



Certificate No:
TAA0000386

TYPE APPROVAL CERTIFICATE

This is to certify:

That the EPL / ShaPoLi arrangement

with type designation(s)

ShaPoLi Bridge Panel, MetaPower Cabinet, MetaPower Quad Shaft Torque Meter

Issued to

**Kongsberg Maritime AS Avd Skonnertvegen
Ranheim, Norway**

is found to comply with

Resolution MEPC.335(76)

IACS Recommendation 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 Bridge Panel	D	B	A	B (see App/Lim)	IP20
MetaPower Cabinet	D	B	A	B	IP55
MetaPower Quad Shaft Torque Meter	B	B	B	B	IP66

Issued at **Høvik** on **2023-03-13**

This Certificate is valid until **2025-03-12**.

DNV local unit: **Trondheim**

Approval Engineer: **Thorbjørn Hansen**

for **DNV**



Digitally Signed By: **Tag, Siri**
Location: **DNV Høvik, Norway**

Siri Tag
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.



Form code: TA 251

Revision: 2022-09

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Page 1 of 5



Product description

The MetaPower Quad ShaPoLi solution is designed to comply with the ShaPoLi approach as outlined in IACS Rec.172 (section 6.6, first bullet) of June 2022. The basic MetaPower Quad ShaPoLi solution comprises the following main parts:

1. HW for measuring torque and rotational speed delivered to the propeller of the ship.
2. A control unit (HSIO) installed in the engine room for calculation and monitoring of the power transmitted by the shaft to the propeller.
3. A bridge panel with HMI and facilities for EEXI power override.

The MetaPower Quad ShaPoLi basic solution may be extended to comprise additional HMI's and/or interfaced to other third party systems.

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.

Vessels having existing Metapower Quad installed may be applied for ShaPoLi functionality provided a ShaPoLi bridge panel is adapted.

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}		TAA00001FG
2	Override			
2a	Override power limitation	Yes ^{Note 1}		
3	Alarming			
3a	Alarming relevant failures on bridge	Yes		
4	Indication (on the bridge)			
4a	Activation of un-limiting mode	Yes ^{Note 1}		
4b	Power limit exceeded (visual and audible)	Yes		
4c	Indication of shaft speed, -torque and -power ^{Note 2}	Yes		
5	Recording			
5a	Shaft speed, -torque and -power recorded in un-limiting mode ^{Note 1}	Yes		TAA00001FG
5b	Power limit exceeded	Yes		
5c	Activation of override ^{Note 3}	N/A		
6	Tamper-proofing			
6a	The following measures are established to arrange the MetaPower Quad ShaPoLi system tamper proof: <ul style="list-style-type: none"> • The system parameters are password protected • Date and time of last change of a critical system parameter is showed. This should match date of the commissioning, last service or calibration report, or communication between maker and user in case of e.g. troubleshooting the system. • The internal logs are stored in SQL format and cannot be manipulated by user. It is protected by a password only known to system developers. • Internal logs contain shaft rpm, torque and power at all times, including other internal parameters and changes to all critical parameters. 	Yes		
^{Note 1}	The subject system shall primarily be 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. However, if the subject system shall be applied in ShaPoLi-arrangements with automatic power limitation as specified MEPC.335(76), such use is not covered by this Type Approval certificate and may be 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 provides a complete list of HW & SW that are covered by the subject TA certificate. The HW required by the MetaPower Quad ShaPoLi basic solution are identified by "R" / required.

Table 2: MetaPower Quad ShaPoLi system, HW & SW overview

Component		R / O*	Loc.	DNV TAC	SW no
Name	Description				
	ShaPoLi bridge Panel, comprising:	R	WH	N/A	
MFD 307	• 7" HMI***	R	WH	TAA0000386	2.00.00
	• ShaPoLi breach alarm sounder	R	WH	N/A	
	• ShaPoLi alarm ackn / sound off	R	WH	N/A	
AX Compact enclosure	MetaPower Cabinet, comprising:	R	ER	TAE00003WA	
HSIO-100-C	• Engine performance module	R	ER	TAA00001FG	1.4.0****
EDS 205	• Moxa switch**	O	ER	TAA000021N	
MFD 307	• 7" HMI in cabinet door***	O	ER	TAA0000386	
AX Compact enclosure	• ECR console, comprising:	O		TAE00003WA	
EDS 205	• Moxa switch**	O	ECR	TAA000021N	
MFD 307	• 7" HMI***	O	ECR	TAA0000386	
	MetaPower Quad Shaft Torque Meter, comprising:				
NQB101	• Fork A,B,C,D	R	ER	TAA0000386	
NQ-045, NQ-051	• Shaft Code wheel 1,2	R	ER	N/A	
* R / O: Required / Option ** Switch to be covered by TAA000021N *** See Application / Limitations concerning EMC **** SW revision 1.4.x covered by this TAC					

Approval conditions

This Type Approval certificate covers HW and SW in MetaPower Quad ShaPoLi basic solution for vessels with a single propulsion shaft.

The following documents, holding vessel specific information shall be available onboard and be presented to the DNV surveyor upon request:

- Annex 1 in this TA certificate.
- Service or commissioning report documenting evidence of correct configured ShaPoLi system.
- Torquemeter Calibration Certificate.

Any deviations from the default choices in Annex 1 in this TA certificate may be subject to separate approval.

The adjustable delay timer for power exceedance alarm shall be set to max 15 seconds.

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

MFD 307 is not tested towards all EMC requirements in DNV-CG-0339 August 2021. However, as it is tested towards IEC60945 Ed. 4 it is found acceptable for use onboard.

The MetaPower Quad ShaPoLi cover functionality directly related to ShaPoLi only. Other functionality such as e.g. torsion analysis, fuel performance etc. are not covered by this TA certificate.

The MetaPower Quad ShaPoLi basic solution is approved for use in DNV classed vessels subject to EEXI overridable power limitation provided the vessel's Flag Administration have accepted the ShaPoLi approach as outlined in IACS Rec.172 (section 6.6, first bullet) of June 2022.

The MetaPower Quad ShaPoLi system is approved for vessels with single propulsion shaft.

When multiple HMI's are installed in the MetaPower Quad ShaPoLi system onboard, the ShaPoLi alarming and acknowledging functionality shall be enabled in the HMI installed on the bridge only. Except from the recording functionality, this TA certificate does not cover use in ShaPoLi systems with functionality for automatic power limitation. Such use may be subject to case-by-case approval.

Prior to installation onboard, KM shall ensure that the individual DNV TA certificates referred to in Table 2 are valid and that any application limitations in these are complied with.

Type Approval documentation

DNV No	Drawing No	Rev	Title
1	110-0014543	B	MetaPower Quad System, Incl. ShaPoLi (EEXI) feature, System Drawing
2	110-0015639	B	MetaPower Quad ShaPoLi Standalone, Connection drawing
4	110-0016162	D	MetaPower quad ShaPoLi Bridge panel, Connection drawing
5	110-0016316	C	Factory Acceptance Test, MetaPower Quad with ShaPoLi Shaft Power Limitation
6	110-0016317	D	Function Description, ShaPoLi Shaft Power Limitation
7	110-0016328	B	ShaPoLi, MetaPower Quad ShaPoLi data sheet
8	110-0016346	D	MetaPower Quad, ShaPoLi Shaft Power Limitation, Operator Manual
9	430609	G	MetaPower Quad cabinet without display, Assembly drawing
11	REP001771	B	Nemko TRF MAR Test Report, NQB-101, NQB-102
15	110-0018627	A	MetaPower Quad System, System drawing
35	110-0017821	B	MetaPower Quad ShaPoLi standalone bridge panel
36	E17288	00	Nemko TRF MAR 60945 Test Report, MFD 307

Tests carried out

Applicable tests according to class guideline DNV-CG-0339, August 2021.
 Function tests according to document no. 110-0016316 rev. B.

Marking of product

Bridge:

- MetaPower Quad ShaPoLi

Engine room / ECR:

- MetaPower Quad

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 signed project specific copy of Annex 1 shall be available onboard and presented to the DNV surveyor upon request. The default choices are indicated in **bold**.

No	Item	Actual configuration			
1	Installed SW / system configuration:				
1.1	SW version no. 1.4.x is implemented in the system installed onboard (Y / N ) .....	.....		
1.2	Adjustable time delay for power exceeded alarm set to max 15 seconds (Y / N ) .....	.....		
1.3	Service or commissioning report available onboard (Y / N ) .....	.....		
1.4	Torquemeter calibration certificate available onboard (Y / N ) .....	.....		
2	Shaft power limitation arranged as per IACS Rec. 172, section 6.6, including				
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 when power limit is exceeded:				
2.2.1	- Shaft rotational speed (Y / N ) .....	.....		
2.2.2	- Shaft torque (Y / N ) .....	.....		
2.2.3	- Shaft power (Y / N ) .....	.....		
2.2.4	Continuously indicated on the bridge when the EEXI power limit is exceeded (Y / N ) .....	.....		
3	Interface to external systems				
3.1	GPS position (Y / N) ^{Note 1} .....	.....		
3.1.1	Speedlog (Y / N ) .....	.....		
3.1.2	Anemometer (Y / N ) .....	.....		
3.1.3	System fail output interfaced to external alarm system (Y / 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:					
<hr/> Manufacturer's signature, date & stamp					