DNV·GL

Certificate No:
TAE00000H2

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Frequency Converter

with type designation(s)
FR-A800 series

Issued to
Mitsubishi Electric Corp. Nagoya Works
Nagoya Aichi, Japan

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards

Application :

Frequency Converter FR-A800 series for use onboard ships and mobile offshore units

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

This Certificate is valid until **2018-12-31**.

Issued at **Busan** on **2015-10-05**

for **DNV GL**

DNV GL local station: **Kobe**

Approval Engineer: **Byoung So Lee**

Baeg Soon Choi
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

Frequency converter drives FR-A800 series:

Inverters whose capacity is up to 280K (Standard model)

Model 1)		Input Power Supply (3 phase)		Output			
		Voltage	ND 2)	ND 2)	ND 2)	Freq.	Voltage
Capacity designation	Current designation	V AC	A	kW	A	Hz	3-Phase AC
FR-A840-0.4K-#	FR-A840-00023-#	380-500V, 50/60Hz	2.3	0.4	1.5	0.2-590	380-500V max
FR-A840-0.75K-#	FR-A840-00038-#	380-500V, 50/60Hz	3.7	0.75	2.5	0.2-590	380-500V max
FR-A840-1.5K-#	FR-A840-00052-#	380-500V, 50/60Hz	6.2	1.5	4	0.2-590	380-500V max
FR-A840-2.2K-#	FR-A840-00083-#	380-500V, 50/60Hz	8.3	2.2	6	0.2-590	380-500V max
FR-A840-3.7K-#	FR-A840-00126-#	380-500V, 50/60Hz	12.3	3.7	9	0.2-590	380-500V max
FR-A840-5.5K-#	FR-A840-00170-#	380-500V, 50/60Hz	17.4	5.5	12	0.2-590	380-500V max
FR-A840-7.5K-#	FR-A840-00250-#	380-500V, 50/60Hz	22.5	7.5	17	0.2-590	380-500V max
FR-A840-11K-#	FR-A840-00310-#	380-500V, 50/60Hz	31	11	23	0.2-590	380-500V max
FR-A840-15K-#	FR-A840-00380-#	380-500V, 50/60Hz	40.3	15	31	0.2-590	380-500V max
FR-A840-18.5K-#	FR-A840-00470-#	380-500V, 50/60Hz	48.2	18.5	38	0.2-590	380-500V max
FR-A840-22K-#	FR-A840-00620-#	380-500V, 50/60Hz	56.5	22	44	0.2-590	380-500V max
FR-A840-30K-#	FR-A840-00770-#	380-500V, 50/60Hz	75.1	30	57	0.2-590	380-500V max
FR-A840-37K-#	FR-A840-00930-#	380-500V, 50/60Hz	91	37	71	0.2-590	380-500V max
FR-A840-45K-#	FR-A840-01160-#	380-500V, 50/60Hz	108	45	86	0.2-590	380-500V max
FR-A840-55K-#	FR-A840-01800-#	380-500V, 50/60Hz	134	55	110	0.2-590	380-500V max
FR-A840-75K-#	FR-A840-02160-#	380-500V, 50/60Hz	144	75	144	0.2-590	380-500V max
FR-A840-90K-#	FR-A840-02600-#	380-500V, 50/60Hz	180	90	180	0.2-590	380-500V max
FR-A840-110K-#	FR-A840-03250-#	380-500V, 50/60Hz	216	110	216	0.2-590	380-500V max
FR-A840-132K-#	FR-A840-03610-#	380-500V, 50/60Hz	260	132	260	0.2-590	380-500V max
FR-A840-160K-#	FR-A840-04320-#	380-500V, 50/60Hz	325	160	325	0.2-590	380-500V max
FR-A840-185K-#	FR-A840-04810-#	380-500V, 50/60Hz	361	185	361	0.2-590	380-500V max

Model 1)		Input Power Supply (3 phase)		Output			
		Voltage	ND 2)	ND 2)	ND 2)	Freq.	Voltage
Capacity designation	Current designation	V AC	A	kW	A	Hz	3-Phase AC
FR-A840-220K-#	FR-A840-05470-#	380-500V, 50/60Hz	432	220	432	0.2-590	380-500V max
FR-A840-250K-#	FR-A840-06100-#	380-500V, 50/60Hz	481	250	481	0.2-590	380-500V max
FR-A840-280K-#	FR-A840-06830-#	380-500V, 50/60Hz	547	280	547	0.2-590	380-500V max

Inverters whose capacity is 315K or more (Separated converter type)

Model 1)		Input Power Supply (3 phase)		Output			
		Voltage	ND 2)	ND 2)	ND 2)	Freq.	Voltage
Capacity designation	Current designation	V DC	A	kW	A	Hz	3-Phase AC
FR-A842-315K-#	FR-A842-07700-#	430-780V	-	315	610	0.2-590	380-500V max
FR-A842-355K-#	FR-A842-08660-#	430-780V	-	355	683	0.2-590	380-500V max
FR-A842-400K-#	FR-A842-09620-#	430-780V	-	400	770	0.2-590	380-500V max
FR-A842-450K-#	FR-A842-10940-#	430-780V	-	450	866	0.2-590	380-500V max
FR-A842-500K-#	FR-A842-12120-#	430-780V	-	500	962	0.2-590	380-500V max

Inverters (IP55 compatible model)

Model 1)		Input Power Supply (3 phase)		Output			
		Voltage	ND 2)	ND 2)	ND 2)	Freq.	Voltage
Capacity designation	Current designation	V AC 50/60Hz	A	kW	A	Hz	3-Phase AC
FR-A846-0.4K-#2#	FR-A846-00023-#2#	380-500VAC	1.5	0.4	1.5	0.2-590	380-500V max
FR-A846-0.75K-#2#	FR-A846-00038-#2#	380-500VAC	2.5	0.75	2.5	0.2-590	380-500V max
FR-A846-1.5K-#2#	FR-A846-00052-#2#	380-500VAC	4	1.5	4	0.2-590	380-500V max
FR-A846-2.2K-#2#	FR-A846-00083-#2#	380-500VAC	6	2.2	6	0.2-590	380-500V max
FR-A846-3.7K-#2#	FR-A846-00126-#2#	380-500VAC	9	3.7	9	0.2-590	380-500V max
FR-A846-5.5K-#2#	FR-A846-00170-#2#	380-500VAC	12	5.5	12	0.2-590	380-500V max
FR-A846-7.5K-#2#	FR-A846-00250-#2#	380-500VAC	17	7.5	17	0.2-590	380-500V max

Model 1)		Input Power Supply (3 phase)		Output			
		Voltage	ND 2)	ND 2)	ND 2)	Freq.	Voltage
Capacity designation	Current designation	V AC 50/60Hz	A	kW	A	Hz	3-Phase AC
FR-A846-11K-#2#	FR-A846-00310-#2#	380-500VAC	23	11	23	0.2-590	380-500V max
FR-A846-15K-#2#	FR-A846-00380-#2#	380-500VAC	31	15	31	0.2-590	380-500V max
FR-A846-18.5K-#2#	FR-A846-00470-#2#	380-500VAC	38	18.5	38	0.2-590	380-500V max
FR-A846-22K-#2#	FR-A846-00620-#2#	380-500VAC	44	22	44	0.2-590	380-500V max
FR-A846-30K-#2#	FR-A846-00770-#2#	380-500VAC	57	30	57	0.2-590	380-500V max
FR-A846-37K-#2#	FR-A846-00930-#2#	380-500VAC	71	37	71	0.2-590	380-500V max
FR-A846-45K-#2#	FR-A846-01160-#2#	380-500VAC	86	45	86	0.2-590	380-500V max
FR-A846-55K-#2#	FR-A846-01800-#2#	380-500VAC	110	55	110	0.2-590	380-500V max
FR-A846-75K-#2#	FR-A846-02160-#2#	380-500VAC	144	75	144	0.2-590	380-500V max
FR-A846-90K-#2#	FR-A846-02600-#2#	380-500VAC	180	90	180	0.2-590	380-500V max
FR-A846-110K-#2#	FR-A846-03250-#2#	380-500VAC	216	110	216	0.2-590	380-500V max
FR-A846-132K-#2#	FR-A846-03610-#2#	380-500VAC	260	132	260	0.2-590	380-500V max

Converter Units

Input Power Supply (3 phase)			Output
			Voltage
Model	V AC	A	DC
FR-CC2-H315K	380-500V,50/60Hz	610	430-780V max
FR-CC2-H355K	380-500V,50/60Hz	683	430-780V max
FR-CC2-H400K	380-500V,50/60Hz	770	430-780V max
FR-CC2-H450K	380-500V,50/60Hz	866	430-780V max
FR-CC2-H500K	380-500V,50/60Hz	962	430-780V max

1) # means alphanumeric suffix that may be added. In case of IP55 compatible models, the "#2#" means a built-in C2 class EMC filter.
2) The ND ratings values are listed as a representative of the four ratings SLD, LD, ND and HD.

Application/Limitation

Rated input AC voltage, frequency:	380 - 500 V, 50/60 Hz
Tolerable voltage fluctuation:	323 - 528 V* or 323 - 550 V, 50/60 Hz
Tolerable frequency fluctuation:	± 5 %
Frequency range output:	0.2 – 590 Hz
Enclosure class:	IP20 or IP00 or IP55**
Humidity class:	B
Temperature class:	B
Vibration class:	A
EMC class	A***

* Models of 55K or less.

** The Inverter units except IP55 compatible models have to be installed in any of the following enclosure (IP22 for Class A, IP44 for Class B, IP56 for Class C, IP68 for Class D) depending on intended location.

*** EMC has been performed in accordance with IEC 61800-3 / SfC No 2.4. To be used on Class A locations.

The FR-A800 must be regarded as a component. The actual installation shall be designed according to Mitsubishi Electric Instructions manuals and according to the applicable DNV Rules for the actual application. Documents for the actual application are to be submitted for approval in each case in accordance with DNV Rules Pt.4, Ch.8, Sec.1 Table B2.

A Product Certificate is required for converters ≥ 100 kW, if applied for essential or important functions.

Locations of production:

Mitsubishi Electric Corporation Nagoya Works:
1-14, Yada-minami 5–chome, Higashi-ku, Nagoya 461-8670, Japan

Mitshbishi Electric Dalian Industrial Products Co., Ltd.:
Dongbei 3-5, Dalian Economic & Technical Development Zone, Dalian China 116600

Type Approval documentation

Tests carried out

Visual inspection, Performance test, Humidity test, Dry heat test, Insulation test, High voltage test, Full load test, Overload test, Low temperature test, Vibration test, Power supply variation test, Power supply failure test, Radiated emission test, Conducted emission test, Conducted low frequency interference test, Electrical fast transient test, Surge voltage test, Conducted radio frequency interference test, Electrostatic discharge test and Electromagnetic field test.

Marking of product

Mitsubishi Electric – Type designation – Voltage
Note: Each inverter may have its model name according to capacity designation or current designation.

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type Approval is complied with and that no alterations are made to the product design or choice of materials.
The main elements of the survey are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Production Sample Tests (PST) and Routines (RT) checked (if not available tests according to PST and RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring tractability between manufacturer's product type marking and Type Approval Certificate.

Survey to be performed at least every second year.

END OF CERTIFICATE