

ZETADYN 3BF

Frequency inverter

Operating Instruction



Content

1	General information	7
1.1	Validity	7
1.2	Magnitude of the operating instructions	7
1.3	Target group	7
1.4	Structure of the operating instructions	7
1.5	Exclusion of liability	7
1.6	Symbols description	7
1.7	Copyright	8
2	Safety information	8
2.1	In general	8
2.2	Use as intended	8
2.3	Pictographs	8
2.4	Product safety	8
2.5	Requirements placed on the personnel / due diligence	8
2.6	Commissioning	9
2.7	Working on device / Hazards through "residual voltage"	9
2.8	Modifications / interventions in the device	9
2.9	Operator's obligation of diligence	9
2.10	Employment of external personnel	10
3	Product overview	10
3.1	Application	10
3.2	Functional description	10
3.2.1	Ziehl-Abegg drive control features	10
3.2.2	Control system	10
3.2.3	Parameterisation	11
3.2.4	Closed loop control	11
3.3	Requirements / notices	11
3.3.1	Complete system	11
3.3.2	Single components	11
3.3.3	Motors	11
3.3.4	centrifugal masses	11
3.3.5	Frequency inverter	11
3.3.6	Brems-Chopper / Brems-Widerstand	11
3.3.7	Encoder	12
3.4	Service & maintenance	12
3.5	Transport	12
3.6	Storage	12
3.6.1	Ambient conditions	12
3.6.2	Storage times	12
3.7	Disposal & recycling	12
4	Mechanical installation	13
4.1	General	13
4.1.1	Wall installation	13
4.1.2	Switch cabinet installation	13
4.2	Dimensions	13
5	Electrical installation	15
5.1	EMC-compatible installation	15
5.2	Configuration / Terminal positions	16
5.3	Protective ground connection	17
5.4	Mains connection (X1)	17
5.4.1	Line cross-section	17

5.4.2	Mains fuse	17
5.4.3	Type of cable	17
5.4.4	Connection.	17
5.5	Line reactor-radio interference filter	18
5.6	Residual current operated device (RCD)	19
5.7	Control transformer in the mains feed line	19
5.8	Motor connection (X1).	20
5.8.1	Line cross-section	20
5.8.2	Type of cable	20
5.8.3	Cable lengths	20
5.8.4	Connection.	20
5.8.5	Motor contactors	20
5.8.6	Contacting the shielding in the switch cabinet.	21
5.8.7	Contacting the shielding on the motor	21
5.9	Motor temperature monitoring (X-MT)	22
5.10	Digital inputs (X-IN)	23
5.10.1	Connection with external power supply	23
5.10.2	Connection with internal power supply	23
5.10.3	Technical data	24
5.10.4	Terminal assignment X-IN	24
5.10.5	Binary presetting of the travel speeds	25
5.11	Digital outputs (X-OUT)	25
5.11.1	Connection.	25
5.11.2	Technical data	25
5.11.3	Terminal assignment X-OUT.	26
5.12	DCP interface (X-DCP)	26
5.12.1	Electrical connection	26
5.13	Encoder connection asynchronous motors (X-ENC8 X-ENC9).	27
5.13.1	Technical data X-ENC8 X-ENC9	27
5.13.2	Terminal assignment X-ENC8	27
5.13.3	X-ENC9 pin assignment.	28
5.13.4	Encoder connection to terminal X-ENC8	28
5.14	Encoder connection synchronous motors (X-ENC15)	28
5.14.1	Technical data X-ENC15	29
5.14.2	X-ENC15 pin assignment.	29
5.15	Simulating interruption of the encoder line during TÜV acceptance	29
5.16	Artificial encoder (X-ENCO)	30
5.16.1	Technical data X-ENCO	30
5.16.2	Connection X-ENCO	30
5.17	External 24V power supply (X-EXT)	30
5.17.1	Technical data	30
5.17.2	Connection X-EXT	31
5.18	Monitoring the motor contactors(X-CO)	31
5.18.1	Technical data	31
5.18.2	Connection.	31
5.19	Brakes	32
5.19.1	Brake release monitoring (X-BR).	32
5.19.2	Connection X-BR	32
5.19.3	Activating the brakes	33
5.20	Connection suggestion.	34
6	Accessories	35
6.1	Brems-Chopper / Brems-Widerstand	35
6.1.1	Brake-Chopper (BC)	35
6.1.2	Brake-Resistor (BR)	35
6.1.3	Technical data BC / BR	35
6.1.4	Mechanical installation Brake-Chopper / Brake-Resistor.	35
6.1.5	Dimensions type BC / BR	37
6.1.6	Minimum clearances	38

6.1.7	Electrical connection	39
6.1.8	LED display (Brake-Chopper only)	42
6.1.9	Allocation of Brake-Chopper / Brake-Resistor	42
6.2	Line reactor-radio interference filter	42
6.2.1	Technical data line reactor and radio interference filter	42
6.2.2	Mechanical installation line reactor-radio interference filter	43
6.2.3	Switch cabinet installation	43
6.2.4	Dimensions	44
6.2.5	Electrical connection	45
6.2.6	Allocation of the line reactor-radio interference filter to the frequency inverter	46
6.3	Operating terminal ZETAPAD	47
6.3.1	Installation / mounting	47
6.3.2	Dimensions	47
6.3.3	Connection	47
7	Operation and parameterising	48
7.1	Possibilities for operation and configuration	48
7.1.1	Operating terminal ZETAPAD	48
7.1.2	Remote control via ZETAMON software	48
7.1.3	Remote control via the elevator controller display	48
7.2	Menu navigation	48
7.2.1	Control key functions	49
7.2.2	Menu and parameter navigation	49
7.2.3	Meaning of the arrows appearing in the display:	50
7.3	Entering numerical values	50
7.3.1	Continuous change of a parameter value	50
7.3.2	Changing individual digits	50
8	Commissioning	51
8.1	Procedure	51
8.2	Preconfigured inverter	51
8.3	Switching on the frequency inverter	52
8.4	Select operation mode	52
8.5	Enter motor data	52
8.6	Enter encoder data, Brake-Chopper / Brake-Resistor	53
8.7	Enter installation data	54
8.8	Automatic operating-curves default	56
8.9	Traveling speed defaults	56
8.10	Configuring the traveling speeds	56
8.11	Enter the type of communication	57
8.12	Activating the monitoring functions	57
8.13	Setting the cut-off points on site	59
8.13.1	Cut-off points for travel speed V_3	59
8.13.2	Cut-off points for travel speed V_2	59
8.13.3	Cut-off points for travel speed V_1	59
8.14	Carrying out the first test run	60
8.15	Changing the motor direction	60
8.16	Setting the speed controller	61
8.17	Optimizing the acceleration	62
8.18	Optimizing deceleration	62
8.19	Optimizing start up behavior	63
8.19.1	Start-up variations	64
8.19.2	Damping the start-up jerk	66
8.20	Optimizing stopping	67
9	DCP (Drive Control & Position)	67
9.1	The various DCP protocols	67
9.1.1	DCP_01	67

9.1.2	DCP_03.....	68
9.1.3	DCP_02.....	68
9.1.4	DCP_04.....	68
9.2	Configuring in DCP mode.....	69
9.2.1	Activating the DCP interface.....	69
9.2.2	Setting the DCP-leveling behavior.....	70
10	Parameter list.....	70
10.1	LCD & Password menu.....	70
10.2	Motor name plate menu.....	71
10.3	Encoder & BC menu.....	72
10.4	Installation menu.....	73
10.5	Control system menu.....	74
10.6	Monitoring menu.....	77
10.7	Start menu.....	79
10.8	Acceleration menu.....	80
10.9	Travel menu.....	80
10.10	Deceleration menu.....	81
10.11	Stop menu.....	82
10.12	Controller menu.....	83
10.13	Parameter set 2 menu.....	83
10.14	S0:Statistic menu.....	84
10.15	S1:Motor model menu.....	85
10.16	S2:Memory Card menu.....	85
10.17	S3:MMC-Recorder CARD menu.....	86
10.18	S4:Encoder adjustment menu.....	87
10.19	S5:Safety Brake menu.....	88
10.20	S6:HW-Ident. menu.....	89
10.21	S7:Power section menu.....	89
10.22	S8:CAN menu.....	90
10.23	S9: ZA-Intern menu.....	91
10.24	INFO menu.....	92
11	Travel options.....	98
11.1	Normal travel.....	98
11.2	Start-up and acceleration.....	99
11.3	Distance-dependent deceleration.....	100
11.3.1	Normal stop during path dependent deceleration.....	100
11.3.2	Arch travel with path-dependent deceleration.....	101
11.4	Time-dependent deceleration.....	102
11.4.1	Deceleration with reached traveling speed.....	102
11.4.2	Deceleration when traveling speed has not been reached.....	103
11.5	Crawl path optimization.....	104
11.6	Optimizing the step alignment.....	105
11.7	Direct leveling.....	106
11.8	Readjustment.....	106
11.9	Operation in idle.....	107
12	Emergency evacuation.....	108
12.1	Evacuation with 1-phase mains supply 230V AC.....	108
12.1.1	Parameterisation.....	109
12.2	Evacuation with UPS.....	110
12.2.1	Evacuation through UPS with optimum power.....	110
12.2.2	Evacuation through UPS with minimum power.....	110
12.2.3	Parameterisation.....	111
12.3	Improving the positioning.....	113

12.3.1	Parameterisation	113
12.4	Connection diagram for UPS to ZETADYN 3	114
12.5	Emergency evacuation by opening the brakes	115
13	Error diagnosis	115
13.1	Travel abort and acknowledgement during malfunctions	115
13.1.1	Travel abort	115
13.1.2	Acknowledgement	115
13.2	Light emitting diodes	116
13.3	Readout the error memory	116
13.4	Delete error memory	117
13.5	Error list	117
13.5.1	Masc-Funktion	118
13.5.2	Block function	118
13.5.3	Notes 0xx	118
13.5.4	Error 1xx	118
13.5.5	Error 2xx	119
13.5.6	Error 3xx	120
13.5.7	Error 4xx	122
13.5.8	Error 5xx	123
13.5.9	Error 7xx	125
13.5.10	Error 9xx	126
13.6	Operating conditions of the inverter	127
13.7	Automatic parameter check (APC)	127
13.8	Automatic parameter diagnostics (APD)	128
14	Special functions	128
14.1	Changing the Clock frequency	128
14.1.1	Fixed presetting of the clock frequency (Menu S7: Power section/M_PWM=Fix f_PWM)	128
14.1.2	Automatic adjustment if the clock frequency (Menu S7: Power section/M_PWM=Auto)	128
14.2	Encoder offset-alignment	129
14.2.1	SSI-encoder offset alignment	130
14.2.2	EnDat-encoder offset alignment	132
14.2.3	Checking the offset of the SSI- & EnDat-encoders	132
14.2.4	Error messages during encoder offset alignment	133
14.3	Safety Brake	134
14.4	Factory setting	135
14.5	Memory card	136
14.6	Software - Update	137
14.6.1	Loading the update on a memory card	137
14.6.2	Updating with the ZETAPAD operating terminal	138
14.6.3	Updating without the ZETAPAD operating terminal	138
14.6.4	Error flash code during a software update	139
14.7	Checking the motor phases	140
14.8	Field weakening	140
14.9	Open-Loop-operation	141
14.9.1	Commissioning with Open-Loop-operation	141
14.9.2	Parameter for Open-Loop-operation	141
14.9.3	Functions with Open-Loop-operation	142
14.9.3.1	U/f-characteristic curve	142
14.9.3.2	Current-control	142
14.9.3.3	Slip-compensation	143
14.9.3.4	Tilting protection	144
14.9.4	Improvements with Open-Loop-operation	144
14.9.4.1	Optimizing start up behavior	144
14.9.4.2	Slip-compensation	145
15	Software ZETAMON	145

15.1	Functions of the ZETAMON-Software	145
15.2	Design	145
15.2.1	Program-module ZETAMON3_Display	145
15.2.2	Program-module ZETAMON3_Para	146
15.2.3	Program-module ZETAMON3_Rec	146
15.2.4	Program-module ZETAMON3_Oszi	147
15.2.5	Program-module ZETAMON3_ZETAPADConfigurator	147
15.3	Connecting the ZETAMON transmission cable	147
15.4	System requirements	148
16	Enclosure	148
16.1	Technical data ZETADYN 3BF	148
16.1.1	ZETADYN 3BF011 - 034	148
16.1.2	ZETADYN 3BF046 - 074	149
16.2	Adjustment card	150
16.3	Type designation	151
16.4	Article numbers	151
16.5	Hotline	151
16.6	Declaration of conformity	152
16.7	Index	153

1 General information

1.1 Validity

These operating instructions apply to:
Frequency inverter from the series:ZETADYN 3
starting from software version: D1275A23 / Version 3.23

1.2 Magnitude of the operating instructions

Use these operating instructions to work safely with and on the Frequency inverter ZETADYN 3. They contain safety instructions that must be complied with as well as information that is required for failure-free operation of the device.

Keep these operating instructions together with the device. It must be ensured that all persons that are to work on the device can refer to the operating instructions at any time. In addition to the operating instructions, directives in the sense of the ordinance on industrial safety and health and the work equipment ordinance are also to be provided.

Keep the operating instructions for continued use. They must be passed-on to all successive owner, 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 the operating instructions

The operating instructions are structured systematically. The order of the individual chapters corresponds to the work step sequences when first installing a frequency inverter.

The operating instructions contain the following information:

- Device description
- Mechanical and electrical installation
- Accessories
- Operation and parameterising
- Commissioning
- Parameter list
- Drive options and special functions
- Evacuation mode
- Diagnostic
- Software ZETAMON
- Enclosure



1.5 Exclusion of liability

Concurrence between the contents of these operating instructions and the described hardware and software in the frequency inverter has been examined.

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

1.6 Symbols description

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

1.7 Copyright

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

2 Safety information

2.1 In general



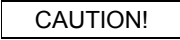


This chapter contains instructions to prevent personal injury and property damage. These instructions do not lay claim to completeness. In case of questions and problems, please consult our company technicians.

2.2 Use as intended

The ZETADYN 3 is a field-oriented Frequency inverter for speed control of three-phase motors developed exclusively for use in elevator machines. The machine is not intended for types of applications not listed here – that is considered incorrect 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 frequency inverter 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.

	Warning! Hazardous area. Death or severe injury or significant property damage can occur if the corresponding precautions are not taken!
	Attention! Slight bodily harm is possible if the corresponding precautions are not taken!
	CAUTION! Material damage is possible if the corresponding precautions are not taken!
	Voltage! Warning about hazardous voltage
	Important information and advice for user.

2.4 Product safety

The Frequency inverter conforms to the state of the art at the time of delivery and is fundamentally considered to be reliable. The Frequency inverter 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 Frequency inverter must have the corresponding qualifications and skills for these jobs. Based on their training, knowledge and experience as well as knowledge of the relevant stand-

ards, 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



Warning!

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

You must comply with the following during commissioning:

- 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 frequency inverters, disconnect the device from the mains.



Dangerous voltage!

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.



It is forbidden to carry out work on electrically live parts. The enclosure rating of the device when open is IP00! It is possible to inadvertently touch components carrying hazardous voltages!

2.8 Modifications / interventions in the device

For reasons of safety, no unauthorized interventions or modifications may be made on the Frequency inverter.

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 AG. 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 optional equipment not supplied by Ziehl-Abegg AG are not approved by Ziehl-Abegg for use in the machine.

2.9 Operator's obligation of diligence

The Frequency inverter 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 Frequency inverter 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 frequency inverter
- These persons are regularly instructed in all applicable questions regarding occupational safety and environmental protection and are knowledgeable regarding the operating instructions and, especially, are familiar with the safety instructions contained therein.
- All safety and warning notices attached to the frequency inverter 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 3 is a field-oriented Frequency inverter for speed control of three-phase motors developed for use in elevator machines.

The inverter is equipped with a microprocessing control. This drives the motor based on time and travel-dependent programs, which can be selected through the upstream elevator controls. The use of IGBT modules and a pulse width modulation in which the clock frequencies can be modified enable low-noise motor operation. The user interface specifically matched to elevator technology, interfaces and software enable simple installation and commissioning of the device.

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 places a three-phase line with variable frequency and variable voltage at your disposal. The amount of voltage and rate of frequency depends on the selected traveling speed and the load to be carried. By using a field-orientated control, the motor is optimally operated at all operating points. As a result, every torque required is made available practically without delay. Even in standstill (speed 0), the motor's entire torque rating is available.

3.2.1 Ziehl-Abegg drive control features

- The drive cycle is controlled from the start (speed 0) up to standstill (speed 0)
- Highly dynamic and high positioning accuracy
- Large speed control range
- Simple commissioning and operation
- Extensive diagnostics functions
- High level of safety through multiple monitoring functions
- Robust EMC behavior

The functional features mean problem-free adaptation to the most varied kinds of applications is feasible.

3.2.2 Control system

The Frequency inverter and the elevator control communicate with each other through inputs and outputs

The time and travel-dependent programs are activated by triggering the inputs.

The control system receives constant feedback about the drive's service condition through the potential-free relay outputs.

Instead of conventional wiring, it is possible to implement a connection between the frequency inverter and the elevator control by using a serial control (see chapter "DCP mode") or a CAN-Bus-control (see chapter "CAN-mode"). As a result, wiring the inputs and outputs is omitted, reducing the wiring costs.

3.2.3 Parameterisation

The traveling speeds, accelerations and therefore additional installation-specific parameters can be entered with the aid of the integrated display and operator unit using text dialogues. Configuration can also be done using a Notebook and the ZETAMON software (see the "ZETAMON software" chapter).

3.2.4 Closed loop control

All operating curves are run speed controlled and load independent. The flux control enables very precise compliance with the specified operating curves throughout the entire speed-control range. The closed loop control can be used up to a speed of 3.2 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).

3.3 Requirements / notices

3.3.1 Complete system

Ziehl-Abegg AG can provide you with optimally matched drive systems. Such a system is composed of the following components:

- Asynchronous or synchronous motor including traction sheave
- Frequency inverter type ZETADYN 3
- Encoder (mounted on motor)

When you purchase a complete system, no special conditions need to be met for the individual components and no special instructions need to be followed.

3.3.2 Single components

When purchasing an individual frequency inverter (e.g. when during conversions or in connection with motors from other manufacturers), the following instructions must be complied with.

3.3.3 Motors

During conversions, check to see if the motor works correctly in all operating- modes in its previous operation. The motor (and possibly the gearbox) must run quietly, without imbalance and without play. Existing mechanical weakness cannot be improved by the closed loop control; rather, they may make controlled operation impossible under certain circumstance.



Before converting an installation, it is recommended to measure the following data in the old motor (in direction of travel, empty car, downwards) and to note the:

- Speed
- Current consumption

These data are needed for later parameterisation of the frequency inverter.

3.3.4 centrifugal masses

To reduce the acceleration currents, all additional centrifugal masses should be removed if possible. Solid hand wheels should be replaced by hand wheels made of plastic or aluminum. However, please note that by removing the centrifugal masses, it is possible that an imbalance arises

3.3.5 Frequency inverter

When selecting the frequency inverter, 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, an additional 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. The frequency inverter can be overloaded for max 3s up to 180% of the rated current. For this reason, the current that adjusts itself during motor acceleration must not be greater than 180% of the rated current.

In general, valid is:

$$I_{\text{Nenn-Umrichter}} \geq I_{\text{Nenn-Motor}}$$

3.3.6 Brems-Chopper / Brems-Widerstand

When selecting the Brake-Chopper / Brake-Resistor, please note that gearless installations regenerate much more energy than installations with gearboxes. That makes it feasible that twice the energy

is regenerated with the same size frequency inverter. When retrofitting an installation, you must recalculate the design of the Brake-Chopper / Brake-Resistor

3.3.7 Encoder

The pin assignment on the SUB-D jacks X-ENC9 and X-ENC15 for the rotary encoder connection is not standardized. When using external encoders, make sure that they have the identical contact assignments and an interface with identical specifications.

Please refer to the "Electrical installation / encoder connection " chapter for the pin assignments and interface specifications.

3.4 Service & maintenance

The Frequency inverter must be checked for soiling and, if necessary, cleaned in periodic intervals.

3.5 Transport

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

3.6 Storage

3.6.1 Ambient conditions

The Frequency inverter must be stored in its original packaging in a dry and weather-proof room.

3.6.2 Storage times

The storage duration is especially dependent on the electric capacitors, because the dielectric material in the capacitor degrades and the electrolyte evaporates.

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 inverter.

New formation:

To reform, the frequency inverter needs to be connected to reduced voltage for ca. 1 hour (230V AC at L1 / L2).

3.7 Disposal & recycling

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

4 Mechanical installation

4.1 General



Warning!

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

Before installation

- Remove the device from the packing and check for any possible shipping damage
- Carry out installation only on a clean, level and stable foundation
- Assemble the device outside of the traffic area

During installation

- Use suitable fastening materials
- Mount the device in a voltage free condition
- Do not allow drilling chips, screws and other foreign bodies to reach the device interior
- Maintain the stated minimum clearances to ensure unobstructed cooling- air feed as well as unobstructed outgoing air discharge (see Fig.)
- To ensure EMC-acceptable installation, mount the device on a galvanized or chrome-plated and grounded mounting plate. When using a painted mounting plate, the paint must be removed from the contact-surface areas.

Ambient conditions

- Prevent humidity
- Avoid aggressive and conductive materials in the environment

4.1.1 Wall installation

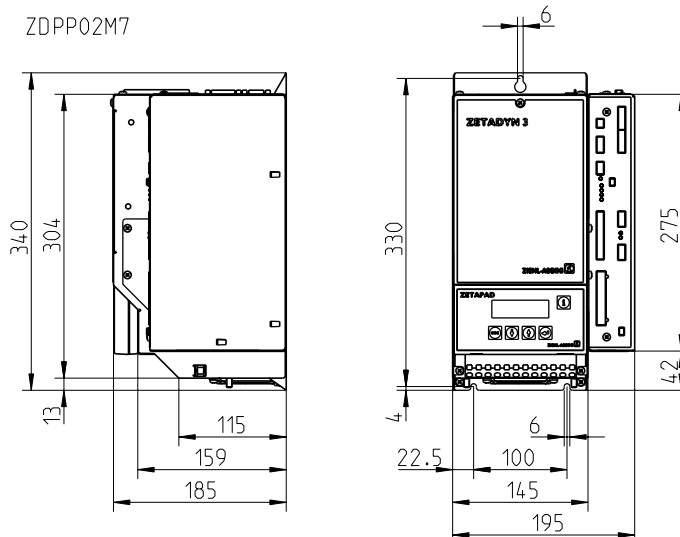
The ZETADYN 3BF Frequency inverter is designed for installation in a switch cabinet. Wall installation outside the switch cabinet is not permitted.

4.1.2 Switch cabinet installation

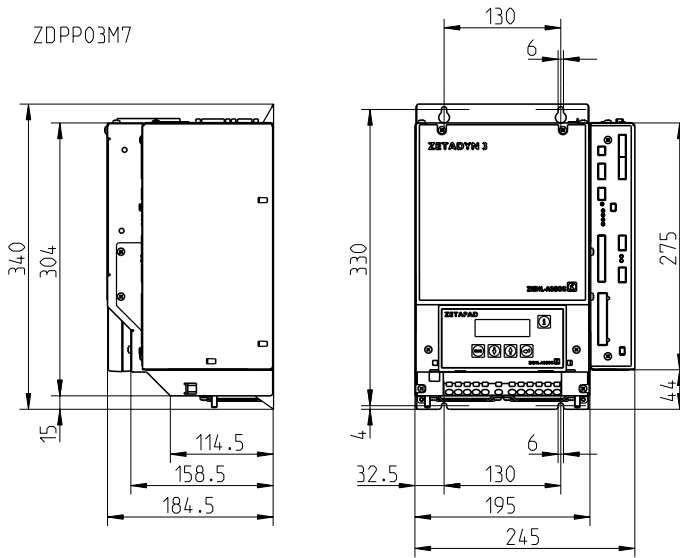
CAUTION!

To ensure unobstructed airflow, you must install the Frequency inverter in a vertical position!

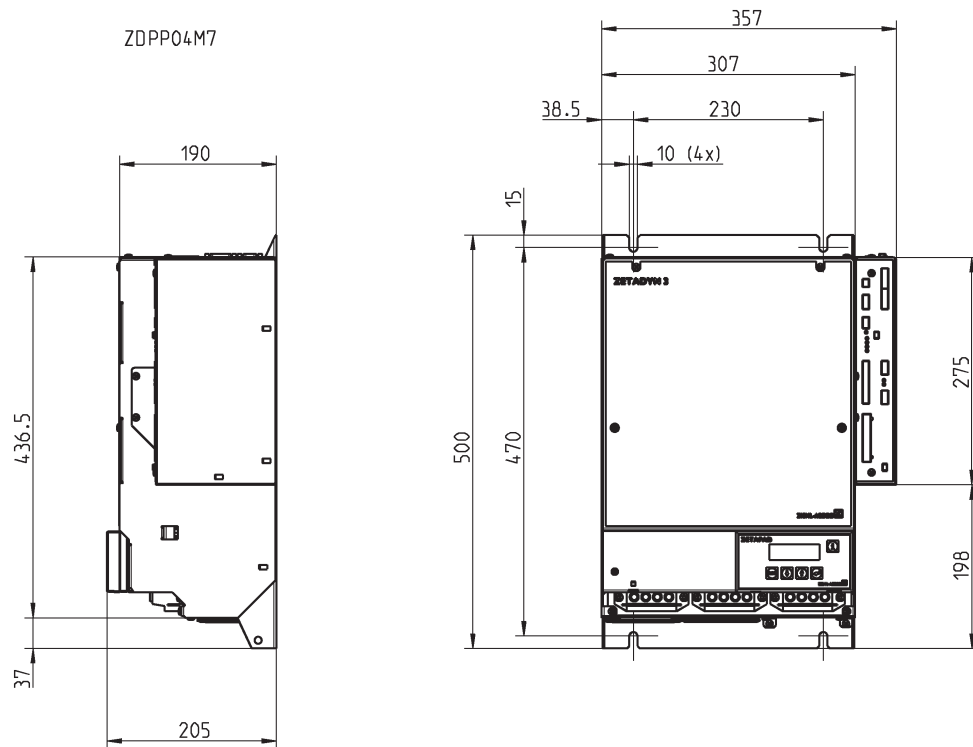
4.2 Dimensions



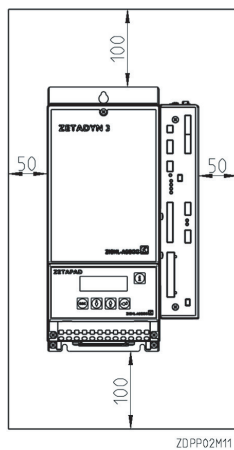
Dimensions ZETADYN 3BF011 bis ZETADYN 3BF017



Dimensions ZETADYN 3BF023 and ZETADYN 3BF034



Dimensions ZETADYN 3BF046 up to ZETADYN 3BF074



Minimum distances ZETADYN 3BF011 up to ZETADYN 3BF74

5 Electrical installation



Warning!

It is forbidden to carry out work on electrically live parts.
Even after disconnection, the dc-link (terminals X1:DC+ / X1:DC-) are still live.
Wait at least 3 minutes before working on the device



Dangerous voltage!

Operating the ZETADYN 3 with the housing cover removed is prohibited because energized, exposed parts are present inside the device. Disregarding this regulation can lead to severe personal injury.

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.

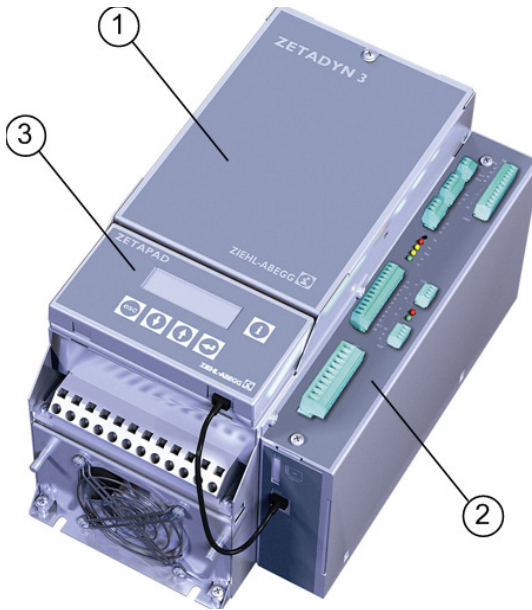
Always keep switch cabinets and all electrical supply facilities locked. Access is only allowed for authorized persons using a key or special tool.

Never clean electrical equipment with water or similar liquids.

5.1 EMC-compatible installation

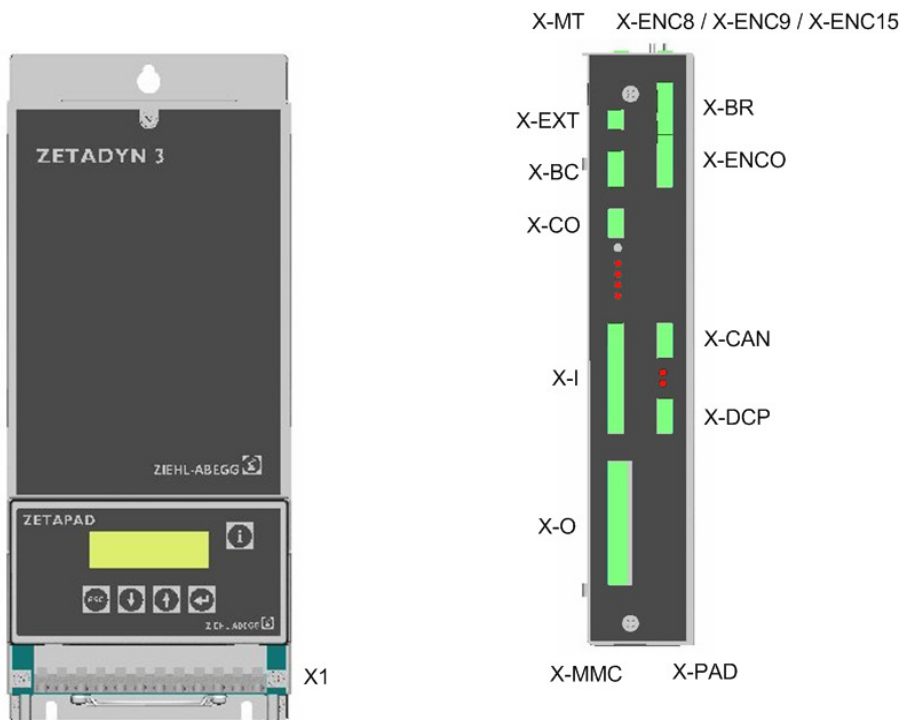
- Use only shielded cables for motor and brake chopper or brake resistor connections.
- Use only shielded control cables
- Max. motor line length is 25m
- If you must interrupt the shielding (e.g., to install a motor contactor), the shielding must be subsequently continued with the lowest possible HF impedance.
- The shielding of power cables (motor cable, Brake-Chopper cable) must be connected to ground on both sides
- The shielding of control cables (in- and outputs, encoder cable, ...) must be connected to ground only at the inverter
- Use shielded lines in the switching cabinet also
- Do not twist shielding for connections; use a suitable shield connection system (e.g. Shield-Kon®)
- Run the control cables and the encoder cables separate from the power cables
- Flawless electrical contact must exist between the grounded mounting plate and the metal housing of the frequency inverter
- Provide connected inductances (brakes, motor contactors) with suppressors

5.2 Configuration / Terminal positions



Configuration ZETADYN 3 BF

- 1 Power unit
- 2 Controller unit (with open loop control inputs and control outputs)
- 3 Operating terminal ZETAPAD

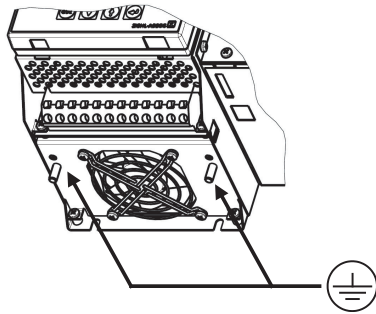


Terminal positions

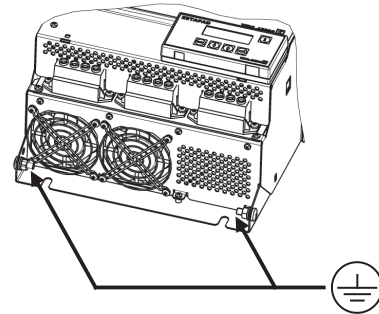
- X1 Mains motor / Brake-Chopper / Brake-Resistor
- X-EXT external 24V DC power supply
- X-BC Brake-Chopper / Brake-Resistor monitoring
- X-CO Contactor monitoring
- X-I Digital inputs
- X-O Digital outputs
- X-MMC Memory card
- X-PAD ZETAPAD
- X-DCP DCP
- X-CAN CAN
- X-ENCO Artificial encoder
- X-BR Brake monitoring
- X-ENC8 Encoder
- X-ENC9 Encoder SUB-D
- X-ENC15 Absolute encoder SUB-D

5.3 Protective ground connection

Every frequency inverter must be grounded! According to DIN EN 50178, grounding must be made using a protective-connector connection of at least 10mm² (for copper lines).
An M6 threaded bolt is available on the frequency inverter to connect the protective ground (see Fig.).



Protective ground connection ZETADYN 3BF011 up to ZETADYN 3BF034



Protective ground connection ZETADYN 3BF046 up to ZETADYN 3BF074

The frequency inverter's PE connection must be connected with the main grounding (neutral bar) in the switch cabinet.

Minimum cross-section for the protective line:

Mains supply cross-section	PE line cross section
≤ 10 mm ²	Min. 10mm ² or route a second electrical conductor parallel to the existing protective line to achieve the minimum cross-section
> 10 mm ²	Mains power supply line cross section according to DIN VDE 0100 Part 540

5.4 Mains connection (X1)



Attention!

Before connecting the mains, make sure the technical data on the frequency-inverter rating plate matches the required connection loads

5.4.1 Line 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.

5.4.2 Mains fuse

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

5.4.3 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.

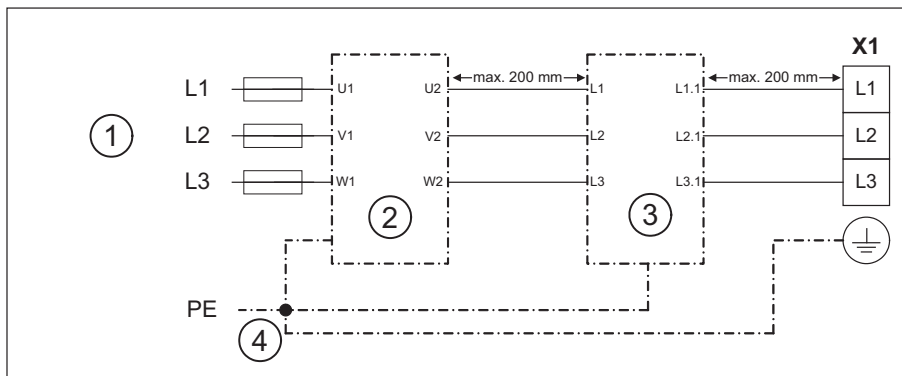
5.4.4 Connection

Type ZETADYN 3BF011 bis ZETADYN 3BF034

The mains connection is implemented with spring terminals. To prevent damage to the terminals and to ensure good contact, insert a suitable screwdriver into the terminal up to the limit when making a mains connection so that it opens completely.

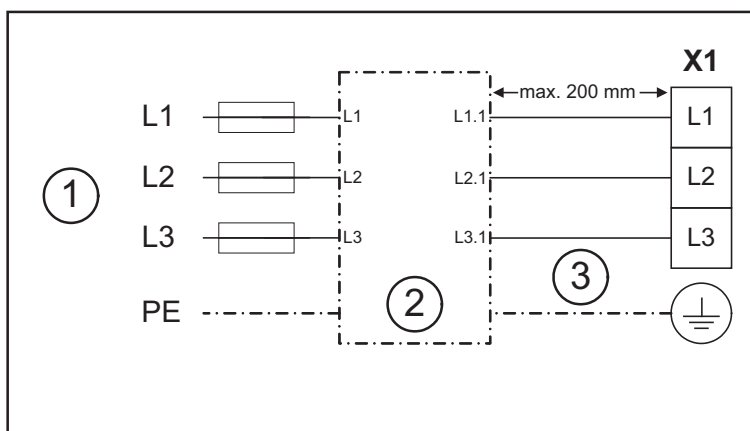
Type ZETADYN 3BF046 bis ZETADYN 3BF074

The mains connection is implemented with screw terminals. To prevent damage to the terminals and to ensure good contact, the terminals must be tightened with the torque as stated in the technical data.



Mains connection ZETADYN 3BF011 und ZETADYN 3BF046-074

- 1 Mains 3~ 400V/PE/50Hz
- 2 Line reactor
- 3 Radio interference filter
- 4 Central ground point



Mains connection ZETADYN 3BF013 - 034

- 1 Mains 3~ 400V/PE/50Hz
- 2 Line reactor-radio interference filter
- 3 Prefabricated connection wires

5.5 Line reactor-radio interference filter

Radio interference filter:

Installation in the mains feed to comply with:

EN 12015 electromagnetic compatibility – electrical interference and
 DIN EN 12016 electromagnetic compatibility – noise immunity.

Line reactor:

Installation in the mains feed to meet the "Directives for connecting elevator installations to the public utility low voltage grid". The line reactor reduces the 5th harmonic oscillations by < 30% in accordance with this directive

Type ZETADYN 3BF011 and ZETADYN 3BF046 - 074:

The line reactor and the radio interference filter are two separate components which have to be mounted in the switch cabinet.

Type ZETADYN 3BF013 - 034:

In the Line reactor-radio interference filter module the line reactor as well as the radio interference filter are integrated in one housing.

With the line reactor radio-interference filter from Ziehl-Abegg, compliance with these standards and directives is guaranteed.

Please refer to the "Accessories" chapter for a detailed description.

5.6 Residual current operated device (RCD)



In case of personal protection through automatic disconnection, according to DIN EN 50178 it is not permissible to use pulsed current sensitive RCD's (type A) because a direct current component in the error current could prevent the RCD from triggering.

A universal current-sensitive, selective RCD (type B) according to DIN-VDE 0644-100 must be used

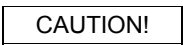


Please note that even when using a correct type B RCD, false triggering due to high protective earth currents (stray current) can still occur and that operation with these protective devices is not possible.

Fire prevention

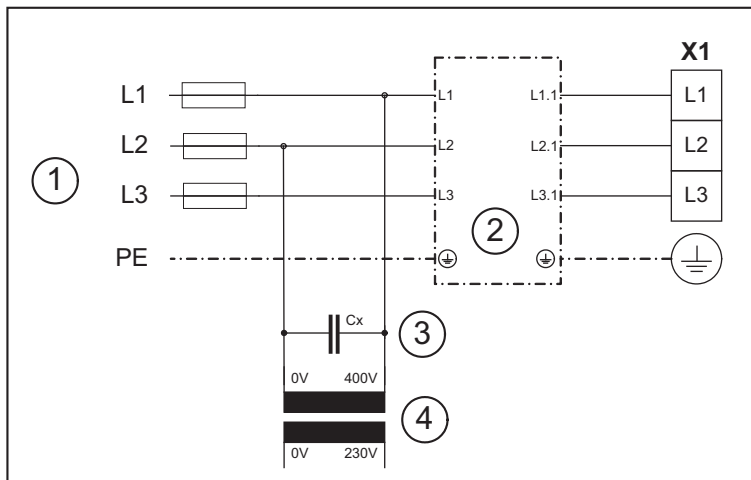
To comply with the fire prevention specifications required in DIN VDE 0100-482, an RCD with a rated differential current of **max. 300mA** must be used.

5.7 Control transformer in the mains feed line



When using a control transformer in the frequency inverter'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 Line reactor-radio interference filter
- 3 Capacitor
- 4 Control transformer

Recommended capacitor types for Cx:

- Epcos Typ B25832 10µF/640V-AV
- Condensers for motor starting with following data: 10µF/450V-AC

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

5.8 Motor connection (X1)

5.8.1 Line 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.

5.8.2 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.

5.8.3 Cable lengths

The maximum line length is 25m. When motor lines over **>25m** are used, compliance with DIN EN 12015 (electromagnetic compatibility – electrical interference) and DIN EN 12016 (electromagnetic compatibility – noise immunity) is no longer guaranteed.

5.8.4 Connection

Type ZETADYN 3BF011 bis ZETADYN 3BF034

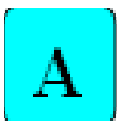
The mains connection is implemented with spring terminals. To prevent damage to the terminals and to ensure good contact, insert a suitable screwdriver into the terminal up to the limit when making a mains connection so that it opens completely.

Type ZETADYN 3BF046 bis ZETADYN 3BF074

The mains connection is implemented with screw terminals. To prevent damage to the terminals and to ensure good contact, the terminals must be tightened with the torque as stated in the technical data.

5.8.5 Motor contactors

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.



When operating asynchronous motors, two master contactors per at least 2 main contacts (make contact element, NO contact) are required for the motor connection and 2 auxiliary contacts (NO contacts) for contact monitoring (see wiring diagram).



When operating synchronous motors, two master contactors with 4 main contacts each (2x NO contacts and 2x break contacts) are required for motor connection plus 2 auxiliary contacts (NO contacts) for contact monitoring (see wiring diagram).

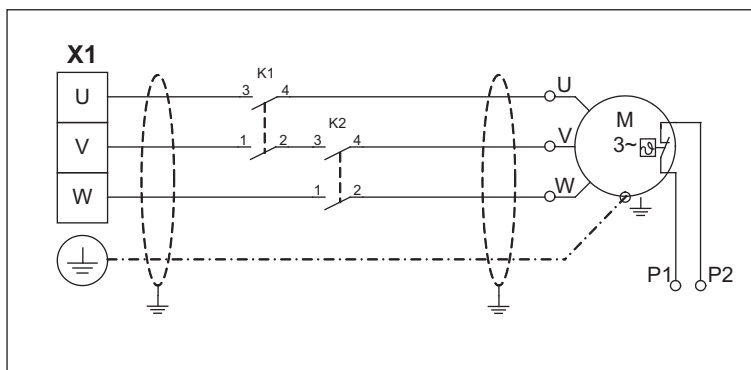
The maximum line length to the motor contactors when using non-shielded lines is **200mm**. If there is a greater distance between the contactors and frequency inverter, you must use shielded lines!



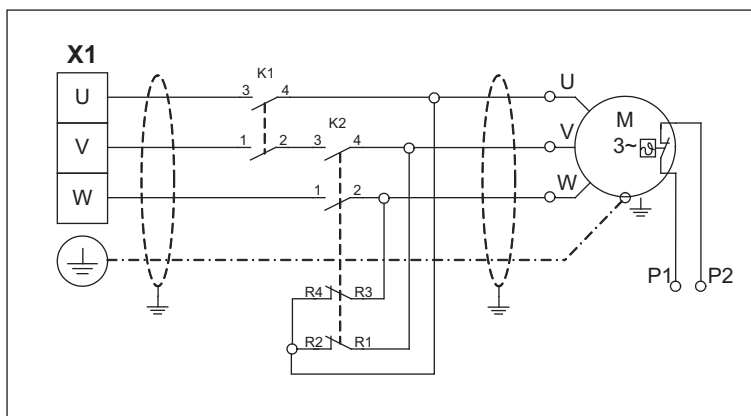
Warning!

When operating the motor with an encoder, 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

CAUTION!

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.

5.8.6 Contacting the shielding in the switch cabinet

You must connect the shielding on the switch cabinet side in to the PE near the contactors

5.8.7 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, 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 (e.g. Shield-Kon®).

5.9 Motor temperature monitoring (X-MT)



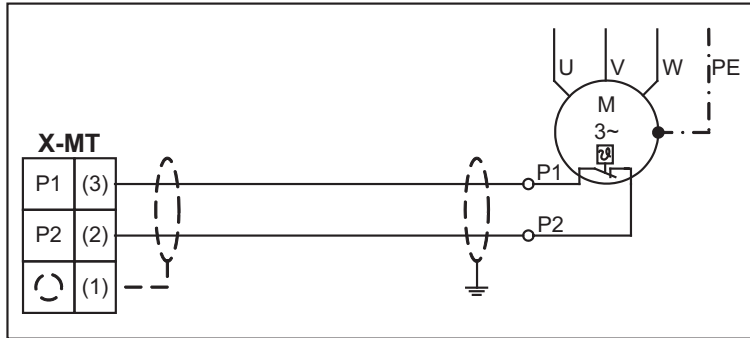
The frequency inverter must be equipped with the option module EM3-MOT-TEMP (item no. 357108) for motor temperature monitoring!

The temperature monitoring is carried out according to IEC 64800-5-1:2002-02 (switching point at 3500Ω)

The following sensor types can be used:

- Ptc thermistor (PTC according to DIN 44082)
- Temperature sensor KTY84-130 (tolerance color code yellow)
- Thermal circuit breaker

It is not necessary to especially configure the sensor type in the software.

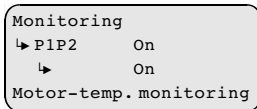


Temperature monitoring connection

() terminal designation of connector

CAUTION!

The motor temperature monitoring must be activated in the menu **"Monitoring/P1P2"**



5.10 Digital inputs (X-IN)

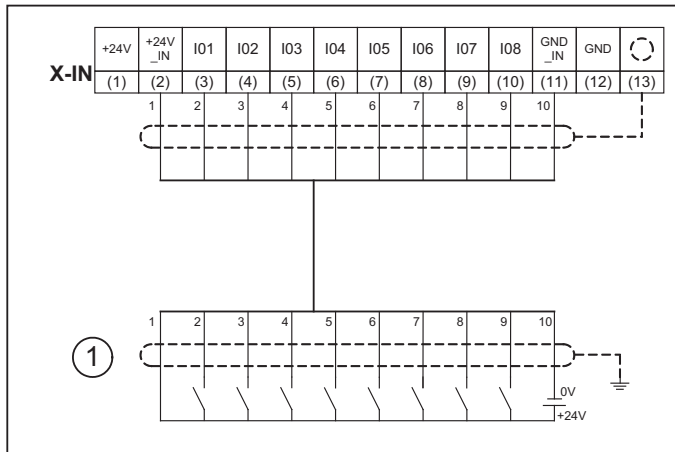
Standard, there are digital inputs available on the X-IN 8 terminals for parallel activation of the frequency inverter. The inputs are pre-parameterized but can be assigned with other functions by modifying the parameters

The inputs can be activated galvanically isolated by an external 24 V power supply in the control system or by the internal 24 V supply in the frequency inverter.



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

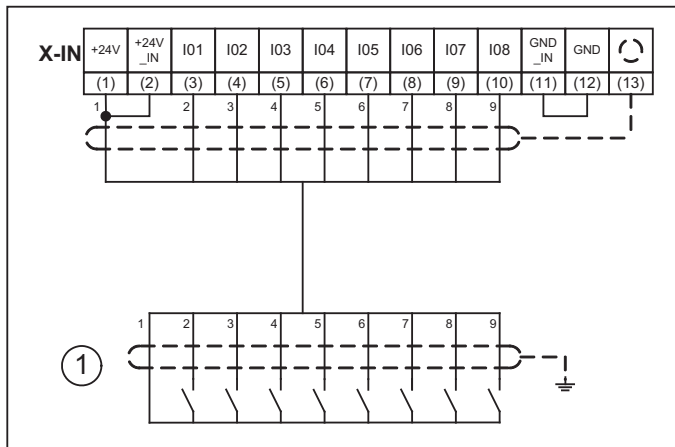
5.10.1 Connection with external power supply



Connection of digital input with external power supply

- 1 Control system
- () terminal designation of connector

5.10.2 Connection with internal power supply



Connection of digital input with internal power supply

- 1 Control system
- () terminal designation of connector



When using the internal power supply, you must make a bridge between both 24V terminals and both 0V terminals.

CAUTION!

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

5.10.3 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. 12.6 mA
Clamping range	max. 1,5 mm ²

5.10.4 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												
	+24V	+24V_IN	I01	I02	I03	I04	I05	I06	I07	I08	GND_IN	GND	⊖
00:Free	24 VDC ext.	24 VDC int.	RF*	V1*	V2*	V3*	VZ*	RV1 UP*	RV2 DOW-N*	PARA 2*	0 VDC ext.	0 VDC intern	Screening
01:ZA_IO			RF	V1	V2	V3	VZ	RV1 UP	RV2 DOW-N	PARA 2*			
03:BP_IO			RF	V1	V2	V3	VZ	RV1 UP	RV2 DOW-N	PARA 2*			
08:KN_IO			RF	V1	V2	V3	VZ	RV1 UP	RV2 DOW-N	PARA 2*			
11:NL_IO			RF	V1	V2	V3	VZ	RV1 UP	RV2 DOW-N	PARA 2*			
13:SS_IO			RF	V1	V2	V3	VZ	RV1 UP	RV2 DOW-N	PARA 2*			
15:ZA_BIN			RF	DIR	BIN0	BIN1	BIN2	Free*	Free*	PARA 2*			
16:WL_IO			RF	V1	V2	V3	VZ	RV1 UP	RV2 DOW-N	PARA 2*			
20:ST_IO			RF	V1	V2	V3	VZ	RV1 UP	RV2 DOW-N	PARA 2*			
24:CSILVA			RF	BIN0	BIN1	BIN2	Free	RV2 DOW-N	RV1 UP	PARA 2*			

* The function of the inputs can be changed



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

- Controller enable
- Speed
- Default for direction of travel

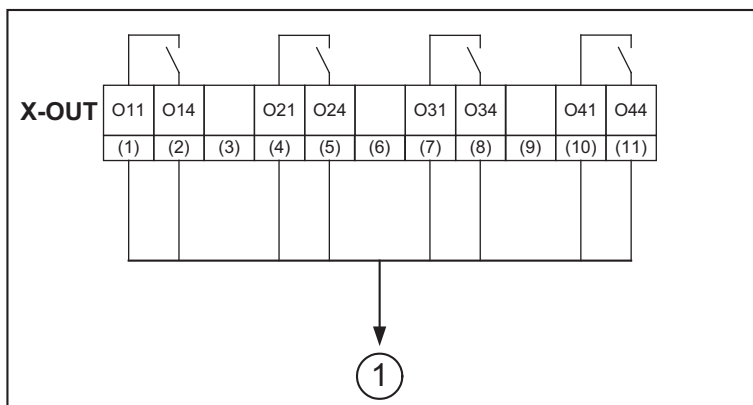
5.10.5 Binary presetting of the travel speeds

travel speed	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
V7	1	1	1

5.11 Digital outputs (X-OUT)

4 digital outputs are available on the X-OUT terminal as floating relay contacts with NO-switching functions. The outputs are pre-parameterized but can be assigned with other functions by modifying the parameters.

5.11.1 Connection



Connection of the digital outputs

- 1 Control system
- () terminal designation of connector

5.11.2 Technical data

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

CAUTION!

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

5.11.3 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\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
00:Free	Fault*	MB*	MotContact*	V < V_G1*
01:ZA_IO	Error	MB	MotContact	V < V_G1
03:BP_IO	Error	MB	MotContact	V < V_G1
08:KN_IO	Error	MB	MotContact	V < V_G1
11:NL_IO	Error	MB	MotContact	V < V_G1
13:SS_IO	Error	MB	MotContact	V < V_G1
15:ZA_BIN	Error	MB	MotContact	V < V_G1
16:WL_IO	Error	MB	MotContact	V < V_G1
20:ST_IO	Error	MB	MotContact	V < V_G1
24:CSILVA	Error	MB	MotContact	V < V_G1

* The function of the outputs can be changed

5.12 DCP interface (X-DCP)

Alternative to conventional wiring, it is also possible to activate the frequency inverter through a DCP protocol via the RS485 interface X-DCP (see "DCP operation" chapter).

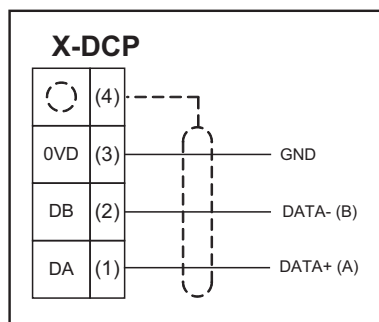


Operating the frequency inverter with DCP protocol is only feasible with the option module EM3-CAN-DCP (item no. 357107)!



- Use a shielded cable for the connection. The shielding must be grounded to ground on both ends
- Make the connection between the frequency inverter and the control system without additional terminal points.
- The maximum line length is 50m.

5.12.1 Electrical connection



DCP connection

() terminal designation of connector

5.13 Encoder connection asynchronous motors (X-ENC8 X-ENC9)



When operating the motor with a sinusoidal or incremental encoder, the frequency inverter must be equipped with the option module EM3-ENC-ASM-ZA (item no. 357104)

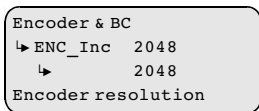
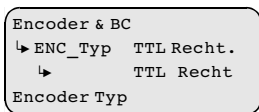
- Use a shielded cable for the connection.
- Attach the shielding on the inverter corresponding to the terminal or pin assignments.
- Make the connection between the frequency inverter and the encoder without additional terminal points.

CAUTION!

The SUB-D jack X-ENC9 pin assignments are not standardized. When using external encoders, make sure that they have the identical contact assignments and an interface with identical specifications.

CAUTION!

Before the encoder can be plugged in or connected, the encoder type and the encoder resolution need to be parameterized in the "Encoder & BC/ENC_TYP" and "Encoder & BC/ /ENC_INC" menu.



X-ENC9:9-pole SUB-D jack for connection with Sub-D plug

X-ENC8:8-pole terminal strip for discrete connection

5.13.1 Technical data X-ENC8 X-ENC9

Encoder types	Sinusoidal encoder (X-ENC8 and X-ENC9) Incremental encode HTL / TTL (only X-ENC9)
Encoder resolution	1024 ... 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
Clamping range X-ENC8	max. 1,5mm ²
Max. cable length	25 m

5.13.2 Terminal assignment X-ENC8

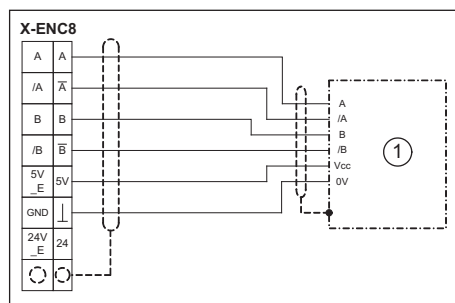
A	Track A
/A	Track A inverse
B	Track B
/B	Track B inverse
+5V_E	+5 V power supply for sinusoidal and TTL encoders
GND	Ground
+24V_E	+24 V power supply for HTL-encoder
⊙	Shielding

5.13.3 X-ENC9 pin assignment

1	A	Track A
2	B	Track B
3	-	N.C.
4	+5V_E	+5 V power supply for sinusoidal and TTL encoders
5	DGND	Ground
6	/A	Track A inverse
7	/B	Track B inverse
8	/FAULT	reserved
9	DGND	Ground

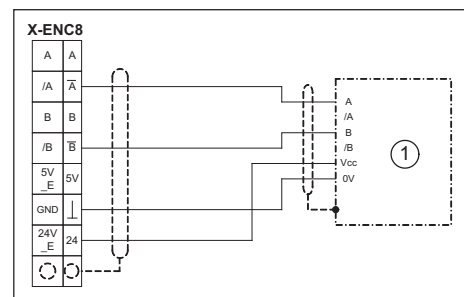
5.13.4 Encoder connection to terminal X-ENC8

TTL incremental encoder (5V), sine encoder (1V_{ss}) HTL encoder



TTL encoder (30V)

1 TTL- or sine encoder



HTL encoder connection

1 HTL-encoder

5.14 Encoder connection synchronous motors (X-ENC15)



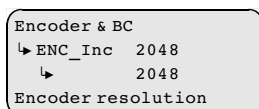
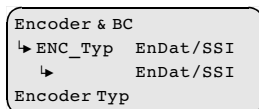
To operate synchronous motors, the frequency inverter has to be equipped with the option module EM3-ENC-SYN-ZA (item no. 357105)!

CAUTION!

The SUB-D jack X-ENC15 pin assignments are not standardized. When using external encoders, make sure that they have the identical contact assignments and an interface with identical specifications.

CAUTION!

Before the encoder can be plugged in or connected, the encoder type and the encoder resolution need to be parameterized in the "Encoder & BC/ENC_TYP" and "Encoder & BC/ /ENC_INC" menu.



X-ENC15:15-pole SUB-D jack for connection with Sub-D plug

5.14.1 Technical data X-ENC15

Encoder types	Absolute encoder with EnDat or SSI interface
Encoder resolution	512, 1024, 2048, 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

5.14.2 X-ENC15 pin assignment

1	DATA	Data line for communication with the absolute encoder
2	/DATA	Data line invers
3	U+ sens	Sensor cable - encoder voltage
4	+5V_REG	Controlled +5 V power supply (With missing encoder the power supply is switched off)
5	DGND	Ground power supply absolute encoder
6	-	N.C.
7	B	Track B
8	-	N.C.
9	/CLK	Clock signal invers
10	CLK	Clock signal for serial transfer
11	U- sens	Sensor cable - encoder voltage
12	A	Track A
13	/A	Track A inverse
14	/B	Track B inverse
15	GND_A_B	Ground for internal shielding
Shielding		Shielding

5.15 Simulating interruption of the encoder line during TÜV acceptance

The simulation of the interruption of an encoder line can be practically implemented by pulling the encoder line plug during travel and then plugging it back in after the inspection has been completed. It is always possible to unplug and plug back in all sinusoidal, incremental and absolute rotary encoders with the frequency inverter switched on.



If the encoder is plugged back in when the controller is switched on, it will not be recognized by the frequency inverter.

To recognize the encoder, the device must be switched off and then back on.

The following procedure is recommended to check the behavior of the frequency controller when the encoder line is interrupted:

- Switch on the frequency inverter
- Apply a travel command
- Pull the encoder line during the drive
- Check the behavior of the frequency inverter
- Switch off the frequency inverter and wait for at least 3 minutes until the device is completely voltage free
- Plug the encoder line back in

5.16 Artificial encoder (X-ENCO)



To read the artificial encoder signals, the frequency inverter must be equipped with the option module EMC-ENC-ASM-ZA (item no. 357104) for asynchronous motors or EMC-ENC-SYN-ZA (item no. 357105) for synchronous motors!

The artificial encoder converts the signals of the encoder attached to the motor into differential signals according to ANSI Standard RS422. The resolution of the artificial encoder is identical with the encoder resolution.

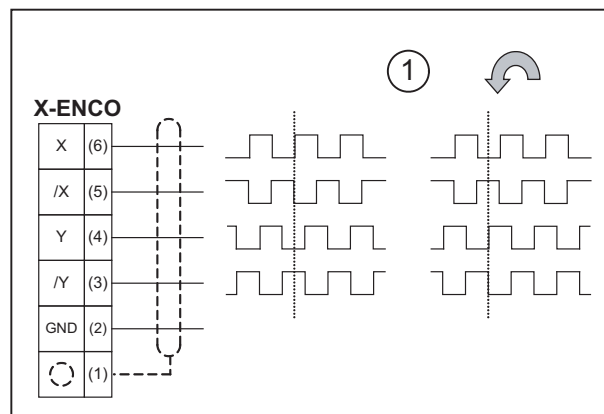


When connecting an external 24V voltage source to terminal X-EXT, the artificial encoder remains active even if the frequency inverter is switched off

5.16.1 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. 1,5 mm ²

5.16.2 Connection X-ENCO



Artificial encoder connection

- 1 Signals depending on the rotating direction of the motor (with view to the power take-off side)
- () terminal designation of connector

5.17 External 24V power supply (X-EXT)

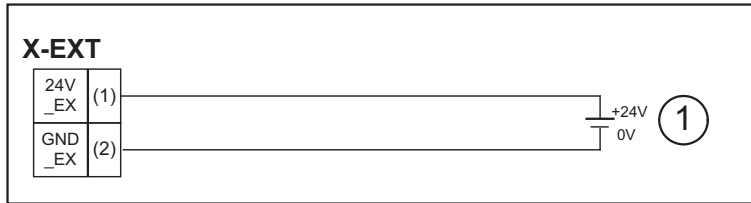
By applying an external 24V power supply to terminal X-EXT, the following functions are active even when the frequency inverter is switched off:

- Communication between the control system and the frequency inverter
- Artificial encoder
- ZETAPAD (parameter changes is possible)
- USB interface of the ZETAPAD

5.17.1 Technical data

Voltage range	23 ... 26 V
Current consumption	max. 625 mA

5.17.2 Connection X-EXT



Connection external power supply

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

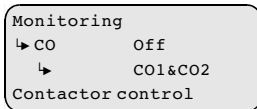
5.18 Monitoring the motor contactors(X-CO)

The frequency inverter 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!

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

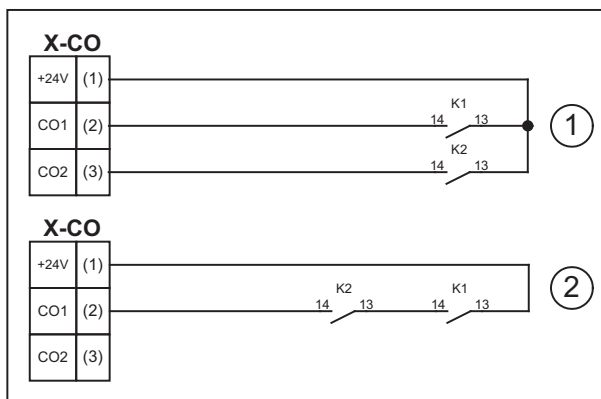
The contactor monitoring can be activated/deactivated in the "**Monitoring/CO**" menu.



5.18.1 Technical data

Monitoring voltage	+24 VDC / 12 mA
Contact type	Normally open contact (NO)
Number of inputs	2
Clamping range	max. 1,5 mm ²

5.18.2 Connection



Contactor monitoring connection

- 1 Parameter "Monitoring/CO=CO1&CO2"
- 2 Parameter "Monitoring/CO=CO1"
- () terminal designation of connector

CAUTION!

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



The frequency-inverter contactor monitoring does not substitute the motor contactors required by EN 81-1!

5.19 Brakes

5.19.1 Brake release monitoring (X-BR)



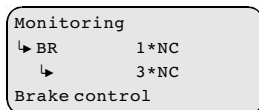
To monitor the switching state of the brakes, the frequency inverter must be equipped with the option module EM3-ENC-SYN-ZA (item no. 357105)!



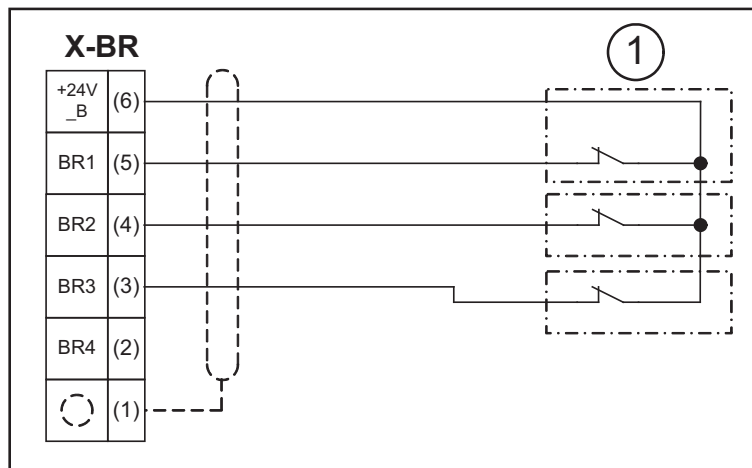
If the service brakes are used in accordance with EN81-1 as a safety device against uncontrolled car movement upwards, the brake release monitoring absolutely must be connected (periodical performance test)!

Monitoring voltage	+24 VDC / 12 mA
Contact type	Normally open contact (NO) or normally closed contact (NC)
Number of inputs	4
Clamping range	max. 1,5 mm ²

The brake release monitoring can be activated/deactivated in the **"Monitoring"** menu.



5.19.2 Connection X-BR



Brake release monitor connection

- 1 Monitoring contacts
- () terminal designation of connector

CAUTION!

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

5.19.3 Activating the brakes

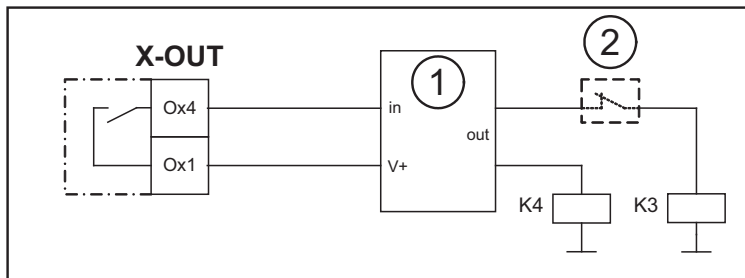
The signal to apply the brakes is implemented via a potential-free digital output DI (see "Digital outputs"). This normally-opencontact can be used either by the control system for further processing or directly to switch the brake contactor (see Fig.).



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

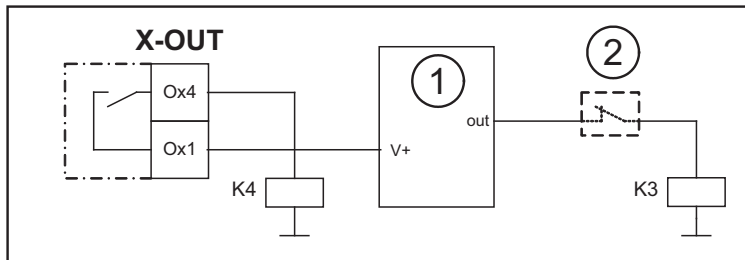
To reduce noises during brake disconnect, during normal operation the brakes should be switched to the alternating current side (K4). The brakes are switched-off slower and thus quieter through the rectifier.

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 Control system
- 2 Safety circuit



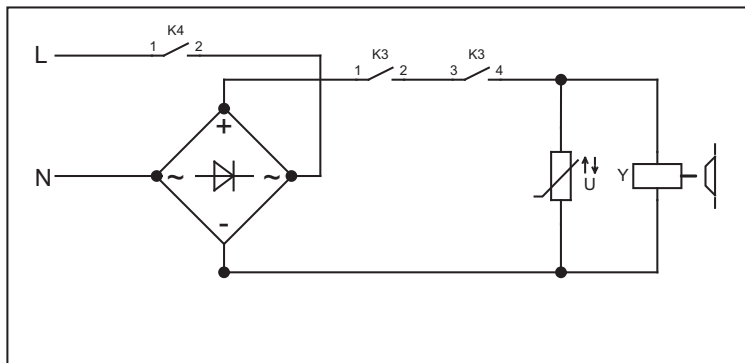
Activating the brakes by the frequency inverter and control system

- 1 Control system
- 2 Safety circuit

CAUTION!

Brakes, which are connected to the direct current side, must be protected against excess voltage from the switching actions by using corresponding varistors!

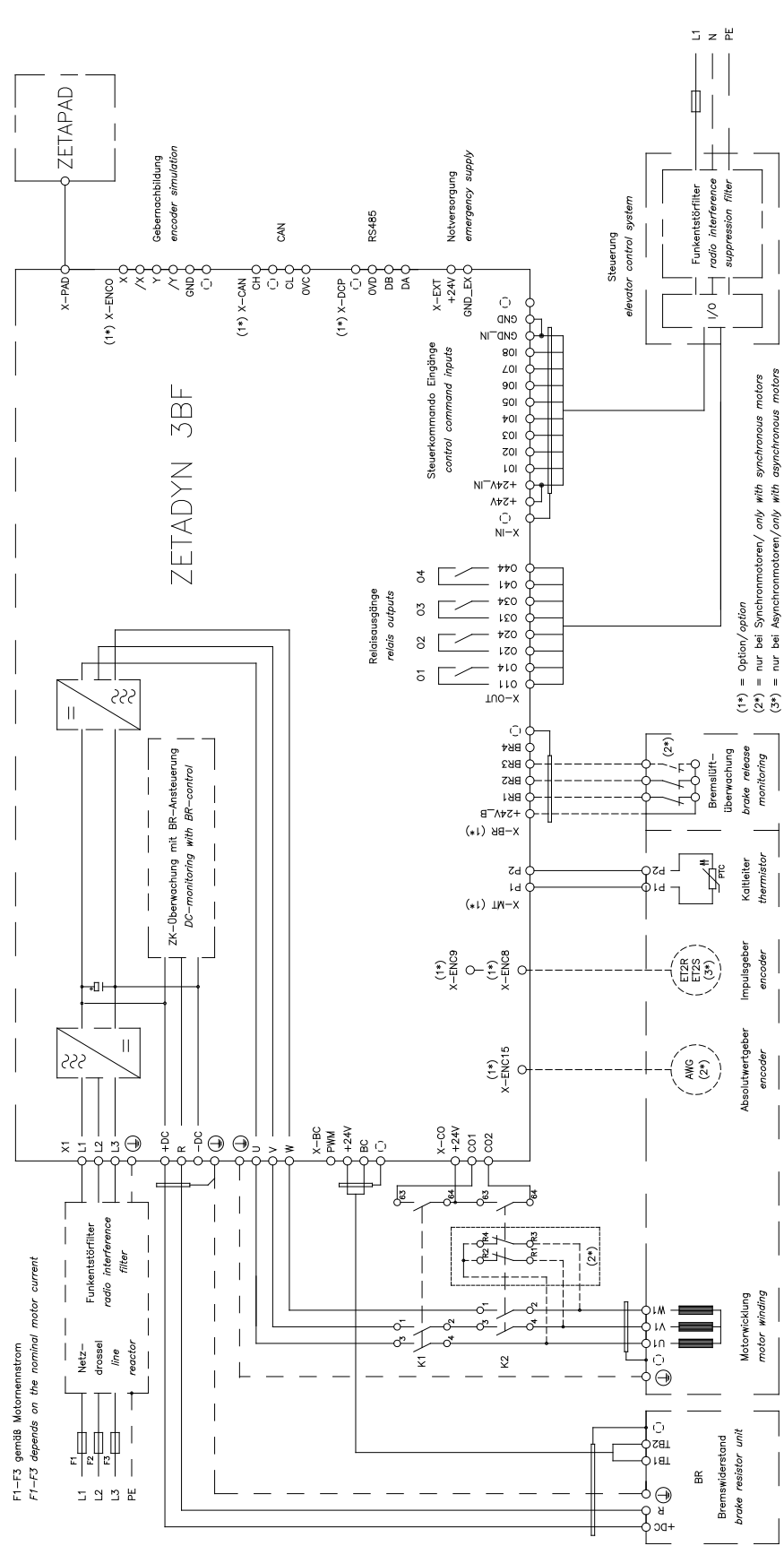
Due to the high operating current, master contactors must be used to switch the brakes!



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.

5.20 Connection suggestion



ZDPP02K1 (11.09.07)

6 Accessories

6.1 Brems-Chopper / Brems-Widerstand

During generator operation, the motor generates an electrical voltage. The voltage will be loaded into the DC-link. It is monitored to make sure this voltage on the DC-link capacitors does not exceed its tolerance of approx. 725V. When the intervention voltage is reached, the brake chopper or brake resistor is activated and the generated energy is converted into heat.

As an option the created energy can be fed back to the mains power supply (e.g. with a Revcon power feedback unit).

6.1.1 Brake-Chopper (BC)

The required control electronics are integrated in the Brake-Chopper.

6.1.2 Brake-Resistor (BR)

The required control electronics are integrated in the frequency inverter.

6.1.3 Technical data BC / BR

		BR11-A	BR17	BR25	BC25	BC50	BC100
Electrical data							
Resistor	[Ω]	64	41	28	28	14	7
Max. supply voltage	[V]	750			750		
Max. peak current with 700 V	[A]	11	17	25	25	50	100
Max. on time with peak breaking power at 120 s cycle time duration	[%]	16	10		10		
Max. peak-braking power	[kW]	7,7 vertical 6,16 horizontal	11,9	17,4	17,4	35	70
Continuous braking power	[kW]	0,7 vertical 0,56 horizontal	1,19	1,74	1,74	3.5	7
Clock frequency	[kHz]	-			1,1		
Trigger voltage	[V]	-			680		
Trigger-value temperature monitoring	[°C]	200 ±3K	100 ±3K		100 ±3K		
Cooling		Convection			Convection		
Ambient conditions							
Ambient conditions operation	[°C]	0 ... +40			0 ... +40		
Ambient conditions storage	[°C]	-20 ... +80			-20 ... +80		
rel. humidity	[%]	90			90		
Max. installation height	[m]	2500*			2500*		
Protection class		IP50	IP20		IP20		
Physical conditions							
Dimensions w x h x d	[mm]	225 x 124 x 115	300 x 185 x 155	300 x 200 x 220	550 x 300 x 220		
Weight	[kg]	1,25	2.2	4,9	5,9	11,3	
Max. lenght connection cable	[m]	1,0	5.0		5.0		
Connection terminal DC-link		-	10mm ²		10mm ²		
Connection terminal temperature monitoring		-	typ. 1,5mm ²		typ. 1,5mm ²		

* above 1000m with power reduction of 1% / 100 meters height

6.1.4 Mechanical installation Brake-Chopper / Brake-Resistor



Warning!

Warning! When the device is overloaded, the air temperature can reach up to 400 °C at a distance of 200 mm. Remaining in this area can lead to severe burns. You must take appropriate precautions.

CAUTION!

Due to the high amount of heat generation, it is only permissible to install the device outside of the switch cabinets! The devices must not be mounted on flammable surfaces

CAUTION!

The brake resistor cooling must not be impaired by the vents becoming covered. A fire hazard exists if covered with flammable materials!

CAUTION!

Additional device cooling through external fans is prohibited because this would change the reaction characteristics of the temperature monitoring.



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

Before installation

- Remove the device from the packing and check for any possible shipping damage
- Carry out installation only on a clean, level and stable foundation
- Assemble the device outside of the traffic area

During installation

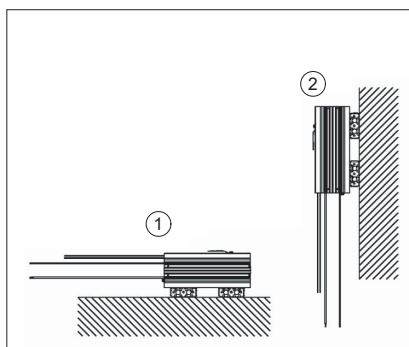
- Use suitable fastening materials
- Mount the device in a voltage free condition
- Do not allow drilling chips, screws and other foreign bodies to reach the device interior
- Vertical fitting position, max. 10° inclination
- Maintain the stated minimum clearances to ensure unobstructed cooling- air feed as well as unobstructed outgoing air discharge

Ambient conditions

- Prevent humidity
- Avoid aggressive and conductive materials in the environment

Installation position**Type BR11-A**

- For protection of contacting the hot surface, the resistor must be installed **min. 2 m** from the floor.
- Horizontal or vertical installation position
- With vertical installation positions the cables must face downwards
- Maintain the stated minimum clearances to ensure unobstructed cooling- air feed as well as unobstructed outgoing air discharge

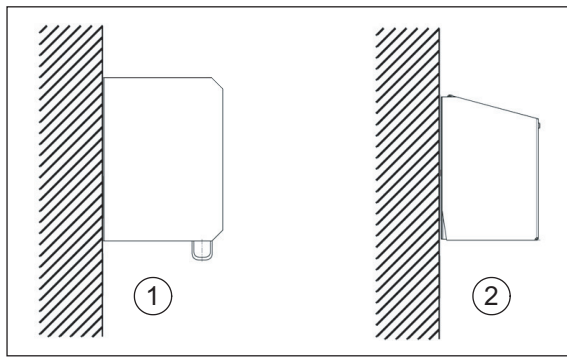


Installation position BR11-A

- 1 horizontal installation position with power reduction
- 2 vertical installation position

Type BR17 / BR25 / BC25 / BC50 / BC100

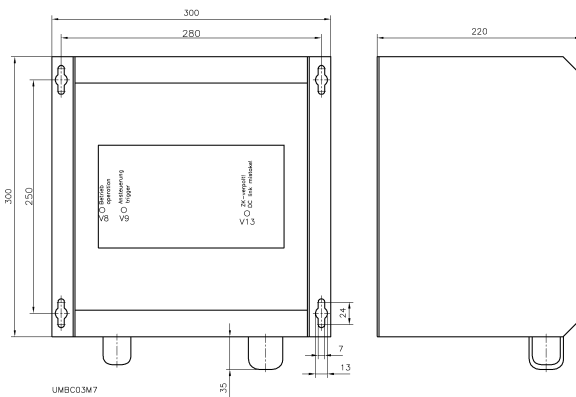
- Vertical fitting position, max. 10° inclination
- Maintain the stated minimum clearances to ensure unobstructed cooling- air feed as well as unobstructed outgoing air discharge



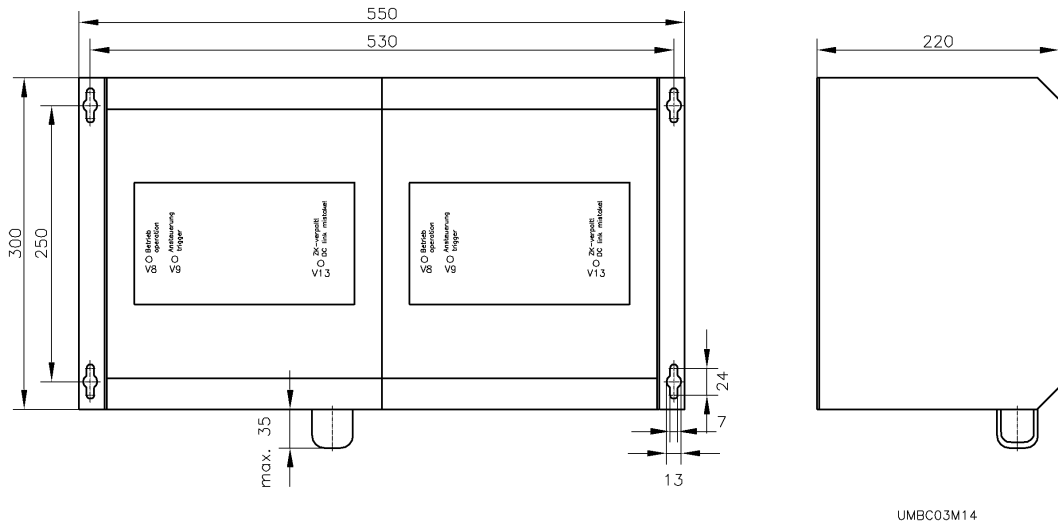
Installation position BC25 / BC50 / BC100 / BR17/ BR25

- 1 Type BC
- 2 Type BR

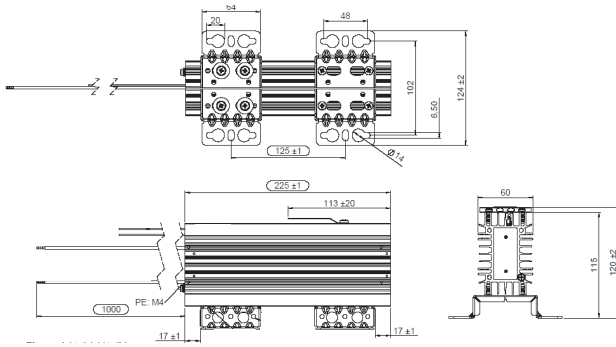
6.1.5 Dimensions type BC / BR



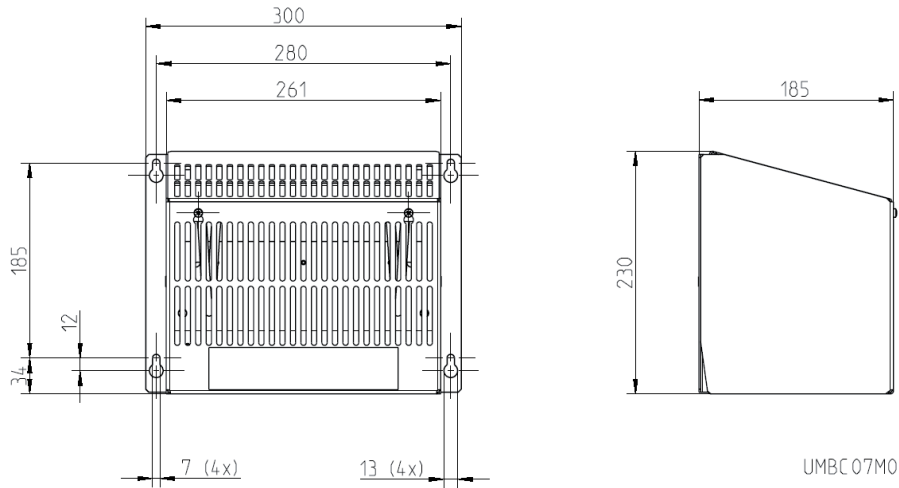
Dimensions BC25 / BC50



Dimensions BC100

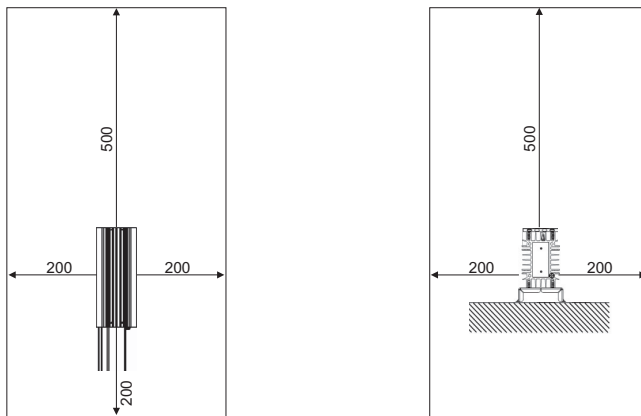


Dimensions BR11-A

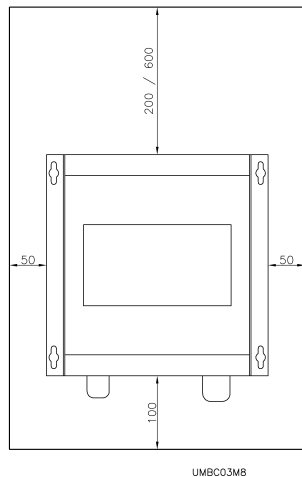


Dimensions BR 17 / BR 25

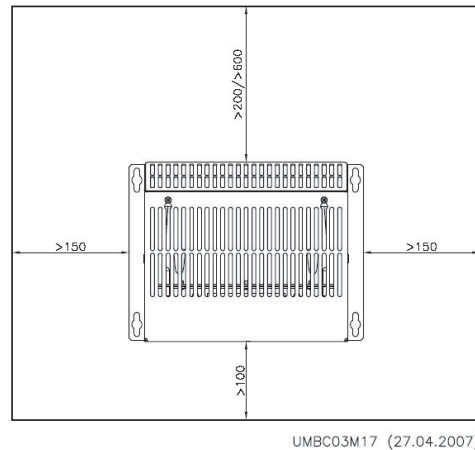
6.1.6 Minimum clearances



Minimum clearances BR11-A vertical / horizontal



Minimum clearances BC25 / BC50 / BC100



Minimum clearances BR17 / BR25

CAUTION!

Minimum clearances Typ BC / BR:

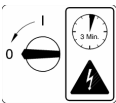
200 mm to non flammable materials (fire classification A1 according to EN 13501-1)
 600 mm to materials of low flammability without smoke emission and without burning dripping (fire classification B, C-s1 do according to EN 13501-1)

6.1.7 Electrical connection



Warning!

It is forbidden to work on the frequency converter under voltage (electrically alive). Even after disconnection, the DC-link (terminals X1:+DC / X1:-DC) is still live.



Wait at least 3 minutes before working on the device



Dangerous voltage!

Operating the device with the housing cover removed is prohibited because energized, exposed parts are present inside the device. Disregarding this regulation can lead to severe personal injury.

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.

CAUTION!

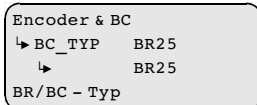
A temperature monitor absolutely must be connected to the frequency inverter!
 Otherwise, the device could burn up during a malfunction!

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!

The brake resistor or Brake-Chopper used must be configured in the "**Encoder & BC /BC**" menu.

**Selecting cables****Type BR11-A**

The Brake-Resistor of the type BR11-A is equipped with prefabricated cables.

Type BR17 / BR25 / BC25 / BC50 / BC100

Always use shielded cables for the connection!

Due to the short load duration, the cable cross-section is not dependent on the Brake-Chopper / Brake-Resistor peak braking current.

Allocating the conductor cross section to the frequency inverter

Inverter	Line cross-section	Article-No..
ZETADYN 3BF013	2,5 mm ²	00164169 (1,9 m) 00164170 (3,0 m)
ZETADYN 3BF017	2,5 mm ²	00164169 (1,9 m) 00164170 (3,0 m)
ZETADYN 3BF023	2,5 mm ²	00164169 (1,9 m) 00164170 (3,0 m)
ZETADYN 3BF034	6,0 mm ²	00159777 (1,9 m) 00156778 (3,0 m)

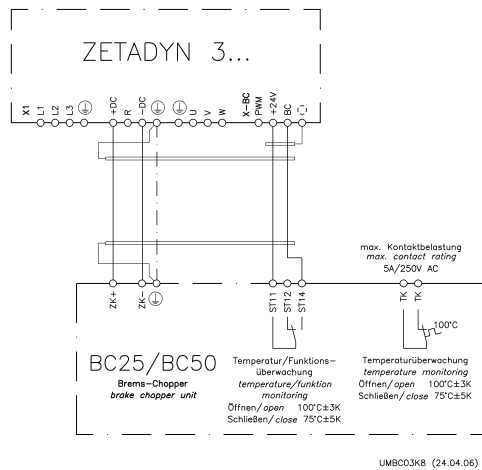
In cables purchased from Ziehl-Abegg, the control lines for temperature monitoring are already integrated.

Cable lengths

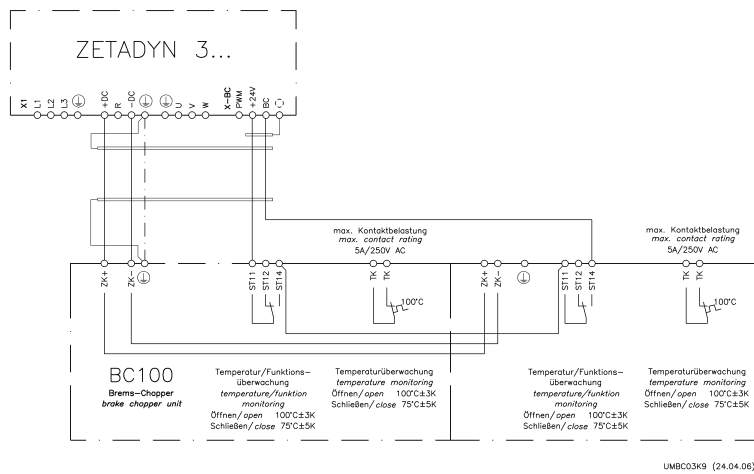
The maximum line length is 5 m.

When lines over >5m are used, compliance with **EN 12015** (electromagnetic compatibility – electrical interference) and **EN 12016** (electromagnetic compatibility – noise immunity) is no longer guaranteed. If the length of prefabricated cable of the Brake-Resistor BR11-A is not sufficient, it can be extended up to a length of 5 m. For this a shielded cable must be used and the clamping point must be placed as closed as possible to the BR11-A.

Brake-Chopper connection

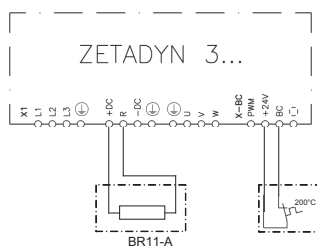


BC25 / BC50 connection

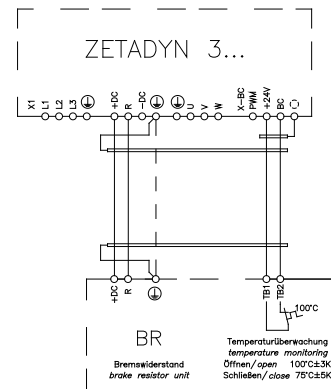


BC100 connection

Brake-Resistor connection



BR11-A connection



UMBC03K7 (11.09.07)

BR17 / BR25 connection

6.1.8 LED display (Brake-Chopper only)

3 LEDs in different colors are provided for performance tests.

YELLOW (operation)

Intermediate circuit has risen so far that the supply voltage for the brake chopper is ensured.

GREEN (triggering)

Starts glowing as soon as the intermediate circuit has reached the intervention voltage of 680 VDC and the regenerative generated energy has been converted into heat.

The greater the PWM signal is modulated, the brighter the LED is illuminated.

RED (reverse polarity)

The DC-link is connected to the Brake-Chopper with reverse polarity.

6.1.9 Allocation of Brake-Chopper / Brake-Resistor

Inverter	Brake-Chopper Brake-Resistor	Article-No.
ZETADYN 3BF011	BR11-A	357058
	BR17	357118
ZETADYN 3BF013	BR17	357118
	BC25	357031
ZETADYN 3BF017	BR17	357118
	BC25	357031
ZETADYN 3BF023	BR25	357119
	BC25	357031
ZETADYN 3BF034	BR25	357119
	BC25	357031

6.2 Line reactor-radio interference filter**6.2.1 Technical data line reactor and radio interference filter****Technical data type NF**

		NF013	NF017	NF023	NF034
Electrical data					
Mains connection voltage	[V]	400 ±10 %			
Mains frequency	[Hz]	50 / 60			
Rated current for 60 % duty cycle	[A]	13 eff	17 eff	23 eff	34 eff
Rated current continuous	[A]	10 eff	17 eff	18 eff	27 eff
Ambient conditions					
Ambient conditions operation	[°C]	0 ... +40			
Ambient conditions storage	[°C]	-20 ... +60			
Protection class		IP20			
Physical data					
Dimensions w x h x d	[mm]	90 x 325 x 185			
Weight	[kg]	4.6	4.9	5.5	6.7
Connection mains side		4 x ST6			4 x ST10
Connection inverter side		flexible wire 1,5 mm ²			flexible wire 4,0 mm ²

Technical data type ND

		ND011	ND046	ND062	ND074
Electrical data					
Mains connection voltage	[V]	500			
Mains frequency	[Hz]	50 / 60			
Rated current for 35 % duty cycle	[A]	11	-	-	-
Rated current for 60 % duty cycle	[A]	-	46	62	74
Ambient conditions					
Ambient conditions operation	[°C]	45			
Protection class		IP00			
Physical data					
Dimensions w x h x d	[mm]	125 x 73 x 158	155 x 73 x 185	206 x 160 x 150	206 x 160 x 168
Weight	[kg]	2,35	5,2	7,1	9,1
Connecting terminals	[mm ²]	2,5 / 4	16 / 25	35 / 50	4 x ST10

6.2.2 Mechanical installation line reactor-radio interference filter

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

Before installation

- Remove the device from the packing and check for any possible shipping damage
- Carry out installation only on a clean, level and stable foundation
- Assemble the device outside of the traffic area

During installation

- Use suitable fastening materials
- Mount the device in a voltage free condition
- Do not allow drilling chips, screws and other foreign bodies to reach the device interior

Ambient conditions

- Prevent humidity
- Avoid aggressive and conductive materials in the environment

6.2.3 Switch cabinet installation

To comply with the EMC-directives following has to be observed:

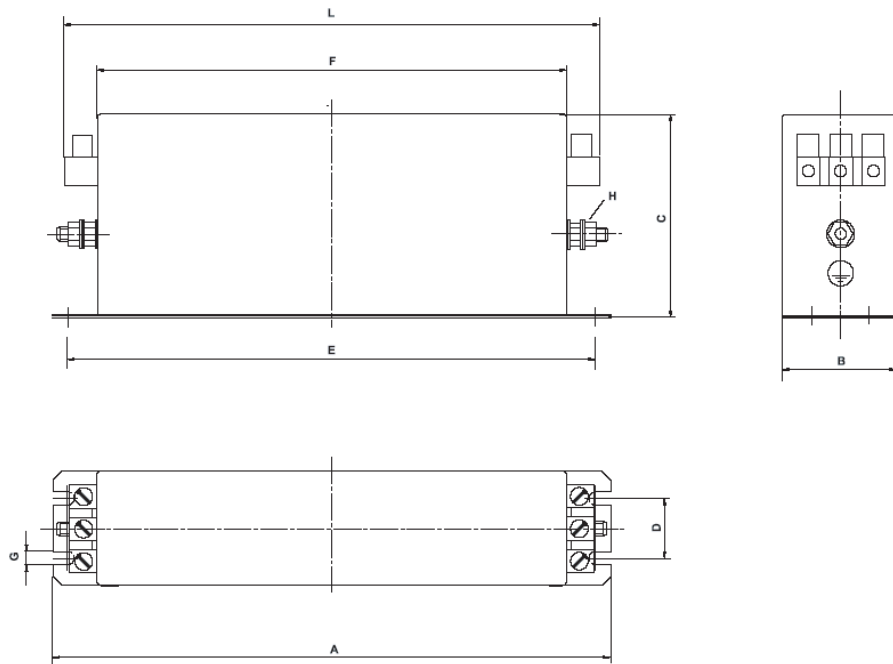
Frequency inverter type ZETADYN 3BF011 and ZETADYN 3BF046-074:

The maximum line length between the line reactor and the radio interference filter as well as between the radio interference filter and the frequency inverter is **200 mm!**

Frequency inverter type ZETADYN 3BF013 - 034:

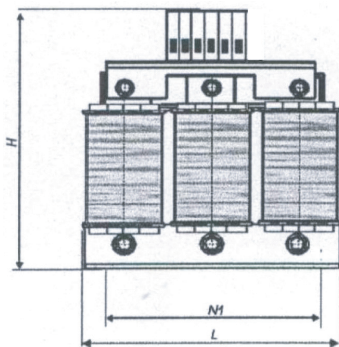
The line reactor-radio interference filter must be installed directly next to the frequency inverter!

6.2.4 Dimensions

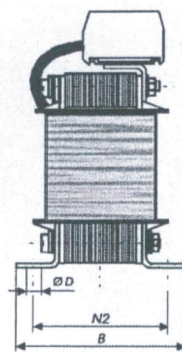


Dimensions radio interference filter FEF

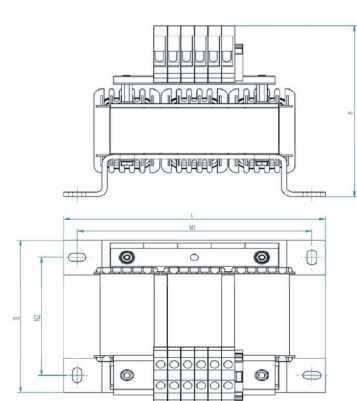
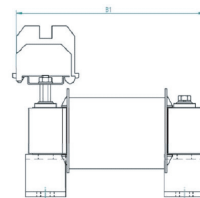
	Dimensions [mm]								
	A	B	C	D	E	F	G	H	L
FEF011KK4D	191	42	71	-	180	160	5,4	M5	-
FEF046KK4D	365	50	85	30	350	280	5,4	M5	345
FEF074KK4D	250	85	90	60	235	220	5,4	M6	300



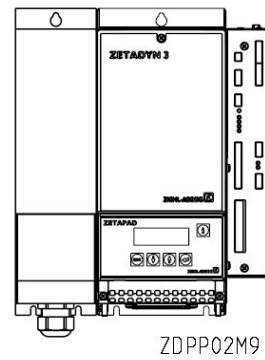
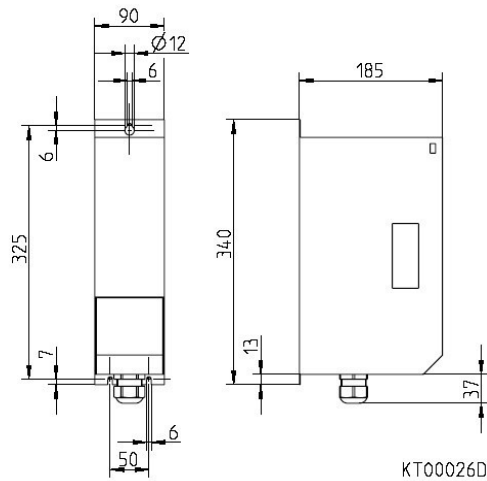
Dimensions line reactor ND011 and ND046



Dimensions line reactor ND062 and ND074



	Dimensions [mm]						
	L	H	B	B1	N1	N2	D
ND011	125	158	73	-	99	55	7
ND046	155	185	91	-	130	280	7x12
ND062	206	150	160	174	185	134	8x12
ND074	206	168	160	174	185	134	8x12



Installation of the line reactor-radio interference filter NF

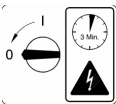
Dimensions line reactor-radio interference filter NF

6.2.5 Electrical connection



Warning!

It is forbidden to work on the frequency converter under voltage (electrically alive). Even after disconnection, the DC-link (terminals X1:+DC / X1:-DC) is still live.



Wait at least 3 minutes before working on the device



Dangerous voltage!

Operating the device with the housing cover removed is prohibited because energized, exposed parts are present inside the device. Disregarding this regulation can lead to severe personal injury.

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.

Selecting cables

Line reactor ND and radio interference filter FEF

Both rigid and flexible lines can be installed. The use of wire-end sleeves is recommended for flexible lines. 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.

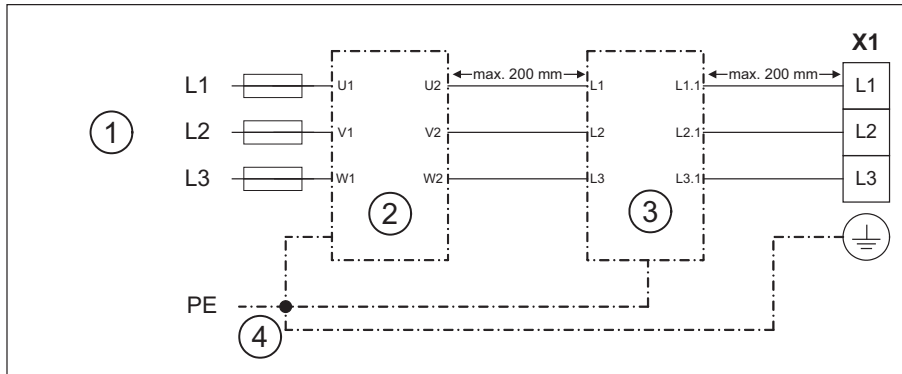
Line reactor-radio interference filter NF

The NF-module module is already prefabricated with output cables for connection to the frequency inverter.

Cable lengths

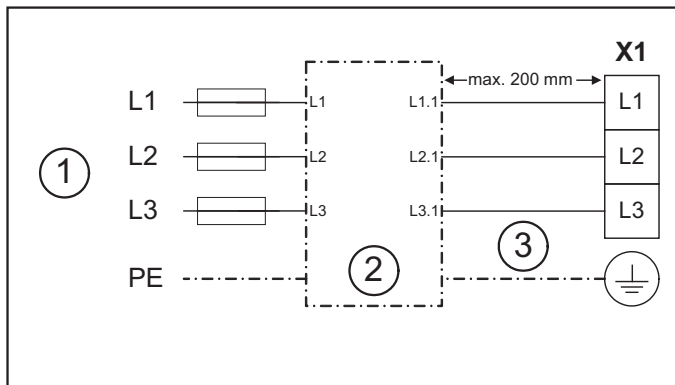
The maximum line length when using non-shielded lines is **200mm**. If there is a greater distance between the choke-module and the frequency inverter, you must use shielded lines

Connection



Connection of the line reactor ND and the radio interference filter FEF

- 1 Mains 3~ 400V/PE/50Hz
- 2 Line reactor
- 3 Radio interference filter FEF
- 4 Central ground point



Line-reactor-radio interference filter NF connection

- 1 Mains 3~ 400V/PE/50Hz
- 2 Line reactor-radio interference filter
- 3 Prefabricated connection wires

6.2.6 Allocation of the line reactor-radio interference filter to the frequency inverter

Inverter	Reactor-filter-module	Line reactor	Radio interference filter	Article-No.
ZETADYN 3BF011	-	ND011	FEF011KK4D	357089
	NF013	-	-	357163
	-	-	-	357010
ZETADYN 3BF013	NF013	-	-	357010
ZETADYN 3BF017	NF017	-	-	357011
ZETADYN 3BF023	NF023	-	-	357012
ZETADYN 3BF034	NF034	-	-	357013
ZETADYN 3BF046	-	ND046	-	357110
		-	FEF046KK4D	357164
ZETADYN 3BF062	-	ND062	-	357111
		-	FEF074KK4D	357164
ZETADYN 3BF074	-	ND074	-	357112
		-	FEF074KK4D	357165

6.3 Operating terminal ZETAPAD

The ZETAPAD is an operating module that is independent of the frequency inverter. It can be used to operate and configure all ZETADYN 3 type frequency inverters.

When using longer connection lines, remote control of the frequency inverter is feasible.

6.3.1 Installation / mounting

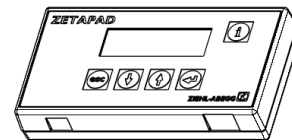
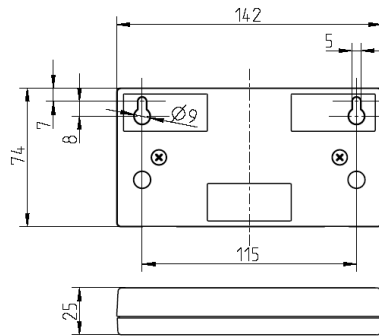
Mount using the supplied magnetic strips, which are to be glued to the back, the front and all magnetized surfaces of the frequency inverter.

Two keyhole notches are available on the rear for mounting the ZETAPAD to non-magnetic surfaces (see Fig.).

6.3.2 Dimensions



Mounting ZETAPAD to ZETADYN 3



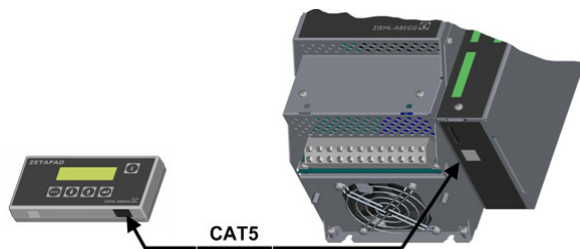
Dimensions ZETAPAD

6.3.3 Connection

Make the connection on the RJ-45 jacks to the operating terminal and the ZETADYN 3 (X-PAD).

Connection cable

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



ZETAPAD connection

7 Operation and parameterising

7.1 Possibilities for operation and configuration

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

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

7.1.1 Operating terminal ZETAPAD

The ZETAPAD is an operating module that is independent of the frequency inverter. It can be used to operate and configure all ZETADYN 3 type frequency inverters.

7.1.2 Remote control via ZETAMON software

To configure the frequency inverter, you need a PC / Notebook and the ZETAMON software (see chapter "ZETAMON software").

7.1.3 Remote control via the elevator controller display

The prerequisite is an elevator controller that supports the DCP protocol along with an existing DCP connection between the frequency inverter and the elevator controller. Please refer to the operating instructions of the elevator control for information about operating the inverter.

7.2 Menu navigation



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!








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

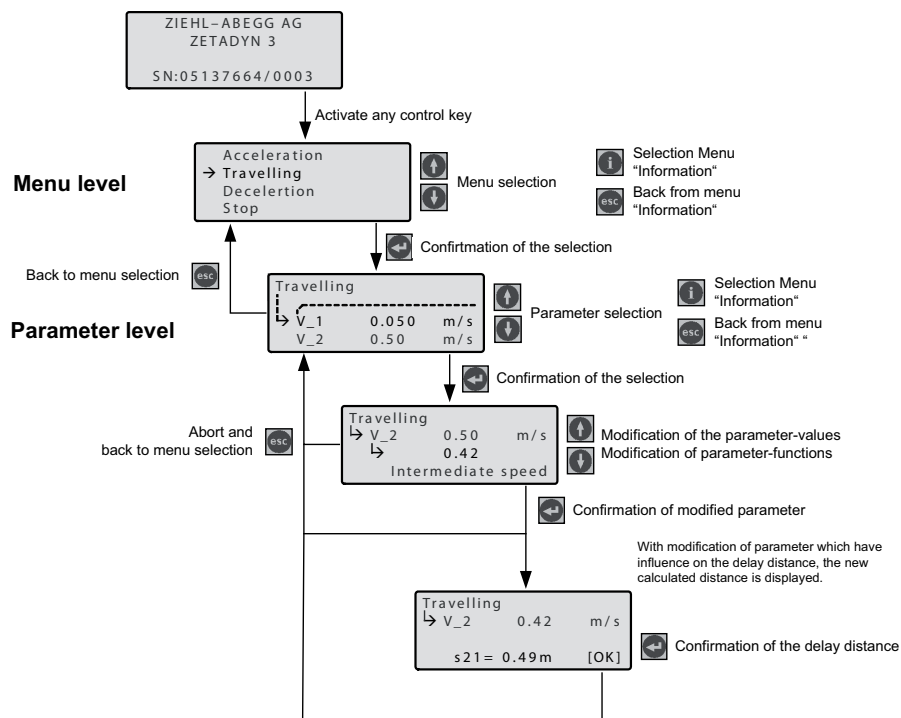


Operating interface ZETAPAD and ZETAMON

7.2.1 Control key functions

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

7.2.2 Menu and parameter navigation



Menu and parameter navigation

7.2.3 Meaning of the arrows appearing in the display:

```
Motor-Typenschild
-> Encoder & BC
  Anlage-daten
  Steuerung
```



Selecting a menus in the menu level

```
Motor-Typenschild
| n      128    rpm
|> f     18.0   Hz
| I      40.4   A
```



Selecting changeable parameters in the menu

```
Anlage-Daten
| MOD_n*  Mit D..i2
|>n*     94    rpm
|__D     0.240 m
```



Selected parameter can be modified, but is blocked at the moment. The block can be implemented by assigning a password or functionally (dependent on another parameter)

```
Start
| T_2     1.0   s
|> T2_real 0.8   s
| T_3     0.1   s
```



Value / function of a parameters is only displayed for informational purposes and cannot be modified.

```
Serial-No-----01
ZETADYN 3BF013-A
SN: 06128238/0001
3.17-1037
```



Current position (page number) in the INFO-menus

```
S3: MMC-Recorder
REC_MOD On
REC_CFG 0
REC_NUM 0
```



The recorder for recording measurements on the memory card is activ

```
Start
| T_2     1.0   s
|> T2_real 0.8   s
| T_3     0.1   s
```



Failure of the frequency inverter
The device 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 push on the key: Number is increased by the value 1.

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

```
Encoder & BC
|> ENC_INC 1024 I
|         2036
Encoder resolution
```

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.

```
Encoder & BC
|> ENC_INC 1024 I
|         2036
↑
```

8 Commissioning



Warning!

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!

Incorrectly wired connections can destroy the electrical/electronic components.

Electrostatic processes/electrical malfunctions 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 machine. 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".



This commissioning assumes the factory settings for the digital inputs and outputs, encoder inputs and monitoring contacts have not been modified!

The prerequisites for error-free commissioning:

- Mains line is connected
- Motor is connected
- Brake chopper or brake resistor are connected
- Controller and monitoring inputs are connected
- Encoder is connected

8.1 Procedure

The parameters in the menus listed below must be entered or checked in the sequence specified:

1. **Select operation mode**
2. **Motor name plate**
3. **Encoder & BC**
4. **Installation**
5. **Control system**
6. **Monitoring**

8.2 Preconfigured inverter

Inverters preprogrammed by Ziehl-Abegg are provided with the following information plate on the faceplate



In these units, the parameters are factory preset, based on customer specific information. Entering parameters is no longer necessary but the parameters must be checked before commissioning!

8.3 Switching on the frequency inverter

After a self-test, the frequency inverter is switched on when the mains voltage is applied. The following appears in the display:

```
Ziehl-Abegg AG
ZETADYN 3BF
SN:12345678/123
3.17-1037
```

8.4 Select operation mode

The ZETADYN 3 can be operated in two different operation modes:

- **Operation mode FOC:**Field orientated operation of asynchronous and synchronous motors mit encoder (closed loop).
- **Operation mode U/f:**Operation of asynchronous motors without encoder according to an U/f characteristic curve (Open- Loop).



The commissioning of both operation modes takes place in accordance with this chapter. If it is necessary to make additional setting with the Open-Loop-operation you will find more information in the chapter "Special functions/Open-Loop-operation".

For the operation mode the factory setting is "FOC".

Select operation mode

```
S9: ZA-Intern
↳ f_C_MOD Off
  ↳ On
Function/Controller
```

Set in the menu "S9:ZA-Intern" the parameter "f_C_MOD=On"

```
Controller
↳ C_MOD FOC
  ↳ U/f
Controller-Mode
```

Select in the menu "Controller" the operation mode with parameter "C_MOD"

- FOC:** Operation with encoder (Closed-Loop)
- U/f:** Operation without encoder (Open-Loop)

8.5 Enter motor data

The specifications for the motor must be entered one time before the first travel in the "Motor name plate" menu. The motor data are configured according to the information on the motor rating plate.

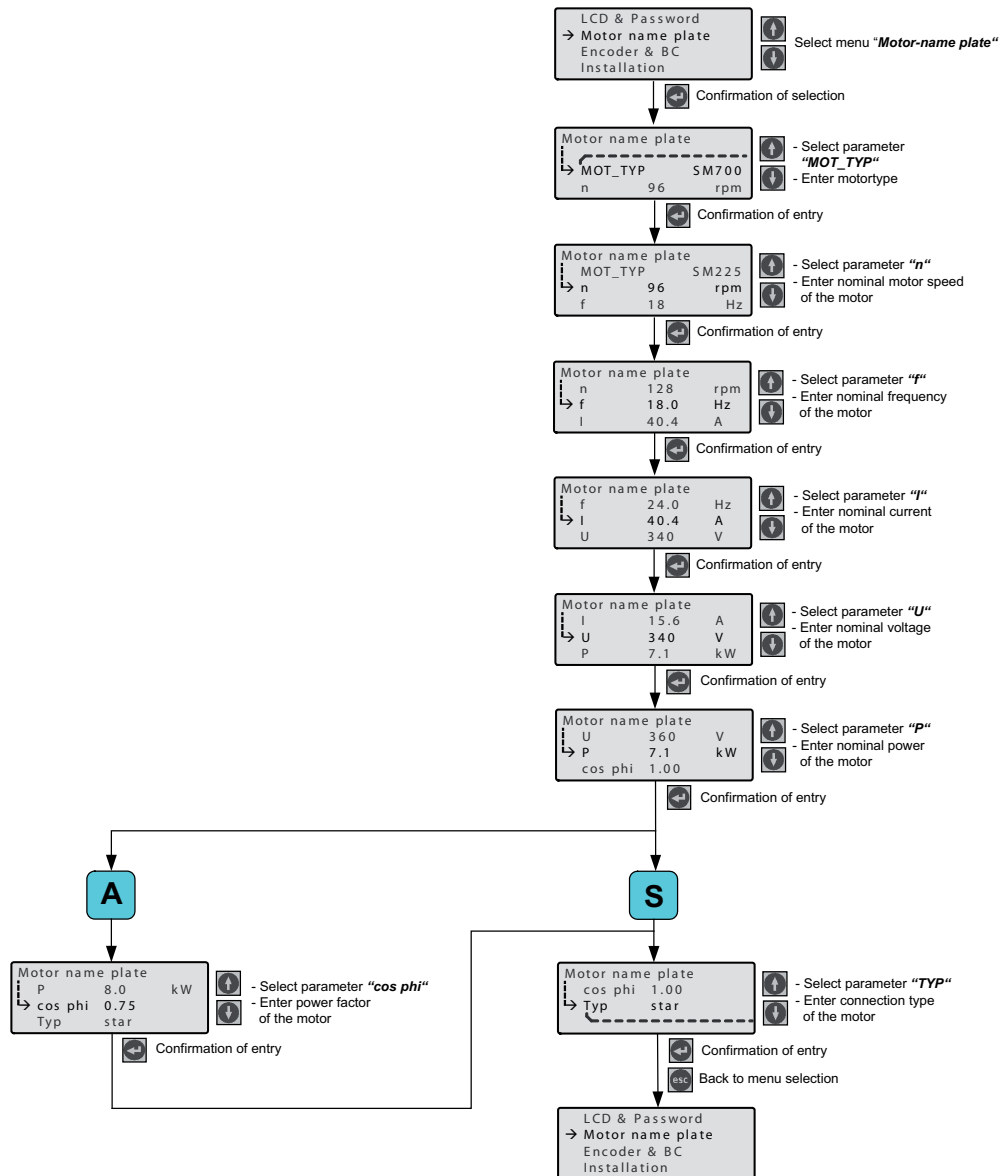


In asynchronous motors, you must enter the nominal speed at the nominal load (e.g. 1450 rpm)! When entering the synchronous speed (e.g. 1500 rpm with a 4-pole motor), apply a travel command will result in an error message.



When a Ziehl-Abegg motor is purchased in connection with a frequency inverter, the motor specifications are already pre-programmed. Always review the specifications before the first travel.

Motor data input:



If the changing of an parameter has effect to the values of the Motor-Modell, after the confirmation of the input the No-load current(I0), Rotor time constant (Tr) and the Stator resistor will be displayed The indication must be confirmed again with the button.

```
Motor-Typenschild
I0 Tr Rs
3.7A 177ms 0.90 [OK]
```

8.6 Enter encoder data, Brake-Chopper / Brake-Resistor

Enter following in the "Encoder & BC" menu:

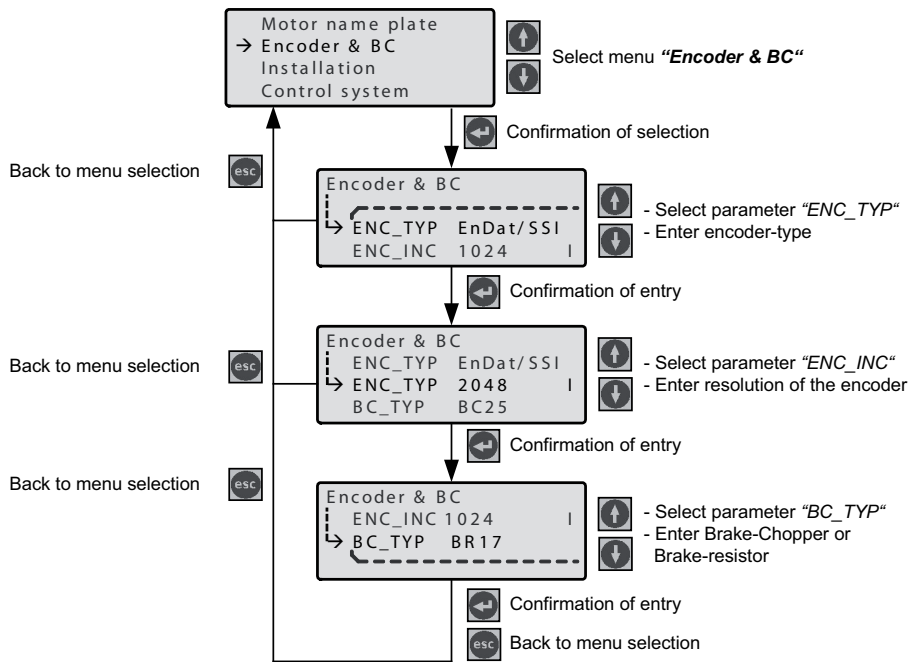
- Encoder type
- Encoder resolution
- Brake-Chopper or Brake-Resistor



Open-Loop-operation

If the U/f operation is selected, the parameter "ENC_TYP=no ENC." und ENC_INC=1024" are setted automatically.

Enter encoder data Brake-Chopper / Brake-Resistor



8.7 Enter installation data

The specifications for the elevator installation must be entered one time before the first travel in the "Installation" menu.



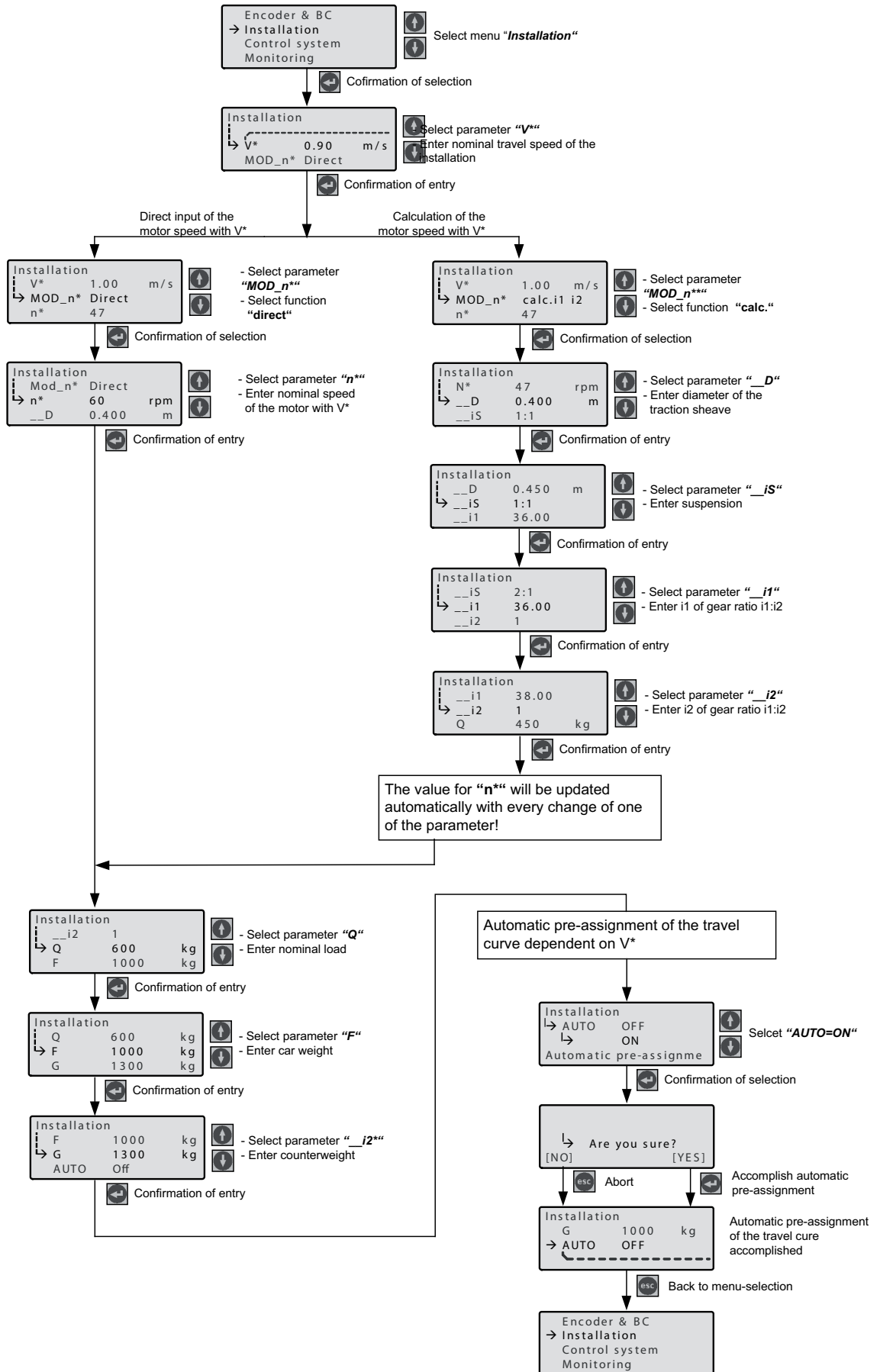
To ensure correct pre-calculation of the SPD_C speed amplifier, **all parameters** in the "Installation data" menu must be assigned with the correct values.

Entering the installation motor speed "n*":

The installation motor speed "n*" at installation nominal speed "V*" can be configured with different methods

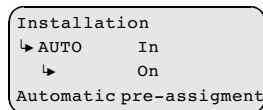
- Directly entering "n*"
- Entering the installation values ("D", "iS", "i1", "i2") and calculating "n*" with the ZETADYN 3BF software (see flowchart)

Installation data input



8.8 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*"**. The automatic operating defaults are started after entering the installation data in the **"Installation/Auto"** menu.



Preconfigured parameters through the automatic operating defaults:

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

8.9 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	Default
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*".

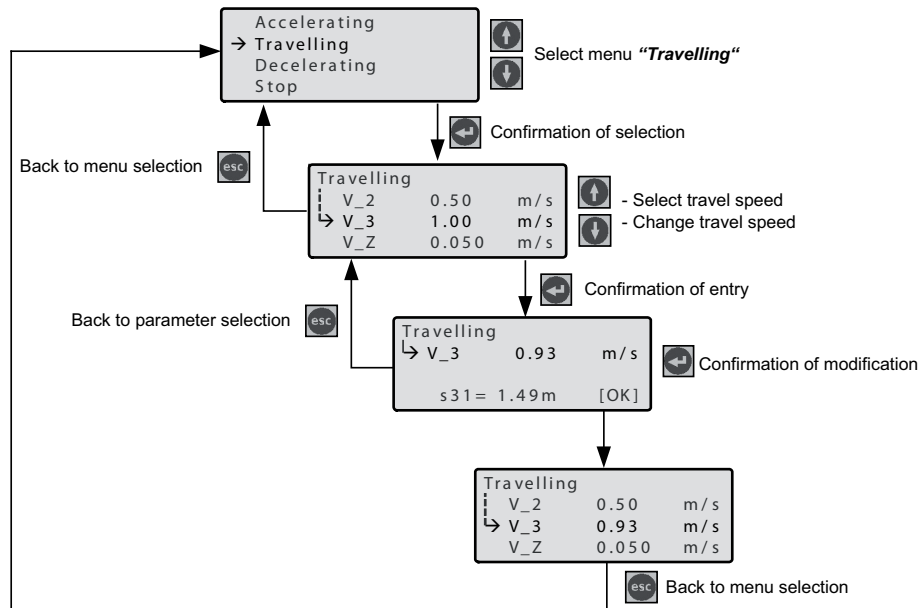
Designation	Parameter	Default
Positioning speed	V_1	0,05 m/s
Readjustment speed	V_Z	0,05 m/s
Additional speed V_4	V_4	0,32 m/s
Additional speed V_5	V_5	0,32 m/s
Additional speed V_6	V_6	0,32 m/s
Additional speed V_7	V_7	0,32 m/s

8.10 Configuring the traveling speeds

All values for the speeds can be modified in the **"Travelling"** menu depending on the installation-specific requirements. While doing so, note that:

Travel speed V_3 > Intermediate speed V_2
Intermediate speed V_2 > Positioning speed V_1

Traveling speed input

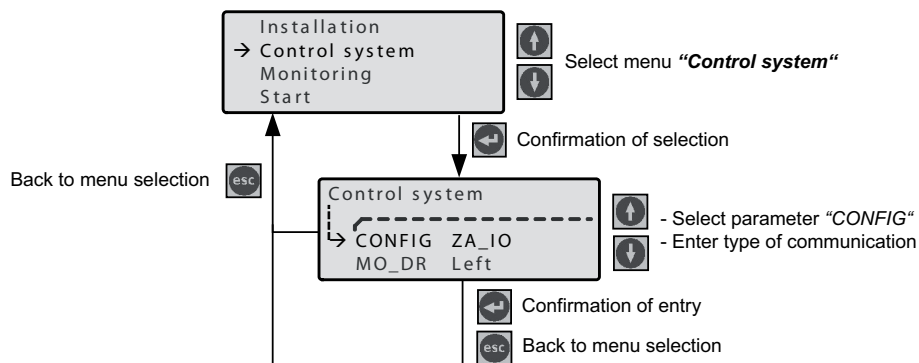


8.11 Enter the type of communication

Configure the type of communication used between the frequency inverter and the elevator control. This configuration presets the following parameters in the "Control system" menu:

- Digital inputs "f_I01" ... "f_I08" (see chapter "Electrical Installation / Digital inputs")
- Digital outputs "f_O1" ... "f_O4" (see chapter "Electrical Installation / Digital outputs")
- Activation type "CTRL" (see chapter "Parameter list / Open loop control menu")

Communication input:



8.12 Activating the monitoring functions

The monitoring functions must be configured or checked in the "Monitoring" menu.

Information about the individual monitoring functions:

MOD_ST: Definition of the inverter behavior during a malfunction

Fix 2 Sek.: no blocking function, the output configured on "ST" drops for 2 seconds during a malfunction and then increases again

Block n.3: Block function after 3 malfunctions. Output "ST" remains dropped after the 3rd error

Block n.2: Block function after 2 malfunctions. Output "ST" remains dropped after the 2nd error

Block n.1: Block function after 1 malfunction. Output "ST" remains dropped after the 1st error

CO: Definition of the contactor monitoring

The contactor monitoring has to be connected to the inverter obligatory!

- Off:** Monitoring deactivated
- CO1:** Series connection
- CO1&CO2:** Individual monitoring (see chapter "Electrical installation / Contactor monitoring" and chapter "Parameter list / Monitor menu")

BR: Definition of the brake release monitoring

If the service brakes are used in accordance with EN81-1 as a safety device against uncontrolled car movement upwards, the brake release monitoring absolutely must be connected (periodical performance test)!

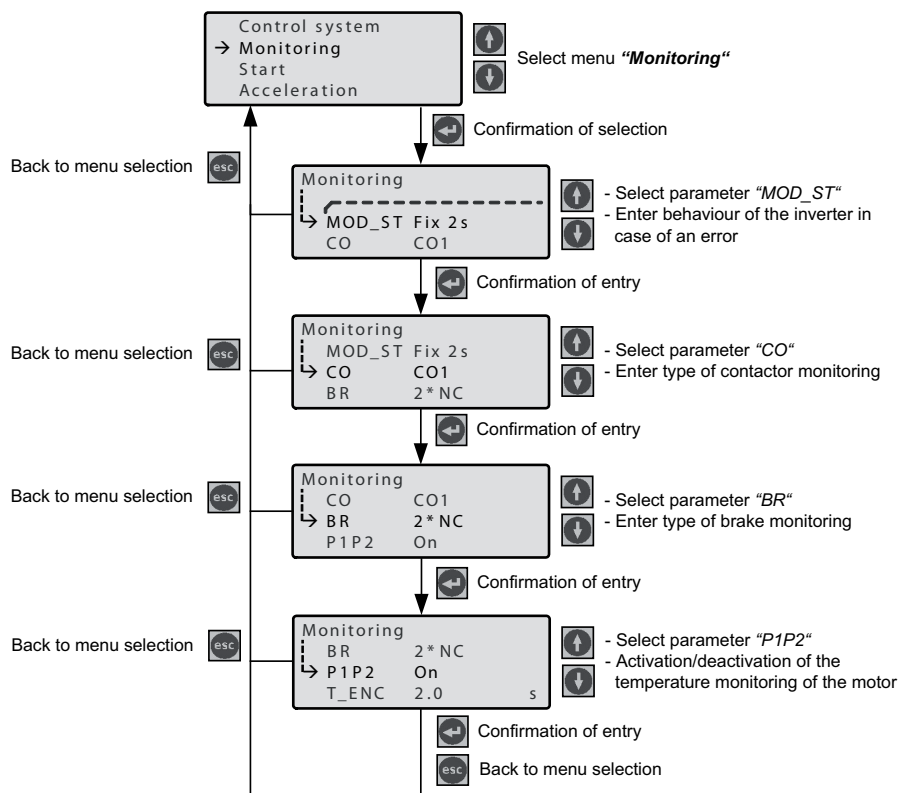
- Off:** Brake release monitoring deactivated
 - 1*NC:** 1 x normally closed contact (contact closed when brake currentless)
 - 2*NC:** 2 x normally closed contact (contact closed when brake currentless)
 - 3*NC:** 3 x normally closed contact (contact closed when brake currentless)
 - 1*NO:** 1 x normally open contact (contact open when brake currentless)
 - 2*NO:** 2 x normally open contact (contact open when brake currentless)
 - 3*NO:** 3 x normally open contact (contact open when brake currentless)
- (see chapter "Electrical installation / Brake control" and chapter Parameter list / Monitor menu")

P1/P2: Motor temperature monitoring

- On:** Temperature monitoring activated
- Off:** Temperature monitor deactivated

The motor temperature monitor can only be activated if the frequency inverter is equipped with the EM3-MOT-TEMP (Art. No. 357108) expansion module.

Monitoring functions input



8.13 Setting the cut-off points on site

8.13.1 Cut-off points for travel speed V_3

The deceleration paths V_3 to V_1 or V_3 to standstill (with DCP2 and DCP4 protocols) can be read out directly on the frequency inverter in the info menu / page 03.

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

s31: Display of calculated deceleration path V_3 → V_1 or V_3 → Standstill

The following parameters influence the deceleration path:

- 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 (s31) is indicated in the display after confirming the modification.

```
Travelling
s31= 1.53m [ok]
```

s31: Display of calculated deceleration V_3 → V_1 or V_3 → Standstill after modifying V_3

To have some leeway to optimize the travel behavior, the interrupt point is set - if possible – to a deceleration path larger than that, which was calculated.

The crawl path can be shortened later directly on the inverter in the "**Decelerating / S_DI3**" menu

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

8.13.2 Cut-off points for travel speed V_2

The deceleration paths V_2 to V_1 or V_2 to standstill (with DCP2 and DCP4 protocols) can be read out directly on the frequency inverter in the info menu / page 03.

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

s21: Display of calculated deceleration path V_2 → V_1 or V_2 → Standstill

The following parameters influence the deceleration path:

- V_1 (Positioning speed)
- V_2 (Intermediate 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 (s21) is indicated in the display after confirming the modification.

```
Travelling
s21= 0.86m [ok]
```

s21: Display of calculated deceleration V_2 → V_1 or V_2 → Standstill after modifying V_2

If the floor separation is smaller than the calculated deceleration path, the speed for V_2 must be decreased until the deceleration path is smaller than the floor separation.

8.13.3 Cut-off points for travel speed V_1

To prevent overshooting the flush alignment, the interrupt points V_1, dependent on the deceleration A_NEG, must be set between **2 and 5cm** 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

8.14 Carrying out the first test run



Attention!

Operating synchronous motors without encoder offset can cause uncontrolled motor movements



With synchronous motors, an encoder-offset alignment must be carried out before the first trip (see "Special functions" chapter)! To perform the offset alignment, the motor must be in the idle state (no ropes on the traction sheave).

When a Ziehl-Abegg motor is purchased in connection with a frequency inverter, the offset alignment is already taken care of.

When using external motors, the offset must be performed as in the following (get information from the manufacturer): Connect motor winding to direct current: U → + und V und W → -. Offset value = 0

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

If you need support during commissioning or trouble shooting, we would be glad to help.

	HOTLINE	Fon	+49 (0) 7940 16-308
		Fax	+49 (0) 7940 16-249
		email	hotline.ra@ziehl-abegg.de

8.15 Changing the motor direction

If the "UP" and "DOWN" directions of travel are mixed up when you carry out a trip, the rotary direction of the motor can be changed in the "**Control system / MO_DR**" menu

```
Control system
↳ MO_DR    left
  ↳        right
Motor direction
```

CAUTION!

You are only allowed to change the motor's rotary direction if the trip with the incorrect travel direction was performed without any error messages

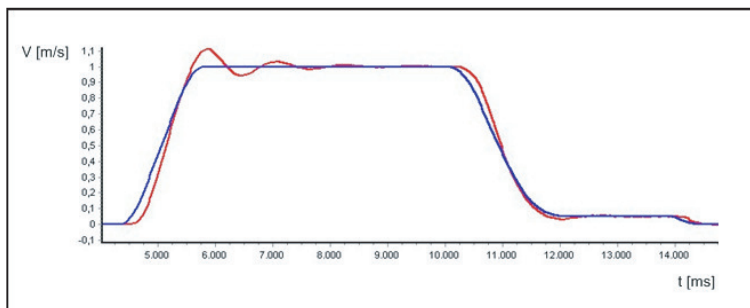
8.16 Setting the speed controller

Use the parameters "SPD_KP" (amplification) and "SPD_TI" (readjustment time) to effectively optimize the setting of the speed controller during travel. The parameters can be changed in the "Controller/SPD_KP" and "Controller/SPD_TI" menus.

```
Controller
↳ SPD_KP 1.00
   ↳ 0.95
SPD_REG: Base-gain
```

```
Controller
↳ SPD_TI 100 ms
   ↳ 65
SPD_REG: reset time
```

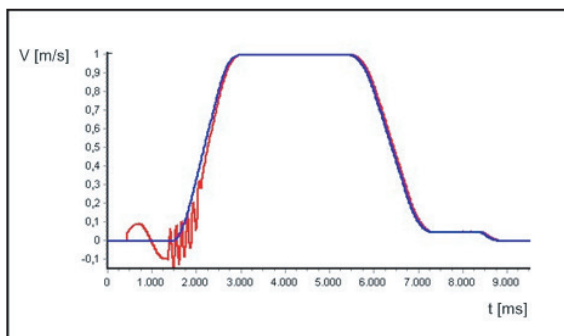
You can generally set the speed control by changing the factor for the basic amplification ("SPD_KP"). If significant control deviations occur during the trip (especially during acceleration and deceleration), (see Fig. 8.1), the amplification has been set too low. In this case, increase the factor for 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 loud or vibrates (see Fig.), the amplification has been set too high. In this case, decrease the factor for amplification ("SPD_KP").

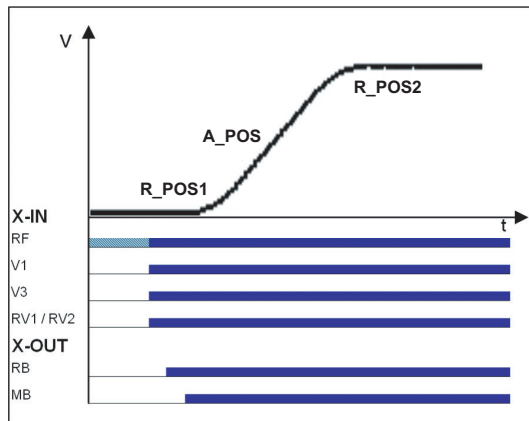


Control deviations when the amplification is set too high

blue Set-value - travel speed
red Actual-value - travel speed

8.17 Optimizing the acceleration

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



Acceleration ramp

- RF Controller enable
- V_1 Positioning speed
- V_3 High travel speed
- RV1 / RV2 Default for direction of travel
- RB Controller ready
- MB Mechanical brake

- A_POS:** Acceleration preset in m/s. A higher value causes greater acceleration and thus a steeper ramp
- R_POS1:** Preset for the lower round off. A higher value causes a softer round off
- R_POS2:** Preset for the upper round off. A higher value causes a softer round off

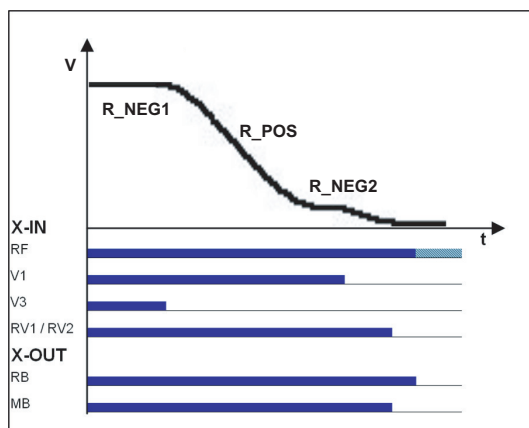


To achieve optimum starting behavior:

- The motor contactors must be switched instantaneously with the digital output "RB"
- The brakes must be switched instantaneously with the digital output "MB"

8.18 Optimizing deceleration

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



Deceleration ramp

- RF Controller enable
- V_1 Positioning speed
- V_3 High travel speed
- RV1 / RV2 Default for direction of travel
- RB Controller ready
- MB Mechanical brake

- A_NEG:** Deceleration preset in m/s. A higher value causes greater deceleration and thus a steeper ramp.
- R_NEG1:** Preset for the upper round off. A higher value causes a softer round off
- R_NEG2:** Preset for the lower round off. A higher value causes a softer round off



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

8.19 Optimizing start up behavior

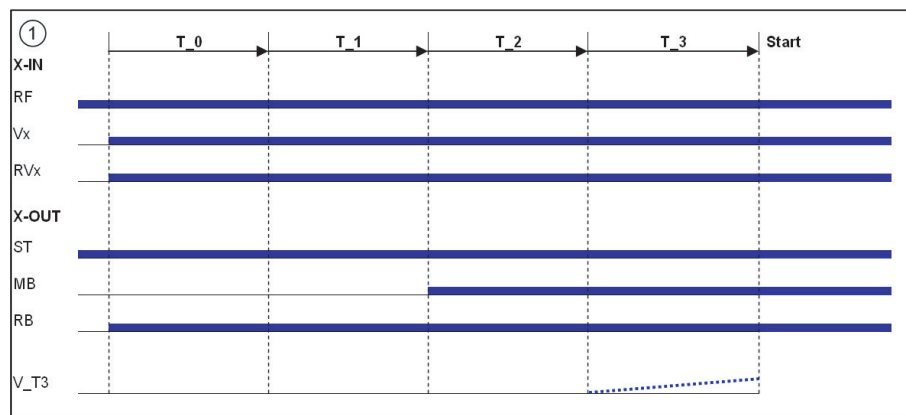
Optimizing the start up behavior is only necessary if there is a negative influence on the travel comfort (e.g. through start up jerks)



Prerequisites for optimizing:

- 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 "CONTROL" 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
- RVx* Travel direction
- ST* Controller failure
- MB* Mechanical brake
- RB* Controller ready

The various times can be set in the "Start-up" menu

8.19.1 Start-up variations



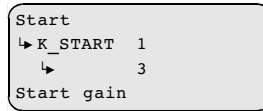
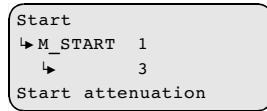
The optimal start-up variations are preset based on the motor type selection in the "Motor name plate" menu.

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_Start**" menu. The speed control amplification **K_START** is configured in the "**Start/K_START**" menu.

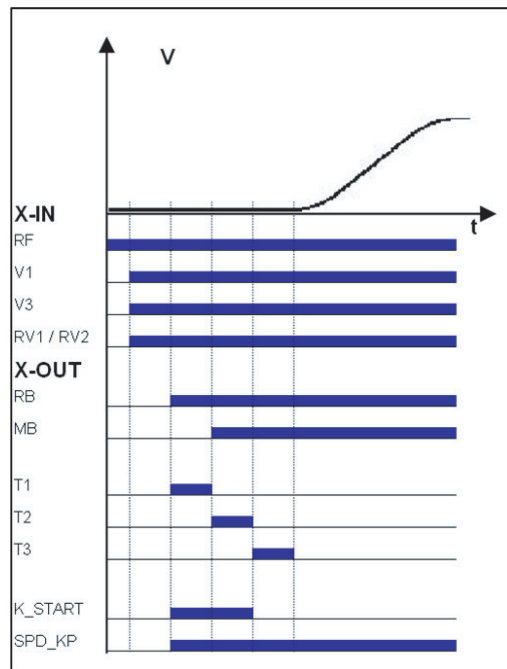


MOD1 (standard setting for asynchronous motors)

The machine is speed controlled. Up to expiration of T2, 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 T1 and deactivated with the expiration of T2.

MOD2

Corresponds to the function of MOD1. In addition, the parameter "s_start" is activated. If the position of the machine changes during time T2 by the value entered in "s_start", "FK_start" is switched off. That prevents the machine from being damaged due to too high a value of "K_start".

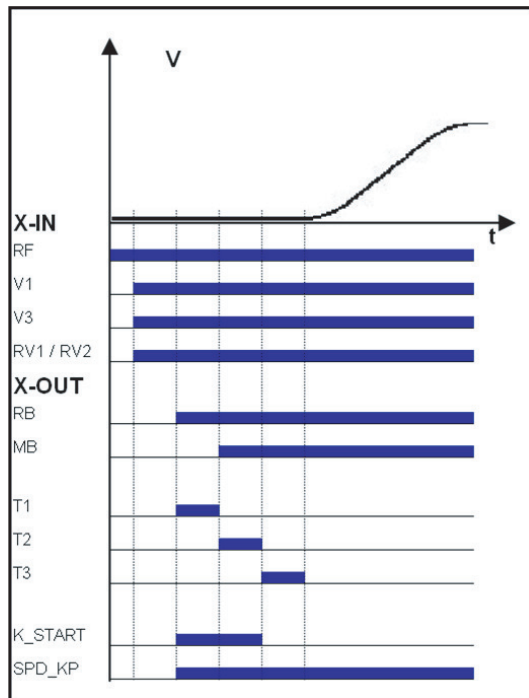


Start-up behavior MOD1 / MOD2

- RF Controller enable
- V_1 Positioning speed
- V_3 High travel speed
- RV1 / RV2 Default for direction of travel
- RB Controller ready
- MB Mechanical brake
- T_1 Flux build-up time
- T_2 Brake opening time
- T_3 Speed=0
- K_START Amplification during start (speed control)
- SPD_KP Base amplification speed controller

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 T1 and deactivated with the expiration of T2.



Start-up behavior MOD3

- RF Controller enable
- V_1 Positioning speed
- V_3 High travel speed
- RV1 / RV2 Default for direction of travel
- RB Controller ready
- MB Mechanical brake
- T_1 Flux build-up time
- T_2 Brake opening time
- T_3 Speed=0
- K_START Amplification during start (Position- & speed control)
- SPD_KP Base amplification speed controller

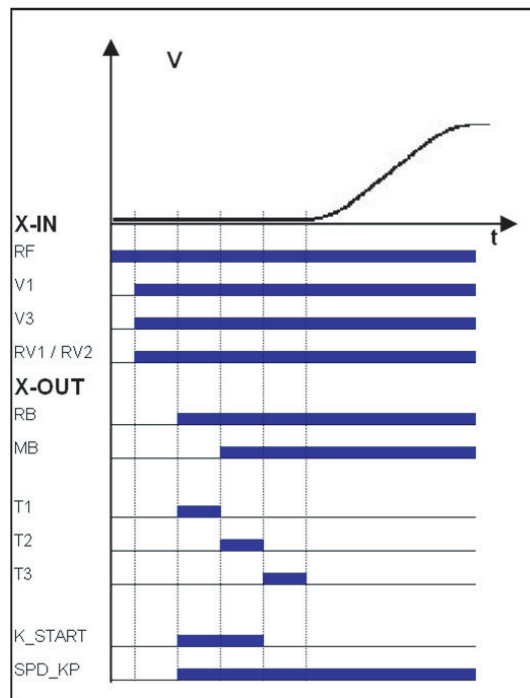


MOD5 (standard setting for synchronous motors)

The machine is position controlled. The machine position is recorded until expiration of T2 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 T1 and deactivated with the expiration of T2

MOD4

Corresponds to the function of MOD5. In addition, the parameter "s_start" is activated. If the position of the machine changes during time T2 by the value entered in "s_start", "FK_start" is switched off. That prevents the machine from being damaged due to too high a value of "K_start".



Start-up behavior MOD5 / MOD4

RF Controller enable
V_1 Positioning speed
V_3 High travel speed
RV1 / RV2 Default for direction of travel
RB Controller ready
MB Mechanical brake
T_1 Flux build-up time
T_2 Brake opening time
T_3 Speed=0
K_START Amplification during start (position control)
SPD_KP Base amplification speed controller

8.19.2 Damping the start-up jerk Applies to all start-up variations!

To decrease the start-up jerk, acceleration can be carried out linearly at the speed V_{T3} during expiration of $T3$. That overcomes the static friction, decreasing the start-up jerks.

Time optimization through contactor monitoring

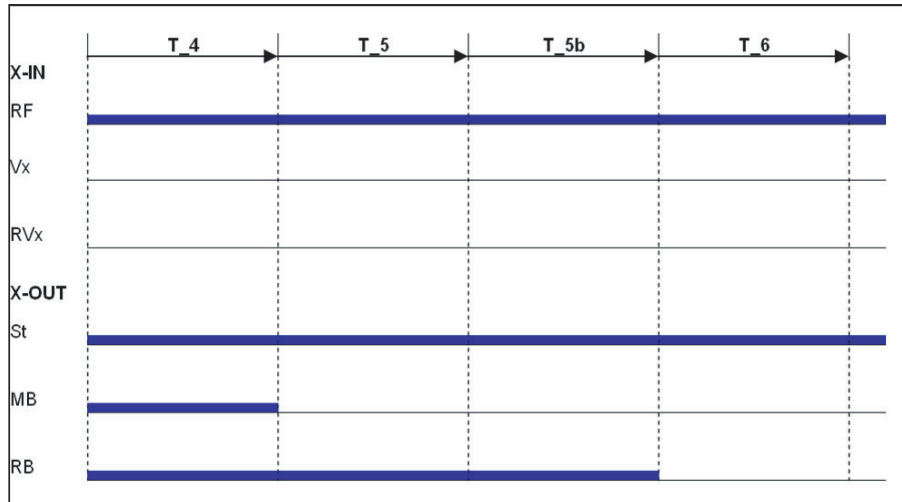
If the contact monitoring is activated ("**Monitoring/CO=ON**") and the monitor contacts are connected, time $T0$ is optimized. As soon as the contactors are closed, time $T0$ is aborted and time $T1$ started.

Time optimization through brake monitoring

If the brake monitoring is activated ("**Encoder & BC/BR=ON**") and the monitor contacts are connected, the time $T2$ is optimized. As soon as the brakes are opened, time $T2$ is aborted and time $T3$ started.

8.20 Optimizing stopping

Stopping time sequence



T_4 Hold speed 0
T_5 Wait until the brake is closed
T_5b Wait until the motor is currentless
T_6 Wait until the motors contactors are open
RF Controller enable
Vx travel speed
RVx Travel direction
ST Controller failure
MB Mechanical brake
RB Controller ready

The different timers can be set in the menu "Stop"

Time optimization through brake monitoring

If the brake monitoring is activated ("**Monitoring/BR≠Off**") and the monitor contacts are connected, time T5 is optimized. As soon as the brakes are closed, time T5 is aborted and time T5b started.

Time optimization through contactor monitoring

If the contact monitoring is activated ("**Monitoring/CO=ON**") and the monitor contacts are connected, time T0 is optimized. As soon as the contactors are open, time T6 is aborted and the stopping sequence ends.

9 DCP (Drive Control & Position)



To operate the installation with DCP protocol, the frequency inverter must be equipped with the optional board EM3-ENC-CAN-ZA (Art.-No.357107)!

The DCP-mode enables serial activation of the frequency inverter 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 and X-OUT are no longer required, which means the wiring expenditure is reduced to a minimum.

9.1 The various DCP protocols

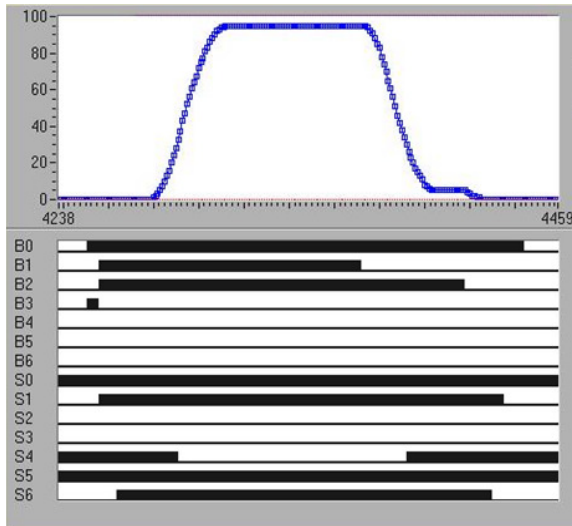
9.1.1 DCP_01

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 frequency inverter as command bits and receives the status messages as status bits as return information from the frequency inverter (e.g. signals for mechanical brakes and motor contactor, speed monitoring and general alarm).

9.1.2 DCP_03

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

- faster data transmission
- a faster communication channel
- automatic compatibility checking between the software in the frequency inverter and software



Command byte		Command byte		Status byte	
B0	Controller enable RF	G0	slow speed (V1)	S0	inverter ready for the next trip
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	G3	return (V5)	S3	general alarm active (ST)
B5	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

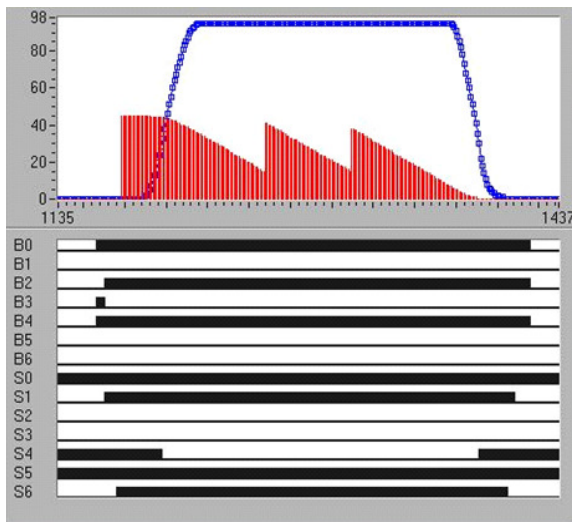
9.1.3 DCP_02

The transmission of the command and status bit correspond to the DCP_01-protocol. In addition, travel is residual path oriented: With the start command, the open loop control determines the path to the next floor for the frequency inverter. This path is continuously updated during the drive (residual path). The frequency inverter adapts its traveling speed to the residual path and the car arrives directly at the floor, time optimized and jolt-free without crawl drive. An absolute rotary encoder is required for setting the residual path!The brake path (shown in the inverter’s display) must be manually entered into the open loop control beforehand.Through the entered brake path and the current residual path during an incoming call during the trip, the open loop control can decide whether it is still possible to stop.If no call comes in latest

9.1.4 DCP_04

The DCP_04 protocol is an expanded version of the DCP_02 protocol. As compared with the DCP_02 protocol, it has:

- faster data transmission
- a faster communication channel
- automatic compatibility checking between the software in the frequency inverter and software
- 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.



Command byte		Command byte		Status byte	
B0	Controller enable RF	G0	slow speed (V1)	S0	inverter ready for the next trip
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	G3	return (V5)	S3	general alarm active (ST)
B5	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

9.2 Configuring in DCP mode

9.2.1 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.

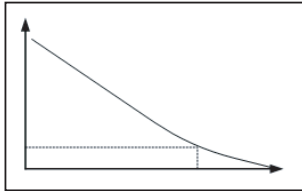
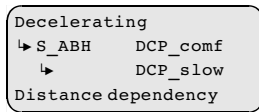
```

Control system1
└─ CTRL      04:BP_DCP1
   └─        05:BP_DCP2
Extern Control.Funct
    
```

Manufacturer	DCP-protocol	Mnemonic ZETADYN 3
BÖHNKE + PARTNER	DCP01	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 Liftechnik	DCP1	17:WL_SCP1
Weber Liftechnik	DCP2	18:WL_DCP2
Weber Liftechnik	DCP3	19:WL_DCP3
Weber Liftechnik	DCP4	20:WL_DCP4

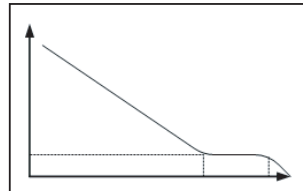
9.2.2 Setting the DCP-leveling behavior

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



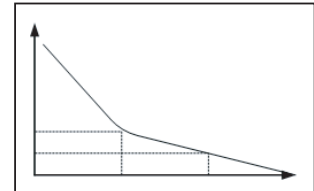
S_ABH=DCP_fast

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 Parameter list



Not all of the described parameters are freely accessible. The indication of the parameters depends on the chosen function and the adjustments of the frequency inverter.

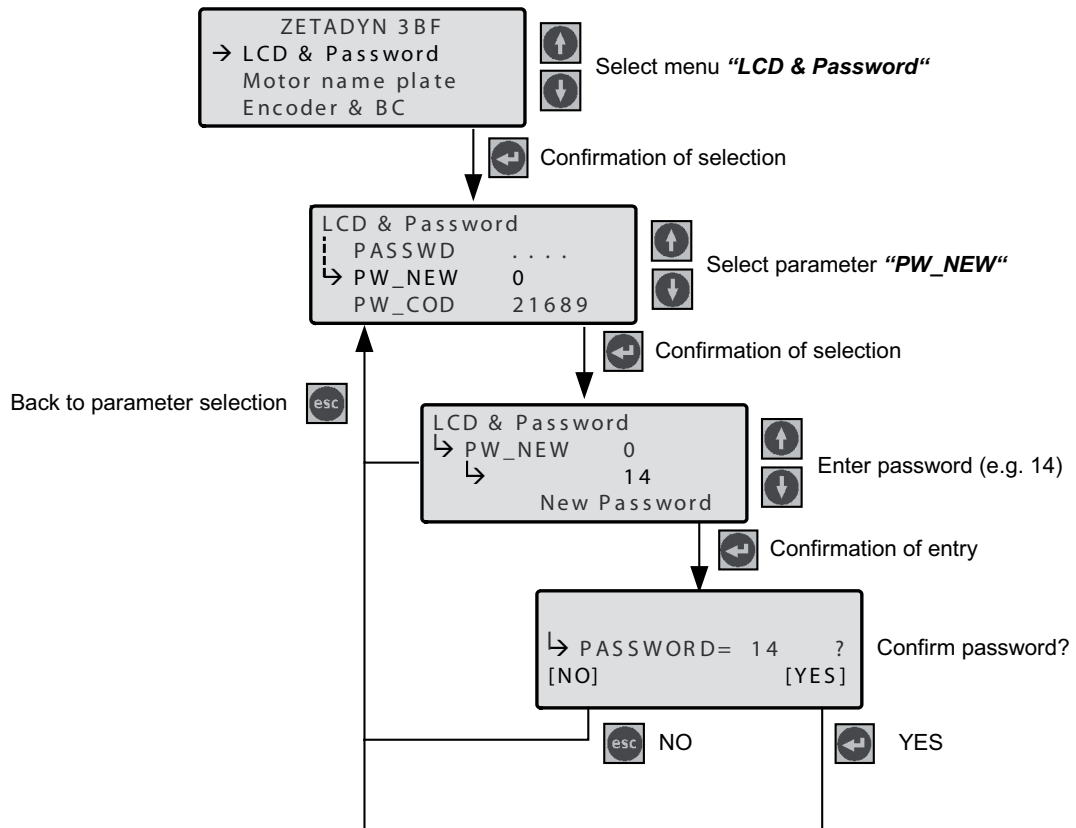
The individual parameters are subdivided into various menus based on their functions.

10.1 LCD & Password menu

Selection the desired operating language. Protects the frequency inverter 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 Language	Select the desired operating language.	German English Dutch Spanish Turkish Italiano Svenska	German
PASSWD Password input	Assign password	0 ... 9999 0=no password	0
PW_NEW New password	New password A number between 0 and 9999 can be used as a password	0 ... 9999	0
PWCOD Coded password	Displays the password in coded form. If you lose the password, please contact the manufacturer.	Cannot be set	21689
PW_CLR Password clear	Delete the password. The password must be correctly entered beforehand ON: Delete password OFF: no function	On Off	Off

Password input



10.2 Motor name plate menu

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



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 Motor type	Enter the operated motor type ?:Inverter is not pre-configured A ASM: Asynchronous moto 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 Nominal motor speed	Enter the motor's rated speed	10 ... 2990 rpm	0
f Nominal frequency	Enter the motor's rated frequency	3.0 ... 125.0 Hz	0.1
I Nominal current	Enter the motor's rated current	5.0 ... 140.0 A	0.0
U Nominal voltage	Enter the motor's rated voltage	200 ... 460 V	0

Parameter	Description	Value range	Factory setting
P Nominal power	Enter the motor's rated power	1.0 ... 65.0 kW	0
cos phi Power factor	A Enter the motor's power factor (only for asynchronous motors)	0.10 ... 1.0	0.88
TYP Connection type	Enter the motor's type of connection	Star Delta	Star

10.3 Encoder & BC menu

Enter:

- Encoder type
- Encoder resolution
- used Brake-Chopper or Brake-Resistor type

Parameter	Description	Value range	Factory setting
ENC_TYP Encoder-type	Enter the used encoder S EnDat/SSI: Absolute rotary 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 Hiperface: Codeface: No ENC.: Open-loop-mode	HTL 10-30V TTL square TTL Sine Hiperface Codeface No ENC.	TTL square
ENC_INC Encoder resolution	Enter the encoder resolution (Imp/rev)	256 ... 10000	2048
BC_TYPE BR / BC - type	Enter the used Brake-Resistor or Brake-Chopper BR11: Brake-Resistor type BR11-A 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 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	BR11 BR17 BR25 BC25 BC50 BC100 BR50+BR25 BR50+Br50 BRxx PFU	BR17
R_BR BR resistor	Resistor of the Brake-Resistor with setting "BC_TYP=BRxx"	4 ... 200 Ohm	64
P_BR BR nominal power	Nominal power of the Brake-resistor with setting "BC_TYP=BRxx"	0.0 ... 65 kW	0.5

10.4 Installation menu

Enter of installation specific data



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* Nominal travel speed	Enter the installation rated speed	0.00 ... 3.0 m/s	1.00
MOD_n* Calc.-mode n*	Enter the installation rated speed direct: manual input of V* and n* calc.D..i2: Calculates the speed of the motor dependent on: V*; __D; __iS; __; __i1 and __i2	direct with D..i2	direct
n* Motor speed at V*	MOD_n = direct: direct input of the motor speed at V* MOD_n = With D..i2: Calculates the speed of the motor dependent on: V*; __D; __iS; __; __i1 and __i2	10 ... 2990 rpm	0
__D Diameter traction sheave	Enter the diameter of the traction sheave	0.10 ... 1.20 m	0.500
__iS Suspension	Enter the installation's type of suspension	1:1 1:2 1:4	1:1
__i1 Gear ratio i1:i2	Input of i1 of the gearbox ratio i1:i2	1 ... 200	38.00
__i2 Gear ratio i1:i2	Input of i2 of the gearbox ratio i1:i2	1 ... 10	1
Q Nominal load	Enter the elevator installation's rated load	xx ... xx kg	600
F Car weight	Enter the car weight	xx ... xx kg	1000
G Counterweight	Enter the counterweight	xx ... xx kg	1300
Auto Automatic pre-assignment	Automatic pre-assignment of the operating curves for acceleration and deceleration dependent on V* ON: Operating curves are assigned one time; after that, the parameter jumps back to "Off" OFF: no pre-assignment of the operating curves	On Off	Off

10.5 Control system menu

Configuring of:

- Elevator control system
- Digital inputs
- Digital outputs
- ZETAPAD

Parameter	Description	Value range	Factory setting
CONFIG Configuration	Configuration of the digital inputs according to the used control system and type of communication 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 Liftechnik standard control 17:WL_DCP1: Weber Liftechnik DCP1 18:WL_DCP2: Weber Liftechnik DCP2 19:WL_DCP3: Weber Liftechnik DCP3 20:WL_DCP4: Weber Liftechnik 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	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	01:ZA_IO
MO_DR Motor direction	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 Extern Control-Func.	Select the communication between the inverter and the control system under "CONFIG=Free" Standard: Parallel connection DCP1: Communication through DCP1 protocol DCP2: Communication through DCP2 protocol DCP3: Communication through DCP3 protocol DCP4: Communication through DCP4 protocol	Standard DCP1 DCP2 DCP3 DCP4	Standard

Parameter	Description	Value range	Factory setting
f_I01 Function of I01	Configure the digital inputs I01 ... I08 under "CONFIG=free" (For description of the functions, see table)	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	01:RF
f_I02 Function of I02			04:V1
f_I03 Function of I03			05:V2
f_I04 Function of I04			06:V3
f_I05 Function of I05			07:VZ
f_I06 Function of I06			02:RV1-UP
f_I07 Function of I07			03:RV2-DOWN
f_I08 Function of I08			00:Free
f_XBR1 Function of BR1	Configure the digital inputs for the brake monitoring BR1 ... BR4 (For description of the functions, see table)	17:v=0 18:RF+RV1 19:RF+RV2 20:BR1 21:BR2 22:BR3 23:BR4	00:Free
f_XBR2 Function of BR2			00:Free
f_XBR3 Function of BR3			00:Free
f_XBR4 Function of BR4			00:Free
f_O1 Function of O1	Configure the digital outputs O1 ... O4 under "CONFIG=free" (For description of the functions, see table)	MB INV V<V_G1 INV V<V_G2 Off MotContact RB-Invers V<V_G1 V<V_G2 V<1.1*V_3 Warning Error Evac.Dir.	Error
f_O2 Function of O2			MB
f_O3 Function of O3			MotContact
f_O4 Function of O4			V < V_G1
V_G1 Speed limit 1	Limit value 1 when using the V<V_G1 parameter for a digital output	0.03 ... 3.20 m/s	0.30
V_G2 Speed limit 2	Limit value 12 when using the V<V_G2 parameter for a digital output	0.03 ... 3.20 m/s	0.80
V_G3 Speed limit 3	Limit value 3 (this information is only issued when using a DCP protocol)	0.03 ... 3.20 m/s	0.50
T_DYST Start-delay	The interbal start-up procedure is delayed by 100 ms after the input signals: Controller enable, Travel direction and Travel speed are activated		100
DCP_LCD Resolution ext. display	Resolution on external display (e.g. in elevato control system) 2x16 : 2 rows with 16 characters each 2x20 : 2 rows with 20 characters each 4x20 : 4 rows with 20 characters each	2*16 2*20 4*20	2*16
DCP_DLY Delay transmission in 1Bit	On : Delay transmission by 1 bit Off : Function deactivated	On Off	On
DCP_TXW Min. switchover time on receipt			0.02

Parameter	Description	Value range	Factory setting
DCP_FIL DCP Filter	CP filter, active in DCP2 / DCP4 and parameter "DECELERATE/S_ABH=DCP_comf". Residual path information is implemented from the input distance to flush position by motor encoder. The information through the digital shaft copy system is not processed.	0 ... 2500 mm	0
DCP_WDT DPC-WDT at standstill	Watchdog during motor standstill ON: Watchdog active Off: Watchdog deactivated	On Off	On
DCP_STP Stop before floor level	Reduction of step during evacuation with UPS. Trip is ended before flush by the amount entered. Function is only active with DCP 04)	0 ... 100 mm	0

Parameter descriptions for digital inputs

Parameter	Function	Description
00:Free	Function not assigned	Activating the input is noneffective
01:RF	Controller enable	Enable for the frequency inverter. This input must be triggered during the entire trip.
02:RV1-UP	Direction default 1	Travel direction "UP" of car
03:RV2-DOWN	Direction default 2	Travel direction "DOWN" of car
04:V1	Positioning speed	Speed to position the car to the stop point
05:V2	Intermediate speed	If necessary, the intermediate speed for normal travel
06:V3	travel speed	High travel speed for normal travel
07:VZ	Readjustment speed	Speed for readjustment. Has precedence above all other speeds!
08:V4	Additional speed 1	Additional speed for inspection and return operation
09:V5	Additional speed 2	Additional speed for inspection and return operation
10:V6	Additional speed 3	Additional speed for inspection and return operation
11:V7	Additional speed 4	Additional speed for inspection and return operation
12:PARA2	Switchover to 2nd parameter set	2nd parameter set is activated
13:BIN0	Binary input 0	Speed default through binary coding
14:BIN1	Binary input 1	Speed default through binary coding
15:BIN2	Binary input 2	Speed default through binary coding
16:DIR	Default for direction of travel	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 using the input terminal X-IN
21:BR2	Brake monitoring 2	Brake monitoring with using the input terminal X-IN
22:BR3	Brake monitoring 3	Brake monitoring with using the input terminal X-IN
23:BR3	Brake monitoring 4	Brake monitoring with using the input terminal X-IN

Parameter descriptions for digital inputs

Parameter	Function	Description
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 "INTERFACE" menu V_G1 is exceeded.
V<V_G2	Speed monitoring	Contact opens when the tolerance set in the "INTERFACE" 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.
Error	Error	Contact is closed if no error is present in the frequency inverter.
EVAC.DIR	Evacuation direction	Contact open: Car is lighter than counterweight Contact closed: car is heavier than counterweight
MB	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 tolerance set in the "INTERFACE" menu V_G1 is exceeded.
INV V<V_G2	inverted function of "V<V_G2"	Contact closes when the tolerance set in the "INTERFACE" menu V_G2 is exceeded.

10.6 Monitoring menu

Configuring the monitoring functions

Parameter	Description	Value range	Factory setting
MOD_ST Behavior on error (Lock)	Block function: If serious errors occur successively without a flawless trip being carried out, it is possible to block the inverter. The output "ST malfunction" remains open. If a flawless trip is carried out, the error counter is reset to 0. Fix 2 Sec: no blocking function, the output configured on "ST" drops for 2 seconds during a malfunction and then increases again Block n.3: Block function after 3 malfunctions. Output "ST" remains dropped after the 3rd error Block n.2: Block function after 2 malfunctions. Output "ST" remains dropped after the 2nd error Block 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 Sek. Block n.3 Block n.2 Block n.1	Fix 2 Sek.
CO Contactor control	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 inputs CO1 and CO2 (individual monitoring of the monitoring contacts)	Off CO1 CO1&CO2	CO1

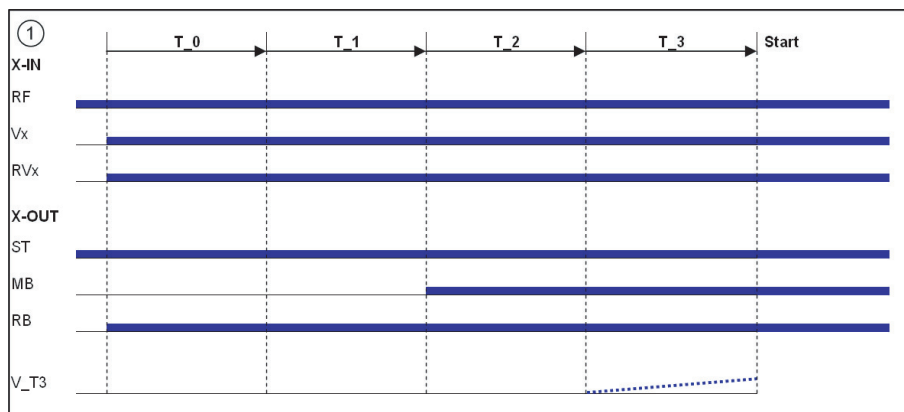
Parameter	Description	Value range	Factory setting
BR Brake control (BR1..BR4)	S Input of number and function of the brake monitoring contacts used OFF :no brake monitoring connected 1*NC : 1x normally closed contact (Contact closed when brake currentless) 2*NC : 2 x normally closed contact (Contact closed when brake currentless) 3*NC : 3 x normally closed contact (Contact closed when brake currentless) 4*NC : 4 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) 4*NO : 4 x normally open (contact is open when brake currentless)	Off 1*NC 2*NC 3*NC 4*NC 1*NO 2*NO 3*NO 4*NO	accordingly to motor type
P1P2 Motor-temp. monitoring	Motor temperature monitoring Off : Temperature monitoring deactivated On : Temperature monitor activated	Off On	Off
T_ENC Encoder check time	Time is started when the output signal "MB" is issued. If there no input signals from the pulse encoder are applied during this time, the inverter goes into malfunction	0.5 ... 7.0 s	2.0
T_CO Mot.Contactor control-time	Monitoring time for the contactor interrupt. The power stage is switched off if the contactor contacts are open longer than the time configured in T_CO. The time T_CO is active upon interrupt during travel, not during a normal stop. Only accessible if the contactor monitoring is activated.	0.00 ... 100 ms 0.00=Off	0.2
T_BR Brake monitor De-bounce tim	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 Distance without brake	If rotary encoder pulses are detected with the digital output "MB" is switched off, the inverter issues an error message if the configured path is exceeded.	0.10 ... 1.00 m	0.50
I_MAX Overload current	Protection against overload current depending on the nominal current of the motor If the configured value for "I_Max" (I x "I_MAX") is exceeded for the time "T_I_MAX" the inverter issues an error message.	20 ...180 %	130
T_I_MAX Overload time	Overcurrent protection. If "T_I_MAX" is exceeded for the configured value (I x "I_MAX") for the time "I_MAX", the inverter issues an error message.	0.3 ... 10.0 s	3.0
APC Auto. parameter controlling	Suppression of up to five error messages through configuring the corresponding error number in an error mask	On Off	On
MASK1 Error mask 1	Suppression of up to five error messages through configuring the corresponding error number in an error mask	Error numb	0
MASK2 Error mask 2			0
MASK3 Error mask 3			0
MASK4 Error mask 4			0
MASK5 Error mask 5			0

10.7 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 Start attenuation	Control action to optimize the starting behavior (see chapter "Commissioning") MOD1: Speed control MOD2: Speed control + safety function MOD3: Speed + position control MOD4: Position control + safety function MOD5: Position control	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	0.1 ... 20.0	3.0
T_0 Measured time that the contactors need to close	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 need to close	Measured time that the contactors need to close	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	0.3
T_2 Mech. brake open 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 Measured brake open time	Measured time after expiration of "T_1" until the brake is open	Cannot be set	0.0
T_3 Max. hold time	Within time T_3, the machine accelerates up to the speed configured in V_T3	0.0 ... 10.0 s	0.0
V_T3 Min. speed at T_3	Minimal speed to minimize starting pressure. 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 Only if M_START D2/4	If the position of the machine changes during the start procedure by the configured value, amplification K_START is switched off	0.1 ... 30 mm	1.0

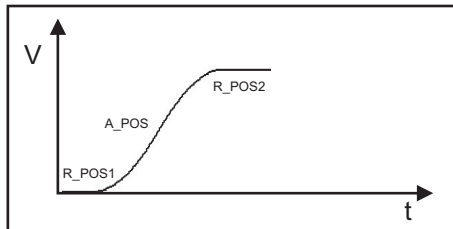
Start-up time sequence



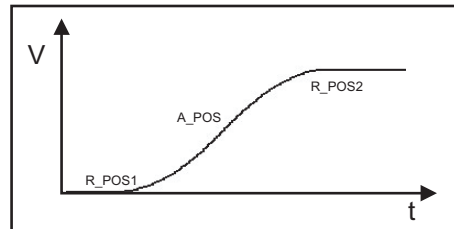
10.8 Acceleration menu

Definition of acceleration ramp.

Parameter	Description	Value range	Factory setting
A_POS Acceleration	Positive acceleration	0.25 ... 2.00 m/s ²	0.5
R_POS1 Rounding bottom	Upper round off during positive acceleration, a higher value causes a softer round off	20 ... 90 %	will be calculated
R_POS2 Rounding top	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

10.9 Travel menu

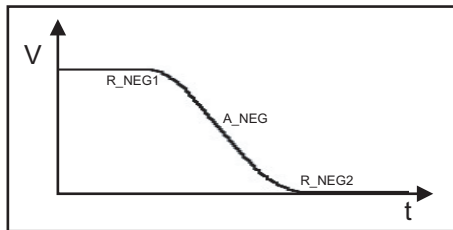
Traveling speed defaults

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	Interim speed for normal traveling e.g. during travel to intermediate floor	0.03 ... 2.50 m/s	0.50
V_3 High travel speed	Maximum traveling speed during 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	0.05
V_4 Additional speed V_4	Additional speed for return control, inspection trip or manual control	0.03 ... 3.00 m/s	0.30
V_5 Additional speed V_5	Additional speed for return control, inspection trip or manual control	0.03 ... 3.00 m/s	0.30
V_6 Additional speed V_6	Additional speed for return control, inspection trip or manual control	0.03 ... 3.00 m/s	0.05
V_7 Additional speed V_7	Additional speed for return control, inspection trip or manual control	0.03 ... 3.00 m/s	0.05

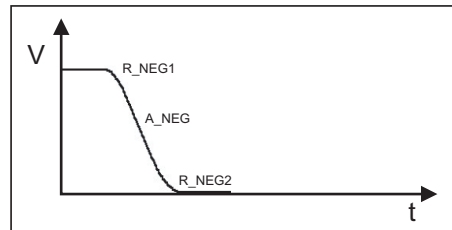
10.10 Deceleration menu

Defines the deceleration ramp and optimizes the positioning behavior.

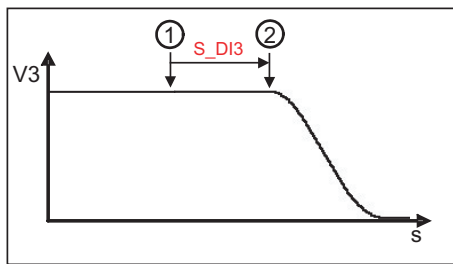
Parameter	Description	Value range	Factory setting
A_NEG Deceleration	Negative acceleration	0.25 ... 2.00 m/s ²	0.5
R_NEG1 Rounding top	Upper round off during negative acceleration, a higher value causes a softer round off	20 ... 90 %	will be calculated
R_NEG2 Rounding bottom	Lower round off during negative 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	0.00 ... 150 mm	0
S_ABH Distance dependency	Path dependent deceleration ON: path dependent arch travel, 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")	On Off DCP_fast DCP_comf DCP_slow	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

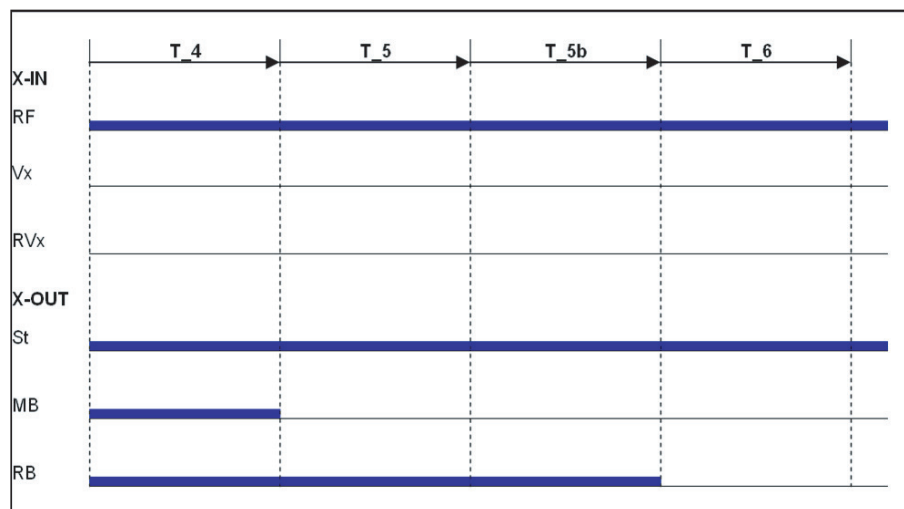
- 1 Switching of V3
- 2 Starting with deceleration

10.11 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
T_5b Wait until the motor is currentless	S 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 Mot.Contactor switch-off time	Time within which the contactor signal must be closed	0.0 ... 10.0 s	0.5

Stopping time sequence



10.12 Controller menu

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

Selection of the operation mode of the frequency inverter

Parameter	Description	Value range	Factory setting
C_MOD Controller Mode	Selection of the operation mode of the frequency inverter FOC: Closed-Loop-operation with encoder (field orientated control) U/f: Open-Loop-operation without encoder	FOC U/f	FOC
SPD_KP SPD_REG:Base gain-factor	Multiplication factor to modify the calculated basic amplification SPD_C	is automatically limited	1.00
SPD_TI SPD_REG: reset time	Limit frequency of the inverter during a travel	5 ... 300 ms	100
SPD_C	Calculated basic frequency inverter amplification dependent on the data entered in the "Installation" menu.	Cannot be set	0.0
SPD_FIL Actual-value-filter	Delay time of the filter for the actual value of the speed The frequency depends on the motor type: Asynchronous motor with sinusoidal encoder: 70 Hz Asynchronous motor with square wave encoder: 30 Hz Synchronous motor: 300 Hz		
J Calc. angular momentum	Inertia calculated from the specifications in the "Installation" menu	Cannot be set	0.0



The parameters which are necessary for the Open-Loop-operation are only displayed with the parameter "C_MOD=U/f. The parameters are described in the chapter "Open-Loop-operation".

10.13 Parameter set 2 menu

A second set of parameters can be stored in the inverter. This can be used for:

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

Parameter	Description	Value range	Factory setting
f_PARA2 Function of parameter set 2	Function allocation of parameter set 2 Locked: 2nd parameter set is blocked 2ndParameter set: Activates the 2nd parameter set EVA.>60VDC: Emergency evacuation with rechargeable battery EVAC 1C) 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)	Blocked 2nd parameter set EVA.>60VDC EVA. 3*AC EVA. 1*AC UPS	Blocked
U_ACCU Accu nominal voltage	Configuring the rated voltage of the rechargeable battery during evacuation with evacuation unit EVAC 3 ("f_PARA2=EVA>60VDC", 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 ... 70.0kW	1.0
RS_UPS Stator resistor (UPS mode)	Enter the resistor of the stator of the motor with "f_PARA2=UPS"	0.0 ... 9.99 Ohm	1.00

Parameter	Description	Value range	Factory setting
STOP Stop function	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	Copies the parameter Off: Function deactivated PARA1->2: copies the data from 1st parameter set into the 2nd parameter set	Off Para 1->2	Off

10.14 S0:Statistic menu

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

Parameter	Description	Value range	Factory setting
ST_LST	Error list	Cannot be set	-
ST_H	Operating hours	Cannot be set	-
ST_DRV	Number of trips	Cannot be set	-
ST_RES	Number of mains interruptions	Cannot be set	-
ST_SRF	Number of travel aborts due to interruption of the controller enable RF during the travel	Cannot be set	-
ST_SCO	Number of trip aborts due to interruption of the contactor monitoring CO (opening of the contactor) during the travel	Cannot be set	-
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 RESET90: Device reset, parameters remain preserved RESET99: Device reset, parameters are deleted and are assigned the factory settings. S If a value is entered for the encoder offset (ECOFF), it will also be deleted!	Reset 90 Reset 99	0

10.15 S1:Motor model menu

After entering the motor data in the "**Motor name plate**" menu, the values for the "Motor model" menu are automatically calculated and the parameters are set correspondingly. Manually modifying the parameters is generally no longer necessary and may only be carried out in conjunction with the ZIEHL-ABEGG hotline. In order to be able to subsequently modify the parameter values manually, the motor-model edit module (MM_ED) must be switched on beforehand.

Parameter	Description	Factory setting
F_WEAK Field weakening (only ASM)	A Off: No field weakening operation Const.: Operation with field weakening: The magnetising current I ₀ is reduced over the whole speed range	Const.
MM_ED Motor-Model-Edit-Mode	ON: manual parameter modification CAUTION: when the MM_ED is switched on, automatic parameter calculation is deactivated! OFF: manual parameter modification is not possible; they will be automatically calculated	On Off
p Number of pole pairs	Calculated number of pole pairs of the motor	will be calculated
PSI magnet. flux	S Calculated value for the magnetic flux (only for synchronous motors)	will be calculated
Ls Stator inductance	Calculated value for stator inductivity	will be calculated
Rs Stator resistor	S Calculated stator resistor (only for synchronous motors)	will be calculated
I_0 Magnetization current	A Calculated value for magnetized current (only for asynchronous motors)	will be calculated
T_ROT Rotor time constant	A Calculated value for rotor time constant (only for asynchronous motors)	will be calculated
sig Sigma	A Calculated value for the leakage factor (only for asynchronous motors)	will be calculated

10.16 S2:Memory Card menu

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

Parameter	Description	Value range	Factory setting
SAV_ALL Save parameter/ST_LST on MMC	Saves data to memory card with serial number allocation <ul style="list-style-type: none"> Parameter list (.PRT) in directory /3BF/DEVICE/serial number/LST Error list (.FLT) in directory /3BF/DEVICE/serial number/LST Parameter (.PA3) in directory /3BF/DEVICE/serial number/LST OFF: no function ON: Parameters will be saved to the memory card. After copying, the parameter jumps back to "Off"	On Off	Off
SAV_PAR Save parameter to MMC	Save on memory card: <ul style="list-style-type: none"> Parameter (.PA3) in directory /3BF/DEVICE/FORCE Here, there is no serial number allocation. The data will be overwritten during each saving OFF: no function ON: Parameters will be saved to the memory card. After copying, the parameter jumps back to "Off"	On Off	Off

Parameter	Description	Value range	Factory setting
LOD_PAR Load param. from MMC	Load parameter from memory card to inverter Enter 27: Parameter (.PA3) will be loaded from the /3BF/DEVICE/FORCE directory into the inverter After loading, the parameter jumps back to "off"	27	0
UPDATE Update: Start with code 27	Starts the software update from a memory card. The most current software will always be loaded from the memory card Enter 27: Software will be loaded from the //3BF/UPDATE/Softwareversion directory into the inverter	27	0
Format Format MMC:Code 27	Reformatting the memory card: Enter 27: Folders and files on the memory card will be deleted	27	0

10.17 S3:MMC-Recorder CARD menue

With the assistance of the memory card it is possible to make measurements on the frequency inverter without notbook. the measurement will be configured in the "**MMC-Recorder**" menu.

Parameter	Description	Value range	Factory setting
REC_MOD Recorder Mode	OFF: Recorder is switched off ON: Recorder ist active, the operating curves are saved to the memory car 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 Configuration	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
REC_NUM Directory number	Number assignment for the file on the memor card. With entering "0" the serial number of the inverter will be used for the name of the file.		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	Record time for a measurement with 1000 values. E.g. with a record time of 5s, every 5ms a value will be recorded	5 s 10 s 15 s 20 s 40 s 80 s 160 s 0.5 h 1 h 24 h	5
T_DLY Trigger Delay	Delay time for stopping of the masurement. E.g. T_DLY=0.5s: the recording will be stopped 0.5s after an error occurs	0.5 s	0.5 s

Parameter	Description	Value range	Factory setting
CHN1 Recorder channel 1	Assignment of the measuring channels 1-4 with analog measurement values	1	3
CHN2 Recorder channel 2	1: setted speed [m/s] 2: acutal speed [m/s]	3 6	1
CHN3 Recorder channel 3	6: internal staus of the inverter 15: torque build-up current [A] 16: flux build-up current [A]r	15 16	15
CHN4 Recorder channel 4	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	26 27 28 31 49 62 119	6
CHN5 Recorder channel 5	Assignment 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
S&H1 Sample & Hold for channel 1	Input type of the single measurmet tracks Single: The measurment values are recorded without filte Average: The average within the sampling time will be recorded	Single Average Peek min. Peek max.	Single
S&H2 Sample & Hold for channel 2	Peek min: The minimum value within the sampling time will be recorded Peek max: The maximum value within the sampling time will be recorded		Single
S&H3 Sample & Hold for channel 3			Single
S&H4 Sample & Hold for channel 4			Single
CPY_Z2M Copy off setting	With activating the parameter, the setting of the measurement channels made with the ZETAMON-Software will be taken over. The PC/notebokk has not to be switched or connected with the inverter.	Off On	Off

10.18 S4:Encoder adjustment menu



Contains parameter values required for aligning the SSI/EnDat rotary 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 Encoder alignment	OFF: no function ON: Starts the encoder offset or control of the encoder offset alignment	On Off	Off
ENC_POS Encoder Position	Numerical display of the absolute position of the encoder per revolution: 0 ... [4x number of grooves in encoder]-1	Cannot be set	-

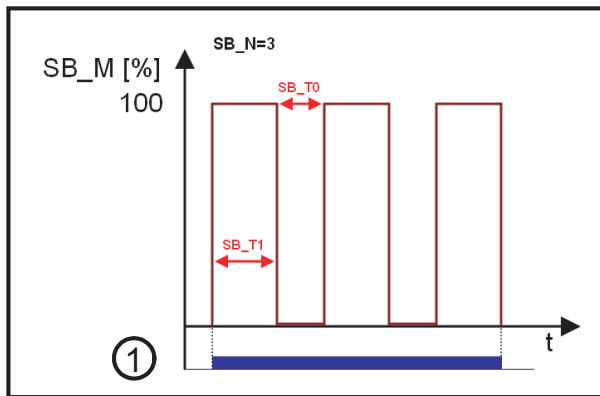
Parameter	Description	Value range	Factory setting
ENC_OFF Encoder Offset	Shifts the zero position of the absolute rotary encoder to the pole's electrical zero position EnDat encoder: Default 0 is absolutely necessary SSI encoder: if the SSI encoder is not mechanically mounted in the zero position, the value ascertained during the offset alignment (ENC_ADJ) for ENC_OFF must be entered	0 ... 360°	0
SIG_ADJ Sinus Error	Automatic adjustment of the signal of the absolute encoder. A shifting if the zero-position of the encoder-signal (2,5V) will be corrected	0 ... 360°	0
SIN_ERR Sinus Error	Deviation from the sinusoidal analogue signal, track A (display only during slow traveling speed)	Cannot be set	-
COS_ERR Cosinus Error	Deviation from the cosine analogue signal, track B (display only during slow traveling speed)	Cannot be set	-
SIN_OFF Sinus Offset	Correction of SIN_ERR	0 ... 65535	
COS_OFF Cosinus offset	Correction of COS_ERR	0 ... 65535	
SIN_AM Sinus amplitude	Amplitude decrease of sine voltage, track A	90.00 ... 100.00 %	100.00
COS_AM Cosinus amplitude	Amplitude decrease of sine voltage, track B	90.00 ... 100.00%	100.00

10.19 S5:Safety Brake menu

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

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

Parameter	Description	Value range	Factory setting
SB_MOD SAFETY BRAKE function	Activates or deactivates the safety brake function Off: Safety brake function 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 Impulse amplitude	Default for pulse amplitude with which the motor is to be fed with current. The default is made as percent from the maximum inverter operating current (rated current x 1.8)	10 ... 100 %	70
SB_T1 Impulse time	Time for which the motor will be fed with current	0.1 ... 2.0 s	0.5
SB_T0 Pulse break	Break time between the individual current pulses	0.1 ... 2.0 s	0.2
SB_N Number of pulses	Number of current pulses	1 ... 10	3



Procedure Safety-Brake

1 Inspection trip "UP" or "DOWN"

10.20 S6:HW-Ident. menu

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

Manual input of the identification defaults is only necessary in case of malfunctions and replacements. To do so, enter the stored version number for the corresponding assembly.

If the number of the stored version numbers is exceeded, a 0 = automatic identification is entered

Parameter	Description	Value range	Factory setting
ID_NOK Number of changed Hardware IDs	The number of the changed hardware identification (identification-no. unequal 0) is indicated		
ID_CU Control Unit	Hardware identification of the control unit	0 or stored identification number	0
ID_CUSH Shunt	Hardware identification of the shunt module	0 or stored identification number	0
ID_CUEE Encoder	Hardware identification of the encoder expansion card	0 or stored identification number	0
ID_CUEC Control system	Hardware identification of the DCP-CAN expansion board	0 or stored identification number	0
ID_CUES Security	Hardware identification of the security expansion card	0 or stored identification number	0
ID_SP Switching power print	Hardware identification of the switching power supply	0 or stored identification number	0
ID_PP Power print	Hardware identification of the power print	0 or stored identification number	0
ID_MP Print Module	Hardware identification of the print module	0 or stored identification number	0

10.21 S7:Power section menu

Configuring the tolerances of the internal power stage.

Parameter	Description	Value range	Factory setting
M_PWM PWM-Mode	Pulse width modulation operating mode Auto: PWM frequency is changed depending on the power stage temperature and load Fix: permanently set PWM frequency (see f_PWM)	Auto Fix f_PWM	Fix f_PWM
f_PWM min. PWM-frequency	Maximum pulse width modulation operating-frequency	2.5 ... 10.0 kHz	8.0

Parameter	Description	Value range	Factory setting
f_PWM_H max. PWM-frequency	Maximum pulse width modulation operating-frequency	2.5 ... 16.0 kHz	16.0
UDC_N DC-link nom. voltage	DC voltage for the DC-link	100 ... 500 V	565
UDC_MIN Min. DC-link voltage	Minimum value of the DC-link voltage	30 ... 500 V	450
UDC_MAX Max. DC-link voltage	Maximum value of the DC-link voltage	300 ... 800 V	760
Temp_MX Max. heat-sink temperature	Maximal permissible temperature on the power stage heat sink	20 ... 90 °C	70
f_BC max. PWM-Freq. internal BC	Pulse width modulation operating-frequency to trigger the brake resistor in the internal electronics	1.2 ... 16.0 kHz	1.4
U_BC BC-operative voltage	DC-link voltage, with which the Brake-Resistor is switched on	635 ... 680 V	680
FAN FAN function	Function of the ventilator AUTO : Fan speed depends on the temperature of the power stage Off : Fan is switched off On 10% : Fan runs permanently with 10% of max. speed On 100% : Fan runs permanently with 100% of max. speed (Gradation in 10%-steps)	AUTO Off On 10 % : : On 100 %	AUTO
FAN_T Temp. - Fan on	Power stage temperature at which the fan is switched on	27 ... 40 °C	33

10.22 S8:CAN menu

For the operation of the Frequency inverter with CAN, a separate manual is existing. In this manual the parameters for the CAN-operation are described

10.23 S9: ZA-Intern menu

Parameterisation of internal measuring and monitoring functions

Parameter	Description	Value range	Factory setting
PW_S9 Password Level S9xx	Password for the indication of additional parameter		0
I_SUM Max. current error iu+iv+iw	Maximum sum of the current of the motorphases U/V/W	0.0 ... 140.0 A	3.5
UVW_CHK Motor phase-current check	Definition of the way how the motor phases are checked during the start-up Single: Motor phases will be check with the first travel after switching-on the inverter. With a successful control no more further examination is made. If the examination is incorrect, with each start an examination is made until a correct examination could be accomplished. Cont: Motor phases will be check with each travel Off: Checking of the motor phases is deactivated	Single Cont Off	Single
UVW_PEK Test-voltage	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. 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 f(P)	f(P)
ENC_AW Encoder-sin/cos-check	Activation/deactivation the examination of the sine signal with sine wave encoders Sin: The sine signal is analysed Rec. The analysis of the sine signal is deactivated The control is equal to the control with using an encoder with rectangle signals	Sin Rec	Sin
ENC_COR Number of new Sin-adjustment	Displays the number of adjustments of the analog-signal and the incremental-signal of the encoder after switching on the inverter The display has to be 0	-	-
ENC_REP Number of read-in ABS-value	S Displays the number of reading in the absolute position of the absolute encoder during the travel The display has to be 0	-	-
f_C_MOD Function/Controller	Activating the possibility to change the operation mode On: The operation mode can be changed Off: The operation mode can not be changed	On Off	Off



10.24 INFO menu


The INFO menu provides an easily accessible overview of the:


- Current measurements
- Current operation conditions of the 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.

<pre>Serial-No ----- 01 ZETADYN 3BF013-A SN_ 06128238/001 3.17-1037</pre>	<p>Page 01: Serial-No. Line 2: Indication of the inverter type and inverter size -A: inverter for asynchronous motors -S: inverter for synchronous motors Line 3: Serial number Line 4: Software version</p>
<pre>Status ----- 02 ▶ Drive standby ◀ 530→540→550→560→ 100 ^0.00 0.00 0.00m/s</pre>	<p>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 ⏪ 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 travel path with positioning speed</p>
<pre>Dist.----- 03 sa: 0.00 s21 0.52m sr:^0.00 s31: 1.45m s1: 0.00 sd: 0.52m</pre>	<p>Page 03: Dist Line 2: sa: current position of car in the shaft s21: calculated deceleration path V₂ → V₁ s20: calculated deceleration path V₂ → Standstill (only in DCP02/DCP04) Line 3: sr: current direction of travel, current total route s31: calculated deceleration path V₂ → V₁ s30: calculated deceleration path V₃ → Standstill (only in DCP02/DCP04) Line 4: s1: current travel path with positioning speed V₁ (not used in DCP02 / DCP04) sd:real deceleration path V₃ → V₁ or V₂ → V₁ The display can be frozen by pressing the ⏸ button.</p>

<pre> Mot ----- 04 ■■■ ----- +0 % real: 0rpm 0V prog: 0rpm +0.0A </pre>	<p>Page 04: Mot</p> <p>Line 2: Bar chart of motor speed Slip in % (only for asynchronous motors)</p> <p>Line 3: Current speed of motor Motor voltage</p> <p>Line 4: Target motor speed Motor current</p> <p>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).</p> <p>The display can be frozen by pressing the  button.</p>
<pre> MotDat ----- 05 I: 11.0A n: 60rp U: 360V f:10 Hz p: 10 </pre> <pre> MotDat ----- 05 I: 11.0A n: 1450rp cos:0.88 f: 50.0Hz I0: 3.8A TR: 316ms </pre>	<p>Page 05: MotDat</p> <p>Display of the motor data entered in the "Motor name plate" menu:</p> <p>S</p> <p>Line 2: Rated current Rated speed</p> <p>Line 3: Rated voltage Rated frequency</p> <p>Line 4: Number of pole pairs</p> <p>A</p> <p>Line 2: Rated current Rated speed</p> <p>Line 3: cos phi Rated frequency</p> <p>Line 4: Magnetization current Rotor time constant</p>
<pre> MotDatFW----- 05 I: 11.0A n: 1560rp cos:0.89 f: 53.4Hz I0: 3.5A TR: 316ms </pre> <pre> MotDatNom----- 05 I: 11.0A n: 1450rp cos:0.88 f: 50.0Hz I0: 3.8A TR: 316ms </pre>	<p>Page 05: MotDatFW</p> <p>Display of the calculated motor data with field weakening operation:</p> <p>A</p> <p>Line 2: Rated current Rated speed</p> <p>Line 3: cos phi Rated frequency</p> <p>Line 4: Magnetization current Rotor time constant</p> <p>Seite 05: MotDatNom By pressing the  button, the original motor date will be displayed</p>

<pre> RegLimits----- 06 SP IQ ID PS U LIM:.. • PEK: </pre>	<p>Page 06: RegLimits Online display of whether a control loop has reached the limit</p> <p>Line 2: SP: Speed controller IQ: Current controller (torque creation current) ID: Current controller (flux creation current) PS: Position controller U: Frequency-inverter voltage limit</p> <p>Line 3: Alarm bell left: minimum limit reached Alarm bell right: maximum limit reached</p> <p>No alarm bell should appear during a faultless, normal trip.</p>
<pre> Brems-Chopper----- 07 Intern 1.4kHz BC • U_DC:----- 565V Ampl:----- 0% </pre>	<p>Page 07: Brake-Chopper Online display:</p> <p>Line 2: Internal PWM frequency (only for brake resistor) Condition of function and temperature monitoring on input terminal BC (larger point = OK)</p> <p>Line 3: DC-link voltage as bar chart display DC-link voltage</p> <p>Line 4 (only with Brake-Resistor): Modulation of Brake-Resistor as bar chart display Modulation of Brake-Resistor in %</p> <p>The DC-link voltage displayed in standstill must have the value "Mains connection voltage x 1,41".</p> <p>A large point must constantly be displayed behind the function and condition monitor.</p> <p>The display can be frozen by pressing the  button.</p>
<pre> Cu-Functions----- 08 CONFIG 00: Frei I:RF RV.2 V..... O:... VG1 </pre>	<p>Page 08: Cu-Functions Online display:</p> <p>Line 2: Selected control system configuration in menu "Control system/CONFIG"</p> <p>Line 3: Active digital input functions:</p> <ul style="list-style-type: none"> • Controller enable (RF) • Direction of travel (RV) • Traveling speed (V) <p>Line 4: Active digital output functions</p>

<pre> Start/Stop ----- 09 RF RB CO MB BR1234 • </pre>	<p>Page 09: Start / Stop Online display of the digital inputs and outputs important for the start / stop process: Line 3: RF – Controller enable (input) RB – Controller ready / Contactors switching (output) CO – Contactor monitoring (input) MB – mechanical brake switching (output) BRx – Brake monitoring contacts Line 4: large point underneath name indicates that the input or output is active</p> <p>A "!" under the monitor input "CO" or "BR" indicates that this monitoring function has been deactivated in the "Monitoring" menu.</p>
<pre> Cu-Ports----- 10 In: Out: 12345678 BC C12 1234 • • </pre>	<p>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: large point underneath name indicates that the input or output is active</p>
<pre> Encoder ----- 11 Incr:2048 Typ:ENDAT Enable•• Err: 0 Cnt:65038=345° A B </pre>	<p>Page 11: Encoder Online display: Line 2: Configured encoder resolution Detected encoder type (with absolute encoders) Configured 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: Error code from encoder, if the encoder is faultless, 0 must be displayed. Line 4: Cnt: Impulse counter's counter level (0...65535) and display of motor revolution degrees (360° = one motor revolution) A and B: graphic display of the sine signal (A) and cos signal (B)</p> <p>The display can be frozen by pressing the  button.</p>

<pre> Power1 ----- 12 DC IGBT PWM ED: 10% •• •• .. FAN: 0% UDC:565V Temp: 28C </pre>	<p>Page 12: Power1 Power stage condition (point for condition OK)</p> <p>Line 2 und 3: DC: first point: Precharge relay switched on second point: Power stage power supply IGBT: first point: ower stage power supply second point: Power stage power supply OK PWM: first point: PWM power stage enabled second point: Power stage power supply OK</p> <p>DC: both points must be active during normal operation IGBT: both points must be active during normal operation PWM: both points are only active during travel</p> <p>Line 4: UDC: DC-link voltage Temp: Power stage temperature</p> <p>The display can be frozen by pressing the  button.</p>
<pre> Power2 ----- 13 ERR_EXT U. OC: ... SRC_APP. UCE_P: ... SRC_MPO. UCE_M: </pre>	<p>Page 12: Power2 Cause for excess current malfunction</p> <p>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 W)</p> <p>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) 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)</p> <p>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)</p>
<pre> DCP-Ident ----- 14 Info: xx 0101 / 010106 de </pre>	<p>Page 14: DCP-Ident Information about the control system</p> <p>Line 2: Manufacturer</p> <p>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 inverter is automatically adapted</p>

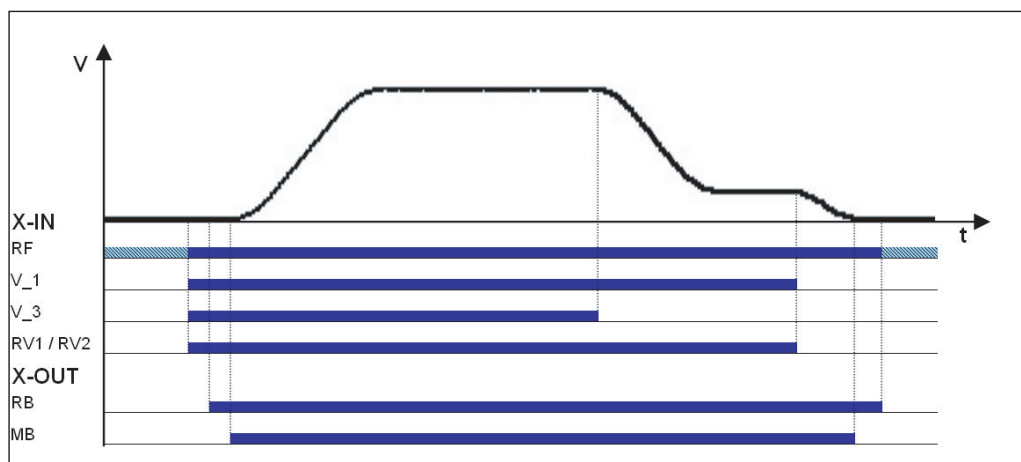
<pre>DCP-Bits----- 15 B..... G..... S..... 100</pre>	<p>Page 15: DCP-Bits Online display: Line 2: Command and speed bytes B= command byte G= speed byte Line 3: Statusbyte S= Statusbyte Current service condition in which the frequency inverter is operating</p>
<pre>DCP-Dist.----- 16 Sv: +0000000 mm S →0 0000000 mm 4</pre>	<p>Page 16: DCP-Dist. Online display: Line 2: Display of the current remaining path Line 3: Display of the remaining path required</p>
<pre>DCP-Err ----- 17 RX_TIM 1 RX_XOR 0 TX_ERR 0</pre>	<p>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 open loop control telegram is detected by inverter Line 4: TX_ERR: erroneous inverter telegram is detected by the open loop control</p>
<pre>A+R ----- 18 0.62 0.62 m/s³ 0.50 0.50 m/s² 0.62 0.50 m/s³</pre>	<p>Page 18: A&R Display of configured values for: <ul style="list-style-type: none"> • Acceleration • Deceleration 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</p>

<pre> InfoBus ----- 19 Ident-No 01234567 Exist: xxxx Error 0000 </pre>	<p>Page 19: InfoBus Display of the inverter configuration</p> <p>Line 2: Ident no. of the internal assemblies</p> <p>0: Controller Unit (CU) 1: Shunt module (CUSH) 2: Expansion card DCP / CAN (CUEC) 3: Expansion card, encoder (CUEE) 4: reserved 5: Switching Power Print (SP) 6: Power Print (PP) 7: Module Print (MP)</p> <p>Line 3: Each board which implemented to the inverter will be indicated (see also menu "S6:HW-Ident."): x: identification of the board by reading out the EEPROM m: identification by manual default in the menu "S6:HW-Ident."</p> <p>Line 4: Error allocation of the assembly</p> <p>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</p> <p>During flawless operation, all internal assemblies must be displayed with a "0"</p>
--	--

11 Travel options

11.1 Normal travel

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



Normal travel

- RF* Controller enable
- V_1* Positioning speed
- V_3* High travel speed
- RV1 / RV2* Default for direction of travel
- RB* Controller ready
- MB* Mechanical brake

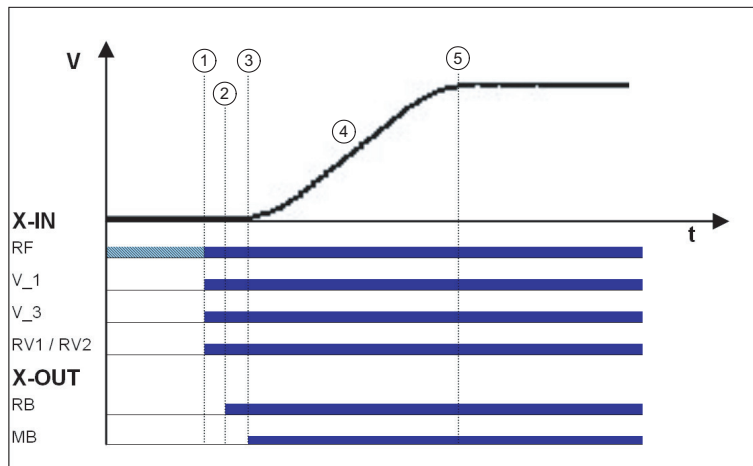
11.2 Start-up and acceleration

To be able to travel, the frequency inverter 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 inverter inputs: <ul style="list-style-type: none"> • Controller enable (RF), can already be triggered • Speed V_1 and V_3 • Direction of travel RV1
2	The inverter switches the digital output "Controller ready RB" time-delayed. The motor contactors must be switched instantaneously with this signal
2	The inverter switches the digital output "Mechanical brake MB" time-delayed. The motor brakes must be opened instantaneously 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* High travel speed
- RV1 / RV2* Default for direction of travel
- RB* Controller ready
- MB* Mechanical brake

11.3 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: **"DECELERATION/S_ABH = ON"**

Path dependent deceleration is carried out during deceleration of:

- V_3 → V_1
- V_2 → V_1
- V_3 → Drehzahl 0 (only in DCP2/DCP4 protocol)
- V_2 → Drehzahl 0 (only in DCP2/DCP4 protocol)

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



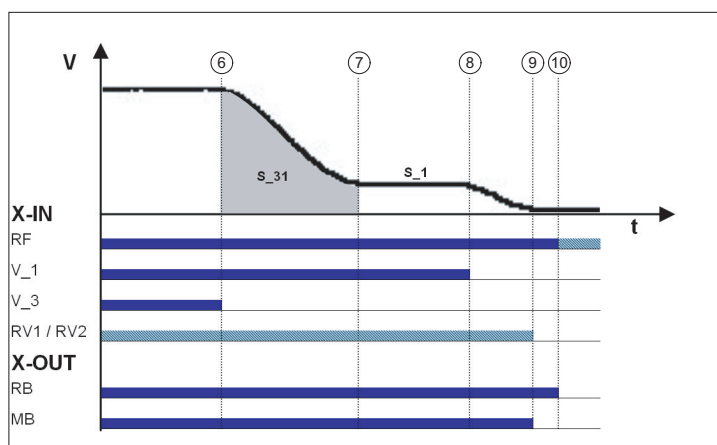
Before removing the digital input for the traveling speeds V_3 or V_2, the input for the traveling speed V_1 must be applied.



If the signal for the higher traveling speed (e.g. V_3) is switched off for a short time, the inverter decelerates the motor to positioning speed V_1. For safety reasons, retriggering a higher traveling speed is ignored. Triggering at a higher traveling speeds is only possible after all the inputs for the traveling speed have been switched off and the motor has reached the speed 0.

11.3.1 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 to V_1 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



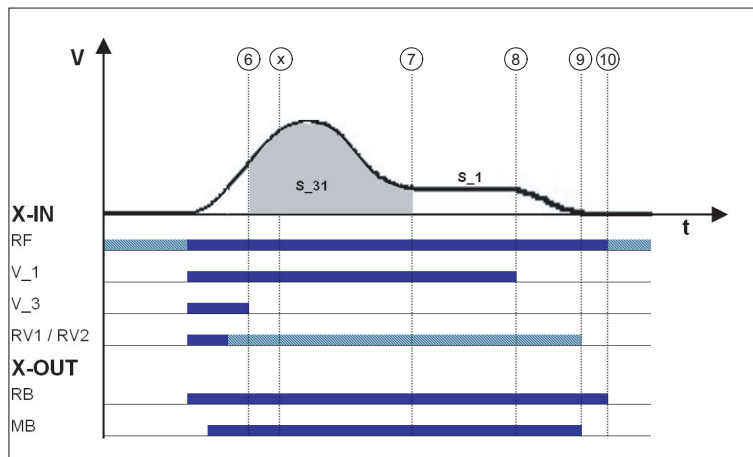
Normal stop during path dependent deceleration

- RF Controller enable
- V_1 Positioning speed
- V_3 High travel speed
- RV1 / RV2 Default for direction of travel
- RB Controller ready
- MB Mechanical brake

11.3.2 Arch travel with path-dependent deceleration

If the selected final speed (V_2 or V_3) is not reached with short floor clearances, the frequency inverter 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 to V_" 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* High travel speed
- RV1 / RV2* Default for direction of travel
- RB* Controller ready
- MB* 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_10, only with DCP2/DCP4) are identical.

11.4 Time-dependent deceleration

Time-dependent deceleration is activated for all speed transitions if the menu "DECELERATION / 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 "Acceleration / S_ABH"

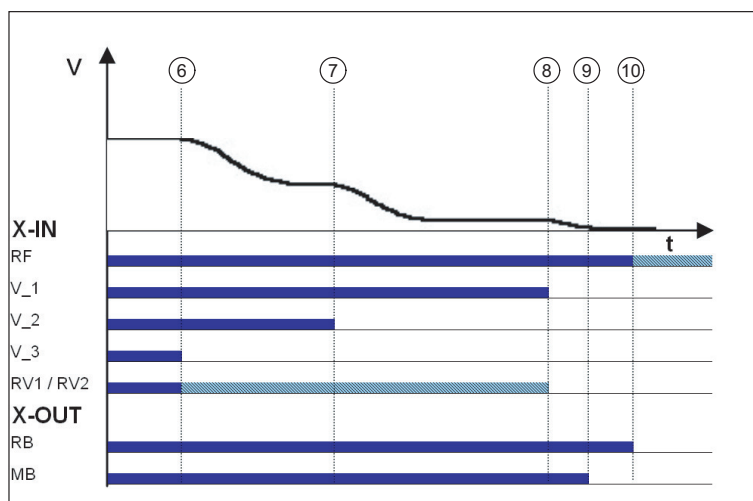
After switching off the current speed preset, the motor is decelerated time-dependent, according to the configured decelerations and round offs, to the highest speed still triggered.



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.

11.4.1 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

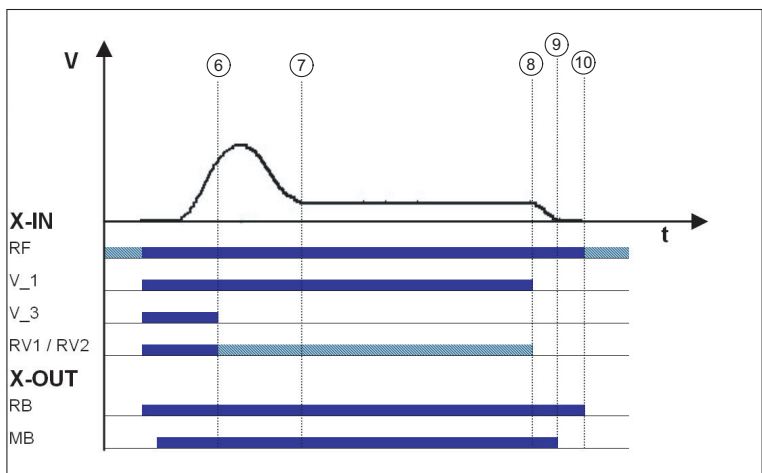


Time-dependent deceleration with reached traveling speed

- RF Controller enable
- V_1 Positioning speed
- V_2 Intermediate speed
- V_3 High travel speed
- RV1 / RV2 Default for direction of travel
- RB Controller ready
- MB Mechanical brake

11.4.2 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 to V_" 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 High travel speed
- RV1 / RV2 Default for direction of travel
- RB Controller ready
- MB Mechanical brake



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!



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

11.5 Crawl path optimization

Improvement of:

- too long crawl paths with traveling speed V_1
- non-flush stopping due to V1 being prematurely switched off

without additional installation work.

Using the crawl path optimization in the menu:

"DECELERATION / S_DI1"

"DECELERATION / S_DI2"

"DECELERATION / S_DI3"

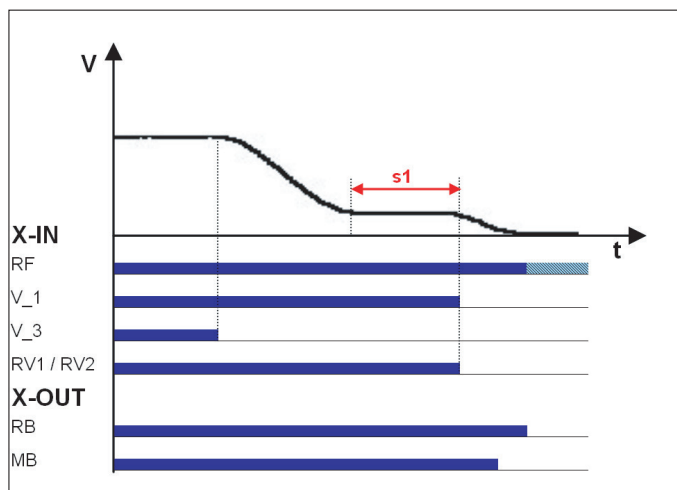
the traveling speeds V_1, V_2 and V_3 are switched off in all floors delayed by the value configured in the corresponding menu

Optimizing the crawl paths

1	<p>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.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <pre>Dist. ----- 03 sa: 0.00 s21 0.52m sr: ^0.00 s31: 1.45m s1: 0.00 sd: 0.52m</pre> </div>
2	<p>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.</p>
3	<p>In the "DECELERATE" menu, change the values for S_DI3 or S_DI2 to that determined for s1</p>
4	<p>Check the deceleration behavior and, if necessary, correct the values for S_DI3 or S_DI2.</p>

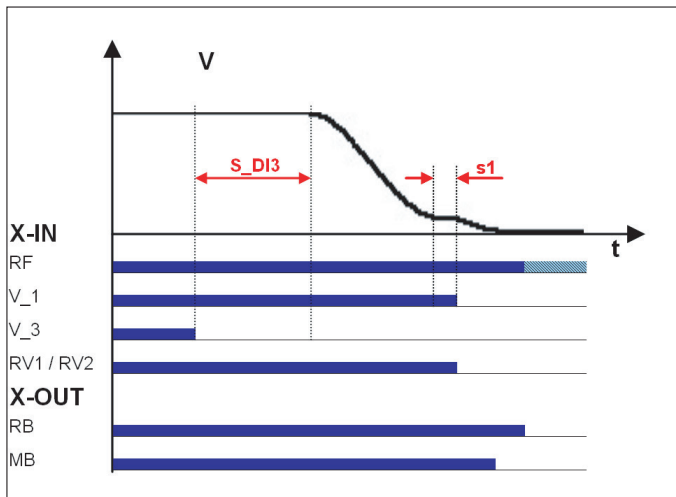


If s1 has different values, it is not possible to get the same crawl path in all floors!



Deceleration with non-optimized crawl path

- RF Controller enable
- V_1 Positioning speed
- V_3 High travel speed
- RV1 / RV2 Default for direction of travel
- RB Controller ready
- MB Mechanical brake



Deceleration with optimized crawl path

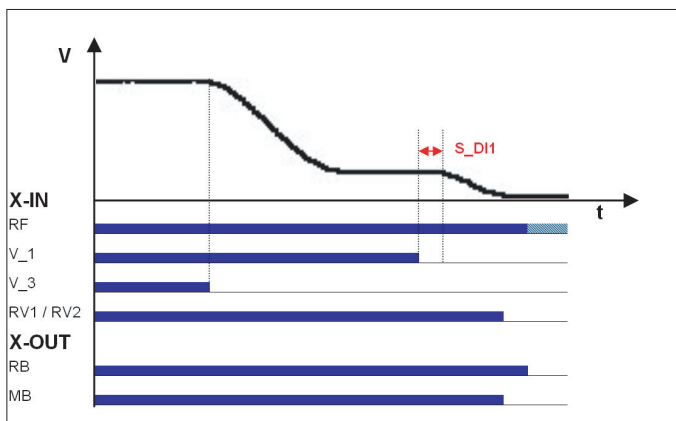
RF Controller enable
 V_1 Positioning speed
 V_3 High travel speed
 RV1 / RV2 Default for direction of travel
 RB Controller ready
 MB Mechanical brake

11.6 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 "DECELERATE" menu, configure the value for S_DI1 to the ascertained value.
4	Check the deceleration behavior and, if necessary, correct the values for S_DI1.



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



Optimizing the step alignment

RF Controller enable
 V_1 Positioning speed
 V_3 High travel speed
 RV1 / RV2 Default for direction of travel
 RB Controller ready
 MB Mechanical brake

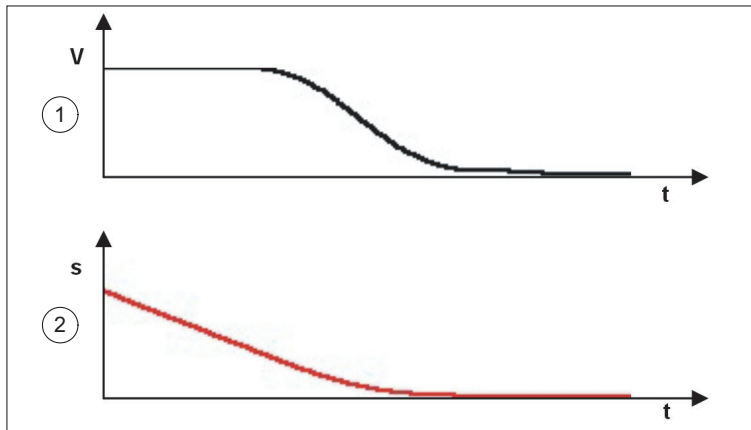
11.7 Direct leveling



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

During direct leveling, the control system predetermines the frequency inverter the residual path to be traveled up to the stopping point.

The inverter decelerates the motor, dependent on the preset remaining path. As a consequence, it is possible to travel to the stop point without a crawl path.



Direct leveling with DCP protocol

- 1 *travel speed*
2 *Residual distance*

11.8 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 "**TravelingI / V_Z**" menu and controlled through a digital input (configured to V_Z).



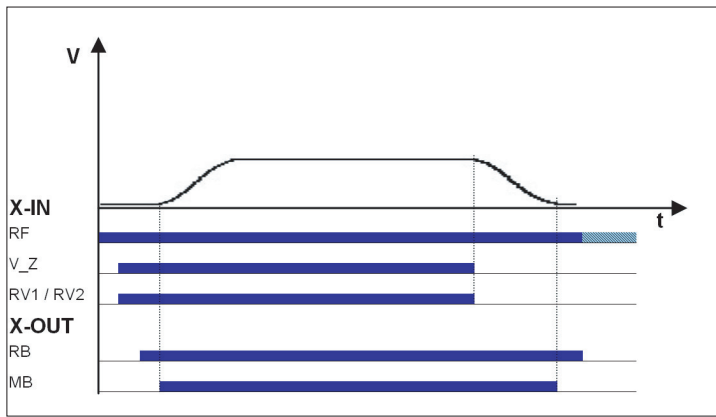
The traveling speed for readjustment takes precedence over the other traveling speeds.

To be able to make a readjustment, at least the following input signals need to be present:

- Controller enable
- Readjustment speed V_Z
- Default for direction of travel



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 V_Z
 RB Controller ready
 MB Mechanical brake

11.9 Operation in idle

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

CAUTION!

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

```

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

12 Emergency evacuation

12.1 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.



Characteristics of evacuation with single-phase mains supply:

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

If there is a mains failure, the mains supply must provide the following voltage to the inverter:

- 230 VAC to feed L1 and L2

The frequency inverter analyses the load ratio between the car and the counterweight during every start.

The control system starts the evacuation trip by activating:

- Controller enable
- Default for direction of travel
- Speed default

Calculation of the UPS

The required UPS performance consists of the following:

- Electronic frequency inverter power consumption
 - + Control system power 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 UPS [W]**



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

12.1.1 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 Menu "Control system" menu to "PARA2"

```
Control system
↳ f_I08   PARA2
   ↳     PARA2
Function of I_08
```

In case of a voltage drop (power failure) the inverter is informed by activating the configured input with 24VDC 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
<p>Configure digital output in the "Control system" menu to "Evac. Dir."</p> <pre>Control system ↳ f_04 Evac.Dir ↳ Evac.Dir Function of 04</pre> <p>Contact open → Car is lighter than counterweight Evacuation trip will be carried out upwards!</p> <p>Output closed → Car is heavier than counterweight Evacuation trip will be carried out downwards!</p>	<p>Status byte 2, Bit 2 = 0 → Car is lighter than counterweight Evacuation trip will be carried out upwards!</p> <p>Status byte 2, Bit 2 = 1 → Car is heavier than counterweight Evacuation trip will be carried out downwards!</p>

(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 of parameter
```

(5) Copying the parameters:

In the "Parameter set 2 / COPY" menu, select the function PARA1->2. After copying, the parameter jumps back to OFF

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



Before copying the parameters, the voltage drop detection and evacuation type must be configured. When copying the parameters, the speeds V_2 and V_3 are restricted to the maximum possible values.

12.2 Evacuation with UPS



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



Due to the high level of magnetization current, emergency evacuation with a single-phase 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 frequency inverter analyses the load ratio between the car and the counterweight. In case of a voltage drop (mains failure), the frequency inverter 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

12.2.1 Evacuation through UPS with optimum power



Characteristics of evacuation with optimum UPS power:

- Load-independent starts
- Load-independent stopping
- Flush stopping
- With corresponding sizing of the UPS, a trip in the motoric direction is also feasible.

Calculation of the UPS

The required UPS performance consists of the following:

Electronic frequency inverter power consumption + Control system power consumption + Electromechanical brakes power consumption + Other consumers (car light, ...) power consumption + Motor power consumption for UPS operation with sufficient power (ask motor manufacturer) <hr/> = Real power UPS [W]



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

12.2.2 Evacuation through UPS with minimum power



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:

- Electronic frequency inverter power consumption
- + Control system power 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]**



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

12.2.3 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 Menu "Control system" menu to "PARA2"

```
Control system
↳ f_I08   PARA2
   ↳      PARA2
Function of I_08
```

In case of a voltage drop (power failure) the inverter is informed by activating the configured input with 24VDC 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
<p>Configure digital output in the "Control system" menu to "Evac. Dir."</p> <div style="border: 1px solid gray; padding: 5px; margin: 10px 0;"> <pre>Control system ↳ f_04 Evac.Dir ↳ Evac.Dir Function of 04</pre> </div> <p>Contact open → Car is lighter than counterweight Evacuation trip will be carried out upwards!</p> <p>Output closed → Car is heavier than counterweight Evacuation trip will be carried out downwards!</p>	<p>Status byte 2, Bit 2 = 0 → Car is lighter than counterweight Evacuation trip will be carried out upwards!</p> <p>Status byte 2, Bit 2 = 1 → Car is heavier than counterweight Evacuation trip will be carried out downwards!</p>

(4) Evacuation type default

Configure the parameter "F_PARA2 =UPS" in the "Parameter set 2" menu.

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

(5) Presetting the stator resistor in synchronous motors

Configure the synchronous motor's stator resistor in the "Parameter set 2/RS_UPS" menu

```
Parametersatz2
↳ RS_UPS 1.00 Ohm
    ↳ 1.00
Stator-Widerstand (UPS)
```

(6) Limit motor current

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

```
Parametersatz2
↳ P_UPS 1.0 kW
    ↳ 1.0
Max. Belastung der USV
```

Calculating the available UPS power:

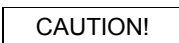
```
UPS powername plate
- Control system power consumption
- Electromechanical brakes power consumption
- Other consumers (car light, ...) power consumption
= Available UPSpower [W]
```



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.



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

(7) Copying the parameters

In the "Parameter set 2 / COPY" menu, select the function **PARA1->2**. After copying, the parameter jumps back to OFF

```
Parameter set 2
↳ COPY Off
    ↳ Para1->2
Copy parameter set
```



Before copying the parameters, the voltage drop detection and evacuation type must be configured. When copying the parameters, the speeds V_2 and V_3 are restricted to the maximum possible values.

(8) Switch off times in which the motor is kept at speed 0:

Configure the "Start / T_3 = 0" menu

```
Start
↳ T_3      0.0      s
  ↳        0.0
Max hold time
```

Configure in the "Stop / T_4 = 0" menu

```
Stop
↳ T_4      0.0      s
  ↳        0.0
Max. hold time
```

12.3 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.

12.3.1 Parameterisation

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

```
Parameter set 2
↳ STOP      On
  ↳         On
Stop-function
```

Standard	DCP2 / DCP4
<p>Configure in the "Parameter set 2 / STOP = ON" menu</p> <p>Brake is already closed when the switch off for the speed V_1 is reached.</p>	<p>Determine overshoot path at the flush position under full load</p> <p>Configure "Control system / DCP_STP = ... mm" menu</p> <div data-bbox="1002 1160 1262 1265" data-label="Code-Block"> <pre>Control system ↳ DCP_STP 35 mm ↳ 35 Stop befor floor level</pre> </div> <p>The brakes are already closed when the distance to the flush position preset by S_Stop is reached.</p>



Despite these measures, positioning is still load-dependent. During trips with half-load, stopping too early outside the door zone area can occur under "ZA_INTERN / STOP = ON".

12.5 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.



Warning!



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!

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

13 Error diagnosis

13.1 Travel abort and acknowledgement during malfunctions

13.1.1 Travel abort

If the frequency inverter detects an error, the current trip program is aborted and the outputs:

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

The open loop control must immediately:

- Close the electromechanical brake
- Open 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.

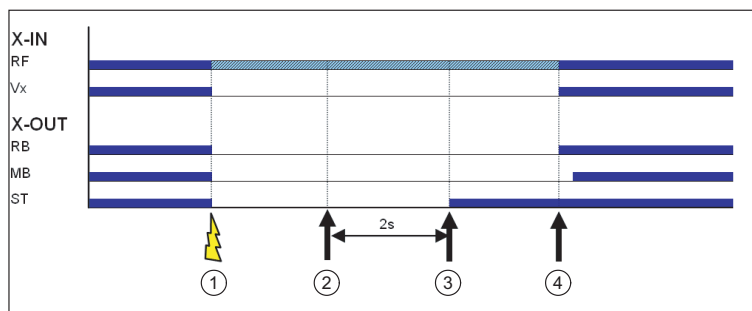
13.1.2 Acknowledgement

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 if traveling signals are applied before the expiration of the 2 seconds.

The following errors are not automatically acknowledged:

Error-No.	Acknowledgement by
912(BC:Fault)	Switch frequency inverter off and then back on



- 1 Error is recognized
- 2 Error is no more present
- 3 Automatic acknowledgement with $V_x=0$
- 4 New travel command

13.2 Light emitting diodes

Condition of the frequency inverter

Four LEDs are available to diagnose the frequency inverter.

	Error (red)	Update (yellow)	Op1 (yellow)	Op2 (green)	Operation condition
Flashing cycle	Off	Off	Slow, alternating flashing		Standstill
	Off	Off	Fast, alternating flashing		Travel

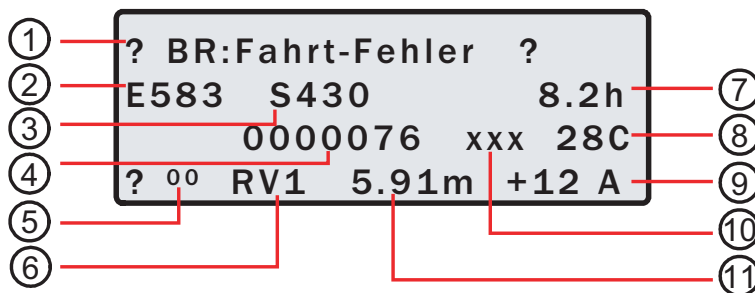
Condition of the CAN- DCP connection

Two LEDs are available to diagnose the CAN / DCP connection.

	Error(-)	Run(-)	Operation condition
Flashing cycle	On	On	CAN/DCP interface module is present, but the DCP function was not activated
	Fast	Off	With activated DCP function, the DCP connection is not present or is defective
	Off	On	With activated DCP function, the DCP connection is flawless

13.3 Readout the error memory

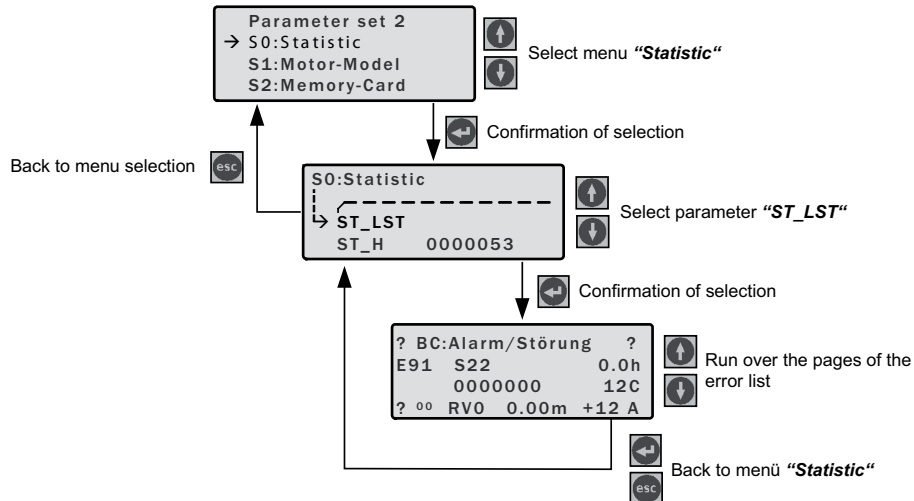
The error list administers up to 64 error messages. If the number of 64 errors is reached, the oldest listing is deleted for each new message. When the error list is called up, the most recently occurring error is shown with the following information:



- 1 Error description
- 2 Error numb
- 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.

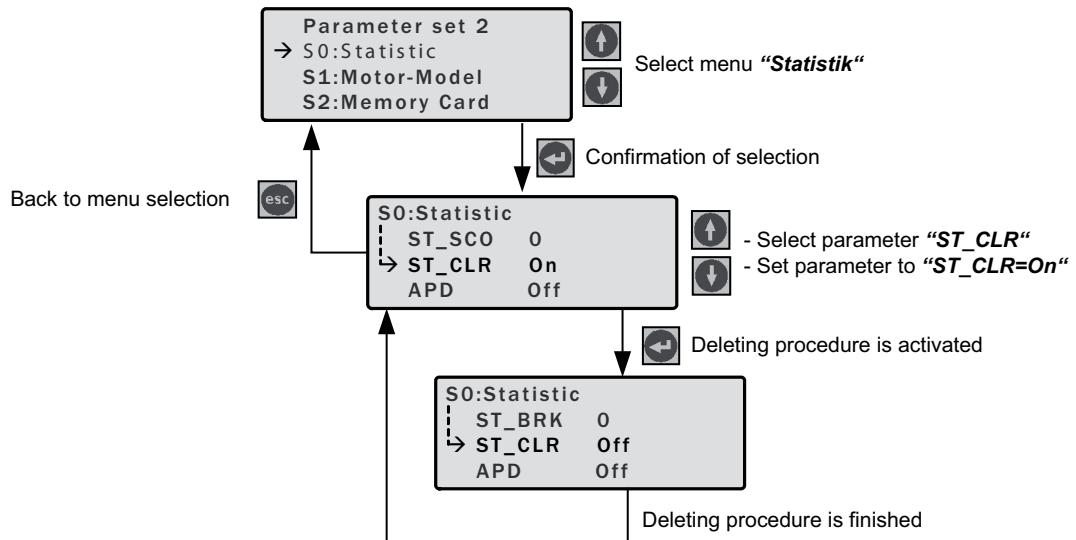
Readout of the error list



13.4 Delete error memory

Deleting the error memory resets the following parameters to 0:

- 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)



13.5 Error list

All error messages are stored in the "S0:Statistic/ST_LST" menu (see "Error diagnosis / error memory" chapter)

13.5.1 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 the column **M**.

CAUTION!

Never use the mask function during trouble shooting and error diagnosis. You must acknowledge the cause of the error for permanent inverter operation!

Sequential errors can occur if errors are masked.

Important monitoring functions are deactivated through masking. That can result in hazardous service conditions or damage to the inverter.

13.5.2 Block function

The block function blocks the controller if certain errors recur several times successively, depending on the configuration in the "Monitoring/MODE_ST" menu (see "Parameter list / "Monitoring" menu chapter). During this, the error must occur in directly successive trip trials. When a flawless trip is carried out, the error counter is reset to 0.

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)
- Block n.3: Block function after 3 malfunctions. Output "ST" remains dropped after the 3rd error
- Block n.2: Block function after 2 malfunctions. Output "ST" remains dropped after the 2nd error
- Block n.1: Block function after 1 malfunction1. Output "ST" remains dropped after the 1st error

Errors that lead to a blocking of the frequency inverter are marked with a **point** in column **S**.

13.5.3 Notes 0xx

Information about:

- Error memory content
- Changes in the operating conditions
- Application of special inverter functions

Note-No.	Note-text	Description	M	S
N0	Memory empty	EEPROM is empty		
N010	Update software	Software update was carried out		
N020	MOT_TYP changed	Motor type in "Motor name plate" was changed		
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		•
N087	Mode:Encoder-Adj.	Manual encoder offset was carried out		
N088	Mode:Encoder-Check	The encoder offset alignment was checked		

13.5.4 Error 1xx

- Hardware configuration error
- Software error

Error-No.	Error text	Error cause	M	S
100	Serial no. missing	Inverter / CU does not have a serial number, e.g. after a component replacement		•
101	System-Error	An internal, defective component was found during a self-test of the inverter		•
110	CU: No ID	CU ID no. was not detected: CU is not present or its ID EEPROM does not reply		

Error-No.	Error text	Error cause	M	S
111	CUSH: No ID	Shunt ID no. was not detected: Shunt module is not present or its ID EEPROM does not reply		
113	CUEE: No ID	ID no. for the additional card for the the encoder was not detected: encoder card is not present or its ID EEPROM does not reply		
115	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	PP: No ID	Power print ID no. was not detected: Power print is not present or its ID EEPROM does not reply		
117	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	•	
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 entered for the communication between inverter and elevator contol. This is not possible with Open-Loop-operation Remedy: Enter DCP1 or DCP3 for the communication	•	

13.5.5 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 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		•
210	Wrong ENC_TYP	Error: Encoder type and motor type do not match Remedy: Enter the correct encoder type in the "Encoder & BC"menu	•	•
211	No binary encoder	Error: With theb encoder types TTL-sine wave or EnDat/SSi no binary resolution was entered Remedy: Enter a binary resolution (e.g. 512, 1024 or 2048)	•	
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	•	•
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		

Error-No.	Error text	Error cause	M	S
232	V_G2 > 150% V*	Error: the limit value configured for V_2 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		
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 data" menu		•
287	V4 ... V7 > V* !	Error: one of the traveling speeds V_4 ... V_7 entered is larger than the entered rated speed V* Remedy: Configure speeds V_4 ... 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 "Travelling" 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 set2" menu, copy the the data from parameter set 1 to parameter set 2		•

13.5.6 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: Carry out a software update	•	•
303	MOP: SW-Error	Error: Software error message in the motor management processor Remedy: Carry out a software update	•	•
304	MOP: HW-Error	Error: Hardware error message in the motor management processor	•	•
306	ADC calibration??	Error: Zero point offset in the motor current detection (analogue digital converter) is outside the tolerance Remedy: Replace defective shunt module		•
307	Iu Iv Iw > 1.0A	Error: Defective current measuring the phase U, V or W Remedy: Check the connector of the Shunt-Modul Current sensors are defekt		•
310	No abs.enc	Error: The connected absolute encoder is not detected (when switching on the inverter no the absolute encoder was not connected) Remedy: Check the encoder connection Switch frequency inverter off and then back on Check the parameter in the "Encoder & BC" menu		•
315	EnDat: HW-error	Error: EnDat encoder delivers error		•
316	EnDat: Resolution	Error: Configured resolution in the EnDat encoder does not match the encoder resolution Remedy: Enter the correct encoder resolution in the "Encoder & BC" me		•
320	ENC: Error-start	Error: Configured sinusoidal encoder was not detected Remedy: Check the connection Check the encoder type; possibly connect a square wave encoder		•

Error-No.	Error text	Error cause	M	S
321	EnDat: ULP-error	<p>Error: While starting, an error was read out from the EnDat encoder. Error is stated as a code: 0: defective encoder power supply 1: no SSI communication 2: Encoder illumination defective 3: defective signal amplitude 4: Positioning error 5: defective sine evaluation Remedy: Check the connection, Check the encoder</p>		
322	EnDat: Com-Fehler	<p>Error: During start, malfunction in communication to EnDat encoder; absolute value could not be read out Remedy: Check the encoder, Check the encoder cable Check the encoder configuration in the "Encoder & BC" menu</p>		
324	SSI: Ack-Error	<p>Error: During start, malfunction in communication to SSI encoder; absolute value could not be read out Remedy: Check the encoder, Check the encoder cable Check the encoder configuration in the "Encoder & BC" menu</p>		
325	SSI: Timeout	<p>Error: During start, malfunction in communication to SSI encoder; absolute value could not be read out, encoder does not reply Remedy: Check the encoder, Check the encoder cable Check the encoder configuration in the "Encoder & BC" menu</p>		
327	ENC: Read-Error	<p>Error: During reading out the position of the absolute encoder (position will be read out repeatedly) different values will be read. Remedy: Check the encoder, Check the encoder cable Check encoder connection (e.g. shielding)</p>		
328	ENC: Count-Dif	<p>Error: Too large a difference between the position determined by the absolute rotary encoder and the position calculated from the encoder pulses Remedy: Check the encoder, Check the encoder cable Check encoder connection (e.g. shielding)</p>		
329	ENC:Sinus-Error S	<p>Error: During slow traveling speed and with a sinusoidal encoder, the level of the sine and cosine tracks are outside tolerance Remedy: Check the encoder, Check the encoder cable Check encoder connection (e.g. shielding)</p>		
330	ENC:Sinus-Error F	<p>Error: During fast traveling speeds and with a sinusoidal encoder, the level of the sine and cosine tracks are outside tolerance Remedy: Check the encoder, Check the encoder cable Check encoder connection (e.g. shielding)</p>		
331	ENC: Error NDEF	<p>Error: Start-Bit of the EnDat-protocol is not detected Remedy: Check the encoder, Check the encoder cable Check encoder connection (e.g. shielding)</p>		
372	ENC:No Abs.value	<p>Error: Before start of trip, no absolute value read in from encoder Remedy: Check the encoder connection</p>		•
373	ENC:No Abs.End	<p>Error: Before start of trip, no absolute value read in from encoder Remedy: Check the encoder connection</p>		•
375	MOT:Temp.warning	<p>Error: Motor temperature monitor triggered during standstill Remedy: Check the temperature sensor connection, remove the cause for the rise in the motor temperature</p>	•	•

Error-No.	Error text	Error cause	M	S
377	BRxx:Temp.warning	Error: The continuous 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!	Error: No temperature measurement possible on the power stage		•
379	MP:Temp.warning	Error: during startup, the temperature on the power stage is too high Remedy: the inverter is overloaded, repair the cause for the overload	•	•
380	BR: Fault start	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: Inverter has not received any initialization data from the open loop control (in 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	•	•

13.5.7 Error 4xx

- Trip abort to protect the frequency inverter
- 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 to inverter output for short-circuit, check encoder connection for connection of 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 the encoder connection	•	•
420	MP: Temp. Fault	Error: Excess heat in the power stage Remedy: Check the fan, check the ambient temperature, when installing the inverter in the switch cabinet, ensure it has sufficient ventilation	•	•
431	MP: Temp. Fault	Error: The pulse width modulation of the clock frequency is not switched on or off Remedy: Check the encoder connection	•	•

Error-No.	Error text	Error cause	M	S
470	DC: U < UDC_MIN	Error: Intermediate circuit has undercut the permissible value for "UDC_MIN" (Menu "S7:Power section") during travel Remedy: Check the setting for the "UDC_MIN!" value in the "S7:Power section" menu, check the inverter size, Check the motor data Voltage drop during the travel Check the input phases	•	•
471	DC: U > UDC_MAX	Error: Intermediate circuit has exceeded the permissible value for "UDC_MAX" (Menu "S7:Power section") during travel Remedy: Check the setting for the "UDC_MAX!" value in the "S7:Power state" menu, Check the connection / functioning of the Brake-Chopper / Brake-Resistor, Check the parameter in the "Encoder & BC" menu Check the size of the Brake-Chopper / Brake-Resistor,	•	•
475	DC: U > 850V	Error: During travel, the intermediate circuit voltage exceeds 850VDC Remedy: Check the connection / functioning of the Brake-Chopper / Brake-Resistor, Check the size of the Brake-Chopper / Brake-Resistor,		•
480	MP: Overcurrent!	Error: In one motor phase, overcurrent was measured Remedy: Check the motor connection (short-circuit, earth fault), Check the 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		•
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 the 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		•

13.5.8 Error 5xx

- Trip abort to protect the installation
- Speed monitoring
- Contactor control
- Monitoring 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 Remedy: Occurs if the brake is opened manually, check the brake functioning	•	•
502	ENC:Sin-Enc.fail	Error: In standstill, a sine signal from the encoder was detected Remedy: Check the brake functioning Check the encoder connection	•	•
503	No starting	Error: No encoder signal was received after expiration of the time T_GUE (T_GUE is started with T_2) Remedy: Check the functioning of the encoder Check the encoder connection Check the opening of the brakes Check the time "T_GUE" in the "Monitoring" menu Check the times "T_2" and T_3" in the "Start" menu	•	•

Error-No.	Error text	Error cause	M	S
505	MB/ENC fault	Error: At target speed of >10cm/s, inverter does not receive an encoder signal Remedy: check motor connections (U→U; V→V; W→W), Brake not closed during start, Check the motor data Check the encoder connection	•	•
515	$v > 110\% V^*$	Error: Actual speed is $\geq 110\%$ of the rated speed V^* Remedy: Check whether the car counterweight is pulling up, Check motor data in the "Motor name plate" menu, Check the 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 $\geq 150\%$ of the rated speed V^* Remedy: Check whether the car counterweight is pulling up, Check motor data in the "Motor name plate" menu, Check the encoder resolution in the "Encoder & BC" menu Check the "SPD_KP" parameter in the "Control system" menu,	•	•
519	Speed too low	Error: The actual speed deviates from the target speed by -15% Remedy: Check the encoder connection check the encoder pulse in the "Info" menu, page 11 check the brake lifting, Check motor data in the "Motor name plate" menu, Check the 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 the encoder connection Check the encoder configuration in the "Encoder & BC" menu check the motor connections (U→U; V→V; W→W) Inverter size too small	•	•
522	ENC: Dif. Pos	Error: Too large positive difference in the encoder counter level between two scan steps. The limit value equals 2 times the installation rated speed Remedy: Check whether the car counterweight is pulling up, Check motor data in the "Motor name plate" menu, Check the 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: Too large negative difference in the encoder counter level between two scan steps. The limit value equals 2 times the installation rated speed Remedy: Check whether the car counterweight is pulling up, Check motor data in the "Motor name plate" menu, Check the encoder resolution in the "Encoder & BC" menu Check the "SPD_KP" parameter in the "Control system" menu, Check the motor connection	•	•
529	Quickstart alarm	Error: During a quick start function, the machine moves more than 7cm while input "V=0" is triggered Remedy: Check the motor data in the "Motor name plate" menu Shorten time during which input "V=0" is triggered	•	•
540	CO: ON!?	Error: After expiration of the contactor switching time T_0 , no signal is present on the contactor monitor Remedy: Check the wiring of the motor contactors, check wiring the contactor control, check the power supply of the motor contactors , Check the power-supply of the contactor monitoring Check the contactor switch time " T_0 " in the "Start" menu Check the contactor monitoring in the "Monitoring" menu		•
544	CO/RF:Vx activ !	Error: 300 ms after switching off the digital outputs RF and MB due to a RF- or CO-interrupt, the travel comands of the elevator control are still activated Remedy: Check the analysis of the output signals from the inverter by the elevator control		

Error-No.	Error text	Error cause	M	S
545	CO open early	Error: Motor contactors are open during travel Remedy: Check the motor contactor triggering Check the safety circuit	•	
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: After expiration of T_6, a signal is still present on the contactor monitor input CO1 or CO2 Remedy: Check the wiring of the motor contactors, check wiring the contactor control, Check the contactor switch off time "T_6" in the "Stop" menu		•
549	CO12: still on	Error: After expiration of T_6, a signal is still present on the contactor monitor input CO1 or CO2 Remedy: Check the wiring of the motor contactors, check wiring the contactor control, Check the contactor switch off time "T_6" in the "Stop" menu		•
550	MOT: Overload !	Error: Motor current exceeds the value max for time Tmax Remedy: Check the motor data in the "Motor name plate" menu Check the weight compensation, Check the brake switching function	•	•
575	MOT: Temp. Fault	Error: Motor temperature monitor triggered during the trip (error evaluation only if error no. 575 is entered in the mask function) Remedy: Check the motor data in the "Motor name plate" menu check the motor's duty cycle, check the motor for winding short, check the encoder	•	•
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	•	•
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 "Start" menu and increase if necessary	•	•

13.5.9 Error 7xx

- Trip abort due to errors between frequency inverter and control system

Error-No.	Error text	Error cause	M	S
710	DCP: Timeout	Error: DCP communication interrupted during travel Remedy: Check the wiring (shielding)	•	•
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	•	•

Error-No.	Error text	Error cause	M	S
721	DCP: Dist. fail	Error: During the trip, no residual path change occurs within 100m 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 ?!	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"	•	•

13.5.10 Error 9xx

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

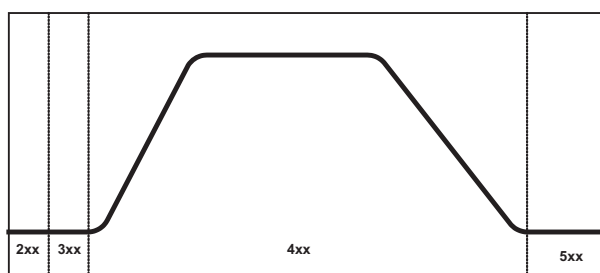
Error-No.	Error text	Error cause	M	S
905	MOP:HW-SW Error	Error: A hard- or software error occurred after switching on the inverter. After 60s the inverter changes to "Wait-Switch off" Remedy: Check the connectors between the Control Unit and Modul Print check the fuse on the Switching Power Print no Modul Print existing check EEPROM on the Modul Print		
910	BC: No function	Error: When switching on the inverter, the monitoring 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 continuous braking power of the Brake-Resistor is exceeded by 150 % within 120 s The inverter switches off during the travel Remedy: Check the configuration of the BR-type Check the connected BR	•	
912	BC: Fault	Error: Monitoring contact for Brake-Chopper or Brake-Resistor opens while the inverter is operating Remedy: Check the temperature monitor for the Brake-Chopper or Brake-Resistor, check the temperature monitoring for the Brake-Chopper or Brake-Resistor,		
913	DC: U_DC > U_BC	Error: 5 s after standstill the measured voltage of the DC-link (+DC/-DC) is higher than the trigger voltage U_BC Remedy: Defective analysis if 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 encoder is detected on jack X-ENC 15 when switching on inverter Remedy: Check the encoder connection reset the inverter		
916	X_ENC15:Discon.	Error: Interruption of the encoder signal during travel Remedy: Check the encoder connection Switch frequency inverter off and then back on		
917	BRxx activ	Error: 5 s after standstill the external BR is still activated although the DC-link voltage U_DC is smaller than the trigger voltage U_BC	•	
918	MP:Temp.missing	Error: Temperature detector on power stage is not supplying any measurements Remedy: Change the device		•

Error-No.	Error text	Error cause	M	S
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 the wiring of the Brake-Resistor Check the Brake-Resistor When using an Brake-Chopper check if the correct type is entered in the parameter "Encoder & BC/BC_Typ"		
931	MP: ERR_EXT_ activ	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)		
994	MOP: Timeout 2	Error: I standstill the communication between the Motor-Management-Processor (MOP) and the Application-Processor (APP) is interrupted for more than 7.5 s Increased BR-protection	•	

13.6 Operating conditions of the inverter


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 their error list. Furthermore, the operating conditions are displayed with the status number and in plain text in the "Info/Page02" menu.

Status number	Condition of the frequency inverter
0 ... 099	Frequency-inverter initialization phase
100	Condition "System off" before each trip start and after each error (if block function was not configured)
200 ... 299	Start-up check (temperature check, parameter check, download absolute rotary encoder, ...)
300 ... 399	Start (contactor on, flux creation, brake open, ..)
400 ... 499	Acceleration, travel, deceleration
500 ... 599	Stop (brake closed, contactor open, ...)
900 ... 999	A malfunction is present

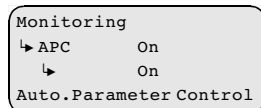


Travel curve with related status numbers

13.7 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.

You can activate or deactivate the APC function in the **"Monitoring / APC"** menu. The factory setting is ON.



Through the APC function:


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

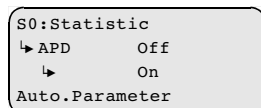
13.8 Automatic parameter diagnostics (APD)

During Automatic parameter diagnostics, the following are checked:

- The parameters for plausibility and tolerances
- Device functions for functional errors

Erroneous parameters or functions are shown in the display.

Every message must be acknowledged by the user with the  key. The APD function can be activated in the **"S0:Statistic / APD"** menu. After checking, the function is reset to "OFF".



14 Special functions

14.1 Changing the Clock frequency

The clock frequency in the frequency inverter is factory set to 8kHz. If necessary, it can be steplessly changed in the **"S7:Power section"** from 4...16kHz.



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 frequency inverter.

CAUTION!

Increasing the clock frequency causes

- a performance reduction of the frequency inverter (see Technical Data chapter)
- a greater power loss and thus increased heating of the frequency inverter

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

14.1.1 Fixed presetting of the clock frequency (Menu S7: Power section/M_PWM=Fix f_PWM)

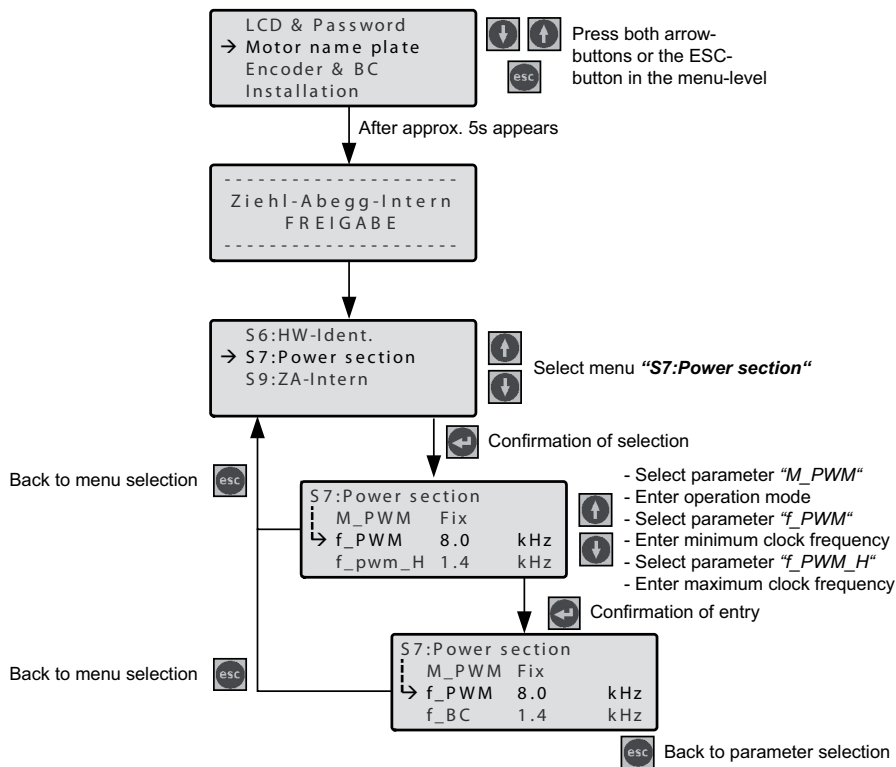
The factory setting of the clock frequency is 8 kHz. If necessary, it can be changed in the "S7:Power section/f_PWM" steplessly from 2.5 ... 10 kHz.

14.1.2 Automatic adjustment if the clock frequency (Menu S7: Power section/M_PWM=Auto)

The inverter works with the clock frequency which is configured in the menu "S7: Power section/f_PWM_H".

If required the inverter switches to the clock frequency which is configured in the menu "S7:Power section/f_PWM"

Modifying the clock frequency



14.2 Encoder offset-alignment

CAUTION!

S

Make sure you perform an encoder alignment if you operate a synchronous motor. Operating the motor without encoder-offset alignment can cause uncontrolled motor movements. Traveling is prohibited before an absolute encoder offset alignment has been performed!

i

In Ziehl-Abegg motors, the absolute encoder is already aligned in the factory to the offset value "0".
It is not necessary to perform an absolute encoder offset alignment!

General conditions required for an encoder offset alignment:

- 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)

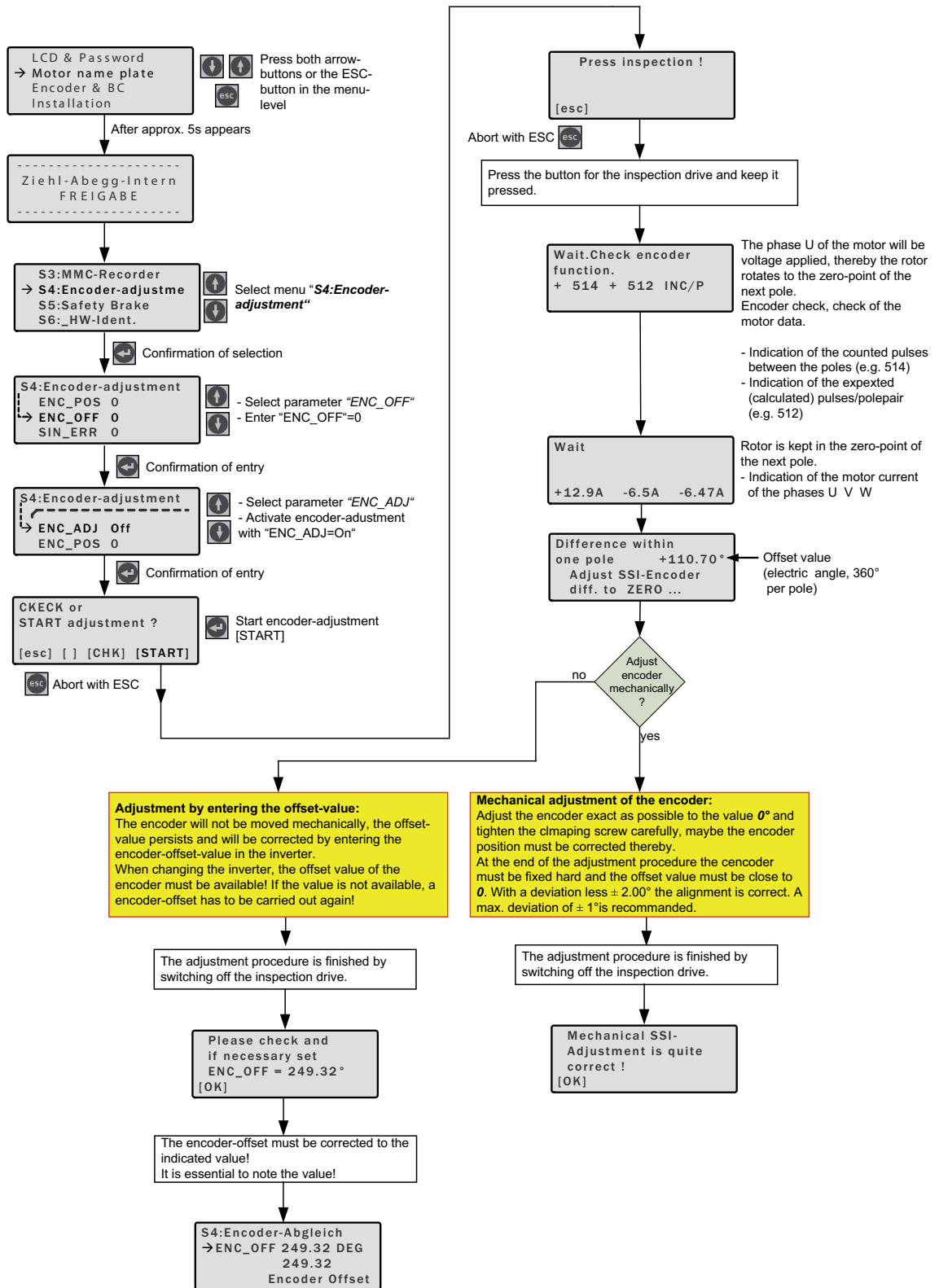
14.2.1 SSI-encoder offset alignment

When aligning the SSI encoder, the frequency inverter supplies the motor with direct current. During this, the rotor jumps to the middle of the nearest magnetic poles. In this rotor position, the absolute rotary encoder must be manually aligned to its zero point. To ease installation, it is recommended to connect the encoder to the frequency inverter before installation and to align the offset value "0" (value in "**S4:Encoder-adjust. / ENC_POS**" menu). After that, mount the encoder into position - shifting as little as possible – into the position in which the terminal screw is easily accessible.

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

Pole pair	ZETATOP-motor 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

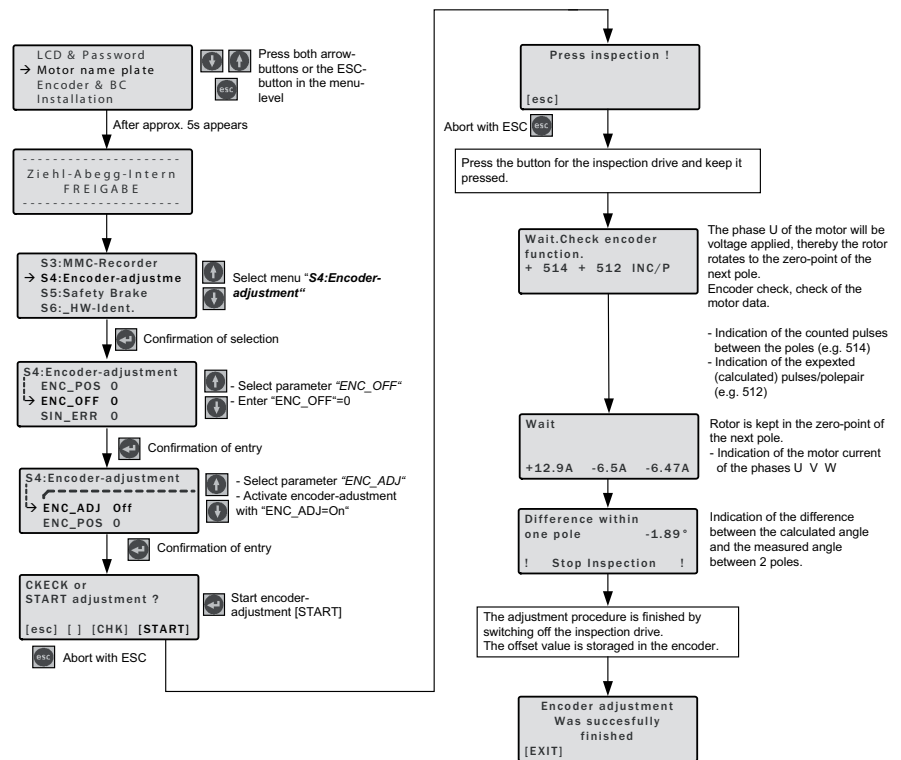
Carrying out the SSI encoder offset alignment



14.2.2 EnDat-encoder offset alignment

When aligning the EnDat encoder, the frequency inverter supplies the motor with direct current. During this, the rotor jumps to the middle of the nearest poles. In this rotor position, the offset value is stored in the encoder, which sets the encoder to the "0" position.

Carrying out the EnDat-encoder offset alignment



14.2.3 Checking the offset of the SSI- & EnDat-encoders

When checking the encoder offset, the frequency inverter supplies each individual pole in the motor with direct current. The offset is determined on each pole and the average offset is calculated from that. This offset can be stored in the frequency inverter.

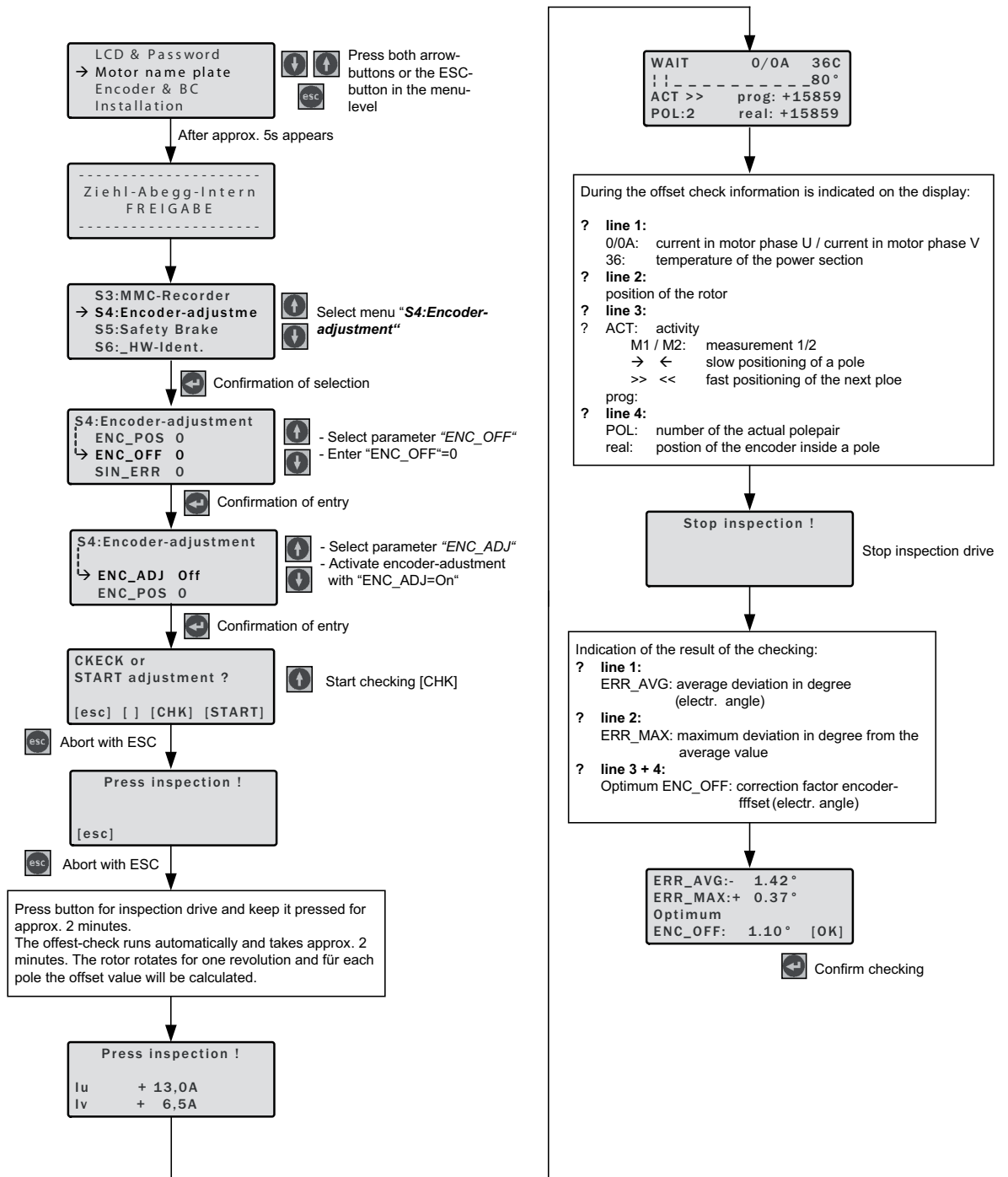


The offset determined during the inspection is not stored in the frequency inverter because if the inverter is replaced, the new inverter will not have the identical encoder offset. You must carry out a new encoder offset alignment or enter the old encoder offset.



During the encoder-offset alignment, the traction sheave must turn in the right-hand direction (when looking at the traction sheave). After completing the alignment, the traction sheave must be in the same position as when the procedure was started.

Carrying out the checking of the encoder offset



14.2.4 Error messages during encoder offset alignment

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 < 200mA Iv, Iw < 100mA
06	No encoder impulses	no encoder pulses Encoder defective or motor brake is closed
07	Wrong dir. Check UVW	Wrong direction motor phases are mixed up

Error-No.	Error text	Error cause
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 encoder offset alignment started
40	CO1 does not turn on	Contactormonitor 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
60	Adj. cannot be stored	Encoder error, absolute value cannot be written into the encoder memory
61	Adj. did not store	Encoder error, absolute value not saved in encoder

14.3 Safety Brake

Function to release the car from the safety gear.

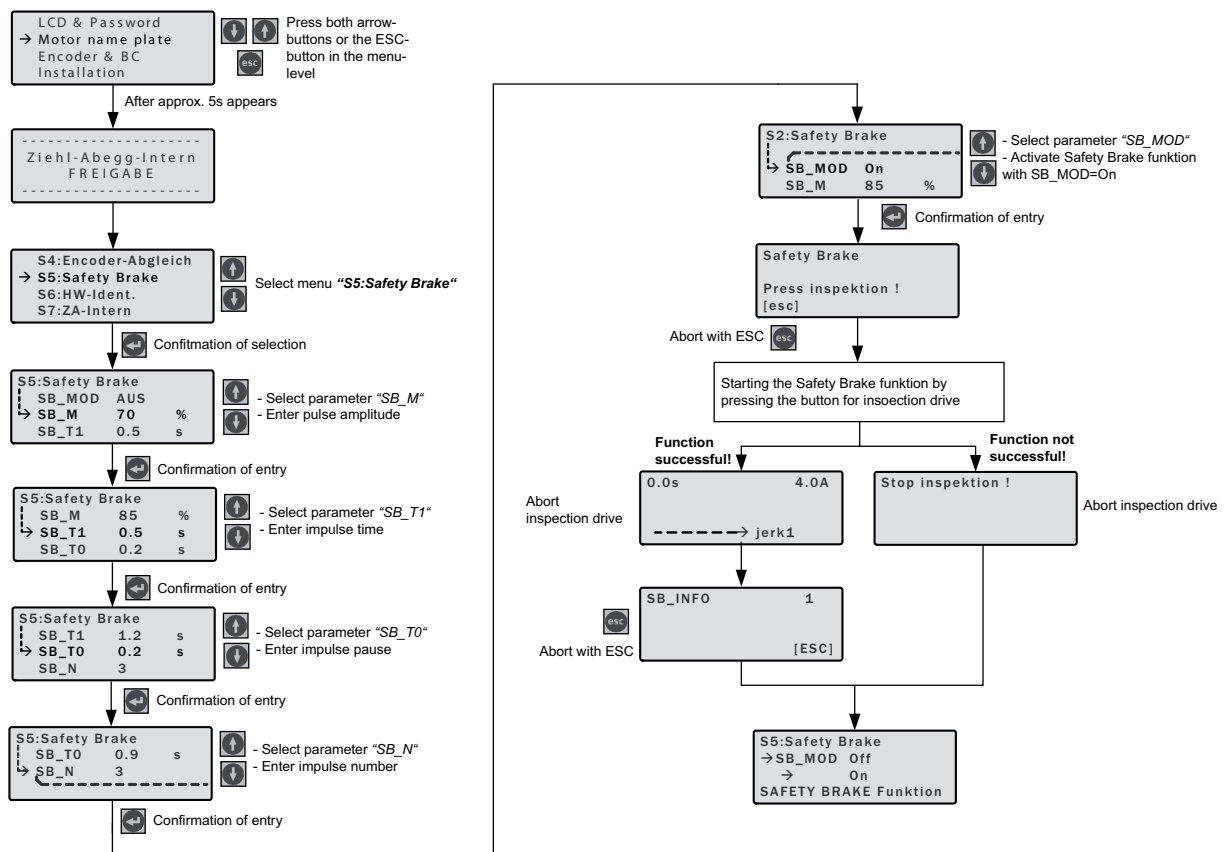
In this function, the motor builds up its maximum torque dependent on the configured values for the pulse sequence, thus attempting to pull the car from the arrester.

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

CAUTION!

Do not repeatedly carry out the safety brake function because that can destroy the frequency inverter.

Carrying out the safety brake-function



14.4 Factory setting

Allocating the parameters of the frequency inverter with a factory setting.

Reset-functions:

Reset-No.	Effect
90	deleting of: <ul style="list-style-type: none"> • Parameter • Error list • Error messages
99	deleting of: <ul style="list-style-type: none"> • Parameter • Error list • Error messages • Encoder-Offset "ENC_OFF" (will be set to 0)

CAUTION!

S

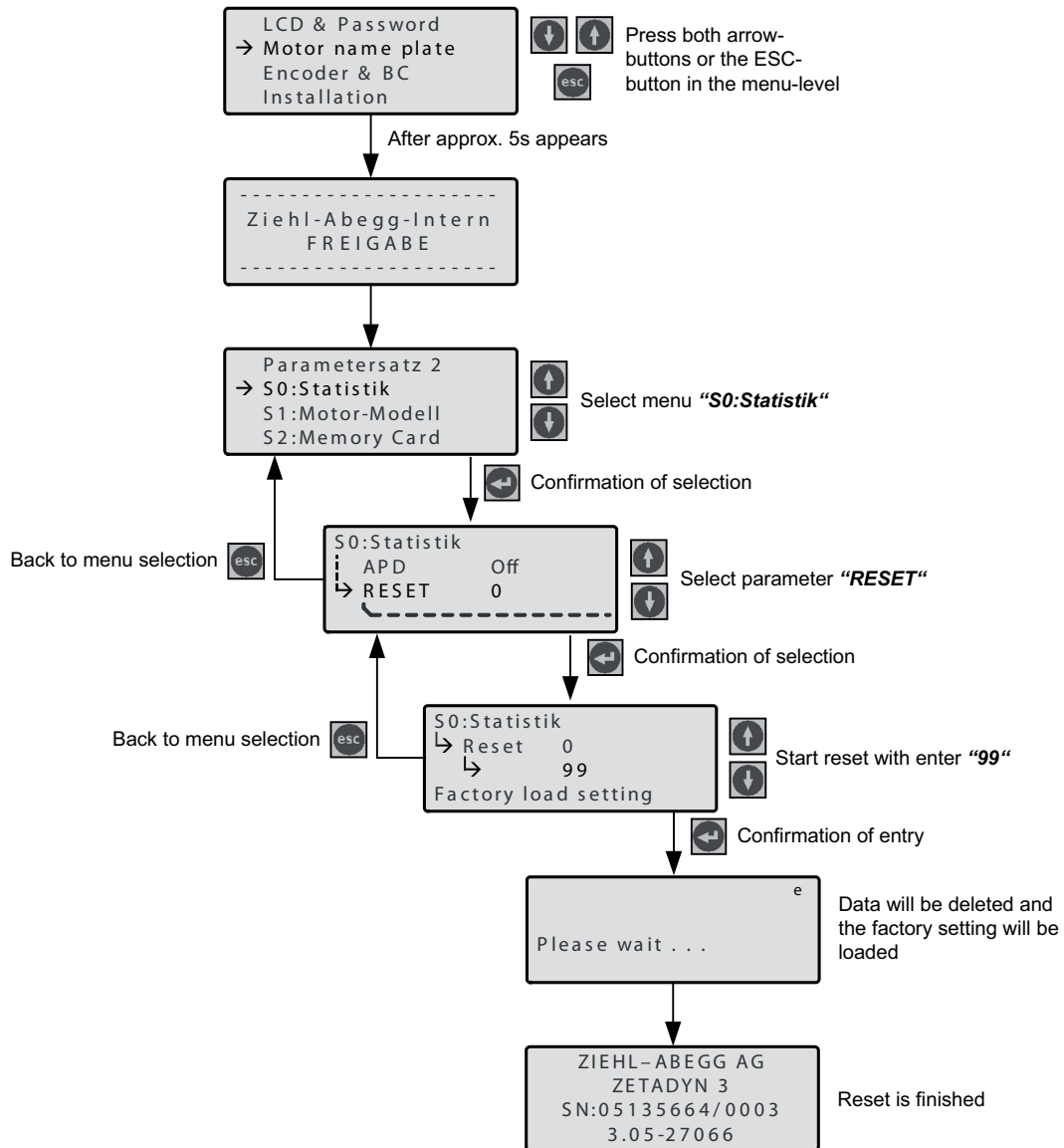
In synchronous motors, the parameters for the encoder offset (ENC_OFF) are set to 0 during a reset. If a value was entered beforehand for ENC_OFF, after performing a reset either an encoder-offset alignment must be carried out or the old values for ENC_OFF must be entered!

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

CAUTION!

Any pre-configuration carried out in the Ziehl-Abegg factory is lost when the reset is carried out. **The parameters are assigned the factory settings. These do not correspond to the pre-configuration!**

Loading the factory settings:



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).

14.5 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 S2:Memory Card / Function SAV_PAR" chapters)
- Loading parameters (see "Parameter list / Menu S2:Memory Card / Function LOD_PAR" chapters)
- Storing parameter lists, error lists and parameters with allocation of the frequency inverter serial number (see "Parameter list / Menu S2: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 S3:MMC recorder" chapter)

14.6 Software - Update

If a software update becomes necessary, you can carry it out using a memory card.

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



For software updates, the memory card must have free memory amounting to at least 1MB!

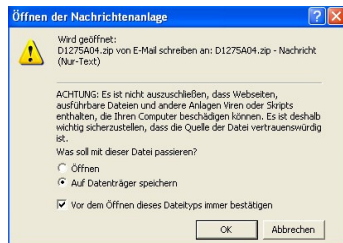


Attention!

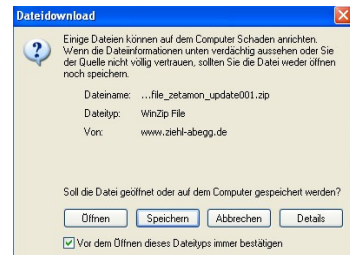
Carry out a supervised inspection trip after completing the update!

14.6.1 Loading the update on a memory card

(1) Save the update as a ZIP file from Internet download or email to the local data medium.

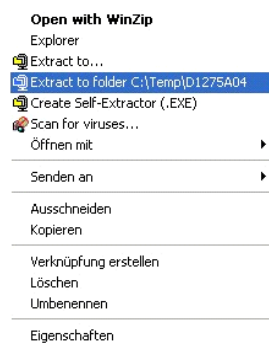


Saving email update



Saving the download update

(2) Extracting the ZIP file to a local data medium

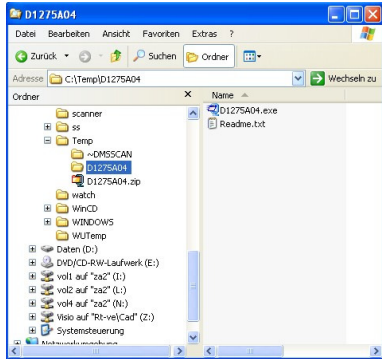


Extracting the ZIP file

The directory created on the local data medium contains two files:

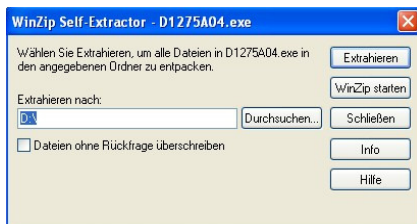
- "Readme.txt": Contains information about the procedure to update a ZETADYN3
- "D1275A04.exe": Contains the software update itself. The file name is assigned depending on the software version.

(3) Start the exe file.



Directory content

(4) Select the card reader drive and press "Extract".



Select drive and extract

(5) If the extraction was successful, a file structure is stored on the memory card. Confirm with "OK"



"Extraction successful" message

(6) The memory card can now be used for to update.

14.6.2 Updating with the ZETAPAD operating terminal

1. Insert the memory card with the software update into the "X-MMC" card slot (see Fig.).
2. Configure the parameters in the "S2:Memory Card / UPDATE=27" menu.
3. The update starts (duration max. 300s).
4. Following another automatic reset, the frequency is once more ready for operation.

14.6.3 Updating without the ZETAPAD operating terminal

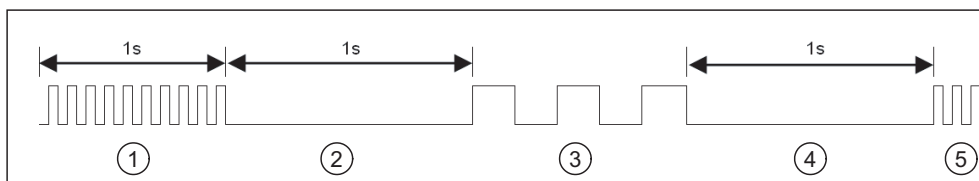
1. Switch off the master switch and wait until the controller unit is voltage free.
2. Insert the memory card with the software update into the "X-MMC" card slot (see Fig.).
3. Switch on the master switch. The inverter starts again.
4. After the LED "OP1" illuminates for the first time, remove the memory card and then reinsert it. You must complete this procedure within 5s (watch for fast "OP1" flash code).
5. The update starts (duration max. 300s).
6. Following another automatic reset, the frequency is once more ready for operation.



X-MMC card slot position

14.6.4 Error flash code during a software update

If an error occurs during the software update, a flash code is issued by LED OP1 for the corresponding error message.



- 1 Quickly flashing (10 pulses/s)
- 2 Break (1s)
- 3 Slowly flashing (Number of pulses corresponds to the error message in the table below)
- 4 Break (1s)
- 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 with 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 programming voltage does not switch on
8,19	Internal programming 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)
18	Error while checking the written files in the program memory (flash data error)
23	Memory card was removed too early

14.7 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. Therefore the current in the phases U/V/W will be measured before the brakes are opening.

Due to this monitoring function the starting procedure will be extended by 300ms. By using the factory setting "Single" and having correct monitoring result only the first travel after switching-on the inverter will be extended.

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 "**S9:ZA-Intern/UVW_CHK**". The factory setting is "Single".

Parameter	Description
Single	Motor phases will be checked with the first travel after switching-on the inverter. With a successful control no more further examination is made. If the examination is incorrect, with each start an examination is made until a correct examination could be accomplished.
Cont	Motor phases will be checked with each travel
Off	Checking of the motor phases is deactivated

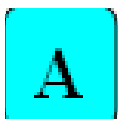
The testing voltage can be selected in the menu "**S9:ZA-Intern/UVW_PEK**" and. The factory setting is "f(P)".

Parameter	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.

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 correctly, maybe the testing voltage is too small. The testing voltage has to be increased manually.

14.8 Field weakening



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

If the required motor speed n^* for an asynchronous motor is higher than the rated speed of the motor, the ZETADYN 3 switches automatically to operation with field weakening (parameter S1:Motor-Model/F_WEAK=Const.).

In operation with field weakening the magnetizing current I_0 is reduced over the complete speed range of the motor. The $\cos \phi$ of the motor data will be increased. Thereby the required speed will be reached.

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

14.9 Open-Loop-operation

Operation of asynchronous motors without encoder.



Restrictions with 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 comfort than with Closed-Loop-operation
- maximum travel speed: 1,0 m/s

14.9.1 Commissioning with Open-Loop-operation

The commissioning with Open-Loop-operation ist described in the menu "Commissioning"

14.9.2 Parameter for Open-Loop-operation

For the Open-Loop-operation additional parameters to improve the travel performance are available in the menu "Controller".

The parameters are only visible with "Controller/C_MOD=U/f"

If it is necessary to change parameters, the parameter "Controller/UF_ED=On" must be entered.

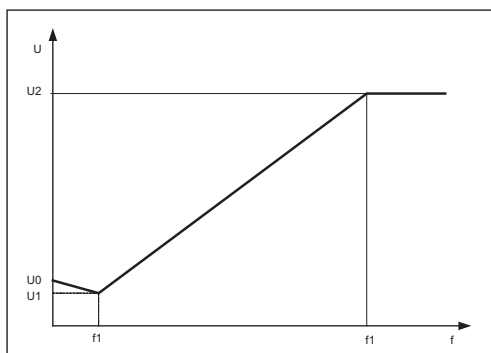
Parameter	Description	Value range	Factory setting
C_MOD Controller Mode	Selection of the operation mode of the frequency inverter FOC : Operation with encoder (Closed-Loop) U/f : Betrieb ohne Drehgeber (Open-Loop)	FOC U/f	FOC
UF_ED U/f-Edit-mode	Enabling the additional parameters with Open-Loop-operation (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 ... 90A	autom. preconfiguration
U0	Voltage at speed 0 of the frequency 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 U/f: Slip-Compensation	Operation with slip-compensation On : Slip-compensation is activated Off : Slip-compensation is deactivated	On Off	Off
s_LIM U/f: Limitation slip	Maximum slip-frequency-compensation		autom. preconfiguration
U_S_MX	Maximum output voltage for the slip compensation	0 ... 300 V	80
I_lxR x	Current controller, sets the minimum current with which 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 IxR_REG: gain	P-contribution of the controller for the current	0 ... 10 V/A	autom. preconfiguration

Parameter	Description	Value range	Factory setting
IxR_TI IxR_REG: reset time	I-contribution of the controller for the current	5 ... 1000 ms	20 ms
IxR_KC IxR_REG: correction factor	Correction factor of the controller for the current	0 ... 127	0.2
IxR_KD IxR_REG: D-part	D-contribution of the controller for the current	0 ... 3.0	0.0
IxR_MX IxR_REG: Max. pos. output	Maximum limitation of the controller	0 ... 100 %	20
IxR_MN IxR_REG: Min. neg. output	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

14.9.3 Functions with Open-Loop-operation

14.9.3.1 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

14.9.3.2 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:

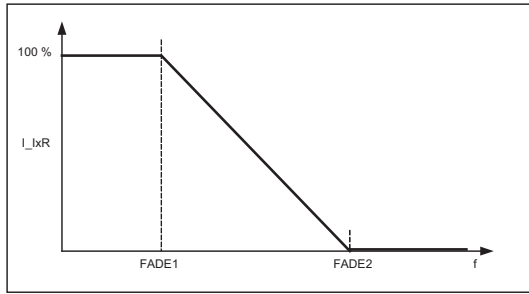
If the frequency of the rotating field in the stator is less than FADE1 the motor will be energised with 100% of I_{IxR}.

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

14.9.3.3 Slip-compensation

With asynchronous motors the slip (difference between synchronous speed and asynchronous speed) is proportional to the load of the motor and therefore proportional 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".

```

Controller
↳ s_COMP  On
    ↳      on
U/f: Slip-Comp.
    
```

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 to the output voltage of the U/f-characteristic curve

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

```

Controller
↳ s_LIM  5      Hz
    ↳      5
U/f: Limitation slip
    
```

Frequency: parameter "s_LIM"

```

Controll
↳ U_S_MX  80      V
    ↳      80
U/f: Max. voltage of
    
```

Voltage: parameter "U_S_MX"

The slip-compensation depends on the parameter FADE1 and FADE2:

f < FADE1:

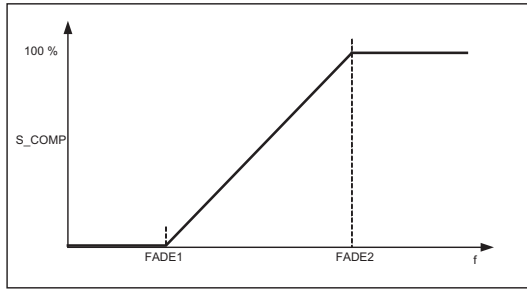
If the frequency of the rotating field in the stator is less than FADE1 the slip-compensation is switched off.

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.



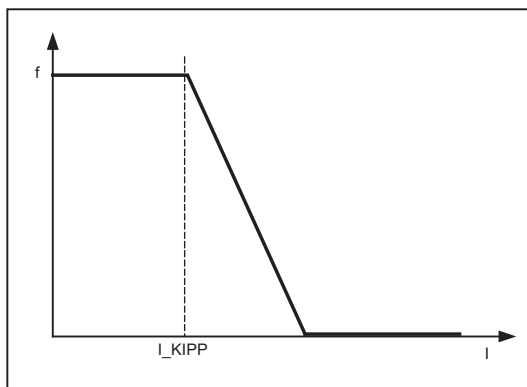
Fader-function with slip-compensation

14.9.3.4 Tilting protection

Avoids an uncontrolled tilting of the speed.

Functionality:

The motor current is recorded by a filter (parameter "s_FIL"). If the 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

14.9.4 Improvements with Open-Loop-operation



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".

14.9.4.1 Optimizing start up behavior

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

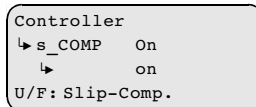
```

Controller
↳ I_IxR  15      A
  ↳      18
    
```

14.9.4.2 Slip-compensation

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

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



15 Software ZETAMON

15.1 Functions of the ZETAMON-Software

- Entering parameters
- Data back-up
- Measuring operating curves and control signals
- Evaluating trip diagrams, data sets and error lists

15.2 Design

The software consists of five program modules:

- ZETAMON3_Display
- ZETAMON3_PARA
- ZETAMON3_REC
- ZETAMON3_Oszi
- ZETAMON3_ZETAPADConfigurator

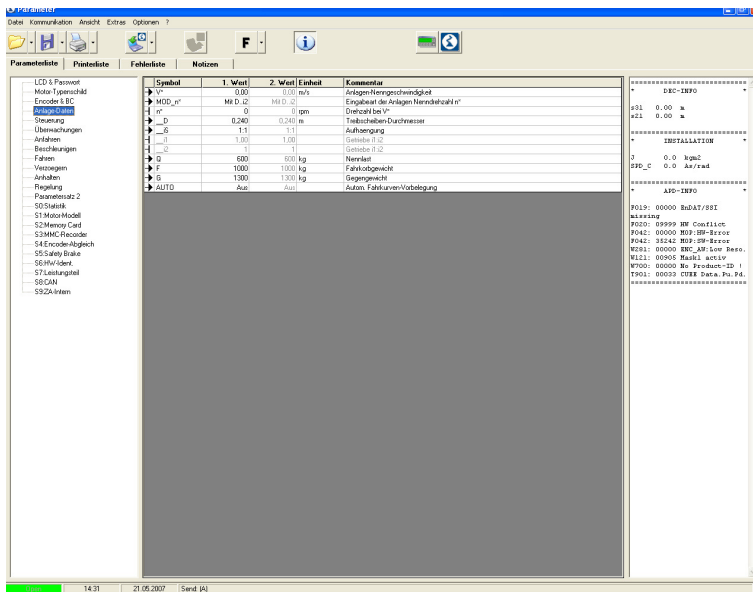
15.2.1 Program-module ZETAMON3_Display

Emulates the display and the operating key functions in the ZETAPAD operating terminal. That enables remote control of the frequency inverter from a PC or Notebook.



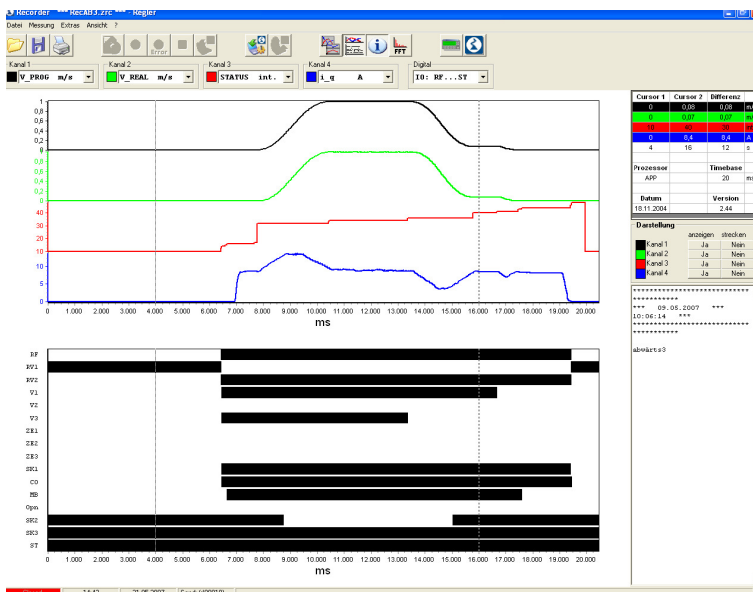
15.2.2 Program-module ZETAMON3_Para

Error lists and data from the frequency inverter can be evaluated, saved and printed out. The module is additionally suitable for backing up parameters and for configuring the controller.



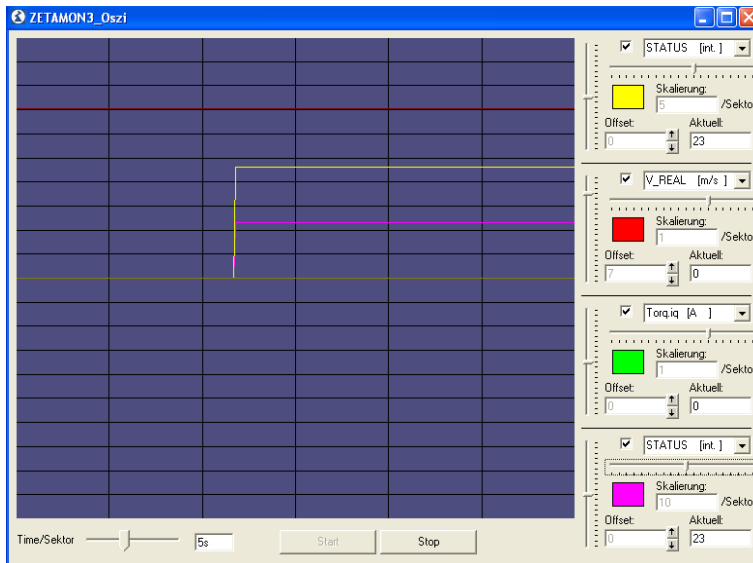
15.2.3 Program-module ZETAMON3_Rec

You can use this module to record operating curves as well as digital inputs and outputs for diagnostic purposes.



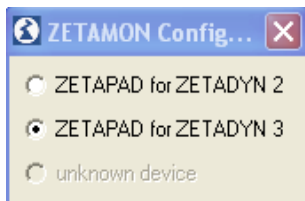
15.2.4 Program-module ZETAMON3_Oszi

Use this module to download and display individual measurement channels in real time (function is similar to a 4-channel oscilloscope).



15.2.5 Program-module ZETAMON3_ZETAPADConfigurator

With this module the ZETAPAD can be configured for operation with ZETADYN 2 or ZETADYN 3.



15.3 Connecting the ZETAMON transmission cable

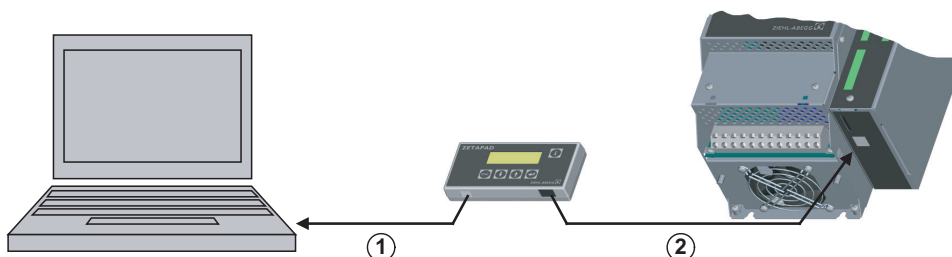


The ZETAPAD must not be connected to the PC/notebook before the software is installed. If the ZETAPAD is connected before the installation of the software, the operating software tries to assign a driver. As there is no driver existing, any driver from the operating software will be assigned. Thereby it is not possible to assign the later installed driver.

Connect the transmission line to the ZETAPAD operating terminal. You will find an isolated USB interface compatible with USB 2.0 and 1.1.

Connection cable

Standard USB 2.0 cable (not included in scope of delivery)
 A-plug to B-plug
 maximum line length: 2 m



- 1 USB-cable
- 2 CAT5 network cable

15.4 System requirements

Operating system:	Windows 2000, Windows XP
PC:	min. 500 MHz / 182 MB RAM
Graphics card:	800x600 / min 256 colors
Interface:	USB 1.1 / 2.0

16 Enclosure

16.1 Technical data ZETADYN 3BF

16.1.1 ZETADYN 3BF011 - 034

	ZETADYN				
	3BF011	3BF013	3BF017	3BF023	3BF034
Electrical data					
Mains connection voltage [V]	3~ 180 ... 440 absolute				
Mains frequency [Hz]	50 / 60 (±1,5 Hz)				
Typ. motor output [kW]	4.6	5,5	7.5	11	15
Duty cycle at rated current and clock frequency 8kHz [%]	35	60			
Rated current for 35/60 % ED and clock frequency 8 kHz fix* [A]	11	13	17	23	34
Rated current for 35/60 % ED and clock frequency 12 kHz fix* [A]	9	11	15	20	29
Rated current for 35/60 % ED and clock frequency 16 kHz fix* [A]	8	10	13	17	25
Max. operating current (for max. 3s) [A]	20	24	31	42	61
Power losses during standstill (Fan 0%) [W]	24			27	
Power losses during standstill (Fan 100%) [W]	30			39	
Clock frequency [Hz]	4 ... 16				
Terminal cross-section mains / motor [mm ²]	6.0			6.0	16,0
Min. cable cross-section Brems-Chopper / Brems-Widerstand [mm ²]	-	2,5	2,5	2,5	6.0
Ambient conditions					
Protection class	IP20				
Ambient conditions operation [°C]	0 ... 55 from 40°C power reduction of 1.66% / 1K temperature increase				
Relative humidity [%]	90 / condensation prohibited				
Installation height [m above sea]	up to 2000 above 1000m power reduction of 1.0% / 100m				
Storage and shipping temperature [°C]	-20 ... +60				
Physical data					
Weight [kg]	7,2			10,8	
Dimensions H x W x D [mm]	340 x 195 x 185			340 x 245 x 185	

* With a variable clock frequency (menu "S7:power section/M_PWM=Auto) a power reduction does not take place.

16.1.2 ZETADYN 3BF046 - 074

	ZETADYN			
	3BF046	3BF062	3BF074	
Electrical data				
Mains connection voltage	[V]	3~ 180 ... 440 absolute		
Mains frequency	[Hz]	50 / 60 ($\pm 1,5$ Hz)		
Typ. motor output	[kW]	22,0	30,0	37,0
Duty cycle at rated current and clock frequency 8kHz	[%]	60		
Rated current for 60 % duty ratio and clock frequency 8 kHz fix	[A]	46	62	74
Rated current for 60 % duty ratio and clock frequency 12 kHz fix*	[A]	39	53	63
Rated current for 60 % duty ratio and clock frequency 16 kHz fix*	[A]	35	46	55
Max. operating current (for max. 3s)	[A]	83	112	134
Power losses during standstill (Fan 0%)	[W]	32		
Power losses during standstill (Fan 100%)	[W]	47		
Clock frequency	[Hz]	4 ... 16		
Terminal cross-section mains / motor	[mm ²]	35 inflexible 25 flexible with cable end sleeve		
Min. cable cross-section Brems-Chopper / Brems-Widerstand	[mm ²]	6.0		
Ambient conditions				
Protection class		IP20		
Ambient conditions operation	[°C]	0 ... 55 from 40°C power reduction of 1.66% / 1K temperature increase		
Relative humidity	[%]	90 / condensation prohibited		
Installation height	[m above sea]	up to 2000 above 1000m power reduction of 1.0% / 100m		
Storage and shipping temperature	[°C]	-20 ... +60		
Physical data				
Clamping torque	[Nm]	25 mm ² =2,5 / 35 mm ² =4,5		
Weight	[kg]	23,8	24,6	24,6
Dimensions H x W x D	[mm]	500 x 360 x 190		

* With a variable clock frequency (menu "S7:power section/M_PWM=Auto) a power reduction does not take place.

16.2 Adjustment card

"Motor name plate" menu

MOT_TYP	
n	
f	
l	
P	
cos phi	
TYP	

"Encoder & BC" menu

ENC_TYP	
ENC_INC	
BC_TYPE	

"Installation" menu

V*	
MOD_n*	
__D	
__iS	
__i1	
__i2	
Q	
F	
G	

"Control system" menu

CONFIG	
MO_DR	
f_I01	
f_I02	
f_I03	
f_I04	
f_I05	
f_I06	
f_I07	
f_I08	
f_O1	
f_O2	
f_O3	
f_O4	
V_G1	
V_G2	
V_G3	

"Monitoring" menu

MOD_ST	
CO	
BR	
P1P2	
T_ENC	
T_CO	
T_BR	
S_MB	
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	

"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	

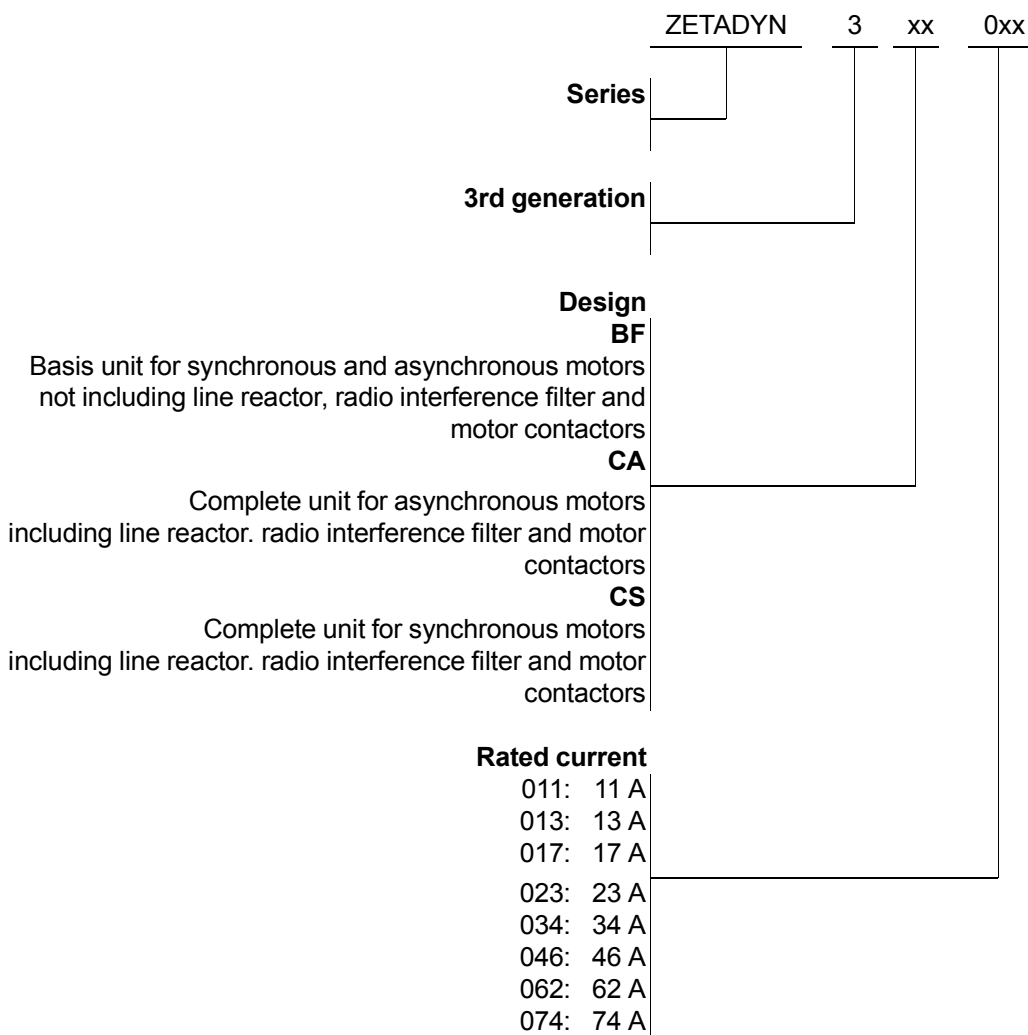
"Stop" menu

T_4	
T_5	
T_5b	
T_6	

"Controller" menu

SPD_KP	
SPD_TI	

16.3 Type designation




16.4 Article numbers

Inverter	Article-No.
ZETADYN 3BF011	352170
ZETADYN 3BF013	352171
ZETADYN 3BF017	352172
ZETADYN 3BF023	352173
ZETADYN 3BF034	352174
ZETADYN 3BF046	352175
ZETADYN 3BF062	352176
ZETADYN 3BF074	352177

16.5 Hotline

If you need support during commissioning or trouble shooting, we would be glad to help.

HOTLINE	
	Fon +49 (0) 7940 16-308
	Fax +49 (0) 7940 16-249
	email hotline.ra@ziehl-abegg.de

16.6 Declaration of conformity

A-KON06_01 / 20.06.2007



EG-Konformitätserklärung

Declaration of Conformity

im Sinne der EG-Richtlinie 89/336/EWG EMV-Richtlinie
as defined by the EC EMV directive 89/336/EEC

Produkte/products:

Regelgeräte für Aufzugsantriebe/VVVF drives for elevator machines

ZETADYN 2CF, ZETADYN 2SY, ZETADYN 3BF, ZETADYN 3C

Bedienteil/Terminal

ZETAPAD

Bremschopper und Widerstände/Brake Chopper and resistors

BC, BR

Netzfilter und Drossel/Line reactor and choke

FEF, NF, ND

sind entwickelt, konstruiert und gefertigt in Übereinstimmung mit der EG-Richtlinie 89/336/EWG, in alleiniger Verantwortung von

are developed, designed and manufactured in accordance with the EC EMV directive 89/336/EEC, on the own responsibility of

Firma	Ziehl-Abegg AG
Company	Heinz-Ziehl-Straße D-74653 Künzelsau Germany

Folgende harmonisierte Normen sind angewandt:

The following harmonized standards are in use

- | | |
|---------|---|
| EN12015 | Elektromagnetische Verträglichkeit – Produktfamilienorm für Aufzüge – Störaussendung unter Berücksichtigung der Fachgrundnorm EN50081
<i>Electromagnetic compatibility – Product family standard for lifts – Emission, under consideration of generic standard EN50081</i> |
| EN12016 | Elektromagnetische Verträglichkeit – Produktfamilienorm für Aufzüge – Störfestigkeit unter Berücksichtigung der Fachgrundnorm EN50082
<i>Electromagnetic compatibility – Product family standard for lifts – Immunity, under consideration of generic standard EN50082</i> |

Eine technische Dokumentation ist vollständig vorhanden.

The complete technical documentation is available.

Produktverwendung:

Diese Produkte sind im Sinne der EMV-Richtlinie nicht selbständig betreibbare Geräte. Die Einhaltung der Richtlinie kann nur bescheinigt werden, wenn die Einbauanweisungen der Betriebsanleitung eingehalten werden. Die Geräte sind nur für den Einsatz durch Fachkräfte geeignet.

Product use:

These products are not to be operated as independent units. The compliance with the directive can only be granted if installed according to the manual. The units are considered only for professional use.

Künzelsau, den 20.06.2007

Ziehl-Abegg AG

ppa.


Ralf Arnold

Leitung Geschäftsbereich Antriebstechnik / Director Drive Division

16.7 Index

A		Disposal	12	Masc-Funktion	118
Acceleration menu	80	Distance-dependent deceleration	100	Mechanical installation	
Activating the DCP interface	69	due diligence	8	Brake-Chopper / Brake-Resistor	35
Allocation of Brake-Chopper / Brake-Resistor	42	E		Mechanical installation line reactor-radio interference filter	43
Allocation of the line reactor-radio interference filter to the frequency inverter	46	EMC-compatible installation	15	Memory card	136
Application	10	Emergency evacuation by opening the brakes	115	Menu and parameter navigation	49
Arch travel	101	Encoder	12	Menu navigation	48
Artificial encoder	30	Encoder & BC menu	72	Minimum clearances Typ BC / BR	39
Automatic parameter check	127	Encoder connection asynchronous motors	27	Minimum distances ZETA-DYN 3BF	14
Automatic parameter diagnostics	128	Encoder connection synchronous motors	28	MMC-Recorder	86
B		Encoder offset-alignment	129	Monitoring	57
Block function	118	Encoder resolution	72	Monitoring menu	77
brake activation	33	Encoder type	53, 72	Monitoring the motor contactors	31
Brake release monitoring	32, 58	EnDat-encoder offset alignment	132	Motor connection	20
Brake-Chopper	35, 54	Error list	84, 117	Motor contactors	20, 31
Brake-Chopper connection	41	Evacuation through UPS with minimum power	110	Motor data	53
Brake-Resistor	35, 54	Evacuation through UPS with optimum power	110	Motor name plate menu	71
Brake-Resistor connection	41	Evacuation with 1-phase mains supply 230V AC	108	Motor temperature monitoring (X-MT)	22
Brakes	32	Evacuation with UPS	110	N	
C		Exclusion of liability	7	Normal stop	100
centrifugal masses	11	External 24V power supply	30	Normal travel	98
Changing the motor direction	60	F		Number of mains interruptions	84
Clock frequency	128	Factory setting	135	Number of trips	84
Commissioning	9, 51	Functional description	10	O	
Configuration	16	H		Open-Loop-operation	141
Connection suggestion	34	Hardware identification	89	Operating conditions	127
contactor monitoring	31, 57	Hotline	151	Operating hours	84
Control system menu	74	I		operating language	70
Control transformer	19	INFO menu	92	Operating terminal ZETA-PAD	47
Controller menu	83	Installation	54	operating-curves default	56
Controller Mode	141	Installation menu	73	operation and configuration	48
Copyright	8	L		Operation in idle	107
Crawl path optimization	104	Language	70	Optimizing start up behavior	63
Cut-off points	59	LCD & Password menu	70	Optimizing stopping	67
D		Light emitting diodes	116	Optimizing the acceleration	62
DCP interface	26	Line reactor-radio interference filter	18, 42	Optimizing the step alignment	105
DCP protocols	67	Line-reactor-radio interference filter NF connection	46	P	
DCP-leveling behavior	70	M		Parameter	70
DCP-mode	67	Mains connection	17	Parameter set 2 menu	83
Deceleration menu	81	maintenance	12	Password	70
Delete error memory	117			Pictographs	8
Digital inputs	23			Preconfigured inverter	51
Digital outputs	25				
Dimensions BC	37				
Dimensions BR	38				
Dimensions line reactor-radio interference filter NF	45				
Dimensions ZETADYN 3BF	13				
Dimensions ZETAPAD	47				
Direct leveling	106				

Protective ground connection	17	ZETAPAD ZETAPAD connection	47 47
R			
Readjustment	106		
Readout the error memory	116		
Recorder	86		
recycling	12		
Reset	135		
Residual current operated device (RCD)	19		
S			
S0:Statistic menu	84		
S1:Motor model menu	85		
S2:Memory Card menu	85		
S3:MMC-Recorder CARD menu	86		
S4:Encoder adjustment menu	87		
S5:Safety Brake menu	88		
S6:HW-Ident. menu	89		
S7:Power section menu	89		
S8:CAN	90		
S9: ZA-Intern	91		
Safety Brake	134		
Safety instructions	8		
Service	12		
SSI-encoder offset alignment	130		
Start menu	79		
Start-up	63, 99		
Stop	67		
Stop menu	82		
Storage	12		
Symbols description	7		
T			
Technical data BC / BR	35		
Technical data line reactor and radio interference filter	42		
Technical data ZETADYN 3BF	148		
Temperature monitoring	58		
Time-dependent deceleration	102		
Transport	12		
Travel abort	115		
travel aborts	84		
travel direction	60		
Travel menu	80		
Traveling speed	56		
Type designation	151		
U			
Update	137		
Z			
ZETAMON-Software	145		

HOTLINE 	Tel. +49 (0) 7940 16-308 Fax +49 (0) 7940 16-249 email hotline.ra@ziehl-abegg.de
---	---

Ziehl-Abegg AG
Heinz-Ziehl-Straße · D-74653 Künzelsau · Germany
Tel. +49 (0) 7940 16-0 · Fax +49 (0) 7940 16-677
info@ziehl-abegg.de · www.ziehl-abegg.de