Certificate no.:
TAA00003BC

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Flow Switch

with type designation(s)
FS 10DNV, FS 11DNV, FS 15DNV, FS 20DNV,
FS 10DNVEx, FS 11DNVEx, FS 15DNVEx, FS 20DNVEx

issued to
COMAC CAL s.r.o.
Třanovice, **Czech Republic**

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	**C**
Humidity	**B**
Vibration	**B**
EMC	**B**
Enclosure	**B / IP66 / IP68 (1.5 m; 1 h)**

Issued at **Høvik** on **2024-07-04**
This Certificate is valid until **2029-07-03**.
DNV local unit: **Prague CMC**

for **DNV**

Approval Engineer: **Ståle Sneen**

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

FS 10DNV/10DNVEx, FS 11DNV/11DNVEx, FS 15DNV/15DNVEx, FS 20DNV/20DNVEx calorimetric flow switches.

A calorimetric flow switch is a device that monitors the flow of fluid based on calorimetry principle. If the flow rate drops below a limit set by user, the status output is changed. The flow rate is displayed by ten LEDs and it is possible to select a boundary for contact making/breaking in the same graduation. The measuring cycle takes from 4 sec to 8 sec with the recommended measurement range 4 ... 150 cm/sec. Based on DN piping, the bar sensor is available in three lengths, 65 mm (standard), 125 mm and 175 mm. In case of an empty pipeline, the sensor behaves in the same way as with zero flow. The flow switch is made in four versions as follows:
FS 10DNV – 1x N.O. contact (depending on flow velocity)
FS 11DNV – 2x N.O. contacts (depending on flow velocity)
FS 15DNV – 1x N.O. contact (depending on flow velocity) + temperature monitoring
FS 20DNV – 1x N.O. contact + 1x current output 4-20mA (depending on flow velocity)
All versions are optionally available with Ex-classification.

Possible versions of the flow monitor FLOW SWITCH based on the calorimetric principle are specified by the order code, and other technical data are given in the manufacturer's documentation (FLOW SWITCH - Installation and technical conditions).

Basic technical data:

Process connection:	according to the DIN2353 by M16x1.5 union nut through the 24° ring into the direct socket with pipe thread (G ½, G ¼, M14x1.5, NPT 1/4) and clamp connection DN25(50.5 mm) or DN50(64 mm)
Version:	compact, separate on DIN rail EN 60715, standard cable length 3m
Flow ranges:	4-400 cm/sec (for water, 25°C)
Control:	2x flush-mounted button
Temperature of liquid:	-25°C to +80°C
Maximum pressure:	63 bar
IP protection	IP 66/68
Power supply:	24 Vdc ±10% with polarity reversal protection
Input power:	1.5/4 VA
Electrical connection:	connector M12 x 1, 4 pin

Tested and approved for connection to 24 Vdc distributions onboard.

Product order code:
FSxxDNV/Ax/Bx/Cx/Dx/Ex/Fx, where Ax represents flow switch type A1, A2 or A3:
A1 = SSR passive (FS 10DNV only)
A2 = transistor PNP
A3 = transistor NPN

The complete order code can be found in the respective manuals listed under Type Approval documentation.

Place of manufacture

COMAC CAL s.r.o.
Těšínská 737/30, 735 42 Těrlicko
Czech Republic

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.

Application/Limitation

Ex-certification is not covered by this certificate. Application in hazardous area to be approved in each case according to the Rules and Ex-Certification/ Special Condition for Safe Use listed in valid Ex-certificate issued by a notified/recognized Certification Body.

Type Approval documentation

Tests carried out
Applicable tests according to class guideline DNV-CG-0339, August 2021.
Static pressure test for 2 minutes at 100 bar.

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
- 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