

Operating and installation instructions

Multi-functional Device
Gas Shortage Alarm and Magnetic Valve Control

SK05MV04

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1 Description

The SK05MV04 monitors up to five pressure gauges (mechanical or inductive contact) for gas shortage alarm and controls and monitors up to four 230V_{AC} magnetic valves. The pressure gauges and magnetic valves are functionally independent.

If no gas interruption occurs, the contacts of the active pressure gauges must be closed. If one or more contacts open due to gas interruption, the device reports it acoustically and optically through an internal piezo buzzer and red blinking LEDs assigned to the manometers.

The magnetic valves are monitored for line and coil malfunction. They are protected in the device with replaceable wire fuses. The magnetic valves are switched ON and OFF through a Key Switch on the device. There is an input to connect an "Emergency Stop" switch to perform emergency shutdown of the magnetic valves.

Magnetic valve malfunctions or emergency shutdown are also reported acoustically and optically respectively with an internal Piezo Buzzer and green blinking LEDs assigned to the valves.

After a Main Voltage Down or an Emergency Shutdown, the controller stops the supply voltage for the magnetic valves avoiding them to automatically switch ON again. The valves may only switch ON again by turning the key switch OFF and back to ON. This also applies in Starting UP with the Key switched ON.

The magnetic valve fault and gas interruption signals can drive a local Alarm/Horn or be forwarded to a higher-level control system through the two potential-free contact relays "Fault" and "New fault".

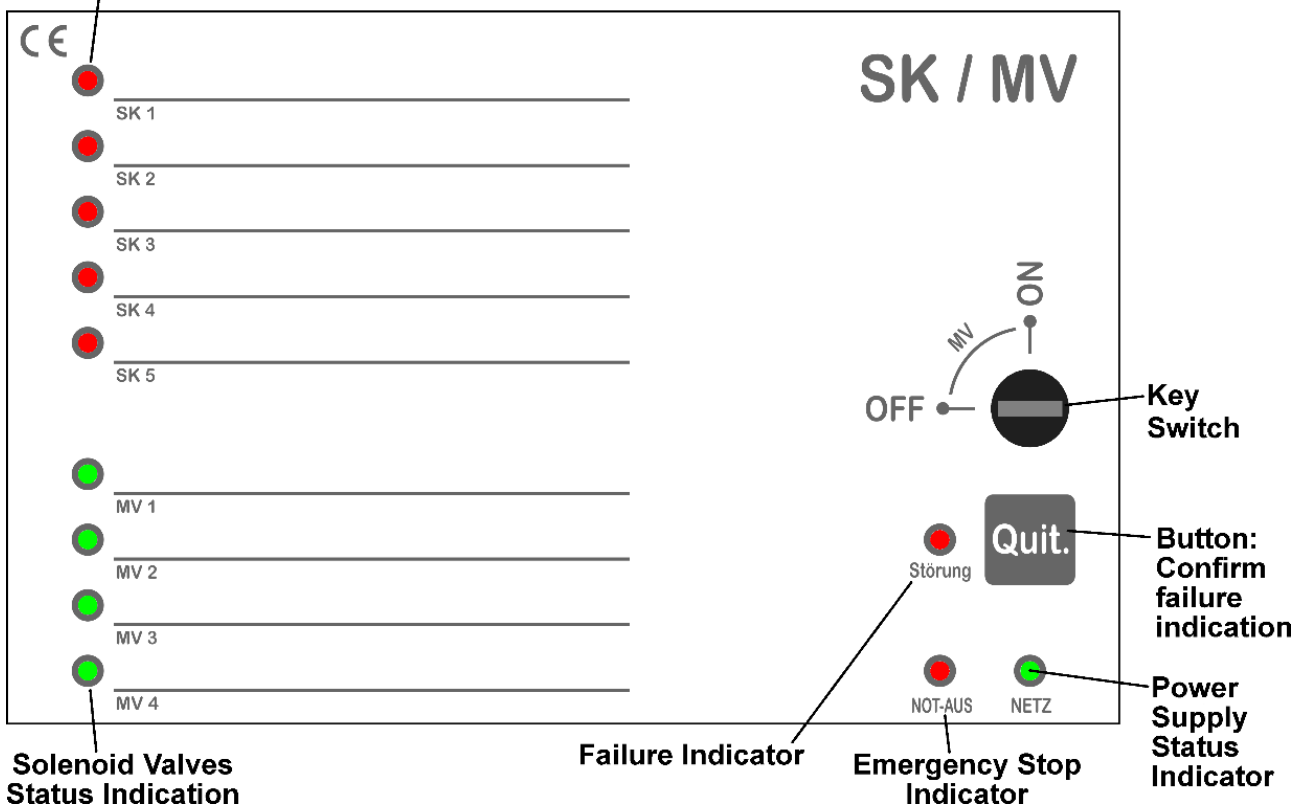
Any time a new fault indication (acoustically, channel red blinking LEDs and the "New Fault" relay) can be deactivated by pressing the built-in acknowledgment button "Quit". When no fault happens, the LED and relay "Fault" also stop reporting.

There is a potential-free contact relay to report an "Emergency Stop" situation to act over the magnetic valves. The associated acoustic alarm can be stopped by pressing the "Quit" button.

Obs.: "Fault", "New Fault" and "Emergency Stop" messages are active by relays turned OFF.

2 Frontal View of SK05MV04

Gas Shortage Indication



3 Functions

Normal Conditions

- The contacts of all connected manometers are closed.
- The green LED (Power) lights up indicating correct supply voltage.
- All channels red LEDs are OFF.
- All active channels green LEDs are ON.
- The key switch stay at ON position.
- The messages "Fault", "New fault" and "Emergency Stop" are not active. The associated relays are switched ON (S and NO contacts closed).

Gas Interruption

Gas fault is detected when the contact of the corresponding manometer opens (New Fault).

- The "Fault" channel red LED blinks.
- The "Fault" red LED blinks.
- The "Fault" and "New fault" relays turn OFF (S and NC contacts closed).
- The internal buzzer rings.

The gas fault alarm is acknowledged by pressing the "QUIT" button:

- The channel red LED stays always ON.
- The "New fault" relay turns ON (S and NO contacts closed).
- The "Fault" relay remains turned OFF (S and NC contacts closed).
- The buzzer stops ringing.

One of several gas faults is fixed

- The corresponding channel red LED turns OFF.
- The "Fault" LED remains blinking and the associated relay stays OFF since other faults exists (S and NC contacts closed).

All gas faults are fixed

- All channels red LEDs turn OFF.
- The "Fault" LED turns OFF.
- The "Fault" and "New fault" relays switch ON (S and NO contacts closed).

Magnetic valve fails

Current interruption on active magnetic valve (due to wire/fuse/coil break) triggers a fault message.

- The green MV LED of the channel failed valve blinks.
- The "Fault" LED blinks
- The buzzer rings.
- The "Fault" and "New Fault" relays turn OFF (S and NC contacts closed).
- The "Emergency Stop" message is not affected and remains inactive. Its relay remains ON (S and NO contacts closed).

The message is recognized pushing the "QUIT" button. The buzzer then stops and the "New Fault" relay turns ON again (S and NO contacts closed).

Magnetic valve failure is fixed

- The corresponding channel MV LED turns ON.
- The "Fault" LED turns OFF.
- The "Fault" and "New fault" relays turn ON (S and NO contacts closed).
- The message "Emergency Stop" stays inactive and its relay remains switched ON (S and NO contacts closed).

Emergency shutdown when the magnetic valves are switched ON

If the "Emergency Stop" switch is actuated (Emergency Stop button locked), the operating voltage for the magnetic valves goes down and all valves switch OFF.

- The "Emergency Stop" red LED blinks.
- The "Power" green LED blinks. It signals that the key switch is still ON.

- All channels green LEDs switch OFF.
 - The Buzzer reports the emergency shutdown acoustically.
 - The "Emergency Stop" message is active and its relay is turned OFF (S and NC contacts closed).
- Pushing the "Quit" button stops the acoustic message.

Unlocking "Emergency Stop" after shutting down the magnetic valves

After unlocking the "Emergency Stop" button, the valves supply voltage is only restored by turning the "Key Switch" **OFF** and **ON** again turning the valves back to **ON**. The green LED "Power" changes to always **ON**.

Pressing "Emergency Stop" button case magnetic valves are turned OFF (key switch is OFF)

By pressed "Emergency Stop" button, no 230V_{AC} voltage is supplied to the valves. It leads to:

- The "Emergency Stop" red LED blinks.
- All green MV LEDs remain **OFF**.
- The buzzer rings.
- The "Emergency stop" message is active and its relay turns OFF (S and NC contacts closed).
- The "Fault" and "New fault" messages are not active. "Fault" LED is OFF and respective relays are turned ON (S and NO contacts closed). **Obs.: only if no manometer failure exists.**

The acoustic message can be stopped by pressing the "QUIT" button.

4 First Use

! Warning! The SK05MV04 is not suitable for installation in Explosion Zone (Ex. Zone). In this case, additional isolating amplifiers are required for the pressure gauges. The SK05MV04 itself must be installed outside the Ex Zone!

X1 – X5: Connections for the manometers.

X6 – X9: Connections for the magnetic valves.

X10: Output connection for messaging "Emergency Stop".

X11: (Fault) connection for external horn/lamp alarm or can be forwarded to a central control unit.

X12: (New Fault) connection for external horn/lamp alarm or can be forwarded to a central control unit.

X20: Supply Voltage (230V_{AC}, 50Hz) – power for the device.

X30: Emergency Stop Input – connection of emergency stop button.

- ! X30 is intended for direct connection of a **potential-free emergency stop button** and already supplies the necessary operating voltage (230V_{AC}, 50Hz).
No external voltage may be applied to it!

SK and MV channels can be activated or deactivated at any time independently of one another or the position of the key switch. To do this, proceed as follows:

1. Programming Mode Activating:

- Hold down the "QUIT" button at least 4s until hearing two short beeps from the buzzer.
- Then immediately press the button twice successively.

2. The red LED SK1 blinks every second and is selected for activation/deactivation. This can be done by pressing the "QUIT" button for approx. 1s. The pulse duration of the LED then changes:

- Long pulse → The channel is activated
- Short pulse → The channel is deactivated

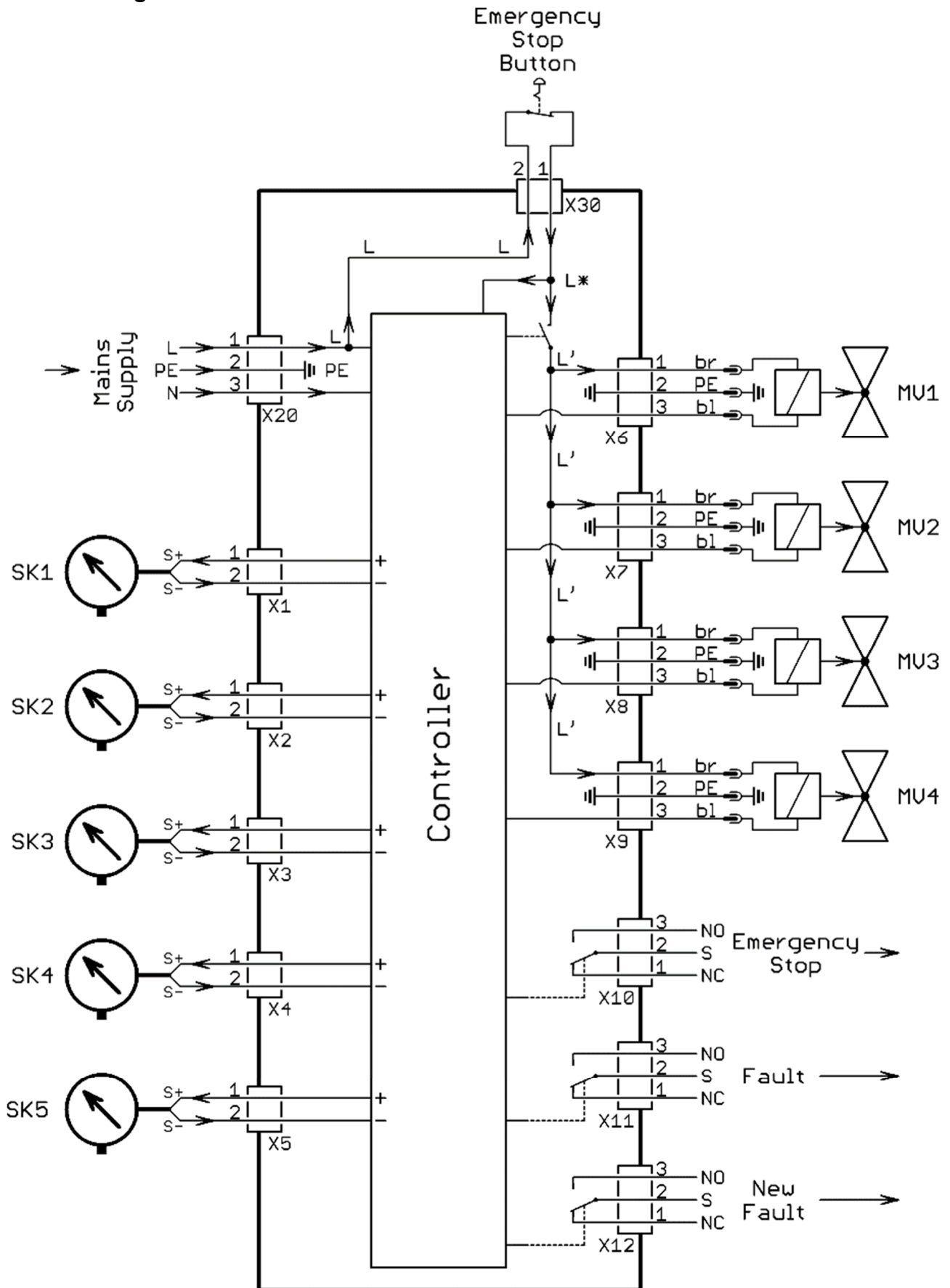
3. The next channel for configuration is selected by briefly pressing the "QUIT" button.

4. Leaving the programming mode:

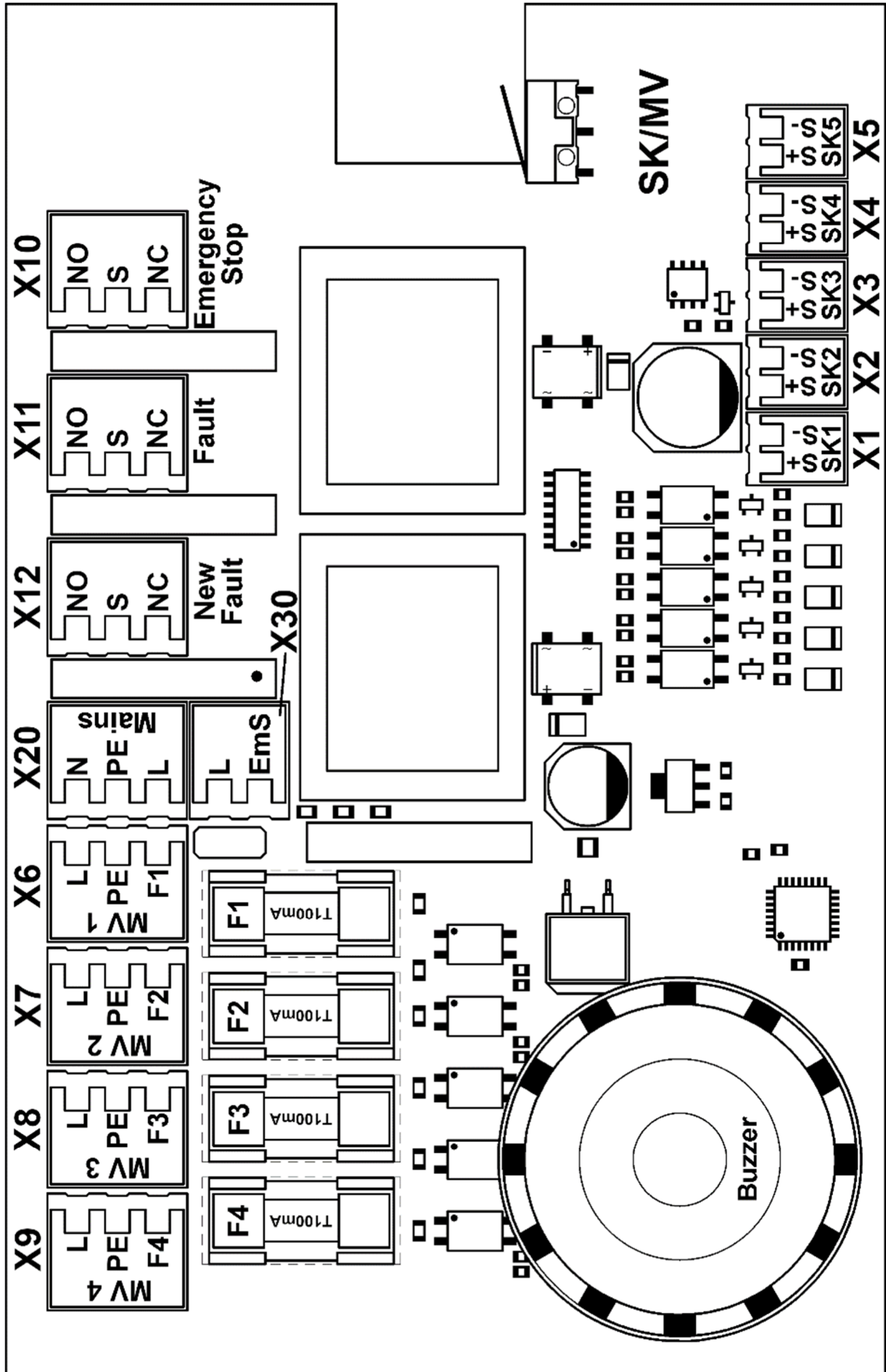
Press the "QUIT" button for approx. 4s until first a beep (at 1s) and then two short beeps (at 4s) can be heard from the buzzer. The device switches back to normal operating mode.

5 Installation

5.1 Cabling



5.2 Connection Plan



6 Technical Data

Parameter	Sym.	Conditions	min	typ	max	Unit	
Operating voltage	V _{Sup}	50/60 Hz	207	230	250	V _{AC}	
Power consumption [#]	P _V	207V _{AC} ≤ U _V ≤ 250V _{AC}			3	VA	
Manometer input		X1 – X5 Internal, non-stabilized, floating DC power supply unit for inductive gauges and gauges with mechanical contacts		10		V _{DC}	
				10		mA	
Magnetic valves	V _{MV}	X6 – X9	Supply voltage		230	V _{AC}	
	P _{MV}		Power		5	15	VA
		internal fine-wire-fuses, time delayed	T100mA 250V				
Relay-Outputs X10 Emergency Stop X11 Fault X12 New Fault		switch-over contact, potential-free, resistive load	Rated voltage	AC	230	250	V _{AC}
				DC	24	125	V _{DC}
			Rated current (externally fused)			6	A
Conductor cross section	∅	X1 – X5 Push-in Cage clamp fine stranded	without ferrule	0,2	1,5	mm ²	
				24	14	AWG	
			with insulated ferrule	0,25	0,75	mm ²	
			with uninsulated ferrule	0,25	1,5	mm ²	
	∅	X6 – X12 X20; X30 Push-in Cage clamp fine stranded	without ferrule	0,2	2,5	mm ²	
				24	12	AWG	
			with insulated ferrule	0,25	1,5	mm ²	
			with uninsulated ferrule	0,25	2,5	mm ²	
Strip length		X1 – X5	8	9	mm		
		X6 – X12; X20; X30	9	10	mm		
Ambient temperature	T _F	Operating temperature	0	+20	+55	°C	
	T _L	Storage temperature	-20		+60	°C	
Case	B	Width		200		mm	
	H	Height		120		mm	
	T	Depth		75		mm	
		Material	ABS				
		Level of protection	IP65 / DIN 40050				
		Colour	RAL 7035				
		Cable glands	8 x M16				

[#] Plus the power for the magnetic valves. The “Emergency Stop” switch must be designed accordingly!

7 Warning Notices

7.1 Danger of the Devices

This gas monitoring equipment is manufactured and tested in accordance with generally accepted technical standards of the electronics industry.

If used properly, the devices are safe to operate. The units may be operated in a perfect condition and in accordance with the instructions only. Incorrect operation or incorrect commissioning and installation results in

- user life and body hazards,
- damage of devices and other properties of the user,
- device malfunctions.

7.2 Permitted Users

All persons involved with installation, commissioning, operation, maintenance and repair of the devices must

- be qualified,
- follow the operating instructions carefully and
- observe the recognized rules for occupational safety.

The devices may be installed and put into operation by trained personnel only. Electrical work must be performed by trained VDE-compliant professional person.

Untrained personnel may work in these products under supervision of trained professionals only.

The operator's manual must be made available for the operator by the system installer.

The installer and the user have to read and understand the manual and this safety information before working with the device.

The minimum age for users is 18 years.

7.3 Intended Use

The unit of SK05MV04 is exclusively qualified for the monitoring of contact pressure gauges and solenoid valves in normal rooms without potentially explosive areas, so, it may not be installed in environment with risk of explosion.

The device SK05MV04 must be located outside of the explosion prone area!

In these risk areas, **only explosion-proof pressure gauges** with a certificate of EC approved test centers for use in Ex-rooms may be used. This certificate does not say anything about the function, but merely indicates that the gauges are explosion protected.

When using the devices, local conditions must be observed. The technical data of the corresponding environmental conditions for the operation of this equipment must be maintained.

7.4 Electrical Connections

WARNING:

Line voltage (230 V_{AC}, 50-60 Hz) can cause severe burns. Careless behavior may be dangerous.

Electrical work may be carried out by qualified person only.

The devices may be installed only with disconnected power!

The VDE regulations, accident prevention regulations and operating manuals for the devices must be always observed.

7.5 Installation

Before installation, it must be verified that all requirements for trouble-free operation are met:

- Are the SK05MV04, the contact gauges and the solenoid valves mounted correctly?
- Is the SK05MV04 accessible and visible?
- Are there required environment conditions for installation and operation?
- Are the SK05MV04, the contact gauges and the solenoid valves connected properly?
- Is the power supply corresponding to the necessary power ratings?

After installation, the proper functioning of the entire system must be reviewed.

7.6 Maintenance

The devices must be inspected regularly by qualified personnel. The inspection should be documented conclusively.