

**Universal Field Controller for motorized fire and smoke extraction dampers.
For bus (Modbus or BACnet) or analog integration into a superior system.
To be used for the connection of 230 V actuators.**



ATTENTION: 230 V Power Supply for Actuators



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Technical Data



ATTENTION: 230 V Power Supply for Actuators

Electrical Data / FSC-UFC24-230, Control Unit	Nominal Voltage	24 V AC / DC
	Nominal Voltage Range	-20%... + 20%
Electrical Data / Actuators	Dimensioning	2 VA + damper actuator (max 24 VA)
	Power Consumption	2 W + damper actuator
	Connections	AMP plug-in connections and quick connections (terminals)
	Nominal Voltage	110 - 230 V AC
	Nominal Voltage Range	Acc. to manufacturer specifications
Dimensioning	Acc. to manufacturer specifications	
Power Consumption	Acc. to manufacturer specifications	
Connections	AMP plug in connections and quick connections (terminals)	

Communication / Modbus



Protocol	Modbus RTU
Medium	RS-485, not electrically isolated
Transmission Formats	Specified by Modbus RTU Standards
Number of Devices per Line	100 (without repeater)
Baud Rates	9'600, 19'200, 38'400, 76'800 bps
Address	1..127 (1-10 reserved for FSC-M200) (0 reserved for broadcast)
Termination	120Ω line termination. Jumper available on extra pin on PCB. Position of jumper if FSC-UFC24-230 is last Modbus device in line see electrical installation, page 7
Typical Response Time	<200 ms

Communication / BACnet



Protocol	BACnet MS/TP
Medium	RS-485, not electrically isolated
Number of Devices per Line	65 (without repeater)
Baud Rates	9'600, 19'200, 38'400, 76'800 (auto detect)
Address	1..127 (1-10 reserved for FSC-M200) (0 reserved for broadcast)
Termination	120Ω line termination. Jumper available on extra pin on PCB. Position of jumper if FSC-UFC24-230 is last BACnet device in line, see electrical installation, page 7
Typical Response Time	<100 ms
Device Instant	Automatically assigned by physical address, writable

Safety*

Protection Class	III (safety extra low voltage)
Protection Degree	IP42, housing of non-flammable polycarbonate
Electromagnetic Tolerance	CE in accordance with 2004/108/EC
Low Voltage Directive	CE in accordance with 2006/95/EC
Mode of Operation	Type 1 (EN 60730-1)
Rated Impulse Voltage	2.5 kV (EN 60730-1)
Degree of Pollution of Environment	2 (EN 60730-1)
Ambient Temperature	-20 °C to + 50 °C
Storage Temperature	-20 °C to + 80 °C
Humidity Test	95% RH, non-condensing (EN 60730-1)
Maintenance	Maintenance free

Mechanical Data (Dimensions / Weight)

Width	120 mm
Length	153 mm
Height	57 mm (with bracket)
Weight	ca. 415 g (with bracket)
See drawings	page 5

*Tests (CE, EMC etc.) in progress.

Installation The FSC-UFC24-230 is directly installed at or close to the fire or smoke extraction damper. The bracket can be pre-installed. The FSC-UFC24-230 can be snapped onto the bracket any time (at the damper manufacturer or at the job site).

Electrical Installation See details page 7.

Safety Notes The FSC-UFC24-230 is not allowed to be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
 The company buying and / or mounting the FSC-UFC24-230 on site bears full responsibility for the proper functioning of the whole system. Only authorized specialists may carry out the installation. All applicable legal or institutional installation regulations must be complied with during installation.
 The device contains electrical and electronic components and is not allowed to be disposed of as domestic refuse. All locally valid regulations and requirements must be observed.

Product Features / Application The FSC-UFC24-230 is used together with a fire or smoke extraction damper actuator to control and monitor one fire or smoke extraction damper. It offers Modbus, BACnet or analog connection and is normally mounted at or close to the damper. Following control modes can be chosen through dip switch terminal:

- Fire or smoke extraction application
- Bus protocols: Modbus or BACnet

Conventional: Analog output and digital input signals for conventional application.

This digital input in the FSC-UFC24-230 always overrides the bus commands.

Universal System Link between fire or smoke extraction damper and any Modbus or BACnet system or analog control.

Power Supply The FSC-UFC24-230 needs to be powered up with 24 V AC/DC for the controls device and 230 V AC for the connection of the actuator. The FSC-UFC24-230 provides the power supply to the actuator and to other connected devices (e.g. smoke detector). For more details see page 7.

Control *Conventional*

The FSC-UFC24-230 has the option to work without the bus communication connected.
 There is one input to open or close the damper, depends on the fire or smoke extraction application.
 There is one analog output to signalize the status of the FSC-UFC24-230 and the actuator.
 This analog output can be read from any controller.

Communication *Serial Communication – RS-485*

Through Modbus RTU (RS-485) or BACnet MS/TP (RS-485).

Actuator Connection

3-pole AMP plug and terminal connection for standard 230 V AC fire or smoke extraction actuator.
 6-pole AMP plug and terminal connection for 2 internal actuator end switches. Identification of the end position switches of the actuators.

Additional Connections *Input Modules*

2-pole AMP plug and 3-pole connection (terminal) for thermoelectric tripping device. Dry contact input.
 4-pole connection (terminal) for smoke detector (incl. power supply). Dry contact input. Digital input for analog application.

Output Module

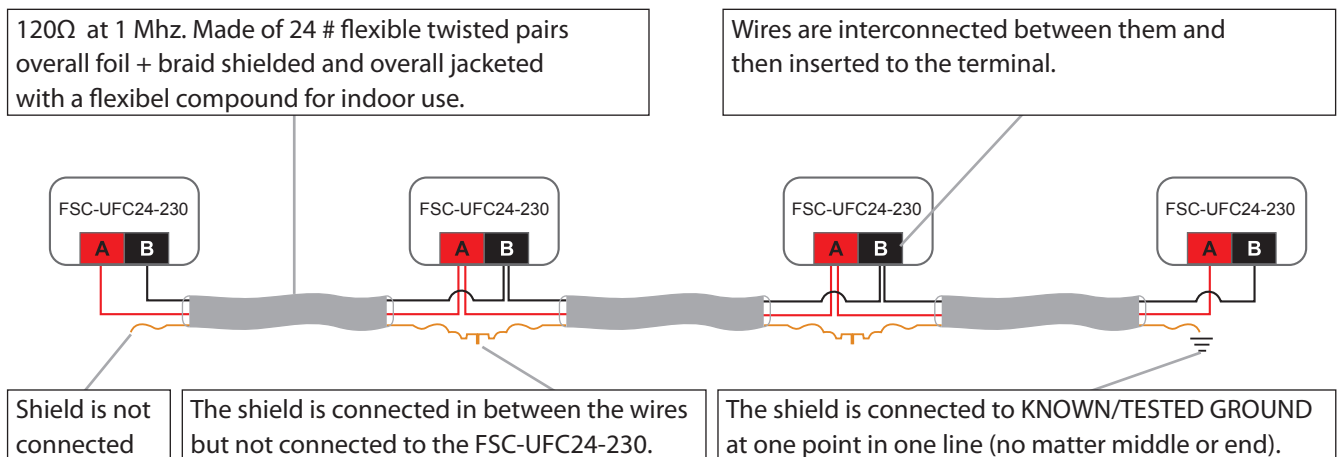
1 analog output, indicates the status of the FSC-UFC24-230.



Cable Specification

120Ω at 1 Mhz. Made of 24# flexible twisted pairs overall foil + braid shielded and overall jacketed with a flexible compound for indoor use, or similar. Cable type: Belden 3105a or equivalent.

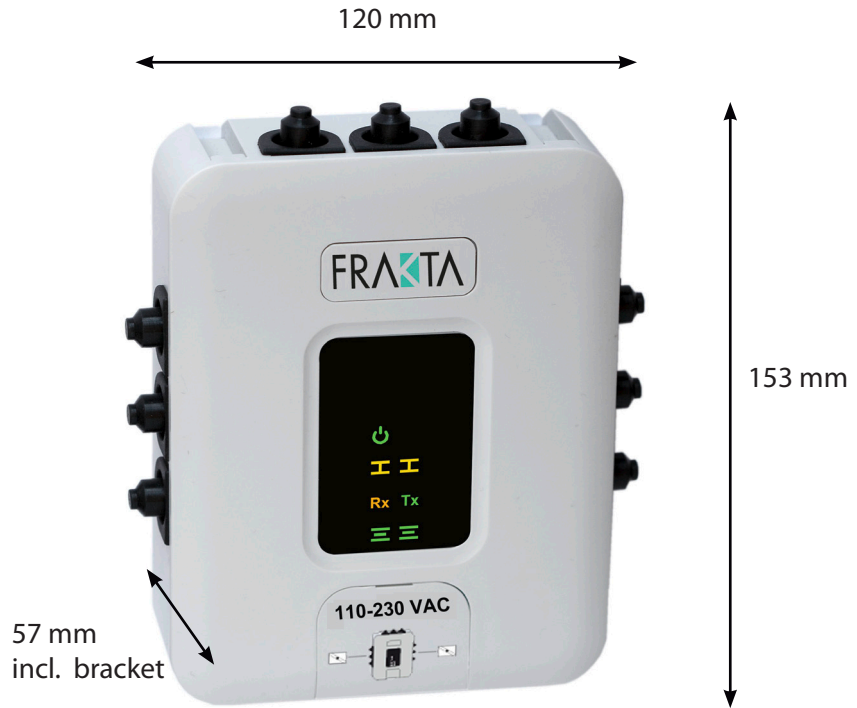
IMPORTANT: SMT takes no responsibility of the functionality of the units/ network if a different cable is used to the one specified here.



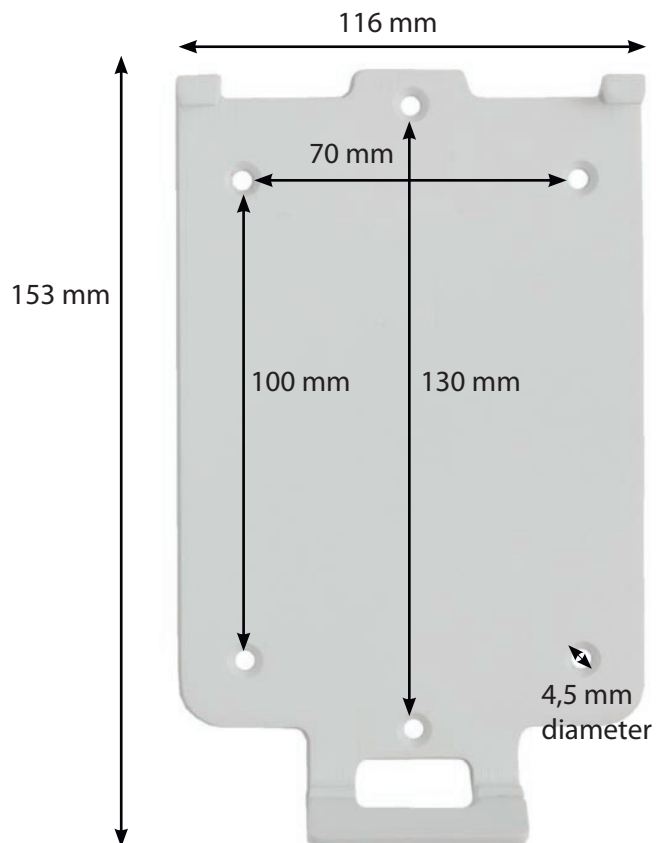
← Up to 1'200 meters and max. 100 FSC-UFC24-230 with Modbus RTU and 65 FSC-UFC24-230 with BACnet MS/TP →

Dimensions

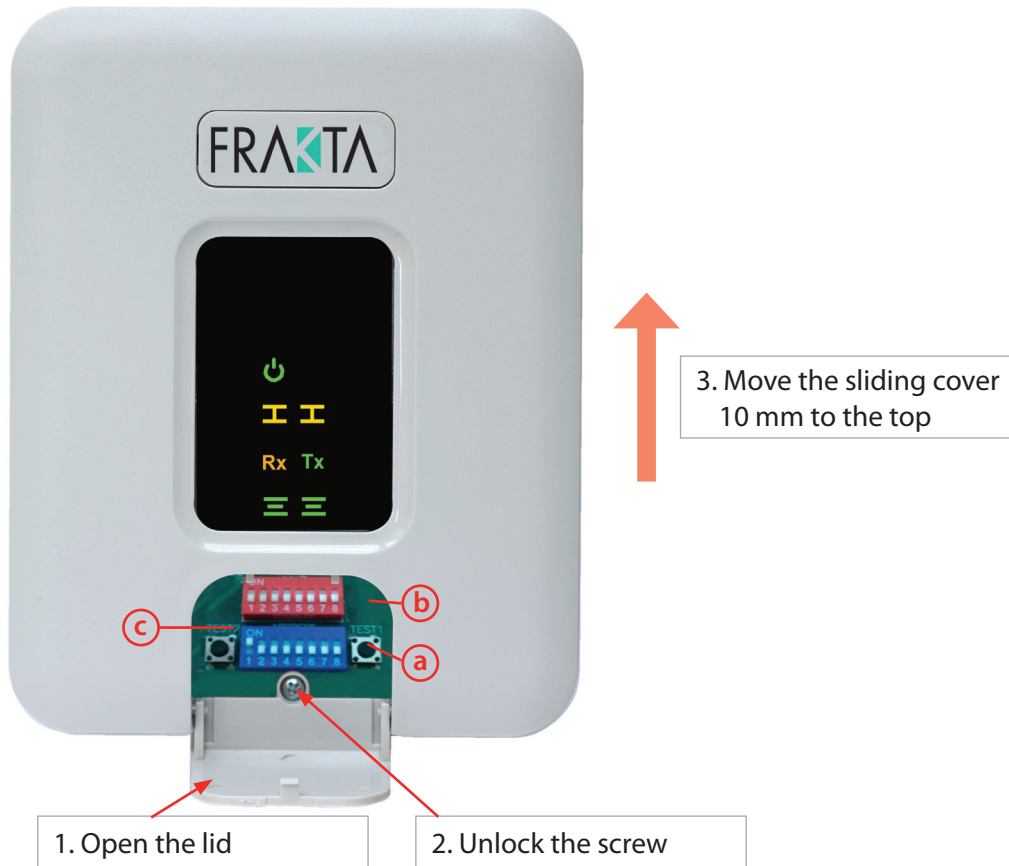
FSC-UFC24-230



Mounting Bracket



Removing the Cover of the Housing



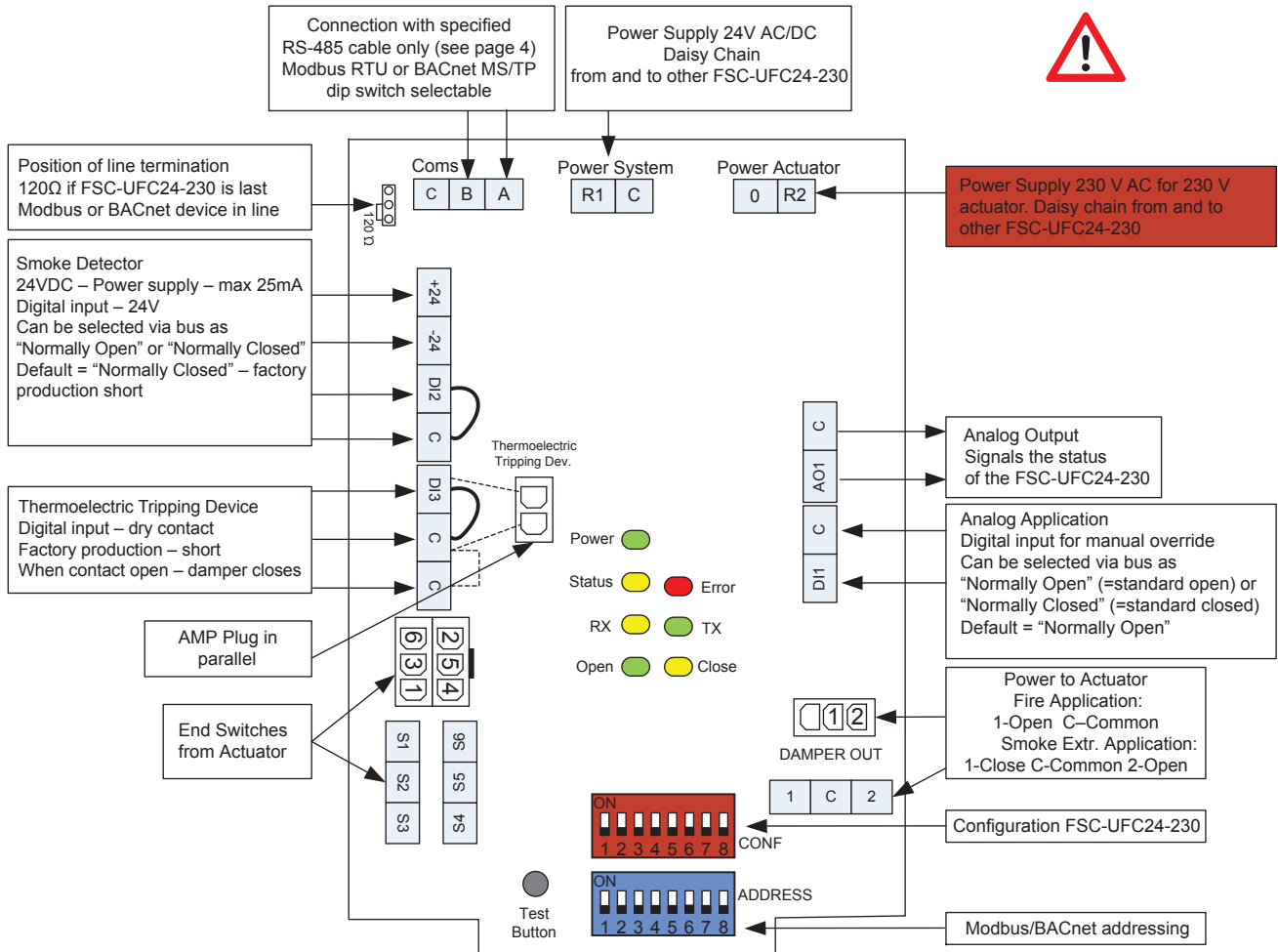
1. Open the small lid on the lower end of the housing by flapping up the cover
2. Unlock the screw which is placed on the lower end in the middle
3. Move the sliding cover 10 mm to the top
4. Remove the cover

Lid for Easy Access to Dip Switch Terminals (Configuration / Addressing) and Test Button

- (a) The blue coloured dip switch terminal is for the Modbus or BACnet addressing.
- (b) The red one for the configuration.
- (c) Test button: For detailed explanation of the function of the test button see page 17.

Electrical Installation

General Information



Power Supply:

Fire or smoke extraction actuators with a power supply of 230 V AC can directly be connected to the FSC-UFC24-230.

Power Supply

Main Power ---FSC-UFC24-230

The FSC-UFC24-230 offers dual power supply of

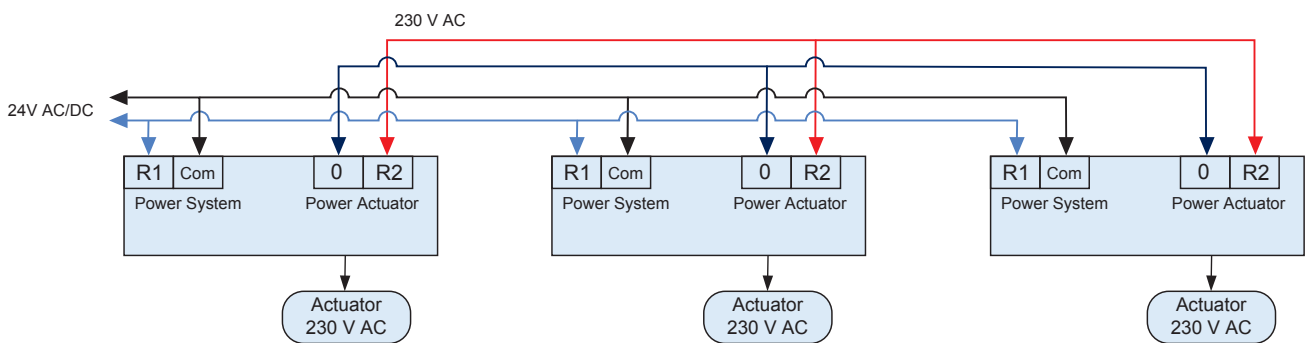
- 24 V AC / DC for the system, smoke detector, thermoel. tripping device, end switches of the actuators
- 230V AC for the power supply of the fire or smoke extraction damper actuator.

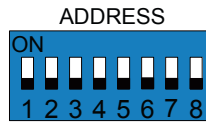
Serial power supply (daisy chain) of more than one FSC-UFC24-230 (24 V AC / DC and 230 V AC) is possible.



IMPORTANT:

- **The correct wiring is very important in regards to the 230 V power supply! The polarity, phase to phase and com to com, must be respected when connecting to the power supply network and also when connecting multiple FSC-UFC24-230!**
- The wiring of the actuator must be done in the correct way and according to the manufacturer's instructions. Especially when using actuators without plugs it is important to have a close focus on the polarity of the cable connection that means, to consider the correct allocation of phase and com!
- **All connections have to be fixed before putting power to the devices. Beside the risk of electrical shock, it is also possible to destroy the FSC-UFC24-230 when not proper handled.**





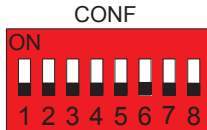
Modbus and BACnet Addressing

*Attention: If the FSC-UFC24-230 is used in combination with the FSC-M200 controller, Modbus addresses 1 – 10 are reserved for the FSC-M200. That means that the Modbus addressing of the FSC-UFC24-230 starts with Modbus address 11. Furthermore, the Baud Rate needs to be changed to 38'400 (PIN 5 to ON). If the FSC-UFC24-230 is used in combination with the FSC-M60, the addressing needs to be done in consecutive order.

Address	Switches On	Address	Switches On	Address	Switches On	Address	Switches On
0*	Broadcast-not in use	33	1+6	66	2+7	99	1+2+6+7
1*	1	34	2+6	67	1+2+7	100	3+6+7
2*	2	35	1+2+6	68	3+7	101	1+3+6+7
3*	1+2	36	3+6	69	1+3+7	102	2+3+6+7
4*	3	37	1+3+6	70	2+3+7	103	1+2+3+6+7
5*	1+3	38	2+3+6	71	1+2+3+7	104	4+6+7
6*	2+3	39	1+2+3+6	72	4+7	105	1+4+6+7
7*	1+2+3	40	4+6	73	1+4+7	106	2+4+6+7
8*	4	41	1+4+6	74	2+4+7	107	1+2+4+6+7
9*	1+4	42	2+4+6	75	1+2+4+7	108	3+4+6+7
10*	2+4	43	1+2+4+6	76	3+4+7	109	1+3+4+6+7
11	1+2+4	44	3+4+6	77	1+3+4+7	110	2+3+4+6+7
12	3+4	45	1+3+4+6	78	2+3+4+7	111	1+2+3+4+6+7
13	1+3+4	46	2+3+4+6	79	1+2+3+4+7	112	5+6+7
14	2+3+4	47	1+2+3+4+6	80	5+7	113	1+5+6+7
15	1+2+3+4	48	5+6	81	1+5+7	114	2+5+6+7
16	5	49	1+5+6	82	2+5+7	115	1+2+5+6+7
17	1+5	50	2+5+6	83	1+2+5+7	116	3+5+6+7
18	2+5	51	1+2+5+6	84	3+5+7	117	1+3+5+6+7
19	1+2+5	52	3+5+6	85	1+3+5+7	118	2+3+5+6+7
20	3+5	53	1+3+5+6	86	2+3+5+7	119	1+2+3+5+6+7
21	1+3+5	54	2+3+5+6	87	1+2+3+5+7	120	4+5+6+7
22	2+3+5	55	1+2+3+5+6	88	4+5+7	121	1+4+5+6+7
23	1+2+3+5	56	4+5+6	89	1+4+5+7	122	2+4+5+6+7
24	4+5	57	1+4+5+6	90	2+4+5+7	123	1+2+4+5+6+7
25	1+4+5	58	2+4+5+6	91	1+2+4+5+7	124	3+4+5+6+7
26	2+4+5	59	1+2+4+5+6	92	3+4+5+7	125	1+3+4+5+6+7
27	1+2+4+5	60	3+4+5+6	93	1+3+4+5+7	126	2+3+4+5+6+7
28	3+4+5	61	1+3+4+5+6	94	2+3+4+5+7	127	Reserved factory defaults
29	1+3+4+5	62	2+3+4+5+6	95	1+2+3+4+5+7		
30	2+3+4+5	63	1+2+3+4+5+6	96	6+7		
31	1+2+3+4+5	64	7	97	1+6+7		
32	6	65	1+7	98	2+6+7		

Configuration through Dip-Switch

Default Dip Switch Position



Configuration Possibilities

Pin	Off (Default)	On
1	Bus	Analog
2	Fire Application	Smoke Extr. Application
3	Modbus RTU	BACnet MS/TP
4	Baud Rate (Off-Default)	
5	Baud Rate (Off-Default)	
6	Not In Use=Off	
7*	Smoke Detector Alarm "System"	Smoke Detector Alarm "Actuator"
8	Not In Use=Off	

Information Pin 3:

If the FSC-UFC24 is used in connection with the FSC-M60, Pin 3 has to be on ON (BACnet).

Information Pin 5:

If the FSC-UFC24-230 is used in connection with the FSC-M200, Pin 5 has to be on ON (Baud Rate 38 400).

*Explanation Pin 7:

- Smoke Detector Alarm "System" = The signal of the smoke detector is transferred directly to the system and processed there.
- Smoke Detector Alarm "Actuator" = The signal of the smoke detector is directly linked with the actuator. In case of a smoke detector alarm the fire damper connected to the same FSC-UFC24-230 will be closed. The signal of the smoke detector is forwarded to the controller.

The above is only valid for the fire safety application. In the smoke extraction application the signal of the smoke detector has no direct influence to the actuator. The signal will be forwarded to the system in any case.

Baud Rate Selection Modbus

This has to be done when choosing Modbus only.

	9 600 (Default)	19 200	38 400	76 800
4	Off	On	Off	On
5	Off	Off	On	On

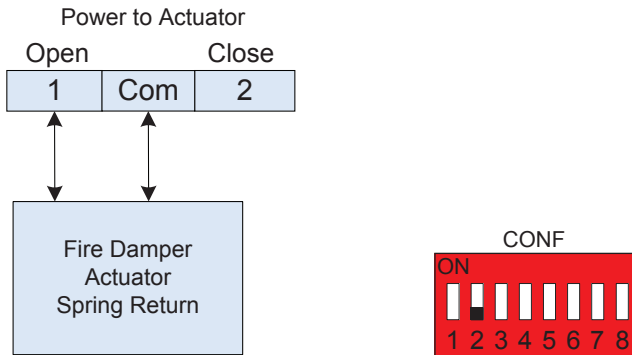
Baud Rate Selection BACnet

Baud rate in BACnet is automatically detected.

Connection Details

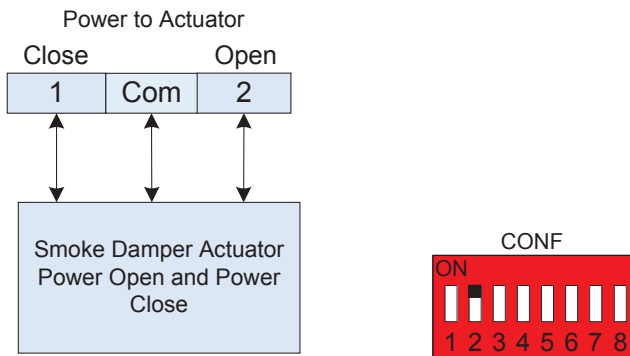
Fire Damper Actuator – Connections

Fire damper actuator (spring return). When the actuator has power it is open, when there is no power the actuator is closed with the spring.

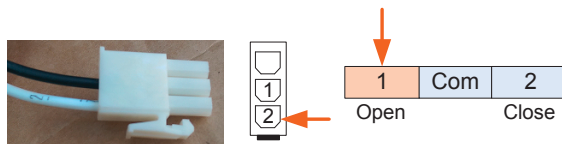


Smoke Extraction Damper Actuator – Connections

If the actuator is powered up the smoke extraction damper is either open or closed. If the FSC-UFC24-230 sends the smoke extraction damper actuator the open signal, pin OPEN is powered. If the FSC-UFC24-230 sends the smoke extraction damper actuator the close signal, pin CLOSE is powered.

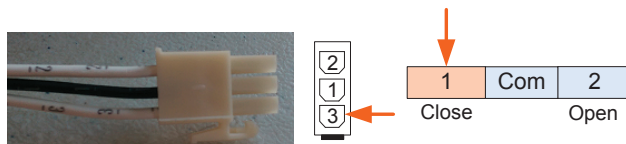


Fire Damper



When the FSC-UFC24-230 is powered up, the power to the actuator is on output 'open' (pin nr 1).

Smoke Extraction Damper



On power up the CLOSE output will be ON. During normal operation the FSC-UFC24-230 in this application ONLY, will hold the last command on memory

After Connection - Power Reset:

- **Fire Damper Application** will always go to OPEN.
- **Smoke Extraction Damper Application** will hold last command on memory.

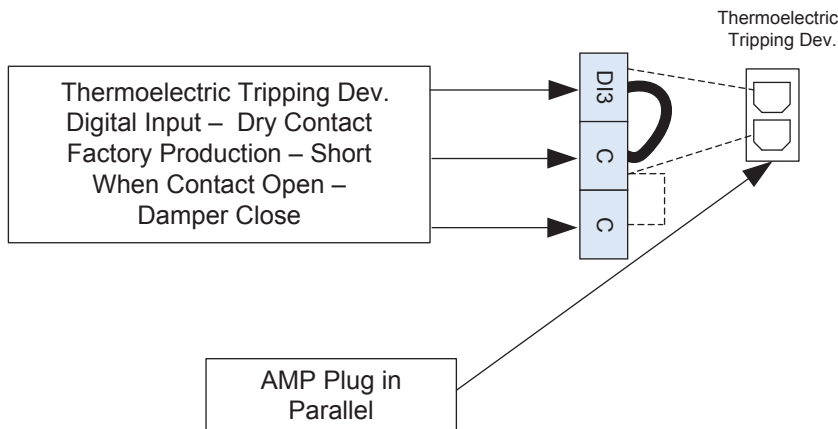
Thermoelectric Tripping Device - Connection

Digital input volt free, normally close as default (can be changed on bus). Factory shorted.
 When this input is active the damper will close and you can override from the bus.
 The 2 connections, the normal quick terminals and the AMP connector are in parallel.
 AMP plug 2-pole. Quick connector 3-pole.

When a thermoelectric tripping device is mounted in the 2-pole AMP plug, the factory production mounted jumper between DI3 and C must be removed!

The above is only valid for the fire safety application.

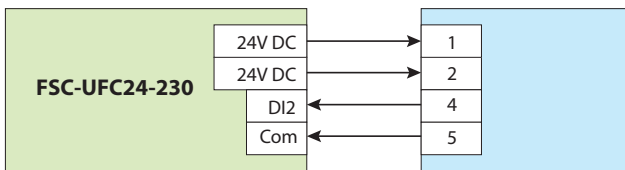
Electrical Installation Thermoelectric Tripping Device



Smoke Detectors – Connections

Smoke detector connection Hekatron ORS 142

Possibility to connect one smoke detector



Kommunikationsschnittstelle
communication interface

Betriebsspannung
operating voltage

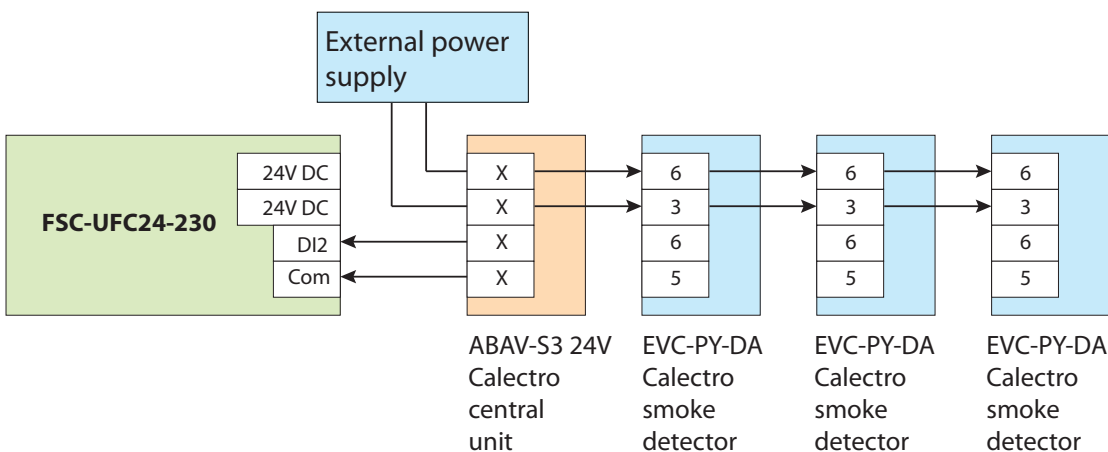
Relaiskontakt
relay contact

Der ORS 142 darf nur an Hekatron-Netzgeräte angeschlossen werden und passt in die vorhandene Sockelserie 143.

The ORS 142 may only be connected to Hekatron mainspower devices and matches the existing bases type 143.

Smoke detector connection Calectro EVC-PY-DA

Multiple smoke detector connections possible with ABAV-S3 24V central unit from Calectro



Analog Application

The FSC-UFC24-230 has the option to work without the bus communication connected. There is one input to open or close the damper, depending on the fire or smoke extraction application. It is also possible to monitor the damper position conventionally through a digital output signal.

The analog output, signals the status of the FSC-UFC24-230:

- 0V – No Power to FSC-UFC24
- 2V – Damper Open
- 4V – Damper Close
- 6V – Smoke Detector Alarm
- 8V – Thermoel. Tripping Device Alarm
- 10V – More than one Alarm Condition

During normal operation this output will signalize the position of the damper (2V, 4V).

This output can be connected in parallel between the various FSC-UFC24-230 in order to monitor their status. Current output max is 5mA.

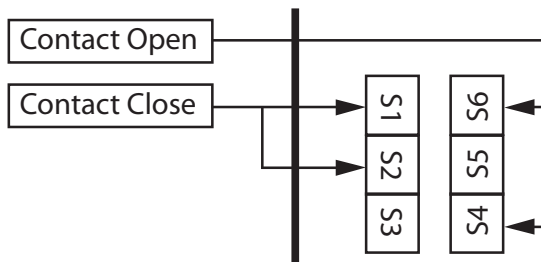
Digital input volt free, normally open as default (can be changed on bus).

The digital input allows to control the damper position through an external contact/device.

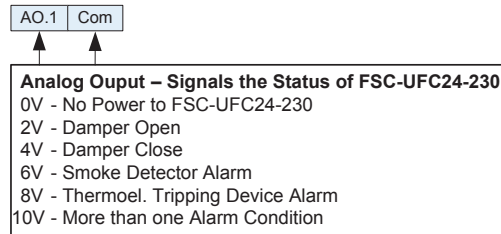
Selection of the analog settings by dip switch.

This digital input for the analog application in the FSC-UFC24-230 overrides always the bus commands.
Electical Installation for Conventional Application

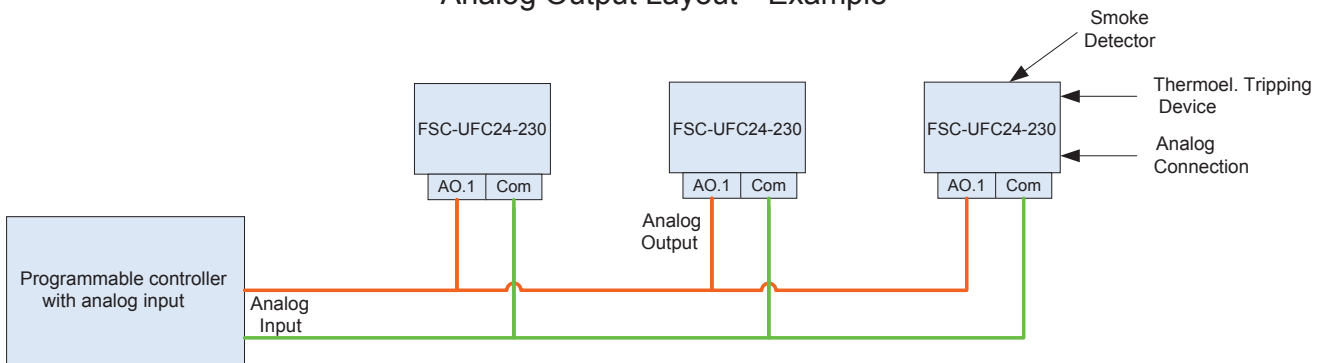
Feedback signals from the UFC:



Electrical Installation for Analog Application:



Analog Output Layout - Example

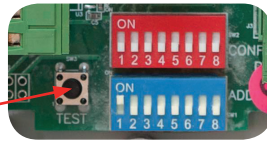


Explanation of LEDs

The LEDs are only visible if they are active. If not active the symbols will not appear.



Led	Color	Action	Description
Power	Green	On	Power is connected
Status	Yellow	Off	Bus operation
		On	Analog connection
Error	Red	Flash Interval 1 sec	Actuator did not reach end switch position within the set time
		Flash Interval 2 sec	Smoke detector alarm
		Flash Interval 3 sec	Thermoelectric tripping device alarm
		Flash Interval 0.3 sec	Error on 2 devices or more Error message test report
		Flash Interval 5 sec	General alarm
Rx	Yellow	Flash	Receive data
Tx	Green	Flash	Transmit data
Close	Yellow	On	Damper close
Open	Green	On	Damper open
Close + Open Flashing	Damper is moving		



Functionality of Test Button

Depending on the application (fire or smoke extraction) the test button creates different test scenarios.

Fire Application:

- Power on the FSC-UFC24-230: actuator (damper) opening until end position is reached
- Pushing test button will interrupt the power supply to the actuator. Spring is closing the actuator
- As soon as the test button is released the power comes back to the actuator and the damper will open again

Smoke Extraction Application:

- Power on: actuator makes self-test and remains in position defined by controls
- Pushing test button changes command of the actuator – actuator (damper) runs into opposite direction
- Release test button: actuator (damper) runs back into last defined position

Run Time Monitoring of Actuator

The FSC-UFC24-230 is equipped with an actuator run time monitoring function. This function monitors the time required by the actuator from leaving of the one and reaching of the other end switch. If the actuator does not reach the other end switch in the specified time an error message is sent.

The default value for the actuator run time is 90 seconds. This can be adapted via Modbus or BACnet from 0...360 seconds.

Full Auto Test

The FSC-UFC24-230 offers a 'Full Auto Test' function. This can be controlled through the Modbus or BACnet controller.

Function

Base for this function is the run time monitoring of the actuator.

Fire Damper

To start the full auto test functionality, the corresponding bus-register has to be activated via bus. By starting the full auto test, the timer of the run time monitoring starts to count the time and the fire damper actuator is closing (spring) and remains in the closed position until the timer of the set running time has reached the set time. Then the actuator will open again automatically until the end switch has been reached. The timer of the run time monitoring starts to count again as soon as the command 'open' has been sent. Once the timer of the set running time has reached the set time, the FSC-UFC24-230 will go back into normal operation mode and a feedback "full auto test ok" is activated. If one of the end switches is not reached within the defined running time, an error message is activated.

Smoke Extraction Damper

To start the full auto test functionality, the corresponding bus-register has to be activated via bus. By starting the full auto test, the timer of the run time monitoring starts to count the time and the smoke extraction damper actuator is moving to the opposite direction and remains in that position until the timer of the set running time has reached the set time. Then the actuator will automatically move back to the original position until the end switch has been reached. The timer of the run time monitoring starts to count again as soon as the command 'opposite direction' has been sent. Once the timer of the set running time has reached the set time, the FSC-UFC24-230 will go back into normal operation mode and a feedback "full auto test ok" is activated. If one of the end switches is not reached within the defined running time, an error message is activated.

Bus Monitoring Application

The FSC-UFC24-230 is equipped with a Bus Monitoring Function. If the bus signal to the unit is interrupted the damper will move to the safety position after the defined period of time and remain there until the bus functionality is back to normal operation.

Objects

There are 2 objects which can be activated by Modbus or BACnet:

- Logic Alarm Communication
- Delay Alarm Communication

Default settings:

Logic Alarm Communication not active

Activation (via Bus):

- Logic Alarm Communication 1 (on)
- Delay Alarm Communication is activated, default delay time is 120 sec. Option to set the delay time via bus between 0...360 sec

Functionality

Fire Damper

After the defined period of time the fire damper will move to the closed position and remains closed until the bus functionality is back to normal operation.

Smoke Extraction Damper

If damper is closed:

After the defined period of time the fire damper will move to the open position and remains open until the bus functionality is back to normal operation.

If damper is open:

Damper remains in open position



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