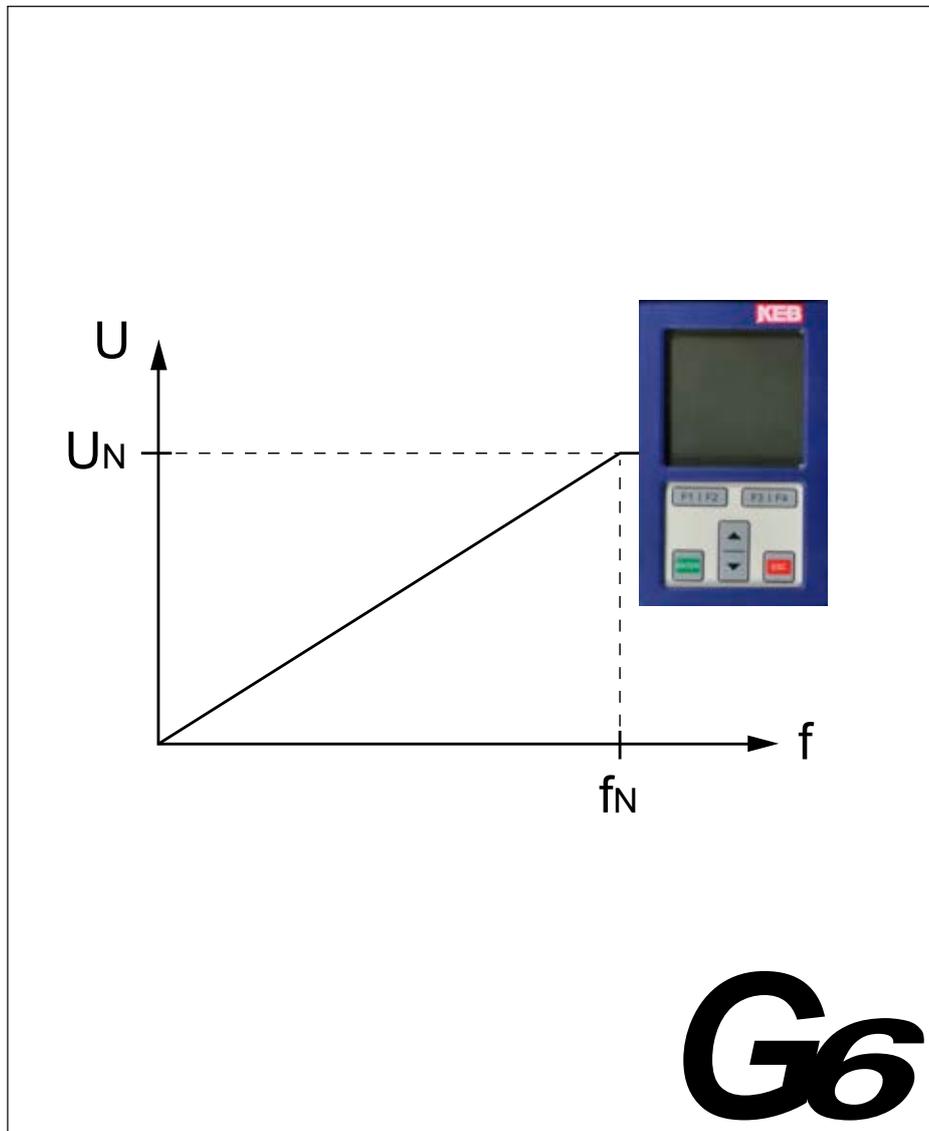


COMBIVERT



Customer parameters

v/f operation

Translation of original manual			
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1. Preface

The described hard- and software are developments of the Karl E. Brinkmann GmbH. The enclosed documents correspond to conditions valid at printing. Misprint, mistakes and technical changes reserved.

1.1 Information on special measures

The used pictograms have following significance:

Danger  Is used, when death or serious bodily injury may be the consequence of non-observance of the measure.

Warning  Is used, when bodily injury and/or substantial property damage may be the consequence of non-observance of the measure.

Caution  Is used, when property damage may be the consequence of non-observance of the measure.

Attention  Is used, when noise sensitive or unrequested operation may be the consequence of non-observance of the measure.

Info  Is used, when a better or simpler result can be the consequence of the measure.

For a special case the instructions can be supplemented by additional pictograms and text.

1.2 Documentation

Before working with the unit the user must become familiar with it. This includes especially the knowledge and observance of the safety and operating instructions.

Attention 	Observe safety and operating instructions
	Precondition for all further steps is the knowledge and observance of the safety and operating instructions. This is provided accompanied by the device or by the download site of www.keb.de .

Non-observance of the safety and operating instructions leads to the loss of any liability claims. The warnings and safety instructions in this manual work only supplementary. This list is not exhaustive.

1.3 Validity and liability

The use of our units in the target products is beyond of our control and therefore exclusively the responsibility of the machine manufacturer, system integrator or customer.

The information contained in the technical documentation, as well as any user-specific advice in spoken and written and through tests, are made to best of our knowledge and information about the application. However, they are considered for information only without responsibility. This also applies to any violation of industrial property rights of a third-party.

Selection of our units in view of their suitability for the intended use must be done generally by the user.

Tests can only be done within the application by the machine manufacturer. They must be repeated, even if only parts of hardware, software or the unit adjustment are modified.

Danger  by tamper from unauthorized personnel	
	<p>Unauthorised opening and tampering may lead to death, bodily injury, property damage and malfunctions. Modification or repair is permitted only by authorized personnel by KEB.. Infringement will annul the liability for resulting consequences.</p>

The suspension of liability is especially valid also for operation interruption loss, loss of profit, data loss or other damages. Disclaimer of warranty will cause void the guarantee. This is also valid, if we referred first to the possibility of such damages.

If single regulations should be or become void, invalid or impracticable, the effectivity of all other regulations or agreements is not affected.

Through multitude applications not each possible case of installation, operation or maintenance can be considered. If you require further information or if special problems occur which are not treated detailed in the documentation, you can request the necessary information via the local Karl E.Brinkmann GmbH agency.

1.4 Copyright

The customer may use the instruction manual as well as further documents or parts from it for internal purposes. Copyrights are with KEB and remain valid in its entirety.

KEB®, COMBIVERT®, COMBICONTROL® and COMBIVIS® are registered trademarks of Karl E. Brinkmann GmbH.

Other wordmarks or/and logos are trademarks (™) or registered trademarks (®) of their respective owners and are listed in the footnote on the first occurrence.

When creating our documents we pay attention with the utmost care to the rights of third parties. Should we have not marked a trademark or breach a copyright, please inform us in order to have the possibility of remedy.

1.5 Specified application

The COMBIVERT G6 serves exclusively for the control and regulation of three-phase motors. The operation of other electric consumers is prohibited and can lead to the destruction of the unit. Frequency inverters are components which are intended for the installation in electric systems or machines.

The used semiconductors and components of the Karl E.Brinkmann GmbH are developed and dimensioned for the use in industrial products. If the KEB COMBIVERT G6 is used in machines, which work under exceptional conditions or if essential functions, life-supporting measures or an extraordinary safety step must be fulfilled, the necessary reliability and security must be ensured by the machine builder.

The operation of our products outside the indicated limit values of the technical data leads to the loss of any liability claims.

1.6 Product description

This manual contains the description of the customer's parameter of the COMBIVERT G6.

Attention



The described parameters are only valid at V/f operation and factory settings.

1.6.1 Corresponding documentation

Attention



Further documentation via www.keb.de



- EMC and safety instructions
- Installation power unit
- Programming Manual

2. Parameter Description

On delivery the KEB COMBIVERT G6 is assigned with an user menu, the customer parameters (CP-Parameters). These represent a selection of important parameters for the operation. Up to a maximum of 48 customer parameters can be defined from over 500 parameters. Only parameter CP00 password input is predefined and can not be modified or deleted.

The customer parameter menu described in this manual is valid for open-loop systems. That can be indentified by parameter CP48 (see below).

2.1 Selection of the customer parameter menu

CP48 Software version

Co-domain	Setting	Description
0.0.0.0 ... F.F.F.F	–	Display of the software version
		The first two digits display the major and minor version number (e.g. 1.2.x.x => V1.2)
		The third digit displays the power unit software
	x.x.0.x	Power unit open-loop 1st Version (this manual)
	x.x.1.x	Power unit open-loop 2nd Version (this manual)
	x.x.2.x	Power unit ASCL → available as Download.
	x.x.3.x	Power unit SCL → available as Download.
		The fourth digit displays a serial number for the date code.

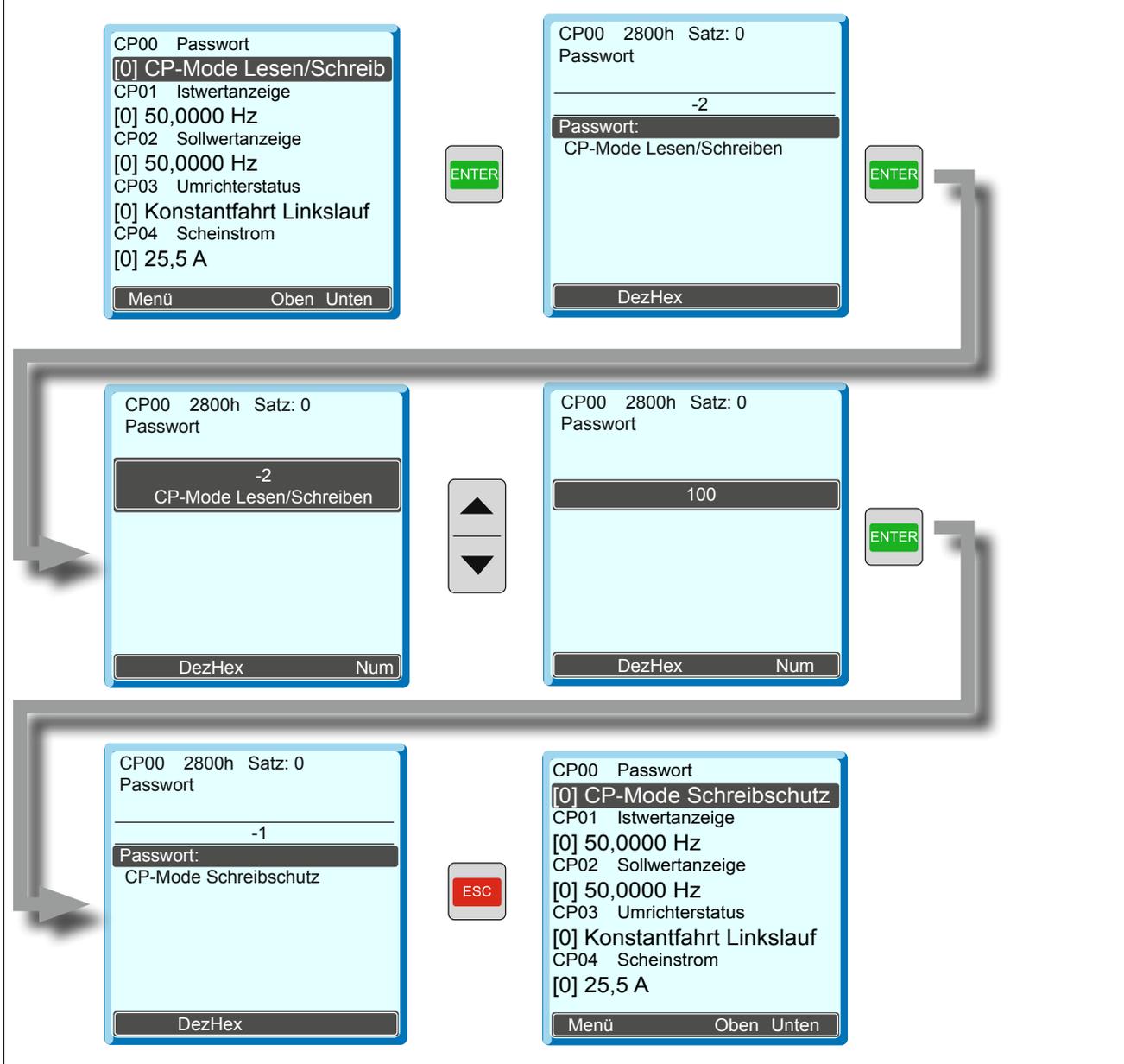
Parameter Description

2.2 Password input in CP mode

CP00 Password input

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. Following password levels are possible:

Password level	Value	Password	Explanation
CP mode write protection	-1	100	Only reading of customer parameters
CP mode read/write	-2	200	Read/write of customer parameters



Info  A detailed description of the display / keyboard can be found in the programming manual "Control circuit analog /digital".

2.3 CP-Parameter for open-loop operation

Parameter	Range	Resolution	Default	Unit	Flag	based on
CP00	Password input	0...9999	1	-	-	Ud01
CP01	Actual value display	-400...400	0,0125	0 Hz	R	ru07
CP02	Set frequency display	-400...400	0,0125	0 Hz	R	ru01
CP03	Inverter state	0...255	1	0	- R	ru00
CP04	Apparent current	0...6553,5	0,1	0 A	R	ru15
CP05	Apparent current peak value	0...6553,5	0,1	0 A	R	ru16
CP06	Actual utilization	0...400	1	0 %	R	ru13
CP07	Actual DC voltage	0...1000	1	0 V	R	ru18
CP08	DC link voltage peak value	0...1000	1	0 V	R	ru19
CP09	Output voltage	0...778	1	0 V	R	ru20
CP10	min. reference forward	0...400	0,0125	0 Hz	-	oP06
CP11	max. reference	0...400	0,0125	70 Hz	-	oP10
CP12	acc. time forward	0,00...300,00	0,01	5 s	-	oP28
CP13	dec. time forward (-1=CP12)	-0,01...300,00	0,01	5 s	-	oP30
CP14	S-curve time acc.	0,00...5,00	0,01	0 s	-	oP32
CP15	Boost	0,0...25,5	0,1	LTK %	-	uF01
CP16	Rated frequency	0...400	0,0125	50 Hz	-	uF00
CP17	Voltage stabilization	0...649	1	off V	E	uF09
CP18	Switching frequency	0...LTK	1	LTK	- E	uF11
CP19	step value 1	-400...400	0,0125	5 Hz	-	oP21
CP20	step value 2	-400...400	0,0125	50 Hz	-	oP22
CP21	step value 3	-400...400	0,0125	70 Hz	-	oP23
CP22	DC braking mode	0...506	1	7	- E	Pn28
CP23	DC braking time	0,00...100,00	0,01	10 s	-	Pn30
CP24	LAD load level	0...200	1	140 %	-	Pn24
CP25	Stall level	0...200	1	200:off %	-	Pn20
CP26	Speed search condition	0...31	1	8	- E	Pn26
CP27	Motor protect. function response	0...6	1	6	- -	Pn14
CP28	Motor protection mode	0...1	1	1	- -	dr11
CP29	motorprot. rated current	0,0...370,0	0,1	LTK A	-	dr12
CP30	ANOUT1 function	0...26	1	2	- E	An31
CP31	ANOUT1 gain	-20,00...20,00	0,01	1	- -	An33
CP32	Condition SB0	0...101	1	20	- E	do00
CP33	Condition SB2	0...101	1	4	- E	do02
CP34	comparison level 2	±30000,00	0,01	100,00	- -	LE02
CP35	AN1 interface selection	0...2	1	0	- E	An00
CP36	select 50Hz/60Hz mode	0...1	1	0	- E	Ud06
CP37	warning dOH stop. mode	0...8	1	7	- -	Pn12
CP38	Inverter address	0...239	1	0	- -	Sy06
CP39	last error	0...255	1	0	- E, R	In24
CP40	parameter set copy function	-4...7	1	0	- -	Fr01
CP48	Software version	x.x.x.x	-	LTK	- R	In06

LTK=depending on power unit; E=ENTER-Parameter; R=read only

CP-Parameter for open-loop operation

CP00 Password input

see chapter 2.2

CP01 Actual value display

Co-domain	Description
0...±400 Hz	Display of the actual output frequency in Hz. The rotation of the inverter is displayed by the sign. Examples:
18.3	Output frequency 18,3 Hz, rotation forward
-18.3	Output frequency 18,3 Hz, rotation reverse

CP02 Set frequency display

Co-domain	Description
0...±400 Hz	Display of actually set value. For control reasons the set speed is displayed, even if the control release or direction of rotation is not switched. If no direction of rotation is set, the set frequency for clockwise rotation (forward) is displayed.

CP03 Inverter state

The actual operating condition of the inverter (e.g. forward constant run, standstill) is displayed in parameter „inverter state“. In the case of an error the current error message is displayed, even if the display has already been reset with ENTER (status LED is still blinking).

Display	State
no operation	modulation switched off; output voltage = 0 V; drive is not controlled.
no direction of rotation preset	modulation switched off; output voltage = 0 V; drive is not controlled.
Acceleration Forward	drive accelerates with direction of rotation forward.
Deceleration Forward	drive decelerates with direction of rotation forward.
Acceleration Reverse	drive accelerates with direction of rotation reverse.
Deceleration Reverse	drive decelerates with direction of rotation reverse.
Speed dependent Forward	Drive runs with constant speed and direction of rotation forward.
Speed dependent Reverse	Drive runs with constant speed and direction of rotation reverse.

Other status messages are described at the parameters, on which they occur (see chapter „Error Diagnosis“).

CP04 Apparent current

Co-domain	Description
0...±6553.5A	Display of the actual apparent current in ampere.

CP05 Apparent current peak value

Co-domain	Description
0...±6553.5A	CP05 makes it possible to recognize the max. apparent current. For that the highest value of CP04 is stored in CP05. The peak value memory can be cleared by pressing the UP, DOWN or ENTER key or via bus by writing any value you like to the address of CP05. The switch off of the inverter also clears the memory.

CP06 DC link voltage peak value

Co-domain	Description
0...400 %	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 generator operation.

CP07 Actual DC voltage

Co-domain	Description			
0...1000 V	Display of actual DC-link voltage in volt. Typical values:			
	V-class	Normal operation	Error! Overvoltage	Error! underpotential
	230 V	290...360 VDC	approx. 400 V DC	approx. 216 V DC
400 V	510...620 VDC	approx. 840 V DC	approx. 240 V DC	

CP-Parameter for open-loop operation

CP08 DC-link voltage/peak value

Co-domain	Description
0...1000V	CP08 makes it possible to recognize short-time voltage rises within an operating cycle. For that the highest value of CP07 is stored in CP08. The peak value memory can be cleared by pressing the UP, DOWN or ENTER key or via bus by writing any value you like to the address of CP08. The switch off of the inverter also clears the memory.

CP09 Output voltage

Co-domain	Description
0...778V	Display of the actual output voltage in volt.

CP10 min. reference forward

Co-domain	Setting	Description	
0.0...400.0Hz	0Hz	With this frequency the inverter operates without presetting an analog set value. Internal limiting of the fixed frequencies CP19...CP21.	

CP11 max. reference forward

Co-domain	Setting	Description	
0.0...400.0Hz	70Hz	With this frequency the inverter operates with maximum set value. Internal limiting of the fixed frequencies CP19...CP21.	→ CP10

CP12 acc. time forward

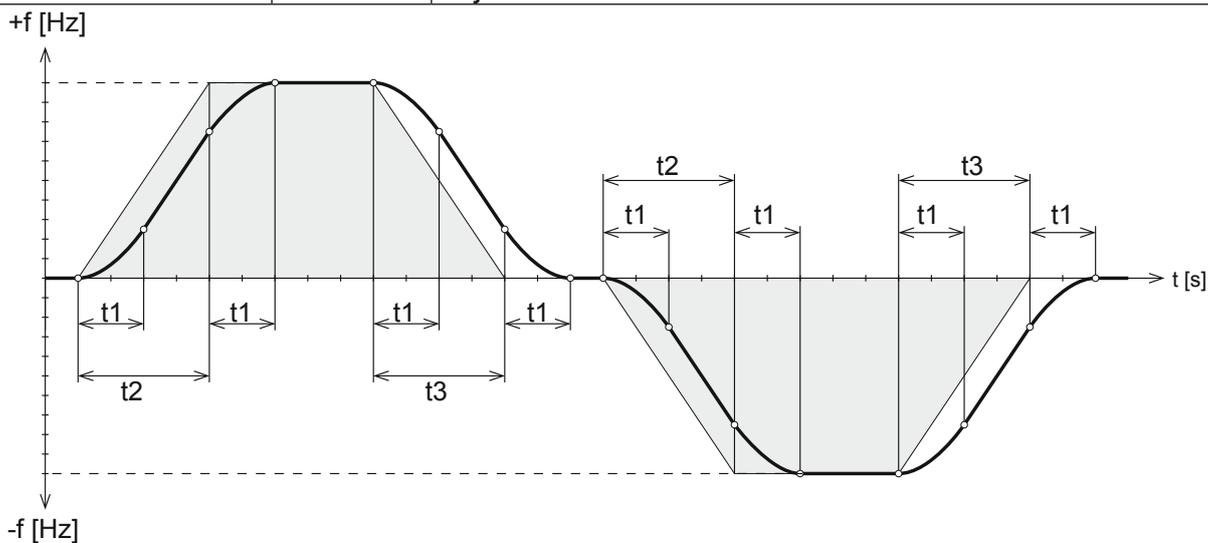
CP13 dec. time forward (-1 = CP12)

Co-domain	Setting	Description
0.00...300.00 s	5.00 s	The parameter determines the time needed to accelerate from 0 Hz to 100 Hz or to decelerate from 100 Hz to 0 Hz. The actual acceleration-/ deceleration time is proportional to the frequency change (Δf).
Δf Frequency change Δt Acceleration-/ deceleration time for Δf		
Example		<p>A drive shall accelerate from 10 Hz to 60 Hz in 5 s.</p> <p>$\Delta f = 60 \text{ Hz} - 10 \text{ Hz} = 50 \text{ Hz}$ $\Delta t = 5 \text{ s}$</p> $CP12 = \frac{\Delta t}{\Delta f} \times 100 \text{ Hz} = \frac{5 \text{ s}}{50 \text{ Hz}} \times 100 \text{ Hz} = 10 \text{ s}$

CP-Parameter for open-loop operation

CP14 S-curve time acceleration forward

Co-domain	Setting	Description
0.00 (off)...5.00 s	0.00 s (off)	For some applications it is of advantage when the drive starts and stops jerk-free. This is achieved through a straightening of the acceleration and deceleration ramps. The straightening time, also called S-curve time, can be adjusted with CP14.



t1	S-curve time (CP14)
t2	Acceleration time (CP12)
t3	Deceleration time (CP13)

Attention



In order to drive defined ramps with activated S-curve time, the preset acceleration and deceleration times (CP12 and CP13) must be adjusted higher than the S-curve time (CP14).

CP15 Boost

Co-domain	Setting	Description
0,0...25,5%	LTK	In the lower speed range a large part of the motor voltage decreases on the stator resistance. To keep the breakdown torque nearly constant over the entire speed range, the voltage decrease can be compensated by the Boost. Adjustment: <ul style="list-style-type: none"> Determine the rate of utilization in no-load operation Preset about 10Hz and adjust the boost, by way that the same rate of utilization is reached as with rated speed.

Attention



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

*) dependent on power circuit

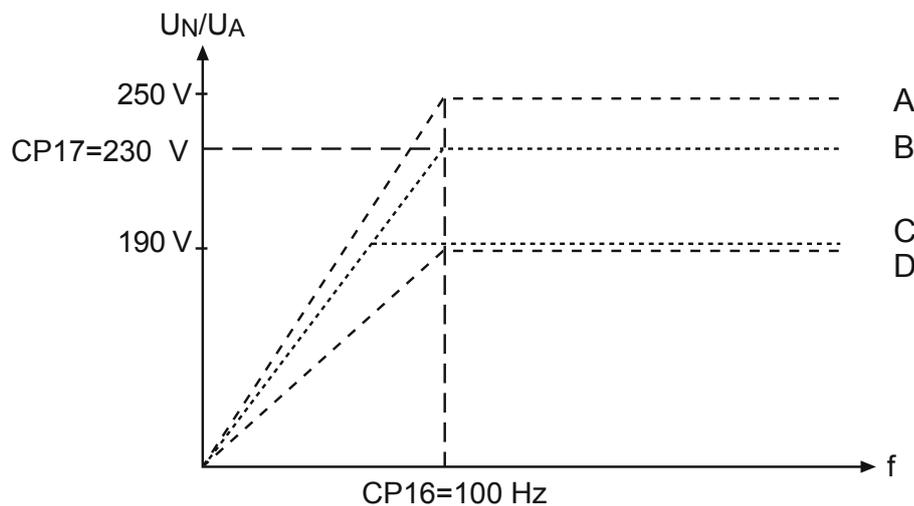
CP16 Rated frequency

Co-domain	Setting	Description
0.00...400.00 Hz	50 Hz	With the adjusted frequency the inverter reaches in controlled operation a maximal output voltage. The adjustment of the rated motor frequency is typical in this case.

<p>Attention</p>	<p>In order to drive defined ramps with activated S-curve time, the preset acceleration and deceleration times (CP12 and CP13) must be adjusted higher than the S-curve time (CP14).</p>	
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CP17 Voltage stabilization

Co-domain	Setting	Description
1...650 V (off)	650 V (off)	With this parameter a regulated output voltage in relation to the rated frequency can be adjusted. For that reason voltage variations at the input as well as in the intermediate circuit only have a small influence to the output voltage (U/f-characteristic). The function allows an adaption of the output voltage to special motors. The values must be confirmed with „ENTER“. In the example below the output voltage is stabilized to 230 V (0 % boost).



UN: Mains voltage
UA: Output voltage

A: UA at UN = 250 V unstabilized
B: UA at UN = 250 V stabilized
C: UA at UN = 190 V stabilized
D: UA at UN = 190 V unstabilized

CP-Parameter for open-loop operation

CP18 Switching frequency

Co-domain	Setting	Description
2 / 4 / 8 / 12 / 16 kHz	LTK	The switching frequency with which the power modules are clocked can be changed depending on the application. The max.possible switching frequency as well as the factory setting are specified by the power circuit. The values must be confirmed with „ENTER“.
Refer to following list to learn about influences and effects of the switching frequency.	low switching frequency	high switching frequency
	less inverter heating	less noise development
	less discharge current	improved sine-wave simulation
	less switching losses	less motor losses
	less radio interferences	improved controller characteristics
	improved concentricity with low speed (only open loop!)	

Attention



At switching frequencies above 4 kHz pay absolute attention to the max. motor line length in the technical data of the power circuit manual.

CP19 Step value 1

CP20 Step value 2

CP21 Step value 3

Co-domain	Setting	Description
CP19	5 Hz	Three fixed frequencies can be adjusted. The selection is made by the inputs I1 and I2. If adjustments are made that are outside the fixed limits of CP10 and CP11, then the frequency is internally limited. The negative values are released in application mode.
CP20	50 Hz	
CP21	70 Hz	
0...±400 Hz		

Info



Input I1 →step value 1
 Input I2 →step value 2
 Input I1 and I2 →step value 3

CP22 DC braking mode

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 upon reaching 0 Hz. The braking time corresponds to CP23 or up to the next rotation setting.
2*	DC-braking as soon as setting for the direction of rotation is absent.
3*	DC-braking as soon as the direction of rotation changes or is absent.

further on next side

4*	DC-braking at switch off of the direction of rotation and upon reaching 4 Hz.	
5*	DC-braking when the real frequency falls below 4 Hz and the drives decelerates	
6*	DC-braking as soon as the set value falls below 4 Hz.	
7*	DC braking if prog. input I4 is set	
8	DC braking as long as prog. input I4 is set	
9	DC-braking after switching on the modulation.	
10	The input occurs by the sum of the desired conditions + "10".	
	Value	Condition
	0	no condition selected
	16	DC braking after the switching the control release
	32	DC braking after switching on
	64	DC braking after reset
	128	DC braking after auto-reset
256	DC braking after 'LS'	
11-15	reserved	

* Braking time depends on the actual frequency.

CP23 DC braking time

Co-domain	Setting	Description
0.00...100.00 s	10 s	If the braking time is depending on the actual frequency (CP22 = 2...7) it is calculated as follows:
$t_B = \frac{CP23 \times f_B}{100 \text{ Hz}}$		
t _B : Real braking time f _B : Actual frequency		

CP24 LAD load level

This function protects the frequency inverter against switching off through overcurrent during the acceleration ramp. When the ramp reaches the adjusted value, it is stopped so long until the current decreases again. "LA stop" is displayed (CP03) when the function is active.

CP-Parameter for open-loop operation

CP25 Stall level

This function protects the frequency inverter against switch off through overcurrent during constant output frequency. When exceeding the adjusted value, the output frequency is reduced until the value drops below the adjusted value. "stall" is displayed (CP03) when the function is active.

CP26 Speed search condition

An error can be triggered caused by different rotary field frequencies at starting the inverter on a free-wheeling motor. With activated speed search the inverter searches for the actual motor speed, adapts its output frequency and accelerates with the adjusted ramp to the given set value. "Speed search" is displayed (CP03) during the search phase. The parameter determines, under what conditions the functions operate.

In case of several conditions the sum of the value must be entered. Example: CP26=12 means after reset **and** after auto-reset UP.

Value	Condition
0	Function off
1	at control release
2	at switch on
4	after reset
8	after Auto-Reset UP
16	after LS

CP27 Motor protect. function response

The warning function protects the connected motor against thermal destruction caused by high currents. The function corresponds largely to mechanical motor protective components, additionally the influence of the motor speed on the cooling of the motor is taken into consideration. The load of the motor is calculated from the measured apparent current (CP04) and the adjusted rated motor current (CP29).

For motors with separately driven fan or rated frequency of a self-ventilated motor following tripping times (VDE 0660, part 104) apply:

1,2	• Rated current	≤	2 hours
1,5	• Rated current	≤	2 minutes
2	• Rated current	≤	1 minute
8	• Rated current	≤	5 seconds

In case of failure CP27 activates the motor protection function and adjusts the corresponding response as follows:

CP27	Response	Description
0	Error, restart after reset Error message „Error! ...“	Immediate switch off of modulation. Correct the error for the restart and activate reset. The pre-warning changes into an error. The drive remains in the error state until a reset signal is recognized.

further on next side

CP27	Response	Description
1	Quick stopping, modulation off, restart after reset Status message „Warning! ...“	Fast stop - switch off of modulation after reaching 0Hz. Correct the error for the restart and activate reset. The drive remains in condition fast stop until a reset signal is recognized.
2	Quick stopping, holding torque, restart after reset Status message „Warning! ...“	Fast stop - holding torque on reaching 0Hz. Correct the error for the restart and activate reset. The drive remains in condition fast stop until a reset signal is recognized.
3	modulation off, automatic restart Status message „Warning! ...“	Immediate switch off of modulation; the drive returns automatically to normal operation, as soon as the fault no longer exists.
4	Quick stopping, modulation off, automatic restart Status message „Warning! ...“	Fast stop - switch off of modulation after reaching 0Hz. the drive returns automatically to normal operation, as soon as the fault no longer exists.
5	Quick stopping, holding torque, automatic restart Status message „Warning! ...“	Fast stop - holding torque on reaching 0Hz. the drive returns automatically to normal operation, as soon as the fault no longer exists.
6	Warning signal by digital output, no message	No effect on the drive. Error is being ignored. Switching condition (CP32 and CP33) value „10“ is set.

CP28 Motor protection mode

The cooling mode of the motor is adjusted with these programmable parameters.

Value	Condition
0	Motor with separate cooling
1	Motor with self-cooling

For self-ventilated motors the tripping times decrease with the frequency of the motor. The motor protective function acts integrating, i.e. times with overload on the motor are added, times with underload are subtracted. After triggering the motor protective function, the new tripping time is reduced to 1/4 of the specified value, if the motor has not been operated for an appropriate time with underload.

CP29 motorprot. rated current

This parameter specifies the rated current (= 100% utilization) for the motor protective function. The motor protection-load is calculated as follows:

$$\text{Motor protection load} = \frac{\text{Inverter apparent current (CP04)}}{\text{motorprot. rated current (CP29)}}$$

CP-Parameter for open-loop operation

CP30 ANOUT1 function

CP30 defines the function of analog output 1. The output at the analog output is made in a range of 0...±10V.

Value	Function	Scaling factor
		0...100% (0...±100%)
0	Absolute actual frequency (CP01)	0...100 Hz
1	Absolute set frequency (CP02)	0...100 Hz
2	Actual frequency (CP01)	0...±100 Hz
3	Set frequency (CP02)	0...±100 Hz
4	Output voltage (CP09)	0...500 V
5	DC link voltage (CP07)	0...1000 V
6	Apparent current (CP04)	0...2 • rated current
7	Active current (ru17)	0...2 • ±rated current
8...10	reserved	–
11	Absolute active current (ru17)	0...2 • rated current
12	Power module temperature (ru38)	0...100 °C
13...21	reserved	–
22	AN1 pre amplifier display (ru27)	0...100 %
23	AN1 post amplifier display (ru28)	0...400 %
24...25	reserved	–
26	Active power (ru81)	0...±2 • rated power

CP32 Condition SB0

The values 0...101 correspond to those of CP33.

The switching level for transistor output 1 is preset to 4.00.

CP33 Condition SB2

The switching level for relay output 1 is adjusted with CP34 (setting: 100.00).

Value	Function
0	No function (generally off)
1	Generally on
2	Run signal; also by DC-braking
3	Ready signal (no error)
4	Error
5	Error (without auto-reset)
6	Warning or error message (also at fast stop)
7	Overload pre-warning (OL) up to 80 %
8	Heat sink temperature pre-warning (OH) up to 70 °C
9	Motor temperature pre-warning (dOH) → CP37
10	Motor protection relay function pre-warning (OH2) → CP27
11	Internal temperature pre-warning
12	Cable breakage 4...20 mA on analog input 1
13	Cable breakage 4...20 mA on analog input 2
14	max. constant current (I>CP25) exceeded
15	max. ramp current (I>CP24) exceeded
16	DC-braking active
17	Power-off function active
18	Brake control
19	Speed control difference > level
20	Actual value=setpoint (CP03=Fcon; rcon; not at noP, LS, error, SSF)
21	Accelerate (CP03 = FAcc, rAcc, LAS)
22	Decelerate (CP03 = FdEc, rdEc, LdS)
23	Real direction of rotation = set direction of rotation

further on next side

Value	Function
24	act. utilization (CP06) > switching level
25	Amount actual active current > switching level
26	DC link voltage (CP07) > switching level
27	Actual value (CP01) > switching level
28	Setpoint (CP02) > switching level
30	Actual torque > switching level
31	Absolute value AN1 > switching level
32	Absolute value AN2 > switching level
34	Setpoint AN1 > switching level
35	Setpoint AN2 > switching level
37	Timer 1 > level
38	Timer 2 > level
40	Hardware current limit activated
41	modulation on
42	ANOUT3 PWM signal
43	ANOUT4 PWM signal
44	Inverter status > switching level
45	Heat sink temperature > switching level
46	Motor temperature > switching level
47	Ramp output value > switching level
48	Apparent current (CP04) > switching level
49	Forward running (not at nOP, LS, abnormal stopping or error)
50	Reverse running (not at nOP, LS, abnormal stopping or error)
51	OL2 warning
52	Current regulator limit reached
59	Inputs in AND-operation (ru22)
60	Inputs in OR-operation (ru22)
61	Inputs in NAND-operation (ru22)
62	Inputs in NOR-operation (ru22)
63	Absolute ANOUT1 > switching level
64	Absolute ANOUT2 > switching level
65	ANOUT1 > switching level
66	ANOUT2 > switching level
69	ext. PID system deviation > switching level
70	Driver voltage active
73	Absolute active power > switching level
74	Active power > switching level
80	Active current > switching level
82	Real value channel 2 > switching level
84	Actual value < minimum setpoint oP06/oP07
85	Warning! External fault
86	Warning! bus
89	Actual value < setpoint • switching level
90	Motor temperature correction > switching level
92	Quick stopping
99	Warning! flow control
100	Combination of different conditions
101	Stop after DC braking and when current > switching level (output switches at modulation = OFF and the measured average value of the apparent value of the apparent current during DC braking before switching off the modulation has exceeded the level of CP34)

The switching condition is off for unlisted values.

CP-Parameter for open-loop operation

CP34 comparison level 2

Co-domain	Setting	Description
-30000,00...30000,00	4,00	This parameter determines the switching level for relay output 1. After the switching of the relay, the value can move within a window (hysteresis), without the relay dropping off.
Output variable		Hysteresis
Frequency		0.5 Hz
DC link voltage		1 V
Analog setpoint		0,5 %
Active current		0.5 A
Temperature		1 °C

CP35 AN1 interface selection

The setpoint input (AN1) of the control can be triggered with different signal levels. In order to correctly evaluate the signal, this parameter must be adapted to the signal source.

Value	Set value signal
0	0...±10 Vdc / Ri = 55 kΩ
1	0...±20 mADC / Ri = 250 Ω
2	4...20 mADC / Ri = 250 Ω

CP36 select 50Hz/60Hz mode

When units or machines are delivered in the area of application of UL an adaption of the factory setting to the valid operating data there can be done with this parameter. The control release must be opened for the changeover, since otherwise error "Operation not possible" appears.

Value	Default value
0	Current values and limits, motor data, frequencies and speed relate to a 50 Hz mains with 400 V rated voltage.
1	Current values and limits, motor data, frequencies and speed relate to a 60 Hz mains with 480 V rated voltage.

CP37 warning dOH stop. mode (only for devices with temperature input)

This parameter determines the response of the drive to the external temperature monitoring. **The function is switched off at factory setting.** The power circuit terminals T1/T2 must be connected to activate the function. Then the response can be adjusted according to the following table. If the overtemperature condition is past, the message „No ERROR drive overheat" (or no ABN.STOP drive overheat") is output. Only then the error can be reset or the automatic restart can be carried out.

CP37	Display	Response	Restart
0	¹⁾	Immediate disabling of modulation	Remove fault; reset
1*	²⁾	Quick stopping / disabling of modulation after reaching speed 0	
2*	²⁾	Quick stopping / holding torque at speed 0	
3	²⁾	Immediate disabling of modulation	Autoreset, if no fault is present
4*	²⁾	Quick stopping / disabling of modulation after reaching speed 0	
5*	²⁾	Quick stopping / holding torque at speed 0	
6*	non	Motor temperature is not monitored. The drive does not execute an automatic abnormal stopping during the pre-warning period. The pre-warning message can only be issued via a digital output (switching condition 9: „dOH warning“). After expiration of the pre-warning period, the inverter changes to „9: ERROR drive overheat“.	inapplicable
7	non	Motor temperature is not monitored. Error „9: Error! drive overheat“ is never triggered. No message via digital output possible.	
8	²⁾	Malfunction is only triggered when the inverter modulates.	Remove fault; reset
9		As value 6, additionally the motor monitoring is also active when the modulation is switched off.	
¹⁾ ERROR! drive overheat ²⁾ ABN.STOP drive overheat			

*) If the drive is still hot after 10 seconds, „ERROR drive overheat“ is triggered and the modulation is switched off!

CP38 Inverter address

Co-domain	Setting	Description
0...239	1	Setting of the bus address, whereby the inverter can be addressed by "COMBIVIS" or another control. If several inverters are operated simultaneously at the bus, it is absolutely necessary to assign different bus addresses to them, since otherwise it leads to communication failures.

CP39 last error

Co-domain	Setting	Description
0...255	1	The inverter stores the eight errors that occurred last. Displays the error that occurs last.

CP40 parameter set copy function

Co-domain	Setting	Description
-4...7	1	CP40 defines the source parameter set. By default set 0 is adjusted as target set in the CP mode.
0...7		All programmable parameters of the source set are copied into the target set.

further on next side

CP-Parameter for open-loop operation

Co-domain	Setting	Description
-1	KEBdef/cust.par/sel.sets.	Default values are copied in all parameters of set 0 (exception: system and security parameters). If the target set is > 0 only programmable parameters are copied.
-2	KEBdef/cust.par/all sets.	Default values are copied in all parameters of all sets (exception: system and security parameters).
-3	KEBdef/cust+sys/sel.sets.	Default values are copied in all parameters of the target set (exception: security parameters). If the target set is > 0 only programmable parameters are copied.
-4	KEBdef/cust+sys/all sets.	Default values are copied in all parameters of all sets (exception: security parameters).

Attention



All definitions defined by the machine builder are reset by loading the default values! This can include the terminal assignment, set changeover or operating conditions. Ensure before loading the default set that there are no unwanted operating conditions.

CP48 Software version

see chapter 2.1

3. Troubleshooting

3.1 General

If error messages or malfunctions occur repeatedly during operation, the first thing to do is to pinpoint the exact error. To do that go through the following checklist:

Is the error reproducible?

For that reset the error and try to repeat it under the same conditions. If the error can be reproduced, the next step is to find out during which operating phase the error occurs.

Does the error occur during a certain operating phase (e.g. always during acceleration)?

If so, consult the error messages and remove the causes listed there.

Does the error occur or disappear after a certain time?

That may be an indication for thermal causes. Check, whether the inverter is used in accordance to the ambient conditions and that no moisture condensation takes place.

3.2 Error Messages and their Cause

The status display is divided at COMBIVERT G6 in status, error and warning messages. Status messages display the actual operating condition of the unit. They have no special identification and are used for information only.

Error messages always consist of the word „Error“ and the cause. Error messages cause the immediate deactivation of the modulation. The restart is only possible after reset or autoreset. In case of temperature or overload errors it must be waited until the status message appears that the error has been removed. A reset can be carried out only then.

Warning messages always consist of the word „warning“ and the cause. How the inverter will behave on warning messages can be defined via parameters in the application mode.

The following table lists the status messages, error messages and finally the warning messages each in alphabetic sequence.

Display	Value	Meaning
Status messages		
calculate drive data	82	Measurement of the motor stator resistance
reverse acceleration	67	Acceleration with the adjusted ramp times in anti-clockwise direction of rotation.
forward acceleration	64	Acceleration with the adjusted ramps in clockwise direction of rotation.
LA stop	72	This message is displayed if during acceleration the load is limited to the adjusted load level
further on next side		

Troubleshooting

Display	Value	Meaning
blockade detected	129	The setpoint must be above the level Pn86. If the actual value is below the level, the counter starts. A blockade is recognized if the counter reaches the adjusted time in Pn86. The output function do00...07 = 96 (blockade active) is set. On exceeding the limit, the value of the counter decreases.
blockade resettable	130	The warning message blockade is no longer available. The message can be reset. The output function do00...07 = 97 "blockade resettable" is set.
close brake	85	Brake control (see chapter "Brake control")
open brake	86	Brake control (see chapter "Brake control")
DC brake	75	Motor is decelerated by DC voltage at the output.
speed search	74	Speed search function active, i.e. the inverter attempts to synchronize onto a running out motor.
no A.STOP overheat int.	92	The temperature in the interior of the inverter is again below the warning threshold.
no A. overheat pow.mod.	88	The heat sink temperature is again below the adjusted warning level.
no A. drive overheat	91	The motor temperature is again below the adjusted warning level. The switch off time is stopped.
no ABN.STOP overload	98	Warning: no more overload, OL counter has reached 0 %, warning „overload" can be reset.
no ABN.STOP overload 2	101	The cooling time after "Warning! Overload during standstill" has elapsed. The warning message can be reset.
hardware current limit	80	The message is output if the output current reaches the hardware current limit.
no ERROR overheat int.	7	No longer overheating in the interior, interior temperature has fallen by at least 3°C, error resettable
low speed	70	No direction of rotation preset, modulation off.
low speed / power off	84	No modulation after power off.
no operation	0	Control release is not set. Terminal ST (for units without safety module) Terminals STO (for units with safety module) Software control release (only in addition with ST or STO)
reverse constant	69	Acceleration / deceleration phase is completed and it is driven with constant speed / frequency in clockwise direction of rotation.
forward constant	66	Acceleration / deceleration phase is completed and it is driven with constant speed / frequency in clockwise direction of rotation.
no E. overheat pow.mod.	36	Temperature of the heat sink is again in the permissible operating range. The error can be reset now.
power unit not ready	13	Power circuit not ready or not identified by the control.

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Display	Value	Meaning
low speed / DC brake	77	Modulation is switched off after DC braking (see chapter brake control).
calc. drive data ready	127	Calculation drive data ready
base block	76	Power modules for motor de-excitation locked
no ERROR drive over-heat	11	Motor temperature switch or PTC at the terminals T1/T2 is again in the normal operating range. The error can be reset now.
power off	78	Depending on the programming of the function (see chapter „Power-off function) the inverter restarts automatically upon system recovery or after reset.
quick stop	79	The message is output if the quick stop function becomes active as response to a warning signal.
stall	71	This message is displayed if during constant operation the load is limited to the adjusted current limit.
no ERROR overload	17	No more overload, OL-counter has reached 0%; after "Error! overload" a cooling phase has to be awaited. This message appears upon completion of the cooling phase. The error can be reset now. The inverter must remain switched on during the cooling phase.
no ERROR overload 2	20	The cooling time has elapsed. The error can be reset.
check STO	131	The safety function is checked (100ms).
reverse deceleration	68	It is stopped with the adjusted ramp times in anti-clockwise direction of rotation.
forward deceleration	65	Forward deceleration with the adjusted ramp times.
Ld stop	73	This message is displayed if during deceleration the load is limited to the adjusted load level or the DC-link current to the adjusted voltage level.
further on next side		

Troubleshooting

Display	Value	Meaning
Error messages		
ERROR calc. drive data	60	Error: During the automatic motor stator resistance measurement.
ERROR output phase fail.	5	Phase loss detection at the output
Error blockade	26	A blockade was recognized. Pn85 Bit 4 is at error, no auto-reset.
ERROR brake	56	Error can occur with activated brake control (see chapter brake control) if: <ul style="list-style-type: none"> • the load during the start is below the min. load level (Pn43) or the missing of a motor phase was detected. • the load is too high and the hardware current limit is reached.
ERROR speed ctrl. lim	25	Speed controller limit reached
ERROR flow control	27	The flow control is activated in Pn91. No input and output for valve control is selected in Pn92 and Pn93.
ERROR input error detect	53	Hardware error at start/stop measurement.
ERROR external fault	31	Is triggered, if a digital input is being programmed as external error input and trips.
ERROR overspeed	58	The speed is outside the defined limits. (can also occur on exceeding of the absolute speed referring to EMF = EMF wrong (servo drives).
ERROR overheat internal	6	Overheating in the interior. Error can only be reset at "no ERROR overheat int." if the interior temperature has dropped by at least 3 °C
ERROR load shunt fault	15	Load-shunt relay has not picked up, occurs for a short time during the switch-on phase, but must automatically be reset immediately. If the error message remains the following causes may be applicable: <ul style="list-style-type: none"> • load-shunt defective • input voltage wrong or too low • high losses in the supply cable • braking resistor wrongly connected or damaged • braking module defective
ERROR power unit	12	Error: General power circuit fault
ERROR motor protection	30	Electronic motor protective relay has tripped.
ERROR max. acceleration	24	Maximum acceleration exceeded
ERROR drive overheat	9	Error: Overtemperature of motor PTC. Error can only be reset at "no ERROR drive overheat" if PTC is again low-resistance. Causes: <ul style="list-style-type: none"> • Resistance at terminals T1/T2 >1650 Ohm • Motor overloaded • Line breakage to the temperature sensor
further on next side		

Display	Value	Meaning
ERROR set	39	It has been attempted to select a locked parameter set. Programmed response "Error, restart after reset".
ERROR phase failure	3	One phase of the input voltage is missing (ripple-detection)
ERROR safety	28	Error in a function that is monitored by the optional safety module. See Safety Instructions Mat.No. 00G6N1F-0000.
		 The error „ERROR 28: safety“ can not be reset with a digital input. The error can only be reset by switching off and on of the frequency inverter.
ERROR overfrequency	61	Current frequency is above the permissible range.
ERROR overload	16	Overload error can only be reset at "no ERROR overload" if OL-counter reaches 0% again. Occurs, if the overload is longer than the permissible time (see technical data).
		<ul style="list-style-type: none"> • mechanical fault or overload in the application • inverter not correctly dimensioned • motor wrongly wired • poor controller adjustment
ERROR overload 2	19	Occurs if the current for zero speed is exceeded (see technical data in the power unit manual). The error can only be reset if the cooling time has elapsed and "no ERROR overload 2" is displayed.
ERROR overpotential	1	Voltage in the DC link circuit too high. Occurs if the DC link voltage exceeds the permissible value. Causes:
		<ul style="list-style-type: none"> • poor controller adjustment (overshooting) • input voltage too high • interference voltages at the input • deceleration ramp too short • braking resistor defective or too small
ERROR overcurrent	4	Occurs, if the specified peak current is exceeded. Causes:
		<ul style="list-style-type: none"> • acceleration ramps too short • the load is too big at switched off acceleration stop and switched off constant current limit • short circuit at the output • ground fault • deceleration ramp too short • motor cable too long • EMC • DC brake active at high power (see chapter brake control)

further on next side

Troubleshooting

Display	Value	Meaning
ERROR overheat pow. mod.	8	Overtemperature of power module. The error can only be reset at "no E. overheat pow.mod.". Causes:
		<ul style="list-style-type: none"> • insufficient air flow at the heat sink (soiled) • ambient temperature too high • ventilator clogged
ERROR underpotential	2	Error: Undervoltage (DC link circuit). Occurs, if DC link voltage falls below the permissible value. Causes:
		<ul style="list-style-type: none"> • input voltage too low or unstable • inverter rating too small • voltage losses through wrong cabling • the supply voltage through generator / transformer breaks down at very short ramps • jump factor (Pn56) too small • if a digital input is programmed as external error input with error message "underpotential" (Pn65).
ERROR bus	18	The adjusted monitoring time (watchdog) of the communication between control board and PC (on an optional fieldbus interface) or between control board and power unit has been exceeded.
Warning Messages		
ABN.STOP speed ctrl. lim	107	The speed controller is in limitation. The response to the cause can be programmed with Pn75.
ABN.STOP external fault	90	This warning is triggered via an external input. The response to this warning can be programmed.
ABN.STOP motor protect.	97	Warning: electronic motor protective relay has tripped. The response to this warning can be programmed.
ABN.STOP drive over-heat	96	The motor temperature has exceeded an adjustable warning level (Pn13). The switch off time is started. The response to this warning can be programmed.
ABN.STOP set	102	It has been attempted to select a locked parameter set. The response to this warning can be programmed.
ABN.STOP overload	99	A level between 0 and 100 % of the load counter can be adjusted. The warning is output on exceeding this level. The response to this warning can be programmed.
ABN.STOP overload 2	100	The warning is output when the standstill continuous current is exceeded (see technical data and overload characteristics). The response to this warning can be programmed. The warning message can only be reset after the cooling time has elapsed and "no ABN.STOP overload 2" is displayed.
ABN.STOP overheat int.	87	The temperature in the interior of the inverter is above the permissible level. The switch off time was started. The programmed response to this warning message is executed.
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Display	Value	Meaning
A.STOP overheat pow. mod	89	This warning is output when the defined level is exceeded. Furthermore the response to this warning can be programmed.
ABN.STOP bus	93	Watchdog for the communication between control board and PC (on an optional fieldbus interface) or control board and power unit has responded. The response to this warning can be programmed.



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