

SIEMENS

Pointek

Point level switches Pointek CLS100

Compact Operating Instructions

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7ML5501 (Pointek CLS100, SS Process connection)
7ML5610 (Pointek CLS100, Plastic version)

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 DANGER
indicates that death or severe personal injury will result if proper precautions are not taken.
 WARNING
indicates that death or severe personal injury may result if proper precautions are not taken.
 CAUTION
indicates that minor personal injury can result if proper precautions are not taken.
NOTICE
indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

 WARNING
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Introduction

Pointek CLS100 is a compact 2-wire capacitance switch for level detection in constricted spaces, interfaces, solids, liquids, slurries, and foam. The stainless steel process connection versions (7ML5501) have an effective process temperature range of -30 to +100 °C (-22 to +212 °F) and the synthetic process connection version (7ML5610) has an effective process temperature range of -10 to +100 °C (+14 to +212 °F).

Note

- Use Pointek CLS100 only in the manner outlined in this instruction manual.
 - For applications in areas classified as Hazardous, observe any restrictions according to the relevant certificate.
-

Pointek CLS100 versions:

- Integral cable version with stainless steel process connection and probe options of PPS or PVDF.
- Enclosure version (thermoplastic polyester enclosure) with stainless steel process connection in combination with a PPS or PVDF probe.
- Enclosure version (thermoplastic polyester enclosure) with fully synthetic process connection combined with a PPS probe.

Features

- NPT, R (BSPT), G (BSPP) process connections.
- Corrosion resistant construction, PPS, and 316L stainless steel (optional PVDF wetted parts).
- Non-polarized, solid-state switch or relay output (enclosure version with fully synthetic process connection only)

Applications

- Liquids, slurries, powders, granules, and solids
- Foods and pharmaceuticals
- Chemical and petrochemical
- Hazardous areas

Mounting

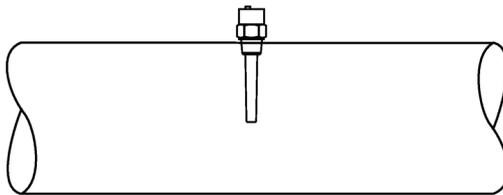
2.1 Location

Note

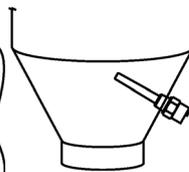
- Installation shall only be performed by qualified personnel and in accordance with local governing regulations.
 - This product is susceptible to electrostatic shock. Follow proper grounding procedures.
 - When using multiple units, sensors must be 100 mm apart. Mount diagonally if vertical space is restricted.
-

Pointek CLS100 is normally mounted into the vessel top (high detection alarm) or through the tank wall at the detection level (high or low detection alarm).

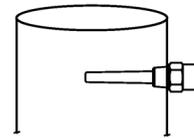
Vertical



Angle



Horizontal

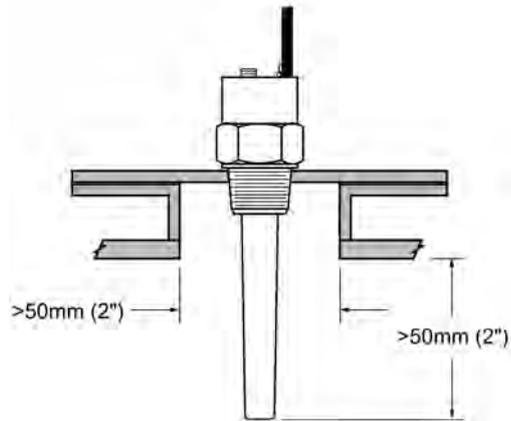


2.2 Installation features and restrictions

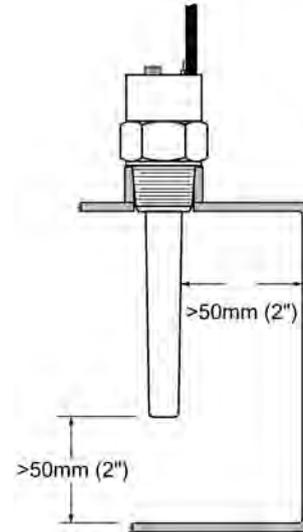
Note

Mounting diagrams apply to all versions.

Standpipes



Wall Restriction



Process Cautions:

- Keep out of path of falling material.
- Consider material surface configuration when installing unit.
- Protect probe from falling material.
- Avoid areas where material buildup occurs.

Connecting

3.1 Safety notes

Intrinsically safe supply

For intrinsically safe models, power must be supplied from an Intrinsically Safe power source, otherwise protection is no longer guaranteed.

Process pressure

The device construction allows process over-pressure up to 10 bar (146 psi). This pressure is allowed for test purposes. The definition of the Ex approvals are only valid for a container-over-pressure between -0.2...+0.1 bar (-2.9 ...+1.45 psi). For higher or lower pressures, the approvals are not valid.

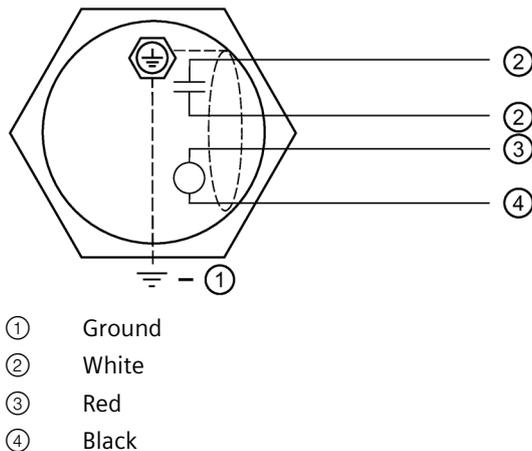
Chemical resistance against the medium

If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring 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.

Pressure Equipment Directive, PED, 2014/68/EU

Siemens Level Transmitters with flanged, threaded, or sanitary clamp type process mounts have no pressure-bearing housing of their own, and therefore, do not come under the Pressure Equipment Directive as 'Pressure Accessories' or 'Safety Accessories'. For more information, see EU Commission Guidelines A-08, A-20, and A-40.

3.2 Cable version



Symbols

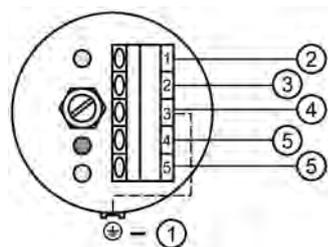


Solid state switch, normally open unpowered.

V supply / mA 2-wire current loop detection 4/20 or 20/4 mA



3.3 Enclosure version



Terminal Operation

- ① Ground
- ② mA current loop (+V or -V)
- ③ mA current loop (-V or +V)
- ④ cable shield connection
- ⑤ solid state switch/relay*

Cable Equivalent

- Red wire
- Black wire
- Cable shield
- White wire

* relay available only on Pointek CLS100 fully synthetic enclosure version

Note

The mA current loop can be wired in either polarity to determine high or low level operation as shown in the examples beginning on Non-intrinsically-safe version (Page 11). The cable shield should be connected to terminal 3 on the terminal block along with the provided ground wire.

3.4 Alarm output status

Alarm Status	Covered Yellow LED ON	Uncovered Yellow LED OFF	Power Connection
high (fail-safe)	red LED OFF 4 mA SSS ¹⁾ = open	red LED ON 20 mA SSS = closed	black wire + V
high (non fail-safe)	red LED ON 20 mA SSS = closed	red LED OFF 4 mA SSS = open	red wire + V
low (fail-safe)	red LED ON 20 mA SSS = closed	red LED OFF 4 mA SSS = open	red wire + V
low (non fail-safe)	red LED OFF 4 mA SSS = open	red LED ON 20 mA SSS = closed	black wire + V

¹⁾ Solid State Switch (SSS)

3.5 Definitions

The alarm conditions below can be detected in a fail-safe or non fail-safe mode.

Fail Safe

- The sensor connection arrangement is fail-safe if the output status is in high alarm status when power fails; open contact state prevents material overflow.
- The sensor connection arrangement switches to the fail-safe low alarm status when power fails; this open contact state prevents material running dry.

High Alarm

When material reaches a maximum process level, covering the probe.

Low Alarm

When material reaches a minimum process level, uncovering the probe.

3.6 Power/alarm wiring

Note

- For terminal block equivalents, see Enclosure version (Page 9).
- The solid-state output should only be used in circuits where the current is limited by a proper load.
- Due to the limited switching capabilities of the solid-state switch component, an auxiliary relay must be applied when switching high-current/high-voltage apparatus.

⚠ CAUTION

Electrical isolation

The DC input terminal shall be supplied from a source providing electrical isolation between the input and output, in order to meet the applicable safety requirements of IEC 61010-1.

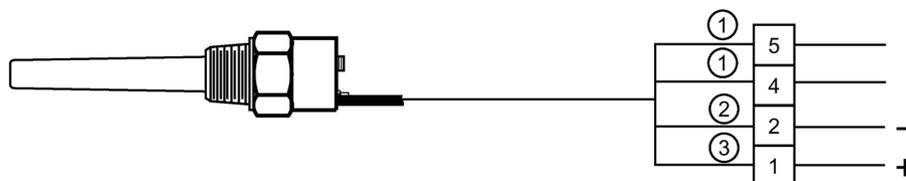
⚠ CAUTION

Electrostatic charge

Parts of the enclosure are non-conducting and may generate an ignition-capable level of electrostatic charge under certain extreme conditions. The user should ensure that the equipment is not installed in a location where it may be subjected to external conditions which might cause a build up of electrostatic charge on non-conducting surfaces. Additionally, cleaning of the equipment should be done only with a damp cloth.

3.7 Non-intrinsically-safe version

Low Alarm



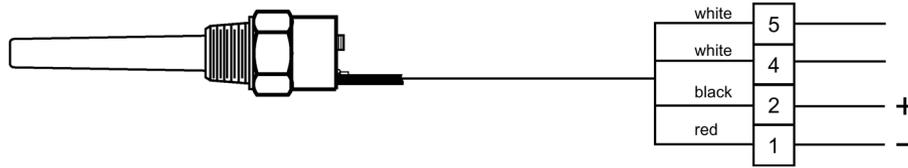
- ① White
- ② Black
- ③ Red

For more information, go to Enclosure version (Page 9).

5 and 4 are connected to Solid state switch output

2 and 1 are connected to 12-33 V DC (polarity determines operation)

High Alarm



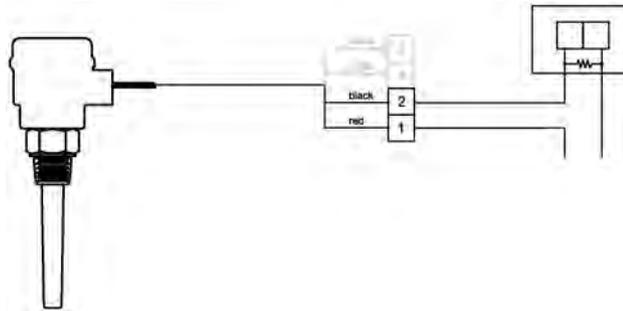
For more information, go to Enclosure version (Page 9).

5 and 4 are connected to Solid state switch output

2 and 1 are connected to 12-33 V DC (polarity determines operation)

4/20 mA Loop Alarm Application

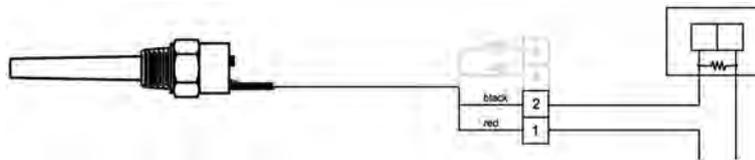
Fully Synthetic Process Connection (Enclosure Version)



$$R_{max} = (V_{supply} - 12 V) / 20 \text{ mA}$$

For example, 250 Ω gives 1 or 5 V DC switch voltage to PLC.

Stainless Steel Process Connection (Integral Cable or Enclosure Version)

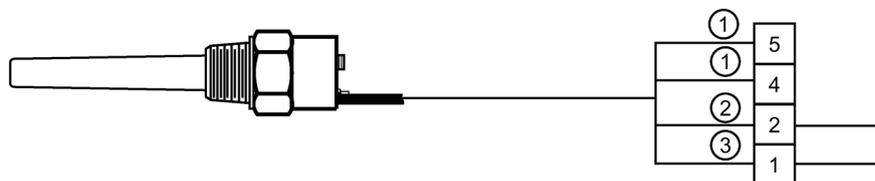


$$R_{max} = (V_{supply} - 12 V) / 20 \text{ mA}$$

For example, 250 Ω gives 1 or 5 V DC switch voltage to PLC.

Intrinsically Safe Version only

Solid State Switch Application

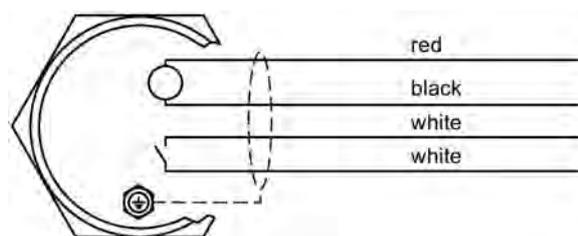


5 and 4 are connected to Solid state switch output

2 and 1 are connected to V supply 10-30 V DC

3.8 Intrinsically safe version only

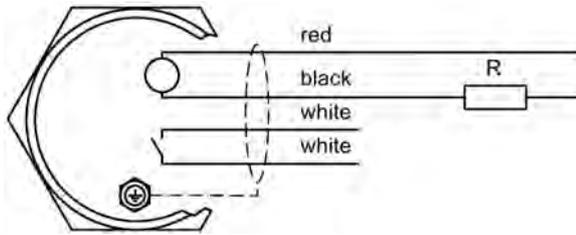
Operation with solid state switch/relay



- For intrinsically safe operation, an intrinsic safety barrier is required. Ratings U_i , I_i , P_i , C_i L_i of power supply and solid state switch
- Shield is internally connected to the ground. It is recommended to use a shielded cable for stable measurement.

red/black	white/white
Supply: 12 - 30V DC 10 - 30V DC intrinsically safe Polarity determines output logic	Output: Solid state switch Observe protection Max. 30V DC/30V AC 82 mA Limited to 30 V DC/16 V AC, 82 mA in wet locations

Operation with 4/20 mA loop



- For intrinsically safe operation, an intrinsic safety barrier is required. Ratings U_i I_i P_i C_i L_i of power supply
- $R_{max} = (V_{supply} - 12 V) / 20 \text{ mA}$. Example: 24 V supply allows R_{max} of 600 Ohms

Shield is internally connected to ground. It is recommended to use a shielded cable for stable measurement.

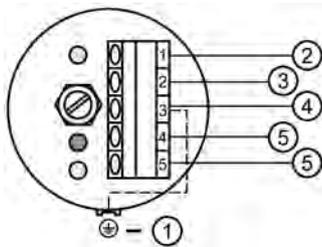
Supply:

12 - 33V DC

10 - 30V DC intrinsically safe

Polarity determines output logic.

3.9 Enclosure version and fully synthetic process



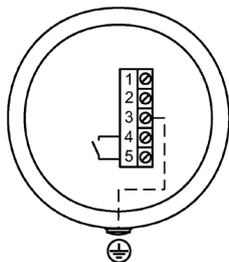
Terminal Operation

- ① Ground
- ② mA current loop (+V or -V)
- ③ mA current loop (-V or +V)
- ④ cable shield connection
- ⑤ relay/solid state switch

Cable equivalent

- red wire
- black wire
- cable shield
- white wire

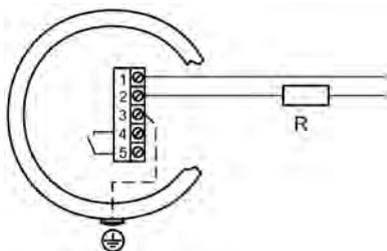
Operation with solid state switch/relay



- Terminal 3 is internally connected to ground. It is recommended to use a shielded cable for stable measurement.
- For intrinsically safe operation an intrinsically safe barrier is required. Ratings U_i I_i P_i C_i L_i

Terminal 1, 2 - supply	Terminal 3	Terminal 4, 5 - output
12 - 33 V DC 10 - 30 V DC intrinsically safe	<ul style="list-style-type: none"> • cable shield connection • connect to ground 	<p>Solid state switch: Present with stainless steel process connection. Observe protection Max. 30 V DC / 30 V AC; limited to 30 V DC / 16 V AC, 82 mA in wet locations</p> <p>Relay: Present with PPS process connection. Intrinsic safety operation not available. Max. 60 V DC or 30 V AC; limited to 30 V DC / 16 V AC in wet locations. Max. 1 A 60 W</p>

Operation with 4/20 mA loop



- Terminal 3 is internally connected to ground. It is recommended to use a shielded cable for stable measurement.
- For intrinsically safe operation an intrinsically safe barrier is required. Ratings U_i I_i P_i C_i L_i of power supply

Supply

12 - 33V DC

10 - 30V DC intrinsically safe

$$R_{max} = (V_{supply} - 12 V) / 20 \text{ mA}$$

Example: 24 V supply allows R_{max} of 600 Ohms

3.10 Protection diodes

Always use a protection diode when driving an external relay with the solid state switch or relay contact. This prevents possible switch damage due to inductive spikes generated by the relay coil.

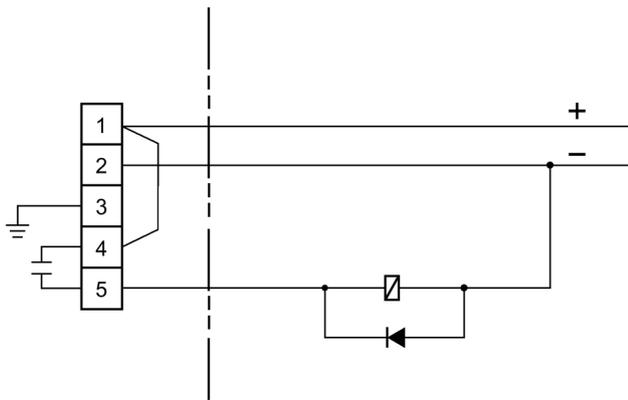
Orient the diode based on the current flow.

DC circuit with Protection Diode

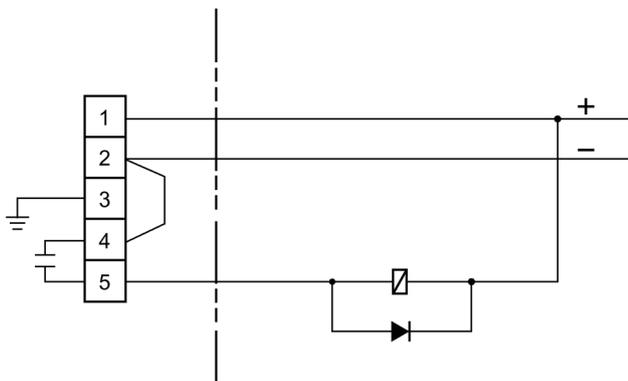
Note

For integral cable equivalents, refer to Enclosure version (Page 9).

CLS100 controlling the high side of the external relay (output acts like PNP transistor switch)



CLS100 controlling the low side of the external relay (output acts like NPN transistor switch)



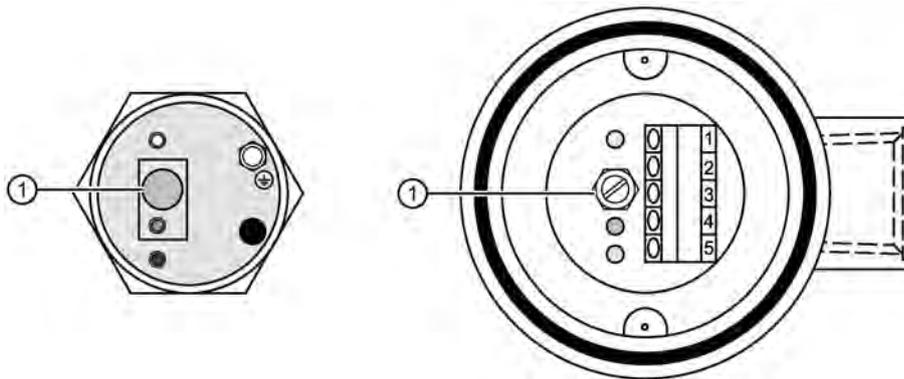
Operation

4.1 LED indicators

Yellow = sensor status	<ul style="list-style-type: none"> • ON indicates contact with the process material (material capacitance is greater than the set point). • OFF indicates when the sensor is out of contact with the process material (material capacitance is less than the set point).
Red = output status	ON indicates the mA loop alarm and solid state switch contact status. Refer to Alarm output status (Page 10).
Green = power	ON indicates the CLS100 is properly powered.

4.2 Alarm output

Setpoint adjustment



① 20-turn trimpot

As a guide to adjusting the alarm set point for reliable and accurate detection of the process material, we have classified the materials and applications into three cases.

Follow the setup procedure associated with the case outline describing your application.

Note that the sensitivity of the unit can be adjusted by the user as required.

Case 1: General applications

Characteristics

- dry solids
- low viscosity liquids

4.2 Alarm output

Preparation

- Ensure that the green LED is ON.
- If yellow LED is ON, turn the trimpot CCW (counter clockwise) until the yellow LED goes OFF, otherwise go to step 1 below.

Configuration

1. With sensor uncovered and a minimum 50 mm free space all around, turn the trimpot CW (clockwise) until the yellow LED just goes **ON**.
2. Turn the trimpot CCW until the yellow LED just goes **OFF**.

Case 2: Demanding applications

Characteristics

- hygroscopic / wet solids
- high viscosity and high conductivity liquids

Preparation

- Ensure that the green LED is **ON**.
- Turn the trimpot CCW (counter clockwise), until the yellow LED goes **OFF**.

Configuration

1. Adjust the material level of the process so that the sensor is immersed. The yellow LED should be ON.
2. Adjust the material level of the process so that the sensor is uncovered, but retains significant (as much as possible) material buildup on sensor.
3. Adjust the trimpot CCW until yellow LED goes OFF. To get the true feel for the correct position, please adjust the trimpot CW then CCW several times to ensure that the yellow LED is OFF. (This adjustment is sensitive, and we recommend this practice exercise so you can fine tune the trimpot movement until the yellow LED L1 turns OFF with minimal adjustment.)

Case 3: Interface detection

Characteristics

- liquid A / liquid B, foam / liquid

Preparation

- Ensure that the green LED is **ON**.
- Turn the trimpot CCW (counter clockwise), until the yellow LED goes **OFF**.

Configuration

1. Immerse the sensor in the material that has the lowest dielectric constant. The yellow LED should be **ON**.
2. Adjust the trimpot CCW until the yellow LED goes **OFF**.
3. Immerse the sensor in the material that has the highest dielectric constant; the yellow LED should come **ON**.

Note

In areas with high levels of EMI, the sensitivity potentiometer should be turned back two turns counter-clockwise after the setpoint is adjusted. After completing the setup, replace the trimpot cap on the cable version, or the lid on the enclosure version. The unit is now in service, providing level detection of your process.

Troubleshooting

5.1 Stainless steel process connection (integral cable)

Symptom	Cause	Action
Green LED off	Proper power not applied to device. Power range must equal 12 to 33 V DC at all times (10 to 30 V DC for IS versions).	Check power source. Minimum 12 V DC on the terminals when the signal current is 20 mA (minimum 10 V DC for IS versions)
Green LED off, with proper supply	Defective component in device.	Contact distributor
Green LED on and Yellow LED on while not responding to product and/or adjustment.	Proper power not applied to device. Power range must equal 12 to 33 V DC at all times (10 to 30 V DC for IS versions).	Check power source. Minimum 12 V DC on the terminals when the signal current is 20 mA (minimum 10 V DC for IS versions)
Hysteresis region too great.	Proper power not applied to device. Power range must equal 12 to 33 V DC at all times (10 to 30 V DC for IS versions).	Check power source. Minimum 12 V DC on the terminals when the signal current is 20 mA (minimum 10 V DC for IS versions)
Unequal current in red and black wire.	Loop circuitry is DC biased w.r.t. ground. Black wire exceeds + 36 V DC against Ground.	Correct loop circuitry. Remove cause of voltage on the red wire and/or bias.
Yellow LED won't come on or off.	Defective component in device.	Contact distributor
Too much current in loop	Supply voltage too high	Ensure power range equals 12 to 33 V DC at all times (10 to 30 V DC for IS versions).
Red LED lights opposite to the Yellow LED when this is not meant to happen.	Incorrect polarity on red and black loop terminals.	Reverse polarity on loop terminals.
Red and Yellow LEDs are blinking fast.	Proper power not applied to device. Power range must equal 12 to 33 V DC at all times (10 to 30 V DC for IS versions).	Check power source. Minimum 12 V DC on the terminals when the signal current is 20 mA (minimum 10 V DC for IS versions)
Red and Yellow LEDs are blinking while switching.	Proper power not applied to device. Power range must equal 12 to 33 V DC at all times (10 to 30 V DC for IS versions).	Check power source. Minimum 12 V DC on the terminals when the signal current is 20 mA (minimum 10 V DC for IS versions)
Solid state contact does not follow status Red LED.	Defective component in device. Probable cause: wrong wiring in this circuit.	Contact distributor
Yellow LED is lit while probe is not covered.	May indicate significant product buildup.	Rotate sensitivity potentiometer further CCW (counter clockwise) Check sensor tip.

5.2 Fully synthetic process connection (enclosure)

Symptom	Cause	Action
Green LED off	Proper power not applied to device. Power range must equal 12 to 33 V DC at all times (10 to 30 V DC for IS versions).	Check power source. Minimum 12 V DC on the terminals when the signal current is 20 mA (minimum 10 V DC for IS versions)
Green LED off, with proper supply	Defective component in device. Connector came loose.	Contact distributor. Refasten connector.
Green LED on and Yellow LED on while not responding to product and/or adjustment.	Proper power not applied to device. Power range must equal 12 to 33 V DC at all times (10 to 30 V DC for IS versions).	Check power source. Minimum 12 V DC on the terminals when the signal current is 20 mA (minimum 10 V DC for IS versions)
Hysteresis region too great.	Proper power not applied to device. Power range must equal 12 to 33 V DC at all times (10 to 30 V DC for IS versions).	Check power source. Minimum 12 V DC on the terminals when the signal current is 20 mA (minimum 10 V DC for IS versions)
Unequal current in red and black wire.	Loop circuitry is DC biased w.r.t. ground. Black wire exceeds + 36 V DC against Ground.	Correct loop circuitry. Remove cause of voltage on the red wire and/or bias.
Yellow LED won't come on or off.	Defective component in device.	Contact distributor
Too much current in loop	Supply voltage too high	Ensure power range equals 12 to 33 V DC at all times (10 to 30 V DC for IS versions).
Red LED lights opposite to the Yellow LED when this is not meant to happen.	Incorrect polarity on red and black loop terminals.	Reverse polarity on loop terminals.
Red and Yellow LEDs are blinking fast.	Proper power not applied to device. Power range must equal 12 to 33 V DC at all times (10 to 30 V DC for IS versions).	Check power source. Minimum 12 V DC on the terminals when the signal current is 20 mA (minimum 10 V DC for IS versions)
Red and Yellow LEDs are blinking while switching.	Proper power not applied to device. Power range must equal 12 to 33 V DC at all times (10 to 30 V DC for IS versions).	Check power source. Minimum 12 V DC on the terminals when the signal current is 20 mA (minimum 10 V DC for IS versions)
Relay contact does not follow status Red LED.	Proper power not applied to device. Power range must equal 12 to 33 V DC at all times (10 to 30 V DC for IS versions). Defective component in device.	Check power source. Minimum 12 V DC on the terminals when the signal current is 20 mA (minimum 10 V DC for IS versions). Contact distributor.
Yellow LED is lit while probe is not covered.	May indicate significant product buildup.	Rotate sensitivity potentiometer further CCW (counter clockwise) Check sensor tip.

5.3 Maintenance

The Pointek CLS100 requires no maintenance or cleaning.

Technical data

6.1 Power

Power supply	Fully synthetic process connection, enclosure version	Stainless steel process connection, integral cable or enclosure version
Standard	12-33 V DC	12-33 V DC
Intrinsically safe	not applicable	10-30 V DC (intrinsically safe barrier required) For ATEX, UKEX and INMETRO: $U_i = 30 \text{ V}$ $I_i = 120 \text{ mA}$ $P_r = 0.8 \text{ W}$ $C_i = 2.1 \text{ nF}^*$ $L_i = 1.3 \text{ mH}$

*For an integral cable with a length of more than 1.5m a capacitance of 0.3 nF/ m shall be added

For more information, see FM/CSA connection drawing (Page 32).

6.2 Alarm output(s)

	Integral cable version or enclosure version with stainless steel process connection	Enclosure version (fully synthetic)
Power supply (standard)	12-33 V DC	12-33 V DC
Power supply (Intrinsically safe)	<ul style="list-style-type: none"> 10 - 30 V DC max Intrinsically safe barrier required The power supply circuit is infallibly galvanically isolated from the solid-state switch circuit. For ATEX, UKEX and INMETRO: $U_i = 30 \text{ V}$ $I_i = 200 \text{ mA}$ $P_i = 0.8 \text{ W}$ $C_i = 2.1 \text{ nF}^*$ $L_i = 1.3 \text{ mH}$ <p>*For an integral cable with a length of more than 1.5 m, a capacitance of 0.3 nF/m shall be added</p>	Not applicable
Alarm outputs		
mA	4/20 mA or 20/4 mA 2-wire current loop detection	4/20 mA or 20/4 mA 2-wire current loop detection
Solid state switch (standard)	30 V DC / 30 V AC 82 mA max. Limited to 30 V DC / 16 V AC 82 mA max. in wet locations	Not applicable
Solid state switch (intrinsically safe)	<ul style="list-style-type: none"> 30 V DC max Intrinsically safe barrier required The power supply circuit is infallibly galvanically isolated from the solid-state switch circuit. For ATEX, UKEX and INMETRO: $U_i = 30 \text{ V}$ $I_i = 200 \text{ mA}$ $P_i = 350 \text{ mW}$ $C_i = 0^*$ $L_i = 0$ <p>*For an integral cable with a length of more than 1.5 m, a capacitance of 0.3 nF/m shall be added</p>	Not applicable

	Integral cable version or enclosure version with stainless steel process connection	Enclosure version (fully synthetic)	
Relay output		max. switching voltage	60 V DC or 30 V AC; limited to 30 V DC/16 V AC in wet locations
		max. switching current	1 A
		max. switching power	60 W
Repeatability	2 mm (0.08")	2 mm (0.08")	

*For an integral cable with a length of more than 1.5m a capacitance of 0.3 nF/m shall be added

For FM/CSA, see FM/CSA connection drawing (Page 32).

Note

A wet location is a location where water or other conductive liquid may be present and is likely to increase the risk of electric shock.

6.3 Environmental

ambient temperature	Integral cable version and Enclosure version with stainless steel process connection:	-30 to +85 °C (-22 to +185 °F) -20 to +85 °C (-4 to +185 °F) with option FFKM seal O-ring
	Enclosure version with PPS process connection:	-10 to +85 °C (+14 to +185 °F)
	With Ex approval:	Depending on Surface Temperature and Temperature Class, details see Notes for use in hazardous locations (Page 30).
ingress protection	Enclosure version	Type 4 / IP68
	Integral cable version	Type 4 / IP65
installation category	I	
pollution degree	4	

6.4 Mechanical

- common probe/wetted parts:
 - PPS process connection and PPS sensor; or 316L process connection and PPS or PVDF sensor. [Standard Metal process connection seal is FKM (e.g. Viton). FFKM (e.g. Kalrez) is optional].
- cable version (SS process connection):
 - integral cable body: 316L stainless steel.
 - 316L stainless steel process connection: 3/4" NPT or R 1" (BSPT), or G 1" (BSPP).
 - 1 m (3.3 ft) of 4 conductor, 22 AWG, shielded, polyester jacket.
- enclosure version (SS process connection):
 - housing: VALOX[®] (thermoplastic polyester).
 - lid: transparent thermoplastic polycarbonate (PC).
 - 316L stainless steel process connection: 3/4" NPT, or R 1" (BSPT), or G 1" (BSPP).
 - internal 5-point terminal block.
 - 1/2" NPT wiring entrance (optional M20 x 1.5" cable entry).
- enclosure version (fully synthetic process connection):
 - housing: VALOX[®] (thermoplastic polyester).
 - lid: transparent thermoplastic polycarbonate (PC).
 - fully synthetic process connection: 3/4" NPT or R 1" (BSPT).
 - internal removable 5-point terminal block.
 - 1/2" NPT wiring entrance (optional M20 x 1.5" cable entry).

[®]VALOX is a registered trademark of the General Electric Company.

6.5 Process conditions

- relative dielectric constant (ϵ_r): 1.5 minimum.
- Integral cable version and Enclosure version with stainless steel process connection:
 - -30 to +100 °C (-22 to +212 °F)
 - -20 to +100 °C (-4 to +212 °F) with option FFKM seal O-ring
- Enclosure version with PPS process connection:
 - -10 to +100 °C (+14 to +212 °F)
- With Ex approval:
 - Depending on Surface Temperature and Temperature Class details, see Notes for use in hazardous locations (Page 30)
- pressure (vessel): -1 to 10 bar (146 psi) gauge, nominal.

6.6 Approvals

Stainless steel process connection (integral cable or enclosure version) (7ML5501)

General	CE, CSA, FM
Marine	Lloyd's Register of Shipping, categories ENV1, ENV2, and ENV5
Intrinsically Safe (barrier required)	CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G <ul style="list-style-type: none"> • ATEX 1G 1/2G IIC • UKEX 1G 1/2G IIC • ATEX 1D 1/2D IIIC • UKEX 1D 1/2D IIIC • INMETRO
Non-incendive	CSA/FM Class I, II and III, Div. 2, Groups A, B, C, D, E, F, G
Overfill protection	WHG (Germany)

Fully synthetic process connection (enclosure version only) (7ML5610)

General	CE, CSA, FM
Marine	Lloyd's Register of Shipping, categories ENV1, ENV2, and ENV5

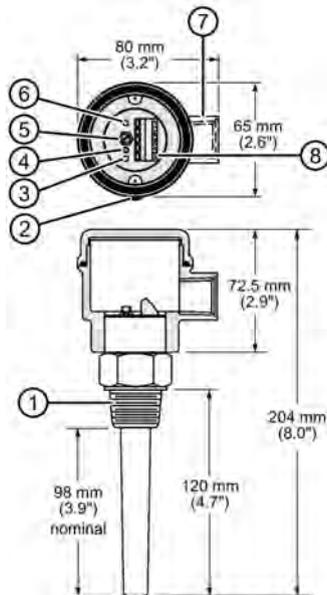
Note

EMC testing was conducted on the CLS100 metal version while mounted in a metallic vessel and wired using shielded cable. The sensitivity was set by turning sensitivity potentiometer 2 turns counter-clockwise from the set point.

Dimensions

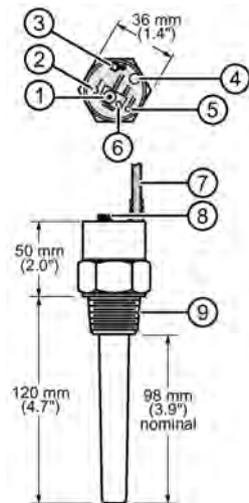
7.1 Dimensions

Enclosure Version



- ① Process connection
- ② Ground lug
- ③ Output status LED (Red)
- ④ Sensor status LED (Yellow)
- ⑤ Sensitivity trimpot
- ⑥ Power LED (Green)
- ⑦ Cable inlet 1/2" NPT (optional M20x1.5)
- ⑧ Terminal block

Integral Cable Version



- ① Sensitivity trimpot
- ② Power LED (Green)
- ③ Ground post
- ④ Cable relief
- ⑤ Output status LED (Red)
- ⑥ Sensor status LED (Yellow)
- ⑦ Cable Ø 5 mm (0.2')
- ⑧ Trimpot cap
- ⑨ Process connection

Notes for use in hazardous locations

A.1 Safety guidelines

Note

This product can only function properly and safely if it is correctly transported, stored, installed, set up, operated, and maintained.

CAUTION

Electrostatic charge

Parts of the enclosure are non-conducting and may generate an ignition-capable level of electrostatic charge under certain extreme conditions. The user should ensure that the equipment is not installed in a location where it may be subjected to external conditions which might cause a build up of electrostatic charge on non-conducting surfaces. Additionally, cleaning of the equipment should be done only with a damp cloth.

A.2 Notes for use in hazardous locations

Use of this manual

For use and assembly, refer to the instructions in this manual. It contains all instructions required by ATEX Directive 2014/34/EU, Annex II, 1/0/6 and Ordinance INMETRO n°179/2010.

General notes

Refer to the appropriate certificate for application in specific hazardous environments. The equipment has not been assessed as a safety related device (as referred to by Directive 2014/34/EU Annex II, clause 1.5). The certificate numbers have an "X" suffix, which indicates that specific condition of use apply. Those installing or inspecting this equipment must have access to the certificates.

Qualifications of personnel / servicing / repair

- Installation and inspection of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice (ABNT NBR IEC/EN 60079-14 and ABNT/NBR IEC/EN 60079-17 in Europe).
- Repair of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice (e.g. ABNT NBR IEC/EN 60079-19 within Europe). Repair of flameproof path is not intended.
- Components to be incorporated into or used as replacements in the equipment shall be fitted by suitably trained personnel in accordance with the manufacturer's documentation.
- In potentially explosive atmospheres open the enclosure only when the device is not energized. Turn off power before servicing any device (the transmitter is in operation when the power supply is switched on). In case of removing the unit from vessel, take care of process pressure and material passing the opening.

ATEX, UKEX list of certificates / list of standards

See EU-Declaration of Conformity for the list of standards valid for ATEX certificates.

See UK-Declaration of Conformity for the list of standards valid for UKEX certificates.

ATEX, UKEX year of manufacturing

Year of manufacture	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Marking code	K	L	M	N	P	R	S	T	U	W	X

ATEX, UKEX: Ex-marking

II 1 G Ex ia IIC TX Ga

II 1/2 G Ex ia IIC TX Ga/Gb

II 1 D Ex ia IIIC TX Da

II 1/2 D Ex ia IIIC TX Da/Db

A.3 Specific condition of use**Electrostatic charge**

The user shall ensure that the equipment is not installed where it may be subjected to external conditions which might cause a build-up of electrostatic charge on non-conducting surfaces.

Ambient and process temperature range

The relation between the ambient and process temperature ranges and the surface temperature or temperature class is shown in the thermal data tables.

A.4 Ambient and process temperature range, max. surface temperature and temperature class**ATEX/UKEX/INMETRO:**

Ambient temperature range	Process temperature range	Max. surface temperature (EPL Da or Db)	Temperature class (EPL Ga or Gb)
-30 to +45 °C (-22 to +113 °F) ¹⁾	-30 to +45 °C (-22 to +113 °F) ¹⁾	T ₂₀₀ 95 °C	T6
-30 to +85 °C (-22 to +185 °F) ¹⁾	-30 to +85 °C (-22 to +185 °F) ¹⁾	T ₂₀₀ 135 °C	T4

FM:

Ambient temperature range	Process temperature range	Temperature class
-30 to +85 °C (-22 to +185 °F)	-30 to +100 °C (-22 to +212 °F)	T4

CSA:

Ambient temperature range	Process temperature range	Temperature class
-40 to +85 °C (-22 to +185 °F)	-40 to +100 °C (-22 to +212 °F)	T4

A.5 FM/CSA connection drawing

<https://support.industry.siemens.com/cs/ww/en/view/109738929>
(<https://support.industry.siemens.com/cs/ww/en/view/109798540>)

Product Documentation and Technical Support

B.1 Product documentation

Process instrumentation product documentation is available in the following formats:

- Certificates (<http://www.siemens.com/processinstrumentation/certificates>)
- Downloads (firmware, EDDs, software) (<http://www.siemens.com/processinstrumentation/downloads>)
- Catalog and catalog sheets (<http://www.siemens.com/processinstrumentation/catalogs>)
- Manuals (<http://www.siemens.com/processinstrumentation/documentation>)

You have the option to show, open, save, or configure the manual.

- "Display": Open the manual in HTML5 format
- "Configure": Register and configure the documentation specific to your plant
- "Download": Open or save the manual in PDF format
- "Download as html5, only PC": Open or save the manual in the HTML5 view on your PC

You can also find manuals with the Mobile app at Industry Online Support (<https://support.industry.siemens.com/cs/ww/en/sc/2067>). Download the app to your mobile device and scan the device QR code.

Product documentation by serial number

Using the PIA Life Cycle Portal, you can access the serial number-specific product information including technical specifications, spare parts, calibration data, or factory certificates.

Entering a serial number

1. Open the PIA Life Cycle Portal (<https://www.pia-portal.automation.siemens.com>).
2. Select the desired language.
3. Enter the serial number of your device. The product documentation relevant for your device is displayed and can be downloaded.

To display factory certificates, if available, log in to the PIA Life Cycle Portal using your login or register.

Scanning a QR code

1. Scan the QR code on your device with a mobile device.
2. Click "PIA Portal".

To display factory certificates, if available, log in to the PIA Life Cycle Portal using your login or register.

B.2 Technical support

Technical support

If this documentation does not completely answer your technical questions, you can enter a Support Request (<http://www.siemens.com/automation/support-request>).

For help creating a support request, view this video here (www.siemens.com/opensr).

Additional information on our technical support can be found at Technical Support (<http://www.siemens.com/automation/csi/service>).

Service & support on the Internet

In addition to our technical support, Siemens offers comprehensive online services at Service & Support (<http://www.siemens.com/automation/serviceandsupport>).

Contact

If you have further questions about the device, contact your local Siemens representative at Personal Contact (<http://www.automation.siemens.com/partner>).

To find the contact for your product, go to "all products and branches" and select "Products & Services > Industrial automation > Process instrumentation".

Contact address for business unit:

Siemens AG

Digital Industries

Process Automation

Östliche Rheinbrückenstr. 50

76187 Karlsruhe, Germany

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