



# TYPE APPROVAL CERTIFICATE

Certificate No:  
**TAA00002HC**  
Revision No:  
**4**

## 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:

<b>Temperature</b>	<b>A</b>
<b>Humidity</b>	<b>B</b>
<b>Vibration</b>	<b>A</b>
<b>EMC</b>	<b>B</b>
<b>Enclosure</b>	<b>D</b>

Issued at **Hamburg** on **2022-09-09**

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

DNV local station: **Augsburg**

Approval Engineer: **Dariusz Lesniewski**

for **DNV**

.....  
**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

<b>xPS11D-</b>	*	**	*	*
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

<b>xPS11E-</b>	**	*	*	**	*	+	*
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

<b>xPS12D-</b>	*	**	*	*
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

<b>xPS12E-</b>	**	*	*	**	*	+	**
<b>x</b> 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

<b>xPF81D-</b>	*	**	*	*
<b>x</b> 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

<b>xPF81E-</b>	**	*	*	**	*
<b>x</b> 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

<b>xLS21D-</b>	*	**	*
<b>x</b> 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

<b>xLS21E-</b>	*	**	**	+	**
<b>x</b> 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

<b>xLS50D-</b>	**	*	*	*	*
<b>x</b> 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

<b>xLS82D-</b>	**	**	*
<b>x</b> 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

<b>xFS51-</b>	**	*	*	*	*	*	*	+	**
<b>x</b> 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

<b>xUS50D-</b>	**	*	*	*	*	*	*
<b>x</b> 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

<b>xUS52D-</b>	**	*	*	*	*
<b>x</b> 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

<b>xCS50D-</b>	**	**	**
<b>x</b> 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 free chlorine  
 010 020 030

<b>xCS51D-</b>	**	**	**
<b>x</b> 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

<b>xCS55D-</b>	**	**	**
<b>x</b> 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

<b>xOS81D-</b>	**	**	*	*	*	*
<b>x</b> 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

<b>xYK10-</b>	*	**	*
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**

**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”.

**Type Approval documentation**

**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





Job Id: **262.1-031103-4**  
Certificate No: **TAA00002HC**  
Revision No: **4**

- 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