Digital
Dual Function Controller EDJ-3 for humidity and temperature

with integrated sensor power supply

Type	Article	Description
EDJ-3	47.133	Input: 2 x 0 ... 20mA

- 2 N/O contacts for humidity circuit,
- 2 N/O contacts for temperature circuit
- Supply voltage 110...240 V AC
- With integrated 24-VDC power supply for the sensors
- Suitable for TFG80J, TFK80J or TFK120J

Description

The controller EDJ-3 for humidity and temperature consists of two integrated, digital microprocessor controllers and also an integrated 24-VDC power supply for the sensors.

The humidity temperature sensor type TFG80J, TFK80J or TFK120J (article no. on page 11) is used as the readings recorder. The humidity and temperature values are displayed digitally on the EDJ-3 controller as actual values.

The EDJ-3 controller can be used as a two or three point controller. The output states are shown by LEDs.

The user-friendly EDJ-3 controller is very easy to use. It has been pre-programmed in the factory so that no particular previous knowledge of control engineering is required to be able to solve simple control tasks. After successfully connecting up and entering the target values, it is ready for immediate use to control humidifying or dehumidifying as well as heating and cooling.

Apart from that, the controller also allows you to solve complex control tasks. By using the keyboard to enter the parameters, you can set the PID characteristics of the controller and also the switching time, the switching hysteresis, the working point and the output limiting.

The controller inputs are digitally filtered to prevent the input signal from changing too quickly. The filter time can be set between 0.0 ... 100.0 sec. This means that the control is no longer affected by interference and transients.

A special feature of the EDJ-3 is the self-optimization (auto tuning). This means that the controller independently determines the optimal control parameters for a PID controller in the given control environment.

The controller has a “manual mode” in which the output level can be increased or reduced.

The EDJ-3 offers another useful feature: the offset correction. This allows the actual values to be adjusted with the measured values of a reference sensor.

The humidity and temperature controller type EDJ-3 provides you with a control unit, which can be used to solve a wide range of problems. The EDJ-3 controller simultaneously acquires and controls the humidity and temperature and is thus suitable for controlling e.g. computer rooms, air conditioning and maturing chambers, monitoring and regulating the ambient conditions at print shops, in the textile industry, the film industry, in hothouses, in warehouses and many other places.

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Intended use

This device is intended for use in industrial environments, as specified in the technical data. Any other use or use beyond that specified shall be regarded as incorrect use.
The device is constructed in accordance with the applicable standards and guidelines as well as the valid safety regulations. Nevertheless, incorrect use may result in personal injury or damage to property.

To avoid hazards, the device must only be used:

- For its intended purpose
- If it is in perfect condition in terms of safety
- In compliance with the technical documentation provided

Even when the device is used properly or as intended, application-related hazards may arise, e.g. due to missing safety equipment or incorrect settings.

Personnel qualifications

This document is intended for technically qualified personnel who have been specially trained and have relevant knowledge in the field of automation technology.

Such knowledge, along with the correct technical implementation of the safety instructions and warnings contained in the technical documentation provided, are essential requirements for ensuring safe assembly, installation and commissioning as well as safety during operation of the device described.

Incoming goods acceptance, storage and transport

Inspection of consignment

- Ensure that packaging and contents are undamaged
- Check consignment contents for completeness by referring to the delivery documents and order details
- Inform the supplier immediately in the event of any damage
- Store damaged parts until the issues have been clarified with the supplier

Included in standard delivery

1 x EDJ-3 controller – version as ordered
1 x these operating instructions
1 x connector part with threaded fitting, 3-pole
2 x connector part with threaded fitting, 8-pole
2 x fastening clip

Information on storage and transport

- Store the device in a dry, clean environment.
- Comply with the permissible environmental conditions (see „Technical data“)
- Protect the device from impacts during transportation
- The original packaging provides optimum protection for storage and transportation

Return of goods

In the event of a repair, please return the device in a clean and complete condition. Use the original packaging when returning the device.
A completed repair covering letter containing the following information must be enclosed with the returned goods:

- Description of the application and of the fault that occurred

Disposal of the device		DISPOSAL! The device and its parts are made from materials, which can be recovered by specialist recycling companies for re-use. Therefore devices or replaced parts which are no longer in use should not be disposed of with the domestic waste. Have the device and the packaging materials disposed of properly and in an environmentally responsible manner. Compliance with the specific national laws and regulations on waste treatment and disposal is also required.
Disposal of the packaging materials		All packaging materials are fully recyclable.

Installation instructions

Installation instructions		The device is not intended for use in potentially explosive atmospheres. There is a risk of explosion. **Only use the device outside of potentially explosive atmospheres .**
Installation location		The device in intended for installation in a switch panel aperture within an enclosed switchboard cabinet. The front of the device and the housing have different IP ratings (see „Technical data“).
Climatic conditions		The ambient temperature and relative humidity at the installation location must comply with the technical data. Aggressive gases and vapours will have a detrimental effect on the service life of the device. The installation location must be free of dust, powders and other suspended matter.
Cleaning		The front of the device (front foil membrane) can be cleaned with commercially available detergents, dishwashing liquids and cleaning agents. **The front of the device is not resistant to aggressive acids and alkalis, scouring agents or pressure washers.** Using these substances/equipment may result in damage. **Use only suitable agents to clean the front of the device!**

Display and controls

Display		in menu
(1) Display	18-segment LCD display, white - on home screen: actual value	Name of parameter
(2) Display	18-segment LCD display, green – on home screen: setpoint; „OK“ is shown when accepting the change	Value of parameter
(3) Display	Shows whether manual mode is active	
(4) Display	Switch position of relay outputs (Yellow = active)	

Symbol	Off (= Default settings)	On
Manual mode	Manual mode is NOT active (=automatic mode)	Manual mode is active The output level can be controlled using the „Up“ and „Down“ buttons: increase/reduce the output level;
Switch position of relay outputs	Contact open	Contact closed: 1.) humidification or heating 2.) dehumidification or cooling

Key functions The device is operated using the four front keys (5...8).

Key or keycombinations (duration)	Function default	Function for navigating	Function for editing
(5) Up	Increase the setpoint; (in manual mode: increase the output level)	Select previous menu- item or parameter	Increase value or move up in selection list
(6) Down	Reduce the setpoint; (in manual mode: reduce the output level)	Select next menu- item or parameter	Reduce value or move down in selection list
(7) Back short (< 2 s)	Function configurable (default: no function)	Switch to higher menu level	Exit edit mode without making any changes
(7) Back long (> 6 s)	Switch to manual mode / leave manual mode	---	---
(8) Menu/OK short (< 2 s)	Main menu	Submenu or switch to editing mode	Exit edit mode with changes
Up + Down long (> 2 s)	Start / stop self-optimization (autotuning)	---	---

Default Home screen

Displays

1. Display (upper 18-segment display_white): Current actual value
2. Display (lower 18-segment display_green): Current setpoint
3. Display (manual mode)
4. Display (status of relay outputs)

Setpoint

The setpoint can be adjusted directly with the „Up“ and „Down“ buttons and accepted with the „Menu/OK“ button.

Manual mode

Use the „Back“ button to switch to manual mode (press and hold button for longer than 6 seconds).
The „Manual mode“ icon is illuminated when manual mode is active.
After switching to manual mode, the current output level is displayed and output.
The output level can be adjusted between 100.0% and -100.0% using the „Up“ and „Down“ buttons.

Note! If the measuring range is exceeded, the controller switches automatically to manual mode and initially adjusts the output level to 0%.

Self-optimisation (auto tuning)

(> 2 s)

Self-optimisation is started by simultaneously pressing and holding the „Up“ and „Down“ buttons (for > 2 s).
During self-optimisation, the message „autotuning active“ is displayed.
Self-optimisation can be cancelled by simultaneously pressing and holding the „Up“ and „Down“ buttons again (for > 2 s).
In the case of the oscillation method used here, the output level is set alternately to 100% and 0%, causing the control variable to oscillate. From the response of the actual value, the controller calculates the optimum controller parameters for PB.1-2; DT.1-2; RT.1-2; CY.1-2.

Warning!
During self-optimisation using the oscillation method, the output level limits Y1 and Y2 are inactive. The output level may exceed or drop below the set limits. Ensure that this will not result in any damage to the system.

Note! If the actual value goes out of the measuring range during self-optimisation, self-optimisation is aborted. In such cases, the configured parameters are not changed.

Main menu

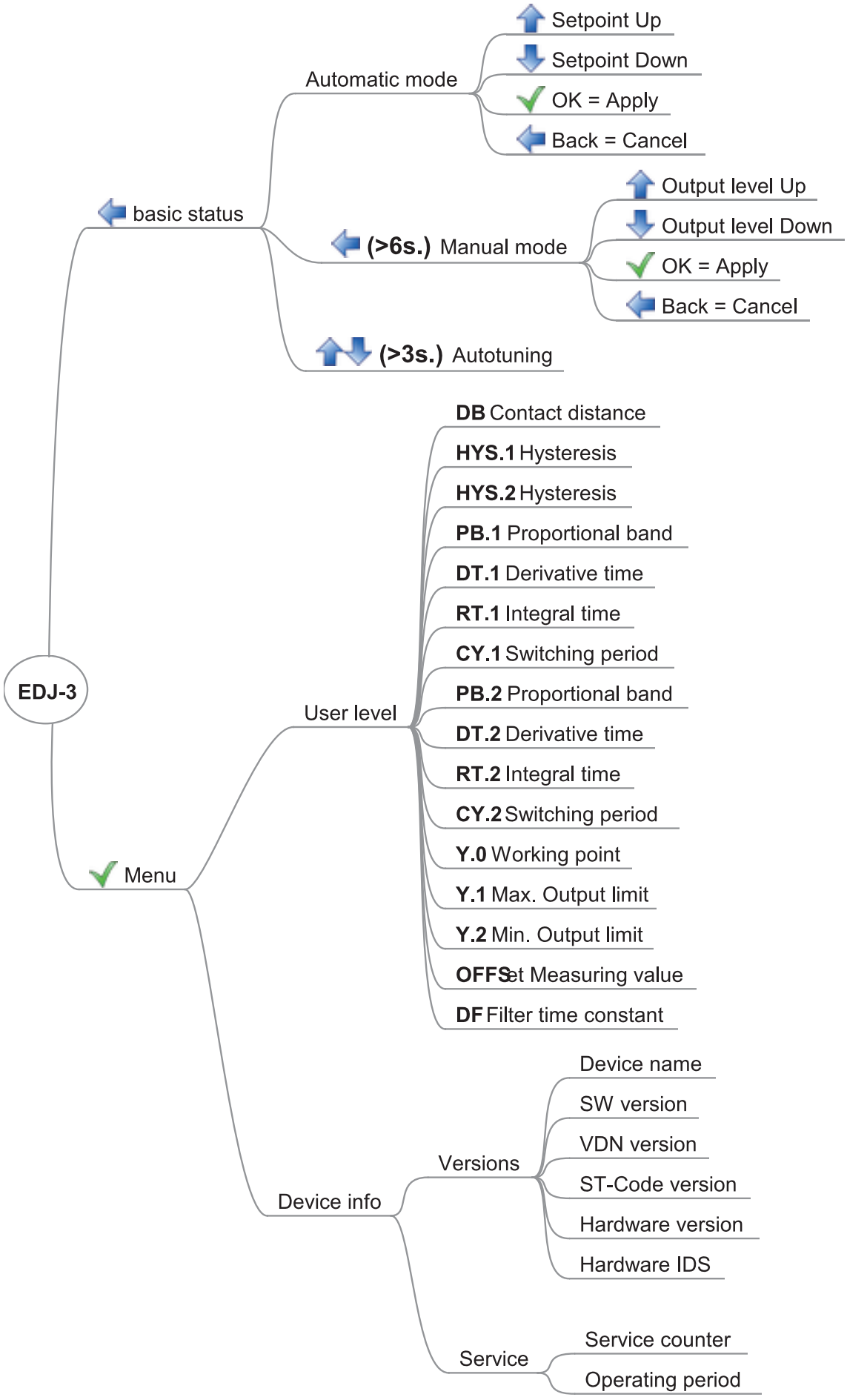
To access the main menu (MENU) from the home screen, press the „Menu/OK“ button.
In addition to the „User level“, the main menu also contains the „Device info“ menu item for displaying device information (name, version numbers) and counter statuses.

Navigation

Select sub-menus
In the main menu, the individual sub-menus can be selected using the „Up“ and „Down“ buttons. Pressing the „Menu/OK“ button again takes you to the relevant sub-menu.

Edit, change and save parameters
At the user level, the parameters can be edited after pressing the „Menu/OK“ button. To change a parameter, in editing mode select the required value or setting using the „Up“ and „Down“ buttons. Press the „Menu/OK“ button to accept the change.

Use the „Back“ button to return to the higher menu level or to exit editing mode without saving your changes. The device switches automatically back to the home screen after 180s if no further buttons are pressed.


EDJ-3
basic status
Automatic mode
Setpoint Up
Setpoint Down
OK = Apply
Back = Cancel
(>6s.) Manual mode
Output level Up
Output level Down
OK = Apply
Back = Cancel
(>3s.) Autotuning
Menu
User level
DB Contact distance
HYS.1 Hysteresis
HYS.2 Hysteresis
PB.1 Proportional band
DT.1 Derivative time
RT.1 Integral time
CY.1 Switching period
PB.2 Proportional band
DT.2 Derivative time
RT.2 Integral time
CY.2 Switching period
Y.0 Working point
Y.1 Max. Output limit
Y.2 Min. Output limit
OFFSet Measuring value
DF Filter time constant
Device info
Versions
Device name
SW version
VDN version
ST-Code version
Hardware version
Hardware IDS
Service
Service counter
Operating period

No.	Parameters	Selection / text / value	Default settings	Your settings
1	**DB** Contact distance (only with three-point control)	0,0 to 999,0	0,5 [%rF] // [K]	
2	**Hys.1** Hysteresis for humidifying or heating (only with three-point control)	0,0 to 999,0	1,0 [%rF] // [K]	
3	**Hys.2** Hysteresis for humidifying or heating (only with three-point control)	0,0 to 999,0	1,0 [%rF] // [K]	
4	**PB.1** Proportionalband („P“ Proportion) for humidifying or heating	0,0 to 9999	0,0 [%rF] // [K]	
5	**DT.1** Derivative time („D“ Proportion) for humidifying or heating	0,000 to 9999	80,00 [Sek.]	
6	**RT.1** Integral time („I“ Proportion) for humidifying or heating	0,000 to 9999	350,0 [Sek.]	
7	**CY.1** Switching period for humidifying or heating	0,000 to 9999	20,00 [Sek.]	
8	**PB.2** Proportionalband („P“ Proportion) for dehumidifying or cooling	0,0 to 9999	0,0 [%rF] // [K]	
9	**DT.2** Derivative time („D“ Proportion) for dehumidifying or cooling	0,000 to 9999	80,00 [Sek.]	
10	**RT.2** Integral time („I“ Proportion) for dehumidifying or cooling	0,000 to 9999	350,0 [Sek.]	
11	**CY.2** Switching period for dehumidifying or cooling	0,000 to 9999	20,00 [Sek.]	
12	**Y.0** Working point	-100 to 100	0 [%]	
13	**Y.1** Max output limit	-100 to 100	100 [%]	
14	**Y.2** Min output limit	-100 to 100	-100 [%]	
15	**OFFSET** Measuring value	0,0 to 9999	0,0 [%rF] // [K]	
16	**DF** Filter time constant	0,00 to 100,0	0,60 [Sek.]	

Note for PID

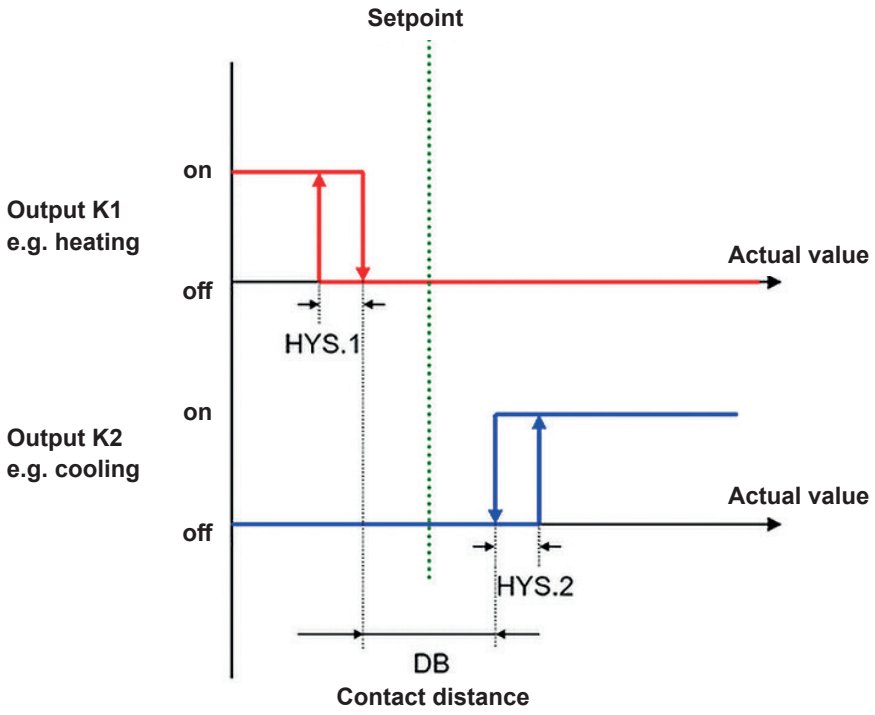
If **PB.1=0** and **PB.2=0**, the controller operates as a three-point controller **without PID** control structure. The relevant parameters in this case are **DB; HYS.1; HYS.2**
In this case, the Y parameters must be set as follows: **Y.0=0; Y.1=100; Y.2=-100!**

If ***PB.1=0*** the following control parameters are therefore not active: **DT.1; RT.1; CY.1**.
(Y.1 is only effective with PB.1>0.)

If **PB.2=0** the following control parameters are also not active: **DT.2; RT.2; CY.2.**
(Y.2 is only effective with PB.2>0.)

If values >0 are set for PB.1 or PB.2, the PID parameters are activated. The controller starts to cycle and automatically sets the current output level according to these parameters, taking into account the setpoint and the movement of the current actual value.

Operating principle of the three-point controller



The setpoint is always in the centre of the contact distance.
When the setpoint is changed, the entire curve moves along with the setpoint.

OFFSET Measuring value	This can be used to adjust the actual value with the measured value of a reference sensor.
DF Filter constant time	The filter time constant is used to adjust the digital input filter (2nd order filter). In the event of a sudden change in the input signal, approx. 26% of the change is detected after a time corresponding to the filter time constant (2 x filter time constant: approx. 59%; 5 x filter time constant: approx. 96%). A large filter time constant means: high attenuation of interference signals; slow response of the actual value display; low cut-off frequency (low-pass filter).
Response to faults	If the measuring range is exceeded or undershot, the controller switches automatically to manual mode and sets an output level of 0%.
Response after power ON	During the device initialisation phase, the relay contacts are open. After initialisation is completed, the output signal depends on the signal of the source.

Analogue input

Name	
Measuring range, Current	0 to 20 mA
Accuracy	≤ 0,1 %
Input resistance or load impedance	< 2,5 V
Scaling	Left: rel. humidity 0…100%rh Right: temperature -10…+90°C
Ambient temperature influence	≤ 100 ppm/K
Sampling cycle	150 ms
Input filter	2nd order digital filter; filter constant adjustable from 0 to 100.0 s

Measuring circuit monitoring

Exceeding or subceeding of the measured value is detected

Error messages

<<<< Measuring range subceeded
>>>> Measuring range exceeded
- - - - Short circuit or polarity reversal

Relay outputs

Relay (N/O contact)	
Switching capacity	Max. 3 A at 230 VAC or 30 VDC, resistive load
Service life of contacts	150,000 switching operations at rated load 350,000 switching operations at 1 A

Electrical data

Power supply	110 to 240 VAC ±10 %, 48 to 63 Hz
Electrical safety	Complying with DIN EN 61010, Part 1; overvoltage category II up to 300 V mains voltage, pollution degree 2
Safety class	I with internal separation from SELV
Power consumption	At 110 to 240 VAC 50 Hz: max. 4.1 W
Integrated sensor power supply	24VDC ±2,5% /300mA
Electrical connection	At back, screw terminals
Wire cross-section Solid wire or stranded wire (without ferrule)	Min. 0,2 mm2, max. 1,5 mm2
Stranded wire with ferrule	Without plastic collar: min. 0.2 mm2, max. 1.5 mm2 With plastic collar: min. 0.2 mm2, max. 0.75 mm2
Stripping length	6 mm

Display

18-segment LCD displays	
Digit height upper display	12,3 mm
Digit height lower display	5,9 mm
Color	Upper display: white; lower display: green
Digits incl. decimal places	Upper display: 4; lower display: 4
Decimal places	1

Environmental effects

Ambient temperature range Storage Operation	 -30 up to +70 °C -10 up to +40 °C
Installation altitude	Max. 2000 m above sea level
Climatic conditions Climatic resistance Storage Operation	To DIN EN 60721-3 with wider temperature range ≤ 90 % rel. humidity without condensation To class 1K2 To class 3K3
Mechanical environmental conditions Storage Transport Operation	To DIN EN 60721-3 To class 1M2 To class 2M2 To class 3M3

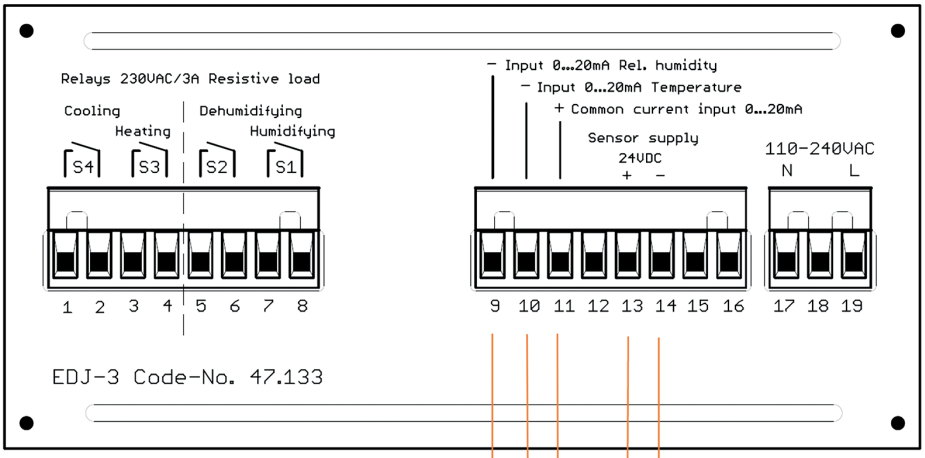
EMC

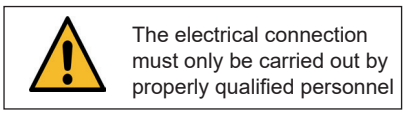
Electromagnetic compatibility (EMC) Emitted interference Interference immunity	To DIN EN 61326-1 Class A – for industrial use only Industry requirement

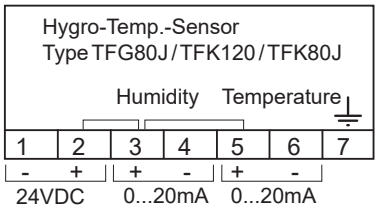
Housing

Type of housing	Plastic housing for installation in switch panel to DIN IEC 61554 (use in inner spaces)
Dimensions (H x B x T)	144 x 72 x 135 mm
Housing front	Plastic with membrane keypad
Switch panel aperture	138 x 66 mm
Switch panel thickness	1 bis 10 mm
Housing mounting	In switch panel using supplied mounting frame or the two fasteners
Position of use	Any
IP rating	To DIN EN 60529, front IP 50, back IP 2
Weight	Max. 580 g

Connecting diagram



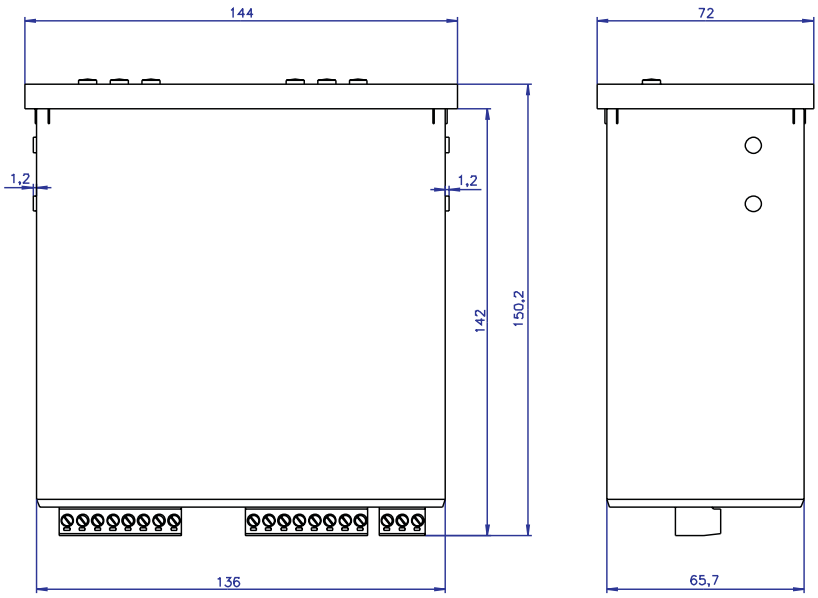




Suitable sensoren

Sensor Type	Measured value	Design	Order No.
TFG80J	Humidity and temperature	Duct mounted version	44623030
TFK80J	Humidity and temperature	Duct mounted version	58623030
TFK120J	Humidity and temperature	Indoor version	59623030

Dimensions



Tampering with the internal parts of the controller will void the warranty.
This information is based on current knowledge and provides details about our products and their possible applications. It does not, therefore, act as a guarantee of specific properties of the products described or of their suitability for a particular application. It is our experience that the equipment may be used across a broad spectrum of applications under a variety of conditions and loads. We cannot appraise every individual case. Purchasers and/or users are responsible for checking the equipment for suitability for any particular application. Any existing commercial property rights must be respected. The perfect quality of our products is guaranteed under our General Terms and Conditions of Sale. Version: April 2024 EDJ-3_en.pdf. Subject to modifications.