TYPE-EXAMINATION CERTIFICATE FOR LIFTCOMPONENTS

Issued by Liftinstituut B.V.

Certificate nr.	2	NL15-400-1002-184-02	Revision nr.: -
Description of the product	:	Application of L1000A and L1 contactors	1000H inverters without motor
Trademark, type	1	Yaskawa, COSMOS Series	Inverter CIMR-L**F******
Name and address of the manufacturer		Yaskawa Electric UK Ltd. 1 Hunt Hill, Cumbernauld, G68 9LF United Kingdom	Yaskawa Electric Corporation Inverter Plant 2-13-1 Nishimiyaichi 824-8511 JAPAN
Name and address of the certificate holder		Yaskawa Europe GmbH Hauptstr. 185 D-65760 Eschborn Deutschland	
Certificate issued on the following requirements		Lifts Directive 95/16/EC	<i>n</i>
Certificate based on the following standards	:	EN 81-1:1998 + A3:2010, cla EN 81-2:1998 + A3:2010, cla	use 12.7 use 12.4.1
Test laboratory	Ę	None	
Date and number of the laboratory report	:	None	
Date of type-examination	1	December 2014 up to March	2015
Additional document with this certificate	1	Report belonging to the type- nr.: NL15-400-1002-184-02	examination certificate
Additional remarks	:	See report. Examination and testing acco	ording Annex F.6 is not included.
Conclusion		The lift component meets the certificate taking into account mentioned above.	requirements referred to in this any additional remarks
	2	ft an	·J
Amsterdam Date of issue : 24-03-2015 Valid until : 31-08-2017		ing. A.J. van Ommen Manager Business Unit Certification	Certification decision by

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F23-02-22-v12.0



Report type-examination

Report belonging to type- examination certificate no.	000	NL15-400-1002-184-02
Date of issue of original certificate		24-03-2015
Concerns	•	Lift component
No. and date of revision		12
Requirements	201002	Lifts Directive 95/16/EC Standard(s): EN 81-1:1998 + A3:2010, clause 12.7; EN 81-2:1998 + A3:2010, clause 12.4.1
Project no.		P140444-01

1. General specifications

Name and address manufacturer	Yaskawa Electric UK Ltd. 1 Hunt Hill, Cumbernauld, G68 9LF United Kingdom and Yaskawa Electric Corporation Inverter Plant 2-13-1 Nishimiyaichi 824-8511 JAPAN
Description of lift	: Application of L1000A / L1000H inverters without motor contactors
Туре	: Yaskawa, COSMOS Series Inverter CIMR-L**F*****
Laboratory	: -
Address of examined lift	:-
Data of examination	: December 2014 up to March 2015
Examination performed by	: P.J. Schaareman

2. Description lift component

To provide state of the art stopping accuracy for lifts, inverters are more and more used. Today drive manufacturers provide inverters with safe torque off (STO) functionality. This means basically that the safety circuit of the lift is directly controlling the information to the drive if torque to the motor is allowed. Motor power contactors are not necessary any more.

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To be able to do this the drive manufacturer have to follow a process to prove that the safety and the reliability of this function is in accordance with the current state of the art. For the application in a lift this is normally expressed as a SIL level. A separate approval (e.g. EC type examination certificate) issued by a certification body will show that a drive system fulfills the relevant safety requirement for application in lifts.

Yaskawa adopted this approach in their drive system L1000A and L1000H. A general type approval is issued by TÜV SÜD confirming the safe torque off functionality at the highest level for the relevant standards.

This examination deals with this STO functionality and application of the CIMR-L**F series in lifts without the use of motor contactors. The safety integrity level achieved is SIL3 according to IEC 61508. The two channel hardware design is able to switch off the PWM signals for the IGBT stage. By switching off the PWM signals it is prevented that torque can be generated for the motor.

There are several types of inverters available for different system requirements. All types use the same safety related circuits and the same safety concept.

Technical details	:	Yaskawa L1000A /L1000H inverters with STO
Technical report type-approval Date		TÜV SÜD, no. YY86099T 2014-10-29
Type designation	:	CIMR-L**F***
Approval based on standards	***	IEC 61508 :2010 EN 61800-5-1:2007 EN 61800-5-2:2007 EN 62061, ED 1.1:2012 EN 13849-1:2008 and IEC 61326-3-1:2008
Possible application	•	The safety function "Safe Torque off" (STO) complies with the relevant standards and can be used for applications up to cat. 3 / PLe acc. to EN13849 and SIL3 acc. to EN62061 / IEC61508.

3. Examinations and tests

The examination covered a check whether compliance with the Lift Directive 95/16/EC is met, based on the harmonized product standards EN 81-1/2:1998 + A3:2010. Issues not covered by or not complying these Standards are directly related to the above mentioned essential requirements based on the risk assessment, where applicable with the aid of harmonized A-and B-standards.

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The classification based on the IEC 61508:2010 is determined to SIL 3. For the confirmation of this TÜV SÜD performed a type approval for the safety related control function Safe Torque Off (STO).

For the review it was necessary to check the implementation of the L1000A and L1000H inverter, the TÜV SÜD type approval and test reports, the installation manual, the electrical diagrams, FMEA on the STO HW and the board layout drawings (See annex 2).

Our study included the feasibility of this component for application in lifts.

No additional testing is performed and also EMC was no part of this examination.

4. Results

The drive system is developed and approved initially without considering the stronger requirements which are required for lifts for failure exclusions on the safety related parts on the PCB's. For lifts pollution degree III needs to be considered while pollution degree II normally is followed for machines. Additional diagnostic functionality in the design and FMEA show that failures related to creepage and clearance distances are considered and lead to a safe state.

The application of the Yaskawa L1000A / L1000H inverters with STO functionality are considered to be in accordance with the requirements and conditions set out by EN 81-1 + A3 clause 12.7 respectively EN 81-2 + A3 clause 12.4.1.

The Yaskawa L1000A and L1000H inverters with STO functionality can be applied in lift control systems according EN 81-1 + A3 respectively EN 81-2 + A3 clause 12.4.1.

EMC was not part of this type examination.

5. Conditions

On the type-examination certificate the following conditions apply:

- Installation, setting and commissioning of the Yaskawa L1000A and L1000H inverter shall be done accordingly the installation manual.
- The safety chain of the lift shall not be connected directly to the safe disable inputs H1 and H2 of the Yaskawa L1000A and L1000H inverter. The safe disable inputs must be switched off by means of two independent switching devices. The proper operation of these devices need to be monitored.
- The energy supply to the brake respectively valves still need to be switched off according the relevant clauses of the EN 81-1/2+A3.

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6. Conclusions

Goal of the review and examination was to check and analyze if the approach to apply inverters with safe torque off functionality in the control of a lift is feasible.

The Yaskawa L1000A and L1000H inverter with STO functionality inverters proved to be in accordance with the requirements and conditions set.

The review and examination confirm that the application of the Yaskawa L1000A and L1000H with STO in the lift control system fulfills the current state of the art. The inverters can be applied in lift control systems.

Based upon the results of the type-examination Liftinstituut B.V. issues a typeexamination certificate.

The type-examination certificate is only valid for products which are in conformity with the same specifications as the type certified product. The type-examination certificate is issued based on the requirements that are valid at the date of issue. In case of changes of the product specifications, changes in the requirements or changes in the state of the art the certificate holder shall request Liftinstituut B.V. to reconsider the validity of the type-examination certificate.

Prepared by: Decision by: P.J. Schaareman **Product Specialist Certification** Liftinstituut B.V.

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Annexes

Annex 1a : Yaskawa L1000A inverter



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Annex 1b : Example of switching safe disable inputs



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Annex 2 : Documents Technical File subjected to the examination

Title	Document number	Date		
		Date		
Technical Report TÜV SÜD	Report_Yaskawa_U1000L1000_86099T.pdf	2014-10-29		
Test report TÜV SÜD	73545905.pdf	2007-12		
Elementary diagram	7161.pdf6-LC2F0060 x x CR.pdf	2014-01-22		
EMC Immunity test-report	TRM-13-563.1.pdf	2014-02-14		
Safety Component FMEA for	VGI-Q1301-04.pdf	2013-10-16		
L1000F (STO function)				
Impact Analysis for L1000A	VGI-Q1310-01.pdf	2013-11-28		
SIL3 series Inverter				
Impact Analysis for L1000A	VGI-Q1310-01.pdf	2013-11-28		
SIL3 series Inverter				
Impact Analysis for L1000A	VGI-Q1310-01.pdf	2013-11-28		
SIL3 series Inverter				
Electrical diagram(s) Power Board related to Safe Disable functionality				
Power Board	ETP714xxxR.pdf	2013		
Gate Driver Board	ETC723xxxR.pdf	2013		
Sub Gate Drive Board	ETC711xxxR.pdf	2008/2012		
Capacitor Board	ETX71xxxxR.pdf	2007/2012		
Power Supply Board	ETX71xxxxR.pdf	2012		
Control Board	ETC740560-SXXXXR.pdf	2012-09-11		
Terminal Board	ETC7403x1R.pdf	2010-08		
Hybrid IC	300-073-612.pdf	2014-01-23		
Technical manuals				
Technical manual	SIEPC7106163xx.pdf	2015-01		
Quick start L1000A	TOEPC7106163xx.pdf	2015-01		
Quick start L1000H	TOEP_C710616_92B_2_0	2015-03-17		

Annex 3 : Revision overview

Rev.:	Date	Summary of revision
-	24-03-2015	Original

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