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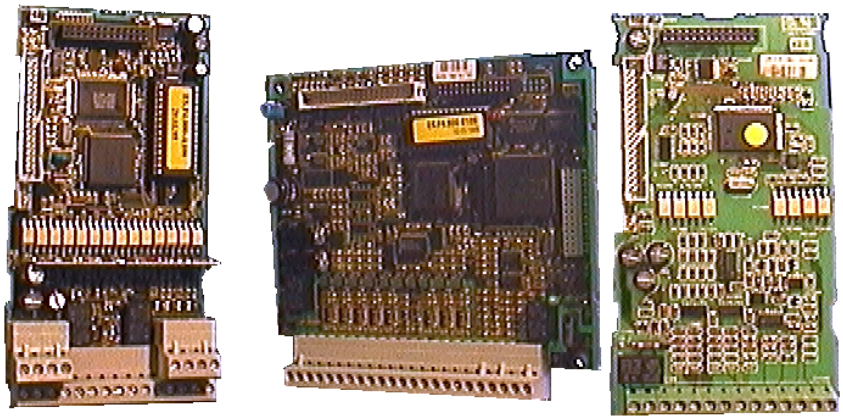
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Find the *KEB / Combivert 00.F4.010-5A08 125k* at our website: *Click HERE*

COMBIVERT

F4-S



F4-C

3

D	**BETRIEBSANLEITUNG**	Steuerteil
GB	**INSTRUCTION MANUAL**	Control circuit
F	**MANUEL D'INSTRUCTION**	Carte de commande
I	**MANUALE DI ISTRUZIONE**	Circuito di controllo
E	**MANUAL DE INSTRUCCIONES**	Circuito de control
RU	**РУКОВОДСТВО ПО ЭКСПЛУАТАЦИИ**	Карта управления

00.F4.C0B-K110

STOP

Erst Betriebsanleitung Teil lesen!
Read Instruction manual part before!
Lisez d'abord le manuel d'instructions partie !
Prima leggere le manuale di istruzione parte !
Leer manual de instrucciones parte antes!
Сначала прочти инструкцию часть !

1

KEB

02/2004

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D **Steuerteil** **Seite 4 ..... 23**

GB **Control circuit** **Page 24 ..... 43**

F **Carte de commande** **Page 44 ..... 63**

I **Circuito di controllo** **Page 64 ..... 83**

E **Circuito de control** **Page 84 ..... 103**

RU **Карта управления** **Страница 104 ... 123**

 **Passwords** **Page 129**

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This Instruction Manual describes the control boards F4-C(ompact) and F4-S(mall). It is only valid together with the Instruction Manuals COMBIVERT F4 Part 1 and Part 2. Both Instruction Manuals must be made available to the user. Prior to performing any work on the unit the user must familiarize himself with the unit. This includes especially the knowledge and observance of the safety and warning directions of Part 1. The pictographs used in this Instruction Manual have following meaning:

Danger
Warning
Caution



Used when life or health of the user are exposed to danger or when severe damage to the material can occur.

Attention, observe at all costs



Special instructions for a safe and trouble-free operation.

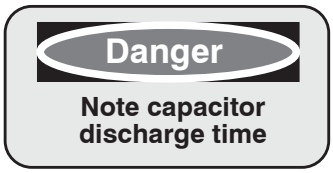
Tip
Help
Information



Used to mark additional important informations.



The KEB COMBIVERT is operated with voltages that can cause a severe electric shock dangerous to life. Therefore the installation of the unit as well as of the available accessories is only permissible by qualified electro-personnel. A safe and trouble-free operation is only possible when the valid regulations according to DIN VDE 0100, IEC1000, EN 60204-1, EN 55014, EN 50082-2 as well as the relevant regulations for your area are observed.



After clearing the frequency inverter the intermediate circuit capacitors are still charged with high voltage for a short period of time. The unit can be worked on again after it has been switched off for 5 minutes.

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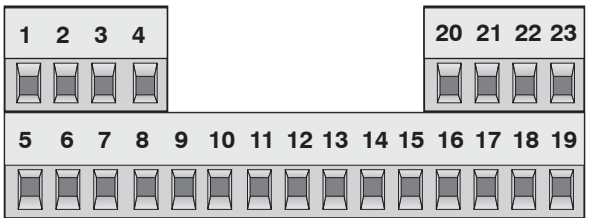
4. Passwords 129

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1.1. Control circuit Version C

1.1.1 Assignment of Terminal Strip X1





GB

PIN	Function	Name	Description
X1.1 **X1.2** **X1.3**	NO contact Opening contact Switching contact	RLA RLB RLC	Relay output Function see parameter CP.22 (factory setting: fault indication)
X1.4 **X1.5**	Fixed frequency 1 Fixed frequency 2	I1 I2	X1.4 + X1.5 = fixed frequency 3 no input = analog set value
X1.6	DC-braking	I3	activates the dc-braking
X1.7	Energy saving funct.	I4	Output voltage is reduced to 70%
X1.8 **X1.9**	REF+ REF-	REF+ REF-	Difference voltage; Voltage difference is added to/ subtracted from inputREF (X1.17)
X1.10 **X1.11**	Forward Reverse	F R	Preset rotation; forward has priority
X1.12	Frequency depend.	OUT1	Transistor output switches at switch $f_{real} = f_{set}$
X1.13 **X1.14**	Digital Mass 15V	0V +15V	Potential for digital in-/outputs voltage supply for digital in-/outputs (max.100mA)
X1.15	Analog output	AOUT	Analog output of the real frequency 0...10VDC = 0...100Hz
X1.16 **X1.17** **X1.18**	+10V Set value input Common	CRF REF COM	Supply voltage for set value potentiometer (max. 4 mA) Factory setting 0...10V (0...20 and 4...20mA adjustable with CP.24) Mass for analog in- and outputs
X1.19	Control release	ST	Power modules are triggered; if opening in case of error Reset; if opening during operation, the motor costs.
X1.20	Reset	RST	Hardware reset; only possible when an error occurs
X1.21 **X1.22** **X1.23**	NO contact Opening contact Switching contact	FLA FLB FLC	Relay output; switches,when level from parameter CP.23 is reached (frequency dependent switch)

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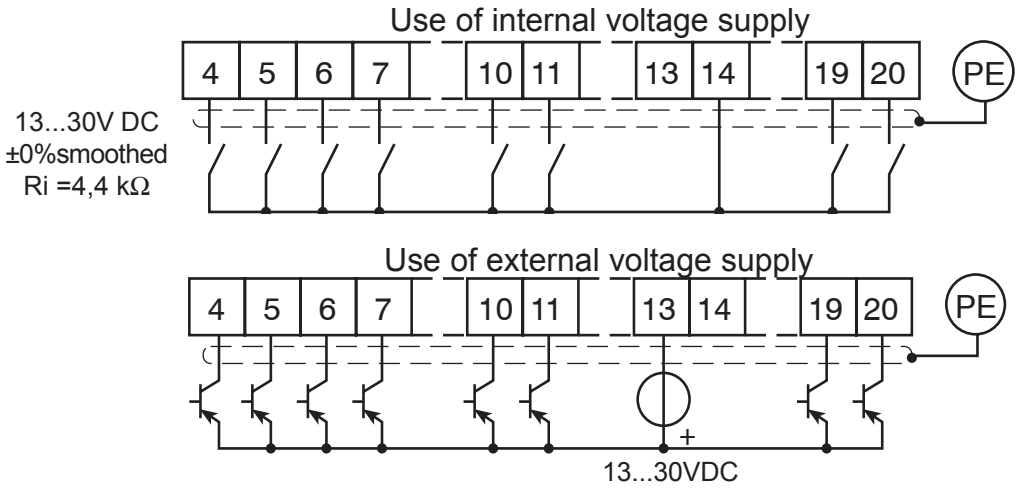
1.1.2 Connection of the Control

In order to prevent a malfunction caused by interference voltage supply on the control inputs, the following directions should be observed:

- Use shielded/drilled cables
- Lay shield **on one side** of the inverter onto earth potential
- Lay control and power cable **separately** (about 10...20 cm apart)
- Lay crossings in a right angle (in case it cannot be prevented)

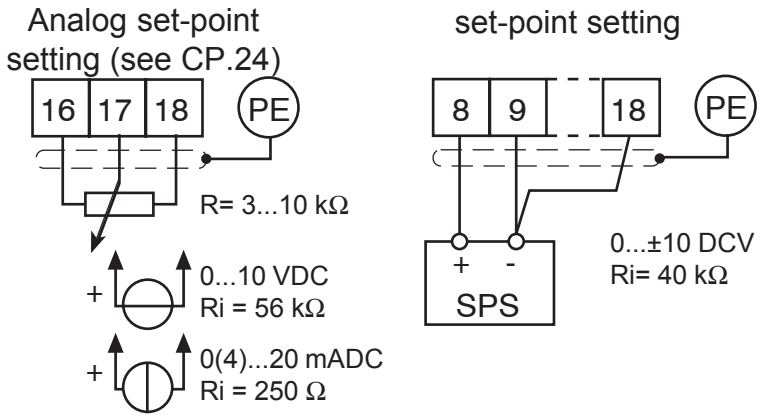
EMC

1.1.3 Digital Inputs



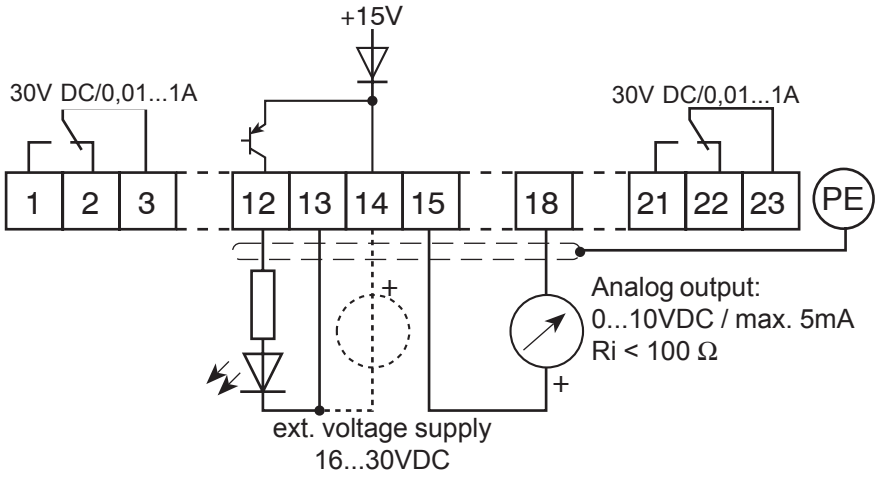
1.1.4 Analog Inputs

Connect unused analog inputs to common, to prevent set value fluctuations!



1.1.5 Outputs

In order to prevent undefined conditions during external power supply, the external power supply should be switched on first and then the inverter.
When using inductive consumers at the relay output a protective wiring (i.e. free wheeling diode) is necessary to protect the relay!

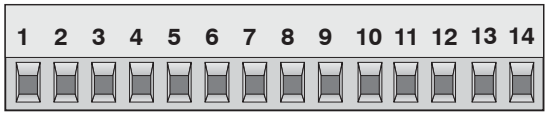


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1.2 Control circuit Version S

1.2.1 Assignment of Terminal Strip X1



PIN	Function	Name	Description
X1.1 **X1.2** **X1.3**	NO contact Opening contact Switching contact	RLA RLB RLC	Relay output Function see parameter CP.22 (factory setting: fault indication)
X1.4 **X1.5**	Fixed frequency 1 Fixed frequency 2	I1 I2	X1.4 + X1.5 = fixed frequency 3 no input = analog set value
X1.6	Digital Mass	0V	Potential for digital in-/outputs
X1.7 **X1.8** **X1.9**	+10V Set value input Common	CRF REF COM	Supply voltage for set value potentiometer (max. 4mA) 0...10VDC for analog set value Mass for analog in- and outputs
X1.10	Analog output	AOUT	Analog output of real frequency 0...10VDC = 0...100Hz
X1.11	15V	+15V	voltage supply for digital in-/outputs (max. 100mA)
X1.12 **X1.13**	Reverse Forward	R F	Preset rotation; forward has priority
X1.14	Control release	ST/RST	Power modules are triggered; if opening in case of error Reset; if opening during operation, the motor costs.

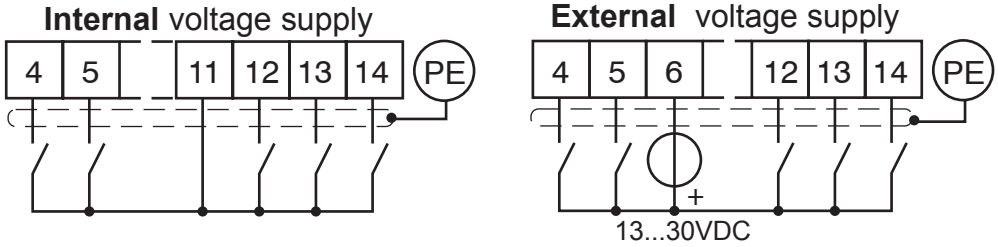
1.2.2 Connection of the control

In order to prevent a malfunction caused by interference voltage supply on the control inputs, the following directions should be observed:

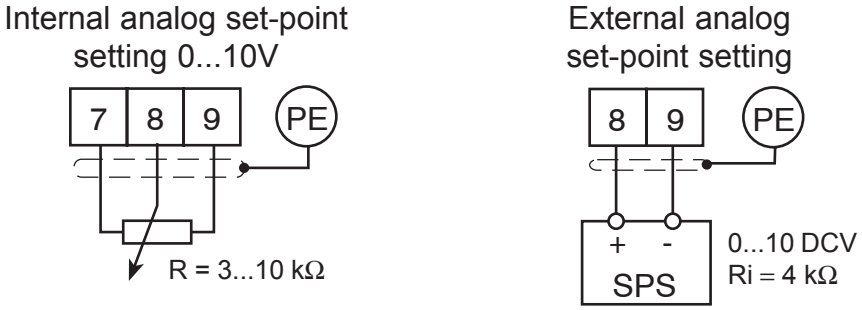


- Use shielded/drilled cables
- Lay shield **on one side** of the inverter onto earth potential
- Lay control and power cable **separately** (about 10...20 cm apart)
- Lay crossings in a right angle (in case it cannot be prevented)

1.2.3 Digital inputs



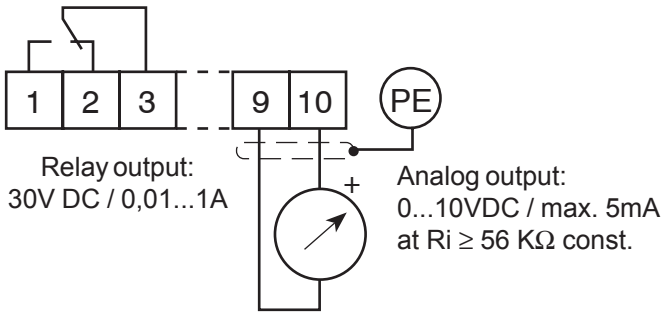
1.2.4 Analog inputs



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1.2.5 Outputs

When using inductive consumers at the relay output a protective wiring (i.e. free wheeling diode) is necessary to protect the relay!



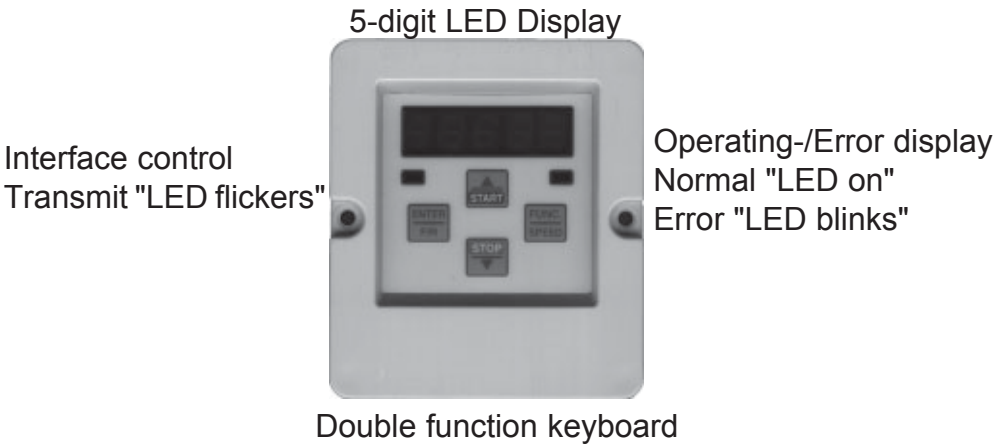
GB

2. Operation of the unit

As an accessory to the local operation an operator is necessary. To prevent malfunctions, the inverter must be brought into ***nOP*** status before connecting/disconnecting the operator (open control release terminal X1.19 ***C-Version***/X1.14 ***S-Version***). When starting the inverter whitout an operator, it is started with the last stored values or factory setting. The operator is obtainable in different versions:

2.1 Digital operator

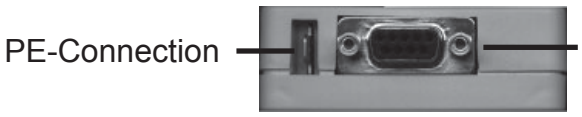
Part-No. 00.F4.010-2009



2.1.1 Interface operator

Part-No. 00.F4.010-1009

In the Interface operator there is an additionally isolated RS232/RS485-Interface integrated.





PIN	RS485	Signal	Meaning
1	–	–	reserved
2	–	TxD	Transmitter signal/RS232
3	–	RxD	Receiver signal/RS232
4	A'	RxD-A	Receiver signal A/RS485
5	B'	RxD-B	Receiver signal B/RS485
6	–	VP	Voltage supply-Plus +5V (I_{max} = 10 mA))
7	C/C'	DGND	Data reference potential
8	A	TxD-A	Transmitter signal A/RS485
9	B	TxD-B	Transmitter signal B/RS485

Informations about other versions of operators contact KEB!

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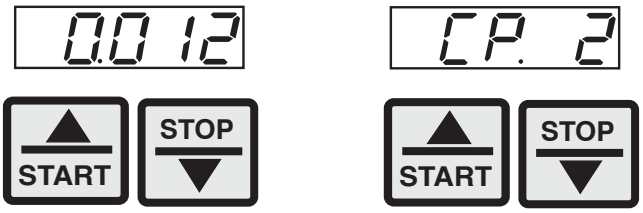
2.1.2 Keyboard

When switching on KEB COMBIVERT the value of parameter CP.1 appears. (See Drive mode to switch the keyboard function)

The **function key** (FUNC) changes between the parameter value and parameter number.



With **UP** and **DOWN** the value of the parameter number is increased/ decreased with **changeable** parameters.



Principally during a change, parameter values are immediately accepted and stored non-volatile. With some parameters it is not useful, that the adjusted value immediately be accepted. When this type of parameter is changed, then a point appears behind the last digit.

By pressing **ENTER** the adjusted value is accepted and non-volatile stored.



If a malfunction occurs during operation, then the actual display is overwritten by the alarm message. The alarm message in the display is reset by ENTER.



With ENTER the error message is only reset in the display. In order to reset an error oneself, the cause must be removed and a reset on terminal X1.20 (C-Version) / X1.14 (S-Version) or a power-on reset must occur. In the Inverter status display (CP. 2) the error is still displayed.

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2.2 Parameter Summary

Display	Parameter	Adjust. range	Resolution	Factory setting
CP. 0	Password input	0...9999	1	-
CP. 1	Actual frequency display	-	0,1 Hz	-
CP. 2	Inverter status display	-	-	-
CP. 3	Actual load	-	1 %	-
CP. 4	Peak load	-	1 %	-
CP. 5	Rated frequency	0...409.58 Hz	0.0125 Hz	50.0 Hz
CP. 6	Boost	0...25.5 %	0.1 %	2 %
CP. 7	Acceleration time	0.01...300 s	0.01 s	10 s
CP. 8	Deceleration time	0.01...300 s	0.01 s	10 s
CP. 9	Minimal frequency	0...409.58 Hz	0.0125 Hz	0 Hz
CP.10	Maximal frequency	0...409.58 Hz	0.0125 Hz	70 Hz
CP.11	Fixed frequency 1	0...±409.58 Hz	0.0125 Hz	5 Hz
CP.12	Fixed frequency 2	0...±409.58 Hz	0.0125 Hz	50 Hz
CP.13	Fixed frequency 3	0...±409.58 Hz	0.0125 Hz	70 Hz
CP.14	Max. ramp current	10...200 %	1 %	140 %
CP.15	Max. constant current	10...200 %	1 %	200 %
CP.16	Speed search	0...15	1	8
CP.17	Voltage stabilization	150...649 V,off	1 V	off
CP.18	Slip compensation	-2.50...2.50	0.01	0=off
CP.19	Autoboost	-2.50...2.50	0.01	0=off
CP.20	DC-braking	0...9	1	7
CP.21	Braking time	0...100 s	0.01 s	10 s
CP.22	Relay output	0...xx	1	2
CP.23	Frequency value	0...409.58 Hz	0.0125 Hz	4 Hz
CP.24	Reference signal (only C)	0...2	1	0

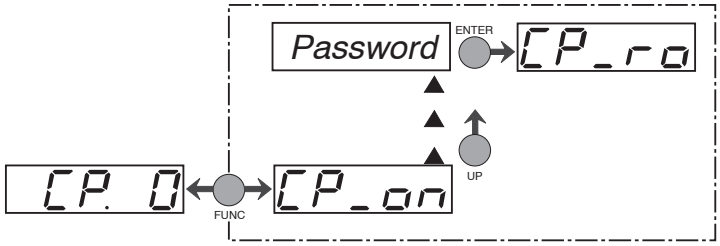
2.3 Password Input



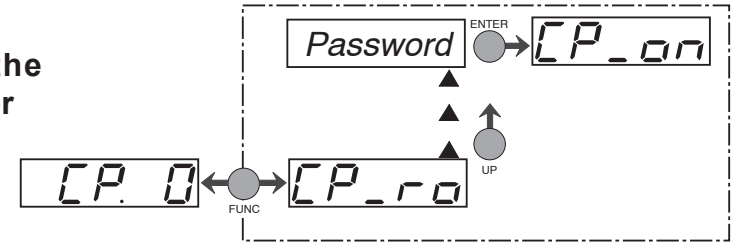
Passwords on Page 129

Ex works the frequency inverter is supplied without password protection, this means that all changeable parameters can be adjusted. After parameterizing the unit can be barred against unauthorized access. The adjusted mode is stored.

Barring the CP-Parameter



Releasing the CP-Parameter



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2.4 Operating Display

The 4 parameters below serve to control the frequency inverter during operation.

Actual frequency display



Display of the actual output frequency with a resolution of 0.0125 Hz. The rotation of the inverter is indicated by the sign.

Examples:



Output frequency 18.3 Hz, rotation forward



Output frequency 18.3 Hz, rotation reverse

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Inverter status display



The status display shows the actual working conditions of the inverter. Possible displays and their meanings are:



" no Operation " control release (terminal X1.19) not bridged, modulation switched off, output voltage = 0 V, drive is not controlled.



" Low Speed " no rotation preset (terminal X1.10 or X1.11), modulation switched off, output voltage = 0 V, drive is not controlled.



" Forward Acceleration " drive accelerates with a forward direction of rotation.



" Forward Deceleration " drive decelerates with a forward direction of rotation.



" Reverse Acceleration " drives accelerates with a reverse direction of rotation.



" Reverse Deceleration " drive decelerates with a reverse direction of rotation.



" Forward Constant " drive runs with a constant speed and a forward direction of rotation.



" Reverse Constant " drive runs with constant speed and a reverse direction of rotation.

Other status messages are described at the parameters, which they cause.

Actual load



Display of the actual inverter rate of utilization in percent. 100% rate of utilization is equal to the inverter rated current. Only positive values are displayed, meaning there is no differentiation between motor and regenerative operation.

Peak load



This display makes it possible to recognize short-term fluctuations of the rate of utilization by storing the highest value that occurred. The display occurs in percent (100% = inverter rated current).

With the UP or DOWN key the peak value can be reset when the unit is on. As as a result it is possible to measure the highest rate of utilization in certain operating phases. Switching off the unit deletes the peak value.

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2.5 Basic Adjustment of the Drive

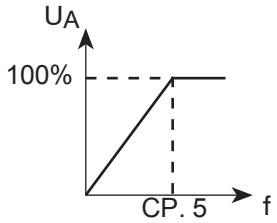
The following parameters determine the fundamental operating data of the drive. They should be checked and/or adapted to the application.

Rated frequency

CP. 5

With the adjusted frequency here the inverter reaches a maximal output voltage. The adjustment of the motor rated frequency is typical here. Note: Motors can overheat when the rated frequency is incorrectly adjusted!

Adjustment range:	0...409.58 Hz
Resolution:	0.0125 Hz
Factory setting:	50.0 Hz
Customer adjustment:	_____ Hz

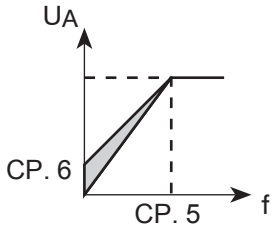


Boost

CP. 6

In the lower speed range a large part of the motor voltage decreases on the stator resistance. In order that the breakdown torque of the motor remains almost constant in the entire speed range, the voltage decrease can be compensated by the boost.

Adjustment range:	0...25.5 %
Resolution:	0.1 %
Factory setting:	2.0 %
Customer adjustment:	_____ %



Adjustment:
- Determine the rate of utilzation in no-load operation during rated frequency
- Preset about 10 Hz and adjust the boost, so that about the same rate of utilization is reached as with the rated frequency.



When the motor, during continuous operation, drives with low speed and too high voltage it can lead to an overheating of the motor.

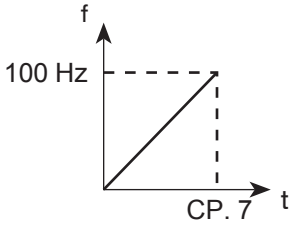
Acceleration time

CP. 7

The parameter determines the time needed, in order to accelerate from 0 to 100 Hz. The actual acceleration time is proportional to the frequency change.

$$\frac{\text{delta f}}{100\ \text{Hz}} \times \text{CP. 7} = \text{actual acceleration time}$$

Adjustment range:	0.01...300 s
Resolution:	0.01 s
Factory setting:	10 s
Customer adjustment:	_____ s



Example: CP. 7 = 10 s ; the drive should accelerate from 10 Hz to 60 Hz
delta f = 60 Hz - 10 Hz = 50 Hz

actual acceleration time = (50 Hz / 100 Hz) x 10s = 5 s

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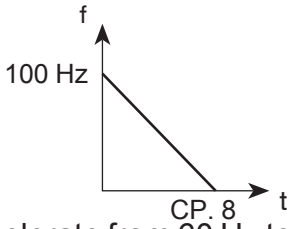
Decceleration time

CP. 8

The parameter determines the time needed in order to decelerate from 100 to 0 Hz. The actual deceleration time is proportional to the frequency change.

$$\frac{\text{delta f}}{100\ \text{Hz}} \times \text{CP. 8} = \text{actual deceleration time}$$

Adjustment range:	0.01...300 s
Resolution:	0.01 s
Factory setting:	10 s
Customer adjustment:	_____ s



Example: CP. 8 = 10 s ; the drive should decelerate from 60 Hz to 10 Hz
delta f = 60 Hz - 10 Hz = 50 Hz

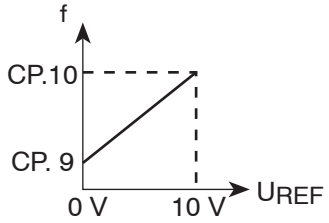
actual deceleration time = (50 Hz / 100 Hz) x 10s = 5 s

Minimal frequency

CP. 9

Frequency on which the inverter runs without presetting an analog set value. Internal limiting of the fixed frequencies CP.11…CP.13.

Adjustment range:	0.0...409.58 Hz
Resolution:	0.0125 Hz
Factory setting:	0.0 Hz
Customer adjustment:	_____ Hz



Maximal frequency

CP. 10

Frequency on which the inverter runs with maximum analog set value. Internal limiting of the fixed frequencies CP.11…CP.13.

Adjustment range:	0.0...409.58 Hz
Resolution:	0.0125 Hz
Factory setting:	70 Hz
Customer adjustment:	_____ Hz

Fixed frequency 1...3

CP. 11 I1

CP. 12 I2

CP. 13 I1+I2

Three fixed frequencies can be adjusted. The selection of the fixed frequencies occurs with the inputs I1 and I2 (terminal X1.4 and X1.5).

Adjustment range:	0.0...±409.58 Hz
Resolution:	0.0125 Hz
Factory setting:	5/50/70 Hz
Customer adjustment 1:	_____ Hz
Customer adjustment 2:	_____ Hz
Customer adjustment 3:	_____ Hz

If presetting occurs outside of the fixed limits of CP.9 and CP.10, then the frequency is internally limited.

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2.6 Special Adjustments

The following parameters serve to optimize the drive and adaption onto certain applications. These adjustments can be ignored at the initial startup.

Max. ramp current

CP. 14

This function protects the frequency inverter against switching off by overcurrent during the acceleration ramp. When the ramp reaches the adjusted value here, then it is stopped so long until the current decreases again. CP.2 displays "LAS" at active function.

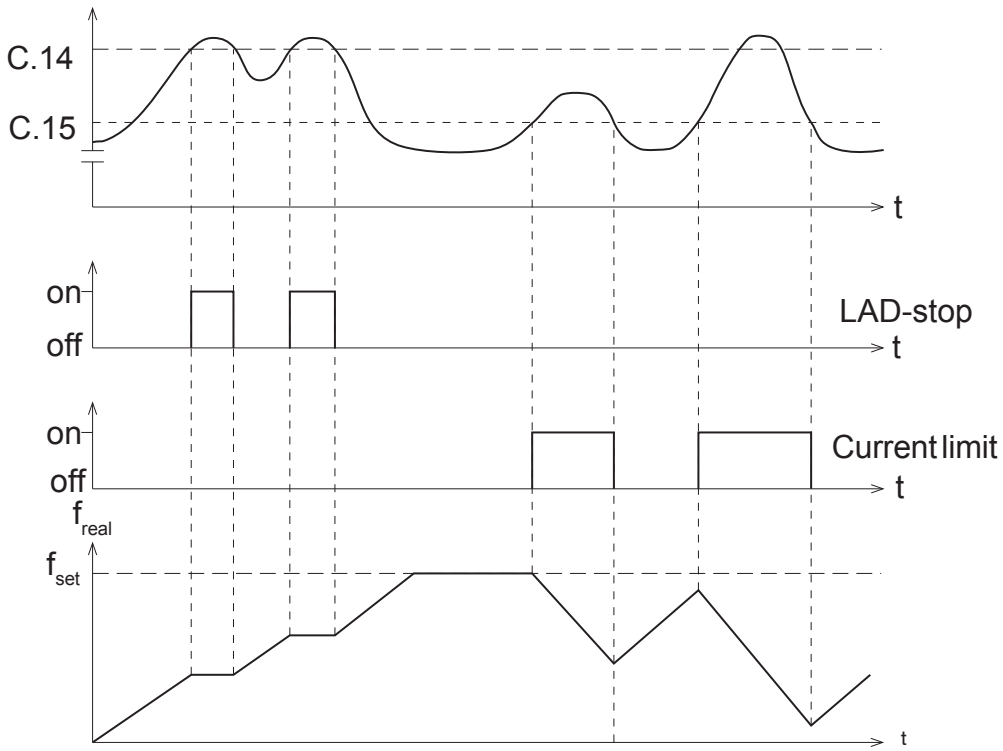
Adjustment range:	10...200 %, 200%=oFF	up to case D
	10...200%; >150% = oFF	from case E
Resolution:	1 %	
Factory setting:	140 %	
Customer adjustment:	_____ %	

Max. constant current

CP. 15

This function protects the frequency inverter against switching off due to overcurrent during constant output frequency. When exceeding the adjusted value here, the output frequency is reduced until the value drops below the adjusted value. CP. 2 displays "SSL" at active function.

Adjustment range:	10...200 %, 200%=oFF	up to case D
	10...200%; >150% = oFF	from case E
Resolution:	1 %	
Factory Setting:	200 %	
Customer adjustment:	_____ %	



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Speed search

CP. 16

When connecting the frequency inverter onto a decelerating motor, an error can be triggered by the differing rotating field frequencies. At activated on speed search the inverter searches the actual motor speed, adapts its output frequency and accelerates with the adjusted ramp onto the given set value. During speed search CP.2 displays "SSF". The parameter determines, under what conditions the functions operate. With several conditions the sum of the value must be entered. Example: CP.16 = 12 means after reset and after auto-reset UP

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Adjustment range: 0...15
Resolution: 1
Factory setting: 8
Customer adjustment: _____

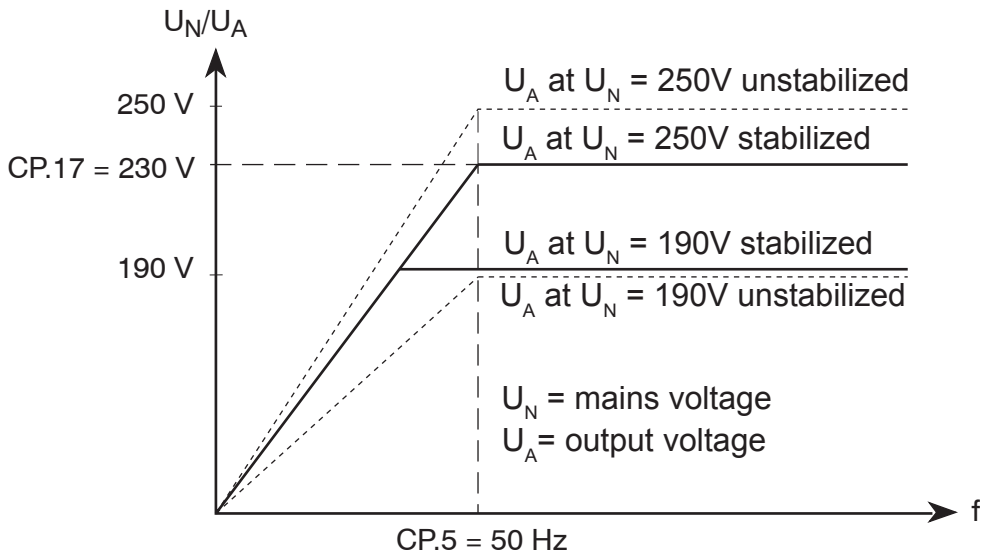
Value	Condtion
0	function off
1	at control release
2	at switch on
4	after reset
8	after Auto-Reset UP

Voltage stabilization

CP. 17

This parameter can adjust a regulated output voltage in relation to the rated frequency. Because of this voltage variations at the input as well as in the intermediate circuit only have a small influence on the output voltage (U/f-characteristic). The function allows, among other things, an adaption of the output voltage onto the special motors. In the example below the output voltage is stabilized onto 230 V (0% boost).

Adjustment range: 150...649 V, oFF
Resolution: 1 V
Factory setting: oFF
Customer adjustment: _____ V



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Slip compensation

CP.18

Slip compensation balances the speed changes caused by the load variation. In order to activate the function, set the value at 1.00 and optimize as directed in the examples below.

Adjustment range:	-2.50...2.50
Resolution:	0.01
Factory setting:	0.00 (=off)
Customer adjustment:	_____

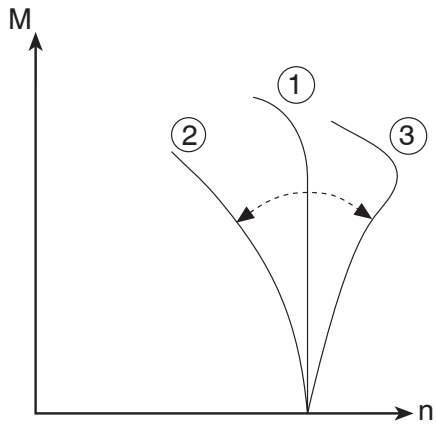
Autoboost

CP.19

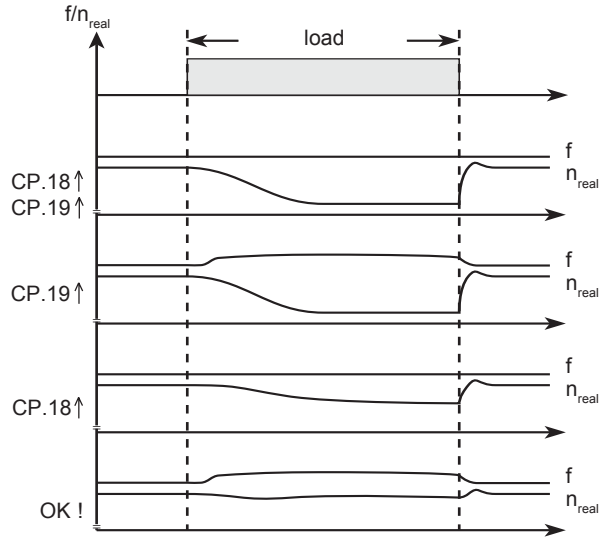
Autoboost causes an automatic I*R-compensation by raising the output voltage during high load torques. The magnetizing current remains constant. To activate the function set the value to 1.00 and optimize as directed in the examples below. Check the motor voltage to see, whether it returned to the normal value after no load of the drive. Otherwise reduce CP.19.

Adjustment range:	-2.50...2.50
Resolution:	0.01
Factory setting:	0.00 (=off)
Customer adjustment:	_____

Slip compensation and autoboost work on the basis of presetting motor data. When using a special motor or in case of overdimensioning of more than one size, then both functions should be deactivated.



1) good - speed remains stable at increasing torque
2) bad - speed decreases with increasing torque
3) bad - speed is increased too much at load



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DC-braking

CP.20

With DC-braking the motor is not decelerated by the ramp. Quick braking is caused by D.C. voltage, which is applied onto the motor winding. This parameter determines how the dc-braking is triggered.

Value	Activation
0	DC-braking deactivated
1	DC-braking at switch off of the direction of rotation and in reaching 0Hz. Braking time is dependent on CP.21 or until the next direction of rotation presetting.
2	DC-braking as soon as the direction of rotation presetting is absent. Braking time dependent on the real frequency
3	DC-braking, as soon as the direction of rotation changes. Braking time dependent on the real frequency.
4	DC-braking at switch off of the direction of rotation and the real frequency goes below 4 Hz.
5	DC-braking, when the real frequency goes below 4 Hz.
6	DC-braking, as soon as the set value goes below 4 Hz.
7	DC-braking, when input I3 (terminal X1.6/Version C) is switched. Braking time is dependent on the real frequency. At version S = value "0".
8	DC-braking as long as input I3 (terminal X1.6/Version C) is switched. At version S same as value "0".
9	DC-braking after switching on the modulation on. Braking time is dependent on CP.21.

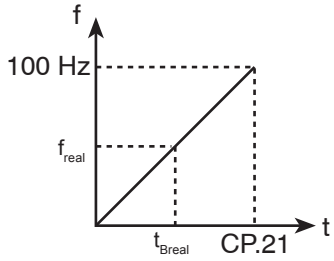
Factory setting: 7
Note: Enter-Parameter
Customer adjustment: _____

Braking time

CP.21

The braking time is evaluated depending on CP.20 as follow:

- entered time = braking time
- entered time relates to 100 Hz and decreases/increases proportionally to the real frequency.



Adjustment range: 0.00...100 s
Resolution: 0.01 s
Factory setting: 10 s
Customer adjustment: _____

Calculation of the braking time:

$$tB_{real} = \frac{CP.21 * f_{real}}{100\ Hz}$$

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Relay output



Relay output (terminal X1.1...X1.3) is adjusted in the factory as a fault relay. This parameter can adjust the function of the output onto any function listed in the table below.

Value	Function
0	No function
1	Generally on
2	Fault relay
3	Fault relay (not at under voltage error)
4	Overload alert signal (10s before switch off)
5	Overtemperature alert signal inverter
6	Overtemperature alert signal motor (10s before switch off)
7	Only for application-mode
8	Max. constant current (stall, CP.15) exceeded
9	Max. LA-/LD-Stop (CP.14) exceeded
10	DC-braking active
11	Only for application mode
12	Rate of utilization (CP.3) > 100%
13	Only for application mode
14	Actual value=set value (CP.2 = Fcon, rcon; not at noP, LS, error, SSF)
15	Accelerate (CP.2 = FAcc, rAcc, LAS)
16	Decelerate (CP.2 = FdEc, rdEc, LdS)
17	Right handed rotation (not at noP, LS error)
18	Left handed rotation (not at noP, LS error)
19	Real direction of rotation = set direction of rotation
20	Real value > frequency level CP.23 (only version S)
21	Set value > freqeuncy level CP.23 (only version S)
22	Only for application-mode
23	Operating signal (after initialization as long as no error is active)
24	Run signal
25...xx	Only for application-mode

Factory setting: 2
Note: Enter-Parameter
Customer adjustment: _____

Frequency value



This parameter determines the switching point for the relay output
- X1.21...X1.23 (only version C)
- X1.1...X1.3 (only version S at CP.22 = "20" or "21").

After the switching of the relay, the frequency can move within a 0.5 Hz window, without the relay dropping off.

Adjustment range: 0.0...409.58 Hz
Resolution: 0.0125 Hz
Factory setting: 4 Hz
Customer adjustment: _____

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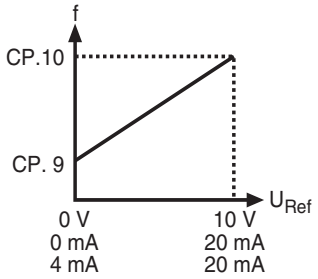
Reference signal

CP.24

(only version C)

The set value input REF (terminal X1.17 / version C) can be driven by various signal levels. It operates cummulatively to the difference voltage input (terminal X1.8 and X1.9 / version C), but can also serve as the sole input to the set value presetting. In order to correctly evaluate the signal, this parameter must be adapted to the signal source.

Value	Set value signal
0	0...10V DC / Ri = 4 kOhm
1	0...20mA DC / Ri = 250 Ohm
2	4...20mA DC / Ri = 250 Ohm



Factory setting: 0
Customer adjustment: _____

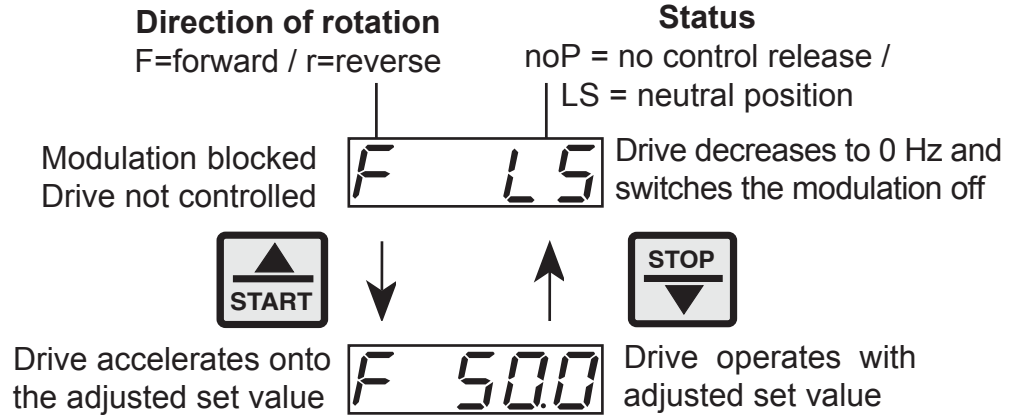
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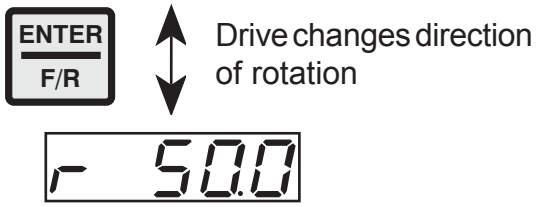
2.7 The Drive Mode

The drive mode is a operating mode of KEB COMBIVERT to start the drive manually by the operator. After switching the control release the set value and rotation presetting is done exclusively by the keyboard. In order to activate the drive mode the corresponding **password in CP.0** must be entered. The display switches over as follows.

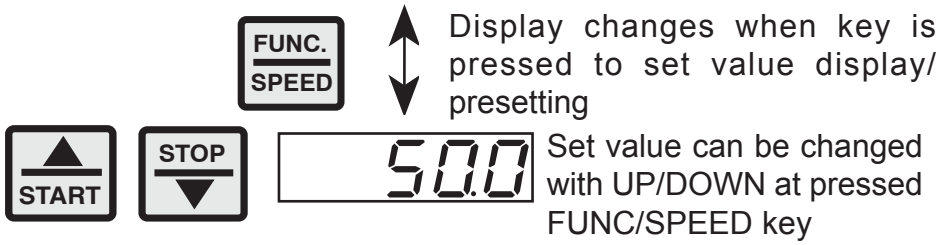


2.7.1 Start / Stop Drive

2.7.2 Change Direction of Rotation



2.7.3 Preset Set Value



2.7.4 Leave Drive Mode

To exit the drive mode the inverter must be in status “stop” (Display noP or LS). Press the FUNC and ENTER keys simultaneously for about 3 seconds in order to leave the drive mode. The CP-parameters appear in the display.

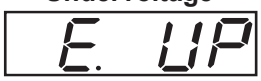


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3. Error Diagnosis

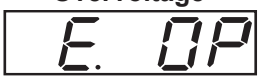
Error messages are represented with an "E. " and the corresponding error in the display of the KEB COMBIVERT. The displays and their causes are described below.

Undervoltage



Occurs, when the intermediate ciruict voltage falls below the permissible value.
Possible causes are
- input voltage too low or unstable
- inverter power too small
- voltage loss due to incorrect cabling
- power supply by generator/transformer breaks down, because ramps are too short

Overvoltage



Occurs, when the intermediate circuit voltage rises above over the permissible value.
Possible causes are
- input voltage too high
- disturbance voltages at the input
- delay ramps too short

Overcurrent



Occurs, when exceeding the peak current or when ground fault.

Overload



Occurs when a too high load is applied for more than the allowed time (see "Performance Data"). Possible causes for this are
- error or overload in the application
- inverter incorrectly dimensioned
- motor incorrectly wired

Cooling down phase completed



After error E. OL you must wait for a cooling down time. This message appears after the cooling down phase is completed. The error can be reset.

Overheat



Occurs, when the inverter temperature >70°C. Possible causes for this are
- insufficient cooling
- surrounding temperature too high
- ventilator clogged

Ext. Overheat



Occurs, when external temperature monitoring is triggered. Possible causes for this are
- resistor on terminals OH/OH > 1650 Ohm
- motor overloaded
- break in the sensor cable

no Overheat



Internal or external excess-temperature error do not occur anymore. Error "E. OH" or "E.dOH" can be reset.

Current limit resistor error



Current limit resistor not bridged, occurs for a short time during the turn on phase and is reset immediately. If the erorr message remains the following may be the cause
- incorrect or input voltage too small
- high loss in the supply line
- brake resistor incorrectly connected
- braking module defective

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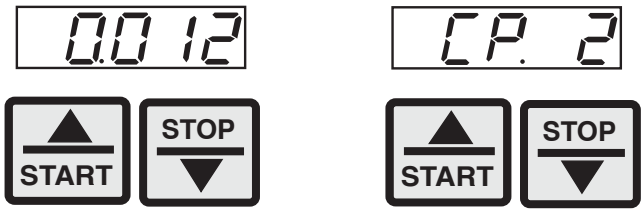
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Display	Parameter	Adjust. range	Resolution	Customer setting
CP. 0	Password input	0...9999	1	-
CP. 1	Actual frequency display	-	0,1 Hz	-
CP. 2	Inverter status display	-	-	-
CP. 3	Actual load	-	1 %	-
CP. 4	Peak load	-	1 %	-
CP. 5	Rated frequency	0...409.58 Hz	0.0125 Hz	
CP. 6	Boost	0...25.5 %	0.1 %	
CP. 7	Acceleration time	0.01...300 s	0.01 s	
CP. 8	Deceleration time	0.01...300 s	0.01 s	
CP. 9	Minimal frequency	0...409.58 Hz	0.0125 Hz	
CP.10	Maximal frequency	0...409.58 Hz	0.0125 Hz	
CP.11	Fixed frequency 1	0...±409.58 Hz	0.0125 Hz	
CP.12	Fixed frequency 2	0...±409.58 Hz	0.0125 Hz	
CP.13	Fixed frequency 3	0...±409.58 Hz	0.0125 Hz	
CP.14	Max. ramp current	10...200 %	1 %	
CP.15	Max. constant current	10...200 %	1 %	
CP.16	Speed search	0...15	1	
CP.17	Voltage stabilization	150...649 V,off	1 V	
CP.18	Slip compensation	-2.50...2.50	0.01	
CP.19	Autoboost	-2.50...2.50	0.01	
CP.20	DC-braking	0...9	1	
CP.21	Braking time	0...100 s	0.01 s	
CP.22	Relay output	0...xx	1	
CP.23	Frequency value	0...409.58 Hz	0.0125 Hz	
CP.24	Reference signal (only C)	0...2	1	

The **function key** (FUNC) changes between the parameter value and parameter number.

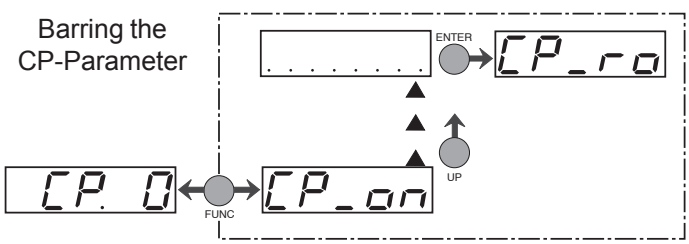


With **UP** and **DOWN** the value of the parameter number is increased/decreased with **changeable** parameters.

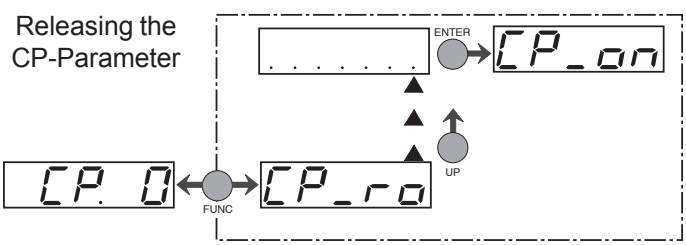


Password input:

Barring the CP-Parameter



Releasing the CP-Parameter

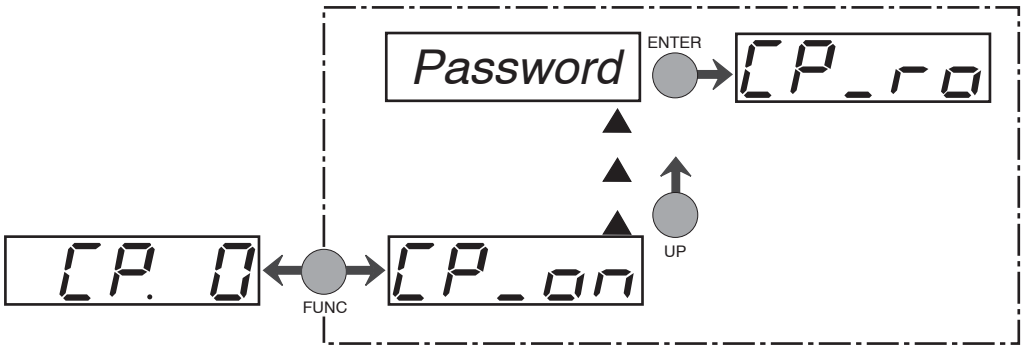


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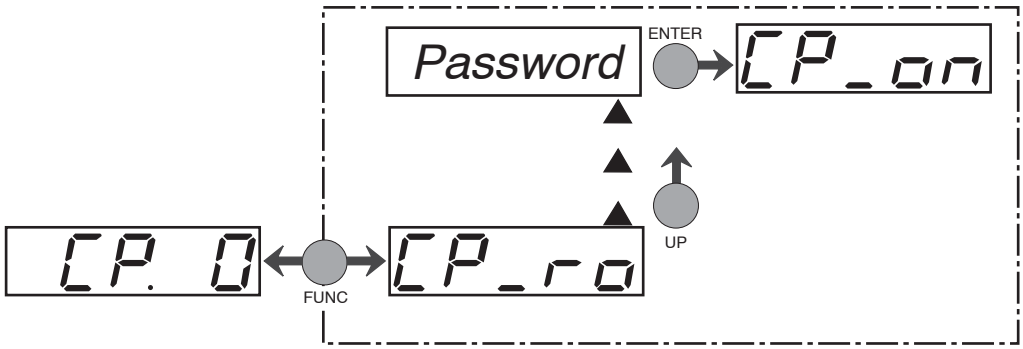
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6. Password

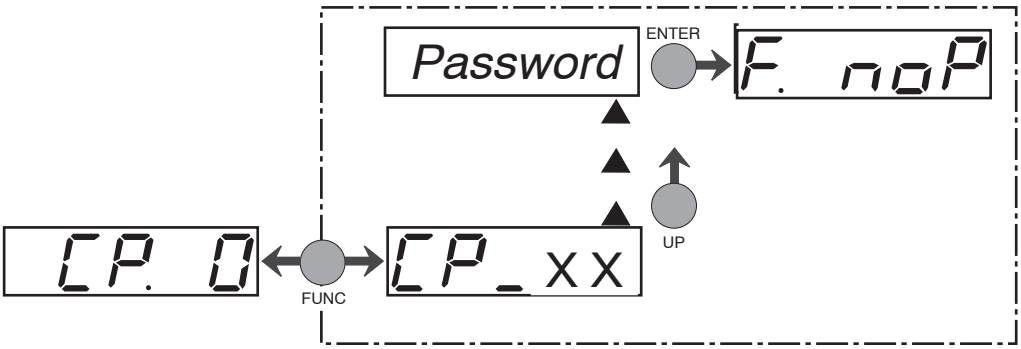
a) CP-Parameter "read only"

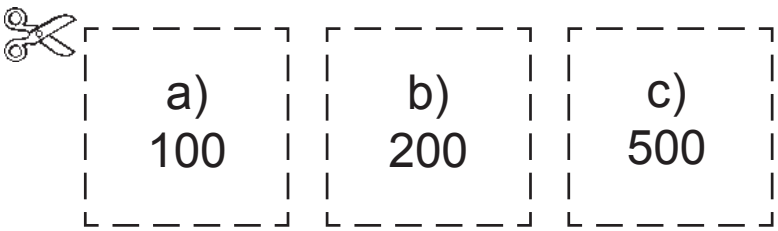


b) CP-Parameter "read/write"



c) Drive mode activ





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