

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Circuit Breaker**

with type designation(s)

MMS-32S/MMS-32H/MMS-32HI/MMS-63S/MMS-63H/MMS-63HI/MMS-100S/MMS-100H/MMS-100HI

Issued to

LSIS Co., Ltd.**Cheongju-si Chungcheongbuk-do, Republic of Korea**

is found to comply with

Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards**IEC 60947-2****Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**

Rated Voltage (V)	230 - 600/690
Rated Current (A)	0.1 - 63
Frequency (Hz)	50 - 60

This Certificate is valid until **2020-12-31**.Issued at **Busan** on **2016-03-15**for **DNV GL**DNV GL local station: **Seoul**Approval Engineer: **Jong Yun Kim**

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

Manual motor starter and circuit breaker with the following data*:

	MMS-32S	MMS-32H	MMS-32HI	MMS-63S	MMS-63H	
Rated insulation voltage AC (V)	690	690	690	1000	1000	
Rated impulse voltage AC (V)	6 kV	6 kV	6 kV	8 kV	8 kV	
Rated operational voltage AC(V)	600/690**	600/690**	600/690**	690	690	
Rated Current (A)	0.16 - 32	0.16 - 32	0.16 - 32	10 - 63	10 - 63	
Rated Frequency Hz	50 - 60	50 - 60	50 - 60	50 - 60	50 - 60	
Rated ultimate breaking capacity Icu (kA)	600 / 690V	3 - 100	4 - 100	4 - 100	4	5 - 6
	500 / 525V	5 - 100	10 - 100	10 - 100	6 - 10	10 - 50
	440 / 460V	6 - 100	20 - 100	20 - 100	10 - 15	35 - 50
	400 / 415V	15 - 100	50 - 100	50 - 100	25 - 100	50 - 100
	220 / 240V	30 - 100	100	100	50 - 100	100
Rated service breaking capacity Ics (kA)	600 / 690V	3 - 100	4 - 100	4 - 100	3	5
	500 / 525V	4 - 100	8 - 100	8 - 100	5 - 8	8 - 38
	440 / 460V	4 - 100	15 - 100	15 - 100	8 - 12	27 - 38
	400 / 415V	11 - 100	38 - 100	38 - 100	19 - 100	50 - 100
	220 / 240V	22 - 100	100	100	38 - 100	100
Rated making Capacity Icm (kA)	4.26 - 63	5.88 - 220	5.88 - 220	5.88 - 105	7.5 - 220	
Utilization category	A	A	A	A	A	
Rated breaking Capacity AC-3	1.28 - 256	1.28 - 256	1.28 - 256	80 - 504	80 - 504	

	MMS-63HI	MMS-100S	MMS-100H	MMS-100HI
Rated insulation voltage AC (V)	1000	1000	1000	1000
Rated impulse voltage AC (V)	8 kV	8 kV	8 kV	8 kV
Rated operational voltage AC(V)	690	690	690	690
Rated Current (A)	10 - 63	17 - 100	17 - 100	17 - 100
Rated Frequency Hz	50 - 60	50 - 60	50 - 60	50 - 60
Rated ultimate breaking capacity Icu (kA)	600 / 690V	5 - 6	5 - 10	6 - 12
	500 / 525V	10 - 50	8 - 25	12 - 35
	440 / 460V	35 - 50	40	50
	400 / 415V	50 - 100	50	75 - 100
	220 / 240V	100	100	100
Rated service breaking capacity Ics (kA)	600 / 690V	5	4 - 8	6 - 9
	500 / 525V	8 - 38	6 - 19	9 - 27
	440 / 460V	27 - 38	30	38
	400 / 415V	50 - 100	38	50 - 100
	220 / 240V	100	100	100
Rated making Capacity Icm (kA)	7.5 - 220	7.5 - 220	9 - 220	9 - 220
Utilization category	A	A	A	A
Rated breaking Capacity AC-3	80 - 504	136 - 800	136 - 800	136 - 800

* The short circuit data is depending of the size of each model. See supplier data for details.

** See application /limitation

Application/Limitation

Shall be installed and tested according to Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards.

The manufacturer's instructions to be observed.

Suitable for use in an IT system with a capacity of 1.2 times the maximum trip current at 600 V AC (IEC 60947-2, Annex H).

For models with $U_{imp} = 6$ kV the max. rated voltage is 600 V when used in an IT (ship) net. Can be used in applications with directly earthed systems with rated voltage of 400/690 V.

Ingress protection: IP 20.

Type Approval documentation

Technical info:

Type designation and Rating table by Ampere Frame size (Part 1.3 and 1.3.1 of document-tation for DNV type approval "LS MMS TYPE APPROVAL" issued 2007-10-08).

Test reports:

PT & T reports nos. R47-1575/6/7/8 issued 2007-10-08 (Appendix 3 in documentation for DNV type approval), KEMA test reports nos.: 2038108.51/52/53/54/55/56 dated 2004-05-26, partly modified 2004-10-07. (Appendix 4 in documentation for DNV type approval).

Type approval survey report for retention dated 2012-01-05.

Type approval survey report for retention dated 2015-12-22.

Tests carried out

Type tests in accordance with IEC 60947-2. Inclination-, vibration -, dry heat- & damp heat.

Marking of product

Manufacturer name - Model name / Rating (type designation)

Periodical assessment

The scope of the retention/renewal survey 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 to be dealt with:

- Ensure that type approved documentation is available.
- Ensure that materials used comply with type approved documents and/or referenced material specifications.
- Review design, materials, performance and production process with respect to possible changes, in order to ensure compliance with the type approved documentation and/or referenced material specifications.
- Ensure traceability between manufacturer's product marking and the DNV Type Approval Certificate.

Survey to be performed at least every second year.

END OF CERTIFICATE