Certificate No:
TAA000030J

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Programmable Electronic System

with type designation(s)
STARDOM (FCN-500)

Issued to
Yokogawa Electric Corporation
Tokyo, **Japan**

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	**B**
Humidity	**B**
Vibration	**A**
EMC	**B**
Enclosure	**Required protection according to relevant rules shall be provided upon installation on board**

Issued at **Høvik** on **2021-08-24**
This Certificate is valid until **2026-08-23**.
DNV local station: **Yokohama**

Approval Engineer: **Ståle Sneen**

for **DNV**

Marta Alonso Pontes
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

STARDOM (FCN-500). FCN-500 Autonomous Controller (acronym of Field Control Node) is a modular controller that can be used in the STARDOM network-based control system.

STARDOM (FCN-500) consists of the following:
• Base module
• Power supply module
• CPU module
• E2 bus interface module (extending the unit)
• I/O modules

STARDOM (FCN-500) comprising the following modules:

Kind of Product	Name / Description	Model	Rated Power Supply	Remark
Base Module	Base module (long)	NFBU200	-	(*1)
Power Supply Module	Power supply module (100 - 120 V AC input)	NFPW441	100 to 120 Vac, 50/60 Hz, 1.4 A	-
Power Supply Module	Power supply module (220 - 240 V AC input)	NFPW442	220 to 240 Vac, 50/60 Hz, 0.7 A	-
Power Supply Module	Power supply module (24 V DC input)	NFPW444	24 Vdc, 3.3 A	-
CPU Module	CPU module for FCN (with 4 Ethernet ports)	NFCP502	-	-
E2 Bus Interface Module	E2 bus interface module	N2EB100	-	-
Analog I/O Module	Analog Input Module (4 to 20 mA,16-channel, Non-Isolated)	NFAI141	-	(*2)
Analog I/O Module	Analog I/O Module (4 to 20 mA input, 4 to 20 mA output, 8-channel input/8-channel output, Non-Isolated)	NFAI841	-	(*2)
Analog I/O Module	Analog Input Module (4 to 20 mA, 16-channel, Isolated)	NFAI143	-	(*2)
Analog I/O Module	Analog Output Module (4 to 20 mA, 16-channel, Isolated)	NFAI543	-	(*2)
Analog I/O Module	RTD Input Module (12-channel, Isolated)	NFAR181	-	-
Analog I/O Module	Analog Input Module (4 to 20 mA, 8-channel, Isolated channels)	NFAI135	-	(*2)
Analog I/O Module	Analog I/O Module (4 to 20 mA, 4-channel input/4-channel output, Isolated channels)	NFAI835	-	(*2)
Analog I/O Module	Pulse Input Module (8-channel, Pulse count, 0 to 10 kHz, Isolated channels)	NFAP135	-	(*2)
Digital I/O Module	Digital Input Module (32-channel, 24 V DC, Isolated)	NFDV151	-	(*2)
Digital I/O Module	Digital Output Module (32-channel, 24 V DC, Isolated)	NFDV551	-	(*2)
Communication Module	Foundation fieldbus communication module (4-port)	NFLF111	-	(*2)
Communication Module	PROFIBUS-DP Communication Module (1-port, 9.6 kbps to 12 Mbps)	NFLP121	-	(*2)
Communication Module	RS-232-C Communication Module (2-port, 300 bps to 115.2 kbps)	NFLR111	-	(*2)
Communication Module	RS-422/RS-485 Communication Module (2-port, 300 bps to 115.2 kbps)	NFLR121	-	(*2)
Terminal Block	MIL Connector Terminal Block (40 Pole Plug Types, M3.5)	TAS40	-	(*1)
Terminal Block	MIL Connector Terminal Block (50 Pole Plug Types, M3.5)	TAS50	-	(*1)
Others	Dummy cover for I/O module slot	NFDCV01	-	-
Others	Dummy cover for power supply module slot	NFDCV02	-	-

*1: DIN rail mounted type is not covered by this type approval
*2: Testing is documented in our project 262.1-012032

Place of manufacture

1. Yokogawa Electric Asia Pte.Ltd
   5 Bedok South Road, Singapore 469270, Singapore
2. PT Yokogawa Manufacturing Batam
   Lot 339-340 Jalan Beringin, Batamindo Industrial Park, Mukakuning, Batam, 29433, Indonesia

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.

Product certificate

If specified in the Rules, ref. Pt.4 Ch.9 Sec.1, the control and monitoring system in which the above listed hardware is used shall be delivered with a product certificate. For each such delivery the certification test is to be performed at the manufacturer of the application system before the system is shipped to the yard. The test shall be done according to an approved test program. After certification the clause for software control will be put into force.

Software control

All changes in software are to be recorded as long as the system is in use on board. Documentation of major changes is to be forwarded to DNV for evaluation and approval before implemented on board. Certification of modified functionality may be required for the particular vessel.

Application/Limitation

Power supply module NFPW444 is not approved for connection to battery power sources. NFPW444 has been tested and approved for direct connection to 24 V DC systems according to the Rules Pt.4 Ch.9 Sec.5 [2.2.2].

The Installation Guides describes how the system shall be installed on board:

- Surge arresters shall be fitted as described in TI 34P02Q91-01E
- Power-line noise filters and ferrites shall be fitted as described in TI 34P02Q93-01E

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