



TYPE APPROVAL CERTIFICATE

Certificate No:
TAA00002HC
Revision No:
7

This is to certify:

That the Sensors for Liquid Analysis

with type designation(s)

xPS11D, xPS11E, xPS12D, xPS12E, xLS21D, xLS21E, xLS50D, xLS82D, xPF81D, xPF81E, xUS50D, xUS52D, xUS52D, xCS50D, xCS51D, xFS51, xCS55D, xOS81D, xYK10

Issued to

Endress+Hauser Conducta GmbH+Co. KG
Gerlingen, Germany

is found to comply with

DNV rules for classification – Ships, offshore units, and high speed and light craft

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Location classes:

Temperature	A
Humidity	B
Vibration	A
EMC	B
Enclosure	D

Issued at **Hamburg** on **2024-01-03**

for **DNV**

This Certificate is valid until **2024-11-03**.

DNV local station: **Augsburg**

Approval Engineer: **Dariusz Lesniewski**

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Joannis Papanuskas
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Product description

ph electrode with digital Memosens technology
 010 020 030 040

xPS11D-	*	**	*	*
x can be named as C, O or OC				
010	Version:			
	7	Basic version		
020	Application Range:			
	AA	1-12pH, -15...80°C, 6 bar		
	AS	1-12pH, -15...80°C, 6 bar, add. salt		
030	Shaft Length:			
	2	120mm		
040	Approval:			
	C	Non-hazardous area + EAC marking		
	1	Non-hazardous area		
	*	one letter for non-ex or ex-approval (no construction relevance)		

ph electrode with digital Memosens technology
 010 020 030 040 50 590

xPS11E-	**	*	*	**	*	+	*
x can be named as C, O or OC							
010	Approval						
	AA	Non-hazardous area					
	**	two letters for non-ex or ex-approval (no construction relevance)					
020	Electrode Type						
	7	Basic version, zero point pH 7,0, temperature sensor NTC 30k					
030	Application Range:						
	A	1-12pH, -15...80°C, 0,8...17 bar (abs)					
	B	0-14 pH, 0...135°C, 0,8...17 bar (abs)					
	F	0-10 pH, 0...70°C, 0,8...7 bar (abs)					
040	Reference system						
	AA	Teflon ring junction, 3 M KCl, Ag/AgCl					
	AS	Teflon ring junction, salt store, saturated KCl, Ag/AgCl					
	TA	Teflon ring junction, ion trap, 3 M KCl, Ag/AgCl					
050	Shaft Length:						
	2	120mm					
590	Additional Approval:						
	LI	DNV					
and other additional marks (no construction relevance, can be more than two letters)							

ORP electrode with digital Memosens technology
 010 020 030 040

xPS12D-	*	**	*	*
x can be named as C, O or OC				
010	Version:			
	7	Basic version		
020	Measuring surface:			
	NA	Gold		
	PA	Platinum		
030	Shaft Length:			
	2	120 mm		
040	Approval:			
	C	Non-hazardous area + EAC marking		
	1	Non-hazardous area		
	*	one letter for non-ex or ex-approval (no construction relevance)		

ORP electrode with digital Memosens technology

010 020 030 040 050 590

xPS12E-	**	*	*	**	*	+	**
x can be named as C, O or OC							
010	Approval						
	AA Non-hazardous area						
	** two letters for non-ex or ex-approval (no construction relevance)						
020	Electrode Type						
	7 Basic						
030	Application Range						
	G Gold, -1500 mV... 1500 mV, -15...135°C, 0,8...17 bar (abs)						
	P Platinum, -1500 mV... 1500 mV, -15...135°C, 0,8...17 bar (abs)						
040	Reference System						
	AA Teflon ring junction, 3 M KCl, Ag/AgCl						
050	Shaft length						
	2 120 mm						
590	Additional Approval:						
	LI DNV						
and other additional marks (no construction relevance, can be more than two letters)							

ph/ORP electrode with digital Memosens technology

010 020 030 040

xPF81D-	*	**	*	*
x can be named as C, O or OC				
010	Version:			
	7 Basic version			
020	Application range:			
	LH 0-14pH; 0-110°C			
	NN 0-11pH; 0-80°C			
030	Insertion length:			
	1 23mm + electrode guard			
	3 58mm + electrode guard			
040	Approval:			
	1 Non-hazardous area			
	* one letter for non-ex or ex-approval (no construction relevance)			

ph/ORP electrode with digital Memosens technology

010 020 030 040 045

xPF81E-	**	*	*	**	*
x can be named as C, O or OC					
010	Approval:				
	** two letters for non-ex or ex-approval				
020	Electrode type:				
	5 Basic version, process connection NPT 3/4", zero point pH 7,0, temperature sensor NTC 30k				
030	Application range:				
	L 0-14 pH, 0...110°C, 0,8... 11 bar (abs)				
	N 0-14 pH, 0...80°C, 0,8... 11 bar (abs)				
040	Reference system:				
	AD Teflon ring junction, double chamber, 3 M KNO3, 3 M KCL, Ag/ AgCl				
045	Insertion Length:				
	1 23 mm, bulb membrane, electrode guard				
	2 13, flat membran				
	3 58 mm, bulb membrane, electrode guard				

Conductivity sensor

010 020 03

xLS21D-	*	**	*
x can be named as C, O or OC			
010	Measuring Range:		
	C	0.01-20.0mS/cm; k=1	
020	Process Connection:		
	1E	Thread G1; PES	
	1N	Thread NPT 1"; PES	
030	Approval:		
	C	Non-hazardous + EAC marking	
	1	Non-hazardous area	
	*	one letter for non-ex or ex-approval (no construction relevance)	

Conductivity sensor with digital Memosens technology

010 020 030 590

xLS21E-	*	**	**	+	**
x can be named as C, O or OC					
010	Approval				
	AA	Non-hazardous area			
	**	two letters for non-ex or ex-approval (no construction relevance)			
020	Process Connection:				
	GA	Thread G1"			
	HA	Thread NPT 1"			
030	Material				
	11	Sensor PES, electrodes Graphite			
590	Additional Approval:				
	LI	DNV			
and other additional marks (no construction relevance, can be more than two letters)					

Inductive conductivity sensor with digital Memosens technology

010 020 030 040 050

xLS50D-	**	*	*	*	*
x can be named as C, O or OC					
010	Approval:				
	AA	Standard:			
	GR	Non-hazardous area + EAC marking			
	**	two letters for non-ex or ex-approval (no construction relevance)			
020	Process Connection:				
	1	Thread G 3/4"			
	2	Thread NPT 1"; PEEK			
030	Sensor-, Seal-, Adapter Material:				
	B	PEEK; Viton; PEEK			
	C	PEEK; Chemraz; PEEK			
	D	PFA; Chemraz; 1.4571			
040	Cable Length:				
	1	3m			
	2	7m			
	3	15m			
050	Cable connection:				
	1	Fixed cable ; crimp sleeves			
	2	Fixed cable; M12 plug			

Hygienic conductivity sensor with digital Memosens technology

010 020 030

xLS82D-	**	**	*
x can be named as C, O or OC			
010	Approval:		
	AA	Non-hazardous	
	GR	Non-hazardous + EAC marking	
	**	two letters for non-ex or ex-approval (no construction relevance)	
020	Process Connection:		
	GA	Thread G1	
	HA	Thread NPT1	
	PG	PG 13.5 120mm	
	PM	PG 13.5 215mm	
030	Sensor Material:		
	A	Ceramic, Platinum, Stainless Steel	

Sensor for fluorescence measurement

010 020 030 040 050 060 070 590

xFS51-	**	*	*	*	*	*	*	+	**
x can be named as C, O or OC									
010	Approval:								
	AA	Non-hazardous area							
	**	two letters for non-ex or ex-approval (no construction relevance)							
020	Application/Measuring Range:								
	1	PAH measurement for marine applications							
030	Process Connection:								
	A	Immersion sensor, thread G1, NPT 3/4							
040	Adaption Cable:								
	A	Fixed cable ; crimp sleeves							
	B	Fixed cable; M12 plug							
050	Cable Length:								
	2	3m							
	3	7m							
	4	15m							
	7	...m							
	8	...ft							
060	Sensor Material:								
	A	Titanium							
070	Seal Material:								
	1	FKM							
590	Additional approval:								
	LI	DNV							

Turbidity and suspended solids sensor

010 020 030 040 050 060 070

xUS50D-	**	*	*	*	*	*	*
x can be named as C, O or OC							
010	Approval:						
	AA	Non-hazardous area					
	GR	Non-hazardous area + EAC marking					
	**	two letters for non-ex or ex-approval (no construction relevance)					
020	Measuring Range:						
	2	Absorption (ISO 7027)					
030	Process Connection:						
	A	Immersion sensor, thread G1, NPT 3/4					

040	Adaption Cable:
	A Fixed cable ; crimp sleeves
	B Fixed cable; M12 plug
050	Cable Length:
	2 3m
	3 7m
	4 15m
	7 ...m
	8 ...ft
060	Sensor Material:
	A Head: PCTFE, shaft: 1.4571
	B Head: PCTFE, shaft: PPS
070	Seal Material:
	1 EPDM

Turbidity sensor

010 020 030 040 050

xUS52D-	**	*	*	*	*
x can be named as C, O or OC					
010	Approval:				
	AA Non-hazardous area				
	GR Non-hazardous area + EAC marking				
	** two letters for non-ex or ex-approval				
020	Measuring Method:				
	1 ISO 7027, IR				
030	Process Connection:				
	A Immersion Sensor, thread G1, NPT 3/4				
	B Clamp 2"				
	C Varivent N DN 65-125 (standard immersion depth 22,5 mm)				
	D Varivent N DN 65-125 (immersion depth 42,5 mm)				
	H Immersion sensor, thread G1, NPT3/4, head: PEEK, shaft: PPS				
040	Adaption Cable:				
	A Fixed cable; crimp sleeves				
	B Fixed cable; M12 plug				
050	Cable Length:				
	2 3m				
	3 7m				
	4 15m				
	7 ...m				
	8 ...Ft				

Chlorine dioxide sensor with digital Memosens technology

010 020 030

xCS50D-	**	**	**
x can be named as C, O or OC			
010	Approval:		
	AA Non-hazardous area		
	GR Non-hazardous area + EAC marking		
	** two letters for non-ex or ex-approval (no construction relevance)		
020	Application:		
	11 Process water, drinking water		
	21 Process water, drinking water		
030	Measuring Range:		
	AD 5 mg/l		
	BF 20 mg/l		

CJ	200 mg/l
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Digital sensor for determining free chlorine
 010 020 030

xCS51D-	**	**	**
x can be named as C, O or OC			
010	Approval:		
	AA	Non-hazardous area	
	GR	Non-hazardous area + EAC marking	
	**	two letters for non-ex or ex-approval (no construction relevance)	
020	Application:		
	11	Process water, drinking water	
	21	Process water, drinking water	
030	Measuring Range:		
	AD	5 mg/l	
	BF	20 mg/l	
	CJ	200 mg/l	

Digital sensor for determining bromine
 010 020 030

xCS55D-	**	**	**
x can be named as C, O or OC			
010	Approval:		
	AA	Non-hazardous area	
	GR	Non-hazardous area + EAC marking	
	**	two letters for non-ex or ex-approval (no construction relevance)	
020	Application:		
	11	Process water, drinking water	
	21	Process water, drinking water	
	31	Process water, sea water	
030	Measuring Range:		
	AD	5 mg/l	
	BF	20 mg/l	
	CJ	200 mg/l	

Optical sensor for measuring oxygen
 010 020 035 040 050 060

xOS81D-	**	**	*	*	*	*
x can be named as C, O or OC						
010	Approval:					
	AA	Non-hazardous area				
	GR	Non-hazardous area + EAC marking				
	**	two letters for non-ex or ex-approval (no construction relevance)				
020	Diameter; Process Connection; Length:					
	A2	12mm; PG13.5; 120mm				
	A4	12mm; PG13.5;220mm				
035	Type Optical Cap:					
	C	C-shape				
	U	U-shape				
040	Material, Sensorshaft; Sensorcap:					
	B	Stainless steel 1.4435, 316L				
050	Material O-Ring:					
	1	EPDM USP Cl. VI+FDA				
	3	FFKM				
060	Material Process Sealing:					

1	FKM USP Cl. VI+FDA
3	FKM Ex

Memosens data cable

010 020 030

xYK10-	*	**	*
x can be named as C, O or OC			
010	Approval:		
	A	Non-hazardous area	
	L	one letter for non-ex or ex-approval (no construction relevance)	
	*	one letter for non-ex or ex-approval	
020	Cable Length:		
	01	1,5m	
	03	3m	
	05	5m	
	10	10m	
030	Cable Connection:		
	1	wire terminals	
	2	M12 plug	

Approval conditions

The Type Approval covers hardware listed under Product description. When the hardware is used in applications to be classed by DNV, documentation for the actual application is to be submitted for approval by the manufacturer of the application system in each case. Reference is made to DNV rules for classification of ships Pt.4 Ch.9 Control and monitoring systems.

Ex-certification is not covered by this certificate. Application in hazardous area to be approved in each case according to DNV Rules and Ex-Certification / Special Condition for Safe Use listed in valid Ex-certificate issued by a notified/recognized Certification Body.

Place of manufacture

Endress+Hauser Conducta GmbH+Co. KG ... for all products except xPF81D and xPF81E
 Landsberger Strasse 28
 04736 Waldheim, Germany

Endress+Hauser Conducta Inc. ... for xPF81D, xPF81E, xPS11D and xPS11E
 4123 East La Palma Avenue, Suite 200
 Anaheim, CA 92807 USA

Application/Limitation

“The sensor for fluorescence measurement, the pH electrodes as well as the sensors for the turbidity measurements are generally in compliance with the with the requirements of Resolution MEPC.259(68) – “2015 Guidelines for exhaust gas cleaning systems”, Chapter 10.2 “Washwater monitoring” as well as Resolution MEPC.340(77) – “2021 Guidelines for exhaust gas cleaning systems”, Chapter 10.2 “Discharge water monitoring”.

“The turbidity sensor CUS52D meets the following requirements:

- Permissible deviation of the Turbidity monitoring equipment MEPC.340(77), 10.2.2
- Principle of detection for Turbidity MEPC.259(68), 10.2.5 and MEPC.340(77), 10.2.6”

Type Approval documentation

- Test Report: PHOENIX TESTLAB No. S182222E1, dated 2019-03-01
- Test Report: PHOENIX TESTLAB No. S202076E1, dated 2021-03-15
- Test Report: PHOENIX TESTLAB No. E182222E1, dated 2019-06-27
- Test Report: PHOENIX TESTLAB No. E202076E1, dated 2021-04-20
- Test Report: PHOENIX TESTLAB No. U182222E1, dated 2019-07-11
- Test Report: PHOENIX TESTLAB No. U202076E1, dated 2021-05-03
- Test Report: PHOENIX TESTLAB No. U220601E1, dated 2022-07-28
- Test Report: PHOENIX TESTLAB No. E220601E1, dated 2022-07-23
- Test Report: PHOENIX TESTLAB No. E231610E1, dated 2023-11-28
- Test Report: PHOENIX TESTLAB No. U231610E1, dated 2023-11-10

Test Report: Currenta No. 19/0390, dated 2019-03-13
Test Report: Currenta No. 19/0397, dated 2019-03-13
Test Report: Currenta No. 19/0914, dated 2019-06-17
Statement of Compliance No. 29917063/DNV issued on 2022-06-13
Statement of Compliance No. 31371820/DNV issued on 2023-06-05
E+H List Marine cables V03
E+H List Marine sensors V02

Technical Information (Data Sheets):

- TI01353CEN0117, TI00085CEN1518, TI00182CEN1615, TI01188CEN0417
- TI01397CEN0118, TI01201CEN0217, TI00191CEN1314, TI00028CEN1415
- TI01397CEN0118, TI01395CEN0118, TI01136CEN0318
- TI01493CEN0120, TI01494CEN0120, TI01528CEN0120, TI01136CEN_0620
- TI01630C/07/EN/02.22-00
- TI01594C/07/EN/01.21

Reference documents:

- 'Sensor documentation overview (02.07.2019)'
 - 'Sensor documentation overview (25.02.2021)'
 - 'Sensor documentation overview (02.09.2022)'
 - User Manuals
 - Mechanical Drawings, Part Lists, Circuit Diagrams, Assembly Plans, Layout Patterns
 - Ex-Certificates
 - IP-Test Reports, Pressure Test Reports
- Checkliste Marine E10 of KSG3 ReDesign (CPS11E, CPF81E), dated 2023-03-09
'Doc. package - folder KSG3_VX.01.XX and folder KSG3_VX.03.XX'

Type approval assessment report issued at Magdeburg on 2019-06-05

Tests carried out

Applicable tests according to class guideline DNV-CG-0339, August 2021.

Marking of product

The products to be marked with:

- manufacturer name
- model name
- serial number
- power supply ratings

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.

The main elements of the assessment are:

- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE