DNV·GL

Certificate No:
TAA000015Z

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Flow Sensor

with type designation(s)
FCB Series 100 & FCB Series 400 & FCT Series 400

Issued to
ABB Automation Products GmbH
Göttingen Niedersachsen, 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.

Temperature	**D**
Humidity	**B**
Vibration	**B**
EMC	**A**
Enclosure	**IP66 / IP67**

Issued at **Hamburg** on **2017-04-19**
This Certificate is valid until **2022-04-18**.
DNV GL local station: **Magdeburg**

Approval Engineer: **Heinz Scheffler**

for **DNV GL**

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.

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Product description

CoriolisMaster FCB1 mass flowmeter

Model Number (coding): FCabcdefghijklm.u.v.w

- a = B (CoriolisMaster)
- b = 1 (Series 100)
- c = 30, 50, 70, 80 (Tier)
- d = Y0 (Without explosion protection certificate)
- e = Y0 (Connection design & material)
- f = Meter size/Connection size; 5-digit alpha-numeric code
- g = D2, D4, D5, D6, D7, E1, S5, S6, S7, A1, A3, A6, A7, A8, A9, J1, J2, J3, J5, P1 (Process Connection Type)
- h = A1, A2, H1, H2, C1, C2, T1 or L1 (material of wetted parts)
- i = Flow calibration; single digit alpha numeric code
- j = Density Calibration; single digit numeric code
- k = B1, B2, (Connection Design / transmitter housing type / transmitter housing material/ cable entries)
- l = M2 (Outputs)
- m = C (Power supply)

After the dot of the Model Number the coding may be in any order and more or less;

- u = TA9 (Ambient temperature range)
- v = CL1 (DNVGL-Approval)
- w = TE3 (Tower extension)

CoriolisMaster FCB4 mass flowmeter

Model Number(coding): FCabcdefghijklm.u.v.w.x.y.z

- a = B (CoriolisMaster)
- b = 4 (Series 400)
- c = 30, 50, 70, 80 (Tier)
- d = Y0 (Without explosion protection certificate)
- e = Y0, U1, U2 (Connection design & material)
- f = Meter size/Connection size; 5-digit alpha-numeric code
- g = D2, D4, D5, D6, D7, E1, S5, S6, S7, A1, A3, A6, A7, A8, A9, J1, J2, J3, J5, P1 (Process Connection Type)
- h = A1, A2, H1, H2, C1, C2, T1 or L1 (Material of wetted parts)
- i = Flow calibration; single digit alpha numeric code
- j = Density Calibration; single digit numeric code
- k = D1, D2, D5, D6, Y0 (Connection Design / transmitter housing type / transmitter housing material/ cable entries)
- l = G0, G1, G2, G3, G4, Y0 (Outputs)
- m = A, C, Y (power supply)

After the dot of the Model Number the coding may be in any order and more or less;

- u = TA9 (Ambient temperature range)
- v = CL1 (DNVGL-Approval)
- w = TE3 (Tower extension)
- x = DRN, DRG, DRA, or DRT (Additional output 1, optional)
- y = DSN, DSG, DSA, or DST (Additional output 2, optional)
- z = L2 (Integrated digital display, optional)

CoriolisMaster FCT4 Transmitter
Model Number(coding): FCabcdefg.u.v.x.y.z

- a = T (Transmitter)
- b = 4 (Series 400)
- c = 30, 50, 70, 80 (tier)
- d = Y0 (Without explosion protection certificate)
- e = R1, R2, R5, R6, W1, W2 (Transmitter housing type / transmitter housing material/ cable entries)
- f = G0, G1, G2, G3, G4, Z9 (Outputs)
- g = A, C (power supply)

After the dot of the Model Number the coding may be in any order and more or less;

- u = TA9 (Ambient temperature range)
- v = CL1 (DNVGL-Approval)
- x = DRN, DRG, DRA, or DRT (Additional output 1, optional)
- y = DSN, DSG, DSA, or DST (Additional output 2, optional)
- z = L2 (Integrated digital display, optional)

Application/Limitation

This Type Approval covers hardware listed under Product description.
For installation on ships 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 Rules for Ships Pt.4 Ch.9 Control and Monitoring Systems.

Production testing
Welding's 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.
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:

- Each mass flowmeter is to be hydraulically pressure tested up to 1,5 times the maximum design pressure in the presence of a DNV GL surveyor. Appropriate product certificate (PC) is to be issued.
- Welding requires approval based on a welding procedure qualification test (WPQT)

Type Approval documentation

Test Reports: U170204E1; U170204E2; E170204E1; 4787065711_IEC 60529, Inspection Certificate Serial-No.: 243967975/X001, dated 07-02-2017.
Model Number (coding): Model Code FCB1+4_IIG-AD-0013_02_modelcode_GE;
Drawings: Overview FCB1+4_DNVGL_IIG-AD-0014_2017-03-14_CD-overview_E;
Data Sheets: DS_FCB400_FCH400_EN_A02; Data Sheet DS_FCB100_FCH100_EN_E;
Operating Instructions: OI/FCB100/FCH100-EN Rev. D; CI/FCB400/FCH400-X2 Rev. A

Tests carried out

Applicable tests according to class guideline DNVGL-CG-0339, November 2016.

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