Bewegung durch Perfektion | Movement by Perfection

ZIEHL-ABEGG

Die Königsklasse

The Royal League

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

R-TBA17_01-GB 1802

Part.-No. 00163459-GB

ZIEHL-ABEGG

Content

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 SEis 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

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!** Risk of moderate or minor injury if the corresponding precautions are not taken!
CAUTION!	**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

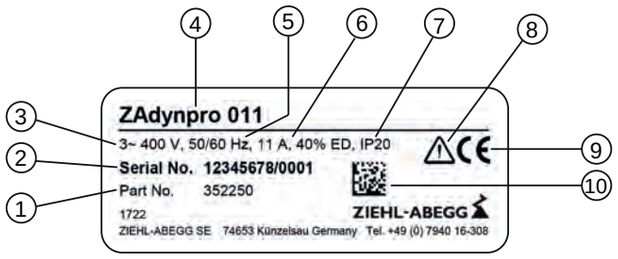
- The device is only used as intended (cmp. chapter "Product overview" concerning this)
- The installation is operated solely in a flawless, functional condition and that especially the safety devices are periodically checked for their properly functioning condition
- The required personal safety gear 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 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% on time
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

3.2 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

3.3 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

3.3.1 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.

3.4 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.

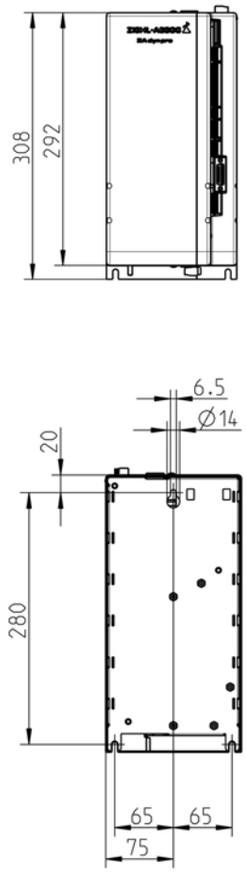
Mounted with the rear on the mounting plate

Mounted with the side area on the mounting plate

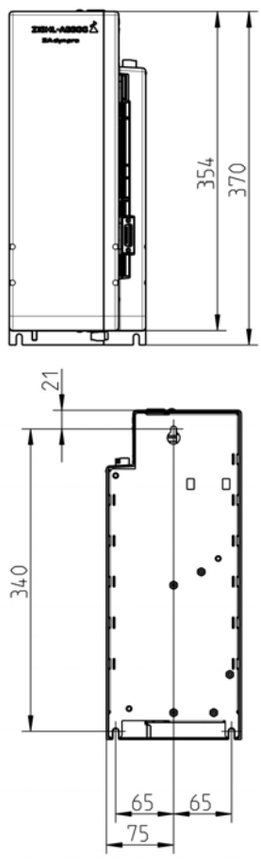
- Mount the frequency inverter so that it is isolated
- Prevent drilling chips, screws and other foreign bodies from reaching the interior of the frequency inverter
- Maintain the stated minimum clearances to ensure unobstructed cooling- air feed as well as unobstructed outgoing air discharge (see fig.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

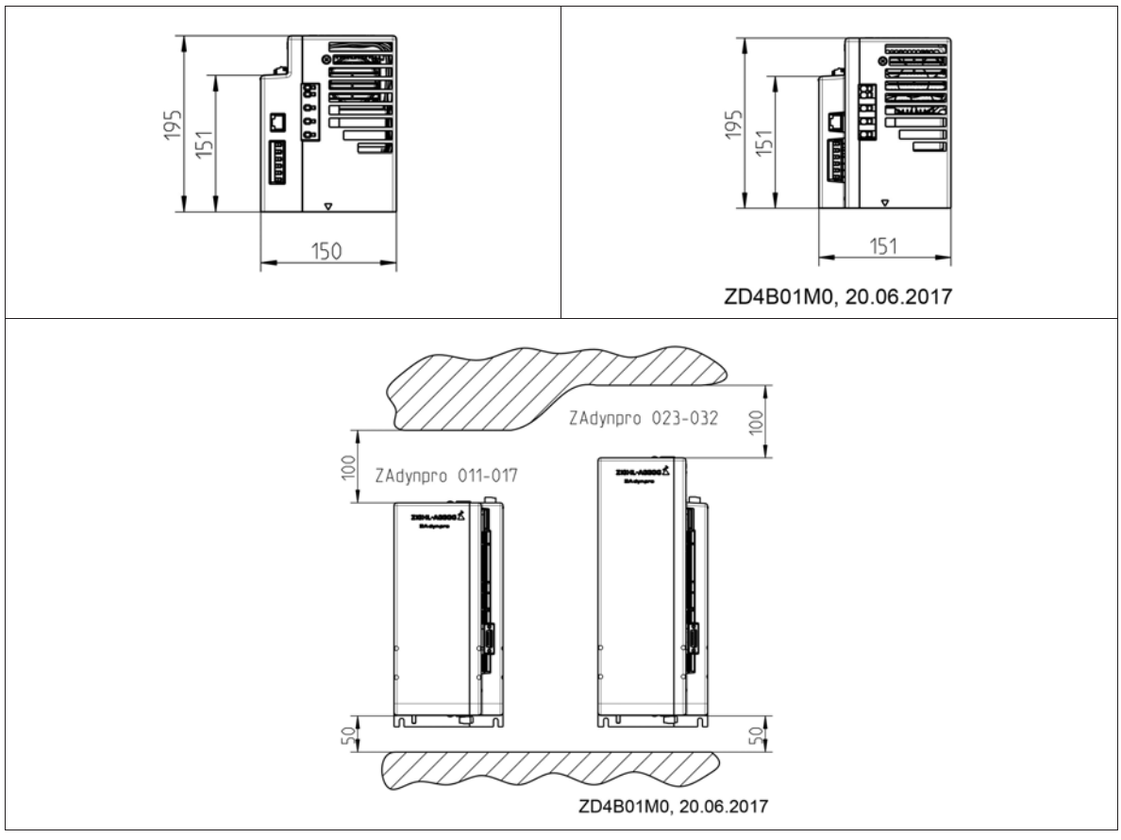
4.2 Dimensional drawings / Minimum distances

ZAdynpro 011-017



ZAdynpro 023-032





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 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:

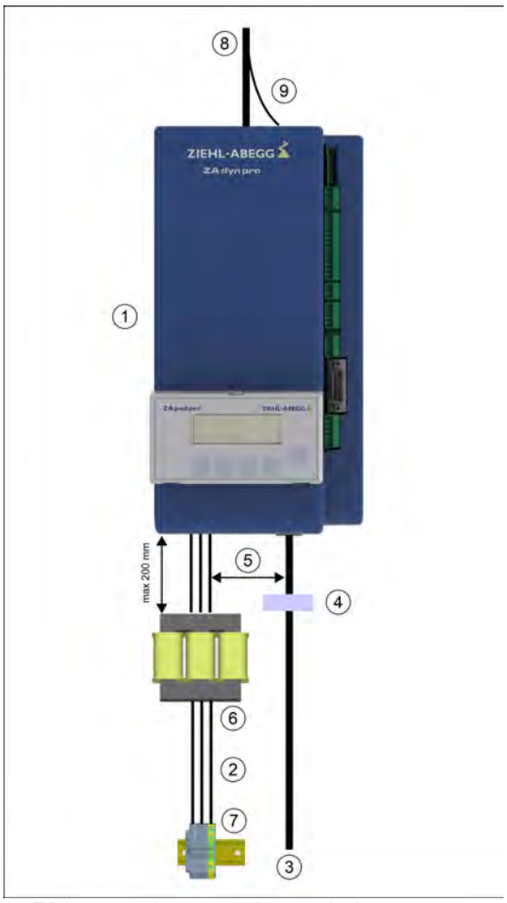
- EN 12015:2014 Electromagnetic compatibility – Product family standard for lifts, escalators and moving walks – Emission
- EN 12016:2013 Electromagnetic compatibility – Product family standard for lifts, escalators and moving walks – Interference immunity

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	Max. 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	Max. 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	• 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".
- 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



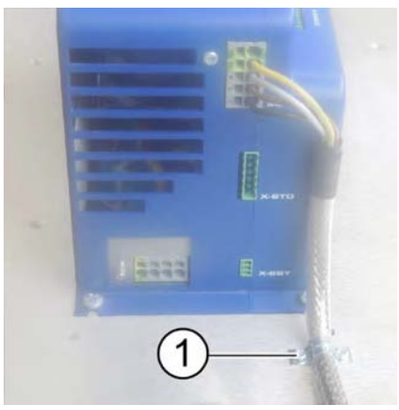
1 ZAdynpro mains connection terminal
2 Power line
3 Motor cable (shielded)
4 Clip for fixing the shielding
5 Route electrical lines with the maximum possible spacing
6 Power choke
7 Mains connection
8 Brake resistor cable (shielded)
9 Shielding (brake resistor cable)

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"
- Line 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

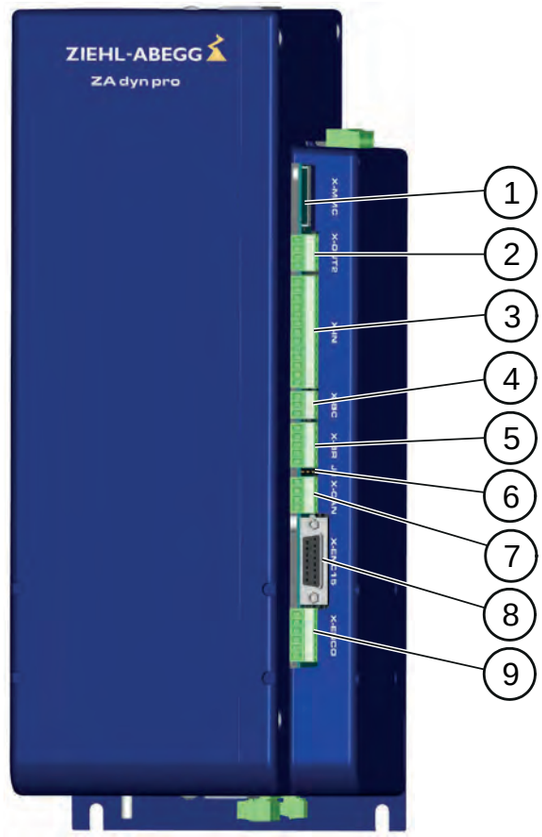
- The shielding of the motor line must be extensively connected to the earth potential in the immediate vicinity of the ZAdynpro. The shielding must be continued right up to the connection terminal.
- We recommend fixing the shielding on the mounting plate by means of a clip (see Fig.).



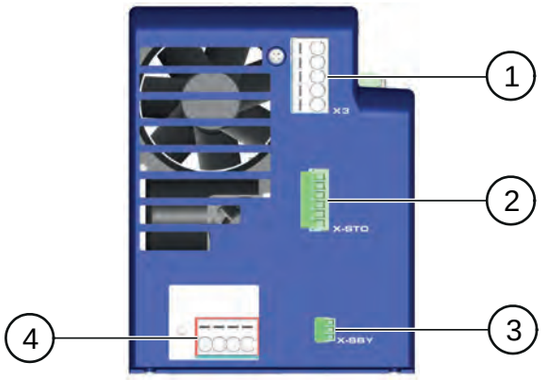
Fixing the shielding on the mounting plate
1 Clip

5.3 Terminal positions

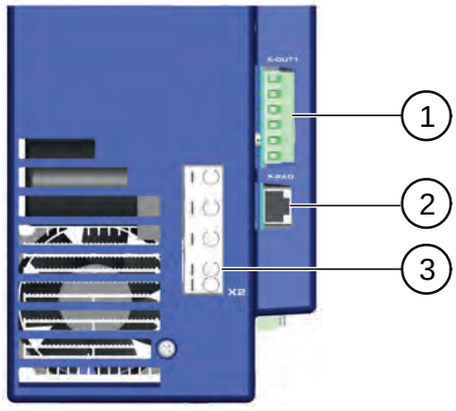
5.3.1 ZAdynpro 011-032



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



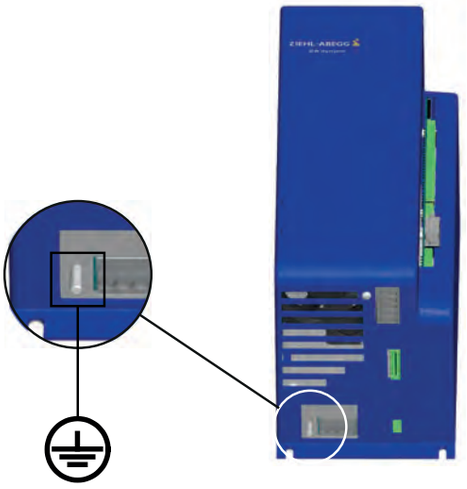
Position of connection terminals on bottom
1 X3 motor
2 X-STO Safe Torque Off
3 X-SBY standby input
4 X1 line



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:	• The line filter and ZAdynpro are designed for use in an earthed power supply system. • Permissible network configurations are: – TN network – TT network • **The line filter and ZAdynpro are unsuitable for use in the IT network!**
Line cross-section:	• 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:	• 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

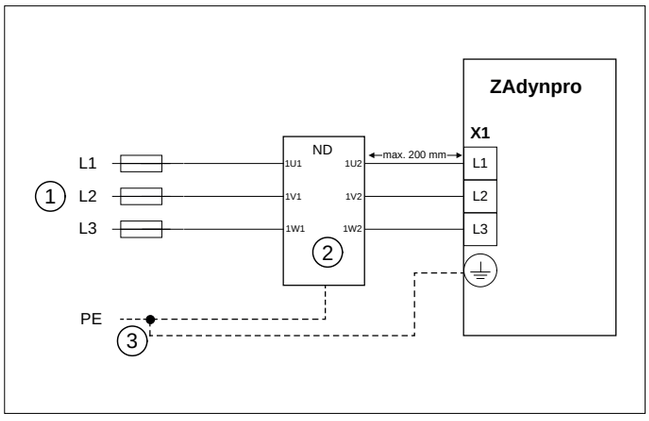
Line reactor:

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



ZAdynpro mains connection
1 Mains 3~ 400V/PE/50Hz
2 Line reactor ND
3 Central ground point

5.6 Residual current operated device (RCCB)

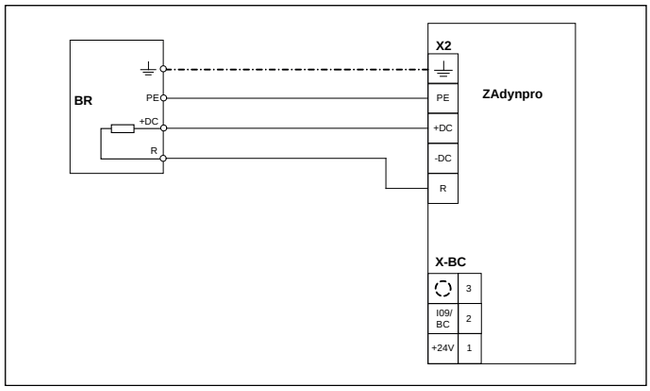
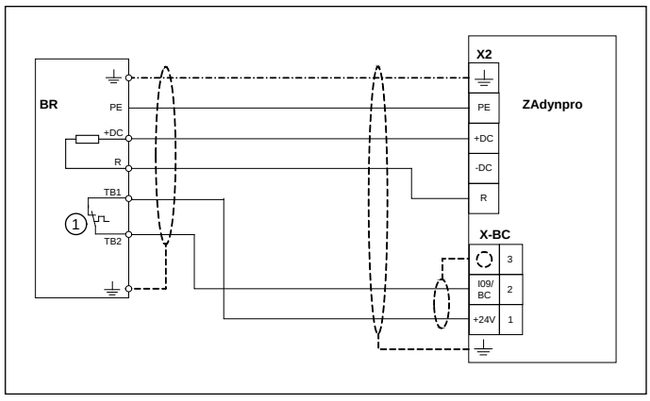
Frequency inverters of the ZAdyn type require no FI circuit breaker for operation.
The circuit at the output of the ZAdynpro is monitored by an electronic short-circuit protection. On detecting a short-circuit current at the output of the ZAdyn (and thus negligible impedance between the phase and a body 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 , 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:	• Maximum 5 m • If 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:	The brake resistor or brake chopper used must be configured in the menu **Encoder & BC/BC_TYP**.
	`Encoder & BC`
	`↳BC_TYP BR25`
	`↳ BR25`
	`BR/BC - Typ`

Connection:	**Brake-Resistor connection** The brake resistor of the BR11-A type has no temperature monitor.  BR11-A/BR 14-A  BR17/BR25/BR50/BR100

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!

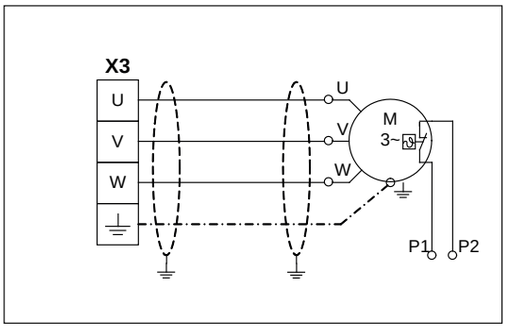
CAUTION!

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

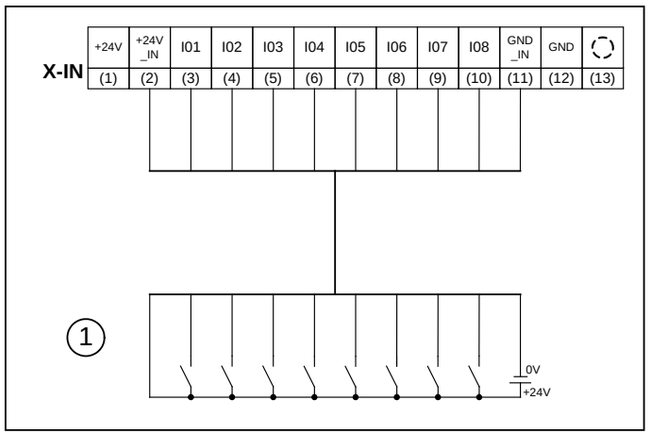
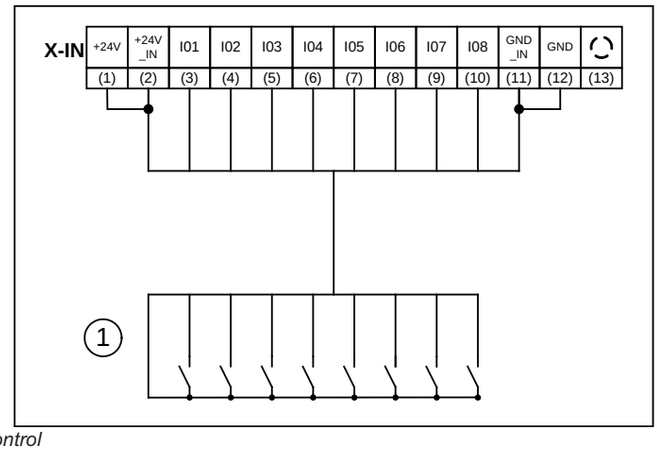
5.8 Motor connection (X 3)

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:	• Shielded line • Rigid or flexible line • Rated voltage U0 / U: 450 / 750 VAC
Cable lengths:	• Max. 25 m
Connection type:	Spring-type terminals
Connection:	 Connection asynchronous motor / synchronous motor

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:	The digital inputs comply with the IEC61131-2 TYPE 2 industry standard.	
	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 mm²	
Type of cable:	• Individual conductors • Not shielded	
Cable lengths:	Max. 25 m	
Connection type:	Screw terminals	
Connection:	**Connection with external power supply**  *1 Control* *() terminal designation of connector* 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!	
	Connection with internal power supply  *1 Control* *() terminal designation of connector* When using the internal power supply, a bridge must be placed between the **+24V / +24V_IN** terminals and between **GND / GND_IN**.	

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*

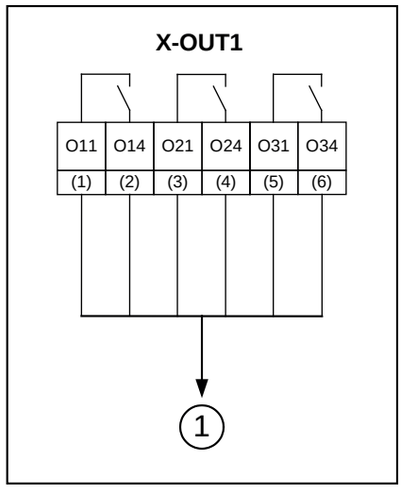
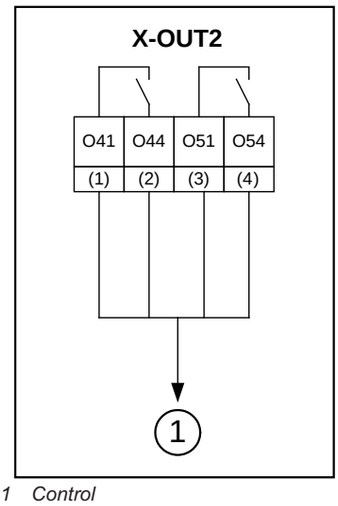
Information
To be able to travel, at least the following input signals need to be present:

- 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 mm²		
Type of cable:	Not shielded		
Cable lengths:	Max. 25 m		
Connection type:	Screw terminals		
Connection:	 *1 Control* *() terminal designation of connector*  *1 Control* *() terminal designation of connector*		

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

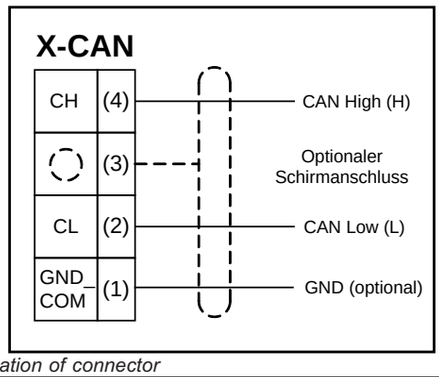
- The output assignments can be configured. The configuration can be implemented by:
  – Presetting the used control system (assignment corresponding to the control requirements)
  – Free configuration
- Implement configuration of the digital outputs in the **Control system\CONFIG** menu.
- Please refer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

The output assignments dependent on the configuration:

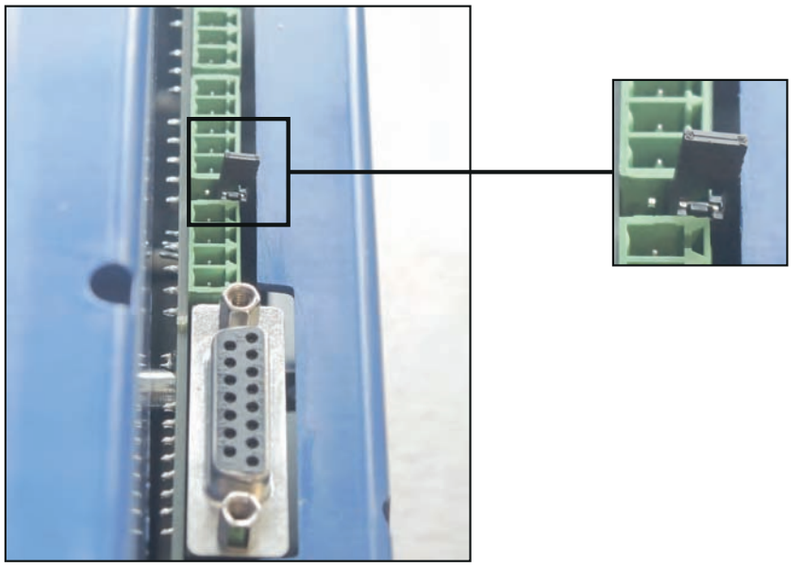
Configuration	Outputs				
	O11 - O14	O21 - O24	O31 - O34	O41 - O44	O51 - 54
00:Free	Err*	MB_Brake*	MotContact*	V < V_G1*	STO-Info*
01:ZA_IO	Fault	MB_Brake	MotContact	V < V_G1	STO-Info
03:BP_IO	Fault	MB_Brake	MotContact	V < V_G1	STO-Info
08:KN_IO	Fault	MB_Brake	MotContact	V < V_G1	STO-Info
11:NL_IO	Fault	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:	• Not shielded • Twisted pair
Cable lengths:	• Main line: Max. 200 m • Stub lines: Max. 6 m
Connection type:	Screw terminals
Connection:	• 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.  () *terminal designation of connector*

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.

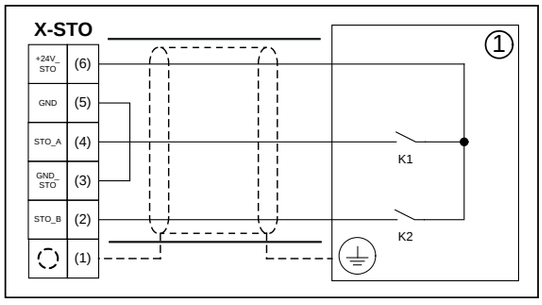
The relays used to activate the STO inputs must meet the following requirements:

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).

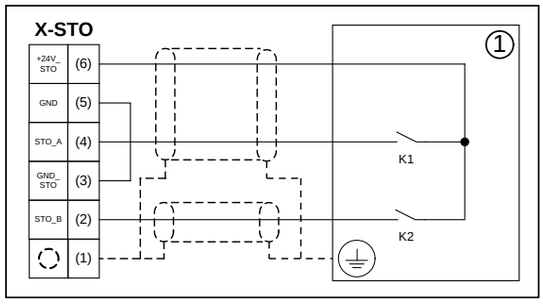
Danger!
If you use an external voltage source instead of the internally generated 24-V voltage (X-STO: +24V_STO) to actuate the STO inputs, you must use a voltage source with low voltage and safe electrical disconnection (SELV/PELV).

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

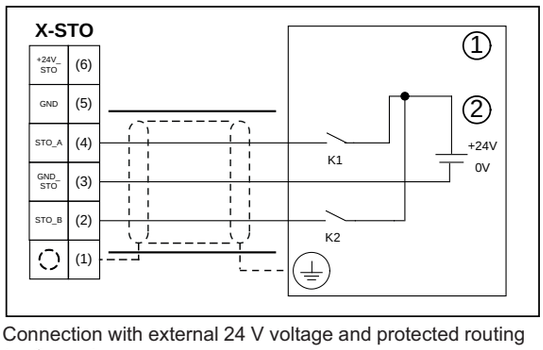
Designation of the connection terminal:	X-STO	
Technical data:	Voltage range	0...30 VDC
	Switching level LOW / HIGH	0 V < LOW < 3 VDC 15 V < HIGH < 30 VDC, typical: 24 VDC
	Current consumption at 24 VDC	typ. 12 mA per input
Line cross-section:	min. 0.25 mm²...max. 2.5 mm²	
Type of cable:	• Shielded lines • 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:		



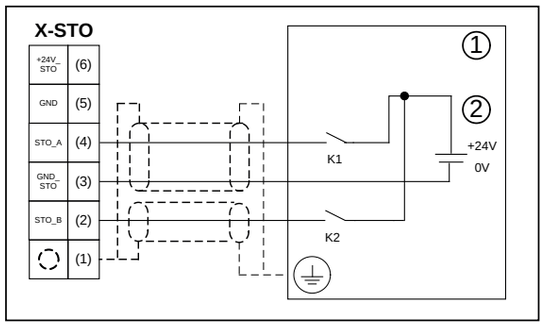
Connection with internal 24 V voltage and protected routing
1 Control



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



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



Connection with external 24 V voltage using two separate jacketed cables
1 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:	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.
	`Encoder & BC`
	`↳ENC_Typ TTL rect.`
	`↳ TTL rect.`
	`Encoder type`
	`Encoder & BC`
	`↳ENC_INC 2048`
	`↳ 2048`
	`Encoder resolution`	

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)

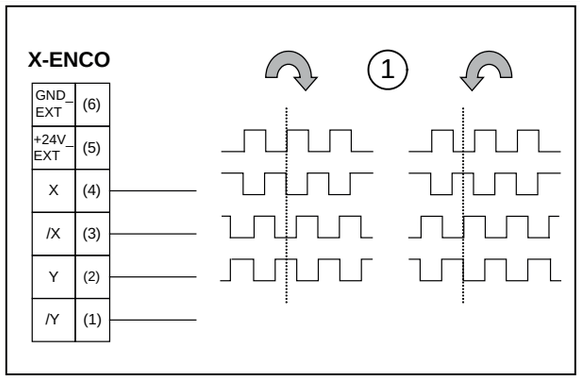
Parametrisation:	Before the rotary encoder is plugged in/connected, the encoder type and resolution used must be configured in the **"Encoder & BC/ENC_TYPE"** and **"Encoder & BC/ENC_INC "** menus.
	`Encoder & BC`
	`↳ENC_Typ TTL rect.`
	`↳ TTL rect.`
	`Encoder type`
	`Encoder & BC`
	`↳ENC_INC 2048`
	`↳ 2048`
	`Encoder resolution`	

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)

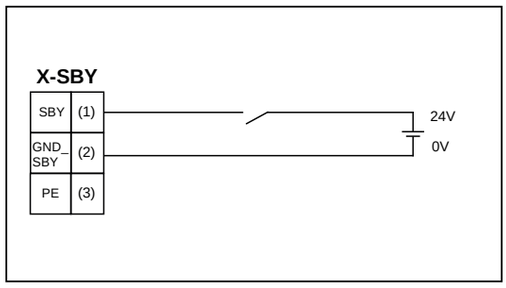
- The rotary encoder simulation transforms the signals of the rotary encoder mounted on the motor into differential signals according to ANSI standard RS422. The resolution of the rotary encoder simulation is identical to the resolution of the rotary encoder.
- As a result of the connection of an external 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. 1.5mm²	
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:		

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

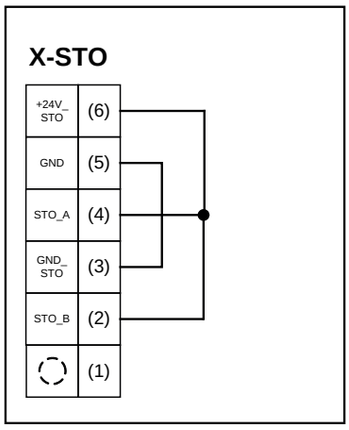
5.16 Standby input (X-SBY)

- 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 mm²	
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.).

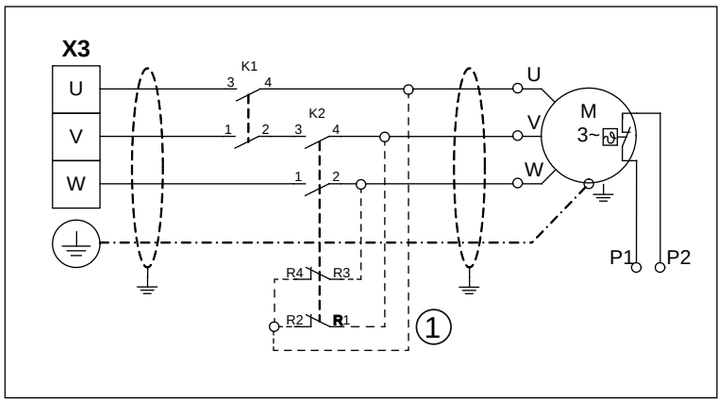


STO connection bridged

The monitor of the STO function must also be deactivated.
The STO function is activated/deactivated in the **Monitors/STO**menu.

```
Monitors
↳ STO      Off
  ↳        Off
STO monitor
```

The maximum line 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.

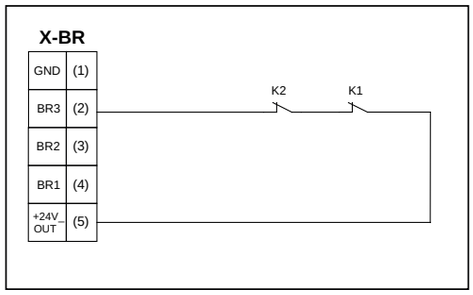
The contactor monitoring is activated/deactivated in the **Control system/f_XBR3** menu.

```
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 mm²
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

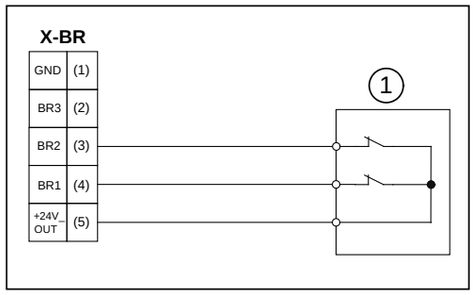
5.18.1 Brake release monitoring (X-BR)

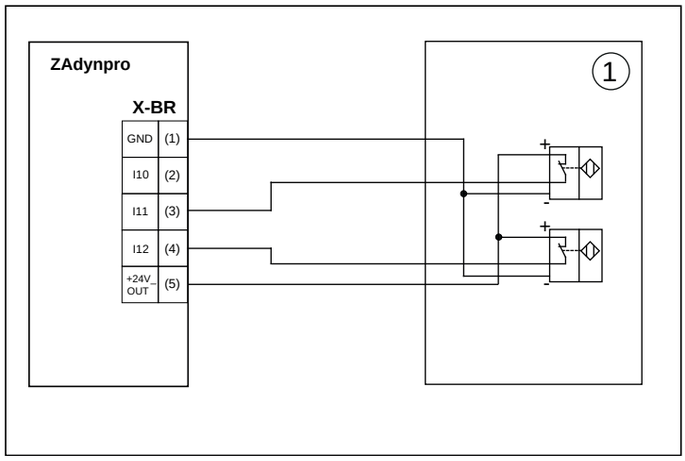
- The brake release monitoring serves as monitoring for redundancy and the operation status of the brakes.
- It is recommended that the brake air monitoring be connected to the ZAdynpro for optimum starting and stopping.

Information
When20the 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 air monitoring	
Symbol:	X-MON	
Line cross-section:	max. 1,5 mm²	
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:	The contactor monitoring can be activated/deactivated in the menu **Monitoring**.
	`Monitoring`
	`↳BR 1*NC`
	`↳ 3*NC`
	`Brake control (BR1..BR4)`
	The lock function of the ZAdynpro is engaged by activating the **LOCKBR=On** parameter in the menu **Monitors**.
	`Monitoring`
	`↳LOCKBR Off`
	`↳ On`
	`Lock inverter`
	Activation of the parameter ensures that the ZAdynpro locks upon detection of a faulty brake circuit.
	The ZAdynpro lock can only be released by setting the **Monitors/UNLOCK = On** parameter.	

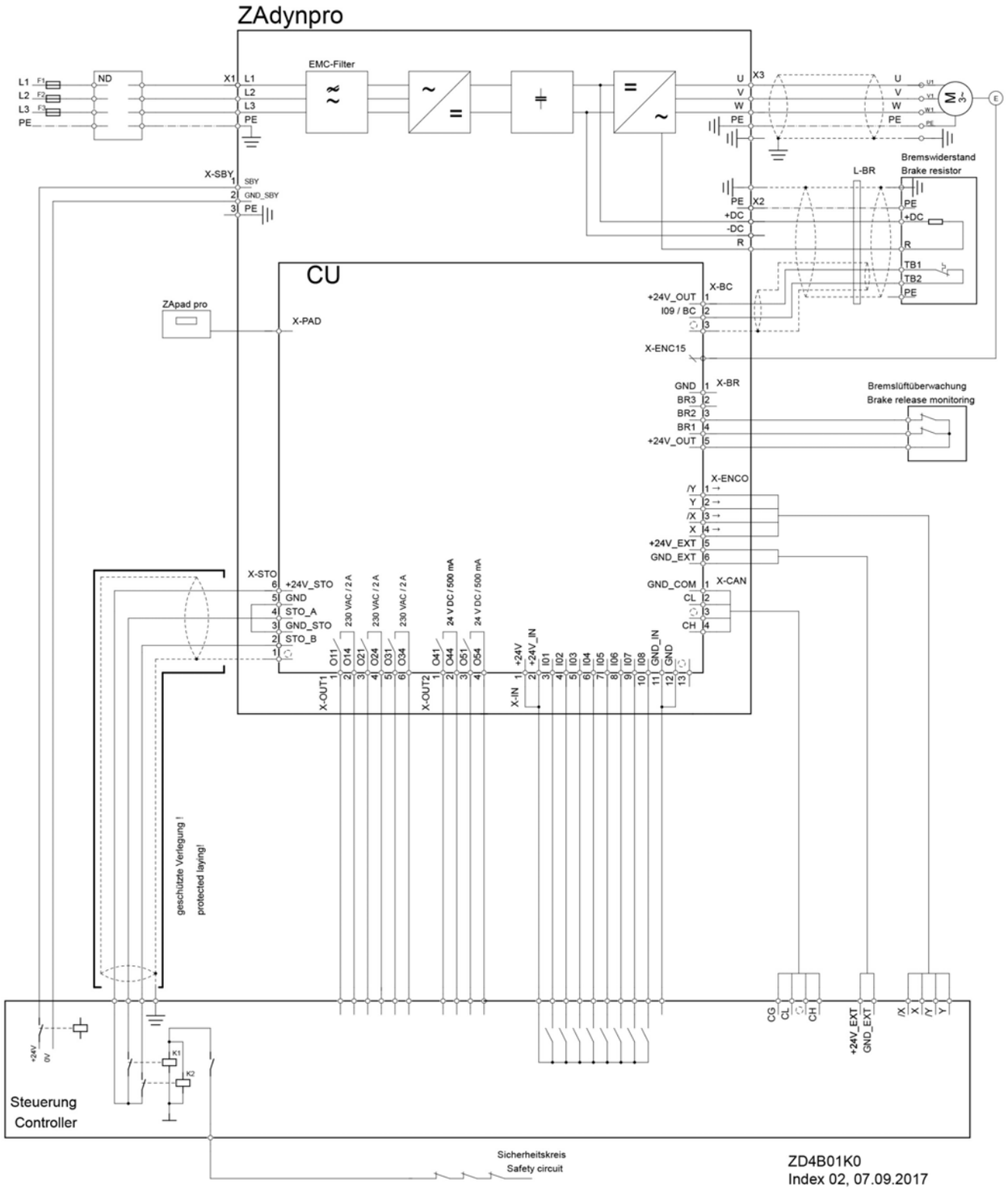
Connection:	 Connection of brake release monitor with micro switches *1 Monitoring contacts* *() terminal designation of connector*	



Brake release monitoring connection with inductive proximity switches
1 Lift drive
0 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!

5.19 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.

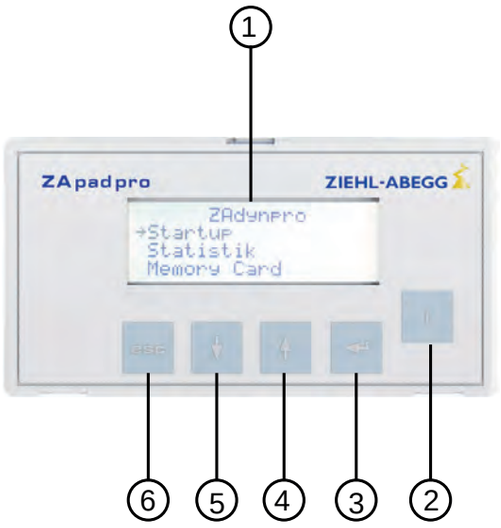
Connection cable

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

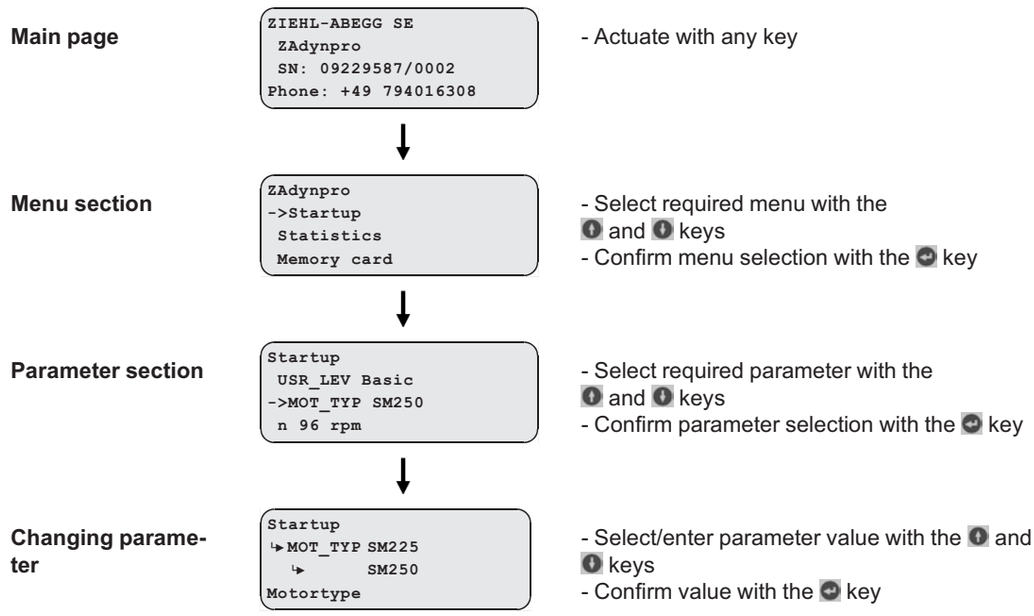


ZApadpro and ZAmon control interface
1 Display
2 i key
3 Enter key
4 Arrow UP key
5 Arrow DOWN key
6 ESC key

6.2.2 Control key functions

esc	• back to menu selection • Back to parameter selection • Negation of yes-no queries • Cancel
↵	• Confirming menu selection • Confirming parameter values • Confirming parameter values • Affirmation of yes-no queries
↑	• Menu selection • Parameter selection • Increasing parameter values
↓	• Menu selection • Parameter selection • Reducing parameter values
i	• 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.

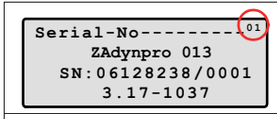
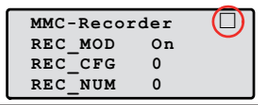
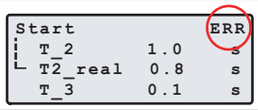
Advanced Level

- 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:

Motor-Typenschild → Encoder & BC Anlage-daten Steuerung	→	Selecting a menus in the menu level
Motor-Typenschild n 128 rpm ↳ f 18.0 Hz I 40.4 A	↳	Selecting changeable parameters in the menu
Anlage-Daten MOD_n* Mit D..i2 ↳ n* 94 rpm __D 0.240 m	↳	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)
Start T_2 1.0 s T2_real 0.8 s T_3 0.1 s	⌞	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
	☐	The recorder for recording measurements on the memory card is activ
	**ERR**	ZAdynpro fault The ZAdynpro must be deactivated

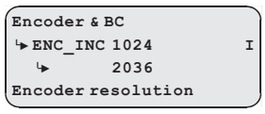
6.3 Entering numerical values

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.

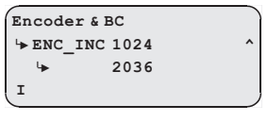


6.3.2 Changing individual digits

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

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

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.

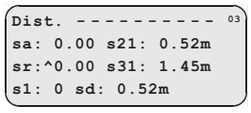
Test step	Result
At standstill of the drive (no travel signals), bridge the normally open contact of the relay for triggering the STO_B signal so that the STO_B input is activated.	In the **Info menu/Start/Stop**, the STO_B input must initially be marked as active by a large dot. A large dot must be 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**.



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!

S

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 **Control/SPD_KP** or amplification of the position controller (dependent on the startup 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").

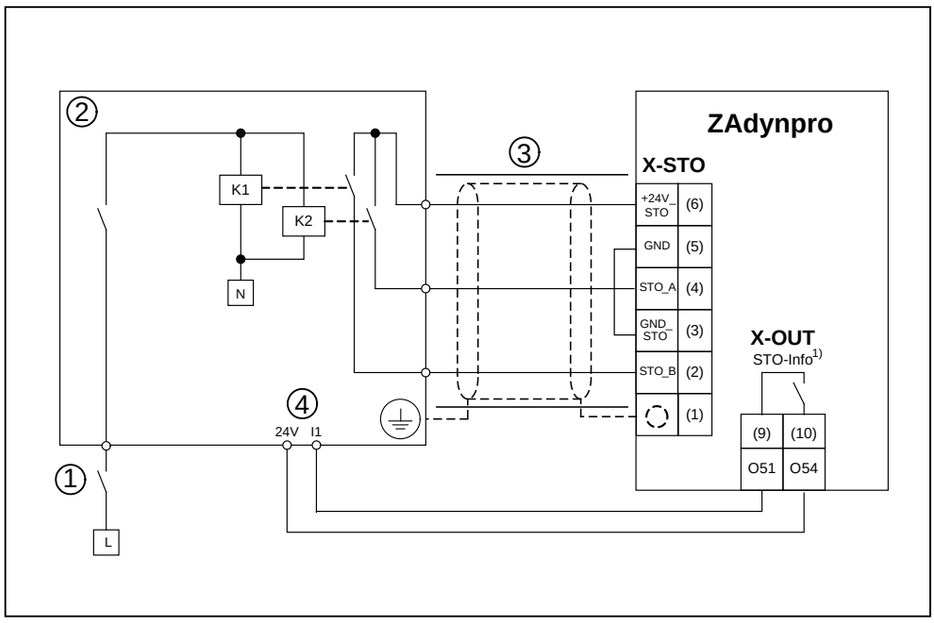
Information
In the version according to the principle circuit diagram, monitoring of the two relays K1/K2 by the lift control system is not necessary in order to meet the requirements of EN 81-20. The requirements are met by the internal diagnostic unit.

- 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 waitat 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



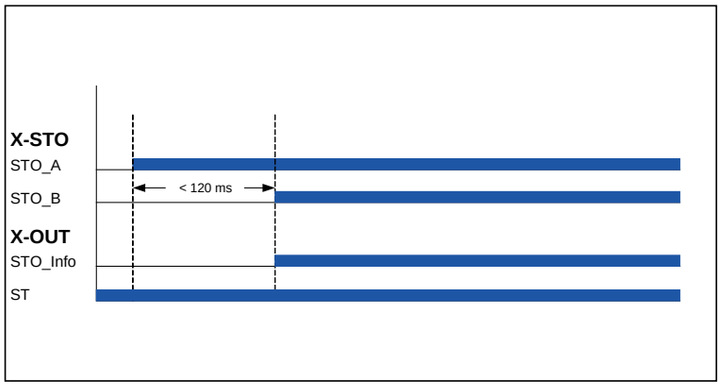
Principle circuit diagram "Safe Torque Off (STO)" function
1 Electrical safety chain
2 Control
3 Protected routing or design with two separate jacketed cables (see chapter "STO interface (X-STO)")
4 Digital inputs control
1) Information only, not safety-related

8.4 Electrical connection

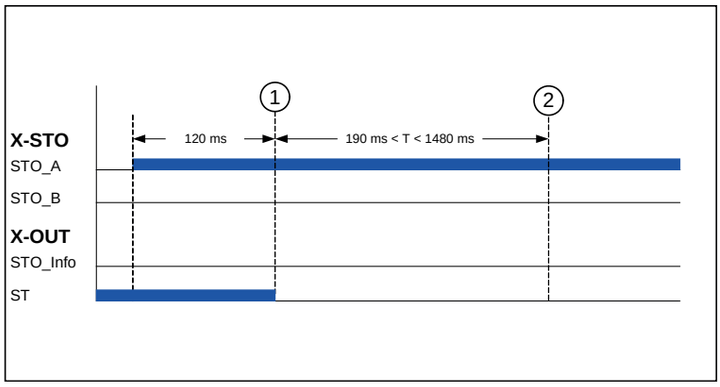
The connection is made via the interface X-STO on the ZAdynpro (see chapter "Electrical installation / STO interface (X-STO))".

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 φ = 360°/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:

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

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% switch-on duration and switching frequency 8 kHz fixed	[A]	11	13	17	23	32
Nominal current for 40% switch-on duration and switching frequency 12 kHz fix[1)]	[A]	9	11	15	20	27
Nominal current for 40% switch-on duration 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% switch-on duration	[W]	193	204	242	309	424
Power loss at nominal current, switching frequency 16 kHz and 40% switch-on duration	[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 by1.66% 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 elevators, 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.

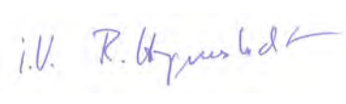
The authorised representative for the assembly of the technical file is:
Mr. Roland Hoppenstedt (see above for address).

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	
I	
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	

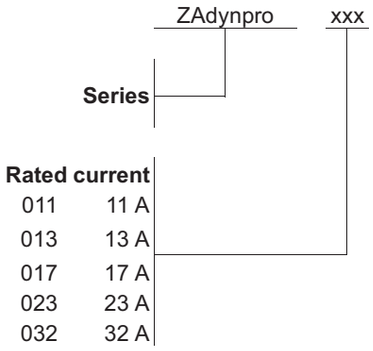
Stop menu

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

TÜVRheinland
CERTIFIED

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.

Testing for Safety
0035
Notified Body

Berlin, 2017-10-10

Notified Body for Machinery, NB 0035

Dipl.-Ing. Eberhard Frejno

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TÜV Rheinland Industrie Service GmbH, Alboinstr. 56, 12103 Berlin / Germany
Tel.: +49 30 7562-1557, Fax: +49 30 7562-1370, E-Mail: industrie-service@de.tuv.com

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Certificate

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www.tuv.com
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 81-1:1998 + A3:2009
EN 81-50:2014	EN 81-2:1998 + A3:2009
IEC 61800-5-2:2016	

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

Dipl.-Ing. Stephan Häb

TÜV Rheinland Industrie Service GmbH, Am Grauen Stein, 51105 Köln / Germany
Tel.: +49 221 806-1790, Fax: +49 221 806-1539, E-Mail: industrie-service@de.tuv.com

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2017-10-10

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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: - 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 ms < t_v < 1600 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))

Annex to Certificate Reg.-Nr.: 968/A 166.02/17 Page 1 of 2

2017-10-10

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	Safety characteristics: SIL 3, PL e, Kat. 4 PFH = 3,11E-10 1/h $MTTF_d$ = 410 a (High) DC_{avg} = High
	Further technical details are stated in the manuals by ZIEHL-ABEGG SE referred to in the Revision Release List.
8. Maintenance	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.
9. Installation	The guidelines regarding installation, commissioning and operation shall be observed. - 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	- 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	- 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.
	  - 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 φ = (180 ° / 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).

Annex to Certificate Reg.-Nr.: 968/A 166.02/17 Page 2 of 2

LIFTINSTITUUT

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

LIFTINSTITUUT B.V. - SAFETY AND QUALITY MANAGEMENT

Buikslotermeerplein 381 | P.O. Box 36027 | Tel. +31 20 - 435 06 06 | www.liftinstituut.nl | VAT number:
NL - 1025 XE Amsterdam | NL - 1020 MA Amsterdam | Fax +31 20 - 435 06 26 | contact@liftinstituut.nl | NL 810399441 B01

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

LIFTINSTITUUT

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.

 Rev. 3 date: November 28, 2016 Page 2 of 2

LIFTINSTITUUT B.V. – SAFETY AND QUALITY MANAGEMENT

Buikslotermeerplein 381 | P.O. Box 36027 | Tel. +31 20 - 435 06 06 | www.liftinstituut.nl | VAT number:
NL - 1025 XE Amsterdam | NL - 1020 MA Amsterdam | Fax +31 20 - 435 06 26 | contact@liftinstituut.nl | NL 810399441 B01

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LIFTINSTITUUT

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 36027 · 1020 MA Amsterdam Netherlands · www.liftinstituut.nl ·
· Registered at the KvK under number 34157363 ·

F23-02-22-v17.0

9.6 Index

Customer Service

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fax +49 7940 16-249
drives-service@ziehl-abegg.com

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ZIEHL-ABEGG

Bewegung durch Perfektion | Movement by Perfection

ZIEHL-ABEGG

Die Königsklasse

The Royal League

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 2
-Parameters
-Diagnosis
-Special functions

R-TBA17_03-GB 1734

Part.-No. 00163461-GB

ZIEHL-ABEGG

Content

1 Serial communication

1.1 Start-up the CAN-interface

1.1.1 ZAdynpro

- Only devices with the CiA 417 profile are allowed.
- All devices work in 11 bit - mode.
- There can only be one ZAdynpro connected per bus system.

☞ For information on the electrical installation of CANopen lift, please refer to chapter "Electrical installation/CAN interface (X-CAN)" in part 1 of the operating instructions.

1.1.2 Activating the interface

The activation of the CAN interface can be set in the menu **Control system/CONFIG**.

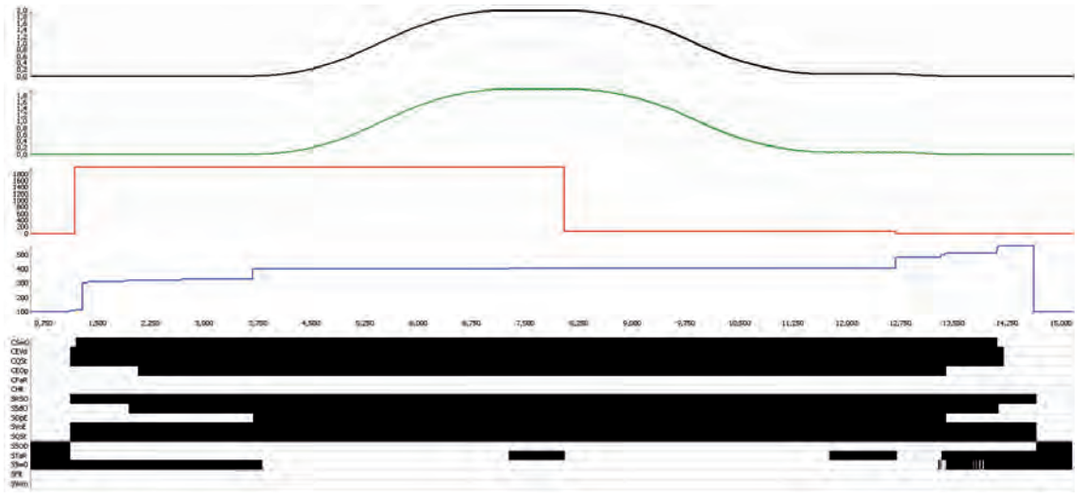
```
Control
↳CONFIG  01:BP_DCP1
  ↳      02:BP_DCP2
Configuration
```

The INFO menu shows CAN information at the pages 14 - 17 (Assumption: "CONFIG" = "02: ZA_CAN").

1.1.3 Operation modes

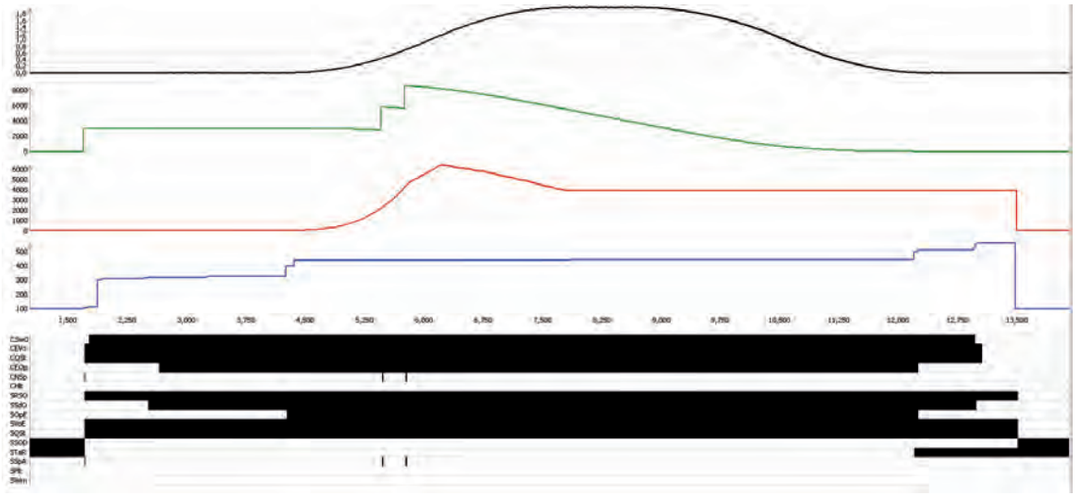
Information
There are two operating modes for the ZAdynpro in CAN operation:

- Velocity Mode (Velocity Mode [pv])



Velocity Mode

- Position Mode (Position Mode [pp]



Position Mode

The respective mode can be set in the ZAdynpro under "CAN/MODE". Most control systems, however, write the mode in the ZAdynpro shortly before startup. This means that the operating mode must be set in the control system.
If the ZAdynpro is operated in position mode, the absolute shaft copy system must be connected to the same bus as the ZAdynpro.

The control system sends the required speed to the ZAdynpro before every journey. If this cannot be achieved, the ZAdynpro will initiate a triangular speed profile journey. The maximum speed must therefore be entered in the control system.

1.1.4 Command- and Statusbits of the recorder

- Position Mode [pp] C&S / Velocity Mode [pv] C&S
- C = Command = command from the control to the frequency inverter
- S = Status = Status of the ZAdynpro as reaction to a prior command from the control system

Status- / Commandbit	Designation	Remarks
CSwO	Command Switch On	
CEVo	Command Enable Voltage	
CQSt	Command Quick Stop	
CEOp	Command Enable Operation	
CFaR	Command Fault Reset	
CNSp	Command New Setpoint	only active in position mode
CHlt	Command Halt	
SRSO	Status Ready to Switch On	
SSdO	Status Switched On	
SOpE	Status Operation Enabled	
SVoE	Status Voltage Enabled	
SQSt	Status Quick Stop	
SSOD	Status Switch On Disabled	
STaR	Status Target Reached	
SS=0	Status Speed = 0	only active in velocity mode
SSpA	Status Setpoint Acknowledge	only active in position mode
SFlt	Status Fault	
SWrn	Status Warning	

2 Parameter list

- The individual parameters are subdivided into various menus based on their functions.
- Not all described parameters are freely accessible and visible. The display depends on the selected functions and settings in the ZAdynpro.

2.1 Basic-Level

- The **Startup**, **Statistic** and **Memory Card** menus are displayed in the basic level.
- The **Startup** menu is only displayed in the basic level.
- The **Statistics** and **Memory card** menus are displayed in both the basic level and advanced level. They are described in the chapters "Parameter list/Statistics menu" and "Parameter list/Memory card menu".

2.1.1 Startup menu

All the parameters required for initial startup are contained in the **Startup** menu.

Parameter	Designation	Value range	Factory setting
LCD	Select the desired operating language. The operating languages German and English are integrated into the device as standard. A third operating language can be loaded onto the ZAdynpro via the memory card. ☞For information on how to save a third operating language, refer to the chapter "Memory card/Saving a third operating language".	Deutsch English Türkce Nederland Espanol Italiano Svenska Czech France Polski Po Russki	Deutsch
USR_LEV	User Level Selection via the user level which is available when starting the ZAdynpro in the ZApadpro.	Basic Advanced	Basic
MOT_TYP	Enter the operated motor type **ASM:**Asynchronous motor **SMxxx:** Synchronous motor External product **SM132:** Ziehl-Abegg synchronous motor type SM132 **SM160:** Ziehl-Abegg synchronous motor type SM160 **SM180:** Ziehl-Abegg synchronous motor type SM180 **SM190:** Ziehl-Abegg synchronous motor type SM190 **SM200:** Ziehl-Abegg synchronous motor type SM200 **SM210:** Ziehl-Abegg synchronous motor type SM210 **SM225:** Ziehl-Abegg synchronous motor type SM225 **SM250:** Ziehl-Abegg synchronous motor type SM250 **SM700:** Ziehl-Abegg synchronous motor type SM700 **SM860:** Ziehl-Abegg synchronous motor type SM860 **SL506:** Ziehl-Abegg synchronous motor type SL506 **SL510:** Ziehl-Abegg synchronous motor type SL510	ASM SMxxx SM132 SM160 SM180 SM190 SM200 SM210 SM225 SM250 SM700 SM860 SL506 SL510	
n	Enter the motor's rated speed	10 ... 6000 rpm	Depends on configured motor type
f	Enter the motor's rated frequency	3.0 ... 200 Hz	
I	Enter the motor's rated current	5.0 ... 200 A	
U	Enter the motor's rated voltage Enter the motor's rated current	200 ... 460 V	
p	Enter the motor's rated power	1.0 ... 90 kW	
cos phi	Enter the motor's power factor (only for asynchronous motors)	0.10 ... 1.0	0.88
TYP	Enter the motor's type of connection	Star Delta	Star

Parameter	Designation	Value range	Factory setting
ENC_TYP	Enter the type of encoder used S **EnDat/SSI:** Absolute rotary encoder Position information is transmitted either via SSI (synchronous serial interface) or EnDat protocol **ERN1387:** absolute encoder Position information is transmitted by analog signal **Hiperface:** absolute encoder (function not assigned) **Codeface:** absolute encoder (function not assigned) **BiSS-C:**: Absolute value encoder with BiSS-C interface A **TTL sine:** 5 V rotary encoder with sine signal **TTL rect.:** 5 V rotary encoder with rectangle signal **HTL 10-30 V:** 10-30 V rotary encoder with rectangle signal (function not assigned) **No ENC:**: Open loop operation	EnDat/SSI HTL 10-30V TTL square TTL Sine Hiperface Codeface ERN1387 No ENC. BiSS-C	Depends on configured motor type
ENC_INC	Enter encoder resolution (pulses/revolution)	64 ... 4096	
BC_TYP	Input of the brake resistor or brake chopper used, or of the power feedback unit used **BR11:** Brake resistor type BR11-A **BR50:**Brake resistor type BR50 **BR50+BR25:** parallel connection of BR25 and BR50 **BR50+BR50:** parallel connection of 2 pieces BR50 **BRxx:** Brake resistor external product **PFU:** Power Feedback Unit **PFU+BR11:** Power feedback unit + brake resistor TYPE BR11 **PFU+BR17:** Power feedback unit + brake resistor TYPE BR17 **PFU+BR25:** Power feedback unit + brake resistor TYPE BR25 **PFU+BR50:** Power feedback unit + brake resistor TYPE BR50 **BR09-1:** Brake-Resistor Type BR09-1 **BR14:** Brake resistor type BR14 **BR100:** Brake resistor type BR100 **PFU+BRxx:** Power feedback unit + brake resistor, third-party product **2*BR100:** parallel connection of 2 pieces BR100 **BR17-1:** Brake resistor type BR17 **BR25-1:** Brake resistor type BR25 **BC25:** Brake-Chopper type BC25 **BC50:** Brake-Chopper type BC50 **BC100:** Brake-Chopper type BC100 **ZArec:** ZArec feedback unit	BR11 BR50 BR50+BR25 BR50+BR50 BRxx PFU PFU+BR11 PFU+BR17 PFU+BR25 PFU+BR50 BR09-1 BR14 BR100 PFU+BRxx 2* BR100 BR17 BR25 BC25 BC50 BC100 ZArec	BR17
V*	Enter the installation rated speed	0.00 ... 10.00 m/s	1.00
n*	Motor speed at V* **MOD_n = direct:** direct input of the motor speed at V* **MOD_n = calculate:** Calculates the speed of the motor dependent on: V*; __D; __iS;__; __i1 and __i2	10 ... 2990 rpm	0
__D	Enter the diameter of the traction sheave	0.06 ... 1.20 m	0.50
__iS	Enter the installation's type of suspension	1:1 2:1 3:1 4:1 5:1 6:1 7:1 8:1	1:1
__i1	Input of **i1** of the gearbox ratio **i1:i1**	1 ... 650	38.00
__i2	Input of **i2** of the gearbox ratio **i1:i2**	1 ... 1000	1
Q	Enter the elevator installation's rated load	100 to 32000	600

Parameter	Designation	Value range	Factory setting
CONFIG	Configuration of the digital inputs according to the used control system and type of communication **00:Free:** Outputs are freely configurable **01:ZA_IO:** Ziehl-Abegg standard actuation **02:ZA_CAN:** Ziehl-Abegg CAN **03:BP_IO:** Böhnke+Partner standard control **04:BP_DCP1:** Böhnke & Partner DCP1 **05:BP_DCP2:** Böhnke & Partner DCP2 **06:BP_DCP3:** Böhnke & Partner DCP3 **07:BP_DCP4:** Böhnke & Partner DCP4 **08:KN_IO:** Kollmorgen standard control **09:KN_DCP3:**Kollmorgen DCP3 **10:KN_DCP4:** Kollmorgen DCP4 **11:NL_IO:** New Lift standard control **12:NL_DCP3:** New Lift DCP3 **13:SS_IO:** Schneider Steuerungen standard control **14:SS_DCP3:** Schneider Steuerungen DCP3 **15:ZA_BIN:** Ziehl-Abegg standard actuation with binary speed specification **16:WL_IO:** Weber Lifttechnik standard control **17:WL_DCP1**: Weber Lifttechnik DCP1 **18:WL_DCP2** Weber Lifttechnik DCP2 **19:WL_DCP3** Weber Lifttechnik DCP3 **20:WL_DCP4** Weber Lifttechnik DCP4 **21:ST_IO** Strack Lift Automation standard control **22:ST_DCP3** Strack Lift Automation DCP3 **23:ST_DCP4** Strack Lift Automation DCP4 **24:CSILVA:** Carlos Silva standard control **25:S+S:** Schmitt+Sohn standard control **26:KW_DCP3:** KW Aufzugstechnik DCP3 **27: MAS_BIN:** Masora standard control **28: BU_SATU:** Function not assigned **29: BU_ORIO:** Function not assigned **30: KS_IO:** Georg Kühn Control systems standard control **31: KL_IO:** Kleemann standard control **32: S_SMART:** Schindler Smart standard control **33: SS_DCP4:** Schneider controls DCP4 **34: OS_DCP3:** Osma DCP3 **35: Lester:** Lester Controls **36: HY-Mod:**Operation of hydraulic systems	00:Free 01:ZA_IO 02:ZA_CAN 03:BP_IO 04:BP_DCP1 05:BP_DCP2 06:BP_DCP3 07:BP_DCP4 08:KN_IO 09:KN_DCP3 10:KN_DCP4 11:NL_IO 12:NL_DCP3 13:SS_IO 14:SS_DCP3 15:ZA_BIN 16:WL_IO 17:WL_DCP1 18:WL_DCP2 19:WL_DCP3 20:WL_DCP4 21:ST_IO 22:ST_DCP3 23:ST_DCP4 24:CSILVA 25:S+S 26:KW_DCP3 27:MAS_BIN 28:Bucher_SATU 29:Bucher_ORIO 30:KS_IO 31:KL_IO 32:S_SMART 33:SS_DCP4 34:OS_DCP3 35:Lester 36:HY-Mod	01:ZA_IO
MO_DR	Changing the rotating direction of the motor It must be observed the with triggering the input RV1 the cabin drives upwards **left:** Rotary direction left **right:** Rotary direction right	left right	left

Parameter	Designation	Value range	Factory setting
BR	Motor brake monitoring Input of number and function of the brake monitoring contacts used **OFF:**no brake monitoring connected **1*NC:** 1x normally closed contact (Contact closed when brake currentless) **2*NC:** 2 x normally closed contact (Contact closed when brake currentless) **3*NC:** 3 x normally closed contact (Contact closed when brake currentless) **1*NO:** 1 x normally open (contact is open when brake currentless) **2*NO:** 2 x normally open contact (contact is open when brake currentless) **3*NO:** 3 x normally open (contact is open when brake currentless)	Off 1*NC 2*NC 3*NC 1*NO 2*NO 3*NO	accordingly to motor type
P1P2	Motor temperature monitoring **Off:** Temperature monitor deactivated **PTC:** thermistor (PTC according to DIN 44082) **TC:** Thermal circuit breaker **KTY:** Temperature sensor KTY84-130	Off PTC TC KTY	PTC
K_START	Start gain Multiplication factor for the parameter **Control/SPD_KP** or amplification of the position controller (dependent on the startup mode)	is automatically limited	1.0
SPD_KP	Multiplication factor to modify the calculated basic amplification SPD_C	is automatically limited	1.0

2.2 Advanced-Level

See the chapter "Operation and parametrisation/The different operating levels" for information about the advanced level.

2.2.1 LCD & Password menu

- Selecting the desired operating language
- The ZAdynpro is protected against access by third parties via a password system.
- The parameters can only by changed after the password has been entered. No password is allocated ex works.

Parameter	Designation	Value range	Factory setting
LCD	Select the desired operating language. The operating languages German and English are integrated into the device as standard. A third operating language can be saved via the memory card. ☞For information on how to save a third operating language, refer to the chapter "Memory card/Saving a third operating language".	Deutsch English Türkce Nederland Espanol Italiano Svenska Czech France Polski Po Russki	Deutsch
USR_LEV	User Level Selection via the user level which is available when starting the ZAdynpro in the ZApadpro.	Basic Advanced	Basic
PASSWD	Enter password.	0 ... 9999 0 = no password	0
PW_NEW	New password A number between 0 and 9999 can be used as a password	0 ... 9999	0

Parameter	Designation	Value range	Factory setting
PWCOD	Displays the password in coded form. If you lose the password, please contact the manufacturer.	Cannot be set	21689
PW_CLR	Deleting the password The password has to be entered correctly before **ON:** Delete password **Off:** no function	On Off	Off

2.3 Motor name plate menu

Enter the motor data in accordance with the data on the motor name plate.

Parameter	Designation	Value range	Factory setting
MOT_TYP	Enter the operated motor type **ASM:** Asynchronous motor **SMxxx:** Synchronous motor External product **SM132:** Ziehl-Abegg synchronous motor type SM132 **SM160:** Ziehl-Abegg synchronous motor type SM160 **SM180:** Ziehl-Abegg synchronous motor type SM180 **SM190:** Ziehl-Abegg synchronous motor type SM190 **SM200:** Ziehl-Abegg synchronous motor type SM200 **SM210:** Ziehl-Abegg synchronous motor type SM210 **SM225:** Ziehl-Abegg synchronous motor type SM225 **SM250:** Ziehl-Abegg synchronous motor type SM250 **SM700:** Ziehl-Abegg synchronous motor type SM700 **SM860:** Ziehl-Abegg synchronous motor type SM860 **SL506:** Ziehl-Abegg disc rotor type SL506 **SL510:** Ziehl-Abegg disc rotor type SL510	ASM SMxxx SM132 SM160 SM180 SM190 SM200 SM210 SM225 SM250 SM700 SM860 SL506 SL510	
n	Enter the motor's rated speed	10 ... 6000 rpm	Depends on configured motor type
f	Enter the motor's rated frequency	3.0 ... 200 Hz	
p	Displays the number of pole pairs of the motor	nicht einstellbar	
I	Enter the motor's rated current	5.0 ... 200 A	
U	Enter the motor's rated voltage	200 ... 460 V	
P	Enter the motor's rated power	1.0 ... 90 kW	
cos phi	A Enter the motor's power factor (only for asynchronous motors)	0.10 ... 1.0	
TYP	Enter the motor's type of connection	Star Delta	Star
M_MAX	Maximum motor torque	0.2 ... 5.0	2.0

2.4 Encoder & BC menu

Enter:

- Rotary encoder type
- Rotary encoder resolution
- used Brake-Chopper or Brake resistor type

Parameter	Designation	Value range	Factory setting
ENC_TYP	Enter the type of encoder used S **EnDat/SSI:** Absolute rotary encoder Position information is transmitted either via SSI (synchronous serial interface) or EnDat protocol **ERN1387:** absolute encoder Position information is transmitted by analog signal **Hiperface:** absolute encoder (function not assigned) **Codeface:** absolute encoder (function not assigned) **BiSS-C:**: Absolute value encoder with BiSS-C interface A **TTL Sine:** 5V encoder with sinusoidal signal **TTL Square:** 5V encoder with square-wave signal **HTL 10-30 V:** 10-30 V rotary encoder with rectangle signal (function not assigned) **No ENC.:** Open-loop-mode	EnDat/SSI HTL 10-30V TTL square TTL Sine Hiperface Codeface ERN1387 No ENC. BiSS-C	EnDat/SSI
ENC_INC	Enter encoder resolution (pulses/revolution)	64 ... 4096	2048
BC_TYP	Enter the used brake resistor or brake chopper **BR11:** Brake resistor type BR11-A **BR50:**Brake resistor type BR50 **BR50+BR25:** parallel connection of BR25 and BR50 **BR50+BR50:** parallel connection of 2 pieces BR50 **BRxx:** Brake resistor external product **PFU:** Power Feedback Unit **PFU+BR11:** Power feedback unit + brake resistor TYPE BR11 **PFU+BR17:** Power feedback unit + brake resistor TYPE BR17 **PFU+BR25:** Power feedback unit + brake resistor TYPE BR25 **PFU+BR50:** Power feedback unit + brake resistor TYPE BR50 **BR09-1:** Brake-Resistor Type BR09-1 **BR14:** Brake resistor type BR14 **BR100:** Brake resistor type BR100 **PFU+BRxx:** Power feedback unit + brake resistor, third-party product **2*BR100:** parallel connection of 2 pieces BR100 **3* BR100:** Parallel circuit of three BR100 **BR17-1:** Brake resistor type BR17 **BR25-1:** Brake resistor type BR25 **BC25:** Brake-Chopper type BC25 **BC50:** Brake-Chopper type BC50 **BC100:** Brake-Chopper type BC100 **ZArec:** ZArec feedback unit	BR11 BR50 BR50+BR25 BR50+BR50 BRxx PFU PFU+BR11 PFU+BR17 PFU+BR25 PFU+BR50 BR09-1 BR14 BR100 PFU+BRxx 2* BR100 3* BR100 BR17 BR25 BC25 BC50 BC100 ZArec	BR17
R_BR	Enter resistance of brake resistor when third-party product used ("BC_TYP=BRxx")	4 ... 200 Ohm	64
P_BR	Enter rating performance when third-party product used ("BC_TYP=BRxx")	0.0 ... 65 kW	0.5
T_PFU	Input of time between end of run and activation of the output with the PFU function **Input 0:** Function deactivated	0 ... 600 s	0

2.5 Installation menu

Enter of installation specific data

Information
The installation data must be configured before the first trip!

Parameter	Designation	Value range	Factory setting
V*	Enter the installation rated speed	0.00 ... 10.00 m/s	1.00
MOD_n*	Input type of the motor speed at installation rated speed **direct:** manual input of n* **Calculate:** Calculates the speed of the motor dependent on: V*; __D; __iS;__; __i1 and __i2	direct Calculate	Calculate
n*	Motor speed at V* **MOD_n = direct:** direct input of the motor speed at V* **MOD_n = calculate:** Calculates the speed of the motor dependent on: V*; __D; __iS;__; __i1 and __i2	10 ... 6000 rpm	0
__D	Enter the diameter of the traction sheave	0.06 ... 1.20 m	0.500
__iS	Enter the installation's type of suspension	1:1 2:1 3:1 4:1 5:1 6:1 7:1 8:1	1:1
__i1	Input of i1 of the gearbox ratio i1:i2	1 ... 650	38.00
__i2	Input of i2 of the gearbox ratio i1:i2	1 ... 1000	1
Q	Enter the elevator installation's rated load	100 ... 20000 kg	600
F	Enter the car weight	100 ... 20000 kg	1000
G	Enter the counterweight	0 ... 20000 kg	1300

2.6 Control system menu

Configuring of:

- elevator control system
- Digital inputs
- Digital outputs

Parameter	Designation	Value range	Factory setting
CONFIG	Configuration of the digital inputs and outputs according to the control system and type of communication used **00:Free:** Outputs are freely configurable **01:ZA_IO:** Ziehl-Abegg standard actuation **02:ZA_CAN:** Ziehl-Abegg CAN **03:BP_IO:** Böhnke+Partner standard control **04:BP_DCP1:** Böhnke & Partner DCP1 **05:BP_DCP2:** Böhnke & Partner DCP2 **06:BP_DCP3:** Böhnke & Partner DCP3 **07:BP_DCP4:** Böhnke & Partner DCP4 **08:KN_IO:** Kollmorgen standard control **09:KN_DCP3:**Kollmorgen DCP3 **10:KN_DCP4:** Kollmorgen DCP4 **11:NL_IO:** New Lift standard control **12:NL_DCP3:** New Lift DCP3 **13:SS_IO:** Schneider Steuerungen standard control **14:SS_DCP3:** Schneider Steuerungen DCP3 **15:ZA_BIN:** Ziehl-Abegg standard actuation with binary speed specification **16:WL_IO:** Weber Lifttechnik standard control **17:WL_DCP1**: Weber Lifttechnik DCP1 **18:WL_DCP2** Weber Lifttechnik DCP2 **19:WL_DCP3** Weber Lifttechnik DCP3 **20:WL_DCP4** Weber Lifttechnik DCP4 **21:ST_IO** Strack Lift Automation standard control **22:ST_DCP3** Strack Lift Automation DCP3 **23:ST_DCP4** Strack Lift Automation DCP4 **24:CSILVA:** Carlos Silva standard control **25:S+S:** Schmitt+Sohn standard control **26:KW_DCP3:** KW Aufzugstechnik DCP3 **27: MAS_BIN:** Masora standard control **28: BU_SATU:** Function not assigned **29: BU_ORIO:** Function not assigned **30: KS_IO:** Georg Kühn Control systems standard control **31: KL_IO:** Kleemann standard control **32: S_SMART:** Schindler Smart standard control **33: SS_DCP4:** Schneider controls DCP4 **34: OS_DCP3:** Osma DCP3 **35: Lester:** Lester Controls **36: HY-Mod:**Operation of hydraulic systems	00:Free 01:ZA_IO 02:ZA_CAN 03:BP_IO 04:BP_DCP1 05:BP_DCP2 06:BP_DCP3 07:BP_DCP4 08:KN_IO 09:KN_DCP3 10:KN_DCP4 11:NL_IO 12:NL_DCP3 13:SS_IO 14:SS_DCP3 15:ZA_BIN 16:WL_IO 17:WL_DCP1 18:WL_DCP2 19:WL_DCP3 20:WL_DCP4 21:ST_IO 22:ST_DCP3 23:ST_DCP4 24:CSILVA 25:S+S 26:KW_DCP3 27:MAS_BIN 28:Bucher_SATU 29:Bucher_ORIO 30:KS_IO 31:KL_IO 32:S_SMART 33:SS_DCP4 34:OS_DCP3 35:Lester 36:HY-Mod	01:ZA_IO
MO_DR	Changing the rotating direction of the motor It must be ensured that the cabin moves upwards when RV1 is actuated. **left:** Rotary direction left **right:** Rotary direction right	left right	left
CTRL	Select the communication between the frequency inverter and the control under "CONFIG=Free" **Standard:** Parallel connection **DCP1:** Communication by DCP01 protocol **DCP2:** Communication by DCP02 protocol **DCP3:** Communication by DCP03 protocol **DCP4:** Communication by DCP04 protocol	Standard DCP01 DCP02 DCP03 DCP04	Standard

Parameter	Designation	Value range	Factory setting
f_I01	Configuration of the function of the digital inputs I01 … I08 under "CONFIG=free" (For description of the functions, see table). Input I08 is free adjustable, independent of "CONFIG".	00:Free 01:RF 02:RV1-UP 03:RV2-DOWN 04:V1 05:V2 06:V3 07:VZ 08:V4 09:V5 10:V6 11:V7 12:PARA2 13:BIN0 14:BIN1 15:BIN2 16:DIR(1=UP) 17:v=0 18:RF+RV1 19:RF+RV2 20:BR1 21:BR2 22:BR3 23:BR4 24:SBIN0 25:SBIN1 26:SBIN2 27:MBIN0 28:MBIN1 29:MBIN2 30: STANDBY2 31:STEP+ 32:STEP- 33:PFU_BR 34:HY_UP 35:HY_DOWN 36:/DELAY 37:DTE 38:RECORD 39:INV_A1 40:FKT.ana 41:Monitor 43: STANDBY1 44:ZR_RDY 45:/ESC 46:SBC_RDY	01:RF
f_I02			04:V1
f_I03			05:V2
f_I04			06:V3
f_I05			07:VZ
f_I06			02:RV1-UP
f_I07			03:RV2-DOWN
f_I08			00:Free
f_XBR1	Configuration of the function of the digital inputs for the brake monitoring BR1 ... BR4 (For description of the functions, see table)		20:BR1
f_XBR2			21:BR2
f_XBR3			22:BR3
f_XBR4			00:Free

Parameter	Designation	Value range	Factory setting
f_O1	Configuration of the function of the digital outputs O1 … O5 under "CONFIG=free" (For description of the functions, see table)	Off MotContact RB-Invers V<V_G1 V<V_G2 V<1.1*V_3 Warning Fault EVAC.Dir MB_Brake INV V<V_G1 INV V<V_G2 V=0 PFU Info rope TD_CNT ext. Full load SD STO-Info /STO info BR Info ZR_EN	Fault
f_O2			MB_Brake
f_O3			MotContact
f_O4			V < V_G1
f_O5			STO-Info
V_G1	Specification of limit value 1 when using the **V<V_G1** parameter for a digital output	0.03 ... 3.20 m/s	0.30
V_G2	Specification of limit value 2 when using the **V<V_G2** parameter for a digital output	0.03 ... 3.20 m/s	0.80
V_G3	Presetting of the limit value 3 (this information is only issued when using a DCP protocol)	0.03 ... 3.20 m/s	0.50
SIM_V1	**ON:** Distance-dependent delay of V3 -> V1 or V2 -> V1 is carried out if V1 is activated 100 ms after switching off V3 or V2 at the latest SIM_V1 must be activated to carry out a distance-dependent delay of V3 -> V1 or V2 -> V1 with binary speed specification **Off:** Distance-dependent delay of V3 -> V1 or V2 -> V1 is only carried out if the positioning speed is already activated at the time of deactivation of a high travelling speed (V3 or V2)	On Off	Off in the case of Config="32:-S_Smart": On
A_MAX	Delay in elevator emergency stop due to deactivation of the input with the function "/DELAY"		1.00 m/s^2
S_B_OFF	Additional braking offset	50 ... 160 mm	50

Digital inputs – description of functions

Function	Characteristic	Explanation
00:Free	Function not assigned	Activating the input is noneffective
01:RF	Controller enable	Release of ZAdynpro. The input must be activated during the entire journey.
02:RV1	Direction preset UP	Travel direction "UP"
03:RV2	Direction prest DOWN	Travel direction "DOWN"
04:V1	Positioning speed	Speed to position the car to the stop point
05:V2	Intermediate speed	If necessary, the intermadiate speed for normal travel
06:V3	Travel speed V_3	High travel speed for normal travel
07:VZ	Readjustment speed	Speed for readjustment. Has precedence above all other speeds!
08:V4	Additional speed 1	Additional speed for inspection and return operation
09:V5	Additional speed 2	Additional speed for inspection and return operation

Function	Characteristic	Explanation
10:V6	Additional speed 3	Additional speed for inspection and return operation
11:V7	Additional speed 4	Additional speed for inspection and return operation
12:PARA2	Switchover to 2nd parameter set	2nd parameter set is activated
13:BIN0	Binary input 0	Speed default through binary coding Standard-configuration
14:BIN1	Binary input 1	Speed default through binary coding Standard-configuration
15:BIN2	Binary input 2	Speed default through binary coding Standard-configuration
16:DIR	Direction default	Default for direction of travel when using one input 1 signal: Direction of travel "UP" 0 signal: Direction of travel "DOWN"
17:v=0	Hold speed 0	When the motor brake is open, speed 0 is controlled
18:RF+RV1	Controller enable + travel direction UP	Controller enable and travel direction "UP" are triggered with one input
19:RF+RV2	Controller enable + travel direction DOWN	Controller enable and travel direction "DOWN" are triggered with one input
20:BR1	Brake monitoring 1	Monitoring of the motor brakes
21:BR2	Brake monitoring 2	Monitoring of the motor brakes
22:BR3	Brake monitoring 3	Monitoring of the motor brakes
23:BR4	Function not assigned	Activating the input is noneffective
24:SBIN0	Binary input 0 Configuration Schmitt+Sohn	Speed default through binary coding Configuration Schmitt+Sohn
25:SBIN1	Binary input 1 Configuration Schmitt+Sohn	Speed default through binary coding Configuration Schmitt+Sohn
26:SBIN2	Binary input 2 Configuration Schmitt+Sohn	Speed default through binary coding Configuration Schmitt+Sohn
27:MBIN0	Binary input 0 Configuration Masora	Speed default through binary coding Configuration Masora
28:MBIN0	Binary input 1 Configuration Masora	Speed default through binary coding Configuration Masora
29:MBIN0	Binary input 2 Configuration Masora	Speed default through binary coding Configuration Masora
30:STANDBY2	Function not assigned	Activating the input is noneffective
31:STEP+	Touch mode for special applications	Positive change
32:STEP-	Touch mode for special applications	Negative change
33:PFU_BR	Power Feedback Unit + brake resistor	Function monitoring of the feedback unit when using a brake resistor in connection with a feedback unit
34:HY_UP	Function not assigned	Activating the input is noneffective
35:HY_DOWN	Function not assigned	Activating the input is noneffective
36:/DELAY	Delay in emergency stop	When deactivating the input the motor is braked with the delay set in the "Controller/A_MAX" menu
37:DTE	Ziehl-Abegg test function	Reserved for Ziehl-Abegg
38:RECORD	Recorder function	Start or stop measurement by external signal **Input activated:** Measurement is active **Input deactivated:** Measurement is stopped and saved
39:INV_A1	Direction UP at hydraulic elevator with Bucher aggregate type Orion ALPHA	Inverting the analog target value A1
40:FKT.ana	Ziehl-Abegg test function	Reserved for Ziehl-Abegg
41:Monitor	Monitoring function for manually evacuation	Shown evacuation direction and evacution speed

Function	Characteristic	Explanation
42: LZ	Distance-dependent deceleration after standstill	With active input there is a deceleration after speed 0, even when travel speeds are activated. The deceleration from travel speed V1 depends on the distance programmed for the parameter S_10.
43:STANDBY 1	Function not assigned	Activating the input is noneffective
44: ZR_RDY	ZArec ready	ZArec monitoring function
45: /ESC	/ESC	Electronic short-circuit is deactivated
46:SBC_RDY	ZAsbc4C ready	ZAsbc4C monitoring function

Digital outputs – description of functions

Function	Characteristic	Explanation
Off	Output has no function	Output is open all the time
MotContact	Controller ready Switching the motor contactors Activating the inputs of the STO function	Contact closes when the following signals are present: Controller enable, travelling speed and direction specification. When closing the contact, the inputs of the STO function must be activated without delay or the motor contactors connected.
RB_Invers	Inverted function of "RB contactor"	Contact opens when the following signals are applied: Controller enable, traveling speed and direction default.
V<V_G1	Speed monitoring	Contact opens when the limit value V_G1 set in the **Control system** menu is exceeded.
V<V_G2	Speed monitoring	Contact opens when the limit value V_G2 set in the **Control system** menu is exceeded.
V<1.1*V_3	Speed monitoring	Contact opens when the traveling speed V3 is exceeded by 10%.
Warning	Warning	Monitoring of the motor temperature and the temperature of the power section. Contact opens if a malfunction advance warning is present because of an excess temperatur. The current trip will be traveled to the end. The advance warning can be evaluated by the open loop control and a new start can be prevented.
Fault	Failure	Contact is closed if no error is present on the ZAdynpro.
EVAC.DIR	Evacuation direction	Contact open: Car is lighter than counterweight Contact closed: car is heavier than counterweight
MB_Brake	Mechanical brake	Contact closes after expiration of the magnetic flux creation time. When the contact close, the mechanical brake must be immediately opened via an external contactor.
INV V<V_G1	inverted function of "V<V_G1	Contact closes when the limit value V_G1 set in the **Control system** menu is exceeded.
INV V<V_G2	inverted function of "V<V_G2	Contact closes when the limit value V_G2 set in the **Control system** menu is exceeded.
V=0	Speed = 0	Contact opens at start of travel, when actual speed > 0 m/s Contact closes at the end of travel when actual speed = 0 m/s and output for control mode contactor = 0
PFU	Recuperation unit	Switching the feedback unit to standby function to save energy
Info rope	Rope-change necessary	Contact closes when the actual rope still can be used, for approx 1 year. Contact stays close until the down-counter will be reset.
TD_CNT ext.	Monostable trigger circuit	The output relay gives an impulse to the output at every travel direction change. For connecting an external counter, e.g. in the control system
Full load	Full load	Contact closes when motor current is exceeded for 200 ms during constant travel

Function	Characteristic	Explanation
SD	Speed monitoring	**Closed Loop operation:** Output becomes active when deceleration from V3 actual speed < limit value V_G1. **Open Loop operation:** Output becomes active when deceleration from V3 nominal speed < limit value V_G1. Output becomes inactive as soon as actual/nominal speed = 0
STO-Info	Status of the STO function	Contact is closed when the output stage is not blocked by the STO function (output is only information, not safety-related).
/STO info	Inverted function of STO info	Contact is closed when the output stage is blocked by the STO function (output is information only, not safety-related).
BR Info	Status of brake monitor inputs BR1...BR4	The contact is closed when the brakes are open during travel
ZR_EN	ZArec: Enable of ZArec4C power feedback unit	Contact closes when the following signals are present: controller enable, travelling speed and direction specification.

2.7 Monitoring menu

Configuring the monitoring functions

Parameter	Designation	Value range	Factory setting
MOD_ST	Behaviour of the ZAdynpro during fault **Block function:** In the event that successive serious errors are reported but an error-free run is performed, you have the option of blocking the frequency inverter. The output "ST fault" remains open. The fault counter is set to 0 when an error-free run is performed. **Fix 2 Sec:** no blocking function, the output configured on "ST" drops for 2 seconds during a malfunction and then increases again **Lock n.3:** Block function after 3 malfunctions. Output "ST" remains dropped after the 3rd error **Lock2.n.2:** Locking function after 2 faults. Output "ST" remains released after the second fault. **Lock n.1:** Block function after 1 malfunction. Output "ST" remains dropped after the 1st error. In the blocking function, the following notice will appear: "ZAdyn block [OFF]". After pressing the "i" button, the device will return to normal operation. The errors that lead to locking are marked accordingly in the error list.	Fix 2 s Lock n.3 Lock n.2: Lock n.1	Fix 2 s
STO	STO function monitor **ON:** STO monitor activated **OFF:** STO monitor deactivated Monitoring of the STO function should only be deactivated when the STO function is not used and motor contactors are used instead.	ON OFF	ON
LOCKBR	Block at brake malfunction The ZAdynpro is locked in the case of brake malfunctions if the parameter is switched on. At **CONFIG: 31:KL_IO** LOCKBR is activated automatically	ON OFF	OFF
UNLOCK	Lifting the block in the event of a brake malfunction. The lock is lifted in case of brake malfunctions if this parameter is switched on.	ON OFF	OFF

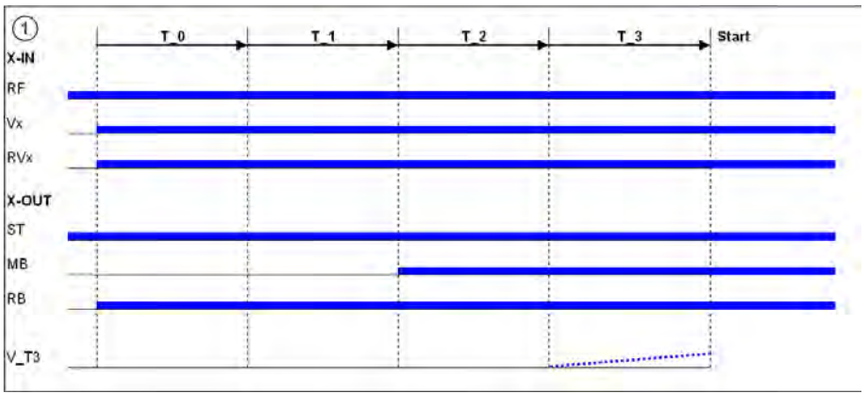
Parameter	Designation	Value range	Factory setting
BR	Motor brake monitoring Input of number and function of the brake monitoring contacts used **OFF:**no brake monitoring connected **1*NC:** 1x normally closed contact (Contact closed when brake currentless) **2*NC:** 2 x normally closed contact (Contact closed when brake currentless) **3*NC:** 3 x normally closed contact (Contact closed when brake currentless) **1*NO:** 1 x normally open (contact is open when brake currentless) **2*NO:** 2 x normally open contact (contact is open when brake currentless) **3*NO:** 3 x normally open (contact is open when brake currentless)	Off 1*NC 2*NC 3*NC 1*NO 2*NO 3*NO	accordingly to motor type
P1P2	Function not assigned	-	-
R_P1P2	Function not assigned	-	-
T_ENC	Rotary encoder monitoring Time starts with an output of the "MB" output signal. If no rotary encoder input signals occur during this time, the frequency inverter enters error mode	0.5 ... 7.0 s	2.0
T_SDLY	Delay STO monitoring When the STO monitor is switched on ("Monitors/STO=ON") the STO function must be activated (stop) or deactivated (start) by the STO_A and STO_B inputs within the time T_SDLY.	0.5 ... 3.0 s	1.5 s
T_BR	Debounce time for brake monitoring. The input signal is evaluated delayed by the time T_BR. Only accessible if the brake monitoring is activated.	0.01 ... 3.00 s	0.40
S_MB	Maximum distance with MB=Off If rotary encoder impulses are detected when the digital output "MB" is switched off, the frequency inverter issues an error message if the configured path is exceeded.	0.10 ... 1.00 m	0.10
I_MAX	Protection against overload current depending on the nominal current of the motor If the configured value for "I_MAX" is exceeded for the time "T_I_MAX", the frequency inverter issues an error message.	20 ...180 %	180
T_I_MAX	Overcurrent protection If the value configured in "I_MAX" (I x "I_MAX") is exceeded for the time "T_I_MAX", the frequency inverter issues an error message.	0.3 ... 10.0 s	5.0
APC	Automatic arameter control Parameter values are checked for plausibility when entered. The values are corrected or additional parameters changes if necessary (see chapter "Error Diagnosis / Automatic Parameter Check")	On Off	On
MASK1	Error mask 1...5 Suppression of up to five error messages through configuring the corresponding error number in an error mask	Error no.	0
MASK2			0
MASK3			0
MASK4			0
MASK5			0

2.8 Start menu

Chronological sequence from before the start of acceleration and optimization of the start-up behavior.

Parameter	Designation	Value range	Factory setting
M_START	Control action to optimize the starting behavior (see chapter "Commissioning") **Off:** RPM control without gain at start (K_Start=1) **MOD1:**Speed control **MOD2:** Speed control + safety function **MOD3:**Speed + position control **MOD2:** Position control + safety function **MOD5:** Position control	Off MOD1 MOD2 MOD3 MOD4 MOD5	accordingly to motor type
K_START	Start gain Multiplication factor for the parameter **Control/SPD_KP** or amplification of the position controller (dependent on the startup mode)	is automatically limited	1.0
T_0	Max. motor contactor switch-on time Time during deactivated contactor monitoring ("Monitoring/CO=-Off" menu) from applying the travel signal up to supplying the motor with current	0.0 … 10.0 s	0.5
T_0 real	Measured time that the contactors require to open	Cannot be set	0.0
T_1	Flux build-up time Time to build-up the magnetic field in the motor (only with asynchronous motors)	A 0.1 … 10.0 s S Value set to 0.0	A 0.1 S 0.0
T_2	Maximum brake opening time After expiration of time "T_1", the brake must have opened within time "T2"	0.0 … 15.0 s	S 1.8, for MOT_-TYP=SM250: 2.5 A 0.6
T_2 real	Measured time that the brake requires to open	Cannot be set	0.0
T_3	Hold speed V_T3 Within time T_3, the machine accelerates up to the speed configured in V_T3	0.0 … 10.0 s	0.0
V_T3	Minimal speed to minimize starting jerk. Within time T_3, the machine is accelerated up to speed V_T3, thus overcoming the static friction.	0 … 50 mm/s	0
s_start	If the position of the machine changes during the start procedure by the configured value, amplification K_START is switched off (only with M_START=MOD2/4)	0.1 … 30 mm	3.0
BRK_DMP	Brake damping	AUS EIN	EIN

Start-up time sequence



2.9 Acceleration menu

Definition of acceleration ramp.

Parameter	Designation	Value range	Factory setting
A_POS	Positive acceleration	0.25 ... 2.00 m/s²	0.5
R_POS1	Lower round off during positive acceleration, a higher value causes a softer round off	20 ... 90 %	will be calculated
R_POS2	Upper round off during positive acceleration, a higher value causes a softer round off	20 ... 90 %	will be calculated

2.10 Travel menu

Traveling speed defaults

Parameter	Designation	Value range	Factory setting
V_1	Positioning speed Speed to position during floor approach	0.010 ... 0.20 m/s	0.050
V_2	Intermediate speed Speed for normal traveling e.g. during travel to intermediate floor	0.03 ... 2.50 m/s	0.50
V_3	Travel Speed Speed for normal travel	0.00 ... 10.00 m/s	0.95
V_Z	Readjustment speed Speed for readjusting the car position during car loading or unloading	0.003 ... 0.30 m/s	0.01
V_4	Additional speed	0.03 ... 3.00 m/s	0.30
V_5	Additional speed	0.03 ... 3.00 m/s	0.30
V_6	Additional speed	0.03 ... 3.00 m/s	0.05
V_7	Additional speed	0.03 ... 3.00 m/s	0.05

2.11 Decelerating menu

Defines the deceleration ramp and optimizes the positioning behavior.

Parameter	Designation	Value range	Factory setting
A_NEG	Negative acceleration	0.25 ... 2.00 m/s²	0.5
R_NEG1	upper round off during negative acceleration, a higher value causes a softer round off	20 ... 90 %	will be calculated
R_NEG2	lower round off during negative acceleration, a higher value causes a softer round off	20 ... 90 %	will be calculated
S_DI3	Dist. correction V3 Travelling speed V_3 is switched off, delayed by the configured value	0.00 ... 2.00 m	0

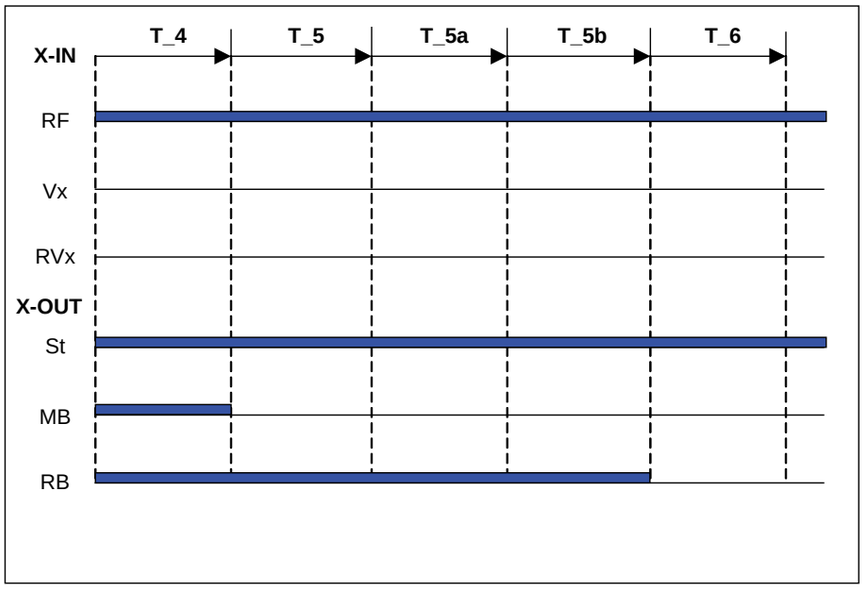
Parameter	Designation	Value range	Factory setting
S_DI2	Dist. correction V2 Travelling speed V_2 is switched off, delayed by the configured value	0.00 ... 2.00 m	0
S_DI1	Dist. correction V1 Travelling speed V_1 is switched off, delayed by the configured value	0 ... 150 mm	0
S_ABH	Path dependent deceleration **ON:** path dependent deceleration, the deceleration paths are always identical **OFF:** time dependent deceleration, deceleration paths can be varied **DCP_fast, DCP_comf, DCP_slow:**Behavior during direct approach with DCP2 or DCP4 (see chapter "DCP mode") **V2toV3:** in distance-dependent travel with intermediate speed (V1 and V2 active) travelling speed V3 can be accelerated to	On Off DCP_fast DCP_comf DCP_slow V2toV3	On

2.12 Stop menu

Chronological sequence after reaching speed 0 during stopping procedure.

Parameter	Designation	Value range	Factory setting
T_4	Hold speed 0 During time T_4, the motor is maintained at speed 0 after reaching this speed	0.0 ... 10.0 s	0.1
T_5	Mech. Brake close time Time within which the mechanical brake must be closed	0.0 ... 10.0 s	A 0.6 S 1.5 in the case of MOT_-TYP=SM250: 2.0
T_5a	additional current feed at closed brakes	0.0 … 2.0 s	0.0
T_5b	S Wait until the motor is currentless Within time T_5b, the powering of the synchronous motor is decreased in a ramp function	0.0 … 2.0 s	0.3
T_6	Wait until contactors open Time within which the contacts of the motor contactors must be opened	0.0 ... 10.0 s	0.5

Stopping time sequence



2.13 Controller menu

- Influences the speed control by the factor of the basic amplification (SPD_KP) and readjustment time (SPD_TI).
- Selection of the control mode of the ZAdynpro.

Parameter	Designation	Value range	Factory setting
SPD_KP	Multiplication factor to modify the calculated basic amplification SPD_C	is automatically limited	1.00
SPD_TI	Adjusting time Controller averaging time during the trip	5 ... 300 ms	100

Information
The parameters required for operation without a rotary encoder (open loop) are only displayed for **C_MOD=U/f**. The parameters are described in the chapter "Operation without a rotary encoder".

2.14 Parameter set 2 menu

A second parameter set can be stored in the frequency inverter. This can be used for:

- Emergency evacuation
- Normal travel with changed parameter values
- Parameter back-up

Parameter	Designation	Value range	Factory setting
F_PAR2	Function allocation of parameter set 2 **Locked:** 2.nd parameter set is blocked **2.ndParameter set:** Activates the 2.nd parameter set **EVAC 3:** Emergency evacuation with evacuation module EVAC 3 **EVA. 3*AC:** Emergency evacuation through three-phase current emergency-generator **EVA. 1*AC:** Emergency evacuation through UPS **UPS:** Emergency evacuation through UPS (with decreased power)	Locked 2nd parameter set EVAC 3 EVA. 3*AC EVA. 1*AC UPS	Locked
U_ACCU	Accu nominal voltage Configuring the rated voltage of the rechargeable battery during evacuation with evacuation unit EVAC 3 ("f_PARA2=EVAC 3B", see "Emergency evacuation" chapter)	60 ... 565 V	120

Parameter	Designation	Value range	Factory setting
P_UPS	Max. Load UPS Configuring the available power of the UPS during evacuation with UPS ("f_PARA2=UPS", see "Emergency evacuation" chapter)	0.0 ... 70.0 kW	1.0
RS_UPS	Stator resistor Enter the resistor of the stator of themotor with "f_PARA2=UPS"	0.0 ... 9.99 Ohm	1.00
STOP	Stop function to improve the positioning accuracy in the evacuation mode "f_PARA2=UPS" **ON:** - Brake is closed when the switch point for V_1 is closed. - Brake is closed when the residual path configured in S_STOP has been reached (only for DCP02/04 **Off:** Stop function deactivated	On Off	Off
Copy	Copy parameter set **OFF:** Function deactivated **PARA1->2:** copies the data from 1st parameter set into the 2nd parameter set	Off Para 1->2	Off

2.15 Statistic menu

All statistical data can be called up in the **Statistics** menu. The data will be retained even after the ZAdynpro has been switched off. Reading out the error list and deleting the error memory are described in the chapter "Error diagnosis".

Information
Not all parameters are visible when the **Statistic** menu is opened in the basic level.

Parameter	Designation	Value range	Factory setting	visible in the basic level
ST_LST	Error list	Cannot be set	-	X
ST_H	Operating hours	Cannot be set	-	X
ST_DRV	Number of trips	Cannot be set	-	X
ST_HDRV	Number of travel hours	Cannot be set	-	X
ST_UC	Usage category in accordance with VDI 4707	Cannot be set	-	X
ST_RES	Number of mains interruptions	Cannot be set	-	X
ST_SRF	Number of travel aborts due to interruption of the controller enable RF during the travel	Cannot be set	-	X
ST_SXO	Number of travel interruptions due to interruption of the STO input signal during travel operation	Cannot be set	-	X
ST_CLR	Delete error memory Deletes ST_LST, ST_RES and ST_SRF and ST_SCO	On Off	Aus	
APD	Automatic parameter diagnosis, see "Error diagnosis" chapter **On:** Automatic parameter diagnostics are activated **Off:** Automatic parameter diagnostics are deactivated	On Off	Off	

Parameter	Designation	Value range	Factory setting	visible in the basic level
RESET	Deletes parameters, counter levels and error lists, preassigning parameters with standard values. **RESET77:** **Pre-configured ZAdynpro:** Parameters are assigned customer-specific system data **Standard ZAdynpro:** Parameters are assigned standard values **RESET90:** Device reset, parameters remain preserved. ENC_-OFF stays. **RESET99:** Device reset, parameters deleted and assigned by the factory settings. S If a value is entered for the rotary encoder offset (ECOFF), it will also be deleted!	Reset 77 Reset 90 Reset 99	0	X
TD_PWN	Assign password for the travel direction counter. A number between 0 and 9999 can be used as a password	0 ... 9999	0	
TD_PWC	Displays the password in coded form. If you lose the password, please contact the manufacturer.	nicht einstellbar	21689	
TD_PW	Enter password.	0 ... 9999 0 = no password	0	
TD_CNT	Initial value of the down counter If the start value of the down counter is set to 0.00, the down counter is deactivated.	0.00 ... 10.00 M	0.00	
TD_RST	Restore the counter level from the rotary encoder	On Off	Off	

2.16 Memory Card menu

Contains the parameters for the various functions in association with a memory card.

Information
Not all parameters are visible when the **Memory Card** menu is opened in the basic level.

Parameter	Designation	Value range	Factory setting	visible in the basic level
SAV_ALL	Saves data to memory card with serial number allocation • Parameter list (.PRT) in directory /4BF/DEVICE/serieal number/LST • Error list (.FLT) in directory /4CX/DEVICE/serial number/LST • Parameter (.PA3) in directory /4CX/DEVICE/serial number/-PAR • Black-Box (.BOX) in directory /4CX/DEVICE/serial number/LST **Off:** no function **ON:** Data will be saved to the memory card. After copying, the parameter jumps back to "Off"	On Off	Off	X
SAV_PAR	Save parameters to memory card (copy parameters in the case of identical systems): • Parameter (.PA4) in directory /4CX/DEVICE/FORCE Here, there is no serial number allocation. The data will be overwritten during each saving **Off:** no function **ON:** Parameter will be saved to the memory card. After copying, the parameter jumps back to "Off"	On Off	Off	X

Parameter	Designation	Value range	Factory setting	visible in the basic level
LOD_PAR	Load parameters from memory card to frequency inverter (copy parameters in the case of identical systems) **Input 27:** Parameters (.PA3) are loaded to the frequency inverter from the /4CX/DEVICE/FORCE directory. The parameter switches to "Off" again after loading	27	0	X
UPDATE	Starts the software update from a memory card. The most current software will always be loaded from the memory card. **Input 27:** Software is loaded to the frequency inverter from the /4CX/Update/Software version directory	27	0	
SAV_CFG	Saves data to memory card with configuration number allocation: • Parameter list (.PRT) in directory /4Cx/CONFIG/configuration • Parameter (.PA3) in directory /4CX/CONFIG/configuration number	0 ... 59999	0	
LOD_CFG	Load parameters from memory card to frequency inverter by specifying the configuration number **Enter configuration number:** Parameters (.PA3) are loaded to the frequency inverter from the /4CX/CONFIG directory. The parameter switches to "Off" again after loading	0 ... 59999	0	
Format	Reformatting the memory card: **Enter 27:**Folders and files on the memory card will be deleted	27	0	

2.17 MMC-Recorder menue

You have the option of performing measurements on the ZAdynpro using a memory card, without a notebook being required for this purpose. The measurement is configured in the **MMC recorder** menu.

Parameter	Designation	Value range	Factory setting
REC_MOD	Recorder settings **Off:**Recorder is switched off **ON:** Recorder ist active, the operating curves are saved to the memory card **Stop&Shot:** Manual stopping and saving of a measurement which was started with MOD=ON". After saving the data on the memory card, REC_MOD will set to "Off". **ZAmon:** Mode for using ZAmon software The settings for REC_MOD can only be changed with REC_CFG=0.	Off On Stop&Shot ZAmon	ZAmon
REC_CFG	Configuring the measurement channels **0:** all measurement channels and the recording time can be freely configured **1 … 9:** permanently set configurations that cannot be modified **20:** Configuration for HY operation	0 1 2 3 4 5 6 7 8 9 20	1
REC_NUM	Directory number Assigned number under which the directory is saved on the memory card. If "0" is entered, the serial number of the frequency inverter is used as the directory name.		0

Parameter	Designation	Value range	Factory setting
TRIG_BY	Trigger-source Specifications for stopping the recorder and saving the data to the memory card. **Error:** data will be saved as soon as an error occurs **Err/stop:** data will be saved as soon as an error occurs or an error-free travel is finished	Error Error/Stop	1.0
T_REC	Record-time Time for 1000 measurements For a recording time of 5 s, for example, measured values are recorded every 5 ms	5 s 10 s 15 s 20 s 40 s 80 s 160 s 0.5 h 1 h 24 h	5
T_DLY	Trigger Delay Delay time for stopping of the masurement, e.g. T_DLY=0.5s: the recording will be stopped 0.5s after an error occurs.	0.5 s	0.5 s
CHN1	Configuration of the measuring channels 1-4 with analog measurement values **1:** setted speed [m/s] **3:** acutal speed [m/s] **6:** Internal status (frequency inverter status) **16:** flux build-up current [A]r **26:** motor current [A] **27:** motor voltage [V] **31:** temperatur power section [°C] **49:** covered total travel distance [m] **62:** residual path by the control system [mm] (only wirh DCP2 or DCP4) **119:** Capacity of the Brake-Chopper / Brake resistor **142:** Intermediate circuit voltage [V] **143:** torque build-up current [A]	0...299	3
CHN2			1
CHN3			143
CHN4		0...299	6
CHN5	Configuration of the measuring channel 5 with digital measurement values **89:** digital in- and outputs with indication of the function **90:** digital in- and outputs optimized for brake monitoring **91:** digital in- and outputs **92:** DCP-order and statusbits		89

2.18 Encoder adjustment menu

The procedure for entering the encoder alignment data is described in the "Special functions" chapter.

Parameter	Designation	Value range	Factory setting
ENC_ADJ	Activating the encoder alignment **Off:** no function **ON:** Start or check the rotary encoder calibration	On Off	Off
ENC_POS	Encoder Position Numerical display of the absolute position of the rotary encoder per revolution: 0 to [4x number of pulses in rotary encoder] rpm	Cannot be set	-

Parameter	Designation	Value range	Factory setting
ENC_OFF	Encoder Offset Shifts the zero position of the absolute rotary encoder to the pole's electrical zero position **EnDat interface, BiSS-C interface:** Default value 0 is imperative **SSI interface:** If the rotary encoder with SSI interface is not mechanically mounted in the zero position, the value ascertained during calibration (ENC_ADJ) for ENC_OFF must be entered	0 ... 360.00°	0
SAV_P_E	Storing of data in the absolute value encoder via the "Electronic rating plate" function (only possible with EnDat absolute value encoders) **ON:** Data from the ZAdynpro are filed in the absolute value encoder **OFF:** Function deactivated	On Off	Off
LOD_P_E	Storing of data in the absolute value encoder via the "Electronic rating plate" function (only possible with EnDat absolute value encoders) **Input 27:** Data are read out from the absolute value encoder into the ZAdynpro	0...65535	0

2.19 Safety gear menu

- The procedure for the safety brake is described in the "Special functions" chapter.

Parameter	Designation	Value range	Factory setting
SB_MOD	Activate or deactivate the capture release **OFF:**Capture release is deactivated **On:** Starting the Safety-Brake-function in the requested direction by pressing the button "Inspection trip UP" oder "Inspection trip DOWN"	On Off	Off
SB_M	Default for pulse amplitude with which the motor is to be fed with current. The default is calculated as a percentage of the maximum operating current of the frequency inverter (nominal current x 1.8)	10 ... 100 %	70
SB_T0	Pulse breake Break time between the individual current pulses	0.1 ... 2.0 s	0.2
SB_T1	Împulse time Time for which the motor will be fed with current	0.1 ... 1.0 s	0.5
SB_N	Number of current pulses	1 ... 5	3

2.20 HW-Ident. menu

Identifying the individual assemblies of the ZAdynpro. The identification of the assembly is generally read out directly from its EEPROM.

Parameter	Designation	Value range	Factory setting
ID_NOK	The number of the changed hardware identification (identification-no. unequal 0) is indicated		

2.21 Power section menu

Configuring the tolerances of the internal power stage.

Parameter	Designation	Value range	Factory setting
M_PWM	Pulse width modulation operating mode **Auto:** PWM frequency is changed depending on the power stage temperature and load. At the start of travel, the motor voltage is cycled at the cycle frequency set in parameter "f_PWM_H". Cycle frequency is reduced if required. **Fix f_PWM:** motor voltage is permanently cycled at the PWM frequency set in the parameter "f_PWM"	Auto Fix f_PWM	Auto
f_PWM	Cycle frequency at parameter setting "M_PWM=Fix f_PWM"	2.5 ... 10.0 kHz	8.0
f_PWM_H	Maximum cycle frequency (start frequency) at parameter setting "M_PWM=Auto" Parameter is only shown for "M_PWM=Auto".	2.5 ... 16.0 kHz	16.0
UDC_N	DC voltage for the DC-link	100 ... 600 V	565
UDC_MIN	Minimum limit value of the DC-link voltage	30 ... 500 V	450
UDC_MAX	Maximum limit value of the DC-link voltage	300 ... 800 V	760
FAN_T	Power stage temperature at which the fan is switched on	28 ... 45 °C	33

2.22 Menu checks

Selection of supporting tests during acceptance of the system:

- Testing of the protection device according to EN81-A3

Parameter	Designation	Value range	Factory setting
SCY_EN	Enabling of the test functions **On:** Functions are accessible **Off:** No access to the functions **After a test function has been performed, this parameter automatically adopts the "Off" value.**	On Off	Off
SCY_ENC	Rotary encoder test **On:** Failure of the rotary encoder is simulated **Off:** Function deactivated	On Off	
SCY_A3	Testing of the protection device according to EN81-A3 **No current:** Movement of the car by releasing the brakes without power to the final stage **max. accel.:** Cabin is accelerated to maximum under full power **Off:** Function deactivated	No current max. accel. Off	Off
SCY_SG	Capture device test **On:** electronic short-circuit is deactivated **Off:** Function deactivated	On Off	
SCY_DA	Driving ability test **On:** Travel with recovery with applied counterweight, display of cabin movement **Off:** Function deactivated Only for CAN actuation.	On Off	
SCY_MB	Motor brakes test **On:** Interruption of the safety circuit, display of braking distance **Off:** Function deactivated Only for CAN actuation.	On Off	

2.23 CAN menu

Parametrize the CAN-specific functions.

Parameter	Designation	Value range	Factory setting
LIFT_NR	Enter the lift number	1 ... 2	1
NODE_ID	Node number, normally: Control system: 1 ZAdynpro: 2 Encoder: 4	1 ... 128	2
BD_RATE	Bitrate	10 kBd ... 250 kBd	250 kBd
MODE	Operating mode of the ZAdynpro	Position / Velocity	Position
T_CMD	Maximum waiting time for commands of the control system	200 ... 3000 ms	1500 ms

2.24 ZA-Intern menu

Parameterisation of internal measuring and monitoring functions

Parameter	Designation	Value range	Factory setting
PW_S9	Password for the indication of additional parameter		0
UVW_CHK	Definition of motor phase checking on start-up **Single:** The motor phases are checked during initial travel once the frequency inverter has been switched on. If the check is successful, no further monitoring is performed. If the examination is incorrect, with each start an examination is made until a correct examination could be accomplished. **Cont:** Motor phases will be check with each travel **Off:** Checking of the motor phases is deactivated	Single Cont Off	Single
UVW_PEK	Test voltage for motor phase check **1 ... 10 V:** Selection of the test voltage between 1 V and 10 V. In case of an error the testing voltage is displayed in the error message. **15 V:**Test voltage 15 V. **f(P):** The testing voltage depends on the nominal voltage of the motor, which is entered in the menu "Motor name plate". In case of an error the testing voltage is displayed in the error message.	1 ... 10 V 15 V f(P)	f(P)

2.25 INFO menu

The **INFO menu** provides an easily accessible overview of:

- Current measurements
- Current operating states of the frequency inverter
- Current switching states of the inputs and outputs
- Inverter internal measurements
- Information about the internal components

The individual pages are numbered for increased clarity.

Serial no. -------- 01 ZAdynpro 013 SN: 06128238/0001 4.42-110308xx	**Page 01: Serial-No.** **Line 2:** Display of frequency inverter type and frame size **Line 3:** Serial number/type consecutively numbered **Line 4:** Software version Loaded 3rd operating language

Status ---------- 02 ▷ System OFF ◀ 530ˢ540ˢ550ˢ560ˢ 100 ^0.00 0.00 0.00m/s	**Page 02: Status** **Line 2:** current service condition in plain text display **Line 3:** last 5 service conditions current operating condition is displayed on right in total, the last 60 service conditions can be inquired: Previous page esc Next page ↵ The current condition will be indicated with the arrows > < The previous conditions are indicated with the arrows < > **Line 4 (from left to right):** current direction of travel current position of car in the shaft current travel path with positioning speed current traveling speed
Dist.---------- 03 sa: 0.00 s21: 0.52m sr:^0.00 s31: 1.45m s1: 0.00 sd: 0.52m	**Page 03: Dist** **Line 2:** sa: current position of car in the shaft s21: calculated deceleration path V_2 ˢ V_1 s20: calculated deceleration path V_2 ˢ Standstill (only in DCP02/DCP04) **Line 3:** sr: current direction of travel, current total route s31: calculated deceleration path V_3 ˢ V_1 s30: calculated deceleration path V_3 ˢ Standstill (only in DCP02/DCP04) **Line 4:** s1: current travel path with positioning speed V_1 (not used in DCP02 / DCP04) sd:real deceleration path V_3 ˢ V_1 or V_2 ˢ V_1 The display can be frozen by pressing the ↵ button.
Mot ---------- 04 ▮▮▮ _ _ _ _ _ _ _+0% real: 0rpm 0V prog: 0rpm +0.0A	**Page 04: Mot** **Line 2:** Bar chart of motor speed A Slip in % S Load angle in ° **Line 3:** Actual motor speed Motor voltage **Line 4:** Target motor speed Motor current A If the motor has been correctly adjusted, the slip is nearly proportional to the motor's rated current (e.g. 50% motor current = 50% slip). The display can be frozen by pressing the ↵ button.

MotDat - - - - - - - - - - 05 I: 11.0A n: 60rp U: 360V f:10Hz p: 10	**Page 05: MotDat** Display of the motor data entered in the **Motor rating plate** menu: S **Line 2:** Rated current Nominal speed **Line 3:** Rated voltage Rated frequency **Line 4:** Number of pole pairs A **Line 2:** Rated current Nominal speed **Line 3:** cos phi Rated frequency **Line 4:** Magnetization current Rotor time constant
MotDatNom - - - - - - - - 05 I: 11.0A n: 1450 rp cos:0.88 f: 50.0Hz I0: 3.8A TR: 316 ms	
MotDatFW- - - - - - - - - 05 I: 11.0A n: 1560rp cos:0.89 f: 53.4Hz I0: 3.5A TR: 316ms	**Page 05: MotDatFW** Display of the calculated motor data with field weakening operation: A **Line 2:** Rated current Nominal speed **Line 3:** cos phi Rated frequency **Line 4:** Magnetization current Rotor time constant **Seite 05: MotDatNom** By pressing the ↵ button, the original motor date wiill be displayed
MotDatNom - - - - - - - - 05 I: 11.0A n: 1450 rp cos:0.88 f: 50.0Hz I0: 3.8A TR: 316 ms	
RegLimits - - - - - - - - 06 SP IQ ID PS U LIM:.. •. .. .. . PEK:	**Page 06: RegLimits** Online display of whether a control loop has reached the limit **Line 2:** SP: Speed controller IQ: Current controller (torque creation current) ID: Current controller (flux creation current) PS: Position controller U: Voltage limit of the frequency inverter **Line 3:** Dot left: minimum limit reached Dot right: maximum limit reached **Line 4:** Alarm bell left: minimum limit reached in previous journey Alarm bell right: maximum limit reached in previous journey No alarm bell should appear during a faultless, normal trip.

Brake Chopper - - - - - 07 Internal 1.4kHz BC • U_DC:_ _ _ _ _ _ 565V Ampl:_ _ _ _ _ _ 0%	**Page 07: Brake-Chopper** Online-display **Line 2:** Internal PWM frequency (only for brake resistor) Condition of function and temperature monitoring on the input terminal BC (larger point = OK) **Line 3:** DC-link voltage as bar chart display DC-link voltage **Line 4 (only with Brake resistor):** Modulation of Brake resistor as bar chart display Modulation of Brake resistor in % The DC-link voltage displayed in standstill must have the value “Mains connection voltage x 1,41". A large point must constantly be displayed behind the function and condition monitor. Pressing the button Display will be frozen Display of the loaf of the brake resistor (average value over 120s)
Cu-Functions- - - - - - 08 CONFIG 00: Frei I:RF RV.2V..... O:.. .. .. VG1	**Page 08: Cu-Functions** Online-display **Line 2:** Selected control configuration in the **Control system/CONFIG menu** **Line 3:** Active digital input functions: • Controller enable (RF) • Direction of travel (RV) • Traveling speed (V) **Line 4:** Active digital output functions
Start/Stop - - - - - - - 09 STOA:• STOB:• DIAG:• RF RB CO MB BR1234 •	**Page 09: Start / Stop** Online display of the digital inputs and outputs important for the start / stop process: **Line 2:** STOA: Status STO_A (input) STOB: Status STO_B (input) Large dot next to the designation indicates that there is a signal at the input and the internal diagnostic unit for monitoring the STP inputs has detected no error The output stage is safely disabled (STO deactivated) if there is no signal at the inputs. DIAG: Status of the internal diagnostic unit Large dot next to the designation indicates that the internal diagnostic unit has not detected any error, if no dot is displayed, the internal diagnostic unit has detected an error **Line 3:** RF – Controller enable (input) RB – Controller ready / Contactors switching (output) CO – Contactor monitoring (input) MB – mechanical brake switching (output) BRx – Brake monitoring contacts E: Electronic short-circuit status **Line 4:** RF, RB, CO, MB, BRx: A large dot beneath the description indicates the input or output is active A "!" under the monitor input "CO" or "BR" indicates that this monitoring function has been deactivated in the "Monitoring" menu.

Cu Ports -------- 10 In: Out: 12345678 BC C12 1234 ..... • .. ...•	**Page 10: Cu-Ports** Online-display **Line 3:** 1…8: digital inputs I1…I8 BC: Function and temperature monitoring of brake resistor or brake chopper C12: Contactor monitoring 1…4: digital outputs O1…O4 **Line 4:** A big dot below the description displays the input or output is active
Encoder --------- 11 Incr:2048 Type:ENDAT Enable•• Err: 0 Cnt:3941=345° A B	**Page 11: Encoder** Online-display **Line 2:** Configured rotary encoder resolution Detected rotary encoder type (with absolute value encoders) Configured rotary encoder type (with incremental encoders) **Line 3:** Enable first point: Enabling of the supply voltage for absolute rotary encoder Enable second point: Absolute rotary encoder performance test S both points must be active A both points must be off ERR: Rotary encoder fault code; 0 must be displayed if there are no faults in the rotary encoder. **Line 4:** Cnt: Counter reading for impulse counter (0 - 4x encoder resolution) and display of motor revolution in degrees (360° = one revolution of the motor) A and B: graphic display of the sine signal (A) and cos signal (B) The display can be frozen by pressing the ↵ button.

Power1 - - - - - - - - - - 12 DC IGBT PWM ED: 10% •• •• .. ▌FAN: 0% UDC:565V Temp: 28C	**Page 12: Power1** Power stage condition (point for condition OK) **Line 2 und 3:** DC: first point: Precharge relay switched on second point: Power stage power supply both points must be active during normal operation IGBT: first point: ower stage power supply second point: Power stage power supply OK both points must be active during normal operation PWM: first point: PWM power stage enabled second point: Power stage power supply OK Both points are only active during driving Bar display under M: narrow: Clock frequency 4 kHz fixed medium: Clock frequency 8 kHz wide: Clock frequency 16 kHz ED: On time of the ZAdynpro (time interval: 10 minutes) FAN: Speed of the fan in % If the ↵ button is pressed, the temperature of the module print will be displayed in line 3 on the right ("MP:xxxC"). **Line 4:** UDC: DC-link voltage Temp: Power stage temperature The display can be frozen by pressing the ↵ button.
Power2 - - - - - - - - - - 13 ERR_EXT U. OC: ... SRC_APP. UCE_P: ... SRC_MOP. UCE_M:	**Page 12: Power2** Cause for excess current malfunction **Line 2:** ERR_EXT: Excess current message (display is not saved; point is only displayed if excess current is present U: Overvoltage error in the DC-link (voltage higher than 850 V DC) OC: Overcurrent was detected by the current sensors (incorrect phase is indicated by letters U V Z) **Line 3:** SRC_APP: Excess current is detected by the application processor. UCE_P: Error in positive current path in power stage (faulty phase is displayed) **Line 4:** SRC_MOP: Excess current is detected by the motor management processor. UCE_M: Error in negative current path in power stage (faulty phase is displayed) During normal operation, no points and phase displays (U V W) should be active During a malfunction, the displays remain active until the next travel command (with the exception of ERR_EXT)

<table>
<tr><td>CAN--------------- - 14
Act• Mode: Velocity
T_max: 0 RErr: 0
NMT:Preop./Warn.Lim:

CAN--------------- - 14
Act• Mode: Velocity
T_max:0.7ms TErr: 0
NMT:Preop./Warn.Lim:</td><td>Page 14: CAN
Information about CAN operation
Line 2:
Act: A dot signals that the ZAdynpro is set to CAN
Mode: Operating mode (velocity or position)
Line 3:
T_max: Number of cycles, which excessed the maximum process time
RErr: Recieve buffer - error counter
Line 4:
NMT: Shows the actual NMT status (see chapter "Serial Communication / NMT")
Pressing the button
Line 3:
T_max: Maximum time for processing the CAN messges per cycle, since switch-on
TErr: Transmit buffer - error counter</td></tr>
<tr><td>CAN Velocity------ - 15
V_CAN: + 0mm/s
Contr.:Disable Volt.
Status:Sw. On Disab.</td><td>Page 15: CAN Velocity
Active in velocity mode
Line 2:
V_CAN: Speed that is sent from the control system to the ZAdynpro
Line 3:
Contr. Control-byte. Shows commands which are sent by the control system
Line 4:
Status: Status byte. Indicates the CAN statuses of the ZAdynpro</td></tr>
<tr><td>CAN Position------ - 15
S_CAN + 0mm
Contr.:Disab. Volt.
Status:Sw.On Disab.</td><td>Page 15: CAN Position
Active in position mode
Line 2:
S_CAN: Relative target position that is sent from the control system to the ZAdynpro
Line 3:
Contr. Control-byte. Shows commands which are sent by the control system
Line 4:
Status: Status byte. Indicates the CAN statuses of the ZAdynpro
After pressing the button the display shows the maximum travel speed, sent by the control system</td></tr>
<tr><td>CAN Error Info------ 16
Err act. Last:No Err
Rec Tra Warn Pas off
0 0 0 0 0</td><td>page 16: CAN Error information
Information about telegram errors in CANopen lift operation
Line 2 (from left to right):
Error status
Load: Fault which last occurred
<table>
<tr><td></td><td>Displayed text:</td><td>Meaning</td></tr>
<tr><td>Error status</td><td>"Err act."
"Warning"
"Err pass"
"Bus off"</td><td>Error active
Warning
Error passive
Bus off</td></tr>
<tr><td>Load: Fault which last occurred</td><td>"No Err"
"Stuff"
"Form"
"ACK"
"Bit(r)"<br>"Bit(d)"<br>"CRC"</td><td>no error
Stuffing Error
Form Error
Acknowledge Error
Bit Error (Recessive Level was output but Dominant Level detected)
Bit Error (Dominant Level was output but Recessive Level detected)
CRC Error</td></tr>
</table>
Line 3 and 4:
Rec: Number of receive errors
Tra: Number of transmit errors
Warn: Indication of how often the ZAdynpro has switched to the warning status
Pas: Indication of how often the ZAdynpro has switched to the "error passive" status
off: Indication of how often the ZAdynpro has switched to the "bus off" status</td></tr>
</table>

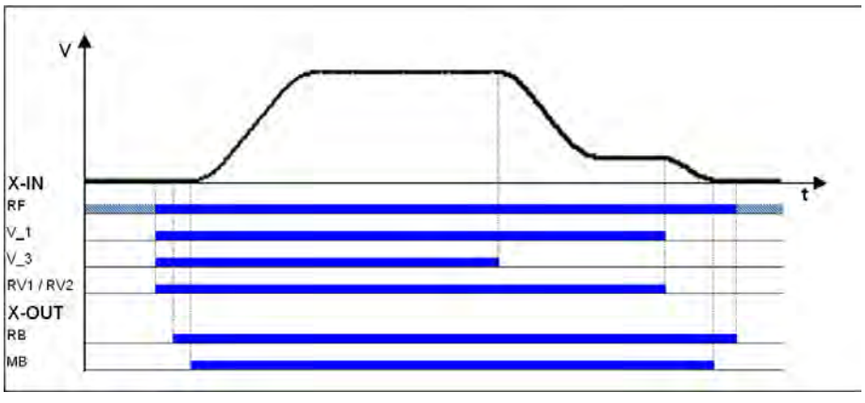
CAN Calib. 1------ - 17 AbsEncmm: 5358 MotEncmm:+ 4169 Offs:13081A/M 1.28	**Page 17: CAN Calib.** Calibration **Lines 2 - 4:** For calibrating the distances which were sent by the rotary encoder and the shaft encoder.
A+R - - - - - - - - - - - - 18 0.62 0.62 m/s3 0.50 0.50 m/s2 0.62 0.50m/s3	**Page 18: A&R** Display of configured values for: • Acceleration • Rampdown time dependent on the operating curve of a normal ride **Line 2:** Upper rounding of the acceleration in m/s^3 Upper rounding of deceleration in m/s^3 **Line 3:** Acceleration in m/s^2 delay in m/s^2 **Line 4:** Lower rounding of acceleration in m/s^3 Lower rounding of the deceleration in m/s^3
Energy - - - - - - - - - - 19 Power: 22.120 W Work: 16 Wh	**Page 19: Energy** **Line 2:** Power: current frequency inverter power in watts **Line 3:** Work: Energy meter. Indication of the work performed in watt hours.
InfoBus - - - - - - - - - 20 Ident No 01234567 Exist: xxxx Error 0000	**Page 20: InfoBus** Display of frequency inverter configuration **Line 2:** Ident no. of the internal assemblies 0: Controller Unit (CU) 1: Shunt module (CUSH) 2: reserved 3: reserved 4: reserved 5: Switching Power Print (SP) 6: Power Print (PP) 7: Module Print (MP) **Line 3:** Each available board is identified in accordance with the population of the frequency inverter (see also menu "HW Ident."): x: identification of the board by reading out the EEPROM m: identification by manual default in the menu "HW-Ident." **Line 4:** Error allocation of the assembly 1: No answer 2: Incorrect or unknown object 3: No proper EEPROM connection 4: No or unknown part number 5: No or unknown index 6: Original and backup copy are not identical During flawless operation, all internal assemblies must be displayed with a "0"

TravelDirection --- 21 TD_SET 10.00 M TD_CNT 4.32 M TD_DRV 18.45 M	**Page 21: Travel direction** Display the direction changes **Line 2:** TD_SET: Initial value of the down counter **Line 3:** TD_CNT: Travel direction counter, resettable. Displays the remained travel direction changes with the actual rope. After resetting the travel direction counter, TD_RES will be increased **Line 4:** TD_DRV: Total counter of the travel direction changes. Value remains after resetting the down counter
TravelDirection --- 21 TD_RES 10 TD_CNT 4.32 M TD_DRV 18.45 M	**Page 21: Travel direction** While pressing the ↵ button, **line 2** shows the actual number of counter resets "TD_RES".
Cuec ---------- 22 Func: DCP & CAN & AN Stat: GRN	**Page 22: Cuec** Expansion board "Control" **Line 2:** Func: Functions of the expansion board "Control" **Line 4:** Stat: LED status of the expansion board "Control"

3 Travel options

3.1 Normal travel

The figure shows the sequence of a trip between two floors with the corresponding input and output signal processes. You can find a detailed description of the various acceleration and deceleration processes in this chapter.



Normal travel
RF Controller enable
V_1 Positioning speed
V_3 Travel Speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

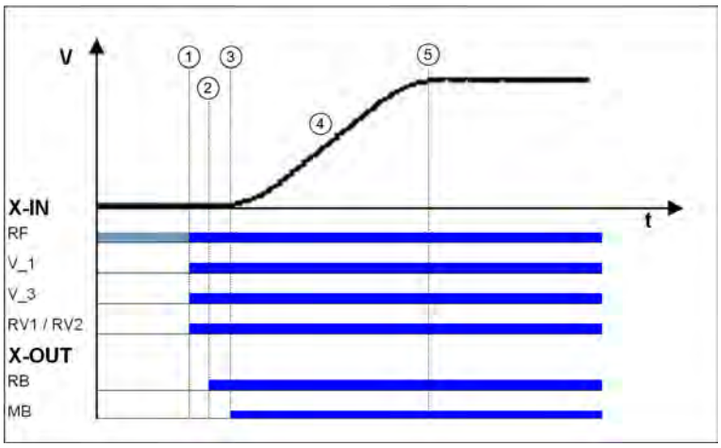
3.2 Start-up and acceleration

To be able to travel, the ZAdynpro requires at least the following input signals:

- Controller enable (RF)
- Speed (V_1, V_2 or V_3)
- Default of travel direction (RV1 or RV2)

Start-up procedure with acceleration

1	The elevator control system triggers the following frequency inverter inputs: • Controller enable (RF), can already be triggered • Speed V_1 and V_3 • Direction of travel RV1
2	The frequency inverter switches the digital "RB" contactor output with a time delay. With this signal, the inputs of the STO function must be activated immediately ("1" signal) or motor contactors energized.
3	The frequency inverter switches the digital output "MB brake" with a time delay. The brakes must be opened without delay with this signal.
4	The controller accelerates the motor up to the highest triggered speed (V_3) according to the set acceleration and round off.
5	Target speed V_3 has been reached.



Start-up and acceleration
RF Controller enable
V_1 Positioning speed
V_3 Travel Speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

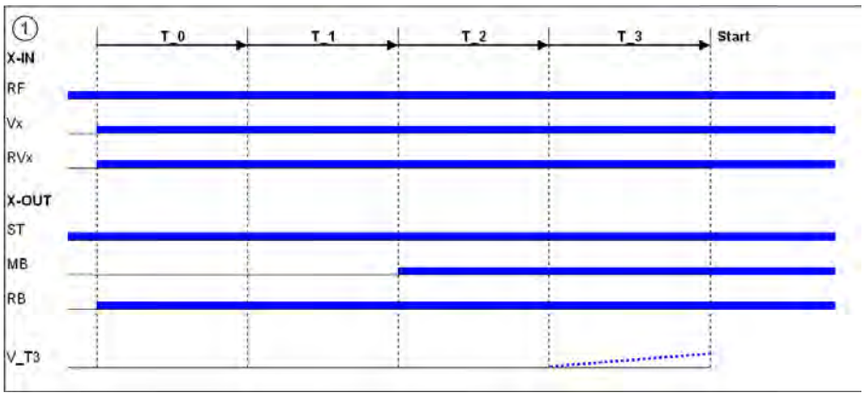
3.3 Optimizing start up behavior

Optimizing the start up behavior is only necessary if there is a negative influence on the travel comfort (e.g. through start up jerks)

Information

- Proper installation condition (rail guides, car suspension, transmission oil filling, etc.)
- The car must be empty and the counterweight completely loaded. Start-up for all loading conditions can only be optimally adjusted in under these conditions
- The speed control parameters must be correctly set in the**Controller** menu (see "Commissioning / Setting the speed control" chapter)

Start-up time sequence



T_0 Time until motor contactors have been opened
T_1 Time until magnetizing flux has been built up (only with asynchronous motors)
T_2 Time until brake has been opened
T_3 Time in which the motor is controlled to speed 0 or accelerated to V_T3
RF Controller enable
Vx Travel speed V_3
RVx Travel direction
ST Controller failure
MB_Brake Mechanical brake
RB Controller ready

The various times can be set in the **Start** menu

Time optimisation through contactor monitoring (optional)
With monitoring of contactors activated (**Monitors/CO** menu activated) and monitor contacts connected, the time T_0 is optimised. As soon as the contactors are closed, the time T_0 is interrupted and the time T_1 started.

Time optimization through brake monitoring
If the brake monitoring is activated (**Monitoring/BR≠ON**) and the monitoring contacts are connected, the time T_2 is optimized. As soon as the brakes are opened, time T_2 is aborted and time T_3 started.

3.3.1 Damping the start-up jerk

Applies to all start-up variations!
To reduce a startup jolt, you can accelerate to speed V_T3 linearly whilst T_3 is running. This overcomes the static friction and reduces the startup jolt (see diagram).

3.3.2 Start-up variations

Information
The optimal start-up variations are preset based on the motor type selection in the **Motor name plate** menu.
S Synchronous motors: MOD5
A Asynchronous motors: MOD1
Additional start-up variations are only required in special cases.

The various start-up variants can be configured in the **Start-up/M_START** menu. The amplification of the speed or position controller K_START is configured in the **Start-up/K_START** menu.

```
Start-up
↳M_START 1
  ↳      3
Start control procedure
```

```
Start-up
↳K_START 1
  ↳      3
Start gain
```

MOD1 (standard setting for asynchronous motors)
The drive is rpm-controlled. Up to the end of T_2, the speed is maintained at nominal value = 0. A change in position of the shaft is not corrected. The parameter **K_START** is used to increase the RPM controller amplification. It is activated at the start of T_1 and deactivated at the end of T_2

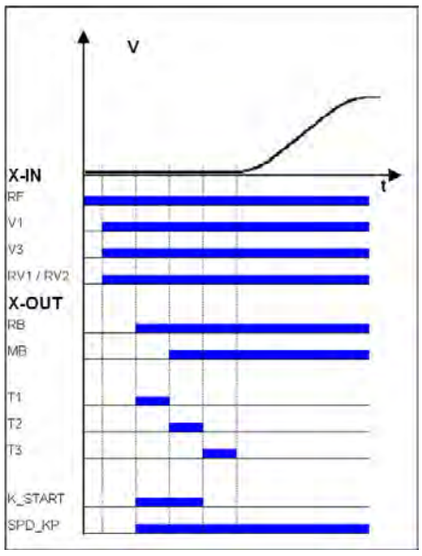
MOD2
Corresponds to the MOD1 function. The parameter **s_start** is additionally activated. If the drive position changes during the time T_2 by the value entered in "s_start", "K_START" is switched off. This prevents the drive from being damaged by too high a value of "K_START".

MOD3
The drive is position- and speed-controlled. Please note that both controls are set via "K_START" and are therefore dependent on one another. The position and speed control is activated at the start of T_1 and deactivated at the end of T_2.

MOD5 (standard setting for synchronous motors)
The drive is position-controlled. Up to the end of T_2, the drive position is recorded and corrected if there is a change. The parameter **K_START** is the position controller amplification. It is activated at the start of T_1 and deactivated at the end of T_2.

MOD4
Corresponds to the MOD5 function. The parameter **s_start** is additionally activated. If the drive position changes during the time T_2 by the value entered in "s_start", "K_START" is switched off. This prevents the drive from being damaged by too high a value of "K_START".

Start-up variations

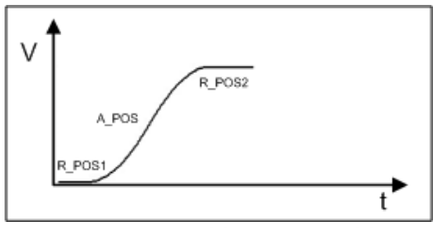


RF	Controller enable
V_1	Positioning speed
V_3	Travel Speed
RV1 / RV2	Direction default
RB	Controller ready
MB_Brake	Mechanical brake
T_1	Flux build-up time
T_2	Brake opening time
T_3	Speed=0
K_START	MOD1 / MOD2 (Speed control) MOD3 (position- & speed control) MOD4 / MOD5 (position control)
SPD_KP	Base amplification speed controller

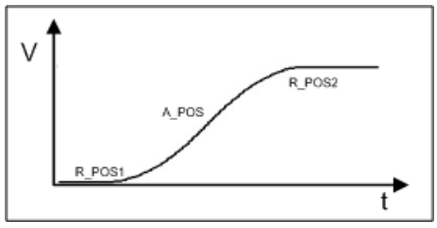
3.4 Optimizing the acceleration

The acceleration torque is defined by the parameter in the **Accelerating** menu. By changing the parameter values, you can adapt the curve shape to the requirements

A_POS: Acceleration preset in m/s². A higher value causes greater acceleration and thus a steeper ramp
R_POS1: Setting the lower round off A higher value causes a softer round off
R_POS2: Setting the upper round off. A higher value causes a softer round off.



Acceleration with high A_POS and low R_POS1 and R_POS2



Acceleration with low A_POS and high R_POS1 and R_POS2

Information
To achieve optimum starting behavior:

- The inputs of the STO function must be activated immediately with the digital output "RB" ("1" signal) or motor contactors energized
- The brakes must be switched instantaneously with the digital output "MB"

3.5 Traveling speed defaults

After entering the installation specifications and carrying out the automatic parameter assignment, the traveling speeds "V_2" and "V_3" are pre-configured in the **Travelling** menu, dependent on "V*".

Designation	Parameter	pre-signment
Intermediate speed V_2	V_2	50% V*
Travel speed V_3	V_3	100% V*

The speeds listed in the table below are permanently preset and thus independent of "V*".

Designation	Parameter	pre-signment
Positioning speed	V_1	0,05 m/s
Readjustment speed	V_Z	0.01 m/s
Additional speed V_4	V_4	0,32 m/s
Additional speed V_5	V_5	0,32 m/s
Additional speed V_6	V_6	0,32 m/s
Additional speed V_7	V_7	0,32 m/s

3.6 Distance-dependent delay

In a path-dependent deceleration, the deceleration paths are always identical. Independent of the speed reached at the start of the deceleration.
The path-dependent deceleration can be activated in the menu **Decelerating/S_ABH = ON**
Path dependent deceleration is carried out during deceleration of:

- V3 ⇦ V1
- V2 ⇦ V1
- V3 ⇦ Drehzahl 0 (only in DCP2/DCP4 protocol)
- V3 ⇦ Drehzahl 0 (only in DCP2/DCP4 protocol)

During all other switchovers between two speeds, the deceleration is carried out time-dependent.

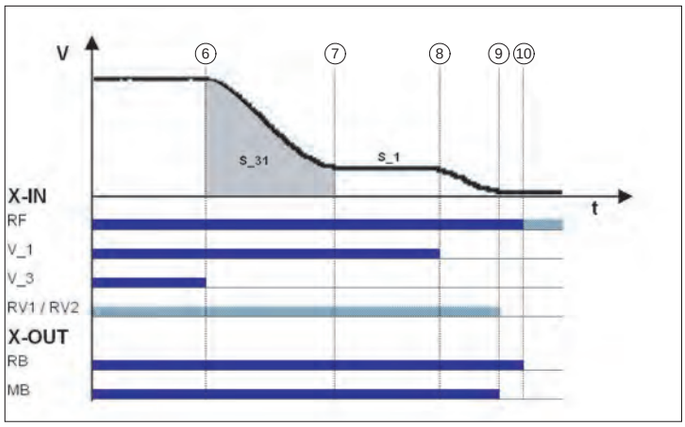
Information
Before removing the digital input for the travel speeds V_3 or V_2 the input for the travel speed V_1 must be applied (see diagram "Normal stop at distance-dependent deceleration").
If it is not possible to control two travelling speeds simultaneously for technical reasons (e.g. control of the speeds by an alternating contact), the distance-dependent delay with the **Control system/-SIM_V1=ON** parameter can be activated!
Here it must be noted that the positioning speed V_1 must be activated 100 ms after deactivation of the travelling speeds V_3 or V_2 at the latest!

If binary speed is specified, there is only a distance-dependent delay at **Control system/SIM_V1=ON**!

Information
If the high travelling speed signal is briefly switched off (e.g. V_3), the frequency inverter slows down the motor to the positioning speed V_1. For safety reasons, further actuation of a greater travelling speed is ignored. A greater travelling speed may only be actuated once all inputs for the travelling speeds have been switched off and once the motor has reached the speed 0.

3.6.1 Normal stop during path dependent deceleration

6	When the switch off point for the traveling speed is reached, the configured final speed V_3 has been reached. Deceleration is initiated
7	Travel at positioning speed V_1
8	Positioning speed V_1 is switched off. Motor continues to decelerate.
9	Speed 0 Output MB is switched off Brake must operate immediately The motor continues to be fed with current
10	The current to the motor is switched off Output RB is switched off The inputs of the STO function must be deactivated immediately ("0" signal) or motor contactors de-energized.

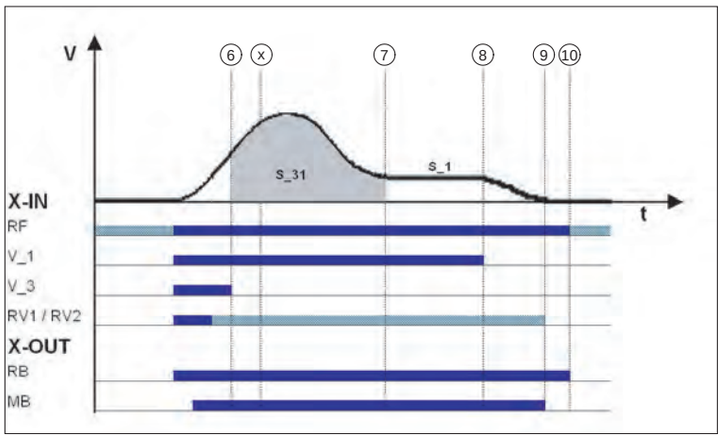


Normal stop during path dependent deceleration
RF Controller enable
V_1 Positioning speed
V_3 Travel Speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

3.6.2 Arch travel with path-dependent deceleration

If the distance between the floors is short and the selected end speed (V_2 or V_3) is not achieved, the ZAdynpro will perform a round speed profile journey. The round speed profile journey means that the same creep paths are always achieved regardless of the speed reached at the switch-off time.

6	When the switch off point for the traveling speed is reached, the configured final speed is not yet reached. The motor continues to be accelerated. The point from which the deceleration must be initiated is calculated.
X	Deceleration is initiated
7	Travel at positioning speed V_1.
8	Positioning speed V_1 is switched off. Motor continues to decelerate.
9	Speed 0 Output MB is switched off Brake must operate immediately The motor continues to be fed with current
10	The current to the motor is switched off Output RB is switched off The inputs of the STO function must be deactivated immediately ("0" signal) or motor contactors de-energized.



Arch travel
RF Controller enable
V_1 Positioning speed
V_3 Travel Speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

That means that during a normal trip and during arch travel, the deceleration path V3 ↘ V1 (S_31) and the crawl path V1 ↘ speed 0 (S_1, only with DCP 1/DCP 3) are identical.

3.7 Time-dependent deceleration

Time-dependent deceleration is activated for all speed transitions if the menu **Decelerating/S_ABH = OFF**.

With the exception of decelerations of:
- V_3 ↘ V_1
- V_2 ↘ V_1

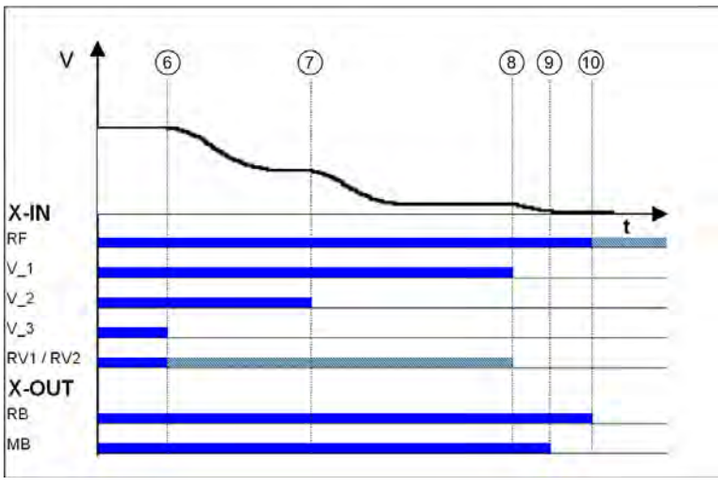
the decelerations are operated time-dependent. They are independent from the configured function of the parameter **Decelerating / S_ABH**

After switching off the current speed preset, the motor is decelerated time-dependent, according to the configured decelerations and round offs, to the highest speed still triggered.

Information
In a time-dependent deceleration, the deceleration paths vary dependent on the speed attained at the time the deceleration starts. For this reason, time-dependent deceleration only makes sense if traveling speed is reached during each trip.

3.7.1 Deceleration with reached traveling speed

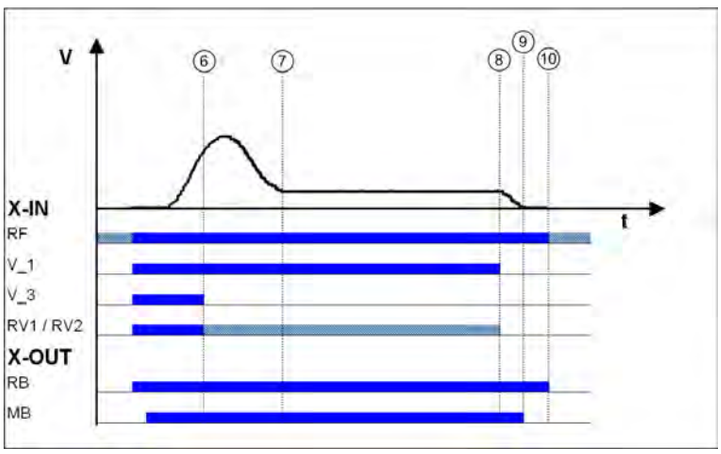
6	When the switch off point for the traveling speed is reached, the configured final speed V_3 has been reached. Deceleration to V_2 is initiated
7	Switch off point for V_2 Deceleration to V_1 is initiated
8	Positioning speed V_1 is switched off. Motor continues to decelerate.
9	Speed 0 Output MB is switched off Brake must operate immediately The motor continues to be fed with current
10	The current to the motor is switched off Output RB is switched off The inputs of the STO function must be deactivated immediately ("0" signal) or motor contactors de-energized.



Time-dependent deceleration with reached traveling speed
RF Controller enable
V_1 Positioning speed
V_2 Intermediate speed
V_3 Travel Speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

3.7.2 Deceleration when traveling speed has not been reached

6	When the switch off point for the traveling speed is reached, the configured final speed V_3 is not reached. Deceleration is initiated
7	Travel at positioning speed V_1
8	Positioning speed V_1 is switched off. Motor continues to decelerate.
9	Speed 0 Output MB is switched off Brake must operate immediately The motor continues to be fed with current
10	The current to the motor is switched off Output RB is switched off The inputs of the STO function must be deactivated immediately ("0" signal) or motor contactors de-energized.



Deceleration when traveling speed has not been reached
RF Controller enable
V_1 Positioning speed
V_3 Travel Speed
RV1 / RV2 Direction default
RB Controller ready

MB_Brake Mechanical brake

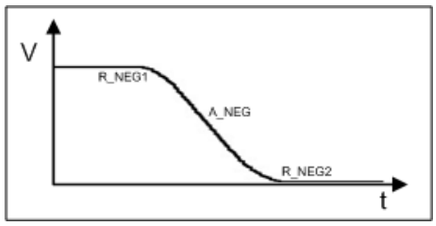
Information
If the trip duration is monitored by the open loop control, due to the long trip time with a traveling speed of V_1 an error message may result!

Information
If the traveling speed is switched off just before the preset final speed has been reached, it could happen that the floor is overshot.

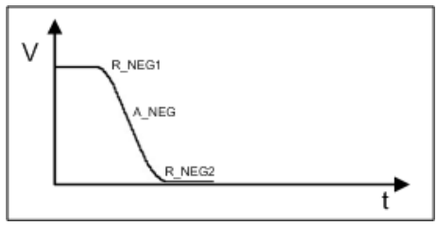
3.8 Optimizing deceleration

The deceleration ramp is defined by the parameter in the **Deceleration** menu. By changing the parameter values, you can adapt the curve shape to the requirements

A_NEG: Deceleration preset in m/s². A higher value causes greater deceleration and thus a steeper ramp.
R_NEG1: Setting the upper round off. A higher value causes a softer round off.
R_NEG2: Setting the lower round off A higher value causes a softer round off.



Deceleration with low A_NEG and high R_NEG1 and R_NEG2



Deceleration with high A_NEG and low R_NEG1 and R_NEG2

Information
Adapting the parameter modifies the deceleration path V_3 ◦ V_1. The recalculated path is shown in the display. If necessary, correspondingly adapt the interrupt point for V_3.

3.9 Crawl path optimization

Improvement of:
- Too long creep paths with travelling speed V_1
- non-flush stopping due to V_1 being prematurely switched off

without additional installation work.

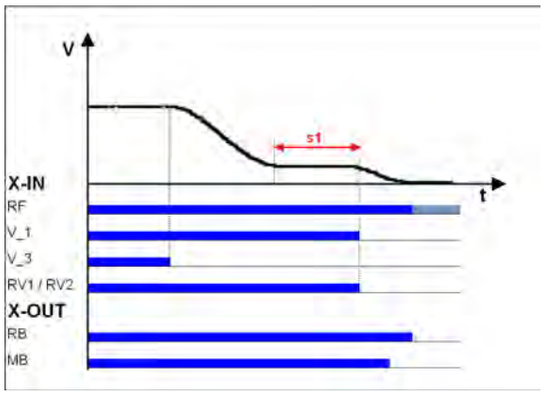
Using the crawl path optimization in the menu:
Decelerating / S_DI1
Decelerating / S_DI2
Decelerating / S_DI3
the traveling speeds V_1, V_2 and V_3 are switched off in all floors delayed by the value configured in the corresponding menu.

Optimizing the crawl paths

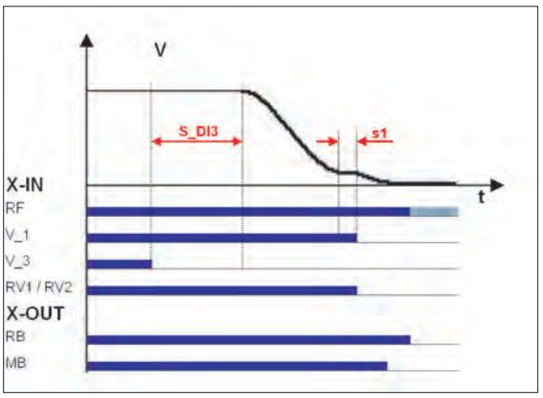
1	Travel to each floor from both directions of travel with the max. traveling speed V_3 or V_2 and check the crawl path s1 in the "INFO / Page 03" menu.
	`Dist. ---------- 03`
	`sa: 0.00 s21: 0.52m`
	`sr:^0.00 s31: 1.45m`
	`s1: 0.00 sd: 0.52m`

2	The value for s1 should be the same for all floors from both travel directions. If the crawl paths differ, use the smallest value for s1.
3	In the **Decelerating** menu, change the values for "S_DI3" or "S_DI2" to that determined for s1
4	Check the deceleration behaviour and correct the values for the parameters "S_DI3" or "S_DI2" if necessary.

Information
If s1 has different values, it is not possible to get the same crawl path in all floors!



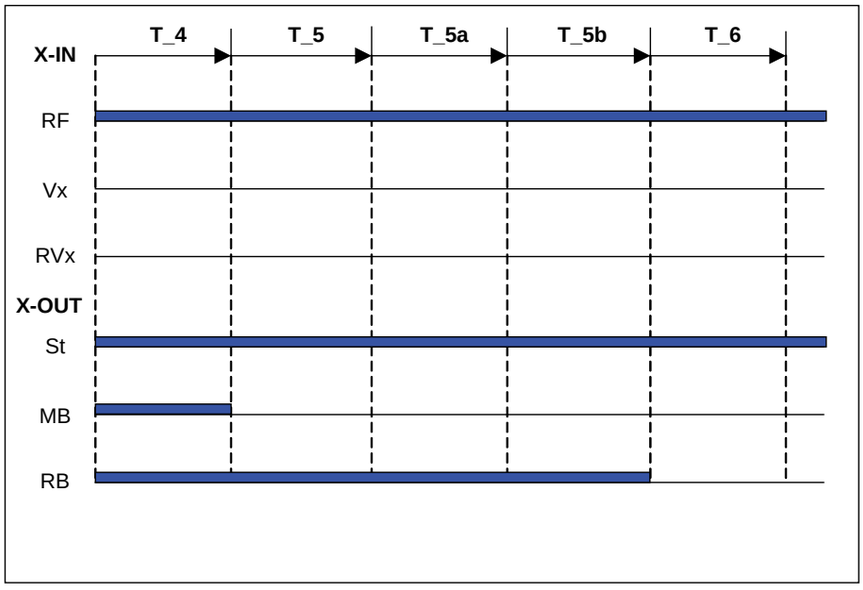
Deceleration with non-optimized crawl path
RF Controller enable
V_1 Positioning speed
V_3 Travel Speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake



Deceleration with optimized crawl path
RF Controller enable
V_1 Positioning speed
V_3 Travel Speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

3.10 Optimizing stopping

Stopping time sequence



T_4 Hold speed 0
T_5 Wait until the brake is closed
T_5a additional current supply of the motor
T_5b Wait until the motor is currentless
T_6 Wait until contactors open
RF Controller enable
Vx Travel speed V_3
RVx Travel direction
ST Controller failure
MB_Brake Mechanical brake
RB Controller ready

The various times can be set in the **Stop** menu.

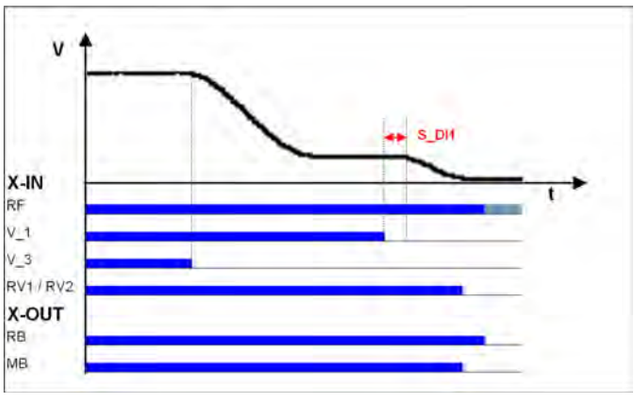
Time optimization through brake monitoring
If the brake monitoring is activated (menu **Monitoring/BR≠Off**) and the monitor contacts are connected, time T_5 is optimized. As soon as the brakes are closed, time T_5 is aborted and time T_5b started.

Time optimisation through contactor monitoring (optional)
If the contact monitoring is activated (menu **Monitoring/CO=ON**) and the monitor contacts are connected, time T_6 is optimized. As soon as the contactors are open, time T_6 is aborted and the stopping sequence ends.

3.11 Optimizing the step alignment

1	Ascertain the distance of the flush in each floor by measuring manually
2	The clearance should be the same in all floors when approaching from both directions. If the values differ, use the smallest value determined.
3	In the **DECELERATING** menu, configure the parameter **S_DI1** to the ascertained value.
4	Check the deceleration behaviour and, if necessary, correct the value for the parameter **S_DI1**.

Information
If there are different distances to the flush alignment, it is not possible to travel flush to all floors by modifying the parameter **S_DI1**!



Optimizing the step alignment
RF Controller enable
V_1 Positioning speed
V_3 Travel Speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

3.12 Direct leveling

Information
Direct levelling is only possible when using the CANopen lift protocol and an absolute shaft copy system!

During direct levelling, the control system indicates to the ZAdynpro the remaining distance to be travelled up to the stopping point.
The inverter slows down the motor in accordance with the specified remaining distance. making it possible to travel to the stop area without a creep path.

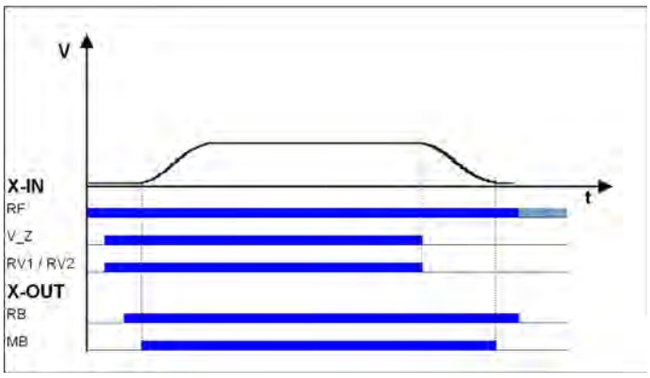
3.13 Readjustment

Correction of the rope elongation under load and relieving the load on the car. The rope elongation is evaluated by the control system.
The readjustment speed is configured in the **Travelling/V_Z"** menu and controlled through a digital input (configured to V_Z).

Information
The traveling speed for readjustment takes precedence over the other traveling speeds.

To be able to make a readjustment, at least the following input signals need to be present:
- Controller enable
- Readjustment speed V_Z
- Direction default

Information
To prevent oscillation, the control system must wait a suitable amount of time until the rope comes to rest before the readjustment is activated.



Readjustment speed
RF Controller enable
V_Z Readjustment speed
RB Controller ready
MB_Brake Mechanical brake

3.14 Operation in idle

With the ZAdynpro, both synchronous as well as asynchronous motors can be operated in an idle state.

CAUTION!

Caution!

S

When operating synchronous motors in idle, strong vibrations and noise development can result! Therefore, the factor for the speed controller basic-amplification **"SPD_KP" must be reduced to approx. 0.1%**.

```
Controller
↳SPD_KP  1.00
  ↳      0.10
SPD_REG: Base gain-factor
```

3.15 Fast-start

The motor is energized as the cabin door closes and the mechanical brake is opened. Motor speed is controlled to 0. This makes it possible to start travel immediately the door is closed.

Information

The Quickstart function may only be used in the door zone range in elevators with adjustment control. The regulations of EN 81-20 must be observed.

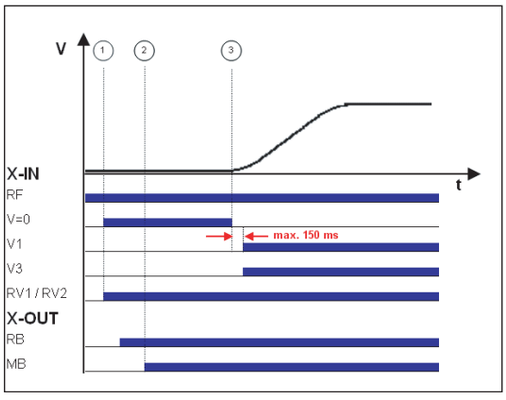
3.15.1 Actuation

Configure digital input in the **Control system** menu to **v=0**.

```
Control
↳f_I08   v=0
  ↳      v=0
Function I08
```

1	Cabin door closing Actuation of inputs: • RF - Controller enable • RVx - Default for travel direction • v=0 - Hold speed 0 Activation of output: • RB - Controller ready The inputs of the STO function must be activated immediately ("1" signal) or motor contactors energized Motor energized
2	Activation of output: • MB – mechanical brake Motor brake must be opened without a delay. Motor speed is controlled to 0.
3	Cabin door is closed Deactivation of input: • v=0 - Hold speed 0 Actuation of inputs: • V1 - Positioning speed or • V2 - Intermediate speed or • V3 - travel speed Travel speeds must be actuated no more than 150 ms after input "v=0" has been deactivated!

Caution!
Danger from traveling with cabin door open!
In order to prevent premature starting up in the event of a defective input or fractured wire for the "Hold speed 0" function, the signals for travel speeds should only be applied after the "Hold speed 0" function has been switched off!



Quickstart
RF Controller enable
v=0 Hold speed 0
V1 Positioning speed
V3 Travel speed V_3
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

4 Emergency evacuation

Information
The shaft efficiency has a decisive influence on the required power of the UPS performance.

4.1 Emergency evacuation with emergency power generator, 230 VAC

Characteristics of evacuation with emergency power generator, 230 VAC:
- Evacuation in motoric and generatoric direction
- Load-independent starts
- Load-independent stopping
- Flush stopping

Information
Due to the high level of magnetization current, emergency evacuation with a single-phase mains supply with asynchronous motors does not make sense.

In the event of a mains failure, the mains supply must provide the following voltage to the frequency inverter:
- 230 VAC to feed L1 and L2

The ZAdynpro analyses the load ratio between the car and the counterweight upon every journey start.

The control system starts the evacuation trip by activating:
- Controller enable
- Direction default
- Speed default

Size of the voltage supply

	The required performance consists of the following:
	Power consumption of ZAdynpro electronics
+	Control systempower consumption
+	Electromechanical brakes power consumption
+	Other consumers (car light, …) power consumption
+	Motor power consumption during motoric operation with sufficient power (ask motor manufacturer)
=	**Real power [W]**

4.1.1 Parameterisation

1.	**The following prerequisite must be present:** The cabin travels downwards when a 24 V signal is applied to the input configured to "RV2".	
2.	**Detection of voltage drop:** Configure digital input in the **Control system** menu to **PARA2**. In case of a voltage drop (power failure), the configured input with 24 VDC is actuated in order to inform the frequency inverter that a switchover must be made to parameter set 2	Control ↳ f_I08 PARA2 ↳ PARA2 Function I_08

3.	**Inform the control system about the permissible direction of travel (optional):**
	Configure digital output in the **Control system** menu to **Evac. Dir.**
	`Control`
	`↳ f_O4 Evac.Dir`
	`↳ Evac.Dir`
	`Function O4`
	
	Contact open ⇦ Car is lighter than counterweight
	Evacuation trip will be carried out upwards!
	
	Output closed ⇦ Car is heavier than counterweight
	Evacuation trip will be carried out downwards!	

4.	**Evacuation type specification:**
	Configure the parameter **F_PARA2 = EVA. 1*AC** in the **Parameter set 2** menu.
		`Parameter set 2`
		`↳ F_PARA2 EVAC1*AC`
		`↳ EVAC1*AC`
		`Function parameter set 2`

5.	**Copy parameter:**
	In the menu **Parameter set 2 / COPY**, select the function **PARA->2**. After copying, the parameter is once again OFF.
		`Parameter set 2`
		`↳ COPY Off`
		`↳ Para1⇦2`
		`Copy parameter`

Information
The power failure detection and type of evacuation must be parameterised before copying the parameters. Only a lower speed of the motor is possible because of the lower mains supply. The maximum possible speeds for V_2 and V_3 are calculated during the copying process.

4.2 Emergency evacuation with UPS, 230 VAC

S

Due to the low power requirements of a synchronous drive, it is possible to carry out an evacuation trip at half-load or in the direction of the pulling load using a commercially available UPS. An evacuation trip against the load direction is not possible!

A

Due to the high level of magnetization current, emergency evacuation with a single-phase mains supply with asynchronous motors does not make sense.

In case of a mains failure, the UPS supplies the following voltage:
- 230 VAC to feed L1 and L2

The ZAdynpro analyses the load ratio between the car and the counterweight for every journey. In the event of a power failure, the ZAdynpro informs the control system in which direction an evacuation is possible. The control system performs the evacuation in the appropriate direction.

The control system starts the evacuation trip by activating:
- Controller enable
- Direction preset (in the direction of the pulling load)
- Speed default

4.2.1 Evacuation through UPS with optimum power

Information - Characteristics of evacuation with optimum UPS power
- Load-independent starts
- Load-independent stopping
- Flush stopping
- With corresponding sizing of the UPS, a trip in the motoric direction is also feasible.

Calculation of the UPS

	The required UPS performance consists of the following:
	Power consumption of ZAdynpro electronics
+	Control systempower consumption
+	Electromechanical brakes power consumption
+	Other consumers (car light, …) power consumption
+	Motor power consumption for UPS operation with sufficient power (ask motor manufacturer)
=	**Real power UPS [W]**

4.2.2 Evacuation through UPS with minimum power

Information - Evacuation through UPS with minimum power
- Load-dependent starting, cannot be optimized
- Evacuation only possible in the direction of the pulling load
- Positioning is carried out load dependent; that means step formation could occur.

Calculation of the UPS

	The required UPS performance consists of the following:
	Power consumption of ZAdynpro electronics
+	Control systempower consumption
+	Electromechanical brakes power consumption
+	Other consumers (car light, …) power consumption
+	Motor power consumption for UPS operation with reduced power (ask motor manufacturer)
=	**Real power UPS [W]**

4.2.3 Parameterisation

1.	**The following prerequisite must be present:** The cabin travels downwards when a 24 V signal is applied to the input configured to "RV2".	
2.	**Detection of voltage drop:** Configure digital input in the **Control system** menu to **PARA2**. In case of a voltage drop (power failure), the configured input with 24 VDC is actuated in order to inform the frequency inverter that a switchover must be made to parameter set 2	Control ↳▶f_I08 PARA2 ↳▶ PARA2 Function I_08
3.	**Inform the control system about the permissible direction of travel (optional):** Configure digital output in the **Control system** menu to **Evac. Dir.**	

```
Control
↳f_O4    Evac.Dir
  ↳      Evac.Dir
Function O4
```

Contact open ⇦ Car is lighter than counterweight
Evacuation trip will be carried out upwards!

Output closed ⇦ Car is heavier than counterweight
Evacuation trip will be carried out downwards!

4. **Evacuation type specification:**
Configure the parameter **F_PARA2 = UPS** in the **Parameter set 2** menu.

```
Parameter set 2
↳F_PARA2 UPS
  ↳      UPS
Function parameter set 2
```

5. **Specification of the stator resistance for synchronous motors:**
Configure the synchronous motor's stator resistor in the **Parameter set 2 / RS_UPS** menu

```
Parameter set 2
↳RS_UPS  1.00       Ohm
  ↳      1.00
Stator resistance (UPS
```

6. **Limit motor current:**
Limit the motor current by entering the available UPS power in the **"Parameter set 2/P_UPS"** menu.

```
Parameter set 2
↳P_UPS   1.0         kW
  ↳      1.0
Max. load of the UPS
```

Calculating the available UPS power:

$x_{1\ \text{rating plate}}$
- Control systempower consumption
- Electromechanical brakes power consumption
- Other consumers (car light, …) power consumption

= **Available UPS_power [W]**

Information
Entering the UPS power determines the type of UPS evacuation.
Sufficient power: An evacuation trip with the characteristics of an evacuation with optimum UPS power is implemented.

Not enough power: An evacuation trip with the characteristics of an evacuation with minimal UPS power is implemented.

CAUTION!

Caution!
Setting the value for P_UPS too high can lead to an overloading or destruction of the UPS.

7. **Copy parameter:**
In the menu **Parameter set 2 / COPY**, select the function **PARA->2**. After copying, the parameter is once again OFF.

```
Parameter set 2
↳COPY    Off
  ↳      Para1⇦2
Copy parameter
```

Information
The power failure detection and type of evacuation must be parameterised before copying the parameters. Only a lower speed of the motor is possible because of the lower mains supply. The maximum possible speeds for V_2 and V_3 are calculated during the copying process.

8.	**Switch off the times in which the motor is kept at speed 0:**	
	Configure in the **Start/T_3 = 0** menu	Start-up ↳T_3 0.0 s ↳ 0.0 Maintain speed=0
	Configure in the **Stop/T_4 = 0** menu	Start-up ↳T_4 0.0 s ↳ 0.0 Maintain speed 0

4.3 Improving the positioning

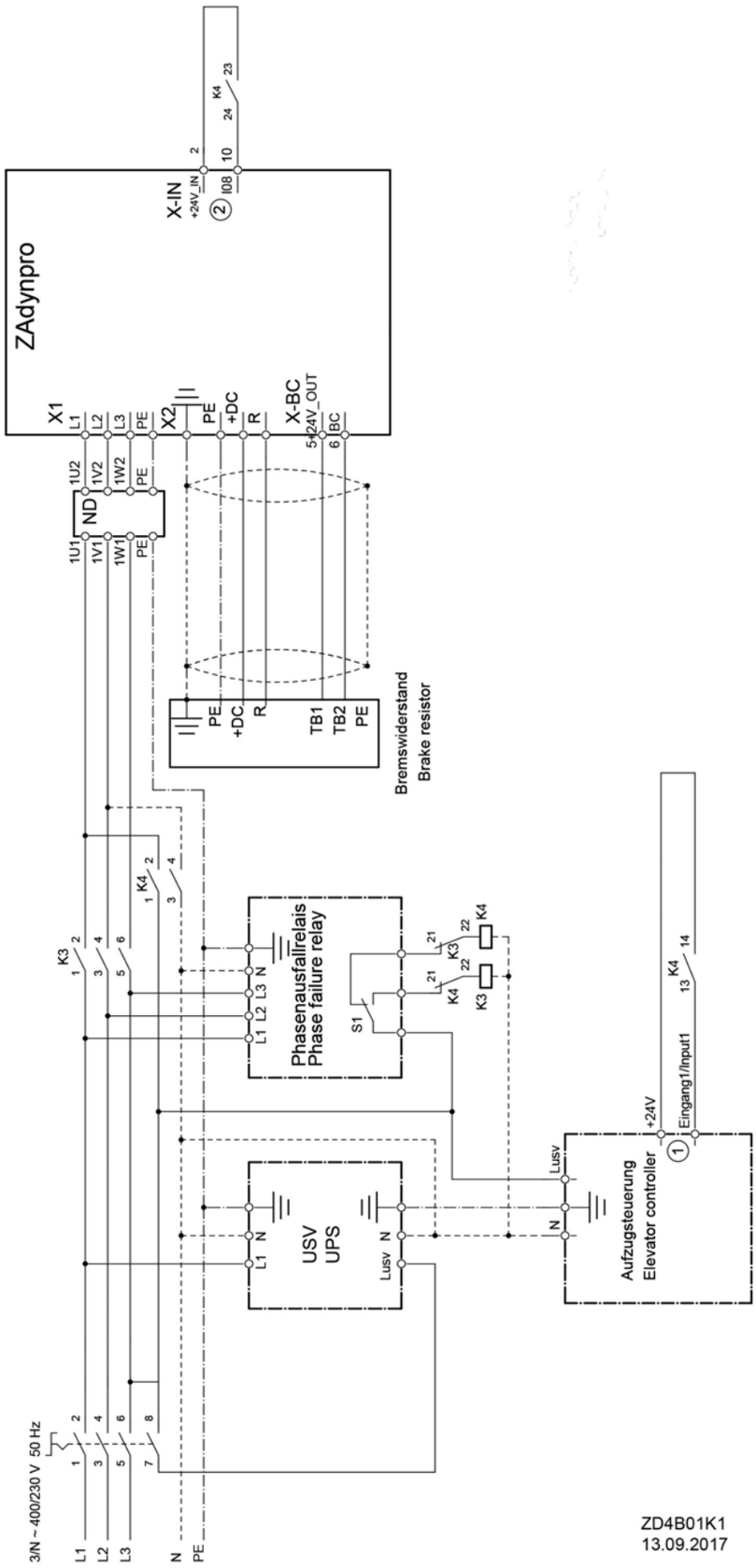
Due to the reduced UPS power, it is not possible to decelerate the motor until standstill. That means, at the time when the floor is reached and the brakes are closed, the motor is still moving. The time delay until the brakes are closed can lead to overshooting the door zone area and thus step formation.

4.3.1 Parameterisation

1.	Configure in the **Parameter set 2 / STOP = ON** menu Brake is already closed when the switch off for the speed V_1is reached.	Parameter set 2 ↳STOP ON ↳ ON Stop function

Information
The positioning is still load-dependent despite this measure. When travelling at half load, the elevator can stop too early outside the door zone range with **parameter set 2/STOP = ON**.

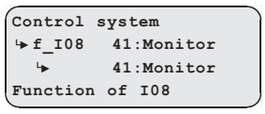
4.4 Plan for connecting UPS to ZAdynpro



1 Function input 1: Monitoring power failure
2 Function input X-IN:I08 = PARA2

4.5 Monitor function

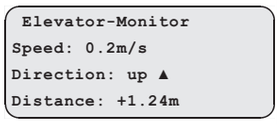
Monitoring of evacuation direction and evacuation speed during the evacuation process.
The monitoring function will be activated by a digital input.



Configure the digital input in the **Control system** menu to the function **41:Monitor**.

Activating of the monitoring function

- Switch ZAdynpro off
- activate the digital input with the "Monitoring" function
- Switch ZAdynpro on
- Monitoring function is active

	**Elevator-Monitor** **Speed:** Display of the actual evacuation speed **Direction:** Display of the actual evacuation direction ▲ Evacuation speed < Limit V_G1 ▲▲ Evacuation speed > Limit V_G1 **Distance:** Display of the evacuation distance past

Information
With an activated monitor function, all further functions of the ZAdynpro are locked!

5 Error diagnosis

5.1 Travel abort and acknowledgement during malfunctions

5.1.1 Travel abort

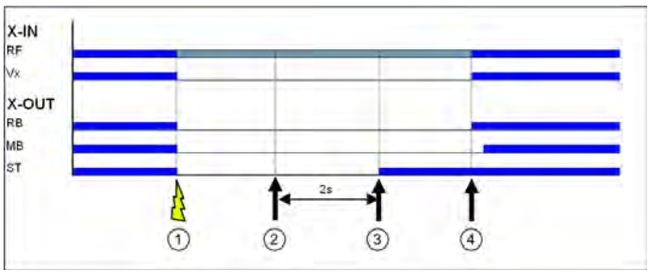
- If the ZAdynpro detects an error, the current travel program is aborted and the following outputs are switched off immediately:
  - ST – Malfunction
  - RB – Controller ready
  - MB – mechanical brake
- The open loop control must immediately:
  - Close the electromechanical brake
  - STO- interruption or opening of the motor contactors
- The error that has occurred is shown in the display with error text and error number. LED's, error memory and an error list are available for additional troubleshooting.

5.1.2 Acknowledgement

Acknowledging the error is performed automatically 2 seconds after the cause of the error has been repaired.
The prerequisite is that there are no input signals for travel speeds. If travel signals are applied before the end of 2 seconds, there will be no error acknowledgement.

The following errors are not automatically acknowledged:

Error no.	Acknowledgement by
900 ... 999	Switch the ZAdynpro off and then back on



1 Error is recognized
2 Error is no more present
3 Atomatic acknowledgement with Vx=0
4 New travel command

5.2 LED

There is an LED on the ZAdynpro for diagnosis.

1 Location of ZAdynpro LED

Status of the ZAdynpro with standard actuation

LED colour	LED status	Operation condition
green	flashing once per second	Holding
green	flashing twice per second	Travel

Condition of the CAN connection

LED colour	LED status	Operation condition / error status
green	flashing once per second	Operation Mode "Stopped"
green	fast flashing	Operation Mode "Preoperational"
green	on	Operation Mode "Operational"
red	Off	no error, connection is in order
red	flashing once per second	CAN error counter has exeeded the warning limit of 96 errors
red	On	Bus off, reset of the controller is necessary

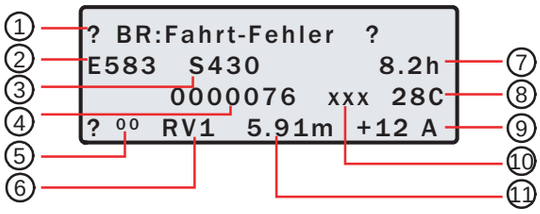
It is possible, that an operation condition and an error state occur at the same time and that they are indicated by the LED at the same time.

5.2.1 Software update

If an error occurs during the software update, a flash code is issued by LED for the corresponding error message.
An explanation of the flash code can be found in the chapter Special Functions/Software Update

5.3 Readout the error memory

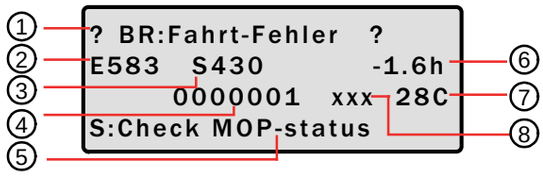
Faults which lead to interruption of the travel are saved in a fault list.
The fault list can be found in menu **Statistik/ST_LST**. Up to 64 error messages can be managed. Once the number of 64 messages has been reached, the oldest entry in each case is deleted for each new error message which arises. When the fault list is called up, the last fault which occurred is displayed with the following information:



1 Error description
2 Error no.
3 Operation condition (S=status)
4 Travel number
5 Consecutive error number
6 Travel direction
7 Operating hours
8 Temperture power stage
9 Motor current consumption
10 Additional information (option)
11 Position of tha car in the shaft

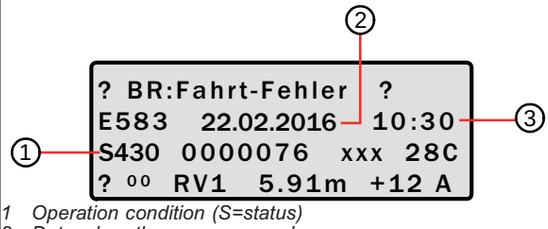
Please refer to the "Error diagnosis“ chapter for a description of the error number and the operating condition.

The following information is displayed when the error list is opened and the ⓘ key is pressed additionally:



1 Error description
2 Error no.
3 Operation condition (S=status)
4 Indication how many trips ago the error occurred
5 Status in which the error occurred is in plain text
6 Time how long ago the error occurred
7 Temperture power stage
8 Additional information (option)

In CANopen lift operation, the time and date when an error occurs are saved in the error list and displayed.



1 Operation condition (S=status)
2 Date when the error occurred
3 Time at which the error occurred

Scroll through fault list:
the fault list can be scrolled through using the two arrow keys.

Scroll up (reduce fault serial number)

Scroll down (increase fault serial number)

Determine time of fault

When i key is pressed, the difference from the current number of travels and operting time is displayed

```
▷ BC:Alarm/fault ◀
E912 S422 -2.4h
 -0000189 12C
▷ 01 RV1 0.00m +12A
```

5.4 Delete error memory

The fault memory is wiped by means of an entry in the **Statistic/ST_CLR=ON**.
The following parameters are reset:

- ST_LST (Error list)
- ST_RES (Number of interruptions in the mains supply)
- ST_SRF (Number of trip interruptions due to an interruption in the control enabling)
- ST_SCO (Number of trip interruptions due to an interruption in the contactor monitor)

5.5 Error list

All error messages are stored in the **Statistic / ST_LST** menu (see "Error diagnosis / error memory" chapter)

5.5.1 Masc-Funktion

You can deactivate individual monitoring functions by inputting an item in the error mask (see "Parameter list/Monitoring" menu chapter). To do this, enter the corresponding error number into error masks 1-5.
The maskable errors are marked in the error list with a **point** in thecolum n **M**.

CAUTION!

Caution!
The mask function may only be used for troubleshooting and error diagnostics. The corresponding error cause must be eliminated in order to ensure continuous service of the frequency inverter!

Sequential errors can occur if errors are masked.

The masking deactivates important monitoring functions. This may result in dangerous operating states or damage to the inverter.

5.5.2 Block function

Blocks the controller if certain errors occur several times is succession. The errors must occur in directly consecutive travel tests. The fault counter is set to 0 when performing a trouble-free run.
The following block functions can be set in the **Monitoring / MOD_ST** menu:

- Fix 2 Sec.: No blocking function, the output configured on "ST" drops for 2 seconds during a malfunction and then increases again (speed preset V_x must be switched off)
- Lock n.3: Lock function after 3 malfunctions. Output "ST" remains dropped after the 3rd error
- Lock n.2: Lock function after 2 malfunctions. Output "ST" remains dropped after the 2rd error
- Lock n.1: Lock function after 1 malfunction1. Output "ST" remains dropped after the 1st error

Errors that lead to the locking of the ZAdynpro are identified by a **dot** in the **S** column.

5.5.3 Notes 0xx

Information about:
- Error memory content
- Changes in the operating conditions
- Application of special frequency inverter functions

Note-No.	Note text	Designation	M	S
N0	Memory empty	EEPROM is empty		
N010	Software update	Software update was carried out **Additional information:** Version of the new software		
N020	MOT_TYP changed	Motor type in "Motor name plate" was changed		
N077	ST_LST: locked	Five faults occurred in direct succession Fault memory is blocked **Additional information:** indicates the most recent fault The fault counter is set to 0 when performing a trouble-free run.	●	
N080	Mode: EVA ->Norm	Switchover from evacuation to normal mode was implemented		
N081	Mode: Norm ->EVA	Switchover from normal to evacuation to mode was implemented		
N082	Mode:ParaChange	The parameter set was changed during travel	●	
N085	Mode: Safety Br	Safety brake function was implemented		●
N086	Mode:Enc.Adj.MB	Encoder-alignment with closed brakes was carried out		
N087	Mode:Encoder-Adj.	Manual encoder offset was carried out		
N088	Mode:Encoder-Check	The encoder offset alignment was checked		

5.5.4 Error 1xx
- Hardware configuration error
- Software error

Error no.	Error text	Error cause	M	S
110	CU: No ID	CU ID no. was not detected: CU is not present or its ID EEPROM does not reply		●
111	CUSH: No ID	Shunt ID no. was not detected: Shunt module is not present or its ID EEPROM does not reply		●
121	CUSH: ID-Error	Internal shunt module was detected but there are problems with the shunt module's informational content		●
140	MP:Unknown IGBT	A unknown IGBT-module was recognized		
150	HW-Conflict !	Shuntmodul, Power Print and Modul Prind do not match	●	
160	ADC adj.:outside tol.	**Error:**2The deviation between the first measured value and the second measured value during the zero point comparison of the motor current measurement is greater than 2 %.	●	
180	UF CTRL=DCP2/4	**Error:** DCP2 or DCP4 is configured as the actuation type. This is not possible during operation without a rotary encoder **Remedy:** Enter DCP1 or DCP3 for the communication	●	

5.5.5 Error 2xx
- Configuration error

Error no.	Error text	Error cause	M	S
200	Stop input	**Error:** A parameter is open while apply a correct travel command (RF + RVx + Vx) **Remedy:** End parameter inputs	●	
201	Motor name plate	**Error:** A parameter in the **Motor rating plate** menu has not been assigned **Remedy:** Check parameters in the **Motor rating plate** menu		
202	MOT_TYP = ?	**Error:** No motor type was selected in the **Motor rating plate** menu **Remedy:** Enter motor type in the **Motor rating plate** menu		●

Error no.	Error text	Error cause	M	S
203	n* = 0?	**Error:** No speed was entered in the **System data** menu **Remedy:** Enter the speed at V* in the **System data** menu directly or have it calculated based on the system data		•
204	n* > 3*n!	**Error:** n* was incorrectly calculated due to incorrect installation data (n* >3xn) **Remedy:** Check the installation data for correct entry	•	
205	Input duplicated	**Error:** two digital inputs are assigned with the same function **Remedy:** Change the function allocation of the digital inputs		•
207	Input PFU_BR miss.	**Fault:**When using a feedback unit in connection with a brake resistor the temperature monitor of the brake resistor is not programmed **Remedy:** Parameterise digital input (preferably X_BR4) in the "Control" menu to the "PFU_BR" function	•	
208	DELAY active	**Error:** Emergency stop was done by deactivating of the input with the function "/DELAY" At travel start, the input with the function "/DELAY" is not active **Remedy:** Check the triggering of the input with the function "/DELAY"		
210	Wrong ENC_TYP	**Error:** Rotary encoder type and motor type are not compatible **Remedy:**Enter the correct rotary encoder type in the "Encoder & BC" menu	•	•
213	ZR_EN /ZR_RDY missing	**Error:**"ZR_RDY" or "ZR_EN" was not configured **Remedy:**Set digital input to "ZR_RDY" or set digital output to "ZR_EN"	•	
221	Error: ASM data	**Error:** While operating asynchronous motors, the values for the rated speed (n) and the rated frequency (f) do not match in the **Motor rating plate** menu **Remedy:** Enter the correct data for rated speed and rated frequency in the "Motor name plate" menu	•	•
231	V_G1 > 150% V*!	**Error:** the limit value configured for V_G1 is too large **Remedy:** Configure the limit value V_G1 to max. 150% V* in the **Control system** menu		
232	V_G2 > 150% V*!	**Error:** the limit value configured for V_G2 is too large **Remedy:** Configure the limit value V_G2 to max. 150% V* in the **Control system** menu		
233	V_G3 > 150% V*!	**Error:** the limit value configured for V_G3 is too large **Remedy:** Configure the limit value V_G3 to max. 150% V* in the **Control system** menu		
240	ZR:Not RDY	**Error:** At start of travel, no signal present at the digital input set to "ZR_RDY" **Remedy:** Check wiring Use the ZArec display to check for an error at the ZArec Exit ZArec configuration level		
250	Disc: No Enc Adj.	**Error:** Rotor position unknown **Remedy:** Switch frequency inverter off and then back on		
251	Disc: Wrong ENC_INC	**Error:** An invalid value was configured in the parameter **ENC_INC** **Remedy:** Configure correct value in the parameter **ENC_INC**.		
252	Disc:EncInc deviance	**Error:** During the continuous automatic updating of the encoder line number, an implausible value was determined. **Remedy:** Switch frequency inverter off and then back on		
253	Disc:Wrong position!	**Error:** Error occurs if the Hall sensor detects a magnet at a time earlier than expected. **Remedy:** Switch frequency inverter off and then back on		
260	V_EXT active!	**Error:** An error occurs if in the case of the available mains connection voltage the external 24 V power supply exceeds the internal power supply by 1 V. **Remedy:** Unplug the connecting lead of the external 24 V power supply.	•	
270	Cable change warning	**Error:** Information travel direction change counter Replacement of the cables in about 1 year		
280	Decel. distance too long	**Error:** the calculated deceleration path S31 is too long **Remedy:**In the **Decelerating** menu, increase the deceleration "A_NEG" or decrease the roundings "R_NEG1" and "R_NEG2"		•
285	Installation:V*=0	**Error:** V* in the **System data** menu has not been assigned **Remedy:** Check the parameters in the **System data** menu		

Error no.	Error text	Error cause	M	S
287	V1 . . . V7 > V*!	**Error:** One of the travelling speeds V_1 ... V_7 entered is larger than the entered rated speed V* **Remedy:** Configure speeds V_1 … V_7 in the **Travel** menu to ≤ V*		
288	V_3 > V*	**Error:** The traveling speed V_3 entered is larger than the entered rated speed V* **Remedy:** Set speed "V_3" in the **Travel** menu to ≤ V* **Info:** Error is deactivated in CAN mode. If speed values are entered that are greater than V*, the ZAdyn automatically limits the speeds to V*.	•	•
289	V_1 < V_2 < V_3!	**Error:** Speeds in the **Travel** menu are incorrectly configured **Remedy:** In the **Travel** menu, ensure that V_1 < V_2 and V_2 <V_3	•	•
290	ParaSet2 empty!	**Error:** Activated parameter set 2 does not contain any data **Remedy:** In the **Parameter set 2** menu, copy the data from parameter set 1 to parameter set 2		•

5.5.6 Error 3xx

- Error before trip start

Error no.	Error text	Error cause	M	S
301	MOP: Timeout	**Error:** No communication between the application processor and the motor management processor during start due to an error during the update **Remedy:** Perform a software update	•	•
303	MOP: SW-Error	**Error:** Software error message in the motor management processor **Remedy:** Perform a software update	•	•
304	MOP: HW-Error	**Error:** Hardware error message in the motor management processor	•	•
306	ADC calibration??	**Error:** Zero point offset in the motor current detection (analogue digital converter) is outside the tolerance **Remedy:** Replace defective shunt module		•
308	Iu Iv!=0A!	**Error:** Defective current detection for phases U and V. Standby current too high at a standstill. **Remedy:** Inspect the connectors in the shunt module. Current sensors are defective.	•	•
310	ENC:No AVE	**Error:** Connected absolute value encoder not detected (no absolute value encoder connected when frequency inverter was switched on) **Remedy:** Check absolute value encoder connection Switch frequency inverter off and then back on Check parameters in the **Encoder & BC** menu		•
312	HIPER:Status error	**Error:** Error message via status bits of the Hiperface encoder **Remedy:** Check connection and wiring, check encoder type		
313	HIPER:No incr. mode	**Error:** Number of pulses of the Hiperface encoder is not supported **Remedy:** Check encoder type		
314	HIPER:Alarm	**Error:** Alarm bit set by the Hiperface encoder **Remedy:** Check connection and wiring, check encoder type		
315	EnDat: HW-error	**Error:** EnDat encoder delivers error		•
316	EnDat: Resolution!	**Error:** Configured resolution in the EnDat encoder does not match the EnDat encoder resolution **Remedy:** In the **Encoder & BC** menu, configure the correct resolution for the EnDat encoder		•
318	HIPER: HW error	**Error:** Error message via status bits of the Hiperface encoder **Remedy:** Check connection and wiring, check encoder type		
319	HIPER: Resolution!	**Error:** HIPERFACE encoder was detected, the resolution does not match the setting (ENC_INC) **Remedy:** Check encoder type		
320	ENC: Error-start	**Error:** Configured sinusoidal encoder was not detected **Remedy:** Check connection Check the rotary encoder type; possibly connect an encoder with rectangle signals	•	•

Error no.	Error text	Error cause	M	S
321	EnDat: ULP-error	**Error:** While starting, an error was read out from the EnDat encoder. Error is stated as a code: 0: faulty EnDat encoder power supply 1: no SSI communication 2: faulty EnDat encoder lighting 3: defective signal amplitude 4: Positioning error 5: defective sine evaluation **Remedy:** Check connection, check EnDat encoder		
322	EnDat: Com-Fehler	**Error:** During start, malfunction in communication to EnDat encoder; absolute value could not be read out **Remedy:** Check EnDat encoder, Check rotary encoder line Check the rotary encoder configuration in the **Encoder & BC** menu		
324	SSI: Ack-Error	**Error:** During start, malfunction in communication to SSI encoder; absolute value could not be read out **Remedy:** Check SSI encoder, Check rotary encoder line Check the rotary encoder configuration in the **Encoder & BC** menu		
325	SSI: Timeout	**Error:** Faulty communication with SSI encoder during start-up; absolute value could not be read out, SSI encoder does not reply **Remedy:** Check SSI encoder, Check rotary encoder line Check the rotary encoder configuration in the **Encoder & BC** menu		
327	ENC: Read-Error	**Error:** During reading out the position of the absolute encoder (position will be read out repeatedly) different values will be read. **Remedy:** Check absolute value encoder Check rotary encoder line Check rotary encoder connection (e.g. shielding)		
328	ENC: Count-Dif	**Error:** Excessive difference between the position determined by the absolute value encoder and the position calculated from the absolute value encoder impulses **Remedy:** Check absolute value encoder Check rotary encoder line Check rotary encoder connection (e.g. shielding)		
329	ENC:Sinus-Error S	**Fault:** Plausibility between sine and cosine track of sinus encoder unsatisfactory **Remedy:** Check sinus encoder Check rotary encoder line Check rotary encoder connection (e.g. shielding)		
330	ENC:Sinus-Error F	**Fault:** Plausibility between sine and cosine track of sinus encoder unsatisfactory The number of checks can be set in the **S9_ZA Internal/ENC_CHK** menu. The factory setting ENC_CHK=4 corresponds to a check duration of approx. 1 ms. **Remedy:** Check sinus encoder Check rotary encoder line Check rotary encoder connection (e.g. shielding)		
331	ENC: Error NDEF	**Error:** Start-Bit of the EnDat-protocol is not detected **Remedy:** Check EnDat encoder Check rotary encoder line Check rotary encoder connection (e.g. shielding)		
332	ENC: 1387 CD=0	**Fault:** input voltages of signal tracks C and D of absolute value encoder type ERN1387 areboth zero **Remedy:** Check absolute value encoder Check rotary encoder line Check rotary encoder connection		

Error no.	Error text	Error cause	M	S
340	ENC:magnet miss.	**Error:** Occurs if a magnet is not detected in an expected position and also within the tolerance range. **Remedy:** Stick on the magnet in the right position In case the magnet was lost, stick on the lost magnet Set the Hall sensor to the correct distance Check if there is play on the driving disk disassembly	•	
350	MP: Temp.Sens?	The external temperature sensor for the power component is not detected. Further travel with reduced switching frequency of 4 kHz and maximum fan output possible.		
372	ENC:No Abs.value	**Error:** Absolute values cannot be read in by the rotary encoder prior to starting travel **Remedy:** Check rotary encoder connection		•
373	ENC:No Abs.End	**Error:** Absolute values cannot be read in by the rotary encoder prior to starting travel **Remedy:** Check rotary encoder connection		•
377	BRxx:Temp.warning	**Error:** The continious braking power of the Brake resistor is exceeded by 150 % within 120 s A restart will be avoided **Remedy:** Check the configuration of the BR-type Check the connected BR	•	•
378	MP: Not active!	**Fault:** Mains supply of the power section not active		•
379	MP:Temp.warning	**Error:** during startup, the temperature on the power stage is too high **Remedy:** Frequency inverter is overloaded, repair the cause for the overload	•	•
380	BR: Start-Error	**Error:** When the brake monitoring is activated, at least 1 brake monitoring contact is not connected or is incorrectly connected **Remedy:** Check the functioning (NO or NC) in the monitoring contacts, Check the configured number and function of the monitor contacts in the **Monitors** menu, check the connection of the monitoring contacts **Info:** • Error leads to locking of the ZAdynpro with parameter **LOCKBR="ON"**		•
395	MP:ERR_EXT active	**Error:** Internal defect of the device, overcurrent in the power stage	•	•

5.5.7 Error 4xx

- Travel abort to protect the ZAdynpro
- Voltage monitoring
- Overvoltage Brake resistor / Brake-Chopper
- Power stage temperature recording
- Current monitoring

Error no.	Error text	Error cause	M	S
410	ADC: Over current!	**Error:** Maximum modulation of the analogue current converter, motor current too high **Remedy:** Check the connection at the frequency inverter output for short-circuit, Check rotary encoder connection for connection of rotary encoder tracks, check the phase position (U↞U; V↞V; W↞W), Check motor data in the **Motor rating plate** menu, Decrease "SPD_KP" amplification in the **Control system** menu, Decrease amplification during start "K_START" in the **Start** menu		•
412	MOT:UVW fail	**Error:** Motor test current not correct **Remedy:** Check the motor connection Check the motor contactors (see also "Special functions" chapter) **Info:** If parameter **UVW_CHK="OFF"** is present, the motor phase check upon start-up is deactivated. The error message is then not issued.	•	

Error no.	Error text	Error cause	M	S
415	MOT: Current UVW	**Error:** Motor fault current, earth fault **Remedy:** Check the motor connection Check rotary encoder connection	•	•
420	MP: Temp. Fault	**Error:** Excess heat in the power stage **Remedy:** Check the fan, check the ambient temperature, When installing the frequency inverter in the switch cabinet, ensure it has sufficient ventilation	•	•
421	STO: Temp. alarm	**Error:** Overtemperature internal electronics **Remedy:** Check the fan, check the ambient temperature, When installing the frequency inverter in the switch cabinet, ensure it has sufficient ventilation **Info:** Error only occurs in ZAdynpro of frame sizes 040-074	•	•
431	MP: PWM fail	**Error:** The pulse width modulation of the clock frequency is not switched on or off **Remedy:** Check rotary encoder connection	•	•
450	MP: Overload!	**Error:** Nominal current of the frequency inverter was exceeded for 10 s by a factor of 1.8 **Remedy:** Check motor data Check calculation Check the weight compensation	•	
470	DC: U < UDC_MIN	**Error:** Intermediate circuit voltage has undercut the permissible value for "UDC_MIN" (**Power component** menu) during travel **Remedy:** Check the set value for "UDC_MIN" in the **Power component** menu, Check the frequency inverter design, Check the motor data Voltage drop during the travel Check the input phases	•	•
471	DC: U > UDC_MAX	**Error:** Intermediate circuit voltage has undercut the permissible value for "UDC_MAX" (**Power component** menu) during travel **Remedy:**Check the set value for **UDC_MAX!** in the **Power component** menu, Check the connection / functioning of the brake chopper / brake resistor Check parameters in the **Encoder & BC** menu, Check the size of the Brake-Chopper / Brake-Resistor,	•	•
475	DC: U > 850 V	**Error:** During travel, the intermediate circuit voltage exceeds 850 VDC **Remedy:** Check the connection / functioning of the brake chopper / brake resistor, Check the size of the Brake-Chopper / Brake-Resistor, Check selection of brake chopper / brake resistor in chapter "Encoder & BC/BC_Type"		•
480	MP: Overcurrent!	**Error:** In one motor phase, overcurrent was measured **Remedy:** Check the motor connection (short-circuit, earth fault), Check rotary encoder connection, Check the **SPD_KP** parameter in the **Control system** menu		•
481	MP: Overcurr. CO	**Error:** in at least 1 open motor contactor monitoring-contact (contactor monitor on X-CO not triggered), overcurrent was measured in one motor phase **Remedy:** Check the contactor monitoring Check the contactor wiring		•
485	Intermediate circuit overcurrent	**Error:** Overcurrent was measured in the intermediate circuit **Remedy:** Check the motor connection (short-circuit, earth fault), Check rotary encoder connection, Check brake chopper/brake resistor connection, Check the **SPD_KP** parameter in the **Control system** menu		•
486	MP:Overcurr.ZK CO	**Error:** In at least one open motor contactor monitor contact (contactor monitor on X-CO not actuated), overcurrent was measured in the DC circuit **Remedy:** Check contactor monitoring, check contactor wiring		•

Error no.	Error text	Error cause	M	S
487	STO MOP	**Error:** STO input signals are interrupted for longer than 200 ms during travel **Remedy:** Check activation of the STO inputs, check safety circuit	•	•

5.5.8 Error 5xx

- Trip abort to protect the installation
- Speed monitoring
- STO function monitor
- Contactor monitor (optional)
- Monitoring of Brake resistor / Brake-Chopper

Error no.	Error text	Error cause	M	S
501	Travel at MB=OFF	**Error:** Machine moves with deactivated MB output occurs if the brake is opened manually occurs if the brake is opened manually, **Remedy:** Check the brake functioning	•	•
502	ENC:Sin-Enc.fail	**Error:** Rotary encoder sinus signal was detected at standstill **Additional information:** The maximum output voltage of the frequency inverter was reached at the time of the error **Remedy:** Check the brake functioning Check rotary encoder connection	•	•
503	No starting	**Error:** No rotary encoder signal was received after expiration of the time T_ENC (T_ENC is started with T_2) **Remedy:** Check rotary encoder function, Check rotary encoder connection, Check the brake lifting Check the time "T_ENC" in the **Monitoring** menu, Check the times "T_2" and "T_3" in the **Start** menu,	•	•
504	ENC: Sig.Int.	**Error:** Frequency inverter does not receive a rotary encoder signal at a target speed >10 cm/s **Remedy:** check motor connections (U ⇔ U; V ⇔ V; W ⇔ W), Brake not closed during start, Check the motor data Check rotary encoder connection, Increase the **SPD_KP** parameter in the **Control system** menu	•	•
505	MB/ENC fault	**Error:** Frequency inverter does not receive a rotary encoder signal at a target speed >10 cm/s **Additional information:** Motor current in A **Remedy:** check motor connections (U ⇔ U; V ⇔ V; W ⇔ W), Brake not closed during start, Check the motor data Check rotary encoder connection, Increase/decrease the **SPD_KP** parameter in the **Control system** menu	•	•
506	X_ENC15:Discon.	**Error:** Rotary encoder signal interruption during travel **Remedy:** Check rotary encoder connection, Switch frequency inverter off and then back on		
515	v > 110% V*	**Error:** Actual speed is ≥ 110% of the nominal speed V* **Remedy:** Check whether the car counterweight is pulling up, Check motor data in the **Motor rating plate** menu, Check the rotary encoder resolution in the **Encoder & BC** menu, Check the **SPD_KP** parameter in the **Control system** menu	•	•
516	v > 150% V*	**Error:** Actual speed is ≥ 150% of the nominal speed V* **Remedy:** Check whether the car counterweight is pulling up, Check motor data in the **Motor rating plate** menu, Check the rotary encoder resolution in the **Encoder & BC** menu, Check the **SPD_KP** parameter in the **Control system** menu,	•	•

Error no.	Error text	Error cause	M	S
520	Wrong direction	**Error:** Machine moves more than 12 cm in the wrong direction **Remedy:** Check rotary encoder connection, Check the rotary encoder configuration in the **Encoder & BC** menu, check the motor connections (U↞U; V↞V; W↞W) Frequency inverter design too small	•	•
522	ENC: Dif. pos.	**Error:** Excessive positive difference between the rotary encoder counter statuses of two sampling steps. The limit value corresponds to double the nominal system speed **Remedy:** Check whether the car counterweight is pulling up, Check motor data in the **Motor rating plate** menu, Check the rotary encoder resolution in the **Encoder & BC** menu, Check the **SPD_KP** parameter in the **Control system** menu, Check the motor connection	•	•
523	ENC: DIF. neg.	**Error:** Excessive negative difference between the rotary encoder counter statuses of two sampling steps. The limit value corresponds to double the nominal system speed **Remedy:** Check whether the car counterweight is pulling up, Check motor data in the **Motor rating plate** menu, Check the rotary encoder resolution in the **Encoder & BC** menu, Check the **SPD_KP** parameter in the **Control system** menu, Check the motor connection	•	•
525	ENC: ADC Limit	**Fault:**signal track A or B of the absolute value or sinus encoder exceeding permitted limit value during travel Fault entry not made until end of travel Travel not cancelled **Remedy:** Check sinus encoder, Check the optional board for rotary encoder connection, Check the rotary encoder type in the **Encoder & BC** menu,	•	•
529	Quickstart alarm	**Error:** During a quick start function, the machine moves more than 7 mm while input "V=0" is triggered **Remedy:** Check motor data in the **Motor rating plate** menu, Shorten time during which input "V=0" is triggered, check the motor connections (U↞U; V↞V; W↞W)	•	•
530	STO: Remains!	**Error:** At the start of travel there is no signal at the STO_A and STO_B inputs at the end of the time T_SDLY. **Remedy:** Check activation of the STO inputs	•	
531	STO: Interruption!	**Error:** STO input signals are interrupted for longer than 200 ms during travel **Remedy:** Check activation of the STO inputs, check safety circuit	•	
532	STO: Missing!	**Error:** At the end of travel there is still a signal at the STO_A and STO_B inputs at the end of the time T_SDLY. **Remedy:**check control of the STO inputs, adjust the time at the elevator control during which the STO inputs are controlled		
533	STO: Fault!	**Error:** The status of the STO_A und STO_B signals was different for longer than 120 ms. **Remedy:** Check activation of the STO inputs	•	
534	STO: No trav. sig.	**Error:** At standstill (no travel signal) the STO inputs were set and there was no valid travel signal within the time T_SDLY. **Adjustment:** Check activation of the STO inputs, check safety circuit, check activation of the travel signals		
535	ZR:RDY abort	**Error:** The signal at the digital input set to "ZR_RDY" drops out during travel **Remedy:** Use the ZArec display to check for an error at the ZArec		
536	SBC:RDY abort	**Error:** The digital input with the "SBC_RDY" function is de-energized during travel or is not set at the start of travel. **Remedy:** See "Error diagnosis" chapter in the operating instructions of the ZAsbc4C.	•	

Error no.	Error text	Error cause	M	S
540	CO: ON!?	**Fault:** No signal is available at the end of the contactor monitoring time T_CDLY **Remedy:** Check the wiring of the contactor monitoring, check wiring the contactor control check the power supply of the motor contactors , Check the power-supply of the contactor monitoring, Check contactor switch-on time "T_CDLY" in the **Monitors** menu, Check the contactor monitoring type in the **Monitoring** menu **Info:** In case of a contactor monitor break, the inputs that triggered the error are displayed in the "Additional information" field (1: CO1, 2: CO2, 3: CO1 and CO2).		•
544	CO/RF:Vx activ!	**Error:** 300 ms after switching off the digital outputs RB and MB due to a RF- or CO-interrupt, the travel comands of the elevator control are still activated **Remedy:** Use the control to check the evaluation of the frequency inverter output signal	•	
545	CO open early	**Error:** Motor contactors are open during travel **Remedy:** Check the motor contactor triggering Check the safety circuit **Info:** In case of a contactor monitor break, the inputs that triggered the error are displayed in the "Additional information" field (1: CO1, 2: CO2, 3: CO1 and CO2).	•	
546	CO: open early M	**Error:** Motor contactors are open during travel **Remedy:** Check the motor contactor triggering Check the safety circuit	•	
548	CO1: still on	**Error:** 5s after expiration of T_CDLY, a signal is still present on the contactor monitor input CO1 **Remedy:** Check the wiring of the contactor monitoring, check wiring the contactor control		•
549	CO12: still on	**Error:** 5s after expiration of T_CDLY, a signal is still present on the contactor monitor input CO1 or CO2 **Remedy:** Check the wiring of the contactor monitoring, check wiring the contactor control **Info:** In case of a contactor monitor break, the inputs that triggered the error are displayed in the "Additional information" field (1: CO1, 2: CO2, 3: CO1 and CO2).		•
550	MOT: Overload !	**Error:** Motor current exceeds the value max for time Tmax **Remedy:** Check motor data in the **Motor rating plate** menu, Check the weight compensation Check the brake switching function		•
560	V > VZ	**Error:** Actual speed exceeds the specified nominal speed for readjustment when readjusting. **Info:** • Inverted function: Error is displayed if entered in interface. With **CONFIG: 31:KL_IO**, the function is entered in the interface automatically. • Error leads to locking of the ZAdynpro with parameter **LOCKBR="ON"**	•	•
570	PFU: Fault	**Error:** Monitor contact of the power feedback unit opens during operation of the ZAdynpro **Remedy:** Check connection of the feedback unit function monitor, Check function monitor of power feedback unit, Check the function of the power feedback unit The error is automatically acknowledged when the monitor contact of the power feedback unit reconnects.		•
571	PFU:Stdby remains in place	**Error:** PFU is not yet active 1 s after start of travel	•	

Error no.	Error text	Error cause	M	S
575	MOT: Temp. -Alarm	**Error:** Motor temperature monitor triggered during the trip (error evaluation only if error no. 575 is entered in the mask function) **Remedy:** Check motor data in the **Motor rating plate** menu, check the motor's duty cycle, check the motor for winding short, Check rotary encoder, Check the brake function	•	•
582	BR:T2 too small	**Error:** Brake does not open within time T2 (only active if brake monitor is switched on) **Remedy:** Check the brake triggering, check the brake opening time, Check the configured brake opening time "T_2" in the **Start** menu and increase if necessary **Info:** • Error leads to locking of the ZAdynpro with parameter **LOCKBR="ON"**		•
583	BR: Fault Travel	**Error:** Brake monitoring contacts triggered during travel **Remedy:** Check the brake triggering, check the monitoring contacts, check the power supply of the brakes **Info:** • Negated function: If entered in the mask, the error leads to immediate stop of travel • Error does not lead to locking of ZAdyn with parameter **LOCKBR="ON"**	•	•
584	BR: Fault Travel	**Error:** Brake monitoring contacts triggered during travel Fault message at end of travel with additional information = 0: Brake monitor contacts have switched during travel but the brake was not closed Fault message without immediate interruption of travel and additional information ≠ 0: Brake was closed during travel **Additional information:** Indicates consequential fault **Remedy:** Check the brake triggering, check the monitoring contacts, check the power supply of the brakes **Info:** If it persists until the end of travel, error leads to locking of the ZAdynpro with parameter **LOCKBR="ON"**.	•	•
585	BR: T5 too small	**Error:** Brake does not close within time T5 (only active if brake monitor is switched on) **Remedy:** Check the brake triggering, check the brake closing time, Check the configured brake closing time "T_5" in the **Stop** menu and increase if necessary **Info:** • Error leads to locking of the ZAdynpro with parameter LOCKBR="ON"		•
586	BR: Stop-Error	**Fault:** Monitoring contact of the brake briefly signals "Brake closed and then "Brake open" again longer as the time T5 (only active with the brake monitor switched on) **Remedy:** Check the brake triggering, check the brake closing time, Check the configured brake closing time "T_5" in the **Stop** menu and increase if necessary **Info:** • Error leads to locking of the ZAdynpro with parameter LOCKBR="ON"		•
590	RV1/RV2:Change	**Fault:** Change the direction specification during active travel **Additional information:** Display of the set direction 1 = RV1 3 = RV2 **Remedy:** Check control of travel directions	•	•

5.5.9 Error 7xx

- Trip abort due to errors between ZAdynpro and control system

Error no.	Error text	Error cause	M	S
780	DCP: Quick Start >20s	**Error:** In the quick start function, input "V=0" is triggered for over 20s **Remedy:** Shorten the time in which "V=0" is triggered	•	•
781	DCP: Quick. during travel!	**Error:** Input "V=0" is triggered during travel **Remedy:** Check the triggering of "V=0"	•	•
799	RF:Failure	**Error:** Control enable RF was switched off during travel (error evaluation only if error no. 799 is entered in the error mask) **Remedy:** Check the triggering of "RF"	•	•

5.5.10 Error 8xx

- Errors which can occur in operation with CANopen Lift

If an error occurs during operation with CANopen, the frequency inverter runs through status "ST_Delay" and finally goes to status "Check ST release". The frequency inverter remains in this status until the control sends the command "Fault Reset".

Error no.	Error text	Error cause	M	S
800	CAN: Timeout	**Errors in Velocity Mode:** Heartbeat from control system is missing or at wrong time. **Errors in Position Mode:** Heartbeat from control and/or rotary encoder missing or does not occur at the set times. **Adjustment:** Check CAN-connection Check if devices have the right heartbeat.	•	
820	CAN: Illegal Status	**Error:** Control sends commands to the frequency inverter in the wrong order. **Adjustment:** Take care to the right order in CAN drive cycle	•	
831	CAN: Timeout Dis. Op.	**Error:** Control system gives command "Disable Operation" not within T_CMD **Adjustment:** Increase time for T_CMD		
832	CAN: Timeout Shutdown	**Error:** Control system gives command "Shutdown" not within T_CMD. Occurs by closing the brakes. **Adjustment:** Increase time for T_CMD		
833	CAN: Timeout Dis. Vol.	**Error:** Control system gives command "Disable Voltage" not within T_CMD. Occurs at end of travel. **Adjustment:** Increase time for T_CMD		
840	CAN: ENC. Info missing	**Error:** The object "Encoder Info" was not written to the frequency inverter by the control		

5.5.11 Error 9xx

- Fatal error, which can only be acknowledged by switching off the ZAdynpro

Error no.	Error text	Error cause	M	S
905	MOP:HW-SW Error	**Error:** Hardware or software error occurred after switch-on. After 60 s, the frequency inverter switches to "Wait-Switch off" **Remedy:**Check the connectors between the Control Unit and Modul Print check the fuse on the Switching Power Print no Modul Print existing check EEprom on the Modul Print	•	
906	ZR:ERR by start	**Error:** No signal at BC input during ZAdynpro startup **Remedy:** Check wiring Use the ZArec display to check for an error at the ZArec		•
908	PFU: No function	**Error:** When switching on the frequency inverter, the monitor contact of the power feedback unit is not closed **Remedy:** Check connection of the feedback unit function monitor, Check function monitor of power feedback unit, Check field of rotation of the mains connection for the power feedback unit		•
910	BC: No function	**Error:** When switching on the frequency inverter, the monitor contact for the brake chopper or brake resistor is not closed **Remedy:** Check the temperature monitor for the Brake-Chopper or Brake resistor, check the temperature monitoring for the Brake-Chopper or Brake-Resistor, Check whether there is a voltage of 24VDC at the connection terminal X-IN between +24V_IN and GND_IN.		
911	BRxx: Overload!	**Error:** The continious braking power of the Brake resistor is exceeded by 150 % within 120 s The frequency inverter switches off during travel **Remedy:** Check the configuration of the BR-type Check the connected BR	•	
912	BC:Alarm/fault	**Error:** Monitor contact for brake chopper or brake resistor opens during frequency inverter operation **Remedy:** Check the temperature monitor for the Brake-Chopper or Brake resistor, check the temperature monitoring for the Brake-Chopper or Brake-Resistor,	•	
913	DC: U_DC>U_BC	**Fault:** at a standstill, the voltage measured at the intermediate circuit (+DC/-DC) after 5 s is higher than trigger voltage U_BC **Remedy:** Defective analysis of the DC-link voltage U_DC The synchronous motor is operated without motor contactors and driven by an external load	•	
914	X-ENC15:Miss.	**Error:**No rotary encoder detected at X-ENC15 when switching on the frequency inverter **Remedy:** Check rotary encoder connection, Reset frequency inverter		
916	X_ENC15:Discon.	**Error:** Rotary encoder signal interruption during travel **Remedy:**Check rotary encoder connection, Switch frequency inverter off and then back on		
917	BRxx activ	**Error:The internal transistor for the brake resistor is still activated** 5.5 s after end of travel	•	
919	ZR:ERR by opera.	**Error:** Signal at BC input drops out during travel **Remedy:** Use the ZArec display to check for an error at the ZArec		
920	MOP:ERRNMI active	**Error:** Overcurrent during standstill **Remedy:** Check the brake chopper / brake resistor wiring	•	
931	MP: ERR_EXT_ active	**Error:** internal error message of the output stage **Remedy:** Switch frequency inverter off and then back on Replace the device (only after consulting the Ziehl-Abegg hotline)		•
950	TD_CNT: Drive Limit	**Error:** Number of maximum drives reached! Only one travel with the actual rope remains. **Remedy:** Change ropes and reset the down counter. One journey is possible after resetting the ZAdynpro.		•

Error no.	Error text	Error cause	M	S
960	STO: Diagnostics!	**Error:** The status of the STO_A und STO_B signals was different for at least 310 ms so that the internal diagnostic unit performed a switch-off. **Remedy:** Check activation of the STO inputs. Error can only be reset once the ZAdynpro is switched off.		●
961	STO: Hardware!	**Error:** Internal hardware error **Remedy:** Error can only be reset once the ZAdynpro is switched off.	●	●
991	MOP: Timeout	**Error:** The communication between the processors was interrupted or the communication between the processors is faulty during travel. **Remedy:** Make sure that the EMC regulations are observed (see chapter "Electrical Installation / EMC-conform Installation")	●	●
993	ENC: Error diff.	**Error:** Occurs during startup if the difference between the last measured value of the absolute value encoder and the newly read value is too great. **Remedy:** Check absolute value encoder Check rotary encoder line Check rotary encoder connection (e.g. shielding) **Info:** The difference between the last measured value of the absolute value encoder and the newly read value is saved.		
994	MOP: Timeout 2	**Error:** I standstill the communication between the Motor-Management-Processor (MOP) and the Application-Processor (APP) is interupped for more than 7.5 s Increased BR-protection	●	
995	ENC:1387 CD-Lim	**Fault:** signal track C and/or D of absolute value encoder type ERN1387 exceeds permitted limit value before travel starts **Remedy:** Check absolute value encoder Check the optional board for rotary encoder connection Error can only be reset once the ZAdynpro is switched off	●	●

5.5.12 Information texts

An information text appears in the display for approx. 2 s for faults which are not saved in the fault list.

Information text	Cause
CO-Interrupt	During a non distance-dependent travel (speeds V4 ... V7) the travel contactors are opened. During the halt process the motor contactors open before the timer T5b has expired. The number of CO interruptions is counted in the **Statistics/SCO** menu.
RF-Interrupt	The controller enable (signal CE) is deactivated during travel. During the halt process the controller enable (signal CE) is deactivated before the timer T5b has expired. The number of CE interruptions is counted in the **Statistics/SCE** menu.
s1 = 0 cm	During the distance-dependent delay phase from travelling speed V2 or V3 to positioning speed V1 the signal is already deactivated for the positioning speed V1.
Attention! n*>n	Calculated speed n* is greater than the speed n specified on the rating plate.
automatic pre-signment?	Immediately after changing the parameter **V***, you can confirm or reject the request "Automatic pre-assignment?".
Until rope change xxx travels possible	Shows the remaining travels with the actual rope. Information will be shown in the display until pressing the [ESC] button.

5.6 Operating states of the ZAdynpro

The software of the ZAdynpro divides the travel curve into multiple ranges. Each of these ranges is allocated a status number, which relates to a certain operating state.
If an error occurs, the status number is stored with the error number in ther error list.
Furthermore, the operating conditions are displayed with the status number and in plain test in the **Info/Page02** menu.

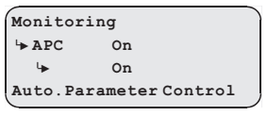
status	Condition of the frequency inverter	status	Condition of the frequency inverter
10	Checking of voltage supply	430	Constant running at speed V3(time-dependent, V1 is not activated)
21	Check software version	431	Round down the acceleration to V3 (distance-dependent)
22	Parameter transmission	432	Linear acceleration to V3 (distance-dependent)
30	Check absolute value encoder	433	Constant travel with V3 (distance-dependent)
41 42	Check input BC 41: Power feedback unit 42: Brake chopper or brake resistor	435	Deceleration with safety ramp
50	Adjust current transformer	440	distance dependent travel with DCP4
70	Check temperature power unit	480	Retract to standstill
100	Device off	490	fast stop
105	Power feedback unit on standby	500	Keep motor at speed 0 (T4)
110	Machine ready	510	Wait until motor brakes are closed (T5)
200	Start-up check	515	Brake is energised for 1 s longer
210 ... 223	Check absolute value encoder	520	S Switch off current to motor (T5b)
280	Wait until STO deactivates	530	Wait until motor contactors switched off
300	Wait until motor contactors switched on	535	Travel interrupted due to interruption of the controller enable RF
305	Checking the motor phases	536	Travel interrupted due to interruption of the contactor monitor COx
310 311	A Build-up of magnetic field in the motor (T1)	538	Wait until STO activates
320	Wait until motor brakes have opened (T2)	540	Wait for standstill
330	Accelerate motor to speed V_T3 (T3)	550	Checking the input BR after travel finished
340	Start up	560	End of travel
400	Accelerate to speed Vx	900	Delay of automatic acknowledgement after remedying the cause of the fault (2 s)
402	Constant running at speed Vx	950	Parameter change
404	Delay from speed Vx	982	Motor type changed
410	Constant running at speed V1	988	Wait for reset
420	Constant running at speed V2	990	Fault input BC
421	Round down the acceleration to V2 (distance-dependent)	991	No absolute value encoder detected
422	Linear acceleration to V2 (distance-dependent)	992	Temperature of the power section missing
423	Constant travel with V2 (distance-dependent)	996	Wait until ZAdynpro is switched off for error acknowledgement
424	Rounding up and linear delay from V2 (distance-dependent)	997	Frequency converter is in stand-by mode
425	Rounding down of the delay from V2 (distance-dependent)	998	Wait until ZAdynpro is switched off

5.7 Frequent startup problems

Problem	Cause	Adjustment
ZAdynpro does not start after switching on	Brake resistance is connected to the +DC and -DC terminals on terminal X1/X3	Brake resistance is connected to the +DC and R terminals on terminal X1/X3
ZAdynpro stops in status 40 during the start procedure, the error message relay of output O11-O14 does not pick up, the menu can be operated	Input voltage is too low	Check the frequency inverter input voltage
	One phase on the line connection is missing	Check wiring of the line connection
Motor does not reach nominal speed (comparison of actual and nominal speed visible in the Info menu on page 04)	Half load adjustment is not correct	Check half load adjustment and correct if necessary
	Settings in the **Motor rating plate** and **System data** menus are incorrect	Check settings in the **Motor rating plate** and **System data** menus (the value of the parameter **n*** in the **System data** menu may not be considerably larger than the value of the parameter **n** in the **Motor rating plate** menu)
	Motor data are not correct	

5.8 Automatic parameter check (APC)

The Automatic parameter check checks the input values for plausibility and tolerances while the parameters are being entered.
The APC function aims to prevent erroneous parameter inputs. Every message must be acknowledged by the user with the ↵ key
You can activate or deactivate the APC function in the **Monitoring/APC** menu. The factory setting is ON.

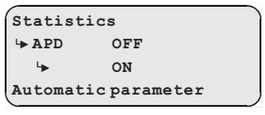


Through the APC function:
- Values are restricted (Limit)
- Parameters are set (Set)
- Parameters are updated (Update). Parameters that are not preset are updated during a software update.

5.9 Automatic parameter diagnostics (APD)

During Automatic parameter diagnostics, the following are checked:
- The parameters for plausibility and tolerances
- Device functions for functional errors

Erroneous parameters or functions are shown in the display.
Every message must be acknowledged by the user with the ↵ key. The APD function can be activated in the **"Statistic/APD"** menu. After checking, the function is reset to "OFF".



6 Travel direction counter

The travel direction counter is a down counter which is counting the allowed travel direction changes with coated ropes. With the travel direction counter the frequency inverter shows an accurately timed info text when a rope change is necessary.

6.1 Parameters for the travel direction counter

For the travel direction counter there are the following parameters, available in the menu **Statistic**. In order to be able to use all parameters, the password **TD_PWN** must be assigned first.

Parameter	Designation	Value range	Factory setting
TD_PWN	New password A number between 0 and 9999 can be used as a password	0 ... 9999	0
TD_PWC	Displays the password in coded form. If you lose the password, please contact the manufacturer.	nicht einstellbar	21689
TD_PW	Enter password.	0 ... 9999 0 = no password	0
TD_CNT	Initial value of the down counter If the start value of the down counter is set to 0.00, the down counter is deactivated.	0.00 ... 10.00 M	0.00
TD_RST	Restore the counter reading from the absolute value encoder	On Off	Off

The current counter readings and the start value of the direction change counter are also available in the **INFO menu** on **page 20**.

6.2 Configuring the travel direction change counter

For using the travel direction counter, the following parameters have to be adjusted.

1.	Assign new password with the parameter **TD_PWN** in the menu **Statistic**. If there is already a password existing, you have to enter it to "TD_PW" before it can be replaced by a new password.	Statistics ↳ TD_PWN 0 ↳ 0 *New password
2.	The coded password is shown with the parameter **TD_PWC** in the menu **Statistic**. With the coded password the ZIEHL-ABEGG SE can decode the original password. For example if the owner has forgotten it.	Statistics TD_PWN 0 ->TD_PWC 21689 *Encrypted password
3.	Before you can change TD_CNT you have to enter the password to the parameter **TD_PW** in the menu **Statistic**.	Statistics ↳ TD_PW 0 ↳ 0 *Password entry
4.	Enter the maximum allowed travel directions with the parameter **TD_CNT** in the menu **Statistic**.	Statistics ↳ TD_CNT 0 M ↳ 0 *Down counter start value

CAUTION!

Caution!
When the ZAdynpro is replaced, the current counting value of the down counter "TD_CNT" must be transferred to the new ZAdynpro!

6.3 Configuring a preallocated travel direction change counter

The functions of a pre-assigned travel direction change counter are password-protected. You can detect this in the parameter **TD_PWC**, where "16481" is displayed as an encrypted password.

```
Statistics
 TD_PWN 0
->TD_PWC 16481
```

In order to access the travel direction change counter's functions, you must access the **Statistics** menu and enter the password "1234" for the parameter **TD_PW**.

```
Statistics
↳TD_PW   0
  ↳      1234
```

Enter password.

6.4 Output functions

Two special counter functions can be assigned to the digital outputs of the ZAdynpro when using the travel direction change counter:

Parameter	Function	Explanation
Info rope	Rope-change necessary	Contact closes when the actual rope still can be used, for approx 1 year. Contact stays close until the down-counter will be reset.
TD_CNT ext.	Monostable trigger circuit	The output relay gives an impulse to the output at every travel direction change. For connecting an external counter, e.g. in the control system

6.5 Resetting the travel direction counter

Information
At the end of the maximum change of direction, the ZAdynpro is locked and the error **"E950 TD_CNT: Drive limit"** appears on the display.
To move the cabin into the position for a cable change after locking the frequency inverter, the ZAdynpro must be switched off and back on. Then a further run is possible.

After a successful cable change, the password must be entered in the **Statistics** menu and the down counter set to its new start value:

1.	Entert he current password in the menu **Statistics**, Parameter **TD_PW** to be able reset the value of the down counter.	`Statistics`
		`↳TD_PW 0`
		`↳ 0`
		`*Password entry`

2.	Enter the maximum allowed travel directions with the parameter **TD_CNT** in the menu **Statistic**.	`Statistics`
		`↳TD_CNT 0 M`
		`↳ 0`
		`*Down counter start val-ue`

After successfully setting the down counter the number of counter resets **"TD_RES"** is increased by one.
To display the current value of TD_RES the ↵ key must be pressed in the **INFO menu** on **page 20**.

6.6 Restore the counter reading from the absolute value encoder

The counting value of the travel direction change counter is automatically saved in the absolute value encoder. This is performed at the following intervals:

- every 100 changes in direction up to 1,000 changes in direction
- every 1,000 changes in direction up to 10,000 changes in direction
- every 3,000 changes in direction from 10,000 changes in direction

The function is possible in absolute value encoders with EnDat and Codeface interface.

The current counter reading can be loaded into the ZAdyn from the absolute value encoder:

1.	In the **Statistics** menu, enter the current password for the parameter **TD_PW**.	Statistics ↳ TD_PW 0 ↳ 0 *Password entry
2.	In the **Statistics** menu, set the parameter **TD_RST** to "ON". The counter reading is restored and can be viewed in the parameter TD_CNT in the **Info menu on page 20**.	Statistics ↳ TD_RST OFF ↳ ON *Restore counter reading

7 Autotune function for asynchronous motors

With asynchronous motors the motor data are often unavailable or the data specified on the name plate are not correct. The optimum operating data for the motor can be automatically determined with the Autotune function.

Information
Make sure that the cabin is empty whilst performing a measurement with the Autotune function, otherwise the measuring result will be incorrect.

7.1 Determining the operating data with the Autotune function

1.	**Standard actuation:** When you use the standard actuation, reduce V_3 to 75% of V* in the **Travel** menu. **CAN actuation:** If you use CAN activation, reduce the travel speed manually to 75% with the control.	Travel ↳ V_3 0.95m/s ↳ 0.95m/s High travel speed
2.	Move down with empty cabin. Check in the **INFO menu/page 04** whether motor voltage is < 320 V. If the motor voltage is > 320 V, reduce V_3 further in the **Travel** menu. Repeat the steps until the motor voltage is < 320 V.	Mot - - - - - - - - - - - - 04 ▮▮▮ _ _ _ _ _ _ _+0% real: 0rpm 0V prog: 0rpm +0.0A
3.	Select **Motor rating plate** menu	LCD & password ->Motor name plate Encoder & BC System data
4.	Select parameter **ASM_ID** Enter "ASM_ID=On"	Motor name plate ↳ ASM_ID OFF ↳
5.	Confirm with the ↵ key.	ASM identification? [NO] [YES]

6.	Confirm that you have reduced the travel speed to 75% with the ↵ key. If you have not yet reduced the travel speed to 75%, press the esc key and start determining the operating data from the beginning with the Autotune function.	`Set speed at the controller to 75% [ESC] [DONE]`
7.	Go to the top floor with the control travel command. Confirm that the cabin has reached the top floor with the ↵ key.	`Drive to top floor [ESC] [DONE]`
8.	Go to the bottom floor with the control travel command.	`Start travelling to bottom floor [ESC]`
9.	Determines the motor data. During this, the ZAdynpro counts up from 0 to 10. This and the two previous steps are repeated until the measuring process is completed.	`Measuring... 3 0`
10.	Motor data is saved in the parameter memory of the ZAdynpro. Confirm with the ↵ key.	`All data stored in inverter [OK]`

8 Memory card

8.1 General

The following functions are feasible when using a memory card (MMC card or SD card) in the X-MMC card slot:

- Software update (see chapter "Memory card/Software update")
- Saving a third operating language (refer to the chapter "Memory card/Saving a third operating language")
- Storing parameters (see "Parameter list / Menu Memory Card / Function SAV_PAR" chapters)
- Loading parameters (see "Parameter list / Menu Memory Card / Function LOD_PAR" chapters)
- Saving parameter lists, error lists and parameters with assignment of the ZAdynpro serial number (refer to chapter "Parameter list/Memory card menu/Function SAV_ALL")
- Continuous recording of operating curves with an MMC recorder and saving the measurements in standstill (see "Parameter list / Menu MMC recorder" chapter)

Information
The LED of the ZAdynpro lights up in blue when the ZAdynpro is accessing the memory card.

8.2 Software update

Caution!
Carry out a supervised inspection trip after completing the update!

8.2.1 Software update with the ZApadpro control terminal

Information
A software update **cannot** be performed using the card slot on the ZApadpro! Do **not** insert the memory card into the card slot of the ZApadpro!

▷ Save the software on a memory card.
▷ Insert the memory card into card slot X-MMC.

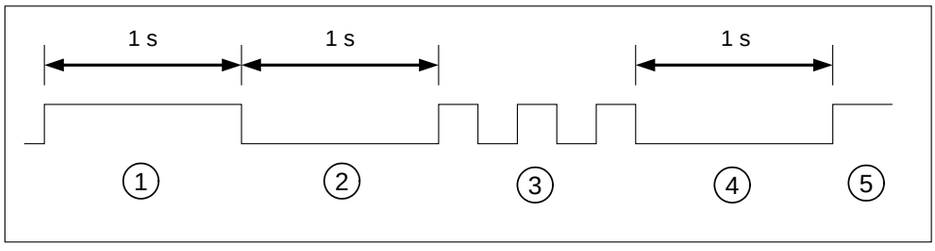
1.	Select **Memory card** menu ↵ Confirming menu selection	Statistics ->Memory Card MMC Recorder Encoder-adjust.
2.	Select parameter **UPDATE** ↵ Confirming menu selection Enter "UPDATE=27"	Memory Card ↳UPDATE 0 ↳ 27
3.	The update is performed and last a maximum 5 minutes.	Please wait ... max 300s
4.	A restart is performed after the update. The frequency inverter is ready for operation again. The display shown on the left appears.	ZIEHL-ABEGG AG ZAdynpro SN: 12345678 4.42 - 506

8.2.2 Software update without ZApadpro control terminal

▷ Switch off the master switch and wait until the controller unit is voltage free.
▷ Insert the memory card with the software update into the "X-MMC" card slot.
▷ Switch on the master switch. The inverter starts again.
▷ After the LED illuminates yellow for the first time, remove the memory card and then reinsert it. You must complete this procedure within 5s (watch for fast flash code of the LED).
✓ The Update starts (duration max. 300s).
Following another automatic reset, the ZAdynpro is once more ready for operation.

8.2.3 Error flash code during a software update

If an error occurs during the software update, a flash code is issued by LED for the corresponding error message.
☞ See the "Error Diagnostics / Light Emitting Diodes" chapter for the position of the LED.



1 white glow (1 s)
2 Break (1 s)
3 Slowly flashing (Number of pulses corresponds to the error message in the table below)
4 Break (1 s)
5 Cycle is repeated

Number of pulses	Error description
1	EEPROM is missing
2	The memory card does not contain a software update
3	The update software on the memory card is identical to the software in the frequency inverter
4	The memory card does not contain a valid software update
5	The files in the update software are identical
6	External application-processor RAM is defective
7	**Error:** Occurs if the ZAdynpro is restarted after error 25 has occurred. **Remedy:** Repeat the software update without the ZApadpro control terminal
8,14	Internal programing voltage does not switch on
8,19	Internal programing voltage does not switch off (it is possible that the prog. key is blocked)
16	Error while deleting the program memory (flash delete error)
17	Error while writing the program memory (Flash write error) (Flash write error)
18	Error while checking the written files in the program memory (flash data error)
23	Memory card was removed too early
25	Check sum of the update code incorrectly detected

8.3 Saving a third operating language

On the ZAdynpro, a memory card can be used to save a third operating language. If a new third operating language is saved, the existing third operating language is overwritten.

▷ Save the software of the ZAdynpro on a memory card.
▷ Insert the memory card into card slot X-MMC.

1.	Select **LCD & password** menu ↵ Confirming menu selection	ZAdynpro ->LCD & password Motor rating plate Encoder & BC
2.	Select parameter **LCD** ↵ Confirming menu selection Select operating language ↵ Confirm selection	LCD & password ↳LCD Deutsch ↳ Nederlands Sprache - Language
3.		Load language.....

8.4 Saving parameters

The parameters of a frequency inverter can be saved to the memory card.

Information
You can only save the parameters of **one** frequency inverter to the memory card. It is not possible to save the parameters of multiple frequency inverters.

Saving parameters

1.	Select **Memory card** menu ↵ Confirming menu selection	Statistics ->Memory Card MMC Recorder Encoder-adjust.
2.	Select parameter **SAV_PAR** ↵ Confirming menu selection Select "SAV_PAR=EIN"	Memory Card ↳ SAV_PAR OFF ↳ ON
3.	Confirm with the ↵ key.	
4.	The parameters are saved.	Please wait ... Copy1:_ _ _ _ _ _ _

8.5 Loading parameters

Loading parameters which have been saved using the SAV_PAR function.

Loading parameters

1.	Select **Memory card** menu ↵ Confirming menu selection	Statistics ->Memory Card MMC Recorder Encoder-adjust.
2.	Select parameter **LOD_PAR** ↵ Confirming menu selection Enter "LOD_PAR=27"	Memory Card ↳ LOD_PAR 0 ↳ 27
3.	Confirm with the ↵ key.	
4.	The parameters are saved.	Please wait ... Copy1:_ _ _ _ _ _ _

8.6 Saving parameters lists, printer lists and error lists

Parameter lists, printer lists and error lists can be saved on the memory card with assignment of the ZAdynpro serial number. The following folder structure is created on the memory card: **"4CX\DEVICE\serial number"**.

Folder	Contents
"Serial number"	Folder "LST", folder "PAR"
"LST"	Error lists, printer lists
"PAR"	Parameter lists

The lists are named according to the actual number of runs at the time of the data backup (e.g. "00000109.FLT" with 109 runs).

Saving parameters lists, printer lists and error lists

1.	Select **Memory card** menu ↵ Confirming menu selection	Statistics ->Memory Card MMC Recorder Encoder-adjust.
2.	Select parameter **SAV_ALL** ↵ Confirming menu selection Select "SAV_ALL=EIN"	Memory Card ↳ SAV_ALL OFF ↳ ON
3.	Confirm with the ↵ key.	
4.	The parameter list, the printer list and the error list are saved.	Copy1: _ _ _ _ _ _ _ _ _
5.	After the data backup the "SAV_ALL" parameter reassumes the value "OFF".	Memory Card -> SAV_ALL Off SAV_PAR Off

8.7 Performing measurements

It is possible to perform measurements on the ZAdynpro. These measurements are configured in the **MMC recorder** menu and can be saved on the memory card. A description of the individual parameters of the **MMC recorder** menu can be found in the chapter "Parameter list/MMC recorder menu". The following folder structure is created on the memory card: **"4CX\DEVICE\serial number\Rec"**. A sub-folder is created in the "Rec" folder for every measuring variant. The measurements are saved in these sub-folders. The following sub-folders can be created:

- **"ERR"**folder: Save measurements which were interrupted by occurrence of an error.
- **"NORM"**folder: Save measurements for runs without errors.
- **"SHOT"**folder: Save measurements which were made with the "Stop&Shot" function.

The actual number of runs is used as a file name (e.g. "00000109.ZR3" for 109 runs).

8.8 Saving configurations

The configurations of parameters can be saved on the memory card by allocating configuration numbers. The parameter list and the printer list are saved. The following folder structure is created on the memory card: **"4CX\CONFIG\configuration number"**. Parameter lists are saved with the file extension ".PA4" and printer lists with the file extension ".PRT".

Information
If two configurations are saved under the same configuration number, the existing configuration is overwritten.

Saving configurations

1.	Select **Memory card** menu ↵ Confirming menu selection	Statistics ->Memory Card MMC Recorder Encoder-adjust.
2.	Select parameter **SAV_CFG** ↵ Confirming menu selection **Line 3:** Enter configuration number ("1" in this example)	Memory Card ↳ SAV_CFG 0 ↳ 1
3.	Confirm with the ↵ key.	
4.	The parameter list and the printer list are saved.	Copy1: _ _ _ _ _ _ _ _ _
5.	After the data backup the **"Memory Card"** menu is displayed again.	Memory Card UPDATE 0 -> SAV_CFG 0 LOD_CFG 0

8.9 Loading configurations

Saved configurations of parameters can be loaded from the memory card into the ZAdynpro by entering the respective configuration number.

Saving configurations

1.	Select **Memory card** menu ↵ Confirming menu selection	Statistics ->Memory Card MMC Recorder Encoder-adjust.
2.	Select parameter **SAV_CFG** ↵ Confirming menu selection **Line 3:** Enter configuration number ("1" in this example)	Memory Card ↳ LOD_CFG 0 ↳ 1
3.	Confirm with the ↵ key.	
4.	The parameter list and the printer list are loaded. The frequency inverter performs a reset after loading.	Please wait ... _ _ _ _ _ _ _ _ _

9 Open loop operation (operation without encoder)

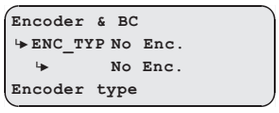
Information

Restrictions during open loop operation:

- no distance dependent deceleration
- no arch-travel
- possibly higher heating of the motor
- worse positioning accuracy than with Closed-Loop-operation
- worse travel confort than with Closed-Loop-operation
- maximum travel speed: 1,0 m/s

9.1 Activate operating mode for open loop operation

To be able to commission a motor without an encoder, the operating mode has to be activated before.



Adjust the parameter **ENC_TYP=No Enc.** in the menu **Encoder & BC**

Further procedure is identical to commissioning for operation with an encoder. This is described in the section entitled "Commissioning".

9.2 Parameters for open loop operation

For open loop operation, additional parameters for optimising travel performance are available in the **Control** menu.
The parameters are visible only when open loop operation is active.
If it is necessary to change parameters, the parameter **Controller/UF_ED=manually** must be entered.

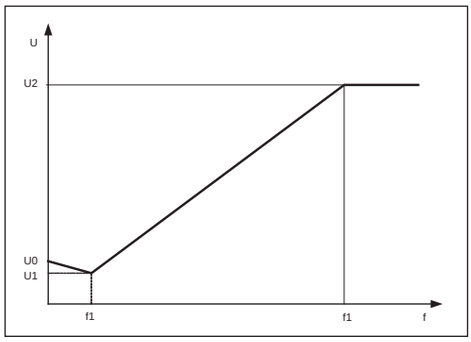
Parameter	Designation	Value range	Factory setting
C_MOD	Controller Mode Selecting the operating mode of the ZAdynpro **FOC:** Operation with encoder (Closed-Loop) **U/f:** Operation without encoder (Open Loop)	FOC U/f	FOC
UF_ED	U/f-Edit-mode Enabling the additional parameters with Open-Loop-operation (U/f)	On Off	Off
V_0	Minimum travel speed at start The setpoint for V_0 will be activated before the brake opens	0 ... 0.2 m/s	autom. preconfiguration
V_STOP	Minimum travel speed at stop The brake will be closed when the V_STOP is reached	0 ... 0.2 m/s	autom. preconfiguration
I_Kipp	Tilting protection: If the entered limit value is exceeded, the set value for the speed will be reduced.	0 ... 90 A	autom. preconfiguration
U0	Voltage at speed 0 of the frequence dependent voltage characteristic	0 ... 460 V	autom. preconfiguration
U1	Start voltage of the frequency dependent voltage characteristic	0 ... 460 V	autom. preconfiguration
U2	Corner voltage of the frequency dependent voltage characteristic	0 ... 460 V	autom. preconfiguration
f1	Start frequency of the frequency dependent voltage characteristic	0 ... 125 Hz	autom. preconfiguration
f2	Corner frequency of the frequency dependent voltage characteristic	0 ... 125 Hz	autom. preconfiguration
s_FIL	Filter for measuring motor current for the slip compensation	0 ... 400 ms	autom. preconfiguration
s_COMP	Operation with slip-compensation **On:**Slip-compensation is activated **Off:**Slip-compensation is deactivated	On Off	Off

Parameter	Designation	Value range	Factory setting
s_LIM	Maximum slip frequency compensation		autom. preconfiguration
U_S_MX	Maximum output voltage for the slip compensation	0 ... 300 V	80
I_IxR	Current controller, sets the minumm current with wihich the motor is energised	0 ... 90 A	Nominal current (I) of the motor
I_FIL	Filter of the motor current for the slip-compensation	0 ... 125 Hz	autom. preconfiguration
IxR_KP	P-contribution of the controller for the current	0 ... 10 V/A	autom. preconfiguration
IxR_TI	I-contribution of the controller for the current	5 ... 1000 ms	20 ms
IxR_KC	Correction factor of the controller for the current	0 ... 127	0.2
IxR_KD	D-contribution of the controller for the current	0 ... 3.0	0.0
IxR_MX	Maximum limitation of the controller	0 ... 100%	20
IxR_MN	Minimum limitation of the controller	0 ... 100%	0
FADE1	Fading-in and fading-out the current-control and the slip-compensation depending on the frequency of the rotating field in the stator	0 ... 125 Hz	autom. preconfiguration
FADE2	Fading-in and fading-out the current-control and the slip-compensation depending on the frequency of the rotating field in the stator	0 ... 125 Hz	autom. preconfiguration

9.3 Functions with Open-Loop-operation

9.3.1 U/f-characteristic curve

By entering the motor data in the **Motor rating plate** menu, the parameters **"U0", "U1", "U2", "f1"** and **"f2"** are pre-assigned. With these parameters, the U/f characteristic curve is defined that specifies the motor voltage dependent on the frequency of the rotary field in the stator.



U/f-characteristic curve

9.3.2 Current-control

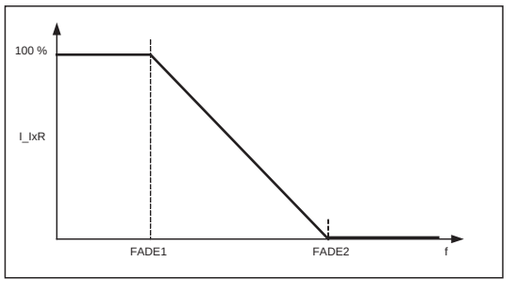
To optimise starting, stopping and travelling at a low speed, the motor is energised with a minimum current (parameter **Control/I_IxR**). With the parameters **FADE1** and **FADE2**, the current supply is specified depending on the frequency (f) of the rotary field in the stator.

f < FADE1:
If the frequency of the rotating field in the stator is less than FADE1 the motor will be energised with 100% of I_IxR.

f > FADE2:
If the frequency of the rotating field in the stator is greater than FADE2 the current I_IxR is 0

FADE1 < f < FADE2:
If the frequency of the rotating field is between FADE1 and FADE2 the current-control depends on the characteristic curve: the higher the frequency the lower is the current impression.

The characteristic curve is defined by the values for FADE1 and FADE2.



Fader-function for the current-control

9.3.3 Slip-compensation

With asynchronous motors the slip (difference between synchronous speed and asynchronous speed) is proportional to the load of the motor and therefore porportional to the motor current. This leads to different travel speeds in upwards and downwards direction with the same load.
Example:
The nominal speed of a motor is 1430 rpm. With empty car in downwards direction the speed is 1430 rpm. In upwards direction the speed is 1570 rpm.
The difference of 140 rpm will be settled by the slip-compensation.

The slip-compensation will be activated with the parameter **Controller/s_COMP=On**.

```
Control
↳ s_COMP  On
  ↳       On
U/F: Slip compensation
```

Functionality:
The motor current is recorded by a filter (parameter **s_FIL**). In proportion to the level of the measured current, the following occur:

- the slip-frequency will be added or subtracted to the output frequency of the U/f-characteristic curve
- voltage will be added dto the output voltage of the U/f-characteristic curve

The additional values of the slip-compensation will be limited by following parameters:

```
Control
↳ s_LIM   5          Hz
  ↳       5
U/f:Slip limitation
```

Frequency: Parameter **s_LIM**

```
Control
↳ U_S_MX  80          V
  ↳       80
U/f:Maximum output volt.
```

Voltage: Parameter **U_S_MX**

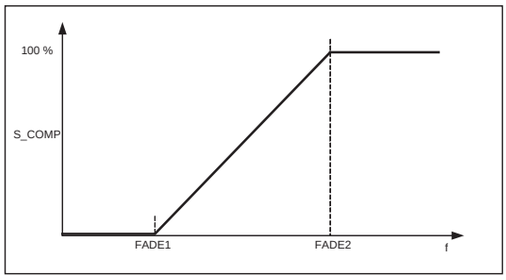
The slip-compensation is specified depending on the parameters **FADE1** and **FADE2**.

f < FADE1:
If the frequency of the rotating field in the stator is less than "FADE1" the slip-compensation is switched off.

f > FADE2:
If the frequency of the rotating field in the stator is greater than "FADE1" the slip-compensation is activated 100 %.

FADE1 < f < FADE2
If the frequency of the rotating field in the stator is between "FADE1" and "FADE2" the slip-compensation depends on the characteristic curve: the higher the frequency the higher the slip-compensation.
The characteristic curve is defined by the values for "FADE1" and "FADE2".

Thereby a seamless transition from current-control to slip compensation and backwards is existing.

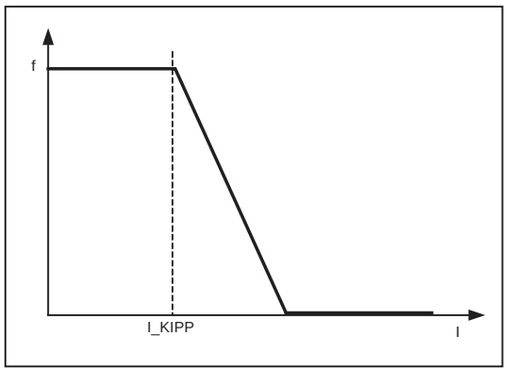


Fader-function with slip-compensation

9.3.4 Tilting protection

Avoids an uncontrolled tilting of the speed.

Functionality:
The motor current is recorded by a filter (parameter **s_FIL**).
If the limit value set for the current (parameter **I_KIPP**) is reached, the specified target value for the speed is reduced in line with the motor current.



Tilting protection

9.4 Improvements with Open-Loop-operation

Information
The described possibilities for improvements apply only to parameter which are available only in the U/f-operation mode (Open-Loop).
Possibilities for improving travel curve or the signal-timing are described in the chapter "Commissioning".

9.4.1 Optimizing start up behavior

If the motor has a rollback during the start, the minimum current, which is impressed to the motor, too low. In this case the parameter **Controller/I_IxR** must be increased to minimise the rollback.

```
Control
↳ I_IxR   15          A
  ↳       18
```

9.4.2 Slip-compensation

Due to the different speeds in upwards and downwards direction the different positioning travels or inexactness during the stopping can occur. By having nearly the same speed in both directions these inaccuracies can be minimised. The adjustment of the speed is carried out by the slip-compensation.

The slip-compensation will be activated with the parameter **Controller/s_COMP=On**.

```
Control
↳ s_COMP  On
  ↳       On
U/F: Slip compensation
```

10 Energy saving

10.1 ZAdynpro standby function

- To save energy at a standstill, the ZAdynpro can be switched to standby mode.
- In standby mode, the ZAdynpro is completely switched off.

Power loss in standby mode

	ZAdynpro 011-017	ZAdynpro 023-032
Heat dissipation	≤ 3.0 W	≤ 6.0 W

☞For activation of standby mode, see chapter "Electrical installation/Standby input (X-SBY)" in part 1 of the operating instructions.

11 Calibration of absolute rotary encoders

11.1 General

CAUTION!

Caution!

S

Rotary encoder calibration must be performed when a synchronous motor is in operation. Operating the motor without rotary encoder calibration can cause uncontrolled motor movements!
Travelling is prohibited before absolute rotary encoder calibration has been performed!

Information
In Ziehl-Abegg motors, the absolute rotary encoder is already aligned in the factory to the offset value "0".
It is no longer necessary to perform absolute rotary encoder calibration!

11.1.1 Load-free alignment SSI-Encoder

General conditions for rotary encoder calibration without load:

- The installation and motor data must be configured
- Load-free operation (ropes must be removed from the traction sheave)
- Brake monitor must be activated in accordance with the number of brakes in use (**Monitors/BR** menu)

While the SSI encoder is being calibrated, the ZAdynpro energises the motor with direct current. In the process, the rotor jumps to the centre of the nearest magnetic pole. In this rotor position, the SSI encoder must be manually calibrated to its zero point. In order to make mounting easier, it is recommended that you connect the SSI encoder to the ZAdynpro prior to mounting and calibrate the offset value "0" (value in the **ENCODER calibration/ENC_POS** menu). Subsequently mount the SSI encoder, if possible without any twisting, in the position in which the locking screw is easily accessible.

The rotary encoder calibration should always be conducted twice. By conducting the 2nd rotary encoder calibration, any potential inaccuracies in the 1st rotary encoder calibration are detected and can be corrected.

Carrying out the load-free alignment with SSI-encoder

1.	Select menu **Encoder calibration**	MMC Recorder ->Encoder adjust. Safety gear HW-Ident.
2.	Select parameter **ENC_OFF** **Enter ENC_OFF=0**	Encoder-adjust. ↳ENC_OFF 0.00 DEG ↳ 0.00 Encoder Offset
3.	Select parameter **ENC_ADJ** Activate rotary encoder calibration with **ENC_ADJ=ON**	Encoder-adjust. ↳ENC_ADJ Off ↳ On Encoder adjustment
4.	Start rotary encoder calibration with **[START]**	CHECK or START adjustment? [Esc][x][CHK][START]
5.	Keep the inspection run push-button pressed.	Press inspection! [Esc]
6.	The motor is powered in phase U and the rotor to zero of the next pole. Rotary encoder check, check of the motor data for plausibility. - Display of number of expected (calculated) impulses / pole pair (e.g. 512) - Display of impulses counted between the poles (e.g. 514)	Wait.Check encoder function. +514 +512 INC/P
7.	Rotor is held in zero point of the next pole - Display of motor current of phases U V W	Wait +12.9A -6.5A -6.47A
8.	Offset value (electrical angle, 360° per pole)	Difference within one pole +110.70° Adjust SSI encoder diff. to ZERO ...
	Adjust rotary encoder mechanically?	

	No	**Yes**
9.	**Adjustment by entering the offset value:** The rotary encoder is not moved mechanically, the offset value is retained and is corrected by entering the rotary encoder offset value in the controller unit. The offset value must be available when changing devices! If the value is not available, a new rotary encoder calibration must be performed!	**Mechanical adjustment of the rotary encoder:** Adjust the rotary encoder as exactly as possible to the value **0 °** by turning and tightening the locking screw carefully; correct the rotary encoder position if necessary. At the end of rotary encoder calibration process, the rotary encoder must be fully tightened and the value must be close to **0**. At deviations of less than ± 2.00 °, the rotary encoder calibration is considered correct. A deviation of max. ± 1 ° is recommended.
10.	End the rotary encoder calibration process by switching off the inspection run.	End the rotary encoder calibration process by switching off the inspection run.
11.	Please check and if necessary set ENC_OFF=249.32° [OK]	Mechanical SSI adjustment is quite correct! [OK]
12.	The rotary encoder offset must be corrected to the specified value! The value must be noted.	

	Encoder-adjust. ↳ENC_OFF 249.32 DEG ↳ 249.32 Encoder Offset	

11.1.2 Load-free alignment EnDat-Encoder

General conditions for a rotary encoder calibration with closed brake:

- The installation and motor data must be configured
- It must be ensured that the brake does not open during the rotary encoder calibration (disconnect brake)
- Brake monitor must be activated in accordance with the number of brakes in use (**Monitors/BR** menu)

While the EnDat encoder is being calibrated, the ZAdynpro energises the motor with direct current. In the process, the rotor jumps to the centre of the nearest pole. In this rotor position, the offset value is saved to the EnDat encoder and the EnDat encoder is subsequently set to position "0".

The rotary encoder calibration should always be conducted twice. By conducting the 2nd rotary encoder calibration, any potential inaccuracies in the 1st rotary encoder calibration are detected and can be corrected.

Carrying out the load-free alignment with EnDat-encoder

1.	Select menu **Encoder calibration**	MMC Recorder ->Encoder adjust. Safety gear HW-Ident.
2.	Select parameter **ENC_OFF** **Enter ENC_OFF=0**	Encoder-adjust. ↳ENC_OFF 0.00 DEG ↳ 0.00 Encoder Offset
3.	Select parameter **ENC_ADJ** Activate rotary encoder calibration with **ENC_ADJ=ON**	Encoder-adjust. ↳ENC_ADJ Off ↳ On Encoder adjustment
4.	Start rotary encoder calibration with **[START]**	CHECK or START adjustment? [Esc][x][CHK][START]
5.	Keep the inspection run push-button pressed.	Press inspection! [Esc]
6.	The motor is powered in phase U and the rotor to zero of the next pole. Rotary encoder check, check of the motor data for plausibility. - Display of impulses counted between the poles (e.g. 514) - Display of number of expected (calculated) impulses / pole pair (e.g. 512)	Wait.Check encoder function. +514 +512 INC/P
7.	Rotor is held in zero point of the next pole - Display of motor current of phases U V W	Wait +12.9A -6.5A -6.47A

8.	Display of difference between calculated and measured angle between 2 poles End the rotary encoder calibration process by switching off the inspection run. The offset value is saved in the rotary encoder.	Difference within one pole -1.89 ! Stop Inspection !
9.		Encoder adjustment was successfully finished [EXIT]

11.1.3 Checking the load-free alignment of the SSI- & EnDat-encoders

While the rotary encoder calibration is being checked, the ZAdynpro energises each individual pole of the motor with direct current. The offset is determined at each pole and the averaged offset is calculated from this. This offset can be saved in the ZAdynpro.

Information
The offset determined during the check is not saved in the ZAdynpro because, if the frequency inverter is replaced, the new frequency inverter will not use the same rotary encoder offset. A new rotary encoder offset must be performed, or the old rotary encoder offset must be entered.

Information
During the rotary encoder calibration, the driving disc must turn to the right (when looking at the driving disc). Once the rotary encoder calibration is complete, the driving disc must be located in the same position as at the start of the process.

Saving the checking
To save the result, a memory card needs to be in the X-MMC card slot during the check.
The result is filed under **travel number.POL** in the folder **/4CX/DEVICE/Seriennummer/LST**.

Carrying out the checking of the encoder offset

1.	Select menu **Encoder calibration**	MMC Recorder ->Encoder adjust. Safety gear HW-Ident.
2.	Select parameter **ENC_OFF** **Enter ENC_OFF=0**	Encoder-adjust. ↳ENC_OFF 0.00 DEG ↳ 0.00 Encoder Offset
3.	Select parameter **ENC_ADJ** Activate rotary encoder calibration with **ENC_ADJ=ON**	Encoder-adjust. ↳ENC_ADJ Off ↳ On Encoder adjustment
4.	Start check with **[CHK]**	CHECK or START adjustment? [Esc][x][CHK][START]
5.	Keep the inspection run push-button pressed for approximately 2 minutes. The offset value check now runs automatically and lasts about 2 minutes. The rotor now makes a full revolution and the offset value is determined at every pole.	Press inspection! [Esc]
6.		Press inspection! Iu + 13.0A Iv + 6.5A

7.	Information is shown on the display during automatic rotary encoder calibration:
	Line 1:
	0/0A: Current in motor phase U / V
	36: Current temperature of the power unit
	Line 2:
	Display rotor position
	Line 3:
	ACT: Current action
	M1 / M2: Measurement 1/2
	-> <- Slow positioning of a pole
	>> << Fast positioning of the next pole
	prog: Latest current pointer position
	Line 4:
	POLE: Number of the approached pole pair
	Real: Current rotary encoder position within a pole
		`WAIT 0/0A 36C`
		`||- - - - - - -80°`
		`ACT >> prog:+15859`
		`POL:2 real:+15859`

8.	Release inspection run push-button	`Stop inspection!` `[Esc]`

9.	Result of the check is displayed:
	Line 1:
	ERR_AVG: Average error in degrees (electr. angle)
	Line 2:
	ERR_MAX: Maximum error in degrees of average value
	Line 3+4:
	Optimum ENC_OFF: Correction factor for the rotary encoder offset (electr. angle)
		`ERR_AVG: -1.42°`
		`ERR_MAX: +0.37°`
		`Optimum`
		`ENC_OFF: 1.10° [OK]`

11.1.4 Rotary encoder calibration with closed brake

If the rotary encoder is calibrated with the brake closed, there is no need to take the cables off the driving disc.

CAUTION!

Caution!
The electric brake of the motor must not open during the encoder offset alignment!
It is recommended to remove the electrical connection of the brake for the duration of the encoder offset alignment!

Information
Considerable noise may occur on the motor for approx. 10-15 s during rotary encoder calibration. These noises are caused by the special current supply to the motor and are normal for this kind of rotary encoder calibration.
Pleas keep the button for the inspection travel still closed!

CAUTION!

Caution!
If the device is replaced, the offset needs to be entered in the new device!

Perform calibration of EnDat or SSI encoders

1.	Select menu **Encoder calibration**	MMC Recorder ->Encoder adjust. Safety gear HW-Ident.
2.	Select parameter **ENC_OFF** **Enter ENC_OFF=0**	Encoder-adjust. ↳ENC_OFF 0.00 DEG ↳ 0.00 Encoder Offset
3.	Select parameter **ENC_ADJ** Activate rotary encoder calibration with **ENC_ADJ=ON**	Encoder-adjust. ↳ENC_ADJ Off ↳ On Encoder adjustment
4.	Start check with the key.	CHECK or START adjustment? [Esc][x][CHK][START]
5.	Disconnect electrical connection of the mechanical brake. Confirm with the key.	Is the elec. connec. to the mechanical brake disconnected? [Esc] [Yes][No]
6.	Keep the inspection run push-button pressed for approximately 2 minutes.	Press inspection! [Esc]
7.	Motor voltage is increased until motor current flows. Calibration is performed.	*Set test current 0 8.8A 23V
8.	Release inspection run push-button	Stop inspection !
9.	Result of the rotary encoder calibration is displayed (ENC_-OFF=356) If ENC_OFF = ? is displayed, it is not possible to determine the correct rotary encoder offset. It is recommended to move the motor shaft to a different position by briefly releasing the brake and to repeat the rotary encoder calibration. If correct rotary encoder calibration is still not possible, a test run must be performed with both of the gained results. With one result, the motor runs error-free; with the other result, uncontrolled movements of the motor can occur!	*Result: 2.7A 132-222 -> 176/ 356 ENC_ABS=263 ENC_OFF=356 [END]
10.	Query whether determined rotary encoder offset (ENC_OFF) is to be saved **[yes]:** Value is saved **[no]:** Value is not saved	Save new ENC_OFF? [no] [yes]

11.1.5 Calibration of absolute rotary encoders type ERN1387

The calibration of absolute rotary encoders of type ERN1387 corresponds to rotary encoder calibration with the brake closed.

Information
To minimise inaccuracies when determining the position, the calibration of absolute rotary encoders must be performed **4 times** with the brake closed!

The driving disc needs to be turned by approx. 90° after every rotary encoder calibration.

Perform calibration of absolute rotary encoders type ERN1387

1.	Perform absolute rotary encoder calibration 4 times with the brake closed.
	Note the value for ENC_OFF after each rotary encoder calibration
		`* Result: 2.7A`
		`144-228 -> 186/ 6`
		`ENC_OFF= 6 [END]`

2.	Calculating the average offset	$ECN\_OFF = \frac{ECN\_OFF_1 + ECN\_OFF_2 + ECN\_OFF_3 + ECN\_OFF_4}{4}$

3.	Enter average offset in parameter **ENC_OFF** **in the Encoder calibration** menu	`Encoder-adjust.`
		`↳ENC_OFF 6.00 DEG`
		`↳ 6.00`
		`Encoder Offset`

11.1.6 Error messages during calibration of absolute rotary encoders

Error no.	Error text	Error cause
01	Drop out of inspect.	Measurement was aborted too soon
05	Phase UVW is missing	Phase current too small Iu < 200 mA Iv, Iw < 100 mA
06	No encoder impulses	No rotary encoder impulses Rotary encoder defective or motor brake is closed
07	Wrong dir. Check UVW	Wrong direction motor phases are mixed up
08	Wrong amount of pole	Wrong number of pole pairs Deviation of the increments by ± 10% within one pole
10	Asym. current	Motor current is unsymmetrical
12	Drop out of inspect.	Signals for the inspection trip were removed too early
30	BR is not off.	Brake monitor contacts are active even before the absolute rotary encoder calibration is started
40	CO1 does not turn on	Contactor monitor contacts do not switch or contactors are not open
50	BR does not turn on	Brake monitor contacts do not switch or brakes are not open
52	Input CO interrupt	Contactors open during rotary encoder calibration
60	Adj.cannot be stored	Absolute rotary encoder error, absolute value cannot be written to the memory of the absolute rotary encoder
61	Adj.did not store	Absolute rotary encoder error, absolute value will not be saved in the absolute rotary encoder
70	BR1..4 are activ	Brake opens when performing a rotary encoder calibration with a closed brake
71	Check nominal power!	Motor data are not correct

12 Support with acceptance test

12.1 Rotary encoder test

The function uses software to simulate rotary encoder failure.

Information
The test function can also be activated during travel.

Performing rotary encoder test

1.	Select **Tests** menu	Powersection -> Checks ZA-Intern
2.	Select parameter **SCY_EN** **Enter** SCY_EN=On	Checks ↳SCY_EN OFF ↳ ON Enable tests
3.	Select parameter **SCY_ENC** Switch on rotary encoder test with **SCY_ENC=ON**	Checks ↳SCY_ENC OFF ↳ ON Encoder test
4.	Then send a travel signal. The travel is aborted with an error message because the rotary encoder is deactivated. The **SCY_EN** parameter is then switched automatically to "OFF".	

12.2 Testing of the protection device according to EN81-A3

Testing of the protection device according to EN81-A3 to prevent accidental movement of the cabin from the stopping point.

12.2.1 Powerless drifting of the cabin from the floor

The output stage is switched off, the motor brake open, the cabin drifts away.

Danger!
- The motor is not powered and drifts in the direction of the pulling load!
- The monitor functions of the ZAdyn are deactivated. There is a risk for the system and persons due to uncontrolled movement of the lift.

Perform testing of protection device according to EN81-A3 with powerless drifting

1.	Select **Tests** menu	Powersection -> Checks ZA-Intern
2.	Select parameter **SCY_EN** **Enter SCY_EN=On**	Checks ↳SCY_EN OFF ↳ ON Enable tests
3.	Select parameter **SCY_A3** Switch on test EN81-A3 with **SCY_A3=powerless**	Checks ↳SCY_A3 OFF ↳ Powerless A3 support
4.	Message that the brake is opened in the following trip	CAUTION!!! A3 test active Travel command will [ESC] just open brake
5.	To start the test, give a travel command.	

12.2.2 Travel with maximum acceleration from floor

The output stage is switched on, the brakes are open, the cabin is accelerated to maximum under full power.

CAUTION!

Caution!

- Do not perform testing of the protection device according to EN81-A3 "Travel with maximum acceleration from floor" if the motor already has high temperature because the motor will be heated up even more by the maximum acceleration.
- The motor can be demagnetised by the testing of the protection device according to EN81-A3 "Travel with maximum acceleration from floor". Ziehl-Abegg will give no guarantee for motors which are do not originate from Ziehl-Abegg.

Danger!

- The monitor functions of the ZAdyn are deactivated. The maximum acceleration of the lift poses a risk to persons and the system.

Perform testing of protection device according to EN81-A3 with maximum acceleration

1.	Select **Tests** menu	Powersection -> Checks ZA-Intern
2.	Select parameter **SCY_EN** **Enter** SCY_EN=On	Checks ↳ SCY_EN OFF ↳ ON Enable tests
3.	Select parameter **SCY_A3** Switch on test EN81-A3 with **SCY_A3=max. accel.**	Checks ↳ SCY_A3 OFF ↳ Max. accel. A3 support
4.	Message that the cabin is accelerated to maximum	CAUTION!!! A3 test active Travel command will [ESC] acc. to max.
5.	To start the test, give a travel command.	

12.3 Capture device test

The function deactivates the electronic short-circuit. The brakes must be opened manually after switching on the function.

Danger!
The monitor functions of the ZAdyn are deactivated. There is a risk for the system and persons due to uncontrolled movement of the lift.

Perform capture device test

1.	Select **Tests** menu	Powersection -> Checks ZA-Intern
2.	Select parameter **SCY_EN** **Enter** SCY_EN=On	Checks ↳SCY_EN OFF ↳ ON Enable tests
3.	Select parameter **SCY_SG** Switch on capture device test with **SCY_SG=ON**	Checks ↳SCY_SG OFF ↳ ON Capture test
4.	Message that the electronic short-circuit is deactivated. The brakes can be opened manually.	CAUTION!!! Safety gear test ac- tive. Motor windings [ESC] not shorted

12.4 Driving ability test

The cabin is moved up with the counterweight applied. The cabin movement is shown in the display.

Information
The function is only possible in connection with CAN activation.

Perform capture device test

1.	Move up with the recovery control until the counterweight is resting on the buffer.	
2.	Select **Tests** menu	Powersection -> Checks ZA-Intern
3.	Select parameter **SCY_EN** **Enter** SCY_EN=On	Checks ↳SCY_EN OFF ↳ ON Enable tests
4.	Select parameter **SCY_DA** Switch on driving capability test with **SCY_DA=ON**	Checks ↳SCY_DA OFF ↳ ON Driving capability test
5.	Move up with recovery control until the cables slip over the traction sheave.	

6.	Display cabin movement	CAUTION!!! Test driving ability Active. Cabin pos.: [ESC] + 13mm

12.5 Motor brakes test

The function interrupts the safety circuit during travel. The distance covered by the cabin before coming to standstill is shown in the display.

Information
The function is only possible in connection with CAN activation.

Perform motor brakes test

1.	Select **Tests** menu	Powersection -> Checks ZA-Intern
2.	Select parameter **SCY_EN** **Enter** SCY_EN=On	Checks ↳ SCY_EN OFF ↳ ON Enable tests
3.	Select parameter **SCY_MB** Switch on motor brakes test with **SCY_MB=ON**	Checks ↳ SCY_MB OFF ↳ ON Engine brakes test
4.	Give travel command up with empty cabin Interrupt safety chain	
5.	Display distance up to standstill	CAUTION!!! Test motor brakes active. Braking dist. [ESC] 87mm

13 Electronic name plate

With the "Electronic rating plate" function, you can save parameters from the ZAdynpro in an absolute value encoder or load data from an absolute value encoder into the ZAdynpro. The function is possible in rotary encoders with EnDat and Codeface interfaces.

13.1 Save data

1.	Select menu **Encoder calibration**	MMC Recorder -> Encoder adjust. Safety gear HW. Ident.
2.	Select parameter **SAV_P_E** **Enter SAV_P_E=On**	Encoder-adjust. ↳ SAV_P_E OFF ↳ ON Parameters on encoder

13.2 Load data

In order to be able to load data from the absolute value encoder, you must have saved the data in the absolute value encoder with the ZAdynpro first.		
1.	Select menu **Encoder calibration**	MMC Recorder -> Encoder adjust. Safety gear HW. Ident.
2.	Select parameter **LOD_P_E** **Enter LOD_P_E=27** to load data	Encoder-adjust. ↳LOD_P_E OFF ↳ 27 Parameters from encoder

14 Special functions

14.1 Changing the Clock frequency

- The factory setting for the switching frequency of the ZAdynpro is 16 kHz.
- If required, the switching frequency can be continuously changed in the **Power component** menu between 2.5 and 16 kHz. The **Power component** menu is in the advanced level. To access the advanced level, press and hold the esc key.
- The switching frequency should only be changed after consultation with the Ziehl-Abegg hotline.

CAUTION!

Caution!
Increasing the clock frequency causes

- A performance reduction of the ZAdynpro (refer to chapter "Technical data")
- A greater power loss and thus increased heating of the ZAdynpro

14.1.1 Fixed presetting of the clock frequency (Menu Power sectionl/M_PWM=Fix f_PWM)

The ZAdynpro works with the switching frequency configured in the **Power component/f_PWM** menu.

14.1.2 Automatic adjustment if the clock frequency (Menu Power sectionl/M_PWM=Auto)

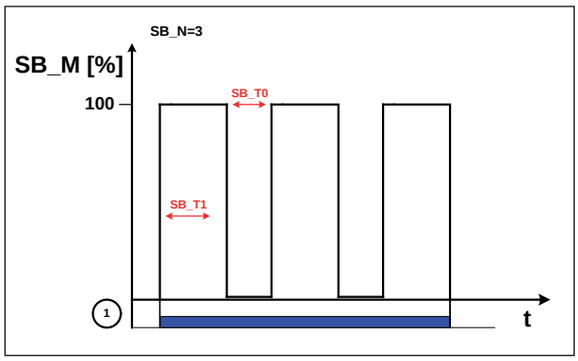
The frequency inverter works with the switching frequency configured in the **Power component/f_PWM_H** menu.
If required, the frequency inverter switches to the switching frequency configured in the **Power component/f_PWM** menu.

14.2 Safety Brake

In this function, the motor builds up its maximum torque dependent on the configured values for the pulse sequence, thus attempting to pull the car from the arrester.

CAUTION!

Caution!
The capture release must not be repeatedly carried out, as this can destroy the ZAdynpro.



Process capture release
1 Inspection trip "UP" or "DOWN"

Carrying out the safety brake-function

1.	Select **Capture device** menu	MMC Recorder ->Encoder adjust. Safety gear HW-Ident.
2.	Select **SB_MOD** parameter Activate capture release	Capture device ↳ SB_MOD Off ↳ On Freeing function act
3.	Start capture release by pressing the inspection run push-button	Safety Brake Press inspection! [esc]

	Function successful!	Function faile!
4.	0.0s 4.0A - - - - - - -> jerk1	Stop inspection
5.	Abort inspection run in both cases.	
6.	SB_INFO 1 [ESC]	

Information
If required, the parameters impulse amplitude, impulse time, impulse pause and number of impulses can be changed in the **Capture device** menu.

Possible errors during safety gear mode

Error no.	Error description
1	The travelling was interrupted too early by the user. Travel command has to be longe existent.
2	No absolute encoder existent. Check encoder connection.
3	Absolute value could not be read out from the absolute value encoder. Check encoder cable.
10	Asymetric motor current. Difference over 12.5%. Check motor phases / contactors.
30	The brake monitor indicates that the brakes are open, although the frequency inverter has not yet opened them. Check brake monitoring respectively the brakes.
40	Motor contactors do not switch.
50	Brake does not switch.
71	SIN / COS - Error
72	Missing SSI module
73	Missing SSI dialogue
74	EnDat Light Error
75	EnDat Amplitude Error
76	EnDat Position Error
77	EnDat Supply Error

14.3 Reset

Assigning the parameters of the ZAdynpro with the standard values or customer-specific system data. The works setting is made by a numeric input in the **Statistics/RESET**menu.

Reset-functions:

Reset-No.	Effect
77	**Pre-configured ZAdynpro:** Parameters are assigned customer-specific system data **Standard ZAdynpro:** Parameters are assigned standard values
90	deleting of: • Parameter • Error list • Error messages Parameters will be set with standard data
99	deleting of: • Parameter • Error list • Error messages • Encoder-Offset "ENC_OFF" (will be set to 0) Parameters will be set with standard data

CAUTION!

Caution!

S

In synchronous motors, the parameters for the encoder offset (ENC_OFF) are set to 0 during a reset. If a value was entered beforehand for ENC_OFF, after performing a reset either an encoder-offset alignment must be carried out or the old values for ENC_OFF must be entered!

Operating the motor without encoder offset alignment can cause uncontrolled motor movements!

CAUTION!

Attention! - Reset 90 and 99
Any pre-configuration of the ZAdynpro carried out in the Ziehl-Abegg factory is lost when the reset is carried out.
The parameters are allocated the factory settings. These do not correspond to the pre-configuration!

14.4 Checking the motor phases

To avoid undefined motor activities due to wrong connection, short circuit , broken wires, etc, the motor phases will be checked during the start procedure. Therefor the current in the phases U/V/W will be measured before the brakes are opening.

The monitoring function extends the start-up procedure by approx. 300 ms. In the case of the factory setting "Single" and the correct test result, this only happens during initial travel once the frequency inverter has been switched on.

If during the inspection an error is detected the error message **E412 - MOT:UVW fail** is displayed.

The different monitoring functions can be selected in the menu **ZA-Intern/UVW_CHK** . The factory setting is "Single".

Function	Designation
Single	The motor phases are checked during initial travel once the frequency inverter has been switched on. If the check is successful, no further monitoring is performed. If the examination is incorrect, with each start an examination is made until a correct examination could be accomplished.
Cont	Motor phases will be check with each travel
Off	Checking of the motor phases is deactivated

The testing voltage can be selected in the menu **ZA-Intern/UVW_PEK** an. The factory setting is "f(P)".

Function	Designation
f(P)	The testing voltage depends on the nominal voltage of the motor, which is entered in the menu **"Motor name plate"**. In case of an error the testing voltage is displayed in the error message.
1V ... 10V	Selecting the testing voltage between 1 V and 10 V. In case of an error the testing voltage is displayed in the error message.
15V	Test voltage 15 V.

Error "E412 - MOT:UVW fail" occurs, but the motor connection is correct
If the error "E412 - MOT:UVW fail" occurs even though the motor is connected correct, maybe the testing voltage is to small. The testing voltage has to be increased manually.

14.5 Field weakening

The operation with field weakening is only possible with asynchronous motor.

If the required motor speed n* for an asynchronous motor is above the nominal speed n of the motor, the ZAdynpro automatically switches over to operation in the field-weakening range.
In operation with field weakening the magnetizing current I_0 is reduced over the complete speed range of the motor. The cos phi of the motor data will be increased. Thereby the required speed will be reached.

The original and the new calculated motor data can be compared in the **Info/page05** menu.

14.6 Operation with a 3-phase 230 VAC power supply

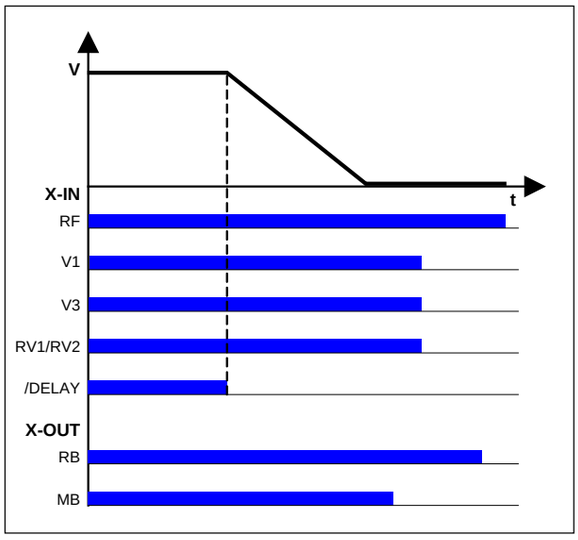
The ZAdynpro can be operated with a 3~ 230 VAC power supply.
For this purpose, it is only necessary to adapt various monitoring functions to the lower power supply.

1.	In the **Power component** menu, configure the parameter **UDC_N=325 V**	Power component ↳UDC_N 325 V ↳ 325 Nominal DC voltage
2.	In the **Power component** menu, configure the parameter **UDC_MIN=250 V**	Power component ↳UDC_MIN 250 V ↳ 250 Min. DC voltage
3.	In the **Power component** menu, configure the parameter **UDC_MAX=760 V**	Power component ↳UDC_MAX 760 V ↳ 760 Max. DC voltage
4.	In the **Power component** menu, configure the parameter **U_BC=650 V**	Power component ↳U_BC 650 V ↳ 650 BC intervention voltage

14.7 Controlled emergency stop in inclined elevators

If an emergency stop is implemented in inclined elevators by suddenly closing the brakes, the abrupt stop can lead to injury to passengers. To avoide this, the cabin should also be braked controlled in emergency stop.
The **/DELAY** input function is available for this.
When deactivating the input with the **/DELAY** function, the motor is delayed with the delay parameterised in the **Controller/A_MAX** menu (see fig.).

Information
At the end of the emergency stop the fault **E208 - DELAY active** is output.
A new run can only be performed after activating the **/DELAY** input function!



Controlled emergency stop
RF Controller enable
V1 Positioning speed
V3 Travel Speed
RV1 / RV2 Direction default
/DELAY Delay in emergency stop
RB Controller ready
MB_Brake Mechanical brake

14.8 Self-monitoring of the brakes as per EN81-20

The operating brakes can be used as brake elements for protection against unintentional movement of the car. The micro-switches on the brakes are used for the required self-monitoring. Monitoring can take place both with normally closed contacts (NC) and normally open contacts (NO). The type of monitoring contact can be selected in the input programming.

14.8.1 Activation of the self-monitoring

The self-monitoring is activated by selecting the number of brake circuits and the function of the microswitch based on the **BR** parameter in the **Startup** or **Monitors** menu (e.g. 2 brake circuits with normally open function of the microswitches: BR=2xNO).

```
Monitoring
↳BR      2*NO
  ↳      2*NO
Brake Monitoring
```

```
Startup
↳BR      2*NO
  ↳      2*NO
Brake Monitoring
```

14.8.2 Activating the ZAdyn lock in case of a malfunctioning brake circuit

The lock function of the ZAdyn is engaged by activating the **LOCKBR=On** parameter in the **Monitors** menu.

```
Monitoring
↳LOCKBR  Off
  ↳      On
Lock inverter
```

Activation of the parameter ensures that the ZAdyn locks upon detection of a faulty brake circuit. The ZAdyn lock can only be released by configuring the **Monitors/UNLOCK = On** parameter.

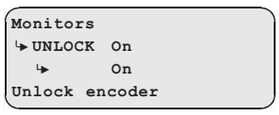
14.8.3 Function test of the self-monitoring

Functional test according to EN 81-50:2014
The self-monitoring test required by EN 81-50, 5.8.3.2.5 is performed for every software version during the internal software test at Ziehl-Abegg.
For this, 10 test runs are made and the function of the self-monitoring checked.

Function test in start-up
If the drive unit brakes are used as brake elements for protection against unintended movement of the car, a function test of the self-monitoring must be made during start-up.

Test step 1

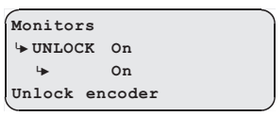
1. Disconnect signal cable at a monitor input.
2. Perform test run.
3. The error message "380 BR:Start Error" (monitor function "NCC") or "582 BR:T2 too small" (monitor function "NOC") must be output already at the start, otherwise the monitor is faulty.
4. The ZAdyn locks, no further travel is possible.
5. Re-connect the signal cable.
6. Repeat the test run to check the lock. A new run may not be possible, the ZAdyn is still locked.
7. Release the lock by configuring the **Monitors/UNLOCK = On** parameter (see display).
8. Start new run, this must take place without errors.



Repeat test step 1 for every monitor input.

Test step 2

1. Disconnect the signal cable at a monitor input and short circuit the monitor input with the internal 24V DC voltage source of the ZAdyn.
2. Perform test run.
3. The error message "380 BR:Start Error" (monitor function "NOC") or "582 BR:T2 too small" (monitor function "NCC") must be output already at the start, otherwise the monitor is faulty.
4. The ZAdyn locks, no further travel is possible.
5. Remove short-circuit and re-connect the signal cable.
6. Repeat the test run to check the lock. A new run may not be possible, the ZAdyn is still locked.
7. Release the lock by configuring the **Monitors/UNLOCK = On** parameter (see display).
8. Start new run, this must take place without errors.



Repeat test step 2 for every monitor input.

14.9 Index

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