

EC Type – Examination

Registered no.
TÜV CY 24 MD 020616

Customer's name and address

LS ELECTRIC Co., Ltd.
LS-ro 127(Hogye-dong) Dongan-gu, Anyang-si, Gyeonggi-Do, 14119
Korea

Tested in accordance with

Annex I Machinery Directive 2006/42/EC
EN 61800-5-2:2007 Adjustable speed electrical power drive systems - Part 5-2:
Safety requirements – Functional
EN ISO 13849-1:2023 Safety of machinery — Safety-related parts of control
systems —Part 1: General principles for design
EN/IEC 61508-1:2010 Functional safety of electrical/ electronic/programmable
electronic safety-related systems. Part 1: General requirements
EN/IEC 61508-2:2010 Functional safety of electrical/ electronic/programmable
electronic safety-related systems. Part 2: Requirements for
electrical/electronic/programmable electronic safety-related
systems
EN/IEC 61800-5-2:2017 Adjustable speed electrical power drive systems –
Part 5-2: Safety requirements – Functional

Description of product

The safety function Safe Torque Off (STO) within the LSLV-G100 series

**Type Description according to
Annex IV of Machinery**

Logic Unit to ensure Safety Functions

Order number

020616

Validity

From 30/09/2024 to 30/09/2029

Date of issue

30/09/2024

Remark

See 7 safety function assessed and for achieved SIL and PL.
The EC for Type – Examination certificate is used according to Article 12(3) b or 12(4) a of
Council Directive 2006/42/EC relating to machinery. It confirms that the listed Annex-IV
equipment complies with the principal protection requirements of the directive.

TÜV CYPRUS Ltd (TUV NORD Group)
The Head of NB,

D. Demosthenous

The Inspector



Accredited by CYS-CYSAB
Certificate No. IB 002-2

TÜV CYPRUS
TÜV NORD GROUP

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This document is not valid when presented without the full attached schedule composed of 7 sections and 3 pages. This certifies the result of the examination of the product sample submitted by the manufacturer. A general statement concerning the quality of the products from the series manufacture cannot be derived there from.

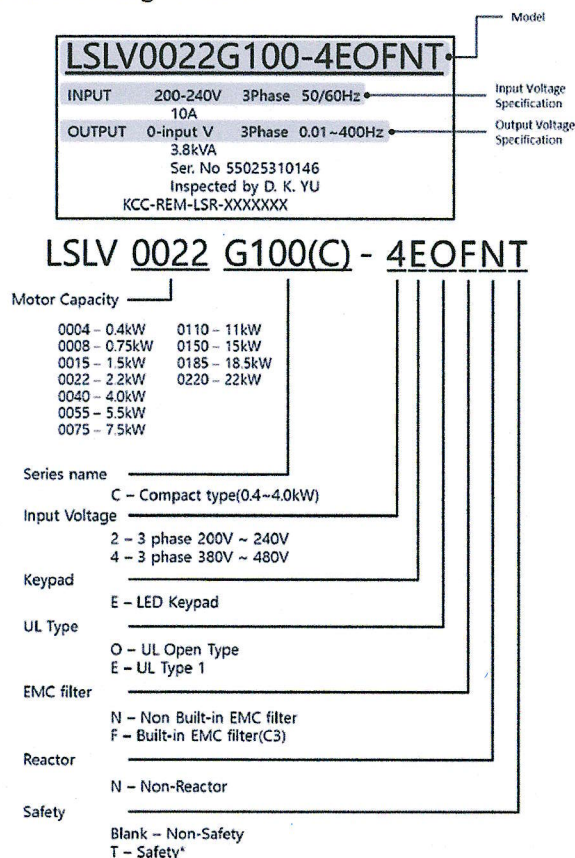
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1. Product Technical Specifications

The safety function Safe Torque Off (STO) within the LSLV-G100 series is manufactured in a range of product groups based on drive capacity and power source specifications. Product name and specifications are detailed on the rating plate. The present certificate is related to the following modules:



* For information on safety products, please refer to the Safety Manual.

Technical Specification:

DETAIL	MIN	TYP	MAX
Safety input Power supply of control PCB [V _{dc}]	-	24	-
Ambient Humidity	-	-	Less than 95% relative humidity (no condensation)
Operation Temperature range [°C] (max Rh 90%)	-10	-	-10 to +40°C (Normal Duty) -10 to +50°C (Heavy Duty)
Storage Temperature range [°C] (max Rh 90%)	-20	-	+65
Vibration (Oscillation)			Less than 9.8m/sec ² (1G)
Air pressure [kPa]	70	-	106
Max Installation height a.s.l. [m]	1000m (From 1000 to 4000m, the rated input voltage and rated output current of the drive must be derated by 1% for every 100m)		
Environmental factors	Pollution Degree 2. An environment free from corrosive or flammable gases, oil residue or dust as stated on the U&M instructions		

HW release

List of HW design circuits is included inside the assessment report No. 24 MD 020616.

Safety functions:

SF1

Safe Torque Off as per Clause 4.2.2.2 of EN 61800-5-2:2007.

2. Technical file reference

Technical file reference “10-09-2024 LSE_BDM of Inverters_LSLV-G100 series”. The complete file listed in the assessment report No. 24 MD 020616

3. Test report no.

Test documents according to applied standards are reported in the test report No. 24 MD 020616 dated 2024-09-30.

4. Application and Limitation

STO safety function only was evaluated. The above-mentioned equipment was tested according to the standards on the first sheet of this certificate.

5. Notes for the erection and operation:

Please refer to documents “G100(C)_User Manual_EN_V2.2” and “G100_LSE_DSTO01_Safety Manual_V0.1.0” for the safe and proper operation, maintenance, and service of the unit.

6. Risks analysis

Performed and recorded inside the Technical File, document:
“G100_LSE_DSTO01_RARR_V0.0.2”

7. Performance level evaluation and common cause failure analysis

The results of the evaluation are reported below for each Safety Function:

<i>Safety Function</i>	<i>HFT</i>	<i>SFF</i>	<i>Beta factor for CCF</i>	<i>SIL</i>	<i>PFH (h⁻¹)</i>
<i>SF1 (SIL)</i>	<i>1(STO)+ 0 (SMPS)</i>	<i>75%</i>	<i>2%</i>	<i>2</i>	<i>1,7226E-08</i>

<i>Safety Function</i>	<i>DCavg</i>	<i>Cat.</i>	<i>CCF</i>	<i>PL</i>	<i>MTTFd(years)</i>
<i>SF1 (PL)</i>	<i>74,29%(Low)</i>	<i>3</i>	<i>71</i>	<i>d</i>	<i>100</i>

- End of certificate-