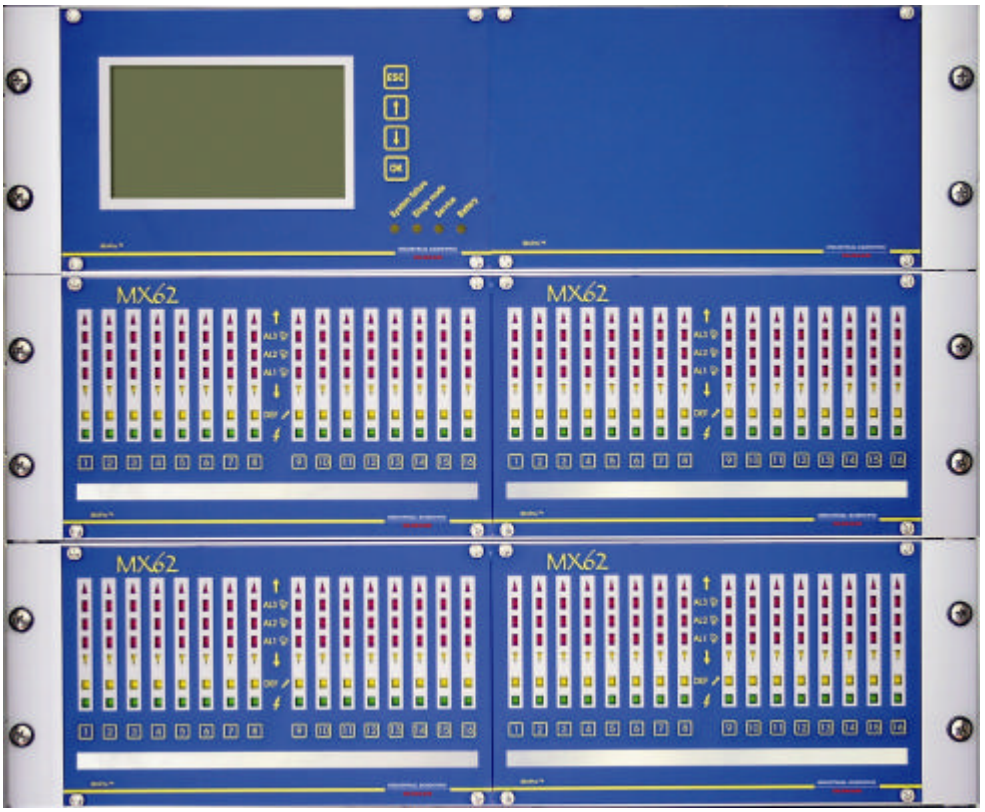
MX62

Operating Instructions
Gas Detection System



INDUSTRIAL SCIENTIFIC

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Révision : **D**

INDUSTRIAL SCIENTIFIC

GAS DETECTION

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FE BA MX62 V4.2 E 0801SE

1. The System *MX62*

MX62 is a stationary control system and evaluator to be used in combination with a variety of transmitters for continuous detection of combustible gases, toxic gases and oxygen.

Main features are high reliability as well as remarkable flexibility. This flexibility refers to all areas, such as free programmability and placing of relays and analogue outputs as well as optional installation in wall-mounted housings, 19"-racks or control panels.

Modular components allow extension of up to 64 channels, 128 relays and 64 analogue outputs as well as optional use of an LCD Module with data logger or Profibus Module, making the gas detection system suitable for all applications.

The complete system and all required modifications can be set by software *ConfigPro*®. This software is detailed separately.

2. Configuration

The system consists of a Controller Module plus various other modules linked by digital busses. The basic configuration is as follows:

- **Analogue Input Module (AEM)**
- **Controller Module (CM)**
- **LED Module**
- **LCD or Logo Module**

The Analogue Input Module converts the 4-20 mA of the transmitters into digital bus signals to be transmitted to the Controller Module where these are evaluated and then separately indicated for each channel according to the respective presetting. One Analogue Input and one LED Module are provided for eight channels each. The Controller Module can directly be employed for 64 channels.

In addition, further modules can be integrated into the system as required:

- **Basic Relay Module (RBM)**
- **Extension Relay Module (REM)**
- **Analogue Output Module (AAM)**
- **Loop Module (LOOPM)**
- **LCD Data Logger Module**
- **Profibus Module**
- **Analogue Input Extension Module (AEAM)**

Each Basic Relay Module provides eight relays to be freely allocated. The Extension Relay Module allows an addition of eight relays with a minimum of space. The Analogue Output Module is available for either 4-20 mA or 0-10 V. Furthermore, all measured values and information can be displayed with the LCD Module and stored by a data logger.

2.1. Description of Modules

2.1.1. Controller Module (CM)

The Controller Module is the central control unit of the system for all 64 channels of maximum configuration. Two synchronously working 16-bit micro controllers redundantly process the measured values of the Analogue Input Modules. Via a redundant bus, the status of the relays and the analogue output signals are transmitted to the Relay and Analogue Output Modules respectively. Another bus transmits the measured values to the LCD and LED Module. For safety control, the Controller Module also contains relays to signal system errors, emergency operation and maintenance mode.

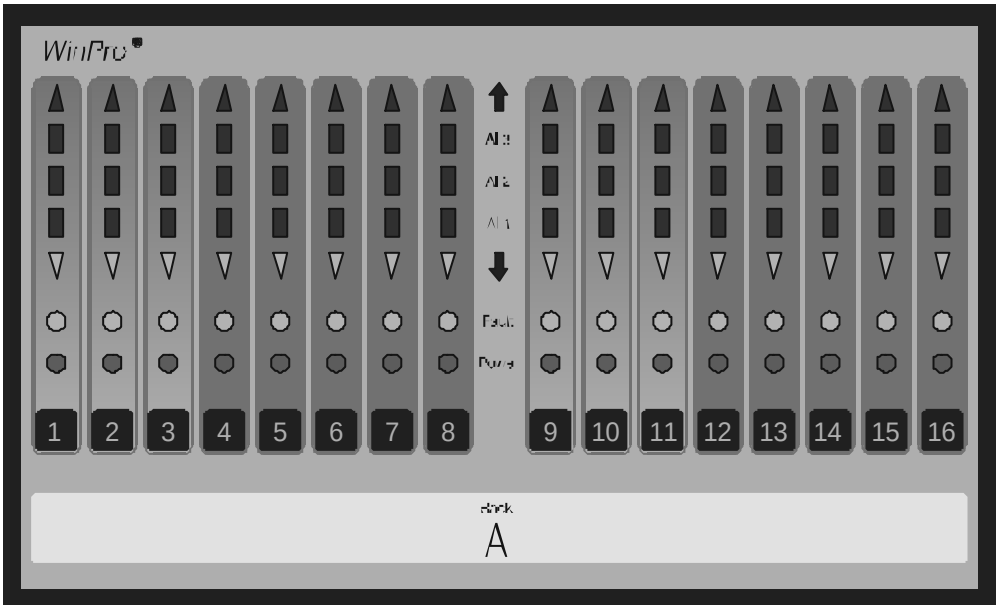
By means of an RS232 interface, the entire system can be configured and all data can be visualized on a PC. A Centronics interface is available for connection of a printer.

2.1.2. Analogue Input Module (AEM)

The transmitters are connected to the Analogue Input Modules. Each module accommodates up to any eight transmitters of 4-20 mA and provides an additional RS485 interface per channel. By this interface, communication can be established during maintenance between a PC, connected to the Controller Module, and the respective transmitter. Up to eight Analogue Input Modules can be connected to the Controller Module. An address between 1 and 8 is allocated to each module by rotary switch.

2.1.3. LED Module

The status of each channel is indicated by LEDs (One transmitter can be connected to any channel). Operation of the keys for the respective channels displays additional information about the relevant transmitters on the LCD Module and triggers further channel functions such as alarm suspension, operational test, channel disconnection and calibration mode. The LED Module consists of an LED panel for 16 channels and one or two PCBs for eight channels each.



2.1.4. Basic Relay Module (RBM) and Extension Relay Module (REM)

A Basic Relay Module has eight relays and can be extended by eight relays with a pluggable Extension Relay Module.

Redundant triggering of the relays is done via two 8-bit micro controllers. Free parameter setting of the relays with the help of software *ConfigPro*® meets all individual requirements:

- AND/OR Logic Operation
- Open and Closed Circuit Operation
- Grouping
- Voting
- Time-delay and Slow Release
- Relay Function for Buzzers
- Relay Reproduction

Up to eight relay modules with a total of 128 relays can be integrated into the system. The redundant, opto-isolated RS485 bus allows spatial separation (up to 800 m) of the modules and control unit. An address between 1 and 8 is allocated to each module by rotary switch.

<u>*Open circuit:*</u>
The relays are activated as soon as the respective status is recognized, i.e. the relay inductor pick up.

<u>*Closed circuit:*</u>
The relays are activated during undisturbed operation, i.e. the relay inductor have picked up, and will be deactivated in case of alarm, i.e. the relay inductor will be released.

2.1.5. Loop Module (LOOPM)

The Loop Module for *MX62* offers the possibility to build a network of digital transmitters or to record measured values of any standard 4-20 mA transmitter by means of the Analogue Input Modules connected to a Loop Module.

The Loop Module can be employed in three different configurations:

1. As regular Loop Module with up to 16 digital transmitters (e.g. TBGW EX) linked to the closed loop (addresses 1 to 16). When using this type of configuration, no additional Analogue Input Modules (AEM) can be connected.
2. With one Analogue Input Module (AEM) and up to 8 digital transmitters linked to the loop (addresses 9 to 16).
3. With two Analogue Input Modules (AEM) for connection of up to 16 standard 4-20 mA transmitters. In this case, digital transmitters cannot be linked to the loop.

Connection of digital transmitters to the loop is realized by means of junction boxes (Item No. 81090). Junction cables must not exceed a length of 30 cm.

ATTENTION!
When connecting digital transmitters to the Loop Module, the current output (4-20 mA) inside the transmitter has to be blocked with a shunt resistance of approx. 180 ohms between ground (GND) and current output (4-20 mA).
Furthermore, the two jumpers inside the transmitter for the bus end resistance (jumpers for RS485, next to the connection for power supply) need to be removed.

2.1.6. Analogue Output Module (AAM)

The employment of up to eight AAMs with a total of 64 outputs allows transmission of transmitter signals (4-20 mA or 0-10 V). An address between 1 and 8 is allocated to each module by rotary switch.

ATTENTION!
Though the AAM has two microcontrollers, only one controller is able to transmit data to the outputs. This is generally done by controller B. Since this will block transmission of measured values by controller A, same will be considered as faulty and the LED for fault will light up in red.
Should controller B be faulty, controller A will take over transmission of measured values to the outputs. In this case, the LED of controller A will light up in green and that of controller B in red.

2.1.7. LCD Module

The system *MX62* can be equipped with a graphic LCD display (240 x 128 pixels) showing, for example, information on measuring points, all relevant system parameters as well as system events and histograms. The LCD Module is provided with an integrated data logger with a storage capacity of up to 64 MB.

2.1.8. Analogue Input Extension Module (AEAM)

The AEAM is intended for the connection of smoke detectors. It is possible to connect up to 8 smoke detectors at each AEAM. The AEAM is an extension module and has to be plugged on the AEM.

ATTENTION!
It is not allowed to connect gas detectors to the AEAM.

2.1.9. LCD Copy Module

The LCD Copy Module is a modified LCD Module. It offers the possibility to connect additional LCD displays (max. 30) to the "display bus" of the MX62 System®.

The LCD Copy Modules have to be use in principle only in combination with a standard LCD Module (Software version 2.05 and higher).

In opposition to the LCD Module it offers no data logging functionality and any interaction. In normal operation mode it displays the logo of the company and the date. The backlight is off.

Each alarm on one of the 64 channels will be displayed by the LCD Module and the LCD Copy Module(s). The backlight will be activated automatically. If there is more than one alarm at the same time, the affected channels will be displayed alternating for ten seconds.

The LCD Copy Module is subordinated to the LCD Module. During interaction with the standard LCD Module, e.g. a user wants to see information about one channel by pushing the channel button, the LCD Copy Module still shows the logo of the company, even if there is an alarm.

System messages are displayed by four LEDs.

The LCD Copy Modules are addressable (Software V 2.18 and higher). The addresses are set during production. By setting a address it is possible to display the alarms selective. Modules with the address "0" are showing all messages. The configuration of selective messages has to be done by the software *"ConfigPro"*.

2.1.10. MIMIC Module

It is possible to copy the LED Modules by using MIMIC Modules.
The MIMIC Module has to be connected to the "display bus" of the system *MX62*.

Each MIMIC Module copies exactly one LED Module. It is possible to connect a further LED Module to the MIMIC Module or to copy the primary LED Module by using the open collector outputs of the MIMIC Modules.

Note:

The MIMIC Module just shows status information of the channels. The buttons of the LED Module are deactivated.

2.2. Description of Redundancy

The redundant structure of the system *MX62* means that the complete safety functions are provided twice. From conversion of analogue signals into bus signals to evaluation in the controller module and relay connection, any single error will not lead to failure of the safety functions. In addition, the two controllers of the Controller Module continuously compare with each other. Thus, not only single-error-protection is achieved but also maximum availability.

To fulfill maximum safety criteria, the whole safety chain from transmitter to relay must be provided twice. Linking of transmitters and relays can be carried out with the software *ConfigPro*®.

2.3. Description of Control Panel

The control panel consists of at least one LED Module indicating 16 channels and one Logo Module displaying the four LEDs for status monitoring. Three further LED Modules can increase the number of channels to 64. The LED Modules are identified by letters of A to D. The channels are always numbered consecutively from 1 to 16.

Inputs			**Channel Identification**	
From	to	LED Module	from	to
1	16	A	A1	A16
17	32	B	B1	B16
33	48	C	C1	C16
49	64	D	D1	D16

The inputs can also be freely allocated to the LED Modules with the software *ConfigPro*®.

3. Operation of the System *MX62*

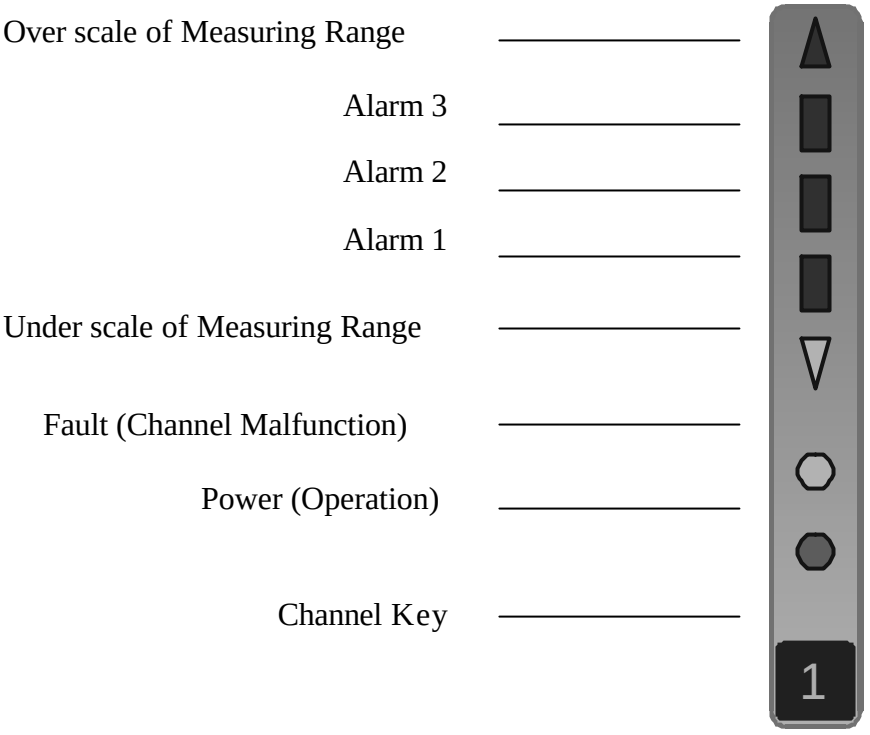
During normal operation, the control system and evaluator *MX62* continuously processes signals of the connected transmitters. Besides, *MX62* can enter into other modes for servicing or in case of malfunction. This chapter describes the various operating modes and the respective system performance.

3.1. Channel and System Information

As a standard, *MX62* provides optical LEDs for the display of channel and system information.

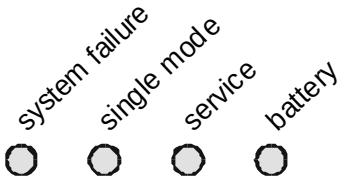
Channel information refers to the respective transmitters. The indication is done by seven LEDs for every channel on the LED Module.

LEDs for Channel Information:



The four LEDs on the Logo Module or optional LCD Module provide System Information of the System MX62 itself.

LEDs for System Information:



These blinking LEDs indicate a certain system status. For detailed description, please see:

- 3.6. “System Error”
- 3.5. “Single Mode”
- 3.4. “Maintenance Mode”

On the Controller Module a separate relay output is allocated to each of these three modes.

The blinking LED for ‘battery’ signals power failure, which provides an emergency power supply (optional).

Information of channel and system status can also be gained from the relay and analogue transmitter signals.

➲ *In the following chapters the relay modules RBM and REM are explained. Details are given assuming a 1:1 relation between signal and relay output. Please note that this relation might not be valid when using the program ConfigPro® to link several alarms or fault alarms in an installed system.*

3.1.1. ISA Procedure (slow flashing channel LEDs)

For a better differentiation between "old" and "new" channel information it is possible to activate the ISA procedure by the software *ConfigPro*. If the ISA procedure is activated, each new channel information will be shown by a slow flashing LED. After acknowledgement by the user the respective LED will light continuously or will set off (see chapter 3.2.7 "Resetting of messages").

If the ISA procedure is not activated, a new alarm or a new channel fault is leading directly to a continuous lightning of the respective LED.

Note:
In this manual the description of the status of the channel LEDs is done for the deactivated ISA procedure.

3.1.2. General buzzer relay

Beneath the three system relay outputs on the CM there is a further relay output for system information. This relay is configurable by software as follows:

- general buzzer relay:
  The relay will be activated at each new alarm. This means that each new alarm can be indicated visually or acoustically.

and/or

- warning for deactivated channels:
  If the service rotary switch on the CM is moved from position 4 (activating/deactivating channel, chapter 3.4.4) to another position and minimum one channel is still deactivated, this relay will operate and the user is informed that not all channels are activated.

Note:
The general buzzer relay will not be activated if a deactivated or an alarm suspended channel is triggered by an alarm.

3.2. Normal Operation

The system automatically enters into normal operation once power has been supplied and the system has undergone a short-term start-up mode (chapter 3.3). During normal operation, both controllers of the Controller Module carry out redundant measurement. Every channel that has been switched on will, depending on the measured value, enter into one of several possible states. The relevant green LED for 'power' on the LED Module will signal if a channel is switched on. This LED will start blinking as soon as the respective channel is shown on the LCD display.

3.2.1. Operating status

The measuring signal is within the measuring range and the preset alarm levels.

Display:	
LED Module:	-
System:	-
RBM/REM:	-
AAM:	4-20 mA / 0-10 V according to the gas concentration calculated by *MX62*
LCD Module:	operating status (see chapter 4)
Printer:	-

3.2.2. Alarms

The system *MX62* has three free adjustable alarm levels within the measuring range of 4-20 mA. The software *ConfigPro*® allows, for example, adjusting of alarm levels, latching of alarms or setting of alarm thresholds for mean values within a specified time. Furthermore, alarms can be triggered in case of over- or under run of alarm levels.

For numerous target gases and measuring profiles, *Industrial Scientific*- provides standard presettings with *ConfigPro*®.

Display:	
LED Module:	red LED(s) for 'alarm'
System:	-
RBM/REM:	Alarm 1, 2 and/or 3
AAM:	4-20 mA / 0-10 V depending on the gas concentration calculated by *MX62*
LCD Module:	Alarm 1, 2 and/or 3
Printer:	A1, A2 and/or A3

3.2.3. Channel Malfunction

In case of channel malfunction, the measuring signal has either fallen below 2 mA or exceeded 24.5 mA. Channel malfunction could, for example, mean interruption or short circuit of the signaling line. The transmitter may also be defective.

It is also possible that communication with Analogue Input Modules or Loop Modules is interrupted. In this case, all channels go into the fault mode.
This signal is not latching (see 3.7 "Measures against Faults").

Display:

LED Module:	yellow LED for 'fault'
System:	-
RBM/REM:	fault
AAM:	current output of transmitter (voltage output: 0 or 10 V) or, in case of communication error, 0 mA or 0 V
LCD Module:	display signal for over- or under run (see 3.2.4 and 3.2.6) message: fault and, if non-latching for overrun, short circuit
Printer:	FLT

ATTENTION!
The gas detection system *MX62* differentiates the faults of a specific channel from those of the complete system (chapter 3.6). If channel malfunctions have to trigger an external measure automatically, the signals in configuration need to be allocated to one or several relay outputs.
One relay output must always be configured as collective relay if application is according to EU certificate BVS 03 ATEX G 002 X.

3.2.4. Negative Measured Values

The measuring signal is below zero but above the threshold mentioned in chapter 3.2.5 for under scale of measuring range. Zero fluctuations of the transmitters are within the normal and acceptable range of deviations.

Display:

LED Module:	-
System:	-
RBM/REM:	-
AAM:	current output of transmitter (voltage output: 0 V)
LCD Module:	operating status (see chapter 4) up to –3% of measuring range: "0", below –3%: "< 0"
Printer:	-

3.2.5. Under scale of Measuring Range

In case of under scale, the signal of the transmitter is below a preset threshold which is generally –5% of the detection range. (Deviating values up to a maximum of –10% of the detection range can only be configured by *Industrial Scientific*.) Though the transmitter should be calibrated measuring is still given. The signal is not latching.

Display:

LED Module:	yellow LED for ‘under scale’ (arrow pointing downwards)
System:	-
RBM/REM:	under scale by measuring point
AAM:	current output of transmitter (voltage output: 0 V)
LCD Module:	display of concentration: “< 0”, message: under scale
Printer:	US

3.2.6. Over scale of Measuring Range

Case A (standard setting):
Threshold for over scale equals the upper range value

In case of over scale, the signal of the transmitter will be higher than 20 mA. Measuring is still given but the signal is above the measuring range. The measured value can only be defined as concentration above the upper scale value but no indication is available how far the upper scale value has been exceeded. Usually, this alarm is configured to be latching.

By the software *ConfigPro*®, over scale of measuring range can be signaled as an alarm.

➲ *Some transmitters require special action to be taken after they have been exposed to high gas concentrations. Calibration and adjustment might become necessary. Please refer to the recommendations in the manuals for the respective transmitters.*

Display:

LED Module:	red LED for ‘over scale’ (arrow pointing upwards)
System:	-
RBM/REM:	over scale by measuring point
AAM:	latching in case of overrun: 22 mA, non-latching in case of over scale: actual output of transmitter; voltage output in both cases: 10 V
LCD Module:	display of gas concentration: end scale value or, with measuring profiles of x% LEL or LEL, > end scale value, message: over scale, display of measured value is frozen
Printer:	OS

Case B:
Threshold for over scale is below the end scale value
MX62 will react as if an alarm has been signaled (see 3.2.2).

3.2.7. Resetting of Alarm Signals

There are two different types of resetting:

- Resetting of Audible Alarm Signals:
  Relays can be configured to be reset. In general, these should, however, exclusively be employed for the triggering of buzzers, sirens and other audible alarm indicators.
- Resetting of Latching Alarm Signals:
  A latching alarm signal will be extant even if the gas concentration diminishes. The alarm signal (with the allocated relays) can only be reset after the gas concentration has fallen below the alarm level.

Resetting is done by the keys for the respective channels.
Resetting is also possible by the external reset input (ext. reset). In this case, all resettable messages will be resetted.

The behavior of a channel, when resetted, depends on the activation of "ISA procedure" (chapter 3.1.1).

ISA procedure activated:

- In case an LCD module is used, **operating** the key **the first time** is for the LCD display.
- **Operating** the key **a second time** resets an existing relay for audible alarm signals and the blinking channel LED will light continuously.
- **Operating** the key **a third time** resets a latching alarm signal. (gas concentration < alarm threshold)

➲ *Should neither an LCD module nor a relay for audible alarm signals be employed, the latching alarm signal is already reset when the key is first operated.*

ISA procedure deactivated:

- In case an LCD module is used, **operating** the key **the first time** is for the LCD display.
- **Operating** the key **a second time** resets an existing relay.
- **Operating** the key **a third time** resets a latching alarm signal. (gas concentration < alarm threshold)

➲ *Should neither an LCD module nor a relay for audible alarm signals be employed, the latching alarm signal is already reset when the key is first operated.*

3.3. Start-up Mode

Upon start-up or directly after voltage cut-off, alarm signals are blocked for 1 to 10 minutes (setting by software *ConfigPro*®). After the start-up mode, the system automatically enters into the operating status.

➲ *As many transmitters signal undefined values after start-up, this mode eliminates any false alarms.*

At the beginning of the start-up mode, functioning of the LEDs for system information can be checked. All four system LEDs are switched on for 0.5 s and those of the LED Modules for 2 s. The display of the LCD Module is built up line by line.

Display:	
LED Module:	all green LEDs for 'power' and yellow LEDs for 'fault' flash
System:	LED for 'maintenance' flashes, maintenance relay is activated
RBM/REM:	-
AAM:	2 mA
LCD Module:	display initialization and start-up signals
Printer:	cold reset, software version

If a mean value is configured for a given channel, it will only be determined from the mean values calculated within a preset number of minutes after the system has re-entered its operating status.

3.4. Maintenance Mode

This mode is for service and modification of the gas detection system.

For the various functions available in the maintenance mode, the rotary switch on the Controller Module has to be set to the respective position **(switch positions 1-5)**. The number is indicated on the pertaining LED display (see chapter 7.1).

Channel Selection:
After positioning of the rotary switch (except position 5 for PC communication), one or several channels can now successively be entered into a selected function for servicing by operating the respective key for more than two seconds. After the two seconds have elapsed, all LEDs for the relevant channel briefly light up. Only after releasing the key, the respective function is available.

Completion of Servicing:
Completion of servicing of the relevant channel will be effected if the respective key is operated once again (for more than two seconds) or the maximum time preset for servicing is exceeded (software *ConfigPro*®).
With the switch on the controller module in **position 0**, the maintenance mode is ended and the unit is back to normal operation. The yellow LED for 'maintenance' switches off.

3.4.1. Alarm Suspension

Switch Position 1

The suspension of alarms prevents that relays which are related to alarms, faults, over- or under scale are not taken into account and are consequently not triggered.

A general alarm suspension is possible as described in chapter 3.4.7.

Display:

LED Module:	yellow LED for 'fault' flashes, LEDs for alarm, fault, over scale or under scale will flash if the transmitter signal complies with respective condition
System:	LED for 'maintenance' is on and the respective relay is activated as soon as a channel is selected.
RBM/REM:	all deactivated
AAM:	2 mA or 0 V
LCD Module:	display of concentration: as in operating status, message: alarm suspension
Printer:	service relay activated

ATTENTION!

- **Previously activated relay outputs are reset when, after selecting alarm suspension, conditions for triggering these relays are no longer given.**
- **Alarm suspension must not be used for calibration purposes.**

3.4.2. Operational Test

Switch Position 2

This operational test allows checking of channel LEDs, relay and analogue outputs.

➲ *The operational test simulates the triggering of all signals and alarms. After the operational test has been completed, any triggered alarm will be reset only if the measured value is below the alarm threshold (including configured alarm hysterese).*

Display:

LED Module:	yellow LED for 'fault' flashes, all other channel LEDs are on
System:	LED for 'maintenance' is on and the respective relay is activated as soon as a channel is selected
RBM/REM:	all activated
AAM:	latching in case of overrun (3.2.6): 22 mA, non-latching in case of overrun: actual output of transmitter
LCD-Module:	latching in case of over scale (3.2.6): display > end scale value, non-latching in case of over scale: display of concentration equals sensor output signal, message: operational test and other channel related signals, e.g. alarms
Printer:	service relay activated

3.4.3. Calibration

Switch Position 3

This function allows calibration and adjustment of transmitters. Outwardly, the system operates as it does with alarm suspension.

Display:

LED Module:	yellow LED for 'fault' flashes, LEDs for alarm, fault, over- or under scale will flash, if the transmitter signal complies with respective condition
System:	LED for 'maintenance' is on and the respective relay is activated as soon as a channel is selected
RBM/REM:	all deactivated
AAM:	2 mA or 0 V
LCD Module:	display of concentration: as in operating status message: calibration
Printer:	service relay activated

3.4.4. Channel On/Off

Switch Position 4

Should a channel be deactivated, the measuring signal is no longer evaluated. Channel deactivation will be extant even after the maintenance mode is ended.
The channel can be re-activated by renewed selection.

ATTENTION!

- Even if the channel is switched off, the transmitter will be provided with 24V. For works to be carried out in hazardous areas, power to the transmitter must be disconnected.

- For safety reasons, an alarm is internally signaled when deactivating a channel being in an AND or VOTING operation. The alarm will, however, not be shown on the LED Module. This evaluation may cause alarm signaling with an AND or VOTING operation of channels, even though this should not be the case according to the displays of the LED Modules.

Display:

LED Module:	all LEDs are off
System:	LED for 'maintenance' is on and the respective relay is activated as soon as the rotary switch is set to position 4 and a channel had already been deactivated or after channel selection
RBM/REM:	all deactivated
AAM:	0 mA or 0 V
LCD Module:	no display available
Printer:	service relay activated

3.4.5. PC Communication

Switch Position 5

PC communication allows external access to the system *MX62*, e.g. for changing the configuration with software *ConfigPro®*. Measurement and evaluation are continued as long as no command via PC communication is given that requires quitting the measuring mode.

➲ *During UPLOAD (see operating instructions of software ConfigPro®) of a changed system configuration, first of all an alarm for system error is triggered. After resetting, the system will be re-started with the changed configuration (see 3.3).*

Display:

LED Module:	as operating status
System:	LED for 'maintenance' is on and respective relay is activated as soon as the PC is logged in
RBM/REM:	as operating status
AAM:	as operating status
LCD Module:	as operating status
Printer:	as with operating status

3.4.6. Ignore communication fault with relay modules

Switch Position 6

This function allows the replacement of a defective relay module during the normal operation mode without setting a system failure message.

In normal operation mode a replacement of a defective relay module would cause a communication fault with relay modules and the system would have a system failure.

If the rotary switch is in position 6, all communication errors with relay modules will be ignored for 30 minutes. The system will go into a system failure if the function is activated longer than 30 minutes and a message will be displayed on the LCD module and/or the CM.

To activate this function turn the rotary switch into position 6 and push the reset buttons of both controller.

To deactivate this function turn the rotary switch into position 0 and push the reset buttons of both controller.

ATTENTION!

The new relay module has to be of the same hardware type as the replaced. The replacement e.g. of a RBM+REM by a RBM is not allowed and causes a system failure.

Indication (during the 30 minutes)

LED Module	according to normal operation mode
System	service LED is blinking + the service relay is activated
RBM/REM	according to normal operation mode
AAM	according to normal operation mode
LCD Module	service mode
Printer	service relay activated

Indication (after the 30 minutes)

LED Module	all yellow fault LEDs are on
System	System failure LED is blinking
	System failure relay activated
RBM/REM	according to normal operation mode
AAM	according to normal operation mode
LCD Module	message system failure
Printer	Failure relay activated

Note:
During replacement of the defective module disturbances on the output bus are possible, e.g. relays of other relay modules can be affected and switch.

3.4.7. General alarm suspension

The general alarm suspension is a special case of the channel depended alarm suspension. If activated, all channels are in the operation mode "alarm suspension", independent of the position of the rotary switch at the CM.

For activation of the general alarm suspension two analogue inputs (channels) are needed. The two channels have to be configured in a special manner by the software *ConfigPro*.

The general alarm suspension is activated when both special configured channels have an alarm.
The general alarm suspension is deactivated when both special configured channels have not an alarm.

Configuration of the channels:
A key switch with two independent contact pairs is needed.
When not switched (position "0"), on both channels a signal current of 4 mA will be simulated using a 6k resistor.

In the switched position (position "1", general alarm suspension activated) at one channel a signal current of 8 mA will be simulated using a 3k resistor and at the other channel a signal current of 14 mA using a 1k7 resistor.

ATTENTION!
Only authorized and instructed persons are allowed to use the key switch.

Note:
It is not allowed to connect gas detectors to the channels for general alarm suspension.

3.5. Single Mode

In this mode, full redundancy is no longer given or comparison of the two controllers with each other is disturbed. Measurement will still be done correctly and all safety functions are maintained. In particular, switching of relay outputs is guaranteed. Since channel indication on the LED Modules and the LCD Module is linked to one of the two controllers, information will not be available if the respective controller is faulty (see 3.7 "Measures against Faults")

ATTENTION!
If *MX62* changes into single mode, immediate measures must be taken to cancel redundancy loss.

Display:	
LED Module:	as operating status or all LEDs for 'fault' flash
System:	LED for 'single mode' flashes and relay for 'single mode' is activated
RBM/REM:	as operating status
AAM:	as operating status
LCD Module:	as operating status with message of 'single mode' or 'display failure'
Printer:	'emergency operation relay activated'

3.6. System Error

In this case, the safety function has failed (see 3.7 - 'Measures against Faults'). Two separate errors have occurred in the MX62 System®.

This 'system error' is only indicated after the system has tried to maintain the measuring function by resetting. During this time, the system operates as if it is in start-up mode though the outputs of the relay modules are not reset. Depending on the configuration of the system, there can be a time delay of up to 90 s between error occurrence and indication.

ATTENTION!
The gas detection system *MX62* differentiates the faults of the complete system from those of a specific channel (chapter 3.2.3). When configuring safety control devices to be connected to the system, please bear in mind that a system error does not automatically lead to activation of all relay outputs for channel malfunctions. In this case, the switch position of the relay 'system error' has to be taken in account.

Display:	
LED Module:	all 'fault' LEDs are on
System:	LED 'system error' flashes and relay 'system error' is activated
RBM/REM:	status at beginning of 'system error' will be maintained
AAM:	0 mA or 0 V
LCD Module:	message: 'system error or failure'
Printer:	'system error' or 'failure relay activated'

3.7. Measures against Faults

Display:	Possible Reason:	Measures against Faults:
LED 'fault'	• Line disconnection • Insulation defect • Defective transmitter • Wrong connected line • A transmitter signal has exceeded 24.5 mA. **(Attention! Danger!)**	• Measure signal current • Check connection • Check gas concentration separately, e.g. with portable detector Check transmitter and replace, if necessary
All 'fault' LEDs are on and LED 'system failure' is blinking	• Timeout for 'Ignore communication faults with relay modules'	• Turn the rotary switch into position 0 and reset both controller
Part of LEDs for 'fault' are on; no LED for system information is on.	• An Analogue Input Module is defective or not connected. • An Analogue Input Module is addressed wrong.	• Check connection between Analogue Input Module and Controller Module • Check 24V power supply • Check address of Analogue Input Module • Replace Analogue Input Module • Check configuration with PC software *ConfigPro*® • Check transmitter and replace, if necessary

Display:	Possible Reason:	Measures against Faults:
All LEDs for over- and under run of measuring range are blinking; the remaining LEDs for channel and system information are off.	• Communication error between Controller Module and display **(In this case, safety functions are fully maintained by the relays.)**	• Check connection between Controller Module and display
LED 'single mode' is blinking.	• Malfunction of controller B	• Evaluate error code on the Controller Module
LED 'single mode' is blinking; all 'fault' LEDs are blinking.	• Malfunction of controller A	• Evaluate error code on the Controller Module
LED 'system error' is blinking; all LEDs for 'fault' are on.	• Both controllers of the Controller Module are defective. • Interruption of connection to all Analogue Input Modules • Interruption of connection to at least one relay module	• Evaluate error codes on the Controller Module • Check connection between Analogue Input Module and Controller Module • Check connection between relay module and Controller Module
Analogue outputs: 0 mA or 0 V; channel 'fault' LEDs are off.	• Defective Analogue Output Module • Interruption of connection between Analogue Output Module and Controller Module	• Replace Analogue Output Module • Check connection between Analogue Output Module and Controller Module
LED 'battery' is blinking.	• Emergency power supplied	• Check mains supply

All LEDs for 'fault' and 'operation' are blinking.	• Power failure logic in operation – no malfunction!	• After the preset time for power failure logic, the system automatically returns to normal operation.
Wrong indication of date/time after power failure	• Buffer battery on the controller module is exhausted (expected life time ≥ 10 years)	• Adjust setting via *ConfigPro* • Have battery replaced

Note:
After rectifying system errors, a resetting of the micro controllers on the modules might be necessary. The Controller Modules should always be resetted at last. The reset keys are positioned on the modules (see chapter 7).

3.8. Error Codes of the Controller Module

The redundant controllers A and B in the Controller Module have both an LED display (status µC) for indication of error codes, assisting fast repair of any malfunction of the gas detection system by simplifying the search of errors within a limited range. Always of the first error recognized by the system is indicated. Only 'error code 20' can be overwritten by an error recognized later on.

Code	Description of Error
3	Controller A (or B) has activated its fault release, the cause for it can however not be determined.
4	DPRAM error The status of Controller A (or B) cannot be read by the DPRAM.
10	The printer is offline.
11	No paper in the printer.
12	DATA LOGGER: Storing chip is filled to capacity.
20 (only CPU A)	Failure in LED Module addressing. Be sure that the number of connected LED Modules is the same as the number of configured input modules (in groups of eight).
21	Error in automatic recognition of LED Modules: Recognized addresses are not consecutive or incomplete.
40	No valid values in the parameter memory.
41	Checksum error in flash memory.
42	Incomplete upload. Not all parameters set have successfully been loaded or initialized.
43	Incomplete configuration. No channels have been configured.
44	Error in loading or deleting the flash memory.
45	The system has not been activated.
46	The system could recognize several successive power failures.
47	The Controller has received instruction for RESET from the RS232 interface.
48	Error in configuration of input modules: e.g. Loop Module has an even address
60	The running time of the program (loop time) has been exceeded repeatedly.
61	Error in communication with the Analogue Input Module. The measured values cannot be read within the preset short period of time.
62	Error in memorizing measured values. No module can memorize any measured values.
63	Communication error with one or several relay modules.
64	Configuration error: Please check configuration of relay modules.
70	Hardware malfunction: The READY line remains at high level after reset.

71	Hardware malfunction: The RESET line remains at high level after reset.
72	Hardware malfunction: The RESET line remains at low level after reset.
73	Hardware malfunction: The fault relay is active during resetting.
74	Hardware malfunction: The fault relay does not switch.
77	Hardware malfunction: Error in testing of external UART (output modules).
79	Hardware malfunction: Overrun of external UART (output modules).
80	Hardware malfunction: Error in testing of internal RAM.
81	Hardware malfunction: Error in testing of external watchdog.
82	Hardware malfunction: Error in testing of flash ROM

Code	**Description of Error**
83	Hardware malfunction: Error in testing of external RAM.
84	Hardware malfunction: Verification error after loading into the EEPROM.
85	Software error: Variable outside the valid range.
86	Hardware malfunction: Error in testing of internal UART.
87	Hardware malfunction: Error in testing of external UART (input modules).
88	Processor is in the course of resetting which will be completed after a few seconds.

The following messages of digital transmitters can be displayed if a LCD Module is used. Measures against faults are described in the respective manuals.

error	(F) Vcc out of range
error	(F) Vee out of range
error	(F) Heating
error	(F) Bias Voltage
error	(F) Iout
error	(F) ADC overflow or underflow
error	(F) Offset drift > 50%
error	(F) Sensitivity < 20%
error	(F) Sensor changed
error	(F) EEprom not readable
error	(F) ROM
error	(F) RAM
error	(F) EEprom
warning	(W) Low limit humidity
warning	(W) High limit humidity
warning	(W) Low limit pressure
warning	(W) High limit humidity
warning	(W) Low limit temperature
warning	(W) High limit temperature
warning	(W) Offset drift > 30 %
warning	(W) Sensitivity < 50%
warning	(W) Sensor changed
warning	(W) Low limit current
warning	(W) Low limit voltage
warning	(W) Cancel calibration: zero gas/reference gas
warning	(W) Service needed

3.9. Overview of LED Indications

The following tables show the various possibilities of indication by the LED Modules and the LEDs for system information.
Besides the channel status, information on the system status can also be signaled in case of malfunction.

ATTENTION!
The tables below show the possibilities of indication when the ISA procedure is deactivated. For detailed information see chapter 3.1.1 "ISA procedure" (slow blinking channel LED).

Channel-related Indications

LEDs	Standard	Channel selected (LCD)	Alarm suspension	Calibration	Functional Test	Power Failure Logic
Over scale	on/off	on/off/blinking	off/blinking	off/blinking	on	off
Alarm 3	on/off	on/off/blinking	off/blinking	off/blinking	on	off
Alarm 2	on/off	on/off/blinking	off/blinking	off/blinking	on	off
Alarm 1	on/off	on/off/blinking	off/blinking	off/blinking	on	off
Under scale	on/off	on/off/blinking	off/blinking	off/blinking	on	off
Fault	on/off	on/off/blinking	blinking	blinking	blinking	blinking
Power	on	blinking	on	on	on	blinking
Single Mode	off	off	off	off	off	off
System Error	off	off	off	off	off	off
Service	off	off	blinking	blinking	blinking	blinking
Battery	blinking/off	blinking/off	blinking/off	blinking/off	blinking/off	blinking/off

System-related Indications

LEDs	Communication Error (*1)	Error in LEDM Addressing (*4) (Error Code 20)	Single Mode µCA: ok µCB: error	Single Mode µCA: error (*2) µCB: ok	System Error µCA: error µCB: error
Over scale	all blinking	all blinking	on/off/blinking	off	off
Alarm 3	off	off	on/off/blinking	off	off
Alarm 2	off	off	on/off/blinking	off	off
Alarm 1	off	all blinking	on/off/blinking	off	off
Under scale	all blinking	all blinking	on/off/blinking	off	off
Fault	off	off	on/off/blinking	all blinking (*3)	all on (*3)
Power	off	off	on/off/blinking	off	off
Single Mode	off	blinking/off	blinking	blinking	off
System Error	off	blinking/off	off	off	blinking
Service	off	blinking/off	off	off	off
Battery	off	blinking/off	blinking/off	blinking/off	blinking/off

(*1) The LED Modules do not receive any data from the Controller Module (Controller A).
(*2) In this single mode, LED Modules do not receive any information on status of channels. The safety function of the system is, however, fully maintained.
(*3) The respective LEDs of all channels on the LED Module are activated, i.e. including channels not used or deactivated.
(*4) This error code is exclusively indicated on CPU A (the fault relay will not be activated). Be sure that the number of connected LED Modules is identical with the number of input channels. The number of connected LED Modules must not be more or less.

4. Operating of the LCD Module

The optional LCD Module (240 x 128 pixels) is operated by its four keys as well as those for the respective channels. Besides display of the individual channels indicating information on measuring points and system events, menu-driven operation allows calling up of all settings and information plus controlling of data logger and printer.

4.1. Display of Channels

Normal operation:

- The logo is displayed. By operating a **key** of any channel, the respective channel information is shown for 60 minutes - indicating information of measuring point, system parameters as well as events. Afterwards, the display returns to the logo automatically.
- When operating an **arrow key** during channel display, the following channel is indicated next to the one currently shown.
- By the menu item for LCD settings (see following chapter), two different displays can be selected:
  - After operating an **arrow key** while the logo is displayed, all channels will successively be switched through their full range in rising order, i.e. the display of each channel changes every 5 seconds. After all channels have been shown, the display returns to the logo.
  - Alternatively, constant scrolling of the display for all activated channels can be set by the menu.

Alarm:

- In **case of alarm**, the respective channel is automatically displayed. If several channels are affected, these will automatically be scrolled through.
- While alarm for one or more channels is indicated, any channel can be displayed by constant operation of the **respective key**. As soon as it is released, alarm for the channel(s) is once more indicated.
- Any system events are indicated while the logo is displayed.

4.2. Menu

By operating the keys **OK** or **ESC** while the logo of is displayed, the main menu is entered in which various settings can be modified or information be obtained. While the unit is in service mode, ie. during PC communication, values can only be read and not changed.

The menu is left 60 seconds after the last operation automatically and the display returns to the logo.

Generally, the following applies for any operation of the menu:

- **OK key**: for going one menu level lower or acknowledgement of entry and modification respectively
- **ESC key**: for going one menu level higher or rejection of entry and modification respectively.
- **Arrow keys**: for scrolling within a menu or change of values

4.2.1. System / LED-Test

The LEDs of all LED panels are activated by this menu item.

4.2.2. System / System Status

The current system status is indicated.

4.2.3. System / System Information

Indication of system information such as:

- actual software version
- order number
- serial number
- next date of maintenance
- etc.

4.2.4. Channel Information / Current Information

After the respective channel has been selected with the aid of the **arrow keys**, current channel information is displayed. This menu corresponds with operating the **key for any channel** during normal operation (see 4.1 Display of Channels).

4.2.5. Channel Information / Display of Configuration

After selecting the respective channel with the aid of the **arrow keys**, the actual status of the channel (activated, deactivated etc.) as well as the actual channel configuration is displayed.

4.2.6. Relays

The respective relay is selected by the **arrow keys**. For selection, only configured relays are taken into consideration and displayed. After selection of a relay, its configuration is indicated.

4.2.7. Analogue Outputs

The respective analogue output is selected by the **arrow keys**. For selection, only configured analogue outputs are taken into consideration and displayed. After selection of an analogue output, its configuration and actual value are indicated.

4.2.8. Data Logger / Set-up

After selection of the respective channel, data recording for this channel can be configured.

The modes ’8-hour mean value’ as well as ’recording’ can be activated or deactivated. With ’recording’ being activated, the ‘recording mode’ may also be set.

With continuous recording, the measured values of the selected channel are constantly stored.
With event recording, only events of the respective channel are recorded.

Note:
Modifications for recording of a channel can only be effected if the rotary switch on the controller module is not in position "5" (PC communication).

4.2.9. Data Logger / Histogram

After selecting the respective channel by the **arrow keys**, the histogram of the channel is displayed.

By means of this histogram, gas concentrations can be monitored over a longer period of time.

To see the concentration prevalent at a certain time, a cross is moved to the respective position with the aid of the **arrow keys**. This cross is found on the X-axis. The gas concentration measured as well as any active alarm signal at the time is shown in the upper margin of the LCD.

By operating the **OK key**, the histogram can be deleted.

Recording intervals may be set in the menu "Data Logger" of the configuration software *ConfigPro*®.

4.2.10. Data Logger / Events

At first, general information on events is shown such as number of all events from beginning of the recording, start of recording, date of latest event, etc.

In addition, a menu is displayed for selecting the next step:

- **Show events**:
  All events are shown in chronological and declining order, i.e. the most recent events come first.
  The channels are indicated on the LED Module according to their configuration, e.g. A03 means "rack A, channel 3".
  As to the display of relays, first the module address and then the relay number is shown, e.g. M8 R3 means "relay module 8, relay No. 3".

- **Delete events**:
  In this menu item, all stored events are deleted.

4.2.11. Data Logger / 8-Hour Mean Values

After selecting the respective channel with the aid of the **arrow keys**, stored mean values are shown.

For this, however, the recording of mean values need to be activated for the respective channel by the configuration software *ConfigPro*®.

4.2.12. Data Logger / Format

On the one hand, this menu item can be used to format the memory card. On the other hand, general information of the memory card is shown.

4.2.13. Printer Settings

The printer can be activated or deactivated.

Note:
Activation or deactivation of the printer can only be effected if the rotary switch on the controller module is not in position "5" (PC communication).

4.2.14. LCD Settings

LCD settings can be modified by this menu item. For this, the entry to be modified is selected by the **arrow keys**, after which the **OK key** is operated.

Language:
The menu language of the LCD can be selected.
Options: English, German, French, Spanish and Dutch.

ATTENTION!
Changing the language only refers to the menu structure. Designations regarding channel information such as measuring point description, target gas etc. are not affected. Such designations can only be changed with the aid of the configuration software *ConfigPro*®.

Contrast:
By the **arrow keys**, contrast can be increased or decreased.

Scroll Mode:
As already mentioned in chapter 4.1, Display of Channels, operation of the **key arrows** allows the actual measured values of all configured and activated channels to be automatically shown for approx. 5 seconds while the company logo is displayed.
This parameter can change the scroll mode.

Off:
The channels are not scrolled through.

Once:
All configured and activated channels are scrolled through once.
When the last channel has been shown, the company logo will be displayed again.

Continuous:
All configured and activated channels are continuously shown.

Background Light:
This parameter determines when the display is to be backlit.

Constant:
The background light of the display is always activated.

Pressing of Keys:
The background light of the display is only switched on when a key is pressed. It makes no difference whether a key of the LCD Module or a key for a respective channel is operated.

Events:
The background light of the display will be activated if any event occurs. This includes alarms and operating the keys of the LCD Module or those for a respective channel.

Rate of Repetition:
If the **ESC key** is operated while a system event is shown, the display will return to the company logo.

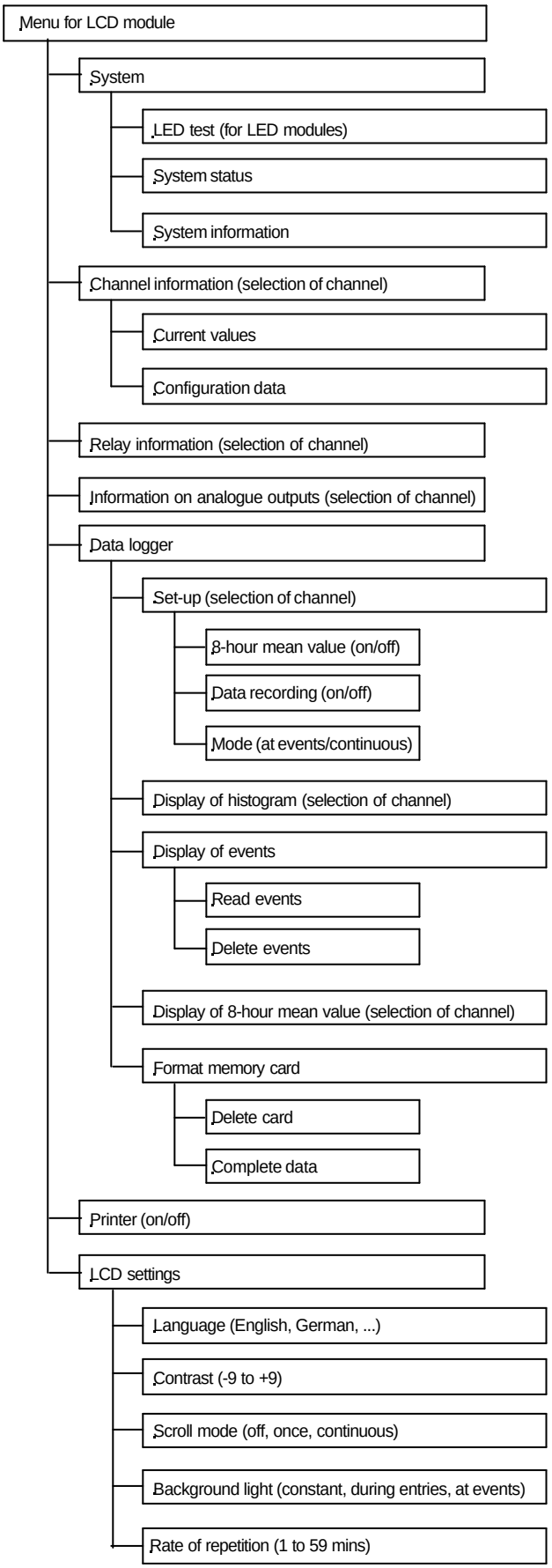
After a certain period of time, the display changes back to the system event in case the fault is still prevailing.

This period of time can be set with this parameter.

LCD Copy number:
For determination of the LCD Copy Module address for the LCD Copy Filter see chapter 2.1.10 “LCD Copy Module”.

Each LCD Module has automatically the address “0”. Changing the address of an LCD Module has no consequences.

The structure of the menu is shown on the following page.


Menu for LCD module
System
LED test (for LED modules)
System status
System information
Channel information (selection of channel)
Current values
Configuration data
Relay information (selection of channel)
Information on analogue outputs (selection of channel)
Data logger
Set-up (selection of channel)
8-hour mean value (on/off)
Data recording (on/off)
Mode (at events/continuous)
Display of histogram (selection of channel)
Display of events
Read events
Delete events
Display of 8-hour mean value (selection of channel)
Format memory card
Delete card
Complete data
Printer (on/off)
LCD settings
Language (English, German, ...)
Contrast (-9 to +9)
Scroll mode (off, once, continuous)
Background light (constant, during entries, at events)
Rate of repetition (1 to 59 mins)

5. Maintenance

Maintenance of gas detection systems includes inspection, servicing, calibration and adjustment. EN 50073 and EN 45544-4[1] give respective instructions.
Inspection and **servicing** by specialists comprise verification of keys, LCD display and relay contacts as well as operational check of alarm thresholds with test gas to ensure correct triggering of alarms plus calibration and adjustment of transmitters. These maintenance works should be carried out during initial operation and in half-yearly intervals.

Calibration and **adjustment** of the transmitters means verification of the zero point with the help of zero gas as well as of sensitivity and response time with test gas including corrective adjustment, if necessary.
Intervals of calibration and adjustment can be shorter than intervals of inspection and maintenance. When fixing these intervals, specifications given in the operating instructions for the transmitters connected to *MX62* are to be followed.

➲ *National regulations may exist that include rules of maintenance for special applications. In Germany, for example, regulations BGI 518 and BGI 836 of the Employers' Liability Insurance Association are to be observed.*[2]

5.1. Calibration and Adjustment

The system *MX62* provides four different methods of calibration that depend on the transmitter to be calibrated as well as the prevailing conditions on site.

5.1.1. Direct Calibration at the Transmitter

Transmitters with a standardized output of 4-20 mA are directly adjusted with, for example, the aid of potentiometers fitted inside the transmitters. This calibration is carried out with the function for calibration of the maintenance mode to avoid triggering of relays.

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[1] EN 50073: Regulation for selection, installation, employment and maintenance of units for detection and measuring of combustible gases or oxygen
EN 45544-4: Electric units for detection and direct measuring of concentration of toxic gases and vapors – Part 4: Regulation for selection, installation, employment and maintenance

[2] BGI 518: Gas detection systems for protection against explosion – Employment and operation
BGI 836: Gas detection systems for toxic gases/vapors and oxygen – Employment and operation

For optimum and safe execution of servicing, we recommend concluding a maintenance contract with us. This will allow your system to be serviced by our qualified engineers at the required intervals and will provide maximum safety.

5.1.2. Remote Calibration for Standard Transmitter

It is possible to adjust standard 4-20 mA transmitters without actually accessing the transmitter directly. This remote calibration can be carried out in the maintenance mode of "PC Communication" by adjusting the 4-20 mA output of the *MX62* within a preset range by means of special PC software *RemoteCalibrationPro*.

ATTENTION!
Since evaluation of the 4-20 mA input signal is altered, the signal of 4-20 mA needs to be reset in case the transmitter is replaced or directly calibrated. This is achieved by the function for calibration of the maintenance mode.

5.1.3. Manual and Automatic Field Adjustment of Digital Transmitter TBGW EX

The digital transmitters by, e.g. TBGW EX, have a 4-20 mA analogue as well as a RS485 connection to the MX62 System®. The latter serves for transmission of additional data during normal operation as well as for adjustment. Adjustment is detailed in the operating instructions for digital transmitters and carried out with the help of software *ConfigEx*®.

5.2. Transmitters

For calibration and adjustment, specifications laid down in the operating instructions for the transmitters have additionally to be observed. This refers especially to the selection of test gases.

In general, the concentration of the test gas must be above alarm level 2 and below the end scale value.

6. Technical Data

Power Supply:	230 V AC, 50 Hz or 24 V DC (permissible range: 19.2 to 27.6 V)
Power Consumption:	the number of modules and input requirement of transmitters determine power consumption
Maximum Input:	64 transmitters (e.g. 8 Analogue Input Modules with 8 inputs each)
Input Signal:	standardized 4-20 mA interface (3- and 2-wire technique) as well as RS485 connection The input load is dependent on current: R_{in}=200O + 4300/I_{mA}

Input Load:

Analogue Output 4-20 mA	450 O at maximum
Voltage Output 0-10 V	100 kO at minimum

Input Requirement for Transmitters:	24 V DC (regulated power supply)
Maximum Current Load per Transmitter:	3.5 VA, 150 mA
Signal Evaluation:	two 16-bit micro controllers working in parallel with a maximum cycle time of T_z < 100 ms
PC Interface:	RS232
Printer Output:	Centronics interface
Display:	seven LEDs for channel information of each channel; optional LCD display (240 x 128 pixels)
Data Logger:	64 MB
Maximum of Relays:	128 freely programmable relays with change-over contacts for 250 V AC, 6 A resistive load (8 relay modules with up to 16 relays)
Operation:	one key per channel as well as four keys for the optional LCD Module
Temperature Range:	0 to + 55 °C
Storage Temperature: (for unit, accessories, spares)	- 25 to + 60 °C
Humidity:	5% to 90% rH
Ambient Pressure:	80 to 120 kPa
Drift at Input:	< 0.1% of end scale value per month
Deviation between Analogue Output and Displayed Value:	< 2.5% of end scale value
Vibratory Fatigue Limit:	10 to 55 Hz (at maximum amplitude of A = 0.15 mm) Installation of relay modules has to be vibration-free to avoid any oscillation of switching contacts (false alarm).
Installation:	wall-mounted housing, 19"-rack with mounting plate, control panel with mounting plate

<u>Wall-mounted Housing:</u>

Material:	sheet steel / 1.5 mm, powder-coated, RAL 7032
Size:	depending on number of modules
Enclosure Rating:	IP 40 and, optionally, IP 54

Please see relevant data sheets for technical details of respective transmitters.

7. Terminal Connections, Jumpers and Rotary Switch

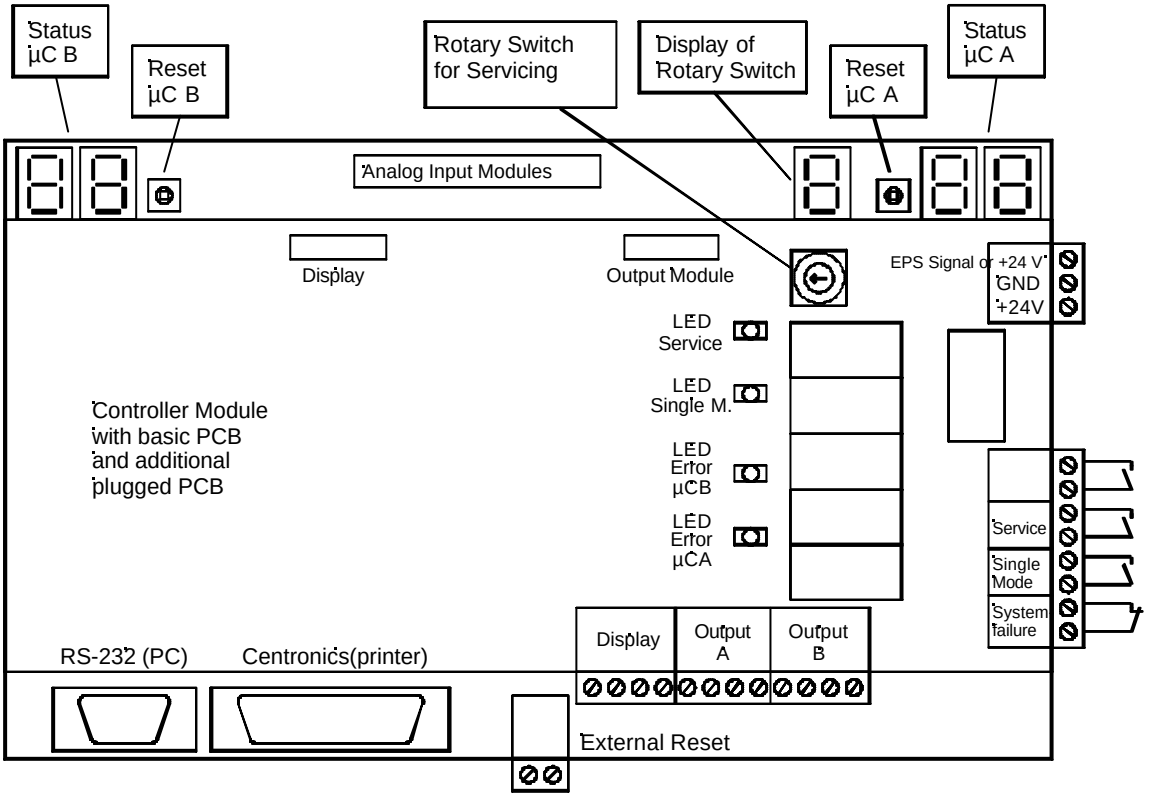
7.1. Controller Module (CM)

The CM, consisting of two PCBs, is fitted with **relays** for indication of maintenance mode (make contact), single mode (make contact) as well as system error (break contact). The relays are only provided for signals of up to 30 V DC, 0.1 A.

The **rotary switch** allows setting of the various functions for servicing (see 3.4. "Maintenance Mode").

At the External Reset Input all relevant relays and latching alarms can be reset with an external key connected.

In case no emergency power is supplied (with a 24 V signal), a bridge connection between the 24 V inputs has to be made.

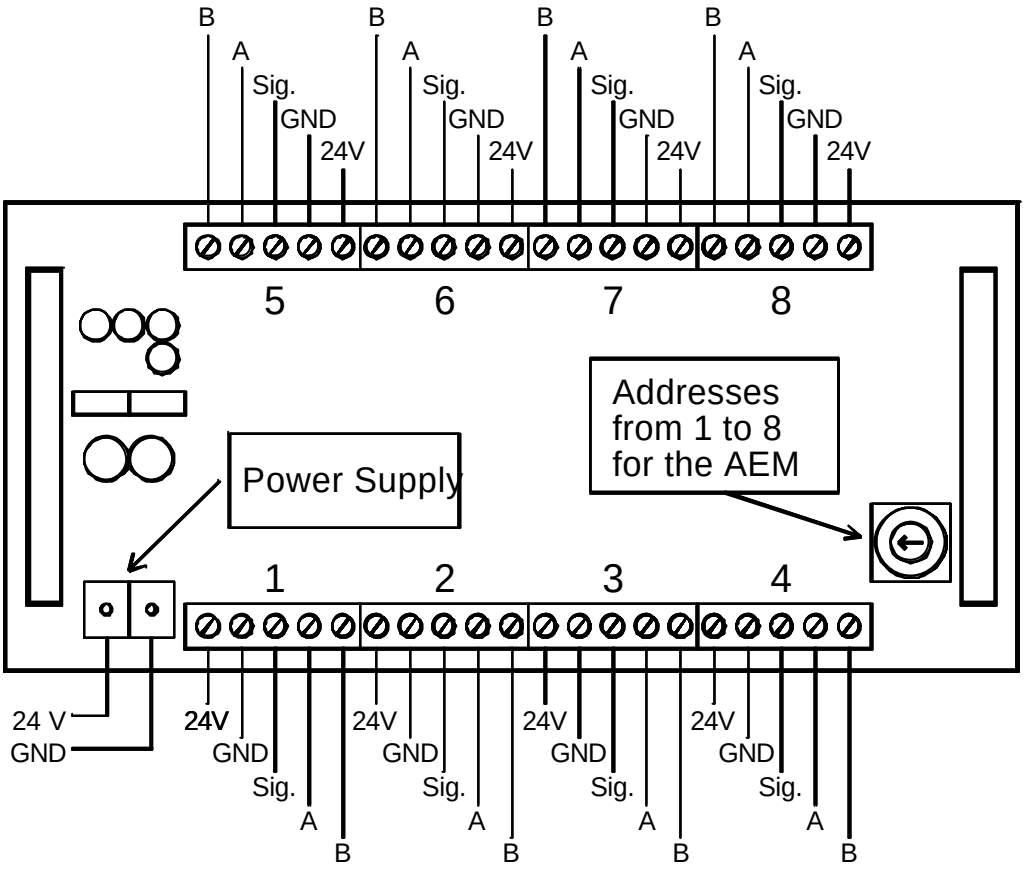


7.2. Analogue Input Module (AEM)

Different addresses between 1 and 8 are to be allocated to the AEMs with help of the fitted **rotary switch**.

Five terminals each are available for all eight input channels:

- 24 V Power Input requirement of the transmitter
- GND Connection to ground (not required for 2-wire connections)
- Sig. 4-20 mA signal from transmitter
- A Line A of RS485 connection
- B Line B of RS485 connection



Module size: 160 x 90 x 50 mm

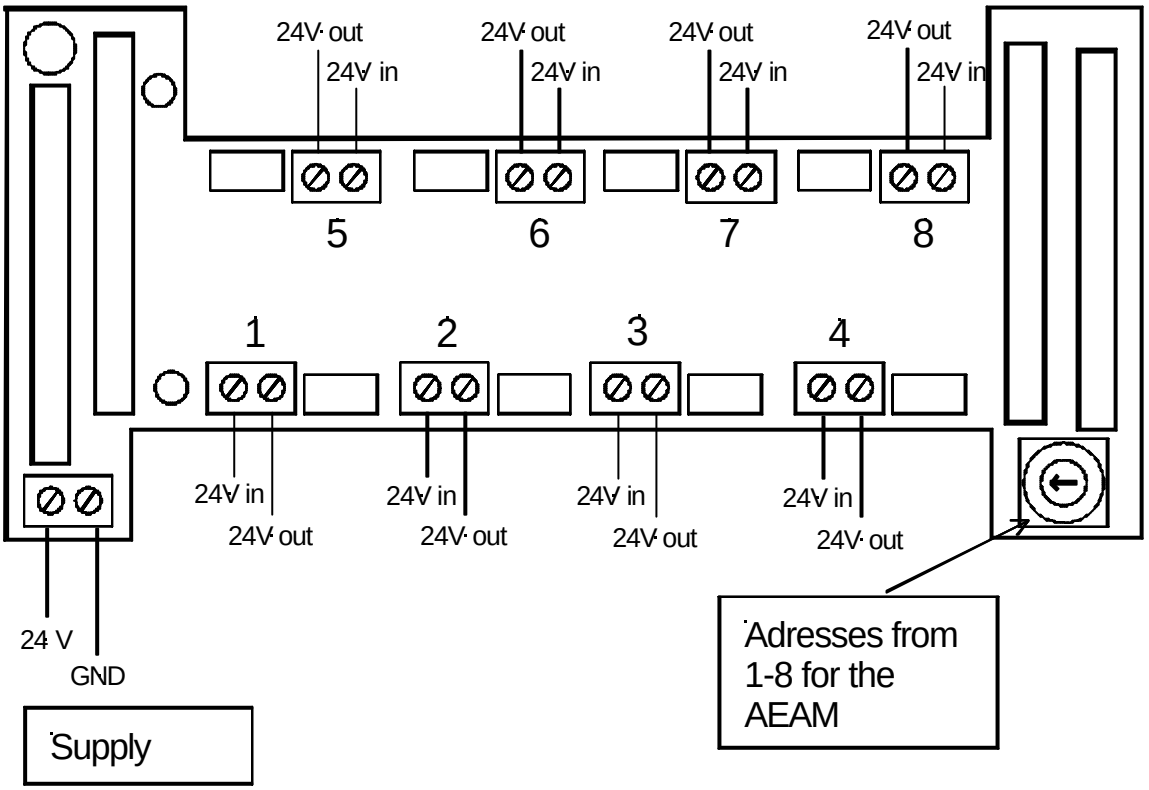
7.3. Analogue Input Extension Module (AEAM)

The AEAM needs to have the same address as the respective AEM.

The smoke detector has to be connected to the AEM, excepting the 24 V supply. The connection of the 24 V supply has to be done on the AEAM. Therefore the terminals 24 V of the AEM and AEAM are connected.

Each of the 8 channels has two connectors

- 24 V in Supply for the Smoke Detector (from AEM)
- 24 V out Supply for the Smoke Detector (to the detector)



Module size: 160 x 70 x 50 mm

7.4. Basic Relay Module (RBM) and Extension Relay Module (REM)

Different addresses between 1 and 8 have to be allocated to the relay modules with help of the fitted **rotary switch**.

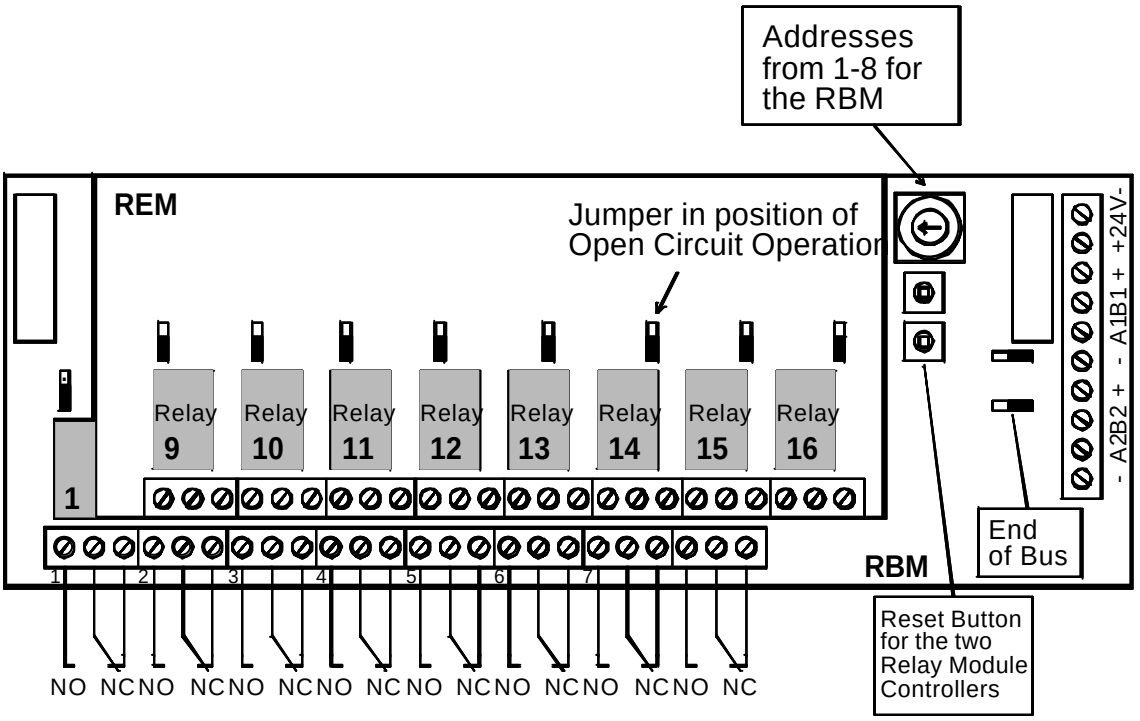
The REM with relays 9 to 16 is plugged onto the RBM with relays 1 to 8. All 16 relays have a **change-over contact** (make contact, input, break contact).

Each relay has a pertaining **jumper** by which closed or open circuit operation can be selected (see 2.1.4).

- upper position (R) => closed circuit operation
- lower position (A) => open circuit operation

The last output module has to form a bus end for both signal buses with two **jumpers** (see Analogue Output Module).

- left position => end of bus
- right position => further output modules



Module size: 190 x 90 x 75 mm

7.5. Loop Module (LOOPM)

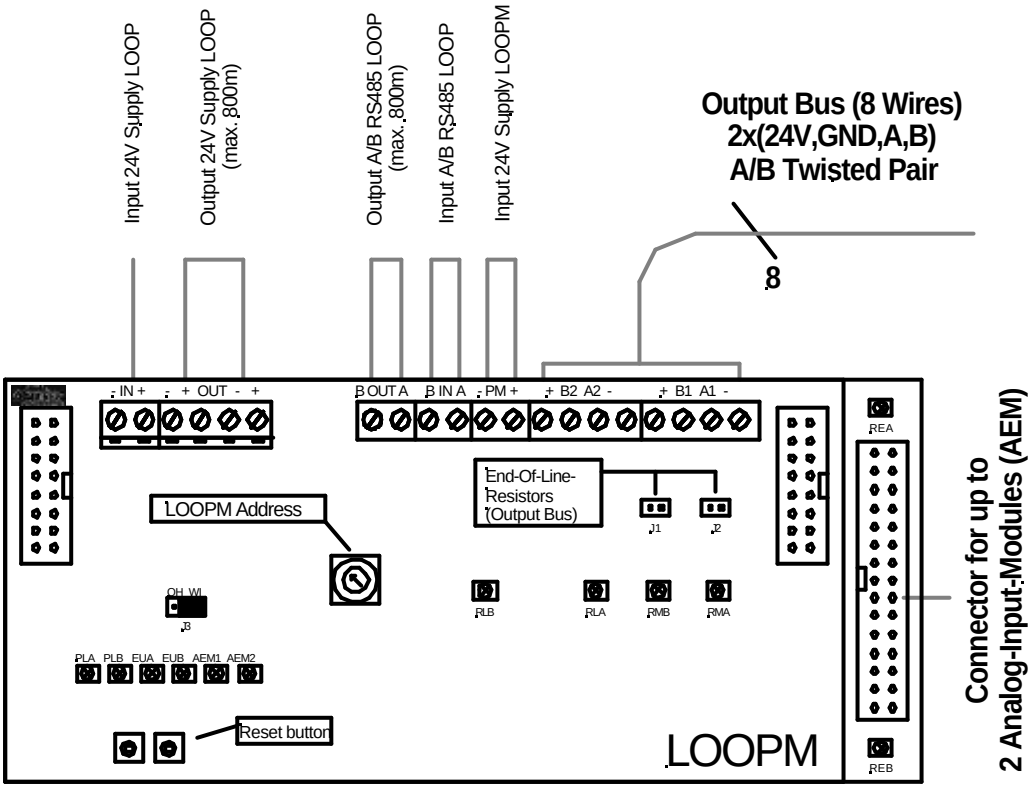
The address of the LOOPM has to be allocated with help of the fitted **rotary switch**.

Possible addresses for loop modules are 1, 3, 5 and 7. In case of a wrong address (even numbers), the loop module activates its LED for 'error'.

The last module of the output bus has to form a bus end with two **jumpers**. Contrary to the other modules on the output bus, the loop module has two jumpers J1 and J2 with only two contacts each.

- J1 & J2 closed => terminated output bus
- J1 & J2 open => non-terminated output bus

The jumper J3 is not used as its position does not affect the function of the module.



Module size: 167 x 90 x 85 mm

7.6. Analogue Output Module (AAM)

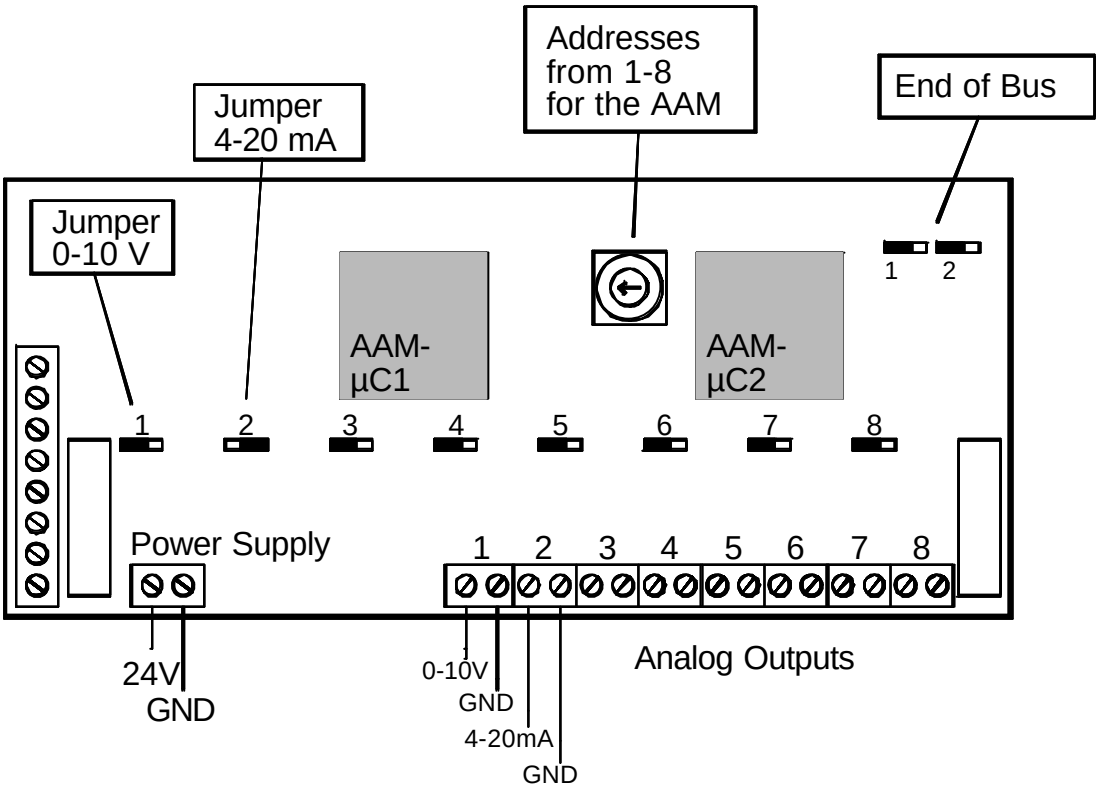
Different addresses between 1 and 8 have to be allocated to the AAMs with the help of the fitted **rotary switch**.

Each relay has a pertaining **jumper** by which 0-10 V or 4-20 mA can be selected.

- left position => 0–10 V
- right position => 4–20 mA

The last output module (whether it is a relay or analogue output module) has to form a bus end for both signal buses (redundancy). This is done with the two **jumpers** on the upper right-hand side.

- left position => end of bus
- right position => further output modules



Module size: 160 x 90 x 50 mm

7.7. LCD Module / LCD Copy Module

The LCD Module with integrated data logger can accommodate a storing chip of 64 MB memorizing measured values, alarms and system events as well as 8-hour mean values.

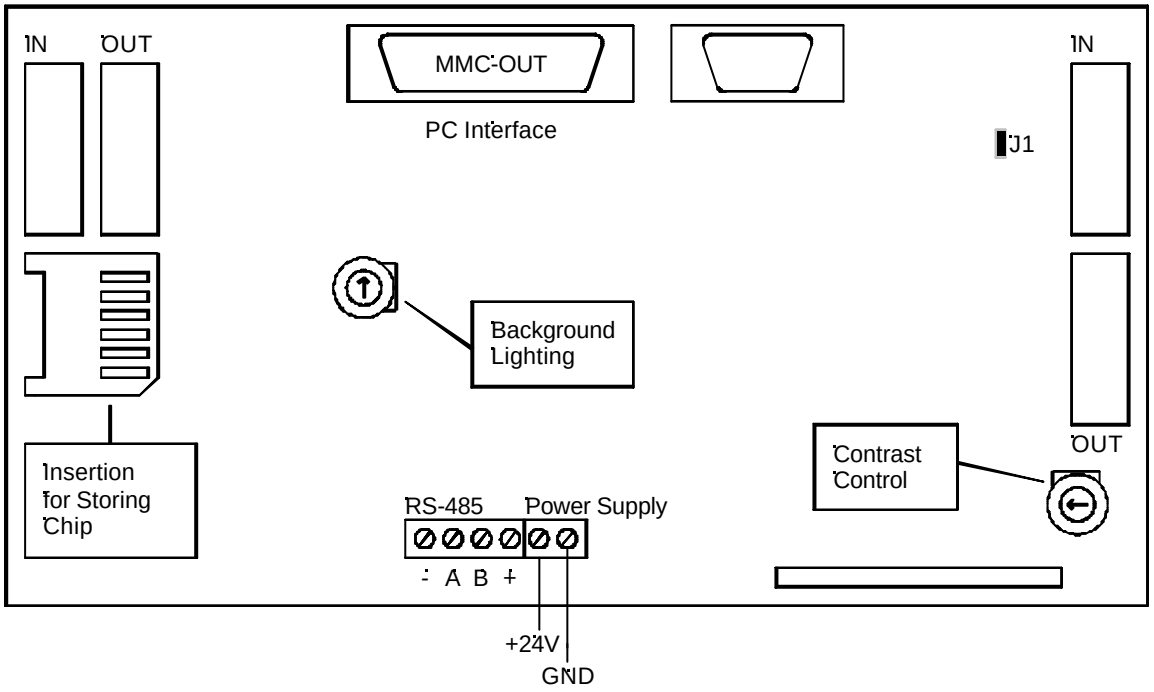
All information stored can be shown on the LCD screen.

The recorded values are shown on the LCD in form of a histogram.

If the LCD Module/LCD Copy Module is the last module to be operated on the display bus, the bus will have to be terminated on the Module with the bus end jumper J1:

- J1 open => further display modules
- J1 closed => bus end

Background lighting and contrast can be set via potentiometers.

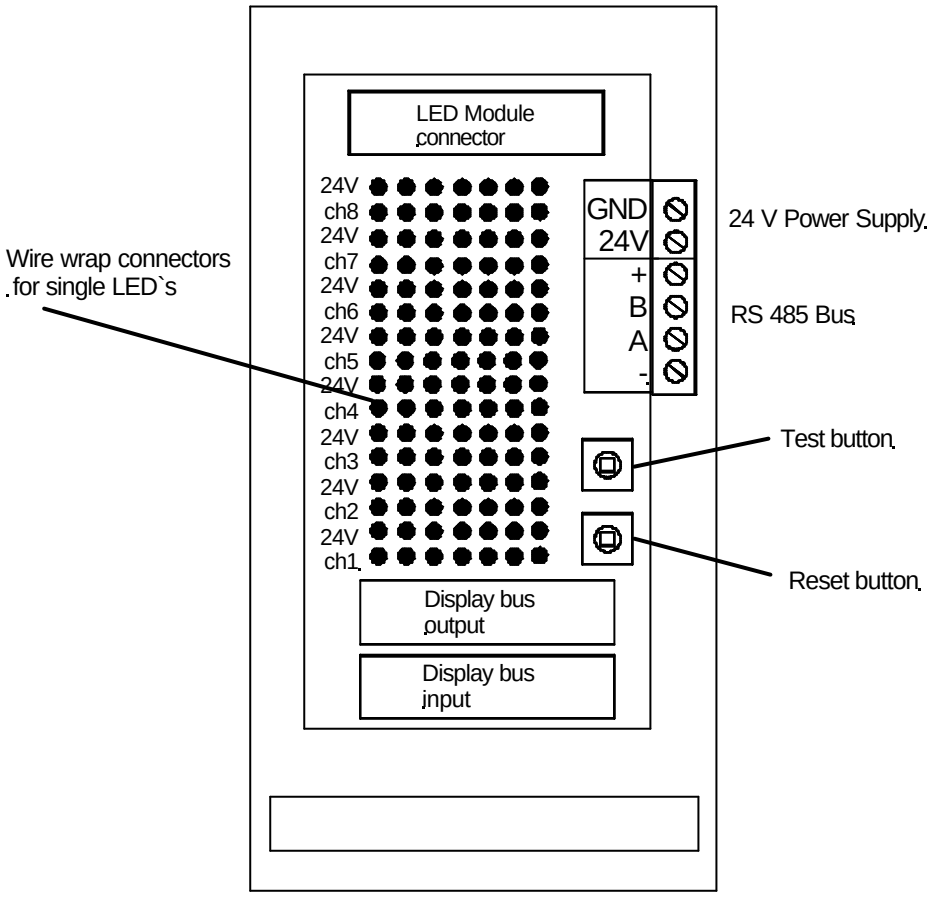


7.8. MIMIC Module

The address of the copied LED Module has to be set with the address select switch at the MIMIC Module. The switch is on the main PCB of the MIMIC Module.

The maximum current of the OC outputs of the MIMIC Module is 200mA.

For connection of external LED a 24V supply is needed.



Module size: 160 x 71 x 128 mm

8. Connection and Installation

8.1. Wiring

8.1.1. Mains Supply

The electric installation for *MX62* has to provide an isolator (e.g. an overload release) to guarantee secure disconnection from the mains supply. *MX62* must not be installed in hazardous areas.

MX62 is designed for stationary installation to a mains supply of 230 V AC/50 Hz (also available for 24 V DC). The unit complies with Protection Class I according to EN 60335 and has to be connected to a protective conductor (PE).

8.1.2. Connection of Relays

A maximum of 128 relays (8 relay modules with up to 16 relays) with potential-free change-over contacts for 230 V/6 A resistive load can activate external devices or transmit information. Selection of closed or open circuit operation is done by a jumper. Unshielded cables can be used for connection. The relay modules can be connected through a flat or bus cable. The maximum bus length is 800 m.

Installation of the relay modules must not be subject to any oscillation, the impact of which could cause short-term false signals at the relay outputs.

8.1.3. Connection of Transmitters

The gas detection system is designed for connection of up to 64 transmitters (4-20 mA) by 2- or 3-wire technique. Connecting of the transmitters to the Analogue Input Modules is via shielded cable. Transmitters with external input requirement must not be connected.

The sheath of the shielded line must be connected with the housing of *MX62*. In case the housing of the transmitter is made of metal, the sheath is also to be connected with this housing via the screwing.

The maximum cable length is determined by the transmitter to be connected (see respective data sheet) and must not be exceeded.

8.2. Installation of *MX62*

Attention! Make sure power supply is cut off prior to opening the unit.

8.2.1. Wall-mounted Housing

The size of the wall-mounted housing depends on the number of modules. Attention is to be paid to free accessibility. Safety systems should always be installed at a distance from any devices with high generic emission.

8.2.2. 19"-Rack

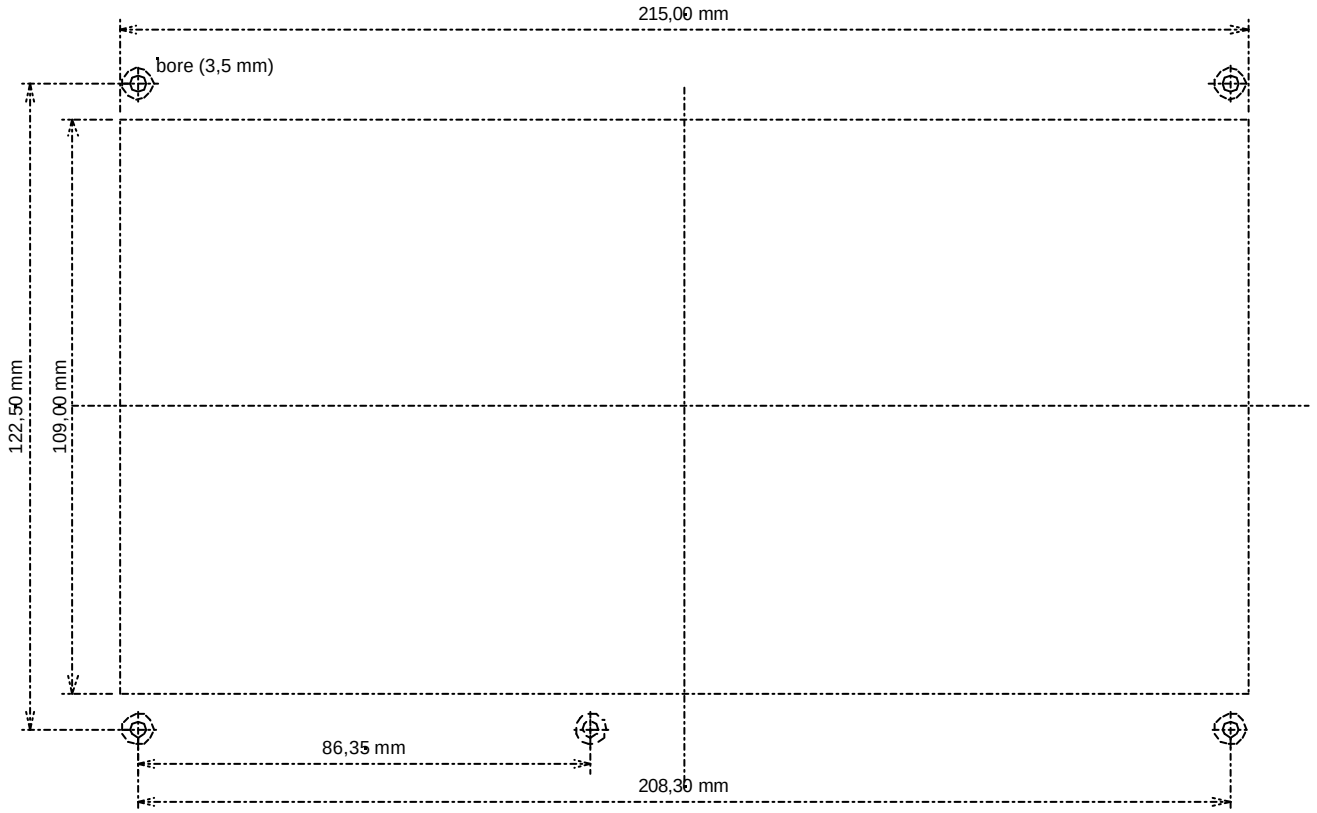
The distance between the 19"-rack and the mounting plate must be less than three meters. The sheath of the shielded line should be connected with the housing at the entry of the switchboard cabinet and on the mounting plate. The relay modules and LED Modules can be connected by a flat or bus cable. The maximum bus length is 800 m.

8.2.3. Control Panel

The distance between Controller Module and mounting plate must be less than three meters. The sheath of the shielded line must be connected with the housing on the mounting plate. The relay modules and LED Modules can be connected by a flat or bus cable. The maximum bus length is 800 m.

9. Cut-out for Control Panel Installation

The cut-out and bores apply to all three front panels (LED, LCD and LOGO front panels).



The front panels have a total size of 243 x 149 mm. The front panels project from the cut-out at top and bottom by 20 mm, left and right by 14 mm.

10. Accessories and Spare Parts

Optional Accessories:	Order No.
Software *VisualPro*® for visualization of several linked *MX62* units	31550
Software *ConfigPro*® for parameter settings of *MX62*	31500
Flashing Luminous Transparency 230 V AC	67040
Flashing Alarm Light 230 V AC	67160
Super tone Horn 108 dB/m (A) 230 V AC	67010
Spare Parts:	
Analogue Input Set (AES 8)	31140
Basic Relay Module (RBM 8)	31150
Extension Relay Module (REM 8)	31160
Analogue Output Module (AAM 8)	31130
LCD-Copy Module Set for 19”-Rack	31445
Please ask or your local distributor for further accessories and spare parts.	

11. Certificates

11.1. CE Accreditation

MX62 complies with the basic safety requirements of the following European directives.

EMC Directive 89/336/EWG:
The unit has passed EMC testing according to **EN 50081-1** and **EN 50270** and can be employed in domestic and industrial areas in view of generic emission and immunity.

Low Voltage Directive 73/23/EWG:
The system is in compliance with **EN 61010-1** Part 1, Safety regulations for electric measuring, control and laboratory equipment.

ATEX Directive 94/9/EG:
The gas detection system is approved for measurements in explosive areas using suitable transmitters such as TBGW EX:
EC-type examination certificate BVS 03 ATEX G 002 X
For further details please refer to the ‘EC Declaration of Conformity’ and chapters 11.2 and 11.3.

11.2. Metrological Approvals

MX62 is approved by EXAM BBG Prüf- und Zertifizier GmbH, Bochum, according to **EN 61779-1**, **EN 61779-4** and **EN61779-5** (combustible gases), **EN 50104** (oxygen) and **EN 45544-1** with **EN 45544-2** (toxic gases) and **EN 50271** (digital technique).

Certificate No. 41300402

Metrological approval included the following measuring ranges:

- 0 – 20% LEL	
- 0 – 100% LEL	
- 0 – 100 %vol. CH_4	
- 0 – 100 %vol. CO_2	
- 0 – 10 %vol. O_2	
- 21 – 0 %vol. O_2	
- 0 – 25 %vol. O_2	
- 0 – 1000 ppm NH_3	
- 0 – 300 ppm CO;	MBU/NA:[1] 1.2/2.4 ppm CO
- 0 – 500 ppm CO;	MBU/NA: 2/4 ppm CO
- 0 – 3000 ppm CO_2;	MBU/NA: 20/25 ppm CO_2
- 0 – 5 %vol. CO_2;	MBU/NA: 0.02/0.04 %vol. CO_2
- 0 – 50 ppm H_2S;	MBU/NA: 0.2/0.4 ppm H_2S
- 0 – 100 ppm H_2S;	MBU/NA: 0.4/0.8 ppm H_2S

Testing did not include the following functions described in these operating instructions:

- Data logger of LCD Module (chapter 2.1.7)
- Calibration of 4-20 mA input of standard transmitters (chapters 3.4.3 and 5.1.2)
- Manual and automatic field adjustment of digital transmitter (chapter 5.1.3)
- LCD Copy Module (chapter 7.7)
- "ADVANCED" relay (see manual "ConfigPro")
- MIMIC Module (chapter 7.8)
- Analogue Input Extension Module AEAM (chapter 2.1.9)

The metrological approval will only be valid if the gas detection system is used together with transmitters having the same approval.

[1] MBU/NA: Minimum end scale value and zero drift according to EN 45544. When connecting a transmitter, its respective values have to be observed. In case of combination, the higher value is valid.

11.3. Special Conditions for Safe Operation

- The control unit has to be operated in a way that one relay output must be configured as collective relay for all channel malfunctions.
- The outputs for measured values are to be operated as current outputs.
- Installation of the relay modules must not be subject to any oscillation, the impact of which could cause short-term false signals at the relay outputs.
- Please note that when employing the gas detection unit at very low concentrations of the target gas, measurement uncertainty is higher than 50% for the ranges of 0-5 %vol. CO_2 and 0-100 ppm H_2S.
- Indication on the LCD display must not be used for any safety control purposes.
- Alarm 3 must be configured to be latching when measuring combustible gases or oxygen.
- If a remote sensor with internal relays is used, it has to be ensured that a failure of data transmission to the remote sensor is unambiguously signaled. For this purpose a relay output of a relay module has to be configured in a way that a failure of data transmission and the subsequent loss of function of the transmitter relay are signaled. If more than one transmitter with internal relays is connected, this signal may be configured as a common signal.
- The operation of a Loop Module with transmitters of different type via the digital interface has to be certified by a separate supplement to the EC-type examination certificate.

12. Annex A: EC-Declaration of Conformity

EC-Declaration of Conformity

INDUSTRIAL SCIENTIFIC

It is declared that the gas detection system for measurement and detection of gases and vapours

WinPro® / MX62

with or without connection of **LOOP-Moduls** and with marking

CE 0158

⟨Ex⟩ **II (2) G**

complies with the essential safety requirements of the following European directives:

1. **Directive 94/9/EC** of the European parliament and the council on the approximation of the laws of the member states concerning equipment and protective systems intended for use in potentially explosive atmospheres

Applied European Standards:

EN 61779-1:2000+A11	Electrical apparatus for the detection and measurement of combustible gases - General requirements and test methods
EN 61779-4:2000	Electrical apparatus for the detection and measurement of combustible gases - Performance requirements for Group II apparatus indicating up to 100 % lower explosive limit
EN 61779-5:2000	Electrical apparatus for the detection and measurement of combustible gases - Performance requirements for Group II apparatus indicating a volume fraction up to 100 % gas
EN 50104:2002+A1	Electrical apparatus for the detection and measurement of oxygen - Performance requirements and test methods
EN 50271:2001	Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen - Requirement and tests for apparatus using software and/or digital technologies

EC-type-examination certificate: BVS 03 ATEX G 002 X and supplements 1 to 3
Certificate about acknowledgement of quality assurance production: DMT 03 ATEX ZQS/E172

Notified body 0158: EXAM BBG Prüf- und Zertifizier GmbH (former DMT), Dinnendahlstr. 9, 44809 Bochum, GERMANY

2. **Directive 89/336/EEC** on the approximation of the laws of the Member States relating to electromagnetic compatibility

Applied European Standards:

EN 50270:1999 (prEN 50270:2003)	Electromagnetic Compatibility: Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen: - The requirements for immunity and emission of type 1 and 2 are fulfilled

3. **Directive 73/23/EEC** on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits - Low voltage directive -

Applied European Standards:

EN 61010-1:2001	Safety requirements for electrical equipment for measurement, control and laboratory use - General requirements

This declaration is valid for all devices which are produced according the actual technical specification.

This declaration is given for the manufacturer

Winter GmbH, Gernotstraße 19, 44319 Dortmund, GERMANY

by procuration:

ppa. Anja Gropp

Dortmund, November 2007

WINTER GmbH, Gernotstr. 19, 44319 Dortmund, Tel. +49 (0)231/92 41-0, Fax +49 (0)231/92 41-25, e-mail: info@winter-gmbh.com, Internet: www.winter-gmbh.com

13. Annex B: Translation of Data Logger Messages

In the German version of the operation instructions for *MX62* this chapter contains the german translations for the Data Logger Messages which are in English language originally.

14. Annex C: Planning Aid: Functional Safety for *MX62*

14.1. Introduction

This document is a planning aid for any *MX62* system to be employed as part of a safety control installation.

Extracts of this document will also be integrated into the operating instructions of Gas Detection System *MX62* (version 2.2 and higher).

14.2. *MX62* as a part of safety control installations in compliance with directive EN 61508

The system *MX62* is designed for safety control installations complying with requirements of directive EN 61508 up to SIL 3 inclusive. Classification is based on directive DIN EN 50402 as specific standard for gas detection systems in addition to the aforementioned basic standard.

This document gives planning aid for integration of MX62 in a safety control installation:

- Definition of safety-related functions to be effected by *MX62*
- Definition of testing cycle for safety-related functions
- Requirements for the configuration of *MX62*
- Probability of failure on demand (PFD) of *MX62* for total failure assessment of the superior system in compliance with directive EN 61508

Note:

This planning aid only refers to aspects relevant to the avoidance or control of failures affecting regular system functions. Measuring during undisturbed operation is not taken into account. For this please refer to the respective notes in the operating instructions of *MX62* and of transmitters connected to it.

14.3. Definition of safety-related functions to be effected by *MX62*

Integrated into a safety control installation, the gas detection system *MX62* is a link of the chain, forming the overall safety structure. The safety-related function of *MX62* begins at the channel input of the Analogue Input Module and ends at the relay output of the gas detection system.

MX62 provides the following outputs:

- safety-relevant outputs:
  - Relay for system failure
  - Relay outputs (Basic Relay Module and Extension Relay Module)
- non-safety-relevant outputs:
  - Outputs for visual indication (LED, LCD and Logo Modules)
  - Analogue outputs for measured values (Analogue Output Module)
  - Relays to indicate emergency operation and maintenance mode

The chain of measurement processing always includes Analogue Input Modules, the Controller Module and data transmission.

Requirements for the safety-related functions of *MX62* follow the overall configuration of a safety control installation. In addition, any legal or locally applicable regulations need to be observed.

Example:
Requirements for functional safety of a relay output triggering a visual alarm on a control panel only are generally lower than those for a relay output activating emergency shutdown of the system.

14.4. Requirements for the configuration of *MX62*

- Directive DIN EN 50402 provides that a Safety Integrity Level (SIL) is allocated to each safety-related function of a gas detection system in conformity with the respective SIL laid down in directive EN 61508.

  The central functions of *MX62* which refer to the Controller Module and its operations are designed to correspond with the requirements of Safety Integrity Level 3.

  Different levels only apply to the inputs (transmitters, Analogue Input Module) and the various outputs. Table 1 lists the requirements for configuration of the hard- and software in accordance with the varying Safety Integrity Levels.

  Since visual indications are not integrated into the chain of safety control and will therefore not have any impact on the chain of safety control of *MX62*, these will not be taken into account for configuration requirements.

  ATTENTION!
  ADVANCED logic operations (see operating instructions *ConfigPro*) for the triggering of relay outputs are not metrological approved. Consequently, ADVANCED logic operations must not be employed for safety-relevant purposes.

When configuring *MX62*, please observe that each connected transmitter is monitored for any short circuit or interruption of power supply which will then trigger a fault alarm.

Note:
If two or more transmitters are to monitor the same area, it will have to be made sure that the transmitters will not stop operating for same reason such as poisoning of the sensor or power failure.

Requested SIL Level	Instructions for configuration	
	Input	Output
3	- Since directive DIN EN 50402 basically limits functional safety of the individual gas sensors to Safety Integrity Level 2, at least two transmitters need to be connected in order to achieve Safety Integrity Level 3. These transmitters have to monitor the same area. - It also has to be made sure that transmitters monitoring the same area do not fail for same reason. - Transmitters monitoring the same area, i.e. operating redundantly, should be allocated to one measuring group for configuration of software *ConfigPro*. - If transmitters monitor the same area and are not allocated to one measuring group, each will independently have to be able to initiate the safety-related function. This means that for relay configuration, no AND logic operation can be employed for these channels nor they can be part of a VOTING function. Moreover, both channels must be configured identically, e.g. having the same alarm levels. - With transmitters of SIL 2, two transmitters are required for the same area to be monitored and they are not allowed to fail for the same reason. - With transmitters of SIL 1, three transmitters are required for the same area to be monitored and they are not allowed to fail for the	- One relay output has to be configured for each transmitter. - The relays must operate in a closed circuit (to be set by jumper on the Basic Relay Module or Extension Relay Module). - The relay contacts of the safety-relevant relays linked to the Basic Relay Module or Extension Relay Module are to be connected in a way that each relay is, independent of other relays, able to provide safety control when de-energized or through a switching process. Example: Connection of the relays to break contact (e.g. for triggering audible alarms such as horns) need to be parallel while relays to make contact (e.g. disconnection of power supply to a motor) need to be switched in series. - Parameters must be identical for the triggering of all relays within the same area to be monitored. - The contacts of the safety-relevant relays are to be connected in a way that each relay can, independent of the other relays, implement the safety-related function. Moreover, a de-energized relay or Basic Relay Module/extension Relay Module has to provide safety control. - If the Controller Module fails (e.g. due to complete power failure), the safety-related function of the

	same reason. - It has to be made sure that inputs of those transmitters monitoring the same area are not connected to the same Analogue Input Module. - It has to be made sure that if the mains supply fails, the gas detection system will be provided with an emergency power supply.	unit will no longer be guaranteed. Therefore the relay for system failure has to be integrated into the safety structure designed by the user in a way that the de-energized relay for system failure will provide safety control. - The Basic Relay Module has, also within the MX62 housing, not to be connected by the flat cable but the bus cable. It has to be made sure that each channel (A/B) has its own cable.
2	- When employing a transmitter of SIL 2, no further transmitter is required for monitoring. - When employing transmitters of SIL 1, two transmitters are needed to monitor the same area. It also has to be made sure that the transmitters do not fail for the same reason. - Transmitters monitoring the same area, i.e. operating redundantly, have to be allocated to one measuring group in configuration of software *ConfigPro*. - If transmitters monitor the same area and are not allocated to one measuring group, each will independently have to be able to initiate the safety-related function. This means that for relay configuration, no AND logic operation has to be employed for these channels nor they can be part of a VOTING function. Moreover, both channels must be configured identically, e.g. having the same alarm levels. - It has to be made sure that inputs of those transmitters monitoring the same area are not connected to one Analogue Input Module.	- The relays must operate in a closed circuit (to be set by jumper on the Basic Relay Module or Extension Relay Module). - It is sufficient to use one relay output for each area to be monitored. - Should several transmitters be employed for monitoring the same area, the system has to be configured in a way that each transmitter can independently initiate the safety-related function (relay control). - If the Controller Module fails (e.g. due to complete power failure), the safety-related function of the unit will no longer be guaranteed. Therefore the relay for system failure has to be integrated into the safety structure designed by the user in a way that the de-energized relay for system failure will provide safety control.
1	- A transmitter of SIL 1 is sufficient.	- The relays must operate in a closed circuit (to be set by jumper on the Basic Relay Module or Extension Relay Module)
None	No further requirements	See Safety Integrity Level 1

14.5. Failure rates

The basic directive EN 61508 provides that, in view of separate safety-related functions forming part of the overall safety control installation, probability of a dangerous failure of the safety-related function is to be determined on demand. Probability rates of failure on demand defined for the safety integrity level of the overall installation need then to be adhered as lay down in directive EN 61508-1.

Since probability of failure on demand depends on the configuration of the safety-related function (single or two-channel control) as well as on its testing interval, rate results are as follows:

- Probability rate of failure on demand for a safety-related function with single channel control:
    - Testing of safety-related function at 3-month intervals: The probability rate of failure on demand is: $1{,}35 \cdot 10^{-3}$
    - Testing of safety-related function at 6-month intervals: The probability rate of failure on demand is: $2{,}66 \cdot 10^{-3}$
- Probability rate of failure on demand for a safety-related function with two-channel control:
    - Testing of safety-related function at 3-month intervals: The probability rate of failure on demand is: $4{,}37 \cdot 10^{-4}$
    - Testing of safety-related function at 6-month intervals: The probability rate of failure on demand is: $8{,}49 \cdot 10^{-4}$

Safety-related function with single channel control means that there is no redundancy at the in- or outputs.

Safety-related function with two-channel control means that there is redundancy at both the analogue inputs and relay outputs.

The rates indicated are based on the assumption that the fixed intervals for inspection and maintenance of *MX62* and its transmitters are adhered to. These intervals need to be determined prior to start-up of the central unit of the gas detection system.

14.6. Instructions for employment

- Please observe that the gas detection system *MX62* is not subject to any oscillation when forming part of a safety control installation.
- When employing remote relay modules, i.e. relay modules not positioned inside the *MX62* housing, it has to be made sure that the two channels (A/B) of the relay module are connected with the controller module via two separate bus cables having a different layout.
- The safety-related function must be checked on its performance at regular intervals. The testing cycle has to be defined prior to start-up of the central unit of the gas detection system. See chapter 4 for optional testing cycles and their impact on the probability rate of failure on demand.
- The relay for system failure has to be checked on its performance at regular intervals. This verification should be carried out while checking the safety-related function.
- All remote modules forming part of a safety-related function including their cable connections must be protected mechanically as well as against electromagnetic interferences.
- All channel malfunctions need to be evaluated and transmitted by at least one relay. Suitable repair works has to be done in adequate period of time.

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1 Les Plus
Au travers de notre service client, à répondre rapidement et efficacement à vos besoins de conseil, de suivi de commande, et ce, partout dans le monde.
A répondre dans les plus brefs délais à toutes questions d'ordre technique.

2 Qualité
A vous assurer la meilleure qualité de produits et de services conformément aux normes et directives internationales en vigueur.

3 Fiabilité & Contrôles
A vous fournir un matériel fiable. La qualité de notre production est une condition essentielle à cette fiabilité. Elle est garantie grâce à des vérifications très strictes réalisées dès l'arrivée des matières premières, en cours et en fin de fabrication (tout matériel expédié est configuré selon vos besoins).

4 Mise en service
A mettre en service, sur demande, votre matériel par nos techniciens qualifiés Ism.ATEX. Un gage de sécurité supplémentaire.

5 Formation
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6 Contrat d'entretien
A vous proposer des contrats d'entretien évolutifs au regard de vos besoins pour vous garantir une parfaite sécurité :

- Une ou plusieurs visites par an, garantie totale ou partielle,
- Renouvelable par tacite reconduction,
- Incluant le réglage des détecteurs de gaz fixes ou portables et le contrôle des asservissements.

7 Dépannage sur site
A faire intervenir nos techniciens du **Service Après Vente** rapidement. Ceci est possible grâce à nos implantations de proximité en France et à l'étranger.

8 Dépannage en usine
A traiter tout problème qui ne pourrait être résolu sur site par le renvoi du matériel en usine. Des équipes de **techniciens spécialisés** seront mobilisées pour réparer votre matériel, dans les plus brefs délais, limitant ainsi au maximum la période d'immobilisation.
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Through our customer service to respond to your needs for advice and order follow-up services wherever in the world you may be.
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To provide you with products and services of the best quality, in accordance with current international directives and regulations.

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That our Ism.ATEX qualified technicians will start up your equipment, if you wish so. This gives you the guarantee of additional safety.

5 *Training*
Will train on risks, on products and on consulting: Highlights that meet your needs.

6 *Maintenance contract*
To offer you open-ended maintenance contracts according to your needs so as to give you the guarantee of complete safety:

- *One or more visits a year, comprehensive or partial warranty,*
- *Renewal by tacit agreement,*
- *Including the adjustment of fixed or portable gas detectors, the calibration of equipment and the verification of servo-control systems.*

7 *Field servicing*
*To send out our **After-Sales Service** technicians quickly for servicing on your site. This is made possible by our efficient network in France and other countries.*

8 *Factory repairs*
*We give the undertaking that any problem that cannot be solved in the field will be dealt with by the return of the equipment concerned to our factory. Teams of **specialized technicians** are on hand to ensure the immediate repair of your equipment in the shortest possible time, so keeping downtimes for your equipment to a minimum.*
For any specific technical question, please contact our technical support service : 00 33 3 21 60 80 80

NOTRE MISSION

Protéger l'Homme dans ses activités professionnelles.
Fournir la plus haute qualité et le meilleur service client
à chaque échange, à chaque instant.

OUR MISSION :

Preserving human life on, above and below the earth.
Delivering highest quality, best customer service...
every transaction, every time.

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