Measurement of Dissolved Oxygen Liquisys M COM 223 F / 253 F

Oxygen transmitter





















Liquisys M COM 223 F

The modular design of the Liquisys M COM 223 F / 253 F allows customer-oriented adaptation of the transmitter to a variety of customer requirements. Starting with the basic version for »measurement and alarm generation«, the transmitter can be equipped with additional software and hardware modules for special applications. These modules can also be retrofitted as required.

Applications

- Process control in enzyme production
- Control of culture preparations
- Biotechnological production

Features and benefits

- Transmitter in field or panel-mounted housing
- Universal application
 - Switchable between oxygen content in mg/l and saturation index in % SAT
- Easy to use
 - Clear menu structure with plaintext in 6 languages makes parameter entry easy
 - Large two-line LCD allows the simultaneous display of measured variable and temperature
 - Very simple single-point calibration in air or in air-saturated water
- Reliable
 - Overvoltage protection (lightning protection) to EN 61000-4-5
 - Directly accessible manual control of contacts

Basic unit expandable with:

- 2 or 4 contacts, assignable as
 - Limit contacts (also for temperature)
 - P(ID) controller
 - Timer for simple rinsing processes
 - Chemoclean, the »full cleaning system«
- »Plus package«:
 - Process monitoring
 - Sensor live check
 - Select any current output configuration from table
 - Automatic cleaning trigger on alarm or limit excess
- HART[®] or PROFIBUS-PA /-DP
- 2nd current output for temperature







In detail

Liquisys M COM 223 F / 253 F offers the right solutions for all application in the field of water and sewage treatment.

The **basic version (HX)** contains:

Measurement of oxygen content in mg/l or in % SAT.

Selection is by menu. The **temperature** is displayed simultaneously. It can also be hidden as required.



The COS 21 sensor is zero-current-free and only requires **single-point calibration.** This takes place in air saturated with vapour or in air-saturated water.



Depending on the application and operator, a number of different alarms may be requested. Liquisys M COM 223 F / 253 F therefore allows **configuration of the alarm contact and the error current** independently of each other and separately for every possible error. Unnecessary or undesired alarm scan be hidden in this way.



Up to four contacts can be used as limit contacts (also for temperature) or as P(ID) controller and for cleaning functions.

Direct manual operation of the

contact without going through the menu allows quick access to limit, controller or cleaning contacts. If required, you can then correct delta conditions very quickly.



The LCD displays the **serial numbers** of the device and the modules and the order code when you request them.

Version HS has additional functions:



Oxygen concentration is not only dependent on altitude but also on the ambient pressure. **Automatic pressure compensation** also takes these fluctuations into account.



The **Process Check System** comprises two independent safety functions:

Errors in applications **without** control are detected by monitoring the limit between plausible and implausible measured values, i.e. **the alarm threshold**.

Errors in applications **with** control are detected by the **controller monitor** which monitors freely adjustable, maximum permissible time intervals and reference value overshoot or undershoot.



The **live check** generates an alarm when the sensor signal fails to change over a specific period of time. This may be caused by a blockage, passivation, separation from the actual process or other reasons.



In order to display large measuring ranges and still achieve a high resolution in specific areas, you can freely configure the **current output** using a table. This permits **bilinear** as well as **quasi-logarithmic** processes, etc.

Basic equipment and »Plus package«

		Basic equipment (HX version)	with »Plus package« (HS version)
	»Alarming«	MEASURE CALIBRATE	PROCESS CHECK SYSTEM for monitoring e.g. ventilatuion
		Linear CURRENT OUTPUT CURRENT OUTPUT simulation 1 programmable ALARM CONTACT (contact and error current)	Sensor LIVE CHECK Programmable CURRENT OUTPUT (Table)
h		additional	additional
	Controlling«	2 TWO-WAY SWITCHES for – measurement parameter limit value – temperature limit value – P(ID) controller – timer for cleaning	Automatic cleaning trigger on alarm or limit excess
	»	additional	additional
	»Cleaning«	2 additional TWO-WAY SWITCHES (total of 4) for – measurement parameter limit value – temperature limit value – P(ID) controller – Chemoclean cleaning (water and cleaning agent)	External or automatic cleaning trigger on alarm or limit excess

Measuring system

A complete measuring system comprises

- an oxygen transmitter
- Liquisys M COM 223 F or COM 253 F • an oxygen sensor COS 21 with
- integrated NTC temperature sensoran immersible, installation, flow or
- retractable assembly, e.g. UniFit H CPA 442 or CleanFit H CPA 475

and optionally

- an extension cable (type CYK 71) and
- a junction box VBM.



Complete measuring system with transmitter Liquisys M COM 2X3 F

- 1 Oxygen sensor OxyMax H COS 21
- OxyMax H COS 21 2 Retractable assembly CleanFit H CPA 475
- CleanFit H CPA 475 3 Measuring cable
- COK 21 4 Field instrument
- Liquisys M COM 253 F 5 Panel-mounted
- instrument Liquisys M COM 223 F

Operation



User interface: Display and keys

All process data at a glance

The LCD displays the current measured variable and the temperature simultaneously. This provides you with all the main process data at a glance. The Configuration menu contains text information to help you configure the device parameters.

Intelligent and simple

All the functions for operating the device are grouped in a well arranged menu structure. Each of the parameters are easily selectable after entering a code and you can then edit them.



Menu overview of Liquisys M COM 223 F / 253 F. The maximum expansion stage is described (see page 2 »In detail«).

Electrical connection

All the wires on the panel-mounted device COM 223 F are terminated at terminal strips on the device rear. On the field device COM 253 F all the wires are routed to terminals in the separate terminal compartment (versions WX/WS: sensor on outer socket). If repair is necessary,

the transmitter can remain mounted with all its connections: only complete modules are replaced. As a result, there is no longer any need

to remove the transmitter, to rearrange the terminals or install new terminal wires.





S 41 BN 11 θ 42 NTC ò Alarm 43 12 RD (current-free contact base) Κ 47 90 0, <u>48</u> Sensor Relay 1 COS 21 GN A 49 91 (current-free contact base) 57 3 mΑ + ċ 58 Signal output 1 ò Relay 2 32 59 oxygen 0, (current-free contact base) 51 33 mΑ 52 Relay 3 Signal output 2 53 ¦ (current-free 9 temperature contact base) for Chemoclean 54 Water Digital + 55 10-50 V Relay 4 input 1 ♥ѷ 56 . (Hold) 82 (current-free contact base) for Chemoclean (||)Cleaner Digital + input 2 10-50 V ₹₹ (Chemoclean) 94 Auxiliary voltage ò 15 V NL output Power supply 4 ____ * optional ANO201.CDR

left: Liquisys M COM 223 F Connections on device rear

right: Liquisys M COM 253 F Device rear with replaceable electronics box (E)

Electrical connection of

Liquisys M COM 223 F / 253 F with full wiring

Dimensions



Dimensions of Liquisys M COM 223 F



Dimensions of Liquisys M COM 253 F

Installing the Liquisys M COM 223 F

The panel mounted device is fixed using the supplied clamping screws. The total installation depth required is approx. 165 mm.



Installing the panelmounted housing

Installing the Liquisys M COM 253 F



1

 60×60

120

495

2

0

YY101102.CDR

There are several installation options for the field device:

- Attachment to a square mounting post
- Attachment to cylindrical pipe
- Wall mounting with fixing screws

For outdoor operation, the weather protection cover CYY 101 is required. It can be mounted on the field device in all installation types.

To attach it to a square mounting post (universal upright post CYY 102 or upright post of the suspension assembly holder CYH 101), proceed as follows:

- Mount the weather protection cover on the upright post
- ② Mount the field device from the rear to the weather protection cover.

Weather protection cover CYY 101 (see "Accessories")



Installing the Liquisys M COM 253 F (continued)







Installing on cylindrical pipes (right with weather protection cover)



Wall mounting; screws: Ø 6 mm rawl plugs: Ø 8 mm

Technical data

General data

Input

Output

Manufacturer	Endress+Hauser
Product designation	Liquisys M COM 223 F Liquisys M COM 253 F
Parameters	O ₂ , temperature

O_2 measurement with sensor COS 21 $\,$

Display and measuring range	0,1 20 mg/l or 0 200 % SAT
Temperature compensation range	0 50 °C
Pressure compensation range	500 1100 hPa
Altitude adjustment range	0 4000 m
Salinity adjustment range	0 4.0 %

O₂ signal input

Signal	0 650 nA
Nominal slope (sensor in air, 20 °C, 1013 hPa)	50 nA
Maximum cable length to sensor	50 m

Temperature measurement

Temperature sensor	NTC, 30 kΩ at 25 °C
Display range	–10 +60 °C

Digital inputs 1 and 2

O₂ signal output

Voltage	10 50 V
Current consumption	max. 10 mA

Current range	0 / 4 20 mA, galvanically isolated; error current 2.4 / 22 mA
Load	max. 500 Ω
Maximum resolution	700 digits/mA
Transfer range with COS 21	Δ 0.2 Δ 20 mg/l or Δ 20 Δ 200 % SAT
Isolation voltage	max. 350 V _{rms} / 500 V DC
Overvoltage protection (lightning protection)	acc. to EN 61000-4-5:1995

Temperature signal output (optional)

Current range	0 / 4 20 mA, galvanically isolated
Load	max. 500 Ω
Maximum resolution	700 digits/mA
Transfer range	Δ7Δ70 °C
Isolation voltage	max. 350 V _{rms} / 500 V DC
Overvoltage protection (lightning protection)	to EN 61000-4-5:1995

Auxiliary voltage output

Output voltage	15 V ± 0.6 V
Output current	max. 10 mA

Contact outputs (floating changeover contacts)

Switching current with resistive load (cos $\phi = 1$)	max. 2 A
Switching current with inductive load (cos $\phi = 0,4$)	max. 2 A
Switching voltage	max. 250 V AC, 30 V DC
Switching power with resistive load (cos $\varphi = 1$)	max. 500 VA AC, 60 V DC
Switching power with inductive load (cos $\varphi = 0,4$)	max. 500 VA AC, 60 V DC

Limit contactor

Limit value adjustment range	0 20 mg/l, 0 200 % SAT or -10 °C +60 °C
Pick-up / drop-out delay	0 7200 s

Technical data (continued)

Controller

Function (adjustable)	pulse length / pulse-frequency controller
Controller response	P, PI, PD, PID
Controller gain K _p	0.01 20.00
Integral action time Tn	0.0 999.9 min
Derivative action time T_v	0.0 999.9 min
Period with pulse length controller	0.5 999.9 s
Frequency with pulse-frequency controller	60 180 min ⁻¹

Alarm

Function (switchable)	steady contact / fleeting contact
Alarm threshold adjustment range	same values as for limit contactor/adjustment range
Alarm delay	0 2000 s
Monitoring time of lower limit violation (undershoot)	0 2000 min
Monitoring time of limit value violation (overshoot)	0 2000 min

Accuracy

O₂ measurement with sensor COS 21

Measured value resolution	0.01 mg/l or 0.1 % SAT
Measured error ¹ display	±0.03 mg/l
	±0.3 % SAT
Repeatability	±0.05 mg/l
	±0.5 % SAT
Measured error ¹ O ₂ signal output	max. 0.75 % of measuring range

Temperature measurement with COS 21

Storage and transport temperature

Ambient temperature (nominal operating conditions)

Ambient temperature (limit operating conditions)

Relative humidity (nominal operating conditions)

Degree of protection for panel-mounted device

Measured value resolution	0.1 °C
Measured error ¹ display	max. 1.0 % of measuring range
Measured error ¹ temperature signal output	max. 1.25 % of current output range

–10 ... +55 °C

–20 ... +60 °C

–25 ... +65 °C

10 ... 95 %, non-condensing IP 54 (front), IP 30 (housing)

Ambient conditions

Mechanical data

Power supply

Degree of protection of field device	IP 65
Electromagnetic compatibility	Interference emission and immunity to EN 61326-1 : 1997/ A1: 1998
Dimensions of panel-mounted device $(H \times W \times D)$	$96 \times 96 \times 145$ mm
Installation depth	approx. 165 mm
Dimensions of field housing $(h \times w \times d)$	204 × 155 × 215 mm
Weight of panel-mounted device	max. 0.7 kg
Weight with field housing	max. 2.3 kg
Measured value display	LC display, two-line, 5 and 9 characters with status indicators

Materials

Housing of panel-mounted device	polycarbonate
Front membrane	polyester, UV-resistant
Field device	ABS PCFr or PCFr (CSA Gen. Purp.)
Supply voltage	100 / 115 / 230 V AC +10 / -15 %, 48 62 Hz 24 V AC/DC +20 / -15 %
Power consumption	max. 7.5 VA
Fuse protection	Fine-wire fuse, medium time lag 250 V / 3.15 A

¹to IEC 746-1, under nominal operating conditions

Subject to modifications.

Accessories

Mounting accessories

 Weather protection cover CYY 101 For mounting on field housing, for outdoor installation.
 Dimensions (H × W × D): 320 × 300 × 270 mm Material: Stainless steel SS 304 Order No.: CYY 101-A

 Universal upright post CYY 102 Square tube for mounting of field housing.
 Dimensions (H × W × D): 1495 × 60 × 60 mm
 Material: Stainless steel SS 304 Order No.: CYY 102-A

Assemblies

- UniFit H CPA 442
 Sterilisable process assembly for
 fixed installation with EHEDG and 3A
 certificate. For 120 mm sensors.
 Technical Information TI 306C/07/en
 Order No.: 51507254
- ProbFit H CPA 465
 Sterilisable retractable assembly with EHEDG and 3A certificate.
 For 360 mm sensors.
 Technical Information TI 146C/07/en Order No.: 50076878

Sensor

 OxyMax H COS 21 Sterilisable sensor for dissolved oxygen Technical Information TI 244C/07/en Best.-Nr.: 51505857

Connection accessories

- Measuring cable COK 21 for COS 21: 3 m length, order no.: 51505870
 10 m length, order no.: 51505868
- Extension cable CYK 71 Non-terminated measuring cable for oxygen sensors (Metre goods) Order No.: 50085333
- Junction box VBM Junction box for measuring cable extension between sensor and transmitter. Order No.: 50003987

Device upgrade

(please quote the serial number of the device in your order)

- Plus package
 Order No.: 51506469
- Chemoclean
 Order No.: 51500963
- Two-relay card Order No.: 51500320
- Four-relay card
 Order No.: 51500320

Product overview

Liquisys M COM 223 F / COM 253 F



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