- Read prior to operation!
- Observe all safety instructions!
- Keep for further reference!

Gas Measuring System
Operating Instructions

CE

EURO-GAS MANAGEMENT SERVICES LTD, CHURSTON HOUSE,
BASCOMBE ROAD, CHURSTON FERRERS, DEVON, TQ5 0JJ, UK
TEL: +44 (0)1803 844414 FAX: +44 (0)1803 844224
sales@euro-gasman.com www.euro-gasman.com

EURO-GAS
MANAGEMENT SERVICES LTD

TABLE OF CONTENTS

1. FOR YOUR SAFETY

Observe the instructions for use

Any use of the gas measuring system requires full understanding and strict observation of these operating instructions. The gas measuring system is only to be used as described in section 1.2

Servicing

The gas measuring system must be inspected and serviced regularly by trained personnel. Maintenance work on the gas measuring system may only be carried out by trained personnel. (See sections 1.4 and 5)

Certified for operation in areas subject to explosion hazards

The gas measuring system is certified for operation in areas subject to explosion hazards (Zones 1 and 2) and has an EC Type Examination Certificate in accordance with Directive 94/9/EC as follows:

IBExU 12 ATEX 1080 X
II 2G Ex de IIC T6/T4 Gb
Ambient temperature range:
T4: -40°C to +60°C / T6: -40°C to +50°C

WARNING!
These operating instructions do not contain all the information necessary for the safe operation of the device. Please acquaint yourself with the regulations and operator's obligations that apply in your area. In addition to these operating instructions, for example, you should observe and instruct others concerning the universally valid legal and other binding regulations for the prevention of accidents and protection against accidents.

1.1. SAFETY INFORMATION AND TIPS

A number of warnings are used in these instructions concerning some of the risks and dangers that may occur during the use of the gas measuring system. These warnings contain "signal words" designed to draw attention to the degree of danger that is to be expected.

These signal words and the associated hazards are as follows:

	**DANGER!** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

	**WARNING!** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

	**CAUTION!** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or material damage. It may also be used to alert against unsafe practices.

	**IMPORTANT!** Indicates information concerning use and other useful information

1.2. INTENDED USE

Proper use of the gas measuring system:

- The gas measuring system may only be used to measure the concentration of combustible gases and vapours in air to detect a potential explosion hazard.
- The device may only be used in potentially explosive atmospheres caused by gases (G) in zones 1 and 2.

	**DANGER!** **Danger to life due to fire and explosion!** Since flammable gases and vapours above a certain concentration are explosive, in addition to fires they can also trigger explosions. Users and operators of the system must ensure that, in the event of increased gas concentrations, suitable measures are taken for personal protection in accordance with the statutory regulations. These include, for example, increasing the supply of fresh air, and shutting down and evacuating the plant.

There must be no substances contained in the air mixture to be measured that may contaminate the sensor. In this case the sensor would output measured values that are too low! Sensor poisons include silicones and heavy metals (leaded petrol!).

It is essential to mount the gas measuring system only as described in section 3.3 and adheres to the stated ambient conditions (e.g. temperature limits)!

	**IMPORTANT!** The gas measuring system is a safety device and must only be repaired by the manufacturer. Do not tamper with or modify the gas measuring system, otherwise it might not measure the gas concentration reliably.

The gas measuring system is calibrated at the factory for a specific gas (e.g. either methane or hydrogen; other gases on request). This is noted in the enclosed test report. Due to the characteristics of the sensor, however, there always remains some cross sensitivity to other flammable gases.

The measurement signals from the gas measuring system must be evaluated and further processed by a downstream device of the user.

	**WARNING!** If the gas measuring system is used for a danger alarm, **the main alarm of the gas warning unit must be latching**. If the concentration of flammable gases/vapours increases greatly during an interruption to the power supply, then after the power has been reinstated the measuring system may in some circumstances only output a low % LEL value. In this case, the cause of the false measured signal is the pellistor, which requires a certain concentration of oxygen in the ambient air in order to function correctly ("ambiguous" measured value).

	**DANGER!** **Danger to life due to poisoning!** Certain flammable gases and vapours such as CO and NH3 are in addition toxic. Toxic concentrations cannot, however, be detected in time with the measuring system since it is not sufficiently sensitive.

	**IMPORTANT!** It is essential to observe the information given in these operating instructions with regard to operation, maintenance and servicing. Faults must be rectified immediately.

1.3. OTHER DANGERS

Despite its careful design, other dangers remain when handling the gas measuring system. The following are known to us:

	**DANGER!** • Electrical voltages, danger to life due to electric shock or burns. • Do not bring into contact with water. • Before opening the gas measuring system, safely disconnect the mains voltage (safe electrical isolation). • Electrical work should only be carried out by a qualified electrician. • Only install in a voltage-free state. • Not open while energized.

	**DANGER!** **Danger to life due to fire and explosion!** Certain external conditions may lead to the gas measuring system being **unable to measure** a possibly present increased concentration of flammable gases, e.g. in the event of a power failure. In this case, users and operators of the system must ensure that suitable measures are taken to protect personnel in accordance with statutory regulations.

1.4. QUALIFICATION OF PERSONAL

Only qualified mechatronic engineers or persons with comparable training may mount, install or commission the gas measuring system or carry out any maintenance and servicing work.

Only qualified electricians may carry out work on the electrical system.

Activities to be carried out by authorized and qualified personnel. This qualification includes:

- Training, experience and knowledge of the regulations, standards and accident prevention regulations
- Appropriate expertise on explosion protection, the equipment technology and the activities to be undertaken (commissioning, tests, etc.)

The operator must instruct all users of the system on the basis of these operating instructions. The minimum age is 16 years. An experienced person must supervise juveniles and apprentices when working on the gas measuring system.

Any work that is not described in these operating instructions must be executed by the manufacturer.

i	**IMPORTANT!** The gas measuring system is a safety device and must only be repaired by the manufacturer. Do not tamper with or modify the gas measuring system, otherwise it might not measure the gas concentration reliably.

2. PRODUCT DESCRIPTION

2.1. DESIGN OF THE GAS MEASURING SYSTEM

The sensor sits in an approx. 46 mm long stainless steel probe tube. Cable entry is by means of a screwed cable gland M16x1,5 (clamping area 6-10 mm). The aluminium housing incorporates: a four-digit, alphanumeric display, two buttons and the transmitter with a signal amplifier and a 4-20mA analogue output (see Figure 1). The transmitter processes and transmits the measured signals. The gas measurement system is connected via a three-wire shielded cable.

Figure 1: Gas measuring system

2.2. PRINCIPLE OF OPERATION

The gas measuring system determines the concentration of flammable gases and vapours in an explosive air mixture at an ambient temperature of -40°C to +60°C for temperature class T4 as well as -40°C to +50°C for temperature class T6. It is certified for use in areas subject to explosion hazards and has an EC Type Examination Certificate in accordance with Directive 94/9/EC as follows:

IBExU 12 ATEX 1080 X

II 2G Ex de IIC T6/T4 Gb

The gas measurement system is equipped with a pellistor as sensor. The pellistor detects either methane (CH4) or hydrogen (H2) in a measuring range of 0 to 100 %LEL (Lower Explosive Limit); other hydrocarbons on request.

A separate mounting flange facilitates simple wall mounting and adjustment of the measuring system, such as after all other construction measures have been completed. Since the housing does not need to be opened for calibration, “one-man calibration” at the place of installation is possible. The sensor is replaced by means of a simple plug connector. For this only the probe tube needs to be opened and not the housing itself. The device provides, with appropriate parameters, the possibility of an automatic detection of the newly inserted sensor.

An alphanumeric display shows the measured value as well as any malfunctions in the sensor or electronics. The measured signals are processed and output (linear current output, 4-20 mA) as an integral feature of the measuring system. The measured values are evaluated and further processed in a device arranged downstream according to the user’s specifications.

2.3. TECHNICAL DATA

Transmitter		
Supply Voltage	18V to 30V DC	
Current consumption	approx. 105 mA at 24 V	Depends on the sensor element
Connections	Pin 1 (+)	Supply Voltage
	Pin 2 (S)	Output (4–20 mA)
	Pin 3 (-)	GND (0V)
	Pin 4	Not assigned
	Pin 5	Not assigned
	Pin 6	Not assigned
Ambient temperature	-40°C to +60°C -40°C to +50°C	For temperature class T4 For temperature class T6
Air pressure	700 hPa to 1300 hPa	
Permissible humidity	10-95% relative humidity	Non-condensing
Output	4-20 mA	max. load 500Ω (Error state at I<2,5mA)
Housing	Aluminium alloy/stainless steel	
Protection class of housing	IP 65	Saltwater-proof
Housing weight	approx. 1.100 g	
Housing dimensions	approx. ø84 x H78 mm	Without probe tube and screwed connection
Connection cable	3-wire shielded cable	Recommended Wiring min. 1.5mm²
Clamping range	0,5 - 2,5 mm²	Cage clamp
Cable entry	Cable gland M 16 x 1,5	Cable diameter 6 – 10 mm
Display	Four-digit alphanumeric display	Displays measured value and/or status
Controls	2 buttons	
Certification		
EC Type Examination Certificate	IBExU 12 ATEX 1080 X II 2G Ex de IIC T6/T4 Gb	In accordance with Directive 94/9/EC
Sensor		
Sensor type	Pellistor	
Gas access	By diffusion	
Measuring range	0-100 % LEL	
Warm-up time	approx. 5 min	

2.4. CERTIFICATION

The gas measuring system complies with EN 61000-6-2, EN 61000-6-3 and EN 50270 and thus EMC Directives 2004/108/EC.

3. TRANSPORT AND INSTALLATION

3.1. TRANSPORT

The gas measuring system is supplied together with these operating instructions. Please check the packaging for any damage when the product is delivered. Report any damage immediately to the forwarding agency and dealer. Do not throw or drop: the gas measuring system may be damaged or scratched. Protect it against wet conditions, humidity, dirt and dust.

3.2. STORAGE

The gas measuring system may be stored in its packaging in dry rooms at temperatures between +10°C and +50°C. Protect it against wet conditions, humidity, dirt and dust.

3.3. INSTALLATION

i	**IMPORTANT!** The device may only be used in potentially explosive atmospheres caused by gases (G) in zones 1 and 2. The explosion group (C) and the temperature class (T6/T4) must cover the key figures of the hazardous substances.

Mount the gas measuring system with the probe tube pointing down on a level, firm and dry wall. When installing, it is essential to remain within the following permissible ambient conditions:

- Ambient temperature between -40°C and +60°C for temperature class T4 as well as -40°C to +50°C for temperature class T6. (Please bear in mind that under certain circumstances the sun can heat up the housing considerably!)
- The housing must be freely accessible and visible at all times.
- The gas measuring system must not be brought into contact with water (splash water, condensate)! For this reason, protect the device against the weather when mounted outdoors!
- It must **not be accessible to dust** as this will block the diffusion opening and cause the gas measuring system to take false measurements! Avoid when cleaning the device electrostatic charge. Device only wet cloth!
- The gas measuring system must not be installed in damp locations.
- Parasitic voltages must not be permitted to occur.

i	**IMPORTANT!** The gas measuring system must be mounted as close as possible to the places where it is likely that gases and vapours will emerge. In addition, for gases and vapours that are heavier than air (e.g. propane/butane, alcohol, petrol); measuring systems must be mounted near the floor (lowest point). For gases and vapours that are lighter than air (e.g. methane, hydrogen), by contrast, the measuring systems must be mounted at the highest point. The ambient air must contain no sensor poisons such as silicones, lead tetraethyl and similar substances, as these destroy the pellistor.

3.4. ELECTRICAL CONNECTION

	**DANGER!** • Electrical voltages, danger to life due to electric shock or burns. • Do not bring into contact with water. • Before opening the gas measuring system, safely disconnect the mains voltage (safe electrical isolation). • Electrical work should only be carried out by a qualified electrician. • Only install in a voltage-free state. • Not open while energized.

The electrical connection must be carried out according to the installation guidelines for the type of protection "increased safety". The gas measuring system must be protected by an upstream protective device with a maximum current rating of 0.15A (external fuse 150 mA slow-blow).

The gas measuring system must be connected to any downstream equipment by means of a three-wire, shielded cable. When laying the cable, observe the existing rules and regulations. The cable must be capable of withstanding the anticipated mechanical, chemical and thermal stresses.

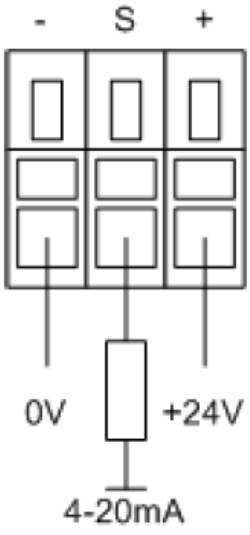


Figure 2: Connection diagram

The gas measuring system is connected (see Figure 2) to the electric circuit via Pin (-) and Pin (+) and the measured data is read via Pin S (4-20mA). The system earth is connected to the housing. The shielding is placed on the clamping screw on the base.

	**CAUTION!** With consideration for existing safety regulations, the gas measuring system must only be connected to power supply units that are suitable for it and which comply with the valid technical regulations. It must be ensured that fuse protection is provided that is suitable for the power supply units used (SAFE ELECTRICAL ISOLATION)!

External grounding of the device is done through the grounding screw on the outer edge of the housing.

	**IMPORTANT!** The ground terminal outside on the housing must be low-impedance connection to the potential equalization of the hazardous area. There may be no flow of potential equalization currents between hazardous areas and non-hazardous areas. The cable cross-section must be at least 2 x 1.5 mm² or 1 x 4mm².

4. OPERATION

4.1. COMMISSIONING

Before commissioning use the following list to check whether all requirements for normal operation are met:

- The device must not be damaged or any other noticeable changes.
- The IP protection class of the equipment shall meet the operational and environmental conditions.
- Check whether the device complies with the category specified by the operator and given zones.
- Important characteristics of explosion protection must be satisfied by the marking of the product (Equipment Group and Category, Type of Protection, Explosion Group, Temperature Class, Equipment Protection Levels).
- Check that the gas measuring system is properly installed (orientation of the device, mounting, ambient temperatures, etc.) and connected (fuse, proper connector cable, connector pin assignment, external ground, etc.). Check that the gas measuring system is completely closed (probe tube screwed on, housing cover closed) after all installation and connection work.

Next, carry out a test of the measured values. To do this, offer up test gas (e.g. Test gas with 50% LEL of the gas to be measured) to the diffusion opening and read the measured value on the display. If the measured value of the concentration of test gas (note: allow for the tolerance of the test gas), the gas measuring system is ready for use. Prepare a commissioning report (see section 9.2 Warranty).

4.2. CONFIGURING THE GAS MEASURING SYSTEM

Configuration of the gas measuring system is menu-controlled. The levels are as follows:

- „yyyy“; display measured value
- „Info“; query system information
- „Cali“; calibrate
- „Conf“; set parameters

A precise description of the menu and its use may be found in section 10, Appendix II: Menu.

4.3. CALIBRATION

Manual “one-man calibration” takes place at the place of installation using the two buttons on the housing and with the aid of the submenu "Calibrate" (See section 10.3). This requires synthetic air and test gas (concentration 50% LEL). It is not necessary to open the housing.

- First calibrate the zero point. To do this, call up the submenu "Calibrate / Calibrate zero point".
- Offer up synthetic air to the diffusion opening.
- Read current value for zero point. If this remains constant for at least 1 minute, specify this as the new zero point as indicated in the menu and save.
- Remove synthetic air.
- Then set the span. To do this, call up the submenu "Calibrate / Calibrate span".
- Enter the concentration of the test gas in %LEL (Note: Consider gas-dependent conversion factors between %LEL and %-Vol.)
- Next, offer up test gas to the diffusion opening.
- Read current measured value. If this remains constant for at least 1 minute, specify this as the span value and save (Note: Allow for the tolerance of the measuring gas!).
- Remove test gas.
- If it is not possible to calibrate the sensor, it must be replaced.

4.4. REPLACING THE SENSOR

DANGER!

- Electrical voltages, danger to life due to electric shock or burns.
- Do not bring into contact with water.
- Before opening the gas measuring system, safely disconnect the mains voltage (safe electrical isolation).
- Electrical work should only be carried out by a qualified electrician.
- Only install in a voltage-free state.
- Not open while energized.

The sensor can be replaced if necessary with the aid of a simple plug connector and with the device switched off and safe. It is only necessary to open the probe tube – the housing itself does not need to be touched. Unscrew the securing screws and twist off the protective cap to open the probe tube. Remove the old sensor. Insert a new sensor. Twist on the protective cap and screw in the securing screws. Secure screws with thread locking compound. The device provides, with appropriate parameters, the possibility of an automatic detection of the newly inserted sensor. If not, see section 10.8, Fault codes. Finally, calibrate the new sensor.

5. MAINTENANCE AND SERVICING

i	**IMPORTANT!** The gas measuring system is a safety device and may only be repaired by the manufacturer. Do not tamper with or modify the gas measuring system, otherwise it might not measure the gas concentration reliably.

The gas measuring system and the connecting cable must be tested by qualified personnel at least every six months (see section 1.4) and a corresponding servicing report prepared. Always ensure that the interval between services meets safety requirements!

Check the measured values after each period of non-use or interruption in operation (see section 4.1). If the measured value of the concentration of the test gas (Note: Allow for the tolerance of the test gas), the gas measuring system is again ready for use. If the measured value is outside this range, please calibrate the device (see section 4.3). If this does not work, then the gas measuring system is not working correctly. Inform the manufacturer or dealer and have the device repaired.

Ensure that the gas measuring system and its environment are clean, accessible and visible at all times by making the relevant checks. The gas measuring system is otherwise maintenance-free.

i	**IMPORTANT!** The time interval from the valid regulations for the application to be considered. For example, according to the German Ordinance on Industrial Safety, the time interval must not exceed 3 years. As manufacturer, we recommend a maximum time interval of half a year.

6. DECOMMISSIONING

Switch off the power supply. For storage it is essential to refer to section 3.2.

7. PACKAGING AND TRANSPORT

This device is a measuring instrument with sensitive electronic components. When returning it, please use the appropriate class of packaging according to the applicable regulations.

8. DISPOSAL

Obsolete devices should be rendered unusable immediately and disposed of according to the relevant regulations. Please contact your local authority for information about disposal.

9. APPENDIX I

9.1. COPYRIGHT

Euro-Gas Management Services Ltd. reserves the copyright to these operating instructions. Reproduction, translation and duplication, in whole or in part, are not permitted without written approval.

9.2. WARRANTY

Euro-Gas grants a warranty for this device for a period of 6 months from commissioning, documented by a commissioning report. Within this warranty period we will at our discretion repair or replace the device free of charge if found to be defective as to workmanship or material. The warranty excludes: damages attributable to improper use, normal wear, and defects that have only a negligible influence on the device's value or suitability for use.

Liability for the functioning of the gas measuring system is irrevocably transferred to the owner or operator if the gas measuring system is serviced or maintained improperly or if it is used in a manner not conforming to its intended use. Euro-Gas Management Services Ltd. accepts no liability for damage caused by failure to observe the above information.

The warranty expires in the event that work is carried out by agents we have not authorised or if parts are used other than original spare parts.

Claims under the warranty may be made in all countries where this device is sold by authorised dealers.

In the event of any claim under the warranty, please return the device to us. The buyer shall bear the costs of transportation and the risk while the device is in transit. The execution of work under the warranty does not affect the warranty period in any way.

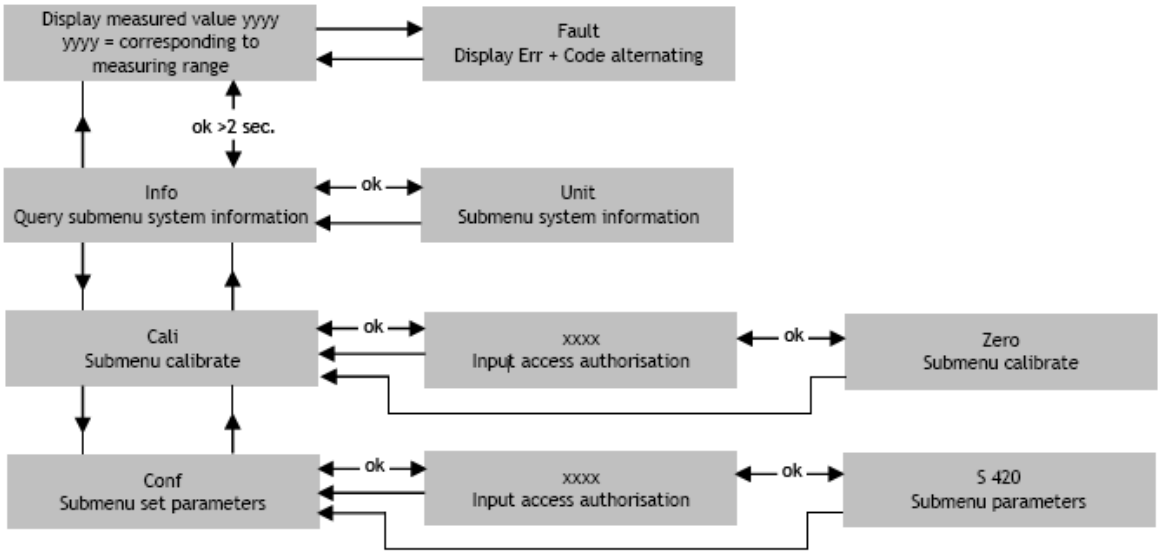
The manufacturer accepts no liability for printing errors or any damage resulting therefrom.

The above information does not extend the conditions of warranty and liability contained in the Terms and Conditions of Sale and Delivery of Euro-Gas Management Services Ltd.

10. APPENDIX II: MENU NAVIGATION

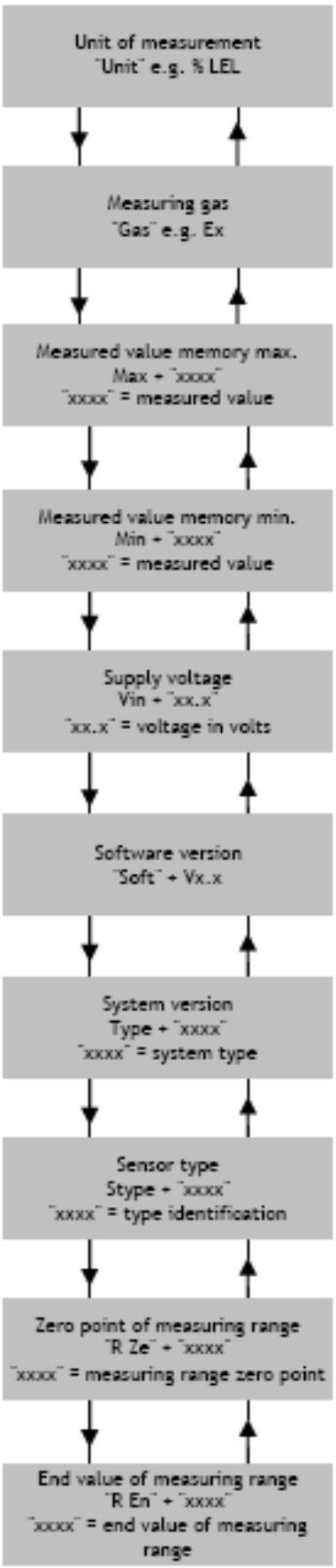
10.1. MAIN MENU

Current display = current measured value
“xxxx + yyyy” = display alternates between xxxx and yyyy
Button combination “ok” = press buttons ▲ and ▼ simultaneously
▲ = in flow diagram arrow to right or down
▼ = in flow diagram arrow to left or up
4 minutes without pressing a button: menu is reset
Access authorisation entry: ▲ = numeric value +1;
▼ = cursor position +1 to left



Access code (default setting):
Cali (Submenu calibrate) → 3412
Para (Submenu set parameters) → 3512

10.2. SUBMENU SYSTEM INFORMATION



The unit of measurement is the unit in which the measured value is displayed; e.g. %UEG, %LEL, ppm, ppb, vol%.

The measuring gas defines the command variable of the measuring system; e.g. Ex for explosive gases.

Shows the greatest measured value since the memory was last reset.

Shows the smallest measured value since the memory was last reset.

Display of current supply voltage in volts.

Display the software status of the device.

Identifies the system. Depending on the version, the relevant character string is shown here.
Sensor P ,H, IR, EC + output mA, Mo, Re, OC, O+

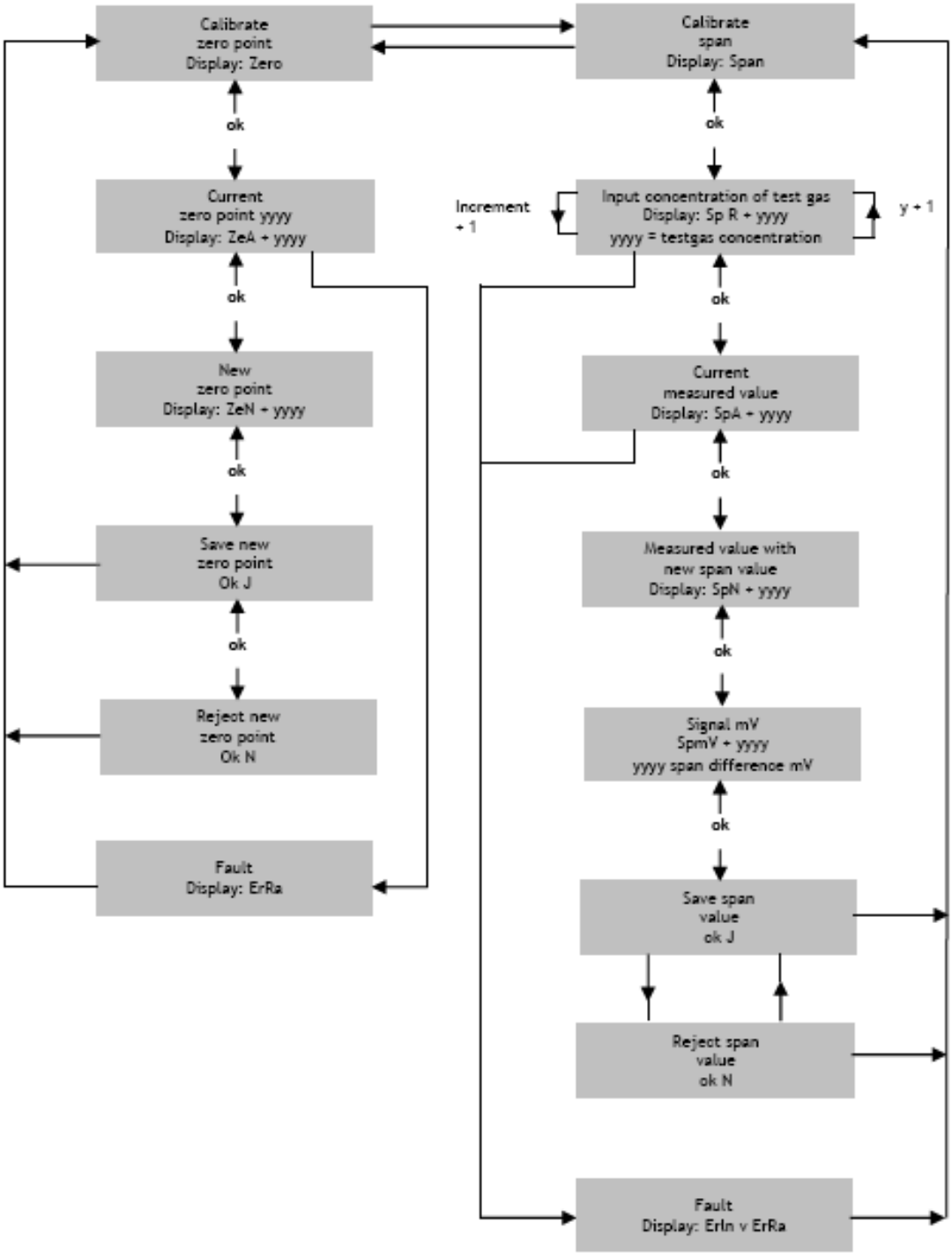
Identifies the sensor. The customer can quickly identify the sensor that is being used. In the case of a pellistor, only when automatic is activated. Assists with ordering a spare sensor.

Displays the zero point of the measuring range..

Displays the end value of the measuring range.

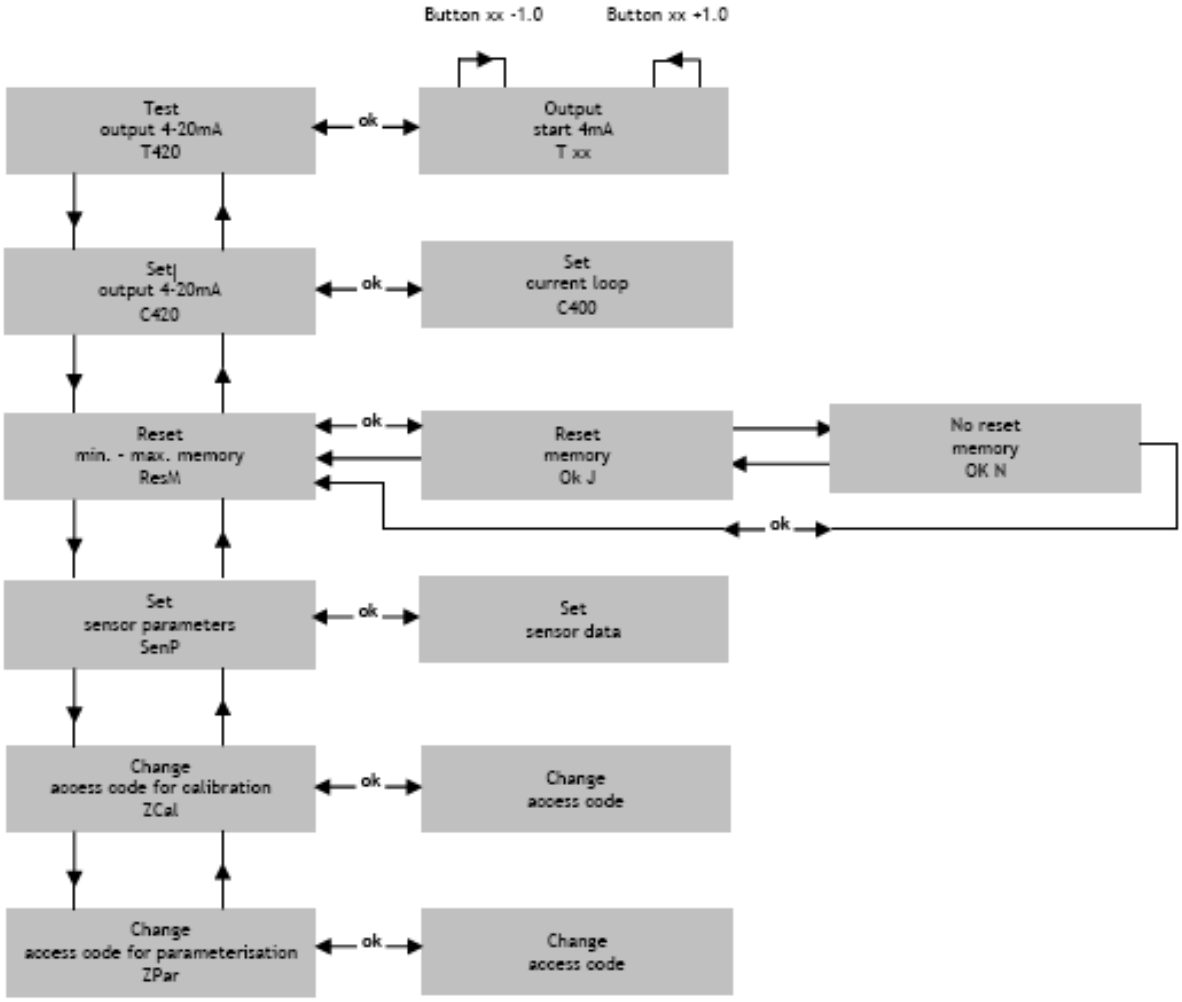
10.3. SUBMENU CALIBRATION

It is essential to read section 4.3 before calibration!

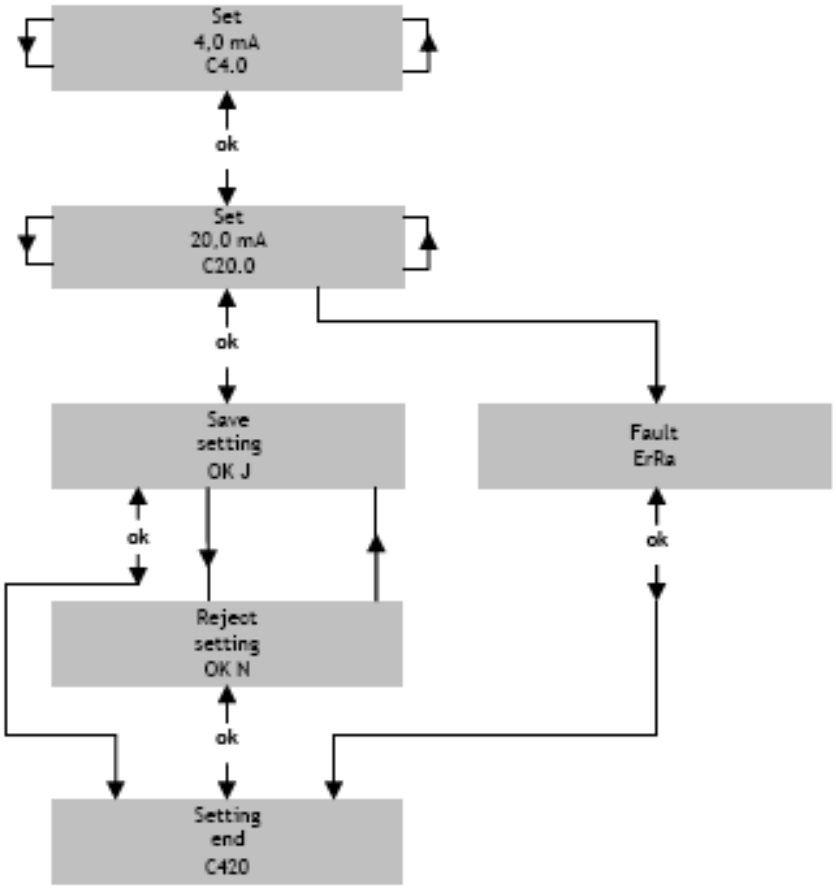


When the calibration function is activated the digital output is frozen.
The current follows the measured signal.
„yyyy“ = measured value unless otherwise stated.

10.4. SUBMENU SET PARAMETERS



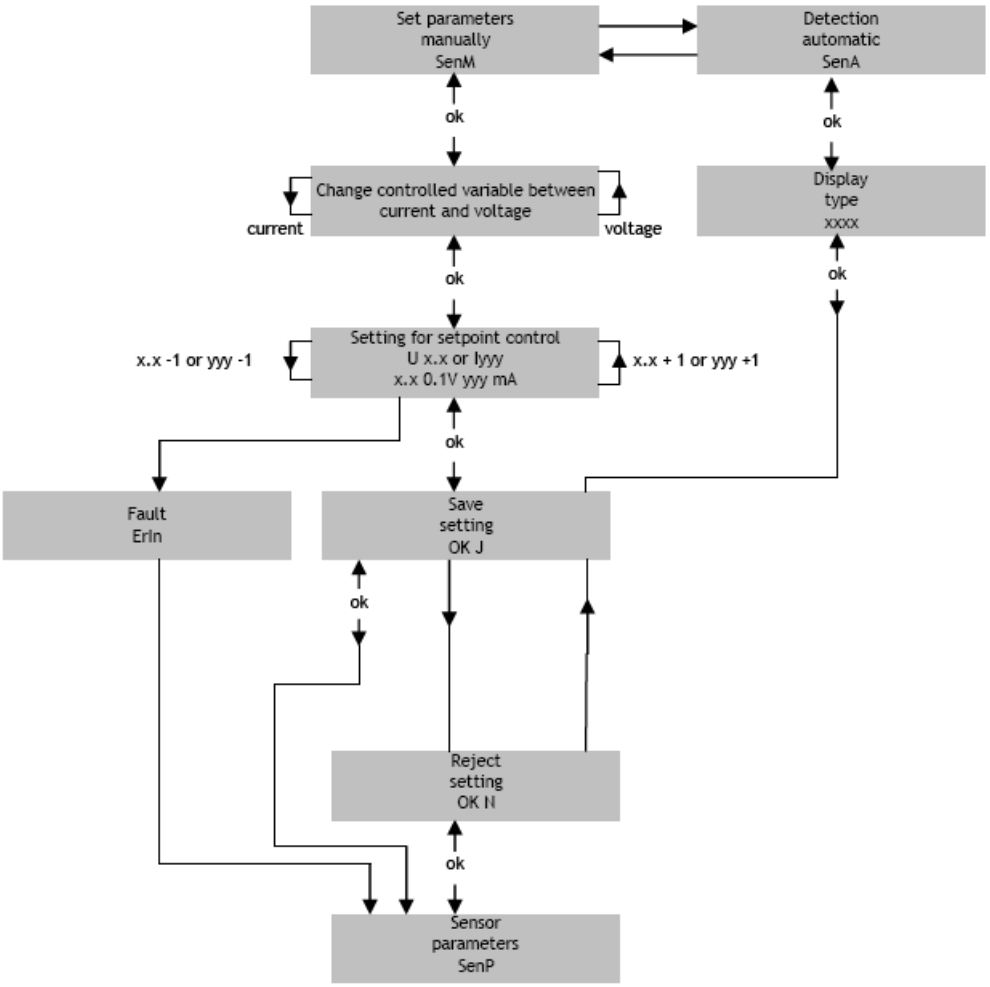
10.5. SUBMENU SET CURRENT LOOP



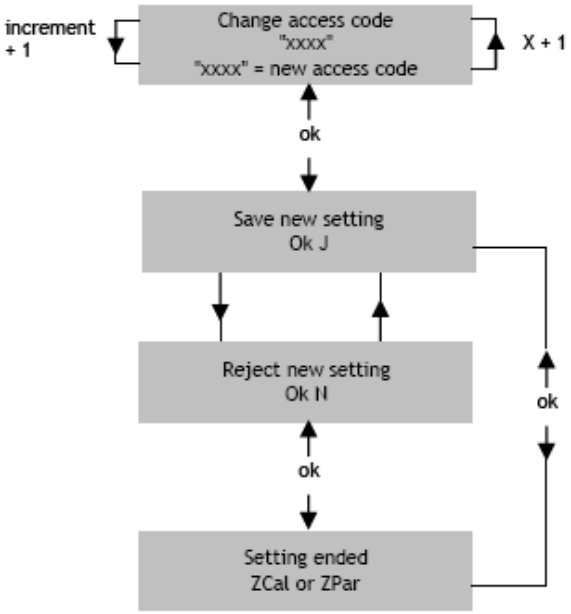
▼ = decrease current

▲ = increase current

10.6. SUBMENU SET SENSOR PARAMETERS



10.7. SUBMENU CHANGE ACCESS CODE



10.8. FAULT CODES

Fault code	Fault definition	Cause of fault	Clear fault
1	CPU	CPU-Kern	Replace system
2	Parameters	Fault in parameter range	Repeat adjustment
3	Supply voltage	Voltage outside permissible range	Correct supply voltage
4	Sensor	Sensor is not inserted correctly or is faulty	Insert sensor correctly or replace
5	Sensor drift	The sensor has drifted too far into the negative range	Recalibrate zero point or replace sensor (too old)
6	Automatic sensor detection	Sensor does not have an identification signal (not supported or wrong sensor	Change sensor from "automatic sensor detection" to "manual

EURO-GAS MANAGEMENT SERVICES LTD, CHURSTON HOUSE,
BASCOMBE ROAD, CHURSTON FERRERS, DEVON, TQ5 0JJ, UK
TEL: +44 (0)1803 844414 FAX: +44 (0)1803 844224
sales@euro-gasman.com www.euro-gasman.com

EURO-GAS
MANAGEMENT SERVICES LTD