english

ZETADYN 4C

Frequency inverter

Translation of the original operating instructions

R-TBA12_01-GB 1415 Part.-No. 00163371-GB

ZIEHL-ABEGG

Content

1 General information

1.1 Validity

These operating instructions apply to:
Frequency inverter from the series: ZETADYN 4C
from software version 4.46

1.2 Structure of the operating instructions

These operating instructions help you to work safely on and with the frequency inverter ZETADYN 4C. They contain safety instructions that must be complied with as well as information that is required for failure-free operation of the frequency inverter.
The operating instructions are to be stored together with the frequency inverter. It must be ensured that all persons who have to perform activities on the frequency inverter can consult the operating instructions at any time. Instructions for use in accordance with the German Occupational Safety and Health Act and the German Work Equipment Ordinance must be provided in addition to the operating instructions.
Keep the operating instructions for continued use. They must be passed-on to all successive owners, users and final customers.

1.3 Target group

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

1.4 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 ZETAMON
- 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

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 ZETADYN 4C is a frequency inverter for RPM control of three-phase current 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
Not the manufacturer, rather the operator of the ZETADYN 4 is liable for any personal harm or material damage arising from non-intended use!

2.3 Pictographs

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

	**Danger!** General hazardous area. Death or severe injury or significant property damage can occur if the corresponding precautions are not taken!
	**Warning!** Risk of moderate or minor injury if the corresponding precautions are not taken!
CAUTION!	**Caution!** Material damage is possible if the corresponding precautions are not taken!

	**Danger!** Danger by dangerous, electric voltage! Death or severe injury can occur if the corresponding precautions are not taken!

Information
Important information and advice for user

2.4 Product safety

The device conforms to the state of the art at the time of delivery and is fundamentally considered to be reliable. The device and its accessories must only be used in a flawless condition and installed and operated with compliance to the operating instructions.
Exceeding the limits stated in the “Enclosure / technical data” chapter can lead to a defect in the device.

2.5 Requirements placed on the personnel / due diligence

Persons entrusted with the planning, installation, commissioning and maintenance and servicing in connection with the device must have the corresponding qualifications and skills for these jobs. Based on their training, knowledge and experience as well as knowledge of the relevant standards, they must be able to judge the work transferred to them and be able to recognize possible hazards.
In addition, they must be knowledgeable about the safety regulations, EU directives, rules for the prevention of accidents and the corresponding national as well as regional and in-house regulations.
Personnel to be trained or instructed and apprentices are only permitted to work on the device under the supervision of an experienced person. This also applies to personnel undergoing general training.
Comply with the legal minimum age

2.6 Commissioning

Danger!
During commissioning, unexpected and hazardous conditions can arise in the entire installation due to defective adjustments, 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 functions must be in working order
- The mechanical safety brakes must be installed and in working order
- Commissioning is only permitted with compliance to the EMC directive 39/336/EEC

2.7 Working on device/ hazards through residual voltage

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

Danger!
Through use of capacitors, danger of death exists even after switching off the device through directly touching the energized parts or due to parts that have become energized due to faults.
Wait at least **3 minutes** before working on the device.
The safe isolation from the supply must be checked using a **two-pole** voltage detector.

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

2.8 Modifications / interventions in the device

For reasons of safety, no unauthorized interventions or **modifications** may be made on the device .
All planned modifications must be authorized by the manufacturer in writing.
Use only genuine spare parts / genuine wearing parts / genuine accessories from the ZIEHL-ABEGG SE.These parts were specifically designed for the device. There is no guarantee that parts from non-original sources are designed and manufactured in correspondence with load and safety requirements.
Parts and special equipment not supplied by the ZIEHL-ABEGG SE are not approved for use.

2.9 Operator's obligation of diligence

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

In particular, the operator must ensure that

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

2.10 Employment of external personnel

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

3 Product overview

3.1 Application

The ZETADYN 4C 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 inertia weights are to be removed. Solid hand wheels are to be replaced with plastic or aluminium hand wheels.
However, please note that the removal of the inertia weights may cause an imbalance.

3.2.2 Current consumption of the ZETADYN 4 during acceleration

When selecting the ZETADYN 4, it is assumed that the motor to be controlled will be loaded with the rated torque at the rated speed. Additional torque is required to accelerate the motor. To create this torque, an180additional current of approx. 60 – 80% of the rated current is necessary. That means during acceleration, the motor's current consumption is approx. 160 – 180% of the rated current. TheZETADYN 4 can be loaded with up to 180% of the reference 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 Service & maintenance

These jobs must be completed during the recurrent maintenance work:
- Check the device for dirt and clean if necessary
- Check the connections and tighten if necessary

3.4 Transport

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

3.4.1 Storage duration:

The storage duration depends particularly on the electrolytic capacitors because the oxide coating in the capacitor deteriorates.
Storage duration:
- 12 months at -20 ... +50 °C
- 24 months at -20 .. +45 °C
- 36 months at -20 .. +40 °C

If storage exceeds the stated maximum storage times, you must carry out a reformation of the capacitors before applying the entire mains voltage to the frequency inverter.
New formation:
To reform, the ZETADYN 4 needs to be connected to reduced voltage for ca. 1 hour (230 VAC at L1 / L2).

3.5 Disposal & recycling

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

4 Mechanical installation

4.1 General notes

The ZETADYN 4C 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 frequency inverter due to assembly errors or environmental influences:

Before installation
- Remove the frequency inverter from the packaging and check for any possible shipping damage
- Carry out installation only on a clean, level and stable foundation
- 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

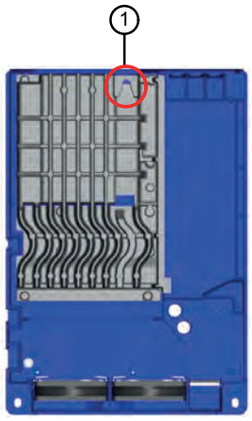
CAUTION!

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

The ZETADYN 4C is mounted on the wall using a 3-point fastening.

▷ Attach fastening screw for the upper fastening point.



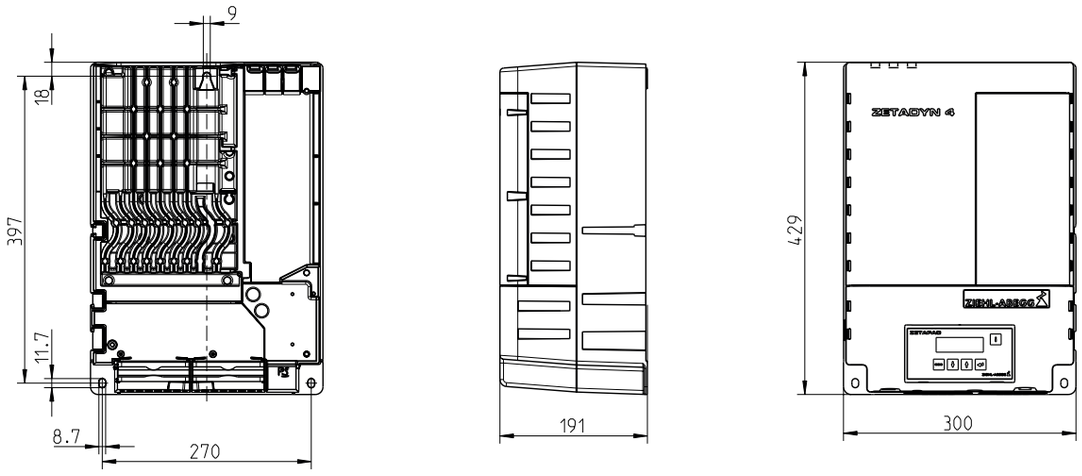
1 Upper fastening point

▷ Hang the ZETADYN 4C on the upper fastening point.
▷ Mark the positions of the lower fastening points.

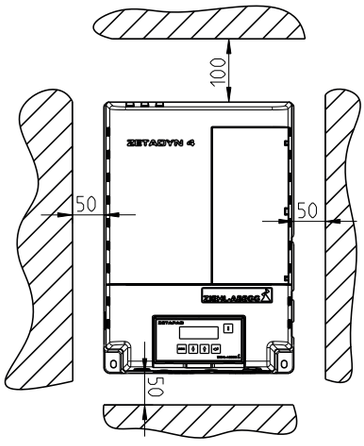
2 Lower fastening points

▷ Drill the fastening holes (the ZETADYN 4C can be moved to the side and must not be removed).
▷ Fix the ZETADYN 4C with one screw each at the lower fastening points.

4.2 Dimensions / Minimum distances



ZD4C01M0
Dimensions ZETADYN 4C in mm



ZD4C01M0
Minimum distances ZETADYN 4C 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) are still live.
Wait at least 3 minutes before working on the device

Danger!
It is not permitted to operate the ZETADYN 4C 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.

Inspect electrical equipment periodically: retighten loose connections – immediately replace damaged lines and cables.
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 12015:2004 Electromagnetic compatibility – Product family standard for lifts, escalators and moving walks – Emission
- EN 12016:2004 + A1:2008 Electromagnetic compatibility – Product family standard for lifts, escalators and moving walks – 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 power cables (motor cable, Brake-Chopper cable) must be connected to ground on both sides
- 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, motor contactors) with suppressors
- Feed the power supply of the motor contactors through the mains filter of the lift control

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

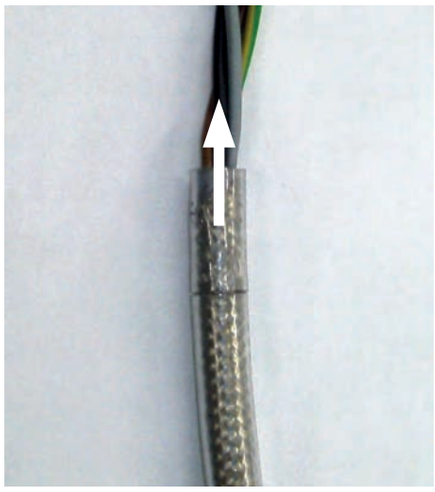
5.1.1.1 Cable length

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

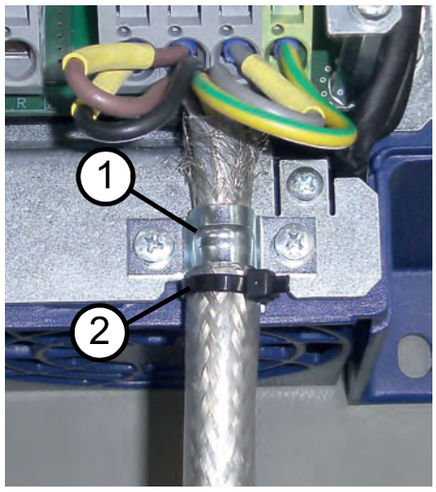
In the case of a supply line > 25 m (motor line) or > 5 m (brake resistor line), it is no longer possible to guarantee compliance with **DIN EN 12015** (Electromagnetic compatibility – Emission) and **DIN EN 12016** (Electromagnetic compatibility – Immunity).

5.1.1.2 Contacting the shielding of the motor cable on the ZETADYN 4

On the ZETADYN 4, the shielding of the motor line must be connected to earth potential with the clip provided (see fig.).



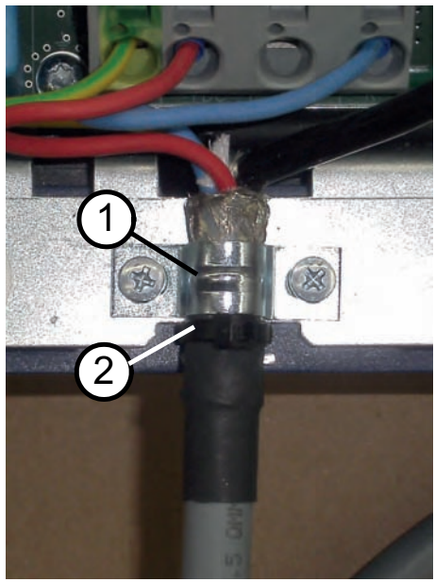
Remove the sheath



1 Clip
2 Cable tie for strain relief

5.1.1.3 Contacting of the shielding of the brake resistor line

On the ZETADYN 4 and the brake resistor, the shielding of the brake resistor line must be connected to earth potential with the clip provided (see fig.). .



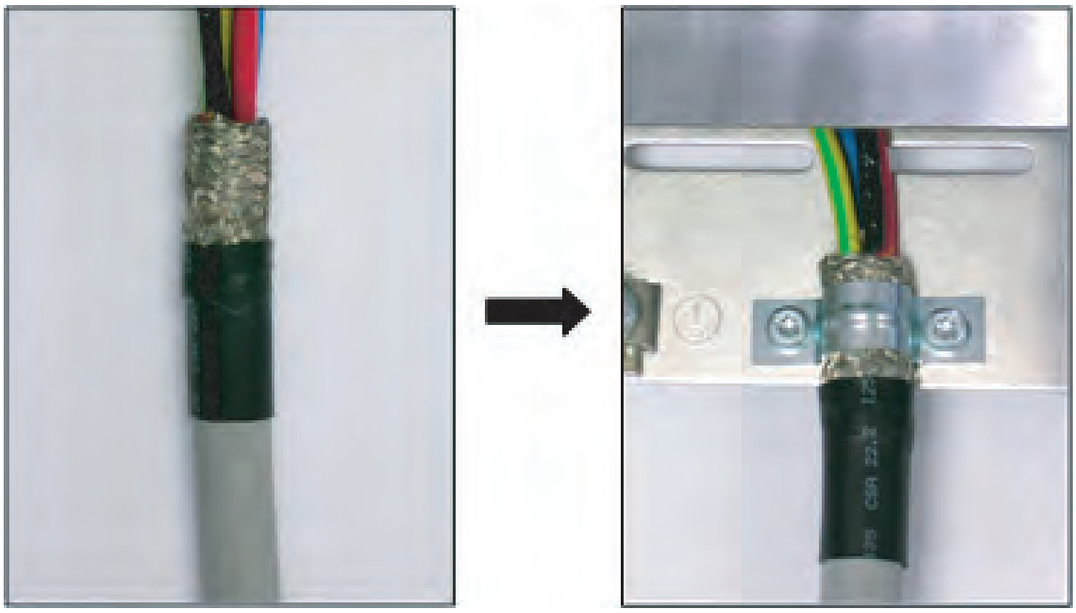
EMC connection, brake resistor line
1 Clip
2 Cable tie for strain relief

5.1.1.4 Contacting the shielding on the motor

Connect the shielding on the motor side to the PE junction that is located directly on the motor housing.
For prefabricated motor lines from ZIEHL-ABEGG SE, the shielding connection is provided with a ring cable eye for the corresponding thread size.
When using non-prefabricated lines, implement the shielding connection by using a suitable shielding connection system.

5.1.1.5 Contacting the shielding on the brake resistor

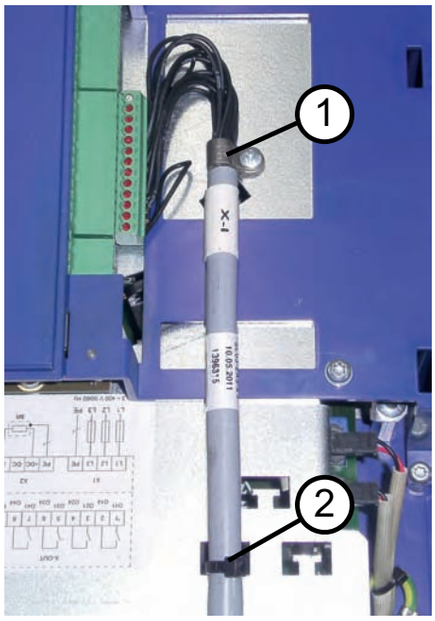
On the brake resistor the shielding must be connected with earth potential with the clip provided (see fig.).



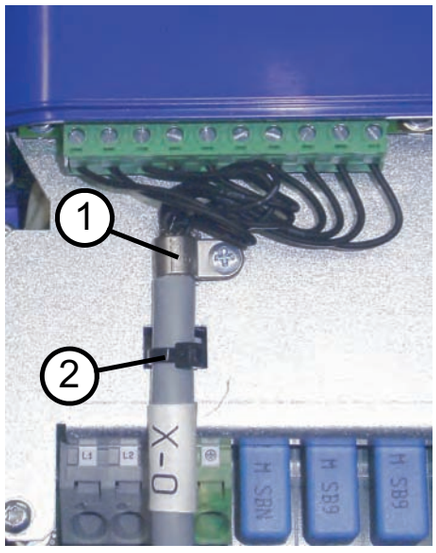
EMC-connection brake resistor

5.1.2 Control cables

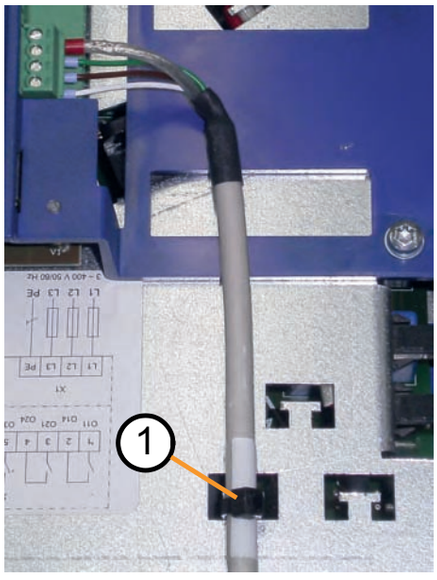
The shields of the control cables (digital inputs and outputs, DCP) must be connected to earth potential on the converter side. Earth clips are available in the ZETADYN 4 for this (see fig.).



Shielding digital inputs line
1 Earthing clip
2 Strain relief by cable ties



Shielding digital outputs line
1 Earthing clip
2 Strain relief by cable ties



Strain relief DCP line
1 Strain relief by cable ties

5.1.3 STO line

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 ZETADYN 4 for this (see fig.).

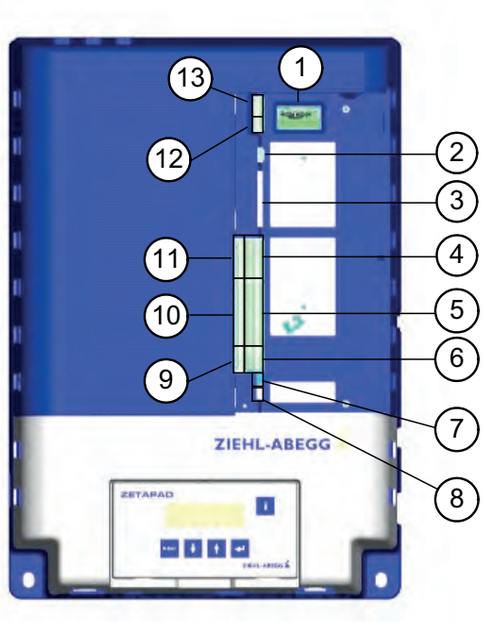
See the chapter "Safe Torque Off(STO) function" for further information.

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)")

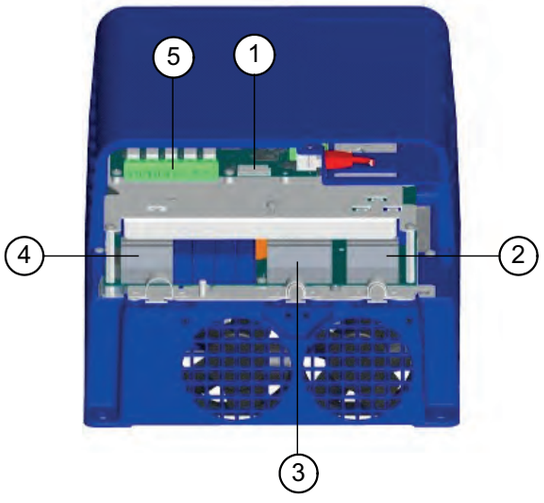
1,2 Earthing clips

3 Strain relief by cable ties

5.2 Terminal positions



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 ZETAPAD
9 X-DCP DCP
10 X-MON input monitor functions
11 X-ENCO rotary encoder simulation
12 X-AN analogue inputs
13 X-EXT external 24V voltage 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

5.3 Wiring

The frequency inverter is fitted with clips and recesses to feed the different lines into the ZETADYN 4C. The table and figures below show their allocation and positions.

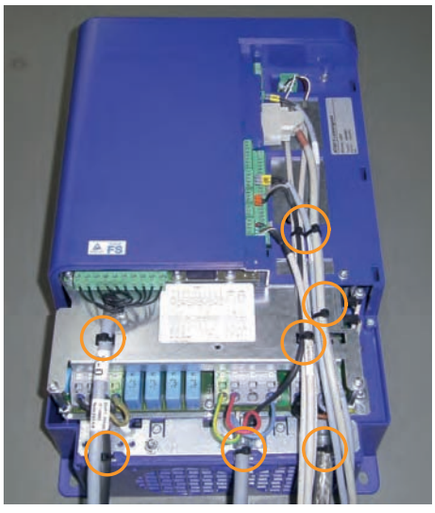
Power line, X-OUT line	Recess at bottom left
Motor cable	Clip, recess bottom right
Brake resistor cable	Clip, second recess from bottom right
X-DCP, X-IN, X-ENC8, X-CAN, X-MON, X-ENC8 lines	Recess bottom right

5.3.1 Line laying ZETADYN 4C

Line laying front
1 Power line, X-OUT line
2 Protective earth connection
3 Brake resistor cable
4 Motor line, X-DCP, X-IN, X-ENC8, X-CAN, X-MON, X-ENC8 lines

5.4 Strain relief by cable ties

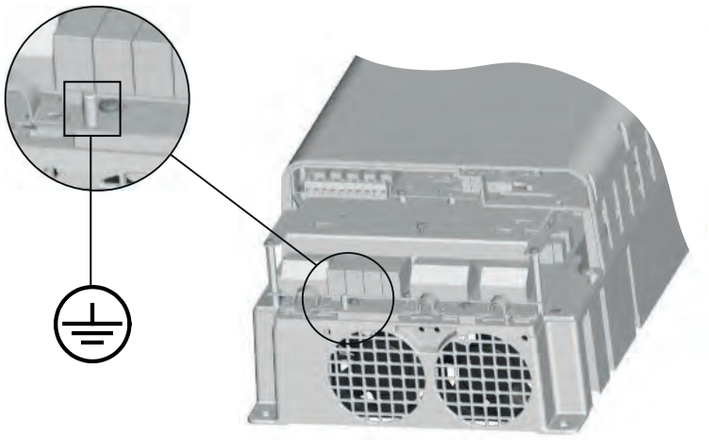
Information
A cable tie must be attached to all lines for strain relief (see fig.).



Strain relief by cable ties

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. M6 threaded bolts are available on the ZETADYN 4 for connecting the PE conductors (see fig.).



Protective earth conductor connection ZETADYN 4C

5.6 Mains connection (X1)

Danger!
Before connecting to mains you have to check if the technical Datas on the rating plate of the ZETADYN 4 are according to the required connecting values.

5.6.1 Network form

The mains filter and ZETADYN 4 are designed for use in an earthed supply system. Permissible network forms are:

- TN network
- TT network

Information
The line filter and ZETADYN 4 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

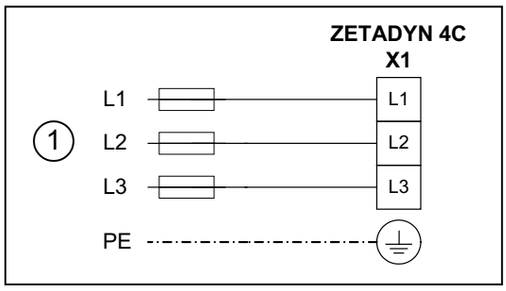
The fuseprotection is implemented in accordance with the line cross-section used

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.



Line connection ZETADYN 4C
1 Mains 3~ 400V/PE/50Hz

5.7 Line reactor-radio interference filter

The line reactor 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 ZETADYN type require no RCD circuit breaker for operation.
The1997circuit0100at4100the output of the ZETADYN C 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 (VDE -Part 540:2012-06 and DIN EN 50178:1997), this06behaviour is sufficient for the automatic switch off in case of an error demanded by VDE 0100-
If an RCD circuit breaker is required for special reasons (e.g. fire protection), an all current-sensitive RCD circuit breaker type B must be used. For maximum operational reliability Ziehl-Abegg recommends the use of an RCD circuit breaker with reference fault current 300 mA for fire protection according to regulation VdS 3501.

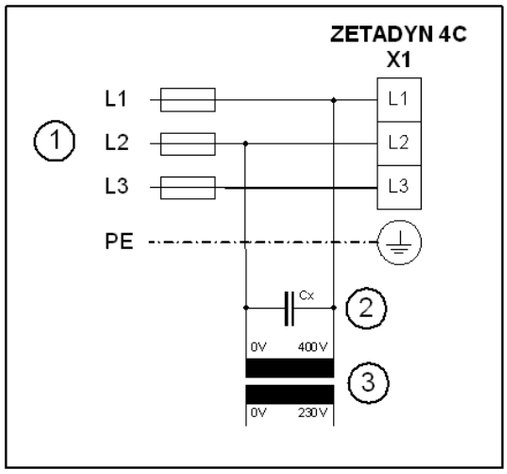
Information
Please note that even when using a correct type B RCCB, false triggering due to high protective earth currents (stray current) can still occur and that operation with these protective devices is not possible.

5.9 Control transformer in the mains feed line

CAUTION!

Caution!
When using a control transformer in the ZETADYN 4's mains supply line, 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

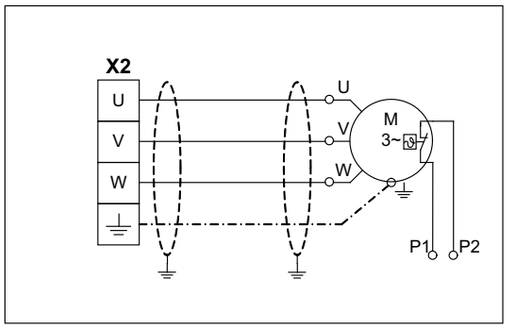
5.10.3 Cable length
The maximum line length is 25 m. With a motor power line **> 25 m** compliance with DIN EN 12015 (electromagnetic compatibility – spurious emission and DIN EN 12016 (electromagnetic compatibility – interference immunity) can no longer be guaranteed.

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 ZETADYN 4.
- 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 X-MT terminal is a standard part of the ZETADYN 4C frequency inverter.

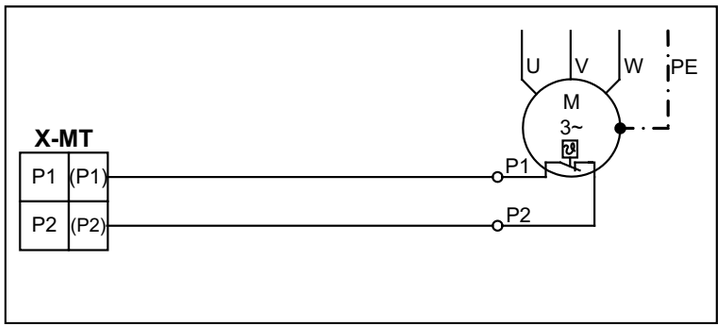
Information
The detection of over temperature of the motor doesn't cause a drive interruption. The current drive will be completed.
If an over temperature of the motor will be detected at stop, there is no further drive possible.

The temperature monitoring is carried out according to IEC 61800-5-1:2003-02 (switching point at 3500 Ω)
The following sensor types can be used:

- PTC thermistor (PTC according to DIN 44082)
- Temperature sensor KTY84-130
- 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
If4you do not use the temperature monitor and install a PTC thermistor (PTC in accordance with DIN 44082) or a KTY84-130 temperature sensor, you must switch off the temperature monitor **(Monitors/P130P1=Off)**. Short-circuiting of the inputs P130 and P1 is detected as an error by the ZETADYN 4C.

5.12 Brake resistor (X 2)

CAUTION!

Caution!
An existing temperature monitor absolutely must be connected to the ZETADYN 4!
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 type
```

Type BR11-A

The brake resistor of the type BR11-A is equipped with prefabricated cables. These must be wound around the delivered toroidal core (see fig.).

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

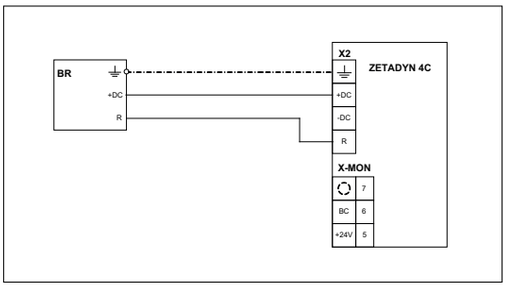
Cable length

The maximum line length is 5 m.
When lines over >5 m are used, compliance with **DIN EN 12015** (electromagnetic compatibility – electrical interference) and **DIN EN 12016** (electromagnetic compatibility – noise immunity) is no longer guaranteed.
If the11pre-fabricated5cable is not long enough in the brake resistor of the BR11-A type, this can be extended up to a length of 5 m.
A shielded, self-extinguising cable is required for this.

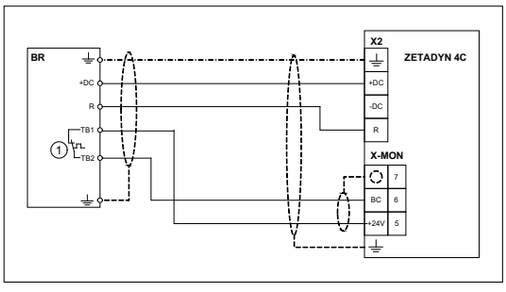
Brake-Resistor connection

Information

The brake resistor of the BR11-A type has no temperature monitor.

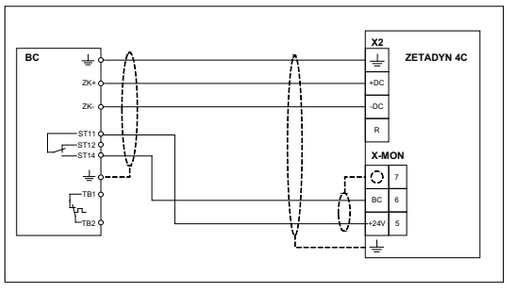


Connection of BR11-A / BR 14-A



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

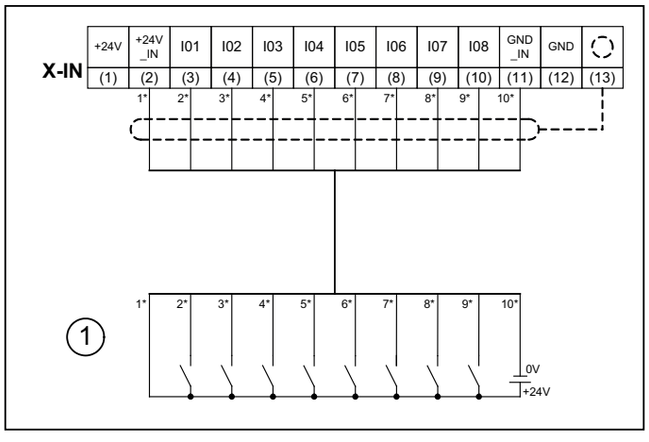
5.13 Digital inputs (X-IN)

Standard,8there are digital inputs available on the X-IN 8 terminals for parallel activation of the frequency inverter. The inputs are pre-parameterized but can be assigned with other functions by modifying the parameters
The inputs can be activated galvanically isolated by an external 24 V power supply in the control system or by the internal 24 V power supply in the ZETADYN 4.

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.

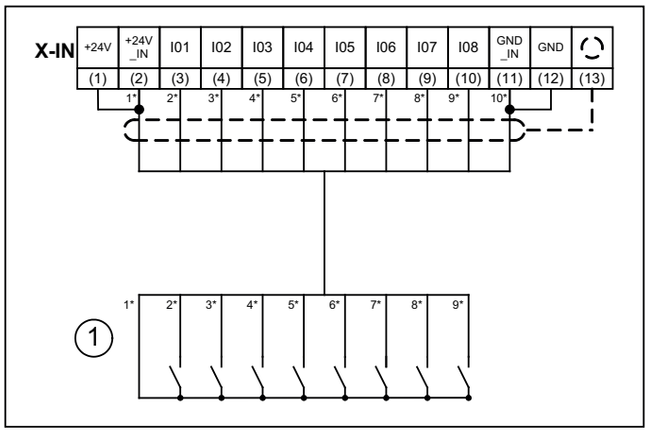
5.13.1 Connection with external power supply



Connection of digital input with external power supply
1 Modulation
() 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 Modulation
() 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	typ. 8 mA
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\CONFIG"** menu.

The input assignments dependent on the configuration:

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

* *The function of the inputs can be changed*

Information

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

- Controller enable
- Speed
- Direction default

5.13.5 Binary traveling speed default Standard (CONFIG=15:ZA_BIN)

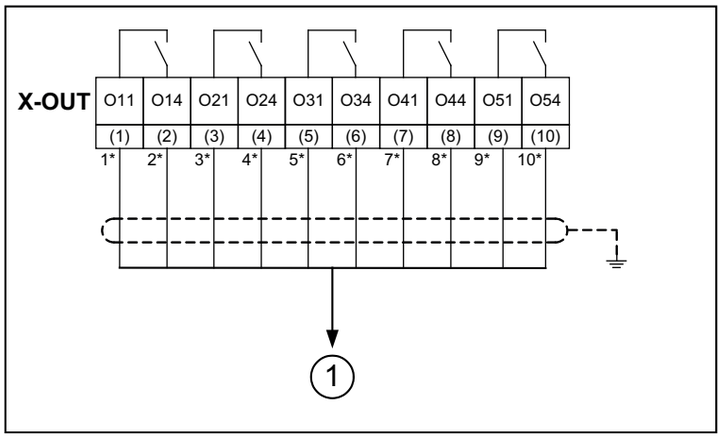
Travel speed V_3	Binary inputs		
	BIN2	BIN1	BIN0
-	0	0	0
V1	0	0	1
V2	0	1	0
V3	0	1	1
V4	1	0	0
V5	1	0	1
V6	1	1	0
VZ	1	1	1

5.14 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 Modulation
() terminal designation of connector
** Wire number of the pre-assembled connecting lead X-O*

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

* *The function of the outputs can be changed*

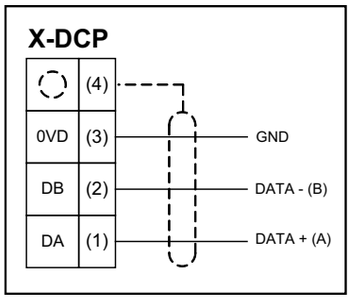
5.15 DCP / CAN interface (X-DCP, X-CAN)

As an alternative to the conventional wiring, it is possible to actuate the ZETADYN 4 via DCP or CANopen lift (see chapter "Serial communication").

Information
The X-DCP and X-CAN terminals are standard parts of the ZETADYN 4C.

5.15.1 DCP

- Use a shielded cable for the connection. The shielding must be grounded on the inverter side.
- Make the connection between the ZETADYN 4 and the control 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)"

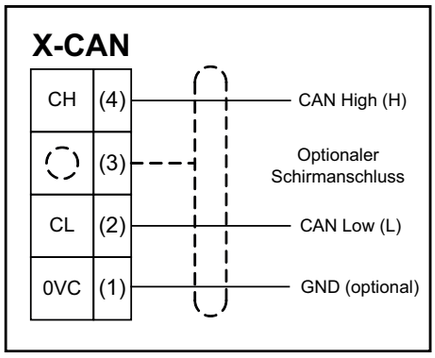
5.15.2 CANopenLift

- A shielded bus-cable is not needed, but the data wires should be twisted.
- The installation takes place in line structure. The seperate devices are connected to the bus with short branch 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!

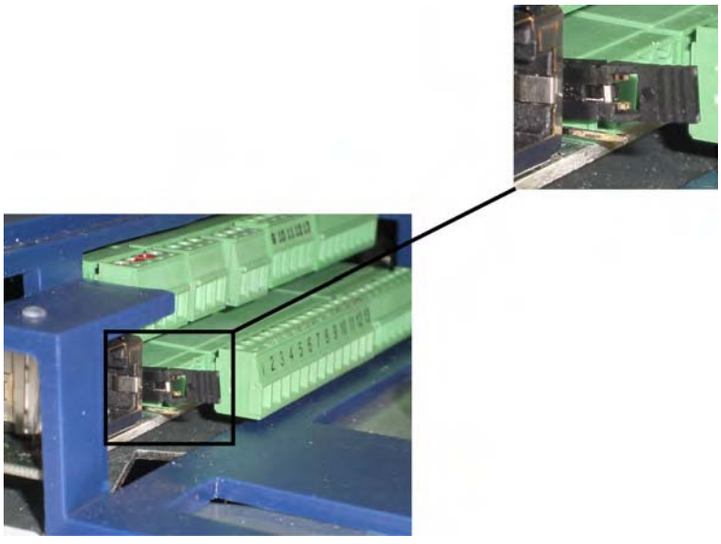
Caution!
Incorrectly wired connections can destroy the electrical / electronic components.
Electrostatic discharges can be hazardous to the electronic components and lead to errors in the software.

The bus cable is connected by the interface X-CAN at the ZETADYN 4



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 ZETADYN 4C 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

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.

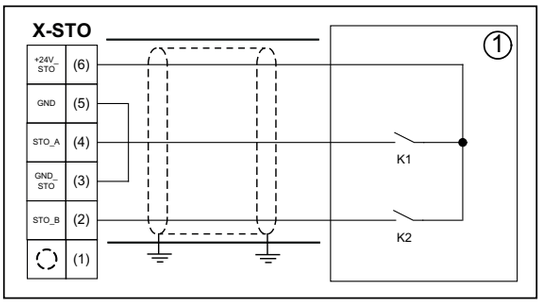
5.16.1 Terminal assignment X-STO

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

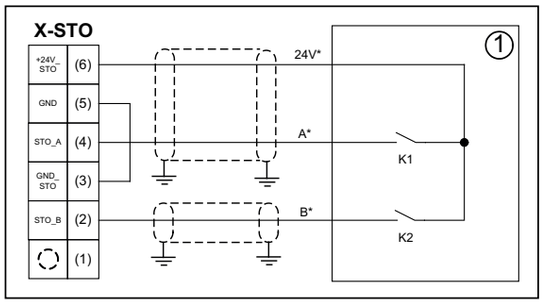
5.16.2 Technical data X-STO

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

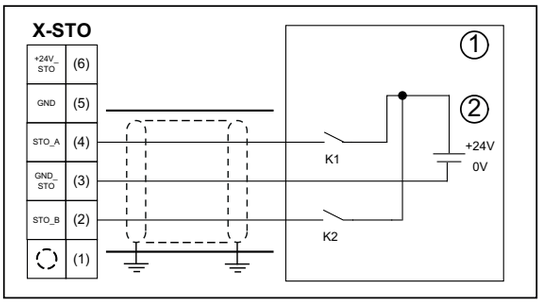
5.16.3 X-STO connection



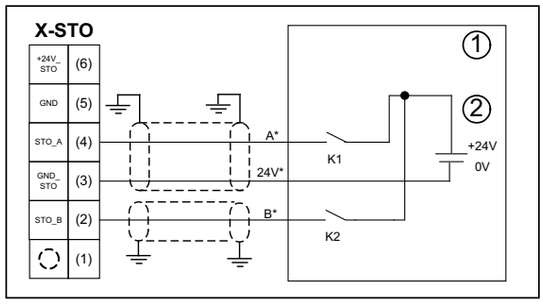
Connection with internal 24 V voltage and protected routing
1 Modulation



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



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



Connection with external 24 V voltage using two separate jacketed cables
1 Modulation
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.
- Make the connection between the ZETADYN 4 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

Rotary 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 cable	Shielded twisted pair cable
Terminal assignment X-ENC8	max. 1,5 mm²
Max. cable length	25 m

5.17.2 Terminal assignment X-ENC8

A	Track A
/A	Track A inverse
B	Track B
/B	Track B inverse
+5/8V_E	+5 V power supply for sinus and TTL encoder
GND	Ground
+24V_E	+24 V power supply for HTL encoder
⏚	Shielding

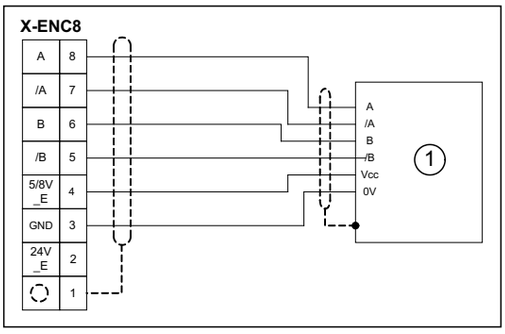
5.17.3 X-ENC15 pin assignment

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

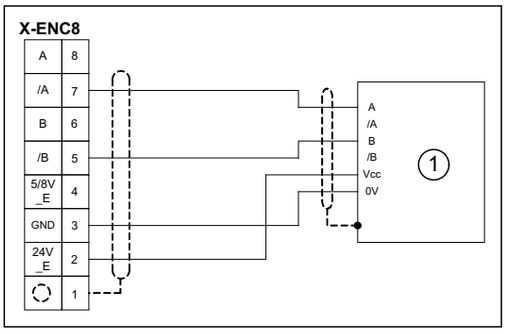
5.17.4 Rotary encoder connection to terminal X-ENC8

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 asynchronous motors (X-ENC15)

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

```
Encoder & BC
↳ENC_Typ EnDat/SSI
  ↳      EnDat/SSI
Encoder type
```

```
Encoder & BC
↳ENC_INC 2048
  ↳      2048
Encoder resolution
```

5.18.1 Technical data X-ENC15

Rotary encoder types	Absolute value encoder with EnDat, SSI or Hiperface interface Absolute value 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 cable	Shielded twisted pair cable
Max. cable length	25 m

5.18.2 Pin assignment X-ENC15 for absolute value encoder with EnDat, SSI, ERN1387 and HIPERFACE 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

5.19 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.

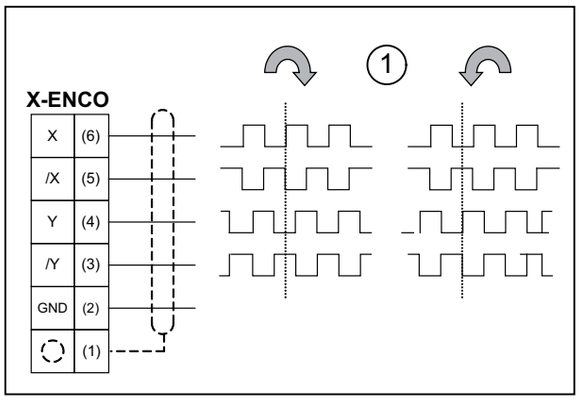
Information
The X-ENCO connection is not a connection for the rotary encoder but an output for transmission of data to the control. The rotary encoder is connected to the connection X-ENC8 or X-ENC15.

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 ZETADYN 4 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 cable	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 24V power supply (X-EXT)

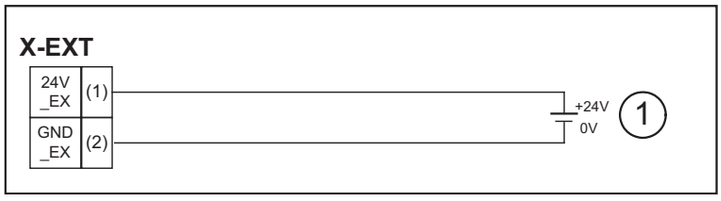
By applying an external 24 V power supply to terminal X-EXT, the following functions are active even when the ZETADYN 4 is switched off:

- Communication between control and ZETADYN 4
- Rotary encoder simulation
- ZETAPAD (parameter changes is possible)
- USB interface of the ZETAPAD

5.20.1 Technical data

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

5.20.2 Connection X-EXT

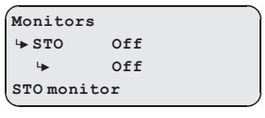


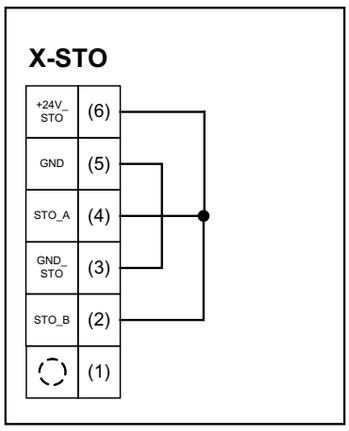
Connection external power supply
1 external power supply
() terminal designation of connector

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.



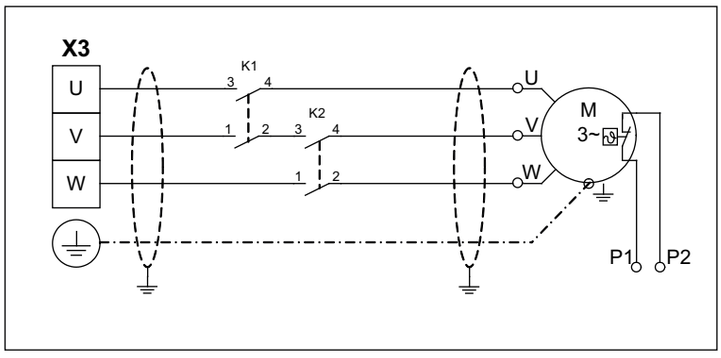


STO connection bridged

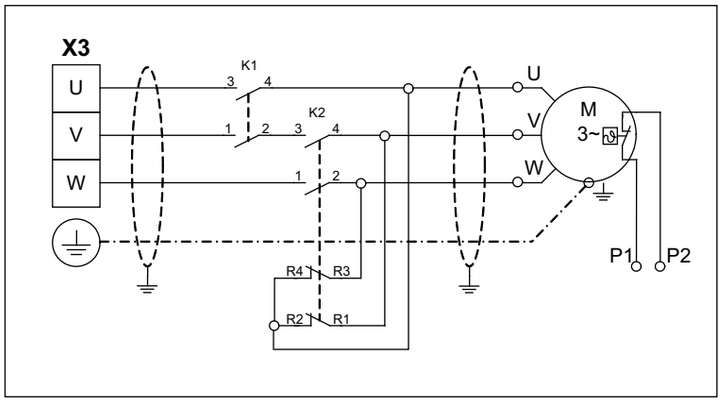
Select the motor contactors depending on the type of motor and the corresponding motor data. According to DIN EN 81-1, the motor contactor contacts must be self-commutated.

The maximum line length to the motor contactors when using non-shielded lines is **200mm**. If there is a greater distance between the contactors and ZETADYN 4, you must use shielded lines!

Danger!
Whenoperatingthemotorwithanencoder,the feed 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 must 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 limit 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-CO)

Information

The switching states of the motor contactors must be monitored according to EN 81-1.
The ZETADYN 4 contactor monitoring does not substitute this monitoring of the motor contactors demanded in EN 81-1!

The ZETADYN 4 monitors the switching status of the motor contactors. The contactors must be applied during travel. Opening the contactors during travel (e.g. through chatter) leads to an immediate travel abort.

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.

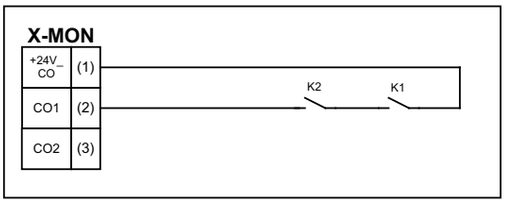
```
Monitors
↳CO      Off
  ↳      CO1
Contactor monitoring
```

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 / 12 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

Connection internal contactor monitoring – separate
1 Parameter "Monitoring/CO=CO1&CO2"
() 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-BR)

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 ZETADYN 4C for optimum starting and stopping.
The monitoring conforms chapter 9.10 of EN81-1:2010 for brakes as protection for the upside traveling elevator car against overspeed.
When the lock function is activated, the brake release monitoring fulfils the requirements for self-monitoring according to chapter 9.11.3 EN81-1:2010 for brake elements for protection against unintended movement of the cabin.

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**.

```
Monitors
↳BR      1*NC
  ↳      3*NC
Brake monitor
```

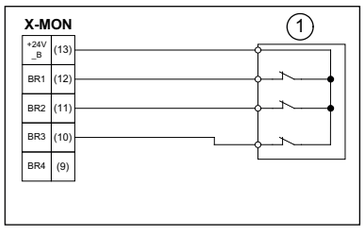
The lock function of the ZETADYN is engaged by activating the “LOCKBR=On” parameter in the menu **Monitoring**.

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

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

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

5.22.2 Connection X-BR



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

CAUTION!

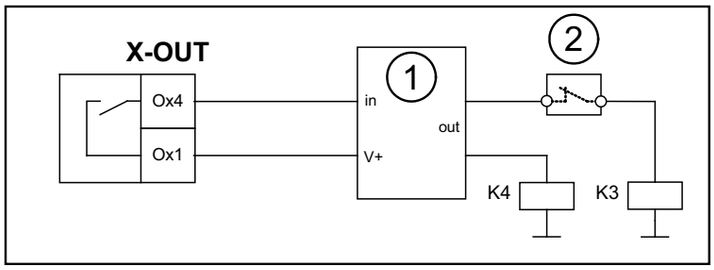
Caution!
The internal 24 V power supply is provided solely for the brake release monitoring. Switching consumer load with this voltage is prohibited!

5.22.3 Activation of the brakes without Silent Brake Module

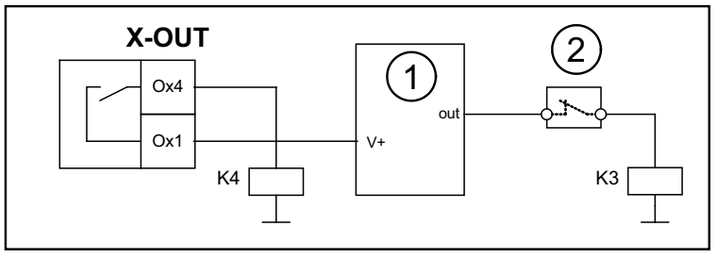
The signal for controlling the brakes is provided via a zero potential digital output (see "Digital outputs"). This normally open contact can be used either by the control for further processing or directly for switching the brake contactor (see fig.).

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.



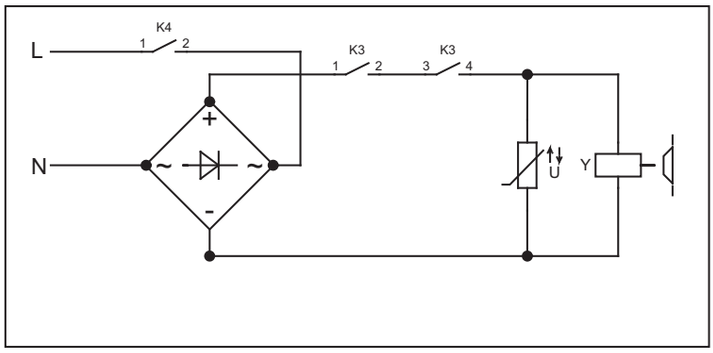
Activating the brakes by the control system
1 Modulation
2 Safety circuit



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

CAUTION!

Caution!
Brakes, which are connected to the direct current side, must be protected against excess voltage from the switching actions by using corresponding varistors!
Due to the high operating current, master contactors must be used to switch the brakes!



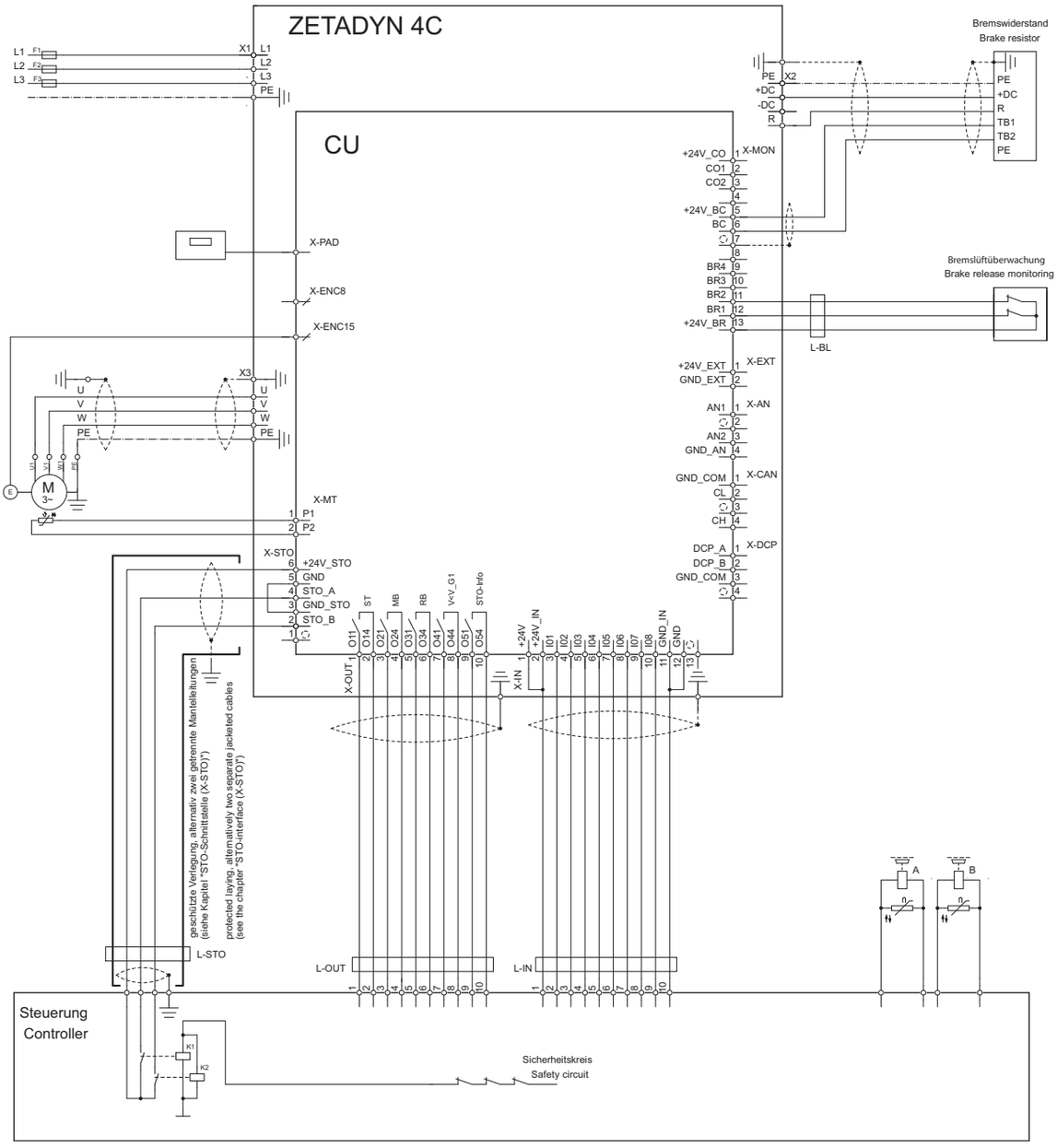
Simplified diagram for brake activation

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

5.22.4 Silent Brake Module

Information about the Silent Brake Module can be found in the operating manual for the Silent Brake Module.

5.23 Connection suggestion ZETADYN 4C



ZD4C01K2

6 Accessories

6.1 Operating terminal ZETAPAD

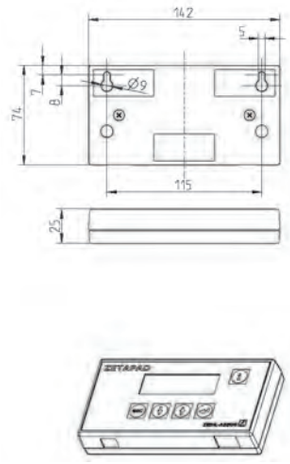
The ZETAPAD is an operating module independent of the ZETADYN 4. It can be used to operate and configure all ZETADYN 3 and ZETADYN 4 frequency inverters.
Remote control of the frequency inverter is feasible when a longer connection line is used.

6.1.1 Mounting / Fastening

To fasten it to the ZETADYN 4, the ZETAPAD is inserted into the recess on the lid and pressed in.

The ZETAPAD 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 ZETAPAD.

6.1.2 Dimensions



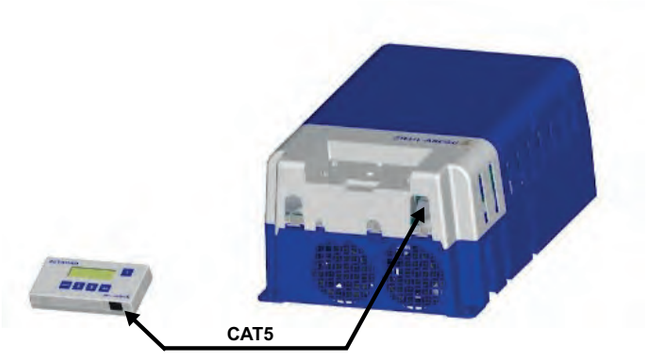
ZETAPAD dimensions

6.1.3 Connection

The connection has to be effected on the RJ45-female plug of the operating terminal and the ZETADYN 4 (X-PAD).

Connection cable

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



Connection ZETAPAD

7 Operation and parameterising

7.1 Possibilities for operation and configuration

The following operations can be performed with the aid of the various operating facilities on the ZETADYN 4:

- 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 Operating terminal ZETAPAD

TheZETAPAD is an operating module independent of the ZETADYN 4. It can be used to operate and configure frequency inverters of the ZETADYN 4 type and evacuation modules of the EVAC 4 type.

7.1.2 Remote control via ZETAMON software

When the ZETAMON software is used the ZETADYN 4 can be operated by a PC / Notebook (see chapter "ZETAMON Software").

7.1.3 Remote control via the elevator controller display

The prerequisite for this is an elevator control system which supports the DCP protocol or CANopen lift protocol as well as an existing connection between the ZETADYN 4 and the 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 for the ZETAPAD and ZETAMON operating facilities is uniform! Please inform yourself about navigation with an elevator control by using the corresponding operating instructions!

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

Operating interface ZETAPAD and ZETAMON

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-ABEGG AG
ZETADYN 4CS011-D
 SN: 09229587/0002
Phone: +49 794016308
```

- Actuate with any key

Menu section

```
 ZETADYN 4
->Startup
 Statistic
 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 ZETADYN 4C is divided into two operating levels:

Basic-Level

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

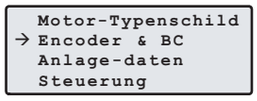
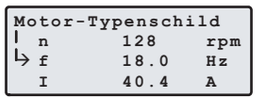
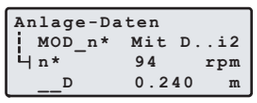
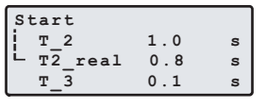
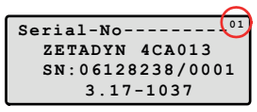
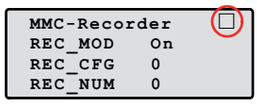
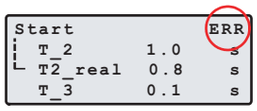
Advanced-Level

- 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 level which is active after the controller start can be set by the parameter **LCD & Password/USR_LEV**.

7.2.4 Meaning of the arrows appearing in the display:

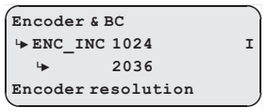
	→	Selecting a menus in the menu level
	↳	Selecting changeable parameters in the menu
	↳	Selected parameter can be modified, but is blocked at the moment. The block can be implemented by assigning a password or functionally (dependent on another parameter)
	└	Value / function of a parameters is only displayed for informational purposes and cannot be modified.
	**i** **Zahl**	Current position (page number) in the INFO-menue
	□	The recorder for recording measurements on the memory card is activ
	**ERR**	Fault of the ZETADYN 4 The ZETADYN 4 must be switched off

7.3 Entering numerical values

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

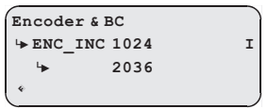
7.3.1 Continuous change of a parameter value

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 selecting the parameter, use ⬆ to the select the desired digit and change from 0…9 with the ⬆ & ⬇ key
The selected digit is marked with an arrow.



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 ESC 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 Switching on the ZETADYN 4

When the mains voltage is applied, the ZETADYN 4 switches on after a self test. The display shows thefoll owing:

```
Ziehl-Abegg AG
ZETADYN 4C
SN:12345678/123
Phone +49 794016308
```

8.2 Parameterising the ZETADYN 4

If the ZETADYN 4 doesn't have preset parameters, you have to adjust the following parameters before start-up.

```
 ZETADYN 4
->Startup
 Statistic
 Memory Card
```

Select menu **"Startup"**

↓

```
Start-up
↳LCD     Deutsch
  ↳      English
Sprache - Language
```

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

↓

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

Select parameter **"USR_LEV"**
The level which is active after the controller start can be set by the parameter USR_LEV.

↓

```
Start-up
↳MOT_TYP SM 200
  ↳      SM 200
Motor
```

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

↓

```
Start-up
↳n       72          rpm
  ↳      72
Rated speed
```

Select parameter **"n"**
Enter nominal speed of the motor

Information

A With asynchronous motors it is possible to determine the motor data automatically by means of the Autotune function of the ZETADYN 4C and to save them in the parameter memory. See the "Special functions/Autotune Function" for further information about the Autotune function.

↓

```
Start-up
↳f       18.0        rpm
  ↳      18.0
Rated frequency
```

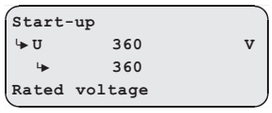
Select parameter **"f"**
Enter nominal frequency of the motor

↓

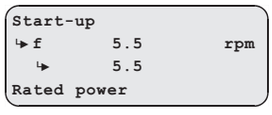
```
Start-up
↳f       13.7        rpm
  ↳      13.7
Rated current
```

Select parameter **"I"**
Enter nominal current of the motor

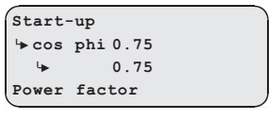
↓



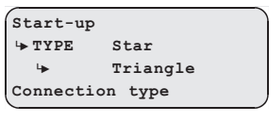
Select parameter **"U"**
Enter nominal voltage of the motor



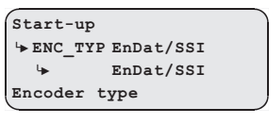
Select parameter **"P"**
Enter nominal power of the motor



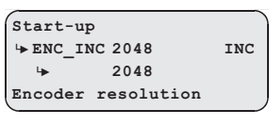
Select parameter **"cos phi"**
Enter power factor of the motor
A **Possible only for asynchronous motors**



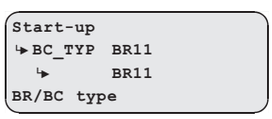
Select parameter **"TYP"**
Choose connection type of the motor



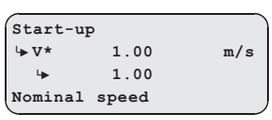
Select parameter **"ENC_TYP"**
Enter the type of encoder used



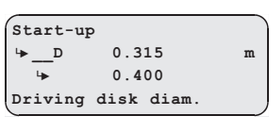
Select parameter **"ENC_INC"**
Enter the encoder resolution



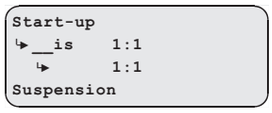
Select parameter **"BC_TYP"**
Enter the used brake resistor or brake chopper



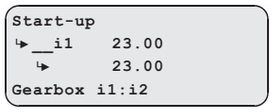
Select parameter **"V*"**
Enter the installation rated speed



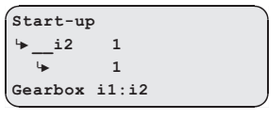
Select parameter **"__D"**
Enter the diameter of the traction sheave



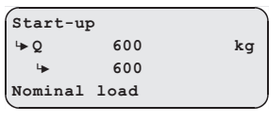
Select parameter **"__is"**
Enter the installation's type of suspension



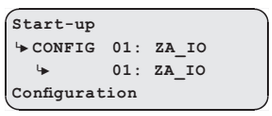
Select parameter **"__i1"**
Input of i1 of the gearbox ratio i1:i2
A **Possible only for asynchronous motors**



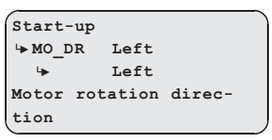
Select parameter **"__i2"**
Input of i2 of the gearbox ratio i1:i2
A **Possible only for asynchronous motors**



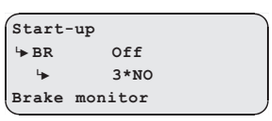
Select parameter **"Q"**
Enter the elevator installation's rated load



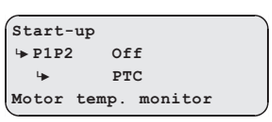
Select parameter **"CONFIG"**
Configuration of the digital inputs according to the used control system and type of communication



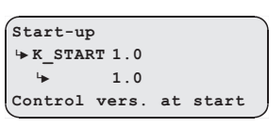
Select parameter **"MO_DR"**
Changing the rotating direction of the motor
It must be observed the with triggering the input RV1 the cabin drives upwards



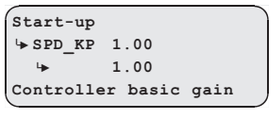
Select parameter **"BR"**
Definition of the brake monitoring



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



Select parameter **"K_START"**
Start gain
Multiplicative factor for the parameter "Controller/SPD_KP"
Increasing the PI controller during the 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*"**.
After changing the parameter **V***, you can confirm the request " automatic pre-signment?" 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 (STO)" function

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

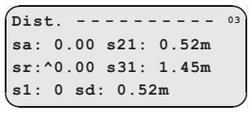
Test step	Result
Check the state of the two inputs STO_A and STO_B at standstill of the drive (no travel signals).	In the Info menu /Start/Stop the STO_A and STO_B inputs must be marked inactive by a small dot. A large dot must be visible next to the DIAG display.
Trigger application of a travel command, 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 ZETADYN 4 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 ZETADYN 4 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 ZETADYN 4 triggers the "STO: Travel signal missing" error (error 534) after the time specified by the T_SDLY parameter. Then remove the bridge at the relay contacts again.

The 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

Warning!
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.

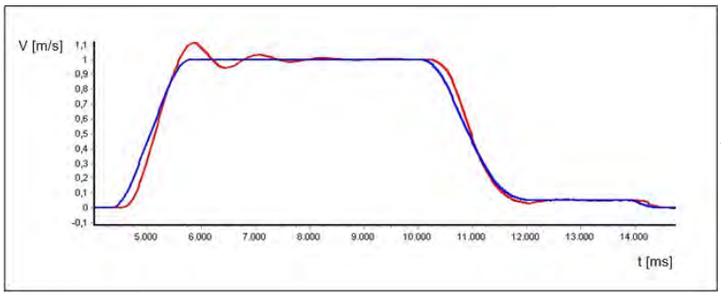
If fault messages appear, an error list is available in the “Diagnose” chapter together with the corresponding error causes

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.

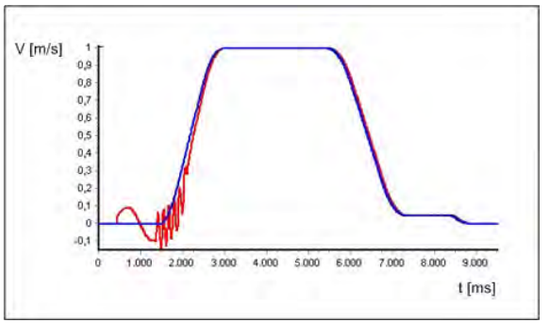
```
Control
↳ SPD_KP  1.00
  ↳       0.95
Speed controller basic
gain
```

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.



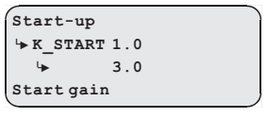
Control deviations when the amplification is set too high
blue Set-value - travel speed
red Actual-value - travel speed

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
Turning awaywhen 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 **ControllerI/SPD_KP**) this can be optimised by increasing the parameter **Start/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 ZETADYN 4C 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 ZETADYN 4 cannot supply any energy to the motor which can cause a torque.
The STO function allows the contactors that are usually installed between the ZETADYN 4 and motor in lifts to be omitted. The requirements in accordance with EN81-1 section 12.7.3 or EN81-2 section 12.4.1 are therefore 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 ZETADYN 4C series have two safety-related inputs (two-channel structure). The drive can only generate a torque when a 24V 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.

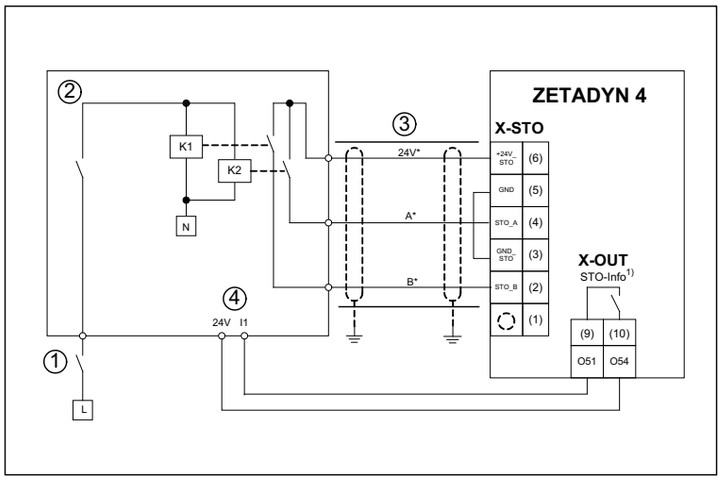
Information
In the version according to the principle circuit diagram, monitoring of the two relays K1/K2 by the lift control is not necessary in order to meet the requirements of EN81-1. The requirements are met by the internal diagnostic unit.

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 ZETADYN 4 by activation of the STO function. Therefore, you must disconnect the ZETADYN 4 from the supply voltage in order to perform work on the wiring or the motor. You must wait at least Allow 3 minutes for discharging the intermediate circuit capacitors. The safe isolation from the supply must be checked using a two-pole voltage tester.

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



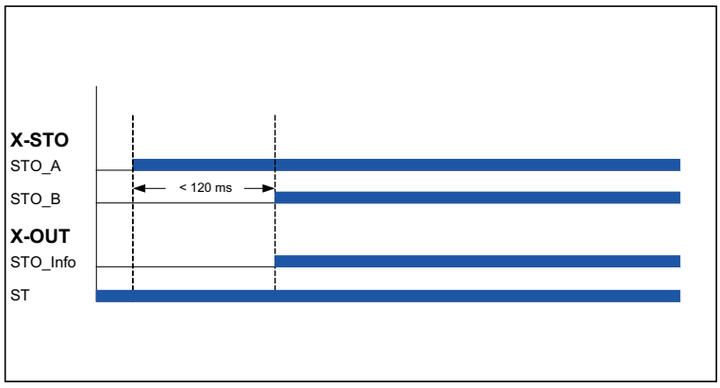
Principle circuit diagram "Safe Torque Off (STO)" function
1 Safety circuit
2 Modulation
3 Protected routing or design with two separate jacketed cables (see chapter "STO interface (X-STO)")
4 Digital inputs control
** Wire designation of the pre-assembled connecting lead L-SL-xx-HX-ZA4-STO*
1) Information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

9.4 Electrical connection

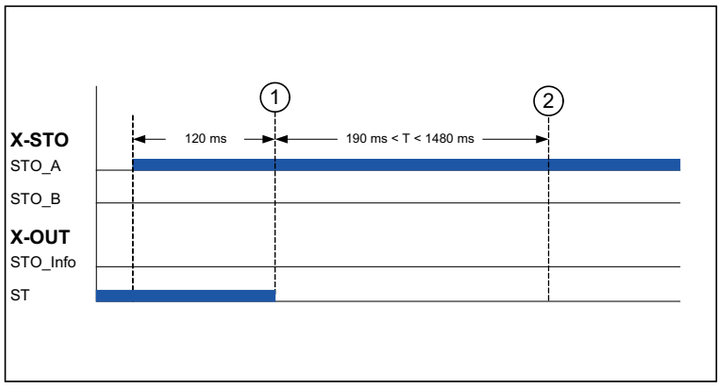
The connection is made via the interface X-STO on the ZETADYN 4 (see chapter "Electrical installation/STO function (X-STO)").

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. In the event of a greater offset the ZETADYN 4 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.
- STO activation (switch-off of STO_A and STO_B) at least once an hour for at least 1600 ms.

The correct activation of the STO inputs is monitored additionally (not safety-related) by the ZETADYN 4 for every travel:
- If the safe torque off is not cancelled (signals STO_A, STO_B remain LOW) at the beginning of travel after expiry of the time specified by the T_SDLY parameter (Monitors menu), the error "STO: Remains" (error 530) is triggered.
- If no safe torque off takes place (signals STO_A, STO_B remain HIGH) at the end of travel after expiry of the time specified by the T_SDLY parameter (Monitors menu), the error "STO: Missing" (error 532) is triggered.
- If the safe torque off is cancelled at standstill (no travel signals applied) (signals STO_A, STO_B become HIGH) and no travel signal is applied after the time specified by the T_SDLY parameter (Monitors menu), the error "STO: Travel signal missing" (error 534) is triggered.

- If the STO input signals are switched off during travel, the error “STO: Interruption” (error 531) is triggered after 200 ms.

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

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 ZETATOP (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

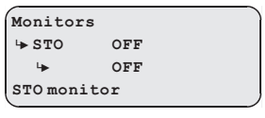
The cabin movement must be taken into consideration in a risk analysis of the complete system.

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 EN81 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 monitoring of the STO function must also be deactivated in the **"Monitors/STO"** menu.



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
Safety class	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[1)] or DIN EN 81-2, section 12.4.1
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 offset between the STO A / STO B signals	max. 120 ms (on exceeding this, ZETADYN 4 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 serial activation of the ZETADYN 4 through an RS485 interface. Through the bi-directional, serial triggering, the control signals are conducted through a 2- or 3-core connection line. Generally, the lines X-IN andX-OUT are no longer required, which means the wiring expenditure is reduced to a minimum.

10.1.1 Electrical connection

The connection is made via the interface X-DCP on the ZETADYN 4 (see chapter "Electrical Installation / DCP Interface (X-DCP)".

10.1.2 The various DCP protocols

DCP_01

The operating principle is similar to a conventional triggering via the (X-IN) control inputs and (X-OUT) control outputs. The elevator control transmits the required activation signals (e.g. controller enable, direction of travel, speed, deceleration point) to the ZETADYN 4 as command bits and receives the status messages as status bits as return information from the ZETADYN 4 (e.g. signals for mechanical brakes and motor contactor, 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
- an automatic compatibility check between the software in the ZETADYN 4 and software in the control

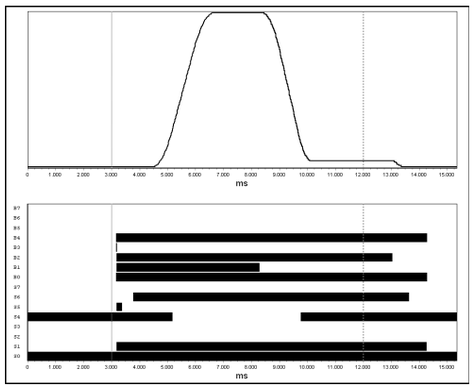
DCP_02

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 ZETADYN 4 start command to specify the path to the next level. This path is continuously updated during travel (remaining distance). The ZETADYN 4 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.

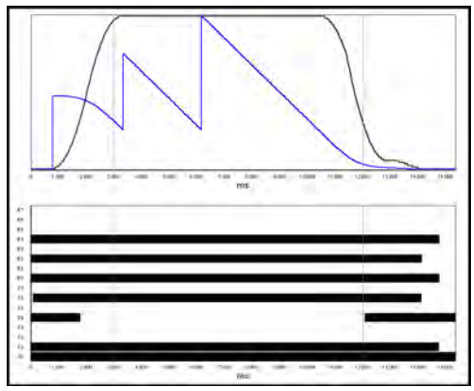
DCP_04

The DCP_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
- an automatic compatibility check between the software in the ZETADYN 4 and software in the control
- 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	Travel speed V_3		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**.

```
DCP Bits--------- 15
B01..4... G....4...
S.1....6. 100
```

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.

```
Control
↳CONFIG  04:BP_DCP1
  ↳      05:BP_DCP2
Configuration
```

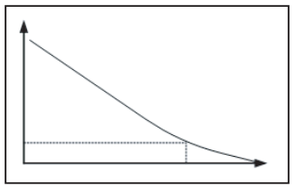
Manufacturer	DCP-protocol	Mnemonic ZETADYN 4
BÖHNKE + PARTNER	DCP1	04:BP_DCP1
BÖHNKE + PARTNER	DCP2	05:BP_DCP2
BÖHNKE + PARTNER	DCP3	06:BP_DCP3
BÖHNKE + PARTNER	DCP4	07:BP_DCP4
Kollmorgen	DCP3	09:KN_DCP3
Kollmorgen	DCP4	10:KN_DCP4
NEW LIFT	DCP3	12:NL_DCP3
SCHNEIDER STEUERUNGSTECHNIK	DCP3	14:SS_DCP3
STRACK 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

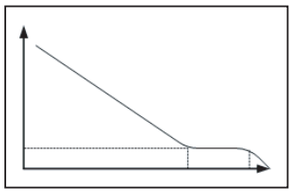
10.1.3.2 Setting the DCP-leveling behavior

The behavior during direct leveling (only in DCP_02 and DCP_04) can be set in the **DECELERATION/S_ABH** menu.

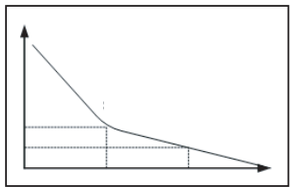
```
Delay
↳ S_ABH   DCP_comf
  ↳       DCP_slow
Distance dependency
```



S_ABH=DCP_fast
Time optimized leveling



S_ABH=DCP_comf
Leveling with short crawl path



S_ABH=DCP_slow
Leveling with early reduction of the leveling speed

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 ZETADYN 4

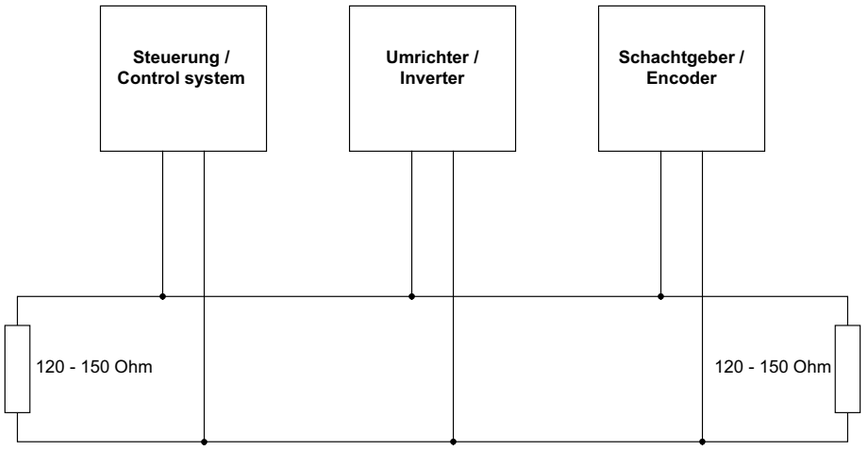
- Only devices with the CiA 417 profile are allowed.
- All devices work in 11 bit - mode.
- By implication, there can be one ZETADYN 4C connected to one bus-system.
- When more than one ZETADYN 4C per bus-system are needed, please call Ziehl-Abegg before installing.

10.2.1.3 Bus-cable

- A shielded bus-cable is not needed, but the data wires should be twisted.
- The installation takes place in line structure. The seperate devices are connected to the bus with short branch 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

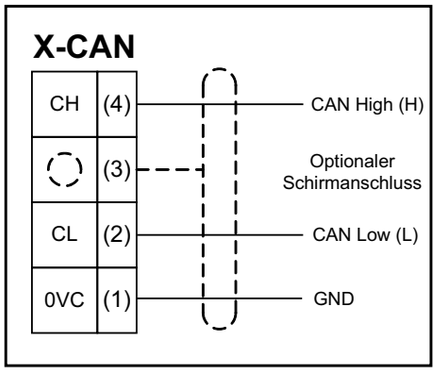
- The bus cable is connected at the "X-CAN" slot of the ZETADYN 4.
- Take care of the maximum bus length.
- Not correctly shielded motor- , brake chopper- or brake resistor cables can cause significant errors.
- In case of an error, check the shielding of the cables.



Exemplary assembly of a bus-system with CANopen

10.2.1.5 Electrical connection

The bus cable is connected by the interface X-CAN at the ZETADYN 4



Connection CAN

10.2.1.6 Activating the interface

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

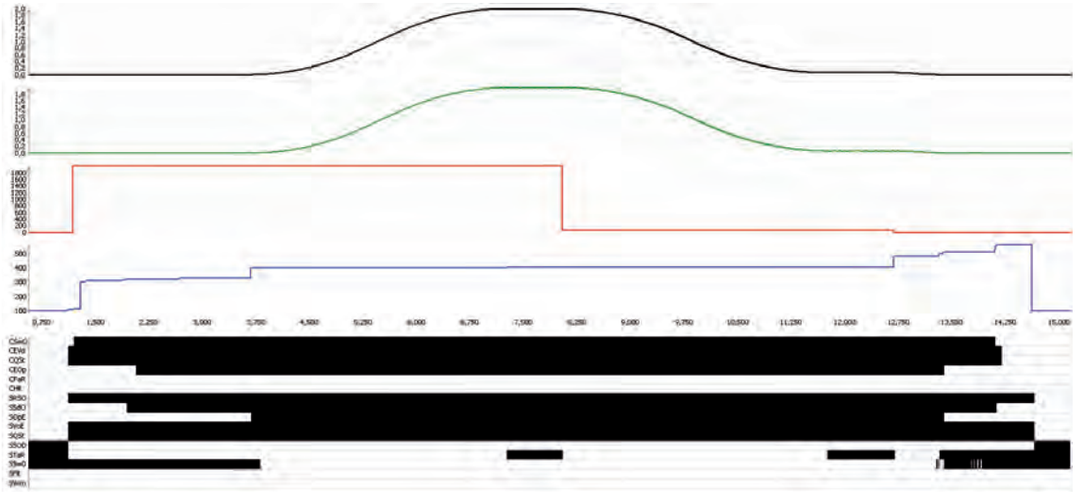
```
Control
↳CONFIG  01:BP_DCP1
  ↳      02:BP_DCP2
Configuration
```

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

10.2.1.7 Operation modes

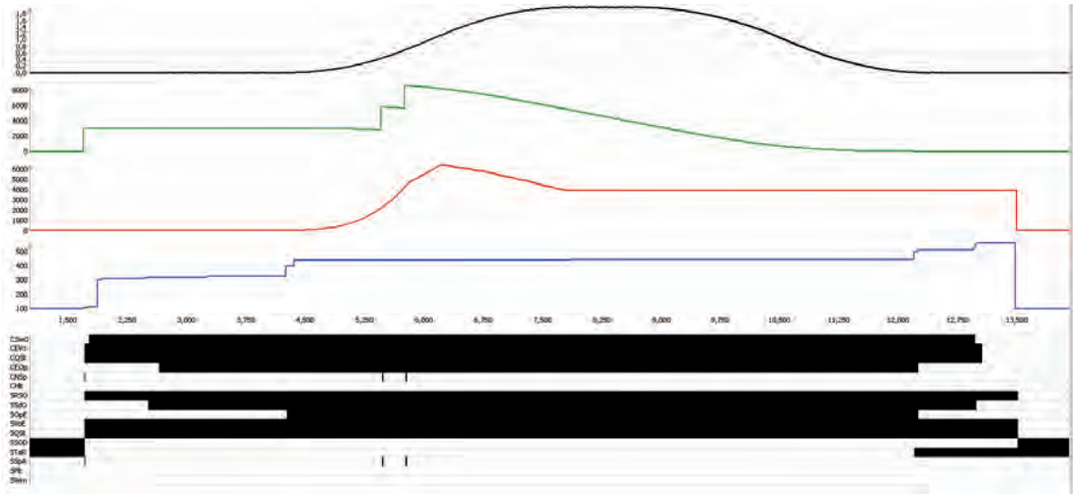
Information
For the ZETADYN 4C are two operation modes by using CAN:

- Velocity Mode (Velocity Mode [pv])



Velocity Mode

- Position Mode (Position Mode [pp]



Position Mode

The used mode can be set in the menu "CAN/MODE" of the ZETADYN 4C Generally the mode is sent from the control system to the ZETADYN 4C shortly before start-up. Therefor you have to set the operation mode in the control system.
When the ZETADYN 4C is operated in position mode, the shaft-encoder has to be connected to the same bus as the ZETADYN 4C.

The control system transmits the travel speed to the ZETADYN 4 before every drive. If the transmitted speed couldn't be reached, the ZETADYN 4 initiates a pointed arch drive. Therefor the maximum speed has to 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 ZETADYN 4 as reaction to a previous command from the control

Status- / Commandbit	Description	Comment
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

Status- / Commandbit	Description	Comment
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 seperate parameters for CAN operation can be modified in the menu **CAN**.

Parameter	Description	Value range	Factory setting
LIFT_NR	Enter the lift number	1 ... 2	1
NODE_ID	Node number, normally: Control system: 1 ZETADYN 4: 2 Rotary encoder: 4	1 ... 128	2
BD_RATE	Transmission rate (baud rate)	10 kBd ... 250 kBd	250 kBd
MODE	Operating mode of the ZETADYN 4C	Position / Velocity	Position
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 in the ZETADYN 4C adjusted nominal travel speed V* has to be equal or higher than the speed which is sent to the ZETADYN 4C by the control system. Otherwise no drive takes place.

10.2.2.2 Network Management Status

Status:	BootUp:	ZETADYN 4C is switching to the bus
	Stop:	ZETADYN 4C was stopped (normally by the control system)
	Preop.:	ZETADYN 4C can be parametrised, but before the it has to be set to "operational".
	Opera.:	ZETADYN 4C is ready, a drive 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 Parameter list

Information
Not all of the described paramters are freely accessible and visible. The indication of the parameters depends on the choosen functions and the adjustments of the ZETADYN 4.

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

11.1 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.

11.1.1 Startup menu

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

Parameter	Description	Value range	Factory setting
LCD	Select the desired operating language. The operating languages German and English are integrated into the device as standard. A third operating language can be loaded with the memory card. The following folders must be saved on the memory card for this: 4CX\Update\Language	Deutsch English Türkce Nederland Espanol Italiano Svenska Czech France Polski Po Russki	Deutsch
USR_LEV	User Level Choice about the user level which is active on the ZETAPAD after starting the ZETADYN4C.	Basic Advanced	Basic
MOT_TYP	Enter the operated motor type A **ASM:**Asynchronous motor S **SMxxx:** Synchronous motor External product **SM160:** Ziehl-Abegg synchronous motor type SM160 **SM200:** Ziehl-Abegg synchronous motor type SM200 **SM225:** Ziehl-Abegg synchronous motor type SM225 **SM250:** Ziehl-Abegg synchronous motor type SM250 **SM700:** Ziehl-Abegg synchronous motor type SM700 **SM860:** Ziehl-Abegg synchronous motor type SM860	ASM SMxxx SM160 SM200 SM225 SM250 SM700 SM860	
n	Enter the motor's rated speed	10 ... 6000 rpm	Depends on configured motor type
f	Enter the motor's rated frequency	3.0 ... 200 Hz	
I	Enter the motor's rated current	5.0 ... 200 A	
U	Enter the motor's rated voltage Enter the motor's rated current	200 ... 460 V	
p	Enter the motor's rated power	1.0 ... 90 kW	
cos phi	A Enter the motor's power factor (only for asynchronous motors)	0.10 ... 1.0	0.88
TYP	Enter the motor's type of connection	Star Delta	Star

Parameter	Description	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 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-mode	EnDat/SSI HTL 10-30V TTL square TTL Sine Hiperface Codeface ERN1387 No ENC.	Depends on configured motor type
ENC_INC	Enter encoder resolution (pulses/revolution)	64 ... 4096	
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 **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 power feedback unit	BR11 BR50 BR50+BR25 BR50+BR50 BRxx PFU PFU+BR11 PFU+BR17 PFU+BR25 PFU+BR50 BR09-1 BR14 BR100 PFU+BRxx 2* BR100 BR17 BR25 BC25 BC50 BC100 ZArec	BR17
V*	Enter the installation rated speed	0.00 ... 4.00 m/s	1.00
__D	Enter the diameter of the traction sheave	0.06 ... 1.20 m	0.50
__iS	Enter the installation's type of suspension	1:1 2:1 3:1 4:1 5:1 6:1 7:1 8:1	1:1
__i1	Input of **i1** of the gearbox ratio **i1:i1**	1 ... 650	38.00
__i2	Input of **i2** of the gearbox ratio **i1:i2**	1 ... 1000	1
Q	Enter the elevator installation's rated load	100 to 32000	600

Parameter	Description	Value range	Factory setting
CONFIG	Configuration of the digital inputs according to the used control system and type of communication **00:Free:** Outputs are freely configurable **01:ZA_IO:** Ziehl-Abegg standard control **02:ZA_CAN:** Ziehl-Abegg CAN **03:BP_IO:** Böhnke+Partner standard control **04:BP_DCP1:** Böhnke & Partner DCP1 **05:BP_DCP2:** Böhnke & Partner DCP2 **06:BP_DCP3:** Böhnke & Partner DCP3 **07:BP_DCP4:** Böhnke & Partner DCP4 **08:KN_IO:** Kollmorgen standard control **09:KN_DCP3:**Kollmorgen DCP3 **10:KN_DCP4:** Kollmorgen DCP4 **11:NL_IO:** New Lift standard control **12:NL_DCP3:** New Lift DCP3 **13:SS_IO:** Schneider Steuerungen standard control **14:SS_DCP3:** Schneider Steuerungen DCP3 **15:ZA_BIN:** Ziehl-Abegg standard control with binary speed presetting **16:WL_IO:** Weber Lifttechnik standard control **17:WL_DCP1**: Weber Lifttechnik DCP1 **18:WL_DCP2** Weber Lifttechnik DCP2 **19:WL_DCP3** Weber Lifttechnik DCP3 **20:WL_DCP4** Weber Lifttechnik DCP4 **21:ST_IO** Strack Lift Automation standard control **22:ST_DCP3** Strack Lift Automation DCP3 **23:ST_DCP4** Strack Lift Automation DCP4 **24:CSILVA:** Carlos Silva standard control **25:S+S:** Schmitt+Sohn standard control **26:KW_DCP3:** KW Aufzugstechnik DCP3 **27: MAS_BIN:** Masora standard control **28: BU_SATU:** 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	00:Free 01:ZA_IO 02:ZA_CAN 03:BP_IO 04:BP_DCP1 05:BP_DCP2 06:BP_DCP3 07:BP_DCP4 08:KN_IO 09:KN_DCP3 10:KN_DCP4 11:NL_IO 12:NL_DCP3 13:SS_IO 14:SS_DCP3 15:ZA_BIN 16:WL_IO 17:WL_DCP1 18:WL_DCP2 19:WL_DCP3 20:WL_DCP4 21:ST_IO 22:ST_DCP3 23:ST_DCP4 24:CSILVA 25:S+S 26:KW_DCP3 27:MAS_BIN 28:Bucher_SATU 29:Bucher_ORIO 30:KS_IO 31:KL_IO 32:S_SMART	01:ZA_IO
MO_DR	Changing the rotating direction of the motor It must be observed the with triggering the input RV1 the cabin drives upwards **left:** Rotary direction left **right:** Rotary direction right	left right	left
BR	Motor brake monitoring Input of number and function of the brake monitoring contacts used **OFF:**no brake monitoring connected **1*NC:** 1x normally closed contact (Contact closed when brake currentless) **2*NC:** 2 x normally closed contact (Contact closed when brake currentless) **3*NC:** 3 x normally closed contact (Contact closed when brake currentless) **1*NO:** 1 x normally open (contact is open when brake currentless) **2*NO:** 2 x normally open contact (contact is open when brake currentless) **3*NO:** 3 x normally open (contact is open when brake currentless)	Off 1*NC 2*NC 3*NC 1*NO 2*NO 3*NO	accordingly to motor type

Parameter	Description	Value range	Factory setting
P1P2	Motor temperature monitoring **Off:** Temperature monitor deactivated **PTC:** thermistor (PTC according to DIN 44082) **TC:** Thermal circuit breaker **KTY:** Temperature sensor KTY84-130	Off PTC TC KTY	PTC
K_START	Start gain Multiplicative factor for the parameter "Controller/SPD_KP" Increasing the PI controller during the start-up	is automatically limited	1.0
SPD_KP	Multiplication factor to modify the calculated basic amplification SPD_C	is automatically limited	1.0

11.2 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.

11.2.1 LCD & Password menu

Selection the desired operating language. Protects the ZETADYN 4 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	Description	Value range	Factory setting
LCD	Select the desired operating language. The operating languages German and English are integrated into the device as standard. A third operating language can be loaded with the memory card. The following folders must be saved on the memory card for this: 4CX\Update\Language	Deutsch English Türkce Nederland Espanol Italiano Svenska Czech France Polski Po Russki	Deutsch
USR_LEV	User Level Choice about the user level which is active on the ZETAPAD after starting the ZETADYN 4C.	Basic Advanced	Basic
PASSWD	Enter password.	0 ... 9999 0 = no password	0
PW_NEW	New password A number between 0 and 9999 can be used as a password	0 ... 9999	0
PWCOD	Displays the password in coded form. If you lose the password, please contact the manufacturer.	Cannot be set	21689
PW_CLR	Deleting the password The password has to be entered correctly before **ON:** Delete password **Off:** no function	On Off	Off

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

11.4 Encoder & BC menu

Enter:

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

Parameter	Description	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 A **TTL Sine:** 5V encoder with sinusoidal signal **TTL Square:** 5V encoder with square-wave signal **HTL 10-30V:** 10-30V encoder with square-wave signal **No ENC.:** Open-loop-mode	EnDat/SSI HTL 10-30V TTL square TTL Sine Hiperface Codeface ERN1387 No ENC.	EnDat/SSI
ENC_INC	Enter encoder resolution (pulses/revolution)	64 ... 4096	2048

BC_TYP	Enter the used brake resistor or brake chopper **BR11:** Brake resistor type BR11-A **BR50:**Brake resistor type BR50 **BR50+BR25:** parallel connection of BR25 and BR50 **BR50+BR50:** parallel connection of 2 pieces BR50 **BRxx:** Brake resistor external product **PFU:** Power Feedback Unit **PFU+BR11:** Power Feedback Unit + Brake 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 **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 power feedback unit	BR11 BR50 BR50+BR25 BR50+BR50 BRxx PFU PFU+BR11 PFU+BR17 PFU+BR25 PFU+BR50 BR09-1 BR14 BR100 PFU+BRxx 2* BR100 BR17 BR25 BC25 BC50 BC100 ZArec	BR17
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

11.5 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	Description	Value range	Factory setting
V*	Enter the installation rated speed	0.00 ... 4.0 m/s	1.00
MOD_n*	Input type of the motor speed at installation rated speed **direct:** manually input of V* and n* **Calculate:** Calculates the speed of the motor dependent on: V*; __D; __iS;__; __i1 and __i2	direct Calculate	Calculate
n*	Motor speed at V* **MOD_n = direct:** direct input of the motor speed at V* **MOD_n = calculate:** Calculates the speed of the motor dependent on: V*; __D; __iS;__; __i1 and __i2	10 ... 6000 rpm	0
__D	Enter the diameter of the traction sheave	0.06 ... 1.20 m	0.500
__iS	Enter the installation's type of suspension	1:1 2:1 3:1 4:1 5:1 6:1 7:1 8:1	1:1
__i1	Input of i1 of the gearbox ratio i1:i2	1 ... 650	38.00
__i2	Input of i2 of the gearbox ratio i1:i2	1 ... 1000	1
Q	Enter the elevator installation's rated load	100 ... 20000 kg	600
F	Enter the car weight	100 ... 20000 kg	1000
G	Enter the counterweight	0 ... 20000 kg	1300

11.6 Control system menu

Configuring of:

- elevator control system
- Digital inputs
- Digital outputs

Parameter	Description	Value range	Factory setting
CONFIG	Configuration of the digital inputs according to the used control system and type of communication **00:Free:** Outputs are freely configurable **01:ZA_IO:** Ziehl-Abegg standard control **02:ZA_CAN:** Ziehl-Abegg CAN **03:BP_IO:** Böhnke+Partner standard control **04:BP_DCP1:** Böhnke & Partner DCP1 **05:BP_DCP2:** Böhnke & Partner DCP2 **06:BP_DCP3:** Böhnke & Partner DCP3 **07:BP_DCP4:** Böhnke & Partner DCP4 **08:KN_IO:** Kollmorgen standard control **09:KN_DCP3:**Kollmorgen DCP3 **10:KN_DCP4:** Kollmorgen DCP4 **11:NL_IO:** New Lift standard control **12:NL_DCP3:** New Lift DCP3 **13:SS_IO:** Schneider Steuerungen standard control **14:SS_DCP3:** Schneider Steuerungen DCP3 **15:ZA_BIN:** Ziehl-Abegg standard control with binary speed presetting **16:WL_IO:** Weber Lifttechnik standard control **17:WL_DCP1**: Weber Lifttechnik DCP1 **18:WL_DCP2** Weber Lifttechnik DCP2 **19:WL_DCP3** Weber Lifttechnik DCP3 **20:WL_DCP4** Weber Lifttechnik DCP4 **21:ST_IO** Strack Lift Automation standard control **22:ST_DCP3** Strack Lift Automation DCP3 **23:ST_DCP4** Strack Lift Automation DCP4 **24:CSILVA:** Carlos Silva standard control **25:S+S:** Schmitt+Sohn standard control **26:KW_DCP3:** KW Aufzugstechnik DCP3 **27: MAS_BIN:** Masora standard control **28: BU_SATU:** 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	00:Free 01:ZA_IO 02:ZA_CAN 03:BP_IO 04:BP_DCP1 05:BP_DCP2 06:BP_DCP3 07:BP_DCP4 08:KN_IO 09:KN_DCP3 10:KN_DCP4 11:NL_IO 12:NL_DCP3 13:SS_IO 14:SS_DCP3 15:ZA_BIN 16:WL_IO 17:WL_DCP1 18:WL_DCP2 19:WL_DCP3 20:WL_DCP4 21:ST_IO 22:ST_DCP3 23:ST_DCP4 24:CSILVA 25:S+S 26:KW_DCP3 27:MAS_BIN 28:Bucher_SATU 29:Bucher_ORIO 30:KS_IO 31:KL_IO 32:S_SMART	01:ZA_IO
MO_DR	Changing the rotating direction of the motor It must be observed the with triggering the input RV1 the cabin drives upwards **left:** Rotary direction left **right:** Rotary direction right	left right	left
CTRL	Select the communication between the frequency inverter and the control under "CONFIG=Free" **Standard:** Parallel connection **DCP1:** Communication by DCP01 protocol **DCP2:** Communication by DCP02 protocol **DCP3:** Communication by DCP03 protocol **DCP4:** Communication by DCP04 protocol	Standard DCP01 DCP02 DCP03 DCP04	Standard

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

Parameter	Description	Value range	Factory setting
f_O1	Configuration of the function of the digital outputs O1 … O5 under "CONFIG=free" (For description of the functions, see table)	Off MotContact RB-Invers V<V_G1 V<V_G2 V<1.1*V_3 Warning Fault EVAC.Dir MB_Brake INV V<V_G1 INV V<V_G2 V=0 PFU Info rope TD_CNT ext. Full load SD STO-Info /STO info ZR_EN	Fault
f_O2			MB_Brake
f_O3			MotContact
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
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
A_MAX	Delay in elevator emergency stop due to deactivation of the input with the function "/DELAY"		1.00 m/s^2
S_B_OFF	Additional braking offset If the control system doesn't extend early enough, it can be increased here	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	Enable for the ZETADYN 4. This input must be triggered during the entire travel.
02:RV1	Direction preset UP	Travel direction "UP"
03:RV2	Direction prest DOWN	Travel direction "DOWN"
04:V1	Positioning speed	Speed to position the car to the stop point
05:V2	Intermediate speed	If necessary, the intermadiate speed for normal travel
06:V3	Travel speed V_3	High travel speed for normal travel
07:VZ	Readjustment speed	Speed for readjustment. Has precedence above all other speeds!
08:V4	Additional speed 1	Additional speed for inspection and return operation
09:V5	Additional speed 2	Additional speed for inspection and return operation

Parameter	Function	Explanation
10:V6	Additional speed 3	Additional speed for inspection and return operation
11:V7	Additional speed 4	Additional speed for inspection and return operation
12:PARA2	Switchover to 2nd parameter set	2nd parameter set is activated
13:BIN0	Binary input 0	Speed default through binary coding Standard-configuration
14:BIN1	Binary input 1	Speed default through binary coding Standard-configuration
15:BIN2	Binary input 2	Speed default through binary coding Standard-configuration
16:DIR	Direction default	Default for direction of travel when using one input 1 signal: Direction of travel "UP" 0 signal: Direction of travel "DOWN"
17:v=0	Hold speed 0	When the motor brake is open, speed 0 is controlled
18:RF+RV1	Controller enable + travel direction UP	Controller enable and travel direction "UP" are triggered with one input
19:RF+RV2	Controller enable + travel direction DOWN	Controller enable and travel direction "DOWN" are triggered with one input
20:BR1	Brake monitoring 1	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:SBIN0	Binary input 0 Configuration Schmitt+Sohn	Speed default through binary coding Configuration Schmitt+Sohn
25:SBIN1	Binary input 1 Configuration Schmitt+Sohn	Speed default through binary coding Configuration Schmitt+Sohn
26:SBIN2	Binary input 2 Configuration Schmitt+Sohn	Speed default through binary coding Configuration Schmitt+Sohn
27:MBIN0	Binary input 0 Configuration Masora	Speed default through binary coding Configuration Masora
28:MBIN0	Binary input 1 Configuration Masora	Speed default through binary coding Configuration Masora
29:MBIN0	Binary input 2 Configuration Masora	Speed default through binary coding Configuration Masora
30:STANDBY2	Standby 2	Switching the ZETADYN 4 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	Power Feedback Unit + brake resistor	Function monitoring of the feedback unit when using a brake resistor in connection with a feedback unit
34:HY_UP	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 ZETADYN HY
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 ZETADYN HY
36:/DELAY	Delay in emergency stop	When deactivating the input the motor is braked with the delay set in the "Controller/A_MAX" menu
37:DTE	Ziehl-Abegg test function	Reserved for Ziehl-Abegg
38:RECORD	Recorder function	Start or stop measurement by external signal **Input activated:** Measurement is active **Input deactivated:** Measurement is stopped and saved
39:INV_A1	Direction UP at hydraulic elevator with Bucher aggregate type Orion ALPHA	Inverting the analog target value A1
40:FKT.ana	Ziehl-Abegg test function	Reserved for Ziehl-Abegg
41:Monitor	Monitoring function for manually evacuation	Shown evacuation direction and evacution speed

Parameter	Function	Explanation
42: LZ	Distance-dependent deceleration after standstill	With active input there is a deceleration after speed 0, even when travel speeds are activated. The deceleration from travel speed V1 depends on the distance programmed for the parameter S_10.
43:STANDBY 1	Standby 1	Switching the ZETADYN 4 to Standby 1 function to save energy
44: ZR_RDY	ZArec ready	ZArec monitoring function
45: /ESC	/ESC	Electronic short-circuit is deactivated

Parameter descriptions for digital outputs

Parameter	Function	Explanation
Off	Output has no function	Output is open all the time
MotContact	Controller ready Switching the motor contactors	Contact closes when the following signals are applied: Controller enable, traveling speed and direction default. When the contact closes, the motor contactors must be switched immediately.
RB_Invers	Inverted function of "RB contactor"	Contact opens when the following signals are applied: Controller enable, traveling speed and direction default.
V<V_G1	Speed monitoring	Contact opens when the tolerance set in the "Control system" menu V_G1 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 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 ZETADYN 4.
EVAC.DIR	Evacuation direction	Contact open: Car is lighter than counterweight Contact closed: car is heavier than counterweight
MB_Brake	Mechanical brake	Contact closes after expiration of the magnetic flux creation time. When the contact close, the mechanical brake must be immediately opened via an external contactor.
INV V<V_G1	inverted function of "V<V_G1	Contact closes when the limit value set in the "Control system" menu V_G1 is exceeded.
INV 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	Power regeneration unit	Switching the feedback unit to standby function to save energy
Info rope	Rope-change necessary	Contact closes when the actual rope still can be used, for approx 1 year. Contact stays close until the down-counter will be reset.
TD_CNT ext.	Monostable trigger circuit	The output relay gives an impulse to the output at every travel direction change. For connecting an external counter, e.g. in the control system
Full load	Full load	Contact closes when motor current is exceeded for 200 ms during constant travel
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

Parameter	Function	Explanation
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).
ZR_EN	ZArec: Controller ready	Contact closes when the following signals are present: controller enable, travelling speed and direction specification.

11.7 Monitoring menu

Configuring the monitoring functions

Parameter	Description	Value range	Factory setting
MOD_ST	Behaviour of the ZETADYN 4s in case of a fault **Block function:** In the event that successive serious errors are reported but an error-free run is performed, you have the option of blocking the frequency inverter. The output "ST fault" remains open. The fault counter is set to 0 when an error-free run is performed. **Fix 2 Sec:** no blocking function, the output configured on "ST" drops for 2 seconds during a malfunction and then increases again **Lock n.3:** Block function after 3 malfunctions. Output "ST" remains dropped after the 3rd error **Lock2.n.2:** Locking function after 2 faults. Output "ST" remains released after the second fault. **Lock n.1:** Block function after 1 malfunction. Output "ST" remains dropped after the 1st error. The following notification text appears during a block function: "ZETADYN block [OFF]".After pressing the "i" key, the device returns back to normal operation. The errors that led to the block are accordingly marked in the error list.	Fix 2 s Lock n.3 Lock n.2: Lock n.1	Fix 2 s
STO	STO function monitor **ON:** STO monitor activated **OFF:** STO monitor deactivated Monitoring of the STO function should only be deactivated when the STO function is not used and motor contactors are used instead.	ON OFF	ON
LOCKBR	Block at brake malfunction The ZETADYN 4 is locked in case of brake malfunctions if this parameter is switched on. At **CONFIG: 31:KL_IO** LOCKBR is activated automatically	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

Parameter	Description	Value range	Factory setting
BR	Motor brake monitoring Input of number and function of the brake monitoring contacts used **OFF:**no brake monitoring connected **1*NC:** 1x normally closed contact (Contact closed when brake currentless) **2*NC:** 2 x normally closed contact (Contact closed when brake currentless) **3*NC:** 3 x normally closed contact (Contact closed when brake currentless) **1*NO:** 1 x normally open (contact is open when brake currentless) **2*NO:** 2 x normally open contact (contact is open when brake currentless) **3*NO:** 3 x normally open (contact is open when brake currentless)	Off 1*NC 2*NC 3*NC 1*NO 2*NO 3*NO	accordingly to motor type
P1P2	Motor temperature monitoring **Off:** Temperature monitor deactivated **PTC:** thermistor (PTC according to DIN 44082) **TC:** Thermal circuit breaker **KTY:** Temperature sensor KTY84-130	Off PTC TC KTY	PTC
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_SDLY	Delay STO monitoring When the STO monitor is switched on ("Monitors/STO=ON") the STO function must be activated (stop) or deactivated (start) by the STO_A and STO_B inputs within the time T_SDLY.	0.5 ... 3.0 s	1.5 s
T_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

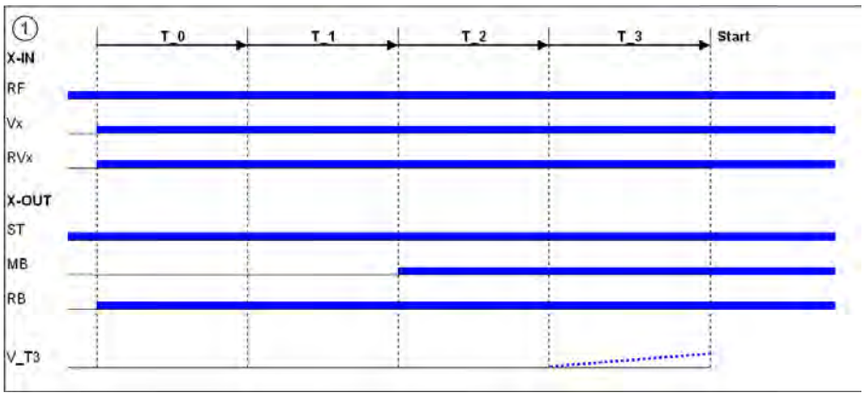
Parameter	Description	Value range	Factory setting
APC	Automatic arameter control Parameter values are checked for plausibility when entered. The values are corrected or additional parameters changes if necessary (see chapter "Error Diagnosis / Automatic Parameter Check")	On Off	On
MASK1	Error mask 1...5 Suppression of up to five error messages through configuring the corresponding error number in an error mask	Error no.	0
MASK2			0
MASK3			0
MASK4			0
MASK5			0

11.8 Start menu

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

Parameter	Description	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 Multiplicative factor for the parameter "Controller/SPD_KP" Increasing the PI controller during the start-up	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 supply the contactors with current	0.0 … 10.0 s	0.5
T_0 real	Measured time that the contactors require to open	Cannot be set	0.0
T_1	Flux build-up time Time to build-up the magnetic field in the motor (only with asynchronous motors)	0.0 … 10.0 s	0.2
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	0.6
T_2 real	Gemessene Zeit, welche die Bremse zum Öffnen benötigt	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

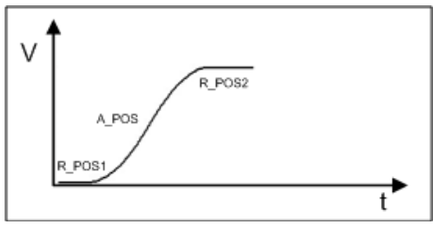
Start-up time sequence



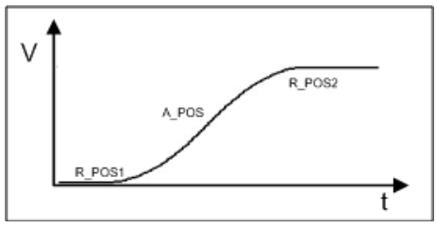
11.9 Acceleration menu

Definition of acceleration ramp.

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



Acceleration with high A_POS and low R_POS1 and R_POS2



Acceleration with low A_POS and high R_POS1 and R_POS2

11.10 Travel menu

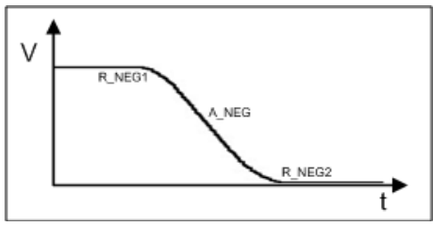
Traveling speed defaults

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

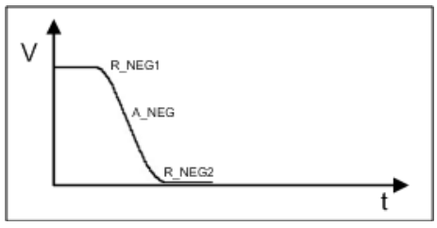
11.11 Decelerating menu

Defines the deceleration ramp and optimizes the positioning behavior.

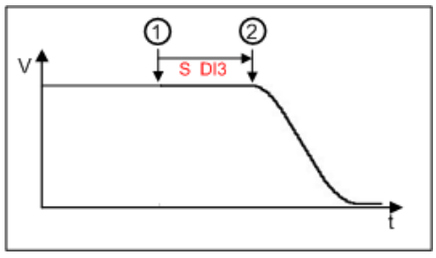
Parameter	Description	Value range	Factory setting
A_NEG	Negative acceleration	0.25 ... 2.00 m/s²	0.5
R_NEG1	upper round off during negative acceleration, a higher value causes a softer round off	20 ... 90 %	will be calculated
R_NEG2	lower round off during negative acceleration, a higher value causes a softer round off	20 ... 90 %	will be calculated
S_DI3	Dist. correction V3 Traveling speed V_3 is switched off, delayed by the configured value	0.00 ... 2.00 m	0
S_DI2	Dist. correction V2 Traveling speed V_2 is switched off, delayed by the configured value	0.00 ... 2.00 m	0
S_DI1	Dist. correction V1 Traveling speed V_1 is switched off, delayed by the configured value	0 ... 150 mm	0
S_ABH	Path dependent deceleration **ON:** path dependent deceleration, the deceleration paths are always identical **OFF:** time dependent deceleration, deceleration paths can be varied **DCP_fast, DCP_comf, DCP_slow:**Behavior during direct approach with DCP2 or DCP4 (see chapter "DCP mode") **V2toV3:** in distance-dependent travel with intermediate speed (V1 and V2 active) travelling speed V3 can be accelerated to	On Off DCP_fast DCP_comf DCP_slow V2toV3	On



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

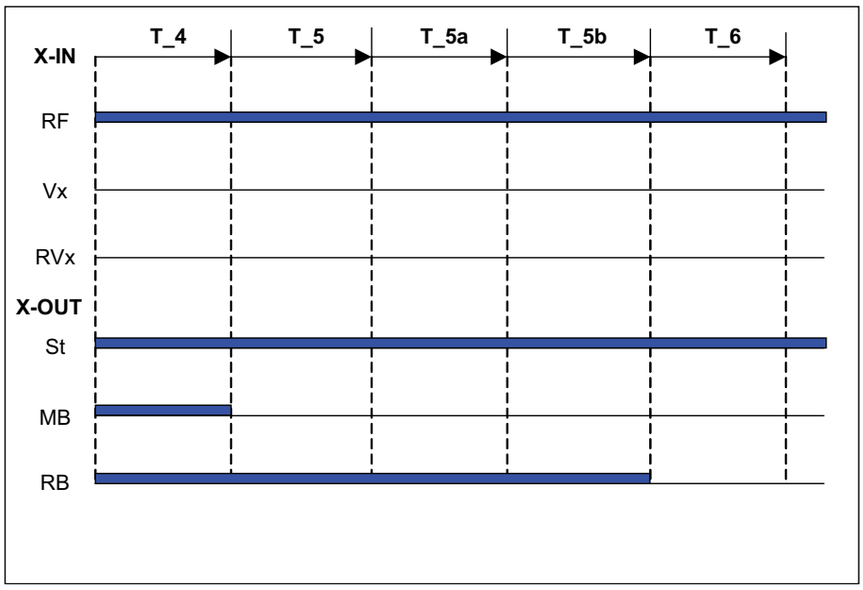
11.12 Stop menu

Chronological sequence after reaching speed 0 during stopping procedure.

Parameter	Description	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	0.6

Parameter	Description	Value range	Factory setting
T_5a	additional current feed at closed brakes	0.0 … 2.0 s	0.0
T_5b	S Wait until the motor is currentless Within time T_5b, the powering of the synchronous motor is decreased in a ramp function	0.0 … 2.0 s	0.3
T_6	Wait until contactors open Time within which the contactor signal must be closed	0.0 ... 10.0 s	0.5

Stopping time sequence



11.13 Controller menu

Influences the speed control by the factor of the basic amplification (SPD_KP) and readjustment time (SPD_TI).
Selection of the control mode of the ZETADYN 4

Parameter	Description	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".

11.14 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	Description	Value range	Factory setting
F_PAR2	Function allocation of parameter set 2 **Locked:** 2.nd parameter set is blocked **2.ndParameter set:** Activates the 2.nd parameter set **EVAC 3:** Emergency evacuation with evacuation module EVAC 3 **EVA. 3*AC:** Emergency evacuation through three-phase current emergency-generator **EVA. 1*AC:** Emergency evacuation through UPS **UPS:** Emergency evacuation through UPS (with decreased power)	Locked 2nd parameter set EVAC 3 EVA. 3*AC EVA. 1*AC UPS	Locked
U_ACCU	Accu nominal voltage Configuring the rated voltage of the rechargeable battery during evacuation with evacuation unit EVAC 3 ("f_PARA2=EVAC 3B", see "Emergency evacuation" chapter)	60 ... 565 V	120
P_UPS	Max. Load UPS Configuring the available power of the UPS during evacuation with UPS ("f_PARA2=UPS", see "Emergency evacuation" chapter)	0.0 ... 70.0 kW	1.0
RS_UPS	Stator resistor Enter the resistor of the stator of themotor with "f_PARA2=UPS"	0.0 ... 9.99 Ohm	1.00
STOP	Stop function to improve the positioning accuracy in the evacuation mode "f_PARA2=UPS" **ON:** - Brake is closed when the switch point for V_1 is closed. - Brake is closed when the residual path configured in S_STOP has been reached (only for DCP02/04 **Off:** Stop function deactivated	On Off	Off
Copy	Copy parameter set **OFF:** Function deactivated **PARA1->2:** copies the data from 1st parameter set into the 2nd parameter set	Off Para 1->2	Off

11.15 Statistic menu

All statistical data can be called up in the **Statistic** menu. The data remain saved even after the ZETADYN 4 has been switched off. Reading out the error list and deleting the error memory are described in the "Error diagnosis" chapter.

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

Parameter	Description	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

Parameter	Description	Value range	Factory setting	visible in the basic level
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_CRL	Delete error memory Deletes ST_LST, ST_RES and ST_SRF and ST_SCO	Cannot be set	-	
APD	Automatic parameter diagnosis, see "Error diagnosis" chapter **On:** Automatic parameter diagnostics are activated **Off:** Automatic parameter diagnostics are deactivated	On Off	Off	
RESET	Deletes parameters, counter levels and error lists, preassigning parameters with standard values. **RESET77:** **Pre-parameterised ZETADYN 4:** Parameters are assigned customer-specific system data **Standard ZETADYN 4:** Parameters will be set with standard data **RESET90:** Device reset, parameters remain preserved. ENC_-OFF stays. **RESET99:** Device reset, parameters deleted and assigned by the factory settings. S If a value is entered for the rotary encoder offset (ECOFF), it will also be deleted!	Reset 77 Reset 90 Reset 99	0	X
TD_PWN	Assign password for the travel direction counter. A number between 0 and 9999 can be used as a password	0 ... 9999	0	
TD_PWC	Displays the password in coded form. If you lose the password, please contact the manufacturer.	nicht einstellbar	21689	
TD_PW	Enter password.	0 ... 9999 0 = no password	0	
TD_CNT	Initial value of the down counter If the start value of the down counter is set to 0.00, the down counter is deactivated.	0.00 ... 10.00 M	0.00	
TD_RST	Restore the counter level from the rotary encoder	On Off	Off	

11.16 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	Description	Value range	Factory setting	visible in the basic level
SAV_ALL	Saves data to memory card with serial number allocation • Parameter list (.PRT) in directory /4BF/DEVICE/serieal number/LST • Error list (.FLT) in directory /4CX/DEVICE/serial number/LST • Parameter (.PA3) in directory /4CX/DEVICE/serial number/-PAR • Black-Box (.BOX) in directory /4CX/DEVICE/serial number/LST **Off:** no function **ON:** Data will be saved to the memory card. After copying, the parameter jumps back to "Off"	On Off	Off	X

Parameter	Description	Value range	Factory setting	visible in the basic level
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 over-written 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 /4CX/Update/Software version directory	27	0	
SAV_CFG	Saves data to memory card with configuration number allocation: • Parameter list (.PRT) in directory /4Cx/CONFIG/configuration • Parameter (.PA3) in directory /4CX/CONFIG/configuration number	0 ... 59999	0	
LOD_CFG	Load parameters from memory card to frequency inverter by specifying the configuration number **Enter configuration number:** Parameters (.PA3) are loaded to the frequency inverter from the /4CX/CONFIG directory. The parameter switches to "Off" again after loading	0 ... 59999	0	
Format	Reformatting the memory card: **Enter 27:**Folders and files on the memory card will be deleted	27	0	

11.17 MMC-Recorder menue

You have the option of performing measurements on the ZETADYN 4 using a memory card, but a notebook is required for this purpose. The measurement is configured in the **MMC recorder** menu.

Parameter	Description	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". **ZETAMON:** Mode for using ZETAMON software The settings for REC_MOD can only be changed with REC_CFG=0.	Off On Stop&Shot ZETAMON	ZETAMON
REC_CFG	Configuring the measurement channels **0:** all measurement channels and the recording time can be freely configured **1 … 9:** permanently set configurations that cannot be modified	0 1 2 3 4 5 6 7 8 9	1

Parameter	Description	Value range	Factory setting
REC_NUM	Directory number Assigned number under which the directory is saved on the memory card. If "0" is entered, the serial number of the frequency inverter is used as the directory name.		0
TRIG_BY	Trigger-source Specifications for stopping the recorder and saving the data to the memory card. **Error:** data will be saved as soon as an error occurs **Err/stop:** data will be saved as soon as an error occurs or an error-free travel is finished	Error Error/Stop	1.0
T_REC	Record-time Time for 1000 measurements For a recording time of 5 s, for example, measured values are recorded every 5 ms	5 s 10 s 15 s 20 s 40 s 80 s 160 s 0.5 h 1 h 24 h	5
T_DLY	Trigger Delay Delay time for stopping of the masurement, e.g. T_DLY=0.5s: the recording will be stopped 0.5s after an error occurs.	0.5 s	0.5 s
CHN1	Configuration of the measuring channels 1-4 with analog measurement values **1:** setted speed [m/s] **3:** acutal speed [m/s] **6:** Internal status (frequency inverter status) **16:** flux build-up current [A]r **26:** motor current [A] **27:** motor voltage [V] **28:** voltage DC-link [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 **143:** torque build-up current [A]	1 3 6 15 16 26 27 28 31 49 62 119	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-order and statusbits	89 90 91 92	89

11.18 Encoder adjustment menu

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

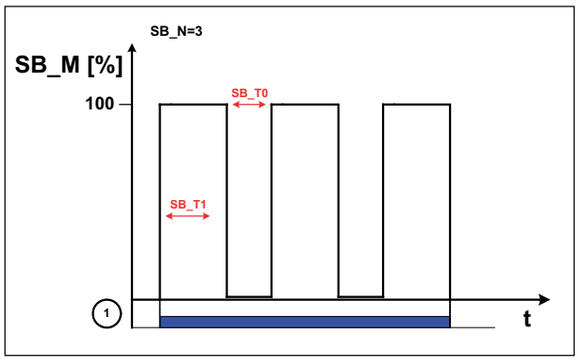
The procedure for entering the encoder alignment data is described in the "Special functions" chapter.

Parameter	Description	Value range	Factory setting
ENC_ADJ	Activating the encoder alignment **Off:** no function **ON:** Start or check the rotary encoder calibration	On Off	Off
ENC_POS	Encoder Position Numerical display of the absolute position of the rotary encoder per revolution: 0 to [4x number of pulses in rotary encoder] rpm	Cannot be set	-
ENC_OFF	Encoder Offset Shifts the zero position of the absolute rotary encoder to the pole's electrical zero position **EnDat encoder:** Default 0 is absolutely necessary **SSI encoder:** if the SSI encoder is not mechanically mounted in the zero position, the value ascertained during the offset alignment (ENC_ADJ) for ENC_OFF must be entered	0 ... 360.00°	0
SAV_P_E	Filing data in the absolute encoder with the "electronic name plate" function **ON:** Data from the ZETADYN 4 are filed in the absolute encoder **OFF:** Function deactivated	On Off	Off
LOD_P_E	Reading out data from the absolute encoder with the "electronic name plate" function **Input 27:** Data are read out of the absolute encoder into the ZETADYN 4	0...65535	0

11.19 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	Description	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"

11.20 HW-Ident. menu

Identification of the individual assemblies in the ZETADYN 4. The identification of the assembly is generally downloaded directly from its EEPROM.

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

11.21 Power section menu

Configuring the tolerances of the internal power stage.

Parameter	Description	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"	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

11.22 Menu checks

Selection of supporting tests during acceptance of the system:

- Testing of the protection device according to EN81-A3

Parameter	Description	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	

Parameter	Description	Value range	Factory setting
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 of the protection device according to EN81-A3 **No current:** Movement of the car by releasing the brakes without power to the final stage **max. accel.:** Cabin is accelerated to maximum under full power **Off:** Function deactivated	No current max. accel. Off	Off
SCY_SG	Capture device test **On:** electronic short-circuit is deactivated **Off:** Function deactivated	On Off	
SCY_DA	Driving ability test **On:** Travel with recovery with applied counterweight, display of cabin movement **Off:** Function deactivated Only for CAN actuation.	On Off	
SCY_MB	Motor brakes test **On:** Interruption of the safety circuit, display of braking distance **Off:** Function deactivated Only for CAN actuation.	On Off	

11.23 CAN menu

Parametrize the CAN-specific functions.

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

11.24 ZA-Intern menu

Parameterisation of internal measuring and monitoring functions

Parameter	Description	Value range	Factory setting
PW_S9	Password for the indication of additional parameter		0
UVW_CHK	Definition of motor phase checking on start-up **Single:** The motor phases are checked during initial travel once the frequency inverter has been switched on. If the check is successful, no further monitoring is performed. If the examination is incorrect, with each start an examination is made until a correct examination could be accomplished. **Cont:** Motor phases will be check with each travel **Off:** Checking of the motor phases is deactivated	Single Cont Off	Single

Parameter	Description	Value range	Factory setting
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 analog input in ZETADYN HY **Example:** n_ANA = 3000 analogue input = 0-10 V 10 V = 3000 1/min	1 ... 3300	3000

11.25 INFO menu

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

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

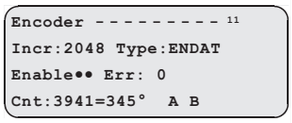
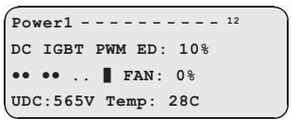
The individual pages are numbered for increased clarity.

Serial No - - - - - - - - 01 ZETADYN 4C013-A SN: 06128238/0001 4.42-110308xx	**Page 01: Serial-No.** **Line 2:** Display of frequency inverter type and frame size: -A: Type ZETADYN 4C for asynchronous motors -S: Type ZETADYN 4C for synchronous motors -X: unknown type **Line 3:** Serial number/type consecutively numbered **Line 4:** Software version Loaded 3rd operating language
Status - - - - - - - - - - 02 ▷ System OFF ◀ 530ˢ540ˢ550ˢ560ˢ 100 ^0.00 0.00 0.00m/s	**Page 02: Status** **Line 2:** current service condition in plain text display **Line 3:** last 5 service conditions current operating condition is displayed on right in total, the last 60 service conditions can be inquired: Previous page ESC Next page ↵ The current condition will be indicated with the arrows > < The previous conditions are indicated with the arrows < > **Line 4 (from left to right):** current direction of travel current position of car in the shaft current travel path with positioning speed current traveling speed

Dist. - - - - - - - - - - - 03 sa: 0.00 s21: 0.52m sr:^0.00 s31: 1.45m s1: 0.00 sd: 0.52m	**Page 03: Dist** **Line 2:** sa: current position of car in the shaft s21: calculated deceleration path V_2 ◦ 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 ↵ button.
Mot - - - - - - - - - - - 04 ▮▮▮ _ _ _ _ _ _ _+0 % real: 0rpm 0V prog: 0rpm +0.0A	**Page 04: Mot** **Line 2:** Bar chart of motor speed **A** Slip in % **S** Load angle in ° **Line 3:** Actual motor speed Motor voltage **Line 4:** Target motor speed Motor current **A** If the motor has been correctly adjusted, the slip is nearly proportional to the motor's rated current (e.g. 50% motor current = 50% slip). The display can be frozen by pressing the ↵ button.
MotDat - - - - - - - - - - 05 I: 11.0A n: 60rp U: 360V f:10 Hz p: 10	**Page 05: MotDat** Display of the motor data entered in the "Motor name plate" menu: **S** **Line 2:** Rated current Nominal speed **Line 3:** Nominal voltage Rated frequency **Line 4:** Number of pole pairs **A** **Line 2:** Rated current Nominal speed **Line 3:** cos phi Rated frequency **Line 4:** Magnetization current Rotor time constant
MotDat - - - - - - - - - - 05 I: 11.0A n: 1450rp cos:0.88 f: 50.0Hz I0: 3.8A TR: 316ms	

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 Nominal speed **Line 3:** cos phi Rated frequency **Line 4:** Magnetization current Rotor time constant **Seite 05: MotDatNom** By pressing the ↵ button, the original motor date wiill be displayed
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:** Alarm bell left: minimum limit reached Alarm bell right: maximum limit reached 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 RV.2 V..... O:.. .. .. VG1	**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) • Traveling speed (V) **Line 4:** Active digital output functions
Start/Stop - - - - - - - 09 STOA:• STOB:• DIAG:• RF RB CO MB BR1234 E •	**Page 09: Start / Stop** Online display of the digital inputs and outputs important for the start / stop process: **Line 2:** STOA: Status STO_A (input) STOB: Status STO_B (input) Large dot next to the designation indicates that there is a signal at the input and the internal diagnostic unit for monitoring the STP inputs has detected no error The output stage is safely disabled (STO deactivated) if there is no signal at the inputs. DIAG: Status of the internal diagnostic unit Large dot next to the designation indicates that the internal diagnostic unit has not detected any error, if no dot is displayed, the internal diagnostic unit has detected an error **Line 3:** RF – Controller enable (input) RB – Controller ready / Contactors switching (output) CO – Contactor monitoring (input) MB – mechanical brake switching (output) BRx – Brake monitoring contacts E: Electronic short-circuit status **Line 4:** RF, RB, CO, MB, BRx: A large dot beneath the description indicates the input or output is active A "!" under the monitor input "CO" or "BR" indicates that this monitoring function has been deactivated in the "Monitoring" menu. E: 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: Out: 12345678 BC C12 1234 ..... • .. ...•	**Page 10: Cu-Ports** Online-display **Line 3:** 1…8: digital inputs I1…I8 BC: Function and temperature monitoring of brake resistor or brake chopper C12: Contactor monitoring 1…4: digital outputs O1…O4 **Line 4:** A big dot below the description displays the input or output is active

	**Page 11: Encoder** Online-display **Line 2:** Configured rotary encoder resolution Detected rotary encoder type (with absolute value encoders) Configured rotary encoder type (with incremental encoders) **Line 3:** Enable first point: Enabling of the supply voltage for absolute rotary encoder Enable second point: Absolute rotary encoder performance test S both points must be active A both points must be off ERR: Rotary encoder fault code; 0 must be displayed if there are no faults in the rotary encoder. **Line 4:** Cnt: Counter reading for impulse counter (0 - 4x encoder resolution) and display of motor revolution in degrees (360° = one revolution of the motor) A and B: graphic display of the sine signal (A) and cos signal (B) The display can be frozen by pressing the ↵ button.
	**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: Turn on duration of the ZETADYN 4 (time interval: 10 minutes) FAN: Speed of the fan in % **Line 4:** UDC: DC-link voltage Temp: Power stage temperature The display can be frozen by pressing the ↵ button.

Power2 - - - - - - - - - - 13 ERR_EXT U. OC: ... SRC_APP. UCE_P: ... SRC_MOP. UCE_M:	**Page 12: Power2** Cause for excess current malfunction **Line 2:** ERR_EXT: Excess current message (display is not saved; point is only displayed if excess current is present U: Overvoltage error in the DC-link (voltage higher than 850 V DC) OC: Overcurrent was detected by the current sensors (incorrect phase is indicated by letters U V Z) **Line 3:** SRC_APP: Excess current is detected by the application processor. UCE_P: Error in positive current path in power stage (faulty phase is displayed) **Line 4:** SRC_MOP: Excess current is detected by the motor management processor. UCE_M: Error in negative current path in power stage (faulty phase is displayed) During normal operation, no points and phase displays (U V W) should be active During a malfunction, the displays remain active until the next travel command (with the exception of ERR_EXT)
DCP Ident- - - - - - - - 14 Info: **xx** 0101 / 010106 en Load: 77% - 12.3A	**Page 14: DCP-Ident** 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
DCP Bits - - - - - - - - 15 B01..4... G....4... S.1....6. 100 CR UP V_3* MTW	**Page 15: DCP-Bits** Online-display **Line 2:** Command and speed bytes B= command byte G= speed byte **Line 3:** Status byte S= Statusbyte Current service condition in which the ZETADYN 4 is operating **Line 4:** Display of the actual travel commands: RF: Controller enable Travel direction controlled travel speed MTW: Motor temperature pre-warning (displayed at overtemperature) See chapter "Serial Communication / DCP (Drive Control & Position)" for further information about DCP operation.

Display 1 DCP Dist.- - - - - - - - 16 sv_I7: +0002210 mm sv: +0002198 mm Prg:Rea 1.15:x.xxm/s **Display 2** DCP Dist.- - - - - - - - 16 sv_I7: +0002210 mm sv: +0002198 mm Prg:Rea 1.15:1.10m/s	**Page 16: DCP-Dist.** Online-display **Line 2:** Display of the current remaining path **Line 3:** Display of the remaining path required **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)
DCP Err - - - - - - - - - 17 RX_TIM 1 RX_XOR 0 TX_ERR 0	**Page 17: DCP-Err** 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
CAN- - - - - - - - - - - - - - - 14 Act• Mode: Velocity T_max: 0 RErr: 0 NMT:Preop./Warn.Lim: CAN- - - - - - - - - - - - - - - 14 Act• Mode: Velocity T_max:0.7ms TErr: 0 NMT:Preop./Warn.Lim:	**Page 14: CAN** Information about CAN operation **Line 2:** Act: A dot signals that the ZETADYN 4 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
CAN Velocity- - - - - - - 15 V_CAN: + 0mm/s Contr.:Disable Volt. Status:Sw. On Disab.	**Page 15: CAN Velocity** Active in velocity mode **Line 2:** V_CAN: speed, sent from the control system to the ZETADYN 4C **Line 3:** Contr. Control-byte. Shows commands which are sent by the control system **Line 4:** Status: Status byte. Shows CAN statuses of the ZETADYN 4C
CAN Position- - - - - - - 15 S_CAN + 0mm Contr.:Disab. Volt. Status:Sw.On Disab.	**Page 15: CAN Position** Active in position mode **Line 2:** S_CAN: Relative target position, sent from the control system to the ZETADYN 4C **Line 3:** Contr. Control-byte. Shows commands which are sent by the control system **Line 4:** Status: Status byte. Shows CAN statuses of the ZETADYN 4C **After pressing the button the display shows the maximum travel speed, sent by the control system**

CAN Error Info------ 16
Err act. Last:No Err
Rec Tra Warn Pas off
0 0 0 0 0

page 16: CAN Error information
Information about telegram errors in CANopen lift operation
Line 2 (from left to right):
Error status
Load: Fault which last occurred

	Displayed text:	Meaning
Error status	"Err act."	Error active
	"Warning"	Warning
	"Err pass"	Error passive
	"Bus off"	Bus off
Load: Fault which last occurred	"No Err"	no error
	"Stuff"	Stuffing Error
	"Form"	Form Error
	"ACK"	Acknowledge Error
	"Bit(r)"	Bit Error (Recessive Level was output but Dominant Level detected)
	"Bit(d)"	Bit Error (Dominant Level was output but Recessive Level detected)
	"CRC"	CRC Error

Line 3 and 4:
Rec: Number of receive errors
Tra: Number of transmit errors
Warn: Indication how often the ZETADYN 4 switched to the warning status
Pas: Indication how often the ZETADYN 4 switched to the error passive status
off: Indication how often the ZETADYN 4 switched to the bus off status

CAN Calib. 1------ - 17
AbsEnc mm: 5358
MotEnc mm:+ 4169
Offs:13081A/M 1.28

Page 17: CAN Calib.
Calibration
Lines 2 - 4:
For calibrating the distances which were sent by the rotary encoder and the shaft encoder.

A+R - - - - - - - - - - - - 18
0.62 0.62 m/s3
0.50 0.50 m/s2
0.62 0.50 m/s3

Page 18: A&R
Display of configured values for:
- Acceleration
- Delay

dependent on the operating curve of a normal ride
Line 2:
upper round off of the acceleration in m/s³
upper round off of the deceleration in m/s³
Line 3:
Acceleration in m/s³
Deceleration in m/s³
Line 4:
lower round off of the acceleration in m/s³
lower round off of the deceleration in m/s³

Energy - - - - - - - - - - 19
Power: 22.120 W
Work: 16 Wh

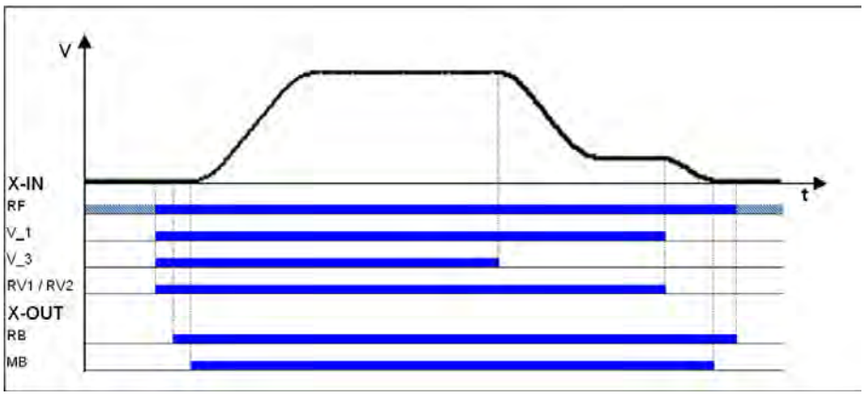
Page 19: Energy
Line 2:
Power: current frequency inverter power in watts
Line 3:
Work: work currently performed by ZETADYN in watt hours

InfoBus - - - - - - - - - 20 Ident No 01234567 Exist: xxxx Error 0000	**Page 20: InfoBus** Display of frequency inverter configuration **Line 2:** Ident no. of the internal assemblies 0: Controller Unit (CU) 1: Shunt module (CUSH) 2: reserved 3: reserved 4: reserved 5: Switching Power Print (SP) 6: Power Print (PP) 7: Module Print (MP) **Line 3:** Each available board is identified in accordance with the population of the frequency inverter (see also menu "HW Ident."): x: identification of the board by reading out the EEPROM m: identification by manual default in the menu "HW-Ident." **Line 4:** Error allocation of the assembly 1: No answer 2: Incorrect or unknown object 3: No proper EEPROM connection 4: No or unknown part number 5: No or unknown index 6: Original and backup copy are not identical During flawless operation, all internal assemblies must be displayed with a "0"
TravelDirection - - - 21 TD_SET 10.00 M TD_CNT 4.32 M TD_DRV 18.45 M	**Page 21: Travel direction** Display the direction changes **Line 2:** TD_SET: Initial value of the down counter **Line 3:** TD_CNT: Travel direction counter, resettable. Displays the remained travel direction changes with the actual rope. After resetting the travel direction counter, TD_RES will be increased **Line 4:** TD_DRV: Total counter of the travel direction changes. Value remains after resetting the down counter
TravelDirection - - - 21 TD_RES 10 TD_CNT 4.32 M TD_DRV 18.45 M	**Page 21: Travel direction** While pressing the ↵ button, **line 2** shows the actual number of counter resets "TD_RES".
Cuec - - - - - - - - - - - 22 Func: DCP & CAN & AN Stat: GRN	**Page 22: Cuec** Expansion board "Control" **Line 2:** Func: Functions of the expansion board "Control" **Line 4:** Stat: LED status of the expansion board "Control"

12 Travel options

12.1 Normal travel

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



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

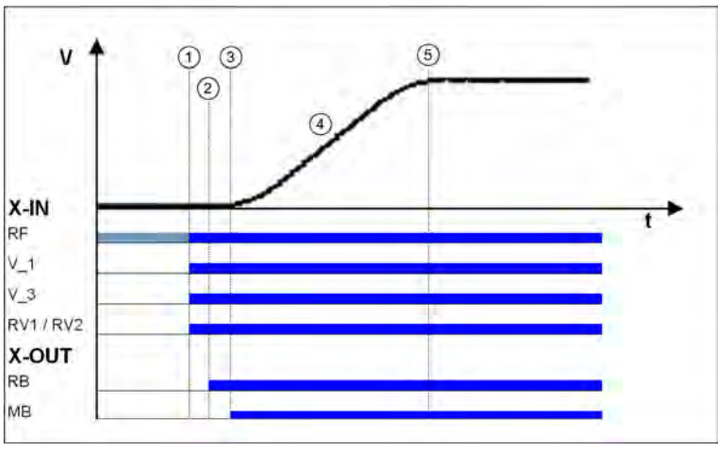
12.2 Start-up and acceleration

To be able to travel, the ZETADYN 4 requires at least the following input signals:

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

Start-up procedure with acceleration

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



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

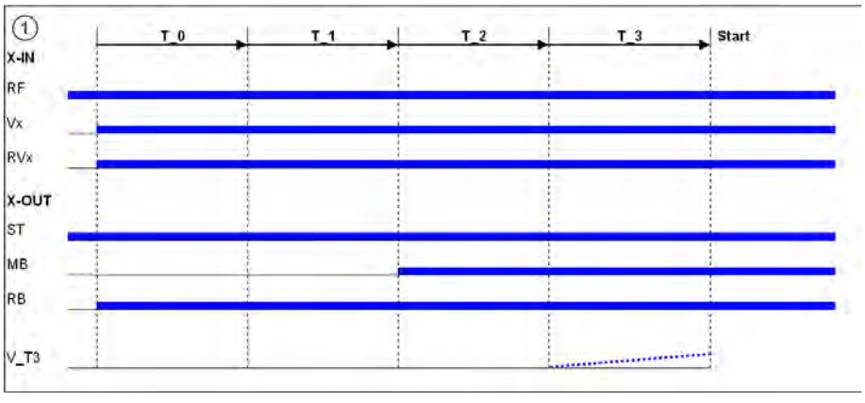
12.3 Optimizing start up behavior

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

Information

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

Start-up time sequence



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

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

Time optimisation through contactor monitoring (optional)
With monitoring of contactors activated (Monitors/CO 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.

12.3.1 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).

12.3.2 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 variations can be configured in the **Start/M_Star** menu. The speed control amplification K_START is configured in the **Start/K_START** menu.

```
Start-up
↳M_START 1
  ↳      3
Start control proce-
dure
```

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

MOD1 (standard setting for asynchronous motors)
The machine is speed controlled. Up to expiration of T_2, the speed is controlled at target value = 0. A shaft position change is not corrected. The parameter "K_start" is used to increase the speed control amplification. It is activated with the start of T_1 and deactivated with the expiration of T_2.

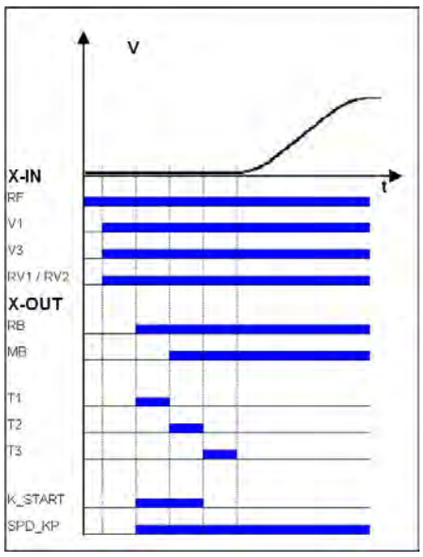
MOD2
Corresponds to the function of MOD1. In addition, the parameter "s_start" is activated. If the position of the machine changes during time T_2 by the value entered in "s_start", "K_start" is switched off. That prevents the machine from being damaged due to too high a value of "K_start".

MOD3
The machine is both position and speed controlled. Please note that both controls are set through "K_start" and are thus dependent on each other. The position and speed control is activated with the start of T_1 and deactivated with the expiration of T_2.

MOD5 (standard setting for synchronous motors)
The machine is position controlled. The machine position is recorded until expiration of T_2 and is corrected if it changes. The parameter "K_start" is used to increase the position control amplification. It is activated with the start of T_1 and deactivated with the expiration of T_2

MOD4
Corresponds to the function of MOD5. In addition, the parameter "s_start" is activated. If the position of the machine changes during time T_2 by the value entered in "s_start", "K_start" is switched off. That prevents the machine from being damaged due to too high a value of "K_start".

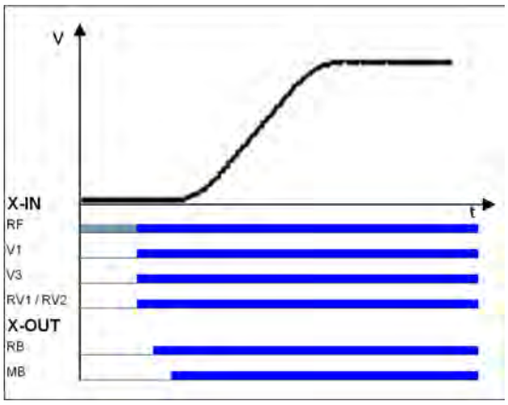
Start-up variations



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

12.4 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 Travel 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 motor contactorsmust be switched instantaneously with the digital output "RB" in case motor contactors are used.
- The brakes must be switched instantaneously with the digital output "MB"

12.5 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

12.6 Distance-dependent deceleration

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

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

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

Information

Before removing the digital input for the travel speeds V_3 or V_2 the input for the travel speed V_1 must be applied (see diagram "Normal stop at distance-dependent deceleration").
If it is not possible to control two travelling speeds simultaneously for technical reasons (e.g. control of the speeds by an alternating contact), the distance-dependent delay with the **Control system/SIM_-V1=ON** parameter can be activated!
Here it must be noted that the positioning speed V_1 must be activated 100 ms after deactivation of the travelling speeds V_3 or V_2 at the latest!

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

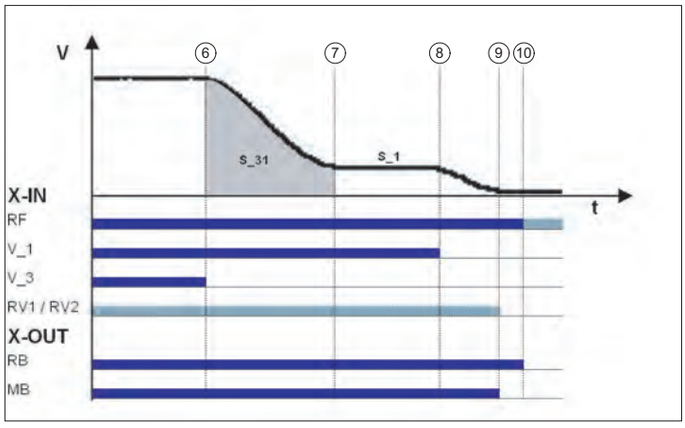
Information

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

12.6.1 Normal stop during path dependent deceleration

6	When the switch off point for the traveling speed is reached, the configured final speed V_3 has been reached. Deceleration is initiated
7	Travel at positioning speed V_1
8	Positioning speed V_1 is switched off. Motor continues to decelerate.
9	Speed 0 Output MB is switched off Brake must operate immediately The motor continues to be fed with current

10	The current to the motor is switched off Output RB is switched off Motor contactors must drop immediately

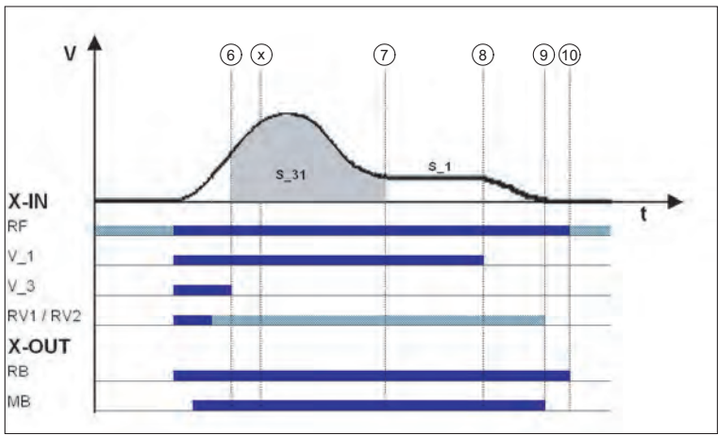


Normal stop during path dependent deceleration
RF Controller enable
V_1 Positioning speed
V_3 Travel Speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

12.6.2 Arch travel with path-dependent deceleration

If the selected final speed (V_2 or V_3) is not reached with short floor clearances, the ZETADYN 4 carries out arch travel. Independent of the speed reached upon the interrupt time point, the identical crawl paths are always achieved through the arch travel.

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 Motor contactors must drop immediately



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

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

12.7 Time-dependent deceleration

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

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

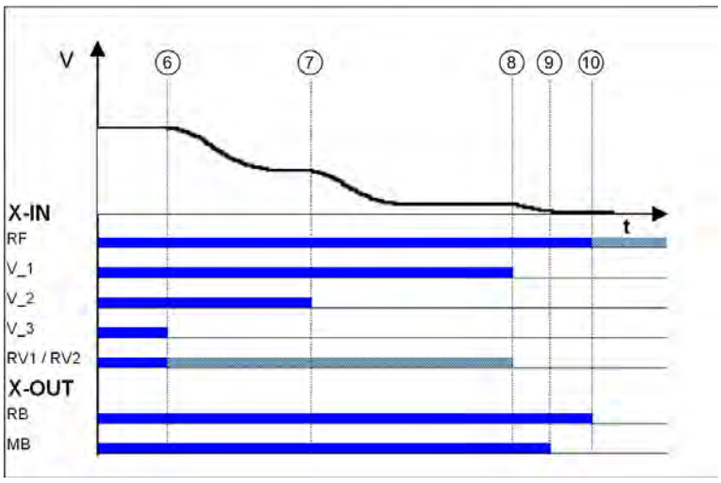
the decelerations are operated time-dependent. They are independent from the configured function of the parameter **Decelerating / S_ABH**

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

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

12.7.1 Deceleration with reached traveling speed

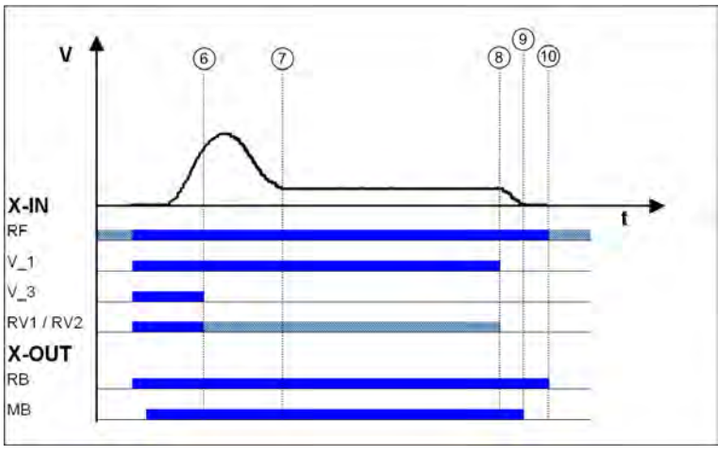
6	When the switch off point for the traveling speed is reached, the configured final speed V_3 has been reached. Deceleration to V_2 is initiated
7	Switch off point for V_2 Deceleration to V_1 is initiated
8	Positioning speed V_1 is switched off. Motor continues to decelerate.
9	Speed 0 Output MB is 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 Motor contactors must drop immediately



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

12.7.2 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 Motor contactors must drop immediately



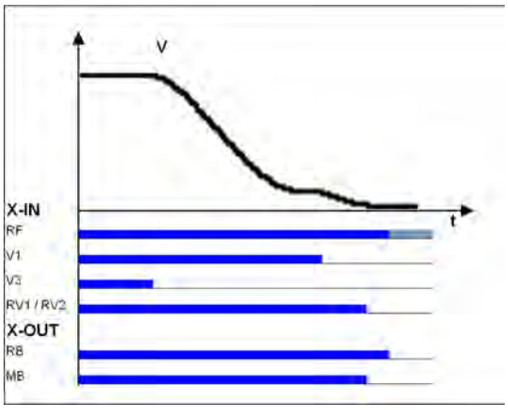
Deceleration when traveling speed has not been reached
RF Controller enable
V_1 Positioning speed
V_3 Travel Speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

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

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

12.8 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 Travel 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.

12.9 Crawl path optimization

Improvement of:
- too long crawl paths with traveling speed V_1
- non-flush stopping due to V_1 being prematurely switched off

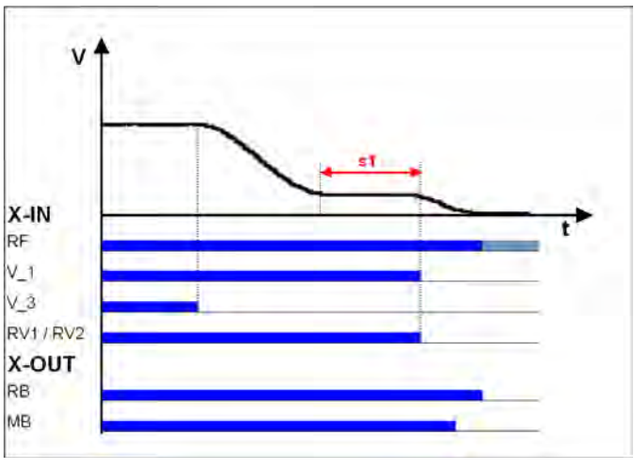
without additional installation work.

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

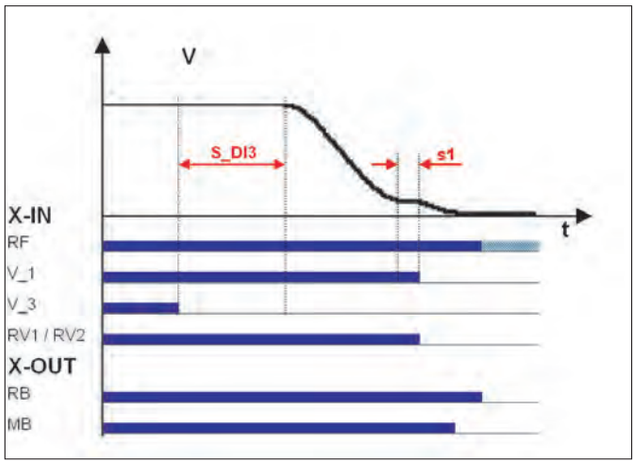
Optimizing the crawl paths

1	Travel to each floor from both directions of travel with the max. traveling speed V_3 or V_2 and check the crawl path s1 in the "INFO / Page 03" menu. Dist. - - - - - - - - - - - 03 sa: 0.00 s21 0.52m sr:^0.00 s31: 1.45m s1: 0.00 sd: 0.52m
2	The value for s1 should be the same for all floors from both travel directions. If the crawl paths differ, use the smallest value for s1.
3	In the **Decelerating** menu, change the values for "S_DI3" or "S_DI2" to that determined for s1
4	Check the deceleration behaviour and correct the values for the parameters "S_DI3" or "S_DI2" if necessary.

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



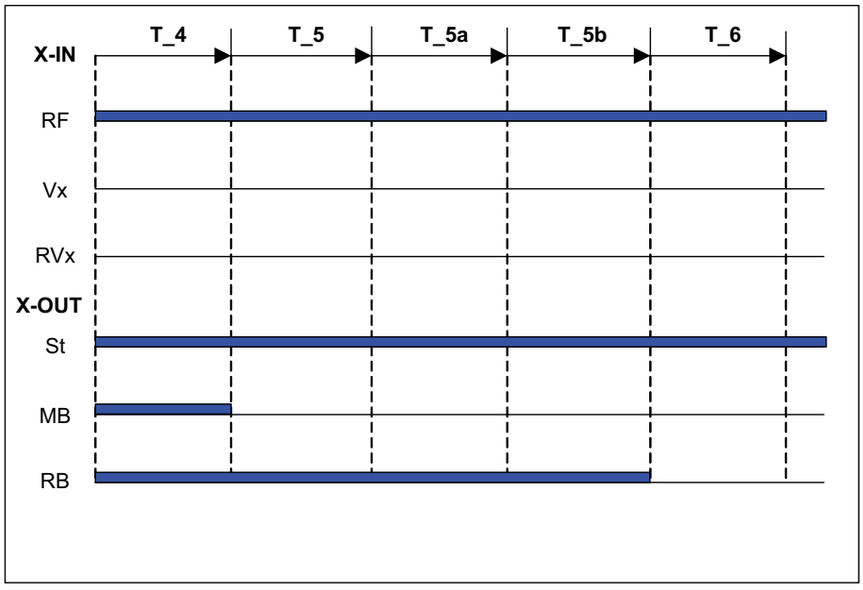
Deceleration with non-optimized crawl path
RF Controller enable
V_1 Positioning speed
V_3 Travel Speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake



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

12.10 Optimizing stopping

Stopping time sequence



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

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

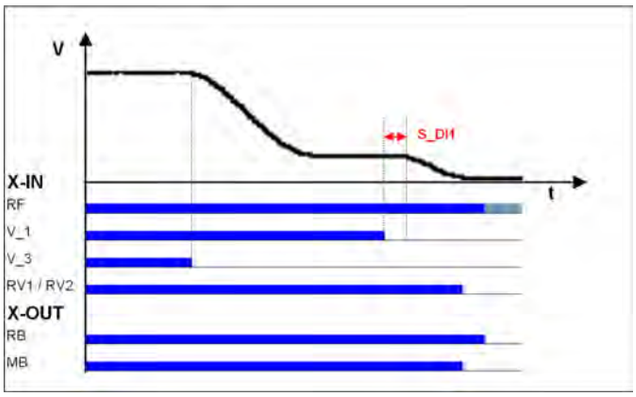
Time optimization through brake monitoring
If the brake monitoring is activated (menu **Monitoring/BR≠Off**) and the monitor contacts are connected, time T_5 is optimized. As soon as the brakes are closed, time T_5 is aborted and time T_5b started.

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

12.11 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"!

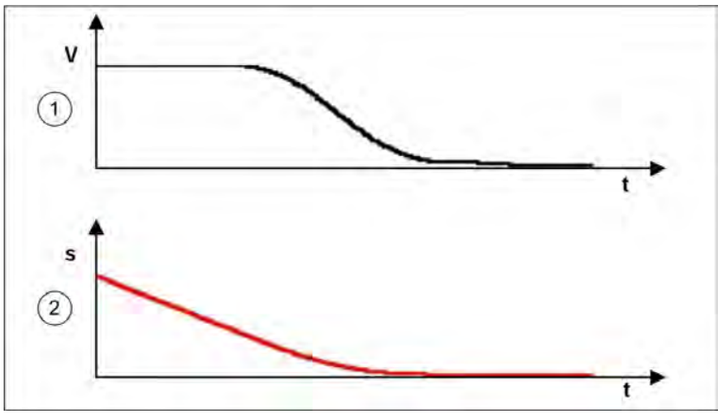


Optimizing the step alignment
RF Controller enable
V_1 Positioning speed
V_3 Travel Speed
RV1 / RV2 Direction default
RB Controller ready
MB_Brake Mechanical brake

12.12 Direct leveling

Information
Direct leveling is only possible when using the DCP2, the DCP4 or the CANopen Lift protocols and an absolute shaft copy system!

During direct leveling, the control system predetermines the ZETADYN 4 the residual path to be traveled up to the stopping point.
The frequency inverter slows down the motor in accordance with the specified remaining distance, making it possible to travel to the stop area without a creep path.



Direct leveling with DCP protocol
1 Travel speed V_3
2 Residual distance

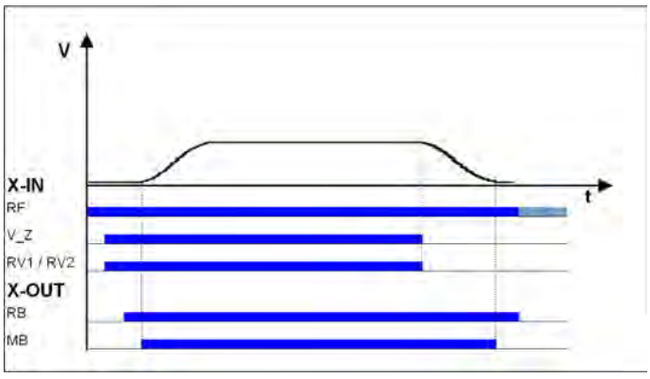
12.13 Readjustment

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

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

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

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



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

12.14 Operation in idle

With the ZETADYN 4C frequency inverter, 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%.

```
Control
↳ SPD_KP  1.00
  ↳       0.10
Speed controller basic
gain
```

12.15 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 DIN EN 81-1 must be observed.

12.15.1 Actuation

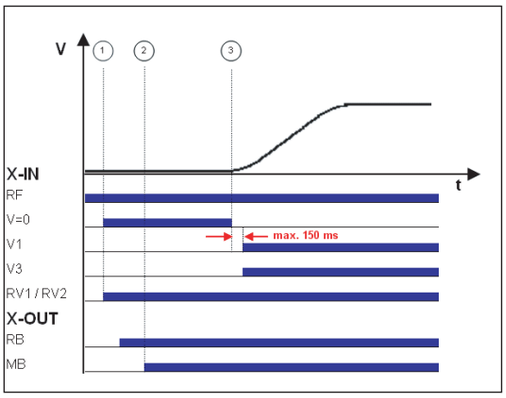
Configure digital input in the **Control system** menu to **v=0**.

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

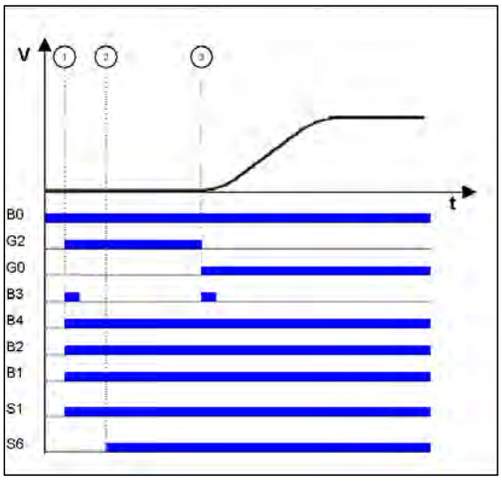
	Standard	DCP
1	Cabin door closing Actuation of inputs: • RF - Controller enable • RVx - Default for travel direction • v=0 - Hold speed 0 Activation of output: • RB - Controller ready Motor contacts must be switched without a delay. Motor energized	Cabin door closing Setting the bits by lift control: • G2 - RPM 0 • B1 – travel command • B2 – off switch • B3 – travelling speed • B4 – travel direction Setting the bits by ZETADYN 4 • S1 – travel active Motor contacts must be switched without a delay. 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 ZETADYN 4 • 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 Travel speed V_3
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 Travel speed V_3
B4 Direction default
S1 Travel active
S6 Mechanical brake
G2 Speed 0
G7 Travel speed

12.15.2 Monitoring functions for Quickstart

- If the drive is maintained at speed 0 for longer than 20 s, the frequency inverter enters fault mode and displays **ERR780/Quickst. t-limit**
- 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 ZETADYN 4 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

13 Emergency evacuation

13.1 Evacuation with 1-phase mains supply 230V AC

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 mains supply with asynchronous motors does not make sense.

Information - Characteristics of evacuation with single-phase mains supply:

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

In the event of a mains failure, the mains supply must provide the following voltage to the frequency inverter:

- 230 VAC to feed L1 and L2

The ZETADYN 4 analyses the load ratio between the car and the counterweight during every start. The control system starts the evacuation trip by activating:

- Controller enable
- Direction default
- Speed default

Size of the voltage supply

	The required performance consists of the following:
	Power consumption electronics ZETADYN 4
+	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.

13.1.1 Parameterisation

(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 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
Configure digital output in the **Control system** menu to **Evac. Dir.** Control ↳ f_O4 Evac.Dir ↳ Evac.Dir Function O4 Contact open ◦ Car is lighter than counterweight **Evacuation trip will be carried out upwards!** Output closed ◦ Car is heavier than counterweight **Evacuation trip will be carried out downwards!**	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.

13.2 Evacuation with UPS

S

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

A

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

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

During each trip, the ZETADYN 4 analyses the load ratio between the car and the counterweight. In case of a voltage drop (mains failure), the ZETADYN 4 informs the control system which direction is possible for an evacuation trip. The open loop control carries out the evacuation trip in the corresponding direction.

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

13.2.1 Evacuation through UPS with optimum power

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

Calculation of the UPS

	The required UPS performance consists of the following:
	Power consumption electronics ZETADYN 4
+	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.

13.2.2 Evacuation through UPS with minimum power

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

Calculation of the UPS

	The required UPS performance consists of the following:
	Power consumption electronics ZETADYN 4
+	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.

13.2.3 Parameterisation

(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

Configure digital output in the **Control system** menu to **Evac. Dir.**
`Control`
`↳ f_O4  Evac.Dir`
`  ↳  Evac.Dir`
`Function O4`
Contact open ⇢ Car is lighter than counterweight
Evacuation trip will be carried out upwards!
 	
Output closed ⇢ Car is heavier than counterweight
Evacuation trip will be carried out downwards!
	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
Configure the synchronous motor's stator resistor in the **Parameter set 2 / RS_UPS** menu

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

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

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

Calculating the available UPS power:

$x_{1\ \text{rating plate}}$
- Control systempower consumption
- Electromechanical brakes power consumption
- Other consumers (car light, …) power consumption
= **Available UPS_power [W]**

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

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

CAUTION!

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

(7) 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

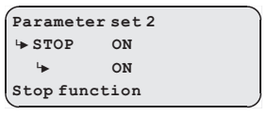
```
Start-up
↳T_4     0.0          s
  ↳      0.0
Maintain speed 0
```

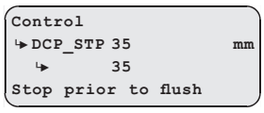
13.3 Improving the positioning

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

13.3.1 Parameterisation

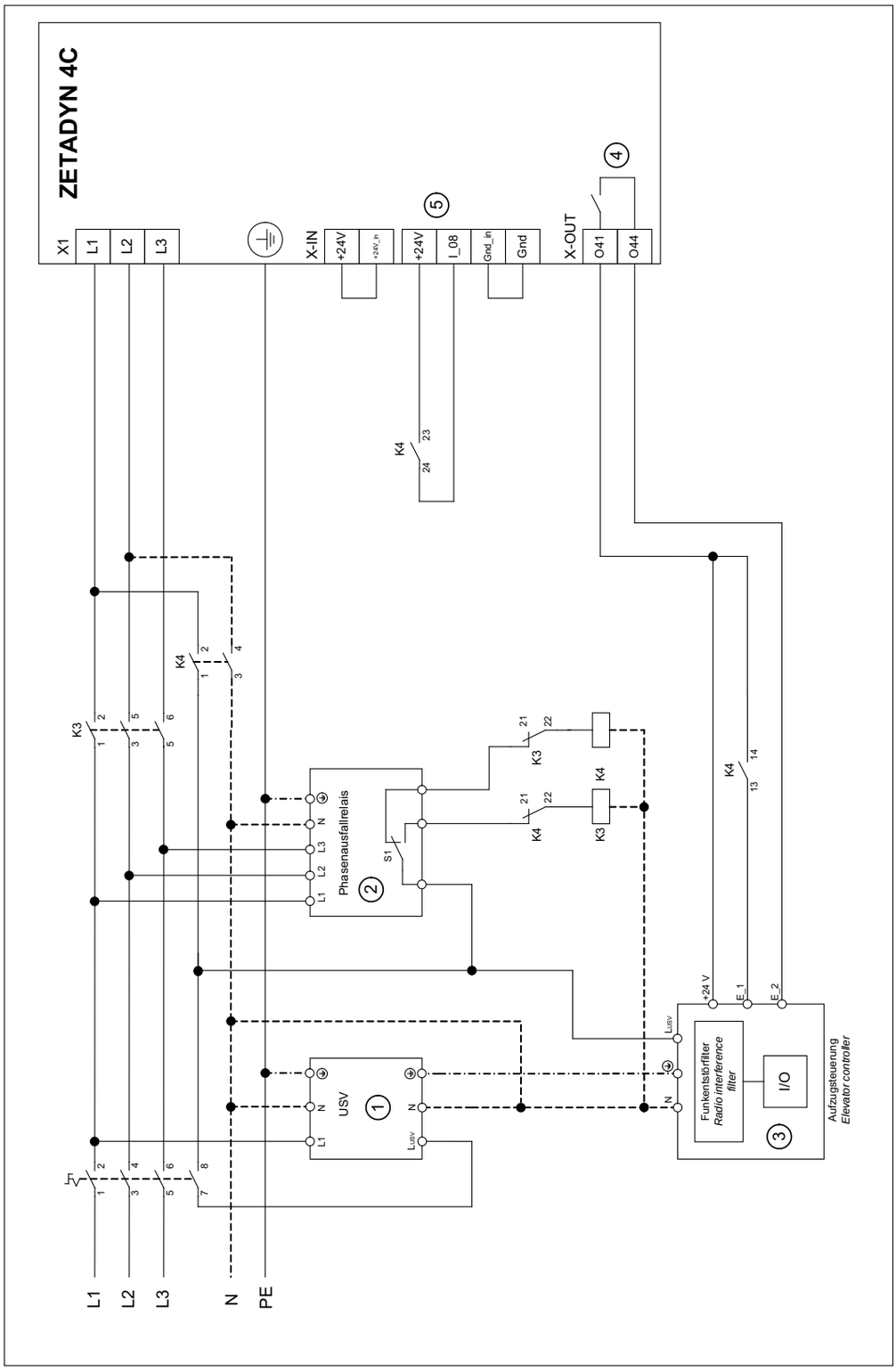
Configure the **Parameter set 2/STOP = ON** menu



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  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**.

13.4 Connection diagram for UPS to ZETADYN 4C



1 Uninterruptible power supply
2 Phase failure relay
3 elevator control system
4 Output paramterised to "Evac.Dir" function (information direction of generator)
5 Input parameterised for "PARA2" function
S1 Relay is active when all 3 phases of the power supply are connected.
E_1 Information voltage failure
E_2 Information direction of generator (can be omitted when extended status bytes evaluated at DCP3 and DCP4)
K3 Normal operation
K4 Operation with uninterruptible power supply

13.5 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 must 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 limit the elevator speed to a safe level.

- If the ZETADYN 4 is operated without contactors, the short-circuit is made by the internal short-circuit of the ZETADYN 4.
- If the ZETADYN 4 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.

13.5.1 Monitor function

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

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

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

Activating of the monitoring function

- Switching off the ZETADYN 4
- activate the digital input with the "Monitoring" function
- Switch on the ZETADYN 4
- Monitoring function is active

`Elevator monitor`
`Speed: 0,2 m/s`
`Direction: up ▲`
`Distance: +1.2 m`
	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
During activated monitor function, all further functions of the ZETADYN 4 are locked!

14 Error diagnosis

14.1 Travel abort and acknowledgement during malfunctions

14.1.1 Travel abort

If the ZETADYN 4 detects an error, the actual 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 machine is decelerated by the brake torque of the mechanical brake.

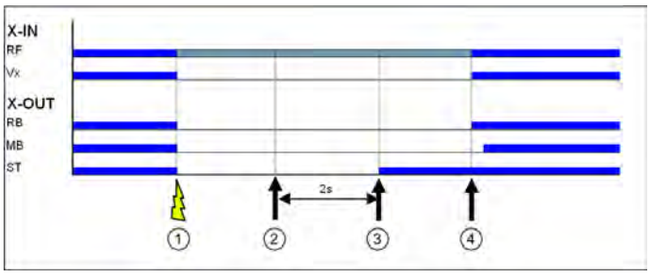
The error that has occurred is shown in the display with error text and error number. LED's, error memory and an error list are available for additional troubleshooting.

14.1.2 Acknowledgement

Acknowledging the error is performed automatically 2 seconds after the cause of the error has been repaired.
The prerequisite is that the input signals for traveling speeds are applied. No error acknowledgement is issued f traveling signals are applied before the expiration of the 2 seconds.

The following errors are not automatically acknowledged:

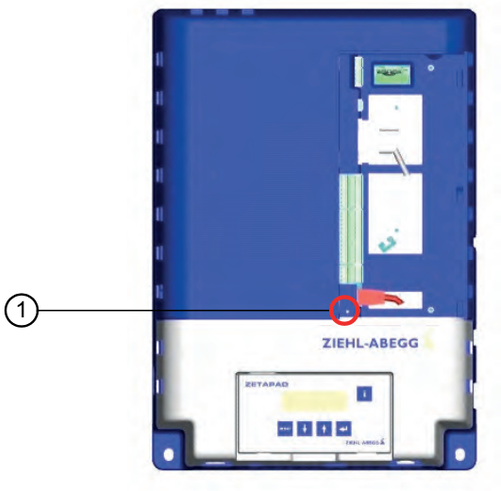
Error no.	Acknowledgement by
900 ... 999	Switch ZETADYN 4 off and then back on



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

14.2 LED

A LED is available to diagnose the ZETADYN 4. The LED lights in various colours.



1 LED position

Status of the ZETADYN 4 with standard activation

LED colour	LED status	Operation condition
green	flashing once per second	Standstill
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

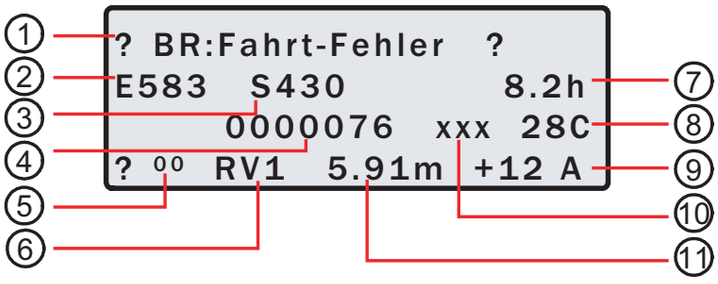
It is possible, that an operation condition and an error state occur at the same time and that they are indicated by the LED at the same time.

14.2.1 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

14.3 Readout the error memory

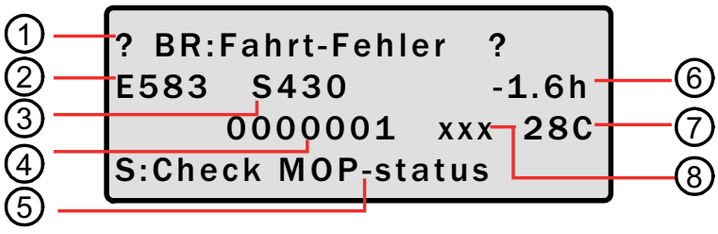
Faults which lead to interruption of the travel are saved in a fault list.
The fault list can be found in menu **Statistik/ST_LST**. Up to 64 error messages can be managed. Once the number of 64 messages has been reached, the oldest entry in each case is deleted for each new error message which arises.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



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

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

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



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

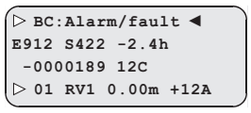
Scroll through fault list:
the fault list can be scrolled through using the two arrow keys.


Scroll up (reduce fault serial number)

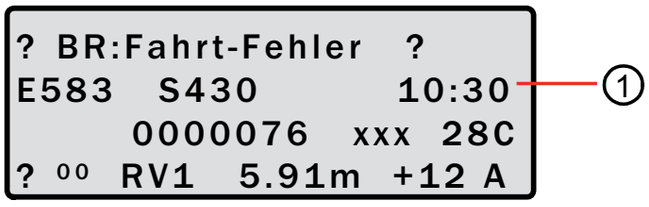

Scroll down (increase fault serial number)

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 at which an error occurs is saved in the error list and displayed.



1 Time at which the error occurred

14.4 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)

14.5 Error list

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

14.5.1 Masc-Funktion

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

CAUTION!

Caution!

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

Sequential errors can occur if errors are masked.

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

14.5.2 Block function

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

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

Errors which lead to disabling of the ZETADYN 4 are marked by a **dot** in the **S** column.

14.5.3 Notes 0xx

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

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

14.5.4 Error 1xx

- Hardware configuration error
- Software error

Error no.	Error text	Error cause	M	S
100	Serial no. missing	Frequency inverter/CU does not have a serial number, e.g. after a component replacement		●
101	System-Error	A defective internal component was identified during a self-test of the frequency inverter		●
110 120	CU: No ID	CU ID no. was not detected: CU is not present or its ID EEPROM does not reply		●
111	CUSH: No ID	Shunt ID no. was not detected: Shunt module is not present or its ID EEPROM does not reply		●
113 123	CUEE: No ID	ID no. of the extension card for the rotary encoder was not detected: extension module is not present or its ID EEPROM does not reply	●	
115 125	SP: No ID	Switching power supply ID no. was not detected: Switching power supply is not present or its ID EEPROM does not reply		●
116 126	PP: No ID	Power print ID no. was not detected: Power print is not present or its ID EEPROM does not reply		●

Error no.	Error text	Error cause	M	S
117 127	MP: No ID	The print module ID no. was not detected: Module Print is not present or its ID EEPROM does not reply		●
121	CUSH: ID-Error	Internal shunt module was detected but there are problems with the shunt module's informational content		●
140	MP:Unknown IGBT	A unknown IGBT-module was recognized		
141	MP: Temp.Sens?	The external temperature sensor for the Modul Print is not recognized	●	
150	HW-Conflict !	Shuntmodul, Power Print and Modul Prind do not match		
160	ADC adj.:outside tol.	**Error:**2The deviation between the first measured value and the second measured value during the zero point comparison of the motor current measurement is greater than 2 %.	●	
174	CUMT:Not detect	Option module for the temperature monitoring of the motor is nit recognized: Check the configuration for rhe temperature monitoring in the "Monitoring" menu		●
180	UF CTRL=DCP2/4	**Error:** DCP2 or DCP4 is configured as the actuation type. This is not possible during operation without a rotary encoder **Remedy:** Enter DCP1 or DCP3 for the communication	●	

14.5.5 Error 2xx

- Configuration error

Error no.	Error text	Error cause	M	S
200	Stop input	**Error:** A parameter is open while apply a correct travel command (RF + RVx + Vx) **Remedy:** End parameter inputs	●	
201	Motor name plate	**Error:** a parameter in the "Motor name plate" menu has not been assigned **Remedy:** Check the parameter in the "Motor name plate" menu,		
202	MOT_TYP = ?	**Error:** No motor type was selected in the "Motor name plate" menu **Remedy:** Enter in the "Motor name plate"menu		●
203	n* = 0?	**Error:** No speed was entered in the "Installation" menu **Remedy:** Enter the speed at V* in the "Installation" menu directly or have it calculated based on the installation data		●
204	n* > 3*n	**Error:** n* was incorrectly calculated due to incorrect installation data (n* >3xn) **Remedy:** Check the installation data for correct entry	●	
205	Input duplicated	**Error:** two digital inputs are assigned with the same function **Remedy:** Change the function allocation of the digital inputs		●
207	Input PFU_BR miss.	**Fault:**When using a feedback unit in connection with a brake resistor the temperature monitor of the brake resistor is not programmed **Remedy:** Parameterise digital input (preferably X_BR4) in the "Control" menu to the "PFU_BR" function	●	
208	DELAY active	**Error:** Emergency stop was done by deactivating of the input with the function "/DELAY" At travel start, the input with the function "/DELAY" is not active **Remedy:** Check the triggering of the input with the function "/DELAY"		
210	Wrong ENC_TYP	**Error:** Rotary encoder type and motor type are not compatible **Remedy:**Enter the correct rotary encoder type in the "Encoder & BC" menu	●	●
211	No binary encoder	**Error:** Binary resolution not configured for rotary encoder type TTL sinus or EnDat/SSI **Remedy:** Enter a binary resolution (e.g. 512, 1024 or 2048)		
213	ZR_EN /ZR_RDY missing	**Error:**"ZR_RDY" or "ZR_EN" was not configured **Remedy:**Set digital input to "ZR_RDY" or set digital output to "ZR_EN"		
220	Error: SM data	**Error:** While operating synchronous motors, the values for the rated speed (n) and the rated frequency (f) do not match in the "Motor name plate" menu **Remedy:** Enter the correct data for rated speed and rated frequency in the "Motor name plate" menu	●	●

Error no.	Error text	Error cause	M	S
221	Error: ASM data	**Error:** While operating asynchronous motors, the values for the rated speed (n) and the rated frequency (f) do not match in the "Motor name plate" menu **Remedy:** Enter the correct data for rated speed and rated frequency in the "Motor name plate" menu	•	•
231	V_G1 > 150% V*	**Error:** the limit value configured for V_G1 is too large **Remedy:** Configure the limit value V_G1 to max 150% V* in the "Control system" menu		
232	V_G2 > 150% V*	**Error:** the limit value configured for V_G2 is too large **Remedy:** Configure the limit value V_G2 to max 150% V* in the "Control system" menu		
233	V_G3 > 150% V*	**Error:** the limit value configured for V_G3 is too large **Remedy:** Configure the limit value V_G3 to max 150% V* in the "Control system" menu		
240	ZR:Not RDY	**Error:** At start of travel, no signal present at the digital input set to "ZR_RDY" **Remedy:** Check wiring Use the ZArec display to check for an error at the ZArec Exit ZArec configuration level		
270	Cable change warning	**Error:** Information travel direction change counter Replacement of the cables in about 1 year		
280	S31 too long	**Error:** the calculated deceleration path S31 is too long **Remedy:** in the "Decelerate" menu, increase the deceleration "A_NEG" or reduce the round offs "R_NEG1" and "R_NEG2		•
285	Installation:V*=0	**Error:** V* in the "Installation data" menu has not been assigned **Remedy:** Check the parameter in the "Installation" menu		
287	V1 . . . V7 > V*!	**Error:** One of the travelling speeds V_1 ... V_7 entered is larger than the entered rated speed V* **Remedy:** Configure speeds V_1 … V_7 in the "Travel" menu to ≤ V*		
288	V_3 > V*	**Error:** The traveling speed V_3 entered is larger than the entered rated speed V* **Remedy:** Set speed "V_3" in the "Travel" menu to ≤ V	•	•
289	V_1 < V_2 < V_3!	**Error:** Speeds in the "Travellingl" menu are incorrectly set **Remedy:** In the "Travel" menu, make sure that V_1 < V_2 and V_2 <V_3	•	•
290	ParaSet2 empty!	**Error:** Activated parameter set 2 does not contain any data **Remedy:** In the "Parameter set 2" menu, copy the the data from parameter set 1 to parameter set 2		•

14.5.6 Error 3xx

- Error before trip start

Error no.	Error text	Error cause	M	S
301	MOP: Timeout	**Error:** No communication between the application processor and the motor management processor during start due to an error during the update **Remedy:** Perform a software update	•	•
303	MOP: SW-Error	**Error:** Software error message in the motor management processor **Remedy:** Perform a software update	•	•
304	MOP: HW-Error	**Error:** Hardware error message in the motor management processor	•	•
305 306	ADC calibration??	**Error:** Zero point offset in the motor current detection (analogue digital converter) is outside the tolerance **Remedy:** Replace defective shunt module		•
307	Iu Iv Iw > 1.0A	**Error:** Defective current measuring the phase U, V or W **Remendy:** Check the connector of the Shunt-Modul Current sensors are defekt	•	•
310	No abs.enc	**Error:** Connected absolute value encoder not detected (no absolute value encoder connected when frequency inverter was switched on) **Remedy:** Check absolute value encoder connection Switch frequency inverter off and then back on Parameter im Menü "Encoder & BC" überprüfen		•

Error no.	Error text	Error cause	M	S
315	EnDat: HW-error	**Error:** EnDat encoder delivers error		•
316	EnDat: Resolution	**Error:** Configured resolution in the EnDat encoder does not match the EnDat encoder resolution **Remedy:** Configure the correct EnDat encoder resolution in the "Encoder & BC" menu		•
320	ENC: Error-start	**Error:** Configured sinusoidal encoder was not detected **Remedy:** Check connection Check the rotary encoder type; possibly connect an encoder with rectangle signals	•	•
321	EnDat: ULP-error	**Error:** While starting, an error was read out from the EnDat encoder. Error is stated as a code: 0: faulty EnDat encoder power supply 1: no SSI communication 2: faulty EnDat encoder lighting 3: defective signal amplitude 4: Positioning error 5: defective sine evaluation **Remedy:** Check connection, check EnDat encoder		
322	EnDat: Com-Fehler	**Error:** During start, malfunction in communication to EnDat encoder; absolute value could not be read out **Remedy:** Check EnDat encoder, Check rotary encoder line Check the rotary encoder configuration in the "Encoder & BC" menu		
324	SSI: Ack-Error	**Error:** During start, malfunction in communication to SSI encoder; absolute value could not be read out **Remedy:** Check SSI encoder, Check rotary encoder line Check the rotary encoder configuration in the "Encoder & BC" menu		
325	SSI: Timeout	**Error:** Faulty communication with SSI encoder during start-up; absolute value could not be read out, SSI encoder does not reply **Remedy:** Check SSI encoder, Check rotary encoder line Check the rotary encoder configuration in the "Encoder & BC" menu		
327	ENC: Read-Error	**Error:** During reading out the position of the absolute encoder (position will be read out repeatedly) different values will be read. **Remedy:** Check absolute value encoder Check rotary encoder line Check rotary encoder connection (e.g. shielding)		
328	ENC: Count-Dif	**Error:** Excessive difference between the position determined by the absolute value encoder and the position calculated from the absolute value encoder impulses **Remedy:** Check absolute value encoder Check rotary encoder line Check rotary encoder connection (e.g. shielding)		
329	ENC:Sinus-Error S	**Fault:** Plausibility between sine and cosine track of sinus encoder unsatisfactory **Remedy:** Check sinus encoder Check rotary encoder line Check rotary encoder connection (e.g. shielding)		
330	ENC:Sinus-Error F	**Fault:** Plausibility between sine and cosine track of sinus encoder unsatisfactory Number of checks can be set in the menu "S9_ZA-Intern/ENC_C HK". The factory setting ENC_CHK=4 corresponds to a check duration of approx. 1 ms. **Remedy:** Check sinus encoder Check rotary encoder line Check rotary encoder connection (e.g. shielding)		

Error no.	Error text	Error cause	M	S
331	ENC: Error NDEF	**Error:** Start-Bit of the EnDat-protocol is not detected **Remedy:** Check EnDat encoder Check rotary encoder line Check rotary encoder connection (e.g. shielding)		
332	ENC: 1387 CD=0	**Fault:** input voltages of signal tracks C and D of absolute value encoder type ERN1387 areboth zero **Remedy:** Check absolute value encoder Check rotary encoder line Check rotary encoder connection		
372	ENC:No Abs.value	**Error:** Absolute values cannot be read in by the rotary encoder prior to starting travel **Remedy:** Check rotary encoder connection		●
373	ENC:No Abs.End	**Error:** Absolute values cannot be read in by the rotary encoder prior to starting travel **Remedy:** Check rotary encoder connection		●
374	P1P2:short-circuit	**Fault:** with parameterised motor temperature monitor "P1P2=PTC" the resistance at the input P1P2 is < 20 ohms **Remedy:** Check connected motor temperature monitor Check parameterised sensor type in "Monitoring/P1P2" menu Short-circuit at the X-MT:P1P2 is not permissible	●	
375	MOT:Temp.warning	**Fault:** motor temperature monitoring has responded at a standstill **Remedy:** Check the temperature sensor connection remove the cause for the rise in the motor temperature	●	●
377	BRxx:Temp.warning	**Error:** The continious braking power of the Brake resistor is exceeded by 150 % within 120 s A restart will be avoided **Remedy:** Check the configuration of the BR-type Check the connected BR	●	●
378	MP: Not active!	**Fault:** Mains supply of the power section not active		●
379	MP:Temp.warning	**Error:** during startup, the temperature on the power stage is too high **Remedy:** Frequency inverter is overloaded, repair the cause for the overload	●	●
380	BR: Start-Error	**Error:** When the brake monitoring is activated, at least 1 brake monitoring contact is not connected or is incorrectly connected **Remedy:** Check the functioning (NO or NC) in the monitoring contacts, check the configured number and function of the monitoring contacts in the "Monitoring" menu, check the connection of the monitoring contacts		●
385	DCP: Init fail	**Error:** Frequency inverter has not received any initialisation data from the control (for DCP03 & DCP04) **Remedy:** Check the DCP line connection, Check the type of triggering control in the "Control system" menu Check the elevator control system		●
395	MP:ERR_EXT active	**Error:** Internal defect of the device, overcurrent in the power stage	●	●

14.5.7 Error 4xx

- Abort travel to protect the ZETADYN 4
- Voltage monitoring
- Overvoltage Brake resistor / Brake-Chopper
- Power stage temperature recording
- Current monitoring

Error no.	Error text	Error cause	M	S
410	ADC: Over current!	**Error:** Maximum modulation of the analogue current converter, motor current too high **Remedy:** Check the connection at the frequency inverter output for short-circuit, Check rotary encoder connection for connection of rotary encoder tracks, check the phase position (U ↖ U; V ↖ V; W ↖ W), Check motor data in the "Motor name plate" menu, Decrease "SPD_KP" amplification in the "Control system" menu, Reduce amplification during start "K_START" in the "Start" menu		●
412	MOT:UVW fail	**Error:** Motor test current not correct **Remedy:** Check the motor connection Check the motor contactors (see also "Special functions" chapter)	●	
415	MOT: Current UVW	**Error:** Motor fault current, earth fault **Remedy:** Check the motor connection Check rotary encoder connection	●	●
420	MP: Temp. Fault	**Error:** Excess heat in the power stage **Remedy:** Check the fan, check the ambient temperature, When installing the frequency inverter in the switch cabinet, ensure it has sufficient ventilation	●	●
431	MP: PWM fail	**Error:** The pulse width modulation of the clock frequency is not switched on or off **Remedy:** Check rotary encoder connection	●	●
450	MP: Overload!	**Error:** Nominal current of the frequency inverter was exceeded for 10 s by a factor of 1.8 **Remedy:** Check motor data Check calculation Check the weight compensation	●	
470	DC: U < UDC_MIN	**Error:** Intermediate circuit has undercut the permissible value for "UDC_MIN" (Menu "Power section") during travel **Remedy:** Check the setting for the "UDC_MIN! value in the "Power section" menu, Check the frequency inverter design, Check the motor data Voltage drop during the travel Check the input phases	●	●
471	DC: U > UDC_MAX	**Error:** Intermediate circuit has undercut the permissible value for "UDC_MAX" (Menu "Power section") during travel **Remedy:** Check the setting for the "UDC_MAX! value in the "Power section" menu, Check the connection / functioning of the brake chopper / brake resistor Parameter im Menü "Encoder & BC" überprüfen, Check the size of the Brake-Chopper / Brake-Resistor,	●	●
475	DC: U > 850 V	**Error:** During travel, the intermediate circuit voltage exceeds 850 VDC **Remedy:** Check the connection / functioning of the brake chopper / brake resistor, Check the size of the Brake-Chopper / Brake-Resistor, Check selection of brake chopper / brake resistor in chapter "Encoder & BC/BC_Type"		●

Error no.	Error text	Error cause	M	S
480	MP: Overcurrent!	**Error:** In one motor phase, overcurrent was measured **Remedy:** Check the motor connection (short-circuit, earth fault), Check rotary encoder connection, Check the "SPD_KP" parameter in the "Control system" menu,		●
481	MP: Overcurr. CO	**Error:** in at least 1 open motor contactor monitoring-contact (contactor monitor on X-CO not triggered), overcurrent was measured in one motor phase **Remedy:** Check the contactor monitoring Check the contactor wiring		●
485	Intermediate circuit overcurrent	**Error:** Overcurrent was measured in the intermediate circuit **Remedy:** Check the motor connection (short-circuit, earth fault), Check rotary encoder connection, Check brake chopper/brake resistor connection, Check the "SPD_KP" parameter in the "Control system" menu,		●
490	MP: UCE -Alarm	**Error:**The IGBT monitoring was activated due to high motor current **Remedy:** Check the motor connection (short-circuit, earth fault), Check rotary encoder connection, Check the "SPD_KP" parameter in the "Control system" menu,		●
491	MP: UCE -Alarm CO	**Error:** in at least 1 open motor contactor monitoring-contact (contactor monitor on X-CO not triggered), the IGBT monitoring was activated due to high motor current **Remedy:** Check the contactor monitoring Check the contactor wiring		●

14.5.8 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	**Error:** Machine moves with deactivated MB output occurs if the brake is opened manually occurs if the brake is opened manually, **Remedy:** Check the brake functioning	●	●
502	ENC:Sin-Enc.fail	**Error:** Rotary encoder sinus signal was detected at standstill **Additional information:** The maximum output voltage of the frequency inverter was reached at the time of the error **Remedy:** Check the brake functioning Check rotary encoder connection	●	●
503	No starting	**Error:** No rotary encoder signal was received after expiration of the time T_ENC (T_ENC is started with T_2) **Remedy:** Check rotary encoder function, Check rotary encoder connection, Check the brake lifting Check the time "T_ENC" in the "Monitoring" menu Check the times "T_2" and T_3" in the "Start" menu	●	●
504	ENC: Sig.Int.	**Error:**Frequency inverter does not receive a rotary encoder signal at a target speed >10 cm/s **Remedy:** check motor connections (U ↔ U; V ↔ V; W ↔ W), Brake not closed during start, Check the motor data Check rotary encoder connection, Increase the "SPD_KP" parameter in the "Control system" menu,	●	●

Error no.	Error text	Error cause	M	S
505	MB/ENC fault	**Error:** Frequency inverter does not receive a rotary encoder signal at a target speed >10 cm/s **Additional information:** Motor current in ampere **Remedy:** check motor connections (U ↞ U; V ↞ V; W ↞ W), Brake not closed during start, Check the motor data Check rotary encoder connection, Increase/reduce the "SPD_KP" parameter in the "Control" menu	•	•
506	X_ENC15:Discon.	**Error:** Rotary encoder signal interruption during travel **Remedy:** Check rotary encoder connection, Switch frequency inverter off and then back on		
515	v > 110% V*	**Error:** Actual speed is ≥ 110% of the nominal speed V* **Remedy:** Check whether the car counterweight is pulling up, Check motor data in the "Motor name plate" menu, Check the rotary encoder resolution in the "Encoder & BC" menu, Check the "SPD_KP" parameter in the "Control system" menu,	•	•
516	v > 150% V*	**Error:** Actual speed is ≥ 150% of the nominal speed V* **Remedy:** Check whether the car counterweight is pulling up, Check motor data in the "Motor name plate" menu, Check the rotary encoder resolution in the "Encoder & BC" menu, Check the "SPD_KP" parameter in the "Control system" menu,	•	•
518 519	Speed too low	**Error:** The actual speed deviates from the target speed by -15% **Remedy:** Check rotary encoder connection, Check the rotary encoder impulses in the "Info" menu, page 11, Check the brake lifting Check motor data in the "Motor name plate" menu, Check the rotary encoder resolution in the "Encoder & BC" menu, Increase "SPD_KP" amplification in the "Controller" menu	•	•
520	Wrong direction	**Error:** Machine moves more than 12 cm in the wrong direction **Remedy:** Check rotary encoder connection, Check the rotary encoder configuration in the "Encoder & BC" menu, check the motor connections (U↞U; V↞V; W↞W) Frequency inverter design too small	•	•
522	ENC: Dif. Pos	**Error:** Excessive positive difference between the rotary encoder counter statuses of two sampling steps. The limit value corresponds to double the nominal system speed **Remedy:** Check whether the car counterweight is pulling up, Check motor data in the "Motor name plate" menu, Check the rotary encoder resolution in the "Encoder & BC" menu, Check the "SPD_KP" parameter in the "Control system" menu, Check the motor connection	•	•
523	ENC: Dif. neg	**Error:** Excessive negative difference between the rotary encoder counter statuses of two sampling steps. The limit value corresponds to double the nominal system speed **Remedy:** Check whether the car counterweight is pulling up, Check motor data in the "Motor name plate" menu, Check the rotary encoder resolution in the "Encoder & BC" menu, Check the "SPD_KP" parameter in the "Control system" menu, Check the motor connection	•	•
525	ENC: 1387 ADC Limit	**Fault:**signal track A or B of the absolute value or sinus encoder exceeding permitted limit value during travel Fault entry not made until end of travel Travel not cancelled **Remedy:** Check sinus encoder, Check the optional board for rotary encoder connection, Check the rotary encoder type in the "Encoder & BC" menu,	•	•

Error no.	Error text	Error cause	M	S
529	Quickstart alarm	**Error:** During a quick start function, the machine moves more than 7 mm while input "V=0" is triggered **Remedy:** Check the parameter in the "Motor name plate" menu, Shorten time during which input "V=0" is triggered, check the motor connections (U↔U; V↔V; W↔W)	●	●
530	STO: remains	**Error:** At the start of travel there is no signal at the STO_A and STO_B inputs at the end of the time T_SDLY. **Remedy:** Check activation of the STO inputs	●	
531	STO: Interruption	**Error:** STO input signals are interrupted for longer than 200 ms during travel **Remedy:** Check activation of the STO inputs, check safety circuit	●	
532	STO: missing	**Error:** At the end of travel there is still a signal at the STO_A and STO_B inputs at the end of the time T_SDLY. **Remedy:** Check activation of the STO inputs		
533	STO: Fault	**Error:** The status of the STO A and STO B signals was different for longer than 120 ms. **Remedy:** Check activation of the STO inputs	●	
534	STO: No travel signal	**Error:** At standstill (no travel signal) the STO inputs were set and there was no valid travel signal within the time T_SDLY. **Adjustment:** Check activation of the STO inputs, check safety circuit, check activation of the travel signals		
535	ZR:RDY abort	**Error:** The signal at the digital input set to "ZR_RDY" drops out during travel **Remedy:** Use the ZArec display to check for an error at the ZArec		
540	CO: ON!?	**Fault:** No signal is available at the end of the contactor monitoring time T_CDLY **Remedy:** Check the wiring of the contactor monitoring, check wiring the contactor control check the power supply of the motor contactors , Check the power-supply of the contactor monitoring, Check contactor switch-on time "T_CDLY " in the "Monitoring" menu, Check the contactor monitoring in the "Monitoring" menu **Info:** In case of a contactor monitor break, the inputs that triggered the error are displayed in the "Additional information" field (1: CO1, 2: CO2, 3: CO1 and CO2).		●
544	CO/RF:Vx activ!	**Error:** 300 ms after switching off the digital outputs RB and MB due to a RF- or CO-interrupt, the travel comands of the elevator control are still activated **Remedy:** Use the control to check the evaluation of the frequency inverter output signal	●	
545	CO open early	**Error:** Motor contactors are open during travel **Remedy:** Check the motor contactor triggering Check the safety circuit **Info:** In case of a contactor monitor break, the inputs that triggered the error are displayed in the "Additional information" field (1: CO1, 2: CO2, 3: CO1 and CO2).	●	
546	CO: open early M	**Error:** Motor contactors are open during travel **Remedy:** Check the motor contactor triggering Check the safety circuit	●	
548	CO1: still on	**Error:** 5s after expiration of T_CDLY, a signal is still present on the contactor monitor input CO1 **Remedy:** Check the wiring of the contactor monitoring, check wiring the contactor control		●
549	CO12: still on	**Error:** 5s after expiration of T_CDLY, a signal is still present on the contactor monitor input CO1 or CO2 **Remedy:** Check the wiring of the contactor monitoring, check wiring the contactor control **Info:** In case of a contactor monitor break, the inputs that triggered the error are displayed in the "Additional information" field (1: CO1, 2: CO2, 3: CO1 and CO2).		●

Error no.	Error text	Error cause	M	S
550	MOT: Overload !	**Error:** Motor current exceeds the value max for time Tmax **Remedy:** Check the parameter in the "Motor name plate" menu, Check the weight compensation Check the brake switching function	●	●
560	V > VZ	**Error:** Actual speed exceeds the specified nominal speed for readjustment when readjusting. **Info:** inverted Function Error is displayed if entered in mask At **CONFIG: 31:KL_IO** the function is entered in the mask automatically.	●	
570	PFU: Fault	**Error:** Monitor contact of the power feedback unit opens during ZETADYN 4 operation **Remedy:** Check connection of the feedback unit function monitor, Check feedback unit function monitor		●
571	PFU:Stdby remains in place	**Error:** PFU is not yet active 1 s after start of travel	●	
575	MOT: Temp. -Alarm	**Error:** Motor temperature monitor triggered during the trip (error evaluation only if error no. 575 is entered in the mask function) **Remedy:** Check the parameter in the "Motor name plate" menu, check the motor's duty cycle, check the motor for winding short, Check rotary encoder, Check the brake function	●	●
582	BR:T2 too small	**Error:** Brake does not open within time T2 (only active if brake monitor is switched on) **Remedy:** Check the brake triggering, check the brake opening time, check the configured brake opening time "T_2" in the "Start" menu and increase if necessary		●
583	BR: Fault Travel	**Error:** Brake monitoring contacts triggered during travel **Remedy:** Check the brake triggering, check the monitoring contacts, check the power supply of the brakes **Info:** inverted Function If entered in the mask, the error leads to immediate stop of travel	●	●
584	BR: Fault Travel	**Error:** Brake monitoring contacts triggered during travel Fault message at end of travel with additional information = 0: Brake monitor contacts have switched during travel but the brake was not closed Fault message without immediate interruption of travel and additional information ≠ 0: Brake was closed during travel **Additional information:** Indicates consequential fault **Remedy:** Check the brake triggering, check the monitoring contacts, check the power supply of the brakes	●	●
585	BR: T5 too small	**Error:** Brake does not close within time T5 (only active if brake monitor is switched on) **Remedy:** Check the brake triggering, check the brake closing time, check the configured brake opening time "T_5" in the "Stop" menu and increase if necessary		●
586	BR: Stop-Error	**Fault:** Monitoring contact of the brake briefly signals "Brake closed and then "Brake open" again longer as the time T5 (only active with the brake monitor switched on) **Remedy:** Check the brake triggering, check the brake closing time, check the configured brake opening time "T_5" in the "Stop" menu and increase if necessary		

Error no.	Error text	Error cause	M	S
590	RV1/RV2:Change	**Fault:** Change the direction specification during active travel **Additional information:** Display of the set direction 1 = RV1 3 = RV2 **Remedy:** Check control of travel directions	•	•

14.5.9 Error 7xx

- Travel abort due to communication errors between ZETADYN 4 and control

Error no.	Error text	Error cause	M	S
710	DCP: Timeout	Error: DCP communication interrupted during travel **Remedy:** check wiring (shields)	•	•
715	DCP: G0-G7 fail !	**Error:** Transmission error in the DCP protocol: Telegram for the speed preset (G0-G7) not received **Remedy:** Possibly the DCP-function of the elevator control is not compatible	•	•
720	DCP: Delay fail	**Error:** The DCP residual path increases during deceleration by more than 5cm **Remedy:** Check the absolute rotary encoder for its residual path determination Wrong residual path signal from open loop control	•	•
721	DCP: Dist. fail	**Fault:** There is no change in the residual path for 200 ms during the run **Remedy:** Check the absolute rotary encoder for its residual path determination Wrong residual path signal from open loop control	•	•
722	DCP: s_rest = 0?	**Error:** Residual path > 20mm jumps to 0mm **Remedy:** Check the absolute rotary encoder for its residual path determination Wrong residual path signal from open loop control	•	•
723	DCP: s_rest < 0!	**Error:** A negative residual path is transmitted during travel Remedy: Check the DCP wiring	•	•
780	DCP: Quick Start >20s	**Error:** In the quick start function, input "V=0" is triggered for over 20s **Remedy:** Shorten the time in which "V=0" is triggered	•	•
781	v0 at travel ?!l	**Error:** Input "V=0" is triggered during travel **Remedy:** Check the triggering of "V=0"	•	•
799	RF:Failure	**Error:** Control enable RF was switched off during travel (error evaluation only if error no. 799 is entered in the error mask) **Remedy:** Check the triggering of "RF"	•	•

14.5.10 Error 8xx

- Errors which can occur in operation with CANopen Lift

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

Error no.	Error text	Error cause	M	S
800	CAN: Timeout	**Errors in Velocity Mode:** Heartbeat from control system is missing or at wrong time. **Errors in Position Mode:** Heartbeat from control and/or rotary encoder missing or does not occur at the set times. **Adjustment:** Check CAN-connection Check if devices have the right heartbeat.	•	
810	CAN: Quick Stop Det.	**Error:** Control system activates a quick stop.		
820	CAN: Illegal Status	**Error:** Control sends commands to the frequency inverter in the wrong order. **Adjustment:** Take care to the right order in CAN drive cycle	•	

Error no.	Error text	Error cause	M	S
830	CAN: Timeout Enab.-Det.	**Error:** Control system gives command "Enable Operation" not within T_CMD **Adjustment:** Increase time for T_CMD		
831	CAN: Timeout Dis. Op.	**Error:** Control system gives command "Disable Operation" not within T_CMD **Adjustment:** Increase time for T_CMD		
832	CAN: Timeout Shut-down	**Error:** Control system gives command "Shutdown" not within T_CMD. Occurs by closing the brakes. **Adjustment:** Increase time for T_CMD		
833	CAN: Timeout Dis. Vol.	**Error:** Control system gives command "Disable Voltage" not within T_CMD. Occurs at end of travel. **Adjustment:** Increase time for T_CMD		
840	CAN: ENC. Info missing	**Error:** The object "Encoder Info" was not written to the frequency inverter by the control		

14.5.11 Error 9xx

- Fatal errors which can only be acknowledged by switching off the ZETADYN 4

Error no.	Error text	Error cause	M	S
905	MOP:HW-SW Error	**Error:** Hardware or software error occurred after switch-on. After 60 s, the frequency inverter switches to "Wait-Switch off" **Remedy:**Check the connectors between the Control Unit and Modul Print check the fuse on the Switching Power Print no Modul Print existing check EEprom on the Modul Print		
906	ZR_ERR by start	**Error:** No signal at BC input during ZETADYN 4 start-up **Remedy:** Check wiring Use the ZArec display to check for an error at the ZArec		
908	PFU: No function	**Error:**When switching on the frequency inverter, the monitor contact of the power feedback unit is not closed **Remedy:** Check connection of the feedback unit function monitor, Check feedback unit function monitor		•
910	BC: No function	**Error:** When switching on the frequency inverter, the monitor contact for the brake chopper or brake resistor is not closed **Remedy:** Check the temperature monitor for the Brake-Chopper or Brake resistor, check the temperature monitoring for the Brake-Chopper or Brake-Resistor,		
911	BRxx: Overload	**Error:** The continious braking power of the Brake resistor is exceeded by 150 % within 120 s The frequency inverter switches off during travel **Remedy:** Check the configuration of the BR-type Check the connected BR	•	
912	BC: Fault	**Error:** Monitor contact for brake chopper or brake resistor opens during frequency inverter operation **Remedy:** Check the temperature monitor for the Brake-Chopper or Brake resistor, check the temperature monitoring for the Brake-Chopper or Brake-Resistor,		

Error no.	Error text	Error cause	M	S
913	DC: U_DC>U_BC	**Fault:** at a standstill, the voltage measured at the intermediate circuit (+DC/-DC) after 5 s is higher than trigger voltage U_BC **Remedy:** Defective analysis of the DC-link voltage U_DC The synchronous motor is operated without motor contactors and driven by an external load	●	
914	X-ENC15:Miss.	**Error:**No rotary encoder detected at X-ENC15 when switching on the frequency inverter **Remedy:** Check rotary encoder connection, Reset frequency inverter		
916	X_ENC15:Discon.	**Error:**Rotary encoder signal interruption during travel **Remedy:**Check rotary encoder connection, Switch frequency inverter off and then back on		
917	BRxx activ	**Error:**The internal Transistor for the brake resistor is still triggered 5,5 s after travel-end	●	
918	MP:Temp.missing	**Error:** Temperature detector on power stage is not supplying any measurements **Remedy:** Change the device Check fuse on SP board		●
919	ZR:ERR by opera.	**Error:** Signal at BC input drops out during travel **Remedy:** Use the ZArec display to check for an error at the ZArec		
920	MOP:ERRNMI active	**Error:** Overcurrent during standstill **Remedy:** Check the brake chopper / brake resistor wiring	●	
930	MP: UCE Alarm BR	**Error:** The voltage monitoring of the transistor of the Brake resistor has triggered (Overcurrent of the electric circuit of the Brake resistor) **Remedy:** Check wiring of the Brake-Resistor Check Brake-Resistor Check whether the correct type is configured in the "Encoder & BC/BC_Typ" menu		●
931	MP:ERR_EXT active	**Error:** internal error message of the output stage **Remedy:** Switch frequency inverter off and then back on Replace the device (only after consultation of the Ziehl-Abegg-Hotline)		●
950	TD_CNT: Drive Limit	**Error:** Number of maximum drives reached! Only one travel with the actual rope remains. **Remedy:** Change ropes and reset the down counter. After resetting the ZETADYN 4C there is one additional drive possible.		●
960	STO: Diagnostic	**Error:**The status of the STO A and STO B signals was different for at least 310 ms so that the internal diagnostic unit performed a switch-off. **Adjustment:** Check activation of the STO inputs. Error can only be reset once the ZETADYN 4 is switched off.	●	●
961	STO: Hardware	**Error:** Internal hardware error **Adjustment:** Error can only be reset once the ZETADYN 4 is switched off.	●	●
991	MOP: Timeout	**Error:** The communication between the processors was interrupted or the communication between the processors is faulty during travel. **Remedy:** Make sure that the EMC regulations are observed (see chapter "Electrical Installation / EMC-conform Installation")	●	●
994	MOP: Timeout 2	**Error:** I standstill the communication between the Motor-Management-Processor (MOP) and the Application-Processor (APP) is interupped for more than 7.5 s Increased BR-protection	●	
995	ENC:1387 CD-Lim	**Fault:** signal track C and/or D of absolute value encoder type ERN1387 exceeds permitted limit value before travel starts **Remedy:** Check absolute value encoder Check the optional board for rotary encoder connection Error can only be reset once the ZETADYN 4 is switched off.	●	●

14.5.12 Information texts

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

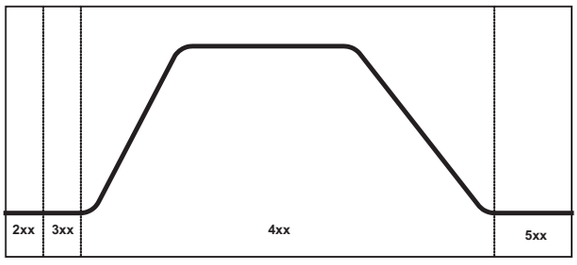
Information text	Cause
CO-Interrupt	During a non distance-dependent travel (speeds V4 ... V7) the travel contactors are opened. During the halt process the motor contactors open before the timer T5b has expired. The number of CO interruptions is counted in the **Statistics/SCO** menu.
RF-Interrupt	The controller enable (signal CE) is deactivated during travel. During the halt process the controller enable (signal CE) is deactivated before the timer T5b has expired. The number of CE interruptions is counted in the **Statistics/SCE** menu.
s1 = 0 cm	During the distance-dependent delay phase from travelling speed V2 or V3 to positioning speed V1 the signal is already deactivated for the positioning speed V1.
Attention! n*>n	Calculated speed n* is greater than the speed n specified on the rating plate.
automatic pre-signment?	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.

14.6 Operating modes of the ZETADYN 4

The frequency inverter software divides the operating curve into various sections. Each of these sections is assigned a status number that refers to a defined service condition.
If an error occurs, the status number is stored with the error number in ther error list.
Furthermore, the operating conditions are displayed with the status number and in plain test in the **Info/Page02** menu.

status	Condition of the frequency inverter	status	Condition of the frequency inverter
10	Checking of voltage supply	430	Constant running at speed V3(time-dependent, V1 is not activated)
21	Check software version	431	Round down the acceleration to V3 (distance-dependent)
22	Parameter transmission	432	Linear acceleration to V3 (distance-dependent)
30	Check absolute value encoder	433	Constant travel with V3 (distance-dependent)
41 42	Check input BC 41: Power feedback unit 42: Brake chopper or brake resistor	435	Deceleration with safety ramp
50	Adjust current transformer	440	distance dependent travel with DCP4
70	Check temperature power unit	480	Retract to standstill
100	Device off	490	fast stop
105	Power feedback unit on standby	500	Keep motor at speed 0 (T4)
110	Machine ready	510	Wait until motor brakes are closed (T5)
200	Start-up check	515	Brake gets additional current feed for 1s
210 ... 223	Check absolute value encoder	520	S Switch off current to motor (T5b)
280	Wait until STO is switched off (inputs STO_A and STO_B set)	530	Wait until motor contactors switched off (T6)
300	Wait until motor contactors switched on (T0)	535	Travel interrupted due to interruption of the controller enable RF
305	Checking the motor phases	536	Travel interrupted due to interruption of the contactor monitor COx
310 311	A Build-up of magnetic field in the motor (T1)	538	Wait until STO is switched on (inputs STO_A and STO_B reset)
320	Wait until motor brakes have opened (T2)	540	Wait for standstill
330	Accelerate motor to speed V_T3 (T3)	550	Checking the input BR after travel finished
340	Start up	560	End of travel

status	Condition of the frequency inverter	status	Condition of the frequency inverter
400	Accelerate to speed Vx	900	Delay of automatic acknowledgement after remedying the cause of the fault (2 s)
402	Constant running at speed Vx	950	Parameter change
404	Delay from speed Vx	982	Motor type changed
410	Constant running at speed V1	988	Wait for reset
420	Constant running at speed V2	990	Fault input BC
421	Round down the acceleration to V2 (distance-dependent)	991	No absolute value encoder detected
422	Linear acceleration to V2 (distance-dependent)	992	Temperature of the power section missing
423	Constant travel with V2 (distance-dependent)	996	Wait until ZETADYN 4 is switched off for error acknowledgement
424	Rounding up and linear delay from V2 (distance-dependent)	997	Frequency converter is in stand-by mode
425	Rounding down of the delay from V2 (distance-dependent)	998	Wait until ZETADYN 4 is switched off



Travel curve with related status numbers

14.7 Frequent startup problems

Problem	Cause	Adjustment
ZETADYN 4 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
ZETADYN 4 stands still in status 40 during start procedure, the fault 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	

14.8 Automatic parameter check (APC)

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

```
Monitor
↳APC      ON
  ↳       ON
Auto. parameter via
```

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

14.9 Automatic parameter diagnostics (APD)

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

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

```
Statistics
↳APD      OFF
  ↳       ON
Automatic parameter
```

15 Energy saving

15.1 ZETADYN 4 standby function

To save energy at standstill, the ZETADYN 4C can be switched to standby mode. Internal components of the ZETADYN 4 are switched off in standby mode. This means that the ZETADYN 4 has a much lower power loss at standstill. There are two standby modes in the ZETADYN 4C: 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.

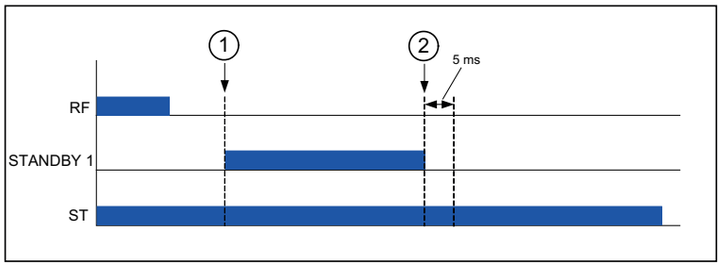
15.1.1 Activate Standby 1 or Standby 2 mode

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**.

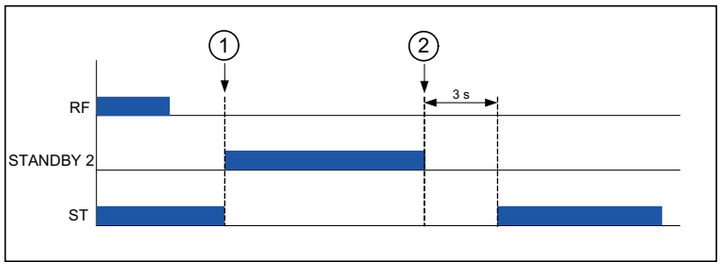
```
Control
↳ f_I08   STANDBY1
  ↳       STANDBY1
Function I08
```

5 ms after deactivation of the digital STANDBY1 input the ZETADYN 4 is ready for operation again (see diagram).



Function stand-by 1 mode ZETADYN 4C
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 ZETADYN 4 is ready for operation again. The ST fault output is activated (see diagram).



Function stand-by 2 mode ZETADYN 4C
1 STANDBY2 input is activated
2 STANDBY2 input is activated
RF Controller enable
STANDBY2 Input with STANDBY 2 function
ST Fault

15.2 Power Feedback Unit (PFU)

The power feedback unit offers the possibility to save energy by feeding the energy generated in a generator run into the supply network. This energy is used by other consumers in the building.

Information

By using a power feedback unit graduation in energy efficiency class A according to VDI 4707 can be achieved!

15.2.1 Stand-by operation of the power feedback unit

To reduce the power loss of the power feedback unit at standstill the REVCON power feedback unit can be switched to stand-by mode.

		Revcon				
		SVC 07- 400	**SVC 13 - 400**	**SVC 22 - 400**	**SVC 33 - 400**	**SVC 70 - 400**
Power losses during standstill	[W]	24				
Power loss in stand-by	[W]	8				

15.2.1.1 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 stand-by mode the input A2 of the power feedback unit must be disconnected from GND!

Deactivation of the digital output PFU:

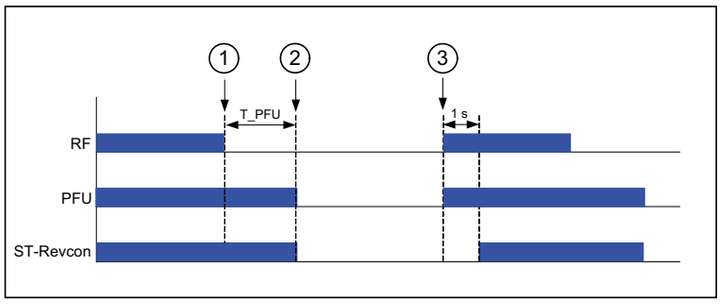
- Power feedback unit switches to standby mode

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
```

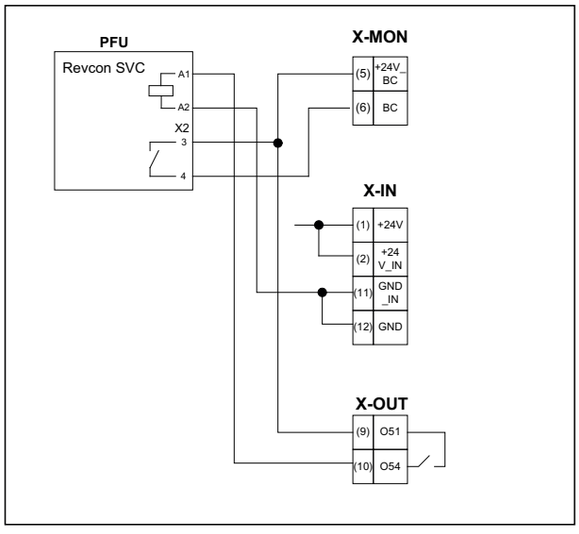
If the parameter **T_PFU** is set to **0s** , the output PFU is always active. Standby is now deactivated.

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



Function stand-by mode Revcon
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

15.2.1.2 Electrical connection stand-by mode



Connection Revcon power feedback unit with stand-by mode

15.2.1.3 Power feedback unit in connection with automatic emergency evacuation.

CAUTION!

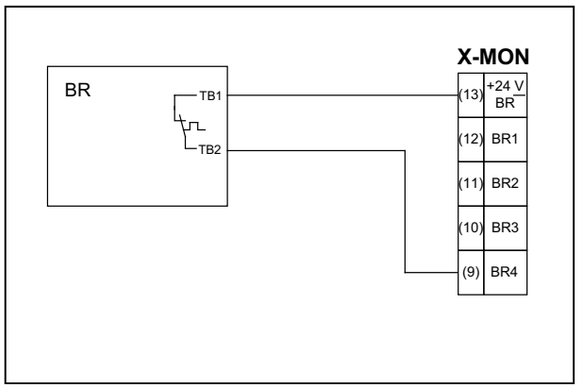
In lift systems with automatic emergency evacuation by a single-phase mains supply (emergency power supply unit/UPS) or battery (EVAC 3B) the power feedback unit is not active due to the too operating voltage failure. To avoid too high a voltage in the intermediate circuit when evacuating by a generator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

16 Special functions

16.1 Changing the Clock frequency

The factory setting of the ZETADYN 4 switching frequency depends on the size and the motor type:

Size	Synchronous motor	Asynchronous motor
ZETADYN 4xx011 ZETADYN 4xx013 ZETADYN 4xx017 ZETADYN 4xx023 ZETADYN 4xx032	Clock frequency 16 kHz auto (Parameter M_PWM=Auto)	Clock frequency 16 kHz auto (Parameter M_PWM=Auto)

Information

If necessary the clock frequency can be changed continuously between 2.5 … and 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

Only change the clock frequency after consultation with the Ziehl-Abegg hotline. Consultation can clarify the effect of changing the clock frequency on the service life of the ZETADYN 4.

CAUTION!

Caution!

Increasing the clock frequency causes

- **a performance reduction of the ZETADYN 4 (see Technical Data chapter)**
- **a greater heat dissipation and thus increased heating of the ZETADYN 4**

The service life of the ZETADYN 4 is negatively influenced by the higher temperatures.

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

The cycle frequency of the ZETADYN 4 is 8 kHz after setting at the factory. This can be changed, if necessary, in the **Power Unit/f_PWM** menu continuously between 2.5 ... 10 kHz.

16.1.2 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.

16.2 Rotary encoder calibration

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 calibrate the absolute value encoder!

Options for calibrating an absolute value encoder

The ZETADYN 4 ZETADYN 4C offers two different methods of calibrating the absolute 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 (ropes 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)

16.2.1 Load-free alignment SSI-Encoder

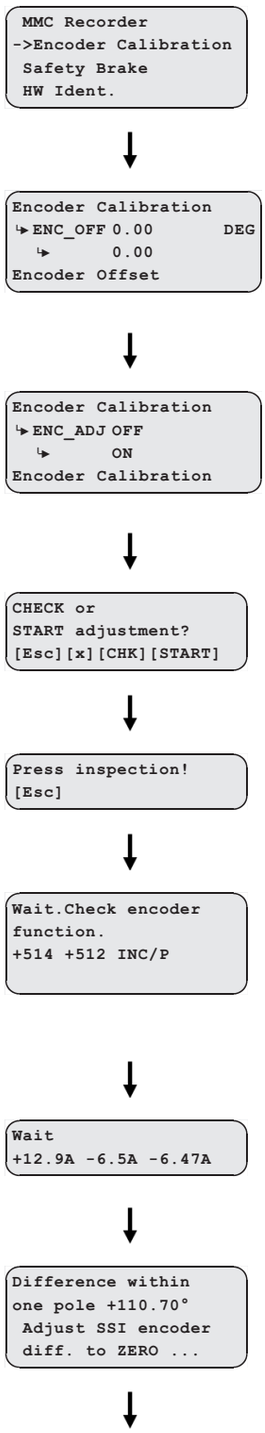
While the SSI encoder is being calibrated, the ZETADYN 4 energises the motor with direct current. In the process, the rotor jumps to the centre of the nearest magnetic pole. In this rotor position, the SSI encoder must be manually calibrated to its zero point. In order to make assembly easier, it is recommended that you connect the SSI encoder to the ZETADYN 4 prior to assembly and calibrate the offset value "0" (value in the **ENCODER calibration/ENC_POS** menu). Subsequently mount the SSI encoder, if possible without any twisting, in the position in which the locking screw is easily accessible.

Information
The calibration should always be done twice. Any inaccuracy in the 1st calibration is detected by the 2nd calibration and can be corrected.

If the SSI encoder terminal screw is not accessible in the "ENC_POS = 0" position, the SSI encoder can be calibrated to the value of any pole pair (see table).

Pole pair	ZETATOP-motor SM 160 / SM200 / SM225 / SM250	ZETASYN-motor SM700 / SM860
1	0	0
2	819	546
3	1638	1092
4	2458	1638
5	3277	2185
6	4096	2731
7	4915	3277
8	5734	3823
9	6554	4369
10	7373	4915
11	-	5461
12	-	6007
13	-	6554
14	-	7100
15	-	7646

Carrying out the load-free alignment with SSI-encoder



Select menu **Encoder adjustment**

Select parameter **"ENC_OFF"**
Enter "ENC_OFF=0"

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

Start Encoder-adjustment with **[START]**

Keep the inspection run push-button pressed.

The motor is powered in phase U and the rotor to zero of the next pole.
Encoder check, check the motor data for plausibility.

- Display of number of expected (calculated) impulses / pole pair (e.g. 512)
- Display of impulses counted between the poles (e.g. 514)

Rotor is held in zero point of the next pole
- Display of motor current of phases U V W

Offset value (electrical angle, 360° per pole)

Adjust encoder mechanically?

No

Adjustment by entering the offset value:
The encoder is not moved mechanically, the offset value is retained and is corrected by entering the encoder offset value in the controller unit.
The offset value must be available when changing devices!
If the value is not available, a new encoder adjustment must be made!

End the adjustment procedure by switching off the inspection run.

```
Please check and
if necessary set
ENC_OFF=249.32°
[OK]
```

The encoder offset must be corrected to the specified value!
The value must be noted.

```
Encoder Calibration
↳ENC_OFF 249.32     DEG
  ↳      249.32
Encoder Offset
```

Yes

Mechanical adjustment of the encoder:
Adjust the encoder as exactly as possible to the value **0 °** by turning and tighten the locking screw carefully, correct the encoder position if necessary.
At the end of the adjustment procedure the encoder must be tightened and value close to **0**.
At deviations less than ± 2.00 ° the adjustment is considered correct. A
deviation of max. ± 1 ° is recommended.

End the adjustment procedure by switching off the inspection run.

```
Mechanical SSI
adjustment is quite
correct!
[OK]
```

16.2.2 Load-free alignment EnDat-Encoder

While the EnDat encoder is being calibrated, the ZETADYN 4 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".

Information
The calibration should always be done twice. Any inaccuracy in the 1st calibration is detected by the 2nd calibration and can be corrected.

Carrying out the load-free alignment with EnDat-encoder

```
 MMC Recorder
->Encoder Calibration
 Safety Brake
 HW Ident.
```

Select menu **Encoder adjustment**

↓

```
Encoder Calibration
↳ENC_OFF 0.00       DEG
  ↳      0.00
Encoder Offset
```

Select parameter **"ENC_OFF"**
Enter "ENC_OFF=0"

↓

```
Encoder Calibration
↳ENC_ADJ OFF
  ↳      ON
Encoder Calibration
```

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

↓

```
CHECK or
START adjustment?
[Esc][x][CHK][START]
```

Start Encoder-adjustment with **[START]**

↓

```
Press inspection!
[Esc]
```

Keep the inspection run push-button pressed.

↓

```
Wait.Check encoder
function.
+514 +512 INC/P
```

The motor is powered in phase U and the rotor to zero of the next pole.
Encoder check, check the motor data for plausibility.

- Display of impulses counted between the poles (e.g. 514)
- Display of number of expected (calculated) impulses / pole pair (e.g. 512)

↓

```
Wait
+12.9A -6.5A -6.47A
```

Rotor is held in zero point of the next pole
- Display of motor current of phases U V W

↓

```
Difference within
one pole -1.89
! Stop inspection!
```

Display of difference between calculated and measured angle between 2 poles

End the adjustment procedure by switching off the inspection run.
The offset value is saved in the encoder.

↓

```
Encoder adjustment
was successfully
finished
[EXIT]
```

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

While the rotary encoder calibration is being checked, the ZETADYN 4 energises each individual pole with direct current. The offset is determined at each pole and the averaged offset is calculated. This offset can be saved in the ZETADYN 4.

Information

The offset determined during the check is not saved in the ZETADYN 4 because if the frequency inverter is replaced, the new frequency inverter will not use the same rotary encoder offset. A new rotary encoder offset must be performed, or the old rotary encoder offset must be entered.

Information

During the rotary encoder offset, the driving disk must turn to the right (when looking at the driving disk). Once the calibration 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**.

Carrying out the checking of the encoder offset

```
MMC Recorder
->Encoder Calibration
Safety Brake
HW Ident.
```

Select menu **Encoder adjustment**

↓

```
Encoder Calibration
↳►ENC_OFF 0.00      DEG
  ↳      0.00
Encoder Offset
```

Select parameter **"ENC_OFF"**
Enter "ENC_OFF=0"

↓

```
Encoder Calibration
↳►ENC_ADJ OFF
  ↳      ON
Encoder Calibration
```

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

↓

```
CHECK or
START adjustment?
[Esc][x][CHK][START]
```

Start check with **[CHK]**

↓

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

↓

Information is shown in the display during automatic adjustment:
Line 1:
0/0A: Current in motor phase U / V
36: Current temperature of the power unit
Line 2:
Display rotor position
Line 3:
ACT: Current action
M1 / M2: Measurement 1/2
-> <- Slow positioning of a pole
>> << Fast positioning of the next pole
prog: Latest current pointer position
Line 4:
POLE: Number of the approached pole pair
real: Currect encoder position within a pole

Release inspection run push-button

Result of the check is displayed:
Line 1:
ERR_AVG: Average error in degrees (electr. angle)
Line 2:
ERR_MAX: Maximum error in degrees of average value
Line 3+4:
Optimum ENC_OFF: Correction factor encoder offset (electr. angle)

16.2.4 Rotary encoder calibration with closed brake

If the rotary encoder is calibrated with the brake closed, there is no need to take the cable off the driving disk. This allows calibration to be performed with much less effort.

CAUTION!

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

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

CAUTION!

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

Perform calibration of EnDat or SSI encoders

```
 MMC Recorder
->Encoder Calibration
 Safety Brake
 HW Ident.
```

Select menu **Encoder adjustment**

↓

```
Encoder Calibration
↳►ENC_OFF 0.00       DEG
  ↳►      0.00
Encoder Offset
```

Select parameter **"ENC_OFF"**
Enter "ENC_OFF=0"

↓

```
Encoder Calibration
↳►ENC_ADJ OFF
  ↳►      ON
Encoder Calibration
```

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

↓

```
CHECK or
START adjustment?
[Esc][x][CHK][START]
```

Start check with the ⓘ key.

↓

```
Is the elec. connec.
to the mechanical
brake disconnected?
[Esc] [Yes][No]
```

Disconnect electrical connection of the mechanical brake.

Confirm with the ⓘ key.

↓

```
Press inspection!
[Esc]
```

Keep the inspection run push-button pressed for approximately 2 minutes.

↓

```
*Set test current
 0 8.8A 23V
```

Motor voltage is increased until motor current flows.
Calibration is performed.

↓

```
Stop inspection !
```

Release inspection run push-button

↓

```
*Result: 2.7A
132-222 -> 176/ 356
 ENC_ABS=263
ENC_OFF=356 [END]
```

Result of the adjustment is displayed (176 / 356)
If ENC_OFF = ? is displayed, it is not possible to determine the correct Encoder Offset. In this case one of the two results (176 or 356 in the example) is correct. It is recommended to move the motor shaft to a different position by briefly releasing the brake and to repeat the calibration. If correct calibration i still not possible, a test run must be made with both of the received results. With one result the motor runs error-free, with the other result uncontrolled movements of the motor can occur!

↓

```
Save new ENC_OFF?
[no] [yes]
```

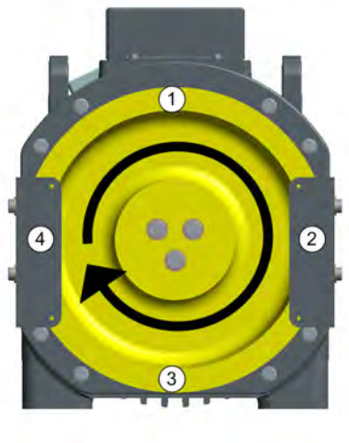
Query whether determined encoder offset (ENC_OFF) is to be saved
[yes]: Value is saved
[no]: Value is not saved

16.2.5 Alignment absolute encoder type ERN1387

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

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

The traction sheave needs to be turned through approx. 90° after every calibration.



Absolute value encoder calibration positions

Carry out encoder calibration type ERN1387

```
* Result: 2.7A
144-228 -> 186/ 6
ENC_OFF= 6 [END]
```

Perform rotary encoder calibration 4 times with the brake closed.
Note the value for ENC_OFF after each calibration

$$ECN\_OFF = \frac{ECN\_OFF_1 + ECN\_OFF_2 + ECN\_OFF_3 + ECN\_OFF_4}{4}$$

Calculating the average offset

```
Encoder Calibration
↳ENC_OFF 6.00 DEG
  ↳      6.00
Encoder Offset
```

Enter mean offset in parameter **"ENC_OFF"**
in the menu **"Encoder-adjust"**

16.2.6 Error messages during absolute value encoder calibration

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

16.3 Safety Brake

Function to release the car from the safety gear.

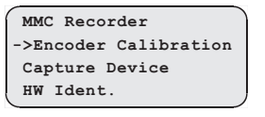
In this function, the motor builds up its maximum torque dependent on the configured values for the pulse sequence, thus attempting to pull the car from the arrester.

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

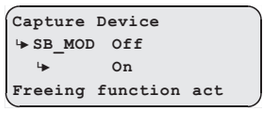
CAUTION!

Caution!
Do not repeatedly carry out the safety brake function because that can destroy the ZETADYN 4.

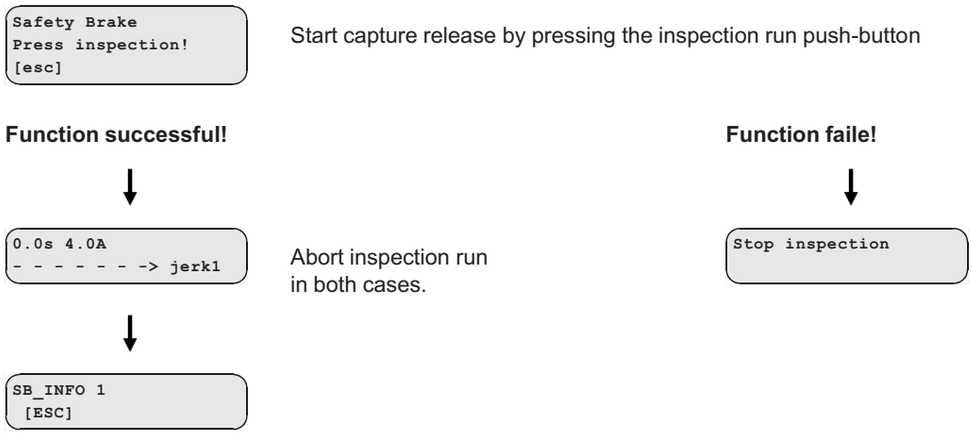
Carrying out the safety brake-function



Select **"Capture device"** menu



Select **"SB_MOD"** parameter
Activate capture release



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

Possible errors during safety gear mode

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

16.4 Reset

Allocating the parameters of the ZETADYN 4 with the standard values or customer specific system data.
The works setting is made by a numeric input in the **Statistics/RESET**menu.
Reset-functions:

Reset-No.	Effect
77	**Pre-parameterised ZETADYN 4:** Parameters are assigned customer-specific system data **Standard ZETADYN 4:** Parameters will be set with standard data
90	deleting of: • Parameter • Error list • Error messages Parameters will be set with standard data
99	deleting of: • Parameter • Error list • Error messages • Encoder-Offset "ENC_OFF" (will be set to 0) Parameters will be set with standard data

CAUTION!

Caution!

S

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

Operating the motor without rotary encoder calibration can cause uncontrolled motor movements!

CAUTION!

Attention! - Reset 90 and 99

Any pre-configuration 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).

16.5 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 ZETADYN 4 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 ZETADYN 4 lights blue when the ZETADYN 4 is accessing the memory card.

16.5.1 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!

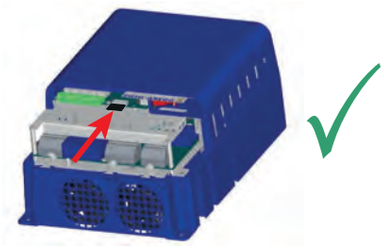
16.5.1.1 Software update with the ZETAPAD operating terminal

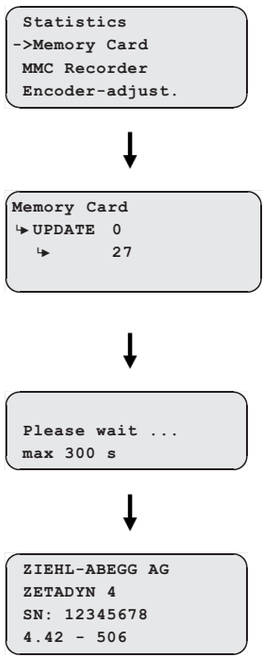
Perform a software update

▷ 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 ZETAPAD!

Memory card in card slot of the ZETAPAD


Memory card in the X-MMC card slot



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

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

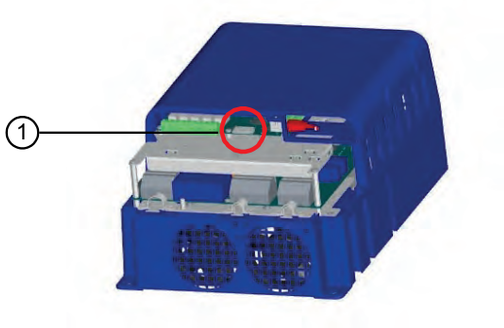
Confirm with the key.

The update is performed and last a maximum 5 minutes.

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

16.5.1.2 Software update without the ZETAPAD operating terminal

1. Switch off the master switch and wait until the controller unit is voltage free.
2. Insert the memory card with the software update into the "X-MMC" card slot (see Fig.).
3. Switch on the main switch. The frequency inverter starts again.
4. 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).
5. The Update starts (duration max. 300s).
6. Following another automatic reset, the ZETADYN 4 is once more ready for operation.

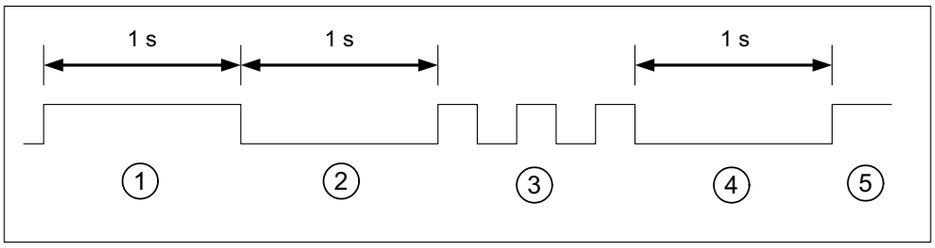


1 X-MMC card slot position

16.5.1.3 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
8,14	Internal programing voltage does not switch on
8,19	Internal programing voltage does not switch off (it is possible that the prog. key is blocked)
16	Error while deleting the program memory (flash delete error)
17	Error while writing the program memory (Flash write error) (Flash write error)
18	Error while checking the written files in the program memory (flash data error)
23	Memory card was removed too early

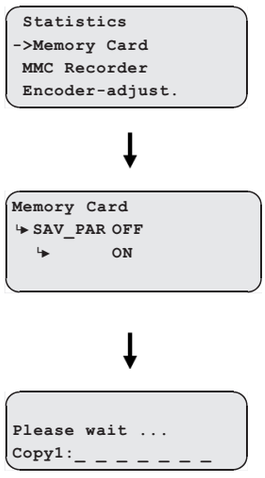
16.5.2 Saving parameters

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.

Saving parameters



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

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

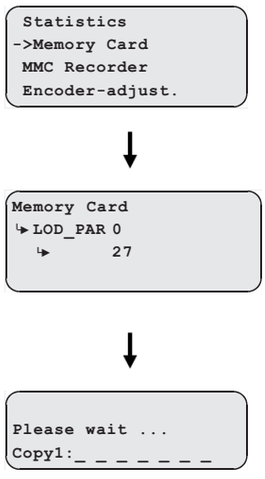
Confirm with the key.

The parameters are saved.

16.5.3 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"

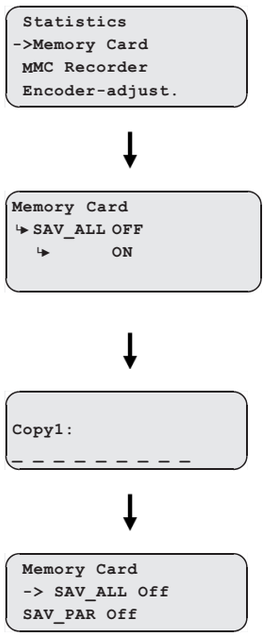
Confirm with the key.

The parameters are saved.

16.5.4 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 ZETADYN 4 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).

Loading parameters



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".

16.5.5 Performing measurements

It is possible to perform measurements on the ZETADYN 4. 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.

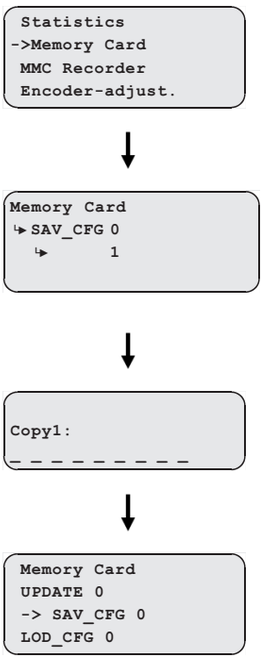
The actual number of runs is used as a file name (e.g. "00000109.ZR3" for 109 runs).

16.5.6 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.

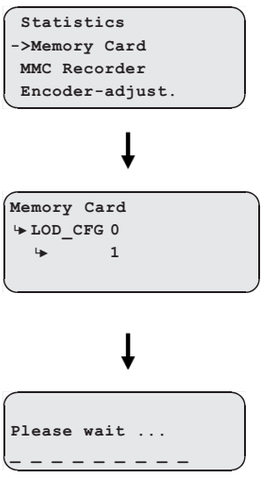
The parameter list and the printer list are saved.

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

16.5.7 Loading configurations

Saved configurations of parameters can be loaded from the memory card into the ZETADYN 4 by entering the respective configuration number. The parameters list saved in the "CONFIG" folder is loaded into the ZETADYN 4 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.

16.6 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	Description
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	Description
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.

16.7 Field weakening

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

If the require motor speed for an asynchronous motor n* is above the rated speed n of the motor, the ZETADYN 4C 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.

16.8 Open loop operation (operation without encoder)

Information
Restrictions during open loop operation:

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

16.8.1 Activate operating mode for open loop operation

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

```
Encoder & BC
↳ENC_TYP No Enc.
  ↳      No Enc.
Encoder type
```

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

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

16.8.2 Parameters for open loop operation

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

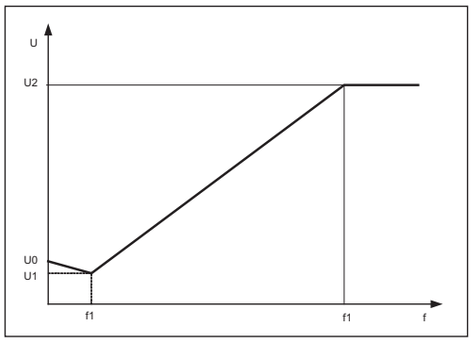
Parameter	Description	Value range	Factory setting
C_MOD	Controller Mode Selecting the operating mode of the ZETADYN 4 **FOC:** Operation with encoder (Closed-Loop) **U/f:** Operation without encoder (Open Loop)	FOC U/f	FOC
UF_ED	U/f-Edit-mode Enabling the additional parameters with Open-Loop-operation (U/f)	On Off	Off
V_0	Minimum travel speed at start The setpoint for V_0 will be activated before the brake opens	0 ... 0.2 m/s	autom. preconfiguration
V_STOP	Minimum travel speed at stop The brake will be closed when the V_STOP is reached	0 ... 0.2 m/s	autom. preconfiguration
I_Kipp	Tilting protection: If the entered limit value is exceeded, the set value for the speed will be reduced.	0 ... 90 A	autom. preconfiguration
U0	Voltage at speed 0 of the frequence dependent voltage characteristic	0 ... 460 V	autom. preconfiguration
U1	Start voltage of the frequency dependent voltage characteristic	0 ... 460 V	autom. preconfiguration
U2	Corner voltage of the frequency dependent voltage characteristic	0 ... 460 V	autom. preconfiguration
f1	Start frequency of the frequency dependent voltage characteristic	0 ... 125 Hz	autom. preconfiguration
f2	Corner frequency of the frequency dependent voltage characteristic	0 ... 125 Hz	autom. preconfiguration
s_FIL	Filter for measuring motor current for the slip compensation	0 ... 400 ms	autom. preconfiguration
s_COMP	Operation with slip-compensation **On:**Slip-compensation is activated **Off:**Slip-compensation is deactivated	On Off	Off

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

16.8.3 Functions with Open-Loop-operation

16.8.3.1 U/f-characteristic curve

With entering the motor data in the menu **motor name plate** the parameters "U0", "U1", "f1" and "f2" will be pre-assigned. By these parameters the U/f-characteristic curve will be defined. The U/f-characteristic curve sets the motor voltage depending on the frequency of the rotating field in the stator.



U/f-characteristic curve

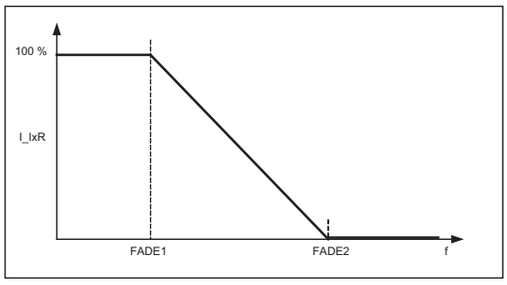
16.8.3.2 Current-control

For improving the startin, the stopping as well as the travelling with a slow speed, the motor will be energised with a minimum current (Parameter **Controller/I_IxR**). With the parameters FADE1 and FADE2 the current can be set depending on the frequency (f) of the rotating 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

16.8.3.3 Slip-compensation

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

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

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

Functionality:
The motor current is recorded by a filter (parameter "s_FIL"). Proportional to the measured motor current:

- 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.
```

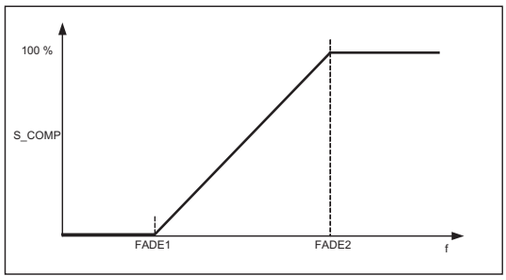
Voltage: parameter **"U_S_MX"**

The slip-compensation depends on the paremeter "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.

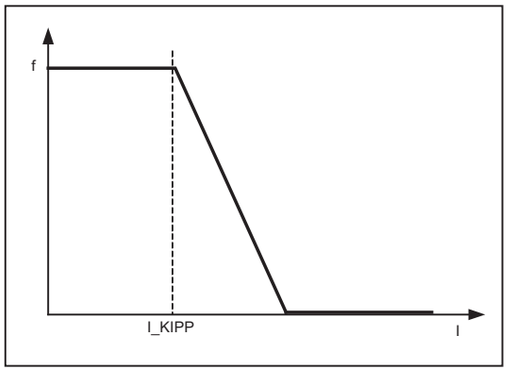


Fader-function with slip-compensation

16.8.3.4 Tilting protection

Avoids an uncontrolled tilting of the speed.

Functionality:
The motor current is recorded by a filter (parameter "s_FIL").
If the setted limit value for the current (Parameter "I_KIPP") is exceeded, the setpoint for the speed will be reduced linear to the motor current.



Tilting protection

16.8.4 Improvements with Open-Loop-operation

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

16.8.4.1 Optimizing start up behavior

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

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

16.8.4.2 Slip-compensation

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

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

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

16.9 Operation with a 3-phase 230 VAC power supply

Der ZETADYN 4 ZETADYN 4C can be operated with a voltage supply 3~ 230 VAC.
For this purpose, it is only necessary to adapt various monitoring functions to the lower power supply.

```
Power component
↳UDC_N   325         V
  ↳      325
Nominal DC voltage
```

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

↓

```
Power component
↳UDC_MIN 250         V
  ↳      250
Min. DC voltage
```

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

↓

```
Power component
↳UDC_MAX 760         V
  ↳      760
Max. DC voltage
```

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

↓

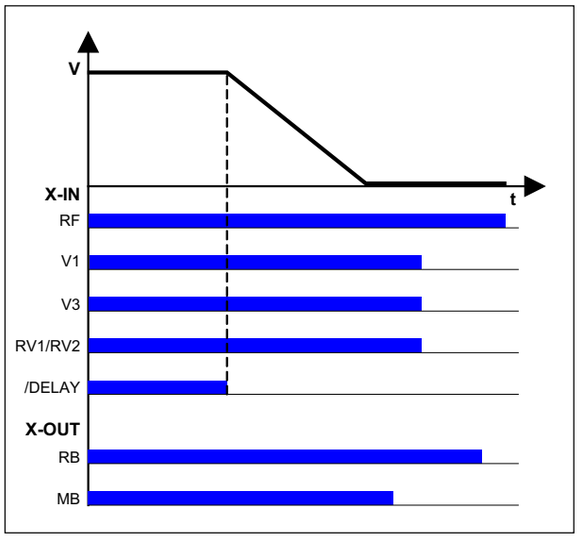
```
Power component
↳U_BC    650         V
  ↳      650
BC intervention voltage
```

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

16.10 Controlled emergency stop in inclined elevators

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

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



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

16.11 Travel direction counter

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

16.11.1 Parameters for the travel direction counter

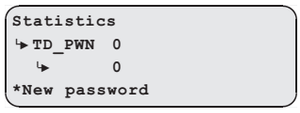
For the travel direction counter there are the following parameters, available in the menu **Statistic**.
In order to be able to use all parameters, the password **TD_PWN** must be assigned first.

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

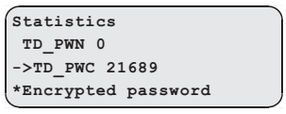
The current counter readings and the start value of the travel direction change counter are also available in the **INFO menu** on **page 20**.

16.11.2 Configuring the travel direction change counter

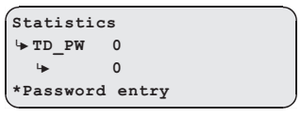
For using the travel direction counter, the following parameters have to be adjusted.



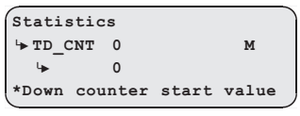
Assign new password with the parameter **"TD_PWN"** in the menu **"Statistic"**.
If there is already a password existing, you have to enter it to "TD_PW" before it can be replaced by a new password.



The coded password is shown with the parameter **"TD_PWC"** in the menu **"Statistic"**.
With the coded password the ZIEHL-ABEGG SE can decode the original password.
For example if the owner has forgotten it.



Before you can change TD_CNT you have to enter the password to the parameter **"TD_PW"** in the menu **"Statistic"**.



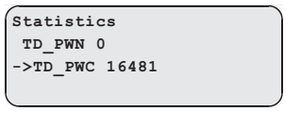
Enter the maximum allowed travel directions with the parameter **"TD_CNT"** in the menu **"Statistic"**.

CAUTION!

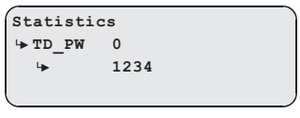
Caution!
When replacing the ZETADYN 4C the actual value of the down counter "TD_CNT" must be transferred to the new ZETADYN 4C !

16.11.3 Configuring a preallocated travel direction change counter

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



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



Enter password.

16.11.4 Output functions

Two special counterfunctions can be assigned to the digital outputs of the ZETADYN 4C when using the change of direction counter:

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

16.11.5 Resetting the travel direction counter

Information

At the end of maximum change of direction ZETADYN 4C is locked and the error **"E950 TD_CNT: Drive Limit"** appears in the display.
To move the cabin into the position for a cable change after locking the frequency inverter, the ZETADYN 4C must be switched off and back on. Then a further run is possible.

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

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

Entert he current password in the menu **"Statistics"**, "Parameter" **"TD_PW"** to be able reset the value of the down counter.

```
Statistics
↳ TD_CNT  0           M
  ↳       0
*Down counter start value
```

Enter the maximum allowed travel directions with the parameter **"TD_CNT"** in the menu **"Statistic"**.

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

16.11.6 Restore the counter reading from the absolute value encoder

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

- up to 1,000 direction changes, performed every 100 direction changes
- up to 10,000 direction changes, performed every 1,000 direction changes
- above 10,000 direction changes, performed every 3,000 direction changes

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

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

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

In the **"Statistics"** menu, enter the current password for the parameter **"TD_PW"**.

```
Statistics
↳ TD_RST  OFF
  ↳       ON
*Restore counter reading
```

In the **"Statistics"** menu, set the parameter **"TD_RST"** to "ON".

The counter reading is restored and can be viewed in the parameter TD_CNT in the **Info menu on page 20**.

16.12 Self-monitoring of the brakes according to EN81-A3

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.

16.12.1 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).

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

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

16.12.2 Activation of the ZETADYN lock in case of a malfunctioning brake circuit

The lock function of the ZETADYN is engaged by activating the “LOCKBR=On” parameter in the “Monitors” menu.

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

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

16.12.3 Function test of the self-monitoring

Function test according to EN81-1:1998+A3:2009

The self-monitoring test required according to EN81-1:1998+A3:2009 Enclosure F8.3.2 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

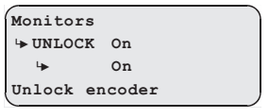
1. Disconnect signal cable at a monitor input.
2. Perform test run.
3. The error message "380 BR:Start Error" (monitor function "NCC") or "582 BR:T2 too small" (monitor function "NOC") must be output already at the start, otherwise the monitor is faulty.
4. The ZETADYN locks, no further travel is possible.
5. Re-connect the signal cable.
6. Repeat the test run to check the lock. A new run may not be possible, the ZETADYN 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.

```
Monitors
↳UNLOCK  On
  ↳      On
Unlock encoder
```

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 ZETADYN.
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 ZETADYN 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 ZETADYN 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.



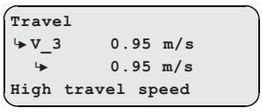
Repeat test step 2 for every monitor input.

16.13 Autotune function

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

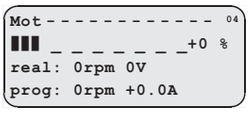
Information
Make sure that the cabin is empty whilst performing a measurement with the Autotune function, otherwise the measuring result will be incorrect.

Determining the operating data with the Autotune function



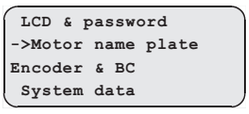
Standard or DCP actuation:
When you use the standard or the DCP activation, reduce V_3 to 75% of V* in the **Travel** menu.

CAN actuation:
If you use CAN activation, reduce the travel speed manually to 75% with the control.

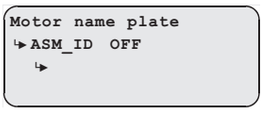


Move down with empty cabin. Check in the **INFO menu/page 04** whether motor voltage is < 320 V.

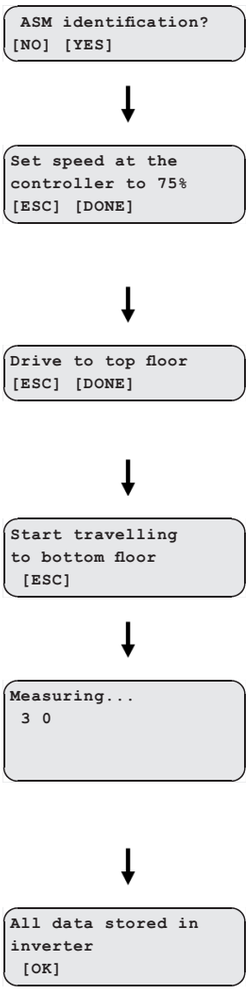
If the motor voltage is > 320 V, reduce V_3 further in the **Travel** menu. Repeat the steps until the motor voltage is < 320 V.



Select menu **"Motor name plate"**



Select parameter **"ASM_ID"**
Enter "ASM_ID=On"



Confirm with the ↵ key.

Confirm that you have reduced the travel speed to 75% with the ↵ key.
If you have not yet reduced the travel speed to 75%, press the ESC key and start determining the operating data from the beginning with the Autotune function.

Go to the top floor with the control travel command.

Confirm that the cabin has reached the top floor with the ↵ key.

Go to the bottom floor with the control travel command.

Determines the motor data.
In the meantime the ZETADYN 4C counts up from 0 to 10.

This and the two previous steps are repeated until the measuring process is completed.

Motor data are stored in the parameter memory of the ZETADYN 4C.

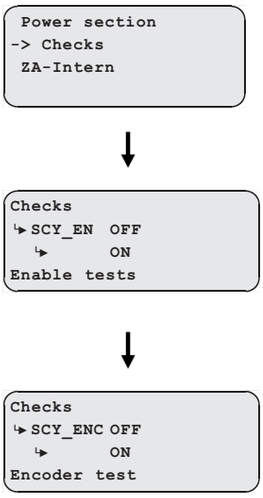
Confirm with the ↵ key.

16.14 Support with acceptance test

16.14.1 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"

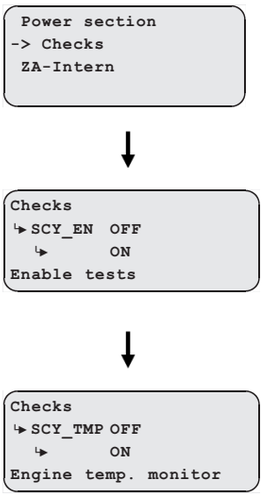
Then send a travel signal. The travel is aborted with an error message because the rotary encoder is deactivated. The SCY_EN parameter is then switched automatically to "OFF".

Information
The test function can also be activated during travel.

16.14.2 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. You must switch the ZETADYN 4 off and back on to reset the error. After switching back on, the SCY_TMP parameter is set to "OFF" automatically.

Information
The test function can also be activated during travel.

16.14.3 Testing of the protection device according to EN81-A3

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

16.14.3.1 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 protection device according to EN81-A3 with powerless drifting

```
 Power section
-> 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
  ↳      Powerless
A3 support
```

Select parameter **"SCY_A3"**
Switch on test EN81-A3 with "SCY_A3=powerless"

↓

```
 CAUTION!!!
A3 test active
Travel command will
[ESC] just open brake
```

Message that the brake is opened in the following trip

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

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

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

```
 Power section
-> 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-A3 with "SCY_A3=max. accel."

↓

```
 CAUTION!!!
A3 test active
Travel command will
[ESC] acc. to max.
```

Message that the cabin is accelerated to maximum

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

16.14.4 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

```
 Power section
-> Checks
 ZA-Intern
```

Select **"Checks"** menu

↓

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

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

↓

```
Checks
↳SCY_SG  OFF
  ↳      ON
Capture test
```

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

↓

```
 CAUTION!!!
Safety gear test ac-
tive. Motor windings
[ESC] not shorted
```

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

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

16.14.5 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.

```
 Power section
-> Checks
 ZA-Intern
```

Select **"Checks"** menu

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

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

```
Checks
↳ SCY_DA  OFF
  ↳       ON
Driving capability
test
```

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

Move up with recovery control until the cables slip over the traction sheave.

```
 CAUTION!!!
Driving ability test
active. Cabin pos.:
[ESC] + 13 mm
```

Display cabin movement

16.14.6 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

```
 Power section
-> Checks
 ZA-Intern
```

Select **"Checks"** menu

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

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

```
Checks
↳SCY_MB  OFF
  ↳      ON
Engine brakes test
```

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

Give travel command up with empty cabin
Interrupt safety chain

```
 CAUTION!!!
Motor brakes test
active. Braking dist.
[ESC] 87 mm
```

Display distance up to standstill

16.15 Electronic name plate

With the "electronic name plate" function, you can file parameters from the ZETADYN 4 in an absolute value encoder or load data from an absolute value encoder into the ZETADYN 4. The function is possible in rotary encoders with EnDat, Codeface and Hiperface interfaces.

Save data

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

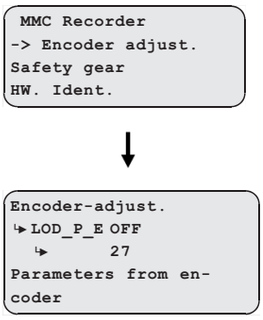
Select menu **Encoder adjustment**

```
Encoder-adjust.
↳SAV_P_E OFF
  ↳      ON
Parameters on encoder
```

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 ZETADYN 4 first.



Select menu **Encoder adjustment**

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

17 Enclosure

17.1 Technical data ZETADYN 4C

17.1.1 ZETADYN 4C011 - 032

		ZETADYN				
		4Cx011	**4Cx013**	**4Cx017**	**4Cx023**	**4Cx032**
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	18	19	19
Heat dissipation stand-by 1 4CS	[W]	19	20	20	21	21
Heat dissipation in Standby 2 4CA	[W]	13	14	15	16	17
Heat dissipation stand-by 2 4CS	[W]	15	16	17	18	19
Switching Freq.	[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 class		IP20				
Ambient conditions 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 ZETADYN 4C for asynchronous motors	[kg]	11.8	12.6	13.0	14.1	16.4
Weight ZETADYN 4C 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*

17.2 Adjustment card

"Motor name plate" menu

MOT_TYP	
n	
f	
p	
I	
U	
P	
TYP	
cos phi[1)]	
M_Max	

Encoder & BC menu

ENC_TYP	
ENC_INC	
BC_TYP	

Installation menu

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

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

Control system menu

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

Monitoring menu

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

Start menu

M_START	
K_START	
T_0	
T_1	
T_2	
T_3	
V_T3	
BRK_DMP	

Acceleration menu

A_POS	
R_POS1	
R_POS2	

Travelling menu

V_1	
V_2	
V_3	
V_Z	
V_4	
V_5	
V_6	
V_7	

Deceleration menu

A_NEG	
R_NEG1	
R_NEG2	
S_DI3	
S_DI2	
S_DI1	
S_ABH	

Stop menu

T_4	
T_5	
T_5a	
T_5b	
T_6	

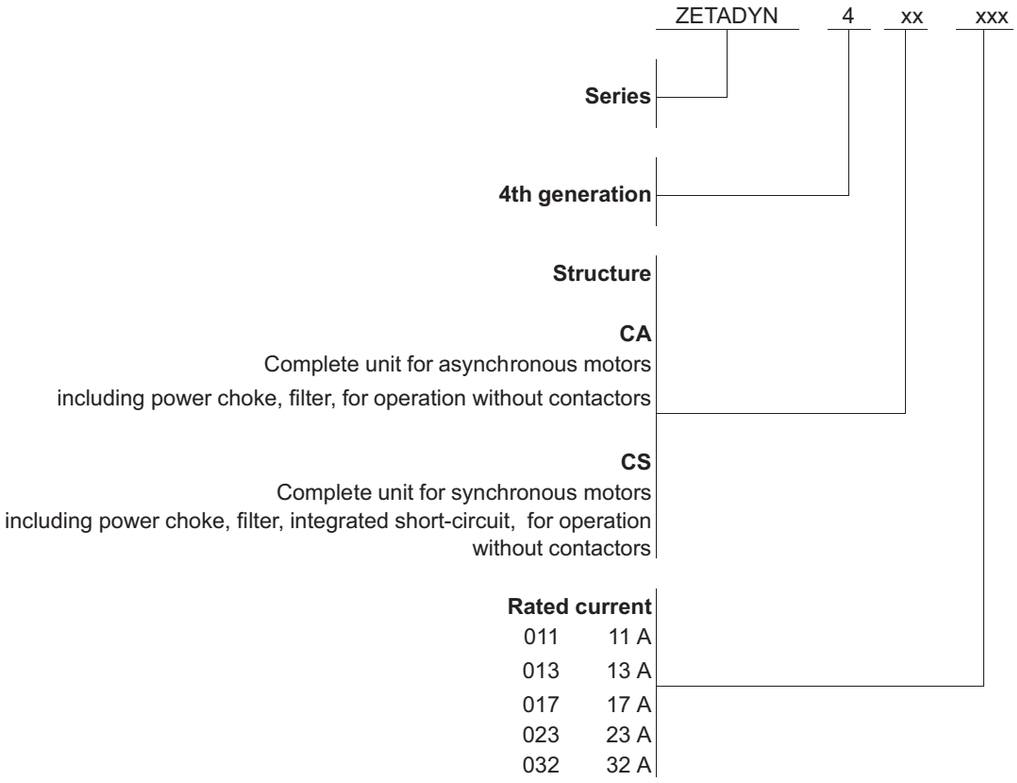
Controller menu

SPD_KP	
SPD_TI	

17.3 Brake resistor allocation

Frequency inverter	Brake resistor	Part no.
ZETADYN 4xx011	BR11-A	357171
	BR17	357216
ZETADYN 4xx013	BR17	357216
ZETADYN 4xx017	BR17	357216
ZETADYN 4xx023	BR25	357217
ZETADYN 4xx032	BR25	357217
	BR50	357218

17.4 Type designation



17.5 Part numbers

A ZETADYN 4 for asynchronous motors			S ZETADYN 4 for synchronous motors	
ZETADYN 4CA011	352194		ZETADYN 4CS011	352201
ZETADYN 4CA013	352195		ZETADYN 4CS013	352202
ZETADYN 4CA017	352196		ZETADYN 4CS017	352203
ZETADYN 4CA023	352197		ZETADYN 4CS023	352204
ZETADYN 4CA032	352198		ZETADYN 4CS032	352205

17.6 Declaration of conformity

A-KON13_01 / Index 01 / 07.02.2013

ZIEHL-ABEGG

EG-Konformitätserklärung
Declaration of Conformity

Firma
Company

Ziehl-Abegg AG
Heinz-Ziehl-Straße
74653 Künzelsau
Germany

Produkte
Products

Regelgeräte für Aufzugsantriebe ZETADYN 4C
Control devices for elevator machines ZETADYN 4C

4CA011	4CA013	4CA017	4CA023	4CA032
4CS011	4CS013	4CS017	4CS023	4CS032

Diese Produkte sind entwickelt, konstruiert und gefertigt in Übereinstimmung mit der Maschinenrichtlinie 2006/42/EG und der Richtlinie für Elektromagnetische Verträglichkeit 2004/108/EG. Aufgrund der Übereinstimmung mit der Maschinenrichtlinie sind auch die Anforderungen der Niederspannungsrichtlinie 2006/95/EG erfüllt.
These products are developed, designed and manufactured in accordance with the Machinery directive 2006/42/EC and the EMC directive 2004/108/EC. Because of the accordance with the Machinery directive also the requirements of the Low Voltage directive 2006/95/EC are fulfilled.

Folgende harmonisierte Normen sind angewandt:
The following harmonized standards are in use:

EN 61800	**Elektrische Leistungsantriebssysteme mit einstellbarer Drehzahl - Teil 5-1: Anforderungen an die Sicherheit** *Adjustable speed electrical power drive systems Part 5-1: Safety requirements*	EN 61800-5-1:2007
EN 61800	**Elektrische Leistungsantriebssysteme mit einstellbarer Drehzahl – Teil 5-2: Anforderungen an die Sicherheit – Funktionale Sicherheit IEC 61800-5-2:2007** *Adjustable speed electrical power drive systems – Part 5-2: Safety requirements – Functional*	EN 61800-5-2:2007
EN 61800	**Drehzahlveränderliche elektrische Antriebe- Teil 3: EMV-Anforderungen einschließlich spezieller Prüfverfahren** *Adjustable speed electrical power drive systems – Part 3: EMC requirements and specific test methods*	EN 61800-3:2004
EN 62061	**Sicherheit von Maschinen - Funktionale Sicherheit sicherheitsbezogener elektrischer, elektronischer und programmierbarer elektronischer Steuerungssysteme** *Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems*	EN 62061:2005 / AC:2010

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ZIEHL-ABEGG

EN 13849	**Sicherheit von Maschinen – Sicherheitsbezogene Teile von Steuerungen - Teil 1: Allgemeine Gestaltungssätze** *Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design*	EN ISO 13849-1:2008 / AC:2009
EN 13849	**Sicherheit von Maschinen - Sicherheitsbezogene Teile von Steuerungen - Teil 2: Validierung** *Safety of machinery - Safety-related parts of control systems – Part 2: Validation*	EN ISO 13849-2:2012
EN 12015	**Elektromagnetische Verträglichkeit – Produktfamiliennorm für Aufzüge – Störaussendung** *Electromagnetic compatibility – Product family standard for lifts – Emission*	EN 12015:2004
EN 12016	**Elektromagnetische Verträglichkeit – Produktfamiliennorm für Aufzüge – Störfestigkeit** *Electromagnetic compatibility – Product family standard for lifts – Immunity*	EN 12016:2004 + A1:2008

Die Konformität wurde vom TÜV Rheinland mit der EG-Baumusterprüfbescheinigung 01/205/5288/13 bestätigt.
The conformity is accredited with the certificate 01/205/5288/13 by the notified body TÜV Rheinland.

Die Nummer Adresse der benannten Stelle ist:
The number address of the notified body is:

NB 0035
TÜV Rheinland Industrie Service GmbH
Alboinstr. 56
12103 Berlin
Germany

Künzelsau, den 07.02.2013

Ziehl-Abegg AG

ppa.

Ralf Arnold
Leitung Geschäftsbereich Antriebstechnik / *Director Drive Division*

A-KON13_02 / Index 01 / 07.02.2013

ZIEHL-ABEGG

EG-Konformitätserklärung
Declaration of Conformity

Firma *Company*	**Ziehl-Abegg AG** Heinz-Ziehl-Straße 74653 Künzelsau Germany
Produkte *Products*	**Regelgeräte für Aufzugsantriebe ZETADYN 4C** *Control devices for elevator machines ZETADYN 4C*

4CA011	4CA013	4CA017	4CA023	4CA032
4CS011	4CS013	4CS017	4CS023	4CS032

Diese Produkte sind entwickelt, konstruiert und gefertigt in Übereinstimmung mit der Aufzugsrichtlinie 95/16/EG und der Richtlinie für Elektromagnetische Verträglichkeit 2004/108/EG.
These products are developed, designed and manufactured in accordance with the lift directive 95/16/EC and the EMC directive 2004/108/EC.

Folgende harmonisierte Normen sind angewandt:
The following harmonized standards are in use:

EN 81	**Sicherheitsregeln für die Konstruktion und den Einbau von Aufzügen – Teil 1: Elektrisch betriebene Personen- und Lastenaufzüge** *Safety rules for the construction and installation of lifts – Part 1: Electric lifts*	EN 81-1:1998 + A3:2009
EN 81	**Sicherheitsregeln für die Konstruktion und den Einbau von Aufzügen – Teil 2: Hydraulisch betriebene Personen- und Lastenaufzüge** *Safety rules for the construction and installation of lifts – Part 2: Hydraulic lifts*	EN 81-2:1998 + A3:2009
EN 12015	**Elektromagnetische Verträglichkeit – Produktfamiliennorm für Aufzüge – Störaussendung** *Electromagnetic compatibility – Product family standard for lifts – Emission*	EN 12015:2004
EN 12016	**Elektromagnetische Verträglichkeit – Produktfamiliennorm für Aufzüge – Störfestigkeit** *Electromagnetic compatibility – Product family standard for lifts – Immunity*	EN 12016:2004 + A1:2008

A-KON13_02 / Index 01 / 07.02.2013

ZIEHL-ABEGG

Die Konformität wurde vom TÜV Rheinland mit der Baumusterprüfbescheinigung 01/208/6005/13 bestätigt.
The conformity is accredited with the certificate 01/208/6005/13 by the notified body TÜV Rheinland.

Die Nummer Adresse der benannten Stelle ist:
The number address of the notified body is:

NB 0035
TÜV Rheinland Industrie Service GmbH
Alboinstr. 56
12103 Berlin
Germany

Künzelsau, den 07.02.2013

Ziehl-Abegg AG

ppa.

Ralf Arnold
Leitung Geschäftsbereich Antriebstechnik / *Director Drive Division*

17.7 Certificates

LIFTINSTITUUT

PRODUCTS RvA C 067

Declaration for trip direction change counter

Date of issue of original declaration	: June 24, 2011
Revision number	: -
Revision date	: -
Requirements	: Lifts Directive 95/16/EC
Project no.	: P110087-01

1. General specifications

Name and address manufacturer	: Ziehl-Abegg AG Heinz-Ziehl-Strasse 74653 Künzelsau Germany
Description of the reviewed component	: Trip direction change counter
Frequency inverter type	: ZETADYN
Data of examination	: April 2011 - June 2011
Examination done by	: A. van den Burg
Laboratory	: None

LIFTINSTITUUT B.V. – SAFETY AND QUALITY MANAGEMENT

Buikslotermeerplein 381	P.O. Box 36027	Tel. +31 (0)20 - 435 06 06	www.liftinstituut.nl	VAT number:
NL - 1025 XE Amsterdam	NL - 1020 MA Amsterdam	Fax +31 (0)20 - 435 06 26	contact@liftinstituut.nl	NL 812392991 B 01

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LIFTINSTITUUT

PRODUCTS RvA C 067

2. Description of the component

We herewith declare that the trip direction change counter fulfils all requirements as stated in the certificate NL 10-400-1002-130-01 for the application of the Brugg SDR 8,1 mm coated suspension ropes for lifts.
For applications with comparable conditions the counter can also be used with other coated suspension rope types.
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 ZETADYN frequency inverter.
It consists of two digital counters, the counter "A" (Parameter "TD_DRV") and the counter "B" (Parameter "TD_CNT"), both counters only count the number of changes in direction, successive trips in the same direction are counted as one trip only.
Counter "A" is used to collect the total number of trips, it is not possible to reset this counter also not by a reset of the frequency inverter nor by removing its power supply.
Counter "B" is used to limit the amount of allowed trips, changing of allowable maximum number of trips or resetting is protected by a password, this password can be defined for each controller separately.
Approximately one year before the allowed number of trips is reached, the display of the frequency inverter shows the number of trips that are left until the lift will be blocked (the ropes shall be changed before).
The estimation of the time that is left is based on the history of lift use and is updated after each trip.
When the maximum number of trips is reached, the inverter is setting the fault-output and an error message is shown in the display.
The inverter will not accept new trip commands until counter "B" has received a reset.
To be able to exchange the ropes, after each restart of the inverter, one additional trip is possible.
Every reset of counter "B" is registered in memory in order to be able to check the history.
When the frequency inverter is interchanged by a new one, the contents of counter "B" must be copied from the old inverter into the new one.

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

TÜVRheinland®

ZERTIFIKAT
CERTIFICATE

Type-Examination Certificate

Reg.-Nr./No.: 01/208/6005/13

Prüfgegenstand **Product tested**	Sicherheitsfunktion STO, Sicherer Halt (Stopp Kategorie 0) Safety Function STO, Safe Stop (Stop Category 0)	**Zertifikats-inhaber** **Certificate holder**	Ziehl-Abegg AG Drive Division Heinz-Ziehl-Straße 74653 Künzelsau Germany
Typbezeichnung **Type designation**	ZETADYN 4C Drive Family: ZETADYN 4Cxyyy, x = S, A (Synchronous- / Asynchronous AC-Motors), y = 011, 013, 017, 023, 032 (rated current in Amps)	**Hersteller** **Manufacturer**	wie Zertifikatsinhaber see certificate holder
Prüfgrundlagen **Codes and standards forming the basis of testing**	Directive 95/16/EC EN 81-1:1998 + A3:2009 EN 81-2:1998 + A3:2009		EN 12015:2004 EN 12016:2004 + A1:2008 EN 61800-5-2:2007
Bestimmungsgemäße Verwendung **Intended application**	Sicheres Stillsetzen zur Anwendung bei Personen- und Lastenaufzügen: Ersatz der Motorschütze zur Stillsetzung des Antriebs Use at elevators, safe stop of the lift car: Replacement of contactors to stop the machine 12.7.3 a) der/of EN 81-1 or 12.4.1 a) der/of EN 81-2.		
Besondere Bedingungen **Specific requirements**	Die Hinweise in der zugehörigen Installations- und Betriebsanleitung sind zu beachten. Siehe auch Anhang zum Zertifikat. The instructions of the associated Installation and Operating Manual shall be considered. See Annex to Certificate.		
Es wird bestätigt, dass das Produkt mit den Anforderungen der Richtlinie 95/16/EG über Aufzüge übereinstimmt. It is confirmed that the product under test complies with the requirements for lifts defined in the EC Directive 95/16/EC.			
Dieses Zertifikat ist gültig bis 12.02.2018. This certificate is valid until 2018-02-12.			

TÜVRheinland® Functional Safety Type Approved **FS**

Der Ausstellung dieses Zertifikates liegt eine Prüfung zugrunde, deren Ergebnisse im Bericht-Nr. 968/A 166.00/13 vom 12.02.2013 dokumentiert sind.
Der Inhaber eines für den Prüfgegenstand gültigen Genehmigungs-Ausweises ist berechtigt, die mit dem Prüfgegenstand übereinstimmenden Erzeugnisse mit dem abgebildeten Prüfzeichen zu versehen.
The issue of this certificate is based upon an examination, whose results are documented in report-no.: 968/A 166.00/13 cated 2013-02-12.
The holder of a valid licence certificate for the product tested is authorized to affix the test mark shown opposite to products, which are identical with the product tested.

TÜVRheinland® 0035

Köln, 2013-02-12

Certification Body for Lifts and their Safety Components, NB 0035

Dipl.-Ing. Volker Sepanski

TÜV Rheinland Industrie Service GmbH, Am Grauen Stein, 51105 Köln / Germany
Tel.: +49 221 806-2024, Fax: +49 221 806-1354, E-Mail: industrie-service@de.tuv.com

2013-02-13

TÜVRheinland®
Genau. Richtig.

Supplemental sheet of the EC Type Examination Certificate 01/208/6005/13 dated 2013-02-12.

1.	Component	Safety-Function STO (ZETADYN 4C) Safety circuit containing electronic components	
2.	Manufacturer	ZIEHL-ABEGG AG Heinz-Ziehl-Straße 74653 Künzelsau	
3.	Designation / Nomenclature	ZETADYN 4Cxyyy x = S, A (synchronous- / asynchronous motor) y = 011, 013, 017, 023, 032 (nominal current in [Amps])	
4.	Intended application	Lift safe stop (Safe Torque OFF (STO))	
5.	Function indication	Safety Function STO / Safe Stop (Stop-Category 0) for the ZETADYN 4C product family	
6.	Intended use	Electric lifts - Replacement of motor contactors for stopping the lift 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. delay 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. 750 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 on BMPB Reg.-Nr. 01/208/6005/13 Page 1 of 2

2013-02-13

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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 manual of the ZETADYN 4C by Ziehl-Abegg AG.	
8. Maintenance	The frequency converter ZETADYN 4C 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 directives stated in the manual.	
9. Installation	The guidelines in the ZETADYN 4C manual regarding installation, commissioning and test shall be observed. - The relevant national regulations (e.g. VDE-directions) and the requirements of the EN 81-1/-2 shall be followed. The wiring shall conform to general EMC requirements. - External short circuits and cross faults on the wiring of the STO-signals must be excluded. The user shall make sure that terminal points and wirings are fault free because the internal diagnostic of the ZETADYN 4 is not able to detect cross faults. - 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 actuated when necessary.	

11. Auxiliary conditions for a safe operation	- By selelection of an appropriate mounting location it shall be ensured that environmental influences have no adverse effect on the safety function. In particular pollution degree 2 in accordance to DIN EN 61800-5-1 shall be ensured.
	- For commissioning and periodical tests of the elevator the following checks are required.
	  - Check for correct Installation
	  - Check for hardware version
	  - Test of the Safety Function.
	- In case of fault accumulation (defects on 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. Power shall be disconnected 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).	

Sepanski

Digital unterschrieben von Sepan
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Rheinland, ou=TIS,
email=sepanski@de.tuv.com, c=D
Datum: 2013.07.10 10:52:27 +02'0

Annex on BMPB Reg.-Nr. 01/208/6005/13

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TÜVRheinland®

ZERTIFIKAT
CERTIFICATE

EC Type-Examination Certificate

Reg.-Nr./No.: 01/205/5288/13

Prüfgegenstand **Product tested**	Sicherheitsfunktion STO Sicherer Halt (Stopp Kategorie 0) Safety Function STO, Safe Stop (Stop Category 0)	**Zertifikats-inhaber** **Certificate holder**	Ziehl-Abegg AG Drive Division Heinz-Ziehl-Straße 74653 Künzelsau Germany
Typbezeichnung **Type designation**	ZETADYN 4C Drive Family: ZETADYN 4Cxyyy, x = S, A (Synchronous- / Asynchronous AC-Motors), y = 011, 013, 017, 023, 032 (rated current in Amps)	**Hersteller** **Manufacturer**	wie Zertifikatsinhaber see certificate holder
Prüfgrundlagen **Codes and standards forming the basis of testing**	EN 61800-5-2:2007 EN 61800-5-1:2007 EN 61800-3:2004		EN 62061:2005 + AC:2010 EN ISO 13849-1:2008 + AC:2009 EN 61508 Parts 1-7:2010
Bestimmungsgemäße Verwendung **Intended application**	Sicherer Halt an drehzahlveränderbare Antrieben. Die Sicherheitsfunktion STO in den ZETADYN 4C Antrieben erfüllt die Anforderungen der Prüfgrundlagen (Kat. 4 / PL e nach EN ISO 13849-1, SIL CL 3 nach EN 61800-5-2 / EN 62061 / IEC 61508) und können in Anwendungen bis Kat. 4 / PL e nach EN ISO 13849-1 und SIL 3 nach EN 62061 / IEC 61508 eingesetzt werden. Safe Stop at speed variable drives. The safety function STO within the ZETADYN 4C drives complies with the requirements of the relevant standards (Cat. 4 / PL e acc. to EN ISO 13849-1, SIL CL 3 acc. to EN 61800-5-2 / EN 62061 / IEC 61508) and can be used in applications up to Cat. 4 / PL e acc. to EN ISO 13849-1 and SIL 3 acc. to EN 62061 / IEC 61508.		
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.			
Dieses Zertifikat ist gültig bis 12.02.2018. This certificate is valic until 2018-02-12.			

Functional Safety Type Approved
TÜVRheinland FS

Der Ausstellung dieses Zertifikates liegt eine Prüfung zugrunde, deren Ergebnisse im Bericht-Nr. 968/A 166.00/13 vom 12.02.2013 dokumentiert sind.
Der Inhaber eines für den Prüfgegenstand gültigen Genehmigungs-Ausweises ist berechtigt, die mit dem Prüfgegenstand übereinstimmenden Erzeugnisse mit dem abgebildeten Prüfzeichen zu versehen.
The issue of this certificate is based upon an examination, whose results are documented in report-no.: 968/A 166.00/13 dated 2013-02-12.
The holder of a valid licence certificate for the product tested is authorized to affix the test mark shown opposite to products, which are identical with the product tested.

TÜVRheinland 0035 Notified Body

Berlin, 2013-02-12

Certification Body for Machinery, NB 0035

Dipl.-Ing. Eberhard Frejno

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LIFTINSTITUUT

PRODUCTS
RvA C 067

TYPE-EXAMINATION CERTIFICATE

FOR LIFTCOMPONENTS

Issued by Liftinstituut B.V.

Certificate nr.	:	NL12-400-1002-163-01 Revision nr.:
Description of the product	:	Brake monitoring as part of protection against unintended car movement.
Trademark, type	:	ZETADYN 4 and ZETADYN 3 (Software version 3.39 or higher)
Name and address of the manufacturer	:	Ziehl-Abegg AG Heinz-Ziehl-Strasse 74653 Künzelsau Germany
Name and address of the certificate holder	:	Ziehl-Abegg AG Heinz-Ziehl-Strasse 74653 Künzelsau Germany
Certificate issued on the following requirements	:	Lifts Directive 95/16/EG, EN 81-1:1998+A3:2009
Test laboratory	:	None
Date and number of the laboratory report	:	None
Date of type-examination	:	
Annexes with this certificate	:	Report belonging to the type-examination certificate nr.: NL12-400-1002-163-01
Additional remarks	:	None
Conclusion	:	The lift component meets the requirements referred to in this certificate taking into account any additional remarks mentioned above.

Issued in Amsterdam
Date of issue : March 2, 2012

ing. A.J. van Ommen
Manager Business Unit
Certification

Certification decision by

Report type-examination

Report belonging to type-examination certificate no.	:	NL12-400-1002-163-01
Date of issue of original certificate	:	March 2, 2012
No. and date of revision of certificate	:	-.-
No. and date of revision of report	:	-.-
Concerns	:	lift component
Revision concerns	:	-.-
Requirements	:	Lifts Directive 95/16/EC Standard: EN 81-1:1998+A3:2009
Project no.	:	P120044-01

1. General specifications

Name and address manufacturer	:	Ziehl-Abegg AG Heinz-Ziehl-Strasse 74653 Künzelsau Germany
Description of lift component	:	Brake monitoring as part of protection against unintended car movement.
Type	:	ZETADYN 4 and ZETADYN 3 (Software version 3.39 or higher)
Laboratory	:	-
Address of examined lift	:	-
Date / data of examination	:	February 2012
Examination performed by	:	A. van den Burg

2. Description lift component

The brake monitoring described in this report shall be used in combination with a suitable detection system and a suitable brake to build an unintended car movement protection for lifts.
The monitoring function that is integrated in the ZETADYN frequency converter becomes effective after activation.
A maximum of 4 inputs can be programmed to monitor the correct opening and closing of brakes, it can be done with either normally closed or normally open contacts.

LIFTINSTITUUT B.V. - SAFETY AND QUALITY MANAGEMENT

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The activated system will stop the lift when at least one programmed brake monitoring inputs detects one of the following situations:

- An opened brake at the moment a drive command is received.
- When the brake monitoring signal does not change status within a time period "T2" after the brake is ordered to open during a trip.
- When the brake monitoring signal does not change status within a time period "T5" after the brake is ordered to close after a trip.

After detection of brake malfunction, the lift remains out of service, also after switching off- and on the supply power.
Resetting of the system is only possible by setting the parameter "UNLOCK=ON" in the "monitoring" menu.

Technical data of the inputs	:
Voltage range	: +22,0...26,0 VDC
Switching level	: < 5,0 VDC / > 11,0 VDC
Power consumption	: typ. 12,6 mA
Clamping range	: Max. 1,5 mm^2

The examination covered a check whether compliance with the Lift Directive 95/16/EC is met. The model is examined based on the Standard EN 81-1:1998+A3:2009 Issues not covered by or not complying these Standards are directly related to the essential requirements of the Lift Directive.
The examination included:

- Examination of the technical file R-TIA12_02-D 1209

3. Results

After the final examination the installation and the technical file R-TIA12_02-D 1209 were found in accordance with the requirements.

4. Conditions

On the type-examination certificate the following conditions apply:
Before taking the lift into service and after each change in the software of the ZETADYN, the proper functioning of the brake monitoring must be checked.
The checking shall be done by disconnecting and short circuiting the brake monitoring switches one by one.
Each time after a command is given, the manipulation shall be detected by the system and a reset shall be necessary to bring the lift back into operation.

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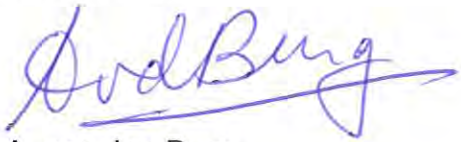
5. Conclusions

Based upon the results of the type-examination Liftinstituut B.V. issues a type-examination certificate.

The type-examination certificate is only valid for products which are in conformity with the same specifications as the type certified product. Products deviating of these specifications need additional examination by Liftinstituut B.V. in order to determine whether a new type-examination certificate is necessary. Additional examination shall be requested by the certificate holder.

The type-examination certificate is issued based on the requirements that are valid at the date of issue. The manufacturer shall request from Liftinstituut B.V. the review of the validity of the type-examination certificate, taking into account the changes in the requirements or changes in the state of the art of the product, every 5 years.

Prepared by:



A. van den Burg
Senior Specialist
Liftinstituut B.V.

Certification decision by:

Annex 1 : Overview of previous revisions of certificate(s) and report(s)

REVISIONS OF CERTIFICATE

Rev.:	Date	Summary of revision
-	March 2, 2012	Original

REVISIONS OF REPORT, BELONGING TO THE CERTIFICATE

Rev.:	Date	Summary of revision
-	March 2, 2012	Original

LIFTINSTITUUT B.V. - SAFETY AND QUALITY MANAGEMENT

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