

Enhanced



## Model 9010/9020 LCD Control Unit

[The Sophisticated Hazardous Gas Warning System]

MSA's 9010/9020 LCD control units are designed to offer maximum flexibility to work in conjunction with a wide variety of remote sensors to provide reliable gas detection in a wide range of industries and applications.

Advanced design using SMD and mostly RoHS Directive compliant components throughout and innovative features put the 9010/9020 LCD control units a step ahead of any conventional gas warning system.

The 9010 LCD operates with one independent sensor [single channel] while the 9020 LCD operates with

two independent sensors [dual channel] per control module offering considerable cost saving while maintaining high reliability and performance.

Modular design combined with dual channel capability allows for high density packaging in a single 19" rack [up to 20 points].

A high level of reliability is possible as each control module is fitted with an independent AC/DC power supply transformer and logic circuit with software validated according to ATEX Directive 94/9/EC.



**9010/9020 LCD:** 19" rack with up to 10 modules [20 points-9020], or as a half rack with up to 5 modules [10 points-9020], or a quarter rack with up to 2 modules [4 points-9020].



**9010 LCD:** Single channel IP 54 wall mount.



**9020 LCD:** Dual channel IP 54 wall mount.  
[ABS housing with up to five modules also available.]



**9020-4 LCD:** Four channel IP 65 wall mount with common alarm.  
Marine Directive Ⓜ MED 96/98/EC approved for all demanding applications. Please ask for specific leaflet 07-517.2.

## [ Features ]

- ATEX 94/9/EC compatible where applicable
- Failure status for low AC/DC power
- Over range EEEE latching
- Series connected opto-isolators provide failure status
- Redundant dual contact failure relay [selectable latching/non-latching function]
- Alarm threshold inhibit
- Choice of measuring units – LEL-LELm-PPM-% Vol-g/m<sup>3</sup> or blank
- Operates with a complete range of gas sensors and transmitters including semiconductor sensors, conventional smoke and temperature sensors, manual call points, thermo-resistive cable
- 4–20 mA current loop accept [one person]
- Full internal diagnostics
- User-friendly configurable operation
- Firmware can be easily loaded via laptop
- Versatile system functions with logic levels
- Adjustments via membrane keypads
- Up to 20 channels per rack
- Individual terminal blocks per module

## [ LCD Display ]

The 9010/9020 LCD features large 4-digit 7-segment back lit Liquid Crystal Display and high brightness LED's to provide ease of reading and alarm visualisation.

The display provides information on the gas concentration, alarm status, measurement units, flags indicating status and settings such as calibration interval, time-out function, alarm ON delay and alarm inhibit.

## [ TWA-STEL ]

When operating in connection with toxic sensors, the 9010/9020 LCD can be set to alarm when relevant STEL and TWA values are exceeded.

## [ Sensor Wiring ]

According to the specific application, the remote sensors can be connected by means of 2, 3 or 4 wire cabling.

## [ Benefits ]

- Meets ATEX Directive 94/9/EC requirements
- A multi-purpose version which accepts both bridge [mV] and active [4–20 mA] input signals
- A cost-effective version operating on a 4–20 mA input signal is also available
- Satisfies a variety of gas monitoring applications/industries
- Inherent reliability minimises spurious alarms and unexpected “down-time”
- No tools required for adjustments [operation by Access Code]
- High density monitoring

Each control module has an independent LCD display specific to each channel and three keys for configuration, calibration and routine operation. Specific access codes to the various features prevent accidental or undesired tampering.

Error and failure messages on the display warn of any operational anomalies.

Each channel may be equipped with an optional card to provide opto-isolated outputs for the three alarm thresholds:

**C** [Caution] **W** [Warning] **A** [Alarm]. The card may either be with common emitter or common collector output.

Each module has two [SPDT] relays with change-over contacts for remote repeat of Warning [W] and Alarm [A] conditions [common to both channels in the 9020 LCD version].

The analogue output signal for each channel can be linearised.

An RS-485 interactive serial interface is available [double on request]. A customised ModBUS RTU protocol can be used for serial bus data transmission such as system configuration, gas concentration, alarm and failure events, alarm inhibit and reset.

In addition to handling the sensor input signal [by current or voltage] the 9010/9020 LCD can also power the remote sensors [by constant current or voltage] enhancing the versatility of the system.

The 9010/9020 LCD control units can be configured to meet the stringent requirements of the ATEX Directive 94/9/EC for combustible gas monitoring or to meet any other applications in gas detection including process control, such as suppressed Zero reading and reverse full scale range and output signal.

## [ Type Approvals ]

The 9010/9020 LCD control units are certified to meet the performance requirements of the following type approvals:

**Europe:** EN 61779-1, EN 61779-4, EN 50271, EN 50104, EN 50402 [INERIS 00ATEX0028X], SIL 2 [pending], SBG Certificate No. 213.010 SOLAS 74/88

[☉ MED 96/98/EC]

RINA Certificate No. ELE 04 CS 176101,

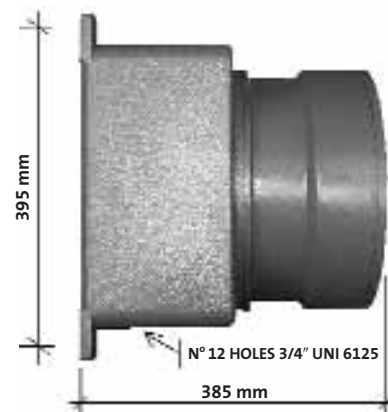
**China:** CCCF GB 16808-97 [pending]

**USA:** MET Laboratories, Inc. Listing no. E112409, FM approval [pending]

**Russia:** Pattern Approval Certificate of Measuring Instruments DE.C.31.001A No. 22292, GOST R ROSS DE.GB05.V02463

**Ukraine:** Pattern Approval Certificate of Measuring Instruments No. UA-MI/1-1921-2006

⚠ housing [ATEX] with up to 4 modules [8 points-9020 LCD].



For installation in classified Zones 1 and 2.

## [ Rack Dimensions ]

Number of modules	weight [kg]	width [mm]	height [mm]	depth [mm]
10	12.50	482.60	132.50	270.00
5	6.60	279.52	132.50	270.00
2	3.00	157.60	132.50	270.00

## [ Wall Mount Dimensions ]

Number of modules	weight [kg]	width [mm]	height [mm]	depth [mm]
1	2.00	255.00	180.00	90.00
2	11.00	300.00	400.00	150.00
1 to 5 ABS	3.00–4.50	205.00–355.00	223.00	360.00

## Technical Data

Power supply	115/230 VAC $\pm$ 15% 50/60 Hz 24 VDC $\pm$ 15% – 20%	
Power consumption [no load]	<b>9010 LCD</b>	<b>9020 LCD</b>
■ AC supply 24 VA transformer	13 VA	15 VA
■ DC supply 24 VDC nominal	3 W	4 W
Sensor supply		
■ Constant current	5–500 mA	5–500 mA
■ Constant voltage	3–24 VDC	3–24 VDC
Sensor connection modes	2-3-4 wires	
Connection terminals	for wires up to 2.5 mm <sup>2</sup>	
Input signals	10–200 mV/4–20 mA	
Output signals can be linearised		
■ Analogue [normal]	0–20/4–20 mA [selectable] floating	
■ Analogue [fault]	0/2/4/20 mA/frozen [selectable]	
Serial interface	RS-485	
Alarm levels 3	C [Caution] W [Warning] A [Alarm]	
Alarm remote repeat		
■ Via relay contacts [SPDT]	5 A @ 24 VDC/250 VAC*	
■ Via opto-isolators [common collector or common emitter]	30 mA @ 24 VDC max.*      * resistive load	
Fault and below zero drift alarm		
■ Via relays	common to both channels on 9020 LCD and one channel on 9010 LCD	
■ Via opto-isolators	individual for each channel [optional card either common collector or emitter]	
Alarm handling		
■ Reset	latching/non-latching	
■ ON delay	0–9999 sec adjustable	
■ Automatic inhibit	by specific Access Code	
■ Manual inhibit	by specific Access Code	
Electronic speed of response	< 0.5 sec for 100% f.s.	
Span and Zero drift	< $\pm$ 0.5% f.s. $\pm$ 1 digit/month	
Repeatability	$\pm$ 1% f.s. $\pm$ 1 digit	
Operating temperature	–10° C to +50° C	
Storage temperature	–20° C to +75° C	
Humidity	90% R.H. non-condensing	
Vibrations	unaffected within 10 to 55 Hz, 0.15 mm bandwidth	
LCD display	back lit Liquid Crystal Display/ 4 digit 7 segments	
Optical alarms	high brightness LED's	
Warm-up and self-diagnosis time	60 sec/channel	
Time-out setting	2–6 min	
Default and configuration data	stored in EEPROM/MP	

## Protections

- AC/DC automatic switching in case of mains failure by means of electronic switch
- Accidental tampering by specific Access Codes and Password
- Software self-diagnosis by watch-dog and check-sum



## A/D Converter

- For controls 16 bit  $\pm$  1 @ 25° C with 4 multiplexed inlets
- For analogue signal 16 bit  $\pm$  1 @ 25° C with 2 multiplexed inlets

Front panel size 3 U x 8 T. E.

Weight 720 g

Electrical installation category II

ATEX designation  II [2] G [1] G certificate INERIS 00 ATEX 00 28X  
 II 2GD EEx d IIC T5 IP 65 EC-type  
Certificate INERIS 01 ATEX 0057 Ex-proof housing

## Approvals

EMC 89/336/EEC-EN 50270  
TEST REPORT 78550 EMC NEMKO  
LOW VOLTAGE 73/23/EEC  
TEST REPORT 78550 SAF NEMKO  
VIBRATIONS [9020-4 LCD only]  
NEMKO IND 2172-1/03

## Ordering Information

10093583	9010 LCD 24 VA mV & mA
10093585	9010 LCD 24 VA 4–20 mA
10093582	9020 LCD 24 VA mV & mA
10093584	9020 LCD 24 VA 4–20 mA
10093662	9010 LCD wall mount IP 54
10093663	9020 LCD wall mount IP 54
10093664	9020-4 LCD wall mount IP 65
10094046	Opto-isolator card common collector
10094047	Opto-isolator card common emitter
10093586	9010 main pcb with header
10093588	9020 main pcb with header
10029374	Blank panel
10029329	Rack 19"/2 slots
10029370	Rack 19"/5 slots
10029328	Rack 19"/10 slots
10035782	Rack, mounting plate & ABS enclosure 5-way
10035783	Rack, mounting plate & ABS enclosure 2-way

Ex-proof ATEX version system is available on request





## 9020-4 LCD Wall Mount Control Unit

[ Gas Warning System for Marine Applications ]

The hazardous gas warning system 9020-4 LCD meets the application requirements of monitoring for combustible gas and oxygen deficiency hazards on board tankers and has received the distinctive wheelmark certification.

The 9020-4 LCD is designed to offer maximum protection and flexibility with ease of use in the demanding conditions on board vessels. In conjunction with remote sensors the 9020-4 LCD provides reliable and continuous gas detection.



# 9020-4 LCD features easy and reliable

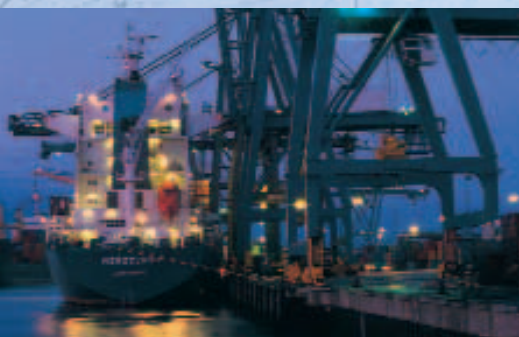
Advanced design using SMD components throughout together with innovative features put the 9020-4 LCD Control Unit a step ahead of any conventional gas warning system.

Sophisticated software, sturdy wall mount sheet metal enclosure and a vibration-proof printed circuit board locking system enable the 9020-4 LCD to provide reliable performance at economical cost.



## [ Features and Benefits ]

- ATEX 94/9/EC and MED 96/98/EC approved
- 4-digit, 7-segment back lit Liquid Crystal Display – one for each measuring channel
- High-brightness alarm LED's on front door
- Choice of measuring Units – LEL, LELm, PPM, %Vol, g/m<sup>3</sup> or blank
- Redundant dual contact failure relay with safety function
- Alarm threshold inhibit
- User-friendly software configuration by specific Access Codes
- Each Channel has three alarm thresholds: Caution, Alarm, Warning
- Analogue output signal for each channel with linearisation
- RS-485 common serial interface ModBUS RTU data transmission
- 4–20 mA current loop calibration at Transmitter only [one person]
- Full internal diagnostics
- Versatile system functions with logic levels
- Common alarm, horn and failure relay contacts available on terminal board
- Sheet metal vibration-proof IP 65 enclosure with bottom gland plate for cable entry





# ble gas detection on board vessels

## [ Sensors ]

9020-4 LCD operates with a complete range of gas sensors and transmitters: Toxic, Combustible and Oxygen.

Four independent sensors/transmitters provide common alarm relay contacts on an easy to access customer terminal board. The sensors can operate either in diffusion or in flow-mode if used with a sampling system.

## [ Sampling System ]

The 9020-4 LCD can also operate in conjunction with a sampling system for remote monitoring. Typically the sampling system is supplied piped and wired on a mounting plate ready for operation. The sampling system includes in-line filters, 3-way valves, needle valves, flow-meters to provide a flow-failure alarm, compressed air ejectors to pull the sample gas and flow-through sensor adaptors.



## [ Approvals ]

The 9020 LCD and its software is approved according to ATEX Directive 94/9/EC with the performance requirements of EN 61779-1, EN 61779-4, EN 50271, EN 50104 – INERIS 00ATEX0028X.

SIL 2 certificate [pending].

Additionally it meets the requirements for gas detection as indicated in the IMO document MSC/Circ 774 of 12.12.96 regarding revised measures to prevent explosions in oil tanker cargo pump-rooms. According to the MED 96/98/EC [Wheelmark], certified by “See-Berufsgenossenschaft” No. 213.010, 31.08.2013.

RINA Certificate no. ELE 04 CS 176101

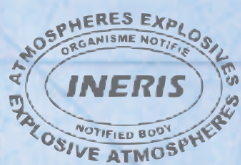
China: CCCF GB 16808-97 [pending]

USA: FM approval [pending]

Russia: GOST R ROSS DE.GB05.V02463

Ukraine: Pattern Approval Certificate of Measuring Instruments No. UA-MI/1-1921-2006

# ATEX



## [ Technical Specification ]

<b>Power supply</b>	115/230 V $\pm$ 15% 50/60 Hz 24 VDC $\pm$ 15% – 20%
<b>Power consumption</b>	
DC supply 24 V nominal	8 W
AC supply	30 VA
<b>Sensor supply</b>	5 – 500 mA Constant Current 3 – 24 VDC Constant Voltage
<b>Sensor connection modes</b>	2, 3 or 4 wires
<b>Connection terminals</b>	for wires up to 2.5 mm <sup>2</sup>
<b>Input signals</b>	10 – 200 mV/4 – 20 mA
<b>Output signals</b>	can be linearised
Analogue [normal]	0 – 20/4 – 20 mA [selectable] per channel-floating
Analogue [fault]	0/2/4/20 mA/frozen [selectable]
<b>Serial interface</b>	RS-485 common to four channels
<b>Alarm levels</b>	Caution Warning Alarm
<b>Visual Alarms</b>	high brightness LED's
<b>Remote Alarm repeat</b>	normally energised relays
<b>Relay contacts on terminal blocks</b>	5A @ 24 VDC / 250 VAC resistive load Caution N/O Warning N/O or N/C Alarm N/O or N/C Fault SPST Horn N/O
<b>Enclosure Dimensions</b>	width 300 mm, height 400 mm, depth 150 mm
<b>Weight</b>	11 kg

## [ Ordering Information ]

10093664	Wall Mount 9020-4 LCD
10056301	Sampling System 2 point Mounting plate
10048862	Combustible gas sensor 47K-PRP, St.St., NPT, EExd, with junction box
10048853	Combustible gas sensor 47K-PRP, St.St., M 25 x 1.5, EExe, with junction box
D0742601	DF-9500 Transmitter O <sub>2</sub>
10056093	Active Barrier

Additional MSA sensors/transmitters are available for different applications.  
Please contact the nearest MSA representative.

<b>Alarm handling</b>	
Reset	latching/non-latching
On Delay	0 – 999 s adjustable
Automatic inhibit	by specific Access Code
Manual inhibit	by specific Access Code
<b>Electronic speed of response</b>	< 0.5 s for 100% f.s.
<b>Span and Zero drift</b>	< 0.5 % f.s. $\pm$ 1 digit/month
<b>Repeatability</b>	$\pm$ 1% f.s. $\pm$ 1 digit
<b>Operating temperature</b>	–10 °C to +50 °C
<b>Storage temperature</b>	–20 °C to +75 °C
<b>Warm-up time</b>	120 s [including self-diagnostics]
<b>Humidity</b>	90% R.H. [non-condensing]
<b>Vibration</b>	according to RINA Rules 2003 and IEC 60068-2-6
<b>Calibration and configuration data</b>	stored in EEPROM/Micro
<b>Protections</b>	
AC/DC	automatic switching in case of mains failure by means of electronic switch
Accidental tampering	by specific Access Codes and Password
Software self-diagnostics	by watch-dog and check-sum
<b>Installation</b>	Group II Category [2] G [1] G
<b>ATEX designation</b>	Ⓔ II [2] G [1] G certificate INERIS 00 ATEX 0028X
<b>Wheelmark designation</b>	See-Berufsgenossenschaft, Certificate 213.010 31.08.13; SOLAS 74/88 IMO MSC 98 [73]
<b>Approvals</b>	EMC 89/336/EEC – EN 50270 TEST REPORT 78550 EMC – NEMKO LVD 73/23/EEC TEST REPORT 78550 SAF – NEMKO VIBRATIONS TEST REPORT IND 2172-1/03 NEMKO IP 65 NEMKO TEST REPORT PT 00695/04 EN 60529



47K metric



47K NPT



DF-9500

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