

Translation

Test Report

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(2)

Functional safety of fixed gas detection systems

(3)

BVS Pb 04/06 X

(4)

Equipment: Gas detection system WinPro / MX 62



(5)

Manufacturer: Winter GmbH

(6)

Address: Gernotstr. 19, 44319 Dortmund, Germany

(7)

The design and construction of this equipment and any acceptable variation thereto are specified in the appendix to this test report.

(8)

The Expert Body for Safety Related Process Control Devices of EXAM BBG Prüf- und Zertifizier GmbH certifies that this equipment has been found to comply with the requirements of

DIN EN 50402:2006 Electrical apparatus for the detection and measurement of combustible or toxic gases or vapours or of oxygen - Requirements on the functional safety of fixed gas detection systems

DIN EN 50402:2006 requires evidence of the fulfilment of the requirements of DIN EN 61508-3 for gas detection systems if software is part of a safety function. The examination of the software of the gas detection system WinPro / MX 62 according to DIN EN 61508-3 was not a subject of the tests which form the basis of this test report. The fulfilment of the requirements of this standard has to be verified in a separate examination for the relevant safety integrity level.

(9)

If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11)

This test report relates only to the design, examination and tests of the specified equipment in accordance to DIN EN 50402.

(12)

The marking of the equipment shall include the following:
Not relevant.

EXAM BBG Prüf- und Zertifizier GmbH

Bochum, dated 11. April 2006

Signed: Dr. Eickhoff

Signed: Willemeit

Special services unit

Testing officer

(13) Appendix to

(14) **Test Report**

BVS Pb 04/06 X

(15) 15.1 Subject and type

Gas detection system WinPro / MX 62

15.2 Description

The gas detection system WinPro / MX 62 is a fixed analysis and control system for combustible or toxic gases or vapours in the air or of oxygen.

The maximum configuration allows to connect up to 64 transmitters to the system (max. 8 transmitters can be connected to max. 8 input modules) as well as 128 relays and 64 analog outputs.

The input modules of the system receive 4-20 mA analog signals from the transmitters. The input module digitalizes these signals and transfers them to the controller module. Here the signals are processed and then issued to the following (partly optional) modules:

- LED module
- System LEDs
- LCD module (optional)
- Analog output module(s) (optional)
- Relay module(s)

Additionally, system relays may signalize operating states and special states (e.g. operation, emergency operation, fault).

Depending on the system configuration and the type of the output module, the data processing and data transmission is carried out either completely or partly redundant.

The following software versions were subject of the examinations:

- Controller module (CM): 1.14
- Relay basic module (RBM): 1.01

The safety function of the gas detection system WinPro / MX 62 considered has been specified by the company Winter GmbH. Depending on the respective configuration, the safety function is provided by one or two relays being cut off in case the threshold of a gas concentration is exceeded or falls below; these relays are located on one or two relay basic module(s) respectively relay add-on module(s). The cut-off of the relay(s) enables the safe state of the equipment under control (EUC).

The safety function of the gas detection system WinPro / MX 62 can be configured in two variations:

1. "Single channel system variation":

For this system variation, one sensor (with a SIL-capability of 2) is connected to one analog input module. This module transmits the measured values received to the controller module which, depending on the gas concentration measured, will either enable one relay (located on a relay basic module respectively relay add-on module) or perform a cut-off.

2. "Redundant system variation":

For this system variation, two sensors (each with a SIL-capability of 2) are connected to two analog input modules (each one to one analog input module). These modules transmit the measured values received to the controller module which, depending on the gas concentration measured, will either enable two relays (located on one or two relay basic module(s) respectively relay add-on module(s)) or perform a cut-off.

This configuration is redundant, i.e. as soon as one sensor recognizes the condition for a cut-off, the safe state for the equipment under control (EUC) will be achieved by the execution of the safety function and the cut-off of one relay.

The following hardware components are part of the safety function of the gas detection system WinPro / MX 62:

- Analog input module (AEM) and
- Controller basic module (CM-Basic) and
- Controller power module (CM-Power) and
- Relay basic module (RBM) and/ or
- Relay add-on module (REM)

The following hardware components are not part of a safety function:

- Analog output module (AAM)
- LCD module (LCDM)
- LED module (LEDM)

15.3 Parameters

Nominal voltage U_N :	230 V AC, 50 Hz or 24 V DC (-20 % + 15 %)
Power consumption:	Depending on the number of modules and connected transmitters (power consumption max. 3.5 VA per connected transmitter).
Input:	Max. 64 transmitters can be connected (i.e. 8 analog input modules and up to 8 transmitters can be connected to each input module)
Ambient temperature:	0 °C ... +55 °C
Storage temperature:	-25 °C ... +60 °C
Output:	Max. 128 relays (8 relay modules with up to 16 relays on each module)
Relay contacts:	Changeover contacts (power rating: 250 V AC, 6 A, resistive load)

(16) Test results

“Single channel system variation”:

The “single channel system variation” of the gas detection system WinPro / MX 62 fulfils the requirements for a

SIL-capability of 2 ¹⁾

according to DIN EN 50402:2006 with a

PFDF of $2.66 \cdot 10^{-3}$ for a proof test interval of six months for the test of the safety function respectively with a

PFDF of $1.35 \cdot 10^{-3}$ for a proof test interval of three months for the test of the safety function

“Redundant system variation”:

The “redundant system variation” of the gas detection system WinPro / MX 62 fulfils the requirements for a

SIL-capability of 3 ¹⁾

according to DIN EN 50402:2006 with a

PFDF of $8.49 \cdot 10^{-4}$ for a proof test interval of six months for the test of the safety function respectively with a

PFDF of $4.37 \cdot 10^{-4}$ for a proof test interval of three months for the test of the safety function

¹⁾ DIN EN 50402:2006 requires evidence of the fulfilment of the requirements of DIN EN 61508-3 for gas detection systems if software is part of a safety function. The examination of the software of the gas detection system WinPro / MX 62 according to DIN EN 61508-3 was not a subject of the tests which form the basis of this test report. The fulfilment of the requirements of this standard has to be verified in a separate examination for the relevant safety integrity level.

(17) FLES-test report
FLES-Nr. PB05029, dated 28th March 2006

(18) Special conditions for safe use

General requirements and conditions:

- When sensors and actuators are connected to the gas detection system, it has to be ensured that the safety instrumented system resulting thereof fulfils the requirements of DIN EN 61508 resp. DIN EN 50402:2006 for the safety integrity level required (SIL).
- The idle current principle has to be applied for relays which are part of the safety function.
- The deenergized state of relays which are part of the safety instrumented system has to enable the safe state of the equipment under control (EUC).
- If the usage of more than one sensor is necessary to fulfil the requirements of the required safety integrity level, it is to ensure that each sensor is connected to a separate analog input module.
- Each sensor which is part of the safety instrumented system has to be able to perform the safety function independently of other sensors (e.g. 1oo2 or 1oo3 sensor architecture). This has also to be considered when configuring the system (e.g. setting parameters of alarm thresholds).
- It is to ensure, that all sensors, which are part of the safety instrumented system, cannot fail by the same cause (e.g. sensor poisoning).
- The system failure relays have to be integrated into the safety function in such a way that the deenergized state of these relays enables the safe state of the equipment under control (EUC). This, however, is not required for the application of the gas detection system WinPro / MX 62 for safety functions of safety integrity level 1.
- The safety functions of the gas detection system WinPro / MX 62 have to be tested periodically. Proof test intervals, which have been considered for the assessment of the functional safety of the gas detection system WinPro / MX 62, can be obtained from clause (16) of this test report.
- The function of the system failure relays has to be tested periodically. The proof test intervals shall not exceed the intervals for the safety functions test.
- The gas detection system WinPro / MX 62 shall not be subjected to any vibrations if it is used in safety-related applications.
- Modules and their associated connecting leads which are part of the safety instrumented system and located outside the cabinet shall be installed in a way that they are protected against mechanical and electromagnetic influences.
- Channel failures shall be signaled by a separate relay output. These fault indications have to be analyzed. Restoration measures have to be executed within an adequate space of time.

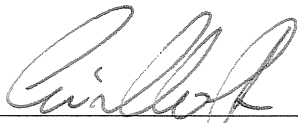
Special requirements and conditions for the application of the gas detection system WinPro / MX 62 for safety functions of safety integrity level 3:

- The gas detection system WinPro / MX 62 has to be connected to an uninterruptable power supply (UPS) which takes over the power supply of the system in case of a power failure.
- It is required to apply two relays to obtain a SIL-capability 3. The relay basic module, on which these relays are located, has to be connected by two separate bus cables. The application of ribbon cables is not permitted.
- The relay contacts of relays which are part of the safety instrumented system have to be connected in such a way that both relays are able to perform the safety function independent of each other (connection of the relay contacts in series if normally open contacts are used; connection of the relay contacts in parallel if normally closed contacts are used respectively).
- The same conditions for the performance of a cut-off have to be configured for all relays which are part of a safety function.

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

44809 Bochum, 11. April 2006
BVS-Wil/Ar A 20060245

EXAM BBG Prüf- und Zertifizier GmbH


Special services unit


Testing officer