COMBIVERT **G6**

PROGRAMMING MANUAL | **CONTROL G6 CANopen**

Translation of the original manual
Document 20100573 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

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

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.

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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 CANopen 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 power units of the following devices:

Device series:	COMBIVERT G6
Hardware:	CANopen

2.2 Overview of functions

2.2.1 Overview of functions

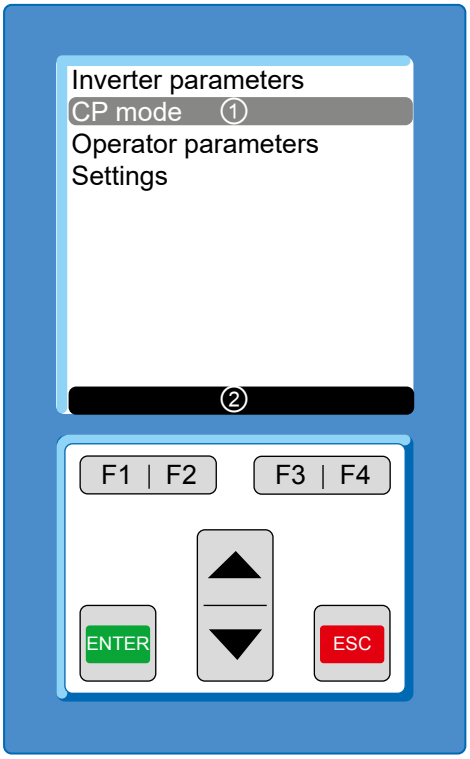
The control provides the following functions:

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

3 LC display operation

For optional assembly of the LC display.

3.1 Control elements



Name	Function
①	Menu bar
②	Function bar
F1	Function key 1
F2	Function key 2
F3	Function key 3
F4	Function key 4
▲	Menu bar up or increase parameter value
▼	Menu bar down or increase parameter value
ENTER	select / confirm
ESC	return to the superordinate menu

Abbildung 1: Control elements

3.1.1 Description of control elements

3.1.1.1 Menu bar

The menu bar shows the current selection in the menu. It can be moved with the ▲ and ▼ keys. Press Enter to change to the subordinate operating level, ESC to return to the next higher operating level.

3.1.1.2 Function keys and toolbar

The function keys F1...F4 are variable assigned depending on the menu item. The toolbar displays current assignment of the function keys F1 ... F4.

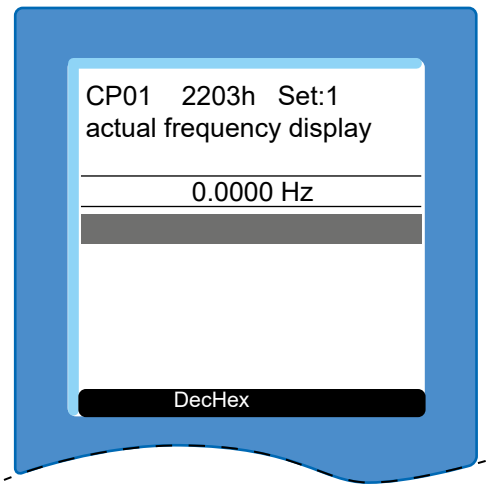
The keys can have the following assignment:

Display	Function
DecHex	Display changes between decimal and hexadecimal display
Menu	jumps to the main menu
Up	jumps to the top of the current page, repeated pressing scrolls back one page
Down	jumps to the end of the current page, repeated pressing scrolls forward to the next page

Tabelle 1: Assignment of the function keys

3.2 Initial start-up

3.2.1 Switch on



At the first switch on with factory setting the operator indicates the actual frequency in the customer parameter menu (CP mode).
To make the basic settings change to the main menu as follows:

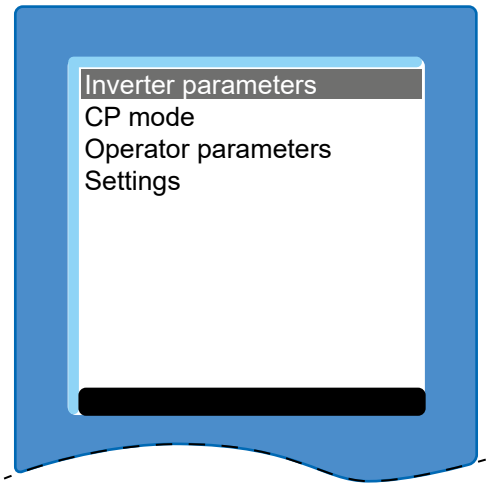
<ESC> → changes to the parameter selection

<F1> → jumps to the main menu

Abbildung 2: Switch-on display

The startup menu can be defined under "Start mode".

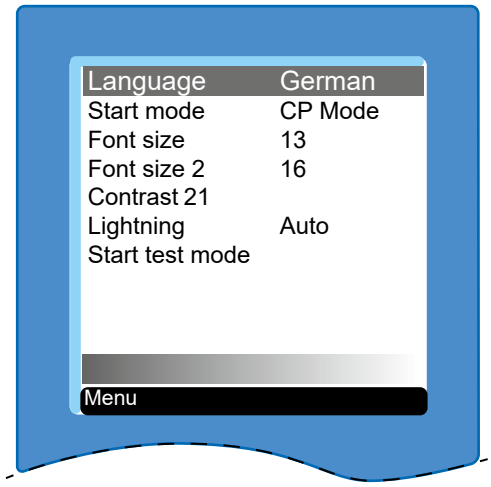
3.2.2 Main menu



The main menu is the top-level menu. With the keys <▲> and <▼> select the desired submenu. Press <ENTER> to jump to the selected submenu.

Abbildung 3: Main menu

4 Basic settings



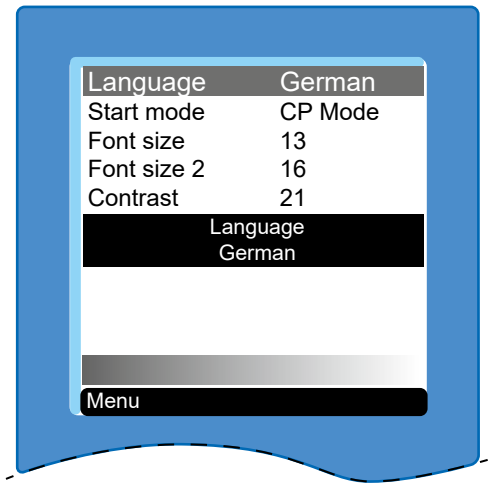
To adjust the display to the individual needs select "Settings" in the main menu and confirm with <ENTER>.

With the keys <▲> and <▼> select the desired function.

Press <ENTER> to switch into the input mode to change the parameter value.

Abbildung 4: Basic settings

4.1 Change language



Press <ENTER> to switch into the input mode to change the parameter value. With the keys <▲> and <▼> select one of the following languages:

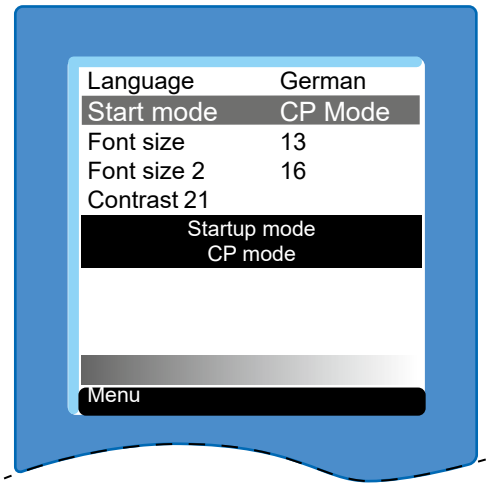
- German
- English
- Espanõl
- Russian
- Italiano
- Francais
- American

<ENTER> selects the desired language and jumps back into the "Settings" sub-menu.

Abbildung 5: Change language

If the selected language is not available the parameters are displayed in English.

4.2 Startup mode



The startup mode determines which display appears at switch on.

Press <ENTER> to switch into the input mode to change the parameter value.

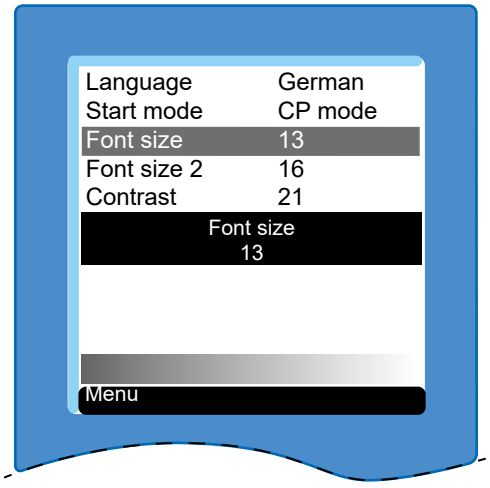
With the keys <▲> and <▼> select one of the following home screens:

- Inverter parameters
- CP Mode (customer parameter)
- Operator parameters
- Settings

<ENTER> selects the desired startup screen and jumps back into the "Settings" submenu.

Abbildung 6: Set start mode

4.3 Set font size and font size 2



The font size determines the complete menu view in the display except for the font size 2 (see below).

Press <ENTER> to switch into the input mode to change the parameter value.

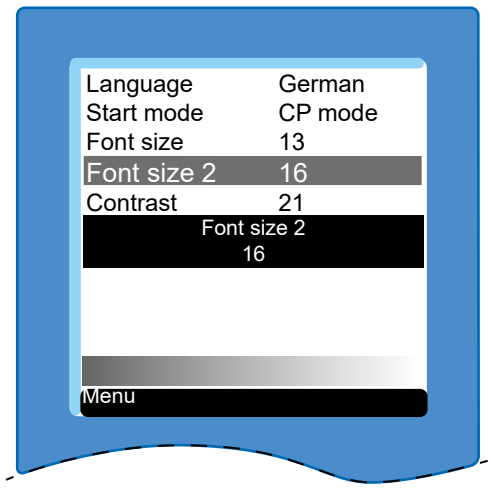
With the keys <▲> and <▼> select one of the following font sizes:

- 8, 10, 13, 16, 24

<ENTER> selects the desired font size and jumps back into the "Settings" submenu.

The display will only be updated after a change of the menu.

Abbildung 7: Set font size



The font size 2 determines the display size of the parameter values in CP mode.

Press <ENTER> to switch into the input mode to change the parameter value.

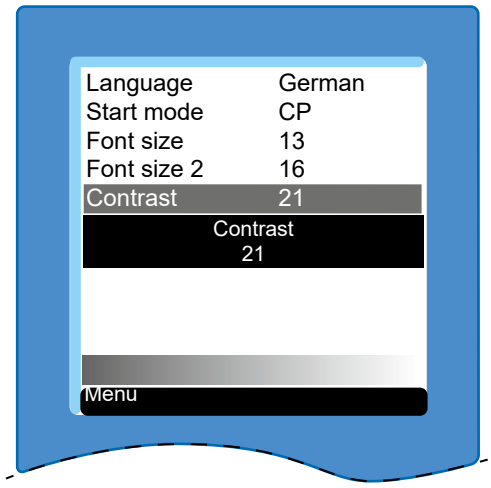
With the keys <▲> and <▼> select one of the following font sizes:

- 8, 10, 13, 16, 24

<ENTER> selects the desired font size and jumps back into the "Settings" sub-menu.

Abbildung 8: Set font size 2

4.4 Contrast settings



Sets the contrast level of the LC display.

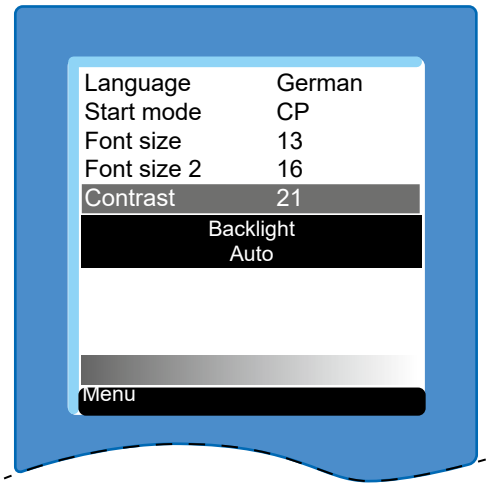
Press <ENTER> to switch into the input mode to change the parameter value.

With the keys <▲> and <▼> set the contrast level from 0...50. Use the contrast bar on the bottom of the toolbar to control the settings.

<ENTER> stores the specified contrast setting and returns to the "Settings" sub-menu.

Abbildung 9: Contrast settings

4.5 Setting the backlight of the display



The menu item "Lighting" defines the behavior of the backlight of the LC Display.

Press <ENTER> to switch into the input mode to change the parameter value.

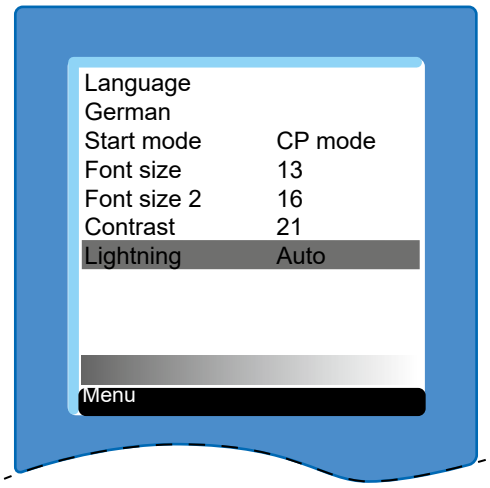
With the keys <▲> and <▼> select one of the following settings:

- on → generally on
- off → generally off
- auto → on when pressing a button; off after 10 seconds of non-operation

<ENTER> selects the desired backlight and jumps back into the "Settings" submenu.

Abbildung 10: Backlight settings

4.6 Functional test of keyboard and display

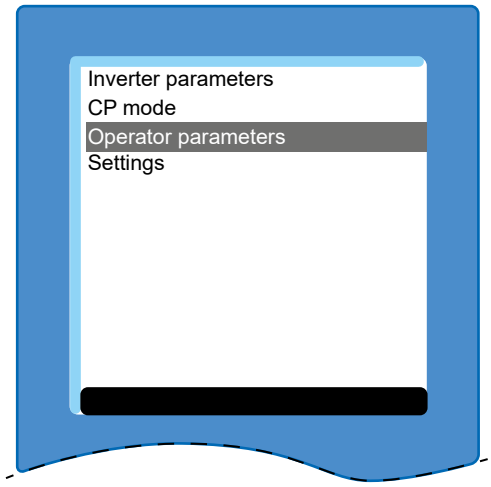


<ENTER> starts a test mode, which allows you to test the function of each button and the LCD display.

Follow the instructions on the screen during the test run.

Abbildung 11: Functional test of keyboard and display

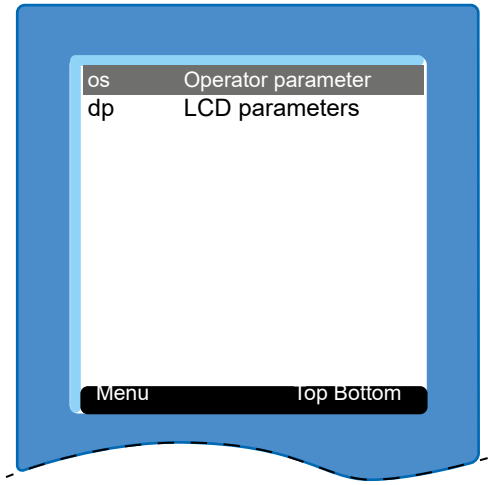
5 Operator parameters



Use the operator parameters to configure the control card, the fieldbus (if available) and the display.

With the keys <▲> and <▼> select "Operator parameter" and confirm with <ENTER>.

Abbildung 12: Operator parameters



The control card parameters are divided into two groups:

- os - operator system parameters; Display and setting of the control board
- dp - LC display parameter; Configuration of the LC display via bus

With the keys <▲> and <▼> select the corresponding parameter group.

<ENTER> switches to the selected submenu.

Abbildung 13: Select control board parameter group

5.1 Parameters for LC display setting

The settings of the LC parameters are completely accepted from the LC display only after restarting the device.

Id-Text	Name	Parameter index
dp00	language	0x2780
Meaning	A language is selected for the menu and the parameters. If the selected language is not available the parameters are displayed in English.	
Type	Variable	
Data length	8 bit	
Access	read / write	
Coding	0: English 1: German 2: American 3: French 4: Italian 5: Russian 6: Spanish Standard value: 0	
Note	–	

Id-Text	Name	Parameter index
dp01	startup mode	0x2781
Meaning	The startup mode determines the menu item after initialisation of the control.	
Type	Variable	
Data length	8 bit	
Access	read / write	
Coding	0: Inverter parameters 1: CP mode 2: Operator parameters 3: Menu Standard value: 1	
Note	–	

Id-Text	Name	Parameter index
dp02	font size	0x2782
Meaning	It can be selected between the font sizes 8,10,13,16 and 24 in the display. Exception: see parameter „font size 2“	
Type	Variable	
Data length	8 bit	
Access	read / write	
Coding	8: 8dpi 10: 10dpi 13: 13dpi 16: 16dpi 24: 24dpi Standard value: 13	
Note	–	

Id-Text	Name	Parameter index
dp03	front size 2	0x2783
Meaning	The font size for the display of parameter values is specified in the CP mode.	
Type	Variable	
Data length	8 bit	
Access	read / write	
Coding	8: 8dpi 10: 10dpi 13: 13dpi 16: 16dpi 24: 24dpi Standard value: 16	
Note	–	

Id-Text	Name	Parameter index
dp04	contrast	0x2784
Meaning	The contrast settings of the LC display can be changed to optimize readability.	
Type	Variable	
Data length	8 bit	
Access	read / write	
Coding	0...50 Standard value: 21	
Note	–	

Id-Text	Name	Parameter index
dp05	backlight	0x2785
Meaning	The contrast settings of the LC display can be changed to optimize readability.	
Type	Variable	
Data length	8 bit	
Access	read / write	
Coding	0 off Lighting of the LC display generally off. 1 on Lighting of the LC display generally on. 2 auto If the backlight is adjusted to "auto", it is switched on during pressing a key and switched off again after 10 seconds if no key is pressed. Standard value: 2	
Note	–	

6 Basics of the CAN BUS

Here we like to introduce the system of the CAN (Controller-Area-Network) BUS and also explain some terms that are frequently used in the following.

The CAN is a multi master system, i.e. each user has access to the BUS and can send telegrams. In order to avoid invalid conditions during simultaneous access of two users, the CAN-BUS knows a so-called arbitration phase, which defines the telegram beginning. In case of access conflicts all users recognize during this arbitration, who sends the lowest telegram number (identifier). Then this user can continue to send his telegram completely, without having to start from the beginning again. Now all other (willing-to-send) users pass over into the receiving status and abort their telegram for the time being. Thus it is specified that lower telegram numbers automatically have priority over higher numbers. The number of telegram numbers is limited to 2032 identifier (0...2031) at CAN version 2.0A. CAN telegrams can contain a maximum of 8 byte user data.

The term logical CAN master used in the following, refers to the CAN user, who is responsible for the control of the entire CAN system. Even if there are physically only masters at CAN, in most applications there will be one or several users who exercise control. In this combination the KEB frequency inverter is considered as recipient of orders (logical slave).

7 Functions

The CAN protocol is uniformly standardized for the data backup layer. Furthermore, the CAN in Automation association (CiA) has passed a standard for the higher protocol layer that was named CAN Application Layer (CAL). Based on this standard the "CAL-based Communication Profile“ (CiA,DS301) was published in September 1995. This standard is the basis for all CANopen device profiles. In this standard, a certain subset of the CAL standards is selected. The communication profile defines, among other things, a minimum capability device. That is the minimum required functionality, which a CANopen node must make available. The present CAN interface connection realizes such a minimum capability device.

An important point for every CAN network is the assignment of the telegram numbers (Identifier). The numbers are limited to 2032 CAN V2.0 A. In the CAL standard an own procedure has been defined, which processes this assignment dynamically over an own protocol. This relative complex procedure for the assignment of identifiers is not mandatory for a minimum capabiltity device and is not integrated into the KEB CAN interface connection. For this case a more simpler procedure for the arrangement of the identifier assignment is defined in the communication profile. This procedure is also supported by the KEB CAN interface connection and looks as follows:

Each drive controller receives a clear CAN address, the CAN node ID (fb00). There are two possibilities to determine the CAN node ID:

- If the value of the parameter CAN Node ID (fb00) = 255 (dec):
  → actual CAN Node ID = Node ID (os07) +1
- If the value of the parameter CAN Node ID (fb00) ≠ 255 (dec):
  → actual CAN Node ID = CAN Node ID (fb00)

Parameter "Node ID“ (os07) is always equal to parameter "inverter address“ (sy06).

After delivery, all KEB drive controllers have the drive controller address "1". If several KEB drive controllers are to be networked via CAN, they must first be given different drive controller addresses. This is done e.g. via the parameter interface or the optional keyboard of the control.

7.1 Broadcast objects

Broadcast object	Address	
NMT	0 (000h)	
SYNC	128 (080h)	

7.2 Communication objects

Communication object	from address	to address
EMCY	129 (081h)	255 (0FFh)
TPDO1	385 (181h)	511 (1FFh)
RPDO1	513 (201h)	639 (27Fh)
TPDO2	641 (281h)	767 (2FFh)
RPDO2	769 (301h)	895 (37Fh)
TPDO3	897 (381h)	1023 (3FFh)
RPDO3	1025 (401h)	1151 (47Fh)
SDO(tx)	1409 (581h)	1535 (5FFh)
SDO(rx)	1537 (601h)	1663 (67Fh)
NMT Error Control	1793 (701h)	1919 (77Fh)

7.3 Request/Response-Identifier (SDO)

Over the request identifier any CAN node can request the reading or writing of a parameter value.

The response identifier is reserved for the appropriate response of the drive controller. The mechanism of request and response is also referred to as acknowledged service. The CANopen communication profile combines these functions under the term Service Data Object (SDO):

SDO(rx)	=	Request-Identifier	=	1536+CAN Node ID
SDO(tx)	=	Response-Identifier	=	1408+CAN Node ID

Example: CAN Node ID= 30 → Write/read requests over identifier = 1566(dec)
→ Write/read requests over identifier = 1438(dec)

Basically the function of the SDO is completely sufficient to control the KEB G6 drive controller by CAN. Each parameter value in the inverter can be changed or inquired herewith.

The SDO channel is continuous operated independent of the process data transfer. The cycle time depends on the program run time of the COMBIVERT G6.

7.4 Out/In-Identifier (PDO)

The CAN master can give the drive controller unaddressed and unconfirmed data via the Out identifier. The identification Out is based on the data direction from master to slave. Via the In-Identifier, the drive controller sends new data unaddressed and unconfirmed to the CAN master.

This function is called Process Data Object (PDO) by the communication profile. Three process data objects (PDOs) with two object parts Out/In are available at COMBIVERT G6 and they are addressed as follows:

PDO1(rx)	=	Out-Identifier	=	200h + CAN Node ID
PDO1(tx)	=	IN-Identifier	=	180h + CAN Node ID
PDO2(rx)	=	Out-Identifier	=	300h + CAN Node ID
PDO2(tx)	=	IN-Identifier	=	280h + CAN Node ID
PDO3(rx)	=	Out-Identifier	=	400h + CAN Node ID
PDO3(tx)	=	IN-Identifier	=	380h + CAN Node ID

The three process data objects (PDO) can be assigned each with 8 bytes per direction. Up to eight parameters with a total of 8 bytes per PDO can be mapped as follows:

2x Long
1x Long, 2x Word
1x Long, 1x Word, 2x Byte
4x Word
3x Word, 2x Byte
2x Word, 4x Byte
8x Byte

The parameters of the control are generally not available as process data. Observe the corresponding property bit in COMBIVIS 6 (available for process data) at the power unit parameters.

The processing of process data occurs with the minimum cycle time of 1 ms

per activated PDO, i.e. three ms if all PDO are activated.

- The process data mapping is located in the co-parameter and fb-parameter group.

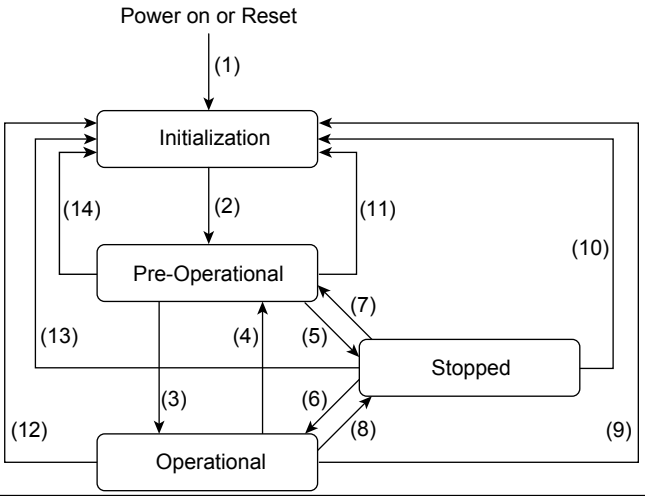
7.5 Process data mapping

The definition of the target for the data in the PDO(rx) telegrams respectively the source for the data in the PDO(tx) telegrams completely abides by the regulations of the CANopen communication profile. A complex object (parameter) defines the PDO mapping for each data direction. Another object per data direction defines the communication definition (Communication parameter).

RPDO1 Mapping	**RPDO1 Communication parameter**
TPDO1 Mapping	**TPDO1 Communication parameter**
RPDO2 Mapping	**RPDO2 Communication parameter**
TPDO2 Mapping	**TPDO2 Communication parameter**
RPDO3 Mapping	**RPDO3 Communication parameter**
TPDO3 Mapping	**TPDO3 Communication parameter**

7.6 CANopen bootup sequence

After the initialisation phase the KEB CAN interface connection goes automatically into status pre-operational. In this status the communication by SDO(rx) and SDO(tx) with the services domain download (parameter write) and domain upload (parameter read) is already activated. Only the process data communcation is still inactive in this status. It is released by the NMT command Start_Remote_Node() (Fig.). The target of this start sequence is the operating condition operational. In this status the communication is completely activated. With the NMT protocol certain CAN nodes are addressed by the above mentioned CAN Node-ID.



1	The initialisation is automatically carried out when switching on
2	Initialisation completed; automatic change into status Pre-Operational
3, 6	Start_Remote_Node message
4, 7	Enter_Pre-Operational_State Message
5, 8	Stop_Remote_Node message
9, 10, 11	Reset_Node message
12, 13, 14	Reset_Communication message

The G6 CANopen control board realises following transitions, illustrated in the above diagram by a solid line:

Start_Remote_Node()

CAN-telegram: :

Identifier = 0	
01h	CAN Node ID
B0	B1

Node_Id = 0 (all NMT slaves are addressed) or
Node_Id = inverter-address + 1 (only 1 drive controller is addressed)

Stop_Remote_Node()

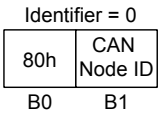
CAN-telegram: :

Identifier = 0	
02h	CAN Node ID
B0	B1

Node_Id = 0 (all NMT slaves are addressed) or
Node_Id = inverter-address + 1 (only 1 drive controller is addressed)

Enter_Pre-Operational_State()

CAN-telegram: :

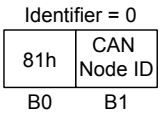


Node_Id = 0 (all NMT slaves are addressed) or

Node_Id = inverter-address + 1 (only 1 drive controller is addressed)

Reset_Node(): During the execution of this function a software reset is carried out in the KEB CAN interface connection.

CAN-telegram: :

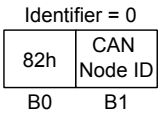


Node_Id = 0 (all NMT slaves are addressed) or

Node_Id = inverter-address + 1 (only 1 drive controller is addressed)

Reset_Communication(): function like at Reset_Node().

CAN-telegram: :



Node_Id = 0 (all NMT slaves are addressed) or

Node_Id = inverter-address + 1 (only 1 drive controller is addressed)

7.7 Bootup message

The G6 CAN control board releases a bootup message, if the initialisation phase is completed after power on. It is a telegram to identifier = 1792 + Node_Id with the data length = 1 and the value = 0.

7.8 Node guarding

Provided protocol with which a CAN node can inquire the current status of any node. It belongs to the network management functionality (NMT) of the CAN node and is referred to as node guarding. The G6 CAN control board supports the node guarding. The node guarding request is deposited on the node guarding identifier by a remote frame. The response arrives as data telegram with 1 byte data on the same identifier. The data byte contains the node status plus one toggle bit (MSBit), which is inverted from message to message. Each node has its special node guarding identifier.

Node Guarding Identifier = 1792 + Node-Id

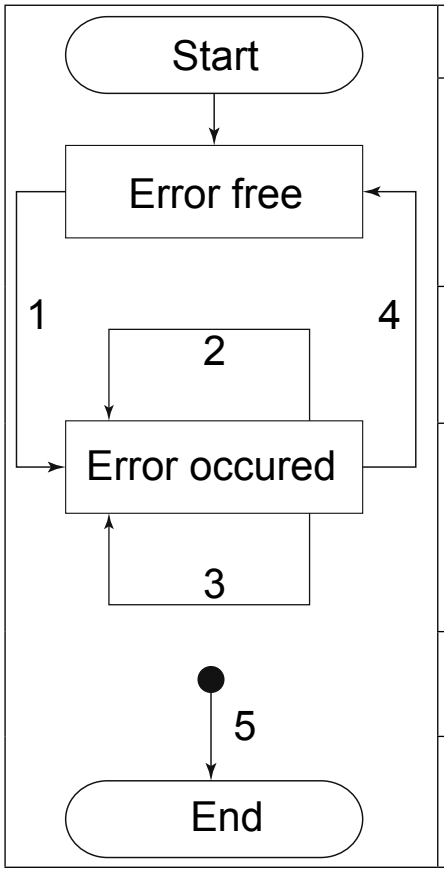
Value of the node status	Meaning
1	DISCONNECTED
2	CONNECTING
3	PREPARING
4	PREPARED
5	OPERATIONAL
127d	PRE_OPERATIONAL

7.9 Life guarding

The G6 CAN control board supports the life guarding. It is a monitoring of the cyclic node guarding the CAN master. For this reason, life guarding should only be activated during cyclic node guarding. The life guarding operates completely detached from all other monitoring functions. It is activated by the product of the two parameter values guard time and life time factor. Shows the product = 0, then the life guarding is not activated. Otherwise the product specifies the life guarding timeout time. With activated life guarding the node guarding monitoring starts as soon as the first node guard request is received. The function that is executed upon occurrence of the life guarding timeout is adjustable by two further parameters (LifeGuardTout.Addr, LifeGuardTout.Data). It concerns on the one hand to a write access to any parameter in the inverter control and furthermore to a function code that defines, which operation shall be executed in the control. On delivery life guarding is deactivated via parameter LifeGuardTout.Addr.

7.10 Emergency object

The CANopen communication profile DS301 defines a mechanism, after which the nodes signal independently, if the important events incidents. This emergency message supports also the G6 CAN control.



0	If no error is detected, the CANopen control changes after initialisation into status "Error free". An error message is not sent.
1	The CANopen control detects an internal error in the first 3 bytes of the emergency message (error code and error register). The CANopen control changes into error state. An emergency object with the associated error code and register is sent. The error code is entered at the place of object 1003h (pre-defined error field).
2	One but not all error causes are corrected. An emergency message with error code 0000h (error reset) is sent together with the remaining errors in the error register and in the manufacturer-specific error field.
3	There is a new error in the CANopen control. The CANopen control remains in error state and sends an emergency object with the appropriate error message. The new error code is entered at the top of the error code array (1003h). This ensures that the errors will be in the correct order (oldest error - highest subindex, see object 1003h).
4	All errors are corrected. The CANopen control changes into status "Error free" and sends an emergency object with the error code "Error reset/no error“.
5	Reset or switch off.

If the value has changed an emergency message is send to identifier 128d + Node_Id. That means, that the transition from an error state to normal operating conditions is also announced by an emergency message. The contents of the telegram is only in part firmly set by the profile. The content of the G6 emergency message is as follows: Identifier = 128 + Node_Id

B0	B1	B2	B3	B4	B5	B6	B7
Error code		Error register	Error fields				
LB	HB	=> *„Error Register“*	last error	last but one error	…	…	oldest error

All errors are stored in the ErrorField defined by the profile. This field contains a maximum of five entries in the G6 CAN control. Whereby the first entry always contains the last error that occurred.

7.10.1 Error register

The error register can contain the following error types:

0	NO_ERROR
1	GENERIC_ERROR (LT Communication timeout)
80h	MANUFACTURER_SPECIFIC (Info LT ru.00)

7.11 Producers heartbeat

The heartbeat protocol provides additional monitoring of the CAN bus without knowledge of the heartbeat producer via the connected user.

A heartbeat producer sends cyclically a heartbeat message. The time when the message is sent, is adjustable. The heartbeat protocol starts as soon as the heartbeat producer time is set. If the heartbeat protocol already has a value unequal 0 (at unit switch on) the protocol starts during transition from initialisation to pre-operational. In this case, the bootup message is considered before the heartbeat message.

7.12 Consumers heartbeat

One or more heartbeat consumer receive the message. The consumer can also define a max. time in which a heartbeat message has to be receive. If no message is received within this time, an adjustable behavior is started. The consumers heartbeat protocol starts with the first heartbeat signal.

It is not possible to activate the guarding protocol and the heartbeat protocol simultaneously on one unit. The guarding protocol only works when the consumers heartbeat time is 0.

8 Coding of the data in the four CAN telegram types

Via this telegram the logical CAN master can inquire (read) or change (write) the value of a parameter. In the communication profile a write-service is referred to as domain download and a read service as domain upload. The KEB CAN interface connection supports only the short form of these two services, thus only one telegram can be exchanged for the service request and another for the service acknowledgement between logical CAN master and the G6 CAN control.

8.1 SDO(rx) telegram

The addressing of the parameter is done via unsigned 16 bit index and unsigned 8 bit subindex. The parameters of the frequency inverter control are in the index range 2000h to 5EFFh. Here the CAN index results directly from the parameter address (see parameter description of the used FI control):

CAN-Index = COMBIVERT G6 parameter address

Changing from F5
The required offset of 2000h to the parameter address is not applicable at G6 (compared with COMBIVERT F5).

The subindex serves as additional addressing for complex parameters. It can also be used for the set-addressing of parameters of the power unit. The following applies:

Subindex	Type	Access to
0	Variable	Parameter value
	Field/structure	Subindex 0 (highest addressable subindex)
1…8	Variable	Parameter not possible
	Field/structure	Subindex 1…8 (corresponds to parameter set 0…7); Multiple selection not possible

8.1.1 Initiate domain download request (write request of the master)

7…0	7…0	15…8	7…0	7…0	15…8	23…16	31…24
0010nn1s	Index LB	Index HB	Sub index	LSB	Data		
B0	B1	B2	B3	B4	B5	B6	B7

nn:	Only valid with s=1: Contains the number of bytes of the data field, that contains no data.
s:	If it is equal 1, then nn contains the number of bytes in the data field, that contains no data. Otherwise no display of the data length in nn.
Index:	16 bit (unsigned) addressing of the parameter (see above).
Subindex:	8 bit (unsigned) subaddressing for complex parameters and the direct set-addressing.
Data:	Data to be transmitted. The LS byte is transmitted first.

8.1.2 Initiate domain upload request (read request of the master)

7…0	7…0	15…8	7…0				
01000000	Index LB	Index HB	Sub index	reserved			
B0	B1	B2	B3	B4	B5	B6	B7

Index:	16 bit (unsigned) addressing of the parameter (see above).
Subindex:	8 bit (unsigned) subaddressing for complex parameters and the direct set-addressing.

8.2 SDO(tx) telegram

8.2.1 Initiate domain download response (write confirmation from the FI)

This response is transmitted by the G6 CAN control, if the requested write service was executed error-free.

7…0	7…0	15…8	7…0				
01100000	Index LB	Index HB	Sub index	reserved			
B0	B1	B2	B3	B4	B5	B6	B7

Index:	16 bit (unsigned) addressing of the parameter (see above).
Subindex:	8 bit (unsigned) subaddressing for complex parameters and the direct set-addressing.

8.2.2 Initiate domain upload response (read confirmation from the drive controller)

This response is transmitted by the G6 CAN control, if the requested read service was executed error-free.

7…0	7…0	15…8	7…0	7…0	15…8	23…16	31…24
0100nn1s	Index		Sub index	LSB	Data		
	LB	HB					
B0	B1	B2	B3	B4	B5	B6	B7

nn:	Only valid with s=1: Contains the number of bytes of the data field, that contains no data.
s:	If it is equal 1, then nn contains the number of bytes in the data field, that contains no data. Otherwise no display of the data length in nn.
Index:	16 bit (unsigned) addressing of the parameter (see above).
Subindex:	8 bit (unsigned) subaddressing for complex parameters and the direct set-addressing.
Data:	Data to be transmitted. The LS byte is transmitted first.

8.2.3 Abort domain transfer (error response from the drive controller)

This response is transmitted by the G6 CAN control, if the requested write or read service could not be carried out. In this case an error description is returned.

7…0	7…0	15…8	7…0	7…0	15…8	7…0	7…0
10000000	Index		Sub index	Additional code		Error code	Error class
	LB	HB		LB	HB		
B0	B1	B2	B3	B4	B5	B6	B7

Error class	Error code	Addi-tional code	Meaning
00	00	0000h	OK, no error
05	04	0000h	Timeout at SDO protocol
05	04	0001h	Service not supported
06	01	0000h	Invalid operation
06	01	0002h	Attempt to write to a read-only parameter.
06	01	0010h	Invalid password
06	02	0000h	invalid address
06	04	0041h	Invalid PD assignment
06	09	0011h	Subindex does not exist
06	09	0012h	Invalid language identifier
06	09	0030h	Invalid value for this parameter
06	09	0031h	Parameter value is too high
06	09	0032h	Parameter value is too low
08	00	0020h	Data can not be transferred or stored
08	00	0022h	Unit busy

8.3 RPDO1…3 telegram

With this telegram the logical CAN master transfers new process output data to the inverter. The length and assignment of the RPDO1... 3 telegram can be changed by different communication parameters.

Following operator parameters affect the structure of the process output data:

- RPDO1…3 Mapping
- RPDO1…3 Communication parameter
- from the fb group: PD1…3 out parameter

8.4 TPDO1…3 telegram

With this telegram the G6 CAN control announces process input data to the (logical) CAN master.

The length, assignment and control of this telegram is affected by following communication parameters:

- TPDO1…3 Mapping
- TPDO1…3 Communication parameter
- from the fb group: PD1…3 in parameter

9 Parameters of the communication profile

The following parameters are defined by the communication profile.

9.1 Device and manufacturer data

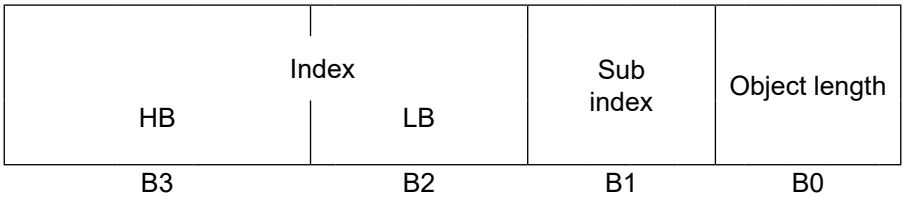
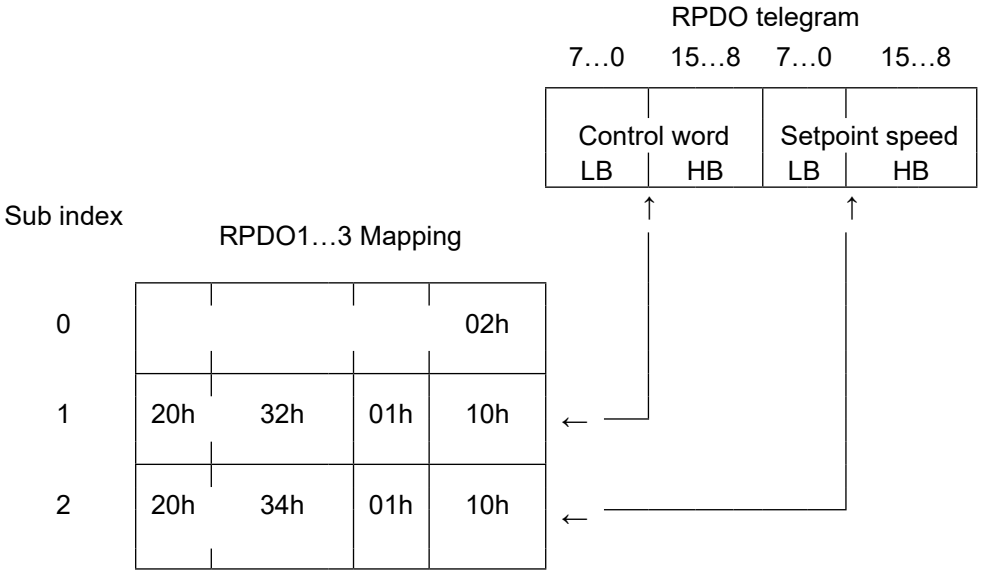
Parameter	Id-Text	Name	CAN-SDO-Index
	co01	**DeviceType**	**1000h**
Subindex	0		
Object type	Single variable (var)		
Data length	unsigned Long		
Access	Read only		
Meaning	Decribes the device type according to CANopen communication profile.		
Coding	No predefinition up to now		
Standard	0		
Note	This parameter is constant, therefore it can be read only.		

Parameter	Id-Text	Name	CAN-SDO-Index
	co02	**Error register**	**1001h**
Subindex	0		
Object type	Single variable (var)		
Data length	unsigned Byte		
Access	Read only		
Meaning	Indicates the error status of the CANopen user.		
Coding	Bit 0	0	no error
		1	General error
	Bit 7	Manufacturer-specific error	
		0	no error
		1	Error
Standard	0		
Note	This parameter can be read only.		

Parameter	**Id-Text**	**Name**	**CAN-SDO-Index**
	co04	**Identity object**	**1018h**
Subindex	0		
Object type	Structured variable (Struct)		
Data length	unsigned Byte		
Access	Read only		
Meaning	Specifies the number of sub-indices in this object.		
Number of subindices	4		
Note	Manufacturer and production data are stored in the sub-indices of this parameter.		
Subindex	1		
Sub-Name	VendorID		
Data length	unsigned Long		
Access	Read only		
Meaning	Includes the manufacturer-id assigned by CiA.		
Coding	Bit 0…23 manufacturer Bit 24…31 department		
Standard	0014h		
Subindex	2		
Sub-Name	ProductCode		
Data length	unsigned Long		
Access	Read only		
Meaning	Includes a unique value for this device series.		
Coding	00300000h : G6		
Standard	00300000h		
Subindex	3		
Sub-Name	RevisionNumber		
Data length	unsigned Long		
Access	Read only		
Meaning	Includes the revision number of the G6 power unit in the MSB. In the LSB the revision number of the control.		
Coding	00000000h… FFFFFFFFh		
Standard	version-dependent		
Subindex	4		
Sub-Name	KEB_DeviceSerialNumber		
Data length	unsigned Long		
Access	Read only		
Meaning	Includes the serial number of the device.		
Coding	00000000h…7FFFFFFFh		
Standard	device-dependent		

9.2 Process data

Parameter	Id-Text	Name	CAN-SDO-Index
	co05	**RPDO1 Communication parameter**	**1400h**
	co06	**RPDO2 Communication parameter**	**1401h**
	co07	**RPDO3 Communication parameter**	**1402h**
Subindex	0		
Object type	Structured variable (Struct)		
Data length	unsigned Byte		
Access	Read only		
Meaning	Specifies the number of sub-indices in this object.		
Number of subindices	2		
Note			
Subindex	1		
Sub-Name	COB-ID		
Data length	unsigned Long		
Access	Read only		
Meaning	Indicates to which identifier the RPDO for the transfer of the process output data is transmitted. Additionally there are control information for this RPDO contained in the highest bits. A changed value takes effect immediately and is stored non-volatile. Since the identifier assignment of the PDOs is derived directly from the Node_Id, the Bits Bit28 to Bit 0 can only be read. During writing these bits are ignored.		
Coding	Bit 31	0	The processing of the process output data is activated.
		1	The processing of the process output data is deactivated.
	Bit 30	0	Remote frame on the appropriate identifier is responded.
		1	Remote frame is not answered.
	Bit 29	0	11-Bit CAN-ID
		1	29-Bit CAN-ID
	Bit 28...Bit 11	29-bit CAN-ID for the extended frame of the CAN	
	Bit10…Bit0	11-bit CAN-ID for the base frame of the CAN	
Standard	00000200h + Node_Id		
Subindex	2		
Sub-Name	Transmission type		
Data length	unsigned Byte		
Access	Read/Write		
Meaning	Defines, when and how this object is transmitted on the CAN Bus.		
Coding	0…240	On receipt of a SYNC command (Identifier = 128d, data length = 0) the current process output data are transferred to the FI control.	
	241…253	reserved	
	254	(asynchronous, manufacturer-specific) The process output data are transferred to the FI control as soon as at least one byte has changed.	
	255	255 (asynchronous, profile-specific):	
Standard	254		
Notes	A changed value takes effect immediately and is stored non-volatile.		

Parameter	Id-Text	Name	CAN-SDO-Index
	co08	**RPDO1 Mapping**	**1600h**
	co09	**RPDO2 Mapping**	**1601h**
	co10	**RPDO3 Mapping**	**1602h**
Subindex	0		
Object type	Array		
Data length	unsigned Byte		
Access	Read write		
Meaning	Indicates the number of the mapped objects and determines the offset (consecutive no gaps such as the fb mapping parameter possible)! Can cause changes in parameters fb12,17 and 22.		
Number of subindices	8		
Subindex	1…8		
Data length	4 byte		
Meaning	Describes an object mapping. The index, subindex and the object length are specified in bits.		
Coding			
Standard	see below		
Note	Writing of this parameter requires that the count (subindex) is set to 0. The correlation between process output data mapping and the corresponding RPDO1…3 telegram structure is shown once more in the default assignment: 		

Parameter	Id-Text	Name	CAN-SDO-Index
	co11	**TPDO1 Communication parameter**	**1800h**
	co12	**TPDO2 Communication parameter**	**1801h**
	co13	**TPDO3 Communication parameter**	**1802h**
Subindex	0		
Object type	Structured variable (Struct)		
Data length	unsigned Byte		
Access	Read only		
Meaning	Specifies the number of entries in this object.		
Number of subindices	3		

Subindex	1		
Sub-Name	COB-ID		
Data length	unsigned Long		
Access	Read/Write		
Meaning	Indicates on which identifier the TPDO for the transfer of the process input data is transferred. Additionally there are control informations for this TPDO contained in the highest bits. A changed value takes effect immediately and is stored non-volatile. Since the identifier assignment of the PDOs is derived directly from the Node_Id, bits 28 to 0 can only be read. During writing these bits are ignored.		
Coding	Bit 31	0	The processing of the process output data is activated.
		1	The processing of the process output data is deactivated.
	Bit 30	0	Remote frame on the appropriate identifier is responded.
		1	Remote frame is not answered.
	Bit 29	0	11-Bit CAN-ID
		1	29-Bit CAN-ID
	Bit 28...Bit 11	29-bit CAN-ID for the extended frame of the CAN	
	Bit10…Bit0	11-bit CAN-ID for the base frame of the CAN	
Standard	00000200h + Node_Id		

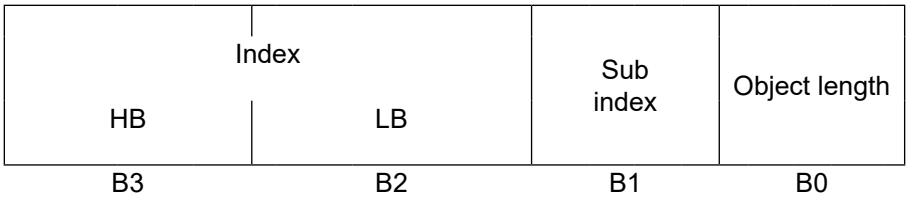
Subindex	2
Sub-Name	Transmission type
Data length	unsigned Byte
Access	Read/Write
Meaning	Defines, when and how this object is transmitted on the CAN Bus.

continued on the next page

Coding	0	synchronous, acyclic	At every receipt of a SYNC a TPDO telegram is transmitted on CAN.
	1…240	synchronous, cyclic	In this setting range it is adjusted by means of the value, how many SYNC telegrams must be received, before a TPDO telegram is transmitted on CAN. For parameter TPDO1...3 the value transmission type = 0/1 means, that in status OPERATIONAL a TPDO telegram is immediately transmitted on CAN after receiving a SYNC-telegram. For all synchronous values of the tx_type applies, that the SYNC-telegram triggers the transmission of the appropriate TPDO respectively the transmission of the RPDO. With the exact value it is determined how many SYNC-telegrams are necessary for it. With the values 0 and 1 every SYNC activates the corresponding event. The values 2 to 240 itself specify the number of required SYNC-telegrams.
	252	synchronous, RTROnly	A TPDO telegram is only transmitted after a remote request on the TPDO identifier.
	253	asynchronous, RTROnly	
	254	asynchronous, manufacturer-specific	A TPDO telegram is transmitted as soon as at least one byte has changed.
	255	asynchronous, profile-specific	
Standard	254		
Notes	A changed value takes effect immediately and is stored non-volatile.		

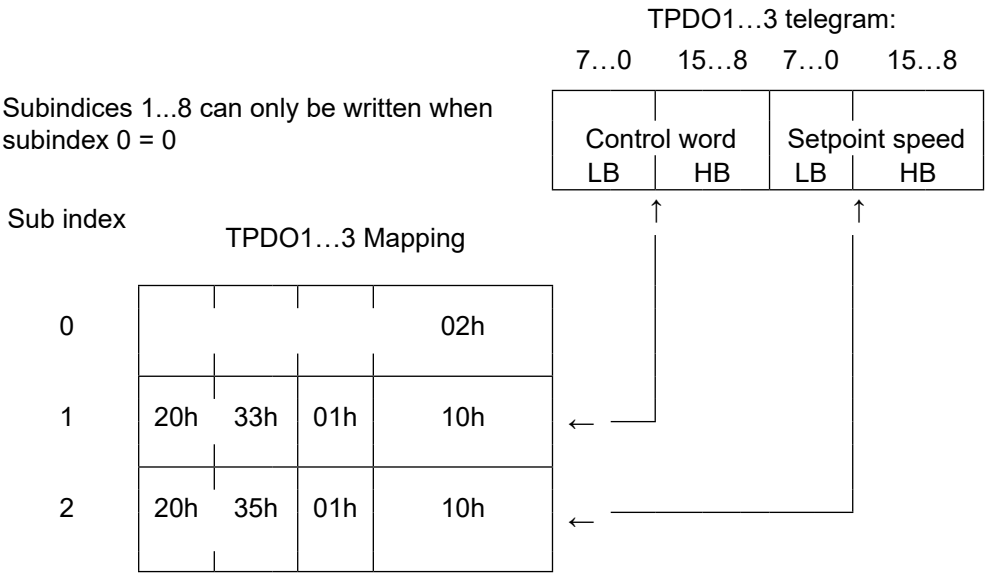
Subindex	3
Sub-Name	Off time
Data length	unsigned Word
Meaning	Describes the minimal temporal distance between two CAN telegrams on this identifier.
Coding	0…655350 * 0.1 ms
Standard	100 (= 10 ms)
Note	A changed value takes effect immediately and is stored non-volatile. The internal resolution for the off-time is 1ms. Thus the adjusted value has an inaccuracy of ±1 ms.

Parameter	**Id-Text**	**Name**	**CAN-SDO-Index**
	co14	**TPDO1 Mapping**	**1A00h**
	co15	**TPDO2 Mapping**	**1A01h**
	co16	**TPDO3 Mapping**	**1A02h**
Subindex	0		
Object type	Array		
Data length	unsigned Byte		
Access	Read write		
Meaning	Indicates the number of the mapped process input data. Subindex 1 - 8 can be adjusted or changed. 1-8 indicates the number of the mapped objects.		
Number of subindices	8		
Note			

Subindex	1 upto maximum 8
Data length	unsigned Long
Meaning	Describes an object mapping. The index, subindex and the object length are specified in bits.
Coding	
Standard	see below

continued on the next page

Note	A writing of this parameter causes the automatic deactivation of the process input data processing (Bit31 of index 1800h, (or 1801, 1802) subindex = 1 is set to “1”). The correlation between process input data mapping and the corresponding TPDO1…3 telegram structure is shown once more in the default assignment:



9.3 Parameters for the life guarding

Parameter	**Id-Text**	**Name**	**CAN-SDO-Index**
	co20	**Guard time**	**100Ch**
Subindex	0		
Object type	Single variable (var)		
Data length	unsigned Word		
Access	Read write		
Meaning	Defines together with the Life Time Factor the monitoring time for the life guarding.		
Coding	0	Life guarding switched off	
	1…65535	Time in ms	
Standard	0		

Parameter	**Id-Text**	**Name**	**CAN-SDO-Index**
	co21	**Life Time Factor**	**100Dh**
Subindex	0		
Object type	Single variable (var)		
Data length	unsigned Byte		
Access	Read write		
Meaning	Defines together with the guard time the monitoring time for the life guarding.		
Coding	0	Life guarding switched off	
	1…255	Factor for the guard time	
Standard	0		

9.4 Parameter for the heartbeat

Parameter	Id-Text	Name	CAN-SDO-Index
	co30	**Consumers heartbeat time**	**1016h**
Subindex	0		
Object type	Array		
Data length	unsigned Byte		
Access	Read only		
Meaning	Specifies the number of sub-indices in this object.		
Number of subindices	1		
Sub-Name	Consumers heartbeat time		
Subindex	1		
Data length	unsigned Long		
Access	Read write		
Meaning	Adjusts the monitoring time and the node-ID of the heartbeat producer. If no heartbeat telegram is received in the monitoring time, then the function adjusted via parameters LifeGuardTout.Addr and LifeGuardTout.Data is executed. Activation occurs with receipt of the first heartbeat telegram.		
Coding	Bit 0…15	Setting of the monitoring time in the range of 0…65535 ms.	
	Bit 16…23	Setting of the Node-Id in the range of 0…255	
	Bit 24…31	reserved	
Standard	00000000h		
Notes	A monitoring time of 0 ms or a node address of 0 or greater than 127 switches the appropriate object off.		

Parameter	Id-Text	Name	CAN-SDO-Index
	co31	**Producer heartbeat time**	**1017h**
Subindex	0		
Object type	Single variable (var)		
Data length	unsigned Word		
Access	Read write		
Meaning	Adjusts the time in ms between two heartbeat telegrams. 0 switches off the producer heartbeat.		
Coding	Bit 0…15	Default of the producer heartbeat time in the range of 0 (off), 1... 65535 ms.	
Standard	00000000h		

Parameter	Id-Text	Name	CAN-SDO-Index
	co34	**Error behavior**	**1029h**
Subindex	0		
Object type	Array		
Data length	unsigned Byte		
Access	Read only		
Meaning	Specifies the number of sub-indices in this object.		
Number of subindices	1		
Subindex	1		
Sub-Name	**Communication error**		
Data length	unsigned Byte		
Access	Read write		
Meaning	Adjusts the behavior of the CAN bus user in case of communication error.		
Coding	00h	Change into NMT status "Pre-Operational“ (only at actual status "Operational“)	
	01h	no change into NMT status	
	02h	Change into NMT status "Stopped“	
Standard	00000000h		

10 Fieldbus parameters

The fieldbus parameters (fb) are defined by KEB.

Parameter	**Id-Text**	**Name**	**CAN-SDO-Index**
	fb00	**CAN Node ID**	**0x2180**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	Setting of the CANopen node address in the CAN control.		
Coding	255	The node address is determined from the inverter address (SY06): CAN Node ID = inverter address + 1	
	1…127	The node address is maintained in the control board and stored: CAN Node Id = fb00.	
Standard	255		

Parameter	**Id-Text**	**Name**	**CAN-SDO-Index**
	fb02	**CAN Baudrate**	**0x2182**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	Index for CAN transmission rate.		
Coding			
Standard	6		
Notes	The bit-timing abides by the specifications of the working committee Physical-Layer of CiA. What kind of transmission rates are possible depends on the line length, the sum of the deceleration times and the bit-timing and must be cleared up for each individual case.		

1	20 Kbit/s	6	250 Kbit/s
2	25 Kbit/s	7	500 Kbit/s
3	50 Kbit/s	8	800 Kbit/s
4	100 Kbit/s	9	1 Mbit/s
5	125 Kbit/s		

Parameter	Id-Text	Name	CAN-SDO-Index
	fb03	**CAN State**	**0x2183**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read only		
Meaning	Display of the CANopen slave state		
Coding	0 Initialisation 4 Stopped 5 Operational 127 Preoperational		
Standard	0		

Parameter	Id-Text	Name	Index
	fb04	**LifeGuardTout.Addr**	**0x2184**
Subindex	0		
Object type	Variable		
Data length	unsigned Long		
Access	Read write		
Meaning	Defines together with the LifeGuardTout.Data the function, that is executed once after the life guarding timeout occurred. The value consists of the parameter address to be written and the parameter set as well as the function code for the control board.		
Coding	Bit 0…15	Index	0000h : no function 0001h…FFFFh address
	Bit 16…24	Set	00h : no set 01h : Set 0 02h : Set 1 03h : Set 2 04h : Set 3 05h : Set 4 06h : Set 5 07h : Set 6 08h : Set 7
	Bit 25…31	Operational	00h : no function 01h : Change to ready for operation
Standard	0101202Bh (change to ready for operation, set 0, Sy43)		

Parameter	Id-Text	Name	CAN-SDO-Index
	fb05	**LifeGuardTout.Data**	**0x2185**
Subindex	0		
Object type	Variable		
Data length	unsigned Long		
Access	Read write		
Meaning	Defines the value of the inverter parameter to be written in case life guarding time-out occurs.		
Coding	0…4294967294 (depending on the selected parameter)		
Standard	0		

Parameter	Id-Text	Name	CAN-SDO-Index
	fb06	**SubIdxForISet**	**0x2186**
Subindex	0		
Object type	Variable		
Data length	unsigned Long		
Access	Read write		
Meaning	Parameter value indicates the sub index access to values from indirect parameter set is possible. Example: Fr09 = 3 fb06=11 SDO read access with subindex = 11 The SDO response contains the value of parameter from set 3 (Fr09).		
Coding	9…255		
Standard	9		

Parameter	Id-Text	Name	CAN-SDO-Index
	fb07	**buswatchdog activation**	**0x2187**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	Allows a delayed activation of the fieldbus watchdog after Power On or a reset command via CAN. The fieldbus watchdog is used to bring the drive into the error state when on CAN is no more activity. The real activation and programming of watchdog is adjusted in the FI control. Take the parameters to be adjusted from the instruction manual of the FI control.		
Coding	0	The fieldbus watchdog is inactive.	
	1	Activation of the fieldbus watchdog after the first SYNC telegram.	
	2	Activation of the fieldbus watchdog after the first node guarding.	
	4	Activation of the fieldbus watchdog after the first transition into the node status OPERATIONAL	
	8	Activation of the fieldbus watchdog after the first PDOUT1 telegram.	
	16	Activation of the fieldbus watchdog after the first PDOUT2 telegram.	
	32	Activation of the fieldbus watchdog after the first SDO telegram.	
	64	Activation of the fieldbus watchdog after the first PDOUT3 telegram.	
	128	Activation after transition to ready for operation	
Standard	0		

Parameter	Id-Text	Name	CAN-SDO-Index
	fb08	**buswatchdog inhibit**	**0x2188**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	Defines upon which events the fieldbus watchdog is reset.		
Coding	1 — When starting a PDOUT telegram to the FI control the watchdog is reset. 2 — The watchdog is reset when receiving a SDO order. 8 — At every receipt of a SYNC telegram the watchdog is reset. 16 — At every receipt of a node guard request telegram the watchdog is reset.		
Standard	0		

Parameter	Id-Text	Name	CAN-SDO-Index
	fb10	**PD1 out index**	**0x218A**
	fb20	**PD2 out index**	**0x2194**
	fb30	**PD3 out index**	**0x219E**
Subindex	0		
Number of subindices	8		
Object type	Array		
Data length	unsigned Byte		
Access	Read write		
Meaning	Specifies the number of entries in this object.		
Subindex	1…8		
Data length	unsigned Word		
Access	Read write		
Meaning	Setting of up to 8 parameter addresses to be used as process data. Use only parameters which are permitted as process data. The value corresponds to byte 2 and 3 of the CAN parameters co08…10.		
Coding	0000h…FFFFh		

Parameter	Id-Text	Name	CAN-SDO-Index
	fb11	**PD1 out subindex**	**0x218B**
	fb21	**PD2 out subindex**	**0x2195**
	fb31	**PD3 out subindex**	**0x219F**
Subindex	0		
Number of subindices	8		
Object type	Array		
Data length	unsigned Byte		
Access	Read write		
Meaning	Specifies the number of entries in this object.		
Subindex	1…8		
Data length	unsigned Word		
Access	Read write		
Meaning	The value of the subindex determines the parameter set of the selected PD parameter. The value corresponds to byte 1 in the CAN parameters co08...10.		
Coding	0 actual set 1…8 for set 0…7		

Parameter	Id-Text	Name	CAN-SDO-Index
	fb12	**PD1 out offset**	**0x218C**
	fb22	**PD2 out offset**	**0x2196**
	fb32	**PD3 out offset**	**0x21A0**
Subindex	0		
Number of subindices	8		
Object type	Array		
Data length	unsigned Byte		
Access	Read write		
Meaning	Specifies the number of entries in this object.		
Subindex	1…8		
Data length	unsigned Byte		
Access	Read write		
Meaning	Indicates the offset of the assignment in the 8 byte process data field. Position of the value of the mapped parameter.		
Coding	0...7 for byte 0...7		

Parameter	Id-Text	Name	CAN-SDO-Index
	fb13	**PD1 out type**	**0x218D**
	fb23	**PD2 out type**	**0x2197**
	fb33	**PD3 out type**	**0x21A1**
Subindex	0		
Number of subindices	8		
Object type	Array		
Data length	unsigned Byte		
Access	Read write		
Meaning	Specifies the number of entries in this object.		
Subindex	1…8		
Data length	unsigned Byte		
Access	Read write		
Meaning	The value defines the parameter type of the selected PD parameter.		
Coding	0 = off; no parameter type defined 1 = Long 2 = Word 3 = Byte		

Parameter	Id-Text	Name	CAN-SDO-Index
	fb14	**PD1 out count**	**0x218E**
	fb24	**PD2 out count**	**0x2198**
	fb34	**PD3 out count**	**0x21A2**
Subindex	0		
Number of subindices	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	Adjusts the number of PD out objects.		
Coding	0...8		
Standard	0		

Parameter	Id-Text	Name	CAN-SDO-Index
	fb15	**PD1 in index**	**0x218F**
	fb25	**PD2 in index**	**0x2199**
	fb35	**PD3 in index**	**0x21A3**
Subindex	0		
Number of subindices	8		
Object type	Array		
Data length	unsigned Byte		
Access	Read write		
Meaning	Specifies the number of subindices in this object.		
Subindex	1...8		
Data length	unsigned Word		
Access	Read write		
Meaning	Setting of up to 8 parameter addresses to be used as process data. Use only parameters which are permitted as process data. The value corresponds to byte 2 and 3 of the CAN parameters co12…14.		
Coding	0000h…FFFFh		

Parameter	Id-Text	Name	CAN-SDO-Index
	fb16	**PD1 in subindex**	**0x2190**
	fb26	**PD2 in subindex**	**0x219A**
	fb36	**PD3 in subindex**	**0x21A4**
Subindex	0		
Number of subindices	8		
Object type	Array		
Data length	unsigned Byte		
Access	Read write		
Meaning	Specifies the number of subindices in this object.		
Subindex	1...8		
Data length	unsigned Word		
Access	Read write		
Meaning	The value of the sub-index determines the parameter set of the selected PD parameter. The value corresponds to byte 1 in the CAN parameters co14...16.		
Coding	0	actual set	
	1…8	for set 0…7	

Parameter	Id-Text	Name	CAN-SDO-Index
	fb17	**PD1 in offset**	**0x2191**
	fb27	**PD2 in offset**	**0x219B**
	fb37	**PD3 in offset**	**0x21A5**
Subindex	0		
Number of subindices	8		
Object type	Array		
Data length	unsigned Byte		
Access	Read write		
Meaning	Specifies the number of subindices in this object.		
Subindex	1...8		
Data length	unsigned Byte		
Access	Read write		
Meaning	Indicates the offset of the assignment in the 8 byte process data field. Position of the value of the mapped parameter.		
Coding	0...7 for byte 0...7		

Parameter	Id-Text	Name	CAN-SDO-Index
	fb18	**PD1 in type**	**0x2192**
	fb28	**PD2 in type**	**0x219C**
	fb38	**PD3 in type**	**0x21A6**
Subindex	0		
Number of subindices	8		
Object type	Array		
Data length	unsigned Byte		
Access	Read write		
Meaning	Specifies the number of subindices in this object.		
Subindex	1...8		
Data length	unsigned Byte		
Access	Read write		
Meaning	The value defines the parameter type of the selected PD parameter.		
Coding	0	off; no parameter type defined	
	1	Long	
	2	Word	
	3	Byte	

Parameter	Id-Text	Name	CAN-SDO-Index
	fb19	**PD1 in count**	**0x2193**
	fb29	**PD2 in count**	**0x219D**
	fb39	**PD3 in count**	**0x21A7**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	Adjusts the number of PD in objects.		
Coding	0…8		
Standard	0		

Parameter	Id-Text	Name	CAN-SDO-Index
	fb18	**PD1 in type**	**0x2192**
Subindex	0		
Number of subindices	8		
Object type	Struct. Var.		
Data length	unsigned Byte		
Access	Read write		
Meaning	Specifies the number of subindices in this object.		
Subindex	1		
Subindex Name	SYNC counter		
Data length	unsigned Word		
Access	Read write		
Coding	0…65355 number of received SYNC telegrams.		
Subindex	2		
Subindex Name	NMT counter		
Data length	unsigned Word		
Access	Read write		
Coding	0…65355 number of incoming network management telegrams.		
Subindex	3		
Subindex Name	PDO1 counter		
Data length	unsigned Word		
Access	Read write		
Coding	0…65355 number of received process data telegrams 1.		
Subindex	4		
Subindex Name	PDO2 counter		
Data length	unsigned Word		
Access	Read write		
Coding	0…65355 number of received process data telegrams 2.		

Subindex	5
Subindex Name	PDO3 counter
Data length	unsigned Word
Access	Read write
Coding	0…65355 number of received process data telegrams 3.
Subindex	6
Subindex Name	SDO counter
Data length	unsigned Word
Access	Read write
Coding	0…65355 number of received SYNC telegrams.
Subindex	7
Subindex Name	Node guarding counter
Data length	unsigned Word
Access	Read write
Coding	0…65355 number of received node monitoring telegrams (Node Guarding).
Subindex	8
Subindex Name	HB counter
Data length	unsigned Word
Access	Read write
Coding	0…65355 number of received SYNC telegrams.

11 Operator parameters

The operator parameters determine the configuration of the G6 CAN control. The software version and the actual state can also be read out.

Parameter	Id-Text	Name	CAN-SDO-Index
	os00	**operator identifier**	**0x2080**
Subindex	0		
Object type	Variable		
Data length	unsigned Long		
Access	Read only		
Meaning	Display of the control board type and software version.		
Coding	e.g. 150304	150xxx: G6 xxx3xx: CANopen xxxx04: V1.3.0/1.x	
Standard	Device-dependent		

Parameter	Id-Text	Name	CAN-SDO-Index
	os01	**password OS**	**0x2081**
Subindex	0		
Object type	Variable		
Data length	Long		
Access	Read write		
Meaning	Input of the password for processing of parameters via the keyboard of the control card.		
Coding	0…65535		
Standard	Device-dependent		

Parameter	Id-Text	Name	CAN-SDO-Index
	os02	**software date OS**	**0x2082**
Subindex	0		
Object type	Variable		
Data length	Long		
Access	Read only		
Meaning	Display of the operator software date.		
Coding	0.0000…9999, 3112 Display of the year before the decimal point, month and day after the decimal point. 2012,0813 means 13.08.2012.		
Standard	Device-dependent		

Parameter	Id-Text	Name	CAN-SDO-Index
	os03	**software version**	**0x2083**
Subindex	0		
Object type	Variable		
Data length	Long		
Access	Read only		
Meaning	Display of the operator software version.		
Coding	0.0.0.0…255.255.255.255 e.g. 1.3.0.1		
Standard	Device-dependent		

Parameter	Id-Text	Name	CAN-SDO-Index
	os04	**diag error count**	**0x2084**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	Specifies the number of occurred errors on the diagnostic interface.		
Coding	0…255		

Parameter	Id-Text	Name	CAN-SDO-Index
	os05	**diag response delay time**	**0x2085**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	Adjusts the minimum response delay time for inquiries over the diagnostic interface.		
Coding	0…126 ms		

Parameter	Id-Text	Name	CAN-SDO-Index
	os06	**baud rate diag**	**0x2086**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	Setting the transmission speed on the diagnostic interface.		
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	5		

Parameter	Id-Text	Name	CAN-SDO-Index
	os07	**node ID**	**0x2087**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	This parameter specifies the inverter address for the diagnostic interface (DIN 66019). The parameter is a mapping of the system parameter Sy06. If the inverter address is changed via bus, then there is no longer access.		
Coding	0…239		

Parameter	Id-Text	Name	CAN-SDO-Index
	os08	**operator type**	**0x2088**
Subindex	0		
Object type	Variable		
Data length	unsigned Word		
Access	Read only		
Meaning	Display of the functions implemented in the control board.		
Coding	Bit 0 / Initiator / 0: without, 1: with initiator		
	Bit 1 / Keyboard/display / 0: without, 1: with keyboard/LCD display		
	Bit 8 / 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	Device-dependent		

Parameter	Id-Text	Name	CAN-SDO-Index
	os09	**PU max invbusy retries**	**0x2089**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	Number of retries which are sent on the internal bus from the power unit to the control if this rejects the service with the error "inverter busy".		
Coding	0…255		
Standard	200		

Parameter	Id-Text	Name	CAN-SDO-Index
	os10	**PU tout count**	**0x208A**
Subindex	0		
Object type	Variable		
Data length	unsigned Word		
Access	Read write		
Meaning	Counts the timeouts on the internal bus between the control and power unit.		
Coding	0…255		
Standard	200		

Parameter	Id-Text	Name	CAN-SDO-Index
	os12	**operator command**	**0x208C**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	Setting of instructions in accordance with the coding mentioned below		
Coding	0 non 1 Load default values in all operator sets 2 Reinitialise LT image		

Parameter	Id-Text	Name	CAN-SDO-Index
	os13	**operator state**	**0x208D**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read only		
Meaning	Displays the status of the power unit and the mapping of the power unit parameters in the control board.		
Coding	Bit 0	reserved	
	Bit 1…2	PU-conf.-ID State	0: Unknown power unit-ID 2: Power unit-Id OK 4: Power unit-Id wrong
	Bit 3…5	PU-Image state	0: PU image not initialised 1: write PU image 2: read PU image 3: PU image changed 4: PU image initialised 5: LT-Image checking 6: PU image not available
	Bit 6…15	reserved	

Parameter	Id-Text	Name	CAN-SDO-Index
	os14	**store state**	**0x208E**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	By writing of value "0" non-volatile parameters are immediately stored. After the storing the status changes to value "1". If at the end of download lists in COMBIVIS first value "0" and then value "1" is written, COMBIVIS transmits the value as long as the inverter has completed the storage.		
Coding	0 busy 1 completed 2 off		

Parameter	Id-Text	Name	CAN-SDO-Index
	os15	**store mode**	**0x208F**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
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.		
Coding	0 off, curr. off / on at startup 1 on, always store 2 off, never store		
Standard	1		

Parameter	Id-Text	Name	CAN-SDO-Index
	os17	**safety type**	**0x2091**
Subindex	0		
Object type	Variable		
Data length	unsigned Word		
Access	Read only		
Meaning	Type of safety module		
Coding	0 no safety module available 1 Safety module STO 2 Safety module STO with 0 Hz function		

Parameter	Id-Text	Name	CAN-SDO-Index
	os18	**safety software date**	**0x2092**
Subindex	0		
Object type	Variable		
Data length	Long		
Access	Read only		
Meaning	Display of the safety module software date.		
Coding	0.0000… 9999, 3112	Display of the year before the decimal point, month and day after the decimal point. 2012,0813 means 13.08.2012. If no safety module is installed, the value "0: no safety functionality“ is displayed.	
Standard	Device-dependent		

Parameter	Id-Text	Name	CAN-SDO-Index
	os19	**safety software version**	**0x2093**
Subindex	0		
Object type	Variable		
Data length	Long		
Access	Read only		
Meaning	Display of the safety module software version.		
Coding	0.0.0.0… 255.255.255.255	If no safety module is installed, value "0: no safety functionality" is displayed.	
Standard	Device-dependent		

Parameter	Id-Text	Name	CAN-SDO-Index
	os29	**serial number OS**	**0x209D**
Subindex	0		
Object type	Variable		
Data length	Long unsigned		
Access	Read only		
Meaning	Serial number of the control hardware.		
Coding	0…4294967294		
Standard	Device-dependent		

Parameter	Id-Text	Name	CAN-SDO-Index
	os30	**serial number OS 2**	**0x209E**
Subindex	0		
Object type	Variable		
Data length	Long unsigned		
Access	Read only		
Meaning	Serial number part 2 of the control hardware.		
Coding	0…4294967294		
Standard	Device-dependent		

12 Initiator interface

A initiator input is realised at the CAN control on terminal strip X2A terminal 31. The following parameters are used for the activation and configuration of the initiator input.

Parameter	Id-Text	Name	CAN-SDO-Index
	ii02	**initiator funktionality**	**0x2382**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	Activation of the initiator input.		
Coding	0 Intiator input off 1 Initiator input on		
Standard	0		

Parameter	Id-Text	Name	CAN-SDO-Index
	ii04	**initiator trigger/mult.**	**0x2384**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	Edge evaluation		
Coding	Bit 0…7	0	Single evaluation; only the rising edge is evaluated per cam. Is used when no symmetric pulse/pause ratio is available.
		1	Double evaluation; the rising and the falling edge are evaluated per cam. By way a higher resolution is reached with symmetric pulse/pause ratio.
	Bit 8…15	reserved	
Standard	0		

Parameter	Id-Text	Name	CAN-SDO-Index
	ii05	**increment count**	**0x2385**
Subindex	0		
Object type	Variable		
Data length	unsigned Word		
Access	Read write		
Meaning	Measurement of the number of pulses		
Coding	0…65535 pulses		
Standard	0		

Parameter	Id-Text	Name	CAN-SDO-Index
	ii06	**time for speed calculation**	**0x2386**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	Time to calculate a new speed value. The higher the time, the higher the resolution of the speed.		
Coding	1 — 1 ms 2 — 2 ms 3 — 4 ms 4 — 8 ms 5 — 16 ms 6 — 32 ms 7 — 64 ms 8 — 128 ms 9 — 256 ms 10 — 512 ms		
Standard	3		

Parameter	Id-Text	Name	CAN-SDO-Index
	ii07	**pulses per revolution**	**0x2387**
Subindex	0		
Object type	Variable		
Data length	unsigned Word		
Access	Read write		
Meaning	Input of the value of existing chopper- or punched disc in increments or pulses per revolution.		
Coding	1…16384 inc		
Standard	62 inc		

Parameter	Id-Text	Name	CAN-SDO-Index
	ii09	**speed no gear**	**0x2389**
Subindex	0		
Object type	Variable		
Data length	unsigned Long		
Access	Read write		
Meaning	The value corresponds to the speed of the shaft at the initiator.		
Coding	0.0…20000.00 Hz		
Standard	0.0 Hz		

13 LCD parameters

13.1 Parameter to set the LCD display

The settings of the LCD parameters are only accepted completely fom the LCD display after restarting the device.

Parameter	Id-Text	Name	CAN-SDO-Index
	dp00	**language**	**0x2780**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	A language is selected for the menu and the parameters. If the selected language is not available the parameters are displayed in English.		
Coding	0 English 1 German 2 American 3 French 4 Italian 5 – 6 Spanish		
Standard	0		

Parameter	Id-Text	Name	CAN-SDO-Index
	dp01	**startup mode**	**0x2781**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	The startup mode determines the menu item after initialisation of the control.		
Coding	0 Inverter parameters 1 CP mode 2 Operator parameters 3 Menu		
Standard	1		

Parameter	Id-Text	Name	CAN-SDO-Index
	dp02	**font size**	**0x2782**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	It can be selected between the font sizes 8,10,13,16 and 24 in the display. Exception: see "Font size 2".		
Coding	8 = 8 dpi 10 = 10 dpi 13 = 13 dpi 16 = 16 dpi 24 = 24 dpi		
Standard	1		

Parameter	Id-Text	Name	CAN-SDO-Index
	dp03	**Font size 2**	**0x2783**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	Determines the font size for the display of parameter values in the CP mode and in the work list.		
Coding	8 = 8 dpi 10 = 10 dpi 13 = 13 dpi 16 = 16 dpi 24 = 24 dpi		
Standard	1		

Parameter	Id-Text	Name	CAN-SDO-Index
	dp04	**contrast**	**0x2784**
Subindex	0		
Object type	Variable		
Data length	unsigned Byte		
Access	Read write		
Meaning	The contrast of the LCD display can be changed in a range of 0 to 50 to optimise the readability.		
Coding	0…50		
Standard	21		

<table>
<tr><td>Parameter</td><td>Id-Text</td><td>Name</td><td>CAN-SDO-Index</td></tr>
<tr><td></td><td>dp05</td><td>backlight</td><td>0x2785</td></tr>
<tr><td>Subindex</td><td colspan="3">0</td></tr>
<tr><td>Object type</td><td colspan="3">Variable</td></tr>
<tr><td>Data length</td><td colspan="3">unsigned Byte</td></tr>
<tr><td>Access</td><td colspan="3">Read write</td></tr>
<tr><td>Meaning</td><td colspan="3">The menu item "Lighting" defines the behavior of the backlight of the LCD display.</td></tr>
<tr><td>Coding</td><td colspan="3"><table>
<tr><td>0</td><td>off</td><td>Lighting of the LCD display generally off.</td></tr>
<tr><td>1</td><td>on</td><td>Lighting of the LCD display generally on.</td></tr>
<tr><td>2</td><td>auto</td><td>If the lighting is set to "Auto", it turns on when you press a key and it turns off after 10 seconds when no key is pressed.</td></tr>
</table></td></tr>
<tr><td>Standard</td><td colspan="3">2</td></tr>
</table>

14 Annex

14.1 CAN-Bit-Timing

Regarding the adjusted bit timing the KEB CAN control adhere to the specifications of the CiA standard. The nominal bit timing is as follows:

Area for each segment: Bit time = 8 Tq to 25 Tq

Bit Time		
SYNC (1 Tq)	TSEG1 (4…16 Tq)	TSEG2 (2…8 Tq)

Samplepoint

Synchronisation step width (SJW) = 1…4 Tq

Values from TSEG1 and TSEG2: TSEG1 > TSEG2 > SJW

For all adjustable baud rates applies:

t_q = Base time unit. All segments of the Bit-Timing result in a multiple of this time unit.

SYNC = Only the edges from recessive to dominant are used for the synchronisation.

SJW = Synchronisation step width (only for information)

Baud rate	Timequantum (t_q)	TSEG1	TSEG2	SJW
10 Kbit/s	6.25 µs	16 Tq	8 Tq	4
20 Kbit/s	3.125 µs	10 Tq	5 Tq	2
25 Kbit/s	2.5 µs	10 Tq	5 Tq	2
50 Kbit/s	1.25 µs	Tq 10	5 Tq	2
100 Kbit/s	625 ns	10 Tq	5 Tq	2
125 Kbit/s	500 ns	10 Tq	5 Tq	2
250 Kbit/s	250 ns	10 Tq	5 Tq	2
500 Kbit/s	125 ns	10 Tq	5 Tq	2
800 Kbit/s	78.125 ns	6 Tq	3 Tq	2
1000 Kbit/s	62.5 ns	5 Tq	2 Tq	1

The grey highlighted transmission rates in the table are to be considered as particularly critical with regard to the line length.

The KEB-CAN control has an isolated CAN interface. The additional delay elements (optocoupler) in the waveform, the possible cable length or the possible transmission speed decreases. The possible line length or transmission rate is depending on the delay times of all users in the CAN network. It is the responsibility of the customer to make an assessment concerning bit rate and possible line length. The necessary information for the KEB CAN interface connection are listed below:

Transmit-deceleration time of the CAN driver:	≤	80 ns
Receive-deceleration time of the CAN driver:	≤	70 ns
Transmit-deceleration time of used opto-coupler:	≤	40 ns
Receive-deceleration time of used opto-coupler:	≤	40 ns

Always select the smallest CAN transmission rate, that is needed for the processing of the process.

14.2 Compact summary of CAN communication

Fixed identifier allocation:				
SDO(rx) Identifier	=	1536 + Node_Id	:	SDO request to KEB FI
SDO(tx) Identifier	=	1408 + Node_Id	:	SDO acknowledgement from KEB FI
RPDO1-Identifier	=	200h + Node_Id	:	Process data to KEB FI
TPDO1-Identifier	=	180h + Node_Id	:	Process data from KEB FI
RPDO2-Identifier	=	300h + Node_Id	:	Process data to KEB FI
TPDO2-Identifier	=	280h + Node_Id	:	Process data from KEB FI
RPDO3-Identifier	=	400h + Node_Id	:	Process data to KEB FI
TPDO3-Identifier	=	380h + Node_Id	:	Process data from KEB FI
Node Guarding Identifier	=	1792 + Node_Id		
Emergency Identifier	=	128 + Node_Id	:	Emergency message from KEB FI

The most important NMT commands (telegrams) to identifier = 0

Start_Remote_Node

01h	Node-Id
B0	B1

Enter_Pre_Operational_State

80h	Node-Id
B0	B1

Reset_Node

81h	Node-Id
B0	B1

The most important values of the node state:

PRE_ OPERATIONAL	=	7Fh	:	Communication active except for the PDOs
OPERATIONAL	=	05h	:	Complete communication active

Examples for SDO communication:

Reading of parameter digital setpoint setting (oP03) in set 4 → index = 2303h, subindex = 05h

SDO(rx) telegram (to KEB FI)

40h	03h	23h	05h	XXh	XXh	XXh	XXh
B0	B1	B2	B3	B4	B5	B6	B7

SDO(tx) telegram (from KEB FI)

43h	03h	23h	05h	E8h	03h	00h	00h
B0	B1	B2	B3	B4	B5	B6	B7

In this example the read value is = 1000 (03E8h)

Write value = 5 to parameter reference source (oP.00) in set 0 → Index = 2300h, subindex = 01h

SDO(rx) telegram (to KEB FI)

22h	00h	23h	01h	05h	00h	00h	00h
B0	B1	B2	B3	B4	B5	B6	B7

SDO(tx) telegram (from KEB FI)

60h	00h	23h	01h	05h	00h	00h	00h
B0	B1	B2	B3	B4	B5	B6	B7

Example for the setting of new process data with the RPDO1 telegram:

co08 subindex 1 = 2032 (control word SY50) should have value 1

co08 subindex 2 = 2034 (setpoint speed SY52) should have value 1500 (05DCh)

RPDO1 telegram (to the KEB-FI)

01h	00h	DCh	05h

15 Revision history

Revision	Date	Description
1A	2012-11	Series release
Version	**Date**	**Description**
00	2015-07	Changed to document view
01	2019-05	Changed to new KEB CI optic, LC display operation added
02	2023-08	Updating the standard pages, editorial changes

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