TYPE APPROVAL CERTIFICATE

Certificate No:
TAA0000386
Revision No:
2

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), as amended by Resolutions MEPC.375(80) and MEPC.390(81)
IACS Recommendation No. 172 Rev.1 (Apr 2024) EEXI Implementation Guidelines
DNV rules for classification – Ships
DNV rules for classification – Ships Pt.6 Ch.5 Sec.21 Cyber security

Application :

The Type Approval covers security capabilities in accordance with DNV security profile 1 and IACS UR E27 Rev.1, subject to conditions stated in this certificate.

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 **2025-06-30**

This Certificate is valid until **2027-06-29**.
DNV local unit: **Trondheim**

Approval Engineer: **Knut Omberg**

for **DNV**
Digitally signed by: Jarle Coll Blomhoff
Location: DNV Høvik, Norway

Jarle Coll Blomhoff
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 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: • 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-7	• 7" HMI***	R	WH	TAA0000386	1.3.x
	• 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	1.6.x****
EDS 405A/408A	• Moxa switch**	O	ER	TAA000006K	
MFD-7	• 7" HMI in cabinet door***	O	ER	TAA0000386	1.3.x
AX Compact enclosure	• ECR console, comprising:	O		TAE00003WA	
EDS 405A/408A	• Moxa switch**	O	ECR	TAA000006K	
MFD-7	• 7" HMI***	O	ECR	TAA0000386	1.3.x
	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: R**equired / **O**ption
** Switch to be covered by TAA000021N
*** See Application / Limitations concerning EMC
**** SW revision 1.6.x covered by this TAC
Components located in ER and ECR are pr. shaft system. Hence to be duplicated for twin shaft systems.

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.

If the type approved system is part of scope (SuC) for class notation Cyber secure(Essential, +), it shall be delivered with a vessel-specific product certificate (PC). The product certificate shall be issued based on the following verification as per DNV-RU-SHIP Pt.6 Ch.5 Sec.21:

a) It shall be demonstrated that the architecture of each delivery is documented in a project-specific system topology F030 and that this is consistent with type approved document System Topology 110-0061720.

b) It shall be demonstrated that each delivery is correctly represented by a vessel-specific asset inventory (F071) and that this inventory is consistent with type approved document Asset Inventory 110-0061719.

c) It shall be demonstrated by a declaration or test report (Z261) that each delivery has been configured and hardened as per the type approved document Security Configuration Guideline 110-0096452.

If a delivered system differs from the type approved system, this shall be described and submitted for assessment.

Application/Limitation

MFD-7 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

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
60	110-0082763	E	Description of Security Capabilities
61	110-0061719	F	Asset Inventory
62	110-0061720	E	System Topology
63	110-0064995	E	Test Procedure
78	110-0096452	B	Security Configuration Guideline
85	110-0112041	B	Moxa Security Configuration
86		1.6.0	Release notes for HSIO-C
87	424979	F	Software revision history for Kongsberg Maritime HSIO units
79	110-0026766	D	Kongsberg Shaft Torque Meter MetaPower Quad User Manual

Documentation of major changes to the type approved system shall be informed to DNV. If the changes are found to affect functionality covered by this TA certificate, relevant document assessment shall be carried out and type testing may be required. The TA certificate shall then be renewed, identifying the new version. Major modifications are identified by updating either of the first two numbers in the version identifier.

Minor changes are covered by this type approval. Minor modifications to the type approved system is identified by updating the last number in the version identifier.

At renewal of this TA certificate a complete change log of the type approved product shall be submitted.

Tests carried out

Applicable tests according to class guideline DNV-CG-0339, August 2021.
Function tests according to document no. 110-0016316 rev. B.
Tested in accordance with requirements for security profile 1 (SP1) as per document test procedure 110-0064995, September 2024.

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
- Review documented evidence of adherence to Secure Development Lifecycle processes

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. 1.6.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)	
2.2.5	System is used for automatic power limitation (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 configuration applies to the following vessel (IMO No. and/or DNV Id): ……..

Comments:

Manufacturer's signature, date & stamp