

KURZANLEITUNG

QUICK REFERENCE



KEB COMBIVERT F4-F Lift
Version 3.0 (Lift-Servo)

Aufzugstechnik
Lift Technology

D Seite D-3 . . . D-28

Diese Betriebsanleitung

- ist gültig für den Frequenzumrichter **KEB COMBIVERT F4-F Lift** Version 3.0
- muß jedem Anwender zugänglich gemacht werden

Vor jeglichen Arbeiten muß sich der Anwender mit dem Gerät vertraut machen. Darunter fällt insbesondere die Kenntnis und Beachtung der Sicherheits- und Warnhinweise. Lesen Sie deshalb unbedingt die "Technische Dokumentation Teil 1".

GB Page GB-3 . . . GB-28

This manual

- is valid for frequency inverter **KEB COMBIVERT F4-F Lift** Version 3.0
- 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'.

1.	Inputs/Outputs	4
1.1	Terminal X2 - Control Terminals (units $\geq$ G-housing)	4
1.2	Terminal X3 - I/O-Expander (units $\geq$ G-housing)	5
1.5	Terminal X2 - Control Terminals (D- and E-housing)	6
2.	Connection	7
2.1	Example connection diagram for Lift Inverters $\geq$ G-housing	7
2.2	Example connection diagram for Lift Inverters in D- and E-housing	8
2.3	Connection X4	9
2.3.1	Connection Incremental Encoder	9
2.3.2	Connection SIN/COS Encoder	9
2.3.3	Connection Resolver	9
2.3.4	Connection Hiperface Encoder	10
2.3.5	Connection UVW Encoder	10
2.4	Connection X5 - Incremental Encoder Emulation	10
3.	Start-Up Instructions	11
3.1	Commissioning of an Asynchronous Machine with Gearbox	11
3.2	Commissioning of a Gearless Permanent Magnet Machine	13
3.3	Commissioning of a Gearless Asynchronous Machine	16
3.4	Commissioning of a Permanent Magnet Machine with Gearbox	18
4.	Operating Parameter	20
5.	Parameter Lists	24
5.1	LF-Parameter	24
5.2	dr-Parameter	26
5.3	EC-Parameter	27
5.4	An-Parameter	27
5.5	ru-Parameter	28
5.6	In-Parameter	28

1. Inputs / Outputs

1.1 Terminal X2 Control Terminals (units $\geq$ G-housing)

Terminal	Function	
1	Control Release	digital inputs: noise immunity: 2 kV logic 1: $\pm 12 \dots 30$ V internal input resistor: approx. 2 kOhm 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: speed deviation, warning	see chapter 3.4
9	Digital output signal: main contactor control inverted	see chapter 3.4
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 and An-parameter)	Differential voltage input -10V ... +10V resolution: 12 Bit $R_i = 40$ kOhm Smoothing time: 2 ms / processing time: 1...3 ms
15		
16	Analog input of the load measure for pretorque (see parameter LF.30, LF.67 and An-parameter)	Differential voltage input -10V ... +10V resolution: 12 Bit $R_i = 40$ kOhm Smoothing time: 2 ms / processing time: 1...3 ms
17		
18	Analog output set speed	-10V...+10V / resolution: 8 Bit $R_i = 100$ Ohm conditional short-circuit proof (<1 rpm) $0 \dots 10V \wedge 0 \dots LF.20$
19	Analog output actual speed	
20	Relay output for cabinet fan control (LF.66)	30 VDC / 1 A see chapter 6.1
21		
22		
23	External voltage supply	+ 24 ... + 30 V external voltage input for digital outputs on terminal strip X2

1.2 Terminal X3 I/O-Expander (units $\geq$ G-housing)

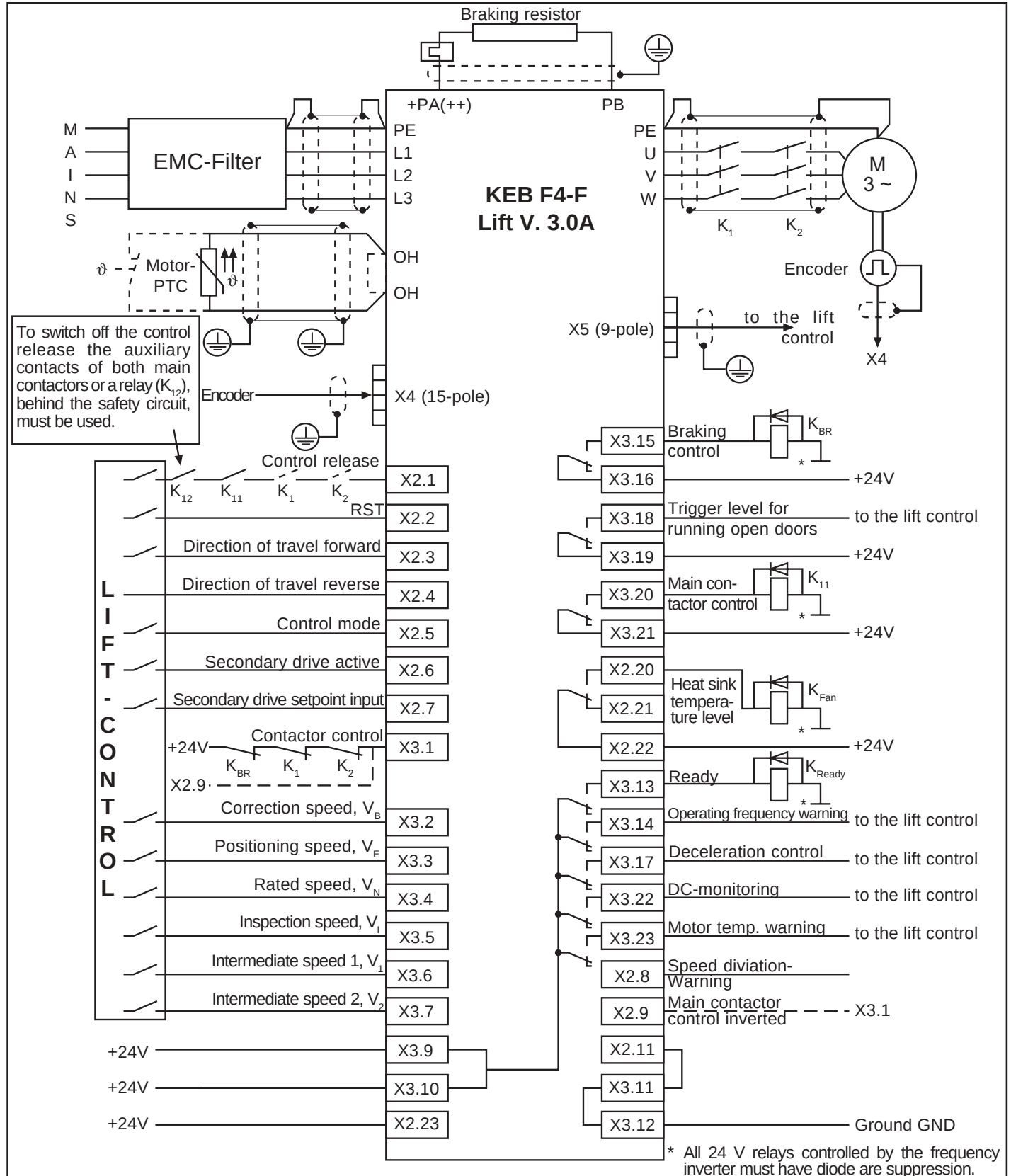
Terminal	Function		
1	Digital input signal: contactor control (see chapter 3.6)	max. voltage endurance to ground: 100 V	
2	Setpoint input correction-speed: V _B	digital inputs for setpoint activation	
3	Setpoint input positioning speed: V _E	! only valid with LF.2 = 2 !	
4	Setpoint input rated speed: V _N	max. voltage endurance to ground: 100 V	
5	Setpoint input inspection speed: V _I	terminal assignment with binary coded set value selection see LF.2	
6	Setpoint input intermediate speed 1: V ₁		
7	Setpoint input intermediate speed 2: V ₂		
8	Option ! do not connect !		
9	External supply voltage	+ 24 ... + 30 V external voltage input	
10		for relay outputs on terminal X3	
11	Ground for X3.9 / X3.10		
12			
13	Output signal: ready / overspeed	≈ U _{X3.9 / X3.10} / 500 mA	see chapter 3.4
14	Output signal: switching frequency warning	≈ U _{X3.9 / X3.10} / 500 mA	see chapter 3.4
15	Output relay contact: braking control	30 V DC / 1 A	see chapter 3.4
16			
17	Output signal: delay control	≈ U _{X3.9 / X3.10} / 500 mA	see chapter 3.4
18	Output relay contact: running open doors	30 V DC / 1 A	see chapter 3.4
19			
20	Output relay contact: main contactor control	30 V DC / 1 A	see chapter 3.4
21			
22	Output signal: DC monitoring	≈ U _{X3.9 / X3.10} / 500 mA	see chapter 3.4
23	Output signal: motor temperature warning	≈ U _{X3.9 / X3.10} / 500 mA	see chapter 3.4

1.3 Terminal X2 Control Terminals (D- and E-housing)

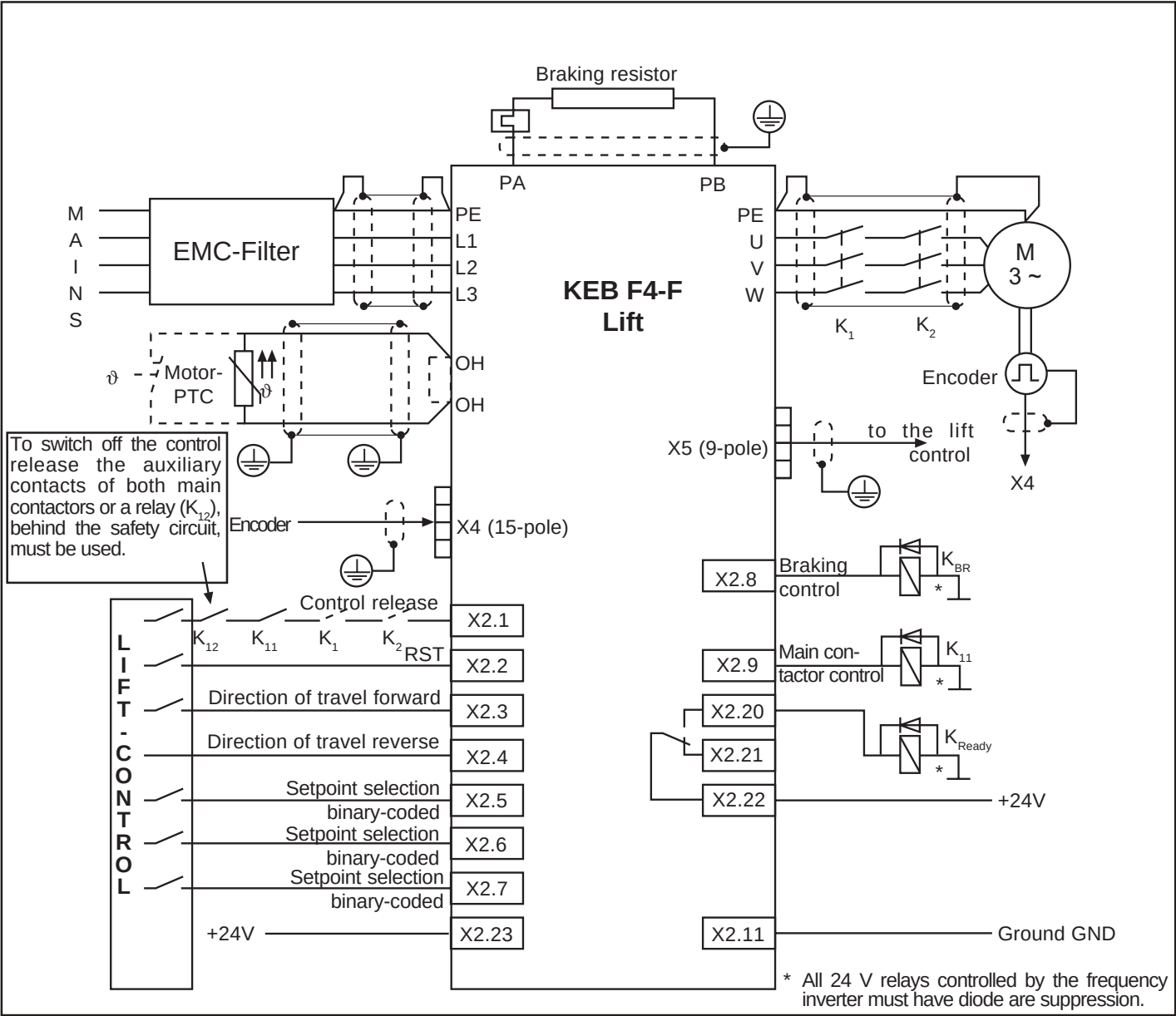
Terminal	Function	
1	Control Release	digital inputs: noise immunity: 2 kV logic 1: ± 12...30 V internal input resistor: approx. 2 kOhm PNP-logic
2	Reset	
3	Direction of travel forward	
4	Direction of travel reverse	
5	binary-coded setpoint setting (see parameter LF.02)	
6		
7		
8	Digital output signal: braking control	14...30 V / max. 20mA (per output)
9	Digital output signal: main contactor control	PNP-logic
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 and An-parameter)	Differential voltage input -10V ... +10V resolution:12 Bit Ri = 40 kOhm Smoothing time: 2 ms / processing time: 1...3 ms
15		
16	Analog input of the precontrol torque (see parameter LF.30, LF.67 and An-parameter)	Differential voltage input -10V ... +10V resolution:12 Bit Ri = 40 kOhm Smoothing time: 2 ms / processing time: 1...3 ms
17		
18	Analog output set speed	-10V...+10V / resolution: 8 Bit Ri = 100 Ohm conditional short-circuit proof (<1 rpm) 0...10V ^ 0...LF.20
19	Analog output actual speed	
20	Relay: Ready / overspeed	30 VDC / 1 A see output signal description
21		
22		
23	External voltage supply	+ 24 ... + 30 V external voltage input for digital outputs

2. Connection

2.1 Example connection diagram for Lift Inverters $\geq$ G-housing



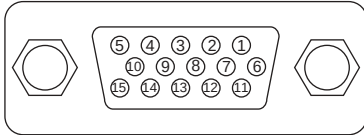
2.2 Example connection diagram for Lift Inverters in D- and E-housing



	X2.5	X2.6	X2.7
V = 0	0	0	0
V _B	1	0	0
V _E	0	1	0
V _N	1	1	0
V _I	0	0	1
V ₁	1	0	1
V ₂	0	1	1
n _{Door}	1	1	1

2.3 Connection X4

Encoder 1



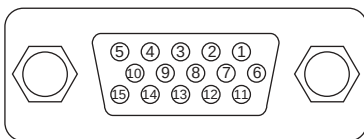
2.3.1 Connection Incremental Encoder

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.

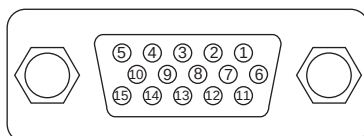
2.3.2 Connection SIN/COS Encoder



PIN-No.	Signal	PIN-No.	Signal
1	C -	9	B +
2	D -	10	
3	A -	11	
4	B -	12	+ 5 V
5		13	GND
6	C +	14	R -
7	D +	15	R +
8	A +	Housing	Shield

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

2.3.3 Connection Resolver



PIN-No.	Signal	PIN-No.	Signal
1		9	COS
2		10	SIN_REF
3	SIN_LO	11	
4	COS_LO	12	
5	SIN_REF_LO	13	
6		14	
7		15	
8	SIN	Housing	Shield

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

Connection

2.3.4 Connection
Hiperface Encoder

PIN-No.	Signal	PIN-No.	Signal
1	REF_COS REF_SIN	9	SIN+
2		10	12 V
3		11	GND DATA- DATA+ Shield
4		12	
5	COS+	13	
6		14	
7		15	
8		Housing	

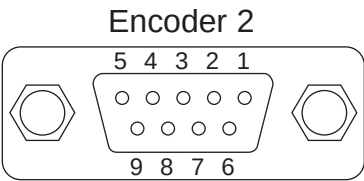
The connector may only be connected / disconnected when the inverter and voltage supply are shut off.

2.3.5 Connection UVW
Encoder

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

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

2.4 Connection X5
Incremental Encoder
Emulation



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.

PIN-No.	Signal	Meaning
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-	inverted signal channel A
7	B-	inverted signal channel B
8		reserved
9	GND	external ground
Housing		Shielding

3. Start - Up Instructions

3.1 Commissioning of an Asynchronous Machine with Gearbox

The following procedure is recommended for the commissioning of the KEB COMBIVERT F4-F lift version 3.0 with asynchronous machine and gearbox:

Adjust the parameters in ascending sequence, as this initiates partial presettings of the unit. Start with the lift data (LF-parameter). Save the adjusted data by activating the „Enter key“.

LF.00: Enter password (440)

LF.02: Enter setpoint setting/rotation setting

1 = Binary coded setpoint setting

2 = Input coded setpoint setting

3 = Analog setpoint setting 0...+10V

4 = Analog setpoint setting -10...+10V

LF.04: Check, if the value „0“ is adjusted (asynchronous machine)

LF.20: Enter system speed in m/s

LF.21: Enter the diameter of the traction sheave in mm, if necessary, remeasure

LF.22: Enter gear reduction, if necessary, count

LF.23: Enter rope suspension (1 for 1:1, 2 for 2:1 etc.)

LF.24: Enter nominal load (lifting capacity) of the cabine in kg

LF.30: Select control procedure (0 = without feedback, 2 = with feedback)

LF.40: Enter correction speed in m/s

LF.41: Enter crawl speed in m/s

LF.42: Enter rated speed in m/s

LF.43: Enter inspection speed in m/s

dr.00: Enter rated motor power in kW (1 kW = 1.36 PS)

dr.01: Enter rated motor speed in rpm (not synchronous speed)

dr.02: Enter rated motor current in A

dr.03: Enter rated motor frequency in Hz

dr.04: Enter cos phi of the motor

dr.12: Enter rated motor voltage in V (if the value to be adjusted is already entered, it is essential to acknowledge the value with ENTER)

EC.01: Enter encoder pulse number

With inspection speed check, whether the lift moves. In case of error message „E.EnC“ execute an encoder track change with EC.2=1. Reset the error message through switch off and switch on.

Optimization LF.30=0 must be adjusted, if the motor shall be driven without encoder.

If the load cannot be lifted with this, increase LF.37 (torque increase).

In case of error message „E.OL2“ adjust LF.38=0 (8 kHz operating frequency).

In case of wrong travel direction (up and down exchanged) activate the reversal of driving direction with LF.05=1.

The driving comfort can be optimized with the following parameters:

LF.50 Starting jerk in m/s^3

LF.51 Acceleration in m/s^3

LF.52 Deceleration jerk in m/s^3

LF.53 Deceleration in m/s^3

LF.54 Stopping jerk in m/s^3

The ramps becomes steeper by increasing the values, e.g. the jerk values becomes harder.

If the cabine rolls back when releasing the brake, increase LF.33 in steps of 500.

If the lift at the beginning of the drive runs against the brake, increase LF.70 (brake release time) because the brake release is not fast enough.

The brake engage time can be increased with parameter LF.79, if the brake is not closed after stopping when the inverter switches off the modulation.

If the lift does not reach the rated speed during 'empty-downward-drive' (display LF.90), do the following:

- Set cos phi (dr.04) to 0.9
- Decrease field weakening speed (dr.19) to approx. 2/3 of the synchronous speed (approx. 1000 rpm with 4-pole motors; approx. 680 rpm with 6-pole motors)
- decrease rated motor speed (dr.01) in steps of 20 until the rated speed is reached during a downward drive.

3.2 Commissioning of a Gearless Permanent Magnet Machine

The following procedure is recommended for the commissioning of a KEB COMBIVERT F4-F lift version 3.0 with a gearless permanent magnet machine:

Adjust the parameters in ascending sequence, as this initiates partial presettings of the unit. Start with the selection of the motor and the resolution and adjustment of the lift data (LF-parameter). Save the adjusted data by activating the „ENTER key“.

When using a synchronous machine with Hiperface-encoder (inverter part no. xx.F4.Fxx-xi5x), the motor, encoder and control data are automatically transferred from the encoder to the inverter at the first switch on. However, the encoder must be preset with the data. Please inquire at your motor manufacturer, whether this has been done. If the data is stored in the encoder, the entire „dr“ and „EC“-parameters as well as LF.30 - LF.36 need not to be entered in the inverter anymore.

LF.00: Enter password (440)

LF.02: Enter setpoint setting/rotation setting

1 = Binary coded setpoint setting

2 = Input coded setpoint setting

3 = Analog setpoint setting 0...+10V

4 = Analog setpoint setting -10...+10V

LF.04: Adjust value "1"

LF.06: Adjust value "1"

LF.20: Enter system speed in m/s

LF.21: Enter the diameter of the traction sheave in mm, if necessary, remeasure

LF.22: Enter gear reduction 1

LF.23: Enter rope suspension (1 for 1:1, 2 for 2:1 etc.)

LF.24: Enter nominal load (lifting capacity) of the cabine in kg

LF.31 to LF.33: Enter speed controller data (Use practical values or inquire about adjustment at KEB.)

LF.40: Enter correction speed in m/s

LF.41: Enter crawl speed in m/s

LF.42: Enter rated speed in m/s

LF.43: Enter inspection speed in m/s

- dr.00: Enter rated motor power in kW
- dr.01: Enter rated motor speed in rpm
- dr.02: Enter rated motor current in A
- dr.03: Enter rated motor frequency in Hz
- dr.09: Enter rated motor torque in Nm
- dr.17: Enter EMK voltage constant in V/1000 rpm (if only the rated motor voltage is known, EMK can be calculated according to following formula: $U_{EMK} = U_N / n_N \times 1000 \text{ rpm}$)
- dr.41: Enter winding resistance in Ohm
- dr.42: Enter winding inductivity in mH

EC.01: Enter encoder pulse number

EC.04: Enter value „1“ to execute a position alignment and give a drive command. Cancel drive command, when value „5“ is displayed. In doing so make sure that the machine is unloaded, i.e. the ropes may not rest upon the traction sheave.

If the position alignment is successful completed, value „7“ is displayed.

If the error „E.EnC“ or E.OS“ occurs during the alignment or if the alignment is not automatically completed, it must be checked, if the motor cables UVW inverter correspond to UVW motor.

If the position of the encoder is known the value can be entered directly as hexadecimal value in EC.07.

Let the motor rotate without ropes and with inspection speed after the position alignment. If the error message „E.EnC“ or „E.OS“ occurs during the alignment, check if the motor cables UVW inverter are correspond to UVW motor, if necessary change. The position alignment must be done again if the motor cables are changed.

LF.36: Check the maximum torque in Nm of the motor and, if necessary, adjust it.

(Attention: If this parameter is adjusted too high for synchronous machines and if the machine is permanently overloaded, it will lead to demagnetization of the permanent magnets and the destruction of the motor!)

With inspection speed check, whether the lift moves.

Optimization In case of error message „E.OL2“ adjust LF.38=0 (8 kHz operating frequency).

In case of wrong travel direction (up and down exchanged) activate the reversal of driving direction with LF.05=1.

The driving comfort can be optimized with the following parameters:

LF.50 Starting jerk in m/s^3

LF.51 Acceleration in m/s^3

LF.52 Deceleration jerk in m/s^3

LF.53 Deceleration in m/s^3

LF.54 Stopping jerk in m/s^3

The ramps become steeper by increasing the values, e.g. the jerk value becomes harder.

If the cabine rolls back when releasing the brake, increase LF.33 in steps of 500.

If the lift at the beginning of the drive runs against the brake, increase LF.70 (brake release time) because the brake release is not fast enough.

The brake engage time can be increased with parameter LF.79, if the brake is not closed after stopping when the inverter switches off the modulation.

3.3 Commissioning of a Gearless Asynchronous Machine

The following procedure is recommended for the commissioning of the KEB COMBIVERT F4-F lift version 3.0 with a gearless asynchronous machine with SinCos-encoder:

Adjust the parameters in ascending sequence, as this initiates partial presettings of the unit. Start with the selection of the resolution and the adjustment of the lift data (LF-parameter). Save the adjusted data by activating the „ENTER key.

LF.00: Enter password (440)

LF.02: Enter setpoint setting/rotation setting

1 = Binary coded setpoint setting

2 = Input coded setpoint setting

3 = Analog setpoint setting 0...+10V

4 = Analog setpoint setting -10...+10V

LF.04: Check, if value „0“ is adjusted

LF.06: Adjust value „1“

LF.20: Enter system speed in m/s

LF.21: Enter diameter of traction sheave in mm, if necessary, remeasure

LF.22: Enter gear reduction 1

LF.23: Enter rope suspension (1 for 1:1, 2 for 2:1 etc.)

LF.24: Enter nominal load (lifting capacity) of the cabine in kg

LF.30: Select control procedure (0=without feedback, 2=with feedback, 3=with torque pre-control)

LF.31 to LF.33: Enter speed controller data (use practical values or inquire about adjustment at KEB)

LF.40: Enter correction speed in m/s

LF.41: Enter crawl speed in m/s

LF.42: Enter rated speed in m/s

LF.43: Enter inspection speed in m/s

LF.54: Due to the high mass moment of inertia, adjust the stopping jerk as small as possible
(ca. $0,3\text{m/s}^3$)

dr.00: Enter rated motor power in kW (1 kW = 1.36 PS)

dr.01: Enter rated motor speed in rpm (not synchronous speed)

dr.02: Enter rated motor current in A

dr.03: Enter rated motor frequency in Hz

dr.04: Enter cos phi of the motor

dr.12: Enter rated motor voltage in V (if the value to be adjusted is already entered, it is essential to acknowledge the value with ENTER)

EC.01: Enter encoder pulse number

LF.36: Check the maximum torque in Nm of the motor and, if necessary, adjust it.

With inspection speed check, whether the lift moves. In case of error message „E.EnC“ execute an encoder track change with EC.2=1. Reset the error message through switch off and switch on.

Optimization

LF.30=0 must be adjusted, if the motor shall be driven without encoder. If the load cannot be lifted with this, increase LF.37 (torque increase).

In case of error message „E.OL2“ adjust LF.38=0 (8 kHz operating frequency).

In case of wrong travel direction (up and down exchanged) activate the reversal of driving direction with LF.05=1.

The driving comfort can be optimized with the following parameters:

LF.50 Starting jerk in m/s^3

LF.51 Acceleration in m/s^3

LF.52 Deceleration jerk in m/s^3

LF.53 Deceleration in m/s^3

LF.54 Stopping jerk in m/s^3

The ramps becomes steeper by increasing the values, e.g. the jerk values becomes harder.

If the cabine rolls back when releasing the brake, increase LF.33 in steps of 500.

If the lift at the beginning of the drive runs against the brake, increase LF.70 (brake release time) because the brake release is not fast enough.

The brake engage time can be increased with parameter LF.79, if the brake is not closed after stopping when the inverter switches off the modulation.

If the lift does not reach the rated speed during 'empty-downward-drive' (display LF.90), do the following:

- Set cos phi (dr.04) to 0.9
- Decrease field weakening speed (dr.19) to approx. 2/3 of the synchronous speed (approx. 1000 rpm with 4-pole motors; approx. 680 rpm with 6-pole motors)
- decrease rated motor speed (dr.01) in steps of 20 until the rated speed is reached during a downward drive.

3.4 Commissioning of a Permanent Magnet Machine with Gearbox

The following procedure is recommended for the commissioning of the KEB COMBIVERT F4-F lift version 3.0 with permanent magnet machine and gearbox:

Adjust the parameters in ascending sequence, as this initiates partial presettings of the unit. Start with the selection of the motor and the resolution and adjustment of the lift data (LF-parameter). Save the adjusted data by activating the „Enter key“.

LF.00: Enter password (440)

LF.02: Enter setpoint setting/rotation setting

1 = Binary coded setpoint setting

2 = Input coded setpoint setting

3 = Analog setpoint setting 0...+10V

4 = Analog setpoint setting -10...+10V

LF.04: Adjust value „1“

LF.20: Enter system speed in m/s

LF.21: Enter diameter of the traction sheave, if necessary, remeasure

LF.22: Enter gear reduction, if necessary, count

LF.23: Enter rope suspension (1 for 1:1, 2 for 2:1 etc.)

LF.24: Enter additional load (lifting capacity, payload) of the cabine in kg

LF.31 to LF.33: Enter speed controller data (use practical values or inquire about adjustment at KEB)

LF.40: Enter correction speed in m/s

LF.41: Enter crawl speed in m/s

LF.42: Enter rated speed in m/s

LF.43: Enter inspection speed in m/s

dr.01: Enter rated motor speed in rpm

dr.02: Enter rated motor current in A

dr.03: Enter rated motor frequency in Hz

dr.09: Enter rated motor torque in Nm

dr.17: Enter EMK voltage constant in V/1000 rpm (if only the motor voltage is known, EMK can be calculated according to following formula: $U_{EMK} = U_N / n_N \times 1000 \text{ rpm}$)

dr.41: Enter winding resistance in Ohm

dr.42: Enter winding inductivity in mH

EC.01: Enter encoder pulse number. (If a resolver is used, the parameter must not be changed).

EC.04: Enter value „1“ to execute a position alignment and give a drive command. Cancel drive command, when value „5“ is displayed. In doing so make sure that the machine is unloaded, i.e. the ropes may not rest upon the traction sheave.

If the position alignment is successful completed, value „7“ is displayed.

If the error „E.EnC“ or E.OS“ occurs during the alignment or if the alignment is not automatically completed, it must be checked, if the motor cables UVW inverter correspond to UVW motor. If the position of the encoder is known the value can be entered directly as hexadecimal value in EC.07.

Let the motor rotate without ropes and with inspection speed after the position alignment. If the error message „E.EnC“ or „E.OS“ occurs during the alignment, check if the motor cables UVW inverter are correspond to UVW motor, if necessary change. The position alignment must be done again if the motor cables are changed.

LF.36: Check the maximum torque in Nm of the motor and, if necessary, adjust it.

(Attention: If this parameter is adjusted too high for synchronous machines and if the machine is permanently overloaded, it will lead to demagnetization of the permanent magnets and the destruction of the motor!)

With inspection speed check, whether the lift moves.

Optimization

In case of error message „E.OL2“ adjust LF.38=0 (8 kHz operating frequency).

In case of wrong travel direction (up and down exchanged) activate the reversal of driving direction with LF.05=1.

The driving comfort can be optimized with the following parameters:

LF.50 Starting jerk in m/s^3

LF.51 Acceleration in m/s^3

LF.52 Deceleration jerk in m/s^3

LF.53 Deceleration in m/s^3

LF.54 Stopping jerk in m/s^3

The ramps becomes steeper by increasing the values, e.g. the jerk values becomes harder.

If the cabine rolls back when releasing the brake, increase LF.33 in steps of 500.

If the lift at the beginning of the drive runs against the brake, increase LF.70 (brake release time) because the brake release is not fast enough.

The brake engage time can be increased with parameter LF.79, if the brake is not closed after stopping when the inverter switches off the modulation.

4. Operating Parameter



X2 Input State

Terminal X2 (upper terminal)

With the X.2 input state it can be easily checked, whether the input signals reached the inverter control. Every input (output) has a specific value. If several inputs are set, the sum of the values is shown.

Value Table:

Display Combivis	Valency	Function		Input terminal
		> G	D + E	
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	setpoint selection binary-coded	X2.5
I2	32	door drive active		X2.6
I3	64	door drive setpoint setting		X2.7

Example: Input control release (X2.1) and direction forward (X2.3) are triggered with 24V .

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



X2 Output State

Terminal X2 (upper terminal)

With the X.2 output state it can be easily checked, whether the outputs were set by the inverter control. Every digital output has a specific value. If several outputs are set at the same time, the sum of the values is shown.

Value table:

Display Combivis	Valency	Function		Output terminal
		> G	D + E	
O1	1	digital output signal: braking control		X2.8
O2	2	digital output signal: main contactor control inverted		X2.9
		main contactor control		
O3	4	relay control cabinet fan	relay ready-to-operate collective fault overspeed	X2.20/X2.22



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: contactor 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: V_{11}	X3.6
I11	64	Set value 1st intermediate speed: V_{11}	X3.7

Terminal strip is nonexistent at units in D- and E-housing!


X3 Output State

Terminal X3 (lower terminal)

See parameter LF.83 for functional description.

Value table:

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

Terminal strip is nonexistent at units in D- and E-housing!



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



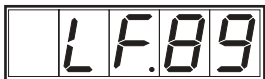
Actual Inverter Utilization

Display of the actual inverter utilization in %.



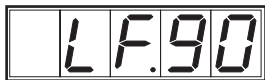
Actual Set Speed

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



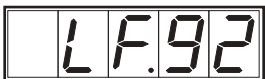
Actual Speed

The value shows the real speed in rpm, only with connected encoder.



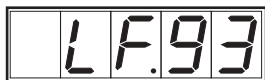
Actual Car Speed

Display of the current speed in m/s; only with connected encoder.



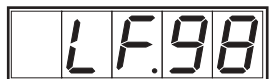
Crawl Distance

Display of the positioning distance in cm, after a completed ride.



Total Path

Display of the total path in cm, from releasing to applying the brake.

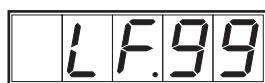


Error Status in Starting Procedure

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

Display	Significance
StOP	no setpoint selection
S.Co	setpoint selection without contactor control
S.IO	setpoint selection without control release
S.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
noP	No Operation; term. X2.1 (control release) is not assigned.
LS	Low speed; control release is set, no direction of rotation selected, modulation off.
Facc	Forward acceleration; acceleration phase forward.
Fcon	Forward constant running; constant drive forward.
Fdec	Forward deceleration; deceleration phase forward.
racc	Reverse acceleration; acceleration phase reverse.
rcon	Reverse constant running; constant drive reverse.
rdec	Reverse deceleration; deceleration phase reverse.
bbl	Base-block-time; power modules are locked for 3s (always, if control release is switched off or when an inverter error occurs) .

b) Error messages

Display	Significance
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.EnC	Error, encoder, error in the encoder break (reset only possible with Power-On-Reset)
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.OL2	Error overload, overloading of the inverter at output frequency < 3 Hz
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 in DC voltage circuit

Parameter Lists

5. Parameter Lists

5.1 LF-Parameter

Gr.	No.	Name	Address	P	E	R	Resol.	Lower Limit	Upper Limit	Default Value	Unit
LF	00	Password	3500		E		1	0	9999	-4	---
LF	01	User-defined password	3501		E		1	0	9999	440	---
LF	02	Steering / operating mode	3502		E		1	1	4	1	---
LF	04	ASM/SSM-selection	3504		E		1	0:ASM	1:SSM	0:ASM	---
LF	05	Reversal of travel direction	3505				1	0:off	1:on	0:off	---
LF	06	High-resolution	3506		E		1	0:off	1:on	0:off	---
LF	19	DC voltage compensation	3513		E		1	150	501:off	400	V
LF	20	Rated system speed	3514				0,001	0,000	15,000	0	m/s
LF	21	Traction sheave diameter	3515				1	200	2000	600	mm
LF	22	Gear reduction ratio	3516				0,01	1,00	99,99	30	---
LF	23	Catenary suspension	3517				1	1	8	1	---
LF	24	Load	3518				1	0	65535	0	kg
LF	25	Torque increase of the door drive	3519				0,1	0,0	25,5	6	%
LF	26	Rated speed of the door drive	351A				1	100	6000	1440	rpm
LF	27	Rated frequency of the door drive	351B				1	20	100	50	Hz
LF	28	Rated voltage of the door drive	351C				1	1	650	400	V
LF	30	Control method	351E		E		1	0	3	0	---
LF	31	KP speed	351F				1	1	65535	3000	---
LF	32	KI speed	3520				1	0	65535	1000	---
LF	33	KI speed offset	3521				1	0	65535	1000	---
LF	34	KP current	3522				1	1	65535	1500	---
LF	35	KI current	3523				1	0	65535	500	---
LF	36	Maximum torque	3524				0,1	0	dr.10	2 * dr.9	
							1'1			1,5*dr.9 '2	Nm
LF	37	Torque increase	3525				0,1	0,0	25,2	10	%
LF	38	Operating frequency change	3526				1	0	1	1	---
LF	40	Set value VB, correction speed	3528				0,001	0,000	0,300	0	m/s
LF	41	Set value VE, crawl speed	3529				0,001	0,000	0,300	0	m/s
LF	42	Set value VN, rated speed	352A				0,001	0,000	LF.20	0	m/s
LF	43	Set value VI, inspection speed	352B				0,001	0,000	0,630	0	m/s
LF	44	Set value V1, intermediate speed 1	352C				0,001	0,000	LF.20	0	m/s
LF	45	Set value V2, intermediate speed 2	352D				0,001	0,000	LF.20	0	m/s
LF	46	Set speed of door drive	352E				0,5	0	16000	0	rpm
							0,1 '1		2000 '1		
LF	50	Starting jerk	3532				0,01	0,10	9,99	0,60	m/s^3
LF	51	Acceleration	3533				0,01	0,10	2,00	0,90	m/s^2
LF	52	Deceleration jerk	3534				0,01	0,10	9,99	1,00	m/s^3
LF	53	Deceleration	3535				0,01	0,10	2,00	0,60	m/s^2
LF	54	Stopping jerk	3536				0,01	0,01:off	9,99	0,01:off	m/s^3
LF	55	Starting jerk VE (crawl speed)	3537				0,01	0,10	9,99	0,60	m/s^3
LF	56	Acceleration VE (crawl speed)	3538				0,01	0,10	2,00	0,90	m/s^2
LF	57	Speed Deviation mode	3539				1	0	2	1	---
LF	58	Speed deviation level	353A				1	0	30	10	%
LF	59	Speed diviation - release time	353B				0,001	0,000	10,000	3,000	s
LF	60	Switching level brake disconnection	353C				0,001	0,000	0,010	0,005	m/s
LF	61	Monitoring overspeed	353D				0,001	0,000	18,000	1,1 * LF.42	m/s
LF	62	Deceleration check level	353E				0,001	0,000	15,000	0,95 * LF.42	m/s
LF	63	Running open door level	353F				0,001	0,000	0,300	0,250	m/s

'1 LF.06 = 1 high-resolution on

'2 LF.04 = 1 SSM

Gr.	No.	Name	Address	P	E	R	Resol.	Lower Limit	Upper Limit	Default Value	Unit
LF	64	DC-voltage circuit control	3540				1	0	800	0	V
LF	65	E.dOH deceleration time	3541				1	0	3600	300	s
LF	66	Heat sink temperature level	3542				1	20	50	40	°C
LF	67	Pretorque gain	3543				0,01	0,50	1,50	1,00	---
LF	68	Pretorque offset	3544				0,1	-25,0	25,0	0,0	%
LF	69	Pretorque reversal of direction	3545				1	0:off	1:on	0:off	---
LF	70	Brake release time	3546				0,001	0,000	3,000	0,300	s
LF	71	Crawl path optimization rated speed VN	3547				0,1	0,0	200,0	0,0	cm
LF	72	Crawl path optimization speed V1	3548				0,1	0,0	200,0	0,0	cm
LF	73	Crawl path optimization speed V2	3549				0,1	0,0	200,0	0,0	cm
LF	74	Crawl path optimization crawl speed VE	354A				1	0	300	0	mm
LF	75	Ogive function	354B				1	0:off	1:on	0:off	---
LF	76	Ogive status	354C			R	---	---	---	---	---
LF	77	Braking distance	354D				0,001	0,000	5,000	0,000	m
LF	79	Brake engage time	354F				0,001	0,000	3,000	LF.70	s
LF	80	Software version	3550			R	---	---	---	---	---
LF	81	Software date	3551			R	---	---	---	---	---
LF	82	X2 input state	3552			R	---	---	---	---	---
LF	83	X2 output state	3553			R	---	---	---	---	---
LF	84	X3 input state	3554			R	---	---	---	---	---
LF	85	X3 output state	3555			R	---	---	---	---	---
LF	86	Actual set value	3556			R	---	---	---	---	---
LF	87	Actual inverter utilization	3557			R	---	---	---	---	%
LF	88	Actual set speed	3558			R	0,5	---	---	---	rpm
							0,1 '1				
LF	89	Actual speed	3559			R	0,5	---	---	---	rpm
							0,1 '1				
LF	90	Actual car speed	355A			R	---	---	---	---	m/s
LF	92	Crawl distance	355B			R	---	---	---	---	cm
LF	93	Total path	355C			R	---	---	---	---	cm
LF	98	Error status in starting procedure	3562			R	---	---	---	---	---
LF	99	Inverter state	3563			R	---	---	---	---	---

'1 LF.06 = 1 high-resolution on

Parameter Lists

5.2 dr-Parameter

The dr-parameter group contains the motor parameters. Depending on the selected motor (see LF.04), the dr-parameters are differently assigned.

LF.04 = 0:ASM

Gr.	No.	Name	Address	P	E	R	Resol.	Lower Limit	Upper Limit	Default Value	Unit
dr	00	Rated motor power	2400				0,01	0,00	160,00	4	kW
dr	01	Rated motor speed	2401		E		1 0,1 '1	100 10 '1	15000 1500 '1	1440	rpm
dr	02	Rated motor current	2402		E		0,1	0,1	1,1*IN.01	8	A
dr	03	Rated motor frequency	2403		E		1 0,1 '1	20 2	800 80	50	Hz
dr	04	Rated motor power factor cos phi	2404		E		0,01	0,05	1	0,86	---
dr	09	Rated motor torque	2409			R	0,1 1 '1	---	---	---	Nm
dr	10	Max. motor torque	240A			R	0,1 1 '1	---	---	---	Nm
dr	12	Rated motor voltage	240C		E		1	100	500	400	V
dr	13	Corner speed for max. torque	240D		E		0,5 0,1 '1	200 25 '1	6000 750 '1	dr.12 '2	rpm
dr	16	Max. torque at dr.19	2410		E		0,1 1 '1	0	dr.10	dr.12 '2	Nm
dr	19	Corner speed field weakening	2413		E		0,5 0,1 '1	200 25 '1	6000 750 '1	dr.12 '2	rpm
dr	20	Gain factor field wakening	2414		E		0,01	0,10	2,00	1,20 '2	---
dr	21	Flux adaptation	2415		E		1	25	250	100 '2	%

'1 LF.06 = 1 high-resolution on

'2 After the input of dr.12 the dr-parameters dr.13-19 are recalculated from the motor data.
The dr-parameter dr.20 and 21 are reset again to the default value.

LF.04 = 1:SSM

Gr.	No.	Name	Address	P	E	R	Resol.	Lower Limit	Upper Limit	Default Value	Unit
dr	00	Rated motor power	2400				0,01	0,00	160,00	3,53	kW
dr	01	Rated motor speed	2401		E		1 0,1 '1	100 10 '1	15000 1500 '1	1500	rpm
dr	02	Rated motor current	2402		E		0,1	0,1	1,1*IN.01	7,5	A
dr	03	Rated motor frequency	2403		E		1 0,1 '1	20 2	800 80	75	Hz
dr	07	Static continuous current	2407		E		0,1	0,1	1,1*IN.01	1,1* dr.02	A
dr	09	Rated motor torque	2409		E		0,1 1 '1	0,1 1 '1	1000,0 10000 '1	7,5	Nm
dr	10	Max. motor torque	240A		E		0,1 1 '1	0,1 1 '1	Inv. dependent	Inv. depentent	Nm
dr	17	EMK voltage constant	2411		E		1	0	8000	0	V * rpm 1000
dr	41	Winding resistance Ru-v	240D		E		0,1	0,1	100,0	2,6	Ohm
dr	42	Winding inductance Lu-v	2410		E		0,1	0,1	100,0	29,7	mH

'1 LF.06 = 1 high-resolution on

5.3 EC-Parameter

Gr.	No.	Name	Address	P	E	R	Resol.	Lower Limit	Upper Limit	Default Value	Unit
EC	00	Encoder interface 1	3800			R	1				---
EC	01	Pulse number encoder 1	3801		E		1	256	10000	2500	Inc
EC	02	Track change encoder 1	3802				1	0 : off	1 : on	0 : off	---
EC	03	Encoder pole pairs	3803				1	0 : off	1 : on	0 : off	---
EC	04	System position adjustment	3804				1	0	7	0	---
EC	05	Clock frequency encoder 1	3805		E		0,01	5,00	10,00	8,00	kHz
EC	06	Encoder 1 mode	3806		E		1	0	1	0	---
EC	07	System position			E		1	0	65535	19017	---
EC	08	Speed sampling time encoder 1	3808				1	0	5	3	---
EC	09	Current input resolver	3809		E		0,1	-1:Auto	72,0	7,7	mA
EC	10	Encoder interface 2	380A			R	1	---	---	---	---
EC	11	Pulse number encoder 2	380B		E		1	256	10000	2500	Inc
EC	17	Divider incremental encoder output	3811		E		1	0 : off	1 : on	0 : off	---
EC	20	Hiper-Type	3814			R	1				---
EC	21	Hiper-Status	3815			R	1				---
EC	22	Read Hiperface data	3816				1	0	1	0	---
EC	23	Write Hiperface data	3817				1	0	1	0	---

5.4 An-Parameter

Gr.	No.	Name	Address	P	E	R	Resol.	Lower Limit	Upper Limit	Default Value	Unit
An	01	Noise filter analog inputs	2801				Tab	0	8	3	---
An	02	Zero point hysteresis REF 1	2802				0,1	0,0	10,0	0,2	%
An	03	REF 1 gain	2803				0,01	-20,00	20,00	1,00	---
An	04	REF 1 Offset X	2804				0,1	-100,0	100,0	0,0	%
An	05	REF 1 Offset Y	2805				0,1	-100,0	100,0	0,0	%
An	08	Zero point hysteresis REF 2	2808				0,1	0,0	10,0	0,2	%
An	09	REF 2 gain	2809				0,01	-20,00	20,00	1,00	---
An	10	REF 2 Offset X	280A				0,1	-100,0	100,0	0,0	%
An	11	REF 2 Offset Y	280B				0,1	-100,0	100,0	0,0	%
An	13	REF 2 Funktion	280D		E		1	0	7	7	---
An	14	Analog output 1 function	280E		E		1	0	6	4	---
An	15	Analog output 1 gain	280F				0,01	-20,00	20,00	1,00	---
An	16	Analog output 1 offset X	2810				0,1	-100,0	100,0	0,0	%
An	18	Analog output 2 function	2812		E		1	0	6	0	---
An	19	Analog output 2 gain	2813				0,01	-20,00	20,00	1,00	---
An	20	Analog output 2 offset X	2814				0,1	-100,0	100,0	0,0	%

Parameter Lists

5.5 ru-Parameter

Gr.	No.	Name	Address	P	E	R	Resol.	Lower Limit	Upper Limit	Default Value	Unit
ru	00	Display inverter status	2000			R	Table				-
ru	01	Display actual speed	2001			R	0,5	---	---	---	rpm
							0,1 '1				
ru	02	Actual torque display	2002			R	0,1	---	---	---	Nm
							1 '1				
ru	04	Set speed display	2004			R	0,5	---	---	---	rpm
ru	05	Display setpoint torque	2005			R	0,1	---	---	---	Nm
							1 '1				
ru	08	Peak inverter utilization	2008				0,1	---	---	---	%
ru	09	Apparent current	2009			R	0,1	---	---	---	A
ru	10	Active current	200A			R	0,1	---	---	---	A
ru	11	Actual DC voltage	200B			R	1	---	---	---	V
ru	12	Peak DC voltage	200C			R	1	---	---	---	V
ru	14	X2 Input terminal status	200E			R	Table	---	---	---	
ru	15	X2 Output terminal status	200F			R	Table	---	---	---	
ru	18	Actual parameter set	2012			R	Table	---	---	---	
ru	20	Speed reference display	2014			R	0,5	---	---	---	rpm
							0,1 '1				
ru	23	REF 2 display	2016			R	0,1	---	---	---	%
ru	24	OL counter display	2018			R	1	---	---	---	-
ru	25	Peak apparent current	2019			R	0,1	---	---	---	A
ru	29	Heat sink temperature	201D			R	1	---	---	---	°C
ru	31	Power on counter	201F			R	1	---	---	---	h
ru	32	Modulation on counter	2020			R	1	---	---	---	h
ru	50	Display of feedback power	2032			R	1	---	---	---	kWh

'1 High-resolution at LF.06 = 1

5.6 In-Parameter

Gr.	No.	Name	Address	P	E	R	Resol.	Lower Limit	Upper Limit	Default Value	Unit
In	00	Inverter type display	2C00				Table	---	---	---	---
In	01	Rated inverter current	2C01				0,1	---	---	---	A
In	06	Configfile number	2C06			R	1	---	---	---	
In	07	Serial number high	2C07				1	0	65535	0	---
In	08	Serial number low	2C08				1	0	65535	0	---
In	09	Serial number order no. high	2C09				1	0	65535	0	---
In	10	Serial number order no. low	2C0A				1	0	65535	0	---
In	11	Customer number HIGH	2C0B				1	0	65535	0	---
In	12	Customer number LOW	2C0C				1	0	65535	0	---
In	40	Last error	2C28				1	0	63	0	---
In	41	Error counter OC	2C29				1	0	255	0	---
In	42	Error counter OL	2C2A				1	0	255	0	---
In	43	Error counter OP	2C2B				1	0	255	0	---
In	44	Error counter OH	2C2C				1	0	255	0	---
In	45	Error counter WD	2C2D				1	0	255	0	---
In	54	Software ID version DSP	2C36			R		---	---	---	---
In	55	Software date DSP	2C37			R		---	---	---	---
In	60	Display Last error (t-1)	2C3C			R	1	---	---	---	---
In	61	Display Last error (t-2)	2C3D			R	1	---	---	---	---
In	62	Display Last error (t-3)	2C3E			R	1	---	---	---	---
In	63	Display Last error (t-4)	2C3F			R	1	---	---	---	---
In	65	Braking resistance	2C41				0,1	0,1	100,0	12,0	Ohm



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