LIFTINSTITUUT

TYPE EXAMINATION CERTIFICATE

FOR LIFTCOMPONENTS

Issued by Liftinstituut B.V.

Certificate no.	:	NL 16-400-1002-210-01 Revision no.: -
Description of the product	:	Drive
Trademark, type	:	VFD -ED
Name and address of the manufacturer	:	Delta Electronics, De Witbogt 20, 5652 AG Eindhoven The Netherlands
Name and address of the certificate holder	:	Delta Electronics, De Witbogt 20, 5652 AG Eindhoven The Netherlands
Certificate issued on the following requirements	:	Lifts Directive 2014/33/EU
Certificate based on the following standards	:	EN 81-1+A3, EN 81-20
Test laboratory	:	None
Date and number of the laboratory report	:	None
Date of type examination	:	9-2-2016
Additional document with this certificate	:	Annex / Report belonging to the type examination certificate no.: NL 16-400-1002-210-01
Additional remarks	:	None
Conclusion	:	The lift component meets the requirements referred to in this certificate taking into account any additional remarks mentioned above.

Date of issue : 21-04-2016

Valid until : 21-04-2021

ing. J.L. van Vliet
Managing Director

Certification decision by

Report type-examination

Report belonging to type-examination certificate no.	:	NL16-400-1002-210-01
Date of issue of original certificate	:	21-04-2016
Concerns	:	Lift Component
No. and date of revision	:	21-04-2016, original
Requirements	:	Lifts Directive 2014/33/EU Standards: EN-81-1:1998+A3:2009 clause 12.7.2.2 b) EN-81-20:2014 clause 5.9.2.5.4 b)
Project no.	:	P150332-01

1. General specifications

Name and address manufacturer	:	Delta Electronics, De Witbogt 20, 5652 AG Eindhoven The Netherlands
Description of component	:	Lift drive with Safe Torque Off (STO) and brake monitoring.
Type	:	Elevator Drive ED Series
Laboratory	:	-
Date / Data of examination	:	19-2-2016
Examination performed by	:	P.J. Schaareman, T. Molema

2. Description component

The Delta VFD-ED drive is a drive which is suitable for lift applications. The drive has a Safe Torque Off (STO) function built in. Due to this, the system is suitable for a 1 contactor solution as described in EN 81-1 and EN 81-20.
The STO input has dual inputs which are monitored for differences. When the inputs have a different value, the system goes into an error state.
The drive can also handle brake monitoring: when a fault occurs the drive will go into an error state which is not resettable by switching the power off and on. The drive Is only suitable for A.C. motors.

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Technical details	:	VFD - XXX ED23/21S, VFD-XXX ED43S
Possible application	:	The function "Safe Torque Off" (STO) allows the drive to be applied in combination with one motor contactor according the relevant standards.
HW STO board	:	As described in Certificate 01.205/5429.00/15, TUV Rheinland.
Operating temperature range	:	-10°C (14°F) to 40°C (104°F)
Altitude	:	1.000m or lower (3300 ft)
Humidity	:	Below 90% RH (non- condensing)

3. Examinations and tests

The review and examination is meant to provide a confirmation if the design of the VFD-ED drives is implemented correctly.
For the review it was necessary to check the application of the VFD-ED drives, the installation manual, the electrical diagrams, the FMEA and the board layout drawings. The examination covered a check of the technical file whether compliance with the rules set out is met based on the product standards EN 81-1:1998 + A3:2009 and EN 81-20:2014. Additional tests were performed in a test setup to confirm the proper operation of the design.

Requirements EN 81-1+A3 clause 12.7.3 resp. EN 81-20 clause 5.9.2.5.4 to be met:

A.C. or D.C. motor supplied and controlled by static elements

b) a system consisting of:

1) a contactor interrupting the current at all poles.
   The coil of the contactor shall be released at least before each change in direction. If the contactor does not release, any further movement of the lift shall be prevented. Stuck-at failure of this monitoring function shall have the same result; and
2) a control device blocking the flow of energy in the static elements; and
3) a monitoring device to verify the blocking of the flow of energy each time the lift is stationary.
   If, during a normal stopping period, the blocking of the energy flow by the static elements is not effective, the monitoring device shall cause the contactor to release and any further movement of the lift shall be prevented.

The drive SW version at the moment testing was SW 1.04

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Performed tests STO

For the STO, the following functional tests were performed multiple times:

1. A drive command with the STO not enabled
   - Result: The drive does not move and gives an error
2. After a drive command, the STO is not shut off
   - Result: The drive does not move and gives an error
3. While driving, a difference in the STO inputs (both 2 options)
   - Result: The drive does not move and gives an error
4. While driving, both STO inputs are cleared at the same time
   - Result: The drive does not move and gives an error

Performed tests Brake monitoring

1. After a drive, one of the two brakes won't turn off (both options tested)
   - Result: Error, MBF
2. At the start of a drive, one of the two brakes won't turn on (both options tested)
   - Result: Error, brake Failure

All brake failures where not resettable by switching off and on the power of the installation.

4. Results

After the final examination the product and the technical file were found in accordance with the requirements. The functional tests passed without remarks.

The application of the VFD-ED drives with STO functionality is considered to be in accordance with the requirements and conditions set out by EN 81-1 + A3 clause 12.7.3 b) and EN 81-20 clause 5.9.2.5.4 b).

The approach allows the VFD-ED drives with STO functionality to be applied in lift control systems according EN 81-1 + A3 clause 12.7.3 b) and EN 81-20 clause 5.9.2.5.4 b).

The brake monitoring works as described in 81-1 + A3 clause 9.11.3 / 81-20 clause 5.6.7.3

5. Conditions

To the type-examination certificate the following conditions apply:

- The drive must be installed according the manual.
- The energy supply to the brakes still needs to be switched off according to the standard.
- Before taking the lift in service the proper operation and fault detection shall be tested and confirmed.

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6. Conclusions

Goal of the examination was to check and analyse the application of the VFD-ED drives with Safe Torque Off (STO) functionality in the control of a lift.
The VFD-ED drives with STO functionality proved to be in accordance with the requirements and conditions set.
The examination confirms that the application of the VFD-ED drives with STO in the lift control system fulfil the current state of the art.
The brake monitoring described in this report shall be used with suitable detection systems and a suitable brake to build a protection against unintended car movement (UCM) for lifts.

Based upon the results of the type-examination Liftinstituut B.V. issues a type-examination 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 on the date of issue. In case of changes in 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:

P.J. Schaareman
Product Specialist Certification
Liftinstituut B.V.

Certification decision by:

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Annexes

Annex 1 : Basic lay-out

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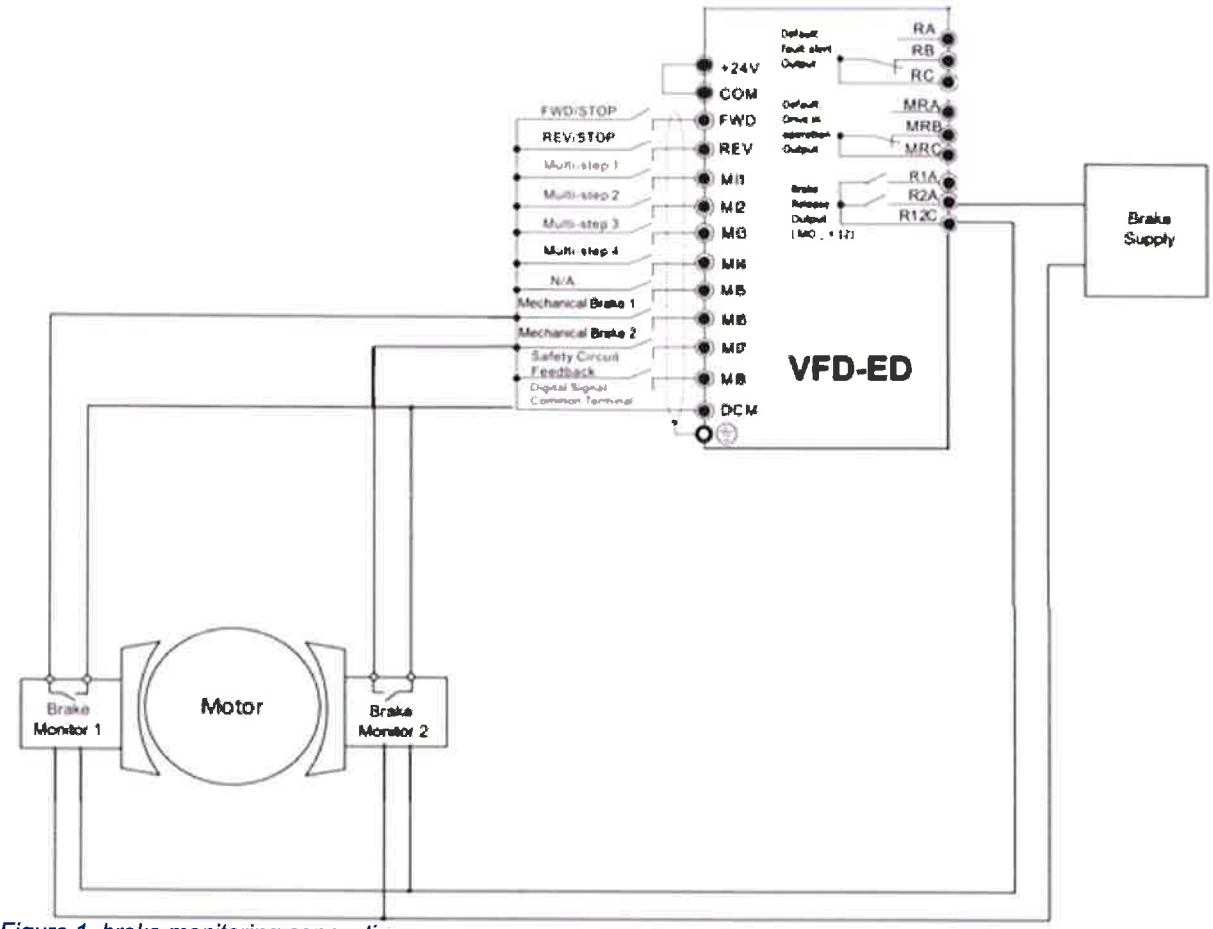

Figure 1, brake monitoring connections

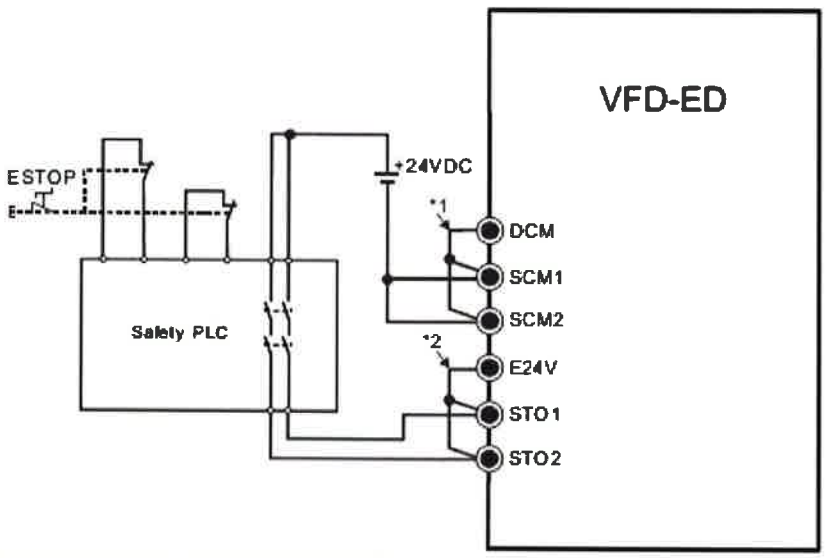

Figure 2, Possible connections for STO

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Annex 2 : Documents of the Technical File which were subject of the examination

title	document number	date
STO explanation	STO for VFD-ED.pdf	2-3-2015
VFD-ED Addendum for A3	ED-S EN81+A3_20160203	2-3-2015
Delta Elevator Drive ED series	DELTA_IA-MDS_VFD-ED_C_EN_20150630	2-3-2015
Delta STO Safety Manual_TUV.pdf	STO Safety Manual Rev 1.0	2-3-2015
Delta STO FMEA	Delta_IABU_FMEA_STO_IEC61508-PFH_SIL2 20130704	2-3-2015
Delta Elevator Drive VFD-ED Series User Manual	DELTA_IA-MDS_VFD-ED_C_EN_20150630	2-3-2015

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Annex 3 : Revision overview

REVISIONS OF THE CERTIFICATE

Rev.:	Date	Summary of revision
-	21-04-2016	Original

REVISIONS OF THE REPORT, BELONGING TO THE CERTIFICATE

Rev.:	Date	Summary of revision
-	21-04-2016	Original

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