Датчики хлора, кислорода Liquisys M COM223/253

Техническая информация

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Technical Information
Liquisys M COM223/253

Dissolved oxygen measurement

Transmitter for oxygen sensors

Application

- Wastewater treatment plants and wastewater treatment
- Water treatment and drinking water monitoring
- Surface water: rivers, lakes, sea
- Fish farming
- Boiler feedwater (trace measurement)

Your benefits

- Field or panel-mounted housing
- Universal application
- Easy to use
  - Simple menu structure
  - Simple calibration in air, air-saturated water or medium
- Manual contact control and user-defined alarm configuration

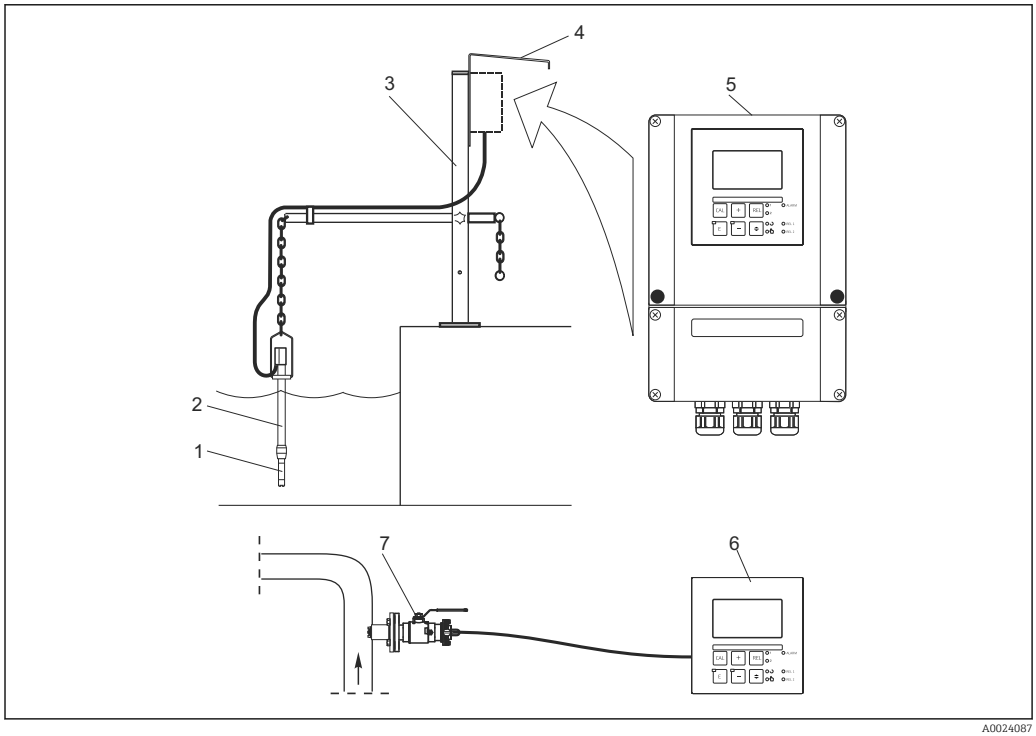
The basic device can be extended with:
- 2 or 4 contacts for use as
  - Limit contacts (also for temperature)
  - P(ID) controller
  - Timer for simple rinse processes or Chemoclean
- Plus package:
  - Configurable current output characteristic
  - Cleaning started automatically
  - Process monitoring
  - Sensor signal live check
- HART or PROFIBUS-PA/-DP
- 2nd current output: temperature, main measured value, actuating variable
- Current input for flow monitoring or for feedforward control

Function and system design

Measuring system

A complete measuring system comprises:
- Transmitter Liquisys M COM223 or COM253
- Oxygen sensor
  - COS41 for Liquisys M COM2x3-DS/DX
  - COS61 for Liquisys M COM2x3-WS/WX

Optionally:
- Extension cable OM, junction box VS
- Weather protection cover CYY101 for field housing



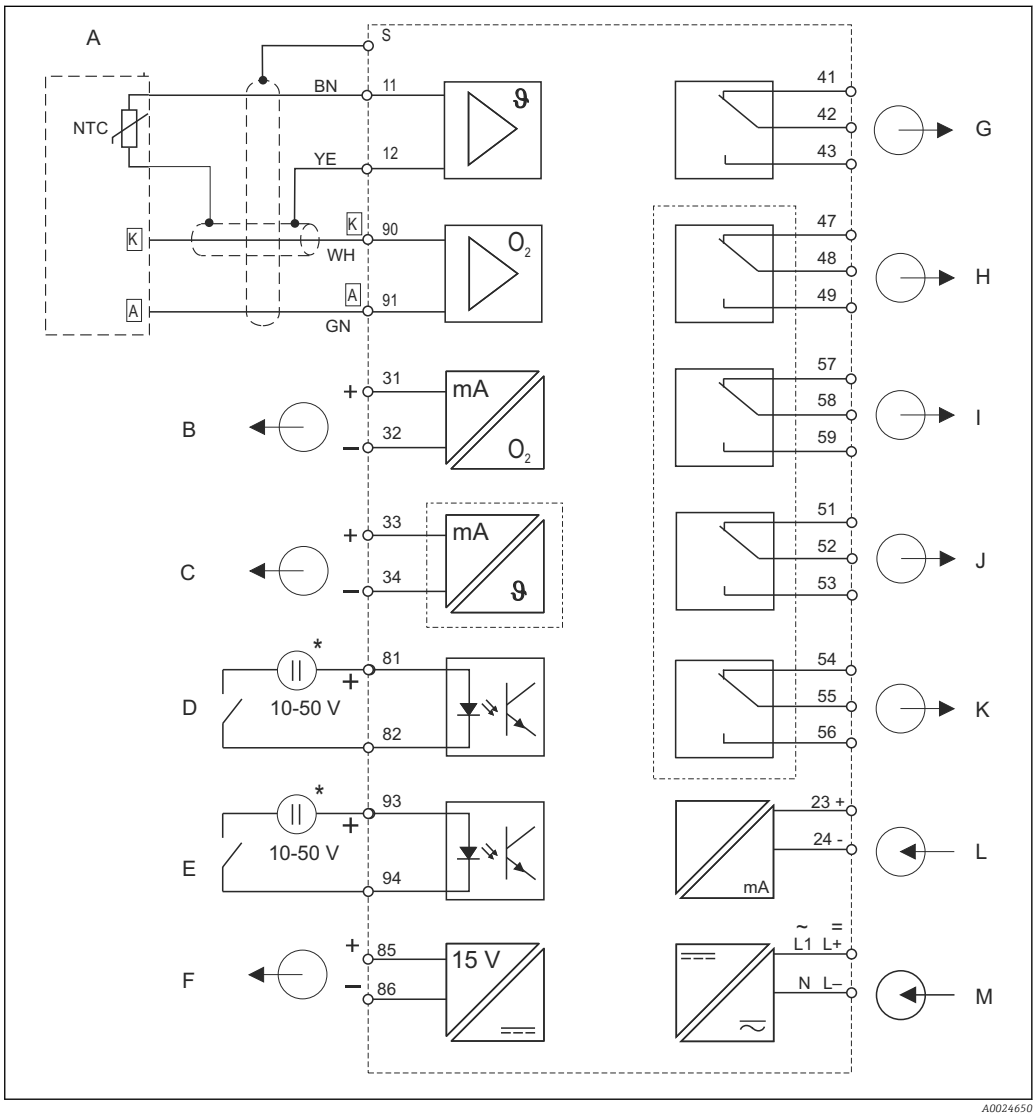
1 Complete measuring systems

1 Oxygen sensor
2 Immersion assembly CYA112
3 Universal suspended assembly holder CYH112
4 Weather protection cover CYY101
5 Liquisys M COM253
6 Liquisys M COM223
7 Retractable assembly COA451

Equipment architecture

Block diagram

COM2x3-DS/DX (COS41)

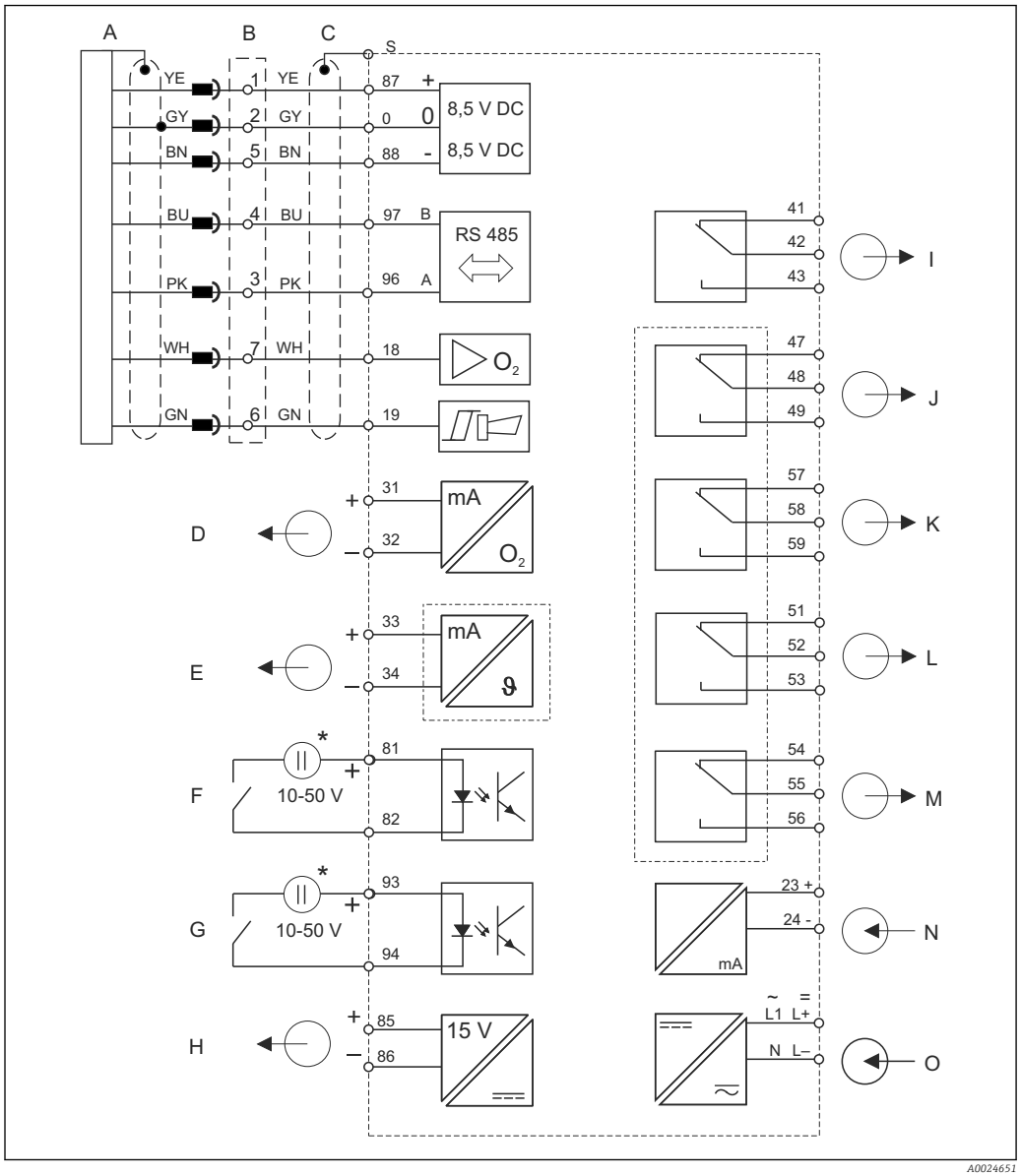


2 *Block circuit diagram COM2x3-DS/DX*

A	*COS41 sensor*	*H*	*Relay 1 (current-free contact position)*
B	*Signal output 1, oxygen*	*I*	*Relay 2 (current-free contact position)*
C	*Signal output 2, temperature*	*J*	*Relay 3 (current-free contact position)*
D	*Binary input 1 (hold)*	*K*	*Relay 4 (current-free contact position)*
E	*Binary input 2 (Chemoclean)*	*L*	*Current input 4 to 20 mA*
F	*Auxiliary voltage output*	*M*	*Power supply*
G	*Alarm (current-free contact position)*	*	*Auxiliary voltage, terminal 85/86 can be used*

The device is approved for protection class II and is generally operated without a protective ground connection.

COM2x3-WS/WX (COS61 from serial number 79xxxx)



3 Block circuit diagram COM2x3-WS/WX

A	*COS61 sensor*	*I*	*Alarm (current-free contact position)*
B	*VS box for extension*	*J*	*Relay 1 (current-free contact position)*
C	*COM253: plug-in connection for O_2 connector COM223: connector of sensor cable must be removed or VS box must be used*	*K*	*Relay 2 (current-free contact position)*
D	*Signal output 1, oxygen*	*L*	*Relay 3 (current-free contact position)*
E	*Signal output 2, temperature*	*M*	*Relay 4 (current-free contact position)*
F	*Binary input 1 (hold)*	*N*	*Current input 4 to 20 mA*
G	*Binary input 2 (Chemoclean)*	*O*	*Power supply*
H	*Auxiliary voltage output*	*	*Auxiliary voltage, terminal 85/86 can be used*

The device is approved for protection class II and is generally operated without a protective ground connection.

No function is associated with terminals 18 and 19 when a COS61 is connected.

Dependability

Reliability

Calibration

Amperometric sensors have no zero current and therefore only require one-point calibration. This calibration is performed in air, in air-saturated water or by reference calibration in the medium.

The optical sensor is calibrated when delivered and can be calibrated in the air and at the zero point if necessary.

Sensor live check (process check system, PCS (Plus package))

The process check system (PCS) checks the measuring signal for stagnation. An alarm is triggered if the measuring signal does not change over a specific period (several measured values).

The main causes of stagnating measured values are:
- Contaminated sensor, or sensor outside of medium
- Sensor defective
- Process error (e.g. through control system)

Current output configuration (Plus package)

In order to display wide measuring ranges while still achieving a high resolution in specific ranges, the current output can be configured as required via a table. This permits **bilinear** and **quasi-logarithmic** curves etc.

Second current output

The second current output can be flexibly configured to output the temperature, the main measured value (conductivity, resistance, concentration) or the controller actuating variable.

Current input

The transmitter current input permits two different applications:
- Flow monitoring with controller switch-off if flow falls below lower flow level in the main flow
- Feedforward control to the controller

The two functions can also be combined.

Automatic pressure compensation (only DS/WS/WX versions)

The oxygen concentration not only depends on the altitude but also on the weather conditions (pressure). Automatic pressure compensation also takes these fluctuations into consideration.

Safety

Process safety

Different alarms are required depending on the application and operator. The transmitter therefore permits the independent configuration of the fault-signaling contact and the error current for every individual error. Unnecessary or undesired alarms can be suppressed in this way. Up to four contacts can be used as limit contacts (also for temperature), as a P(ID) controller and for cleaning functions. The direct manual operation of the contacts (bypassing the menu) enables quick access to limit value, control or cleaning contacts. Any deviations can be quickly corrected in this way.

Input

Measured values

Oxygen
Temperature

Measuring ranges

Concentration	0 to 20 mg/l
Saturation index	0 to 200 % SAT
Partial pressure	0 to 400 hPa (0 to 6 psi)
Temperature	-10 to 60 °C (can also be displayed in °F)

Signal input

DS/DX version	0 to 3000 nA
WS/WX version	Digital communication or 0 to -7500 mV

Binary inputs	Voltage	10 to 50 V
	Current consumption	Max. 10 mA

Current input

4 to 20 mA, galvanically isolated

Load: 260 Ω for 20 mA (voltage drop 5.2 V)

Output

Output signal

0/4 to 20 mA, galvanically isolated, active

HART	
Signal encoding	Frequency Shift Keying (FSK) + 0.5 mA via current output signal
Data transmission rate	1200 baud
Galvanic isolation	Yes

PROFIBUS PA	
Signal encoding	Manchester Bus Powered (MBP)
Data transmission rate	31.25 kBit/s, voltage mode
Galvanic isolation	Yes (IO modules)

PROFIBUS DP	
Signal encoding	RS485
Data transmission rate	9.6 kBd, 19.2 kBd, 93.75 kBd, 187.5 kBd, 500 kBd, 1.5 MBd
Galvanic isolation	Yes (IO modules)

Signal on alarm

2.4 or 22 mA in the event of an error

Load

Max. 500 Ω

Transmission range	Concentration	Δ 0.2 to Δ 20 mg/l
	Saturation index	Δ 2 to Δ 200 % SAT
	Partial pressure	Δ 4 to Δ 400 hPa

Signal resolution

Max. 700 digits/mA

Separation voltage

Max. 350 V_{RMS} / 500 V DC

Auxiliary voltage output	Output voltage	15 V ± 0.6 V
	Output current	Max. 10 mA

Contact outputs	Switching current with ohmic load (cos φ = 1)	Max. 2 A
	Switching current with inductive load (cos φ = 0.4)	Max. 2 A
	Switching voltage	Max. 250 V AC, 30 V DC
	Switching power with ohmic load (cos φ = 1)	Max. 500 VA AC, 60 W DC
	Switching power with inductive load (cos φ = 0.4)	Max. 500 VA AC, 60 W DC

Limit contactors	Pickup/dropout delay	0 to 2000 s

Controller	Function (configurable)	Pulse length/pulse frequency controller, continuous controller
	Controller behavior	P, PI, PD, PID, basic load dosing
	Control gain K_p	0.01 to 20.00
	Integral action time T_n	0.0 to 999.9 min
	Derivative action time T_v	0.0 to 999.9 min
	Period length for pulse length controller	0.5 to 999.9 s
	Frequency for pulse frequency controller	60 to 180 min^{-1}
	Basic load	0 to 40 % of max. actuating variable
Alarm	Function (switchable)	Latching/momentary contact
	Alarm threshold adjustment range	O_2 / temperature: entire measuring range depending on sensor used
	Alarm delay	0 to 2000 s
	Monitoring time for lower limit violation	0 to 2000 min
	Monitoring time for upper limit violation	0 to 2000 min

Protocol-specific data

HART	
Manufacturer ID	11_h
Device type	0094_h
Transmitter-specific revision	0001_h
HART version	5.0
Device description files (DD)	
HART load (communication resistor)	250 Ω
Device variables	None (only dynamic variables PV and SV)
Supported features	-

PROFIBUS PA	
Manufacturer ID	11_h
Device type	1518_h
Device revision	0001_h
Profile version	2.0
GSD files	
GSD version	
Output values	Primary value, temperature
Input variables	PCS display value
Supported features	Device lock: The device can be locked using the hardware or software.

PROFIBUS DP	
Manufacturer ID	11_h
Device type	$151E_h$
Profile version	2.0
GSD files	
GSD version	
Output values	Primary value, temperature
Input variables	PCS display value
Supported features	Device lock: The device can be locked using the hardware or software.

Power supply

Supply voltage

Depending on order version:
- 100/115/230 V AC +10/-15 %, 48 to 62 Hz
- 24 V AC/DC +20/-15 %

Power supply via fieldbus

HART	
Supply voltage	Not applicable, active current outputs
Reverse polarity protection	Not applicable, active current outputs

PROFIBUS PA	
Supply voltage	9 V to 32 V, max. 35 V
Sensitivity to reverse polarity	No
FISCO/FNICO compliant according to IEC 60079-27	No

PROFIBUS DP	
Supply voltage	9 V to 32 V, max. 35 V
Sensitivity to reverse polarity	Not applicable
FISCO/FNICO compliant according to IEC 60079-27	No

Power consumption

Max. 7.5 VA

Mains fuse

Fine-wire fuse, semi-delay 250 V/3.15 A

Circuit breaker

NOTICE

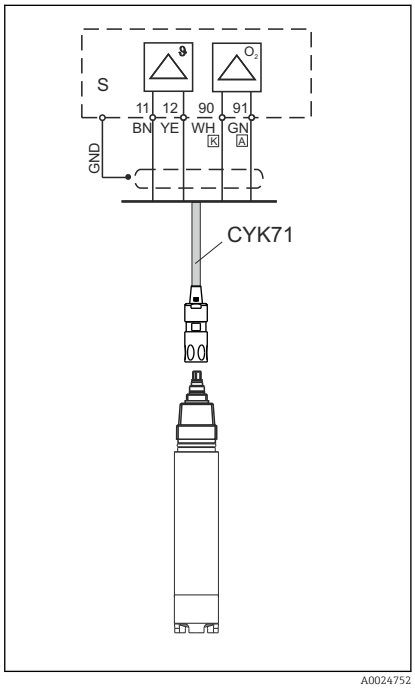
The device does not have a power switch
- ▶ The customer must provide a protected circuit breaker in the vicinity of the device.
- ▶ The circuit breaker must be a switch or power switch, and you must label it as the circuit breaker for the device.
- ▶ At the supply point, the power supply for the 24 V versions must be isolated from dangerous live cables by double or reinforced insulation.

Cable specification

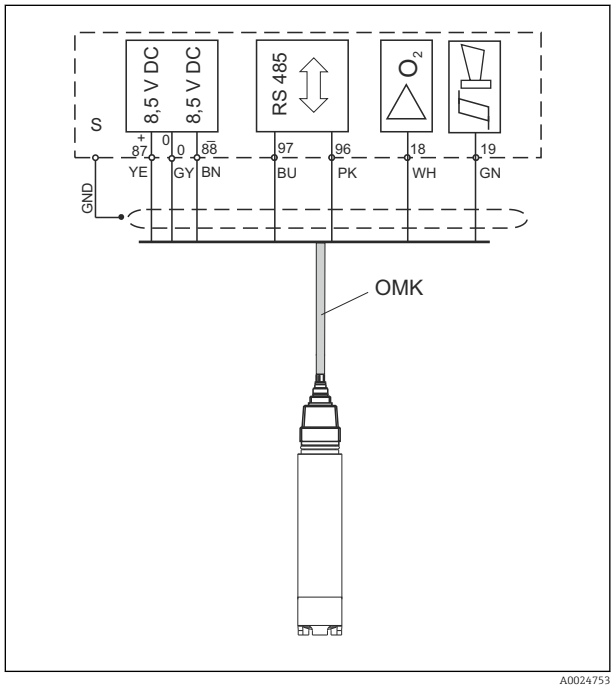
Cable length COS61	Max. 100 m (330 ft)
Cable length COS41	Max. 50 m (160 ft)

Overvoltage protection According to EN 61000-4-5

Sensor connection The oxygen sensors are supplied with a measuring cable. Use a junction box and a cable to extend this measuring cable (see Accessories).



4 *COS41 to COM2x3-DX/DS*



5 *COS61 to COM2x3-WX/WS*

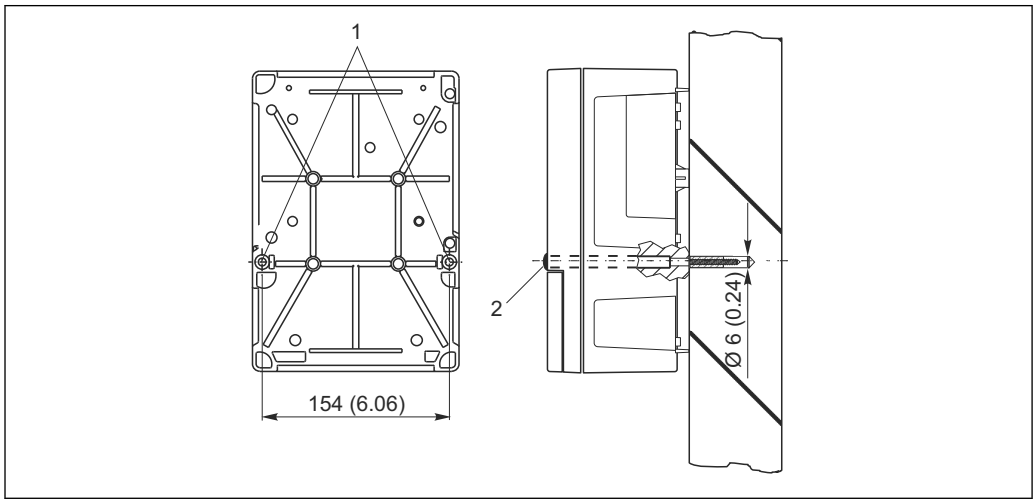
Performance characteristics

Reference operating conditions	Reference temperature:	25 °C (77 °F)
	Reference pressure:	1013 hPa (15 psi)
	Reference application:	Air-saturated water
Measured value resolution	Oxygen	0.01 mg/l / 0.1 % SAT / 1 hPa
	Temperature	0.1 °C
Maximum measured error	Display	
	Oxygen	Max. 0.5 % of measuring range
	Temperature	Max. 1.0 % of measuring range
	Signal output	
	Oxygen	Max. 0.75 % of measuring range
	Temperature	Max. 1.25 % of measuring range
	Measured errors in accordance with DIN IEC 746 Part 1, at rated operating conditions	
Repeatability	Max. 0.2 % of measuring range	
Slope adjustment	COS41	75 to 140 % (nominal 290 nA, in air, 20 °C, 1013 hPa)
	COS61	75 to 140 % (nominal 1340 nA, in air, 20 °C, 1013 hPa)

Installation

Installation instructions

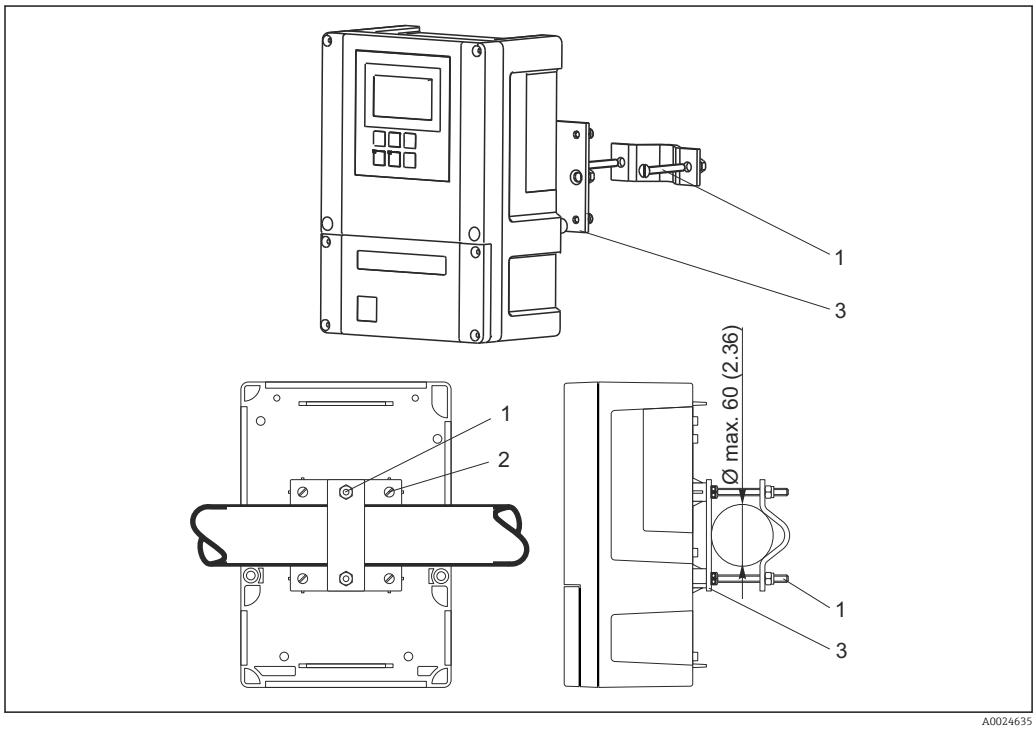
Field device wall mounting



6 *Field device wall mounting*

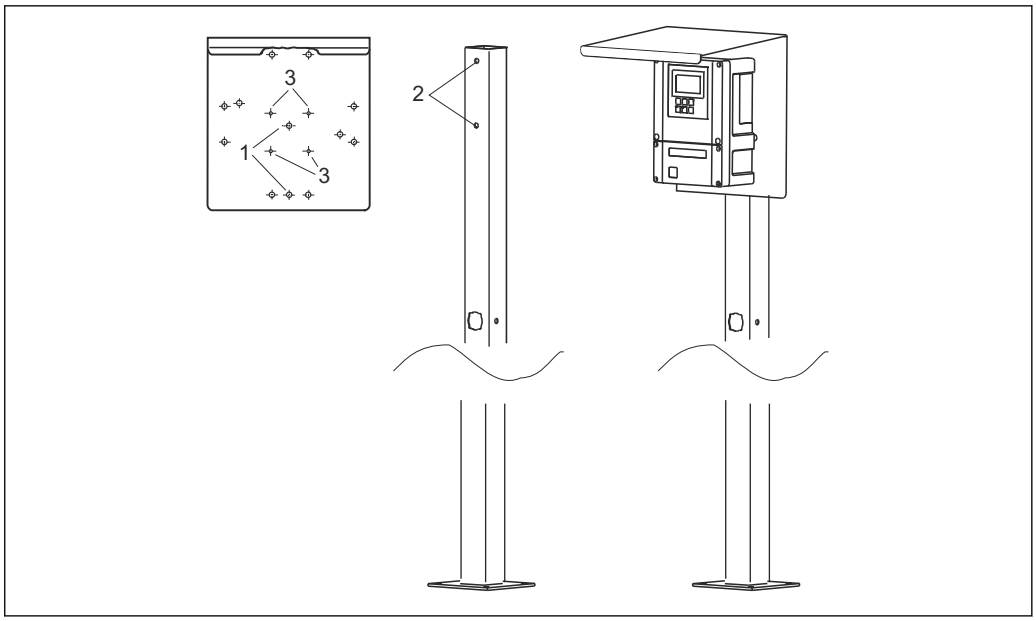
1 Fixing bore holes
2 Plastic caps

Field device post mounting



7 *Field device on horizontal or vertical pipes*

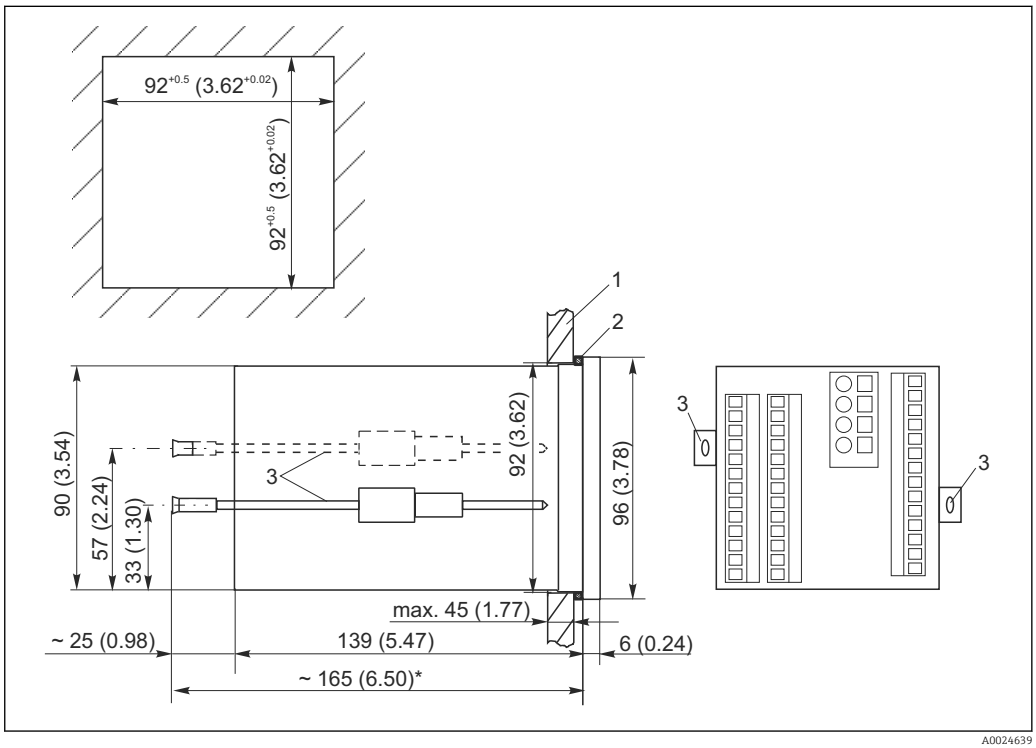
1 Securing screws
2 Fixing screws
3 Securing plate



8 Field device with universal post and weather protection cover

1 Bore holes in the weather protection cover to secure to the upright post
2 Bore holes in the upright post to secure the weather protection cover
3 Bore holes in the weather protection cover to secure the field device

Panel mounting



9 Dimensions in mm (inch)

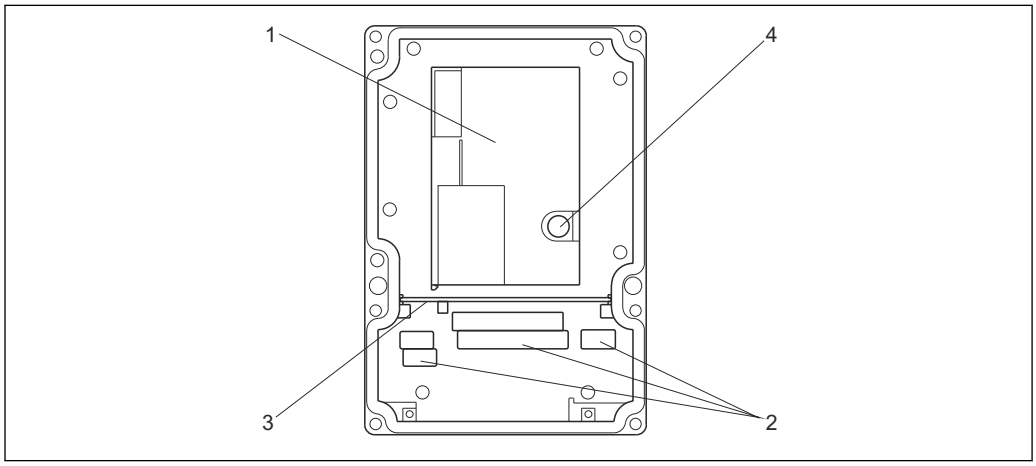
1 Mounting plate
2 Seal
3 Tensioning screws
** Necessary installation depth*

Environment

Ambient temperature range	-10 to +55 °C (+10 to +130 °F)	
Storage temperature	–25 to +65 °C (-10 to +150 °F)	
Electromagnetic compatibility	Interference emission and interference immunity as per EN 61326-1:2006, EN 61326-2-3:2006	
Degree of protection	Field device	IP 65 / integrity according to NEMA 4X
	Panel-mounted device	IP 54 (front), IP 30 (housing)
Electrical safety	As per EN/IEC 61010-1:2010, overvoltage category II for installations up to 2000 m (6500 ft) above MSL	
CSA	Device versions with CSA General Purpose approval are certified for indoor use.	
Relative humidity	10 to 95%, not condensing	
Degree of contamination	The product is suitable for pollution degree 2.	

Mechanical construction

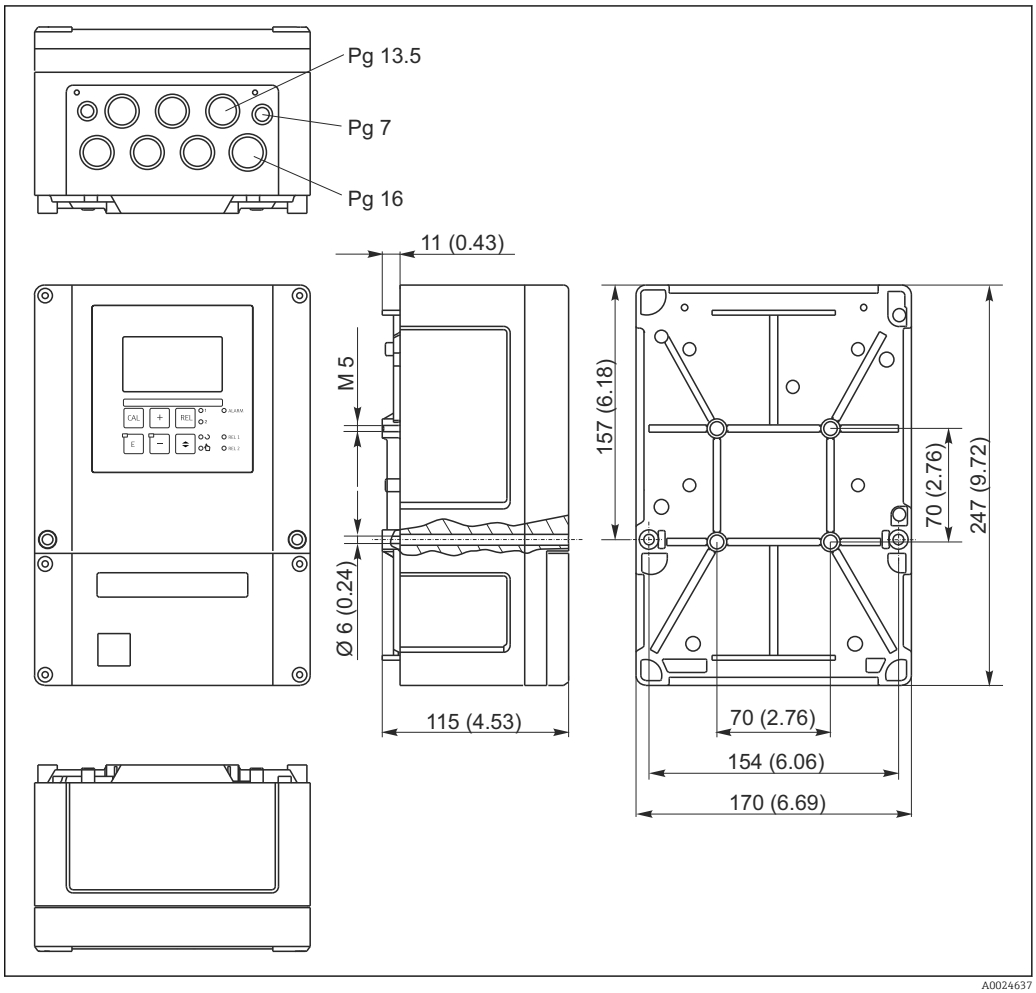
Design



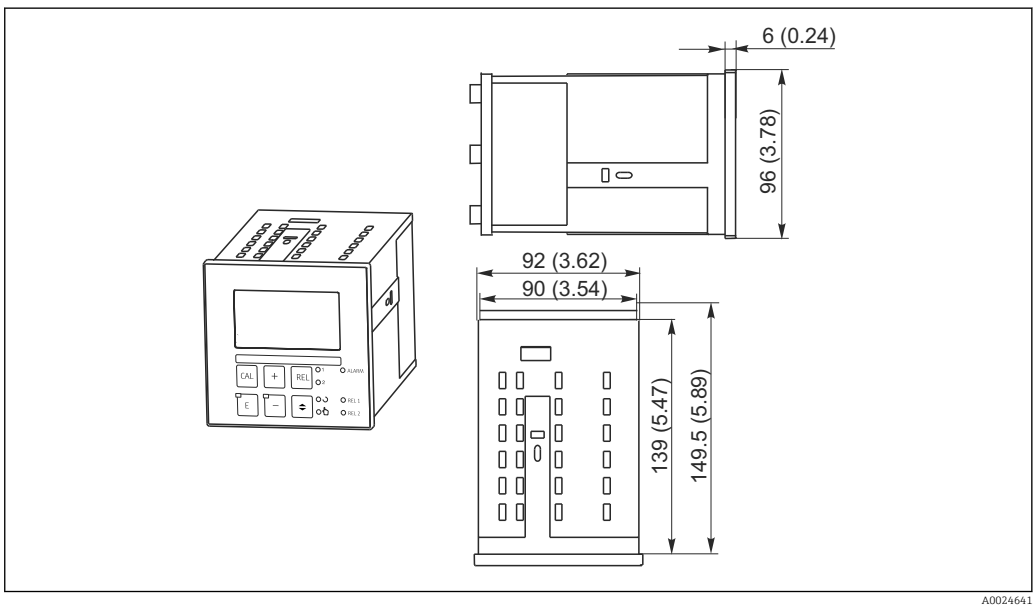
10 View into the field device housing

1 Removable electronics box
2 Terminals
3 Partition plate
4 Fuse

Dimensions



11 Field device: dimensions in mm (inch)



12 Panel-mounted device: dimensions in mm (inch)

Weight	Panel-mounted device	Max. 0.7 kg (1.54 lbs.)
	Field device	Max. 2.3 kg (5.07 lbs.)

Materials	Panel-mounted device housing	Polycarbonate
	Field housing	ABS PC FR
	Front membrane	Polyester, UV-resistant
Terminals	Cable cross-section	Max. 2.5 mm² (14 AWG)

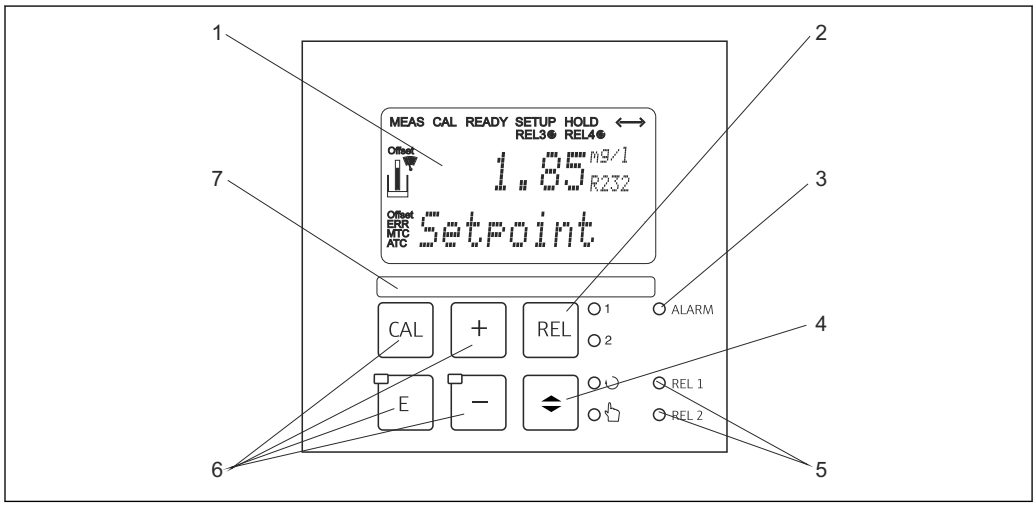
Operability

Operating concept

All the device's operating functions are arranged in a clear menu structure. The individual parameters can be selected and modified once the access code has been entered.

Display and operating elements

The display shows the current measured value and the temperature simultaneously, which means you have an overview of the most important process data at once. Help text in the configuration menu helps users configure the device parameters.



13 Operating elements

1 *LC display for displaying the measured values and configuration data*
2 *Key to switch relays in manual mode and to display the active contact*
3 *LED for alarm function*
4 *Changeover switch for automatic/manual mode*
5 *LEDs for limit contactor relay (switch status)*
6 *Main operating keys for calibration and device configuration*
7 *Field for user-defined information*

Certificates and approvals

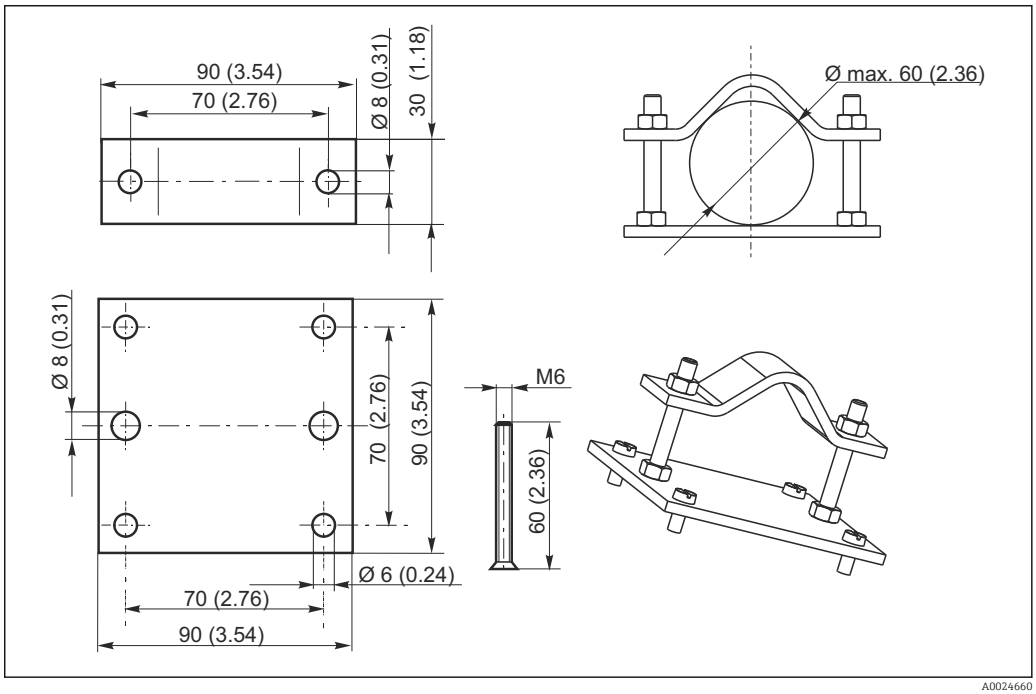
CE mark

The product meets the requirements of the harmonized European standards. As such, it complies with the legal specifications of the EC directives. The manufacturer confirms successful testing of the product by affixing to it the CE mark.

CSA General Purpose

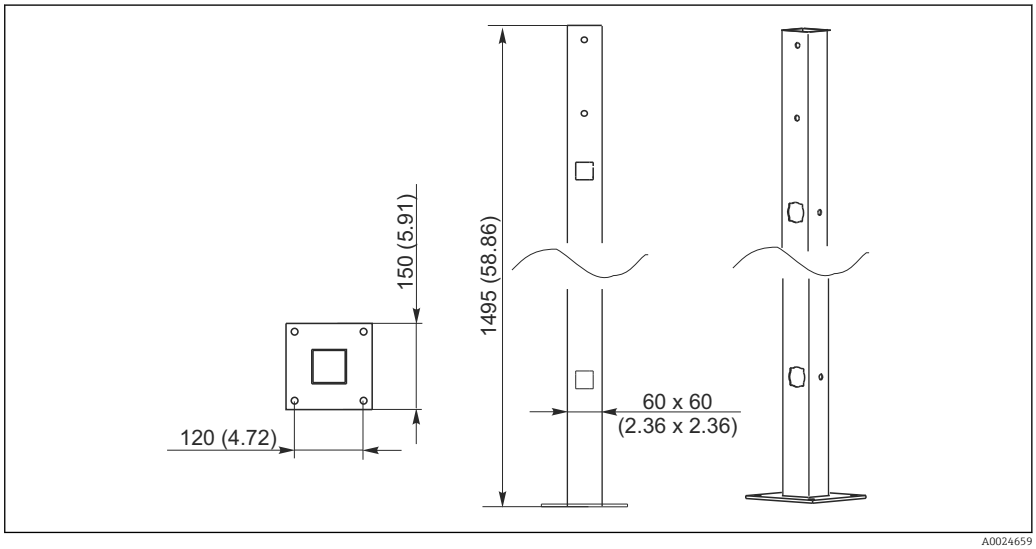
The following device versions meet the requirements of CSA and ANSI/UL for Canada and the US:
- COM253-**2/3/7***
- COM223-**2/3/7***

Post mounting kit
- For securing the field housing to horizontal and vertical posts and pipes
- Material: stainless steel 1.4301 (AISI 304)
- Order No. 50086842



15 *Dimensions in mm (inch)*

Universal post CYY102
- Square pipe for mounting transmitters
- Material: stainless steel 1.4301 (AISI 304)
- Order No. CYY102-A



16 *Dimensions in mm (inch)*

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