Overview

Pointek CLS100 is a compact, 2-wire, inverse frequency shift capacitance switch for level and material detection in constricted spaces, interfaces, solids, liquids, slurries, and foam; with the ability to tune out buildup on probe.

Benefits

- Easy installation with verification by built-in LED
- Low maintenance with no moving parts
- Sensitivity adjustment
- Integrated cable or PBT enclosure versions available
- Intrinsically Safe, Dust Ignition Proof, and General Purpose options available

Application

Pointek CLS100's short insertion length of 100 mm (4 inch) and versatility in various applications and in vessels or pipes makes it a good replacement for traditional capacitance sensors.

Its advanced tip-sensing technology provides accurate, repeatable switchpoint performance. The PPS (Polyphenylene sulfide) probe [optional PVDF (Polyvinylidene Fluoride)] is chemically resistant with an effective process operating temperature range from -30 to +100 °C (-22 to +212 °F) (7ML5501), and -10 to +100 °C (14 to 212 °F) (7ML5610). The fully potted design ensures reliability in a vibrating environment such as agitated tanks up to 4 g. When used with a SensGuard protection cover, the CLS100 is protected from shearing, impact, and abrasion in tough primary processes.

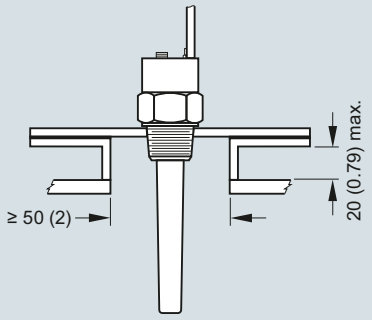
The Pointek CLS100 is available in three versions. The integral cable version has a stainless steel process connection and probe options of PPS or PVDF. The fully synthetic version has a thermoplastic polyester enclosure with a PPS process connection combined with a PPS probe. The standard enclosure version has a thermoplastic polyester enclosure with a stainless steel process connection in combination with a PPS or PVDF probe.

- Key Applications: liquids, slurries, powders, granules, food and pharmaceuticals, chemicals, hazardous areas

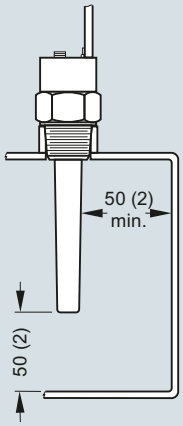
Configuration

Installation

Standpipes



Wall restriction



Pointek CLS100 installation, dimensions in mm (inch)

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Technical specifications

	Stainless steel process connection (integral cable or enclosure version) (7ML5501)	Fully synthetic process connection (enclosure version only) (7ML5610)
Mode of operation		
Measuring principle	Inverse frequency shift capacitive level detection	Inverse frequency shift capacitive level detection
Input		
Measured variable	Change in picoFarad (pF)	Change in picoFarad (pF)
Output		
Output signal		
• Alarm output	4 ... 20/20 ... 4 mA 2-wire loop	4 ... 20/20 ... 4 mA 2-wire loop
• Switch output[1]	Solid-state: 30 V DC/30 V AC, max. 82 mA	Max. switching voltage: 60 V DC/30 V AC Max. switching current: 1 A
• Fail-safe mode	Min. or max.	Min. or max.
Accuracy		
Repeatability	2 mm (0.08 inch)	2 mm (0.08 inch)
Rated operating conditions[2]		
Installation conditions		
• Location	Indoor/outdoor	Indoor/outdoor
Ambient conditions		
• Ambient temperature	-30 ... +85 °C (-22 ... +185 °F)	-10 ... +85 °C (14 ... 185 °F)
• Installation category	I	I
• Pollution degree	4	4
Medium conditions		
• Relative dielectric constant ε_r	Min. 1.5	Min. 1.5
• Process temperature	-30 ... +100 °C (-22 ... +212 °F)	-10 ... +100 °C (14 ... 212 °F)
• Pressure (vessel)	-1 ... +10 bar g (-14.6 ... +146 psi g), nominal[2]	-1 ... +10 bar g (-14.6 ... +146 psi g), nominal
• Degree of protection		
- Enclosure version	IP68/Type 4/NEMA 4	IP68/Type 4/NEMA 4
- Integral cable version	IP65/Type 4/NEMA 4	Not applicable
• Cable inlet	½" NPT (M20 x 1.5 optional)	½" NPT (M20 x 1.5 optional)
Design		
	Enclosure/Integral cable version	Fully synthetic version
Material		
• Body (Enclosure version)	Thermoplastic polyester	Thermoplastic polyester
• Lid (Enclosure version)	Transparent thermoplastic polycarbonate (PC)	Transparent thermoplastic polycarbonate (PC)
• Integrated cable body (Integral cable version)	316L stainless steel	Not applicable
Sensor length (nominal)	100 mm (4 inch)	100 mm (4 inch)
Process connection material of probe/wetted parts[3]	Connection: 316L stainless steel; Process seal: FKM (optional FFKM); Sensor: PPS (optional PVDF)[4]	PPS process connection and PPS sensor (Uni-Construction)
Connection (Enclosure version)	Internal 5-point terminal block, ½" NPT wiring entrance, M20 x 1.5 optional	Removable internal 5-point terminal block, ½" NPT wiring entrance, M20 x 1.5 optional
Connection (Integral cable version)	4 conductors, 1 m (3.3 ft), 0.5 mm² (22 AWG), shielded, polyester jacket	Not applicable
Process connection	¾" NPT [(Taper), ANSI/ASME B1.20.1] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	¾" NPT [(Taper), ANSI/ASME B1.20.1] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]
Power supply		
Standard	12 ... 33 V DC	12 ... 33 V DC
Intrinsically Safe	10 ... 30 V DC (Intrinsically Safe barrier required)	Not applicable
Certificates and approvals	• General: CE, CSA, FM, RCM • Marine: Lloyds Register of Shipping, categories ENV1, ENV2, and ENV5 Dust Ignition Proof (barrier required): CSA/FM Class II and III, Div. 1, Groups E, F, G T4 • Intrinsically Safe (barrier required): CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G T4 ATEX II 1 GD 1/2GD EEx ia IIC T4 to T6 T107 °C • Overfill protection: WHG (Germany)	• General: CSA, FM

[1] When synthetic process connection version (7ML5610) is used in wet locations, switching voltage of the relay is limited to 35 V DC/16 V AC.

[2] When operation is in areas classified as hazardous, observe restrictions according to relevant certificate.
See also Pressure/Temperature curves on page 4/15.

[3] For caustic materials, consult a local sales person for alternative O-rings. For more information, please visit http://www.automation.siemens.com/aspa_app.

[4] When FFKM O-ring (Option A22) is selected, process temperature is restricted to -20 °C (-4 °F).

Selection and Ordering data	Article No.
Pointek CLS100, stainless steel process connection ↗	**7ML5501-**
Compact 2-wire inverse frequency shift capacitance switch for level and material detection in constricted spaces, interfaces, solids, liquids, slurries and foam, with the ability to tune out buildup on probe.	**0** ■■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process connection	
¾" NPT [(Taper), ANSI/ASME B1.20.1]	**A**
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	**E**
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	**J**
Approvals	
General Purpose: CE, CSA, FM, RCM	**A**
CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G T4; ATEX II 1 GD 1/2GD EEx ia IIC T4 ... T6 T107 °C[1)]	**C**
CSA/FM Class II and III, Div. 1, Groups E, F, G[1)]	**G**
Device version	
Integral cable version (PPS probe)	**1**
Enclosure version (PPS probe), ½" NPT cable inlet	**3**
Integral cable version with PVDF probe body	**5**
Enclosure version with PVDF probe body (½" NPT cable inlet)	**6**
Enclosure version (PPS probe), M20 x 1.5 cable inlet	**7**
Enclosure version with PVDF probe body, M20 x 1.5 cable inlet	**8**
Overfill protection	
Not required	**0**
Required (WHG)	**1**

[1)] Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text	**Y17**
FFKM seal O-ring[1)]	**A22**
Material inspection Certificate Type 3.1 per EN 10204	**C12**
Operating Instructions	
Note: due to ATEX regulations one Quick start manual is included with every product.	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	

[1)] See Temperature restriction on page 4/15

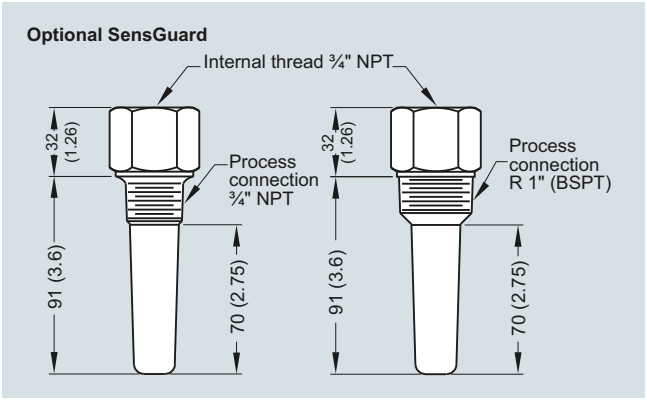
Selection and Ordering data	Article No.
Accessories	
SensGuard, ¾" NPT (PPS) Only available for CLS100 with ¾" NPT thread	**7ML1830-1DL**
SensGuard, R 1" (BSPT) (PPS) Only available for CLS100 with ¾" NPT thread	**7ML1830-1DM**
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosures	**7ML1930-1AC**
Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia	**7NG4124-0AA00**
½" NPT cable gland, nickel plated brass, fits cable diameter 6 ... 12 mm (0.24 ... 0.47 inch) -40 ... +100 °C (-40 ... +212 °F), IP68 (General Purpose)	**7ML1830-1JA**
M20 x 1.5 cable gland, PA polyamide, ATEX II 2G EEx e II, fits cable diameter 7 ... 12 mm (0.28 ... 0.47 inch), -20 ... +70 °C (-4 ... +158 °F), IP68 (General Purpose)	**7ML1830-1JC**

Selection and Ordering data	Article No.
Pointek CLS100, PPS process connection ↗	**7ML5610-**
Compact 2-wire inverse frequency shift capacitance switch for level and material detection in constricted spaces, interfaces, solids, liquids, slurries and foam, with the ability to tune out buildup on foam.	**0** ■■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process connection (PPS)	
¾" NPT [(Taper), ANSI/ASME B1.20.1] (PPS probe body)	**A**
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] (PPS probe body)	**B**
Approvals	
General Purpose: CSA, FM	**D**
Versions/Options	
Enclosure version, PPS process connection, ½" NPT cable inlet	**1**
Enclosure version, PPS process connection, M20 x 1.5	**2**
Overfill protection	
Not required	**0**
Required	**1**

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Stainless steel tag [70 x 13 mm (2.75 x 0,5 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text	**Y17**
FFKM seal O-ring[1)]	**A22**
Material inspection Certificate Type 3.1 per EN 10204	**C12**
Operating Instructions	
Note: due to ATEX regulations one Quick start manual is included with every product.	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	Article No.
SensGuard, ¾" NPT (PPS) Only available for CLS100 with ¾" NPT thread	**7ML1830-1DL**
SensGuard, R 1" (BSPT) (PPS) Only available for CLS100 with ¾" NPT thread	**7ML1830-1DM**
Tag, stainless steel, 12 x 45 mm, (0.47 x 1.77 inch) one text line, suitable for enclosures	**7ML1930-1AC**

[1)] See Temperature restriction on page 4/15

Options



Optional SensGuard, dimensions in mm (inch)

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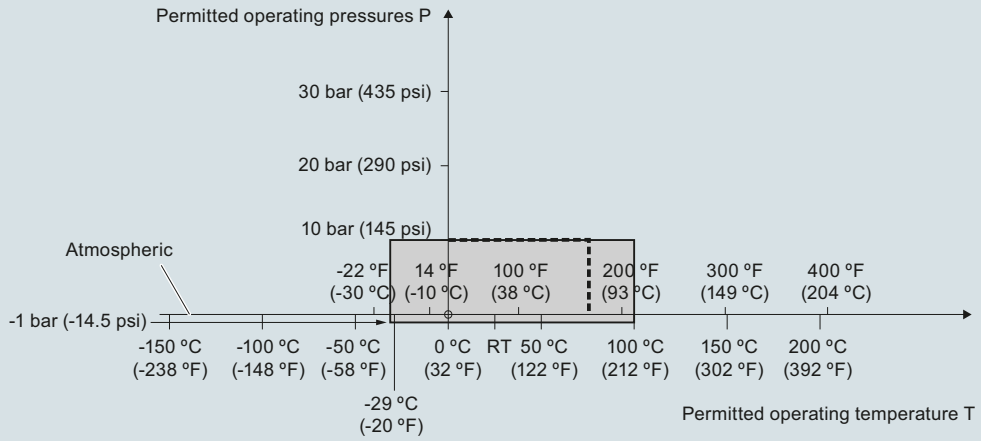
Characteristic curves

Pressure/temperature curve CLS100
Threaded process connections (7ML5501)

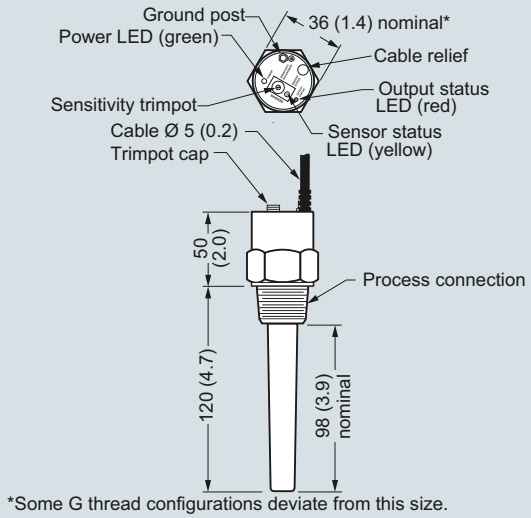


---- Example:
Permitted operating pressure = 10 bar (145 psi) at 75 °C

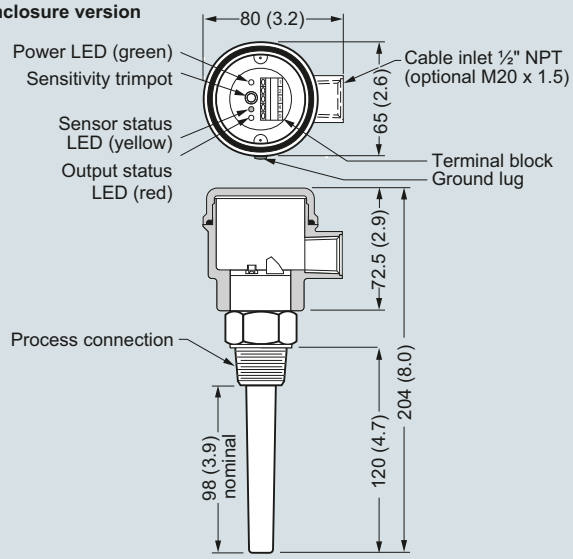
Pointek CLS100 process pressure/temperature derating curves

Dimensional drawings

Integral cable version



Enclosure version

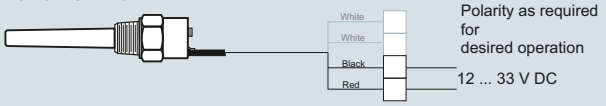


Pointek CLS100, dimensions in mm (inch)

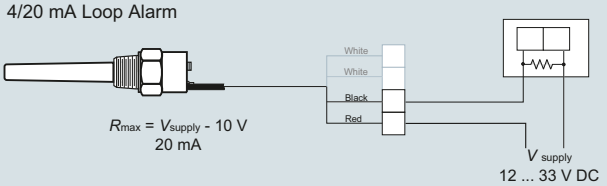
Circuit diagrams

Integral Cable Version - Non Intrinsically Safe only

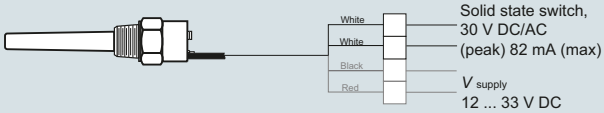
LOW/HIGH Alarm



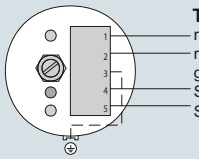
4/20 mA Loop Alarm



Solid State Switch Version



Enclosure and Fully Synthetic Version



Terminal operations	Cable equivalent
mA current loop (+V or -V)	Red wire
mA current loop (+V or -V)	Black wire
ground	Cable shield
Solid state switch/relay*	White wire
Solid state switch/relay*	White wire

* Switch/relay normally open in unpowered state
* Relay not available on Pointek CLS100 IS version (7ML5501)

Note:
When driving an inductive load (for example, an external relay), a protection diode must be connected in the correct polarity to prevent possible switch damage due to inductive spikes generated by switching the inductor (please refer to instruction manual). Intrinsically Safe Models - please follow local regulations and area classifications; refer to instruction manual for more details.

Pointek CLS100 connections