

Die Königsklasse in Lufttechnik, Regeltechnik und Antriebstechnik | **The Royal League** in ventilation, control and drive technology



ZA dynpro

Frequency inverter

Original operating instructions

Store for future use!

Part 1

-Installation

-Start-up

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1 General information

1.1 Validity

This instruction manual applies to:
Frequency inverter from the series:ZAdynpro
from software version 4.53

1.2 Structure of the operating instructions

These operating instructions help you to work safely on and with the frequency inverter ZAdynpro. They contain safety instructions that must be complied with as well as information that is required for failure-free operation of the frequency inverter.

The operating instructions are to be stored together with the frequency inverter. It must be ensured that all persons who have to perform activities on the frequency inverter can consult the operating instructions at any time. Instructions for use in accordance with the German Occupational Safety and Health Act and the German Work Equipment Ordinance must be provided in addition to the operating instructions.

Keep the operating instructions for continued use. They must be passed-on to all successive owners, users and final customers.

1.3 Target group

The operating instructions address persons entrusted with planning, installation, commissioning and maintenance and servicing and who have the corresponding qualifications and skills for their job.



1.4 Exclusion of liability

It has been established that the content of these operating instructions is concurrent with the frequency inverter hardware and software described.

It is still possible that non-compliances exist; no guarantee is assumed for complete conformity. The contents of this manual are put through periodic reviews. Necessary modifications are incorporated into the next version.

ZIEHL-ABEGG SE is not liable for damage due to misuse, incorrect use, improper use or as a consequence of unauthorized repairs or modifications.

Symbols description

	Asynchronous motors The contents in the operating instructions refer specifically to the operation of asynchronous motors.
	Synchronous motors. The contents in the operating instructions refer specifically to the operation of synchronous motors.

1.5 Copyright

These operating instructions contain copyright protected information. The operating instructions may be neither completely nor partially photocopied, reproduced, translated or put on data medium without previous explicit consent from ZIEHL-ABEGG SE. Infringements are liable for damages.
All rights reserved, including those that arise through patent issue or registration on a utility model.

1.6 Explanation of symbols and designators

Symbol	Meaning
▷	Instruction. Follow the instructions in sequence in the order described.
✓	Result of an action (result). Here, the result of an action is described.

2 Safety instructions

2.1 General

This chapter contains instructions to prevent personal injury and property damage. These instructions do not lay claim to completeness. In case of questions and problems, please consult our company technicians.

2.2 Intended use






The ZAdynpro is a field-orientated Frequency inverter for RPM control of asynchronous motors and synchronous motors. The Frequency inverter is designed for lift systems used to convey people and cargo. The device is not designed for any other use than those listed here – this is considered improper use.

Reading these operating instructions and complying with all contained instructions – especially the safety instructions contained therein – are considered part of intended use. Furthermore, carrying out all inspection work in the prescribed scheduled intervals is part of intended use.

The operator of the ZAdynpro is liable for any personal harm or material damage arising from non-intended use! The manufacturer shall bear no liability for such damage!

2.3 Pictographs

Safety instructions are highlighted with warning triangles and are depicted according to the degree of hazard as follows.

	Danger! General hazardous area. Death or severe injury or significant property damage can occur if the corresponding precautions are not taken!
	Warning! Mittlere oder leichte Körperverletzung kann eintreten, wenn entsprechende Vorsichtsmaßnahmen nicht getroffen werden!
	Caution! Material damage is possible if the corresponding precautions are not taken!
	Danger! Danger by dangerous, electric voltage! Death or severe injury can occur if the corresponding precautions are not taken!
	Information Important information and advice for user

2.4 Product safety

The device conforms to the state of the art at the time of delivery and is fundamentally considered to be reliable. The device and its accessories must only be used in a flawless condition and installed and operated with compliance to the operating instructions.

Exceeding the limits stated in the “Enclosure / technical data” chapter can lead to a defect in the device.

2.5 Requirements placed on the personnel / due diligence

Persons entrusted with the planning, installation, commissioning and maintenance and servicing in connection with the device must have the corresponding qualifications and skills for these jobs. Based on their training, knowledge and experience as well as knowledge of the relevant standards, they must be able to judge the work transferred to them and be able to recognize possible hazards.

In addition, they must be knowledgeable about the safety regulations, EU directives, rules for the prevention of accidents and the corresponding national as well as regional and in-house regulations. Personnel to be trained or instructed and apprentices are only permitted to work on the device under the supervision of an experienced person. This also applies to personnel undergoing general training.

Comply with the legal minimum age

2.6 Commissioning



Danger!

During commissioning, unexpected and hazardous conditions can arise in the entire system due to incorrect settings, defective components or incorrect electrical connections

During the commissioning following has to be observed:

- Remove all persons and objects from the hazardous area
- The EMERGENCY-STOP function must be in working order
- The mechanical safety brakes must be installed and in working order
- Commissioning is only permitted with compliance to the EMC directive 39/336/EEC

2.7 Working on device/hazards through residual voltage

Before working on previously installed devices, separate them from the mains and secure them against reconnection.



Danger!

Through use of capacitors, danger of death exists even after switching off the device through directly touching the energized parts or due to parts that have become energized due to faults.

Wait at least **3 minutes** before working on the device.

The safe isolation from the supply must be checked using a **two-pole** voltage detector.



Danger!

It is generally forbidden to carry out work on electrical live parts. Protection class of the device when open is IP 00! It is possible to touch hazardous voltages directly.

2.8 Modifications / interventions in the device

For reasons of safety, no unauthorized interventions or **modifications** may be made on the device . All planned modifications must be authorized by the manufacturer in writing.

Use only genuine spare parts / genuine wearing parts / genuine accessories from the ZIEHL-ABEGG SE. These parts were specifically designed for the device. There is no guarantee that parts from non-original sources are designed and manufactured in correspondence with load and safety requirements.

Parts and special equipment not supplied by the ZIEHL-ABEGG SE are not approved for use.

The warranty shall be void if the device is tampered with or modified without authorisation.

2.9 Operator's obligation of diligence

The device has been designed and constructed with consideration of a hazard analysis and after carefully selecting the harmonized standards to be complied with as well as additional technical specifications. It thus complies with the state-of-the art and ensures the highest degree of safety. However, this safety can only be implemented in operational practice if all measures necessary for this purpose are taken. The operator of the installation has the obligation of due diligence to plan these measures and monitor their implementation.

In particular, the operator must ensure that

- The device is only used as intended (cmp. chapter "Product overview" concerning this)
- The installation is operated solely in a flawless, functional condition and that especially the safety devices are periodically checked for their properly functioning condition
- The required personal safety gear is available to and used by the operating, maintenance and repair personnel
- The operating instructions are always readily available at the location where the frequency inverter is being used, are complete and are in legible condition
- Only sufficiently qualified and authorized personnel operate, maintain and repair the device
- these staff receive regular instruction in all relevant occupational safety and environmental protection issues, are knowledgeable about the operating instructions and, especially, are familiar with the safety instructions contained therein.
- all safety and warning notices attached to the device are never removed and remain legible.

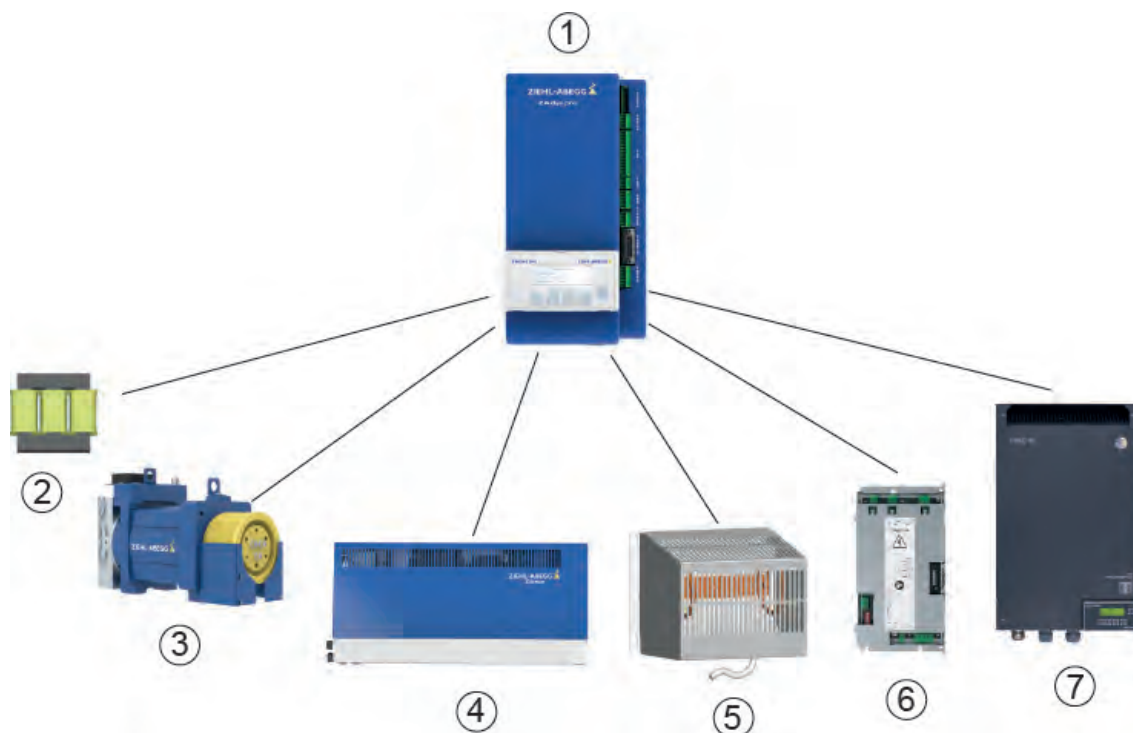
2.10 Employment of external personnel

Maintenance and service work are frequently carried out by external employees who often do not recognize the specific situations and the thus resulting dangers. These persons must be comprehensively informed about the hazards in their area of activity. You must monitor their working methods in order to intervene in good time if necessary.

3 Product overview

3.1 System overview

The drive system for ZIEHL-ABEGG SE elevators consists of several individual components.



1) ZAdynpro

Frequency inverter for RPM control of asynchronous motors and synchronous motors.

2) Power choke

System component to reduce current harmonics and to attenuate commutation notches and line feedback.

3) Elevator drive

Synchronous or asynchronous motor, with and without gearbox.

4) ZArec4c (optional)

Power feedback unit for elevator systems with frequency inverter.

5) Brake resistor

System component to convert energy generated during the regenerative run into heat.

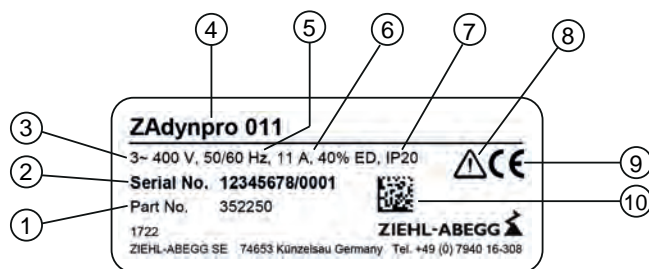
6) ZAsbc4B (optional)

System component for contactorless actuation of electromechanical brakes.

7) EVAC3C (optional)

Evacuation module for automatic evacuation run in case of mains failure.

3.2 Name plate



no.	Designation
1	Part no.
2	Serial number
3	Mains connection voltage
4	Type designation
5	Mains frequency
6	Rated current for 40% duty cycle
7	Protection rating
8	Touch current in protective earth line exceeds an alternating current of 3.5 mA, or a direct current of 10 mA
9	CE mark
10	Internal DATA MATRIX code of ZIEHL-ABEGG SE

3.3 Service & maintenance

These jobs must be completed during the recurrent maintenance work:

- Check the device for dirt and clean if necessary
- Check the connections and tighten if necessary

3.4 Transport

- The device is packed ex factory to suit the transport method previously agreed.
- Always use the original packaging materials when transporting the device
- Avoid shocks and impacts to the device during the transport

3.4.1 Storage duration:

The storage duration depends particularly on the electrolytic capacitors because the oxide coating in the capacitor deteriorates.

Storage duration:

- 12 months at -20 ... +50 °C
- 24 months at -20 .. +45 °C
- 36 months at -20 .. +40 °C

If storage exceeds the stated maximum storage times, you must carry out a reformation of the capacitors before applying the entire mains voltage to the frequency inverter.

New formation:

To reform, the ZAdynpro needs to be connected to reduced voltage (230 VAC at L1 / L2) for approx. 1 hour.

3.5 Disposal / recycling



Disposal must be carried out professionally and environmentally friendly in accordance with the legal stipulations.

4 Mechanical installation

4.1 General notes

- The frequency inverter ZAdynpro is designed for mounting on the wall in the switch cabinet. Mounting outside of the switch cabinet is not permitted.
- Ensure that there is sufficient cooling in the switch cabinet. When doing so, observe the power loss of the ZAdynpro.
- The following points must be complied with during the mechanical installation to avoid causing a defect in the frequency inverter due to assembly errors or environmental influences.

Ambient conditions

- It is not permitted to mount the frequency inverter on vibrating components
- The frequency inverter must not be exposed to any shock
- Prevent humidity
- Avoid aggressive and conductive materials in the environment

Mounting

- Check frequency inverter for any transport damage
- Mounting is performed on a metallic mounting plate
- Mount the device in a torsion free conditions
- Mounting position: Vertical, connection terminals X3, X-STO, X-SBY and X1, bottom
- Permissible installation positions:
 - Mounted with the rear on the mounting plate (see Fig.)
 - Mounted with the side area on the mounting plate (see Fig.). An additional mounting bracket is required for this.



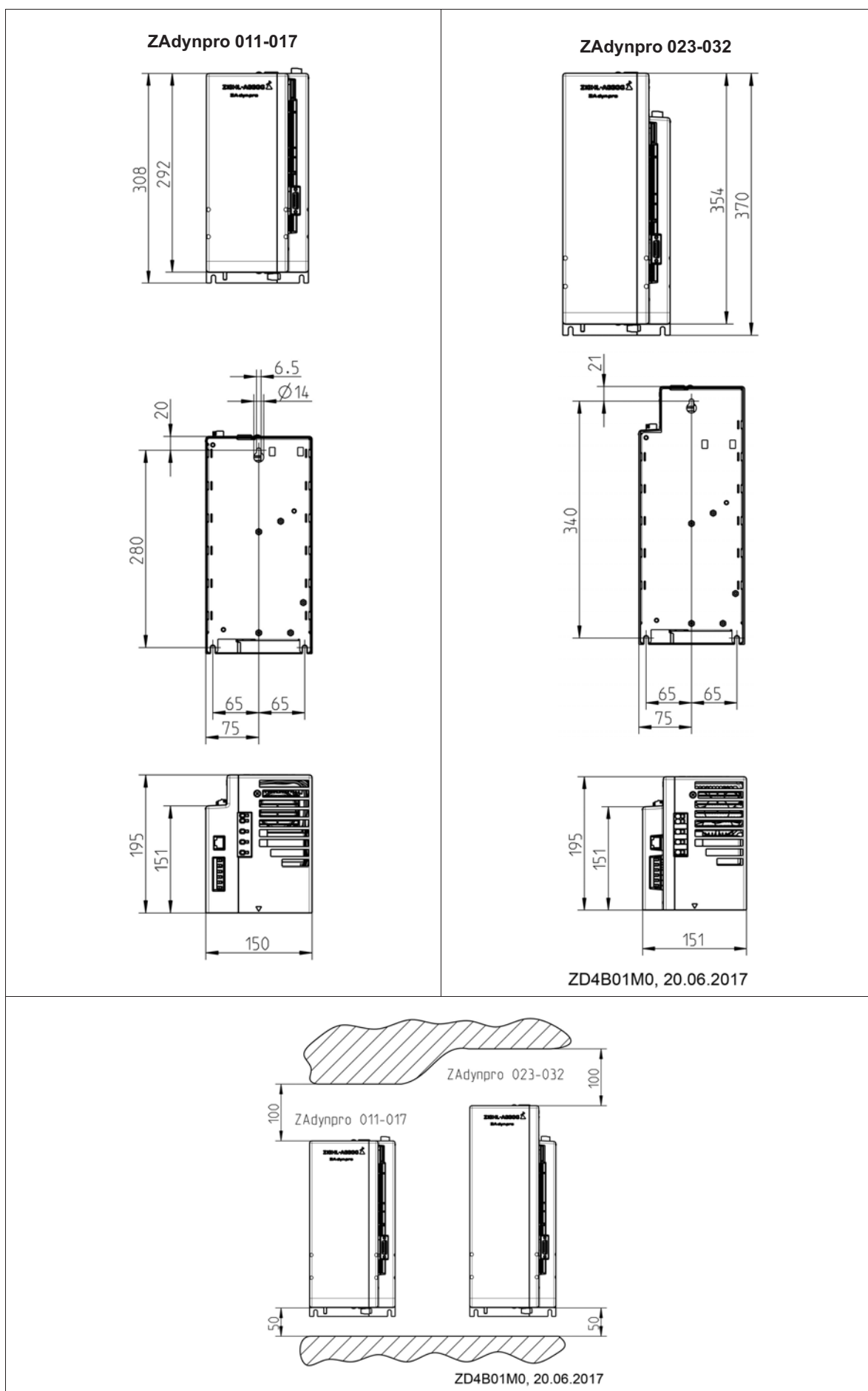
Mounted with the rear on the mounting plate



Mounted with the side area on the mounting plate

- Mount the frequency inverter so that it is isolated
- Prevent drilling chips, screws and other foreign bodies from reaching the interior of the frequency inverter
- Maintain the stated minimum clearances to ensure unobstructed cooling- air feed as well as unobstructed outgoing air discharge (see fig. "Minimum clearances")
- Ensure sufficient cooling when mounting in the switch cabinet. When doing so, observe the power loss of the ZAdynpro.

4.2 Dimensional drawings / Minimum distances



5 Electrical installation

5.1 General



Danger!

It is forbidden to carry out work on the frequency inverter when it is live.
Even after disconnection, the DC-link (terminals X2: +DC / X2:-DC) are still live.
Wait at least 3 minutes before working on the device



Danger!

It is not permitted to operate the ZAdynpro with the housing covers removed, as exposed live parts are present inside the frequency inverter. Failure to observe this provision can lead to serious injury.



Caution!

Parts can be destroyed by electrostatic discharge.

Discharge yourself by suitable action before working on electrical components (connectors, etc.). You can do this, for example, by touching earthed metal parts.

- Work on electric components may only be carried out by trained electricians or by persons instructed in electricity under the supervision of an electrician in accordance with electrical engineering regulations.
- A second person must always be present when working on energized parts or lines who disconnects in case of emergency.
- Electrical equipment must be checked regularly: Loose connections are to be re-tightened and damaged lines or cables must be replaced immediately.
- Always keep switch cabinets and all electrical supply facilities locked. Access is only allowed for authorized persons using a key or special tool.
- Never clean electrical equipment with water or similar liquids.
- Incorrectly wired connections can destroy the electrical/electronic components.

5.2 EMC-compatible installation

5.2.1 Standards

When correctly installed, the frequency inverter corresponds to the following standards:

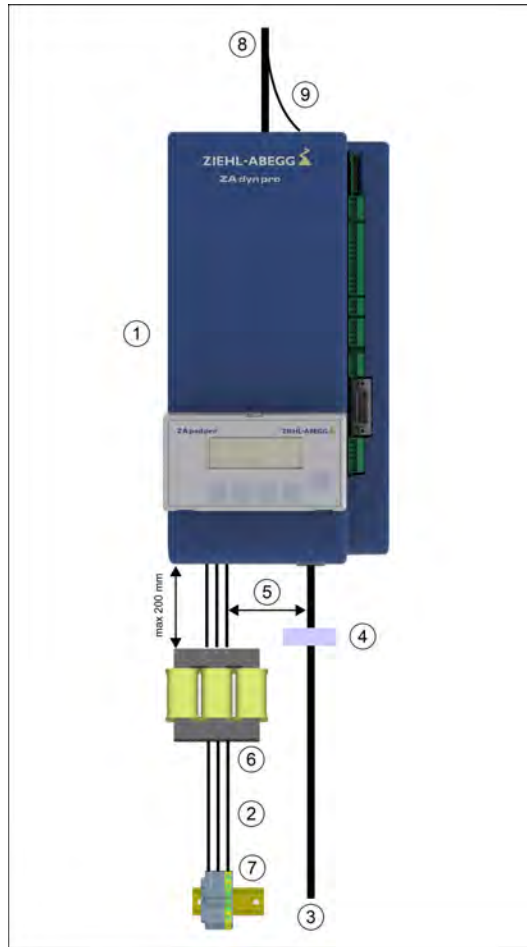
- EN 12015:2014 Electromagnetic compatibility – Product family standard for lifts, escalators and moving walks – Emission
- EN 12016:2013 Electromagnetic compatibility – Product family standard for lifts, escalators and moving walks – Interference immunity

5.2.2 Electrical connection

Lead	Cable length	Shielding	ZAdynpro shield coating version
Power line	-	-	-
Motor cable	Max. 25 m	Earthed at both ends	Clip on mounting plate
Brake chopper/brake resistor line	Maximum 5 m	Earthed at both ends	Pigtail
Connecting line for standby input	Max. 25 m	-	-
Connecting line for the digital inputs	Max. 25 m	-	-
Connecting lines for the digital outputs	Max. 25 m	-	-
Rotary encoder line	Max. 25 m	Earthed at both ends	Via connector
Temperature monitoring of brake resistor	Maximum 5 m	Earthed at the inverter end	Pigtail
STO line	Max. 50 m	Earthed at both ends	Pigtail
Connecting line for ZApadpro	Max. 50 m	Earthed at both ends	Via connector
Connecting line of rotary encoder simulation	Max. 25 m	Earthed at the customer system end	-
Connecting line for CAN interface	<ul style="list-style-type: none"> • Main line: Max. 200 m • Stub lines: Max. 6 m 	-	-
Connecting line for brake release monitoring	Max. 25 m	-	-

- Do not twist shielding for connections; use a suitable shield connection system
- Run the control cables and the encoder cables separate from the power cables
- Provide connected inductances (brakes, contactors) with suppressors
- In order to use the ZAdynpro safely and in compliance with standards, a power choke of type ND... from ZIEHL-ABEGG must be integrated into the power line. For assignment of the frame sizes of the ZAdynpro to the respective power chokes, refer to chapter "Electrical installation/Mains connection".
- Operating the ZAdynpro without the ND.. type power choke voids all warranty entitlements.
- In the case of a supply line of > 25 m (motor line) or > 5 m (brake resistor line), adherence to standard **EN 12015** (Electromagnetic compatibility – Emission) and **EN 12016** (Electromagnetic compatibility – Interference immunity) can no longer be guaranteed.
- If you must interrupt the shielding on a particular line (e.g. to install motor contactors), the shielding must be subsequently continued with the lowest possible HF impedance.
- Use shielded lines in the switching cabinet also
- Feed the power supply of the motor contactors through the mains filter of the lift control system

5.2.3 EMC-compatible assembly of the control cabinet



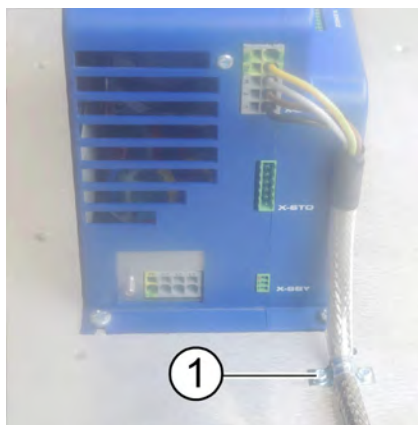
- 1 ZAdynpro mains connection terminal
- 2 Power line
- 3 Motor cable (shielded)
- 4 Clip for fixing the shielding
- 5 Route electrical lines with the maximum possible spacing
- 6 Power choke
- 7 Mains connection
- 8 Brake resistor cable (shielded)
- 9 Shielding (brake resistor cable)

The following points must be observed if the standards outlined in chapter "EMC-compatible installation/Standards" are to be adhered to:

- Refer to chapter "EMC-compatible installation/Standards"
- Cable length between power choke and ZAdynpro maximum 200 mm
- Route the power line (including the mains connection terminal and power choke) separately from the brake resistor line and the motor line

5.2.4 Motor cable

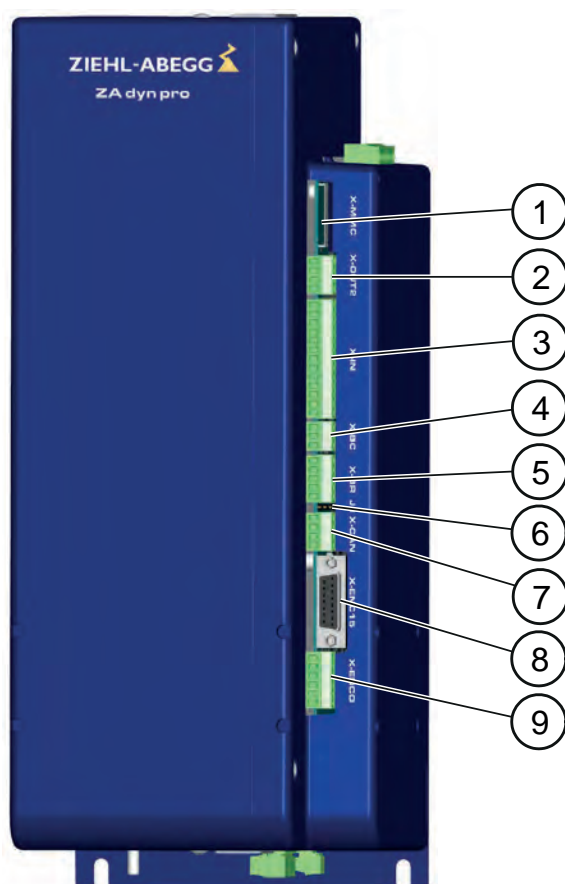
- The shielding of the motor line must be extensively connected to the earth potential in the immediate vicinity of the ZAdynpro. The shielding must be continued right up to the connection terminal.
- We recommend fixing the shielding on the mounting plate by means of a clip (see Fig.).



Fixing the shielding on the mounting plate
1 Clip

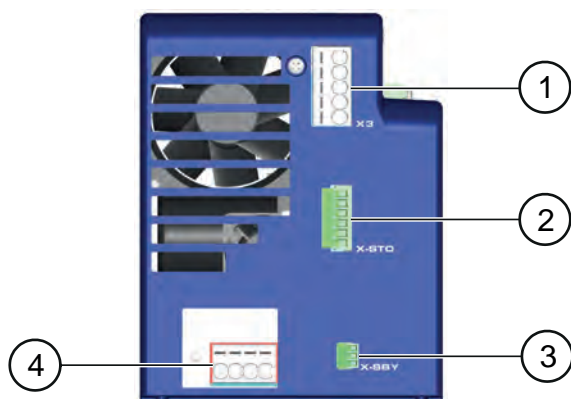
5.3 Terminal positions

5.3.1 ZAdynpro 011-032



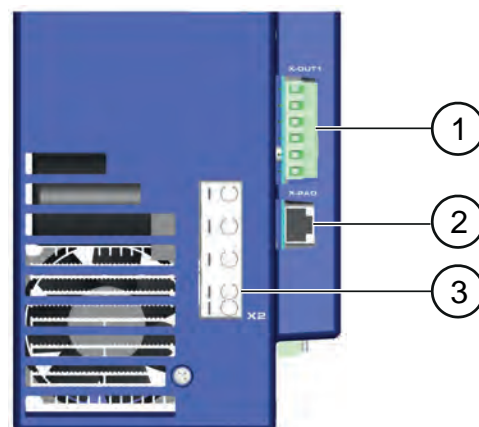
Front terminal positions

- 1 X-MMC memory card
- 2 X-OUT2 digital outputs
- 3 X-IN digital inputs
- 4 X-BC temperature monitoring for brake resistor/brake chopper
- 5 X-BR inputs for monitoring the brake microswitches
- 6 J4 terminating resistance CAN line
- 7 X-CAN CAN
- 8 X-ENC15 rotary encoder SUB-D
- 9 X-ENCO rotary encoder simulation



Position of connection terminals on bottom

- 1 X3 motor
- 2 X-STO Safe Torque Off
- 3 X-SBY standby input
- 4 X1 line

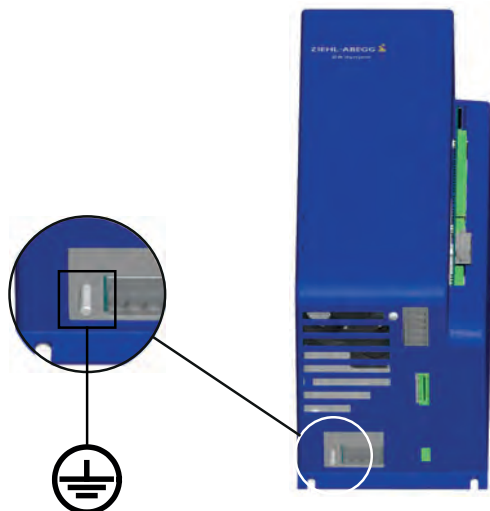


Terminal positions top

- 1 X-OUT1 digital outputs
- 2 X-PAD ZApad
- 3 X2 brake chopper/brake resistor

5.4 Protective ground connection

- The ZAdynpro has a leakage current of > 3.5 mA according to the defined networks in DIN EN 60990 and must therefore be permanently connected.
- In accordance with EN 50178, item 5.2.11 and 5.3.2.1, the PE conductor connection must have a cross-section of at least 10 mm².
- In the case of PE conductors < 10 mm², an additional PE conductor must be connected. The cross-section must correspond at least to the cross-section of the PE conductor on the connecting line.
- An M6 threaded bolt is available on the ZAdynpro to connect the PE conductor (see Fig.).



PE conductor connection ZAdynpro

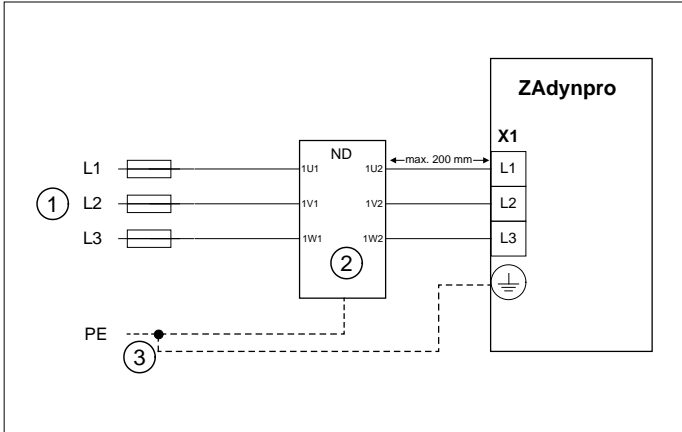
5.5 Mains connection (X1)



Danger!

Before connecting the ZAdynpro to the mains supply, it must be checked that the technical specifications on the rating plate and in the operating instructions of the ZAdynpro match the characteristics of the mains supply.

Designation of the connection terminal:	X1	
Network configurations:	<ul style="list-style-type: none">• The line filter and ZAdynpro are designed for use in an earthed power supply system.• Permissible network configurations are:<ul style="list-style-type: none">– TN network– TT network• The line filter and ZAdynpro are unsuitable for use in the IT network!	
Line cross-section:	<ul style="list-style-type: none">• The line cross-section must be specified dependent on the nominal motor current and the ambient conditions (e.g. temperature, wiring method) in accordance with DIN VDE 0100.	
Type of cable:	<ul style="list-style-type: none">• Rigid or flexible lines• In the case of flexible lines: Wire end ferrules recommended• Not shielded	
Connection type:	Spring-type terminals	
Mains fuse	The size of the mains fuse must reflect the cable cross-section used and the ambient conditions. Use the following maximum fuse sizes, depending on the frame size of the ZAdynpro:	
	ZAdynpro frame size	Max. fuse for operating class gG
	011/013	16 A
	017	20 A
	023	25 A
	032	35 A

Line reactor:	In order to use the ZAdynpro safely and in compliance with standards, a power choke of type ND... from ZIEHL-ABEGG SE must be integrated into the power line. Use the following power chokes, depending on the frame size of the ZAdynpro:		
	ZAdynpro frame size	Line reactor	Article number for power choke
	011	ND011	357180
	013	ND013	357181
	017	ND017	357182
	023	ND023	357183
	032	ND032	357184
Connection:	Mains connection		
	 <p>ZAdynpro mains connection 1 Mains 3~ 400V/PE/50Hz 2 Line reactor ND 3 Central ground point</p>		

5.6 Residual current operated device (RCCB)

Frequency inverters of the ZAdyn type require no FI circuit breaker for operation.

The circuit at the output of the ZAdynpro is monitored by an electronic short-circuit protection. On detecting a short-circuit current at the output of the ZAdyn (and thus negligible impedance between the phase and a body or the protective earth of the circuit, or a protective earth of the operating medium in the case of an error) the output current is switched off within a time of <20 µs. On condition that the potential equalisation for the ZAdyn and the motor was performed according to the valid standards (VDE0100-Part 540:2012-06 and DIN EN 50178:1997), this behaviour is sufficient for the automatic switch off in case of an error demanded by VDE 06-4100

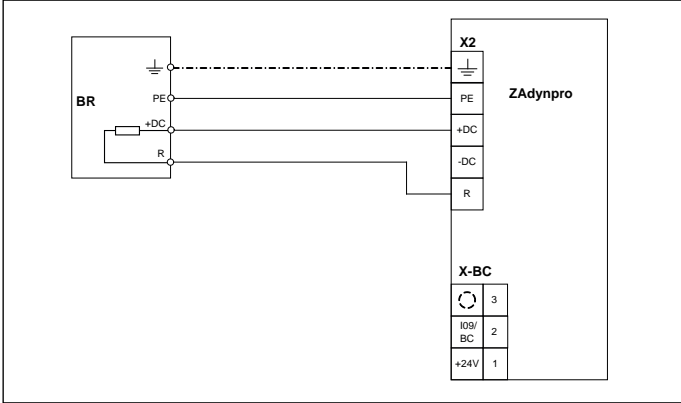
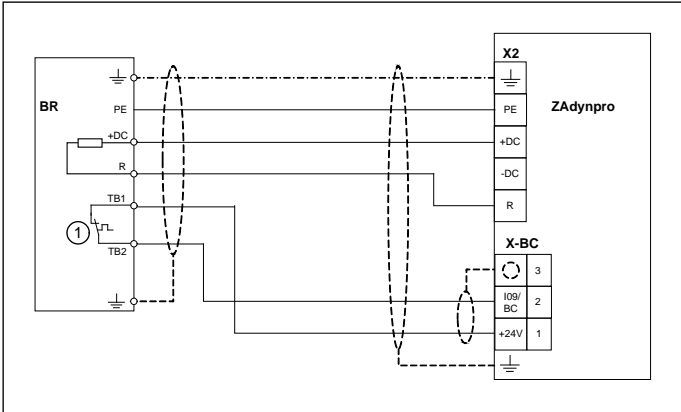
If an FI circuit breaker is required for special reasons (e.g. fire prevention), an all-current-sensitive FI circuit breaker type B must be used. For maximum operational reliability, ZIEHL-ABEGG recommends the use of an FI circuit breaker with a reference fault current of 300 mA for fire prevention according to regulation VdS 3501.



Information

Please note that even when using a correct FI circuit breaker of type B, false tripping due to high protective earth currents (leakage currents) can still occur.

5.7 Brake resistor (X2)

Designation of the connection terminal:	X2
Line cross-section:	max. 6 mm ²
Type of cable:	Shielded
Cable lengths:	<ul style="list-style-type: none">Maximum 5 mIf the pre-assembled line is not long enough in the brake resistor of the BR11-A type, this can be extended up to a length of 5 m. A shielded, self-extinguishing line is required for this.
Connection type:	Spring-type terminals
Parametrisation:	<p>The brake resistor or brake chopper used must be configured in the menu Encoder & BC/BC_TYP.</p> <div><div>Encoder & BC</div><div>↳ BC_TYP BR25</div><div>↳ BR25</div><div>BR/BC - Typ</div></div>
Connection:	<p>Brake-Resistor connection</p> <p>The brake resistor of the BR11-A type has no temperature monitor.</p> <div><p>BR11-A/BR 14-A</p><p>BR17/BR25/BR50/BR100</p></div>

CAUTION!

Caution!

It is imperative for an existing temperature monitor to be connected to the ZAdynpro! The brake resistor or the brake chopper may be burnt out in the event of a fault!

CAUTION!

Caution!

If the connection of a brake resistor (type BRxx) to the +DC and -DC terminals is faulty, it will emit a continuous power output and the device will become overheated. If a temperature monitor is not connected, the device will burn out!

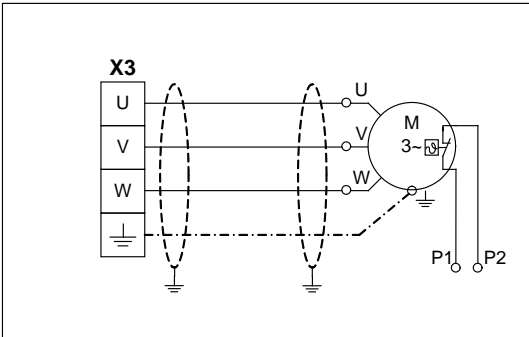
Type BR11-A

Brake resistor BR11-A possesses connected connecting wires. These must be wound twice around the toroidal core provided. It is important to wind both wires with the same direction of winding (see figure).



Toroidal core BR11-A

5.8 Motor connection (X 3)

Designation of the connection terminal:	X3
Line cross-section:	The line cross-section must be specified dependent on the motor's current and the ambient conditions (e.g. temperature, wiring method) in accordance with DIN VDE 0298-4.
Type of cable:	<ul style="list-style-type: none">• Shielded line• Rigid or flexible line• Rated voltage U_0 / U: 450 / 750 VAC
Cable lengths:	<ul style="list-style-type: none">• Max. 25 m
Connection type:	Spring-type terminals
Connection:	<div></div> <p>Connection asynchronous motor / synchronous motor</p>

**Danger!**

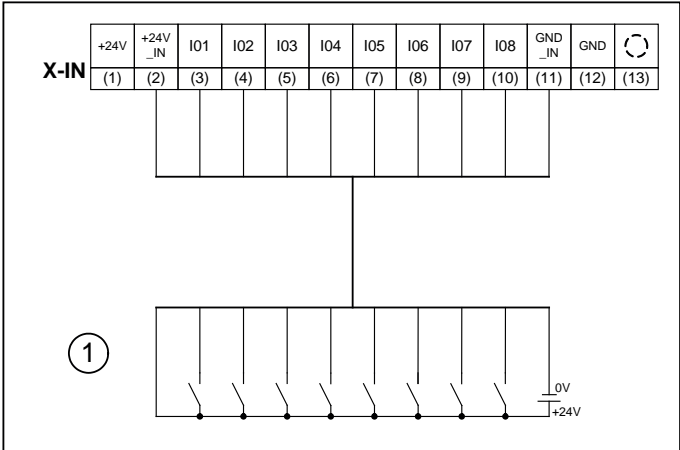
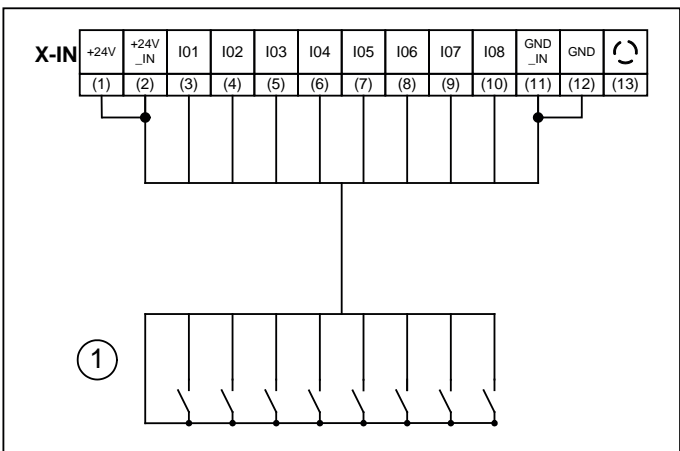
Always switch off the mains voltage when connecting the motor line. The contactorless operation mode ("safe torque off" function (STO)) does **not** galvanically isolate the output stage of the frequency inverter from the motor line connection terminal!

**Danger!**

When operating the motor with a rotary encoder, the line to the motor must be connected on the motor and inverter side phase-correct: U -> U / V -> V / W -> W.

Never swap the connection; not even if the rotary direction of the motor is false!! If the motor phases are swapped, motor control is generally not possible. This can lead to jerky movements or uncontrolled acceleration of the motor.

5.9 Digital inputs (X-IN)

Designation of the connection terminal:	X-IN						
Number of the digital inputs:	8, freely configurable						
Technical data:	<p>The digital inputs comply with the IEC61131-2 TYPE 2 industry standard.</p> <table> <tr> <td>Voltage range:</td><td>+22 ... 26 VDC</td></tr> <tr> <td>Switching level low/high:</td><td><5 VDC / >11 VDC</td></tr> <tr> <td>Current consumption at 24 V:</td><td>10 mA (-20%)</td></tr> </table>	Voltage range:	+22 ... 26 VDC	Switching level low/high:	<5 VDC / >11 VDC	Current consumption at 24 V:	10 mA (-20%)
Voltage range:	+22 ... 26 VDC						
Switching level low/high:	<5 VDC / >11 VDC						
Current consumption at 24 V:	10 mA (-20%)						
Line cross-section:	max. 1,5 mm ²						
Type of cable:	<ul style="list-style-type: none"> Individual conductors Not shielded 						
Cable lengths:	Max. 25 m						
Connection type:	Screw terminals						
Connection:	<p>Connection with external power supply</p>  <p>1 Brake control () terminal designation of connector</p> <p>When using the external power supply the bridges between the terminals +24V / +24V_IN and GND / GND_IN the pre-assembled control cable X-I are not required. These must be removed!</p> <p>Connection with internal power supply</p>  <p>1 Brake control () terminal designation of connector</p> <p>When using the internal power supply, a bridge must be placed between the +24V / +24V_IN terminals and between GND / GND_IN.</p>						

CAUTION!**Caution!**

The internal 24 V power supply is provided solely for the digital inputs. Switching consumer load with this voltage is prohibited!

Terminal assignment X-IN

- You can configure the inputs I1 ... I8 assignments. The configuration can be implemented by:
 - Presetting the used control system (assignment corresponding to the control requirements)
 - Free configuration
- Implement configuration of the digital inputs in the **Control system\CONFIG** menu.

The input assignments dependent on the configuration:

Configuration	Inputs							
	I01	I02	I03	I04	I05	I06	I07	I08
00:Free	RF*	V1*	V2*	V3*	VZ*	RV1 UP*	RV2 DOWN*	Free*
01:ZA_IO	RF	V1	V2	V3	VZ	RV1 UP	RV2 DOWN	Free*
03:BP_IO	RF	V1	V2	V3	VZ	RV1 UP	RV2 DOWN	Free*
08:KN_IO	RF	V1	V2	V3	VZ	RV1 UP	RV2 DOWN	Free*
11:NL_IO	RF	V1	V2	V3	VZ	RV1 UP	RV2 DOWN	Free*
13:SS_IO	RF	V1	V2	V3	VZ	RV1 UP	RV2 DOWN	V4*
15:ZA_BIN	RF	DIR	BIN0	BIN1	BIN2	Free	Free	Free*
16:WL_IO	RF	V1	V2	V3	VZ	RV1 UP	RV2 DOWN	V4*
21:ST_IO	RF	V1	V2	V3	VZ	RV1 UP	RV2 DOWN	Free*
24:CSILVA	RF	BIN0	BIN1	BIN2	Free	RV2 DOWN	RV1 UP	Free*
25:S+S	SBIN2	SBIN1	SBIN0	RV1 UP	RV2 DOWN	Free*	Free*	RF*
27:MAS_BIN	RF	DIR	MBIN0	MBIN1	MBIN2	BR1	BR2	Free*
30:KS_IO	RF	V1	V4	V2	VZ	RV1 UP	RV2 DOWN	V3*
31:KL_IO	V4	V1	V2	V3	VZ	RF+RV1	RF+RV2	PA-RA*2
32: S_SMART	RF*	V1*	LZ*	V3*	V5*	RV1 UP*	RV2 DOWN*	Free*

* The function of the inputs can be changed

**Information**

To be able to travel, at least the following input signals need to be present:

- Controller enable
- Speed
- Direction default

**Binary travelling speed default
Standard (CONFIG=15:ZA_BIN)**

Travel speed V_3	Binary inputs		
	BIN2	BIN1	BIN0
-	0	0	0
V1	0	0	1
V2	0	1	0
V3	0	1	1
V4	1	0	0
V5	1	0	1
V6	1	1	0
VZ	1	1	1

5.10 Digital outputs (X-OUT1, X-OUT2)

Designation of the connection terminals:	X-OUT1 X-OUT2		
Number of outputs:	X-OUT1: 3, freely configurable X-OUT2: 2, freely configurable		
Technical data:		X-OUT1	X-OUT2
	Short-circuit-proof	no*	no*
	Min. switching capacity	5 mA / 12 VDC	5 mA / 12 VDC
	Max. switching capacity	2 A / 250 VAC	500 mA / 24 VDC
Line cross-section:	max. 1,5 mm ²		
Type of cable:	Not shielded		
Cable lengths:	Max. 25 m		
Connection type:	Screw terminals		
Connection:	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>X-OUT1</p> </div> <div style="text-align: center;"> <p>X-OUT2</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: left;"> <p>1 Brake control () terminal designation of connector</p> </div> <div style="text-align: left;"> <p>1 Brake control () terminal designation of connector</p> </div> </div>		

CAUTION!**Caution!**

* In order to protect the relay contacts, switched inductivities must be provided with an external suppressor circuit (suppressor diode, RC element).

Terminal assignment of X-OUT1, X-OUT2

- The output assignments can be configured. The configuration can be implemented by:
 - Presetting the used control system (assignment corresponding to the control requirements)
 - Free configuration
- Implement configuration of the digital outputs in the **Control system\CONFIG** menu.
- Please refer to the "Parameter list/Control menu" chapter for a description of the individual parameters

The output assignments dependent on the configuration:

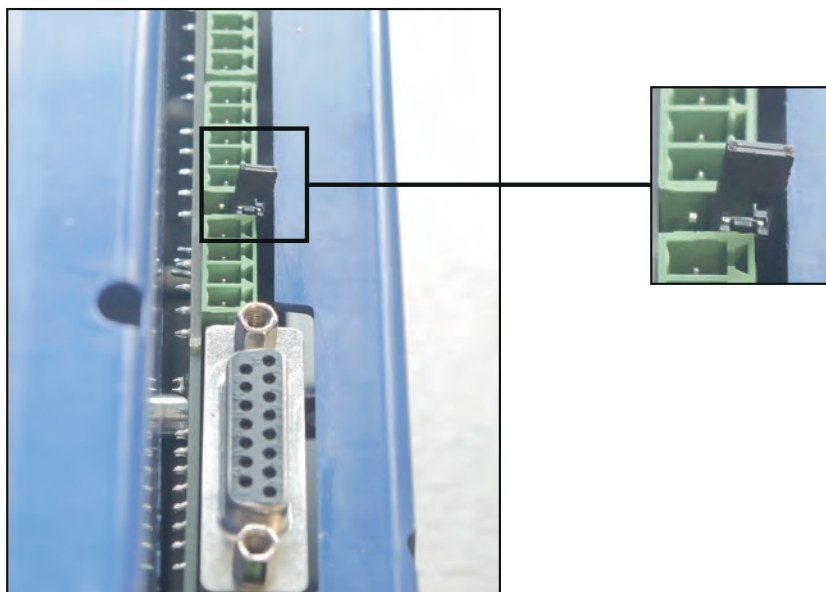
Configuration	Outputs				
	O11 - O14	O21 - O24	O31 - O34	O41 - O44	O51 - 54
00:Free	Err*	MB_Brake*	MotContact*	V < V_G1*	STO-Info*
01:ZA_IO	Fault	MB_Brake	MotContact	V < V_G1	STO-Info
03:BP_IO	Fault	MB_Brake	MotContact	V < V_G1	STO-Info
08:KN_IO	Fault	MB_Brake	MotContact	V < V_G1	STO-Info
11:NL_IO	Fault	MB_Brake	MotContact	V < V_G1	STO-Info
13:SS_IO	Fault	MB_Brake	MotContact	V < V_G1	STO-Info
15:ZA_BIN	Fault	MB_Brake	MotContact	V < V_G1	STO-Info
16:WL_IO	Fault	MB_Brake	MotContact	V < V_G1	STO-Info
21:ST_IO	Fault	MB_Brake	MotContact	V < V_G1	STO-Info
24:CSILVA	Fault	MB_Brake	MotContact	V < V_G1	STO-Info
25:S+S	MotContact	MB_Brake	V=O	Fault	STO-Info
27:MAS_BIN	Fault	MB_Brake	MotContact	Off*	STO-Info
30:KS_IO	Fault	MB_Brake	MotContact	V < V_G1	STO-Info
31:KL_IO	fault	MB_Brake	MotContact	EVAC.DIR	STO-Info
32: S SMART	Fault	MB_Brake	MotContact	SD	STO-Info

* The function of the outputs can be changed

5.11 CAN interface (X-CAN)

Designation of the connection terminal:	X-CAN
Line cross-section:	
Type of cable:	<ul style="list-style-type: none"> • Not shielded • Twisted pair
Cable lengths:	<ul style="list-style-type: none"> • Main line: Max. 200 m • Stub lines: Max. 6 m
Connection type:	Screw terminals
Connection:	<ul style="list-style-type: none"> • The wiring is in a linear structure. The individual devices are connected to the main line with short stub lines. • The bus should be terminated with a terminating resistor of 120 - 150 Ohms, at both ends of the bus. <div data-bbox="794 1682 1251 2051" data-label="Diagram"> </div> <p>() terminal designation of connector</p>

To activate the terminating resistance, the jumper at terminal J4 must be plugged into the right two pins (see Fig.).



Jumper at terminal J4

☞ For more detailed information on CANopen lift, see chapter "Serial communication/CANopen lift" in part 2 of the operating instructions.

5.12 STO interface (X-STO)

The following points must be observed when switching and wiring the STO signals:

- Separate relays must be used for every input for switching the STO signals (two-channel activation).
- When wiring the STO signals, short-circuits and external shorts must be ruled out on power lines and terminal points because the internal diagnostics of the ZAdynpro does not detect any short-circuits on the power lines:
 - Outside the switch cabinet, the STO line must be permanently laid (fixed) and protected against external damage (e.g. cable duct, armoured tube or similar). If separate jacketed cables are used for the STO_A and STO_B signals, the cables must not be laid with protection (according to ISO 13849-2).
 - Air and creep distances of at least 2 mm must be kept between the STO_A, STO_B and +24V_STO signals according to EN81 (e.g. at terminal points).
 - Terminals which comply with a CENELEC or IEC standard must be used.
 - The wiring technique must be compliant with DIN EN 60204-1
- External shorts must be ruled out in the exciter voltage of the relays that actuate the STO inputs (end of the safety chain).
- Supply cables (power cable, motor cable) and STO cables must be laid separately.

The relays used to activate the STO inputs must meet the following requirements:

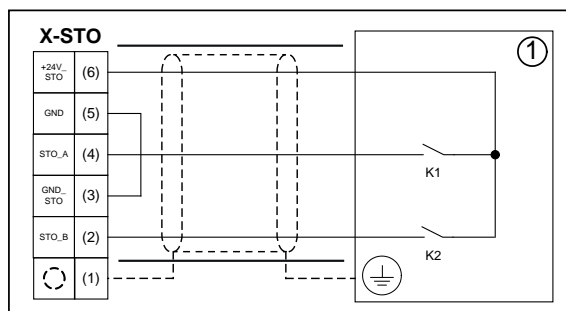
Rating:	According to the technical data of the STO inputs: Typ. 24 V/12 mA
Switching voltage:	Min. 60 VDC
Relay contacts:	Recommended: Relays with hard-gold-plated contacts
Isolation:	Safe disconnection between coil and contacts according to EN 60664-1 or equivalent standard.
Interference immunity:	Sufficient interference immunity to interference voltages on the control side (coil), such as for capacitive couplings in long control lines. If in doubt, use a relay with increased drop voltages (such as Phoenix Contact series PLC-...SO46, Finder series 38.51.3 or comparable).

**Danger!**

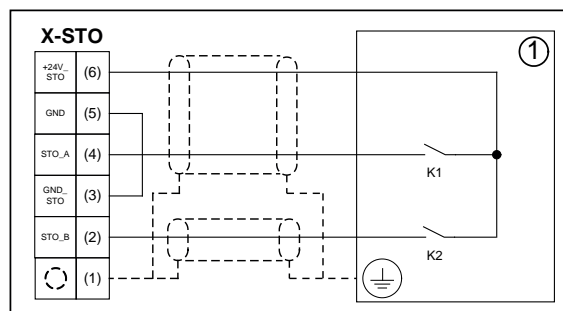
If you use an external voltage source instead of the internally generated 24-V voltage (X-STO: +24V_STO) to actuate the STO inputs, you must use a voltage source with low voltage and safe electrical disconnection (SELV/PELV).

See the chapter "Safe Torque Off(STO) function" for further information.

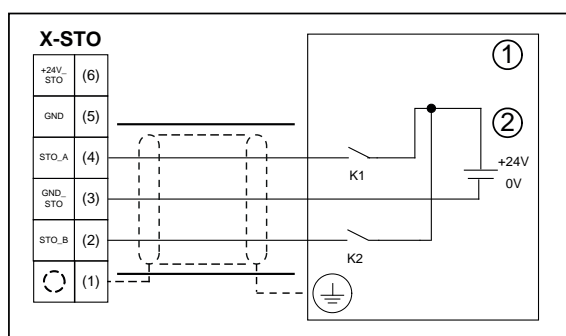
Designation of the connection terminal:	X-STO	
Technical data:	Voltage range	0...30 VDC
	Switching level LOW / HIGH	0 V < LOW < 3 VDC 15 V < HIGH < 30 VDC, typical: 24 VDC
	Current consumption at 24 VDC	typ. 12 mA per input
Line cross-section:	min. 0.25 mm ² ...max. 2.5 mm ²	
Type of cable:	<ul style="list-style-type: none">• Shielded lines• Apply shielding on both sides• ZAdynpro shield coating version: Connection of pigtail to terminal 1 of connection terminal X-STO	
Cable lengths:	Max. 50 m	
Connection type:	Screw terminals	
Connection:		



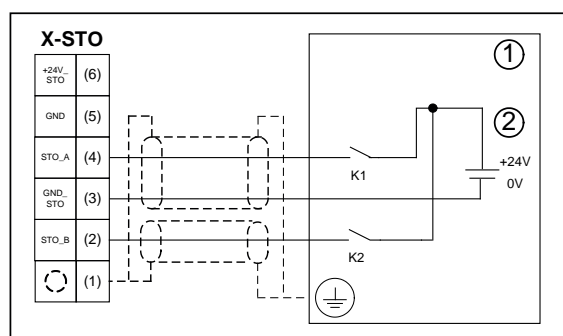
Connection with internal 24 V voltage and protected routing
1 Brake control



Connection with internal 24 V voltage using two separate jacketed cables
1 Brake control




Connection with external 24 V voltage and protected routing
1 Brake control
2 External voltage source SELV/PELV



Connection with external 24 V voltage using two separate jacketed cables
1 Brake control
2 External voltage source SELV/PELV

Terminal assignment X-STO

no.	Name	Function
6	+24V_STO	24VDC output voltage (to be used only for activation of the STO inputs, do not connect any additional loads)
5	GND	Reference potential 24VDC output voltage
4	STO_A	Input STO A
3	GND_STO	Reference potential, inputs STO_A/B
2	STO_B	Input STO_B
1		Shielding

5.13 Connection of asynchronous motor rotary encoder (X-ENC15)

Designation of the connection terminal:	X-ENC15	
Connection type:	D-Sub, 15-pin, in two rows	
Cable lengths:	Max. 25 m	
Type of cable:	Shielded twisted pair cable	
Technical data:	Type:	Incremental counter TTL
	Signal shape:	Right angle, Sin/Cos
	Operating voltage:	5 VDC
	Resolution:	64 ... 4096 pulse / revolution
	Input resistor	120 Ω
	Cut-off frequency	200 kHz
	TTL differential frequency (against GND)	Ulow ≤ 0.5 V Uhigh ≥ 2.5 V
	Sine differential signal (at 2.5 V offset against GND)	0,6 Vss ... 1,2 Vss (typ. 1Vss)
Parametrisation:	<p>Before the rotary encoder is plugged in/connected, the rotary encoder type and resolution used must be configured in the "Encoder & BC/ENC_TYP" and "Encoder & BC/ENC_INC" menu.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <pre>Encoder & BC ↳ ENC_Typ TTL rect. ↳ TTL rect. Encoder type</pre> </div> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <pre>Encoder & BC ↳ ENC_INC 2048 ↳ 2048 Encoder resolution</pre> </div> </div>	

5.13.1 X-ENC15 pin assignment

1	-	-
2	-	-
3	-	-
4	+5 V_E	Power supply
5	DGND	Ground
6	-	-
7	B	Track B
8	-	-
9	-	-
10	-	-
11	-	-
12	A	Track A
13	/A	Track A inverse
14	/B	Track B inverse

15	DGND	Ground
Housing		Shielding

5.14 Rotary encoder connection for synchronous motors (X-ENC15)

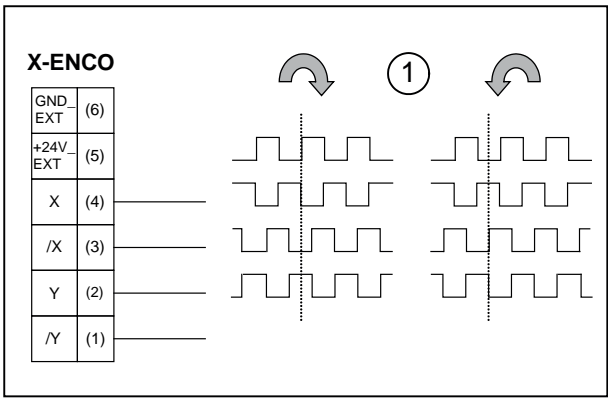
Designation of the connection terminal:	X-ENC15	
Connection type:	D-Sub, 15-pin, in two rows	
Cable lengths:	Max. 25 m	
Type of cable:	Shielded twisted pair cable	
Technical data:	Type:	Rotary encoder, absolute
	Interfaces:	EnDat 01 SSI Sin/Cos BiSS-C
	Resolution:	512 ... 4096 pulse / revolution
	Input resistor	120 Ω
	Cut-off frequency	200 kHz
	Sine differential signal (at 2.5 V offset against GND)	0,6 Vss ... 1,2 Vss (typ. 1Vss)
Parametrisation:	Before the rotary encoder is plugged in/connected, the encoder type and resolution used must be configured in the " Encoder & BC/ENC_TYPE " and " Encoder & BC/ENC_INC " menus. <div style="display: flex; justify-content: space-around; align-items: flex-start;"><div style="border: 1px solid black; padding: 5px; width: 45%;"><p>Encoder & BC</p><p>↳ ENC_Typ TTL rect.</p><p> ↳ TTL rect.</p><p>Encoder type</p></div><div style="border: 1px solid black; padding: 5px; width: 45%;"><p>Encoder & BC</p><p>↳ ENC_INC 2048</p><p> ↳ 2048</p><p>Encoder resolution</p></div></div>	

5.14.1 Pin assignment for EnDat 01, SSI, SIN/COS interface

1	DATA	Data line
2	/DATA	Data line inverse
3	/D	Analog track D inverse
4	+5 V_E	+5/8V voltage supply (power supply is switched off if the rotary encoder is missing)
5	DGND	Ground
6	/C	Analog track C inverse
7	B	Analog track B
8	C	Analog track C for transmitting position
9	/CLK	Clock signal invers
10	CLK	Clock signal for serial transfer
11	D	Analog track D for transmitting position
12	A	Analog track A
13	/A	Analog track A inverse
14	/B	Analog track B inverse
15	DGND	Ground
Housing		Shielding

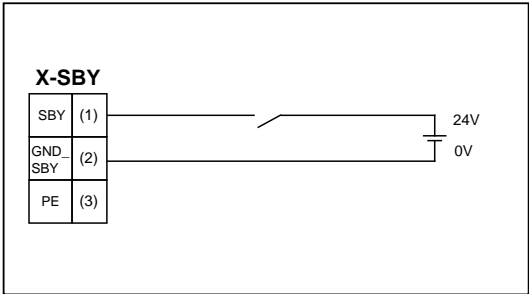
5.15 Rotary encoder simulation (X-ENCO)

- The rotary encoder simulation transforms the signals of the rotary encoder mounted on the motor into differential signals according to ANSI standard RS422. The resolution of the rotary encoder simulation is identical to the resolution of the rotary encoder.
- As a result of the connection of an external 24 V voltage source to terminal +24V_EXT, the rotary encoder simulation is active even when the ZAdynpro is switched off.

Designation of the connection terminal:	X-ENCO	
Line cross-section:	max. 1.5mm ²	
Type of cable:	Shielded twisted pair cable	
Connection type:	Screw terminals	
Technical data:	Output signal high	min. 2,8 V / 8 mA
	Output signal low	max. 0,4 V / 4 mA
	Rload	≥ 120 Ω
	Short-circuit-proof	No
Connection:	 <p>Connection of rotary encoder simulation 1 Signals depending on the rotating direction of the motor (with view to the power take-off side) () terminal designation of connector</p>	

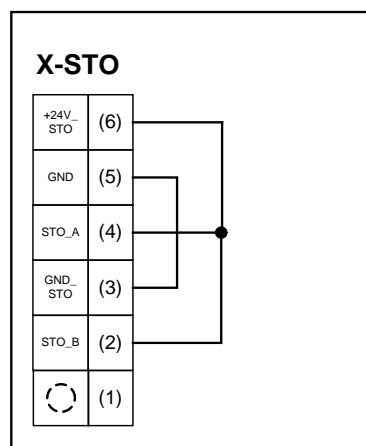
5.16 Standby input (X-SBY)

- By applying a 24-V voltage, the standby mode of the ZAdynpro is activated.

Name:	Standby input	
Symbol:	X-SBY	
Technical data:	Voltage range:	+20...28 VDC
	Switching level low/high	<5 VDC / >15 VDC
	Current consumption at 24 V	typ. 8 mA
Line cross-section:	max. 1.5 mm ²	
Type of cable:	Shielded lines	
Cable lengths:	Maximum 50 m	
Connection type:	Screw terminals	
Connection:		

5.17 Motor contactors (optional)

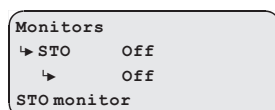
The STO connection must be bridged if motor contactors are used (see fig.).



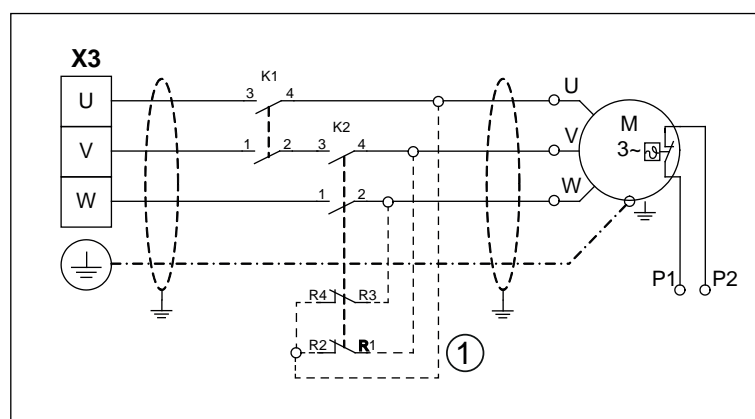
STO connection bridged

The monitor of the STO function must also be deactivated.

The STO function is activated/deactivated in the **Monitors/STO** menu.

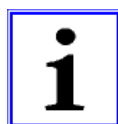


The maximum cable length to the motor contactors for non-shielded lines is **200 mm**. Shielded lines must be used if there is a greater distance between the contactors and the ZAdynpro.



Synchronous motor connection

1 Bridges can be omitted for asynchronous motors



Information

S

If an emergency evacuation is carried out by opening the brakes, the motor windings should be short-circuited for the evacuation to prevent an uncontrolled acceleration of the elevator. The short-circuit generates a speed-dependent braking torque, sufficient in most cases to reduce the elevator speed to a safe level.

CAUTION!

If operating with synchronous motors from other manufacturers, you have to ensure that a manually emergency evacuation is approved.

5.17.1 Monitoring of the motor contactors (X-BR)**Danger!**

Operating lift drives is only permissible with connected and activated contactor monitoring!

**Information**

The switching states of the motor contactors must be monitored according to EN 81-20. The ZAdynpro contactor monitoring is no substitute for this monitoring of the motor contactors demanded in EN 81-20!

General

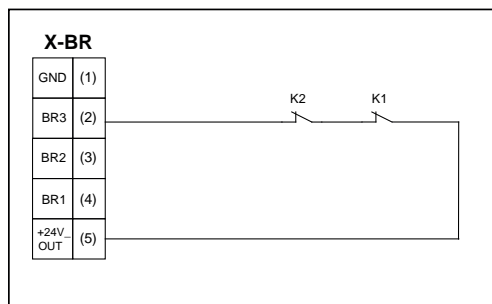
- The ZAdynpro monitors the switching status of the motor contactors. The contactors must be retracted during travel. Opening the contactors during travel (e.g. through bar impacts) will lead to immediate interruption of the travel.
- The contacts for monitoring the motor contactors are arranged in series.

The contactor monitoring is activated/deactivated in the **Control system/f_XBR3** menu.

```
Control
↳ f_XBR3 44:
  ↳      47: CO
Function of input BR3
```

Technical data for contactor monitoring

Monitoring voltage	+24 VDC
Contact type	Normally open contact (NO) or normally closed contact (NC)
Number of inputs	1
Clamping range	max. 1,5 mm ²
Current consumption at 24 V	Typ. 10 mA -20%

Contactor monitoring connection

Connection internal contactor monitoring – series circuit
() terminal designation of connector

**Information**

The internal 24 V power supply is only provided for the inputs of the ZAdynpro. Switching consumers with this voltage is not permitted!

5.18 Brakes

5.18.1 Brake release monitoring (X-BR)

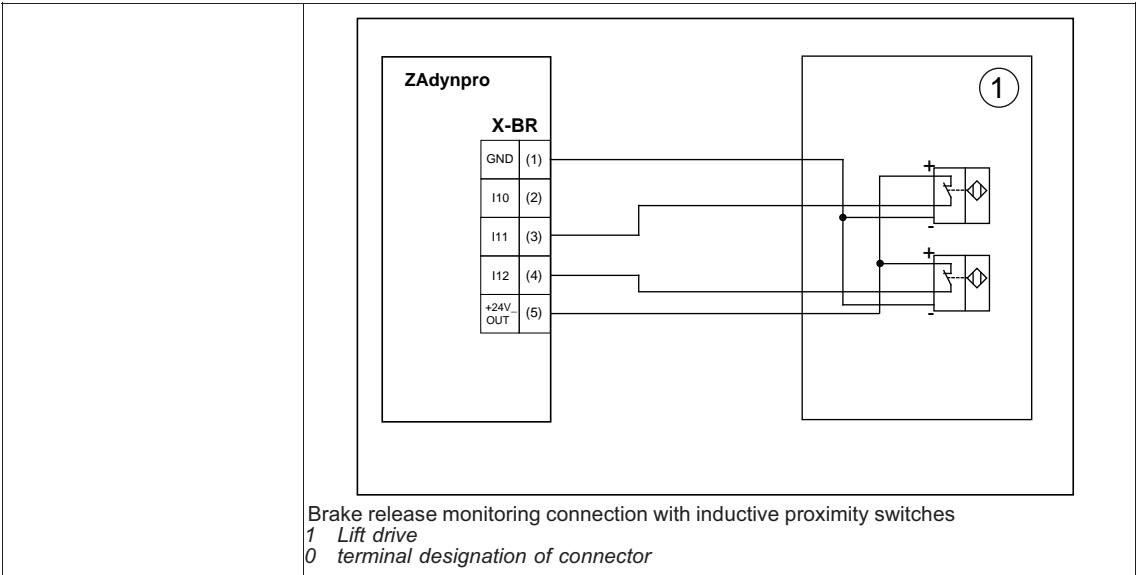
- The brake release monitoring serves as monitoring for redundancy and the operation status of the brakes.
- It is recommended that the brake release monitoring be connected to the ZAdynpro for optimum starting and stopping.



Information

When the lock function is activated, the brake release monitor meets the self-monitoring requirements according to EN 81-20 Chapter 5.6.6.2 for protection devices for the cabin moving upwards against overspeeding and Chapter 5.6.7.3 as a protection device against unintended cabin movement.

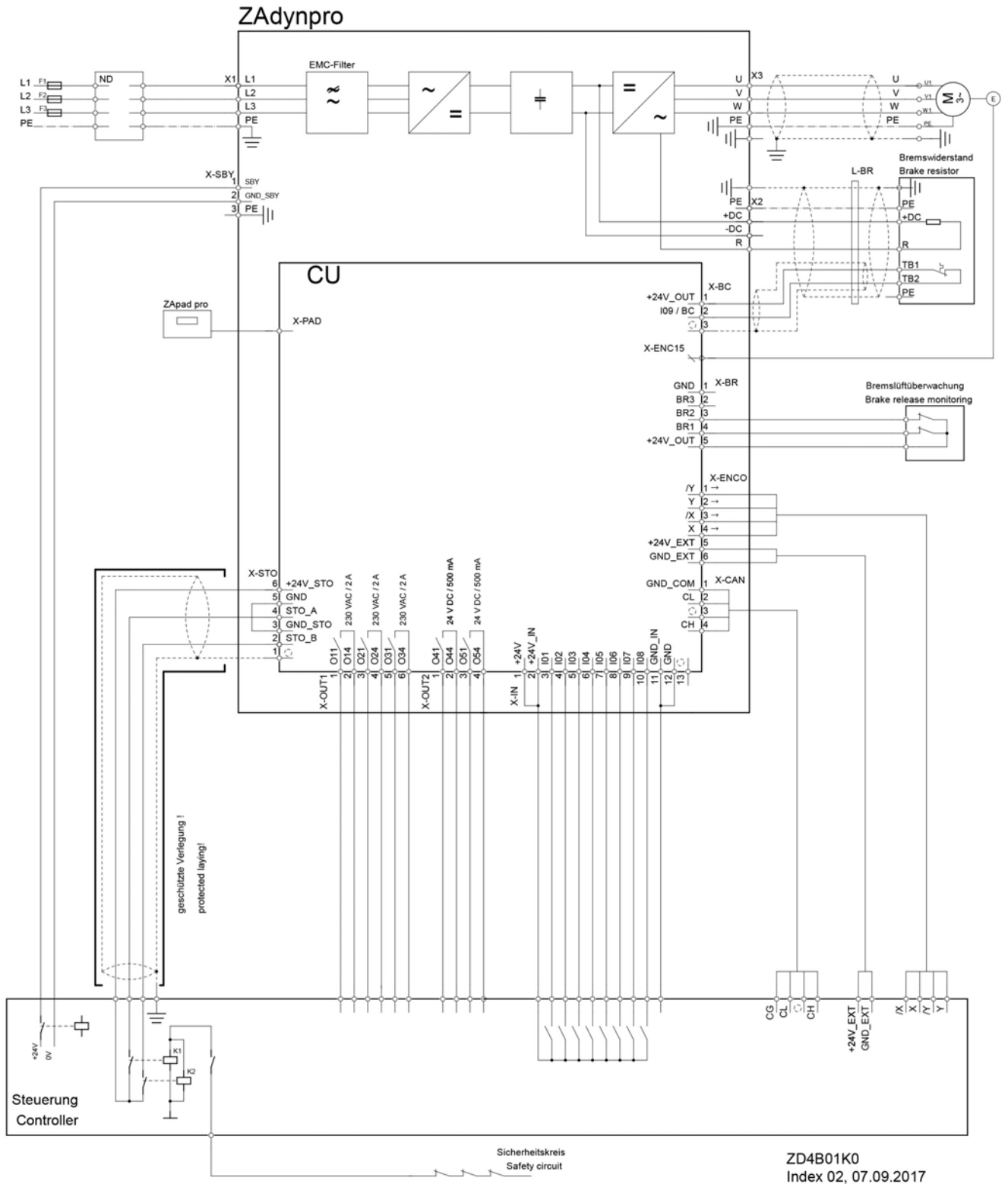
Name:	Brake release monitoring											
Symbol:	X-MON											
Line cross-section:	max. 1,5 mm ²											
Type of cable:	Not shielded											
Cable lengths:	Max. 25 m											
Connection type:	Screw terminals											
Technical data:	Monitoring voltage	+24 VDC										
	Contact type	Normally open contact (NO) or normally closed contact (NC)										
	Number of inputs	4										
	Clamping range	max. 1.5 mm ²										
	Current consumption at 24 V	Typ. 10 mA -20%										
Parametrisation:	<p>The contactor monitoring can be activated/deactivated in the menu Monitoring.</p> <div><div>Monitoring</div><div>↳ BR 1*NC</div><div>↳ 3*NC</div><div>Brake control (BR1..BR4)</div></div>											
	<p>The lock function of the ZAdynpro is engaged by activating the LOCKBR=On parameter in the menu Monitors.</p> <div><div>Monitoring</div><div>↳ LOCKBR Off</div><div>↳ On</div><div>Lock inverter</div></div>											
	<p>Activation of the parameter ensures that the ZAdynpro locks upon detection of a faulty brake circuit.</p> <p>The ZAdynpro lock can only be released by setting the Monitors/UNLOCK = On parameter.</p>											
Connection:	<div><div><div><div>X-BR</div><table><tr><td>GND</td><td>(1)</td></tr><tr><td>BR3</td><td>(2)</td></tr><tr><td>BR2</td><td>(3)</td></tr><tr><td>BR1</td><td>(4)</td></tr><tr><td>+24V OUT</td><td>(5)</td></tr></table></div><div><div>1</div></div></div></div> <div><p>Connection of brake release monitoring with micro switches</p><p>1 Monitoring contacts</p><p>() terminal designation of connector</p></div>		GND	(1)	BR3	(2)	BR2	(3)	BR1	(4)	+24V OUT	(5)
GND	(1)											
BR3	(2)											
BR2	(3)											
BR1	(4)											
+24V OUT	(5)											



Information

The internal 24 V power supply is only provided for the inputs of the ZAdynpro. Switching consumers with this voltage is not permitted!

5.19 ZAdynpro circuit suggestion



6 Operation and parameterising

6.1 Options for control

To operate and configure the ZAdynpro, the following control options are available:

- ZApadpro control terminal
- Remote control via ZAmon software
- Remote control via the elevator controller display

6.1.1 ZApadpro control terminal

The ZApadpro is a control module independent of the ZAdynpro. Remote control of the ZAdynpro is possible when a longer connection line is used.

6.1.1.1 Mounting / Fastening



ZApadpro on the front



ZApadpro on the right-hand side

6.1.1.2 Connection

The RJ-45 socket of the control terminal and of the ZAdynpro (X-PAD) are used for connection.

Connection cable

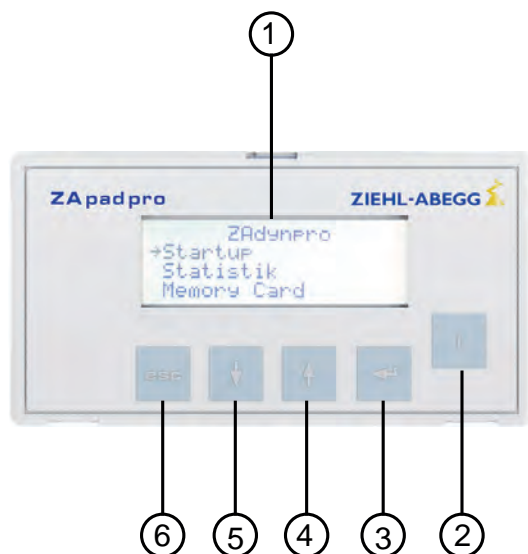
Line cross-section:	>= AWG26
Type of cable:	CAT5 network cable, 8-core
Cable lengths:	Max. 50 m
Connection type:	both sides RJ-45 plug, 8-pole



Connection of the ZApadpro on the ZAdynpro

6.2 Menu navigation






6.2.1 ZApadpro and ZAmon control interface



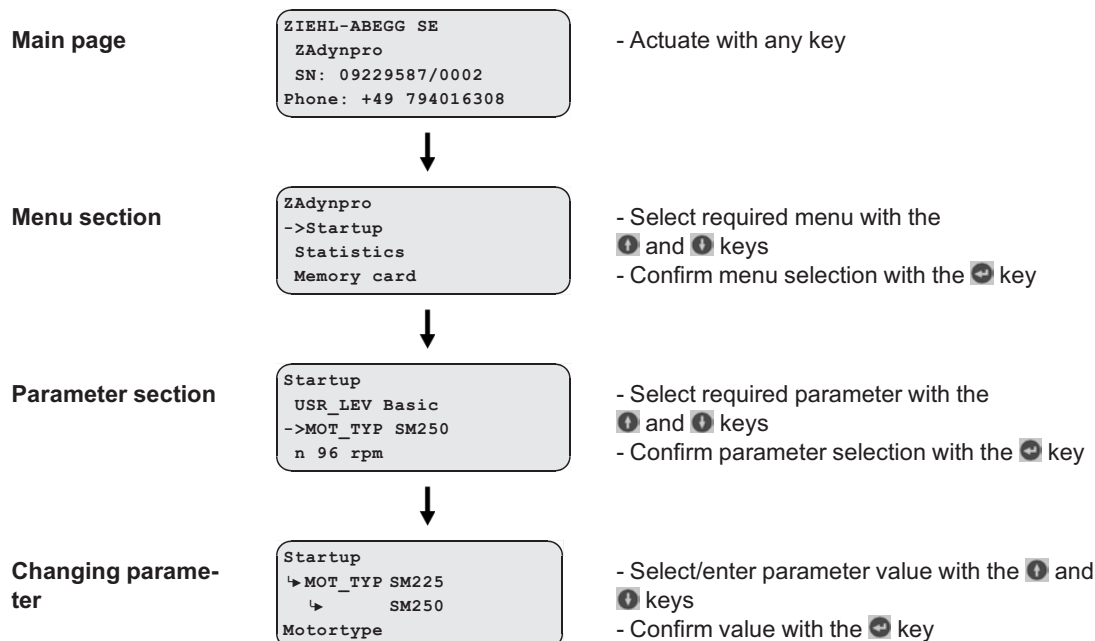
ZApadpro and ZAmon control interface

- 1 Display
- 2 i key
- 3 Enter key
- 4 Arrow UP key
- 5 Arrow DOWN key
- 6 ESC key

6.2.2 Control key functions

	<ul style="list-style-type: none"> • back to menu selection • Back to parameter selection • Negation of yes-no queries • Cancel
	<ul style="list-style-type: none"> • Confirming menu selection • Confirming parameter values • Confirming parameter values • Affirmation of yes-no queries
	<ul style="list-style-type: none"> • Menu selection • Parameter selection • Increasing parameter values
	<ul style="list-style-type: none"> • Menu selection • Parameter selection • Reducing parameter values
	<ul style="list-style-type: none"> • Show / exit INFO menu • Display of current operational states

6.2.3 Menu and parameter navigation



6.2.4 The different operating levels

The firmware of the ZAdynpro is divided into two control levels:

Basic Level

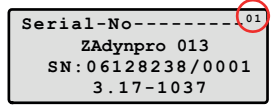
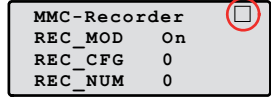
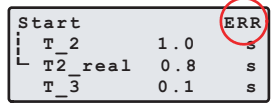
- Three menus are available here: **Startup**, **Statistics** and **Memory card**.
- Starting up takes place exclusively in the **Startup** menu.

Advanced Level

- In the advanced level, all parameters are displayed. The parameters are described in the chapter "Parameter list".
- Depending on the parameterisation, unneeded parameters are hidden automatically to give a better overview.
- You can switch between the basic level and advanced level section by pressing and holding the key.
- The level which is active after the controller start can be set by the parameter **LCD & Password/USR_LEV**.

6.2.5 Meaning of the arrows appearing in the display:



<pre>Motor-Typenschild → Encoder & BC Anlage-daten Steuerung</pre>	→	Selecting a menus in the menu level
<pre>Motor-Typenschild n 128 rpm ↳ f 18.0 Hz I 40.4 A</pre>	└→	Selecting changeable parameters in the menu
<pre>Anlage-Daten MOD_n* Mit D..i2 n* 94 rpm __D 0.240 m</pre>	└└	Selected parameter can be modified, but is blocked at the moment. The block can be implemented by assigning a password or functionally (dependent on another parameter)
<pre>Start T_2 1.0 s T2_real 0.8 s T_3 0.1 s</pre>	└└└	Value / function of a parameters is only displayed for informational purposes and cannot be modified.

	i Zahl	Current position (page number) in the INFO-menue
	<input type="checkbox"/>	The recorder for recording measurements on the memory card is activ
	ERR	ZAdynpro fault The ZAdynpro must be deactivated

6.3 Entering numerical values

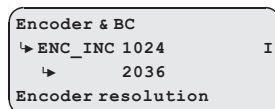
Entering numerical parameter values can be done in two different ways:

6.3.1 Continuous change of a parameter value

After selecting the parameter, the parameter value can be set by continuously changing the numerical value using the  &  key.




Short keypress: Number is incremented/decremented by 1

Long push on the key: Number automatically increases/decreases until the key is released.

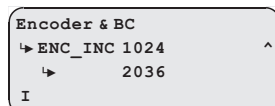


6.3.2 Changing individual digits

When changing a parameter by a large value, it is possible to change the individual digits separately

After selecting the parameter, use  to select the desired digit and change from 0...9 with the  &  key

The selected digit is marked with an arrow.



7 Start-up

7.1 General



Danger!

Defective connections can cause the motor to start unexpectedly or lead to uncontrolled motor movements.

Reversed connections cause the motor to rotate in the wrong direction. That can cause serious machine damage.

CAUTION!

Caution!

Incorrectly wired connections can destroy the electrical/electronic components.

Electrostatic discharges can be hazardous to the electronic components and lead to errors in the software.

You must comply with the following points to prevent machine damage or life-threatening injuries when commissioning the machine:

- Only suitably qualified personnel are to be entrusted with the commissioning of the device. They must comply with the safety instructions.
- Before starting work, make sure all tools and external parts have been removed from the machine.
- Activate all safeguards and the emergency-off switches before commissioning.
- Make sure no unauthorized persons are in the machine working area and that no other persons can be endangered when the installation is started up.
- inspect the electrical connections before the first start
- Pay special attention to the protective measures (e.g. grounding, ...) for the electrostatically endangered components.
- Also read the chapter "General Safety Instructions".

7.2 Configuring the ZAdynpro

1.	Select Startup menu	ZAdynpro ->Startup Statistics Memory card
2.	Select parameter LCD Choose language The languages German and English are integrated as standard. A third language can be loaded with the memory card.	Start-up ↳ LCD Deutsch ↳ English Sprache - Language
3.	Select parameter USR_LEV The level which is active after the controller start can be set with the parameter USR_LEV .	Start-up ↳ USR_LEV Basic ↳ Advanced User level
4.	Select parameter MOT_TYP Enter the operated motor type	Start-up ↳ MOT_TYP SM 200 ↳ SM 200 Motor
5.	Select parameter n Enter nominal speed of the motor	Start-up ↳ n 72 rpm ↳ 72 Rated speed
6.	Select parameter f Enter nominal frequency of the motor	Start-up ↳ f 18.0 rpm ↳ 18.0 Rated frequency
7.	Select parameter I Enter nominal current of the motor	Start-up ↳ f 13.7 rpm ↳ 13.7 Rated current

8.	Select parameter U Enter nominal voltage of the motor	<div>Start-up</div> <div>↳ U 360 V</div> <div>↳ 360</div> <div>Rated voltage</div>
9.	Select parameter P Enter nominal power of the motor	<div>Start-up</div> <div>↳ f 5.5 rpm</div> <div>↳ 5.5</div> <div>Rated power</div>
10.	Select parameter cos phi Enter power factor of the motor A Possible only for asynchronous motors	<div>Start-up</div> <div>↳ cos phi 0.75</div> <div>↳ 0.75</div> <div>Power factor</div>
11.	Select parameter TYP Choose connection type of the motor	<div>Start-up</div> <div>↳ TYPE Star</div> <div>↳ Triangle</div> <div>Connection type</div>
12.	Select parameter ENC_TYP Enter the type of encoder used	<div>Start-up</div> <div>↳ ENC_TYP EnDat/SSI</div> <div>↳ EnDat/SSI</div> <div>Encoder type</div>
13.	Select parameter ENC_INC Enter the encoder resolution	<div>Start-up</div> <div>↳ ENC_INC 2048 INC</div> <div>↳ 2048</div> <div>Encoder resolution</div>
14.	Select parameter BC_TYP Enter the used brake resistor or brake chopper	<div>Start-up</div> <div>↳ BC_TYP BR11</div> <div>↳ BR11</div> <div>BR/BC type</div>
15.	Select parameter V* Enter the installation rated speed	<div>Start-up</div> <div>↳ V* 1.00 m/s</div> <div>↳ 1.00</div> <div>Nominal speed</div>
16.	Select parameter __D Enter the diameter of the traction sheave	<div>Start-up</div> <div>↳ __D 0.315 m</div> <div>↳ 0.400</div> <div>Driving disk diam.</div>
17.	Select parameter __is Enter the installation's type of suspension	<div>Start-up</div> <div>↳ __is 1:1</div> <div>↳ 1:1</div> <div>Suspension</div>
18.	Select parameter __i1 Input of i1 of the gearbox ratio i1:i2 A Possible only for asynchronous motors	<div>Start-up</div> <div>↳ __i1 23.00</div> <div>↳ 23.00</div> <div>Gearbox i1:i2</div>
19.	Select parameter __i2 Input of i2 of the gearbox ratio i1:i2 A Possible only for asynchronous motors	<div>Start-up</div> <div>↳ __i2 1</div> <div>↳ 1</div> <div>Gearbox i1:i2</div>
20.	Select parameter Q Enter the elevator installation's rated load	<div>Start-up</div> <div>↳ Q 600 kg</div> <div>↳ 600</div> <div>Nominal load</div>

21.	Select parameter CONFIG Configuration of the digital inputs according to the used control system and type of communication	Start-up ↳ CONFIG 01: ZA_IO ↳ 01: ZA_IO Configuration
22.	Select parameter MO_DR Changing the rotating direction of the motor It must be observed the with triggering the input RV1 the cabin drives upwards	Start-up ↳ MO_DR Left ↳ Left Motor rotation direction
23.	Select parameter BR Definition of the brake monitoring	Start-up ↳ BR Off ↳ 3*NO Brake monitor
24.	Select parameter P1P2 Motor temperature monitoring	Start-up ↳ P1P2 Off ↳ PTC Motor temp. monitor
25.	Select parameter K_START Amplification at start (see chapter "List of parameters/menu start-up")	Start-up ↳ K_START 1.0 ↳ 1.0 Control vers. at start
26.	Select parameter SPD_KP Multiplication factor to modify the calculated basic amplification SPD_C	Start-up ↳ SPD_KP 1.00 ↳ 1.00 Controller basic gain

7.3 Testing the "Safe Torque Off" function (STO)

In the course of the startup, the "Safe Torque Off (STO)" function must be tested as a functional safety test. Proceed as follows:

Test step	Result
Check the state of the two inputs STO_A and STO_B at standstill of the drive (no travel signals).	In the Info menu/Start/Stop , the STO_A and STO_B inputs must be marked as inactive by a small dot. A large dot must be visible next to the DIAG display.
Trigger application of a travel command, e.g. by briefly pressing the Recover UP or DOWN button.	In the Info menu/Start/Stop , the STO_A and STO_B inputs must be marked as active by a large dot. A large dot must be visible next to the DIAG display. Attention: As soon as the large dots are visible at STO_A and STO_B, remove the travel command.
At standstill of the drive (no travel signals), bridge the normally open contact of the relay for triggering the STO_A signal so that the STO_A input is activated.	In the Info menu/Start/Stop , the STO_A input must initially be marked as active by a large dot. A large dot must be visible next to the DIAG display. After a time of approx. 1 second, the displays for STO_A and DIAG change from a large dot to a small dot (all displays marked as inactive). The ZAdynpro triggers the "STO diagnostic" error (error 960). Then remove the bridge at the relay contact again. Then reset the error by switching the line voltage off/on.

Test step	Result
At standstill of the drive (no travel signals), bridge the normally open contact of the relay for triggering the STO_B signal so that the STO_B input is activated.	In the Info menu/Start/Stop , the STO_B input must initially be marked as active by a large dot. A large dot must be visible next to the DIAG display. After a time of approx. 1 second, the displays for STO_B and DIAG change from a large dot to a small dot (all displays marked as inactive). The ZAdynpro triggers the "STO diagnostic" error (error 960). Then remove the bridge at the relay contact again. Then reset the error by switching the line voltage off/on.
At standstill of the drive (no travel signals), bridge both normally open contacts of the relay for triggering the STO_A/STO_B signals so that both inputs are activated.	The ZAdynpro triggers the "STO: Travel signal missing" error (error 534) after the time specified by the T_SDLY parameter. Then remove the bridge at the relay contacts again.

The test of the STO safety function should be repeated at regular intervals (e.g. annually during routine inspections).

7.4 Setting the switch-off points

7.4.1 Interrupt points for the travel speeds V_3 and V_2

The deceleration paths after V_1 or after standstill (in DCP2 and DCP4 protocol) can be read directly in the **Info menu/page 03**.

```
Dist. ----- 03
sa: 0.00 s21: 0.52m
sr: ^0.00 s31: 1.45m
s1: 0 sd: 0.52m
```

s31: Display of calculated deceleration path V_3 → V_1
s30: Display of calculated deceleration path V_3 → Standstill
s21: Display of calculated deceleration path V_2 → V_1
s20: Display of calculated deceleration path V_2 → Standstill

7.4.2 Cut-off points for travel speed V_1

To prevent the flush alignments from being travelled over, the switch-off points of V_1 must be set depending on the deceleration A_NEG at between **2 and 5 cm** before the flush alignment.

7.5 Carrying out the first test run



Warning!



Operating synchronous motors without encoder offset can cause uncontrolled motor movements

- The first trip must be carried out with the return control or as an inspection trip.
- If this trip can be carried out without any problems and without any fault messages, a normal trip can be made as the next step.
- If fault messages appear, an error list is available in the "Diagnose" chapter together with the corresponding error causes

7.6 Optimisation of the startup and drive behaviour

Turning away when starting up

Turning away when starting up is indicated by uncontrolled movement of the driving disc. The reason for this is insufficient amplification of the RPM controller at the time when the brake opens.

RPM controller

The **SPD_KP** (amplification) parameter can be used to optimise the setting of the RPM controller acting during travel.

1.	Select parameter Startup/SPD_KP Multiplication factor to modify the calculated basic amplification SPD_C	Startup ↳ SPD_KP 1.00 ↳ 0.95 RPM controller basic gain
2.	Increase of the parameter Startup/SPD_KP until the motor either no longer turns away or causes noises/vibrations when starting up.	Start-up ↳ SPD_KP 1.00 ↳ 1.00 Controller basic gain
3.	If the motor causes noises/vibrations when starting up, decrease the parameter Startup/SPD_KP until the motor no longer causes any noises/vibrations.	Start-up ↳ SPD_KP 1.00 ↳ 1.00 Controller basic gain

If the motor turns away when starting up despite optimum setting of the basic gain (parameter **Control/SPD_KP**), this can be optimised by increasing the parameter **Startup/K_START**.

CAUTION!**Caution!**

Before the parameter **Start-up/K_START** is increased, it must be ensured that the basic gain (**Control/SPD_KP**) is optimally configured!

4.	Select parameter " SPD_KP " Start gain Multiplication factor for the parameter Controller/SPD_KP or charge controller boost (depending on start-up mode)	Start-up ↳ K_START 1.0 ↳ 3.0 Start gain
----	--	--

8 "Safe Torque Off (STO)" function

8.1 General

- The "Safe torque off (STO)" function in the ZAdynpro product series corresponds to the "Safe torque off (STO)" stop function in accordance with DIN EN 61800-5-2.
- Activation of this function ensures that the ZAdynpro cannot supply any energy to the motor which can cause a torque.
- The STO function allows the contactors that are usually installed between ZAdynpro and motor in lifts to be omitted. The requirements in accordance with EN 81-20, section 5.9.2.5.4 d) or section 5.9.3.4.2 d) are fulfilled.
- The STO function must be taken into consideration in an application-specific risk analysis by the company responsible for the start-up. This company is also responsible for considering other valid safety regulations as well as the definition of the requirements for the component which control the STO function in compliance with standards.



Danger

There is no active braking when the STO function is activated. The drive stops gradually. This must be taken into consideration in applications in which there might be a hazard (e.g. by vertical loads). Active braking must be implemented by additional measures (e.g. by a mechanical motor brake).

8.2 Safety concept

- The devices of the ZAdynpro series have two safety-related inputs (two-channel structure). The drive can only generate a torque when a V switching signal is applied to both of these inputs. When the two 24V switching signals are switched off, the STO function is activated and the activation of the switching transistors (IGBTs) is safely prevented.
- An internal diagnostic unit constantly compares the status of the two switch-off channels (STO_A and STO_B). If there is an error (unequal activation or an internal hardware defect), the internal diagnostic unit triggers switch-off of the drive.
- Both inputs must be activated via two separate relays whose control voltage is supplied at the end of the electrical safety chain (see Chapter "Safe torque off (STO) function/Principle circuit diagram").



Information

In the version according to the principle circuit diagram, monitoring of the two relays K1/K2 by the lift control system is not necessary in order to meet the requirements of EN 81-20. The requirements are met by the internal diagnostic unit.

- If the contacts are switched differently (e.g. one of the two relays does not open), this will be detected at the STO inputs by the different signals. In this case the internal diagnostic unit will turn off safely after a max. 1600 ms. In this case, a reset is only possible by switching the device off and on again.
- The status of the STO function can be queried optionally (not safety-related) via the digital output "STO-Info".



Danger

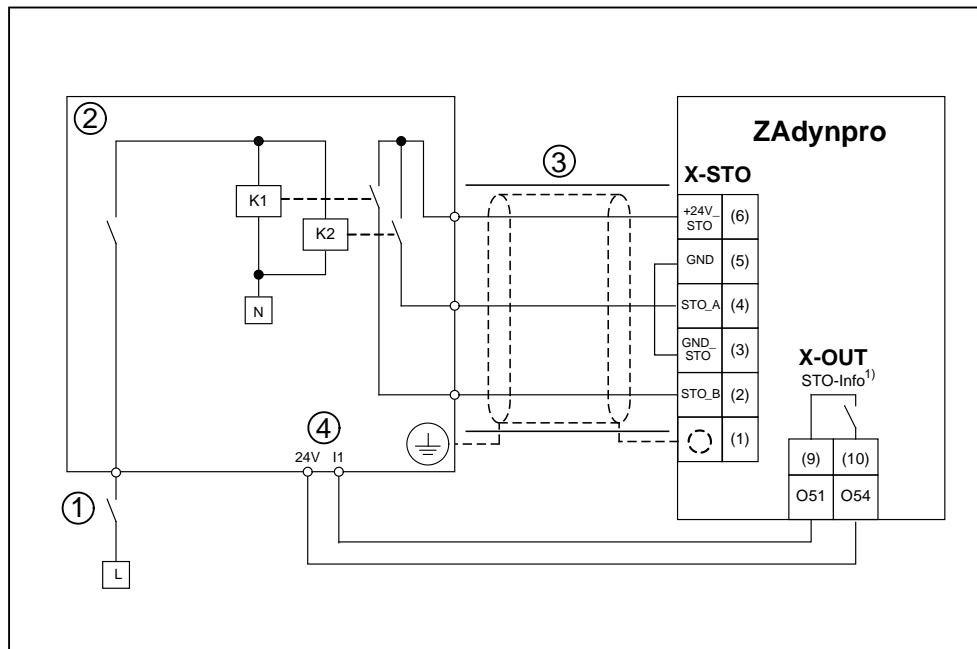
The connected motor is not separated from the ZAdynpro by activation of the STO function. Therefore, you must disconnect the ZAdynpro from the supply voltage in order to perform work on the wiring or the motor. You must wait at least Allow 3 minutes for discharging the intermediate circuit capacitors. The safe isolation from the supply must be checked using a two-pole voltage detector.



Danger

If the drive is enabled again after being disabled by the STO function, the drive can restart automatically. If this is not admissible for the application, this must be implemented by external measures (restart e.g. only after confirmation).

8.3 Principle circuit diagram



Principle circuit diagram "Safe Torque Off (STO)" function

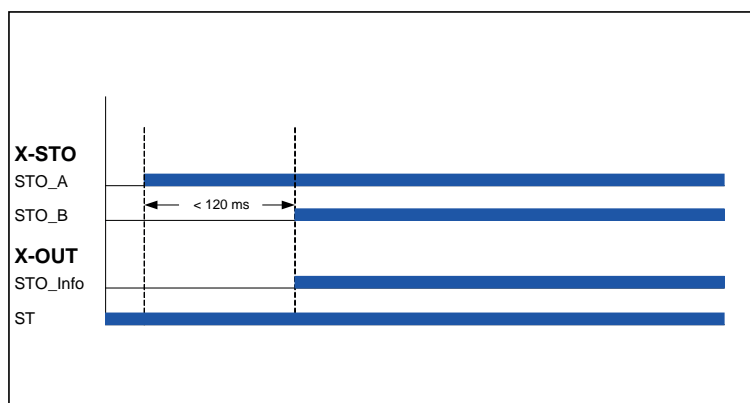
- 1 *Electrical safety chain*
 - 2 *Brake control*
 - 3 *Protected routing or design with two separate jacketed cables (see chapter "STO interface (X-STO)")*
 - 4 *Digital inputs control*
- 1) *Information only, not safety-related*

8.4 Electrical connection

The connection is made via the interface X-STO on the ZAdynpro (see chapter "Electrical installation / STO interface (X-STO)").

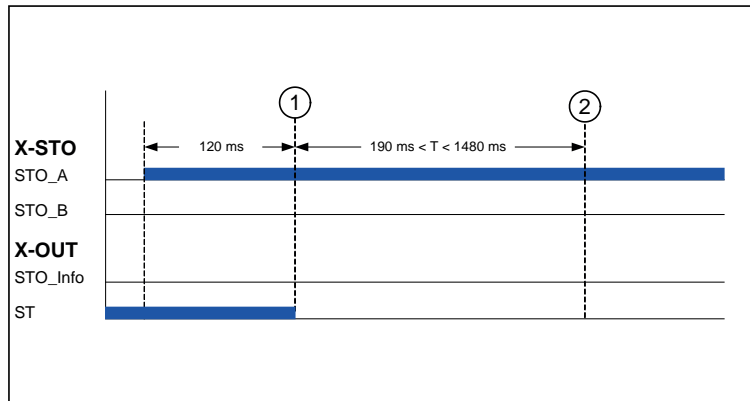
8.5 Notes for operation

- The two STO inputs must be switched simultaneously by separate relays with every travel (two-channel activation). Removal of one of the two STO_A or STO_B input signals already leads to switching off of the output stage.
- When switching the STO input signals STO_A / STO_B, a time offset of max. 120 ms is tolerated between the signals. With a greater offset the ZAdynpro first triggers the error "STO: fault" (error 533). This gives the elevator control system the option of aborting travel.
- If the actuation fault persists, safe switch-off is effected after a further min. 190 ms and max. 1,480 ms (typically 630 ms) by the internal diagnostics (error 960 "STO: diagnostics").
- An error detected by the internal diagnostic (unequal activation or internal hardware defect) leads to a locked error state. The error can only be reset after switching the line voltage off/on.



Correct activation STO

STO_A safety-related input STO_A
STO_B safety-related input STO_B
STO_Info inputs STO_A / STO_B active – enable output stage
ST fault



Faulty activation STO

- 1 Error "STO: Fault"
- 2 Error "STO: Diagnostic"

The following times must be kept in operation for sufficient test coverage by the diagnostics.

- Activation STO (switch-off of STO_A and STO_B) at least once an hour for at least 1,600 ms.

The correct activation of the STO inputs is monitored additionally (not safety-related) by the ZAdynpro for every journey:

- If the safe torque off is not cancelled (signals STO_A, STO_B remain LOW) at the beginning of travel after expiry of the time specified by the **T_SDLY** parameter (**Monitors** menu), the error "STO: Remains" (error 530) is triggered.
- If no safe torque off takes place (signals STO_A, STO_B remain HIGH) at the end of travel after expiry of the time specified by the **T_SDLY** parameter (**Monitors** menu), the error "STO: Missing" (error 532) is triggered
- If the safe torque off is cancelled (signals STO_A, STO_B become HIGH) at a standstill (no travel signals applied) and no travel signal is applied after the time specified by the **T_SDLY** parameter (**Monitors** menu), the error "STO: Travel signal missing" (error 534) is triggered.
- If the STO input signals are switched off during travel, the error "STO: Interruption" (error 531) is triggered after 200 ms.

During first-time start-up and the recurring tests, the function "Safe torque off (STO)" must be tested (see chapter "Start-up/testing the safety function "Safe torque off (STO)"")

8.6 Notes on use of motors



Danger

A brief aligning torque is possible in the event of an error. The motor can turn in the event of an error (defect of two or more power semiconductors) by a maximum angle $\varphi = 360^\circ/\text{number of poles}$.

- If there is a random component error on two or more circuit breakers of the inverter, there may be a brief alignment movement by a few degrees with permanently excited synchronous machines even when the STO function is activated. A permanent field of rotation cannot be generated. The effect of the aligning torque is described below.
- The maximum possible cabin movements allowed by the alignment torque can be calculated with the following formula:

$$\text{Cabin movement [mm]} = 3.142 \times \frac{\text{driving disk diameter [mm]}}{\text{Number of poles} \times \text{suspension}}$$

Examples for possible cabin movements depending on the motor, the driving disk diameter and the suspension can be found in the following table.

Examples for max. cabin movement in mm with ZATop (20-pole)

Ø driving disk	160 mm			210 mm			240 mm			320 mm			400 mm			450 mm			500 mm			520 mm			600 mm		
Suspension	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1
Cabin movement [mm]	26	13	7	33	17	9	38	19	10	51	26	13	63	32	16	71	36	18	79	40	20	82	41	21	95	48	24

Examples for max. cabin movement in mm with ZAsyn (30-pin)

Ø driving disk	-			-			-			320 mm			400 mm			480 mm			520 mm			600 mm			680 mm		
Suspension	-	-	-	-	-	-	-	-	-	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1
Cabin movement [mm]	-	-	-	-	-	-	-	-	-	34	17	9	42	21	11	51	26	13	55	28	14	63	32	16	72	36	18

The cabin movement must be taken into consideration in a risk analysis of the complete system.

8.7 Deactivation of the STO function**Danger**

There is no safety-related switch-off of the output stage when the STO function is deactivated. Safety switch-off in accordance with EN 81 must then be implemented by other measures (e.g. by motor contactors), (refer to chapter "Electrical installation/Motor contactors (optional)").

8.8 Testing the "Safe Torque Off (STO)" safety function

In the course of start-up, the "Safe Torque Off (STO)" function must be tested as a safety function test (see chapter "Start-up/Testing the Safe Torque Off (STO) Function").

8.9 Technical data

Safety characteristics	
Safety function	Safe torque off (STO) according to DIN EN 61800-5-2
Protection rating	SIL 3 according to DIN EN 61800-5-2 ¹⁾ Category 4, PL e according to DIN EN ISO 13849-1 ¹⁾ Meets the requirements according to DIN EN 81-20, section 5.9.2.5.4 d) or section 5.9.3.4.2 d) ¹⁾
Probability of one dangerous failure per hour (PFH)	3.11E-10 per hour ²⁾
Mean time to dangerous failure of each channel (MTTFd)	410 years ²⁾
Diagnostic coverage (DC)	high
Switch-off time (duration from switching off the input signals to blocking the output stage)	< 50 ms
Minimum request rate for the STO function	Once an hour for at least 1,600 ms
Life cycle	20 years, then the device must be replaced
max. permissible time delay between the signals STO_A / STO_B	max. 120 ms (on exceeding this, ZAdynpro outputs an error message, see chapter "Safe Torque Off (STO) Function / Notes on Operation")

¹⁾ TÜV Rheinland conducted type examination and certification for this. Copies of the test certificates can be requested from Ziehl-Abegg.

²⁾ assuming maximum device load for the entire life cycle

9 Enclosure

9.1 Technical data for ZAdynpro

	ZAdynpro				
	011	013	017	023	032
ZAdynpro article number	352250	352251	352252	352253	352254
Electrical data					
Mains connection voltage [V]	3~ 180 ... 440 absolut				
Mains frequency [Hz]	50 / 60 (±1,5 Hz)				
Typ. motor output (400 V) [kW]	4.6	5.5	7.5	11	14
Duty cycle at rated current and clock frequency 8 kHz [%]	40				
Nominal current for 40% duty cycle and switching frequency 8 kHz fixed [A]	11	13	17	23	32
Nominal current for 40% duty cycle and switching frequency 12 kHz fix ¹⁾ [A]	9	11	15	20	27
Nominal current for 40% duty cycle and switching frequency 16 kHz fix ¹⁾ [A]	8	10	13	17	23
Max. operating current (for max. 10 s) [A]	20	24	31	42	58
Power loss at nominal current, switching frequency 8 kHz and 40% duty cycle [W]	193	204	242	309	424
Power loss at nominal current, switching frequency 16 kHz and 40% duty cycle [W]	298	326	373	475	612
Power losses during standstill [W]	24	25	26	27	27
Power loss in standby [W]	≤ 3.0 W			≤ 6.0 W	
Switching frequency [kHz]	4 ... 16				
Motor frequency [Hz]	max. 200				
Max. terminal cross-section line/motor/brake chopper/brake resistor [mm ²]	16				
Ambient conditions					
The user must ensure that the specified ambient conditions are observed.					
Protection rating (as per DIN EN 60529)	IP20				
Ambient temperature for operation [°C]	0 ... 55, from 40 °C power reduction by 1.66% per 1 K temperature increase				
Relative humidity [%]	90 / condensation prohibited				
Installation height [m über NN]	bis 2000, ab 1000 m Leistungsreduzierung um 1% pro 100 m				
Storage and shipping temperature [°C]	-20 to +60				
Degree of soiling (in acc. with DIN EN 61800-5-1)	2				
Physical data					
Weight ZAdynpro [kg]	4.5	4.5	4.6	6.0	6.1
Dimensions h x w x d [mm]	290 x 150 x 195			390 x 151 x 195	

¹⁾ with a variable switching frequency (**power component/M_PWM=AUTO** menu), there is no reduction in power

9.2 EC/EU declaration of conformity

- Translation -
(english)

A-KON16_06-GB
1741 Index 003

Manufacturer: ZIEHL-ABEGG SE
Heinz-Ziehl-Straße
74653 Künzelsau
Germany

The manufacturer shall bear sole responsibility for issuing this EC/EU declaration of conformity.

Product description: Control devices ZAdyn/ZETADYN for elevator machines

Frequency inverters with a safe torque off (STO) function according to the Machinery directive 2006/42/EC, Annex IV, Nr. 21.

Type: ZAdyn4CA...
ZAdyn4CS...
ZETADYN
4CA...
ZETADYN
4CS...
ZAdynpro...

(The type details contain further additions concerning the version, e.g. ZAdyn4CA 018 HY)

Serial number from
30284129/0001

The above mentioned products of this declaration fulfil all relevant provisions of the following Directives of the Union:

Machinery directive 2006/42/EC

EMC Directive 2014/30/EU

Because of the accordance with the Machinery directive, the protection targets of the Low voltage directive 2014/35/EU are also fulfilled.

The following harmonised standards have been used:

EN 61800-5-1:2007	Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy
-------------------	--

IEC 61800-5-2:2016	Adjustable speed electrical power drive systems – Part 5-2: Safety requirements – Functional
EN 62061:2005 + A1:2013	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems
EN ISO 13849-1:2008 + AC:2009	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design
EN ISO 13849-2:2012	Safety of machinery - Safety-related parts of control systems - Part 2: Validation
EN 61800-3:2004 + A1:2012	Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods
EN 12015:2014	Electromagnetic compatibility- Productfamily standard for lifts, escalators and moving walks - Emission
EN 12016:2013	Electromagnetic compatibility- Productfamily standard for lifts, escalators and moving walks - Immunity

The EG type-examination procedures referred to in the enclosure IX of the Machinery directive 2006/42/EC was carried out by TÜV Rheinland and certified by the type-examination certificate 01/205/5288.01/17

The identification number / address of the notified body is:

NB 0035
TÜV Rheinland Industrie Service GmbH
Am Grauen Stein
51105 Köln
Germany

This declaration relates exclusively to the product in the state in which it was placed on the market, and excludes components which are added and/or operations carried out subsequently by the final user.

The authorised representative for the assembly of the technical file is:
Mr. Roland Hoppenstedt (see above for address).

Künzelsau, 10.10.2017
(place and date of issue)

ZIEHL-ABEGG SE
Werner Bundscherer
Director Drive Division
(name, function)



(signature)

ZIEHL-ABEGG SE
Roland Hoppenstedt
Technical Director Drive Division
(name, function)



(signature)

9.3 Adjustment card

"Motor name plate" menu

MOT_TYP	
n	
f	
p	
l	
U	
P	
TYP	
cos phi ¹⁾	
M_Max	

Encoder & BC menu

ENC_TYP	
ENC_INC	
BC_TYP	

Installation menu

V*	
MOD_n*	
n*	
__D	
__iS	
__i1	
__i2	
Q ¹⁾	
F ¹⁾	
G ¹⁾	

¹⁾ The parameter is only visible if
MOT_TYP=ASM is selected.

Control system menu

CONFIG	
MO_DR	
CTRL	
f_I01	
f_I02	
f_I03	
f_I04	
f_I05	
f_I06	
f_I07	
f_I08	
f_XBR1	
f_XBR2	
f_XBR3	
f_XBR4	
f_O1	
f_O2	
f_O3	
f_O4	
V_G1	
V_G2	
V_G3	
SIM_V1	
S_B_OFF	

Monitoring menu

MOD_ST	
STO	
CO	
BR	
LOCKBR	
UNLOCK	
P1P2	
T_ENC	
T_SDLY	
I_MAX	
T_I_MAX	
APC	
MASK1	
MASK2	
MASK3	
MASK4	
MASK5	

Start menu

M_START	
K_START	
T_0	
T_1	
T_2	
T_3	
V_T3	
BRK_DMP	

Acceleration menu

A_POS	
R_POS1	
R_POS2	

Travelling menu

V_1	
V_2	
V_3	
V_Z	
V_4	
V_5	
V_6	
V_7	

Deceleration menu

A_NEG	
R_NEG1	
R_NEG2	
S_DI3	
S_DI2	
S_DI1	
S_ABH	

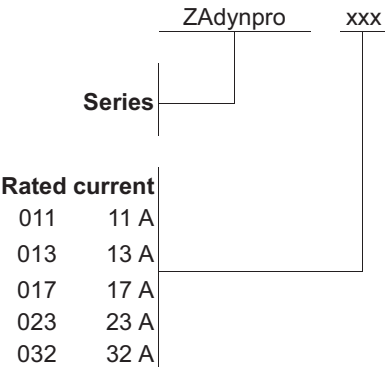
Stop menu

T_4	
T_5	
T_5a	
T_5b	
T_6	

Controller menu

SPD_KP	
SPD_TI	

9.4 Type designation



9.5 Certificates

EC Type-Examination Certificate





**Product Safety
Functional
Safety**

www.tuv.com
ID 0600000000

Reg.-Nr./No.: 01/205/5288.02/17

Prüfgegenstand Product tested	Sicherheitsfunktion STO, Sicherer Halt (Stopp Kategorie 0) Safety Function STO, Safe Stop (Stop Category 0)	Zertifikats- inhaber Certificate holder	ZIEHL-ABEGG SE Heinz-Ziehl-Straße 74653 Künzelsau Germany
Typbezeichnung Type designation	ZETADYN 4C / ZAdyn4C / ZAdynpro Drive Family (für Einzelheiten siehe Revisions-Liste / for details see Revision List)		
Prüfgrundlagen Codes and standards	IEC 61800-5-2:2016 EN 61800-5-1:2007 EN 61800-3:2004 + A1:2012 IEC 62061:2015	ISO 13849-1:2015 ISO 13849-2:2012 IEC 61508 Parts 1-7:2010	
Bestimmungsgemäße Verwendung Intended application	Sicherer Halt an drehzahlveränderbaren Antrieben. Die Sicherheitsfunktion STO in den ZETADYN 4C / ZAdyn4C / ZAdynpro Antrieben erfüllt die Anforderungen der Kat. 4 / PL e nach EN ISO 13849-1, SIL CL 3 nach EN 61800-5-2 / IEC 62061 / IEC 61508 und kann in Anwendungen bis zu diesen Sicherheitsleveln eingesetzt werden. Safe Stop at speed variable drives. The safety function STO within the ZETADYN 4C / ZAdyn4C / ZAdynpro drives complies with the requirements of Cat. 4 / PL e acc. to EN ISO 13849-1, SIL CL 3 acc. to EN 61800-5-2 / IEC 62061 / IEC 61508 and can be used in applications up to these safety levels.		
Besondere Bedingungen Specific requirements	Die Hinweise in der zugehörigen Installations- und Betriebsanleitung sind zu beachten. The instructions of the associated Installation and Operating Manual shall be considered.		

Es wird bestätigt, dass der Prüfgegenstand mit den Anforderungen nach Anhang I der Richtlinie 2006/42/EG über Maschinen übereinstimmt.
It is confirmed that the product under test complies with the requirements for machines defined in Annex I of the EC Directive 2006/42/EC.

Gültig bis / Valid until 2022-10-10

Der Ausstellung dieses Zertifikates liegt eine Prüfung zugrunde, deren Ergebnisse im Bericht Nr. 968/A 166.02/17 vom 10.10.2017 dokumentiert sind.
Dieses Zertifikat ist nur gültig für Erzeugnisse, die mit dem Prüfgegenstand übereinstimmen. Es wird ungültig bei jeglicher Änderung der Prüfgrundlagen für den angegebenen Verwendungszweck.
The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/A 166.02/17 dated 2017-10-10.
This certificate is valid only for products which are identical with the product tested. It becomes invalid at any change of the codes and standards forming the basis of testing for the intended application.



Berlin, 2017-10-10

Notified Body for Machinery, NB 0035



Dipl.-Ing. Eberhard Frejno

Certificate



Product Safety
Functional
Safety

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ID 0600000000

Nr./No.: 968/A 166.02/17

Prüfgegenstand Product tested	Sicherheitsfunktion STO, Sicherer Halt (Stopp Kategorie 0) Safety Function STO, Safe Stop (Stop Category 0)	Zertifikats- inhaber Certificate holder	ZIEHL-ABEGG SE Heinz-Ziehl-Straße 74653 Künzelsau Germany
Typbezeichnung Type designation	ZETADYN 4C / ZAdyn4C / ZAdynpro Drive Family (für Einzelheiten siehe Revisions- Liste / for details see Revision List)		
Prüfgrundlagen Codes and standards	EN 81-20:2014 EN 81-50:2014 IEC 61800-5-2:2016	EN 81-1:1998 + A3:2009 EN 81-2:1998 + A3:2009	
Bestimmungsgemäße Verwendung Intended application	Sicheres Stillsetzen zur Anwendung in Personen- und Lastenaufzügen: Ersatz der Motorschütze zur Stillsetzung des Antriebes gemäß Safe stop for use at passenger lifts and goods passenger lifts: Replacement of contactors to stop the drive acc. to 5.9.2.5.4 d) or 5.9.3.4.2 d) of EN 81-20 or 12.7.3 a) of EN 81-1 or 12.4.1 a) of EN 81-2		
Besondere Bedingungen Specific requirements	Die Hinweise in der zugehörigen Installations- und Betriebsanleitung sowie dem Anhang zu diesem Zertifikat sind zu beachten. The instructions of the associated Installation and Operating Manual as well as the annex to this certificate shall be considered.		

Gültig bis / Valid until 2022-10-10

Der Ausstellung dieses Zertifikates liegt eine Prüfung zugrunde, deren Ergebnisse im Bericht Nr. 968/A 166.02/17 vom 10.10.2017 dokumentiert sind.

Dieses Zertifikat ist nur gültig für Erzeugnisse, die mit dem Prüfgegenstand übereinstimmen. Es wird ungültig bei jeglicher Änderung der Prüfgrundlagen für den angegebenen Verwendungszweck.

The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/A 166.02/17 dated 2017-10-10.

This certificate is valid only for products which are identical with the product tested. It becomes invalid at any change of the codes and standards forming the basis of testing for the intended application.

TÜV Rheinland Industrie Service GmbH

Bereich Automation
Funktionale Sicherheit

Am Grauen Stein, 51105 Köln

Köln, 2017-10-10

Certification Body Safety & Security for Automation & Grid

[Signature]

Dipl.-Ing. Stephan Häb

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www.tuv.com

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Precisely Right.

2017-10-10

**Annex to Certificate 968/A 166.02/17 dated 2017-10-10**

1. Component	Safety-Function STO (ZETADYN 4C / ZAdyn4C / ZAdynpro) implemented as safety circuit containing electronic components	
2. Manufacturer	ZIEHL-ABEGG SE Heinz-Ziehl-Straße 74653 Künzelsau	
3. Designation / Nomenclature	see Revision Release List	
4. Intended application	Safe stop of the lift drive (Safe Torque Off (STO))	
5. Function indication	Safety Function STO / Safe Stop (Stop-Category 0) within the ZETADYN 4C / ZAdyn4C / ZAdynpro product family	
6. Intended use	Use at passenger and goods passenger lifts: <ul style="list-style-type: none">- Replacement of motor contactors for stopping the lift acc. to 5.9.2.5.4 d) und 5.9.3.4.2 d) of EN 81-20 or acc. to 12.7.3 a) of EN 81-1 or acc. to 12.4.1 a) of EN 81-2.	
7. Characteristics	Input voltage: STO_A – GND and STO_B – GND	typ.: 0 / 24 V DC LOW: 0 ... 3 V DC HIGH: 15 ... 30 V DC
	Input current: STO_A – GND and STO_B – GND	typ.: 12 mA (HIGH)
	turn-off time: (time between switching off the input signal(s) and disabling the power stage)	max. 50 ms
	Discrepancy time t_v	Max. allowed discrepancy time between STO_A and STO_B: $t_v < 120$ ms
	Software diagnostic: (not safety relevant)	if $t_v > 120$ ms then failure indication by frequency converter
	Hardware diagnostic:	$310 \text{ ms} < t_v < 1600 \text{ ms}$ (typ. 700 ms) (when exceeded, the drive is locked out and can only be set in operation again by power cycling).
	Minimum demand rate of the STO function:	1/h for min. 1600 ms each
	Working life:	After 20 years the device shall be replaced by a new one.
	Protection degree of enclosure:	IP 20 The user is required to ensure pollution degree 2 acc. to EN 61800-5-1 by suitable measures or choice of the mounting location.
	Operating temperature:	0 ... +55 °C (above +40 °C reduction of rated power by 1,66 % per 1 K is required)
	Humidity:	< 90 % rH (no condensation))

2017-10-10



	<p>Safety characteristics:</p> <p>SIL 3, PL e, Kat. 4 PFH = 3,11E-10 1/h MTTF_d = 410 a (High) DC_{avg} = High</p> <p>Further technical details are stated in the manuals by ZIEHL-ABEGG SE referred to in the Revision Release List.</p>
8. Maintenance	<p>The frequency converter ZETADYN 4C / ZAdyn4C / ZAdynpro product family shall not be maintained by the end user. In case of failure, the device shall be replaced. The correct installation of the frequency converter and also the safety function STO needs to be checked regularly in accordance with the specifications stated in the manual.</p>
9. Installation	<p>The guidelines regarding installation, commissioning and operation shall be observed.</p> <ul style="list-style-type: none"> - The relevant national regulations (e.g. VDE-directions) and the requirements of the EN 81-20 resp. EN 81-1/-2 shall be followed and the wiring shall conform to general EMC requirements. - External short circuits and cross faults on the wiring and terminals of the STO-signals must be excluded because the internal diagnostic of the ZETADYN 4C / ZAdyn4C / ZAdynpro is not able to detect short circuits on the wiring. - Supply lines (power-, motor cable) and STO-cables shall be spatially separated. - The cable length for STO signals must not exceed 50 m.
10. Configuration	<ul style="list-style-type: none"> - The safety function STO is neither adjustable nor configurable. - Switching of the STO-signals shall be done by separate relays. (two channel operation). - It must be noted that the lift brakes are not operated by the STO function. Therefore the user shall ensure by appropriate electric circuits that the brakes are dropped when necessary.
11. Auxiliary conditions for a safe operation	<ul style="list-style-type: none"> - By selection of an appropriate mounting location it shall be ensured that environmental influences have no adverse effect on the safety circuit. In particular pollution degree 2 in accordance to DIN EN 61800-5-1 shall be ensured by appropriate measures / mounting location. - In line with the commissioning and the periodical tests of the lift the following checks are required. <ul style="list-style-type: none"> - Check for correct Installation - Check for hardware version - Test of the Safety Function. - In case of a fault accumulation (defects of two or more power semiconductors), even at correct operation of the safety function STO, the motor shaft could turn for a maximum angle of $\varphi = (180^\circ / \text{number of pole pairs})$. Therefore the installation company shall ensure by risk analysis that this movement cannot cause any hazard. - A circuit breaker / fuse shall be installed in the power input of the frequency converter which disconnects the power in case of failures in the power stage. - It must be noted that up to 3 minutes after mains disconnection dangerous voltage is still present on the device (capacitor discharge time).



Declaration for trip direction change counter

Date of issue of original declaration : June 24, 2011
Revision number : 3
Revision date : 22-11-2016
Requirements : Lifts Directive 2014/33/EU
Project no. : P160397-01

1. General specifications

Name and address manufacturer : ZIEHL-ABEGG SE
Heinz-Ziehl-Strasse
74653 Künzelsau
Germany

Description of the reviewed component : Safe trip direction change counter

Frequency inverter type : Type series ZETADYN and ZAdyn

Data of examination : April 2011 - June 2011, May 2016, November 2016

Examination done by : A. van den Burg

Laboratory : None

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Rev. 3 date: November 28, 2016

Page 1 of 2

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VAT number:
NL 810399441 B01

Registered by the Dutch Chamber of Commerce nr. 34157363. General terms of supply of Liftinstituut B.V. are registered at the Dutch Chamber of Commerce, under number 34157363.



2. Description of the component

We herewith declare that the trip direction change counter fulfils all requirements for application with below mentioned certificates:

- NL10-400-1002-130-01 Brugg CTP 8,1 G2 coated suspension ropes for lifts.
- NL15-400-1002-130-02 Brugg CTP 6.5 G2 coated suspension ropes for lifts.
- NL12-400-1002-166-01 Contitech Polyrope 25-6x2,0 Lift suspension means.
- KP 195/2 Drako PTX 300 coated suspension ropes for lifts.

For applications with comparable conditions the counter can also be used with other lift suspension means.

This declaration is based on ZIEHL-ABEGG document "Sicherer Zähler für Seil Brugg SDR 8,1 mm" of June 21, 2011 as described below.

The counter is part of the ZIEHL-ABEGG type ZETADYN and ZAdyn frequency inverter. It consists of two digital counters, the counter "A" (Parameter "TD_DRV") and the counter "B" (Parameter "TD_CNT"), both counters only count the number of changes in direction, successive trips in the same direction are counted as one trip only.

Counter "A" is used to collect the total number of trips, it is not possible to reset this counter also not by a reset of the frequency inverter nor by removing its power supply.

Counter "B" is used to limit the amount of allowed trips, changing of allowable maximum number of trips or resetting is protected by a password, this password can be defined for each controller separately.

Approximately one year before the allowed number of trips is reached, the display of the frequency inverter shows the number of trips that are left until the lift will be blocked (the ropes shall be changed before).

The estimation of the time that is left is based on the history of lift use and is updated after each trip.

When the maximum number of trips is reached, the inverter is setting the fault-output and an error message is shown in the display.

The inverter will not accept new trip commands until counter "B" has received a reset.

To be able to exchange the ropes, after each restart of the inverter, one additional trip is possible.

Every reset of counter "B" is registered in memory in order to be able to check the history.

When the frequency inverter is interchanged by a new one, the contents of counter "B" must be copied from the old inverter into the new one.

A. van den Burg
Senior Specialist
Dep. Product Certification
Liftinstituut B.V.

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Rev. 3 date: November 28, 2016

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TYPE EXAMINATION CERTIFICATE FOR LIFTCOMPONENTS

Issued by Liftinstituut B.V.

Certificate no.	: NL12-400-1002-163-01	Revision no.:	3
Description of the product	: Self- monitoring of the motor brake - as part of protection against unintended car movement. - as part of ascending car overspeed protection means.		
Trademark, type	: ZAdynpro ZAdyn4 ZETADYN 4 ZETADYN 3 (Software version 3.39 or higher)		
Name and address of the manufacturer	: ZIEHL-ABEGG SE Heinz-Ziehl-Strasse 74653 Künzelsau Germany		
Name and address of the certificate holder	: ZIEHL-ABEGG SE Heinz-Ziehl-Strasse 74653 Künzelsau Germany		
Certificate issued on the following requirements	: Lifts Directive 2014/33/EU		
Certificate based on the following standard	: EN 81-20:2014 Parts of:-		
Test laboratory	: None		
Date and number of the laboratory report	: None		
Date of type examination	: March 2012, January 2015, September 2015, November 2017		
Additional document with this certificate	: Report belonging to the type examination certificate no.: NL12-400-1002-163-01 Rev.3		
Additional remarks	: None		
Conclusion	: The lift component meets the requirements referred to in this certificate taking into account any additional remarks mentioned above.		

Amsterdam

Date : 16-11-2017
Valid until : 16-11-2022

ing. P.J. Peeters
Manager

Certification decision by

Liftinstituut B.V. · Buikslotermeerplein 381 · P.O. Box 38027 · 1020 MA Amsterdam Netherlands · www.liftinstituut.nl ·
Registered at the KvK under number 34157363 ·

F23-02-22-v17.0

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