LIFT TECHNOLOGY

GB **Instruction Manual** **COMBIVERT F5-Lift**

Version 2.2

Mat.No.	Rev.
00F5LEB-K220	1D

KEB

Table of Contents

1. Introduction

1.1 Preface

We welcome you as a customer of the Karl E. Brinkmann GmbH and congratulate you to the aquisition of this product. You have chosen a product on highest technical standard.
This manual as well as the specified hardware and software are developments of the Karl E. Brinkmann GmbH. Errors and ommissions excepted! The Karl E. Brinkmann GmbH have prepared the documentation, hardware and software to the best of their knowledge, however, no guarantee is given that the specifications will provide the efficiency aimed at by the user. The Karl E. Brinkmann GmbH reserves the right to change the specifications without prior notification or further obligation. All rights reserved. The safety and warning instructions specified in this manual do not lay claim on completeness.

The pictograms used in this manual mean:

Danger
Warning
Caution

Attention
observe at all costs

Information
Help
Tip

1.2 Product description

This instruction manual describes the frequency inverter series KEB COMBIVERT F5 for lift drives. This series convinces through the special adaption of the operation to the requirements of lift drives. The lift functions are available only in connection with the lift operator (part number 00.F5.060-200C software version 2.2).

The power range of KEB COMBIVERT F5 for lift drives ranges from
- 2.2…45 kW / 230 V class
- 2.2…630 kW / 400 V class

The designs are available in following variants:
- heat sink for control cabinet installation (standard)
- heat sink for control cabinet cutout (through-mount version)
- without heat sink for customer-specific cooling systems (Flat-Rear)

1.3 Safety and Operating Instructions

Safety and Operating Instructions for drive converters
(in conformity with the Low-Voltage Directive 2006/95/EG)

1. General
In operation, drive converters, depending on their degree of protection, may have live, uninsulated, and possibly also moving or rotating parts, as well as hot surfaces.
In case of inadmissible removal of the required covers, of improper use, wrong installation or maloperation, there is the danger of serious personal injury and damage to property.
For further information, see documentation.
All operations serving transport, installation and commissioning as well as maintenance are to be carried out by **skilled technical personnel** (Observe IEC 364 or CENELEC HD 384 or DIN VDE 0100 and IEC 664 or DIN/VDE 0110 and national accident prevention rules!).
For the purposes of these basic safety instructions, „skilled technical personnel“ means persons who are familiar with the installation, mounting, commissioning and operation of the product and have the qualifications needed for the performance of their functions.

2. Intended use
Drive converters are components designed for inclusion in electrical installations or machinery.
In case of installation in machinery, commissioning of the drive converter (i.e. the starting of normal operation) is prohibited until the machinery has been proved to conform to the provisions of the directive 2006/42/EC (Machinery Safety Directive - MSD). Account is to be taken of EN 60204.
Commissioning (i.e. the starting of normal operation) is admissible only where conformity with the EMC directive (2004/108/EC) has been established.
The drive converters meet the requirements of the Low-Voltage directive 2006/95/EC. They are subject to the harmonized standards of the series EN 50178/VDE 0160.
The technical data as well as information concerning the supply conditions shall be taken from the rating plate and from the documentation and shall be strictly observed.

3. Transport, storage
The instructions for transport, storage and proper use shall be complied with.
The climatic conditions shall be in conformity with EN 50178.

4 Installation
The installation and cooling of the appliances shall be in accordance with the specifications in the pertinent documentation.
The drive converters shall be protected against excessive strains. In particular, no components must be bent or isolating distances altered in the course of transportation or handling. No contact shall be made with electronic components and contacts.
Drive converters contain electrostatic sensitive components which are liable to damage through improper use. Electric components must not be mechanically damaged or destroyed (potential health risks).

5. Electrical connection
When working on live drive converters, the applicable national accident prevention rules (e.g. VBG 4) must be complied with.
The electrical installation shall be carried out in accordance with the relevant requirements (e.g. cross-sectional areas of conductors, fusing, PE connection). For further information, see documentation. (Instruction manual part 1)
Instructions for the installation in accordance with EMC requirements, like screening, earthing, location of filters and wiring, are contained in the drive converter documentation. They must always be complied with, also for drive converters bearing a CE marking. Observance of the limit values required by EMC law is the responsibility of the manufacturer of the installation or machine.
A high frequency filter and a THD filter are additionally required in order to meet the european lift standard EN12015.

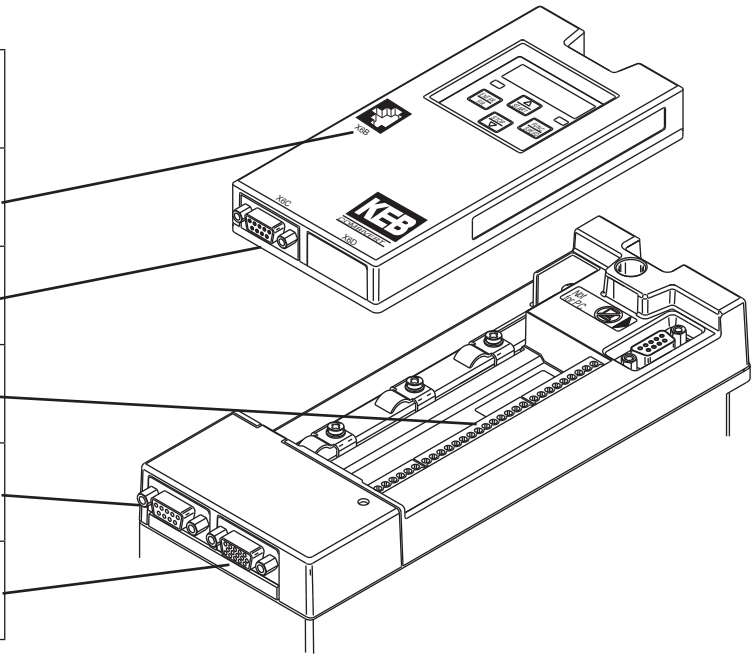
6. Operation
Installations which include drive converters shall be equipped with additional control and protective devices in accordance with the relevant applicable safety requirements, e.g. act respecting technical equipment, accident prevention rules etc.. Changes to the drive converters by means of the operating software are admissible.
After disconnection of the drive converter from the voltage supply, live appliance parts and power terminals must not be touched immediately because of possibly energized capacitors. In this respect, the corresponding signs and markings on the drive converter must be respected.
During operation, all covers and doors shall be kept closed.

7. Maintenance and servicing
The manufacturer’s documentation shall be followed.
KEEP SAFETY INSTRUCTIONS IN A SAFE PLACE!

2. Overview of Control Connections

2.1 Housing sizes D…E

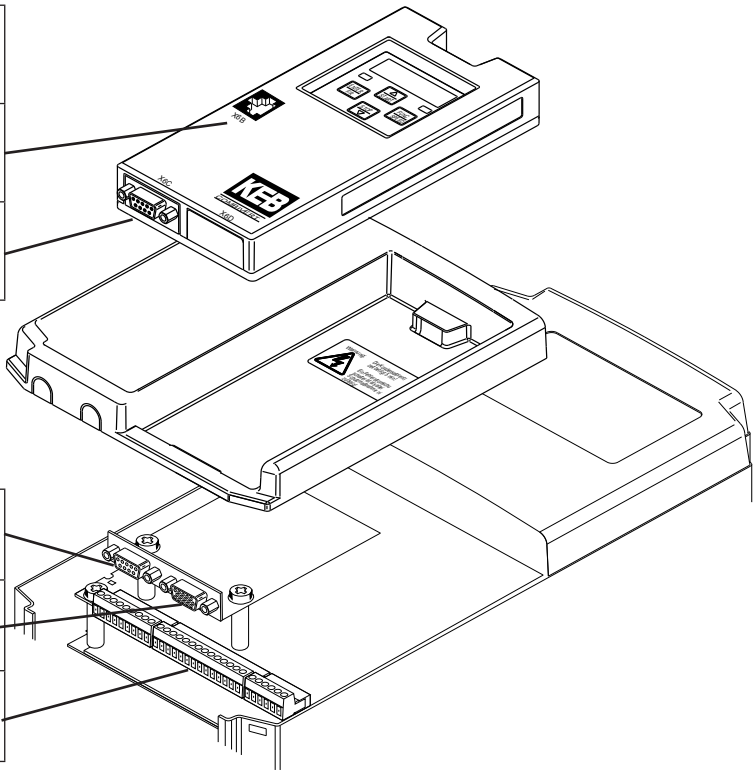
Lift operator (00.F5.060-200C)	
HSP5 interface	X6B
RS232/485 interface	X6D
Control terminal strip	X2A
Lift shaft encoding	X3B
Motor encoder	X3A



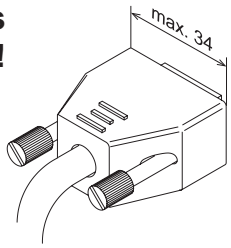
2.2 Housing size G…U

Lift operator (00.F5.060-200C)	
HSP5 interface	X6B
RS232/485 interface	X6D

Lift shaft encoding	X3B
Motor encoder	X3A
Control terminal strip	X2A



Observe maximum width of the connectors for X3A and X3B !

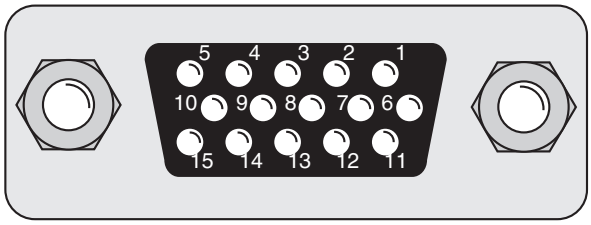


2.3 Motor encoder connection X3A

The connection of the motor encoder is done on socket X3A. Which of the encoders can be connected depends on the installed encoder interface and is displayed in LC.11.

⚠	All encoder connectors may be connected / disconnected only at switched off frequency inverter and switched off supply voltage.
⚠	The frequency inverter monitores all encoder signals. If the encoder alarm is activated and no zero track is existent, connect N- with +5V (PIN12) and N+ with COM (PIN13).
⚠	The encoder alarm can be switched off with LC.03.

X3A



2.3.1 Incremental encoder interface

PIN	Name	Description
3	A-	Differential signal to A+
4	B-	Differential signal to B+
8	A+	Incremental encoder track A
9	B+	Incremental encoder track B
11	+24 V	Voltage output 20...30 V
12	+5 V	Voltage output 5 V, power supply for the encoders
13	COM	Reference potential for voltage supply
14	N-	Difference signal to N+ **(if non-existent, assign with +5 V PIN12)**
15	N+	Zero track **(if non-existent, assign with COM PIN13)**
-	GND	Connection for shielding at connector housing . Internally directly connected with inverter earth.

2.3.2 SIN/COS encoder interface

PIN	Name	Description
1	C-	Differential signal to C+
2	D-	Differential signal to D+
3	A-	Differential signal to A+
4	B-	Differential signal to B+
6	C+	Absolute track for initial position and angular calculation
7	D+	Absolute track for initial position and angular calculation
8	A+	Incremental signals A for counter and direction detection
9	B+	Incremental signals B for counter and direction detection
12	+5,25 V	Power supply for encoder
13	COM	Reference potential for supply voltage
14	-R	Differential signal to zero track R+
15	+R	Zero track
-	GND	Connection for shielding at connector housing . Internally directly connected with inverter earth.

2.3.3 Resolver encoder interface

PIN	Name	Description
3	SIN-	Negated sinus signal
4	COS-	Negated cosine signal
5	REF-	Negated field voltage output
8	SIN+	Sinus signal
9	COS+	Cosine signal
10	REF+	Field voltage output
14	GND	Connection for shielding of signal lines
-	GND	Connection for shielding of the entire cable at the connector housing. Internally directly connected with inverter earth.

2.3.4 Hiperface encoder interface

PIN	Name	Description
3	REF_COS	Signal offset to COS
4	REF_SIN	Signal offset to SIN
8	COS+	Incremental signal COS for counter and direction detection
9	SIN+	Incremental signal SIN for counter and direction detection
10	+7,5 V	Power supply for encoder
13	COM	Reference potential for supply voltage
14	Data-	Data channel RS485
15	Data+	Data channel RS485
-	GND	Connection for shielding at connector housing . Internally directly connected with inverter earth.

2.3.5 EnDat encoder interface

PIN	Name	Description
3	A-	Signal input A- (difference signal to A+)
4	B-	Signal input B- (difference signal to B+)
6	Clock+	Clock signal RS485
7	Clock-	Clock signal RS485
8	A+	Incremental signals A for counter and direction detection
9	B+	Incremental signals B for counter and direction detection
12	+5,25 V	Power supply for encoder
13	COM	Reference potential for supply voltage
14	Data-	Data channel RS485
15	Data+	Data channel RS485
-	GND	Connection for shielding at connector housing . Internally directly connected with inverter earth.

2.3.6 UVW encoder interface

PIN	Name	Description
1	A+	Incremental signal A
2	A-	Differential signal to A+
3	B+	Incremental signal B
4	B-	Differential signal to B+
5	N+	Zero track
6	N-	Difference signal to zero track N+
7	U+	Commutation signal U
8	U-	Differential signal to U+
9	V+	Commutation signal V
10	V-	Differential signal to V+
11	W+	Commutation signal W
12	W-	Differential signal to W+
13	5 V	Voltage output 5V
14	COM	Reference potential for supply voltage
15	-	-
-	GND	Connection for shielding at connector housing . Internally directly connected with inverter earth.

2.3.7 HTL encoder interface 0...30 V with difference signals

PIN	Name	Description
3	A-	Differential signal to A+
4	B-	Differential signal to B+
8	A+	HTL incremental encoder track A
9	B+	HTL incremental encoder track B
11	+24 V	Voltage output 20...30 V
12	+5 V	Voltage output 5 V, power supply for the encoders
13	COM	Reference potential for voltage supply
14	N-	Differential signal to N+ (if nonexistent, assign with +5 V PIN12)
15	N+	HTL zero track (if non-existent, assign with 0 V PIN13)
-	GND	Connection for shielding at connector housing . Internally directly connected with inverter earth.

2.3.8 HTL encoder interface without difference signals

PIN	Name	Description
1	NO contact	Error relay NO contact
2	NC contact	Error relay NC contact
3	Switching contact	Error relay switching contact
4	HTL A+	HTL input track A+ (parallel X3A.7)
5	HTL B+	HTL input track B+ (parallel X3A.2)
6	+24 V	Voltage output 20..30 V, power supply for the encoders
7	COM	Reference potential for voltage supply
8	GND	Connection for shielding - directly connected with inverter earth.

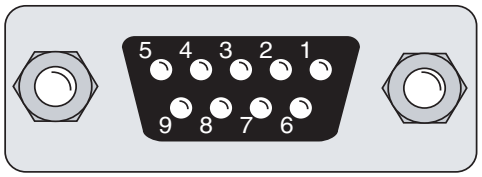
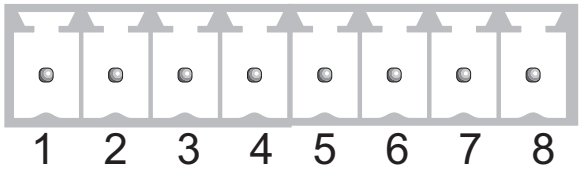
2.3.9 BISS encoder interface

PIN	Name	Description
		Information on request

2.4 Lift shaft encoder connection X3B

The connection of the lift shaft encoder is done on socket X3B. Which of the encoders can be connected depends on the installed encoder interface and is displayed in LC.21.

All encoder connectors may be connected / disconnected only at switched-off frequency inverter and switched-off supply volage.

X3B	X3B
	
Picture 1	**Picture 2**

2.4.1 Incremental encoder output /incremental encoder input

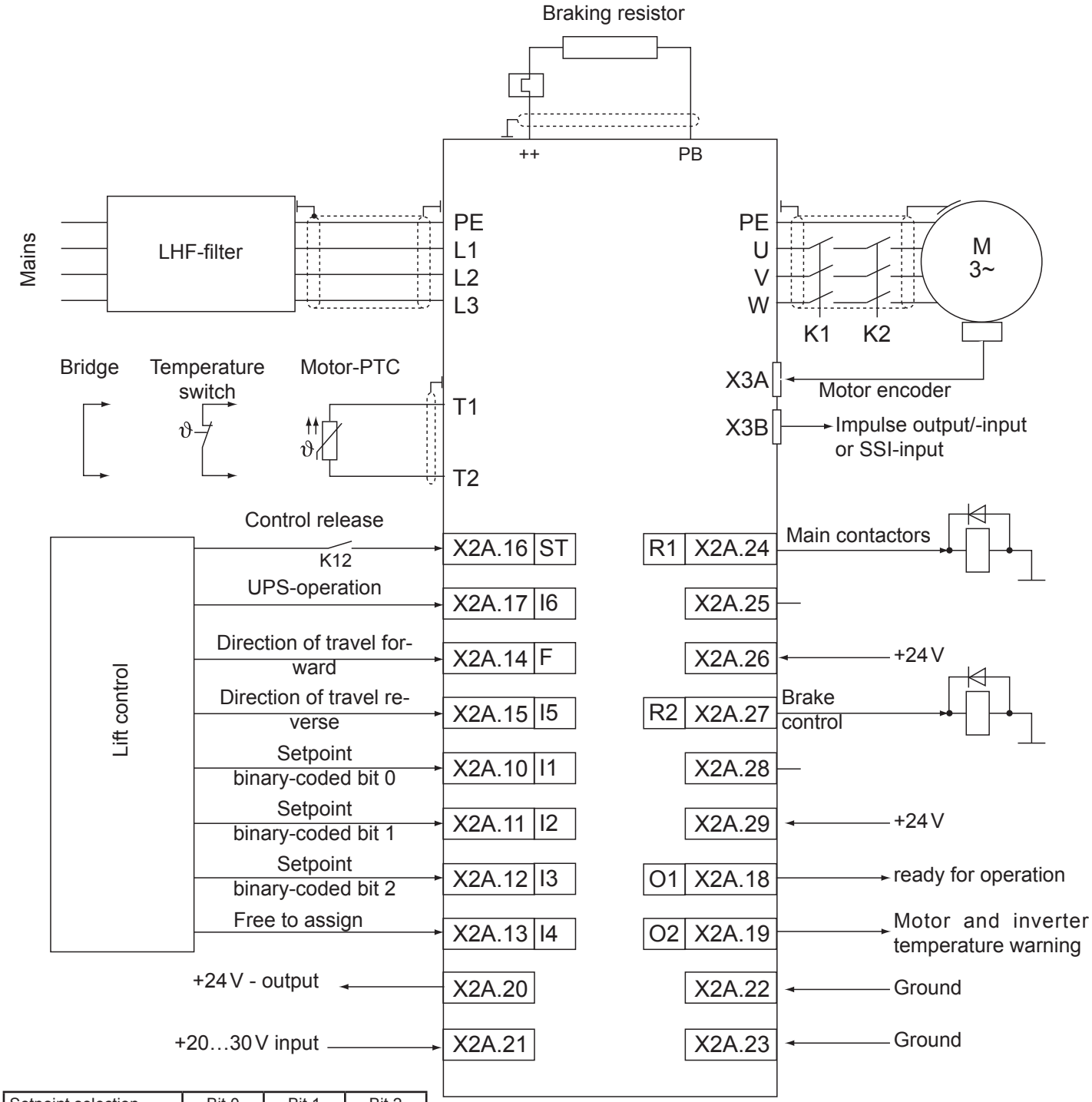
Picture1	Picture2	Name	Description
1	1	A+	Incremental encoder output /-input track A
2	3	B+	Incremental encoder output /-input track B
3	5	N+	Output / input zero track
4	7	+5 V	Voltage output 5 V, power supply for the encoders
5	-	+24 V	Voltage output 20...30 V
6	2	A-	Differential signal to A+
7	4	B-	Differential signal to B+
8	6	N-	Differential signal to zero track
9	8	COM	Reference potential for voltage supply
-	-	GND	Connection for shielding at connector housing . Internally directly connected with inverter earth.

2.4.2 SSI encoder input

Picture1	Picture2	Name	Description
1	-	CL+	Output of the clock signal
2	-	DAT+	Input data track
3	-	-	-
4	-	+5 V	Voltage output 5 V, power supply for the encoders
5	-	+24 V	Voltage output 20...30 V
6	-	CL-	Differential signal to clock output CL+
7	-	DAT-	Differential signal to data track+
8	-	-	-
9	-	COM	Reference potential for voltage supply
-	-	GND	Connection for shielding at connector housing . Internally directly connected with inverter earth.

2.5 Wiring examples / flow charts

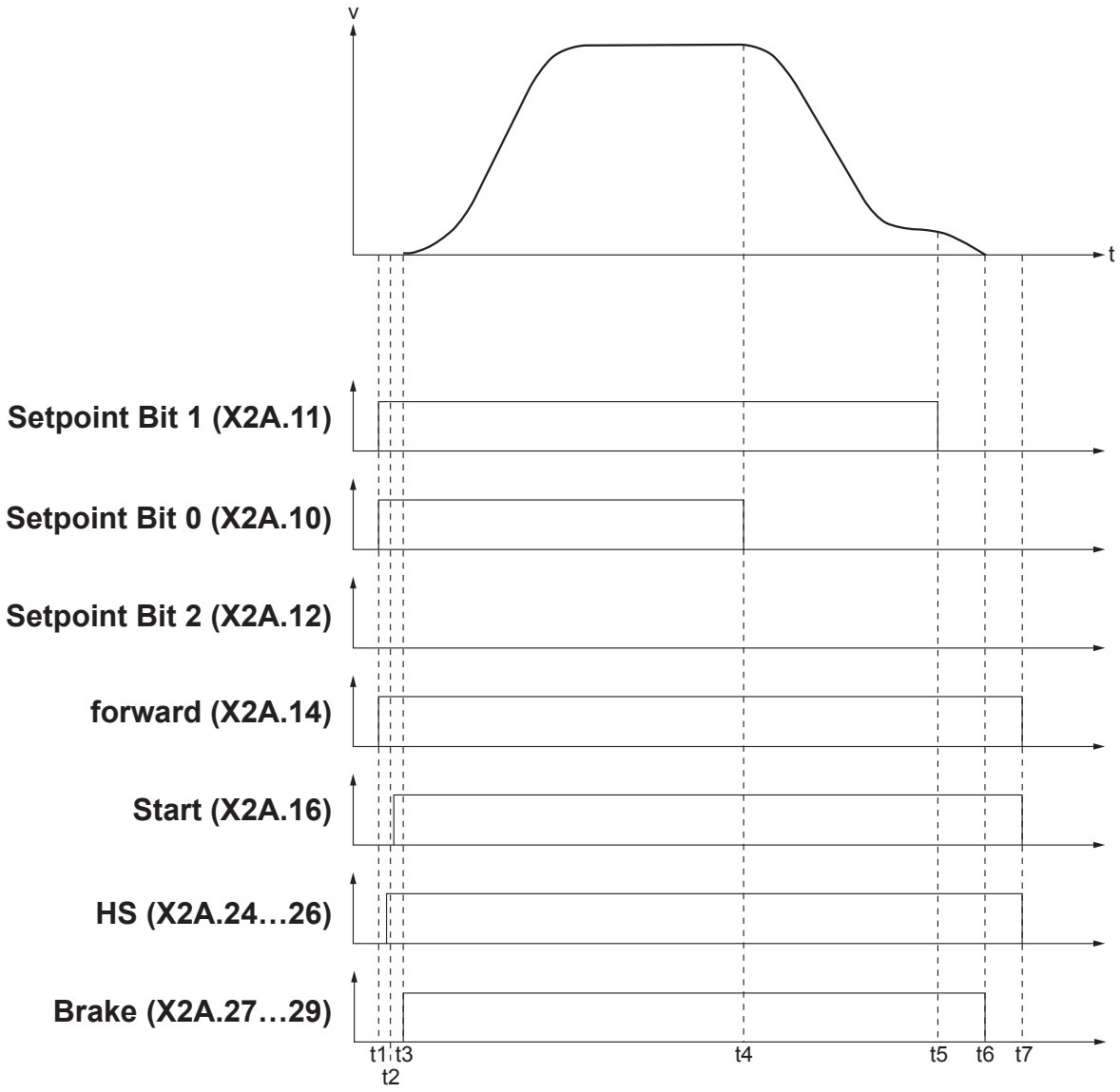
2.5.1 Connection F5-Lift for binary-coded setpoint selection (factory setting)



Setpoint selection	Bit 0 (X2A.10)	Bit 1 (X2A.11)	Bit 2 (X2A.12)
0	-	-	-
VR (LF.20)	1	-	-
VL (LF.21)	-	1	-
VN (LF.22)	1	1	-
VI (LF.23)	-	-	1
V1 (LF.24)	1	-	1
V2 (LF.25)	-	1	1
V3 (LF.26)	1	1	1

- To switch the control release a relay (K12) must be used parallel to the safety circuit.
- All 24 V-relays triggered by the inverter must be protected with diodes.

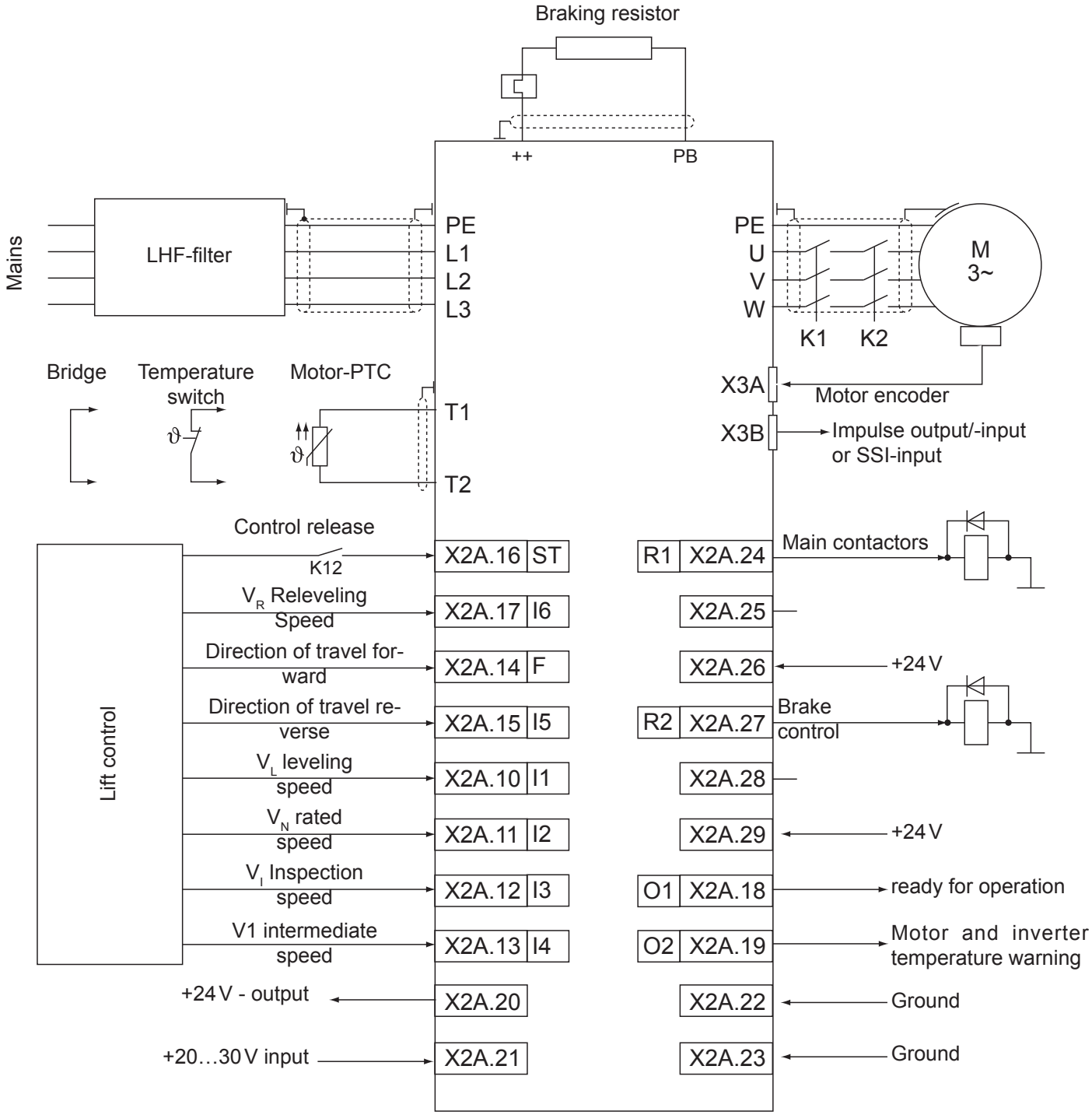
Flow chart at factory setting



t1: The bit sample for the setpoint values and the direction of travel is set. Immediately after that the inverter sets the output for the main contactors.
t2: The control release (Start) is set by a relay parallel to the main contactor control. Thereupon the output phase check is executed.
t3: Upon successful output phase check the brake output is set. Thereupon the brake opening time runs out. Then the motor starts to turn.
t4: The rated speed is reset and switched over to leveling speed.
t5: The leveling speed is reset and the stopping is initiated.
t6: On reaching the speed 0 rpm the brake output is reset. Afterwards the brake engage time runs off.
t7: The output for the main contactor is reset and thus also the control release and the direction of travel.

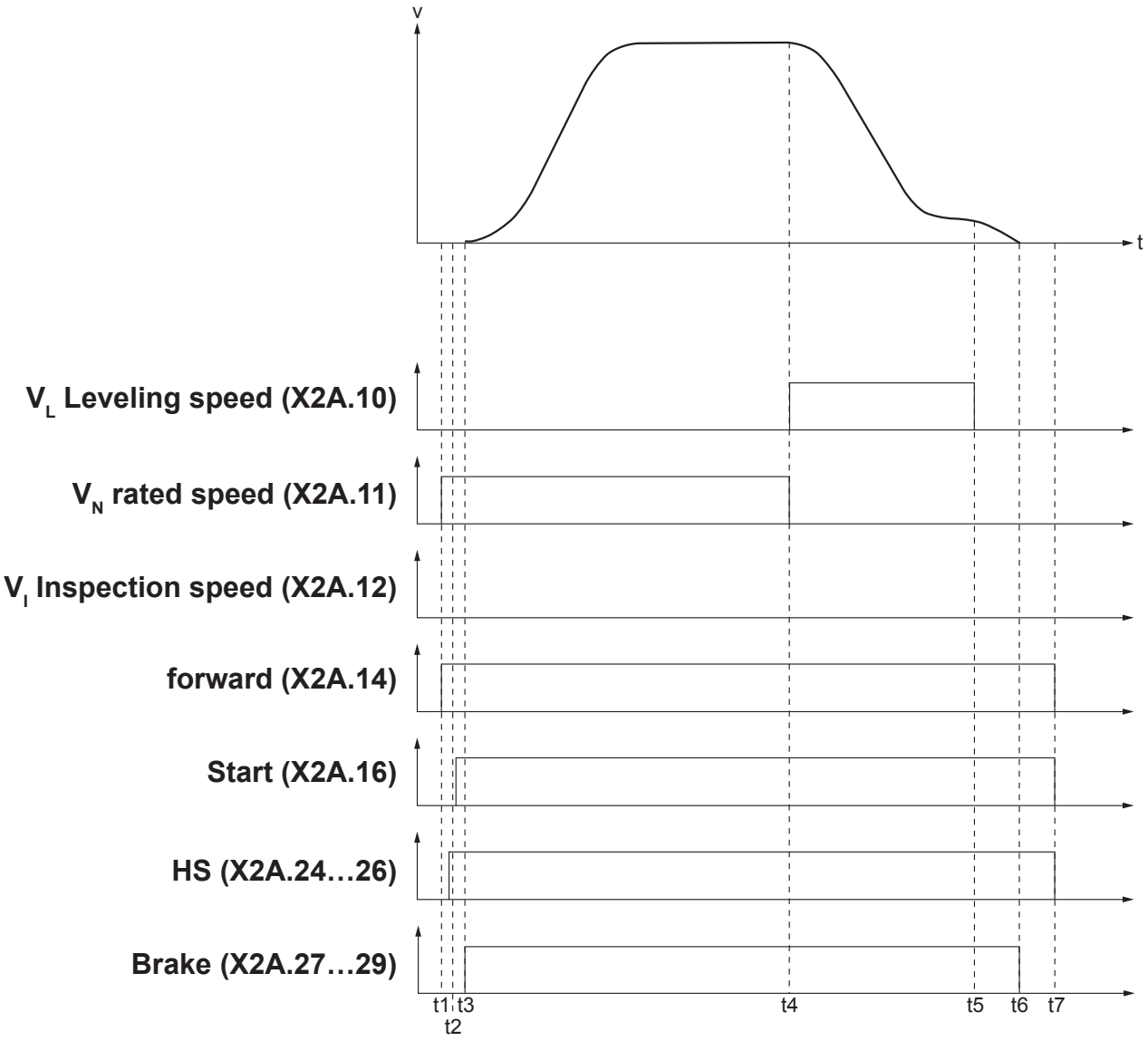
Generally the inverter switches the main contactors only in currentless condition.

2.5.2 Connection F5-Lift for input-coded setpoint selection (Lb.05=2, Lb.12=0, Lb.13=1)



- To switch the control release a relay (K12) must be used parallel to the safety circuit.
- All 24 V-relays triggered by the inverter must be protected with diodes.

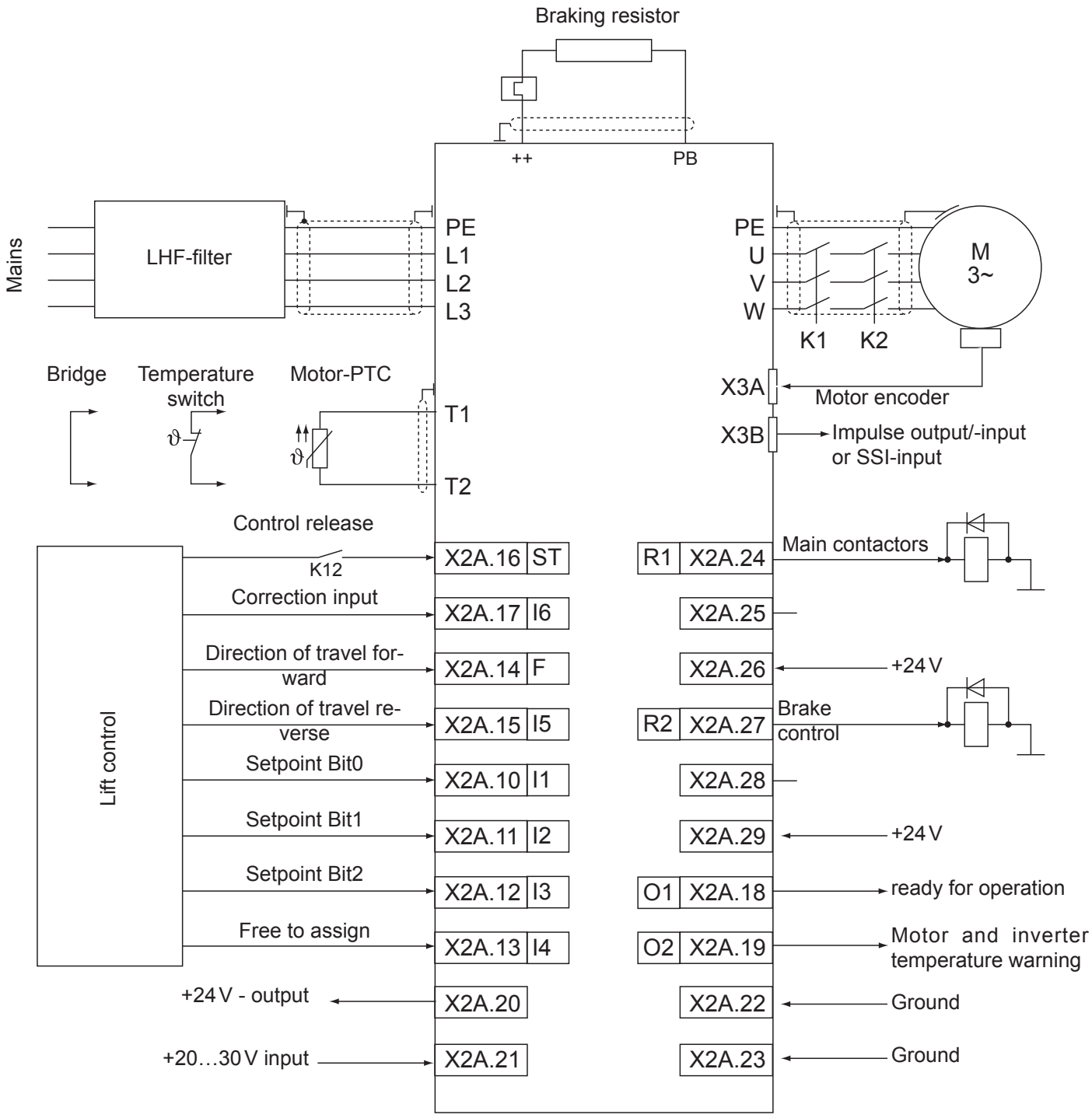
Flow chart at input coding



t1: VN rated speed and direction of travel are set. Immediately after that the inverter sets the output for the main contactors.
t2: The control release (Start) is set by a relay parallel to the main contactor control. Thereupon the output phase check is executed.
t3: Upon successful output phase check the brake output is set. Thereupon the brake opening time runs out. Then the motor starts to turn.
t4: The rated speed is reset and the leveling speed is set.
t5: The leveling speed is reset and the stopping is initiated.
t6: On reaching the speed 0 rpm the brake output is reset. Afterwards the brake engage time runs off.
t7: The output for the main contactor is reset and thus also the control release and the direction of travel.

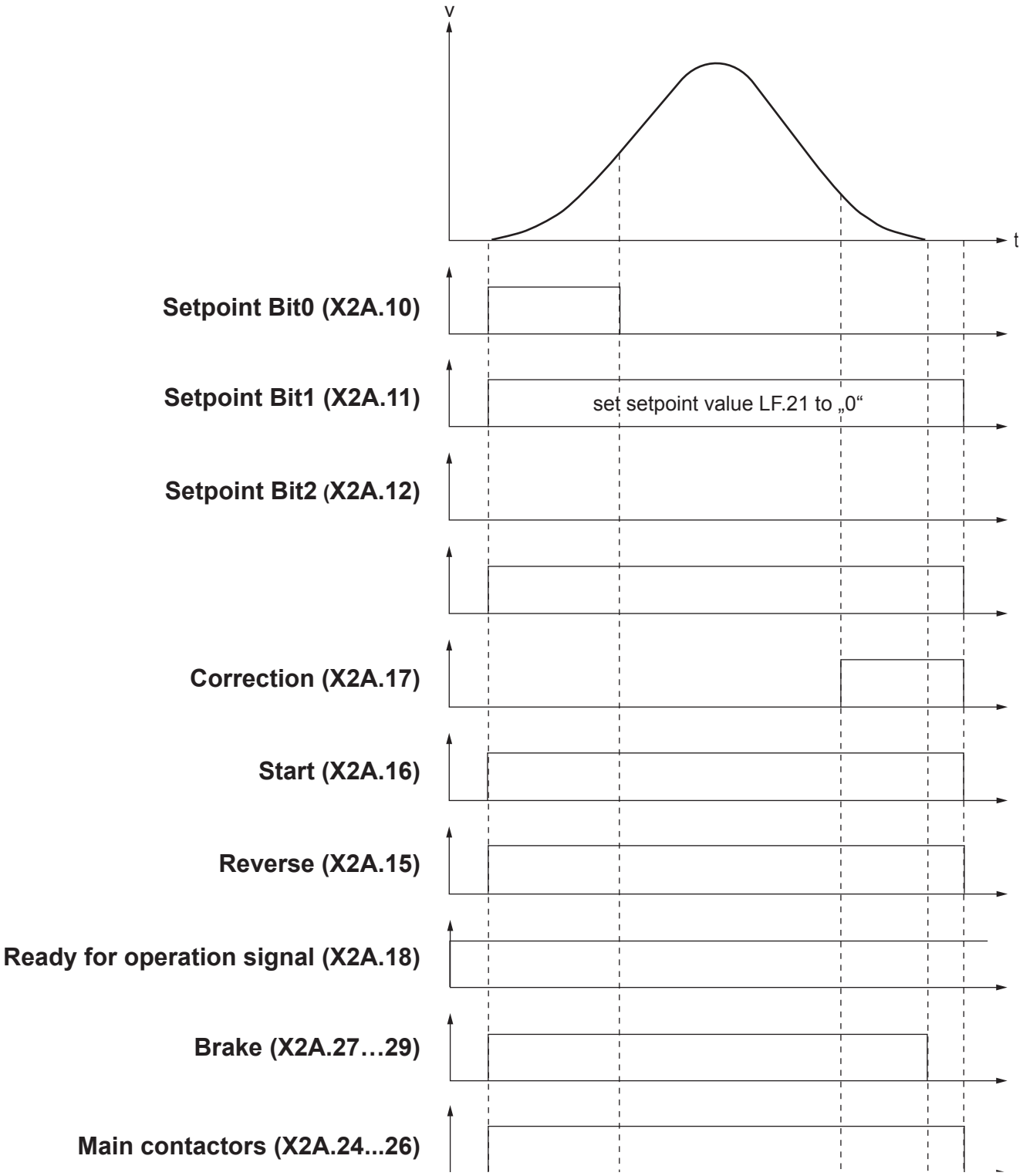
Generally the inverter switches the main contactors only in currentless condition.

2.5.3 Connection F5-Lift for ogive travel with correction input (Lb.05=1, Lb.12=9)

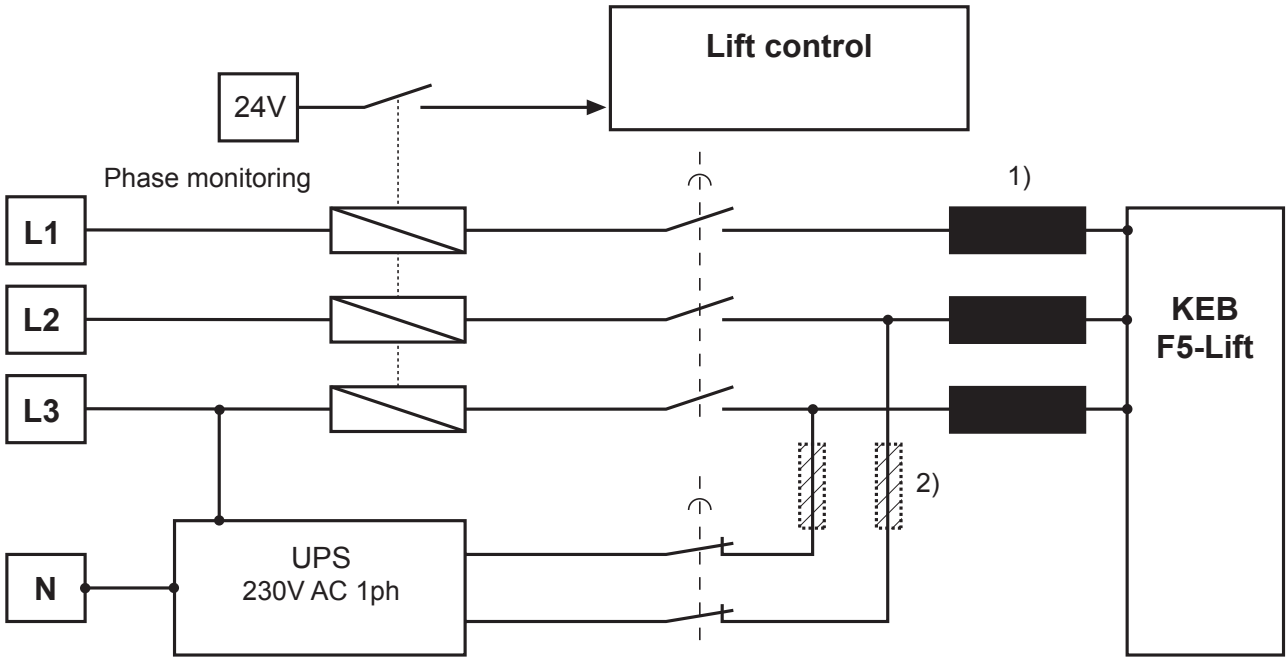


- To switch the control release a relay (K12) must be used parallel to the safety circuit.
- All 24 V-relays triggered by the inverter must be protected with diodes.

Flow chart for digital direct approach, peak arch with correction



2.5.4 Connection F5-Lift for UPS operation



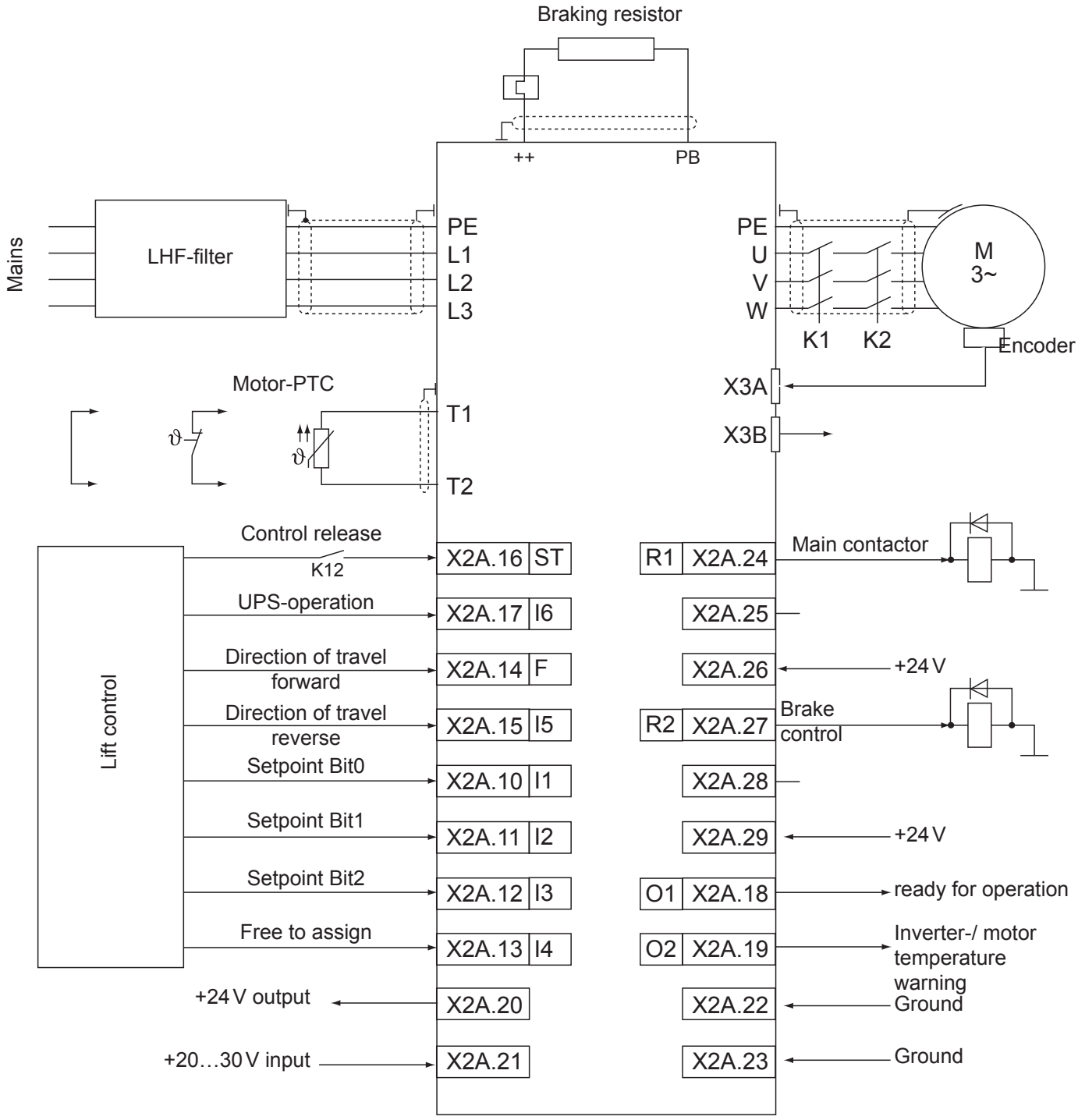
[1)] We recommend the use of chokes to avoid current peaks. Without chokes the UPS may be bigger or go to the limit.
[2)] Alternatively a single-phase transformer 230 V AC can be used at 380 V AC.

Between disconnecting the mains and connecting the UPS to the inverter a certain time must run out to avoid a short circuit. The same is necessary for switching back to the mains.

F5-A-Lift offers the possibility to select a digital input with the function „UPS-operation“. With this the undervoltage threshold will be decreased to 200 VDC.

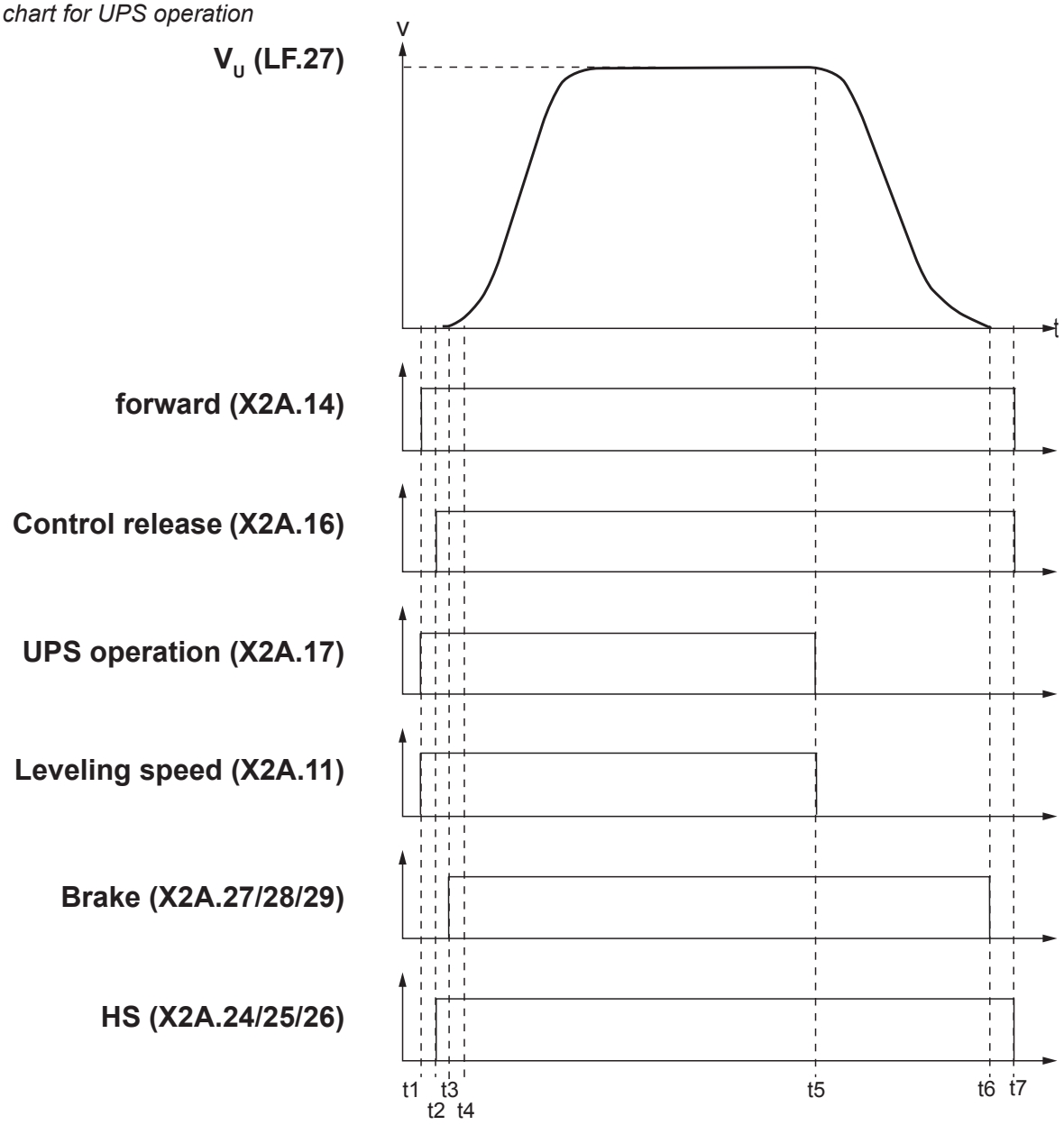
It is also possible to execute an evacuation with an undersized UPS. In that case it is possible to evacuate people to that floor where the load pulls the cabin. For this a digital output with condition „9: simple direction of rotation identification for UPS“ is programmed (see Lb.14…17).

Connection F5-Lift for UPS operation (Lb.05=1, Lb.12=5)



- To switch the control release a relay (K12) must be used parallel to the safety circuit.
- All 24 V-relays triggered by the inverter must be protected with diodes.

Flow chart for UPS operation



t1 The travel direction and the set speeds VU and VL must be set.

t2 After a debounce timer run out the main contactors are controlled (powerless switching) . Via the main contactors the control release X2A.16 is set and the inverter checks in all phases whether the current can flow to the motor.

t3 When the motor phase check succeeds the output for the the brakes will be set and the brake release time runs out.

t4 After the brake release time has run out the inverter starts turning the motor.The internal undervoltage level is reduced to 200 VDC.

t5 When the car reaches the deceleration switch the setspeed inputs must be reset.

t6 When the motor has decelerated to zero speed the brake out will be reset. Afterwards the brake closing time runs out.

t7 The main contactor output is reset after elapsed brake closing time. The control release is also switched off with the main contactors and the direction of rotation can be reset.

For undersized UPS the inverter can recognise the „easy direction“. That means the travel direction will be in that direction where the load is pulling (see also Ld.24). Therefore both direction inputs must be set together with the set speed inputs.

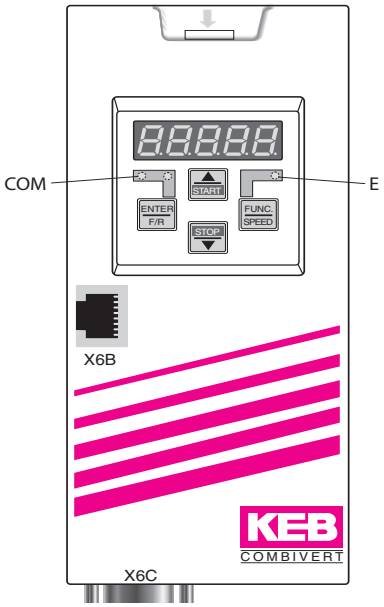
2.6 Control terminal strip X2A

- Tightening torque 0,22…0,25 Nm
- Use shielded / twisted lines
- To avoid interferences a separate shield must be provided for analog and digital control lines as well as the relay outputs
- Apply shield to one side of the inverter to the earth potential.
- The function of the inputs and outputs depends on the operating mode

PIN	Function	Name	Description	Specifications
1	+ Set value input 1	AN1+	Differential voltage input for analog setpoint setting	Input voltage: 0…±10 V DC Ri: 55 kΩ
2	- Setpoint input 1	AN1-		
3	+Pretorque	AN2+	Differential voltage input for analog torque control	
4	-Pretorque	AN2-		
5	Actual speed	AN-OUT1	Output of actual speed 0…±10 VDC ^ 0…±maximum speed	Output voltage: 0…±10 V DC Ri: 100 Ω Resolution: ±12 Bit
6	Actual torque	AN-OUT2	Output of actual torque 0…10 VDC ^ 0…maximum torque	
7	+10 V - output	CRF	Reference voltage output for setpoint potentiometer	+10 VDC +5 % max. 4 mA
8	Analog ground	COM	Ground for analog in- and output	
9	Analog ground	COM		
10	Progr. input 1	I1	Setpoint Bit 0	13…30 VDC ±0 % smoothed Ri: 2,1 kΩ scan time: 1 ms
11	Progr. input 2	I2	Setpoint Bit 1	
12	Progr. input 3	I3	Setpoint Bit 2	
13	Progr. input 4	I4	prog. mit Lb.13	
14	Input up/down	F	Input for direction of travel up/down	
15	Progr. input 5	I5	progr. with Lb.11	
16	Control release	ST	Output is enabled, error reset upon release	
17	Progr. input 6	I6	prog. with Lb.12	
18	Transistor output 1	O1	„Ready for operation“; is set if the unit is initialized and no error is present, progr. with LB.16 gesetzt	Imax: 50 mA altogether for both outputs
19	Transistor output 2	O2	progr. with Lb.17	
20	24V output	Uout	Supply voltage for digital inputs and outputs	Imax: 100 mA
21	20…30 V input	Uin	Voltage input for external supply, reference potential 0 V	
22	Digital ground	0V	Reference potential for digital inputs/outputs	
23	Digital ground	0V		
24	Relay 1 / NO contact	RLA	Relay output 1, activation of main contactors, progr. with Lb.14	max. 30 V DC 0,01…1 A
25	Relay1 / NC contact	RLB		
26	Relay1 / switching contact	RLC		
27	Relay 2 / NO contact	FLA	Relay output 2, brake control, progr. with Lb.15	
28	Relay 2 / NC contact	FLB		
29	Relay 2 / switching contact	FLC		

2.7 Lift-Operator

The F5-Lift operator is integrated into the FI housing by plug-in and fits into all KEB F5 lift units. Parallel to the bus operation over the RS232/485 interface the operation via integrated display/keyboard as well as a further interface for diagnosis/parameterizing (KEB COMBIVIS) is possible.



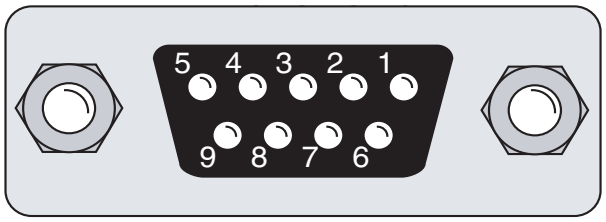
COM (green)	Interface control ON => Bus operation
E (red)	Operation / Error display
	ON => inverter ready for operation flashing => inverter in error routine off => no supply voltage
X6B	HSP5 parameterizing interface (COMBIVIS)
X6C	RS232/485 interface
	Reset operator • in case of abnormal indications which are not described in this instruction manual. • disconnect operator briefly from the inverter and reconnect again.

2.7.1 Parameterizing interface X6B

⚠ To avoid a desctruction of the PC-interface, the diagnostic interface may only be connected via a special HSP5-cable with voltage adaption to a PC!

A HSP5-cable (00.F5.0C0-0001) is connected to the adapter (00.F5.0C0-0002 via the diagnostic interface. The PC-software KEB COMBIVIS 5 now permits normal access to all inverter parameters. The internal operator parameters can also be read and adjusted or parameterized by means of download.

2.7.2 RS232/485-Interface X6C



PIN	RS485	Signal	Meaning
1	-	-	reserved
2	-	TxD	transmission signal RS232
3	-	RxD	receive signal RS232
4	A‘	RxD-A	receive signal A RS485
5	B‘	RxD-B	receive signal B RS485
6	-	VP	Voltage supply +5 V (Imax=10 mA)
7	C/C‘	DGND	data reference potential
8	A	TxD-A	transmission signal A RS485
9	B	TxD-B	transmission signal B RS485

2.7.3 The operator panel

The **function** key is used to change between parameter value and parameter number.

With **UP** (▲) and **DOWN** (▼) the parameter number or, in case of **changeable** parameters, the value is increased/ decreased. When holding the key it is automatically switched further.

Principally during a change, parameter values are immediately accepted and stored non-volatile. But at some parameters it is not sensible that the adjusted value is accepted immediately. When this type of parameter is changed, a point appears behind the last digit. The value is stored with ENTER.

If a disturbance occurs during operation, the actual display is overwritten with the error message. The alarm message in the display is reset by ENTER.

With ENTER only the error message is reset. The status display continues to display the error that occurred. In order to reset the error, the cause must be eliminated first. After that the "Reset"-input must be switched or the inverter must be disconnected from the supply.

3. Parameter Description

3.1 Overview of parameter groups

The operating menu is devided into following parameter groups:

Gruppe	Name	Function
Lb	**L**ift **b**asic	Basic setting
Ld	**L**ift **d**rive	Entry of the motor data
LC	**L**ift en**c**oder	Adjustment of motor and shaft encoder
LF	**L**ift **F**unction	Lift-specific adjustments
LP	**L**ift **P**osi	Adjustment for positioning operation and ogive run
LI	**L**ift **I**nfo	Information, running messages, measured values, error memory
LA	**L**ift **A**nalog	Adjustment of analog in- and outputs

The adjustment of the parameters must absolutely be made in ascending order, because:
- the operating menu optimizes itself by displaying only the required parameters.
- the lower parameters effect pre-settings for the following parameters.
- otherwise settings can be overwritten otherwise.

In case of doubt the factory settings should be kept.

3.2 Basic settings

Display	Name	Setting range	Default setting
Lb.00	Parameter group	BASIC	-
Lb.01	Password	10…65535	11
Lb.02	Customer-specific password	11…65535	11
Lb.03	Drive selection	0…4	AG
Lb.04	Positioning mode	0…4	1
Lb.05	Setpoint selection	1…6	1
Lb.06	Reset to factory setting	0…1	0
Lb.07	Pretorque on/off	0…1	0
Lb.08	Switching frequency	2, 4, 8, 12, 16	16
Lb.10	In-/output configuration	1…2	1
Lb.11	Input function for terminal X2A.15	0…9	1
Lb.12	Input function for terminal X2A.17	0…9	5
Lb.13	Input function for terminal X2A.13	0…9	0
Lb.14	Output function for X2A.24	0…8	1
Lb.15	Output function for X2A.27	0…8	2
Lb.16	Output function for X2A.18	0…8	3
Lb.17	Output function for X2A.19	0…8	4
Lb.18	Brake resistance value	0,5…300,0 Ω	30,0 Ω
Lb.19	Safety gear release	0...1	0

Lb.00 Display of the current parameter group „Basic“

Lb.01 Password

To protect the lift drive against unauthorized access, a password is to be entered before parameterizing. If no password has been set with Lb.02, the factory setting „11“ is valid.

Input	Function
10…65535	Input of password
10	Inhibits the programming
11	Factory setting

Display	Meaning
US_ro	User read-only, programming inhibited, parameter can be read-only
US_on	User on, programming enabled

Lb.02 Customer-specific password

With this parameter a customer-specific password can be defined. It becomes active at the next switch-on and must then be entered before the programming of LB.01.

Input	Function
11…65535	Input of password

Lb.03 Drive selection

With this parameter the main lift drive is defined.
When „Idata“ is indicated, the mode is unknown.
Remedy: Select the requested mode with „up/down“ and confirm with „Enter“.

Input	Setting	Motor	Gearbox	Notes	
AG	x	Asynchronous motor	with		When you press „ENTER“ all parameters are reset to factory setting.
AGL		Asynchronous motor	none		
SG		Synchronous motor	with		
SGL		Synchronous motor	none		

Shall be operated in open-loop mode, select LF.10 = 0.

Lb.04 Positioning mode

Input	Setting	Positioning mode
0		off, conventional lift shaft encoding
1	x	Ogive function, dependent on LP.01
2		do not adjust
3		do not adjust
4		do not adjust

Lb.05 Setpoint selection

Input	Setting	Setpoint selection	Direction of travel
1	x	binary-coded via terminal X2A.10…12	via terminal strip
2		Input-coded via terminal X2A.10…12	via terminal strip
3		Analog setpoint setting 0…10V	via terminal strip
4		Analog setpoint setting 0…±10V	sign-dependent
5		do not adjust	
6		input-coded and V_L	via terminal strip
7		binary-coded without limits	via terminal strip

Binary-coded setpoint selection (Lb.05 = 1)

Speed	Bit 0 (terminal X2A.10)	Bit 1 (terminal X2A.11)	Bit 2 (terminal X2A.12)
0	-	-	-
VR (LF.20)	1	-	-
VL (LF.21)	-	1	-
VN (LF.22)	1	1	-
VI (LF.23)	-	-	1
V1 (LF.24)	1	-	1
V2 (LF.25)	-	1	1
V3 (LF.26)	1	1	1

Input-coded setpoint selection (Lb.05 = 2)

Speed	Terminal X2A.10	Terminal X2A.11	Terminal X2A.12	Terminal X2A.13	Terminal X2A.17
0	-	-	-	-	-
VL (LF.21)	1	-	-	-	-
VN (LF.22)	-	1	-	-	-
VI (LF.23)	-	-	1	-	-
V1 (LF.24)	-	-	-	1	-
VR (LF.20)	-	-	-	-	1

Analog setpoint setting (Lb.05 = 3 or 4)

The analog setpoint setting is done over terminals X2A.1 and X2A.2. The speed is calculated according to following formula:
value „3“ 0…10 V correspond to 0…maximum lift speed (LF.01)
value „4“ 0…±10 V correspod to 0…±maximum lift speed (LF.01)

If the drive profile is generated with the setpoint value, the values LF.30…LF.36 must be set to „off“.

Input-coded setpoint selection AND V_L (Lb.05=6)

Speed	Terminal X2A.17	Terminal X2A.10	Terminal X2A.11	Terminal X2A.12	Terminal X2A.13
0	0	0	0	0	0
VL (LF.21)	0	1	0	0	0
VN (LF.22)	0	x	1	0	0
VI (LF.23)	0	x	x	1	0
V1 (LF.24)	0	x	x	x	1
VR (LF.20)	1	x	x	x	x

Symbols: 1 = Input is set at 24 V
0 = Input may not be set
x = Input setting has no effect

Lb.06 Reset to factory setting

Input	Setting	Description
0	x	-
1		Factory setting is loaded by setting „1“ and pressing 'ENTER'. After that a power-on reset must be made.

Lb.07 Pretorque

Input	Setting	Pretorque	Description
0	x	off	Is adjusted for drives with gearboxes.
1		on	Analog signal at the terminals X2A.3 and X2A.4 is used for the torque precontrol with gearless drives.

Adjustment of amplification and offset see parameters LA.12 / LA.14.

Lb.08 Switching frequency

Factory setting: 16kHz

Lb.10 In-/ Output configuration

With this parameter the programming of the digital inputs (Lb.11…13) and the digital outputs (Lb.14…17) can be enabled. The programming is generally inhibited for positioning operation (Lb.01 = 2…4).

Input	Setting	Programming	Description
1	x	inhibited	The configuration of the in- and outputs is reset to factory setting.
2		enabled	The programming of the in- and outputs with the parameters Lb.11…17 is enabled.

Lb.11 Input function for terminal X2A.15

Input	Setting	Function	Description
0	X2A.13	off	
1	X2A.15	Direction of rotation reverse	
2		Contactor control	
3		Quick stopping	
4		Control mode	
5	X2A.17	UPS operation	
6		Safety-gear release	
7		Brake switching surveillance	
8		Contactor control and brake switching surveillance	
9		Correction input	

Lb.12 Input function for terminal X2A.17

Input	Setting	Function	Description
0		VR with input-coded setpoint selection	
1		Reset	
2...9		see Lb.11	

Lb.13 Input function for terminal X2A.13

Input	Setting	Function	Description
0		off	
1		V1 with input-coded setpoint selection	
2...9		see Lb.11	

Lb.14 Output function for X2A.24…26 (relay output 1) see table Lb.17

Lb.15 Output function for X2A.27…29 (relay output 2) see table Lb.17

Lb.16 Output function for X2A.…18 (relay output 1) see table Lb.17

Lb.17 Output function for X2A.19 (transistor output 2)

Input	Setting	Function	Description
0		off	
1	X2A.24	Main contactor activation	
2	X2A.27	Brake handling with phase check	
3	X2A.18	Ready for operation and overspeed	
4	X2A.19	Motor or inverter temperature warning	
5		Activation contol cabinet fan	
6		Speed for deceleration check	
7		Speed for running open doors	
8		Speed deviation warning	
9		Easy direction of rotation UPS	

Lb.18 Brake resistance value

Value range	Setting	Description
0,5…300,0 Ω	30,0 Ω	Input of the actually used brake resistance value. With it the inverter calculates the refed energy and outputs the result in parameter LI.23. It serves as decision support on whether the employment of a feedback unit would be worth it.

Lb.19 Safety-gear release

Value range	Setting	Description
0…1	0	The next drive is executed with hard ramps if value 1 is adjusted, in order to pull the car out of the safety gear.

3.3 Input of the motor data

Display	Name	Setting range	Default setting AG
Ld.00	Parameter group	drIuE	-
Ld.01	Power rating	0,10…400,00 kW	4,0 kW
Ld.02	Rated speed	0,000…4000,000 rpm	1450,000 rpm
Ld.03	Rated current	0,0…710,0 A	1,0 A
Ld.04	Rated frequency	0,0…710,0 Hz	50,0 Hz
Ld.05	cos phi	0,50…1,00	0,5
Ld.06	Rated voltage	120…830 V	400 V
Ld.07	Winding resistance measure	0…1	0
Ld.08	Winding resistance	0,000…250,000 Ω	1,864 Ω
Ld.09	Winding inductivity	0,00…500,00 mH	-
Ld.10	Rated torque	unit-dependent	auto
Ld.11	Maximum inverter torque	unit-dependent	auto
Ld.12	Maximum torque limitation	0,01...32000,00 Nm	0,95 • Ld.11
Ld.13	Field weakening speed	0…32000 rpm	auto
Ld.14	Motor identification	0…1	-
Ld.15	DSM max. inductance	0…500 mH	auto
Ld.20	Maximum torque at UPS operation	0,01...32000,00 Nm	auto
Ld.22	- only for internal use -	-	-
Ld.23	- only for internal use -	-	-
Ld.24	Rotation change UPS	0…1	1

Presettings are specified for ‚Lb.03=0: ASM with gear (AG)‘.
If Lb.03 is adjusted unequal 0, presettings can deviate from the specified values above.

Ld.00 Display of current parameter group „drIvE“

Drive-specific data are entered in this parameter group. Depending on the adjusted drive type (Lb.03) only certain data are requerid.

Ld.01 Power rating

Value range	Setting	Description
0,10…400,00 kW	4,0 kW	Input of the motor power rating according to motor name plate. Only display at synchronousmotors.

Ld.02 Rated speed

Value range	Setting	Description
0,00…4000,00 rpm	1450 rpm	Input of the motor rated speed according to motor name plate.

Ld.03 Rated current

Value range	Setting	Description
0,0…710,0 A	-	Input of the motor rated current according to motor name plate.

Ld.04 Motor rated frequency

Value range	Setting	Description
0,0…710,0 Hz	50,0 Hz	Input of the motor rated frequency according to motor name plate. For synchronous motors frequency and speed depend on each other according to following formula. $\text{Motor speed} = \frac{\text{Frequency} \cdot 60}{\text{Pole-pair number}}$ The pole-pair number is always a whole-numbered value!

Ld.05 Cos phi

Value range	Setting	Description
0,5…1,0	-	Input of the cos phi of the motor according to motor name plate.

Ld.06 Rated voltage

Value range	Setting	Description
120…830 V	400 V	Input of the motor rated voltage according to motor name plate.

Ld.07 Calibration of winding resistance (only at Lb.03 = A G or A GL)

Value range	Setting	Description
0	x	Basic position before and after the automatic calibration.
1		• Bring motor to working temperature • Activate calibration mode by setting „1“ • Set drive command (e.g. return) • Set control release • Press UP (▲) -key in Ld.08 once shortly • The calibration starts and is completed after approx. 10 s • Ld.08 displays now the measured value • Cancel the drive command • Open control release, thereby the measure procedure is finished

Ld.08 Winding resistance

Value range	Setting	Description
0,00…250,00 Ω	249,99 Ω	With this parameter the direct input of the motor winding resistance can be made. Measure with a multimeter: The motor resistance is measured, independent of the motor connection (Δ/Y), between two phases of the motor feed line. That way the ohmic line resistance is recorded at the same time (important in case of long feed lines). At that the motor should be at working temperature. Input of the motor winding resistance according to data sheet: When taking the motor resistance from a data sheet, the R120 - equivalent resistance (phase value) is mostly specified there. Then the following values, depending on the used connection, must be adjusted in Ld.08 : Star connection: Ld.08 = 2 • $R1_{20}$ to 2,24 • $R1_{20}$ Delta connection: Ld.08 = 0,666 • $R1_{20}$ to 0,75 • $R1_{20}$ If only the warm resistance R1W is specified: Star connection: Ld.08 = 1,4 • $R1_W$ to 1,6 • $R1_W$ Delta connection: Ld.08 = 0,46 • $R1_W$ to 0,53 • $R1_W$

Ld.09 Winding inductance (only at LB.03 = S G or S GL)

Value range	Setting	Description
0,00…500,00 mH	x,x mH	Input of the leakage inductivity of the motor winding. When taking the leakage inductivity from a data sheet, the phase value for σLS is mostly specified there. Then the following value, depending on the used connection, must be entere in Ld.09: Star connection: Ld.09 = 2 x σLS Delta connection: Ld.09 = 2/3 x σLS

Ld.10 Rated torque

Value range	Setting	Description
0,0…xxx,0 Nm	xx Nm	Input of the motor rated torque of the synchronous machine according to the data sheet. The value is automatically calculated at asynchronous machines

Ld.11 Maximum torque of inverter

Value range	Setting	Description
0,0…xxxx Nm	Nm	Based on the peak current of the inverter, the maximum torque that can be supplied by the inverter, is displayed.

Ld.12 Maximum torque limitation

Value range	Setting	Description
0,0…xxxx Nm	0,95 • Ld.11	Adjustment of the maximum torque limit.

Ld.13 Field weakening speed

Value range	Setting	Description
0,0…32000,0 rpm	auto	Input of the field weakening speed according to the data sheet.

Ld.14 Motor identification (only at Lb.03 = S G or S GL)

Value range	Setting	Description
0 - off 1 - start 2 - calcu 3 - ready	0	Calibration of the motor resistance and inductance Adjust „start“ with UP key, confirm with Enter Give drive command and wait approx. two minutes until „ready“ is displayed Cancel the drive command

Ld.15 DSM max. inductance (only at Lb.03 = S G or S GL)

Value range	Setting	Description
0…500 mH	auto	The value is automatically set by Ld.14 after calibration..

Ld.20 Maximum torque for UPS-operation

Value range	Setting	Description
0,0…xxx,0 Nm	xxx,0 Nm	Adjustment of the maximum torque limit during UPS-operation. The value becomes active, if an input programmed for it is set.

Ld.22 Do not change - only for internal use!

Ld.23 Do not change - only for internal use!

Ld.24 Rotation change UPS

Value range	Setting	Description
0		Serves for the driving change, if it is driven with under-sized UPS automatically into easy direction. Change the adjusted value, if empty car do not drive upwards.
1	x	

3.4 Adjustment of the speed encoder

Display	Name	Setting range	Default setting
LC.00	Parameter group	Enc	-
LC.01	Selection motor encoder input	0…1	0
LC.02	Encoder 1 Status	-	-
LC.03	Encoder alarm mode	0...15	0
LC.11	Display Interface 1	-	-
LC.12	Increments Encoder 1	0…65535 inc	2500 Ink
LC.13	Track change and travel direction inverting Encoder 1	0…19	0
LC.14	Encoder pole-pair	1…10	1
LC.15	Teach-in system position	0…3	0
LC.16	System position value	0…65535	-
LC.17	Filter time for actual speed Encoder 1	0…5	1
LC.18	System position detection (SPI)	0…15	0
LC.19	System position mode	0…1	auto
LC.21	Display Interface 2	-	-
LC.22	Increments Encoder 2	0…65535 inc	2500 inc
LC.23	Track change and travel direction inverting Encoder 2	0…19	0
LC.24	Operation mode output	0...127	0
LC.27	Filter time for actual speed Encoder 2	0…5	3
LC.30	Encoder 1 type	-	-
LC.31	Encoder 1 read/write data	0…4	4
LC.32	Encoder 1 SSI data code	0…1	0
LC.33	Encoder 1 SSI singleturn resolution	0…13 Bit	10 Bit
LC.40	SSI Multiturn-resolution	0…13 Bit	12 Bit
LC.41	SSI clock frequency	0…1	0
LC.42	SSI data format	0…1	1
LC.43	SSI voltage surveillance	0…1	0

LC.00 Parameter group

The LC parameters (**L**ift En**c**oder) include all parameters for the adjustment of the encoder and the encoder interfaces.

LC.01 Selection motor encoder input

Input	Setting	Description
0	x	Motor speed encoder is connected to input X3A.
1		Motor speed encoder is connected to input X3B .

LC.02 Encoder 1 Status

This parameter shows the status of intelligent encoders (Hiperface, ENDAT, SIN/COS) and the encoder interface 1. Depending on the encoder only certain messages are possible. An error is triggered only upon control reset, even though it is already displayed in LC.02.

Inverter status	Value	Description
no error	16	System position values aer transferred, encoder and interface are all right.

continued on next page

Inverter status	Value	Description
Error „E.EncC“ ⚠ Please consider LC.31 and/or chapter 2.3.	The correct evaluation of the system position is no longer ensured. The error E.EncC can only be reset via parameters Ec.00/LC.11. Exception! An error, due to wrong encoder increments (value 70), is immediately reset, once the correct encoder increments are adjusted. Attention, if the control release is still set, the modulation is enabled!	
	64	Encoder unknown and not supported.
	68	No encoder connected of encoder breakage detection has tripped.
	69	System deviation too large. The position, determined from the incremental signals, and the absolute position (from absolute track, zero signal or serial read) no longer match or cannot be corrected. see LC.12/ LC.22!
	70	Adjusted increments do not match the encoder increments.
	71	Interface type is unknown: Interface was not identified.
	75	Encoder temperature is too high (message from encoder)
	76	Speed is too high (message from encoder)
	77	Encoder signals are outside the specifications (message from encoder)
	78	Encoder has an internal defect (message from encocer)
	92	Encoder is formatted. When writing on an encoder, whose storage structure does not correspond to the KEB definition, the storage areas are reorganized, so that they can be written on. Depending on the storage structure, this process can take several seconds.
	96	New value recognized, because another encoder was plugged in.
	98	Interface is busy.
Error „E.Enc1“	During read out of the encoder the error „E.Enc1“ is output.	
	97	KEB identifier undefined. Storage structure of the encoder does not correspond to the KEB definition, thus data cannot be read. By writing on it the encoder is defined. The error can be reset as follows: • Writing a system position into Ec.2. • Carry out a system position alignment .
Error „E.Hyb“	0 255	No communication between interface and control board

LC.03 Encoder alarm mode

Input	Setting	Description
0	x	off
2		Channel 1
8		Channel 2
10		Channel 1 and 2

LC.11 Display Interface 1

Shows which encoder interface is installed and thus which encoder may be connected to channel 1 (X3A).

Value	Installed encoder interface
0	none
11	Hiperface
12	Incremental encoder input 24 V HTL
13	Incremental encoder input TTL with error detection
14	SIN/COS
15	Incremental encoder input 24 V HTL with error detection (push-pull)
16	ENDAT
17	Incremental encoder input 24 V HTL with error detection
19	Resolver

continued on next page

Value	Installed encoder interface
20	SSI - SIN/ COS
22	UVW

In case of an invalid encoder identifier the error „E.Hyb“ is displayed in Li.01 and the measured value is indicated negated. When changing the encoder interface the error „E.HybC“ is displayed. By writing on this parameter the change is confirmed and the default values for the new interface are loaded.

LC.12 Increment Encoder 1

Value range	Setting	Description
0…65535 Ink	2500 Ink	Input of the encoder increments (number of increments per revolution).

LC.13 Track change and travel direction inverting Encoder 1

With this parameter the encoder tracks A and B on the encoder interface X3A can be exchanged. In addition to that the travel direction inverting can be activated. Thus it is possible to run the motor with positive setting counter-clockwise on the shaft without changing the hardware.

Input	Setting	Change encoder tracks A/B	Travel direction inverting
0	x	-	-
1		YES	-
16		-	YES
17		YES	YES

LC.14 Encoder pole-pairs

Value range	Setting	Description
0…xxx	1	Adjustment of the encoder pole-pairs for encoders with several commutation signals.

LC.15 Determine system position (only at synchronous motors) -alternatively also possible with LC.18-

If the drive system (inverter and motor) is started for the first time, the system position of the encoder to the rotor position of the motor must be known. By entering „1“ in LC.15 the system position alignment is started. In doing so the drive may not be loaded (remove cable from the leading sheave). After the system position alignment is completed, the determined value is displayed in LC.16.

During the alignment several functional steps are carried out which are displayed as feedback signals.

Value	Action inverter	Action operator
off	No system alignment carried out	-
1	Display „start“	Enter „start“, set drive command
2	Calibration procedure „calcu“	-
3	Procedure completed „ready“	Cancel the drive command

LC.16 System position value

Value range	Setting	Description
0…65535	-	In this parameter the position of the encoder to the rotor position of the motor is displayed (also see LC.15). If the system position of motor and rotor is known, then the position alignment described under LC.15 needs not to be made. The position value can be entered directly into the parameter. The value is stored with „ENTER“.

LC.17 Filter time Encoder 1

Value range	Setting	Description					
0…5	1	Serves for the smoothing of faulty speed signals.					
		0 = 0, 5 ms	1 = 1 ms	2 = 2 ms	3 = 4 ms	4 = 8 ms	5 = 16 ms

LC.18 System position detection (SPI)

Value range	Setting	Description	
0	x	off	The function SPI (static pole identification) finds the system position without rotation of the motor. LC.18 determines when the function becomes active. The sum of the values must be entered in case of several possibilities.
1		after control release	
2		after switching on	
4		after direction of rotation release	
8		after Reset	

If the values of LC.16 should deviate more than 2500 increments in spite of several procedures of calibration, calibration by LC.15 is required.

LC.19 System position mode

Value range	Setting	Description	
0	0, auto	Ld is unequal Lq	This parameter is determined by the automatic motor identification Ld.14.
1		Ld is equal Lq	

LC.21 Display Interface 2

Indicates which encoder interface is installed and thus which encoder may be connected to channel 2 (X3B).

Value	Installed encoder interface
0	none
1	Incremental encoder input TTL
2	Incremental encoder output 5 V
3	Incremental encoder input and output direct
4	Incremental encoder input and output TTL
6	Sychron-serial interface (SSI)
9	Incremental encoder output TTL of resolver via channel 2
10	Incremental encoder output TTL

In case of an invalid encoder identifier the error „E.Hyb“ is displayed in Li.01 and the measured value is indicated negated. When changing the encoder interface the error „E.HybC“ is displayed. By writing on this parameter the change is confirmed and the default values for the new interface are loaded.

LC.22 Increments Encoder 2

Value range	Setting	Description
0…65535 Ink	4096 Inc	Input of the encoder increments (number of increments per revolution).

LC.23 Track change and travel direction inverting Encoder 2

With this parameter the encoder tracks A and B on the encoder interface X3B can be exchanged. In addition to that the travel direction inverting can be activated. Thus it is possible to run the motor with positive setting counterclockwise on the shaft without changing the hardware.

Input	Setting	Change encoder tracks A/B	Travel direction inverting
0	x	-	-
1		YES	-
16		-	YES
17		YES	YES

LC.24 Operation mode output

If one of the encoder channels is used as encoder output, the output increments per revolution can be adapted to the requirements of the control card.

Input	Setting	Description
0	x	off
1		256 Incr.
5		1024 Incr.
9		2048 Incr.
13		4096 Incr.

LC.27 Filter time Encoder 2

Value range	Setting	Description
0…5	3	Serves for the smoothing of faulty speed signals. 0 = 0,5 ms | 1 = 1 ms | 2 = 2 ms | 3 = 4 ms | 4 = 8 ms | 5 = 16 ms

LC.30 Encoder 1 Type

Display	Description
0	no encoder identified
2	SCS 60/70
7	SCM 60/70
34	SRS 50/60
39	SRM 50/60
64	undefined type

LC.31 Encoder 1 read/write data

Input	Setting	Description
0…14	0	In case of „E.EncC“ together with EnDat- or Hiperface encoders: set Lb.01 = 2206 + ENTER EC.38 = 2 + ENTER Ud.01 = 11 + ENTER

LC.32 Encoder 1 SSI data code

Input	Setting	Description
0	x	Binary-coded
1		Graycode

LC.33 Encoder 1 SSI singleturn resolution

Input	Setting	Description
0…13 Bit	10 Bit	This parameter adjusts the number of bits of the SSI data word to the connected encoder. The resolution of the digital singleturn absolute position is determined by the number of bits.

LC.40 SSI Multiturn-resolution

Input	Setting	Description
0…13 Bit	12 Bit	Number of Bits for the multiturn-resolution, if a SSI multiturn-absolute valure encoder is connected.

LC.41 SSI Clock frequency

Adjustment of the clock frequency for SSI-encoder.

Input	Setting	Description
0	x	156,25 kHz
1		312,5 kHz

LC.42 SSI Data format

Input	Setting	Description
0	x	Binary-coded
1		Graycode

LC.43 SSI Voltage monitoring

Input	Setting	Description
0	x	off
1		on

3.5 Lift functions

Display	Name	Setting range	Default setting
LF.00	Parameter group	Funct	-
LF.01	max. speed of system	0,000…15,000 m/s	0,000 m/s
LF.02	Traction sheave diameter	0…2000 mm	600 mm
LF.03	Gear reduction ratio multiplier	0,00…99,99	1,00/ 30,00
LF.04	Gear reduction ration divisor	0,00...99,99	1,00
LF.05	Factor rope suspension	1…8	1
LF.06	Contract load	0…65535 kg	0 kg
LF.10	Control mode	0…2	2
LF.11	KP speed controller	0…32767	auto
LF.12	KI speed controller	0…32767	auto
LF.13	KI speed controller Offset	0…32767	auto
LF.14	KP current controller	0…65535	auto
LF.15	KI current controller	0…65535	auto
LF.16	Boost	0,0…25,5 %	10,0 %
LF.17	Autoboost on/off	0…1	auto
LF.18	Autoboost / ampliciication	0,00…2,50	1,20
LF.19	Filter time for current loop	0...5	3
LF.20	V_R releveling speed	0,000…0,300 m/s	0,000 m/s
LF.21	V_L leveling speed	0,000…0,300 m/s	0,000 m/s
LF.22	V_N nominal speed	0,000 m/s…LF.01	0,000 m/s
LF.23	V_I inspection speed	0,000…0,630 m/s	0,000 m/s
LF.24	V_1 intermediate speed 1	0,000 m/s…LF.01	0,000 m/s
LF.25	V_2 intermediate speed 2	0,000 m/s…LF.01	0,000 m/s
LF.26	V_3 intermediate speed 3	0,000 m/s…LF.01	0,000 m/s
LF.27	V_U evacuation speed	0,000 m/s…LF.01	0,000 m/s
LF.28	Setpoint value debounce time	0…127 ms	10 ms
LF.30	Starting jerk	0,10…9,99 m/s³	0,50 m/s³
LF.31	Acceleration	0,10…2,00 m/s²	0,90 m/s²
LF.32	Jerk at end of acceleration	0,10…9,99 m/s³	1,00 m/s³
LF.33	Jerk at begin of deceleration	0,10…9,99 m/s³	1,00 m/s³
LF.34	Deceleration	0,10…2,00 m/s²	0,90 m/s²
LF.35	Jerk at end of deceleration	0,10…9,99 m/s³	0,70 m/s³
LF.36	Stopping jerk	0,00…9,99 m/s³	0,40 m/s³
LF.40	Brake release time	0,00…3,00 s	0,25 s
LF.41	Brake engage time	0,00…3,00 s	0,25 s
LF.42	Switching threshold brake deactivation	0,000…0,010 m/s	0,005 m/s
LF.43	Level overspeed	0,000…18,000 m/s	1,1•LF.1
LF.44	Deceleration check	0,000…15,000 m/s	0,95•LF.22
LF.45	Level „running open doors“	0,000…0,300 m/s	0,250 m/s
LF.46	Speed deviation mode	0…1	0
LF.47	Spedd deviation level	0…30 %	10 %
LF.48	Speed deviation tripping time	0,000…10,000 s	3,000 s
LF.49	Motor + inverter OH-function	0…1	0
LF.50	drive OH delay time	0…120 s	0 s
LF.51	Standstill control	0,00...8000,00 rpm	auto
LF.52	KP start amplification	0…32767	1100 or LF.11
LF.53	KP start timer	-0,01(oFF)…50000,00 s	-0,01 = oFF
LF.60	Display levelling path	0,0...264,0 cm	-
LF.61	Levelling path optimization V_N	0,0…200,0 cm	0,0 cm
LF.62	Levelling path optimization V_1	0,0…200,0 cm	0,0 cm
LF.63	Levelling path optimization V_2	0,0…200,0 cm	0,0 cm
LF.64	Levelling path optimization V_3	0,0…200,0 cm	0,0 cm
LF.65	Levelling path optimization V_L	0...300 mm	0 mm

LF.00 Display of current parameter group „Funct“

LF.01 Max. speed of system

This parameter limits the speed of the system to the adjusted value. For analog setpoint setting applies 0…±10 V correspond to 0…±LF.01.

Value range	Setting	Description
0,000…15,000 m/s	0,000 m/s	

LF.02 Traction sheave diameter

Value range	Setting	Description
0…2000 mm	600 mm	Enter the diameter of the employed leading sheave.

LF.03 Gear reduction ratio/multiplier

Value range	Setting	Description
0,00…99,99	1,00/ 30,00	Adjustment according to gearbox name plate (possible determination by counting the revolutions of the handwheel at one revolution of the leading sheave). Example: i = 43:3 LF.3=43 For gearless motors adjust value „1“.

LF.04 Gear reduction ratio/divisor

Value range	Setting	Description
0,00…99,99	1,00	Adjustment according to gearbox name plate (possible determination by counting the revolutions of the handwheel at one revolution of the leading sheave). Example: i = 43:3 LF.4=3 For gearless motors adjust value „1“.

LF.05 Factor rope suspension

Value range	Setting	Description
1…8	1	Adjustment according to system data (1:1…8:1)

LF.06 Contract load

Value range	Setting	Description
0…65535 kg	0	Adjustment according to system data (possibly number of persons x 75 kg)

LF.10 Control mode

Value range	Setting	Description
0		Without speed encoder (open-loop)
1		Control procedure switchable by digital input
2	x	With speed encoder (closed-loop)

LF.11 KP Speed controller

Value range	Setting	Description
0…32767	auto	Adjustment of the P-amplification of the speed controller. If the KP-values are too large vibrations occur during the constant drive. If the KP-values are too small a deviation between setpoint and actual value occurs. It results in transient effects after the acceleration.

LF.12 KI Speed controller

Value range	Setting	Description
0…32767	auto	Adjustment of the I-amplification of the speed controller reset time.

LF.13 KI Speed controller Offset

Value range	Setting	Description
0…32767	auto	Serves for an improved load transfer at high-efficient gearboxes.

LF.14 KP Current controller

Value range	Setting	Description
0…65535	auto	P-amplification of the magnetizing and active current.

LF.15 KI Current controller

Value range	Setting	Description
0…65535	auto	I-amplification of the current controller reset time.

LF.16 Boost

Value range	Setting	Description
0,0…25,5 %	Depending on the motor type	Serves for the adjustment of the U/f-charateristic in open-loop operation. Too little torque increase makes the motor soft and the load cannot be lifted. Too much torque increase leads to vibration during acceleration and in the positioning drive.

LF.17 Autoboost on/off

Value range	Setting	Description
0	auto	Autoboost (torque compensation) off
1		Autoboost is effective in the motor-driven and generatoric operation (recommend for old lift equipmen).

LF.18 Autoboost / amplification

Value range	Setting	Description
0,00…2,50	1,20	Adjustment of the amplification factor for Autoboost.

LF.19 Filter time for current loop

Value range	Setting	Description
0…5	3	0 = 0,5 ms | 1 = 1 ms | 2 = 2 ms | 3 = 4 ms | 4 = 8 ms | 5 = 16 ms

LF.20 VR Releveling speed

Value range	Setting	Description
0,000…0,300 m/s	0,000 m/s	With the readjustment speed the lift is driven aligned. • for a better positioning the drive abort is made without jerk limitation • it cannot be accelerated from the readjustment speed • when Lb.05 = 2 or 6, only active if Lb.12 = 0

LF.21 VL Leveling speed

Value range	Setting	Description
0,000…0,300 m/s	0,000 m/s	• it cannot be accelerated from the approch speed

LF.22 VN Nominal speed

Value range	Setting	Description
0,000 m/s…LF.01	0,000	

LF.23 VI Inspection speed

Value range	Setting	Description
0,000…0,630 m/s	0,000 m/s	• it cannot be accelerated from the inspection speed

LF.24 V 1 intermediate speed 1

Value range	Setting	Description
0,000 m/s…LF.01	0,000 m/s	• when Lb.05 = 2 or 6, only active if Lb.13 = 1

LF.25 V2 intermediate speed 2

Value range	Setting	Description
0,000 m/s…LF.01	0,000 m/s	• not active at Lb.05 = 2 or 6

LF.26 V3 intermediate speed 3

Value range	Setting	Description
0,000 m/s…LF.01	0,000 m/s	• not active at Lb.05 = 2 or 6

LF.27 VU Evacuation speed

Value range	Setting	Description
0,000 m/s…LF.01	0,000 m/s	• off, if no input is assigned with the function „UPS-operation“

LF.28 Setpoint value debounce time

Value range	Setting	Description
0…127 ms	0 ms	

LF.30 Starting jerk

Important for the well-being of passengers in a lift is the so-called jerk or shock, that always occurs during acceleration processes. This phenomenon even causes objects on conveyor system to topple or fall and puts a heavy strain on mechanical components. People perceive the jerk differently, depending on age, physical and mental constitution and whether the movement was anticipated or not.

Value range	Setting	Description
0,10…9,99 m/s³	0,50 m/s³	Experience values: 0,5...0,8 m/s³ for nursing homes, hospitals, apartment houses 0,8...1,2 m/s³ for office buildings, banks etc.

LF.31 Acceleration

Value range	Setting	Description
0,10…2,00 m/s²	0,90 m/s²	Experience values: 0,5...0,8 m/s² for nursing homes, hospitals, apartment houses 0,8...1,2 m/s² for office buildings, banks etc.

LF.32 Jerk at end of acceleration

Value range	Setting	Description
0,10…9,99 m/s³	1,00 m/s³	If the jerk at the end of acceleration is adjusted too low, the parameter „deceleration“ LF.34 is overridden.

LF.33 Jerk at begin of deceleration

Value range	Setting	Description
0,10…9,99 m/s³	1,00 m/s³	

LF.34 Deceleration

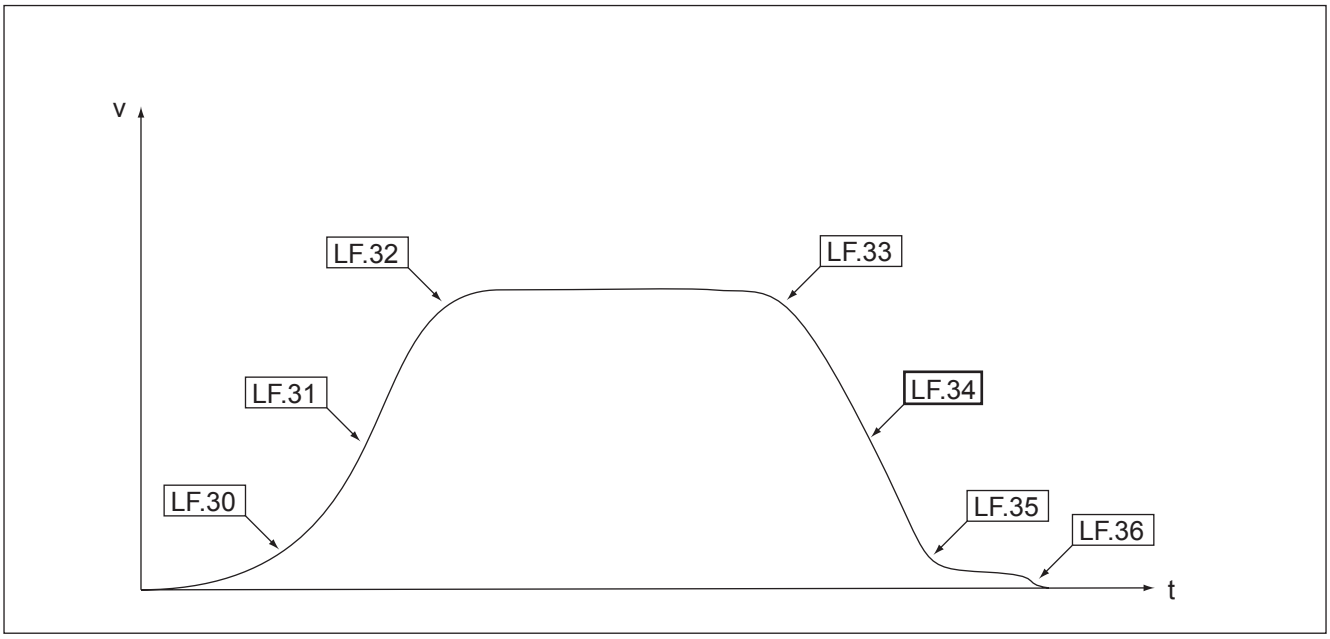
Value range	Setting	Description
0,10…2,00 m/s²	0,90 m/s²	

LF.35 Jerk at end of deceleration

Value range	Setting	Description
0,10…9,99 m/s³	0,70 m/s³	

LF.36 Stopping jerk

Value range	Setting	Description
0,00…9,99 m/s³	0,40 m/s³	The starting jerk determines the ride comfort on settling on the floor from the positioning drive. With LF.36=“off“ the stopping jerk is the same as the jerk at the end of deceleration (LF.35).



Driving characteristic with jerk-free acceleration and deceleration

LF.40 Brake release time

Value range	Setting	Description
0,00…3,00 s	0,25 s	

LF.41 Brake engage time

Value range	Setting	Description
0,00…3,00 s	0,25 s	

LF.42 Switching threshold at brake deactivation

Value range	Setting	Description
0,000…0,010 m/s	0,005 m/s	

LF.43 Level overspeed

Value range	Setting	Description
0,000…18,000 m/s	auto	The displayed value is 110 % of the maximum speed (LF.01).

LF.44 Deceleration check level

Value range	Setting	Description
0,000…15,000 m/s	auto	The displayed value is 96 % of the rated speed LF.22).

LF.45 Level „running open doors“

Value range	Setting	Description
0,000…0,300 m/s	0,250 m/s	Defines the maximum approach speed, on falling below this speed the doors can open.

LF.46 Speed deviation mode

This parameter serves as control, whether the motor speed can follow the actual speed. Die monitoring is active only in closed-loop operation with motor encoder. The tripping level is adjusted with LF.47 . If the function is assigned to a digital output, a warning is given.

Value range	Setting	Description
off	x	No error switch off. The output condition. The output condition „speed deviataion warning“ is set.
on		Inverter switches off the modulation with error E.hSd (high speed difference). The output condition „speed deviataion warning“ is set.

LF.47 Speed deviation level

Value range	Setting	Description
0…30 %	10 %	The value in percent refers to the selected speed. The detection takes place at constant run.

LF.48 Speed deviation tripping time

Value range	Setting	Description
0,000…10,000 s	3,000 s	Adjustment of the time between detection of a speed deviation and tripping of the error E.hSd (LF.46 = 1).

LF.49 Motor + Inverter OH-function

This parameter activates the temperature monitoring of motor and inverter. Precondition for the motor monitoring is the connection of a motor temperature sensor to the terminals T1/T2. When the heat sink of the inverter reaches a temperature of 90°C, the error E.OH is triggered and the drive is stopped. If the function is assigned to a digital output, a warning is given. At a temperature of 75°C the output is reset and the drive continues to run. The display shows the warning message „OH“.

Value range	Setting	Description
off	x	No error switch-off at overtemperature. The output condition „motor or inverter excess temperature“ is set.
on		When the heat sink of the inverter reaches a temperature of 90°C, the error E.OH is triggered and the drive is stopped. At a temperature of 75°C the error is reset and the drive continues to run. The display shows the warning message „OH“. At an excess temperature of the motor the drive behaves according to LF.50. The output condition „motor or inverter excess temperature“ is set immediately.

LF.50 Drive OH Delay time

If a drive shall still be made despite a hot motor, a deceleration time between warning and triggering the excess temperature error can be adjusted with this parameter. After the adjusted time has expired the inverter switches off the modulation with error E.dOH.

Value range	Setting	Description
0 s	x	After detection of motor excess temperature the current ride is still completed, before the inverter switches off the modulation with „E.dOH“.
1…120 s		After detection of motor excess temperature the adjusted time is waited for before the inverter switches off the modulation with error „E.dOH“.

LF.51 Standstill control

A wrong system position or an encoder which is not securely mounted may lead to dangerous conditions with gearless synchronous machines. If the different between set and actual speed cross over the speed level of this parameter the inverter will trip with "E.EF".
This parameter is mainly designed for the period of load transfer and starting.
To avoid failures caused by wrong system position or bad encoder mounting a combination with function ‚speed deviation‘ LF.46, LF.47 and LF.48 is recommended.

Value range	Setting	Description
0,00...8000,00 rpm	auto	

LF.52 KP start amplification

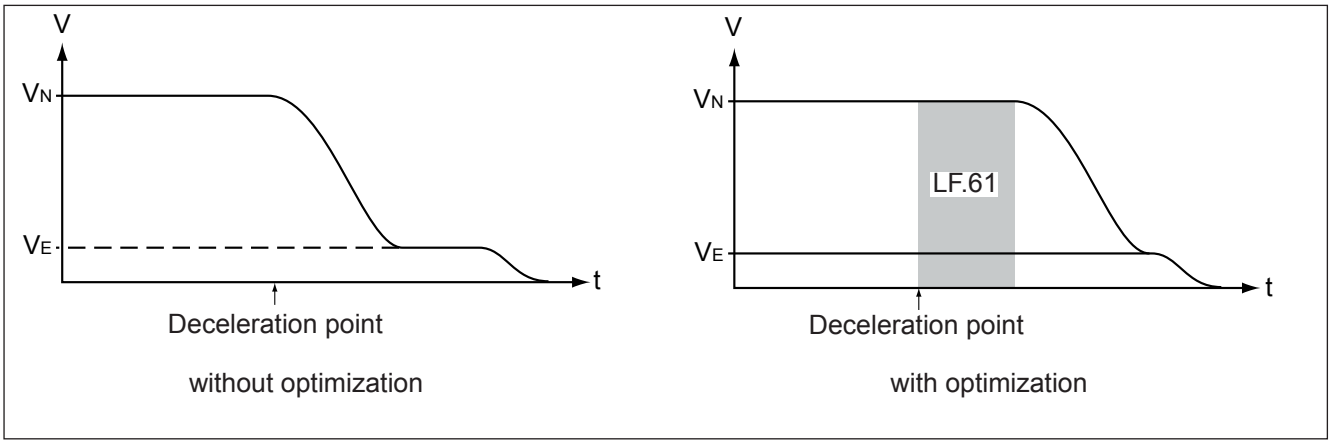
Value range	Setting	Description
0…32767	1100 or LF.11	The temporary proportional factor enables a better starting behavior at high static friction in the system. The duration is adjusted with LF.53 . A typical value here is 4000.

LF.53 KP start timer

Value range	Setting	Description
-0,01(oFF)… 50000,00 s	off	The timer determines the duration of LF.52. A typical value here is 2 s.

LF.60 Indication levelling path

Value range	Setting	Description
0,0…264,0 cm	-	The time of constant drive in crawl speed (VL) is measured and displayed after each run in standardized cm. .



Levelling path optimization VN

With the levelling distance optimization the levelling path become shorter by the entered value. 3…5 cm levelling path are sufficient. Measuring the levelling distance with LF.60.

LF.61 Levelling path optimization VN

Value range	Setting	Description
0,0…200,0 cm	0,0 cm	Out of operation at ogive function.

LF.62 Levelling path optimization V1

Value range	Setting	Description
0,0…200,0 cm	0,0 cm	

LF.63 Levelling path optimization V2

Value range	Setting	Description
0,0…200,0 cm	0,0 cm	

LF.64 Levelling path optimization V3

Value range	Setting	Description
0,0…200,0 cm	0,0 cm	

LF.65 Levelling path optimization VL

Value range	Setting	Description
0...300 mm	0 mm	

3.6 Positioning mode / ogive run

Display	Name	**Setting range**	**Default setting**
LP.00	Display	„POSI“	-
LP.01	Ogive function	0…2	0
LP.02	Minimum deceleration distance (calculated)	0,0…6553,5 cm	auto
LP.03	Deceleration distance (measured)	-3276,7…3276,7 cm	0,0 cm
LP.04	Correction distance	0,0…6553,5 cm	10,0 cm

LP.00 Display of current parameter group „POSI“

LP.01 Ogive function

Input	Setting	Function	Description
off	x	off	With switched off ogive function the acceleration at the deceleration point is aborted immediately. With this parameter the ogive function is activated or a calibration run according to following description is carried out.
1		Calibration run	
2		active	

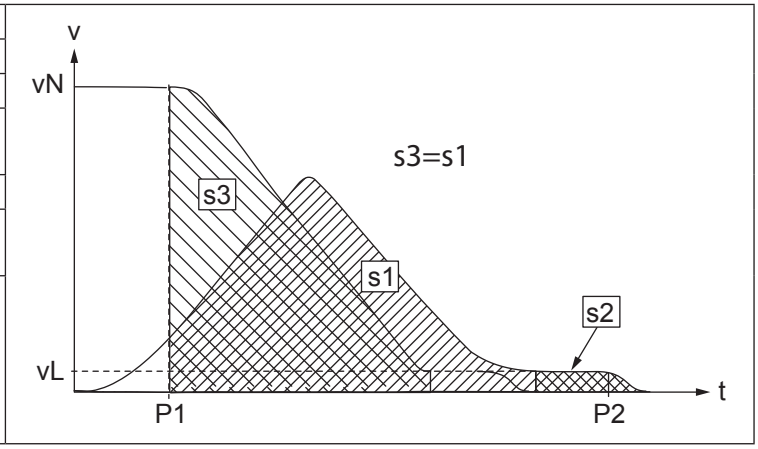
There are three possibilities to execute the ogive function:
Ogive run
- with crawl path (DOL= digital ogive with leveling speed)
- with direct approach(DODA = digital ogive with direct approach)
- with direct approach and correction shortly before the stopping position (DODAC = digital ogive with direct approach and correction)

Ogive run with crawl path (DOL= digital ogive with leveling speed)

This operating mode is recommended
- for all conventional control with levelling switches.
- if control run-times lead to large tolerances.
- if strong slip develops on the leading sheave.
- if speed signal are noisy.
- if the shaft signals are not accurately installed.
- if mechanical transient processes must be waited for.

The procedure is active as long as a crawl speed entered in LF.21 is larger than 0 m/s.

V	Speed
VN	Nominal speed
vL	Levelling speed LF.21
P1	Deceleration point from rated speed VN to crawl speed VL
P2	Levelling switch
s1	The distance between deceleration point and levelling switch is measured.
s2	Levelling path + stopping path



Following conditions must be created:
- Adjust/install deceleration points on all floors and for both directions equally.
- Distance of the deceleration points as far away as possible from the floor, so that a pleasant ogive rounding is possible.

Distintive features of ogive run with crawl path:
- The F5-lift optimizes the crawl path principally to 5 cm.
- This also applies to the run with rated speed.
- ADA-function (auto deceleration adaption): If the change-over from VN to VL takes place too late at higher floors, the F5-lift calculates a driving curve with steeper deceleration in order not to overrun the stopping position.

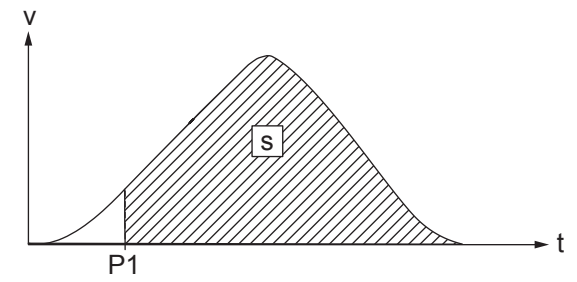
Start-up:
- Check whether Lb.4 = 1 is adjusted (Factory setting)
- Enter deceleration path in LP.3
- In case of unknown distances (e.g.renovation) carry out a calibration run, for that adjust LP.1 = 1 and perform a normal drive. The distance between deceleration point and levelling switch is measured.
- For a checkup compare input value with the calculated deceleration path in LP.2. Here the required minimum deceleration path is displayed (see mapping: Distance „s3“ + 5 cm). The value in LP.3 always must be larger or equal to the value in LP.2.
- If the deceleration curve is subsequently adjusted „softer“, check again whether value LP.2 is smaller than value LP.3.
- Swith LP.1 to 2. Thereby the value from LP.3 is accepted and the ogive function is activated.

Trouble-shooting:
- If LP.2 is larger than LP.3, increase the deceleration distance and correction in LP.3 or adjust a „harder“ deceleration curve.
- If the lift overruns the floor, an error in the measuring system of your shaft encoding exists.
- If the crawl path of 5 cm should be too short, enter a smaller value in LP.3. Reduce LP.3 by as many cm as the crawl path shall become longer.

Ogive run with direct approach (DODA = digital ogive with direct approach)

This operating mode is recommended
- if the change-over of the speed inputs takes place precisely and fast (ca. 1 ms)
- if the mentioned problems at ogive run with crawl path do not exist. Otherwise it result in non-levelling.

The procedure is activated by adjusting the crawl speed LF.21 to 0 m/s.

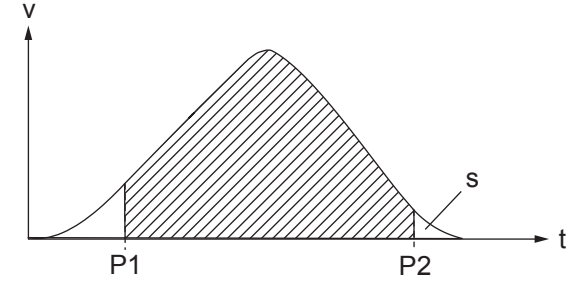
P1 Deceleration point from rated speed VN to crawl speed VL s Path of deceleration = LP.03 V Speed t Time	

Start-up:
- Check whether Lb.4 is adjusted to 1 (factory setting).
- Check whether LF.21 is = 0 m/s.
- Enter path of deceleration in LP.3. The path of deceleration in LP.3 must match the position of the deceleration points in the shaft to the millimeter. It is measured from the deceleration point to the levelling position/door threshold.
- Activate ogive run with LP.1=2.

Ogive run with direct approach and correction shortly before the stopping position (DODAC = digital ogive with direct approach and correction)

This operating mode is recommended
- if only minor system errors (up to 3 cm) need to be adjusted.

With this procedure ca. 10…15 cm before the stopping position a digital input is set on the frequency inverter, by which the actual residual distance is detected.

P1 Deceleration point from rated speed VN to crawl speed VL P2 Correction switch s Path of correction = LP.04 V Speed t Time	

Start-up:
- Check whether Lb.4 is adjusted to 1 (factory setting).
- Check whether LF.21 is set to 0 m/s.
- Adjust Lb.10 to 2 (customer-specific input assignment)
- Adjust Lb.12 to 9 (assignment of correction input is terminal X2A.17)
- Enter path of deceleration in LP.3. It is measured from the deceleration point to the levelling position/door threshold. The path of deceleration in LP.3 must match the position of the deceleration points in the shaft to the millimeter.
- All correction points must have exactly the same distance (residual distance) to the stopping position.
- The path of correction (residual distance) must be entered accurately to the millimeter in LP.4.
- Activate ogive run with LP.1=2.

LP.02 Minimum deceleration distance (calculated)

Value range	Setting	Description
0,0…6553,5 cm	auto	only display

LP.03 Deceleration distance (measured)

Value range	Setting	Description
-3276,7…3276,7 cm	0,0 cm	Distance from deceleration point to levelling signal.

LP.04 Correction distance

Value range	Setting	Description
0,0…6553,5 cm	10,0 cm	

3.7 Information, indications and measured values

Display	Name	Unit	Default setting
LI.00	Display	„InFo“	-
LI.01	Inverter status	-	-
LI.03	Set speed	min^{-1}	-
LI.04	Actual speed	min^{-1}	-
LI.07	Actual car speed	m/s	-
LI.08	Floor distance	cm	-
LI.09	Set torque	Nm	-
LI.10	Actual torque display	Nm	-
LI.11	Apparent current	A	-
LI.12	Actual load	%	-
LI.13	Peak load	%	-
LI.14	Actual DC link voltage	V	-
LI.15	Peak value DC link voltage	V	-
LI.16	Active parameter set	-	-
LI.17	Terminal input status	-	-
LI.18	Terminal output status	-	-
LI.19	Overload integrator (OL)	%	-
LI.20	Heat sink temperature	°C	-
LI.21	Power on counter	h	-
LI.22	Modulation on counter	h	-
LI.23	Feedback energy display	kWh	-
LI.24	Modulation rate	%	-
LI.25	Minimum deceleration distance V_1	cm	-
LI.26	Minimum deceleration distance V_2	cm	-
LI.27	Minimum deceleration distance V_3	cm	-
LI.30	Inverter type	-	-
LI.31	Inverter rated current	A	-
LI.32	Serial number Date	YY.WW	-
LI.33	Serial number Counter	-	-
LI.34	Software version Inverter	-	-
LI.35	Software date Inverter	DD.MM.Y	-
LI.36	Software version Operator	-	-
LI.37	Software date Operator	DD.MM.Y	-
LI.38	Software version Interface	-	-
LI.39	Software date Interface	DD.MM.Y	-
LI.40	Last error	-	-
LI.41	Last error (t-1)	-	-
LI.42	Last error (t-2)	-	-
LI.43	Last error (t-3)	-	-
LI.44	Last error (t-4)	-	-
LI.45	Last error (t-5)	-	-
LI.46	Last error (t-6)	-	-
LI.47	Last error (t-7)	-	-
LI.48	Last error (t-8)	-	-
LI.50	AN1 display before amplification	%	-
LI.51	AN1 display after amplification	%	-
LI.52	AN2 display before amplificatiaon	%	-
LI.53	AN2 display after amplification	%	-

LI.00 Display of current parameter group „InFo“

LI.01 Inverter status

This parameter shows the current status (e.g. constant run, acceleration counter-clockwise rotation) of the inverter. You find a table of all status and error messages in the annex.

LI.03 Set speed

Display	Description
0…±4000 rpm	Display of the current setpoint value. For control reasons the set speed is also displayed, if the control release or the direction of rotation is not switched. If no direction of rotation is given, the set speed for clockwise rotation (forward) is displayed.

LI.04 Actual speed

Display	Description
0…±4000 rpm	Display of the current motor speed (encoder channel 1). For control reasons the set speed is also displayed, if the control release or the direction of rotation is not switched. A counter-clockwise rotating field (reverse) is represented by a negative sign. Precondition for the correct display value is the in-phase connection of the motor and the correct adjustment of the encoder increments as well as the direction of rotation.

LI.07 Actual car speed

Display	Description
0…±20 m/s	Display of the current speed of the lift. For control reasons the actual speed is also displayed, if the control release or the direction of rotation is not switched. A counter-clockwise rotating field (reverse) is represented by a negative sign. Precondition for the correct display value is the in-phase connection of the motor and the correct basic setting.

LI.08 Floor distance

Display	Description
±32767 cm	Indicates the last travel distance from start to stop.

LI.09 Set torque

Display	Description
0,00…32000,00 Nm	

LI.10 Actual torque display

Display	Description
0,00…32000,00 Nm	The displayed value corresponds to the current motor torque in Nm. The value is calculated from the active current. Due to common type variations and temperature drifts of the motor tolerances of up to 30 % are possible in the base speed range. Basic requirement for the torque display is the adjustment of the motor data. If the real motor data deviate strongly from the name plate data, the operating performance can be optimized by entering the real data. For the start-up the adjustment of the name plate data is sufficient.

LI.11 Apparent current

Display	Description
0…1000 A	Display of the current motor apparent current.

LI.12 Actual load

Display	Description
0…200 %	

LI.13 Peak load

Display	Description
0…200 %	

LI.14 Actual DC link voltage

Display	Description
0…1000 V	Display of the current DC link voltage in volt. Typical values are:

V-class	Normal operation	Overvoltage (E.OP)	Undervoltage (E.UP)
230 V	300…330 V DC	ca. 400 V DC	ca. 216 V DC
400 V	530…620 V DC	ca. 800 V DC	ca. 240 V DC

LI.15 Peak value DC link voltage

Display	Description
0…1000 V	This parameters makes it possible to determine short-term voltage rises within an operating cycle. For that purpose the highest value that occurred is stored. The peak value memory can be cleared by pressing the key UP, DOWN or ENTER and over Bus by writing any value onto this parameter. Switching off the inverter also results in the deletion of the memory.

LI.16 Active parameter set

Display	Description
0…7	Display of the parameter set, in which the frequency inverter currently works.

LI.17 Terminal input status

Decimal value	Input	Function
1	X2A.16	Display of the currently activated digital inputs. The logical levels at the digital inputs and at the internal inputs are indicated, independent of the following linkage. A certain decimal value is given out for each digital input. If several inputs are activated, the sum of the decimal value is displayed.
2	X2A.17	
4	X2A.14	
8	X2A.15	
16	X2A.10	
32	X2A.11	
64	X2A.12	
128	X2A.13	
256	internal A	
512	internal B	
1024	internal C	
2048	internal D	

LI.18 Terminal output status

Decimal value	Output	Function
1	X2A.18	Display of the currently set external and internal digital outputs. A certain value is given out for each digital output. If several outputs are activated, the sum of the decimal value is displayed.
2	X2A.19	
4	X2A.24…26	
8	X2A.27…29	
16	internal A	
32	internal B	
64	internal C	
128	internal D	

LI.19 Overload integrator (OL)

Value range	Description
0…100 %	To prevent overload errors (E.OL) (load reduction in time), the internal meter reading of the OL-counter can be made visible with this parameter. At 100 % the inverter switches off with error „E.OL“. The error can be reset after a cooling down phase (blinking display „E.nOL“).

LI.20 Heat sink temperature

Value range	Description
0…150 °C	The parameter displays the current heat sink temperature of the inverter.

LI.21 Power on counter

Value range	Description
0…65535 h	The power on counter shows how long the inverter was switched on. The displayed value includes all operating phases. On reaching the maximum value (ca. 7.5 years) the display stays on the maximum value.

LI.22 Modulation on counter

Value range	Description
0…65535 h	The modulation on counter shows how long the inverter was active (power modules activated). On reaching the maximum value (ca. 7.5 years) the display stays on the maximum value.

LI.23 Feedback energy display

Value range	Description
0…65535 kWh	Display of the feedback energy during generative operation. On the basis of this value it can be calculated, whether the use of a regenerative unit could be profitable. For that purpose the actual resistance value of the brake resistor must be entered in Lb.18.

LI.24 Modulation rate

Value range	Description
0…110 %	The modulation rate shows the output voltage in percent. 100% correspond to the input voltage (unloaded). At a value above 100 % the inverter operates with overmodulation.

LI.25 Minimum deceleration distance V_1

Value range	Description
0,0…6553,5 cm	Indicates the calculated deceleration distance for V_1.

LI.26 Minimum deceleration distance V2

Value range	Description
0,0…6553,5 cm	Indicates the calculated deceleration distance for V2.

LI.27 Minimum deceleration distance V3

Value range	Description
0,0…6553,5 cm	Indicates the calculated deceleration distance for V3.

LI.30 Inverter type

Bit	Meaning	Meaning			
0	Inverter size		binary-coded, e.g. 00101 for size 05		
1					
2					
3					
4					
5	Voltage class	0	230 V	1	400 V
6	Phases	0	single-phase	1	3-phase
7	free				
8	Housing Sizes	0	A-housing	7	H-housing
9		1	B-housing	10	K-housing
10		2	C-housing	15	P-housing
11		3	D-housing	17	R-housing
12		4	E-housing	20	U-housing
		6	G-housing	22	W-housing
13	Control	0	G-control	3	S-control
14		1	M-control	4	A-control
15		2	B-control		

LI.31 Inverter rated current

Value range	Description
0…710A	Display of the inverter rated current in A. The value is calculated from the power section identifier and cannot be changed.

LI.32 Serial number Date

Value range	Description
0…65535	The parameter shows the date of production in the format „YY.WW“.

LI.33 Serial number Counter

Value range	Description
0…65535	The parameter shows the consecutive number of the production date from LI.32.

LI.34 Software version Inverter

Value range	Description
0,00…9,99	Display of the software version number of the inverter.

LI.35 Software date Inverter

Value range	Description
0…65535	Display of the software date of the inverter in the format „DD.MM.Y“.

LI.36 Software version Operator

Value range	Description
0,00…9,99	Display of the software version number of the operator.

LI.37 Software date Operator

Value range	Description
0…65535	Display of the software date of the operator in the format „DD.MM.Y“.

LI.38 Software version Interface

Value range	Description
0,00…9,99	Display of the software version number of the encoder interface.

LI.39 Software date Interface

Value range	Description
0…65535	Display of the software date of the encoder interface in the format „DD.MM.Y“.

LI.40 Last error

Value range	Description
0…255	The parameter stores the last error that occurrred. E.UP is not stored. The error messages are described in the annex „Error Diagnosis“.

LI.41 Last Error (t-1)
LI.42 Last Error (t-2)
LI.43 Last Error (t-3)
LI.44 Last Error (t-4)
LI.45 Last Error (t-5)
LI.46 Last Error (t-6)
LI.47 Last Error (t-7)
LI.48 Last Error (t-8)

<table>
<tr><td>Value range</td><td>Description</td></tr>
<tr><td>0000…5FFFh</td><td>The parameters LI.41…48 show the last eight errors that occurred. The oldest error is in LI.48. If a new error occurs, it is stored in LI.41. All other errors are moved one parameter further. The oldest error (LI.48) is cancelled. The display of the error takes place in the most significant word (Bit 12…15).
Between errors of the same type (e.g. twice OC) the time difference is determined. It is stored in the three low-order words. The display is hexadecimal.
<table>
<tr><th>Error</th><th colspan="3">Time difference</th><th rowspan="2">Value</th></tr>
<tr><th>Bit 15…12</th><th>Bit 11…8</th><th>Bit 7…4</th><th>Bit 3…0</th></tr>
<tr><td>x</td><td>0</td><td>0</td><td>0</td><td>0 min</td></tr>
<tr><td>x</td><td>0</td><td>0</td><td>1</td><td>1 min</td></tr>
<tr><td>x</td><td>:</td><td>:</td><td>:</td><td>:</td></tr>
<tr><td>x</td><td>F</td><td>F</td><td>E</td><td>4094 min</td></tr>
<tr><td>x</td><td>F</td><td>F</td><td>F</td><td>>4095 min</td></tr>
<tr><td>0</td><td>x</td><td>x</td><td>x</td><td>no error</td></tr>
<tr><td>1</td><td>x</td><td>x</td><td>x</td><td>E.OC</td></tr>
<tr><td>2</td><td>x</td><td>x</td><td>x</td><td>E.OL</td></tr>
<tr><td>3</td><td>x</td><td>x</td><td>x</td><td>E.OP</td></tr>
<tr><td>4</td><td>x</td><td>x</td><td>x</td><td>E.OH</td></tr>
<tr><td>5</td><td>x</td><td>x</td><td>x</td><td>E.OHI</td></tr>
</table>
</td></tr>
<tr><td>Example</td><td>The display shows following values:
LI.41: 3000
LI.42: 2000
LI.43: 4023
LI.44: 4000
LI.45…48: 0000</td></tr>
<tr><td>Description</td><td>The last error that occurred is stored in LI.41. The table shows for the most significant hex-value "3" the error E.OP (overvoltage).
Before that the error E.OL (LI.42=2xxx) occurred. Because it concerns two different errors, no time difference was stored.
In LI.43 and LI.44 the error E.OH is stored. Since these errors are of the same type, a time difference (here „023“) is stored in the three low-order words of LI.43. The hexadecimal value of 23 corresponds to a time difference of 35 minutes in decimal.
No errors are stored in LI.45…48.</td></tr>
</table>

LI.50 AN1 Display before amplification

Value range	Description
0…65535	The parameter shows the value of the analog signal AN1 before the characteristic amplification in percent. Depending on the setpoint setting the displayed value of 0…±100 % corresponds to 0…±10 V, 0…±20 mA or 4…20 mA.

LI.51 AN1 Display after amplification

Value range	Description
0…±400 %	The parameter shows the value of the analog signal AN1 after running through the characteristic amplification in percent. The value range is limited to ±400 %.

LI.52 AN2 Display before amplification

Value range	Description
0…±100 %	The parameter shows the value of the analog signal AN2 before the characteristic amplification in percent. Depending on the setpoint setting the displayed value of 0…±100 % corresponds to 0…±10 V, 0…±20 mA or 4…20 mA.

LI.53 AN2 Display after amplification

Value range	Description
0…±400 %	The parameter shows the value of the analog signal AN2 after running through the characteristic amplification in percent. The value range is limited to ±400 %.

3.8 Adjustment of analog inputs and outputs

Display	Name	Setting Range	Default setting
LA.00	Display	„AnLog“	-
LA.01	AN1 setpoint selection	0…2	0
LA.02	AN1 interference filter	0…4	0
LA.03	AN1 zero point hysteresis	0…±10 V	0,2 V
LA.04	AN1 amplification	0,00…±20,00	1,00
LA.05	AN1 Offset X	0,0…±100,0 %	0,0 %
LA.06	AN1 Offset Y	0,0…±100,0 %	0,0 %
LA.07	AN1 lower limit	0,0…±400,0 %	-400,0 %
LA.08	AN1 upper limit	0,0…±400,0 %	400,0 %
LA.09	AN2 setpoint selection	0…2	0
LA.10	AN2 interference filter	0…4	0
LA.11	AN2 zero point hysteresis	0…±10 V	0,2 V
LA.12	AN2 amplification	0,00…±20,00	1,00
LA.13	AN2 Offset X	0,0…±100,0 %	0,0 %
LA.14	AN2 Offset Y	0,0…±100,0 %	0,0 %
LA.15	AN2 lower limit	0,0…±400,0 %	-400,0 %
LA.16	AN2 upper limit	0,0…±400,0 %	400,0 %
LA.17	Selection REF-input/AUX-function	32768	2112
LA.23	Rope weight	0…500 kg	0

LA.00 Display of the current parameter group „AnLog“

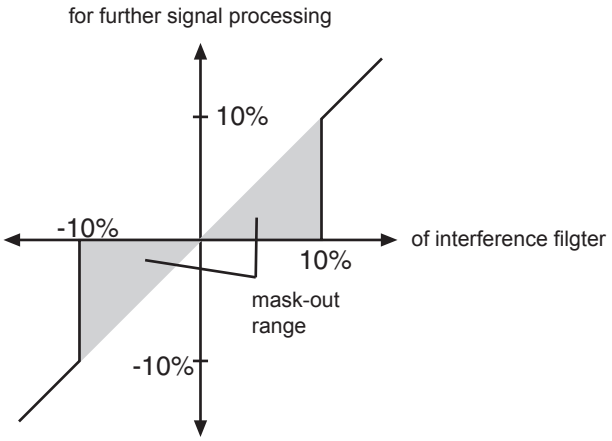
LA.01 AN1 Setpoint selection

Input	Setting	Signal	Description
0	x	0…±10 V	Depending on the setting the analog input can process the listed setpoint signals.
1		0…±20 mA	
2		4…20 mA	

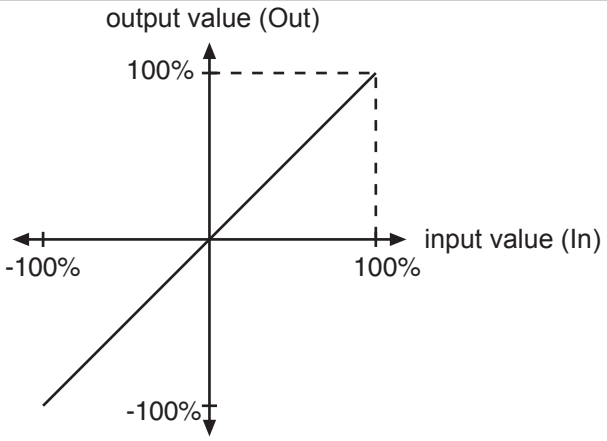
LA.02 AN1 Interference filter

Input	Setting	Average value from	Description
0	x	none	A query of the analog signal takes place every millisecond. The interference filter shall suppress interferences and ripples of the input signal, by forming the average value from 2, 4, 8 or 16 scanned values for further processing.
1		2 values	
2		4 values	
3		8 values	
4		16 values	

LA.03 AN1 zero point hysteresis

Value range	Setting	Description
0…±10 %	0,2 %	Through capacitive as well as inductive coupling on the inputs lines or voltage fluctuations of the signal source, the motor connected to the inverter can drift („vibrate“). during standstill in spite of the analog input filter. It is the job of the zero point hysteresis to suppress this. The parameter masks out the analog signal in the adjusted value range. The value applies to both directions of rotation. If a negative percentage is adjusted, the hysteresis acts in addition to the zero point also around the current setpoint value. Setpoint changes are accepted only if they are larger than the adjusted hysteresis.
Fig. LA.03: Zero Point Hysteresis		

LA.04 AN1 amplification

Value range	Setting	Description
0,00…±20,00	1,00	The amplification of the input signal is adjusted with this parameter. At an amplification of 1.00 the input value corresponds to the output value.
Fig. LA.04: Amplification of´the analog input signal		
Formula for the calculation of the output value		Out = amplification • (In - Offset X) + Offset Y

LA.05 AN1 Offset X

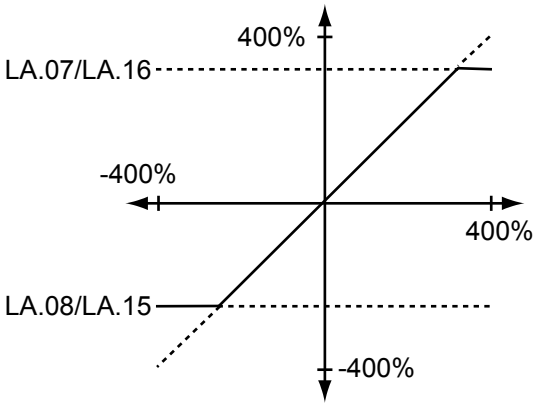
Value range	Setting	Description
0,0…±100,0 %	0,0 %	The parameter shifts the input characteristic on the X-axis.

LA.06 AN1 Offset Y

Value range	Setting	Description
0,0…±100,0 %	0,0 %	This parameter shifts the input characteristic on the Y-axis.

LA.07 AN1 lower limit

LA.08 AN1 upper limit

Value range	Setting	Description
0,0…±400,0	LA.07 -400,0 LA.08 +400,0	The parameter serves for the limitation of the analog signal AN1 after the amplifier stage. As no interacting locking exists, it must be observed, that the lower limit is adjusted smaller than the upper limit. (Exception F5-M: In case of lower limit > upper limit then output value = lower limit).
Fig. LA.07/08: Limitation of the analog input signal AN1		

LA.09 AN2 setpoint selection

Input	Setting	Signal	Description
0	x	0…±10 V	Depending on the setting the analog input can process the listed setpoint signals.
1		0…±20 mA	
2		4…20 mA	

LA.10 AN2 interference filter

Input	Setting	Average value from	Description
0	x	none	A query of the analog signal takes place every millisecond. The interference filter shall suppress interferences and ripples of the input signal, by forming the average value from 2, 4, 8 or 16 scanned values for further processing.
1		2 values	
2		4 values	
3		8 values	
4		16 values	

LA.11 AN2 zero point hysteresis

Value range	Setting	Description
0…±10 %	0,2 %	see LA.03

LA.12 AN2 amplification

Value range	Setting	Description
0,00…±20,00	1,00	see LA.04

LA.13 AN2 Offset X

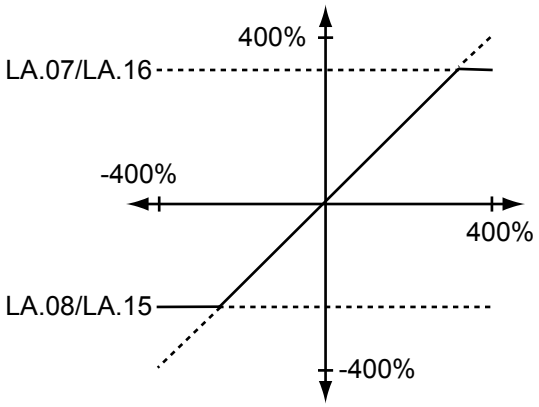
Value range	Setting	Description
0,0…±100,0 %	0,0 %	The parameter shifts the input characteristic on the X-axis.

LA.14 AN2 Offset Y

Value range	Setting	Description
0,0…±100,0 %	0,0 %	The parameter shifts the input characteristic on the Y-axis.

LA.15 AN2 lower limit

LA.16 AN2 upper limit

Valuer range	Setting	Description
0,0…±400,0	LA.15 -400,0 LA.16 +400,0	The parameter serves for the limitation of the analog signal AN2 after the amplifier stage. As no interacting locking exists, it must be observed, that the lower limit is adjusted smaller than the upper limit. (Exception F5-M: In case of lower limit > upper limit then output value = lower limit).
Fig. LA.15/16: Limitation of the analog input signal AN2		

LA.17 Selection REF-input/AUX-function

To allow further expansions not all values are defined in the bit groups. Undefined values have the same function as the value 0. The sum of the values is to be entered.

Bit	Input	Setting	Function	Description
0…2	0	x	AN1	Selection of the analog input (AN1, AN2, AN3) as REF analog
	1		AN2	
	2		AN3	
3…5	0	x	Source1	Mode of the AUX-function
	8		Source1+ Souce2	
	16		Source1 • (100 %+Source2)	
	24		Source1•Source2	
	32		Source1 absolute	
6…10	0		AN1	Selection of Source1 for the AUX-function
	64	x	AN2	
	128		Setpoint value in percent	
	192		Motor potentiometer	
	256		Technology controller	
	320		AN3	
11…15	0		AN1	Selection of Source2 for the AUX-function
	2048	x	AN2	
	4096		Setpoint value in percent	
	6144		Motor potentiometer	
	8192		Technology controller	

3.9 Adjustment of pretorque function

1) Preparations
- Enter motor data
- Connect load weighing equipment to X2A.3 and X2A.4
- Switch on the pretorque with Lb.7 =1
- Drive the cabine to the middle of the shaft
- Remain at the same position in the shaft when carrying out the measurements
- Carry out measurements during standstill of the motor after the brake has released
- Adjust the brake release time to 3 s to get a better measurement

2) Measurement with empty cabine
- Measure the signal of the load weighing equipment with LI.52. This value „L1“ is displayed in percent.
- Measure the torque including the sign with LI.10.
- Calculate the torque "T1" in percent according to formula: T1 = LI.10 • 100 / motor rated torque.

3) Measurement with 100% load in the cabine
- Measure the signal of the load weighing equipment with LI.52. This value „L2“ is displayed in percent.
- Measure the torque including the sign with LI.10.
- Calculate the torque "T2" in percent according to formula: T2 = LI.10 • 100 / motor rated torque.

4) Calculate the amplification according to formula LA.12 = (T1-T2)/(L1-L2).

5) Calculate the Offset according to formula LA.14 = LA.12•L1-T1.

6) Enter the caluculated values in LA.12 and LA.14.

Examples

Example 1:	Payload	2000 kg	
	Speed	1 m/s	
	Motor rated torque	1200 Nm	
	Counterweight balance	50 %	
Empty cabine	LI.52 = L1 = 0 % (0 V)	LI.10 = +1200 Nm	T1 = +100 %
Full cabine	LI.52 = L2 = 100 % (10 V)	LI.10 = -1200 Nm	T2 = -100 %
Gain	LA.12 = (100 %-(-100 %))/(0 %-100 %) = -2		
Offset	LA.14 = -2•0 %-100 % = -100 %		

Example 2:	Payload	2000 kg	
	Speed	1 m/s	
	Motor rated torque	1000 Nm	
	Counterweight balance	45 %	
	Load weighing signal has an Offset of -0,5 V and can give out only 8 V at 100 %.		
Empty cabine	LI.52 = L1 = -5 % (-0,5 V)	LI.10 = 1080 Nm	T1 = +108 %
Full cabine	LI.52 = L2 = 80 % (+8 V)	LI.10 = -1320 Nm	T2 = -132 %
Gain	LA.12 = (108 %-(-132 %))/(-5 %-80 %) = -2,82		
Offset	LA.14 = -2,82•(-5 %)-108 % = -93,9 %		

Example 3:	Same system data as in example 2, but the installed motor is rotated by 180°.		
Empty cabine	LI.52 = L1 = -5 %	LI.10 = -1080 Nm	T1 = -108 %
Full cabine	LI.52 = L2 = 80 %	LI.10 = +1320 Nm	T2 = +132 %
Gain	LA.12 = (-108 %-132 %)/(-5 %-80 %) = 2,82		
Offset	LA.14 = -2,82•(-5 %)-(-108 %) = +93,9 %		

LA.23 Rope weight

Value range	Setting	Description
0…500 kg	0 kg	Enter the weight of the free-hanging part of the suspension rope at maximum length.

4. Start-up

Adjust the parameters in ascending order, because by doing so partial pre-adjustments of the unit are initiated. Start with the basic settings (Lb-parameter). Store the adjusted data by pressing the „Enter“-key.

4.1 Start-up of an asynchronous motor without speed encoder with gearbox

The following procedure is recommended for the start-up of the COMBIVERT F5 Lift with a gearbox-fitted asynchronous motor:

Lb.03: Selection of the appropriate motor type (Lb.03= A G/ 0:ASM closed loop geared)
Lb.05: Select the mode of setpoint setting
Ld.01
to
Ld.06: Enter the motor data according to the name plate.
Ld.07: Enter or calibrate winding resistance.
LF.01
to
LF.05: Adjust the data of the elevator.
LF.10 set to 0 = open-loop operation
LF.20
to
LF.27: Adjustment of the corresponding speeds.
LF.30
to
LF.36: Adjustment of the drive profile.
LF.40: Adjustment of the brake release time. A time that is too short causes a starting jerk against the brake. A time that is too long causes the rolling back after the brake is released. Experience values: 0.2…0.5 s.
LF.41: Adjustment of the brake apply time. A time that is too short causes a rolling back before the brake is completely applied. A time that is too short causes a rolling back before the brake is completely applied. A time that is too long results in a dropout-delay of the main contactors. Experience values: 0.3…0.7 s.
LF.49: If the motor temperature shall be monitored, enter the corresponding values.

Carry out following checks/optimizations during some test rides:

- Load-dependent driving can be optimized by lowering the rated motor speed in steps of 10 rpm.
- Measure the motor speed during an inspection ride with a hand-held tacho. It should nearly be the same speed at „Empty-up“ and „Empty-down“.
- Deviations within the range of 5…10 rpm are normal.
- The rolling back at releasing the brake or at stopping can be optimized by increasing LF.16 in steps of 0.5%.

4.2 Start-up of an asynchronous motor with speed encoder and gearbox

Lb.03: Selection of the appropriate motor type (Lb.03= AG/ 0: ASM closed loop geared)
Lb.05: Select the mode of setpoint setting
Ld.01
to
Ld.06: Enter the motor data according to the name plate.
Ld.11: If necessary, limit the maximum torque for normal operation.
Ld.20: Possible limitation of the maximum torque for UPS operation, to protect the UPS (uninterruptible power supple) against overload..
LC.12: Adjust the increments per revolution of the motor encoder.
LF.01
to
LF.05: Adjust the data of the elevator.
LF.20
to
LF.27: Adjustment of the corresponding speeds.
LF.30
to
LF.36: Adjustment of the drive profile.
LF.40: Adjustment of the brake release time. A time that is too short causes a starting jerk against the brake. A time that is too long causes the rolling back after the brake is released. Experience values: 0.2…0.5 s.
LF.41: Adjustment of the brake apply time. A time that is too short causes a rolling back before the brake is completely applied. A time that is too long results in a dropout-delay of the main contactors. Experience values: 0.3…0.7 s.
LF.49: If the motor temperature shall be monitored, enter the corresponding value.

Carry out following checks/optimizations during some test rides:
- Is the desired travel direction (up/down) maintained?
- Compare setpoint speed LI.03 with actual speed LI.04. The sign of both speed displays in the same travel direction must be the same (positive is not displayed). If the sign is not equal, an encoder track change must be made with LC.13. In addition to that the travel direction can also be changed:
- Optimization of the load transfer by increasing LF.13 in steps of 500, if the drive turns away too much on releasing the brake.

4.3 Start-up of a synchronous motor with speed encoder without gearbox

Lb.01: Input of password
Lb.03: Select the appropriate motor type (Lb.03=S GL/ 3: SSM closed loop gearless)
Lb.05: Select the mode of setpoint setting
Lb.10: Decide, whether you want to assign other functions to the digital in-/outputs.
Lb.18: If you want to know the energy losses on the braking resistor, enter the value of the brake resistor
Ld.02
to
Ld.10: Enter the motor data according to the name plate.
Ld.12: Possibly adjust torque limit, to protect the drive against overload during acceleration.
Ld.14: If winding resistance (Ld.08) and winding inductance (Ld.09) are not known, they can be measured with Ld.14.
Ld.20: Possibly adjust torque load, to protect the UPS (uninterruptible power supply) against overload.
LC.12: Enter the increments per revolution of the motor encoder.
LC.16: Enter the system position value. If it is not known, it must be calibrated with LC.18="1" + start command. This procedure should be repeated three times.
If the values of LC.16 should deviate more than 2500 increments, calibration by LC.15 is required.
LF.01
to
LF.05: Enter the data for the elevator.
LF.03: Set gear reduction ratio to „1" .
LF.20
to
LF.27: Setting of the corresponding speeds.
LF.30
to
LF.36: Setting the value for the drive profile.
LF.40: Set the brake release time. A time that is too short causes a starting jerk against the brake. A time that is too long delays the start. Experience values: 0.3…0.8 s.
LF.41: Set the brake apply time. A time that is too short causes a rolling back before the brake is completely applied. A time that is too long results in a dropout-delay of the main contactors. Experience values: 0.3…0.7 s.

Carry out following checks/optimizations during some test rides:
- Rolling back upon releasing the brake or at stopping can be optimized by increasing LF.13 in steps of 500.
- For fast plants it may be necessary to use the torque precontrol, to ensure a perfect load transfer.
- Starting can be significant improved by LF.52/LF.53 at rucksack lifts.

5. Error Diagnosis

At KEB COMBIVERT error messages are always represented with an "E." and the appropriate error code in the display. Error messages cause the immediate deactivation of the modulation. Restart possible only after reset or autoreset.
Malfunctions are represented with an "A." and the appropriate message. Reactions to malfunctions can vary.
Operating messages during the start-up phase start with an "S".
In the following the display indications and their cause are described.

Display	COMBIVIS	Value	Meaning
	Status Messages		
bbL	base block	76	Power modules for motor de-excitation locked
bon	close brake	85	Brake control, brake engaged
boFF	open brake	86	Brake control, brake released
Cdd	Calculate drive	82	Measurement of the motor stator resistance.
dcb	DC brake	75	Motor is decelerated by a DC voltage at the output.
dLS	Low speed / DC brake	77	Modulation is switched off after DC-braking .
FAcc	Forward acceleration	64	Acceleration with the adjusted ramps in clockwise direction of rotation.
Fcon	Forward constant	66	Acceleration / deceleration phase is completed and it is driven with constant speed / frequency in clockwise direction of rotation.
FdEc	Forward deceleration	65	It is stopped with the adjusted ramp times in clockwise direction of rotation.
HCL	Hardware current limit	80	The message is output if the output current reaches the hardware current limit.
LAS	LA stop	72	This message is displayed if during acceleration the load is limited to the adjusted load level.
LdS	Ld stop	73	This message is displayed if during deceleration the load is limited to the adjusted load level or the DC-link current to the adjusted voltage level.
LS	Low speed	70	No direction of rotation pre-set, modulation is off.
nO_PU	Power unit not ready	13	This message is displayed if during deceleration the load is limited to the adjusted load level or the DC-link current to the adjusted voltage level.
noP	No operation	0	Control release (terminal ST) is not switched.
PA	Positioning active	122	This message is displayed during a positioning process.
PLS	Low speed / power off	84	No modulation after Power-Off.
PnA	Position not reachable	123	The specified position cannot be reached within the pre-set ramps. The abort of the positioning can be programmed.
POFF	Power off function	78	Depending on the programming of the function the inverter restarts automatically upon system recovery or after a reset.
POSI	Positioning	83	Positioning function active (F5-G).
rAcc	Reverse acceleration	67	Acceleration with the adjusted ramp times in anti-clockwise direction of rotation.
rcon	Reverse constant	69	Acceleration / deceleration phase is completed and it is driven with constant speed / frequency in clockwise direction of rotation.
rdEc	Reverse deceleration	68	It is stopped with the adjusted ramp times in anti-clockwise direction of rotation.
rFP	Ready for positioning	121	The drive signals that it is ready to start the positioning process.
SLL	Stall	71	This message is displayed if during constant operation the load is limited to the adjusted current limit.
SrA	Search for ref. active	81	Search for reference point approach active.
SSF	Speed search	74	Speed search function active, that means that the inverter attempts to synchronize onto a running down motor.

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Display	COMBIVIS	Value	Meaning
STOP	Quick stop	79	The message is output if as response to a warning signal the quick-stop function becomes active.
	Error Messages		
E. br	Error! Brake control	56	Error: can occur in the case of switched on brake control, if
			the load is below the minimum load level at start up or the absence of an engine phase was detected
			the load is too high and the hardware current limit is reached
E.buS	Error! Watchdog	18	Adjusted monitoring time (Watchdog) of communication between operator and PC / operator and inverter has been exceeded.
E.Cdd	Error! Calculation drive data	60	Error: During the automatic motor stator resistance measurement.
E.co1	Error! Encoder counter overflow 1	54	Counter overflow encoder channel 1.
E.co2	Error! Encoder counter overflow 2	55	Counter overflow encoder channel 2.
E.dOH	Error! Drive overheat	9	Error: Overtemperature of motor PTC at terminals T1/T2. Error can only be reset at E.ndOH, if PTC is again low-resistance. Causes:
			resistance at the terminals T1/T2 >1650 Ohm
			motor overloaded
			line breakage to the temperature sensor
E.dri	Error! Driver relay	51	Error: Driver relay. Relay for driver voltage on power circuit has not picked up even though control release was given.
E.EEP	Error! EEPROM defective	21	After reset the operation is again possible (without storage in the EEPROM)
E. EF	Error! Speed deviation	31	Set speed and actual speed are different (see LF.46, LF.47, LF.48 and LF.51)
E.EnC	Error! Encoder cable	32	Cable breakage on resolver or incremental encoder
E.Hyb	Error! Hybrid	52	Invalid encoder interface identifier.
E.HybC	Error! Hybrid changed	59	Error: Encoder interface identifier has changed, it must be confirmed over ec.00/ LC.11 or ec.10/ LC.21.
E.iEd	Error! Input error detect	53	Hardware error at the NPN-/PNP changeover or the start/stop measurement.
E.Inl	Error! Initialisation MFC	57	MFC not booted.
E.LSF	Error! Load shunt fault	15	Load-shunt relay has not picked up. Occurs for a short time during the switch-on phase, but must automatically be reset immediately. If the error message remains the following causes may be applicable:
			load-shunt defective
			input voltage wrong or too low
			high losses in the supply cable
			braking resistor wrongly connected or damaged
			braking module defective
E.ndOH	No error drive overheat	11	Motor temperature switch or PTC at the terminals T1/T2 is again in the normal operating range. The error can then be reset.
E.nOH	No error over heat power module	36	Temperature of the heat sink is again in the permissible operating range. The error can be reset now.
E.nOHI	No error internal overheat	7	No longer overheating in the interior E.OHI, interior temperature has fallen by at least 3°C, error can be reset.

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Display	COMBIVIS	Va-lue	Meaning
E.nOL	No error overload	17	No more overload, OL-counter has reached 0%; after the error E.OL a cooling phase must elapse. This message appears upon completion of the cooling phase. The error can be reset now. The inverter must remain switched on during the cooling phase.
E.nOL2	No error overload 2	20	The cooling time has elapsed. The error can be reset.
E. OC	Error! Overcurrent	4	Occurs, if the specified peak current is exceeded. Causes:
			acceleration ramps too short
			the load is too big at turned off acceleration stop and turned off constant current limit
			short-circuit at the output
			short-circuit at the output
			deceleration ramp too short
			motor cable too long
			EMC
			DC brake at high ratings active
E. OH	Error! Overheat power module	8	Overtemperature of power module. Error can only be reset at E.nOH. Causes:
			insufficient air flow at the heat sink (soiled)
			ambient temperature too high
			ventilator clogged
E.OH2	Error! Motor protection	30	Electronic motor protective relay has tripped.
E.OHI	Error! Internal overheat	6	Error: Overheating in the interior: error can only be reset at E.nOHI, if the interior temperature has dropped by at least 3 °C
E. OL	Error! Overload (Ixt)	16	Error: Overload error can only be reset at E.nOL, if OL-counter reaches 0% again. Occurs, if an excessive load is applied longer than for the permissible time (see technical data).Causes:
			poor control adjustment
			mechanical fault or overload in the application
			inverter not correctly dimensioned
			motor wrongly wired
			encoder damaged
E.OL2	Error! Overload 2	19	Occurs if the standstill constant current is exceeded (see technical data and overload characteristics). The error can only be reset if the cooling time has elapsed and E.nOL2 is displayed.
E. OP	Error! Overvoltage	1	Voltage in the DC-link circuit too high. Occurs when the DC bus voltage rises above the permissible value. Causes:
			poor controller adjustment (overshooting)
			input voltage too high
			interference voltages at the input
			deceleration ramp too short
			braking resistor defective or too small
E.OS	Error! Over speed	58	The speed lies outside the specified limits (LF.43)
E.PFC	Error! Power factor control	33	Error in the power factor control
E.PrF	Error! Prot. rotation forward	46	The drive has driven onto the right limit switch. Programmed response „Error, restart after reset”.
E.Prr	Error! Prot. rotation reverse	47	The drive has driven onto the left limit switch. Programmed response „Error, restart after reset”.
E. Pu	Error! Power unit	12	General power circuit fault (e. g. fan)

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Display	COMBIVIS	Value	Meaning
E.Puci	Error! Unknown power unit	49	Error: During the initialization the power circuit could not be recognized or was identified as invalid.
E.Puch	Error! Power unit changed	50	Error: Power circuit identification was changed; with a valid power circuit this error can be reset by writing to SY.3. If the value displayed in SY.3 is written, only the power-circuit dependent parameters are reinitialized. If any other value is written, then the default set is loaded. On some systems after writing Sy.3 a Power-On-Reset is necessary.
E.PUCO	Error! Power unit communication	22	Error: Parameter value could not be written to the power circuit. Acknowledgement from LT <> OK
E.SbuS	Error! Bus synchron	23	Sychronization over sercos-bus not possible. Programmed response „Error, restart after reset”.
E.SEt	Error! Set	39	It has been attempted to select a locked parameter set. Error!
E.SLF	Error! Software limit switch forward	44	The target position lies outside of the limit defined with the right software limit switch. Error!
E.SLr	Error! Software limit switch reverse	45	The target position lies outside of the limit defined with the left software limit switch. Error!
E. UP	Error! Underpotential	2	Undervoltage (DC-link circuit). Occurs when the DC bus voltage drops below the permissible value. Causes:
			input voltage too low or instable
			inverter rating too small
			voltage losses through wrong cabling
			the supply voltage through generator / transformer breaks down at very short ramps
			if a digital input was programmed as external error input with error message E.UP.
E.UPh	Error! Phase failure	3	One phase of the input voltage is missing (ripple-detection)
	Warning messages		
A.buS	Warning! Watchdog	93	Watchdog for communication between operator/control card or operator/PC has responded. The response to this warning can be programmed.
A.dOH	Warning! Drive overheat	96	The motor temperature has exceeded an adjustable warning level. The switch off time is started. The response to this warning can be programmed. This warning can be generated only with a special power circuit.
A. EF	Warning! External fault	90	This warning is triggered via an external input. The response to this warning can be programmed.
A.ndOH	All-clear! Drive overheat	91	The motor temperature is again below the adjusted warning level. The switch off time is stopped.
A.nOH	All-clear! Overheat power module	88	The heat sink temperature is again below the adjusted warning level.
A.nOHI	All-clear! Internal overheat	92	The temperature in the interior of the inverter is again below the warning threshold.
A.nOL	All-clear! Overload	98	OL counter has reached 0 %, the warning “overload“ can be reset.
A.nOL2	All-clear! Overload 2	101	The cooling time after “Warning! Overload during standstill" has elapsed. The warning message can be reset.
A. OH	Warning! Overheat power module	89	A level can be defined, when it is exceeded this warning is output. The response to this warning can be programmed.
A.OH2	Warning! Motor protection	97	Warning: electronic motor protective relay has tripped. The response to this warning can be programmed.
A.OHI	Warning! Internal overheat	87	The temperature in the interior of the inverter lies above the permissible level. The switch off time was started. The programmed response to this warning message is executed.

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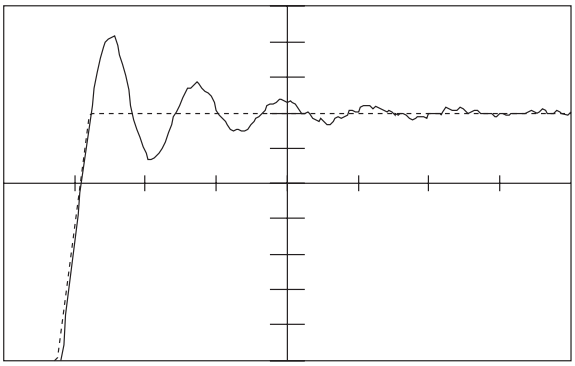
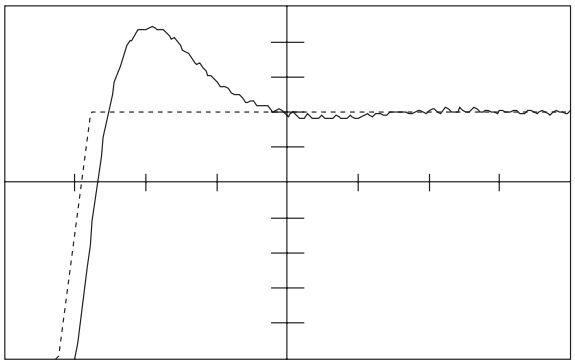
Display	COMBIVIS	Value	Meaning
A. OL	Warning! Overload	99	A level between 0 and 100 % of the load counter can be adjusted, when it is exceeded this warning is output. The response to this warning can be programmed.
A.OL2	Warning! Overload 2	100	The warning is output when the standstill continuous current is exceeded (see technical data and overload characteristics). The response to this warning can be programmed. The warning message can only be reset after the cooling time has elapsed and A.nOL2 is displayed.
A.PrF	Warning! Prot. rotation forward	94	The drive has driven onto the right limit switch. The response to this warning can be programmed.
A.Prr	Warning! Prot. rotation reverse	95	The drive has driven onto the left limit switch. The response to this warning can be programmed.
A.SbuS	Warning! Bus synchron	103	Sychronization over sercos-bus not possible. The response to this warning can be programmed.
A.SEt	Warning! Set	102	It has been attempted to select a locked parameter set. The response to this warning can be programmed.
A.SLF	Warning! Software limit switch forward	104	The target position lies outside of the limit defined with the right software limit switch. The response to this warning can be programmed.
A.SLr	Warning! Software limit switch reverse	105	The target position lies outside of the limit defined with the left software limit switch. The response to this warning can be programmed.
Messages during the start-up phase			
S.cc	contactor closed	143	Contactor control input not reset
S.co	contactor open	141	Setpoint selection without contactor control input
S.Ebd	both directions	144	Both directions of motion actuated simultaneously
S.Ebr	Error brake	142	Brake does not release
S.io	illegal operation	140	Setpoint selection without control release
Other messages			
idata	invalid data		Adjustments unknown. Select correct adjustment with "Up/ Down" keys.

6. Adjustment Speed Controller of F5 Lift with "speed jump"

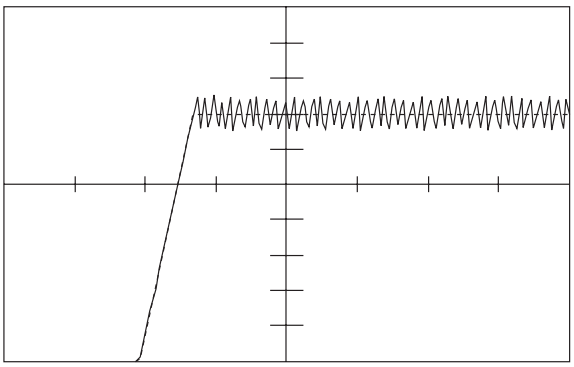
1. Open control release (terminal X2A.16) => frequency inverter in status *„noP“*
2. Select closed loop operation => Parameter LF.10 = 2
3. Motor without load
4. Set parameters LF.30, LF.31, LF.32 to maximum values
5. Give drive command and measure ru.02/ LI.03 and ru.09/ LI.04



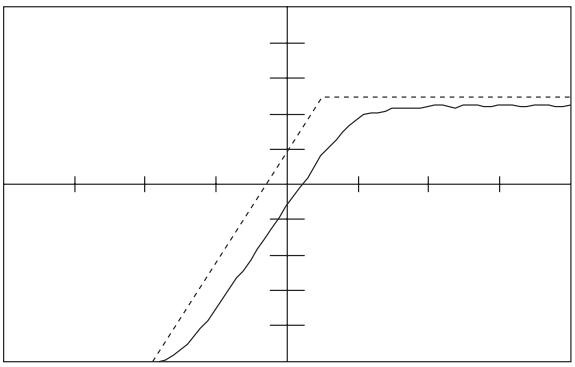
Problem	Very long transient process
Solution	Increase KP speed (LF.11); eventually reduce KI spped (LF.12)



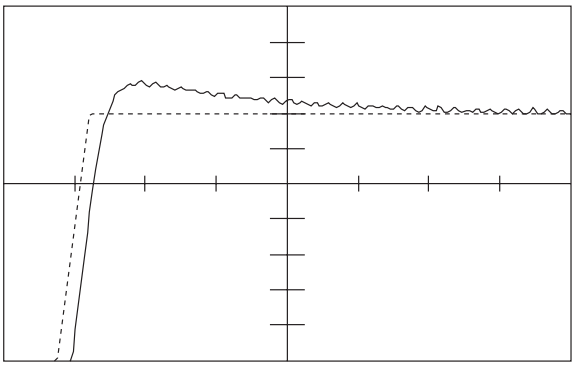
Problem	Very long speed overshoot
Solution	Increase KP speed (LF.11); eventually reduce KI spped (LF.12)



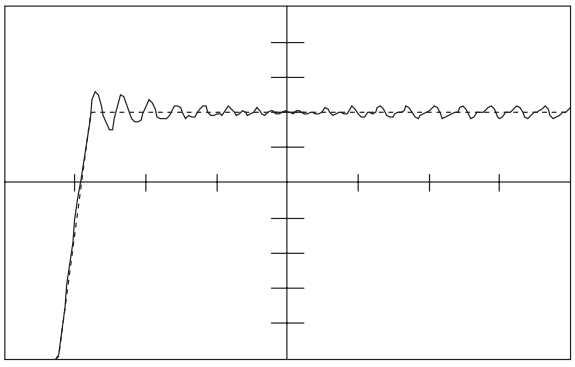
Problem	Sustained oscillation short billowy, noises, vibes
Solution	Decrease KP speed (LF.11)



Problem	Transient too slow / remaining system deviation
Solution	Increase KI speed (LF.12)



Problem	Overshoot too long, strong speed decreases at load change
Solution	Increase KI speed (LF.12)



Problem	Sustained oscillation long billowy
Solution	Reduce KI speed (LF.12) and / or reduce KP speed (LF.11)

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