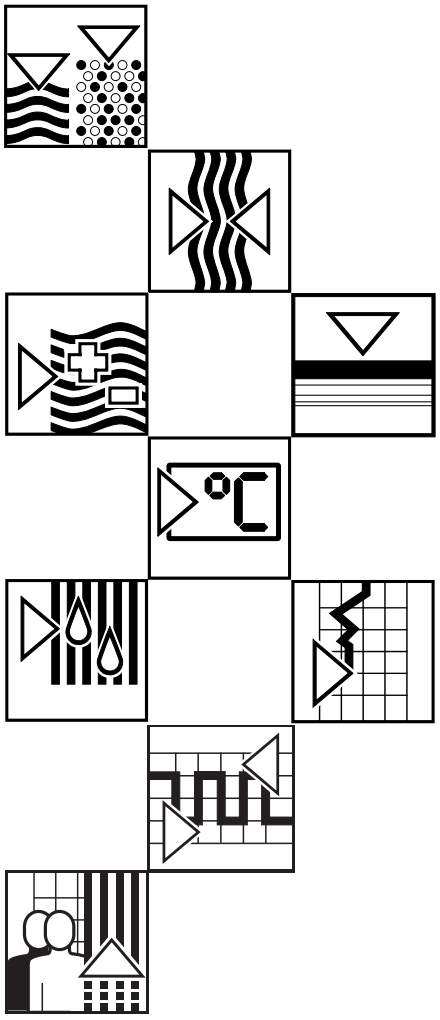
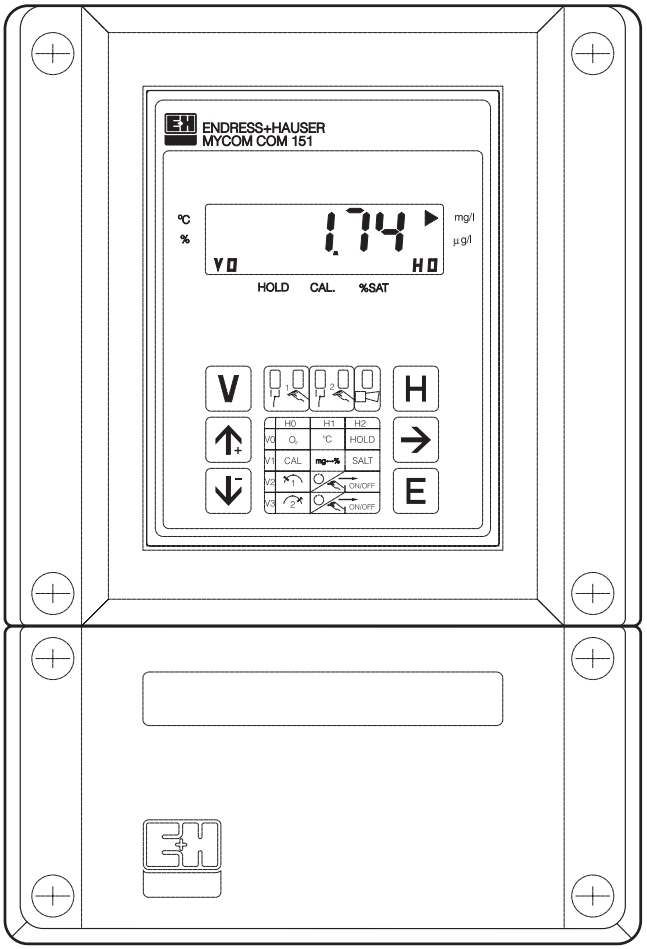
BA 106C/07/en/09.97
Software version 6.02 or later
No. 50063021

mycom
COM 121 / 151
O_2 / Temperature
Transmitter / Controller

Operating Instructions





Quality made by
Endress+Hauser

ISO 9001

Endress+Hauser

Nothing beats know-how

Please familiarise yourself with the instrument before you take any other steps:

General information

Safety

Description

You wish to install and start up the instrument. The required steps are described in these chapters:

Installation

Start-up

You wish to operate or reconfigure the instrument. The operating concept is explained in these chapters:

Operation

Calibration

Description of operating functions

Limit contacter/time interval control

When you encounter problems or when the instrument requires maintenance, please refer to these chapters for help:

Diagnosis

Service and maintenance

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1. General information

1.1 Symbols used

Warning
This symbol alerts to hazards which may cause irreparable damage.

Caution
This symbol alerts to possible malfunction due to operator error.

Note
This symbol indicates important items of information.

1.2 Conformity statement

The Mycom COM 121 / 151 has been developed and manufactured in accordance with currently valid European standards and directives.

Note:
The corresponding certificate of conformity may be requested from Endress+Hauser.

2. Safety

2.1 Intended application

Note:

These installation and operating instructions describe the O_2 instrument Mycom COM 121 / 151 equipped with all the options.

The Mycom COM 121 / 151 is a microprocessor-based measuring and control instrument used to determine the dissolved O_2 value. State-of-the-art engineering allows the instrument to be adapted to all dissolved oxygen measuring tasks in a simple manner.

A bilateral limit monitor with two additional long-term time generators permits oxygen control and automatic nitrification/denitrification control systems to be implemented.

Digital interfaces require separate operating instructions from the Mycom family of instruments:

Mycom Serial Interfaces
BA 090C/07/en

The separate operating instructions BA 965C/07/en are required for the oxygen sensors COS 3 / COS 3S.

2.2 General safety notes

Warning:

Operating the instrument in any way other than as described in these instructions may compromise the safety and function of the measuring system and is therefore impermissible.

Installation, start-up and operation:

The Mycom COM 121/151 instrument has been designed and manufactured for safe operation according to the state of the art in engineering and conforms to the relevant regulations and EC directives (see "Technical data"). However, if used improperly or other than for the intended purpose, it may be hazardous, e.g. due to improper connection.

Installation, electrical connection, start-up, operation and maintenance of the measuring system must therefore be performed exclusively by trained specialist personnel properly authorised by the system operator for such work. The specialist personnel must have read and understood these operating instructions and must adhere to the instructions contained therein.

2.3 Safety functions

- **Access code:** Unauthorised access to the calibration and configuration data of the measuring transmitter is effectively prevented by access codes. The instrument settings can be read at any time without entry of an access code.
- **Alarm function:** System errors, malfunction and continued violation of a limit will result in an alarm signalled by an alarm contact. The alarm signalling contact is fail-safe by design, i.e. an alarm condition will also be signalled in the event of a power failure.
- **Data integrity:** The instrument configuration is retained even after a power failure.
- **Immunity to interference:** This instrument is protected against interference, such as pulse-shaped transients, high frequency and electrostatic discharges, according to the applicable European standards. This is only valid, however, for an instrument connected according to the notes in these installation and operating instructions.

3. Description

3.1 Areas of application

Typical areas of application are:

- Waste water treatment
- Sewage treatment plants
- Water treatment
- Drinking water
- Water monitoring
- Fish farming

3.2 Measuring system

The measuring system consists of:

- the oxygen sensor COS 3 / COS 3S
- an appropriate immersion or flow assembly
- the O_2 measuring instrument Mycom COM 151 in the field housing

or

- the Mycom COM 121 instrument in the housing for panel mounting

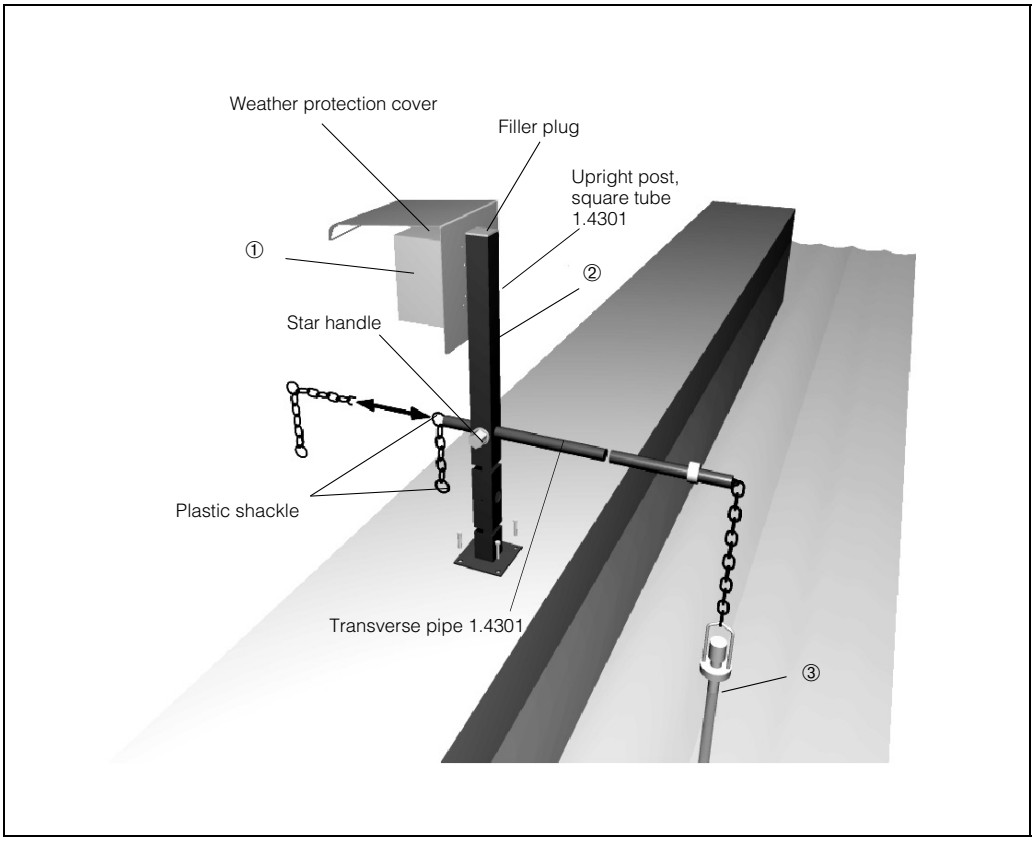


Fig. 3.1: Example of a complete measuring system with:

① Mycom COM 151 with weather protection cover installed
② Universal suspension assembly holder
③ O_2 assembly COA 110-40 with oxygen sensor COS 3 installed

3.3 Order code

Mycom COM 121 / 151

Types
121 dissolved O_2 measuring transmitter for panel mounting, 96 x 96 mm, ingress protection IP 54 (front)
151 field transmitter, 247 x 167 x 111 mm (H x W x D), ingress protection IP 65

Versions
1 with fault signalling contact
3 with fault signalling contact and 2 limit contacts
9 special version

Measuring range
A 0 ... 20 mg O_2 / l
B 0 ... 200 % saturation
Y special version

Power supply
0 230 V AC, 50 / 60 Hz
1 110 V AC, 50 / 60 Hz
2 200 V AC, 50 / 60 Hz
3 24 V AC, 50 / 60 Hz
4 48 V AC, 50 / 60 Hz
5 100 V AC, 50 / 60 Hz
6 127 V AC, 50 / 60 Hz
7 240 V AC, 50 / 60 Hz
8 24 V DC

Outputs
0 0/4 ... 20 mA for O_2
1 0/4 ... 20 mA for O_2 and temperature
3 0/4 ... 20 mA for O_2 with additional RS 232-C interface
6 0/4 ... 20 mA for O_2 value with additional RS 485 / E+H Rackbus interface
9 special version

COM ☐ ☐☐☐☐ ⇐ **complete order code**

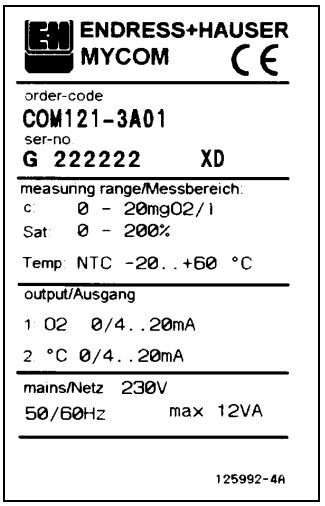


Fig. 3.2: Nameplate of Mycom COM 121

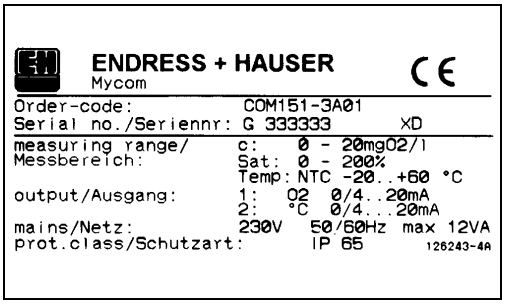


Fig. 3.3: Nameplate of Mycom COM 151

3.4 Technical data

Electrical data

O_2 measurement with oxygen sensors COS 3 / COS 3S

Display range O_2	0 … 20 mg / l ; 0 … 200 % SAT
Measured value resolution	<0.5 % of upper range value
Zero point	sensor has no zero current
Automatic temperature compensation range	0 … 50 °C ; –20 … +60 °C with SAT
Status indication	LEDs, red or red / green
Temperature sensor	2 NTC (in O_2 sensor)
Air pressure measurement	integrated pressure sensor
Reference temperature	+20 °C
O_2 signal input	max. 8 V at 200 kΩ
Slope adjustment	60 … 120 % referred to normal conditions
Normal conditions	approx. –4 mV / mbar O_2 (1013 mbar, 20 °C)
O_2 signal output (galvanically separated)	0 / 4 ... 20 mA
Load	max. 600 Ω
O_2 signal output range	adjustable from Δ2 … Δ20 mg / l
	or from Δ20 … 200 % SAT

Temperature measurement

Temperature measuring range	–10 … +60 °C
Temperature signal output (variant)	0 or 4 … 20 mA
Load	max. 400 Ω
Temperature output range	adjustable from Δ 25 … Δ 165 K
Temperature calibration offset	adjustable from –3.0 … +3.0 °C

Limit contacter, timer and alarm functions

Limit contacter / time interval control	2 contact outputs
Function type	MIN or MAX (direct / inverted)
Setpoint settings	0 … 20 mg / l or 0 … 200 % SAT
Hysteresis for switching contacts	0 … 5 mg / l or 0 … 50 % SAT
Timer interval period	1 … 1440 min
Contact delay	pickup / dropout
Delay period	0 … 6000 s
Alarm threshold	0 … 10 mg / l or 0 … 100 % SAT
Alarm delay period	0 … 6000 s

General technical data

Measured value display	LC display, 7 segments, 4 digits, height = 10 mm
Indication error of measurement	
Display (acc. to DIN IEC 746)	0.2 %
Measured value output (acc. to DIN IEC 746)	0.5 %
Status indication	LEDs, red and red / green
Electromagnetic compatibility (EMC)	
Emission	according to DIN EN 50081-1, 01.92
Immunity	according to DIN EN 50082-1, 03.93
Ambient temperature, nominal operating range	–10 … +55 °C
Ambient temperature, limit operating range	–20 … +60 °C
Ambient temperature for storage and transport	–25 … +85 °C
Relative humidity	10 … 90 % (non-condensing)

Electrical data (continued)

Electrical data and connections

AC power supply	24, 48, 100, 110, 127, 200, 230, 240 V, –15 … +10 %
Frequency	50 … 60 Hz, ± 6 %
DC power supply	24 V, –20 … +15 %
Power consumption	12 VA
Contact outputs on COM 121	2 changeover contacts, 1 floating NO contact
Contact outputs on COM 151	3 changeover contacts
Switching voltage	max. 250 V AC
Switching current	max. 3 A
Switching power	max. 500 VA
Signal outputs	1 or 2 x 0 / 4 … 20 mA, galvanically separated
Insulation voltage	650 Vp-p
Auxiliary power supply output	± 8.5 V, max. 10 mA (R_i = 400 Ω)
Digital interface (variant)	optionally RS 232-C, RS 485 or E+H Rackbus
Hold input	ext. floating NO contact
Input current	max. 10 mA
Terminals	terminal block, removable
Max. conductor cross section	4 mm^2

Physical data

Dimensions / weights / protection

COM 121

Dimensions	96 x 96 x 176.5 mm (HxWxD)
Weight	1.1 kg
Ingress protection (front)	IP 54
Housing material	polycarbonate
Front of housing	polyester

COM 151

Dimensions	247 x 167 x 111 mm (HxWxD)
Weight	3.5 kg
Ingress protection	IP 65
Housing material	GD-ALSI (Mg component > 0.05 %)
Paintwork	2-component PU-varnish
Front of housing	polyester, UV-resistant

4. Installation

4.1 Storage and transport

The packaging material used to store or transport the instrument must provide shock and moisture protection. Optimal protection is provided by the original packaging materials. Conformance with the ambient conditions (see technical data) must be assured.

4.2 Unpacking

- Inspect for any damaged packaging! The post office or freight carrier must be informed of any damage. Damaged packaging material must be retained until the matter has been settled.
- Verify that the contents are undamaged! Inform the post office or freight carrier as well as the supplier of any damage.
- Check that the delivery is complete and agrees with the shipping documents. Refer to the nameplate (see fig. 3.2 or 3.3) to verify that you have received the instrument type and version ordered.

The scope of delivery of the Mycom COM 121 (panel-mounted unit) comprises:
- 2 housing fastening elements (order no. 50047795)
- 1 submin D connector (only for instruments equipped with a digital interface) (order no. 50051998)
- Installation and operating instructions
- Instrument identification card(s)

The scope of delivery of the Mycom COM 151 comprises:
- 1 housing mounting kit (order no. 50061357)
- 1 measuring point identification label (order no. 50061359)
- Installation and operating instructions
- Instrument identification card(s)

If you have any questions, consult your supplier or the Endress+Hauser sales agency in your area (see back cover of these installation and operating instructions for addresses).

4.3 Mounting

The instrument can be mounted as follows:
- COM 121: panel installation
- COM 151: – panel installation
  – wall installation
  – post installation

Panel installation of COM 121
The mounting cutout required according to DIN 43 700 is $92^{+0.5}$ x $92^{+0.5}$ mm.
The instrument is installed using the supplied housing mounting elements. The required installation depth is approx. 180 mm.

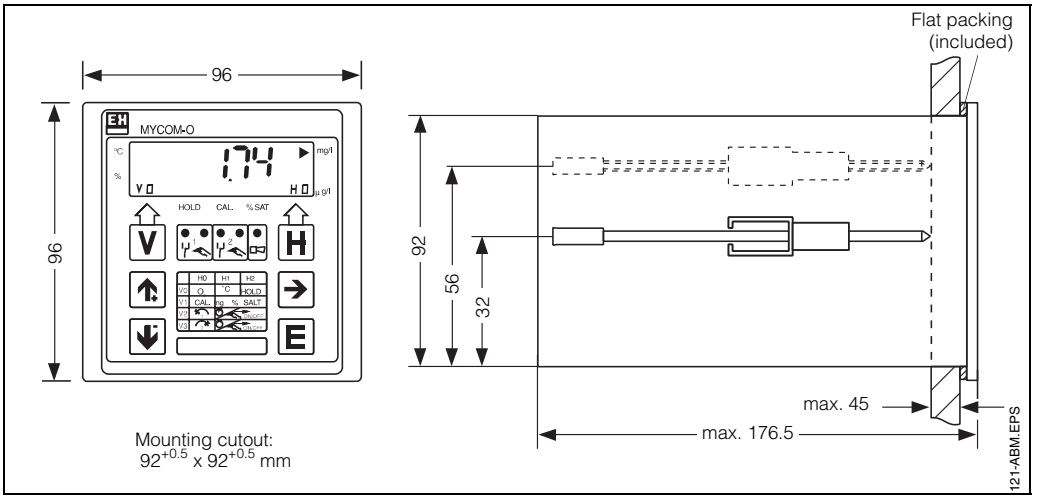


Fig. 4.1: Dimensions of Mycom COM 121/151

Dimensions of COM 151

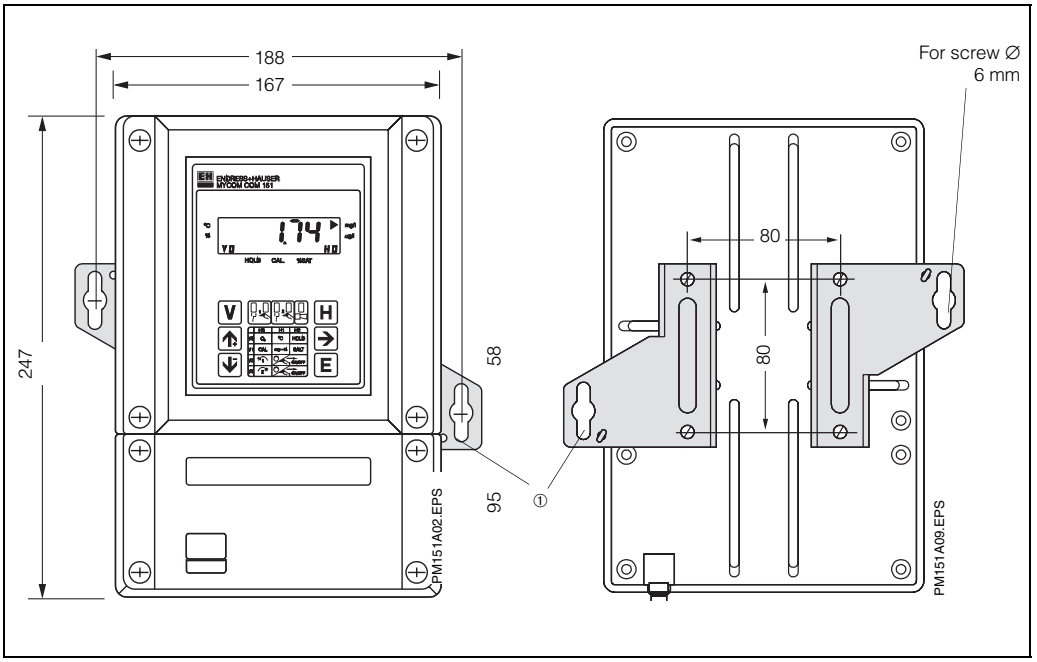


Fig. 4.2 : (left) Dimensions of Mycom COM 151

① Brackets for wall installation

Fig. 4.3: (right) Rear of field housing with mounting brackets installed

Note:
Mounting brackets and screws for wall installation are included in the housing mounting kit supplied with the instrument.

Wall installation of COM 151
Install the mounting brackets on the rear of the instrument according to fig. 4.4.

Refer to figs. 4.2 and 4.3 for the housing and mounting dimensions of the field housing.

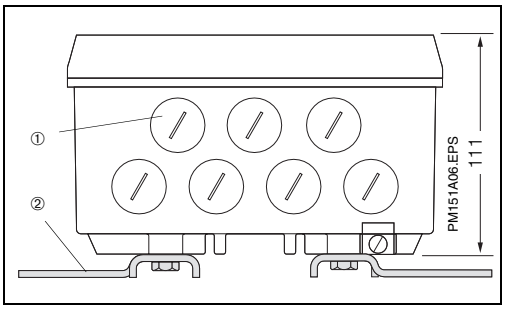


Fig. 4.4: Bottom of field housing with brackets for wall mounting installed

① Screw plugs for Pg 13.5
② Mounting brackets

Panel installation of COM 151
The instrument is installed using the supplied housing fastening elements (see fig. 4.5).
A flat packing (see chapter 11.4) is required to seal the panel cutout.

The cutout required for panel mounting is $161^{+0.5}$ x $241^{+0.5}$ mm (W x H).

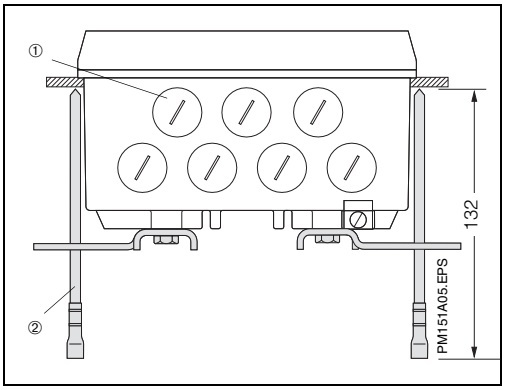


Fig. 4.5: Bottom of field housing with mounting dimensions and tensioning screws for panel mounting installed

① Screw plugs for Pg 13.5
② Tensioning screws

Post installation of COM 151

The Mycom COM 151 (field housing) can be installed on vertical or horizontal tubing with a max. diameter of 70 mm using parts supplied with the housing mounting kit.

These mounting parts are to be installed on the rear of the instrument according to fig. 4.6. Refer to chapter 11.4 regarding other accessories available for the Mycom COM 151.

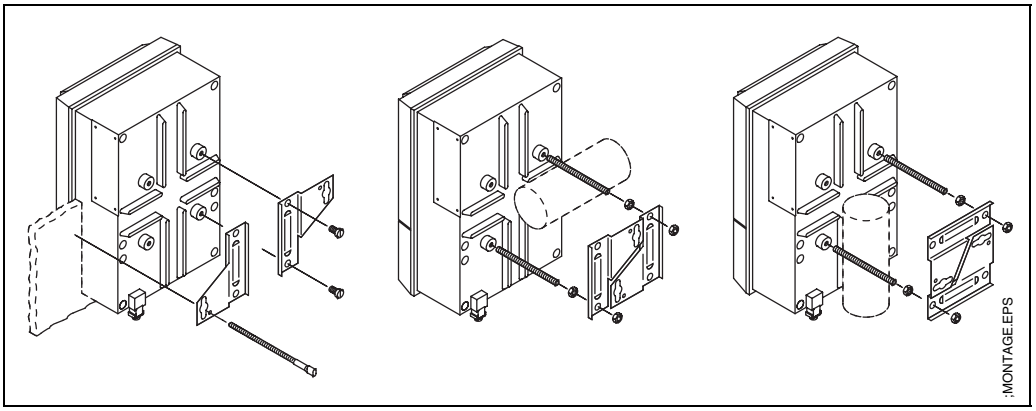


Fig. 4.6: Panel installation and post mounting of Mycom COM 151

Caution:

Outdoor installation

Long-term, direct exposure of the instrument front to solar radiation is to be avoided.

Install weather protection cover CYY 101 in these cases.

4.4 Mounting accessories

Weather protection cover CYY 101

Weather protection cover CYY 101 can be attached directly to the upright post of assembly holder CYH 101 by means of two M8 screws (see fig. 4.8, mounting position ①).

Two round post mounting brackets (see fig. 4.7, order no. 50062121) are required to install the weather protection cover on vertical or horizontal tubing or posts with a max. cross section of 60 mm.

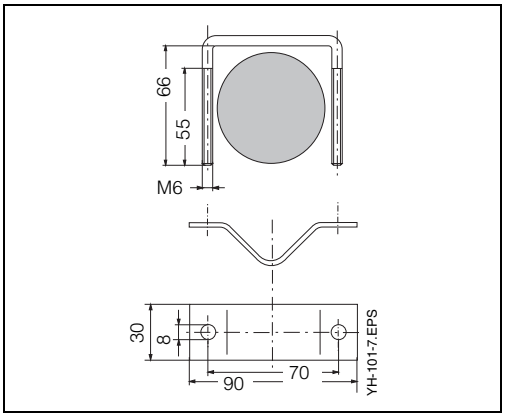


Fig. 4.7: Round post mounting for weather protection cover CYY 101 if not installed on assembly holder CYH 101

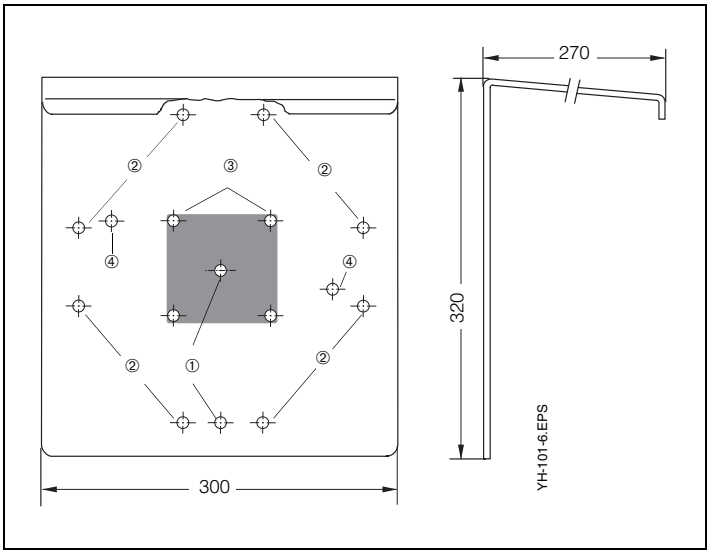


Fig. 4.8: (left) Weather protection cover CYY 101 with dimensions and mounting positions for:

① Installation on upright post CYH 101 with two M8 screws
② Installation on vertical or horizontal tubing with 2 round post mounting brackets
③ Installation of O_2 meas. transmitter Mycom COM 151
④ Wall installation

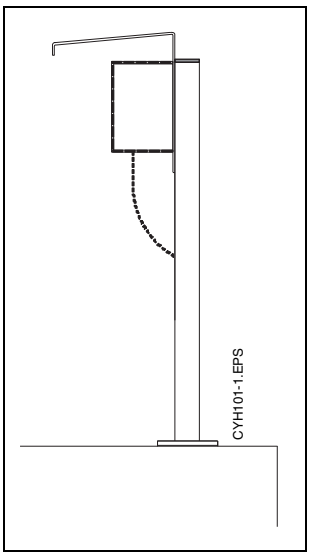


Fig. 4.9 (right) Weather protection cover CYY 101 with Mycom COM 151 installed on upright post

Junction box VS
(Order No. 50001054)
Junction box VS, equipped with a plug-in socket, is required to extend the length of the standard connecting cable supplied with the COS 3 / COS 3S oxygen sensor (max. length 15 m).
Junction box VS is equipped with a 7-pin plug for the sensor and a cable gland for the signal line extension.

Ingress protection of junction box is IP 65.

Recommended extension cable:
Type OMK (order no. 50004124)

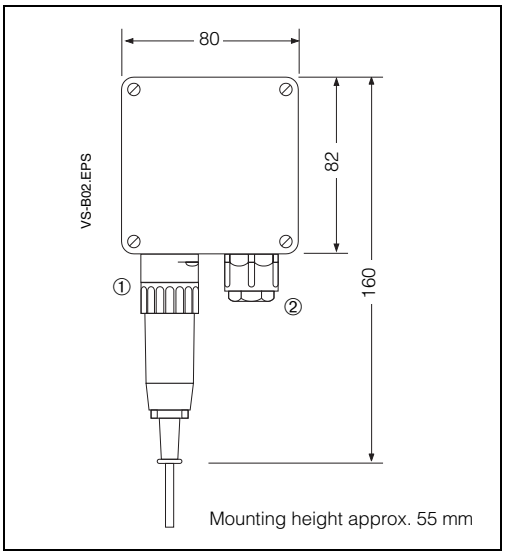


Fig. 4.10: Junction box VS for extension of connecting cable between oxygen sensor and instrument

① Plug-in connector
② Pg 13.5 cable gland

4.5 Connection

The following connections must be established:
- Mains connection
- Switching contact connection (depending on instrument version)
- O_2 signal output (0/4 ... 20 mA) connection if required
- O_2 sensor COS 3 / COS 3S

Warning:
Work under tension and connection to the mains may only be performed by properly trained personnel.

A mains disconnecting device must be installed close to the instrument and identified as a mains disconnecting device for the COM 121 / 151 (see EN 61010-1).

Before connecting the instrument to the mains, make sure the mains voltage matches the voltage rating on the nameplate.

Note:
This instrument has been designed and tested according to the applicable European regulations with regard to electromagnetic compatibility.

However, optimal EMC protection is only guaranteed for a properly grounded instrument with a screened measured value output line.

Keep the screen connection to the grounding terminal (PE) as short as possible.
Do not solder an extension onto the screen!
This also applies to the connection of junction box VS.

Ground the upright post when installing the field housing (COM 151) to increase immunity to interference. Running the cable in the post will improve interference suppression.

After installing and connecting the instrument and sensors, the entire measuring system must be checked for proper function.

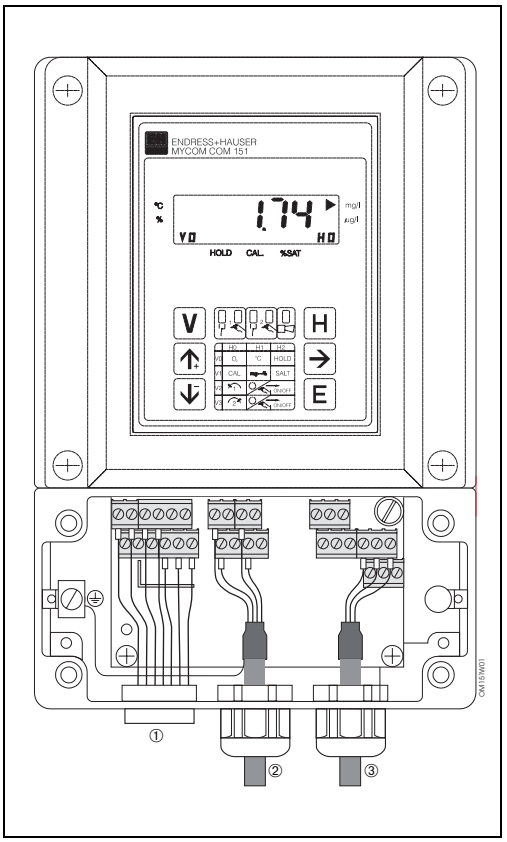


Fig. 4.10: Mycom COM 151 with connections in separate terminal connection compartment

① Plug-in connection for O_2 sensor COS 3 / COS 3S
② Meas. signal output, interface
③ Power supply

Connection of COM 151

The mains and the signal lines are connected to the terminal strip in the separate connection compartment (see fig. 4.10). A plug-in connector is provided for connecting the O_2 sensor.

- Replace the screw plugs underneath the instrument with the corresponding number of Pg cable glands.
- Introduce the connecting cables through the Pg cable glands (see fig. 4.10).
- Connect the instrument according to the connection diagram (see fig. 4.11). Signal cables must be spatially separated from mains and power cables.
- Tighten the cable glands.
- Install the cover on the separate terminal connection compartment and tighten the cover screws.

Connection of COM 121

The signal, mains and switching contact connections to the instrument are established via the (removable) terminal strip.

Terminals	
Cross section:	4.0 mm^2
Temperature output on COM 121:	2 terminals with a max. cross section of 2.5 mm^2
Optionally connectable:	1 wire with 2.5 mm^2 1 wire with 4.0 mm^2 2 litz wires with 1.5 mm^2 each and end sleeves 1 litz wire with 2.5 mm^2 and end sleeve
Terminal designations:	acc. to DIN 45140

Cable lengths available for oxygen sensor COS 3/COS 3S	Extension cable
COS 3 : 1.5 / 7 / 15 m COS 3S : 1.5 / 7 / 15 m Special sensor versions up to 50 m	OMK
Use junction box VS for extension (max. total cable length: 100 m)	

4.6 Connection diagram

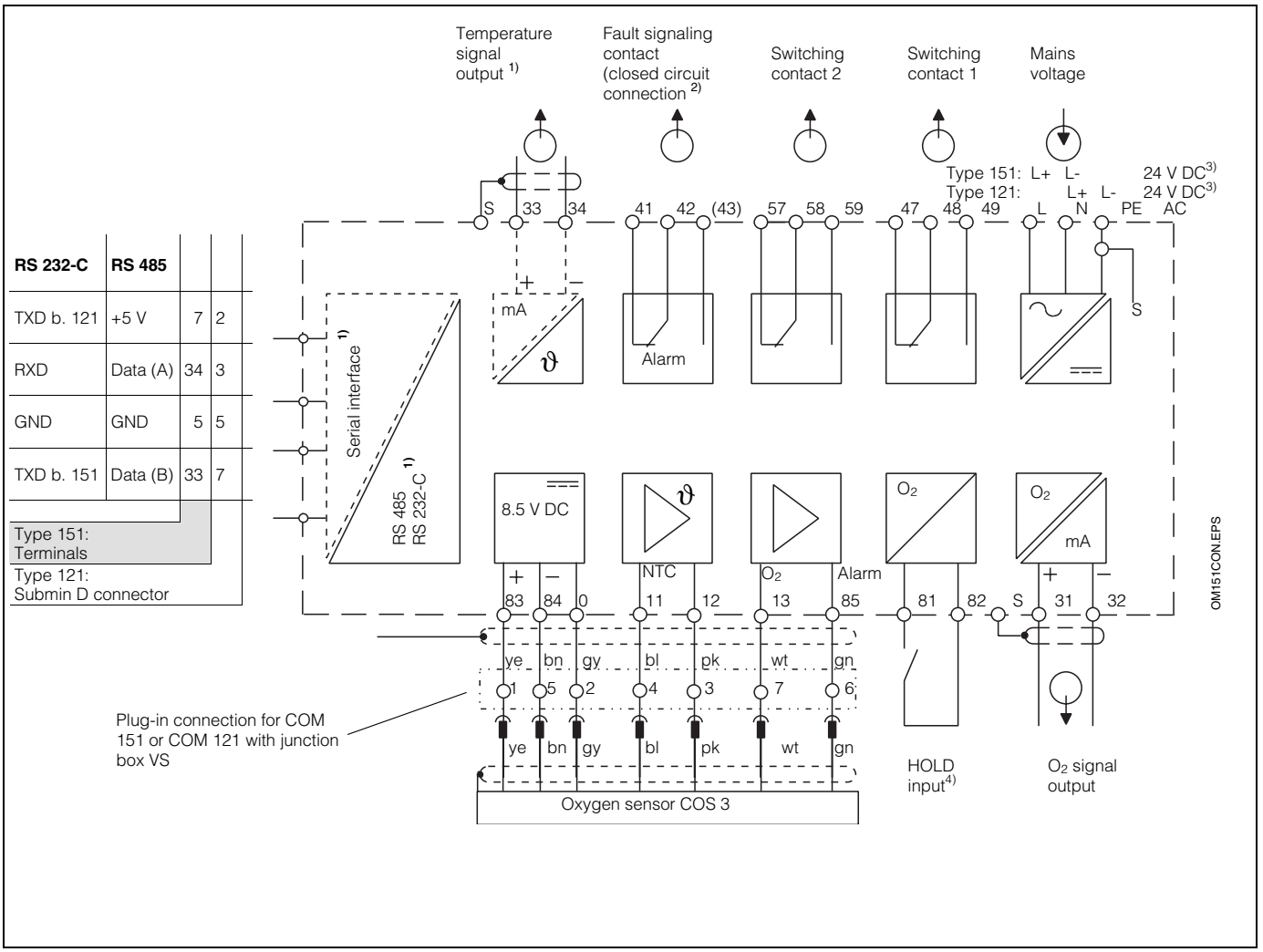


Fig. 4.11: Electrical connection of Mycom COM 121 / 151

Note:
The connection diagram shows the fully equipped unit! Terminal designations in parentheses only apply to the Mycom COM 151!

Please also note the connection diagram on the instrument (COM 121) or inside the connection compartment (COM 151).

1) Instrument version optionally with temperature signal output or serial digital interface (terminals 33 und 34) according to order code (see chapter 3.3).

2) Contact status shown: no current or fault present

Terminal 43 does not exist on COM 121.

All switching contacts are thoroughly interference-suppressed. External loads connected may have to be additionally interference-suppressed.

3) 24 V DC: floating or minus pole grounded

4) When operating more than one Mycom series instruments, each hold input requires its own potential-free contact.

5. Start-up

5.1 Measures before first power-up

Familiarise yourself with the operation of the measuring transmitter before switching it on for the first time.

Caution:

- Make sure all connections have been established correctly before power-up!
- Make sure the oxygen sensor is connected.

Warning:

- Before power-up make sure that there is no risk of damage to the system the instrument is a part of; for example, due to valves or pumps that might operate in an uncontrolled manner, etc.

5.2 Instrument status after first power-up

- After power-up, all LCD segments of the display are briefly activated (approx. 2 s), and all LEDs turn red. Then the unit starts measuring (matrix position V0 / H0).

The operating and start-up levels are locked.

Note:

The instrument automatically starts up in matrix field V0 / H0 (measurement) following interruptions in operation.

5.3 Measures after first power-up

- Calibrate the instrument as described in chapter 7.
  Also observe the operating instructions for the oxygen sensor COS 3/COS 3S.

5.4 Power failure handling

- In the event of a power failure with a maximum duration of 20 ms, measuring operation continues.
- If there is a power failure with a duration of more than 20 ms, measuring operation is interrupted, but the values entered for the parameters are retained.
- When the operating voltage returns, the unit resumes measuring operation as described in chapter 5.1.

6. Operation

6.1 General notes on operation

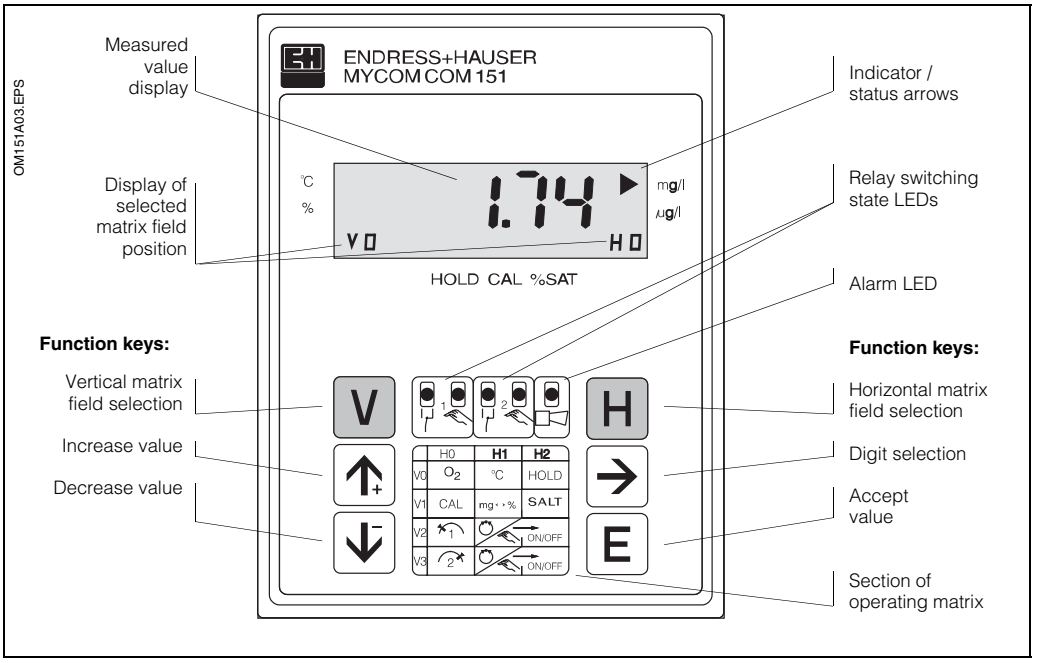


Fig. 6.1: Mycom COM 121 / 151 Front view of instrument with display and operating elements

The operation of the unit is matrix-oriented, i.e. each function of the instrument is assigned one position in a 10 x 10 field matrix (fields V0 / H0 to V9 / H9, see double page 19/20).

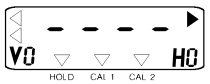
The operating functions are selected via the V (vertical) and H (horizontal) keys. These keys step through the matrix fields, including those which have not been assigned. The key functions are explained in chapter 6.2.

The functions of the matrix are grouped into 3 levels according to their purpose:

- Level 0: **Indication** (O_2 concentration, saturation index, temperature)
- Level 1: **Operation** (calibration, hold) Code entry: **1111**
- Level 2: **Start-up** (current output assignment, damping; controller functions) Code entry: **2222**

Without previous entry of code 1111 or 2222, the content of the matrix fields is only displayed and cannot be modified.

All matrix fields where the corresponding function has not been activated display:



Unlocking the levels

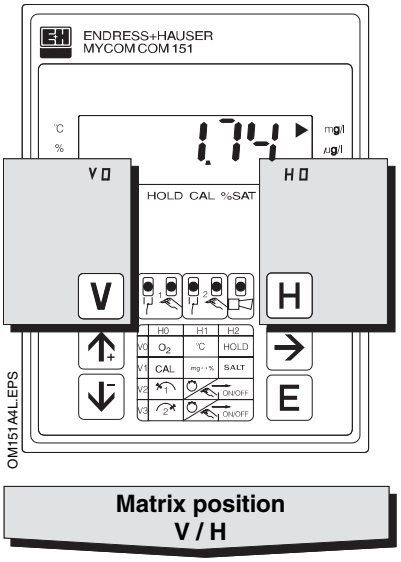
- Select matrix field V0 / H0 and press the E key
- The code number last entered is displayed in field V8 / H9
- Unlock level 1 **Operation** by entering **code 1111** or
- level 2 **Start-up** (including level 1 Operation) by entering **code 2222**
- Acknowledge by pressing the E key
- Return to matrix field V0 / H0 (measured value display) by pressing the V and H keys simultaneously

Locking levels 1 and 2

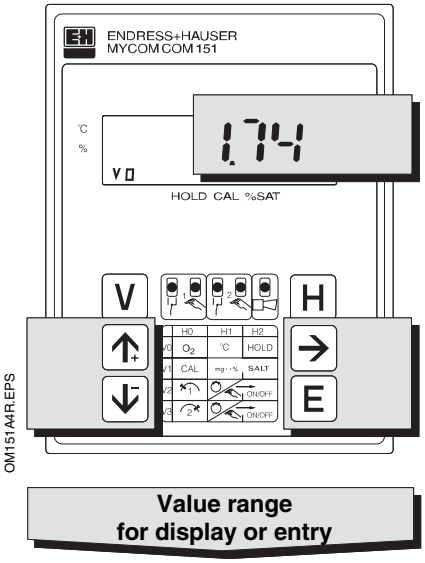
Proceed as described above but enter any value **except** 1111 or 2222.

The instrument is automatically locked (code 0000) following interruptions in operation.

6.2 Key functions



Matrix position V / H



Value range for display or entry

V V key:
Selection of row:
matrix fields V0 to V9

Each key stroke increases the V (row) display value by one.

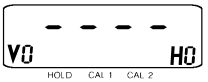
H H key:
Selection of column:
matrix fields H0 to H9

Each key stroke increases the H (column) display by one.

Example:
To select matrix field V1 / H2:

Press V key 1 time
Press H key 2 times

Display for locked matrix fields:



Display for matrix fields that can be changed: digit that can be edited flashes.

Use these keys to enter values and select functions:

Increase value

Decrease value

- Select digit:
  This key cycles from 1st digit to 2nd digit, 3rd digit, etc.
- Start editing
- Recall after E

E Accept matrix field value displayed or modified.

Note:

1. Code 0000 is always displayed in matrix field V8 / H9 when the instrument is started up for the first time or after power failures.

2. Only matrix field V8 / H9 can be selected directly with the „ E “ key. All other matrix fields must be accessed by means of individual selection with the „ V “ and „ H “ keys.

3. **Jumping back** to matrix field **V0 / H0** by pressing the „ V “ and „ H “ keys at the same time is possible from any matrix field position.

6.3 Hold function

Activation of the hold function freezes the existing current outputs to their present values. In automatic operation, all contacts go to their normal positions. Any accumulated alarm time is reset to 0.

This function is advantageous e. g. for performing a calibration, maintenance work etc. It guarantees a constant controller output for external control by using the Mycom's current output.

The hold function can be activated in three different ways:
- by manual switching on and off at the device
- as a special calibration hold during sensor calibration only
  or
- by external triggering (potential-free normally open contact) at the hold input.

Manual activation of HOLD
By entering „1“ in the matrix field V0 / H2, HOLD is switched on. Entering „0“ terminates HOLD.

HOLD during calibration
HOLD during calibration is preselected by entering „1“ in the matrix field V1 / H9.
Advantage: When measuring operation is resumed after completed calibration, HOLD is *automatically* switched off. This ensures a correct return to correct control or measured value recording. A delay time of 3 min for adapting the sensor to the medium is taken into account automatically.

Activation of HOLD by external triggering
HOLD is activated as long as the connection between terminals 81 and 82 is closed by an external switching contact.

Warning:
If several Mycom devices are operated, then each HOLD input needs its own potential-free contact.

Optional functions depending on instrument variant

Basic functions 1	V0 H0 **Measurement** 0.0 to 22.0 mg/l 0.0 to 220.0 % SAT	V0 H1 **Temperature display** –20 to +60 °C	1111 V0 H2 **HOLD OFF / ON** 0 = OFF 1 = ON Default: 0	2222 V0 H3 **Toggle 0 … 20 mA / 4 … 20 mA** 0 = 0 to 20 mA 1 = 4 to 20 mA Default: 1
Basic functions 2	1111 V1 H0 **Calibration** see description in chapter 7	V1 H1 **Toggle mg/l ↔ % SAT** 0 = mg/ l 1 = % SAT Default: 0	V1 H2 **Entry of salinity** 0.0 to 4.0 % Default: 0.0	
Limit / contact configuration for controller 1	1111 V2 H0 **Setpoint entry** for limit contacter/ controller 1 0.00 to 20.00 mg/l 0.0 to 200.0 % SAT Default: 0.5/5.0 . . mg/l/%	1111 V2 H1 **Toggle Auto / Manual** 0 = manual 1 = automatic Default: 1	1111 V2 H2 **Manual OFF / ON** Keys ↑ ↓	2222 V2 H3 **Pickup delay** limit contacter 1 0 to 6000 s Default: 0 . . . . . s
Limit / contact configuration for controller 2	1111 V3 H0 **Setpoint entry** for limit contacter/ controller 2 0.00 to 20.00 mg/l 0.0 to 200.0 % SAT Default: 5.0/50.0 . . mg/l/%	1111 V3 H1 **Toggle Auto / Manual** 0 = manual 1 = automatic Default: 1	1111 V3 H2 **Manual OFF / ON** Keys ↑ ↓	2222 V3 H3 **Pickup delay** limit contacter 2 0 to 6000 s Default: 0 . . . . . s
Alarm	1111 V7 H0 **Alarm threshold** Alarm for setpoint + threshold 0.0 to 10.0 mg/l 0.0 to 100.0 % SAT Default: 0.5/5.0 . . . mg/l/%	1111 V7 H1 **Alarm delay** 0 to 6000 s Default: 0 . . . . . s	2222 V7 H2 **Toggle steady / fleeting contact** 0 = steady contact 1 = fleeting contact Default: 0	2222 V7 H3 **Alarm assignment** 0 = both limit contacts 1 = limit contact 1 2 = limit contact 2 Default: 0
Interface configuration, unlock / lock	2222 V8 H0 **Parity** 0 = none 1 = odd 2 = even Default: 2	2222 V8 H1 **Baud rate selection** 0 = 4800 Bd 1 = 9600 Bd 2 = 19200 Bd Default: 1		
Service and simulation	V9 H0 **Diagnostic code** Error messages E1 to E255	V9 H1 **Service** Displays and clears auto resets (watchdog triggering due to EMC events)	V9 H2 **Display instrument configuration**	V9 H3 **Software version**

2222 **Rate of rise mA / s** V0 H4 0.1 to 20.0 mA / s Default: 20.0 . . . . . mA/s	2222 **O_2 at 0 / 4 mA** V0 H5 0.0 to 10.0 mg / l 0.0 to 100.0 % SAT Default: 0 . . . . . mg/l; %	2222 **O_2 at 20 mA** V0 H6 2.0 to 20.0 mg / l 20.0 to 200.0 % SAT Default: 10.0;100 . mg/l; %	2222 **Temperature at 0 / 4 mA** V0 H7 –20.0 to +50.0 °C Default: 0 . . . . . °C	2222 **Temperature at 20 mA** V0 H8 –10.0 to +60.0 °C Default: 40.0 . . . . . °C	2222 **Calibration temperature measurement** V0 H9 –3.0 to +3.0 °C Default: 0.0 . . . . . °C
				2222 **Time interval control ON / OFF** V1 H8 0 = OFF 1 = ON Default: 0	1111 **HOLD during calibration ON / OFF** V1 H9 0 = OFF 1 = ON Default: 0. . . . .
2222 **Dropout delay** limit contacter 1 V2 H4 0 to 6000 s Default: 0 . . . . . s	2222 **Toggle MIN / MAX** V2 H5 0 = MIN 1 = MAX Default: 0	2222 **Toggle NC / NO contact** V2 H6 0 = NC contact 1 = NO contact Default: 1	2222 **Hysteresis** V2 H7 0.0 to 5.0 mg / l 0.0 to 50.0 % SAT Default: 0.1/1 . . . . . mg/l %	2222 **Timer 1** V2 H8 1 to 1440 min Default: 1 . . . . . min	
2222 **Dropout delay** limit contacter 2 V3 H4 0 to 6000 s Default: 0 . . . . . s	2222 **Toggle MIN / MAX** V3 H5 0 = MIN 1 = MAX Default: 1	2222 **Toggle NC / NO contact** V3 H6 0 = NC contact 1 = NO contact Default: 1	2222 **Hysteresis** V3 H7 0.0 to 5.0 mg / l 0.0 to 50.0 % SAT Default: 0.5 . . . . . mg/l %	2222 **Timer 2** V3 H8 1 to 1440 min Default: 1 . . . . . min	
				H9 V8 **Unlock / Lock** 0000 to 9999 Default: 0000.	
2222 **Device addresses** V9 H4 RS 485: 0 to 64 RS 232-C: 1 to 32 Default: 0/1	2222 **Preset values (defaults)** V9 H5			2222 **Simulation ON / OFF** V9 H8 0 = simulation OFF 1 = simulation ON Default: 0	2222 **Output current simulation** V9 H9 0.00 to 20.00 mA Default: 10.0 . . . . . mA

7. Calibration

During calibration, the measuring transmitter is adapted to the sensor characteristics. Since the COS 3 / COS 3S sensor does not need to be zero-calibrated, the calibration can be performed as a one-point calibration in the presence of oxygen.
The calibration is performed in air (preferably water vapour-saturated, e.g. close to a water surface).

Sensor calibration is required in the following cases:
- After start-up
- After membrane or electrolyte replacement
- After cleaning of the gold cathode or counter-electrode
- After extended periods of interruption with the sensor disconnected
- At typical intervals according to experience

Typical recalibration intervals according to application:
- Drinking water: 1 to 6 months
- Water monitoring (rivers, lakes): 1 to 4 months
- Communal waste water: 2 weeks to 3 months
- Industrial waste water: 1 week to 2 months

Presetting the measuring transmitter
Depending on what has been selected in matrix field V1 / H 1 (mg / l or % SAT), the measured oxygen value is displayed:

- **either**
  in concentration units (mg/l). If required, a salinity correction value (V1 / H2) is used by the instrument to determine and display the reduced O_2 concentration.

- **or**
  as a saturation index percentage (% SAT).

Measures for first calibration and recalibration
- Pull off the sensor protection cap.
- The sensor should be dry on the outside and located in air. For maximum accuracy, the air should preferably be water vapour-saturated. Therefore the sensor should be mounted above and close to a water surface. However, the membrane should remain dry during the entire calibration sequence.
- Wait for 60 minutes (polarisation time). The polarisation time is over when the measured value stabilises and remains constant after elevated initial values that decrease over time.

Measures to take for calibration
- Remove the sensor from the medium.
- Clean and dry the exterior of the sensor with a moist cloth or sponge (particularly the membrane).
- Only if the sensor has been removed from a closed system with an operating pressure higher than the atmospheric pressure: Open membrane cap briefly for pressure compensation, clean if necessary and replace electrolyte, then replace cap. Wait for sensor to polarise (30 to 60 min).
- Wait for the sensor to adapt to the ambient air temperature (approx. 20 minutes). Avoid direct exposure to sunlight.
- Start the calibration procedure when the measured value display on the instrument is stable.
- Return the sensor to the medium following successful calibration.

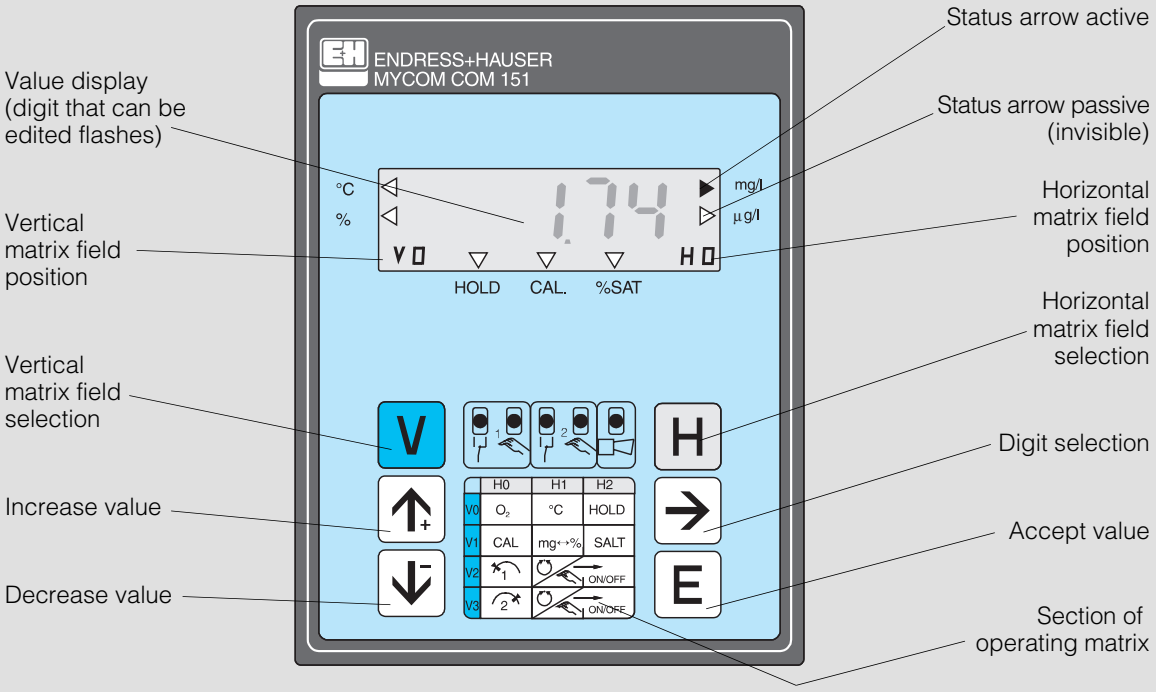
Note:
Also observe the notes on maintenance and cleaning in the operating instructions for the COS 3 / COS 3S (BA 065C/07/e).

mycom COM 121
mycom COM 151

Short Operating Instructions / Configuration

Supplement to operating instructions BA 106C/07/en

Instrument front panel



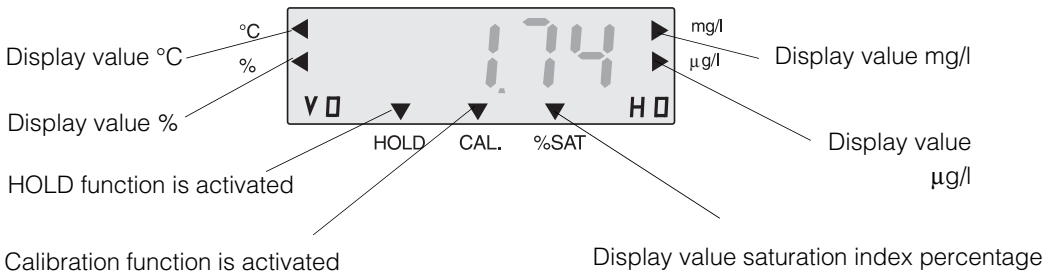
Unlock
Operation: 1111
Start-up and maintenance: 2222

Lock
enter any number (except unlock code)

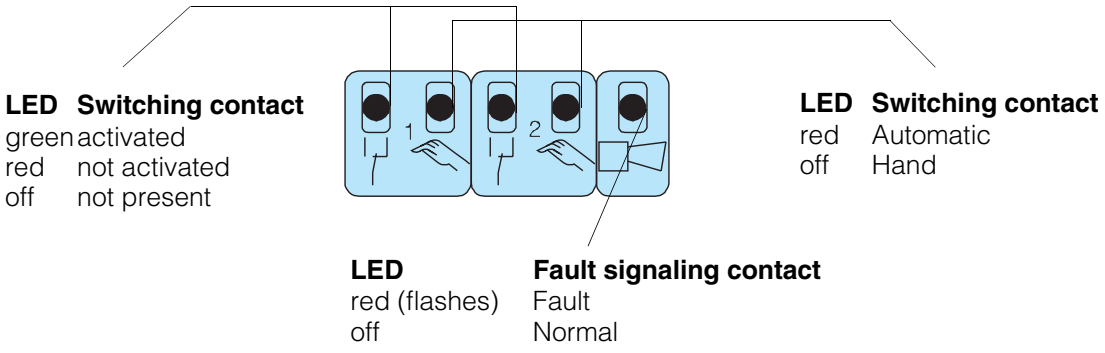
Shortcuts
Measurement: Press V + H at the same time

Access unlock/lock field from measurement mode: Press E key

Status display



LED display



LED **Switching contact**
green activated
red not activated
off not present

LED **Switching contact**
red Automatic
off Hand

LED
red (flashes)
off

Fault signaling contact
Fault
Normal

Warning!
Please read your manual before operating.

Optional functions depending on instrument variant

Basic functions 1	V0 H0 **Measurement** 0.0 to 22.0 mg / l 0.0 to 220.0 % SAT	V0 H1 **Temperature display** –20 to +60 °C	1111 V0 H2 **HOLD OFF / ON** 0 =OFF 1 = ON Default: 0	2222 V0 H3 **Toggle 0 … 20 mA / 4 … 20 mA** 0 = 0 to 20 mA 1 = 4 to 20 mA Default: 1
Basic functions 2	1111 V1 H0 **Calibration** see description in chapter 7	V1 H1 **Toggle mg/l ↔ % SAT** 0 = mg/ l 1 = % SAT Default: 0	V1 H2 **Entry of salinity** 0.0 to 4.0 % Default: 0.0	
Limit / contact configuration for controller 1	1111 V2 H0 **Setpoint entry** for limit contacter/ controller 1 0.00 to 20.00 mg/l 0.0 to 200.0 % SAT Default: 0. 5/ 5.0 . mg/l/%	1111 V2 H1 **Toggle Auto / Manual** 0 = manual 1 = automatic Default: 1	1111 V2 H2 **Manual OFF / ON** Keys ↑ ↓	2222 V2 H3 **Pickup delay** limit contacter 1 0 to 6000 s Default: 0 s
Limit / contact configuration for controller 1	1111 V3 H0 **Setpoint entry** for limit contacter / controller 2 0.00 to 20.00 mg/l 0.0 to 200.0 % SAT Default: 5.0/50.0 . . mg/l/%	1111 V3 H1 **Toggle Auto / Manual** 0 = manual 1 = automatic Default: 1	1111 V3 H2 **Manual OFF / ON** Keys ↑ ↓	2222 V3 H3 **Pickup delay** limit contacter 2 0 to 6000 s Default: 0 s
Alarm	1111 V7 H0 **Alarm threshold** Alarm for setpoint + threshold 0.0 to 10.0 mg/l 0.0 to 100.0 % SAT Default: 0.5./5.0 . . mg/l/%	1111 V7 H1 **Alarm delay** 0 to 6000 s Default: 0 s	2222 V7 H2 **Toggle steady / fleeting contact** 0 = steady contact 1 = fleeting contact Default: 0	2222 V7 H3 **Alarm assignment** 0 = both limit contacts 1 = limit contact 1 2 = limit contact 2 Default: 0
Interface configuration, unlock / lock	2222 V8 H0 **Parity** 0 = none 1 = odd 2 = even Default: 2	2222 V8 H1 **Baud rate selection** 0 = 4800 Bd 1 = 9600 Bd 2 = 19200 Bd Default: 1		
Service and simulation	V9 H0 **Diagnostic code** Error messages E1 to E255	V9 H1 **Service** Display and clears auto resets (watchdog triggering due to EMC events)	V9 H2 **Display instrument configuration**	V9 H3 **Software version**

Indication Operation (code 1111) Start-Up (code 2222)

2222 V0 H4 **Rate of rise mA / s** 0.1 to 20.0 mA / s Default: 20.0 . . . . . mA/s	2222 V0 H5 **O_2 at 0 / 4 mA** 0.0 to 10.0 mg / l 0.0 to 100.0 % SAT Default: 0 . . . . . mg/l/%	2222 V0 H6 **O_2 at 20 mA** 2.0 to 20.0 mg / l 20.0 to 200.0 % SAT Default: 10.0;100 . . mg/l/%	2222 V0 H7 **Temperature at 0 / 4 mA** –20.0 to +50.0 °C Default: 0 . . . . . °C	2222 V0 H8 **Temperature at 20 mA** –10.0 to +60.0 °C Default: 40.0 . . . . . °C	2222 V0 H9 **Calibration temperature measurement** –3.0 to +3.0 °C Default: 0.0 . . . . . °C
				2222 V1 H8 **Time interval control ON / OFF** 0 = OFF 1 = ON Default: 0	1111 V1 H9 **HOLD during calibration ON / OFF** 0 = OFF 1 = ON Default: 0. . . . .
2222 V2 H4 **Dropout delay** limit contacter 1 0 to 6000 s Default: 0 . . . . . s	2222 V2 H5 **Toggle MIN / MAX** 0 = MIN 1 = MAX Default: 0	2222 V2 H6 **Toggle NC / NO contact** 0 = NC contact 1 = NO contact Default: 1	2222 V2 H7 **Hysteresis** 0.0 to 5.0 mg / l 0.0 to 50.0 % SAT Default: 0.1/1 . . . . . mg/l%	2222 V2 H8 **Timer 1** 1 to 1440 min Default: 1 . . . . . min	
2222 V3 H4 **Dropout delay** limit contacter 2 0 to 6000 s Default: 0 . . . . . s	2222 V3 H5 **Toggle MIN / MAX** 0 = MIN 1 = MAX Default: 1	2222 V3 H6 **Toggle NC / NO contacter** 0 = NC contact 1 = NO contact Default: 1	2222 V3 H7 **Hysteresis** 0.0 to 5.0 mg / l 0.0 to 50.0 % SAT Default: 0.5 . . . . . mg/l%	2222 V3 H8 **Timer 2** 1 to 1440 min Default: 1 . . . . . min	
					H9 V8 **Unlock / Lock** 0000 to 9999 Default: 0000. . . . .
2222 V9 H4 **Device address** RS 485: 0 to 64 RS 232-C: 1 to 32 Default: 0/1	2222 V9 H5 **Preset values (defaults)**			2222 V9 H8 **Simulation ON / OFF** 0 = simulation OFF 1 = simulation ON Default: 0	2222 V9 H9 **Output current simulation** 0.00 to 20.00 mA Default: 10.0 . . . . . mA

Calibration

Note:
- After start-up or interruptions in operation, allow the sensor to polarise for 30 ... 60 minutes
- Clean the sensor with water and dry
- Avoid direct exposure of sensor to sunlight
- Wait for approx. 20 minutes to allow the medium to adapt to the air temperature
- The sensor signal should be stable and in the range between 178 and 390 approx. 500 s after start of calibration (see below).

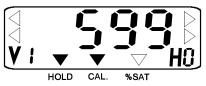
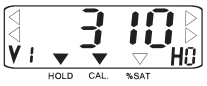
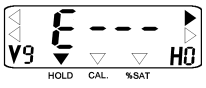
Calibration sequence			
Step	**Matrix**	**Command**	**Meaning**
1	V8 / H9	1111	Unlock
2	V1 / H0		Calibration selected
3	V1 / H0	→	Activate hold
4	V1 / H0	E	Start calibration (only if calibration hold is activated)
5	V1 / H0	→	Displays the sensor signal value
6	V9 / H0		Check for calibration errors when timer countdown = 0
7		Press V + H at the same time	Measurement

Refer to chapter 7 of operating instructions for details.

Error list (matrix field V9 / H0)			
E. No.	**Meaning**	**E. No.**	**Meaning**
	System errors		**Warnings**
1	Data exchange error in processor	30	Current output simulation enabled
2	Internal configuration error	31	Parameter range for current output 1 too small
		32	Parameter limits for current output 1 interchanged
	Disturbances		(falling assignment)
10	Limit or setpoint exceeded for longer period at than dela setting	34	Temperature range for current output 2 too small
13	O_2 display range exceeded	35	Temperature range limits for current output 2 interchanged
19	Temperature below lower limit of measuring range		
20	Temperature measuring range exceeded		**Warning (for oxygen)**
21	Temperature measurement short circuit in line	100	Calibration voltage after 530 s outside of 415 ... 913 mV range
22	Below permissible minimum value for 0/4 mA		(i. e. sensor slope too low or excessive)
	current range (output 1)	101	Measured value unstable, i. e. automatic calibration aborted
23	Permissible maximum value for 20 mA current	102	Pressure exceeds measuring range > approx. 1100 mbar
	range exceeded (output 1)	103	Pressure below measuring range < 500 mbar
25	Permissible minimum value for 0/4 mA current		
	range exceeded (output 2)		
26	Permissible maximum value for 20 mA current		
	range exceeded (output 2)		
28	Sensor alarm.		
	The alarm meassage „S E N S“ additionally appears on the display		
	at intervals of 3 seconds.		

7.1 Calibration sequence

Matrix field V1 / H0 (code 1111)

Function	Matrix field or command	Display value	Instrument display	Note
Select calibration function	V1 / H0	Calibration timer starting value		
Switch on HOLD	→	Status arrow HOLD additionally active		Only with „HOLD during calibration“ (V1 / H9 = „1“)
Remove sensor from medium and prepare it for calibration (according to operating instructions of sensor).				
Start calibration	E	Time (in s) until end of calibration Status arrow CAL additionally active		Calibration timer countdown to 0.
Possibility of inquiring sensor slope	→	Relative sensor signal value		From 70 s to 0 s: permissible range 178…390
End of calibration		Count 0 Status arrow CAL is switched off		If alarm LED flashes, check for calibration errors
If alarm LED does not flash: calibration correct. Place sensor back into the medium.				
Resume measuring operation	V and H simul-taneously	O_2 value measured Status arrow HOLD: Switching-off after 3 min (only with „HOLD during calibration“)		Measuring operation continued
If alarm LED flashes: check for calibration errors.				
Check for calibration errors	V9 / H0	Diagnostic code		If E100 or E101: Perform sensor maintenance
Selection of calibration function	V1 / H0	Sequence as described above		
Restart calibration	E	Sequence as described above		

Note:

Sensor signal and oxygen calibration value check

- For purposes of verification, this display can be called up whenever the calibration sequence has been initiated. The current sensor signal is displayed for 3 seconds when the "→" key is pressed. The instrument accepts sensor signal values from 178 to 390 for calibration.
  These are "raw" sensor signal values, i.e. no absolute oxygen values.
  Values outside this range trigger error message 100.
- The sensor signal is considered stable if its fluctuation (relative to the current measured value) is ≤ ±1 % per minute. Greater fluctuation triggers error message 101.
  Error messages can be called up via matrix field V9 / H0 (diagnostic code). They are defined in the error list in chapter 10.3.
- The atmospheric oxygen saturation value after calibration varies depending on temperature and current atmospheric pressure.
- A saturation index of 102 % is displayed in the % SAT measuring range after calibration. (This is equivalent to the corresponding saturation value × 1.02 in mg/l.
  1.02 = mean air/water correction factor.)

8. Description of operating functions

Matrix pos. V / H	Description of functions	Parameter settings	
		Fact.	User
0 / 0	**Measurement** Displays the temperature-compensated O_2 value in concentration units (0.0 to 22.0 mg/l) or optionally as a saturation index percentage (0.0 to 220 % SAT). Use the ENTER key to jump directly to field V8 / H9 (Unlock / Lock).		
0 / 1	**Temperature display** Displays the temperature in °C. –20 ... +60 °C If below minimum value, error message 19 is issued. If above maximum value, error message 20 is issued. Error message 21 is issued in the event of a short circuit in the temperature signal lines.		
0 / 2	**HOLD ON / OFF** Activates the HOLD function. 0 = OFF 1 = ON See description of hold function in chapter 6.3.	0	
0 / 3	**Toggle 0 ... 20 mA / 4 ... 20 mA** Switches the lower current output limit to 0 or 4 mA. 0 = 0 ... 20 mA 1 = 4 ... 20 mA This setting affects the current outputs installed.	1	
0 / 4	**Rate of rise mA / s (damping)** Sets the current rate of rise of the current output for the measured value. 0.1 ... 20.0 mA This setting does not affect the temperature output.	20.0	
0 / 5	**O_2 at 0 or 4 mA** Entry of O_2 value for the lower current limit. 0.0 ... 10.0 mg / l 0.0 ... 100.0 % SAT If below a minimum difference of 10 % between the upper and lower current values, error message 31 is issued.	0	
0 / 6	**O_2 at 20 mA** Entry of O_2 value for 20 mA current. 2.00 ... 20.00 mg / l 20.0 ... 200.0 % SAT If below a minimum difference of 10 % between the upper and lower current values, error message 31 is issued.	10 mg / l or 100 %	
	Temperature output entries only for instruments with temperature output installed! (See chapter 3.3, Order code.)		
0 / 7	**Temperature at 0 or 4 mA** Entry of temperature for the lower current value (0 or 4 mA) of the 2nd current output. –20.0 ... +50.0 °C The minimum difference to the value at 20 mA is 10 K; if below, error message 34 is issued.	0	
0 / 8	**Temperature at 20 mA** Entry of temperature for the upper current value (20 mA) of the 2nd current output. –10.0 ... +60.0 °C The minimum difference to the value at 0 / 4 mA is 10 K; if below, error message 34 is issued.	40.0	
0 / 9	**Calibration temperature measurement** The temperature value can be corrected by max. ±3 °C.	0.0	

Matrix pos. V / H	Description of functions	Parameter settings	
		Fact.	User
1 / 0	**Calibration** See description in chapter 7, Calibration.		
1 / 1	**Toggle mg / l <—> % SAT** Toggles the measured value display between mg / l O_2 and SAT % (saturation index percentage). 0 = mg / l 1 = % SAT	0	
1 / 2	**Salinity input** Entry of salinity value (salt concentration) as a percentage by weight. 0.0 ... 4.0 %	0.0	
1 / 8	**Time interval control ON / OFF** 0 = OFF 1 = ON See description of time interval control in chapter 9.4.	0	
1 / 9	**HOLD during calibration ON / OFF** 0 = OFF 1 = ON See description of hold function in chapter 6.3.	0	
	Instrument variant 3 only Values in parentheses apply to setpoint 2.		
2 / 0 (3 / 0)	**Setpoint O_2** Input of O_2 setpoint for controller 1: 0.50 mg/l or 5.0 % Input of O_2 setpoint for controller 2: 5.00 mg/l or 50.0 % 0.0 ... 200.0 % SAT 0.0 ... 20.00 mg / l	4.00 10.00	
2 / 1 (3 / 1)	**Toggle AUTO / MANUAL** controller 1 (controller 2) 0 = MANUAL 1 = AUTO In the MANUAL mode of operation (MANUAL / AUTO switching of controller 1 (controller 2)), the manual mode LED is red (see chapter 9.3). You can then use field V2 / H2 to manually actuate the contacts. When you return from MANUAL to AUTO, the contacts drop out.	1	
2 / 2 (3 / 2)	**Manual OFF / ON** If 0 = MANUAL is selected in field V2 / H1 (V3 / H1) , this field can be used to enable or disable contact 1 (2) with the $\uparrow_+$ or $\downarrow^-$ key. When time interval control is enabled (V1 / H8 = 1) and V2 / H1 (V3 / H1) is set to 0 = MANUAL, these keys do not affect contact 1 (2).		
2 / 3 (3 / 3)	**Pickup delay** Input of pickup delay for contact 1 (2) of limit contacter in seconds. 0 ... 6000 s	0	
2 / 4 (3 / 4)	**Dropout delay** Input of dropout delay for contact 1 (2) of limit contacter in seconds. 0 ... 6000 s	0	

Matrix pos. V / H	Description of functions	Parameter settings Fact.	User
	Values in parentheses apply to setpoint 2.		
2 / 5 (3 / 5)	**Toggle MIN / MAX** Determines the function of contact 1: 0 = MIN 1 = MAX **MIN** setting means: Contact is enabled when the value drops below the setpoint. **MAX** setting means: Contact is enabled when the value exceeds the setpoint.	0 (1)	
2 / 6 (3 / 6)	**Toggle NC / NO contact** Determines whether contact 1 is to be used as a normally closed contact or a normally open contact. 0 = normally closed contact (NC) 1 = normally open contact (NO)	1	
2 / 7 (3 / 7)	**Hysteresis** Determines the hysteresis for limit contacter 1 (2) in mg / l or % SAT. 0.0 ... 5.0 mg / l 0.0 ... 50.0 % SAT Effect of **MAX** contact function: The contact is enabled when the setpoint is exceeded and disabled when the value drops below setpoint minus hysteresis. Effect of **MIN** contact function: The contact is enabled when the value drops below the setpoint and disabled when setpoint plus hysteresis are exceeded.	0.1 mg / l or 1 %	
2 / 8 (3 / 8)	**Timer** 1 ... 1440 min See separate description: Time interval control (timer function, chapter 9.4).	1	
7 / 0	**Alarm threshold** Determination of the threshold in mg / l or % values where an alarm condition starts if a limit is exceeded. 0.00 ... 10.00 mg / l 0.0 ... 100.0 % SAT **Example:** Limit 3.5 mg / l, MAX function of contact, alarm threshold 0.5 mg / l; an alarm condition exists starting at 4 mg / l. **Note:** Fields 7/0 to 7/3 can only be accessed on instrument variant 3 (with fault signalling contact and 2 limit contacts).	0.5 mg / l or 5.0 %	
7 / 1	**Alarm delay** Determination of the delay period in seconds after which, following violation of the alarm threshold (see V7 / H0), an alarm condition is signalled (see chapter 9.3). 0 ... 6000 s If the alarm situation ceases before expiration of the delay period, the timer is reset to 0. When the HOLD function is enabled, the timer is also reset to 0.	0	

Matrix pos. V / H	Description of functions	Parameter settings	
		Fact.	User
7 / 2	**Toggle steady / fleeting contact** Defines the alarm relay as a steady or fleeting contact. 0 = steady contact 1 = fleeting contact If defined as a fleeting contact, the closing time is 1 s.	0	
7 / 3	**Alarm assignment** 0 = both limit contacts 1 = limit contact 1 only 2 = limit contact 2 only	0	
8 / 0	**Parity** Determination of parity bit for the RS interface. 0 = none 1 = odd 2 = even	2	
8 / 1	**Baud rate selection** **(instrument output variants 3 ... 6 only)** For RS 232-C, the transfer rate can be switched between 4800 and 9600 baud. 0 = 4800 Bd (only RS 232-C) 1 = 9600 Bd (RS 232-C and RS 485) 2 = 19200 Bd with RACKBUS protocol (only RS 485) The RS standard protocol is used for transfer when this field is set to "0" or "1"; the parity is set to the desired value in V8 / H0. When set to "2", (19200 baud), the RACKBUS protocol is used and the parity setting is fixed to "even" ("2" in V8 / H0).	1	
8 / 9	**Unlock / Lock** Entry of access code: 0000 ... 9999 **Level 0** (measurement) **no code required**, read fields. **Level 1** (operation) is accessed with **code 1111**. **Level 2** (start-up) is accessed with **code 2222**. **Note:** • Field V8 / H9 can be accessed directly from field V0 / H0 (measurement) with the E key. • Levels 1 and 2 are locked by entering any number **except 1111 or 2222**. • Locking affects only the keyboard, not the interface!	0000	
9 / 0	**Diagnostic code** Display of current diagnostic code according to chapter 10. E001 to E255 – The error with the highest priority, i.e. the error with the lowest number, is displayed. – More errors can be displayed using the $\uparrow_+$ or $\downarrow^-$ key. – Errors are automatically cancelled when the corresponding error condition ceases to exist.		

Matrix pos. V / H	Description of functions	Parameter settings	
		Fact.	User
9 / 1	**Service** Displays the number of automatic resets. 0 … 255 The display value can be reset to 0 with the ↑+ and ↓− keys and E. Restoring the defaults in V9 / H5 does not reset this counter.		
9 / 2	**Display instrument configuration** Displays the current instrument configuration. 0 … 9999 1st digit: 0 2nd digit: 0 3rd digit: 1 = with fault signalling contact 3 = with fault signalling contact and 2 controllers 9 = special version 4th digit: 0 = no second current output 1 = second current output 3 = RS 232-C 6 = RS 485		
9 / 3	**Software version** Displays the software version of the unit according to Endress+Hauser Conducta standards. 0.00 ... 99.99		
9 / 4	**Device addresses** Determines the device address when operated via an RS interface. 1 ... 32: RS 232-C 0 ... 63: RS 485	 1 0	
9 / 5	**Preset values (default)** Press the E key to restore the factory defaults as specified for the various fields. When you select this field, the text “SEtd” appears. When you press the E key, the display flashes. “End” is displayed once the defaults have been transferred. **Warning:** This function overwrites all parameter settings made by the user. This does not affect field V8 / H9 (Unlock/ Lock). This function is not accessible via the interface.		

Matrix pos. V / H	Description of functions	Parameter settings	
		Fact.	User
9 / 8	**Simulation ON / OFF** 0 = simulation OFF 1 = simulation ON Enter 0 to disable the simulation function. An entry of 1 causes the current value entered in field V9 / H9 to be applied to the O_2 signal output and the temperature signal output. **Note:** When finished simulating the output current defined in field V9 / H9 (see below), the simulation must be set to 0 (= OFF) again.	0	
9 / 9	**Output current simulation** Entry of a current value not affected by measurement which is applied to the O_2 and temperature outputs if field V9 / H8 has been set to 1 (= ON). 0.00 … 20.00 mA The new value takes effect after pressing the E key.	10.00	

9. Limit contacter and time interval control

9.1 Limit contacter function

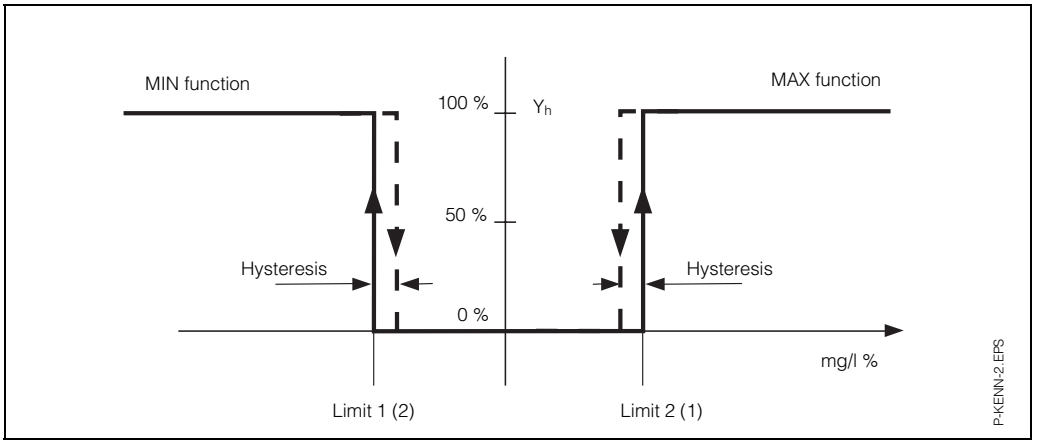


Fig. 9.1: Characteristic curve of limit contacter

Sequence of parameter settings		Matrix position V / H (contr. 1)	Matrix position V / H (contr. 2)	See
Limit contacter adjustments				
1.	Contact pickup **and / or** dropout delay	2 / 3 2 / 4	3 / 3 3 / 4	page 24
2.	Switching function MIN / MAX	2 / 5	3 / 5	pages 25 and 29
3.	Relay contact closed or open circuit function	2 / 6	3 / 6	
4.	Hysteresis	2 / 7	3 / 7	page 25
5.	Setpoint	2 / 0	3 / 0	page 24

9.2 Switching contact configuration

The following table shows all the operating states for the limit contacter function of the unit. The measured or display value (actual value) fluctuates between approx. 0 % (> setpoint 1) and approx. 100 % (< setpoint 2).

Different switching contact positions (0 = OFF, 1 = ON) will result depending on the switching function (MIN / MAX) and the operating mode (closed / open circuit) of the output contact.

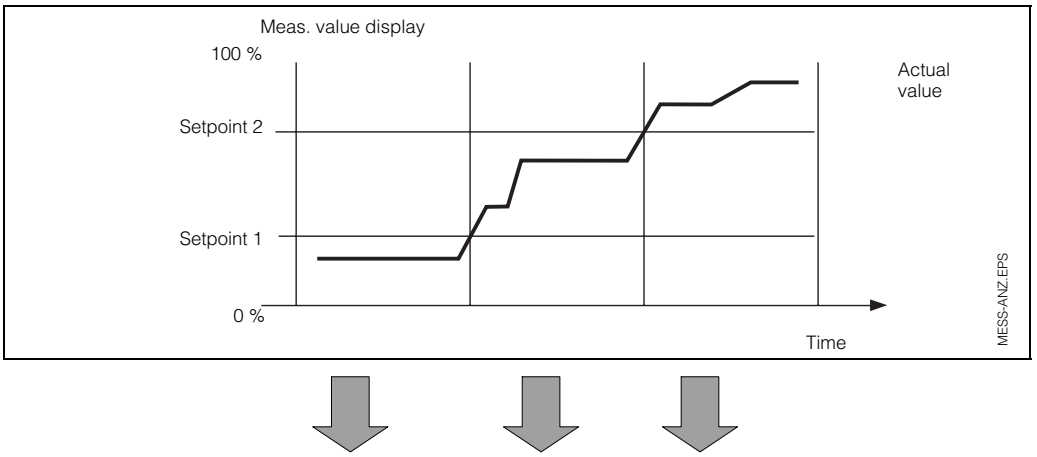


Fig. 9.2: Status diagram for automatic operation of Mycom COM 121/151 with limit contacter function

		Switching contacts						
Function V2 / H5 V3 / H5	**Principle V2 / H6 V3 / H6**	**LED**	**Cont.**	**LED**	**Cont.**	**LED**	**Cont.**	**Contact at power failure**
Setpoint MIN	Closed circuit	red	OFF	green	ON	green	ON	OFF
	Open circuit	red	ON	green	OFF	green	OFF	OFF
Setpoint MAX	Closed circuit	green	ON	green	ON	red	OFF	OFF
	Open circuit	green	OFF	green	OFF	red	ON	OFF

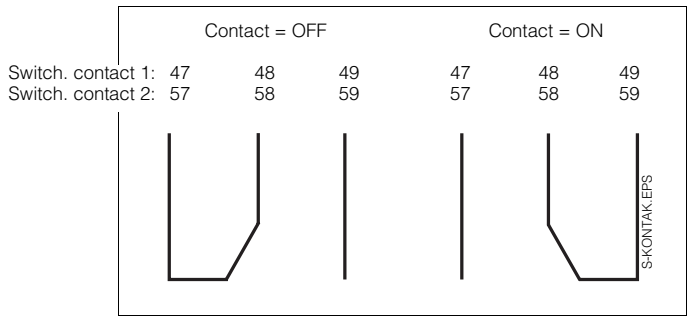
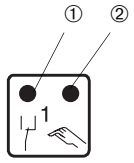


Fig. 9.3: Contact positions for switching contacts with terminal assignments (according to fig. 4.11, chapter 4.6)

LED function



① Red / green switching status LED:
green = idle position = OFF
red = working position = ON

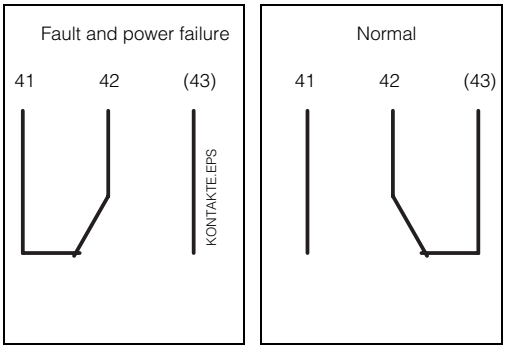
② Red manual / automatic LED:
Automatic operation: LED OFF
Manual operation: LED ON

9.3 Alarm function / fault signalling contact

Sequence of parameter settings		Matrix position V / H
1.	Setpoint controller 1 controller 2	2 / 0 3 / 0
2.	Alarm threshold	7 / 0
3.	Alarm delay	7 / 1
4.	Steady or fleeting contact	7 / 2

Fault signalling contact

Operating condition	LED	Contact 41/42
Normal	–	OFF
Power failure	–	ON
Fault	flashes	ON



(contact 43 on COM 151 only)

Fig. 9.4: Contact positions of fault signalling contact with terminal assignments (according to fig. 4.11, chapter 4.6)

Alarm condition

- Alarm LED flashes red
- Fault signalling contact ON
- Error number in matrix field V9 / H0 (see error list in chapter 10.3)

9.4 Time interval control (timer function)

The interval control function can be used, for example, for controlled nitrification with a high setpoint (nitri setpoint) and subsequent denitrification with a low setpoint (denitri setpoint).

During nitrification, ammonium is transformed to nitrate via nitrite by means of oxidation. During denitrification, nitrate is converted to nitrogen gas by means of oxidation of carbon compounds (anoxic environment).

Two operating modes are available when time interval control (V1 / H8) is enabled:

Automatic operation (see fig. 9.5):
Fields V2 / H1 and V3 / H1 are set to "1".

- During time interval 1 (timer 1), the settings of setpoint 1 and hysteresis 1 determine the switching behaviour of contact 1. Contact 2 is off during this time interval.
- During time interval 2 (timer 2), the settings of setpoint 2 and hysteresis 2 determine the switching behaviour of contact 2. Contact 1 is off during this time interval.
- The following switching behaviour is obtained when the MIN contact function has been selected:
  The switching contact is enabled when the O_2 value drops below the setpoint.
  The switching contact is disabled when the O_2 value exceeds the setpoint plus hysteresis.

Parameter setting sequence		Matrix position V / H (Contr. 1)	Matrix position V / H (Contr. 2)
1.	Interval control ON = 1	V1 / H8	
2.	Switching function MIN = 0	2 / 5	3 / 5
3.	Hysteresis	2 / 7	3 / 7
4.	Timer (switching interval length)	2 / 8	3 / 8
5.	Setpoint	2 / 0	3 / 0

Manual operation:
Fields V2 / H1 and V3 / H1 are set to "0".

- Contact 1 is on continuously during time interval 1. Contact 2 is continuously off.
- Contact 2 is on continuously during time interval 2. Contact 1 is continuously off.

Mixed operation is also possible, e.g. contact 1 in the automatic mode and contact 2 in the manual mode.
The MANUAL mode is preferably used for maintenance work or when the O_2 sensor is disconnected.

Note:
The $\uparrow_+$ and $\downarrow^-$ keys do not affect the switching contacts in the manual mode of the time interval control function.

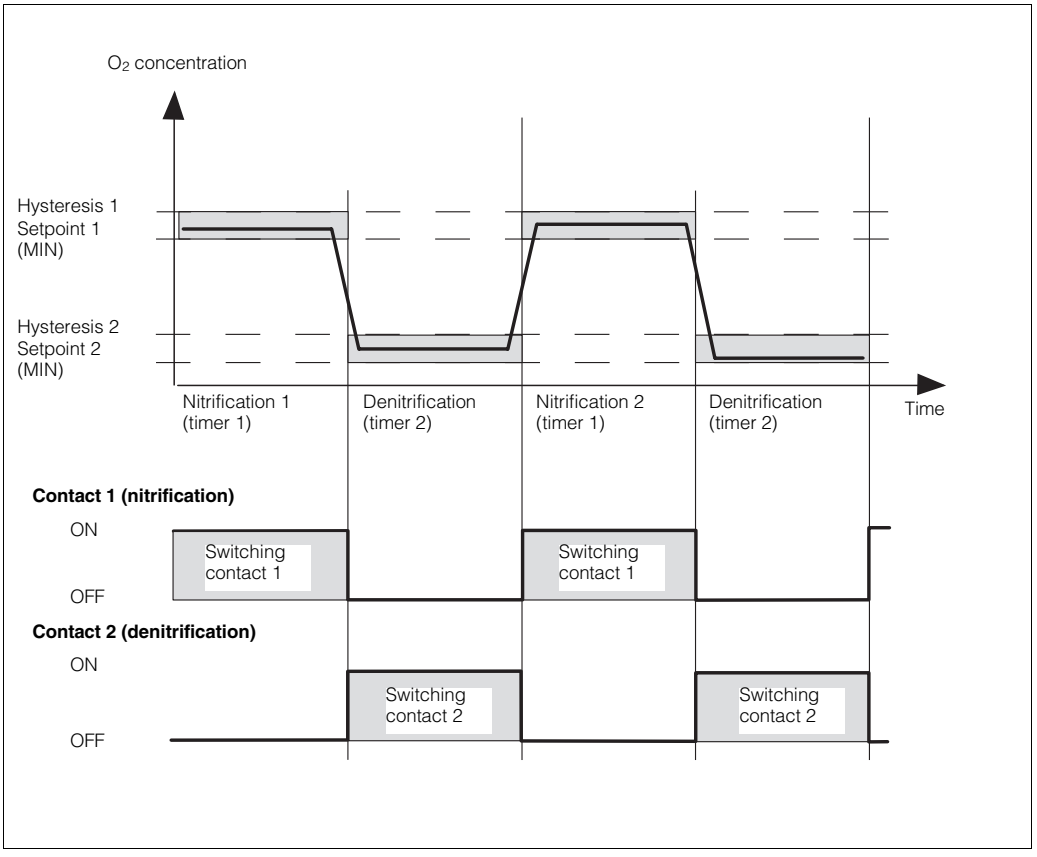


Fig. 9.5: Example for sequence of an interval control for periodic nitrification / denitrification

Settings for nitrification or denitrification time interval control (example)

Nitrification at: 3.0 mg / l O_2
Hysteresis: 0.3 mg / l

Denitrification at: 0.3 mg / l O_2
Hysteresis: 0.1 mg / l

Nitrification phase: 3 hrs. (timer 1)
Denitrification phase: 6 hrs. (timer 2)

Step no.	Function	Matrix field position	Setting
1	Interval control ON	V1 / H8	1
2	Setpoint 1	V2 / H0	3.00
3	Limit value 1 - automatic	V2 / H1	1
4	MIN function 1	V2 / H5	0
5	Hysteresis 1	V2 / H7	0.30
6	Timer 1	V2 / H8	180
7	Setpoint 2	V3 / H0	0.30
8	Limit value 2 - automatic	V3 / H1	1
9	MIN function 2	V3 / H5	0
10	Hysteresis 2	V3 / H7	0.10
11	Timer 2	V3 / H8	360
12	Alarm threshold	V7 / H0	0.50
13	Alarm assignment to both contacts	V7 / H3	0

10. Diagnosis

10.1 Error classes and error numbers

Errors are grouped into three classes:

Error class	Priority	Error no.
No error		- - - -
System error	1 = high	1 ... 9
Disturbance	2 = medium	10 ... 29
Warning	3 = low	30 ... 255

System errors
are error conditions where proper operation of the entire measuring system is no longer guaranteed (e.g., parameter storage EEPROM cannot be read correctly).
These errors require servicing (repair of instrument at factory or replacement) since they cannot be cleared.

Disturbances
are error conditions where

a) the process parameter to be measured and possibly to be controlled lies outside the limits (process error),

or

b) display and / or current output lie outside the specified accuracy range,

or

c) the measuring transmitter connections receive incorrect signals.

These errors are cancelled as soon as the error condition ceases to exist.

Warnings
are error conditions where

a) an operator error must be corrected,

or

b) maintenance will be required shortly.

These errors are cancelled as soon as the error condition ceases to exist.

Caution:
If a warning is ignored, a disturbance may result.

10.2 Error display and handling

Each of the errors described below is entered in an error list which is sorted by the error number in ascending order
(see chapter 10.3). The error list has exactly one space for each error number.
Multiple occurrences of an error are therefore signalled only once.

Any occurrence of an error activates the alarm LED (flashes at intervals of one second). System errors and disturbances also activate the alarm contact (which may be defined as a steady or a fleeting contact).

When field V9 / H0 is selected, the display shows the number of the error with the lowest number which has occurred in the format „E001" to “E255".
The error list can be searched for other errors which have occurred using these keys:

ascending

and

descending

Disturbances and warnings are deleted from the error list as soon as the error condition ceases to exist. If the error list is empty, „E- - -“ is displayed.

10.3 Error list

No.	Meaning	Field V / H	Measures for maintenance / troubleshooting
	System errors		
1	Data exchange error in processor		Return instrument to your Endress+Hauser sales agency for repair or request service.
2	Internal configuration error		Return instrument to your Endress+Hauser sales agency for repair or request service.
	Disturbances		
10	Limit or setpoint exceeded for period exceeding delay setting	7 / 2	Alarm delay timeout. Check actuator, controller function and control parameters.
13	O_2 display range exceeded	0 / 0	Check O_2 measurement, control and connections; check instrument and measuring cable with O_2 simulator if necessary.
18	Temperature measurement line open	0 / 1	Check connections and measuring cable.
19	Temperature below limit of measuring range	0 / 1	Check temperature measurement and connections; check instrument and measuring cable with temperature simulator if necessary.
20	Temperature measuring range exceeded	0 / 1	Check temperature measurement and connections; check instrument and measuring cable with temperature simulator if necessary.
21	Temperature measurement short circuit in line	0 / 1	Check connections and measuring cable.
22	Current below permissible minimum of 0 / 4 mA (output 1)	0 / 5	Check 0 / 4 mA measuring range assignment and change if necessary. Check measurement and control.
23	Current exceeds 20 mA range (output 1)	0 / 6	Check 20 mA measuring range assignment and change if necessary. Check measurement and control.
25	Current below permissible minimum of 0 / 4 mA (output 2)	0 / 7	Check 0 / 4 mA measuring range assignment and change if necessary. Check measurement and control.
26	Current exceeds 20 mA range (output 2)	0 / 8	Check 20 mA measuring range assignment and change if necessary. Check measurement and control.

No.	Meaning	Field V / H	Measures for maintenance / troubleshooting
	Disturbances (continued)		
28	Sensor alarm. The alarm message „ S E N S “ additionally appears on the display at intervals of 3 seconds. **Note:** This error message is effective only with matrix fields V0 / H0 and V0 / H1 selected!	0 / 0 0 / 1	Stop measurement. Regenerate sensor or change diaphragm. **Note:** Also see installation and operating instructions for COS 3/COS 3-S sensor for dissolved oxygen (BA 065C/07/en)
	Warnings (general)		
30	Current output simulation switched on	9 / 8	Switch simulation off.
31	O_2 range for current output 1 too small	0 / 5 0 / 6	Increase difference (min. 20 % SAT or 2 mg / l).
34	Temperature range for current output 2 too small	0 / 7 0 / 8	Increase difference (min. 10 °C).
35	Temperature range for current output 2 overlaps	0 / 7 0 / 8	Enter new temperature values.
	Warnings (for oxygen)		
100	Calibration voltage after 530 s outside of 415 ... 913 mV range (i.e. sensor slope too low or excessive)	1 / 0	Check O_2 sensor.
101	Measured value unstable, i.e. automatic calibration aborted	1 / 0	Check O_2 sensor.
102	Pressure exceeds measuring range > approx. 1100 mbar		Carry out instrument maintenance if needed.
103	Pressure below measuring range < 500 mbar		Carry out instrument maintenance if needed.

11. Service and maintenance

11.1 Cleaning

Use commercial cleansers to clean the instrument front panel.

The front panel is resistant (test method DIN 42 115) to:
- Alcohol
- Diluted acids
- Diluted bases
- Ester
- Hydrocarbons
- Ketones
- Household cleansers

Note:
- We do not guarantee resistance to concentrated mineral acids or concentrated lyes, benzyl alcohol, methylene chloride and high-pressure steam with temperatures above 100 °C.

11.2 Repairs

Repair work must only be carried out directly by the manufacturer or by the Endress+Hauser service organization. See the back cover of these operating instructions for an overview of the Endress+Hauser service network.

11.3 Preparation for storage, proper disposal

Packaging
Packaging must provide shock and moisture protection. Optimal protection is provided by the original packaging materials.

Note:
Electronic components to be disposed of are considered special waste!
Please observe local regulations for disposal!

11.4 Accessories

The following accessories may be ordered separately for the Mycom COM 121/151:

- Weather protection cover CYY 101
  Weather protection cover for installation on the Mycom COM 151
  Dimensions: 320 x 300 x 270 mm (L x W x D)
  Material: stainless steel 1.4301
  (order no. CYY 101)

- Assembly holder CYH 101
  Assembly holder with an upright post (for mounting of measuring transmitter) for pendulous suspension of an oxygen sensor
  (order no. CYH 101-A)

- Round post mounting kit CYY 101
  for installation of weather protection cover and Mycom on horizontal or vertical tubing (max. Ø 60 mm)
  Material: stainless steel 1.4301
  (order no. 50062121)

- Universal mounting post CYY 102
  Post of square tube (1.4301) for installation of measuring transmitters
  Height of post: 1.50 m
  Square tube dimensions: 80 x 80 mm
  Material: hot-dip galvanised steel
  (order no. CYY 102-A)

- Junction box VS
  Junction box with plug-in socket including type SXP plug to connect the O_2 sensor and the extension cable to the instrument.
  Dimensions: see fig. 4.9
  Material: plastic
  Ingress protection: IP 65
  (Order no. 50001054)

- Flat packing
  To seal panel cutout for panel installation of Mycom COM 151
  (order no. 50064975)

- Cable OMK
  Special cable to extend the connecting line between oxygen sensor COS 3/COS 3S and the oxygen instrument; cable with 7 auxiliary cores (0.38 mm^2 per core) and outer screen, cable sheath made of smooth PUR.
  Cable diameter: approx. 8.6 mm
  (Order no. 50004124)

Supplementary documentation

☐ Operating instructions
Mycom serial interfaces
BA 090C/07/en

☐ Operating instructions
COS 3 / COS 3-S
Sensor for dissolved oxygen
BA 065C/07/en

☐ Technical Information
COS 3 / COS 3-S
Sensor for dissolved oxygen
TI 065C/07/en

☐ Technical Information
Universal suspension assembly holder
CYH 101
TI 092C/07/en

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❑ Endress+Hauser S.A./N.V.
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