71589-00002.B

Communication and power supply unit for motorised fire dampers
• **Communication via Modbus RTU (RS-485)**
• **AC 230 V supply via Euro plug**
• **Power is supplied to the actuators via a plug contact (galvanically isolated, DC 24 V)**
• **Simple integration of a smoke detector with no additional power supply is possible**
• **Suitable actuators: BF24..-ST, BLF24..-ST**

Technical data

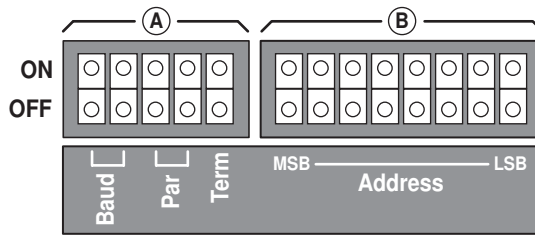| Electrical data	Nominal voltage		AC 230 V, 50/60 Hz
	Nominal voltage range		AC 198…264 V
	Power consumption	In operation	3 W (operating position, incl. actuator)
		For wire sizing	14 VA (incl. actuator)
	Connections		See "Connections" on page 2
	Modbus		
	Protocol		Modbus RTU
	Medium		RS-485, not galvanically isolated from actuator
	Transmission formats		1-8-N-2, 1-8-N-1, 1-8-E-1, 1-8-O-1
			Default: 1-8-N-2 (Start bits, Data bits, Parity, Stop bits)
	Number of nodes		Max. 64 (without repeater)
	Baud rates		9,600, 19,200, 38,400, 76,800 Bd
			Default: 38,400 Bd
	Addresses		1...247, values over 247 are interpreted as 247, 0 = Broadcast
	Bus termination		150 Ω, can be switched if necessary
Safety	Protection class		**II** Protective insulated ▣
	Degree of protection		IP40
	EMC		CE according to 2004/108/EC
	Low-voltage-directive		CE according to 2006/95/EC
	Mode of operation		Type 1 (EN 60730-1)
	Rated impulse voltage		2.5 kV (EN 60730-1)
	Control pollution degree		2 (EN 60730-1)
	Ambient temperature		–20...+50°C
	Non-operating temperature		–40...+80°C
	Humidity test		95% r.h., non-condensing (EN 60730-1)
	Maintenance		Maintenance-free
Dimensions / Weight	Dimensions		See "Dimensions" on page 5
	Weight		Approx. 380 g

Safety notes

⚠️

• **The device has been designed for use in stationary heating, ventilation and air-conditioning systems and is not allowed to be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.**
• **Only authorised specialists may carry out installation.**
  All applicable legal or institutional installation regulations must be complied with during installation.
• **The device may only be opened at the manufacturer's site. It does not contain any parts that can be replaced or repaired by the user.**
• **The device contains electrical and electronic components and is not allowed to be disposed of as household refuse. All locally valid regulations and requirements must be observed.**

Product features

Application

The BKN230-24-MOD is installed with the motorised fire damper. This unit sets up the communication connection with higher-level systems while the built-in safety isolating transformer supplies DC 24 V voltage to the damper actuator.

Parameterisation (DIL switch)

A

Baud rate		
9,600	OFF	OFF
19,200	OFF	ON
38,400	ON	OFF
76,800	ON	ON

Parity		
1-8-N-2	OFF	OFF
1-8-N-1	OFF	ON
1-8-E-1	ON	OFF
1-8-O-1	ON	ON

Termination	
OFF	OFF
Modbus with 150 Ω	ON

B

Modbus address								
1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
2	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
3	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON
...								
247	ON	ON	ON	ON	OFF	ON	ON	ON

Test run / fault acknowledgement

Press the button for longer than one second to trigger the following functions:
a) starts test run
b) resets a current error message

Expansion options

A BAE...ST thermoelectric tripping device and/or an optoelectronic smoke detector can be connected directly without add-on devices. If a smoke or temperature alarm is tripped, the local damper immediately moves into the safety position and sends a corresponding message to the higher-level system.

Local override control

If no control commands are received by the BKN230-24-MOD or if no communication line is connected, the damper remains in the safety position. However, the damper can still move into the operating position by means of the wire bridge (Terminal 1 to 4) as soon as power supply voltage is applied. The BKN230-24-MOD can thus be used without a control system, for example if the damper needs to be continuously open without remote monitoring. The local safety function of thermoelectric tripping devices and smoke detectors is not affected. The actual position of the damper is displayed by the LEDs in the device. On-site damper test using the test key is possible.
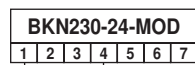

Electrical installation

① **Halogen-free power supply cable and plug, AC 230 V**

② **Connecting terminals for**
  1 External smoke detector, +24 V, max. 50 mA
  2 External smoke detector, control input
  3 GND
  4 BKN Direct Control, override control input
  5 Modbus GND
  6 Modbus D+
  7 Modbus D–

③ **Tab connection for**
  – BAE.. thermoelectric tripping device

④ **Tab connection for**
  – BELIMO damper actuator (motor DC 24 V)

⑤ **Tab connection for**
  – BELIMO damper actuator (limit switch)
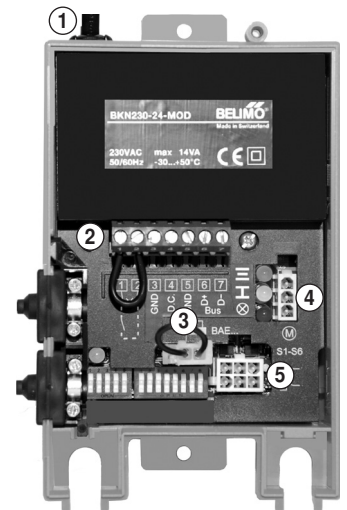
Indicators and operating elements

⑥ **Button** (see "Test run / fault acknowledgement" above)

⑦ **DIL switch** (see "Parameterisation" above)

⑧ **LEDs status signalisation BELIMO damper actuator:**

Green	On	Upper limit switch (damper open)
	flashes	Damper opens (motor is actuated)
Yellow	On	Lower limit switch (damper closed)
	flashes	Damper closes (motor is not actuated)
Red	On	Internal device fault (BKN)
	flashes	External fault = BAE or smoke sensor triggered, nominal position not reached

⑨ **LED Modbus communication:**

Yellow pulses Modbus communication is illuminated during RX and TX
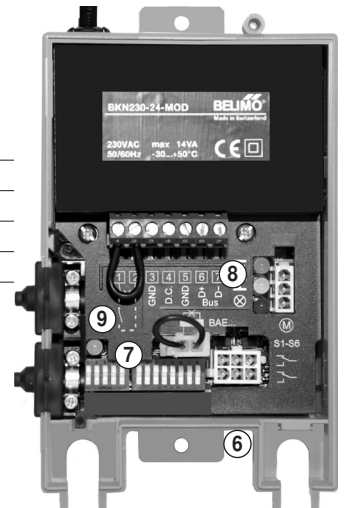
Signalisation

Lower limit position (Damper CLOSED) not reached:	Upper limit position (Damper OPEN) not reached:
LED red flash	LED red flash
LED green flash	LED green off
LED yellow off	LED yellow flash
Signal via LED after 2:30 min	Signal via LED after 2:30 min

Modbus overview

Register

	No.	Adr	Register
In operation	1	0	–
	2	1	**Override control**
	3	2	**Command**
	4	3	Actuator type
	5	4	Relative position [%]
	6	5	–
	7	6	–
	8	7	–
	9	8	Collective fault
Service	101	100	Series number 1st part
	102	101	Series number 2nd part
	103	102	Series number 4th part
	104	103	Firmware version (Modbus module)
	105	104	Malfunction and service information
	106	105	–
	107	106	–
	108	107	–
	109	108	**Bus fail position**

• Registers in Bold can be written
• Registers <100 (In operation) which can be written are non-permanent and should therefore be updated periodically
• Registers >100 which can be written are permanent

Commands

All data is arranged in a table and addressed by 1..n (register) or 0..n-1 (address). No distinction is made between data types (Discrete Inputs, Coils, Input Registers, Holding Registers). As a consequence, all data can be accessed with the two commands for Holding Register. The commands for Discrete Inputs and Input Registers can be used as an alternative.

Standard commands:
Read Holding Registers [3]
Write Single Register [6]

Optional commands:
Read Discrete Inputs [2]
Read Input Registers [4]
Write Multiple Registers [16]

Note regarding Read Discrete Inputs

The command reads one or more bits and can alternatively be applied for reading the malfunction and service information in Register 105 (Adr 104). The Start address for "BAE (duct temperature sensor) triggered" is calculated with $104 * 16 + 6 = 1670$

Modbus register description

Register 2: Override control — Overriding the setpoint with defined compulsions

Override control	
0	None (initial value, cannot be written)
1	Open
2	Close

Note

If no override is set (value 0), then the fire damper remains in safety position (Closed).

Register 3: Command — Initiation of actuator functions for service and test; the register is reset automatically.

Command	
0	None
2	Test run
4	Reset faults

Register 4: Actuator type

Actuator type	
3	Fire damper actuator

Register 5: Relative position — Position in accordance with position indicator switches
Damper closed: 0 (0%)
Intermediate switching: 5,000 (50%)
Damper open: 10,000 (100%)

Register 9: Collective fault
0 = no fault
1 = fault
Fault is set when one of the bits 0...7 of Register 105 is set.
(used as sensor value for air/water/VAV)

Register 101, 103: Series number — Each node has an unambiguous series number. The series number consists of 4 segments, although only parts 1, 2 and 4 are displayed on Modbus.
Example: 00839-31324-064-008

Register 9	Register 10	Register 11
1st part	2nd part	4th part
00839	31234	008

Register 104: Firmware Version
Firmware Version (VX.XX)
e.g. 101   V1.01

Register 105: Malfunction and service information — The status information is split into messages about the actuator (malfunctions) and other service information.

	bit	Description
Malfunctions (low byte)	0	–
	1	Actuation path increased
	2	Mechanical overload
	3	–
	4	Safety-relevant malfunction
	5	–
	6	Duct temperature too high
	7	Smoke detector triggered
Service (high byte)	8	Internal activity (test run, adaption, …)
	9	–
	10	Bus monitoring triggered
	11	Local override control active
	12	–
	13	–
	14	–
	15	–

The malfunction bits can be reset with Register 3 (command 4) or with the Belimo PC-Tool. Malfunctions 0 and 4 cannot be reset.

Modbus register description	*(continued)*

Register 109: Bus fail position The bus monitoring controls the Modbus communication. If the override control (Register 2) is not renewed within 120 seconds, the actuator controls to the bus fail position (closed). Triggered bus monitoring is indicated in Register 105.

Bus fail position	
0	No bus monitoring
1	Rapid close if time is exceeded (factory setting)

Dimensions [mm]

Dimensional drawings