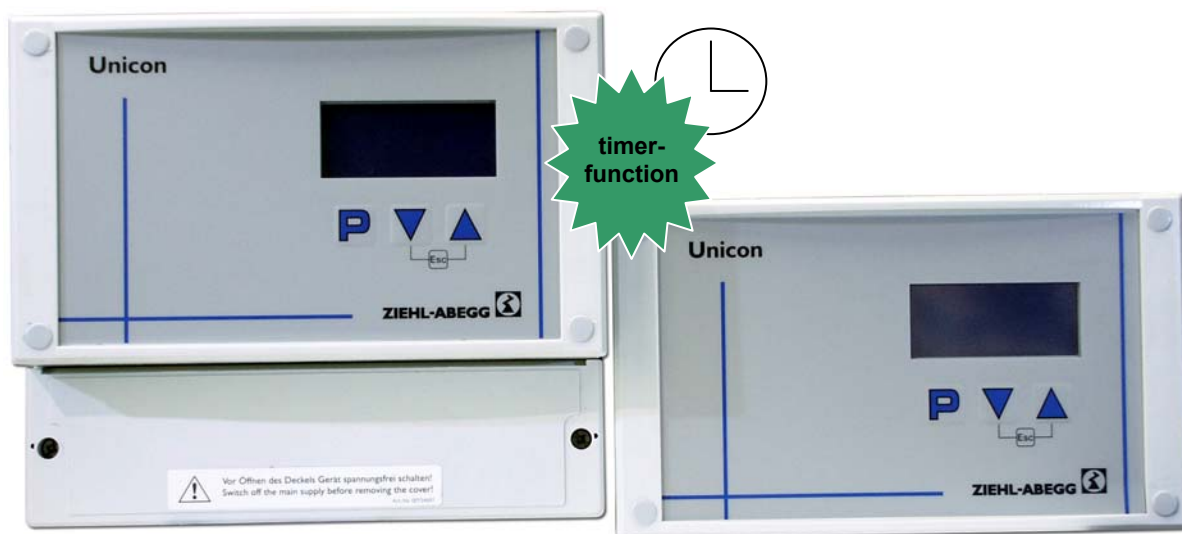


Unicon

Type CXE/AVC (E)

Universal module with timer function



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Software D 1185A03 Part.No. 00162609 from version 1.07

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1. General

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

Attention! Hazardous area!



Danger owing to electric current or voltage!!



Important information!



- The copyright for these operating instructions remains to ZIEHL-ABEGG AG, Künzelsau.
- The device is constructed in accordance with the current state of technology and the recognised safety regulations. Nevertheless, use of the device is associated with dangers which may cause death or injury to users or third parties as well as damage to the system and other objects.
- The device is intended exclusively for the tasks listed in the order confirmation. Any other or extraordinary uses of the device (unless previously agreed by contract) are considered contrary to regulations. The manufacturer is not liable for damages resulting from incorrect use. The operating company alone bears the risk.
- 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.
- The controllers are packed ex factory to suit the transport method previously agreed. Always use the original packaging materials when transporting the controller. When transporting by hand, ensure that personnel possess the strength required to lift and carry the device. Avoid shocks and impacts to the device. Check the packaging and controller for damage.
- Store the controller in its original packaging in a dry and weather-proof room. The device must not be exposed to extreme heat and low temperatures.

2. Safety measures

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.

- Apart from the operating instructions and the obligatory regulations to be followed by users relating to accident prevention, the recognised technical regulations must also be observed (safety and branch-related work as per UVV, VBG, VDE, etc.).
- These devices are potentially dangerous if they are used incorrectly by untrained personnel or are not implemented according to their specified use.
- **Work on electric components/modules may only be carried out by trained electricians in accordance with electro-technical regulations (e.g. EN 60204, DIN VDE 0100/0113/0160).**
- 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 are operated in perfect working order only.
- **It is forbidden to carry out work on electrically live parts. The rating given in the enclosure for the device when open is IP00! It is possible to inadvertently touch components carrying hazardous voltages!**
- 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 (☞ Technical data). Use only fuses specified in schematic diagrams.
- The safe isolation from the supply must be checked using a two-pole voltage detector.
- 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.

3. General description

3.1 Scope of applications

Universal controller for clean room, refrigeration and air conditioning

Controlled 0-10 V „A1“ (Analog OUT 1) output e.g. for electronic speed controllers of fans

3.2 Technical data

Type	Part.No	line voltage	internal device fuse	Weight
CXE/AVC	320006	1~ 110 .. 277 V (-15 % bis +10 %), 50/60 Hz	T 400 mA (5x20 mm) Art.Nr. 00153002	1.05 kg
CXE/AVCE	320008			0.85 kg
CXE/AVC	320007	2~ 208 .. 415V (-15 % bis +10 %), 50/60 Hz	T 400 mA (6,3 x 32mm) Art.Nr. 00153840	1.05 kg

- Input resistance for sensor or signal set for the rotational speed:
- for 0-10 V input: $R_i > 100 \text{ k}\Omega$ / - bei Eingang 4-20 mA: $R_i = 100 \Omega$
- Voltage supply e.g. for sensors $+24 \text{ V} \pm 20 \%$, $I_{\max} 120 \text{ mA}$ (for connection to an external AXG terminal minus ca. 50 mA)
- Output (0-) 10 V, $I_{\max} 10 \text{ mA}$ (short-circuit-proof)
- Heat dissipation approx. 6.5 W
- Max. line fuse 10 A
- The clock is buffered and has a 2-3 day reserve
- Max. permissible ambient temperature 40° C
- Min. permissible ambient temperature 0° C (if mains voltage is not switched off up to -20° C)
- Permissible rel. humidity 85 % no condensation
- Interference emission EN 61000-6-3
- Interference immunity EN 61000-6-2

3.3 Versions Unicon

Type CXE/AVC Housing version IP54 for wall mounting

Type CXE/AVCE for panel mounting (IP54 mounted)

4. Installation

4.1 Wall-mounting, installation in a switching cabinet

- For CXE/AVC Housing version for wall mounting
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!
- For CXE/AVCE for panel mounting
The installation cutout of the controller amounts to 206 x 118 mm (⌀ dimensions). Bring the controller into the installation cutout and hang up you the enclosed clamps laterally. Subsequently, you screw the threaded rods with a screwdriver against the housing.
- Do not mount equipment on vibrating base!
- Install the device away from transport routes. However, ensure however that the device is still easily accessible!
- Cable ducts must remain freely accessible!
- Protect the device from direct exposure to sunlight!
- The device is designed for vertical installation A reclined installation is only permissible after consultation with the manufacturer.

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

In order to avoid damage caused by ammoniac vapours (NH₃), the controller shall not be installed in the stable, but rather in an outhouse wherever possible.

4.4 Temperature influences during commissioning

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

4.5 Potential at control voltage connections

The control voltage connections (<50 V) relate to the joint GND potential (Exception: Relay contacts are potential free). There is a potential separation between the control voltage connections and the earthed conductor.

It must be ensured that the maximum external voltage at the control voltage connections cannot exceed 50V (between „GND“ terminals and „PE“ earthed conductor).

5. Electrical connections

5.1 Mains connection

Power from the mains is connected to terminals: PE, L1 and N. Here, it must be strictly observed that the mains voltage lies within the allowable tolerance specifications (☞ General description: Technical data and nameplate affixed to the side).

The supply voltage has to correspond to DIN EN 50160!

5.2 Signal cable (sensor cable)

Pay attention to sufficient distance from powerlines and motor wires to prevent interferences.

The control cables 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 screened cable, the screen must be connected to the protective conductor at one end, i.e. only at the control unit (as short and of as low an inductance as possible!).

5.3 Signal connection to analog inputs (Analog IN1, Analog IN2, ..)

The controller can work with 2 analog inputs, dependent on the type of signals must the appropriate terminals connected.

Signal type	Connection terminals
Input 1 for Temperature sensor TF..	7 – 8 (to pay attention to no polarity)
Input 2 for Temperature sensor TF..	9 - 10 (to pay attention to no polarity)
Input 1 for 4..20mA (0..20mA)	11 - *12 (with Two-wire-technology)
Input 2 for 4..20mA (0..20mA)	13 - *14 (with Two-wire-technology)
Input 1 for 0-10 V	15 (+) - 16 (GND)
Input 2 for 0-10 V	17 (+) - 18 (GND)

Ensure correct polarity when connecting; a 24 V DC power supply is integrated for sensors.

*For sensors in two-wire-technology (4-20 mA signal), the connection is made on the +24 V and terminals „11“ (Input 1) or „13“ (Input 2) the GND terminal is omitted.

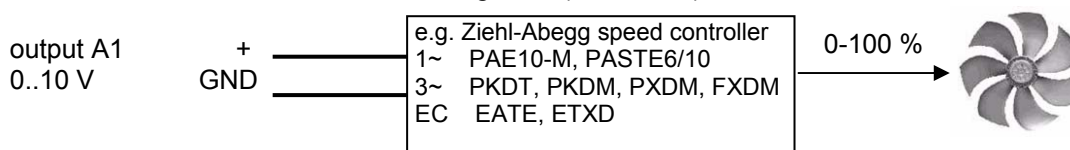
For three wire technology connection to GND terminal is necessary (terminals 8,10,16,18)

The connection is independent of the programmed operating mode and from the sensor signal employed (☞ Presets of the selected operating mode).

5.4 Output voltage 0-10 V (Analog OUT1 und Analog OUT2)

Analog output 1 (Analog OUT 1) is pre-programmed control outpute.g. for controlling a speed controller for fans.

Connection to terminal „A“ - „GND“ = Analog OUT ($I_{\max}$ 10 mA)



Analog output 2 (Analog OUT 2) is pre-programmed for constant voltage +10 V. E.g. supply for external potentiometer connection to terminals „A2“ - „GND“ = Analog OUT 2 ($I_{\max}$ 10 mA)

Both 0-10 V analog outputs can be allocated with various functions (☞ IO Setup: Analog output A1 or A2).

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

A voltage supply is integrated for external devices, e.g., for a sensor.

Terminal +24 V Output voltage tolerance $\pm 20\%$.

Max. load current 120 mA (for connection to an external AXG terminal minus ca. 50 mA)

During an overload or short-circuit (24 V $\leftrightarrow$ GND), the control voltage (and thus the controller) is disconnected (Multifuse). Automatic start after elimination of the cause of error

5.6 Relay outputs (K1, K2)

Various functions can be allocated to the relay outputs K1 and K2

(☞ IO Setup: Function and inversion of the relay outputs). Max. contact load 5A / 250 V AC

Connection of the floating contacts of relay K1 to the terminals 1, 2, 3

Connection of the floating contacts of relay K2 to the terminals 4, 5, 6

5.7 Digital inputs (D1 .. D5)

Various functions can be allocated to the digital inputs D1 .. D5

(☞ IO Setup: Functions summary of the digital inputs).

Activation via floating contacts (a low voltage of ca. 24 V DC is connected).



Never apply external voltage to the digital inputs!

5.8 Connection RS-485 interface for MODBUS

The device comes equipped via a RS-485 interface for networking via a MODBUS. The data connection lead is connected to **D+**, **D-** and **GND**.

The data connector spring-loaded contact is suitable for solid conductors of up to 0.5 mm² cross-section or 0.8 mm diameter. The stripped lead makes contact by itself upon insertion. The orange colored latch only needs to be pushed in the case of smaller cross-sections or when detaching the connections.



You must ensure correct connection; i.e. „**D+**“ must also be connected on the following devices to „**D+**“. The same applies to „**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).



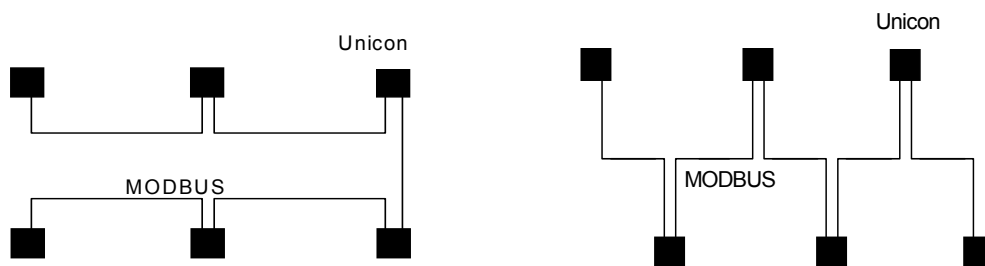
The data line must be conducted from one device into the next. To do this, two connectors are available in each device. No other type of wiring is allowed.

Always use only two wires of one lead for the connection.

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

„**D+**“ = red „**D-**“ = black „**GND**“ = white

Examples:



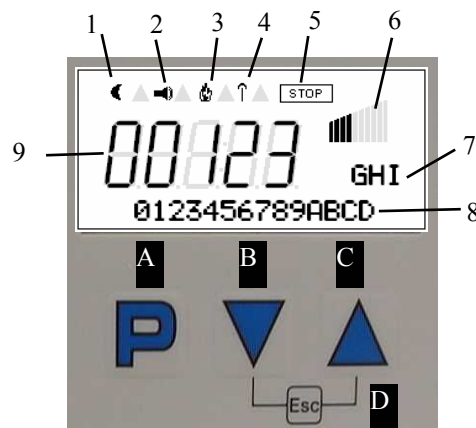
A maximum of 247 network users can be connected to the data bus .

6. Controls

6.1 Multipurpose LC display

- 1 Moon-Symbol for set point 2
- 2 Alarm-Symbol (fault indication)
- 3 Fire-Symbol (heating operation)
- 4 Antenna-Symbol (Remote-Control active)
- 5 STOP-Symbol (enable)
- 6 Bargraph (intern control output)
- 7 Text line 3 figures (display unit, etc.)
- 8 Text line 16 figures (display text menu.)
- 9 Numeric display 5 digit

- A** P-key (program key, open menu)
- B** arrow -down-key (Menu down, reduce value)
- C** arrow-up-key (Menu up, increase value)
- D** ESC-key combination (↑ + ↓)
Escape, leave menu)

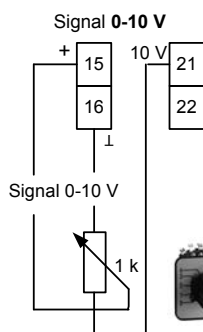


7. Connection terminals depending on input signal

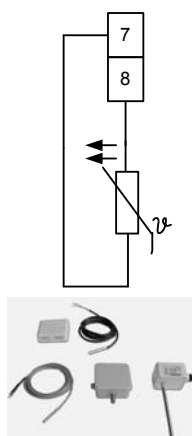
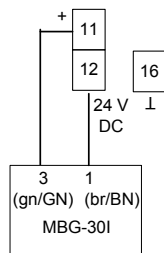
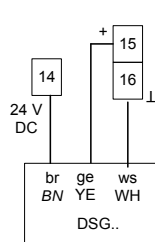
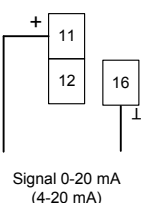
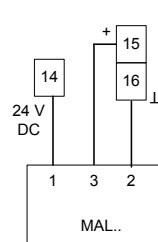


Dependet ont the type of signal must the appropriate terminals connected. If necessary configuration of sensors in menu „E1 Analog IN“ or „E2 Analog IN“ .

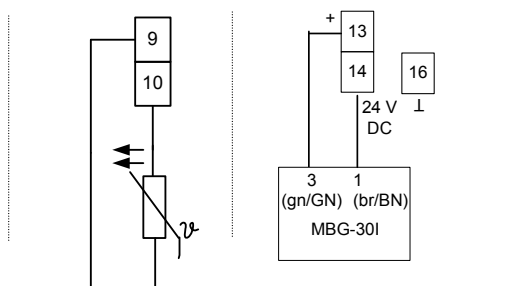
Analog IN 1 „E1“



Sensor TF..(KTY)

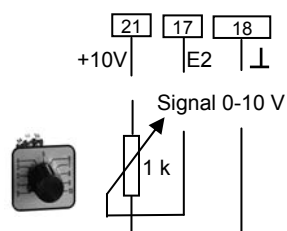
Sensor MBG-30I
4-20 mASensor DSG..
0-10 VSensor MAL1/10
0-10 V

Analog IN 2 „E2“ for modes with two sensors



7.1 External Setpoint / External speed setting in manual operation

External Setpoint or external manual operation is possible by 0-10 V (0-20 mA, 4-20 mA) Signal at terminals „E2“ and „GND“. Place internal Jumper E2.1 and E2.2 for Analog IN 2 in correct position. Configuration in base setup. For Potentiometer Analog OUT 1 (terminal „A“) program to function 1A = +10 V (like factory setting ⚙ IO Setup). If a second sensor is connected at input 2, external Setpoint or speed setting in manual operation is possible with additional modul „ZmodulB“ (input E3).



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 **E2 function**. Switchover between settings on the device and external manual operation via the digital input or imer (⚙ IO Setup: Internal / External or timer).

8. Mode selection**8.1 Selection of the mode of operation**

Simple installation is possible through the selection of the preprogrammed mode of operation. 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 (→ 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.

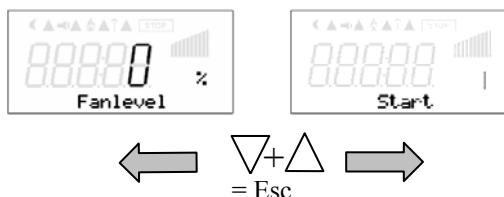
Mode	Signal or Sensor (input)	Function
1.01	Signal 0-10 V(E1)	Speed controller, two step operation (factory setting)
2.01	Sensor TF..(E1)	Temperature control airconditioning and refrigeration (preset set-point 20.0 °C, P-band 5K)
2.02	Sensor TF..(E1)	Temperature control depending on outdoor temperature (preset set-point 5.0 °C, - P-band 20 K)
2.03	Sensor TF..(E1)	Temperature control with additional functions (shutter and heating)
2.04	1x Sensor TF..(E1) 1x Sensor TF..(E2)	Temperature control with two sensors, comparison or average
2.05	1x Sensor TF..(E1) 1x Sensor TF..(E2)	Temperature control with two sensors differential temperature
3.01	Sensor MBG.. (E1)	Pressure control condensers (refrigeration)
3.02	Sensor MBG..(E1)	Pressure control for condensers with input for refrigerant
3.03	1x Sensor MBG..(E1) 1x Sensor MBG..(E2)	Pressure control for two circuit condensers
3.04	1x Sensor MBG..(E1) 1x Sensor MBG..(E2)	Pressure control for two circuit condensers with input for refrigerant
4.01	Sensor DSG..(E1)	Pressure control for ventilation systems
4.02	1x Sensor DSG..(E1) 1x Sensor TF..(E2)	Pressure control depending on outdoor temperature
5.01	Sensor DSG..(E1)	Volume control (constant) for ventilation systems
5.02	1x Sensor DSG..(E1) 1x Sensor TF..(E2)	Volume control with setpoint depending on outdoor temperature
6.01	Sensor MAL.. (E1)	Air velocity control

8.2 Menu operation

Display after turning on the mains voltage

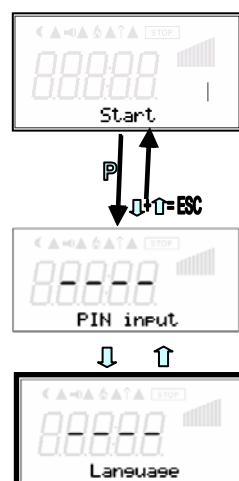


Switch-over between **Fanlevel** and **Start** or **actual value** with the key shortcut for Escape (Esc = ↑ + ↓).



Example for mode **1.01** language English

One reaches the menu item **START** by pushing the **P** key.
One moves up and down within the menu group using the arrow keys.
One returns to the menu group using the **ESC** (↑ + ↓) shortcut keys.



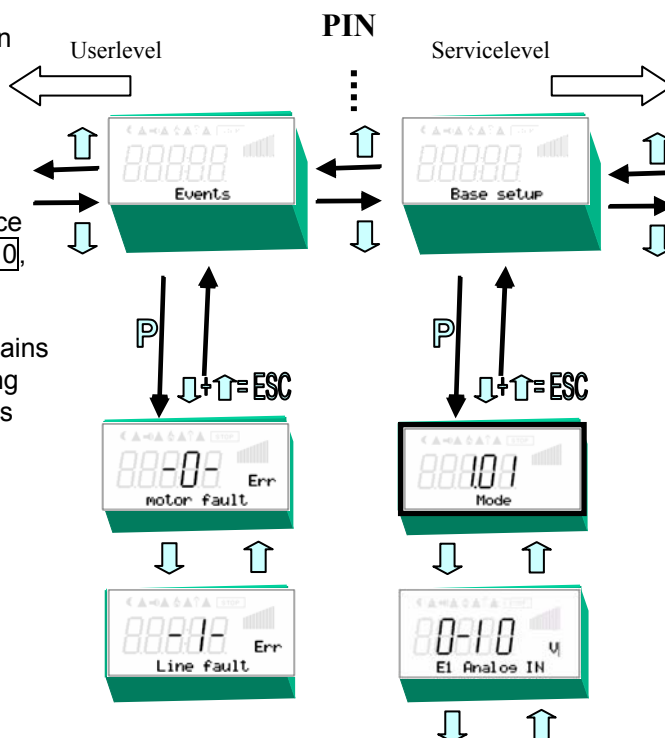
Selection of the menu group to the right through the down key, to the left through the up key.

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.

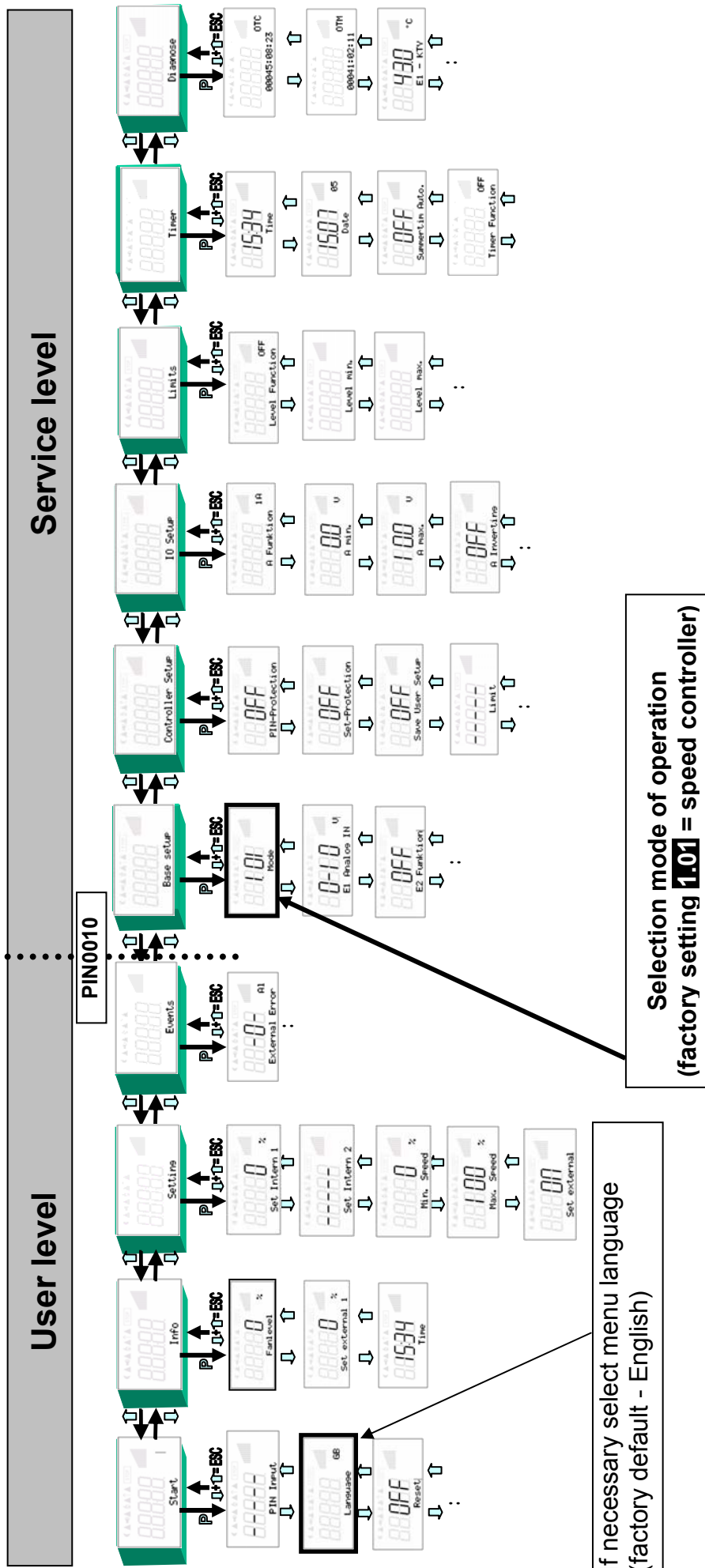
In order to simplify the initial start-up operation, the service level is enabled at first (i.e., not protected by the **PIN 0010**, see Controller Setup, PIN protection = OFF).

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.



After installation of the device has been carried out, PIN protection should be activated!





Caution! When saving the operating mode, the respective preset factory operating-mode setting is loaded. That means, the settings you have made, e.g., in „Motor setup“ are lost. An exception: the menu language setting remains preserved.



9. Programming

9.1 Speed controller 1.01

9.1.1 Basic setting 1.01



↓P ↑ESC



Factory setting Mode **1.01**

↓ ↑



Factory setting 0-10 V
Selection : 0-20 mA, 4-20 mA,
Bus
Inverting in IO Setup

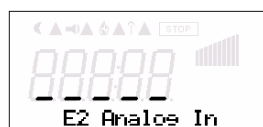
↓ ↑



Analog input 2 „E2“ factory set at
OFF

- For operation with a second signal and switch over via floating contact (☞ IO Setup) set to function **1E**.
- For operation with a second signal and automatic control at the higher level. Set E2 Funktion to **4E**.

↓ ↑



9.1.2 Setting for operation 1.01



↓P ↑ESC



Manual speed setting
Set Internal 1

↓ ↑



Set internal 2
Switch over 1/2 by external contact

↓ ↑



Minimal speed
0 - 100 %

↓ ↑



Maximal speed
100% - Min.

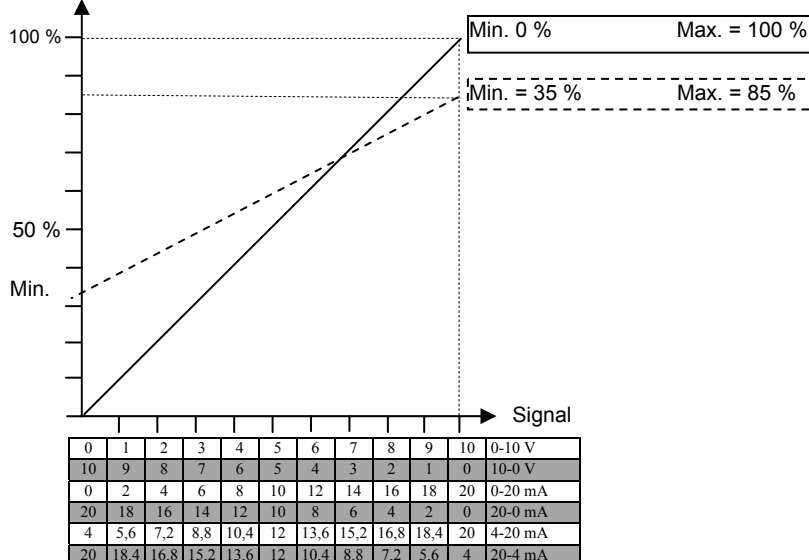
↓ ↑



ON = (factory setting)
speed setting by external signal
OFF =
Set internal 1

Diagram default signal and output voltage
Idealized principle diagram

0-100% = 0-10V



9.1.3 Menu speed controller **1.01**

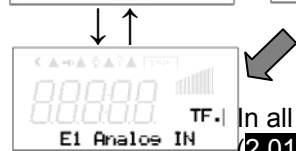
	Parameter	Factory setting	User Setting		
Start	PIN Input	.----			
	Language	GB			
	Reset	OFF			
	Mode	1.01			Only Display
	Unicon	1.06			
Info	Fanlevel	0%			
	Set external 1	0%			
	Time	12:06			
	Date	18.07.05			
Setting	Set Intern 1	80%			
	Set Intern 2	.----			
	Min. Speed	0%			
	Max. Speed	100%			
	Set external 1	ON			
Events	External Error	*			
		*			
		*			
INSTALLATION					
Base setup	Mode	1.01			
	E1 Analog IN	0-10V			E2 Function
	E2 Function	OFF		1E	E1/E2 switch over
	E2 Analog IN	.----		4E	E1/E2 autom. control to higher value
Controller Setup	PIN Protection	OFF			
	Set protection	OFF			
	Save User Setup	OFF			
	Limit	.----			
	ON Value Group 2	.----			
	nmim at Group 2	.----			
IO Setup	A1 Function	2A			A1 / A2 Function
	A1 min.	0.0 V		1A	Constant voltage + 10V
	A1 max.	10.0 V		2A	proportional modulation
	A1 Inverting	OFF		3A	proportional signal E1
	A2 Function	1A		4A	proportional signal E2
	A2 min.	0.0 V		5A	Group control
	A2 max.	10.0 V			
	A2 Inverting	OFF			
	D1 Function	OFF			D1..D5 Funktion
	D1 Inverting	.----		1D	Enable ON / OFF
	D2 Function	OFF		2D	External fault
	D2 Inverting	.----		3D	Limit ON / OFF
	D3 Function	OFF		4D	Switch over Singnal E1/E2
	D3 Inverting	.----		5D	switch over Intern 1 / 2
	D4Function	OFF		6D	switch over:Set Intern / Extern
	D4 Inverting	.----			
	D5 Function	OFF			K1 / K2 Function
	D5 Inverting	.----		1K	Operation indication
	E1 Inverting	OFF		2K	Fault indication
	E2 Inverting	.----		3K	external fault
	K1 Function	1K		4K	Limit modulation
	K1 Inverting	OFF		5K	Limit E1
	K2 Function	2K		6K	Limit E2
	K2 Inverting	OFF		8K	Group control
	BUS Address	247			
Limits	Level. Function	OFF			Limits (Lmt. Function)
	Level min.	.----		1L	Indication with centralized fault
	Level max.	.----		2L	Indication as message
	Level Delay	.----			
	Lmt E1 Function	OFF			
	Lmt E1 min.	.----			
	Lmt E1 max.	.----			
	Lmt E1 Hyst.	.----			
	Lmt E1 Delay	.----			
	Lmt E2 Function	.----			
	Lmt E2 min.	.----			
	Lmt E2 max.	.----			
	Lmt E2 Hyst.	.----			
	Lmt E2 Delay	.----			
Timer	Time	13:25			
	Date	18.07.05			
	Summertime Auto.	OFF			
	Timer Function	OFF			
	Mon				
	Mon ON1	--:--			
	Mon OFF1	--:--			
	Mon ON2	--:--			
	Mon OFF2	--:--			

Diagnostics

Menu see chapter 16

9.2 Temperature control **2.01..2.05**9.2.1 Basic setting **2.01..2.05**

↓ P ↑ ESC



In all group 2 operating modes
(**2.01**, **2.02**, **2.03**,)
E1 analogue input IN factory set
to „TF“

Alternative selection signal: 0-10 V, 0-20 mA, 4-20 mA, jumper accordingly inserted. The sensor measurement-range must be entered in order to correctly display the actual value. Example with a 0-10 V sensor and 0-100° C measurement range



Initial value measuring range



Final value measuring range



Decimal places



display unit



Sensor calibration with calibrated
comparison device

Function analog Input 2



- External setpoint = Function **1E**
by external signal (0-10 V) instead of
„Set point 1“
For sensor type „E1 TF“: 0-10 V $\hat{=}$ -27°C..+75.0°C

For sensors with active signal:
0-10 V $\hat{=}$ 0-100 % sensor measuring range

- External manual operation via external signal (0-10V) =
function **2E**
Switch over between settings on the device and external
manual operation via digital input (☞ IO Setup).

- **Measurement value = function 7E**
e.g. for limit indication, display in Info menu “E2 actual”

- Modes with two sensors
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.

2.04

E2 Function at **4E** preprogrammed = comparison value with
control to higher temperature.
alternative: average of 2 measuring points for this must be
reprogrammed on function **3E** preprogrammed sensor type
TF..

2.05

E2 Function at **5E** preprogrammed = regulation on
difference temperature between sensor 1 and sensor 2.
Preprogrammed sensor type TF..

9.2.2 Settings for operation modes 2.01 .. 2.05

2.01

Temperature control

2.02

Temperature control depending on outdoor temperature

2.03

Temperature control with additional functions (heating, shutter, temp. monitoring)

2.04

Temperature control with two 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 Display during operation: "Average E1 / E2 („E2 Function“ set to „3E“)

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>E1) difference



↓ P ↑ ESC

**Setpoint 1**

Setting range: -27.0 .. 75°C

↓ ↑

**Setpoint 2**

„Setpoint 2“ (factory setting OFF)

e.g. reduced value for night operation. Switch over by digital input.

(As long as no allocation has been carried out: Display: - - - - IO Setup).

↓ ↑

**Pband (Control range)**

The control response can be adjusted to the system conditions

- small control range = greater amplification and shorter control times
- big control range = longer control times and higher controller stability

Setting range: 0-102,0 K

↓ ↑

**Min. Speed „n-min“ (minimum output voltage)**

If required setting of a minimum output voltage e. g. basic speed (minimum airflow rate) of fans.

Setting range: 0 % up to 100 % (or Max. speed).

↓ ↑

**Max. Speed „n-max“ (maximum output voltage)**

If required setting of a maximum output voltage, e. g. speed limiter.

Setting range: 100 % down to „Min speed“.

↓ ↑

**Manual mode**

OFF = automatic control as function of the set parameters

ON = automatic control without function, speed setting in menu "Speed manual"

↓ ↑

**Speed manual**

Manual speed setting without influence by the external signal

Activation by menu „Manual mode“ or external contact at digital input (IO Setup).

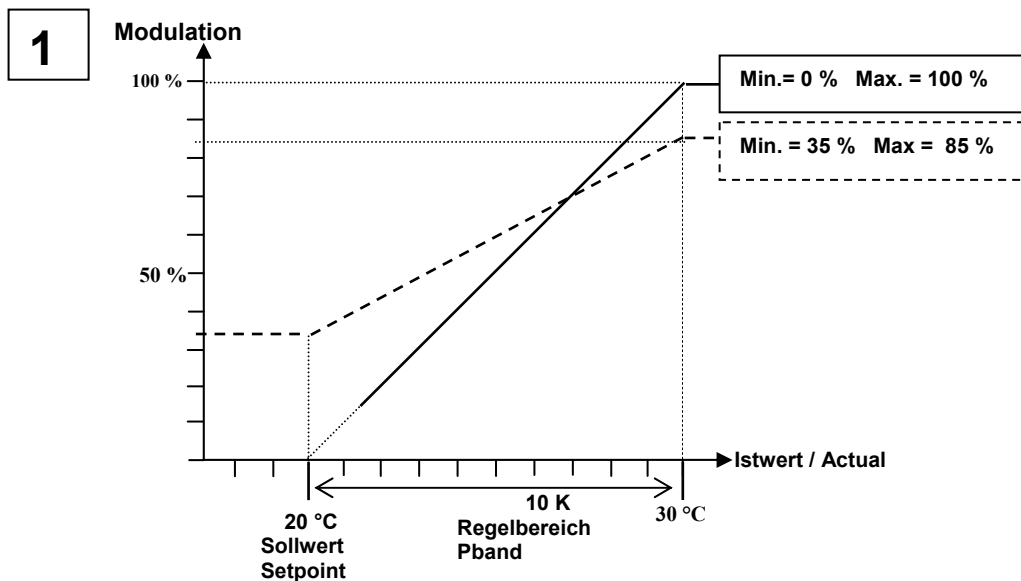
For information about deactivated regulation the adjusted value for manual speed is indicated alternating with the actual value

9.2.3 Functional diagrams temperature control

Example 1:

Temperature control in **factory setting** „Cooling function“ (Controller Setup: $Ist > Soll = n+$ ☐ ON)

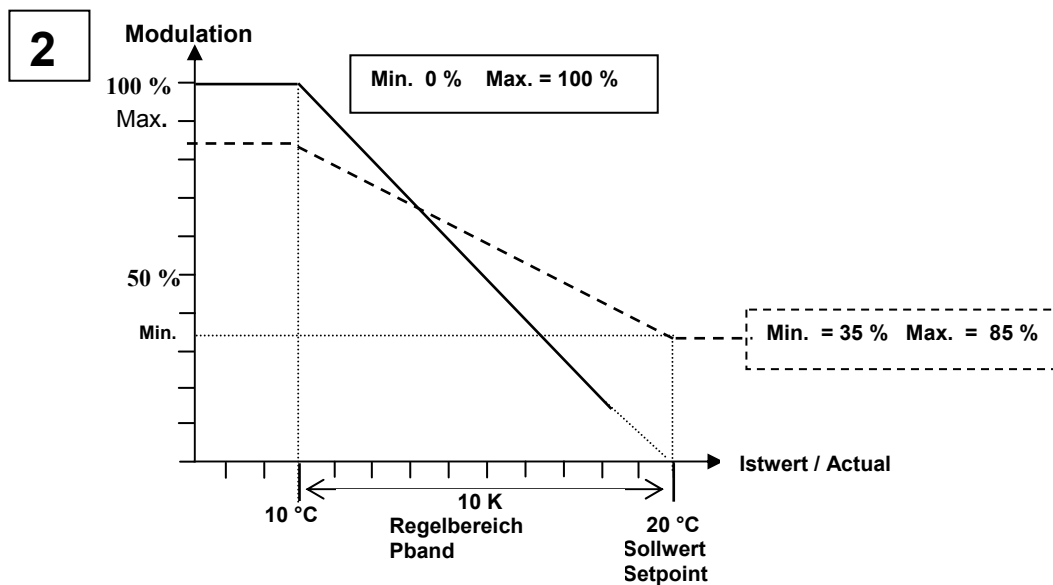
(Idealized principle diagram)



Example 2:

Temperature control in „Heating function“ (Controller Setup: $Ist > Soll = n+$ OFF)

(Idealized principle diagram)



9.2.4 For mode 2.03 temperature controller with additional functions: Signal output 0-10 V

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



The target value for this output is the target value (Setpoint) for the ventilation $\pm$ offset setting. Adjustment range ± 10 K relative to the active Setpoint.

Example for triggering a shutter servomotor:

At factory setting „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 (☞ IO Setup).

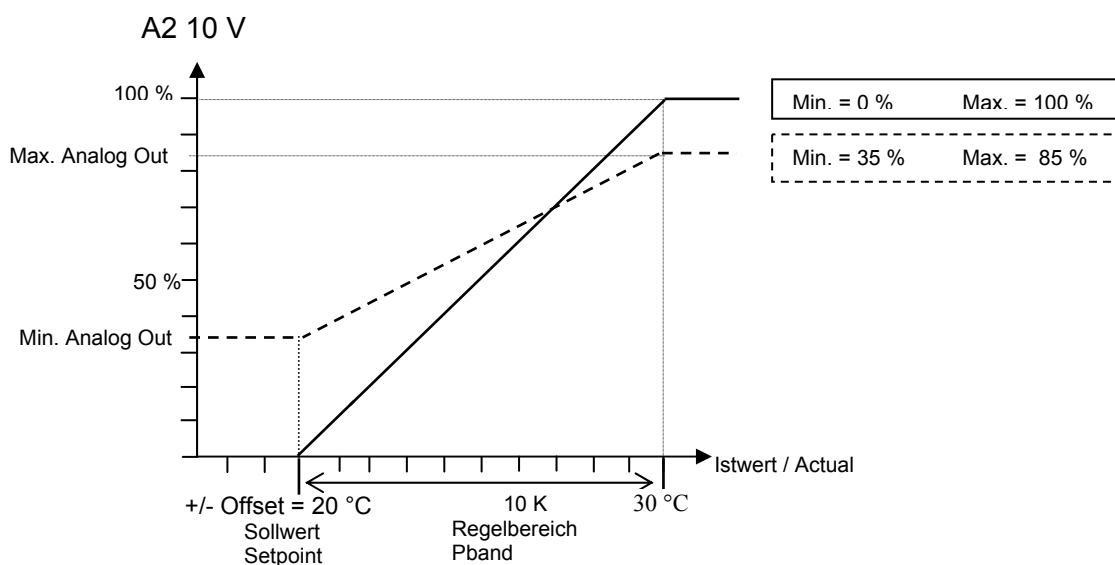
Pband = separately adjustable range of control (P-band) for 0-10 V output

Min Analog Out = Minimal output voltage, setting range 0-100 % = 0-10 V

Max. Analog Out = Maximal output voltage, setting range 100-0 % = 10-0 V

Example for signal out 0-10 V

- Setpoint ventilation 25°C
- Offset -5 K
- Pband 10 K



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

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).

0.0 K set, i.e.

heating „ON“ when: actual value = Setpoint

During negative offset value

heating „ON“ when: actual value = Setpoint - offset

During positive offset value

heating „ON“ when: actual value = Setpoint + offset



The switching hysteresis of the relay is set to 1 K at factory **Hyst. Digital Out**.

Example 1**Temperature variation with factory setting **9 K** 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, the heating is switched off. I.e., the release point is situated at the hysteresis value over the operating point.

The activated heating is indicated over the fire symbol in the display

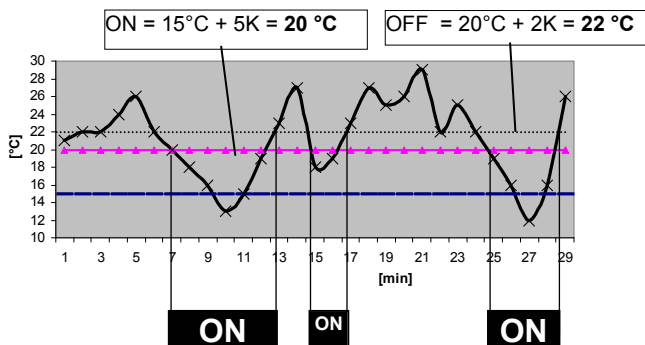
**Example 2****Temperature variation with reprogramming to **10K** in IO Setup, e.g., for activation of the **cooling****

If the ambient temperature is higher than the set operating point, the cooling remains switched on.

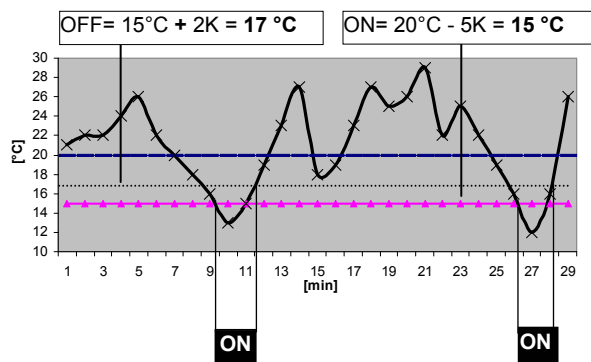
If the ambient temperature falls below the set operating point of the cooling by 2 K, it is switched off. I.e., the OFF point is situated at the hysteresis value under the ON point.

IO Setup K2 Function for **Heating = **9K****

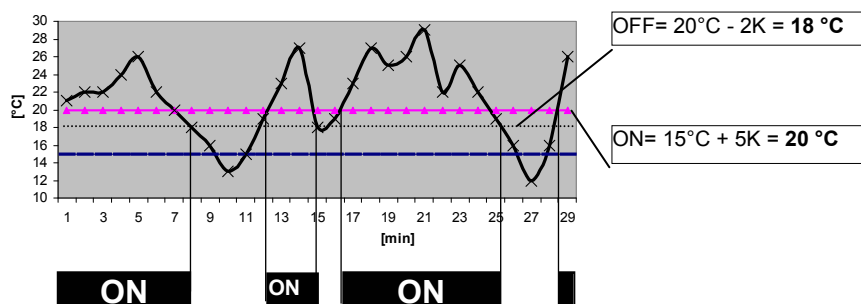
Example 1: Setpoint 15°C, Offset +5K, Hysteresis 2 K



Example 1: Setpoint 20°C, Offset -5K, Hysteresis 2 K

**IO Setup K2 Function for **Cooling** = **10K****

Example 2: Setpoint 15°C, Offset +5K, Hysteresis 2 K

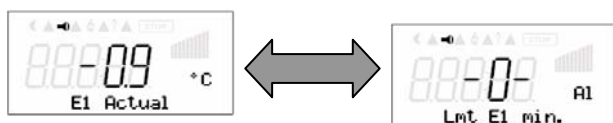


9.2.6 For mode 2.03 Relay output for temperature monitoring

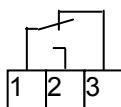
If the set value for the minimum alarm is not reached or the set value for the maximum alarm is exceeded, a message is generated via the alarm symbol in the display. In addition, „Lmt E1 min“ is displayed alternately with the actual value for the minimum alarm and Lmt E1 max for the „Maximum alarm“.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



Example for display if temperature is falling below setting „Alarm Minimum“

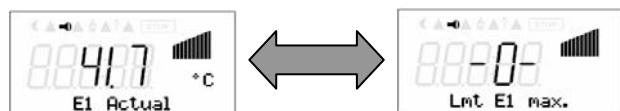


Relay K1 disengages (if not inverted)

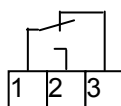


K1

Example for display if temperature is exceeding setting „Alarm Maximum“



Relay K1 disengages (if not inverted)



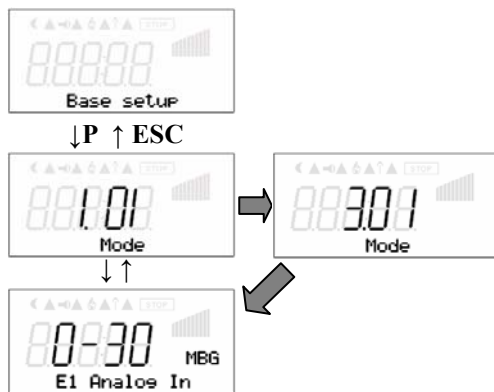
K1

	Parameter	factory setting					User Setting
Start	PIN Input	----	----	----	----	----	
	Language	GB	GB	GB	GB	GB	
	Reset	OFF	OFF	OFF	OFF	OFF	
	Mode	2.01	2.02	2.03	2.04	2.05	
	Unicon	1.06	1.06	1.06	1.06	1.06	
Info	Value E1-E2					-2.4°C	
	Control value				26.1°C		
	E1 Actual	30°C	10°C	30.0°C	22.9°C	21.9°C	
	E2 Actual	----	----	----	26.1°C	24.3°C	
	Setpoint 1	20.0°C	5.0°C	20.0°C	20.0°C	0.0°C	
	Fanlevel	0,5	0,25	0,5	1	0	
	Msc0.	OFF	OFF	OFF	OFF	OFF	
	Time	12:06	12:06	12:06	12:06	12:06	
	Date	18.07 05	18.07 05	18.07 05	18.07 05	18.07 05	
	Setting	Setpoint 1	20.0°C	5.0°C	20.0°C	20.0°C	0.0°C
Setpoint 2		----	----	----	----	----	
Pband		5.0 K	20.0 K	5.0 K	5.0 K	5.0 K	
Min. Speed		0%	0%	0%	0%	0%	
Max. Speed		100%	100%	100%	100%	100%	
Manual mode		OFF	OFF	OFF	OFF	OFF	
Speed manual		100%	100%	100%	100%	100%	
Offset AnalogOut				0.0K			
Pband AnalogOut				2.0K			
Min. AnalogOut				0%			
Max. AnalogOut				100%			
OffsetDigitalOut				-1.0K			
Hyst.DigitalOut				1.0K			
Alarm Minimum				0.0°C			
Alarm Maximum				40.0°C			
Events		External Error	*	*	*	*	
	Sensor 1	*	*	*	*		
INSTALLATION							
Base setup	Mode	2.01	2.02	2.03	2.04	2.05	
	E1 Analog IN	TF	TF	TF	TF	TF	
	E1 Min.	----	----	----	----	----	2.01 Temperature control
	E1 Max.	----	----	----	----	----	
	E1 Decimals	----	----	----	----	----	2.02 Temperature control depending on outdoor temperature
	E1 unit	----	----	----	----	----	
	E1 Offset	0.0K	0.0K	0.0K	0.0K	0.0K	2.03 Temperature control with additional functions: Heating, shutter, temp. Monitoring
	E2 Function	OFF	OFF	OFF	4E	5E	
	E2 Analog IN	----	----	----	TF	TF	
	E2 Min.	----	----	----	----	----	2.04 Temperature control with two Sensors comparison with control to higher value average calculation of 2 measuring places
	E2 Max.	----	----	----	----	----	
	E2 Decimals	----	----	----	----	----	
	E2 unit	----	----	----	----	----	
E2 Offset	----	----	----	0.0K	0.0K	2.05 Temperature control of 2 sensors regulation on difference temperature	
Controller Setup	PIN Protection	OFF	OFF	OFF	OFF	OFF	
	Set protection	OFF	OFF	OFF	OFF	OFF	
	Save User Setup	OFF	OFF	OFF	OFF	OFF	
	Alarm Sensors	OFF	OFF	OFF	OFF	OFF	
	Limit	----	----	OFF	----	----	
	Msc0.	OFF	OFF	OFF	OFF	OFF	
	ON Value Group2	----	----	----	----	----	
	nminm bei Gruppe2	----	----	----	----	----	
	Val>Set = n+	ON	ON	ON	ON	ON	
	Type of control	P	P	P	P	P	
	KP	50%	50%	50%	50%	50%	
	KI	50%	50%	50%	50%	50%	
KD	50%	50%	50%	50%	50%		
TI	0%	0%	0%	0%	0%		

		2.01	2.02	2.03	2.04	2.05	User Setting		
		2A	2A	2A	2A	2A		A1 / A2 Function	
IO Setup	A1 Function	2A	2A	2A	2A	2A		1 A	Constant voltage + 10V
	A1 min.	0.0 V	0.0 V	0.0 V	0.0 V	0.0 V		2 A	proportional modulation
	A1 max.	10.0 V	10.0 V	10.0 V	10.0 V	10.0 V		3 A	proportional signal E1
	A1 Inverting	OFF	OFF	OFF	OFF	OFF		4 A	proportional signal E2
	A2 Function	1A	1A	6A	1A	1A		5 A	Group control
	A2 min.	0.0 V	0.0 V	0.0 V	0.0 V	0.0 V		6 A	only 2.03 cooling
	A2 max.	10.0 V	10.0 V	10.0 V	10.0 V	10.0 V		7 A	only 2.03 Heating
	A2 Inverting	OFF	OFF	OFF	OFF	OFF			
	D1 Function	OFF	OFF	OFF	OFF	OFF		D1..D5 Funktion	
	D1 Inverting	.----	.----	.----	.----	.----		1 D	Enable ON / OFF
	D2 Function	OFF	OFF	OFF	OFF	OFF		2 D	External fault
	D2 Inverting	.----	.----	.----	.----	.----		3 D	Limit ON / OFF
	D3 Function	OFF	OFF	OFF	OFF	OFF		4 D	Switch over Singnal E1/E2
	D3 Inverting	.----	.----	.----	.----	.----		5 D	switch over Setpoint 1 / 2
	D4Function	OFF	OFF	OFF	OFF	OFF		6 D	switch over: Set Intern / Extern
	D4 Inverting	.----	.----	.----	.----	.----		7 D	Controlling / Manual intern
	D5 Function	OFF	OFF	OFF	OFF	OFF		8 D	switch over: ActualValue>Set=n+/-n-
	D5 Inverting	.----	.----	.----	.----	.----			
	E1 Inverting	OFF	OFF	OFF	OFF	OFF		K1..K4 Funktion	
	E2 Inverting	.----	.----	.----	.----	.----		1 K	Operation indication
	K1 Function	1K	1K	1K	1K	1K		2 K	Fault indication
	K1 Inverting	OFF	OFF	OFF	OFF	OFF		3 K	external fault
	K2 Function	2K	2K	9K	2K	2K		4 K	Limit modulation
	K2 Inverting	OFF	OFF	OFF	OFF	OFF		5 K	Limit E1
	BUS Address	247	247	247	247	247		6 K	Limit E2
Limits	Level. Function	OFF	OFF	OFF	OFF	OFF		7 K	Setpoint Offset
	Level min.	.----	.----	.----	.----	.----		8 K	Group control
	Level max.	.----	.----	.----	.----	.----		9 K	only 2.03 heating funktion
	Level Delay	.----	.----	.----	.----	.----		10 K	only 2.03 cooling funktion
	Lmt E1 Function	OFF	OFF	1L	OFF	OFF			
	Lmt E1 min.	.----	.----	0.0°C	.----	.----		Limits (Lmt. Function)	
	Lmt E1 max.	.----	.----	40.0°C	.----	.----		1 L	Indication with centralized fault
	Lmt E1 Hyst.	.----	.----	1.0K	.----	.----		2 L	Indication as message
	Lmt E1 Delay	.----	.----	2sec	.----	.----			
	Lmt E2 Function	.----	.----	.----	.----	.----			
	Lmt E2 min.	.----	.----	.----	.----	.----			
	Lmt E2 max.	.----	.----	.----	.----	.----			
	Lmt E2 Hyst.	.----	.----	.----	.----	.----			
	Lmt E2 Delay	.----	.----	.----	.----	.----			
	Offset Function	OFF	OFF	OFF	OFF	OFF			
	Offset 1	.----	.----	.----	.----	.----			
	Offset 2	.----	.----	.----	.----	.----			
	Offset Hyst.	.----	.----	.----	.----	.----			
	Offset Delay	.----	.----	.----	.----	.----			
Timer	Time	13:25	13:25	13:25	13:25	13:25			
	Date	18.07 05	18.07 05	18.07 05	18.07 05	18.07 05			
	Summertime Auto.	OFF	OFF	OFF	OFF	OFF			
	Timer Function	OFF	OFF	OFF	OFF	OFF			
	Mon								
	Mon ON1	-:-	-:-	-:-	-:-	-:-			
	Mon OFF1	-:-	-:-	-:-	-:-	-:-			
	Mon ON2	-:-	-:-	-:-	-:-	-:-			
	Mon OFF2	-:-	-:-	-:-	-:-	-:-			

Diagnostics

Menu see chapter 16

9.3 Pressure control for condensers refrigeration 3.01 .. 3.04**9.3.1 Basic setting 3.01 3.04**

For all Modes in Group 3 (3.01, 3.02, 3.03)
Analog input E1 factory setting to "MBG-30I"
(measuring range 0-30 bar, proportional output 4-20 mA).
Selection sensor: MBG-30I DSF2-25

Alternative selection signal: 0-10 V, 0-20 mA, 4-20 mA,
jumper accordingly inserted. The sensor measurement
range must be entered in order to display the actual value
correctly.

Example: 0-10 V sensor and range 20 bar



Initial value measuring range



Final value measuring range



Decimal places



display unit



Sensor calibration with calibrated
comparison device

3.02 and 3.04 operating modes with refrigerant for use with
Ziehl-Abegg pressure sensor type MBG-30I or DSF2-25



Upon input of the refrigerant, the device automatically
calculates the corresponding temperature for the
measured pressure. The settings for offset, target value
and the controlling range are then carried out in °C or K.
Calculation for relative pressure (differential measurement
of pressure relative to ambient pressure)
No further settings are necessary for pressure sensors
from Ziehl-Abegg model e.g. MBG-30I (measurement
range 0-30 bar). In the case of sensors with other
measurement ranges, the „E1 Min value“ and the „E1 Max
Value“ must be entered in °C. To do this, convert the bar
values for min and max into °C.

Selection refrigerant :

Function Analog Input 2

- External setpoint = Function **1E**
by external signal (0-10 V) instead of „Setpoint 1“
0-10 V $\hat{=}$ sensor measuring range
- External manual = function **2E**
operation via external signal (0-10V)
Switch over between settings on the device and external
manual operation via digital input
($\rightarrow$ IO Setup).
- Measurement value = function **7E**
e.g. for limit indication, display in Info menu “E2 actual”
- Modes with two sensors
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.

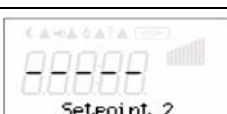
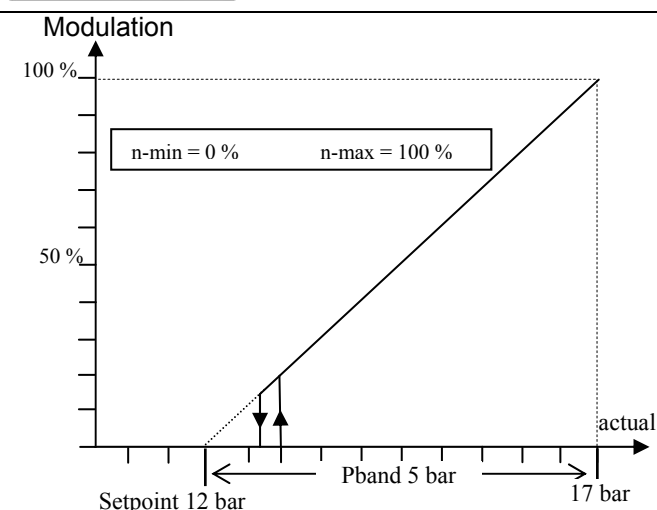
3.04 + 3.03

E2 Function at **4E** preprogrammed = comparison value with
control to higher value (two circuit condensers).

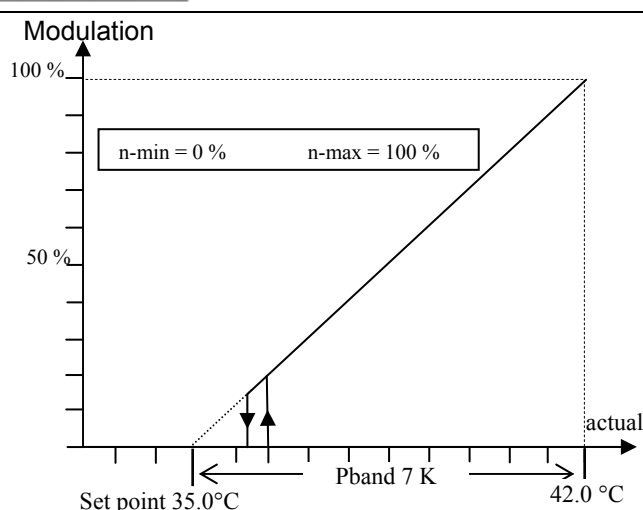
R12	R13	R13b1	R22	R23	R32	R114	R134a	R142B
R227	R401	R401A	R401B	R402	R402A	R402B	R404A	R407A
R407B	R407C	R500	R502	R503	R507	R717		

9.3.2 Setting for operation 3.01 .. 3.04**3.01** Pressure control condensers, Setpoint in bar**3.02** Pressure control for condensers with input for refrigerant, Setpoint in °C**3.03** t w o sensors for dual circuit condenser, automatic regulation to the highest pressure (selection amplifier integrated)
operation display: „Control value“, Setpoint in bar**3.04** t w o sensors for dual circuit condenser with input for refrigerant automatic regulation to the highest pressure
(selection amplifier).Setpoint in °C , also for different refrigerants suitably there comparison of the temperatures. Display during
operation: „Control value“

↓P ↑ESC

3.01 and 3.03 setting in bar**3.02 and 3.04 input for refrigerant setting in °C**Setpoint 1 (factory setting 12.0 bar)
Setting range:
in measuring range of sensorSetpoint 1 (factory setting 35.0.°C)
Setting range:
in measuring range of sensorSetpoint 2
Switch over 1/2 by external contact
(IO Setup)Setpoint 2
Switch over 1/2 by external contact
(IO Setup)Control range „Pband“
small range = great amplification and
short control time
Big range = longer control times
(higher controller stability)Control range „Pband“
small range = great amplification and
short control time
Big range = longer control times (higher
controller stability)Minimal speed
0-100 %Minimal speed
0-100 %Maximal speed
100% - Min.Maximal speed
100% - Min.OFF = automatic control
ON = manual speed setting 0 - 100
%OFF = automatic control
ON = manual speed setting 0 - 100Manual speed setting
0 - 100 % if manual mode = ONManual speed setting
0 - 100 % if manual mode = ON

(Idealized prinziple diagram)



(Idealized prinziple diagram)

**The factory default presets must be adapted to match the system conditions by a competent person.**

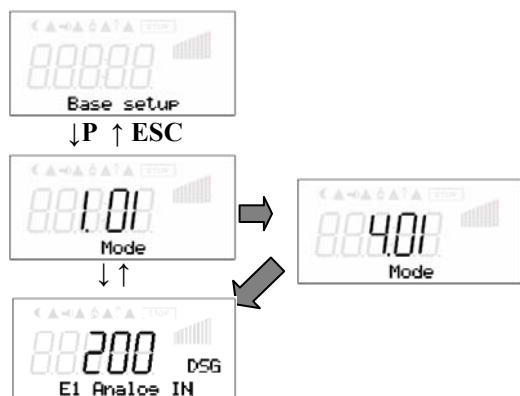
9.3.3 Menu for pressure control refrigeration **3.01 .. 3.04**

	Parameter	factory setting				User Setting			
Start	PIN Input	.---	.---	.---	.---				
	Language	GB	GB	GB	GB		only display		
	Reset	OFF	OFF	OFF	OFF				
	Mode	3.01	3.02	3.03	3.04				
	Unicon	1.06	1.06	1.06	1.06				
Info	Control value			10.91 bar	22.6°C				
	E1 Actual	10.00 bar	19.5°C	9.95 bar	19.4 °C				
	E2 Actual	.---	.---	10.91bar	22.5°C				
	Setpoint 1	12.00 bar	35.0°C	12.00 bar	35.0°C				
	Fanlevel	0	0	0	0				
	Msc0.	OFF	OFF	OFF	OFF				
	Time	12:06	12:06	12:06	12:06				
Date	18.07 05	18.07 05	18.07 05	18.07 05					
Setting	Setpoint 1	12.00 bar	35.0°C	12.00 bar	35.0°C				
	Setpoint 2	.---	.---	.---	.---				
	Pband	5.0 bar	7.0 K	5.00 bar	7.0 K		3.01	Pressure control condensers	
	Min. Speed	0%	0%	0%	0%		Setpoint in bar		
	Max. Speed	100%	100%	100%	100%				
	Manual mode	OFF	OFF	OFF	OFF		3.02	Pressure control condensers with input for refrigerant	
	Speed manual	100%	100%	100%	100%		Setpoint in °C		
Events	External Error	*	*	*	*				
	Sensor 1	*	*	*	*		3.03	2 sensors for dual circuit condensers	
							regulation to the highest actual value		
							(selection amplifier integrated)		
							Setpoint in bar		
INSTALLATION									
Base setup	Mode	3.01	3.02	3.03	3.04	User Setting	3.04	2 sensors for dual circuit condensers with input for	
	E1 Analog IN	0-30 MBG	0-30 MBG	0-30 MBG	0-30 MBG		refrigerant regulation to the highest actual value		
	E1 Refrigerant		R507		R507		(selection amplifier integrated)		
	E1 Min.	.---	.---	.---	.---		Setpoint in °C		
	E1 Max.	.---	.---	.---	.---		also for different refrigerants suitably		
	E1 Decimals	.---	.---	.---	.---		there comparison of the temperatures		
	E1 Unit	.---	.---	.---	.---				
	E1 Offset	0.00 bar	0.0K	0.00 bar	0.0K				
	E2 Function	OFF	OFF	4 E	4E		E2 Function		
	E2 Analog IN	.---	.---	0-30 MBG	0-30 MBG				
	E2 Refrigerant				R507		1E	0-10 V external Setpoint	
	E2 Min.	.---	.---	.---	.---		2E	external manual mode	
	E2 Max.	.---	.---	.---	.---		3E	Sensor average to E1	
	E2 Decimals	.---	.---	.---	.---		4E	Sensor comparison to E1	
E2 Unit	.---	.---	.---	0.0K		5E	Sensor difference to E1		
E2 Offset	.---	.---	0.00 bar	0.0K		6E	Sensor for setpoint lowering		
Controller Setup	PIN Protection	OFF	OFF	OFF	OFF			only for mode 4.02 and 5.02)	
	Set protection	OFF	OFF	OFF	OFF		7 E	measurement value for indication and display	
	Save User Setup	OFF	OFF	OFF	OFF				
	Alarm Sensors	OFF	OFF	OFF	OFF				
	Limit	.---	.---	OFF	.---				
	Msc0.	OFF	OFF	OFF	OFF				
	ON Value Group2	.---	.---	.---	.---				
	nminm bei Gruppe2	.---	.---	.---	.---				
	Val>Set = n+	ON	ON	ON	ON				
	Type of control	P	P	P	P				
	KP	50%	50%	50%	50%				
	KI	50%	50%	50%	50%				
	KD	50%	50%	50%	50%				
	TI	0%	0%	0%	0%				

	3.01	3.02	3.03	3.04			
A1 Function	2A	2A	2A	2A			
A1 min.	0.0 V	0.0 V	0.0 V	0.0 V		A1 / A2 Function	
A1 max.	10.0 V	10.0 V	10.0 V	10.0 V		1 A	Constant voltage + 10V
A1 Inverting	OFF	OFF	OFF	OFF		2 A	proportional modulation
A2 Function	1A	1A	6A	1A		3 A	proportional signal E1
A2 min.	0.0 V	0.0 V	0.0 V	0.0 V		4 A	proportional signal E2
A2 max.	10.0 V	10.0 V	10.0 V	10.0 V		5 A	Group control
A2 Inverting	OFF	OFF	OFF	OFF		6 A	only 2.03 cooling
D1 Function	OFF	OFF	OFF	OFF		7 A	only 2.03 Heating
D1 Inverting	----	----	----	----			
D2 Function	OFF	OFF	OFF	OFF		D1..D5 Funktion	
D2 Inverting	----	----	----	----		1 D	Enable ON / OFF
D3 Function	OFF	OFF	OFF	OFF		2 D	External fault
D3 Inverting	----	----	----	----		3 D	Limit ON / OFF
D4 Function	OFF	OFF	OFF	OFF		4 D	Switch over Singnal E1/E2
D4 Inverting	----	----	----	----		5 D	switch over Setpoint 1 / 2
D5 Function	OFF	OFF	OFF	OFF		6 D	switch over:Set Intern / Extern
D5 Inverting	----	----	----	----		7 D	Controlling / Manual intern
E1 Inverting	OFF	OFF	OFF	OFF		8 D	switch over:ActualValue>Set=n+/n-
E2 Inverting	----	----	----	----			
K1 Function	1K	1K	1K	1K		K1..K4 Funktion	
K1 Inverting	OFF	OFF	OFF	OFF		1 K	Operation indication
K2 Function	2K	2K	2K	2K		2 K	Fault indication
K2 Inverting	OFF	OFF	OFF	OFF		3 K	external fault
BUS Address	247	247	247	247		4 K	Limit modulation
Level. Function	OFF	OFF	OFF	OFF		5 K	Limit E1
Level min.	----	----	----	----		6 K	Limit E2
Level max.	----	----	----	----		7 K	Setpoint Offset
Level Delay	----	----	----	----		8 K	Group control
Lmt E1 Function	OFF	OFF	1L	OFF		9 K	only 2.03 heating funktion
Lmt E1 min.	----	----	0.0°C	----		10 K	only 2.03 cooling function
Lmt E1 max.	----	----	40.0°C	----			
Lmt E1 Hyst.	----	----	1.0K	----			
Lmt E1 Delay	----	----	2sec	----			
Lmt E2 Function	----	----	----	----		Limits (Lmt. Function)	
Lmt E2 min.	----	----	----	----		1 L	Indication with centralized fault
Lmt E2 max.	----	----	----	----		2 L	Indication as message
Lmt E2 Hyst.	----	----	----	----			
Lmt E2 Delay	----	----	----	----			
Offset Function	OFF	OFF	OFF	OFF			
Offset 1	----	----	----	----			
Offset 2	----	----	----	----			
Offset Hyst.	----	----	----	----			
Offset Delay	----	----	----	----			
Time	13:25	13:25	13:25	13:25			
Date	18.07 05	18.07 05	18.07 05	18.07 05			
Summertime Auto.	OFF	OFF	OFF	OFF			
Timer Function	OFF	OFF	OFF	OFF			
Mon							
Mon ON1	---	---	---	---			
Mon OFF1	---	---	---	---			
Mon ON2	---	---	---	---			
Mon OFF2	---	---	---	---			

Diagnostics

Menu see chapter 16

9.4 Pressure control for ventilation systems 4.01..4.03**9.4.1 Basic setting 4.01..4.03**

Analog In E1 factory setting to DSG200

Selection sensor measuring range: DSG 50, *DSG100

DSG200, *DSG300, DSG500, DSG1000, DSG2000,
DSG4000, DSG6000

(* no Ziehl-Abegg standard type)

For sensors with 0-20 mA, 4-20 mA signal put Jumper accordingly and select measuring range DSG50 .. DSG6000.

For not preprogrammed measuring range the sensor measurement range must be entered in order to display the actual value correctly.

Example with a 0-10 V sensor and 0-400 Pa measurement range (proportional output signal)



Initial value measuring range



Final value measuring range



Decimal places



display unit
Sensor calibration with



calibrated comparison device

Function Analog Input 2

- External setpoint = Function **1E**
by external signal (0-10 V) instead of „Setpoint 1“
0-10 V $\hat{=}$ sensor measuring range
- External manual operation via external signal (0-10V) = function **2E**
Switch over between settings on the device and external manual operation via digital input (IO Setup).
- Measurement value = function **7E**
e.g. for limit indication, display in Info menu “E2 actual”
- Modes with two sensors
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.

4.02

E2 Function at **6E** preprogrammed = sensor for setpoint lowering.
preprogrammed sensor type TF..

9.4.2 Setting for operation modes 4.01 and 4.02**4.01** pressure control, setpoint in Pa

4.02 Pressure control for ventilation systems setpoint depending on outdoor temperature Setpoint in Pa (hPa, mbar) and temperature in °C.



↓ P ↑ ESC



Setpoint 1
Setting range:
in measuring range of sensor

↓ ↑



Setpoint 2
Switch over 1/2 by external
contact
IO Setup

↓ ↑



Control range „Pband“
small range = great amplification
and short control time
Big range = longer control times
(higher controller stability)

↓ ↑



Minimal speed
0-100 %

↓ ↑



Maximal speed
100% - Min.

↓ ↑



OFF = automatic control
ON = manual speed setting
0 - 100 %

↓ ↑



Manual speed setting
0 - 100 % if manual mode = ON

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

An outside temperature compensation can be activated (sensor connection E2 to 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 Setpoint1/2 is automatically changed proportional to the measured outside temperature (Info: "Setpoint control").



Temperature range in which the
setpoint change continuously with
outside temperature

↓ ↑

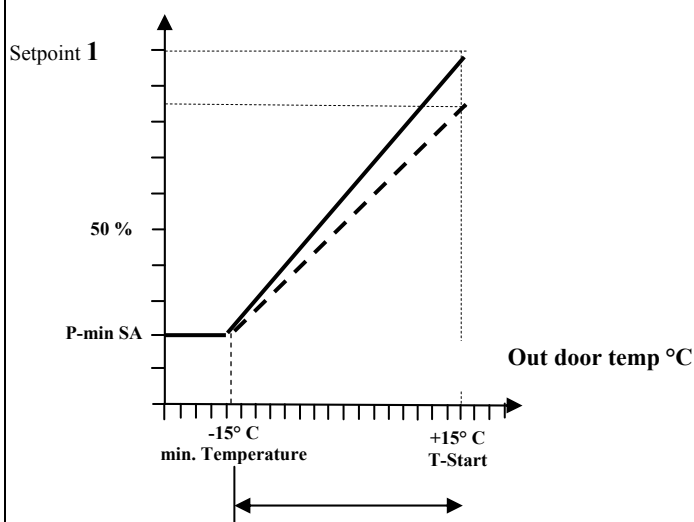


Setpoint reducing will start below this
outside temperature (start point)

↓ ↑



Minimum pressure for very low
outside temperature



9.4.3 Menu for pressure control airconditioning 4.01 ..4.02

	Parameter	factory setting		User Setting
Start	PIN Input	.----	.----	
	Language	GB	GB	
	Reset	OFF	OFF	
	Mode	4.01	4.02	
	Unicon	1.06	1.06	
Info	E1 Actual	88.7 Pa	88.7 Pa	
	E2 Actual	.----	21.0 °C	
	Setpoint 1	100.0 Pa	100.0 Pa	
	Setpint control		100.0 Pa	
	Fanlevel	0	0	
	Msc0.	OFF	OFF	
	Time	12:06	12:06	
	Date	18.07 05	18.07 05	
	Setting	Setpoint 1	100.0 Pa	100.0 Pa
Setpoint 2		.----	.----	
Pband		100.0 Pa	100.0 Pa	
Min. Speed		0%	0%	
Max. Speed		100%	100%	
Manual mode		OFF	OFF	
Speed manual		100%	100%	
T-Band SD			30.0 K	
T-Start SD			15.0°C	
P-Min SD			70.0 Pa	
Events		External Error	*	*
	Sensor 1	*	*	
INSTALLATION				
Base setup	Mode	4.01	4.02	
	E1 Analog IN	200 DSG	200 DSG	
	E1 Min.	.----	.----	
	E1 Max.	.----	.----	
	E1 Decimals	.----	.----	
	E1 unit	.----	.----	
	E1 Offset	0.0 Pa	0.0 Pa	
	E2 Function	OFF	6 E	
	E2 Analog IN	.----	TF	
	E2 Min.	.----	.----	
	E2 Max.	.----	.----	
	E2 Decimals	.----	.----	
	E2 unit	.----	.----	
	E2 Offset	.----	0.0 K	
	Controller Setup	PIN Protection	OFF	OFF
Set protection		OFF	OFF	
Save User Setup		OFF	OFF	
Alarm Sensors		OFF	OFF	
Limit		.----	.----	
Msc0.		OFF	OFF	
ON Value Group2		.----	.----	
nminm bei Gruppe2		.----	.----	
Val>Set = n+		OFF	OFF	
Type of control		Pid	Pid	
KP		50%	50%	
KI		50%	50%	
KD		50%	50%	
TI		0%	0%	

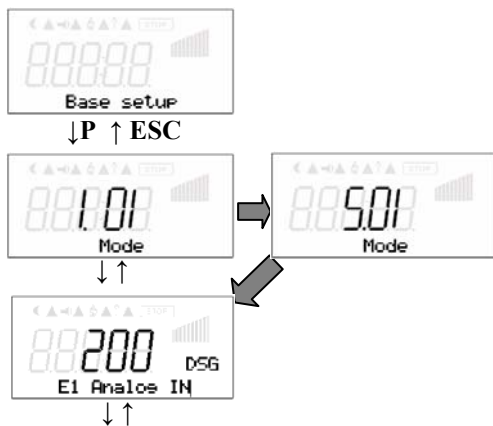
	4.01	4.02	User Setting			
IO Setup	A1 Function	2A	2A			
	A1 min.	0.0 V	0.0 V		A1 / A2 Function	
	A1 max.	10.0 V	10.0 V		1 A	Constant voltage + 10V
	A1 Inverting	OFF	OFF		2 A	proportional modulation
	A2 Function	1A	1A		3 A	proportional signal E1
	A2 min.	0.0 V	0.0 V		4 A	proportional signal E2
	A2 max.	10.0 V	10.0 V		5 A	Group control
	A2 Inverting	OFF	OFF		6 A	only 2.03 cooling
	D1 Function	OFF	OFF		7 A	only 2.03 Heating
	D1 Inverting	.----	.----			
	D2 Function	OFF	OFF		D1..D5 Funktion	
	D2 Inverting	.----	.----		1 D	Enable ON / OFF
	D3 Function	OFF	OFF		2 D	External fault
	D3 Inverting	.----	.----		3 D	Limit ON / OFF
	D4 Function	OFF	OFF		4 D	Switch over Singnal E1/E2
	D4 Inverting	.----	.----		5 D	switch over Setpoint 1 / 2
	D5 Function	OFF	OFF		6 D	switch over: Set Intern / Extern
	D5 Inverting	.----	.----		7 D	Controlling / Manual intern
	E1 Inverting	OFF	OFF		8 D	switch over: ActualValue>Set=n+/n-
	E2 Inverting	.----	.----			
	K1 Function	1K	1K		K1..K4 Funktion	
	K1 Inverting	OFF	OFF		1 K	Operation indication
	K2 Function	2K	2K		2 K	Fault indication
	K2 Inverting	OFF	OFF		3 K	external fault
	BUS Address	247	247		4 K	Limit modulation
Limits	Level. Function	OFF	OFF		5 K	Limit E1
	Level min.	.----	.----		6 K	Limit E2
	Level max.	.----	.----		7 K	Setpoint Offset
	Level Delay	.----	.----		8 K	Group control
	Lmt E1 Function	OFF	OFF		9 K	only 2.03 heating funktion
	Lmt E1 min.	.----	.----		10 K	only 2.03 cooling function
	Lmt E1 max.	.----	.----			
	Lmt E1 Hyst.	.----	.----			
	Lmt E1 Delay	.----	.----			
	Lmt E2 Function	.----	.----		Limits (Lmt. Function)	
	Lmt E2 min.	.----	.----		1 L	Indication with centralized fault
	Lmt E2 max.	.----	.----		2 L	Indication as message
	Lmt E2 Hyst.	.----	.----			
	Lmt E2 Delay	.----	.----			
	Offset Function	OFF	OFF			
	Offset 1	.----	.----			
	Offset 2	.----	.----			
	Offset Hyst.	.----	.----			
	Offset Delay	.----	.----			
Timer	Time	13:25	13:25			
	Date	18.07 05	18.07 05			
	Summertime Auto.	OFF	OFF			
	Timer Function	OFF	OFF			
	Mon					
	Mon ON1	--	--			
	Mon OFF1	--	--			
	Mon ON2	--	--			
	Mon OFF2	--	--			

Diagnostics

Menu see chapter 16

9.5 Volume control **5.01**, **5.02**

9.5.1 Basic setting **5.01**, **5.02**



For all modes in group 5 (**5.01** and **5.02**)
Analog In E1 factory setting to DSG200

Selection sensor measuring range: **DSG 50**, ***DSG100**,
DSG200, ***DSG300**, **DSG500**, **DSG1000**, **DSG2000**,
DSG4000, **DSG6000**

(* no Ziehl-Abegg standard type)

For sensors with 0-20 mA, 4-20 mA signal put Jumper
accordingly and select measuring range **DSG50** ..
DSG6000.

Input of the K of factor dependent on
the fan (inlet duct)
setting range 0..7.000

Sensor calibration with calibrated
comparison device

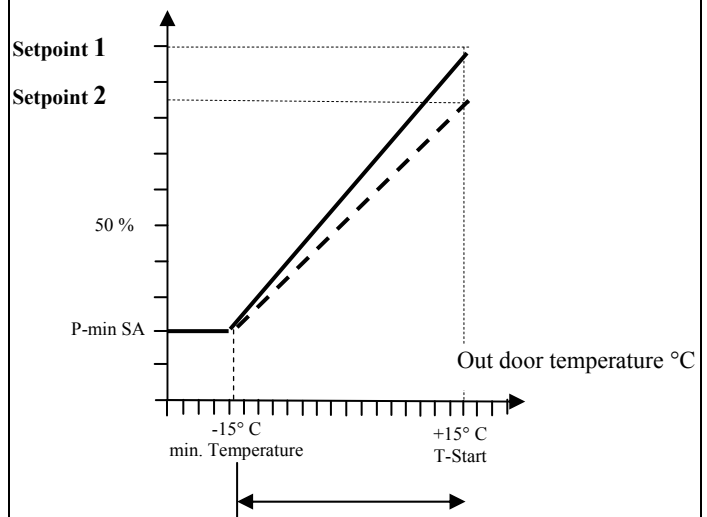
Function Analog Input 2



- External setpoint = Function **1E** by external signal (0-10 V) instead of „Setpoint 1“
0-10 V $\hat{=}$ 0-100 % setting range
- External manual operation via external signal (0-10V) = function **2E**
Switch over between settings on the device and external manual operation via digital input (↔ IO Setup).
- Measurement value = function **7E**
e.g. for limit indication, display in Info menu “E2 actual”
- Modes with two sensors
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.

5.02

E2 Function at **6E** preprogrammed = sensor for setpoint lowering. Pre-programmed sensor type TF....



9.5.2 Setting for operation modes 5.01 and 5.02**5.01** Volume control, Setpoint in m³/h (m³/s)**5.02** Volume control for ventilation systems setpoint depending on outdoor temperature Setpoint in Pa (hPa, mbar) and temperature in °C.

↓P ↑ESC



Setpoint 1
Setting range:
in measuring range of sensor and
"K" factor

↓ ↑



Setpoint 2
Switch over 1/2 by external contact
(☞ IO Setup)

↓ ↑



Control range „Pband“
small range = short control time
Big range = longer control times
(higher controller stability)

↓ ↑



Minimal speed
0-100 %

↓ ↑



Maximal speed
100% - Min.

↓ ↑



OFF = automatic control
ON = manual speed setting 0 - 100 %

↓ ↑



Manual speed setting
0 - 100 % if manual mode = ON

Additional menu item for mode 5.02 with outside-temperature dependent target-setpoint

An outside temperature compensation can be activated (sensor connection E2 to 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 Setpoint1/2 is automatically changed proportional to the measured outside temperature (☞ Info: "Setpoint control").



Temperature range in which the
setpoint change continuously with
outside temperature

↓ ↑



Setpoint reducing will start below
this outside temperature (start
point)

↓ ↑



Minimum air volume for very low
outside temperature

9.5.3 Menu for air volume control 5.01 ..5.02

	Parameter	factory setting		User Setting					
Start	PIN Input	.----	.----						
	Language	GB	GB						
	Reset	OFF	OFF						
	Mode	5.01	5.02						
	Unicon	1.06	1.06						
Info	E1 Actual	712 m3h	712 m3h						
	E2 Actual	.----	21.0 °C						
	Setpoint 1	530m3h%	530m3h%						
	Setpoint control		530m3h%						
	Fanlevel	0	0						
	Msc.	OFF	OFF						
	Time	12:06	12:06						
	Date	18.07 05	18.07 05						
Setting	Setpoint 1	530m3h	530m3h						
	Setpoint 2	.----	.----						
	Pband	530m3h	530m3h						
	Min. Speed	0%	0%						
	Max. Speed	100%	100%						
	Manual mode	OFF	OFF						
	Speed manual	100%	100%						
	T-Band SD		30.0 K						
	T-Start SD		15.0°C						
	P-Min SD		70.0 Pa						
Events	External Error	*	*						
	Sensor 1	*	*						
INSTALLATION									
Base setup	Mode	5.01	5.02		5.01	Volume control (constant) for ventilation systems			
	E1 Analog IN	200 DSG	200 DSG						
	E1 K-Factor	75	75						
	E1 Min.	.----	.----		5.02	Volume control depending on outdoor temperature			
	E1 Max.	.----	.----						
	E1 Decimals	.----	.----						
	E1 unit	.----	.----						
	E1 Offset	0 m3h	0 m3h						
	E2 Function	OFF	6 E						
	E2 Analog IN	.----	TF						
	E2 K-Factor	.----							
	E2 Min.	.----	.----						
	E2 Max.	.----	.----						
	E2 Decimals	.----	.----						
	E2 unit	.----	.----						
	E2 Offset	.----	0.0 K						
Controller Setup	PIN Protection	OFF	OFF						
	Set protection	OFF	OFF						
	Save User Setup	OFF	OFF						
	Alarm Sensors	OFF	OFF						
	Limit	.----	.----						
	Msc.	OFF	OFF						
	ON Value Group2	.----	.----						
	nminm bei Gruppe2	.----	.----						
	Val>Set = n+	OFF	OFF						
	Type of control	Pid	Pid						
	KP	50%	50%						
	KI	50%	50%						
	KD	50%	50%						
	TI	0%	0%						

only display

5.01 Volume control (constant) for ventilation systems

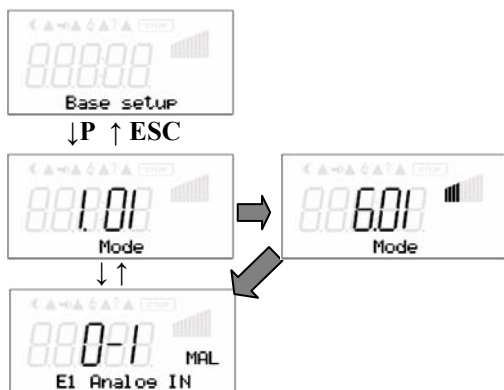
5.02 Volume control depending on outdoor temperature

E2 Function

1E	0-10 V external Setpoint
2E	external manual mode
3E	Sensor average to E1
4E	Sensor comparison to E1
5E	Sensor difference to E1
6E	Sensor for setpoint lowering
	only for mode 4.02 and 5.02)
7 E	measurement value for indication and display

		5.01	5.02	User Setting						
	A1 Function	2A	2A							
IO Setup	A1 min.	0.0 V	0.0 V		A1 / A2 Function					
	A1 max.	10.0 V	10.0 V		1 A	Constant voltage + 10V				
	A1 Inverting	OFF	OFF		2 A	proportional modulation				
	A2 Function	1A	1A		3 A	proportional signal E1				
	A2 min.	0.0 V	0.0 V		4 A	proportional signal E2				
	A2 max.	10.0 V	10.0 V		5 A	Group control				
	A2 Inverting	OFF	OFF		6 A	only 2.03 cooling				
	D1 Function	OFF	OFF		7 A	only 2.03 Heating				
	D1 Inverting	----	----							
	D2 Function	OFF	OFF		D1..D5 Funktion					
	D2 Inverting	----	----		1 D	Enable ON / OFF				
	D3 Function	OFF	OFF		2 D	External fault				
	D3 Inverting	----	----		3 D	Limit ON / OFF				
	D4Function	OFF	OFF		4 D	Switch over Singnal E1/E2				
	D4 Inverting	----	----		5 D	switch over Setpoint 1 / 2				
	D5 Function	OFF	OFF		6 D	switch over:Set Intern / Extern				
	D5 Inverting	----	----		7 D	Controlling / Manual intern				
	E1 Inverting	OFF	OFF		8 D	switch over:ActualValue>Set=n+/n-				
	E2 Inverting	----	----							
	K1 Function	1K	1K		K1..K4 Funktion					
	K1 Inverting	OFF	OFF		1 K	Operation indication				
	K2 Function	2K	2K		2 K	Fault indication				
	K2 Inverting	OFF	OFF		3 K	external fault				
	BUS Address	247	247		4 K	Limit modulation				
	Limits	Level. Function	OFF	OFF		5 K	Limit E1			
Level min.		----	----		6 K	Limit E2				
Level max.		----	----		7 K	Setpoint Offset				
Level Delay		----	----		8 K	Group control				
Lmt E1 Function		OFF	OFF		9 K	only 2.03 heating funktion				
Lmt E1 min.		----	----		10 K	only 2.03 cooling function				
Lmt E1 max.		----	----							
Lmt E1 Hyst.		----	----							
Lmt E1 Delay		----	----							
Lmt E2 Function		----	----		Limits (Lmt. Function)					
Lmt E2 min.		----	----		1 L	Indication with centralized fault				
Lmt E2 max.		----	----		2 L	Indication as message				
Lmt E2 Hyst.		----	----							
Lmt E2 Delay		----	----							
Offset Function		OFF	OFF							
Offset 1		----	----							
Offset 2		----	----							
Offset Hyst.		----	----							
Offset Delay		----	----							
Timer		Time	13:25	13:25						
		Date	18.07 05	18.07 05						
		Summertime Auto.	OFF	OFF						
		Timer Function	OFF	OFF						
		Mon								
		Mon ON1	-- --	-- --						
	Mon OFF1	-- --	-- --							
	Mon ON2	-- --	-- --							
Mon OFF2	-- --	-- --								

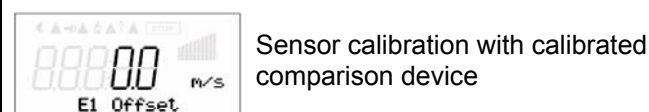
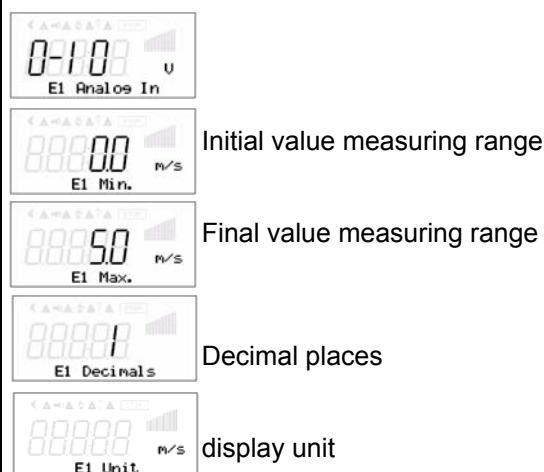
Diagnostics | Menu see chapter 16

9.6 Air velocity control 6.01**9.6.1 Basic setting 6.01**

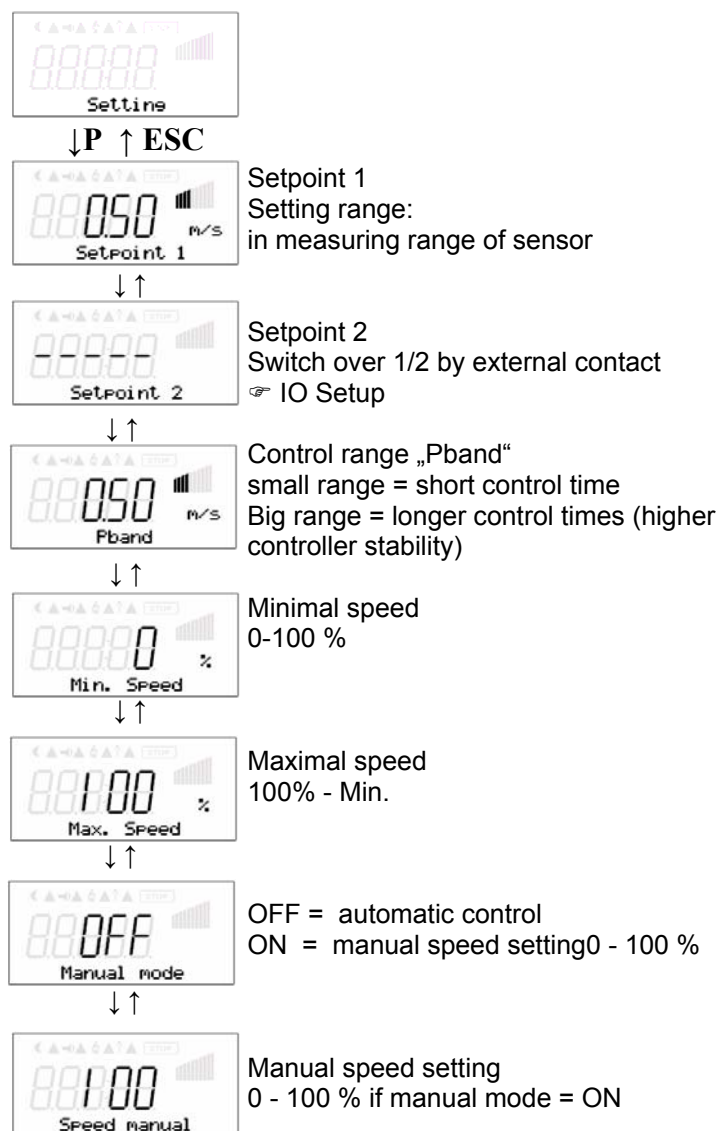
For mode 6.01 E1 factory setting to MAL1 selection sensor measuring range: MAL1, MAL 10

Alternative selection signal: 0-10 V, 0-20 mA, 4-20 mA, jumper accordingly inserted.

The sensor measurement range must be entered in order to display the actual value correctly. Example with a 0-10 V sensor and 0-100° C measurement range

**Funktion analog Eingang 2**

- External setpoint = Function **1E**
by external signal (0-10 V) instead of „Setpoint 1“
0-10 V $\hat{=}$ 0-100 % setting range
- External manual operation = function **2E**
via external signal (0-10V).
Switch over between settings on the device and external manual operation via digital input
(☞ IO Setup).
- Measurement value = function **7E**
e.g. for limit indication, display in Info menu “E2 actual”.

9.6.2 Settings for operation modes 6.01

9.6.3 Menu for air velocity control 6.01

	Parameter	factory setting	User Setting					
Start	PIN Input	.----						
	Language	GB						
	Reset	OFF			only display			
	Mode	6.01						
	Unicon	1.06						
Info	E1 Actual	0.45m/s						
	E2 Actual	.----						
	Setpoint 1	0.50m/s						
	Fanlevel	0						
	Msc0.	OFF						
	Time	12:06						
	Date	18.07 05						
Setting	Setpoint 1	0.50m/s						
	Setpoint 2	.----						
	Pband	0.50m/s						
	Min. Speed	0%						
	Max. Speed	100%						
	Manual mode	OFF						
	Speed manual	100%						
Events	External Error	*						
	Sensor 1	*						
INSTALLATION								
Base setup	Mode	6.01		6.01	Air velocity control			
	E1 Analog IN	0-1 MAL						
	E1 Min.	.----						
	E1 Max.	.----						
	E1 Decimals	.----						
	E1 unit	.----						
	E1 Offset	0.00 m/s						
	E2 Function	OFF						
	E2 Analog IN	.----			E2 Function			
	E2 Min.	.----			1E	0-10 V external Setpoint		
	E2 Max.	.----			2E	external manual mode		
	E2 Decimals	.----			3E	Sensor average to E1		
	E2 unit	.----			4E	Sensor comparison to E1		
	E2 Offset	.----			5E	Sensor difference to E1		
	Controller Setup	PIN Protection	OFF		6E	Sensor for setpoint lowering		
Set protection		OFF			only for mode 4.02 and 5.02)			
Save User Setup		OFF		7 E	measurement value for indication and display			
Alarm Sensors		OFF						
Limit		.----						
Msc0.		OFF						
ON Value Group2		.----						
nminm bei Gruppe2		.----						
Val>Set = n+		OFF						
Type of control		Pid						
KP		50%						
KI		50%						
KD		50%						
TI		0%						

IO Setup		5.01							
	A1 Function	2A							
	A1 min.	0.0 V			A1 / A2 Function				
	A1 max.	10.0 V			1 A	Constant voltage + 10V			
	A1 Inverting	OFF			2 A	proportional modulation			
	A2 Function	1A			3 A	proportional signal E1			
	A2 min.	0.0 V			4 A	proportional signal E2			
	A2 max.	10.0 V			5 A	Group control			
	A2 Inverting	OFF			6 A	only 2.03 cooling			
	D1 Function	OFF			7 A	only 2.03 Heating			
	D1 Inverting	.----							
	D2 Function	OFF			D1..D5 Funktion				
	D2 Inverting	.----			1 D	Enable ON / OFF			
	D3 Function	OFF			2 D	External fault			
	D3 Inverting	.----			3 D	Limit ON / OFF			
	D4Function	OFF			4 D	Switch over Singnal E1/E2			
	D4 Inverting	.----			5 D	switch over Setpoint 1 / 2			
	D5 Function	OFF			6 D	switch over:Set Intern / Extern			
	D5 Inverting	.----			7 D	Controlling / Manual intern			
	E1 Inverting	OFF			8 D	switch over:ActualValue>Set=n+/n-			
E2 Inverting	.----								
K1 Function	1K			K1..K4 Funktion					
K1 Inverting	OFF			1 K	Operation indication				
K2 Function	2K			2 K	Fault indication				
K2 Inverting	OFF			3 K	external fault				
BUS Address	247			4 K	Limit modulation				
Limits	Level. Function	OFF		5 K	Limit E1				
	Level min.	.----		6 K	Limit E2				
	Level max.	.----		7 K	Setpoint Offset				
	Level Delay	.----		8 K	Group control				
	Lmt E1 Function	OFF		9 K	only 2.03 heating funktion				
	Lmt E1 min.	.----		10 K	only 2.03 cooling funktion				
	Lmt E1 max.	.----							
	Lmt E1 Hyst.	.----							
	Lmt E1 Delay	.----							
	Lmt E2 Function	.----		Limits (Lmt. Function)					
	Lmt E2 min.	.----		1 L	Indication with centralized fault				
	Lmt E2 max.	.----		2 L	Indication as message				
	Lmt E2 Hyst.	.----							
	Lmt E2 Delay	.----							
	Offset Function	OFF							
	Offset 1	.----							
	Offset 2	.----							
	Offset Hyst.	.----							
	Offset Delay	.----							
	Timer	Time	13:25						
Date		18.07 05							
Summertime Auto.		OFF							
Timer Function		OFF							
Mon									
Mon ON1		--:--							
Mon OFF1		--:--							
Mon ON2		--:--							
Mon OFF2	--:--								

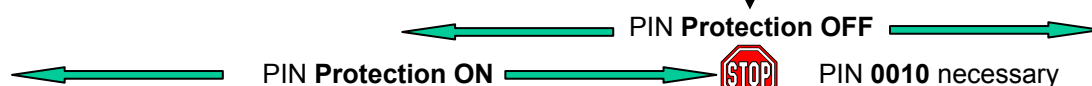
10. Menu group Start	11. Menu group Info
The service menu for the installation can be protected against unintentional changes by a pin code. With further pin codes putting back to pre-setting is possible. PIN 0010 Opening service menu, if PIN-protection activated PIN 1234 opening “setting”, if “set protection” ON (☞ Controller Setup) PIN 9090 Restore user setting PIN 9091 Save user setting (corresponds function “Save user setup ON” ☞ Controller Setup) PIN 9095 Restore factory setting = delivery status Example for PIN input 0010 for opening service menu Menu language by the factory set to English. In this menu different national languages can be selected (GB = English, D = Deutsch ...). Complete re-start of the device. Query of the operating mode Query of the device software version	For mode speed controller 1.01 Modulation of the controller device in addition to the bar display. Display of the type and level of the active default signal in percent (0-100 % $\hat{=}$ 0-10 V, 10-0 V, 0-20 mA, 20-0 mA, 4-20 mA, 20-4 mA). Display: the device operates at : Set „External 1“ = Signal to „E1“ / „GND“ Set „External 2“ = Signal to „E2“ / „GND“ Set „Intern 1“ = Menu „Set intern 1“ Set „Intern 2“ = Menu „Set intern 2“ Info for mode controller 2.01 ..., 3.01 ..., 4.01 ..., 5.01 ..., 6.01 ... Current actual value measured on the sensor 1. Depending sensor-type, in mbr, m³/s, m/s, Pa, %, bar, m³/h, °C, V, mA, etc. For operation with two sensors display for „E2 actual“. If function not active, display ---- Display of the active target value at which the device operates „Setpoint 1“ = Menu Setting Setpoint 1 „Setpoint 2“ = Menu Setting Setpoint 2 „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”. Modulation of the controller device, in addition to the bar display. Momentarily status for minimum speed cut off Msc0. : ON = switch off, if Setpoint ($\pm$ Min. speed cut off) is reached “Msc0” : OFF = no switch off that means operation with minimum rate of air. Announcement of the current time Announcement of the current date

12. Controller Setup**12.1 PIN Protection**

The adjustments for the installation in the service level can be protected against unintentional modifications. To do this, activate the „PIN protection“.

In order to simplify the initial start-up operation, the service level in the factory setting is free – i.e. accessible without PIN **0010**.

After installation of the device has been carried out, PIN protection should be activated!



Start	INFO	Setting	Events	Base setup	Controller Setup	IO
----	:	:	:	.	OFF	
PIN Input					PIN-Protection	
:	:	:	.	:		

12.2 Set protection

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 PIN (1234). For this, the settings protection must be programmed to „ON“. The settings menu is then no longer visible without inputting a PIN!

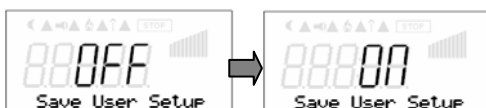


Function only in combination with activated PIN protection!



Menu „Setting“ if Set-protection „ON“ only after PIN Input (1234) visible

Start	INFO	Setting	Events
:	:	:	:

12.3 Save user settings

The individually made device configurations (User Settings) can be saved and, with the corresponding PIN input (**9090**), can be reestablished (☞ Start → PIN input).

**Important information!**

By entering PIN **9095** in the „PIN“ menu in the start menu-group, the device is entirely reset to the pre-delivery condition **Any changes that have been made to the settings are thus lost!**

12.4 Sensor Alarm ON / OFF

Function only in controller mode!

For "Analog IN 1" and if activated for sensor 2 Analog IN2. 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, an error message can occur via the alarm symbol in the display and a relay.



The sensor malfunction indicator is factory set to off so that error messages do not interfere with start-up operations. When the alarm sensors are set to **OFF**, the sensor malfunctions are stored merely for informational purposes as "messages" in "Events".



For Alarm OFF
Message in "Events"



For Alarm ON
Display alternating to actual value

12.5 Limit

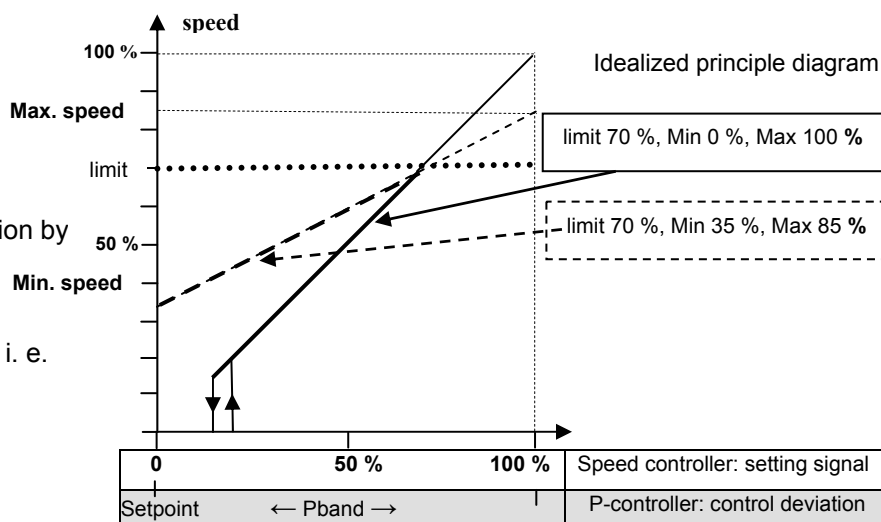
An adjustable limitation of the modulation can be activated via a digital input („D1“, „D2“, ..) (depending on the programming, **as long as no allocation is carried out: Display: [----] IO Setup**). **Limit** value= max. possible modulation (e.g. speed reduction during night operation by time switch).



Limit value= max. possible modulation (e.g. speed reduction during night operation by time switch).

Setting range Limit „Max. Speed“ up to „Min. Speed“

Factory setting 100 % $\hat{=}$ max. modulation, i. e. no limit.



12.6 Minimum speed cut off

This function is primarily significant for installation of the device as a pure P Controller in refrigeration and air-conditioning technology.

For operation mode speed controller **1.01** without function!

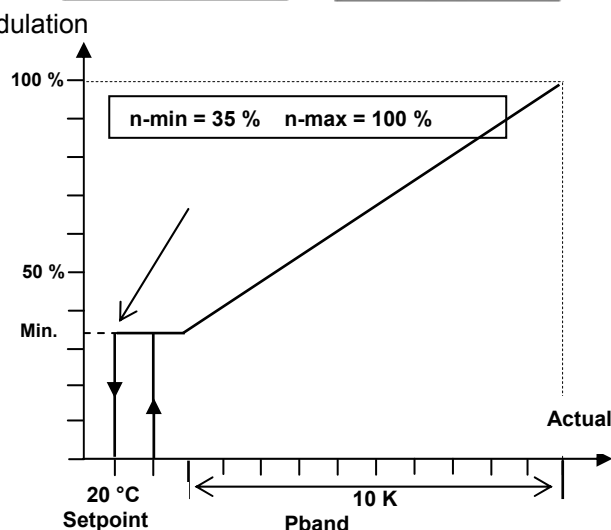
- **Msc0** = **OFF** (factory setting)

If no "Min. speed" is adjusted, the fan stops with reaching 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").

- **Msc0** = **ON**

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.



12.7 Second Group

**Second group „indirectly controlled“ (picture 1)**

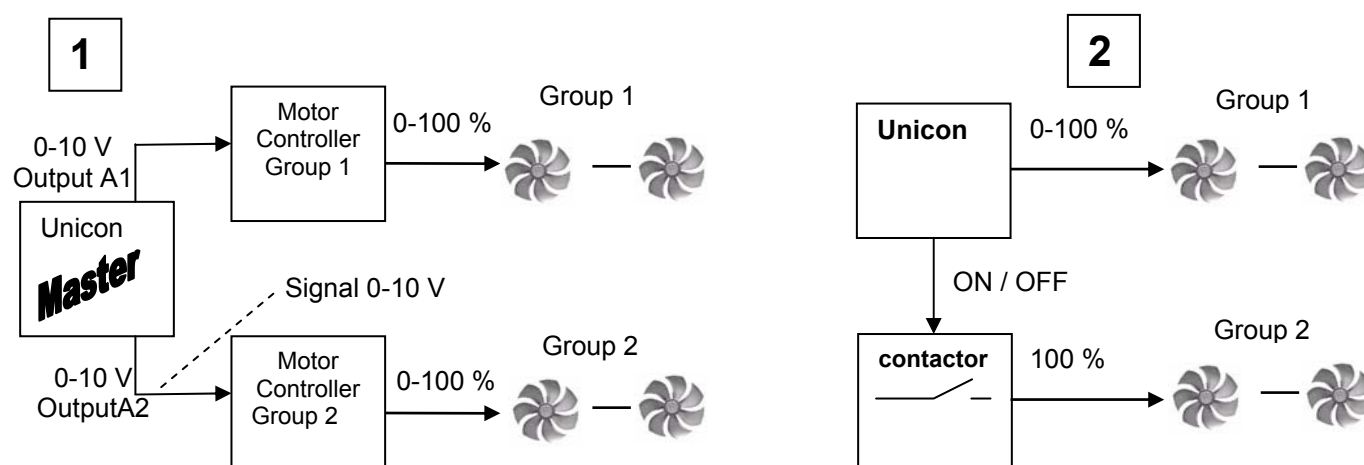
Analog output „Analog OUT 1“ in IO Setup function **5 A** = group control is programmed.

This output is employed as the default signal for a speed controller. If the default signal or the regulation deviation exceeds the group 2 switch-on point, group 1 is reduced to „n-min group 2“. Starting here, both groups run parallel at maximum power.

Second group „100 % energized“ (picture 2)

Relay output (K1 or K2) in IO Setup function **8 K** = group control is programmed.

A contactor is triggered via this relay contact, which directly switches the fans of the second group to mains voltage. If the default signal or the regulation deviation exceeds the „Group 2 ON value“ switch-on point, the relay for the second group switches on and the speed of the first group is lowered to an adjustable minimum value. After that, the speed of the first group increases back up to maximum.

**12.8 Reverse action of the control function (actual Value > Set = n+)**

For the effect of the regulation there are **TWO** functions

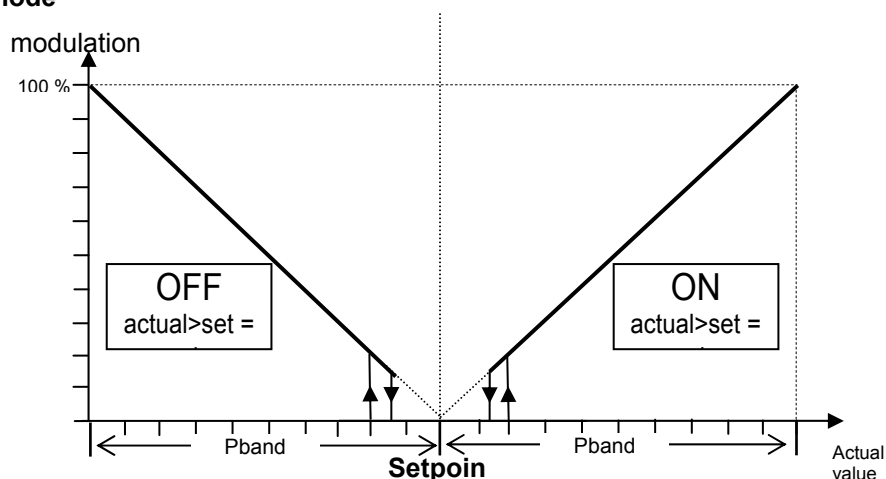
1. Setting **ON** for **actual Value > Set = n+ Δ** increasing output voltage at increasing actual value
2. Setting **OFF** for **actual Value > Set = n+ Δ** decreasing output voltage at increasing actual value

For special applications an **external switch over of control function is possible** (IO Setup → Reverse for control function).

Factory setting depending on selected mode

Mode	Control function
1.01	No control function
2.01 ..	ON
3.01 ..	ON
4.01 ..	OFF
5.01 ..	OFF
6.01 ..	OFF

Example for temperature control
(Idealized principle diagram)



12.9 Controller configuration (controller type) and controller action)

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.

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:

Selection P, PID

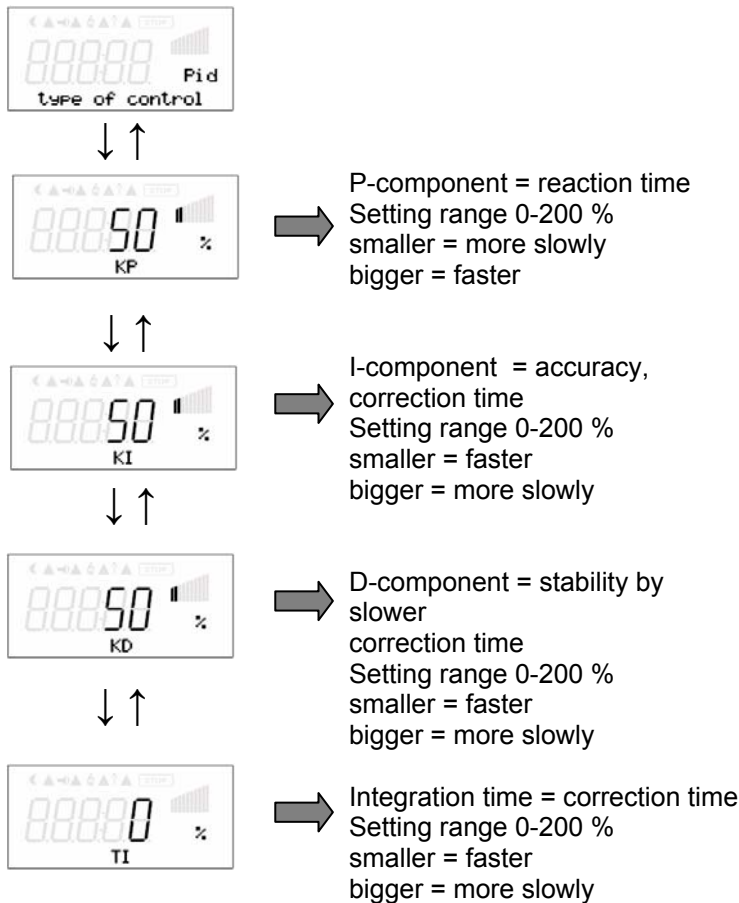
Pcontrol (**P**roportional component, proportion of the absolute deviation)

Icontrol (**I**ntegral component, proportion of the sum of all deviations)

Dcontrol (**D**ifferential component, proportion of the last difference)

With pure P controllers (controller type P), 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.



13.1 Analog Output A (Analog OUT 1)

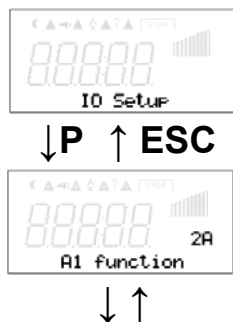
13.1.1 Function analog output A (Analog OUT 1)

The analog outputs 0-10 V can be allocated with various functions.

Den analogen Ausgängen 0-10 V können unterschiedliche Funktionen zugeordnet werden.

Terminals 19 (A1) - 20 (GND) = Analog OUT 1 ($I_{\max}$ 10 mA) Pre-setting for speed controller input

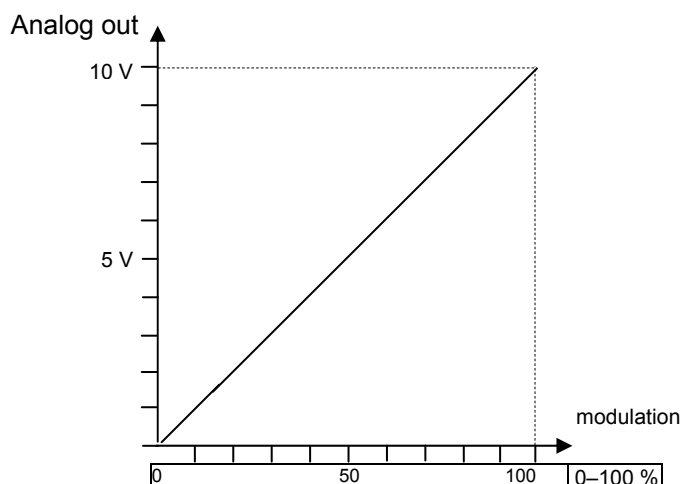
Terminals 21 (A2) - 22 (GND) = Analog OUT 2 ($I_{\max}$ 10 mA)



The following functions can be assigned to the output

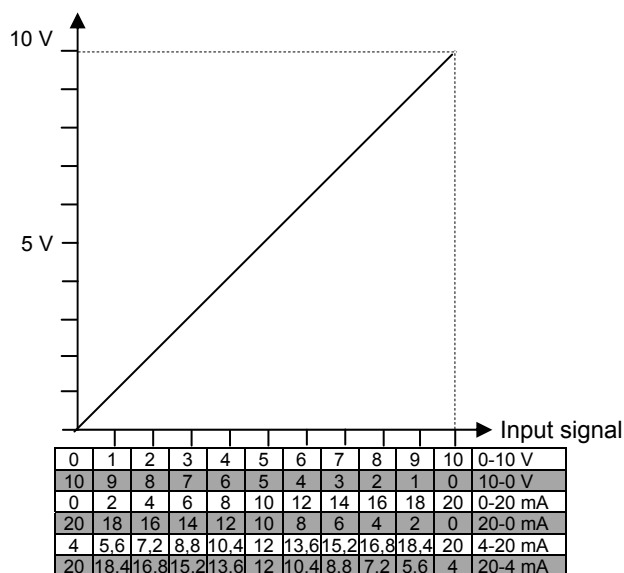
Function	description
OFF	no Function
1 A	Constant voltage +10 V (factory setting for A2, out of 2.03)
2 A	proportional modulation (Factory setting A1)
3 A	proportional input E1
4 A	proportional input E2
5 A	Group control
6 A	Control output 2 increasing modulation at <u>actula value</u> >Set (cooling) (only mode 2.03 temperature controller with additional functions)
7 A	Control output 2 incresing modulation at actual value<Set (Heating) (only mode 2.03 temperature controller with additional functions)

Function 2 A proportional modulation



Idealized principle diagram

Function 3 A / 4 A proportional input signal



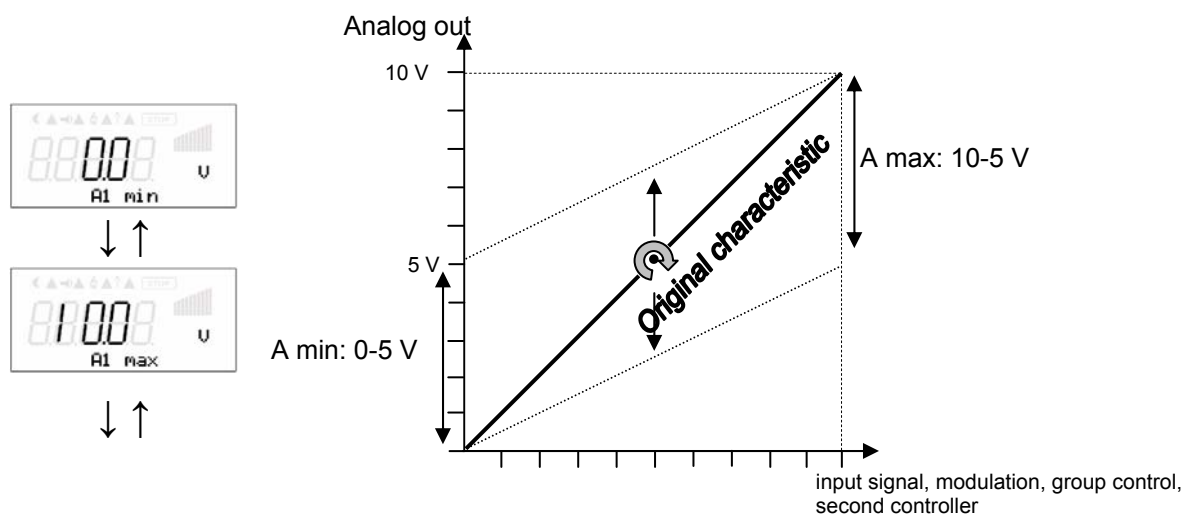
For activ sensors 0-10 V Signal proportional measuring range.
For passiv temperature sensors type TF.. (KTY10-6) proportional to -25 up to +80° C (↗ 1.303 Ω up to 2.886 Ω).

13.1.2 Adjustment analog output A1 und A2

With the attitudes A1 min or A2 min and A1 max or A2 max the characteristic of the output voltage can be adapted

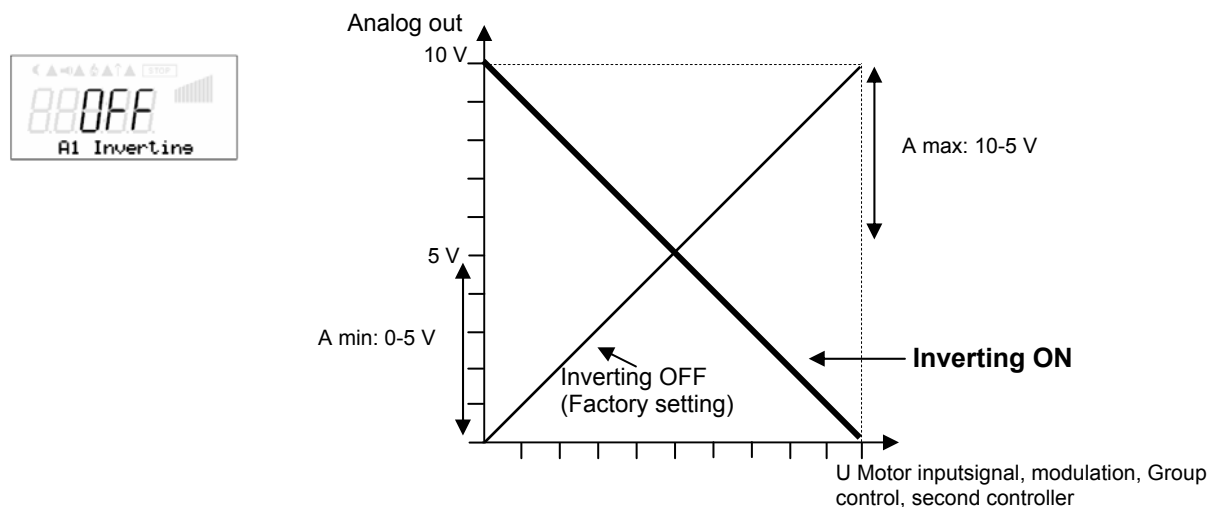
Factory setting: A1 min or A2 min = 0 V, A1 max bzw. A2 max = 10 V

Setting range: A1 min or A2 min = 0-5 V, A1 max bzw. A2 max = 10-5 V



With the attitudes A Inverting the output voltage can be inverted

Factory setting OFF



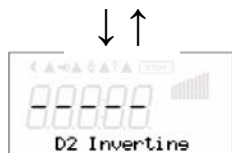
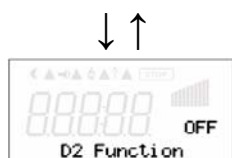
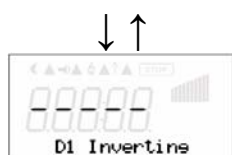
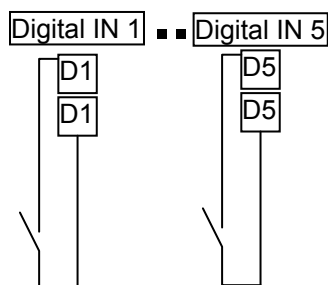
13.2 Functional overview of digital inputs D1 ... D5

The 5 digital inputs Digital IN 1 (D1) to Digital IN 5 (D5) can be allocated with various functions..
Avoid the same function allocation for several Input in order to exclude undefined conditions.

Activation via floating contacts (a low voltage of approx. 24 V DC is connected).

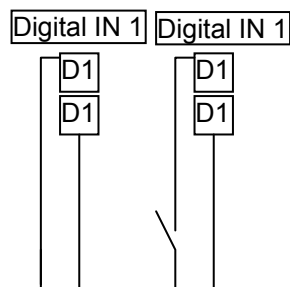
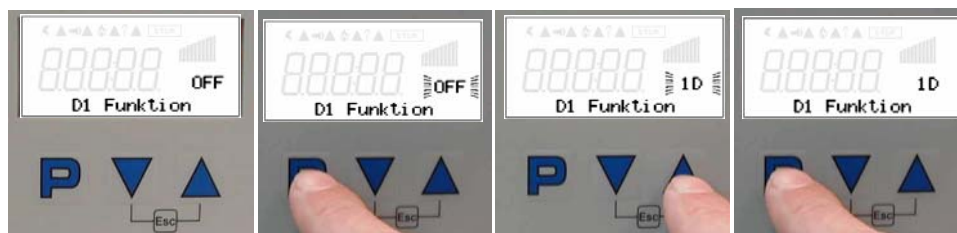


Never apply external voltage to the digital inputs!



Function	description
--	no Function (factory setting) controller reacts neither to opened nor closed contact
1 D	Enable (remote control) ON / OFF Release ON / OFF
2 D	External fault connecting an external alarm indication
3 D	Limit ON / OFF Limitation of max. output voltage
4 D	E1 / E2 Switch over between signal at Analog IN 1 (E1) and Analog IN 2 (E2)
For mode speed controller 1.01	
5 D	Set Intern 1 / 2 Switch over between 2 adjusted settings at the controller
6 D	Intern / Extern Switch over setting at the controller / external signal
For modes as controller (higher 2.01)	
5 D	Setpoint 1 / 2 Switch over between 2 Setpoints (e. g. day- / night operation)
6 D	Intern / Extern Switch over between setting at the controller or external signal
7 D	automatic control / speed manual internal (menu Speed manual) switch over between automatic control and Speed manual
8 D	Switch over between ON: ActualVal>Set =n+ and OFF: Actual>Set=n- Reverse action of control function (e. g. Heating / Cooling)

Example:
Programming D1 (Digital IN 1) for enable controller by floating contact
Function 1D



device ON device OFF

D1 ..D5 Inverting

If D1 or D2 was allocated with a function, the device works factory preset with a non-inverted input **D Inverting OFF**

Not inverted

Device ON with closed contact, device OFF with open contact on terminal D1-D1 (the other way around with inversion – i.e., device OFF with closed contact)

as long as no allocation is carried out: Display: ----

13.2.1 Enable ON / OFF Funktion 1D

Remote ON / OFF (electronic disconnection) contact free of potential, operation of the device is still possible after pressing the "ESC" hotkey combination in switched-off condition. Signal- in and outputs remain active
 A programmed operating indicator relay (factory set K1 function 1K) reports the switch-off.
 A programmed alarm relay (factory set K2 function 2 K) does not report the switch-off.



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

Display **STOP** for switch off by remote switch at digital input e. g. Digital IN 1 = D1-D1

Controller ON for closed contact

D1 Inverting **OFF** D1-D1 bridged =controller ON

Controller ON with opened kontakt

D1 Inverting **ON** D1-D1 open = controller ON

13.2.2 External fault Funktion 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).

Indication during closed contact (factory preset)

D1 Inverting **OFF**

Indication during opened contact

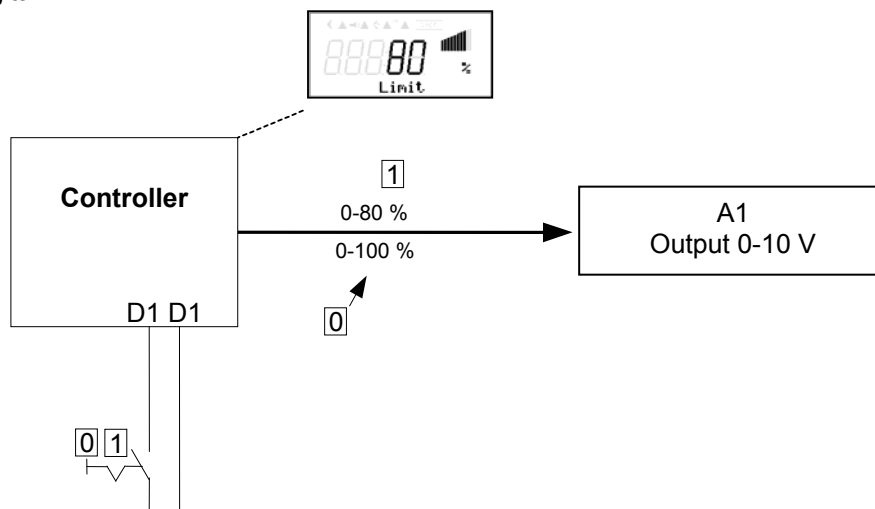
D1 Inverting **ON**

13.2.3 Limit ON / OFF Funktion 3D

The value for Limit adjusted in the Controller Setup, is activated over a digital input („Digital IN 1“ = D1-D5 or Timer function activates).

Limit value = max. possible modulation (e.g. speed reduction during night operation by time switch)

contact at digital inputs e.g. Digital IN 1 = D1-D1



Limit ON (limitation activ) at closed contact (factory setting)

D1 Inverting OFF

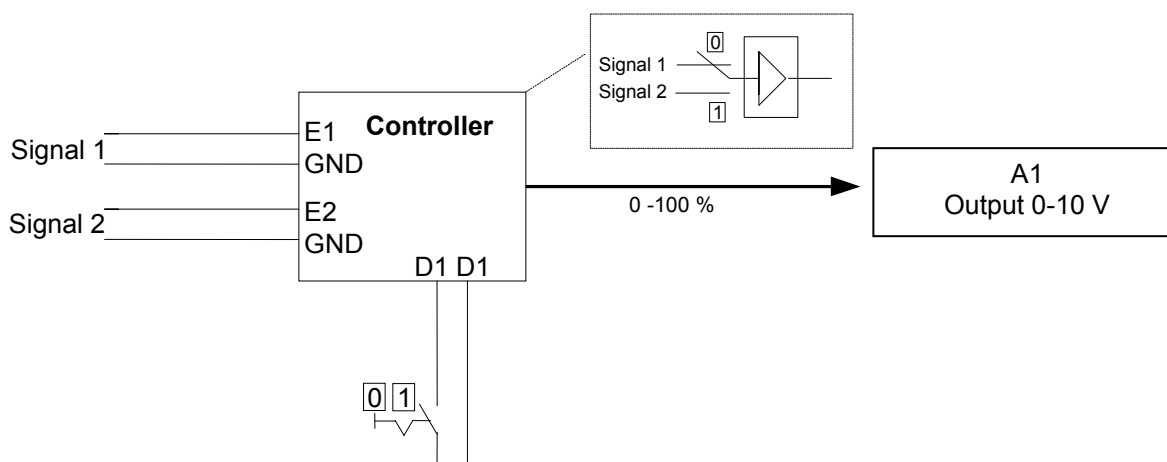
Limit ON (limitation activ) at opened contact

D1 Inverting ON

13.2.4 Switch over E1 / E2 Funktion 4D

Switch over between input signal 1 (at Analog IN 1 terminal E1) and input signal 2 (an Analog IN terminal E2)

contact at digital input e. g. Digital IN 1 = D1-D1



Signal from (E1) at opened contact ↔ Signal from “E2” at closed contact

D1 Inverting OFF

Signal from (E1) at closed contact ↔ Signal from “E2” at opened contact

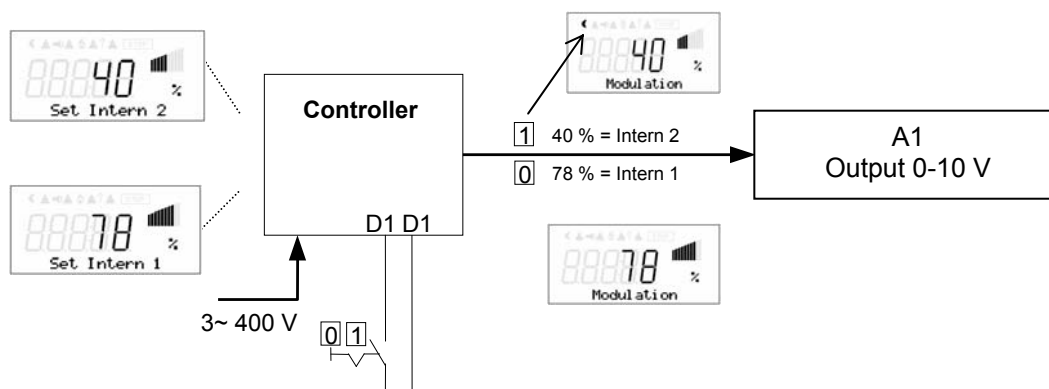
D1 Inverting ON

13.2.5 Set Intern 1 / Set Intern 2 or. Setpoint 1/2 **Function 5D**♦ **Switch over between Set Intern 1 and Set Intern 2** (for speed controller **1.01**)

Operation with "Internal default 2" is signalized by the moon symbol for reduced operation.

"Set external 1" under settings must be programmed to OFF.

contact at digital input e. g. Digital IN 1 = D1-D1



Set Intern 1 at opened contact ↔ Set Intern 2 at closed contact

D1 Inverting OFF

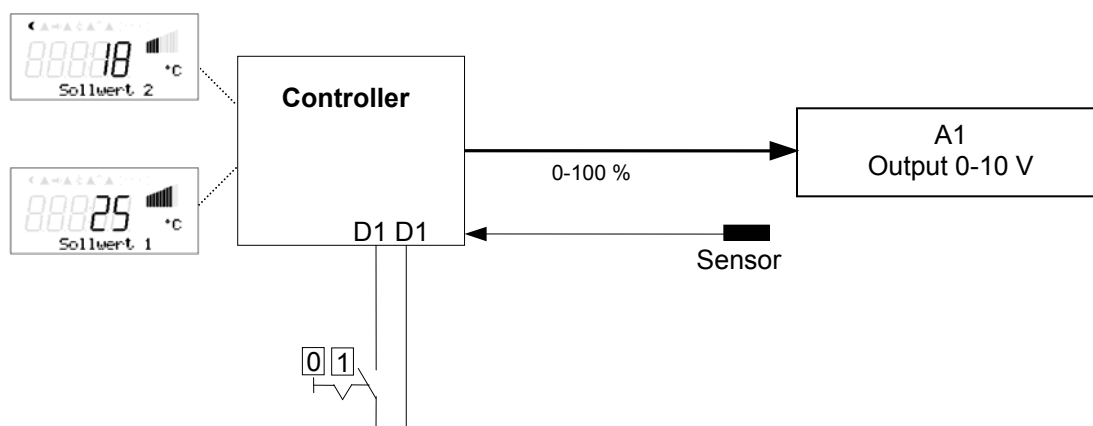
Set Intern 1 at closed contact ↔ Set Intern 2 at closed contact

D1 Inverting ON

♦ **Switch over between Setpoint 1 and Setpoint 2** (for modes as controller higher **2.01**)

operation with „Setpoint 2“ is signalized by the moon symbol for reduced operation.

contact at digital input e. g. Digital IN 1 = D1-D1



Setpoint 1 = 18° C at opened contact ↔ Setpoint 2 = 25° C at closed contact

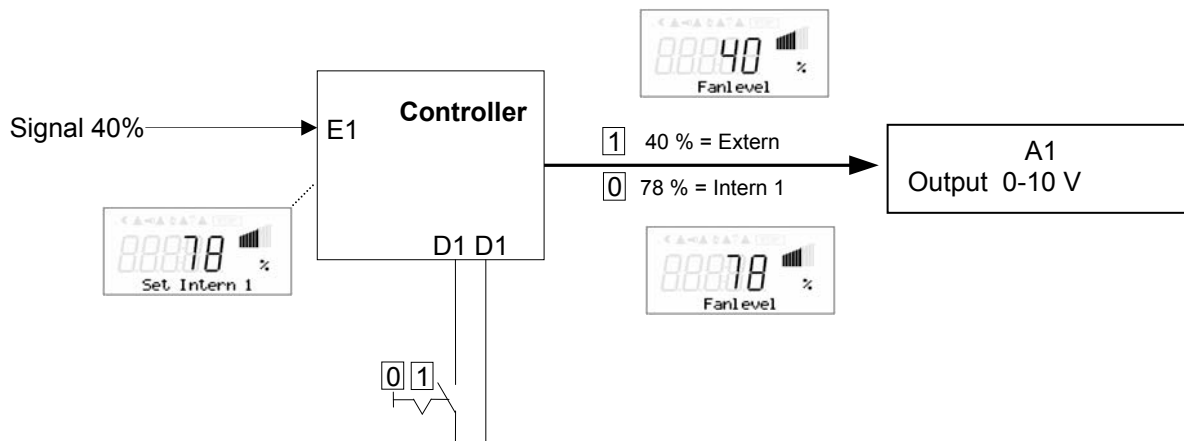
D1 Inverting OFF

Setpoint 1 = 18° C at closed contact ↔ Setpoint 2 = 25° C at opened contact

D1 Inverting ON

13.2.6 Intern / Extern **Function 6D**♦ **Switch over between Set Intern and Set Extern** (for mode speed controller **1.01**)

“Set external 1” under settings must be programmed to OFF
contact at digital input e. g. Digital IN 1 = D1-D1

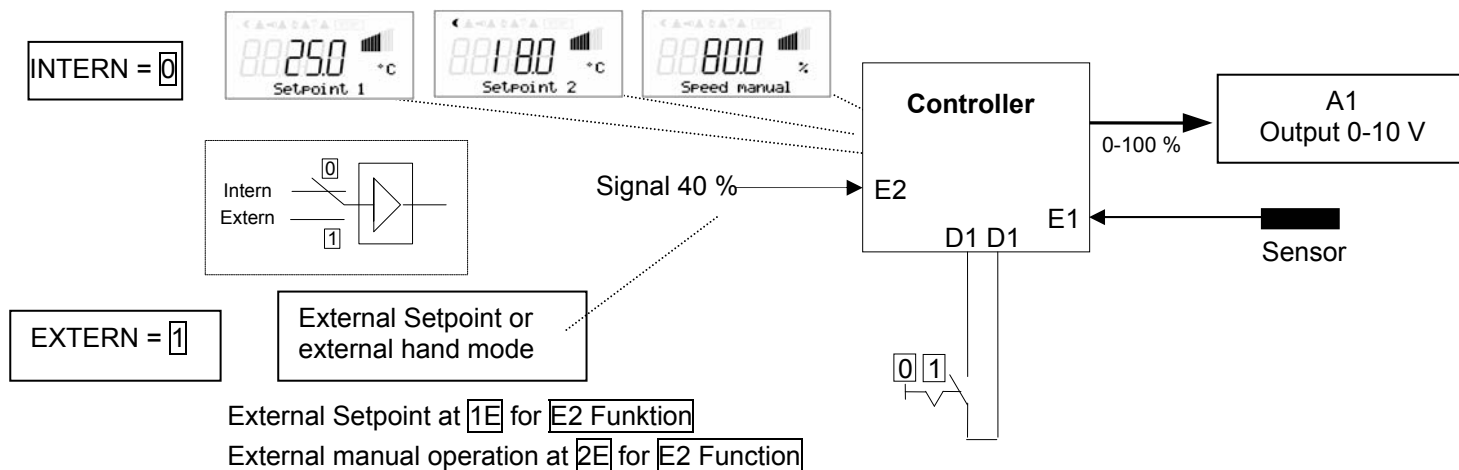


Set Intern 1 at opened kontakt ↔ Set Extern at closed contact **D1 Inverting** **OFF**

Set Intern 1 at closed kontakt ↔ Set Extern at opened contact **D1 Inverting** **ON**

♦ **Switch over between aktiv setting at the unit and external Signal** (for mode controller higher **2.01**)

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



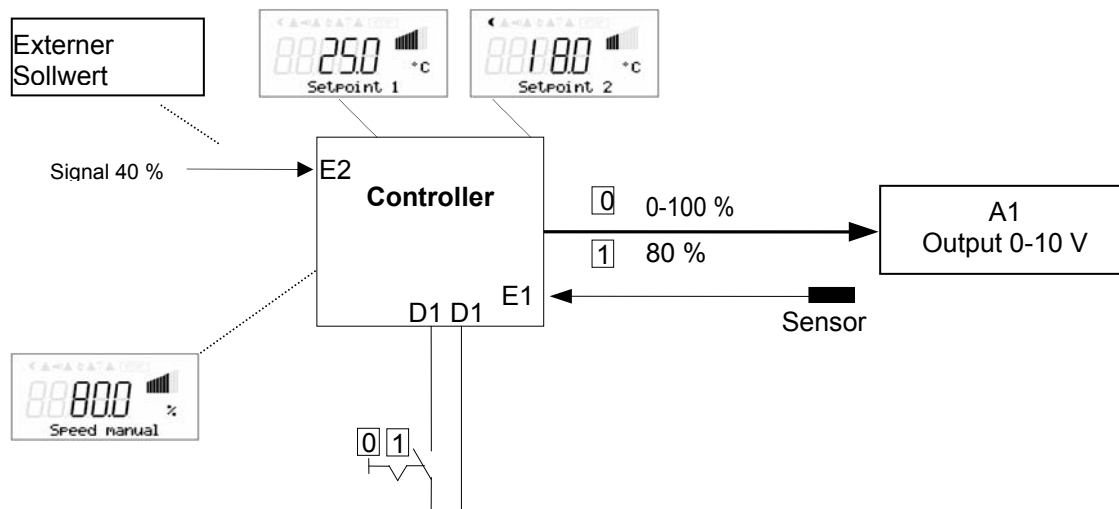
Setting at the unit at opened contact ↔ Signal Extern at closed contact **D1 Inverting** **OFF**

Setting at the unit at closed contact ↔ Signal Extern at opened contact **D1 Inverting** **ON**

13.2.7 Automatic control / speed manual internal (Menu Speed manual) Funktion 7D

Switch over between automatic control to set target value (depending on the activation: Setpoint 1, Setpoint 2, Setpoint external) and the default for manual operation set at the device.

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



Automatic control at opened contact ↔ manual operation at closed contact

D1 Inverting OFF

Automatic control at closed contact ↔ manual operation at opened contact

D1 Invertierung ON

13.2.8 Reverse action of control function actual value>Set = n+ or actual value>Set = n- Funktion 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.)

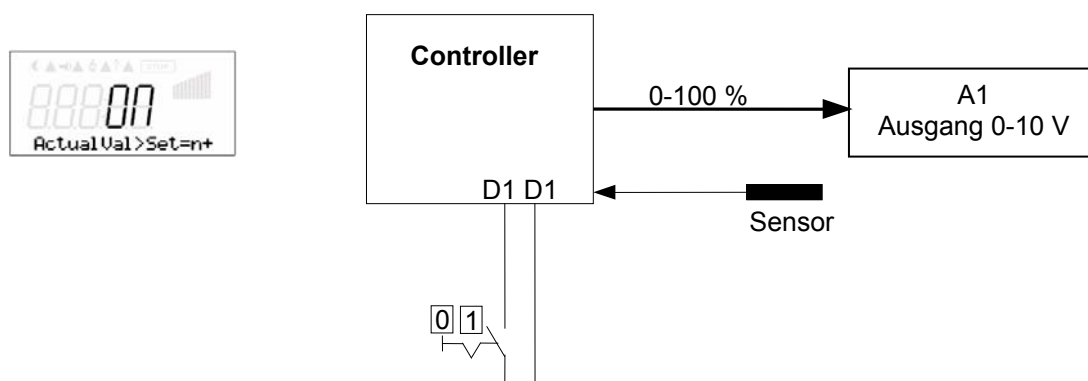
When switching over via a digital input, the device works with the opposite function than the one set there!

Example: Actual value>Set = n+ (increasing modulation during increasing actual value)

kontakt at digital input e. g. Digital IN 1 = D1-D1

Setting in Controller Setup

kontakt at digital input e. g. Digital IN 1 = D1-D1



actual Value>Set = n+ at opened contact ↔ actual > Set = n- at closed kontakt

D1 Inverting OFF

actual Value>Set = n+ at closed contact ↔ actual > Setl = n- at opened contact

D1 Inverting ON

13.3 Inverting analog inputs E1 and E2

After programming the signal or sensor type, an inversion of the inputs can be carried out.



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)

Ziehl-Abegg sensors generally do not work with inverted output signals
(i.e., these are not suitable for an inverted evaluation)

e. g.:

DSG200	0-10 V	proportional	0-200 Pa
MAL1	0-10 V	proportional	0-1 m/s
DSF2-25	4-20 mA	proportional	2-25 bar
MBG-30I	4-20 mA	proportional	0-30 bar

In sensors with inverted outputs, 0 V or 4 mA must correspond to the final value of the measurement range.

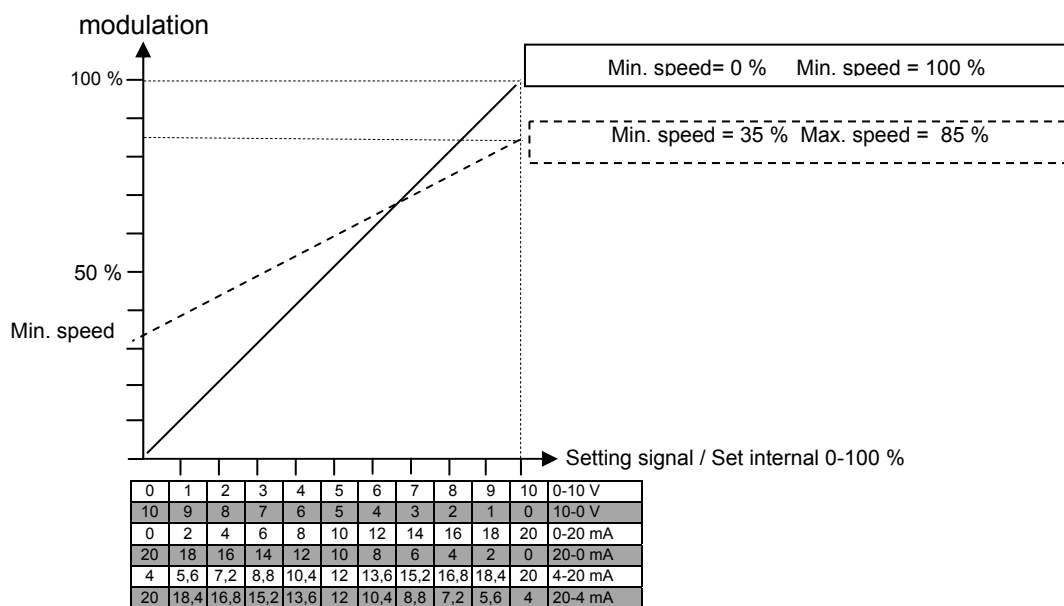
e. g. pressure sensor 10-0 V proportional 0-200 Pa

example:

mode **1.01** speed controller

setting by external signal

Inverting	OFF
Inverting	ON

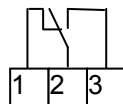


Idealized principle diagram

13.4 Function and inverting for relay outputs K1 and K2

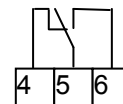
Various functions can be allocated to the relay outputs K1 and K2

In case of the same function allocation for K1 and K2, these work parallel.



K1

Max. contact rating
5 A / 250 V AC



K2



1 = de-energized, terminals 2-3 bridged
0 = energized, terminals 1-2 bridged

1 = energized, bridged 5-6 bridged
0 = de-energized, bridged 4-5 bridged

Function	description
--	no Function Relays remain always de-energized
1 K	Operating indication (factory setting for K1) Operation without fault, reports enable ON / OFF
2 K	Fault indication (factory setting for K2) At controller fault, Sensor fault dependent on programming, external fault at digital input
3 K	External fault separate With message at digital input (factory setting if terminals bridged)
4 K	Limit modulation when over or falling below limits for modulation
5 K	Limit E1 when over or falling below limits for input signal E1
6 K	Limit E2 when over or falling below limits for input signal E2
For modes as controller (higher 2.01)	
7 K	Setpoint Offset Deviation between actual value and setpoint to high
8 K	Group control Switching on fans depending on modulation
For modes as temperature controller with additional functions (2.03))	
9 K	Heating function Switch ON point: temperature = Setpoint +/- Offset Switch OFF point: Temperature around hysteresis <u>over</u> switch ON point
10 K	Cooling function Switch ON point: temperature = Setpoint +/- Offset Switch OFF point: Temperature around hysteresis <u>below</u> switch ON point

K1 / K2 Inverting

The factory preset is the inversion of relay K1 and K2 to „OFF“ (if a function has been programmed).

Switch to „ON“ for inversion (switch-time response depends on the allocated function). Fundamentally, the relays can only become operative if the electronics' voltage supply is functioning.

Function	Controller status	K1 / K2 Inverting	
		OFF	ON
1 K	Operation without fault, line suply okay	1	0
2 K	Fault with indication by relay	0	1
3 K	Ext. Fault at digital input for external fault	1	0
4 K	when over or falling below limits for modulation	1	0
5 K	when over or falling below limits for input signal E1	1	0
6 K	when over or falling below limits for input signal E2	1	0
7 K	setpoint deviation to high	1	0
8 K	Switching on second group	1	0

13.5 Network for several devices by MODBUS

13.5.1 MODBUS - RTU (Remote terminal unit)

It is possible to network several devices with each other. .

The device uses the MODBUS-RTU as the protocol for the RS-485 interface. The communications parameters are permanently set to 19200 baud, 8 data bits, EVEN parity, 1 stopbit, (8E1).

A maximum of 247 stations can be connected with each other. The device address (Device-ID) is factory set to the highest available MODBUS address: **247**

This address is reserved for operation with an external terminal model A-XG.. and should not be occupied with anything else.

The addresses of the individual units must be continuously numbered beginning with „1“. No address may be allocated twice.

MODBUS address adjustable from 1-247

Address 247 = preprogrammed for an external terminal



When using an external AXG.. terminal, the interface is assigned and can not be employed for anything else

13.5.2 External display

The device uses MODBUS as the protocol for data exchange with an external AXG... display. During this, the external display is the MODBUS master. In this case, the interface is occupied and cannot be utilized for anything else.

The external display uses the **function code 105** (User Code) for the data exchange. This function code should therefore be avoided in a MODBUS system with other stations.

13.5.3 Reading and writing parameters

The device supports reading and writing processes for MODBUS Holding Registers (3). The start address is 1; the number of registers depends on the device. If the allowable start address or number is exceeded, the device answers with an exception code. The description of the register is device dependent and can be requested from Ziehl-Abegg service for the device/version concerned.

14. Limits

14.1 Limit indication depending on modulation



↓ P ↑ ESC



↓ ↑



↓ ↑



↓ ↑



following functions can be allocated to the limit indication

Function	description
OFF	No function
1 L	Indication with the centralized fault of a programmed relay (IO allocation function 2K) warning symbol in display, "AL" code in events memory
2 L	Is merely displayed in the events menu as message "msg"

In the IO setup, a separate relay can be allocated independent of these settings.

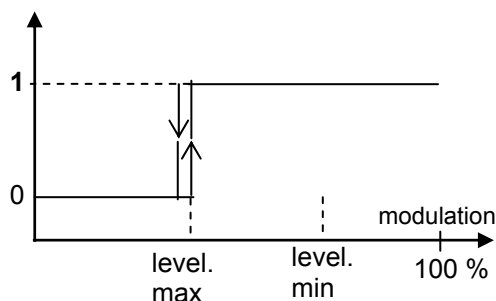
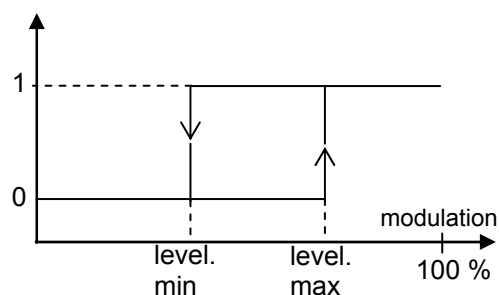
If the modulation exceeds the set "Level max" value, this is reported until the set value "Level min" has been undercut. The indication is delayed by the time set in "Display delay".

Time delay exceeding "Level max." Up to indication by relay and alarm symbol.
Factory setting 2 Seconds
setting range 0-120 Seconds

Example indication by relay K1:

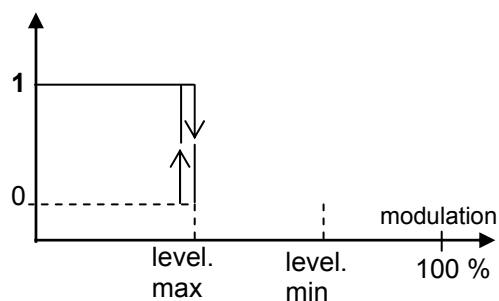
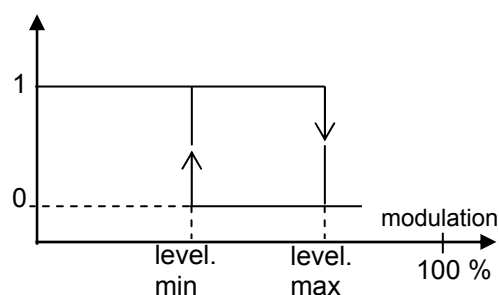
not inverted

IO Setup → K1 Function: **4K**
IO Setup → K1 Inverting: „OFF“



inverted

IO Setup → K1 Function: **4K**
IO Setup → K1 Inverting: „ON“



If „Display min“ is **higher** than „Display max“, the „Display max.“ switching point is without hysteresis!

14.2 Limit indication depending on setting or sensor signal

following functions can be allocated to the limit indication:



Function	description
OFF	No function
1 L	Indication with the centralized fault of a programmed relay (IO allocation function 2K1) warning symbol in display, "AL" code in events memory
2 L	Is merely displayed in the events menu as message "msg"

In the IO setup, a separate relay can be allocated independent of these settings

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“)

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“)

If the signal exceeds the set value „E1 max“, this is reported until the set value (minus hysteresis) has been undercut once again.



Hysteresis adjustment in the unit of measure of the programmed input signal



Time delay during alarms

Factory preset 2-seconds, adjustment range 0-120 seconds



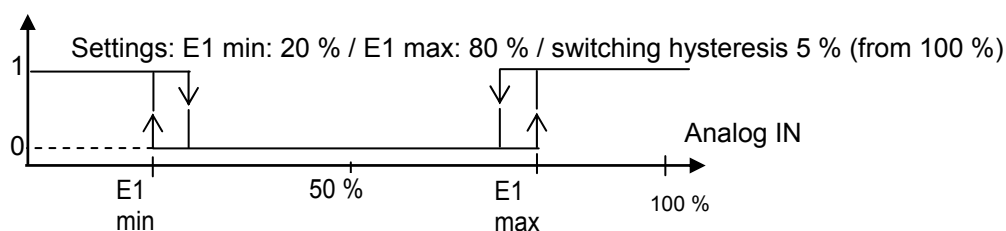
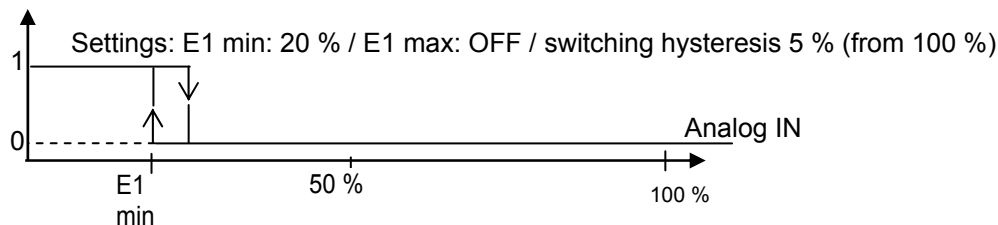
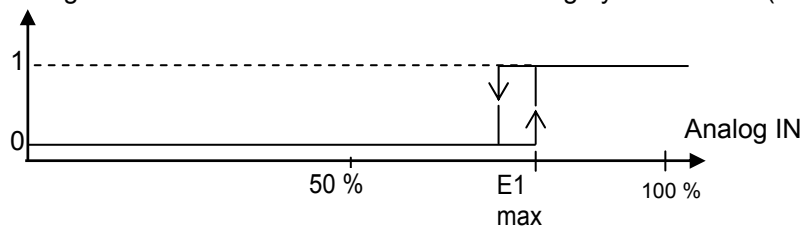
Always adjust the value for the maximum input signal higher than the value for the minimum input signal! E1 max. > E1 min!

Example for a limit indication of default signal or sensor signal to Analog IN 1

(Terminal E1 and GND) alarm via relay K1 (non-inverted) IO Setup → K1 function:

„5 K“ = limit indicators E1

Settings: E1 max: 80 % / E1 min: OFF / switching hysteresis 5 % (from 100 %)



14.3 Limit indication depending on offset to Setpoint

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

The following functions can be allocated to this limit indicator



Function	Description
OFF	No function
1 L	Indication with the centralized fault of a programmed relay (IO allocation function 2K) warning symbol in display, "AL" code in events memory
2 L	Is merely displayed in the events menu as message "msg"

In the IO setup, a separate relay can be allocated independent of these settings.

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.



Offset 1 for alarm in case of an **exceeding of the max. deviation** between actual and target

SwitchON point: actual value = Setpoint +/- offset

SwitchOFF 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

SwitchON point: actual value = target value +/- offset

SwitchOFF point: Actual value by hysteresis over the switch-on point.



Hysteresis switch-on point: In temperature regulation ± 10 K, otherwise sensors 10 % of measurement range.

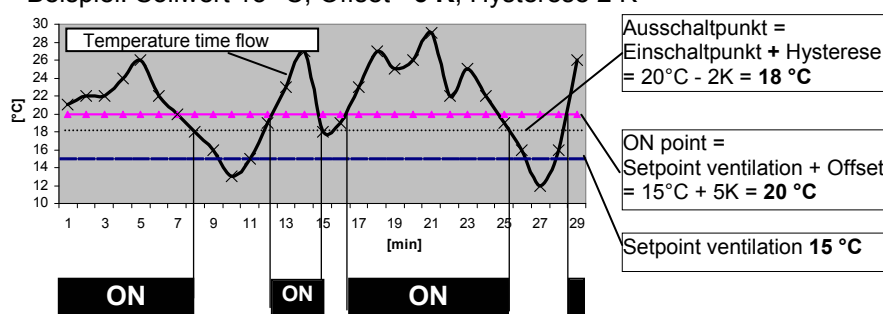


Time delay until indication through relay and alarm symbol. Factory preset 2 seconds, adjustment range 0-120 sec

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

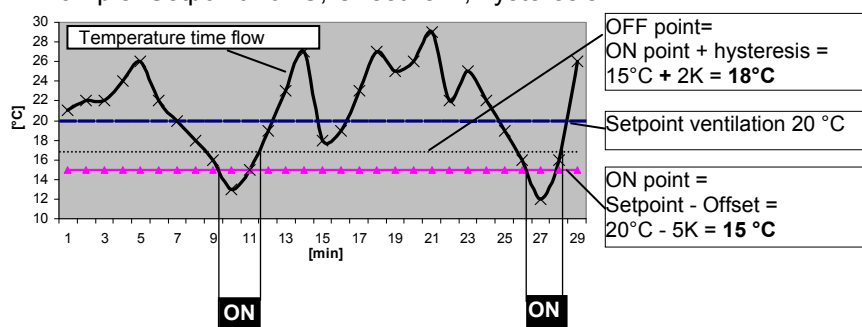
Offset 1 for alarm during exceeding

Beispiel: Sollwert 15° C, Offset +5 K, Hysterese 2 K



Offset 2 for alarm during undercutting

Example: Setpoint 20° C, Offset -5 K, hysteresis 2 K



15. Timer (timer)

The device has a real-time clock. The clock is buffered and has a 2-3 day reserve. 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.

15.1 Setting the time and date



↓ P ↑ ESC



„Press the „P button“ and, using the UP and DOWN keys, set the hours. Press the „P button“ to save. The minutes indicator now flashes and can be set using the UP / DOWN keys. Press the „P button“ once more to conclude. The time has now been stored. This procedure only takes a moment. Afterwards, the new time appears in the display.



To set the date follow the same method as for „Time“. The date setting consists of DAY, MONTH, and YEAR

day / month / year

15.2 Automatic summer/winter time

The automatic summer/winter time is factory set to „OFF“, i.e. switched off.

When the automatic summer/winter timer is set to = „ON“, the device automatically switches between daylight savings time and standard time.



Automatic swicht over between summer time and winter time

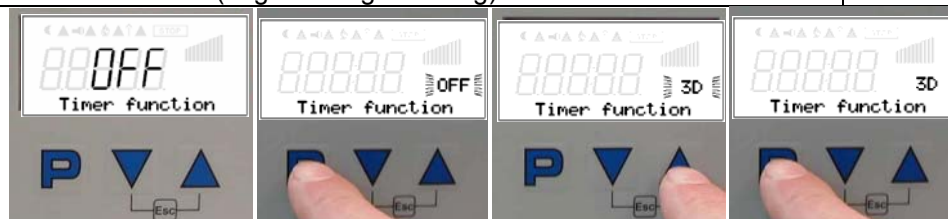
15.3 Timer function

In principle, the timer function acts like one digital switch input. Thus, the same functions can be assigned to the timer switch as the digital inputs, „D1“, „D2“..

A summary of the timer functions (example IO Setup / Function description **1D**.**8D**) then corresponds to Timer „On“ with function 1D a closed contact with function **2D**.**8D** a closed contact (OFF during inversion).

Function	description	Timer ON =
--	no function (factory setting)	
1 D	Enable (remote control) ON / OFF	Device OFF
2 D	External fault	fault
3 D	Limit ON / OFF Limitation of max. output voltage	Limit ON
4 D	E1 / E2 Switch over between signal at Analog IN 1 (E1) and Analog IN 2 (E2)	Signal at E2
For mode speed controller 1.01		
5 D	Set Intern 1 / 2 Switch over between 2 adjusted settings at the controller	Set intern 2
6 D	Intern / Extern Switch over setting at the controller / external signal	External signal
For modes as controller (higher 2.01)		
5 D	Setpoint 1 / 2 Switch over between 2 Setpoints (e. g. day- / night operation)	Setpoint 2
6 D	Intern / Extern Switch over between setting at the controller or external signal	External signal
7 D	switch over between automatic control and Speed manual	Setting manual
8 D	Switch over between ON: ActualVal>Set =n+ and OFF: Actual>Set=n- Reverse action of control function (e. g. Heating / Cooling)	Reverse Standard

Example:
Programming
limitation for output
voltage
(„Limit ON / OFF“)



15.4 Enter switching times

T w o 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.



♦ Factory setting without preprogrammed switching times

Mo - Su													
Mo - Fr										Sa - Su			
Mo		Tu		We		Th		Fr		Sa		Su	
ON1	--:--	ON 1	--:--	ON 1	--:--	ON 1	--:--	ON 1	--:--	ON 1	--:--	ON 1	--:--
OFF1	--:--	OFF 1	--:--	OFF 1	--:--	OFF 1	--:--	OFF 1	--:--	OFF 1	--:--	OFF 1	--:--
ON 2	--:--	ON 2	--:--	ON 2	--:--	ON 2	--:--	ON 2	--:--	ON 2	--:--	ON2	--:--
OFF 2	--:--	OFF 2	--:--	OFF 2	--:--	OFF 2	--:--	OFF 2	--:--	OFF 2	--:--	OFF 2	--:--

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

Mo - Su													
EIN1	08:00	EIN 1	08:00	EIN 1	08:00	EIN 1	08:00	EIN 1	08:00	EIN 1	08:00	EIN 1	08:00
OFF1	18:00	OFF1	18:00	OFF1	18:00	OFF1	18:00	OFF1	18:00	OFF1	18:00	OFF1	18:00
ON 2	--:--	ON 2	--:--	ON 2	--:--	ON 2	--:--	ON 2	--:--	ON 2	--:--	ON 2	--:--
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

Mo - Fr										Sa - Su			
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

Mo	Tu	We	Th	Fr	Sa	Su							
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

Mo	Tu	We	Th	Fr	Sa	Su							
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	

16. Diagnostics menu



The diagnostics menu supplies information about the momentary operating condition of the device. Under certain circumstances, conclusions can be drawn about possible malfunctions through these insights..

**Operation hours counter for Controller.**

The time counting runs, as soon as mains voltage is connected (without fault). If events step on (motor fault, external fault, etc.), the period of operation is stored at this time.

**Operation hours counter for motor.**

The time counting runs as soon as a modulation of the controller is present.



Signal height at analog input E1 (Analog IN 1)



Signal height at analog input E2 (Analog IN 2)

**Status digital input 1 (Digital IN 1)**

OFF = terminals D1- D1 bridged ↔ ON = terminals D1-D1 not bridged

**Status digital input 2 (Digital IN 2)**

OFF = terminals D2- D2 bridged ↔ ON = terminals D2-D2 not bridged

**Status digital input (Digital IN 3)**

OFF = terminals D3- D3 bridged ↔ ON = terminals D3-D3 not bridged

**Status digital input 4 (Digital IN 4)**

OFF = terminals D4- D4 bridged ↔ ON = terminals D4-D4 nicht gebrückt

**Status digital input 5 (Digital IN 5)**

OFF = terminals D5- D5 bridged ↔ ON = terminals D5-D5 nicht gebrückt

**Status timer function**

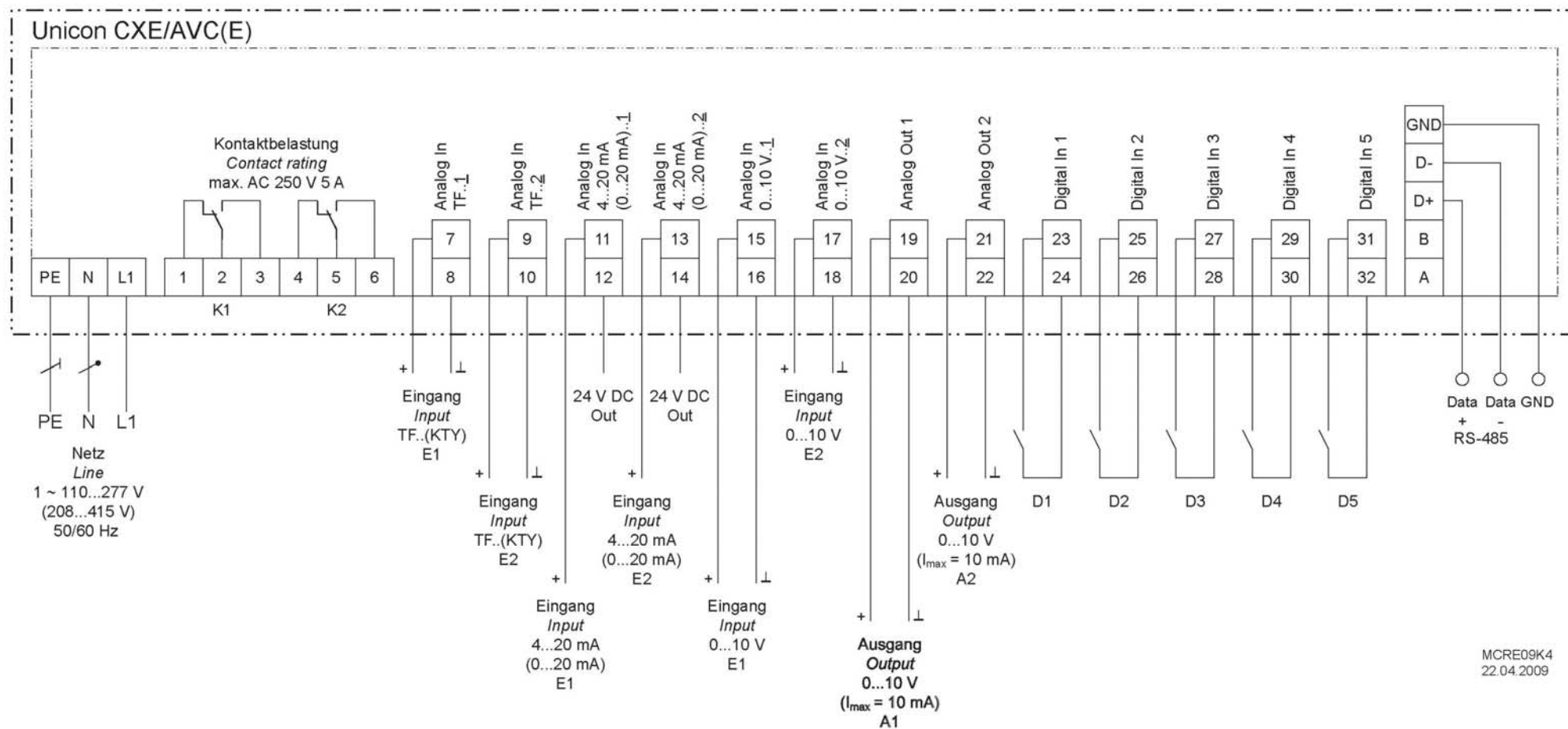
OFF = relay K1 de-energized terminals 1-2 bridged

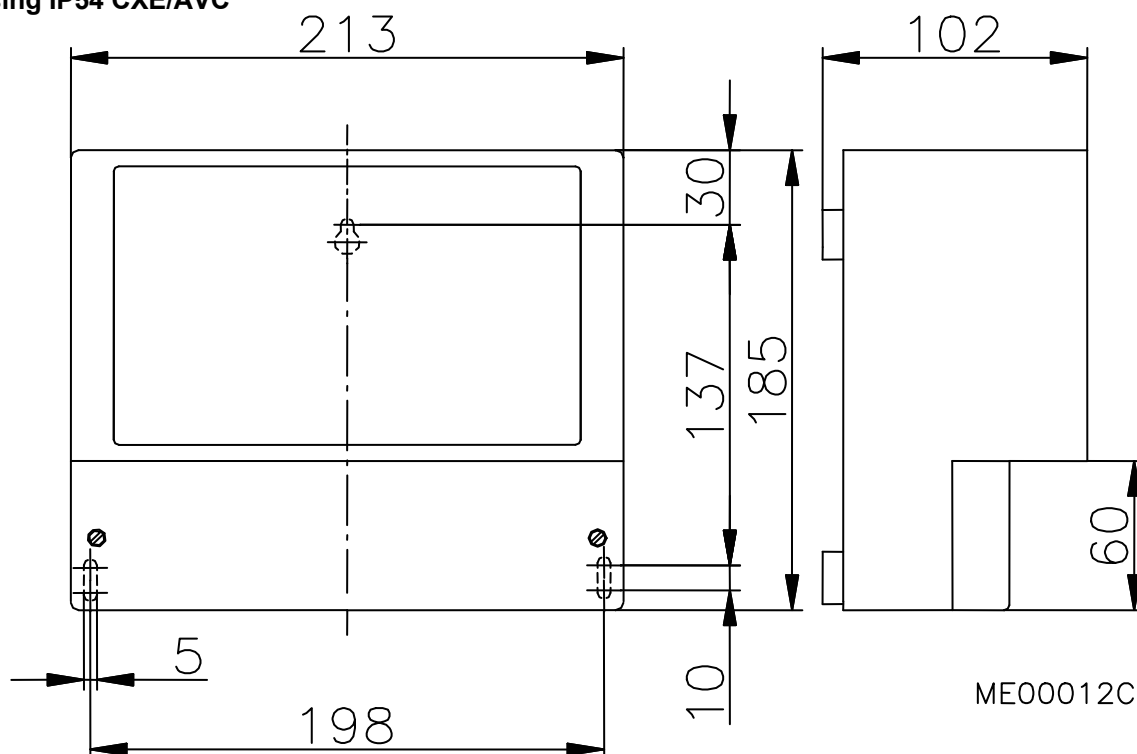
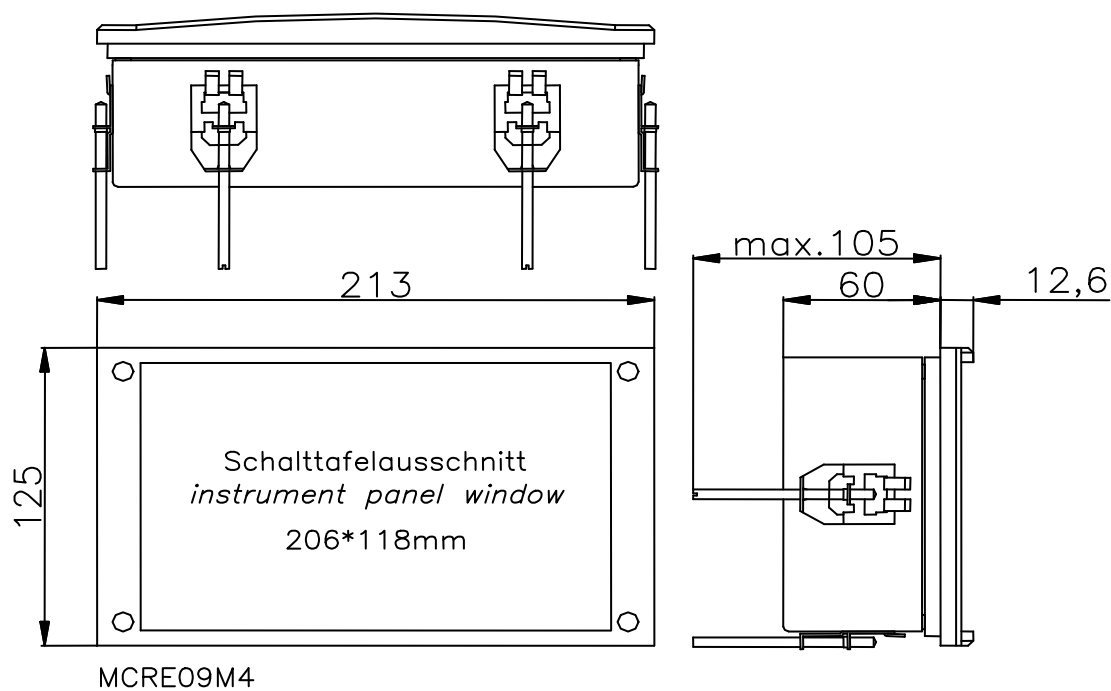
ON = relay K1 energized = terminals 2-3 bridged



OFF = relay K2 de-energized terminals 4-5 bridged

ON = relay K2 energized = terminals 5-6 bridged

17. Enclosure**17.1 Connection diagram**

17.2 Dimension sheet**Wall housing IP54 CXE/AVC****Installation into control panel CXE/AVCE**

18. Events

The last 10 (0-9) events and malfunctions are stored in the „Events“ menu group (position „0“ = most recent event).

Device differentiates between 3 types of events:

1. Messages with code **Msg**

Message sensor fault for information if „Alarm Sensor“ deactivated.

2. Alarms with code **AL**

Events during which the device automatically restarts operation or remains in operation after the cause of the malfunction has been remedied (e.g. externally-trunked centralized fault).

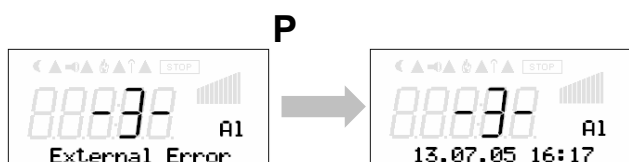
A momentary pending alarm or error message is indicated by a blinking indicator and appears alternately with the standard display.

Possible events and faults:

- **Factory setting** **Msg**
Fault in Eprom
controller works with defaults
- **Externe fault** **AL**
Motor protection unit triggered (signal contact at digital input)
- **EEP Error** **AL**
fault EEP EEP damaged
controller works with defaults
- **EEP Corruption** **AL**
data incorrectly. Controller runs with the read settings

With the "P" key can be switched between description of the message and the time when it happened.
E.G. on place 3 which is past message "motor fault"

Inquiry of the CONTROLLERS period of operation at the time of the message.

**19. Messages and trouble shooting**

A momentary pending alarm or error message is indicated by a blinking indicator and appears alternately with the standard display. In addition, it is signaled via the 3-internal LED's.



No Display

- line voltage available ? Unit switches OFF and automatically ON when the voltage has been restored
- check internal controller fuse)



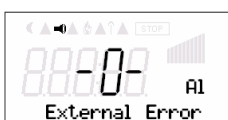
Sensor fault

Interruption / short circuit in the sensor leads or sensor values measured are outside measuring range.
(Controller setup Alarm Sensors = ON)



NO enable

Switch OFF by external contact
(function 1D = enable programmed for Digital IN1/2)



External fault

Alarm from external contact (e.g. motor protection unit STDT with auxiliary contact)



Limit indication actual minimum

Actual value below setting "Alarm Minimum"
(Input E1)



Limit indication actual maximum

Actual value above setting "Alarm Maximum"
(Input E1)

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