

KOOLAIR

series

KOOLCOM

Motor-driven
fire damper
monitoring systems

ISO 9001

BUREAU VERITAS
Certification

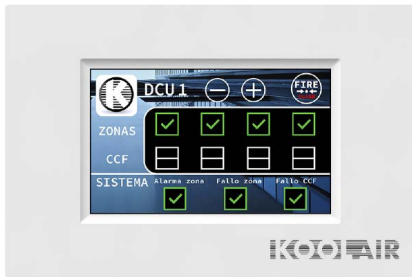
Sistema de Gestión



www.koolair.com



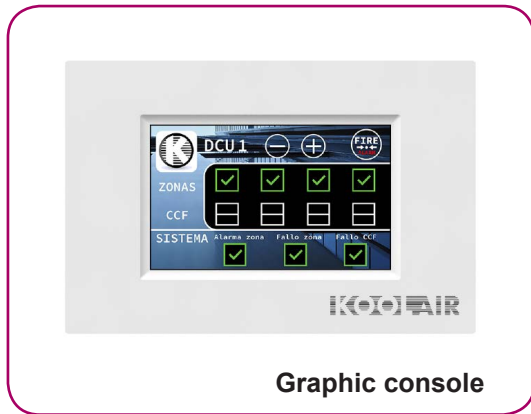
KOOLCOM fire damper monitoring system



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KOOLCOM fire damper monitoring system.



Graphic console

Introduction

KOOLCOM is an electronic control system for fire dampers that allows the condition and functionality of each fire damper to be periodically and automatically monitored and checked. It can also close the dampers should the fire alarm be activated.

While this system is capable of being managed by a BMS (Building Management System) system, KOOLCOM can also work in Standalone mode, i.e., operate autonomously without the need for a BMS or any external maintenance personnel.



**Communication control unit
KHUK**

HUB Design Concept

KOOLCOM is the only system on the market whose installation is based on the HUB design concept (a central communications hub). This allows:

- Control of up to 31,616 fire dampers.
- Greater data communication speed (32 times faster than systems without this arrangement).
- Simple alarm wiring.



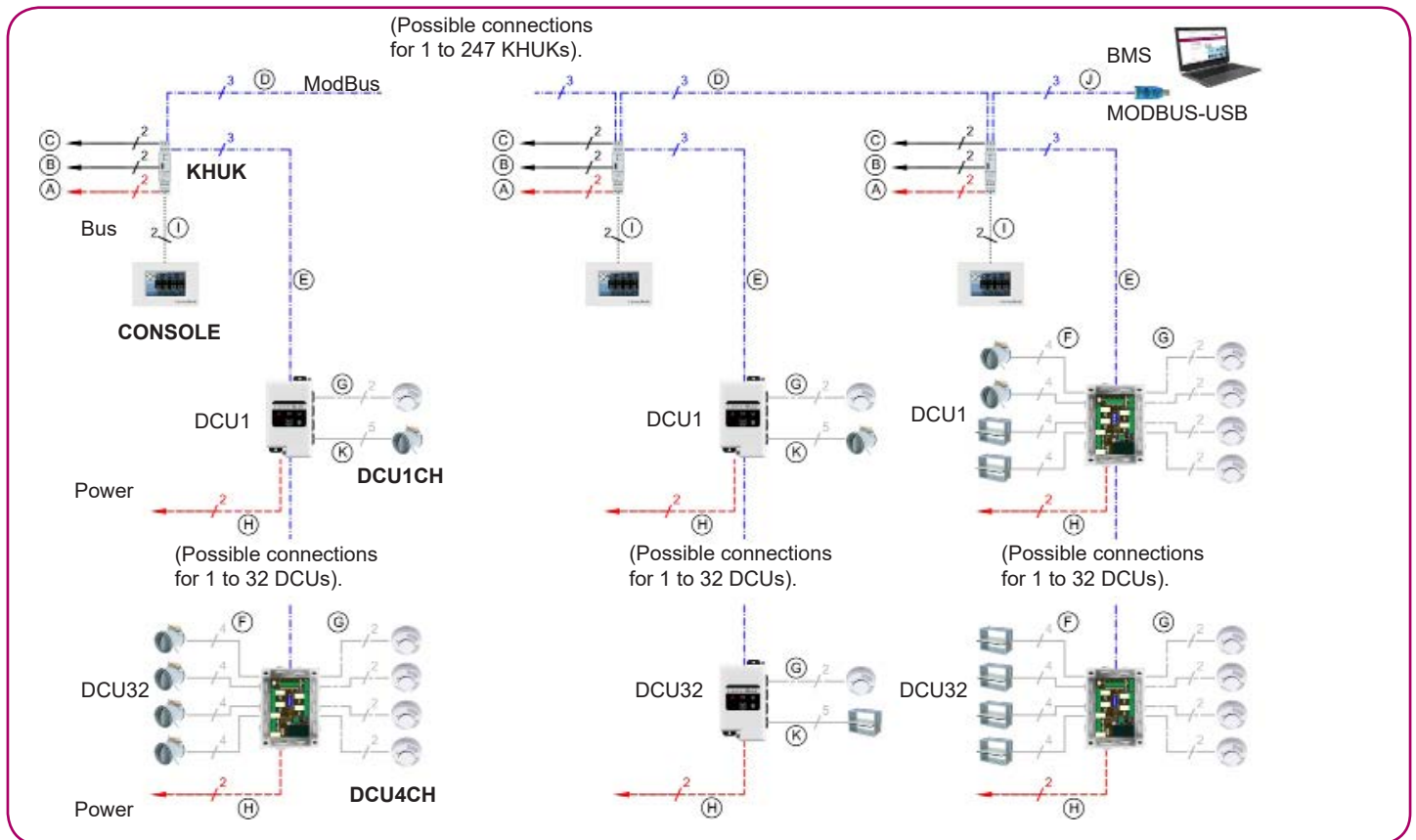
**Fire damper control unit
DCU 1CH**

Technical specifications

- Control electronics for 1 to 4 fire dampers (DCU)
- Control electronics for 24 V (AC and DC) and 230 V AC dampers
- Autonomous or interactive with the central fire alarm system
- Programmable periodic checks
- Supply fan actuator, configurations for extract fans and smoke extract by means of an external contact.
- MODBUS Communication. Adjustable velocity. Integrated bus terminator.
- Alarm input/output. Dry contact.
- Test mode for smoke detectors
- Segregated graphic console.

General schematic diagram of the KOOLCOM monitoring system.

Note: If the KHUK alarm input is connected to a fire panel, the modbus wiring between KHUK and DCUs, and between KHUK and the BMS, must be **flame retardant**.



- A - Power Connection-KHUK. 24V. 2 Wires. Observe polarity +24V and GND(-). AWG20 (0.5mm²).
- B - KHUK-RESET PUSH BUTTON. 24V.2 Wires. Observe polarity RESET and +24V AWG26 (0.13mm²).
- C - KHUK- INPUT FROM ALARM PANEL. 2 Wires. Observe polarity. +24V and ALARM. AWG26 (0.13mm²).
- D - KHUK-KHUK. ModBus. 3 Wires. Observe polarity A+, B- and GND. 0.2mm².
- E - KHUK-DCU. ModBus. 3 Wires. Observe polarity A+, B- and GND. 0.2mm².
- F - DCU-FIRE DAMPER. 2 Wires contacts + 2 Wire Motor. Contacts AWG206 (0.13mm²) / Motor AWG20 (0.5mm²).
- G - DCU-SMOKE DETECTOR. 2 Wires. AWG20 (0.5mm²).
- H - DCU-Power 220V. 2 Wires. AWG20 (0.5mm²).
- I - KHUK-CONSOLE. 2 Wires. No polarity. AWG20 (0.5mm²).
- J - KHUK-BMS. ModBus. 0.2mm².
- K - DCU-GATE. 3 wires + 2 wires Motor. Contacts AWG206 (0.13mm²) / Motor AWG20 (0.5mm²).

Minimum cross sections for a maximum length of 100m. For longer lengths refer to standard values A.W.G. ModBus: 3 Wires. RS-485 specific cable, minimum 3 conductors + screen. Nominal impedance 100-120 ohms. AWG24 (0.2mm² section, 0.51mm diameter, twisted).

Note: If the Alarm Input of the DCU is used, use 2 wires AWG26 (0.13mm²).

System components. Damper Control Unit (DCU 1CH)

The DCU contains the control electronics for the different fire dampers. KOOLCOM offers two models which allow either 1, or up to 4 dampers to be controlled by the same device.



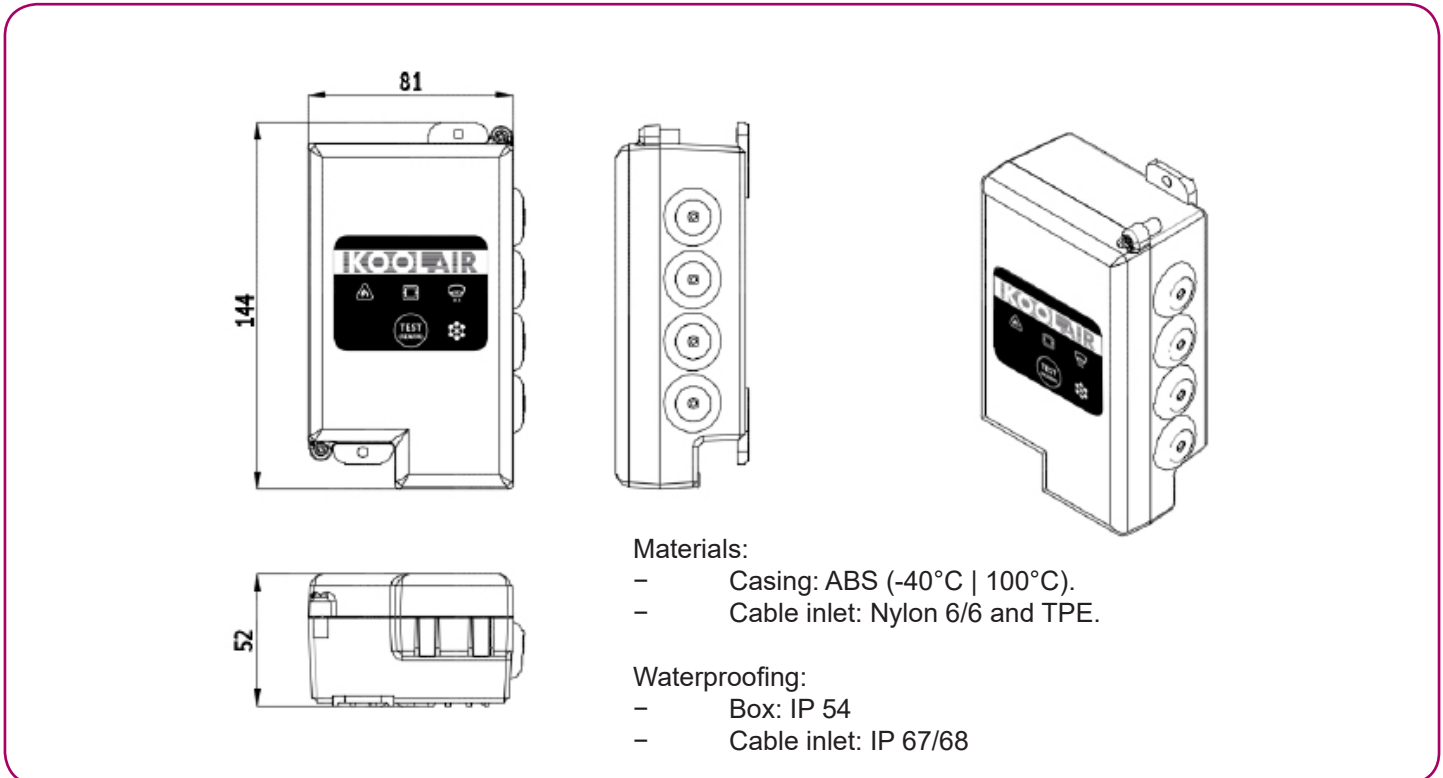
DAMPER CONTROL UNIT 1 CHANNEL (DCU 1CH)

DCU 1CH (Damper Control Unit, 1 Channel) are devices used to send commands and supervise motorised fire dampers, which by means of commands sent through the ModBus allow them to be automated and controlled.

They are integrated in the KOOLCOM fire damper control and supervision system. This system is completed with KHUK units (KoolCom Hub Unit KoolAir), which allow DCUs (1CH or 4CH) to be grouped in sets of 32 units, and connects the colour, touch screen consoles.

Each DCU 1CH has:

- 1 input for a conventional smoke detector (zone).
- 1 output for fire damper in two available formats:
 - Direct connection for Belimo motors.
 - Universal motor connection.
- 1 power input.
- 1 ModBus connection.
- Models:
 - 24V (AC/DC) - 100-DCK300: For 24V fire damper motor.
 - 230V AC - 100-DCK400: For 230V power supply damper motor.



Materials:

- Casing: ABS (-40°C | 100°C).
- Cable inlet: Nylon 6/6 and TPE.

Waterproofing:

- Box: IP 54
- Cable inlet: IP 67/68

Specifications (DCU 1CH)

- **Maximum load** on the damper motor output:

24V (AC/DC) model: 3A
230V AC model: 0.5A

- **Maximum load** in the detection zone: 100mA

- **Maximum power consumption** (without detector or damper):

24V (AC/DC) model: 100mA@24V 0.72W
230V AC model: 70mA@230V 0.88W

- **Protected against short circuits and ESDs** at zone connections, fire damper contacts, and ModBus.

- **MODBUS:**

- Device type: Slave
- ModBus implementation: RTU on RS-485
- Maximum number of DCUs (without repeater): 32
- Default configuration: 9600bps 8E1
- Bus data transfer speed can be configured both on the PCB and via ModBus.
- Integrated termination in PCB, can be activated by jumper.
- Typical response time: <10 ms.

- **Installer push-button** on the front panel to:

- Perform tests and set up from the front panel.
- Reset alarms from the DCU itself: a laptop is not required to reset alarms if the operator is present at the DCU.

- **Zone Connection:**

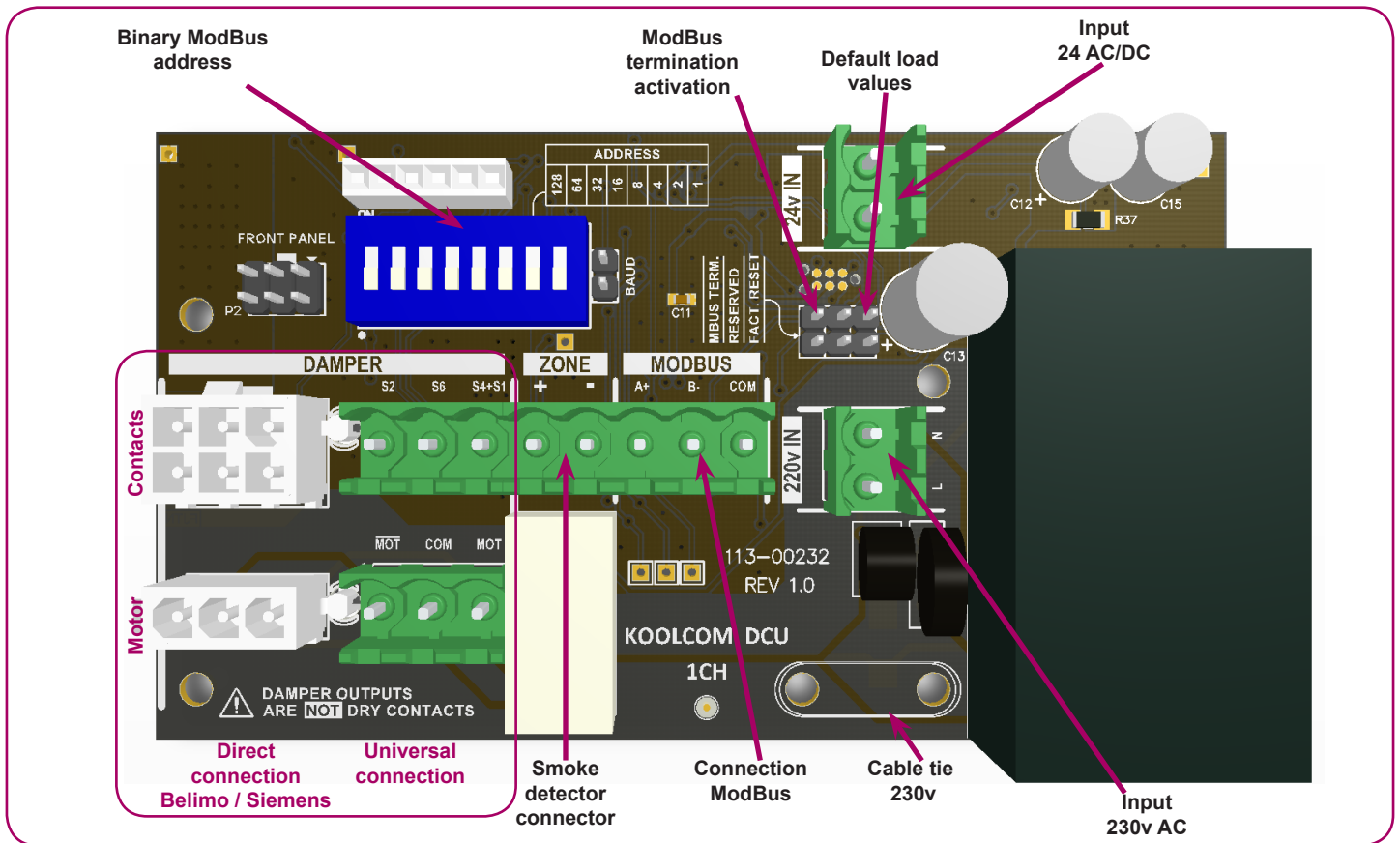
- Protected against short circuits and ESDs.
- Monitored: If there is a wiring failure or the detector is disassembled, monitoring allows the problem to be detected and highlighted.
- Most smoke detectors are supported, including both those that are self-limiting and those that need current to be limited in the control panel.
- Automatic detection in the zone: it is not necessary to place a resistance at the terminals or to simulate a fault if the zone is not in use.
- Smoke detector test mode: allows smoke detectors to be tested without the DCU triggering the fire alarms.

- **Automatic fire damper testing** with programmable test intervals.

- **Automatic detection of fire damper and zone:** it is not necessary to bypass the damper or simulate a fault if the zone is not in use.

- **Clearly indicated connections** next to each connector.

Damper Control Unit 1 channel (DCU 1CH)



The universal damper connection is a 5-wire connection:

o Contacts:

- S4+S1: can be connected inside the damper.
- S2 and S6: Are the normally open contacts of the matching limit switches.

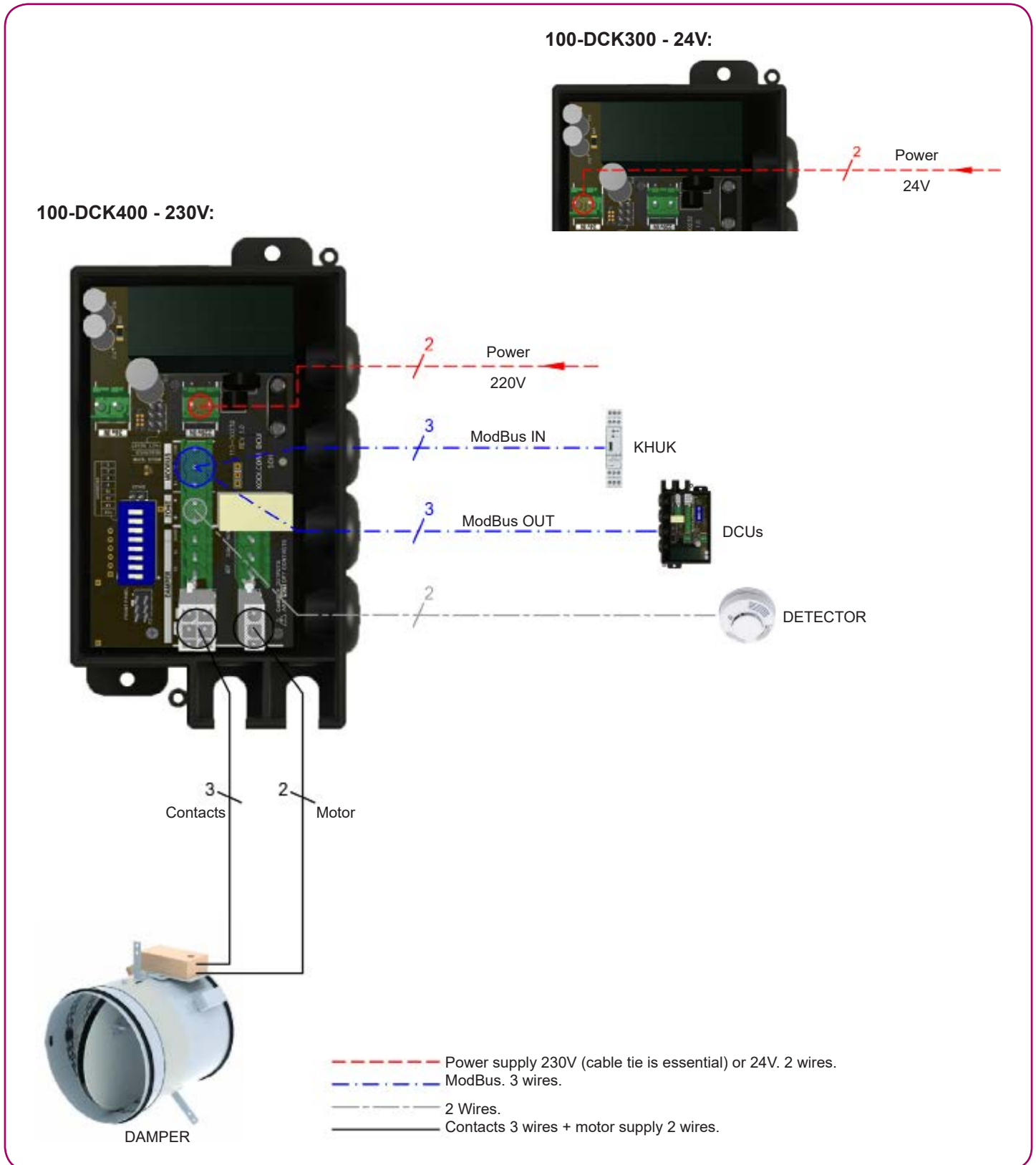
o Motor:

- COM: common, negative (or neutral in DCU 230V)
- MOT: positive (or phase in DCU 230V)

$\overline{\text{MOT}}$: normally not used, it is the same signal as MOT but with inverse logic.

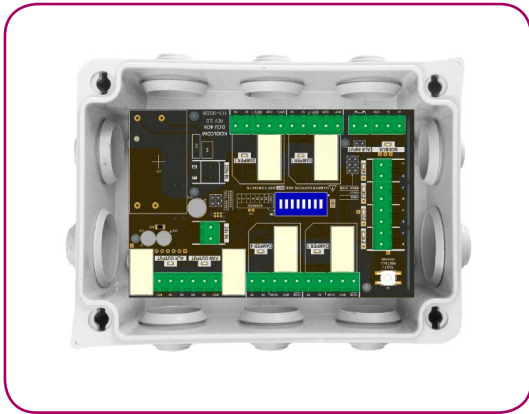
The output connections to the damper motor are not dry contacts, but are already powered to supply the voltage needed to power the motor: 24V o 230V, as per the DCU model.

Damper Control Unit 1 channel connection (DCU 1CH): two versions (24V / 230V)



System components

Damper Control Unit 4 channel (DCU 4CH)

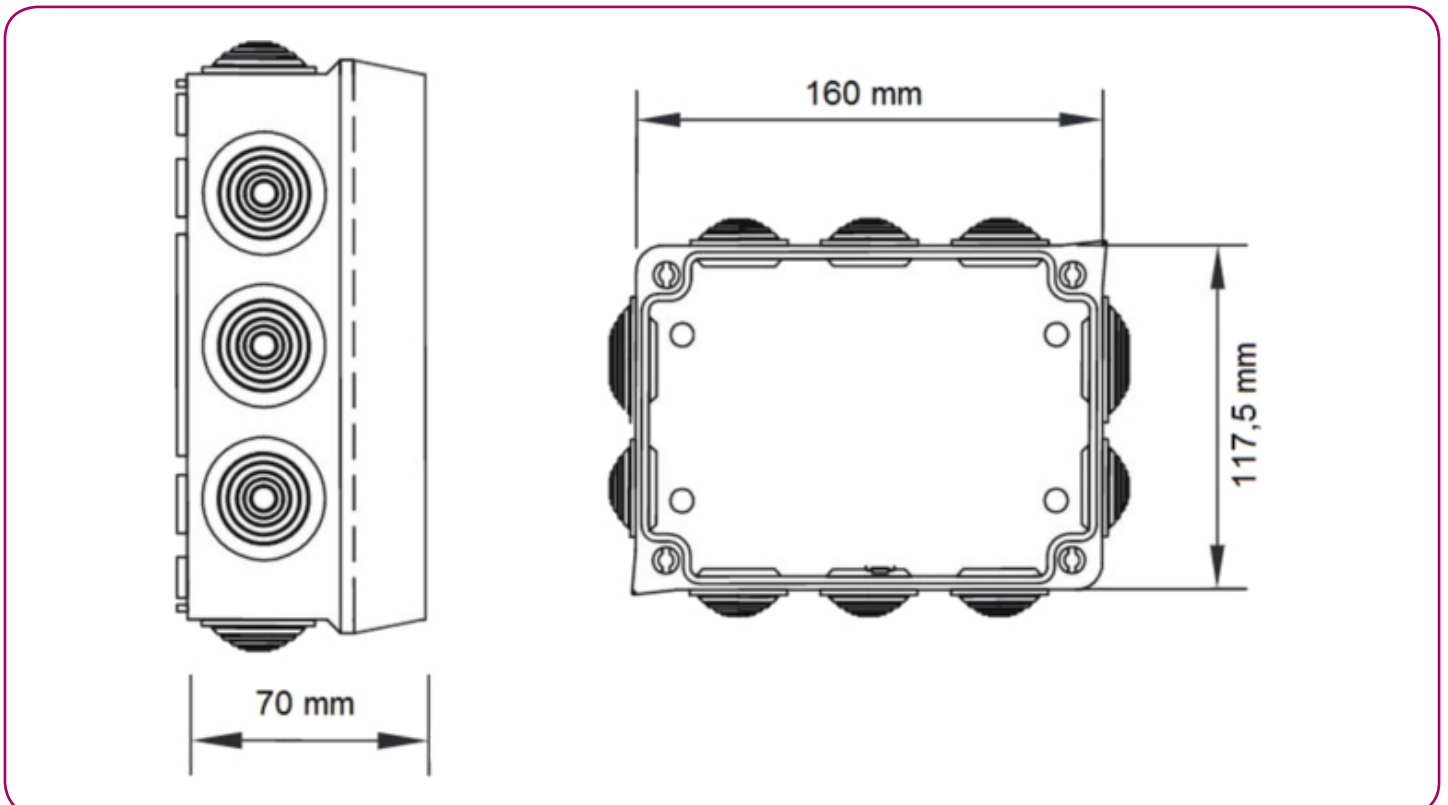


DCU 4CH (Damper Control Unit, 4 Channel) are devices used to send commands and supervise up to 4 motor-driven fire dampers and 4 smoke detectors, which, by means of commands sent through the ModBus, allow them to be automated and controlled

They are integrated in the KOOLCOM system for controlling and supervising motor-driven fire dampers and four smoke detectors (zones). This system is completed with KHUK units (KoolCom Hub Unit KoolAir), which allow DCUs to be grouped (1CH or 4CH) in sets of 32 units, in addition to connecting the colour, touch screen consoles.

Each DCU 4CH has:

- 4 inputs for a conventional smoke detector.
- 4 outputs for fire dampers. Direct connection from motors.
- 1 power input.
- 1 ModBus connection.
- 24V (AC/DC) and 230V AC models
- Damper test button
- Dry contact for external alarm input
- Dry contact for supply/extract fan
- Dry contact indicating alarm detected
- Visual indication of the status of all the elements by means of LEDs on the board



Specifications (DCU 4CH)

- **Maximum joint load** on the damper motor outputs:

24V (AC/DC) model: 3A
230V AC model: 0.5A

- **Maximum load** in the detection zone: 100mA per zone / 300 mA combined

- **Maximum consumption** (without detector or damper):

24V (AC/DC) model: 100mA@24V DC
230V AC model: 70mA@230V AC

- **Auxiliary Relays** (FAN AND ALARM):

24V (AC/DC) model: 5 A@24V DC
230V AC model: 5 A@230V AC (for resistive loads)

- **Protected against short circuits and ESDs** at zone connections, fire damper contacts and ModBus.

- **MODBUS:**

- Device type: Slave
- ModBus implementation: RTU on RS-485
- Maximum number of DCUs (without repeater): 32
- Default configuration: 9600bps 8E1
- Bus data transfer speed can be configured both on the PCB and via ModBus.
- Termination integrated in internal PCB, can be activated by jumper.
- Typical response time: <10 ms.

- **Installer push-button** on the panel to:

- Perform tests and set up.
- Reset alarms from the DCU itself: a laptop is not required to reset alarms if the operator is at the DCU.

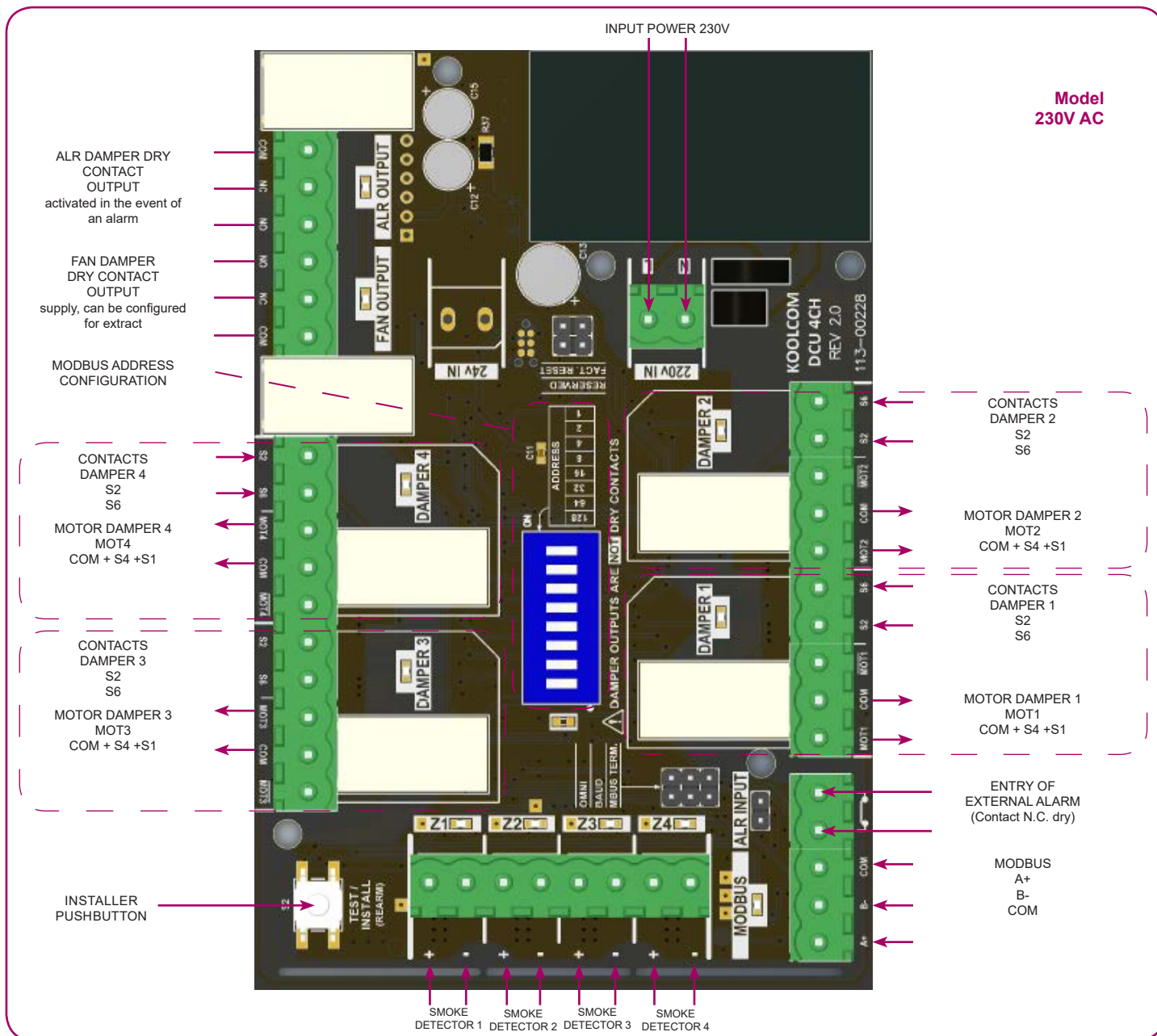
- **Zone Connection:**

- Protected against short circuits and ESDs.
- Monitored: If the wiring fails or the detector is disassembled, monitoring allows problems to be detected and highlighted.
- Most smoke detectors are supported, including both those that are self-limiting and those that need current to be limited in the control panel.
- Automatic detection in the zone: it is not necessary to place a resistance at the terminals or to simulate a fault if the zone is not in use.
- Smoke detector test mode: allows smoke detectors to be tested without the DCU activating the fire alarms.

- **Automatic fire damper testing** with programmable test periods.

- **Automatic detection of dampers and zones:** it is not necessary to bridge or to simulate a fault if the zone is not in use.

Damper Control Unit 4 channel (DCU 4CH)



The universal damper connection uses 4 wires:

o Contacts:

- S2 and S6: are the normally open contacts of the matching limit switches.

o Motor:

- COM + S4 + S1: common, negative (or neutral in DCU 230V) attached to cables S4 and S1 of the motor contacts.

- MOTX: positive (or phase in DCU 230V)

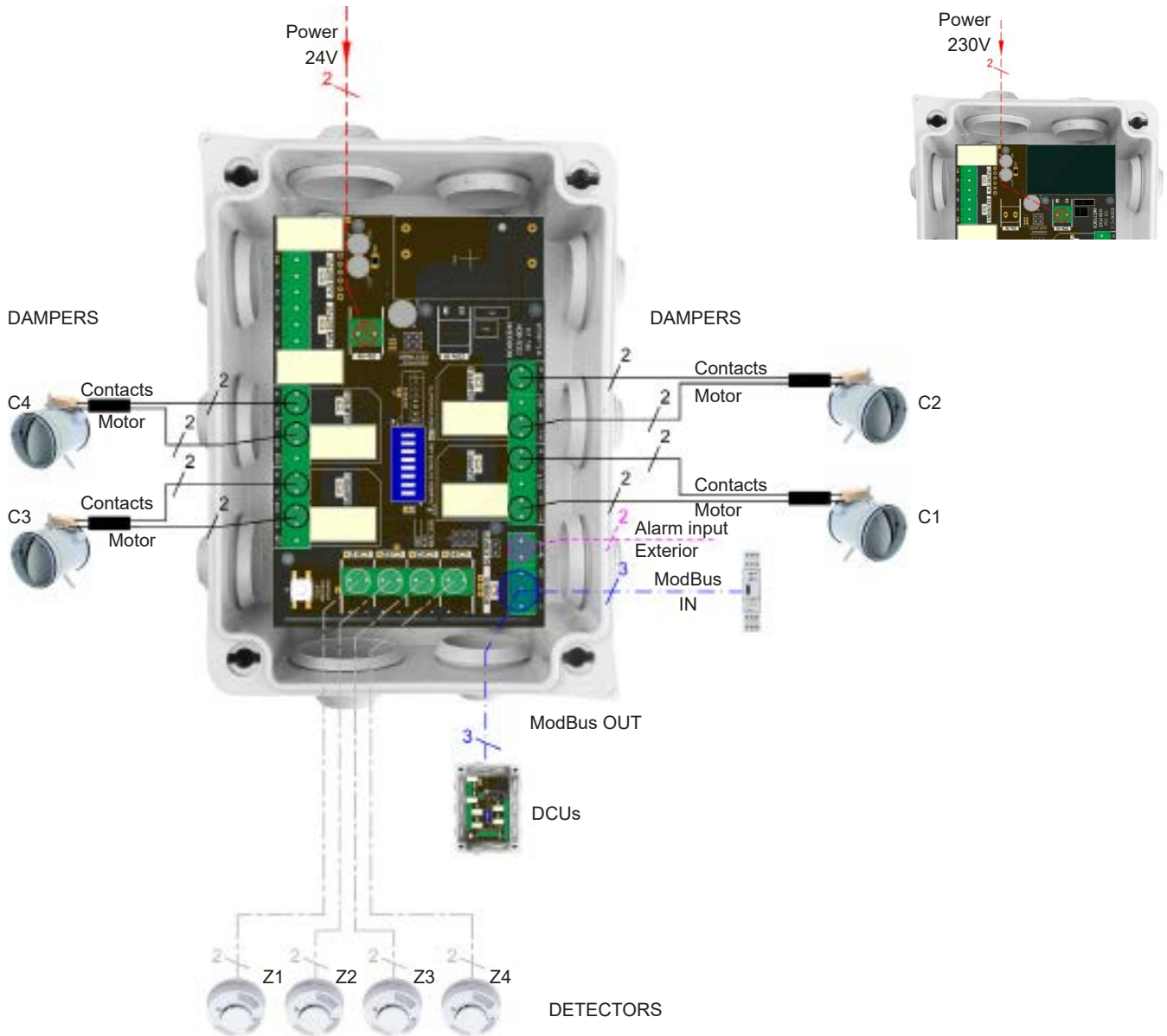
MOTX: normally not used, it is the same signal as MOT but with inverse logic.

The output connections to the damper motor **are not dry contacts**, but are already powered to supply the voltage needed to power the motor: 24V o 230V, as per the DCU model.

Damper Control Unit 1 channel connection (DCU 4CH): two models (24V / 230V)

100-DCK500 - 24V AC/DC:

100-DCK600 - 230V AC:



- 230V AC or 24V AC/DC supply. 2 wires.
- ModBus. 3 wires.
- 2 wires.
- 2 wires.
- 2 wires contacts (S2, S6) + 2 wires motor supply (COM+S4+S1), MOTx.

System components. KHUK (HUB)



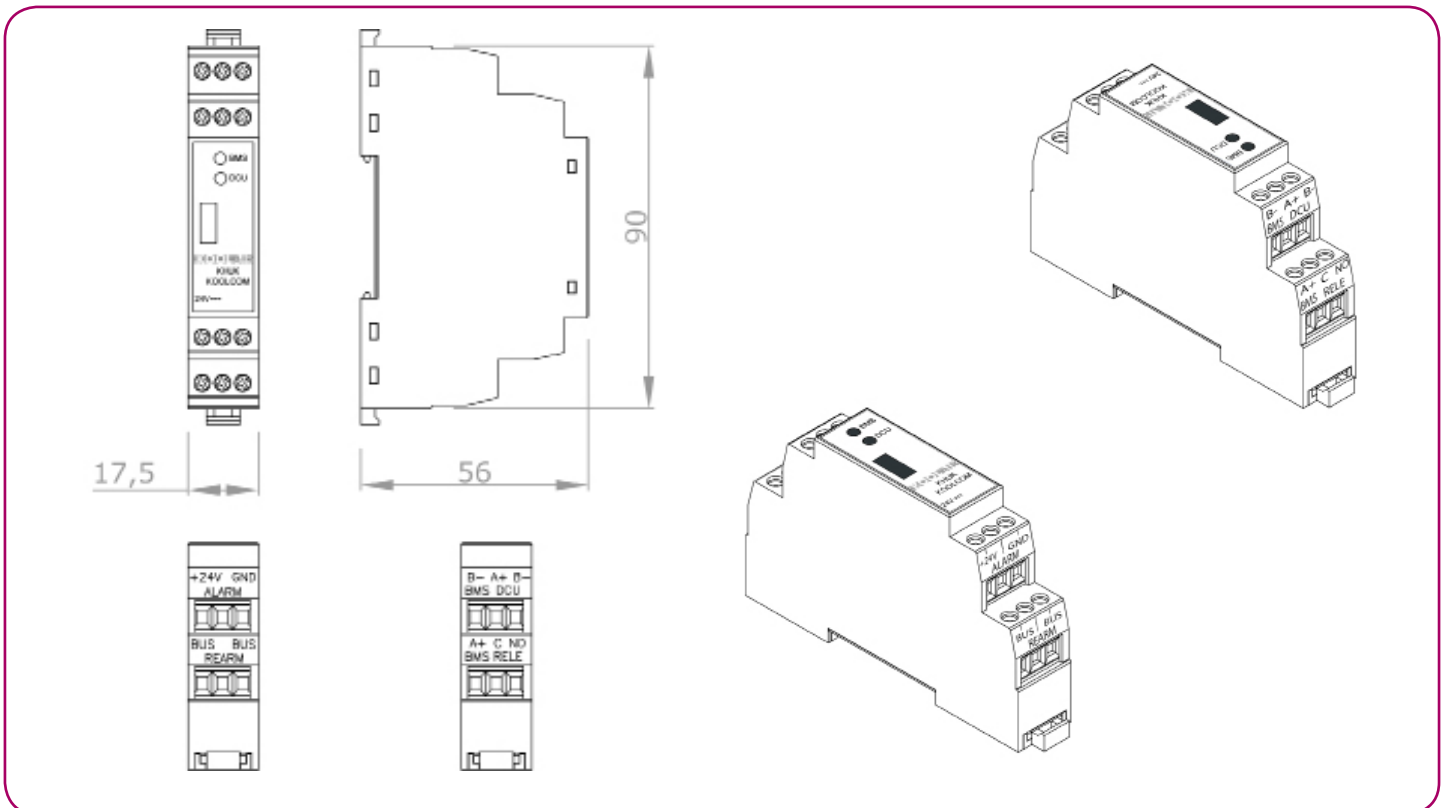
The KHUK is a Modbus hub device that occupies a single address, allows up to 128 fire dampers and 128 smoke detectors (32 DCU-4CH units) to be managed.

Each KHUK has:

- 1 connection to the Koolcom console.
- Direct connection to fire panel:
 - Alarm activation input.
 - Alarm reset input.
 - NO alarm relay output (Max 8Amp).
- 1 24V DC power input.
- Maximum consumption: 100-UCK000: 125mA@24v
- 1 ModBus connection on RS485 for DCUs.
- 1 ModBus connection on RS485 for BMS.
- ModBus:

Type of device going to DCUs:	Master
Type of device going to the BMS:	Slave
ModBus implementation:	ModBus RTU on RS-485
Maximum number of DCUs:	32
Default configuration:	9600bps 8E1

The KHUK is always powered by a 24V DC power supply.



System components. Graphic console

The KOOLCOM graphic console allows monitoring and control of DCUs connected to the associated KHUK, facilitating the monitoring and control of fire dampers and smoke detectors (zones).

The console allows information on the overall status of the system and each connected DCU to be displayed, as well as the basic parameters to be configured and managed. (* Only available in installations that include KHUKs).



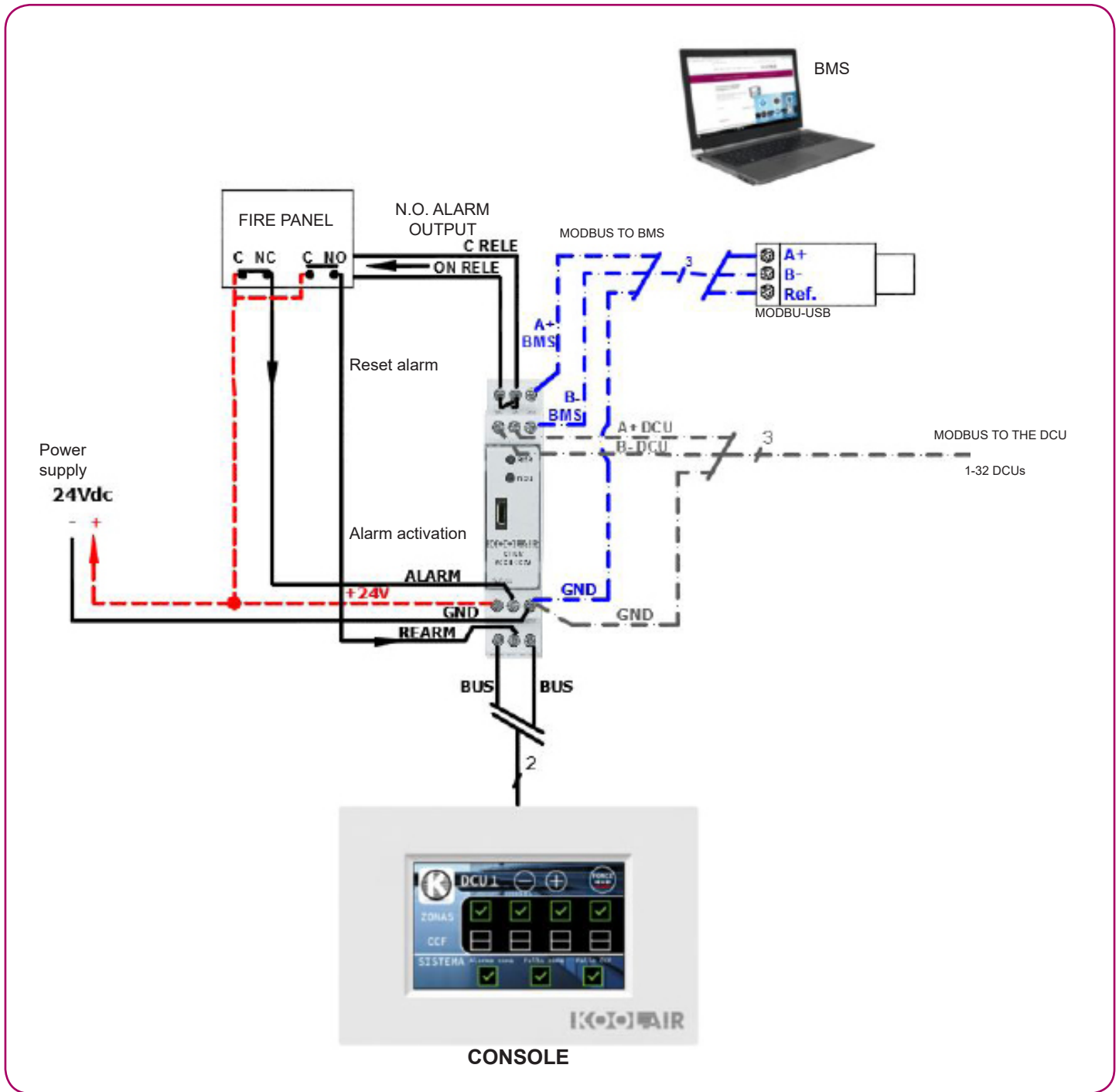
KOOLCOM Graphic Console with 3.2" display. Surface mounted version. Specific flush mounted box available for flush mounting.

CHARACTERISTICS:

- Surface mounted or flush (optional)
- Powered from the KHUK (No external power supply required).
- Dimensions: 79x119x16 mm.
- TFT 3.2" display. 65,536 colours. 4R resistant touch panel.
- Resolution: 400x240 pixels.
- Testing, control and monitoring of up to 128 fire dampers and 128 smoke detectors (32 No. DCU 4CH).
- Autonomous or integrated with the central fire alarm system
- Programmable periodic checks
- Global and localised indication of the state of the zones (smoke detectors) and the fire dampers.

KHUK connection schematic

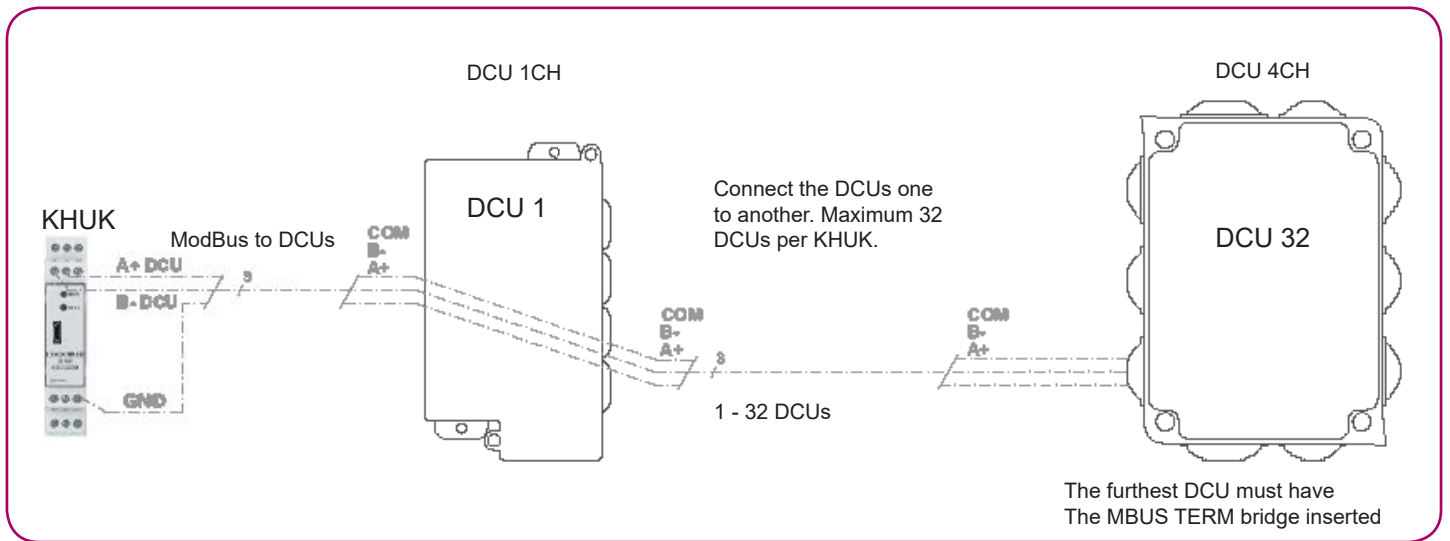
One KHUK has connections for up to 32 DCUs (maximum 128 dampers and 128 detectors), the wall mounted graphic console and a BMS. It can interact with the central fire alarm system with external alarms going to the KHUK and detected alarm coming from the KHUK.



KHUK AND DCUs

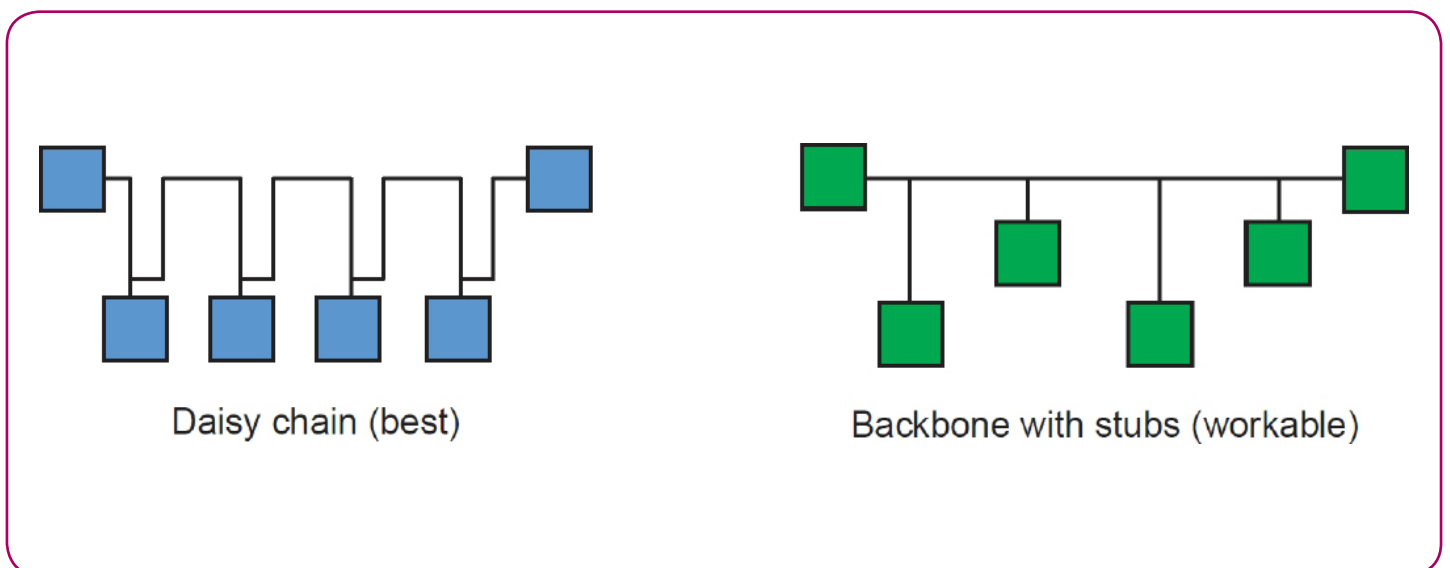
Three wires with polarity that connect exclusively to the DCUs. The KHUK contains the MODBUS termination. By inserting the MBUS TERM bridge into the furthest DCU, the two necessary terminations are achieved. Different DCU models (DCU-1CH and DCU-4CH) can be mixed in the same bus.

For the modbus wiring, RS-485 cable must always be used; available from various manufacturers.



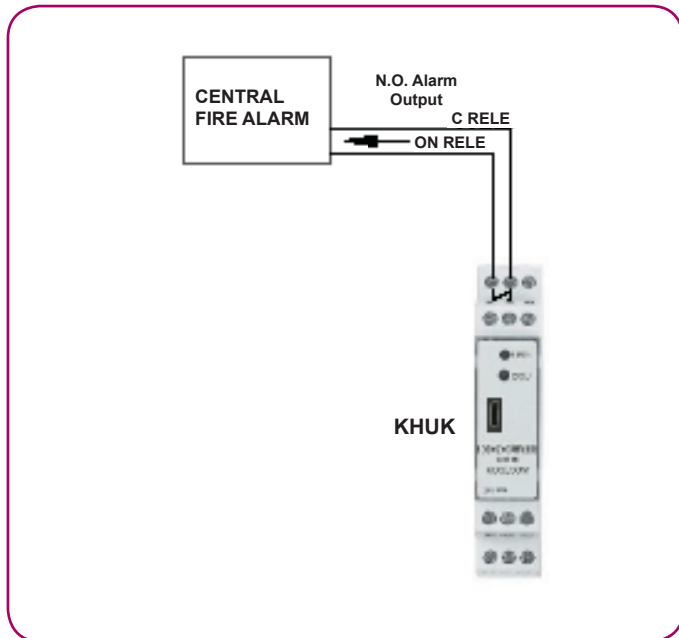
MOD-BUS Topology

Daisy Chain topology must be used wherever possible. If this is not feasible at any point, a **Backbone with stubs** can also be used.

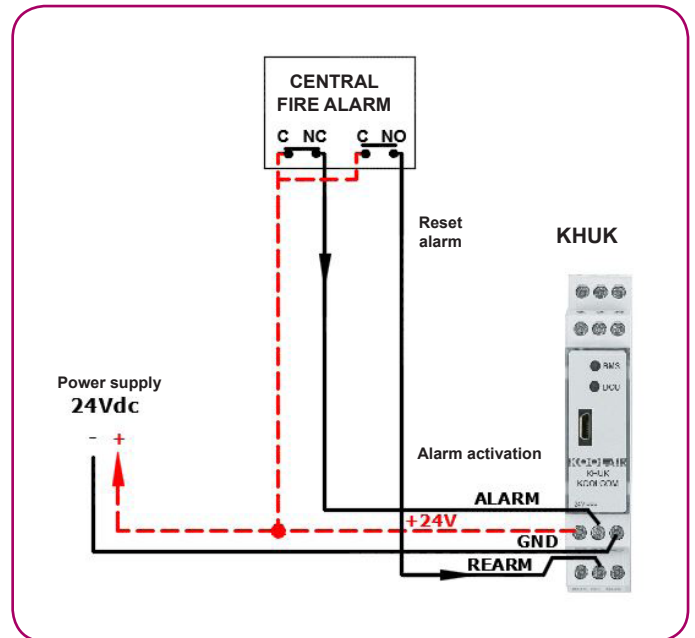


In cases where backbone with stubs topology is used, the stubs should be as short as possible and **never exceed 10 meters**.

KHUK and alarms



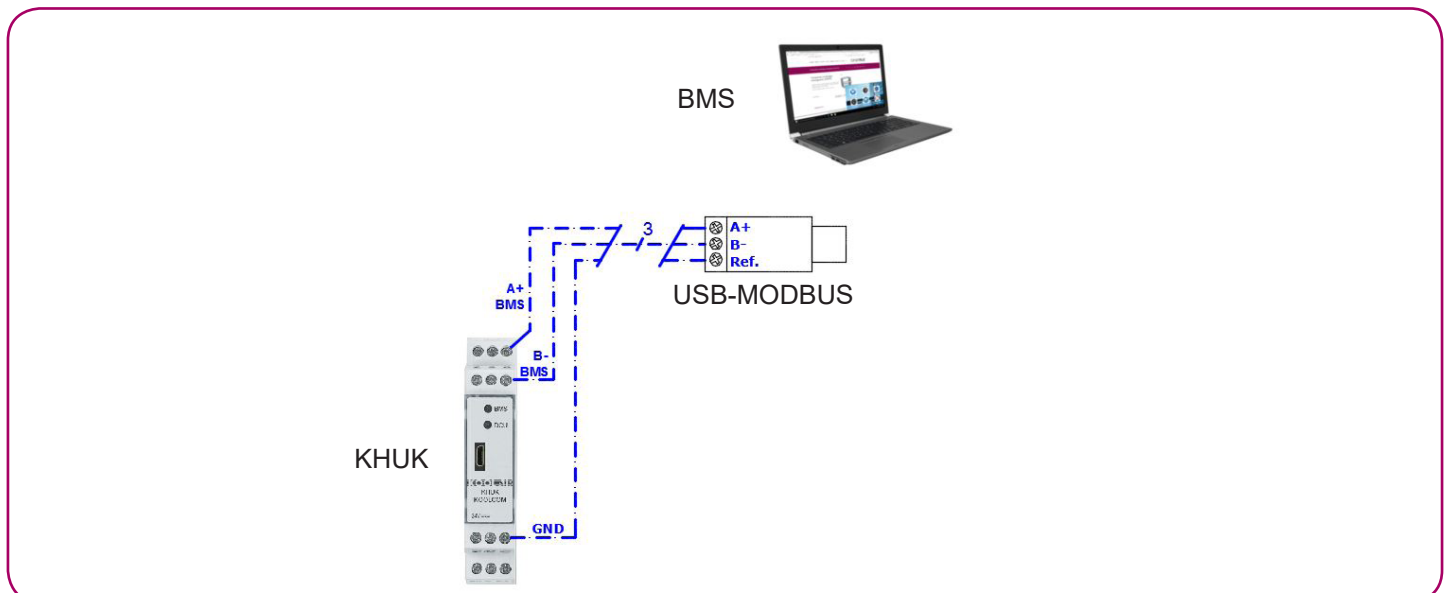
N.O. Alarm Relay Output: Volt-free contacts with a maximum switching capacity of 8Amp, which are closed when any DCU informs the KHUK of the occurrence of an alarm. They are usually connected to the central fire alarm system, which awaits the closure of these contacts.



Fire Alarm and Reset Input: When the +24V from the source is received at the alarm input, the KHUK considers there to be a fire alarm external to the system (not activated by the smoke detectors). It will activate the alarm input on each DCU connected to the KHUK, resulting in the closing of all connected dampers.

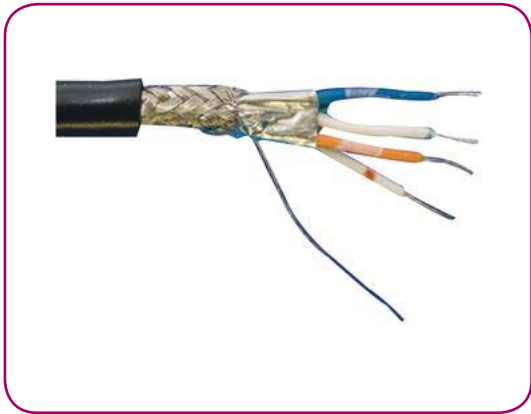
KHUK and BMS

Three wires with polarity that are connected to a PC that contains an available RS485 port. The third wire COM (Ref.) is the negative of the KHUK supplier (GND).



Accessories

This section describes the accessories that may be necessary during installation.



Cable MODBUS

This depends on the specific conditions of each installation, especially the level of electrical noise in the zones which the wiring passes through, the distance to be covered and the chosen connection speed. We recommend that RS-485-specific cable always be used.

In general the cable specifications will comply with:

- be twisted pair (or pairs) cable.
- have at least three conductors + screen.
- nominal impedance: 100-120 ohms
- AWG24 (section 0.2mm², diameter 0.51mm)
- screened



MODBUS Extender/Isolator

Optical MODBUS Extender / Isolator. In cases with long cable runs, or even to facilitate easy fault detection in the installation, this allows the connection wiring between the KHUK and the different DCUs to be expanded and isolated.



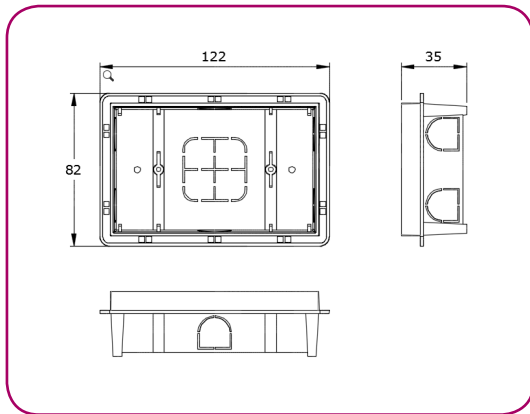
USB-MODBUS Interface

Allows the KOOLCOM system and a computer to be connected if there is no integrated RS485 port.

Accessories

Graphic console back box

Non-standard back box for installations where the graphic console is to be flush mounted instead of surface mounted.



Coding

CODE	DESCRIPTION
100-UCK000	KOOLCOM HUB
100-TCK000	KOOLCOM GRAPHIC DISPLAY
100-DCK500	DAMPER CONTROL UNIT KOOLCOM, 4 DAMPERS, 24V (AC/DC)
100-DCK600	DAMPER CONTROL UNIT KOOLCOM, 4 DAMPERS, 230V AC
100-DCK300	DAMPER CONTROL UNIT KOOLCOM, 1 DAMPER, 24V (AC/DC)
100-DCK400	DAMPER CONTROL UNIT KOOLCOM, 1 DAMPER, 230V AC
100-MBUS00	CABLE MODBUS TWISTED KOOLCOM, 3 CONDUCTORS+MESH
100-MBUS01	KOOLCOM SYSTEM OPTICAL ISOLATOR / EXTENDOR
100-MBUS02	MODBUS INTERFACE TO KOOLCOM USB
100-TCK001	KOOLCOM GRAPHIC CONSOLE BACK BOX

Environment, guarantee and safety.

ENVIRONMENT

Never dispose of this equipment together with household waste. Electrical and electronic products contain substances that can be harmful to the environment if not disposed of properly. The symbol of a crossed out rubbish bin indicates the special collection of electrical appliances, differing from other urban rubbish. For correct environmental disposal, they should be taken to specially designed collection centres at the end of their useful life. Their constituent parts are recyclable. Therefore, observe the applicable environmental protection regulations.

You must return them to your dealer if they are being replaced by another, or dispose of them at a specialised collection centre.

Violators are subject to the sanctions and measures established by the Law on environmental protection.



GUARANTEE

This product is covered by a legal guarantee; please contact your seller for more information.

KOOLCOM guarantees the products will conform to the technical specifications for a period of 2 years, including parts and labour, from the date of purchase included on the purchase document. The user can put the guarantee into effect at the distributor or point of sale or by calling the customer service number. The nonconforming part or product will be repaired or replaced by an equivalent piece or product at no cost to the customer. Any part or product changed becomes the property of KOOLCOM. The remedied defect of the repaired product is guaranteed for a period of 6 months from the date of repair.

However, this guarantee does not apply in the following cases:

Installation or use that is not in accordance with the instructions given in this manual; incorrect connection or improper use of the product, in particular, with accessories not designed for the purpose; abnormal wear; failure to comply with the technical and safety standards in force in the geographical area of use; products that have received shocks or falls; products damaged by lightning, electrical overloads, heat sources or radiation, water damage, exposure to excessive humidity or any other outside cause; misuse or negligence; intervention, modification or repair by any person not approved by the manufacturer or distributor **CONDITIONAL TO THE LEGAL PROVISIONS, ALL WARRANTIES DIFFERENT FROM THOSE DESCRIBED IN THIS SECTION ARE SPECIFICALLY EXCLUDED.**

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