

# EUR EC

## Helios fans

### Electronic universal controller

no. 82558-002/0419

### Installation and Operating Specification



**Keep for reference!**

**NOTE: See start-up wizard, see "First start-up" chapter**

Software version: from Version 12.22

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## 1 General notes

Compliance with the following instructions is mandatory to ensure the functionality and safety of the product. If the following instructions given especially but not limited for general safety, transport, storage, mounting, operating conditions, start-up, maintenance, repair, cleaning and disposal / recycling are not observed, the product may not operate safely and may cause a hazard to the life and limb of users and third parties.

Deviations from the following requirements may therefore lead both to the loss of the statutory material defect liability rights and to the liability of the buyer for the product that has become unsafe due to the deviation from the specifications.

### 1.1 Structure of the operating instructions

Before installation and start-up, read this manual carefully to ensure correct use!

We emphasize that these operating instructions apply to specific units only, and are in no way valid for the complete system!

Use these operating instructions to work safely with and on the device. They contain safety instructions that must be complied with as well as information that is required for failure-free operation of the device.

Keep these operating instructions together with the device. It must be ensured that all persons that are to work on the device can refer to the operating instructions at any time.

Keep the operating instructions for continued use. They must be passed-on to all successive owners, users and final customers.

### 1.2 Target group

The operating instructions address persons entrusted with planning, installation, start-up, maintenance and servicing, who have the corresponding qualifications and skills for their job.

### 1.3 Exclusion of liability

Concurrence between the contents of these operating instructions and the described hardware and software in the device has been examined. It is still possible that non-compliances exist; no guarantee is assumed for complete conformity. To allow for future developments, construction methods and technical data given are subject to alteration. We do not accept any liability for possible errors or omissions in the information contained in data, illustrations or drawings provided.

We accept no liability for damage caused by misuse, incorrect use, improper use or as a consequence of unauthorized repairs or modifications.

### 1.4 Copyright

These operating instructions contain copyright protected information. The operating instructions may be neither completely nor partially photocopied, reproduced, translated or put on data medium without previous explicit consent. Infringements are liable for damages. All rights reserved, including those that arise through patent issue or registration on a utility model.

## 2 Safety instructions

This chapter contains instructions to prevent personal injury and property damage. These instructions do not lay claim to completeness. In case of questions and problems, please consult our company technicians.

### 2.1 Intended use




The equipment is to be used solely for the purposes specified and confirmed in the order.

Any other use above and beyond this is considered not for the intended purpose unless agreed otherwise by contract. The manufacturer will not be liable for any damage resulting from this. The individual or company using it bears the sole risk.

Reading these operating instructions and complying with all contained instructions - especially the safety notifications contained therein - are considered part of intended use. To consider is also the manual of attached components. Not the manufacturer, rather the operator of the device is liable for any personal harm or material damage arising from non-intended use!

## 2.2 Explanations of symbols

Safety instructions are highlighted with warning triangles and are depicted according to the degree of hazard as follows.

	<p><b>Attention!</b> General hazardous area. Death or severe injury or significant property damage can occur if the corresponding precautions are not taken!</p>
	<p><b>Danger due to electric current</b> Danger by dangerous, electric voltage! Death or severe injury can occur if the corresponding precautions are not taken!</p>
	<p><b>Information</b> Important additional information and advice for user.</p>

## 2.3 Product safety

The device conforms to the state of the art at the time of delivery and is fundamentally considered to be reliable. The device and its accessories must only be used in a flawless condition and installed and operated in compliance with the assembly instructions and/or operating instructions. Operating outside the device's technical specifications (see name plate and attachment / technical data) can lead to a defect in the device and additional damage!



### Information

In the case of a malfunction or a failure of the equipment check all functions with alarms in order to prevent injury to persons or property. Note possibility of back-up operation. If used in intensive animal environments, any malfunctions in the air supply must be detected as soon as possible to prevent the development of a life-threatening situation for the animals. The design and installation of the system must comply with local regulations and directives. In Germany these include DIN VDE 0100, the animal protection and the keeping of working animals ordinance and the pig-keeping ordinance etc. Also note the instructions of AEL, DLG, VdS.

## 2.4 Requirements placed on the personnel / due diligence

Persons entrusted with the planning, installation, commissioning and maintenance and servicing in connection with the frequency inverter must have the corresponding qualifications and skills for these jobs.

In addition, they must be knowledgeable about the safety regulations, EU/EC directives, rules for the prevention of accidents and the corresponding national as well as regional and in-house regulations. Personnel to be trained or instructed and apprentices are only permitted to work on the device under the supervision of an experienced person. This also applies to personnel undergoing general training. Comply with the legal minimum age.

## 2.5 Start-up and during operation



### Attention!

- During commissioning, unexpected and hazardous conditions can arise in the entire installation due to defective adjustments, defective components or incorrect electrical connections. Remove all persons and objects from the hazardous area.
- During operation, the device must be closed or installed in a control cabinet. Fuses may only be replaced by new ones and must not be repaired or bypassed. The data for the maximum line fuse are to be considered absolutely (see Technical data). Use only fuses specified in schematic diagrams.
- Any faults detected in the electric system/modules/operating equipment must be corrected immediately. If these faults are not corrected, the device/system is potentially very dangerous. The device/system must therefore not be operated when it is faulty.
- Pay attention to smooth, low vibration running of the motor/fan, the appropriate instructions in the drive documentation must be observed!

## 2.6 Work on the device



### Information

Mounting, electrical connection, and start-up operation may only be carried out by an electrical specialist in accordance with electrotechnical regulations (e.g. EN 50110 or EN 60204)!



### Danger due to electric current

It is generally forbidden to carry out work on electrical live parts. Protection class of the device when open is IP00! It is possible to touch hazardous voltages directly.

The safe isolation from the supply must be checked using a **two-pole** voltage detector.

## 2.7 Modifications / interventions in the device



### Attention!

For reasons of safety, no unauthorized interventions or modifications may be made on the device. All planned modifications must be authorized by the manufacturer in writing.

Only use the manufacturer's original spare parts / wearing parts / accessories. These parts are specially designed for this device. If parts from other sources are used, there is no guarantee that they are designed and produced for the proper loads and with the required level of safety.

Parts and special equipment not supplied by the manufacturer are not approved for use.

## 2.8 Operator's obligation of diligence

- The contractor or owner must also ensure that the electric systems and equipment are operated and maintained in accordance with electro-technical regulations.
- The owner is obliged to ensure that the device is operated in perfect working order only.
- The device may only be used as intended.
- You must periodically examine the safety equipment for their properly functioning condition.
- The assembly instructions and/or operating instructions are always readily available at the location where the device is being used, are complete and are in legible condition.
- These persons are regularly instructed in all applicable questions regarding occupational safety and environmental protection and are knowledgeable regarding the assembly instructions and/or operating instructions and, especially, are familiar with the safety instructions contained therein.
- All safety and warning notices attached to the device are never removed and remain legible.

## 2.9 Employment of external personnel

Maintenance and service work are frequently carried out by external employees who often do not recognize the specific situations and the thus resulting dangers. These persons must be comprehensively informed about the hazards in their area of activity.

You must monitor their working methods in order to intervene in good time if necessary.

# 3 Product overview

## 3.1 Application

The purpose of the device is to reach and maintain the target values set. To accomplish this, the measured actual value (sensor value) is compared with the adjusted target value, and the controlled value is deduced from this.

The device has two separate control circuits and two sensor inputs (0 - 10 V, 4 - 20 mA, KTY 81-210, PT 1000).

Speed controllers for fans or fans with an integrated controller can be activated via the 0 - 10 V signal or the parallel option of the MODBUS Master interface.

## 3.2 Maintenance

The device must be checked for soiling and, if necessary, cleaned in periodic intervals.

### 3.3 Transport

- The device is packed ex factory to suit the transport method previously agreed.
- Always use the original packaging materials when transporting the device.
- Avoid shocks and impacts to the device during the transport.
- During manual handling the human lifting and carrying restrictions must be observed and adhered to.

### 3.4 Storage

- The device must be stored in its original packaging in a dry and weather-proof room.
- Avoid exposure to extreme heat and cold.
- Avoid over-long storage periods (we recommend a maximum of one year).

### 3.5 Disposal / recycling



Disposal must be carried out professionally and in an environmentally friendly way in accordance with the respective national legal stipulations.

- ▷ Separate the materials by type and in an environmentally friendly way.
- ▷ If necessary, commission a specialist company with the waste disposal.

## 4 Mounting

### 4.1 General notes



#### Attention!

The following points must be complied with during the mechanical installation to avoid causing a defect in the device due to assembly errors or environmental influences:

- Before installation remove the device from the packing and check for any possible shipping damage! Start-up is not allowed in the case of transport damage!
- At a weight greater than 25 kg for men / 10 kg for women, the device should be lifted out by two persons (according to REFA). The values may differ from country to country.
- Wear safety shoes and gloves for handling!
- Assemble the device on a clean and stable base. Do not distort during assembly! Use the appropriate mounting devices for proper installation of the unit!
- Do not mount equipment on vibrating base!
- When mounted onto lightweight walls, there must be no impermissibly high vibrations or shock loads. Any banging shut of doors that are integrated into these lightweight walls, can result in extremely high shock loads. Therefore, we advise you to decouple the devices from the wall.
- Do not allow drilling chips, screws and other foreign bodies to reach the device interior!
- The device should be installed in a location where it will not be disturbed, but at the same time can be easily accessed!
- Depending on the housing model use supplied stoppers for cable inlets, cut off necessary cable inlets respectively to the cable diameter. Or alternative use cable inlet for cable glands. Any cable ducts openings not used must be sealed!
- Care must be taken to avoid direct radiation from the sun!
- The device is designed for vertical installation (bottom cable inlet). A horizontal or reclined installation is only permissible after technical release of the manufacturer!
- Be sure to observe proper heat dissipation (see Technical data, heat dissipation).

### 4.2 Outdoor installation

Outdoor installation is possible up to -20 °C when the controller supply is not switched off. Installation must be protected from the effects of weather as much as possible, including protection from direct sunlight!

### 4.3 Installation location for agriculture

When using for animal keeping, do not install the device directly in the stable but in a separate room with a lower pollutant load. This helps to avoid damages caused by pollutant gases (e.g. ammonia fumes, hydrogen sulphide fumes).



#### 4.4 Temperature influences during commissioning

Avoid condensation in the controller and functional faults attributable to condensation by storing the controller at room temperature!

## 5 Electrical installation

### 5.1 Safety precautions



#### Danger due to electric current

- Work on electric components may only be carried out by trained electricians or by persons instructed in electricity under the supervision of an electrician in accordance with electrical engineering regulations.
- The 5 electrical safety rules must be observed!
- It is forbidden to carry out work on electrically live parts.
- Cover neighbouring electrical equipment during installation work.
- Other measures may be necessary to achieve safe electrical isolation.
- A second person must always be present when working on energized parts or lines who disconnects in case of emergency.
- Electrical equipment must be checked regularly: Loose connections are to be re-tightened and damaged lines or cables must be replaced immediately.
- Always keep switch cabinets and all electrical supply facilities locked. Access is only allowed for authorized persons using a key or special tool.
- Operating the device with the housing cover removed is prohibited because energized, exposed parts are present inside the device. Disregarding this regulation can lead to severe personal injury.
- The required protective earth connection is established using screws between the housing parts in metal terminal space covers and housing casings. Commissioning is only permissible after these screws have been properly attached!
- The device owner is responsible for the EMC of the entire plant according to the locally applicable standards.
- Metal screwed-connections are not permitted in plastic housing parts because there is no potential equalization.
- Never clean electrical equipment with water or similar liquids.



#### Information

The respective connections are represented in the enclosure of this Operating Instructions (see connection diagram)!

### 5.2 EMC-compatible installation of control lines

Pay attention to sufficient distance from powerlines and motor wires to prevent interferences. The control cable may not be longer than 30 m. Screened control cables must be used when the cable length is longer than 20 m. When using a shielded cable connect the shielding to one side only, i.e. only to the control unit with the protective ground (keep cable short and with as little inductance as possible!).

### 5.3 Mains connection

The mains connection is made at the terminals: PE, L1 and N. In this regard, it is essential to ensure that the mains voltage lies within the allowable tolerance specifications (see technical data and rating plate affixed to the side).



#### Danger due to electric current

The mains voltage must comply with the DIN EN 50160 quality characteristics and the defined standard voltages in IEC 60038!

### 5.4 Signal input or sensor connection (E1, E2)

The unit has two analog inputs: Analog In 1 = "E1" and Analog In 2 = "E2"

The connection is independent of the programmed operating mode and from the sensor signal employed.

- When connecting **passive** temperature sensors LTR, LTK, LTA.. (KTY81- ) or PT1000 at terminals “E1000” and “T” or “E2” und “T” must be paid attention to no polarity.  
For a high interference immunity a capacitor must be connected directly to the sensor (1 nF parallel). With temperature sensors type LTR, LTK, LTA.. (KTY81- ) a capacitor is integrated.
- When connecting **active** sensors at the terminals “E1” and “GND” and or “E2” and “GND” attention must be paid to correct polarity, a 24 V DC power supply is integrated.
- For sensors in two-wire-technology (4 - 20 mA signal), the connection is made on the “E1” and “24 V” or “E2” and “24 V”, “GND” terminal is omitted.



**Danger due to electric current**

Never apply line voltage to analog inputs!

### 5.5 Control outputs 0 - 10 V (A1, A2)

The analogue outputs can be used to activate a speed controller with 0 - 10 V input for example. Fans with integrated controller and 0 - 10 V input can be activated directly.

- Analog output 1 (terminals A1 - GND)
  - Controlled 0 - 10 V output for control circuit 1 (factory setting function  $\boxed{2A}$ ).
- Analog output 2 (terminals A2 - GND)
  - For operation with one control circuit: constant voltage +10 V e.g. for supply of an external potentiometer (function factory setting  $\boxed{1A}$ ).
  - For operation with a second control circuit: controlled 0 - 10 V output for control circuit 2 (function initial setting  $\boxed{8A}$ ).

Other functions can be assigned if necessary (see Operating Instructions / IO Setup).



**Danger due to electric current**

It is not permissible to connect outputs of several devices to each other!

### 5.6 Voltage supply for external devices (+24V, GND)

A voltage supply is integrated for external devices e.g. a sensor (max. current load see technical data).

In case of overload or short circuit (24 V – GND), the external power supply is shut down (multi-fuse). The device performs a “Reset” and continues operation.

- It is not permissible to connect voltage outputs of several devices to each other!
- It is not permissible to connect voltage outputs in the device to each other!

### 5.7 Digital inputs (D1, D2)

Different functions can be assigned to the digital inputs “D1”and “D2” (see IO Setup: Functional overview of digital inputs). Activation via floating contacts, a low voltage of approx. 24 V DC is connected.



**Danger due to electric current**

Never apply line voltage to the digital input!

Note the input resistance (see technical data).

## 5.8 Relay outputs (K1, K2)

Various functions can be allocated to the relay outputs “K1” and “K2” (see IO Setup: function and inverting relays outputs). Max. contact rating see technical data and connection diagram.

### Relays K1

- Connection of the floating contacts of relay “K1” to the terminals 11, 14, 12.
- “K1 Function” factory setting: **[1K] = Operating indication**. I.e. energized for operation without fault, for enable “OFF” de-energized.

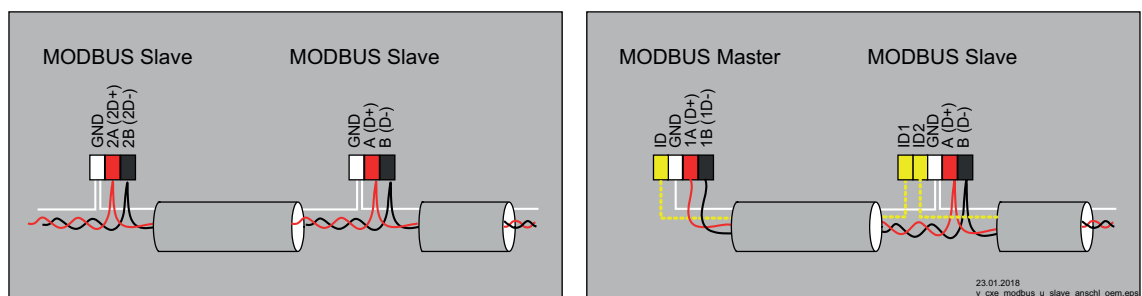
### Relays K2

- Connection of the floating contacts of relay “K2” to the terminals 21, 24, 22.
- “K2 Function” factory setting: **[2K] = Fault indication**. I.e. energized for operation without fault and for enable “OFF”.

## 5.9 RS-485 interfaces for MODBUS RTU

The device has two RS-485 interfaces for networking via MODBUS RTU:

1. Interface “1A (1D+)”, “1B (1D-)” for MODBUS Master applications
  - Pre-programmed function is output from control circuit 1: **[1. Control signal (2A)]** e.g. for activating speed controllers for fans or fans with integrated controller and MODBUS interface (☞ member MODBUS Master).  
The programmable functions correspond to the functions for the analogue outputs described in the IO Setup.
  - Automatic addressing of members via a patented procedure.  
It is no longer necessary to address each individual member manually in the network. The “ID” connection is also assigned (for more information ☞ the following chapter).
  - Integrated failsafe wiring and 150 Ω termination.
2. Interface “2A (2D+)”, “2B (2D-)” for MODBUS Slave applications
  - Connection of the device to a superordinate building control system.
  - Setting of address and communication parameters ☞ Programming: Menu group MODBUS Slave.



Connection MODBUS Slave and MODBUS Master interface

**When using telephone cable with four cable cores, we recommend the following allocation:**

- A (D+) = red
- B (D-) = black
- ID - ID1/2 = yellow (for automatic addressing for MODBUS Master)
- GND = white

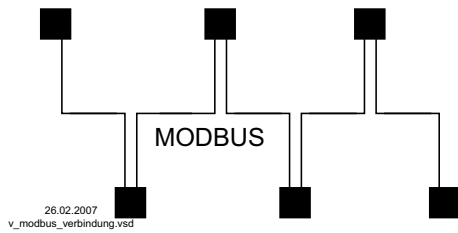


### Information

- You must ensure correct connection; i.e. “A (D+)” must also be connected on the following devices to “A (D+)”. The same applies to “A (D+)”.
- In addition, a “GND” connection must be established, as dissimilar potential (over 10 V!) will lead to the destruction of the RS-485 interface (e.g. lightning).
- Except for the data link “A (D+)”, “B (D-)”, the “ID1 - ID2” (automatic addressing for MODBUS Master) and the “GND” connection, no further cable cores of the data line may be used.
- Make sure the distance from powerlines and motor wires is sufficient (min. 20 cm).

The data line must be connected from one device to the next. No other type of wiring is allowed! Always use only two wires of one lead (twisted pair) for the connection.

MODBUS connection



Recommended wire types

1. CAT5 / CAT7 cables
2. J-Y (St) 2x2x0.6 (telephone cable)
3. AWG22 (2x2 twisted pair)

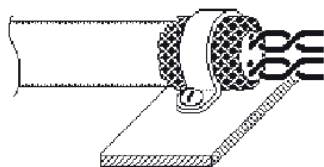
Max. allowed wire length 1000 m (CAT5/7 500 m)

Shielding

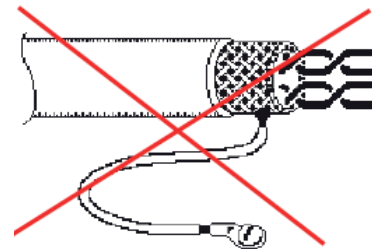
The use of shielded cables is normally not needed but offers high protection against electromagnetic interferences, especially high frequencies. However, the effectiveness of the shield depends on careful installation of the line.

If shielded cables are used, the shield should be placed at "PE" on at least one side (preferably on the master connection). The occurrence of compensating currents may have to be considered if the shield is contacted on both sides.

Shield connection correct



Shield connection incorrect



5.9.1 Addressing member MODBUS Master Interface

Up to 32 members can be connected at the MODBUS Master interface.

No other components are required for the patented automatic addressing (activation menu group MODBUS Master: AutoAddressing). Only the connections "ID1" and "ID2" of the Slave members are connected additionally next to the bus connection and at the "ID" connection of the MODBUS Master for this.

The "ID" connection of the MODBUS Master must be connected to the "ID1" or "ID2" connection of the **first Slave member**. This is recognised as a result and occupied by address 1.

For the following users the connection "ID1" or "ID2" of a Slave user respectively is connected with connection "ID1" or "ID2" of the next Slave user.

The automatic addressing of other users is initiated by the previous user via this connection.

The individual members can be addressed in advance without this device by an external terminal or a PC.

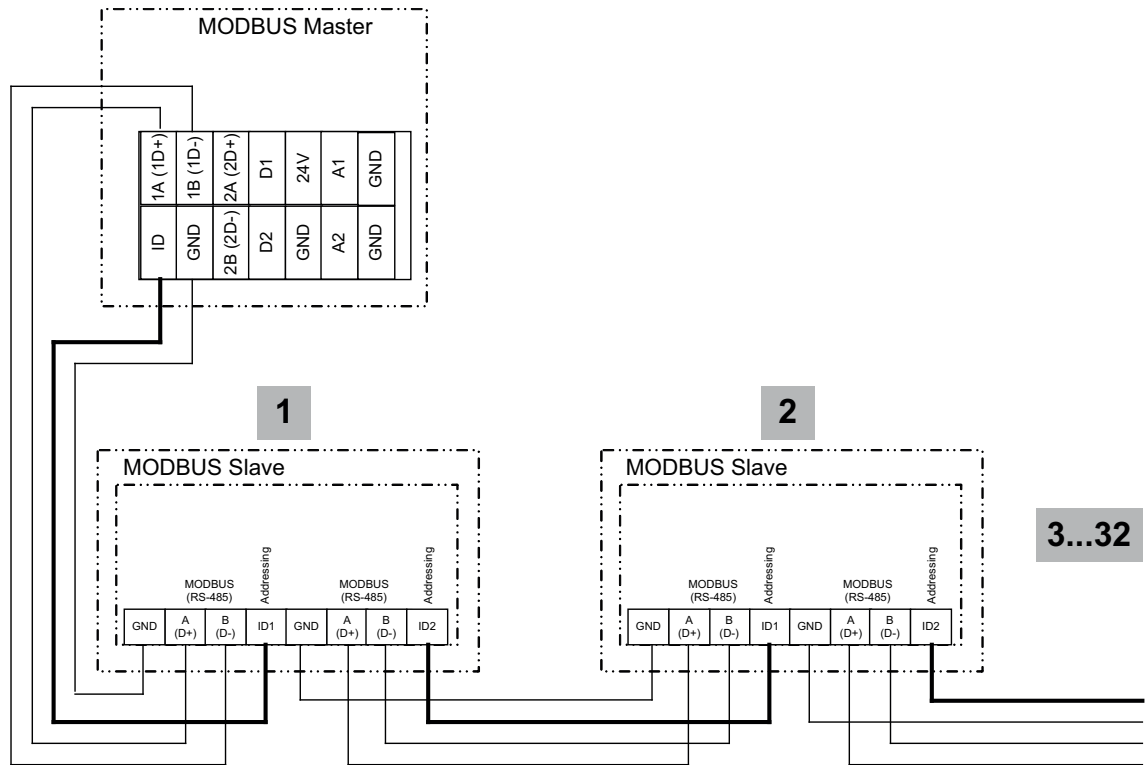
Alternatively the addressing can be done manually by a separate hand held terminal or PC software, the appropriate number of members must then be entered on the MODBUS Master ( menu group MODBUS Master).



Information

- If a repeater is necessary and automatic addressing is to be carried out, only certain repeaters that relay the addressing signal can be used.
- Depending on the version, the connections for MODBUS "A (D+)", "B (D-)" are available single or double at the Slave members. These are connected with each other internally electrically.
- The connections for the automatic addressing "ID1" and "ID2" of the Slave members are **not directly** connected with each other. These may not be bridged; any order of connection is possible.
- The communication parameters are fixed Programming: Menu group MODBUS Master.

Networking with telephone wire



13.03.2013  
v\_modbus\_master\_autoadr.vsd

Connection at MODBUS Master via the terminals: A (1D+), B (1D-), ID and GND  
 Connection of the Slave members via the terminals: A (D+), B (D-), GND and ID1 / ID2

**5.10 USB-interface**

Over the USB interface if necessary a software update can be made. For this a consultation with the manufacturer is necessary.



**Danger due to electric current**

**Plug the jumper J1** to both PINs only for a software update via USB interface. The device will not switch on if this jumper is plugged to both PINs!

Do not replug the jumper under voltage, observe the safety instructions!

**5.11 Potential at control voltage connections**

The connections for the control voltage (< 30 V) relate to the common GND potential (exception: relay contacts are potential-free). There is a potential isolation between the connections for the control voltage and the PE conductor. It must be ensured that the maximum external voltage at the connections for the control voltage cannot exceed 30 V (between the "GND" and "PE" conductor terminals). A connection to the PE conductor potential can be made if required; fit a bridge between the "GND" terminal and the "PE" connection (terminal for shield).

## 6 Select operation mode

### 6.1 Mode and signal input



#### Information

Simple installation is possible through the selection of the preprogrammed mode of operation (☞ Start-up)

This determines the basic function of the device; factory setting **1.01** = speed controller (activation via 0 - 10 V signal). The controller configuration is automatically carried out during selection of the application related mode of operation. The factory presets in accordance with the mode of operation are based on many years of experience, which is suitable for many applications. Under special circumstances, these can be individually adapted (☞ Operating Instructions / Controller Setup: "Controller Configuration").

The purpose of the device is to reach and maintain the target values set. To accomplish this, the measured actual value (sensor value) is compared with the adjusted target value, and the controlled value (modulation) is deduced from this.

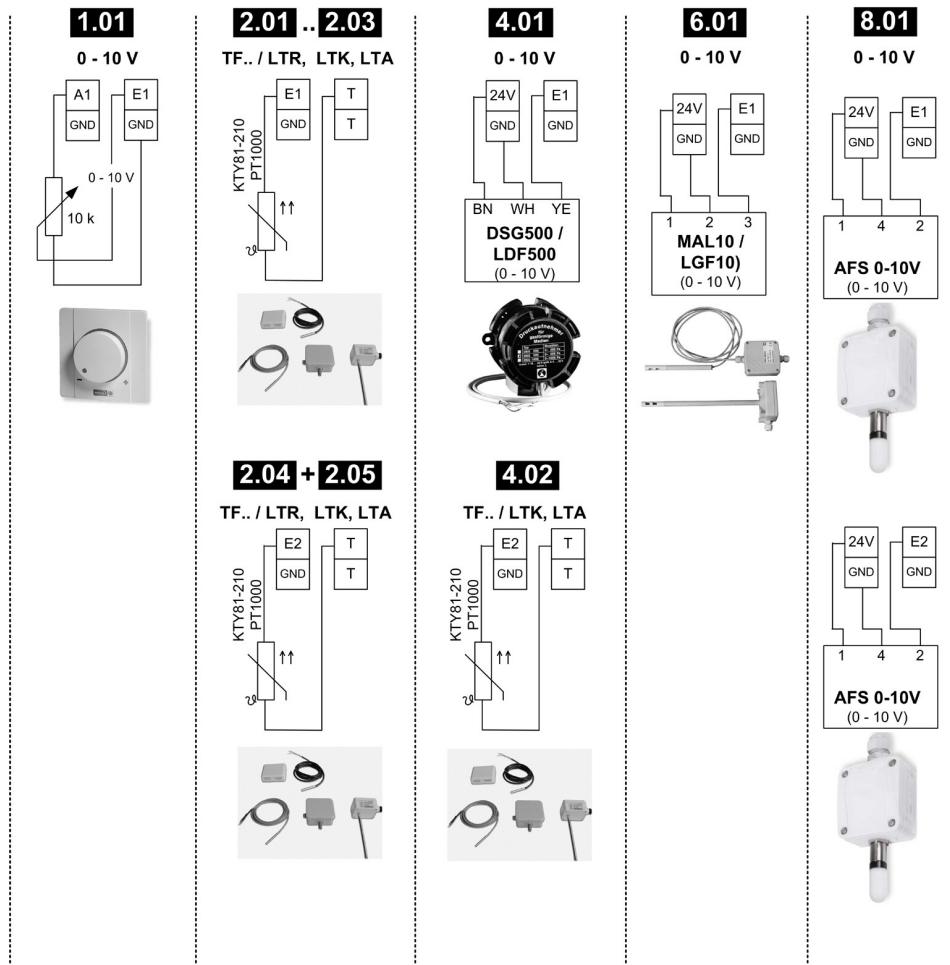
By selection of the mode the function for control circuit 1 is determined, this influences the following outputs (factory setting):

1. Analog output "A1" 0 - 10 V with function **2A** (☞ Electrical installation).
2. MODBUS Master interface "1A" + "1B" with function **2A** (☞ Electrical installation).

Mode	Signal or Sensor (input)	Input	Function
<b>1.01</b>	Signal: 0 - 10 V, 0 - 20 mA, 4 - 20 mA (E1)	E1	Speed controller with input for Setting signal, two step operation (Factory setting)
<b>1.02</b>	-		Manual speed controller with direct setting by the ▼ + ▲ keys (0 - 100 % or in 1 - 5 steps)
<b>2.01</b>	* Sensor TF.. / LTR, LTK, LTA	E1	Temperature control airconditioning and refrigeration (preset Setpoint 20.0 °C, P-band 5.0 K)
<b>2.03</b>	Sensor TF.. / LTR, LTK, LTA	E1	Temperature control with additional functions (shutter and heating)
<b>2.04</b>	* Sensor TF.. / LTR, LTK, LTA Sensor TF.. / LTR, LTK, LTA	E1 E2	Temperature control with two sensors, comparison or average
<b>2.05</b>	* Sensor TF.. / LTR, LTK, LTA Sensor TF.. / LTR, LTK, LTA	E1 E2	Temperature control with two sensors differential temperature
<b>4.01</b>	* Sensor DSG../LDF500	E1	Pressure control for ventilation systems
<b>4.02</b>	1 x Sensor DSG../LDF500 1 x Sensor TF.. / LTK, LTA	E1 E2	Pressure control depending on outdoor temperature
<b>6.01</b>	* Sensor MAL10 / LGF10	E1	Air velocity control e.g. clean room
<b>8.01</b>	1 x Sensor AFS 0-10 V 1 x Sensor AFS 0-10 V	E1 E2	Absolute humidity control with 2 sensors (humidity difference)

\* Operation with a second control circuit possible

Mode and signal to E1, E2



23.01.2018  
v\_e1\_e2\_sigl\_sens\_eur\_ec.vsd

**6.2 Operation with a second control circuit**

The function for control circuit 1 is determined by selection of the mode. This influences the output with function **[2A]**.

A second control circuit with separate actual value measuring and separate output can be activated additionally if required.

Control circuit 2 influences the output with function **[8A]**.

- Analog output “A2” (factory setting) IO Setup
- MODBUS Master interface member menu

Operation with a second control circuit is **not** possible in the following modes:

**1.01, 1.02, 2.03, 4.02**

The following modes which are pre-programmed to operation with a second sensor can be reprogrammed to operation with a second control circuit.

**2.04, 2.05**

The second control circuit is activated by the “E2 function” for the second analogue input “E2” ( menu group “Base Setup”).

**E2 functions for activating control circuit 2:**

E2 Function	Function second control circuit	Factory setting	
		E2 Analog In	2.Setpoint 1
Temperature (8E)	Temperature control Presettings and sensor selection  Mode <b>2.01</b>	TF / LTR, LTK, LTA	20.0 °C
Cold-Pressure (9E)	Function not permitted!	MBG0-30	15.00 bar
Cold-Temperature (10E)	Function not permitted!	MBG0-30	35.0 °C
Air Pressure (11E)	Pressure control Airconditioning Presettings and sensor selection  Mode <b>4.01</b>	DSG200	100.0 Pa
Air flow (12E)	Function not permitted!	DSG200	44720 m <sup>3</sup> h
Air speed (13E)	Air velocity control Presettings and sensor selection  Mode <b>6.01</b>	MAL1	0.50 m/s

When activating control circuit 2, the “Setting” menu group is extended.

- The additional parameters for control circuit 2 are identified by a prefixed “2.” e.g. “2.Setpoint 1”.
- A prefixed “1.” e.g. “1.Setpoint 1” is added to the parameters for control circuit 1.

**Example: Second control circuit for pressure control**

E2 function = <input type="text" value="9E"/> , Mode <b>2.01</b> for temperature control via control circuit 1	
Setting	<b>1.Setpoint 1</b>
<b>20.0 °C</b> <b>1.Setpoint 1</b>	Setpoint 1 for control circuit 1 Setting range with passive sensor type “TF”, “PT1000” : -50.0...150.0 °C Factory setting: 20.0 °C
Setting	<b>1.Setpoint 2</b>
<b>-----</b> <b>1.Setpoint 2</b>	Setpoint 2 for control circuit 1 Setting “Setpoint 2” e.g. reduced value for night operation. Switch over Setpoint 1/2 by external contact (as long as no allocation is carried out Display: <input type="text" value="-----"/> IOSetup).
Setting	<b>1. Pband 1</b>
<b>5.0 K</b> <b>1. Pband 1</b>	Pband 1 for control circuit 1 Setting range with passive sensor type “TF”, “PT1000” : 0.0...200.0 K Factory setting: 5.0 K
Setting	<b>1. Min. Speed</b>
<b>0 %</b> <b>1. Min. Speed</b>	Minimal Speed for control circuit 1 Setting range: 0... “1. Max. Speed” Factory setting: 15 %
Setting	<b>1. Max. Speed</b>
<b>100 %</b> <b>1. Max. Speed</b>	Maximal Speed for control circuit 1 Setting range: 100 %... “1. Min. Speed” Factory setting: 100 %
Setting	<b>2.Setpoint 1</b>
<b>100.0 Pa</b> <b>2.Setpoint 1</b>	Setpoint 1 for control circuit 2 Setting range: in measuring range of sensor Factory setting: 100 Pa



Setting	<b>2.Setpoint 2</b>
----- <b>2.Setpoint 2</b>	Setpoint 2 for control circuit 2 Setting "Setpoint 2" e.g. reduced value for night operation. Switch over Setpoint 1/2 by external contact (as long as no allocation is carried out Display: [-----]  IOSetup).
Setting	<b>2. Pband 1</b>
<b>100.0 Pa</b> <b>2. Pband 1</b>	Pband 1 for control circuit 2 Setting range: in measuring range of sensor Factory setting: 100 Pa
Setting	<b>2. Min. Speed</b>
<b>0 %</b> <b>2. Min. Speed</b>	Minimal Speed for control circuit 2 Setting range: 0... "2. Max. Speed" Factory setting: 0 %
Setting	<b>2. Max. Speed</b>
<b>100 %</b> <b>2. Max. Speed</b>	Maximal Speed for control circuit 2 Setting range: 100 %... "2. Min. Speed" Factory setting: 100 %
Setting	<b>Manual mode</b>
<b>OFF</b> <b>1. Manual mode</b>	Manual mode for control circuit 1 "OFF" = automatic control as function of the set parameters (Factory setting) "ON" = automatic control without function, speed setting in menu "Speed manual"
Setting	<b>Speed manual</b>
<b>100 %</b> <b>1. Speed man.</b>	Speed Manual mode for control circuit 1 Setting range: 0... "1. Max. Speed" Factory setting: 100 %

**Function extension for digital inputs "D1" and "D2" in operation with second control circuit**


D1 / D2 Function	Description *
<b>E1 / E2</b> <b>(4D)</b>	The output for control circuit 2 is set additionally to "A2" to "A1" (regardless of the programmed function for [A1]). Control circuit 1 has no output for the duration of the switching.
<b>2. Setpoint 1/2</b> <b>(9D)</b>	for control circuit 2: Switch over "Setpoint 1" / "Setpoint 2"
<b>2.Setp+Pband1/2</b> <b>(16D)</b>	for control circuit 2: Switch over Setpoint 1/2 and Pband 1/2 When programming this function, "Setting" additionally lists the parameter: "2.Pband 2 for control circuit 2"

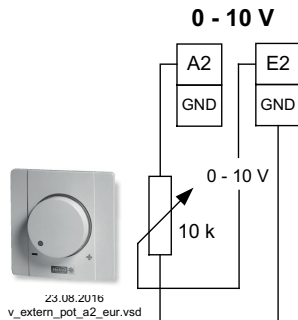
\* Detailed description IO Setup / Digital Inputs "D1" / "D2"

**Following restrictions apply for the control circuit 2:**


- The "Manual Mode" function in the "Setting" menu group only influences control circuit 1!
- The Limit function ( IO Setup [3D] and Controller Setup) influences both control circuits simultaneously.
- The "Max. Speed" setting by a digital input ( IO Setup [11D]) simultaneously influences both control circuits. I.e. at "1.Max. Speed" and at "2.Max. Speed".
- The controller configurations (KP, KI, KD, TI Controller Setup) are identical for both control circuits. Fine adjustment is possible for each control circuit by the separate "Pband" setting.

### 6.3 External Setpoint / External speed setting in manual operation

External setpoint setting or external manual operation are possible using a 0 - 10 V (0 - 20 mA, 4 - 20 mA) signal at the "E2" and "GND" terminals. Configure "E2" in Base setup. For potentiometers, program Analog Out 1 (terminal "A1") to the function [1A] = "+10 V" (as factory setting  IO Setup).  
E2 Analog In = factory setting 0 - 10 V



**External Setpoint** via external signal instead of "Setpoint 1". The "external Setpoint" function must be activated in base setup [1E] for "E2 function". The active external Setpoint value is displayed in the "info" menu group.

**External speed setting** in manual operation. The "external manual operation" function must be activated in the basic settings [2E] for "E3 function". Switchover between settings on the device and external manual operation via the digital input ( IO Setup: "Control / manual operation" [7D]).

Not possible in modes with 2 sensors and operation with a second control circuit because the second analogue input is already occupied by it.

## 7 Start-up

### 7.1 Prerequisites for commissioning



#### Attention!

1. You must mount and connect the device in accordance with the operating instructions.
2. Double check that all connections are correct.
3. The mains voltage must match the information on the rating plate.
4. Make sure that no persons or objects are in the fan's hazardous area.

### 7.2 First Start-up

**1. Before first-time start-up can take place, all the necessary components must be connected** ( Wiring Diagram Standard).

#### 2. The EUR has a start-up wizard

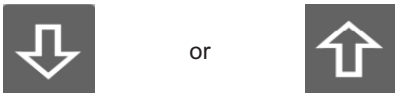
Four parameters are prompted.

- a) Language
- b) Mode
- c) Setpoint
- d) Pband

After selecting the "language" and "mode", a nominal value followed by a control range are suggested respectively. The suggestion can be accepted in most cases. Later changes are possible at any time after first-time start-up.

The **first** time the EUR is switched on, the Start-up menu opens automatically. After selecting the language, the possible mode variants are displayed first. Also see the printout in the display.

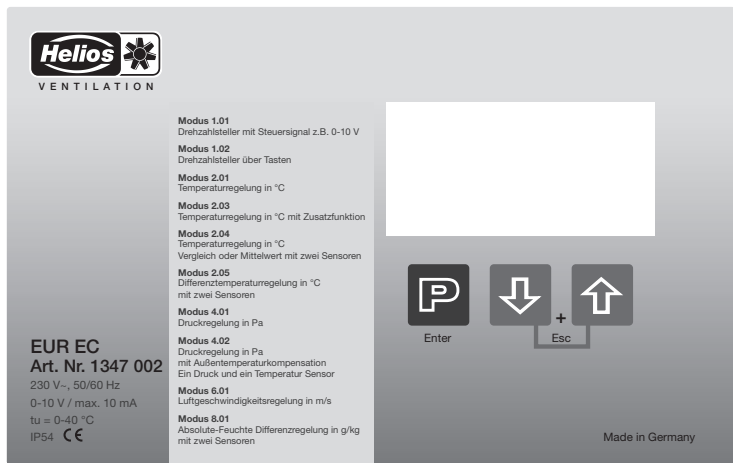
The desired value is found using



and confirmed with



After setting the “language” and “mode” the desired “nominal value” is set, followed by the “control range”. Select respectively with the “Up” and “Down” keys and confirm with “P”.



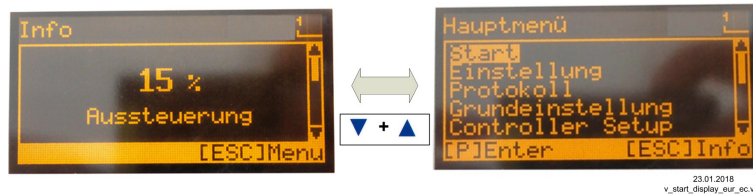
The successful start-up is confirmed with “OK”. The device is now ready for operation. Then the control or the current actual value is displayed. Extensive further settings can be made as required. See these instructions.

**3. The first-time start-up wizard can be reactivated if desired.**

To do this, press “Esc” (arrow “Up” and “Down” briefly together) until the “Start” menu is displayed. With “P” you first go to the “PIN” selection. Press “P” again. Now the code [1020] can be entered. Terminate again with “P”. Now you are back in the first-time start-up wizard, see section 3.

**7.3 Procedure as for start-up (without wizard)**

1. Turn on mains voltage
  - Display:



(Function of display controls and menu)

2. Switch over between “Info” and “Main menu” with the “Esc” key combination
3. Menu group: **Start**
  - Set the menu language if necessary (factory setting German = Language D).
  - The display can be switched between SI units (US units = OFF) and imperial (US) units (US units = ON).
4. Menu group: **Base setup**
  - Set the desired mode (factory setting **1.01** = speed controller).
  - Further settings depend on the selected mode and the sensor / setting signal used.
5. Menu group: **Setting**
  - Set the parameters for the control mode.

**Excerpt from the menu table**

<b>Start</b>						
Language	D	D	D	D	D	D
US units	OFF	OFF	OFF	OFF	OFF	
<b>Base setup</b>						
Mode	<b>1.01</b> <b>1.02</b>	<b>2.01</b> <b>2.03</b> <b>2.04</b>	<b>2.05</b>	<b>4.01</b> <b>4.02</b>	<b>6.01</b>	<b>8.01</b>
E1 Analog In	1.01 = 0 - 10 V	TF.. / LTR, LTK, LTA	TF.. / LTR, LTK, LTA	DSG500 / LDF500	MAL10 / LGF10	AFS 0-10 V
Number steps	1.02 = 0					
Step 1 value	1.02 = ---- (20%)					
<b>Setting</b>						
Set Internal1	1.01 = 80%					
Setting direct	1.02 = 80%					
Setting Step	1.02 = 0					
Setpoint1		20.0 °C	0.0 °C	2500 Pa	5.0 m/s	0.0 g/kg
Pband 1		5.0 K	3.0 K	250 Pa	5.0 m/s	5.0 g/kg
Set external1	1.01 = ON					

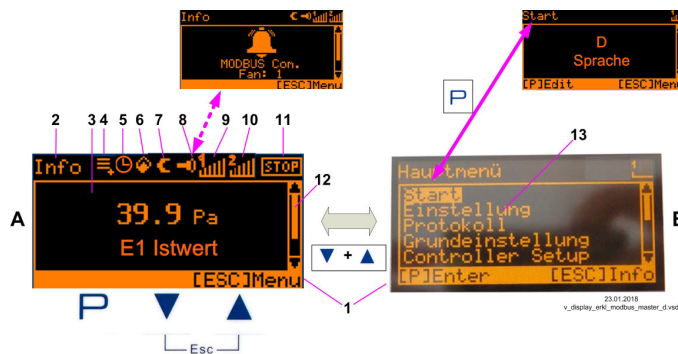


**Information**

Adjust other settings according to the desired function (see Programming)

## 8 Controls and Menu

### 8.1 Multipurpose LC display and keyboard



<p><b>A</b></p>	<p><b>Actual value display</b>                  Display after line voltage is switched on or after the <b>Esc</b> key combination is used to exit the settings menu (display depends on selected mode and sensor value).</p>	<p>1. Status bar                  2. Display of the menu group in which the displayed menu is located                  3. Display window                  4. Log entry which still was not seen                  5. Timer function active</p>
<p><b>B</b></p>	<p><b>Main menu</b>                  Display after the <b>Esc</b> key combination is used to exit the actual value display.                  Select the desired menu group with the ▼▲ buttons and use the <b>P</b>-key to open it.</p>	<p>6. Fire-Symbol (heating operation)                  7. Moon-Symbol for set point 2                  8. Alarm symbol (fault message alternating with actual value display)</p>
<p><b>P</b></p>	<p>Program key and open menu.</p>	<p>9. Modulation control circuit 1</p>
<p>▼</p>	<p>Menu selection, reduce value.</p>	<p>10. Modulation control circuit 2 (if activated)</p>
<p>▲</p>	<p>Menu selection, increase value.</p>	<p>11. STOP-Symbol (enable)</p>
<p>▼ + ▲ Esc</p>	<p><b>Esc</b>-key combination, Escape = leave menu.                  Switch between Info and Main menu.</p>	<p>12. Position of the menu in the menu group                  13. List of the menu groups</p>

### 8.2 Menu operation

Info	<b>Display after switching on the mains voltage (mode 1.01)</b> Display for German menu language = "D" (as delivered). Switch over between "Info" * and "Main menu" with the <b>Esc</b> key combination.	Hauptmenü
0 % <b>Aussteuerung</b>		Start Einstellung Protokoll Grundeinstellung Controller Setup
[ESC] Menu		[P] Enter [ESC] Info

Hauptmenü	
Start	Select the desired menu group with the ▼▲ keys (text highlighted) and open with the <b>P</b> -key.
Einstellung	
Protokoll	
Grundeinstellung	
Controller Setup	
[P] Enter [ESC] Info	

▲ ▼

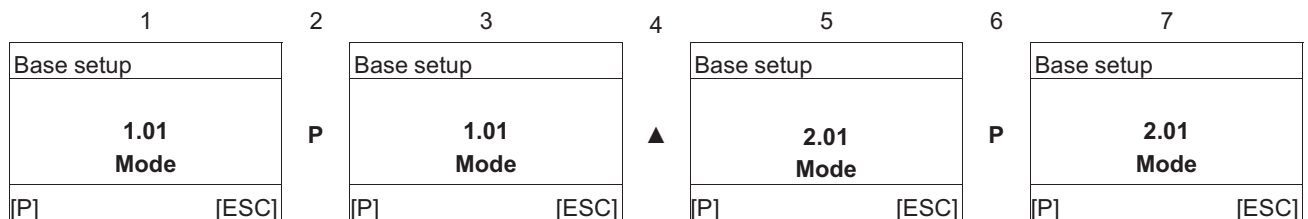
Start	
----- <b>PIN Eingabe</b>	PIN input, e.g. for resetting to basic factory setting
[P] Edit [ESC] Menu	

▲ ▼

Start	
<b>D</b> <b>Sprache</b>	In the menu point "Language" display language can be selected. One returns to the menu group "Start" using the Esc (▼ + ▲) shortcut keys.
[P] Edit [ESC] Menu	

### 8.3 Example for programming mode **2.01** in "Base setup "

**Sequence**



#### 8.4 Menu structure

Selection of the menu group (e.g. Base setup) with the arrow keys ▼ + ▲.

You can go to the menu items in the menu groups (e.g. mode of operation) by using the **P** key. Use the arrow keys to move up and down within the menu group.

The menu groups consist of one area for the user (user menu) and one area for installation (service). The service area can be protected against unauthorized access by using a PIN.

In order to simplify the initial start-up operation, the service level is enabled at first (i.e., not protected by the PIN 0010 (see Operating Instructions / Controller Setup, PIN protection = OFF). If PIN protection is activated (ON), the service menu remains enabled after input of PIN 0010 as long as one is pressing keys. If no keys are pressed for ca. 15 minutes, the PIN is automatically erased, i.e. the service level is blocked.

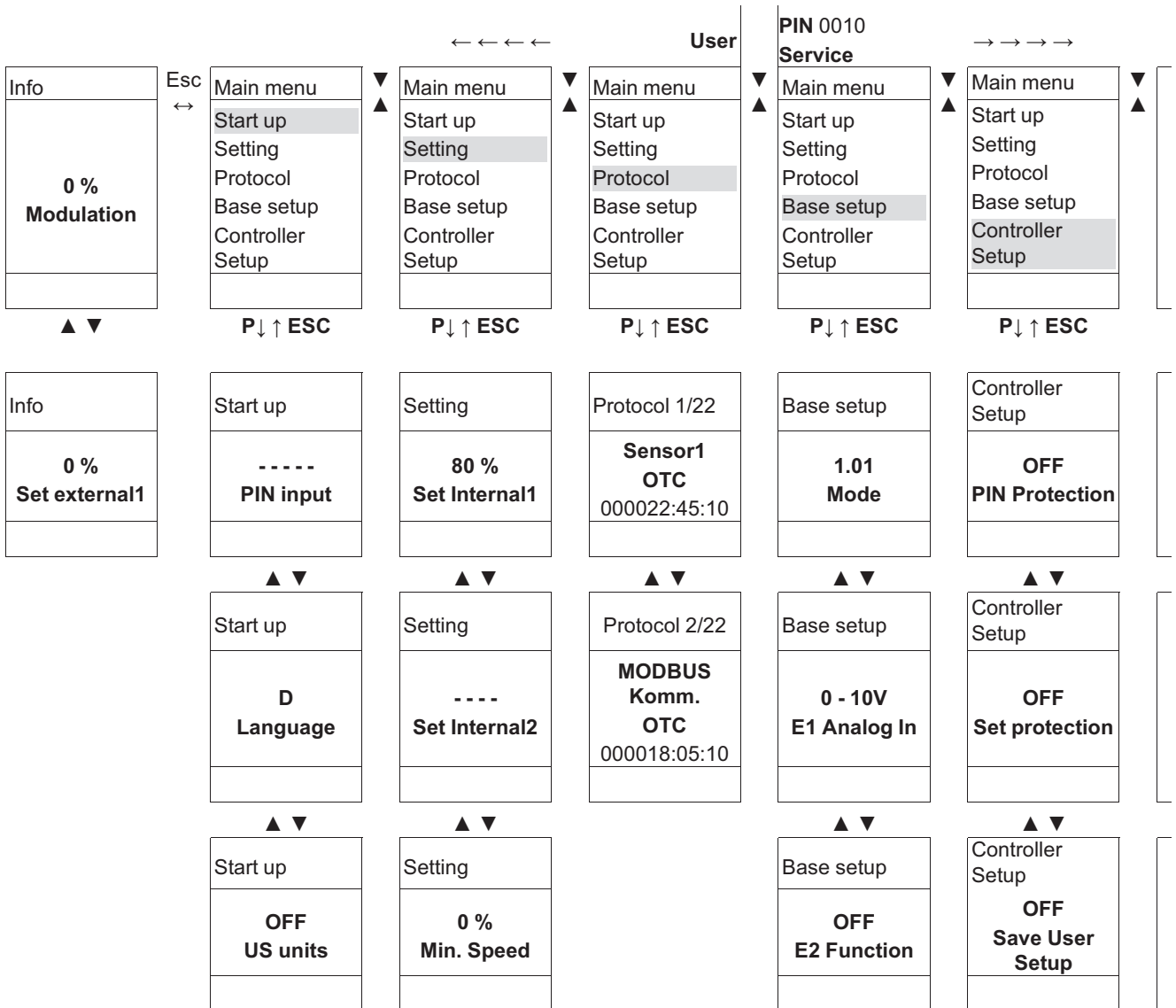
To make adjustments, press the **P** key after selecting the menu item. If the previously set value starts to flash, it can be adjusted with the ▼ + ▲ keys and then saved with the **P** key. To exit the menu without making any changes, use the "Esc" short-key, i.e., the originally set values remain.



##### Information

After installation of the device has been carried out, PIN protection should be activated (see Operating Instructions / Controller Setup)!

**Example for Mode 1.01**



*Menu dependent on mode*



## 8.5 Overview menu groups

Main menu	Possible settings
<b>Info</b>	Display measured actual values, selected setpoints, modulation, etc. Settings cannot be made in this menu group.
<b>Start up</b>	PIN input for reset to initial settings and to protect settings. Setting the menu language. Display in SI units or Imperial units (US) Complete re-start of the device. Display of the set mode, software version, etc.
<b>Setting</b>	Settings for Operation, Setpoint, Pband, Min. Speed, Max. Speed, etc.
<b>Protocol</b>	Display and query of events / malfunctions.
<b>Base setup</b>	Setting of the desired mode, configuration of signal and sensor inputs. Activation control circuit 2.
<b>Controller Setup</b>	Activate set protection, save user settings. Activate alarm message in the event of a sensor fault. Activate limitation of modulation via digital input or timer of time switch. Configuration of control parameters, group control.
<b>IO Setup</b>	Configuration and function assignment for: analogue outputs, digital inputs, relay outputs.
<b>Limits</b>	Limit messages depending on modulation, setting signal or sensor signal, offset to setpoint.
<b>Timer</b>	Integrated time switch with programmable timer functions. Clock fine adjustment
<b>Diagnostic</b>	Current operating states of the device.
<b>MODBUS Slave</b>	Addressing and configuration of the MODBUS Slave interface.
<b>MODBUS Master</b>	Start automatic addressing of members. alternatively Manual input of number of members.

## 9 Programming



### Display in SI units or Imperial units (US)

The following description is for display in SI units (factory setting). The appropriate conversion factors must be observed when switching over to Imperial units (US) (☞ menu group Start / US Units).

### 9.1 Speed controller **1.01, 1.02**

#### 9.1.1 Speed controller with setting by external signal **1.01**

Settings for controller output with function **2A** (by analogue signal ☞ IO Setup, by MODBUS ☞ members menu).

#### Base setup **1.01**

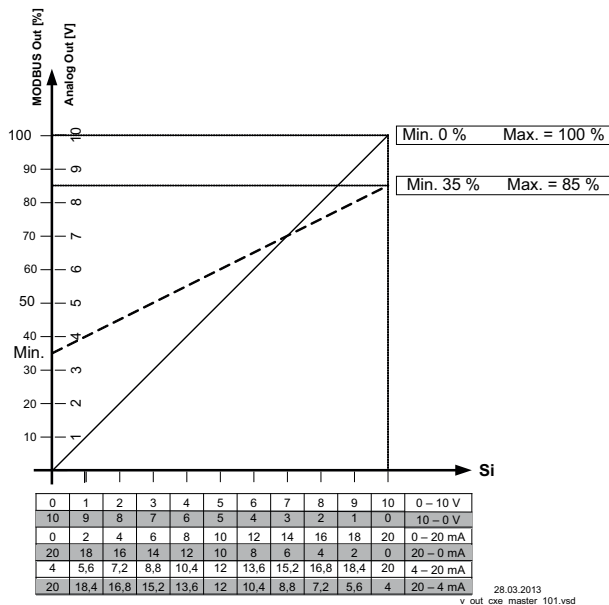
Main menu	<b>Base setup</b>
Setting	
Protocol	
Base setup	
Controller Setup	
IO Setup	
Base setup	<b>Mode</b>
<b>1.01</b> Mode	Factory setting Mode: <b>1.01</b>
Base setup	<b>E1 Analog In</b>
<b>0 - 10V</b> E1 Analog In	Selection: 0 - 10V, 0 - 20 mA, 4 - 20 mA (Inverting, E1 BUS Modus ☞ IO Setup) Factory setting: 0 - 10 V
Base setup	<b>E2 Function</b> (only for special applications)
<b>OFF</b> E2 Function	Analog input 2 "E2" factory set at "OFF".  For operation with a second setting signal and switch over by potential-free contact: E2 Function = Ext. Setpoint (1E) Necessary function for digital input: E1/E2 (4D) ☞ IO Setup  For operation with a second signal and automatic control at the higher level: E2 Function = comparison E1 (4E).
Base setup	<b>E2 Analog In</b>
<b>-----</b> E2 Analog In	Display as long as no function allocated: <b>-----</b> Selection: 0 - 10 V, 0 - 20 mA, 4 - 20 mA (Inverting, E1 BUS Modus ☞ IO Setup) Factory setting: 0 - 10 V

#### Setting for operation **1.01**

Main menu	<b>Setting</b>
Setting	
Protocol	
Base setup	
Controller Setup	
IO Setup	

Setting	<b>Set Internal1</b>
<b>50 % Set Internal1</b>	Setting range manual speed setting: 0...100 % $\hat{=}$ "Min. Speed"... "Max. Speed" Factory setting: 50 %
Setting	<b>Set Internal2</b>
<b>----- Set Internal2</b>	Setting "Set Intern2" e.g. reduced value for night operation. Switch over Internl 1/2 over external contact (display as long as no allocation is carried out: <input type="checkbox"/> IO Setup).
Setting	<b>Min. Speed</b>
<b>15 % Min. Speed</b>	Setting range: 0... "Max. Speed" Factory setting: 15 %
Setting	<b>Max. Speed</b>
<b>100 % Max. Speed</b>	Setting range: 100 %... "Min. Speed" Factory setting: 100 %
Setting	<b>Set external1</b>
<b>ON Set external1</b>	"ON" (factory setting) = speed setting by external Signal "OFF" = Setting "Set Intern1"

Diagram setting signal and output voltage (Idealized principle diagram)



MODBUS Out: speed setting over MODBUS  
 Analog Out: speed setting over analog output 0 - 10 V  
 Si Signal

9.1.2 Speed controller with direct setting by keyboard **1.02**

**Base setup 1.02**

Main menu	<b>Base setup</b>
Setting	
Protocol	
Base setup	
Controller Setup	
IO Setup	
Base setup	<b>Mode</b> Mode selection: <b>1.02</b>
<b>1.02</b> <b>Mode</b>	
Base setup	<b>Number steps</b> Selection: 0, 1, 2, 3, 4, 5 Factory setting: <b>0</b>  <b>Number steps: 0</b> In the factory setting "0" (without steps) the output frequency can be set directly with the ▼ + ▲ keys (☞ setting in operation).  <b>Number steps: 1, 2, 3, 4, 5</b> The modulation value can be assigned to each step. The desired step is set with the ▼ ▲ keys (☞ setting in operation). The following menus become active depending on the selected step count. (Step not active = [---])
<b>0</b> <b>Number steps</b>	
Base setup	<b>Step 1 value - 5</b> Setting range: 0...100 %. Factory setting: - - - - (Number steps 0) Factory setting: 20 %, 40 %, 50 %, 60 %, 100 % (Anzahl Stufen 1 - 5)
<b>-----</b> <b>Step 1 value</b>	

**Menu group "Setting" (only when needed)**

Main menu	<b>Setting</b>
Setting	
Protocol	
Base setup	
Controller Setup	
IO Setup	
Setting	<b>Setting direct</b> (at Number steps: 0 ☞ "Base setup") If the setting is to be made during operation directly with the ▼ + ▲ keys, no setting is necessary here (☞ setting in operation <b>1.02</b> ). Setting range: Min. Speed - Max. Speed Factory setting: 50 %
<b>50 %</b> <b>Setting direct</b>	
Setting	<b>Setting step</b> (at Number steps: 1 - 5 ☞ "Base setup") If the setting is to be made during operation directly with the ▼ + ▲ keys, no setting is necessary here (☞ setting in operation <b>1.02</b> ). Setting range: 0 - setting nummber steps Factory setting: 0
<b>0</b> <b>Setting Step</b>	

Setting	<b>Min. Speed</b>
<b>15 %</b>	Setting range: 0... "Max. Speed"
<b>Min. Speed</b>	Factory setting: 15 %
Setting	<b>Max. Speed</b>
<b>100 %</b>	Setting range: 100 % - "Min. Speed"
<b>Max. Speed</b>	Factory setting: 100 %

**Setting in operation 1.02**

After installation is completed, only the "Setting direct" or "Setting Step" setting is visible in the "Info" menu group. All other menus are protected by a PIN.

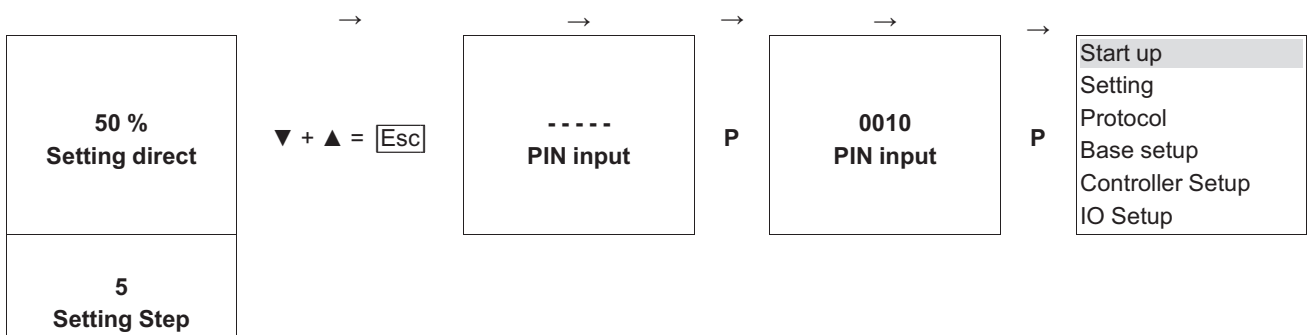
Info	<b>Setting direct</b> (at Number steps: 0 ↻ "Base setup")
<b>50 %</b>	Setting range: Min. Speed - Max. Speed
<b>Setting direct</b>	Factory setting: 50 %
	The value set by the ▼ ▲ keys is accepted and executed directly (P key without function).
Info	<b>Setting step</b> (at Number steps: 1 - 5 ↻ "Base setup")
<b>5</b>	Setting range: 0 - programmed number steps
<b>Setting Step</b>	Factory setting: 0

Switching over to the protected "Info" menu group takes place automatically after approximately 15 minutes if no key is pressed.

**Possibilities for early activation of PIN protection:**

- Select the "Info" menu group and confirm with the P key.
- Press the [Esc] key combination several times until the "Setting direct" or "Setting Step" menu is displayed.
- Execute the "Reset" function in the "Start" menu group.
- By switching the mains voltage off and then on again.

**Input PIN [0010] exit the protected area**



adjust PIN 0010

**9.2 Temperature control 2.01...2.05**



**9.2.1 Basic setting 2.01... 2.05**


Main menu	<b>Base setup</b>
Setting	
Protocol	
Base setup	
Controller Setup	
IO Setup	
Base setup	<b>Mode</b> Mode selection e.g. <b>2.01</b>
<b>2.01</b> <b>Mode</b>	
Base setup	<b>E1 Analog In</b> The sensor input is factory set in modes of group <b>2</b> to sensors of the "TF" type series (sensor type KTY81-210). Measuring range: -50.0...+150 °C Connection terminals: "E1" and "T"
<b>TF</b> <b>E1 Analog In</b>	
	<p><b>Other settable sensors:</b></p> <ul style="list-style-type: none"> <li>• PT1000 at terminals "E1" and "T", (measuring range -50.0...+150 °C)</li> <li>• MTG-120V (type designation for active sensor with 0 - 10 V output, connection to terminals "E1", "GND" and "24 V", measuring range: -10...+120 °C)</li> <li>• 0 - 10 V, 0 - 20 mA, 4 - 20 mA (for sensors with free measuring range and linear characteristic)</li> </ul> <p>The sensor measuring range must be entered for sensors with free measuring range in order to display the actual value correctly. Example with a 0 - 10 V sensor and 0 - 100 °C measurement range: E1 Analog In = 0 - 10 V, E1 Unit = °C, E1 Decimals = 1, E1 Min. = 0,0 °C, E1 Max. = 100,0 °C, When selecting sensors with active signal, the setpoint and the Pband are automatically set to the 1/2 measuring range.</p>
Base setup	<b>E1 Offset</b> Sensor calibration with calibrated comparison device. The current "E1 Actual" is displayed including the offset set here.
<b>20.0 °C</b> <b>E1 Offset</b>	

Base setup	<b>E2 Function</b>
<b>OFF E2 Function</b>	<p>The second signal input is not activated at the factory for modes with one sensor. The function is automatically jointly programmed in operating modes using 2 sensors. The second analog input is thus allocated and additional function allocations are not possible.</p>
	<ul style="list-style-type: none"> <li>• <b>2.04</b> E2 Function at <b>4E</b> preprogrammed = comparison value with control to higher temperature. Alternative: average of 2 measuring points for this must be reprogrammed on function <b>3E</b> preprogrammed sensor type “TF”.</li> <li>• <b>2.05</b> E2 Function at <b>5E</b> preprogrammed = regulation on difference temperature between sensor 1 and sensor 2. Preprogrammed sensor type “TF”.</li> </ul> <p><b>Adjustable “E2 Function”</b></p> <ul style="list-style-type: none"> <li>• <b>1E</b> = External Setpoint e.g. via external signal (0 - 10 V) instead of “Setpoint 1”             <ul style="list-style-type: none"> <li>– For sensor type “E1 Analog In” = “TF or PT1000”: 0 - 10 V <math>\hat{=}</math> -50.0...+150 °C.</li> <li>– For sensors with active signal: 0 - 10 V <math>\hat{=}</math> 0 - 100 % sensor measuring range.</li> </ul> </li> <li>• <b>2E</b> = External manual operation via external signal (0 - 10 V). Switching between setting on the device and external manual operation via digital input (☞ IO Setup: Function <b>7D</b>).</li> <li>• <b>6E</b> = sensor for outdoor temperature-dependent setpoint adaptation (at <b>2.03</b> not possible), pre-programmed sensor type “TF..”             <ul style="list-style-type: none"> <li>– additional parameters menu group “Setting”: T-Band, T-Start SA, Min. Setpoint.</li> <li>– additional parameters menu group “Info”: Setpoint Control</li> <li>– Example ☞ Setting for operation <b>4.01</b> + <b>4.02</b> / additional menu items.</li> </ul> </li> <li>• <b>7E</b> = Measurement value = Measurement value e.g. for limit indication, display in Info menu “E2 Actual”.</li> <li>• <b>8E</b> ... <b>13E</b> = sensor input for control circuit 2 (at <b>2.03</b> not possible) ☞ base setup / operation with second control circuit.</li> </ul>

**9.2.2 Settings for operation modes 2.01... 2.05**

- 2.01** Temperature control airconditioning and refrigeration (preset Setpoint 20.0 °C, P-band 5.0 K)
- 2.03** Temperature control with pre-programmed additional functions (heating, shutter, temperature monitoring).
- 2.04** Temperature control with 2 sensors  
Comparison with control to higher value "E2 Function" set to comparison **4E**. Display during operation: "Control value"  
Alternative: Average calculation of 2 measuring places "E2 Function" set to **3E**. Display during operation: "Average E1 / E2"
- 2.05** Temperature control with 2 sensors, regulation on difference temperature.  
Display during operation: "Value of E1 - E2" in K, "E1" = reference temperatur, "E2" causes positiv (E2 < E1) or negative (E2 >E 1) difference.

Settings for controller output with function **2A** (by analogue signal  IO Setup, by MODBUS  members menu).

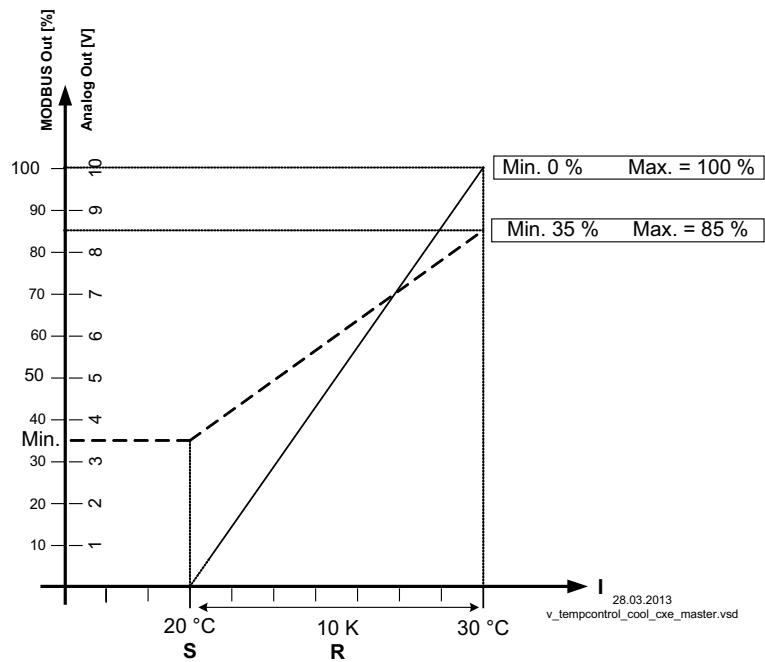
Main menu	<b>Setting</b>
Setting	
Protocol	
Base setup	
Controller Setup	
IO Setup	
Setting	<b>Setpoint1</b>
20.0 °C	Setting range with passive sensor type "TF", "PT1000": -50.0...150.0 °C
Setpoint1	Factory setting: <b>2.01, 2.03, 2.04</b> : 20.0 °C at <b>2.05</b> : 0.0 °C
Setting	<b>Set Internal2</b>
-----	Setting "Setpoint 2" e.g. reduced value for night operation.
Set Internal2	Switch over Setpoint 1/2 over external contact (display as long as noch allocation is carried out: <input type="checkbox"/>  IO Setup).
Setting	<b>Pband</b>
5.0 K	Narrow control range = Short control times
Pband	Wide control range = Longer control times and more stable control
	Passive sensor type "TF", "PT1000"
	Setting range: 0 - 200.0 K (Kelvin)
	Factory setting: 5.0 K
	active Sensor type "MTG-120V"
	Setting range: -10.0...+120.0 K
	Factory setting: 65.0 K
Setting	<b>Min. Speed</b>
15 %	Setting range: 0... "Max. Speed"
Min. Speed	Factory setting: 15 %
Setting	<b>Max. Speed</b>
100 %	Setting range: 100 %... "Min. Speed"
Max. Speed	Factory setting: 100 %
Setting	<b>Manual mode</b>
	"OFF" = automatic control as function of the set parameters (Factory setting)
	"ON" = automatic control without function, speed setting in menu "Speed manual"



<b>OFF</b> <b>Manual mode</b>	
Setting	<b>Speed manual</b>
<b>100 %</b> <b>Speed manual</b>	Manual speed setting without influence by the external signal. Activation by menu "Manual mode" or external contact at digital input (☞ IO Setup). Setting range: 0...100 % $\triangle$ "Min. Speed"... "Max. Speed" Factory setting: 100 %
	For information about deactivated regulation the adjusted value for manual speed is indicated alternating with the actual value.

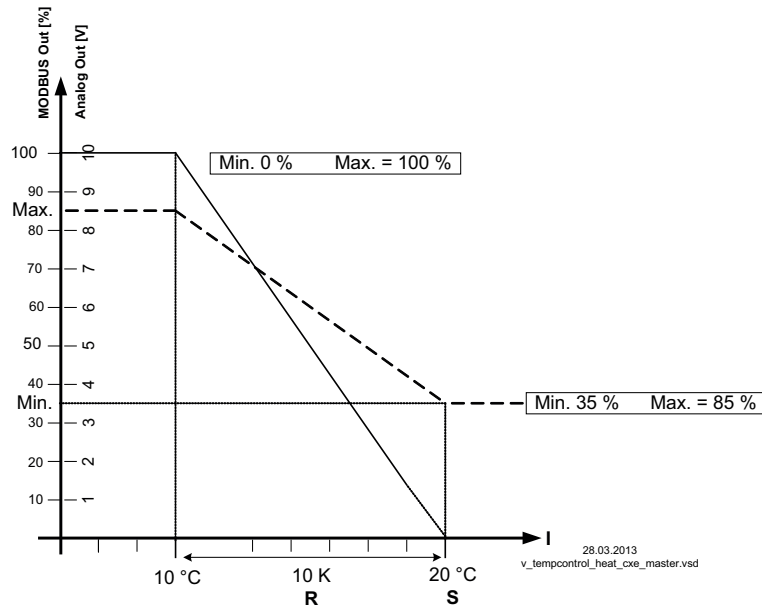
**9.2.3 Functional diagrams temperature control**

Example 1: Temperature control in factory setting "Cooling function" (Idealized principle diagram)



(Controller Setup: "Val > Set = n+" to "ON")  
 MODBUS Out: speed setting over MODBUS  
 Analog Out: speed setting over analog output 0 - 10 V  
 S Setpoint  
 R Pband  
 I Actual value

Example 2: Temperature control in “Heating function” (Idealized principle diagram)



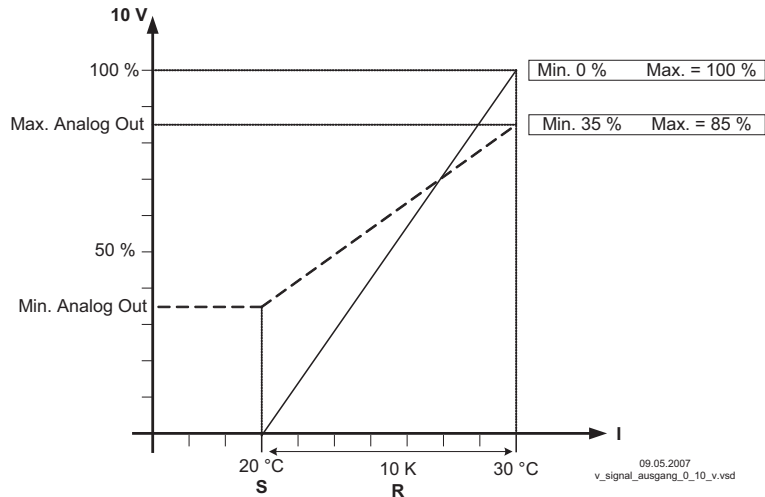
(Controller Setup: “Val > Set = n+” to “OFF”)  
 MODBUS Out: speed setting over MODBUS  
 Analog Out: speed setting over analog output 0 - 10 V  
 S Setpoint  
 R Pband  
 I Actual value

**9.2.4 Additionally for 2.03 (controller output 2 with function 6A)**

The 0 - 10 V output signal A2 can, e.g., be used for triggering a shutter or heating.

Setting	<b>Offset AnalogOut</b>
<b>0.0 K</b> <b>Offset AnalogOut</b>	The target value for this output is the target value (Setpoint) for the ventilation “offset” setting. Adjustment: range +/- 10,0 K relative to the active Setpoint. Example for triggering a shutter servomotor: At factory setting “0,0 K” = synchronous operation. The analog output is factory set to increasing activation during increasing temperature. Reprogramming to “Heating function”, i.e., increasing modulation during decreasing temperature is possible (see IO Setup).
Setting	<b>Pband AnalogOut</b>
<b>2.0 K</b> <b>Pband AnalogOut</b>	Pband AnalogOut = separately adjustable range of control (P-band) for 0 - 10 V output Setting range: 0...200.0 K Factory setting: 2.0 K
Setting	<b>Min. AnalogOut</b>
<b>0 %</b> <b>Min. AnalogOut</b>	Min. AnalogOut = Minimal output voltage Setting range: 0...100 % = 0 - 10 V Factory setting: 0 %
Setting	<b>Max. AnalogOut</b>
<b>100 %</b> <b>Max. AnalogOut</b>	Max. AnalogOut = Maximal output voltage Setting range: 100...0 % = 10 - 0 V Factory setting: 100 %

**Example for signal out 0 - 10 V (IO Setup: "A2 function" = [6A])**



Example: Setpoint ventilation 25.0°C, Offset -5.0 K, Pband 10.0 K  
*S* Setpoint Ventilation +/- Offset  
*R* Pband  
*I* Actual value

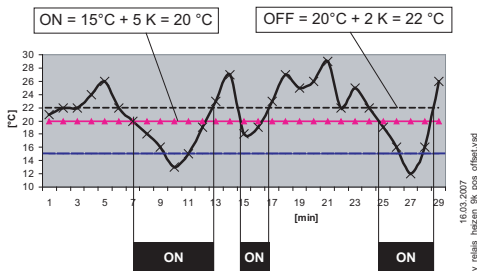
**9.2.5 For mode 2.03: Relay output for Heating or Cooling**

Setting	<b>OffsetDigitalOut</b>
<b>-1.0 K</b> <b>OffsetDigitalOut</b>	Offset Digital Out = Offset for relay output ("K2" is pre-programmed by the factory). The relay operating point deviates by the adjusted offset of the Setpoint of the ventilation (if relay "K2" not inverted, terminal "21"- "24" bridged). Setting range: -10.0...+10.0 K Factory setting: -1.0 K <ul style="list-style-type: none"> <li>• "0.0 K" set, i.e. heating "ON" when: actual value = Setpoint</li> <li>• During negative offset value heating "ON" when: actual value = Setpoint - offset</li> <li>• During positive offset value heating "ON" when: actual value = Setpoint + offset</li> </ul>
Setting	<b>Hyst.DigitalOut</b>
<b>1.0 K</b> <b>Hyst.DigitalOut</b>	Switching hysteresis of the relay Setting range: 0...10.0 K, Factory setting: 1.0 K (Kelvin)

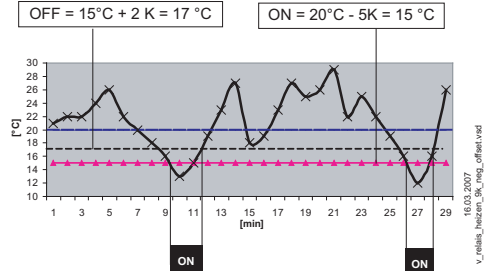
**Temperature variation with factory setting [9K] in IO Setup e. g. for controlling a Heating.**


If the ambient temperature is lower than the set operating point, the heating remains switched on. If the ambient temperature exceeds the set operating point of the heating by 2 K (Kelvin), the heating is switched off. I.e., the release point is situated at the hysteresis value over the operating point.

Example:  
Setpoint 15.0 °C, Offset +5.0 K, Hysteresis 2.0 K



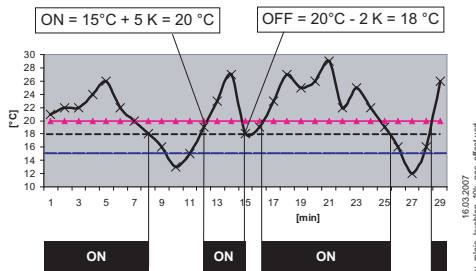
Example:  
Setpoint 20.0 °C, Offset -5.0 K, Hysteresis 2.0 K



Info 	
<b>28.7 °C</b> <b>E1 Actual</b>	The activated heating is indicated over the fire symbol in the display.

**Temperature variation with reprogramming to 10K for “K2” in IO Setup, e.g., for activation of the Cooling**

Example:  
Setpoint 15.0 °C, Offset +5.0 K, Hysteresis 2.0 K





If the ambient temperature is higher than the set operating point, the cooling remains switched on. If the ambient temperature falls below the set operating point of the cooling by 2 K (Kelvin), it is switched off. I.e., the OFF point is situated at the hysteresis value under the ON point.

**9.2.6 For mode 2.03 Relay output for temperature monitoring**

If the set value for the “minimum alarm” is not reached or the set value for the “maximum alarm” is exceeded, a message is generated via the alarm symbol in the display. In addition, „Lmt E1 min“ is displayed alternately with the actual value for the minimum alarm and Lmt E1 max for the „Maximum alarm“. An external message follows via the factory-assigned “K1” relay. (IO Setup: K1 function = 2K).

Setting	<b>Alarm Minimum</b> Setting range: OFF / -49.9...150.0 °C Factory setting: 10.0 °C
<b>10.0 °C</b> <b>Alarm Minimum</b>	
Setting	<b>Alarm Maximum</b> Setting range: OFF / -49.9...150.0 °C Factory setting: 35.0 °C
<b>35.0 °C</b> <b>Alarm Maximum</b>	

Info	Example for display if falling below setting “Alarm Minimum” alternating to the actual value display. Relay “K1” disengages (if not inverted).
 <b>GW E1 min.</b>	
Info	Example for display if exceeding setting “Alarm Maximum” alternating to the actual value display Relay “K1” disengages (if not inverted).
 <b>Lmt E1 max.</b>	



**9.3 Pressure control airconditioning 4.01... 4.02**



**9.3.1 Base setup 4.01... 4.02**

Main menu	<b>Base setup</b>
Start up	
Setting	
Protocol	
Base setup	
Controller Setup	
Base setup	<b>Mode</b> Mode selection e.g. <b>4.01</b>
<b>4.01</b> <b>Mode</b>	
Base setup	<b>E1 Analog In</b> The sensor input is factory set for modes of group <b>4</b> to sensor type "DSG500". Measuring range: 0...500 Pa Output signal: 0 - 10 V Connection terminals: "E1", "GND", "24V"
<b>DSG500</b> <b>E1 Analog In</b>	
	<b>Other settable sensors / measuring ranges:</b> <ul style="list-style-type: none"> <li>"DSG 50", "DSG100", "DSG200", "DSG300", "DSG500 / LDF500", "DSG1000", "DSG2000", "DSG4000", "DSG6000" (numerical specification <math>\triangleq</math> measuring range [Pa], output signal 0 - 10 V).</li> <li>0 - 10 V, 0 - 20 mA, 4 - 20 mA (for sensors with free measuring range and linear characteristic)</li> </ul> <p>The sensor measuring range must be entered for sensors with free measuring range in order to display the actual value correctly. Example with a 0 - 10 V sensor and 0 - 400 Pa measurement range: E1 Analog In = 0 - 10 V, E1 Unit = Pa, E1 Decimals = 1, E1 Min. = 0,0 Pa, E1 Max. = 400 Pa</p>
Base setup	<b>E1 Offset</b> Sensor calibration with calibrated comparison device. The current "E1 Actual" is displayed including the offset set here.
<b>0.0 Pa</b> <b>E1 Offset</b>	
Base setup	<b>E2 Function</b> The second signal input is not activated at the factory for modes with one sensor. The function is automatically jointly programmed in operating modes using 2 sensors. The second analog input is thus allocated and additional function allocations are not possible.
<b>OFF</b> <b>E2 Function</b>	
	<b>Modes with two sensors</b> <ul style="list-style-type: none"> <li>For <b>4.02</b> E2 Function at <b>6E</b> preprogrammed = sensor for setpoint lowering. Preprogrammed sensor type "TF.."</li> </ul> <b>Adjustable "E2 Function" for Modes with one sensor</b> <ul style="list-style-type: none"> <li><b>1E</b> = External setpoint e.g. by external signal (0 - 10 V) instead of setting "Setpoint 1". 0 - 10 V <math>\triangleq</math> 0 - 100 % sensor measuring range.</li> <li><b>2E</b> = External manual operation via external signal (0 - 10 V). Switching between setting on the device and external manual operation via digital input (☞ IO Setup: Function <b>7D</b>).</li> <li><b>3E</b> = Sensor average to E1</li> <li><b>4E</b> = Sensor comparison to E1</li> <li><b>5E</b> = Sensor difference to E1</li> <li><b>7E</b> = Measurement value = Measurement value e.g. for limit indication, display in Info menu "E2 Actual".</li> <li><b>8E</b>... <b>13E</b> = sensor input for control circuit 2 ☞ base setup / operation with second control circuit.</li> </ul>

**9.3.2 Setting for operation modes 4.01... 4.02**

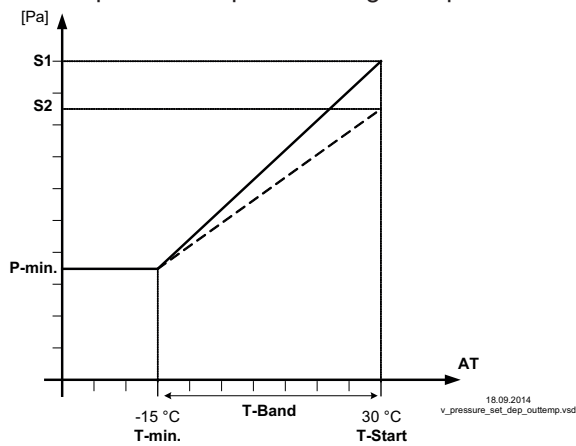
- 4.01** Pressure control, Setting Setpoint in Pa
- 4.02** Pressure control setpoint depending on outdoor temperature

Settings for controller output with function **2A** (by analogue signal  IO Setup, by MODBUS  members menu).

Main menu	<b>Setting</b>
Start up	
Setting	
Protocol	
Base setup	
Controller Setup	
Setting	<b>Setpoint1</b>
<b>250 Pa</b> <b>Setpoint1</b>	Setting range: in measuring range of sensor Factory setting: 250 Pa
Setting	<b>Set Internal2</b>
----- <b>Set Internal2</b>	Setting "Setpoint 2" e.g. reduced value for night operation. Switch over Setpoint 1/2 over external contact (display as long as noch allocation is carried out: <input type="checkbox"/>  IO Setup).
Setting	<b>Pband</b>
<b>250 Pa</b> <b>Pband</b>	Narrow control range = Short control times Wide control range = Longer control times and more stable control Setting range: in measuring range of sensor Factory setting: 250 Pa
Setting	<b>Min. Speed</b>
<b>15 %</b> <b>Min. Speed</b>	Setting range: 0... "Max. Speed" Factory setting: 15 %
Setting	<b>Max. Speed</b>
<b>100 %</b> <b>Max. Speed</b>	Setting range: 100 %... "Min. Speed" Factory setting: 100 %
Setting	<b>Manual mode</b>
<b>OFF</b> <b>Manual mode</b>	"OFF" = automatic control as function of the set parameters (Factory setting) "ON" = automatic control without function, speed setting in menu "Speed manual"
Setting	<b>Speed manual</b>
<b>100 %</b> <b>Speed manual</b>	Manual speed setting without influence by the external signal. Activation by menu "Manual mode" or external contact at digital input (  IO Setup). Setting range: 0...100 % $\Delta$ "Min. Speed"... "Max. Speed" Factory setting: 100 %
	For information about deactivated regulation the adjusted value for manual speed is indicated alternating with the actual value.

**Additional menu item for mode 4.02 and 4.02 with outside-temperature dependent target-setpoint.**

Outside-temperature dependent target-setpoint



An outside temperature compensation can be activated (sensor connection "E2" = "Analog In 2") when being operated as a pressure regulation device.

An optimal building climate, e.g., can be achieved through this. Through this function, the set and active "Setpoint 1" or "Setpoint 2" is automatically changed proportional to the measured outside temperature (Info: "Setpoint control").

- S1 Setpoint1
- S2 Set Internal2
- P-min. Min. Setpoint
- T-min. Min. temperature
- T-Start Setpoint reducing will start below this outside temperature
- T-band Temperature range
- AT Outdoor temperature

Setting	<b>T-Band SA</b>
<b>30 K</b> <b>T-Band SA</b>	Temperature range in which the setpoint change continuously with outside temperature Setting range: 0.0...+100.0 K Factory setting: 30.0 K
Setting	<b>T-Start SA</b>
<b>15 °C</b> <b>T-Start SA</b>	Setpoint reducing will start below this outside temperature Setting range: -10.0...40.0 °C Factory setting: 15.0 °C
Setting	<b>Min. Setpoint</b>
<b>70.0 Pa</b> <b>Min. Setpoint</b>	Minimum pressure for very low outside temperature Setting range: in measuring range of sensor Factory setting: 70 Pa

**9.4 Air velocity control 6.01**



**9.4.1 Base setup 6.01**




Main menu	<b>Base setup</b>
Start up	
Setting	
Protocol	
Base setup	
Controller Setup	
Base setup	<b>Mode</b> Mode selection <b>6.01</b>
<b>6.01</b> <b>Mode</b>	
Base setup	<b>E1 Analog In</b> The sensor input is factory set for mode <b>6.01</b> to sensor type "MAL10". Measuring range: 0...10 m/s Output signal: 0 - 10 V Connection terminals: "E1", "GND", "24V"
<b>MAL10</b> <b>E1 Analog In</b>	
	<b>Other settable sensors / measuring ranges:</b> <ul style="list-style-type: none"> <li>• MAL10 (0...10 m/s, output signal 0 - 10 V)</li> <li>• MAL15 * (0...15 m/s, output signal 0 - 10 V)</li> <li>• MAL20 * (0...20 m/s, output signal 0 - 10 V)</li> <li>• 0 - 10 V, 0 - 20 mA, 4 - 20 mA (for sensors with free measuring range and linear characteristic)</li> </ul> <p>The sensor measuring range must be entered for sensors with free measuring range in order to display the actual value correctly. Example 0 - 10 V sensor and measuring range 0 - 5 M/s: E1 Analog In = 0 - 10 V, E1 Unit = m/s, E1 Decimals = 1, E1 Min. = 0,0 m/s, E1 Max. = 5 m/s</p> <p>* Alternative measuring ranges which can be selected by jumpers for sensor type MAL10.</p>
Base setup	<b>E1 Offset</b> Sensor calibration with calibrated comparison device. The current "E1 Actual" is displayed including the offset set here.
<b>0.00 m/s</b> <b>E1 Offset</b>	
Base setup	<b>Adjustable "E2 Function"</b> <ul style="list-style-type: none"> <li>• <b>1E</b> = External setpoint e.g. by external signal (0 - 10 V) instead of setting "Setpoint 1". 0 - 10 V <math>\triangleq</math> 0 - 100 % sensor measuring range.</li> <li>• <b>2E</b> = External manual operation via external signal (0 - 10 V). Switching between setting on the device and external manual operation via digital input (☞ IO Setup: Function <b>7D</b>).</li> <li>• <b>3E</b> = Sensor average to E1</li> <li>• <b>4E</b> = Sensor comparison to E1</li> <li>• <b>5E</b> = Sensor difference to E1</li> <li>• <b>6E</b> = sensor for outdoor temperature-dependent setpoint adaptation, pre-programmed sensor type "TF..". <ul style="list-style-type: none"> <li>– Menu group "Setting" additional parameter: T-Band, T-Start SA, Min. Setpoint.</li> <li>– Menu group "Info" additional parameter: Setpoint control</li> <li>– Example ☞ Setting for operation <b>4.01</b>... <b>4.02</b> / additional menu items.</li> </ul> </li> <li>• <b>7E</b> = Measurement value = Measurement value e.g. for limit indication, display in Info menu "E2 Actual".</li> <li>• <b>8E</b>... <b>13E</b> = sensor input for control circuit 2 ☞ base setup / operation with second control circuit.</li> </ul>
<b>OFF</b> <b>E2 Function</b>	



**9.4.2 Settings for operation modes 6.01**

**6.01** Air velocity control, Setpoint in m/s

Settings for controller output with function **2A** (by analogue signal  IO Setup, by MODBUS  members menu).

Main menu	<b>Setting</b>
Start up	
Setting	
Protocol	
Base setup	
Controller Setup	
Base setup	<b>Setpoint1</b>
<b>5.0 m/s Setpoint1</b>	Setting range: in measuring range of sensor Factory setting: 5.0 m/s
Base setup	<b>Set Internal2</b>
<b>----- Set Internal2</b>	Setting "Setpoint 2" e.g. reduced value for night operation. Switch over Setpoint 1/2 over external contact (display as long as noch allocation is carried out:   IO Setup).
Base setup	<b>Pband</b>
<b>5.0 m/s Pband</b>	Narrow control range = Short control times Wide control range = Longer control times and more stable control Setting range: in measuring range of sensor Factory setting: 5.0 m/s
Base setup	<b>Min. Speed</b>
<b>15 % Min. Speed</b>	Setting range: 0... "Max. Speed" Factory setting: 15 %
Base setup	<b>Max. Speed</b>
<b>100 % Max. Speed</b>	Setting range: 100 %... "Min. Speed" Factory setting: 100 %
Base setup	<b>Manual mode</b>
<b>OFF Manual mode</b>	"OFF" = automatic control as function of the set parameters (Factory setting) "ON" = automatic control without function, speed setting in menu "Speed manual"
Base setup	<b>Speed manual</b>
<b>100 % Speed manual</b>	Manual speed setting without influence by the external signal. Activation by menu "Manual mode" or external contact at digital input (  IO Setup). Setting range: 0...100 % $\Delta$ "Min. Speed"... "Max. Speed" Factory setting: 100 %
	For information about deactivated regulation the adjusted value for manual speed is indicated alternating with the actual value.

9.5 Absolute humidity difference control **8.01**



**Information**



For further information, see appendix Basic principles / Setting options for “Absolute humidity difference control”.




9.5.1 Base setup **8.01**

Main menu	<b>Base setup</b>
Start up	
Setting	
Protocol	
Base setup	
Controller Setup	
Base setup	<b>Mode</b>
<b>8.01</b>	Mode selection <b>8.01</b>
<b>Mode</b>	
Base setup	<b>E1 Analog In</b>
<b>AFS 0-10V</b>	The sensor input is factory set for Mode <b>8.01</b> to sensor type “AFS 0-10V”.
<b>E1 Analog In</b>	Measuring range: 0...50.0 g/kg Output signal: 0 - 10 V Connection terminals: “E1”, “GND”, “24V”
	Input for sensors with free measuring range and linear characteristic curve adjustable for the following standard signals: 0 - 10 V, 0 - 20 mA, 4 - 20 mA For sensors with free measuring range, the sensor measuring range must be entered under the following menu points in order to ensure a correct actual value display: E1 unit, E1 decimal, E1 Min., E1 Max.
Base setup	<b>E1 Offset</b>
<b>0.0 g/kg</b>	Sensor calibration with calibrated comparison device.
<b>E1 Offset</b>	The current “E1 Actual” is displayed including the offset set here.
Base setup	<b>E2 Function</b>
<b>5E</b>	<ul style="list-style-type: none"> <li>In mode <b>8.01</b> the E2 function is preprogrammed to <b>5E</b> = Control on difference value between sensor 1 and sensor 2. Pre-programmed sensor: Type “AFS 0-10V”.</li> </ul>
<b>E2 Function</b>	<p><b>Adjustable “E2 Function” (alternative)</b></p> <ul style="list-style-type: none"> <li>OFF = Operation with one sensor</li> <li><b>1E</b> = External setpoint e.g. by external signal (0 - 10 V) instead of setting “Setpoint 1”. 0 - 10 V <math>\triangleq</math> 0 - 100 % sensor measuring range.</li> <li><b>2E</b> = External manual operation via external signal (0 - 10 V). Switching between setting on the device and external manual operation via digital input (☞ IO Setup: Function <b>7D</b>).</li> <li><b>3E</b> = Sensor average to E1</li> <li><b>4E</b> = Sensor comparison to E1</li> <li><b>6E</b> = sensor for outdoor temperature-dependent setpoint adaptation, pre-programmed sensor type “TF..”.                         <ul style="list-style-type: none"> <li>– Menu group “Setting” additional parameter: T-Band, T-Start SA, Min. Setpoint.</li> <li>– Menu group “Info” additional parameter: Setpoint control</li> <li>– Example ☞ Setting for operation <b>4.01</b>... <b>4.02</b> / additional menu items.</li> </ul> </li> <li><b>7E</b> = Measurement value = Measurement value e.g. for limit indication, display in Info menu “E2 Actual”.</li> <li><b>8E</b>... <b>13E</b> = sensor input for control circuit 2 ☞ base setup / operation with second control circuit.</li> </ul>

**9.5.2 Settings for operation modes 8.01**

**8.01** Humidity control with 2 sensors, control on humidity difference.  
 Operating display: "Actual value E1 - E2" in g/kg, "E1" = reference value, "E2" results in positive (E2 < E1) or negative (E2 > E1) difference.

Settings for controller output with function **2A** (by analogue signal  IO Setup, by MODBUS  members menu).

Main menu	<b>Setting</b>
Start up	
Setting	
Protocol	
Base setup	
Controller Setup	
Base setup	<b>Setpoint1</b>
<b>0.0 g/kg Setpoint1</b>	Setting range: in measuring range of sensor Factory setting: 0.0 g/kg
Base setup	<b>Set Internal2</b>
<b>----- Set Internal2</b>	Setting "Setpoint 2" e.g. reduced value for night operation. Switch over Setpoint 1/2 over external contact (display as long as noch allocation is carried out:   IO Setup).
Base setup	<b>Pband</b>
<b>5.0 g/kg Pband</b>	Narrow control range = Short control times Wide control range = Longer control times and more stable control Setting range: in measuring range of sensor Factory5.0setting: 5.0 g/kg
Base setup	<b>Min. Speed</b>
<b>15 % Min. Speed</b>	Setting range: 0... "Max. Speed" Factory setting: 15 %
Base setup	<b>Max. Speed</b>
<b>100 % Max. Speed</b>	Setting range: 100 %... "Min. Speed" Factory setting: 100 %
Base setup	<b>Manual mode</b>
<b>OFF Manual mode</b>	"OFF" = automatic control as function of the set parameters (Factory setting) "ON" = automatic control without function, speed setting in menu "Speed manual"
Base setup	<b>Speed manual</b>
<b>100 % Speed manual</b>	Manual speed setting without influence by the external signal. Activation by menu "Manual mode" or external contact at digital input (  IO Setup). Setting range: 0...100 % $\hat{=}$ "Min. Speed"... "Max. Speed" Factory setting: 100 % For information about deactivated regulation the adjusted value for manual speed is indicated alternating with the actual value.

## 9.6 Menu group Start

Main menu	<b>Start up</b>
Start up	
Settings	
Protocol	
Base setup	
Controller Setup	
Start up	<b>PIN input</b> The service menu for the installation can be protected against unintentional changes by a pin code. With further pin codes putting back to pre-setting is possible.
-----	
<b>PIN input</b>	
	<p><b>PIN 0010</b> Opening service menu, if PIN-protection activated.</p> <p><b>PIN 1020</b> Reactivate wizard for first-time start-up</p> <p><b>PIN 1234</b> Freischalten Menu group "Setting". if "set protection" = "ON" (☞ Controller Setup)</p> <p><b>PIN 9090</b> Restore user setting.</p> <p><b>PIN 9091</b> Save user setting (corresponds function "Save user setup" = "ON"☞ Controller Setup)</p> <p><b>PIN 9095</b> Restore factory setting = delivery status Exception: The stored events in the "Protocol" menu are retained after resetting to factory setting!</p>
Start up	<b>Language</b> In this menu different national languages can be selected (GB = English, D = German ...).
<b>D</b> <b>Sprache</b>	
	<b>US Einheiten</b> The display can be switched between SI units and imperial (US) units =>US units ON. SI units (factory setting): °C, bar, Pa, m <sup>3</sup> /h, K-Faktor, m/s Imperial (US) units: °F, psi, in.wg, cfm, K-Faktor US, ft/s Settings for temperature differences (with SI units in K) are also made for Imperial units (US) in °F ( $\Delta 1.8 \text{ }^\circ\text{F} \triangleq \Delta 1 \text{ K}$ ). Conversion factors: <ul style="list-style-type: none"> <li>• Temperature: <math>t / \text{ }^\circ\text{F} = 1,8 \times t \text{ }^\circ\text{C} + 32</math>.</li> <li>• Pressure: 1.0 psi = 0.069 bar, 1.0 in.wg = 254 Pa</li> <li>• Air flow: 1.0 cfm = 0.5885 m<sup>3</sup>/h, inlet ring: K-Faktor US = 9.3 x K-Faktor SI</li> <li>• Speed: 1.0 ft/s = 0.3048 m/s</li> </ul> In order to refresh the display, the desired mode must be confirmed again after switching over the units (☞ Base setup)!
<b>OFF</b> <b>US Einheiten</b>	
Start up	<b>Reset</b> Complete re-start of the device
<b>OFF</b> <b>Reset</b>	
Start up	<b>Mode</b> Query of the operating mode (e.g. <b>1.01</b> for speed controller)
<b>1.01</b> <b>Mode</b>	

Start up	<b>Device name</b>
<b>12.00</b> <b>EUR EC</b>	Display of device name and software version
Start up	Individual unit number
<b>SN: 154036311039</b>	

**9.7 Menu group Info**

The first menu item in the Info menu group is displayed (display dependent on selected mode) after switching on the line voltage or after exiting the setting menu with the Esc key combination.  
Settings cannot be made in this menu group!

<b>Info for mode speed controller 1.01</b>	
Info	Level modulation control output.
<b>0 %</b> <b>Brake control</b>	The percentage modulation factor is displayed in addition to the bar chart.
Info	Display of the currently active default signal.
<b>0 %</b> <b>Set external1</b>	The percentage corresponds to internal actuation of the device taking into account the "Min. speed" and "Max. speed" settings. 0 - 100 % $\triangleq$ 0 - 10 V, 10 - 0 V, 0 - 20 mA, 20 - 0 mA, 4 - 20 mA, 20 - 4 mA
	Display: The device operates at:
	"Set external1" Signal to "E1" / "GND"
	"Set external2" Signal to "E2" / "GND"
	"Set Internal1" Menu "Set Intern1"
	"Set Internal2" Menu "Set Intern2"
<b>Info for mode controller 2.01... 8.01</b>	
Info	Only for mode <b>2.05</b> , <b>8.01</b>
<b>0 °C</b> <b>E1-E2 actual</b>	Current actual value difference sensor 1 - sensor 2 (unit depending on the programming).
Info	Only in mode <b>2.04</b> (E2 function = <b>4E</b> )
<b>0 °C</b> <b>Control value</b>	The highest value determined automatically from two sensor measuring values which is used as the actual value for the control (unit depending on programming).
Info	Only for mode <b>2.04</b> programmed for averaging (E2 function = <b>3E</b> ).
<b>49.9 °C</b> <b>Average E1/E2</b>	
Info	Current actual value measured at sensor 1 (unit depending on programming).
<b>0 °C</b> <b>E1 Actual</b>	
Info	Display for "actual value 2" for operation with two sensors.
<b>0 °C</b> <b>E2 Actual</b>	Display if function not active: <span style="border: 1px solid black; padding: 0 5px;">-----</span>

Info	Display of the active target value at which the device operates.
<b>0 °C Setpoint1</b>	<p>“Setpoint1” Menu “Setting”</p> <p>“Setpoint2” Menu “Setting”</p> <p>“Ext. Setpoint” = setting by external signal 0-10 V. With activated manual mode the display constantly changes between actual value and value for manual mode.</p> <p>Display for operation with two control circuits:  “1.Setpoint 1” or “1.Setpoint 2” for control circuit 1  “2.Setpoint 1” or “2.Setpoint 2” for control circuit 2</p>
Info	Only for mode <b>4.02</b> , with setpoint depending on outdoor temperature (E2 function = <b>6E</b> ).
<b>100.0 Pa Setpoint control</b>	
Info	Level modulation control output.
<b>0 % Modulation</b>	<p>In addition to the bar chart, the level of the output voltage is indicated.</p> <p>The modulation for each control circuit is displayed in operation with two control circuits:  “1. Modulation” for control circuit 1  “2. Modulation” for control circuit 2</p>
Info	Momentarily status for minimum speed cut off
<b>OFF Min. speed cut off</b>	<p>“ON” = switch off, if Setpoint (+/- “Min. speed cut off”) is reached.</p> <p>“OFF” = no switch off that means operation with minimum rate of air.</p> <p>Display for operation with two control circuits:  “1. Min. speed cut off” for control circuit 1  “2. Min. speed cut off” for control circuit 2</p>

### 9.8 Controller Setup

Main menu	<b>Controller Setup</b>
Start up	
Settings	
Protocol	
Base setup	
Controller Setup	

#### 9.8.1 PIN protection activate, PIN0010

Controller Setup	The adjustments for the installation in the service level can be protected against unintentional modifications. To do this, activate the "PIN protection" = "ON". In order to simplify the initial start-up operation, the service level in the factory setting is free = "OFF" i.e. accessible without <b>PIN 0010</b> .
<b>OFF PIN Protection</b>	

#### Available menu groups with activated PIN-protection

Main menu	
Start up	
Setting	
Protocol	

If PIN-protection is switched on, it automatically becomes active after about 15 minutes without keys being pressed.

#### Possibilities for early activation of PIN protection:

- Execute the "Reset" function in the "Start" menu group.
- By switching the mains voltage off and then on again.



#### Information

After installation of the device has been carried out, "PIN-Protection" should be activated = "ON"

#### 9.8.2 Set protection activate, PIN 1234

Controller Setup	The "Settings" menu for the user's basic settings (Setpoint, default value, min, max ..) are freely accessible when using the factory settings (i.e. without "PIN"). If necessary, these can also be protected against unauthorized modifications by using a " <b>PIN 1234</b> ". For this, the settings protection must be programmed to "ON". The settings menu is then no longer visible without inputting a PIN! Function only in combination with activated PIN-Protection!
<b>OFF Set protection</b>	

#### Available menu groups with activated PIN-protection + setting protection

Menu	
Start up	
Protocol	

**9.8.3 Save user settings restore with PIN 9090**

Controller Setup	The individually made device configurations (User Setting) can be saved here (corresponds to PIN 9091).
<b>OFF</b> <b>Save User Setup</b>	By entering <b>PIN 9090</b> the individually made device configurations can be reestablished (9090 Start - PIN Input).
	A file (userconf.csv) is generated and saved on the main drive (root directory) when saving the user setting. The data can be accessed via the <b>ZAsset</b> program.



**Information**



By entering the "PIN 9095" in the "PIN" menu of the "Start" menu group the device is reset to the as-delivered state (except for the saved events in the "Protocol" menu). Any changes that have been made to the settings are thus lost.

**9.8.4 Sensor Alarm ON / OFF**

The sensors at the analog inputs "E1 Analog In" and "E2 Analog In" (if sensor 2 is activated) are monitored.

In case of an interruption or short-circuit in the sensor conductor, or in case of measured values that lie outside of the device's measurement range, a time-delayed fault indication takes place.

Function only in controller mode (from **2.01**)!

Controller Setup	With "Alarm Sensors" = "ON" (factory setting). Indicated sensor disturbances are displayed as "Alarm" alternating to the actual value and stored in the menu of "Protocol". A programmed alarm relay (factory setting relay K2) indicates the sensor failure.	 <b>Sensor 1</b>
<b>ON</b> <b>Alarm sensors</b>		
Controller Setup	With "AlarmSensors" = "OFF" are indicated sensor disturbances as "Message" alternating to the actual value and stored in the menu of "Protocol".	 <b>Sensor 1</b>
<b>OFF</b> <b>Alarm sensors</b>		



**9.8.5 Limit**

Controller Setup	After allocation of a digital input (see IO Setup) an adjustable limitation of the modulation can be activated via a digital input ("D1", "D2", ..).
----- <b>Limit</b>	Display as long as no allocation has been carried out in "IO Setup": <span style="border: 1px solid black; padding: 2px;">-----</span> The limitation influences both outputs in operation with two control circuits.

"Limit value" = max. possible modulation (e.g. speed reduction during night operation by time switch).  
 Setting range: "Limit" = "Min. Speed" to "Max. Speed".  
 Factory setting: 100 %  $\hat{=}$  max. modulation, i. e. no limit.  
 Setting depending on device tye in: % or rpm.

Limit (idealized principle diagram)  
 MODBUS Out: speed setting over MODBUS  
 Analog Out: speed setting over analog output 0 - 10 V  
 L Limit  
 S Setpoint  
 R Pband  
 D Speed controller: setting signal  
 P P-controller: control deviation

**9.8.6 Minimum switch-off**

Controller Setup	This function is primarily significant for installation of the device as a pure P Controller in refrigeration and air-conditioning technology.
<b>OFF</b> <b>Min. switch-off</b>	For operation mode speed controller <b>1.01</b> without function!
	Display for operation with two control circuits: "1. Minimum switch-off" for control circuit 1 "2. Minimum switch-off" for control circuit 2

**Minimum switch-off = OFF** (factory setting)  
 If no "Min. speed" is adjusted, the fan stops with reaching the desired value.  
 If "Min. speed" is adjusted (e.g. 20%), then no disconnection of the fan takes place. I.e., always a minimum ventilation is ensured (fan does not go under setting "Min. speed").

**Minimum switch-off, e.g. -2.0 K**  
 It takes place a disconnection from setting "Min. speed" to "0", if the given difference is reached related to the desired value.  
 At a plus value (+) before reaching the desired value  
 At a minus value (-) after falling below the desired value.

Minimum cut off (idealized principle diagram)  
 MODBUS Out: speed setting over MODBUS  
 Analog Out: speed setting over analog output 0 - 10 V  
 S Setpoint  
 R Pband  
 I Actual value

**9.8.7 Reverse action of the control function**

Controller Setup	<p><b>For the effect of the regulation there are two functions:</b></p> <ul style="list-style-type: none"> <li>• <b>ON</b> for “Val &gt; Set = n+” <math>\hat{=}</math> increasing Fanlevel for increasing actual value over Setpoint.</li> <li>• <b>OFF</b> for “Val &gt; Set = n+” <math>\hat{=}</math> increasing Fanlevel for decreasing actual value below Setpoint.</li> </ul> <p>Display for operation with two control circuits:                      “1. Actual&gt;Set=n” for control circuit 1                      “2. Actual&gt;Set=n” for control circuit 2</p> <p>For special applications an external switch over of the control function is possible (☞ IO Setup).</p>
<p><b>ON</b> Val&gt;Set=n+</p>	

Factory setting depending on selected mode	Example for temperature control (Idealized principle diagram)												
<table border="1"> <thead> <tr> <th>Mode</th> <th>Controller function</th> </tr> </thead> <tbody> <tr> <td><b>1.01</b></td> <td>non</td> </tr> <tr> <td><b>2.01...</b></td> <td>ON</td> </tr> <tr> <td><b>4.01...</b></td> <td>OFF</td> </tr> <tr> <td><b>6.01...</b></td> <td>OFF</td> </tr> <tr> <td><b>8.01...</b></td> <td>ON</td> </tr> </tbody> </table>	Mode	Controller function	<b>1.01</b>	non	<b>2.01...</b>	ON	<b>4.01...</b>	OFF	<b>6.01...</b>	OFF	<b>8.01...</b>	ON	<p>MODBUS Out: speed setting over MODBUS                      Analog Out: speed setting over analog output 0 - 10 V                      R Pband                      S Setpoint                      I Actual value                      OFF for Val&gt;Set=n+ = heating function                      ON for Val&gt;Set=n+ = cooling function</p>
Mode	Controller function												
<b>1.01</b>	non												
<b>2.01...</b>	ON												
<b>4.01...</b>	OFF												
<b>6.01...</b>	OFF												
<b>8.01...</b>	ON												

**9.8.8 Controller configuration**

The “controller configuration” is automatically carried out during selection of the application related mode of operation (Base setup). The factory presets in accordance with the mode of operation are based on many years of experience, which is suitable for many applications. Under special circumstances, these can be individually adapted (see menu group “setting”).

Controller Setup	<p>The type of control determines the method with which the controlled value behaves in case of a difference between the target and current values. For this, the control technology has standard algorithms, which consist of a combination of three methods:</p> <p><b>Selection P, PID:</b></p> <ul style="list-style-type: none"> <li>• <b>P</b> control (Proportional component, proportion of the absolute deviation)</li> <li>• <b>I</b> control (Integral component, proportion of the sum of all deviations)</li> <li>• <b>D</b> control (Differential component, proportion of the last difference)</li> </ul> <p>Display for operation with two control circuits:                      “1.Controller type” for control circuit 1                      “2.Controller type” for control circuit 2</p>
<p><b>P</b> Type of control</p>	
<p>With pure P controllers (controller type <b>P</b>), the following described settings do not have any function. If needed, the most suitable combination for the respective control system can be determined from these proportions.</p> <p>The control configuration (KP, KI, KD, TI) is identical for both control circuits in operation with two control circuits. Fine adjustment is possible for each control circuit by the separate “Pband” setting.</p>	

Controller Setup	<b>P-component = reaction time</b>
<b>50 % KP</b>	Setting range: 0 - 200 % smaller = more slowly bigger = faster
Controller Setup	<b>I-component = accuracy, correction time</b>
<b>50 % KI</b>	Setting range: 0 - 200 % bigger = faster smaller = more slowly
Controller Setup	<b>D-component</b>
<b>50 % KD</b>	More "D-component" causes more stability by a clean actual value signal with shorter correction times By a actual value signal with a superposition should be done to attitude without "D-component" → 0 % Setting range: 0 - 200 % value smaller = less "D-component" value higher = more "D-component"
Controller Setup	<b>Integration time = correction time</b>
<b>0 % TI</b>	Setting range: 0 - 200 % smaller = faster bigger = more slowly

**9.8.9 Group control**

Fan groups can be activated by the analogue outputs "A1" and "A2", the relay outputs "K1" and "K2" or by the RS-485 interface for MODBUS RTU.

Controller Setup	Following group versions are available:
<b>OFF Group version</b>	<ul style="list-style-type: none"> <li>• <b>OFF</b>: no group control (factory setting)</li> <li>• <b>1</b>: Two controlled groups</li> <li>• <b>2</b>: One controlled group and up to three switched groups</li> </ul>

**Group control via analogue outputs and relays**

- The groups must be connected at the appropriate programmed output when activating by the analogue outputs and relays.
- The assignment of the analogue outputs and the relays for the group control takes place in the IO Setup.
- The number of possible groups depends on the available hardware outputs in the MODBUS Master (maximum of 4 groups possible).

**Group control im MODBUS Master Operation**

- If controlling via MODBUS, an individual function can be programmed for each group device.
- The virtual outputs are assigned after the menu group "MODBUS Master" for the respective component "fan 1" .. "fan xx".
- The number of possible groups does **not depend** on the available hardware outputs in the MODBUS Master (maximum of 4 groups possible).

Relay output K1, K2

**8K** = Group 2  
**12K** = Group 3  
**13K** = Group 4



**Information**

- Group activation by analogue output, relay and MODBUS can also be combined.
- Ensure an ascending and complete sequence when assigning the groups. This means that if, for example, the function for a fourth group was assigned for an output, there must already be an assignment for groups 2 and 3 (see IO Setup).
- The group control only becomes active once a group function is allocated to an output (analogue, relay, MODBUS).

**9.8.9.1 Version “1”: Two controlled groups**

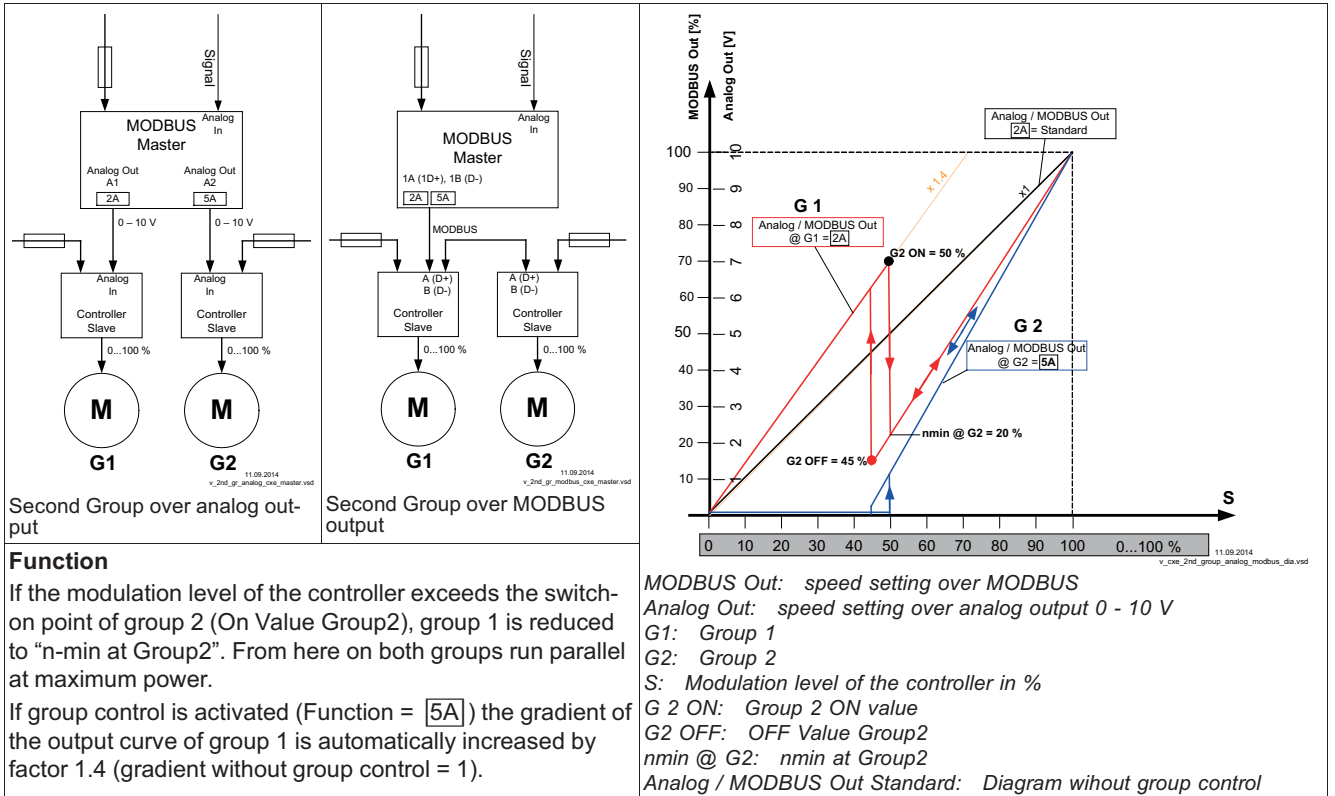
The programming described below applies equally for group control by the analogue outputs “A1” / “A2” and by the MODBUS interface.

Required allocation: Function **2A** for activation of Group1, function **5A** for Group2.

Controller Setup	<b>Group 2 ON value</b>
<b>50 %</b> <b>Group 2 ON value</b>	Switch-on value for Group2 Setting range: 0 - 100 % Factory setting: 50 % *
Controller Setup	<b>OFF Value Group2</b>
<b>45 %</b> <b>OFF Value Group2</b>	Switch-off value for group2 Setting range: 0 - 100 % Factory setting: 45 % *
Controller Setup	<b>nmin at Group2</b>
<b>20 %</b> <b>nmin at Group2</b>	Minimum Value for Group2 Setting range: 0 - 100 % Factory setting: 20 % *

\* Display as long as no group assignment via analogue output, relay, MODBUS: **----**

**Example version “1”: Two controlled groups**



**9.8.9.2 Variant “2”: One controlled group and up to three switched groups**

The programming described below applies equally for group control by analogue outputs, relay outputs and MODBUS.

For group control by the analogue outputs “A1” / “A2” and the relay outputs “K1” and “K2”, the available outputs must be observed in the selection of the version (combinations are possible).

**Example: Required assignment for a controlled and a switched group**

- For activation by analogue output (see IO Setup) or MODBUS (see MODBUS Master)
  - Function **A** for group 1 (0 - 100 % controlled)
  - Function **5A** for group 2 (0 / 100 % switched)
- For activation of Group 2 by relay (see IO Setup)
  - Function **A** for group 1 (0 - 100 % controlled)
  - Function **8K** for group 2 (ON / OFF switched)

The function **11A** must be allocated additionally to Group 3 for one controlled and two switched groups.

The function **12A** must be allocated additionally to Group 4 for one controlled and three switched groups.

Controller Setup	<b>Group 2 ON value</b>
<b>50 %</b> <b>Group 2 ON value</b>	Switch-on value for Group2 Setting range: 0 - 100 % Factory setting: 50 % *
Controller Setup	<b>OFF Value Group2</b>
<b>45 %</b> <b>OFF Value Group2</b>	Switch-off value for group2 Setting range: 0 - 100 % Factory setting: 45 % *

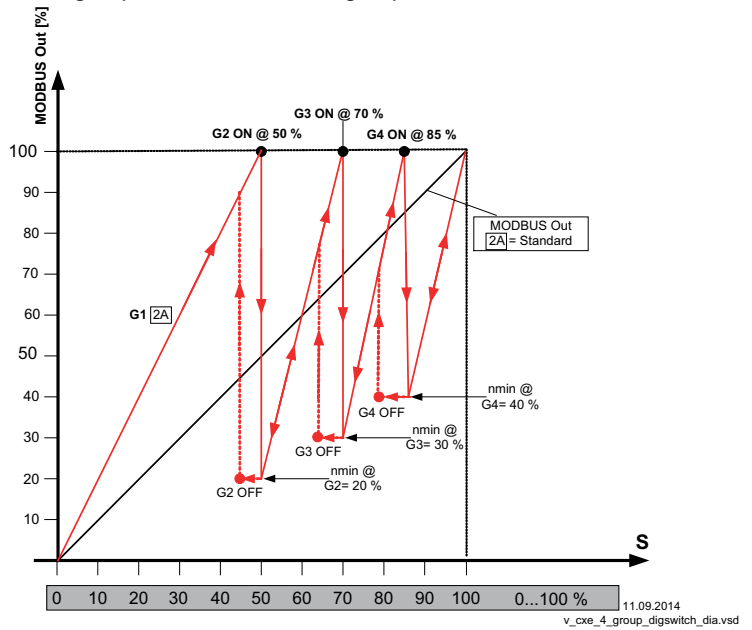
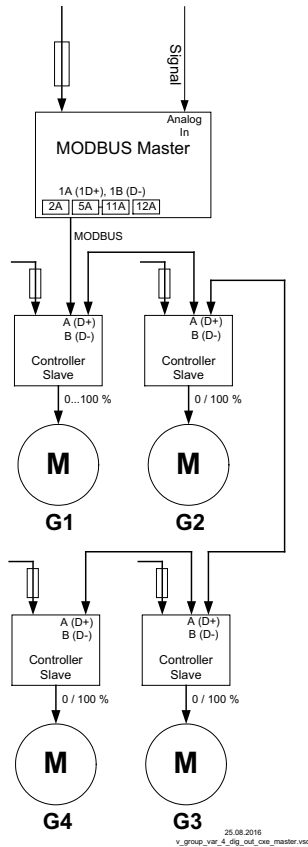
Controller Setup	<b>nmin at Group2</b>
<b>20 % nmin at Group2</b>	Minimum Value for Group2 Setting range: 0 - 100 % Factory setting: 20 % *
Controller Setup	<b>Group 3 ON value</b>
<b>70 % Group 3 ON value</b>	Switch-on value for Group3 Setting range: 0 - 100 % Factory setting: 70 % *
Controller Setup	<b>OFF Value Group3</b>
<b>65 % OFF Value Group3</b>	Switch-off value for group3 Setting range: 0 - 100 % Factory setting: 65 % *
Controller Setup	<b>nmin at Group3</b>
<b>30 % nmin at Group3</b>	Minimum Value for Group3 Setting range: 0 - 100 % Factory setting: 30 % *
Controller Setup	<b>Group 4 ON value</b>
<b>85 % Group 4 ON value</b>	Switch-on value for Group4 Setting range: 0 - 100 % Factory setting: 85 % *
Controller Setup	<b>OFF Value Group4</b>
<b>80 % OFF Value Group4</b>	Switch-off value for group4 Setting range: 0 - 100 % Factory setting: 80 % *
Controller Setup	<b>nmin at Group4</b>
<b>40 % nmin at Group4</b>	Minimum Value for Group4 Setting range: 0 - 100 % Factory setting: 40 % *

\* Display as long as no group assignment via analogue output, relay, MODBUS:

Higher settings must be selected for following groups and the switch-off value of the group must be below the switch-on value.

**Example version “2” via MODBUS**

On controlled group and three switched groups



MODBUS Out: speed setting over MODBUS  
 S: Modulation level of the controller in %  
 G1: Group 1  
 G2: Group 2  
 G3: Group 3  
 G4: Group 4  
 G2, G3, G4 ON: ON Value Group2, 3, 4  
 G2, G3, G4, OFF: OFF Value Group2, 3, 4  
 nmin@G 2, 3, 4: nmin at Group2, 3, 4  
 MODBUS Out Standard: Diagram without group control

**Function**

Group 1 is continuously controlled (0 - 100 %), the other groups are switched on and off depending on the degree of modulation (0 / 100%).  
 If the modulation level exceeds the switch-on point “ON Value Group2”, the MODBUS Master switches on the second group and the speed of the first group is reduced to an adjustable minimal value “nmin at Group2”.  
 Then the speed of the first group increases to maximum within the remaining range.  
 If a third group is programmed up to switch-on point “ON Value Group3” etc.  
 Switch-off point “OFF Value Group2” at diminishing speed requirement.

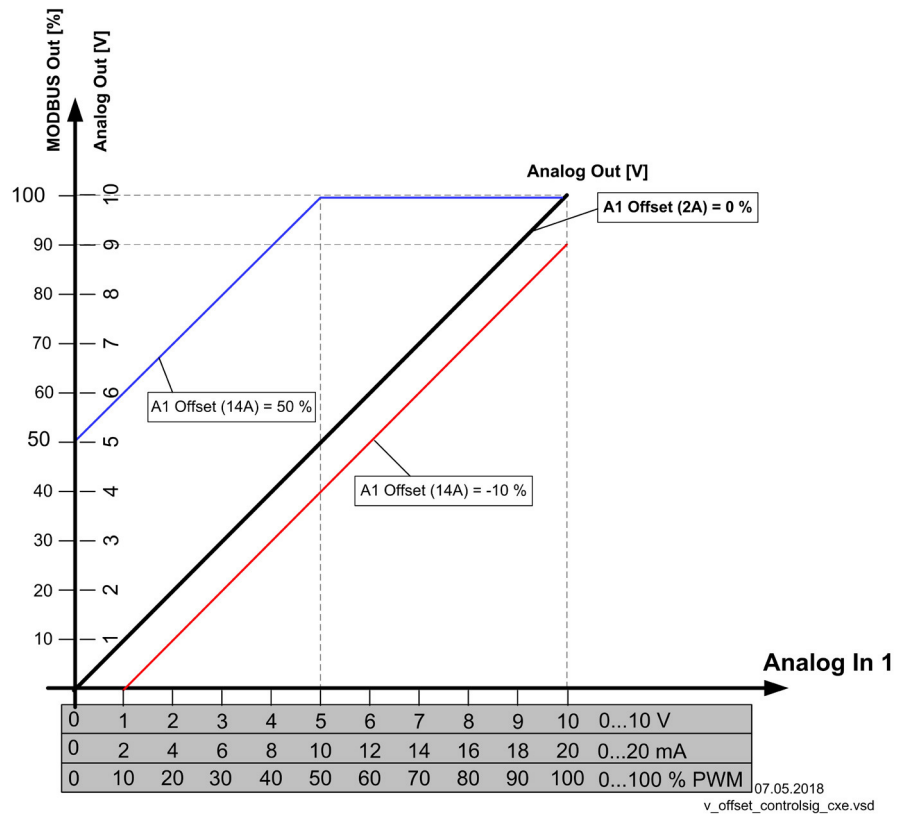
**9.8.10 Display text for external message**

Controller Setup	Alternatively to the “External Error” display when an external message occurs (see IO Setup / Digital Inputs “D1” / “D2” the following error texts can be programmed:
<b>External error</b> External message	<ul style="list-style-type: none"> <li>• <b>EC Motors</b></li> <li>• <b>Filter</b></li> <li>• <b>Frost protection</b></li> <li>• <b>Adiabatic</b></li> <li>• <b>Firealarm</b></li> <li>• <b>Pressure switch</b></li> <li>• <b>Gas alarm</b></li> <li>• <b>Water alarm</b></li> <li>• <b>RCD</b></li> <li>• <b>Exhaust air</b></li> </ul>

RCD Residual-current-operated protective device

9.8.11 Offset control signal

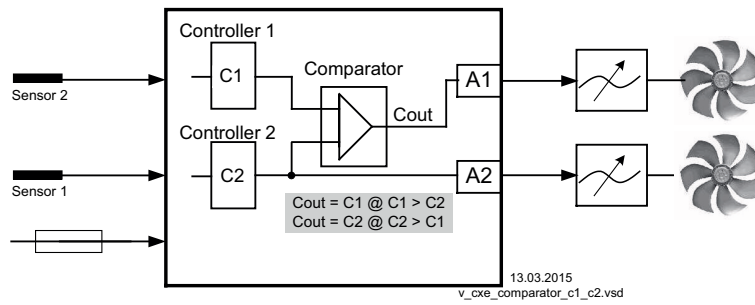
Controller Setup	<b>Offset control sig. 1</b>
<b>0 %</b> <b>Offset control sig. 1</b>	If required, the characteristic of the control signal for control circuit 1 can be adjusted. To activate this function, re-program the output with function <b>2A</b> to function <b>14A</b> , see IO Setup. Setting range: -50...+50 % Factory setting: 0 % (characteristic curve unchanged)



9.8.12 Selection amplifier (comparator) control circuit 1 or 2 at output A1

Controller Setup	If using two control circuits, the control circuit with the higher modulation can be selected to affect the power component of the device.
<b>OFF</b> <b>Selection amplifier</b>	This function can be used for refrigeration systems with combined refrigerant circuit and floating brine pressure control circuits, for example.
	<p><b>Example:</b></p> <ul style="list-style-type: none"> <li>Control circuit 1 is used for the refrigerant circuit. A pressure sensor is connected to determine the actual value. The setpoint and control range are set in bar.</li> <li>Control circuit 2 is used for the brine pressurised circuit. A temperature sensor is connected to determine the actual value. The setpoint and control range are set in C° / K.</li> <li>Depending on which control circuit produces the higher modulation (depending on the measured and set values), the pressure control or temperature control is used as a specification for the power component.</li> </ul> <p><b>Selection amplifier = OFF</b> (factory setting) No comparison of the two control circuits.</p> <p><b>Selection amplifier = ON</b> Comparison of the modulation of control circuit 1 and control circuit 2 with automatic control active at the highest value.</p>





**9.8.13 COM2 Function**

IO Setup	Possible settings:
<b>MODBUS Slave</b> COM2 Function	<ul style="list-style-type: none"> <li>• MODBUS Slave (factory setting): In the main menu the “Diagnostic” menu group is followed by the “MODBUS Slave” menu group. The communication parameters can be set in this.</li> <li>• OFF: The “MODBUS Slave” or “MODEM SMS” menu group is not displayed in the main menu.</li> <li>• MODEM SMS: In the main menu the “IO Setup” menu group is followed by the “MODEM SMS” menu group. Input SIM PIN for MODEM SMS interface (no function at present).</li> </ul>

**9.8.14 Data on the total control deviation**

The total control deviation is comprised of the sum of the control deviations for performance quantities and work quantities combined and refers to the specified areas.  
 In direct reference to the acquired input and controlled variables, the maximum deviation to the target value is  $< \pm 5\%$ . By activating the menu-assisted adjustment, the total control deviation can be reduced to a value of  $< \pm 1\%$ .  
 For indirect reference of the acquired input value to the controlled variable, i.e., two physical variables still need to be converted, the deviation can be reduced to  $< \pm 5\%$  through adjustment.  
 In the case of an internal default value through the integrated or external terminal, the control deviation remains at  $< \pm 0.5\%$ .

**9.9 IO Setup**

**9.9.1 overview Menu group IO Setup**

Main menu	<b>IO Setup</b>
Settings	
Protocol	
Base setup	
Controller Setup	
IO Setup	
IO Setup	The IO setup consists of 4 areas:
Analog Out	Analog outputs
Analog In	Analog inputs
Digital Out	Digital outputs
Digital In	Digital inputs

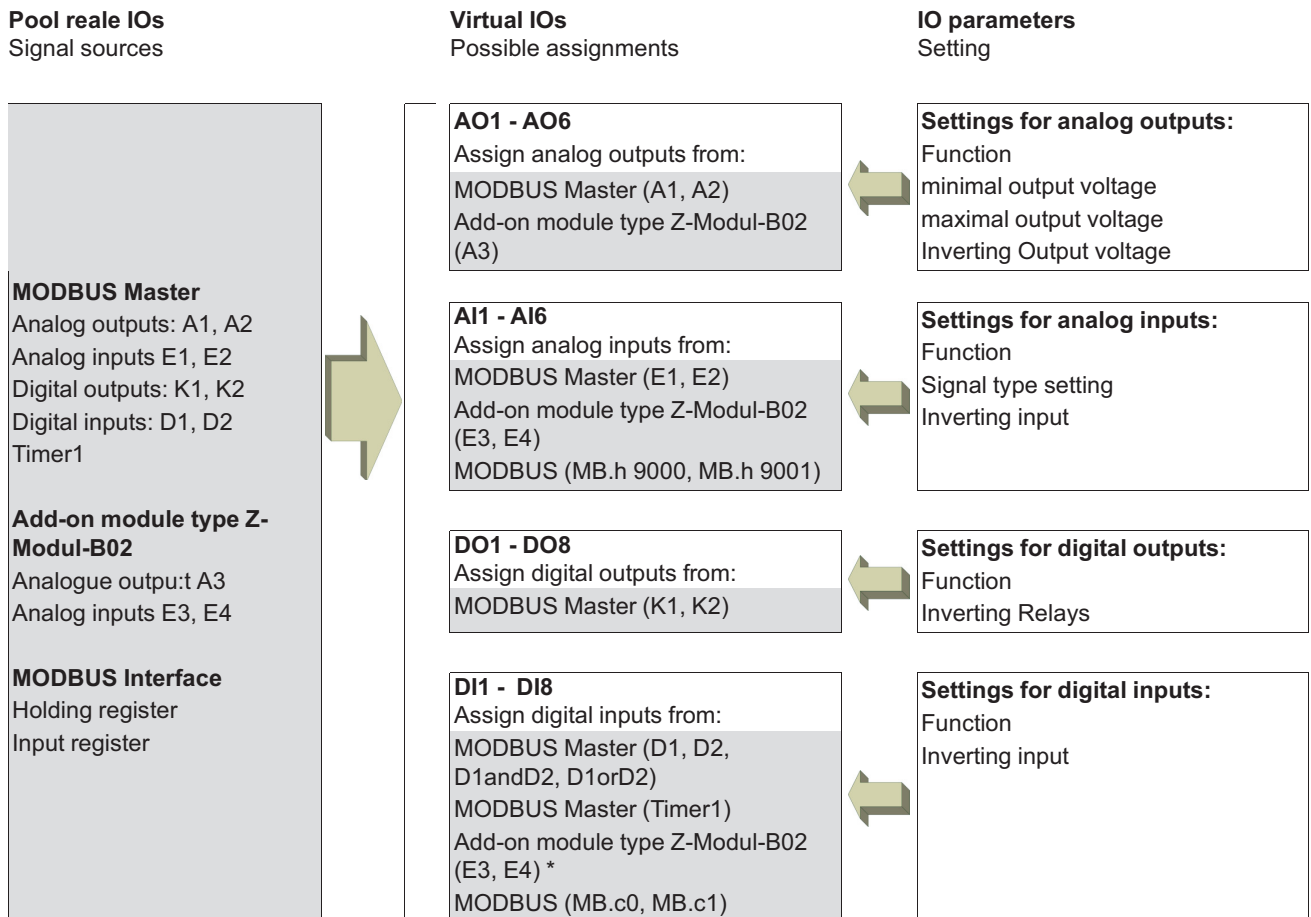
**9.9.2 Allocation: virtual IOs / real IOs**

A distinction is made between virtual IOs and actual IOs.

- Actual IOs are physical inputs, physical outputs and timer functions on the MODBUS master, on add-on modules and on devices connected via the MODBUS interface.
- Virtual IOs are the inputs and outputs used to make the settings on the MODBUS master.

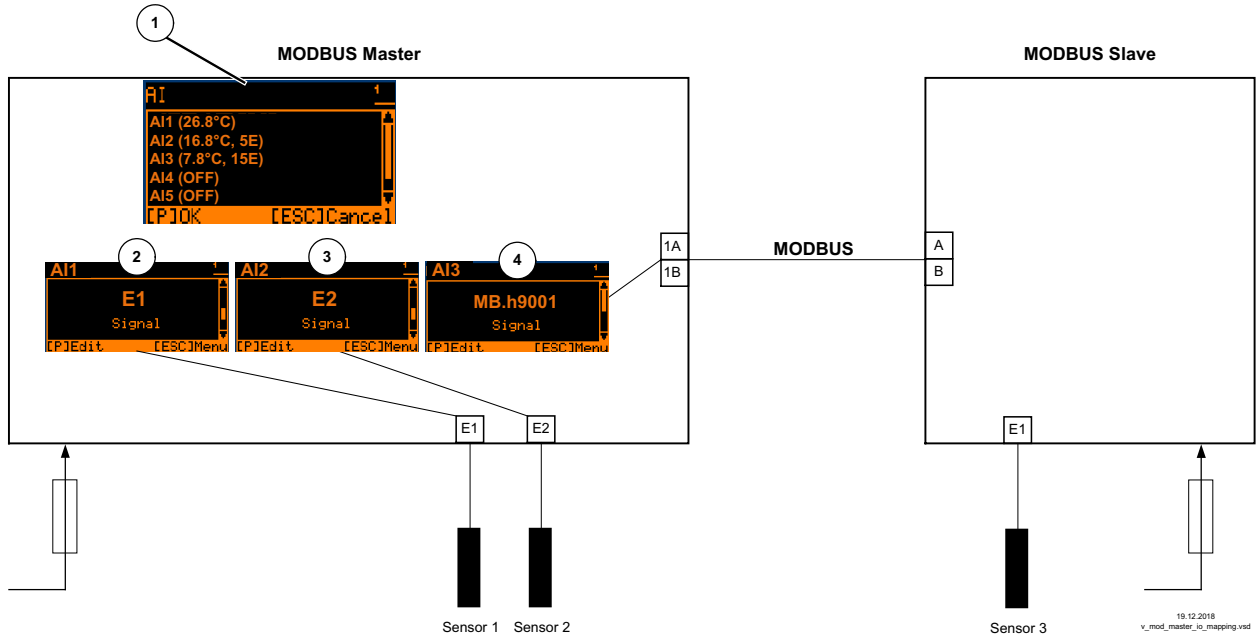
The actual inputs and outputs that the virtual inputs and outputs affect can be freely assigned. This enables the “pool” of available actual IOs (signal sources) to be used as effectively as possible. The possible selection of signal sources that can be assigned to the virtual IOs depends on the available actual IOs.

**Example of possible assignments from actual to virtual IOs**



\* When assigning the analog inputs of the auxiliary module, they are used as digital inputs

Example: Assignment of inputs for temperature sensors



- 1 Overview display of virtual inputs "AI1-AI6" with display of actual values and programmed functions
- 2 Assignment of actual input "E1" on MODBUS master to virtual input "AI1"
- 3 Assignment of actual input "E2" on MODBUS master to virtual input "AI2"
- 4 Assignment MODBUS holding register 9001 to virtual input "AI3"

**Assignment of IOs and display of designations**

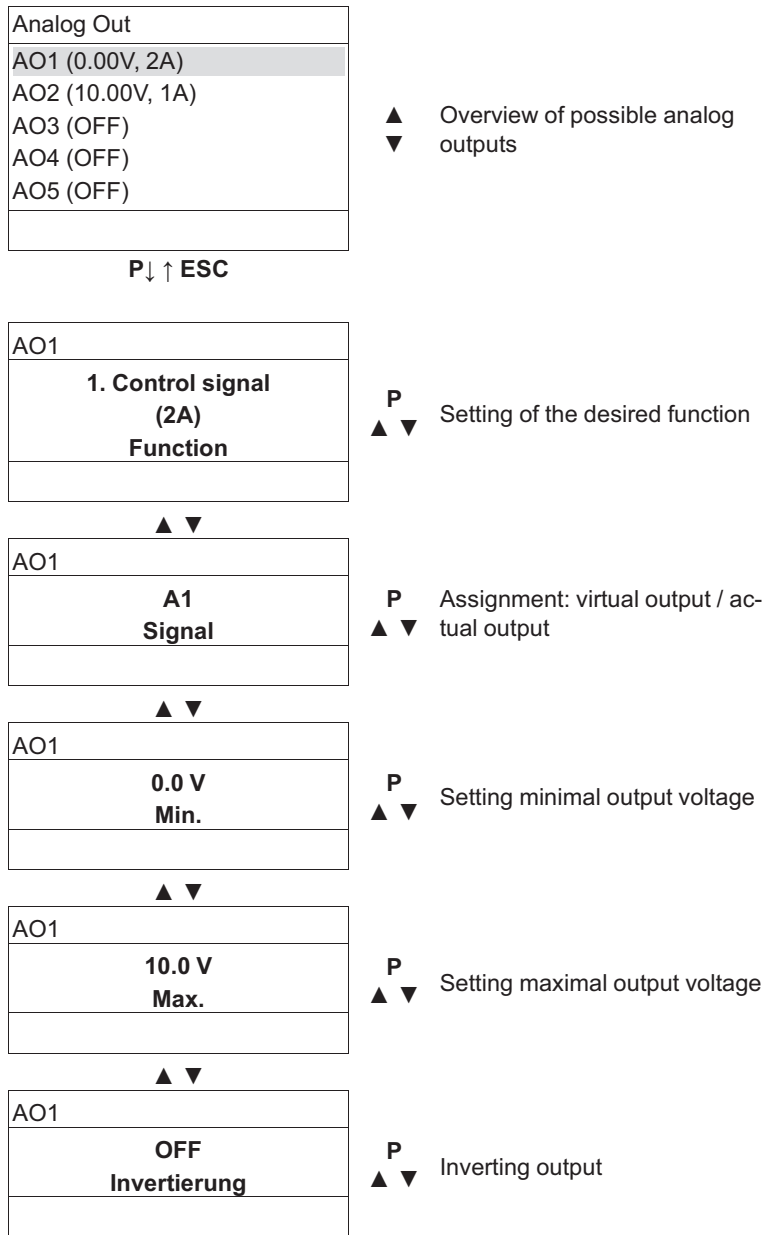
With the factory default assignment, the designations of the inputs and outputs in the display correspond to the connection designations (see circuit board and connection diagram imprint). If you make a different assignment, e.g. assigning the input "E2" instead of the previous hardware input "E1" under "AI1" (analog input 1), the display and setting is still under "E1". In other words, the designation of the connection and the designation in the display no longer match.

**Example of possible assignment for analog input AI1 and AI2**

<p><b>Factory assignment</b></p> <p>The actual input "E1" is assigned to the virtual input "AI1".</p> <p>The actual input "E2" is assigned to the virtual input "AI2".</p> <ol style="list-style-type: none"> <li>1 Actual value display for "E1" and "E2" in Info menu group</li> <li>2 Overview display of virtual inputs "AI1-AI6" with display of actual values and programmed functions</li> <li>3 Assignment of signal at "E1" to analog input "AI1"</li> <li>4 Assignment of signal at "E2" to analog input "AI2"</li> </ol>	<p><b>Exchanged assignment</b></p> <p>The actual input "E2" is assigned to the virtual input "AI1".</p> <p>The actual input "E1" is assigned to the virtual input "AI2".</p> <ol style="list-style-type: none"> <li>1 Actual value display for "E1" and "E2" in Info menu group</li> <li>2 Overview display of virtual inputs "AI1-AI6" with display of actual values and programmed functions</li> <li>3 Assignment of signal at "E2" to analog input "AI1"</li> <li>4 Assignment of signal at "E1" to analog input "AI2"</li> </ol>
---	---

### 9.9.3 Analog outputs “AO”

#### Menu structure



#### Overview of possible analog outputs

Analog Out	Example to explain the display
AO1 (0.00V, 2A)	0.00V = Current output voltage at “AO1” 2 A = Programmed function (1st control signal) for “AO1”
AO2 (10.00V, 1A)	10.00V = Current output voltage at “AO2”. 1A = Programmed function (fixed voltage 10V) for “AO2”
AO3 (OFF)	OFF = No function assigned
AO4 (OFF)	OFF = No function assigned
AO5 (OFF)	OFF = No function assigned
AO6 (OFF)	OFF = No function assigned

**Setting of the desired function**

Function	Designation
<b>OFF</b>	no function
<b>Constant voltage 10 V (1A)</b>	Constant voltage +10 V Factory setting for "A2" at operation with one control circuit.
<b>1. Control signal (2A)</b>	<b>Controlled 0 - 10 V output for control circuit 1 (factory setting for "A1")</b>
<b>E1 (3A)</b>	proportional input "E1"
<b>E2 (4A)</b>	proportional input "E2"
<b>Group2 (5A)</b>	Group control (see controller setup group 2)
<b>2.Cooling (6A)</b>	Only for mode <b>2.03</b> temperature controller with additional functions. Controller output 2 with rising activation at Actual>Nominal = <b>Cool</b> .
<b>2.Heating (7A)</b>	Only for mode <b>2.03</b> temperature controller with additional functions. Controller output 2 with rising activation at Actual<Nominal = <b>Heat</b> .
<b>2. control signal (8A)</b>	Controlled 0 - 10 V output for control circuit 2 (factory setting for "A2" at operation with second control circuit). Control circuit 2 can be activated by programming the E2 function if required (see Base setup / Operation with second control circuit).
<b>Modulation (9A)</b>	proportionally 1.Control signal
<b>Group3 (11A)</b>	Group control (see controller setup group 3)
<b>Group4 (12A)</b>	Group control (see controller setup group 4)
<b>Offset control sig. 1 (14A)</b>	Offset control signal 1 Offset setting (see controller setup)

**Factory assignments: Virtual outputs / actual outputs**

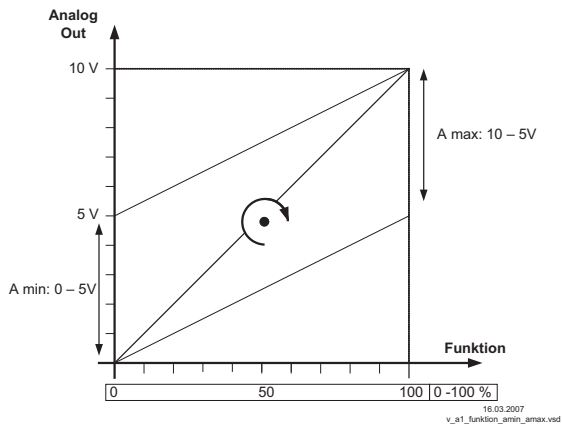
Virtual output	Actual output	Explanation
AO1	A1 Signal	A1 MODBUS Master
AO2	A2 Signal	A2 MODBUS Master
AO3	n.a.	not available (no output assigned)
AO4	n.a.	not available (no output assigned)
AO5	n.a.	not available (no output assigned)
AO6	n.a.	not available (no output assigned)

**Signal settings**

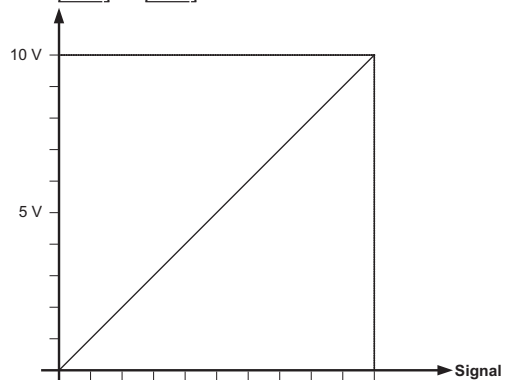
With the attitudes "min" / "max" the characteristic of the output voltage can be adapted.	
AO1	<b>Min.</b>
<b>0.0 V Min.</b>	Setting range: 0 - 10 V Factory setting: 0 V
The setting for "min." must be below "max".	

AO1	<b>Max.</b>
<b>10.0 V</b>	Setting range: 10 - 0 V Factory setting: 10 V
AO1	<b>Inverting</b>
<b>OFF</b>	With the attitudes "Inverting" the output voltage can inverted. Factory setting: Inverting = "OFF"
<b>Inverting</b>	

"Min." / "Min."



Function **3A** / **4A**



0	1	2	3	4	5	6	7	8	9	10	0 - 10 V
10	9	8	7	6	5	4	3	2	1	0	10 - 0 V
0	2	4	6	8	10	12	14	16	18	20	0 - 20 mA
20	18	16	14	12	10	8	6	4	2	0	20 - 0 mA
4	5.6	7.2	8.8	10.4	12	13.6	15.2	16.8	18.4	20	4 - 20 mA
20	18.4	16.8	15.2	13.6	12	10.4	8.8	7.2	5.6	4	20 - 4 mA
-27	-16.8	-6.6	3.6	13.8	24	34.2	44.4	54.6	64.8	+75	TF. (KTY)

16.03.2007  
v\_s1\_funktion\_3a\_4a.vsd

### 9.9.4 Analog inputs "AI"

#### Menu structure for "AI1" and "AI2"

Analog Out
AI1 (0.00V, 2A)
AI2 (10.00V, 1A)
AI3 (OFF)
AI4 (OFF)
AI5 (OFF)

P ↓ ↑ ESC

▲ Overview of possible analog inputs  
▼

AI1
E1
Signal

P Allocation: virtuell input / real input  
▲ ▼

▲ ▼

AI1
OFF
Invertierung

P Inverting input  
▲ ▼

The function and signal type settings for the analog inputs "AI1" and "AI2" are made in the base setup.

**Menu overview for “AI3” and “AI6”**

Analog In AI1 (0.00V, 2A) AI2 (10.00V, 1A) <b>AI3 (OFF)</b> AI4 (OFF) AI5 (OFF)	▲ Overview of possible analog inputs ▼			
P↓ ↑ ESC				
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="padding: 2px;">AI3</td></tr> <tr><td style="text-align: center; padding: 2px;">OFF</td></tr> <tr><td style="text-align: center; padding: 2px;">Function</td></tr> </table>	AI3	OFF	Function	P ▲ ▼ Setting of the desired function
AI3				
OFF				
Function				
▲ ▼				
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="padding: 2px;">AI3</td></tr> <tr><td style="text-align: center; padding: 2px;">0-10V</td></tr> <tr><td style="text-align: center; padding: 2px;">Analog In</td></tr> </table>	AI3	0-10V	Analog In	P ▲ ▼ Signal type setting: 0-10V, 0-20mA, 4-20mA, TF, PT1000
AI3				
0-10V				
Analog In				
▲ ▼				
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="padding: 2px;">AI3</td></tr> <tr><td style="text-align: center; padding: 2px;">n.a.</td></tr> <tr><td style="text-align: center; padding: 2px;">Signal</td></tr> </table>	AI3	n.a.	Signal	P ▲ ▼ Allocation: virtuell input / real input
AI3				
n.a.				
Signal				
▲ ▼				
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="padding: 2px;">AI3</td></tr> <tr><td style="text-align: center; padding: 2px;">OFF</td></tr> <tr><td style="text-align: center; padding: 2px;">Invertierung</td></tr> </table>	AI3	OFF	Invertierung	P ▲ ▼ Inverting input
AI3				
OFF				
Invertierung				

**Overview of possible analog inputs**

Analog In	Example to explain the display
AI1 (32.7 °C)	32.7 °C = Current temperature measured at “AI1”
AI2 (16.8 °C, 5E)	16.8 °C = Current temperature measured at “AI2” 5E = Programmed function (E1 difference) for “AI2”
AI3 (OFF)	OFF = No function assigned
AI4 (OFF)	OFF = No function assigned
AI5 (OFF)	OFF = No function assigned
AI6 (OFF)	OFF = No function assigned

**Setting for desired function (AI3-AI6)**

Function	Description Function
OFF	No function
<b>For mode speed controller 1.01</b>	
1E	Operation with a second setting signal (switch over “E1” <-> “E2” via floating contact)
4E	Operation with a second setting signal and automatic control at the higher level (“E1” <-> “E2”)

Function	Description Function
<b>For modes as controller higher 2.01</b>	
<b>Ext. Setpoint (1E)</b>	<b>1E</b> = External Setpoint e.g. via external signal (0 - 10 V) instead of "Setpoint 1"
<b>Ext. Manual mode (2E)</b>	External manual operation via external signal (0 - 10 V). Switch over between settings on the device and external manual operation via digital input.
<b>Measurement (7E)</b>	Measurement value e.g. Measurement value e.g. for limit indication, display in Info menu "E2 Actual".
<b>Outdoor temperature (15E)</b>	No function!

#### Factory assignments: Virtual inputs / actual inputs

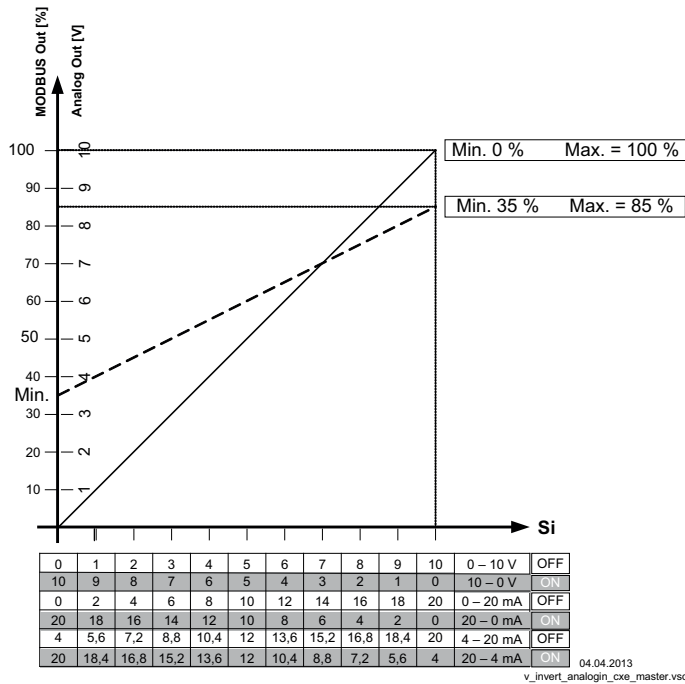
Virtual input	Real input	Explanation
AI1	E1 Signal	E1 MODBUS Master
AI2	E2 Signal	E2 MODBUS Master
AI3	n.a.	not available (no input assigned)
AI4	n.a.	not available (no input assigned)
AI5	n.a.	not available (no input assigned)
AI6	n.a.	not available (no input assigned)

#### Signal settings

AI1	After programming the signal or sensor type, an inversion of the inputs can be carried out.
<b>OFF Inverting</b>	Factory setting for Inverting inputs = "OFF" (if input activated) (signal: 0 - 10 V, 0 - 20 mA, 4 - 20 mA).
	For activation using inverted default signals or sensors with inverted output signals proportional to the measurement range, switch inverting to "ON" (Signal: 10 - 0 V, 20 - 0 mA, 20 - 4 mA).



Example: mode **1.01** speed controller, setting by external signal



MODBUS Out: speed setting over MODBUS  
 Analog Out: speed setting over analog output 0 - 10 V  
 Si Signal  
 OFF Inverting = OFF  
 ON Inverting = ON

**9.9.5 Digital outputs “DO”**

**Menu structure**

Digital Out
DO1 (0, 1K)
DO2 (1, 2K)
DO3 (OFF)
DO4 (OFF)
DO5 (OFF)

▲ Overview of possible digital outputs  
 ▼

P ↓ ↑ ESC

DO1
Operating indication (1K)
Function

P  
 ▲ ▼ Setting of the desired function

▲ ▼

DO1
K1
Signal

P  
 ▲ ▼ Assignment: virtual output / actual output

▲ ▼

DO1
OFF
Invertierung

P  
 ▲ ▼ Inverting output

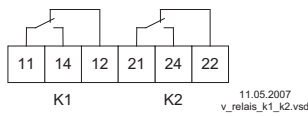
**Overview of possible digital outputs**

Digital Out	Example to explain the display
DO1 (0, 1K)	0 = Relays D01 de-energized 1K = Programmed function (operating indication) for "DO1"
DO2 (1, 2K)	1 = Relay D02 energised 2K = Programmed function (fault indication) for "DO2"
DO3 (OFF)	OFF = No function assigned
DO4 (OFF)	OFF = No function assigned
DO5 (OFF)	OFF = No function assigned
DO6 (OFF)	OFF = No function assigned

**Setting of the desired function**

Various functions can be allocated to the relay outputs "K1" and "K2". In case of the same function allocation for "K1" and "K2", these work parallel.

Function	Designation
<b>OFF</b>	No function Relays remain always de-energized.
<b>Operating indication (1K)</b>	Operating indication (factory setting for "K1", non inverting). Operation without fault, reports enable "OFF"
<b>Fault indication (2K)</b>	Fault indication (factory setting for "K2", non inverting). Pulled up in operation without fault, with release "OFF" not dropped out. Drops out in case of line and device fault and external fault at the digital input. Depending on programming in event of sensor failure. When networked via the MODBUS Master interface, fault indication in case of faulty MODBUS connection and fault on a member.
<b>External error (3K)</b>	External fault separate with message at digital input (factory setting if terminals bridged).
<b>Limit modulation (4K)</b>	Limit modulation Exceeding or falling below limits for modulation.
<b>Limit E1 (5K)</b>	Limit "E1" Whenever or falling below limits for input signal "E1".
<b>Limit E2 (6K)</b>	Limit "E2" Whenever or falling below limits for input signal "E2".
<b>Setpoint Offset (7K)</b>	Only in controller modes (from <b>2.01</b> ) Limit: Setpoint offset (only for active Setpoint control circuit 1). Deviation between actual value and setpoint to high.
<b>Group2 (8K)</b>	Group control (Group 2) Switching on fans depending on modulation
<b>Group3 (12K)</b>	Group control (Group 3) Switching on fans depending on modulation
<b>Group4 (13K)</b>	Group control (Group 4) Switching on fans depending on modulation
<b>(14K) to (18K)</b>	no function
	<b>For modes as temperature controller with additional functions 2.03</b>
<b>2.Heating (9K)</b>	Heating function Switch ON point: temperature = Setpoint +/- Offset Switch OFF point: Temperature around hysteresis over switch ON point
<b>2.Cooling (10K)</b>	Cooling function Switch ON point: temperature = Setpoint +/- Offset Switch OFF point: Temperature around hysteresis below switch ON point



**K1** 1 = energized, terminals 11-14 bridged  
 0 = de-energized, terminals 11-12 bridged  
**K2** 1 = energized, terminals 21-24 bridged  
 0 = de-energized, terminals 21-22 bridged

Function	Controller status	K1/ K2	
		1 = energized 0 = de-energized	
		Inverting	
		OFF	ON
<b>1K</b>	Operation without fault, line supply okay	<b>1</b>	<b>0</b>
<b>2K</b>	Fault with indication by relay	<b>0</b>	<b>1</b>
<b>3K</b>	External Fault at digital input for external fault	<b>1</b>	<b>0</b>
<b>4K</b>	Exceeding or falling below modulation	<b>1</b>	<b>0</b>
<b>5K</b>	over or falling below limits for input signal "E1"	<b>1</b>	<b>0</b>
<b>6K</b>	over or falling below limits for input signal "E2"	<b>1</b>	<b>0</b>
<b>7K</b>	setpoint deviation to high	<b>1</b>	<b>0</b>

**Factory assignments: Virtual outputs / actual outputs**

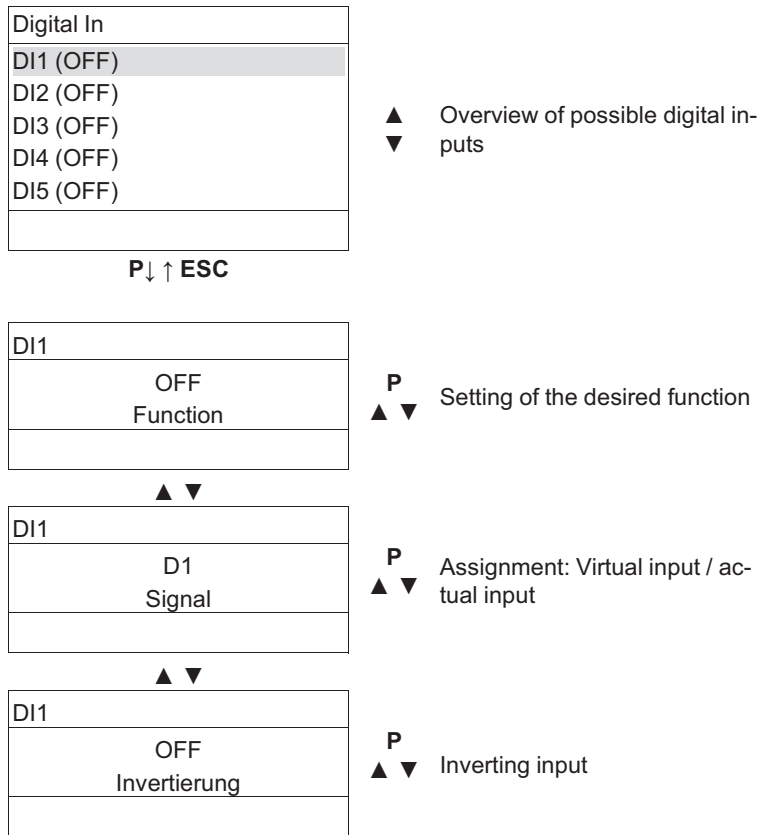
Virtual output	Actual output	Explanation
DO1	K1 Signal	K1 MODBUS Master
DO2	K2 Signal	K2 MODBUS Master
DO3	n.a.	not available (no output assigned)
DO4	n.a.	not available (no output assigned)
DO5	n.a.	not available (no output assigned)
DO6	n.a.	not available (no output assigned)

**Inverting**

DO1	<b>Inverting</b>
<b>OFF</b> <b>Inverting</b>	The inversion of the relays "K1" and "K2" is set at the factory to "OFF" (when a function is programmed). For switching inversion to "ON" (switching behaviour dependent on assigned function). The relays can only pull up basically when the voltage supply of the electronics is working. Three-phase current devices must have at least 2 line phases!

### 9.9.6 Digital inputs “DI”

#### Menu overview



#### Overview of possible digital inputs

Digital In	Example to explain the display
DI1 (0, 1D)	0 = Input DI1 not active 1D = Programmed function (enable) for “DI1”
DI2 (1, 3D)	1 = input DI2 active 3D = Programmed function (limit) for “DI1”
DI3 (OFF)	OFF = No function assigned
DI4 (OFF)	OFF = No function assigned
DI5 (OFF)	OFF = No function assigned
DI6 (OFF)	OFF = No function assigned

**Linking the physical inputs D1 and D2**

If necessary, you can allocate the two physical digital inputs (D1 and D2) to a virtual input DI... as the signal source. You can determine the type of link (AND/OR) of D1 and D2 by selecting the corresponding parameter.

DI1	<b>D1andD2</b> <b>Signal</b>	<b>D1andD2</b> = AND relation The function becomes active when both digital inputs (D1 and D2) are activated.
DI2	<b>D1orD2</b> <b>Signal</b>	<b>D1orD2</b> = OR relation The function becomes active when one digital input (D1 or D2) is activated.



**Information**

If you allocate identical functions for multiple (virtual) digital inputs (e.g. for DI1 and DI2 the function 1D for enable ON/OFF), it is automatically an OR link. This also applies if you select different signal sources for the allocation (e.g. DI1 = signal D1 and DI2 = Timer1). In the example cited, this means that the digital input D1 **or** or the integrated timer is used for the enable.

**Setting of the desired function**

Function	Designation
<b>OFF</b>	no function (factory setting)
<b>Enable (1D)</b>	Enable (remote control) "ON" / "OFF"
<b>External error (2D)</b>	External fault alarm
<b>Limit (3D)</b>	"Limit" ON / OFF Influences control circuit 1 and control circuit 2 in operation with two control circuits
<b>E1 / E2 (4D)</b>	Switch over input "E1" / "E2" (for operation with one control circuit)
<b>Reset (10D)</b>	no function
<b>Max. Speed (11D)</b>	Setting Max. Speed "ON" / "OFF" Influences the respectively set value "1. Max. Speed" and "2. Max. Speed" in operation with two control circuits.
<b>Motorheating (12D)</b>	no function
<b>Reverse rotation direction (13D)</b>	no function
<b>Freeze function (14D)</b>	"Freeze function" = maintain momentary modulation value
<b>Override Time (21D)</b>	Override timer function (in operation with timer) The timer output is overwritten for a settable time with a selectable status (ON / OFF).
<b>(22D) to (33D)</b>	no function
<b>For Mode Speed controller 1.01</b>	
<b>Setpoint1/2 (5D)</b>	Switch over "Set Intern1" / "Set Intern2" "Setting External 1" must be at "OFF".

<b>Setpoint int./ext. (6D)</b>	Switch over "Intern" / "Extern"
<b>For modes as controller (from 2.01.)</b>	
<b>Setpoint1/2 (5D)</b>	Switch over "Setpoint 1" / "Setpoint 2" for control circuit1
<b>Setpoint int./ext. (6D)</b>	Switch over "Intern" / "Extern" Possible only for operation with one control circuit!
<b>Control/Manual (7D)</b>	Switch over "automatic control" / "Speed manual" Possible only for operation with one control circuit!
<b>Heating/Cooling (8D)</b>	Switch over control function (e.g. "heating" / "cooling")
<b>Only active in operation with a second control circuit</b>	
<b>E1 / E2 (4D)</b>	The output for control circuit 2 is set additionally to "A2" to "A1" (regardless of the programmed function for "A1"). Control circuit 1 has no output for the duration of the switching. The switch over input "E1" / "E2" as in operation with one control circuit is no longer possible.
<b>2. Setpoint 1/2 (9D)</b>	for control circuit 2: Switch over "2. Setpoint 1" / "2. Setpoint 2"
<b>1.Setp+Pband1/2 (15D)</b>	for control circuit 1: Switch over Setpoint 1/2 and Pband 1/1 When programming this function, "Setting" additionally lists the parameter: "1.Pband 1. for control circuit 1"
<b>2.Setp+Pband1/2 (16D)</b>	for control circuit 2: Switch over Setpoint 1/2 and Pband 1/2 When programming this function, "Setting" additionally lists the parameter: "2.Pband 2 for control circuit 2"

**Factory assignments: Virtual inputs / actual inputs**

Virtual input	Real input	Explanation
DI1	D1 Signal	D1 MODBUS Master
DI2	D2 Signal	D2 MODBUS Master
DI3	n.a.	not available (no input assigned)
DI4	n.a.	not available (no input assigned)
DI5	n.a.	not available (no input assigned)
DI6	n.a.	not available (no input assigned)

**Inverting**

DI1	<b>Inverting</b>
<b>OFF Inverting</b>	The inverting of digital inputs is factory set to "OFF" (if a function is programmed). To invert the function, switch to "ON" (display <input type="checkbox"/> ) as long as no function is allocated for DI1).


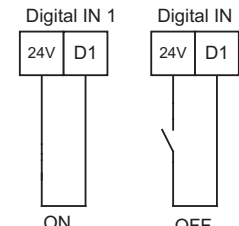
**9.9.6.1 Enable ON/OFF function [1D]**

Remote ON/OFF by potential-free contact.

Activation of the members (speed setting) by analogue output and MODBUS interface is switched off, the other signal inputs and outputs stay active.

The device can still be operated in the switched-off state after pressing the “Esc” key combination.

- A programmed operating indicator relay (factory set “K1 function” = [1K]) reports the switch-off.
- A programmed alarm relay (factory set “K2 function” = [2K]) does not report the switch-off.

 <p>Display for switch-off alternately with actual value display</p>	<p><b>Display STOP for switch OFF</b></p> <ul style="list-style-type: none"> <li>• Controller “OFF” with opened contact</li> <li>• Controller “ON” for closed contact (factory setting).</li> </ul> <p>At “D1 Inverting” = “ON” reversed function, i.e. device “OFF” when contact closed.</p>	 <p>25.06.2007 v_1d_24v_freigabe.vsd</p> <p>Contact at digital input e.g. “Digital In 1”</p>
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**Attention!**

No disconnection (isolation) when turned off, in accordance with VBG4 §6!

**9.9.6.2 External message, function [2D]**

Connecting an external alarm indication (via floating contact). The device continues to work unchanged during an external indication to the digital input; the alarm symbol appears in the display. This indication can be issued via the relay contacts (K1 K2) (☞ IO Setup function K1, K2).

<p>Info</p>  <p><b>External error</b></p> <p>Display alternating with actual value display</p>	<ul style="list-style-type: none"> <li>• Indication during closed contact (factory setting): “D1 Inverting” = “OFF”</li> <li>• Indication during opened contact: “D1 Inverting” = “ON”</li> </ul> <p>Alternative display texts for error message ☞ Controller Setup / display text for external message.</p>
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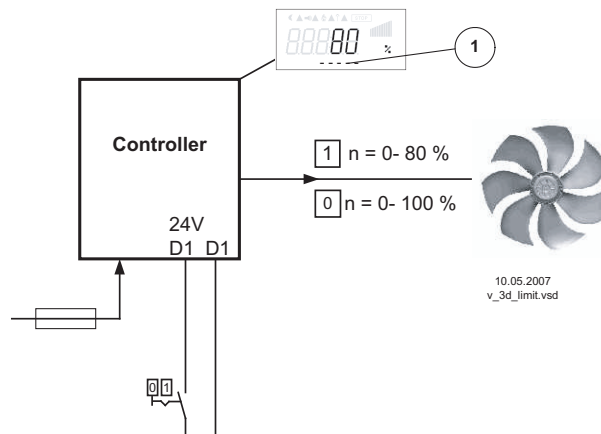
**9.9.6.3 Limit ON / OFF, Function [3D]**

The value for “Limit” adjusted in the Controller Setup, is activated over a digital input.

Contact e.g. at digital input “Digital In 1” (depending on device type at terminals “D1” - “D1” or “D1” - “24 V”).

For “D1” Inverting “OFF”, limitation active at closed contact.

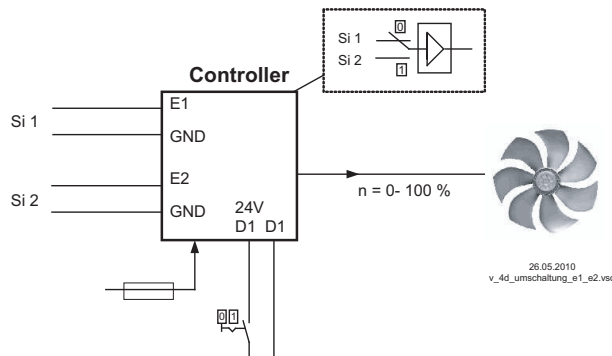
The limitation influences both outputs in operation with two control circuits.



1 Setting “Limit” (depending on device type in: %, Hz, rpm)

**9.9.6.4 Switch over input “E1” / “E2”, function 4D**  
**(operation with one control circuit)**

Switch over between Input signal 1 (Analog In 1 terminal “E1”) and input signal 2 (Analog In 2 terminal “E2”).  
 Contact e.g. at digital input “Digital In 1” (depending on device type at terminals “D1” - “D1” or “D1” - “24 V”).

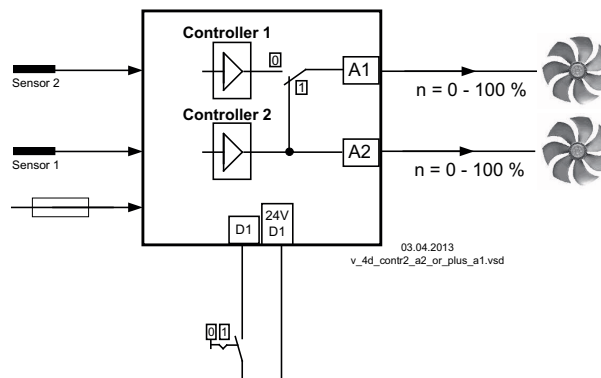


Si 1 Signal 1  
 Si 2 Signal 2

For mode speed controller (1.01) Base setup for “E2 Analog In”: 1E necessary.  
 For modes controller (higher 2.01 ..) Base setup for “E2 Analog In”: 7E necessary (as far as otherwise does not occupy).

**9.9.6.5 Output control circuit 2 additional to “A2” on “A1”, function 4D**

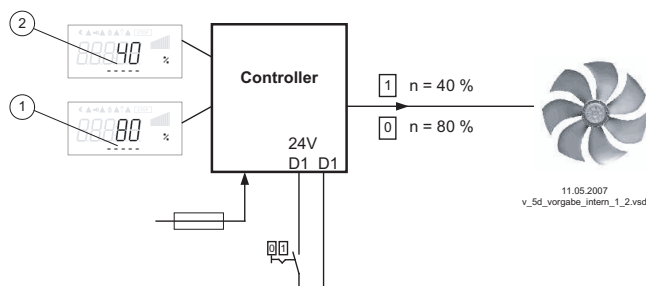
The output for control circuit 2 is set additionally to “A2” to “A1” (regardless of the programmed function for A1). Control circuit 1 has no output for the duration of the switching.  
 Contact e.g. at digital input “Digital In 1” (depending on device type at terminals “D1” - “D1” or “D1” - “24 V”).  
 At “D1” Inverting “OFF” the output of control circuit 2 also influences output “A1” when the contact is closed.



**9.9.6.6 Set 1/2 or Setpoint 1/2, Function 5D**

**For Mode Speed controller 1.01: Switch over “Set Intern1” / “Set Intern2”**

Contact e.g. at digital input “Digital In 1” (depending on device type at terminals “D1” - “D1” or “D1” - “24 V”).



- “D1 Inverting” = “OFF”: “Set Intern1” at opened contact / “Set Intern2” at closed contact.
- “D1 Inverting” = “ON”: “Set Intern1” at closed contact / “Set Intern2” at opened contact.

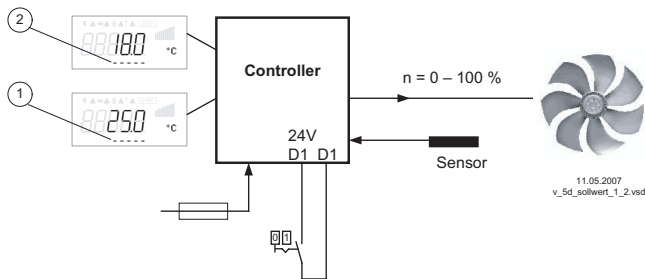
- 1 Setting “Set Intern1” (depending on device type in: %, Hz, rpm)
- 2 Setting “Set Intern2” (depending on device type in: %, Hz, rpm)



<p>Info</p>	<p>☾ Operation with "Set Intern2" is signaled by the moon symbol for reduced operation. "Set extern1" under "settings" must be programmed to "OFF".</p>
<p><b>50 % Modulation</b></p>	

**For operation as controller (starting from 2.01): switch over "Setpoint 1" / "Setpoint 2"**  
**For operation with second control circuit: switch over "1.Setpoint 1" / "1.Setpoint 2"**

Contact e.g. at digital input "Digital In 1" (depending on device type at terminals "D1" - "D1" or "D1" - "24 V").



- "D1 Inverting" = "OFF": "Setpoint1" = 18 °C at opened contact / "Setpoint2" = 25 °C at closed contact.
- "D1 Inverting" = "ON": "Setpoint1" = 18 °C at closed contact / "Setpoint2" = 25 °C at opened contact.

- 1 Setting "Setpoint 1" or "1.Setpoint 1" (display in operation with two control circuits for Setpoint 1 of control circuit 1)
- 2 Setting "Setpoint 2" or "1.Setpoint 2" (display in operation with two control circuits for Setpoint 2 of control circuit 1)

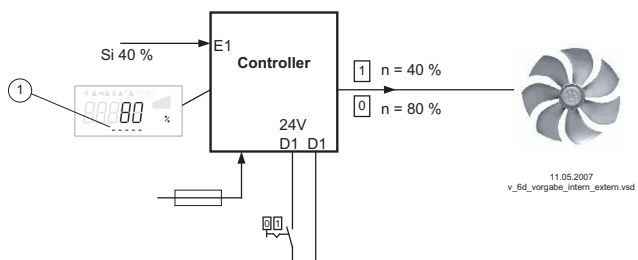
<p>Info</p>	<p>☾ Operation with "Setpoint2" is signaled by the moon symbol for reduced operation.</p>
<p><b>28.7 °C E1 Actual</b></p>	

**9.9.6.7 Intern / Extern Function [6D]**

**For Mode Speed controller 1.01: Switch over "Set Intern" / "Set external"**

"Set extern1" under settings must be programmed to "OFF".

Contact e.g. at digital input "Digital In 1" (depending on device type at terminals "D1" - "D1" or "D1" - "24 V").



- "D1 Inverting" = "OFF": "Set Intern1" at opened contact / "Setting Extern" at closed contact.
- "D1 Inverting" = "ON": "Set Intern1" at closed contact / "Set Extern" at opened contact.

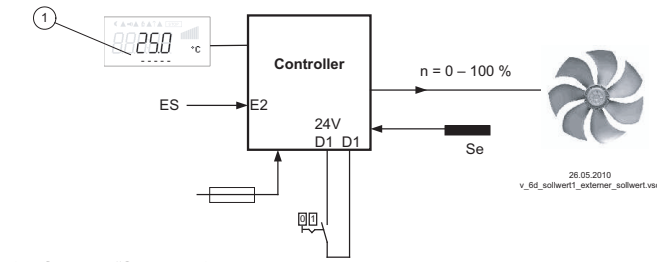
- Si Signal  
 1 Setting "Set Intern1" (depending on device type in: %, Hz, rpm)

**For operation as controller (starting from 2.01): switch over "Setpoint 1" / "external Setpoint"**

Possible only for operation with one control circuit!

Under Base setup "E2 function" programmed to function [1E] for "external setpoint".

Contact at digital input e.g. "Digital In 1" = "D1" - "D1"



- “D1 Inverting” = “ON”: Setting at the unit at opened contact / Signal Extern at closed contact
- “D1 Inverting” = “OFF”: Setting at the unit at closed contact / Signal Extern at opened contact

1 Setting “Setpoint1”  
 ES External Setpoint e.g. 5 V  $\Delta$  23.8°C  
 Se Sensor

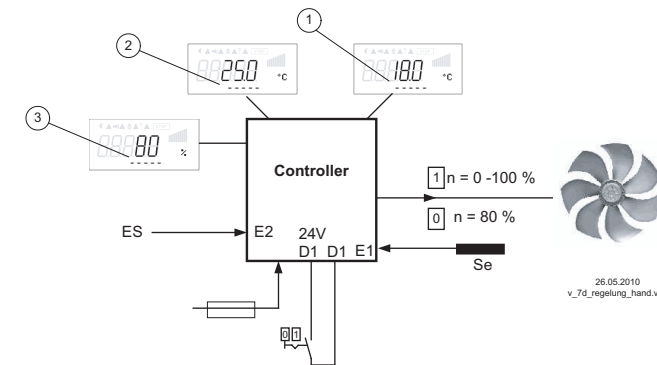
**9.9.6.8 Automatic control / speed manual Function [7D] (mode 2.01)**

Possible only for operation with one control circuit!

Switch over between automatic control to set target value (depending on the activation: “Setpoint1”, “Setpoint2”) and the default for “manual operation” set at the device.

If for Analog In 2 “E2 function” is programmed to [2E] switch over between “Setpoint1” or “Setpoint2” and external manual operation. With activated manual mode the display constantly changes between “actual value” and value for “manual mode”.

Contact at digital input e.g. “Digital In 1”



- “D1 Inverting” = “OFF” Automatic control at opened contact / manual operation at closed contact.
- “D1 Inverting” = “ON”: Automatic control at closed contact / manual operation at opened contact.

1 Setting “Setpoint1”  
 2 Setting “Setpoint2”  
 3 Setting “Speed manual” (depending on device type in: %, Hz, rpm)  
 EH Signal for Manual mode extern, E2 Function = [2E]  
 Se Sensor

**9.9.6.9 Reverse action of control function (2.01), Function [8D]**

Switchover between: Increasing modulation during increasing actual-value and increasing modulation during sinking actual-value.

The factory presets for the “Control function” are dependent on the selected Mode of operation (Controller Setup - reverse operation of the control function).

When switching over via a digital input, the device works with the opposite function as set there.

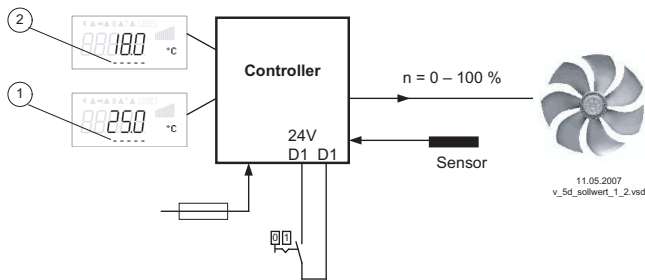
The inversion of the control function influences both circuits in operation with two control circuits.

Controller Setup	Settings in Controller Setup
<b>ON</b> <b>Val&gt;Set=n+</b>	Display for operation with two control circuits: “1. Actual>Set=n” for control circuit 1 “2. Actual>Set=n” for control circuit 2

**9.9.6.10 Switch over Setpoint 1/2 for control circuit 2 [9D]**

Switch over between “2.Setpoint 1” and “2.Setpoint 2” (for operation with two control circuits)

Contact e.g. at digital input “Digital In 1” (depending on device type at terminals “D1” - “D1” or “D1” - “24 V”).



- “D1 Inverting” = “OFF”: “2. Setpoint 1” = 18 °C at opened contact / “2. Setpoint 2” = 25 °C at closed contact.
- “D1 Inverting” = “ON”: “2. Setpoint 1” = 18 °C at closed contact / “2. Setpoint 2” = 25 °C at opened contact.

- 1 Setting “2.Setpoint 1” = Setpoint 1 of control circuit 2
- 2 Setting “2.Setpoint 2” = Setpoint 2 control circuit 2

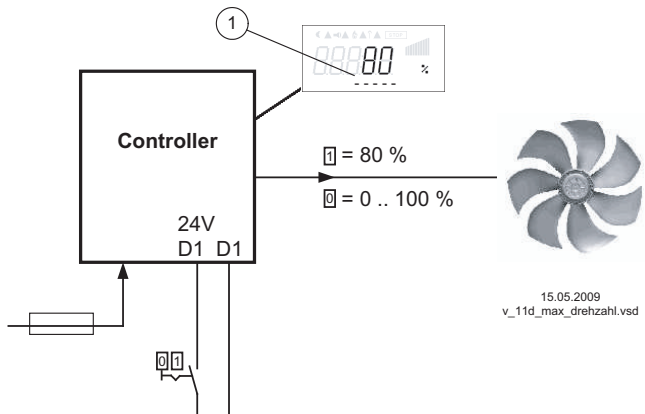
Info	Operation with “2. Setpoint2” is signaled by the moon symbol for reduced operation. If Setpoint 2 was activated additionally for control circuit 1 “1.Setpoint 2” by a digital input with function [5D], the moon symbol is already switched on.
28.7 °C E2 Actual	

**9.9.6.11 Setting Max. Speed ON / OFF function [11D]**

The value for “Max Speed” adjusted in menu “Settings”, is activated over a digital input. I.e. the unit works independently of the controller function firm with this value.

Contact e.g. at digital input “Digital In 1” (depending on device type at terminals “D1” - “D1” or “D1” - “24 V”).

This function influences both circuits in operation with two control circuits.



- “D1 Inverting” = “OFF”: “Max. Speed” active at closed contact
- “D1 Inverting” = “ON”: “Max. Speed” active at opened contact

Display depending on device type in: %, Hz, rpm  
 1 Setting “Max. Speed” or “1.Max. Speed” and “2.Max. Speed” for operation with two control circuits

**9.9.6.12 Switch over Setpoint 1/2 and Pband 1/ 2 for control circuit 1 [15D]**

Switching between “1st setpoint 1” / “1st setpoint 2” and “1st Pband 1” / “1st Pband 2” (from 2.01, not for 2.03).

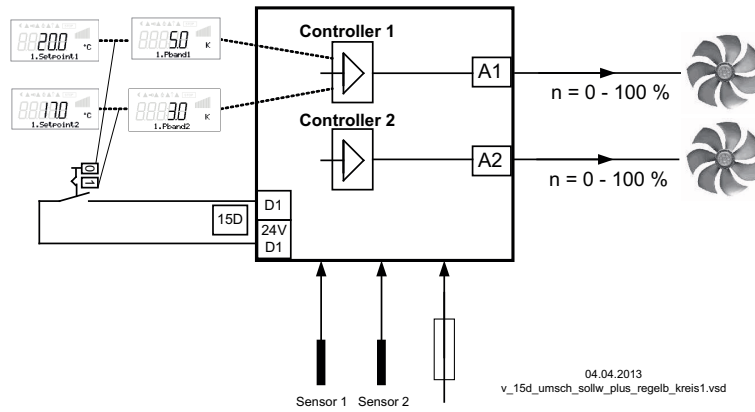
Function basically the same as [5D], it is additionally switched over to Pband 2.

When programming this function, “Setting” additionally lists the parameter: “1.Pband 1. for control circuit 1”

Contact e.g. at digital input “Digital In 1” (depending on device type at terminals “D1” - “D1” or “D1” - “24 V”).

Example for “D1 Inverting” = “OFF”:

- With open contact: “1.Setpoint 1” = 20 °C + “1.Pband 1” = 5 K
- With closed contact: “1.Setpoint 2” = 17 °C + “1.Pband 2” = 3 K



- 1.Setpoint1 Setting "1.Setpoint 1" = Setpoint 1 of control circuit 1
- 1.Pband1 Setting "1.Pband 1" = Pband 1 von control circuit 1
- 1.Setpoint2 Setting "1.Setpoint 2" = Setpoint 2 of control circuit 1
- 1.Pband2 Setting "1.Pband 2" = Pband 1 von control circuit 1

Info	Operation with "1.Setpoint2" and "1.Pband2" is signaled by the moon symbol for reduced operation.
<b>28.7 °C</b> <b>E1 Actual</b>	If Setpoint 2 was activated additionally for control circuit 1 or control circuit 2 by a digital input with function <b>5D</b> / <b>9D</b> the moon symbol is already switched on. If Setpoint 2 and Pband 2 were activated additionally for control circuit 2 by a digital input with function <b>16D</b> , the moon symbol is already switched on.

**9.9.6.13 Switch over Setpoint 1/2 and Pband 1/2 for control circuit 2 **16D****

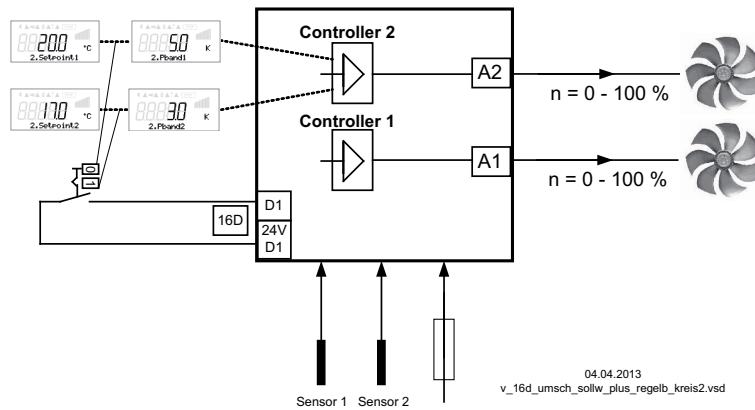
Switch over between "2.Setpoint 1" / "2.Setpoint 2" and "2.Pband 1" / "2.Pband 2" (only for operation with second control circuit possible).  
 Function basically the same as **5D** and **9D**, it is additionally switched over to Pband 2.

When programming this function, "Setting" additionally lists the parameter: "2.Pband 2 for control circuit 2"

Contact e.g. at digital input "Digital In 1" (depending on device type at terminals "D1" - "D1" or "D1" - "24 V").

Example for "D1 Inverting" = "OFF":

- With open contact: "2.Setpoint 1" = 20 °C + "2.Pband 1" = 5 K
- With closed contact: "2.Setpoint 2" = 17 °C + "2.Pband 2" = 3 K



- 2.Setpoint1 Setting "2.Setpoint 1" = Setpoint 1 of control circuit 2
- 2.Pband1 Setting "2.Pband 2" = Pband 1 von control circuit 2
- 2.Setpoint2 Setting "2.Setpoint 2" = Setpoint 2 control circuit 2
- 2.Pband2 Setting "2.Pband 2" = Pband 2 von control circuit 2

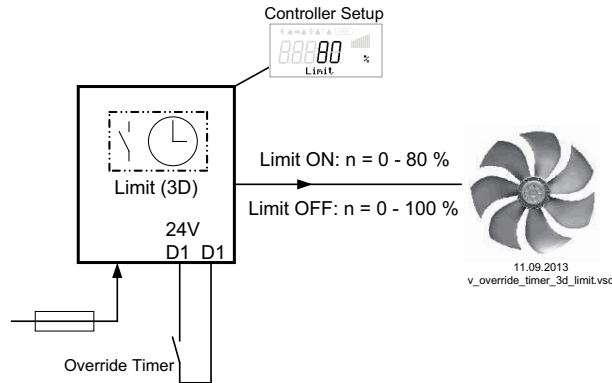
Info	Operation with "2.Setpoint2" and "2.Pband2" is signaled by the moon symbol for reduced operation.
<b>28.7 °C</b> <b>E2 Actual</b>	If Setpoint 2 was activated additionally for control circuit 1 or control circuit 2 by a digital input with function <b>5D</b> / <b>9D</b> the moon symbol is already switched on. If Setpoint 2 and Pband 2 was activated additionally for control circuit 1 by a digital input with function <b>15D</b> , the moon symbol is already switched on.

**9.9.6.14 Timer function overwrite 21D**

The timer output can be overwritten for a settable time with a selectable status if required (see timer). To overwrite the timer function by pressing keys until the next timing change => "Override Time" = 0 min.

The override time is activated by pressing a key at a digital input (example for D1 not inverted). The bypass time can be ended prematurely by pressing another key.

If the contact remains closed, the override time also run out, then a short interruption is required to reactivate.



Contact depending on device type at terminals "D1" - "D1" or "D1" - "24 V"

Example: speed limitation over Timer (Function 3D)

The timer limits the maximum speed for a certain period of time (e.g. timer ON from 6:00 - 10:00 am). With the "Override Timer" contact the limitation (from 6:00 - 10:00 am) activated by the timer can be cancelled for an adjustable period "Override Time" (see timer / timer function overwritten: Override Status = OFF)

To activate the limitation outside the programmed time (10:01 - 5:59 am) => "Override Status" = ON

**9.10 Limits**

Main menu	<b>Limits</b>
Protocol	
Base setup	
Controller Setup	
IO Setup	
Limits	

**9.10.1 Limit indication depending on modulation**

only for Modulation control circuit 1!

Display for operation with two control circuits: 1.Modul. function, 1.Modulation min., 1.Modulation max., 1.Modul. Delay

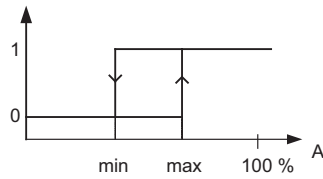
Limits	Following functions can be allocated to the limit indication	
<b>OFF Controller function</b>	OFF	no function (factory setting)
	Fault (1L)	Limit alarm alternating with actual value display is listed in the protocol as an alarm. Indication with the centralized fault of a programmed relay (IO allocation Function <b>2K</b> ).
	Message (2L)	Is listed in the protocol as a message. There is no alternating message on the actual value display and no message via alarm relay.
	Filter error (3L)	Like function <b>1L</b> with fault message "Filter"
	Filter Message (4L)	Like function <b>2L</b> with fault message "Filter"
In the IO setup, a separate relay can be allocated independent of these settings.		
Limits	If the modulation exceeds the set "Modulation max" value, this is reported until the set value "Modulation min" has been undercut.	
<b>30 % Level min.</b>	The indication is delayed by the time set in "Display delay". Setting range: 0 - 100 % Factory setting: 30 % / 40 % *	
Limits		
<b>40 % Level max.</b>		
Limits	Time delay exceeding "Modulation max." up to indication by relay and alarm symbol.	
<b>2 sec Level Delay</b>	Setting range: 0 - 120 sec. Factory setting: 2 sec. *	

\* Display **----** as long as function = OFF

**Example indication by relay “K1”:**

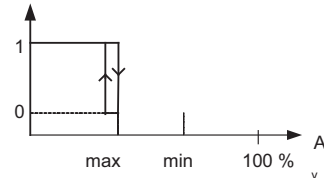
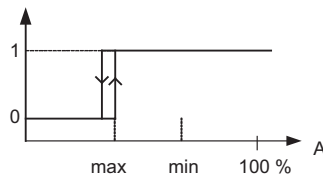
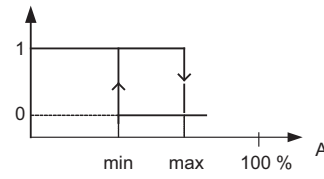
**not inverted**

IO Setup: K1 Function = 4K  
IO Setup: K1 Inverting = OFF



**Inverting**

IO Setup: K1 Function = 4K  
IO Setup: K1 Inverting = OFF



A Modulation

If “Level min.” is higher than “Level max.”, the “Level max.” switching point is without hysteresis.

**9.10.2 Limit indication depending on setting or sensor signal**

**Same procedure for analogue inputs “E1” and “E2”.**

Limits	Following functions can be allocated to the limit indication	
<b>OFF</b> <b>Lmt E1 Function</b>	OFF	no function (factory setting)
	Fault (1L)	Limit alarm alternating with actual value display is listed in the protocol as an alarm. Indication with the centralized fault of a programmed relay (IO allocation Function [2K]).
	Message (2L)	Is listed in the protocol as a message. There is no alternating message on the actual value display and no message via alarm relay.
	Filter error (3L)	Like function [1L] with fault message “Filter”
	Filter Message (4L)	Like function [2L] with fault message “Filter”
In the IO setup, a separate relay can be allocated independent of these settings.		
Limits	Both values for E1 (“E1 min” and “E1 max”) can be set independent of each other and act on a relay together if correspondingly programmed. If a function is activated or if a relay is allocated, both settings (“min” and “max”) are initially at “OFF”. Work can be carried out with one as well as with both limit indicators. The same setting applies to “E2 Min.” and “E2 Max.”, described below for “E1”. Undercutting the signal (“E1 Min”).	
<b>-----</b> <b>Lmt E1 min</b>		
Limits	If the signal undercuts the set value “E1 min”, this is reported until the set value (plus adjustable hysteresis) has been exceeded once again. Exceeding the signal (“E1 max”).	
<b>-----</b> <b>Lmt E1 max.</b>		
Limits	If the signal exceeds the set value “E1 max”, this is reported until the set value (minus hysteresis) has been undercut once again.	
Limits	<b>E1 Hysteresis</b> Hysteresis adjustment in the unit of measure of the programmed input signal.	
<b>-----</b> <b>Lmt E1 Hyst.</b>		

Limits	<b>E1 Delay</b>
----- <b>Lmt E1Del.</b>	Time delay until indication through relay and alarm symbol. Setting range: 0 - 120 sec. Factory setting: 2 sec.

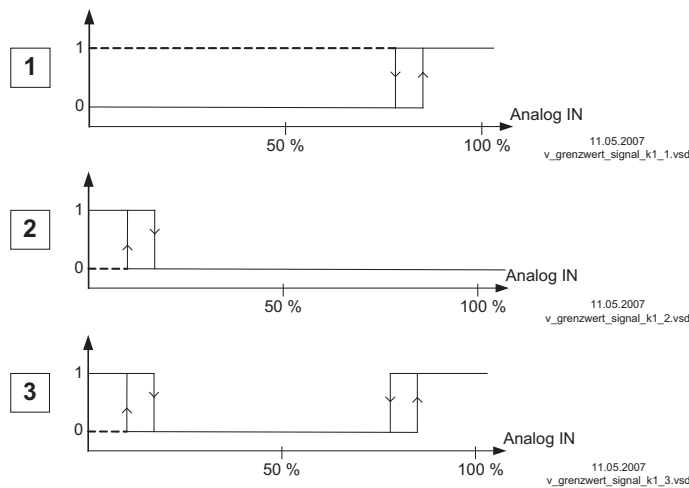


**Information**

Always adjust the value for the maximum input signal higher than the value for the minimum input signal!

E1 Max. > E1 Min.

**Example for a limit indication of default signal or sensor signal to “Analog In 1”**



**Settings**

- E1 Max.: 80 %
- E1 Min.: OFF
- switching hysteresis 5 % (from 100 %)

**Settings**

- E1 Min.: 20 %
- E1 Max.: OFF
- switching hysteresis 5 % (from 100 %)

**Settings**

- E1 Min.: 20 %
- E1 Max.: 80 %
- switching hysteresis 5 % (from 100 %)

Terminal “E1” and “GND” alarm via relay “K1” (non-inverted) IO Setup → K1 function: **[5 K]** = limit indicators



**9.10.3 Limit indication depending on (offset) to Setpoint**

In operating modes as a controller (starting from **2.01**), two limit indicators can be carried out based on the set target value (Setpoint) and measured actual value (on E1).

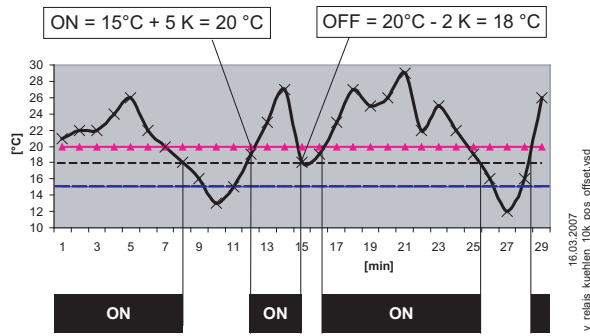
Only for active Setpoint of control circuit 1!

Display for operation with two control circuits: 1.Offset function, 1.Offset 1, 1.Offset 2, 1.Offset hyst., 1.Offset Delay

Limits	Following functions can be allocated to the limit indication. Identical setting for both analogue inputs "E1" and "E2".	
<b>OFF Offset Function</b>	OFF	no function (factory setting)
	Fault (1L)	Limit alarm alternating with actual value display is listed in the protocol as an alarm. Indication with the centralized fault of a programmed relay (IO allocation Function <b>2K</b> ).
	Message (2L)	Is listed in the protocol as a message. There is no alternating message on the actual value display and no message via alarm relay.
	Filter error (3L)	Like function <b>1L</b> with fault message "Filter"
	Filter Message (4L)	Like function <b>2L</b> with fault message "Filter"
	In the IO setup, a separate relay can be allocated independent of these settings.	
Limits	<b>Offset 1, Offset 2</b>	
<b>----- Offset 1</b>	Both values for Offset 1 and Offset 2 can be set independent of each other and act on a relay together if correspondingly programmed. If a function is activated or if a relay is allocated both settings (Offset 1 and Offset 2) are initially at "OFF". Work can be carried out with one as well as with both limit indicators.	
Limits	"Offset 1" for alarm in case of an exceeding of the max. deviation between actual and target.	
<b>----- Offset 2</b>	Switch ON point: actual value = Setpoint +/- offset Switch OFF point: Actual value by hysteresis under the switch-on point	
	"Offset 2" for alarm in case of an undercutting of the max. deviation between actual and target	
	Switch ON point: actual value = Setpoint +/- offset Switch OFF point: Actual value by hysteresis over the switch-on point	
Limits	<b>Offset Hysteresis</b>	
<b>----- Offset Hyst.</b>	Hysteresis switch-on point: In temperature regulation +/- 10 K, otherwise sensors 10 % of measurement range	
Limits	<b>Offset Delay</b>	
<b>----- Offset Delay</b>	Time delay until indication through relay and alarm symbol. Setting range: 0 - 120 sec. Factory setting: 2 sec.	

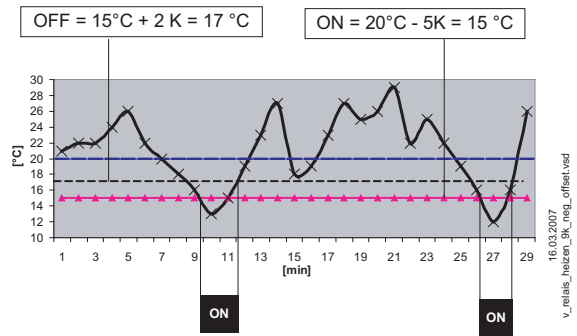
Example for temperature regulation; for other modes of operation settings in corresponding sensor unit.

Offset 1 for alarm during exceeding



Example: Setpoint 15.0 °C, Offset +5.0 K, Hysteresis 2.0 K

Offset 2 for alarm during undercutting



Example: Setpoint 15.0 °C, Offset -5.0 K, Hysteresis 2.0 K

9.11 Timer


Main menu	<b>Timer</b>
Protocol	
Base setup	
Controller Setup	
IO Setup	
Limits	
Timer	


9.11.1 Function of the timer

The device has a real time clock. The clock is backed up (Gold Cap) and has a reserve of 2 or 3 days after sufficient operation on a voltage supply. The time and date must be set during start-up operation and when using the real-time clock. The device calculates the weekday based on the date. In principle, the timer function acts like a digital switch input (timer “On”  $\hat{=}$  closed contact at inverting OFF). The same functions can be assigned to the timer switch as the digital inputs (see IO Setup/Digital inputs “DI”).

Inverting of the timer function

The timer function can be inverted by inverting the digital input to which the timer function is assigned (see IO Setup/Digital inputs “DI”). With inversion “DI” = “OFF” (factory setting) the programmed function is activated at the switch on time (clock symbol in display) and deactivated again at the switch off time. With the setting “DI” = “ON” the programmed function is deactivated at the switch on time and reactivated at the switch off time (clock symbol in display).

Function	Description *	Timer ON = (@ Timer Invert. = OFF) 
<b>OFF</b>	no function (factory setting)	
<b>Enable (1D)</b>	Enable (remote control) “ON” / “OFF”	Device ON
<b>External error (2D)</b>	External fault alarm	Fault
<b>Limit (3D)</b>	“Limit” ON / OFF Influences control circuit 1 and control circuit 2 in operation with two control circuits	Limit ON
<b>E1 / E2 (4D)</b>	Switch over input “E1” / “E2” (for operation with one control circuit)	Signal at E2
<b>Reset (10D)</b>	no function	Reset

Function	Description *	Timer ON = (@ Timer Invert. = OFF) 
<b>Max. Speed (11D)</b>	Setting Max. Speed "ON" / "OFF" Influences the respectively set value "1. Max. Speed" and "2. Max. Speed" in operation with two control circuits.	Max. Speed ON
<b>Override Time (21D)</b>	Do not use function for timer (only for digital input).	-
<b>For mode speed controller 1.01</b>		
<b>Setpoint1/2 (5D)</b>	Switch over "Set Intern1" / "Set Intern2" "Setting External 1" must be at "OFF".	Set Internal2
<b>Setpoint int./ext. (6D)</b>	Switch over "Intern" / "Extern"	Set external
<b>For modes as controller (from 2.01.)</b>		
<b>Setpoint1/2 (5D)</b>	Switch over "Setpoint 1" / "Setpoint 2" for control circuit1	Set Internal2
<b>Setpoint int./ext. (6D)</b>	Switch over "Intern" / "Extern" Possible only for operation with one control circuit!	Setpoint External
<b>Control/Manual (7D)</b>	Switch over "automatic control" / "Speed manual" Possible only for operation with one control circuit!	Manual mode
<b>Heating/Cooling (8D)</b>	Switch over control function (e.g. "heating" / "cooling")	Reversal standard
<b>1.Setp+Pband1/2 (15D)</b>	for control circuit 1: Switch over Setpoint 1/2 and Pband 1/1 When programming this function, "Setting" additionally lists the parameter: "1.Pband 1. for control circuit 1"	First control circuit Setpoint 2 + Pband 2
<b>Only active in operation with a second control circuit</b>		
<b>E1 / E2 (4D)</b>	The output for control circuit 2 is additionally set to "A2" to "A1" (regardless of the programmed function for "A1"). The first control circuit has no output for the duration of the switch over. The switch over input "E1" / "E2" as in operation with one control circuit is no longer possible.	Second control circuit to A1 + A2
<b>2. Setpoint 1/2 (9D)</b>	for control circuit 2: Switch over "2. Setpoint 1" / "2. Setpoint 2"	Second control circuit Setpoint 2
<b>2.Setp+Pband1/2 (16D)</b>	for control circuit 2: Switch over Setpoint 1/2 and Pband 1/2 When programming this function, "Setting" additionally lists the parameter: "2.Pband 2 for control circuit 2"	Second control circuit Setpoint 2 + Pband 2

\* For a detailed function description, see IO Setup

**9.11.2 Setting of time and date**

Main menu	<b>Menu group timer</b>
Controller Setup	
IO Setup	
Limits	
Timer	
Autoaddressing	
Timer	<b>Press the P-key</b> and set the hours with the UP / DOWN keys, press the <b>P-key</b> to save. Now the minutes flash and can be set with the UP / DOWN keys, press the <b>P-key</b> to save.
<b>13:05</b> <b>Time</b>	
Timer	To set the date follow the same method as for "Time". The date setting consists of day, month and year Example for: 9. April 2013
<b>09.04.13</b> <b>Date</b>	

**9.11.3 Automatic summer time**

The summertime automatic is factory set to "OFF", i.e. switched off. When the summertime automatic is activated the device automatically switches between daylight saving time and wintertime. "North" = for countries in the Northern Hemisphere. "South" = for countries in the Southern Hemisphere.

		<b>for Northern Hemisphere</b>		<b>for Southern Hemisphere</b>
Timer		Timer		Timer
<b>OFF</b> <b>Summertime Auto.</b>	<b>→</b>	<b>North</b> <b>Summertime Auto.</b>		<b>South</b> <b>Summertime Auto.</b>



**Information**

If the summer time automatic is used, the switch over date and the switch over time are identical and unchangeable for both settings. The time is put forward from 2:00 am to 3:00 am respectively on the last Sunday in March (South put back from 3:00 am to 2:00 am) and put back from 3:00 am to 2:00 am (South put forward from 2:00 am to 3:00 am) on the last Sunday in October. If other dates for the switch over between summer time and winter time are required, the clock must be changed by hand (manually) on the respective date.

**9.11.4 Enter switching times**

**Two** switching times can be entered for the same function (e.g. 3D = Limit) for each weekday. The menu items are repeated for each weekday with two on- and off-times each. Switching times are not preprogrammed at the factory. In order to make configuration easier, the same switching times can be made for several days in a block. To prevent unwanted switching times from arising, all should be deleted before programming. To do this, select the block Mo - Su and deactivate all 4 switching times.

**Be sure to delete all switching times before carrying out complete new settings.**

Sequence		1	2	3	4	5	6	7
Timer		Mon	Mon-Sun	----- Mon-Sun ON1	----- Mon-Sun OFF1			
[P] [ESC]	P 9 x ▲	[P] [ESC]	[P] [ESC]	P	[P] [ESC]	[P] [ESC]	3 x P	[P] [ESC]
Factory setting first week-day *		All weekdays selected		First switch-on time for all weekdays. Display: [----] = no switching times programmed yet.				The first switching times for all weekdays are now deleted. Then the first switch-off time for all weekdays is displayed. Now delete all other switching times in the same way.

\* If switching times are already programmed for all weekdays "Mon-Sun", press the P key and increase the hours with the ▲-key until the deactivation appears after "23", display: [---]. Then press the P key twice to confirm and delete the switching times.

All programmed switching times are deleted after loading the factory setting or resetting the mode.

**Factory setting without preprogrammed switching times**

Mon-Sun													
Mon-Fri										Sat-Sun			
Mon	Tue	Wed	Thr	Fri	Sat	Sun							
ON1	--:--	ON1	--:--	ON1	--:--	ON1	--:--	ON1	--:--	ON1	--:--	ON1	--:--
OFF1	--:--	OFF1	--:--	OFF1	--:--	OFF1	--:--	OFF1	--:--	OFF1	--:--	OFF1	--:--
ON2	--:--	ON2	--:--	ON2	--:--	ON2	--:--	ON2	--:--	ON2	--:--	ON2	--:--
OFF2	--:--	OFF2	--:--	OFF2	--:--	OFF2	--:--	OFF2	--:--	OFF2	--:--	OFF2	--:--

**Example 1: Every day at 8 am ON and at 6 pm OFF**

Mon-Sun													
ON1	08:00	ON1	08:00	ON1	08:00	ON1	08:00	ON1	08:00	ON1	08:00	ON1	08:00
OFF1	18:00	OFF1	18:00	OFF1	18:00	OFF1	18:00	OFF1	18:00	OFF1	18:00	OFF1	18:00
ON2	--:--	ON2	--:--	ON2	--:--	ON2	--:--	ON2	--:--	ON2	--:--	ON2	--:--
OFF2	--:--	OFF2	--:--	OFF2	--:--	OFF2	--:--	OFF2	--:--	OFF2	--:--	OFF2	--:--

**Example 2: Monday to Friday at 6 am ON at 8 am OFF and at 5 pm ON at 10 pm OFF**

Mon-Fri										Sat-Sun			
ON1	06:00	ON1	06:00	ON1	06:00	ON1	06:00	ON1	06:00	ON1	--:--	ON1	--:--
OFF1	08:00	OFF1	08:00	OFF1	08:00	OFF1	08:00	OFF1	08:00	OFF1	--:--	OFF1	--:--
ON2	17:00	ON2	17:00	ON2	17:00	ON2	17:00	ON2	17:00	ON2	--:--	ON2	--:--
OFF2	22:00	OFF2	22:00	OFF2	22:00	OFF2	22:00	OFF2	22:00	OFF2	--:--	OFF2	--:--

**Example 3: Wednesday 6 pm ON and Thursday at 8 am OFF**

Mon	Tue	Wed	Thr	Fri	Sat	Sun							
ON1	--:--	ON1	--:--	ON1	18:00	ON1	--:--	ON1	--:--	ON1	--:--	ON1	--:--
OFF1	--:--	OFF1	--:--	OFF1	--:--	OFF1	08:00	OFF1	--:--	OFF1	--:--	OFF1	--:--
ON2	--:--	ON2	--:--	ON2	--:--	ON2	--:--	ON2	--:--	ON2	--:--	ON2	--:--
OFF2	--:--	OFF2	--:--	OFF2	--:--	OFF2	--:--	OFF2	--:--	OFF2	--:--	OFF2	--:--

**Free tables for entering individual timer settings**

Mon	Tue	Wed	Thr	Fri	Sat	Sun							
ON1		ON1		ON1		ON1		ON1		ON1		ON1	
OFF1		OFF1		OFF1		OFF1		OFF1		OFF1		OFF1	
ON2		ON2		ON2		ON2		ON2		ON2		ON2	
OFF2		OFF2		OFF2		OFF2		OFF2		OFF2		OFF2	

**9.11.5 Overwrite timer function**

The timer output can be overwritten for a settable time with a selectable status if required. Activation is by a digital input (☞ IO Setup function **21D**)

Application: Exceptions from the normal timing operation, e.g. for manual or automatic presence switch, party mode, etc.

Timer	<b>Override Time</b>
<b>120 min Override Time</b>	Settable time for overwriting the timer function Setting range: 0...65535 min. Factory setting: 120 min
	In the "0 min." setting, the timer function is overwritten with the selected status until the next timing change.
Timer	<b>Override Status</b>
<b>OFF Override Status</b>	Settable status when overwriting the timer function: ON = function as for timer ON ☞ timer function OFF = function as for timer OFF (factory setting)

**9.11.6 Adjustment of the real time clock**

Timer	Fine adjustment of the real time clock is possible if required.
<b>60 RTC Adjust</b>	The greater the value, the slower the clock runs. If the value is increased by one point, this corresponds to a slowing of the clock by approx. 2 to 3 s per month. Setting range: 0 - 127 Factory setting: 60

**9.12 MODBUS Slave**

Addressing and configuration of the MODBUS Slave interface.

Via this interface the device can be networked with a master building control system, the device then operates as a pure Slave and uses the MODBUS-RTU protocol.

The connection is made to the terminals "2A (2D+)", "2B (2D-)" of the MODBUS Slave interface (☞ installation / RS-485 interfaces for MODBUS RTU).



**Information**

- In the IO Setup the "COM function must be set" to "MODBUS Slave" so that this menu group is displayed (factory setting).
- MODBUS settings (baud rate, parity) are saved after a reset (☞ menu group "Start" -> "Reset" or interrupt voltage supply).

MODBUS Slave	<b>Bus Address</b>
<b>247 Bus Address</b>	The device address is factory set to the highest available MODBUS address: 247. Setting range MODBUS Address: 1 - 247.
MODBUS Slave	<b>Addressing</b>
<b>OFF Addressing</b>	Switch addressing to "ON" before setting "address".
MODBUS Slave	<b>UART Baudrate</b>
<b>19200 UART Baudrate</b>	Setting transfer rate Valid values: 4800, 9600, 19200, 38400, 115200 Factory setting: 19200

MODBUS Slave	<b>UART Mode</b>
<b>8E1</b>	Setting transfer format
<b>UART Mode</b>	Valid values: 8O1, 8N1, 8E1
	Factory setting: 8E1

**9.13 MODBUS Master**

Addressing of the members that are activated via the MODBUS Master interface. Addressing can be done automatically by a patented method. It is then no longer necessary to address every single member manually in the network. Alternatively, manual addressing with free assignment of the address is possible (see Manual addressing).



**Information**

- A **maximum of 32 devices** can be connected. The communication settings are pre-set to 19.2kbd, 8E1 and cannot be changed.
- To ensure activation, the function of the digital input “D1” of the members is automatically set to “OFF” by the MODBUS Master. I.e. any programmed enable function for switching off the member (by a potential-free contact) is no longer active.

Main menu	<b>MODBUS Master</b>
MODBUS Master	After addressing (manual or automatic), the devices are subsequently listed to the “MODBUS Master” menu group (see “Members MODBUS Master”).
Fan 1 (2A)	
Fan 2 (2A)	
Fan 3 (2A)	
[P] Enter	[ESC] Info

**9.13.1 Automatic addressing**

- The first member (MODBUS address **1**) must be connected to the terminals 1A(1D+) and 1B (1D-), additionally the “ID” connections must be connected (see Installation / Communication / Addressing members MODBUS Master interface).
- The members are automatically addressed consecutively according to the installation.
- In order to do the automatic addressing successfully, all the bus members to be addressed must be connected with each other, applied to voltage and switched on.



**Information**

The automatic addressing can only be done with compatible devices!



Main menu	<b>MODBUS Master</b> 1. <b>Press the P-key</b> to open the “MODBUS Master”.
Limits	
Timer	
Diagnostic	
MODBUS Master	
[P] Enter      [ESC] Info	
MODBUS Master	1. <b>Press the P-key</b> to select automatic addressing. 2. <b>Press the P-key</b> to start automatic addressing.
<b>Auto Address</b>	
[P] Enter      [ESC] Menu	
MODBUS Master	Display while the automatic addressing is in progress.
<b>Addressing</b> <b>Found: 0</b> In progress	
[P] Repeat    [ESC] Cancel	
MODBUS Master	The found members count is displayed at the end of automatic addressing. Press the <b>P-key</b> again to repeat the addressing. Exit the menu with [ESC].
<b>Addressing</b> <b>Found: 5</b> Done	
[P] Repeat    [ESC] Cancel	

**9.13.2 Manual addressing**

- The members are connected to the device by the terminals 1A(1D+) and 1B (1D-) (see Installation / RS-485 interfaces for MODBUS RTU).
- All bus members to be addressed must be connected with one other in order for manual addressing to be successful.
- Only connect the bus members currently to be addressed to the voltage and switch on, not all the other members during the addressing operation.

Main menu	<b>MODBUS Master</b> ▷ <b>Press the P-key</b> to open the “MODBUS Master”.
Limits	
Timer	
Diagnostic	
MODBUS Master	
[P] Enter      [ESC] Info	
MODBUS Master	
<b>Auto Address</b>	
[P] Enter      [ESC] Menu	
MODBUS Master	▷ <b>Press the ▼ key</b> to select the “ManualAddressing” menu. ▷ <b>Press the P-key</b> to open the menu.
<b>Manual address</b>	
[P] Edit      [ESC] Menu	
MODBUS Master	▷ Set the lowest desired address using the <b>▼+▲</b> keys and confirm with the <b>P key</b> .
<b>4</b> Select address	
[P] Start      [ESC] Menu	
Manual address	▷ Select the type with the <b>▼+▲</b> keys and confirm with the <b>P key</b> . – ZA ECblue – ZA B-G-028NE
<b>ZA ECblue</b> Select type	

[P] OK	[ESC] Cancel	
Manual address		
Switch on device <b>4</b>		▷ Connect device to voltage and switch on ▷ <b>Press the P key</b> to perform addressing.
[P] OK	[ESC] Cancel	
Manual address		
<b>5</b> Select address		▷ Set the desired address with the ▼+▲ keys (higher than addresses already assigned). ▷ <b>Press the P key</b> to perform addressing of more members.
[P] Next		

Manual address		
Addressing Error		Error message for unsuccessful addressing.
[P] Next		

### 9.14 Member MODBUS Master

After addressing, (manual or automatic) the members are then listed to the “MODBUS Master” menu group.

Main menu	The function for activation by MODBUS is displayed after the address of the member. The same function is programmed initially for all members after addressing. [1]. Control Signal (2A)]. I.e. every member is activated by the output of control circuit 1.
MODBUS Master	
Fan 1 (2A)	
Fan 2 (2A)	
Fan 3 (2A)	
[P] Enter	[ESC] Info

After selection with the ▼ ▲ keys, press the **P-key** to open the State menu of the member (menu content depends on the type of member).

#### State menu member Example: ECblue fan

Fan 1 (2A)	
ECblue V13.05	← Device type and firmware version
Fan OK!	← Operating state of the member
Speed [rpm 570]	← Speed Actual value (1/min)
Motorcurrent [A] 2.60	← Current consumption
P=0W Level=0%	← Power consumption and modulation of the device
[P] Edit	[ESC] Menu

To set the MODBUS function for the member, press the **P-key**.

Fan 1 (2A)	<b>Press the P-key</b> to open the menu.
<b>1. Control signal (2A) MB Function</b>	Select the desired MODBUS function with the ▼ ▲ keys and save with the <b>P-key</b> . Pre-programmed function <b>1. Control Signal (2A)</b> = output of control circuit 1. For example, to activate speed controllers for fans or fans with integrated controller and MODBUS interface.
[P] Edit      [ESC] Menu	The programmable functions correspond to the functions for the analogue outputs (☞ IO Setup). <ul style="list-style-type: none"> <li>• For members activated by control circuit 2, function: <b>2. Control Signal (8A)</b></li> <li>• For members activated in groups (function: <b>5A</b>, <b>11A</b>, <b>12A</b>), the “Group Version” setting must be observed, at factory setting “OFF” there is no activation (☞ Controller Setup)!</li> </ul>

Exit the menu with the Esc key combination ▼ + ▲.

## 10 Menu tables

### 10.1 Menues of operating modes

Mode	<b>1.01</b> <b>1.02</b>	<b>2.01</b> <b>2.03</b> <b>2.04</b>	<b>2.05</b>	<b>4.01</b> <b>4.02</b>	<b>6.01</b>	<b>8.01</b>	User Setting
<b>Parameter</b>	<b>Factory setting</b>						
<b>Info</b>							
Setting direct	1.02 = 50 %						
Setting step <sup>1</sup>	1.02 = 0						
E1-E2 actual			-2.4 °C			0.50 g/kg	
Control value		2.04 = 30.0 °C					
E1 Actual		30.0 °C	30.0 °C	188.7 Pa	4.45 m/s	0.45 g/kg	
E2 Actual		----- 2.04 = 30.0 °C	30.0 °C	----- 4.02 = 21.0 °C	-----	0.95 g/kg	
Setpoint1 1.Setpoint 1 <sup>2</sup>		20.0 °C	0.0 °C	100 Pa	5.0 m/s	0.0 g/kg	
2.Setpoint 1 <sup>3</sup>							
Setpoint control				4.02 = 100 Pa			
Modulation 1. Control <sup>2</sup>	1.01 = 0 %	0 %	0 %	0 %	0 %	0 %	
1. Control <sup>3</sup>		0 %		0 %	0 %	0 %	
Set external1	1.01 = 0 %						
Min. speed cut off 1. Min. speed cut off <sup>2</sup>		OFF	OFF	OFF	OFF	OFF	
2. Min. speed cut off <sup>3</sup>							
<b>Start up</b>							
PIN input	-----	-----	-----	-----	-----	-----	
Language	D	D	D	D	D	D	
US units	OFF	OFF	OFF	OFF	OFF	OFF	
Reset	OFF	OFF	OFF	OFF	OFF	OFF	
Mode	1.01 1.02	2.01 2.03 2.04	2.05	4.01 4.02	6.01	8.01	
EUR EC	12.03	12.03	12.03	12.03	12.03	12.03	
SN:	xxx	xxx	xxx	xxx	xxx	xxx	
<b>Setting</b>							
Set Internal1	1.01 = 50%						
Set Internal2	1.01 = -----						
Setting direct	1.02 = 50%						
Setting step <sup>1</sup>	1.02 = 0						
Setpoint1 1.Setpoint 1 <sup>2</sup>		20.0 °C	0.0 °C	250 Pa	5.0 m/s	0.0 g/m <sup>3</sup>	
Set Internal2 1.Setpoint 2 <sup>2</sup>		-----	-----	-----	-----	-----	
Pband 1 1. Pband 1 <sup>2</sup>		5.0 K	3.0 K	250 Pa	5.0 m/s	5.0 g/m <sup>3</sup>	
1. Pband 2 <sup>4</sup>		5.0 K	5.0 K	250 Pa	0.50 m/s	1.0 g/m <sup>3</sup>	
Min. Speed 1.Min. Speed <sup>2</sup>	15%	15%	15%	15%	15%	15%	

Mode	<b>1.01</b> <b>1.02</b>	<b>2.01</b> <b>2.03</b> <b>2.04</b>	<b>2.05</b>	<b>4.01</b> <b>4.02</b>	<b>6.01</b>	<b>8.01</b>	User Setting
<b>Parameter</b>	<b>Factory setting</b>						
Max. Speed	100 %	100 %	100 %	100 %	100 %	100 %	
1. Max. Speed <sup>2</sup>							
2. Setpoint 1 <sup>3</sup>							
2. Setpoint 2 <sup>3</sup>							
2. Pband 1 <sup>3</sup>							
2. Pband 2 <sup>5</sup>							
2. Min. Speed <sup>3</sup>	0%	0%		0%	0%	0%	
2. Max. Speed <sup>3</sup>	100 %	0%		100 %	100 %	100 %	
Set external1	1.01 = ON						
Manual mode							
1. Manual mode <sup>2</sup>		OFF	OFF	OFF	OFF	OFF	
Speed manual							
1. Speed man. <sup>2</sup>		100 %	100 %	100 %	100 %	100 %	
Offset AnalogOut		2.03 = 0.0 K					
Pband AnalogOut		2.03 = 2.0 K					
Min. AnalogOut		2.03 = 0 %					
Max. AnalogOut		2.03 = 100 %					
OffsetDigitalOut		2.03 = -1.0 K					
Hyst.DigitalOut		2.03 = 1.0 K					
Alarm Minimum		2.03 = 10.0 °C					
Alarm Maximum		2.03 = 35.0 °C					
T-Band SA				4.02 = 30.0 K			
T-Start SA				4.02 = 15.0 °C			
Min Setpoint				4.02 = 70.0 Pa			
<b>Protocol</b>							
<b>Base setup</b>							
Mode	<b>1.01</b> <b>1.02</b>	<b>2.01</b> <b>2.03</b> <b>2.04</b>	<b>2.05</b>	<b>4.01</b> <b>4.02</b>	<b>6.01</b>	<b>8.01</b>	
E1 Analog In	1.01 = 0 - 10 V	TF	TF	DSG500	MAL10	AFS 0-10V	
Number steps	1.02 = 0						
Step 1 value	1.02 = ---- (20%)						
Step 2 value	1.02 = ---- (40%)						
Step 3 value	1.02 = ---- (50%)						
Step 4 value	1.02 = ---- (60%)						
Step 5 value	1.02 = ---- (100%)						
E1 Unit		-----	-----	-----	-----	-----	
E1 Decimals		-----	-----	-----	-----	-----	
E1 Min.		-----	-----	-----	-----	-----	

Mode	1.01 1.02	2.01 2.03 2.04	2.05	4.01 4.02	6.01	8.01	User Setting
<b>Parameter</b>	<b>Factory setting</b>						
E1 max		-----	-----	-----	-----	-----	
E1 Offset		149.9 °C	149.9 °C	0.0 Pa	0.0 m/s	0.0 g/kg	
E2 Funktion	OFF	OFF 2.04 = 4E	5E	OFF	OFF 4.02 = 6E	5E	
E2 Analog In	1.01 = -----	----- 2.04 = TF	TF	----- 4.02 = TF	-----	-----	
E2 Unit		-----	-----	-----	-----	-----	
E2 Decimals		-----	-----	-----	-----	-----	
E2 Min.		-----	-----	-----	-----	-----	
E2 Max.		-----	-----	-----	-----	-----	
E2 Offset		----- 2.04 = 149.9 °C	149.9 °C	----- 4.02 = 149.9 °C	-----	0.0 g/kg	
<b>Controller Setup</b>							
PIN Protection	OFF	OFF	OFF	OFF	OFF	OFF	
Set protection	OFF	OFF	OFF	OFF	OFF	OFF	
Save User Setup	OFF	OFF	OFF	OFF	OFF	OFF	
Alarm sensors		ON	ON	ON	ON	ON	
Limit	-----	-----	-----	-----	-----	-----	
Min. speed cut off		OFF	OFF	OFF	OFF	OFF	
1. Min. speed cut off <sup>2</sup>							
2. Min. speed cut off <sup>3</sup>							
Val>Set=n+		ON	ON	OFF	OFF	ON	
1. Val>Set=n+ <sup>2</sup>							
2. Val>Set=n+ <sup>3</sup>							
Type of control		P	P	Pid	Pid	P	
1.Controller type <sup>2</sup>							
2.Controller type <sup>3</sup>							
KP		50 %	50 %	50 %	50 %	50 %	
KI		50 %	50 %	50 %	50 %	50 %	
KD		50 %	50 %	50 %	50 %	50 %	
TI		0 %	0 %	0 %	0 %	0 %	
Group version	OFF	OFF	OFF	OFF	OFF	OFF	
Group 2 ON value	-----	-----	-----	-----	-----	-----	
OFF Value Group2	-----	-----	-----	-----	-----	-----	
nmin at Group2	-----	-----	-----	-----	-----	-----	
Group 3 ON value	-----	-----	-----	-----	-----	-----	
OFF Value Group3	-----	-----	-----	-----	-----	-----	
nmin at Group3	-----	-----	-----	-----	-----	-----	
Group 4 ON value	-----	-----	-----	-----	-----	-----	
OFF Value Group4	-----	-----	-----	-----	-----	-----	
nmin at Group4	-----	-----	-----	-----	-----	-----	
External message	External error	External error	External error	External error	External error	External error	
Offset control sig. 1	0 %	0 %	0 %	0 %	0 %	0 %	
Selection amplifier		OFF	OFF	OFF	OFF	OFF	
COM2 Function	MODBUS Slave	MODBUS Slave	MODBUS Slave	MODBUS Slave	MODBUS Slave	MODBUS Slave	

Mode	1.01 1.02	2.01 2.03 2.04	2.05	4.01 4.02	6.01	8.01	User Setting
Parameter	Factory setting						
IO Setup							
Analog Out							
AO1							
Function	2A	2A	2A	2A	2A	2A	
Signal	A1	A1	A1	A1	A1	A1	
Min.	0.0 V	0.0 V	0.0 V	0.0 V	0.0 V	0.0 V	
Max.	10.0 V	10.0 V	10.0 V	10.0 V	10.0 V	10.0 V	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
AO2							
Function	1A	1A (2.03 = 6A)	1A	1A	1A	1A	
Signal	A2	A2	A2	A2	A2	A2	
Min.	0.0 V	0.0 V	0.0 V	0.0 V	0.0 V	0.0 V	
Max.	10.0 V	10.0 V	10.0 V	10.0 V	10.0 V	10.0 V	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
AO3							
Function	OFF	OFF	OFF	OFF	OFF	OFF	
Signal	n.a	n.a	n.a	n.a	n.a	n.a	
Min.	0.0 V	0.0 V	0.0 V	0.0 V	0.0 V	0.0 V	
Max.	10.0 V	10.0 V	10.0 V	10.0 V	10.0 V	10.0 V	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
AO4							
Function	OFF	OFF	OFF	OFF	OFF	OFF	
Signal	n.a	n.a	n.a	n.a	n.a	n.a	
Min.	0.0 V	0.0 V	0.0 V	0.0 V	0.0 V	0.0 V	
Max.	10.0 V	10.0 V	10.0 V	10.0 V	10.0 V	10.0 V	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
AO5							
Function	OFF	OFF	OFF	OFF	OFF	OFF	
Signal	n.a	n.a	n.a	n.a	n.a	n.a	
Min.	0.0 V	0.0 V	0.0 V	0.0 V	0.0 V	0.0 V	
Max.	10.0 V	10.0 V	10.0 V	10.0 V	10.0 V	10.0 V	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
AO6							
Function	OFF	OFF	OFF	OFF	OFF	OFF	
Signal	n.a	n.a	n.a	n.a	n.a	n.a	
Min.	0.0 V	0.0 V	0.0 V	0.0 V	0.0 V	0.0 V	
Max.	10.0 V	10.0 V	10.0 V	10.0 V	10.0 V	10.0 V	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
Analog In							
AI1							
Signal	E1	E1	E1	E1	E1	E1	

Mode	<b>1.01</b> <b>1.02</b>	<b>2.01</b> <b>2.03</b> <b>2.04</b>	<b>2.05</b>	<b>4.01</b> <b>4.02</b>	<b>6.01</b>	<b>8.01</b>	User Setting
<b>Parameter</b>	<b>Factory setting</b>						
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	AI2						
Signal	E2	E2	E2	E2	E2	E2	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	AI3						
Function	OFF	OFF	OFF	OFF	OFF	OFF	
Analog In	-----	-----	-----	-----	-----	-----	
Signal	n.a	n.a	n.a	n.a	n.a	n.a	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	AI4						
Function	OFF	OFF	OFF	OFF	OFF	OFF	
Analog In	-----	-----	-----	-----	-----	-----	
Signal	n.a	n.a	n.a	n.a	n.a	n.a	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	AI5						
Function	OFF	OFF	OFF	OFF	OFF	OFF	
Analog In	-----	-----	-----	-----	-----	-----	
Signal	n.a	n.a	n.a	n.a	n.a	n.a	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	AI6						
Function	OFF	OFF	OFF	OFF	OFF	OFF	
Analog In	-----	-----	-----	-----	-----	-----	
Signal	n.a	n.a	n.a	n.a	n.a	n.a	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	<b>Digital Out</b>						
	DO1						
Function	1K	1K (2.03 = 2K)	1K	1K	1K	1K	
Signal	K1	K1	K1	K1	K1	K1	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	DO2						
Function	2K	2K (2.03 = 9K)	2K	2K	2K	2K	
Signal	K2	K2	K2	K2	K2	K2	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	DO3						
Function	OFF	OFF	OFF	OFF	OFF	OFF	
Signal	n.a	n.a	n.a	n.a	n.a	n.a	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	DO4						
Function	OFF	OFF	OFF	OFF	OFF	OFF	
Signal	n.a	n.a	n.a	n.a	n.a	n.a	



Mode	1.01 1.02	2.01 2.03 2.04	2.05	4.01 4.02	6.01	8.01	User Setting
<b>Parameter</b>	<b>Factory setting</b>						
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	DO5						
Function	OFF	OFF	OFF	OFF	OFF	OFF	
Signal	n.a	n.a	n.a	n.a	n.a	n.a	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	DO6						
Function	OFF	OFF	OFF	OFF	OFF	OFF	
Signal	n.a	n.a	n.a	n.a	n.a	n.a	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	DO7						
Function	OFF	OFF	OFF	OFF	OFF	OFF	
Signal	n.a	n.a	n.a	n.a	n.a	n.a	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	DO8						
Function	OFF	OFF	OFF	OFF	OFF	OFF	
Signal	n.a	n.a	n.a	n.a	n.a	n.a	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	Digital In						
	DI1						
Function	OFF	OFF	OFF	OFF	OFF	11D	
Signal	D1	D1	D1	D1	D1	D1	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	DI2						
Function	OFF	OFF	OFF	OFF	OFF	11D	
Signal	D2	D2	D2	D2	D2	D2	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	DI3						
Function	OFF	OFF	OFF	OFF	OFF	11D	
Signal	n.a	n.a	n.a	n.a	n.a	n.a	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	DI4						
Function	OFF	OFF	OFF	OFF	OFF	11D	
Signal	n.a	n.a	n.a	n.a	n.a	n.a	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	DI5						
Function	OFF	OFF	OFF	OFF	OFF	11D	
Signal	n.a	n.a	n.a	n.a	n.a	n.a	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	DI6						
Function	OFF	OFF	OFF	OFF	OFF	11D	

Mode	1.01 1.02	2.01 2.03 2.04	2.05	4.01 4.02	6.01	8.01	User Setting
<b>Parameter</b>	<b>Factory setting</b>						
Signal	n.a	n.a	n.a	n.a	n.a	n.a	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	<b>DI7</b>						
Function	OFF	OFF	OFF	OFF	OFF	11D	
Signal	n.a	n.a	n.a	n.a	n.a	n.a	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	<b>DI8</b>						
Function	OFF	OFF	OFF	OFF	OFF	11D	
Signal	n.a	n.a	n.a	n.a	n.a	n.a	
Inverting	OFF	OFF	OFF	OFF	OFF	OFF	
	<b>Limits</b>						
Level Function 1. Level. Function <sup>2</sup>	OFF	OFF	OFF	OFF	OFF	OFF	
Level min. 1. Level min. <sup>2</sup>	-----	-----	-----	-----	-----	10 %	
Level max. 1. Level max. <sup>2</sup>	-----	-----	-----	-----	-----	50 %	
Level Delay 1. Level Delay <sup>2</sup>	-----	-----	-----	-----	-----	-----	
Lmt E1 Function	OFF	OFF 2.03 = 1L	OFF	OFF	OFF	OFF	
Lmt E1 min	-----	----- 2.03 = 0.0 °C	-----	-----	-----	-----	
Lmt E1 max.	-----	----- 2.03 = 40.0 °C	-----	-----	-----	-----	
Lmt E1 Hyst.	-----	----- 2.03 = 1.0 K	-----	-----	-----	-----	
Lmt E1 Del.	-----	----- 2.03 = 2 sec.	-----	-----	-----	-----	
Lmt E2 Function	-----	----- 2.04 = OFF	OFF	----- 4.02,03 = OFF	-----	-----	
Lmt E2 min.	-----	-----	-----	-----	-----	-----	
Lmt E2 max.	-----	-----	-----	-----	-----	-----	
Lmt E2 Hyst.	-----	-----	-----	-----	-----	-----	
Lmt E2 Delay	-----	-----	-----	-----	-----	-----	
Offset Function 1. Offset Function <sup>2</sup>		OFF	OFF	OFF	OFF	OFF	
Offset 1 1. Offset 1 <sup>2</sup>		-----	-----	-----	-----	-----	
Offset 2 1. Offset 2 <sup>2</sup>		-----	-----	-----	-----	-----	
Offset Hyst. 1. Offset Hyst. <sup>2</sup>		-----	-----	-----	-----	-----	
Offset Delay 1. Offset Del. <sup>2</sup>		-----	-----	-----	-----	-----	
	<b>Timer</b>						

Mode	1.01 1.02	2.01 2.03 2.04	2.05	4.01 4.02	6.01	8.01	User Setting
<b>Parameter</b>	<b>Factory setting</b>						
Time	14:24	14:24	14:24	14:24	14:24	14:24	
Date	19.04.13	19.04.13	19.04.13	19.04.13	19.04.13	19.04.13	
Summertime Auto.	OFF	OFF	OFF	OFF	OFF	OFF	
Mon							
Mon ON1	--:--	--:--	--:--	--:--	--:--	--:--	
Mon OFF1	--:--	--:--	--:--	--:--	--:--	--:--	
Mon ON2	--:--	--:--	--:--	--:--	--:--	--:--	
Mon OFF2	--:--	--:--	--:--	--:--	--:--	--:--	
Override Time	120 min	120 min	120 min	120 min	120 min	120 min	
Override Status	OFF	OFF	OFF	OFF	OFF	OFF	
RTC Adjust	60	60	60	60	60	60	
<b>Diagnostic</b>							
Runtime Controller	000056:46:1-3	000056:46:1-3	000056:46:1-3	000056:46:1-3	000056:46:1-3	000056:46:1-3	
Runtime Motor	000056:46:1-3	000056:46:1-3	000056:46:1-3	000056:46:1-3	000056:46:1-3	000056:46:1-3	
E1 - KTY	20.0 °C	20.0 °C	20.0 °C	20.0 °C	20.0 °C	20.0 °C	
E1-Current	0.00 mA	0.00 mA	0.00 mA	0.00 mA	0.00 mA	0.00 mA	
E1 - Voltage	0.00 V	0.00 V	0.00 V	0.00 V	0.00 V	0.00 V	
E2 - KTY	20.0 °C	20.0 °C	20.0 °C	20.0 °C	20.0 °C	20.0 °C	
E2-Current	0.00 mA	0.00 mA	0.00 mA	0.00 mA	0.00 mA	0.00 mA	
E2 - Voltage	0.00 V	0.00 V	0.00 V	0.00 V	0.00 V	0.00 V	
Operating h group 1	xx:xx:xx	xx:xx:xx	xx:xx:xx	xx:xx:xx	xx:xx:xx	xx:xx:xx	
Operating h group 2	xx:xx:xx	xx:xx:xx	xx:xx:xx	xx:xx:xx	xx:xx:xx	xx:xx:xx	
Operating h group 3	xx:xx:xx	xx:xx:xx	xx:xx:xx	xx:xx:xx	xx:xx:xx	xx:xx:xx	
Operating h group 4	xx:xx:xx	xx:xx:xx	xx:xx:xx	xx:xx:xx	xx:xx:xx	xx:xx:xx	
<b>MODBUS Slave</b>							
Bus Address	247	247	247	247	247	247	
Addressing	OFF	OFF	OFF	OFF	OFF	OFF	
UART Baudrate	19200	19200	19200	19200	19200	19200	
<b>MODBUS Master</b>							
Autoaddressing							
ManualAddressing							

- 1 For adjustment "Setting Sep" > 0 (☞ Base setup)
- 2 For control circuit 1 in operation with a second control circuit (☞ Base Setup / Function E2)
- 3 For control circuit 2 in operation with a second control circuit (presetting depending on programmed function)
- 4 In operation with control circuit 2 and programmed function 15 D for digital input (☞ IO Setup)
- 5 In operation with control circuit 2 and programmed function 16 D for digital input (☞ IO Setup)

## 10.2 Possible allocation of the IOs, PINs

### Units for analog inputs E1 and E2

The following units can be set for programmed sensors with free measuring range (0 - 10 V, 0 - 20 mA, 4 - 20 mA).	
E1 Analog In	mA, V, Hz, kHz, A, rpm, °C, m <sup>3</sup> /h, bar, %, Pa, m/s, m <sup>3</sup> /s, Ohm, mbr, °F, ft/s, cfm, ppm, psi, in.wg, g/kg
E2 Analog In	

### Analog outputs A1 and A2

Function	Designation
<b>OFF</b>	no function
<b>Constant voltage 10 V (1A)</b>	Constant voltage +10 V Factory setting for "A2" at operation with one control circuit.
<b>1. Control signal (2A)</b>	<b>Controlled 0 - 10 V output for control circuit 1 (factory setting for "A1")</b>
<b>E1 (3A)</b>	proportional input "E1"
<b>E2 (4A)</b>	proportional input "E2"
<b>Group2 (5A)</b>	Group control (☞ Controller Setup - group 2)
<b>2.Cooling (6A)</b>	Only for mode <b>2.03</b> temperature controller with additional functions. Controller output 2 with rising activation at Actual>Nominal = <b>Cool</b> .
<b>2.Heating (7A)</b>	Only for mode <b>2.03</b> temperature controller with additional functions. Controller output 2 with rising activation at Actual<Nominal = <b>Heat</b> .
<b>2. control signal (8A)</b>	Controlled 0 - 10 V output vor control circuit 2. Factory setting for "A2" at operation with second control circuit. A second control circuit can be activated if required by programming the E2 function (☞ Base Setup E2 functions 8E - 13E and second control circuit)
<b>Modulation (9A)</b>	proportionally 1.Control signal
<b>Group3 (11A)</b>	Group control (☞ Controller Setup - group 3)
<b>Group4 (12A)</b>	Group control (☞ Controller Setup - group 4)
<b>Offset control sig. 1 (14A)</b>	Offset control signal 1 Setting offset ☞ Controller Setup

### Digital inputs D1 and D2

Function	Designation
<b>OFF</b>	no function (factory setting)
<b>Enable (1D)</b>	Enable (remote control) "ON" / "OFF"
<b>External error (2D)</b>	External fault alarm
<b>Limit (3D)</b>	"Limit" ON / OFF Influences control circuit 1 and control circuit 2
<b>E1 / E2 (4D)</b>	Switch over input "E1" / "E2" (for operation with one control circuit)
<b>Reset (10D)</b>	no function

<b>Max. Speed (11D)</b>	Setting Max. Speed "ON" / "OFF" Influences the respectively set value "1. Max. Speed" and "2. Max. Speed" in operation with two control circuits.
<b>Override Time (21D)</b>	Override timer function (in operation with timer)
<b>For Mode Speed controller 1.01</b>	
<b>Setpoint1/2 (5D)</b>	Switch over "Set Intern1" / "Set Intern2" "Setting External 1" must be at "OFF".
<b>Setpoint int./ext. (6D)</b>	Switch over "Intern" / "Extern"
<b>For modes as controller higher 2.01</b>	
<b>Setpoint1/2 (5D)</b>	Switch over "Setpoint 1" / "Setpoint 2" for control circuit1
<b>Setpoint int./ext. (6D)</b>	Switch over "Intern" / "Extern" Possible only for operation with one control circuit!
<b>Control/Manual (7D)</b>	Switch over "automatic control" / "Speed manual" Possible only for operation with one control circuit!
<b>Heating/Cooling (8D)</b>	Switch over control function (e.g. "heating" / "cooling")
<b>1.Setp+Pband1/2 (15D)</b>	for control circuit 1: Switch over Setpoint 1/2 and Pband 1/1 When programming this function, "Setting" additionally lists the parameter: "1.Pband 1. for control circuit 1"
<b>Only active in operation with a second control circuit</b>	
<b>E1 / E2 (4D)</b>	The output for control circuit 2 is set additionally to "A2" to "A1" (regardless of the programmed function for <b>A1</b> ). The first control circuit has no output for the duration of the switch over. The switch over input "E1" / "E2" as in operation with one control circuit is no longer possible.
<b>2. Setpoint 1/2 (9D)</b>	for control circuit 2: Switch over "Setpoint 1" / "Setpoint 2"
<b>2.Setp+Pband1/2 (16D)</b>	for control circuit 2: Switch over Setpoint 1/2 and Pband 1/2 When programming this function, "Setting" additionally lists the parameter: "2.Pband 2 for control circuit 2"

**Analogue input E2**

Function	Description Function E2
<b>OFF</b>	no function (factory setting)
<b>For mode speed controller 1.01</b>	
<b>1E</b>	Operation with a second setting signal (switch over "E1" <-> "E2" via floating contact)
<b>4E</b>	Operation with a second setting signal and automatic control at the higher level ("E1" <-> "E2")
<b>For modes as controller higher 2.01</b>	
<b>Ext. Setpoint (1E)</b>	<b>1E</b> = External Setpoint e.g. via external signal (0 - 10 V) instead of "Setpoint 1"
<b>Ext. Manual mode (2E)</b>	External manual operation via external signal (0 - 10 V). Switch over between settings on the device and external manual operation via digital input.
<b>Average E1 (3E)</b>	Sensor average with E1 (☞ mode <b>2.04</b> )
<b>Comparison E1 (4E)</b>	Sensor comparison with E1 (☞ mode <b>2.04</b> )

Function	Description Function E2
<b>Difference E1 (5E)</b>	Sensor difference to E1 (☞ mode <b>2.05</b> )
<b>Setpoint derating (6E)</b>	Sensor for setpoint outdoor temperature controlled (☞ mode <b>4.02, 5.02</b> ).
<b>Measurement (7E)</b>	Measurement value e.g. Measurement value e.g. for limit indication, display in Info menu "E2 Actual".
<b>For activation of a second control circuit</b> (only possible in certain modes (☞ operation with second control circuit))	
<b>Temperature (8E)</b>	Temperature control, pre-settings and sensor selection correspond to mode <b>2.01</b>
<b>Cold-Pressure (9E)</b>	Pressure control condensers
<b>Cold-Temperature (10E)</b>	Pressure control for condensers with input for refrigerant
<b>Air Pressure (11E)</b>	Pressure control air conditioning, pre-settings and sensor selection correspond to mode <b>4.01</b>
<b>Air flow (12E)</b>	Air volume control
<b>Air speed (13E)</b>	Air velocity control, pre-settings correspond to mode <b>6.01</b>

#### Digital outputs K1 and K2

Function	Designation
<b>OFF</b>	No function Relays remain always de-energized
<b>Operating indication (1K)</b>	Operating indication (factory setting for "K1", non inverting). Operation without fault, reports enable "OFF"
<b>Fault indication (2K)</b>	Fault indication (factory setting for "K2", non inverting). Pulled up in operation without fault, with release "OFF" not dropped out. Drops out in case of line and device fault and external fault at the digital input. Depending on programming in event of sensor failure.
<b>External error (3K)</b>	External fault separate with message at digital input (factory setting if terminals bridged)
<b>Limit modulation (4K)</b>	Limit modulation Exceeding or undercutting the limits for modulation
<b>Limit E1 (5K)</b>	Limit "E1" When over or falling below limits for input signal "E1"
<b>Limit E2 (6K)</b>	Limit "E2" When over or falling below limits for input signal "E2"
<b>For modes as controller higher 2.01</b>	
<b>Setpoint Offset (7K)</b>	Setpoint Offset Deviation between actual value and setpoint to high
<b>Group2 (8K)</b>	Group control (Group 2) Switching on fans depending on modulation
<b>Group3 (12K)</b>	Group control (Group 3) Switching on fans depending on modulation
<b>Group4 (13K)</b>	Group control (Group 4) Switching on fans depending on modulation
<b>For modes as temperature controller with additional functions 2.03</b>	
<b>2.Heating (9K)</b>	Heating function Switch ON point: temperature = Setpoint +/- Offset Switch OFF point: Temperature around hysteresis over switch ON point

<b>2.Cooling (10K)</b>	Cooling function Switch ON point: temperature = Setpoint +/- Offset Switch OFF point: Temperature around hysteresis below switch ON point
------------------------	---

**Limits GW E1 and GW E2**

Function	Description function GW E1, GW E2
<b>OFF</b>	no function
<b>Fault (1L)</b>	Indication with the centralized fault of a programmed relay (IO allocation Function <b>2K</b> ). Warning symbol in display, "AL" code in events memory.
<b>Message (2L)</b>	Is merely displayed in the events menu as message "msg".
<b>Filter error (3L)</b>	Like function <b>1L</b> with fault message "Filter"
<b>Filter Message (4L)</b>	Like function <b>2L</b> with fault message "Filter"

**PINs**

PIN	Function
<b>PIN 0010</b>	Opening service menu, if PIN-protection activated
<b>PIN 1020</b>	Reactivate wizard for first-time start-up
<b>PIN 1234</b>	Freischalten Menu group "Setting". if "set protection" = "ON" (☞ Controller Setup)
<b>PIN 9090</b>	Restore user setting
<b>PIN 9091</b>	Save user setting (corresponds function "Save user setup" = "ON"☞ Controller Setup)
<b>PIN 9095</b>	Restore factory setting = delivery status

**11 Diagnostics menu**

Main menu	The diagnostics menu supplies information about the momentary operating condition of the device.
IO Setup	
Limits	
Timer	
Auto Address	
<b>Diagnostic</b>	
Diagnostic	<b>Operating hours on the line</b> The time counter (h:m:s) runs as soon as line voltage is applied to the device and the device is switched on (without failure). If events occur (e.g. sensor failure, MODBUS communication etc.), the operating time at this time is also saved (☞ Protocol).
Diagnostic	<b>Operating hours with modulation</b> The time counting (h:m:s) runs only when a modulation of the controller is present
<b>000419:27:28 Runtime Controller</b>	
Diagnostic	Signal height at analog input E1 (Analog In 1)
<b>20.0 °C E1 - KTY</b>	
Diagnostic	

<b>9.0 mA E1-Current</b>	
Diagnostic	
<b>4.0 V E1 - Voltage</b>	
Diagnostic	Signal height at analog input E2 (Analog In 2)
<b>20.0 °C E2 - KTY</b>	
Diagnostic	
<b>9.0 mA E2-Current</b>	
Diagnostic	
<b>4.0 V E2 - Voltage</b>	
Diagnostic	<b>Operating h group1</b> Display of operating hours for group 1
<b>065535:28:50 Operating h group1</b>	
Diagnostic	<b>Operating h group2</b> Display of operating hours for group 2
<b>048535:28:50 Operating h group2</b>	
Diagnostic	<b>Operating h group3</b> Display of operating hours for group 3
<b>078535:48:50 Operating h group3</b>	
Diagnostic	<b>Operating h group4</b> Display of operating hours for group 4
<b>012335:45:50 Operating h group4</b>	






## 12 Protocol

### 12.1 Display and query of events and malfunctions


Main menu	Events during operation can lead to a malfunctioning of the device. The last 100 events are saved in the "Protocol" menu group. Position 1 = latest event, display: Protocol 1/100 Position 100 = last saved event, display: Protocol 100/100  The saved events are retained even after resetting to factory setting (☞ menu group Start / PIN input)!
Start up	
Setting	
Protocol	
Base setup	
Controller Setup	

The device distinguishes between several event types which are identified by different symbols.


#### Examples

Protocol 1/100		Attention symbol = message
<b>Modulation Runtime Controller 000493:04:59</b>		The message is only listed in the protocol. There is no message alternately with the actual value display and no message via alarm relay. Exception In case of sensor failure there is always a message in the display (☞ Controller Setup / Alarm Sensors) .
Protocol 2/100		Bell symbol = Alarm
<b>Error MODBUS Com Runtime Controller 000193:04:59</b>		The alarm message is listed in the protocol and appears alternately with the actual value display. Message by alarm relay depending on the type of failure and programming.
Protocol 2/100		Cross symbol = previous messages
<b>Line Fault Runtime Controller 000493:04:59</b>		Cause of the message no longer exists.


#### Example: Previous line failure on a member

Protocol 2/100		
<b>Line Fault Runtime Controller 000493:04:59</b>		Previous line failure on a member connected via the MODBUS interface. When the failure was cleared (line voltage available again), the device was on the line for 493 hours, 4 minutes and 59 seconds.
[P] Details	[ESC]Menu	


Press the P-key to show further details.

Protocol 2/100		
<b>Line Fault</b>		Date and time when the failure was cleared (time setting ☞ timer)
<b>Date</b> 15.04.13	<b>Time</b> 10:24	
[P] Details	[ESC]Menu	

Press the P-key to show further details.

Protocol 2/100		
<b>Line Fault Place Fan 1</b>		Member on which the failure occurred.
[P] Details	[ESC]Menu	






Press the P-key to show further details.

Protocol 2/100		
<b>Line Fault Modulation 0 %</b>		Modulation of the member at the time of the message.
[P] Details	[ESC]Menu	



Exit the menu with the Esc key combination ▼ + ▲ .

## 12.2 Messages and trouble shooting

A momentary pending alarm or error message is indicated by a blinking display and appears alternately with the actual value display.

Display	Relais switches *		Cause	Reaction of Controller
	Opera- tion	Fault		Adjustment
no display	-	-	No line voltage Jumper J1 for USB interface plugged	Line voltage available? Unit switch OFF and automatically ON when the voltage has been re-stored Check line fuse Check jumper J1, pull off or only plug to one PIN
<b>OFF</b>	X	-	No enable	Switch OFF by external contact (function <b>1D</b> = enable programmed for Digital In)
 <b>Factory setting</b>	-	-	fault in Eprom	Works with defaults.
 <b>EEP error</b>	-	X	fault EEP damaged	Works with defaults.
 <b>EEP Corruption</b>	X	X	EEP data incorrectly	controller runs with the read settings.
 <b>Sensor 1</b>	-	X	Sensor 1 Interruption / short circuit in the sensor leads or sensor values measured are outside measuring range	The device works with minimal or maximum modulation depending on whether there is a short-circuit or an interruption, and on the programmed mode of operation. Check sensor
 <b>Sensor2</b>	-	X	Sensor2 Interruption / short circuit in the sensor leads or sensor values measured are outside measuring range	The device works with minimal or maximum modulation depending on whether there is a short-circuit or an interruption, and on the programmed mode of operation. Check sensor

Display	Relais switches *		Cause	Reaction of Controller
	Operation	Fault		Adjustment
 <b>External error *</b> EC Motors Filter Frost protection Adiabatic Firealarm Pressure switch Gas alarm Water alarm RCD	-	X	Alarm from external contact	The device continues working unchanged. check contacts.
<b>Messages for programmed limits</b>				
 <b>Modulation</b> Filter **	-	X	Limit message modulation	The device continues working unchanged. ☞ Limit indication depending on modulation. .
 <b>Lmt E1 min</b> Filter **	-	X	Limit indication minimum Signal actual value at "E1" below setting	The device continues working unchanged. ☞ Limit indication depending on setting or sensor signal.
 <b>Lmt E1 max.</b> Filter **	-	X	Limit indication maximum Signal actual value at "E1" above setting	The device continues working unchanged. ☞ Limit indication depending on setting or sensor signal.
 <b>Lmt E2 min.</b> Filter **	-	X	Limit indication minimum Signal actual value at "E2" above setting	The device continues working unchanged. ☞ Limit indication depending on setting or sensor signal.
 <b>Lmt E2 max.</b> Filter **	-	X	Limit indication maximum Signal actual value above setting	The device continues working unchanged. ☞ Limit indication depending on setting or sensor signal.
 <b>Offset 1</b> Filter **	-	X	Limit alarm deviation from Offset 1 too high	The device continues working unchanged. ☞ Limits depending on the deviation from the setpoint.
 <b>Offset 2</b> Filter **	-	X	Limit alarm deviation from Offset 2 too high	The device continues working unchanged. ☞ Limits depending on the deviation from the setpoint.
<b>For operation as MODBUS Master</b>				
When networking via the MODBUS Master interface, the individual error messages of the members are displayed. These depend on the type of member (☞ operating instructions of the respective device). Example:				
 <b>Error MODBUS Com</b> Fan: 8	-	X	Connection to the MODBUS Master interface interrupted Entered member count too high	The device continues working unchanged. Check member count Check MODBUS connection.

Display	Relais switches *		Cause	Reaction of Controller
	Operation	Fault		Adjustment
 <b>Motor fault</b> Fan: 3	-	X	Example for motor fault at member with address 3	The control module continues running unchanged. Reset required on the member (☞ operating instructions of the device concerned).
 <b>Line Fault</b> Fan: 6	-	X	Example for line failure at member with address 6	The control module continues running unchanged. Check line supply of member.

\* Alternative display texts for error message via external contact ☞ Controller Setup / display text for external message.

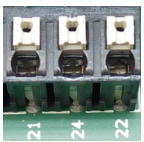
\*\* Alternative display texts for limit alarms ☞ limits function 3L

## 13 Enclosure

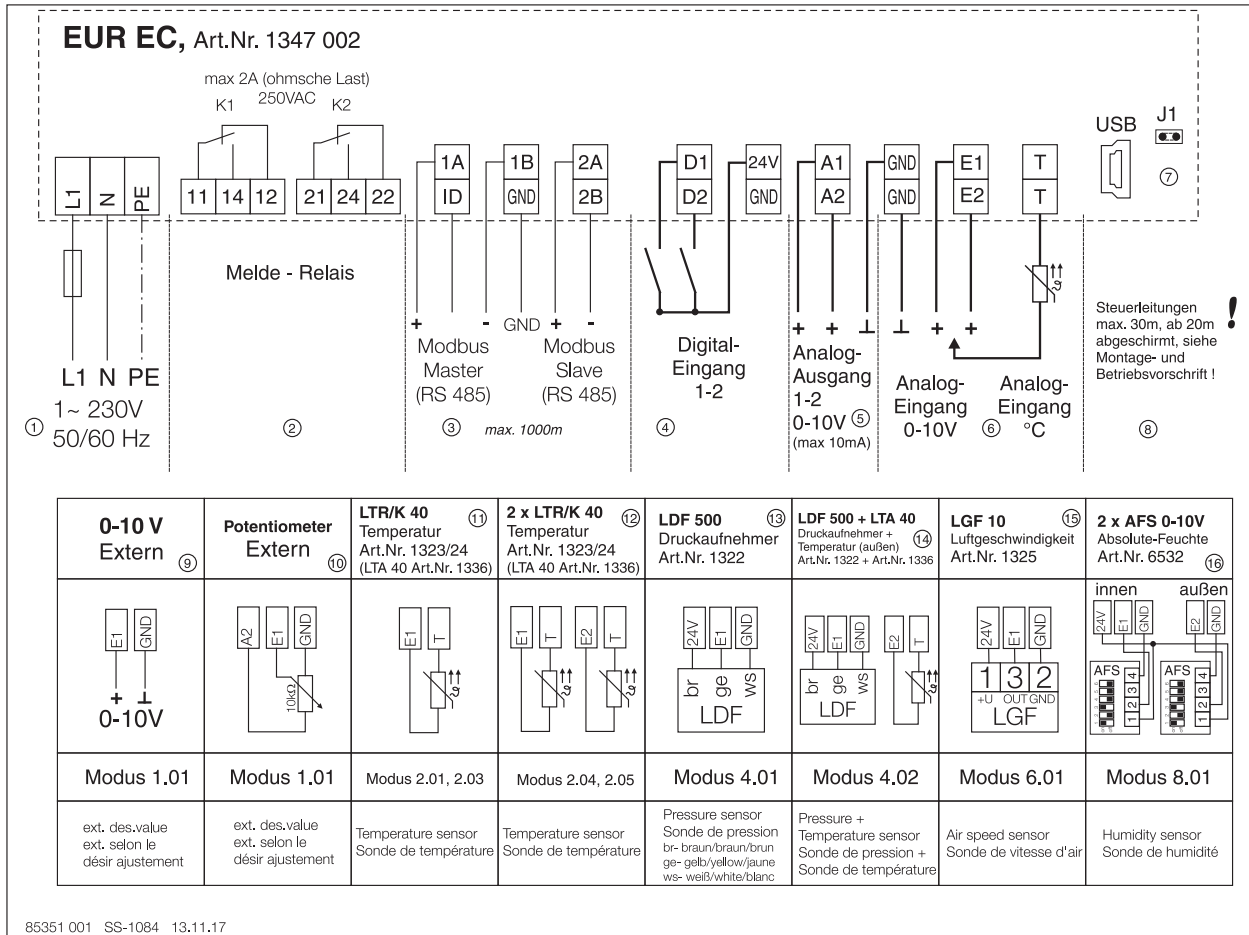
### 13.1 Technical data

Type	EUR EC
Part-No.	1347 002
Line voltage	1 ~ 230 V (-15 % bis +10 %), 50/60 Hz
Input resistance for sensor or signal set for the rotational speed (E1, E2)	for 0 - 10 V input: $R_i > 900 \text{ k}\Omega$ for input 4 - 20 mA: $R_i = 250 \text{ }\Omega$ (max. load 500 $\Omega$ )
Voltage supply e.g. for sensors	+24 V (-30...+20 %), $I_{\text{max}} 70 \text{ mA}$ (for version 24 V DC this depends directly on supply voltage)
Analog output (A1, A2 0 - 10 V)	Load resistance (load) $> 5 \text{ k}\Omega$ Short-circuit proof, short-circuit current = 24 mA
Digital inputs (D1, D2)	$R_i$ approx. 7.8 k $\Omega$ Input current typ. 2.5 mA
Max. heat dissipation	approx. 10 W
Max. line fuse	10 A
Max. permissible ambient temperature	55 °C
Min. permissible ambient temperature	0 °C (if mains voltage is not switched off up to -20 °C)
Permissible temperature range for storage and transport	-30...+80 °C
Permissible installation height	0...4000 m amsl $\leq 2000 \text{ m}$ : no limitation $> 2000 \text{ m}$ : max. permissible line voltage = max. voltage indication name plate minus 1.29 % / 100 m
Permissible rel. humidity	85 % no condensation
Electromagnetic compatibility for the standard voltage 230 / 400 V according to DIN IEC 60038	Interference emission EN 61000-6-3 (domestic household applications)
	Interference immunity EN 61000-6-2 (industrial applications)
Housing protection	IP54

#### Connectable conductors (information for all terminals)

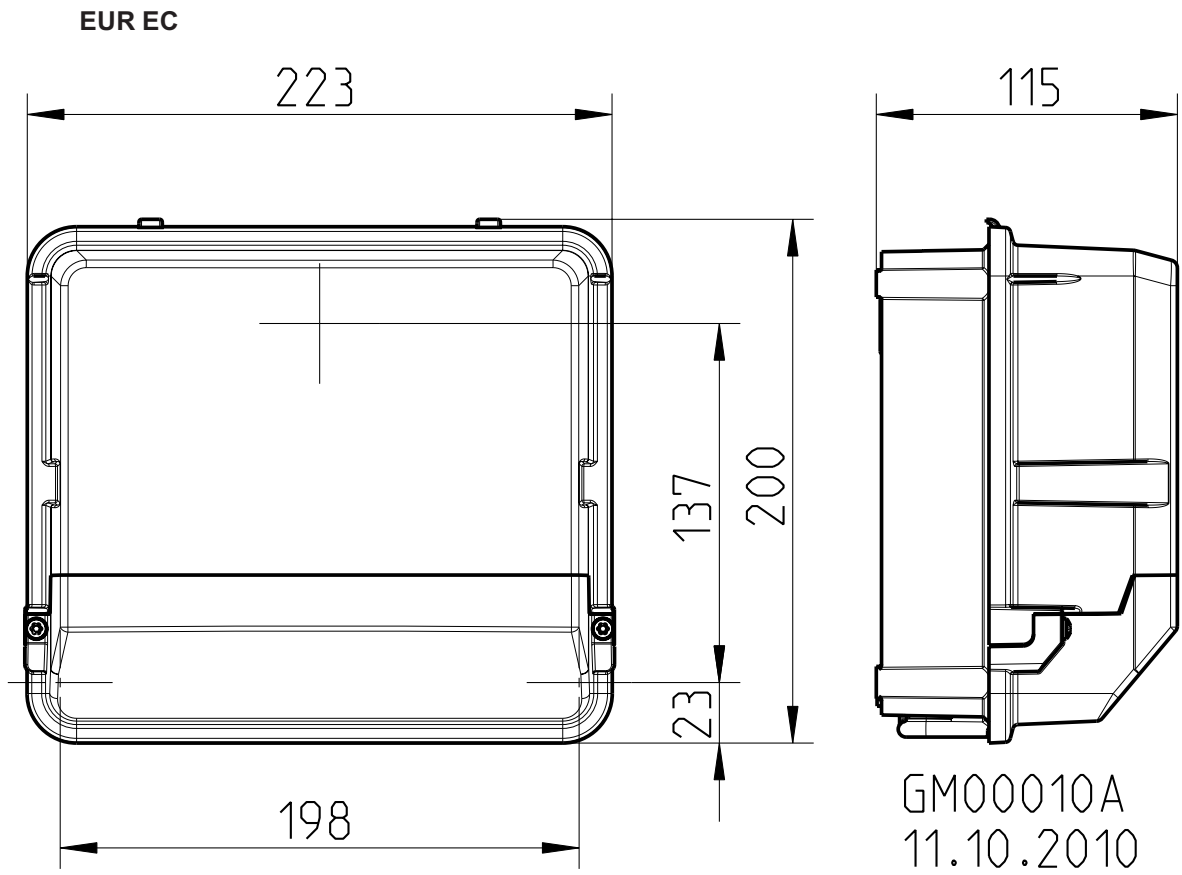
		Cross section min.	Cross section max.
Push-In Terminals 	Terminal range, rated connection	0.13 mm <sup>2</sup>	1.5 mm <sup>2</sup>
	Wire connection cross section AWG	AWG 24	AWG 16
	Solid H05(07) V-U	0.2 mm <sup>2</sup>	1.5 mm <sup>2</sup>
	Flexible H05(07) V-K	0.2 mm <sup>2</sup>	1.5 mm <sup>2</sup>
	With wire end ferrule DIN 46 228/1	0.25 mm <sup>2</sup>	1.5 mm <sup>2</sup>
	Wire plastic collar ferrule DIN 46 228/4,	0.25 mm <sup>2</sup>	0.75 mm <sup>2</sup>
	Rigid conductors and conductors with wire end ferrules can be plugged into the terminal without tools. Use the flexible conductor for connection and the push button for release. Stripping length: 8 mm		
The data refer to the connection possibilities of the terminals. The necessary conductor cross section must be dimensioned according to the respective prevailing conditions.			

13.2 Connection diagram



- 1 Line 1 ~ 230 V, 50 / 60 Hz
- 2 Signal relay, contact load max. AC 250 V 5 A (Ohmic load)
- 3 Modbus Master (RS 485) and Modbus Slave (RS485) max. 1000 m
- 4 Digital input 1 -2
- 5 Analogue output 1 - 2.0 - 10 V (max. 10 mA)
- 6 analogue input 1 - 2.0 - 10 V / °C
- 7 Jumper J1 for USB interface (Bootloader)
- 8 Control cables max. 30 m, from 20 m shielded, see Installation and Operating Specification!
- 9 0 - 10 V External
- 10 Potentiometer external
- 11 LTR/K 40, temperature Art. No. 1323/24
- 12 2 x LTR/K 40, temperature part. no. 1323/24 (LTA 40 part. no. 1336)
- 13 LDF 500, pressure sensor Art. No. 1322
- 14 LDF500 + LA 40, pressure sensor + temperature (external) Art. No. 1322 + Art. no. 1336
- 15 LGF 10, air speed Art. No. 1325
- 16 2 x AFS 0-10V, humidity sensor item no. 6532

**13.3 Dimensions [mm]**



## 13.4 Basic principles and setting options for “Absolute humidity difference control”

### 13.4.1 Note on setting the output variable for the measured humidity value

The AFS 0-10V sensor has three possible physical output options:

1. Factory setting
  - **MV** = Mixing ratio in **g/kg** (mass of water vapour per mass of dry air). The humidity difference control uses this humidity value to most accurately determine the drying potential of the outside air.
2. Not recommended
  - **a.H.** = Absolute humidity in **g/m<sup>3</sup>** (mass of water vapour per room volume of humid air). This setting leads to inaccurate determination of the drying potential of the outside air, which in individual cases can even lead to an increase in the room humidity.
3. Not permitted
  - **r.H.** = Relative humidity in %. This humidity value is unsuitable for use of absolute humidity difference control and may **not** be set. It can result in damage to the building due to a sustained increase in room humidity.

### 13.4.2 Required components

**1 x EUR EC, item no. 1347 002**

**2 x AFS 0-10V, item no. 06532 001**

- Use at operating temperature -30 to +70 °C (no direct solar radiation)
- Output 1 = Temperature -20 to +80 °C (not required for control)
- Output 2 = MV mixing ratio 0 - 50 g/kg
- Relative humidity tolerance +/- 3 % (40 - 60 %) at 20 °C, otherwise +/- 5 %
- DIP switch: 101000
- Protection class: IP65

### 13.4.3 Sensor assembly

The sensors have the protection rating IP65 and may be installed outdoors and in humid rooms. They may not be exposed to direct solar radiation.

- The first sensor is installed outside. It checks how dry the outside air is. Evaluation is carried out on the EUR EC via the analog input “E2”.
- The second sensor is installed indoors in the room to be dried. Evaluation is carried out on the EUR EC via the analog input “E1”.
- The 24 VDC supply comes from the EUR EC.

### 13.4.4 Functionality

The “AFS 0-10V” sensor measures the relative humidity and temperature, and uses these to calculate the required MV mixing ratio necessary for control. The mixing ratio 0 - 50 g/kg is output in 0 - 10 V (factory setting).

The first sensor is installed indoors and the second sensor outdoors.

The “EUR EC” control unit evaluates the two 0 - 10 V signals from the relevant sensor (AFS 0-10V).

The 0 - 10 V output value from the indoor room sensor is compared with the 0 - 10 V output value from the sensor outdoors.

The EUR EC outputs an analog control signal of 0 - 10 V depending on the difference in the two sensors. The difference value to be controlled and a control range can be set by entering parameters in the EUR EC

- The **difference value** specifies the variation from which control starts.
- The **control range** specifies the final value up to which the 10 V output is achieved.

**Example:**

- Set difference value = 0 corresponds to 0 g/kg
- Control starts working at a variation of >0 g/kg.

**Slow modulation:**

- Sensor output 0 - 50 g/kg.
- Control range 50 corresponds to an output of 10 V.
- Thus 0 - 50 g/kg corresponds to control of 0 - 10 V.
- To achieve an output value of 10 V, the difference must be 50 g/kg.



**Fast modulation:**

- Sensor output 0 - 50 g/kg.
- Control range 5 corresponds to an output of 10 V.
- Thus 0 - 5 g/kg corresponds to control of 0 - 10 V.
- From 5 g/kg the maximum modulation is achieved at 10 V.
- To achieve an output value of 10 V, the difference must be 5 g/kg.

**Alternative to 0-10 V output value from EUR EC, control with on/off signal via relay**

As an alternative to the 0 - 10 V output, an off/signal can be used for control on a fan via a relay in the EUR EC.

To boost the power of the EUR EC relay, a contactor corresponding to the fan current must be selected.

If there is a difference, which means venting for drying is worthwhile, the relay is switched on. The fan is switched on accordingly.

**Forced ventilation independent of control**

Independently of the difference control, a digital input on the EUR EC, e.g. a light switch to be set by the customer, can be used to activate forced ventilation mode.

**13.4.5 Setting****13.4.5.1 Settings for absolute humidity difference control**

Analog output 0-10 V DC for 0-10 V EC fan actuation.

**The settings specified below are already saved on delivery (factory setting)**

Base setup menu	Value	Meaning
Mode	8.01	Control on difference between sensor 1 and sensor 2, E1-E2
E1 Analog In	AFS 0-10V	Helios type humidity sensor at E1 (the following E1 parameters (unit, decimal, min. and max.) are fixed settings when using the Helios sensor, i.e. settings are not possible)
E1 Unit	-----	g/kg
E1 Decimals	-----	One decimal place displayed
E1 Min.	-----	Scaling 0 g/kg
E1 max	-----	Scaling 50 g/kg
E1 Offset	0.0	Signal shift
E2 Function	5E	Difference E1-E2
E2 Analog In	AFS 0-10V	Helios type humidity sensor at E2 (the following E1 parameters (unit, decimal, min. and max.) are fixed settings when using the Helios sensor, i.e. settings are not possible)
E2 Unit	-----	g/kg
E2 Decimals	-----	One decimal place displayed
E2 Min.	-----	Scaling 0 g/kg
E2 Max.	-----	Scaling 50 g/kg
E2 Offset	0.0	Signal shift
Setting menu	Value	Meaning
Setpoint1	0 g/kg (suggestion)	Setpoint 1 = Initial value No control takes place at a variation of 0. If the variation is >0 control starts. 100% = 10 V output depends on the set control range. To compensate for tolerances in the measurement chain, the initial value can be set to e.g. 0.5 instead of 0. Control thus begins from 0.5 g/kg.

Pband	5 g/kg (suggestion)	The full modulation (analog output) of 10 V is achieved at 5 g/kg. 0 - 10 V = 0 - 5 g/kg. > 5 g/kg always means 100 % modulation with a 10 V output. Modulation of the 0 - 10 V analog output. 0 % = 0 V, 100 % = 10 V
IO Setup	Value	Meaning
A01 Function	2A	Controlled 0 - 10 V output vor control circuit 1
A01 signal	A1	Assignment of actual output A1 to virtual output A01
A01 Min.	0.0 V	0 g/kg = 0 V
A01 max	10.0 V	50 g/kg = 10 V
A01 Inverting	OFF	Positive control

#### 13.4.5.2 Alternative to 0-10 V control output, signal relay to control a fan

In addition to or as an alternative to the 0 - 10 V control output (see Electrical installation, Signal outputs chapter), a signal relay (see Electrical installation, Relay outputs chapter) can be used to control a fan (fan on/off).

Note:

The signal relay controls an optional contactor, dimensioned for the fan current.

IO Setup	Value	Meaning
D01 Function	1K	Operating indication (default)
D02 Function	4K	Limit modulation for fan control on/off
Limits	Value	Meaning
Controller function	OPF	no message
Level min. *	10 %	Value in % of max. control range at which the relay K2 shuts off again. For example, with 5 g/kg as the control range, the relay shuts off again at 0.5 g/kg.
Level max. *	50 %	Value in % of max. control range at which the relay K2 switches on. For example, with 5 g/kg as the control range, the relay switches on at 2.5 g/kg.
Level Delay	0 sec	0 = Immediate response without delay

\* If Modulation max =< Modulation min., only Modulation max i executed.

#### 13.4.5.3 Forced ventilation/Party

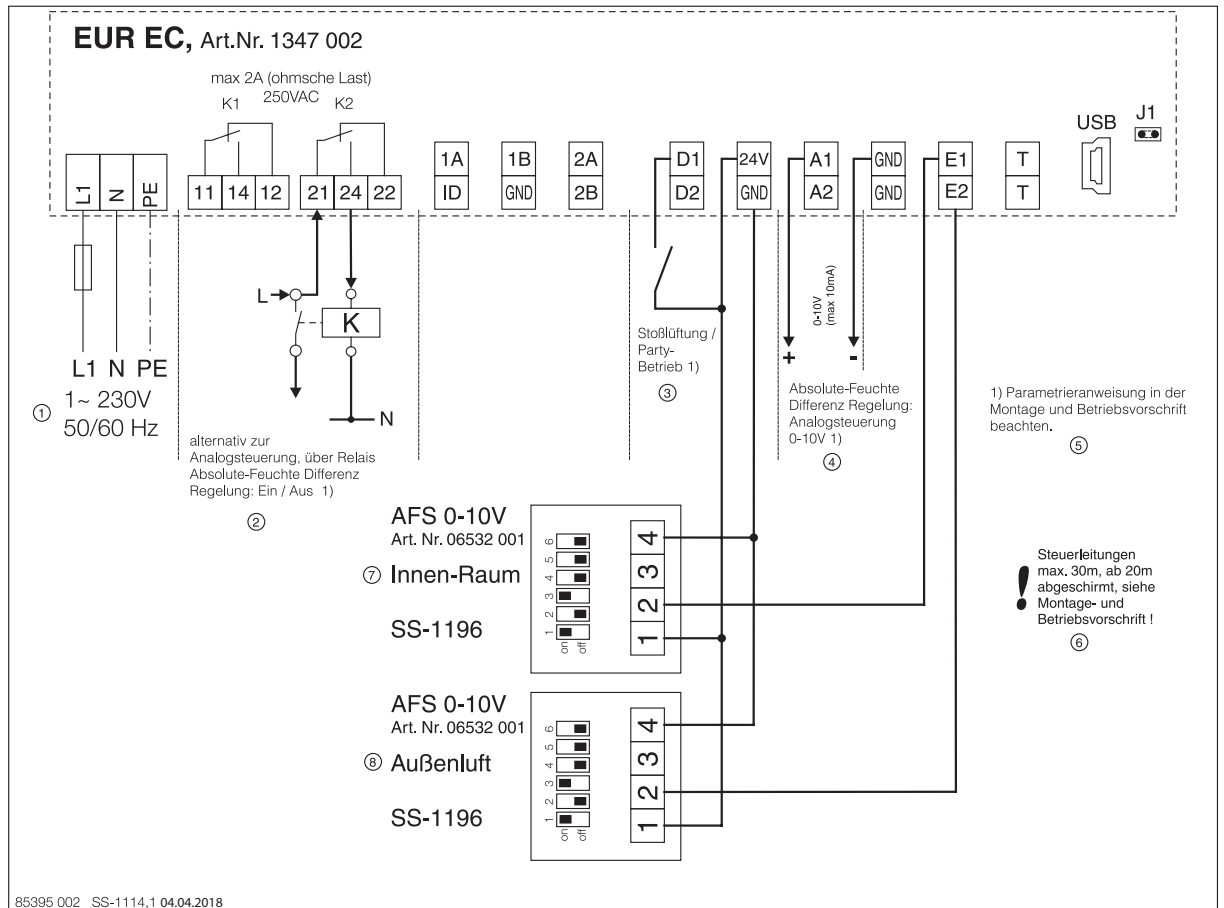


##### Information

If ventilation even without a difference (diff = 0) is required, a control contact / light switch can be used to activate 100% ventilation.

IO Setup	Value	Meaning
DI1 Function	11D	Max. speed setting is activated

13.4.6 Connection suggestion for SS-1114,1



- 1 Line 1 ~ 230 V, 50 / 60 Hz
- 2 Alternative to analog control, absolute humidity difference control via relay: On / Off
- 3 Forced ventilation / Party mode
- 4 Absolute humidity difference control: Analog control 0-10 V
- 5 Observe the configuration instructions in the installation and operation specification.
- 6 Control cables max. 30 m, from 20 m shielded, see Installation and Operating Specification!
- 7 AFS 0-10V for indoors
- 8 AFS 0-10V for outside air

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## 13.6 Service and Information

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Keep this document close to the device as a reference!

NOTE: "See start-up wizard, see chapter "First Start-up"

# EUR EC

## Ventilateurs Helios

### Régulateur universel électronique

Nr. 82558-002/0419

#### Prescription de montage et d'utilisation



**À conserver pour consultation ultérieure !**

**REMARQUE : Tenir compte de l'assistant de mise en service, voir chapitre Première mise en service**

Version du logiciel: à partir de la version 12.22

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# 1 Instructions générales

Le respect des consignes suivantes vise également à assurer la sécurité du produit. Si les consignes de sécurité en général, de transport, de stockage, de montage, d'utilisation, de mise en service, de maintenance, d'entretien, de nettoyage et d'élimination/recyclage ne sont pas respectées, le produit ne pourra éventuellement pas être utilisé de manière sûre et pourra représenter un danger de blessure et de mort des utilisateurs et de tiers.

Le non-respect des consignes suivantes peut, par conséquent, entraîner la perte des droits de garantie légaux et rendre l'acheteur responsable du produit devenu dangereux suite au non-respect des consignes.

## 1.1 Importance de la notice d'utilisation

Avant l'installation et la mise en service, veuillez lire cette notice d'utilisation attentivement afin de garantir une utilisation correcte !

Nous attirons votre attention sur le fait que cette notice d'utilisation ne concerne que l'appareil et n'est absolument pas applicable à l'installation complète !

La présente notice d'utilisation sert à garantir un travail en toute sécurité sur et avec l'appareil mentionné. Elle contient des consignes de sécurité devant être respectées ainsi que des informations nécessaires à l'utilisation sans problème de l'appareil.

La notice d'utilisation doit être conservée près de l'appareil. L'accès à la notice d'utilisation doit être garanti à tout moment aux personnes devant effectuer des activités sur l'appareil.

La notice d'utilisation doit être conservée pour une utilisation ultérieure et doit être remise à tout propriétaire, utilisateur ou client final futur.

## 1.2 Groupe-cible

La notice d'utilisation s'adresse aux personnes chargées de la planification, de l'installation, de la mise en service ainsi que de l'entretien et de la maintenance et disposant de la qualification et des connaissances requises pour exécuter leurs activités.

## 1.3 Exclusion de la responsabilité

La concordance du contenu de cette notice d'utilisation avec le matériel décrit et le logiciel de l'appareil a été contrôlée. Il peut cependant y avoir des écarts ; aucune garantie de concordance complète n'est donnée. Nous nous réservons le droit d'apporter des modifications à la construction et aux données techniques dans l'intérêt du développement. Par conséquent, aucun droit ne peut être revendiqué à partir des indications, illustrations ou dessins et des descriptions. Sous réserve d'erreurs.

Nous déclinons toute responsabilité pour les dommages résultant d'une mauvaise utilisation, d'une utilisation non conforme, d'une utilisation non pertinente ou de réparations ou modifications non autorisées.

## 1.4 Droit d'auteur

Cette instruction de service contient des informations protégées par droit d'auteur. Toute photocopie partielle ou intégrale, reproduction, traduction ou saisie sur des supports de données de cette instruction de service sont interdites sans autorisation préalable. Les infractions sont passibles de dommages-intérêts. Tous droits réservés, y compris ceux résultant d'une délivrance de brevet ou d'un modèle déposé.

## 2 Consignes de sécurité

Ce chapitre contient des conseils destinés à éviter les dommages aux personnes et aux biens. Ces conseils ne prétendent pas être complets. Les techniciens de notre maison sont à votre disposition en cas de questions et de problèmes.




### 2.1 Consignes de sécurité

L'appareil est destiné exclusivement aux tâches mentionnées dans la confirmation de commande. Sauf accord contractuel, toute utilisation autre ou allant au-delà est considérée non conforme. Le fabricant décline toute responsabilité pour les dommages qui en résultent. Seule l'entreprise utilisatrice ou l'utilisateur supporte les risques.

La lecture de cette notice d'utilisation ainsi que le respect des consignes contenues dans celle-ci, en particulier les consignes de sécurité, font partie de l'utilisation conforme. La notice d'utilisation des composants raccordés est également à respecter. Le fabricant n'est pas responsable des dommages aux personnes et aux biens résultant d'une utilisation non conforme. Cette responsabilité est celle de l'exploitant de l'appareil.

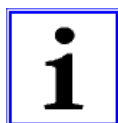
### 2.2 Explication des symboles

Les consignes de sécurité sont mises en évidence par un triangle d'avertissement et représentées selon le degré de dangerosité comme suit.

	<p><b>Attention !</b> Zone de danger générale. Mort, graves blessures corporelles ou dommages importants aux biens peuvent survenir lorsque les mesures de précaution ne sont pas prises !</p>
	<p><b>Danger présenté par l'électricité</b> Danger dû à la tension électrique ! Le fait de ne pas prendre de mesures de précaution appropriées est susceptible d'occasionner de graves blessures corporelles, voire la mort !</p>
	<p><b>Information</b> Informations supplémentaires importantes et conseils d'utilisation.</p>

### 2.3 Sécurité produit

L'appareil correspond à l'état de la technique au moment de sa livraison et il est considéré comme étant d'utilisation sûre. L'appareil ainsi que ses accessoires ne doivent être installés et utilisés qu'en parfait état et en respectant la notice de montage et la notice d'utilisation. Une utilisation ne respectant pas les spécifications techniques de l'appareil (plaque signalétique et annexe/données techniques) peut entraîner un défaut de l'appareil et causer des dommages plus importants !



#### Information

En cas de défaut ou de panne de l'appareil, une surveillance de fonctionnement séparée avec fonctions d'alarme est nécessaire pour éviter des dommages aux personnes et aux biens. Une exploitation en situation de dérangement doit être considérée ! Lors de l'utilisation dans l'élevage d'animaux, il faut que les dysfonctionnements dans l'alimentation en air soient détectés suffisamment tôt afin d'éviter des situations où la vie des animaux est mise en danger. Les prescriptions et les règlements locaux doivent être respectés lors de la planification et de la construction de l'installation. En Allemagne, cela signifie entre autres DIN VDE 0100, la prescription en matière de protection des animaux d'élevage etc. Il convient également de respecter les fiches techniques AEL, DLG, VdS.

### 2.4 Exigences concernant le personnel / Obligation de soins

Les personnes chargées de l'appareil lors de la planification, l'installation, la mise en service ainsi que l'entretien et la maintenance doivent posséder la qualification et les connaissances appropriées. Par ailleurs, elles doivent être au fait des règles de sécurité, des directives EU / EG, des prescriptions en matière de prévention des accidents et des prescriptions nationales ainsi que locales correspondantes et être en possession des instructions internes à l'entreprise. Le personnel suivant une formation, une initiation ou un apprentissage ne doit travailler sur l'appareil que sous la surveillance d'une personne expérimentée. Ceci est également valable pour le personnel suivant une formation générale. L'âge minimal légal doit être respecté.

## 2.5 Mise en service et pendant l'exploitation



### Attention !

- Lors de la mise en service, des états inattendus et dangereux peuvent se présenter dans toute l'installation du fait de mauvais réglages, de composants défectueux ou d'un raccordement électrique mal effectué. Toutes les personnes et objets doivent être éloignés de la zone de danger.
- Pendant l'exploitation, l'appareil doit être fermé ou installé dans l'armoire de commande. Les fusibles doivent être remplacés, en aucun cas réparés ou pontés. Les indications concernant la protection maximale doivent être absolument respectées (voir Données techniques). Seuls doivent être utilisés les fusibles prévus dans le schéma électrique.
- Les défauts constatés sur les installations électriques / les ensembles / les moyens d'exploitation doivent être immédiatement éliminés. Si un danger imminent existe, l'appareil / l'installation ne doit pas être utilisé(e) dans l'état défectueux.
- Il convient de veiller au fonctionnement régulier, à faibles oscillations du moteur et du ventilateur. Les remarques figurant dans la documentation de l'entraînement doivent être absolument respectées !

## 2.6 Travaux sur l'appareil



### Information

Le montage, le raccordement électrique et la mise en service ne doivent être effectués que par un électricien dans le respect des règlements électrotechniques (entre autres EN 50110 ou EN 60204) !



### Danger présenté par l'électricité

Il est absolument interdit d'effectuer des travaux sur des pièces d'appareil sous tension. Le type de protection de l'appareil ouvert est IP00 ! Il est possible d'entrer en contact direct avec des tensions présentant un danger de mort.

L'absence de tension doit être constatée à l'aide d'un détecteur de tension **bipolaire**.

## 2.7 Modifications / Interventions sur l'appareil



### Attention !

Pour des raisons de sécurité, aucune intervention ou modification ne doit être effectuée de son propre chef sur l'appareil. Toutes les modifications envisagées doivent être autorisées par écrit par le fabricant.

Utilisez exclusivement des pièces détachées originales / des pièces d'usure originales / des pièces accessoires originales et délivrées par le fabricant. Ces pièces ont été spécialement conçues pour l'appareil. Avec des pièces étrangères, rien ne peut garantir que ces pièces aient été conçues et fabriquées pour satisfaire aux exigences et aux normes de sécurité exigées.

Les pièces et les options n'ayant pas été livrées par le fabricant ne sont pas autorisées pour l'utilisation.

## 2.8 Obligation de soin de l'exploitant

- L'entrepreneur ou l'exploitant doit veiller à ce que les installations et les moyens d'exploitation électriques soient utilisés et maintenus en état conformément aux règlements électrotechniques.
- L'exploitant est tenu d'utiliser l'appareil uniquement en parfait état.
- L'appareil doit toujours être utilisé de manière conforme.
- La fonctionnalité des dispositifs de sécurité doit être contrôlée régulièrement.
- La notice d'assemblage et/ou notice d'utilisation doit être toujours tenue intégralement à disposition sur le lieu d'utilisation de l'appareil et être parfaitement lisible.
- Le personnel doit être régulièrement informé de toutes les questions en matière de sécurité au travail et de protection de l'environnement et doit connaître la notice d'assemblage et/ou notice d'utilisation et en particulier les consignes de sécurité mentionnées dans celle-ci.
- Il est interdit d'enlever l'ensemble des consignes de sécurité et d'avertissement apposées sur l'appareil qui doivent par ailleurs rester lisibles.

## 2.9 Emploi de personnel ne faisant pas partie de l'entreprise

Les travaux de maintenance et d'entretien sont souvent effectués par du personnel n'appartenant pas à l'entreprise. Souvent, ce personnel ne connaît pas les conditions particulières et les dangers qui en résultent. Ces personnes doivent être informées dans le détail des dangers présents dans la zone où ils exercent leur activité.

La façon de travailler doit être contrôlée afin de pouvoir intervenir suffisamment tôt en cas de besoin.

## 3 Aperçu des produits

### 3.1 Domaine d'application

La tâche de l'appareil consiste à atteindre et maintenir la consigne réglée. Pour ce faire, la valeur actuelle mesurée (valeur de capteur) est comparée à la consigne réglée ce qui permet de déterminer la grandeur de réglage.

L'appareil possède deux circuits de régulation séparés et deux entrées de capteur (0 - 10 V, 4 - 20 mA, KTY 81-210, PT 1000).

Des régulateurs de vitesse pour ventilateurs ou des ventilateurs avec contrôleur intégré peuvent être commandés par un signal de 0 - 10 V ou via l'interface MODBUS Master disponible en parallèle.

### 3.2 Travaux de service

Il convient de contrôler régulièrement l'encrassement de l'appareil et de le nettoyer si nécessaire.

### 3.3 Transport

- L'appareil est emballé en usine en fonction du type de transport convenu.
- L'appareil ne doit être transporté que dans son emballage d'origine.
- Les coups et les chocs doivent être évités pendant le transport.
- Le transport humain doit être effectué dans le respect des charges admissibles.

### 3.4 Stockage

- L'appareil doit être stocké au sec et à l'abri des intempéries dans son emballage d'origine.
- Evitez des températures extrêmes vers le haut ou vers le bas.
- Evitez de l'entreposer trop longtemps (nous recommandons un an au maximum).

### 3.5 Elimination / recyclage



L'élimination doit être effectuée selon les règles et dans le respect de l'environnement, conformément aux dispositions légales du pays.

- ▷ Triez les matériaux par catégories, dans le respect de l'environnement.
- ▷ Le cas échéant, confiez l'élimination à un professionnel.

## 4 Montage

### 4.1 Instructions générales



#### Attention !

Pour éviter un défaut de l'appareil causé par un montage défectueux ou des influences de l'environnement, il convient de respecter les points sous-mentionnés pendant l'installation mécanique :

- Avant le montage, retirez l'appareil de son emballage et contrôlez l'absence de dommages dus au transport. La mise en service est interdite en présence de dommages dus au transport !
- En présence d'un poids supérieur à 25 kg pour les hommes / 10 kg pour les femmes, la sortie du ventilateur doit être effectuée par deux personnes (selon REFA). Les valeurs peuvent être éventuellement différentes en fonction du pays.
- Lors de la manipulation, utiliser des chaussures et des gants de sécurité !
- Montez l'appareil sans le serrer avec des moyens de fixation appropriés sur un support porteur propre !
- Une fixation sur un support vibrant n'est pas acceptable !

- Lors du montage sur des cloisons légères, veillez à ce qu'il n'y ait pas de vibrations ou de chocs excessifs. En particulier, la fermeture de portes intégrées dans ces cloisons légères en les claquant peut entraîner des chocs très importants. C'est pourquoi nous recommandons dans ce cas de séparer les appareils de la cloison.
- Des copeaux dus au perçage, des vis et d'autres corps étrangers ne doivent pas pénétrer à l'intérieur de l'appareil !
- Installer l'appareil en dehors d'une zone de passage, veiller toutefois à la bonne accessibilité !
- Utiliser les bouchons fournis pour les entrées de câble en fonction du modèle du coffret. Découper les entrées de câble selon le diamètre des câbles ou utiliser l'entrée de câble pour raccords vissés. Obturer les entrées non utilisées !
- Protéger l'appareil du rayonnement solaire direct !
- L'appareil est prévu pour être monté verticalement (introduction du câble par le bas). Un montage horizontal ou couché n'est autorisé qu'après accord du technique fabricant !
- Veillez à ce que la chaleur soit évacuée correctement (voir Données techniques puissance dissipée).

#### 4.2 Montage à l'extérieur

Un montage à l'extérieur est possible jusqu'à -20 °C si l'appareil n'est pas mis hors circuit. Dans la mesure du possible, installation protégée des intempéries, c.-à-d. exclure le rayonnement solaire direct !

#### 4.3 Emplacement d'installation en agriculture

Si vous utilisez l'appareil pour l'élevage, dans la mesure du possible ne pas monter celui-ci directement dans l'étable mais au contraire dans un hall à émissions polluantes réduites. Ceci permet d'éviter les dommages dus aux gaz nocifs (par ex. vapeurs d'ammoniac, vapeurs d'hydrogène sulfuré).

#### 4.4 Influences de la température lors de la mise en service

Évitez la condensation de l'humidité et les dysfonctionnements qui en résultent en entreposant l'appareil à température ambiante !

## 5 Installation électrique

### 5.1 Mesures de sécurité



#### Danger présenté par l'électricité

- Les travaux sur les pièces électriques doivent être effectués uniquement par un électricien ou des personnes ayant reçu une formation dans ce domaine sous la surveillance d'un électricien conformément aux règles de la technique.
- Il convient de respecter les 5 règles de sécurité en matière d'électricité !
- Ne travaillez jamais sur l'appareil sous tension.
- Recouvrir les équipements électriques voisins lors des travaux de montage.
- Pour la réalisation d'isolement électrique de sécurité, des mesures supplémentaires sont nécessaires.
- Lors de tous les travaux sur des pièces ou des conducteurs sous tension la présence d'une deuxième personne est requise pour couper le courant en cas de danger.
- Les équipements électriques doivent être régulièrement contrôlés : Les connexions détachées doivent être fixées de nouveau, les conducteurs ou les câbles endommagés sont immédiatement remplacés.
- L'armoire de commande et toutes les unités d'alimentation doivent toujours rester fermées. Seules les personnes autorisées possédant une clé ou un outil spécial peuvent avoir accès.
- Il est interdit de faire fonctionner l'appareil en ayant retiré les couvercles car des pièces nues sous tension se trouvent à l'intérieur de l'appareil. Le non-respect de cette disposition peut entraîner des dommages importants aux personnes.
- Si le coffret à bornes ou le boîtier dispose d'un couvercle métallique, la liaison nécessaire avec le conducteur de protection entre les pièces du boîtier doit être réalisée à l'aide de vis. La mise en service est autorisée uniquement après avoir remis correctement en place ces vis.

- L'exploitant de l'appareil est responsable de la compatibilité CEM de l'ensemble de l'installation conformément aux normes en vigueur sur site.
- Il est interdit d'utiliser des raccords vissés métalliques dans les parties caoutchouc du coffret car il n'y a pas de liaison équipotentielle.
- Ne nettoyez jamais les dispositifs électriques à l'eau ou avec d'autres liquides.



### Information

Les différents raccordements sont représentés dans l'annexe de cette notice d'utilisation (voir schéma des connexions) !

## 5.2 Installation conforme CEM des câbles de commande

Pour éviter les interférences, il convient de respecter un dégagement suffisant par rapport aux câbles de réseau et aux câbles moteur. La longueur des câbles de conduite doit être de 30 m au maximum, à partir de 20 m ils doivent être blindés ! En cas d'utilisation d'un câble blindé, le blindage doit être relié d'un côté, c'est-à-dire uniquement au conducteur de protection sur l'appareil de régulation (aussi court et avec une induction aussi faible que possible !).

## 5.3 Raccordement au réseau

Le raccordement au réseau est réalisé aux bornes : PE, L1 et N. Il convient absolument de veiller à ce que la tension du réseau se trouve dans les tolérances admissibles (voir Données techniques et plaque signalétique apposée sur le côté).



### Danger présenté par l'électricité

La tension du réseau doit satisfaire aux caractéristiques de qualité de la norme DIN EN 50160 et correspondre aux tensions normalisées définies de DIN IEC 60038 !

## 5.4 Entrée de signal ou raccordement de capteur (E1, E2)

L'appareil possède 2 entrées analogiques : Analog In = "E1" et Analog In 2 = "E2"

Le raccordement dépend du mode de fonctionnement programmé et du signal de capteur utilisé.

- En cas de raccordement de capteurs de température **passifs** de type LTR, LTK, LTA.. (KTY81-210) ou PT1000 aux bornes "E1" et "T" ou "E2" et "T" il ne faut pas tenir compte de la polarité.  
Pour une résistance de perturbation élevée, raccorder directement un condensateur au capteur (1nF parallèle). Sur les capteurs de température de type LTR, LTK, LTA.. (KTY81- ) le condensateur est intégré.
- Lors du raccordement de capteurs **actifs** aux bornes "E1" et "GND" ou "E2" et "GND", respecter la polarité, une alimentation en tension de 24 V DC est intégrée.
- Pour les capteurs à deux conducteurs (signal 4 - 20 mA), le raccordement se fait aux bornes "E1" et "24 V" et/ou "E2" et "24 V" le raccordement "GND" n'a pas lieu d'être.



### Danger présenté par l'électricité

N'appliquez jamais la tension du réseau à l'entrée du signal !

## 5.5 Sorties de signal 0 - 10 V (A1, A2)

Les sorties analogiques permettent de commander par ex. des régulateurs de vitesse avec une entrée 0 - 10 V. Les ventilateurs avec contrôleur intégré et entrée 0 - 10 V peuvent être commandés directement.

- Analog sortie 1 (bornes A1 - GND)
  - Sortie 0 - 10 V régulée pour circuit de régulation 1 (réglage usine fonction **[2A]**).
- Analog sortie 2 (bornes A2 - GND)
  - En cas de fonctionnement avec un circuit de régulation : tension fixe +10 V par ex. pour alimenter un potentiomètre externe (réglage usine fonction **[1A]**).
  - En cas de fonctionnement avec un deuxième circuit de régulation : Sortie 0 - 10 V régulée pour circuit de régulation 2 (préréglage fonction **[8A]**).

D'autres fonctions peuvent être affectées si nécessaire (voir Notice d'utilisation/Réglage IO).



### Danger présenté par l'électricité

Les sorties de plusieurs appareils ne doivent pas être connectées ensemble !

### 5.6 Alimentation en tension pour appareils externes (+24V, GND)

Une alimentation en tension est intégrée pour les appareils externes, par ex. pour un capteur (courant de charge maxi voir Données techniques).

En cas de surcharge ou de court-circuit (24 V – GND), l'alimentation en tension externe est mise hors circuit (multifusible). L'appareil effectue une réinitialisation "Reset", puis se remet à fonctionner.

- Les sorties de tension de plusieurs appareils ne doivent pas être connectés ensemble !
- Les sorties de tension de l'appareil ne peuvent pas être reliés les uns aux autres !

### 5.7 Entrées numériques (D1, D2)

Différentes fonctions peuvent être attribuées aux entrées numériques "D1" et "D2" (voir IO Setup : Aperçu des fonctions des entrées numériques). Activation via des contacts sans potentiel, une basse tension d'env. 24 V DC est commutée.



#### Danger présenté par l'électricité

N'appliquez jamais la tension du réseau aux entrées numériques !  
Tenir compte de la résistance d'entrée (voir Données techniques).

### 5.8 Sorties de relais (K1, K2)

Différentes fonctions peuvent être attribuées aux sorties de relais "K1" et "K2" (voir IO Setup : fonction et inversion des sorties de relais). Charge de contact max., voir Données techniques et Schéma de raccordement.

#### Relais K1

- Raccordement des contacts sans potentiel du relais "K1" aux bornes 11, 14, 12.
- "K1 Fonction" réglage usine : **[1K]** = **message de fonction**. C'est-à-dire armé en cas de fonctionnement sans défaut, retombé si libération "OFF".

#### Relais K2

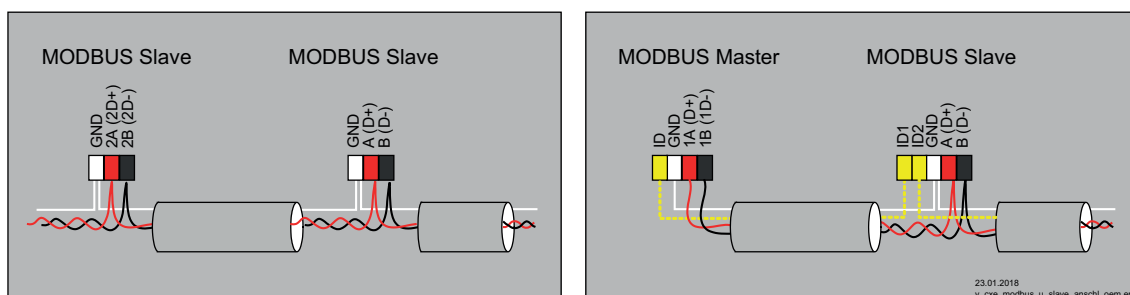
- Raccordement des contacts sans potentiel du relais "K2" aux bornes 21, 24, 22.
- "K2 Fonction" réglage usine : **[2K]** = **message de défaut**. C'est-à-dire armé en cas de fonctionnement sans défaut et retombé si libération "OFF".



## 5.9 Interfaces RS-485 pour MODBUS RTU

L'appareil possède deux interfaces RS-485 pour l'interconnexion via MODBUS RTU :

1. Interface "1A (1D+)", "1B (1D-)" pour applications MODBUS Master
  - La fonction préprogrammée est la sortie du circuit de régulation 1 : **1. Signal de régulation (2A)**  
Par ex. pour la commande de régulateurs de vitesse pour ventilateurs ou de ventilateurs avec contrôleur intégré et interface MODBUS (☞ Participant MODBUS Master).  
Les fonctions programmables correspondent aux fonctions décrites dans l'IO Setup pour les sorties analogiques.
  - Adressage automatique "des" participants ☞ par un procédé breveté. Il n'est plus nécessaire d'adresser manuellement chaque participant dans le réseau. En outre, le raccordement ID est occupé (plus d'informations chapitre suivant).
  - Câblage Fail-Safe intégré et terminaison 150 Ω.
2. Interface "2A (2D+)", "2B (2D-)" pour applications MODBUS Slave
  - Pour le raccordement de l'appareil à un système domotique de niveau supérieur.
  - Réglage de l'adresse et des paramètres de communication ☞ Programmation : Groupe de menus MODBUS Slave.



Raccordement interface MODBUS Slave et MODBUS Master

**En cas d'utilisation d'une ligne téléphonique à quatre conducteurs, nous recommandons l'attribution suivante :**

- A (D+) = rouge
- B (D-) = noir
- ID - ID1/2 = jaune (pour l'adressage automatique avec MODBUS Master)
- GND = blanc

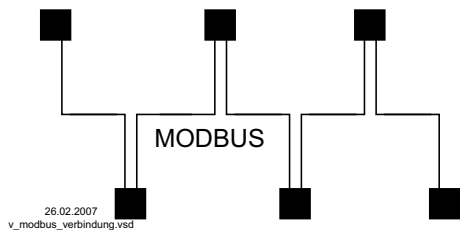


### Information

- Veiller impérativement à ce que le raccordement soit correct, à savoir que "A (D+)" doit également être raccordé à "A (D+)" des appareils suivants. Idem pour "B (D-)".
- Par ailleurs, une liaison "GND" doit être réalisée car un potentiel différent (au-delà de 10 V !) entraîne la destruction de l'interface RS-485 (par ex. foudre).
- Outre la liaison de données "A (D+)", "B (D-)" de "ID1 - ID2" (adressage automatique avec MODBUS Master) et la liaison "GND", aucun autre brin du câble de données ne doit être utilisé.
- Il faut veiller à une distance suffisante par rapport aux câbles réseau et moteur (au moins 20 cm).

La ligne des données doit être guidée d'un appareil à l'autre. Un autre type de câblage n'est pas autorisé ! Seuls deux conducteurs d'un câble (paire torsadée) peuvent être utilisés pour la liaison des données.

## Connexion MODBUS



## Recommandation pour les types de câble

1. Câbles CAT5 / CAT7
2. J-Y (St) Y 2x2x0,6 (ligne téléphonique)
3. AWG22 (2x2 torsadé)

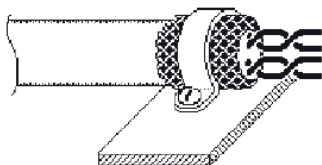
La longueur maximale de câbles est de 1 000 m (avec CAT5/7 500 m)

## Blindage

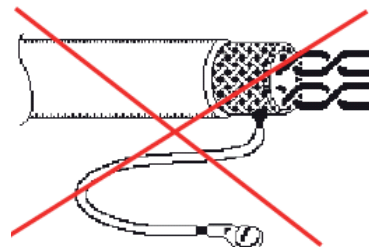
L'utilisation de câbles blindés n'est normalement pas nécessaire mais elle offre une protection élevée contre les perturbations électromagnétiques, notamment contre les hautes fréquences. Toutefois, l'efficacité d'un blindage est tributaire du soin apporté à l'installation du câble.

Si des câbles blindés sont utilisés, le blindage doit être raccordé au moins d'un côté à "PE" (de préférence au raccordement maître). Si le blindage est raccordé des deux côtés, les éventuels courants de compensation sont à prendre en compte !

Raccordement correct du blindage




Raccordement incorrect du blindage



## 5.9.1 Adressage des participants interface MODBUS Master

Jusqu'à **32** participants peuvent être raccordés à l'interface MODBUS Master.


Aucun autre composant n'est nécessaire pour l'adressage automatique breveté (activation  Groupe de menus Modbus Master : AutoAddressing). Il suffit, à cet effet, de relier entre eux les raccordements "ID1" et "ID2" des participants Slave en plus de la liaison bus et de les relier au raccordement "ID" du MODBUS Master.

Le raccordement "ID" du MODBUS Master doit être relié au raccordement "ID1" ou "ID2" du **premier participant Slave**. Celui-ci est ainsi reconnu et l'adresse **1** lui est attribuée.

Sur les participants suivants, le raccordement "ID1" ou "ID2" d'un participant Slave est à chaque fois relié au raccordement "ID1" ou "ID2" du participant Slave suivant.


Cette liaison permet l'adressage automatique des autres participants, initié par le participant précédent.

L'adressage des différents participants peut être effectué par avance sans cet appareil, à l'aide d'un terminal externe ou d'un PC et du logiciel correspondant.

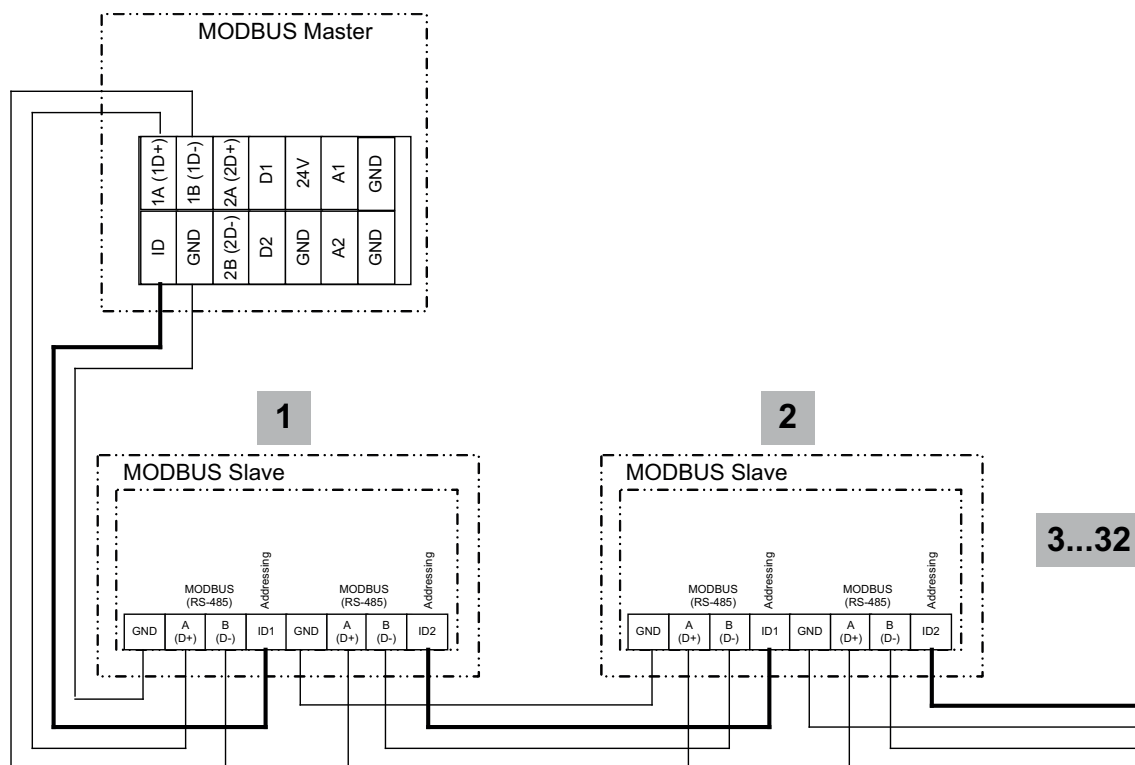
L'adressage peut également être effectué manuellement à l'aide d'un terminal portatif séparé ou d'un logiciel PC ; le nombre de participants doit alors être entré sur le MODBUS Master ( Groupe de menus MODBUS Master).



## Information

- Si un répéteur est nécessaire et si l'adressage automatique doit être effectué, seuls certains répéteurs qui transmettent le signal d'adressage peuvent être utilisés.
- Selon la version, les raccordements pour MODBUS "A (D+)", "B (D-)" sont présents en simple ou en double sur les participants Slave. Ils sont reliés électriquement en interne.
- Les raccords pour l'adressage automatique "ID1" et "ID2" ne sont **pas reliés directement** entre eux du point de vue électrique. Ils ne doivent pas être pontés, l'ordre de raccordement étant au choix.
- Les paramètres de communication sont pré-réglés de manière fixe  Programmation : Groupe de menus MODBUS Master.

Interconnexion avec un câble téléphonique



13.03.2013  
v\_modbus\_master\_autoadr.vsd

Raccordement du terminal aux bornes : A (D+), B (D-) et GND.  
Liaison des participants via les bornes : A (D+), B (D-), GND et ID1 / ID2

**5.10 Port USB**

Le port USB permet d'effectuer une mise à jour du logiciel en cas de besoin. Contacter le fabricant à ce sujet.



**Danger présenté par l'électricité**

**N'enfoncer le connecteur J1** sur les deux broches que pour une mise à jour du logiciel par le port USB . L'appareil ne se met pas en marche si ce connecteur est enfoncé sur les deux broches !  
Ne pas déplacer les connecteurs sous tension, respecter les consignes de sécurité !

**5.11 Potentiel des raccordements de tension de commande**

Les raccordements de la tension de commande (< 30 V) se rapportent au potentiel GND commun (exception : les contacts de relais sont sans potentiel). Il y a séparation de potentiel entre les raccordements de la tension de commande et le conducteur de protection. La tension extérieure maximale ne doit pas pouvoir dépasser 30 V aux raccordements de la tension de commande (entre les bornes "GND" et le conducteur de protection "PE"). Si nécessaire, une liaison avec le potentiel du conducteur de protection peut être établie en plaçant un pont entre la borne "GND" et le raccordement "PE" (borne pour le blindage).

## 6 Sélection du mode de fonctionnement

### 6.1 Mode de fonctionnement et entrée de signal



#### Information

La sélection de modes de fonctionnement préprogrammés permet une installation facile (☞ Mise en service).

Ceci détermine le fonctionnement de base de l'appareil, d'origine **1.01** = régulateur de vitesse (commande par signal 0 - 10 V). La configuration du régulateur est effectuée automatiquement lors de la sélection des modes de fonctionnement spécifiques aux applications. Les pré réglages effectués en usine pour chaque mode de fonctionnement sont basés sur des valeurs empiriques établies depuis de nombreuses années et qui conviennent pour de nombreuses applications. Celles-ci peuvent être adaptées à titre exceptionnel (☞ Notice d'utilisation / Controller Setup : "configuration du régulateur"). La tâche de l'appareil consiste à atteindre et maintenir la consigne réglée. Pour ce faire, la valeur actuelle mesurée (valeur de capteur) est comparée à la consigne réglée ce qui permet de déterminer la grandeur de réglage (modulation).

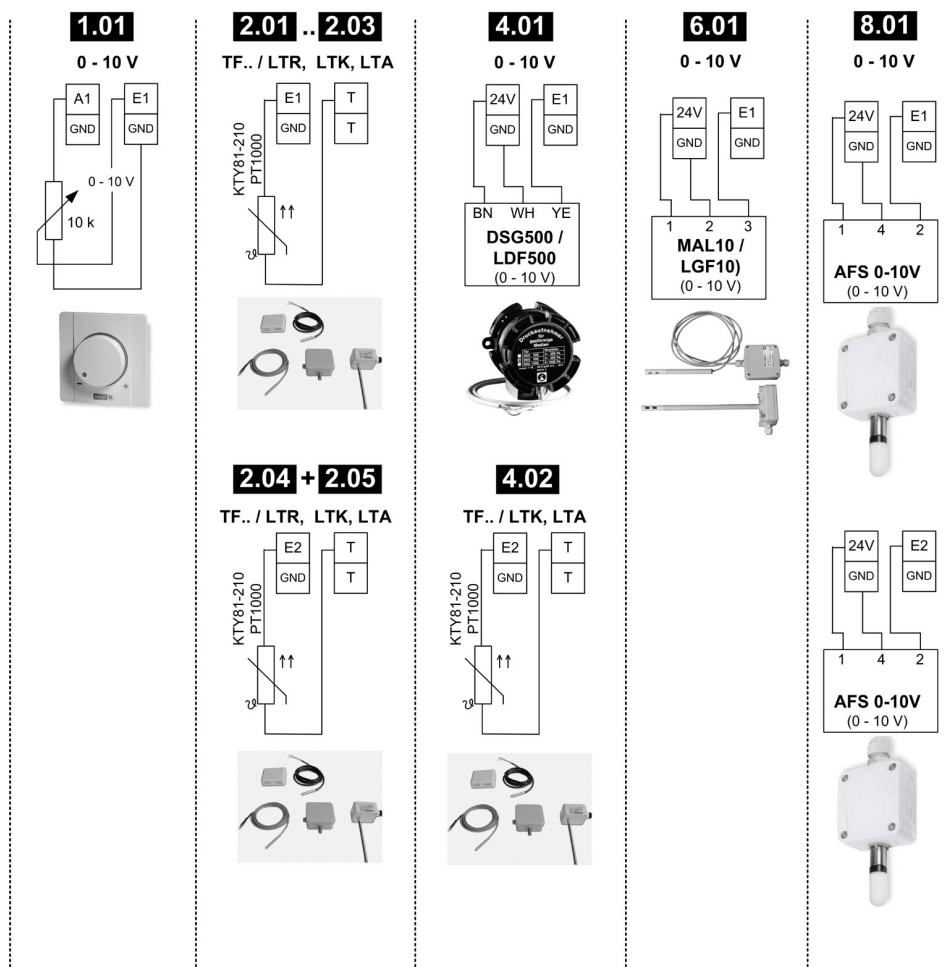
La sélection du mode de fonctionnement définit la fonction du circuit de régulation 1 qui agit sur les sorties suivantes (réglage usine) :

1. Sortie analogique "A1" 0 - 10 V avec fonction **2A** (☞ Installation électrique).
2. Interface MODBUS Master "1A" + "1B" avec fonction **2A** (☞ Installation électrique).

Mode	Signal ou capteur (entrée)	Entrée	Fonction
<b>1.01</b>	Signal: 0 - 10 V, 0 - 20 mA, 4 - 20 mA (E1)	E1	Régulateur de vitesse avec entrée pour signal de consigne, mode deux étages (réglage d'usine)
<b>1.02</b>	-		Régulateur de vitesse manuel avec réglage direct au moyen des touches ▼ + ▲ (0 - 100 % ou 1 - 5 étages)
<b>2.01</b>	* Capteur TF.. / LTR, LTK, LTA	E1	Régulation de température, technique de climatisation et du froid (Consigne pré réglée 20,0 °C, plage de réglage 5.0 K)
<b>2.03</b>	Capteur TF.. / LTR, LTK, LTA	E1	Régulation de température avec fonctions supplémentaires (chauffage, volet, surveillance de température)
<b>2.04</b>	* Capteur TF.. / LTR, LTK, LTA Capteur TF.. / LTR, LTK, LTA	E1 E2	Régulation de température avec 2 capteurs, comparaison ou prise de la moyenne
<b>2.05</b>	* Capteur TF.. / LTR, LTK, LTA Capteur TF.. / LTR, LTK, LTA	E1 E2	Régulation de la température avec 2 capteurs, différentiel de température
<b>4.01</b>	* Capteur DSG../LDF500	E1	Régulation de pression pour systèmes d'aération
<b>4.02</b>	1 x Capteur DSG../LDF500 1 x Capteur TF.. / LTK, LTA	E1 E2	Régulation de pression avec compensation de la température extérieure
<b>6.01</b>	* Capteur MAL10 / LGF10	E1	Régulation de la vitesse de l'air, par ex. pour installations salles blanches
<b>8.01</b>	1 x Capteur AFS 0-10 V 1 x Capteur AFS 0-10 V	E1 E2	Régulation d'humidité absolue avec 2 capteurs (humidité différentielle)

\* Fonctionnement avec un deuxième circuit de régulation possible

Mode de fonctionnement et signal en E1, E2



23.01.2018  
v\_e1\_e2\_sig\_sens\_eur\_ec.vsd

## 6.2 Fonctionnement avec un deuxième circuit de régulation

La fonction pour le circuit de régulation 1 est déterminée par la sélection du mode de fonctionnement. Celui-ci agit sur la sortie avec la fonction **[2A]**.

Si nécessaire, un deuxième circuit de régulation avec une saisie de valeur effective séparée et une sortie séparée peut être activé.

Le circuit de régulation 2 agit sur la sortie avec la fonction **[8A]**.

- Sortie analogique "A2" (d'origine) IO Setup
- Interface MODBUS Master Menu Participants

Le fonctionnement avec un deuxième circuit de régulation **n'est pas** possible pour les modes de fonctionnement suivants :

**1.01, 1.02, 2.03, 4.02**

Les modes de fonctionnement suivants, qui sont préprogrammés pour le fonctionnement avec un deuxième capteur, peuvent être reprogrammés pour le fonctionnement avec un deuxième circuit de régulation :

**2.04, 2.05**

Le deuxième circuit de régulation est activé via la "fonction E2" pour la deuxième entrée analogique "E2" ( Groupe de menus "Réglage de base").

**Fonctions E2 pour activation circuit de régulation 2 :**


E2 Fonction	Fonction deuxième circuit de régulation	Réglages d'usine	
		E2 Analog In	2. Consigne 1
Température (8E)	Régulation de température Préréglages et sélection du capteur  Mode de fonctionnement <b>2.01</b>	TF / LTR, LTK, LTA	20.0 °C
Froid-Pression (9E)	Fonction non autorisée !	MBG0-30	15.00 bar
Froid-Température (10E)	Fonction non autorisée !	MBG0-30	35.0 °C
Pression d'air (11E)	Régulation de la pression technique de climatisation Préréglages et sélection du capteur  Mode de fonctionnement <b>4.01</b>	DSG200	100.0 Pa
Débit volumétrique (12E)	Fonction non autorisée !	DSG200	44720 m³h
Vitesse de l'air (13E)	Régulation de la vitesse de l'air Préréglages et sélection du capteur  Mode de fonctionnement <b>6.01</b>	MAL1	0.50 m/s

En cas d'activation du circuit de régulation 2, le groupe de menus "Réglage" est élargi.

- Les paramètres supplémentaires pour le circuit de régulation 2 sont précédés d'un "2", par ex. "2.Consigne 1".
- Les paramètres pour le circuit de régulation 1 sont précédés d'un "1.", par ex. "1.Consigne 1".

**Exemple : deuxième circuit de régulation pour la régulation de pression**

E2 Fonction = <b>9E</b> , mode de fonctionnement <b>2.01</b> pour la régulation de température via le circuit de régulation 1	
Réglage	<b>1. Consigne 1</b>
<b>20.0 °C</b> <b>1. Consigne 1</b>	Consigne 1 pour circuit de régulation 1 Plage de réglage pour capteur passif, type "TF", "PT1000" : -50,0...150,0 °C Réglages d'usine : 20.0 °C
Réglage	<b>1. Consigne 2</b>
<b>-----</b> <b>1. Consigne 2</b>	Consigne 2 pour circuit de régulation 1 Réglage "Consigne 2" par ex. pour valeur réduite en mode nuit. Commutation consigne 1/2 via contact externe (tant qu'aucune attribution n'a été effectuée : Affichage : <b>[- - - -]</b> IO Setup).
Réglage	<b>1. Gamme régulation 1</b>
<b>5.0 K</b> <b>1. Gamme régulation 1</b>	Gamme de régulation 1 pour circuit de régulation 1 Plage de réglage pour capteur passif, type "TF", "PT1000" : 0,0...200,0 K Réglages d'usine : 5.0 K
Réglage	<b>1. Vitesse min.</b>
<b>0 %</b> <b>1. Vitesse min.</b>	Vitesse minimale pour circuit de régulation 1 Plage de réglage : 0 rpm... "1. Vitesse max." Réglages d'usine : 15 %
Réglage	<b>1. Vitesse max.</b>
<b>100 %</b> <b>1. Vitesse max.</b>	Vitesse maximale pour circuit de régulation 1 Plage de réglage : 100 %... "Vitesse 1min." Réglages d'usine : 100 %

Réglage	<b>2. Consigne 1</b>
<b>100.0 Pa</b> <b>2. Consigne 1</b>	Consigne 1 pour circuit de régulation 2 Plage de réglage : dans la plage de mesure du capteur Réglages d'usine : 100 Pa
Réglage	<b>2. Consigne 2</b>
<b>-----</b> <b>2. Consigne 2</b>	Consigne 2 pour circuit de régulation 2 Réglage "Consigne 2" par ex. pour valeur réduite en mode nuit. Commutation consigne 1/2 via contact externe (tant qu'aucune attribution n'a été effectuée : Affichage : <input type="text" value="-----"/>  IO Setup).
Réglage	<b>2. Gamme régulation 1</b>
<b>100.0 Pa</b> <b>2. Gamme régulation 1</b>	Gamme de régulation 1 pour circuit de régulation 2 Plage de réglage : dans la plage de mesure du capteur Réglages d'usine : 100 Pa
Réglage	<b>2. Vitesse min.</b>
<b>0 %</b> <b>2. Vitesse min.</b>	Vitesse minimale pour circuit de régulation 2 Plage de réglage : 0. rpm... "2. Vitesse max." Réglages d'usine : 0 %
Réglage	<b>2. Vitesse max.</b>
<b>100 %</b> <b>2. Vitesse max.</b>	Vitesse maximale pour circuit de régulation 2 Plage de réglage : 100 %... "Vitesse 2.min." Réglages d'usine : 100 %
Réglage	<b>Fonct. manuel</b>
<b>OFF</b> <b>1. Fonct. manuel</b>	Fonctionnement manuel pour circuit de régulation 1 "OFF" = Régulation automatique sur la consigne réglée (réglage en usine) "ON" = Régulation automatique hors fonction, consigne de vitesse dans le menu "Vitesse manuelle"
Réglage	<b>Vitesse manuelle</b>
<b>100 %</b> <b>1. Vitesse manuelle</b>	Vitesse manuelle pour circuit de régulation 1 Plage de réglage : 0 rpm... "1. Vitesse max." Réglages d'usine : 100 %

**Extension de fonctions pour entrées numériques "D1" et "D2" en cas de fonctionnement avec un deuxième circuit de régulation**

D1 / D2 Fonction	Description *
<b>E1 / E2 (4D)</b>	La sortie pour le circuit de régulation 2 est mise en plus de "A2" sur "A1" (indépendamment de la fonction programmée pour <input type="text" value="A1"/> ). Le circuit de régulation 1 ne possède pas de sortie pendant la durée de la commutation.
<b>2.Consigne 1/2 (9D)</b>	Pour le circuit de régulation 2 : commutation "consigne 1" / "consigne 2"
<b>2.Co.+Ga.Rég.1/2 (16D)</b>	Pour le circuit de régulation 2 : commutation consigne 1/2 et gamme de régulation 1/2 Lors de la programmation de cette fonction, le paramètre supplémentaire suivant apparaît sous "Réglage" pour le circuit de régulation 2 : "2.Gamme régulation 2"

\* Description détaillée  IO Setup / Entrées numériques "D1" / "D2"