

COMBIVERT



G6

Programming Manual

**Control circuit
EtherCAT**

Translation of the original manual		
Document	Part	Version
20099835	GBR	00

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1. Preface


The described hardware 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 KEB authorized personnel. 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. The disclaimer will void the warranty. 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 arise which are not treated in detail in the documentation, you can request the required information from the local agency of the company Karl E.Brinkmann GmbH.

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 inverter are components which are intended for the installation in electric systems or machines.

Die bei KEB eingesetzten Halbleiter und Bauteile sind für den Einsatz in industriellen Produkten entwickelt und ausgelegt. If the KEB COMBIVERT F5 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

The product family COMBIVERT G6 with safety function STO has been developed for the use in safety-oriented applications. The basic standards as well as application and country-specific standards must be observed furthermore. The manual refer to standards that are complementary to note!

This document is a description of the functions and parameters of the G6 - control card with VARAN interface (Versatile Automation Random Access Network).

1.6.1 Overview of functions

The control provides the following functions:


- hardware-installed supply of digital and analog inputs and outputs.
- Diagnostic interface
- Ethernet-based fieldbus interface (EtherCAT / Varan)
- CAN fieldbus interface
- Multi encoder interface
- KTY interface
- Brake control
- STO functionality
- Status LEDs

1.6.2 Safety function




The safety function STO according to IEC 61800-5-2 contains:

- Safe torque off (Safe Torque Off - STO)

The safety function meet the requirements in accordance with performance level e (ISO13849-1) and SIL 3 (IEC 61508 and IEC 62061). In case of proper project design, installation and operation the safety function protects people against mechanical damages.

Attention  Validity of certificates	
FS	The certification of controllers with safety technology is only valid if the material number corresponds with the specified numerical code and the FS logo is printed on the type plate.

1.6.3 Corresponding documentation

Attention 	Documentation via www.keb.de
	Prior to performing any work on the unit, it is absolutely necessary to download and read the documentation, especially the safety precautions and instructions for use. Follow these steps to get the documentation:
Step 1	Read the material number (Mat.No.) from nameplate
Step 2	<p>Input the material number at "www.keb.de => Service => Downloads" and click "search".</p> <p style="text-align: center;">Downloads</p> <div style="border: 1px solid gray; padding: 10px; background-color: #f0f0f0;"> <p style="text-align: center;">Search for specific material numbers</p> <p style="text-align: center;">Please enter a complete (11-digit) material number.</p> <p>Search for: <input style="width: 150px;" type="text" value="15G6DCD3510"/> <input style="width: 60px;" type="button" value="search"/></p> </div>
Step 3	The entire documentation associated with the device will be displayed, including the instruction manuals in German and English. If available, other translations are also indicated. Make sure that the user understands the provided language.
	Should you be unable to read or understand the documentation, do not take any further steps. Please inform our support network for further assistance.

1.7 Type code

xx	G6	x	x	x	x	x	x	x	x
Cooling (not valid for customer-/special version)									
0									
Air-cooling/flat Rear (housing A, B)									
Air-cooling (housing C, E);									
1									
Flat rear									

continued on the next page

xx G6 x x x-x x x x

Control/keyboard/display (not valid for customer-/special version)					
A	G6K-G	Open-loop without keyboard/display	0	G6-G	Open-loop without keyboard/display
B	G6K-G	Open-loop with keyboard/display	1	G6-G	Open-loop with keyboard/display
2	G6P-S	SCL (Sensorless Closed Loop) without keyboard/display			
3	G6P-S	SCL (Sensorless Closed Loop) with keyboard/display			
4	G6L-M	ASCL (Asynchronous Sensorless Closed Loop) without keyboard/display			
5	G6L-M	ASCL (Asynchronous Sensorless Closed Loop) with keyboard/display			

Switching frequency; short time current limit; overcurrent cut-off (not valid at customer/special version)									
0	2 kHz	125 %	150 %		1	4 kHz	125 %	150 %	
2	8 kHz	125 %	150 %		3	16 kHz	125 %	150 %	
4	2 kHz	150 %	180 %		5	4 kHz	150 %	180 %	
6	8 kHz	150 %	180 %		7	16 kHz	150 %	180 %	
8	2 kHz	180 %	216 %		9	4 kHz	180 %	216 %	
A	8 kHz	180 %	216 %		B	16 kHz	180 %	216 %	

Voltage, connection							
0	1-phase	230 V	AC/DC	3	3-phase	400 V	AC/DC
1	3-phase	230 V	AC/DC	5		400 V	DC
2	1/3-phase	230 V	AC/DC	6	1-phase	230 V	AC
A-Z	Customer-/special version (firmware and download)						

Housing type A, B, C, E

Variants					
0	without filter, without braking transistor, without safety function STO	A	like 0 with STO	H	like A with f=0Hz
1	without filter, with braking transistor, without safety function STO	B	like 1 with STO	I	like B with f=0Hz
2	internal filter; without braking transistor, without safety function STO	C	like 2 with STO	K	like C with f=0Hz
3	internal filter, with braking transistor, without safety function STO	D	like 3 with STO	L	like D with f=0Hz

Control type	
C	Analog/digital (standard)
D	CAN® 1
E	IO-Link® 2
F	EtherCAT® 3
G	PROFINET® 4
H	reserved for POWERLINK
I	VARAN

G6 unit type

Inverter size

EtherCAT interface

Id-Text	Name	Parameter index
co04	Identity object	0x1018
Type	Structure	
Subindex 0		
Meaning	Number of subindices of this object	
Data length	8 bit	
Access	read	
Coding	4 Standard value:4	
Subindex 1		
Name	Customer-ID	
Meaning	Includes manufacturer id. assigned by the CiA	
Data length	32 bit	
Access	read	
Coding	20: KEB Standard value:20	
Subindex 2		
Name	Product code	
Meaning	Includes a unique value for this unit series.	
Data length	32 bit	
Access	read	
Coding	300000h...30FFFFh Standard value:300000h : G6	
Subindex 3		
Name	Revision number	
Meaning	Includes in the low word the revision number of the G6 power unit. In the high word the revision number of the control.	
Data length	32 bit	
Access	read	
Coding	00000000h...FFFFFFFFh Standard value:-	
Subindex 4		
Name	KEB_device serial number	
Meaning	Includes the serial number of the unit.	
Data length	32 bit	
Access	read	
Coding	0...2147483647 Standard value:0	

2.2 Addressing in the fieldbus

The G6 device is provided by the EtherCAT master at system startup with an address.

Alternatively a fixed fieldbus address can be stored by the master as a station alias for the hot connect functionality in the EtherCAT EEPROM. If this address is not 0, it is taken and used at power on of the device.

Id-Text	Name	Parameter index
co40	EtherCAT Address	0x1100
Meaning	Displays the currently used address in the fieldbus	
Type	Variable	
Data length	16 bit	
Access	read	
Coding	0...65535 Standard value:0	
Note	-	

2.3 Status and Error Messages

Id-Text	Name	Parameter index
fb00	AL status	0x2180
Meaning	Display of the application layer state	
Type	Variable	
Data length	16 bit	
Access	read	
Coding	Status	
	Bitmask	0x000F
	Name	State
	Sub-Definitions	[5]
	Init	1
	Pre-operational	2
	Boot	3
	Saveoperational	4
	OPERATIONAL	8
	Error	
	Bitmask	0x0010
	Name	Error
	Sub-Definitions	[1]
	Error	16
	Type	1
	Value	16
	Name	Error
Standard value:0		

EtherCAT interface

Id-Text	Name	Parameter index														
fb01	Communication state	0x2181														
Meaning	Display of the EtherCAT communication state															
Type	Variable															
Data length	16 bit															
Access	read															
Coding	<table border="1"> <thead> <tr> <th colspan="2">Decimal values (bit-coded):</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Error</td> </tr> <tr> <td>2</td> <td>started</td> </tr> <tr> <td>4</td> <td>ready to start</td> </tr> <tr> <td>8</td> <td>mailbox run</td> </tr> <tr> <td>16</td> <td>PDinRun</td> </tr> <tr> <td>32</td> <td>PDoutRun</td> </tr> </tbody> </table> <p>Standard value:0</p>		Decimal values (bit-coded):		1	Error	2	started	4	ready to start	8	mailbox run	16	PDinRun	32	PDoutRun
Decimal values (bit-coded):																
1	Error															
2	started															
4	ready to start															
8	mailbox run															
16	PDinRun															
32	PDoutRun															
Note	-															

Id-Text	Name	Parameter index										
co02	ErrorRegister	0x1001										
Meaning	Indicates the error status of the EtherCAT user											
Type	Variable											
Data length	8 bit											
Access	read											
Coding	<table border="1"> <thead> <tr> <th colspan="2">Decimal values (bit-coded):</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>No error</td> </tr> <tr> <td>1</td> <td>Generioc error</td> </tr> <tr> <td>2</td> <td>Error overcurrent</td> </tr> <tr> <td>4</td> <td>Overvoltage or undervoltage error</td> </tr> </tbody> </table> <p>Standard value:0</p>		Decimal values (bit-coded):		0	No error	1	Generioc error	2	Error overcurrent	4	Overvoltage or undervoltage error
Decimal values (bit-coded):												
0	No error											
1	Generioc error											
2	Error overcurrent											
4	Overvoltage or undervoltage error											
Note	-											

3. Process Data Mapping

The setting of the process data assignment can be done in two different ways. One is through the KEB specific parameters (fb10-fb19), on the other hand about the parameters (co08, c014) which are defined according to the CAN DS301 profile.

After successful adjustment of the process data mapping the process data can be processed by the G6 device.

3.1 Output process data (manager => client)

Id-Text	Name	Parameter index
fb10	PD out index	0x218A
Type	ARRAY	
Subindex 0		
Meaning	Number of subindices of this object	
Data length	8 bit	
Access	read	
Coding	8 Standard value:8	
Note	-	
Subindex 1...8		
Meaning	Default up to 8 parameter addresses to be used as process data. Only parameters may be used that are allowed as process data. The value corresponds byte 2 and 3 of the DS301 parameter co08.	
Data length	16 bit	
Access	read / write	
Coding	0000h...FFFFh Standard value:0000h	
Note	-	

Process Data Mapping

Id-Text	Name	Parameter index
fb11	PD out subindex	0x218B
Type	ARRAY	
Subindex 0		
Meaning	Number of subindices of this object	
Data length	8 bit	
Access	read	
Coding	8 Standard value:8	
Note	-	
Subindex 1...8		
Meaning	The value of the subindex determines the parameter set of the selected PD parameter. The value corresponds byte 1 of the DS301 parameter co08.	
Data length	8 bit	
Access	read / write	
Coding	1...8 for subindex 1...8 (or rather set 0..7) Standard value:1	
Note	-	

Id-Text	Name	Parameter index
fb12	PD out offset	0x218C
Type	ARRAY	
Subindex 0		
Meaning	Number of subindices of this object	
Data length	8 bit	
Access	read	
Coding	8 Standard value:8	
Note	-	
Subindex 1...8		
Meaning	Specifies the offset of occupancy in the process data field. Position of the value of the mapped parameter.	
Data length	8 bit	
Access	read / write	
Coding	0...15 Standard value:0	
Note	-	

Id-Text	Name	Parameter index
fb13	PD out type	0x218D
Type	ARRAY	
Subindex 0		
Meaning	Number of subindices of this object	
Data length	8 bit	
Access	read	
Coding	8 Standard value:8	
Note	-	
Subindex 1...8		
Meaning	The value specifies the parameter type of the selected PD parameter.	
Data length	8 bit	
Access	read / write	
Coding	0: off (no parameter type defined) 1: Long (32bit) 2: Word (16bit) 3: Byte (8 bit) Standard value:0	
Note	-	

Id-Text	Name	Parameter index
fb14	PDO out count	0x218E
Meaning	Sets the number of PD-out objects	
Type	Variable	
Data length	8 bit	
Access	read / write	
Coding	0...8 Standard value:0	
Note	Is automatically set to 0 when changing the parameters fb10...fb13.	

Process Data Mapping

Id-Text	Name	Parameter index														
co08	RPDO1 mapping	0x1600														
Type	ARRAY															
Subindex 0																
Meaning	Sets the number of mapped objects															
Data length	8 bit															
Access	read / write															
Coding	0...8 Standard value:0															
Note	Successively, no gaps as on the fb-mapping parameters possible.															
Subindex 1...8																
Meaning	Describes an object mapping. The index, subindex and the object length are specified in bits.															
Data length	32 bit															
Access	read / write															
Coding	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>Index</td> <td>Index</td> <td>Subindex</td> <td>Object length</td> </tr> <tr> <td>HB</td> <td>LB</td> <td></td> <td></td> </tr> <tr> <td>B3</td> <td>B2</td> <td>B1</td> <td>B0</td> </tr> </table> <p>Standard value:00000100h</p>				Index	Index	Subindex	Object length	HB	LB			B3	B2	B1	B0
Index	Index	Subindex	Object length													
HB	LB															
B3	B2	B1	B0													
Note	A writing of this parameter requires that the count (subindex 0) is set to 0.															

3.2 Input process data (client => manager)

Id-Text	Name	Parameter index
fb15	PD in index	0x218F
Type	ARRAY	
Subindex 0		
Meaning	Number of subindices of this object	
Data length	8 bit	
Access	read	
Coding	8 Standard value:8	
Note	-	
Subindex 1...8		
Meaning	Default up to 8 parameter addresses to be used as process data. Only parameters may be used that are allowed as process data. The value corresponds byte 2 and 3 of the DS301 parameter co14.	
Data length	16 bit	
Access	read / write	
Coding	0000h...FFFFh Standard value:0000h	
Note	-	

Id-Text	Name	Parameter index
fb16	PD in subindex	0x2190
Type	ARRAY	
Subindex 0		
Meaning	Number of subindices of this object	
Data length	8 bit	
Access	read	
Coding	8 Standard value:8	
Note	-	
Subindex 1...8		
Meaning	The value of the subindex determines the parameter set of the selected PD parameter. The value corresponds byte 1 of the DS301 parameter co14.	
Data length	8 bit	
Access	read / write	
Coding	1...8 for subindex 1...8 (or rather set 0..7) Standard value:1	
Note	-	

Process Data Mapping

Id-Text	Name	Parameter index
fb17	PD in offset	0x2191
Type	ARRAY	
Subindex 0		
Meaning	Number of subindices of this object	
Data length	8 bit	
Access	read	
Coding	8 Standard value:8	
Note	-	
Subindex 1...8		
Meaning	Specifies the offset of occupancy in the process data field. Position of the value of the mapped parameter.	
Data length	8 bit	
Access	read / write	
Coding	0...15 Standard value:0	
Note	-	

Id-Text	Name	Parameter index
fb18	PD in type	0x2192
Type	ARRAY	
Subindex 0		
Meaning	Number of subindices of this object	
Data length	8 bit	
Access	read	
Coding	8 Standard value:8	
Note	-	
Subindex 1...8		
Meaning	The value specifies the parameter type of the selected PD parameter.	
Data length	8 bit	
Access	read / write	
Coding	0: off (no parameter type defined) 1: Long (32bit) 2: Word (16bit) 3: Byte (8 bit) Standard value:0	
Note	-	

Id-Text	Name	Parameter index
fb19	PDO in count	0x2193
Meaning	Sets the number of PD-in objects	
Type	Variable	
Data length	8 bit	
Access	read / write	
Coding	0...8 Standard value:0	
Note	Is automatically set to 0 when changing the parameters fb15...fb18.	

Id-Text	Name	Parameter index													
co14	TPDO1 mapping	0x1A00													
Type	ARRAY														
Subindex 0															
Meaning	Sets the number of mapped objects														
Data length	8 bit														
Access	read / write														
Coding	0...8 Standard value:0														
Note	Successively, no gaps as on the fb-mapping parameters possible.														
Subindex 1...8															
Meaning	Describes an object mapping. The index, subindex and the object length are specified in bits.														
Data length	32 bit														
Access	read / write														
Coding	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>Index</td> <td>Index</td> <td>Subindex</td> <td>Object length</td> </tr> <tr> <td>HB</td> <td>LB</td> <td></td> <td></td> </tr> <tr> <td>B3</td> <td>B2</td> <td>B1</td> <td>B0</td> </tr> </table>			Index	Index	Subindex	Object length	HB	LB			B3	B2	B1	B0
Index	Index	Subindex	Object length												
HB	LB														
B3	B2	B1	B0												
	Standard value:00000100h														
Note	A writing of this parameter requires that the count (subindex 0) is set to 0.														

Sync manager

4. Sync manager

This parameter indicates the communication type of the used SyncManager.

Id-Text	Name	Parameter index
co45	Sync Manager Communication Type	0x1C00
Type	Structure	
Subindex 0		
Meaning	Number of sync manager channels	
Data length	8 bit	
Access	read	
Coding	4 Standard value: 4	
Subindex 1		
Name	Communication type sync manager 0	
Meaning	Communication type of the sync manager 0	
Data length	8 bit	
Access	read	
Coding	1 Standard value: 1	
Subindex 2		
Name	Communication type sync manager 1	
Meaning	Communication type of the sync manager 1	
Data length	8 bit	
Access	read	
Coding	2 Standard value: 2	
Subindex 3		
Name	Communication type sync manager 2	
Meaning	Communication type of the sync manager 2	
Data length	8 bit	
Access	read	
Coding	3 Standard value: 3	
Subindex 4		
Name	Communication type sync manager 3	
Meaning	Communication type of the sync manager 3	
Data length	8 bit	
Access	read	
Coding	4 Standard value: 4	

Communication types	
1	Mailbox receive (master to slave)
2	Mailbox send (slave to master)
3	Processdata output (master to slave)
4	Processdata input (slave to master)

Id-Text	Name	Parameter index
co46	Sync Manager0 PDO Assign	0x1C10
Meaning	Number of assigned PDOs for mailbox receiving	
Type	Variable	
Data length	8 bit	
Access	read	
Coding	0 Standard value: 0	
Note	-	

Id-Text	Name	Parameter index
co47	Sync Manager1 PDO Assign	0x1C11
Meaning	Number of assigned PDOs for mailbox send	
Type	Variable	
Data length	8 bit	
Access	read	
Coding	0 Standard value: 0	
Note	-	

Sync manager

Id-Text	Name	Parameter index
co48	Sync Manager2 PDO Assign	0x1C12
Type	Structure	
Subindex 0		
Meaning	Number of assigned PDOs for mailbox receiving	
Data length	8 bit	
Access	read	
Coding	1 Standard value: 1	
Note	-	
Subindex 1		
Name	PDout mapping index	
Meaning	Index of the object 1st receive PDO mapping.	
Data length	16 bit	
Access	read	
Coding	1600h Standard value: 1600h	
Note	-	

Id-Text	Name	Parameter index
co49	Sync Manager3 PDO Assign	0x1C13
Type	Structure	
Subindex 0		
Meaning	Number of available transmit PDOs	
Data length	8 bit	
Access	read	
Coding	1 Standard value: 1	
Note	-	
Subindex 1		
Name	PDout mapping index	
Meaning	Index of the object 1st transmit PDO mapping.	
Data length	16 bit	
Access	read	
Coding	1A00h Standard value: 1A00h	
Note	-	

5. Fieldbus Watchdog

The fieldbus watchdog is a function in the EtherCAT control board. It is used to trigger an error or warning in the inverter, if certain events are not cyclically repeated within a certain time. The activation of the watchdog is set by the control card parameters fb04 and fb05. The monitoring time and the at exceeding of the monitoring time executed function is set by parameter in the inverter (pn05, pn06).

Id-Text	Name	Parameter index
fb04	buswatchdog activation	0x2184
Meaning	Allows a delayed activation of the fieldbus watchdog after switching on the device.	
Type	Variable	
Data length	8 bit	
Access	read / write	
Coding	0...65535	Value range
	0:	off (fieldbus watchdog inactive)
	1:	Activation after the first asynchronous communication
	16:	Activation after the first received process output data via isochronous communication
	Standard value: 0	
Note	Possible settings are OR connected.	

Id-Text	Name	Parameter index
fb05	buswatchdog inhibit	0x2185
Meaning	Determines on which incidents the fieldbus watchdog gets reseted.	
Type	Variable	
Data length	8 bit	
Access	read / write	
Coding	0...65535	Value range
	0:	off (no reset)
	2:	When receiving an asynchronous communication request, the watchdog gets reseted.
	128:	When receiving of process output data via isochronous communication the watchdog gets reseted.
	Standard value: 0	
Note	Possible settings are OR connected.	

General control card parameters (operator functionality)

6. General control card parameters (operator functionality)

The operator parameters set the configuration of the G6 EtherCAT control. Furthermore, the software version as well as the current status can be read.

Id-Text	Name	Parameter index
os00	operator identifier	0x2080
Meaning	Displays the control card type, as well as the software version.	
Type	Variable	
Data length	32 bit	
Access	read	
Coding	e.g.: 150508 15xxxx: G6 xx05xx: EtherCAT xxxx08: Version of the configuration parameters Standard value: Device dependent	
Note	-	

Id-Text	Name	Parameter index
os02	software date OS	0x2082
Meaning	Software date of the control card	
Type	Variable	
Data length	32 bit	
Access	read	
Coding	0.0000...9999, 3112: The year is displayed before the comma, month and day are after that. 2012,0813 means 13.08.2012. Standard value: 0.0000	
Note	-	

Id-Text	Name	Parameter index
os03	software version	0x2083
Meaning	Software version of the control card	
Type	Variable	
Data length	32 bit	
Access	read	
Coding	0.0.0.0...255.255.255.255 e.g.: 1.3.0.1 Standard value: 0.0.0.0	
Note	-	

Id-Text	Name	Parameter index
os04	diag error count	0x2084
Meaning	Specifies the number of errors occurred on the diagnostic interface.	
Type	Variable	
Data length	8 bit	
Access	read / write	
Coding	0...255 Standard value: 0	
Note	-	

Id-Text	Name	Parameter index
os05	diag response delay time	0x2085
Meaning	Sets the minimum response delay time for requests on the diagnostic interface.	
Type	Variable	
Data length	8 bit	
Access	read / write	
Coding	0...126 ms Standard value: 0 ms	
Note	-	

Id-Text	Name	Parameter index
os06	baud rate diag	0x2086
Meaning	Default transfer speed on the diagnostic interface.	
Type	Variable	
Data length	8 bit	
Access	read / write	
Coding	0: 1.2 kbit/s 1: 2.4 kbit/s 2: 4.8 kbit/s 3: 9.6 kbit/s 4: 19.2 kbit/s 5: 38.4 kbit/s 6: 55.5 kbit/s 7: 57.6 kbit/s 8: 100 kbit/s Standard value: 5	
Note	-	

General control card parameters (operator functionality)

Id-Text	Name	Parameter index
os07	node ID	0x2087
Meaning	This parameter specifies the inverter address for the diagnostic interface (DIN 66019). The parameter is an image of the system parameter Sy06.	
Type	Variable	
Data length	8 bit	
Access	read / write	
Coding	0...239 Standard value: 1	
Note	-	

Id-Text	Name	Parameter index	
os08	operator type	0x2088	
Meaning	Displaying the implemented control card functions.		
Type	Variable		
Data length	16 bit		
Access	read		
Coding	Bit 0	Initiator	0: without 1: with initiator
	Bit1	Keyboard/dis- play	0: without 1: with keyboard/LCD display
	Bit8	LT image	0: with power unit image 1: without power unit image
	Bit 10	f = 0Hz	0: without 1: with f=0Hz functionality
	Bit 11	STO	0: without safety function 1: with safety function STO
	Bit 12...13	Bus connection	0: without (standard) 1: CANopen 2: IO-Link 3: EtherCAT 4: VARAN
	Standard value: 0		
Note	-		

Id-Text	Name	Parameter index
os09	PU max invbusy retries	0x2089
Meaning	Number of repetitions that are sent on the internal bus from the power module to the controller if it rejects "inverter busy" error.	
Type	Variable	
Data length	8 bit	
Access	read / write	
Coding	0...255 Standard value: 200	
Note	-	

Id-Text	Name	Parameter index
os10	PU tout count	0x208A
Meaning	Counts the timeouts on the internal bus between control and power unit.	
Type	Variable	
Data length	16 bit	
Access	read / write	
Coding	0...65535 Standard value: 0	
Note	-	

Id-Text	Name	Parameter index
os12	operator command	0x208C
Meaning	Default of instructions according to coding (see below)	
Type	Variable	
Data length	8 bit	
Access	read / write	
Coding	0: no 1: Load default values in all operator parameters 2: reinitialize LT-parameter image Standard value: 0	
Note	-	

General control card parameters (operator functionality)

Id-Text	Name	Parameter index	
os13	operator state	0x208D	
Meaning	Displays the status of the power unit, as well as the image of the power unit parameter of the control board.		
Type	Variable		
Data length	8 bit		
Access	read		
Coding	Bit 0	reserved	
	Bit 1...2	LT-conf.-ID status	0: Power unit-ID unknown 2: Power unit-ID OK 4: Power unit-ID incorrect
	Bit 3...5	LT-image status	0: PU image not initialised 1: write PU image 3: PU image changed 4: PU image initialised 5: PU image check 6: PU image not available
	Bit 6...15	reserved	
	Standard value: 0		
Note	-		

Id-Text	Name	Parameter index
os14	store state	0x208E
Meaning	By writing of value "0" non-volatile parameters are saved immediately. After completion of the storage the value jumps to status "1". If at the end of the download lists in COMBIVIS the value "0" comes before value "1", COMBIVIS will send the value as long as the inverter finishes storing.	
Type	Variable	
Data length	8 bit	
Access	read / write	
Coding	0: busy 1: ready 2: off Standard value: 1	
Note	-	

Id-Text	Name	Parameter index
os15	store mode	0x208F
Meaning	The memory type of non-volatile parameters must be adjusted with this parameter. The parameters will not be stored if the value is "0", the device automatically changes to value "1" after the next "power down". This value is the default value, the non-volatile parameters are always stored. Value „2“ deactivates the storing, also over the next start of the module.	
Type	Variable	
Data length	8 bit	
Access	read / write	
Coding	0: off, curr. off / on at startup 1: on, always store 2: off, never store Standard value: 1	
Note	-	

Id-Text	Name	Parameter index
os17	safety type	0x2091
Meaning	Type of safety module	
Type	Variable	
Data length	16 bit	
Access	read	
Coding	0: no safety module available 1: Type 1 (STO) Standard value: 0	
Note	-	

Id-Text	Name	Parameter index
os18	safety software date	0x2092
Meaning	Displays the software date of the safety module.	
Type	Variable	
Data length	32 bit	
Access	read	
Coding	0.0000...9999, 3112: The year is displayed before the comma, month and day are after that. 2012,0813 means 13.08.2012. If no security module is installed, the value "0: no safety functionality" is displayed. Standard value: 0	
Note	-	

General control card parameters (operator functionality)

Id-Text	Name	Parameter index
os19	safety software version	0x2093
Meaning	Displays the software version of the safety module.	
Type	Variable	
Data length	32 bit	
Access	read	
Coding	0.0.0.0...255.255.255.255 If no security module is installed, the value "0: no safety functionality" is shown. Standard value: 0	
Note	-	

Id-Text	Name	Parameter index
os29	serial number OS	0x209D
Meaning	Serial number on the control hardware.	
Type	Variable	
Data length	32 bit	
Access	read	
Coding	0...4294967295 Standard value: 0	
Note	-	

Id-Text	Name	Parameter index
os30	serial number OS 2	0x209E
Meaning	Serial number part 2 on the control hardware.	
Type	Variable	
Data length	32 bit	
Access	read	
Coding	0...4294967295 Standard value: 0	
Note	-	

7. Light-emitting diodes

7.1 Status LEDs of EtherCAT plugs

Link/Activity LED	Green	LED Link/Activity	Function
		off	Port closed; no data transfer
		on	Port opened; no data transfer
		flicker	Port opened with data transfer
Bus speed	Yellow	Light pattern Bus speed	Function
		off	Transmission error
		on	EtherCAT ready for operation with 100 MBit

7.2 Network status LED

The LED2 "Network STATUS" located on the top of the unit, is a two-color combination of RUN LED (green) and ERROR LED (red).

The RUN LED displays the status of the EtherCAT state machine (ESM). The ERROR LED displays watchdog errors and unwanted status changes in the case of local errors.

LED RUN (green)	Function
off	Initialization
blinking	ready for operation
flickering	booting
simple flash	Safe operation
on	Normal operation

LED ERROR (red)	Function
off	No error
blinking	Configuration error (e.g. missing xml-file)

Light pattern	Interval
on	continuously shining
blinking	200 ms on, 200 ms off, 200 ms on ...
simple flash	200 ms on, 1000 ms off, repetitive
double flash	200 ms on, 200 ms off, 200 ms on, 1000 ms off, repetitive
flickering	50 ms on, 50 ms off, 50 ms on ...
off	dark

7.3 XML description (ESI)

The ESI can be created with Combivis 6 for each unit.



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