

## FKD003



### Field module for cold locations for installation in refrigerators



## Features

- Operation of electronic expansion valves pulsed via ATV230 (valve controller 230V~/=)
- Control of one evaporator per module
- Integrated temperature display
- Tool-free front installation
- Fixed input/output allocation for probes, control inputs and relays
- Emergency program in case of bus errors
- External power supply over TR9-9-4
- Secure connection via prefabricated accessories (ZCB)
- Front panel with seal frame for increased splash protection
- Connection to main module via field bus (CAN bus)

### Writing conventions

Symbol	Meaning
 <b>CAUTION!</b>	Avoid the described hazard: Otherwise <b>minor</b> or <b>medium</b> bodily injury or property damage will result.
 <b>WARNING!</b>	Avoid the described hazard: Otherwise there is danger from <b>electric voltage</b> that can lead to death or <b>serious</b> bodily injury.

### For your safety

For safe operation and to avoid personal injury and equipment damage through operational error, always read these instructions, become familiar with the device, and implement all of the safety instructions on the product and in these instructions as well as the safety guidelines of Wurm GmbH & Co. KG Elektronische Systeme. Keep these instructions ready to hand for quick reference and pass them on with the device when the product is sold.

Wurm GmbH & Co. KG Elektronische Systeme accepts no liability in case of improper use or use for other than the intended purpose.

<b>Target group</b>	These instructions are intended for "service technician" personnel.
<b>Intended use</b>	The FKD003, which is installed in refrigerators, is a field module for cold locations.



#### **WARNING!**

##### **Danger of death from electric shock!**

- Switch off the power to the entire system when installing, wiring or removing! Otherwise a mains voltage may still be present even if the control voltage is switched off!
- The wiring of the device should be carried out only by a qualified electrician!
- Use only the correct tools for all work!
- Check all wiring after connection!
- Never expose the device to moisture, for example due to condensation or cleaning agents!
- Take the device out of operation if it is faulty or damaged and is therefore compromising safe operation!



#### **CAUTION!**

##### **Danger of fire if there is overloading of the connections!**

- Ensure the maximum loads on all connections!

##### **Faults are caused by electromagnetic interference!**

- Use only shielded data lines and place them far away from power lines!

##### **Damage to device if handled incorrectly!**

- Do not open the device.
- Do not repair the device yourself! If required, send it in for repair with an exact description of the fault!

### Software revisions and validity of documentation

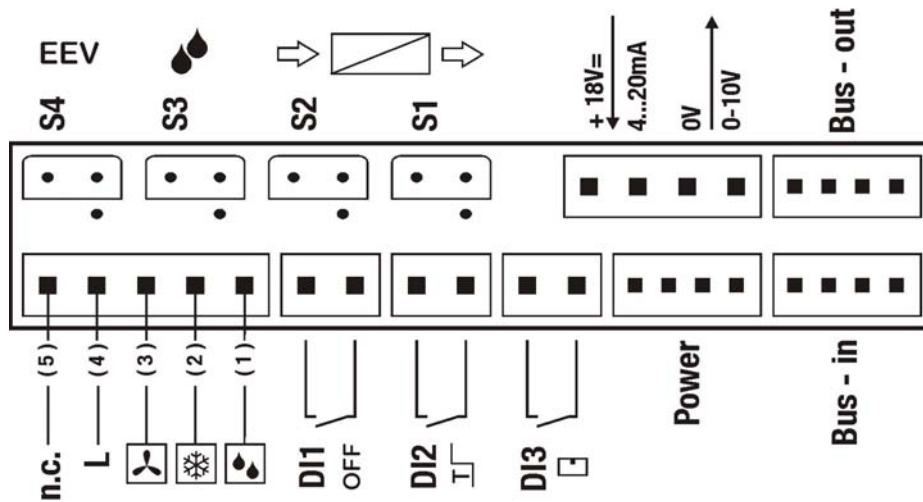
Software version	Functional upgrade	Page
V2.0	2011-08	Basis of documentation
	2012-09	Device operation, parameters list and listing of prefabricated cables added

Any software versions not listed are special solutions for individual projects and are not documented in detail in this description. This document automatically ceases to be valid if a new technical description is issued. **Manufacturer:** Wurm GmbH & Co. KG Elektronische Systeme. For further information, see our website at [www.wurm.de](http://www.wurm.de)

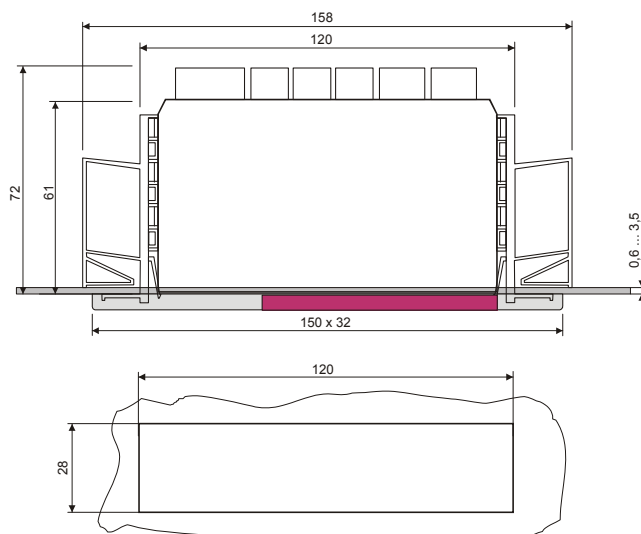
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**1 Circuit diagram**



**2 Assembly / connections**



Installation section

## Product information

All connections are designed as plugs for prefabricated cable.

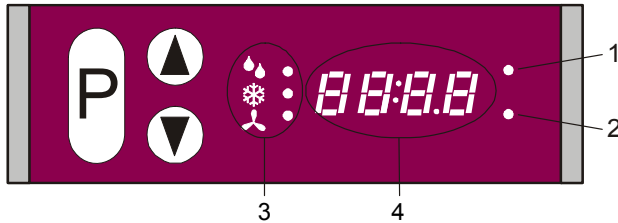





Connections for prefabricated cables

The following cables, bus adapters and terminating resistors are available for FKD003.

<b>Cables</b>	<b>Use</b>
ZCB-C/TR-0,6	Controller – transformer 0.6 m
ZCB-C/TR-2,0	Controller – transformer 2.0m
ZCB-C/REL-2,0M	Controller - load (solenoid valve, defr., fan) 2.0 m sheathed cable
ZCB-C/DI-2,0	Controller - digital inputs 2.0 m
ZCB-C/DI-7,0	Controller - digital inputs 7.0m
ZCB-C/AI-2,0	Controller - analogue input 4...20mA, 2.0m
ZCB-C/AI-7.0	Controller - analogue input 4...20mA, 7.0m
ZCB-C/AO-2,0	Controller - analogue output 0...10V, 2.0m
ZCB-C/BUS-0,6	Controller - controller/bus adapter, 0.6m
ZCB-C/BUS-4,5	Controller - controller/bus adapter, 4.5m
<b>Bus adapter</b>	<b>Use</b>
ZCB-ADP/BUS	Bus adapter
<b>End resistor</b>	<b>Use</b>
ZCB-ADP/R	Terminating resistor for CAN bus

### 3 Controls and indicators



LEDs and 7-segment display	
1	Parameter change approved
2	Advanced level
3	Status LEDs
4	Value/parameter number
Display symbols	
	Defrosting
	Cooling
	Fan

### 4 Device operation

The setting menu is divided into 2 distinct function areas, the **standard level** and the **advanced level**.

The **standard level** encompasses only the display of the control actual value and the status LEDs.

The **advanced level** encompasses all parameters (P01 to P16).

#### 4.1 Activating the advanced level

- To switch to the advanced level, press the <P> key for 5 seconds.  
The LED "Advanced level" will flash for as long as the level is released.



5sec.

- To return to the advanced level, press the <P> key again for 5 seconds.  
If no key is pressed within 2 minutes, the display automatically returns to the standard level.

#### 4.2 Selecting parameters

- Press the <P> key to display the parameter number. The parameter number will appear in the display for as long as the key is depressed.
- To select individual parameters with the <P> key depressed, press the ▲ or ▼ key.  
When the keys are released, the value corresponding to the parameter is displayed.



### 4.3 Setting parameters

1. Select the parameter to be adjusted (having previously released the advanced level if necessary).
2. Parameter change approved. Press all 3 keys simultaneously for 5 seconds.  
The LED "Parameter change approved" flashes.
3. Change the values using the ▲ or ▼ keys.



When changing the parameters, it is not necessary to re-enable access to make further value adjustments.

Current values are simply displayed. They cannot be adjusted even if the LED "Parameter change approved" is flashing.

4. To disable parameter change, press all 3 keys simultaneously again for 5 seconds.

If no key is pressed within 2 minutes, the display automatically returns to the standard level and parameter change is disabled. The jump back is always made to the temperature display.

### 4.4 Set module number



**Note!**  
▪ 3 x Service button => address P11

To simplify setting of the module number (P11), it is possible to go directly to the menu position by pressing the Service button of the device (behind the front plate) 3x in rapid succession.

All that is needed now to set the address is to release parameter adjustment.

### 4.5 Block keys against unauthorised operation



**Note!**  
▪ 5sec. Service button + ▼ =>keys blocked

If the Service button and the arrow key ▼ are pressed simultaneously for 5 seconds, the keyboard (3 visible keys) is blocked. An effective block is confirmed by displaying the text ""no OP" for 1 second. Blocking the keys simultaneously exits the advanced level and branches to the standard menu. Access is also blocked if it was released before.

When the keys are blocked, any time a key is pressed the block is indicated by the access and advanced level LEDs lighting up; this way the device will not incorrectly be considered defective.


**Note!**

- 5sec. Service button + **P** => buttons free

The block can be removed by pressing the Service button together with the Menu button "**P**" for 5 seconds. Removal of the block is signalled by the appearance of the text "**F r E E**" for 1 second.

## 5 Parameter

### Standard level: Actual value

No.	Parameter	Default	Min.	Max.	Description
P00	Control actual value		-	-	Current actual value of temperature control

### Advanced level: Actual values and setpoints

No.	Parameter	Default	Min.	Max.	Description
P01	Actual value of supply air		-	-	Temperature of supply air probe F1
P02	Actual value of return air		-	-	Temperature of return air probe F2
P03	Actual value of defrosting limit probe		-	-	Temperature of defrost limit probe F3
P04	Actual value of suction gas temperature		-	-	Temperature of suction gas probe F4
P05	Actual value 4..20mA		0	25.5	Current of the 4..20mA input (resolution: 0...25.5mA)
P06	Actual value 0..10V output		0	100	Triggering of the 0...10V output (resolution: 0...100%)
P07	Probe type supply air F1	277	-	-	Type of the temperature probe – to be set on the main module
P08	Probe type return air F2	277	-	-	Type of the temperature probe – to be set on the main module
P09	Probe type defrost limit F3	277	-	-	Type of the temperature probe – to be set on the main module
P10	Probe type suction gas temperature F4	277	-	-	Type of the temperature probe – to be set on the main module
P11*	Address	0	0	7	Set module number (field bus address)
P12	Version		-	-	Applied device version
P13*	Relay test function		0	3	0 = all relays off 1 = defrost 2 = cooling 3 = fan The relay test is automatically deactivated when the menu is exited or no further buttons are pressed within 2 minutes.
P14	Status of input: CLR OFF	OFF	OFF	ON	Current status of digital input DI1
P15	Status of input: 2. Setpoint	OFF	OFF	ON	Current status of digital input DI2
P16	Status of input: Door open	OFF	OFF	ON	Current status of digital input DI3

\* Adjustable parameters

## 6 Fault messages and emergency programs

In case of a fault, the display flashes with the fault code.

Display	Fault cause	Monitoring function and emergency program
<i>C O L L</i>	Address collision at the bus	The set module number is already assigned. Set a different module number!
<i>b u S</i>	Bus fault No bus communication	Check bus connection!
<i>E r C o</i>	Bus communication error	The device has detected activities on the field bus, but is not being controlled by the corresponding main module. Check address setting and parameter settings of the main module!
<i>E E</i>	Data fault in non-volatile memory	A power surge may destroy the set parameters. Operation is carried out with the factory default settings. Re-enter all memory locations. De-energise the control unit!

## 7 Technical data

Supply voltage	Over transformer TR9-9-4 with plug connection
Connections	Plug for prefabricated connecting cable ZCB
Communication	3-wire CAN-BUS interface, electrically isolated
Temperature probe	3 x TRK277/5ST-PLUS, Standard connection: Supply air, return air, defrost limit 1 x TRK-EEV/7ST suction gas
Analogue input	4...20mA
Digital inputs	3 x inputs for voltage free contacts: 1 x cold room off, 1 x 2. Setpoint, 1 x cold room door open
Outputs	<b>The total current of these output relays must not exceed 6A.</b>
Output relay	1x cooling, opening contact, 230V~, 3(2)A 1x fan, opening contact, 230V~, 3(2)A 1 x defrost, closing contact, 230V~, 3(2)A
Analogue output	1 x 0...10V=, tied to potential, capable of bearing max. 1mA Alternatively for control of an electronic relay ATV230
Housing	Plastic housing
Dimensions	(WxHxD) 158 x 32 x 75mm <sup>3</sup>
Mounting	See installation instructions
Ambient temperature	0...+50°C (operation)
IP protection class	IP54
Weight	About 150g
CE conformity	EC conformity according to - 2004/108/EC (EMC Directive) - 2006/95/EC (Low Voltage Directive)
	RoHS
Valid from	Version 2.0