TYPE APPROVAL CERTIFICATE

Certificate No:
TAA00000GW
Revision No:
2

This is to certify:

That the Temperature Sensor

with type designation(s)
MF19, MF20, TP2, TP3, TH3, TP8, TH8, TP11, TH11/TN4, TF4, TP4, TH4

Issued to
NORIS Automation GmbH
Nürnberg, Bayern, Germany

is found to comply with
DNV GL rules for classification – Ships

Application :

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

Location classes:

Temperature	**B**
Humidity	**B**
Vibration	**B**
EMC	**--**
Enclosure	**Required protection according to DNVGL Rules shall be provided upon installation on board.**

Issued at **Hamburg** on **2021-06-04**

This Certificate is valid until **2026-06-03**.
DNV local station: **Augsburg**

Approval Engineer: **Holger Jansen**

for **DNV**
Digitally Signed By: Rinkel, Marco
Location: DNV GL SE Hamburg, Germany
Signing Date: 04.06.2021 , on behalf of

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

Temperature sensors and Thermowells as specified below:

Sensor types (Part 1)

Series MF19	**MF19**–{d}–{e}–{g}–{k}	Pt100, Stern tube temperature
	MF19–{d}–{e}–**H**{b}–{k}	NTC, Stern tube temperature

Sensor elements:	Pt100	Class F0,3 (B)	Range -25°C … 100°C
	NTC	"NORIS Standard"	Range 0°C … 70°C ; 40°C … 100°C

Sensor lengths: Manufactured to customer requirements. (no standard lengths)
{b} = Temperature range NTC
{d} = Position sensor 1 (length L1)
{e} = Position sensor 2 (length L2, does not apply for 1 sensor)
{g} = Measuring circuit of Pt100 (does not apply for Pt100 2-Wire or NTC)
{k} = Cable length (does not apply for standard length)

Series MF20	**MF20**–{a}–{x}	Pt100, Bearing temperature
	MF20–{a}**H**{b}–{x}	NTC, Bearing temperature

Sensor elements:	Pt100	Class F0,3 (B)	Range -25°C … 120°C
	NTC	"NORIS Standard"	Range 0°C … 70°C ; 40°C … 120°C

Sensor lengths: Manufactured to customer requirements. (no standard lengths)
{a} = Number of sensor elements (max. 3)
{b} = Temperature range NTC
{x} = special design

Series TP2	{a}**TP2**{b}–{d}–{g}–{k}	Pt100, for protection tube
	{a}**TP2**{b}**0**–{d}–{k}	Pt1000, for protection tube
Series TP3	**TP3**{b}–{d}–{x}	Pt100, for protection tube
	TP3{b}**0**–{d}–{x}	Pt1000, for protection tube
Series TH3	**TH3**{b}–{d}–{x}	NTN, for protection tube
Series TP8	{a}**TP8**{b}–{d}–{x}	Pt100, for protection tube
	{a}**TPT8**{b}–{d}–{x}	Pt1000, for protection tube
Series TH8	{a}**TH8**{b}–{d}–{x}	NTN, for protection tube
Series TP11	{a}**TP11**{b}–{d}–{n}	Pt100, for protection tube
	{a}**TPT11**{b}–{d}–{n}	Pt100, for protection tube
Series TH11	{a}**TH11**{b}–{d}–{n}	NTN, for protection tube

Sensor elements:	Pt100/Pt1000	Class F0,3 (B)	Range -25°C … 120°C (150°C, 200°C)
	NTC	"NORIS Standard"	Range 0°C … 70°C ; 40°C … 120°C

Immersion depth: Standard lengths 50, 56, 75, 100, 150, 200, 250mm

Protection tube (Thermowell)	**MX2**–{c}–{d}		CuZn39 , max. 200°C
	MX5–{c}–{d}		1.4305 , max. 200°C
	MX6–{c}–{d}		1.4305 , max. 200°C
	MX13–{c}–{d}	seawater resistant	2.1972 (CuNi10Fe)
	MX24–{c}–{d}		CuZn39 , max. 200°C
	MX25–{c}–{d}		1.4305 , max. 200°C
	MX34–{c}–{d}		CuZn39 , max. 200°C
	MX37–{c}–{d}		CuZn39 , max. 200°C
	MX41–{c}–{d}		1.4305 , max. 200°
	MX42–{c}–{d}		1.4305 , max. 200°C

{a} = Number of sensor elements (max. 2, does not apply for 1)
{b} = Construction / Temperature range
{c} = Thread
{d} = Immersion depth (does not apply for standard length 56mm)

{g} = Measuring circuit of Pt100 (does not apply for Pt100 2-Wire or NTC)
{k} = Cable length (does not apply for standard length 2,3m)
{n} = Connection
{x} = Option for special design

Sensor types (Part 2)

Series TN4	{a}**TN4**{b}–**0**–{d}–{k}	type K (NiCr-Ni), angled version for compression fitting
	{a}**TN4**{b}–**1**–{d}–{k}	type K (NiCr-Ni), angled version for protection tube
	{a}**TN4**{b}–**2**–{d}–{h}	type K (NiCr-Ni), connection head version for compression fitting
	{a}**TN4**{b}–**3**–{d}–{h}	type K (NiCr-Ni), connection head version for protection tube
	{a}**TN4**{b}–**4**–{d}–{k}	type K (NiCr-Ni), straight version for compression fitting
	{a}**TN4**{b}–**5**–{d}–{k}	type K (NiCr-Ni), straight version for protection tube

Series TF4	{a}**TF4**{b}–**0**–{d}–{k}	type J (Fe-CuNi), angled version for compression fitting
	{a}**TF4**{b}–**1**–{d}–{k}	type J (Fe-CuNi), angled version for protection tube
	{a}**TF4**{b}–**2**–{d}–{h}	type J (Fe-CuNi), connection head version for compression fitting
	{a}**TF4**{b}–**3**–{d}–{h}	type J (Fe-CuNi), connection head version for protection tube
	{a}**TF4**{b}–**4**–{d}–{k}	type J (Fe-CuNi), straight version for compression fitting
	{a}**TF4**{b}–**5**–{d}–{k}	type J (Fe-CuNi), straight version for protection tube

Series TP4	{a}**TP4**{b}–**2**–{d}–{h}	Pt100, connection head version for compression fitting
	{a}**TP4**{b}**0**–**2**–{d}–{h}	Pt1000, connection head version for compression fitting
	{a}**TP4**{b}–**3**–{d}–{h}	Pt100, connection head version for protection tube
	{a}**TP4**{b}**0**–**3**–{d}–{h}	Pt1000, connection head version for protection tube

Series TH4	{a}**TH4**{b}–**2**–{d}–{h}	NTN, connection head version for compression fitting
	{a}**TH4**{b}–**3**–{d}–{h}	NTN, connection head version for protection tube

Sensor elements:	type K (NiCr-Ni)	Class 1	Range 0°C … 800°C
	type J (Fe-CuNi)	Class 2	Range 0°C … 600°C
	Pt100 / Pt1000	Class F0,3 (B)	Range -50°C … 200°C ; 0°C … 600°C
	NTC	“NORIS Standard”	Range 0°C … 70°C ; 40°C … 120°C

Immersion depth: Standard lengths 50, 75, 100, 150, 200, 250mm (max 200mm for Diesel exhaust)

Protection tube (Thermowell)	**MX8**–{c}–{d}	medium mech. stress	1.4541 , max. 800°C
	MX9–{c}–{d}	medium mech. stress, with neck tube	1.4541 , max. 800°C
	MX11–{c}–{d}	seawater resistant	2.1972 (CuNi10Fe)
	MX26–{c}–{d}	high mech. stress	1.4541 , max. 800°C
	MX27–{c}–{d}	high mech. stress, with neck tube	1.4541 , max. 800°
Compression fitting	**VS37**–{c}	heavy duty version	1.0718 / ISO4042-A2K

{a} = Number of sensor elements (max. 2, does not apply for 1)
{b} = Construction / Temperature range
{c} = Thread
{d} = Immersion depth
{h} = Option for connection head
{k} = Cable length (does not apply for standard length)

Place of manufacture

NORIS Automation GmbH
Muggenhofer Straße 95
90429 Nürnberg
Germany

Feßlerstraße 3
22083 Hamburg
Germany

Application/Limitation

The Type Approval covers hardware listed under Product description. When the hardware is used in applications to be classed by DNV GL, 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 GL RU SHIP Pt.4 Ch.9 Sec. 1. Sensors longer than standard are to be clamped as found required.

Type Approval documentation

Sensor types (Part 1)

Data sheets	Technical details see drawings

Drawing	MF19–…	60.231 (Rev. n / 22.09.1994)
	MF20–…	60.232 (Rev. 1 / 15.03.2017) 60.232.0 (Rev. 1 / 15.03.2017)
	T.2…	60.230 (Rev. 1 / 17.03.2017) 60.230.1 (Rev. 1 / 17.03.2017)
	T.3…	60.206 (Rev. 1 / 17.03.2017) 60.206.7 (20.09.1996) 60.206.51 (16.05.2002)
	T.8…	60.207.8 (Rev. 1 / 15.03.2017) 60.207.81 (Rev. 1 /15.03.2017)
	T.11…	60.272.2 (Rev. 1 / 15.03.2017) 60.272.21 (Rev. 1 / 15.03.2017) 60.272.22 (Rev. 1 / 15.03.2017) 60.273.23 (Rev. 1 / 15.03.2017) 60.272.3 (Rev. 1 / 15.03.2017)
	MX2–…	60.206 (Rev. 1 / 17.03.2017) 60.206.7 (20.09.1996) 60.206.51 (16.05.2002)
	MX5–…	60.206 (Rev. 1 / 17.03.2017) 60.206.7 (20.09.1996) 60.206.51 (16.05.2002)
	MX6–…	60.230 (Rev. 1 / 17.03.2017) 60.230.1 (Rev. 1 / 17.03.2017)
	MX13–…	60.206 (Rev. 1 / 17.03.2017) 60.206.7 (20.09.1996) 60.206.51 (16.05.2002)
	MX24–…	60.207.8 (Rev. 1 / 15.03.2017) 60.207.81 (Rev. 1 /15.03.2017)
	MX25–…	60.207.8 (Rev. 1 / 15.03.2017) 60.207.81 (Rev. 1 /15.03.2017)
	MX34–…	60.272.2 (Rev. 1 / 15.03.2017) 60.272.21 (Rev. 1 / 15.03.2017) 60.272.22 (Rev. 1 / 15.03.2017) 60.273.23 (Rev. 1 / 15.03.2017) 60.272.3 (Rev. 1 / 15.03.2017)
	MX37–…	60.272.2 (Rev. 1 / 15.03.2017) 60.272.21 (Rev. 1 / 15.03.2017) 60.272.22 (Rev. 1 / 15.03.2017) 60.273.23 (Rev. 1 / 15.03.2017) 60.272.3 (Rev. 1 / 15.03.2017)
	MX41–…	60.272.2 (Rev. 1 / 15.03.2017) 60.272.21 (Rev. 1 / 15.03.2017) 60.272.22 (Rev. 1 / 15.03.2017) 60.273.23 (Rev. 1 / 15.03.2017) 60.272.3 (Rev. 1 / 15.03.2017)
	MX42–…	60.272.2 (Rev. 1 / 15.03.2017) 60.272.21 (Rev. 1 / 15.03.2017) 60.272.22 (Rev. 1 / 15.03.2017) 60.273.23 (Rev. 1 / 15.03.2017) 60.272.3 (Rev. 1 / 15.03.2017)

Test report	LGA No. 477 1245 (16.12.1997)
	NORIS isotemp.doc (11.12.1997)
	NORIS beschlkl.doc (11.12.1997)
	NORIS waermepr.doc (11.12.1997)
	NORIS kaeltepr.doc (11.12.1997)
	NORIS hochsgp.doc (11.12.1997)
	BMP 1/96, NORIS mf201112.doc (23.01.1996) included documents: vibration, dry heat, humidity, insulation, high voltage

Sensor types (Part 2)

Data sheets	Technical details see drawings

Drawing	T.4…–0–…	60.243.422 (Rev. e / 16.06.2016)
	T.4…–1–…	60.244.121 (Rev. g / 16.06.2016) 60.244.122 (Rev. g / 16.06.2016) 60.244.221 (Rev. d / 01.07.2016) 60.244.222 (Rev. d / 01.07.2016)
	T.4…–2–…	60.243.431 (Rev. g / 01.06.2016) 60.243.432 (Rev. g / 01.06.2016) 60.243.433 (Rev. g / 01.06.2016) 60.243.434 (Rev. g / 01.06.2016)
	T.4…–3–…	60.244.131 (Rev. m /28.06.2016) 60.244.132 (Rev. m / 28.06.2016) 60.244.133 (Rev. m / 24.06.2016) 60.244.134 (Rev. m / 28.06.2016) 60.244.231 (Rev. a / 04.07.2016) 60.244.232 (Rev. a / 04.07.2016)
	T.4…–4–…	60.243.411 (Rev. c / 17.06.2016) 60.243.412 (Rev. c / 17.06.2016)
	T.4…–5–	60.244.111 (Rev. c / 29.06.2016) 60.244.112 (Rev. c / 29.06.2016) 60.244.211 (Rev. a / 04.07.2016) 60.244.212 (Rev. a / 04.07.2016)
	MX8–…	60.241.121 (Rev. c / 12.05.2016)
	MX9–…	60.241.221 (Rev. a / 12.05.2016)
	MX11–…	60.241.141 (Rev. b / 12.05.2016)
	MX26–…	60.241.131 (Rev. b / 12.05.2016)
	MX27–…	60.241.231 (Rev. a / 12.05.2016)
	VS37–…	60.241.431 (Rev. a / 12.05.2016)

Test report	RMS No. 48/92 (10.06.1986
	RMS No. 2-03/95 (13.03.1995)
	RMS No. 3-03/95 (13.03.1995)
	RMS No. 03-05/2000 (06.06.2000)

Certificate retention survey report for A-10859, DNV Essen 2012-06-29
Type Approval Assessment Report (2021-04-21)

Tests carried out

Applicable tests according to Class Guideline DNVGL-CG-0339, Edition December 2019.

Marking of product

The products to be marked with:

- device 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