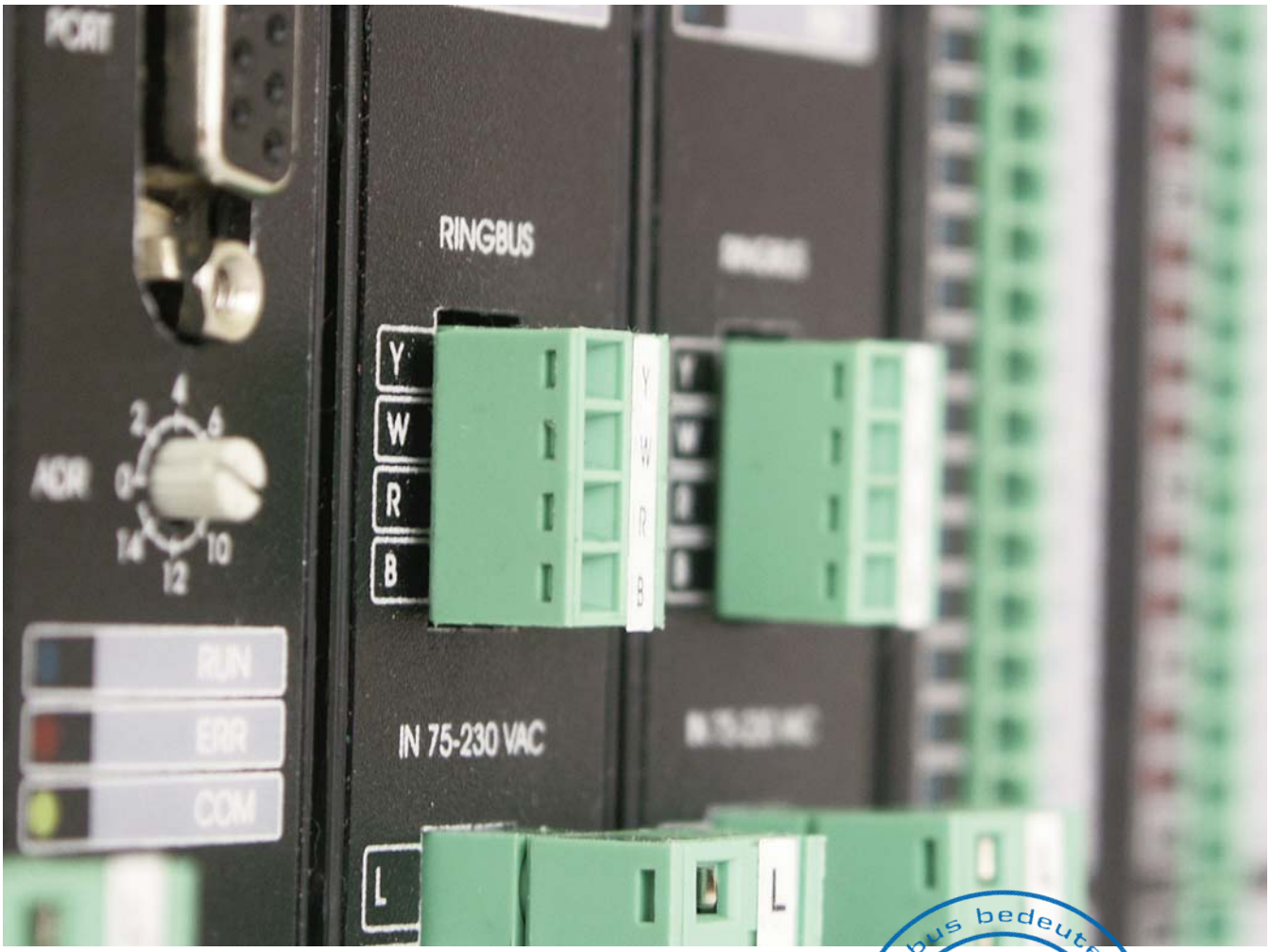
BUSTEC

Ringbus System description

smoke extraction dampers and smoke control systems



Ringbus bedeutet Geprüft nach ÖNORM F3001 Sicherheit!

Version 1.1 | 02.2006

1. Introduction

BUSTEC ringbus system indicates security – certificated pursuant to ÖNORM F3001, because even in case of interruption of the strip constructor, short circuits or other defects a sure data transfer – from two sites in case of disturbance - for monitoring and controlling of fire protection and smoke dampers is ensured – by an automatically dividable ringbus.

New buildings

New building-concepts require a sure and reliable fire protection-solution. This must correspond to the valid norms, ordinances and guidelines. By the respective mechanization-degree of a building and the request of the buildings - supervision a selection of a cost-optimized system-solution has to be guaranteed.

In order to accomplish this requisition as well as a demanded maximum of security, BUSTEC has developed a modern ring-bus-system for control and supervision of fire protection dampers – and protection-systems as well as **smoke extraction dampers and smoke control systems**.

Through the constantly growing mechanization and mobility (move) in buildings, the requests for flexibility and security of these systems rise too.

Cancellations of installation parts and with it interconnected waits (business-halt) always stand in connection with additional and incalculable costs. The operational safety of this short cut- and interruption-sure ringbus system is always standing in the foreground.

Redevelopment of old buildings – renovation

Not only the previous point is valid for the redevelopment or the rebuilding of old buildings, the simple adding or integrating of a simple and sure bus-system in line with the limited cost objective of the project represents the idea of the BUSTEC ring bus system.

Historic buildings

In case of restoration of historic buildings implementation of fire protection and smoke systems retrieves complicacies because of the required space for a conventional wiring. Here the workaround is given by the BUSTEC ringbus system – wiring effort is minimized by maximal safety.

2. General

The Ringbussystem is used for the control and supervision of motor-operated smoke and fire dampers (fire-smoke-tax-tabs) of area-air-technical systems. The ring-bus-system is also suitable for the integration of switch-contacts of the **Fire alarm system** as well as for the depositing of switch-commands for the ventilation systems and ventilators etc. Furthermore, also mechanical fire protection-tabs with end switch can be controlled.
The optimal use of this control and supervision-system is given in building complexes with an accordingly large number of fire protection and smoke dampers.

System description

At a RBCPU 01 control unit up to 500 pieces of ring-bus-field-module can be connected. The maximal distance between two fieldbus modules can be about 500 m.. The entire management-length of a ringbus wiring to a RBCPU 01 should not exceed 5.000 m. By adding more RBCPU 01 the number of fire- and smoke dampers can be elevated as well as the number of controlling and signalling contacts.

A RBCPU 01 control unit can be widened modular with 16 adits or exits. This modular expansion can be intended for the incoming-news of the fire alarm system, for example. The exits can be used exemplary for the signalisation at lighttableaus or for the activation of LED-Tableau.

As ring-bus-field-module, also a ring-bus I/O contact-module RBFU 3.01 can be used. This field-module is used for the integration of controlling and signalling contacts and is conceived for the use in the switch-closet (norm - hat-rail). It is equipped with 8 potential-free entrance-contacts and 8 potential-free exit-contacts,that can be used for the control of the ventilation, ventilators as well as counters and callipers.

Description of function

The importance of the BUSTEC-Ringbus-Systems is in the security of the data-transmission also in the disturbance-case like for example management-interruption or management-short. This security is gained only by the cuttable ring-bus-system with integration of newest technology.

Connection modality

From the RBCPU 01 control unit the four-pole- bus-cable IY (ST) Y 2x2x0,8 - (1)5, is connected as a bus-entrance to the first field bus module. From the same field bus module the bus cable is used as bus – exit connected to the next field bus module and is used as bus – entrance there. In the same way every field bus module is added. The bus – exit of the last field bus module is connected to the RBCPU 01 control unit again so that the ring bus system is complete and can be used.

For activation of **smoke control dampers** the ringbus cable has to be executed at least in E30 (ÖNORM H6029. 400°C / 30 min of function-receipt).

Functioning

For example a short or a management-interruption in a section of the ring-bus-cable can stop data transfer over this cable-section. The RBCPU 01 control unit recognizes this mistake and switches with the help of a relay each field-module from the ringbus – cabling.

Now, the ringbus cabling is undone at each field-module through relay-contacts. Directly after the one part (or branch) of the ringbus cabling up to the field module before the cabling mistake is closed again galvanic by the RBCPU01 control unit.

Through the using of fast switch-relays in the field bus modules this process is completed in fractions of seconds until max. 2 seconds and the data-communication to each field-module is in normal function again.

The other field-modules at the other part (or branch) of the ringbus cabling become connected (fast relay-contact) galvanic by the RBCPU 01 control again.

From now, a data-communication with the RBCPU 01 control unit is resumed up to the field-module before the cabling-defect in normal function. Consequently, all field-modules are again in function like before the disturbance. The ringbus system now works on two paths or part-sections (or branches) and is also supplied from RBCPU 01 control unit by two sides.

The defective cable - section between the neighbouring field-modules is also supply-technically galvanic detached from the ring-bus-system. The corresponding fault is generated and deposed by the RCCPU 01 control unit.

At the touch screen, which is connected to the control unit, the defect cabling section is detected and visualized. This sturgeon-news has to lead to an aimed and immediate mistake-removal. After removal of this disturbance, a manual Software-Reset has to be executed.

The condition of the fire protection-tabs, fire smoke dampers as well as the ring-bus-contact-modules remain unchanged during the "switch off and connection" of the field bus modules. Even the ventilation stays in the current switch-condition, so that the operating conditions of the connected systems is not disturbed.

Construction and Topology

As in point 2.2.1 already described, the bus cable is transferred annular in the building. With the publishing of the bus cabling, the corresponding norms and rules are to be heeded. The field-modules have a bus-entrance and a bus-exit as well as the supply - tension on the spot, that can either be 230 V AC or 24 V AC,. Furthermore, essential tasks of the field bus modules are the activation of the drive motors and the processing of the end position-switch-contacts.

Recommendation for bus cable:
Type: IY (ST) Y 2x2x0,8mm² / PYCM 2x2x0,8mm²

Cable colouring:	Yellow …….	com +
	White ……..	com –
	Red …….	pow +
	Black ……..	pow-

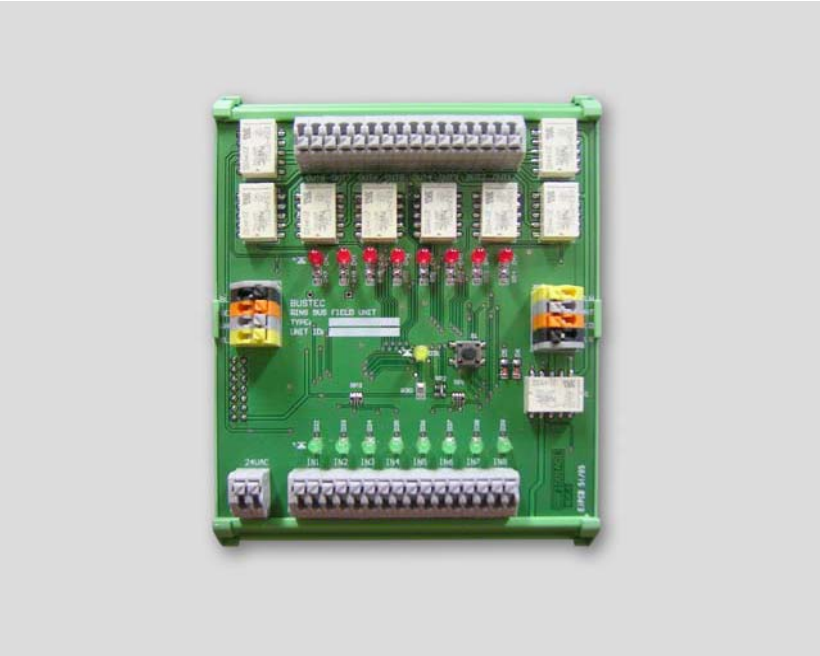
Ring-bus field-modules for tab-control and supervision

The field-module RBFU 1... and RBFU 2... have to be installed on the tab or in immediate proximity of the tab. They electrically switch the tab-drive-motors, that turn into the open- or closed-position and control with the help of the final position switch in the actuators the end position of the tabs. The terms of the drive-motors with or without feather-reverse are overseen by the field-module.

Additionally the supply-tension of the driving motors of smoke dampers is controlled permanently. At disturbance as well as deviation the above described parameters or with non-compliance the straight operation times a disturbance-news is send to the RBCPU 01 control unit.

Ring-bus field-modules for control of the ventilation and ventilators

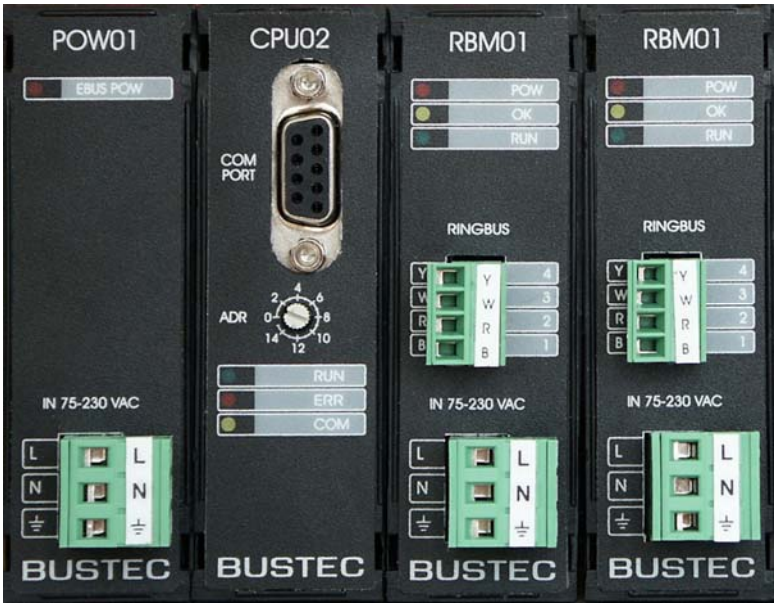
The field-modules RBFU 3.01 ring-buses - I/O contact-module are intended for the mounting in a switch-closet. The module is conceived to the montage on a 35mm norm-hat-splint and has 8 potential-free entrance-contacts as well as 8 potential-free exit-contacts. Furthermore, the field-module requires a supply-tension of 24 V dc.



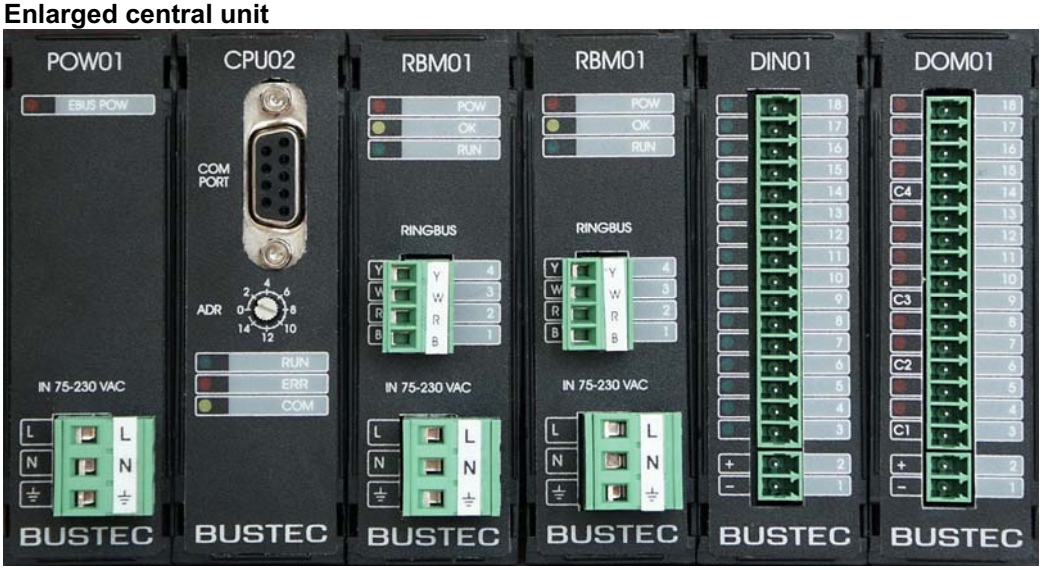
Ring-bus - central unit

The ring-bus-central unit RBCPU 01 is intended for the mounting in a switch-closet on a 35mm norm-hat-splint. The central unit consists of a tension-supply-unit, a processor with program-storage and the two ring-bus-supply-modules. According to demand, this central processing unit is expandable about a module with 16 entrances- and exit-contacts respectively.
The data-communication takes place over a RS 485 and a MOD-Bus respectively. The RBCPU 01 ring-bus-central unit has to be supplied with a tension of 230 V ac and the pre-circuit of an USV - unit is commendable.

Basic module



Enlarged central unit



3. Advantages and benefits

The BUSTEC ring-bus-system distinguishes itself through a simple construction and brings remarkable advantages of the practical use:

- Ring bus-technology with field modules that can be turned off, offers a short circuit- and interruption-safe bus cabling technology in one field level and in conclusion to this a maximum of safety.
- Reduction of the fire-load in a building through diminution of the cable-quantity. It is only one bus cable for data-traffic and one tension-supply-cable for energy supply necessary.
- Costs and place-saving, because cable routs slip away and a smaller amount of conducting and cabling is necessary.
- Connector-plug ready field modules fitting to the approved BELIMO saftey actuators with integrated thermo triggers with test buttons for service and possibility for testing locally.
- Easy implementing and parameterisation of the control centre with touchscreen or laptop.
- Flexible assignment of fire dampers, smoke dampers and controlling- or information contacts in different or changed fire compartments.
- Enlargement of the ringbus system by adding or integration further RBCPU 01 control units.
- Disposal of all operating- and disturbance notifications to DDC-systems by switch contacts
- Disposal of all operating- and disturbance notifications to DDC-systems by serial MODBUS or other interfaces like LON or EIB on enquiry.

4. Responsibility

An unambiguous demarcation of responsibility and competency is an essential factor to the trouble-free project-handling. A clear different trades involved in constructing a building brings a considerable benefit for the planner and the executing companies like manufacturers of **fire protection – and smoke extraction dampers, installation-farmers, regulation-company and electro-businesses.**

BSK producer

Delivery of proofed and certified fire and smoke protection-tabs with all built-on and cabled equipment like actuator, thermoelectric tripping device, ring bus field module and so on.

Electrical craft

Installing the voltage supply cable and the ring bus cabling as well as connecting of the voltage supply to each fire protection- and smoke dampers.

Regulation craft

Connecting the ring bus cabeling to the ring bus field modules RBFU… thru spring clips and connecting of the damper actuator thru spring clips or plug-in connection, if designed. Delivery, assembly and connecting the ring bus contact modules RBFU 3.01 in the individual switchboards. Delivery, assembly and connecting the ring bus control unit RBCPU 01.

5. Products

Product list

Ringbus - Feldmodule

RBFU 1 **für Brandschutzklappen**

RBFU 1. 01 **Ringbus - Feldmodul**
für Belimo Brandschutzklappen-Antriebe
1 Federrücklaufantrieb BF24 T/BLF24 T mit freien Kabelenden
Versorgungsspannung 230 V AC

RBFU 1. 01 ST **Ringbus - Feldmodul**
für Belimo Brandschutzklappen-Antriebe
1 Federrücklaufantrieb BF24-T-ST/BLF24-T-ST mit Steckeranschluss
Versorgungsspannung 230 V AC

RBFU 1. 02 **Ringbus - Feldmodul**
für Belimo Brandschutzklappen-Antriebe
1 Federrücklaufantrieb BF230-T/BLF230-T mit freien Kabelenden
Versorgungsspannung 230 V AC

RBFU 1. 03 **Ringbus - Feldmodul**
für Belimo Brandschutzklappen-Antriebe
2 Federrücklaufantriebe BF230-T/BLF230-T mit freien Kabelenden
Versorgungsspannung 230 V AC

RBFU 1. 04 **Ringbus - Feldmodul**
für mechanische Brandschutzklappen
2 Endschalter mit freien Kabelenden
Versorgungsspannung 230 V AC

RBFU 2 für Entrauchungsklappen (Brandrauchsteuerklappen)

RBFU 2. 01 **Ringbus - Feldmodul**
für Belimo Entrauchungsklappen-Antriebe
1 Entrauchungsmotor BE24 mit freien Kabelenden
Versorgungsspannung 230 V AC

RBFU 2. 01 ST **Ringbus - Feldmodul**
für Belimo Entrauchungsklappen-Antriebe
1 Entrauchungsmotor BE24-ST mit Steckeranschluss
Versorgungsspannung 230 V AC

RBFU 2. 02 **Ringbus - Feldmodul**
für Belimo Entrauchungsklappen-Antriebe
1 Entrauchungsmotor BE230 mit freien Kabelenden
Versorgungsspannung 230 V AC

RBFU 2. 03 **Ringbus - Feldmodul**
für Belimo Entrauchungsklappen-Antriebe
1 Entrauchungsmotor BR24 mit freien Kabelenden
Versorgungsspannung 230 V AC

RBFU 2. 03 ST **Ringbus - Feldmodul**
für Belimo Entrauchungsklappen-Antriebe
1 Entrauchungsmotor BR24-F-ST mit Steckeranschluss
Versorgungsspannung 230 V AC

RBFU 2. 04 **Ringbus - Feldmodul**
für Belimo Entrauchungsklappen-Antriebe
1 Entrauchungsmotor BR230 mit freien Kabelenden
Versorgungsspannung 230 V AC

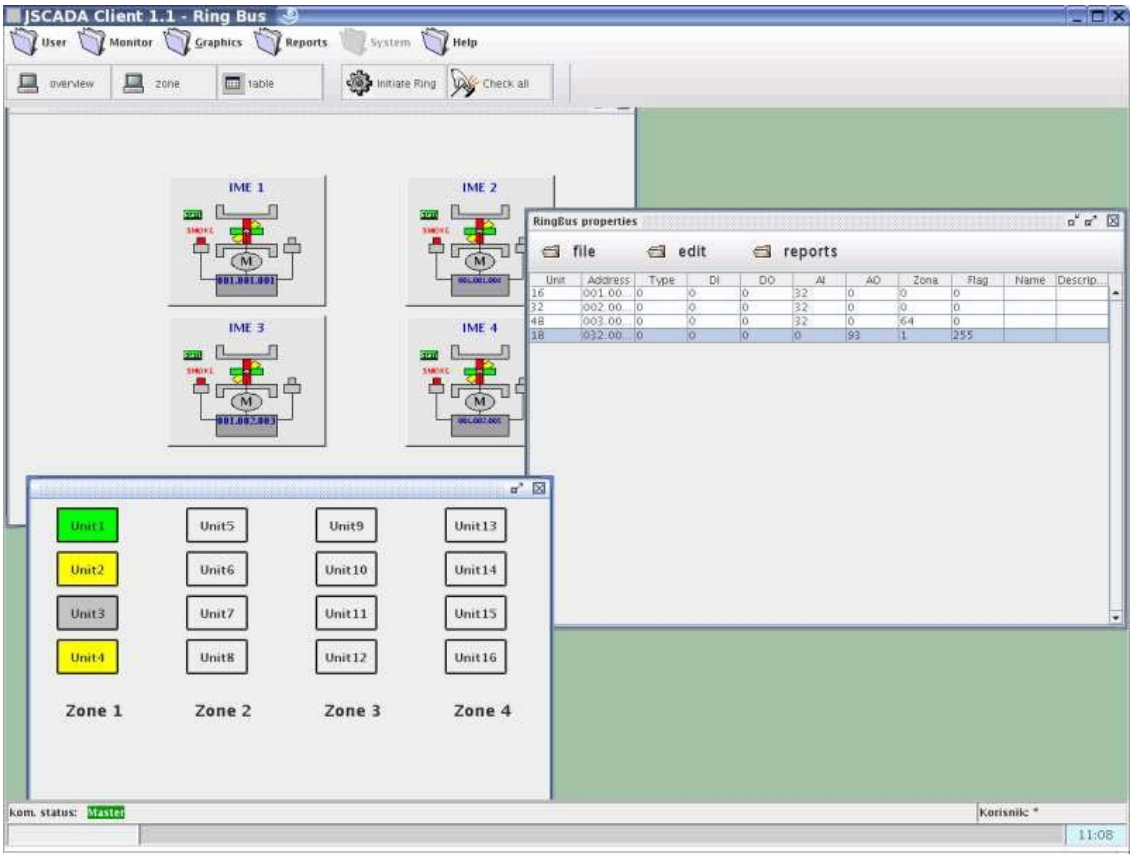
RBFU 3 für Eingangs- u. Ausgangskontakte

RBFU 3. 01 **Ringbus - I/O Kontaktmodul**
für 8 potentialfreie Eingangskontakte und
für 8 potentialfreie Ausgangskontakte Klemmenanschluss
Versorgungsspannung 24 V AC / DC für 35 mm DIN - Hutschiene

Ringbus - Zentreileinheit

RBCPU 1	**Steuerzentrale**	
RBCPU 1. 01	**Ringbus - Zentraleinheit**	
	Feldbuskontroller CPU-2000	Klemmenanschluss
	Versorgungsspannung 230 V AC	für 35 mm DIN - Hutschiene
RBCPU 1. 02	**CPU-IN-Modul**	
	16 Meldekontakte IN	passend zu Feldbuskontroller CPU-2000
	Eingangsmeldungen	Klemmenanschluss
		für 35 mm DIN - Hutschiene
RBCPU 1. 03	**CPU-OUT-Modul**	
	16 Signalkontakte OUT	passend zu Feldbuskontroller CPU-2000
	LED - Ausgänge	Klemmenanschluss
		für 35 mm DIN – Hutschiene

RBDIS		Anzeigesystem
RBDIS 1.	**01**	**Touch Screen**
		Versorgungsspannung 230 V AC



Wiring diagram

attachement !

Standard Program - Description

Standard-program fiel bus modules for fire protection-tabs

- Supply voltage ON (230 V ac od. 24 V ac)
  - motor begins to run in ON direction
  - LED blinks green until endposition is reached (motor runs in OPEN position)
  - motorcontact OPEN is reached
  - blinking green LED changes to continuouse light
  - information DAMPER OPEN is deposed

- Control of operating time
  - time measurement starts together with motor START (CLOSED to the CLOSE direction)
  - motor operating time of 140 sec is included
  - if the effective motor operating time is major than 195 sec information RUNTIME – EXCEEDING is deposed – LED blinks orange.
  - if the damper doesn´t reach the CLOSED – position, an alert DAMPER NOT CLOSED is deposed
  - LED red blinking is alternately flashing to LED orange blinking

- Damper (motor) in OPEN position (normal operating)
  - constantly LED green blinking

- Channel temperature increases to 72 °C – temperaturesafety BAE 72 responses
  - power supply to the motor is broken
  - clip actuation runs to the CLOSED – direction and closes the damper
  - constantly green LED expire
  - red blinking LED
  - CLOSED – postion reached
  - constant red LED blinking changes into continuous light
  - information DAMPER CLOSED is deposed

Standardprogram field bus modules for SMOKE EXTRACTION DAMPERS

- Supply voltage ON (230 V ac od. 24 V ac)
  - motor starts running the direction which the last switching command was given
  - LED blinking green until END position is reached (motor runs in open position)
  - LED green continuous light implies actuator has reached OPEN position – safety position OPEN
  - information DAMPER OPEN is deposed
  - switching command is set for closing
  - LED blinking red until end position is reached (motor runs in OPEN position)
  - constant red LED blinking changes into continuouse red light
  - information DAMPER CLOSED is deposed

- locally voltage control

- LED s expire
- alert VOLTAGE SUPPLY MISSING FEHLT is deposed

- control of operating time and final position
  - time measurement starts when motor STARTs – CLOSED or OPEN direction
  - motor operating time under 60 sec for BE... or 30 sec for BR... actuators is included
  - if the effective motor operating time is major than 195 sec information RUNTIME – EXCEEDING is deposed – LED blinks orange.
  - If the damper doesn´t reach the endposition CLOSED or OPEN, there is also given the alert DAMPER NOT CLOSED/OPEN and showen by an orange blinking LED
  - LED red blinking (motor runs in closed position) – alternating with orange blinking LED