TPM 134/18
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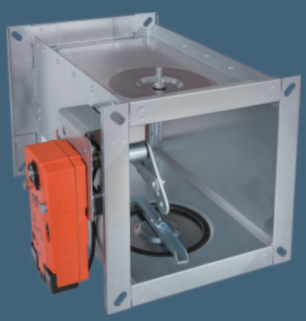
MANDÍK®

Electronic control system MCS-B



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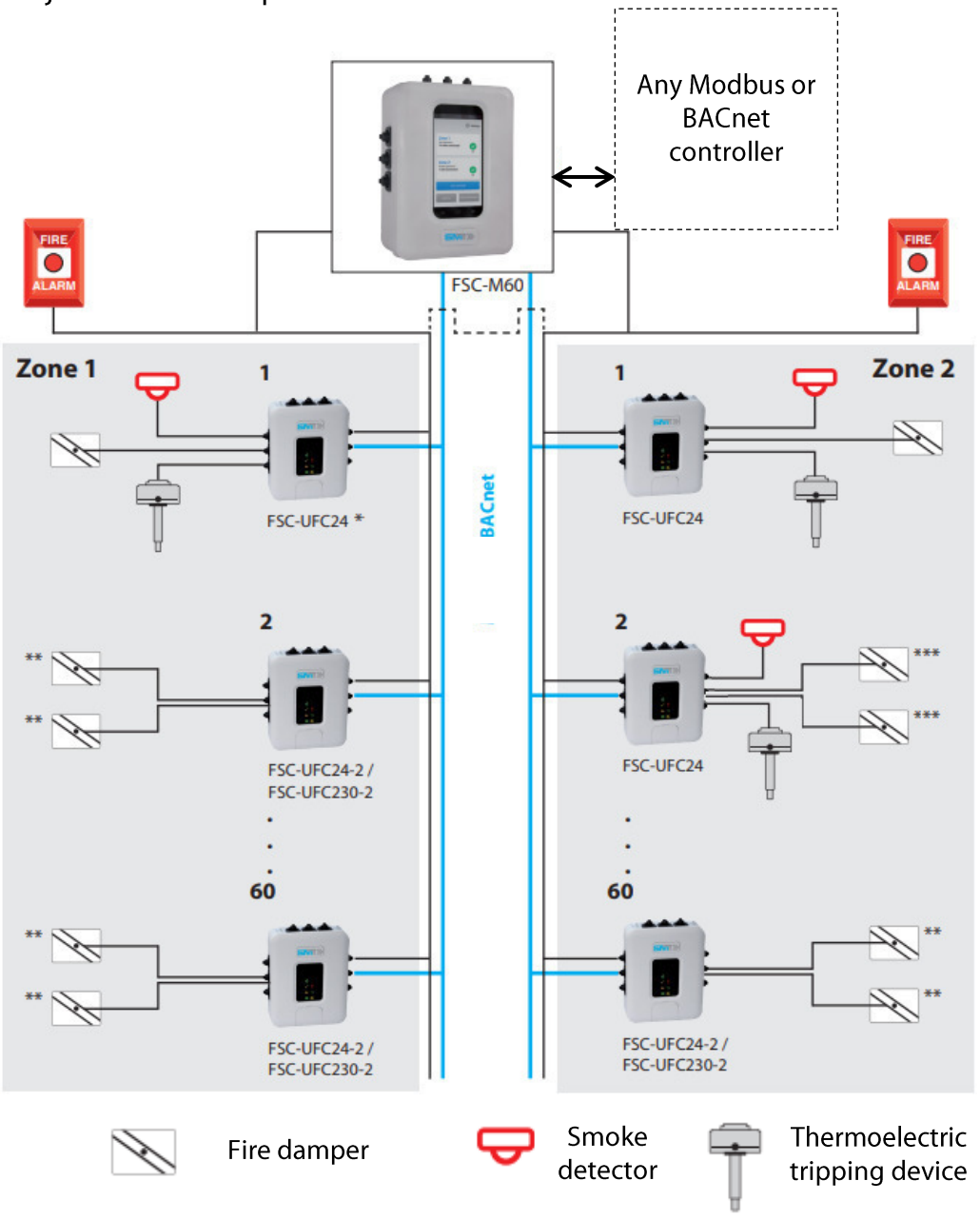
1. General description

This system is used to monitor and control up to 240 motorized fire dampers and is compatible with all standard 24V or 230V actuators. The system consists of communication modules and from a central control unit, which communicates with individual communication modules via Bus communication RS-485. The entire system operates on the Master & Slave principle, where the communications modules (Slaves) have set the address through the Dip switch, the central control unit (Master) automatically detects individual modules and no further adjustments are required.



* Individual control of 1 fire damper with the communication module FSC-UFC24 resp. FSC-UFC24-230

** Individual control of 2 fire dampers with the communication module FSC-UFC24-2 resp. FSC-UFC230-2

2. Central control unit FSC-M60

The FSC-M60 is a smart controller with a high resolution touch screen to control and monitor up to 120 communication modules UFC through the BACnet MS / TP protocol. Thanks to the ability to connect up to two motorized fire dampers to one UFC module it can monitor up to 240 motorized fire dampers. The device allows remote control via Wi-Fi. Thanks to the integrated real time clock it allows automatic control of individual dampers or the entire system, the device records the test reports. The central control unit can be integrated directly into the building automation system via protocols BACnet MS / TP or Modbus RTU.

2.1 Technical parameters

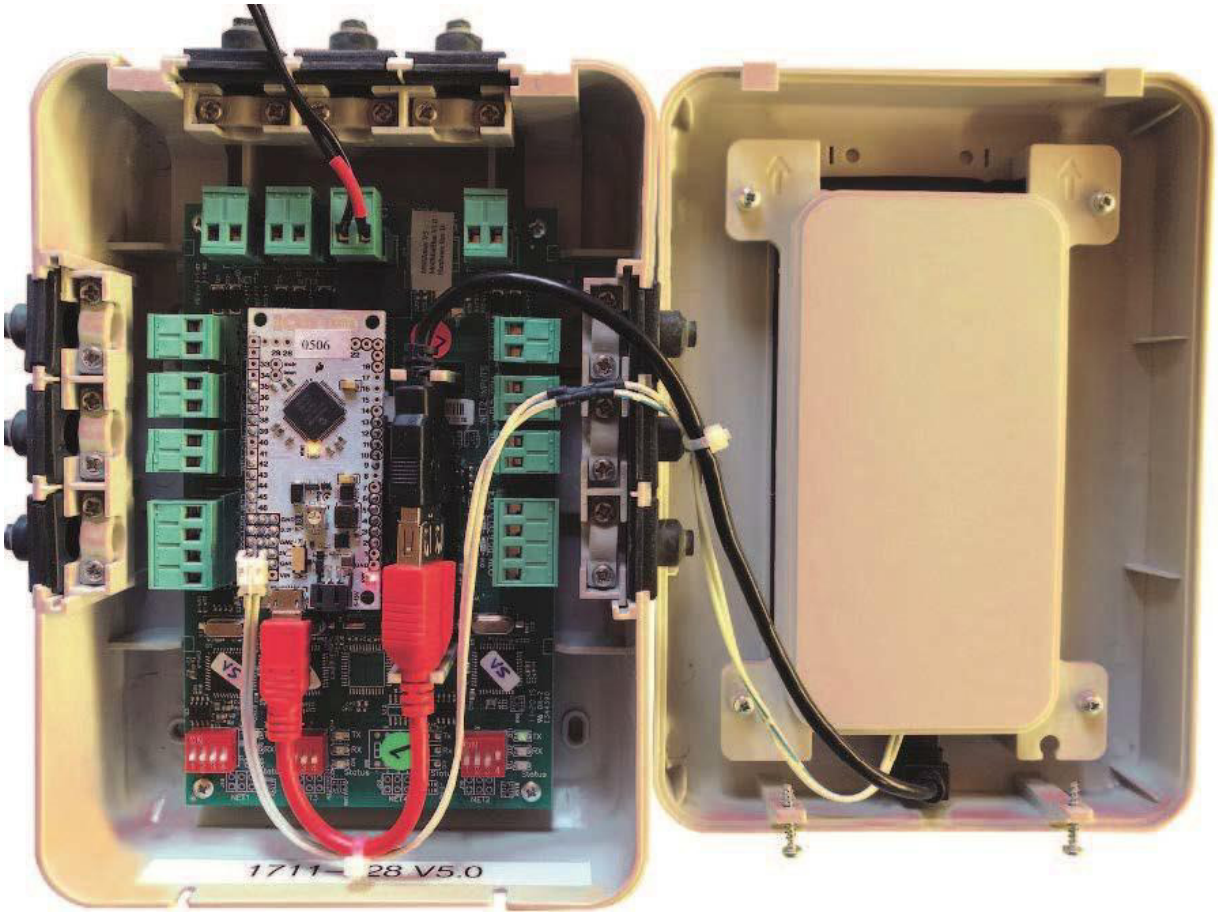
Electrical parameters	Operating voltage	5V DC (Power supply for 230 V AC included in delivery)
	Power consumption	< 10W
	Remote access	Wi-Fi or cellular connection
	Connections	Quick connection terminals
Communication / Modbus	Functionality	For 2 zones with max. 60 UFC devices Per zone. For any integration into any superior Modbus system.
	Protocol	Modbus RTU
	Medium	RS-485, not electrically isolated
	Transmission Formats	Specified by Modbus RTU standards
	Baud rate	9600 bps
	Addresses	Modbus addresses 121 (zone 1) 122 (zone 2) for M60 device.
	Typical response time	< 500 ms
Communication / BACnet	Functionality	For 2 zones with max. 60 UFC devices Per zone. For any integration into any superior BACnet system.
	Protocol	BACnet MS/TP
	Medium	RS-485
	Baud rate	9600, 19200, 38400, 76800 bps default 38400 bps
	Device instant addresses	Zone 1: 804121, zone 2: 804122
	Addresses	Addresses 1-60 (zone 1) and 61-120 (zone 2) for UFC devices.
	Typical response time	< 100 ms
Safety	Protection class	III (safety extra low voltage)
	Protection degree	IP42, housing of non-flammable polycarbonate
	EMC Correlation Emission	EN61000-6-3 and EN55022
	EMC Correlation immunity	EN50130-4 and EN55024
	Electrical safety	EN60950-1
	Ambient temperature	10°C to +30°C
	Storage temperature	0°C to +40°C
	Maintenance	Maintenance free
Mechanical Data	Width	135 mm
	Height	75 mm
	Length	185 mm
	Weight	approx. 1 kg

2.2 Cable specification for connecting the communication

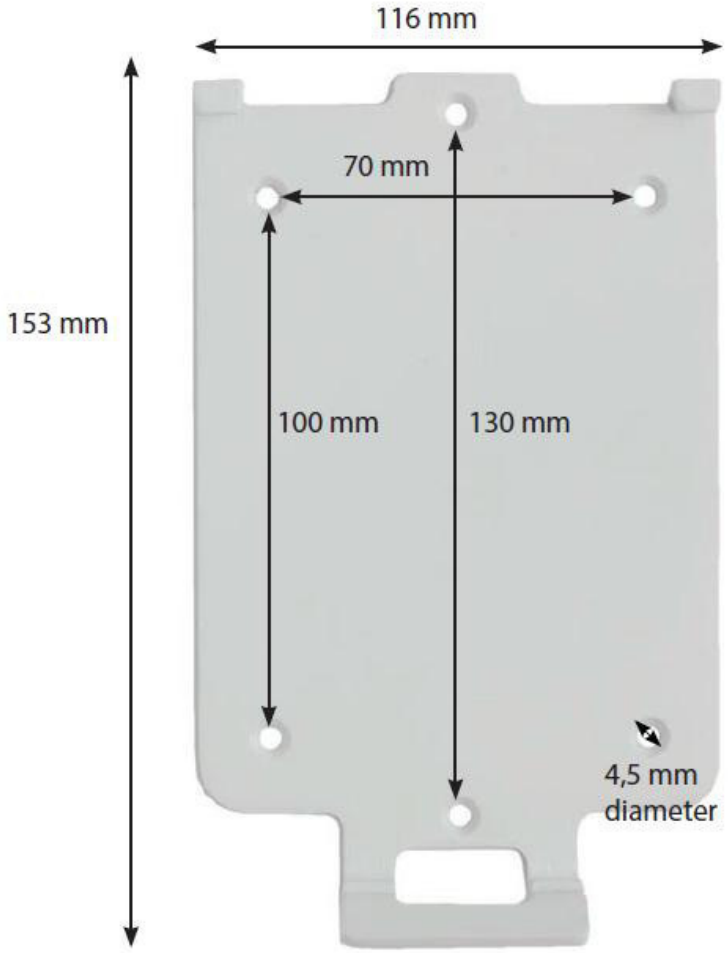
For the connecting of the FSC-M60 with communication modules FSC-UFC you should use shielded twisted pair 120Ω at 1MHz, a cable that is used in telecommunication and computer networks. It is recommended to use the Belden 3105a cable or its equivalent. Using of a different cable may cause functional problems. The maximum distance from the central control unit to the last communication module is 1200m.

2.3 Internal connection of central control unit

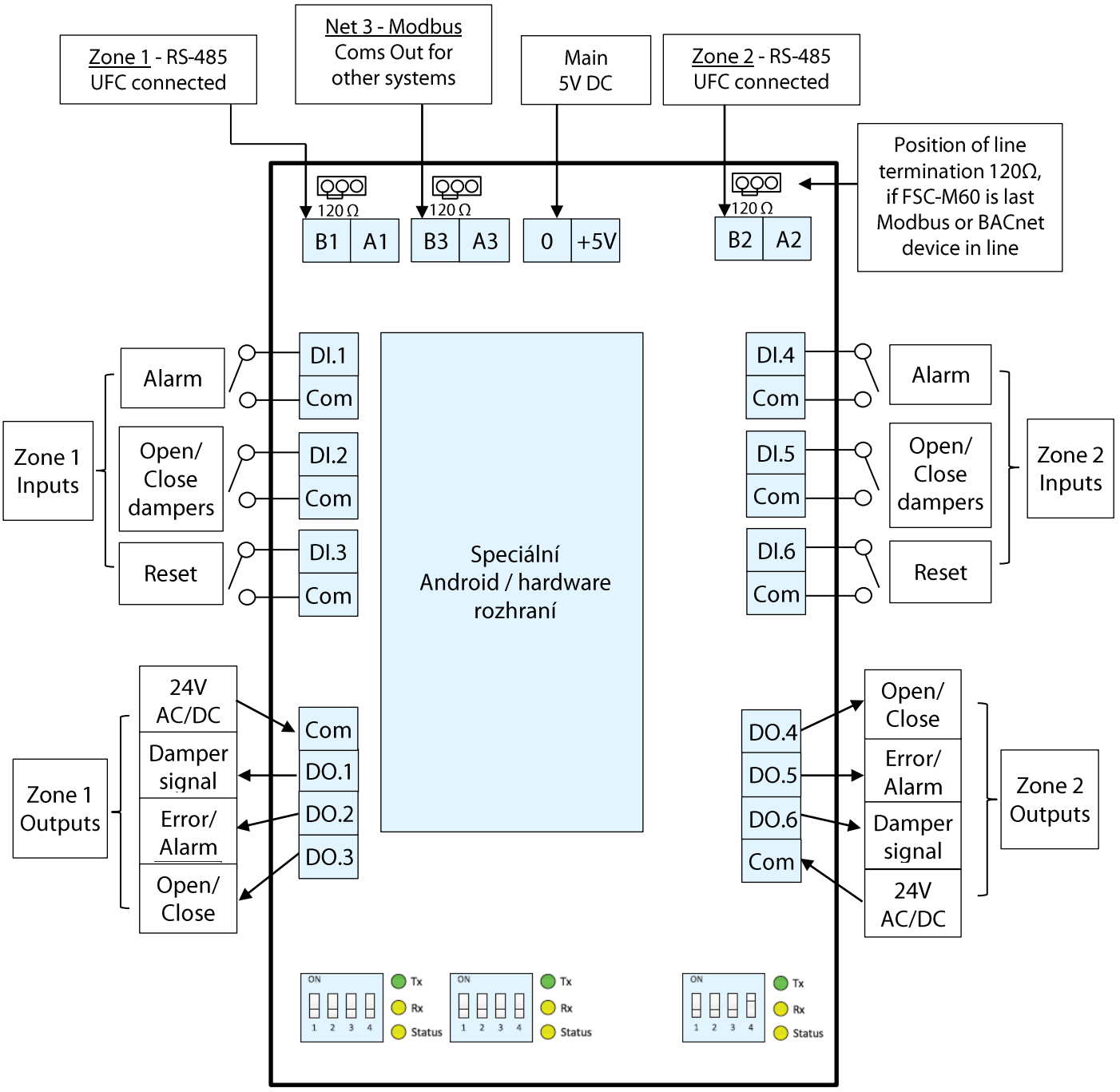
If you need to disconnect the screen from the device, disconnect the USB between the red and black USB cable connections. **DO NOT remove the red USB plug from the IOIO module (white board)! Handle with care.** When powering the FSC-M60 you need to use 5V DC, the 230V AC / 5V DC transformer is included in delivery. **When connecting, the power polarity must be respected.**



2.4 Mounting dimensions



2.5 Electrical installation



Net 3 - The FSC-M60 can be used as slave for the integration into a Modbus network through Net 3. In this case the FSC-M60 operates at the same time as master of all connected devices in zones 1 and 2. Zone 1 has Modbus address 121 and zone 2 Modbus address 122 assigned.

Alarm - Digital inputs DI.1 and DI.4 serve for connection of alarm. By switching ON of these contacts the digital outputs DO.2 and DO.3 resp. DO.5 and DO.4 are activated.

Open/Close dampers- Through the digital inputs DI.2 and DI.5 we can Open/Close all dampers in zone 1 resp. 2. By switching ON of this contact the digital output DO.3 resp. DO.4 is activated. This digital input is used to connect feedback from the air handling unit.

Reset - By switching ON of digital inputs DI.3 and DI.6 we can send to all UFC devices in zone 1 resp. 2 cleaning message.

24V AC/DC - This digital output terminal for zone 1 and 2 labeled “Com” is used to connect a maximum voltage of 24V AC / DC.

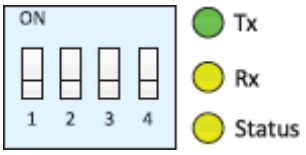
Damper signal - Digital outputs DO.1 and DO.6 indicate that all dampers in zone 1 resp. 2 are open. If digital inputs DI1 or DI.2 resp. DI4 or DI5 are switched off, digital DO.1 resp. DO.6 is activated. If a damper in the zone is closed manually, the corresponding output will also activate.

Error/Alarm – If a damper in zone 1 resp. 2 reports an error or alarm, digital outputs DO.2 resp. DO.5 will switch ON. If a damper in the zone is closed manually, the corresponding output will also activate.

Open/Closed – If digital output DO.3 resp. DO.4 is activated; all dampers in zone 1 resp. 2 will close.

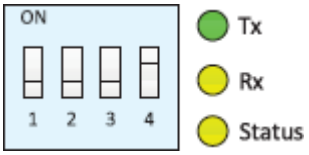
2.6 Functionality Dip Switches

Default setting Net 1 / Zone 1:



Default setting Net 1 / Zone 2:

For the correct operation of the FSC-M60, dip switch no 4 of zone 2 (net2) needs ALWAYS to be ON.



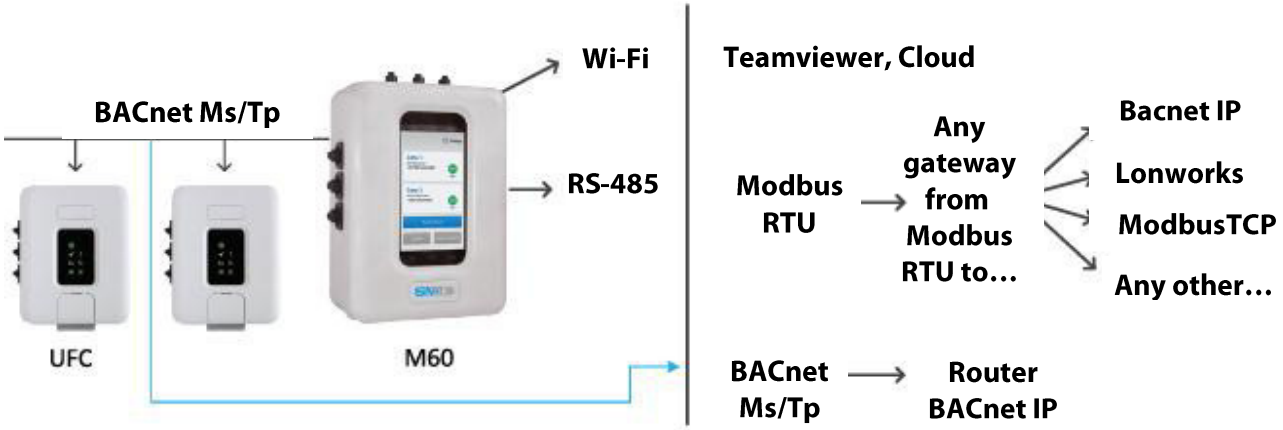
In addition to the switches, LEDs are located to indicate the communication. A green LED indicates transmission data (Tx), yellow data receiving (Rx). The third LED is also yellow and has 2 functions. If it flashes in 1s interval, an alarm is triggered in the corresponding zone. If it flashes in 0.1s interval, there is communication error in the zone.

Pin	On	Off (default)
1	Alarm in zone 1 or 2 *	Alarm on single FSC-UFC... **
2	Smoke application	Fire application
3	Baud rate Auto (only 9600 bps)	
4	Internal use only (Zone 1= Off / Zone 2 = On)	

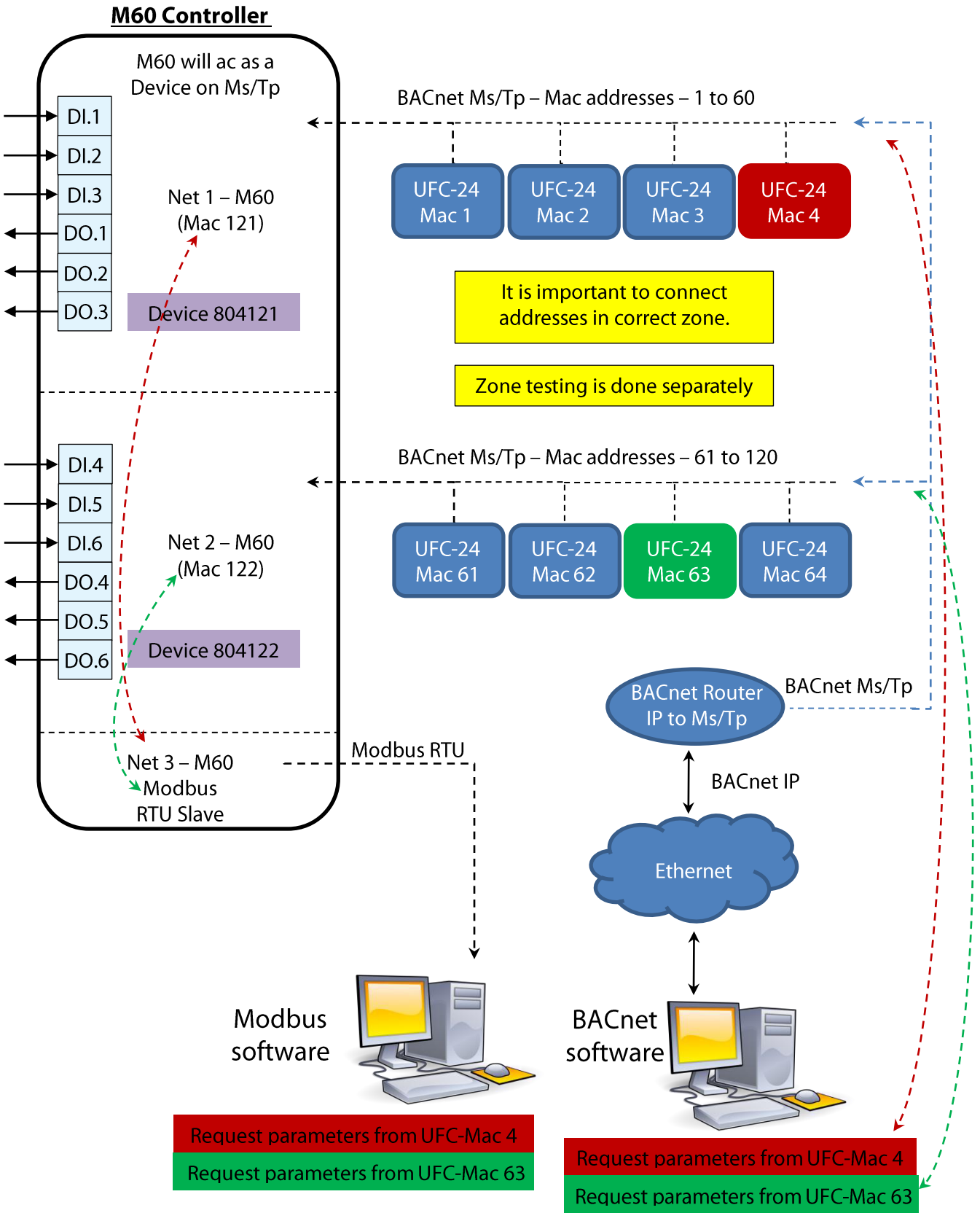
* If pin 1 for zone 1 is ON and there is an alarm in this zone, all dampers in zone 1 will go to their safety position. Same apply for zone 2 if pin 1 for zone 2 is ON.

** If pin 1 for zone 1 is OFF and there is an alarm only the damper connected to the FSC-UFC... which detects an alarm will go to its safety position. All other dampers in this zone remain in the initial position. Same if pin 1 for zone 2 is OFF. The alarm signal will be visible on the FSC-M60.

2.7 Communication/integration in superior systems



2.8 Communication layout

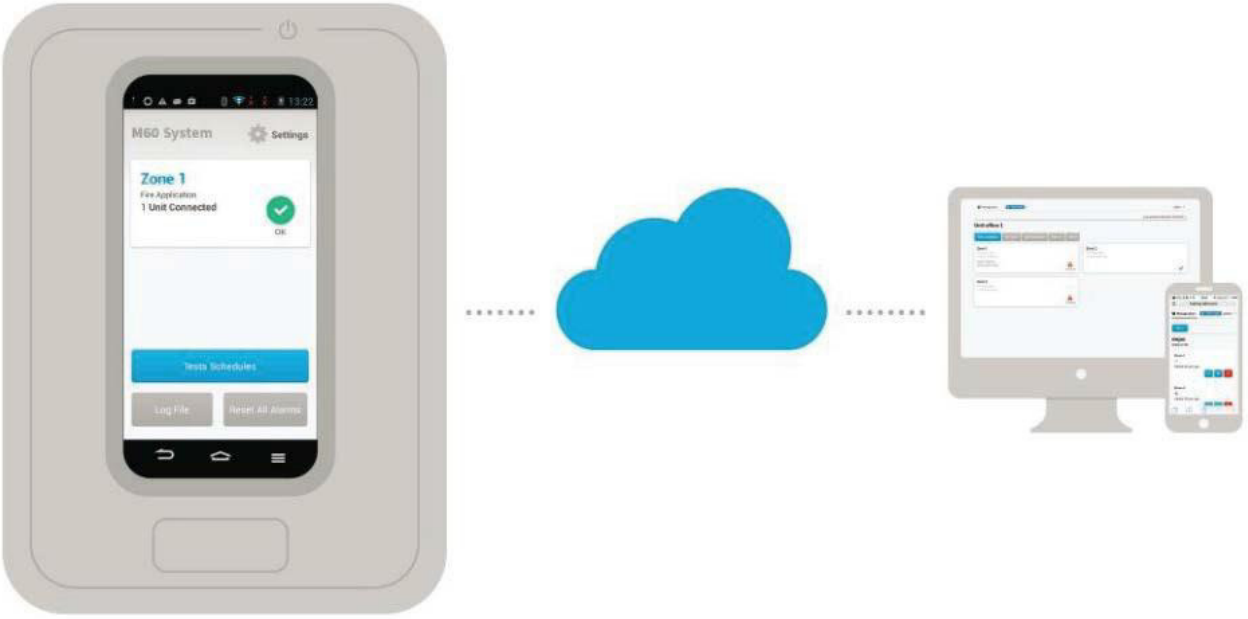


2.9 Remote access

There is the possibility to access the central control unit FSC-M60 remotely via TeamViewer, this software is possible to use in free version, or via Cloud. This is an optional functionality for an annual fee.

Advantages of Cloud access:

- Access to each project anytime possible without having to go there physically.
- Test reports and alarm messages can be automatically sent to registered email addresses.
- For the testing of the dampers only one person is needed (the service worker receives confirmation about functionality via mobile phone => automatic logging).

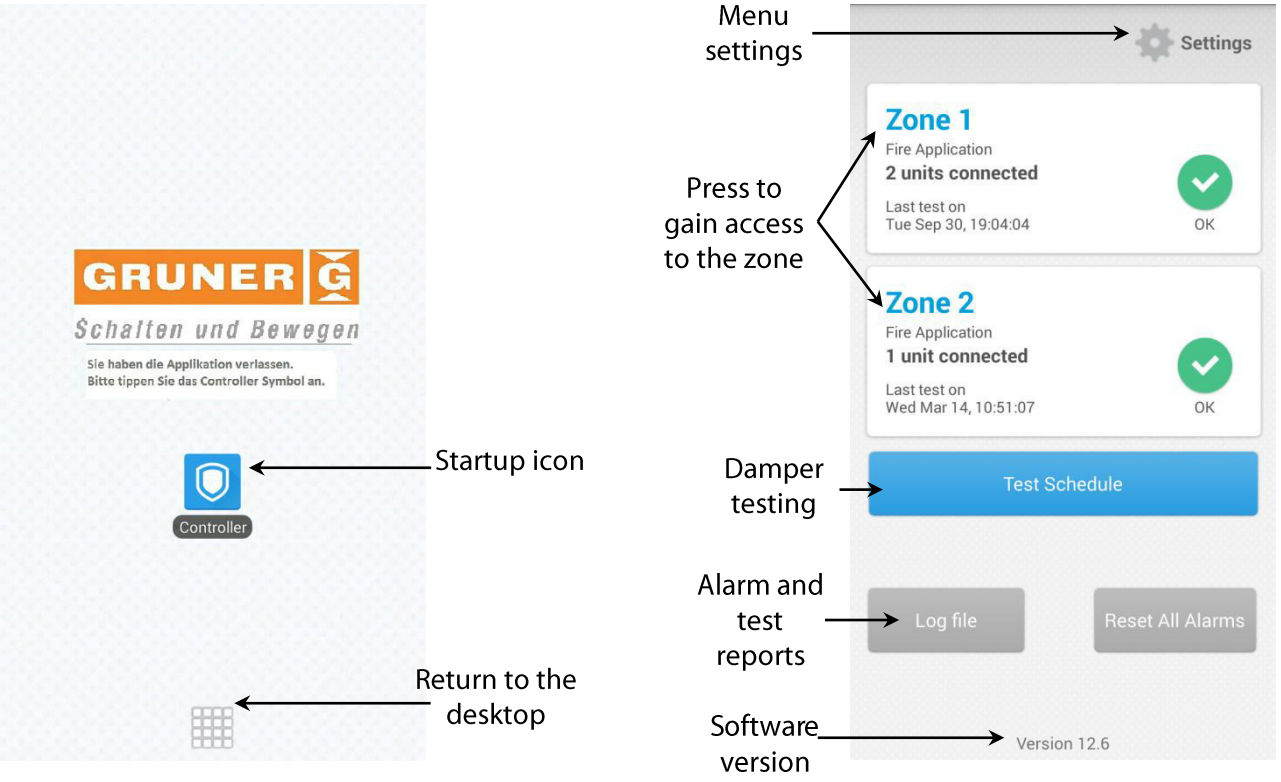


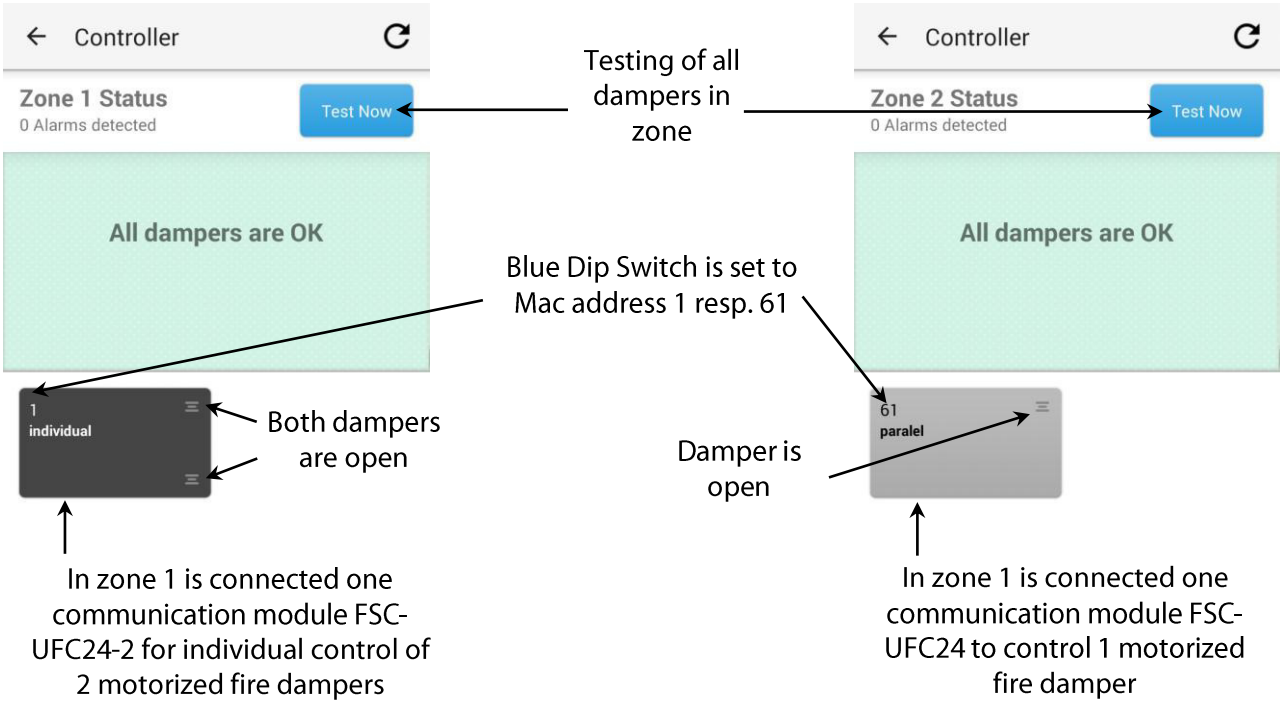
2.10 Bus monitoring functionality

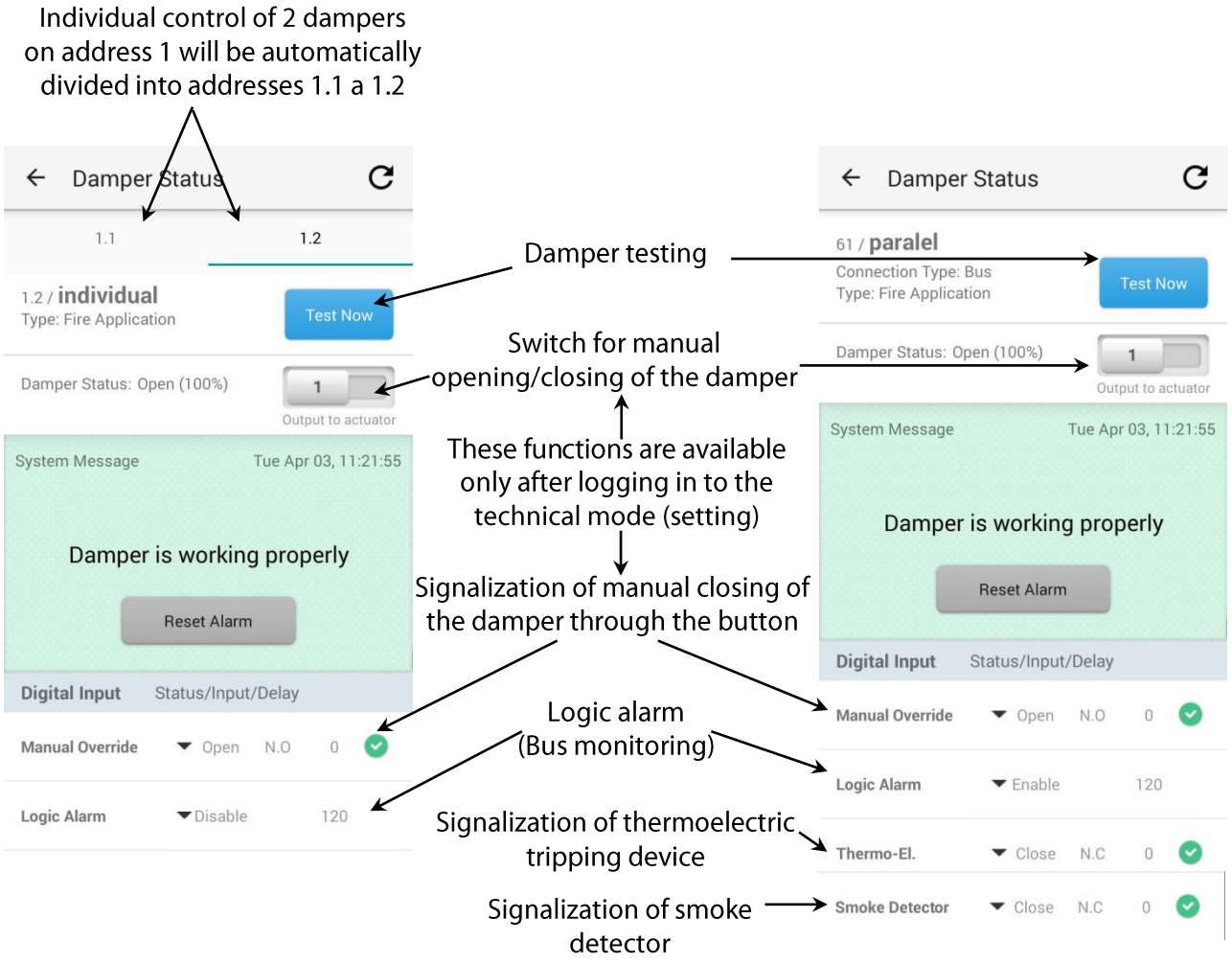
There is an option to activate bus monitoring function of the system directly in central control unit FSC-M60. The functionality can be activated in a simply way for the whole zone or for an individual communication modules FSC-UFC. If the bus communication to the FSC-UFC, in which the functionality is activated, is interrupted, the damper is moving to its safety position after the defined delay time. Damper is in safety position until the communication is restored. By default, bus tracking is off. It can be activated in menu the "bus monitoring activation".

2.11 User interface

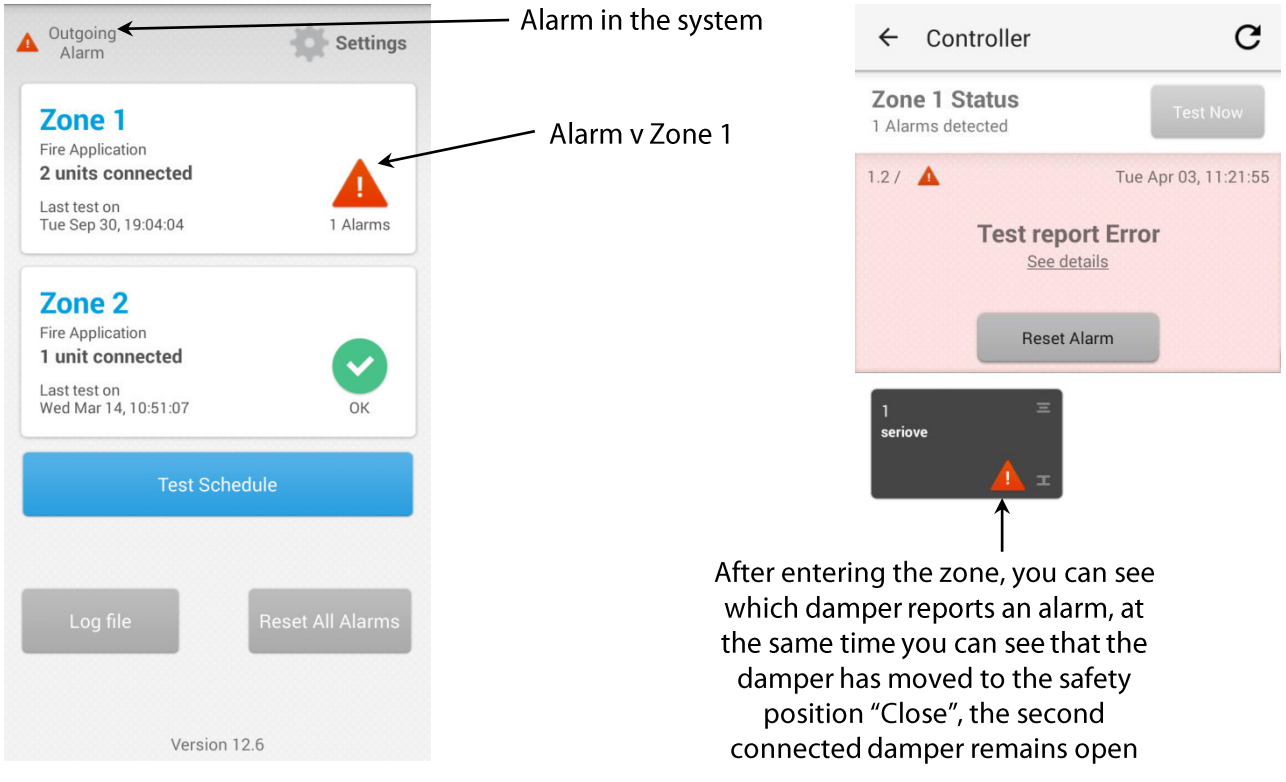
2.11.1 Starting of the system

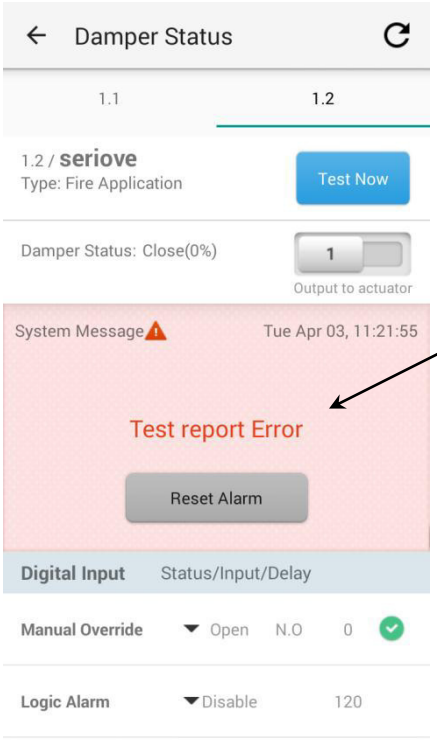




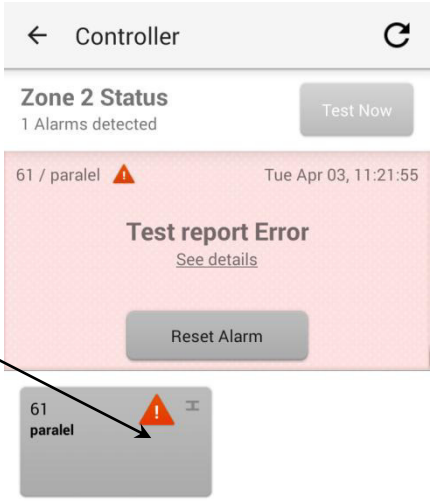


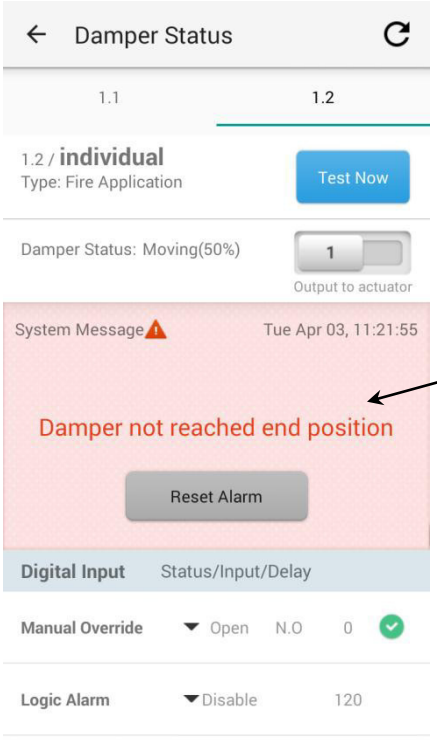
2.11.2 Error messages





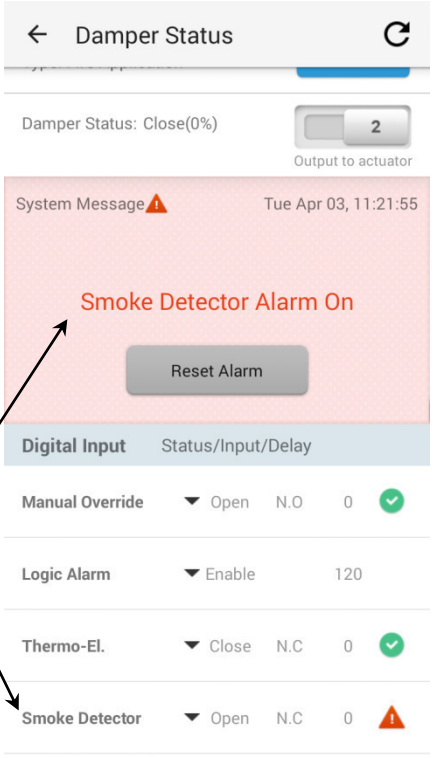
Alarm on the appropriate damper

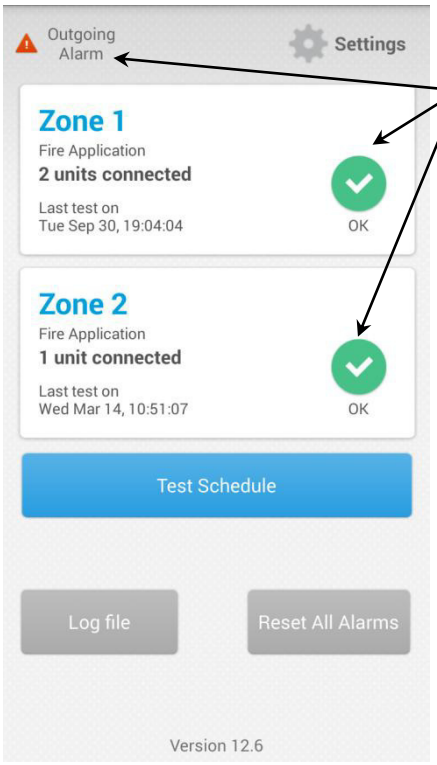




One of the possible errors, when the damper has failed to move from the position „Close“ to the position „Open“ in time

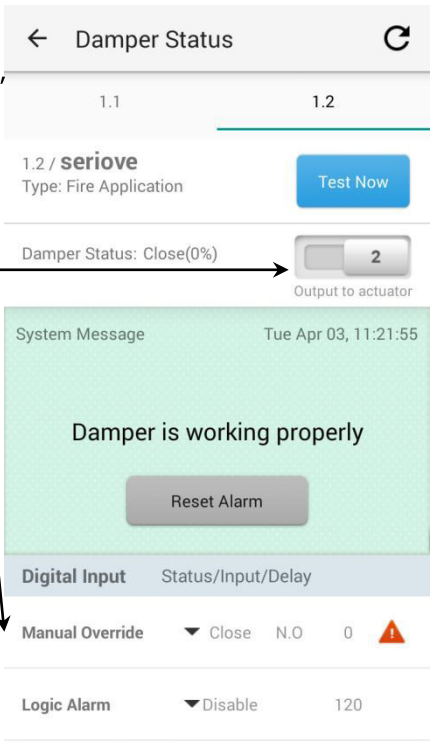
Signalization of an error, triggered by smoke detector

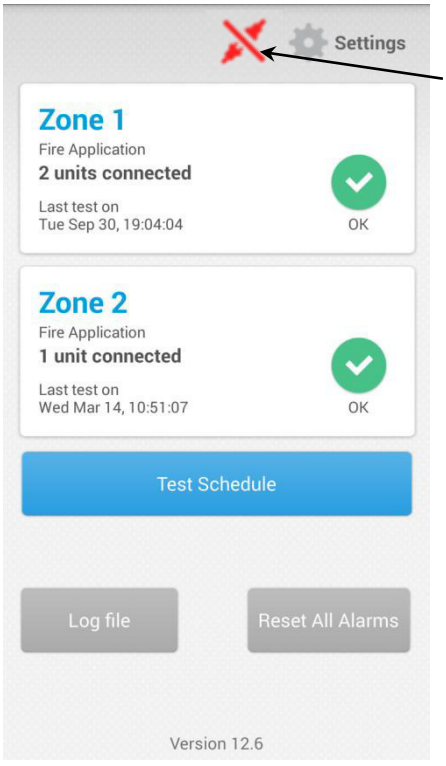




The system is reporting an alarm, but both zones reports all OK

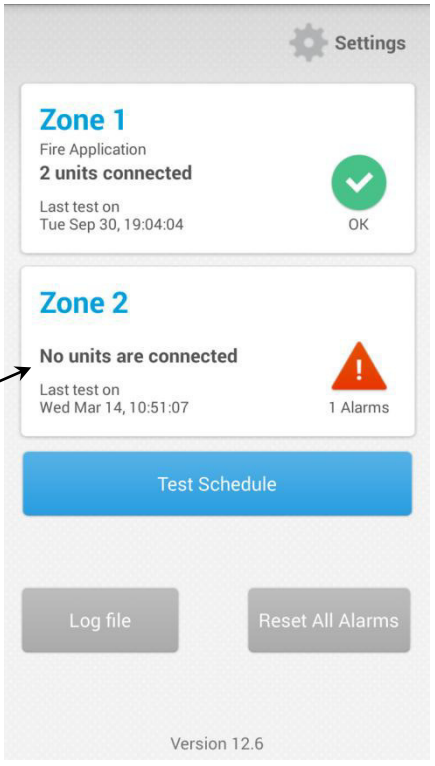
This is happening if a damper is closed by a switch or manual button (Conventional application)



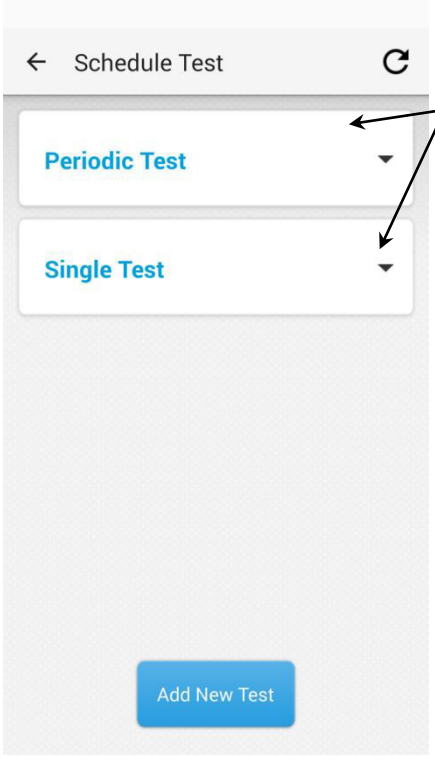


This symbol will appear when the connection between the screen and the central control module is interrupted

This error will appear if the BUS communication with the respective zone is interrupted

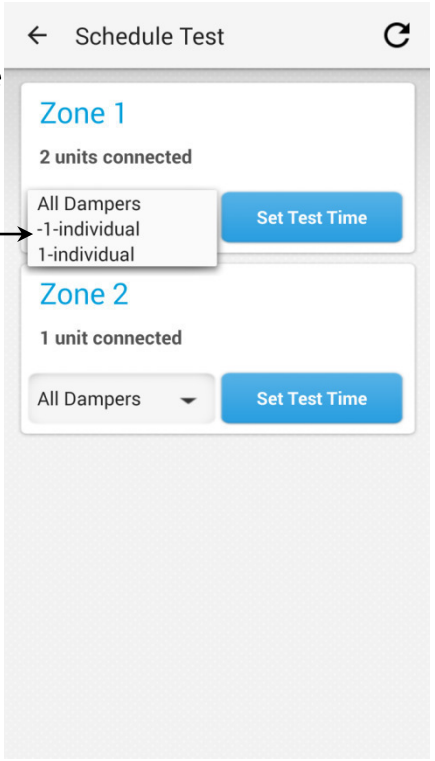


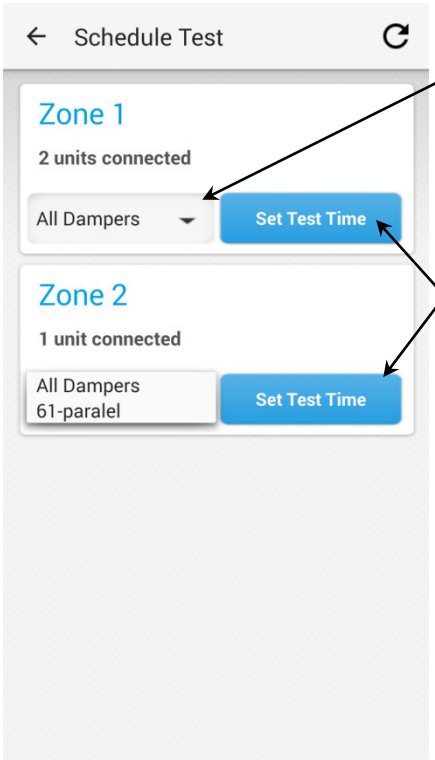
2.11.3 Damper testing



After pressing "Test Schedule", we enter the test settings screen

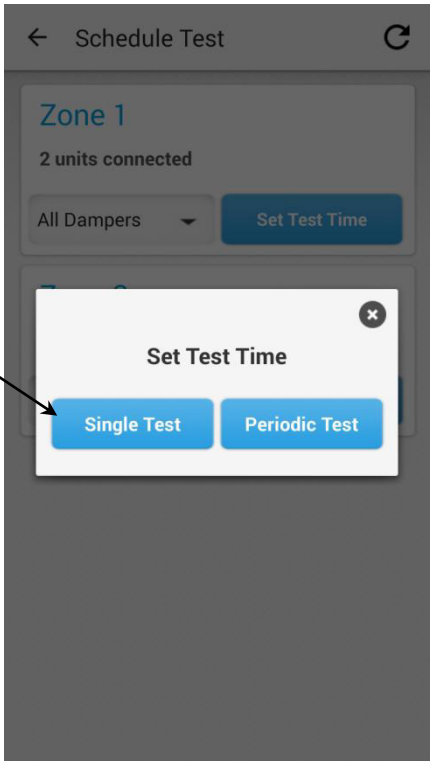
A list of dampers in zone 1, on the communication module UFC-24-2 we can test each damper individually

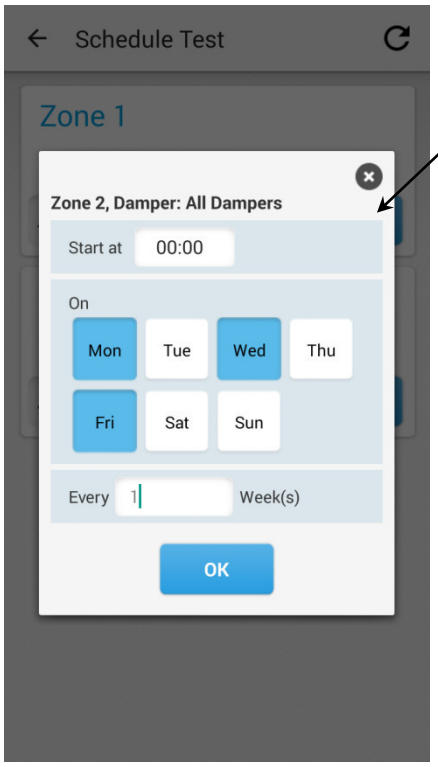




We can test all dampers in the zone at a time, or choose from the list individually

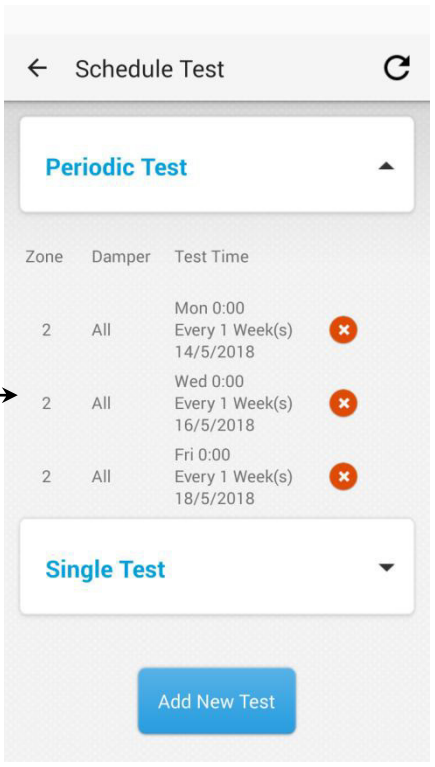
After pressing button for setting of the test time, we can select Single or Periodic Test

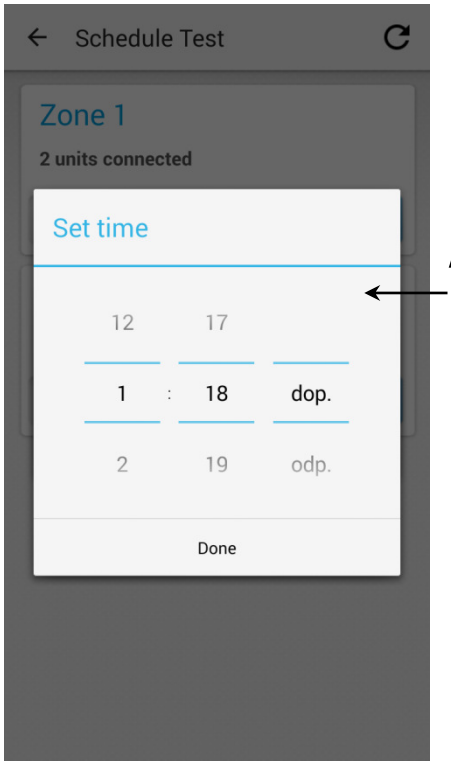




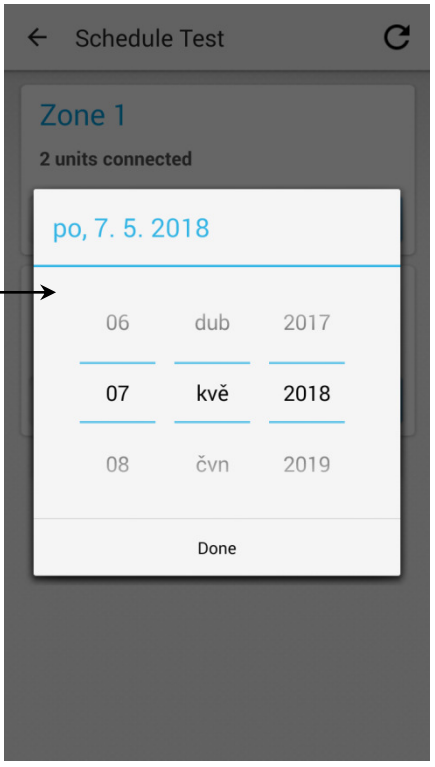
For periodic test we can set how often to perform, on which days and at what time

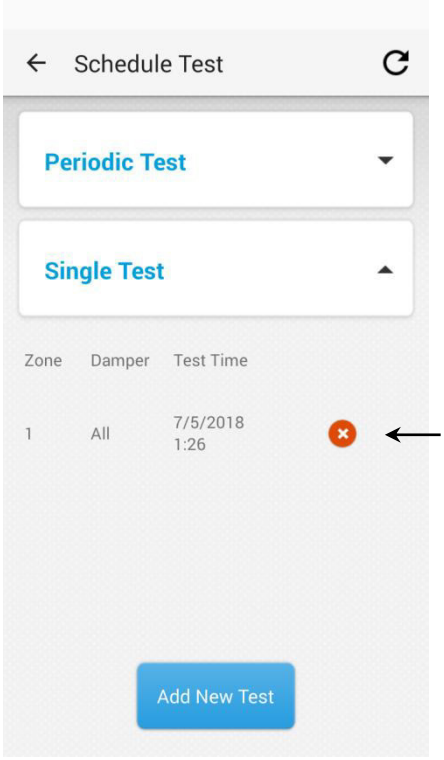
The list of set periodic tests remains in the list until the user deletes them





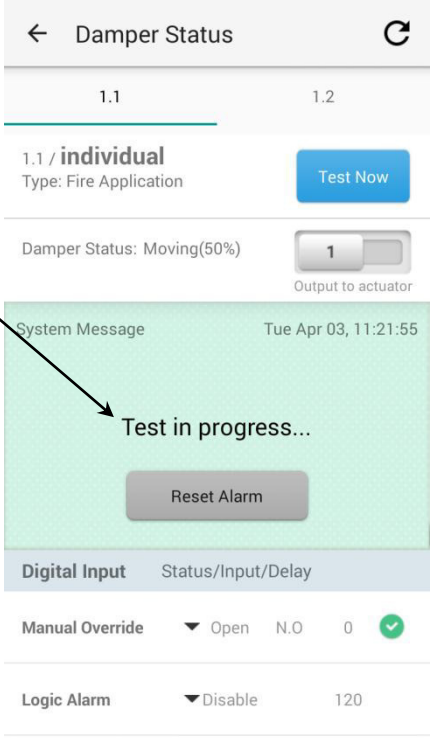
After setting Single test, we can set time and date of the test



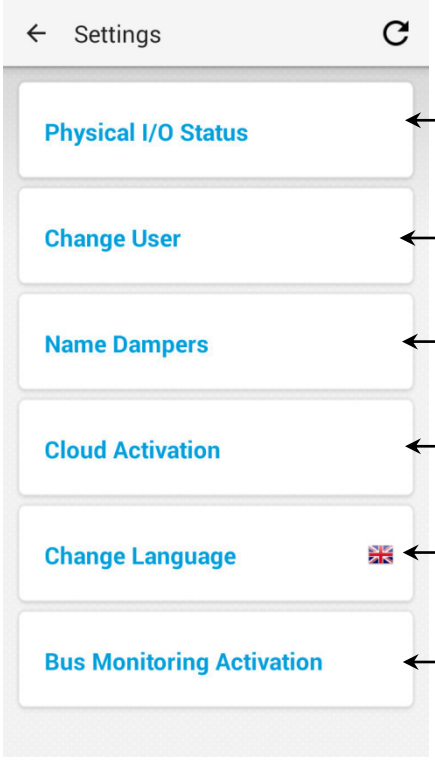


If a damper is being tested, it is forbidden to manually open or close the damper

The list of set single tests remains in the list until they are done or the user deletes them



2.11.4 Menu setting



We can display a list of all inputs and outputs in zone 1 and 2 and their status

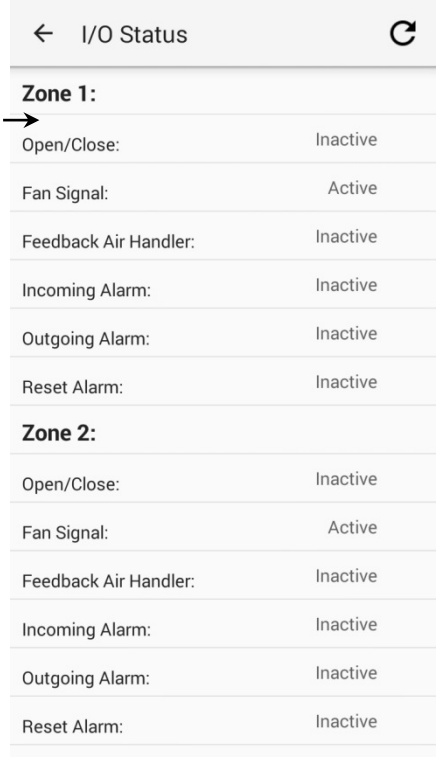
Login to technical mode, password „1234“

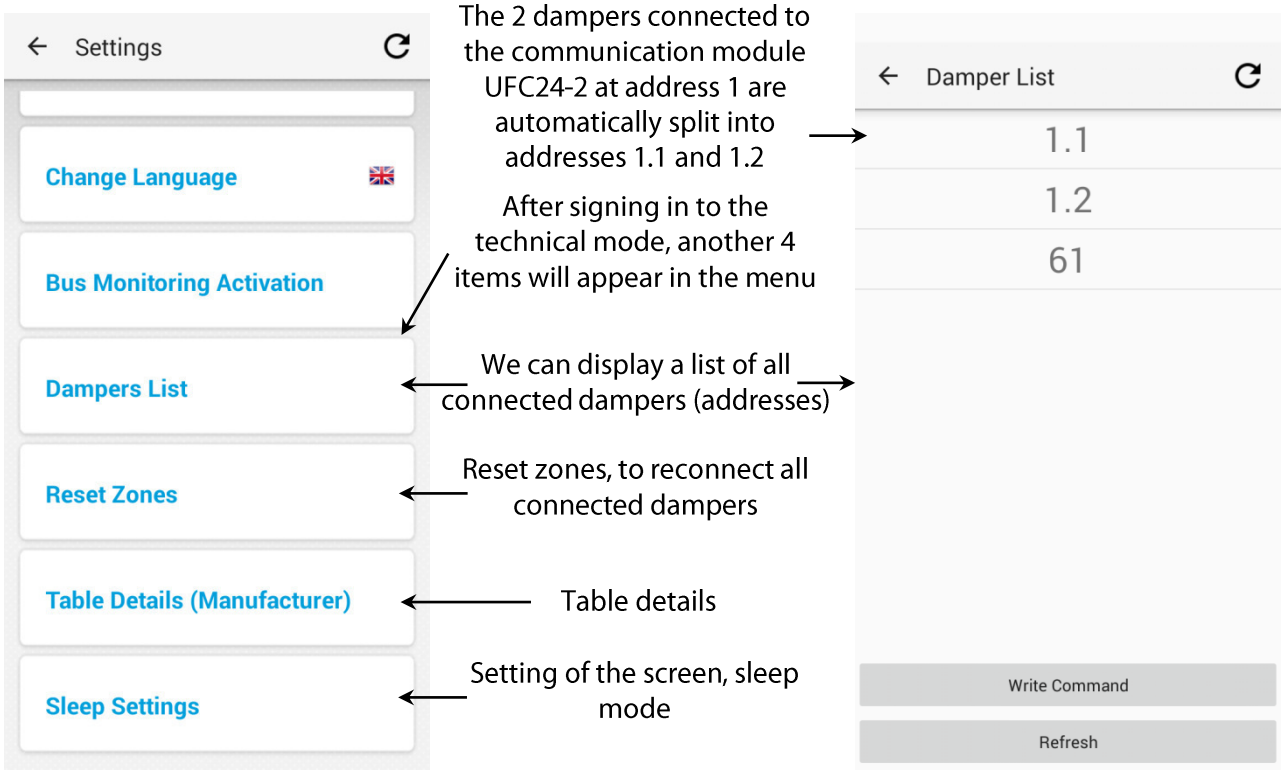
Naming of connected dampers for better orientation

Optional remote access via Cloud

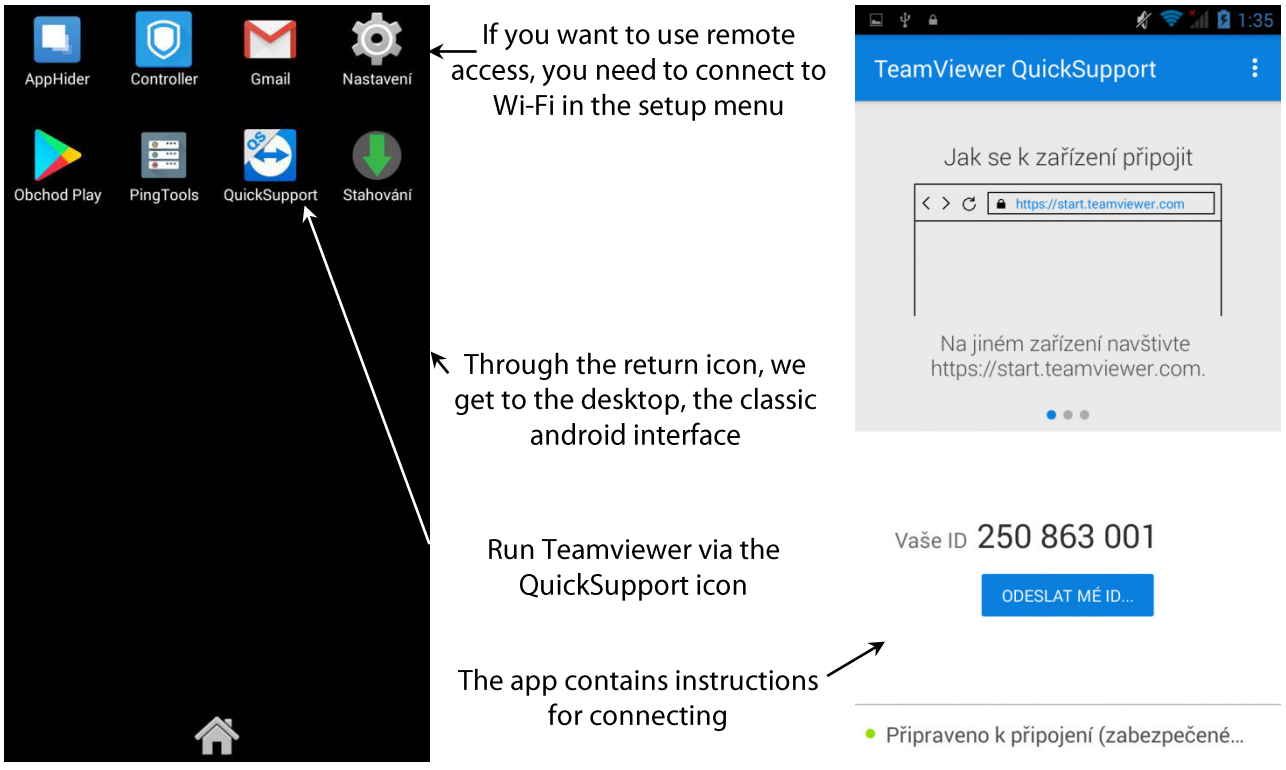
Change language

Bus monitoring activation





2.11.5 Remote access



3. Communication module FSC-UFC24

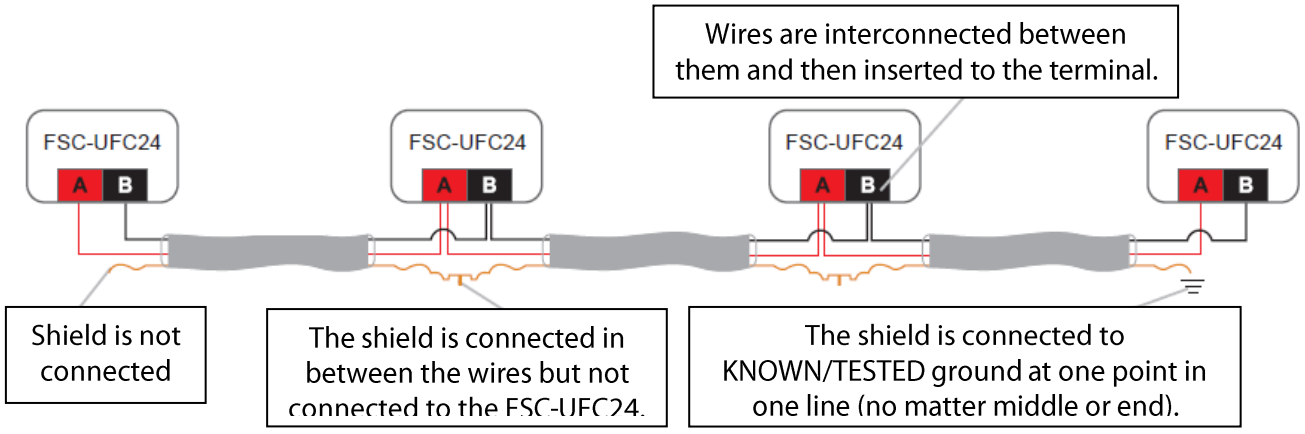
The FSC-UFC24 allows the control one motorized fire damper with 24V AC/DC actuator. It is also possible to connect one smoke detector and one thermoelectric tripping device to the communication module. It offers Modbus, BACnet or an analog connection to the superior system, control modes can be selected using the DIP switch.

3.1 Technical parameters

Electrical parameters	Nominal voltage	24 V AC/DC
	Nominal voltage Range	-20%... + 20%
	Dimensioning	2 VA + actuator (max. 24 VA)
	Power consumption	2W + actuator
	Connections	Quick connections (terminals)
Communication / Modbus	Protocol	Modbus RTU
	Medium	RS-485
	Transmission formats	Specified by Modbus RTU standards
	Number of devices per line	100 (without repeater)
	Baud rate	9600, 19200, 38400, 76800 bps
	Addresses	1..127 (0 reserved for broadcast)
	Typical response time	< 200 ms
Communication / BACnet	Protocol	BACnet MS/TP
	Medium	RS-485
	Number of devices per line	65 (without repeater)
	Baud rate	9600, 19200, 38400, 76800 bps (auto detect)
	Addresses	1..127 (0 reserved for broadcast)
	Typical response time	< 100 ms
Safety	Protection class	III (safety extra low voltage)
	Protection degree	IP42, housing of non-flammable polycarbonate
	Electromagnetic tolerance	CE in accordance with 2004/108EC
	Low voltage directive	CE in accordance with 2006/95EC
	Mode of operation	Type 1 (EN 60730-1)
	Rated impulsive 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 parameters	Width	120 mm
	Length	57 mm (with bracket)
	Height	153 mm
	Weight	415 g (with bracket)

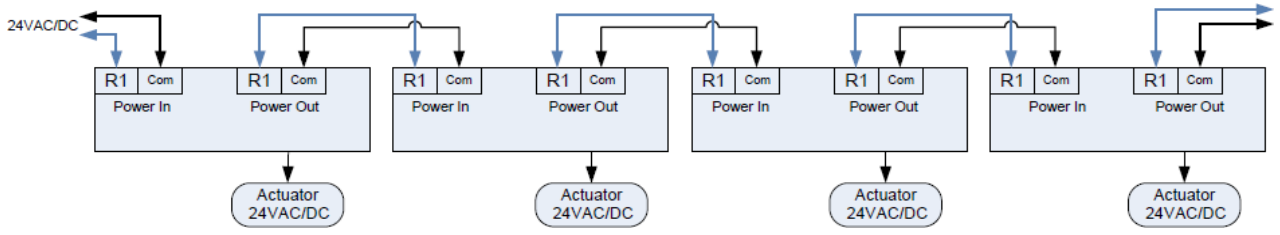
3.2 Cable specification for connecting the communication

For the connecting of the communication module FSC-UFC24 with central control unit FSC-M60 you should use shielded twisted pair 120Ω at 1MHz, a cable that is used in telecommunication and computer networks. It is recommended to use the Belden 3105a cable or its equivalent. Using of a different cable may cause functional problems. The maximum distance from the central control unit to the last communication module is 1200m.

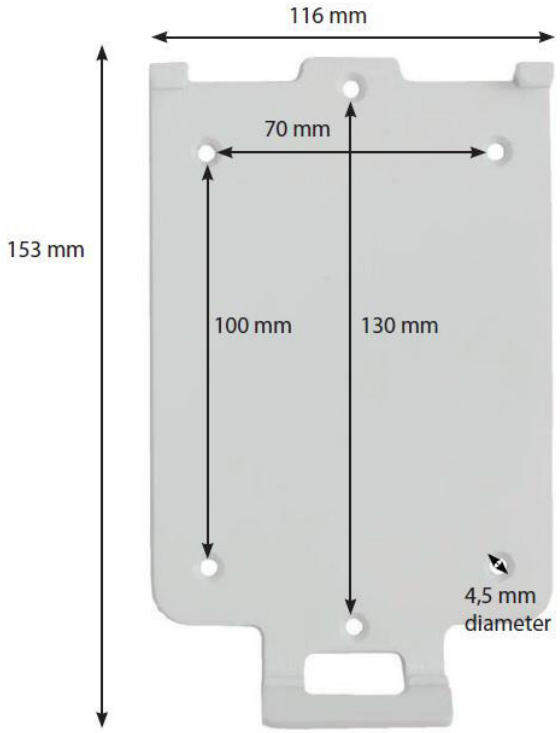


3.3 Cable specification for connecting of power supply

Communication module FSC-UFC24 muss be powered by 24V AC/DC. The damper actuator muss be at 24V AC/DC. The device has two power terminals for easy installation „Daisy chain“. **The polarity must be respected when connecting multiple FSC-UFC24 to one power source (phase to phase, com to com)!**



3.4 Mounting dimensions



3.5 Removing the cover of the housing

3. Move the sliding cover 10 mm to the top

1. Open the lid

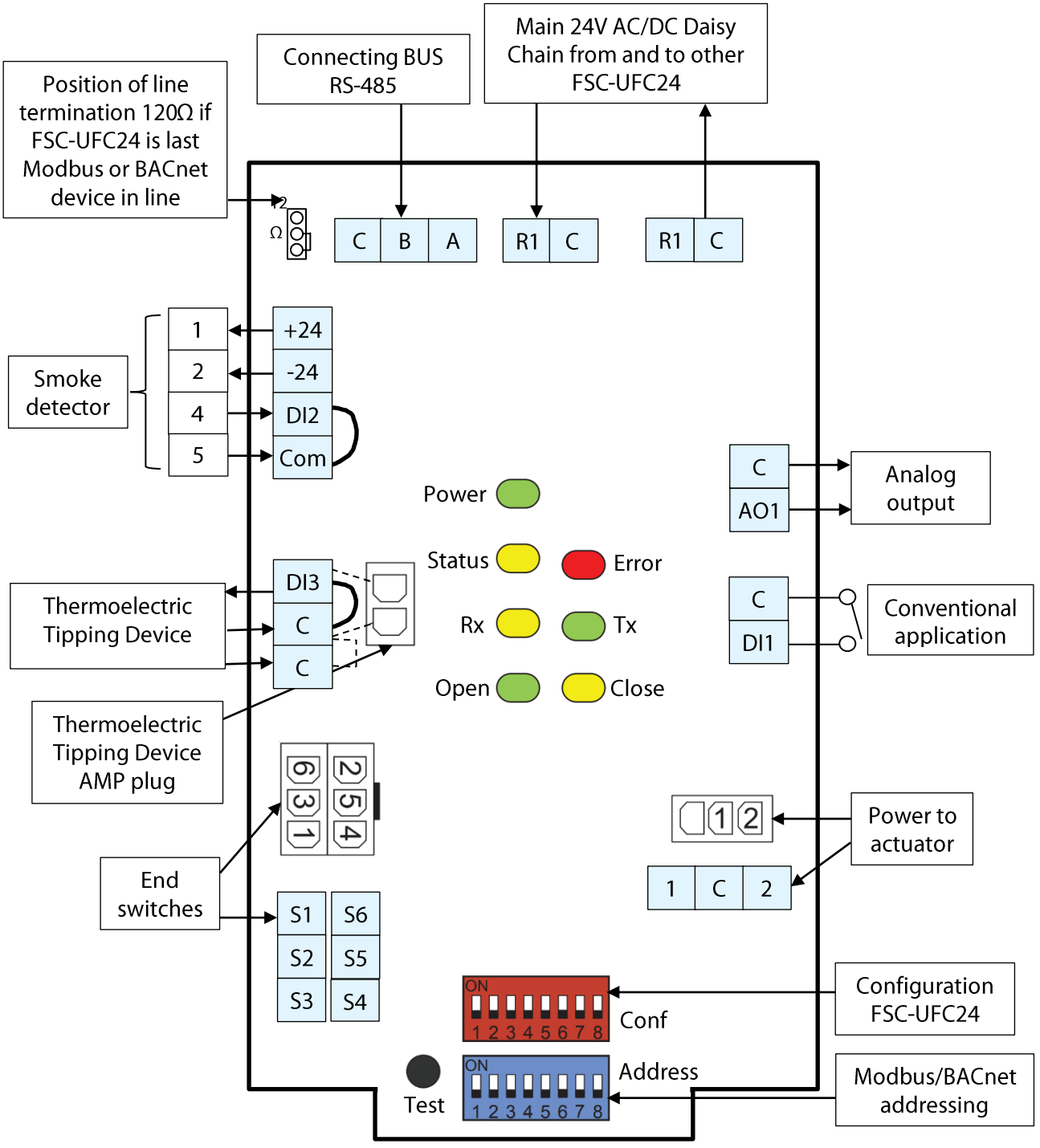
2. Unlock the screw

(a) The blue colored dip switch terminal is for the Modbus or BACnet addressing.

(b) The red dip switch is for the configuration.

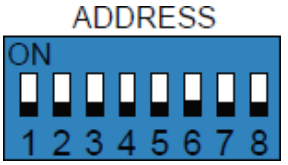
(c) Test button.

3.6 Electrical installation



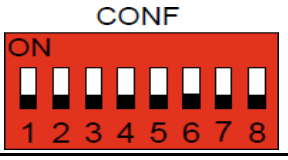
3.7 Modbus/BACnet addressing

If the FSC-UFC24 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	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
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		

3.8 Configuration through Dip-Switch



Configuration of the FSC-UFC24 is done on the red dip switch. For a classic fire application, all pins are OFF, only Pin 3 is ON.

Pin	Off (default)	On
1	Bus	Analog
2	Fire application	Smoke application
3	Modbus RTU	BACnet MS/TP
4	Bit rate (Off-default)	
5	Bit rate (Off-default)	
6	Not in use = Off	
7	Smoke detector alarm „system“	Smoke detector alarm „actuator“
8	Not in use = Off	

Pin 1: Digital Input (Conventional application) allows you to check the position of the damper using an external analog input device.

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.

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

Pin 4 a Pin 5: If the FSC-UFC24 is used in connection with the FSC-M60, Pins 3 and 5 has to be OFF. BACnet communication detects bit rate automatically. If the FSC-UFC24 is connected to another superior system with Modbus communication, the bit rate is set according to the following table.

Pin	9600 (default)	19200	38400	76800
4	Off	On	Off	On
5	Off	Off	On	On

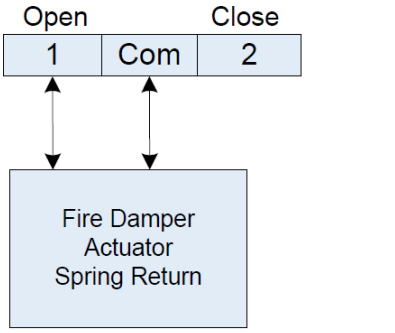
Pin 7: - Smoke detector alarm „system“= the signal of the smoke detector is transferred directly to the system and processed there.

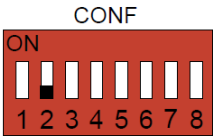
- Smoke detector alarm „actuator“= the signal of the smoke detector is directly linked with the actuator. In case of a smoke detector alarm the fire damper connected to the same FSC-UFC24 will be closed. The signal of the smoke detector is forwarded to the controller.

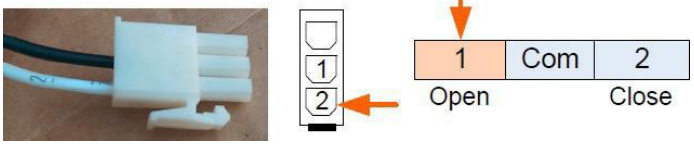
The above is only valid for the fire safety application. In the smoke extraction application the signal of the smoke detector has no direct influence to the actuator. E signal will be forwarded to the system in any case.

3.9 Actuators power supply

Fire damper: When the actuator has power it is open, when there is no power the actuator is closed with the spring. After the power is reset, the damper always goes into the open position.





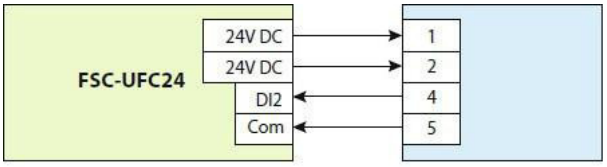


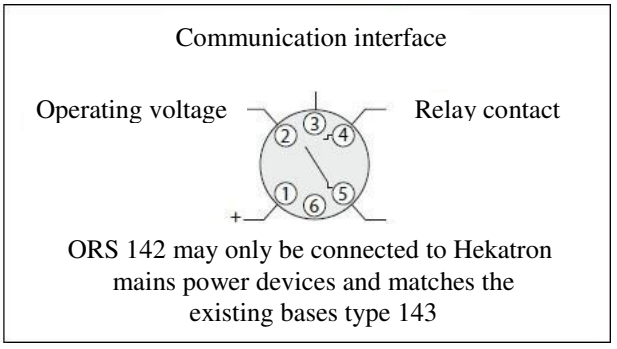
3.10 Thermoelectric tripping device

Digital contact normally set as closed. If the input is active, the damper will go to the safety position. It allows 2 parallel connections, via a normal (3-pole) terminal and via an AMP connector (2 poles). If the thermoelectric switch is connected via an AMP connector, the jumper that shortens the DI3 and C terminals must be removed. The above information applies only to fire applications, and in the smoke application the switch has no function.

3.11 Smoke detector

Hekatron ORS 142: The device allows the connection of one smoke detector.





3.12 Analog application

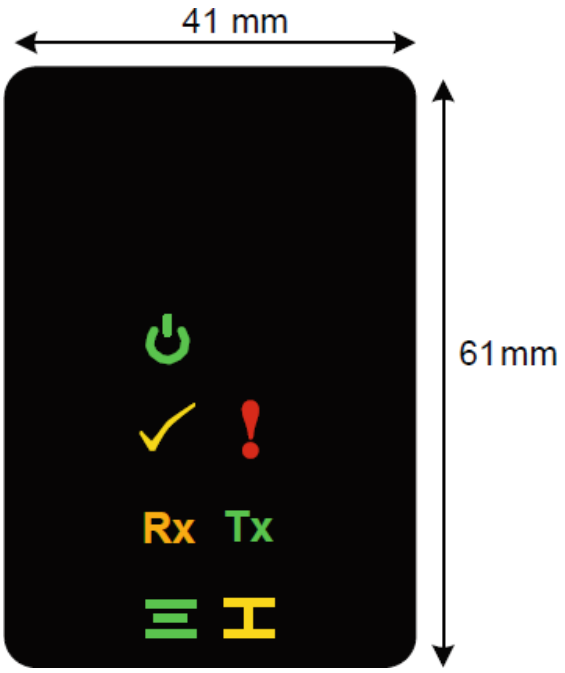
The FSC-UFC24 has the option to work without the bus communication connected. There is one input to open or close the damper, depending on the fire or smoke extraction application. It is also possible to monitor the damper position conventionally through a digital output signal.

- 0V – No power connected to UFC-FSC24
- 2V – Damper open
- 4V – Damper closed
- 6V – Smoke detector alarm
- 8V – Thermoelectric 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 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 us to control the damper position through an external contact/device. Selection of the analog settings is done by red dip switch. This digital input for the analog application in the FSC-UFC24 overrides always the bus commands.

3.13 LED signalization

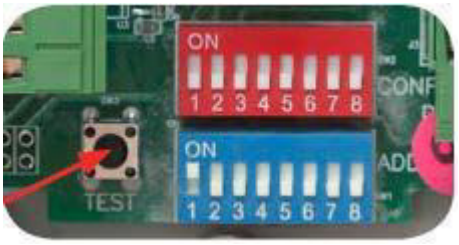


LED	Color	Action	Description
Power	Green	On	Power is connected
Status	Yellow	Off	Bus operation
		On	Analog connection
Error	Red	Flash interval 1s	Actuator did not reach end witch position within the set time
		Flash interval 2s	Smoke detector alarm
		Flash interval 3s	Thermoelectric tripping device alarm
		Flash interval 0,3s	Error on 2 devices or more Error message test report
		Flash interval 5s	General alarm
Rx	Yellow	Flash	Receive data
Tx	Green	Flash	Transmit data
Close	Yellow	On	Damper close
Open	Green	On	Damper open
Open + Close		Flash	Damper is moving

3.14 Test button

Fire application:

- Power on the FSC-UFC24: 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.



3.15 Run time monitoring of damper

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.

4. Communication module FSC-UFC24-2

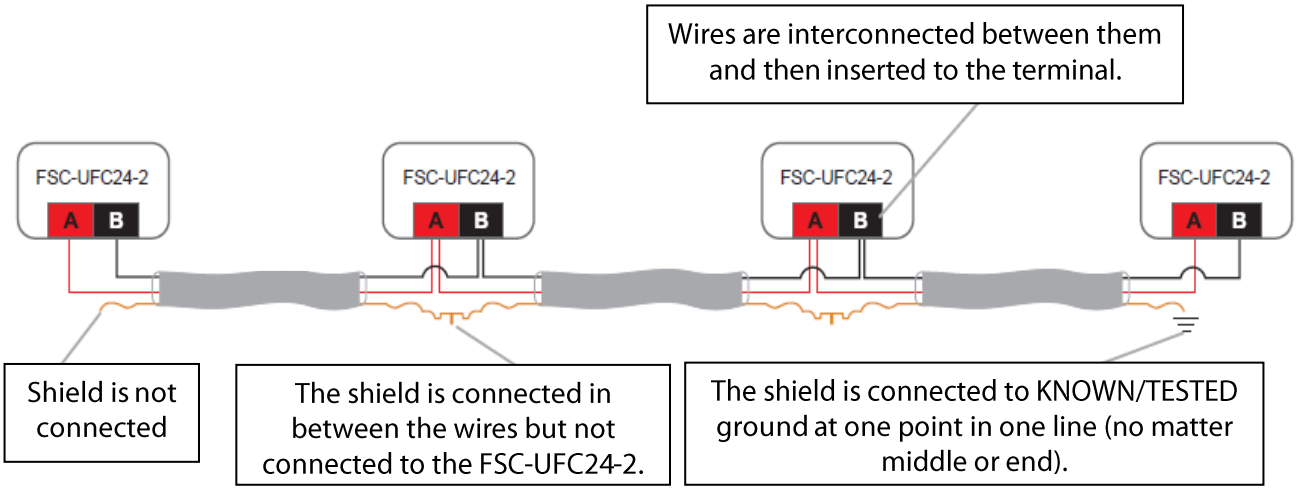
The FSC-UFC24-2 allows the control two motorized fire dampers with 24V AC/DC actuator. The two connected fire dampers are controlled individually, so it is possible to indicate their faults separately. It offers Modbus or BACnet connection to the superior system, control modes can be selected using the DIP switch.

4.1 Technical parameters

Electrical parameters	Nominal voltage	24 V AC/DC
	Nominal voltage Range	-20%... + 20%
	Dimensioning	2 VA + actuator (max. 24 VA)
	Power consumption	2W + actuator
	Connections	Quick connections (terminals)
Communication / Modbus	Protocol	Modbus RTU
	Medium	RS-485
	Transmission formats	Specified by Modbus RTU standards
	Number of devices per line	100 (without repeater)
	Baud rate	9600, 19200, 38400, 76800 bps
	Addresses	1..127 (0 reserved for broadcast)
	Typical response time	< 200 ms
Communication / BACnet	Protocol	BACnet MS/TP
	Medium	RS-485
	Number of devices per line	65 (without repeater)
	Baud rate	9600, 19200, 38400, 76800 bps (auto detect)
	Addresses	1..127 (0 reserved for broadcast)
	Typical response time	< 100 ms
Safety	Protection class	III (safety extra low voltage)
	Protection degree	IP42, housing of non-flammable polycarbonate
	Electromagnetic tolerance	CE in accordance with 2004/108EC
	Low voltage directive	CE in accordance with 2006/95EC
	Mode of operation	Type 1 (EN 60730-1)
	Rated impulsive 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 parameters	Width	120 mm
	Length	57 mm (with bracket)
	Height	153 mm
	Weight	415 g (with bracket)

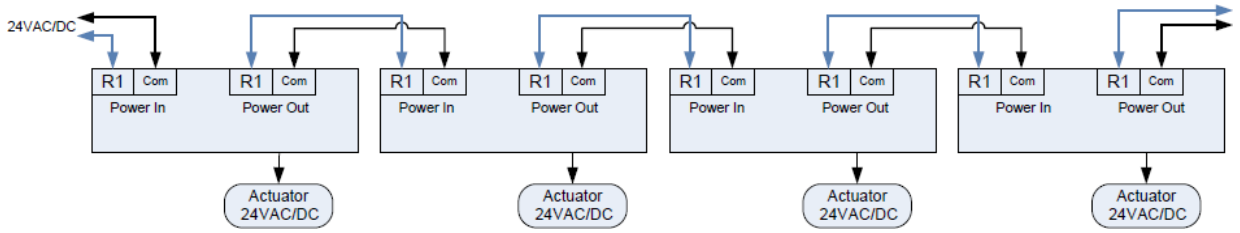
4.2 Cable specification for connecting the communication

For the connecting of the communication module FSC-UFC24-2 with central control unit FSC-M60 you should use shielded twisted pair 120Ω at 1MHz, a cable that is used in telecommunication and computer networks. It is recommended to use the Belden 3105a cable or its equivalent. Using of a different cable may cause functional problems. The maximum distance from the central control unit to the last communication module is 1200m.

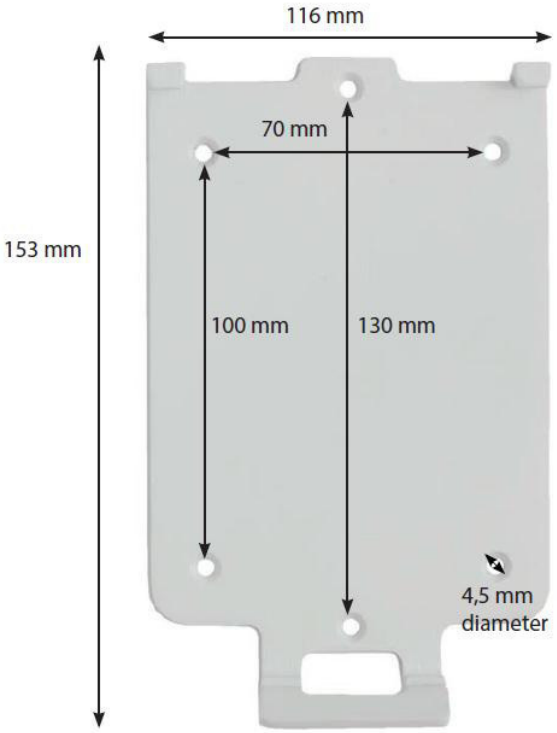


4.3 Cable specification for connecting of power supply

Communication module FSC-UFC24-2 muss be powered by 24V AC/DC. The damper actuator muss be at 24V AC/DC. The device has two power terminals for easy installation „Daisy chain“. **The polarity must be respected when connecting multiple FSC-UFC24 to one power source (phase to phase, com to com)!**



4.4 Mounting dimensions



4.5 Removing the cover of the housing

3. Move the sliding cover 10 mm to the top

1. Open the lid

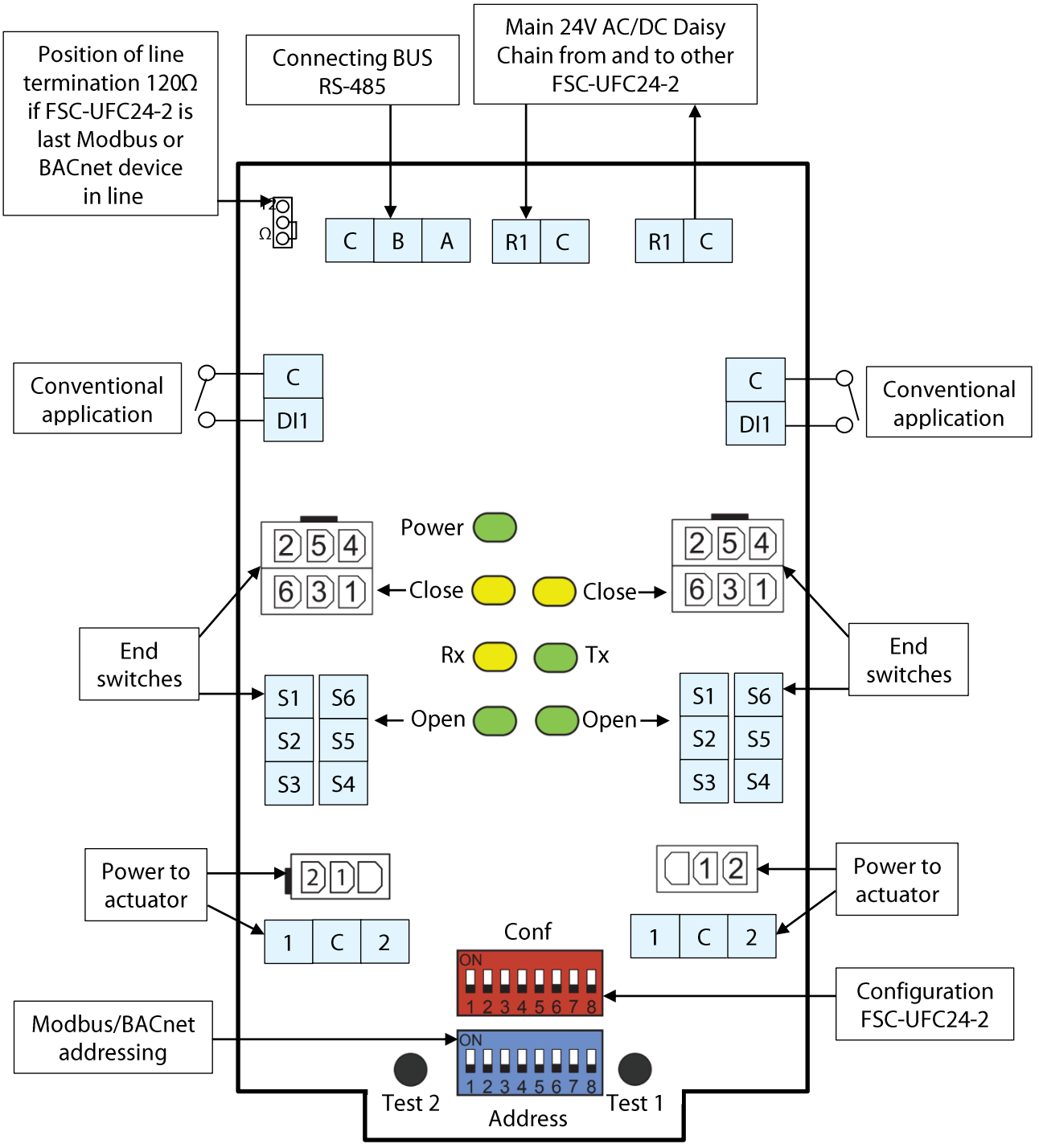
2. Unlock the screw

ⓐ The blue colored dip switch terminal is for the Modbus or BACnet addressing.

ⓑ The red dip switch is for the configuration.

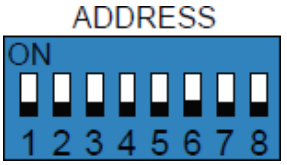
ⓒ Test button.

4.6 Electrical installation



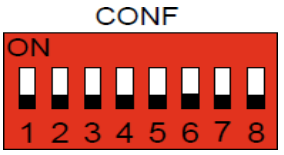
4.7 Modbus/BACnet addressing

If the FSC-UFC24-2 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	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
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		

4.8 Configuration through Dip-Switch



Configuration of the FSC-UFC24-2 is done on the red switch. For a classic fire application, all pins are OFF, only Pin 3 is ON.

Pin	Off (default)	On
1	Fire damper 1	Smoke damper 1
2	Fire damper 2	Smoke damper 2
3	Modbus RTU	BACnet MS/TP
4	Bit rate (Off-default)	
5	Bit rate (Off-default)	
6	Not in use = Off	
7	Not in use = Off	
8	Not in use = Off	

Pin 1 a 2: If the device is changed from fire to smoke extraction application or from smoke extraction to fire application, the FSC-UFC24-2 needs to be taken off the power supply and put back again to activate the new mode.

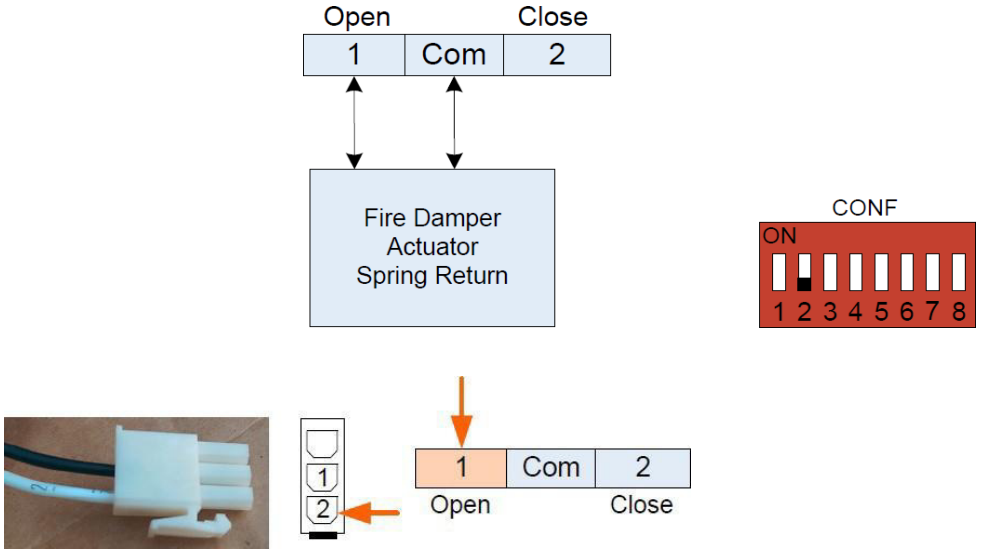
Pin 3: If the FSC-UFC24-2 is used in connection with the FSC-M60, Pin 3 has to be ON (BACnet).

Pin 4 a Pin 5: If the FSC-UFC24-2 is used in connection with the FSC-M60, Pins 3 and 5 has to be OFF. BACnet communication detects bit rate automatically. If the FSC-UFC24-2 is connected to another superior system with Modbus communication, the bit rate is set according to the following table.

Pin	9600 (default)	19200	38400	76800
4	Off	On	Off	On
5	Off	Off	On	On

4.9 Actuators power supply

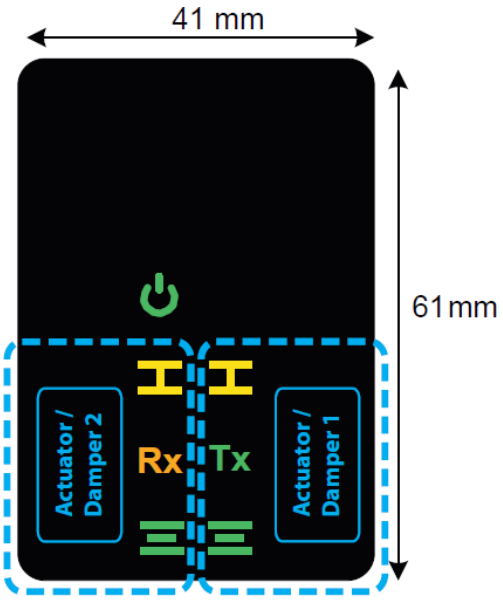
Fire damper: When the actuator has power it is open, when there is no power the actuator is closed with the spring. After the power is reset, the damper always goes into the open position.



4.10 Conventional application

Conventional connection is the application when the FSC-UFC24-2 is not connected to a bus network. No configuration settings are required. One digital input for conventional application is available for each of the two dampers. This is to open and close the damper. Digital output signals indicating the damper positions are available. Digital Input: volt free, normally open as default (can be changed on bus). The digital input allows controlling the damper position through an external contact/device. These digital inputs in the FSC-UFC24-2 always override 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 or monitoring device. These outputs can be connected in parallel between the different FSC-UFC24-2 to monitor their status. Current output max is 5mA.

4.11 LED signalization



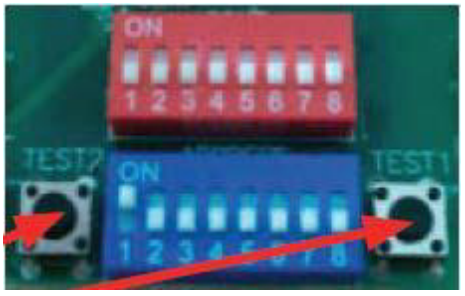
Important: If only one actuator is connected to the FSC-UFC24-2 the LEDs of the side where no actuator is connected indicate an alarm. A jumper has to be installed between S4 and S6 in the terminal where there is no actuator connected, to indicate an "opened" position in the LED. If the second connection is not activated via bus, there will be no alarm signal on the bus system.

LED	Color	Action	Description
Power	Green	On	Power is connected
Alarm	Yellow/Green	Flash interval 0,5s	Actuator did not reach end switch position within set time
Alarm	Yellow/Green	Flash interval 3s	Alarm active at damper
Rx	Yellow	Flash	Receive data
Tx	Green	Flash	Transmit data
Close	Yellow	On	Damper closed
Open	Green	On	Damper open
Open + closed		Flashing in parallel	Damper is moving

4.12 Test button

Fire application:

- Power on the FSC-UFC24-2: 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.



4.13 Run time monitoring of damper

The FSC-UFC24-2 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.

5. Communication module FSC-UFC24-230

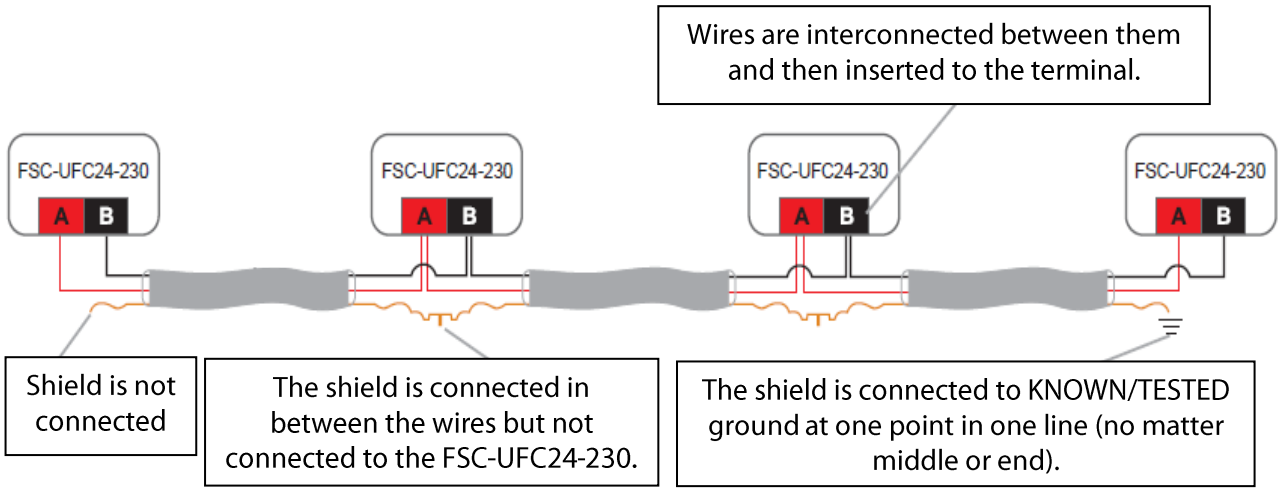
The FSC-UFC24-230 allows the control one motorized fire damper with 230V AC actuator. It is also possible to connect one smoke detector and one thermoelectric tripping device to the communication module. It offers Modbus, BACnet or an analog connection to the superior system, control modes can be selected using the DIP switch.

5.1 Technical parameters

Electrical parameters / FSC-UFC24-230	Nominal voltage	24 V AC/DC
	Nominal voltage Range	-20%... + 20%
	Dimensioning	2 VA + actuator (max. 24 VA)
	Power consumption	2W + actuator
	Connections	Quick connections (terminals)
Electrical parameters / actuator	Nominal voltage	110 – 230V AC
	Nominal voltage Range, dimensioning, power consumption	Manufacturer Specifications
Communication / Modbus	Protocol	Modbus RTU
	Medium	RS-485
	Transmission formats	Specified by Modbus RTU standards
	Number of devices per line	100 (without repeater)
	Baud rate	9600, 19200, 38400, 76800 bps
	Addresses	1..127 (0 reserved for broadcast)
	Typical response time	< 200 ms
Communication / BACnet	Protocol	BACnet MS/TP
	Medium	RS-485
	Number of devices per line	65 (without repeater)
	Baud rate	9600, 19200, 38400, 76800 bps (auto detect)
	Addresses	1..127 (0 reserved for broadcast)
	Typical response time	< 100 ms
Safety	Protection class	III (safety extra low voltage)
	Protection degree	IP42, housing of non-flammable polycarbonate
	Electromagnetic tolerance	CE in accordance with 2004/108EC
	Low voltage directive	CE in accordance with 2006/95EC
	Mode of operation	Type 1 (EN 60730-1)
	Rated impulsive 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 parameters	Width	120 mm
	Length	57 mm (with bracket)
	Height	153 mm
	Weight	415 g (with bracket)

5.2 Cable specification for connecting the communication

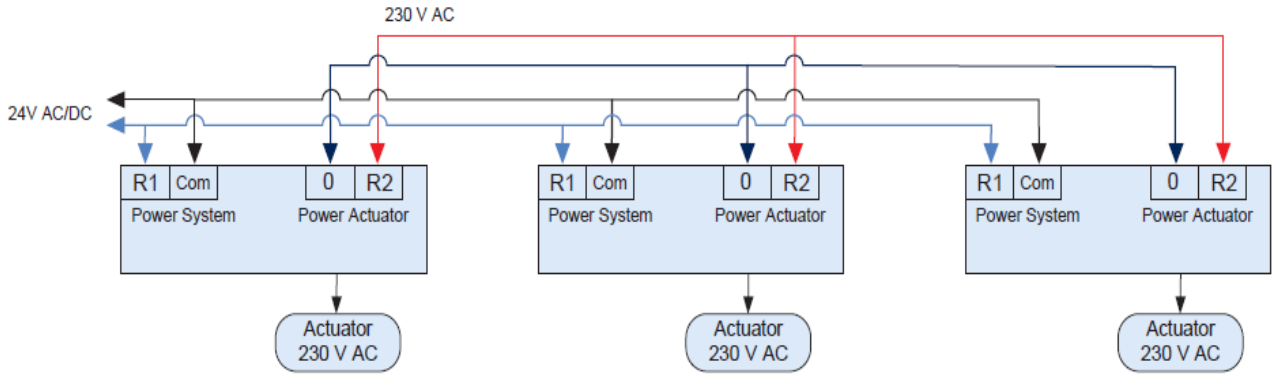
For the connecting of the communication module FSC-UFC24-230 with central control unit FSC-M60 you should use shielded twisted pair 120Ω at 1MHz, a cable that is used in telecommunication and computer networks. It is recommended to use the Belden 3105a cable or its equivalent. Using of a different cable may cause functional problems. The maximum distance from the central control unit to the last communication module is 1200m.



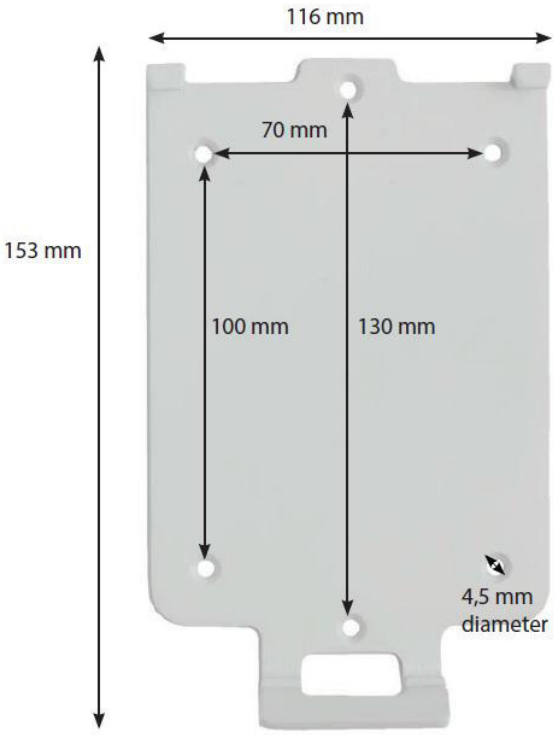
5.3 Cable specification for connecting of power supply

The FSC-UFC24-230 offers dual power supply of 24 V AC / DC for the system, smoke detector, thermoelectric tripping device, end switches of the actuators and 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. **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 .**



5.4 Mounting dimensions



5.5 Removing the cover of the housing

3. Move the sliding cover 10 mm to the top

1. Open the lid

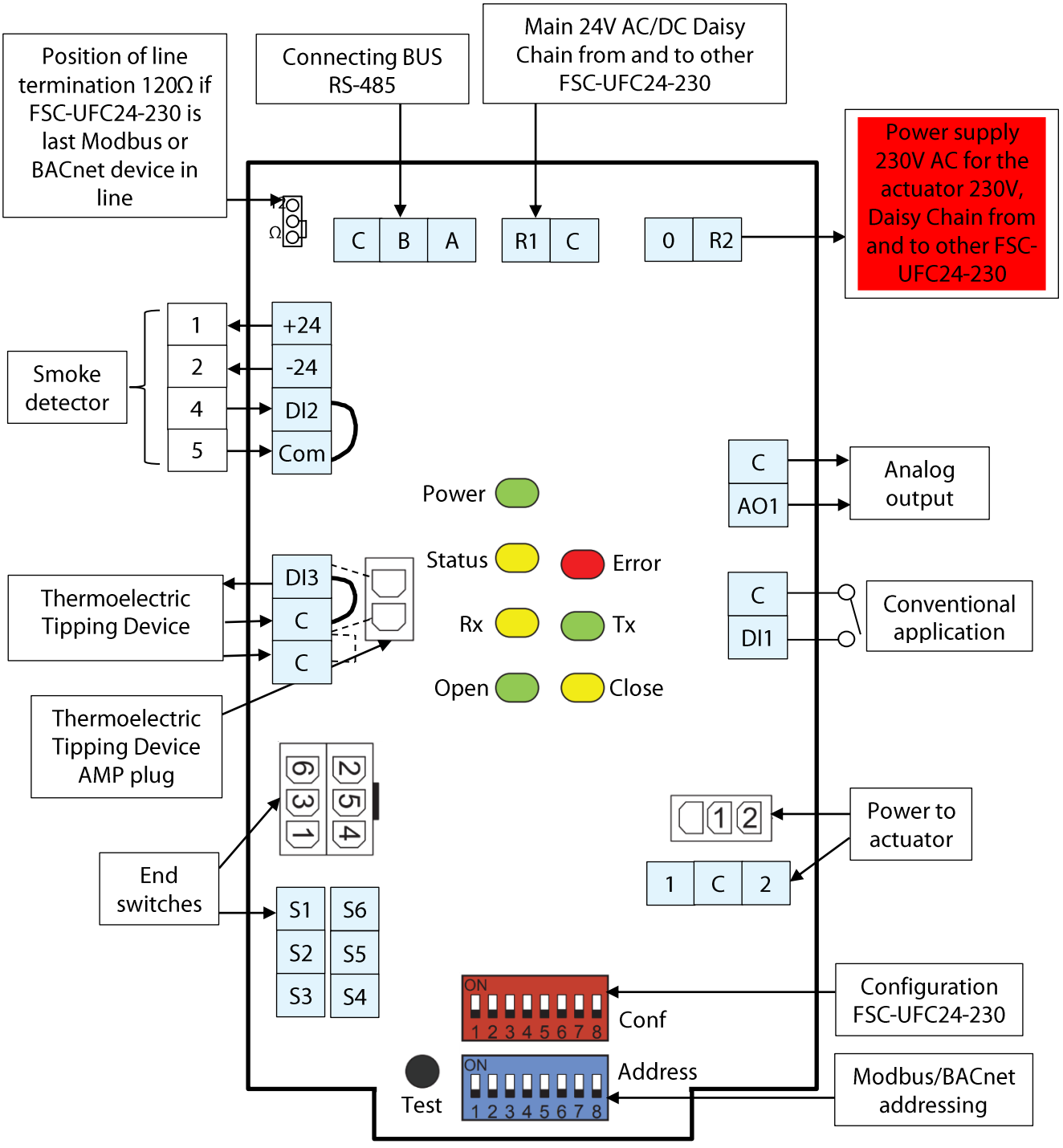
2. Unlock the screw

ⓐ The blue colored dip switch terminal is for the Modbus or BACnet addressing.

ⓑ The red dip switch is for the configuration.

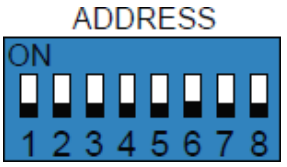
ⓒ Test button.

5.6 Electrical installation



5.7 Modbus/BACnet addressing

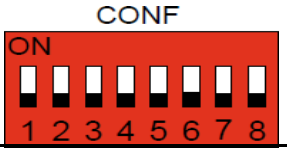
If the FSC-UFC24-230 is used in combination with the FSC-M60, the addressing needs to be done in consecutive order.



Address	Switches ON	Address	Switches ON	Address	Switches ON	Address	Switches ON
0	Broadcast	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
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		

5.8 Configuration through Dip-Switch

Configuration of the FSC-UFC24-230 is done on the red switch.



For a classic fire application, all pins are OFF, only Pin 3 is ON.

Pin	Off (default)	On
1	Bus	Analog
2	Fire application	Smoke application
3	Modbus RTU	BACnet MS/TP
4	Bit rate (Off-default)	
5	Bit rate (Off-default)	
6	Not in use = Off	
7	Smoke detector alarm „system“	Smoke detector alarm „actuator“
8	Not in use = Off	

Pin 1: Digital Input (Conventional application) allows you to check the position of the damper using an external analog input device.

Pin 2: If Pin 2 is changed from fire to smoke extraction application or from smoke extraction to fire application, the FSC-UFC24-230 needs to be taken off the power supply and put back again to activate the new mode.

Pin 3: If the FSC-UFC24-230 is used in connection with the FSC-M60, Pin 3 has to be ON (BACnet)

Pin 4 a Pin 5: If the FSC-UFC24-230 is used in connection with the FSC-M60, Pins 3 and 5 has to be OFF. BACnet communication detects bit rate automatically. If the FSC-UFC24-230 is connected to another superior system with Modbus communication, the bit rate is set according to the following table.

Pin	9600 (default)	19200	38400	76800
4	Off	On	Off	On
5	Off	Off	On	On

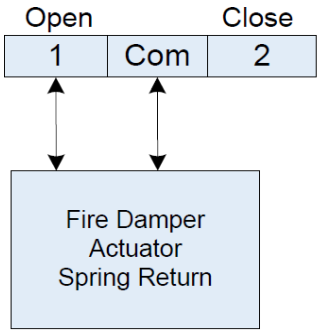
Pin 7: - Smoke detector alarm „system“= the signal of the smoke detector is transferred directly to the system and processed there.

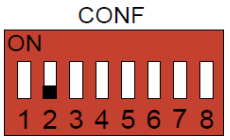
- Smoke detector alarm „actuator“= the signal of the smoke detector is directly linked with the actuator. In case of a smoke detector alarm the fire damper connected to the same FSC-UFC24 will be closed. The signal of the smoke detector is forwarded to the controller.

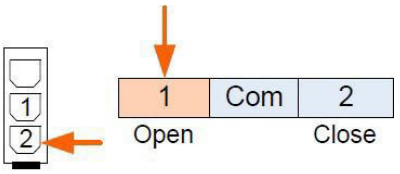
The above is only valid for the fire safety application. In the smoke extraction application the signal of the smoke detector has no direct influence to the actuator. E signal will be forwarded to the system in any case.

5.9 Actuators power supply

Fire damper: When the actuator has power it is open, when there is no power the actuator is closed with the spring. After the power is reset, the damper always goes into the open position.





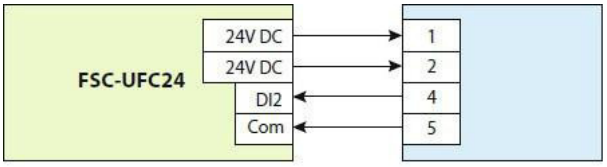


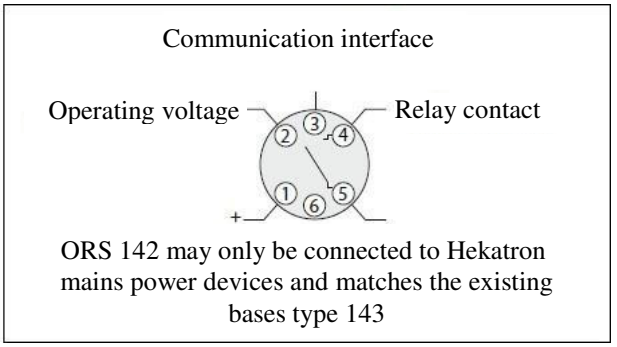
5.10 Thermoelectric tripping device

Digital contact normally set as closed. If the input is active, the damper will go to the safety position. It allows 2 parallel connections, via a normal (3-pole) terminal and via an AMP connector (2 poles). If the thermoelectric switch is connected via an AMP connector, the jumper that shortens the DI3 and C terminals must be removed. The above information applies only to fire applications, and in the smoke application the switch has no function.

5.11 Smoke detector

Hekatron ORS 142: The device allows the connection of one smoke detector





5.12 Analog application

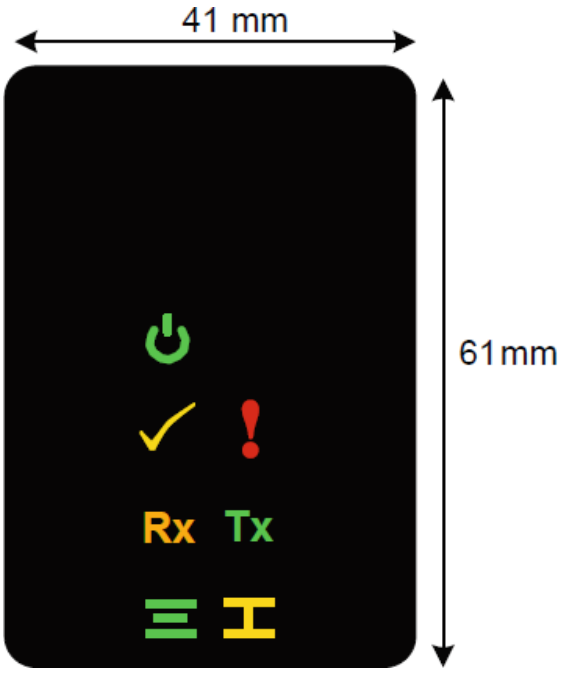
The FSC-UFC24-230 has the option to work without the bus communication connected. There is one input to open or close the damper, depending on the fire or smoke extraction application. It is also possible to monitor the damper position conventionally through a digital output signal.

- 0V – No power connected to UFC-FSC24-230
- 2V – Damper open
- 4V – Damper closed
- 6V – Smoke detector alarm
- 8V – Thermoelectric 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 us to control the damper position through an external contact/device. Selection of the analog settings is done by red dip switch. This digital input for the analog application in the FSC-UFC24-230 overrides always the bus commands.

5.13 LED signalization



LED	Color	Action	Description
Power	Green	On	Power is connected
Status	Yellow	Off	Bus operation
		On	Analog connection
Error	Red	Flash interval 1s	Actuator did not reach end witch position within the set time
		Flash interval 2s	Smoke detector alarm
		Flash interval 3s	Thermoelectric tripping device alarm
		Flash interval 0,3s	Error on 2 devices or more Error message test report
		Flash interval 5s	General alarm
Rx	Yellow	Flash	Receive data
Tx	Green	Flash	Transmit data
Close	Yellow	On	Damper close
Open	Green	On	Damper open
Open + Close		Flash	Damper is moving

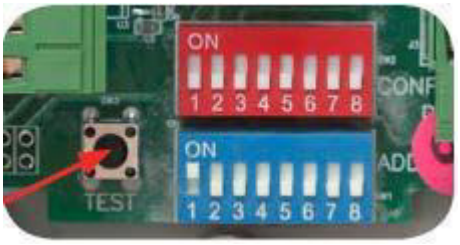
5.14 Test button

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.



5.15 Run time monitoring of damper

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.

6. Communication module FSC-UFC230-2

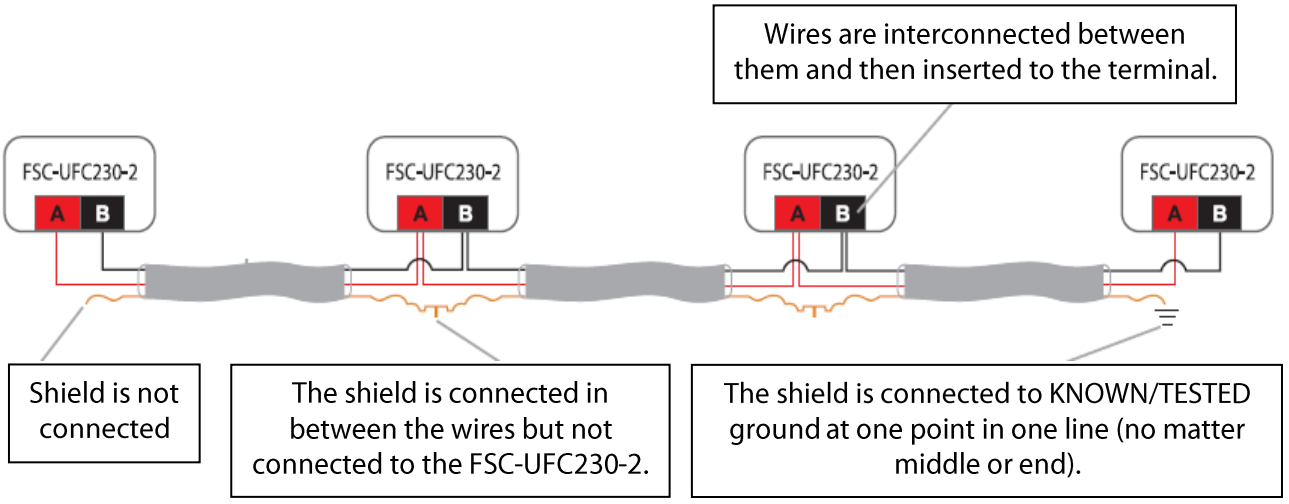
The FSC-UFC230-2 allows the control two motorized fire dampers with 230V AC actuators. The two connected fire dampers are controlled individually, so it is possible to indicate their faults separately. It offers Modbus or BACnet connection to the superior system, control modes can be selected using the DIP switch.

6.2 Technical parameters

Electrical parameters	Nominal voltage	24 V AC/DC
	Nominal voltage Range	-20%... + 20%
	Dimensioning	2 VA + actuator (max. 24 VA)
	Power consumption	2W + actuator
	Connections	Quick connections (terminals)
Communication / Modbus	Protocol	Modbus RTU
	Medium	RS-485
	Transmission formats	Specified by Modbus RTU standards
	Number of devices per line	100 (without repeater)
	Baud rate	9600, 19200, 38400, 76800 bps
	Addresses	1..127 (0 reserved for broadcast)
	Typical response time	< 200 ms
Communication / BACnet	Protocol	BACnet MS/TP
	Medium	RS-485
	Number of devices per line	65 (without repeater)
	Baud rate	9600, 19200, 38400, 76800 bps (auto detect)
	Addresses	1..127 (0 reserved for broadcast)
	Typical response time	< 100 ms
Safety	Protection class	III (safety extra low voltage)
	Protection degree	IP42, housing of non-flammable polycarbonate
	Electromagnetic tolerance	CE in accordance with 2004/108EC
	Low voltage directive	CE in accordance with 2006/95EC
	Mode of operation	Type 1 (EN 60730-1)
	Rated impulsive 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 paramete	Width	120 mm
Electrical parameters	Length	57 mm (with bracket)
	Height	153 mm
	Weight	415 g (with bracket)
	Nominal voltage	24 V AC/DC

6.3 Cable specification for connecting the communication

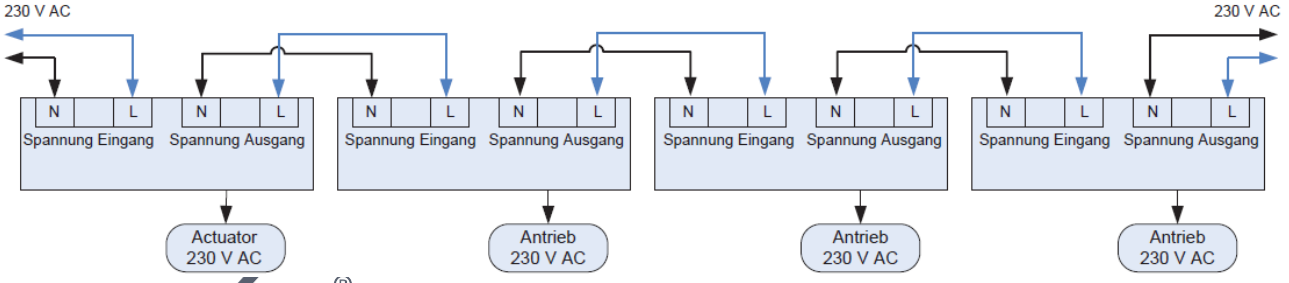
For the connecting of the communication module FSC-UFC230-2 with central control unit FSC-M60 you should use shielded twisted pair 120Ω at 1MHz, a cable that is used in telecommunication and computer networks. It is recommended to use the Belden 3105a cable or its equivalent. Using of a different cable may cause functional problems. The maximum distance from the central control unit to the last communication module is 1200m.



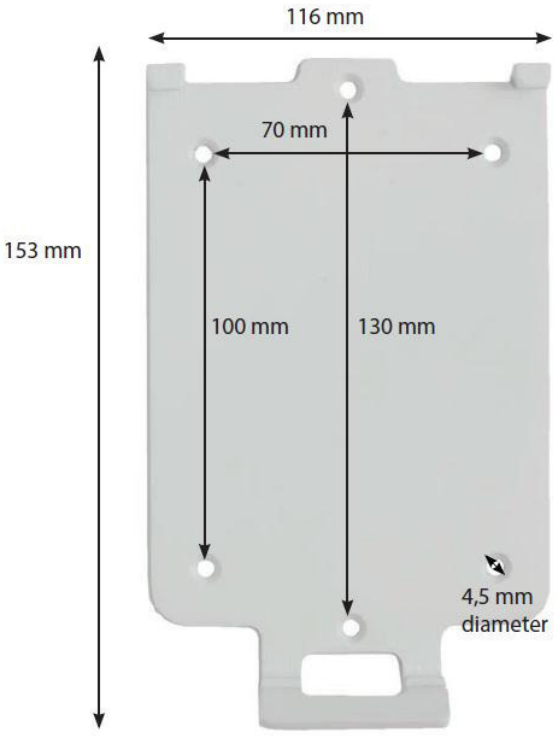
6.4 Cable specification for connecting of power supply

Communication module FSC-UFC230-2 muss be powered by 230V AC. The damper actuator muss be at 230V AC. The device has two power terminals for easy installation „Daisy chain“. **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-UFC230-2!**

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-UFC230-2 when not proper handled.**



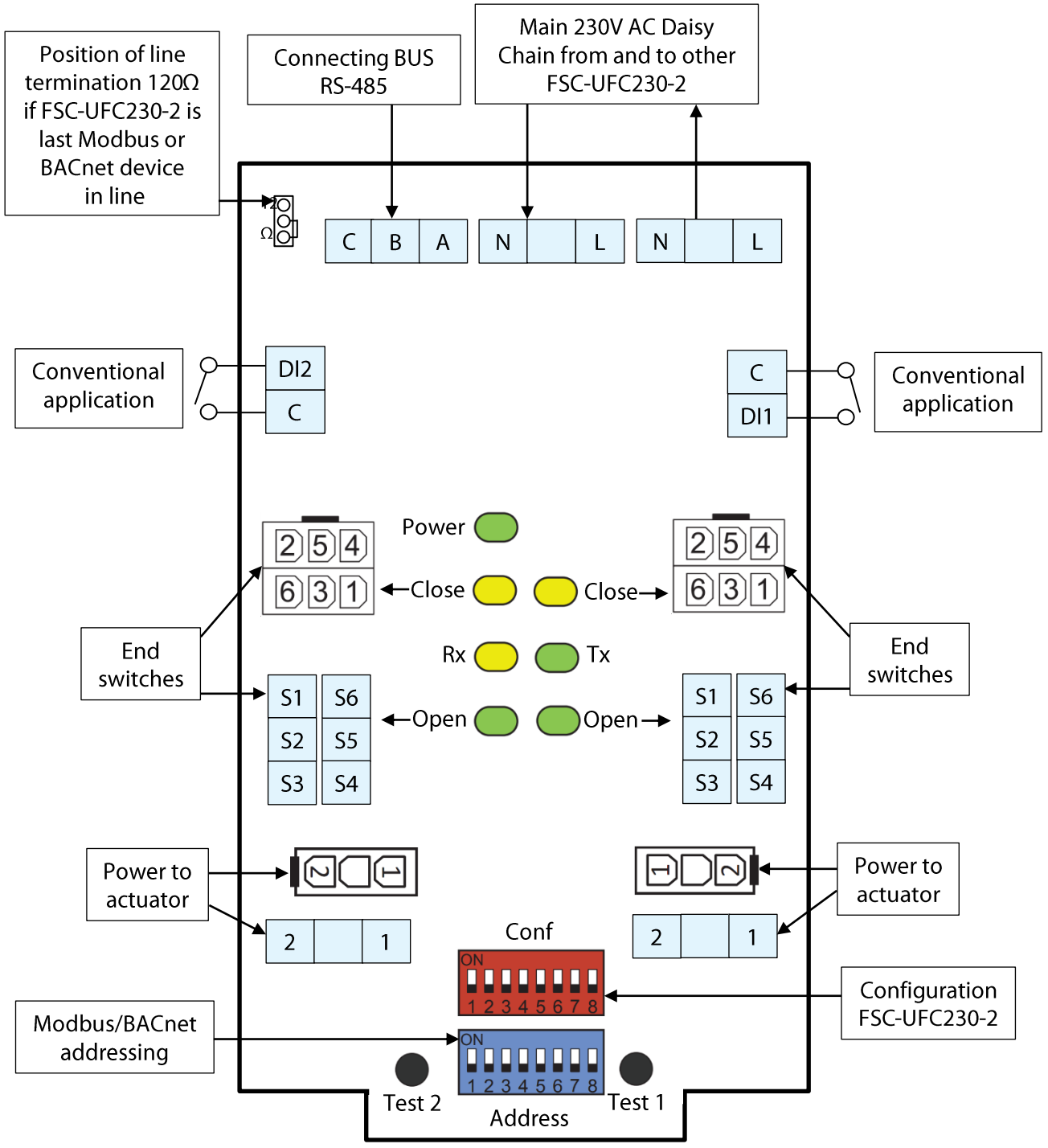
6.5 Mounting dimensions



6.6 Removing the cover of the housing

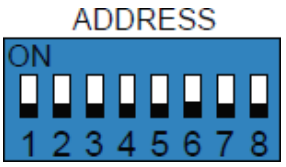
(a) The blue colored dip switch terminal is for the Modbus or BACnet addressing.
(b) The red dip switch is for the configuration.
(c) Test button.

6.7 Electrical installation



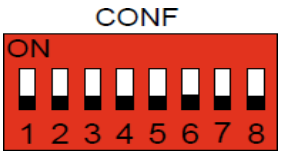
6.8 Modbus/BACnet addressing

If the FSC-UFC230-2 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	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
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		

6.9 Configuration through Dip-Switch



Configuration of the FSC-UFC230-2 is done on the red switch. For a classic fire application, all pins are OFF, only Pin 3 is ON.

Pin	Off (default)	On
1	Fire damper 1	Not in use
2	Fire damper 2	Not in use
3	Modbus RTU	BACnet MS/TP
4	Bit rate (Off-default)	
5	Bit rate (Off-default)	
6	Not in use = Off	
7	Not in use = Off	
8	Not in use = Off	

Pin 3: If the FSC-UFC230-2 is used in connection with the FSC-M60, Pin 3 has to be ON (BACnet).

Pin 4 a Pin 5: If the FSC-UFC230-2 is used in connection with the FSC-M60, Pins 3 and 5 has to be OFF. BACnet communication detects bit rate automatically. If the FSC-UFC230-2 is connected to another superior system with Modbus communication, the bit rate is set according to the following table.

Pin	9600 (default)	19200	38400	76800
4	Off	On	Off	On
5	Off	Off	On	On

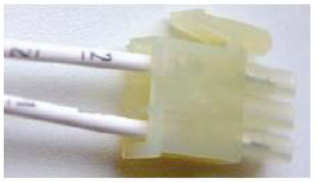
6.10 Actuators power supply

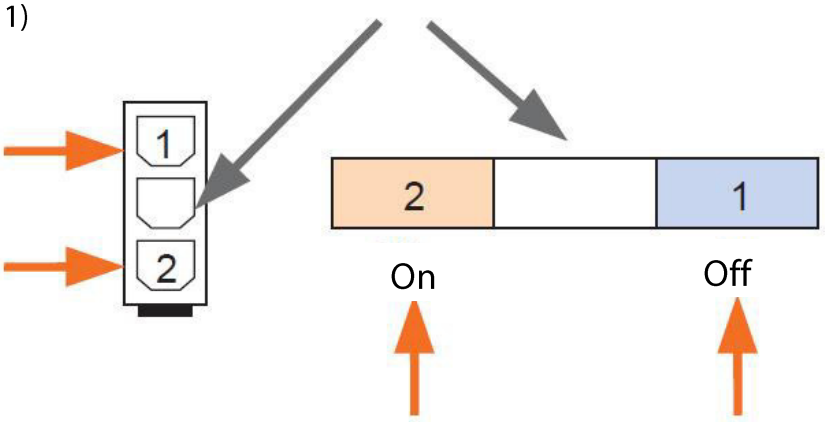
Fire damper: When the actuator has power it is open, when there is no power the actuator is closed with the spring. After the power is reset, the damper always goes into the open position.

When the FSC-UFC230-2 is powered up, the power to the actuator is on output „open“ (pin nr. 1)

Not connected

Fire Damper 230 V AC

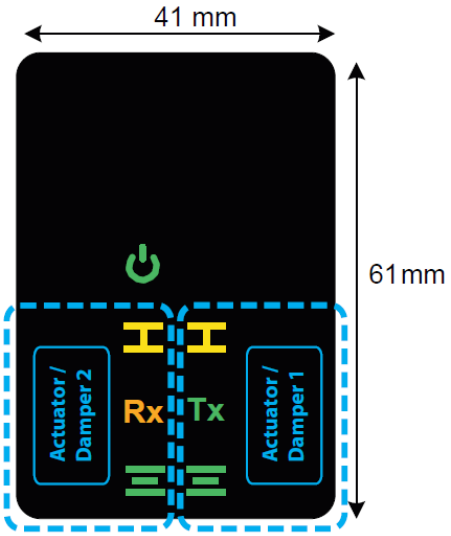




6.11 Conventional application

Conventional connection is the application when the FSC-UFC230-2 is not connected to a bus network. No configuration settings are required. One digital input for conventional application is available for each of the two dampers. This is to open and close the damper. Digital output signals indicating the damper positions are available. 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. These digital inputs in the FSC-UFC230-2 always override 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 or monitoring device. These outputs can be connected in parallel between the different FSC-UFC230-2 to monitor their status. Current output max is 5mA.

6.12 LED signalization



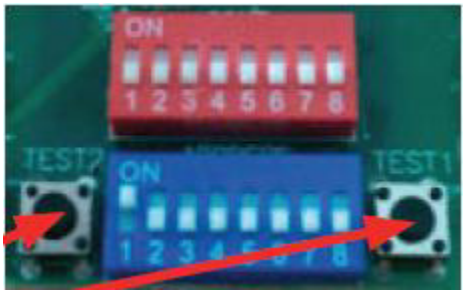
Important: If only one actuator is connected to the FSC-UFC230-2 the LEDs of the side where no actuator is connected indicate an alarm. A jumper has to be installed between S4 and S6 in the terminal where there is no actuator connected, to indicate an "opened" position in the LED. If the second connection is not activated via bus, there will be no alarm signal on the bus system.

LED	Color	Action	Description
Power	Green	On	Power is connected
Alarm	Yellow/Green	Flash interval 0,5s	Actuator did not reach end switch position within set time
Alarm	Yellow/Green	Flash interval 3s	Alarm active at damper
Rx	Yellow	Flash	Receive data
Tx	Green	Flash	Transmit data
Close	Yellow	On	Damper closed
Open	Green	On	Damper open
Open + closed		Flashing in parallel	Damper is moving

6.13 Test button

Fire application:

- Power on the FSC-UFC230-2: 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.



6.14 Run time monitoring of damper

The FSC-UFC230-2 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.

7. Module for free topology FSC-S-RMS

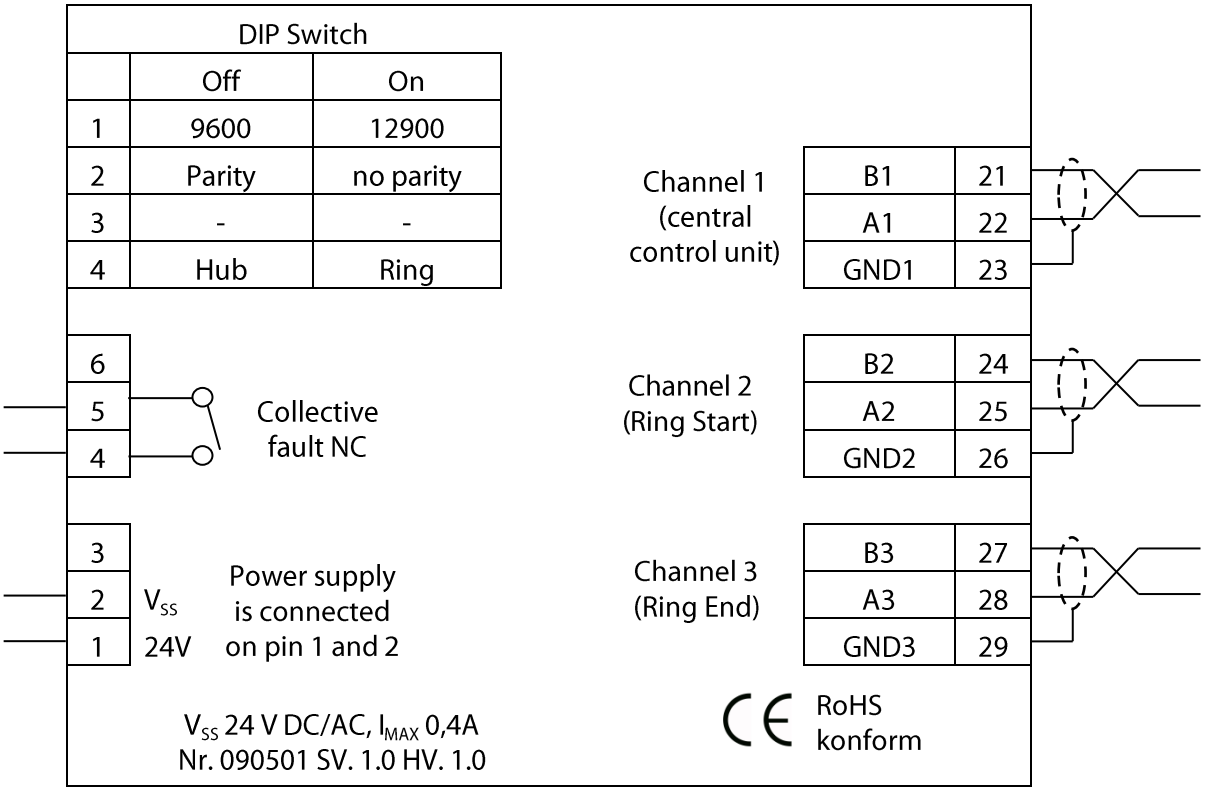
The state of the art Ring Structure Module has been developed especially for RS-485 networks used in building management systems. The realization of a star or ring topology network is very easy and guarantees highest flexibility the applications. The maximum cable length for each of the channels is up to 1'200 m. All channels are constantly monitored in regards to short circuits or cable interruptions. If used as a hub the RSM is acting as star point. It allows the realization of a one cable RS-485 line with a ring-like behavior. Module can be used s repeater to extend already existing RS-485 line.

Channel 1 serves as input channel (from the master or main controller), channel 2 and 3 are start and end point of the ring. All RS-485 channels are galvanically isolated between each other. This enables a high interference suppression and isolation in the network. In case of a short circuit in one of the channels, all other channels are not affected. With the test button the integrity of the bus line can be checked even without communication.

7.1 Technical parameters

Nominal voltage	20-26 V AC, 19-36 V DC
Power consumption	Max. 4 W
LED display	7 LED pro: - Power (green) - Communication Ch1, Ch2, Ch3 (yellow) - Alarm Ch1, Ch2, Ch3 (red)
RS-485 channels	3 channels galvanically isolated max. 1000V
Quantity of modules (slaves)	Per line max. 253 pro 1/8 load, or 30 participants s 1/1 load
Cable length	Max. 1200 m per channel
Setting	- Baud rate 9600, 19200, 1 stop bit - Parity (10-11 bit per byte) - Hub / Ring mode
Delay of signal	approx. 1/2 bit
Line termination	Channel 1 - internal without line termination Channels 2,3 - internal 120Ω line termination
Potential Free Contact	Collective alarm message, NC 230V / 1A
Ambient temperature	0°C up to 40°C
Humidity test	20-90% RH, non-condensing
Protection Degree	IP20
Connection	Plug-in connections max. 1,5mm^2
Dimensions	(W x H x D) 27 x 107 x 89 mm
Mounting instruction	Standard rail 35 mm DIN EN 50022-35
CE	This device fulfills all requirements of the CE mark

7.2 Electrical installation

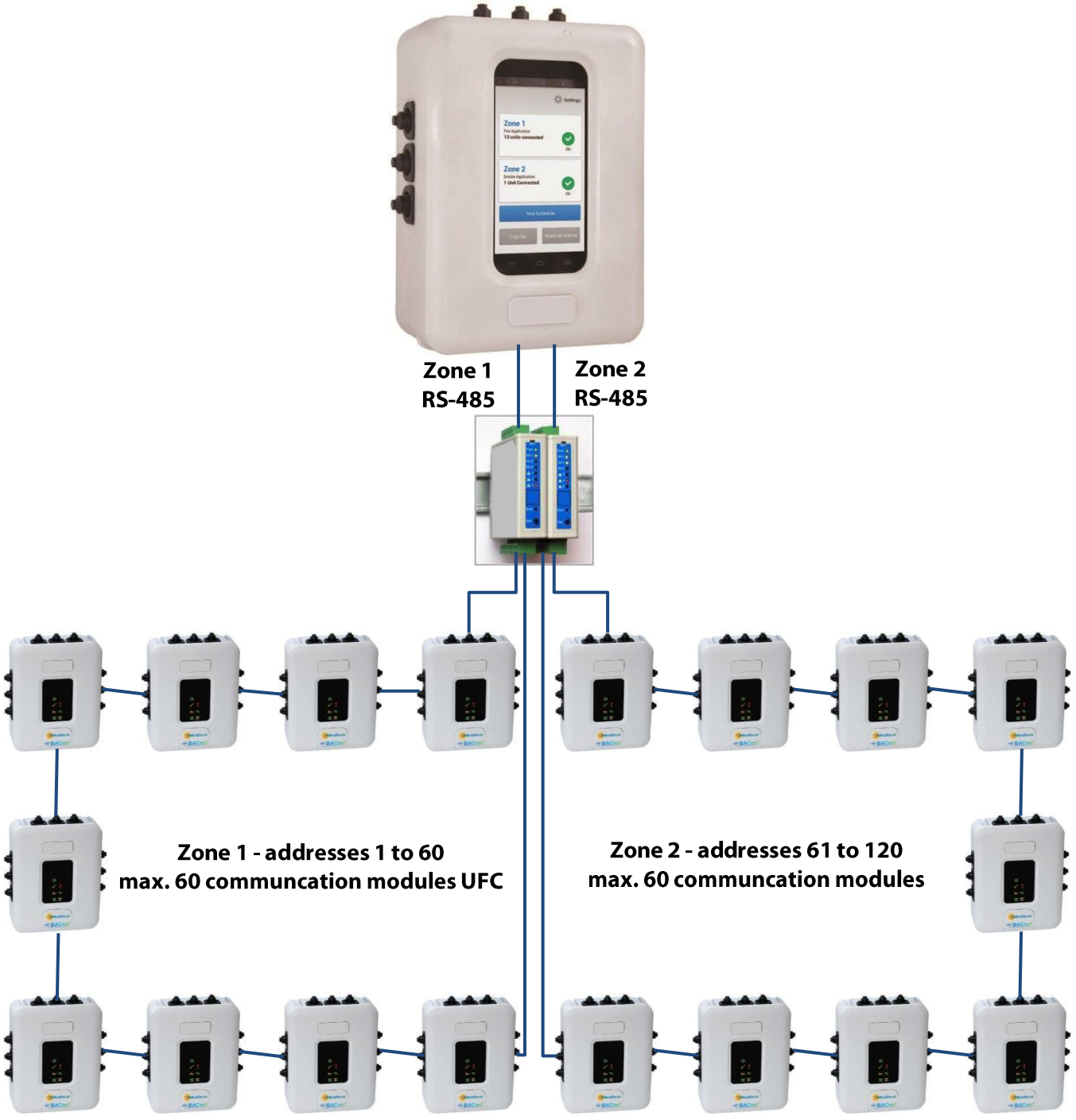


7.3 Configuration via DIP switch

Pin	Off	On
1	Baud rate 9600 (default setting)	Baud rate 19200
2	Parity bit (11bit = Modbus RTU) 1 start + 8 data + 1 parity + 1 stop = 11 Modbus should always have 11 bit frame	no parity bit (10 bit)
3	Not in use	Not in use
4	Hub (repeater function)	Ring mode (ring topology)

Change in setting will only be active after power interruption or trough confirmation via reset button (holding for 5s). RMS module changes to hub mode after a ring failure, the alarm LEDs are blinking, collected message contact opens. Communication continues. Through pressing the reset button (holding for 5s) this situation is being reset and communication is being tested.

7.4 Ring topology



One FSC-A-RSM module is used for each zone, creating a ring topology in each zone. If communication is interrupted at any point, due to this connection we will not lose communication with the communication modules because communication can continue from the other side. When using a ring topology, it is not necessary to use the 120Ω termination, which should be switched on in the UFC communication modules when the communication module is the last one in a line.

8. Safety instructions

The FSC-M60, FSC-UFC24, FSC-UFC24-2, FSC-UFC230 and FSC-UFC230-2 devices are 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-M60 on site bears full responsibility for the proper functioning of the whole system. Only authorized specialist 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.

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