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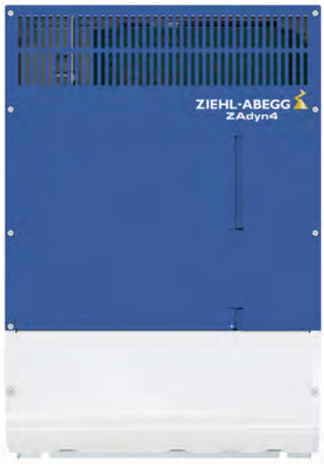
ZIEHL-ABEGG

Die Königsklasse
The Royal League

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



ZA dyn 4C

Frequency inverter

Original operating instructions

Store for future use!

R-TBA12_01-GB 2104 Index 012

Part.-No. 00163371-GB

ZIEHL-ABEGG

Content

1 General information

Compliance with the following instructions is mandatory to ensure the functionality and safety of the product. If the following instructions given especially but not limited for general safety, transport, storage, mounting, operating conditions, start-up, maintenance, repair, cleaning and disposal / recycling are not observed, the product may not operate safely and may cause a hazard to the life and limb of users and third parties.
Deviations from the following requirements may therefore lead both to the loss of the statutory material defect liability rights and to the liability of the buyer for the product that has become unsafe due to the deviation from the specifications.

1.1 Validity

This instruction manual applies to:
Frequency inverter from the series:ZAdyn4C
from software version 4.61

1.2 Structure of the operating instructions

These operating instructions help you to work safely on and with the frequency inverter ZAdyn4C. 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, start-up, maintenance and servicing, who have the corresponding qualifications and skills for their job.

1.4 Structure of operating instructions

The operating instructions have a systematic structure. The order of the individual chapters corresponds to the order of the work steps for first time installation of the frequency inverter.

The operating instructions contain the following information:

- Device description
- Mechanical and electrical installation
- Accessories
- Operation and parameterising
- Start-up
- "Safe Torque Off (STO)" function
- Parameter list
- Drive options and special functions
- Evacuation mode
- Diagnostic
- Software ZAmon
- Enclosure

1.5 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.

1.6 Copyright

1.7 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 ZAdyn4C is a field-orientated Frequency inverter for RPM control of asynchronous motors and synchronous motors. The device is not designed for any other use than those listed here – this is considered as 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 ZAdyn4C is liable for any personal harm or material damage arising from non-intended use! The manufacturer shall bear no liability for such damages.

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!
	**Caution!** 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
- Start-up is only permitted subject to compliance with the EMC Directive 2014/30/EU

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.

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 achieved in practical operation when all the necessary measures are taken. The machine operator therefore has a duty of care to ensure that these measures are planned and to supervise their execution.

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 Application

The ZAdyn4C is a field-oriented Frequency inverter for speed control of three-phase motors developed for use in elevator machines.
The frequency inverter is equipped with a microprocessor control. This tracks the motor through time and distance-restricted programs that are selected using the superordinate elevator control system.
The use of IGBT modules and pulse width modulation with variable switching frequency enables low-noise operation of the motor. The user interface, interfaces and software adapted specially to lift technology enable easy installation and start-up of the frequency inverter.
The Frequency inverter is designed for elevator installations for passenger and freight transport with a high demand on travel comfort and positioning accuracy.
Frequency inverter for operating asynchronous motors and synchronous motors are available.

3.2 Functional description

The Frequency inverter provides an AC mains with variable frequency and variable voltage. The size of the voltage and frequency depends on the selected travelling speed and the load to be operated.
The motor is operated optimally in all operating points by using field-orientated control. This provides every required torque almost without delay. The full rated motor torque is already available at standstill (speed 0). All speed curves are driven in a speed-controlled and load-independent manner. The field-orientated control enables very accurate compliance with the specified travel curve over the whole speed range. The closed loop control can be used up to a speed of 4 m/s (higher speeds available on

request). The brakes operate almost wear-free throughout the controlled operation from speed 0 (start) to speed 0 (stop).

3.2.1 centrifugal masses

In order to reduce the acceleration current, all additional centrifugal masses are to be removed. Solid hand wheels are to be replaced with plastic or aluminium hand wheels.
However, please note that by removing the centrifugal masses, it is possible that an imbalance arises

3.2.2 Current consumption of the ZAdyn4C in acceleration

When selecting the ZAdyn4C, it is assumed that the motor to be controlled is loaded with the rated torque at the reference speed. Accelerating the motor required additional torque. Generating this torque requires additional current of approx. 60 – 80% of the rated current. During acceleration, this results in a motor current consumption of approx. 160 – 180% of the rated current.
The ZAdyn4C can be loaded with up to180% of the rated current for up to 10 s. For this reason, the current which is set when the motor accelerates may not be greater than 180% of the rated current.
In general, valid is:

$$I_{Nenn\ Frequenzumrichter} \geq I_{Nenn\ Motor}$$

3.3 Name plate

The rating plate is found on the left housing side of the ZAdyn4C.

name plate ZAdyn4CS 011

Designation	Meaning
ZAdyn4CS 011	Series
3~400 V	Mains connection voltage
50/60 Hz	Mains frequency
11 A, 60% ED	Rated current for 60% on time
IP20	Protection rating
Series number	Series number
Part no.	Part no.
⚠	Touch current in protective earth line exceeds an alternating current of 3.5 mA, or a direct current of 10 mA
CE	CE mark

3.4 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

3.5 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

3.5.1 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.

3.6 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 ZAdyn4C frequency converter is a closed compact device that is designed for wall mounting in the machine room or lift shaft. It can also be installed in the switch cabinet but adequate cooling must be provided in this case (see chapter "Switch cabinet installation").

Danger!

The following points must be complied with during the mechanical installation to avoid causing a defect in the device due to assembly errors or environmental influences:

Before installation

- Remove the frequency inverter from the packaging and check for any possible shipping damage
- Installation must be on a clean and stable surface
- Installation must be on a level base so that no stresses are exerted on the housing of the ZAdyn4C
- Assemble the frequency inverter outside of the traffic area

During installation

- Mount the device in a torsion free conditions
- Installation position: vertical, connection terminals (X1, X2, X3) at bottom; no horizontal assembly
- 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")

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

4.1.1 Switch cabinet installation

CAUTION!

Caution!

The frequency inverter is designed for wall mounting in the machine room or elevator shaft. Adequate cooling must be ensured for assembly in the switch cabinet. The power loss of the frequency inverter (see chapter "Technical Data") must be taken into account here.

The specified installation position and the minimum distances must be observed when assembling in the switch cabinet.

4.1.2 Wall installation

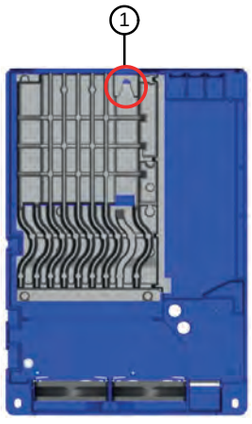
4.1.2.1 ZAdyn4C011-032

CAUTION!

Caution!
Damage to the ZAdyn4C housing
The two lower fixing screws are only used to secure the ZAdyn4C and should not bear any load. If they are not tightened properly, the housing may be damaged.
▷ Only hand-tighten the two lower fixing screws.
▷ Use washers.
▷ Do not use countersunk screws.

The ZAdyn4C 011-032 is mounted on the wall using a 3-point fastening.

▷ Attach fastening screw for the upper fastening point.



1 Upper fastening point

▷ Hang the ZAdyn4C on the upper fastening point.
▷ Mark the positions of the lower fastening points.

2 Lower fastening points

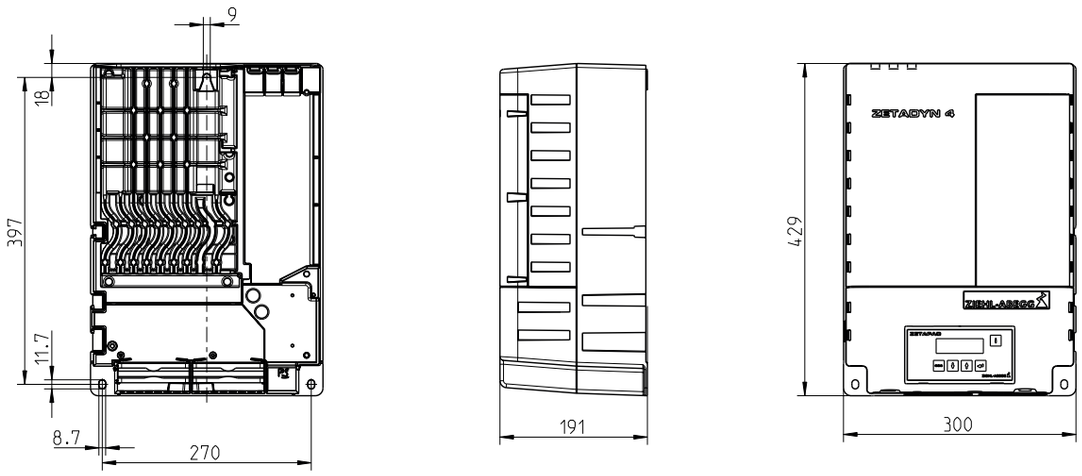
▷ Drill the fastening holes (the ZAdyn4C can be moved to the side and must not be removed).
▷ Fix the ZAdyn4C with one screw each at the lower fastening points.

4.1.2.2 ZAdyn4C 040-074

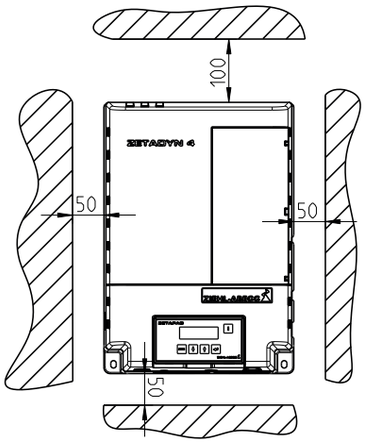
For further information on wall mounting of the ZAdyn4C040-074 refer to the assembly instructions supplied.

4.2 Dimensional drawings / Minimum distances

4.2.1 ZAdyn4C 011-032

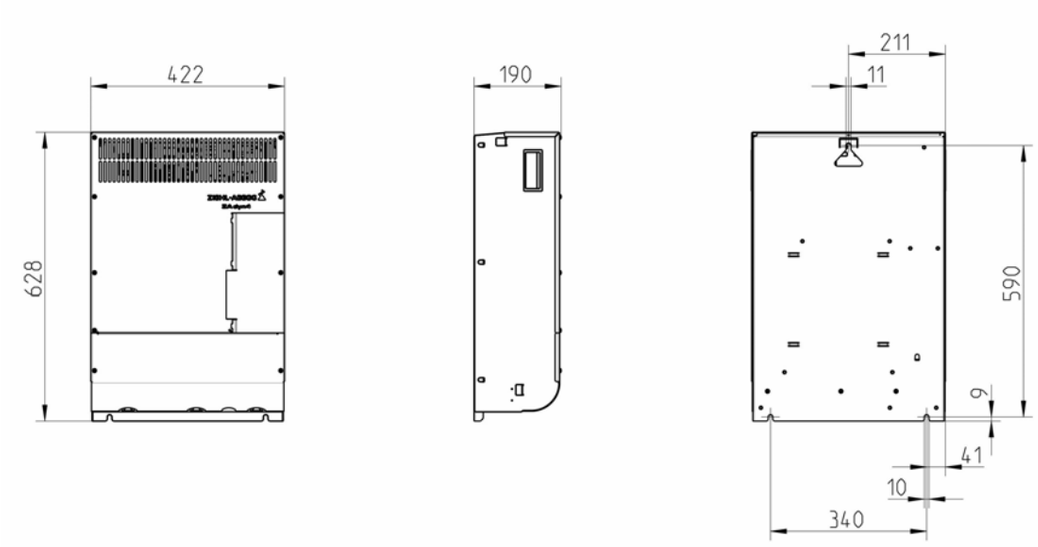


ZD4C01M0
Dimensional drawings ZAdyn4C 011-032 in mm

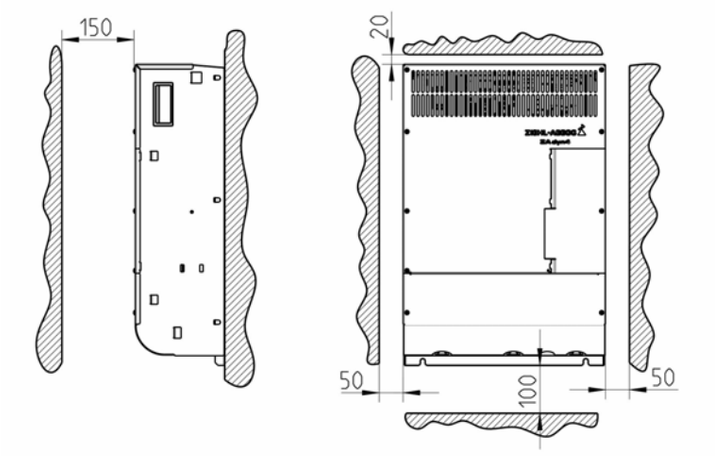


ZD4C01M0
Minimum clearances ZAdyn4C 011-032 in mm

4.2.2 ZAdyn4C 040-074



ZD4C02M0
Dimensional drawings ZAdyn4C 040-074 in mm



ZD4C02M0
Minimum clearances ZAdyn4C 040-074 in mm

5 Electrical installation

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) is still live.
Wait at least 3 minutes before working on the device

Danger!
It is not permitted to operate the ZAdyn4C 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.

5.1 EMC-compatible installation

When correctly installed (see below), 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

The following points must be observed if the above mentioned standards are to be adhered to:

- Use only shielded cables for motor and brake chopper or brake resistor connections
- Max. motor line length is 25 m
- Wind unshielded cables of brake resistor type BR11-A around the toroidal core provided (see figure)
- If you must interrupt the shielding on a cable (e.g., to install a motor contactor), the shielding must be subsequently continued with the lowest possible HF impedance.
- Use only shielded control cables
- The shielding of control cables (inputs and outputs, rotary encoder cable, etc.) must be connected to earth potential on the inverter side
- The shielding of control cables (inputs and outputs, rotary encoder cable, etc.) must be connected to earth potential on the inverter side
- Use shielded lines in the switching cabinet also
- 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

Information
Please contact the manufacturer for information on adhering to the limit value class B in accordance with EN 55011.

Toroidal core BR11-A

5.1.1 Cables motor / brake resistor

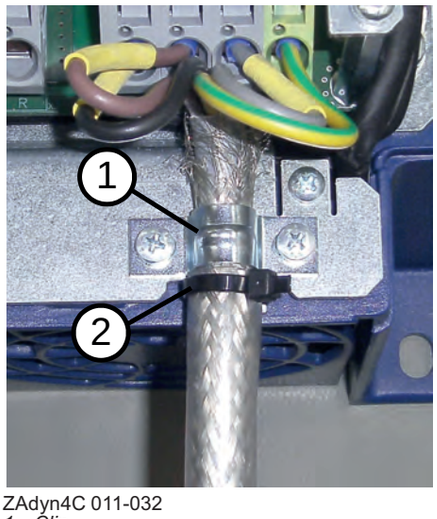
5.1.1.1 Cable length

Motor line: the maximum line length is 25 m.
Brake resistor line: the maximum line length is 5 m.

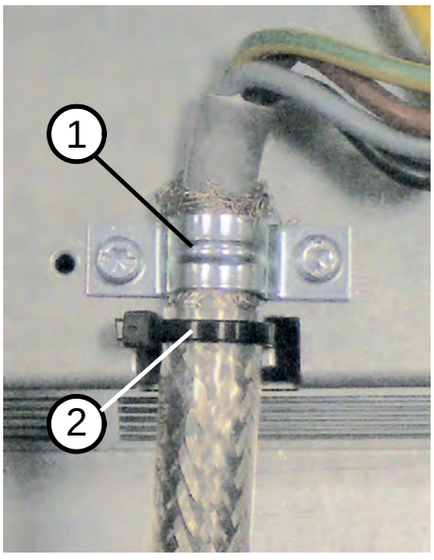
In the case of a supply line > 25 m (motor line) or > 5 m (brake resistor line), it is no longer possible to guarantee compliance with **DIN EN 12015** (Electromagnetic compatibility – Emission) and **DIN EN 12016** (Electromagnetic compatibility – Immunity).

5.1.1.2 Contacting the shielding of the motor line on the ZAdyn4C

On the ZAdyn4C, the shielding of the motor line must be connected with earth potential with the clip provided (see fig.).



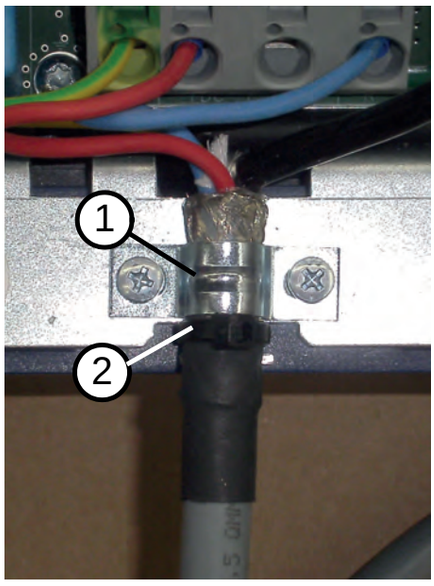
ZAdyn4C 011-032
1 Clip
2 Cable tie for strain relief



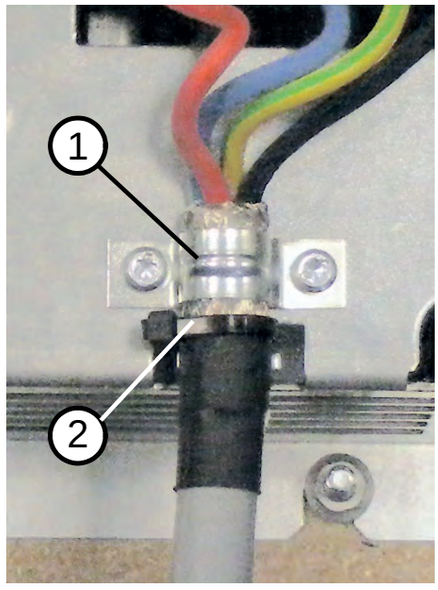
ZAdyn4C 040-074
1 Clip
2 Cable tie for strain relief

5.1.1.3 Contacting of the shielding of the brake resistor line

OntheZAdynCZAdyn4Cand the brake resistor, the shielding of the brake resistor line must be connected to earth potential with the clip provided (see fig.). .



ZAdyn4C 011-032
1 Clip
2 Cable tie for strain relief

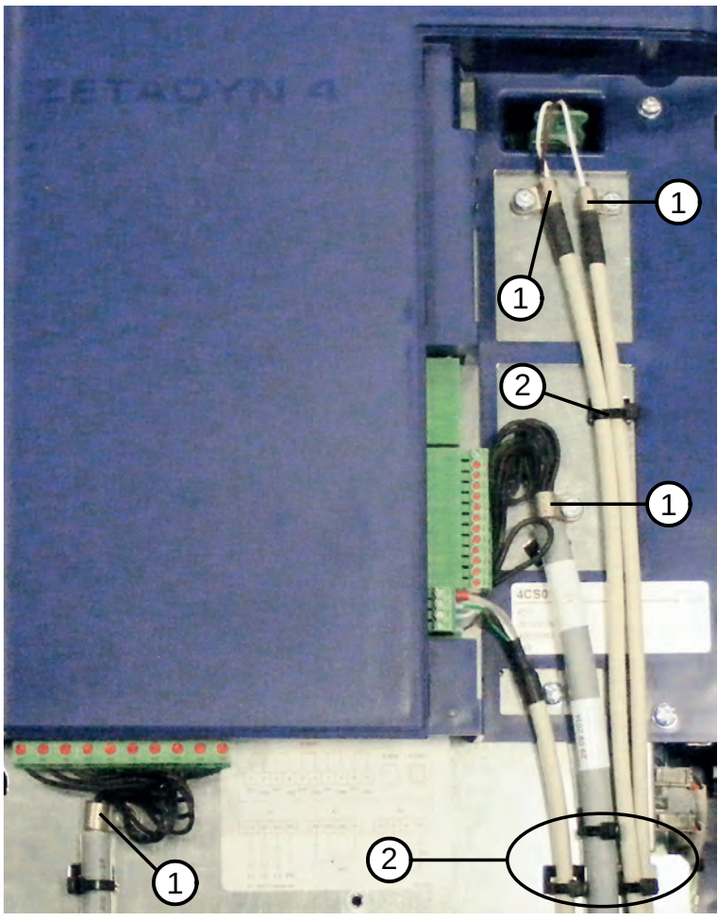


ZAdyn4C 040-074
1 Clip
2 Cable tie for strain relief

5.1.2 Control cables, STO line

The shielding of control cables ZAdyn4C(digital inputs and outputs, DCP) must be connected to earth potential on the inverter side. Earthing clips are provided in the ZAdynC for this (see fig.).

For the STO signals, it is possible to use separate jacketed cables or a protected routing. Shielded lines must be used in each case. The shield must be placed on both sides. The shielding of the STO lines must be connected to earth potential over a large area on the inverter side. Earthing clips are provided in the ZAdyn4C for this (see fig.). See the chapter "Safe Torque Off (STO) function" for further information.

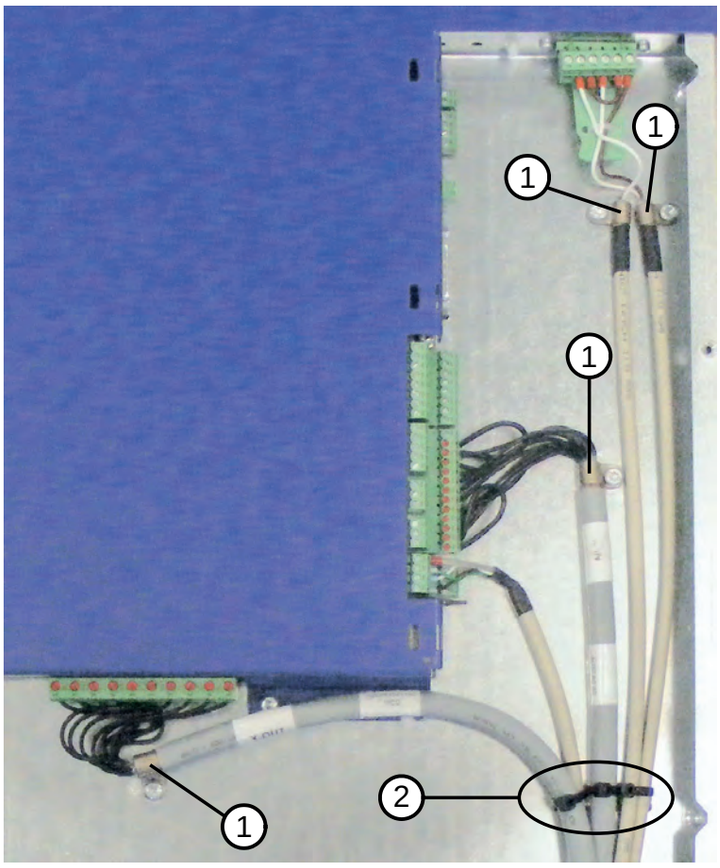


ZAdyn4C 011-032

For example, STO line shielding can be performed using the pre-assembled connecting lead L-SL-xx-HX-ZA4-STO (see chapter "STO interface (X-STO)")

1 Earthing clips

2 Strain relief by cable ties



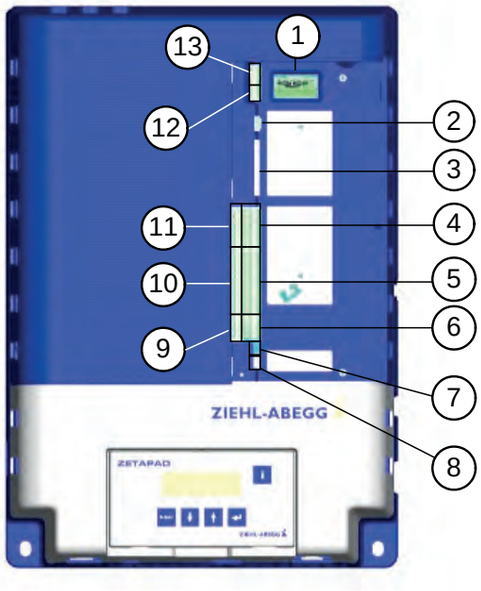
ZAdyn4C 040-074

For example, STO line shielding can be performed using the pre-assembled connecting lead L-SL-xx-HX-ZA4-STO (see chapter "STO interface (X-STO)")

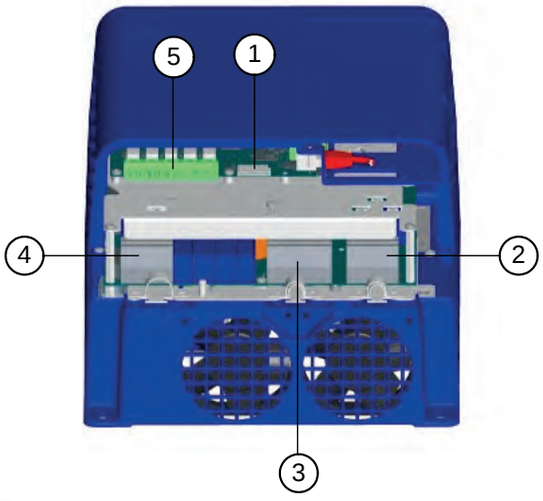
1 Earthing clips
2 Strain relief by cable ties

5.2 Terminal positions

5.2.1 ZAdyn4C 011-032

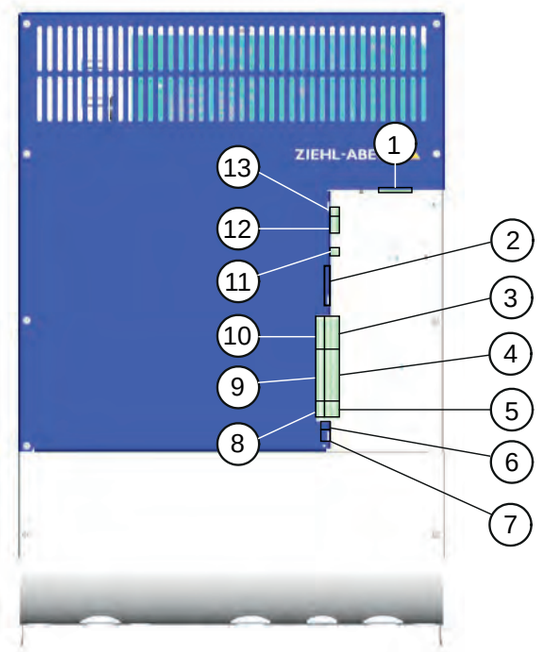


Terminal positions top
1 X-STO Safe Torque Off
2 X-MT motor temperature monitor
3 X-ENC15 rotary encoder SUB-D
4 X-ENC8 rotary encoder
5 X-IN digital inputs
6 X-CAN CAN
7 J1 terminating resistance CAN line
8 X-PAD ZApad
9 X-DCP DCP
10 X-MON inputs for monitoring functions
11 X-ENCO rotary encoder simulation
12 X-AN analogue inputs
13 X-EXT external 24V power supply



Front terminal positions
1 X-MMC memory card
2 X3 motor
3 X2 brake chopper / brake resistor
4 X1 line
5 X-Out digital outputs

5.2.2 ZAdyn4C 040-074



Terminal positions top
1 X-STO Safe Torque Off
2 X-ENC15 rotary encoder SUB-D
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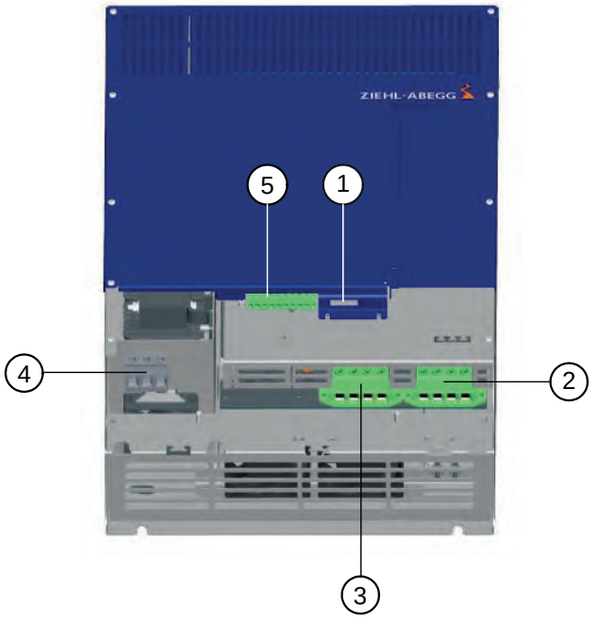
5 X-CAN CAN
6 J1 terminating resistance CAN line
7 X-PAD ZApad
8 X-DCP DCP
9 X-MON inputs for monitoring functions
10 X-ENCO rotary encoder simulation
11 X-MT motor temperature monitor
12 X-AN analogue inputs
13 X-EXT external 24V power supply



Front terminal positions
1 X-MMC memory card
2 X2 brake chopper / brake resistor
3 X3 motor
4 X1 line
5 X-Out digital outputs

5.3 Wiring

The frequency inverter is fitted with clips and recesses to feed the different lines into the ZAdyn4C. The table and figures below show their allocation and positions.

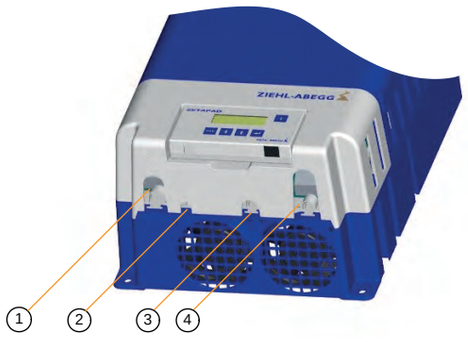
ZAdyn4C 011-032

Power line	Recess at bottom left
Motor cable	Clip, recess bottom right
Brake resistor cable	Clip, second recess from bottom right
Cables X-DCP, X-IN, X-ENC8, X-CAN, X-MON, X-ENC8, X-STO	Recess bottom right

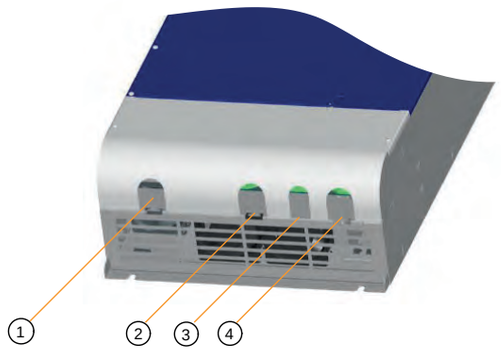
ZAdyn4C 040-074

Power line, X-OUT line	Recess at bottom left
Motor cable	Clip, second recess from bottom right
Brake resistor cable	Clip, recess bottom right
Cables X-DCP, X-IN, X-ENC8, X-CAN, X-MON, X-ENC8, X-STO	Clip, recess bottom right

5.3.1 WiringZAdyn4C



Cable layout front ZAdyn4C 011-032
1 Power line, X-OUT line
2 Protective earth connection
3 Brake resistor cable
4 Motor cable, cables X-DCP, X-IN, X-ENC8, X-CAN, X-MON, X-ENC8, X-STO



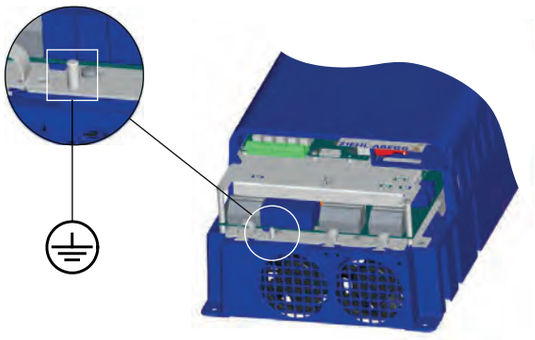
Cable layout front ZAdyn4C 040-074
1 Power line
2 Protective earth connection
3 Motor cable
4 Motor brake resistor, cables X-DCP, X-IN, X-ENC8, X-CAN, X-MON, X-ENC8, X-STO

5.4 Strain relief by cable ties

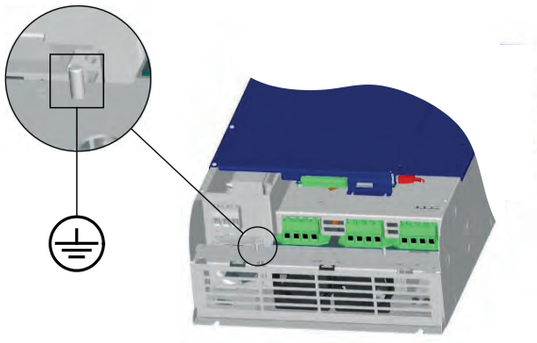
A cable tie must be attached to all lines for strain relief.

5.5 Protective ground connection

In accordance with the defined networks in DIN EN 60990, the frequency inverter has a leakage current > 3.5 mA 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 lead. ZAdyn4C M6 threaded bolts are available on the ZETADYN 4 for connecting the PE conductors (see fig.).



Protective earth connection ZAdyn4C 011-032



Protective earth connection ZAdyn4C 040-074

5.6 Mains connection (X1)

Danger!
Before connecting to the mains, check if the technical data on the rating plate of the ZAdyn4C correspond to the required connection values.

5.6.1 Network form

The mains filter and ZAdyn4C are designed for use in an earthed power supply system. Permissible mains forms are:

- TN network
- TT network

Information
The mains filter and ZAdyn4C are unsuitable for use in the IT network!

5.6.2 Cable cross section

The line cross-section must be specified dependent on the motor's rated current and the ambient conditions (e.g. temperature, wiring method) in accordance with DIN VDE 0100.

5.6.3 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 ZAdyn4C:

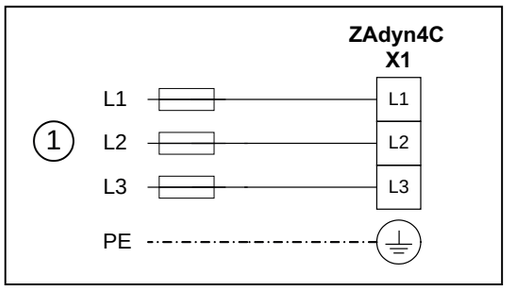
ZAdyn frame size	Max. fuse for operating class gG
4Cx011 / 4Cx013	16 A
4Cx017	20 A
4Cx023	25 A
4Cx032	40 A
4Cx040	50 A
4Cx050	63 A
4Cx062 / 4Cx074	80 A

5.6.4 Type of cable

Both rigid and flexible lines can be utilized. The use of wire-end sleeves is recommended for flexible lines.
The mains line does not have to be shielded.

5.6.5 Connection

The mains connection is designed with spring contact terminals. To avoid damage to the connection terminals and to ensure a safe contact, a suitable screwdriver must be inserted into the terminals as far as it will go to fully open them when connecting cables.



ZAdyn4C mains connection
1 Mains 3~ 400V/PE/50Hz

5.7 Line reactor-radio interference filter

The mains choke and radio interference filter integrated into the device ensures compliance with the product series standards listed below:

- EN 12015 Electromagnetic compatibility – product series standard for lifts, escalators, moving pavements – spurious emission
- EN 12016 Electromagnetic compatibility – product series standard for lifts, escalators, moving pavements – interference immunity

5.8 Residual current operated device (RCCB)

Frequency inverters of the ZAdyn type require no FI circuit breaker for operation.
The circuit at the ZAdyn4C output is monitored by an electronic short-circuit protection. On detecting a short-circuit current at the output of the ZETADYN (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 ZETADYN 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 0100-4100.
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 reference fault current of 300 mA for fire prevention according to regulation VdS 3501.

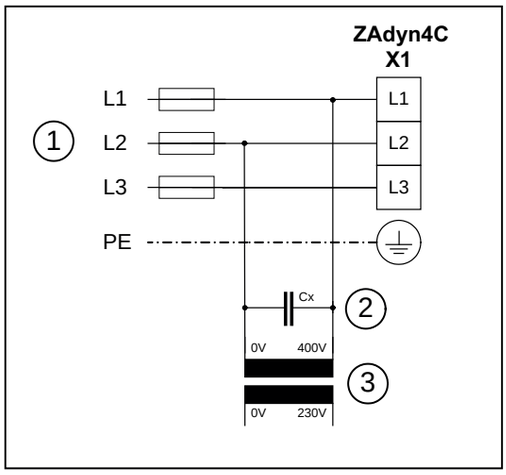
Information
Please note that even when using a correct type B RCCB, false triggering due to high protective earth currents (stray current) can still occur and that operation with these protective devices is not possible.

5.9 Control transformer in the mains supply line

CAUTION!

Caution!
When using a control transformer in the mains supply line of the ZAdyn4C, you must connect a capacitor parallel to the transformer's primary winding (see Fig.).

The capacitor is used to prevent an extreme increase in voltage in case the voltage fails in one of the phases to which the transformer is connected. This voltage increase can lead to destruction of the line filter. The cause of voltage increases is resonance of the control transformer with the radio-interference suppression components, which are always used in frequency inverters.



Control transformer in the mains feed line
1 Mains 3~ 400V/PE/50Hz
2 Capacitor
3 Control transformer

Recommended capacitor types for Cx:
- Epcos Typ B2583210µF/640V-AV
- Capacitors for motor start-up with the following data: 10 µF/450 VAC

In addition, you must comply with the following:
- During sequential disconnection, switch off the phase on which the transformer is operated last
- Do not oversize the transformer
- If a loaded and an intermittently unloaded transformer is operated in the open loop control, operate these on the same phases

5.10 Motor connection (X3)

5.10.1 Cable 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.

5.10.2 Type of cable

Always use shielded cables for the motor connections! Both rigid and flexible lines can be installed.
The use of wire-end sleeves is recommended for flexible lines.
Rated voltage U0 / U: 450 / 750 VAC

5.10.3 Cable length

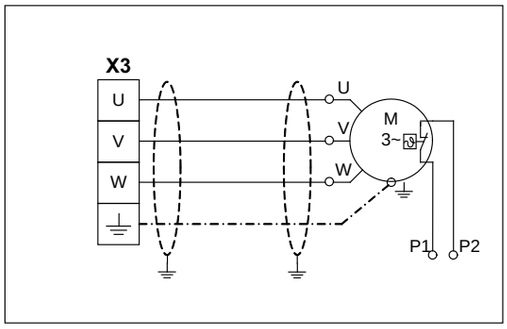
The maximum cable length is 25 m. With a motor line **> 25 m** compliance with DIN EN 12015 (Electromagnetic Compatibility - Interference emissions) and DIN EN 12016 (Electromagnetic Compatibility - Interference immunity) can no longer be guaranteed.

5.10.4 Connection

Danger!
Always switch off the mains voltage when connecting the motor line. The STO function (contactorless operation) does not electrically isolate the output stage of the frequency inverter from the motor line connection terminal!

The motor connection is designed with spring contact terminals. To avoid damage to the connection terminals and to ensure a safe contact, a suitable screwdriver must be inserted into the terminals as far as it will go to fully open them when connecting cables.

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.



Connection asynchronous motor / synchronous motor

5.10.5 Electronic short-circuit

If emergency evacuation is performed by opening the brakes, the motor windings are short-circuited by a self-activating electronic short-circuit to prevent uncontrolled acceleration of the lift. The short-circuit generates a speed-dependent brake torque which is sufficient in most cases to limit the lift speed to a safe value.

Information
S

- The electronic short-circuit is also active when there is no operating voltage on the ZAdyn4C.
- If a ZAdyn4CS with an integrated electronic short-circuit is switched to an asynchronous motor, the electronic short-circuit can no longer be triggered.
- The electronic short-circuit must be deactivated when checking the weight balancing by opening the brakes.
- Please contact Ziehl-Abegg if you want to switch off the electronic short-circuit.

CAUTION!

When operating synchronous motors from other manufacturers, make sure that they can be operated with the electronic short-circuit and that manual emergency evacuation with short-circuited motor windings is permissible.

5.11 Motor temperature monitoring (X-MT)

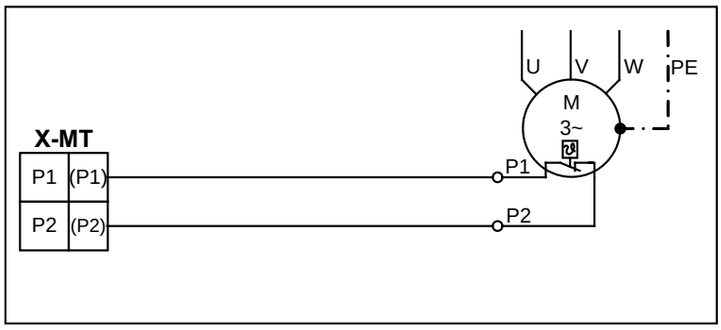
Information
The detection of over temperature of the motor doesn't cause a drive interruption. The current drive will be completed.
If an over temperature of the motor will be detected at stop, there is no further drive possible.

The following sensor types can be used:

- PTC thermistor (PTC in compliance with DIN 44082, switching point at 3500 Ω)
- Temperature sensor KTY84-130 (switching point adjustable: Parameter **Monitoring/R_P1P2**)
- Thermal circuit breaker

The used sensor has to be parametrized in the menue**Monitoring/P1P2**!

```
Monitor
↳ P1P2    PTC
  ↳       PTC
Motor temp. monitor
```



Temperature monitoring connection
() terminal designation of connector

Information
If you do not use the temperature monitoring, you must switch off the temperature monitoring **(Monitoring/P1P2=Off)**. Short-circuiting of the inputs P1 and P2 is detected as an error by the ZAdyn4C.

5.12 Brake resistor (X 2)

CAUTION!

Caution!
An existing temperature monitor absolutely must be connected to the ZAdyn4C!
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!

CAUTION!

Caution!
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
```

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

Information

The pre-assembled line of the BR11-A does not have double insulation.
You can order a retrofit kit for routing in accordance with VDE 0100-400 from ZIEHL-ABEGG SE. Item number: 357260

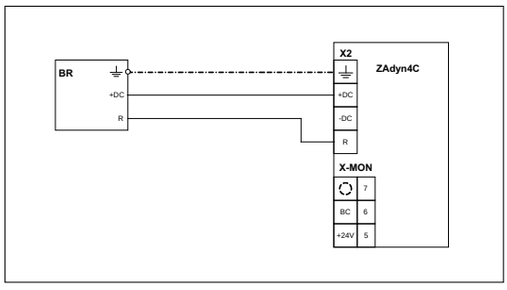
Cable length

The maximum line length is 5 m.
With a supply line > 5 m compliance with **EN 12015** (Electromagnetic Compatibility - Interference Emissions and **EN 12016** (Electromagnetic Compatibility - Interference Immunity) is no longer guaranteed.
If the prefabricated line is not long enough for the brake resistor type BR11-A, it can be extended up to a length of 5 m.
A shielded, self-extinguising cable is required for this.

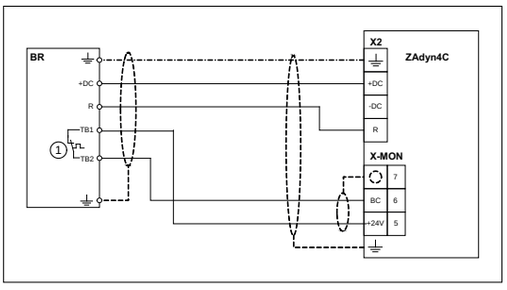
Brake-Resistor connection

Information

The brake resistor type BR11-A has no temperature monitoring.

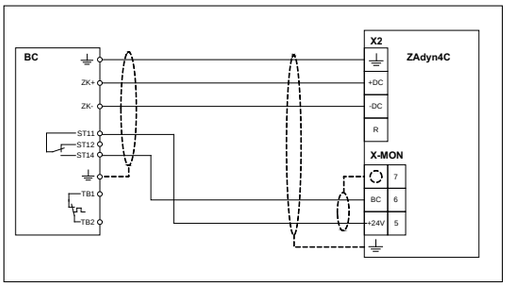


Connection of BR11-A / BR 14-A



Installation position BR17 / BR25 / BR50 / BR100
1 Max. contact load: 5 A / 250 VAC

Brake-Chopper connection



Connection of BC25 / BC50 / BC100
1 Max. contact load: 5 A / 250 VAC

5 Electrical installation

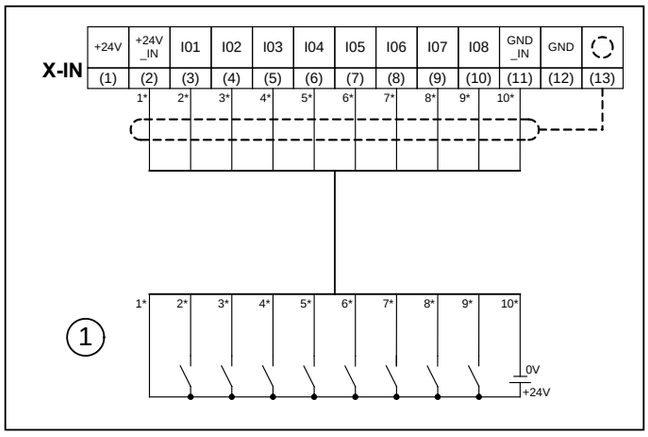
5.13 Digital inputs (X-IN)

For parallel control of the ZAdyn4C, 8 digital inputs are available as standard at connection terminal X-IN. The inputs are pre-parametrised but can be assigned other functions by changing the parameters.
The inputs can be activated either galvanically isolated by an external 24 V power supply in the control system or by the internal 24 V power supply in the ZAdyn4C.

Information
If the digital inputs are connected to the internal or external voltage supply, all inputs, i.e. also CO1, CO2, BR1, BR2, BR3, BR4 and BC are supplied by the internal or external voltage supply.
The bridges +24V/+24V_IN and GND/GND_IN are wired on the plug at the factory so that the internal voltage supply is active.
If the +24V/+24V_IN and GND/GND_IN terminals are not bridged, it is not possible to supply the inputs with the internal voltage supply.

Information
Use shielded cables for the connections. The shielding must be connected to the terminal X-IN shielding connection.

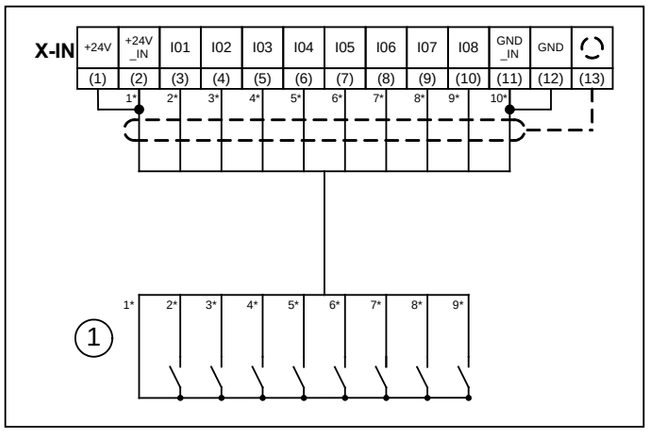
5.13.1 Connection with external power supply



Connection of digital input with external power supply
1 Brake control
() terminal designation of connector
** Wire number of the pre-assembled connecting lead X-I*

Information
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!

5.13.2 Connection with internal power supply



Connection of digital input with internal power supply
1 Brake control
() terminal designation of connector
** Wire number of the pre-assembled connecting lead X-I*

Information
When using the internal power supply a bridge must be inserted between the terminals +24V / +24V_IN and between GND / GND_IN. These bridges are already integrated into the pre-assembled X-I cable.
The cable GND_IN (wire no.10) is not required. This must be removed from the connection terminal both on the converter side and the control side and insulated.

CAUTION!

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

5.13.3 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%)
Clamping range	max. 1,5 mm²

5.13.4 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:X_BIN	XBIN2	XBIN1	XBIN0	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	V4	RV1 UP	RV2 DOWN	Free*

Information

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

- Controller enable
- Speed
- Direction default

5.13.5 Binary travelling speed default

Fixed binary allocation (CONFIG=15:ZA_BIN)

Speed	Input function		
	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

Free binary allocation (CONFIG=25:X_BIN)

Travelling speeds can be freely allocated to the binary codes. The allocation is made using the parameters **Control system/X_BIN1...X_BIN7**.

Input function			Speed
XBIN2	XBIN1	XBIN0	
0	0	0	-
0	0	1	**Control system/X_BIN1**
0	1	0	**Control system/X_BIN2**
0	1	1	**Control system/X_BIN3**
1	0	0	**Control system/X_BIN4**
1	0	1	**Control system/X_BIN5**
1	1	0	**Control system/X_BIN6**
1	1	1	**Control system/X_BIN7**

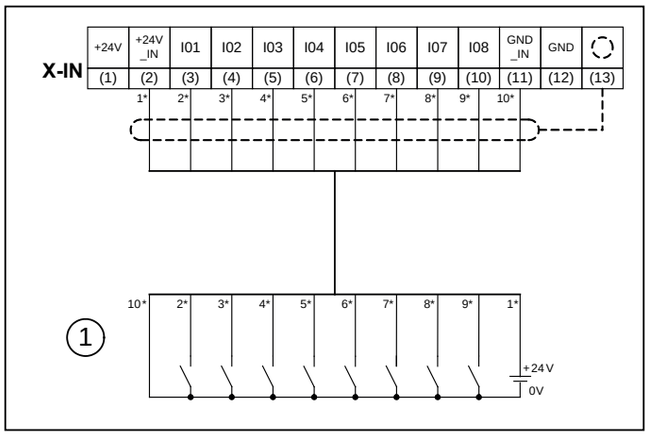
5.13.6 Inverting the logic of the digital inputs

The logic of the digital inputs can be inverted. This requires the jumper J4 to be reconnected.

Information

- If the jumper J4 is reconnected, the logic of digital inputs as well as brake bleeding monitor inputs is inverted. To invert the logic of the brake bleeding monitor inputs, see chapter “Brake bleeding monitor (X-MON) / Inversion of the logic of brake bleeding monitor inputs”.

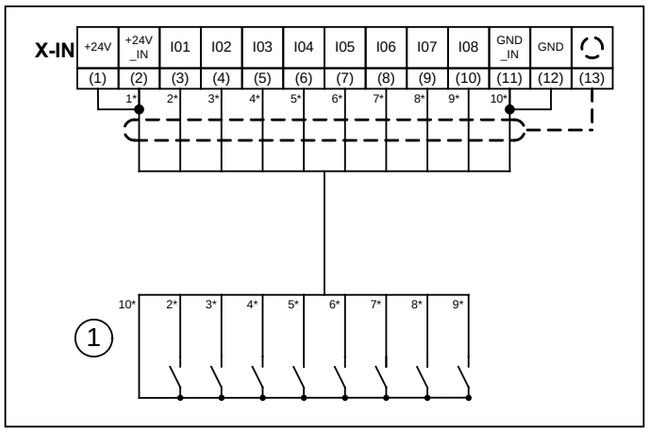
5.13.6.1 Connecting to external power supply with inverted logic



Connecting digital inputs to external power supply with inverted logic
1 Brake control
() terminal designation of connector
** Wire number of the pre-assembled connecting lead X-I*

Information
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!

5.13.6.2 Connecting to internal power supply with inverted logic



Connection of digital input with internal power supply
1 Brake control
() terminal designation of connector
** Wire number of the pre-assembled connecting lead X-I*

Information
When using the internal power supply a bridge must be inserted between the terminals +24V / +24V_IN and between GND / GND_IN. These bridges are already integrated into the pre-assembled X-I cable.
The cable 24V_IN (wire-No.1) is not required. This must be removed from the connection terminal both on the converter side and the control side and insulated.

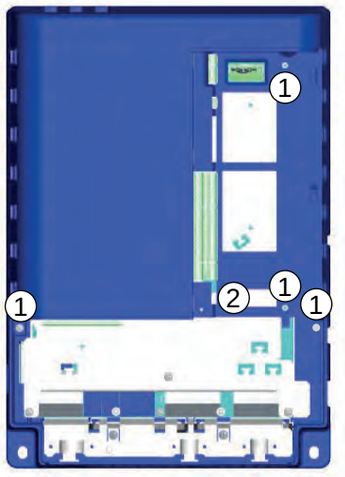
5.13.6.3 Technical data of digital inputs for inverted logic

Output voltage	+12 ... 13 VDC
Switching level low/high	<5 VDC / >11 VDC
Current consumption	6 mA (-20%)
Clamping range	max. 1,5 mm²

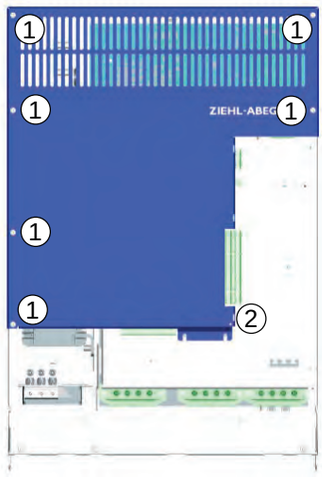
5.13.6.4 Reconnecting the jumper J4

The jumper J4 must be reconnected to invert the logic of the digital inputs.

▷ Unscrew and remove the white cover of the ZAdyn4C.
▷ Remove the small blue cover of the ZAdyn4C.
▷ Remove the connectors, remove the black jumper at terminal J1 (2).
▷ Undo the fastening screws (1).



ZAdyn4C011-032

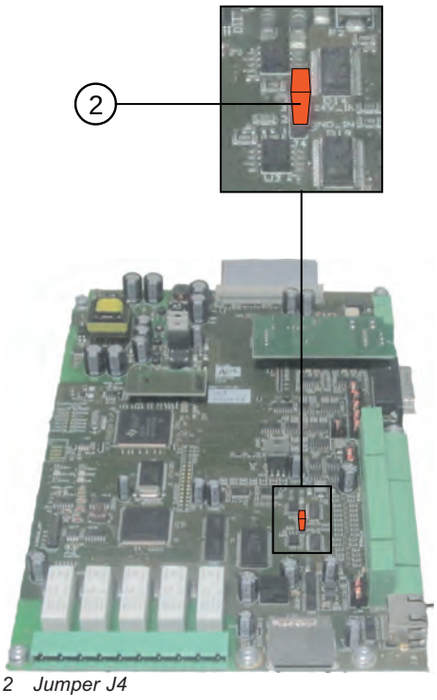


ZAdyn4C040-074

CAUTION!

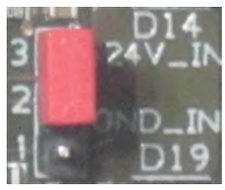
Caution!
Damage to the connection terminal J1
If the large blue cover is removed and the black jumper connected to connection terminal J1, the pins of the connection terminal J1 may bend or break off.
▷ Remove the black jumper at connection terminal J1 before removing the cover.

▷ Remove the large blue cover.
▷ Connect the red jumper J4 from position 2 (pins 1 and 2) to position 1 (pins 2 and 3).



2 Jumper J4

Jumper J4 to position 2



Jumper J4 to position 1

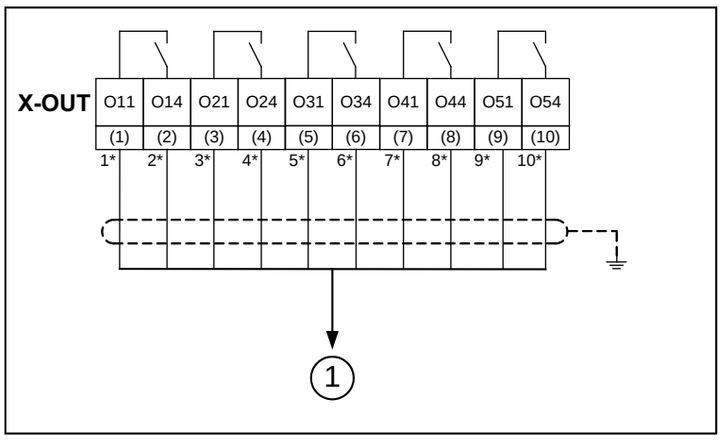
▷ To mount the covers, proceed in the reverse order.

5.14 Digital outputs (X-OUT)

5.14.1 Digital outputs X-OUT

The connection terminal X-OUT is equipped with 5 digital outputs as zero potential relay contacts with normally open function. The functions of the outputs are pre-parameterised but can be assigned other functions by changing the parameters.

5.14.1.1 Connection X-OUT



Connection of the digital outputs X-OUT
1 Brake control
() terminal designation of connector
** Wire number of the pre-assembled connecting lead X-OUT*

5.14.2 Technical data X-OUT

Short-circuit-proof	no*
Min. switching capacity	5 mA / 12 VDC
Max. switching capacity	2 A / 250 VAC
Cable cross section	max. 2,5 mm²

CAUTION!

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

5.14.3 Terminal assignment X-OUT

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	Fault	MB_Brake	RB	V < V_G1	STO-Info
01:ZA_IO	Fault	MB_Brake	RB	V < V_G1	STO-Info
03:BP_IO	Fault	MB_Brake	RB	V < V_G1	STO-Info
08:KN_IO	Fault	MB_Brake	RB	V < V_G1	STO-Info
11:NL_IO	Fault	MB_Brake	RB	V < V_G1	STO-Info
13:SS_IO	Fault	MB_Brake	RB	V < V_G1	STO-Info
15:ZA_BIN	Fault	MB_Brake	RB	V < V_G1	STO-Info
16:WL_IO	Fault	MB_Brake	RB	V < V_G1	STO-Info
21:ST_IO	Fault	MB_Brake	RB	V < V_G1	STO-Info
24:CSILVA	Fault	MB_Brake	RB	V < V_G1	STO-Info
25:X_BIN	RB	MB_Brake	V=O	Fault	STO-Info
27:MAS_BIN	Fault	MB_Brake	RB	Off*	STO-Info
30:KS_IO	Fault	MB_Brake	RB	V < V_G1	STO-Info
31:KL_IO	Fault	MB_Brake	RB	Evac.Dir.	STO-Info
32: S_SMART	Fault	MB_Brake	RB	SD	STO-Info

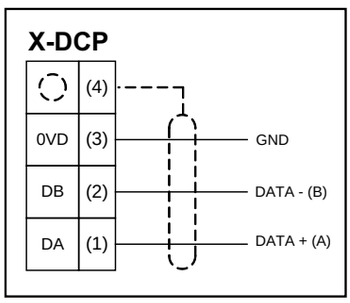
5.15 DCP / CAN interface (X-DCP, X-CAN)

As an alternative to the conventional wiring, it is possible to actuate the ZAdyn4C via DCP or CANopen lift (see chapter "Serial communication").

Information
The X-DCP and X-CAN terminals are standard parts of the ZAdyn4C.

5.15.1 DCP

- Use a shielded cable for the connection. The shielding must be grounded on the inverter side.
- Configure the connection between the ZAdyn4C and the control system without additional terminal points.
- The maximum line length is 50 m.



DCP connection
() terminal designation of connector

☞ For more detailed information on DCP, see chapter "Serial communication/DCP (Drive Control & Position)"

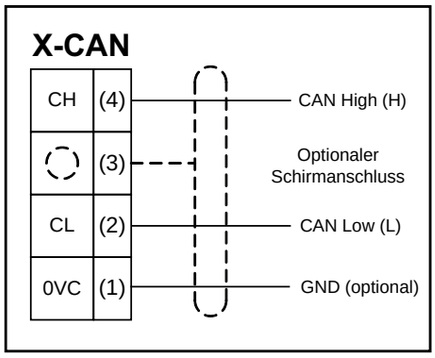
5.15.2 CANopenLift

- A shielded bus-cable is not needed, but the data wires should be twisted.
- 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.
- The maximum length of the bus is 200 m and 6 m at the branch lines.

CAUTION!

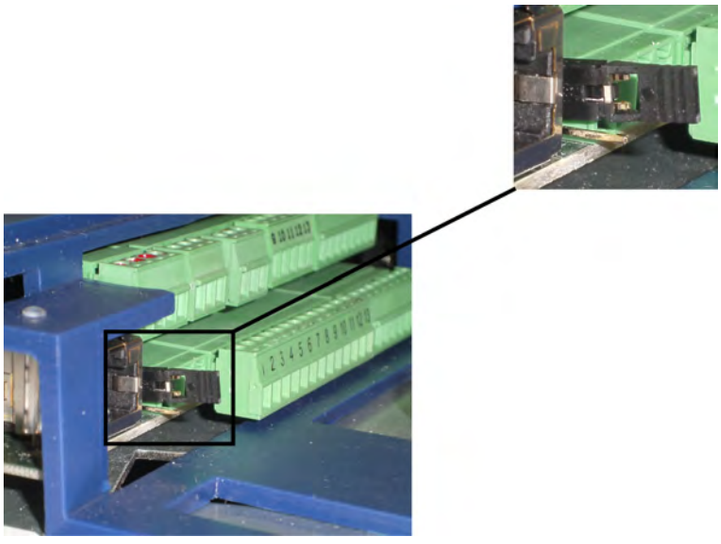
Caution!
Incorrectly wired connections can destroy the electrical/electronic components.
Electrostatic discharges can be hazardous to the electronic components and lead to errors in the software.

The bus cable is connected at the X-CAN interface of the ZAdyn4C



Connection CAN

To activate the terminating resistance, the jumper at terminal J1 must be plugged to the top two pins (see fig.).



☞ For more detailed information on CANopen lift, see chapter "Serial communication/CANopen lift"

5.16 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 ZAdyn4C 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 maximum line length is 50 m.
- Use shielded lines.

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

- Safe disconnection between coil and contacts according to EN 60664-1 or equivalent standard.
- Rating according to the technical data of the STO inputs (typ. 24 V/12 mA). It is recommended to use relays with hard gold-plated contacts.
- Switching voltage min. 60 VDC
- When selecting the relay, ensure sufficient interference immunity to interference voltages on the control side (coil), such as for capacitive couplings in long control cables. 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.

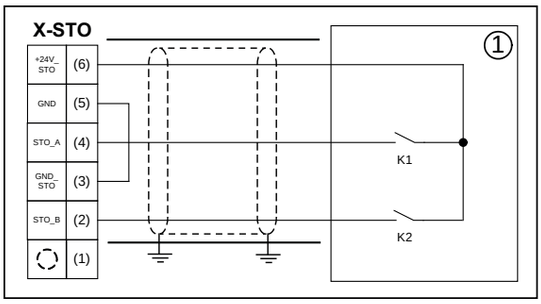
5.16.1 Terminal assignment X-STO

no.	Designation	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

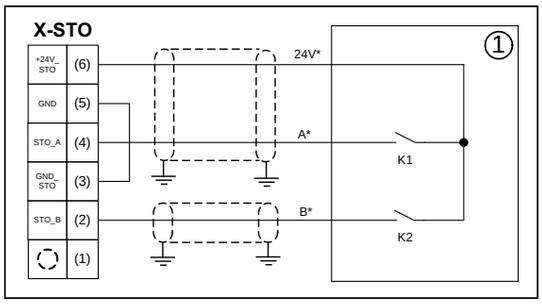
5.16.2 Technical data X-STO

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
Connection terminal range	min. 0.25 mm²...max. 2.5 mm²

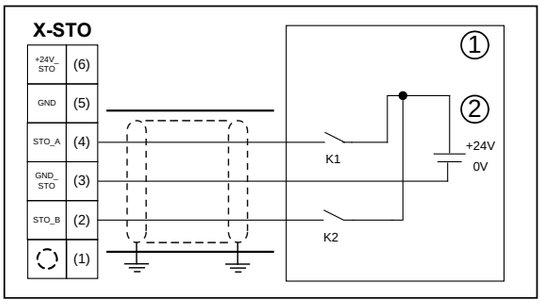
5.16.3 X-STO connection



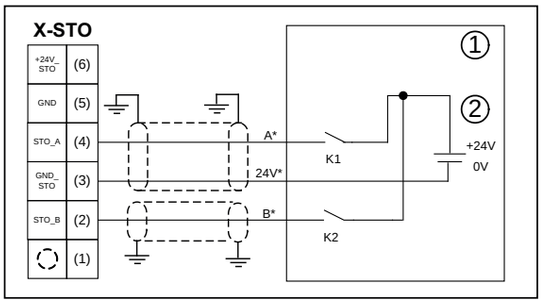
Connection with internal 24 V voltage and protected routing
1 Brake control



Connection with internal 24 V voltage using two separate jacketed cables
1 Brake control
** Wire designation of the pre-assembled connecting lead L-SL-xx-HX-ZA4-STO*



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



Connection with external 24 V voltage using two separate jacketed cables
1 Brake control
2 External voltage source SELV/PELV
** Wire designation of the pre-assembled connecting lead L-SL-xx-HX-ZA4-STO*

Danger!
When using an external 24 V voltage source to activate the STO inputs, only SELV/PELV voltages may be used.
When using an external 24 V voltage source and the pre-assembled connecting leads L-SL-xx-HX-ZA4-STO, the plug pin allocation must be adapted according to the figure. In this case, remove the 24V marking on the wire because this is now used for the ground connection.

5.17 Rotary encoder connection for asynchronous motors (X-ENC8, X-ENC15)

X-ENC8: 8-pole terminal strip for connection with single wires
X-ENC15: 15-pole SUB-D jack for connection with Sub-D plug

Information
At the X-ENC 15 connection, both incremental encoders for asynchronous motors and absolute encoders for synchronous motors can be connected.

Information
- Use a shielded cable for the connection.
- Attach the shielding on the frequency inverter corresponding to the terminal or pin assignments.
- Configure the connection between the ZAdyn4C and the rotary encoder without additional terminal points

CAUTION!

Caution!
The pin assignment of the SUB-D socket X-ENC15 is not standardised. When using encoders from other manufacturers, make sure that these have the same contact assignment and an interface with identical specification.

CAUTION!

Caution!
Before the rotary encoder is plugged in/connected, the rotary 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
```

5.17.1 Technical data X-ENC8 X-ENC15

Encoder types	Sine encoder Incremental encoder TTL Incremental encoder HTL (X-ENC8 only)
Rotary encoder 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)
Connection	Shielded twisted pair cable
Terminal assignment X-ENC8	max. 1,5 mm²
Max. cable length	25 m

5.17.2 Terminal assignment X-ENC8

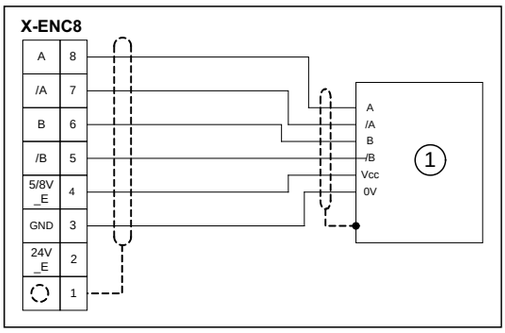
1	⏚	Shielding
2	+24V_E	+24 V power supply for HTL encoder
3	GND	Ground
4	+5/8V_E	+5 V power supply for sinus and TTL encoder
5	/B	Track B inverse
6	B	Track B
7	/A	Track A inverse
8	A	Track A

5.17.3 X-ENC15 pin assignment

1	-	-
2	-	-
3	-	-
4	+5 V_E	+5/8V voltage supply (power supply is switched off if the rotary encoder is missing)
5	DGND	Ground voltage supply of rotary encoder
6	-	-
7	B	Analog track B
8	-	-
9	-	-
10	-	-
11	-	-
12	A	Analog track A
13	/A	Analog track A inverse
14	/B	Analog track B inverse
15	DGND	Ground voltage supply of rotary encoder
Housing		Shielding

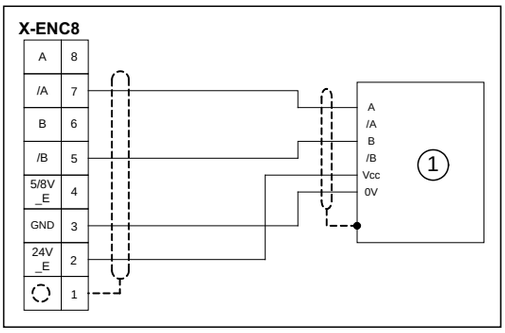
5.17.4 Rotary encoder connection to terminal X-ENC8

TTL incremental encoder (5V), sine encoder (1Vss)



TTL encoder (30V)
1 TTL- or sine encoder

HTL encoder



HTL encoder connection
1 HTL-encoder

Information

Pay attention to correct connection of the signal tracks when connecting HTL incremental encoders!

- signal A ⇢ input /A
- signal B ⇢ input /B

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

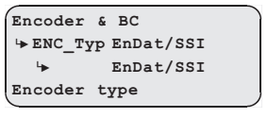
Information
At the X-ENC 15 connection, both incremental encoders for asynchronous motors and absolute value encoders for synchronous motors can be connected.

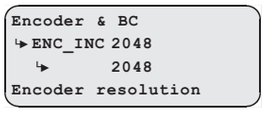
CAUTION!

Caution!
The pin assignment of the SUB-D-socket X-ENC15 is not standardised. When using encoders from other manufacturers, make sure that these have the same contact assignment and an interface with identical specification.

CAUTION!

Caution!
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.





5.18.1 Technical data X-ENC15

Encoder types	Absolute value encoder with EnDat 01, SSI, BiSS-C or Hiperface interface Absolute encoder type ERN1387
Rotary encoder 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)
Connection	Shielded twisted pair cable
Max. cable length	25 m

5.18.2 Pin assignment X-ENC15 for absolute value encoder with EnDat 01, SSI, ERN1387 interface

1	DATA	Data line for communication with the absolute encoder
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 power supply absolute encoder
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 power supply absolute encoder
Housing		Shielding

5.18.3 Pin assignment X-ENC15 for absolute value encoder with HIPERFACE interface

1	Data+	Data line for communication with the absolute encoder
2	Data-	Data line inverse
3	-	-
4	U_s	+5/8V voltage supply (power supply is switched off if the rotary encoder is missing)
5	-	-
6	-	-
7	+SIN	Analog track A
8	-	-
9	-	-
10	-	-
11	-	-
12	+COS	Analog track B
13	REFCOS	Analog track B inverse
14	REFSIN	Analog track A inverse
15	GND	Ground power supply absolute encoder
Housing		Shielding

5.19 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 and transmits them to the control. The resolution of the rotary encoder simulation is identical to the resolution of the rotary encoder.

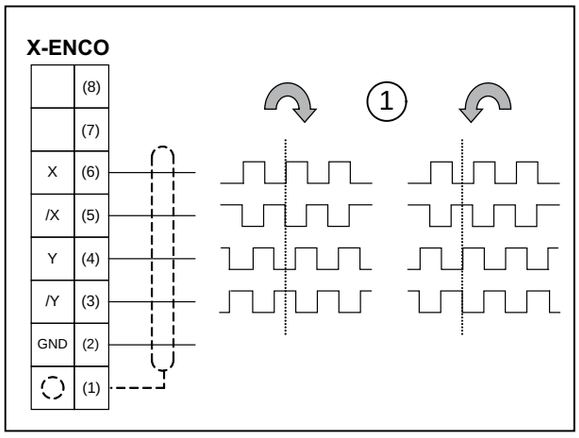
Information
The X-ENCO connection is not a connection for the rotary encoder but an output for transmission of data to the control. The rotary encoder is connected to the connection X-ENC8 or X-ENC15.

Information
As a result of the connection of an external 24 V voltage source to terminal X-EXT, the rotary encoder simulation is active even when the ZAdyn4C is switched off.

5.19.1 Technical data X-ENCO

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	Shielded twisted pair cable
Clamping range	max. 1.5mm²

5.19.2 Connection X-ENCO



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

5.20 External 24 V power supply (X-EXT)

By applying an external 24 V power supply to terminal X-EXT, the following functions are active even when the ZAdyn4C is switched off:

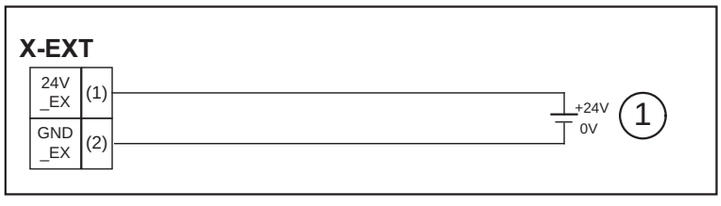
- Rotary encoder simulation
- ZETAPAD (parameter changes are possible)
- USB interface of the ZApad

Information
The external 24-V power supply may only be switched on if the mains connection voltage is not applied.

5.20.1 Technical data

Voltage range	23 ... 26 V
Current consumption	370 mA

5.20.2 Connection X-EXT

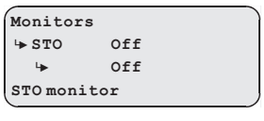


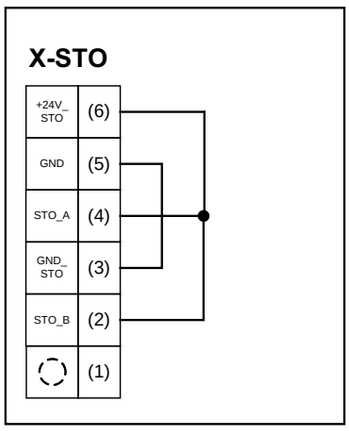
Connection external power supply
1 external power supply
() terminal designation of connector

5.21 Motor contactors (optional)

Information
The STO connection must be bridged if motor contactors are used (see fig.).
The monitor of the STO function must also be deactivated.

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



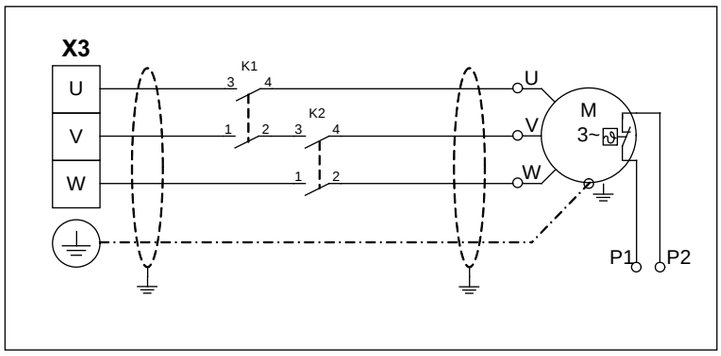


STO connection bridged

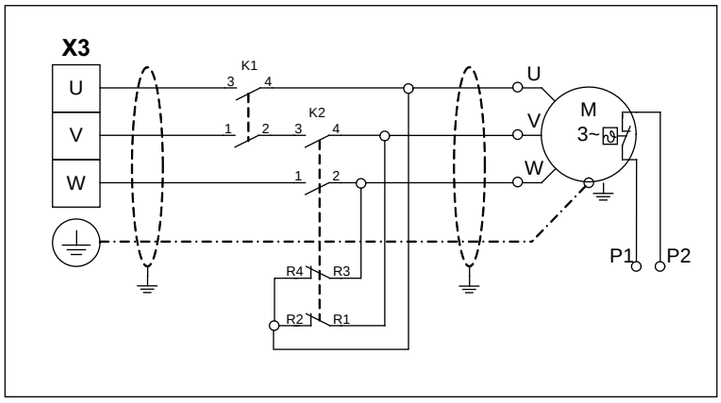
The motor contactors are selected depending on the motor type and the corresponding motor data. The contacts of the motor contactors must be positively driven according to EN 81-1 und EN 81-20.

The maximum cable length to the motor contactors for non-shielded cables is **200mm**. Shielded cables must be used if the distance between the contactors and the ZAdyn4C is larger!

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.



Asynchronous motor connection



Synchronous motor connection

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.

5.21.1 Monitoring of the motor contactors (X-MON)

Information

The switching states of the motor contactors must be monitored according to EN 81-1 or EN 81-20.
The ZAdyn4C contactor monitoring does not replace this monitoring of the motor contactors demanded in EN 81-1 or EN 81-20!

The ZAdyn4C 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 travel.

CAUTION!

Caution!
Operating gearless motors is only permissible with connected and activated contactor monitoring!

The contactor monitoring can be activated/deactivated in the **Monitoring/CO** menu.

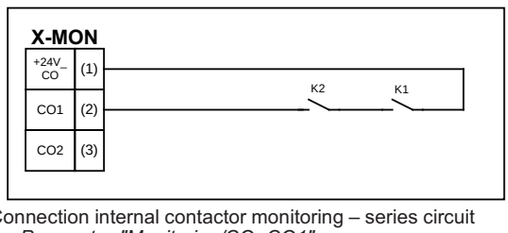
```
Monitors
↳ CO        Off
  ↳         CO1
Contactor monitoring
```

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

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

5.21.1.1 Technical data internal contactor monitoring

Monitoring voltage	+24 VDC / 8 mA
Contact type	Normally open contact (NO)
Number of inputs	2
Clamping range	max. 1,5 mm²



Connection internal contactor monitoring – series circuit
1 Parameter "Monitoring/CO=CO1"
() terminal designation of connector

CAUTION!

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

5.22 Brakes

5.22.1 Brake release monitoring (X-MON)

Information
The brake release monitoring serves as monitoring for redundancy and the operation status of the brakes.
It is recommended to connect the brake air monitor to the ZAdyn4C for optimum starting and stopping.
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.

Information

Monitoring voltage	+24 VDC / 8 mA
Contact type	Normally open contact (NO) or normally closed contact (NC)
Number of inputs	4
Clamping range	max. 1,5 mm²
Current consumption at 24 V	typ. 8 mA

The contactor monitoring can be activated/deactivated in the menu **Monitoring**.

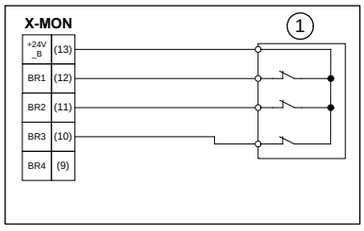
```
Monitoring
↳ BR       1*NC
  ↳        3*NC
Brake control (BR1..BR4)
```

The lock function on the ZAdyn is engaged by activating the “LOCK_X=On” parameter in the **Monitoring** menu.

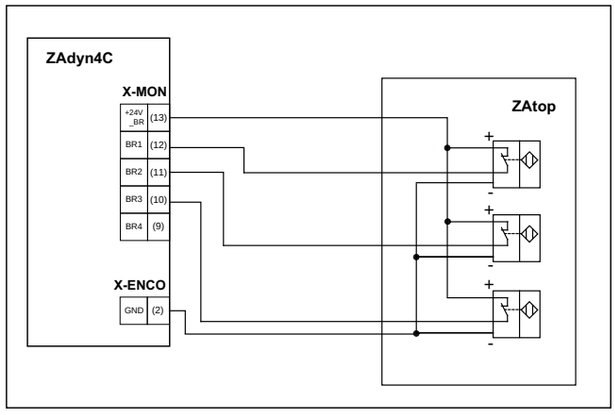
```
Monitoring
↳ LOCK_X  Off
  ↳       On
Lock on malfunction
```

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

5.22.2 Brake release monitor connection



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



Connection of brake release monitor with initiators
0 terminal designation of connector

Information
- The 24V voltage supply for the brake bleeding monitoring can also be tapped on terminals +24V_CO (X-MON: terminal 1) and +24V_BC (X-MON: terminal 5).
- For the brake bleeding monitoring with initiators, the signal GND can also be tapped on terminal 8 of the connection terminal X-MON.

CAUTION!

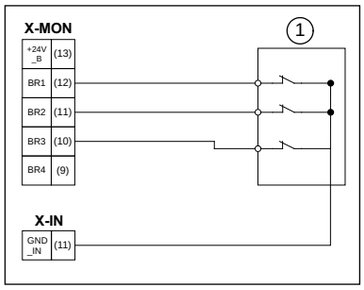
Caution!
The internal 24 V power supply is provided solely for the brake release monitoring. Switching consumer load with this voltage is prohibited!

5.22.3 Inversion of the logic of brake bleeding monitor inputs

The logic of brake bleeding monitor inputs can be inverted. This requires the jumper J4 to be reconnected.

Information
- If the jumper J4 is reconnected, the logic of brake bleeding monitor inputs as well as digital inputs are inverted. To invert the logic of digital inputs, see chapter “Digital inputs (X-IN) / Inversion of the logic of brake bleeding monitor inputs”.
- If the logic of brake bleeding monitor inputs is changed, the brake bleeding monitoring contact type does not change.

5.22.3.1 Connecting X-BR with inverted logic



Brake release monitor connection
1 Monitoring contacts
() terminal designation of connector

5.22.3.2 Technical data of brake bleeding monitor inputs for inverted logic

Output voltage	+12 ... 13 VDC
Switching level low/high	<5 VDC / >11 VDC
Current consumption	6 mA (-20%)
Clamping range	max. 1,5 mm²

5.22.3.3 Reconnecting the jumper J4

Reconnect the jumper J4 as described in the chapter "Inverting the logic of the digital inputs / Reconnecting the jumper J4".

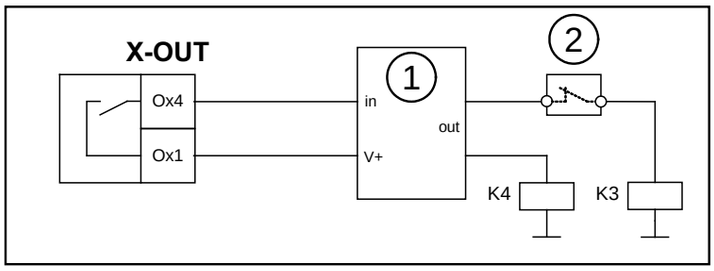
5.22.4 Triggering of the brakes

The signal for controlling the brakes is provided via a zero potential digital output (see "Digital outputs"). This normally open contact can be used either by the control for further processing or directly for switching the brake contactor (see fig.).

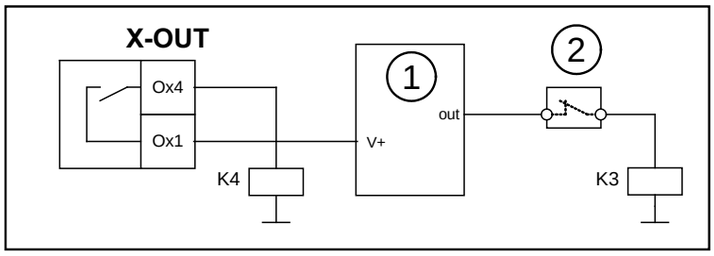
Information
To achieve optimum travel and position behavior, the brakes must be **instantaneously** opened and closed via this contact!

To reduce noises during brake disconnect, during normal operation the brakes should be switched to the alternating current side (K4). The brakes are switched-off slower and thus quieter through the rectifier.

To ensure instantaneous brake application in emergencies, during inspection drives and return rides, use a second contactor (K3), which disconnects the brakes from the direct current side. Integrate this contactor into the safety circuit.



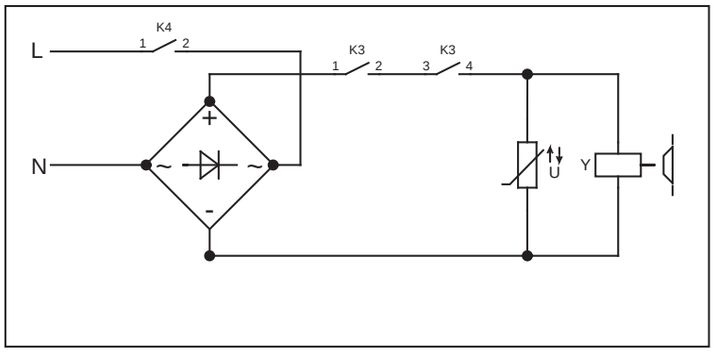
Activating the brakes by the control system
1 Brake control
2 Safety circuit



Actuating the brakes via the frequency inverter and control
1 Brake control
2 Safety circuit

CAUTION!

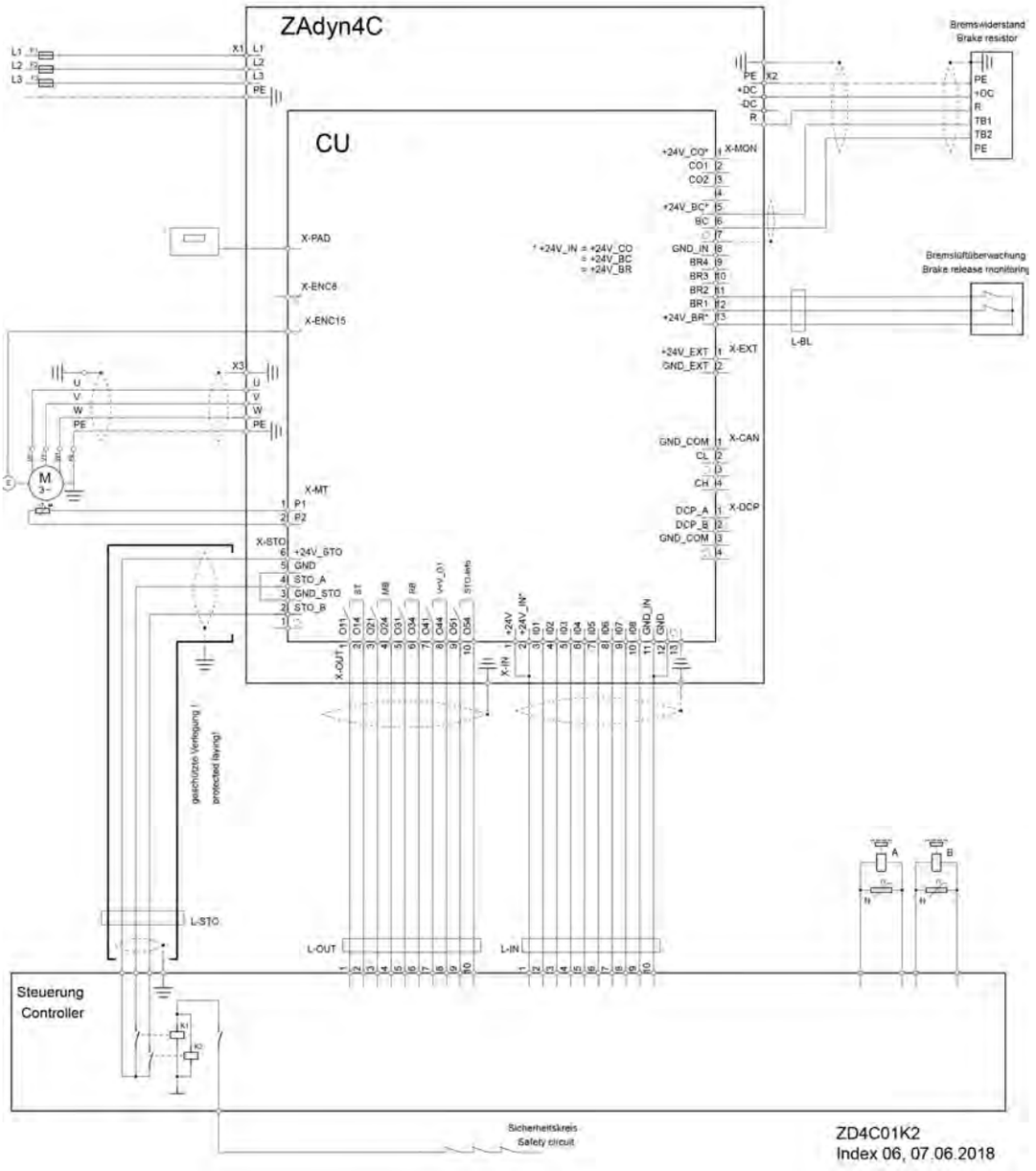
Caution!
The brakes must be protected with varistors against overvoltage from switching operations. The varistor must lie directly on the coil or its connections.
Due to the high operating current, master contactors must be used to switch the brakes!



Brake control principle circuit diagram

The contacts from K3 must close before the contact from K4 and are only permitted to open after the contact from K4 has opened.

5.23 Circuit suggestion for ZAdyn4C



6 Accessories

6.1 ZApad control terminal

The ZApad is an operating module independent of the ZAdyn4C. It can be used to operate and configure all ZETADYN 3 and ZAdyn4C frequency inverters.
Remote control of the frequency inverter is feasible when a longer connection line is used.

6.1.1 Mounting / Fastening

6.1.1.1 ZAdyn4C 011-032

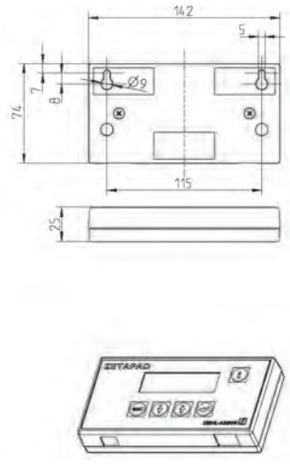
To fasten it to the ZAdyn4C, the ZApad is inserted into the recess on the lid and pressed in.

The ZApad can also be fixed to a magnetic base. This is done using three magnetic strips which are included. The magnetic strips are stuck into the three recesses on the bottom of the ZApad.

6.1.1.2 ZAdyn4C 040-074

The ZApad is secured to the housing of the ZAdyn via magnetic strips. The magnetic strips are stuck into the three recesses on the rear of the ZApad. The magnetic strips are supplied with the ZApad.

6.1.2 Dimensional drawing



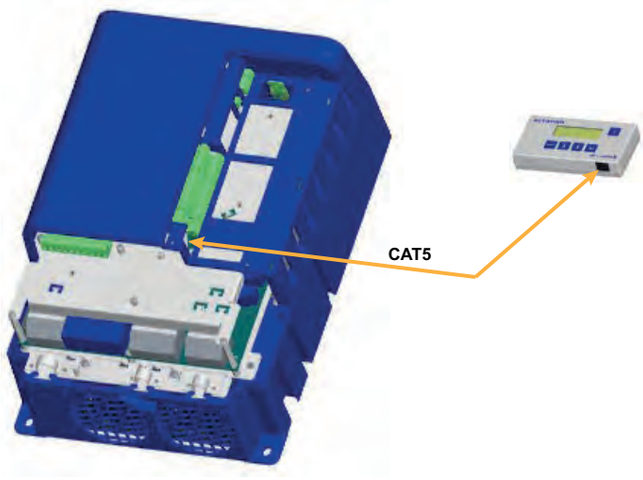
Dimensional drawing ZApad

6.1.3 Connection

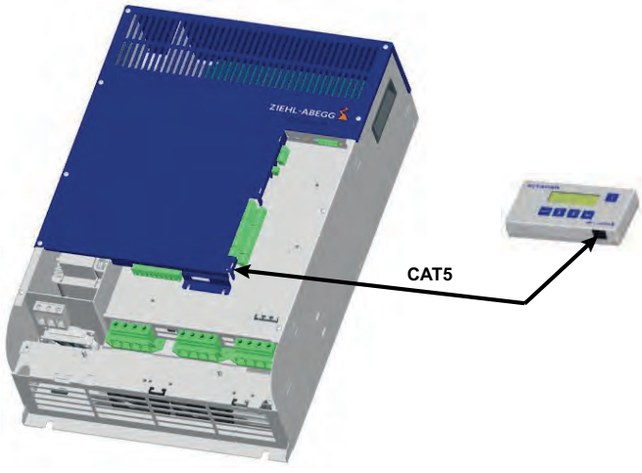
The ZApad must be connected to the RJ-45 female plug of the operating terminal and the ZAdyn4C (X-PAD).

Connection

CAT5 network cable, 8-core
both sides RJ-45 plug, 8-pole
maximum line length: 50 m
line cross-section >= AWG26



Connecting the ZApad to ZAdyn4C 011-032



Connecting the ZApad to ZAdyn4C 040-074

7 Operation and parameterising

7.1 Possibilities for operation and configuration

The following operations can be performed on the ZAdyn4C with the aid of the various operating facilities:

- The parameters needed for commissioning can be set
- Simple measurement and control functions can be carried out
- Service conditions can be recorded

7.1.1 ZApad control terminal

The ZApad is an operating module independent from the ZAdyn4C. It can be used to operate and configure frequency inverters of the ZAdyn4C and ZETADYN 3C type, power feedback units of the ZArec type and evacuation modules of the EVAC 3 type.

7.1.2 Remote control via ZAmon software

When the ZAmon-software is used, the ZAdyn4C can be operated via a PC/notebook (see chapter "ZAmon software"). A requirement is the availability of a ZApad.

7.1.3 Remote control via the elevator controller display

This requires an elevator control system which supports the DCP protocol or CANopen lift protocol, as well as an existing connection between ZAdyn4C and elevator control system. Please see the elevator control system operating instructions for information on operating the frequency inverter via the elevator control system.

7.2 Menu navigation

Information
The menu navigation is designed identically for ZApad and ZAmon operating facilities! Please refer to the corresponding operating instructions for navigation with an elevator control system!

Information
Modifying parameters is only possible when the machine is in standstill!

Operating interface ZApad and ZAmon

7.2.1 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

7.2.2 Menu and parameter navigation

Main page

```
 ZIEHL-ABEGGSE
ZAdyn4CS 011-D
 SN: 09229587/0002
Phone: +49 794016308
```

- Actuate with any key

Menu section

```
 ZAdyn4C
->Startup
 Statistics
 Memory Card
```

- Select required menu
Confirm menu selection

Parameter section

```
Startup
 USR_LEV Basic
->MOT_TYP SM250
 n 96 rpm
```

Parameter selection
- Confirming parameter values

Changing parameter

```
Startup
↳MOT_TYP SM225
  ↳      SM250
Motortype
```

- Enter / select parameter value.
- Confirm value

7.2.3 The different operating levels

The firmware of the ZAdyn4C is divided in two operating 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 as described in chapter 10 "Parameter List" are displayed.
- Depending on the parameterisation, unneeded parameters are hidden automatically to give a better overview.

Information

- You can switch between Basic-Level and Advanced-Level by a long press of the esc key.
- The **LCD & Password/USR_LEV** sets the operator level that is active after starting the ZAdyn4C.

7.2.4 Meaning of the arrows appearing in the display:

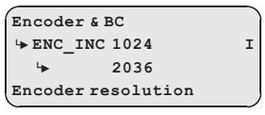
Motor-Typenschild → Encoder & BC Anlage-daten Steuerung	→	Selecting a menus in the menu level
Motor-Typenschild n 128 rpm ↳ f 18.0 Hz I 40.4 A	↳	Selecting changeable parameters in the menu
Anlage-Daten MOD_n* Mit D..i2 └ n* 94 rpm __D 0.240 m	└	Selected parameter can be modified, but is blocked at the 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.
Serial-No-------- ZAdyn4CA 013 SN:06128238/0001 3.17-1037	i Zahl	Current position (page number) in the INFO-menue
MMC-Recorder ? REC_MOD On REC_CFG 0 TRIG_BY Error	□	The recorder for recording measurements on the memory card is activ
Start ERR T_2 1.0 s └ T2_real 0.8 s T_3 0.1 s	ERR	Interference of the ZAdyn4C The ZAdyn4C must be deactivated

7.3 Entering numerical values

Entering numerical parameter values can be done using two different facilities:

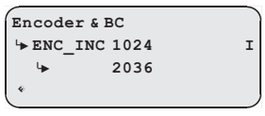
7.3.1 Continuous change of a parameter value

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.



7.3.2 Changing individual digits

When changing a parameter by a large value, it is possible to change the individual digits separately
After parameter selection, the desired digit can be selected with the i key and then changed between 0 and 9 using the ↑ & ↓keys.
The selected digit is marked with an arrow.



8 Start-up

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".

Information
This start-up assumes the factory settings for the digital inputs and outputs, rotary encoder inputs and monitoring contacts have not been modified!

Requirements for error-free commissioning:

- Mains line is connected
- Motor is connected
- Brake chopper or Brake resistor are connected
- Controller and monitoring inputs are connected
- Rotary encoder connected

Information
Startup takes place in the basic level. To go to the advanced level, press the key long (see chapter "Opeation and Parameterisation / The different operating levels") or go to the **Startup** menu and set the **USR_LEV = Advanced**parameter.

```
Start-up
↳USR_LEV Advanced
  ↳      Advanced
User level
```

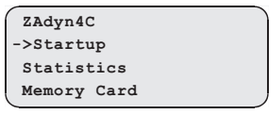
8.1 Activating the ZAdyn4C

The ZAdyn4C will activate after a self-test after applying mains voltage. The following display appears:

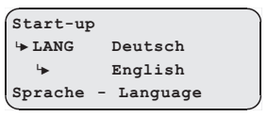
```
ZIEHL-ABEGGSE
ZAdyn4C
SN:12345678/123
Phone +49 794016308
```

8.2 Configuring the ZAdyn4C

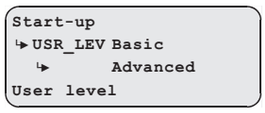
If the ZAdyn4C doesn't have preset parameters, you have to adjust the following parameters before start-up.



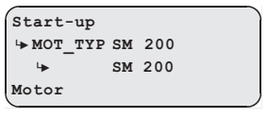
Select menu **"Startup"**



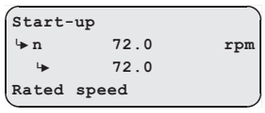
Select the **"LANG"** parameter
Choose language
The languages German and English are integrated as standard. A third language can be loaded with the memory card.



Select parameter **"USR_LEV"**
The USR_LEV parameter can be used to set the operator level that is active after starting the ZAdyn4C.



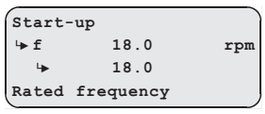
Select parameter **"MOT_TYP"**
Enter the operated motor type



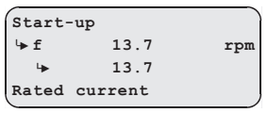
Select parameter **"n"**
Enter the motor's rated speed

Information

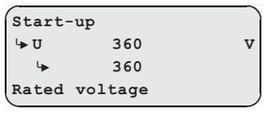
A With asynchronous motors, it is possible to determine the motor data automatically by means of the Autotune function of the ZAdyn4C and to save them in the parameter memory. See the "Special functions/Autotune Function" for further information about the Autotune function.



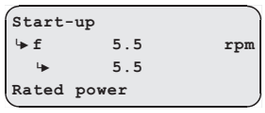
Select parameter **"f"**
Enter the motor's rated frequency



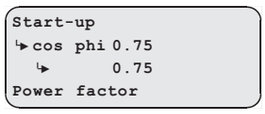
Select parameter **"I"**
Enter the motor's rated current



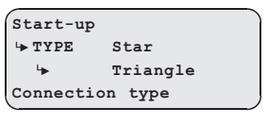
Select parameter **"U"**
Enter the motor's rated voltage



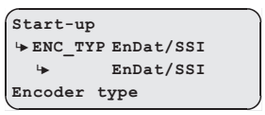
Select parameter **"P"**
Enter the motor's rated power



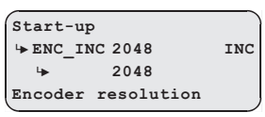
Select parameter **"cos phi"**
Enter power factor of the motor
A **Possible only for asynchronous motors**



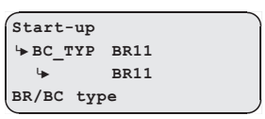
Select parameter **"TYP"**
Choose connection type of the motor



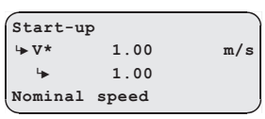
Select parameter **"ENC_TYP"**
Enter the type of encoder used



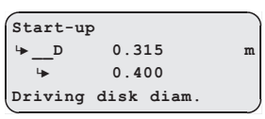
Select parameter **"ENC_INC"**
Enter the encoder resolution



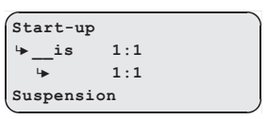
Select parameter **"BC_TYP"**
Enter the used brake resistor or brake chopper



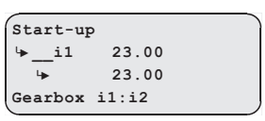
Select parameter **"V*"**
Enter the installation rated speed



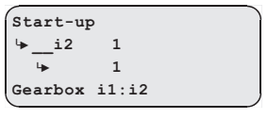
Select parameter **"__D"**
Enter the diameter of the traction sheave



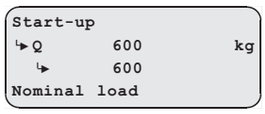
Select parameter **"__is"**
Enter the installation's type of suspension



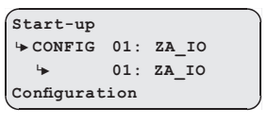
Select parameter **"__i1"**
Input of i1 of the gearbox ratio i1:i2
A **Possible only for asynchronous motors**



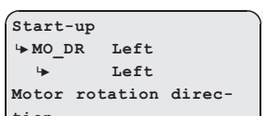
Select parameter **"__i2"**
Input of i2 of the gearbox ratio i1:i2
A Possible only for asynchronous motors



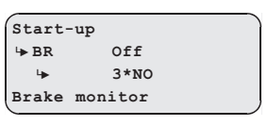
Select parameter **"Q"**
Enter the elevator installation's rated load



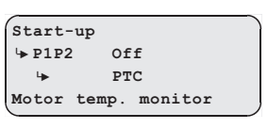
Select parameter **"CONFIG"**
Configuration of the digital inputs according to the used control system and type of communication



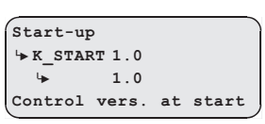
Select parameter **"MO_DR"**
Changing the rotating direction of the motor
It must be observed the with triggering the input RV1 the cabin drives upwards



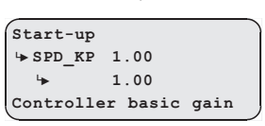
Select parameter **"BR"**
Definition of the brake monitoring



Select parameter **"P1P2"**
Motor temperature monitoring



Select parameter **"K_START"**
Amplification at start (see chapter "List of parameters/menu start-up")



Select parameter **"SPD_KP"**
Multiplication factor to modify the calculated basic amplification SPD_C

8.3 Automatic operating-curves default

Using the automatic operating-curve defaults, the parameters responsible for operating curves and travel speeds are pre-assigned **dependent on the "installation nominal velocity "V*"**.
As soon as the **V*** parameter is changed, the query “Automatic travel curve assignment?” appears, and can be answered with Yes or No.
Preconfigured parameters through the automatic operating defaults:

"Acceleration" menu	"Deceleration" menu	"Travelling" menu
A_POS R_POS1 R_POS2	A_NEG R_NEG1 R_NEG2	V_2 V_3

8.4 Testing the “Safe Torque Off” function (STO)

In the course of start-up, the "Safe Torque Off (STO)" function must be tested as a safety function 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 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 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 be marked 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 ZAdyn4C 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 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 be marked 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 ZAdyn4C 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 349) after 2,5 s. Then remove the bridge at the relay contacts again.

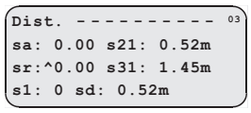
If one of the test steps does not achieve the described result, please contact the ZIEHL-ABEGG customer service.

The STO safety function test should be repeated at regular intervals (e.g. annually during the TUEV inspection).

8.5 Setting the switch-off points

8.5.1 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

The following parameters influence the deceleration paths:

- V_1 (Positioning speed)
- V_3 (Traveling speed)
- R_NEG1 (upper round-off)
- R_NEG2 (lower round-off)
- A_NEG (Deceleration)

When a parameter is changed, the newly calculated deceleration path is indicated in the display after confirming the change.

To have some leeway to optimise the travel behaviour, the interrupt points should be set to a deceleration path larger than that which was calculated.
Subsequent reduction of the creep path can be performed directly at the frequency inverter in the menus**Delay/S_DI3** (for V_3) and **Delay/S_DI2** (for V_2).

To reach almost identical positioning in all floors, the interrupt points must be set with a precision of **± 1 cm**.

8.5.2 Cut-off points for travel speed V_1

To1prevent overshooting the flush alignment, the interrupt points V_1, dependent on the deceleration A_NEG, must be set between **2 and 5 cm** before flush alignment. If the ride ends before alignment, the interrupt points need to be correspondingly adjusted. To reach almost identical positioning in all floors, the interrupt points must be set with a precision of **± 1 mm**.

8.6 Carrying out the first test run

Caution!
S
Operating synchronous motors without encoder offset can cause uncontrolled motor movements

In synchronous motors, an encoder offset calibration must be made prior to initial travel (see chapter "Special functions/rotary encoder calibration")!
When a Ziehl-Abegg motor is purchased in connection with a frequency inverter, the offset alignment is already taken care of.
If third-party motors are used, the offset must be performed as described in the chapter "Special functions/rotary encoder calibration".

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.

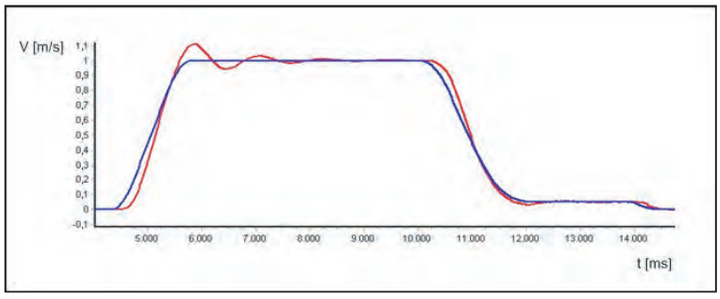
If fault messages appear, an error list is available in the “Diagnose” chapter together with the corresponding error causes

8.7 Optimisation of the startup and drive behaviour

The "SPD_KP" (amplification) parameter can be used to optimise the setting of the speed controller acting during travel. The parameter can be changed in the **Control/SPD_KP** menu.

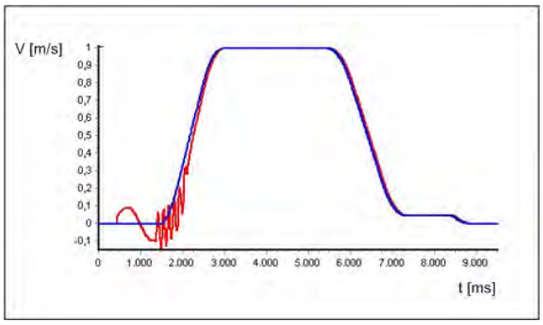
```
Control
↳SPD_KP  1.00
  ↳      0.95
Speed controller basic
gain
```

You can generally set the speed control by changing the factor for the basic amplification ("SPD_KP"). If significant control deviations occur during the trip (especially during acceleration and deceleration), (see Fig.), the amplification has been set too low. In this case, increase the factor for amplification ("SPD_KP").



Control deviations when the amplification is set too low
blue Set-value - travel speed
red Actual-value - travel speed

If the motor is noisy or starts vibrating (see figure), amplification is set too high. In this instance, the factor for amplification ("SPD_KP") should be reduced.



Control deviations when the amplification is set too high
blue Set-value - travel speed
red Actual-value - travel speed

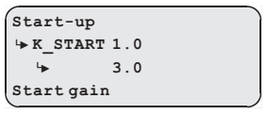
Optimum setting of the speed controller

The following procedure is recommended to obtain an optimum setting of the speed controller:
Increase the parameter **Loop control/SPD_KP**until the motor causes noises/vibrations when starting up.
Decrease the parameter **Loop control/SPD_KP**until the motor causes no noises/vibrations when starting up.

Turning away when starting up

Turningawaywhen starting up is indicated by uncontrolled movement of the traction sheave. The reason for this is too weak a gain of the speed controller for the time at which the brake opens.

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!

9 "Safe Torque Off (STO)" function

9.1 General

The"Safe torque off (STO) function in the ZAdyn4C 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 ZAdyn4C cannot supply any energy to the motor which can cause a torque.
The STO function allows the contactors that are usually installed between ZAdyn4C and motor in lifts to be omitted. The requirements in accordance with EN 81-1 section 12.7.3 or EN 81-2 section 12.4.1 are therefore met. The requirements in accordance with EN 81-20 section 5.9.2.5.4 d) or section 5.9.3.4.2 d) are also met.
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).

9.2 Safety concept

The devices of the ZAdyn4C 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 elvator control is not necessary in order to meet the requirements of EN 81-1 or EN 81-20. The requirements are met by the internal diagnostic unit.

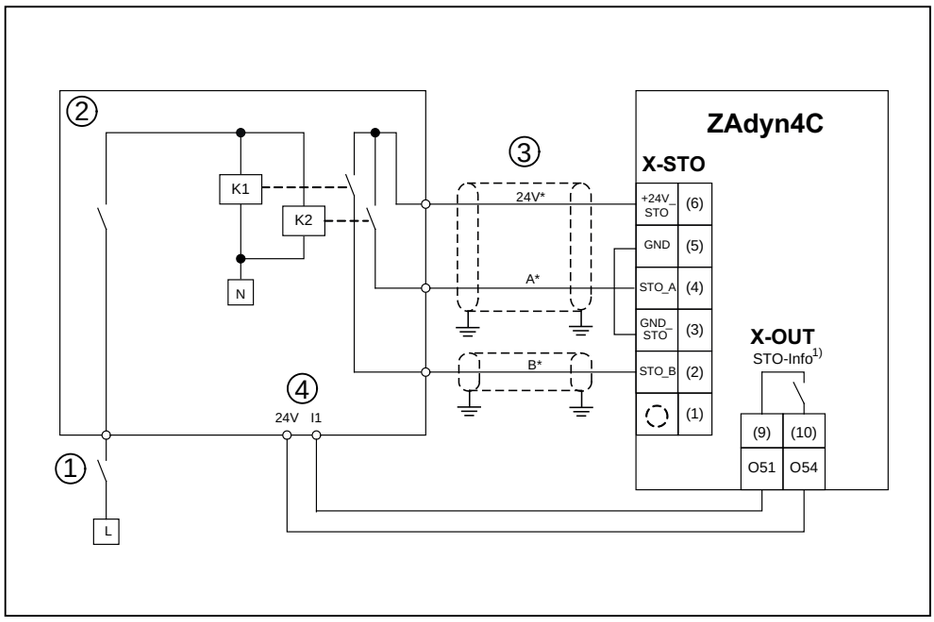
If the contacts are switched differently (e.g. one of the two relays does not open), this will be detected at the STO inputs by the different signals. In this case the internal diagnostic unit will turn off safely after a max. 1600 ms. In this case, a reset is only possible by switching the device off 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 ZAdyn4C by activation of the STO function. Therefore, you must disconnect the ZAdyn4C 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).

9.3 Principle circuit diagram



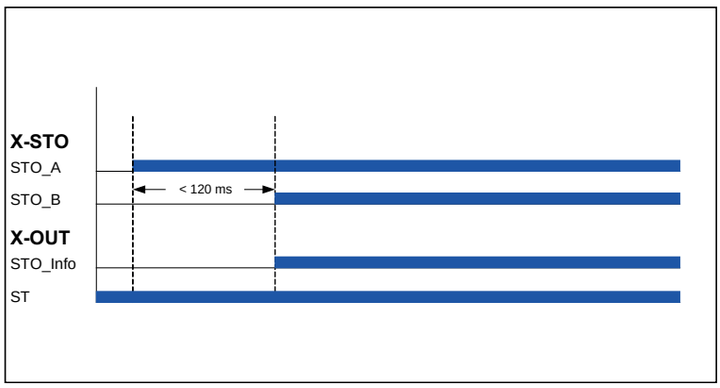
Principle circuit diagram "Safe Torque Off (STO)" function
1 Electrical safety chain
2 Brake control
3 Protected routing or design with two separate jacketed cables (see chapter "STO interface (X-STO)")
4 Digital inputs control
** Wire designation of the pre-assembled connecting lead L-SL-xx-HX-ZA4-STO*
1) Information only, not safety-related

9.4 Electrical connection

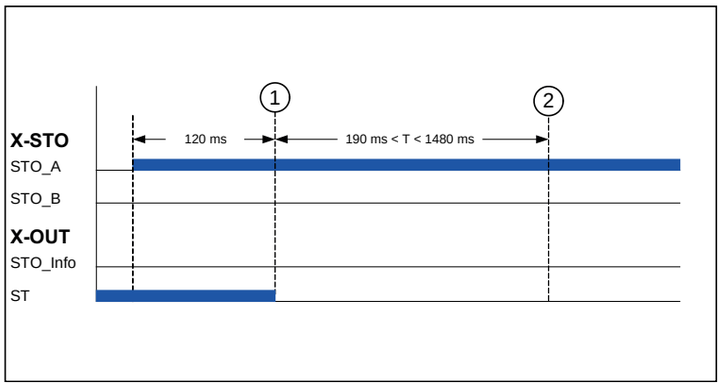
The connection is made via the interface X-STO on the ZAdyn4C (see chapter "Electrical installation / STO interface (X-STO))".

9.5 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 ZAdyn4C 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 ZAdyn4C for every journey:
- If the safe torque off is not cancelled (signals STO_A, STO_B remain LOW) at the beginning of travel after 2,5 s, the error "STO: Remains" (error 348) is triggered.
- If no safe torque off takes place (signals STO_A, STO_B remain HIGH) at the end of travel after 2,5 s, the error "STO: Missing" (error 532) is triggered.
- If the safe torque off is cancelled at standstill (no travel signals applied) (signals STO_A, STO_B become HIGH) and no travel signal is applied after 2,5 s, the error "STO: Travel signal missing" (error 349) 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)"")

9.6 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 ZETASYN (30-pole)

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

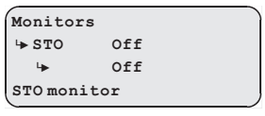
The cabin movement must be taken into consideration in a risk analysis of the complete system.

9.7 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).

The STO function can be deactivated by the following measures:
- Bridging of +24V_STO (terminal 6) to the two inputs STO_A (terminal 4) and STO_B (terminal 2)
- Bridging of GND (terminal 5) to GND_STO (terminal 3)

If the STO function is deactivated, the STO function monitoring must also be deactivated in the menu **"Monitors/STO"**.



9.8 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".

9.9 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 81-1, section 12.7.3 or DIN EN 81-2, section 12.4.1[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 by a new one
max. permissible time delay between the signals STO_A / STO_B	max. 120 ms (on exceeding this, ZAdyn4C outputs an error message, see chapter "Safe Torque Off (STO) Function / Notes on Operation")

[1)] TUEV Rheinland conducted design pattern 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

10 Serial communication

10.1 DCP (Drive Control & Position)

The DCP mode enables series control of the ZAdyn4C via an RS485 interface. The two-directional series control conveys the control signals via a 2 or 3-wire connection cable. In general, the cables X-IN and X-OUT are no longer required, which reduces the wiring outlay significantly.

10.1.1 Electrical connection

The connection is made via the interface X-DCP on the ZAdyn4C (see chapter "Electrical Installation / DCP Interface (X-DCP)".

10.1.2 The various DCP protocols

DCP_01

The functional principle is identical to a conventional actuation via the control inputs (X-IN) and control outputs (X-OUT). The elevator control system transmits the required control signals (e.g. controller enable, direction of travel, speed, deceleration point) to the ZAdyn4C as command bits and receives status messages in the form of status bits as return information from the ZAdyn4C (e.g. signals for mechanical brakes, motor contactors, STO function, speed monitoring and general alarm).

DCP_03

The DCP_03 protocol is an expanded version of the DCP_01 protocol. As compared with the DCP_01 protocol, it has:

- faster data transmission
- a faster communication channel
- Automatic compatibility checking between the software in the ZAdyn4C and the software in the control system

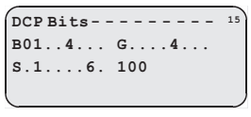
DCP_02
The transmission of the command and status bits is performed according to the DCP_01 protocol. The travel is also oriented towards the remaining distance: the control uses the ZAdyn4C start command to specify the path to the next level. This path is continuously updated during travel (remaining distance). The ZAdyn4C adapts its travelling speed in line with the remaining distance, and the cabin travels directly into the level in a smooth and time-optimised manner without the use of creep speed. An absolute value encoder must be present in the shaft in order to specify the remaining distance! The braking distance (shown in the frequency inverter display) must be manually entered into the control prior to this. Using the braking distance entered and the current remaining distance, the control can decide during travel whether it is still possible to stop in the event that a corresponding command is received. If no command is received by the necessary delay path at the latest, then the remaining distance is extended by an additional level.

DCP_04
The DCP_04 protocol is an expanded version of the DCP_02 protocol. Compared to the DCP_02 protocol, it has:
- faster data transmission
- a faster communication channel
- Automatic compatibility checking between the software in the ZAdyn4C and the software in the control system
- a Braking distance transmission: The control unit continuously transmits the braking distance for the current speed to the open loop control. That means during an incoming call, the trip the open loop control can decide whether it is still possible to stop.

Signal curve DCP_01, DCP_03 Signal curve DCP_02, DCP_04

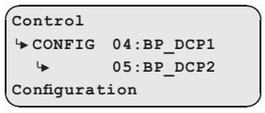
Command byte			Speed default byte			Status byte	
B0	Controller enable RF		G0	slow speed (V1)		S0	Frequency inverter ready for next run
B1	travel command (start)		G1	readjustment (Vz)		S1	travel active (RB)
B2	stop switch (switching off V_1)		G2	Speed 0		S2	advance warning active
B3	Speed		G3	return (V5)		S3	general alarm active (ST)
B4	direction of travel (RV1 or RV2)		G4	Inspection (V4)		S4	speed monitoring (interface/ V_G1)
B5	speed change		G5	Additional speed (V6)		S5	fast stop
B6	transmission of rest of route		G6	interim speed		S6	mechanical brake (MB)
B7	error in the last telegram		G7	high speed (V3)		S7	error in the last telegram

The command, speed and status bytes can be read in the **Info menu / page 15**.



10.1.3 Configuring in DCP mode

10.1.3.1 Activating the DCP interface
Activate the DCP interface in the **Control system/CONFIG** menu dependent on the open loop control used and the applied communication protocol.



Manufacturer	DCP-protocol	Abbreviation ZAdyn4C
BÖHNKE + PARTNER	DCP1	04:BP_DCP1
BÖHNKE + PARTNER	DCP2	05:BP_DCP2
BÖHNKE + PARTNER	DCP3	06:BP_DCP3
BÖHNKE + PARTNER	DCP4	07:BP_DCP4
Kollmorgen	DCP3	09:KN_DCP3
Kollmorgen	DCP4	10:KN_DCP4

NEW LIFT	DCP3	12:NL_DCP3
SCHNEIDER STEUERUNGSTECHNIK	DCP3	14:SS_DCP3
SCHNEIDER STEUERUNGSTECHNIK	DCP4	33:SS_DCP4
STRACK LIFT AUTOMATION	DCP3	22:ST_DCP3
STRACK LIFT AUTOMATION	DCP4	23:ST_DCP4
Weber Lifttechnik	DCP1	17:WL_DCP1
Weber Lifttechnik	DCP2	18:WL_DCP2
Weber Lifttechnik	DCP3	19:WL_DCP3
Weber Lifttechnik	DCP4	20:WL_DCP4
KW AUFZUGSTECHNIK	DCP3	26:KW_DCP3

10.2 CANopen lift

10.2.1 Start-up the CAN-interface

10.2.1.1 Information for start-up

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.

10.2.1.2 ZAdyn4C

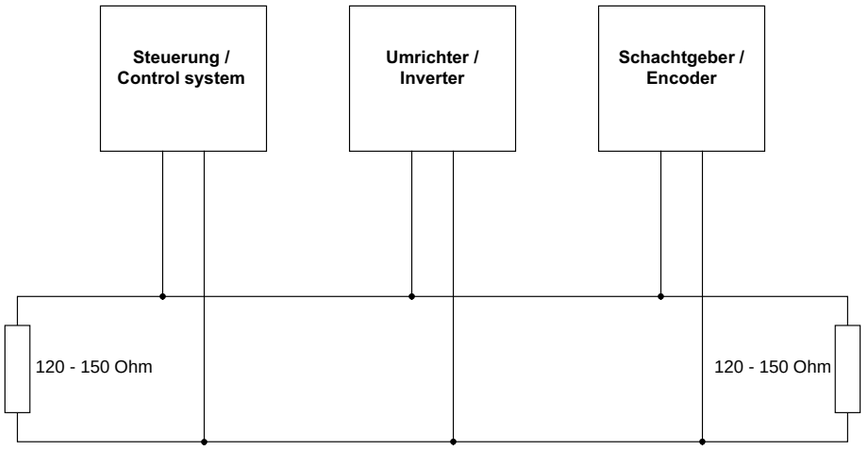
- Only devices with the CiA 417 profile are allowed.
- All devices work in 11 bit - mode.
- Without further measures, there can only be one ZAdyn4C connected per bus system.
- When more than one ZAdyn4C per bus-system are needed, please call Ziehl-Abegg before installing.

10.2.1.3 Bus-cable

- A shielded bus-cable is not needed, but the data wires should be twisted.
- 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.
- The maximum length of the bus is 200 m and 6 m at the branch lines.
- All devices normally work with a baud rate of 250 kBit/s.

10.2.1.4 Wiring

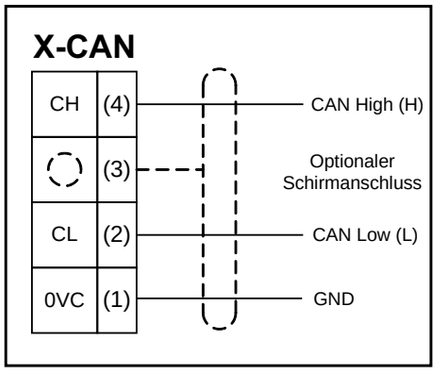
- The bus line is connected at the slot "X-CAN" of the ZAdyn4B.
- Take care of the maximum bus length.
- Not correctly shielded motor- , brake chopper- or brake resistor cables can cause significant errors.
- In case of an error, check the shielding of the cables.



Exemplary assembly of a bus-system with CANopen

10.2.1.5 Electrical connection

The bus cable is connected at the X-CAN interface of the ZAdyn4C



Connection CAN

10.2.1.6 Activating the interface

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

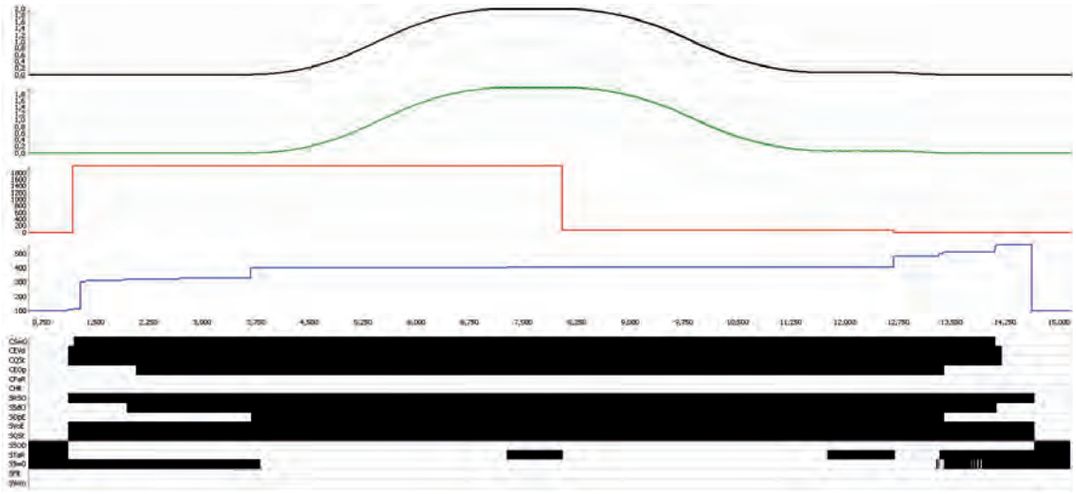
```
Control
↳CONFIG  01:BP_DCP1
  ↳      02:BP_DCP2
Configuration
```

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

10.2.1.7 Operation modes

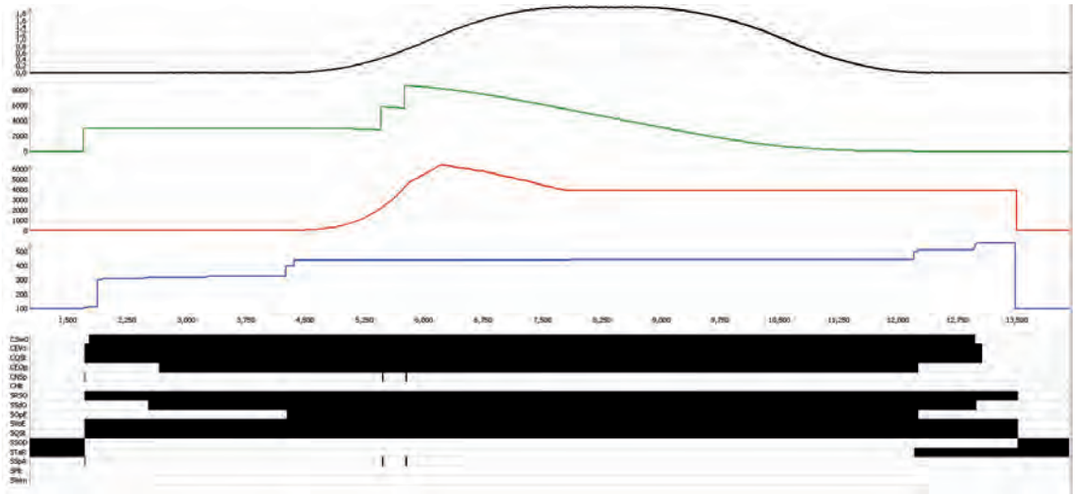
Information
There are two operating modes for the ZAdyn4C in CAN mode:

- Velocity Mode (Velocity Mode [pv])



Velocity Mode

- Position Mode (Position Mode [pp]



Position Mode

Most controls write the mode to the ZAdyn4C shortly before start-up. This means that the operating mode must be set in the control.
If the ZAdyn4C is operated in position mode, the shaft encoder must be connected to the same bus as the ZAdyn4C.

The control system sends the required speed to the ZAdyn4C before every journey. If this cannot be achieved, the ZAdyn4C will initiate a triangular speed profile journey. The maximum speed must therefore be entered in the control system.

10.2.1.8 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 ZAdyn4C 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	

10.2.2 Parameter

10.2.2.1 Parameter settings

The different parameters for CAN operation can be adjusted in the **Control** menu.

Parameter	Designation	Value range	Factory setting
LIFT_NO	Enter the lift number	1 ... 2	1
NODE_ID	Node number, normally: Control system: 1 ZAdyn4C: 2 Encoder: 4	1 ... 128	2
BD_RATE	Transmission rate (baud rate)	10 kBd ... 250 kBd	250 kBd
T_CMD	Maximum waiting time for commands of the control system	200 ... 3000 ms	1500 ms
T_MAX	Maximum processing time for the CAN messages per cycle.	0,1 ... 3 ms	0.8 ms

The CAN-specific displays are in the **Info menu** on **pages 14 - 17** (see chapter "Parameters List").

Information
The system speed V* set in the ZAdyn4C must be equal to or greater than the speed sent by the control system to the ZAdyn4C. Otherwise no travel is possible.

10.2.2.2 Network Management Status

Status:	BootUp:	ZAdyn4C is switching to the bus
	Stop:	ZAdyn4C was stopped (normally by the control system)
	Preop.:	ZAdyn4C can be parametrised, but has to be set to "operational" before the journey.
	Opera.:	ZAdyn4C is ready, a journey can take place.
Controller State:	No Error:	No errors existent
	Warn.Lim.:	Error counter exceed 127
	Bus off:	Because of too many errors the device was switched off the bus (Error counter > 255)

11 Open loop operation (operation without encoder)

Features of open loop operation:

- Distance-dependent deceleration not possible
- Possible communication with elevator 'control:
  - Standard (digital inputs and outputs)
  - DCP1, DCP3
  - CANopenLift (Velocity Mode)
- Round speed profile journey not possible
- This may cause excessive heating of the motor
- Lower positioning accuracy than in closed loop operation
- Worse travel behaviour than in closed loop operation
- maximum travel speed: 1,0 m/s

11.1 Start-up

<table>
<tr><td>Step 1</td><td>Change operator level in the Startup menu
• USR_LEV = Advanced</td></tr>
<tr><td>Step 2</td><td>Enter parameters in the Motor name plate menu

Motor type
• MOT_TYPE = ASM

Technical data
The values correspond to the specifications on the motor name plate
• n = Nominal speed [rpm]
• f = Frequency [Hz]
• p = Number of pole pairs (value is calculated; entry not possible)
• I = Nominal current [A]
• U = Nominal voltage [V]
• P = Nominal power [kW]
• Cos phi = Power factor
• TYP = Circuit type [Y/]</td></tr>
<tr><td>Step 3</td><td>Checking plausibility of n:
1. Calculation of the speed n_{syn} of the magnetic field in the motor winding.
$n_{syn} = f \times 60 / p$

2. Comparison of nominal speed n with speed n_{syn}
Depending on the pole pairs (see parameter p in the Motor name plate menu), the following difference must result between n_{syn} and n:
<table>
<tr><td>Number of pole pairs (p)</td><td>Difference n_{syn} - n [rpm]</td></tr>
<tr><td>2</td><td>80 – 120</td></tr>
<tr><td>3</td><td>50 – 80</td></tr>
</table>
3. If the calculated difference is outside the range specified in the table, the nominal speed n must be calculated using the formula in the table below and entered in the Motor name plate menu
<table>
<tr><td>Number of pole pairs (p)</td><td>Calculation of nominal speed n [rpm]</td></tr>
<tr><td>2</td><td>$n=n_{syn}$ - 100</td></tr>
<tr><td>3</td><td>$n=n_{syn}$ - 65</td></tr>
</table></td></tr>
<tr><td>Step 4</td><td>Activate open loop operation in the Rotary encoder & BC menu
• ENC_TYP = No ENC

Assignment of the parameter ENC_type to the No ENC function activates open loop operation.</td></tr>
</table>

Step 5	Enter parameters in menu **Installation**. • V* = System nominal speed [m/s] • MOD_n*= Calculation • n* = Motor speed at V* [rpm] (value is calculated, entry not possible) • _D = Traction sheave diameter [m] • __iS = suspension • __i1 = i1 of the gear ratio i1:i2 • __i2 = i2 of the gear ratio i1:i2
Step 6	Checking plausibility of n* The value determined for n* must be less than or equal to the nominal speed n in the **Motor name plate** menu. If n* > n, the parameter V* must be reduced in the System data menu until n* < n.
Step 7	Enter the parameters in the **Travel** menu. • V_3 = V* (nominal speed of the installation) In CANopen lift operation, this speed has to be configured in the control.
Step 8	Deactivate distance-dependent deceleration in the **Deceleration** menu • S_ABH = Off
Step 9	Perform travel at reduced speed (e.g. recovery control) **Requirements:** • Weight balancing must be correct • The speed must be min. 30 % of the nominal system speed Move **up** and **down** with an empty cabin. • Travel in both directions possible -> Continue with step 10 • Motor does not rotate and travel is aborted: -> Continue with “Open loop operation (encoder free operation)/Problem repair” chapter
Step 10	Perform travel at nominal system speed • Travel in both directions possible -> Start-up is complete, no further steps necessary • Travel is aborted: -> Continue with problem repair

11.2 Problem repair

Problem	Cause/Remedy
Motor does not rotate and travel is aborted	• Travel is aborted with error: – 410 ADC:Overcurrent – 480 MP:Overcurrent – No Zadyn error message (interruption of travel by control) -> In the **Control** menu configure the **UF_ED = Manual** parameter -> In the **Control** menu increase the **I_IxR** parameter in increments of 10 % until the motor rotates. Do not exceed the maximum value of 1.5 x nominal motor current.
No stopping accuracy despite correctly set switch-off points	• System travels too slowly during motor travel / stops before stop -> In the **Motor name plate** menu reduce the **I** parameter by 10 % • System travels too fast/passes stop on motor travel -> In the **Motor name plate** menu increase the **I** parameter by 10 % • System stays uneven as a function of load -> In the **INFO menu Page 03: Dist.** check the s1 display to see whether a positioning run is being carried out at speed V_1 Dist. ---------- 03 sa: 0.00 s21: 0.52m sr:^0.00 s31: 1.45m s1: 0.00 sd: 0.52m - Travel at V_1 is carried out, system stops before stop -> In the **Travel** menu increase the **V_1** parameter by 10 % - Travel at V_1 is not carried out -> Check switch-off points
Error message during acceleration	• Acceleration cancelled with error: – 410 ADC:Overcurrent – 480 MP:Overcurrent -> In the **Accelerate menu** - Increase **R_POS1** parameter - Reduce **A_POS** parameter
Error message during deceleration	• Deceleration cancelled with error: – 410 ADC:Overcurrent – 480 MP:Overcurrent -> In the **Deceleration menu** - Increase **R_NEG1** parameter - Reduce **A_NEG** parameter

11.3 Parameters for open loop operation

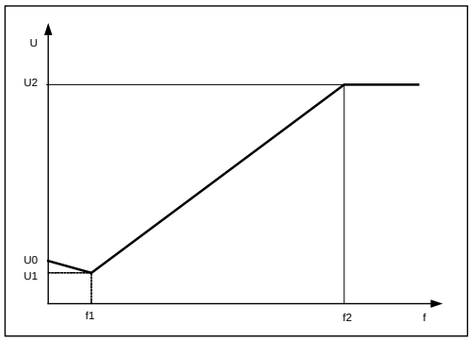
For open loop operation, additional parameters for optimising travel performance are available in the **Control** menu.
The parameters are visible only when open loop operation is active.
If it is necessary to change parameters, the parameter **Controller/UF_ED=manually** must be entered.

Parameter	Designation	Value range	Factory setting
C_MOD	Controller Mode Selecting the operating mode of the ZAdyn4C **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
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

11.4 Functions with Open-Loop-operation

11.4.1 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

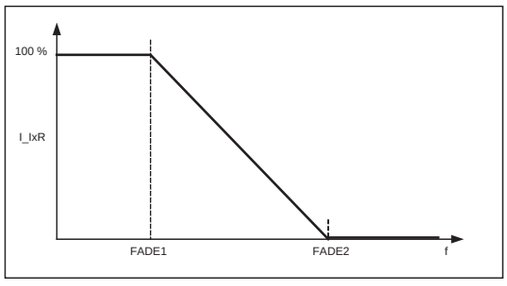
11.4.2 Current-control

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

11.4.3 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.
```

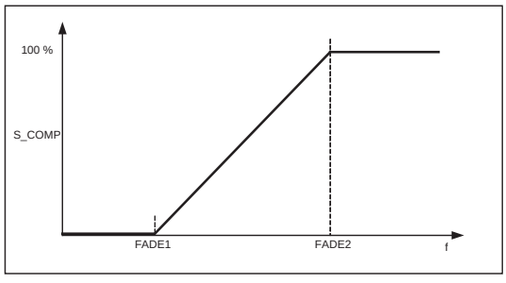
Voltage: Parameter **U_S_MX**

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.

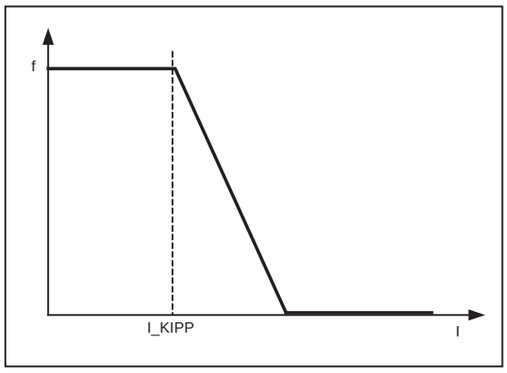


Fader-function with slip-compensation

11.4.4 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

11.5 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".

11.5.1 Optimizing start up behavior

If the motor turns back when starting up, does not start or an overcurrent occurs immediately after opening the mechanical brake, the minimum current that is fed to the motor is too low. In this case, the **Control / I_IxR** parameter can be increased to minimise travel.

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

11.5.2 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
```

12 Parameter list

Information
Not all described parameters are freely accessible and visible. The display depends on the selected functions and settings in the ZAdyn4C.

The individual parameters are subdivided into various menus based on their functions.

12.1 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 **Statistic** and **Memory Card** menus are displayed in both the basic level and advanced level. They are described in the chapters "Parameters List / Statistic Menu" and "Parameters List / Memory Card Menu". See the chapter "Operation and Parameterisation / The different operating levels" for information about the basic level.

12.1.1 Startup menu

All the parameters required for first-time start-up are contained in the **Start-up** menu.

Parameter	Designation	Value range	Factory setting
LANG	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 with the memory card. To do this, the language files must be stored on the memory card in the following folder: 4CX\Update\O_TEXT	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 in the ZApadwhen starting the ZAdyn4C .	Basic Advanced	Basic
MOT_TYP	Enter the operated motor type A **ASM:**Asynchronous motor S **SMxxx:** Synchronous motor, third-party product **SM132.xx-14:** ZIEHL-ABEGG synchronous motor type SM132 **SM160.xx-20:** ZIEHL-ABEGG synchronous motor type SM160 **SM180.xx-14:** ZIEHL-ABEGG synchronous motor type SM180 **SM190.xx-20:** ZIEHL-ABEGG synchronous motor type SM190 **SM200.xx-20:** ZIEHL-ABEGG synchronous motor type SM200 **SM210.xx-20:** ZIEHL-ABEGG synchronous motor type SM210 **SM225.xx-20:** ZIEHL-ABEGG synchronous motor type SM225 **SM250.xx-20:** ZIEHL-ABEGG synchronous motor type SM250 **SM700.xx-30:** ZIEHL-ABEGG synchronous motor type SM700 **SM860.xx-30:** ZIEHL-ABEGG synchronous motor type SM860 **SL506.xx-30:** ZIEHL-ABEGG synchronous motor type SL506 **SL510.xx-28:** ZIEHL-ABEGG synchronous motor type SL510 **BD132.xx-14:** ZIEHL-ABEGG synchronous motor type BD132	ASM SMxxx SM132.xx-14 SM160.xx-20 SM180.xx-14 SM190.xx-20 SM200.xx-20 SM210.xx-20 SM225.xx-20 SM250.xx-20 SM700.xx-30 SM860.xx-30 SL506.xx-30 SL510.xx-28 BD132.xx-14	SM225.xx-20
n	Enter the motor's rated speed	0.1 ... 6000 rpm	Depends on configured motor type
f	Enter the motor's rated frequency	0.1 ... 200 Hz	
I	Enter the motor's rated current	0.1 ... 200 A	
U	Enter the motor's rated voltage Enter the motor's rated current	0.1 ... 460 V	
P	Enter the motor's rated power	0.1 ... 90 kW	
cos phi	A Enter the motor's power factor (only for asynchronous motors)	0.10 ... 1.0	0.88

Parameter	Designation	Value range	Factory setting
TYP	Enter the motor's type of connection	Star Delta	Star
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 **Codeface:** absolute encoder **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 **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 ... 11000	
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 resitor type BR11 **PFU+BR11:** Power Feedback Unit + Brake resitor type BR17 **PFU+BR11:** Power Feedback Unit + Brake resitor type BR25 **PFU+BR11:** Power Feedback Unit + Brake resitor 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 resitor external 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
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	0.1 ... 6000 rpm	A 1358.1 S 60.6
__D	Enter the diameter of the traction sheave	0.06 ... 1.50 m	A 0.45 S 0.315

Parameter	Designation	Value range	Factory setting
__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	Entry of **i1** gearbox ratio **i1:i2**	1 ... 650	1
__i2	Input of **i2** of the gearbox ratio **i1:i2**	1 ... 1000	32
Q	Enter the elevator installation's rated load	100 to 32000	600
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 controls 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:X-BIN:** Free binary assignment **26:KW_DCP3:** KW Aufzugstechnik DCP3 **27: MAS_BIN:** Masora standard control **28: BU_SATU:** Hydraulic elevator aggregate with Bucher-Aggregat type Saturn ALPHA **29: BU_ORIO:** Hydraulic elevator aggregate with Bucher-Aggregat type Orion ALPHA **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	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:X-BIN 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	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:** Clockwise rotation	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) **2x NC:** 2x Normally closed contact (contact closed when brake is currentless) **3x NC:** 3x Normally closed contact (contact closed when brake is currentless) **1*NO:** 1 x normally open (contact is open when brake currentless) **2x NO:** 2x Normally open contact (contact open when brake is currentless) **3x NO:** 3x Normally open contact (contact open when brake is currentless) **4*NC:** 4 x normally closed contact (Contact closed when brake currentless) **4*NO:** 4 x normally open (contact is open when brake currentless)	Off 1*NC 2*NC 3*NC 1*NO 2*NO 3*NO 4*NC 4*NO	accordingly to motor type
P1P2	Motor temperature monitoring **OFF:** Temperature monitoring 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 start-up mode)	is automatically limited	1.0
SPD_KP	Multiplication factor to modify the calculated basic amplification SPD_C	is automatically limited	1.0

12.2 Advanced-Level

The menus of the advanced level are described below. See the chapter "Operation and Parameterisation / The different operating levels" for information about the advanced level.

12.2.1 LCD & Password menu

Selection the desired operating language. Protects the ZAdyn4C from access by third parties by assigning a password.Modifying the parameters is only possible after entering the password. A password is not factory set.

Parameter	Designation	Value range	Factory setting
LANG	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 with the memory card. To do this, the language files must be stored on the memory card in the following folder: 4CX\Update\O_TEXT	Deutsch English Türkce Nederland Espanol Italiano Svenska Czech France Polski Po Russki	Deutsch

Parameter	Designation	Value range	Factory setting
USR_LEV	User Level Selection via the user level which is available in the ZAdyn4C when starting the ZAdyn4C.	Basic Advanced	Basic
PASSWD	Enter password.	0 ... 9999	0
PW_NEW	New password A number between 0 and 9999 can be used as a password 0 = no password	0 ... 9999	0
PWCOD	Displays the password in coded form. If you lose the password, please contact the manufacturer.	Cannot be set	21689

12.3 Motor name plate menu

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

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

The procedure for entering the motor data is described in the "Commissioning" chapter.

Parameter	Designation	Value range	Factory setting
MOT_TYP	Enter the operated motor type A **ASM:**Asynchronous motor S **SMxxx:** Synchronous motor, third-party product **SM132.xx-14:** ZIEHL-ABEGG synchronous motor type SM132 **SM160.xx-20:** ZIEHL-ABEGG synchronous motor type SM160 **SM180.xx-14:** ZIEHL-ABEGG synchronous motor type SM180 **SM190.xx-20:** ZIEHL-ABEGG synchronous motor type SM190 **SM200.xx-20:** ZIEHL-ABEGG synchronous motor type SM200 **SM210.xx-20:** ZIEHL-ABEGG synchronous motor type SM210 **SM225.xx-20:** ZIEHL-ABEGG synchronous motor type SM225 **SM250.xx-20:** ZIEHL-ABEGG synchronous motor type SM250 **SM700.xx-30:** ZIEHL-ABEGG synchronous motor type SM700 **SM860.xx-30:** ZIEHL-ABEGG synchronous motor type SM860 **SL506.xx-30:** ZIEHL-ABEGG synchronous motor type SL506 **SL510.xx-28:** ZIEHL-ABEGG synchronous motor type SL510 **BD132.xx-14:** ZIEHL-ABEGG synchronous motor type BD132	ASM SMxxx SM132.xx-14 SM160.xx-20 SM180.xx-14 SM190.xx-20 SM200.xx-20 SM210.xx-20 SM225.xx-20 SM250.xx-20 SM700.xx-30 SM860.xx-30 SL506.xx-30 SL510.xx-28 BD132.xx-14	SM225.xx-20
n	Enter the motor's rated speed	0.1 ... 6000 rpm	Depends on configured motor type
f	Enter the motor's rated frequency	0.1 ... 200 Hz	
p	Displays the number of pole pairs of the motor		
I	Enter the motor's rated current	0.1 ... 200 A	
U	Enter the motor's rated voltage	0.1 ... 460 V	
P	Enter the motor's rated power	0.1 ... 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

12.4 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 **Codeface:** absolute encoder **BiSS-C:**: Absolute value encoder with BiSS-C interface A **TTL sine:** 5 V encoder with sine signal **TTL rect.:** 5 V encoder with rectangle signal **HTL 10-30 V:** 10-30 V encoder with square-wave signal **No ENC**: Open loop operation	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 ... 11000	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 resitor type BR11 **PFU+BR11:** Power Feedback Unit + Brake resitor type BR17 **PFU+BR11:** Power Feedback Unit + Brake resitor type BR25 **PFU+BR11:** Power Feedback Unit + Brake resitor 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 resitor external 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

12.5 Installation menu

Enter of installation specific data

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

The procedure for calculating the installation nominal speed and to preset the travel data is described in the "Commissioning" chapter.

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	0.1 ... 6000 rpm	A 1358.1 S 60.6
__D	Enter the diameter of the traction sheave	0.06 ... 1.50 m	A 0.45 S 0.315
__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 The parameter_i1 is only visible for operation with asynchronous motors.	1 ... 650	1
__i2	Input of i2 of the gearbox ratio i1:i2 The parameter_i2 is only visible for operation with asynchronous motors.	1 ... 1000	32
Q	Enter the elevator installation's rated load	100 ... 32000 kg	600
F	Enter the car weight	100 ... 32000 kg	1000
G	Enter the counterweight	0 ... 32000 kg	1300

12.6 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 controls 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:X-BIN:** Free binary assignment **26:KW_DCP3:** KW Aufzugstechnik DCP3 **27: MAS_BIN:** Masora standard control **28: BU_SATU:** Hydraulic elevator aggregate with Bucher-Aggregat type Saturn ALPHA **29: BU_ORIO:** Hydraulic elevator aggregate with Bucher-Aggregat type Orion ALPHA **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:X-BIN 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:** Clockwise rotation	left right	left

Parameter	Designation	Value range	Factory setting
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
X_BIN_1	Allocation of travelling speeds to binary codes for “CONFIG=-X_BIN” (for description of functions, see “Parameter description for digital inputs” table).	00:Free 04:V1 05:V2 06:V3 07:VZ 08:V4 09:V5 10:V6 11:V7 17:v=0	00:Free
X_BIN_2			
X_BIN_3			
X_BIN_4			
X_BIN_5			
X_BIN_6			
X_BIN_7			

Parameter	Designation	Value range	Factory setting
f_I01	Configuration of the function of digital inputs I01 … I08 for “CONFIG=free” (for description of the functions, see “Parameter description for digital inputs” 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:XBIN0 25:XBIN1 26:XBIN2 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 47:CO 48: EVA act. 49: MOT_TEMP	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 brake monitoring inputs BR1 ... BR4 (for description of functions, see “Parameter description for digital inputs” 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 digital outputs O1 … O5 for "CONFIG=free" (for description of functions, see "Parameter description for digital outputs" table).	Off RB /RB V<V_G1 V<V_G2 V<1.1*V_3 Warning Fault Evac.Dir. MB_Brake /V<V_G1 /V<V_G2 V=0 PFU Info rope TD_CNT ext. Full load SD STO-Info /STO info BR Info ZR_EN Stutter br. MotShorts EvaDisMains	Fault
f_O2			MB_Brake
f_O3			RB contactor
f_O4			V < V_G1
f_O5			STO-Info
V_G1	Presetting of the limit value 1 when using the V<V_G1 parameter for a digital output	0.03 ... 3.20 m/s	0.30
V_G2	Presetting of the 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
LIFT_NO	Enter the lift number	1 ... 2	1
NODE_ID	Node number, normally: Control system: 1 ZAdyn4C: 2 Encoder: 4	1 ... 128	2
BD_RATE	Bitrate	10 kBd ... 250 kBd	250 kBd
T_CMD	Maximum waiting time for commands of the control system	200 ... 3000 ms	1500 ms
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"	0.2...2.55m/s^2	1.00 m/s^2
S_B_OFF	Additional braking offset	50 ... 160 mm	50

Parameter descriptions for digital inputs

Parameter	Function	Explanation
00:Free	Function not assigned	Activating the input is noneffective
01:RF	Controller enable	Enabling the ZAdyn4C. 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	Speed	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
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	Brake monitoring with unsing the input terminal X-IN
21:BR2	Brake monitoring 2	Brake monitoring with unsing the input terminal X-IN
22:BR3	Brake monitoring 3	Brake monitoring with unsing the input terminal X-IN
23:BR4	Brake monitoring 4	Brake monitoring with unsing the input terminal X-IN
24:XBIN0	Binary input 0 Free binary assignment	Speed default through binary coding Free binary assignment
25:XBIN1	Binary input 1 Free binary assignment	Speed default through binary coding Free binary assignment
26:XBIN2	Binary input 2 Free binary assignment	Speed default through binary coding Free binary assignment
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	Standby 2	Switching the ZAdyn4C to Standby 2 function to save energy
31:STEP+	Touch mode for special applications	Positive change
32:STEP-	Touch mode for special applications	Negative change
33:PFU_BR	BR monitoring for option PFU+BR	Functional monitoring of brake resistor when using a brake resistor in conjunction with power recuperation unit
34:HY_UP	Direction UP at hydraulic elevator with Bucher aggregate type Saturn ALPHA	The input functions RF+RV1+V1 are activated simultaneously when the input is activated only in ZAdyn HY

Parameter	Function	Explanation
35:HY_DOWN	Direction DOWN at hydraulic elevator with Bucher aggregate type Saturn ALPHA and Orion ALPHA	The input functions RF+RV2+V1 are activated simultaneously when the input is activated only in ZAdyn HY
36:/FastStp	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
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	Standby 1	Switching the ZAdyn4C to Standby 1 function to save energy
44: ZR_RDY	ZArec ready	ZArec monitoring function
45: /ESC	/ESC	Electronic short-circuit is deactivated
46:SBC_RDY	ZAsbc4C ready	ZAsbc4C monitoring function
47:CO	Function not assigned	
48: EVA act.	Display: Battery evacuation active	If switching to battery supply takes place during travel, this input function must be set.
49: MOT_TEMP	External motor temperature monitoring	If an external device is used for monitoring the motor temperature, this input function can be used to display overtemperature of the motor.

Parameter descriptions for digital outputs

Parameter	Function	Explanation
Off	Output has no function	Output is open all the time
RB	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	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” menu is exceeded.
V<V_G2	Speed monitoring	Contact opens when the tolerance set in the "Control system" menu V_G2 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 (for ZAdyn4) 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	Fault	Contact is closed if no error is present in the ZAdyn4C.
Evac.Dir.	Evacuation direction	Contact open: Car is lighter than counterweight Contact closed: car is heavier than counterweight

Parameter	Function	Explanation
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.
/V<V_G1	inverted function of "V<V_G1	Contact closes when the limit value set in the "Control system" menu V_G1 is exceeded.
/V<V_G2	Inverted function of “V<V_G2”	Contact closes when the limit value set in the "Control system" menu V_G2 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
Suspension means	Suspension means replacement necessary	Contact closes if the current suspension means can be used for approx. 1 more 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
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.
Stutter br.	Stutter brake	Contact opens if the speed of the elevator cabin exceeds the limit value configured in the parameter V_G1. Contact closes if the speed is below the limit value.
MotShorts	Signal for switching a motor short-circuit contactor	If an external contactor is used to short-circuit the motor, this signal can be used to switch it.
EvaDisMains	Signal for disconnecting the mains for emergency evacuation via battery	If the system is switched to battery operation (see input function 48:EVA act.), this output signal disconnects the mains. As soon as the system is at a standstill, the ZAdyn restarts and waits for the line voltage to be restored.

12.7 Monitoring menu

Configuring the monitoring functions

Parameter	Designation	Value range	Factory setting
MOD_ST	Behavior of the ZAdyn4C 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 to “ST” drops out for 2 seconds in the event of a malfunction and then increases again **Lock n.3:** Block function after 3 malfunctions. Output "ST" remains dropped after the 3rd error **Lock n.2:** Locking function after 2 errors. The “ST” output remains de-energised after the 2nd error. **Lock n.1:** Block function after 1 malfunction. Output "ST" remains dropped after the 1st error. With the blocking function, the following message appears: “ZAdyn lock! To unlock, press OK.” After pressing the “i” key, the device reverts to normal operation. The errors that led 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
LOCK_X	Block at brake malfunction The ZAdyn4C is locked in case of brake malfunctions if this parameter is switched on. With **CONFIG: 31:KL_IO** LOCK_X is automatically activated	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
CO	Monitoring the travel contactors **OFF:** Contactor monitoring deactivated **CO1:** Contactor monitoring is only implemented by input CO1 (series connection of the monitoring contacts) **CO1&CO2:** Contactor monitoring is implemented by inputsCO1 and CO2 (individual monitoring of the monitoring contacts)	OFF CO1 CO1&CO2	AUS
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) **2x NC:** 2x Normally closed contact (contact closed when brake is currentless) **3x NC:** 3x Normally closed contact (contact closed when brake is currentless) **1*NO:** 1 x normally open (contact is open when brake currentless) **2x NO:** 2x Normally open contact (contact open when brake is currentless) **3x NO:** 3x Normally open contact (contact open when brake is currentless) **4*NC:** 4 x normally closed contact (Contact closed when brake currentless) **4*NO:** 4 x normally open (contact is open when brake currentless)	Off 1*NC 2*NC 3*NC 1*NO 2*NO 3*NO 4*NC 4*NO	accordingly to motor type

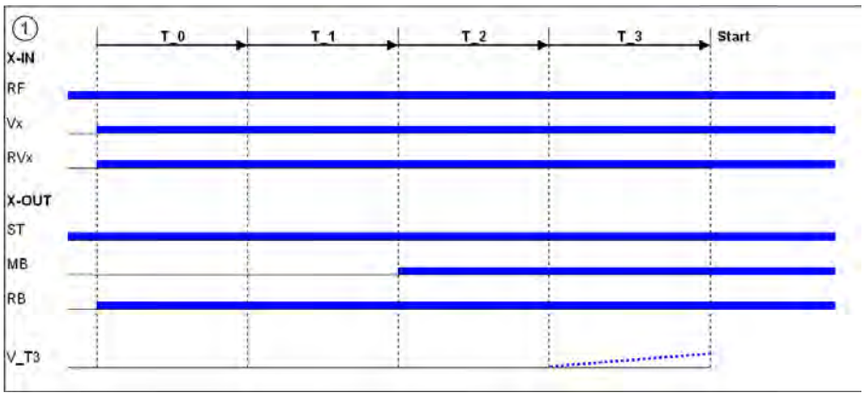
Parameter	Designation	Value range	Factory setting
P1P2	Motor temperature monitoring **OFF:** Temperature monitoring deactivated **PTC:** thermistor (PTC according to DIN 44082) **TC:** Thermal circuit breaker **KTY:** Temperature sensor KTY84-130	Off PTC TC KTY	PTC
R_P1P2	Only accessible when P1P2=KTY is parameterised Resistance value at which the motor temperature monitor responds 1190 Ohm = 130 °C motor temperature	500 ... 5000 Ohm	1190
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_CO	Debounce time of the motor contactor monitoring Monitoring time of the contactor interruption. The final stage is switched off when the contactor contacts are open for longer than the time set in the T_CO parameter. The time T_CO is active in interruptions during travel, not in a normal stop. Only accessible when contactor monitor is activated.	0.00 ... 100.0 ms 0.00=Off	10 ms
T_CDLY	Delay contactor monitor When the contactor monitor is switched on (menu "Monitoring/-CO") the reply must be available at the contactor monitor input within the time T_CDLY for the motor contactors to be closed (start up) or open (stop).	0.5 ... 7.0 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
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
MSK_NEG	Negative error screen Inactive errors are activated by configuring the corresponding error numbers	Error no.	0

12.8 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 start-up 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 a magnetic field in the motor (asynchronous motors only) A The parameter T_1 is only visible for operation with asynchronous motors.	A 0.1 … 10.0 s S Value set to 0.0	A 0.1
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

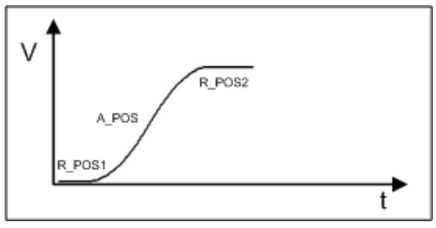
Start-up time sequence



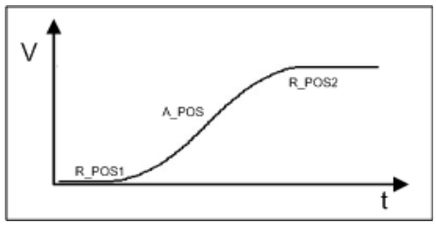
12.9 Acceleration menu

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	5 ... 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



Acceleration with high A_POS and low R_POS1 and R_POS2



Acceleration with low A_POS and high R_POS1 and R_POS2

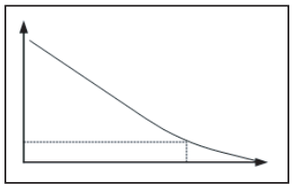
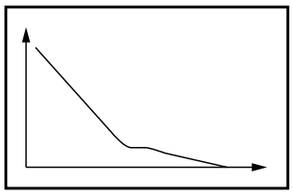
12.10 Travel menu

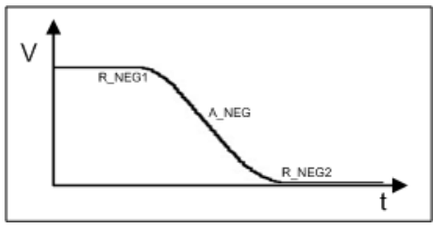
Traveling speed defaults

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 ... 6.50 m/s	0.50
V_3	High travelling 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 ... 3.50 m/s	0.30
V_5	Additional speed	0.03 ... 3.50 m/s	0.30
V_6	Additional speed	0.03 ... 3.50 m/s	0.05
V_7	Additional speed	0.03 ... 3.50 m/s	0.05

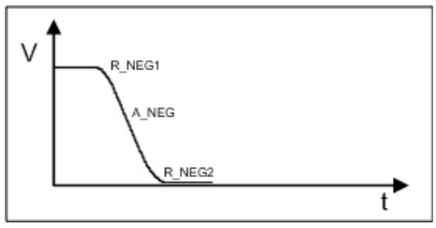
12.11 Decelerating menu

Defines the deceleration ramp and optimizes the positioning behavior.

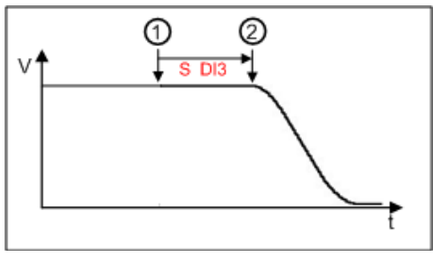
Parameter	Designation	Value range	Factory setting
A_NEG	Negative acceleration	0.25 ... 2.00 m/s²	0.5
R_NEG1	upper round off during negative acceleration, a higher value causes a softer round off	20 ... 90 %	will be calculated
R_NEG2	lower round off during negative acceleration, a higher value causes 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
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	**OFF:** For standard, DCP1 or DCP3 and CANopen lift (Velocity mode) control: time-dependent deceleration, deceleration paths can vary. **On (V2_7):** Distance-dependent deceleration, time-optimised engagement. The setting is effective at all travelling speeds. **On (V2_3):** Distance-dependent deceleration, time-optimised engagement. The setting is effective at travelling speeds V_2 and V_3.  Distance-dependent deceleration, time-optimised engagement. **Slow:** Distance-dependent deceleration, engagement with early reduction of engagement speed  Distance-dependent deceleration, engagement with early reduction of engagement speed	Off On (V2..7) Slow On (V2..3)	On (V2..3)



Deceleration with low A_NEG and high R_NEG1 and R_NEG2



Deceleration with high A_NEG and low R_NEG1 and R_NEG2



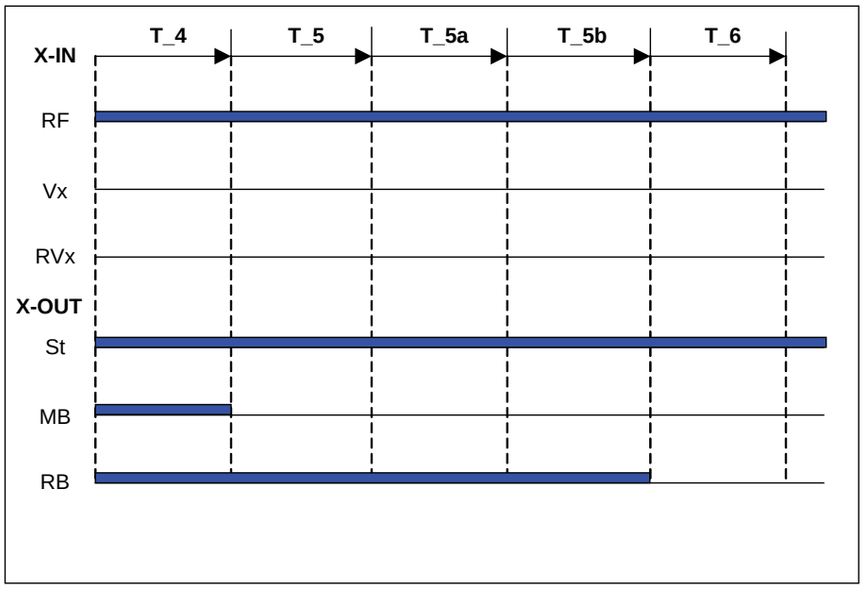
Function S_DI
1 Switching of V3
2 Starting with deceleration

12.12 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	S 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



12.13 Controller menu

Influences the speed control by the factor of the basic amplification (SPD_KP) and readjustment time (SPD_TI).
Selecting the control mode of the ZAdyn4C.

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".

12.14 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_PARA2	Function allocation of parameter set 2 **Locked:** 2nd parameter set is blocked **2nd parameter set:** Activation of 2nd 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 with UPS **UPS:** Emergency evacuation by UPS with reduced 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)	100 ... 565 V	120
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
R_U20	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

12.15 Statistic menu

All statistical data can be called up in the **Statistics** menu. The data will be retained even after the ZAdyn4C 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 or CO 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 is activated **Off:** Automatic parameter diagnostics is deactivated	On Off	Off	
RESET	Deletes parameters, counter levels and error lists, preassigning parameters with standard values. **77:** **Pre-parametrised ZAdyn4C:** Parameters are assigned customer-specific system data **Standard ZAdyn4C:** Parameters are assigned standard data **90:** Device reset, parameters are deleted and set to factory settings. ENC_OFF is retained. **99:** Device reset, parameters are deleted and set to factory settings. ENC_OFF is deleted. S If a value is entered for the rotary encoder offset (ECOFF), it will also be deleted!	77 90 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 = no 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	
TD_SET	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	

12.16 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 folder /4CX/DEVICE/[Serial number]/LST • Error list (.FLT) in folder /4CX/DEVICE/[Serial number]/LST • Parameters (.PA3) in folder /4CX/DEVICE/[Serial number]/-PAR • Black box (.BOX) in folder /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
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 folder /4CX/Update/[Software version]	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 ... 65535	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 ... 65535	0	
DIR_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 ... 65535	0	
Format	Reformatting the memory card: **Input 27:** Folders and files on the memory card are deleted	27	0	

12.17 MMC-Recorder menue

You have the option of performing measurements on the ZAdyn4C using a memory card without the need for a notebook. 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	Off
REC_CFG	Configuring the measurement channels **0:** All measuring 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
TRIG_BY	Trigger-source Specifications for stopping the recorder and saving the data to the memory card. **Error:** Data is 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 **Cont.:** Function is not used **Interval:** Function is not used **Ext.Input:** Function is not used	Error Error/Stop Cont. Interval Ext.Input	1.0
T_REC	Record-time Time for a measurement with 1024 measured values 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

Parameter	Designation	Value range	Factory setting
CHN1	Configuration of the measuring channels 1-4 with analog measurement values **1:** Setpoint for travelling 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			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 command and status bits	0...299	89

12.18 Encoder adjustment menu

Contains parameter values required for aligning the absolute value encoders for synchronous motors.

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

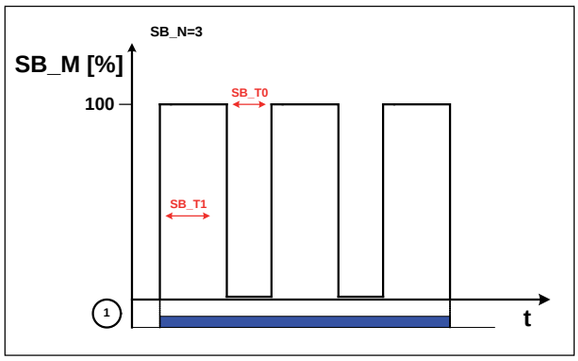
Parameter	Designation	Value range	Factory setting
ENC_ADJ	Activating the encoder alignment **Off:** no function **Check:** Activates load-free rotary encoder adjustment check **Load-free:** Activates load-free rotary encoder adjustment **Braked:** Activates rotary encoder adjustment with closed brake **Mag.Adhesion:**Start magnet adhesion process for operation with Kone EcoDisc type drives. **Mag.Exist.:**Enables replacement of the ZAdyn without carrying out the magnet adhesion process again with Kone EcoDisc type drives.	Off Check Load-free Braked Mag.Adhesion Mag.Exist.	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	-
ENC_OFF	Correction value for encoder offset When performing rotary encoder adjustment with a closed brake, the offset value is saved in this parameter.	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 or Hiperface absolute value encoders) **ON:** Data from the ZAdyn4C are filed in the absolute encoder **Off:** Function deactivated	On Off	Off

Parameter	Designation	Value range	Factory setting
LOD_P_E	Reading of data from the absolute value encoder via the "Electronic rating plate" function (only possible with EnDat or Hiperface absolute value encoders) **Input 27:** Data are read out from the absolute encoder into the ZAdyn4C	0...65535	0

12.19 Safety gear menu

Configuration of the data used for the "Safety gear" function.
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



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

12.20 HW-Ident. menu

Identifying the individual assemblies of the ZAdyn4C. 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		

12.21 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

12.22 Menu checks

Selection of supporting tests during acceptance of the system:

- Testing the protective device in compliance with EN81

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_TMP	Motor temperature test **On:** Failure of the motor temperature module or overtemperature on the motor is simulated **Off:** Function deactivated	On Off	
SCY_A3	Testing the protective device in compliance with EN81 **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	

12.23 ZA-Intern menu

Parameterisation of internal measuring and monitoring functions

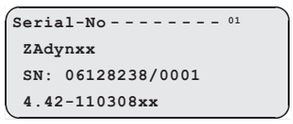
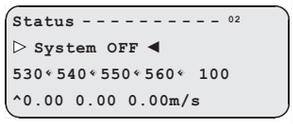
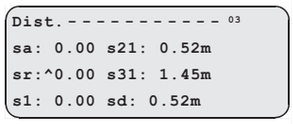
Parameter	Designation	Value range	Factory setting
PW_S9	Password for the indication of additional parameter		0
UVW_CHK	Definition of motor phase checking on start-up **Single:** The motor phases are checked during initial travel once the frequency inverter has been switched on. If the check is successful, 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.:** Check is carried out before starting all travel **Off:** Motor phase check 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)
n_ANA	Initialisation value for analogue input in ZAdyn HY **Example:** n_ANA = 3000 analogue input = 0-10 V 10 V = 3000 1/min	1 ... 3300	3000

12.24 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.

	**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
	**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:** current direction of travel current position of car in the shaft current travel path with positioning speed current traveling speed
	**Page 03: Dist** **Line 2:** sa: current position of car in the shaft s21: calculated deceleration path V_2 ‹ V_1 s20: calculated deceleration path V_2 ‹ Standstill (only in DCP02/DCP04) **Line 3:** sr: current direction of travel, current total route s31: calculated deceleration path V_3 ‹ V_1 s30: calculated deceleration path V_3 ‹ 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 ‹ V_1 or V_2 ‹ V_1 The display can be frozen by pressing the ↵ key.

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 ↵ key.
MotDat ---------- 05 I: 11.0A n: 60rp U: 360V f:10Hz p: 10 MotDatNom-------- 05 I: 11.0A n: 1450rp cos:0.88 f: 50.0Hz I0: 3.8A TR: 316ms	**Page 05: MotDat** Display of the motor data entered in the "Motor name plate" menu: S **Line 2:** Rated current Rated speed **Line 3:** Rated voltage Rated frequency **Line 4:** Number of pole pairs A **Line 2:** Rated current Rated speed **Line 3:** cos phi Rated frequency **Line 4:** Magnetization current Rotor time constant
MotDatFW-------- 05 I: 11.0A n: 1560rp cos:0.89 f: 53.4Hz I0: 3.5A TR: 316ms MotDatNom-------- 05 I: 11.0A n: 1450rp cos:0.88 f: 50.0Hz I0: 3.8A TR: 316ms	**Page 05: MotDatFW** Display of the calculated motor data with field weakening operation: A **Line 2:** Rated current Rated speed **Line 3:** cos phi Rated frequency **Line 4:** Magnetization current Rotor time constant **Seite 05: MotDatNom** Pressing the ↵ key displays the original motor data

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: Free I:RF RV2 V2 > 0.500..... O:ST RB MB ... V>G1	**Page 08: Cu-Functions** Online-display **Line 2:** Selected control system configuration in menu "Control system/CONFIG" **Line 3:** Active digital input functions: • Controller enable (RF) • Direction of travel (RV) • Travelling speed (V) in m/s **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 **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. After “->”: Status of electronic short-circuit: Small dot: short-circuit deactivated Large dot: short-circuit active o: short-circuit switches from inactive to active (duration 1.1 s) t: short-circuit switches from active to inactive (duration 1.1 s)
Cu Ports - - - - - - - - 10 In: BR1234....Out: 12345678 B C12 12345 .... • .. ...•	**Page 10: Cu-Ports** Online-display **Line 2:** Brake monitoring inputs BR1...BR4, large dot after BR1...BR4 indicates the input is active **Line 3:** 1…8: digital inputs I1…I8 B: Function and temperature monitoring for brake resistor or brake chopper C12: Contactor monitoring 1…5: Digital outputs O1…O5 **Line 4:** A big dot below the description displays the input or output is active

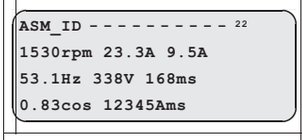
Rotary encoder - - - - 11 2048Inc 5.03V Type? En:• •Err: 0x00000000 Cnt:3941=345° A B	**Page 11: Encoder** Online-display **Line 2:** Configured rotary encoder resolution Rotary encoder supply voltage Detected rotary encoder type (with absolute value encoders) Configured rotary encoder type (with incremental 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 ↵ key.
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 ZAdyn4C (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 ↵ key.

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 detected by the current sensors (incorrect phase is indicated by letters U V W) **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)
Bus Info 1 - - - - - - - 14 Info: xx 0101 / 010106 de Load: 77% - 12.3A	**Page 14: Bus Info 1** Information about the control system **Line 2:** Manufacturer **Line 3:** Software version of control system Software date of the control system Operating language set in the control system, display according to ISO639 The operating language of the frequency inverter is automatically adapted. **Line 4 (only with DCP4):** Load in % (0% = cabin empty) Load-dependent start torque current
Bus Info 2 - - - - - - - 15 B01..4... G....4... S.1....6. 100 RF UP V_3* MTW	**Page 15: Bus Info 2** Online-display **Line 2:** Command and speed bytes B= command byte G= speed byte **Line 3:** Status byte S= Statusbyte Current operating state of the ZAdyn4C **Line 4:** Display of the actual travel commands: RF: Controller enable Travel direction controlled travel speed MTW: Motor temperature pre-warning, displayed at overtemperature (for ZAdyn4) See chapter "Serial Communication / DCP (Drive Control & Position)" for further information about DCP operation.

Display 1 Bus Info 3 - - - - - - - 16 sv_I7: +0002210mm sv: +0002198mm Prg:Rea 1.15:x.xxm/s **Display 2** Bus Info 3 - - - - - - - 16 sv_I7: +0002210mm sv: +0002198mm Prg:Rea 1.15:1.10m/s	**Page 16: Bus Info 3** Online-display **Line 2:** Display of the deceleration path. The deceleration path is calculated before starting the journey. **Line 3:** Display of the remaining path. The display is updated during travel continually. **Line 4:** **Display 1:** Shows the ratio of set nominal speed to real speed. Display during travel (providing that the controller supports the "I9" position telegram) **Display 2:** Shows the ratio of set nominal speed to real speed. Display after travel (providing that the controller supports the "I9" position telegram)
Bus Info 4 - - - - - - - 17 RX_TIM 1 RX_XOR 0 TX_ERR 0	**Page 17: Bus Info 4** Online display of transmission errors that increase the counter level during running operation as soon as transmission errors occur: **Line 2:** RX_TIM: Timing (open loop control does not answer within the cycle time **Line 3:** RX_XOR: erroneous control telegram is detected by the frequency inverter **Line 4:** TX_ERR: erroneous frequency inverter telegram is detected by the control
Bus Info 1- - - - - - - - - - - - - 14 Act• Mode: Velocity T_max: 0 RErr: 0 NMT:Preop./Warn.Lim: Bus Info 1- - - - - - - - - - - - - 14 Act• Mode: Velocity T_max:0.7ms TErr: 0 NMT:Preop./Warn.Lim:	**Page 14: Bus Info 1** Information about CAN operation **Line 2:** Act: A dot signals that the ZAdyn4C 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
Bus Info 2- - - - - - - - - 15 V_CAN: + 0mm/s Contr.:Disable Volt. Status:Sw. On Disab.	**Page 15: Bus Info 2** Active in velocity mode **Line 2:** V_CAN: Speed, sent from the control system to the ZAdyn4C **Line 3:** Contr. Control-byte. Shows commands which are sent by the control system **Line 4:** Status: Status byte. Shows the CAN statuses of the ZAdyn4C
Bus Info 2- - - - - - - - - 15 S_CAN + 0mm Contr.:Disab. Volt. Status:Sw.On Disab.	**Page 15: Bus Info 2** Active in position mode **Line 2:** S_CAN: Relative target position that is sent from the control system to the ZAdyn4C **Line 3:** Contr. Control-byte. Shows commands which are sent by the control system **Line 4:** Status: Status byte. Shows the CAN statuses of the ZAdyn4C **After pressing the ↵ button the display shows the maximum travel speed, sent by the control system**

<table>
<tr>
<td>Bus Info 3-------- 16
Err act. Last:No Err
Rec Tra Warn Pas off
0 0 0 0 0</td>
<td>
Page 16: Bus Info 3
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 ZAdyn4C switched to the warning status
Pas: Indication of how often the ZAdyn4C switched to the error passive status
off: Indication of how often the ZAdyn4C switched to the bus off status
</td>
</tr>
<tr>
<td>Bus Info 4-------- 17
AbsEncmm: 5358
MotEncmm:+ 4169
Offs:13081A/M 1.28</td>
<td>
Page 17: Bus Info 4
Calibration
Lines 2 - 4:
For calibrating the distances which were sent by the rotary encoder and the shaft encoder.
</td>
</tr>
<tr>
<td>A+R ---------- 18
0.62 0.62 m/s3
0.50 0.50 m/s2
0.62 0.50m/s3</td>
<td>
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
</td>
</tr>
<tr>
<td>Energy ---------- 19
Power: 22.120 W
Work: 16 Wh</td>
<td>
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.
</td>
</tr>
</table>

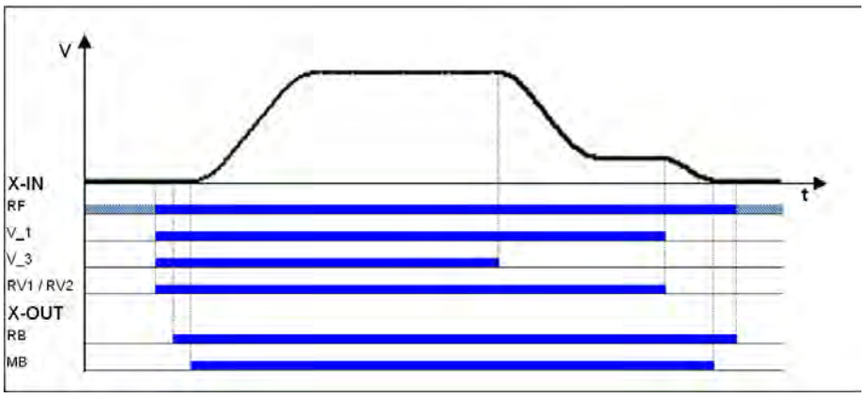
InfoBus - - - - - - - - - 20 Ident No 01234567 Exist: xxxx Error 0000	**Page 20: InfoBus** Display of frequency inverter configuration **Line 2:** Ident no. of the internal assemblies 0: Controller Unit (CU) 1: Shunt module (CUSH) 2: reserved 3: reserved 4: reserved 5: Switching Power Print (SP) 6: Power 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"
Travel direction- - - 21 TD_SET 1,000,000 TD_CNT 874,891 TD_DRV 1,364,832	**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. Indicates the change of direction still possible with the current suspension means. 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
Travel direction- - - 21 TD_RES 10 TD_CNT 874,891 TD_DRV 1,364,832	**Page 21: Travel direction** While pressing the ↵ button, **line 2** shows the actual number of counter resets "TD_RES".
ASM_ID - - - - - - - - - - 22 1530rpm 23.3A 9.5A 53.1Hz 338V 168ms 0.83cos <GOOD 1.2>	**Page 22: ASM_ID** **Line 2:** Determined motor speed Determined motor current Determined magnetisation current **Line 3:** Determined frequency Determined motor voltage Determined rotor time constant **Line 4:** Determined cos phi Status text, factor by which the original values have been corrected

	With ↵ key pressed: **Line 4:** Determined cos phi Magnetisation current x rotor time constant
	**Page 23: CUEC** Expansion board "Control" **Line 2:** Func: Functions of the expansion board "Control" **Line 4:** Stat: LED status of the expansion board "Control"

13 Travel options

13.1 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 High travelling speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

13.2 Start-up and acceleration

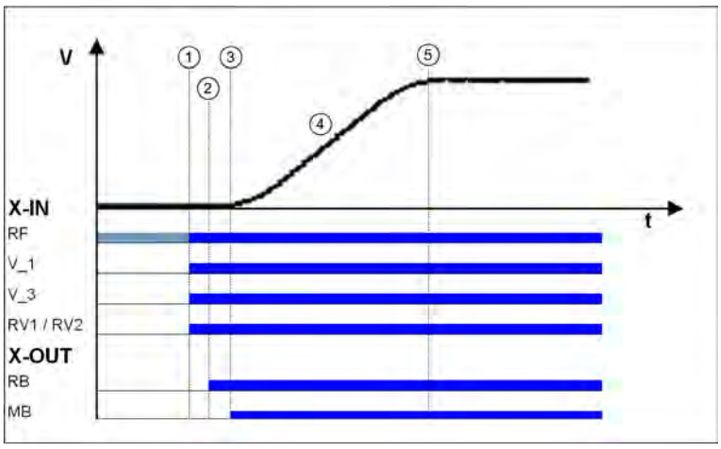
To be able to travel, the ZAdyn4C requires at least the following input signals:

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

13.2.1 Acceleration - default

Start-up procedure with default acceleration

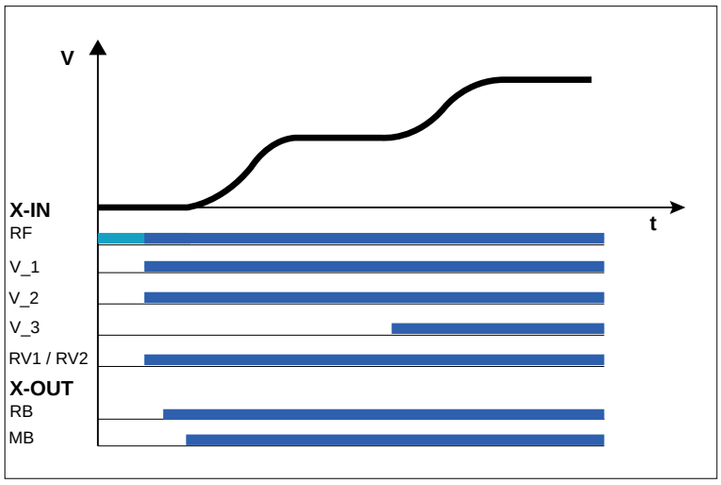
1	The elevator control system triggers the following frequency inverter inputs: • Controller enable (RF), can already be triggered • Speed V_1 and V_3 • Direction of travel RV1
2	The frequency inverter switches the digital "RB" contactor output with a time delay. With this signal, the inputs of the STO 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.



Starting with default acceleration
RF Controller enable
V_1 Positioning speed
V_3 High travelling speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

13.2.2 Acceleration with intermediate speed

It is possible to accelerate to different intermediate speeds when starting.



Starting with acceleration from V_1 to V_2

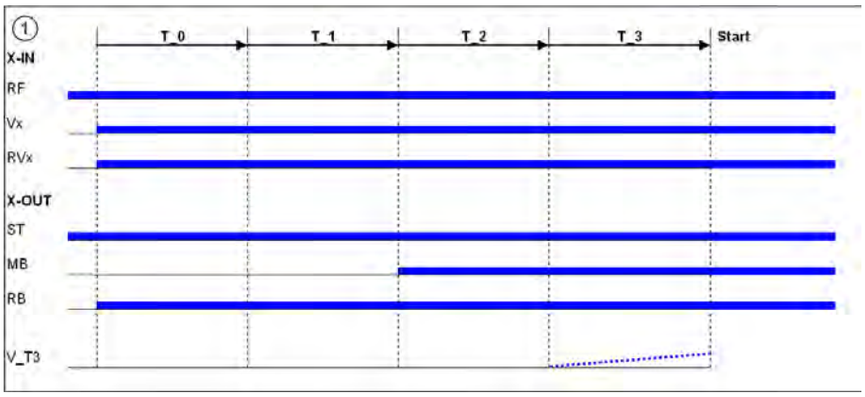
13.3 Optimizing start up behavior

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 Speed
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 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.

13.3.1 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).

13.3.2 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 (default setting for asynchronous motors).
The drive is speed-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 speed controller amplification. It is activated at the start of T_1 and deactivated at the end of T_2

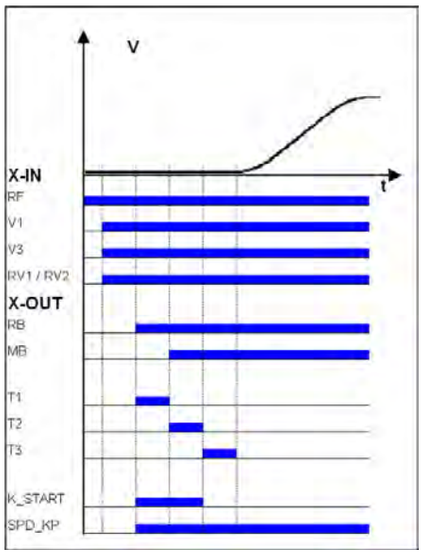
MOD2
Corresponds to the MOD5. function. The parameter "s_start" is activated additionally. If the drive position changes during the time T_2 by the value entered in "s_start", "K_START" is switched off. This prevents the drive from being damaged by too high a value of "K_START".

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 activated additionally. 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".

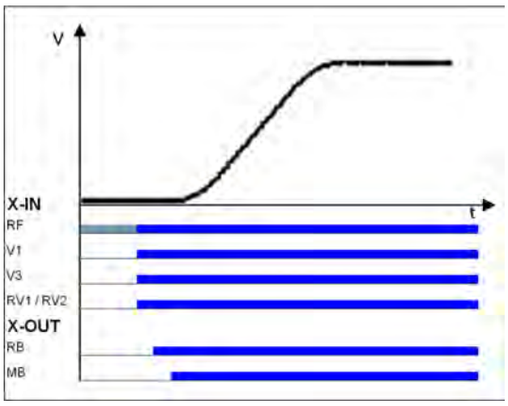
Start-up variations



RF	Controller enable
V_1	Positioning speed
V_3	High travelling 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

13.4 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



Acceleration ramp
RF Controller enable
V_1 Positioning speed
V_3 High travelling speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

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.

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"

13.5 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

13.6 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 distance-dependent deceleration is configured using the **DECELERATION/S_ABH** parameter.

All decelerations from higher to lower speeds are dependent on the distance.

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!

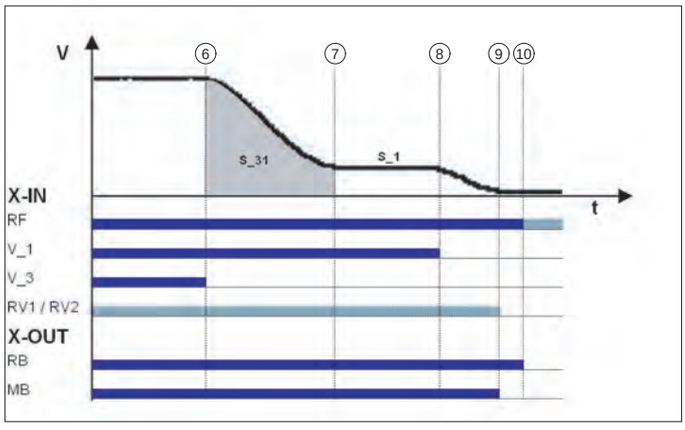
If binary speed is specified, there is only a distance-dependent delay at **Control system/SIM_V1=ON**!

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.

13.6.1 Distance-dependent deceleration - default

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.

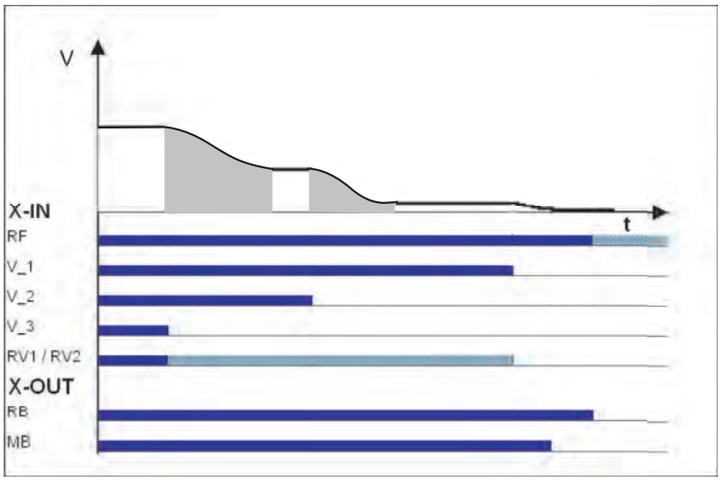


Normal stop during path dependent deceleration
RF Controller enable
V_1 Positioning speed
V_3 High travelling speed
RV1 / RV2 Direction default

RB Controller ready
MB_Brake Mechanical brake

13.6.2 Distance-dependent deceleration with intermediate speed

It is possible to also decelerate from V_3 to V_2 when stopping with distance-dependent deceleration.

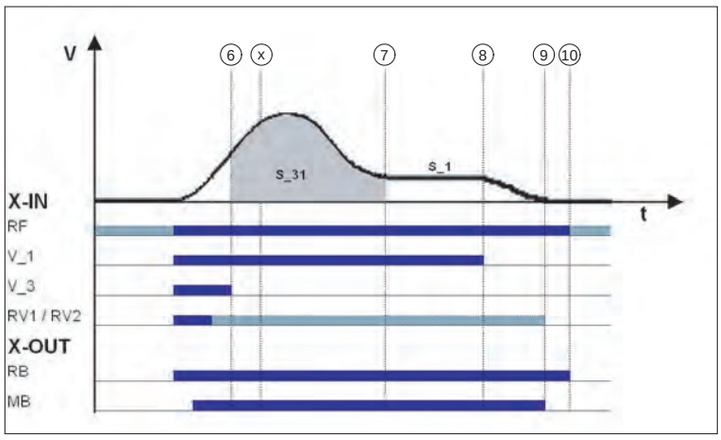


Normal stop with distance-dependent deceleration and deceleration from V_3 to V_2.
RF Controller enable
V_1 Positioning speed
V_2 Intermediate speed
V_3 High travelling speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

13.6.3 Round speed with distance-dependent deceleration

If the distance between the floors is short and the selected end speed (V_2 or V_3) is not achieved, the ZAdyn4C 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 High travelling 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.

13.7 Time-dependent deceleration

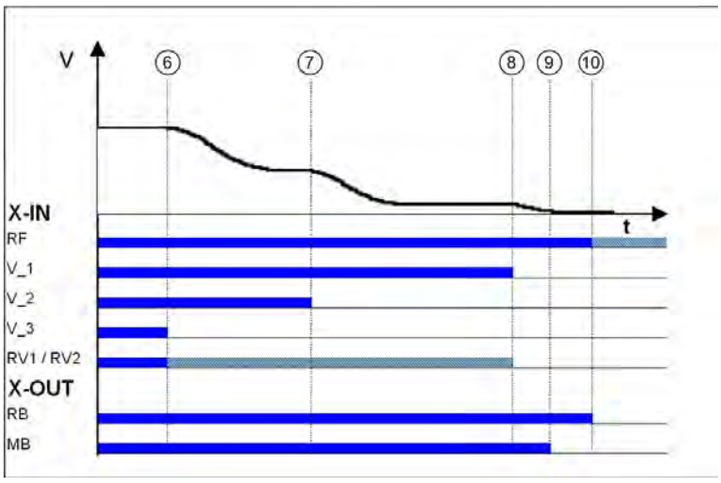
Time-dependent deceleration is activated for all speed transitions if the menu **Decelerating/S_ABH = OFF**.

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.

13.7.1 Deceleration with reached traveling speed

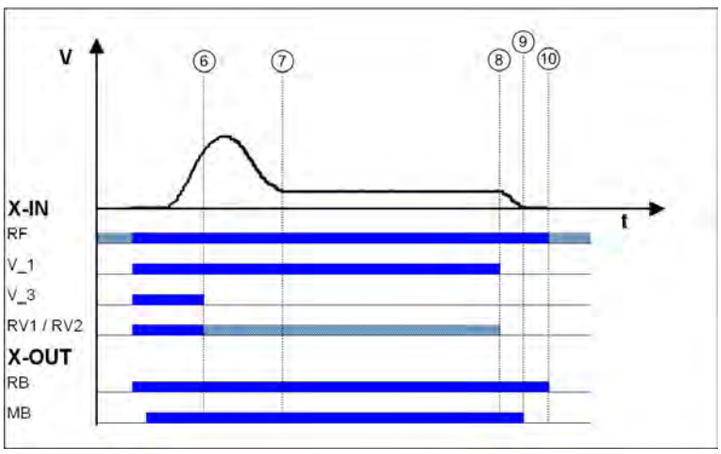
6	When the switch off point for the traveling speed is reached, the configured final speed V_3 has been reached. Deceleration to V_2 is initiated
7	Switch off point for V_2 Deceleration to V_1 is initiated
8	Positioning speed V_1 is switched off. Motor continues to decelerate.
9	Speed 0 Output MB is 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 High travelling speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

13.7.2 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 High travelling speed
RV1 / RV2 Direction default
RB Controller ready

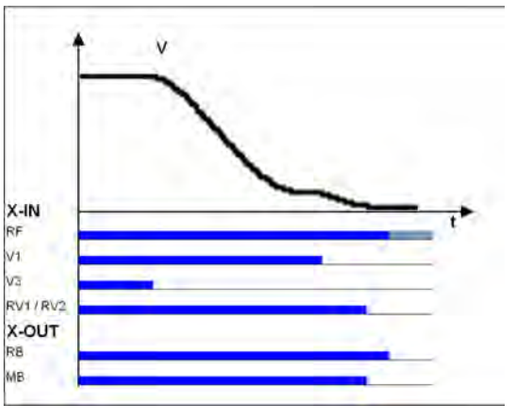
MB_Brake Mechanical brake

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.

13.8 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



Deceleration ramp
RF Controller enable
V_1 Positioning speed
V_3 High travelling speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

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.

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.

13.9 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.

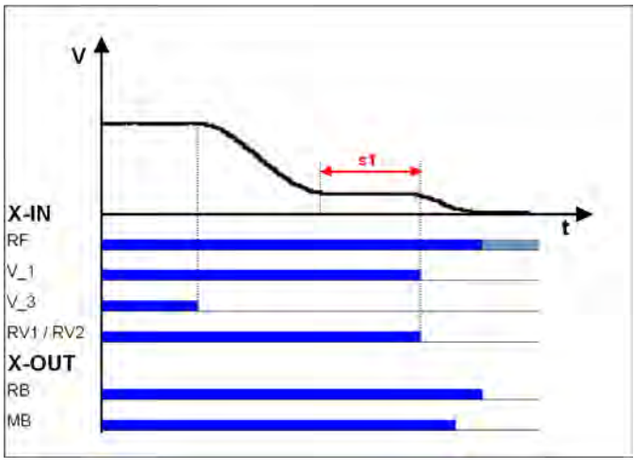
Using the crawl path optimization in the menu:
Decelerating / S_DI1
Decelerating / S_DI2
Decelerating / S_DI3
the traveling speeds V_1, V_2 and V_3 are switched off in all floors delayed by the value configured in the corresponding menu.

Optimizing the crawl paths

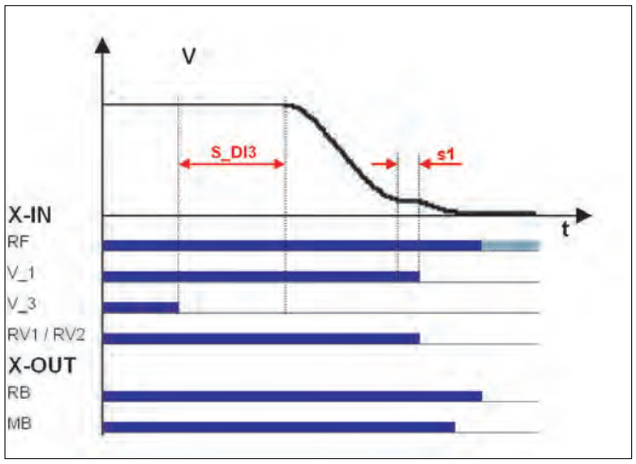
1	Travel to each floor from both directions of travel with the max. traveling speed V_3 or V_2 and check the crawl path s1 in the "INFO / Page 03" menu.
	`Dist. ---------- 03`
	`sa: 0.00 s21: 0.52m`
	`sr:^0.00 s31: 1.45m`
	`s1: 0.00 sd: 0.52m`

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 High travelling speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

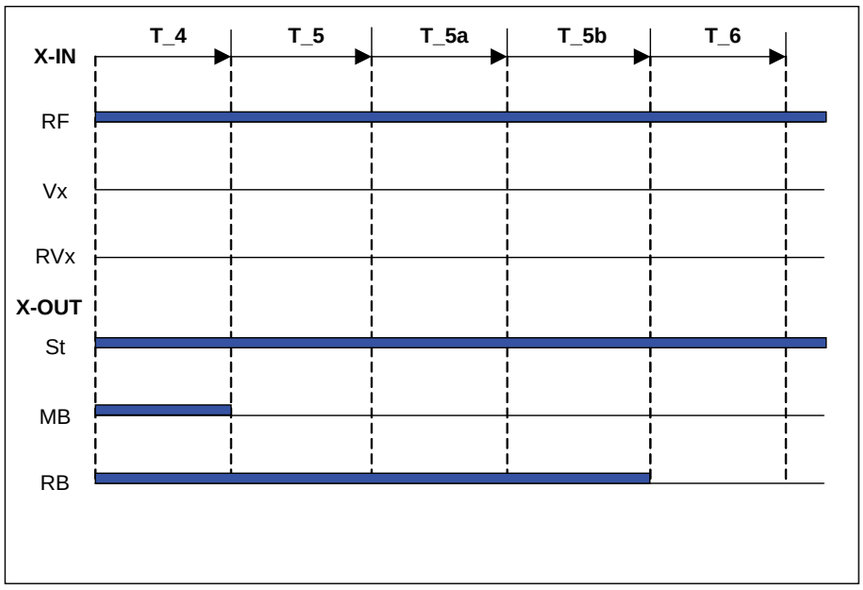


Deceleration with optimized crawl path
RF Controller enable
V_1 Positioning speed
V_3 High travelling speed

RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

13.10 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 Speed
RVx Travel direction
ST Controller failure
MB_Brake Mechanical brake
RB Controller ready

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

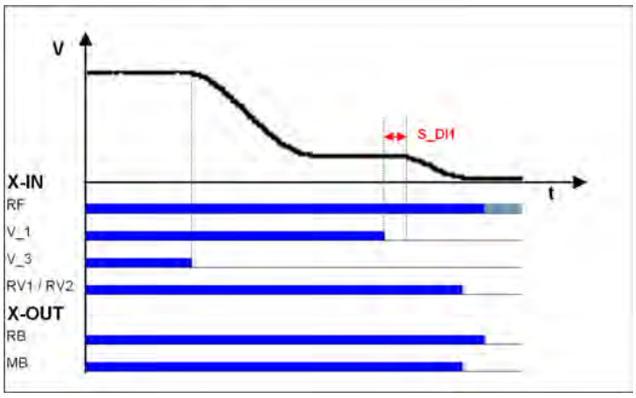
Time optimization through brake monitoring
If the brake monitoring is activated (menu **Monitoring/BR≠Off**) and the monitor contacts are connected, time T_5 is optimized. As soon as the brakes are closed, time T_5 is aborted and time T_5b started.

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.

13.11 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 value for "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 alignments, it is not possible to travel flush to all floors by modifying the parameter "S_DI1"!

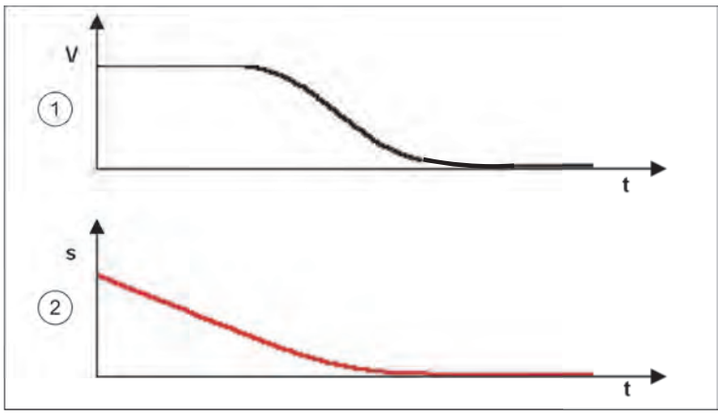


Optimizing the step alignment
RF Controller enable
V_1 Positioning speed
V_3 High travelling speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

13.12 Direct leveling

Information
Direct engagement is only possible when using the DCP2, the DCP4 or the CANopen lift protocol in position mode and an absolute shaft copy.

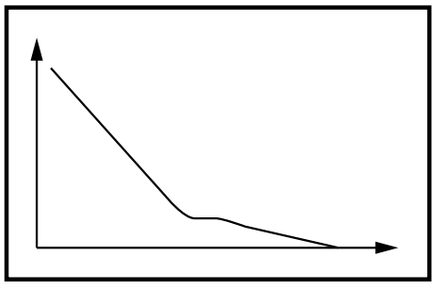
With direct engagement, the control system indicates to the ZAdyn4C the remaining distance to be travelled up to the stopping point. The frequency inverter slows down the motor in accordance with the specified remaining distance. This makes it possible to enter the stopping point without a creep path. Direct engagement enables intermediate speeds to be actuated.



Direct leveling with DCP protocol
1 Speed

2 Residual distance

If the **Deceleration/S_ABH=Slow** parameter is configured, engagement takes place with an early reduction in the engagement speed.



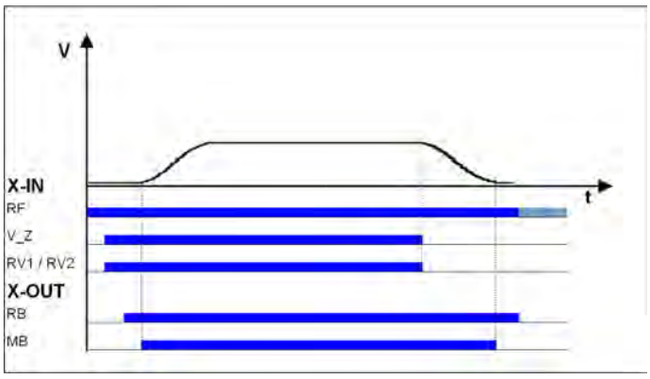
13.13 Readjustment

Correction of the strain on the suspension means when loading and unloading the cabin. The cable extension is evaluated by the control.
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

13.14 Operation in idle

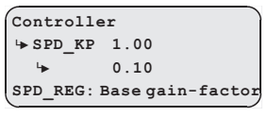
With the ZAdyn4C, both synchronous as well as asynchronous motors can be operated in an idle state.

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%.



13.15 Fast-start

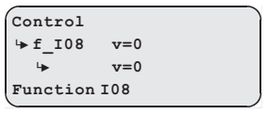
The motor is energized as the cabin door closes and the mechanical brake is opened. Motor speed is controlled to 0. This makes it possible to start travel immediately the door is closed.

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.

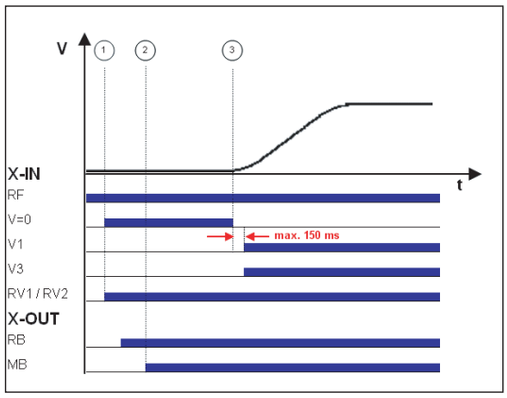
13.15.1 Brake control

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

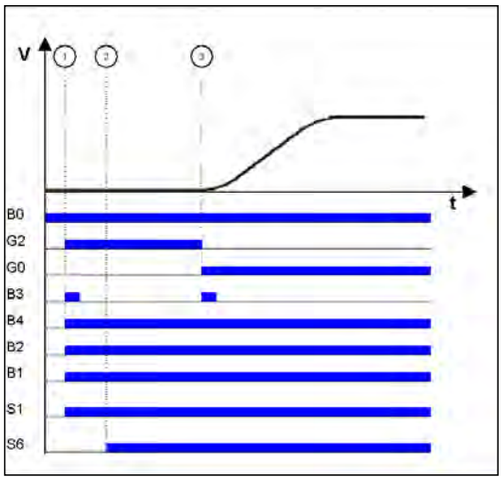


	Standard	DCP
1	Cabin door closing Actuation of inputs: • RF - Controller enable • RVx - Default for travel direction • v=0 - Hold speed 0 Activation of output: • RB - Controller ready The inputs of the STO function must be activated immediately ("1" signal) or motor contactors energized Motor energized	Cabin door closing Setting the bits by lift control: • G2 - RPM 0 • B1 – travel command • B2 – off switch • B3 – travelling speed • B4 – travel direction Setting the bits by ZAdyn4C • S1 – travel active 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.	Setting the bits by ZAdyn4C • S6 - 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!	Cabin door is closed Setting the bits by lift control: • G6 - Intermediate speed or • G7 – fast speed • B3 – travelling speed Cancelling the bits by lift control: • G2 - RPM 0 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 with standard actuation
RF Controller enable
v=0 Hold speed 0
V1 Positioning speed
V3 Speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake



Quick start with DCP actuation
B0 Converter enable
B1 Travel command
B2 Off switch
B3 Speed
B4 Direction default
S1 Travel active
S6 Mechanical brake
G2 Speed 0
G7 High travelling speed

13.15.2 Monitoring functions for Quickstart

- If the drive is held at a speed of 0 for longer than 20 s the frequency inverter enters failure mode and displays the error **ERR780/Quickstart > 20s**
- If the input signal "Maintain speed 0" is set during travel, the frequency inverter enters fault mode and displays **ERR781/Quick. during travel**
- If the motor moves by more than ±7 mm with the input set to speed 0, the ZAdyn4C goes to fault mode, displaying **ERR529 / Quickstart Alarm**
- The monitoring time for the rotary encoder (T_GUE) is started after the function "Speed 0" has been switched off

14 Emergency evacuation

14.1 General

- In the event of a mains failure, there is the possibility to carry out an emergency evacuation.
- By carrying out the emergency evacuation, the elevator cabin is driven into a floor or the ground floor.

14.2 Emergency evacuation with 1-phase 230 VAC power supply

14.2.1 General

Due to the low power requirements of a synchronous drive, it is possible to carry out an evacuation trip in the motoric and generatoric direction.

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

Requirements:

- For emergency evacuation with single-phase 230 VAC power supply, the frequency inverter must provide the following voltage:
  – 230 VAC to feed L1 and L2

Characteristics of evacuation with single-phase power supply:

- Evacuation in motoric and generatoric direction
- Load-independent starts
- Load-independent stopping
- Flush stopping

Process for emergency evacuation with 1-phase voltage supply:

- The ZAdyn4C analyses the load ratio between the car and the counterweight during every start.
- Based on the load ratio, the ZAdyn4C communicates to the control the direction in which the evacuation would be more energy saving.
- 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 for ZAdyn4C 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]**

Information
The shaft efficiency has a decisive influence on the required power of the single-phase mains supply.

14.2.2 Parameterization

(1) The following prerequisites must be present:
The direction of travel of the car is downwards with

Standard	DCP
24 V signal on input configured to "RV2"	Command byte 1, Bit 4 has 1-signal

Detection of voltage drop
Configure digital input in the **Control system** menu to **PARA2**.

```
Control
↳ f_I08   PARA2
  ↳       PARA2
Function I_08
```

In case of a power failure, the input configured for 24 VDC is actuated in order to inform the frequency inverter that a switchover to parameter set 2 is necessary.

(3) Inform the open loop control about the permissible direction of travel (optional):

Standard	DCP

In the **Control** menu, configure the digital output 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!
	Status byte 2, Bit 2 = 0 ⇦ Car is lighter than counterweight
	Evacuation trip will be carried out upwards!
	
	Status byte 2, Bit 2 = 1 ⇦ Car is heavier than counterweight
	Evacuation trip will be carried out downwards!

(4) Evacuation type default
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) Copying the parameters:
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.

14.3 Evacuation with UPS

14.3.1 General

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!

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

Requirements:
- For emergency evacuation with UPS, the frequency inverter must provide the following voltage:
  – 230 VAC to feed L1 and L2

Emergency evacuation process for voltage supply via UPS:
- The ZAdyn4C analyses the load ratio between the car and the counterweight during every start.
- Based on the load ratio, the ZAdyn4C communicates to the control the direction in which the evacuation would be more energy saving.
- The control system starts the evacuation trip by activating:
  – Controller enable
  – Direction default
  – Speed default

14.3.2 Evacuation through UPS with optimum power

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 for ZAdyn4C 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]**

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

14.3.3 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 for ZAdyn4C 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]**

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

14.3.4 Parameterization

(1) The following prerequisites must be present:
The direction of travel of the car is downwards with

Standard	DCP
24V signal on input configured to "RV2"	Command byte 1, Bit 4 has 1-signal

Detection of voltage drop
Configure digital input in the **Control system** menu to **PARA2**.

```
Control
↳ f_I08   PARA2
  ↳       PARA2
Function I_08
```

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.

(3) Inform the open loop control about the permissible direction of travel (optional):

Standard	DCP

In the **Control** menu, configure the digital output 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!
	Status byte 2, Bit 2 = 0 ⇦ Car is lighter than counterweight
	Evacuation trip will be carried out upwards!
	
	Status byte 2, Bit 2 = 1 ⇦ Car is heavier than counterweight
	Evacuation trip will be carried out downwards!

(4) Evacuation type default
Configure the parameter **F_PARA2 = UPS** in the **Parameter set 2** menu.

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

(5) Presetting the stator resistor in synchronous motors
In the **Parameter set 2 / R_U20** menu, enter the stator resistance of the synchronous motor used

```
Parameter set 2
↳ R_U20   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) Copying the parameters
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 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
```

14.4 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.

14.4.1 Parameterization

Configure in the **Parameter set 2 / STOP = ON** menu

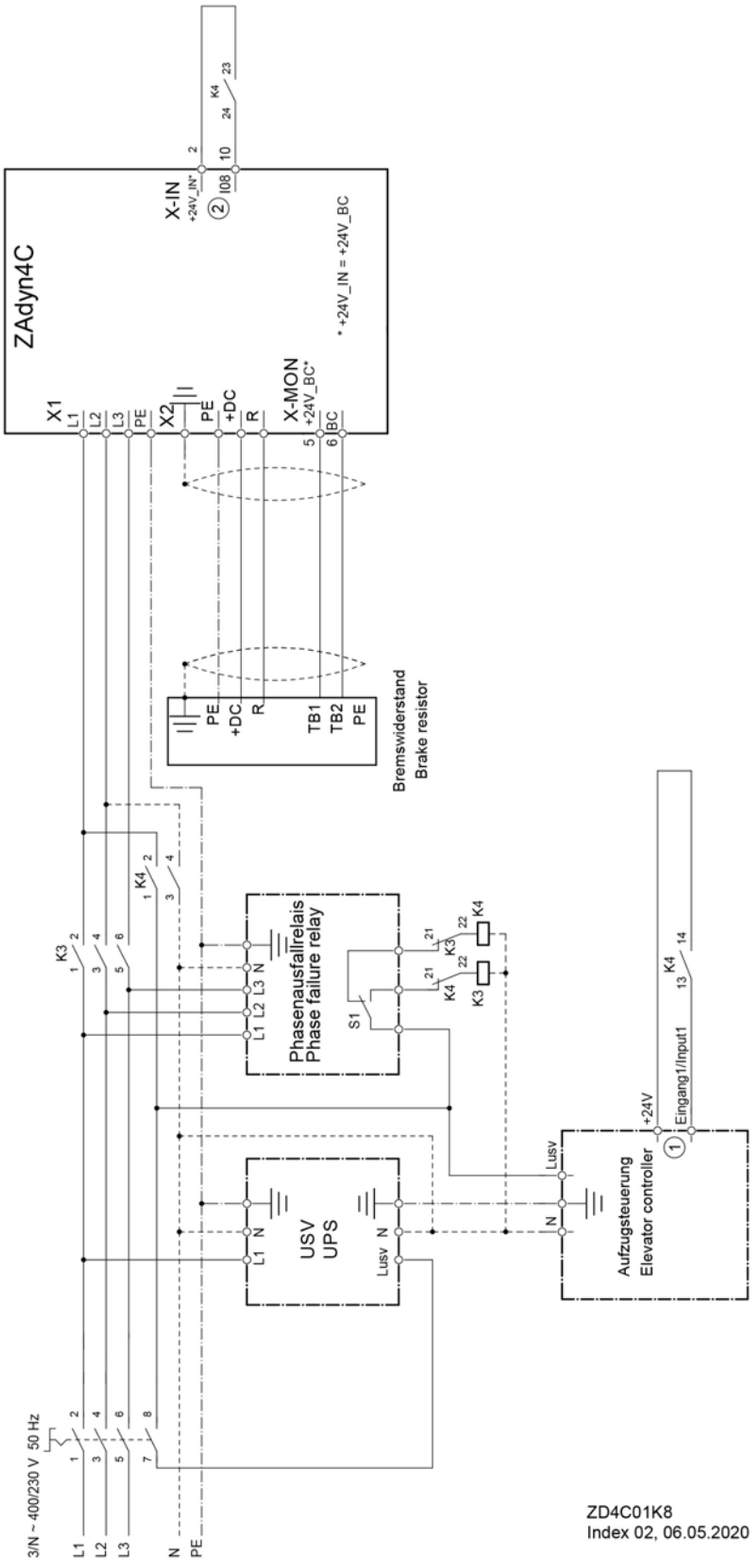
```
Parameter set 2
↳STOP     ON
  ↳       ON
Stop function
```

Standard	DCP2 / DCP4

Configure in the **Parameter set 2/STOP = ON** menu
Brake is already closed when the switch off for the speed V_1is reached.
	Determine overshoot path at the flush position under full load
	Set parameters in the **Control/DCP_STP = ... mm** menu
	`Control system`
	`↳DCP_STP 35 mm`
	`  ↳ 35`
	`Stop before floor level`
	The brakes are already closed when the distance to the flush position preset by S_Stop is reached.

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**.

14.5 Connection plan for USP on ZAdyn4C



ZD4C01K8

1 Function input 1: Monitoring power failure

2 Function input X-IN:I08 = PARA2

14.6 Emergency evacuation by opening the brakes

Emergency evacuation through manually or electrically opening the motor brakes until the cabin has reached the next floor in the direction of the pulling load.
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.

- If the ZAdyn4C is operated without contactors, the short-circuit is made by the internal short-circuit of the ZAdyn4C.
- If the ZAdyn4C is operated with contactors (optional), the short circuit is made by external contactors.

CAUTION!

Caution!
Short-circuiting the motor windings must be authorized by the motor manufacturer. This is tested and guaranteed in Ziehl-Abegg motors.

14.6.1 Monitor function

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

```
Control system
↳f_I08   41:Monitor
  ↳      41:Monitor
Function of I08
```

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

Activating of the monitoring function

- Switch on the ZAdyn4C
- activate the digital input with the "Monitoring" function
- Switch on the ZAdyn4C
- Monitoring function is active

Elevator-Monitor Speed: 0.2m/s Direction: up ▲ Distance: +1.24m	**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 activated monitor function, all further functions of the ZAdyn4C are locked!

14.7 Stutter brake function

14.7.1 General

The stutter brake function can be used for an emergency evacuation with electric manually vented brakes. The function brakes the movement of the elevator cabin and prevents uncontrolled acceleration.

14.7.2 Operation modes

The stutter brake function works in two ways:

- Speed-dependent cycle
- time cycle

Speed-dependent cycle

The digital output configured for the **Stutter br.** function is switched depending on the limit value V_G1.

The speed-dependent cycle includes the following steps, which are repeated in turn:

- If the speed of the elevator cabin exceeds the limit value configured in the parameter **V_G1**, the contact for the digital output is opened.
- The brake is closed.
- The speed falls below the limit value.
- The contact is closed.
- The brake is opened.
- The limit value is exceeded.

The speed-dependent cycle is carried out automatically if

- an emergency rescue is performed and, at the same time,
- the rotary encoder is functional

Time cycle:

The digital output configured for the **Stutter br.** function is switched based on time. This opens and closes the brake at a frequency of 0.5 Hz.

The time cycle is carried out automatically if

- the elevator installation is stopped or
- the rotary encoder is defective

At the same time

- the brake air monitor must be deactivated or
- the brake air monitor must be activated and the microswitch or the inductive proximity switches for the brake must report to the ZAdyn4C that the brake is open.

14.7.3 Parameterization

To activate the stutter brake function, a digital output in the **Control** menu is configured to the **Stutter br.** function.

```
Control
↳f_O1    BR Info
  ↳      Stutter br.
Function O4
```

The limit value V_G1 is entered in the parameter **Control/V_G1**. It is recommended to set the limit value V_G1 to 0.06 m/s.

```
Control
↳V_G1    0.3        m/s
  ↳      0.06
Limit value 1
```

The cabin speed can be changed by adjusting the parameter **Control/V_G1**.

15 Error diagnosis

15.1 Travel abort and acknowledgement during malfunctions

15.1.1 Travel abort

If the ZAdyn4C detects an error, the current travel program is aborted and following outputs are switched off immediately:

- ST – Malfunction
- RB – Controller ready (STO / motor contactors)
- MB – mechanical brake

The open loop control must immediately:

- Close the electromechanical brake
- STO- interruption or opening of the motor contactors

The drive is decelerated by the brake torque of the mechanical brake.

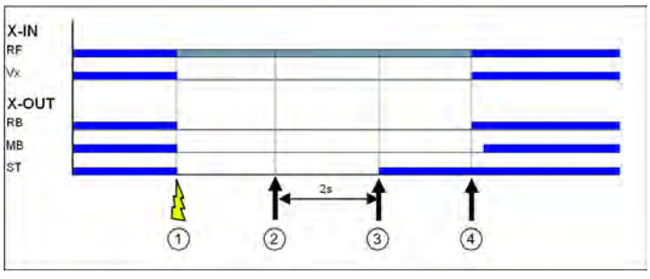
The error that has occurred is shown in the display with error text and error number. LED's, error memory and an error list are available for additional troubleshooting.

15.1.2 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:

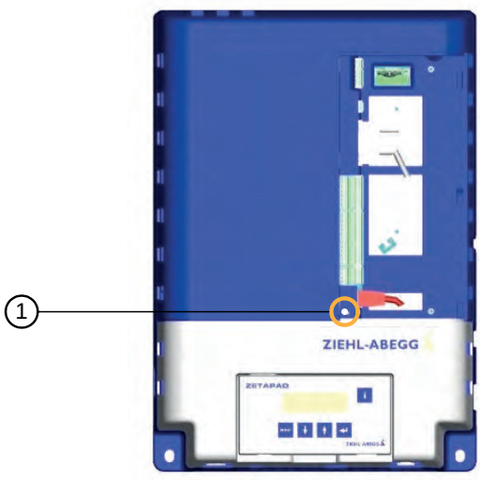
Error no.	Acknowledgement by
900 ... 999	Switch ZAdyn4C off and then back on



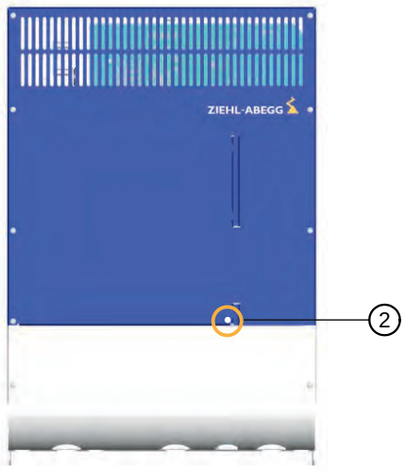
1 Error is recognized
2 Error is no more present
3 Atomatic acknowledgement with Vx=0
4 New travel command

15.2 LED

There is an LED on the ZAdyn4C for diagnosis. The LED illuminates in different colours.



1 Position of LED ZAdyn4C 011-032



2 Position of LED ZAdyn4C 040-074

Status of the ZAdyn4C with standard activation

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

Condition of the DCP connection

LED colour	LED status	Operation condition
red	fast flashing	With activated DCP function, the DCP connection is not present or is defective
green	On	With activated DCP function, the DCP connection is flawless
red / green	Slow alternating flashing	The DCP function is not activated in a trouble-free DCP connection (only DCP3/DCP4)

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

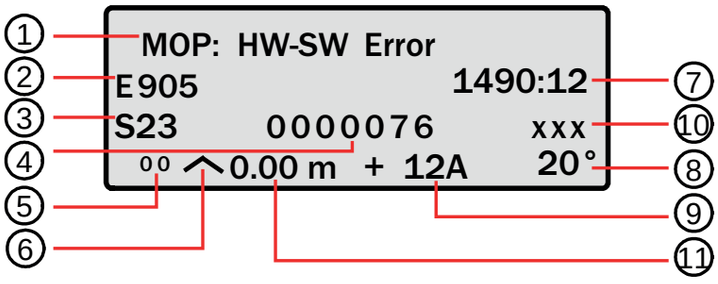
It is possible, that an operation condition and an error state occur at the same time and that they are indicated by the LED at the same time.

15.2.1 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

15.3 Readout the error memory

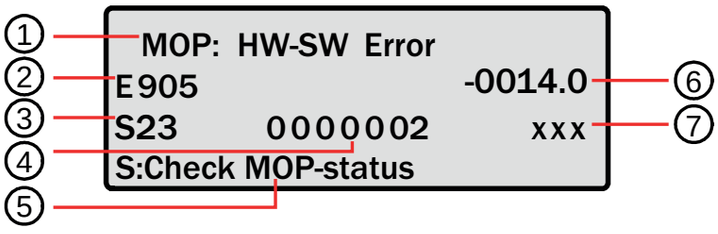
Faults which lead to interruption of the travel are saved in a fault list.
The fault list can be found in menu **Statistik/ST_LST**. Up to 64 error messages can be managed. Once the number of 64 messages has been reached, the oldest entry in each case is deleted for each new error message which arises.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

If the error list is open and the ↩ key is pressed, the following information is displayed:



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 Additional information (option)

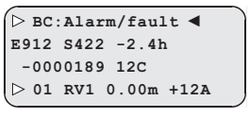
Scroll through fault list:
the fault list can be scrolled through using the two arrow keys.


Scroll up (reduce fault serial number)

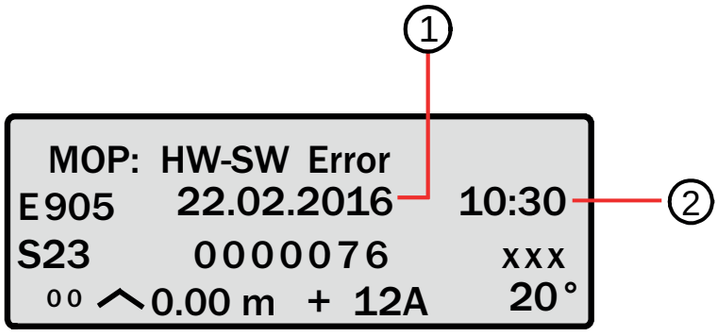

Scroll down (increase fault serial number)

Determine time of fault


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



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



1 Date when the error occurred
2 Time at which the error occurred

Information text display
If an error message is displayed or the error list is opened, an information text about the error message can be displayed. To do this, press the key. The prerequisite is that a memory card on which the information texts are saved is inserted in the X-MMC card slot.

15.4 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)

15.5 Error list

15.5.1 Masc-function

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.

15.5.2 Negative error screen

Inactive errors can be activated by entering the corresponding error number in the negative error screen (see “Parameter list/Monitoring menu” chapter). The inactive errors are indicated by a note in the error list.

15.5.3 Block function

Blocks the ZAdyn if certain errors occur several times in succession. The errors must occur in directly consecutive travel tests. The fault counter is reset to 0 after completion of fault-free travel.
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 which lead to locking of the ZAdyn4C are identified by a **dot** in the **S** column.

15.5.4 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
000	Memory empty	EEPROM is empty		
001	No error text	EEPROM is empty		
010	Software update	Software update was carried out		
020	MOT_TYP changed	On ZAdynpro only. Motor type has been changed in the “Motor name plate” menu		
040	Phase/BR error	On ZAdyn4B only. **Cause:** A phase of the supply mains has not been detected 30s after switching on or the field of rotation is incorrect **Remedy:** Check line voltage Correct the field of rotation at the mains connection		
077	ST_LST: locked	The last error entered occurred more than 5 times in succession	•	
080	Mode: EVA ->Norm	Switchover from evacuation to normal mode was implemented		
081	Mode: Standard->EVA	Switchover from normal to evacuation to mode was implemented		
085	Mode: Safety Brk	Capture release (safety brake function) performed		•

15.5.5 Error 1xx

- Hardware configuration error
- Software error

Error no.	Error text	Error cause	M	S
108	HW-IDENT:Incorrect no.”,	**Cause:** The ID no. of an assembly is not known **Remedy:** Update software (www.ziehl-abegg.com)		
110 120	CU: No ID	**Cause:** ID no. of processor board (CU) is not recognised **Remedy:** Please contact ZIEHL-ABEGG Customer Service		
111	CUSH missing	**Cause:** ID no. of the shunt module (CUSH) is not recognised **Remedy:** Please contact ZIEHL-ABEGG Customer Service		
115 125	SP missing	**Cause:** ID no. of the switching power supply board (SP) is not recognised **Remedy:** Please contact ZIEHL-ABEGG Customer Service		
116 126	PP missing	**Cause:** ID no. of the power unit board (PP) is not recognised **Remedy:** Please contact ZIEHL-ABEGG Customer Service		
117 127	MP missing	**Cause:** ID no. of the power unit board (MP) is not recognised **Remedy:** Please contact ZIEHL-ABEGG Customer Service		
118	PU missing	**Cause:** ID no. of the power unit board (PU) is not recognised **Remedy:** Please contact ZIEHL-ABEGG Customer Service		
119	DC missing	**Cause:** ID no. of the DC-link board (DC) is not recognised **Remedy:** Please contact ZIEHL-ABEGG Customer Service		
121	CUSH: ID-Error	**Cause:** Prohibited combination of assemblies (CUSH) **Remedy:** Please contact ZIEHL-ABEGG Customer Service		
130	Hardware unknown	**Cause:** The ID no. of an assembly is not known **Remedy:** Update software (www.ziehl-abegg.com)		
131	INFB conflict	**Cause:** The ID no. of an assembly is incorrect **Remedy:** Please contact ZIEHL-ABEGG Customer Service		
140	MP:Unknown IGBT	**Cause:** Unknown IGBT module **Remedy:** Please contact ZIEHL-ABEGG Customer Service		
150	HW conflict	**Cause:** Assemblies (SH, PP, MP) are not compatible **Remedy:** Please contact ZIEHL-ABEGG Customer Service		
160	ADC adj.:outside tol.	**Cause:** Incorrect measured values from current recording during switch-on **Remedy:** Switch the ZAdyn off and back on. Please contact ZIEHL-ABEGG Customer Service	•	
174	CUMT:Not detect	**Cause:** Board for monitoring the motor temperature is not recognised. **Remedy:** Check that the board is installed correctly. In the “Monitoring” menu, set the parameter “P1P2 = Off”. Replace the board	•	•

15.5.6 Error 2xx

- Configuration error

Error no.	Error text	Error cause	M	S
200	Stop input	**Cause:** When activating a travel command using the elevator control, a parameter for changing the speed is selected **Remedy:**Exit parameter input	•	
201	Motor name plate	**Cause:** A parameter in the “Motor name plate” menu is set to “0” **Remedy:** Check the motor data in the “Motor name plate” menu		
203	n* = 0	**Cause:** In the “Installation data” menu, the “n*” parameter is set to “0” **Remedy:**Enter the “n*” parameter		
205	Input duplicated	**Cause:** Two digital inputs are assigned the same function **Remedy:** Correct the function allocation of the digital inputs in the “Control” menu		
206	n* > 1.2204 *.n	**Cause:** The calculated motor speed “n*” in the “Installation data” menu is at least 20% above the set nominal speed “n” in the “Motor name plate” menu for the motor **Remedy:** Check system data Check motor data	•	

Error no.	Error text	Error cause	M	S
207	Input PFU_BR miss.	**Cause:** When using a power recuperation unit in conjunction with a brake resistor temperature monitoring of the brake resistor is not programmed **Remedy:** Configure a digital input (preferably “X_BR4”) in the “Control” menu to the “PFU_BR” function		
208	DELAY active	See error 355 “FastStp active”.		
210	Wrong ENC_TYP	**Cause:** Rotary encoder type (motor) and motor type do not match **Remedy:** Enter the correct rotary encoder type for the “ENC_TYP” parameter in the “Rotary encoder & BC” menu Enter the correct motor type for the “MOT_TYP” parameter in the “Motor name plate” menu	•	
213	ZR_EN /ZR_RDY miss-ing	**Cause:** When using a ZArec4C power recuperation unit, the “ZR_RDY” or “ZR_EN” functions have not been configured **Remedy:** In the “Control” menu, configure a digital input to the “ZR_RDY” function In the “Control” menu, configure a digital output to the “ZR_EN” function		
215	No HIPER/CODEFACE	**Cause:** An absolute encoder (motor) with Hiperface or Codeface interface has been selected - these encoder types cannot be used with the ZAdyn4C **Remedy:** In the “Rotary encoder & BC” menu, set the “ENC_TYP” parameter to the correct absolute encoder Replace the absolute encoder on the drive		
220	Error: SM data	**Cause:** In the “Motor name plate” menu, the values for the rated speed “n” and the rated frequency “f” are contradictory **Remedy:** Correct the “n” and “f” parameters (n = fx60/p)	•	
221	Error:ASM data	**Cause:** In the “Motor name plate” menu, the values for the rated speed “n” and the rated frequency “f” are contradictory **Remedy:** Correct the “n” and “f” parameters	•	
231	V_G1 > 150% V*	**Cause:** In the “Control” menu, the configured limit value “V_G1” is too high **Remedy:** Configure the limit value “V_G1” to max. 150% of the value of “V*” (“Installation” menu)		
232	V_G2 > 150% V*	**Cause:** In the “Control” menu, the configured limit value “V_G2” is too high **Remedy:** Configure the limit value “V_G2” to max. 150% of the value of “V*” (“Installation” menu)		
233	V_G3 > 150% V*	**Cause:** In the “Control” menu, the configured limit value “V_G3” is too high **Remedy:** Configure the limit value “V_G3” to max. 150% of the value of “V*” (“Installation” menu)		
240	ZR:Not RDY	See error 345 “ZR: Not RDY”.		
250	Disc: No Enc Adj.	See error 341 “Disc: No Enc Adj.”.		
251	Disc: Wrong ENC_INC	**Cause:** An invalid value has been set for the “ENC_INC” parameter (motor rotary encoder) in the “Rotary encoder & BC” menu **Remedy:** Correct the “ENC_INC” parameter	•	
252	Disc:EncInc deviance	See error 552 “Disc:EncInc deviance”		
260	V_EXT active!	See error 360 “V_EXT active”.		
270	Cable change warning	See error 370 “Cable change warning”.		
280	Decel. distance too long	**Cause:** The calculated deceleration path from travelling speed “V_3” to a standstill (S30) is too long **Remedy:** Increase the deceleration “A_NEG” in the “Deceleration” menu In the “Deceleration” menu, reduce the roundings “R_NEG1” and “R_NEG2” In the “Travel” menu, reduce the travelling speed “V_3”		
281	UF: No Pos. Mode	**Cause:** U/f operation (without encoder) in conjunction with CAN position mode or DCP04 control is not permissible **Remedy:** Change the “Config” parameter to DCP03 in the “Control” menu Change the control type in the elevator control to CAN Velocity mode	•	
284	CC_OFF is on	**Cause:** The travel curve computer is switched off **Remedy:** In the “ZA-Intern” menu, set the “CC_OFF” parameter to “OFF”	•	
285	Installation:V*=0	**Cause:** In the “Installation data” menu, the “V*” parameter is set to “0” **Remedy:** Enter the “V*” parameter		

Error no.	Error text	Error cause	M	S
287	V_1...V_7 > V*	**Cause:** In the “Travel” menu, one of the travelling speeds “V_1 … V_7” is higher than the nominal speed “V*” set in the “Installation data” menu **Remedy:** Check speeds “V_1 … V_7” Check “V*”		
289	V_1 < V_2 < V_3	**Cause:** Speeds are set incorrectly in the “Travel” menu **Remedy:** Set “V_1” to less than “V_2” Set “V_2” to less than “V_3”	•	
290	Para.set2 empty	**Cause:** Parameter set 2 was not preallocated before activation **Remedy:** In the “Parameter set 2” menu, set the “F_PAR2” parameter to the desired operating mode		

15.5.7 Error 3xx

- Error before trip start

Error no.	Error text	Error cause	M	S
301	MOP: Timeout	**Cause:** There is no communication between the application and motor management processor during start-up **Remedy:** For sporadic occurrence: Check EMC-compatible installation (screening, etc.) For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		•
303	MOP: SW-Error	**Cause:** Software error message from the motor management processor **Remedy:** Switch the ZAdyn off and back on Reset ZAdyn to delivery condition: Enter the “RESET = 77” parameter in the “Statistics” menu Perform a software update	•	•
304	MOP: HW-Error	**Cause:** Overvoltage detected in DC-link Memory error Error in measured value recording **Remedy:** Switch the ZAdyn off and back on Reset ZAdyn to delivery condition: Enter the “RESET = 77” parameter in the “Statistics” menu Perform a software update	•	•
306	ADC calibration??	**Cause:** Zero point adjustment for motor current detection (analog-digital converter) is outside of tolerance **Remedy:** Switch the ZAdyn off and back on Replace defective shunt module	•	•
308	Iu Iv not 0A	**Cause:** A motor current is measured even when stopped Current detection defective **Remedy:** Check shunt module Switch the ZAdyn off and back on	•	•
310	ENC: No AWG	**Cause:** The absolute encoder (motor) was not recognised at the start of travel **Remedy:** Check the connection of the absolute encoder Check the setting for the “ENC_TYP” parameter in the “Rotary encoder & BC” menu For further information, see the “Rotary encoder” info menu	•	•
311	ENC:Resolution	**Cause:** In the “Rotary encoder & BC” menu, the “ENC_INC” parameter setting does not match the resolution of the absolute encoder (motor) **Remedy:** Set “ENC_IN” to the correct resolution For further information, see the “Rotary encoder” info menu		
312	HIPER:Status error	On ZAdyn4C and ZAdyn4B only. See error 336 "ENC: Faulty”		
313	HIPER:No incr. mode	On ZAdyn4C and ZAdyn4B only. See error 336 "ENC: Faulty”		
314	HIPER:Alarm	On ZAdyn4C and ZAdyn4B only. See error 335 "ENC: Warning”		
321	EnDat: ULP-error	See error 335 "ENC: Warning”		
322	EnDat: Com-Fehler	See error 337 “ENC:Comm. Error”.		

Error no.	Error text	Error cause	M	S
324	SSI: Ack-Error			
325	SSI: Timeout			
327	ENC: Read-Error			
328	ENC: Count-Dif	**Cause:** Excessive difference between the absolute position read out and the position calculated from the pulses **Remedy:** Check absolute value encoder Check rotary encoder line Check rotary encoder connection (e.g. shielding)		
330	ENC:Sinus-Error F	See error 337.		
331	ENC: Error NDEF	**Cause:** In the “Rotary encoder & BC” menu, the “ENC_INC” parameter setting does not match the resolution of the absolute encoder (motor) **Remedy:** Set “ENC_IN” to the correct resolution For further information, see the “Rotary encoder” info menu		•
332	ENC: 1387 CD=0	**Cause:** Input voltages for signal tracks C and D of the absolute encoder type ERN1387 are both zero **Remedy:** Check absolute value encoder Check rotary encoder line Check rotary encoder connection		
333	ENC:Ill. Counter	**Cause:** The absolute value determined (motor rotary encoder) is invalid **Remedy:** Switch the ZAdyn off and back on Check the “ENC_TYP” and “ENC_INC” parameters in the “Rotary encoder & BC” menu For further information, see the “Rotary encoder” info menu		•
335	ENC: Warning	**Cause:** The absolute encoder (motor) is transmitting a warning which indicates an imminent failure **Remedy:** The absolute encoder must be replaced as quickly as possible In the “Monitoring” menu, one of the “MASKx” parameters can be temporarily set to 335 to mask the error	•	•
336	ENC: Faulty	**Cause:** The absolute encoder (motor) is probably faulty **Remedy:** Switch the ZAdyn off and back on Replace the absolute encoder		•
337	ENC: Comm. Error	**Cause:** Faulty communication with absolute encoder (motor) **Remedy:** Check the “ENC_TYP” and “ENC_INC” parameters in the “Rotary encoder & BC” menu Check the connection of the absolute encoder Check EMC-compatible installation (screening of rotary encoder cable, motor cable, BR cable, etc.) For further information, see the “Rotary encoder” info menu Contact the ZIEHL-ABEGG hotline Replace the absolute encoder		•
340	Disc:magnet miss.	**Cause:** A magnet in the DISCcontrol positioning system was not detected at the expected position **Remedy:** Stick on the magnet in the right position Attach any magnet that may have dropped off Set the Hall sensor to the correct distance Check the clearance of the traction sheave bearing	•	•
341	Disc: No Enc Adj.	**Cause:** Magnet adhesion process was not performed **Remedy:** In the “Rotary encoder adjustment” menu, select the “ENC_ADJ” parameter and perform the magnet adhesion process		
345	ZR: Not RDY	**Cause:** There is no signal at the digital input configured for the “ZR_RDY” function at the start of travel **Remedy:** Exit the ZArec configuration level Check whether there is an error on the ZArec In the “Rotary encoder & BC” menu, check the “BC_TYP = ZArec” parameter Check the wiring between ZAdyn and ZArec		

Error no.	Error text	Error cause	M	S
346	BR: T2 too small	**Cause:** The brake is not detected as open at the start of travel Brake does not open Brake bleeding monitoring switch does not switch **Remedy:** Check brake bleeding monitoring Check brake control Check the opening time of the brakes In the “Start-up” menu, check the “T_2” parameter and increase if necessary Check the configuration of the brake bleeding monitoring (“Monitoring” and “Control” menu)	●	●
347	CO: ON!?	**Cause:** The motor contactors are not detected as closed at the start of travel Motor contactors do not switch Auxiliary contacts of the motor contactors do not switch **Remedy:** Check contactor monitoring Check the wiring of the motor contactors Check the supply voltage to the motor contactors Check the contactor monitoring supply voltage In the “Monitoring” menu, check the “CO” parameter	●	●
348	STO: remains	**Cause:** At the start of travel, after 2,5 s, there are no STO_A and STO_B signals at the X-STO connection terminal **Remedy:** Check the control wiring Check the relay supply voltage Check the control voltage of the STO signals When using the ZAsbc4: Reset the ZAsbc4 by switching it off and back on		●
349	STO: No trav. sig.	**Cause:** After actuation of the STO_A and STO_B inputs, no elevator control travel signal was registered within 2.5 s **Remedy:** Check the elevator control with regard to travel signals Check actuation of the STO inputs With parallel control, check the wiring of the digital control inputs Check the status of the serial control (CAN, DCP) using the status LED on the ZAdyn		
350	Temp:Sens defective	**Cause:** The temperature sensor for the power unit is not detected. The ZAdyn carries out further journeys with a reduced clock frequency of 4 kHz and maximum fan power **Remedy:** Not possible, replace ZAdyn as soon as possible Contact the ZIEHL-ABEGG hotline	●	
355	FastStp active	**Cause:** The “Limited emergency stop” function is already active at the start of travel **Remedy:** Check the setting of the digital inputs in the “Control” menu Check the control and wiring of the input for the “/FastStp” function		●
360	V_EXT active	**Cause:** When connected to line voltage, the external 24 VDC voltage supply to the processor board (CU) exceeds the internal voltage supply by 1 VDC **Remedy:** Remove the external 24 VDC voltage supply Reduce the voltage of the external 24 VDC	●	●
365	Travel at MB=OFF	**Cause:** Movement of the drive is detected although the “MB” output is deactivated **Remedy:** Check the motor brake for sufficient brake torque Check the dropout time of the brake The motor brake must be actuated at the same time as the relay for the “MB” output function is switched	●	●
370	Suspension means warning	**Cause:** Direction change counter information The suspension means must be replaced in approx. 1 year **Remedy:** Replace the suspension means before the direction change counter has reached zero	●	
372	ENC:No Abs.value	See error 337 “ENC:Comm. Error”.		
373	ENC:No Abs.End			

Error no.	Error text	Error cause	M	S
374	P1P2:short-circuit	**Cause:** The measured resistance at the “X-MT” terminal is less than 20 Ohm when “P1P2 = PTC” motor temperature monitoring is set in the “Monitoring” menu **Remedy:** Check the motor temperature monitoring connection Check the “P1P2” parameter in the “Monitoring” menu	●	
375	MOT:Temp.warning	**Cause:** The determined motor temperature is too high at the start of travel **Remedy:** Check the temperature sensor (motor) connection at terminal X-MT Check whether there the motor is overheating Remedy the cause of the motor overheating (reduce on time, check load ratios in the system, check motor parameters, adjust the absolute encoder on synchronous machines, cool the motor etc.)	●	
376	STO: Temp. alarm	See error 976 “STO: Temp. alarm"		
377	BRxx:Temp.warning	**Cause:** The calculated power loss of the brake resistor exceeds the nominal power by 25 % **Remedy:** Check the “BC_TYP” parameter in the “Rotary encoder & BC” menu If “BC_TYP” = “BRxx” in the “Rotary encoder & BC” menu, check the “R_BR” and “P_BR” parameters Remedy the cause of the resistor overload (reduce on time, check the load ratios in the system etc.)		
378	MP: Not active	**Cause:** The voltage supply to the power unit was not active at the start of travel **Remedy:** Contact the ZIEHL-ABEGG hotline		●
379	MP:Temp.warning	**Cause:** The temperature of the power unit is too high at the start of travel **Remedy:** Check the function of the unit fan Check the ambient temperature Remedy the cause of overheating (reduce on time, check load ratios in the system, check motor parameters, adjust the absolute encoder on synchronous machines etc.)	●	
380	BR: Start-Error	**Cause:** At least one brake is detected as bled before the start of travel when brake bleeding monitoring is activated **Remedy:** In the “Monitoring” menu, check the “BR” parameter to make sure the correct number is set and check the switching logic (NO / NC) of the monitoring contacts Check that the monitoring contacts are connected correctly Check the function of the monitoring contacts		●
395	MP:ERR_EXT active	**Cause:** An internal device error occurs at the start of travel **Remedy:** Switch the ZAdyn off and back on Contact the ZIEHL-ABEGG hotline	●	●

15.5.8 Error 4xx

- Travel abort to protect the ZAdyn4C
- Voltage monitoring
- Overvoltage Brake resistor / Brake-Chopper
- Power stage temperature recording
- Current monitoring

Error no.	Error text	Error cause	M	S
410	ADC:Overcurrent	**Cause:** A motor overcurrent has been detected **Remedy:** Check the motor connection for short circuit and earth fault Check the phase sequence of the motor connection (U->U; V->V; W->W) Check the connection and function of the rotary encoder (for further information, see the “Rotary encoder” info menu) Check the absolute encoder adjustment Check the motor data in the “Motor name plate” menu Reduce the “SPD_KP” parameter in the “Control” menu Reduce the “K_START” parameter in the “Start-up” menu For open loop operation (asynchronous operation without sensors): Configure the **Control/UF_ED=On** parameter and then gradually increase the **Control/I_IxR** parameter. Do not exceed a maximum value of 1.5 x nominal motor current.		●
412	MOT: UVW missing	**Cause:** The motor test current was not reached at the start of travel **Remedy:** Check the motor connection and motor cable Contact ZIEHL-ABEGG Customer Service	●	
415	MOT: Current UVW	**Cause:**The sum of the currents U, V, W is not equal to 0 **Remedy:** Check the motor connection for short circuit and earth fault	●	●
420	MP: Temp. alarm	**Cause:** Overtemperature on power unit **Remedy:** Check the function of the unit fan Check the ambient temperature Remedy the cause of overheating (reduce on time, check load ratios in the system, check motor parameters, adjust the absolute encoder on synchronous machines etc.)		●
431	MP: PWM fail	**Cause:** Internal device error, pulse width modulation has been switched off **Remedy:** Check rotary encoder connection For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service For sporadic occurrence: Check EMC-compatible installation (screening, etc.)		●
435	MP: PWM on	See error 935 “MP: PWM on"		
450	MP: Overload	**Cause:** The maximum output current of the ZAdyn has been exceeded for more than 10 s **Remedy:** Check the connection and function of the rotary encoder (for further information, see the “Rotary encoder” info menu) Check motor data Check the weight compensation Check opening of the brake (motor) Check the absolute encoder adjustment Check the required motor power and unit size Check that the cabin and counterweight engage easily	●	●
470	DC: U < UDC_MIN	See error 970 “DC: U > 850 V”.	●	
471	DC: U > UDC_MAX	**Cause:** DC-link voltage has exceeded the maximum voltage during travel **Remedy:** Check the connection, function and design of the brake chopper/-brake resistor, In the “Power unit” menu, check the parameters for “UDC_MAX”, In the “Rotary encoder & BC” menu, check the “BC_TYP” parameter In case of poor travel behaviour (vibration), check the “SPD_KP” parameter in the “Control” menu If the error occurs during deceleration, reduce the “A_NEG” parameter or increase “R_NEG1” in the “Deceleration” menu	●	
472	Line failure	See error 972 “Line failure”.		
475	DC: U > 850 V	See error 975 “DC: U > 850V”.		

Error no.	Error text	Error cause	M	S
480	MP: Overcurrent	**Cause:** Overcurrent has been detected at the motor output **Remedy:** Check the motor connection for short circuit and earth fault Check the phase sequence of the motor connection (U->U; V->V; W->W) Check the connection and function of the rotary encoder (for further information, see the “Rotary encoder” info menu) Check the absolute encoder adjustment Check the motor data in the “Motor name plate” menu Reduce the “SPD_KP” parameter in the “Control” menu Reduce the “K_START” parameter in the “Start-up” menu For open loop operation (asynchronous operation without sensors): Configure the **Control/UF_ED=On** parameter and then gradually increase the **Control/I_IxR** parameter. Do not exceed a maximum value of 1.5 x nominal motor current.		●
484	MP: Overcurrent R	**Cause:** Overcurrent has been detected at the output for the brake resistor **Remedy:** Check the brake resistor connection for short circuit and earth fault Check the type of brake resistor used (see operating instructions, “Brake resistor allocation” chapter)		●
485	Intermediate circuit overcurrent	**Cause:** The DC-link current sensor has detected an overcurrent **Remedy:** Check the brake resistor connection for short circuit and earth fault Check the type of brake resistor used (see operating instructions, “Brake resistor allocation” chapter) Check the motor connection (short circuit, earth fault) Check rotary encoder connection Disconnect the cables at terminals U, V, W and R and send a travel signal. If the error persists, there is a defect in the unit. In this case, contact ZIEHL-ABEGG Customer Service		●
497	SW: System check	See error 982 “SW error (T>4.5ms)”.		

15.5.9 Error 5xx

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

Error no.	Error text	Error cause	M	S
501	Travel at MB=OFF	See error 365 “Travel with MB=OFF”.	●	●
503	No starting	**Cause:** No rotary encoder signal (motor) has been detected yet after the time “T_ENC” in the “Monitoring” menu has elapsed **Remedy:** Check opening of the brake Check the time “T_ENC” in the “Monitoring” menu Observe the value “Cnt” in the “Rotary encoder” info menu when turning the motor shaft (e.g. by bleeding the brake). As the shaft turns, the value must continuously rise/fall Check rotary encoder connection Check the setting for the “ENC_TYP” parameter in the “Rotary encoder & BC” menu	●	●
504	ENC:Sig.Underv.	**Cause:** No more signals from the rotary encoder (motor) are detected during travel **Remedy:** Motor shaft rotating continuously: - Check rotary encoder connection - Observe the value “Cnt” in the “Rotary encoder” info menu when turning the motor shaft (e.g. by bleeding the brake). As the shaft turns, the value must continuously rise/fall, Motor shaft stops during travel: - Check whether brake has engaged during travel - For ASM: Check the motor data - Check the motor connection (U-U, V-V, W-W) - Increase the “SPD_KP” parameter in the “Control” menu	●	●
505	No motor movement	**Cause:** No signals detected by the rotary encoder (motor) **Remedy:** Check whether the brake is opening Check motor data Check the motor connection (U-U, V-V, W-W) Increase the "SPD_KP" parameter in the "Control system" menu,	●	●
514	n > n_LOAD	**Cause:** Speed is above 110 % of the nominal speed V* **Remedy:** Check / increase the “SPD_KP” parameter in the “Control” menu Check the motor data in the “Motor name plate” menu	●	●
515	v > 110% V*	**Cause:** Speed is above 110% of the nominal speed V* **Remedy:** Check / increase the “SPD_KP” parameter in the “Control” menu, Check the motor data in the “Motor name plate” menu	●	
516	v > 150% V*	**Cause:** Speed is above 150% of the nominal speed V* **Remedy:** Check / increase the “SPD_KP” parameter in the “Control” menu, Check the motor data in the “Motor name plate” menu		●
520	Wrong direction	**Cause:** Drive moves several centimetres in the wrong direction **Remedy:** Check the motor connection (U-U, V-V, W-W) Check the settings in the “Motor name plate” menu Check rotary encoder connection Reduce the “SPD_KP” parameter in the “Control” menu Increase the “M_MAX” parameter in the “Motor name plate” menu If the above solutions do not work successfully, replace the wires of the motor cable at connection terminal U and V. Important: In this case, rotary encoder adjustment must be carried out for synchronous drives (“Rotary encoder adjustment” menu, “ENC_ADJ” parameter)	●	●

Error no.	Error text	Error cause	M	S
525	ENC: ADC Limit	**Cause:** Signal track A, B, C or D of the absolute or sinus encoder has exceeded the permissible limit value during travel **Remedy:** Check whether a rectangular rotary encoder is connected when the “ENC type” set in the “Rotary encoder & BC” menu is “TTL sine”. In this case, set the parameter correctly Check whether the ZAdyn supports the connected rotary encoder (see operating instructions, “Rotary encoder connection” chapter) Replace the rotary encoder	●	●
529	Quickstart alarm	**Cause:** In the quick start function, the drive moves by more than 7 mm while the speed is set to 0 m/s **Remedy:** Check the motor data in the “Motor name plate” menu Reduce the “SPD_KP” parameter in the “Control” menu Check the motor connection (U-U, V-V, W-W)	●	●
530	STO: remains	See error 348 “STO: Remains”.	●	
531	STO: Interruption	**Cause:** STO input signals were interrupted during travel. Interruption of the travel in case of signal interruption longer than 200 ms. No interruption of the travel in the event of shorter interruptions, but error entry at the end of travel **Remedy:** Check the safety circuit Check actuation of the STO inputs Check the relay supply voltage Check the control voltage of the STO signals	●	
532	STO: missing	**Error:** At the end of travel there is still a signal at the STO_A and STO_B inputs after 2,5 s. **Remedy:**Check actuation of the STO inputs Adjust the time during which the STO inputs are actuated on the elevator control		●
533	STO: Fault	**Cause:**The status of the STO_A and STO_B signals was different for longer than 120 ms **Remedy:**Check actuation of the STO inputs Check the switching function of the relay contacts Check coupling relay actuation	●	●
534	STO: No travel signal	See error 349 “STO:no travel signal”.		
535	ZR: RDY abort	**Cause:** ZArec error message - the signal at the digital input configured for “ZR_RDY” drops during travel **Remedy:** Use the ZArec display to check for an error on the ZArec For sporadic occurrence: Check EMC-compatible installation (screening, etc.)		●
536	SBC:RDY abort	**Cause:** 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 for the ZAsbc4		●
540	CO: ON!?	See error 337 “CO: Missing”.		●
544	CO/RF:Vx active	**Cause:** Interruption of the travel due to CO interruption, the travel commands from the control remain active **Remedy:** Check the safety circuit Check contactor actuation Check evaluation of the ZAdyn output signals by the control	●	
545	CO open early	**Cause:** Interruption of the travel due to CO interruption **Remedy:** Check the safety circuit Check contactor actuation	●	
548	CO1: still on	**Cause:** At the end of travel, the contactors are not yet detected as de-energized when the time “T_CDLY” in the “Monitoring” menu has elapsed **Remedy:** Check the wiring of the contactor monitoring Check contactor actuation Check the function of the contactors		●

Error no.	Error text	Error cause	M	S
550	MOT: Overload !	**Cause:** Motor current exceeds the value “I_MAX” for the time “T_MAX” in the “Monitoring” menu **Remedy:** Check the motor data in the “Motor name plate” menu Check the weight compensation Check the brake lifting Check the system design	●	●
552	Disc:EncInc deviance	**Cause:** The encoder line count determined has an excessive tolerance **Remedy:** Check the friction wheel (support, bearing, diameter) Switch the ZAdyn off and back on For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service	●	●
553	Disc:Wrong position	**Cause:** A magnet has been detected but is not expected **Remedy:** Check the position of the magnets Switch the ZAdyn off and back on	●	●
560	V > VZ	**Cause:** When travelling at a controlled speed V_Z (resetting), the speed was 10% higher than the specified setpoint speed **Remedy:** Check the parameters set in the “Motor name plate” menu Check the “SPD_KP” and “SPD_TI” parameters in the “Control” menu Only active when entered in negative error screen.	●	●
565	Movement detected	**Cause:** The motor shaft moved during encoder adjustment with closed brake **Remedy:** Check whether the brake was disconnected before starting encoder adjustment. The brake must not be opened during adjustment	●	
570	PFU Alarm	**Cause:** The monitoring contact for the power recuperation unit (input “BC”) opens during operation of the ZAdyn or is not closed during start-up **Remedy:** Check the power recuperation unit error display. Check the connection of the alarm relay for the power recuperation unit	●	●
575	MOT: Temp. -Alarm	**Cause:** The motor temperature has exceeded the permissible limit value during travel **Remedy:** Check the parameters set in the “Motor name plate” menu In the “Mot” info menu, check the motor current for constant travel (empty cabin down). The displayed motor current should not exceed the nominal current of the motor. In asynchronous motors, if necessary perform automatic identification of the motor parameters (in the “Motor name plate” menu, “ASM_ID” parameter) Check the on time of the motor (display in info menu “Power1”, value “ED”) In synchronous motors, check the rotary encoder offset Check the brake lifting Only active when entered in negative error screen.	●	●
582	BR:T2 too small	See error 346 “BR: T2 too small”.		
583	BR: Fault Travel	**Cause:** Brake monitoring has tripped during travel **Remedy:** Check correct function of the monitoring contacts Check brake control check the power supply of the brakes Only active when entered in negative error screen.	●	
584	BR: Fault Travel	**Cause:** Brake monitoring has tripped during travel a) For a brief interruption, entry at the end of travel b) For interruption longer than 500 ms, interruption of the travel **Remedy:** Check correct function of the monitoring contacts Check brake control check the power supply of the brakes	●	●
585	BR: T5 too small	**Cause:** The brake has not closed within the time “T_5” configured in the “Stop” menu **Remedy:** Check brake control Check the dropout time of the brake magnet Check the setting for the “T_5” parameter and increase if necessary Check the switching function of the brake monitoring	●	●

Error no.	Error text	Error cause	M	S
587	BR: Delta t too small	**Cause:** Brakes do not engage with a time offset of min. 50 ms on emergency stop **Remedy:** Carry out brake control according to drive instructions Install free-running diode in a brake circuit Check existing free-running diode for faults	•	•
590	RV1/RV2:Change	**Cause:** The direction specification has been changed during travel **Remedy:** Check control of travel directions For sporadic occurrence: Check EMC-compatible installation (screening, etc.) Only active when entered in negative error screen.	•	•

15.5.10 Error 7xx - 8xx

- Trip abort due to errors between ZAdyn4C and control system
- 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
710	DCP: Timeout	**Cause:** DCP communication was interrupted during travel **Remedy:** Check the wiring of the DCP connection		•
715	DCP:G0-G7 missing	**Cause:** DCP telegram for setting the speed (G0-G7) is not sent by the control **Remedy:** Check compatibility of the control with the DCP specification	•	•
720	Extended in delay	**Cause:** During deceleration, the transferred remaining distance (DCP04) has been increased or a new target position (CAN) has been specified **Remedy:** Check the absolute encoder for determination of the remaining distance Check compatibility of the control with the DCP specification In the Bus Info 3 info menu, check the ratio of the distance measurement on the absolute encoder (shaft) to the motor encoder (line 4)	•	•
721	DCP:Remaining distance error”	**Cause:** The remaining distance specification does not change during travel **Remedy:** Check compatibility of the control with the DCP specification Check the absolute encoder for determination of the remaining distance	•	•
780	Quickstart > 20s	**Cause:** At the start of travel with the quickstart function, the travelling speed “V=0” is actuated for longer than 20s **Remedy:** Shorten the time in which "V=0" is triggered	•	•
781	Quick. during travel	**Cause:** The signal at the digital input configured for “V=0” is activated during travel **Remedy:** Check the triggering of "V=0"	•	•
799	RF: Interruption	**Cause:** The signal at the digital input configured for the “RF” controller enable function has been switched off during travel **Remedy:** Check the triggering of "RF" Check the safety circuit Only active when entered in negative error screen.	•	
800	CAN: Timeout	**Cause:** Error in Velocity mode: Heartbeat from the control missing or not received at the set intervals Error in the Position mode: Heartbeat from the control and/or rotary encoder missing or is not received at the set intervals **Remedy:** Check CAN connections Check that the heartbeat for the corresponding devices is set correctly		•
820	CAN: Illegal State	**Cause:** The control is sending CAN control words at an impermissible time or in the wrong sequence **Remedy:**Check that the control has the latest software version	•	•

Error no.	Error text	Error cause	M	S
821	CAN: Position Error	**Cause:** During travel at a speed greater than 10 cm/s the shaft position does not change within 200 ms (CAN Position mode) **Remedy:**Check the CAN absolute encoder in the shaft Check the traction conditions of the drive (traction sheave) If the error occurs 5 times in a row, the ZAdyn is locked. The lock can be released by parameter **Monitoring/UNLOCK=ON**.	•	•
831	CAN:Timeout Dis. Op.	**Cause:** The control does not issue the “Disable Operation” command within the time “T_CMD” entered in the “CAN” menu when stopping **Remedy:** Check the time for “T_CMD” Check compatibility of the control with the CAN specification CiA-417 Check the fault counter for changes during travel in the “Bus Info 4” info menu For sporadic occurrence: Check EMC-compatible installation (screening, etc.), termination of CAN bus (terminating resistors)		•
832	CAN:Timeout Shutdown	**Cause:** The control does not issue the “Shutdown” command within the time “T_CMD” entered in the “CAN” menu when stopping **Remedy:** Check the time for “T_CMD” Check compatibility of the control with the CAN specification CiA-417 Check the fault counter for changes during travel in the “Bus Info 4” info menu For sporadic occurrence: Check EMC-compatible installation (screening, etc.), termination of CAN bus (terminating resistors)		•
833	CAN:Timeout Dis.Vol.	**Cause:** The control does not issue the “Disable Voltage” command within the time “T_CMD” entered in the “CAN” menu when stopping **Remedy:** Check the time for “T_CMD” Check compatibility of the control with the CAN specification CiA-417 Check the fault counter for changes during travel in the “Bus Info 4” info menu For sporadic occurrence: Check EMC-compatible installation (screening, etc.), termination of CAN bus (terminating resistors)		•
840	CAN:Enc.Info missing	**Cause:** The “Position conversion” object (0x641F) has not been written to the frequency converter by the control **Remedy:**Check that the control has the latest software version		•

15.5.11 Error 9xx

- Fatal error, which can only be acknowledged by switching off the ZAdyn4C

Error no.	Error text	Error cause	M	S
903	SIO not synchr	**Cause:** When the frequency converter is switched on, internal communication between the processors is faulty, the device performs a reset and restarts **Remedy:**Update the ZAdyn software For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service	•	•
905	MOP:HW-SW Error	**Cause:** Hardware or software error occurred after switch-on. The frequency converter switches to the “Wait-Switch off” state after 60s and must be switched off **Remedy:** Switch the ZAdyn off and back on For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service	•	•
906	ZR: ERR by start	**Cause:** If the “BC-TYP” parameter in the “Rotary encoder & BC” menu is set to “ZArec”, “PFU”, or “PFU+BRxx”: There is no signal at the “BC” input when the ZAdyn is switched on **Remedy:** Check wiring Use the energetic recovery system display to check whether it has an error Check the setting of the “BC-TYP” parameter Switch the ZAdyn off and back on	•	•
907	PFU: BR alarm	**Cause:** At the digital input programmed with the “PFU_BR” function, in the 2nd parameter set the signal for temperature monitoring of the brake resistor drops out during travel **Remedy:** Check the brake resistor for overheating Check the wiring of the thermal contact on the BR Switch the ZAdyn off and back on		•

Error no.	Error text	Error cause	M	S
908	PFU: ERR at start	**Cause:** When switching on the frequency inverter, the monitoring contact for the power recuperation unit is not closed **Remedy:**Check the power recuperation unit for fault-free operation Check field of rotation of the mains connection for the power feedback unit Check the power recuperation unit function monitoring connection at the digital input “BC” Switch the ZAdyn off and back on		●
909	PFU Alarm	See error 570 “PFU: Alarm”.		
910	BC/BR: ERR at start	**Cause:** When switching on the frequency inverter, the monitoring contact for the brake chopper or brake resistor is not closed **Remedy:** Check the connection and function of the temperature monitoring for the brake chopper or brake resistor Make sure that a voltage of 24VDC is applied at the X-IN connection terminal between +24V_IN and GND_IN (see “Brake resistor” and “Digital inputs (X-IN)” chapters in the manual) Check the “BR_TYP” parameter in the “Rotary encoder & BC” menu Switch the ZAdyn off and back on		
911	BRxx: Overload	**Cause:**The braking performance of the brake resistor reaches 200 % of the set power within the last 120s; the travel is aborted **Remedy:**Check the “BR_TYP” parameter in the “Rotary encoder & BC” menu When selecting the “BRxx” setting, check the set power in the “P_BR” parameter Check the brake resistor design Switch the ZAdyn off and back on	●	
912	BC:Alarm/fault	**Cause:** The monitoring contact for the brake chopper or brake resistor opens during travel **Remedy:** Check the connection and function of the temperature monitoring Check the brake resistor design Switch the ZAdyn off and back on		
913	DC: U_DC>U_BC	**Cause:** When stopped, the internal measured voltage at the DC-link is higher than the engagement voltage of the brake chopper **Remedy:** Compare the displayed value “U_DC” in the “Brake Chopper” info menu with the measured value at the DC+ and DC- terminals (measuring range 1000 VDC, ATTENTION: High voltage). If the voltage displayed deviates by more than 5%, there is a defect in the device. If the measured voltage is greater than 620V, the line voltage is not compliant with the standards Check the supply voltage between the supply phases, max. value = 440 VAC The synchronous motor is moved away when stopped Switch the ZAdyn off and back on	●	●
914	Rotary encoder missing	**Cause:**No rotary encoder is detected when the ZAdyn is switched on **Remedy:** Check the rotary encoder connection Check the “ENC_TYP” parameter in the “Rotary encoder & BC” menu For further information, see the “Rotary encoder” info menu Switch the ZAdyn off and back on		
915		**Cause:**No rotary encoder is detected at XENC-15 when switching on the frequency inverter **Remedy:** Check rotary encoder connection Reset frequency inverter	●	
917	BRxx activ	**Cause:**The internal transistor for the brake resistor is still activated 5.5 s after the end of travel **Remedy:** Compare the displayed value “U_DC” in the “Brake Chopper” info menu with the measured value at the DC+ and DC- terminals (measuring range 1000 VDC, ATTENTION: High voltage). If the voltage displayed deviates by more than 5%, there is a defect in the device. If the measured voltage is greater than 620V, the line voltage is not compliant with the standards Check the supply voltage between the supply phases, max. value = 440 VAC - Synchronous motor is moved away when stopped Switch the ZAdyn off and back on		●

Error no.	Error text	Error cause	M	S
919	ZR: BC error	**Cause:** ZArec error message - No signal at the digital input “BC” **Remedy:** Use the ZArec display to check for an error on the ZArec Switch the ZAdyn off and back on		●
920	Overcurrent standstill.	**Cause:** Overcurrent at standstill **Remedy:** Check the wiring of the brake chopper (if fitted) Check EMC-compatible installation (screening, etc.) For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		
931	Internal error	**Cause:**Internal device error **Remedy:** Switch the ZAdyn off and back on For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		●
935	MP: PWM on	**Cause:**Internal device error **Remedy:**For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		●
950	TD_CNT: Limit	**Cause:**The maximum number of changes of direction has been reached **Remedy:**Replace the suspension means and reset the counter One journey is possible after switching the ZAdyn off and back on		●
960	STO: Diagnostic	**Cause:** The status of the STO_A and STO_B signals was different for longer than 310 ms. The ZAdyn is the locked by internal hardware diagnostics **Remedy:**Check actuation of the STO inputs Error can only be reset once the ZAdyn4C is switched off		●
961	STO: Hardware	**Cause:** Hardware error in the STO diagnostics **Remedy:** Please contact ZIEHL-ABEGG Customer Service	●	●
970	DC: U < UDC_MIN	**Cause:** The DC-link voltage has fallen below the limit value for the minimum voltage during travel **Remedy:** There is a power failure during travel, check the voltage of the 3 phases of the power supply Check the “UDC_MIN” parameter in the “Power unit” menu (factory setting: 450 V) Check the mains connection (line voltage, cable cross-section, line reactor design, mains impedance)		●
972	Line failure	**Cause:** A phase failure occurs during motorised travel and a reset is triggered. No error is generated during regenerative travel **Remedy:** Check the 3 phases of the supply voltage (measure L1, L2, L3 to PE)		●
975	DC: U > 850V	**Cause:** The DC-link voltage rises to more than 850 VDC during travel or when stopped **Remedy:** Check the “A_NEG” parameter in the “Deceleration” menu and reduce if necessary Check the connection and function of the brake chopper / brake resistor In the “Rotary encoder & BC” menu, check the “BC_TYP” parameter Compare the displayed value “U_DC” in the “Brake Chopper” info menu with the measured value at the DC+ and DC- terminals (measuring range 1000 VDC, ATTENTION: High voltage). If the voltage displayed deviates by more than 5%, there is a defect in the device. If the measured voltage is greater than 620 V, the line voltage is not compliant with the standards Switch the ZAdyn off and back on Check the size of the Brake-Chopper / Brake-Resistor,		●
976	STO: Temp. alarm	**Cause:** The temperature in the area of the STO safety circuit exceeds 75 degrees Celsius **Remedy:** Check the function of the unit fans Ensure an ambient temperature of less than 55 degrees Celsius Switch the ZAdyn off and back on		●
980	SW error (zm)	**Cause:** Internal error, unknown state **Remedy:** Switch the ZAdyn off and back on Perform a software update For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		●
981	SW error (zm cc)	**Cause:** Internal error, unknown travel curve computer state **Remedy:** The error can only be reset by switching off the ZAdyn Perform a software update For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		●

Error no.	Error text	Error cause	M	S
982	SW error (T>4.5ms)	**Cause:** Internal device error, maximum cycle time for internal calculations almost reached **Remedy:** Perform a software update For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		•
990	SW error (Stacktop)	**Cause:** Internal ZAdyn error **Remedy:** Perform a software update For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		•
991	SIO: Timeout	**Cause:** Communication between the motor management processor (MOP) and the application processor (APP) interrupted **Remedy:** Check EMC-compatible installation (screening, etc.) For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		•
994	MOP: Timeout 2	**Cause:** Communication between the motor management processor (MOP) and the application processor (APP) is interrupted when stopped **Remedy:**For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service For sporadic occurrence: Check EMC-compatible installation (screening, etc.)		•
997	SW error (MOP)	**Cause:Cause:** Internal motor management processor (MOP) error **Remedy:** Perform a software update For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		•

15.5.12 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 stopping process motor contactors are opened, before the timer T_5b 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 stopping process the controller enable (signal CE) is deactivated before the timer T_5b 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?	After changing the parameter V*, you can confirm the request " automatic pre-signment?" with yes or no.
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.
Suspension means Remaining change in direction of travel: 5324	The suspension means used must be replaced within approx. 1 year at the latest. The remaining number of changes of direction with the current suspension means is displayed and continuously refreshed. The calculation is based on evaluation of system utilisation in the past. Any change in the utilisation after the information is output is not taken into account. The text must be confirmed with the esc key, otherwise the message will remain in the display.

15.6 Operation conditions of the ZAdyn4C

The software of the ZAdyn4C 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	420, 430	Constant running at speed Vx
21	Check software version	440, 480	Deceleration to speed 0m/s
22	Parameter transmission	460	Deceleration to speed Vx
23	Waiting for signal processor, power unit detection	490	Emergency stop: Deceleration at max. acceleration
30	Check absolute value encoder	493	Mode with travel curve computer switched off
35	Evacuation monitor	495	Travel curve computer end
40	Activation of DC-link voltage	500	Keep motor at speed 0 (T4)
41 42	Check input BC 41: Power feedback unit 42: Brake chopper or brake resistor	510	Wait until the motor brakes are closed (T_5)
50,55	Adjust current transformer	515	Brake gets additional current supply for 1s
70	Check temperature power unit	520	S Switch off current supply to motor (T_5b)
80	Start fan	530	Wait until motor contactors switched off
90	Electronic short-circuit active	535	Travel interrupted due to interruption of the controller enable RF
91	Electronic short-circuit deactivated	536	Travel interrupted due to interruption of the contactor monitor COx
93	Standby 1	538	Wait until STO activates
96	Parameter calculation active	540	Wait for standstill
97	Editing parameter	560	End of travel
98	Waiting for ZArec	570, 572, 575, 902, 904	Recording to MMC
99	Waiting for rotary encoder	900	Delay of automatic acknowledgement after remedying the cause of the fault (2 s)
100	Device off	907	Checking for overcurrent
105	Power feedback unit on standby	908	Deceleration after overcurrent
107, 108	Modifying the clock frequency	909	Waiting for travel command off
110	Machine ready	910	ZAdyn locked
115	Start delay	920	Read absolute value error
200	Start-up check	930	Power unit overtemperature
210 ... 223	Check absolute value encoder	932	Motor overtemperature
280	Wait until STO deactivates	940, 942	Read hardware error
300	Wait until motor contactors switched on	950	Parameter change
305	Checking the motor phases	960	Read absolute value error
310 311	A Build-up of magnetic field in the motor (T1)	980	Switch off DC-link
315, 316	Checking absolute value	982	Motor type changed
319	Start control	988	Wait for reset
320	Wait until motor brakes have opened (T2)	990	Fault input BC
325	Quickstart	993	Overcurrent at standstill
330	Accelerate motor to speed V_T3 (T3)	995	Maximum change of direction reached
340	Start-up	996	STO error
400	Travel curve computer data transmission	997	Frequency converter is in stand-by mode
410	Accelerate to speed Vx	998	Wait until ZAdyn4C is switched off

15.7 Frequent startup problems

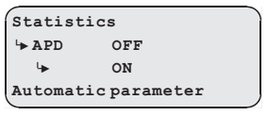
Problem	Cause	Adjustment
ZAdyn4C does not start after switching on	Brake resistance is connected to the +DC and -DC terminals on terminal X1/X3	Brake resistance is connected to the +DC and R terminals on terminal X1/X3
ZAdyn4C stands still in status 40 during start procedure, the error message relay of output O11-O14 does not pull up, the menu cannot 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 not correct	Check settings in the "Motor Rating Plate" and "System Data" menus (the value of the "n*" parameter in the "System Data" menu may not be much greater than the value of the "n" parameter in the "Motor Rating Plate" menu)
	Motor data are not correct	

15.8 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".



16 Energy saving

16.1 Stand-by function ZAdyn4C

To save energy at standstill, the ZAdyn4C can be switched to standby mode. Internal components of the ZAdyn4C are switched off in stand-by mode. This means that the ZAdyn4C has a much lower power loss at standstill. There are two standby modes in the ZAdyn4C: Standby 1 and Standby 2

Standby 1:
In Standby 1 mode, the rotary encoder, monitoring functions and the output relay remain active,

Standby 2:
In Standby 2 mode, the rotary encoder is switched off, the monitoring functions are not active and all relays are switched off, including the fault indication relay.

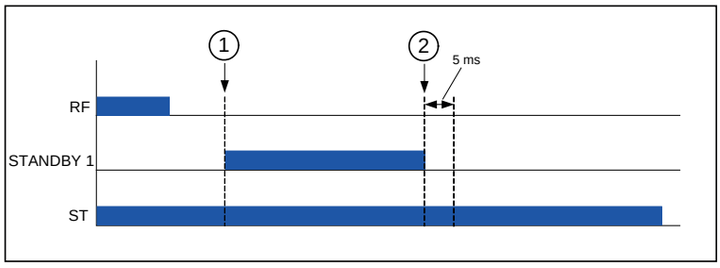
16.1.1 Activate Standby 1 or Standby 2 mode

Information
It is only possible to switch to Standby 1 or Standby 2 mode when the controller enable (input CE) is switched off.

Set digital input in the **Control** menu to **STANDBY1** or **STANDBY2**.

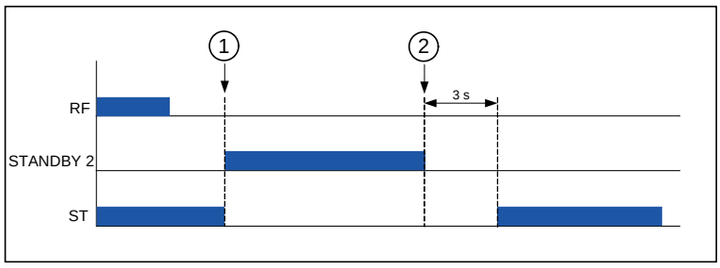
```
Control system
↳ f_I08   STANDBY1
  ↳       STANDBY1
Function of I_08
```

5 ms after deactivation of the digital STANDBY1 input, the ZAdyn4C is ready for operation again (see diagram).



Function stand-by 1 mode ZAdyn4C
1 STANDBY1 input is activated
2 STANDBY1 input is activated
RF Controller enable
STANDBY1 Input with STANDBY 1 function
ST Fault

3 s after deactivation of the digital STANDBY2 input, the ZAdyn4C is ready for operation again. The ST fault output is activated (see diagram).



Function stand-by 2 mode ZAdyn4C
1 STANDBY2 input is activated
2 STANDBY2 input is activated
RF Controller enable
STANDBY2 Input with STANDBY 2 function
ST Fault

16.2 Mains power recuperation

- The mains power recuperation allows energy to be saved by feeding the energy produced during regenerative travel into the power network. This energy is used by other consumers in the building.
- By using mains power recuperation, classification in energy efficiency class A according to VDI 4707 can be achieved.

16.2.1 Power recuperation unit type ZArec4C

☞ For information on mechanical and electrical installation and technical data of the power recuperation unit type ZArec4C, see the operating instructions of the ZArec4C.

16.2.2 Power recuperation unit type REVCON RLD

16.2.2.1 Stand-by mode

In order to reduce power loss during standstill, the power recuperation unit can be switched to stand-by mode.

		Revcon	
		RLD B0 45-400	**RLD B0 70-400**
Power losses during standstill	[W]	24	
Power loss in standby	[W]	8	

Activation of stand-by mode

Set digital output (preferably f_O5) in the **Control** menu to the **PFU** function.

```
Control
↳ f_O5    PFU
  ↳       PFU
Output function O5
```

To switch the power feedback unit to standby mode, the 24V power supply at input A1 on the power feedback unit must be interrupted.

Deactivation of the digital output PFU:

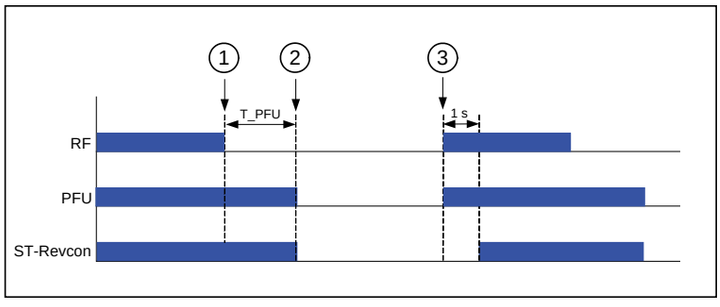
- Power feedback unit switches to standby mode

The time between the end of travel and activation of the PFU output can be specified with the **Encoder & BC/T_PFU** parameter.

```
Encoder & BC
↳ T_PFU   0            s
  ↳       60
Waiting time PFU PWM
```

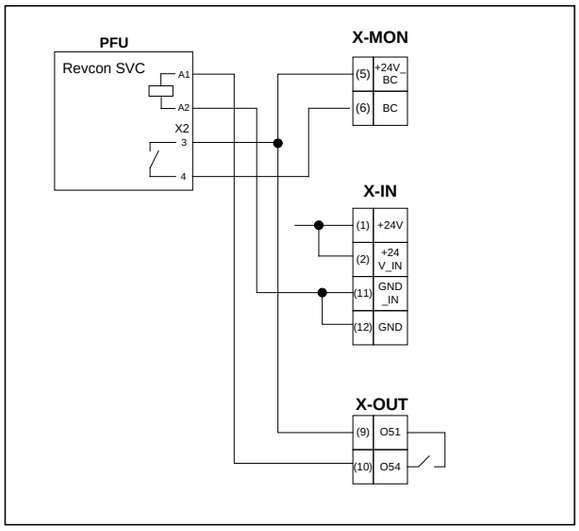
If the parameter **T_PFU** is set to **0s** , the output PFU is always active. Standby is now deactivated.

1 s after deactivation of the digital output PFU the power feedback unit is ready for operation again (see diagram).



Function of stand-by mode of power recuperation unit type REVCON RLD
1 End of travel
2 Output with the "PFU" function is deactivated
3 Output with the "PFU" function is activated
RF Controller enable
PFU Output with the "PFU" function
ST-Revcon Output "Fault" of the power feedback unit

Electrical connection stand-by mode



Connection of power recuperation unit type REVCON RLD to stand-by mode

16.2.2.2 Power feedback unit in connection with automatic emergency evacuation.

In elevator systems with automatic emergency evacuation by a single-phase voltage supply (emergency power supply unit/UPS) or battery (EVAC 3C) the power recuperation unit is not active due to the operating voltage failure. To avoid too high a voltage in the intermediate circuit when evacuating by a generator run, a brake resistor must be used in addition to the power recuperation unit!

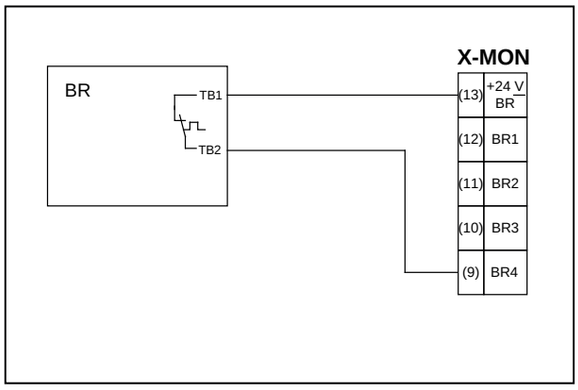
The combination power feedback unit + brake resistor must be entered in the **Encoder & BC/BC_Typ** menu

```
Encoder & BC
↳ BC_TYP  PFU+BR17
  ↳       PFU+BR25
BR/BC type
```

Connection and configuration of brake resistor temperature monitoring when using the power feedback units of outside contractors (not ZArec4C)

The temperature monitor is connected to a digital input (X-IN or X-BR). The input must be parameterised to the **PFU_BR** function.

```
Control
↳ f_XBR4  PFU_BR
  ↳       PFU_BR
Function input BR4
```



Connection brake resistor

17 Special functions

17.1 Changing the Clock frequency

The factory setting of the ZAdyn4C's switching frequency depends on the size and the motor type:

Size	Synchronous motor	Asynchronous motor
ZAdyn4xx 011 ZAdyn4xx 013 ZAdyn4xx 017 ZAdyn4xx 023 ZAdyn4xx 032	Clock frequency 16 kHz auto (Parameter M_PWM=Auto)	Clock frequency 16 kHz auto (Parameter M_PWM=Auto)
ZAdyn4xx 040 ZAdyn4xx 050 ZAdyn4xx 062 ZAdyn4xx 074	Switching frequency 8 kHz fix (Parameter M_PWM=Fix f_PWM)	Clock frequency 16 kHz auto (Parameter M_PWM=Auto)

At a ZAdyn4C output frequency of less than 7 Hz the clock frequency is reduced to 8 kHz.

Information
If necessary the clock frequency can be changed continuously between 2.5 …. 16 kHz in the **Power section** menu.
For release the ESC key must be pressed for approx. 5 s. until **Ziehl-Abegg-Intern FREIGABE** appears in the display.

Information
The switching frequency should only be changed after consultation with the Ziehl-Abegg hotline. This consultation can clarify what effect changing the switching frequency will affect the service life of the ZAdyn4C.

CAUTION!

Caution!
Increasing the clock frequency causes
- **a performance reduction of the ZAdyn4C (see Technical Data chapter)**
- **a greater power loss and thus increased heating of the ZAdyn4C**

The service life of the ZAdyn4C is negatively influenced by the higher temperatures.

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

The switching frequency of the ZAdyn4C is 8 kHz after factory setting. This can be changed, if necessary, in the **Power Unit/f_PWM** menu continuously between 2.5 ... 10 kHz.

17.1.2 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.

17.2 Calibration of absolute rotary encoders

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!
Traveling is prohibited before an absolute encoder offset alignment has been performed!

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

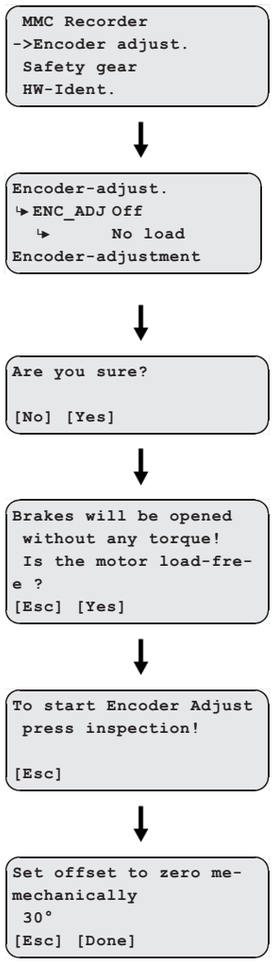
Options for calibrating an absolute value encoder
The ZAdyn4C has two different methods for calibrating the absolute value encoder:
- **load-free** calibration of theabsolutevalue encoder
- calibration of the absolute value encoder with **brake closed**

General conditions required for an encoder alignment without load:
- The installation and motor data must be configured
- Load-free operation, suspension means must be removed from the traction sheave
- Brake monitoring must be activated corresponding to the number and type of brakes in use (**Monitoring/BR** menu)
- Contactor monitoring must be configured according to the type of contact for monitoring (**Monitoring/CO** menu)

General conditions required for an encoder alignment closed brake:
- The installation and motor data must be configured
- It must be ensured that the brake does not open during the calibration (disconnect brake)
- Brake monitoring must be activated corresponding to the number and type of brakes in use (**Monitoring/BR** menu)
- Contactor monitoring must be configured according to the type of contact for monitoring (**Monitoring/CO** menu)

17.2.1 Load-free alignment SSI-Encoder

While the SSI encoder is being calibrated, the ZAdyn4C 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 assembly easier, it is recommended that you connect the SSI encoder to the ZAdyn4C prior to assembly and calibrate the offset value "0" (value in the **ENCODER calibration/ENC_POS**). Subsequently mount the SSI encoder, if possible without any twisting, in the position in which the locking screw is easily accessible.



Select menu **Encoder adjustment**

Select parameter **"ENC_ADJ"**
Switch on encoder adjustment with "ENC_ADJ=No load".

Confirm with the ↵ key.

Query as to whether the drive is in a load-free condition.

Press the ESC key to cancel rotary encoder adjustment.
Press the ↵ key to continue rotary encoder adjustment.

Keep the inspection run push-button pressed.

Performing rotary encoder adjustment.

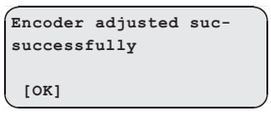
Adjust the rotary encoder as precisely as possible to the value **0 °** and carefully fasten the clamping screw, correcting the encoder position if necessary. At the end of the adjustment procedure, the rotary encoder must be securely tightened and the value close to **0**. With deviations of less than ± 2.00 ° the adjustment is classed as correct. A deviation of max. ± 1 ° is recommended.

Line 2:
Current offset value

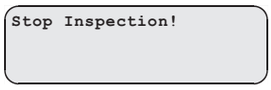
Once the rotary encoder has been adjusted, confirm with the ↵ key.

The ZAdyn checks whether the deviation is less than ± 2.00 °.

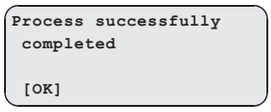
Deviation less than ± 2.00 °:



↵ Press the key.

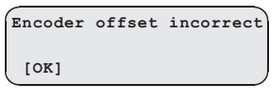


Release inspection run push-button.

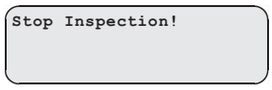


Confirm with the ↵ key.

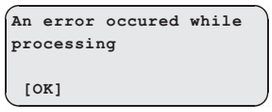
Deviation greater than or equal to ± 2.00 °:



↵ Press the key.



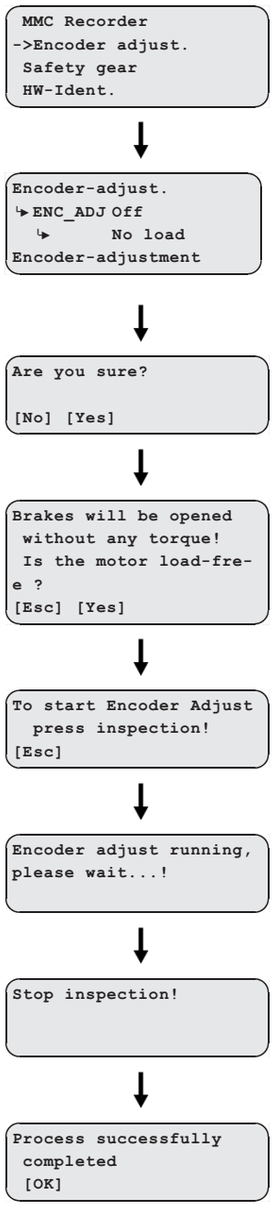
Release inspection run push-button.



↵ Press the key.

17.2.2 Load-free alignment EnDat-Encoder

While the EnDat encoder is being calibrated, the ZAdyn4C 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".



Select menu **Encoder adjustment**

Select parameter **"ENC_ADJ"**
Switch on encoder adjustment with "ENC_ADJ=No load".

Confirm with the ↵ key.

Query as to whether the drive is in a load-free condition.

Press the ESC key to cancel rotary encoder adjustment.
Press the ↵ key to continue rotary encoder adjustment.

Keep the inspection run push-button pressed.

Performing rotary encoder adjustment.

Release inspection run push-button.

Confirm with the ↵ key.

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

While the rotary encoder calibration is being checked, the ZAdyn4C 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 ZAdyn4C.

Information

The offset determined during the check is not saved in the ZAdyn4C.

Information

During the encoder offset alignment, the driving disk must turn to the right (when looking at the driving disk). Once the alignment is complete, the driving disk 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**.

```
 MMC Recorder
->Encoder adjust.
 Safety gear
 HW-Ident.
```

Select menu **Encoder adjustment**

```
Encoder-adjust.
↳ENC_ADJ Off
  ↳      Check
Encoder-adjustment
```

Select parameter **"ENC_ADJ"**
Switch on encoder adjustment with "ENC_ADJ=Check"

```
Are you sure?

[No] [Yes]
```

Confirm with the ↵ key.

```
Brakes will be opened
 without any torque!
 Is the motor load-fre-
e ?
[Esc] [Yes]
```

Query as to whether the drive is in a load-free condition.

Press the esc key to cancel the inspection.
Press the ↵ key to continue the inspection.

```
To start Encoder Adjust
  press inspection!
[Esc]
```

Keep the inspection run push-button pressed for approximately 2 minutes.
The offset value check now runs automatically and lasts about 2 minutes.

```
Running, active pole:
 5
```

The rotor now makes a full revolution and the offset value is determined at every pole.

```
Stop inspection!
```

Release inspection run push-button.

```
encoder check finished
359°
 [OK]
```

17.2.4 Rotary encoder calibration with closed brake

If the rotary encoder is calibrated with the brake closed, it is not necessary to remove the suspension means from the traction sheave. This allows calibration to be performed with much less effort.

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 at the motor for approx. 10-15 s during alignment. These noises are caused by the special form of energization of the motor and are normal for this kind of encoder offset alignment.
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!


```
 MMC Recorder
->Encoder adjust.
 Safety gear
 HW-Ident.
```

Select menu **Encoder adjustment**

```
Encoder-adjust.
↳ENC_ADJ Off
  ↳      On halt
Encoder-adjustment
```

Select parameter **"ENC_ADJ"**
Switch on encoder adjustment with "ENC_ADJ=On halt"

```
Are you sure?

[No] [Yes]
```

Confirm with the ↵ key.

```
Is the brake
 wiring
disconnected?
[Esc] [Yes]
```

Query as to whether the electrical connection for the brake is disconnected.

Press the ESC key to cancel rotary encoder adjustment.
Press the ↵ key to continue rotary encoder adjustment.

```
To start Encoder Adjust
press inspection!
[Esc]
```

Keep the inspection run push-button pressed.

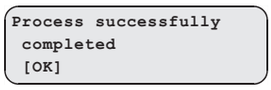
```
Encoder adjust run-
running, current Motor-
Motorcurrent
 1A
```

Performing rotary encoder adjustment.
Line 3:
Current motor current

The ZAdyn checks whether a valid offset value could be determined.

Valid offset value was determined:

Release inspection run push-button.



Confirm with the ↵ key.

Valid offset value could not be determined:

Release inspection run push-button.

An error text is output on the ZApad display.

Confirm with the ↵ key.

17.2.5 Alignment absolute encoder type ERN1387

The calibration of absolute value encoders of type ERN1387 corresponds to calibration with brake closed.

17.3 Safety Brake

Function to release the car from the safety gear.

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.

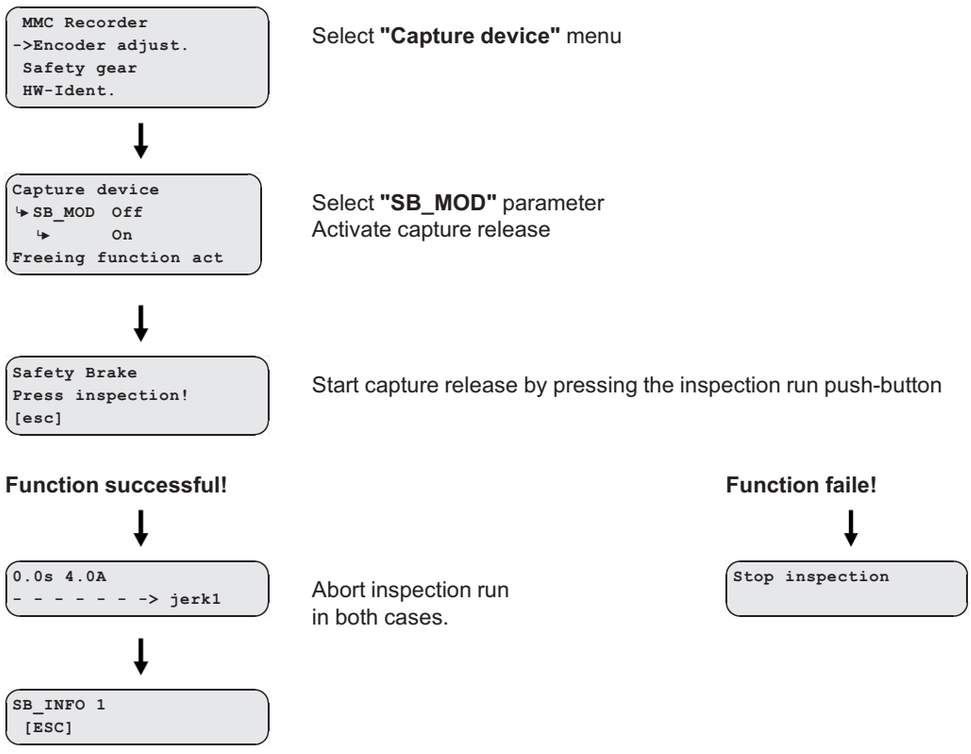
In order to provide the maximum power, the clock frequency of the pulse width modulation is reduced during the safety-brake function time.

CAUTION!

Caution!

Do not repeatedly carry out the safety brake function, as this can destroy the ZAdyn4C.

Carrying out the safety brake-function



Information

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

17.4 Reset

Allocating the parameters of the ZAdyn4C with a factory setting or customer specific settings.
The works setting is made by a numeric input in the **Statistics/RESET**menu.
Reset-functions:

Reset-No.	Effect
77	**Pre-parametrised ZAdyn4C:** Parameters are assigned customer-specific system data **Standard ZAdyn4C:** Parameters are assigned default values based on the available hardware
90	deleting of: • Parameter • Error list • Error messages Parameters are assigned default values based on the available hardware
99	deleting of: • Parameter • Error list • Error messages Parameters are assigned default values based on the available hardware

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 ZAdyn4C 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!

Information

You can only start-up again after entering the parameters in the **Motor name plate**, **Encoder & BC**, **Installation**, **Control system** and **Monitoring** menus (see "Commissioning" chapter).

17.5 Memory card

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

- Software-Update (see "Memory card / Software update" chapter)
- Storing parameters (see "Parameter list / Menu Memory Card / Function SAV_PAR" chapters)
- Loading parameters (see "Parameter list / Menu Memory Card / Function LOD_PAR" chapters)
- Storing parameter lists, error lists and parameters with allocation of the ZAdyn4C serial number (see "Parameter list / Menu Memory Card / Function SAV_ALL" chapters)
- 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 ZAdyn4C lights blue when the ZAdyn4C is accessing the memory card.

17.5.1 Software update

If a software update becomes necessary, you can carry it out using a memory card (SC/MMC).

The update is available at:
- Internet (www.ziehl-abegg.com)
- Email with software from Ziehl-Abegg
- With software from Ziehl-Abegg written on a memory card

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

CAUTION!

Caution!
Destruction of software boot loader
If the power supply to the ZAdyn is interrupted during the software update or the memory card is removed, this can destroy the software boot loader.
▷ Do not interrupt the ZAdyn power supply or remove the memory card during the software update.

17.5.1.1 Software update with the ZApad operating terminal

Perform a software update

▷ Insert the memory card in the X-MMC card slot on the controller unit (see figure bottom right).

A software update cannot be made with the card slot on the ZETAPAD! Do not insert the memory card in the card slot of the ZApad!

Memory card in card slot of the ZApad

Memory card in the X-MMC card slot of ZAdyn4C 011-032

Memory card in the X-MMC card slot of ZAdyn4C 040-074

```
 Statistics
->Memory Card
 MMC Recorder
 Encoder-adjust.
```

Select **"Memory Card"** menu
Confirming menu selection

```
Memory Card
↳UPDATE  0
  ↳      27
```

Select parameter **"UPDATE"**
Confirming menu selection
Enter "UPDATE=27"

Confirm with the key.

```
Please wait ...
 max 30s
```

The update is performed and last a maximum 5 minutes.

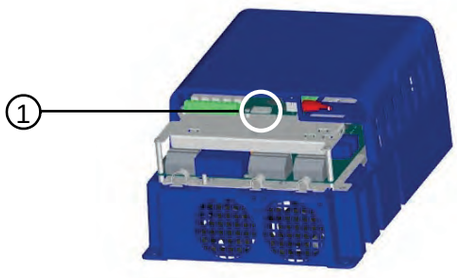
```
 ZIEHL-ABEGG AG
 ZAdyn4C
 SN: 12345678
 4.42 - 506
```

A restart is performed after the update. The frequency inverter is ready for operation again. The display shown on the left appears.

17.5.1.2 Software update without ZApad 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 (see Fig.).
▷ 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 ZAdyn4C is once more ready for operation.



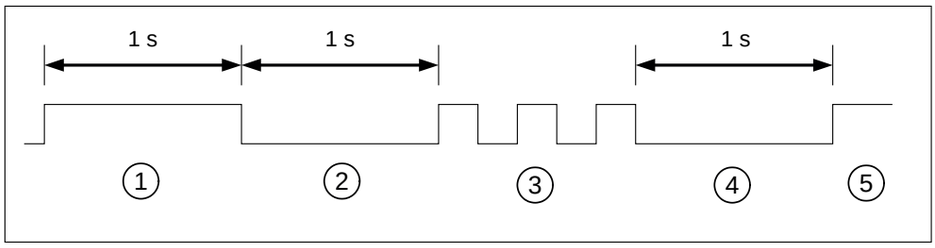
1 Position of card slot X-MMC on ZAdyn4C 011-032

2 Position of card slot X-MMC on ZAdyn4C 040-074

17.5.1.3 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 ZAdyn4C is restarted after error 25 has occurred. **Remedy:** Repeat the software update without the ZApad control terminal
8,14	Internal programing voltage does not switch off
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

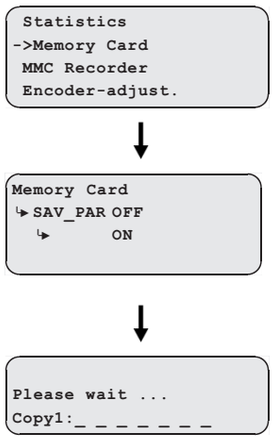
17.5.2 Saving parameters

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.

Parameter back-up



Select **"Memory Card"** menu
↵ Confirming menu selection

Select **"SAV_PAR"** parameter
↵ Confirming menu selection
Select "SAV_PAR=EIN"

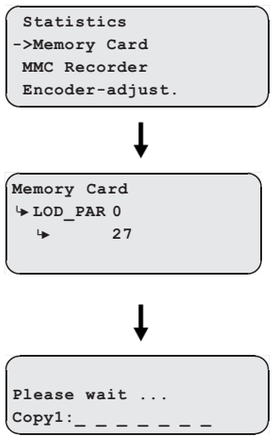
Confirm with the ↵ key.

The parameters are saved.

17.5.3 Loading parameters

With identical systems, the saved parameters of a frequency inverter can be loaded into the frequency inverters of the other systems.

Loading parameters



Select **"Memory Card"** menu
↵ Confirming menu selection

Select **"LOD_PAR"** parameter
↵ Confirming menu selection
Enter "LOD_PAR=27"

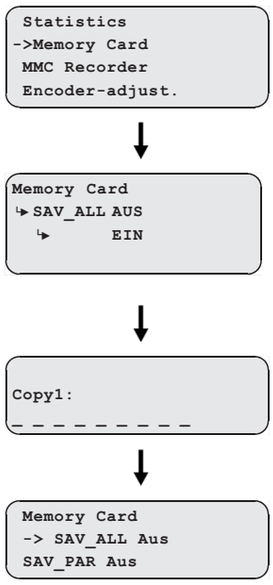
Confirm with the ↵ key.

The parameters are saved.

17.5.4 Saving parameters lists, printer lists and error lists

Parameter lists, printer lists and error lists can be saved on the memory card with allocation of the ZAdyn4C serial number.
The following folder structure is created on the memory card: **"4CX\DEVICE\serial number"**. The "LST" and "PAR" folders are created in the "Serial Number" folder. The error lists and printer lists are saved in the "LST" folder, the parameter lists are saved in the "PAR" folder. 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



Select **"Memory Card"** menu
↵ Confirming menu selection

Select **"SAV_ALL"** parameter
↵ Confirming menu selection
Select "SAV_ALL=EIN"

Confirm with the ↵ key.

The parameter list, the printer list and the error list are saved.

After the data backup the "SAV_ALL" parameter reassumes the value "OFF".

17.5.5 Performing measurements

It is possible to perform measurements on the ZAdyn4C. 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 / Menü MMC-Recorder". 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.

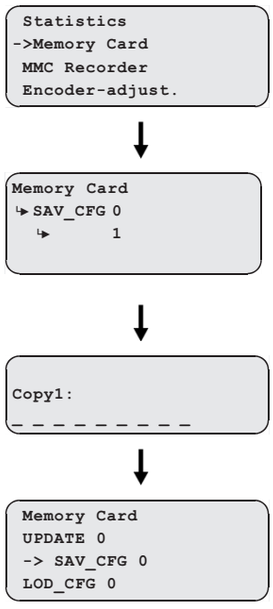
The actual number of runs is used as a file name (e.g. "00000109.ZR3" for 109 runs).

17.5.6 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



Select **"Memory Card"** menu
Confirming menu selection

Select **"SAV_CFG"** parameter
Confirming menu selection
Line 3: Enter configuration number ("1" in this example)

Confirm with the key.

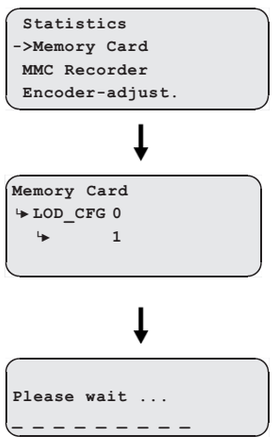
The parameter list and the printer list are saved.

After the data backup the **"Memory Card"** menu is displayed again.

17.5.7 Loading configurations

Saved configurations of parameters can be loaded from the memory card into the ZAdyn4C by entering the respective configuration number. The parameters list saved in the "CONFIG" folder is loaded into the ZAdyn4C for this.

Loading configurations



Select **"Memory Card"** menu
Confirming menu selection

Select **"SAV_CFG"** parameter
Confirming menu selection
Line 3: Enter configuration number ("1" in this example)

Confirm with the key.

The parameter list and the printer list are loaded.
The frequency inverter performs a reset after loading.

17.6 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.

17.7 Field weakening

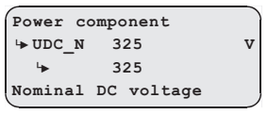
The operation with field weakening is only possible with asynchronous motor.

If the required motor speed for an asynchronous motor n* is above the rated speed n of the motor, the ZAdyn4C 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.

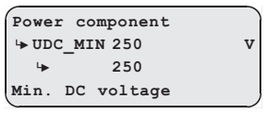
The original and the new calculated motor data can be compared in the **Info/page05** menu.

17.8 Operation with a 3-phase 230 VAC power supply

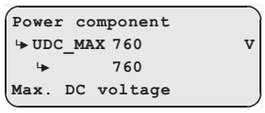
The ZAdyn4C can be operated with a 3~ 230 VAC power supply.
For this purpose, it is only necessary to adapt various monitoring functions to the lower power supply.



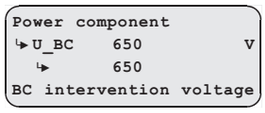
In the menu **"Power section"** configure the parameter **"UDC_N=325 V"**



In the menu **"Power section"** configure the parameter **"UDC_MIN=250 V"**



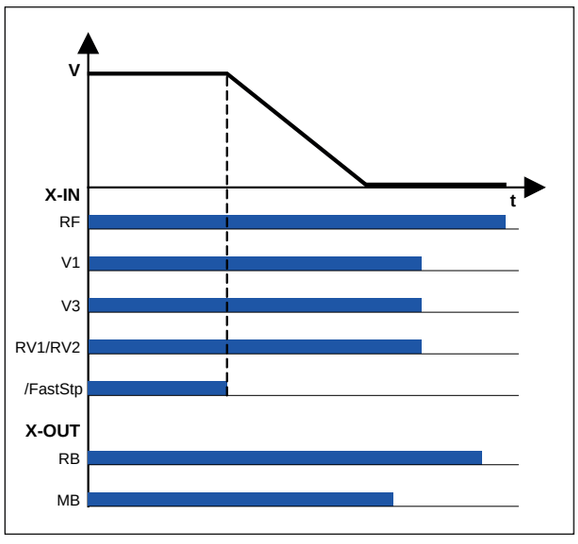
In the menu **"Power section"** configure the parameter **"UDC_MAX=760 V"**



In the menu **"Power section"** configure the parameter **"U_BC=650 V"**

17.9 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 **/FastStp** input function is available for this purpose.
When deactivating the input using the **/FastStp** function, the motor is decelerated with the deceleration configured in the **Control/A_MAX** menu (see Fig.).



Controlled emergency stop
RF Controller enable
V1 Positioning speed
V3 High travelling speed
RV1 / RV2 Direction default
/FastStp Delay in emergency stop
RB Controller ready

MB_Brake Mechanical brake

17.10 Travel direction counter

This function is a reverse counter that counts the permitted number of changes of direction and informs the operator of the elevator system in good time about necessary replacement of the suspension means.

17.10.1 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 1 and 9999 can be used as a password If the password is set to 0, the direction change counter is deactivated.	0 ... 9999 0 = no password	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
TD_SET	Initial value of the down counter	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 for the direction change counter are also available in the **info menu** on the **TravelDirection** page.

17.10.2 Activating the direction change counter

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

```
Statistics
↳TD_PWN  0
  ↳      0
*New password
```

Assign a new password in the **Statistics/TD_PWN** parameter.
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
->TD_PWC 21689
*Encrypted password
```

The **Statistics/TD_PWC** parameter indicates the password in coded form.
With the coded password the ZIEHL-ABEGG SE can decode the original password.
For example if the owner has forgotten it.

```
Statistics
↳TD_PW   0
  ↳      0
*Password entry
```

Before every change to TD_SET, the previously assigned password must be entered in the **Statistics/TD_PW** parameter.

```
Statistics
↳TD_SET  0           M
  ↳      0
*Down counter start val-
ue
```

Enter the maximum number of changes of direction in the **Statistics/TD_SET** parameter.

CAUTION!

Caution!
When the ZAdyn4C is replaced, the current counting value of the down counter "TD_CNT" must be transferred to the new ZAdyn4C!

17.10.3 Deactivating the direction change counter

To deactivate the direction change counter, the following parameters have to be adjusted.

```
Statistics
↳TD_PW   0
  ↳      0
*Password entry
```

Enter the previously assigned password in the **Statistics/TD_PW** parameter.

```
Statistics
↳TD_SET  0            M
  ↳      0
*Down counter start val-
ue
```

Enter “0” in the **Statistics/TD_SET** parameter.

```
Statistics
↳TD_PW   0
  ↳      0
*Password entry
```

Enter the previously assigned password again in the **Statistics/TD_PW** parameter.

```
Statistics
↳TD_PWN  0
  ↳      0
*New password
```

Enter “0” in the **Statistics/TD_PWN** parameter.

17.10.4 Configuring an activated direction change counter

If a direction change counter has already been activated, its functions are blocked by a password. This can be recognised by the fact that “56366” is displayed in the **Statistics/TD_PWC** parameter.

```
Statistics
 TD_PWN 0
->TD_PWC 56366
```

In order to make subsequent changes to an activated change of direction counter, the previously assigned password must be entered in the **Statistics/TD_PW** parameter.

```
Statistics
↳TD_PW   0
  ↳      0
*Password entry
```

17.10.5 Output functions

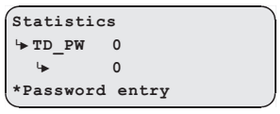
Two special counter functions can be assigned to the digital outputs of the ZAdyn4C when using the change of direction counter:

Parameter	Function	Explanation
Suspension means info	Suspension means replacement necessary	Contact closes if the current suspension means can be used for approx. 1 more 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

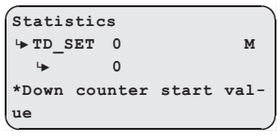
17.10.6 Resetting the travel direction counter

Information
At the end of the maximum change of direction, the ZAdyn4C is locked and the error **"E950 TD_CNT: Drive limit"** appears on the display.
To enable the cabin to be moved to the position for replacement of the suspension means after locking the frequency inverter, the ZAdyn4C must be switched off and back on. Further travel is then possible.

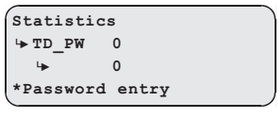
After successfully replacing the suspension means, the password has to be entered in the **Statistics** menu and the reverse counter set to a new initial value:



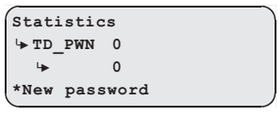
Enter the current password in the **Statistics/TD_PW** parameter to enable the down counter value to be reset.



Enter “0” in the **Statistics/TD_SET** parameter.



Enter the current password in the **Statistics/TD_PW** parameter.



Enter “0” in the **Statistics/TD_PWN** parameter.

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, in the **info menu** on the **TravelDirection** page, press the key.

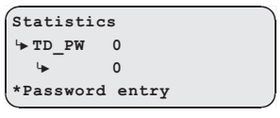
17.10.7 Restore the counter reading from the absolute value encoder

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

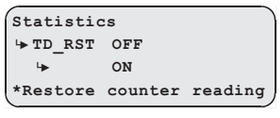
- every 100 changes in direction up to 1,000 changes in direction
- every 1,000 changes in direction up to 10,000 changes in direction
- every 3,000 changes in direction from 10,000 changes in direction

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

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



Enter the current password in the **Statistics/TD_PW** parameter.



Set the **Statistics/TD_RST** parameter to “ON”.

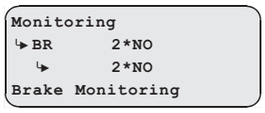
The counter reading is restored and can be seen in the **Info menu** on the **TravelDirection** page in the **TD_CNT** parameter.

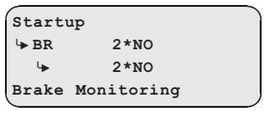
17.11 Self-monitoring of the brakes according to EN81

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.

17.11.1 Activation of the self-monitoring

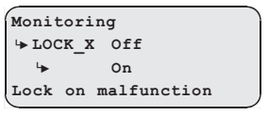
The self-monitoring is activated by selecting the brake circuits count and the function of the micro-switch based on the “BR” parameter in the “Startup” or “Monitors” menu (e.g. 2 brake circuits with normally open function of the microswitches: BR=2xNO).





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

The lock function on the ZAdyn is engaged by activating the “LOCK_X=On” parameter in the “Monitoring” menu.



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

17.11.3 Function test of the self-monitoring

Functional test according to EN81-1:1998+A3:2009 or EN 81-50:2014

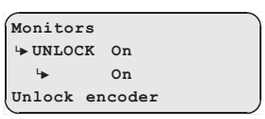
The self-monitoring test required according to EN81-1:1998+A3:2009 Annex F8.32 or EN 81-50, 5.8.3.2.5 is performed for every software version during internal software tests at Ziehl-Abegg. For this, 10 test runs are made and the function of the self-monitoring checked.

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

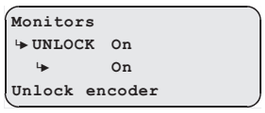
1. Disconnect signal cable at a monitor input.
2. Perform test run.
3. The error message "380 BR:Start Error" (monitor function "NCC") or "582 BR:T2 too small" (monitor function "NOC") must be output already at the start, otherwise the monitor is faulty.
4. The ZAdyn locks, no further travel is possible.
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 setting the “Monitoring / 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 setting the “Monitoring / UNLOCK = On” parameter (see display).
8. Start new run, this must take place without errors.



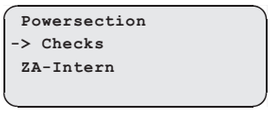
Repeat test step 2 for every monitor input.

17.12 Support with acceptance test

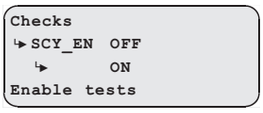
17.12.1 Rotary encoder test

The function uses software to simulate rotary encoder failure.

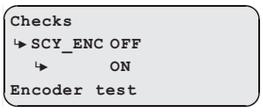
Performing rotary encoder test



Select **"Checks"** menu



Select parameter **"SCY_EN"**
Enter "SCY_EN=On"



Select parameter **"SCY_ENC"**
Switch on rotary encoder test with "SCY_ENC=ON"

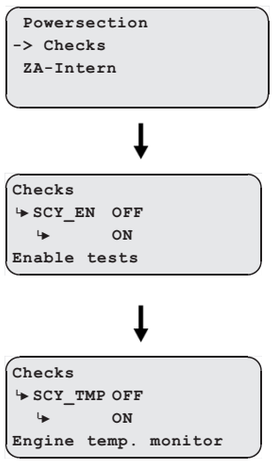
Then send a travel signal. Travel is aborted with an error message, as the rotary encoder is deactivated.

Information
The test function can also be activated during travel.

17.12.2 Motor temperature test

The function simulates failure of the motor temperature module or overtemperature on the motor by software.

Perform motor temperature test



Select **"Checks"** menu

Select parameter **"SCY_EN"**
Enter "SCY_EN=On"

Select parameter **"SCY_TMP"**
Switch on motor temperature test with "SCY_TMP=ON"

After completing the motor temperature test, the “MOT:Temp. -Alarm” error (error 575) is output when starting up.

Information
The test function can also be activated during travel.

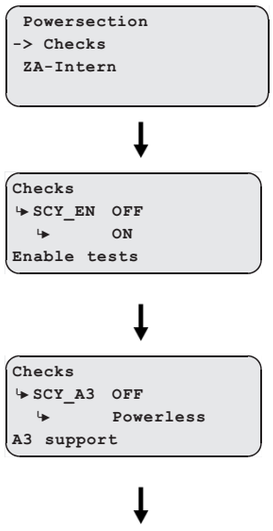
17.12.3 Testing of the protective device according to EN81

Checking of the protective device according to EN81 to prevent unintentional movement of the elevator car away from the stopping place.

17.12.3.1 Powerless drifting of the cabin from the floor

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

Perform testing of the protective device according to EN81 with currentless spin-off



Select **"Checks"** menu

Select parameter **"SCY_EN"**
Enter "SCY_EN=On"

Select parameter **"SCY_A3"**
Switch on test EN81 with “SCY_A3= currentless”

```
Attention:
Drive command just opens
 the brake, power unit
 is without current!
```

Message that the brake is opened in the following trip

To start the test, give a travel command.

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.

17.12.3.2 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 protective device according to EN81 “Travel with maximum acceleration from floor” if the motor already has a high temperature since the motor will become further heated by maximum acceleration.
- The motor can be demagnetised by testing the protective device according to EN81-A3 “Travel with maximum acceleration from floor”. Ziehl-Abegg provides no guarantee for motors that do not originate from Ziehl-Abegg.

Perform testing of the protective device according to EN81 with maximum acceleration

```
 Powersection
-> Checks
 ZA-Intern
```

Select **"Checks"** menu

```
Checks
↳SCY_EN  OFF
  ↳      ON
Enable tests
```

Select parameter **"SCY_EN"**
Enter "SCY_EN=On"

```
Checks
↳SCY_A3  OFF
  ↳      Max. accel.
A3 support
```

Select parameter **"SCY_A3"**
Switch on test EN81 with “SCY_A3=max. accel.”

```
 Attention:
Drive command results
 in maximum torque,
control is not active!
```

Message that the cabin is accelerated to maximum

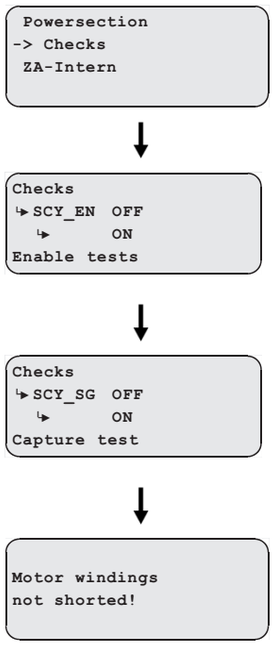
To start the test, give a travel command.

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

17.12.4 Capture device test

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

Perform capture device test



Select **"Checks"** menu

Select parameter **"SCY_EN"**
Enter "SCY_EN=On"

Select parameter **"SCY_SG"**
Switch on capture device test with "SCY_SG=ON"

Message that the electronic short-circuit is deactivated. The brakes can be opened manually.

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.

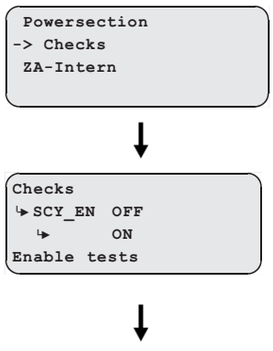
17.12.5 Driving ability test

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.

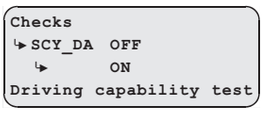
Perform driving ability test

Move up with the recovery control until the counterweight is resting on the buffer.



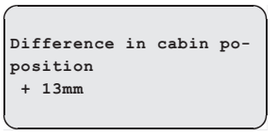
Select **"Checks"** menu

Select parameter **"SCY_EN"**
Enter "SCY_EN=On"



Select parameter **"SCY_DA"**
Switch on driving ability test with "SCY_DA=ON"

Move up with recovery control until the suspension means slide over the traction sheave



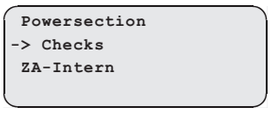
Display cabin movement

17.12.6 Motor brakes test

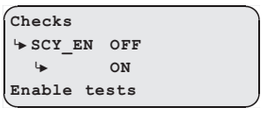
The function interrupts the safety circuit during travel. The distance covered by the cabin before coming to standstill is shown in the display.

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

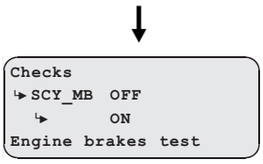
Perform motor brakes test



Select **"Checks"** menu

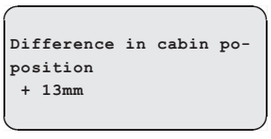


Select parameter **"SCY_EN"**
Enter "SCY_EN=On"



Select parameter **"SCY_MB"**
Switch on motor brakes test with "SCY_MB=ON"

Give travel command up with empty cabin
Interrupt safety chain

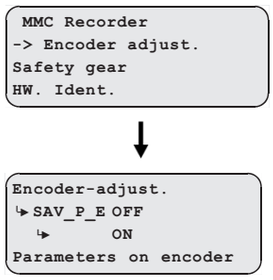


Display distance up to standstill

17.13 Electronic name plate

With the "electronic name plate" function, you can file parameters from the ZAdyn4C in an absolute value encoder or load data from an absolute value encoder into the ZAdyn4C. The function is possible in rotary encoders with EnDat, Codeface and Hiperface interfaces.

Save data

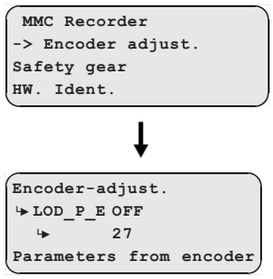


Select menu **Encoder adjustment**

Select parameter **"SAV_P_E"**
Enter "SAV_P_E=On"

Load data

In order to be able to load data from the absolute value encoder, you must have filed the data in the absolute value encoder with the ZAdyn4C first.



Select menu **Encoder adjustment**

Select parameter **"LOD_P_E"**
Enter "LOD_P_E=27" to load data

18 Auto tuning asynchronous motors

18.1 General

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 are determined with the Autotune function.

18.2 Determining the operating data with the Autotune function

- The autotune function must be carried out at a motor temperature <40 ° C.
- Before starting the auto tuning, move the empty cabin to the top stop. Correct connection of the rotary encoder and correct connection of the motor (in phase) is a prerequisite for correct functioning.

If the weight balancing is 40 %, there is not sufficient reserve to move the elevator with nominal load at nominal speed when performing the auto tune function, which assumes 50 % weight. There are several possible ways to prevent this:

- Reduce the **Motor name plate/U_Trim** parameter to 300-310 V. This frees up reserves for travelling with nominal load.

Step 1	Enter parameters in menu **Installation**.
	• V* = 90 % of the system nominal speed • MOD_n* = calculate • n* = Calculated automatically • __D = diameter of the traction sheave • __iS = suspension • __i1 = i1 of the gear ratio i1:i2 • __i2 = i2 of the gear ratio i1:i2
Step 2	Enter the parameters in the **Travel** menu.
	• V_3 = V* (nominal speed of the installation) In CANopen lift operation, this speed has to be configured in the control.
Step 3	First of all the value that has to be entered for the **Motor name plate/f** parameter has to be calculated. This is done by carrying out the following steps 1-3. 1. Calculation of the number of pole pairs using the data on the name plate: p = f x 60 / n 2. Calculation of the nominal frequency using the value of n* calculated in step 1 of the auto tune function and the calculated number of pole pairs. Use the integer proportion for p: f = n* x p / 60 3. Add 1.5 Hz to the calculated nominal frequency value: f = f + 1.5 Hz Enter the calculated value for the **Motor name plate/f** parameter.
	Laden im App Store / JETZT BEI Google Play

	Enter the following additional parameters in the **Motor name plate** menu.
	• n =n* -> calculated motor speed n* • I = Motor name plate specification (if not specified: I[A]= Power [kW] x 2) • cos phi = specification of motor nameplate (if there is no specification: cos phi= 0,88)
Step 4	Travel **down** with empty cabin at inspection speed. If the drive does not start or travel is aborted with an error message, in the **Motor name plate** menu increase the nominal frequency for the **f** parameter in 1 Hz increases until the elevator travels down.

Step 5	Drive the cabin to the top floor.

Step 6	In the **Motor name plate** menu, set the parameter **ASM_ID =One-Step**.
	-> After confirmation, the display changes to the Info menu 22
	`ASM_ID ---------- 22`
	`1420rpm 19.7A 9.6A`
	`50.5Hz 340V 278ms`
	`0.76cos <WAIT >`

Step 7	Give a call to the bottom floor.
Step 8	At the end of travel, one of the following displays appears:

	`Good, Factor x.x----`
	`Accept values determined?`
	`[No] [Yes]`
	The operating data was determined correctly.
	x.x specifies the factor, by which the original values were corrected, e.g. "1.2".
	if the ↵ key is pressed, the data are saved automatically. The process is finished then.

	`U:LIMIT ----------` Determination of the operating data was not completed correctly because the voltage limit of the ZAdyn was reached. The **Motor name plate/U_TRIM** parameter must be set to a lower value. The parameter is only visible if the **Motor name plate/ASM_ID=ON** parameter is configured. Steps 1-8 must be repeated.
	`f:LIMIT ----------` The operating data could not be determined correctly, as the slip limit was reached. The slip limit must be increased in the **Motor name plate/f_SLIP** parameter. To do this, the **Motor name plate/f_SLIP=15 Hz** parameter has to be configured. The parameter is only visible if the **Motor name plate/ASM_ID=ON** parameter is configured. Steps 1-8 must be repeated.

Increase in the nominal system speed to 100%
This is carried out in two stages: First, the system nominal speed is set to 95% and steps 1-6 are carried out. If the data could be determined correctly, the system nominal speed is set to 100% and steps 1-6 are repeated.

Step 1	Adjust parameters in menu **Installation**.
	• V* = 95 % of the system nominal speed • n* = is calculated automatically (expected value ca. 1425 rpm)
	Enter the parameters in the **Travel** menu.
	• V_3 = V* (nominal speed of the installation) In CANopen lift operation, this speed has to be configured in the control.
Step 2	Adjust parameters in the **Motor name plate** menu.
	• n =n* -> calculated motor speed n*
Step 3	In the **Motor name plate** menu, set the parameter **ASM_ID =One-Step**.

	-> After confirmation, the display changes to the Info menu 22
	`ASM_ID ---------- 22`
	`1420rpm 19.7A 9.6A`
	`50.5Hz 340V 278ms`
	`0.76cos <WAIT >`

Step 4	Drive the cabin to the top floor.
Step 5	Give a call to the bottom floor.
Step 6	At the end of travel, one of the following displays appears:

	`Good, Factor x.x----`
	`Accept values determined?`
	`[No] [Yes]`
	The operating data was determined correctly.
	x.x specifies the factor, by which the original values were corrected, e.g. "1.2".
	if the ↵ key is pressed, the data are saved automatically. The process is finished then.
	If the data could not be determined correctly, the **page 22** of the **Info menu** is displayed.

	`U:LIMIT ----------` Determination of the operating data was not completed correctly because the voltage limit of the ZAdyn was reached. The **Motor name plate/U_TRIM** parameter must be set to a lower value. The parameter is only visible if the **Motor name plate/ASM_ID=ON** parameter is configured. Steps 1-6 must be repeated.
	`f:LIMIT ----------` The operating data could not be determined correctly, as the slip limit was reached. The slip limit must be increased in the **Motor name plate/f_SLIP** parameter. To do this, the **Motor name plate/f_SLIP=15 Hz** parameter has to be configured. The parameter is only visible if the **Motor name plate/ASM_ID=ON** parameter is configured. Steps 1- 6 must be repeated.

19 Enclosure

19.1 Technical data ZAdyn4C

19.1.1 ZAdyn4C 011-032

		ZAdyn				
		4Cx 011	**4Cx 013**	**4Cx 017**	**4Cx 023**	**4Cx 032**
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	[%]	60				
Rated current for 60% duty ratio and clock frequency 8 kHz fix	[A]	11	13	17	23	32
Nominal current for 60% switch-on duration and switching frequency 12 kHz fix[1)]	[A]	9	11	15	20	27
Nominal current for 60% 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 rated current, clock frequency 8 kHz and duty ratio of 60 %	[W]	193	204	242	309	424
Power loss at rated current, clock frequency 16 kHz and duty ratio of 60%	[W]	298	326	373	475	612
Heat dissipation standstill 4CS	[W]	24	25	26	27	27
Heat dissipation standstill 4CS	[W]	26	27	28	29	29
Heat dissipation stand-by 1 4CA	[W]	17	18	19	20	20
Heat dissipation stand-by 1 4CS	[W]	19	20	21	22	22
Heat dissipation in Standby 2 4CA	[W]	13	14	15	16	16
Heat dissipation stand-by 2 4CS	[W]	13	14	15	16	16
Switching frequency	[kHz]	4 ... 16				
Motor frequency	[Hz]	max. 200				
Max. terminal cross-section line/motor/brake chopper/brake resistor	[mm^2]	16				
Min. line diameter (for strain relief) Brake-Chopper / Brake-Resistor	[mm]	11	11	11	11	14
Min. line diameter (for strain relief) motor	[mm]	11	11	11	11	14
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 ZAdyn4C for asynchronous motors	[kg]	11.8	12.6	13.0	14.1	16.4
Weight ZAdyn4C for synchronous motors	[kg]	12.0	12.8	13,2	14.3	16,6
Dimensions h x w x d	[mm]	429 x 300 x 191				

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

19.1.2 ZAdyn4C 040-074

		ZAdyn			
		4Cx 040	**4Cx 050**	**4Cx 062**	**4Cx 074**
Electrical data					
Mains connection voltage	[V]	3~ 180 ... 440 absolut			
Mains frequency	[Hz]	50 / 60 (±1,5 Hz)			
Typ. motor output (400 V)	[kW]	19	24	30	37
Duty cycle at rated current and clock frequency 8 kHz	[%]	60			
Rated current for 60% duty ratio and clock frequency 8 kHz fix	[A]	40	50	62	74
Nominal current for 60% switch-on duration and switching frequency 12 kHz fix[1)]	[A]	34	42	53	63
Nominal current for 60% switch-on duration and switching frequency 16 kHz fix[1)]	[A]	30	38	46	55
Max. operating current (for max. 10 s)	[A]	72	90	112	134
Power loss at rated current, clock frequency 8 kHz and duty ratio of 60 %	[W]	470	600	680	820
Power loss at rated current, clock frequency 16 kHz and duty ratio of 60%	[W]	680	860	960	1140
Heat dissipation standstill 4CS	[W]	28	30	33	33
Heat dissipation standstill 4CS	[W]	28	30	33	33
Heat dissipation stand-by 1 4CA	[W]	23	25	27	27
Heat dissipation stand-by 1 4CS	[W]	23	25	27	27
Heat dissipation in Standby 2 4CA	[W]	19	21	23	23
Heat dissipation stand-by 2 4CS	[W]	19	21	23	23
Switching frequency	[kHz]	4 ... 16			
Motor frequency	[Hz]	max. 200			
Terminal range mains	[mm^2]	0.5...35, rigid 1.0...25, fine wire, with wire end ferrule			
Terminal range motor	[mm^2]	0.5...35, rigid 1.0...25, fine wire, with wire end ferrule			
Terminal range brake chopper/brake resistor	[mm^2]	0.5...35, rigid 1.0...25, fine wire, with wire end ferrule			
Min. line diameter (for strain relief) Brake-Chopper / Brake-Resistor	[mm]	14	14	14	14
Min. line diameter (for strain relief) motor	[mm]	18	18	20	25
Ambient conditions					
The user must ensure that the specified ambient conditions are observed.					
Protection rating		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 ZAdyn4C for asynchronous motors	[kg]	32.4	33,3	36,2	36,4
Weight ZAdyn4C for synchronous motors	[kg]	32.6	33.5	36,4	36.6
Dimensions h x w x d	[mm]	628 x 422 x 190			

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

19.2 EC/EU declaration of conformity

- Translation -
(english)

A-KON16_06-GB
1937 Index 004

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. ZAdyn4-CA 018 HY)

Series 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

EN 61800-5-2:2017	Adjustable speed electrical power drive systems - Part 5-2: Safety requirements - Functional
EN 62061:2005 + A1:2013 + A2:2015	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems
EN ISO 13849-1:2015	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 IEC 61800-3:2018	Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods
EN 12015:2014	Electromagnetic compatibility- Productfamily standard for lifts, escalators and moving walks - Emission
EN 12016:2013	Electromagnetic compatibility- Productfamily standard for lifts, escalators and moving walks - Immunity

The EG type-examination procedures referred to in the enclosure IX of the Machinery directive 2006/42/EC was carried out by TÜV Rheinland and certified by the type-examination certificate 01/205/5288.02/17

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, 12.09.2019
(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)

19.3 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	
LOCK_X	
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	

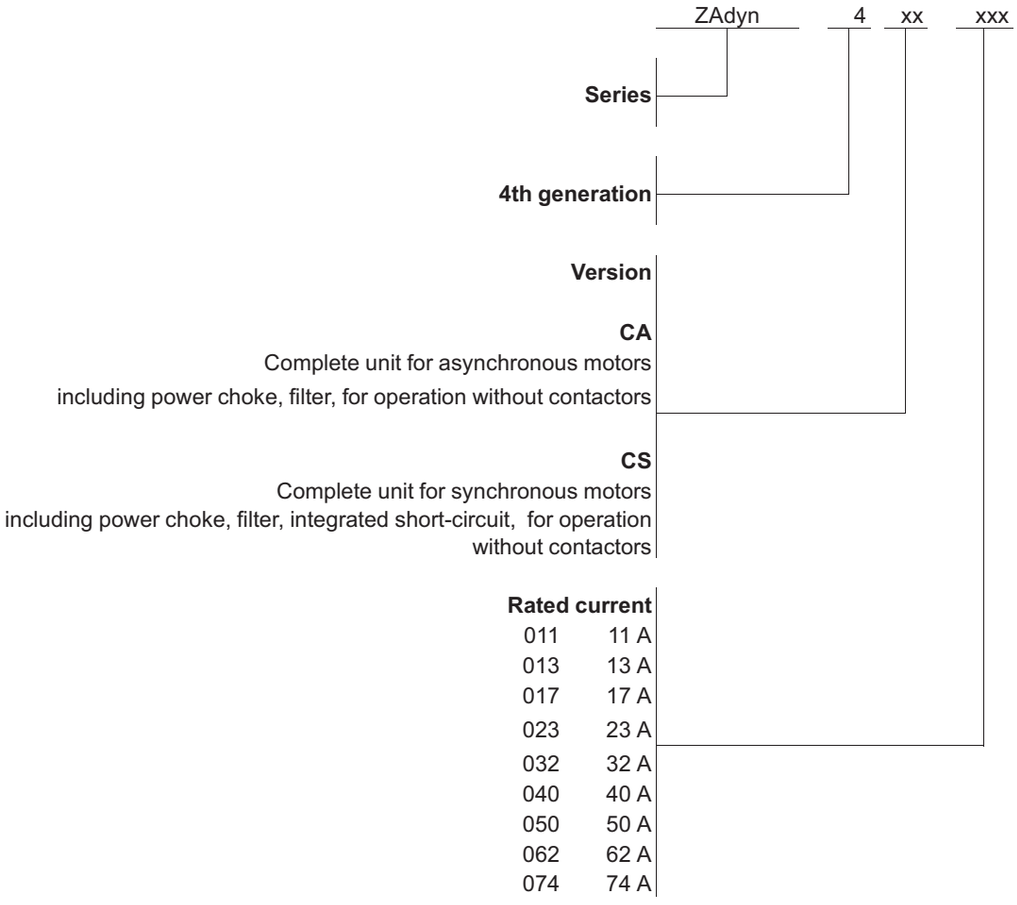
Controller menu

SPD_KP	
SPD_TI	

19.4 Brake resistor allocation

Frequency inverter	Brake resistor	Part no.
ZAdyn4xx 011	BR11-A	357171
	BR17	357216
ZAdyn4xx 013	BR17	357216
ZAdyn4xx 017	BR17	357216
ZAdyn4xx 023	BR25	357217
ZAdyn4xx 032	BR25	357217
	BR50	357218
ZAdyn4xx 040	BR50	357218
ZAdyn4xx 050	BR50	357218
ZAdyn4xx 062	BR50	357218
ZAdyn4xx 074	BR50	357218
	BR100-A	357214

19.5 Series



19.6 Part numbers

A ZAdyn4C for asynchronous motors			S ZAdyn4C for synchronous motors	
ZAdyn4CA 011	352194		ZAdyn4CS 011	352201
ZAdyn4CA 013	352195		ZAdyn4CS 013	352202
ZAdyn4CA 017	352196		ZAdyn4CS 017	352203
ZAdyn4CA 023	352197		ZAdyn4CS 023	352204
ZAdyn4CA 032	352198		ZAdyn4CS 032	352205
ZAdyn4CA 040	352206		ZAdyn4CS 040	352216
ZAdyn4CA 050	352207		ZAdyn4CS 050	352217
ZAdyn4CA 062	352208		ZAdyn4CS 062	352218
ZAdyn4CA 074	352209		ZAdyn4CS 074	352219

19.7 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.

Berlin, 2017-10-10

0035 Notified Body

Notified Body for Machinery, NB 0035

Dipl.-Ing. Eberhard Frejno

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Certificate

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ID 0600000000

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

Prüfgegenstand **Product tested**	Sicherheitsfunktion STO, Sicherer Halt (Stopp Kategorie 0) Safety Function STO, Safe Stop (Stop Category 0)	**Zertifikats-inhaber** **Certificate holder**	ZIEHL-ABEGG SE Heinz-Ziehl-Straße 74653 Künzelsau Germany

Typbezeichnung
Type designation
ZETADYN 4C / ZAdyn4C / ZAdynpro Drive Family (für Einzelheiten siehe Revisions-Liste / for details see Revision List)

Prüfgrundlagen
Codes and standards

EN 81-20:2014	EN 81-1:1998 + 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
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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

TÜVRheinland®
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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

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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
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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

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· Registered at the KvK under number 34157363 ·

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19.8 Index

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