TYPE APPROVAL CERTIFICATE

Certificate no.:
TAA00002CD
Revision No:
3

This is to certify:

that the Flow Transmitter

with type designation(s)
UMF2B, UMF3, PIT, PITE, UMC4, TMU

issued to
Heinrichs Messtechnik GmbH
Köln, Nordrhein-Westfalen, **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.

Type	Temperature	Humidity	Vibration	EMC	Enclosure
UMF2B	D	B	B	B	B (max. IP67)
UMF3	D	B	B	A	B (max. IP67)
PIT	D	B	B	B	B (IP65...IP68)
PITE	D	B	B	B	B (IP65/68)
UMC4	D	B	B	A	B (max. IP67)
TMU	D	B	B	A	C (IP66)

Issued at **Hamburg** on **2025-01-29**

This Certificate is valid until **2030-01-26**.
DNV local unit: **Essen**

Approval Engineer: **Jens Dietrich**

for **DNV**
This document has been digitally signed and will therefore not have handwritten signature

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 USD 300 000.

Product description

Flow Transmitter UMF2B Model-Code:

UMF2-ABCDEFGH

Transmitter layout:
A=C: Remote Transmitter IP67 with ½“ NPT Threaded entries
A=D: Remote Transmitter IP67 with M20 x 1.5 mm Threaded entries
A=E: Remote Transmitter IP65 with ½“ NPT Threaded entries
A=F: Remote Transmitter IP65 with M20 x 1.5 mm Threaded entries
A=G: Remote Transmitter IP68 with ½“ NPT Threaded entries
A=H: Remote Transmitter IP68 with M20 x 1.5 mm Threaded entries

User Interface:
B=1: Integrated Indication/User Interface

Power supply:
C=1: 230VAC (+10%, -15%), 50/60Hz
C=2: 115VAC (+10%, -15%), 50/60Hz
C=4: 24VDC (+/-15%)

Output:
D=F: current output: (0)4-20mA
pulse output: passive Um=24VDC
status output: passive Um=24VDC
D=G: current output: (0)4-20mA with HART® - protocol
pulse output: passive Um=24VDC
status output: passive Um=24VDC

Design:
EFG=SBH: Heinrichs, ships approval version
EFG=SBK: Kobold, ships approval version

Interconnecting cable:
IP 67
H=0 2,5m standard on remote version cable prefabricated on transmitter
H=1 5m cable prefabricated on transmitter
H=2 10m cable prefabricated on transmitter
H=3 15m junction box on transmitter
H=4 20m junction box on transmitter
H=5 30m junction box on transmitter
H=6 40m junction box on transmitter
H=7 50m junction box on transmitter

IP 68
H=A 2,5m standard on remote version junction box on transmitter
H=B 5m junction box on transmitter
H=C 10m junction box on transmitter
H=D 15m junction box on transmitter
H=E 20m junction box on transmitter
H=F 30m junction box on transmitter
H=G 40m junction box on transmitter
H=H 50m junction box on transmitter.

Flow Transmitter UMF3 Model-Code:

UMF3-ABCDEFGH:

Power supply:
A=1: 90-253VAC, 50/60Hz
A=2: 24VDC (+/-20%)

Transmitter layout:

B=C: junction box, intrinsically safe
B=D: junction box, non-intrinsically safe

Approval:
C=S: Ships Approval (only IECEx Gas)

Output:
D=A: Standard: 1x current output : 4 - 20mA (passive) HART®
1x pulse output: 1 kHz, passive 24V DC (Um=30V DC)
1x status output: passive 24V DC (Um=30V DC)
non-intrinsically safe
D=C: Standard: 1x current output : 4 - 20mA (passive) HART®
1x pulse output: 1 kHz, passive 24V DC (Um=30V DC)
1x status output: passive 24V DC (Um=30V DC)
intrinsically safe

Transmitter design:
E=3: IP65, remote transmitter, junction box on transmitter, connecting cable: 0, 1, 2,3, 4, 5, 6, 7, 8
E=6: IP67, remote transmitter, junction box on transmitter, connecting cable: A, B, C, D, E, F, G, H

Threads for cable entries (signal and power supply):
F=1: M20x1,5 (Ex-proof and not Ex-proof)

Design:
G=H: Heinrichs

Interconnecting cable:
IP 65
H=0 without
H=1 2,5m standard on remote version
H=2 5m
H=3 10m
H=4 15m
H=5 20m
H=6 30m
H=7 40m
H=8 50m
IP 68
H=A 2,5m standard on remote version junction box on transmitter
H=B 5m
H=C 10m
H=D 15m
H=E 20m
H=F 30m
H=G 40m
H=H 50m

Software versions:
UMF2B: 3.031
UMF3: 2.01

Magnetic Inductive Flowmeter PIT Model-Code:

PIT-ABCDEFGHI-JKLM-N-O

Model:
A=S: Stainless steel (1.4571/1.4404)/PTFE for nominal diameters DN125 - DN2000
A=A: PFA for nominal diameters DN125 - DN600
A=U: Stainless steel (1.4571/1.4404)/PTFE for nominal diameters DN125 - DN2000
model including Installation/Extraction device, mounting adaptor and valve
A=X: Special on request

Process Connection:

BCDE=317B: DN40 PN40 Form B1 DIN EN 1092-1
BCDE=321B: DN50 PN40 Form B1 DIN EN 1092-1
BCDE=206R: 2" Class 150 RF ASME B16.5-2013
BCDE=326B: DN65 PN40 Form B1 DIN EN 1092-1
BCDE=331B: DN80 PN40 Form B1 DIN EN 1092-1
BCDE=208R: 3" Class 150 RF ASME B16.5-2013
BCDE=XXXX: Special on request

Sensor length:
FGH=163: 163 mm (up to diameters < DN600)
FGH=XXX: length in mm (PIT-S: DN700-DN1200 = 263, DN1400-DN2000 = 363)

Electrode Material:
I=H: Hastelloy C-4
I=T: Tantal only for model PIT-A
I=N: Platin only for model PIT-A
I=X: Special on request

Measuring range/ medium velocity:
J=0: 1-10 m/s
J=L: 0,5 - 5 m/s

Transmitter layout (protection class):
K=3: remote transmitter (UMF3), IP65 junction box on sensor
K=4: remote transmitter (UMF2), IP67 junction box on sensor
K=5: remote transmitter (UMF2), IP68 grouted junction box on sensor

Approval:
L=1 Ships Approval (non-Ex)
L=S Ships Approval (IECEx Gas Ex) only with UMF3

Certificate:
M=0 without
M=1 works certificate 2.1
M=2 works certificate 2.2
M=B material certificate 3.1 incl. Material analysis (DIN EN 10204:2004)
M=C material certificate 3.2 incl. Material analysis (DIN EN 10204:2004)

Supplementary equipment:
N=0: without
N=X: with (separate specification needed)

Design:
O=H: Heinrichs

Magnetic Inductive Flowmeter PITE Model-Code:

PITE-ABCDEFGHIJKL-M-N

Model:
A=S: stainless steel (1.4571/1.4404)/PTFE, Tmax=100°C
A=X: Special on request

Process connection:
BCDE=A504: Weld on adaptor for pipe sizes DN80/3"..DN400/16" c/w. cap nut, pressure rating PN16
BCDE=309B: Flange connection DN25 PN40, pressure rating PN16

Sensor length:
FGH=138: 138,5 mm (L= 166mm for flange connection DN25 PN40)
FGH=XXX: Special on request

Electrode Material:
I=H: Hastelloy
I=X: Special on request

Mounting of Transmitter:
J=4: Remote Transmitter, IP65, cable 5m
J=5: Remote Transmitter, IP68, cable 5m

Approval:
K=1: Ships Approval, with Cable bend protection

Certificate:
L=0: without
L=1: Material certificate 2.1
L=2: Material certificate 2.2
L=B: Material certificate 3.1 (DIN EN 10204:2004)
L=C: Material certificate 3.2 (DIN EN 10204:2004)

Supplement Equipment:
M=0: without
M=X: Special on request

Version:
N=H: Heinrichs

Sensor Power: The sensors are powered from the transmitters via the sensor cable.

Ambient temperature: -20 °C to +60 °C

Process medium temperature:
PIT: -20 °C to +150 °C
PITe: -20 °C to +100 °C

Process pressures:
PIT: max. 40 bar
PITe: max. 16 bar

Ingress protection class:
PIT: IP68, max. 4 bar
PITe: IP65 / IP68 max 1 bar

Required medium conductivity: min. 20µS/cm

Measured accuracy: Q ≥ 30%: +/-1.5 % of measured value plus +/- 0.5 % URV

Q ≤ 30%: +/-1.5 % of measured value plus +/- 2.5 % URV

Flow velocity range: 0.5 m/s to 10 m/s.

Coriolis Flow Transmitter UMC4 Model-Code:

UMC4-ABCDEFG

A=E: Remote mount, transmitter with 5m cable
A=D: Remote mount, terminal connection box, mounted

B=1: Integral display within transmitter housing

C=1: Power supply 90-265VAC, 50/60Hz
C=2: Power supply 19-36VDC, 24VDC (+/-20%), 50/60Hz

D=A: Analog outputs: 4…20mA (active)/HART, pulse output Um=30V DC, status output, passive 24VDC

E=S: Ships approval

F=0: No output protection
F=1: Ex ia
F=2: Ex e (non-intrinsically safe)

G=H: Design Heinrichs
G=K: Design Kobold

Coriolis Mass Flow Sensor TMU Model-Code:

TMU-ABBB-xxxx-CDEFGHJ

A=S: Wetted materials: Stainless steel
A=H: Hastelloy C-22

BBB=008: Meter line size DN8, ANSI ¼"; Range 0-30kg/h up to 0-600kg/h
BBB=010: Meter line size DN10, ANSI 3/8"; Range 0-125kg/h up to 0-2.500kg/h
BBB=015: Meter line size DN15, ANSI ½"; Range 0-1.200kg/h up to 0-12.000kg/h
BBB=025: Meter line size DN25, ANSI 1"; Range 0-3.000kg/h up to 0-30.000kg/h
BBB=040: Meter line size DN40, ANSI 1½"; Range 0-6.000kg/h up to 0-60.000kg/h
BBB=050: Meter line size DN50 ANSI 2"; Range 0-20.0000kg/h up to 0-80.000kg/h
BBB=080: Meter line size DN80, ANSI 3"; Range 0-25.000g/h up to 0-120.000kg/h
BBB=100: Meter line size DN100, ANSI 4"; Range 0-30.000kg/h up to 0-200.000kg/h
BBB=150: Meter line size DN150, ANSI 6"; Range 0-60.000kg/h up to 0-460.000kg/h
BBB=200: Meter line size DN200, ANSI 8"; Range 0-150.0000g/h up to 0-700.000kg/h

xxxx: various process connections as referenced in CMF-CP-4002

C=A: Stainless steel containment 1.4301 (304)
C=B: Standard containment with drain connection ½" NPR(f)
C=X: Agency approved, customer specific

D=0: No heating/cooling connection
D=A: Heating plate
D=X: Society approved, customer specific

E=0: No heating/cooling connection
E=A: Ermeto EO12
E=B: Swagelok 12mm
E=C: DN15 PN40 Form C, DIN 2501
E=D: ½" Class 150 RF ASME B16.5-2003
E=E: ½" NPT(f)
E=F: DN25 PN40 Form C, DIN 2501
E=G: 1" Class 150 RF ASME B16.5-2003
E=H: 1" NPT(f)
E=X: Society approved, customer specific

F=C: Remote mount transmitter, -40° to 212°F, -40° to 100°C, Terminal block via ½" NPT (f) IP66
F=D: Remote mount transmitter, -40° to 356°F, -40° to 180°C, Terminal block via ½" NPT (f) IP66
F=E: Remote mount transmitter, -40° to 500°F, -40° to 260°C, Terminal block via ½" NPT (f) IP66
F=F: Remote mount transmitter, -40° to 212°F, -40° to 100°C, Terminal block via M20x1,5 IP66
F=G: Remote mount transmitter, -40° to 356°F, -40° to 180°C, Terminal block via M20x1,5 IP66
F=H: Remote mount transmitter, -40° to 500°F, -40° to 260°C, Terminal block via M20x1,5 IP66
F=J: Remote mount transmitter, -40° to 140°F, -40° to 60°C, Plug-in connector, IP66
F=K: Remote mount transmitter, -40° to 212°F, -40° to 100°C, Plug-in connector, IP66
F=L: Remote mount transmitter, -40° to 356°F, -40° to 180°C, Plug-in connector, IP66
F=M: Remote mount transmitter, -40° to 500°F, -40° to 260°C, Plug-in connector, IP66
E=X: Society approved, customer specific

F=S Ships Approval

G=1 Standard flow calibration
G=2 10-point flow calibration

G=3 Outside lab
G=7 7-point flow calibration
G=X Agency approved, customer specific

H=0: No density calibration
H=1: Standard density calibration (3-point)
H=2: Special density calibration (5-point)
H=X: Agency approved, customer specific

J=0: No supplementary equipment
J=X: With supplementary equipment by separate specification

Approval conditions

The Type Approval covers hardware listed under Product description based on DNV RU-SHIP Pt.4 Ch.9. 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.

Product certificate
If specified in the Rules, ref. Pt.4 Ch.9 Sec.1, the control and monitoring system in which the above listed hardware is used shall be delivered with a product certificate. For each such delivery the certification test is to be performed at the manufacturer of the application system before the system is shipped to the yard. The test shall be done according to an approved test program. After certification the clause for software control will be put into force.

Software control
All changes in software are to be recorded as long as the system is in use on board. Documentation of major changes is to be forwarded to DNV for evaluation and approval before implemented on board. Certification of modified functionality may be required for the particular vessel.

Production testing
Weldings shall be carried out by qualified welders using approved welding procedure specifications (WPS) and type approved welding consumables. Ref. to Pt.4, Ch.6, Sec. 10.
Listed process connections shall be checked for suitability in accordance with Pt.4 Ch.6, depending on the application system.
Material certificates for pressurized part such as pre-material, flanges, pipes and fittings according to Table 3 of Pt.4, Ch.6 – Section 2 - Piping Systems are to be provided.
For application in piping systems of pipe class I and II the following additional requirements are to be observed:
Hydrostatic pressure test up to 1,5 times the maximum design pressure is to be carried out for each flowmeter in presence of a DNV surveyor. Appropriate product certificate (PC) is to be issued.

Ex-certification is referenced only and not covered by this type approval certificate.

Wall mounting bracket SG4-1012 for transmitter/junction box mounting.

Used DC Power supplies for UMF2B and UMF3 shall safeguard supply voltage within permissible variations range as specified above.

The suitability of the measuring principle is to be checked for the respective fluid media.

Selection of materials:
It shall be noted that for selection of the materials the applicable service condition with respect to type of media, flow velocity, media temperature etc. and installation area of the piping system is to be considered. In particular, the resistance to corrosion, erosion, oxidation and other deterioration during projected service life are to be taken into account.

Type Approval documentation

MID-Meter Marine Approval: Documentation of the Magnetic-Inductive flow meters for installation on marine vehicles, document number: EE0018, rev. 1.1, dated 2019-05-31 (incl. reference to subordinated documents).
Test Reports UMF3:
I2PS, no.2016-0179001, dated 2016-11-25; I2PS, no.2018-0037204, dated 2018-08-14; I2PS, no.2018-0037405, dated 2018-08-14;
I2PS, no.2018-0111806, dated 2018-11-08; I2PS, no.2018-0111506, dated 2018-10-30.
Test Reports UMF2B:

I2PS, no.2016-0178901, dated 2016-11-25; I2PS, no.2018-0110801, dated 2018-10-10; I2PS, no.2018-0110902, dated 2018-11-14;
I2PS, no.2018-0111406, dated 1018-11-08; I2PS, no.2016-0179001, dated 2018-10-20.
Test Reports PIT:
I2PS, no.2016-0178401, dated 2016-11-25, I2PS, no.2018-0037104, dated 2018-08-14.
Test Reports PIT-e:
I2PS, no.2016-0178501, dated 2016-11-25, I2PS, no.2018-0065206, dated 2018-08-14.
Test Report "Pressure Testing of PIT/PITE in the course of DNV-GL ships approval", dated 2019-06-18.
I2PS, no.2019-0078101, additional vibration test report PITe, dated 2019-06-26
BVS Test for degrees of protection IPX8, test record BVSPS29730, dated 2019-06-13.
Additional documents for Coriolis types:
Marine Approval Document CMF-CP-4002, dated 2020-03-05. Documentation of the Coriolis Mass-flow meters for installation in marine vehicles EE0019, rev.1, dated 2020-03-05.
I2PS No.2016-0178601, dated 2016-11-25; I2PS No.2016-0178701, dated 2016-11-25;
I2PS No.2018-0126502, dated 2019-02-07; I2PS No.2018-0126502, dated 2019-02-07;
I2PS No.2016-0177902, dated 2016-11-25; I2PS No.2018-0126201, dated 2019-02-19;
I2PS No.2018-0126101, dated 2019-02-19; I2PS No.2018-0109802, dated 2018-11-08;
I2PS No.2018-0111204, dated 2018-09-21; I2PS No.2016-0178801, dated 2016-11-25;
I2PS No.2019-0031302, dated 2019-03-21; I2PS No.2018-0126301, dated 2019-02-19;
I2PS No.2018-0109702, dated 2018-10-30; I2PS No.2018-0110003, dated 2018-11-08;
Additional vibration test with continuous flow, Test Report Bertrandt no.10399549_V1,
dated 2020-06-12.
Additional documents for AD-0200 terminal box used for UMF2b and UMF3 flow transmitters:
Vibration test report, Bertrandt 10426173_V2, dated 2021-09-07; DEKRA Thermal Endurance to heat/cold, test record BVSPS29570, dated 2019-04-16; Test for degrees of protection IPX8, test record BVSPS29730, dated 2019-06-13; BVSPS29706, dated 2019-05-22; Heinrichs DNV: UMF2/3 Transmitter Review, rev.1.0, dated 2021-09-28; drawing UMF3-1037, rev.b, dated 2021-08-09; drawing SG2B-1002-2, rev.a, dated 2021-09-28; drawing UMF3-1024, rev.b, dated 2021-09-28; drawing SG2B-1001-2, rev.b, dated 2021-09-28; drawing UMF3-1038, rev.a, dated 2021-08-24.
Additional EMC Test Report I2PS No2024-0091402, issued 2024-07-03.
DNV Assessment Report, issued by DNV Essen 2024-03-14.

Tests carried out

Applicable Tests according to DNV CG-0339, August 2021.

Marking of product

Maker, type designation, serial number, manufacturing date, power supply, ex-marking (if applicable)

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