Operating Instructions

Oxygen sensor MF420-O

* Read prior to operation!
* Observe all safety information!
* Keep for future reference!

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by handing over

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1 Safety

1.1 Possible dangers

The oxygen sensor is designed and manufactured according to state-of-the-art technology and the generally acknowledged safety rules.
The operative ness and safety of each O_2 sensor is checked prior to delivery.
When used to the intended purpose the O_2 sensor is safe to operate.
The O_2 sensor may only be operated when it is in a faultless condition and when the operating instructions are observed.
Wrong operation or incorrect use may result in dangers for:

* the physical health and life of the operator,
* the device itself as well as other property of the owner,
* the performance of the device.

All persons involved in the installation, start-up, operation, repair and maintenance of the device must:

* be appropriately qualified,
* carefully observe these operating instructions, and
* observe the generally acknowledged occupational safety rules.

This concerns your safety!

1.2 Safety instructions and tips

The following symbols are used in these operating instructions:

DANGER!
Points out an eminent danger. When the instructions are not followed, death or serious injuries may result.

WARNING!
Points out a potentially dangerous situation.
In case of non-observance, death or serious injuries may result.

CAUTION!
Points out a potentially dangerous situation.
When the instructions are not followed, slight injuries or damage to property may occur.

IMPORTANT!
Points out application and other useful information.

1.3 Use to the intended purpose

The O_2 sensor is designed exclusively for monitoring oxygen.
The ambient temperature must not rise above + 50°C.
Any other application is not to the intended purpose of the device!
Any conversions or modifications of the device may result in significant safety hazards and are prohibited for safety reasons!

Dittrich Elektronic shall not be liable for any damages arising from this or for any damages arising from use that is not to the intended purpose.

WARNING!
The O_2 sensor must not come into contact with water.
Be sure to disconnect the mains voltage before opening the device.
Do not tamper with the O_2 sensor.
Danger of being burned at the front of the sensor pipe!
The end of the sensor is hot. Danger of being burned.

IMPORTANT!
The operating, repair and maintenance conditions set down in these operating instructions must definitely be observed.

1.4 Dangers caused by accessory equipment

Supplementary devices for relaying the output signal may only be installed by an appropriately trained electrician.

1.5 Sources of dangers

Definitely disconnect the mains voltage (switch off external fuse) prior to opening the O_2 sensor or carrying out any maintenance and cleaning work!.
When the device is operated in an explosive environment, sparking may lead to blow-ups, burning or explosions.
The device may only be used:

* for its intended purpose,
* in a technically safe and faultless state.

Faults which could affect the safe operation of the device must be remedied immediately!

1.6 Approved operators

The O_2 sensor may only be installed and started up by appropriately trained personnel.
Any work on electrical parts should be carried out only by an appropriately trained electrician in accordance with the rules prescribed by the German Association of Electrical Engineers (VDE).
Personnel still undergoing training may only operate the device under the supervision of an experienced person.
The electrical fitter has to make the operating instructions available to the operator.
The electrical fitter and the operator should have read and understood the operating instructions before beginning their work.
The prescribed minimum age for the operator is 16 years.

1.7 Safety measures at the place of installation

The O_2 sensor may not come into contact with water or splashing water!
The O_2 sensor may not be mounted in potentially explosive areas!

IMPORTANT!
It is important that appropriate inspections be carried out to ensure that the O_2 sensor and its environment are always clean and accessible and can be inspected from outside.

2 Product description

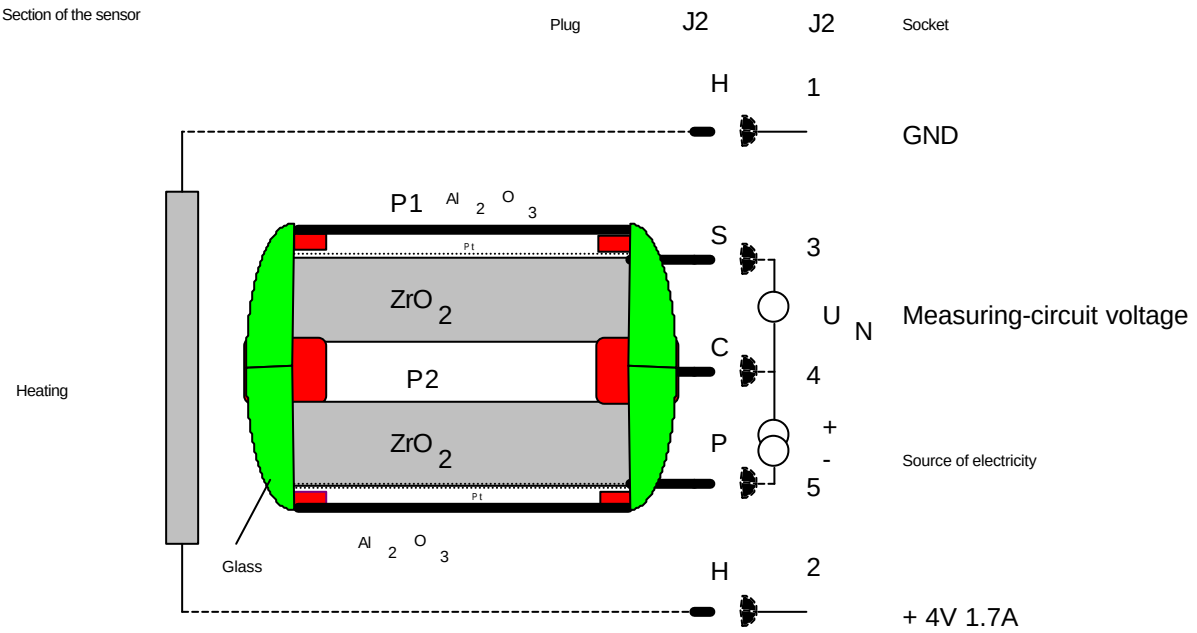
2.1 Design

The O_2 sensor is mounted in an aluminium housing. The 4-20mA transmitter for transmitting signals to the evaluation device is also located in the housing.

2.3 Functional description

MF420-O sensor

With this dynamic oxygen sensor, oxygen measurements can be taken without reference gas. The sensor consists of two identical zirconium dioxide discs which cover a platinum ring on both sides, whereby a tight chamber is created. This chamber holds a gas with an unknown partial pressure of oxygen. One disc is connected to a reversible source of electricity; it serves as an electrochemical oxygen pump. The other disc measures the O_2 partial pressure by measuring the Nernst voltage that is generated.



The source of electricity is switched on. The chamber is evacuated, the partial pressure P_2 changes linearly to the transported quantity of electricity. This causes the voltage on the other disc to rise. When the voltage has reached a certain value, the source of electricity changes its direction of current and oxygen ions are pumped into the chamber again. The partial pressure P_2 rises until it reaches a certain voltage again, and the direction of current changes again. This process is repeated periodically. The period is linear to the partial pressure of oxygen.

Due to this principle, the sensor can be monitored continuously and, consequently, it is „fault proof„!

The sensor is calibrated in atmospheric air, i.e. no reference gases are required.

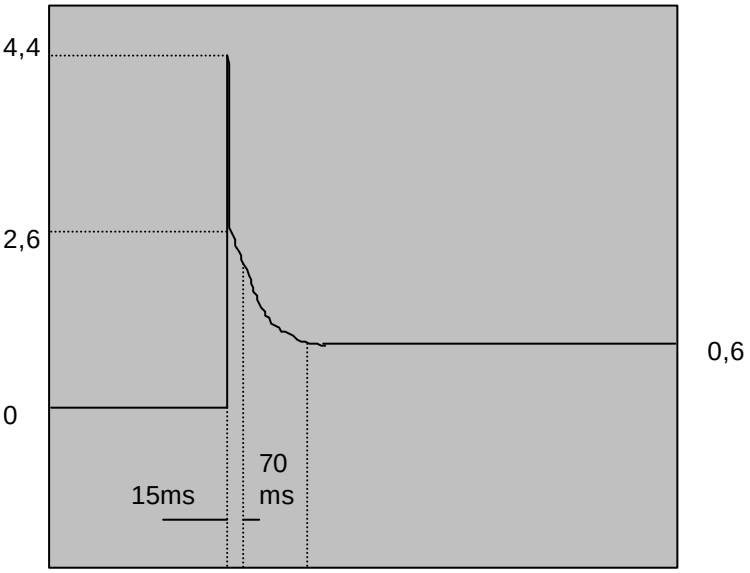
2.4 Technical data

Plug J1 Socket 09-5106-15-03

Power supply 24V DC

Current 650mA

A Einschaltstrom



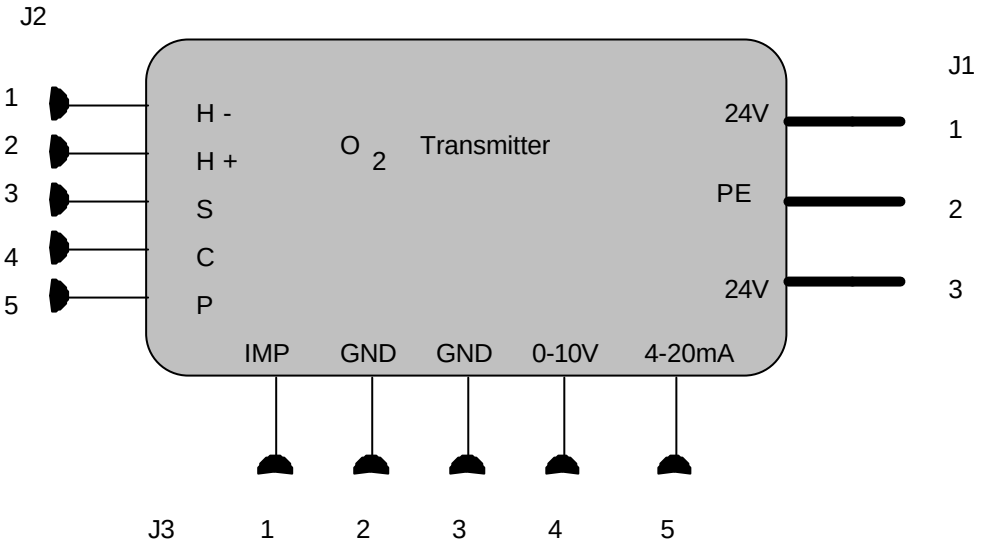
Socket J3 Plug 09-5117-15-05

Output

1 Imp.
2 GND
3 GND
4 0-10V Impedance 1.8k
5 4-20mA

Sensor

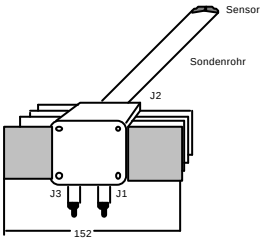
Oxygen measuring system



J1 Plug 09-0107-80-03 Socket 09-0116-90-05

J3 Plug 09-5613-15-05

Buchse 09-0120-80-05



J2 Plug 09-5117-15-05 Socket 09-5106-15-03

Heating-up time about 5 minutes

Measuring range	0.1-25 Vol.% O_2
Temperature	up to +450 °C
Exhaust gas velocity	up to 10m/s
Sensor pipe	12 mm diameter L=380 mm V2A
Reaction time	about 3 sec.

Housing

Dimensions	90 x 85 x 65 mm
Material	Aluminium
Colour	silver

2.5 Certification, tests

The O_2 sensor complies with the EMC guidelines.

3 Transport, installation

3.1 Transport

The O_2 sensors are delivered together with these operating instructions.
Do not throw or drop the O_2 sensor because it could be damaged. Protect against wetness, humidity, dirt and dust.

3.2 Storage

The O_2 sensor can be stored in dry rooms at temperatures between -10°C and +60°C. Protect against wetness, humidity, dirt and dust.

3.3 Installation

IMPORTANT!
The O_2 sensor must be accessible at all times and it must be possible to inspect it from outside. Voltage must always be supplied to the O_2 sensor, otherwise condensation water will be formed and the sensor will be destroyed!
The place of installation should be such that the ambient temperature does not go beyond 0°C to +50°.
When it is mounted outdoors, the O_2 sensor must be protected from the weather.
The O_2 sensor may not come into contact with water or splashing water.
Installation in humid rooms is not permitted.
The O_2 sensor must not be mounted in potentially explosive areas.
The O_2 sensor may only be mounted and started up by appropriately trained and qualified personnel.
It must be ensured that there is no ground offset!

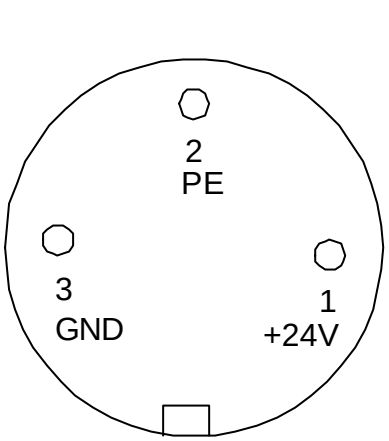
IMPORTANT!
As a rule the sensor should be mounted vertically downwards. This will prevent any possibly arising condensation water from flowing into the sensor and destroying it. It is also possible to mount the sensor in the chimney flue at a slant of 75°.

3.4 Electric connection

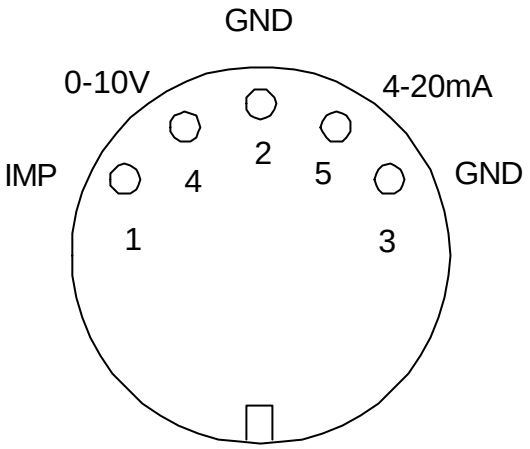
WARNING!
Any electrical work should be carried out by an appropriately trained electrician. Only mount in a de-energized state!

IMPORTANT!
Be sure to observe the provisions of the German Association of Electrical Engineers (VDE), the relevant accident prevention regulations as well as the operating instructions of the O_2 sensor!

Connection diagram



Power supply:



Sensor lead:

Do not lay the sensor lead and the power cables next to each other. Danger of interference radiation.

4 Operation

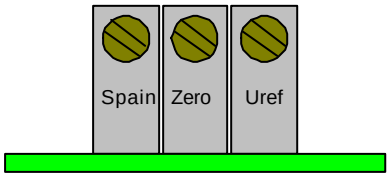
4.1 Start up

Before starting up, the following check-list should be used to check whether all preconditions for trouble-free operation are satisfied:

Preconditions

***** Is the O_2 sensor mounted?
***** Is the O_2 sensor accessible and can it be inspected from outside?
***** Has the ambient temperature been taken into consideration?
* Is the power supply connected?
* Is the measuring lead connected?
***** Is the O_2 sensor connected?
***** Is the housing closed and screwed down?
***** Is the power supply switched on via the mains fuse provided by the customer.

4.2 Setting the O_2 value



The potentiometer Uref may not be reset!
The potentiometer Zero may not be reset!
The potentiometer Spain is used to adjust the oxygen concentration.
20.9 Vol.% O2 = 17,38 mA = 8.36 V

The O_2 sensor is ready for operation now.

The devices should be inspected every six months by appropriately qualified personnel, and a record of such inspection should be drawn up. An inspection or servicing should also be carried out after an interruption of operation.

4.3 Trouble-shooting

Fault	Remedy
	Check voltage!
	Check fuse!
	Short circuit or line break.
	Short circuit or line break in the sensor cable?
Application of air has no effect:	Replace the sensor!

4.4 Maintenance

The operative ness of the O_2 sensor has to be checked every six months by applying air.
Appropriate inspection procedures should be carried out to ensure that the O_2 sensor and its environment are always clean, accessible and can be inspected from outside.

4.5 Repair

WARNING!
O_2 sensors are measuring devices and any defects may only be repaired by the manufacturer. Any tampering with or modifications of the product lead to significant safety hazards!

WARNING!
Mains voltage (230V, 50Hz)
can cause serious burns, and it can kill you.
Only appropriately qualified electricians should carry out electric work. Only mount when disconnected from the power supply!

Only appropriately trained electricians may carry out repairs at the place of installation, and only when the device is disconnected from the power supply. The power supply must definitely be interrupted during the time such repairs are carried out.

Replacing the fuse:

Remove screw cap from the fuse.
Replace 630mA fuse.
Place screw cap onto the fuse and screw into place.

4.6 Shutdown
The device is shutdown by switching off the power supply; afterwards remove the O_2 sensor from the chimney flue.

5 Appendix

5.1 Spare parts, accessories

5.2 Copyright
Dittrich Elektronic reserves the copyright to these operating instructions.

5.3 Warranty
The manufacturer grants a warranty of six months from the date of purchase for this device. During this warranty period we shall remedy any defects free of charge, either by correcting deficiencies or by replacing the device, provided that such defects can be attributed to defects of material or fabrication.
The warranty shall not comprise any damage that can be attributed to improper use, normal wear, or defects that affect the value or operative ness of the device only insignificantly.
The warranty shall expire when personnel not authorized by us are allowed to tamper with the device or when spare parts other than original spare parts are used.
The warranty may be claimed in all countries where this device is sold by authorized dealers.