

Level Measurement

Point level measurement
RF Capacitance switches

Pointek CLS100

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.

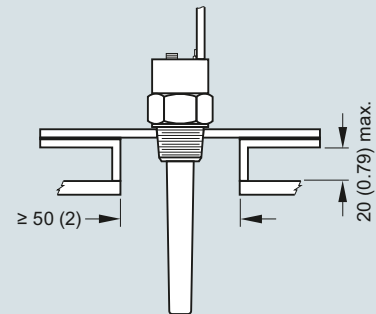
The Pointek CLS100 is available in three versions. The integral cable version has a stainless steel process connection and probe options of PPS or PVDF. The fully synthetic version has a thermoplastic polyester enclosure with a PPS process connection combined with a PPS probe. The standard enclosure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

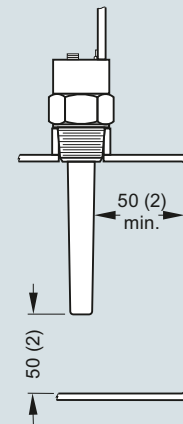
Configuration

Installation

Standpipes



Wall restriction



Pointek CLS100 installation, dimensions in mm (inch)

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 picroFarad (pF)	Change in picroFarad (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 conditions²⁾		
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		
	<u>Enclosure/Integral cable version</u>	<u>Fully synthetic version</u>
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

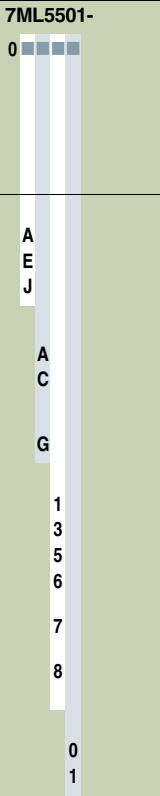
	Stainless steel process connection (integral cable or enclosure version) (7ML5501)	Fully synthetic process connection (enclosure version only) (7ML5610)
Sensor length (nominal)	100 mm (4 inch)	100 mm (4 inch)
Process connection material of probe/wetted parts ³⁾	Connection: 316L stainless steel; Process 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 mm ² (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/FF (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		
	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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 4/14.
- 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).

Level Measurement

Point level measurement
RF Capacitance switches

Pointek CLS100

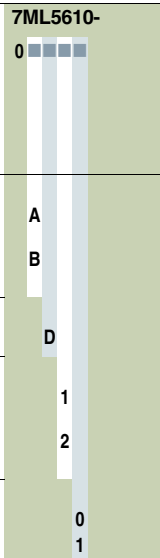
Selection and Ordering data	Article No.
Pointek CLS100, stainless steel process connection Compact 2-wire inverse frequency shift capacitance switch for level and material detection in constricted spaces, interfaces, solids, liquids, slurries and foam, with the ability to tune out buildup on probe. ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5501- 
Process connection 3/4" 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]	A E J
Approvals General Purpose: CE, CSA, FM, RCM 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⁾ CSA/FM Class II and III, Div. 1, Groups E, F, G ¹⁾	A C G
Device version Integral cable version (PPS probe) Enclosure version (PPS probe), 1/2" NPT cable inlet Integral cable version with PVDF probe body Enclosure version with PVDF probe body (1/2" NPT cable inlet) Enclosure version (PPS probe), M20 x 1.5 cable inlet Enclosure version with PVDF probe body, M20 x 1.5 cable inlet	1 3 5 6 7 8
Overfill protection Not required Required (WHG)	0 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 4/14

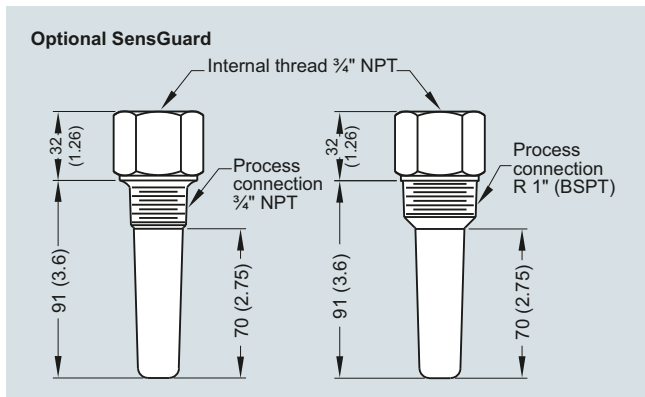
Selection and Ordering data	Article No.
Accessories SensGuard, 3/4" NPT (PPS) Only available for CLS100 with 3/4" NPT thread SensGuard, R 1" (BSPT) (PPS) Only available for CLS100 with 3/4" NPT thread Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosures Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia 1/2" 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) 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)	7ML1830-1DL 7ML1830-1DM 7ML1930-1AC 7NG4124-0AA00 7ML1830-1JA 7ML1830-1JC

Selection and Ordering data	Article No.
Pointek CLS100, PPS process connection 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. ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5610- 
Process connection (PPS) 3/4" NPT [(Taper), ANSI/ASME B1.20.1] (PPS probe body) R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] (PPS probe body)	A B
Approvals General Purpose: CSA, FM	D
Versions/Options Enclosure version, PPS process connection, 1/2" NPT cable inlet Enclosure version, PPS process connection, M20 x 1.5	1 2
Overfill protection Not required Required	0 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 SensGuard, 3/4" NPT (PPS) Only available for CLS100 with 3/4" NPT thread SensGuard, R 1" (BSPT) (PPS) Only available for CLS100 with 3/4" NPT thread Tag, stainless steel, 12 x 45 mm, (0.47 x 1.77 inch) one text line, suitable for enclosures	Article No. 7ML1830-1DL 7ML1830-1DM 7ML1930-1AC

¹⁾ See Temperature restriction on page 4/14

Options



Optional SensGuard, dimensions in mm (inch)

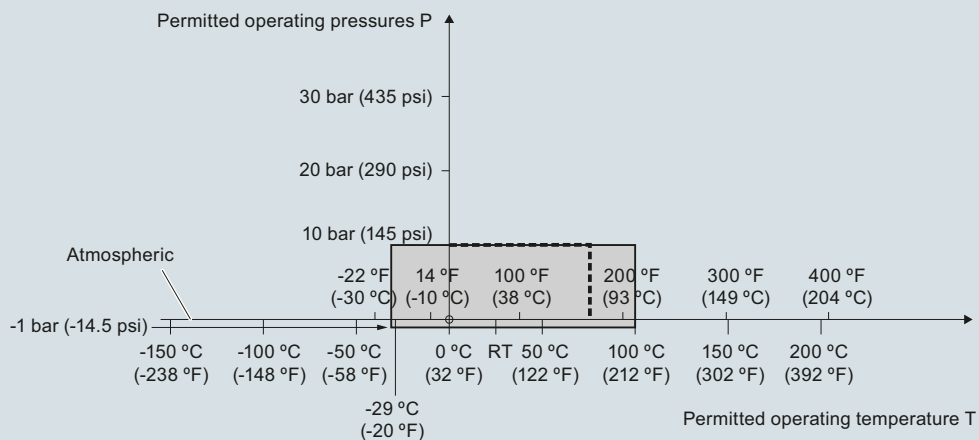
Level Measurement

Point level measurement
RF Capacitance switches

Pointek CLS100

Characteristic curves

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

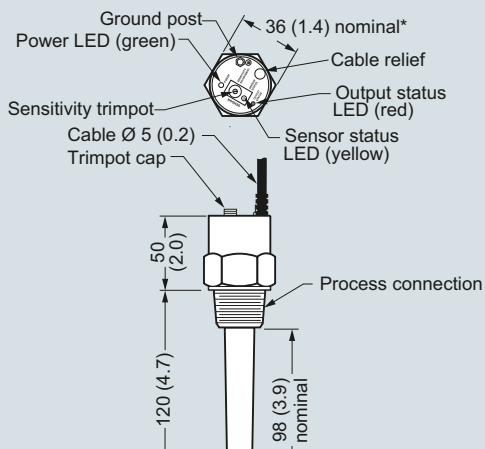


---- Example:
Permitted operating pressure = 10 bar (145 psi) at 75 °C

Pointek CLS100 process pressure/temperature derating curves

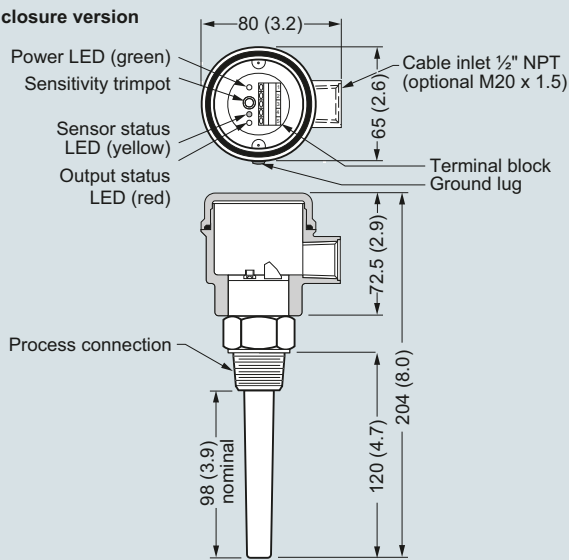
Dimensional drawings

Integral cable version



*Some G thread configurations deviate from this size.

Enclosure version

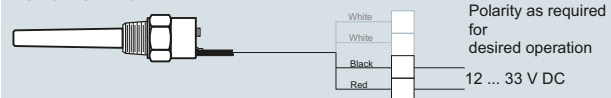


Pointek CLS100, dimensions in mm (inch)

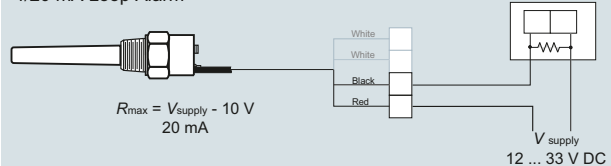
Circuit diagrams

Integral Cable Version - Non Intrinsically Safe only

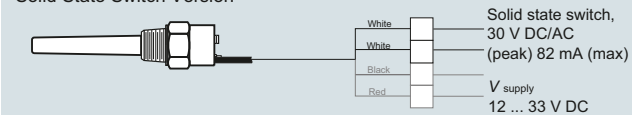
LOW/HIGH Alarm



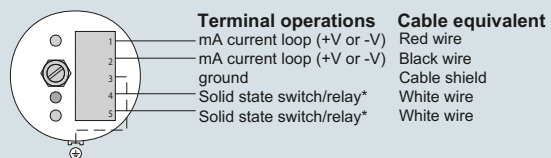
4/20 mA Loop Alarm



Solid State Switch Version



Enclosure and Fully Synthetic Version



- * 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

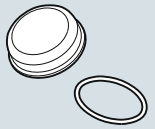

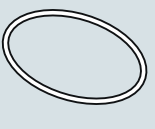
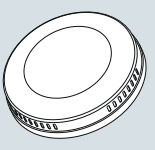
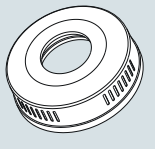

Level Measurement

Point level measurement
RF Capacitance switches

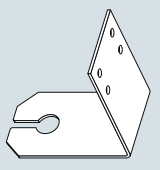


Pointek CLS Specials



Selection and ordering data


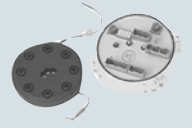
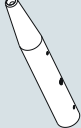
Pointek Specials¹⁾

	Article No.
CLS100 Polycarbonate Lid and Gasket, FKM 	A5E01163671
Kit, Lid and gasket, CLS100 enclosure version	
CLS100 Miscellaneous Parts Custom length of cable is available only for 7ML5501-xxx1x and 7ML5501-xxx5x ²⁾	
CLS200 Gasket (IP65), Synprene 	A5E01163672
Spare gasket, enclosure version (IP65 versions only)	
CLS200 Gasket (IP68), Silicone 	A5E01163673
Spare gasket, enclosure version (IP68 versions)	
CLS200 Blind Lid 	A5E01163674
Spare aluminum blind lid (for standard versions only)	
CLS200 Lid with window 	A5E01163676
Spare aluminum lid with window	
CLS200 Sensor Kit for cable units 	A5E01163677
Kit, sensor for cable units, PPS, Standard, FKM	

Pointek Specials¹⁾

	Article No.
Kit, sensor for cable units, PPS, digital, FKM	A5E01163678
Kit, sensor for cable units, PPS, standard, FFKM	A5E01163679
Kit, sensor for cable units, PPS, digital, FFKM	A5E01163680
Kit, sensor for cable units, PVDF, standard, FKM	A5E01163681
Kit, sensor for cable units, PVDF, digital, FFKM	A5E01163682
Kit, sensor for cable units, PVDF, standard, FFKM	A5E01163683
Kit, sensor for cable units, PVDF, digital, FFKM	A5E01163684
CLS200 Mounting Bracket, 316L stainless steel 	
Spare mounting bracket	A5E01163685
CLS200 PROFIBUS Connector (IP65) 	
Spare, PROFIBUS connector (IP65 versions only)	A5E01163686
CLS200 Miscellaneous Parts CLS200 with FFKM O-rings (any version) ²⁾	
CLS200 Electronics Test magnet, digital version Amplifier/power supply kit, standard version Amplifier/power supply, digital version LCD display, digital version	7ML1830-1JE A5E03251681 7ML1830-1JF 7ML1830-1JK
CLS300 Cable Extensions, 316L stainless steel 	
Kit, stainless steel cable extension, 1 m, adjustable by customer	A5E01163688
Kit, stainless steel cable extension, 3 m, adjustable by customer	A5E01163689
Kit, stainless steel cable extension, 5 m, adjustable by customer	A5E01163690
Kit, stainless steel cable extension, 10 m, adjustable by customer	A5E01163691
Kit, stainless steel cable extension, 15 m, adjustable by customer	A5E01163693
Kit, stainless steel cable extension, 20 m, adjustable by customer	A5E01163695

Pointek Specials ¹⁾	
	Article No.
CLS300 Cable Extensions, 316 stainless steel with PFA coating	
Kit, PFA cable extension, 1 m, adjustable by customer	A5E01163697
Kit, PFA cable extension, 3 m, adjustable by customer	A5E01163698
Kit, PFA cable extension, 5 m, adjustable by customer	A5E01163699
Kit, PFA cable extension, 10 m, adjustable by customer	A5E01163700
Kit, PFA cable extension, 15 m, adjustable by customer	A5E01163701
Kit, PFA cable extension, 20 m, adjustable by customer	A5E01163702
CLS300 Rod Kits, 316L stainless steel	
Kit, stainless steel rod 180 mm (7.09 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 350 mm (13.78 inch).	A5E01163719
Kit, stainless steel rod 330 mm (12.99 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 500 mm (19.69 inch).	A5E01163720
Kit, stainless steel rod 580 mm (22.83 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 750 mm (29.53 inch).	A5E01163721
Kit, stainless steel rod 830 mm (32.68 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 1 000 mm (39.37 inch).	A5E01163722
Kit, stainless steel rod 1 330 mm (52.36 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 1 500 mm (59.06 inch). ²⁾	
Kit, stainless steel rod 1 830 mm (72.05 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 2 000 mm (78.74 inch). ²⁾	
Kit, stainless steel rod customized length up to 1 m ²⁾	
Kit, stainless steel rod customized length up to 2 m ²⁾	

Pointek Specials ¹⁾	
	Article No.
CLS300 Electronics Kits with drivers (for rod or cable versions)	
Kit, electronics with driver, standard CLS300. To be used in rod or cable versions with length less than 5 m. ³⁾⁴⁾	A5E01163723
Kit, electronics with driver, digital CLS300. To be used in rod or cable versions with length less than 5 m. ³⁾⁴⁾	A5E01163725
CLS300 Electronics Kits with drivers (for cable versions)	
Kit, electronics with driver, standard CLS300. To be used in cable versions with length greater than 5 m. ³⁾⁴⁾	A5E01163724
Kit, electronics with driver, digital CLS300. To be used in cable versions with length greater than 5 m. ³⁾⁴⁾	A5E01163726
CLS300 Electronics	
Test magnet, digital version	7ML1830-1JE
Amplifier/power supply kit, standard version	A5E03251683
Amplifier/power supply, digital version	7ML1830-1JF
LCD display, digital version	7ML1830-1JK
CLS300 Weight Kit, 316L stainless steel	
Kit, spare stainless steel weight. To be used in any cable version of CLS300.	A5E01163727

¹⁾ Special flange sizes and facings are available. Please consult a local sales person for details.

²⁾ Please consult a local sales person for part number and pricing

³⁾ For General Purpose approvals only

⁴⁾ To maintain approvals, qualified trained Siemens personnel required for part replacement

Customers interested in a custom designed device should consult a local sales person. For more information, please visit http://www.automation.siemens.com/aspa_app.