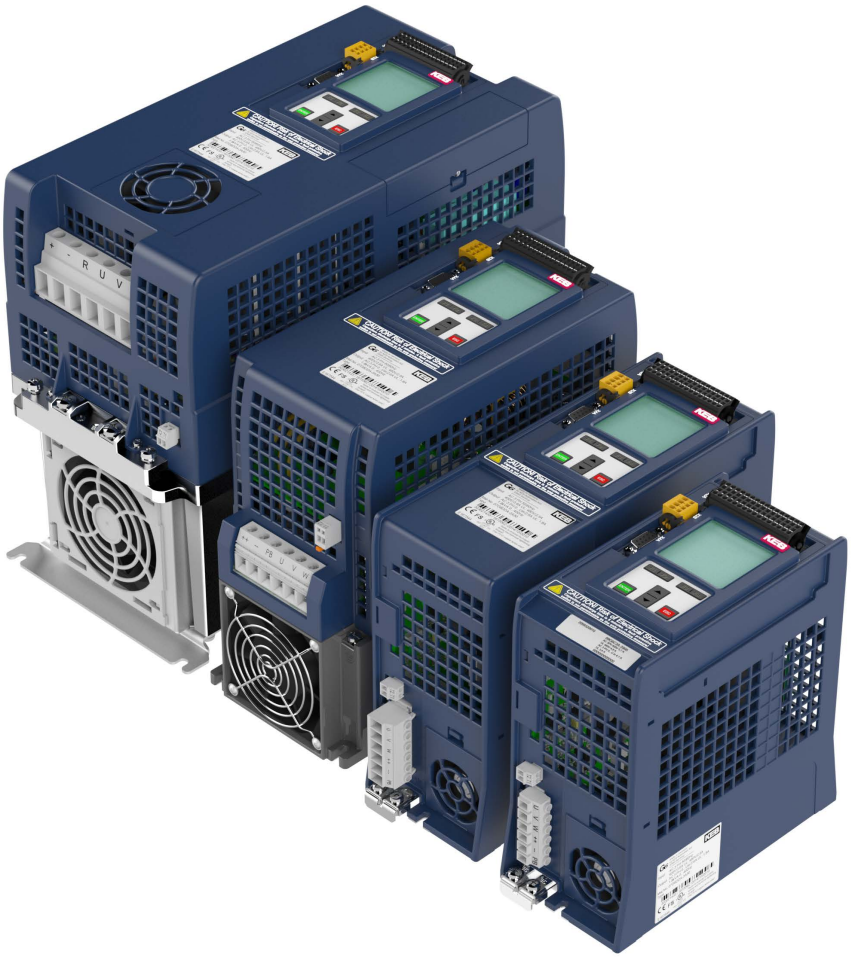

COMBIVERT **G6**

PROGRAMMING MANUAL | **CONTROL G6 ETHERCAT**

Translation of original manual
Document 20099835 EN 02

Preface

The hardware and software described in this document are products of KEB. The information contained in this document is valid at the time of publishing. KEB reserves the right to update this document in response to misprints, mistakes or technical changes.

Signal words and symbols

Certain procedures within this document can cause safety hazards during the installation or operation of the device. Refer to the safety warnings in this document when performing these procedures. Safety signs are also located on the device where applicable. A safety warning is marked by one of the following warning signs:

⚠ DANGER	Dangerous situation, which will cause death or serious injury iif this safety warning is ignored.
⚠ WARNING	Dangerous situation, which may cause death or serious injury if this safety warning is ignored.
⚠ CAUTION	Dangerous situation, which may cause minor injury if this safety warning is ignored.
NOTICE	Situation, which can cause damage to property if this safety warning is ignored.

RESTRICTION

Used when the following statements depend on certain conditions or are only valid for certain ranges of values.

Used for informational messages or recommended procedures.

More symbols

►	This arrow starts an action step.
• / -	Enumerations are marked with dots or indents.
=>	Cross reference to another chapter or another page.

Note to further documentation.
https://www.keb-automation.com/search

Laws and guidelines

KEB Automation KG confirms with the EC declaration of conformity and the CE mark on the device nameplate that it complies with the essential safety requirements.

The EC declaration of conformity can be downloaded on demand via our website.

Warranty and liability

The warranty and liability on design, material or workmanship for the acquired device is given in the general sales conditions.

Here you will find our general sales conditions.
https://www.keb-automation.com/terms-conditions

Further agreements or specifications require a written confirmation.

Support

Although multiple applications are referenced, not every case has been taking into account. If you require further information or if problems occur which are not referenced in the documentation, you can request the necessary information via the local KEB agency.

The use of our units in the target products is outside of our control and therefore lies exclusively in the area of responsibility of the 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 intended use. However, they are regarded as being only informal and changes are expressly reserved, in particular due to technical changes. 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 intended end use of the product (application) by the customer. They must be repeated, even if only parts of hardware, software or the unit adjustment are modified.

Copyright

This KEB product or parts thereof may contain third-party software, including free and/or open source software. If applicable, the license terms of this software are contained in the instructions for use. The instructions for use are already available to you, can be downloaded free of charge from the KEB website or can be requested from the respective KEB contact person.

Table of Contents

1 Basic Safety Instructions

The products are designed and constructed in accordance with state-of-the-art technology and the recognized safety rules and regulations. However, the use of such devices may cause functional hazards for life and limb of the user or third parties, or damages to the system and other material property.

The following safety instructions have been created by the manufacturer for the area of electric drive technology. They can be supplemented by local, country- or application-specific safety instructions. This list is not exhaustive. Violation of the safety instructions by the customer, user or other third party leads to the loss of all resulting claims against the manufacturer.

NOTICE

Hazards and risks through ignorance!

- ► Read the instructions for use!
- ► Observe the safety and warning instructions!
- ► If anything is unclear, please contact KEB Automation KG!

1.1 Target group

This instruction manual is determined exclusively for electrical personnel. Electrical personnel for the purpose of this instruction manual must have the following qualifications:

- Knowledge and understanding of the safety instructions.
- Skills for installation and assembly.
- Start-up and operation of the product.
- Understanding of the function in the used machine.
- Detection of hazards and risks of the electrical drive technology.
- Knowledge of *DIN IEC 60364-5-54*.
- Knowledge of national safety regulations.

1.2 Validity of this manual

This manual describes the control part EtherCAT of the COMBIVERT G6.
The manual

- contains only supplementary safety instructions.
- is only valid in connection with the power unit manual of COMBIVERT G6.

1.3 Electrical connection

⚠ DANGER

Voltage at the terminals and in the device!

Danger to life due to electric shock !

- ► For any work on the unit switch off the supply voltage and secure it against switching on.
- ► Wait until the drive has stopped in order, that perhaps regenerative energy can be generated.
- ► Wait untill the DC-Link capacitors are discharged (5 minutes). Verify by measuring the DC voltage at the terminals.
- ► Never bridge upstream protective devices (also not for test purposes).

For a trouble-free and safe operation, please pay attention to the following instructions:

- The electrical installation shall be carried out in accordance with the relevant requirements.
- Cable cross-sections and fuses must be dimensioned by the user accordly to the specified minimum / maximum values for the operation.
- Within systems or machines the person installing electrical wiring must ensure that on existing or new wired safe ELV circuits the EN requirement for safe insulation is still met!
- For drive converters that are not isolated from the supply circuit (in accordance with *EN 61800-5-1*) all control lines must be included in other protective measures (e.g. double insulation or shielded, earthed and insulated).
- When using components without isolated inputs/outputs, it is necessary that equipotential bonding exists between the components to be connected (e.g. by the equipotential line). Disregard can cause destruction of the components by equalizing currents.

1.4 Start-up and operation

The start-up (i.e. for the specified application) is forbidden until it is determined that the installation complies with the machine directive; account is to be taken of *EN 60204-1*.

⚠ WARNING

Software protection and programming!

Hazards caused by unintentional behavior of the drive!

- ► Check especially during initial start-up or replacement of the drive controller if parameterization is compatible to application.
- ► Securing a unit solely with software-supported functions is not sufficient. It is imperative to install external protective measures (e.g. limit switch) that are independent of the drive controller.
- ► Secure motors against automatic restart.

2 Product Description

2.1 Product features

These instructions for use describe the parameterization of the following devices:

Device series:	COMBIVERT G6
Hardware:	EtherCAT

2.2 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
- KTY interface
- Brake control
- STO functionality
- Status LEDs

3 EtherCAT Interface

An EtherCAT slave is implemented with an EtherCAT input and an EtherCAT output. Process data (PDO) and parameter data (SDO) are supported for accessing the parameters of the device. The device behaves conform to DS301.

3.1 Identification

By reading the EtherCAT EEPROMs the plaintext name and the manufacturer of the device can be determined.

In addition, the following parameters are used to identify the device:

<table>
<tr><th>Id-Text</th><th>Name</th><th>Parameter index</th></tr>
<tr><td>co01</td><td>DeviceType</td><td>0x1000</td></tr>
<tr><td>Meaning</td><td colspan="2">Decribes the device type according to CANopen communication profile.</td></tr>
<tr><td>Type</td><td colspan="2">Variable</td></tr>
<tr><td>Data length</td><td colspan="2">32 bit</td></tr>
<tr><td>Access</td><td colspan="2">read</td></tr>
<tr><td>Coding</td><td colspan="2">MSB LSB
<table>
<tr><td colspan="2">Additional information</td><td>Device profile number</td></tr>
<tr><td>Mode bits</td><td>Type</td><td></td></tr>
<tr><td>31 24</td><td>23 16</td><td>15 0</td></tr>
</table>
Standard value: 0</td></tr>
<tr><td>Note</td><td colspan="2">–</td></tr>
</table>

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	

3.2 Addressing in the fieldbus

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

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	–	

3.3 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

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	**Decimal values (bit-coded):** 1 Error 2 started 4 ready to start 8 mailbox run 16 PDinRun 32 PDoutRun Standard value: 0	
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	**Decimal values (bit-coded):** 0 No error 1 Generioc error 2 Error overcurrent 4 Overvoltage or undervoltage error Standard value: 0	
Note	–	

4 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.

4.1 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	–	

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.	

<table>
<tr><th>Id-Text</th><th>Name</th><th>Parameter index</th></tr>
<tr><td>co08</td><td>RPDO1 Mapping</td><td>0x1600</td></tr>
<tr><td>Type</td><td colspan="2">Array</td></tr>
<tr><td colspan="3">Subindex 0</td></tr>
<tr><td>Meaning</td><td colspan="2">Sets the number of mapped objects</td></tr>
<tr><td>Data length</td><td colspan="2">8 bit</td></tr>
<tr><td>Access</td><td colspan="2">read / write</td></tr>
<tr><td>Coding</td><td colspan="2">0...8
Standard value: 0</td></tr>
<tr><td>Note</td><td colspan="2">Successively, no gaps as on the fb-mapping parameters possible.</td></tr>
<tr><td colspan="3">Subindex 1...8</td></tr>
<tr><td>Meaning</td><td colspan="2">Describes an object mapping. The index, subindex and the object length are specified in bits.</td></tr>
<tr><td>Data length</td><td colspan="2">32 bit</td></tr>
<tr><td>Access</td><td colspan="2">read / write</td></tr>
<tr><td>Coding</td><td colspan="2">
<table>
<tr><td>Index

HB</td><td>Index

LB</td><td>Subindex</td><td>Object length</td></tr>
<tr><td>B3</td><td>B2</td><td>B1</td><td>B0</td></tr>
</table>
Standard value: 00000100h
</td></tr>
<tr><td>Note</td><td colspan="2">A writing of this parameter requires that the count (subindex 0) is set to 0.</td></tr>
</table>

4.2 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	–	

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	Index HB / Index LB / Subindex / Object length B3 / B2 / B1 / B0 Standard value: 00000100h	
Note	A writing of this parameter requires that the count (subindex 0) is set to 0.	

5 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	–	

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	–	

6 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.	

7 Operator Parameters

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 parameter configuration Standard value: Device dependent	
Note	–	

Id-Text	Name	Parameter index
os02	software date OS	0x2082
Meaning	Software date of the control board	
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	–	

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	Display of the functions implemented in the control card.	
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
Bit 8	PU 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 PU-parameter image Standard value: 0	
Note	–	

<table>
<tr><th>Id-Text</th><th>Name</th><th>Parameter index</th></tr>
<tr><td>os13</td><td>operator state</td><td>0x208D</td></tr>
<tr><td>Meaning</td><td colspan="2">Displays the status of the power unit, as well as the image of the power unit parameter of the control board.</td></tr>
<tr><td>Type</td><td colspan="2">Variable</td></tr>
<tr><td>Data length</td><td colspan="2">8 bit</td></tr>
<tr><td>Access</td><td colspan="2">read</td></tr>
<tr><td>Coding</td><td colspan="2">
<table>
<tr><td>Bit 0</td><td>reserved</td><td></td></tr>
<tr><td>Bit 1...2</td><td>PU-conf.-ID status</td><td>0: Power unit-ID unknown
2: Power unit-ID OK
4: Power unit-ID incorrect</td></tr>
<tr><td>Bit 3...5</td><td>PU image status</td><td>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</td></tr>
<tr><td>Bit 6...15</td><td>reserved</td><td></td></tr>
</table>
Standard value: 0
</td></tr>
<tr><td>Note</td><td colspan="2">–</td></tr>
</table>

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	–	

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 displayed. 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	–	

8 Light-Emitting Diodes

8.1 Status LEDs of EtherCAT plugs

LED	Color	Light pattern Link/Activity	Function
Link/Activity	Green	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

8.2 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, repeatitive
Double flash	200 ms on, 200 ms off, 200 ms on, 1000 ms off, repeatitive
Flickering	50 ms on, 50 ms off, 50 ms on ...
Off	dark

8.3 XML description (ESI)

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

9 Revision History

Version	Date	Description
00	2015-07	Completion of series
01	2019-05	Revision to new CI optics, insertion of new parameters
02	2023-08	Aktualisieren der Standardseiten, redaktionelle Änderungen

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