BETRIEBSANLEITUNG

INSTRUCTION MANUAL

3

KEB COMBIVERT F4-F Lift

Version 1.2

Aufzugstechnik

Lift Technology

00.F4.L1B-K120

KEB ANTRIEBSTECHNIK

04/97

This manual
– is valid for frequency inverter **KEB COMBIVERT F4-F Lift**
– must be made available to every user

Before working with this unit you must familiarize yourself with it. Pay special attention to the safety and warning guides. Make sure to read 'Technical Documentation Part 1'.

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The pictographs used in this manual mean:

Danger
Warning
Caution

Used when the life or health of the user is exposed to danger or considerable damage to property can occur.

Attention

Must be observed!
Special instructions for a safe and trouble-free operation.

Information

Help, Tip

1.1 Application

The frequency inverter **KEB COMBIVERT F4-F Lift** is a drive component, which is specified for lift technology. The frequency inverter is exclusively for stepless open loop /closed loop speed control of three-phase asynchronous motors and permanent magnet motors. The operation of other electrical consumers is not permitted and can lead to the destruction of the unit.

1.2 Protective Separation

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The connections of the terminal strip and encoder inputs are safely isolated in accordance with VDE 0100. The person who installs the system/machine must make sure that the wired circuit, whether new or old, meets the VDE requirements.

1.3 Interference Protection of Electric Systems

The frequency inverter **KEB COMBIVERT** transmits electromagnetic waves of high frequency. To reduce arising interference pulses, that may effect electric systems in the vicinity of the frequency inverter, do the following:

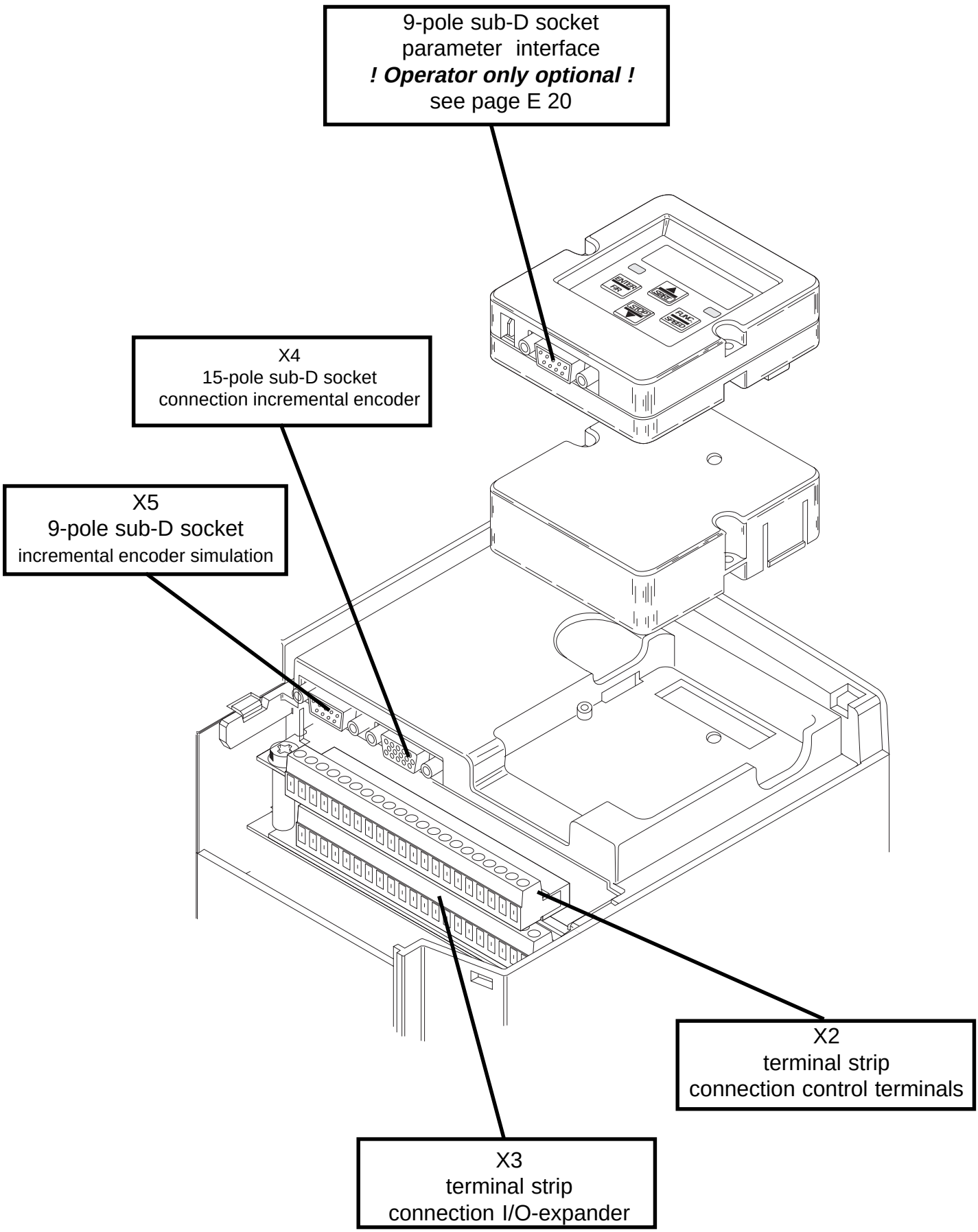
– Install the frequency inverter in metal housing
– Shielded motor cables must be used
  The shield must be connected onto the frequency inverter PE and to the housing of the motor (connect extensive shield). Do not use the shielding as protective earthing. The shield can only operate safely when the shield is not interuppted and is as close as possible to the frequency inverter and motor.
– Good earthing (metal ribbon-cable or 10 mm^2 earth lead)
– Use radio interference suppression filters

1.4 Interference Protection of the Frequency Inverter

The control and power inputs of the frequency inverter are protected against interferences.
For more operational reliability and additional protection against malfunctions take notice of these measures:

– Use of mains filter, when the mains voltage is affected by the connection of large consumers (reactive-power compensation equipment, HF-furnaces etc.)
– Protective wiring of inductive consumers (solenoid valves, relays, electromagnets) with RC elements or similar devices to absorb the energy when the unit is switched off.
– Install wires, as described in the connection directions, to avoid inductive and capacitive coupling of interference pulses.
  Paired-twisted cables protect against inductive parasitic voltages, shielding provides protection against capacitive parasitic voltages. Optimal protection is achieved with twisted and shielded cables when signal and power lines are installed separately.

! see also Instruction Manual part 2 !


9-pole sub-D socket
parameter interface
! Operator only optional !
see page E 20
X4
15-pole sub-D socket
connection incremental encoder
X5
9-pole sub-D socket
incremental encoder simulation
X2
terminal strip
connection control terminals
X3
terminal strip
connection I/O-expander

3.1 Terminal X2
Control Terminals

Terminal	Function	
1	Control Release	digital inputs: noise immunity: 2 kV logic 1: ± 12…30 V internal input resistor: approx. 2 kΩ PNP-logic
2	Reset	
3	Direction of travel forward	
4	Direction of travel reverse	
5	Control Mode	
6	Door drive active	
7	Door drive setpoint input	
8	Digital output signal: braking control	see page E 10
9	Digital output signal: main protection control inverted	see page E 10
10	+ 18 V voltage output	+18V (+/- 20%) ; max. 20 mA **! When external voltage is connected to terminal X2.23 then $U_{X2.10} \approx U_{X2.23}$!**
11	Ground for X2.10 and digital inputs/outputs	
12	+10 V reference voltage	+10V (+/- 3%) ; max. 6 mA
13	Ground for analog inputs/outputs	
14	Analog setpoint input **(see parameter LF.2)**	Differential voltage input / resolution: 12 Bit Ri = 40 kΩ Smoothing time: 2 ms / processing time: 1...3 ms
15		
16	***Option ! do not connect !***	
17	***Option ! do not connect !***	
18	Analog output set speed	-10V…+10V / resolution: 8 Bit Ri = 100 Ω conditional short-circuit proof(<1 min) 0...10V $\hat{=}$ 0...2 x synchronous speed
19	Analog output actual speed	
20	Relay control cabinet fan control (LF.66)	30 VDC / 1 A see page E 17
21		
22		
23	External voltage supply	+ 24 ... + 30 V external voltage input for digital outputs on terminal strip X2

3.2 Terminal X3
I/O-Expander

Terminal	Function		
1	Digital input signal: contactor control (see page E9)	**max. voltage endurance to ground: 100V**	
2	Setpoint input control speed: V_B	**digital inputs for setpoint activation**	
3	Setpoint input positioning speed: V_E	***! only valid with LF.2 = 2 !***	
4	Setpoint input rated speed: V_N	**max. voltage endurance to ground: 100V**	
5	Setpoint input inspection speed: V_I		
6	Setpoint input intermediate speed 1: V_1	**terminal assignment with binary coded**	
7	Setpoint input intermediate speed 2: V_2	**set value selection, see page E 24 - E 25**	
8	***Option ! do not connect !***		
9	External supply voltage	+ 24 V external voltage input	
10		for relay outputs on terminal X3	
11	Ground for X3.9/X3.10		
12			
13	Signal: ready / overspeed	≈ $U_{X3.9/X3.10}$ / 500 mA	see page E 10
14	Signal: switching frequency warning	≈ $U_{X3.9/X3.10}$ / 500 mA	see page E 10
15	Relay contact: braking control	30 V DC / 1A	see page E 10
16			
17	Signal: delay control	≈ $U_{X3.9/X3.10}$ / 500 mA	see page E 11
18	Relay contact: positioning speed	30 V DC / 1A	see page E 11
19			
20	Signal: main contactor triggering	30 V DC / 1A	see page E 11
21			
22	Signal: DC monitoring	≈ $U_{X3.9/X3.10}$ / 500 mA	see page E 11
23	Signal: motor temperature warning	≈ $U_{X3.9/X3.10}$ / 500 mA	see page E 11

3.3 Function of the Digital Inputs

Terminal	Description
X2.1 Control Release	To control the power modules the input must have +24V. If the input is not set, the inverter shows the message „nOP“ (no operation). **!Observe the operating sequence of the inputs/outputs!** see also ‘Control of the main drive’ page E12/E13
X2.2 Reset	With the falling edge of a +24V pulse, the error message (E.xxx) is reset. **Exception:** The error message „E.OS" (error, overspeed) can only be reset by switching off the inverter.
X2.3 Direction of Travel Forward	When the input is set at +24V a clockwise rotating field is produced on the output side. The inverter shows the direction of travel in the indication (F.xxx). The set speed has a positive display. Whether the cabin moves up or down, depends on the phase sequence of the motor wiring and how the hoist is set up in the machine room. **Note:** If the entries for forward (X2.3) and reverse (X2.4) are simultaneously set, the input forward has priority. To change the direction of travel you can only use one input (X2.3). If no direction of travel is selected and the input control release is set, then LS (low speed) appears in the display.
X2.4 Direction of Travel Reverse	When the input is set at +24 V, a reverse rotating field is produced on the output side.The inverter shows the direction of travel in the indication (r.xxx). The display of the set speed has a negative sign. Whether the cabin moves up or down, depends on the phase sequence of the motor wiring and how the hoist is set up in the machine room. **Note:** If the entries for forward (X2.3) and reverse (X2.4) are simultaneously set, the input forward has priority. A change of direction is done with input (X2.3).

Terminal	Description
X2.5 ***Control Mode***	In activating the input you can switch from open loop operation to speed controlled operation. ***! only when LF.30 = 2 !***
X2.6 ***Door Drive Active***	In addition to the main drive the inverter can also start a door drive. The activation of the input causes the switching from the main drive to door drive. **For settings, functions and drive curves of the door drive see pages E 14 - E 15 !**
X2.7 ***Door Drive Setpoint Input***	When the input is set with +24 V the set value of the door drive is activated. The set speed of the door drive is preset in parameter LF.46. **For settings, functions and drive curves of the door drive see page E 14 - E 15 !**
X3.1 ***Contactor Control***	The input X3.1 checks to see if the main contactor and the braking contactor are released. The input **must** be activated when a drive command is entered. If the input is not set, the display “E.Co” (Error, contactor open) appears in parameter LF.98. The power modules are blocked. The contactor control can be simulated, by bridging input X3.1 with output X2.9.
X3.2 ***Correction Speed*** V_B	When the input is assigned +24 V the correction speed is activated. **! also see parameter LF.40 !**
X3.3 ***Crawl Speed,*** V_E	When the input is assigned +24 V the crawl speed is activated. **! also see parameter LF.41 !**
X3.4 ***Rated Speed,*** V_N	When the input is assigned +24 V the rated speed is activated. **! also see parameter LF.42 !**
X3.5 ***Inspection Speed,*** V_I	When the input is assigned +24 V the inspection speed is activated. **! also see parameter LF.43 !**
X3.6 ***1st Intermediate Speed,*** V_1	When the input is assigned +24 V the 1st intermediate speed is activated. **! also see parameter LF.44 !**
X3.7 ***2nd Intermediate Speed,*** V_2	When the input is assigned +24 V the 2nd intermediate speed is activated. **! also see parameter LF.45 !**
Motor Temperature Detector Terminals OH/OH	Terminal motor-PTC ! **see also page E 11, terminal X3.23**

GB

ing thresholds have 12% hysteresis, exept for output X3.22 which has 6%.

Terminal	Description
X3.14 ***Operating Frequency Warning***	The output is reset, when the heat sink is approx. 50°C warm. For the next drive the operating frequency is reduced to 8 kHz. After cooling down (heat sink temperature approx. 40°C) the operating frequency increases to 16 kHz and the output is set again. **! see operating frequency page GB 16 !**
X3.15 ***Braking Control***	The output emits the signal applied on terminal X3.16. See description of terminal X2.8 regarding operating frequencies.
X3.17 ***Delay Control***	The output is set until the speed level LF.62 is gone below. The function only works when the incremental encoder is connected and when the speed controller is switched on (LF.30 = 1 or 2).
X3.18 ***Crawl Speed***	The output emits the applied signal on terminal X3.19. This is done until the preset speed level in parameter LF.63 is gone below. This function only works when the incremental encoder is connected and the speed controller is switched on (LF.30 = 1 or 2).
X3.20 ***Main Contactor Control***	The ouput emits signals that are applied to terminal X3.21. The output occurs, when the following conditions are met at the same time: - no error message is present - setpoint must be selected - the input contactor control must be activated
X3.22 ***DC-Voltage Monitoring***	The output is set, when the dc-bus voltage exceeds the level LF.64.
X3.23 ***Motor Temperature Warning***	The output is reset, when the connection between the “OH” inputs is high-resistant. This is how the lift control receives the message that the motor is overheating. It then can stop driving and let the motor cool down. If the overheating continues, the inverter switches off, when the delay time set in LF.65 has run out. The error signal “E-dOH” (Error, drive overheat) is displayed. When the connection between the OH terminal is low resistant again, the inverter shows the message “E.nOH” (no overheat). The error can then be reset. **See parameter LF.15**

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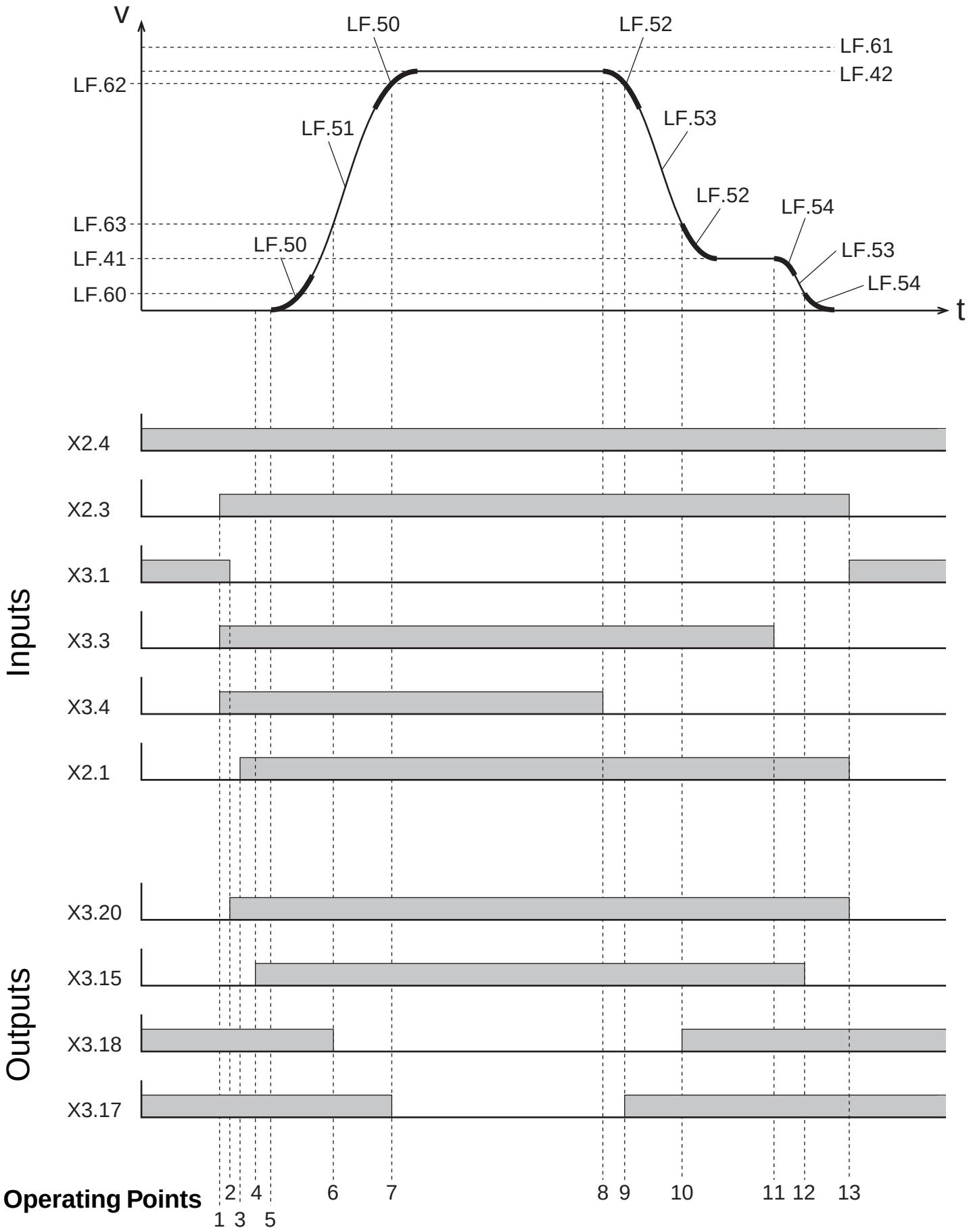
4.1 Activation of the Main Drive (LF.02 = 2)



WHAT HAPPENS WHEN? **Description of the Operating Points of the Main Drive**

1 → Presetting of the setpoint for the drive speed and the selection of the direction of travel. The inverter checks whether input X3.1 (contactor control) is set. If yes the output X3.20 (main contactor control) is set. If X3.1 is not set, the display “E.Co“ is seen in LF.98 and output X3.20 is not set.

2 → If X3.20 is set, then X3.1 must be reset.

3 → X2.1 (control release) is set with the precontrol contact of the main contact. After this is done the inverter provides the motor with current, when the main contacts are connected (powerless switching).

4 → When the motor can receive a current (“hardware test”), the output X3.15 (brake) is set. If there is not enough current flowing, you will see the display “E.nC” in LF.98 and X3.15.

5 → After X3.15 is set, the brake release time (LF.70) runs out; then the motor starts to turn.

6 → When exceeding the monitoring of the crawl speed (LF.63) the output X3.18 is reset.

7 → When exceeding the monitoring of the deceleration check (LF.62) the output X3.17 is reset.

8 → When the setpoint is removed for the rated speed (X3.4) deceleration starts.

9 → When exceeding the monitoring of the deceleration check (LF.62) the output X3.17 is set.

10 → When exceeding the monitoring of the crawl speed (LF.63) the output X3.18 is set.

11 → When the limit switch is reached, the set value for the positioning speed is set at 0 and thus the drive keeps the cabin floating until the brake is engaged,.

12 → When the operating point of the brake (LF.60) is exceeded, the output X3.15 is reset.

13 → After X3.15 is reset 1 s later X3.20 is reset.

4.2 Activation of the Door Drive

4.2.1 Activation of a 2nd Motor for the Door Drive

This function makes it possible to activate the main drive and the door drive with one inverter. The selection of the drive is done with the digital input X2.6.

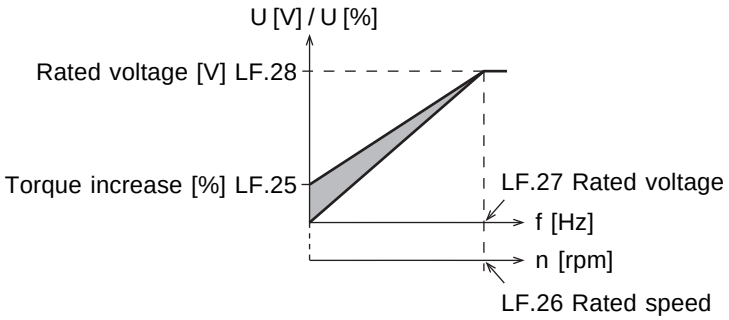
The switching between main and door drive is only accepted in condition 'nop'.

The following is valid:

X2.6	Active Drive	Control Process
0	Main Drive	set as in LF.30
1	Door Drive	controlled

With an active door drive (X2.6 = 1)
- The outputs of the inverter are not changed
- The start up process cannot be completed
- Only the controlled mode is active (U/f-curve). The control method (LF.30) is only valid for the main drive.

4.2.2 U/f-Curve Door Drive



The U/f-curve of the door drive is defined by parameters LF.25, LF.26, LF.27,and LF.28. **The setting of parameters for the U/f-curves of the main and door drives is only possible when the main drive is active (X2.6 = 0).**

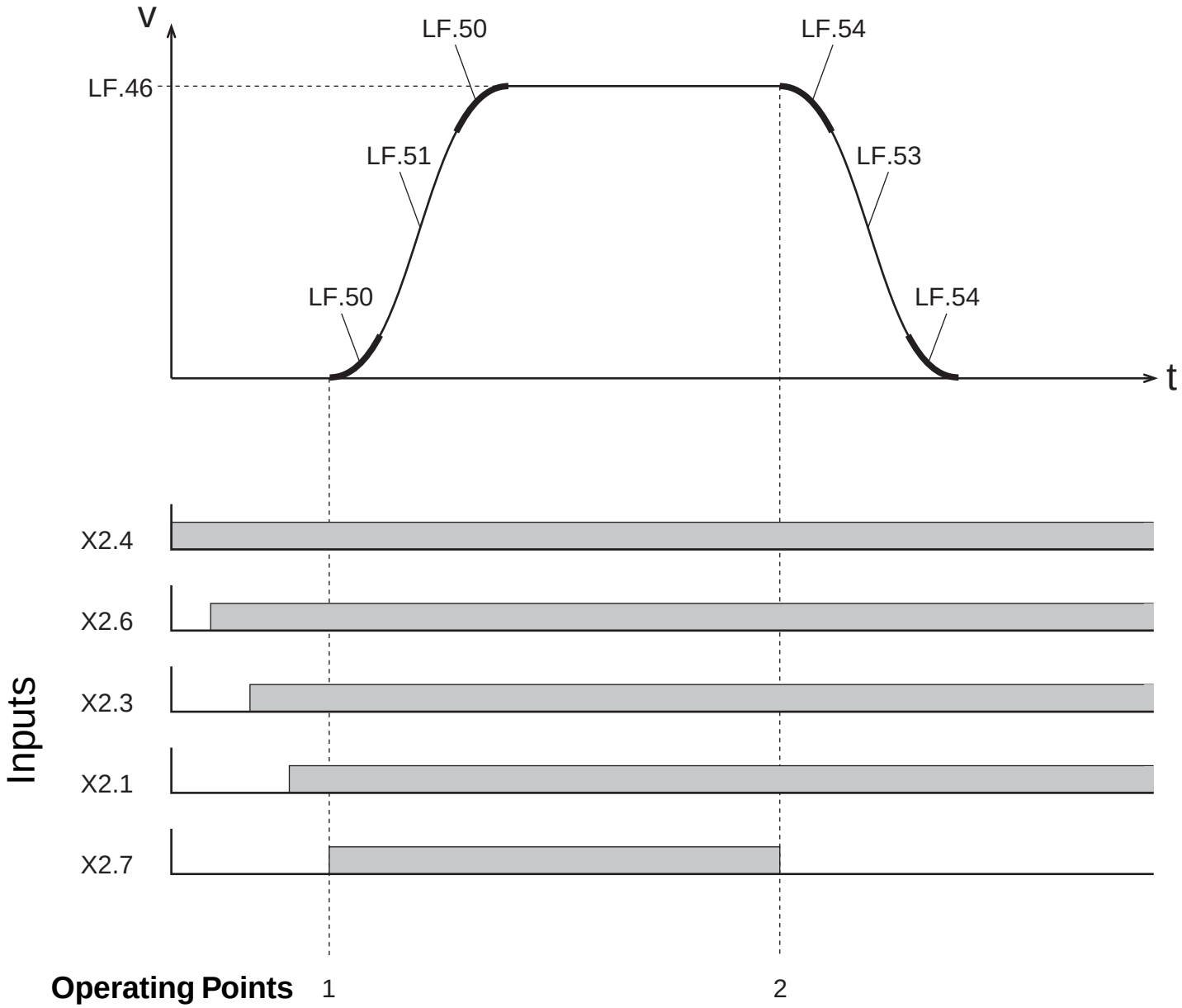
4.2.3 ACC and DEC Ramps

For the ACC and DEC ramps of the door drive the values of parameters LF.50, LF.51, LF.53 und LF.54 are valid, like with the main drive.

4.2.4 Set Speed Door Drive

The set speed (rpm) for the door drive is preset in parameter LF.46 (set speed door drive). The input is limited by LF.20 (max. system speed), i.e. the maximum speed of the door drive cannot be larger than the maximum speed of the main drive. The setpoint activation for the door drive is done with the digital input (X2.7).

4.2.5 Drive Curve Door Drive



What happens when? **Description of the operating points of the door drive.**

1 → The acceleration process starts after the setpoint input is activated (X2.7 = 1).
Condition: Door drive is active (X2.6)
Control release is active (X2.1)
Direction of rotation (X2.3 / X2.4) is preset

2 → When the setpoint for (X3.4) is removed deceleration begins.

5.1 Temperature Dependent Changes in the Operating Frequency

To protect KEB COMBIVERT F4-F Lift from overheating during 16kHz operation and thus prevent the lift from being interrupted, the operating frequency can be reduced dependent on the heat sink temperature (only in condition 'nop'). Inverters with temperature dependent operating frequencies are characterized in parameter In.0 with **xx.F4.F1.-xxxx 8kHz/16kHz**.
!see also parameter LF.38!

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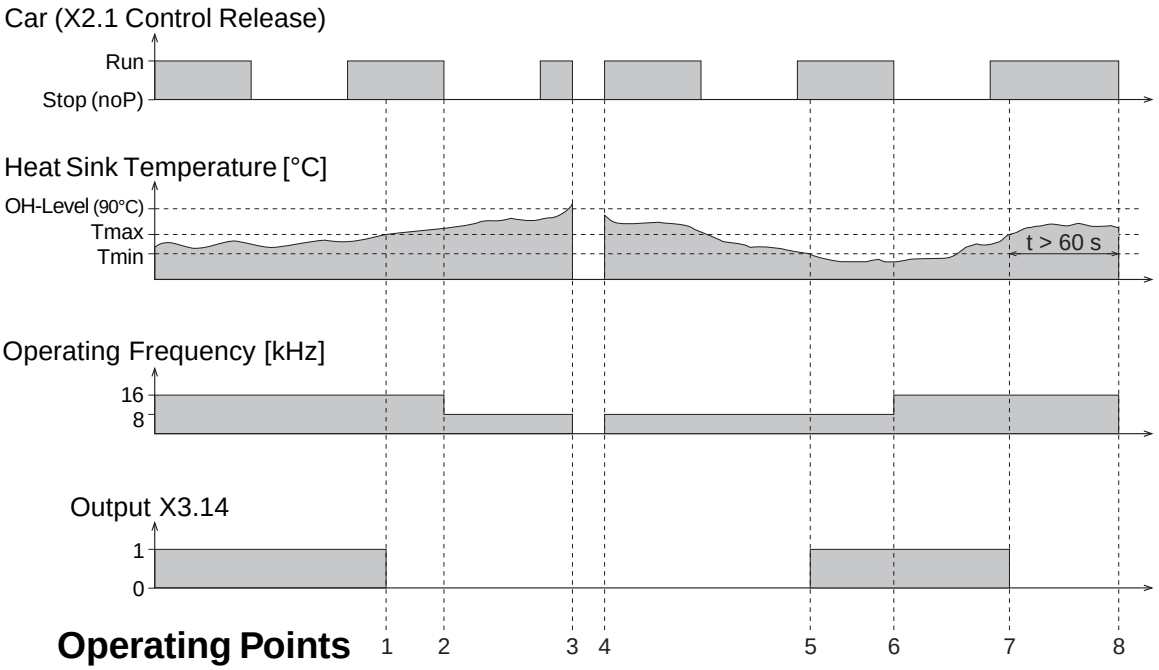
5.2 Digital Output X3.14 Operating Frequency Warning

When the heat sink temperature reaches approximately 50°C, the signal at output X3.14 (operating frequency warning) is reset. With a heat sink temperature of approx. 40°C the signal at the output is set again.

5.3 Switching Conditions



WHAT HAPPENS WHEN?

Operat. Point	Description
1	$T_{heat\ sink}$ exceeds Tmax. The output X3.14 is reset.
2	After the flight is completed (nop) the operating frequency is decreased.
3	$T_{heat\ sink}$ exceeds OH-level. The drive switches off with the message E.oH.
4	After the cooling off phase (E.noH) the drive can be restarted with reset.
5	$T_{heat\ sink}$ goes below Tmin. The ouput X3.14 is set again.
6	After the flight (nop) the operating frequency is increased.
7	$T_{heat\ sink}$ exceeds Tmax. The output X3.14 is reset.
8	If the car is longer than 60s with $T_{heat\ sink}$ > Tmax in the Run-Mode, the drive switches off with the message E.oH. After the cooling off phase (E.noH) the drive can be restarted with reset.

E.noH is reached at 80°C (OH-Level - 10°C).

6.1 Wiring Diagram: Control Terminal X2 and I/O-Expander X3

Digital Outputs:

Braking control	X2.8
Main contactor control inverted	X2.9

Digital Inputs:

Control release	X2.1
Reset	X2.2
Direction of travel foward	X2.3
Direction of travel reverse	X2.4
Control mode	X2.5
Secondary drive active	X2.6
Secondary drive setpoint input	X2.7
Contactor control	X3.1

Setpoint selection
(only with LF.2 = 2)

Re-levelling,	V_B	X3.2
Positioning,	V_E	X3.3
Rated max. speed,	V_N	X3.4
Inspection speed,	V_I	X3.5
Inspection speed 1,	V_1	X3.6
Inspection speed 2,	V_2	X3.7

With binary coded setpoint selection (LF.2 = 1), terminal assignment see page GB 24 - GB 25

Relay Outputs:

X3.15	Braking control
X3.16	Relay contact
X3.18	Positioning speed
X3.19	Relay contact
X3.20	Main contactor control
X3.21	Relay contact
X2.20	Heat sink temperature> LF.66
X2.21	Heat sink temperature < LF.66 (5 K hysteresis)
X2.22	Relay contact
X3.13	Ready
X3.14	Operating frequency warning
X3.17	Deceleration control
X3.22	DC-monitoring
X3.23	Motor temperature warning

Supply

X3.9	+24V (I/O-card)
X3.10	+24V (I/O-card)
X2.23	+24V (control card)
X2.11	Ground (GND)
X3.11	Ground (GND)
X3.12	Ground (GND)

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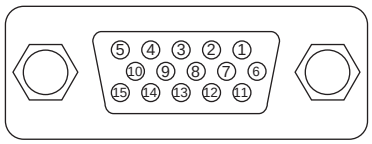
6.2 Connection X4 Incremental Encoder

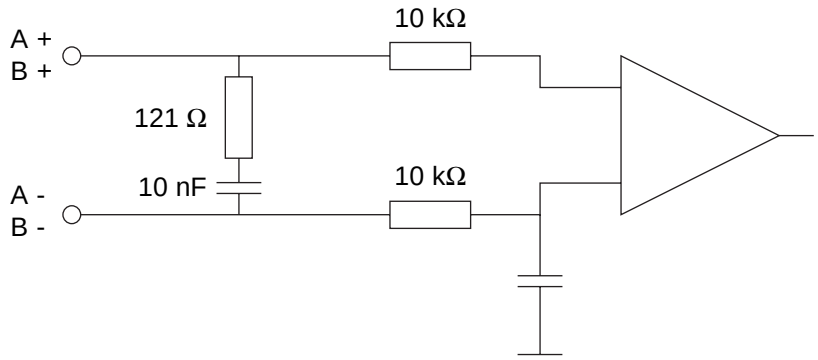
The incremental encoder of the motor is connected to the 15-pole sub-D-socket.



PIN-No.	Signal	PIN-No.	Signal
1	-	9	B +
2	-	10	-
3	A -	11	+ 15 V
4	B -	12	+ 5 V
5	-	13	GND
6	-	14	N -
7	-	15	N+
8	A +	housing	shield

The connector may only be connected/disconnected when the inverter and voltage supply are shut off.

Input Wiring



Encoder Specification:

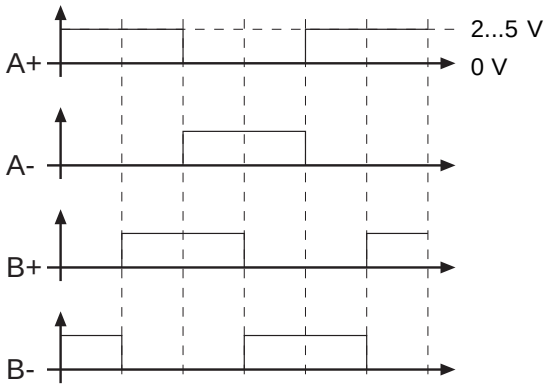
1- Voltage Supply: + 5 V (+/-10 %) max. 110 mA

2- Increments: 256 - 10000 inc. (recommended: 2500 inc.)
Observe limit frequency of encoder:

$$f_{limit} > \frac{\text{increments} \cdot n_{max}}{60} \text{ rpm}$$

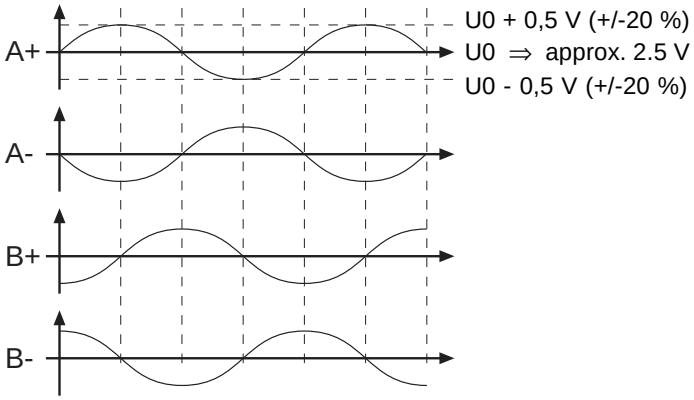
3- Output signals: Rectangular pulse signal

Two square-wave pulses that are electrically by 90° out of phase and their inverse signals



or sinusoidal 1 Vss signals

Two sinusoidal incremental signals that are electrically by 90° out of phase and their inverse signals



6.3 Connection X5 Incremental Encoder Simulation

The 9-pole sub-d-socket is used as an incremental encoder output. The signals are emitted corresponding to the signals on the incremental encoder input X4 in RS422 specifications.
! see also parameter LF.3 !

PIN-No.	Signal	Significance
1	A +	Signal channel A
2	B +	Signal channel B
3		Reserved
4	+ 5 V	Voltage output
5	+ 24 V	External voltage supply
6	A-	Signal channel A inverted
7	B-	Signal channel B inverted
8		Reserved
9	GND	External ground
Housing		Shielding

7.1 Digital / Interface Operator

An operator is a necessary accessory for local operation of the inverter COMBIVERT F4. To prevent maloperation, the inverter must be brought into the n***Op*** status (control release terminal X2.1) before it is connected /disconnected.
The operator is available in several versions:

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Digital Operator
Part.-No. 00.F4.010-2009

5-digit LED display

Interface control
Sends "LED flickers"

Operation/error display
Normal "LED on"
Error "LED blinks"

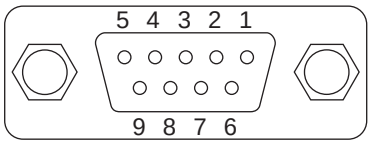
Control panel

Interface Operator
Part.-No. 00.F4.010-1009

An isolated RS232/RS485 interface is additionally integrated into the interface operator.

PE connection

RS232/RS485



PIN	RS485	Signal	Description
1	–	–	Reserved
2	–	TxD	Transmission signal/RS232
3	–	RxD	Incoming signal/RS232
4	A'	RxD-A	Incoming signal A/RS485
5	B'	RxD-B	Incoming signal B/RS485
6	–	VP	Supply voltage plus +5V (I_{max} = 10 mA)
7	C/C'	DGND	Reference potential
8	A	TxD-A	Transmission signal A/RS485
9	B	TxD-B	Transmission signal B/RS485

Information about other operators available from KEB!

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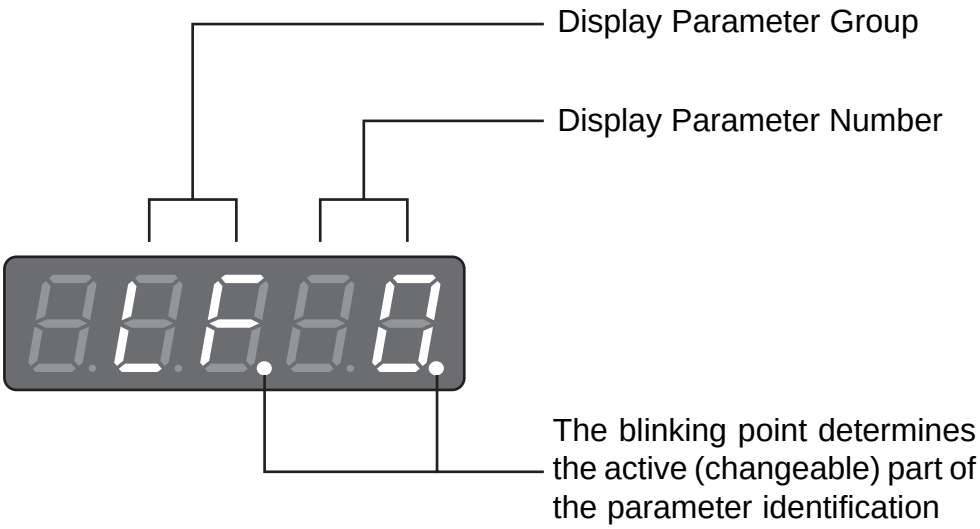
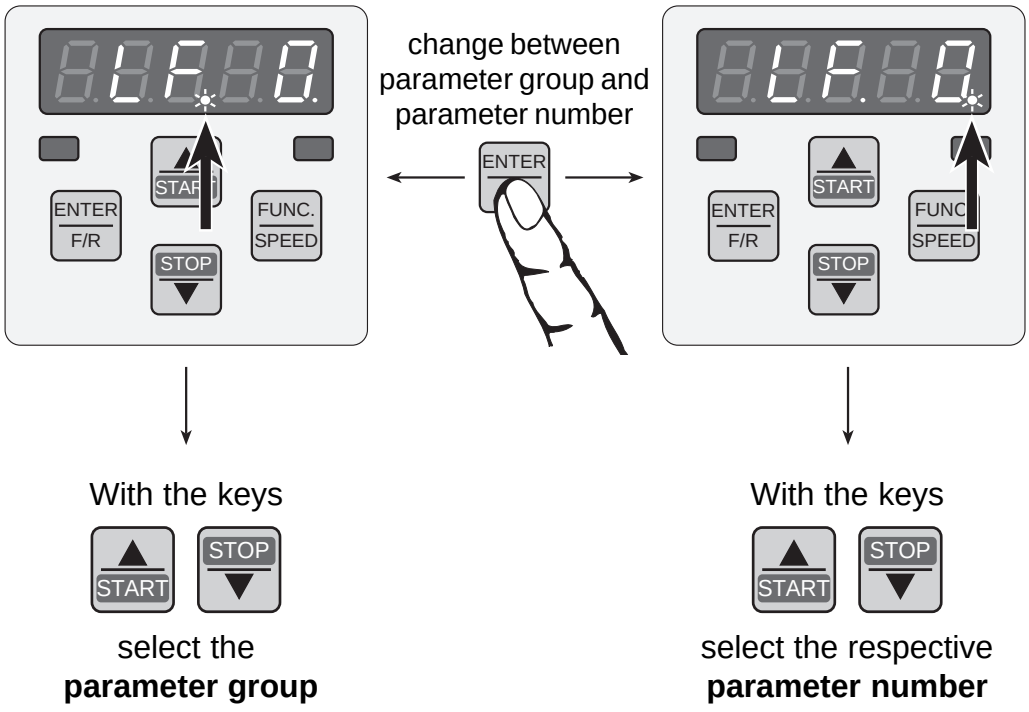
7.2 Parameter Identification



7.3 Parameter Selection



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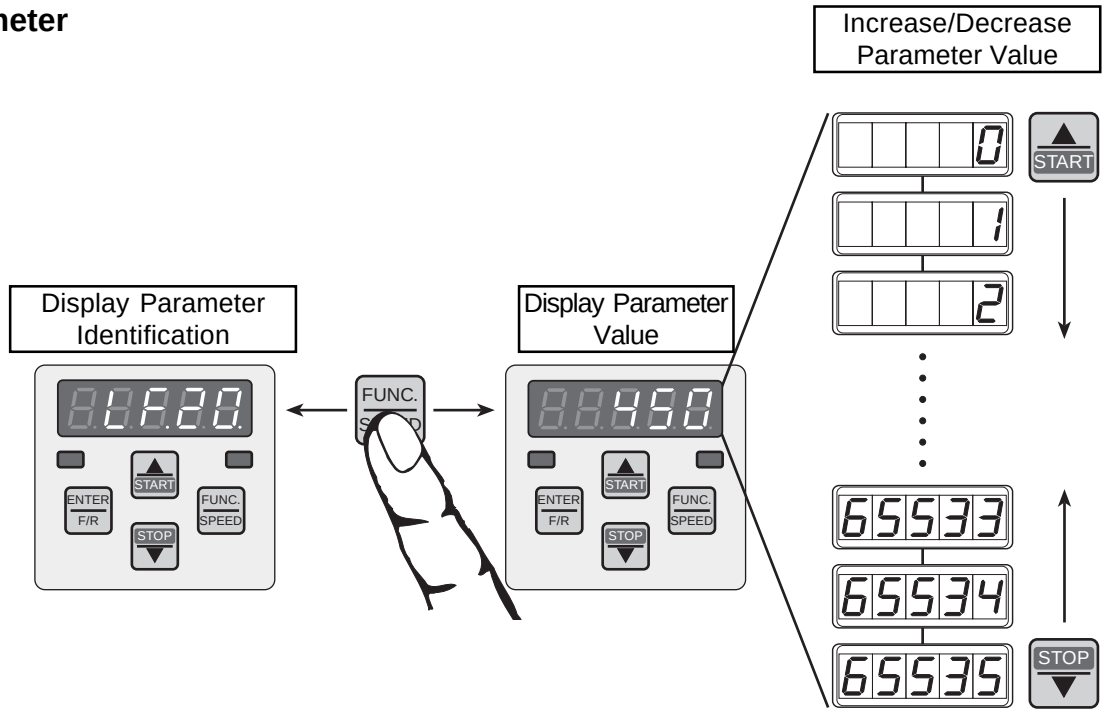
7.4 Changing Parameter Values



7.5 Parameter Structure

Parameter Groups

LF-Parameter: LF. 0 ... LF. 99
ru-Parameter: ru. 0 ... ru. 32
In-Parameter: In. 0 ... In. 57

Read-Only Parameters
can only be read out but not changed
LF.80...LF.99
ru.0...ru.04, ru.09...ru.11, ru.18...ru.24, ru.26...ru.32,
In.0...In.57

Programmable Parameters
can be changed

LF.0...LF.75
ru.8, ru.12, ru.25

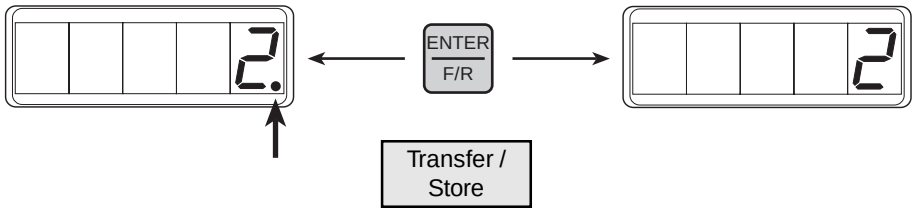
NON-ENTER-Parameters
are programmable parameters, which when changed are immediately accepted and stored.
LF.3...LF.17, LF.20...LF.28, LF.31...LF.75
ru.8, ru.12, ru.25

ENTER-Parameters
are programmable parameters, whose changes are first accepted and stored after the ENTER-key is pressed.
LF.0...LF.2, LF.18, LF.19, LF.30

7.6 Storing Parameter Values

If the parameter value of an ***ENTER Parameter*** is changed, a point appears behind the last position in the display. The adjusted parameter is transferred and permanently stored when **ENTER** is pressed.

Example:



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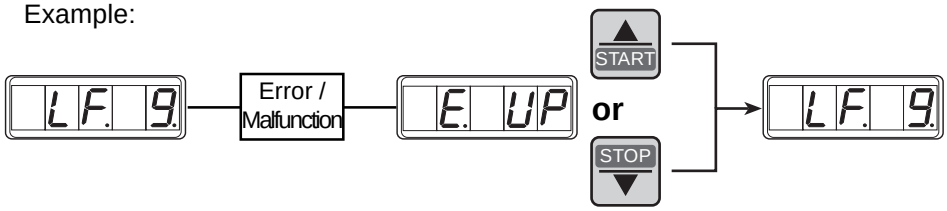
7.7 Error Messages

If a malfunction occurs during operation, the actual display is overwritten with the error message. By pressing the keys "UP" or "DOWN" the error message is reset.

Example:



Only the error message is reset with UP / DOWN. To reset the error remove the cause and reset terminal X2.2 or do a power on reset.

Inverter Status Message (running /error message) see p. GB 42 - GB 43

8.1 LF-Parameter

Password

In order to prevent unauthorized adjustment, a password (factory setting: 440) must be entered (see also parameter LF.01). The inverter can be barred from further use by entering 400 or by switching off the supply voltage.

possible displays : - 4 = read only
- 5 = operation released

factory setting - 4

User-Defined Password

This password replaces the KEB factory password and is valid the next time you switch on the inverter. **This parameter can only be used when a valid password is entered in parameter LF.0.**

Value range: 0 ... 399, ~~400~~, 401 ... 9999
Factory setting 440

The value 400 may <u>not</u> be set in the parameter LF.1! The value 400 is only reserved to block the unit! Only KEB can enable a unit, which is blocked by LF.1

Steering/Operating Mode

This value determines the type of setpoint selection and rotation setting.

Unit: 1
Value range: 1 ... 4
Factory setting: 1

Set Value	Setpoint Selection	Rotation Selection
1	binary coded terminals X3.2, X3.3, X3.4	terminals X2.3, X2.4
2	input coded terminals X3.2, X3.3, X3.4, X3.5, X3.6, X3.7, X3.8	terminals X2.3, X2.4
3	analog setpoint, 0... +10V terminals X2.14, X2.15	terminals X2.3, X2.4
4	analog setpoint, -10V...+10V terminals X2.14,X2.15	rotation detection from analog value polarity

When LF.2 = 3 then: 0 ... +10V$^{\triangleq}$ 0 ... + max. system speed (LF.20)

When LF.2 = 4 then: 0 ... ±10V$^{\triangleq}$ 0 ... ± max. system speed (LF.20)

Function of the digital setpoint inputs

	X3.2	X3.3	X3.4
V = 0	0	0	0
VB	1	0	0
VE	0	1	0
VN	1	1	0
VI	0	0	1
V1	1	0	1
V2	0	1	1
V = 0	1	1	1

GB

b) Input coded setpoint selection LF.02 = 2

With this type of setpoint selection it is permissible to set several inputs at the same time. The table below shows which travelling speeds are used.

	X3.2	X3.3	X3.4	X3.5	X3.6	X3.7	X3.8
V = 0	0	0	0	0	0	0	0
VB	1	X	X	X	X	X	X
VE	0	1	0	0	0	0	0
VN	0	X	1	0	0	0	0
VI	0	X	X	1	0	0	0
V1	0	X	X	X	1	0	0
V2	0	X	X	X	X	1	0
V=0	0	X	X	X	X	X	1

Symbole: 1 = Input is set at 24 V
0 = Input may not be set
X = Setting has no effect

c) analog setpoint selection LF.02 = 3 or 4

The analog setpoint selection is set with the terminals X2.14 / X2.15.

0 ... ±10V $\hat{=}$ 0 ... ±max. system speed (LF.20)

Terminal X3.6 is used to activate/deactivate the starting routine. The directions below must be followed in the exact sequence they are listed:

Start: 1.) Terminal X3.6 = 1 (activate starting routine/open break)
2.) Preset analog setpoint

Stop: 1.) Remove analog setpoint
2.) Terminal X3.6 = 0 (close brake)

Divider Incremental Encoder Output

With LF.3 you can preselect a divider for the signals of the incremental encoder output (X5). The adjusted value is valid after a power-on-reset.

Unit: 1
Value range: 1...128
Factory setting: 1

Rated Motor Power

Unit: kilowatt
Value range: 0,00...75.00 kW
Factory setting: 4.00 kW
Adjustment value: in accordance with the motor name plate

GB

Rated Motor Speed

Unit: rpm
Value range : 100...6000 rpm
Factory setting: 1440 rpm
Adjustment value: in accordance with the motor name plate

You may not enter the motor-synchronous speed (e.g. 1500 rpm for a 4 pole motor). Ask the manufacturer for the motor rated speed if you cannot find it on the name plate.

Rated Motor Current

Unit: ampere
Value range: 1,0...200,0 A
Factory setting: 8,0 A
Adjustment value: in accordance with the motor name plate

Rated Motor Frequency

Unit: hertz
Value range: 20...100 Hz
Factory setting : 50 Hz
Adjustment value: in accordance with the motor name plate

Rated Motor Voltage

Unit: volt
Value range: 1...650 V
Factory setting: 400 V
Adjustment value: in accordance with the motor name plate

Power Factor cos φ

Unit: 1
Value range: 0.01...1.00
Factory setting: 0.86
Adjustment value: in accordance with the motor name plate

Field Weakening Speed

Unit:	revolutions per minute
Value range:	0.0...6000.0 rpm
Factory setting:	1200.0 rpm
Adjustment value:	approx. 80% of the synchronous speed

Encoder Pulse Number

Unit:	pulse per revolution
Value range:	256...10000 pulse per revolution
Factory setting:	2500 pulse per revolution
Adjustment value:	in accordance with the manufacurer specifications

If the incremental encoder pulse number is not correctly adjusted, it may occur that the lift drives too slowly, overspeed is reached or other unforseen conditions occur. Therefore, it is absolutely necessary to compare the set and actual speed with each other during the startup phase (LF.30=0)

Encoder Track

The encoder tracks of the incremental encoder can be changed by software with the paramter LF.18.

Unit:	1
Value range:	off / on
Factory setting:	off
Adjustment value:	dependent on rotating field

See also page GB 51 „Start-Up Assistance“

DC Voltage Compensation

Compensates the dc-bus voltage onto the adjusted level. This parameter is used to adjust the output voltage during open-loop operation (LF.30=0).

Unit:	volt
Value range:	150...500, off V
Factory setting:	400 V
Adjustment value:	supply voltage of the inverter

Rated System Speed

The speeds adjusted in parameters LF.42, LF.44 and LF.45 are limited by LF.20.

With setpoint input the following is valid:

0 ... ±10V ≙ 0 ... ±rated system speed (LF.20)

Unit:	meter per second
Value range:	0.000...15.000 m/s
Factory setting:	0.000 m/s
Adjustment value:	maximum speed of the system

Traction Sheave Diameter

Unit:	millimeter
Value range:	200...2000 mm
Factory setting:	600 mm
Adjustment value:	in accordance with the available traction sheave, (may be determined with a folding rule).

Gear Reduction Ratio

Unit:	1
Value range:	off, 0.01...99.99
Factory setting:	30.00
Adjustment value:	in accordance with the gear name plate, (determine by counting the revolutions of the handwheel during a traction sheave revolution).

Catenary Suspension

Unit:	1
Value range:	1...8 (1:1...8:1)
Factory setting:	1
Adjustment value:	in accordance with the system data

Load

Unit:	kilogram
Value range:	0...65535 kg
Factory setting:	0
Adjustment value:	in accordance with the system data (you may need to multiply the number of people by 75kg)

Torque Increase of the Door Drive

Unit: percent of the rated torque
Value range: 0.0...25.5 %
Factory setting: 6.0 %

!Door drive see pages GB 14 - GB 15 !

Rated Speed of the Door Drive

Unit: revolutions per minute
Value range: 100...6000 rpm
Factory setting: 1440 rpm

! Door drive see page GB 14 - GB 15 !

Rated Frequency of the Door Drive

Einheit: hertz
Wertebereich: 20...100 Hz
Werkseinstellung: 50 Hz

! Door drive see page GB 14 - GB 15 !

Rated Voltage of the Door Drive

Unit: volt
Value range: 1...650 V
Factory setting: 400 V

! Door drive see page GB 14 - GB 15 !

Control Method

Used to switch between regulated and controlled operation.

Unit: 1
Value range: 0...2
Factory setting: 0
Adjustment value: 0 (open loop operation without speed feedback)
1 (closed loop operation with speed feedback)
2 (select via terminal X2.5)

With open loop operation (LF.30 = 0) the digital outputs for crawl speed, overspeed and deceleration control are not set.

Kp Speed

Proportional gain of the speed controller.

Unit: 1
Value range: 1...65535
Factory setting: 3000
Adjustment value: dependent on ratio of inverter / motor

Vibrations occur during constant run when the KP-values are too large. If the KP-values are too small a deviation occurs between the set and actual values of the set speed characteristic.

Ki Speed

Integral gain of the speed controller.

Unit: 1
Value range: 1...65535
Factor setting: 1000
Adjustment value: dependent on ratio of inverter / motor

Ki Speed Offset

Unit: 1
Value range: 0...65535
Factory setting: 1000
Adjustment value: dependent on ratio of inverter / motor

Kp Current

Proportional gain of the magentization and current controllers.

Unit: 1
Value range: 1...65535
Factory setting: 1500
Adjustment value: dependent on ratio of inverter / motor

See page GB 51 „Startup Assistance“

Ki Current

Integral gain of the current controllers.

Unit: 1
Value range: 1...65535
Factory setting: 500
Adjusted value: dependent on ratio of inverter / motor

See page GB 51 „Startup Assistance"

Maximum Torque

Upper limit of the motor torque, which protects the motor from breaking down. The acceleration process will probably take longer with a full load.

Unit:	newtonmeter
Value range:	0.0...5 x motor rated torque
Factory setting:	2 x LF.91
Adjusted value:	approx. 3 x LF.91 (dependent on load and the motor connected)

Boost

Adjusts the u/f-curve **only during open loop** operation (LF.30 =0).

Unit:	% of input voltage
Value range:	0.0...25.0 %
Factory setting:	10.0%
Adjusted value:	dependent on load

If the torque is not increased enough the motor is too ‘soft’ and the load cannot be removed. If there is not enough torque vibrations may occur during deceleration and in the positinging drive.

Operating Frequency Change

Using parameter LF.38 (operating frequency)you can set, whether the operating frequency should constantly be 8 kHz or whether the automatic transfer should be activated.

Unit:	1
Value range:	0 = operating frequency constantly 8 kHz 1 = automatic operating frequency change
Factory setting:	1
Adjustment value:	as needed

Set Value V_B, Correction Speed

Unit:	meter per second
Value range:	0.000...0.300 m/s
Factory setting:	0.000 m/s
Adjusted value:	approx. 0,02 m/s

- To improve the positioning the set speed change occurs without jerk limit.
- If the correction speed is selected for the actual set speed it is not possible to switch onto a higher set speed.

Set Value V_E, Crawl Speed

Unit:	meter per second
Value range:	0.000...0.300 m/s
Factory setting:	0.000 m/s
Adjusted value:	approx. 0,1 m/s

If the crawl speed is selected for the actual set speed it is not possible to switch onto a higher set speed.

GB

Set Value V_N, Rated Speed

Unit:	meter per second
Value range:	0.000...LF.20
Factory setting:	0.000 m/s
Adjusted value:	like LF.20 or smaller

Set Value V_I, Inspection Speed

Unit:	meter per second
Value range:	0.000...0.630 m/s
Factory setting:	0.000 m/s
Adjusted value:	approx. 0.500 m/s

If the inspection speed is selected for the actual set speed it is not possible to switch onto a higher set speed.

Set Value V_1, Intermediate Speed 1

Unit:	meter per second
Value range:	0.000...LF.20
Factory setting:	0.000
Adjusted value:	dependent on the distance between the floors

Set Value V_1, Intermediate Speed 2

Unit:	meter per second
Value range:	0.000...LF.20
Factory setting:	0.000
Adjusted value:	dependent on the distance between the floors

LF.46

Set Speed of Door Drive

Unit: rpm
Value range: 0.0...7520.0 rpm
Factory setting: 0.0 rpm

! See pages GB 14 - GB 15 regarding door drive!

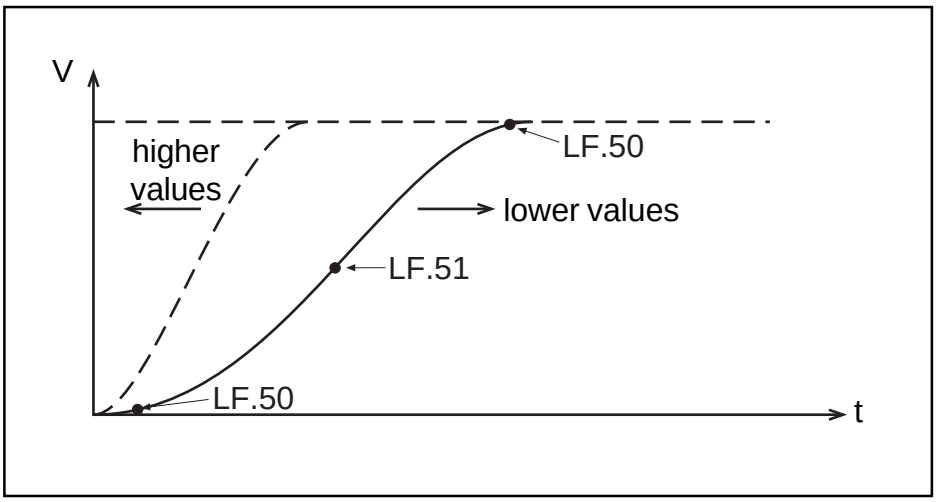
LF.50

Starting Jerk

Unit: meter per second^3
Value range: off, 0.11...9.99 m/s^3
Factory setting: 0.60 m/s^3
Adjusted value: Dependent on the mechanical system (adjustment values which are too high can lead to oscillations in the cabin)

General: The jerk or shock, which **always** occurs during the accleration process, is crucial for the comfort of passengers in a passenger lift. This causes objects on conveyor systems to topple over or sway and puts a lot of stress on the mechanical components. Each person expierences this 'shock' differently, depending on their age, physical and mental state and whether they awaited this movement or not.

Empirical values:	0.5...0.8 m/s^3	for retirement homes, hospitals, apartment buildings
	0.8...1.2 m/s^3	for office buildings, banks etc.



Acceleration

Unit: meter per second^2
Value range: 0.10...2.00 m/s^2
Factory setting: 0.90 m/s^2
Adjusted value: according to comfort

Empirical values: 0.5...0.8 m/s^2 for retirement homes, hospitals, apartment buildings
0.8...1.2 m/s^2 for office buildings, banks etc

Deceleration Jerk

Unit: meter per second^3
Value range: off, 0.11...9.99 m/s^3
Factory setting: 1.00 m/s^3
Adjusted value: according to comfort

When the deceleration jerk is set too low, parameter LF.53 is no longer valid.

Deceleration

Unit: meter per second^2
Value range: 0.10...2.00 m/s^2
Factory setting: 0.90 m/s^2
Adjusted value: according to comfort

Stopping Jerk

The stopping jerk determines the ride comfort as it lowers onto the floor from the path optimization. If the setting LF.54 = off, then the stopping jerk = deceleration jerk (LF.52).

Unit: meter per second^3
Value range: off, 0.02...9.99 m/s^3
Factory setting: off
Adjusted value: according to comfort

Level Brake

Unit: meter per second
Value range: 0.000...0.010 m/s
Factory setting: 0.005 m/s
Adjusted value: 0.005 m/s

Level Overspeed

Unit: meter per second
Value range: 0.000...18.000 m/s
Factory setting: 1.500 m/s
Adjusted value: approx. 1,1 x LF.42

Deceleration Check

Controls whether the drive decelerates during shortened overtravel.

Unit: meter per second
Value range: 0.000...15.000 m/s
Factory setting: 1.300 m/s
Adjusted value: approx. 0.95 x LF.42

Level Crawl Speed

Unit: meter per second
Value range: 0.000... 0.300 m/s
Factory setting: 0.250 m/s
Adjusted value: dependent on the running time of the door and speed

DC-Voltage Circuit Control

Unit: Volt
Value range: 0...800 V
Factory setting: 0 V

Monitors the dc-bus-voltage. If the level is exceeded, the output X3.22 = high, hysteresis 6%.

„E.dOH“ Delay

Unit: seconds
Value range: 0...3600 s
Factory setting: 300 s

After the delay time has run out, the inverter stops with the message „E-dOH“ (Error, motor overheating). The malfunction can be reset, when the motor has cooled down and the frequency inverter shows the display „E.nOH“ (Error, no overheating). If the motor cools down before the delay time runs out, no fault indication is triggered.

For LF.65 = 0 (off) applies: Stop the inverter after the control release is removed.

Heat Sink Temperature Level

Dependent on the temperature level the relay output for the control -cabinet fan control (X2.20 / X2.21 / X2.22) is switched.

current heat sink temperature > LF.66 relay picks up
current heat sink temperature < LF.66 - 5 K relay drops out

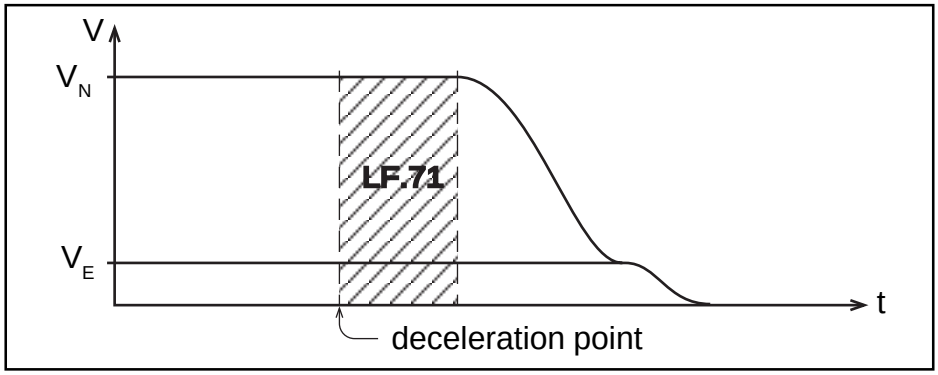
Unit: degreesCelsius
Value range: 20...50 °C
Factory setting: 40 °C

Brake Release Time

Unit: seconds
Value range: 0.300...3.000 s
Factory setting: 0.300 s
Adjusted value: 0.300 s

Crawl Path Optimization Rated Speed V_N

Unit: centimeter
Value range: 0.0...200.0 cm
Factory setting: 0.0 cm



Crawl Path Optimization Speed V_1

Unit: centimeter
Value range: 0.0...200.0 cm
Factory setting: 0.0 cm

Function see parameter LF.71.

Crawl Path Optimization Speed V_2

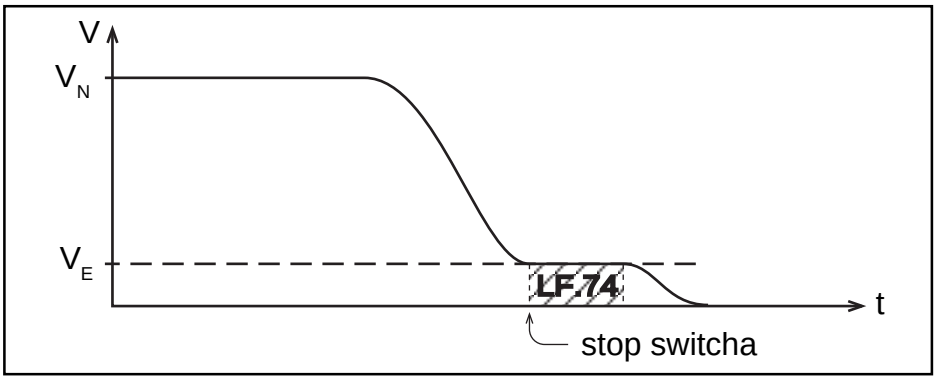
Unit: centimeter
Value range: 0.0...200.0 cm
Factory setting: 0.0 cm

Function see parameter LF.71.

Crawl Path Optimization Speed V_E

Unit: millimeter
Value range: 0...300 mm
Factory Setting: 0.0 mm

The levelling position can be exactly adjusted with the crawl path optimization. Condition: the stop switches in all floors have the same distances to the levelling position for both directions. The crawl speed (LF.41) and stopping jerk (LF.54) must be adjusted before the path optimization crawl speed.

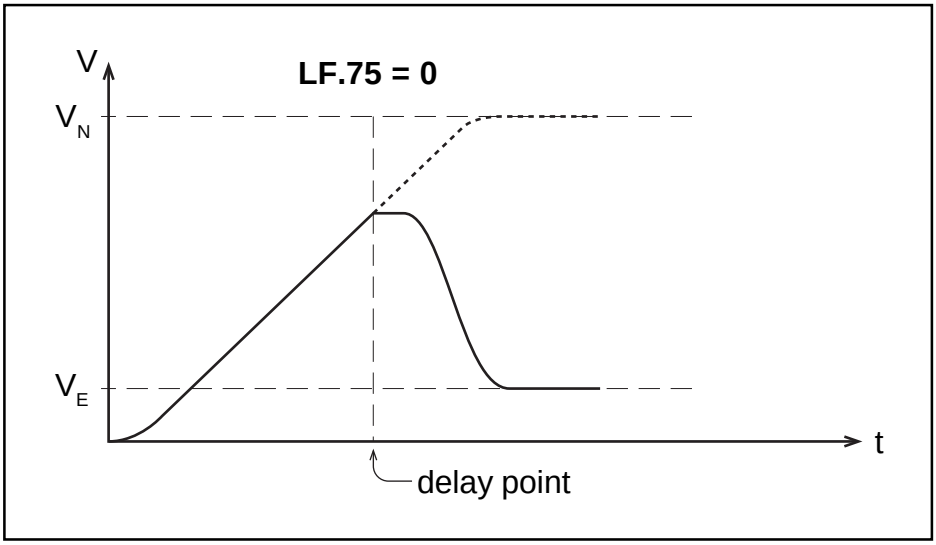


Ogive Function

Unit: 1
Value range: 0 = off
1 = speed controlled
2 = time controlled
Factory setting: 0

a) LF.75 = 0 off

When the ogive function is switched off the acceleration is immediately interrupted at the delay point.



b) LF.75 = 1 Speed Controlled Ogive Function

If the speed controlled ogive function (LF.75=1) is active and *rated speed* is selected **and** the **selected set speed** changes during acceleration, then the acceleration continues for the time adjusted in LF.76 (normally 0 s). The actual speed existing when timer LF.76 runs out determines whether to accelerate onto intermediate speed 1 or intermediate speed 2.

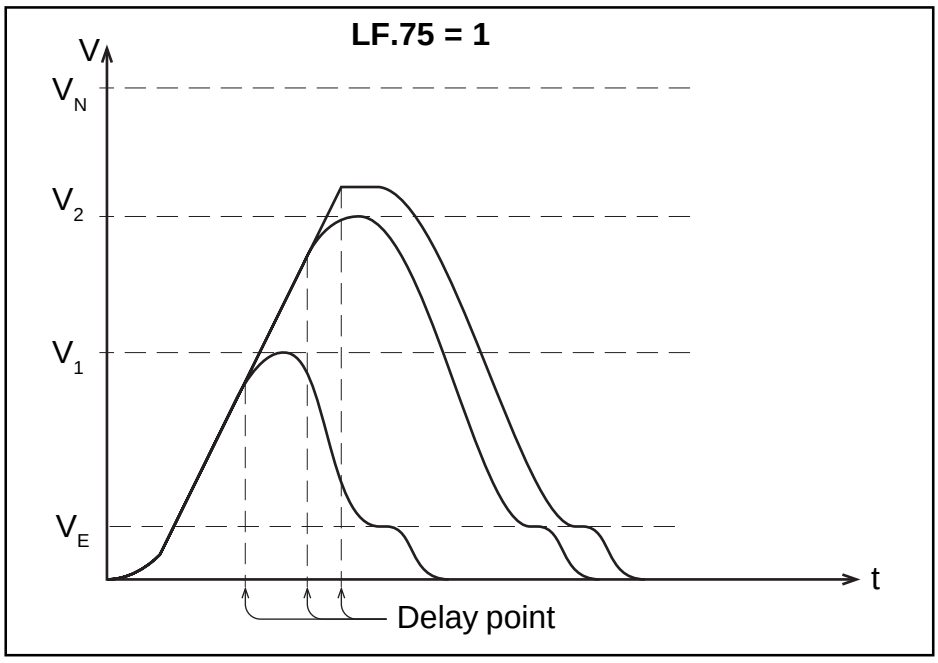
GB

- If the actual speed is more than 90% of intermediate speed 1, the set speed changes to intermediate speed 2. When the adjusted intermediate speed is reached the inverter decelerates immediately with the set delay curve. The crawl path parameters LF.71/72/73 do not have a function then.

- When the 2nd intermediate speed reaches 90% or more, acceleration stops.

- If the time in LF.76 was programmed too long, the rated speed will be reached and then deceleration begins.

If the correction run is done with rated speed and the ogive function is switched on, it could occur that the limit switch is reached. If you want to do a correction run when the ogive function is on, we recommend that you select a speed other than rated speed.

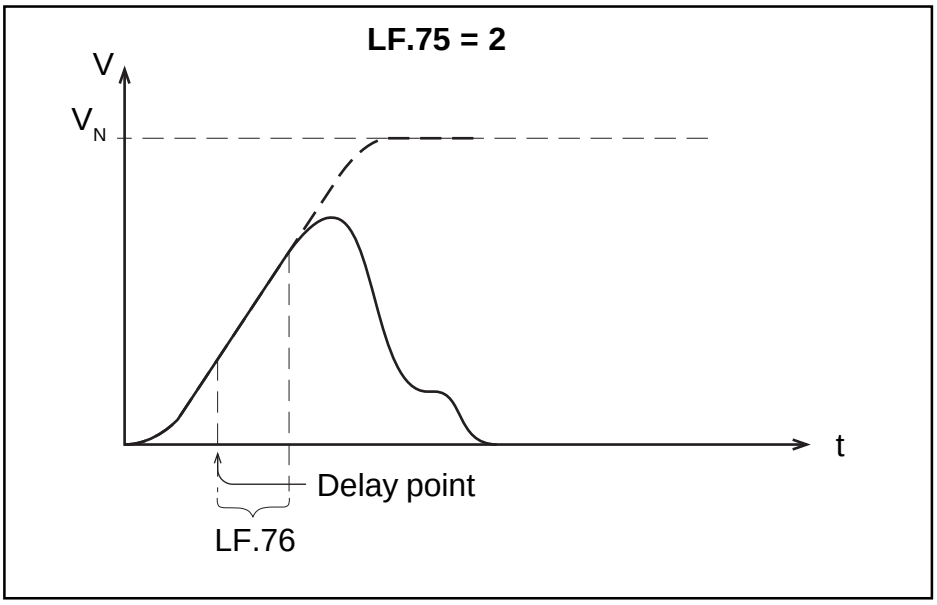


c) LF.75 = 2
Time Controlled Ogive Function

If the time-controlled ogive function (LF.75 = 2) is switched on and rated speed is selected and the selected set speed changes during acceleration, then the acceleration continues for the time adjusted in LF.76.

- After the delay time adjusted in LF.76 has run out, the acceleration continues with the starting jerk and changes into the deceleration ramp.
- If the time in LF.76 was programmed too long, the rated speed will be reached and then deceleration begins.

If the correction run is done with rated speed and the ogive function is switched on, it could occur that the limit switch is reached. If you want to do the correction run when the ogive function is switched on, then it is recommended to select a speed other than rated speed.



Ogive Function Delay

When the ogive function is switched on and rated speed is selected and the selected set speed changes during acceleration, then the aceeleration continues for the time adjusted in LF.76 (normally 0 with LF.75 = 1).

Unit:	seconds
Value range:	0.000 ...10.000 s
Factory Setting:	0.000 s

Software Version

Display of the software version.

Software Date

Display of the software date.

X2 Input State

Terminal X2 (upper terminal)

With the X.2 input state it is easy to control whether the input signals reached the inverter control. Every input (output) has a specific valency. If some inputs are set, the sum of the valency is shown.

Value Table:

Display Combivis	Valency	Function	Input Terminal
ST	1	control release	X2.1
RST	2	reset	X2.2
F	4	direction of travel forward	X2.3
R	8	direction of travel reverse	X2.4
I1	16	control mode	X2.5
I2	32	drive active	X2.6
I3	64	door drive setpoint input	X2.7

Example: Input control release (X2.1), direction of travel up (X2.3) and external error (X2.5) are triggered with 24V.

Display value: 1 + 4 = **5**

X2 Output State

Terminal X2 (upper terminal)

With the X.2 output state it is easy to control, whether the outputs were set by the inverter control. Every digital output has a specific valency. If some outputs are set at the same time, the sum of the valency is shown.

Value table:

Display Combivis	Valency	Function	Input Terminal
O1	1	digital output signal: braking control	X2.8
O2	2	digital output signal: main contactor control inverted	X2.9
O3	4	relay control cabinet fan	X2.20/X2.21

X3 Input State

Terminal strip X3 (lower terminal)

See parameter LF.82 for functional description.

Value table:

Display Combivis	Valency	Function	Input Terminal
I5	1	Input signal: conctactor control	X3.1
I6	2	Set value correction speed: V_B	X3.2
I7	4	Set value crawl speed: V_E	X3.3
I8	8	Set value rated speed: V_N	X3.4
I9	16	Set value inspection speed: V_I	X3.5
I10	32	Set value 1st intermediate speed 1: V_1	X3.6
I11	64	Set value 2nd intermediate speed 2: V_2	X3.7

X3 Output State

Terminal X3 (lower terminal)

See parameter LF.83 for functional description.

Value table:

Display Combivis	Valency	Function	Input Terminal
O5	1	Signal: ready overspeed	X3.13
O7	4	Relay contact: braking control	X3.15/X3.16
O8	8	Signal: operating frequency warning	X3.14
O9	16	Signal: delay control	X3.17
O10	32	Relay contact: crawl speed	X3.18/X3.19
O12	128	Relay contact: main contactor control	X3.20/X3.21
O14	1024	Signal: DC-monitoring	X3.22
O15	4096	Signal: motor temperature warning	X3.23

Actual Set Value

Display Value:	0	1	2	3	4	5	6	7
Speed:	V=0	V_B	V_E	V_N	V_I	V_1	V_2	V=0

Actual Inverter Utilization

Display of the actual inverter utilization in %.

Actual Set Speed

The value shows the actual set speed in rpm, calculated from the system data.

Actual Speed

The value shows the real speed in rpm, led from the impulses of the incremental encoder.

GB

Actual Lift Speed

Display of the speed in m/s; only when the encoder is connected.

Rated Motor Torque

Using the rating plate data the inverter determines the motor rated torque in the rated point. Unit Nm.
Unit: Newton meter
Factory setting: 26.5 Nm

Error State

The parameter shows the fault indications that occur during the starting process and continuous operation.

Display	Significance
StOP	no setpoint selection
E.Co	setpoint selection without contactor control
E.IO	setpoint selection without control release
E.nC	no current flows on the output side, check the wiring between motor and inverter
run	starting procedure is completed

See parameter LF.99 for more information about other fault indications.

Inverter State

a) Running Messages

Display	Significance
bbl	base-block-time runs out, power modules are blocked for 3s (always when control release is cleared)
Facc	forward acceleration
Fcon	forward constant running
FdEc	forward deceleration
nOP	no Operation, terminal X2.1 is not set
rAcc	reverse acceleration
r Con	reverse constant running
rdEc	reverse deceleration

b) Fault Messages

Display	Description
StOP	No setpoint selection
E.buS	Error, bus, failure in serial communication
E.dOH	Error, drive-overheat, motor overheats and prewarning time has run out
E.dSP	Error, digital signal processor, error in signal processor
E.PrF	Error, prohibited rotation forward, error in the software limit switch (when the set direction of rotation is forward, the software limit switch for forward is inactive)
E.Prr	Error, prohibited rotation reverse, error in the software limit switch (when the set direction of rotation is reverse, the software limit switch for reverse is inactive)
E.hyb	Error, hybrid, error in the encoder input card
E.LSF	Error, load shunt fault
E.OC	Error, overcurrent, overcurrent short-time peak overloading
E.OH	Error, overheated, overheating of the inverter
E.OH2	Error, overheat 2, electronic motor protection
E.nOH	Error, no overheat, overheating no longer preset, can be reset (valid for malfunction E.OH or E.OH2)
E.OL	Error, overload, continuous overload, for cooling down the inverter has to stay supplied with power, the cooling time depends on the previous overload time
E.nOL	Error, no overload, cooling time has run out, error can be reset
E.OP	Error, overpotential, overvoltage in the DC voltage circuit
E.OS	Error, overspeed, overspeed (can only be reset with power-on-reset
E.PuC	Error, power unit code, invalid power circuit recognition
E.SEt	Error, set, set selection error, check LF.02
E.UP	Error, underpotential, undervoltage im DC voltage circuit

8.2 ru-Parameter

The actual operating condition of the inverter can be read in these parameters. The parameters in this group are **read-only**. Exception: parameters **ru.8, ru.12** and **ru.25** can be reset with the serial interface by entering any value. You can also use the keyboard and do the reset with the UP/DOWN keys.

Display Inverter Status

Shows the actual inverter status.

See status/error messages pages GB 42 - GB 43

Actual Torque Display

Displays actual motor torque (calculated from the active current).

Max. tolerance approx. +/-20% in the basic speed range (in the field weakening range larger tolerances are possible).
During open loop operation 0 is always shown.

Set Speed Display

In ru. 4 the set speed value, at the output of the ramp generator, is displayed. If the modulation is switched off or abnormal operating state is active, then the actual setpoint 0 rpm is shown.
During controlled operation this parameter shows the output frequency in rpm.

Peak Inverter Utilization

ru.8 makes it possible to immediately detect peak utilization within an operating cycle. In addition the highest value that occurs in LF.87 is stored in ru.8. The peak memory can be deleted by pressing the UP or DOWN key, or with Bus by writing any value onto the address of ru. 8. The memory is deleted when the inverter is switched off.

Apparent Current

Display of the actual apparent current. Resolution 0.1A

Active Current

Display of the actual active current. Resolution 0.1A
The active current is calculated from the motor parameters. The restrictions for the torque accuracy are therefore valid for the active current display as well.
During open loop operation the display is always 0.0A.

Actual DC Voltage

Display of the actual dc-bus voltage Resolution: 1V

Peak DC Voltage

Display of the maximum dc-bus voltage measured. In addition the highest value which occurs in ru.11 is stored in ru.12. (Erasing the peak storage : see parameter ru. 8)

X2 Input Terminal Status

Terminal X2 (upper terminal)

You can control whether the input signal reaches the inverter control with ru.14. Every input (output) has a certain valency. If several inputs are set, the sum is displayed.

! see parameter LF.82 !

X2 Output Terminal Status

Terminal X2 (upper terminal)

You can control whether the outputs were set by the inverter control with ru.15. The digtial outputs have a certain valency. If several outputs are simultaneously set, the sum is shown.

! see parameter LF.83 !

Actual Parameter Set

Displays the parameter set currently active (meaning the set, in which the motor presently operates).

Speed Reference Display

Shows the set speed at the input of the ramp generator. If no function with a higher priority is activated, then the inverter works at this speed.
Resolution: 0.5 rpm.
If no direction of rotation is selected, the setpoint for forward rotation is shown.

GB

REF 1 Display

Display of the applied analog voltage in % (10 V = 100%) at REF 1 (setpoint input).

REF 2 Display

Display of the applied analog voltage in % (10 V = 100%) at REF 2 (auxiliary input).

OL Counter Display

Evaluates the continuous load of the inverter, in order to prevent OL from occuring (load reduction on time). The OL error is triggered, when the OL counter reaches 100%. The counter is shown with a 1% resolution.

Peak Apparent Current

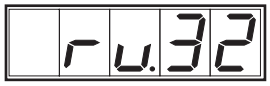
Maximum motor current that occurs during operating time. Display in [A]. The peak memory can be deleted by pressing the UP or DOWN key. The memory is also deleted when the inverter is switched off.

Heat Sink Temperature

Displays the current heat sink temperature in Celsius (°C).

Power On Counter

Shows the time that the inverter was supplied with power.
Resolution: 1 hour



Modulation On Counter

Shows how long the inverter was active. Resolution: 1 hour.
(modulation active, motor supplied with voltage).

8.3 In-Parameter

Data about the frequency inverter are read out in these parameters.

Inverter Type

Display of the type of inverter.

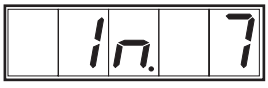
Value (hex)	Description		
1CDA	13.F4.FXG,	200V,	16 kHz
1CDC	14.F4.FXG,	200V,	16 kHz
1CDB	13.F4.FXG,	400V,	16 kHz
1CDD	14.F4.FXG,	400V,	16 kHz
1CDF	15.F4.FXG,	400V,	8 kHz / 16 kHz
1CE1	16.F4.FXG,	400V,	8 kHz / 16 kHz
3CDF	15.F4.FXH,	400V,	16 kHz
3CE1	16.F4.FXH,	400V,	16 kHz
3CE3	17.F4.FXH,	400V,	8 kHz / 16 kHz
3CE5	18.F4.FXH,	400V,	8 kHz / 16 kHz
5CE3	17.F4.FXK,	400V,	16 kHz
5CE5	18.F4.FXK,	400V,	16 kHz
5CE7	19.F4.FXK,	400V,	8 kHz / 16 kHz
5CE9	20.F4.FXK,	400V,	8 kHz / 16 kHz
7CEB	21.F4.FXL,	400V,	8 kHz / 16 kHz
7CED	22.F4.FXL,	400V,	8 kHz / 16 kHz

Rated Inverter Current

Display of the rated inverter current A (resolution 0.1 A).

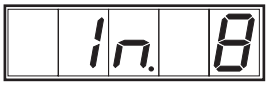
Configfile Number

Contains a software identifier used by KEB COMBIVIS. The configuration automatically starts when COMBIVIS is activated and the inverter is connected.



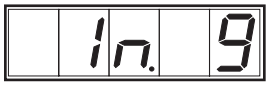
Serial Number High

Displays the serial number of the unit.



Serial Number Low

Displays the serial number of the unit.



Serial Number Order No. High

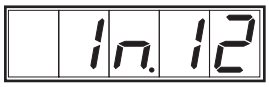
Displays the serial number of the unit.

Serial Number Order No. Low

Displays the serial number of the unit.

Customer Number High

Displays the customer number.



Customer Number Low

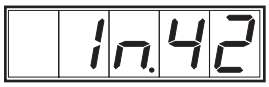
Displays the customer number.

Last Error

Shows the last error that occurred.

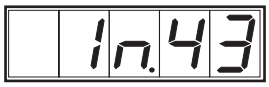
Error Counter OC

Shows the total number of errors that occur of each type. The maximum value is 255.



Error Counter OL

Shows the total number of errors that occur of each type. The maximum value is 255.



Error Counter OP

Shows the total number of errors that occur of each type. The maximum value is 255.

Error Counter OH

Shows the total number of errors that occur of each type. The maximum value is 255.

Error Counter WD

Shows the total number of watchdog errors (Bus) that occur of each type. The maximum value is 255.

Software ID Version DSP

The software version number and the control software are coded in this parameter.

Software Date DSP

Displays the software date. The day, month and year (but only the last digit of the year) are shown.

Example: Display = 1507.4
Date = 15.07.94

Feedback System Channel 1

Shows which feedback system is suited for the inverter.

0 = incremental encoder must be used
x = other values only occur when the control card is defective

Feedback System Channel 2

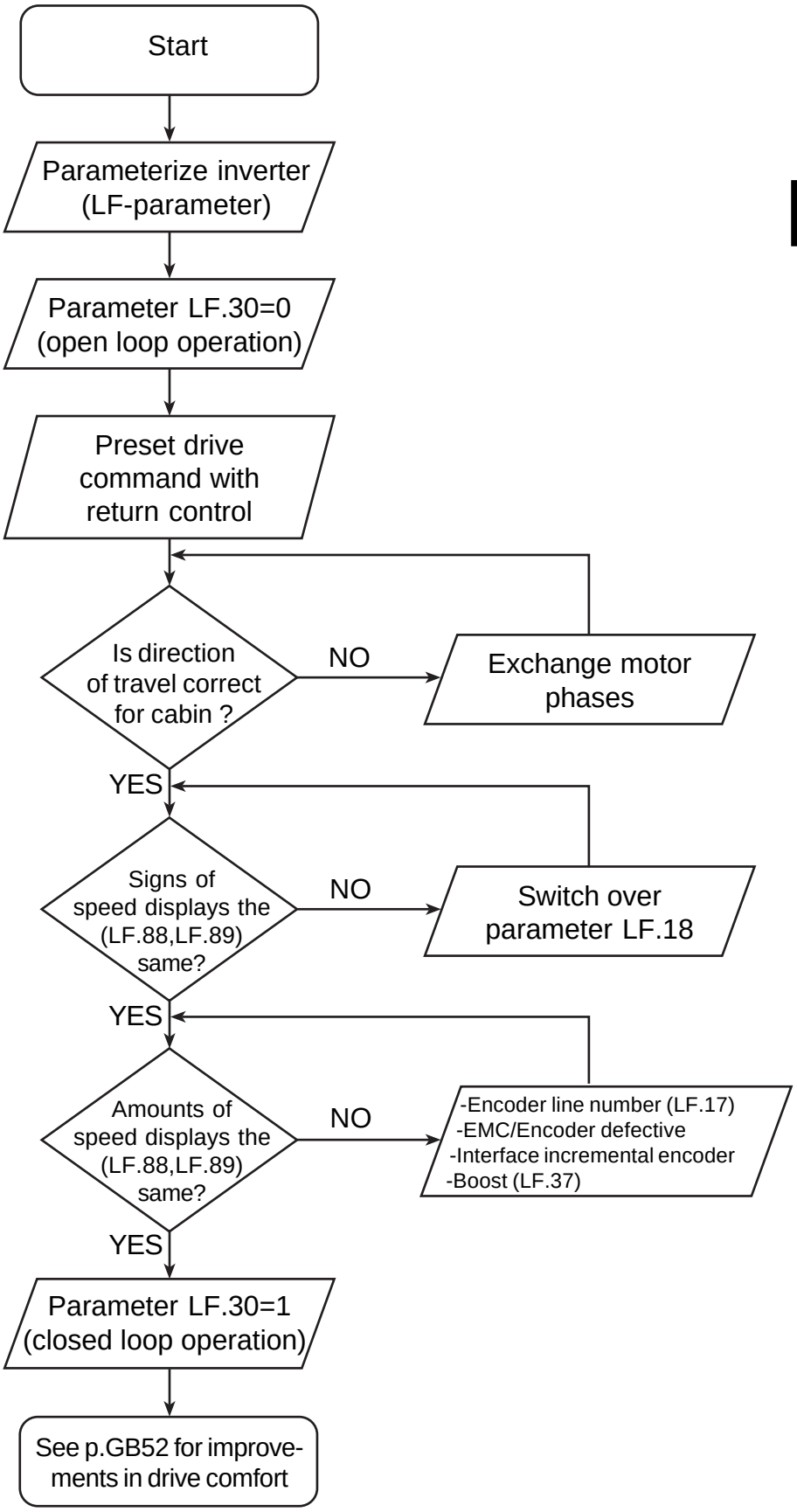
Shows which feedback system is suited for the inverter.

0 = incremental encoder must be used
1 = SSI-encoder must be used
4 = The input signals from channel 1 are outputted onto channel 2.
Channel 2 serves as an incremental encoder output.

GB

9.1 Inital Start-Up

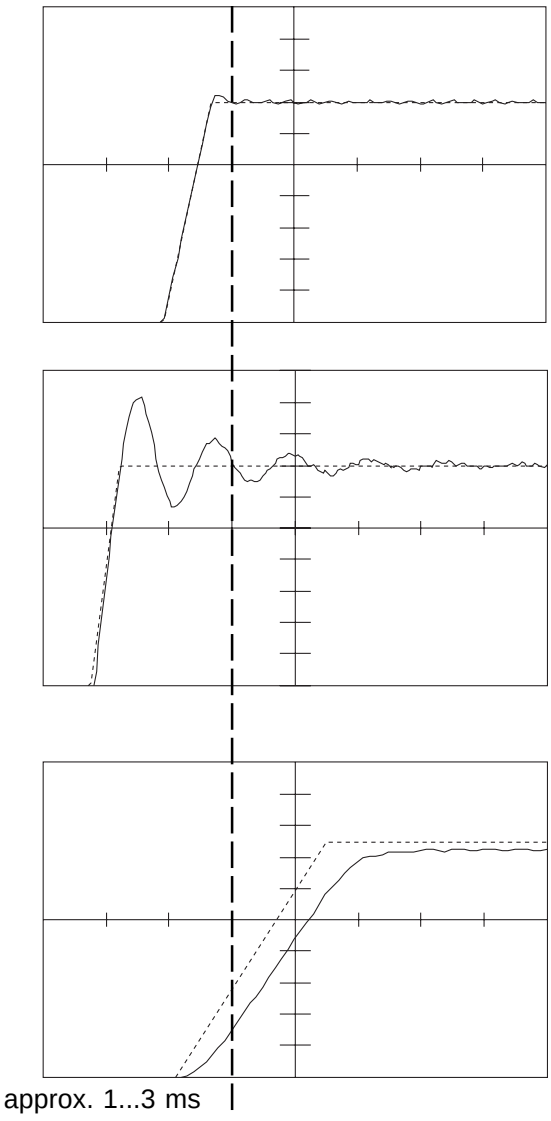
To start KEB COMBIVERT F4-F Lift do as follows:



9.2 Current Controller Optimziation F4-F Lift

When the ride comfort is unsatisfactory, the current controller must be adpated onto the respective motor.
When using a current probe and a storage oscilloscope it is simple to find the correct adjustment of the control.

Procedure:
- Connect motor and inverter
- Adjust control process onto field oriented control (LF.30 = 1)
- Activate control release on inverter (X2.1)
- Switch on direction of rotation (X2.3/X2.4) and watch the current rise
- No setpoint may be applied (speed = 0 rpm)
- Measure the current of a motor phase with the current probe:adjust LF.34 and LF.35, so that the current rises onto the maximum value in approximately 1..3ms without overshoot.
- If the current signal cannot be measured or is too small, measure the current on another phase



Parameter LF.34 and LF.35
are correctly adjusted

Parameter LF.34 and LF.35
are adjusted too large

Parameter LF.34 and LF.35
are adjusted too small

9.3 Adjustment Assistance for Conventional Lift Motors

The inverter KEB COMBIVERT F4-F Lift is suited for modern lift/ industrial motors as well as conventional lift motors and thus for modernization.

In contrast to modern lift motors and industrial motors, conventional and old lift motors have a 'soft' torque-speed-characteristic. This can be seen in the rated speeds. Typical for modern machines is 1450 rpm (with 4-pole motors) and with conventional motors 1380 rpm or 880 rpm (6-pole machines).

Often the specifications on the name plate are inadequate or non-existant. In this case the motor data must be adjusted on-site for the system.

If the lift does not reach the rated speed during 'no-load-downward-drive' (display LF.90), do the following:

1.) Decrease field weakening speed (LF.16) to approx. 2/3 of the synchronous speed (approx. 1000 rpm with 4-pole motors; approx. 680 rpm with 6-pole motors).

2.) Set cos phi (LF.15) to 0.9.

3.) Decrease rated motor speed LF.11 in steps of 20 until the rated speed is reached during a downward drive.

When the power consumption of the motor is too high (display in ru.0 or LF.87) it helps to increase LF.11 in steps of 10. At the same time control whether the 'no-load downward-drive' can still be driven with rated speed.

If possible remove hand wheels with big inertia. If this is not possible, then the starting jerk (LF.50) and acceleration (LF.51) should be low (both values approx. 0.4), so that the motor is not overstressed.

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