Certificate no.:
TAA00003FA

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Miscellaneous Transmitter

with type designation(s)
Sigma 05, MOP301, HTP501

issued to
E+E Elektronik Ges.m.b.H.
Engerwitzdorf, OÖ, Austria

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	**D**
Humidity	**B**
Vibration	**B**
EMC	**B**
Enclosure	**B***

*** see Application/Limitation**

Issued at **Høvik** on **2024-07-10**
This Certificate is valid until **2029-07-09**.
DNV local unit: **Augsburg**

for **DNV**

Approval Engineer: **Heinz Scheffler**

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

Sigma 05: Modular Sensor Platform

The E+E Elektronik Sigma 05 is a host device acting as a hub for intelligent E+E sensors with RS485 interface and Modbus RTU protocol. It features 2 analogue outputs as well as an optional display for up to 3 measurands. The probes are pluggable and can be interchanged.

Sigma 05 order code

Feature	Description	Order code
		SIGMA 05-
Approval	DNV*	AP2
Enclosure material	Polycarbonate	HS1
	Aluminum (without display option)	HS3
Display	No display	D0
	Display with backlight	D2
Output signal	0 - 1 V	GA1
	0 - 5 V	GA2
	0 - 10 V	GA3
	0 - 20 mA	GA5
	4 - 20 mA	GA6
Units	Metric (SI)	U1
	Non metric (US/GB)	U2

*DNV approval available for polycarbonate (PC) enclosure with and without display, and for aluminum without display only

HTP501: Humidity / Temperature Probe

The HTP501 is a robust probe for humidity and temperature measurement in air and other non-explosive gases.
It features a humidity measuring range of 0...100 %RH, a temperature measuring range of -40...+120 °C and a 20 bar pressure rating. RS-485 with Modbus RTU protocol is available as a digital process interface for reading measured values.

HTP501 order code:

Feature	Description	Order code	
		HTP501-	HTP501-
Approval	DNV	AP2	AP2
Type	Probe up to 120 °C	T4	None
	Remote probe, pressure-tight up to 20 bar and 120 °C	None	T10
Filter	Metal grid with polycarbonate body	F3	F3
	Stainless steel sintered	F4	F4
	PTFE (Polytetrafluoroethylene)	F5	F5
Probe cable length	0.5m cable length	K0.5	K0.5
	1m cable length	K1	K1
	1.5m cable length	K1.5	K1.5
	2m cable length	K2	K2
	3m cable length	K3	K3
	5 m cable length	K5	K5
	10 m cable length	K10	K10
	15 m cable length	K15	K15
	20 m cable length	K20	K20
Probe length	200 mm	L200	L200
Process connection	Without probe fitting	no code	no code
	G1/2" ISO - cut-in fitting, Ø 12 mm	PA20	None
	1/2" NPT - cut-in fitting, Ø 12 mm	PA22	None
	G1/2" ISO - sliding fitting, Ø 13 mm	None	PA23
	1/2" NPT - sliding fitting, Ø 13 mm	None	PA25
Sensing element protection	Without	C0	C0
	E+E proprietary coating	C1	C1
	Sensor leads protection	C2	C2
	E+E proprietary coating and sensor leads protection	C3	C3

MOP301: Moisture in Oil Probe
The MOP301 is a robust probe for moisture in oil and temperature measurement. It features a moisture in oil measuring range of 0...1 aw, a temperature measuring range of -40...+120 °C and a 20 bar pressure rating. RS-485 with Modbus RTU protocol is available as a digital process interface for reading measured values.

MOP301 order code:

Feature	Description	Order code	
		MOP301-	MOP301-
Approval	DNV	AP2	AP2
Type	Probe up to 120 °C	T4	None
	Remote probe, pressure-tight up to 20 bar and 120 °C	None	T10
Filter	Stainless steel, for flow <1 m/s	F13	F13
	Stainless steel, for flow >1 m/s	F18	F18
Probe cable length	0.5m cable length	K0.5	K0.5
	1m cable length	K1	K1
	1.5m cable length	K1.5	K1.5
	2m cable length	K2	K2
	3m cable length	K3	K3
	5 m cable length	K5	K5
	10 m cable length	K10	K10
	15 m cable length	K15	K15
	20 m cable length	K20	K20
Probe length	200 mm	L200	L200
Process connection	Without probe fitting	no code	no code
	G1/2" ISO - cut-in fitting, Ø 12 mm	PA20	None
	1/2" NPT - cut-in fitting, Ø 12 mm	PA22	None
	G1/2" ISO - sliding fitting, Ø 13 mm	None	PA23
	1/2" NPT - sliding fitting, Ø 13 mm	None	PA25
Sensing element protection	Without	C0	C0
	Sensor leads protection	C2	C2
Oil parameterization for water content calculation	Mineral transformer oil	no code	no code
	Customer specific oil	PPMxxx	PPMxxx

Application/Limitation
Additional requirements machinery in accordance with the applicable DNV Rules must be proven for the respective application.

Location classes Enclosure:
- Sigma IP65
- MOP301 IP66
- HTP501 IP66

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 Ships Pt.4 Ch.9 Control and Monitoring Systems.

Type Approval documentation
Test Reports and Documents: Test Report & Document list Sigma 05 - MOP501 - HTP301 (Rev. 01)

Tests carried out
Applicable tests according to class guideline DNV-CG-0339, August 2021

Marking of product

The products to be marked with:

- Model name
- Manufacturer name
- Serial number

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