Certificate No:
TAA000032E

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Porgrammable Electronic System

with type designation(s)
HIMA HIQuad X System

Issued to
HIMA Paul Hildebrandt GmbH
Brühl, **Germany**

is found to comply with
DNV GL 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.

Temperature	**B (from 0°C)**
Humidity	**B**
Vibration	**A**
EMC	**B**
Enclosure	**Required protection according to DNV Rules shall be provided upon installation onboard**

Issued at **Hamburg** on **2021-10-29**
This Certificate is valid until **2026-10-28**.
DNV local station: **Augsburg**

Approval Engineer: **Dariusz Lesniewski**

for **DNV**

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.

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

HIQuad X is a module-based safety system which may be used for safety and critical control applications.

Hardware:

Product Code	Description
F-CPU 01	HIQuad X CPU Module, Safety-related SIL 3
F-IOP 01	HIQuad X Processing Module. Tasks of I/O processing modules.
F-PWR 01	HIQuad X Power Supply Module
F-PWR 02	HIQuad X Power Supply Module
H7034, H7035	Mains Filter (24V), Mains Filter (48V), surge and burst protection
F-BASE RACK 11	HIQuad X Extension Rack for I/O's, 19-Inch, 12 Slots for I/O+9 for System Modules
F-BASE RACK 01	HIQuad X Base Rack for H51X, 19-Inch, 21 Slots for System Modules
F-BASE RACK 02	HIQuad X Base Rack for H41X, 19-Inch, 16 Slots for I/O+5 for System Modules
K9203A	Rack Fan with 3 axial fans, redundant supply, monitoring, voltage monitoring
K9202B	Rack Fan with 2 axial fans, otherwise the same as s. a. K9203A
F-COM 01	HIQuad X Communication Module
F3221	16xCh DI, with **Protec**tive **S**eparation (ProtecS).
F3224A	4xCh DI (Ex)i, ProtecS. NAMUR or wired mechanical contacts, **O**pen-**C**ircuit monitoring (OC).
F3236	16xCh DI (24V), Safety-related SIL 3, **Safe S**eparation (SafeS)
F3237	8xCh DI Safety-related SIL 3, NAMUR (EN 60947-5-6). **L**ine **S**hort- (LS), **L**ine **B**reake (LB)
F3238	8xCh DI, (Ex)i, Safety-related SIL 3, prox. switches P+F, NAMUR, LS and LB
F3240	16xCh DI, Safety-related SIL 3 with SafeS. 110 VDC, 127 VAC
F3248	16xCh DI, Safety-related SIL 3 with SafeS. 48 VDC, 48 VAC
F3322	16xCh DO, 500 mA (12 W). LS-proof. ProtecS. **N**o **O**utput signal upon **B**reak in **L**-supply (NoBL-)
F3325	6xCh (Ex)i Power Supply Module for F6221 (Ex)i Module.
F3330	8xCh DO, Safety-related SIL 3, 500mA(12 W), ESD, ProtecS. NoUBrL-
F3331	8xCh DO, Safety-related SIL 3, 500mA(12 W), ESD, ProtecS. NoUBrL-
F3333	4xCh DO, Safety-related SIL 3, 2 A(48W). ESD, ProtecS. NoUBrL-
F3334	4xCh DO, Safety-related SIL 3, 2 A(48W). ESD, ProtecS. NoUBrL- and OC
F3335	4xCh DO, (Ex)i, Safety-related SIL 3, for valves and suppl. transmitters. Current limited.
F3349	8xCh DO, Safety-related SIL 3, 500mA (24/48 V). ESD, ProtecS. SC and OC.
F3422	8xCh Output Relay. 60 VDC / VAC, SafeS
F3430	4xCh Output Relay. Safety-related SIL 3, 250VAC/110VDC, ESD, ProtecS.
F5220	2xCh CI + 2xCh fast Outputs, Safety-related SIL 3, independent from PES cycle
F6215	4xCh AI, 0…1/5/10 V, Pt100 or 0/4..20 mA. ProtecS, 12-bit res., SC and OC
F6217	8xCh AI, Safety-related SIL 3, 0/4..20mA, 0..5/10V. ProtecS. 12-bit res., SC, OC
F6221	8xCh AI (Ex)i, Safety-related SIL 3, 0/4..20mA, 0..1V. 8xCh feeding 30V. SC,OC
F6706	2xCh AO, 0/4...20mA, outputs electrically separated. ProtecS, As current source or sink.
F7133	4xCh Power Distribution with fuse monitoring and L- distribution

System cables with cable plugs

The HIQuad X -PLC- system cables are used to wire the connector of the I/O Modules with the Marshalling cabinets or with the Field Accessory.

Available different types of system cables:

Z 7114/3224/.. Module F3224
Z 7116/3236/.. Module F3236
Z 7108/3237/.. Module F3237
Z 7008/3238/.. Module F3238
Z 7130/3240/.. Module F3240
Z 7130/3248/.. Module F3248
Z 7136/3322/.. Module F3322
Z 7025/3325/.. Module F3325
Z 7138/3330/.. Module F3330
Z 7138/3331/.. Module F3331
Z 7134/3333/.. Module F3333
Z 7134/3334/.. Module F3334
Z 7035/3335/.. Module F3335
Z 7150/3349/.. Module F3349
Z 7139/3422/.. Module F3422
Z 7149/3430/.. Module F3430
Z 7152/5220/.. Module F5220
Z 7127/6215/.. Module F6215
Z 7127/6217/.. Module F6217

Z 7063/6221/.. Module F6221
Z 7126/6705/.. Module F6705
Z 7126/6706/.. Module F6706
Z 7062/6220/.. Module F6220

System Software:

Product Code	Description	Version
F-IOP 01	HIQuad X Processing Module	IOP OS V10.24
F-CPU 01	HIQuad X CPU Module	CPU OS V13.2
F-COM 01	HIQuad X COM Module	COM OS V.14.8

Device Type	Description	Version
SILworX	Programming and Configuration Tool	12.28

Approval conditions

The following documentation of the actual application is required to be submitted for approval in each case:

- Reference to this Type Approval Certificate
- Functional description
- System block diagram
- User interface description
- Power supply arrangement (may be part of the System block diagram)
- List of control and monitored points
- Circuit diagrams
- Description of functions covered by software
- Test program for application software at manufacturer

The Type Approval covers hardware and system software listed under Product Description.

Product certificate
Each delivery of the HIMA HIQuad X system is to be certified according to Pt.4 Ch.9 Sec.1.
The certification test is required to be performed at the manufacturer/supplier of the application system according to an approved test program before the system is shipped to the yard. The project specific application functions shall be included in the certification testing of each delivery.

The software version for each application function shall be recorded in the product certificate. After certification the clause for application software control will be put into force.

Application software control
All changes in software are to be recorded as long as the system is in use on board. The records of all changes are to be forwarded to DNV for evaluation and approval. Major changes in the software are to be approved before being installed in the computer.

Application/Limitation

System cables:
The following restrictions apply to the listed system cables:
- Nominal voltage: <50V AC/DC
- Use only for installation inside switchgears
- Not suitable for the use of special transmission protocols

EMC Cabinet (e.g. Rittal EMC Cabinet Anreih-System TS 8):
- For F5220 EMC Cabinet with at least 20dB@165MHz attenuation must be used.
- For F6215 EMC Cabinet with at least 10dB@164MHz attenuation must be used.

Mains Filter:
- H7034, H7035 mains filters must be used

Type Approval documentation

Tests carried out

Applicable tests according to class guideline DNV-CG-0339, August 2021.

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