SMT »»
Fire & Smoke Control

Universal Field Controller for motorized fire and smoke extraction dampers.
For bus (Modbus or BACnet) or analog integration into a superior system.

Content

Technical Data

Electrical Data		
	Nominal Voltage	24 V AC / DC
	Nominal Voltage Range	-20%... + 20%
	Dimensioning	2 VA + damper actuator (max. 24 VA)
	Power Consumption	2 W + damper actuator
	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 (0 reserved for broadcast)
	Termination	120Ω line termination. Jumper available on extra pin on PCB. Position of jumper if FSC-UFC24 is last Modbus device in line see electrical installation, page 7
	Typical Response Time	<200 ms
	Integration / Modbus Register	We refer to the detailed Modbus register of the FSC-UFC24. Available under www.smtec-ag.ch/en/products

Modbus

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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 bps (auto detect)
	Address	1..127 (0 reserved for broadcast)
	Termination	120Ω line termination. Jumper available on extra pin on PCB. Position of jumper if FSC-UFC24 is last BACnet device in line see electrical installation, page 7
	Typical Response Time	<100 ms
	BACnet Device Instant	Automatically assigned by physical address, writable
	Integration / BACnet Objects, Pics	We refer to the detailed BACnet objects, pics of the FSC-UFC24. Available under www.smtec-ag.ch/en/products

Safety		
	Protection Class	III
	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. 440 g (with bracket)
	See drawings page 5	

Installation The FSC-UFC24 is directly installed at or close to the fire or smoke extraction damper. The bracket can be pre-installed. The FSC-UFC24 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 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 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 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 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 needs to be powered up with 24 V AC / DC. The FSC-UFC24 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 offers the option to work without the bus communication (Modbus / BACnet) and can be controlled in a conventional way. There is one input to open or close the damper. The home position is depending on the fire or smoke extraction application. It is also possible to monitor the damper position conventional through a digital output signal.
There is one analog output to signalize the status of the FSC-UFC24 and the actuator. This analog output can be read from any controller.

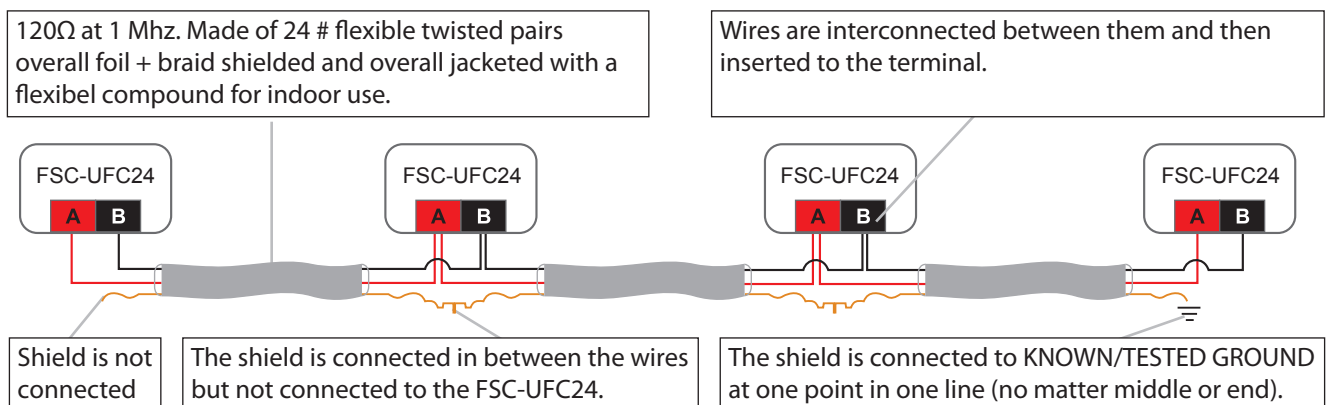|	
Communication	*Serial Communication – RS-485* Through Modbus RTU (RS-485) or BACnet MS/TP (RS-485). We refer to the detailed information in the Modbus register / BACnet object list / pics of the FSC-UFC24. Available under www.smtec-ag.ch/en/products.
Actuator Connection	3-pole AMP plug and terminal connection for standard 24 V AC/DC 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	*Inputs* 2-pole AMP plug and 3-pole connection (terminal) for thermoelectric tripping device (potential free contact), 4-pole connection (terminal) for smoke detector incl. power supply (potential free contact). 2-pole connection (terminal) for digital input (potential free contact) for conventional application. *Output* 2-pole connection (terminal) for 1 analog output. Indicates the status of the FSC-UFC24.

Cable Specification

120Ω at 1 Mhz. Made of 24# flexible twisted pairs overall foil + braidshielded 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.
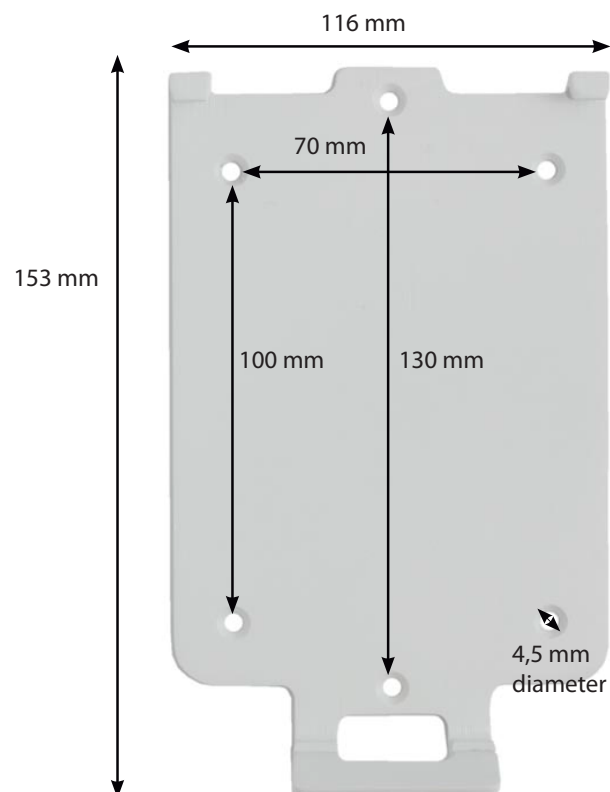
120Ω at 1 Mhz. Made of 24 # flexible twisted pairs overall foil + braid shielded and overall jacketed with a flexibel compound for indoor use.

Wires are interconnected between them and then inserted to the terminal.

FSC-UFC24 A B   FSC-UFC24 A B   FSC-UFC24 A B   FSC-UFC24 A B

Shield is not connected

The shield is connected in between the wires but not connected to the FSC-UFC24.

The shield is connected to KNOWN/TESTED GROUND at one point in one line (no matter middle or end).

◄— Up to 1'200 meters and max. 100 FSC-UFC24 with Modbus RTU and 65 FSC-UFC24 with BACnet MS/TP —►

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Dimensions

FSC-UFC24

120 mm

153 mm

57 mm
incl. bracket

Mounting Bracket

116 mm

70 mm

153 mm

100 mm   130 mm

4,5 mm
diameter

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Removing the Cover of the Housing

3. Move the sliding cover 10 mm to the top

1. Open the lid
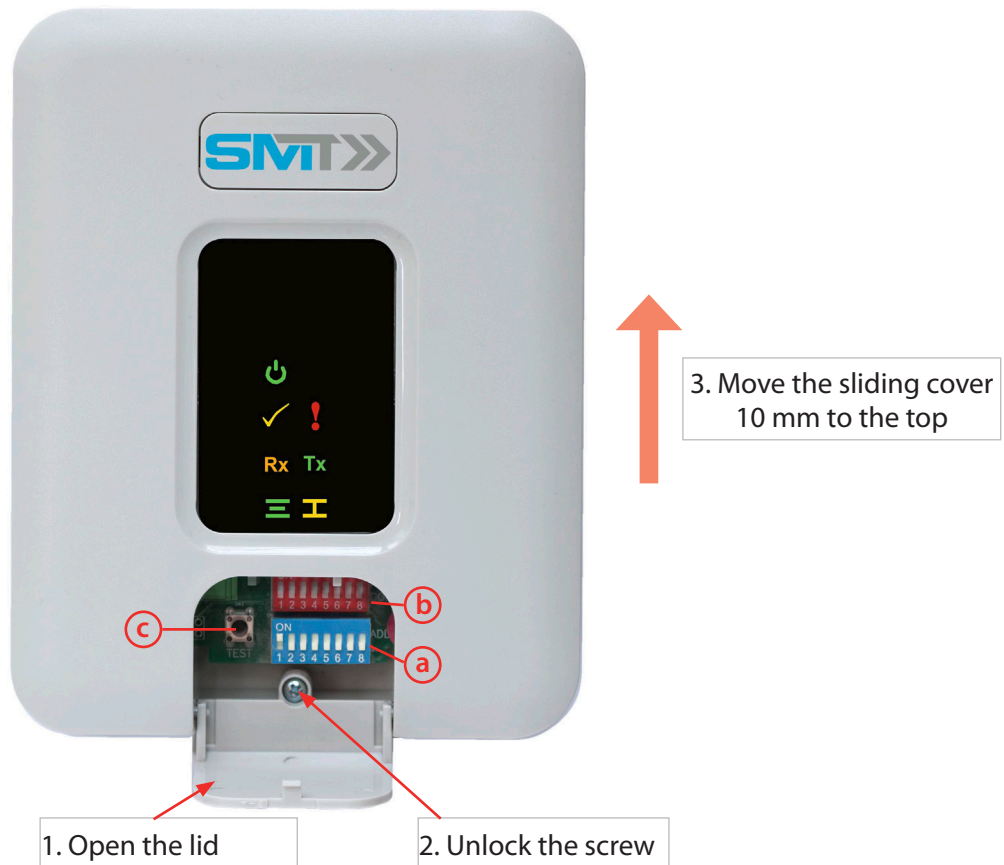
2. Unlock the screw

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 15.

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Electrical Installation

General Information
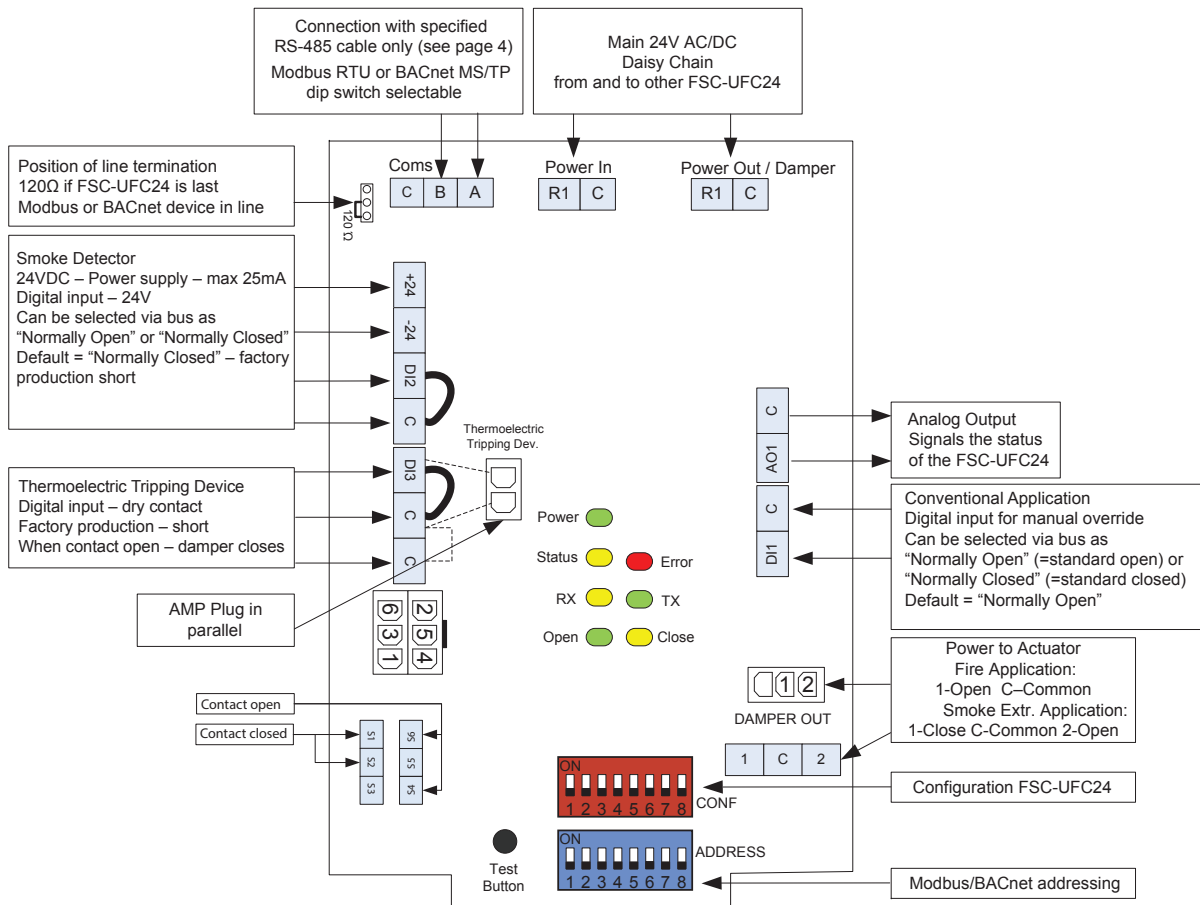
Power Supply

Main Power – FSC-UFC24

The FSC-UFC24 is dual power 24V AC/DC.

The fire or smoke extraction actuator has to be 24V AC and/or DC. Meaning the actuator has to operate with the same voltage (AC or DC) as the FSC-UFC24. There are 2 terminals available for the power supply, in order to make the daisy chain connection for the installer easier.

⚠️ **The polarity must be respected when connecting multiple FSC-UFC24 to one power source (phase to phase, com to com)!**

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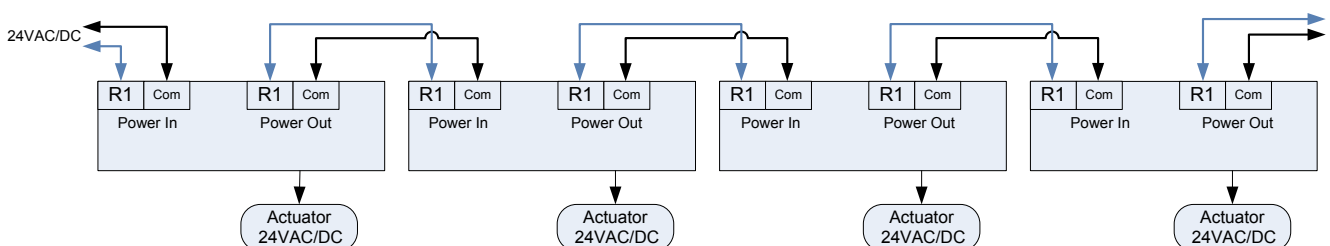
Modbus and BACnet Addressing

If the FSC-UFC24 is used in combination with the Controllers of SMT (FSC-M30, FSC-M240, FSC-M240-MX), the addressing is recommended to be done in consecutive order. Dip switch 8 not in use.

ADDRESS

ON
1 2 3 4 5 6 7 8
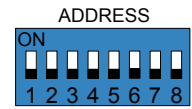
Address	Switches On	Address	Switches On	Address	Switches On	Address	Switches On
0	Broadcast-not in use	33	1+6	66	2+7	99	1+2+6+7
1	1	34	2+6	67	1+2+7	100	3+6+7
2	2	35	1+2+6	68	3+7	101	1+3+6+7
3	1+2	36	3+6	69	1+3+7	102	2+3+6+7
4	3	37	1+3+6	70	2+3+7	103	1+2+3+6+7
5	1+3	38	2+3+6	71	1+2+3+7	104	4+6+7
6	2+3	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
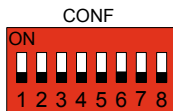
CONF
ON
1 2 3 4 5 6 7 8

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 2:

If Pin 2 is changed from fire to smoke extraction application or from smoke extraction to fire application, the FSC-UFC24 needs to be taken off the power supply and put back again to activate the new mode.

Information Pin 3:

When a FSC-UFC24 has been connected and operated in one bus protocol first (Modbus or BACnet) and then will be operated by the other (BACnet or Modbus) the factory reset functionality in the FSC-UFC24 MUST be activated by bus communication as soon as it is connected to the other protocol (Modbus register 33, BACnet Object List BV 19). **If the FSC-UFC24 is used in connection with the Controllers of SMT (FSC-M30, FSC-M240, FSC-M240-MX), Pin 3 has to be on ON (BACnet).**

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 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.
Single Writing!

|	9600 (Default)	19200	38400	76800
4	Off	On	Off	On
5	Off	Off	On	On

Baud Rate Selection BACnet

Baud rate in BACnet is automatically detected.
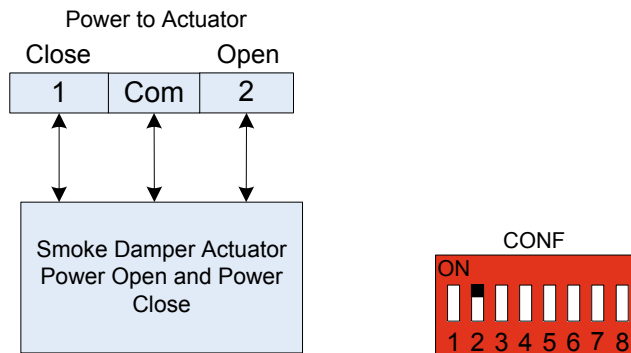Single Writing!

Connection Details

Fire Damper Actuator (spring return) – Connections

When the actuator has power the fire damper is open. When there is no power, the actuator closes the fire damper with the integrated spring.
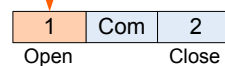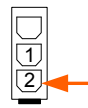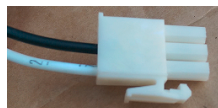
Power to Actuator

Open		Close
1	Com	2

Fire Damper
Actuator
Spring Return

CONF

ON

1 2 3 4 5 6 7 8
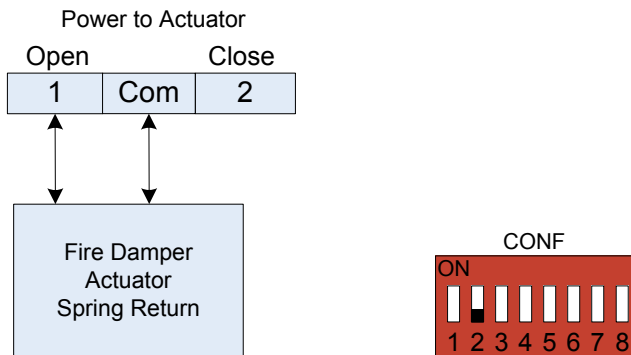
Smoke Extraction Damper Actuator – Connections

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

Power to Actuator

Close		Open
1	Com	2

Smoke Damper Actuator
Power Open and Power
Close

CONF

ON

1 2 3 4 5 6 7 8

Fire Damper

1	Com	2
Open		Close

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

Smoke Extraction Damper

1	Com	2
Close		Open
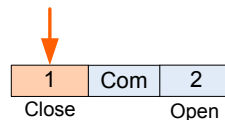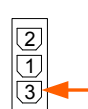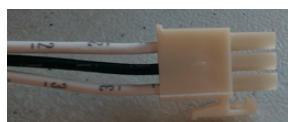
On power up the CLOSE output will be ON.
During normal operation the FSC-UFC24 in this application ONLY, will hold the last command on memory.

After Connection - Power Reset:

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

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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 fire 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. No function in the smoke extraction application.

Electrical Installation Thermoelectric Tripping Device
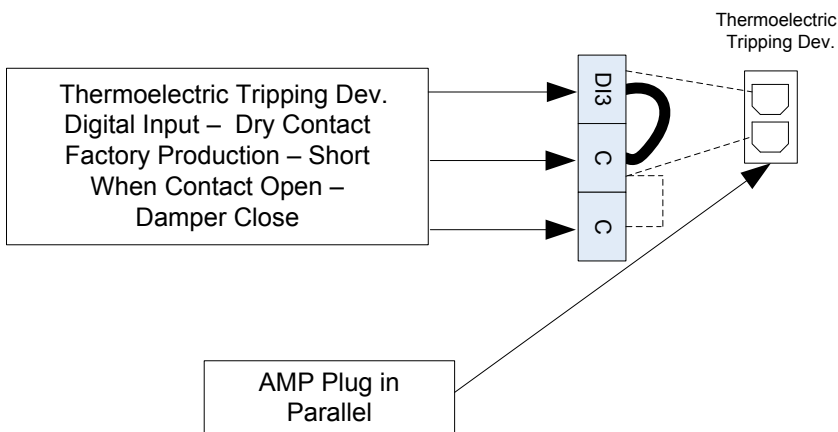
Smoke Detectors – Connection

Smoke detector connection

Possibility to connect one smoke detector

Fire & Smoke Control
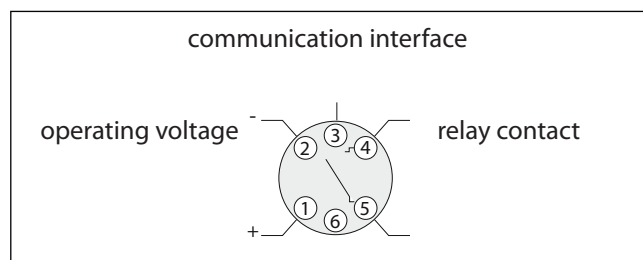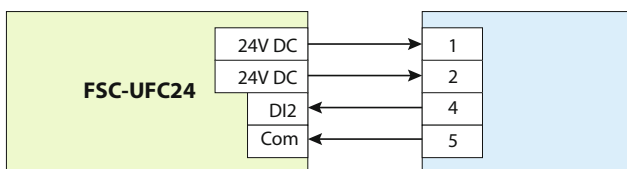
Conventional Application

The FSC-UFC24 has the option to work without the bus communication connected. There is one digital input to open or close the damper. The intitial position is 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:
10 V - all functions OK
0 V   - one or more alarms active.
             No power supply to the FSC-UFC24

This output can be connected in parallel between the various FSC-UFC24 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 conventional (analog) settings by dip switch.

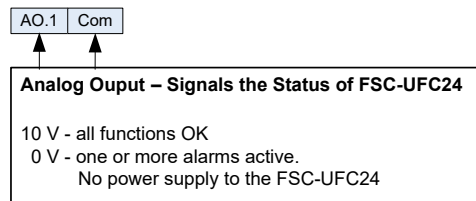***This digital input for the conventional application in the FSC-UFC24 overrides always the bus commands.***
Digital output: The feedback signals (on / off) of the actuator can be forwarded via the connections S1 and S2 (actuator/damper closed) and / or S4 and S6 (actuator/damper open) to any control and monitoring device.
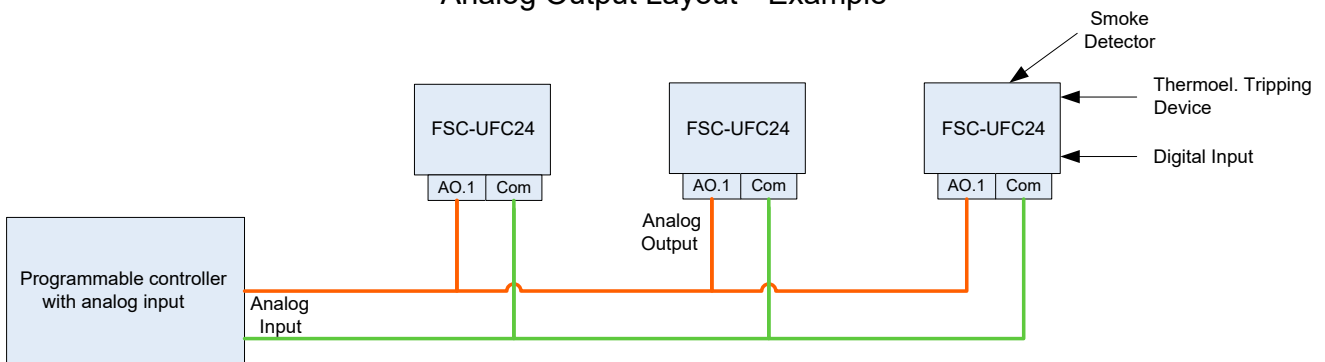
Electical Installation for Conventional Application
Feedback signals from the FSC-UFC24:
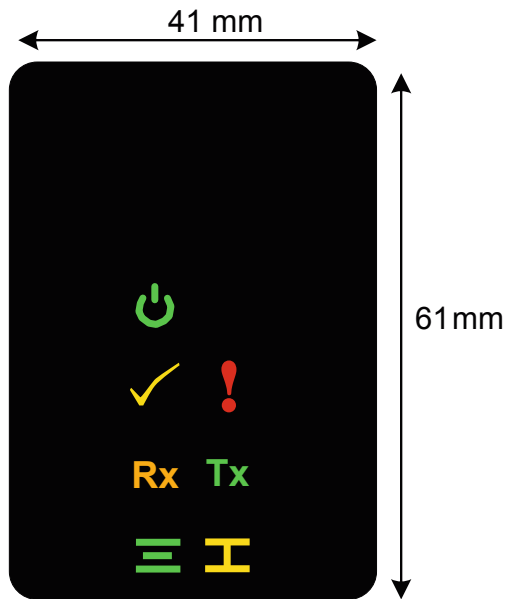
Electrical Installation for Conventional Application

AO.1	Com

Analog Ouput – Signals the Status of FSC-UFC24

10 V - all functions OK
 0 V - one or more alarms active.
      No power supply to the FSC-UFC24
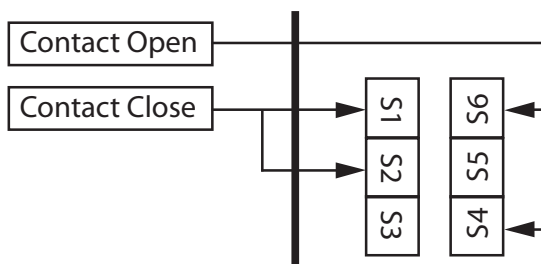
Analog Output Layout - Example

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Explanation of LEDs

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

41 mm

61 mm

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 or more functions Error message test report
			Flash Interval 5 sec	General alarm
Rx	Rx	Yellow	Flash	Receive data
Tx	Tx	Green	Flash	Transmit data
Close	⊥	Yellow	On	Damper close
Open	≡	Green	On	Damper open
Close + Open Flashing		Damper is moving		

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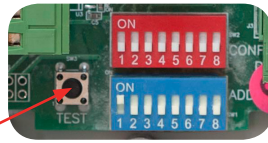
Functionality of Test Button

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

Fire Application:

- Power on the FSC-UFC24: actuator (damper) opening until end position is reached
- The permanent pushing of the 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

If an FSC-UFC24 is newly connected to a bus network:

Press the test button for 5 seconds.

The FSC-UFC24 is then recognized and integrated as participant in the bus network.
This process can be repeated as often as needed.

Run Time Monitoring of Actuator

The FSC-UFC24 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 Application

The FSC-UFC24 offers a 'Full Auto Test' function. This can be controlled through the Modbus or BACnet controller. The command only needs to be sent once to start the function.

Basis of the Functionality
Basis for this function is the run time monitoring of the actuator.

Fire Damper
To start the full auto test functionality, the corresponding bus-register hast 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 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 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.

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Fire & Smoke Control

Bus Monitoring Application

The FSC-UFC24 is equipped with a Bus Monitoring Function. If the bus signal to the FSC-UFC24 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 / Bus Monitoring Function
- Logic Alarm Delay / Set Delay (time in sec)

Default settings:
Logic Alarm / Bus Monitoring Function not active

Activation (via Bus):
- Logic Alarm / Bus Monitoring Function 1 (on)
- Logic Alarm Delay is activated, default delay time is 120 sec. Option to set the delay time via bus between 30…360 sec

Functionality
Fire Damper
After the set delay time ("Delay Alarm" communication) 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 the smoke extraction damper is closed:
After the set delay time ("Delay Alarm" communication) the smoke extraction damper will move to the open position and remains open until the bus functionality is back to normal operation.

If the smoke extraction damper is open:
The smoke extraction damper remains in the open position even if the bus signal is interrupted.

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