



# COMBIVERT ACCESSORIES

INSTRUCTIONS FOR USE | INSTALLATION KTY MONITORING

Translation of the original manual  
Document 20100043 EN 05



# Preface

The described hard- and software are developments of the KEB Automation KG. The enclosed documents correspond to conditions valid at printing. Misprint, mistakes and technical changes reserved.

## Signal words and symbols

Certain operations can cause hazards during the installation, operation or thereafter. There are safety informations in the documentation in front of these operations. Security signs are located on the device or machine. A warning contains signal words which are explained in the following table:

<b>DANGER</b>	Dangerous situation, which will cause death or serious injury in case of non-observance of this safety instruction.
<b>WARNING</b>	Dangerous situation, which may cause death or serious injury in case of non-observance of this safety instruction.
<b>CAUTION</b>	Dangerous situation, which may cause minor injury in case of non-observance of this safety instruction.
<b>NOTICE</b>	Situation, which can cause damage to property in case of non-observance.

### RESTRICTION

Is used when certain conditions must meet the validity of statements or the result is limited to a certain validity range.



Is used when the result will be better, more economic or trouble-free by following these 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

Through multiple applications not every imaginable case has been taken into account. If you require further information or if problems occur which are not treated detailed in the documentation, you can request the necessary information via the local KEB Automation KG 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 Automation KG and remain valid in its entirety.

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# 1 Basic Safety Instructions

The COMBIVERT is designed and constructed in accordance with state-of-the-art technology and the recognised 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. Non-observance 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.

## 1.1 Validity of this manual

This manual describes the optional KTY monitoring for KEB COMBIVERT devices.

The manual

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



## 1.2 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).

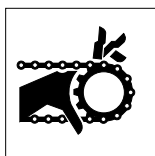
For a trouble-free and safe operation, please pay attention to the following instructions:

- 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.

## 1.3 Start-up and operation

The drive converter 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 converter 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 converter.
- ▶ Secure motors against automatic restart.

## 2 Product Description

The KTY monitoring is an external temperature monitoring for drive converters without internal KTY detection. It is designed for control cabinet usage on mounting rail. The sensor type and the switching threshold can be set independently. The measured temperature can be evaluated via the analog output of the drive converter. Because of the threshold value, it is possible to expand the temperature input of the COMBIVERT also to other sensors.

### 2.1 Functional description

The KTY evaluation allows it to evaluate an only basic insulated sensor by controlling or crossing a limit at the PTC evaluation of the drive converter. The measured temperature is linear between 1...9V at the analog output depending on the limits of the individual sensors.

The PTC emulation (threshold switch) can only indicate exceeding of the set temperature limit, but not the exact temperature value. This is only possible by the analog output. Only the PTC emulation may be used at the provided PTC connector on the drive converter.

When falling again below the threshold temperature, the sensor must cool down by further 10°C before the emulated PTC switches back to the normal temperature range.

### 2.2 Assembly

The KTY evaluation has two rotary coding switches which can be used to set the sensor type and the threshold temperature. The voltage supply, the temperature sensor of the motor, the connection to the drive converter and the analog input can be connected via the terminals with the module. It also features an integrated LED that indicates the current status of the threshold switch.




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The terminals 1...4 are electrically isolated from terminals 5...8 (=> „*Terminals input/output*“ and „*Terminals temperature connection/temperature sensor*“).

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## 3 Technical Data

Unless otherwise indicated, all electrical data in the following chapter refer to a 3-phase AC voltage.

### 3.1 Operating conditions

#### 3.1.1 Climatic environmental conditions

Operation	Standard	Class	Notes
Ambient temperature	<a href="#">EN 60721-3-3</a>	3K3	-10...55 °C
Relative humidity	<a href="#">EN 60721-3-3</a>	3K3	5...85 % (without condensation)
Degree of protection	<a href="#">EN 60529</a>	IP20	Protection against foreign bodies > ø12.5 mm No protection against water Non-conductive pollution, occasional condensation when PDS is out of service.
Site altitude	–	–	Max. 2000m above sea level

Table 1: Climatic environmental conditions

#### 3.1.2 Electrical operating conditions

##### 3.1.2.1 Device classification

Requirement	Standard	Class	Notes
Overvoltage category	<a href="#">EN 61800-5-1</a>	III	–
	<a href="#">EN 60664-1</a>		–
Pollution degree	<a href="#">EN 60664-1</a>	2	Non-conductive pollution, occasional condensation when PDS is out of service

Table 2: Device classification

##### 3.1.2.2 Electromagnetic compatibility

EMC emitted interference	Standard	Class	Notes
Line-conducted interferences	<a href="#">EN 61800-3</a>	C2	–
Radiated interferences	<a href="#">EN 61800-3</a>	C2	–
Interference immunity	Standard	Level	Notes
Static discharges	<a href="#">EN 61000-4-2</a>	8 kV 4 kV	AD (air discharge) CD (contact discharge)
Burst - Signal line	<a href="#">EN 61000-4-4</a>	2 kV	–
Immunity to conducted disturbances, induced by high-frequency fields	<a href="#">EN 61000-4-6</a>	10 V	0.15...80 MHz
Electromagnetic fields	<a href="#">EN 61000-4-3</a>	10 V/m	80 MHz...1 GHz

Table 3: Electromagnetic compatibility

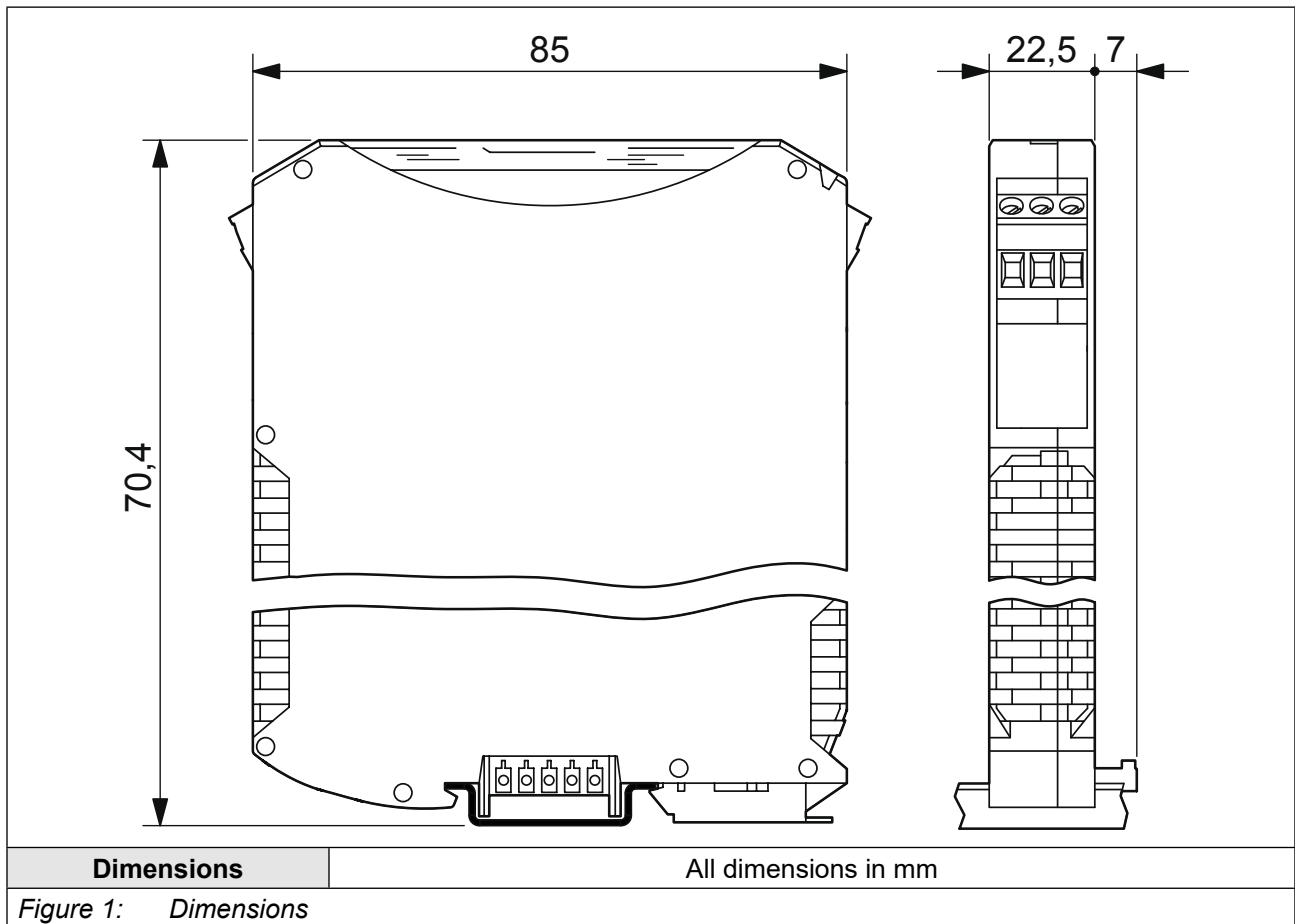
### 3.2 Electrical data

Module type		KTY evaluation
<b>Rated power</b>		
Input voltage range	$U_{in\_dc} / V$	20...28
Rated input current	$I_{in\_dc} / mA$	40
<b>Analog output</b>		
Rated output voltage	$U_{N\_dc} / V$	0...12
Rated output current	$I_{out\_dc} / mA$	4
<b>Threshold switch</b>		
Voltage range	<sup>1)</sup> $U_{dc} / V$	3...5
Resistor (switch closed)	$R / \Omega$	625
<b>Sensor input</b>		
Max. measuring voltage	$U_{max\_dc} / V$	5
Max. measuring current	$I_{max\_dc} / mA$	2

Table 4: Electrical data

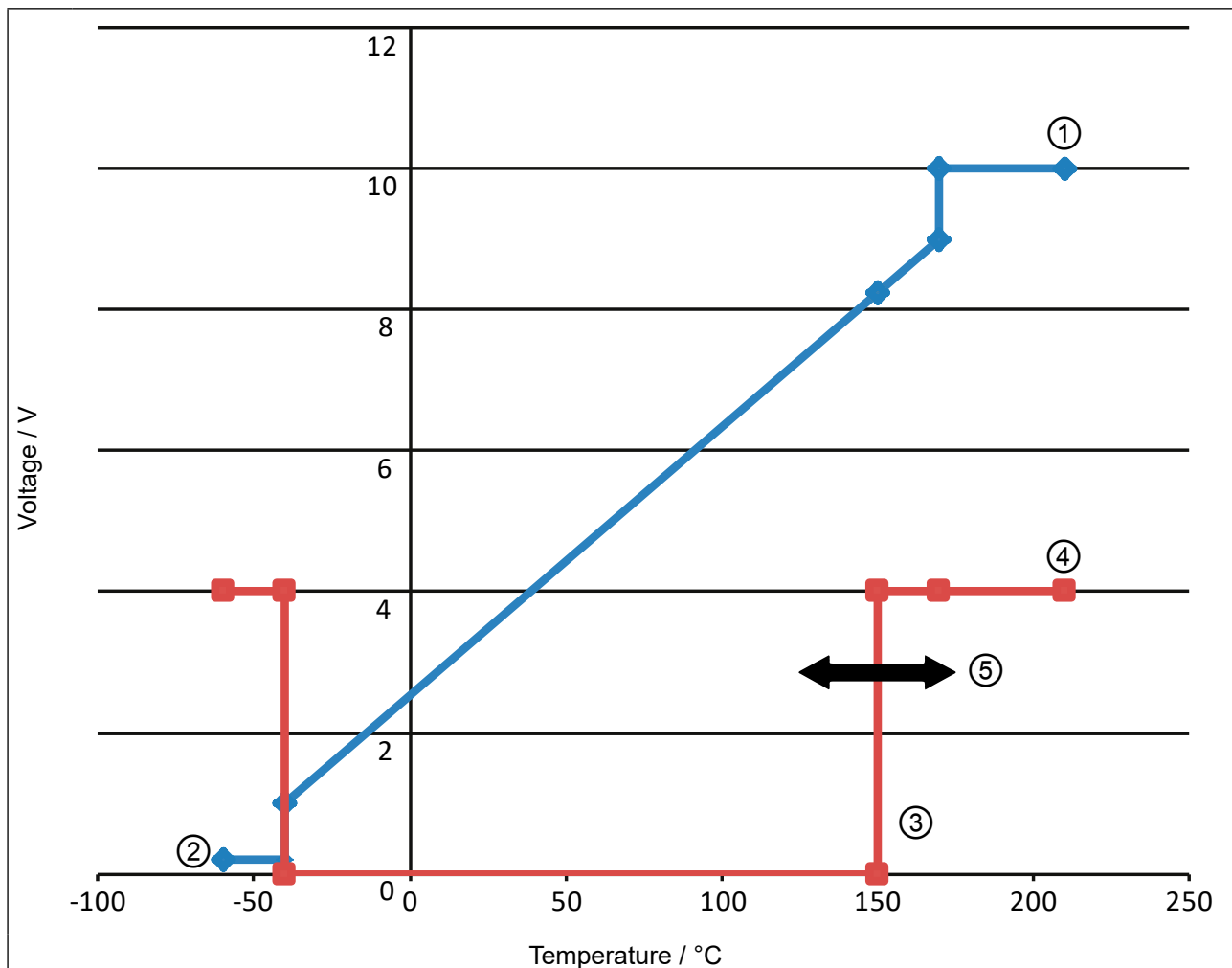
<sup>1)</sup> Using the PTC input of the drive converter.

### 3.3 Dimensions



### 3.4 Output characteristic

The output characteristic is valid for any type of temperature sensor.



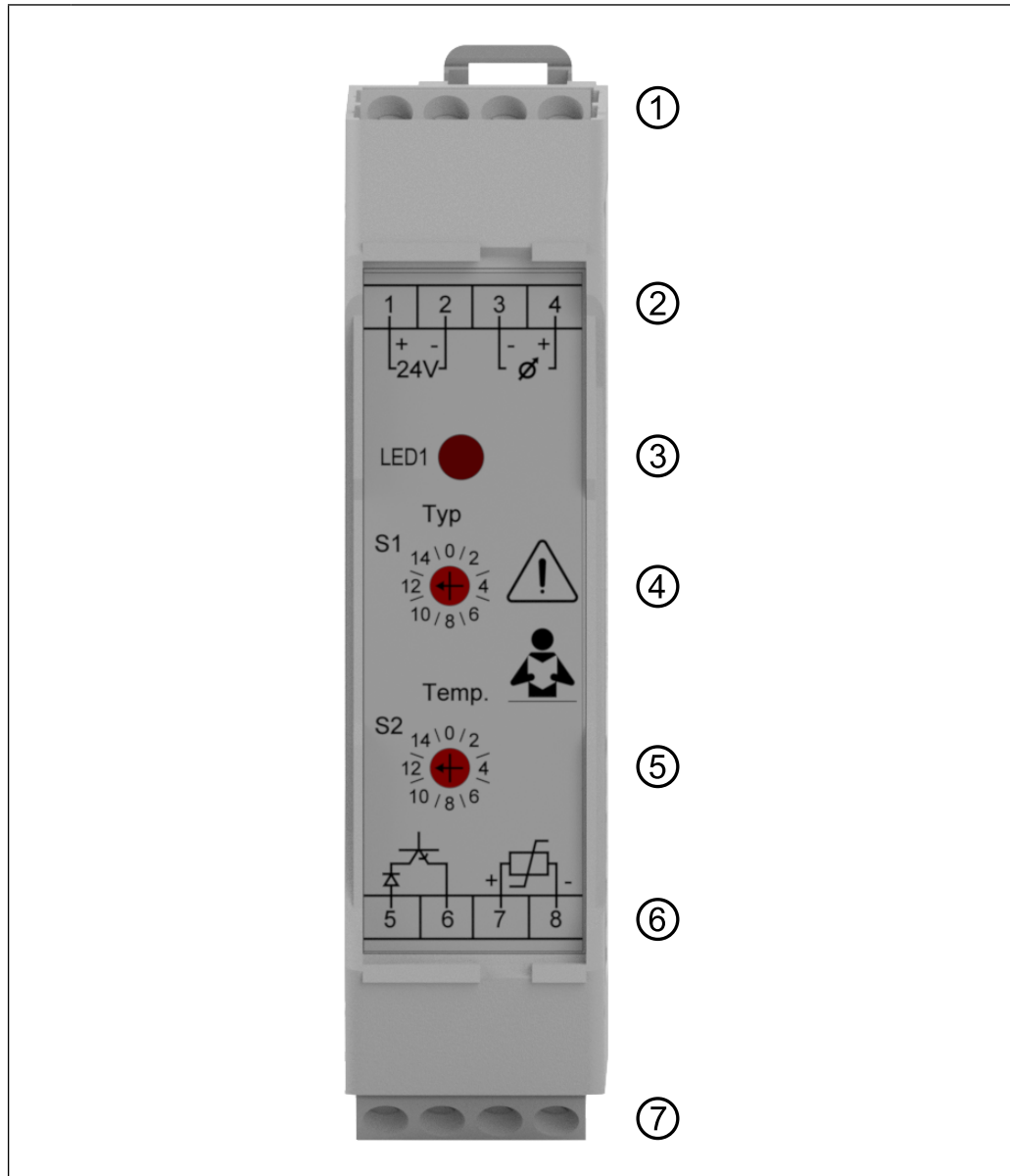
**Legend**

	Voltage
	Threshold switch
1	Measuring range exceeded
2	Measuring range not reached
3	PTC emulation normal
4	PTC emulation triggered
5	Moveable range through temperature settings

Figure 2: Output characteristic

## 4 Operation

### 4.1 Complete overview

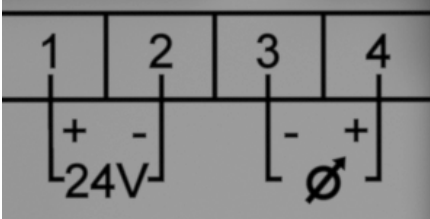


Legend	
1	Terminals input/output
2	Terminal markings input/output
3	Status LED
4	Rotary coding switch S1
5	Rotary coding switch S2
6	Terminal markings temperature connection/temperature sensor
7	Terminals temperature connection/temperature sensor

*Figure 3: Complete overview*

## 4.2 Terminal assignment

### 4.2.1 Terminals input/output



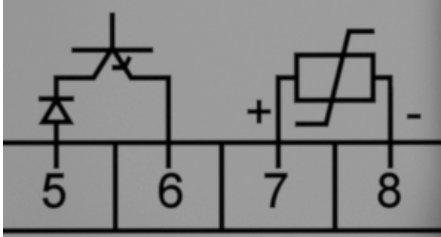
PIN	Function	Explanation
1	+24V	24V input voltage
2	0V	Mass
3	Analog -	Analog output
4	Analog +	

*Figure 4: Terminals input/output*

**NOTICE**

The terminals 24V and analog are at the same potential.

### 4.2.2 Terminals temperature connection/temperature sensor



PIN	Function	Explanation
5	T1 drive converter	Temperature connection Drive converter
6	T2 drive converter	
7	T1 Motor +	Temperature sensor Motor
8	T2 Motor -	

*Figure 5: Terminals temperature connection/temperature sensor*

**NOTICE**

Take care on the proper polarity of the temperature sensor. The faulty installation of the sensor distorts the output characteristic and can lead to destruction of the motor.

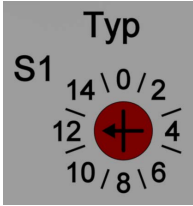
### 4.3 Threshold switch

The threshold switch opens when the threshold temperature is exceeded. After that it signals a triggered temperature sensor to the drive converter. When connecting the sensor take care on the proper polarity, because the threshold switch is a transistor. The measurable resistance via the threshold switch depends on the measuring voltage and whether the threshold switch is closed or open. The sensor type and the threshold temperature can be set via the two rotary coding switches.

### 4.4 Control elements

#### 4.4.1 Rotary coding switch type (S1)

The rotary coding switch type (S1) is responsible for setting the sensor type. The different temperature types, as well as a test function can be adjusted to it.

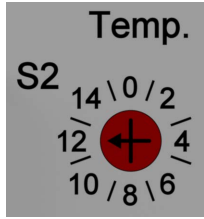
	
Switch position	Temperature type
0	KTY84-130
1	KTY83-110
2	PT1000
15	Test function
3...14	not assigned

*Figure 6: Rotary coding switch type (S1)*



#### 4.4.2 Rotary coding switch temp. (S2)

The rotary coding switch temp. (S2) is used to adjust the threshold temperature. The temperature range is selectable in 16 steps between 80 °C and 155 °C.

	
Switch position	Temperature / °C
0	80
1	85
2	90
3	95
4	100
5	105
6	110
7	115
8	120
9	125
10	130
11	135
12	140
13	145
14	150
15	155

*Figure 7: Rotary coding switch temp. (S2)*

#### 4.4.3 Test function

The test function allows to control the correct function of the KTY evaluation. If the rotary coding switch type (S1) is set to position 15, the test function is active. The voltage at the analog output can be set in 15 steps during the test mode by the rotary coding switch temp. (S2). The chosen position of the rotary coding switch multiplied by 0.667 corresponds to the output voltage. The threshold switch behaves in test mode as follows: At positions 0...14 of the rotary coding switch temp. (S2) it is closed and opened at position 15.

Rotary coding switch	Position	Function
Type (S1)	15	Test function
Temp. (S2)	15	Analog output max. / threshold switch open
Temp. (S2)	0...14	0.667 * switch position

*Table 5: Test function*

4.4.4 Status LED1

The integrated red LED above the rotary coding switch type (S1) indicates the current status of the threshold switch. At closed switch, the LED lights permanent. A flashing status indicates that the switching threshold has been exceeded, the hysteresis value has not yet fallen below, or the measured value is outside the measuring range. In these cases, the switch is opened.

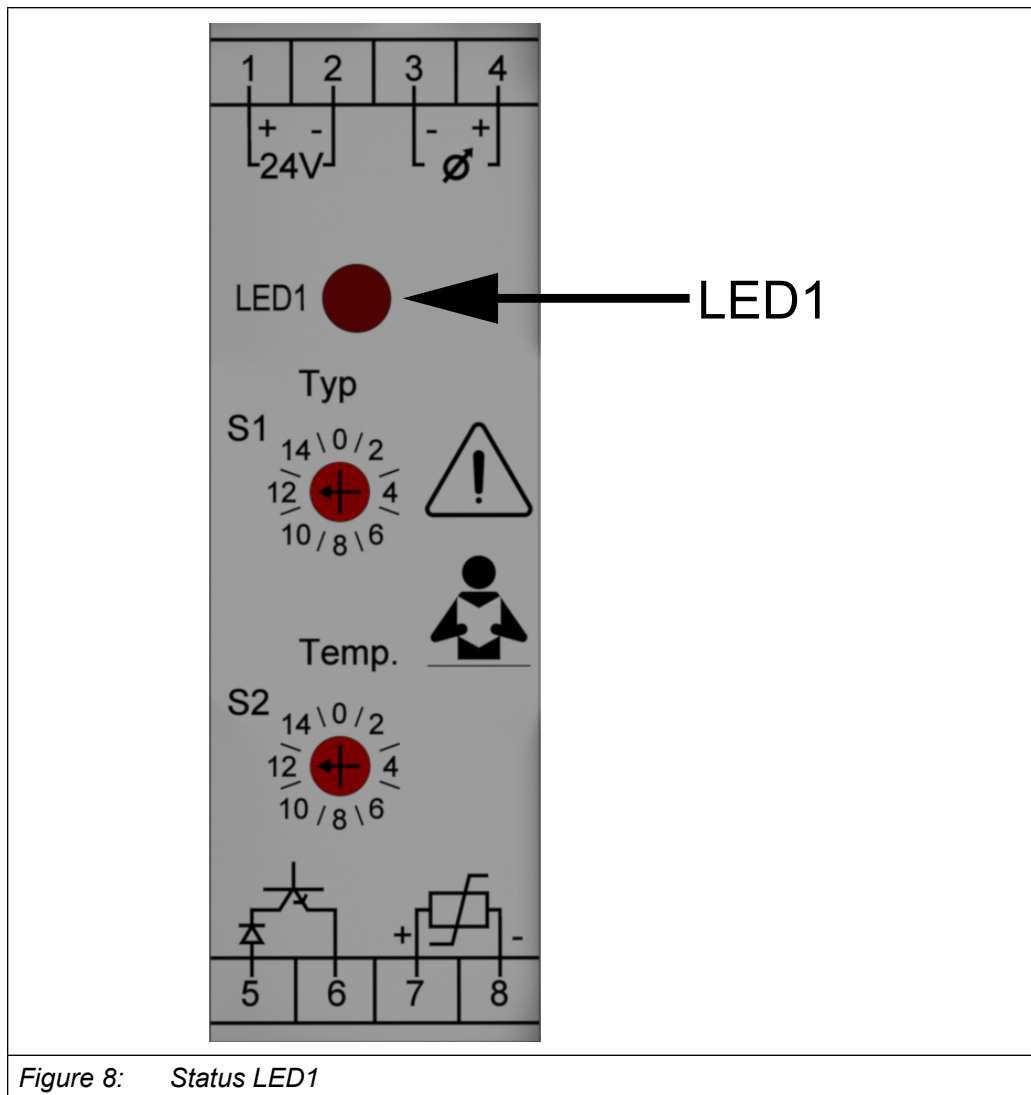


Figure 8: Status LED1



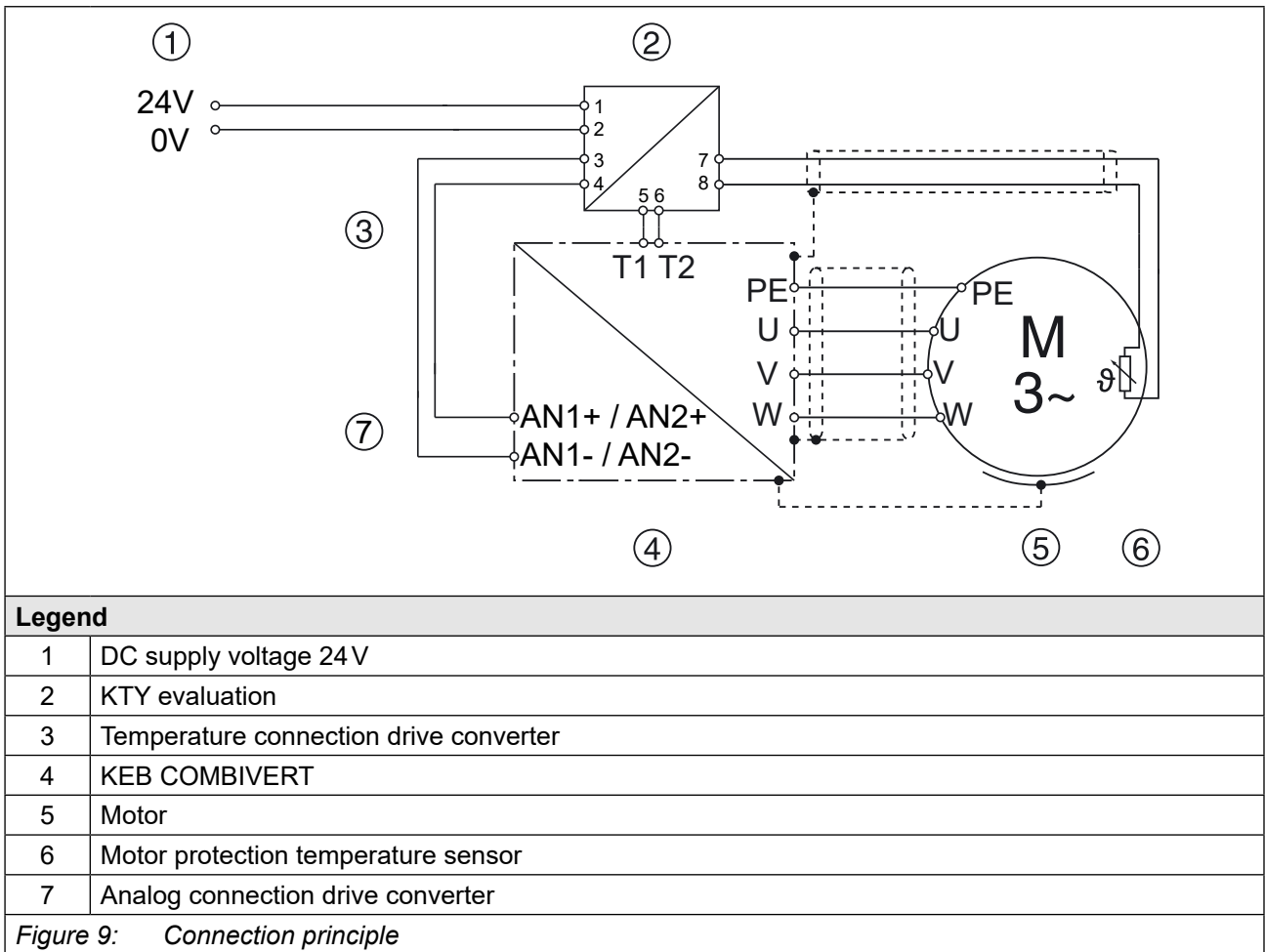
The status LED1 of the KTY evaluation only displays the status of the threshold switch and not the de-energisation of the module.

## 5 Assembly

### 5.1 Connection KTY evaluation

The place of installation for the KTY evaluation is between the KTY sensor in the motor and the PTC or analog input at the drive converter. The analog output of the KTY evaluation must be used for the evaluation of the measured temperature. This is connected to the analog input of the controller.

In order to monitor the exceeding of a set temperature, it is sufficient to connect the switch threshold with the PTC input of the drive converter. However, a specific reaction to individual temperatures can only be realized with the analog output. The reaction of the drive converter can be set via parameters of the control.



## 5.2 Installation instructions

The housing of the KTY evaluation is designed for control cabinet installation on a mounting rail. The PE connection is made via the mounting rail. The mounting rail must be grounded in the control cabinet. The installation must be close to the drive converter to prevent any spread of interferences on the sensor cable. The cables of the two potentials should extend at least 15 cm apart. This prevents interferences in the voltage supply and the analog output. It is recommended to use shielded motor cables to avoid interferences.

### **NOTICE**

#### **Disturbances due to incorrect cables or laying!**

#### **Control malfunctions due to capacitive or inductive coupling.**

- ▶ Do not lay cables from the motor temperature sensor (also shielded) together with control cables.
- ▶ Cables from the motor temperature sensor within the motor cables are only permissible with double shielding!
- ▶ The input of the temperature detection is basic insulated.

## 5.3 Safety instructions

### **NOTICE**

The electrical isolation within the sensor requires safe isolation from the mains. The usage of a least basic-insulated sensor in the engine is necessary at all mains with max. 400 V.

Switching the measurement sensors and threshold voltage only at de-energized drive converter!

## 5.4 Switch on

### **NOTICE**

When the KTY evaluation is switched on, the voltage at the analog output passes the value for "measuring range not reached" and the threshold switch is open. This behavior must be filtered by proper parameterization of the inputs at the drive converter.

## 5.5 Connection

### 5.5.1 Required tools:

Tools	Tightening torque / Nm	
	min.	max.
Head screwdriver M3	0.5	0.6

*Table 6: Required tool*

### 5.5.2 Cable specifications

Cable type	Conductor cross-section / mm <sup>2</sup>		Stripping length / mm	
	min.	max.	min.	max.
Rigid cable	0.14	2.5	2.5	2.5
Flexible cable				

*Table 7: Cable specifications*

## 6 Revision History

Version	Date	Description
00	2015-02	Completion pre-series
01	2015-04	Completion series
02	2015-08	Content adjustments
03	2017-01	Change to newer optics, change in KEB Automation KG
04	2018-03	Content adjustments, change to new KEB-CI
05	2020-11	Revised images, new notes, editorial changes

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