Certificate No:
TAA0000363

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Monitoring System

with type designation(s)
ShaPoLi Data Logging Box SDB-3, ShaPoLi Bridge Panel PC SBP-3

Issued to
VAF Instruments B.V.
Dordrecht, Zuid-Holland, Netherlands

is found to comply with
IACS Recommandation No. 172 (June 2022) EEXI Implementation Guidelines
DNV rules for classification – Ships

Application :

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

Location classes:

Type	Temperature	Humidity	Vibration	EMC	Enclosure
ShaPoLi Data Logging Box SDB-3	B	B	A	A	B
ShaPoLi Bridge Panel PC SBP-3	B	B	B	B	B

Issued at **Høvik** on **2022-09-05**

This Certificate is valid until **2024-09-04**.
DNV local station: **Netherlands CMC**

Approval Engineer: **Thorbjørn Hansen**

for **DNV**
Digitally Signed By: Sneen, Ståle
Location: DNV Høvik, Norway
on behalf of

Jan Tore Grimsrud
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.

Product description

The VAF system is a monitoring system designed to comply with the ShaPoLi approach as outlined in IACS Rec.172 (section 6.6, first bullet) of June 2022 for vessels with maximum of two propulsion shafts. The complete system comprises:

- ShaPoLi Data Logging Box (SDB-3)
- ShaPoLi Bridge Panel PC (SBP-3)
- Torque meter(s):
    - o VAF T-Sense torque meter (covered by TAA000029V)
    - o VAF TT-Sense thrust and torque meter (covered by TAA00002BA)
    - o Optionally a third-party torque meter can be used

The VAF T-sense / TT-sense provides shaft power, RPM and torque to the SDB-3. The SDB-3 may also interface signals for ship-speed, GPS, and wind (NMEA 0183 via RS-422).

Internal failures are alarmed through the SBP-3. A potential-free alarm contact is available for external use.

Functionality specified by MEPC.335(76) concerning EPL/ShaPoLi are listed in Table 1. Which of these functions that are covered by the subject Type Approval Certificate are identified in column no. 3. When the system shall be used onboard DNV classed vessels, the vessel-specific configuration shall be reflected in Annex 1.

Table 1: Functions defined in MEPC.335(76)

No	Function	Covered by the subject TAC	SW No	DNV HW TAC
1	**Power limitation**			
1a	EPL - Power limitation	N/A		
1b	ShaPoLi - Power limitation	Yes Note 1		
2	**Override**			
2a	Override power limitation	Yes Note 1		
3	**Alarming**			
3a	Alarming relevant failures on bridge	Yes	Table 3	
4	**Indication (on the bridge)**			
4a	Activation of un-limiting mode	Yes Note 1		
4b	Power limit exceeded (visual and audible)	Yes	Table 3	
4c	Indication of shaft speed, -torque and -power Note 1	Yes	Table 3	
5	**Recording**			
5a	Shaft speed, -torque and -power recorded in un-limiting mode Note 1	Yes	Table 3	
5b	Power limit exceeded	Yes	Table 3	
5c	Activation of override Note 3	N/A		
6	**Tamper-proofing**			
6a	The following measures are taken to arrange the VAF system tamper proof: • Power limit encrypted in SDB-3. • Access to manipulate records and parameters (range, limit, alarm SP etc) is password protected on the same level as systems source code and accessible to VAF only. • Encrypted SW and settings. • Disconnection of signals will generate alarm and be recorded in log-file.	Yes	Table 3	
Note 1	The subject system is arranged independent of the engine automation system and provides alarm, indication and recording necessary for the navigator to manually limit the power as specified in IACS Rec. 172, Section 6.6. If the subject system shall be applied in ShaPoLi-arrangements with automatic power limitation as specified MEPC.335(76), such use is subject to case-by-case approval.			
Note 2	Required when power limitation is arranged as specified in 1b.			
Note 3	Required when power limitation is arranged as specified in 1a.			

Table 2: HW and SW covered by the subject TAC:

Component	HW	SW
ShaPoLi Data Logging Box	SDB-3	V1.0.0
ShaPoLi Bridge Panel PC	SBP-3	V1.8

Technical specifications:

SDB-3

Power supply:	100 - 230 Vac / 50 - 60 Hz
Power consumption:	24 W
Dimensions:	400 x 300 x 155 mm
Net weight:	~8 kg

Inputs:	2x Modbus RS-485 for use with VAF T-Sense- or VAF TT-sense torque meter 3x Analog 4-20 mA for use with third-party torque meter and rpm sensor 1x NMEA 0183 RS-422 1x Ethernet port for connection to SBP-3
Output:	1x Voltage free contact for alarm 1x Modbus RS-485

SBP-3

Power supply:	24 Vdc
Power consumption:	15 W
Dimensions:	218.16 x 162.67 x 46.5 mm
Net weight:	940 g
Inputs/outputs:	Ethernet port for connection to SDB-3

The system is tested and approved for nominal supply voltage 100 - 230 Vac / 50 - 60 Hz.

Approval conditions

This Type Approval covers hardware and software as listed under product description.

The current software numbers and versions are listed in software program RedMine:

- SDB-3 software development #656 dd: 06-05-2022
- SBP-3 software development #657 dd: 12-05-2022

When the type approved software is revised (affecting all future deliveries) DNV is to be informed by forwarding updated software version documentation. If the changes are judged to affect functionality for which rule requirements apply a new functional type test may be required and the certificate may have to be renewed to identify the new software version.

Application/Limitation

Use of the VAF system on DNV classed vessels subject to EEXI overridable power limitation do in general require acceptance by the vessel's Flag Administration.

Whenever any of the functions listed in Table 1 are implemented on a DNV classed vessel, a signed copy of Annex 1 in this TAC shall be filled in and submitted to DNV.

SBP-3 shall be powered by a galvanically insulated 24 Vdc power supply of approved type.

Type Approval documentation

DNV No.	Description	Document No.	Rev. / date
5	Product Bulletin - Bridge Panel PC	-	4.1 / 2022-08-26
2	EUT details	-	- / 2021-12-24
8	Analyses Document	QD-000-GB-0122	- / 2021-12-23
7	Climate tests on an SDB-3 and Bridge Panel PC	M22.002-P22.002	- / 2022-02-22
10	Maritime vibration test on an SDB-3 and Bridge Panel PC	M22.001-P22.001	01 / 2022-02-15
11	Test Report EMC - SDB-3 and 0697-2107 Touchscreen	2264237.0501-EMC	- / 2022-03-14
22	IPx4 test - DNV Witnessed	-	- / 2022-06-29
14	Checklist Performance Test - DNV Witnessed	-	- / 2022-05-06
25	SCHEMATIC DIAGRAM SHAPOLI HARDWARE	0816-7015	A / 2022-09-02
1	Material Declaration - Asbestos free declaration	-	- / 2022-01-21
4	Product Bulletin - SDB-3	-	4 / 2022-08-26

Tests carried out

Applicable tests according to class guideline DNV-CG-0339, August 2021.
Function tests according to document "Checklist Performance Test, ShaPoLi" of May 6th 2022.

Marking of product

The products to be marked with:
- manufacturer name (VAF for SDB-3, SBP-3)
- 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

A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE

Annex 1: Ship specific configuration

A project specific copy of Annex 1 reflecting the actual configuration onboard shall be submitted to DNV prior to implementation onboard. Any preferred choice is indicated in **bold.** Deviation from the preferred choices shall be elaborated under "comments" in the table below.

No	Item	Actual configuration
1	**Vessel's propulsion shaft arrangement:**	
1.1	No of propulsion shafts (1 / 2)	.....
2	**Shaft power limitation arranged as per IACS Rec. 172, section 6.6**	
2.1	Alarm is activated on the bridge when the EEXI power limit is exceeded (**Y** / N)	.....
2.2	Continuously recording of the following parameters:	
2.2.1	- Shaft rotational speed (**Y** / N)	.....
2.2.2	- Shaft torque (**Y** / N)	.....
2.2.3	- Shaft power (**Y** / N)	.....
3		
3.1	**Input signals to the ShaPoLi Data box / SDB-3**	
3.2	Shaft power and shaft RPM (**Y** / N)	.....
3.3	GPS (**Y** / N)[Note 1]	.....
3.4	Speed log (Y / N)	.....
	Anemometer (Y / N)	.....
4		
4.1	**Output signals from the ShaPoLi Data box / SDB-3**	
	Alarm contact available for connection to external alarm system (**Y** / N)	.....
5		
5.1	**Bridge Panel / SBP-3**	
	Bridge Panel SBP-3 supplied by VAF (**Y** / N)	.....
6		
6.1	**Torquemeter(s)**	
	Torquemeter for the actual application supplied by VAF (DNV TAC no. / N)	.....
Note 1	Interface to the ships GPS shall be through a communication port approved for external use.	

The above, IDENTICAL configuration applies to the following vessels:

IMO No	Flag Admin.	IMO No	Flag Admin.	IMO No	Flag Admin.

Comments:

Manufacturer's signature, date & stamp

Annex 2: Overall description of functionality and variants in Table 1

No.	Variant / option / function	Description
3	Alarm	Common alarm activated in case of instrument fail and communication fail. Separate alarm activated when the EEXI power limit is exceeded. Operator's alarm-acknowledge is recorded in the systems event log. Reference is made to IACS Rec. 172, Section 6.6.
4	Indication	The following is continuously indicated on the bridge panel: • EEXI power limit exceeded • Shaft speed, -torque and -power
5	Recording	The following parameters are continuously recorded: • EEXI power limit exceeded • Shaft speed, -torque and -power Recorded historic data can be presented on the bridge panel. Storage of records (min 18 months): > 18 months Sampling rate (maximum 4 min and 45 sec.): every 15 second