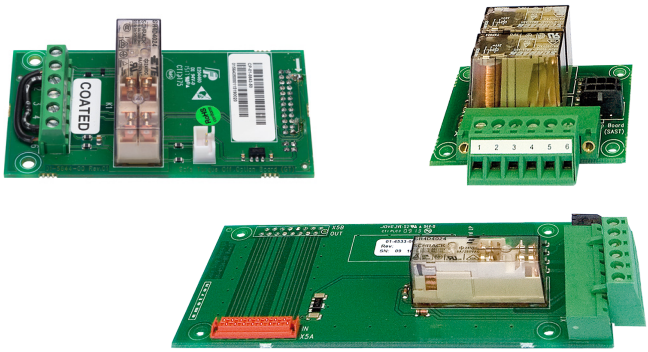
Emotron Safe Stop board Option

(STO – Safe Torque Off)

for Emotron FDU/VFX 2.0 and CDU/CDX 2.0 AC drives

Emotron VFXR, Emotron FDUL and Emotron FlowDrive



Instruction manual
English

emotron
DEDICATED DRIVE
A CG Product

Emotron Option Safe Stop (STO – Safe Torque Off)

For Emotron FDU/VFX 2.0 and CDU/CDX 2.0 AC drives
Emotron VFXR, Emotron FDUL and Emotron FlowDrive

Instruction manual
English

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1. General

Increasing automation is making it more and more important to protect persons from dangerous movements. Functional safety defines the measures necessary, by electrical or electronic means, to minimise or eliminate dangers due to malfunctions.
In normal operation, safety devices prevent access of persons to hazard zones. For certain procedures such as setting up operations, persons must enter hazard zones. In these situations, machine operators must be protected by means of specific safety provisions within the drive and control system.
Integrated safety systems offer the prerequisites for optimal realisation of protective functions on the control and drive side.
This reduces planning and installation complexity. The use of integrated safety systems increases the machine functionality and availability compared to conventional safety systems.

1.1 Integrated safety systems

Emotron FDU / VFX 2.0, CDU/CDX 2.0, VFXR, FDUL and FlowDrive are available with a **safe stop option (STO – Safe Torque Off)**.
Integrated safety systems' are application-related safety functions that can be used for the protection of persons at machines.
Motion functions are still controlled by variable speed drives. This option ensures that limiting values are reliably maintained and provides safe inputs and outputs. With a safe stop option, the safety modules initiate control functions directly in the variable speed drive as defined in EN 60204-1.

1.2 The replacement of EN 954-1

Up to now, machine builders have had to provide verification of compliance with the general safety requirements according to EN 954-1 (Safety-related parts of control systems – Part 1: General principles for design) in accordance with European Machinery Directives. This standard requires risk analysis with the resulting safety categories (B,1,2,3,4), where B stands for low to virtually no safety and 4 for high safety. Machine manufacturers select safety devices for their particular machines based on the resulting safety categories.
EN 954-1 was replaced because it did not adequately consider programmable

electronic systems and took no account of the dynamic behaviour (e.g. test intervals, longevity) and failure probability of the specific components. The successor standards EN 13849-1 (Safety of machinery – Safety-related parts of control systems - Part 1: General principles for design) and EN 62061 (Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems) provide a remedy.

EN ISO 13849-1 includes the qualitative approach of EN 954-1 and also provides quantitative safety function considerations. For the classification of the various safety performance levels, EN ISO 13849-1 defines Performance Levels (PL) based on the corresponding specific categories. The five performance levels (a, b, c, d, e) indicate the different average probability values of a dangerous failure per hour.

1.2.1 Performance Level (PL) according to EN ISO 13849-1

Average probability of a dangerous failure per hour (1/h)

Performance Level (PL)	Average probability of a dangerous failure per hour (1/h)
a	$\geq 10^{-5}$ to $< 10^{-4}$
b	$\geq 3 \times 10^{-6}$ to $< 10^{-5}$
c	$\geq 10^{-6}$ to $< 3 \times 10^{-6}$
d	$\geq 10^{-7}$ to $< 10^{-6}$
e	$\geq 10^{-8}$ to $< 10^{-7}$

Determination of required performance levels (PLr)

To determine the required performance level for each safety function of a safety-related control system, a risk assessment must be carried out and documented. The informative Appendix A of the standard specifies a qualitative procedure for risk assessment and determination of the required performance level. The same risk parameters are used for the purpose of risk assessment as those defined in EN 954-1.

Risk parameters:

S Severity of injury

S1 Slight (normally reversible injury)

S2 Serious (normally irreversible injury or death)

F Frequency and/or exposure to hazard

F1 Seldom-to-less-often and/or exposure time is short

F2 Frequent-to-continuous and/or exposure time is long

P Possibility of avoiding hazard or limiting harm

P1 Possible under specific conditions

P2 Scarcely possible

Risk graph for determination of the required performance level for each safety function:

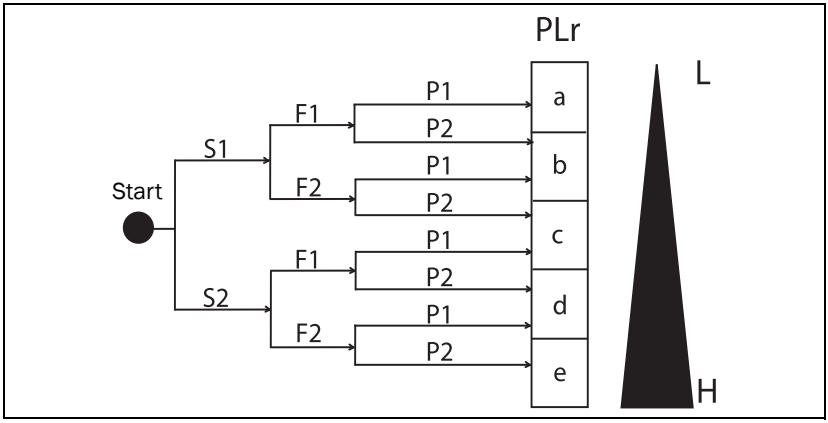


Fig. 1 Risk graph (source: EN ISO 13849-1)

Legend:

Start Starting point for evaluation of safety function's contribution to risk reduction

L Low contribution to risk reduction

H High contribution to risk reduction

PLr Required Performance Level

Determination of achieved performance level

For determination of the performance level of components/devices, the following safety parameters must be taken into consideration:

Safety parameters defined in EN ISO 13849-1	Meaning
Cat.	Category (B, 1, 2, 3, 4), structural design as a basis for achieving a specific performance level
PL	Performance level (a, b, c, d, e)
$MTTF_d$	Mean time to dangerous failure
B_{10d}	Number of cycles until 10 % of the components fail dangerously (for pneumatic and electromechanical components)
DC	Diagnostic coverage
CCF	Common cause failure
T_M	Mission time

Further parameters to be considered are operating factors such as the demand rate and/or test rate for the safety function which can also have an influence on the resulting performance level.

1.3 Risk analysis

This documentation can only indicate the necessity of a risk analysis. Users of integrated safety systems must familiarise themselves with the relevant standards and legislation.

Before a machine can be marketed, machine manufacturers must perform a risk analysis in accordance with the Machinery Directive so as to determine the risk associated with the use of the machine. To achieve the highest level of safety, the Machinery Directive defines three basic principles:

- elimination or minimization of risks due to the design;
- taking necessary protective measures against risks that cannot be eliminated;
- documentation of the residual risks and information of users about these risks.

1.3.1 Safe Stop Parameter

As determined by TÜV testing in accordance with ISO/EN 13849-1:2006

(see TÜV certificate, and based on the associated technical report no. 09 799 555179-001)

Requirements according to category 3 and Performance level d:

PFHDssD =1.70 .10-9 rev per hour
DC = average (86%)
HFT = 1 (Enable input and Safe Stop board)
MTTFd = 380.52 years (high)

Outcome: SIL3, SILCL3 and Performance Level d

Requirements according to category 4 and Performance level e:

PFHDssD =1.70 .10-9 rev per hour
DC = high (90% - indirect monitoring Safe Stop path, direct monitoring contactor contacts)
HFT = 1 (pilot contactor and Safe Stop board)
MTTFd = 380.52 years (high)

Outcome: SIL3, SILCL3 and Performance Level e

The following parameters were assumed and applied in the MTTFd calculation-:

B10d =2,000,000 (contactor under normal loading)
Days in operation per year Dop =365 d/a
Hours of operation per day Hop =24 h/d
Cycle time tcycle =600s

The MTTFd value must be recalculated in the event of different values for Dop, Hop and tcycle.

Abbreviations

Abbreviation	Meaning
PFHDssD	Average probability of a dangerous failure per hour
DC	Diagnostic coverage
HFT	Hardware Fault Tolerance
Dop	Days of operation per year
Hop	Hours of operation per year
tcycle	Cycle time
SIL	Safety Integrity Level

1.4 Stop categories and emergency stop

The following information is important if emergency stop circuits are used or needed in the installation where a variable speed drive is used. EN 60204-1 defines 3 stop categories:

Category 0: Uncontrolled STOP

Stopping by switching off the supply voltage. A mechanical stop must be activated. This STOP may not be implemented with the help of a variable speed drive or its input or output signals.

Category 1: Controlled STOP

Stopping until the motor has come to a standstill, after which the mains supply is switched off. This STOP may not be implemented with the help of a variable speed drive or its input or output signals.

Category 2: Controlled STOP

Stopping while the supply voltage is connected. This STOP can be implemented with each variable speed drive STOP command.



WARNING!

The standard specifies that all machines must be provided with a category 0 stop. If the application prevents this from being implemented, this must be explicitly stated. Furthermore, every machine must be provided with an emergency stop function. This function must ensure that any dangerous voltage on the machine is dis-connected as quickly as possible without the risk of further danger. In such an emergency stop situation, a category 0 or 1 stop may be used; the choice of category depends on the possible risks to the machine.

2. Safe stop option (STO – Safe Torque Off)

In conformity with the machinery standard and certified by an approved body, this safety function can allow:

- easy machine certification
- omission of electromechanical redundance
- reduction of wiring and installation complexity
- space-saving control cabinet use

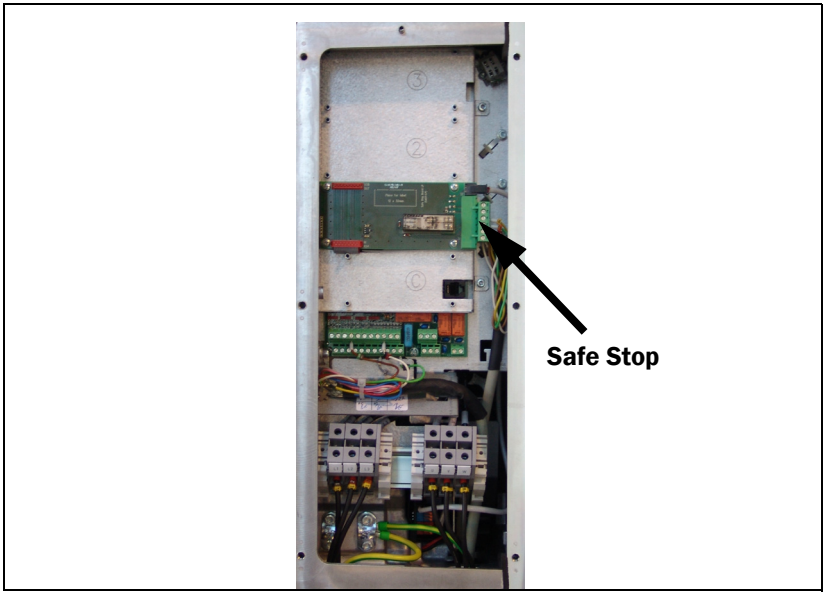


Fig. 2 Safe stop option for sizes B , C, C2, D and D2



Fig. 3 Safe stop option for type IP2Y sizes A3, B3 and C3

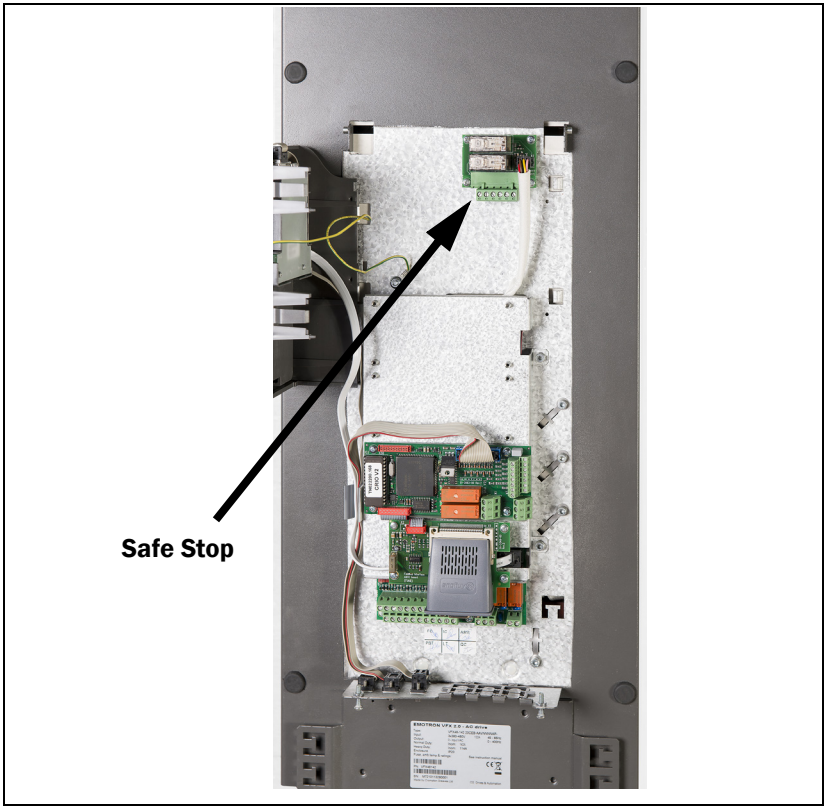


Fig. 4 Safe stop option for type IP20/21 size E2 and F2.

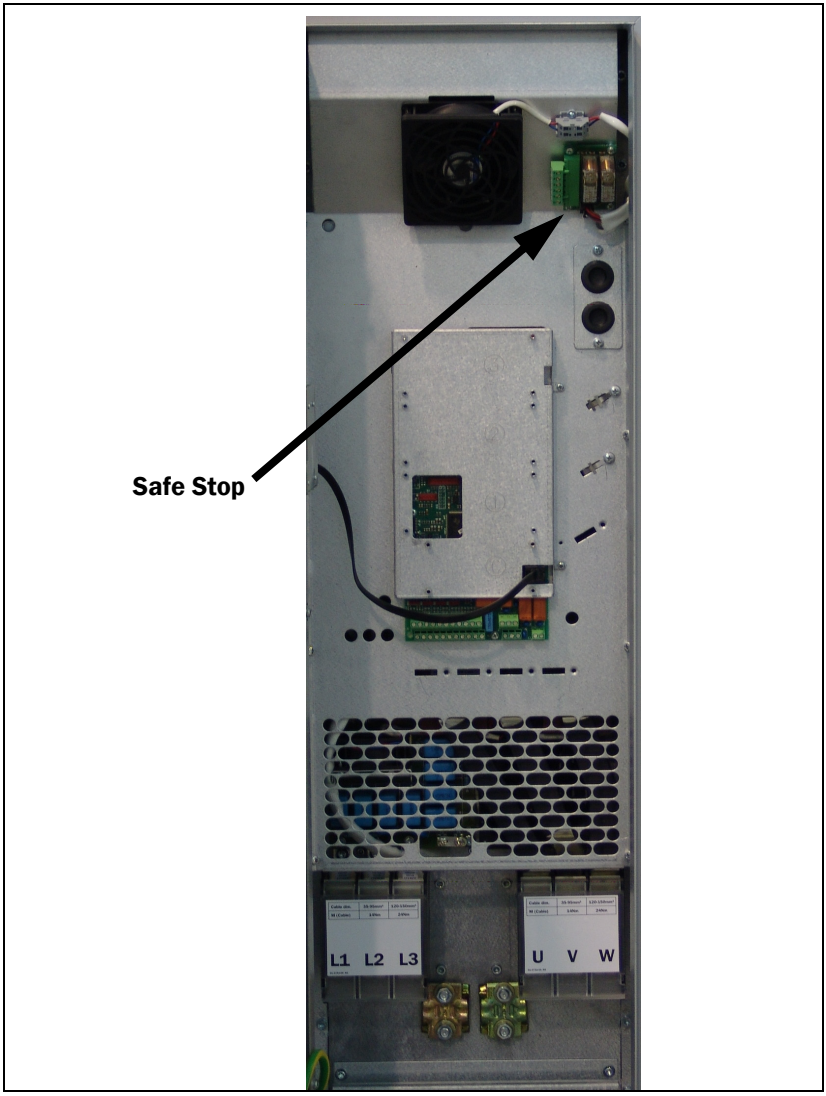


Fig. 5 Safe stop option for size E , F and up

3. Explanation

The safe stop option prevents unintended starting of a motor and ensures the safety of the operator and machine. This is achieved in that the power supply to the drive is reliably interrupted. The drive must not be able to generate any torque and perform any dangerous movements.

Zero-speed monitoring is unnecessary. Interruption of the power supply can, but does not have to take place with contacts.

Where external forces prevail, additional measures such as mechanical brakes must be provided for safe stops to reliably prevent possible movements.

4. Possibilities for safe stops STO

Suitable measures for a safe stop are, for example:

- contactor between power supply and drive system (mains contactor) or
- contactor between power section and drive motor (motor contactor) or
- blocking control pulses to the power semiconductor (pulse blocking).

Emotron FDU and VFX variable speed drives are available with safe stop option which is realised by pulse blocking.

This obviates the necessity of further contactors which increases the operational reliability and incurs no further costs. This allows variable speed drives to be directly included without additional components in standard safety concepts where, for example, operating areas are protected with safety switches on protective devices or the devices are directly included in the emergency stop circuits.

5. Disconnecting time

The disconnecting time on initiating a safe stop is typically < 50 ms.

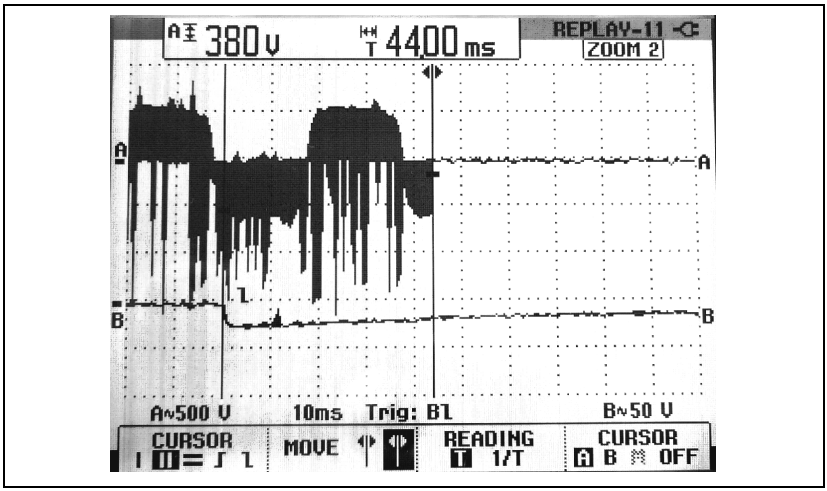


Fig. 6 Disconnecting time

§ Fig. 6 shows the measurement of the disconnecting time. Measurement was made with a FLUKE 196B Scopemeter.

Channel A: Motor output terminals U and W directly on the variable speed drive.
Channel B: EMERGENCY STOP relay terminals S11 and S12

The circuit arrangement used is as shown in the example on page 22 (circuit arrangement according to standards
EN 954-1, category 3 and IEC/EN 61508, capacity SIL2, stop category 1 according to standard IEC/EN 60204-1).

6. Technical description of safe stop option - STO

Emotron FDU and VFX variable speed drives with safe stop option are supplied with the safety function jumpered. This makes commissioning without safe stop easily possible. To use the safe stop function, the jumpers must be removed from the terminal strip on the option board (jumper between terminals 1 and 6 and jumper between
terminals 2 and 5).

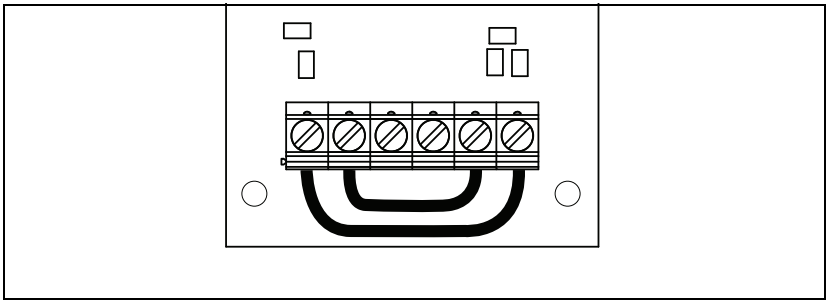


Fig. 7 Terminal strip with jumper between terminals 1 and 6 and jumper between terminals 2 and 5.

Pin	Name	Function	Specification
1	Inhibit +	Inhibit driver circuits of power conductors	DC 24V (20 - 30V)
2	Inhibit -		
3	Contact relay	Feedback: Confirmation of safe stop	48V DC / 30V AC/2A
4	P contact relay		
5	GND	Supply ground	
6	+ 24V DC	Supply Voltage for operating inhibit input only	

When the safety stop function is activated, this circuit arrangement ensures that the motor cannot start. This is achieved by the following actions:

- The 24 V DC signal at the safe stop input (Inhibit+ and Inhibit-) is interrupted.
  Safety relay K1 is de-energised.
  The supply voltage to the driver circuits of the power is interrupted.
  This will inhibit the trigger pulses to the power conductors.
- The trigger pulses from the control board are cancelled. The signal is monitored by the
  control board.

To make sure that the safety relay K1 is de-energised, it should be externally monitored. For this purpose, the safe stop option board generates a feedback signal when the supply voltage to the driver circuits is shut down.

Safe output terminals 3 and 4

Information can be output to a higher-level unit (e.g. safety PLC) or external operating elements (actuators) via the safe output on the option board. The feedback output is isolated and must be separately supplied with 24 V.

When the safe stop input is active, the variable speed drive display will show a blinking 'SST' symbol in section C (bottom left corner) of the display and the red warning/fault LED on the control panel will blink. To resume normal operation, the following steps have to be taken:

- enable safe stop input (terminals 1 and 2)
- Give a STOP signal to the AC drive, according to the set Run/Stop Control in menu [215]
- Give a new RUN command, according to the set Run/Stop Control in menu [215]



WARNING!
The safe stop function must never be used for electrical maintenance purposes. Before carrying out any electrical maintenance, the variable speed drive must always be disconnected from the power supply.

7. Recommended circuit arrangements

The standard specifies the use of a stop button with double contact (S1). The variable speed drive logic output signals cannot be regarded as safety-related signals.

Recommended circuit arrangements are shown on the following pages as examples:

§ Fig. 8, page 20

This circuit arrangement is suitable for free coasting machines with short stopping times.
When the emergency stop circuit is activated, the 'safe stop' safety function is activated.
The connected motor coasts freely.

§ Fig. 10, page 22

Circuit arrangement according to standards EN 954-1, category 3 and IEC/EN 61508, capacity SIL2,
stop category 1 according to standard IEC/EN 60204-1

This circuit arrangement is suitable for free coasting machines with long stopping times (with strong moment of inertia or weak counter-torque).
When the emergency stop circuit is activated, the variable speed drive causes the motor to coast controlled and the 'safe stop' safety function is activated with a delay corresponding to the coasting time.

§ Fig. 12, page 24

Circuit arrangement according to standards EN 954-1, category 3 and IEC/EN 61508, capacity SIL3,
stop category 1 according to standard IEC/EN 60204-1

This circuit arrangement is suitable for free coasting machines with long stopping times (with strong moment of inertia or weak counter-torque).
When the emergency stop circuit is activated, the variable speed drive causes the motor to coast controlled and the 'safe stop' safety function is activated with a delay corresponding to the coasting time.

§ Fig. 13, page 25

Circuit arrangement according to standards EN 954-1, category 4 and IEC/EN 61508, capacity SIL3, stop category 0 according to standard IEC/EN 60204-1(only for sizes B, C, and D).

This circuit arrangement is suitable for free coasting machines with short stopping times.
When the emergency stop circuit is activated, the 'safe stop' safety function is activated and the power supply is disconnected via the power contactor.
The connected motor coasts freely.

§ Fig. 14, page 26

Circuit arrangement according to standards EN 954-1, category 4 and IEC/EN 61508 capacity SIL3, stop category 2 according to standard IEC/EN 60204-1 (only for sizes B, C and D).

This circuit arrangement is suitable for free coasting machines with long stopping times (with strong moment of inertia or weak counter-torque).
When the emergency stop circuit is activated, the variable speed drive causes the motor to coast controlled, the 'safe stop' safety function is activated with a delay corresponding to the coasting time and the power supply is disconnected via the power contactor.

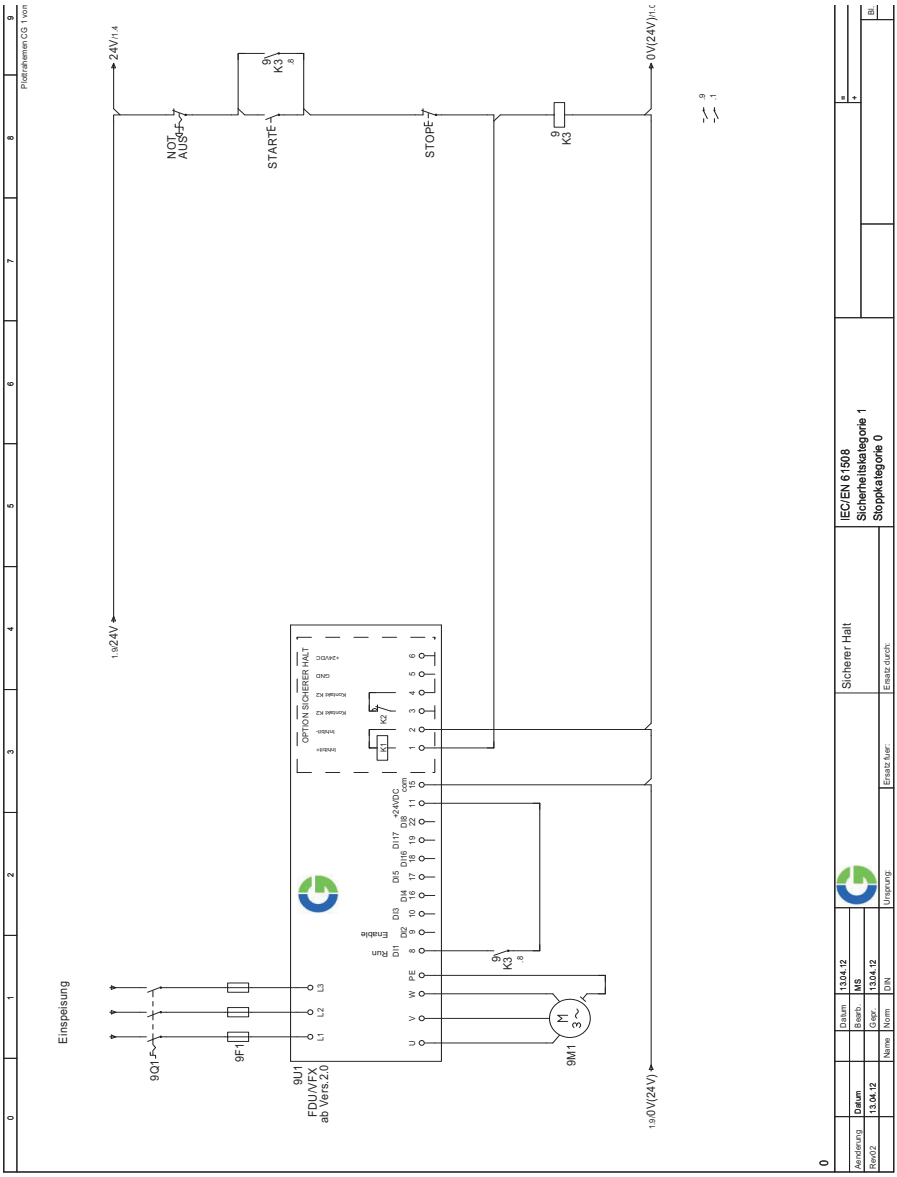


Fig. 8 IEC/EN 61508, safety category 1, stop category 0.

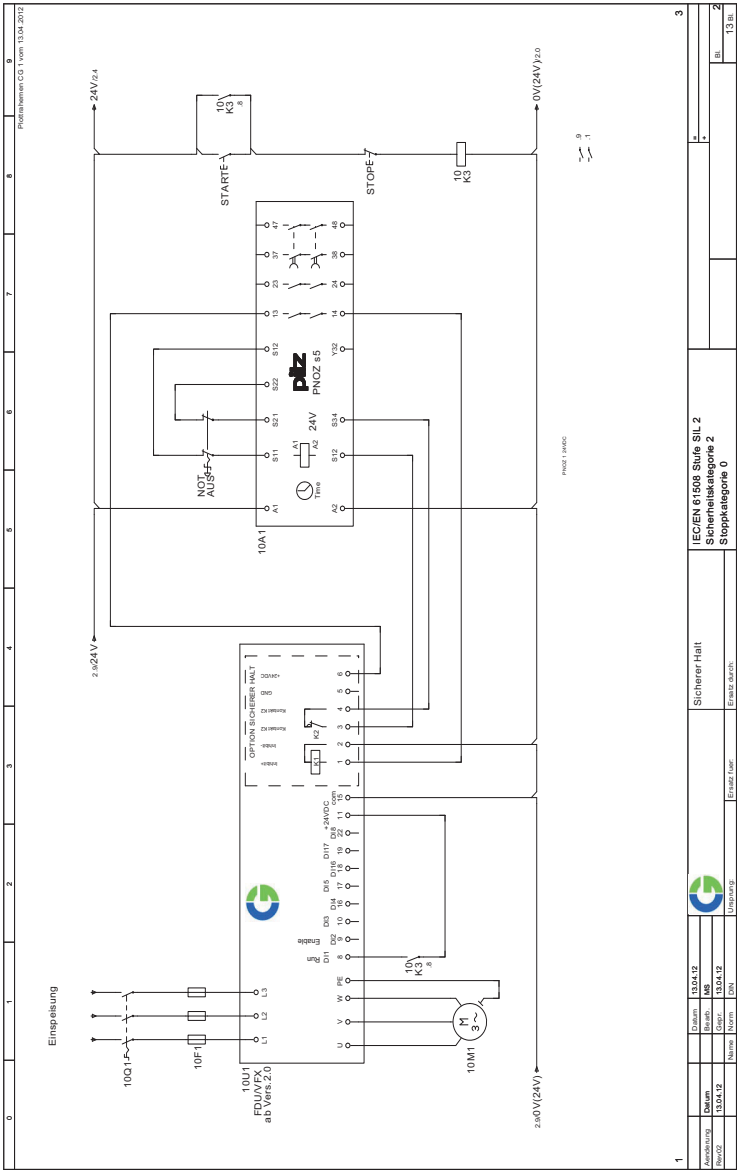


Fig. 9 IEC/EN 61508, level SIL 2, Safety category 2, stop category 0.

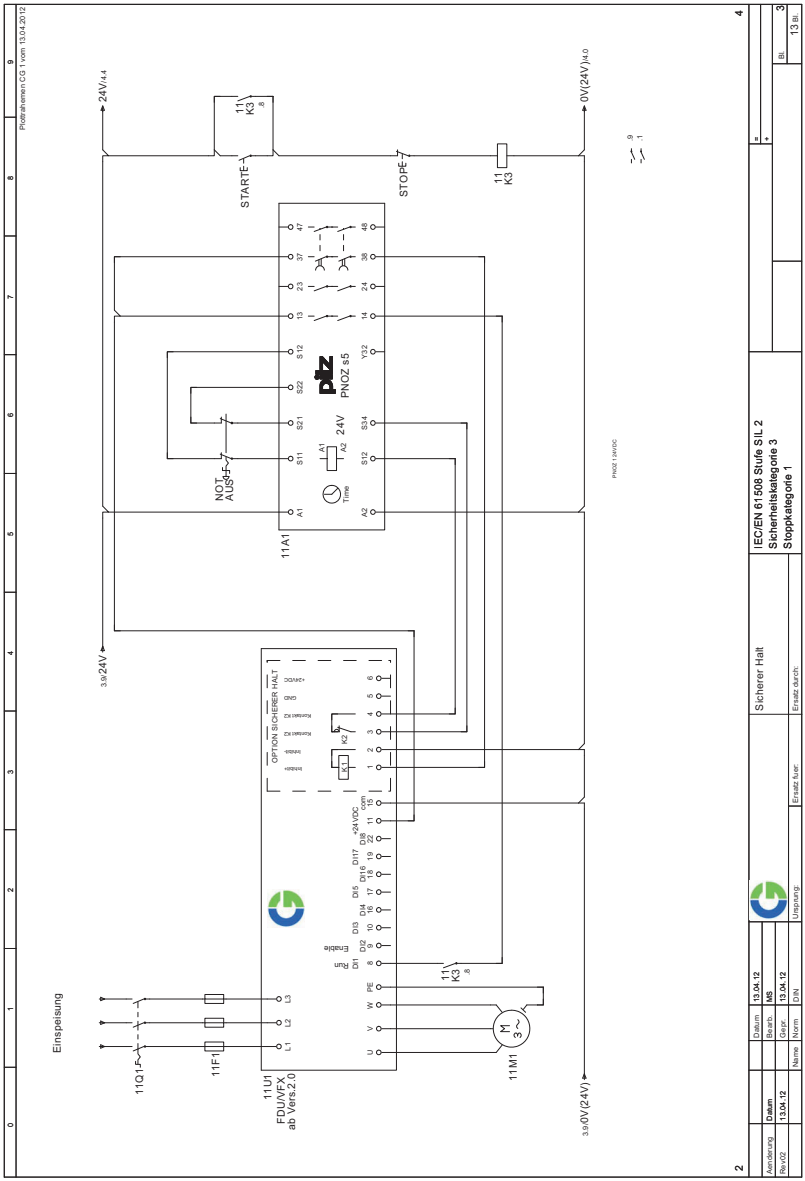


Fig. 10 IEC/EN 61508, level SIL 2, Safety category 3, stop category 1.

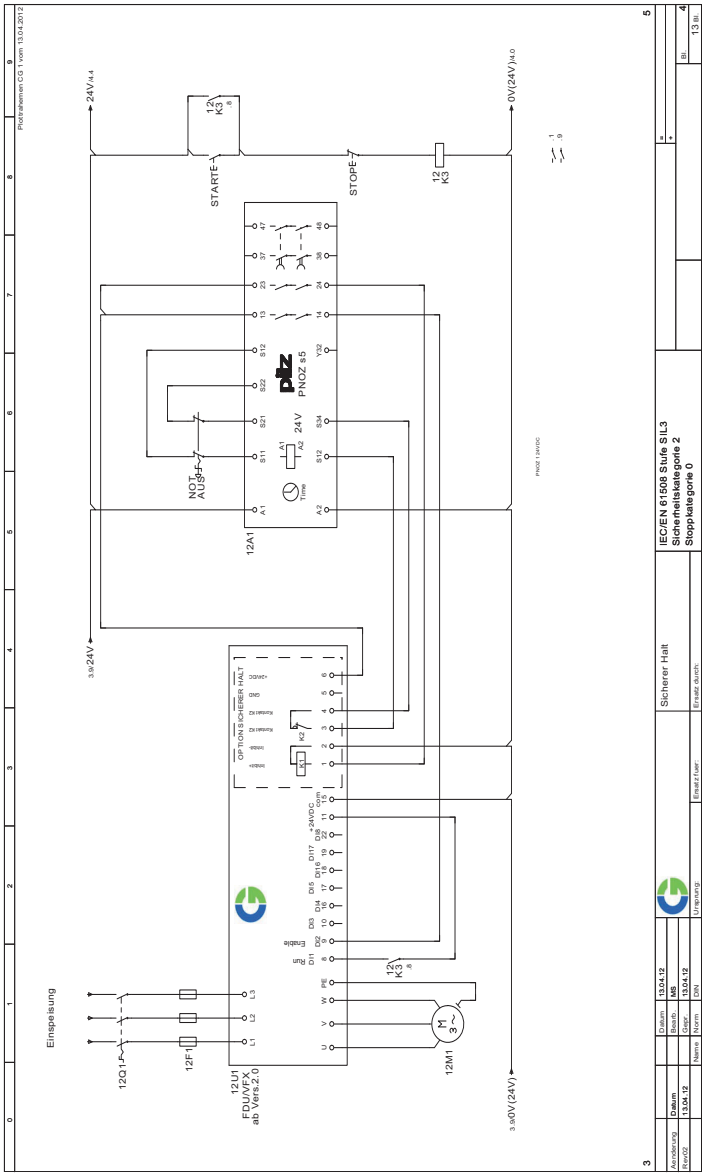


Fig. 11 IEC/EN 61508, level SIL 3. Safety category 2, stop category 0.

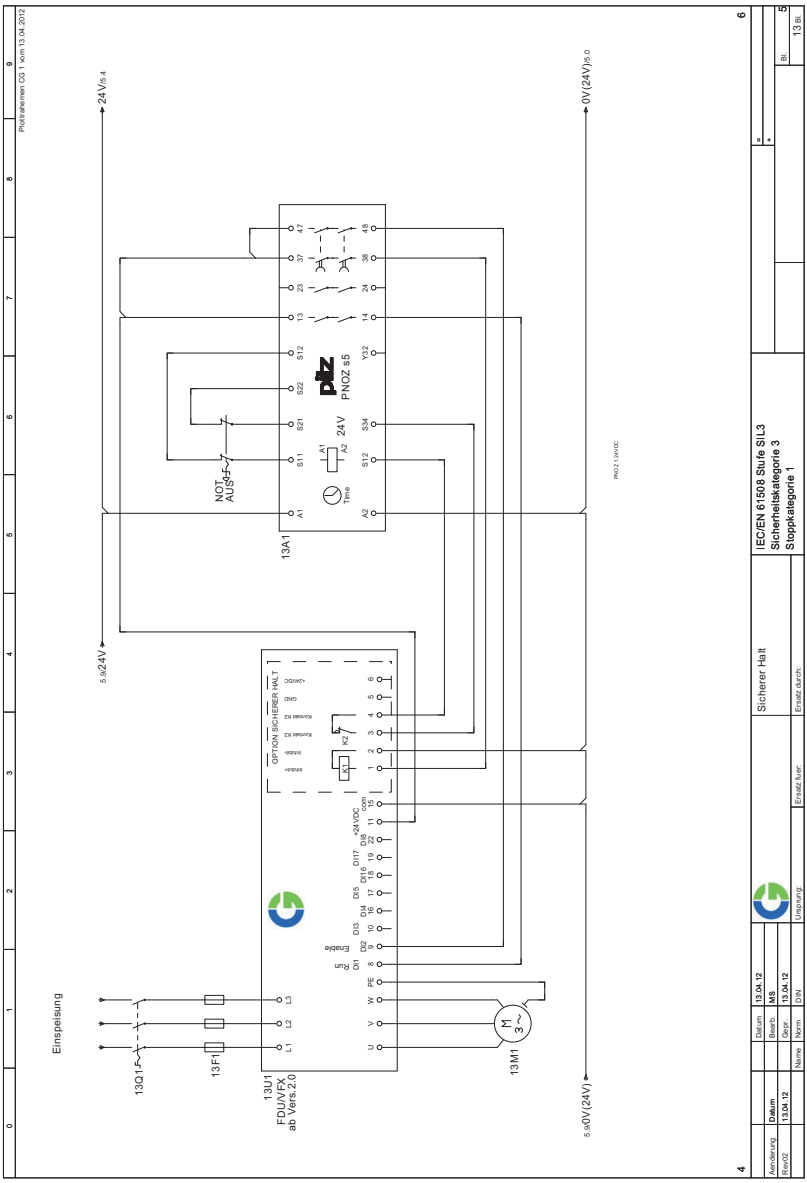


Fig. 12 IEC/EN 61508, level SIL 3. Safety category 3, stop category 1.

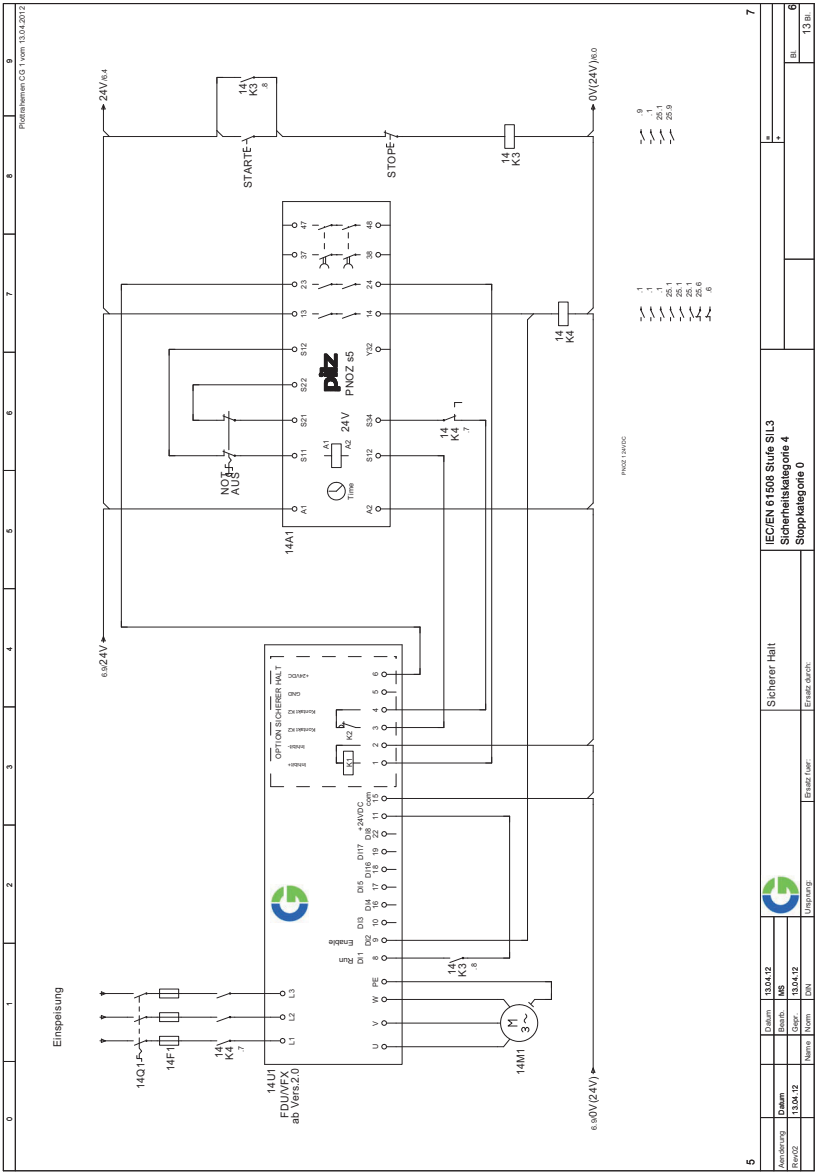


Fig. 13 IEC/EN 61508, level SIL 3 . Safety category 4, stop category 0.

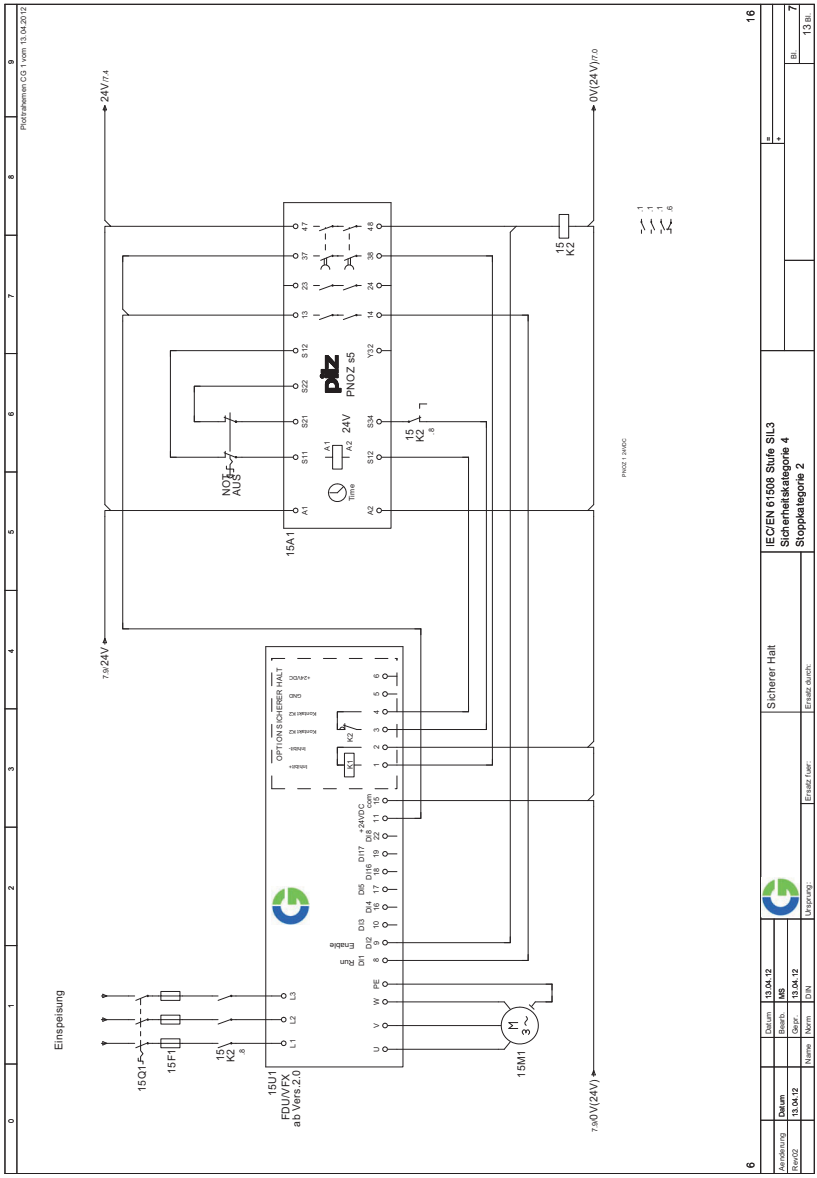


Fig. 14 IEC/EN 61508, level SIL 3. Safety category 4, stop category 2.

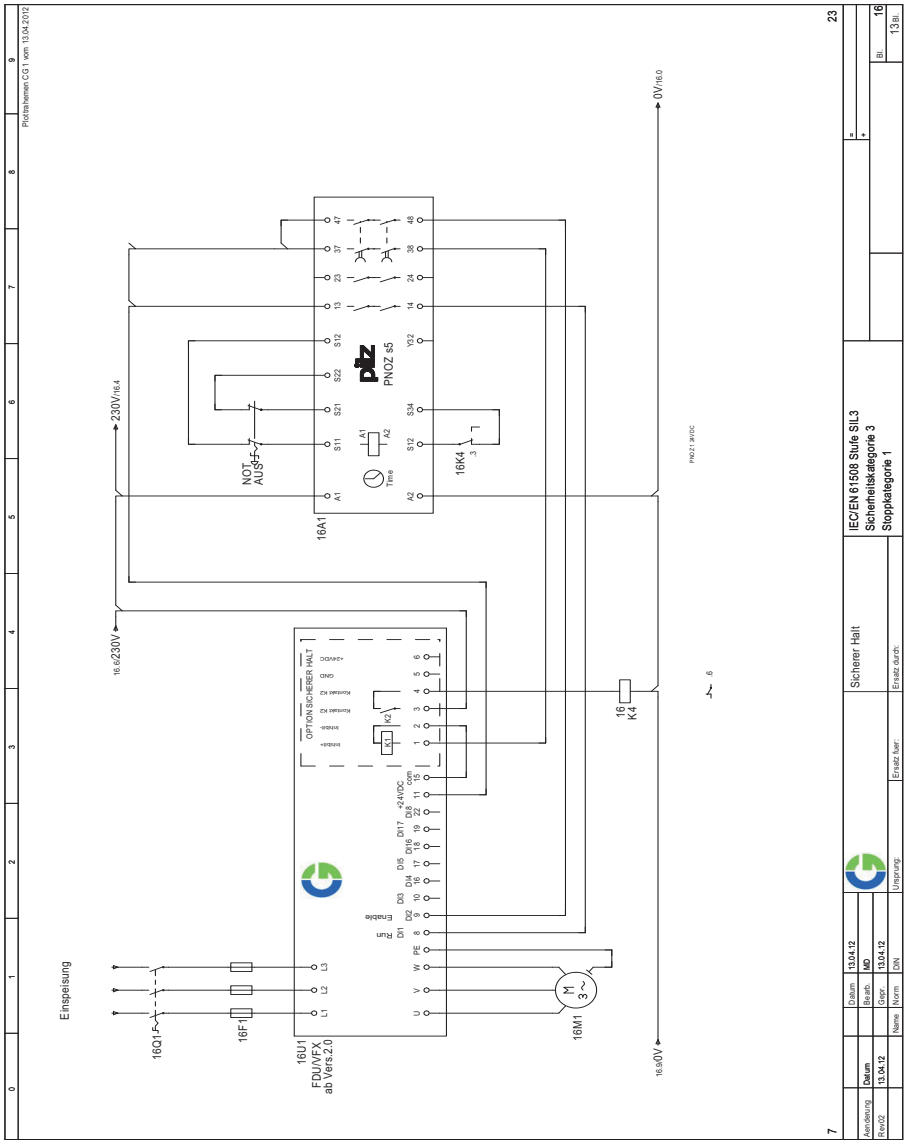


Fig. 15 IEC/EN 61508, level SIL 3. Safety category 3, stop category 1.

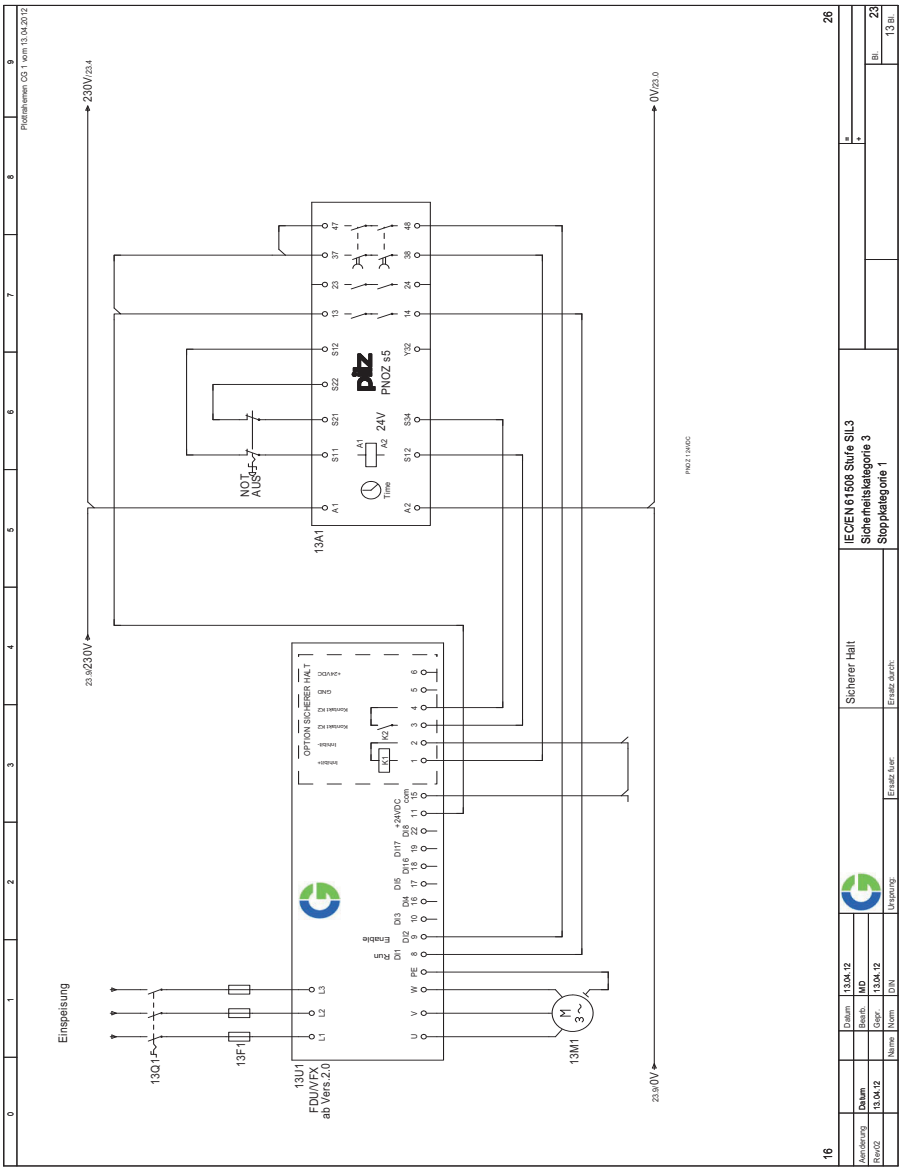


Fig. 16 IEC/EN 61508, level SIL 3. Safety category 3, stop category 1.

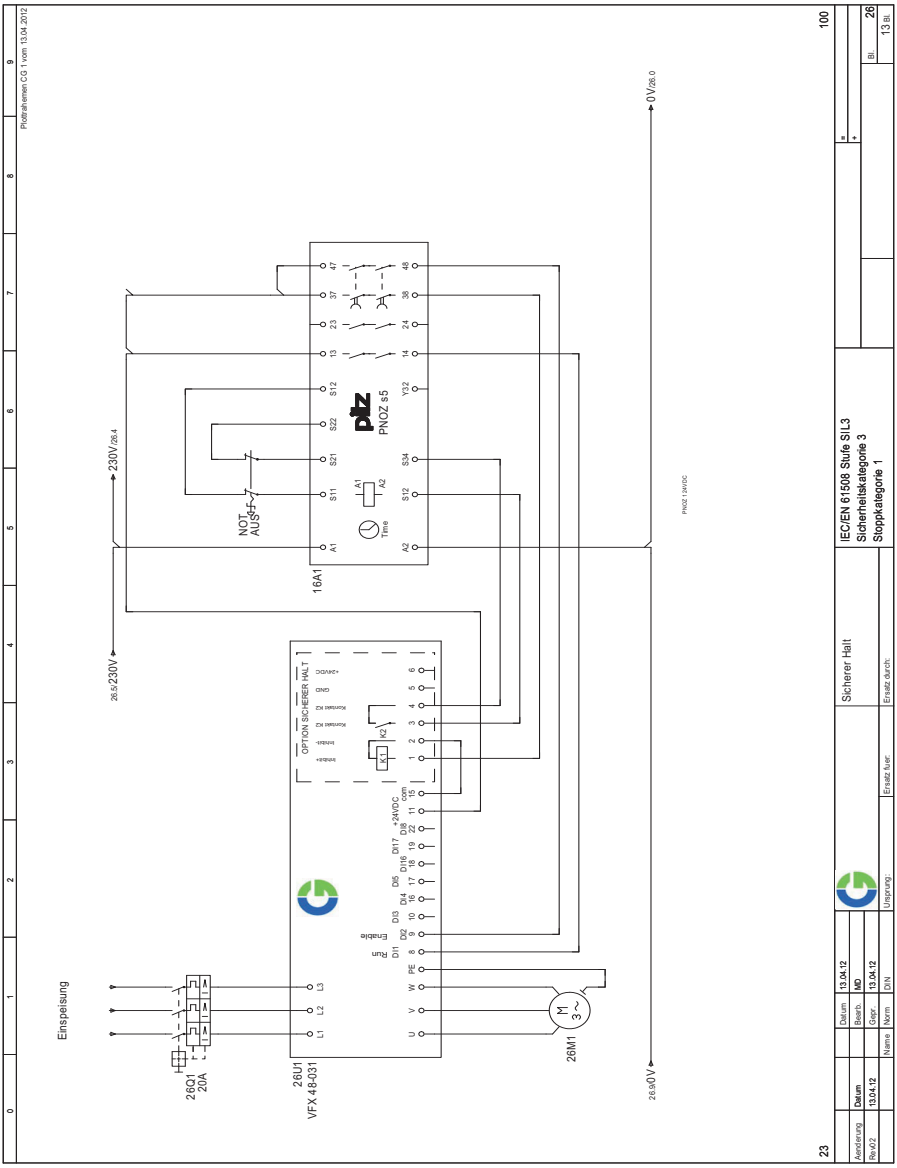


Fig. 17 IEC/EN 61508, level SIL 3. Safety category 3, stop category 1.

8. Certificate



ZERTIFIKAT
CERTIFICATE

Hiermit wird bescheinigt, dass das unten beschriebene Produkt der Firma
This certifies that the product mentioned below from company

CG Drives & Automation Sweden AB
Mörsaregatan 12
SE-250 24 Helsingborg
Sweden

die Anforderungen der folgenden Prüfunterlage(n) erfüllt.
fulfills the requirements of the following test regulations.

Geprüft nach: *Tested in accordance with:*	**EN 61800-5-2:2007** **EN ISO 13849-1:2008**	**Anforderungen bis Kategorie 4 und Performance Level e** *Requirements according to category 4 and performance level "e"*
	EN 62061:2005 + A1:2013	**Anforderungen bis SIL3** *Requirements according to SIL3*
Beschreibung des Produktes: (Details s. Anlage 1) *Description of product:* *(Details see Annex 1)*	**Frequenzumrichter mit der sicheren Funktion STO (sicher abgeschaltetes Moment)** *Frequency converter with safety function STO*	
Typenbezeichnung: *Type designation:*	**Serie** / *Series* **VFX 2.0, VFXR, FDU 2.0, FDUL, CDU 2.0, CDX 2.0 und Flowdrive**	
Bemerkungen: *Remarks:*	**Die Anforderungen gemäß EN 61800-1 waren nicht Bestandteil der Prüfung** *Requirements according to EN 61800-1 are not part of the examination*	

Dieses Zertifikat bescheinigt das Ergebnis der Prüfung an dem vorgestellten Prüfgegenstand. Eine allgemein gültige Aussage über die Qualität der Produkte aus der laufenden Fertigung kann hieraus nicht abgeleitet werden.
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.

Registrier-Nr. / *Registration No.* 44 799 15139901
Prüfbericht Nr. / *Test Report No.* 3516 9119
Aktenzeichen / *File reference* 8000452918

Gültigkeit / *Validity*
von / *from* 2015-12-18
bis / *until* 2020-12-17

Zertifizierungsstelle der
TÜV NORD CERT GmbH

Essen, 2015-12-18

TÜV NORD CERT GmbH Langemarckstraße 20 45141 Essen www.tuev-nord-cert.de technology@tuev-nord.de

Bitte beachten Sie auch die umseitigen Hinweise
Please also pay attention to the information stated overleaf

ANLAGE
ANNEX

Anlage 1, Seite 1 von 1
Annex 1, page 1 of 1

zum Zertifikat Registrier-Nr. / ***to Certificate Registration No.*** **44 799 15139901**

Produktbeschreibung: *Product description:*	**Frequenzumrichter mit der sicheren Funktion STO (sicher abgeschaltetes Moment)** *Frequency converter with safety function STO*	
Typenbezeichnung: *Type designation:*	**Serie /** *Series* **VFX 2.0, VFXR, FDU 2.0, FDUL, CDU 2.0, CDX 2.0 und Flowdrive**	
Technische Daten: *Technical data:*	**Nennleistung** *Nominal power*	**0,75-3.000kW**
	Spannungsversorgung *Supply voltage*	**230-690 V, 3 Phasen**
	Nennstrom *Nominal current*	**2,5-3.000 A**
	Schutzart *Protection class*	**IP54, IP2x**

Zertifizierungsstelle der
TÜV NORD CERT GmbH

Essen, 2015-12-18

TÜV NORD CERT GmbH Langemarckstraße 20 45141 Essen www.tuev-nord-cert.de technology@tuev-nord.de

9. Installation

The Safe stop option boards are often factory mounted and you can ignore this installation instruction.

For AC drives type IP20/21 frame sizes C2, D2, E2 and F2 (Emotron VFX/FDU48-025 to 48-244) and
For AC drives type IP2Y frame sizes A3, B3 and C3
(Emotron VFX/FDU48-2p5-2Y to 48-038-2Y)
the safe stop is considered as after mount option.

There are two safe stop kits for AC drives type IP20/21.
01-5294-60Safe Stop kit for frame size C2 & D2 - IP2x
01-5466-00Safe Stop kit for frame size E2 & F2 - IP2x

There is one safe stop kit for AC drives type IP2Y

01-6070-02 Safe Stop-2Y kit for frame size A3 to C3.

9.1 Mounting Safe stop kit 01-5294-60 for frame size C2&D2

The option kit includes:

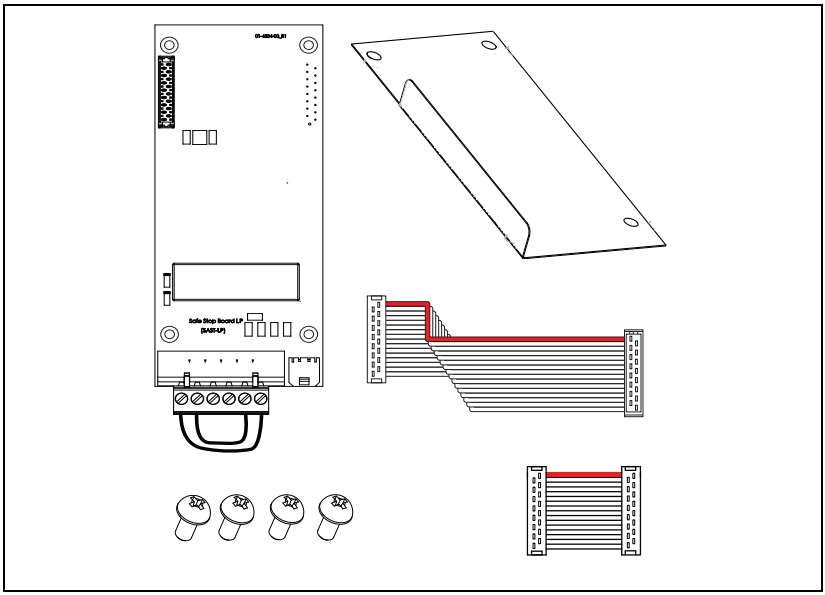


Fig. 18 Option kit content

- Option board
- Four screws, M3 x 6.
- One 16-pole flat cable, approx. 75 mm long. This cable is used to connect the first option board on AC-drives only.
- One 16-pole flat cable approx. 32 mm long, for connection between two option boards. This cable is also used to connect the first option board on Emotron TSA softstarter. 8-pole flat cable for connection between the communication board and the control board.
- Insulating sheet.

9.1.1 Polarisation of flat cables

The flat cable is marked with colour on one side and has a tap on the micromatch male contact. This side must be matched to the female micromatch contact on the control board and option board respectively, where a small hole in the board is located.

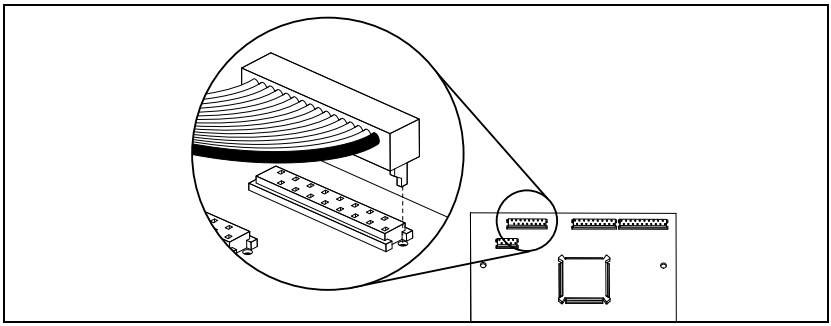


Fig. 19 Polarisation of flat cable

CAUTION!
Incorrect connection might cause damage to both the option and to the control board/external equipment.

9.1.2 Mechanical mounting

Make sure that the AC drive has been switched off for at least seven minutes to ensure that the capacitor bank is discharged before continuing with installation! Also make sure that no external equipment connected to the drive's interface is switched on.

NOTE: Correct installation is essential for fulfilling the EMC requirements and for proper operation of the module.

Mounting the first option board

The first option board is always mounted on the slot marked 1 on the mounting plate. In this example we assume that no other option board is installed.

1. Connect the 16-pole flat cable (75mm) to the X5 connector on the control board with the cable downwards as in Fig. 20.

NOTE: The polarisation of the flat cable, see § 9.1.1, page 34.

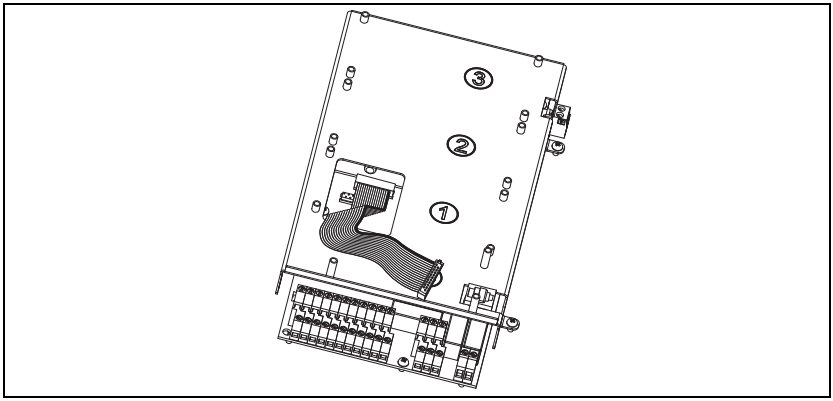


Fig. 20 Flat cable connected to the control board

2. Place the insulating sheet over the short spacers on the slot marked 1 on the mounting plate. Make sure the flap bent upwards is mounted towards the control board interface as in the figure below.

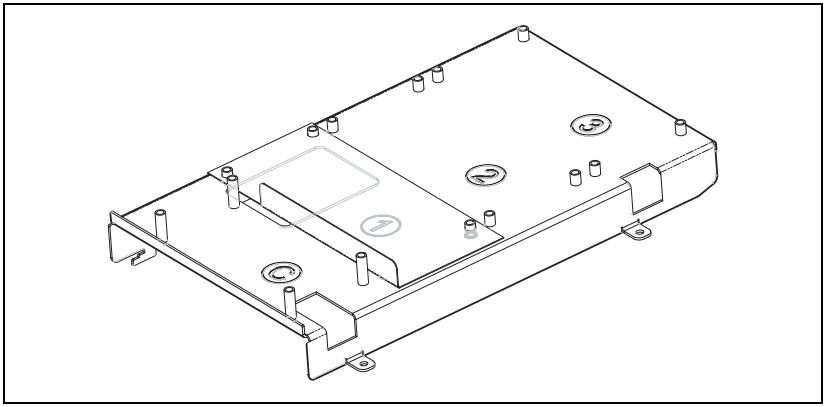


Fig. 21 Mounted insulating sheet

3. Put the option board on the spacers on the same slot. Fasten the board using the four screws.

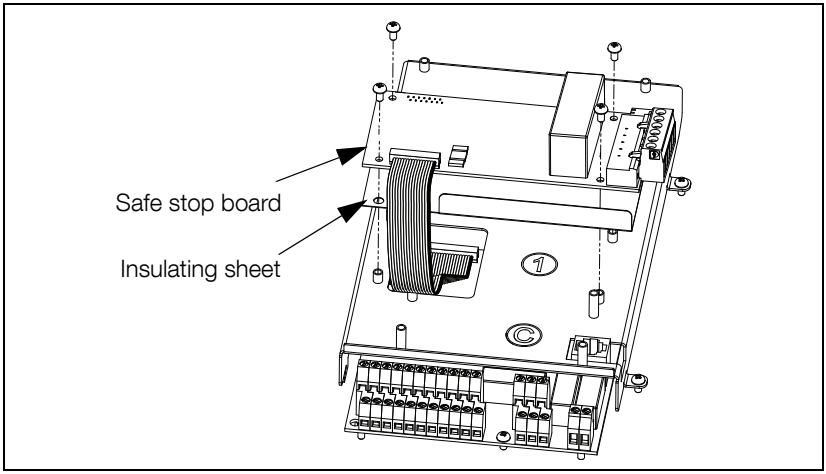


Fig. 22 Mount the option board on the slot marked 1. Connect the flat cable to the X5A connector on the safe stop board.

4. Connect the other end of the 816-pole flat cable to the X5A connector on the option board. Make sure that the polarisation is correct as in § 9.1.1, page 34.
5. Take the 2-pole cable and remove the jumper plug from the cable. Connect the cable to the X2 terminal according to Fig. 23

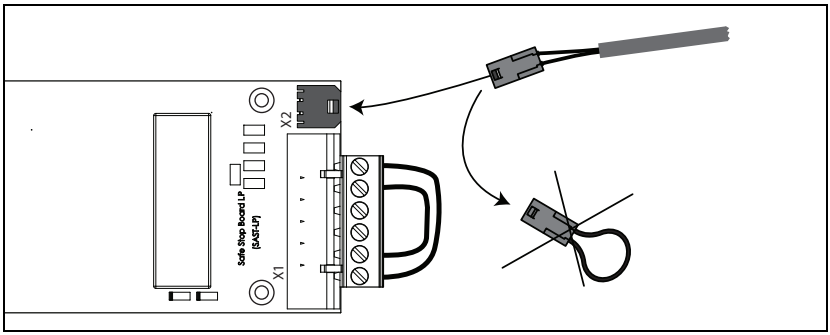


Fig. 23 Remove the jumper plug and connect the 2-pole cable to terminal X2.

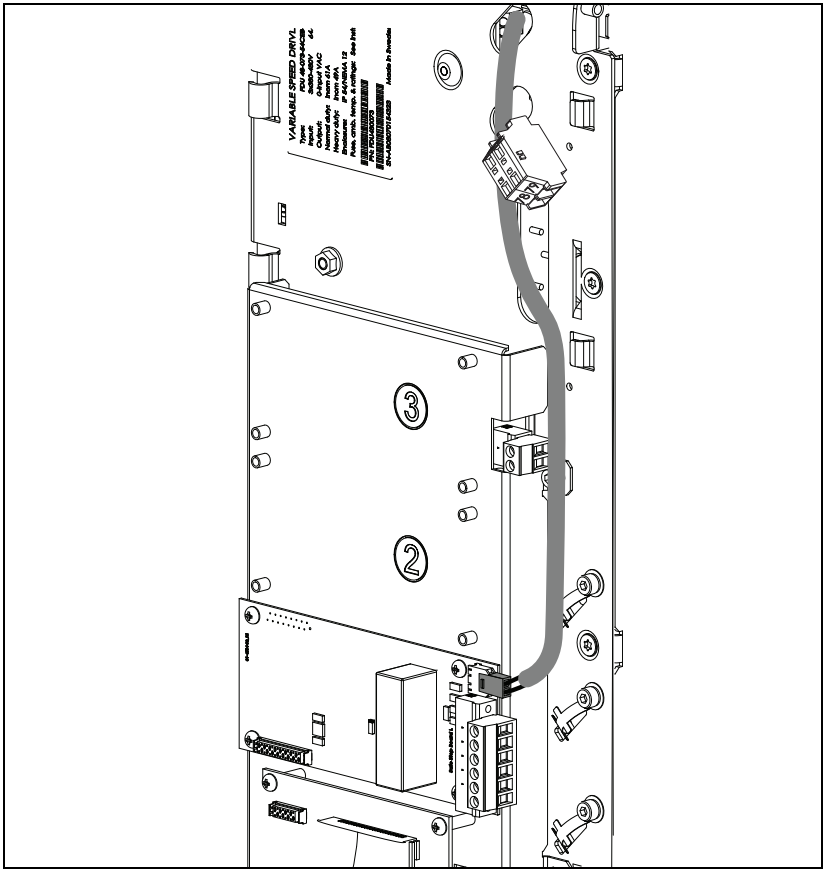


Fig. 24 2 pole cable connected to the Safe stop board.

9.2 Mounting of Safe stop kit 01-5466-00 for frame size E2&F2

The option kit includes:

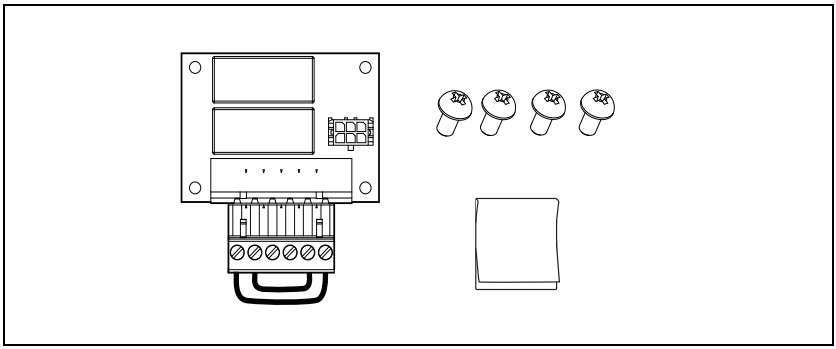


Fig. 25 Option kit content

- Option board.
- Four screws, M3 x 6.
- Cable clip

9.2.1 Mechanical mounting

Make sure that the AC drive has been switched off for at least seven minutes to ensure that the capacitor bank is discharged before continuing with installation! Also make sure that no external equipment connected to the drive's interface is switched on.

NOTE: Correct installation is essential for fulfilling the EMC requirements and for proper operation of the module.

1. Place the option board on the spacers. Fasten the board with the four screws.

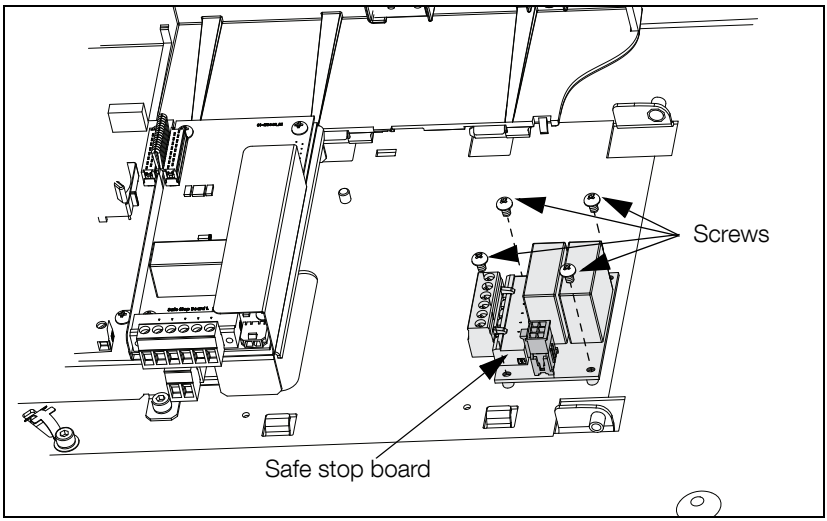


Fig. 26 Mount he option board on the spacers and secure it with he screws.

2. Remove the jumper plug from the 6-pole cable and connect the 6-pole cable to the terminal marked X2 according to Fig. 27.

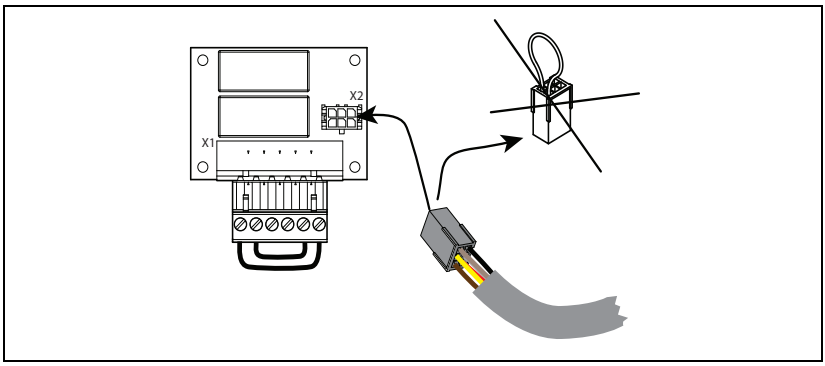


Fig. 27 Remove the jumper plug and connect he 6-pole cable to the terminal X2.

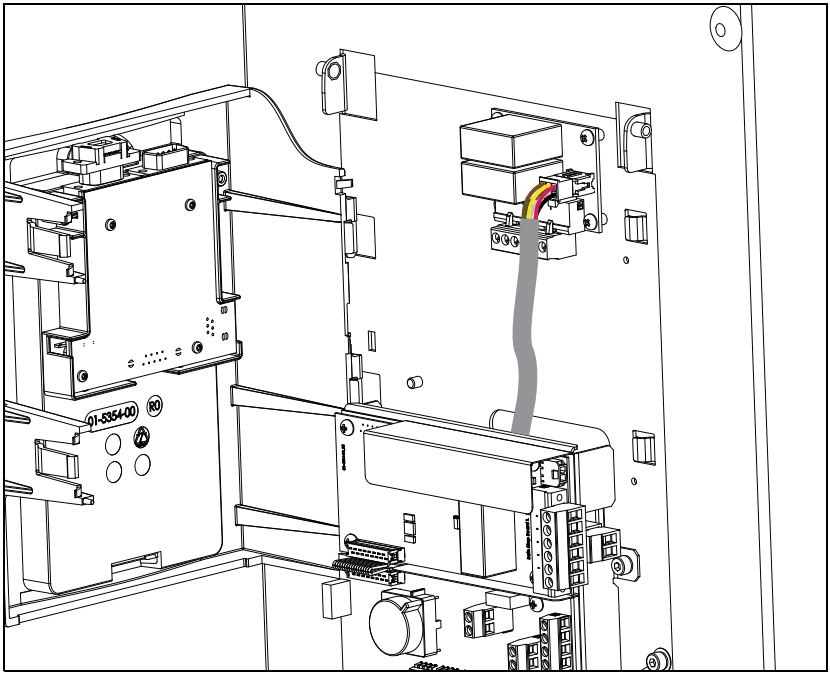


Fig. 28 6 pole cable connected to the Safe stop board.

3. Secure the cable with the cable clip.

9.3 Mounting of Safe stop kit 01-6070-02 for frame sizes A3, B3 and C3

The option kit includes

- option board.
- Two screws, M3 x 6.
- Insulating sheet.

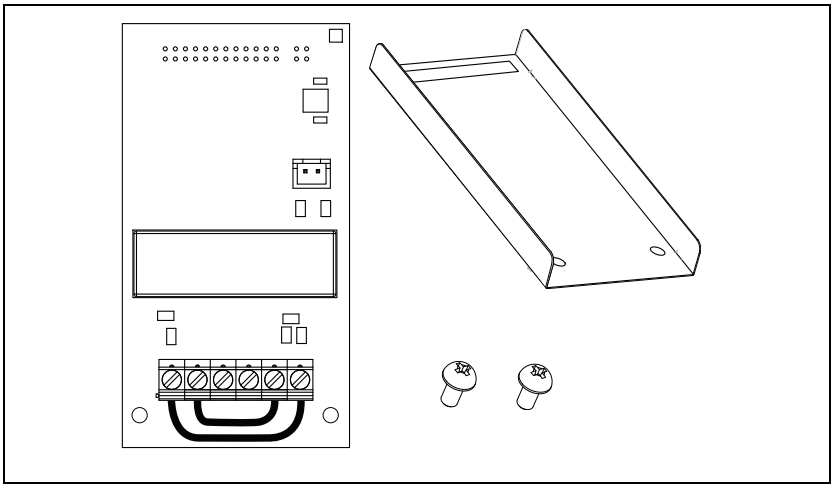


Fig. 29 The IP2Y option kit includes.

Note!
Safe Stop IP2Y option board 01-6070-02 requires software 4.37 or later in order to work safely.

How do i check the software version in my AC drive?
Menu "[922] Software" shows actual software version.

If you have software 4.36 you have to update the software.
Please contact CG drives & Automation for software update.

9.3.1 Mechanical mounting

Make sure that the AC drive has been switched off for at least seven minutes to ensure that the capacitor bank is discharged before continuing with installation! Also make sure that no external equipment connected to the drive's interface is switched on.

NOTE: Correct installation is essential for fulfilling the EMC requirements and for proper operation of the module.

It is possible to mount two option board on the control board connectors X7A and X7B. In this case, we recommend to use connector X7B.

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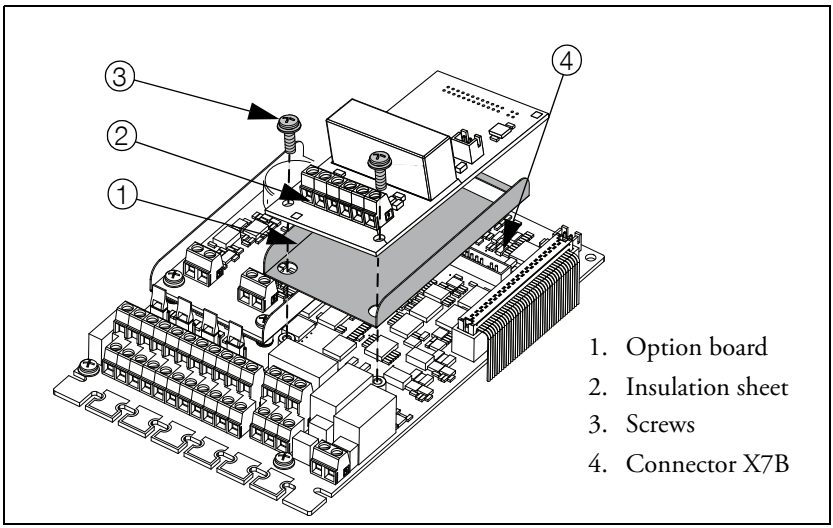


Fig. 30 Mount the option board, in this case on to connector X7B.

1. Place the insulating sheet over the short spacers and make sure the slot fits around the X7B connector on the control board. Make sure the flaps are bent upwards.
2. Put the option board into position by pressing the connector on the option board into connector X7B on the control board. Make sure it rests on the spacers.
3. Secure the option board with the two screws.

4. Disconnect the 2 pole cable plug from terminal X5 on the control board, see Fig. 31.

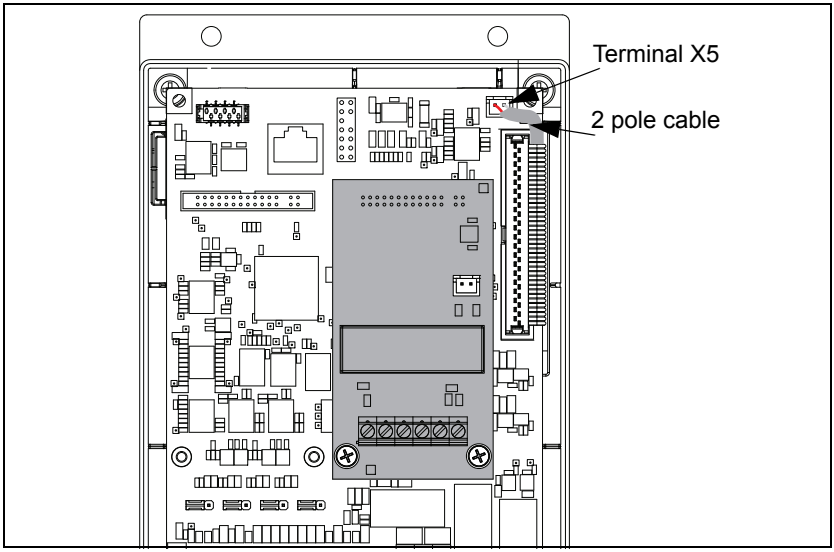


Fig. 31 Remove the 2 pole cable plug from terminal X5.

5. Pull carefully out the 2 pole cable a bit and connect the plug to terminal X2 on the option board, see Fig. 32.

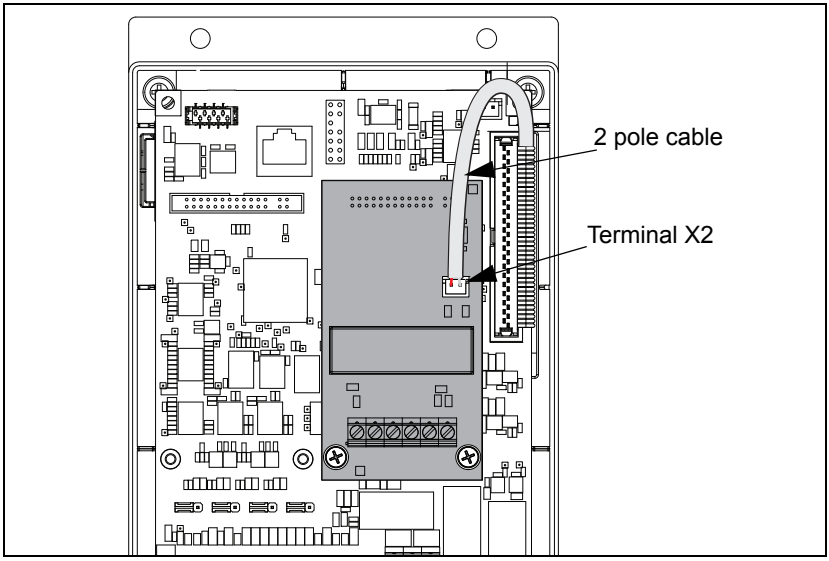


Fig. 32 Connect the 2 pole cable plug to terminal X2 on the option board.

CG Drives & Automation Sweden AB
www.emotron.com/www.cgglobal.com

CG Drives & Automation, 01-5921-01r2, 2016-10-12