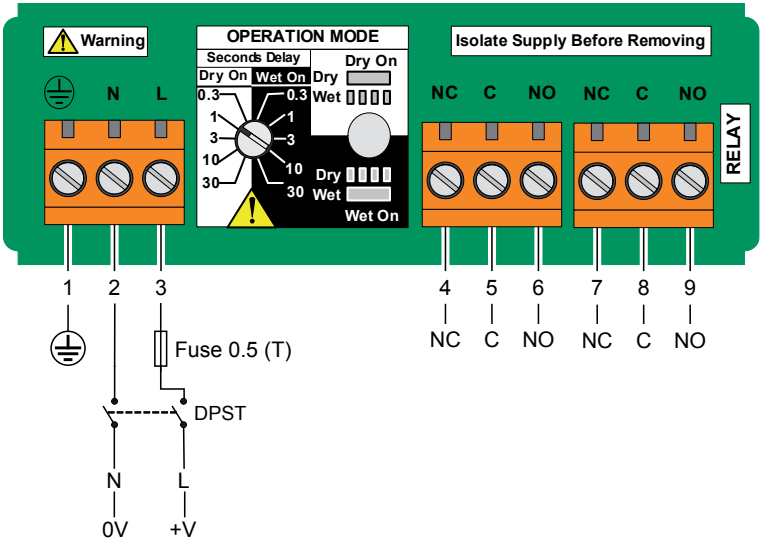
Parameter	Value
U	20 - 60 Vdc
I	< 4 mA + I_L
$I_{L\,(OFF)}$	< 100 µA
$I_{L(MAX)}$	0 - 500 mA
I_{PK}	5 A, 40 ms (inrush)
$U_{OUT(ON)}$	U - 2.5 Vdc (20 °C) U - 2.75 Vdc (-40 to 80 °C)

Table 3-4: PNP/PLC Cassette Functions

Mode: dry on, high level alarm		Mode: wet on, low level alarm	
			
			
PLC (positive input)			
			
PNP dc			
			
LED			
 LED on continuously	 LED flashes every second	 LED on continuously	 LED flashes every second

3.5.3 Relay DPCO cassette (standard version)

Figure 3-3: Relay DPCO Cassette, Standard Version (Green Label) – Code D



Note

A DPST (Double Pole, Single Throw) on/off switch must be fitted for safe disconnection of the power supply. Fit the DPST switch as near as possible to the level switch. Keep the DPST switch free of obstructions. Label the DPST switch to indicate it is the supply disconnection device for the level switch.

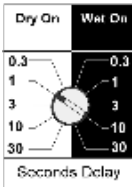
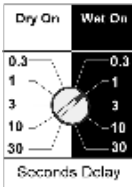
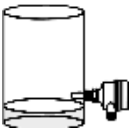
Table 3-5: Electrical Parameters

Parameter	Value
U	20 - 60 Vdc or 20 - 264 Vac (50/60Hz)
I	< 6 mA

Table 3-6: NC, C, and NO Terminals

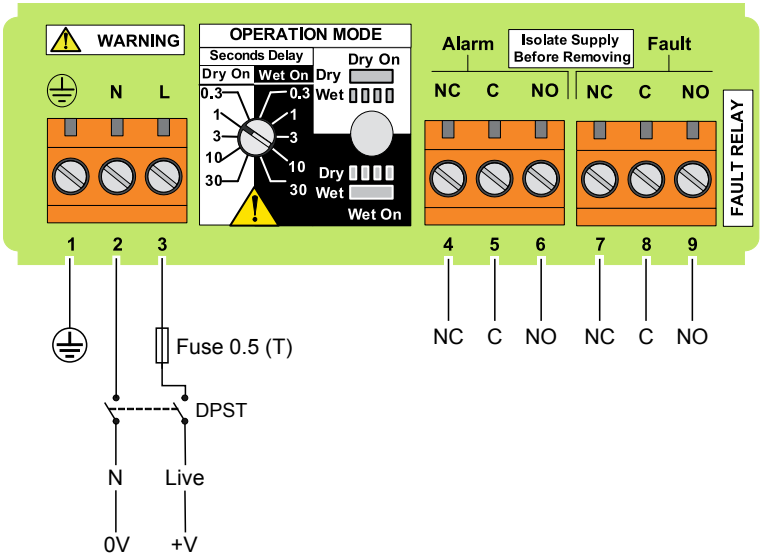
Parameter		Resistive load	Inductive load
cos ϕ		1	0.4
L/R		0 ms	7 ms
I_{MAX}		5 A	3.5 A
U_{MAX}	ac	250 V	250 V
	dc	30 V	30 V
P_{MAX}	ac	1250 VA	875 VA
	dc	240 W	170 W

Table 3-7: Relay Cassette Functions

Mode: dry on, high level alarm		Mode: wet on, low level alarm	
			
			
			
 LED on continuously	 LED flashes every second	 LED on continuously	 LED flashes every second

3.5.4 Fault and alarm relays (2 x SPCO) cassette

Figure 3-4: Fault and Alarm Relay Outputs Cassette (Light Green Label) – Code D with Option R2264



Note

A Double Pole, Single Throw on/off switch must be fitted for safe disconnection of the power supply. Fit the DPST switch as near as possible to the level switch. Keep the DPST switch free of obstructions. Label the DPST switch to indicate it is the supply disconnection device for the level switch.

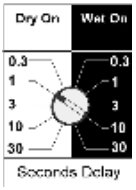
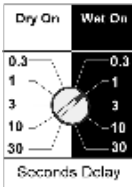
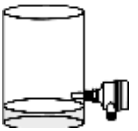
Table 3-8: Electrical Parameters

Parameter	Value
U	20 - 60 Vdc or 20 - 264 Vac (50/60Hz)
I	< 6 mA

Table 3-9: NC, C, and NO Terminals

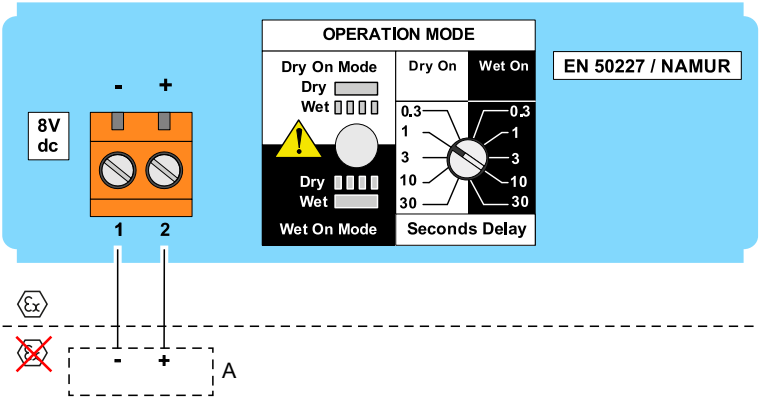
Parameter		Resistive load	Inductive load
cos ϕ		1	0.4
L/R		0 ms	7 ms
I_{MAX}		5 A	3.5 A
U_{MAX}	ac	250 V	250 V
	dc	30 V	30 V
P_{MAX}	ac	1250 VA	875 VA
	dc	240 W	170 W

Table 3-10: Relay Cassette Functions

Mode: dry on, high level alarm				Mode: wet on, low level alarm			
							
							
(No alarm)	(No fault)	(Alarm)	(No fault)	(No alarm)	(No fault)	(Alarm)	(No fault)
							
 LED on continuously		 LED flashes every second		 LED on continuously		 LED flashes every second	

3.5.5 NAMUR cassette

Figure 3-5: NAMUR Cassette (Light Blue Label) – Code N



A. A certified intrinsically safe isolating amplifier to IEC 60947-5-6

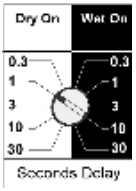
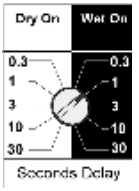
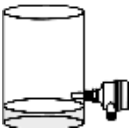
Note

- This cassette is suitable for Intrinsically Safe (IS) applications and requires a certified isolating barrier. See the Rosemount 2130 Product Certifications document for Intrinsically Safe approvals.
- This electronics cassette is also suitable for non-hazardous (safe) area applications.
- It can only be interchanged with the 8/16 mA cassette.
- Do not exceed 8 Vdc.

Table 3-11: Electrical Parameters

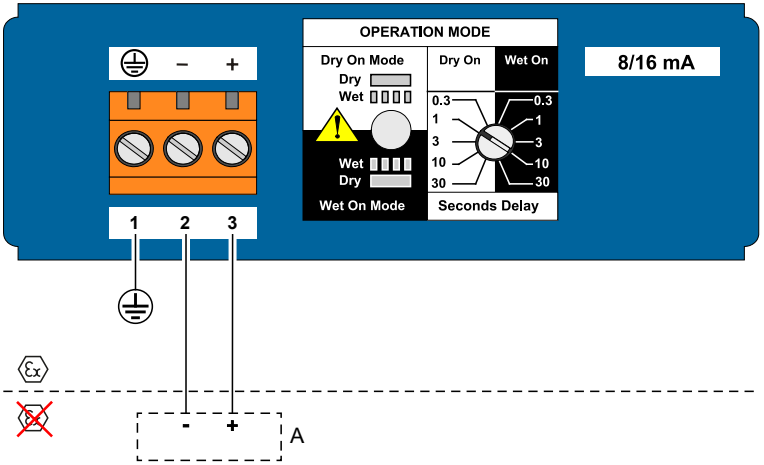
Parameter	Value
I_{ON}	2.2 - 2.5 mA
I_{OFF}	0.8 - 1.0 mA
I_{FAULT}	< 1.0 mA

Table 3-12: NAMUR Cassette Functions

Mode: dry on, high level alarm		Mode: wet on, low level alarm	
			
			
(-) (+) 1 2 > 2.2 mA	(-) (+) 1 2 < 1.0 mA	(-) (+) 1 2 > 2.2 mA	(-) (+) 1 2 < 1.0 mA
			
LED on continuously	LED flashes every second	LED on continuously	LED flashes every second

3.5.6 8/16 mA cassette

Figure 3-6: 8/16 mA Cassette (Dark Blue Label) – Code M



A. A certified intrinsically safe isolating amplifier to IEC 60947-5-6

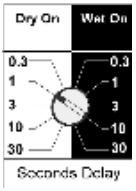
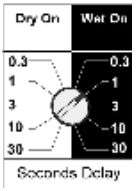
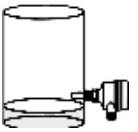
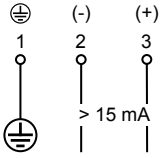
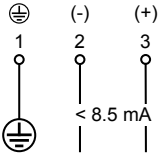
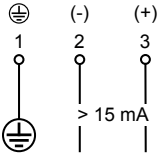
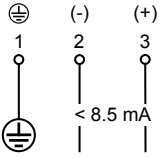
Note

- This cassette is suitable for Intrinsically Safe (IS) applications and requires a certified isolating barrier. See the Rosemount 2130 Product Certifications document for Intrinsically Safe approvals.
- This electronics cassette is also suitable for non-hazardous (safe) area applications. In this case, U = 11 - 36 Vdc.
- It can only be interchanged with a NAMUR cassette.

Table 3-13: Electrical Parameters

Parameter	Value
U	24 Vdc Nominal
I_{ON}	15 - 17 mA
I_{OFF}	7.5 - 8.5 mA
I_{FAULT}	< 3.7 mA

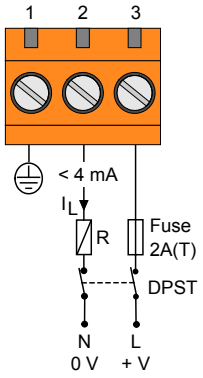
Table 3-14: 8/16 mA Cassette Functions

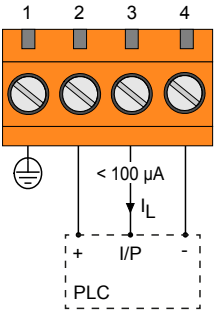
Mode: dry on, high level alarm		Mode: wet on, low level alarm	
			
			
			
 LED on continuously	 LED flashes every second	 LED on continuously	 LED flashes every second

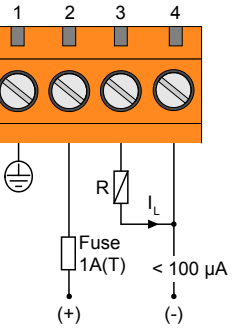
3.5.7 Fault condition detection (self-check mode only)

When a fault condition is detected in the self-check operating mode, the heartbeat LED flashes once every half a second and every third flash is missed. The output from the level switch will then be as Table 3-15.

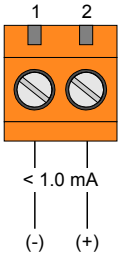
Table 3-15: Fault Condition Detection (Self-check Mode Only)

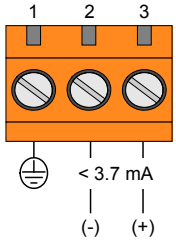
<table>
<tr><th>Direct load</th><th>PLC</th><th>PNP dc</th></tr>
<tr><td>

(=Fault)</td><td>

(=Fault)</td><td>

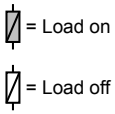
(=Fault)</td></tr>
<tr><th>DPCO relay</th><th>NAMUR</th><th>8/16 mA</th></tr>
<tr><td>

(=Fault)</td><td>

(=Fault)</td><td>

(=Fault)</td></tr>
<tr><th colspan="2">Fault and alarm (2 x SPCO) relays</th><th></th></tr>
<tr><td>Alarm relay


(=No alarm)</td><td>Fault relay


(=Fault)</td><td>
</td></tr>
</table>

3.6 Grounding

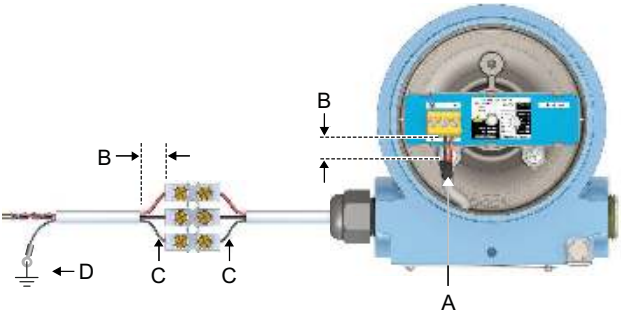
Make sure grounding is done according to national and local electrical codes. Failure to do so may impair the protection provided by the equipment.

3.6.1 Signal cable shield grounding

Make sure the instrument cable shield is:

- Trimmed close and insulated from touching the housing.
- Continuously connected throughout the segment.
- Connected to a good earth ground at the power supply end.

Figure 3-7: Signal Cable Shield Grounding at Power Supply End

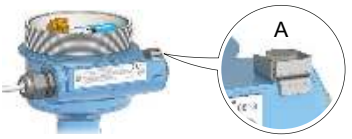


A. Trim shield and insulate
B. Minimize distance
C. Trim shield
D. Connect shield back to the power supply ground

3.6.2 Grounding the housing

The most effective grounding method for the metal housing is a direct connection to earth ground with minimal impedance. Housings with NPT conduit entries do not have an earth ground point and must use the fork earth.

Figure 3-8: Ground Screws



A. External ground screw

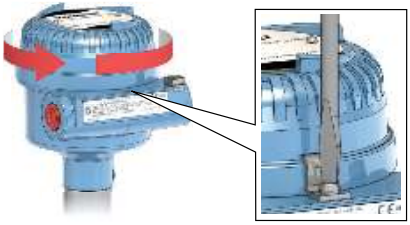
4 Connect wiring and power up

Procedure

1. ⚠ Verify the power supply is disconnected.
2. Remove the field terminals cover.

   In an explosion-proof/flameproof installation, do not remove the level switch cover when power is applied to the unit. The cover must also not to be removed in extreme environmental conditions.

   Versions of the Rosemount 2130 with explosion-proof/flameproof approvals have a cover-lock to be undone first.



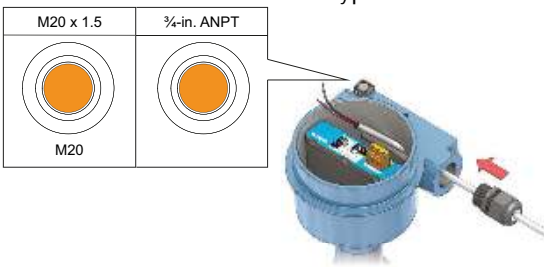
3. Remove the plastic plugs.



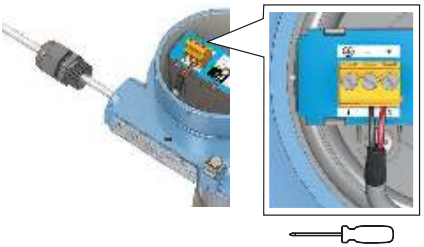
4. Pull cables through the cable gland/conduits.

   Cassettes with a single terminal only require one cable.

   Identification of thread size and type:

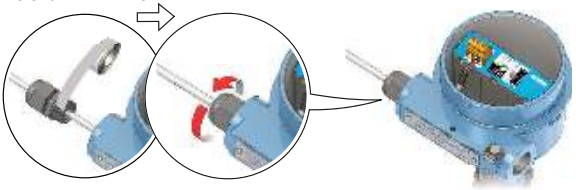


5. Connect the cable wires (see Wiring diagrams for other cassettes).



6. Ensure proper grounding.
7. Tighten the cable glands.

   Apply PTFE tape or other sealant to the threads.



Note
Make sure to arrange the wiring with a drip loop.



8. Plug and seal the unused conduit connection to avoid moisture and dust accumulation inside the housing.

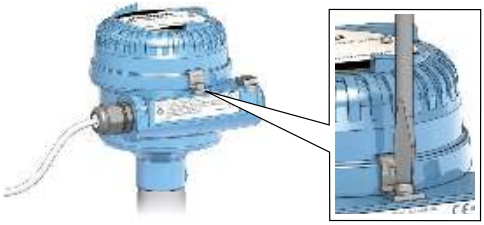
   Apply PTFE tape or other sealant to the threads.



9. Attach and tighten the cover.
   Make sure the cover is fully engaged.



10. ⚠ Required for explosion-proof/flameproof installations only:
    The cover must be fully engaged to comply with explosion-proof requirements.
11. Re-lock the cover.



12. Connect the power supply.

5 Configuration

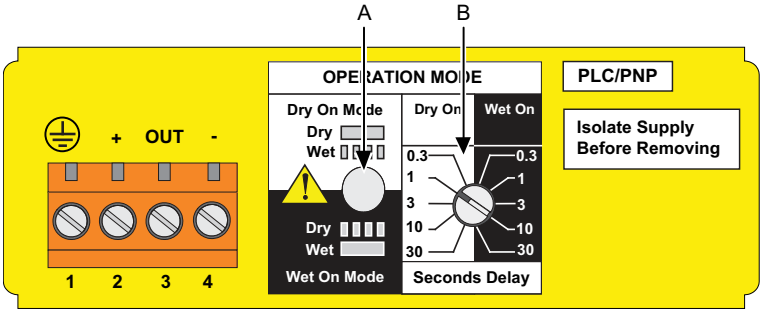
5.1 Output mode and time delay

All electronics cassettes have a rotating switch for setting the output to be "Dry On" (on when the fork is sufficiently dry) or "Wet On" (on when the fork is sufficiently wet).

The electronics uses hysteresis to help prevent constant switching of the output from dry-to-wet and wet-to-dry states due to splashing or intermediate conditions. To further prevent false switching, the rotating switch also sets a time delay of up to 30 seconds before the output changes.

A small cut-out in the rotating switch indicates the present mode and time delay.

Figure 5-1: Top-down View: Example Cassette Inside Housing

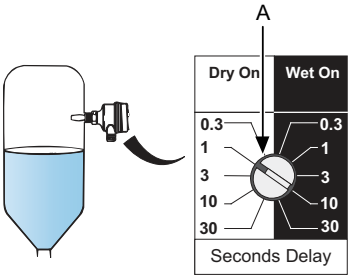


A. 'Heartbeat' LED

B. Rotating switch for setting output mode and time delay

The recommended mode for high level alarm installations is the "Dry On" mode (Figure 5-2).

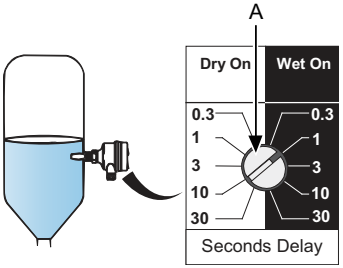
Figure 5-2: Typical Settings for High Level Applications



A. Mode "Dry On" and 1 second time delay

The "Wet On" mode is recommended for low level alarm installations (Figure 5-3).

Figure 5-3: Typical Settings for Low Level Applications



A. Mode "Wet On" and 1 second time delay

5.1.1 Set the mode switch and switching time delay

Procedure

1. Select "Dry on" or "Wet on" mode.
2. Select 0.3, 1, 3, 10, or 30 seconds for the delay before switching output state.

Note
There is a five second delay before changes to the mode and time delay become active.

5.2 Set the operating mode

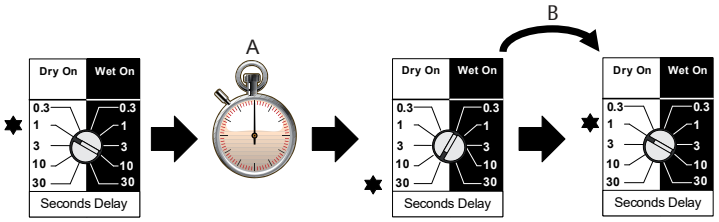
All versions of the level switch have two operating modes:

- Normal mode (red LED)
- Self-check mode (yellow LED)

Procedure

1. Set the mode switch to **1 s Dry On** (or **1 s Wet On**).
2. Wait for 10 seconds.
3. Move the mode switch to **30 s Dry On** (or **30 s Wet On**), and wait for 1 second before moving the mode switch back to **1 s Dry On** (or **1 s Wet On**). This should be completed within 3 seconds.

Figure 5-4: Change Operating Mode



A. 10 seconds
B. < 3 seconds

6 Operation

6.1 LED indication for operating modes

Different LED colors indicate the operating mode (Table 6-1).

Table 6-1: LED Indications – Operating Mode

LED color	Operating modes	Description of mode
Red	Normal	When the LED is red and flashing, it indicates that the Rosemount 2130 may be uncalibrated, successfully calibrated, has an electrical load problem, or has an internal PCB fault.
Yellow	Self-check	When the LED is yellow and flashing, it indicates the same as Normal mode, but also indicates there could be external damage to forks, corroded forks, or internal sensor damage. **Note** For SIL 2 compliance, self-check mode must be enabled.

6.2 LED indication status

Table 6-2 shows the different operation statuses and how they are indicated by the LED.

Table 6-2: LED Indications

	LED flash rate	Switch status
	Continuous	Output state is on.
	1 every ½ second, and every third flash is missing.	External damage to forks, corroded forks, internal wire damage, or internal sensor damage (self-check mode only).
	1 every second	Output state is off.
	1 every 2 seconds	Uncalibrated.
	1 every 4 seconds	Load fault; load current too high; load short circuit.
	2 times / second	Indication of successful calibration.
	3 times / second	Internal PCB fault.
	Off	Problem (e.g. supply).



Quick Start Guide
00825-0100-4130, Rev. DB
May 2022

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