

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Frequency Converter

with type designation(s)
SV-IS7 Series

Issued to

LSIS Co., Ltd. (Cheon-an Plant)
Cheonan-si Chungcheongnam-do, Republic of Korea

is found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :

Frequency Converter for Asynchronous Motors SV series. Range: 0,75 kW to 375 kW 200 - 400 VAC supply.

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

Issued at **Busan** on **2017-04-14**

for **DNV GL**

This Certificate is valid until **2021-12-31**.

DNV GL local station: **Seoul**

Approval Engineer: **Eun Jin Lee**

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Michael Jost Auf der Stroth
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

Variable speed controller for asynchronous motor. Constant / variable torque applications.

3-phase supply 200 V:

Type designation	Mains supply (V)	Number of phases	Motor power output (kW)
SV0008IS7	200 - 230	3	0.75
SV0015IS7	200 - 230	3	1.5
SV0022IS7	200 - 230	3	2.2
SV0037IS7	200 - 230	3	3.7
SV0055IS7	200 - 230	3	5.5
SV0075IS7	200 - 230	3	7.5
SV0110IS7	200 - 230	3	11
SV0150IS7	200 - 230	3	15
SV0185IS7	200 - 230	3	18.5
SV0220IS7	200 - 230	3	22
SV0300IS7	200 - 230	3	30
SV0370IS7	200 - 230	3	37
SV0450IS7	200 - 230	3	45
SV0550IS7	200 - 230	3	55
SV0750IS7	200 - 230	3	75

3-phase phase supply 400 V:

Type designation	Mains supply (V)	Number of phases	Motor power output (kW)
SV0008IS7	380 - 480	3	0.75
SV0015IS7	380 - 480	3	1.5
SV0022 IS7	380 - 480	3	2.2
SV0037IS7	380 - 480	3	3.7
SV0055IS7	380 - 480	3	5.5
SV0075IS7	380 - 480	3	7.5
SV0110IS7	380 - 480	3	11
SV0150IS7	380 - 480	3	15
SV0185IS7	380 - 480	3	18.5
SV0220IS7	380 - 480	3	22
SV0300IS7	380 - 480	3	30
SV0370IS7	380 - 480	3	37
SV0450IS7	380 - 480	3	45
SV0550IS7	380 - 480	3	55
SV0750IS7	380 - 480	3	75
SV0900IS7	380 - 480	3	90
SV1100IS7	380 - 480	3	110
SV1320IS7	380 - 480	3	132
SV1600IS7	380 - 480	3	160
SV1850IS7	380 - 480	3	185
SV2200IS7	380 - 480	3	220
SV2800IS7	380 - 480	3	280
SV3150IS7	380 - 480	3	315
SV3750IS7	380 - 480	3	375

Application/Limitation

Supply voltage range:	200 - 480 V, 50/60 Hz
Voltage variation:	-15, + 10 %
Frequency variation:	± 5 %
Output frequency:	0 - 400 Hz.
Temperature range in operation:	10 - 40 °C VT (Normal duty) /10 - 50 °C CT (Heavy Duty)
Temperature class:	B
Vibration class:	A
Humidity class:	B
EMC class*:	A (with filter and I<400A)
IP Class:	Up to IP54

The SV converter must be regarded as a component. The actual installation to be designed according to LSIS Users Manual and according to the applicable DNV GL Rules for the actual application.

A DNV GL product certificate is needed for converters above 100 kW. The following documents shall be submitted for approval:

- Reference to this Type Approval Certificate
- Functional description for the intended use, configuration and interface (e.g. alarms, monitoring and auxiliary power supplies)
- Test program for routine tests and functional tests
- If additional components apart from the type approved frequency converter are part of the delivery, documentation in accordance with DNV GL rules Pt.4 Ch.8 Sec.1 Table 2 shall be delivered for the additional components.

*Converters EMC classed C3 according to IEC 61800-3 can be installed in "special distribution zone" and "general power distribution zone" in accordance with IEC 60533 provided precautions are taken to attenuate these effects on the distribution system, so the safe operation is assured.

Converters EMC classed C4 according to IEC 61800-3 can be installed in "special distribution zone". For installation in "general power distribution zone", in accordance with IEC 60533 provides measures are taken to attenuate these effects on the distribution system, so the safe operation is assured. Planned EMC measures shall be submitted for approval prior to installation onboard.

The EMC measures should be derived from an EMC analysis and plan in accordance with IEC 60533 Annex B and /or IEC 61800-3 Annex E.

For IT installations, Earth Monitoring System compatibility, must be investigated prior to installation onboard.

To be installed in an enclosure with an IP degree in accordance with DNV GL Rules w.r.t. location.

Type Approval documentation

Technical info:

Type Approval Document for Frequency Converter Doc. No. DS632-DNV202 Part B. "Specification", Ref .no. DS632-DNV203.

Test reports:

UL EMC test report nos. 13-10054989-1-BV, 13-10054989-2-BV & 13-10054989-3-BV dated 2013-11-8.
Applus test report nos. 12/31701778 dated 2012-09-19 and 12/31701779 dated 2012-07-23
UL Reports Files E124949 & E 205705 dated 2011-08-01, (11th revision)
Type Approval Document for Frequency Converter Doc. No. DS632-DNV202 , Part D Environmental and type tests: Environmental type test report no. DS632-DNV205.2 issued 2012-04-27. Part F "CE Test Report for EMC Immunity and Emission Test., File numbers 07-32005737, 07-320066319 & 07-320066321 issued 2007-06-15, 09/34600041 issued 2009-01-29, 11/31702069 & 11/31702333 issued 2011-10-28

Job Id: **262.1-013087-3**
Certificate No: **TAE00001S1**

Test Program_Rev.3 for SV-IS7 dated 2017- 01-26

APPlus Laboratories Test reports for EMC Immunity test, File number: 16/31703587, 16/31703589, 16/31703592, 16/31703595 and 16/31703599 issued 2016-05-26, Declaration of 0370-EMC-0092 issued 2017-02-20

Retention survey report dated 2016-11-30

Tests carried out

DNVGL Class Program- 0395 Dec.2015, Visual inspection, Performance / temperature rise, Power supply failure, Power supply variations, Voltage/frequency variation, Vibration, Dry heat, Damp heat, Insulation resistance, High voltage.

EMC: The following tests are in accordance with the IEC 61800-3 Amd.1(2012) and CN 2.4: Electrical fast transient (Burst), electrical slow transient (Surge), conducted disturbances, electric discharge (ESD), radiated and conducted emission.

Marking of product

SV – Type designation – Power – Voltage

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 traceability between manufacturer's product type marking and Type Approval Certificate.

Survey to be performed at least every second year.

END OF CERTIFICATE