



# COMBIVERT ACCESSORIES

INSTRUCTIONS FOR USE | REALTIME ETHERNET MODULE

Translation of the original manual  
Document 20148981 EN 03



# 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:

<b>DANGER</b>	Dangerous situation, which will cause death or serious injury if this safety warning is ignored.
<b>WARNING</b>	Dangerous situation, which may cause death or serious injury if this safety warning is ignored.
<b>CAUTION</b>	Dangerous situation, which may cause minor injury if this safety warning is ignored.
<b>NOTICE</b>	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.  
[www.keb.de/service/downloads](http://www.keb.de/service/downloads)



## 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. Further information is provided in chapter "Certification".

## 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.  
[www.keb.de/terms-and-conditions](http://www.keb.de/terms-and-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.

Other wordmarks or/and logos are trademarks (™) or registered trademarks (®) of their respective owners.

# Table of Contents

<b>Preface</b> .....	<b>3</b>
Signal words and symbols .....	3
More symbols.....	3
Laws and guidelines.....	4
Warranty and liability.....	4
Support .....	4
Copyright.....	4
<b>Table of Contents</b> .....	<b>5</b>
<b>List of Figures</b> .....	<b>6</b>
<b>List of Tables</b> .....	<b>6</b>
<b>1 Basic Safety Instructions</b> .....	<b>7</b>
1.1 Target group.....	7
1.2 Validity of this manual.....	7
1.3 Electrical connection .....	8
1.4 Start-up and operation.....	8
<b>2 Product Description</b> .....	<b>9</b>
2.1 Product features .....	10
2.1.1 Operating conditions .....	10
2.1.2 Product data .....	10
2.2 Type code .....	10
2.2.1 COMBIVERT F6.....	10
2.2.2 COMBIVERT S6.....	10
<b>3 Hardware Description</b> .....	<b>11</b>
3.1 Overview of the functional elements .....	11
3.2 Fieldbus connections X4B and X4C .....	11
3.3 Positions of the fieldbus connections and the signal transmitter.....	13
3.4 Rotary coding switch (S1, S2).....	14
3.3 Positions of the fieldbus connections and the signal transmitter.....	13
3.4 Rotary coding switch (S1, S2).....	14
<b>4 Technical Data</b> .....	<b>15</b>
4.1 Technical data for EtherCAT.....	15
4.2 Technical data for PROFINET .....	16
4.2.1 Setting of the PROFINET name via rotary coding switch.....	17
4.3 Technical data for POWERLINK .....	18
4.4 Technical data for EtherNet/IP.....	18
4.5 Synchronous communication operating mode .....	19
4.6 Starting behaviour of the main CPU with plugged on RTE module .....	19
4.7 Bicolor-LED „NET ST“ .....	20

4.7.1	Timing of the flashing patterns .....	20
4.7.2	EtherCAT LED status .....	21
4.7.2.1	Error status list .....	21
4.7.3	POWERLINK LED status .....	22
4.7.4	PROFINET LED status.....	22
4.7.5	EtherNet/IP LED status .....	22

## 5 Revision History ..... 23

### List of Figures

Figure 1:	Elements of the Realtime Ethernet option card .....	11
Figure 2:	Meaning and light pattern of the LEDs.....	12
Figure 3:	Positions of the fieldbus connections and the signal transmitters .....	13
Figure 4:	Rotary coding switch at the drive converter .....	14
Figure 3:	Positions of the fieldbus connections and the signal transmitters .....	13
Figure 4:	Rotary coding switch at the drive converter .....	14
Figure 5:	Timing of the flashing patterns .....	20

### List of Tables

Table 1:	Ethernet connections .....	10
Table 2:	Type code drive converter.....	10
Table 3:	Type code drive converter.....	10
Table 4:	Fieldbus connections X4B and X4C .....	11
Table 5:	PIN description RJ45 .....	12
Table 6:	Rotary coding switch Fieldbus protocols.....	14
Table 6:	Rotary coding switch Fieldbus protocols.....	14
Table 7:	Technical Data for EtherCAT .....	15
Table 8:	Technical data for PROFINET.....	16
Table 9:	Setting of the PROFINET name via rotary coding switch .....	17
Table 10:	Technical data for POWERLINK .....	18
Table 11:	Technical data for EtherNet/IP .....	18
Table 12:	Bicolor-LED „NET ST“ .....	20
Table 13:	EtherCAT LED status .....	21
Table 14:	Error status list.....	21
Table 15:	POWERLINK LED status.....	22
Table 16:	PROFINET LED status .....	22
Table 17:	EtherNet/IP LED status .....	22

# 1 Basic Safety Instructions

The COMBIVERT is 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 part of the instructions for use „Accessories“ describes the Real-time ethernet module for COMBIVERT F6, S6 applications.

The manual

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

### 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 until 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).

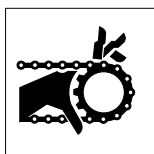
For a trouble-free and safe operation, please pay attention to the following instructions:

- 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 drive controller must not be started 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

The following manual describes the Realtime Ethernet module (RTE) for KEB drive converters of the series COMBIVERT F6 and S6 Application. This is an option card installed into the device for processing all Ethernet-based fieldbus protocols such as PROFINET<sup>® 1)</sup>, EtherCAT<sup>® 2)</sup>, POWERLINK<sup>® 3)</sup> or EtherNet/IP<sup>® 4)</sup>. It essentially contains a fieldbus ASIC with associated peripherals, which is connected via a parallel bus to the main CPU of the control card of the drive converter. Which fieldbus is active can be set via parameter "fb68 fieldbus selection". Only the Ethernet-based fieldbus protocols are processed on the RTE module.

The option card is installed in the factory and is not intended for installation by the customer.

<sup>1)</sup> PROFINET<sup>®</sup> is a registered trademark of Siemens AG.



<sup>2)</sup> is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.



<sup>3)</sup> POWERLINK is a worldwide standard integrated in numerous systems and products of the EPSG Ethernet POWERLINK Standardization Group.



<sup>4)</sup> EtherNET/IP<sup>™</sup> is a trademark of ODVA, Inc.



2.1 Product features

2.1.1 Operating conditions

The operating conditions correspond to the drive converter and remain unchanged with the option.

2.1.2 Product data

Name	Description
Number of fieldbus sockets	2
Type	100BaseTx according to IEEE802.3
Connector	2xModular 8P8C (RJ45) shielded
Bus speed	100 Mbit/s auto-crossover
LEDs integrated in socket	2 per socket
Further LEDs	2x Bicolor-LED
<i>Table 1: Ethernet connections</i>	

2.2 Type code

Position of the fieldbus in the type code of the drive converter.

2.2.1 COMBIVERT F6

xx x6 Axx - x x x x	
	<b>Module identification</b>
	<b>APPLICATION</b>
	1 Realtime-Ethernet module <sup>1)</sup>
<i>Table 2: Type code drive converter</i>	

<sup>1)</sup> The Realtime-Ethernet module (RTE) contains the fieldbus controls EtherCAT®, PROFINET®, POWERLINK and EtherNet/IP™. These can be set by software (parameter "fb68").

2.2.2 COMBIVERT S6

xx x6 Axx - x x x x	
	<b>Module identification</b>
	<b>APPLICATION</b>
	1 Realtime-Ethernet module <sup>1)</sup>
<i>Table 3: Type code drive converter</i>	

<sup>1)</sup> The Realtime-Ethernet module (RTE) contains the fieldbus controls EtherCAT®, PROFINET®, POWERLINK and EtherNet/IP™. These can be set by software (parameter "fb68").

### 3 Hardware Description

#### 3.1 Overview of the functional elements

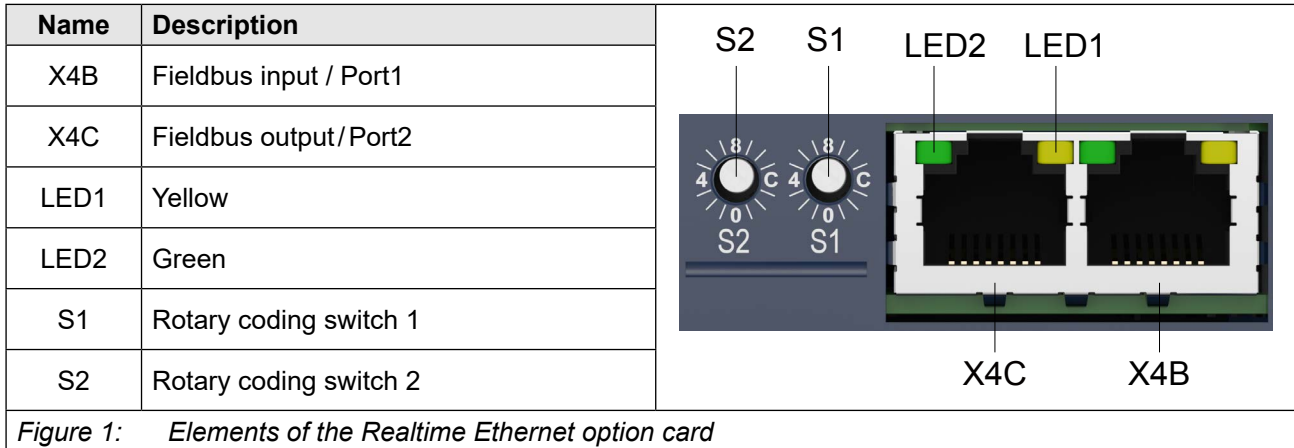


Figure 1: Elements of the Realtime Ethernet option card

#### 3.2 Fieldbus connections X4B and X4C

For connection to the Ethernet-based fieldbus, the RTE module contains two RJ45 sockets in a shielded housing. The physical assignment follows the standard 100 Base Tx according to IEEE802.3. The LEDs in the RJ45 sockets are connected directly to the integrated PHY components.

Specification	Function							
	EtherCAT		PROFINET		POWERLINK		EtherNet/IP	
100 Base Tx according to IEEE802.3 with AutoNegotiation and AutoCrossOver	IN/OUT		2-Port-PROFINET-IRT-Switch		2-Port Ethernet-Hub		2-Port Ethernet-Hub	
	X4B	X4C	X4B	X4C	X4B	X4C	X4B	X4C
	IN	OUT	Port1	Port2	Port1	Port2	Port1	Port2

Table 4: Fieldbus connections X4B and X4C

The meaning of the LEDs integrated in the RJ45 sockets is as follows:

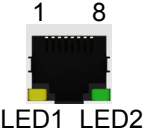
Function			Top view	Name	Description
Bus speed (yellow)				X4B	IN/Port1
Off	No connection or deactivated				
On	Fieldbus ready for operation with 100MBit				
Link/Activity (green)				X4C	OUT/Port2
Off	Port closed				
On	Port opened; without data transfer				
Flicker- ing	Port opened; with data transfer				
<b>EtherCAT</b>					
<b>X4B</b>	LED1	not controlled	<b>X4C</b>	LED1	not controlled
	LED2	Phy0 - Link/Activity		LED2	Phy1 - Link/Activity
<b>PROFINET</b>					
<b>X4B</b>	LED1	tbd	<b>X4C</b>	LED1	tbd
	LED2	tbd		LED2	tbd
<b>POWERLINK</b>					
<b>X4B</b>	LED1	tbd	<b>X4C</b>	LED1	tbd
	LED2	tbd		LED2	tbd
<b>EtherNet/IP</b>					
<b>X4B</b>	LED1	tbd	<b>X4C</b>	LED1	tbd
	LED2	tbd		LED2	tbd

Figure 2: Meaning and light pattern of the LEDs

PIN	RJ45 without supply voltage (shown with auto-cross over)	
1	TX+	RX+
2	TX-	RX-
3	RX+	TX+
4	reserved	
5	reserved	
6	RX-	TX-
7	GND	
8	GND	

Table 5: PIN description RJ45

### 3.3 Positions of the fieldbus connections and the signal transmitter

The figures show the positions of the fieldbus connections and the signal transmitters for the fieldbus (NET ST) and drive converter status (DEV ST) for the device series F6 and S6.

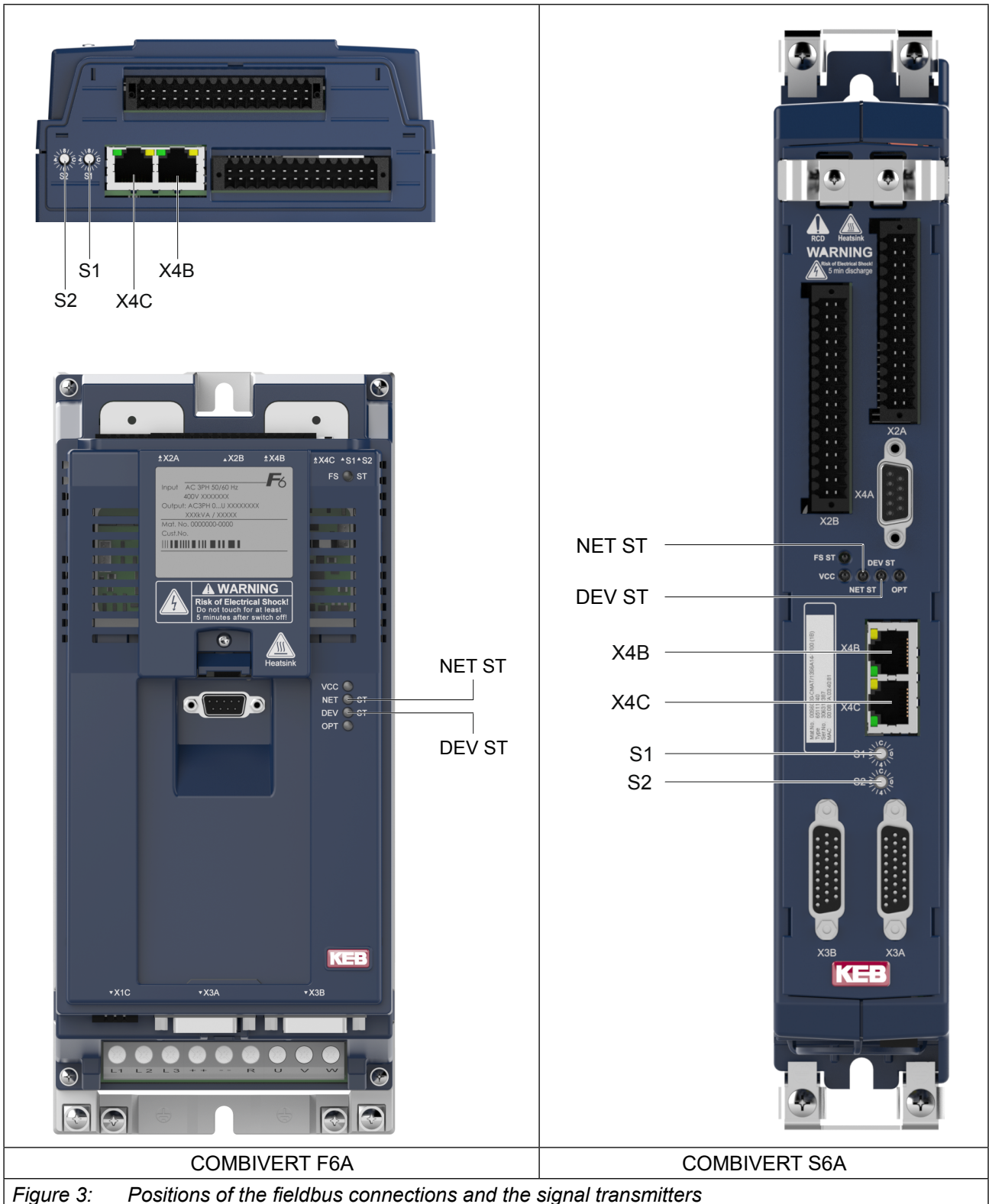


Figure 3: Positions of the fieldbus connections and the signal transmitters

### 3.4 Rotary coding switch (S1, S2)

The hardware of the RTE module contains two 16-fold rotary coding switches for setting an 8-bit value. S1 specifies the low-order 4-bit (Low-Nibble), S2 the higher-order 4-bit (high nibble) of the 8-bit value. Which value was read in by the software can be taken from parameter "fb100". A changed value becomes active only after the next power-on. The active value can be taken from parameter "fb102". The function of this value depends on the set fieldbus protocol set and can be seen in the following table:

EtherCAT	PROFINET	POWERLINK	EtherNet/IP
Currently no function.	Specifies the type of pre-setting of the "NameOf-Station" directly after power-on. => <i>Setting of the PROFINET name via rotary coding switch.</i>	Setting of the POWERLINK node address.	Influence the basic IP configuration.
	Influence the basic IP configuration.	Influence the basic IP configuration.	

Table 6: Rotary coding switch Fieldbus protocols



Figure 4: Rotary coding switch at the drive converter

## 4 Technical Data

### 4.1 Technical data for EtherCAT

Function/description	Value/support	Description
Device addressing	ECAT-Addr	Usually assigned by the master during ramp-up.
Device identification	...via StationAlias	Is supported. The cell in the ECAT-EEPROM(SII) can be written by the master and is stored non-volatile
	...via extension of the state machine	Is not supported (IdentificationReg134 = False)
Hot Connect	Yes, via StationAlias	-
Number SyncManager	4	Receive-, Send-Mailbox, PDOOUT-, PDIN-Data
Number FMMUs	3	PDOOUT-, PDIN-Data, Send-Mailbox-State
Max. number PDOOUT data	64 bytes	Max. 2 PDOs, max. 32 bytes per PDO. Mapping freely selectable for 1. PDO via parameter. 2. PDO for optional FSoE data
Max. number of PDIN data	64 bytes	see max. number of PDOOUT data
Acyclic data transfer: Supported mailbox protocols	CoE	SDO download, SDO upload (Complete Access is not supported), Emergency
Distributed Clocks (DC)	Yes	32-Bit, minimum cycle time = 500 μs => <i>Synchronous communication operating mode</i>

Table 7: Technical Data for EtherCAT

## 4.2 Technical data for PROFINET

Function/Description	Value	Description
PROFINET specification	V2.3	The older startup version according to specification V2.2 is also supported.
Supported protocols	RTC	Real time cyclic protocol, class 1 and class 3
	RTA	Real time acyclic protocol is supported, see Acyclic data transfer
	DCP	Discovery and configuration protocol
	LLDP	Link Layer Discovery Protocol
	SNMP	Simple Network Management protocol
	MRP	Media redundancy protocol as „Client“ is supported
Number of MAC addresses per device	3	Interface, Port1, Port2
Device addressing	NoS (Name of Station)	Max. length = 240 characters. Can be changed by the configurator / controller and is stored non-volatile, => <a href="#">Setting of the PROFINET name via rotary coding switch</a>
	IP address	Is preset by the controller and stored non-volatile.
Acyclic data transfer	Pnet Write-Record and Read-Record	Access to parameters via ProfiDrive Base Mode Parameter Access coding. Max. 39 parameters can be written/read with one access.
Max. number PDOOUT data	32 bytes	Mapping freely selectable via parameter „0x1600 – 1st receive PDO mapping“
Max. number of PDIN data	32 bytes	Mapping freely selectable via parameter „0x1A00 – 1st transmit PDO mapping“
Supported alarms	Process alarm	-
Identification & Maintenance	IM0	Read only
RT support	Yes, RT_CLASS 1	Minimum cycle time = 1 ms
IRT support	Yes, RT_CLASS 3	Minimum cycle time = 1 ms
<i>Table 8: Technical data for PROFINET</i>		



#### 4.2.1 Setting of the PROFINET name via rotary coding switch

For the PROFINET-IO fieldbus, the rotary coding switches (S1, S2) serve as setting of the source for the PROFINET-NoS (Name of Station). All devices in the PROFINET-IO network are addressed via this name. PROFINET controller or configurator can change the PROFINET name of a device. This is then stored non-volatile. Whether this stored value also becomes active with the next power-on depends on the setting of the rotary coding switch. The following table shows the different setting options.

NodeSwitchVal	Short text	Description
0...239	FixedName	PROFINET-Name = „kebx6-n“ with „n“ the decimal value of the node switch
240	UseSavedNoS	Use the last stored PROFINET name
241	ResetToDefault	Set all non-volatile values to default: <ul style="list-style-type: none"> <li>• PROFINET-Name = „ “</li> <li>• PROFINET-IP-Addr = 0.0.0.0</li> <li>• PROFINET-IP-Mask = 0.0.0.0</li> <li>• PROFINET-IP-Gateway = 0.0.0.0</li> </ul>
242	EmptyPnet	(Only) Resetting PROFINET addressing: <ul style="list-style-type: none"> <li>• PROFINET-Name = „ “</li> <li>• PROFINET-IP-Addr = 0.0.0.0</li> <li>• PROFINET-IP-Mask = 0.0.0.0</li> <li>• PROFINET-IP-Gateway = 0.0.0.0</li> </ul>
243	EmptyIP	(Only) Resetting PROFINET-IP addressing: <ul style="list-style-type: none"> <li>• PROFINET-Name = last stored value</li> <li>• PROFINET-IP-Addr = 0.0.0.0</li> <li>• PROFINET-IP-Mask = 0.0.0.0</li> <li>• PROFINET-IP-Gateway = 0.0.0.0</li> </ul>
244...253	Reserved	These values are reserved for future special configurations
254	—	Special configuration for KEB production test: KEBProdTest <ul style="list-style-type: none"> <li>• PROFINET-Name = „ “</li> <li>• PROFINET-IP-Addr = 192.168.0.100</li> <li>• PROFINET-IP-Mask = 255.255.255.0</li> <li>• PROFINET-IP-Gateway = 0.0.0.0</li> </ul>
255	UseSavedNoS	Use the last stored PROFINET name

Table 9: Setting of the PROFINET name via rotary coding switch

### 4.3 Technical data for POWERLINK

Function/Description	Value	Description
POWERLINK specification	V2.0	—
Device addressing	Node-ID	Adjustable via rotary coding switches S1, S2 and parameter "fb100" <sup>1)</sup>
Max. number PDOOUT data	32 bytes	Mapping freely selectable via parameter „0x1600 – 1st receive PDO mapping“
Max. number of PDIN data	32 bytes	Mapping freely selectable via parameter „0x1A00 – 1st transmit PDO mapping“
Minimum cycle time for PD data	—	500 µs => <i>Synchronous communication operating mode</i>
Acyclic data transfer	Via ASND and UDP	SDO
Influence of the IP configuration via rotary coding switch	0, 240, 255	IP address: 192.168.100.0
	1..239, 241...254	IP address: 192.168.100.Node-ID

*Table 10: Technical data for POWERLINK*

<sup>1)</sup> Setting 240 is ignored, instead value = 0 becomes active.

### 4.4 Technical data for EtherNet/IP

Function/Description	Value	Description
EtherNet/IP specification	IEEE 802.3	—
Device addressing	Bootp, DHCP or Static	Adjustable via parameter „fb113“ - IP configuration method
Max. number PDOOUT data	32 bytes	Mapping freely selectable via parameter „0x1600 – 1st receive PDO mapping“
Max. number of PDIN data	32 bytes	Mapping freely selectable via parameter „0x1A00 – 1st transmit PDO mapping“
Minimum cycle time for PD data	—	EtherNet/IP does not support synchronous mode
Acyclic data transfer	Explicit Messaging	Parameterization channel
Influence of the IP configuration via rotary coding switch	0	Is not influenced
	1...255	IP address: 192.168.0.Node-ID

*Table 11: Technical data for EtherNet/IP*

## 4.5 Synchronous communication operating mode

The COMBIVERT F6A / S6A supports a so-called synchronous communication operating mode. This is titled differently for the different fieldbuses. This functionality is referred as Distributed Clocks (DC) for EtherCAT and Isochronous Realtime Ethernet for PROFINET (IRT). For POWERLINK, it is not a separate operating mode, but it is firmly anchored in the protocol. Finally, the synchronous operating mode means that the internal interrupt grid of the drive application is synchronized to the synchronous signal generated by the fieldbus. The KEB drive applications of types F6A and S6A do not support any values for the synchronous cycle time. Refer to the chapters "Synchronization" and "Switching Frequency" of the F6A / S6A programming manuals to find out which dependencies exist here and which parameters have an influence.



Reference to further documentation.

*[Programming manual COMBIVERT F6](#)*

*[Programming manual COMBIVERT S6](#)*

---

## 4.6 Starting behaviour of the main CPU with plugged on RTE module

Due to the switchability of the active fieldbus protocol, the start-up of the F6A / S6A control board is considerably extended when the fieldbus has been changed. Thus the necessary unique copying of the protocol firmware into the non-volatile memory on the RTE module requires a period of up to 1 minute.



---

During the copying process, the two "NET ST" and "DEV ST" LEDs will alternately flash yellow.

---

### 4.7 Bicolor-LED „NET ST“

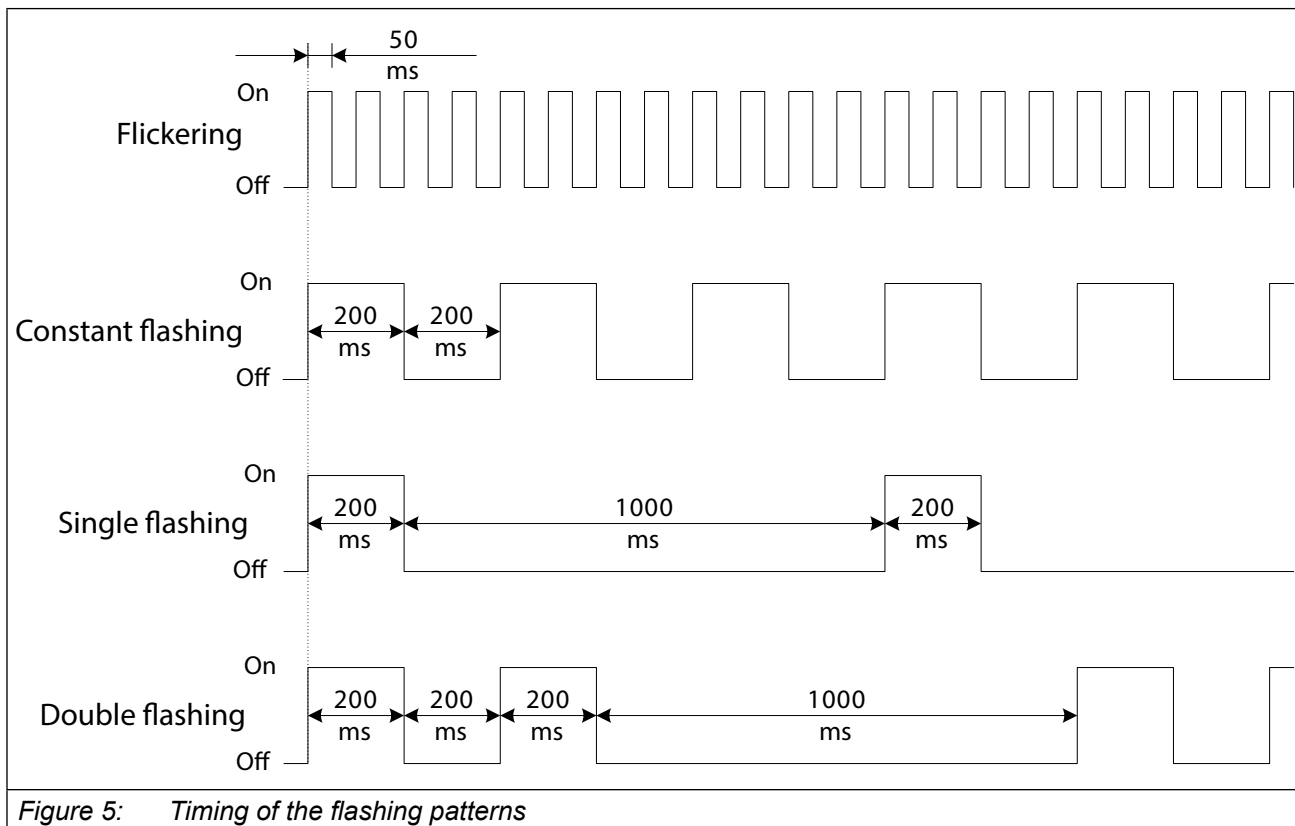
There is an LED named "NET ST" on the motherboard which indicates the state of the fieldbus interface connection. It is a two-colour LED with the basic colours red and green. Which states can be read by the LED "NET ST" is dependent on the set fieldbus.

The following flashing patterns are generally possible.

Light pattern	Description
Off	Sensor is constantly off
On	Sensor is constantly on
Constant flashing	Cyclic change with 200 ms on / 200 ms off
Single flashing	Cyclic change with 200 ms on / 1000 ms off
Double flashing	Cyclic change with 200 ms on/200 ms off/200 ms on/1000 ms off
Flickering	Cyclic change with 50 ms on/50 ms off

*Table 12: Bicolor-LED „NET ST“*

#### 4.7.1 Timing of the flashing patterns



#### 4.7.2 EtherCAT LED status

Status	Light pattern	Description
No activity	Off	Sensor is constantly off
<b>RUN (green)</b>		
Operational	On	Sensor is constantly on
Pre-Operational	Constant flashing	Cyclic change with 200 ms on / 200 ms off
Safe Operational	Single flashing	Cyclic change with 200 ms on / 1000 ms off
Init	Flickering	Cyclic change with 50 ms on/50 ms off
<b>ERROR (red)</b>		
Communication and device errors	Continuous light	Sensor is constantly on
Process data Watchdog	Double flashing	Cyclic change with 200 ms on/200 ms off/200 ms on/1000 ms off
Local error	Single flashing	Cyclic change with 200 ms on / 1000 ms off
Invalid configuration	Constant flashing	Cyclic change with 200 ms on / 200 ms off
Charging error	Flickering	Cyclic change with 50 ms on/50 ms off

Table 13: EtherCAT LED status

##### 4.7.2.1 Error status list

Error	Meaning	Example
Communication and device errors	A communication or device error has occurred	The device does not answer anymore
Process data Watchdog Timeout	The watchdog application signals timeout	Sync Manager timeout
Local error	The fieldbus status has changed due to an error	Device changes its EtherCAT status from OP to SafeOPError due to a synchronization error
Invalid configuration	General configuration error	Status change due to impossible register or object settings or invalid hardware configuration
Charging error	Charging error during initialization	Checksum error in the flash memory of the application controller

Table 14: Error status list

#### 4.7.3 POWERLINK LED status

Status	Light pattern	Description
No activity	Off	Sensor is constantly off
<b>RUN (green)</b>		
Pre-Operational 1	Single flashing	Cyclic change with 200 ms on / 1000 ms off
Pre-Operational 2	Double flashing	Cyclic change with 200 ms on/200 ms off/200 ms on/1000 ms off
Ready for Operational	Triple flashing	Cyclic change with 200 ms on/200 ms off/200 ms on/200 ms off/200 ms on/1000 ms off
Operational	On	Sensor is constantly on
Stopped	Constant flashing	Cyclic change with 200 ms on / 200 ms off
Ethernet mode	Flickering	Cyclic change with 50 ms on/50 ms off
<b>ERROR (red)</b>		
Error	Continuous light	Sensor is constantly on

Table 15: POWERLINK LED status

#### 4.7.4 PROFINET LED status

Status	Light pattern	Description
No activity	Off	Sensor is constantly off
<b>RUN (green)</b>		
PROFINET LED flashing mode	Constant flashing	Cyclic change with 200 ms on / 200 ms off

Table 16: PROFINET LED status

#### 4.7.5 EtherNet/IP LED status

Status	Light pattern	Description
No activity	Off	Sensor is constantly off
<b>RUN (green)</b>		
No connection	Constant flashing	Cyclic change with 200 ms on / 200 ms off
Connection established	On	Sensor is constantly on
<b>ERROR (red)</b>		
Timeout	Constant flashing	Cyclic change with 200 ms on / 200 ms off
Double IP	On	Sensor is constantly on
<b>RUN (green), ERROR (red)</b>		
Self test	Constant flashing	Cyclic change with 200 ms on / 200 ms off

Table 17: EtherNet/IP LED status

## 5 Revision History

Version	Date	Description
00	2017-06	Completion pre-series
01	2018-08	Completion series
02	2020-03	Adjustment of material number key; Extend the light patterns NET-ST; Extension by EtherNet/IP
03	2021-08	Type code position S6 added





**Austria** | KEB Automation GmbH

Ritzstraße 8 4614 Marchtrenk Austria  
 Tel: +43 7243 53586-0 Fax: +43 7243 53586-21  
 E-Mail: info@keb.at Internet: www.keb.at

**Benelux** | KEB Automation KG

Dreef 4 - box 4 1703 Dilbeek Belgium  
 Tel: +32 2 447 8580  
 E-Mail: info.benelux@keb.de Internet: www.keb.de

**Brazil** | KEB South America - Regional Manager

Rua Dr. Omar Pacheco Souza Riberio, 70  
 CEP 13569-430 Portal do Sol, São Carlos Brazil  
 Tel: +55 16 31161294 E-Mail: roberto.arias@keb.de

**Czech Republic** | KEB Automation GmbH

Videnska 188/119d 61900 Brno Czech Republic  
 Tel: +420 544 212 008  
 E-Mail: info@keb.cz Internet: www.keb.cz

**France** | Société Française KEB SASU

Z.I. de la Croix St. Nicolas 14, rue Gustave Eiffel  
 94510 La Queue en Brie France  
 Tel: +33 149620101 Fax: +33 145767495  
 E-Mail: info@keb.fr Internet: www.keb.fr

**Germany | Gearing Motors**

KEB Antriebstechnik GmbH  
 Wildbacher Straße 5 08289 Schneeberg Germany  
 Telefon +49 3772 67-0 Telefax +49 3772 67-281  
 Internet: www.keb-drive.de E-Mail: info@keb-drive.de

**Italy** | KEB Italia S.r.l. Unipersonale

Via Newton, 2 20019 Settimo Milanese (Milano) Italia  
 Tel: +39 02 3353531 Fax: +39 02 33500790  
 E-Mail: info@keb.it Internet: www.keb.it

**Japan** | KEB Japan Ltd.

15 - 16, 2 - Chome, Takanaawa Minato-ku Tokyo 108 - 0074 Japan  
 Tel: +81 33 445-8515 Fax: +81 33 445-8215  
 E-Mail: info@keb.jp Internet: www.keb.jp

**P. R. China** | KEB Power Transmission Technology (Shanghai) Co. Ltd.

No. 435 QianPu Road Chedun Town Songjiang District  
 201611 Shanghai P.R. China  
 Tel: +86 21 37746688 Fax: +86 21 37746600  
 E-Mail: info@keb.cn Internet: www.keb.cn

**Poland** | KEB Automation KG

Tel: +48 60407727  
 E-Mail: roman.trinczek@keb.de Internet: www.keb.de

**Republic of Korea** | KEB Automation KG

Deoksan-Besttel 1132 ho Sangnam-ro 37  
 Seongsan-gu Changwon-si Gyeongsangnam-do Republic of Korea  
 Tel: +82 55 601 5505 Fax: +82 55 601 5506  
 E-Mail: jaeok.kim@keb.de Internet: www.keb.de

**Russian Federation** | KEB RUS Ltd.

Lesnaya str, house 30 Dzerzhinsky MO  
 140091 Moscow region Russian Federation  
 Tel: +7 495 6320217 Fax: +7 495 6320217  
 E-Mail: info@keb.ru Internet: www.keb.ru

**Spain** | KEB Automation KG

c / Mitjer, Nave 8 - Pol. Ind. LA MASIA  
 08798 Sant Cugat Sesgarrigues (Barcelona) Spain  
 Tel: +34 93 8970268 Fax: +34 93 8992035 E-Mail: vb.espana@keb.de

**Switzerland** | KEB Automation AG

Witzbergstrasse 24 8330 Pfaeffikon/ZH Switzerland  
 Tel: +41 43 2886060 Fax: +41 43 2886088  
 E-Mail: info@keb.ch Internet: www.keb.ch

**United Kingdom** | KEB (UK) Ltd.

5 Morris Close Park Farm Industrial Estate  
 Wellingborough, Northants, NN8 6 XF United Kingdom  
 Tel: +44 1933 402220 Fax: +44 1933 400724  
 E-Mail: info@keb.co.uk Internet: www.keb.co.uk

**United States** | KEB America, Inc

5100 Valley Industrial Blvd. South  
 Shakopee, MN 55379 United States  
 Tel: +1 952 2241400 Fax: +1 952 2241499  
 E-Mail: info@kebameric.com Internet: www.kebameric.com



**MORE KEB PARTNERS WORLDWIDE:**

... [www.keb.co.uk/contact/contact-worldwide](http://www.keb.co.uk/contact/contact-worldwide)



**Automation with Drive**

**[www.keb.de](http://www.keb.de)**

KEB Automation KG Suedstrasse 38 32683 Barntrup Tel. +49 5263 401-0 E-Mail: [info@keb.de](mailto:info@keb.de)