COMBICONTROL

Instruction Manual **PCC C5**

00.C5.01B-K200

KEB

12/2004

Preface

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The safety and warning reference specified in this manual is not exhaustive. The manual and the information contained in it is made with care. KEB don´t accept a guarantee for misprint or other errors or resulting damages.
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Content

1. Description of the unit

1.1 Application

KEB C5-PCC is a programmable control with direct connection upto 8 KEB frequency inverters/servo axes of the series F5. The connection to the axes is created as HSP5/485. With this fast, low cost connection all axes can be operated directly and synchronously with an inexpensive operator . Cycle times down to one millisecond are realizable.
The axis control is programmed with the uniform IEC 61131-3 programming system CoDeSys of the 3S-Software Company, Kempten (Germany) (www.3s-software.com).

1.2 Construction

The control consists of four modules:

- **Basic module with**
  - CPU and memory
  - Internal flash file system
  - Switching power supply
  - Real-time clock
  - HSP5/485-interfaces to the inverter/servo axes
- **Operating element with**
  - Ethernet interface
  - Serial interface
  - Control and error LED's
  - RUN/Reset switch
  - External memory card file system
- **Input/output interface contains**
  - Voltage supply connection
  - 8DI/8DO input module with
    - eight digital inputs
    - eight digital outputs
- **Field bus interface**
  - ProfiBus-DP interface

1.3 CE certification

This device was checked in accordance to the generic standard EN 61000-6-2 in the section of interference immunity and corresponds to the EMC guideline 89/336/EWG with changes/ extensions.

1.4 Unit identification

Part Number 09.C5.B30-1000 (ProfiBus-DP and 8DI/8DO)

1.5 Technical data

General

Dimensions (HxBxT)	144 x 182 x 76 mm
Weight	approx. 600 g
Installation method	35 mm mounting rail
Earthing	via mounting rail
Protective system (EN 60529)	IP20
Operation temperature	-10...45 °C (14...113 °F)
Storage temperature	-25...70 °C (-13...158 °F)
Climatic category (EN 60721-3-3)	3K3
Environment (IEC 664-1)	Pollution degree 2

Control

Operating voltage control (US)	18...30 VDC ±0 %
Power input control	4 W max.

Digital inputs/outputs

Wiring system	cage-clamp terminals
Operating voltage inputs/outputs (UM)	18..30 VDC ±0 %
Output current	max. 0,7 A per channel, short-circuit proof, free-wheeling diode integrated
Input voltage/current	according to IEC61131-2 type 1

Feldbus interface

Type	ProfiBus DP slave
Connector	D-Sub 9 female, DIN41652 part 1
Speed	9,6 - 12000 kBaud
Use	Connection to a ProfiBus Master, process data transmission, communication channel to the control and axes

Axis interface

Type	HSP5/485
Connector	RJ-45, 8-pole, screened
Speed	38,4 - 250 kBaud
Use	Connection to KEB F5 inverter/servo Process data transmission, communication channel

Ethernet interface

Type	IEEE 802.3, 10Base-T
Connector	RJ-45, 8-pole, screened
Speed	10 MBaud
Use	connection to CoDeSys (programming system, debugging, visualization) connection to COMBIVIS (control and axis adjustment, Scope)

Serial interface

Type	DIN66019II, RS232
Connector	D-Sub 9 female
Speed	9,6 - 115,2 kBaud
Use	connection to COMBIVIS (control and axis adjustment, Scope)

Memory of the programming system

Code	256 KByte, double for online change
Data	392 KByte
Retain	31 KByte
Flag area	512 Byte
Input	256 Byte
Output	256 Byte

1.6 Accessories

Operators

F5 HSP5/485, screw terminal	00.F5.060-9001
F5 HSP5/485, RJ45	00.F5.060-9002

Supply cable

Cable RS232 for COMBIVIS	00.58.025-001D
Cable for operator 00.F5.060-9001	00.F5.0C3-2025
Cable for operator 00.F5.060-9002	00.F5.0C3-1025

2. Basic module with drive interfaces

The basic module is mounted on a 35 mm mounting rail. The grounding occurs by the mounting rail via spring contact on the back of the basic module. The basic module serves as carrier for the control unit and the field bus interface as well as the input/output terminal blocks. Furthermore it contains the

- CPU
- Switching power supply
- Flash file system
- Real-time clock
- HSP5/485-interfaces to the inverter/servo axes

2.1 Real-time clock

The installed real-time clock is maintenance-free (no battery) and operates without power supply for approx.30 days. After this time it must be adjusted again. A read out parameter indicates the validity of the date and time. The control shall remain switched on min. 30 minutes for complete loading. Leap years are recognized automatically up to the year 2099. Date and time can be read and placed via Combivis or the control program.

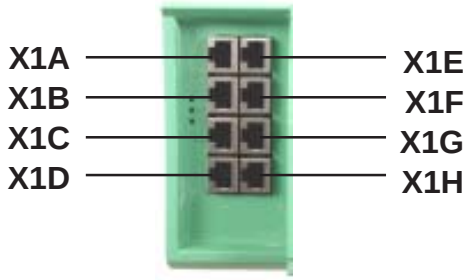
2.2 HSP5/485 interfaces to the inverter/servo axes

Up to eight KEB COMBIVERT F5 can be connected via the terminals X1A to X1H. The connection occurs via reliable RS485 cables, which can be up to 100 m long. A shielded standard cable with RJ-45 connector is used on the control side and appropriate operator on the frequency inverter/servo. The process data of the required axes are exchanged by the control in the cyclic or synchronous mode. Service 50 (1*32 + 2*16 Bit process data) is used thereby. The parameter channel is free for the SPS program and COMBIVIS access to the axes. Depending on the used axes the cycle time can be between 1 and 65 ms. The process data assignment in the axes must be adjusted before starting the cyclic/synchronous operation in parameters SY.16... sy.31 (if not stored in the axes).
The process data are faded-in as follows in the image of the control:

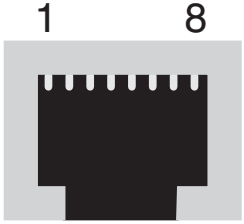
%IW8-9 %ID4	1. Word (32 Bit) of axis 1	%QD4	1. Word (32 Bit) to axis 1
%IW10	2. Word (16 Bit) of axis 1	%QW10	2. Word (16 Bit) to axis 1
%IW11	3. Word (16 Bit) of axis 1	%QW11	3. Word (16 Bit) to axis 1
%IW16+17 %ID8	1. Word (32 Bit) of axis 2	%QD8	1. Word (32 Bit) to axis 2
%IW18	2. Word (16 Bit) of axis 2	%QW18	2. Word (16 Bit) to axis 2
%IW19	3. Word (16 Bit) of axis 2	%QW19	3. Word (16 Bit) to axis 2
%IW24+25 %ID12	1. Word (32 Bit) of axis 3	%QD12	1. Word (32 Bit) to axis 3
%IW26	2. Word (16 Bit) of axis 3	%QW26	2. Word (16 Bit) to axis3
%IW27	3. Word (16 Bit) of axis 3	%QW27	3. Word (16 Bit) to axis3
%IW32+33 %ID16	1. Word (32 Bit) of axis 4	%QD16	1. Word (32 Bit) to axis 4
%IW34	2. Word (16 Bit) of axis 4	%QW34	2. Word (16 Bit) to axis 4
%IW35	3. Word (16 Bit) of axis 4	%QW35	3. Word (16 Bit) to axis 4

%IW40+41	%ID20	1. Word (32 Bit) of axis5	%QD20	1. Word (32 Bit) to axis 5
%IW42		2. Word (16 Bit) of axis5	%QW42	2. Word (16 Bit) to axis 5
%IW43		3. Word (16 Bit) of axis5	%QW43	3. Word (16 Bit) to axis 5
%IW48+49	%ID24	1. Word (32 Bit) of axis 6	%QD24	1. Word (32 Bit) to axis 6
%IW50		2. Word (16 Bit) of axis 6	%QW50	2. Word (16 Bit) to axis 6
%IW50		3. Word (16 Bit) of axis 6	%QW51	3. Word (16 Bit) to axis 6
%IW56+57	%ID28	1. Word (32 Bit) of axis 7	%QD28	1. Word (32 Bit) to axis 7
%IW58		2. Word (16 Bit) of axis 7	%QW58	2. Word (16 Bit) to axis 7
%IW59		3. Word (16 Bit) of axis 7	%QW59	3. Word (16 Bit) to axis 7
%IW64+65	%ID32	1. Word (32 Bit) of axis 8	%QD32	1. Word (32 Bit) to axis 8
%IW66		2. Word (16 Bit) of axis 8	%QW66	2. Word (16 Bit) to axis 8
%IW67		3. Word (16 Bit) of axis 8	%QW67	3. Word (16 Bit) to axis 8

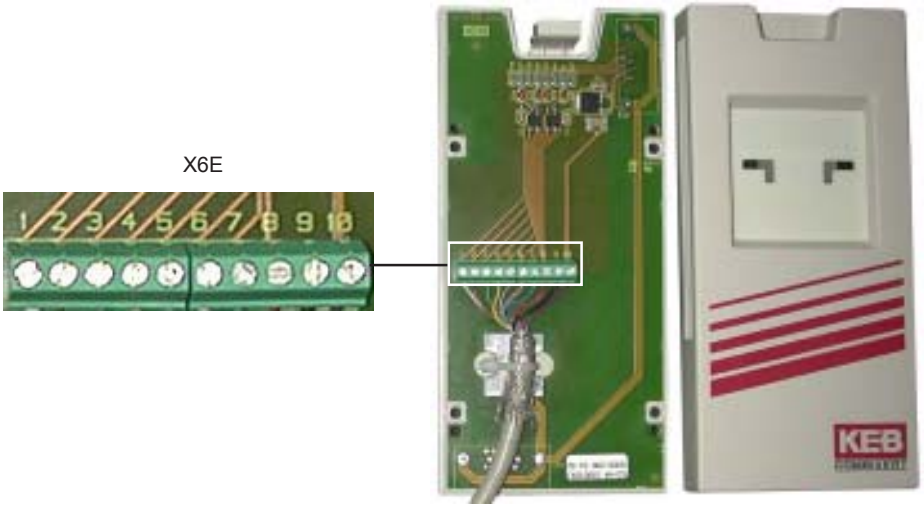
2.2.1 View of the inverter interfaces X1A...X1H for the axes 1..8



2.2.2 Assignment of the HSP5/485 interface

X1A...H	Name	Description	Socket (top view)
1	TXD+	Transmission signal+	
2	TXD-	Transmission signal-	
3	GND	Reference potential	
4	RXD+	Receive signal+	
5	RXD-	Receive signal-	
6	GND	Reference potential	
7	EnTXD+	Handshake transmission signal+	
8	EnTXD-	Handshake transmission signal-	
-	Shield	Shielding	

2.2.3 HSP5 Operator with screw terminal (00.F5.060-9001)

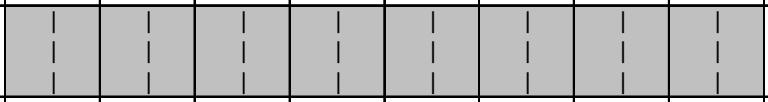


X6E	Name	Description
1	TXD-	Transmission signal-
2	TXD+	Transmission signal+
3	RXD-	Receive signal-
4	RXD+	Receive signal+
5	EnTXD-	Handshake transmission signal-
6	EnTXD+	Handshake transmission signal+
7	EnRxD-	Handshake receive signal-
8	EnRxD+	Handshake receive signal+
9	GND	Reference potential
10	VCC	+24 V voltage output
-	Shield	Shielding (see figure)

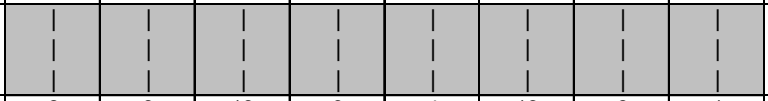
No cables may be connected to terminal VCC. High voltage can destroy the interface in the control.

2.2.4 Adapter cable HSP5 interface operator

Screw terminal:

Color	siehe unten / see below							**C5 PCC X1A...H**
Signal	TxD+	TxD-	GND	RxD+	RxD-	GND	EnTxD+	EnTxD-	
PIN	1	2	3	4	5	6	7	8	
									
PIN	4	3	9	2	1	9	8	7	**Operator X6E**
Signal	RxD+	RxD-	GND	TxD+	TxD-	GND	EnRxD+	EnRxD-	
Color	siehe unten / see below								

Plug-in connection:

Color	siehe unten / see below							**C5 PCC X1A...H**
Signal	TxD+	TxD-	GND	RxD+	RxD-	GND	EnTxD+	EnTxD-	
PIN	1	2	3	4	5	6	7	8	
									
PIN	8	3	13	9	4	13	6	1	**Operator X6C**
Signal	RxD+	RxD-	GND	TxD+	TxD-	GND	EnRxD+	EnRxD-	
Color	siehe unten / see below								

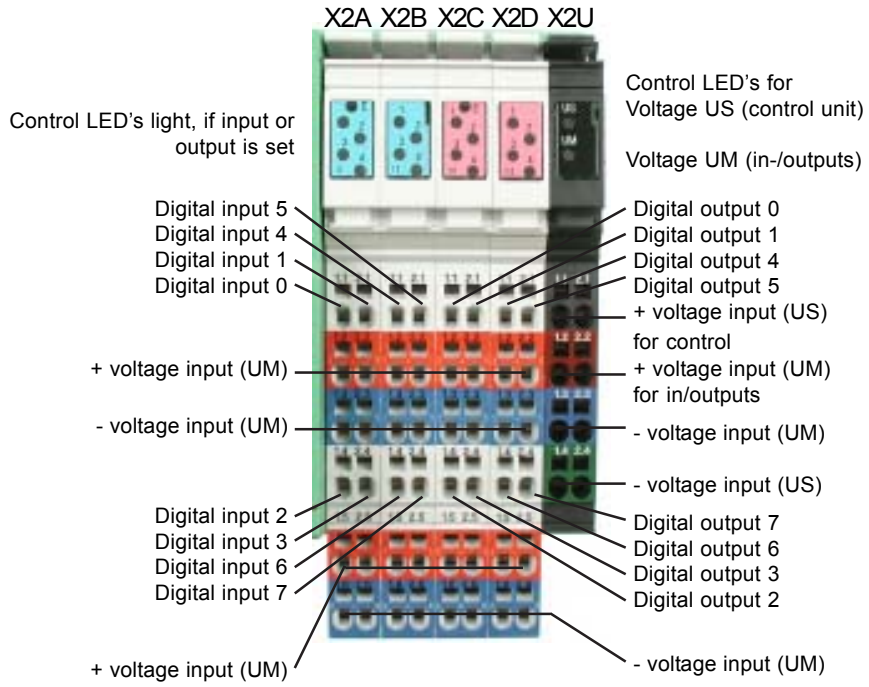
In case of production of own connecting cables please pay attention that the signal pairs (e.g. TxD+ and TxD -) are assigned to the corresponding twisted cables (e.g. green and green/white). Connect un-used scores always to GND.

2.2.5 Comparison of the standards

Pair	PIN	EIA/TIA 568B	EIA/TIA 568A	DIN 47100	IEC 189.2	USOC
3	1	orange/white	green/white	green	red	black
3	2	orange	green	yellow	orange	yellow
2	3	green/white	orange/white	grey	black	orange
1	4	blue	blue	brown	blue	red
1	5	blue/white	blue/white	white	white	green
2	6	green	orange	pink	green	brown
4	7	brown/white	brown/white	blue	yellow	grey
4	8	brown	brown	red	brown	blue

3. In-/output module

Connectors of the in-/output module



The input/output module offers place for five terminal blocks. One is permanently assigned for the voltage supply of the control. The digital inputs/outputs are potential-free from supply voltage.

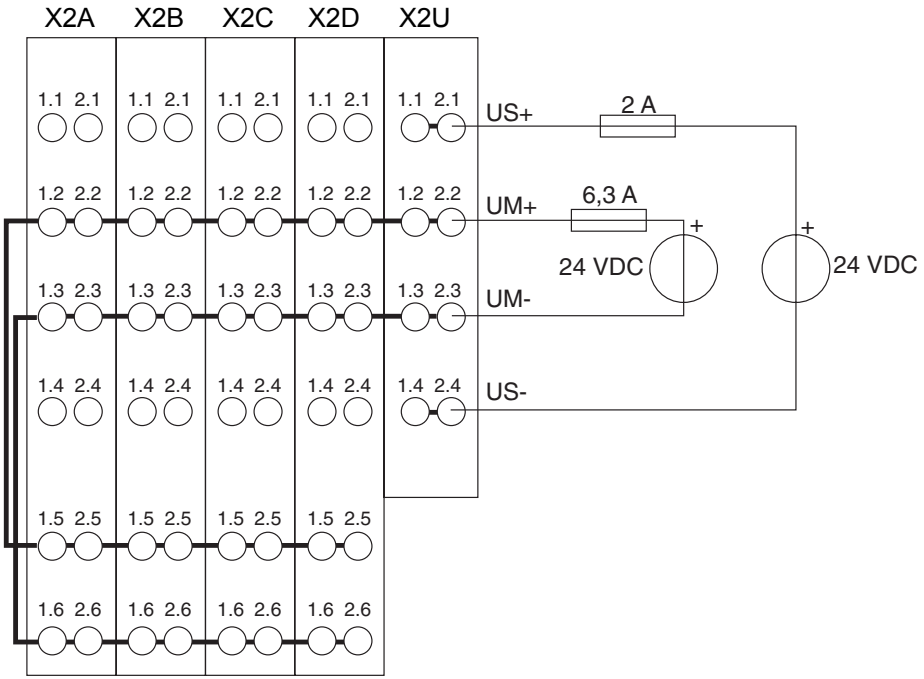
3.1 Voltage supply (X2U)

Voltage supply for the control (US)

Voltage supply for the inputs and outputs (UM)

- %IW1 %IX1.0 condition of the supply voltage in/outputs (UM)
  %IX1.1 is set in case of overload at one ore more outputs
  %IX1.2 to %IX1.15 not assigned

Connection of the supply voltages

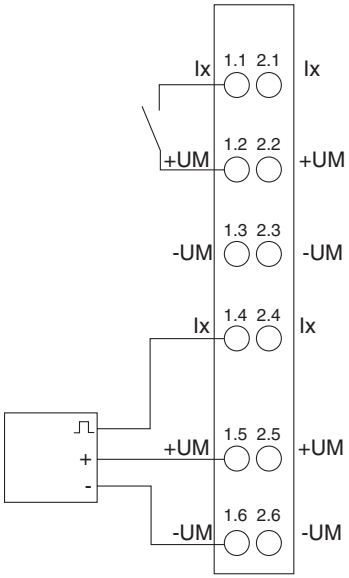


The shown connections between terminal blocks are internally done!

3.2 Digital inputs (X2A and X2B)

8 digital inputs 0...7 (2 blocks)

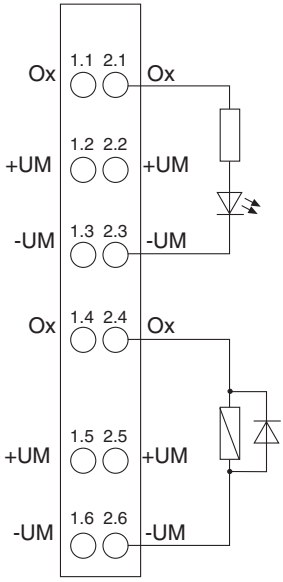
%IW0	%IX0.0 to %IX0.7	(%IB1)	Condition of the inputs 0 to 7
	%IX0.8 to %IX0.15	(%IB0)	not assigned



3.3 Digital outputs (X2C and X2D)

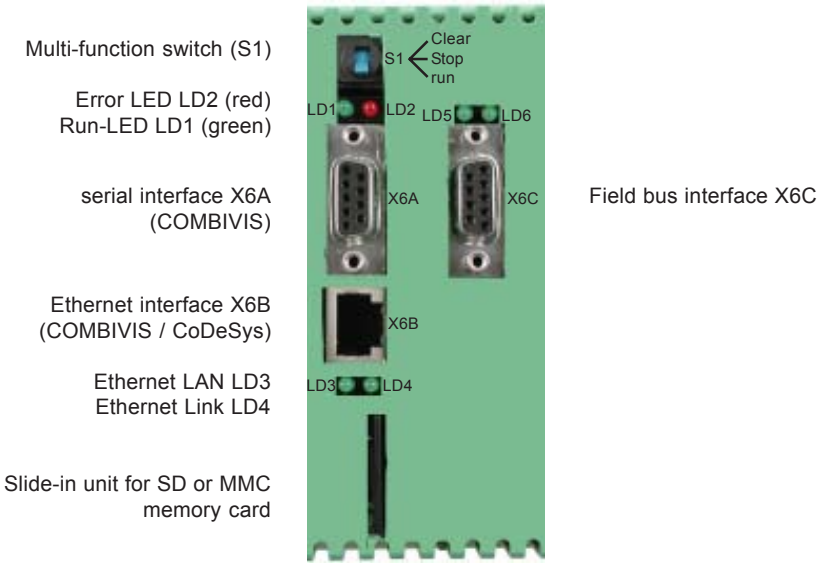
8 digital outputs 0...7 (2 blocks)

%QW0	%QX0.0 to %QX0.7	(%QB1)	Value of the digital outputs 0 to 7
	%QX0.8 to %QX0.15	(%QB0)	not assigned



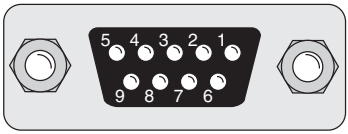
4 The operating unit

Interfaces of *COMBICONTROL*

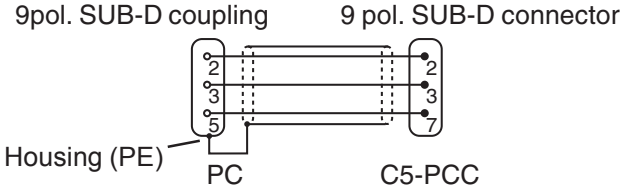


4.1 Serial interface (X6A)

The socket X6A is a serial RS232 interface. It serves for the connection of the control with a PC or other operating units via the protocol DIN66019II.

X6A	Name	Description	SubD-9 socket (top view)
1	PGM	No wiring !	
2	TxD	Transmission signal RS232	
3	RxD	Receive signal RS232	
4	-	-	
5	-	-	
6	PGM+	No wiring !	
7	DGND	Data reference potential	
8	-	-	
9	-	-	

RS 232 cable 3m
PC / C5 PCC
Part No.: 00.58.025-001D



4.2 Ethernet interface (X6B)

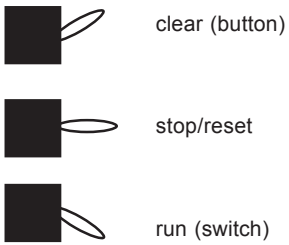
The standardized 10 base-T interface supports the protocols TCP/IP and UDP/IP.
The following ports have these functions:
The CoDeSys port is adjusted to 1200 (as standard). The port can be changed with parameter Et.03. The control program is processed here by means of CoDeSys (only TCP/IP possible).
The COMBIVIS port is adjusted to 8000 (as standard). It can be changed with parameter Et.02. The access of COMBIVIS or other control/visualizations to parameters of the control, the axes as well as if necessary by the control program defined parameters occurs here. TCP or UDP is possible as protocol at which encapsulated DIN66019II data tegrams will transfer.
The used IP address can be adjusted with parameter Et.01. In case that a cross-over cable is used for the connection, make sure that the upper part of the IP address (network number) is the same and the lower part of the IP address (Node number) is different from the PC IP address. The IP address may not have been used in the entire connected Ethernet.

4.3 Description of the LED's

Run-LED	LD1 (green)
off	SPS program stopped or not available
on	SPS program in run mode
Error LED	LD2 (red)
off	O.K.
on	Program error, exact error cause can be determined via CoDeSys or COMBIVIS.
fast blinking	Hardware error, control must be restarted
LAN-LED	LD3 (green)
blinking	Reception active via Ethernet
Link-LED	LD4 (green)
on	Connection to Ethernet active

4.4 Multi-function switch/button S1

The multi function switch/button is constructed as follows:



The button S1 is assigned with the following functions

- Stop --> Run: Program is started
- Run --> Stop: Program is stopped, all variables are reset (reset warm)
- Stop --> Clear and hold (> 3 s) until LD 2 lights: All retain variables are reset (reset cold) after releasing.
- Stop --> Clear and hold (> 10 s) until LD 1+2 light. All variables and the boot project are cleared (reset origin) after releasing the button. If a memory card is plugged-in, all files are copied from the card into the internal flash memory. Existing files (e.g. the boot project) are overwritten.
- Stop --> Clear 3 x within 2 s. All files of the internal flash are copied onto a plugged-in memory card. Existing files are overwritten.

4.5 File system

The file system consists of an internal inserted flash memory (drive C:) and an optionally external plugged-in memory card (drive A:). Access can occur via CoDeSys or directly from the program of the control.

Internal flash memory

This memory is accessed as drive C: and can store the boot project, which is automatically loaded and started when switching on. Any other files (documentation, download lists, prescriptions, etc.) can be stored and read here. The following particularities must be observed:

- Access only possible to files in the root directory.
- Only short file names (8.3 format) are possible.
- Reading takes place with high speed and can occur also at any time in the time-critical cyclic operating modes of the control.
- Writing occurs at a slow rate, because the flash must be programmed here. Any data can be written if the control is in stop condition, but only one file can be opened for writing. If the control is in run condition, only blocks of max. 32KByte can be written into the opened file. As soon as this block was completely stored in the background the next data can be written.

External memory card

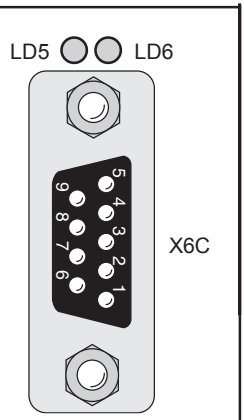
A SD or MMC memory card of any capacity can be plugged-in into the slit-in unit of the operating unit. This memory is accessed as drive A:. Any files can be stored and read here, too. The following particularities must be observed:

- The file system is FAT16 and thereby compatible to an external input device and Windows operating systems.
- Access only possible to files in the root directory.
- Only short file names (8.3 format) are possible.
- Reading and writing is not possible in cyclic operating modes. The card is completely ignored.
- The write protection switch (at SD cards) is not considered, writing on the card is always possible.

Note:
The standard drive of C: can be changed to A: via CoDeSys PLC browser.Thus files can be written and read via CoDeSys to the internal memory or the external memory card.

5. Field bus interface ProfiBus DP

LD5	Ready	Ready for operation
LD6	Data	Data are transmitted by the ProfiBus Master
X6C	Name	Description
1	-	reserved
2	-	reserved
3	RxD/TxD-P	transmission/receive signal P
4	-	reserved
5	DGND	data reference potential
6	VP	supply voltage for terminating resistor
7	-	reserved
8	RxD/TxD-N	transmission/receive signal N
9	-	reserved



The control can be integrated into a ProfiBus network as slave via the ProfiBus-DP interface. Thereby up to 32 bytes (16 words) of process data (in and out) as well as parameterizing data can be exchanged. Depending on the adjustment of object 5FFFh (field bus COMM Axis) the parameterizing data have access to the control (0) or to parameters of the required axis (1..8).
The ProfiBus process data are faded-in in the image of the control:

%IW72 1.process data word of ProfiBus Master
%IW73 2.process data word of ProfiBus Master
... ...
%IW88 16.process data word of ProfiBus Master

%QW72 1.process data word of ProfiBus Master
%QW73 2.process data word of ProfiBus Master
... ...
%QW88 16.process data word of ProfiBus Master

Depending on the number and data type (byte/word/Dword) this range can be adapted in the control configuration with CoDeSys.

6. Software

6.1 Programming system CoDeSys

The axis control is programmed with the programming system CoDeSys of the company 3S-Software (www.3s-software.com). This programming software is free-available in the Internet. A KEB target information file (TNF) for the control is available as accessories, which contains all required hardware specifications. A library with firmware functional modules is further contained for access to the periphery (axes, real-time clock, switch, LED, file system). The use of these functional modules is explained in the provided example projects.

The connection to CoDeSys occurs via the Ethernet interface X6B via IP protocol.
For this the control is connected with a 1:1 cable to the distribution system of an existing firm net or by means of a cross cable directly to the network interface of a PC. IP-address and port number can be adjusted at first via COMBIVIS. TCP/IP (Level2) is selected with the following adjustments in the CoDeSys communication parameter:

Address	: (as adjusted)
Port	: 1200 (or as changed)
Block size	: 512
Motorola Byteorder	: Yes

6.2 Parameterizing System COMBIVIS

The axis control can be parameterized and monitored with COMBIVIS. COMBIVIS is free-available in the Internet (www.keb.de). Access to all axes is possible via the control with COMBIVIS. The control has the node address 0, the axes have the node addresses 1 to 8. Connection with COMBIVIS occurs via Ethernet interface X6B via IP protocol or the serial interface X6A. IP-address and port number can be adjusted first via the serial interface and COMBIVIS. Afterwards the protocol TCP or UDP as well as the correct IP-address of the control is selected in the COMBIVIS IP protocol driver. The data port number is 8000, if necessary it can be changed.
The following must be observed on access to axis:

- First the axes must be switched on, then the control, or the functional module 'Setmodes' must call-upin order to make the connection between control and axis. Thus the baud rate between axis and control is adjusted to the highest possible value and the axis can be accessed via COMBIVIS. (After power-on reset the inverter /servo starts always with 38,4 KBaud)
- If an axis is operated cyclically or synchronously, only the indirect set addressing can be used in COMBIVIS. This applies also to download and scope.

6.3 Parameter description

6.3.1 Runtime and error monitoring

The ru-parameters serve for monitoring of the program flow.

ru.00 status **Address 0200h**

Program status

no prog	no program loaded
prog OK	program loaded
prog corrupt	program checksum error

Control status

run	program runs
Stop	program stopped
breakpoint	program is on break point

Error status

err_cyctime	The adjusted cycle time was exceeded
err_watchdog	The length of the last SPS cycle exceeded the maximum value, the SPS program was stopped.

ru.01 cycle time **Address 0201h**

This parameter indicates the cycle time adjusted by the SPS program in milliseconds. This value is also used for the cycle time monitoring, a value of 0 ms means a free-running SPS program without cycle time monitoring.

ru.02 axis mode **Address 0202h**

The parameter indicates the axis configuration adjusted by the SPS program. There is a differentiation between normal- and synchronous/cyclic operation.

ru.03 axis errors **Address 0203h**

The parameter indicates the axes which did not response. This can have been released by interruption of the cable to the axis or by switching off the axis. The value 0 means that all monitored axes are connected correctly.

ru.04 to ru.08 time measurements

The cycle time of a SPS program flow is composed of:

- Response time : Time of recognizing the new program cycle up to the call of the SPS program
- Process time : Time, when the SPS program as well as all accesses by CoDeSys and COMBIVIS are processed
- Idle time : Remaining time up to the next program cycle

Parameter ru.04 / ru.05 displays the minimum/maximum process time and can be reset by writing of any value.

ru.04	**min. process time**	**Address**	**0204h**
ru.05	**max. process time**	**Address**	**0205h**
ru.06	**response time**	**Address**	**0206h**
ru.07	**process time**	**Address**	**0207h**
ru.08	**idle time**	**Address**	**0208h**

6.3.2 Ethernet parameter

The following parameters contain the values, which are needed for the communication via Ethernet interface.

et.00 MAC address **Address 0300h**

The MAC address (Media Access Control) is formed of 6 byte. The first three bytes contain the manufacturer's code (00-08-FA). Only the lowest 4 bytes are displayed here „FAxxxxxx“. This address is assigned by the manufacturer and cannot be changed.

et.01 IP address **Address 0301h**

The IP address consists of 4 bytes and is the clear identification of one Internet participant (called node by such a way). In case of doubt the network administrator is given the address to be adjusted.
When using a direct connection of control and PC with a cross cable, this IP address should be adjusted in such a way that the difference is only in the lowest byte of the address of the PC's (same network but different node).

et.02 COMBIVIS port number **Address 0302h**

The port number for the access via COMBIVIS is adjusted with this parameter. The standard value is 8000 and normally it is not adjusted.

et.03 CoDeSys port number **Address 0303h**

This parameter adjusts the port number, under which CoDeSys establishes the connection. The standard value is 1200 and normally it is not adjusted.

et.04 IP error count **Address 0304h**

Serves for the diagnosis of the IP protocol stack.

et.05 TCP connections Address 0305h
This parameter displays the number of active TCP connections.

et.06 UDP connections Address 0306h
This parameter displays the number of active UDP connections.

et.07 PGM logged in Address 0307h
This parameter displays that there is an online connection to CoDeSys. A further registration via CoDeSys is not possible then.

et.08 TCP multicount Address 0308h
This parameter serves only for diagnostic purposes.

3.6.3 Real-time clock

The internal real-time clock is adjusted and/or read-out with the following parameters.

rc.00 time Address 0400h
This parameter displays the time in hours and minutes in a 24-hours format. Writing on this parameter adjusts the time.

rc.01 seconds Address 0401h
This parameter displays the seconds in a range of 0...59. Writing on this parameter adjusts the seconds.

rc.02 date Address 0402h
This parameter displays the date in a DD-MM format. Writing on this parameter adjusts the date.

rc.03 year Address 0403h
This parameter displays the year in four digits. Writing on this parameter adjusts the year.

rc.04 data valid Address 0404h
The real-time clock is running for approx. 30 days after switching off the supply. Afterwards it must be adjusted again. If this parameter has the value „no“, the date and/or time is not currently. The clock must be adjusted.

6.3.4 Process Image

pi.00 inputs **Address 0500h**
Displays the condition of the local inputs. See section in-/output module. Set 0 displays the first word, set 1 displays the second word, etc.

pi.01 outputs **Address 0501h**
Displays the condition of the local outputs. See section in-/output module. Set 0 displays the first word, set 1 displays the second word, etc.

pi.02 axis indata 1 **Address 0502h**
Displays the value of the first process-input date (32 Bit) of the axes. Set 0 is for the data of axis 1, set 1 for the axis 2, etc.

pi.03 axis outdata 1 **Address 0503h**
Displays the value of the first process-output date (32 Bit) of the axes. Set 0 is for the data of axis 1, set 1 for the axis 2, etc.

pi.04 axis indata 2 **Address 0504h**
Displays the value of the second process input date (16 Bit) of the axes. Set 0 is for the data of axis 1, set 1 for the axis 2, etc.

pi.05 axis outdata 2 **Address 0505h**
Displays the value of the second process-output date (16 Bit) of the axes. Set 0 is for the data of axis 1, set 1 for the axis 2, etc.

pi.06 axis indata 3 **Address 0506h**
Displays the value of the third process-input date (16 Bit) of the axes. Set 0 is for the data of axis 1, set 1 for the axis 2, etc.

pi.07 axis outdata 3 **Address 0507h**
Displays the value of the third process-output date (16 Bit) of the axes. Set 0 is for the data of axis 1, set 1 for the axis 2, etc.

pi.08 fieldbus indata **Address 0508h**
Displays the value of the fieldbus-input data. Set 0 displays the first word, set 1 displays the second word, etc.

pi.09 fieldbus outdata **Address 0509h**
Displays the value of the fieldbus-output data. Set 0 displays the first word, set 1 displays the second word, etc.

6.3.5 User surface

ud.01 password **Address 0801h**

Password input for the corresponding user level. After switching on the current password level is „user reading“. The following values for the password step are possible:
200: Write protected (operating parameter cannot be changed)
440: User reading/writing

Note: The value for the reading/writing password can be changed with parameter ud.08.

ud.02 smem error count **Address 0802h**

This parameter serves only for diagnostic purposes.

ud.03 IO module **Address 0803h**

This parameter displays the installed I/O module.

ud.04 fieldbus module **Address 0804h**

This parameter displays the installed fieldbus module.

ud.05 error counters rx **Address 0805h**

This parameter counts the receive errors during the communication with the axes. Set 0 displays the errors of axis 1, set 1 of axis 2 etc.

ud.06 error counters tx **Address 0806h**

This parameter counts the errors during the transmission to each individual axis. Set 0 displays the errors of axis 1, set 1 of axis 2 etc.

ud.07 fieldbus comm axis **Address 0807h**

This parameter displays the axis, on which the field bus accesses to by parameter communication.

ud.08 user r/w password **Address 0808h**

Parameters with write/read password level can be changed with the password input of this parameter. The standard value is 440.
This parameter can only be read/changed with a special password.

6.3.6 System Parameters

sy.01 software date **Address 0001h**
This parameter displays the date of the installed unit firmware.

sy.02 device identifier **Address 0002h**
This parameter displays the software-identification number (CFG-ID) for COMBIVIS.

sy.04 max. setnumber **Address 0004h**
Display of the highest set number.

sy.05 password address **Address 0005h**
This parameter displays the address under which the password can be entered.

sy.06 device address **Address 0006h**
This parameter determines the fieldbus unit address.

sy.07 baud rate 66019II **Address 0007h**
The baud rate for the KEB DIN 66019 protocol is adjusted with this parameter.

sy.10 C5 **Address 0010h**
Display of the unit type.

The following parameters serve for the operation of the inverter scope part of COMBIVIS.

sy.32	**scope timer**	**Address**	**0032h**
sy.33	**scope data 1 defin.**	**Address**	**0033h**
sy.34	**scope data 1 set**	**Address**	**0034h**
sy.35	**scope data 2 defin.**	**Address**	**0035h**
sy.36	**scope data 2 set**	**Address**	**0036h**
sy.37	**scope data 3 defin.**	**Address**	**0037h**
sy.38	**scope data 3 set**	**Address**	**0038h**
sy.39	**scope data 4 defin.**	**Address**	**0039h**
sy.40	**scope data 4 set**	**Address**	**0040h**

6.4 System variables

The following system variables are available in the SPS program:

SYSAXISMODE

Displays the axes control modes adjusted via the function block Set modes.

SYSERRORAXIS

Displays the failed monitored or cyclic/synchronous operated axes. In case of failure of an axis the red error LED at the operating unit is switched on and the event "excpt_axis_error" is released (if this event is activated). The control program can evaluate the defective axes in SYSERRORAXIS. Additionally this condition is displayed in parameter ru.03.

SYSCYCLETIME

Displays the cycle time adjusted via the function block SETMODES. Value 0 means that NO cycle time monitoring takes place and the SPS program is running free with a minimum of 1 ms. The cycle time determines the fixed time interval, the SPS program needs for one cycle and into which the process data are exchanged with the axes during cyclic/synchronous operation.

SYSERRORCYCLETIME

The red error LED at the operating unit is switched on, when exceeding the adjusted cycle time. Event "excpt_cycle time_overflow" is released (if this event is activated) and the system variable SYSERRORCYCLETIME is set on TRUE. Additionally this condition is displayed in parameter ru.00.

SYSWATCHDOGMAX

Determines the max. watchdog time in n*44ms. Standard value is 3, that means the program watchdog is adjusted to 132ms.

SYSERRORWATCHDOG

If a cycle of the SPS program needs longer than the maximum watchdog time (e.g. by a endless loop), then the system variable SYSERRORWATCHDOG is set to TRUE and the program is interrupted (SPS is on stop). Additionally this condition is displayed in parameter ru.00.

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12/2004 00.C5.01B-K200