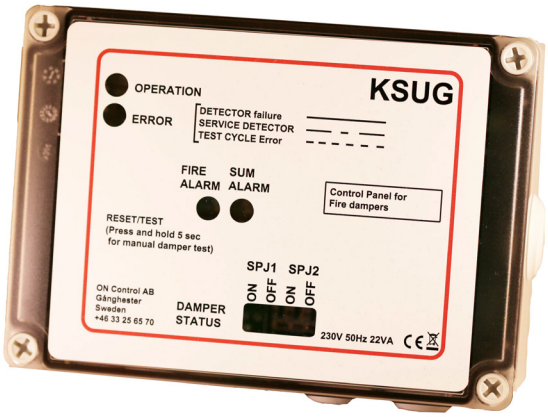
KSUG

CONTROL AND MONITORING UNIT

Valid from week of manufacture 2014.50
and software version 1.0.



Description

The KSUG is a control and monitoring unit designed to control various types of fire/smoke dampers and fans in a flexible way. The KSUG can be connected to the KSUA, or as a completely stand-alone unit. There are damper connections and two smoke detector connections. These units can be grouped in 1 or 2 fire zones. Each damper and detector can be monitored individually. A ventilation system can be connected to the KSUG for locking. The KSUG has an input for an external fire alarm and for night mode. The KSUG can be switched for three actuator types. RF technologies MANF VD24, VM24 and Belimo BSIA24 with BR24-F-ST.

General

- Slave unit for KSUA.
- RF technologies MANF VD24 or MANF VM24 actuator.
- Belimo BR24-F-ST actuator with BSIA24.
- Can be used as a stand-alone unit.
- Two dampers.
- Two detector inputs.
- Built-in locking of fans.
- 48-hour clock for damper exercises
- External input for central fire alarm system.
- Night mode input.
- Damper position indication.
- Integrated transformer.
- Many selectable options.
- Jackable terminals.

Maximum configuration

The KSUG can handle two dampers and two detector groups. 5 smoke detectors on each input. These smoke detector groups and fire dampers can then be grouped into a maximum of two fire zones. One output for fan control.

Installation

Designed for wall installation.

Power supply

230 VAC 50 Hz 30VA. Protected with 2 A at least.

Protection class

IP66.

Ambient temperature

Max +30°C, min 0°C.

Weight

1.5 kg

Outputs

- Sum alarm. Voltage-free changeover contact 5A max 250V. Terminal numbers 10,11,12.
- Triggered smoke detector, shared by all fire zones. Voltage-free changeover contact 5A max 250V. Terminal numbers 7,8,9.
- FAN 1. Voltage-free changeover contact max 5A / 250V. Terminal numbers 13,14,15.
- Damper 1.
- Damper 2.

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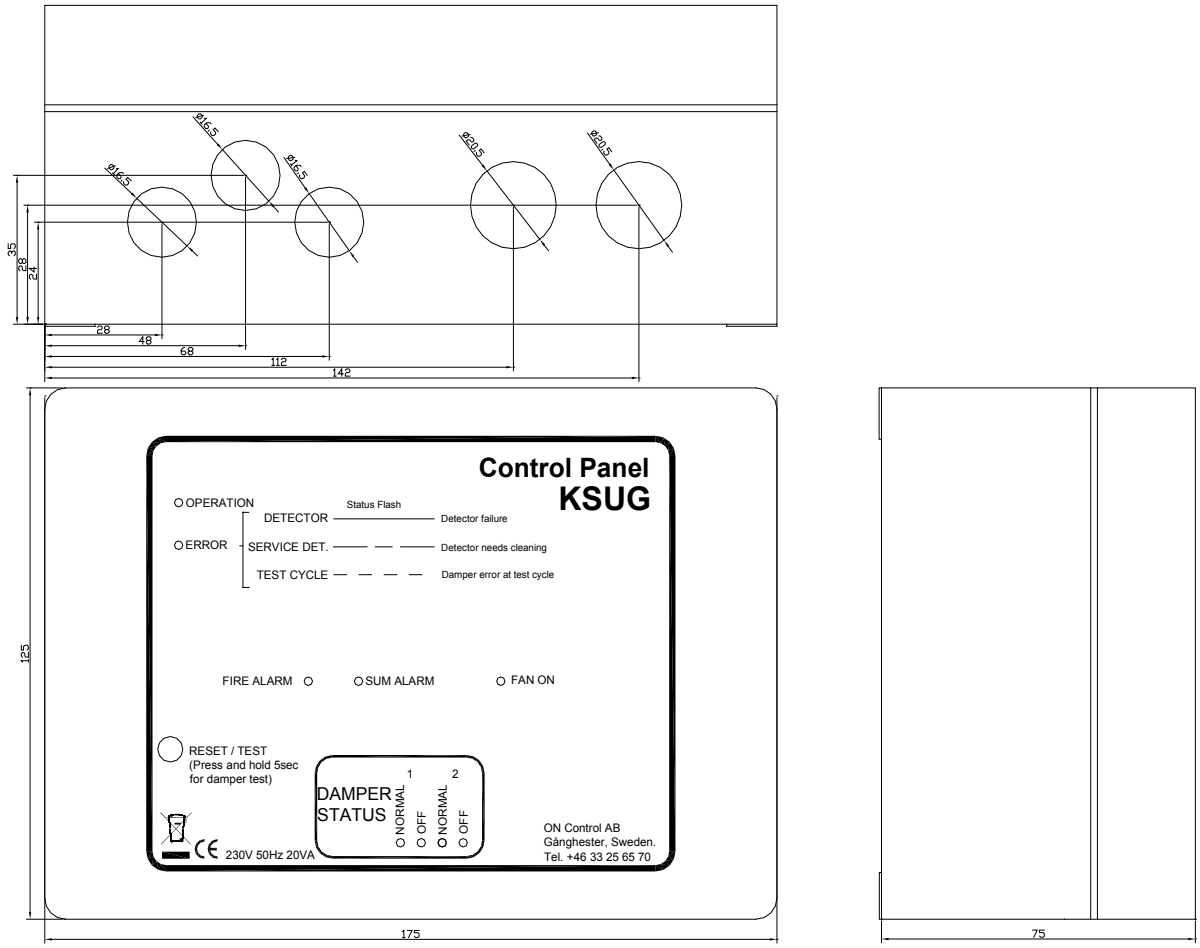
Inputs

- Bus for KSUA master unit (RS485).
- Terminals 1,2. Switchable between External control unit and Night mode. For example, opening the circuit has the same effect as a triggered smoke detector (Both groups affected).
- Detector 1. Terminals 3,4
- Detector 2. Terminals 5,6
- Input for 230V 50Hz

Dimensions



Definitions

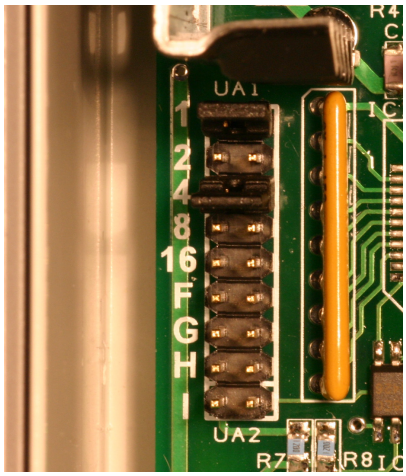
- ***Ventilation dampers***
  Dampers that are closed by a spring.
- ***Evacuation dampers***
  Dampers that are opened by a spring.
- ***Day mode***
  Ventilation dampers open and evacuation dampers closed.
- ***Night mode***
  All damper types are closed.
- ***Forced opening***
  All dampers are open.

Description of the KSUG in a network

(Jumper H must be OFF)
The KSUG will only work in a network if the KSUA has been correctly installed. To communicate, the KSUA and KSUG use a communication protocol which, at level 1, is based on RS485. The physical connections are two-wire links which must also have a ground. In other words, the units must be linked with three wires. Experience shows that the system often works with just two wires, An example of a widely used cable type is FKAR-PG 2*0.5. This is a 2-wire cable with screen. The screen is used as the ground and should ONLY

be connected to the internal terminals. If a number of slave units are connected to the KSUA, the first and last units must be terminated by closing jumper I in the KSUG or jumper PL2 in the KSUA. Sometimes, the KSUA is between other units, and in this case both the terminations are in KSUGs. Note that there cannot be more than two terminations in the whole network. The maximum line length is 1200m without repeater.

Addressing



Jumper settings for address 5.

A KSUG will only work in the network if an address is defined. The jumpers numbered 1,2,4,8 and 16 are used to configure the address. For example to use address 15, close jumpers 1,2,4 and 8 (1+2+4+8=15). You cannot use the same address for two units within the same network. The addresses go from 0 to 31. To set address 0, leave all jumper 1,2,4,8 and 16 empty. Dampers and detectors are counted from address 0 upwards. For example address 0 DMP1+2. Address 1 DMP3+4. Address 3 SPJ5+6 etc. (two dampers per address)

Description of jumpers in network mode.

Jumper	On	Off
1,2,4,8,16	Address configuration	
F	BSIA BR24-F-ST	RFT MANF VD24
G	RFT MANF VM24	Controlled by jumper F
H	Stand-alone mode	Network mode

Choice of damper actuator.

Jumper F and G selects the actuator type to be used. If jumper F is ON, Belimo BSIA24 and BR24-F-ST. If jumper G is on RFT MANF VM24 type is selected. If both jumper F and G is off RFT MANF VD24 is selected.

Smoke detectors

The smoke detectors are connected to the KSUG and are then operated by the KSUA as detector groups, which in turn control the dampers. The EXT input is logically connected to detector input 1. This means the EXT input can be used for a heat detector, for example, or an external central fire alarm system that can be configured to be part of a detector group.
When you perform a reset on the KSUA all detectors are opened for 5 seconds to reset them.

Malfunctions

If a communication error occurs, the KSUG will take over and close the dampers after 15 seconds.
Other errors are forwarded to the KSUA for central processing.

LEDs

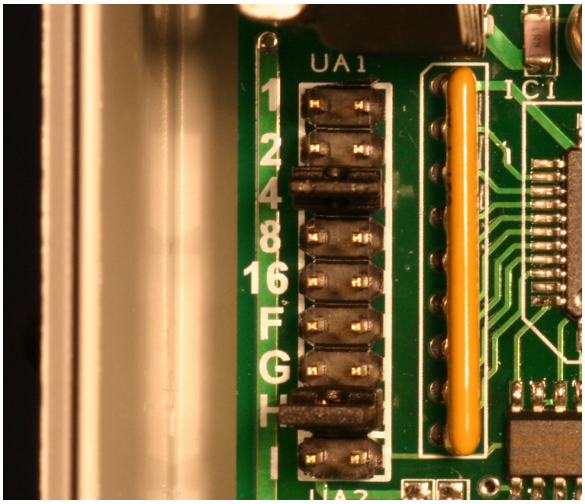
Every time a correct message is received, the Operation LED switches on or off in order to indicate that communication with the master is working correctly. The Error LED lights up if communication stops. Other LEDs work in the same way as in stand-alone mode.

Buttons

No function in network mode.

Stand-alone mode

(Jumper H must be ON)



Jumpers H and 4 are ON (stand-alone mode,RFT MANF VD24 actuator with only damper 1 in use)

Priority handling
If an alarm (triggered detector or external fire alarm) is received during the function test, the test is ended and the unit immediately switches to alarm state.

Function test
The function test is carried out 10 hours after power is connected to the KSUG, and then every 48 hours. This means you can run the function test at night without having to switch on the unit overnight. In night mode, the function test can be run without special programming. The KSUG detects the damper positions and carries out the function test to the other position.

Manual function test
To carry out a manual function test, hold down the reset button for longer than five seconds. After five seconds, the Operation and Alarm LEDs stop alternating. The test starts when you release the button.

Fan control
Intelligent and integrated fan control is provided. There are various options for the fan control output. If the ventilation system is connected, the fan receives the stop signal as soon as smoke is detected. For controlled, non-acute operation, for example in a function test, the fan is given 30 seconds to reduce its speed before any damper is closed.
Various jumper settings can be used to prevent fan locking.

Jumper	On	Off
2	Do not stop in night mode	Stop in night mode
16	Do not stop for test	Stop for test
F	No fan delay	30 s delay

Selectable options
The table below shows the jumper settings that can adjust the function of the unit. The jumper panel is on the left.

Description of jumpers

Table showing how to select options

Jumper	On	Off
1	Inputs 1-2 are night mode inputs	Inputs 1-2 are fire alarm inputs
2	Do not stop fan in night mode	Stop fan in night mode
4	SPJ2 is not in use	Both dampers active
8	RFT MANF VM24	Controlled by jumper F
16	Fan not stopped for test	Fan stopped for test
F	Belimo BSIA / BR24-F-ST	RF technologies MANF VD24
G	Automatic reset after ext. alarm	Manual reset after ext. fire alarm.
H	Stand-alone	Network mode
I	Bus terminated with 120 ohm	No bus connection

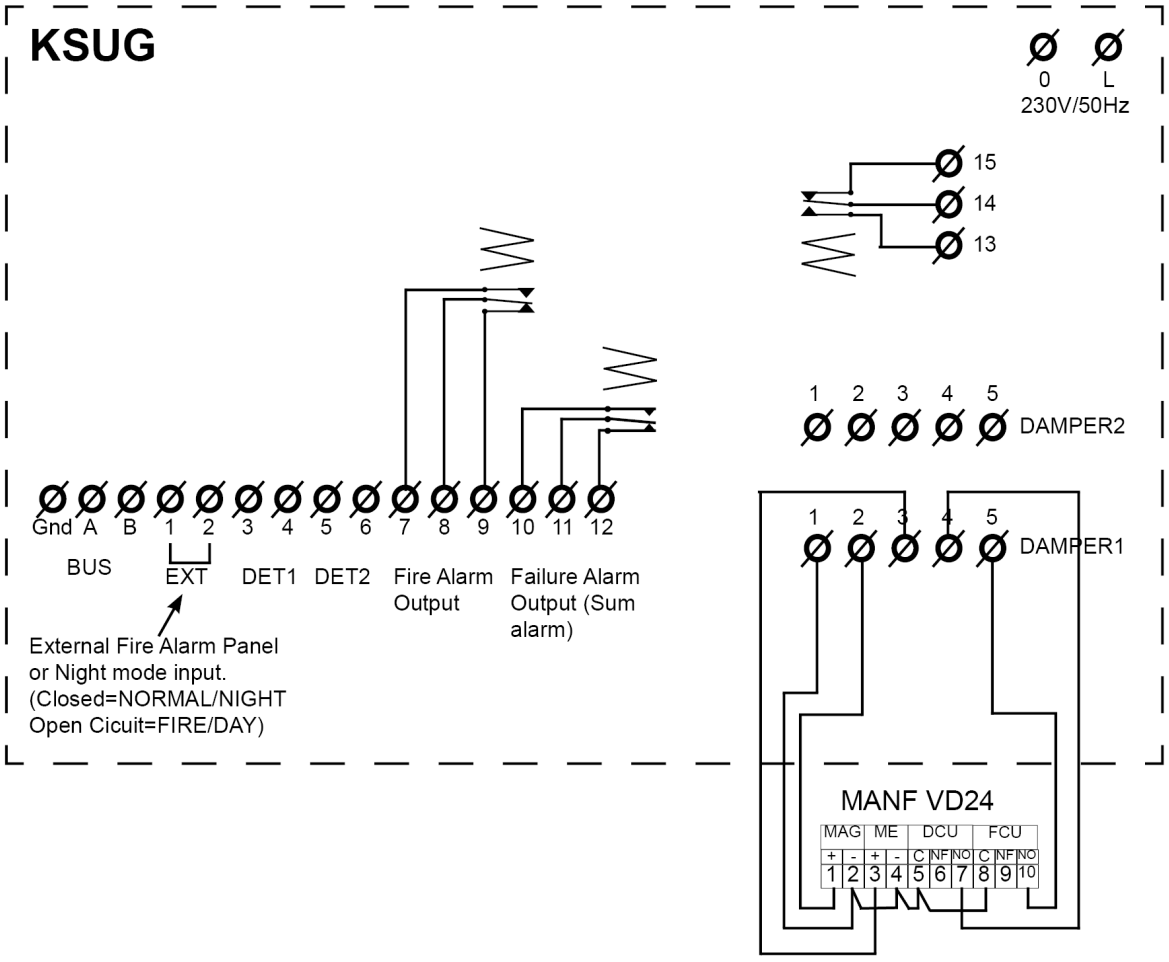
Notes
1=ON
Determines whether the EXT input is used to connect the external fire alarm system (alarm) or to close the dampers (night mode). OFF means that if the EXT input circuit is opened, the effect is the same as if a detector had triggered. This affects zones 1 and 2 simultaneously. ON means that if the EXT input circuit is opened, the system switches to night mode. (The EXT input is normally jumpered.)

8=ON
Actuator of the type RFT MANF VM24. If 8 is OFF actuator selection is done by jumper F.

16=ON
Means that the fans are not stopped for a function test. Use this setting if the unit is operating at the periphery of a ventilation system. Note that high pressure can build up in the duct system if this jumper is on, because the monitored/controlled dampers are located in the main duct.

G=ON
If an external alarm is connected to inputs 1-2, an automatic reset is possible when the alarm stops.

Connections



External units. Damper with actuator of type RF Technologies MANF VD24 or MANF VM24 is connected. DCU and FCU can in some dampers versions be switched. Is that the case terminal 4 and 5 in the KSUG must be switched. Be aware of Jumper 8,F and G for selection of actuator type in stand alone or network mode. Shown without power. 13-14 is closed when dampers are in normal position.

230V 50Hz.

Must be connected via fixed cables to a fuse of at least 2 A. The isolating switch must be positioned close to the unit. The KSUG is built with reinforced insulation, so no ground is necessary.

EXT input

The EXT input has two different applications depending on the setting of jumper 1. If the jumper is off, the input works like a triggered detector. If the jumper is on, the dampers are closed as in night mode. In both cases, EXT must be jumpered in normal operation. When the input is activated, the circuit is opened.

Relay outputs

All relays are shown in the open position. FAN is normally on. In an alarm, the sum alarm is activated and 10-11 closes for example.

Damper connection

Fire/smoke dampers are connected as shown in the diagram above.

Evacuation dampers

(Only relevant in network mode)

If evacuation dampers are used, they should be connected as usual. Evacuation dampers are then defined in the KSUA, which monitors their position. Evacuation dampers are normally closed, and are opened if there is an alarm. The damper motor closes the damper and the spring return opens it. **This is only relevant in network mode. In stand-alone mode, evacuation dampers cannot be fully operated.**

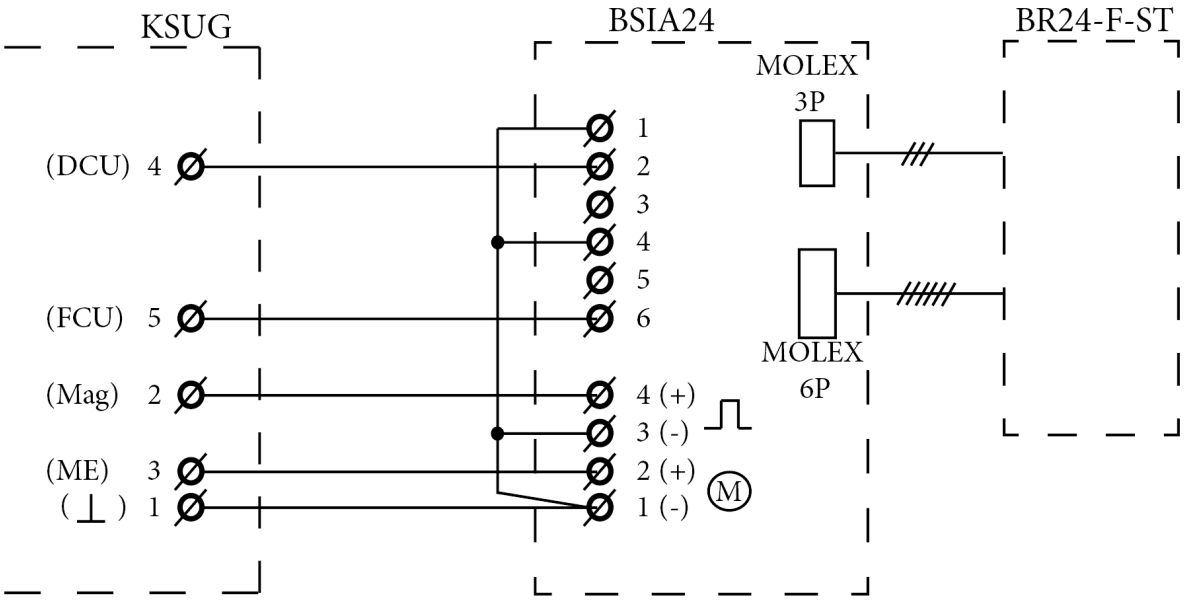


Diagram showing connection of Belimo BSIA / BR24-F-ST to KSUG. Remember that jumper F must be ON and 8 OFF in stand alone mode. In network mode jumper F must be ON and G OFF.

Smoke detector inputs

The two smoke detector inputs are designed for a loop resistance of 2200 ohm (terminating resistor). Unused detector inputs are terminated with a resistor connected directly to the terminal. 2200 ohm, power at least 0.6 W. See also the description of jumper settings.

Cable type for connections

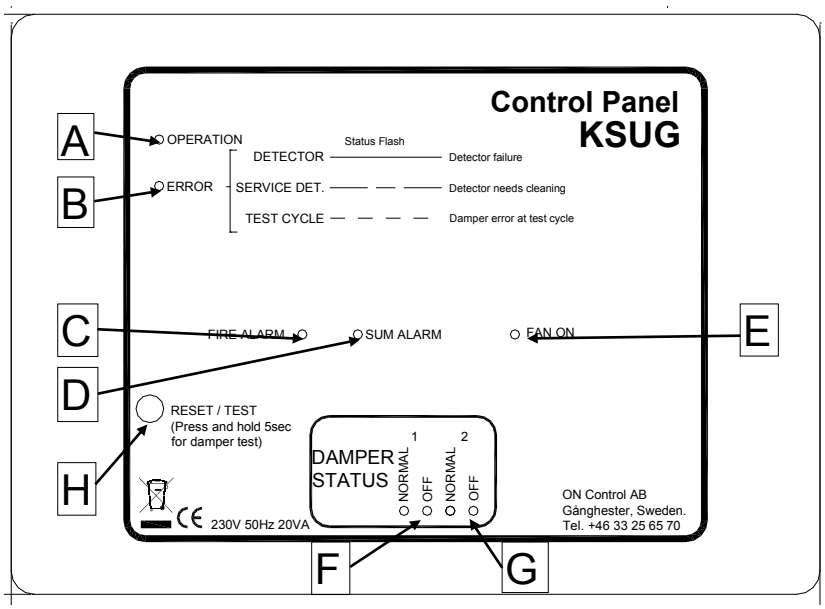
The smoke detectors are connected with twisted-pair cable separated from other parts. Telephone type cable is used, with no particular requirements in terms of area.

For example, the actuator can be connected with 5*0.5mm^2 if the distance between the actuator and the KSUG is less than 100 metres. If the distance is greater, a larger area is required.

Fuses

There is a 160 mAT fuse on the motherboard. The fuse is to the right of the mains transformer. The holder is the bayonet type. To remove the fuse, press down and turn a quarter turn anticlockwise.

Operating instructions



Indicators and buttons

A. OPERATION

Green LED showing that the unit is receiving power and indicating day/night mode. Constant = day mode. Flashing = night mode.

B. ERROR

This LED uses three different flashing sequences to indicate three different alarms.

- Constant if the detector loop is broken.
- Alternating short and long flashes to indicate a service alarm (dirty smoke detector). The indication is delayed by one hour to prevent false alarms. When the alarm is reset, the delay is deactivated to make it possible to confirm immediately that the alarm has been cleared.
- Rapid flashes if the 48-hour test fails. The following situations are tested.
  - Both dampers go to off position within the time specified for the particular actuator.
  - The actuator contacts are correctly closed with the dampers in the off position.
  - The dampers go to normal position within the time specified for the particular actuator.
  - The actuator contacts are closed with the damper in the normal position.

C. FIRE ALARM

The same LED covers both smoke detector loops. If the LED is red, a detector has been triggered. The associated relay is closed.

D. SUM ALARM

The sum alarm is indicated by the red LED and the associated relay output is closed when the following events occur:

- Smoke detector 1 or 2 triggered.
- EXT input activated. (Jumper 1=off)
- Break in any of the detector loops.
- Error during function test.
- Service alarm in any of the detector loops.
- Damper in incorrect position during normal operation.
- Connection error.

E. FAN ON

Fan control is indicated with an LED that lights up when the relay is closed.

F. RESET / Test

Button to reset the entire alarm. While the button is pressed, the detector outputs are disconnected to allow any triggered smoke detectors to be reset.

If you keep the button pressed for at least 5 seconds, the function test starts when you release the button. After five seconds, the Operation and Alarm LEDs stop alternating

and the Operation LED lights up instead. (The function test is usually initiated by the timer every 48 hours)

F and G. DAMPER STATUS

The green and red LEDs indicate the normal position/alarm position respectively for the relevant damper. The normal position is open for a ventilation damper and closed for an evacuation damper.
The dampers are numbered 1 and 2.

Troubleshooting

*The "**ERROR**" LED lights or flashes.*

- Look at the pattern of flashing to identify the error.

If the LED is constantly lit, there is a break in the detector loop.
Check:

- The terminating resistor in the last detector of the loop with the problem. It should be 2200 ohm, 0.6 W.
- If the input is not used, a resistor of 2200 ohm must be installed to replace the detectors.
- Break in cable
- Loose contact in the detector bases.
- Check the connections to the detectors.
- Polarity!

Alternating short and long flashes to indicate a service alarm (dirty smoke detector).
Check:

- For dirt on one or more detectors. Indicated by a yellow LED on the affected detector if the detector has a service alarm function. Vacuum-clean or, in the worst case, replace the detector head.

Rapid flashes if the 48-hour test fails.
Check:

- That the right number of dampers are connected for the selected mode. If only one damper is used, it must be connected to DMP1 and jumper 4=ON
- That the dampers open and that the green LED is normal.
- Carry out a manual function test and check that the dampers operate within 2 seconds if the MANF-VD24 is used. The red LED lights up. The dampers must then return to the normal position within 200 seconds and the green LED lights up.
- That the dampers are correctly connected. Correct actuator type is selected. Pay particular attention to the connection to terminal 1.

*The "**FIRE ALARM**" LED lights up.*
Check:

- That the EXT input is jumpered or closed by an external control unit.
- For a short-circuit in one of the detector loops.
- An alarm from a detector is indicated with an LED on the detector.

*The "**SUM ALARM**" LED lights up.*
Check:

- For other alarms indicated by the LEDs.
- That no damper has operated incorrectly.
- That the dampers are correctly connected.

The dampers do not open.
Check:

- That there are no other alarms on the front panel.
- That the damper motor is connected correctly.

A manual reset is required after an automatic function test.
The "fan lock" output has probably been connected to the wrong input in the ventilation system, which has locked itself as a result.

A manual reset is required after night mode.
Requires a night mode signal from ventilation system to the KSUG.
Locking may occur if night mode is indicated by the KSUG, which then sends a stop signal to the system via the fan lock. This locking may be bypassed by setting jumper 2. The fans are still locked if a smoke detector is triggered and during the function test.

Disposal of waste electrical and electronic equipment (applies to the EU and other European countries with a dedicated collection system)

If this symbol appears on the product or its packaging, the product must not be treated as household waste. Instead, it must be sent to a collection point that recycles electrical and electronic equipment. By making sure this product is correctly processed, you will help to prevent the negative impact on the environment and on human health that could result from inappropriate waste handling. Recycling helps to conserve natural resources. To find out more about recycling this product you can contact your local authority, your cleaning contractor or the dealer you purchased the product from.