

SITRANS L Level instruments

Point level measurement

Pointek CLS 300

Overview



The Pointek CLS 300 is a capacitance level switch for detecting interfaces, solids, liquids, slurries, and viscous materials in demanding conditions of low/high pressure, high temperatures, and corrosive and abrasive materials.

Benefits

- Patented Active-Shield technology
- Integrated local display
- 2-wire loop signal
- Push-button calibration
- Full-function diagnostics
- Unaffected by material build-up
- Multiple outputs

Application

The fully potted electronics are unaffected by condensation, dust or vibration.

All wetted parts are made of stainless steel with a PFA shield for high chemical resistance. For higher temperature applications, ceramics can be supplied. Materials with low or high dielectric constants can be accurately detected. The unique active shield suppresses interferences from material build-up.

The unique modular design provides a wide range of configurations, process connections, extensions and approvals to meet the temperature and pressure requirements of specific applications. The modular design makes ordering easier, and reduces stocking requirements. A wide range of probe configurations is available, including rod and cable versions.

Technical specifications

Mode of operation

- Measuring principle Capacitive level detection
- Measurement frequency 600 kHz max.

Input

- Measured variable High and low

Output

Output signal

- Relay output Relay with failure detection
Changeover contact (selectable
NC or NO contact)
 - Max. contact load 30 V DC, 5 A/250 V AC, 8 A
 - Max. switching capacity 150 W/2000 VA
 - Min. contact load 10 mA/5 V DC
 - Time delay (ON and/or OFF) 1 to 60 s

- Transistor output (with failure de-
tection)
 - Output Galvanically isolated
 - Protection Against reversed polarity
 - Max. load 2 W
 - Max. switching voltage 250 V AC/30 V DC
 - Max. load current 100 mA
 - Voltage drop < 1 V, typical at 50 mA
 - Time delay (ON and/or OFF) 1 to 60 s
- Two-wire switch With customer-supplied external
trip devices
- Failsafe mode Min or Max

Accuracy

- Resolution
 - Min. sensitivity (pF) 1 % change in actual capaci-
tance
 - Max. temperature error 0.2 % of actual capacitance value

Rated operating conditions

Installation conditions

- Location Indoor/outdoor

Ambient conditions

- Ambient temperature -40 to +85 °C (-40 to +185 °F)
- Max. tensile force (probe) 1900 kg (4188 lbs.)
- Pressure range (probe) ¹⁾
 - Standard version -1 to 35 bar (-14.6 to 511 psi)
 - High temperature version -1 to 100 bar (-14.6 to 1460 psi)

Medium conditions

Liquids, bulk solids, slurries and interfaces, and applications with viscous materials

- Dielectric constant ϵ_r Min. 1.5
- Temperature range (probe)
 - Standard version -40 to +200 °C (-40 to +392 °F)
 - High-temperature version -40 to +400 °C (-40 to +752 °F)

Design

- Process connection ¾", 1", 1¼", 1½"-NPT/BSPT/JIS
- Material (enclosure) Epoxy coated
- Degree of Protection IP65/NEMA 4/Type 4
- Material (wetted parts)
 - Standard version AISI 316L/PFA/PEEK
 - High-temperature version AISI 316L/ceramics
- Probe length
 - Rod version Min. 350 mm (14"),
max. 1000 mm (40")
 - Cable/rope version Min. 500 mm (20"),
max. 25000 mm (985")
- Connection Terminals, max. 2.5 mm (0.09")
- Cable entry 2 x ½" NPT

Power supply

- Power consumption 2 VA/2 W
- Overvoltage protection Protected up to 55 kV continuous
discharge

Controls and displays

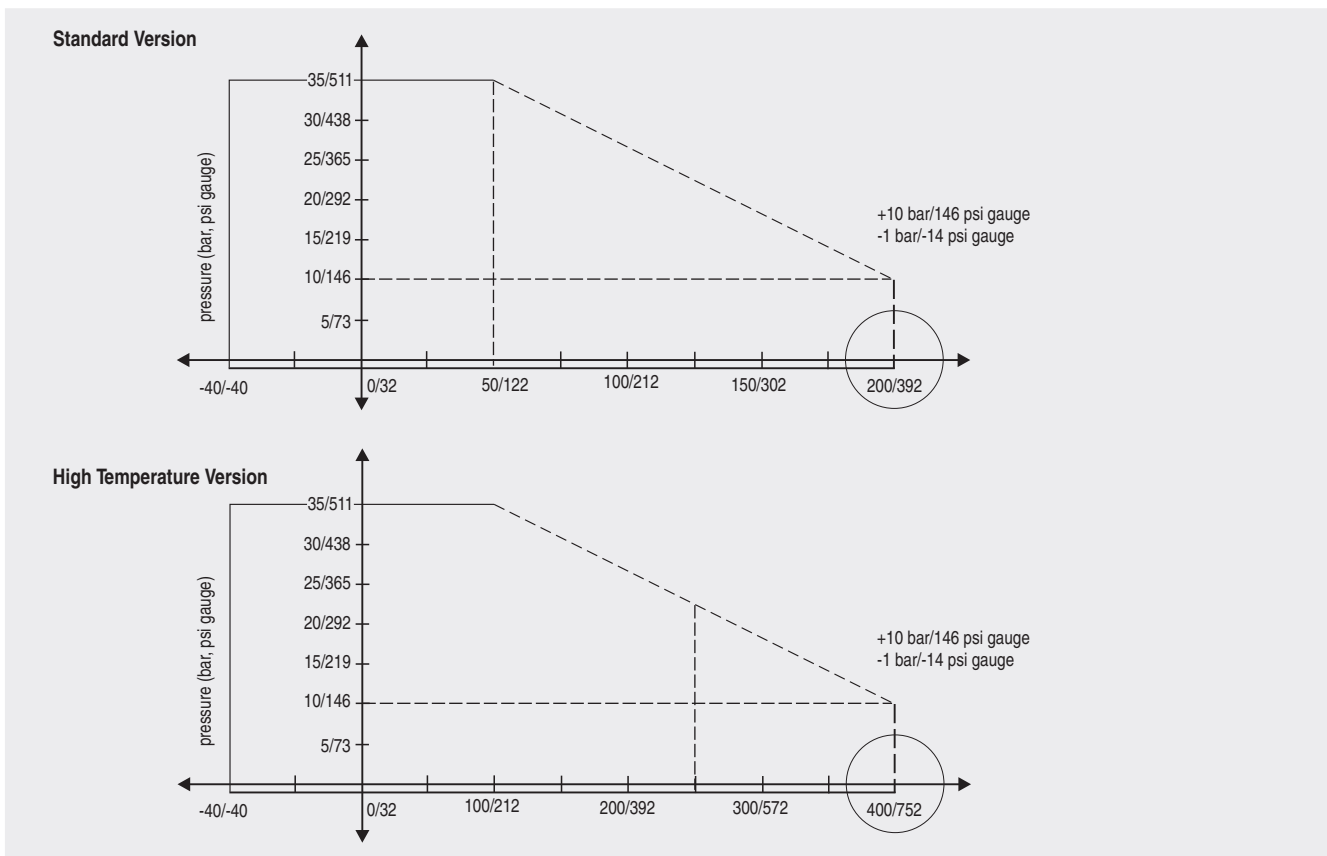
- Displays 3 LEDs, for adjustment control, output status and power supply
- Potentiometers 2 potentiometers for time delay and sensitivity
- Switches 5 DIP switches for delay on/off, fail-safe high/low, time delay test/adjust, high/low sensitivity

Certificates and approvals

CE, CSA_{NRTL/C}, FM
 CSA/FM Class II and III, Div. 1, Group E, F, G
 CENELEC EEx d [ia] IIC T6 to T1,
 CSA/FM Class I, Div. 1, Group A, B, C, D T4
 ATEX II 1/2D T 100 °C
 ATEX II 1/2 G EEx d [ia] IIC T6 to T1
 WHG Overfill protection (Germany)

1) Pressure rating of process seal is temperature dependent. Contact Siemens Milltronics for derating curves.

Characteristic curves



Pointek CLS 300 Derating curves

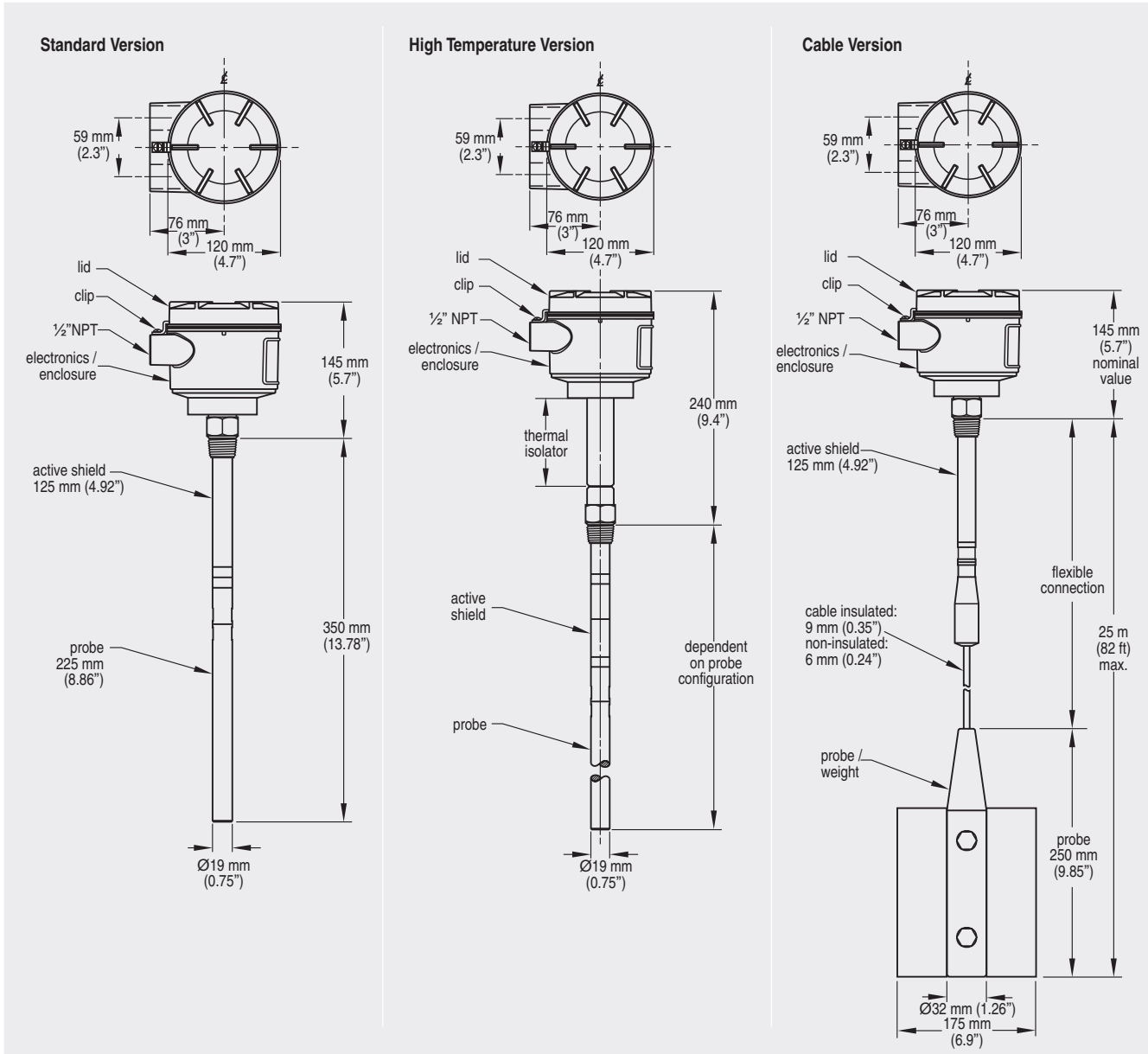
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Point level measurement

Pointek CLS 300

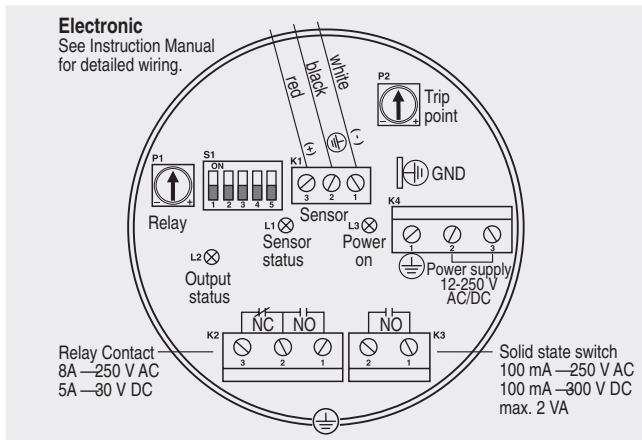
Dimensional drawings

5



Pointek CLS 300 dimensions

Schematics

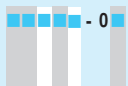



Pointek CLS 300 connections

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Point level measurement

Pointek CLS 300

Ordering data	Order No.
Pointek CLS 300, threaded version	7ML5503 -
Capacitance level switch for detecting interfaces, solids, liquids, slurries, and viscous materials in demanding conditions of low/high pressure, high temperatures, and corrosive and abrasive materials	
Version	
Standard, 350 mm (14")	0 X
Rod, 500 mm (20")	1 A
Rod, 750 mm (30")	1 B
Rod, 1000 mm (40")	1 C
Rod with extension, customer specified length (min. length 350 mm, max. length 1000 mm) Add order code H1Y and plain text: "Insertion lengthmm"	1 Z
Cable version, length 3000 mm (118"), length adjustable by customer	2 A
Cable version, length 6000 mm (236"), length adjustable by customer	2 B
Cable version with extension, customer specified length (min. length 500 mm, max. length 25000 mm) Add order code H1Y and plain text: "Insertion lengthmm"	2 Z
Cable PFA version, length 3000 mm (118"), length adjustable by customer ¹⁾	3 A
Cable PFA version, length 6000 mm (236"), length adjustable by customer ¹⁾	3 B
Cable PFA version, customer specified length (min. length 500 mm, max. length 25000 mm) ¹⁾ Add order code H1Y and plain text: "Insertion lengthmm"	3 Z
Process connection	
<u>Stainless steel</u>	
¾" NPT thread ²⁾	A
1" NPT thread ²⁾	B
1½" NPT thread	C
¾" BSPT thread ²⁾	D
1" BSPT thread ²⁾	E
1½" BSPT thread	F
¾" JIS thread ²⁾	G
1" JIS thread ²⁾	H
1½" JIS thread	J
1¼" NPT thread	K
Approvals	
General purpose	1
CSA/FM Class II and III, Div. 1, Group E, F, G	2
CENELEC EEx d [ia] IIC T6 to T1, CSA/FM Class I, Div. 1, Group A, B, C, D T4	3
ATEX II 1/2D T 100 °C	4
ATEX II 1/2 G EEx d [ia] IIC T6 to T1	5
Overfill protection	
None	0
WHG, German overfill protection	1
Additional Options	
standard version	A
with thermal isolator	B
with butterfly plate ³⁾	C
with thermal isolator and butterfly plate ³⁾	D
high pressure version ⁴⁾	E
high pressure version and thermal isolator ⁴⁾	F
high pressure version with butterfly plate ³⁾ and ⁴⁾	G
high pressure version with thermal isolator and butterfly plate ³⁾ and ⁴⁾	H

Ordering data	Order No.
Pointek CLS 300, threaded version	7ML5503 -
Capacitance level switch for detecting interfaces, solids, liquids, slurries, and viscous materials in demanding conditions of low/high pressure, high temperatures, and corrosive and abrasive materials	
Instruction Manual	
English	7ML1998-5CK03
French	C) 7ML1998-5CK13
German	C) 7ML1998-5CK33
Dutch	C) 7ML1998-5CK43
Note: The instruction manual should be ordered as a separate line on the order.	
Optional Equipment	
½" Cable gland (General Purpose and Dust Ignition Proof)	7ML1830-1JA
½" Cable gland (Explosion Proof)	7ML1830-1JB
Phoenix 2-Wire Trip Device	C) 7ML1830-1DK
Tag, stainless steel with hole, 12 x 45 mm, for fastening on sensors	PBD-45000787
Spare Parts	
Safety Barrier	C) 7ML1830-1DH
Amplifier/Power Supply	7ML1830-1DJ
Aluminum Enclosure	C) 7ML1830-1DA
Driver, CLS 300	PBD-C31010
E.S.D. Circuit, CLS 300	PBD-C31020
Driver/E.S.D. Circuit, CLS 300 (ATEX)	PBD-C31030
Extension rod L=180 mm/ 7", resulting in 350 mm insertion length	PBD-C31100
Extension rod L=330 mm/ 13", resulting in 500 mm insertion length	PBD-C31110
Extension rod L=580 mm/23", resulting in 750 mm insertion length	PBD-C31120
Extension rod L=830 mm/33" resulting in 1000 mm insertion length	PBD-C31130
Extension cable L=3000 mm/118", includes cable weight	PBD-C31140
Extension cable L=6000 mm/236", includes cable weight	PBD-C31150
Extension cable, PFA, L=3000 mm/115", includes cable weight	PBD-C31160
Extension cable, PFA, L=6000 mm/236", includes cable weight	PBD-C31170
Butterfly plate	PBD-C31180

- 1) Do not select PFA cable version if process temperature exceeds 200 °C (392 °F)
 - 2) available for rod version only
 - 3) Butterfly plate available for use with cable versions only
 - 4) High pressure versions for threaded version only, flange version on request
- C) Subject to export regulations AL: N, ECCN: EAR99.

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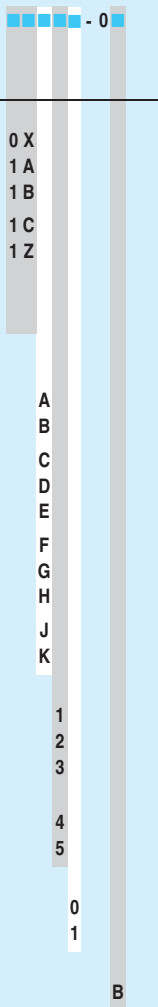
Ordering data	Order No.
Pointek CLS 300, welded flange	7ML5506 - A0
Capacitance level switch for detecting interfaces, solids, liquids, slurries, and viscous materials in demanding conditions of low/high pressure, high temperatures, and corrosive and abrasive materials	
Version	
Standard version, rod 350 mm (14")	0 X
Extended rod, length 500 mm (20")	1 A
Extended rod, length 750 mm (30")	1 B
Extended rod, length 1000 mm (40")	1 C
Extended rod, customer specified length (minimum length 350 mm, max. length 1000 mm)	1 Z
Add order code H1Y and plain text: "Insertion lengthmm"	
Extended cable, length 3000 mm (118"), length adjustable by customer	2 A
Extended cable, length 6000 mm (236"), length adjustable by customer	2 B
Extended cable, customer specified length (minimum length 500 mm, maximum length 25000 mm)	2 Z
Add order code H1Y and plain text: "Insertion lengthmm"	
Extended PFA cable, length 3000 mm (118"), length adjustable by customer ¹⁾	3 A
Extended PFA cable, length 6000 mm (236"), length adjustable by customer ¹⁾	3 B
Extended PFA cable, customer specified length (minimum length 500 mm, maximum length 25000 mm) ¹⁾	3 Z
Add order code H1Y and plain text: "Insertion lengthmm" ¹⁾	
Process connection	
<u>AISI 316L stainless steel</u>	
1" ANSI, 150 lb	A 1
1" ANSI, 300 lb	A 2
1" ANSI, 600 lb	A 3
1½" ANSI, 150 lb	B 1
1½" ANSI, 300 lb	B 2
1½" ANSI, 600 lb	B 3
2" ANSI, 150 lb	C 1
2" ANSI, 300 lb	C 2
2" ANSI, 600 lb	C 3
3" ANSI, 150 lb	D 1
3" ANSI, 300 lb	D 2
3" ANSI, 600 lb	D 3
4" ANSI, 150 lb	E 1
4" ANSI, 300 lb	E 2
4" ANSI, 600 lb	E 3
<u>DIN flange welded, AISI 316 stainless steel</u>	
DN 25, PN 16	J 4
DN 25, PN 25	J 5
DN 25, PN 40	J 6
DN 40, PN 16	K 4
DN 40, PN 25	K 5
DN 40, PN 40	K 6
DN 50, PN 16	L 4
DN 50, PN 25	L 5
DN 50, PN 40	L 6
DN 80, PN 16	M 4
DN 80, PN 25	M 5
DN 80, PN 40	M 6
DN 100, PN 16	N 4
DN 100, PN 25	N 5
DN 100, PN 40	N 6
Approvals	
General purpose	1
CSA/FM Class II and III Div. 1, Group E, F, G	2

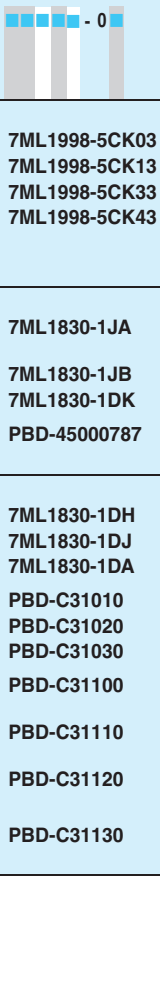
Ordering data	Order No.
Pointek CLS 300, welded flange	7ML5506 - A0
Capacitance level switch for detecting interfaces, solids, liquids, slurries, and viscous materials in demanding conditions of low/high pressure, high temperatures, and corrosive and abrasive materials	
CENELEC EEx d (ia) IIC T6 to T1, CSA/FM Class I Div. 1, Group A, B, C, D, T4	3
ATEX II 1/2D T 100 °C	4
ATEX II 1/2 G EEx d (ia) IIC T6 to T1	5
Overfill protection	
None	0
WHG, German overfill protection	1
Additional Options	
standard version	A
with thermal isolator	B
with butterfly plate ²⁾	C
with thermal isolator and butterfly plate ²⁾	D
high pressure version ³⁾	E
high pressure version and thermal isolator ³⁾	F
high pressure version with butterfly plate ²⁾ and ³⁾	G
high pressure version with thermal isolator and butterfly plate ²⁾ and ³⁾	H
Instruction Manual	
English	7ML1998-5CK03
French	C) 7ML1998-5CK13
German	C) 7ML1998-5CK33
Dutch	C) 7ML1998-5CK43
Note: The instruction manual should be ordered as a separate line on the order.	
Optional Equipment	
½" Cable gland (General Purpose and Dust Ignition Proof)	7ML1830-1JA
½" Cable gland (Explosion Proof)	7ML1830-1JB
Phoenix 2-Wire Trip Device	C) 7ML1830-1DK
Tag, stainless steel with hole, 12 x 45 mm, for fastening on sensors	PBD-45000787
Spare Parts	
Safety Barrier	C) 7ML1830-1DH
Amplifier/Power Supply	7ML1830-1DJ
Aluminum Enclosure	C) 7ML1830-1DA
Driver, CLS 300	PBD-C31010
E.S.D. Circuit, CLS 300	PBD-C31020
Driver/E.S.D. Circuit, CLS 300 (ATEX)	PBD-C31030
Extension rod L=180 mm/7", resulting in 350 mm insertion length	PBD-C31100
Extension rod L=330 mm/13", resulting in 500 mm insertion length	PBD-C31110
Extension rod L=580 mm/23", resulting in 750 mm insertion length	PBD-C31120
Extension rod L=830 mm/33" resulting in 1000 mm insertion length	PBD-C31130
Extension cable L=3000 mm/118", includes cable weight	PBD-C31140
Extension cable L=6000 mm/236", includes cable weight	PBD-C31150
Extension cable, PFA, L=3000 mm/118", includes cable weight	PBD-C31160
Extension cable, PFA, L=6000 mm/236", includes cable weight	PBD-C31170
Butterfly plate	PBD-C31180
1) Do not select PFA cable version if process temperature exceeds 200 °C	
2) Butterfly plate available for use with cable versions only.	
3) High pressure versions for threaded version only, flange version on request	
C) Subject to export regulations AL: N, ECCN: EAR99.	

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Ordering data	Order No.
Pointek CLS 300, high temperature Capacitance level switch for detecting interfaces, solids, liquids, slurries, and viscous materials in demanding conditions of low/high pressure, high temperatures, and corrosive and abrasive materials	7ML5507 - 
Version Standard version, 350 mm (14") rod Extended rod, length 500 mm (20") Extended rod, length 750 mm (30") Extended rod, length 1000 mm (40") Extended rod, customer specified length (min. 350 mm length, max. 1000 mm length) Add order code H1Y and plain text: "Insertion lengthmm"	0 X 1 A 1 B 1 C 1 Z
Process connection <u>AISI 316L stainless steel</u> ¾" NPT thread 1" NPT thread 1½" NPT thread ¾" BSPT thread 1" BSPT thread 1½" BSPT thread ¾" JIS thread 1" JIS thread 1½" JIS thread 1¼" NPT thread	A B C D E F G H J K
Approvals General Purpose CSA/FM Class II and III Div. 1, Group E, F, G CENELEC EEx d (ia) IIC T6 to T1, CSA/FM Class I Div. 1, Group A, B, C, D, T4 ATEX II 1/2 D T 100 °C ATEX II 1/2 G EEx d (ia) IIC T6 to T1	1 2 3 4 5
Overfill protection None WHG, German overfill protection	0 1
Options With thermal isolator	B

Ordering data	Order No.
Pointek CLS 300, high temperature Capacitance level switch for detecting interfaces, solids, liquids, slurries, and viscous materials in demanding conditions of low/high pressure, high temperatures, and corrosive and abrasive materials	7ML5507 - 
Instruction Manual English French German Dutch Note: The instruction manual should be ordered as a separate line on the order.	7ML1998-5CK03 C) 7ML1998-5CK13 C) 7ML1998-5CK33 C) 7ML1998-5CK43
Optional Equipment ½" Cable gland (General Purpose and Dust Ignition Proof) ½" Cable gland (Explosion Proof) Phoenix 2-Wire Trip Device Tag, stainless steel with hole, 12 x 45 mm, for fastening on sensors	7ML1830-1JA 7ML1830-1JB C) 7ML1830-1DK PBD-45000787
Spare Parts Safety Barrier Amplifier/Power Supply Aluminum Enclosure Driver, CLS 300 E.S.D. circuit, CLS 300 Driver/E.S.D. Circuit, CLS 300 (ATEX) Extension rod L=180 mm/7", resulting in 350 mm insertion length Extension rod L=330 mm/13", resulting in 500 mm insertion length Extension rod L=580 mm/23", resulting in 750 mm insertion length Extension rod L=830 mm/33" resulting in 1000 mm insertion length	C) 7ML1830-1DH 7ML1830-1DJ C) 7ML1830-1DA PBD-C31010 PBD-C31020 PBD-C31030 PBD-C31100 PBD-C31110 PBD-C31120 PBD-C31130

C) Subject to export regulations AL: N, ECCN: EAR99.

SITRANS L Level instruments

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Ordering data	Order No.
Pointek CLS 300, high temperature, welded flange	7ML5508 - A0
Capacitance level switch for detecting interfaces, solids, liquids, slurries, and viscous materials in demanding conditions of low/high pressure, high temperatures, and corrosive and abrasive materials	
Version	
Standard version, 350 mm (14") rod	0 X
Extended rod, length 500 mm (20")	1 A
Extended rod, length 750 mm (30")	1 B
Extended rod, length 1000 mm (40")	1 C
Extended rod, customer specified length (min. 350 mm length, max. 1000 mm length) Add order code H1Y and plain text: "Insertion lengthmm"	1 Z
Process connection	
<u>ANSI 316L stainless steel</u>	
1" ANSI, 150 lb	A 1
1" ANSI, 300 lb	A 2
1" ANSI, 600 lb	A 3
1½" ANSI, 150 lb	B 1
1½" ANSI, 300 lb	B 2
1½" ANSI, 600 lb	B 3
2" ANSI, 150 lb	C 1
2" ANSI, 300 lb	C 2
2" ANSI, 600 lb	C 3
3" ANSI, 150 lb	D 1
3" ANSI, 300 lb	D 2
3" ANSI, 600 lb	D 3
4" ANSI, 150 lb	E 1
4" ANSI, 300 lb	E 2
4" ANSI, 600 lb	E 3
<u>DIN flange welded, AISI 316 stainless steel</u>	
DN 25, PN 16	J 4
DN 25, PN 25	J 5
DN 25, PN 40	J 6
DN 40, PN 16	K 4
DN 40, PN 25	K 5
DN 40, PN 40	K 6
DN 50, PN 16	L 4
DN 50, PN 25	L 5
DN 50, PN 40	L 6
DN 80, PN 16	M 4
DN 80, PN 25	M 5
DN 80, PN 40	M 6
DN 100, PN 16	N 4
DN 100, PN 25	N 5
DN 100, PN 40	N 6
Approvals	
General purpose	1
CSA/FM Class II and III Div. 1, Group E, F, G	2
CENELEC EEx d (ia) IIC T6 to T1, CSA/FM Class I Div. 1, Group A, B, C, D, T4	3
ATEX II 1/2 D T 100 °C	4
ATEX II 1/2 G EEx d (ia) IIC T6 to T1	5
Overfill protection	
None	0
WHG, German overfill protection	1
Additional Options	
with thermal isolator	B

Ordering data	Order No.
Pointek CLS 300, high temperature, welded flange	7ML5508 - A0
Capacitance level switch for detecting interfaces, solids, liquids, slurries, and viscous materials in demanding conditions of low/high pressure, high temperatures, and corrosive and abrasive materials	
Instruction Manual	
English	7ML1998-5CK03
French	C) 7ML1998-5CK13
German	C) 7ML1998-5CK33
Dutch	C) 7ML1998-5CK43
Note: The instruction manual should be ordered as a separate line on the order.	
Optional Equipment	
½" Cable gland (General Purpose and Dust Ignition Proof)	7ML1830-1JA
½" Cable gland (Explosion Proof)	7ML1830-1JB
Phoenix 2-Wire Trip Device	C) 7ML1830-1DK
Tag, stainless steel with hole, 12 x 45 mm, for fastening on sensors	PBD-45000787
Spare Parts	
Safety Barrier	C) 7ML1830-1DH
Amplifier/Power Supply	7ML1830-1DJ
Aluminum Enclosure	C) 7ML1830-1DA
Driver, CLS 300	PBD-C31010
E.S.D. circuit, CLS 300	PBD-C31020
Driver/E.S.D. Circuit, CLS 300 (ATEX)	PBD-C31030
Extension rod L=180 mm/7", resulting in 350 mm insertion length	PBD-C31100
Extension rod L=330 mm/13", resulting in 500 mm insertion length	PBD-C31110
Extension rod L=580 mm/23", resulting in 750 mm insertion length	PBD-C31120
Extension rod L=830 mm/33" resulting in 1000 mm insertion length	PBD-C31130

C) Subject to export regulations AL: N, ECCN: EAR99.