

Transmitter pH 2100 e, O₂ 4100 e, and O₂ 4100 ppb

Advanced transmitters for reliable measurements and for harsh conditions

Technical Data



Short description

The cost-effective transmitters pH 2100 e, O₂ 4100 e and O₂ 4100 ppb are suitable designed for highly reliable and accurate measurements in a wide range of industrial applications. The instruments are easy to operate and the large-size LCD provides substantial all essential information. The measurement values are displayed in large characters and additional pictographs explain function operation and advises any signal or functional irregularities.

Features

- New!** – Two 0/4...20 mA current outputs
- Two limit contacts
- Alarm contact
- Wash contact
- Continuous monitoring of sensor and transmitter
- Sensor diagnostic
- Easy operation with help of pictographs
- New!** – PID controller
- New!** – Ability to communicate with EasyClean, a Mettler-Toledo sensor cleaning and calibration system

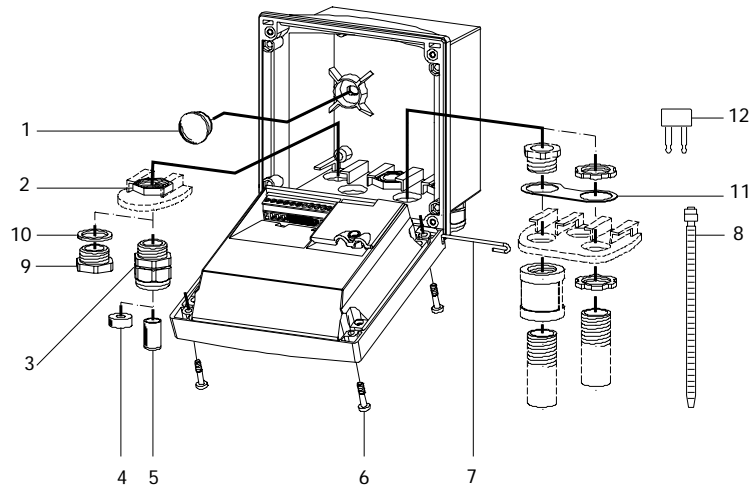
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METTLER TOLEDO

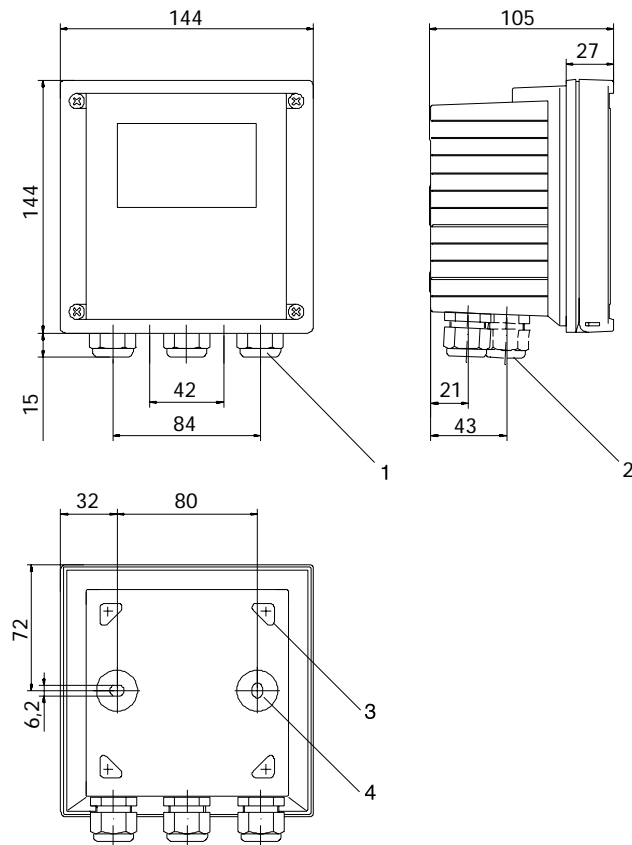
Drawings

Assembly



- 1 Sealing plugs
- 2 Hexagon nuts
- 3 Pg cable glands
- 4 Rubber reducer
- 5 Pg plug
- 6 Enclosure screws
- 7 Hinge pin
- 8 Cable ties
- 9 Filler plugs
- 10 Gaskets
- 11 Washer
- 12 Jumper

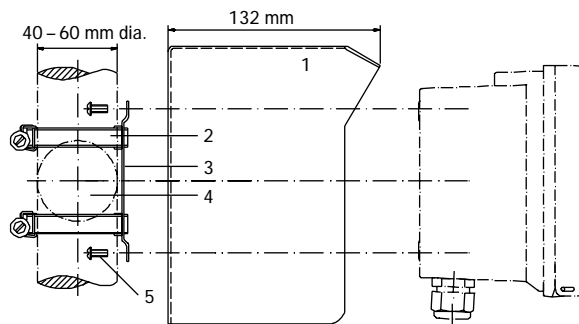
Mounting



- 1 Cable gland (3 pieces)
- 2 Breakthroughs for cable gland or conduit 1/2", \varnothing 21.5 mm (2 breakthroughs).
Conduits not included!
- 3 Holes for post mounting
- 4 Holes for wall mounting

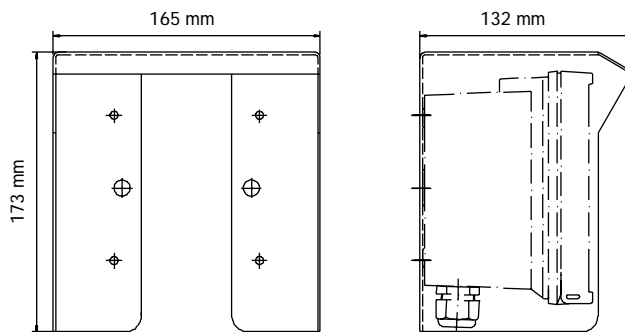
Drawings

Pipe mounting with ZU 0274 bracket kit

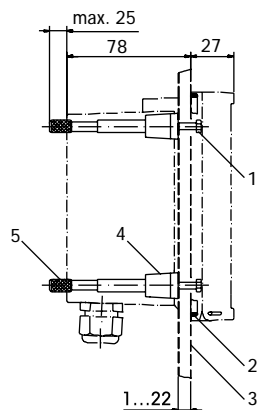


- 1 Protected hood (if required)
- 2 Hose clamps with worm gear drive to DIN 3017 (2 pieces)
- 3 Postmounting plate
- 4 For vertical or horizontal post/pipe mounting
- 5 Self-tapping screws

Protective hood ZU 0276 for wall and pipe mounting



Panel-mount kit ZU 0275



- 1 Screws
- 2 Seal
- 3 Control panel
- 4 Span pieces
- 5 Threaded sleeves

pH/mV input	Input for pH, ORP electrodes or ISFET	
	Measurement range	-1500...+1500 mV
	Display range	pH value -2.00...16.00 ORP -1999...+1999 mV
	Glass electrode input ¹⁾	
	Input resistance	> 0.5 x 10 ¹² Ohms
	Input current	< 2 x 10 ⁻¹² A
	Reference electrode input ¹⁾	
	Input resistance	> 1 x 10 ¹⁰ Ohms
	Input current	< 1 x 10 ⁻¹⁰ A
	Meas. error ^{1,2,3)}	
	pH value	< 0.02
	mV value	< 1 mV
	Electrode standardization pH*	pH calibration
Operating modes	BUF Buffer sets Calibration with automatic buffer recognition Calimatic:	
	-01- Mettler-Toledo 2.00/4.01/7.00/9.21	
	-02- Merck/Riedel de Haen 2.00/4.00/7.00/9.00/12.00	
	-03- Ciba (94) 2.06/4.00/7.00/10.00	
	-04- NIST technical 1.68/4.00/7.00/10.01/12.46	
	-05- NIST standard 1.679/4.006/6.865/9.180	
	-06- HACH 4.00/7.00/10.18	
	-07- WTW technical buffers 2.00/4.01/7.00/10.00	
	MAN Calibration with manual entry of individual buffer values	
	DAT Data entry of premeasured electrodes	
Zero point adjustment	±200 mV	
Max. calibration range	Asymmetry potential: ±60 mV Slope: 80...103 % (47.5...61 mV/pH)	
Sensor standardization		
ORP*	ORP calibration	
Max. calibration range	-700...+700 Δ mV	
Cal timer	0000...9999 h	
Sensocheck	automatic monitoring of glass and reference electrode (can be disabled)	
Sensoface	provides information on the electrode condition. Evaluation of zero/slope, response, calibration interval, Sensocheck	

Temperature input *	Pt 100/Pt 1000/NTC 30 kOhms/NTC 8.55 kOhms 2-wire connection, adjustable
Measurement range	Pt 100/Pt 1000: -20.0...+200.0 °C (-4...+392 °F) NTC 30 kOhms -20.0...+150.0 °C (-4...+302 °F) NTC 8.55 kOhms -10.0...+130.0 °C (+14...+266 °F)
Adjustment range	10 K
Resolution	0.1 °C/1 °F
Meas. error ^{1,2,3)}	< 0.5 K (< 1 K for Pt100; <1K for NTC >100 °C)
Temp. compensation of process medium	Linear -19.99...+19.99%/K (reference temp 25 °C)
Power output	for operating an ISFET adapter + 3 V/0.5 mA - 3 V/0.5 mA

* User-defined

1) To IEC 746 Part 1, at nominal operating conditions

2) ± 1 count

3) Plus sensor error

Dissolved Oxygen input	Sensor Type A:	InPro6000...6800
	Sensor Type B:	InPro6900
	Measuring current	0...1800 nA,
	Resolution	0.05 nA (with V _{pol} = 800 mV and V _{ref} = 200 mV)
	Saturation (-10...80 °C)	0...500 %
	Meas. error ^{1,2,3)}	0.5 % meas. val. +0.5 %
	Concentration (-10...80 °C)	0.00...50.00 mg/l 0.00...50.00 ppm
	Meas. error ^{1,2,3)}	0.5 % meas. val. + 0.05 mg/l or 0.05 ppm
	Adm. guard current	≤ 20 μA
	Polarization voltage *	0...1000 mV,
Process pressure*	0.000...9.999 bar (...999.9 kPa/...145.0 psi)	
Salt correction *	00.00...45.00 g/kg	
Sensor standardization		
Operating modes *	DO saturation (automatic)	
	DO concentration (automatic)	
	Product calibration	
	Zero point calibration	
Calibration range Sensor Type A	Zero point	± 2 nA
	Slope	25...130 nA (at 25 °C, 1013 mbars)
Calibration range Sensor Type B	Zero point	± 2 nA
	Slope	200...550 nA (at 25 °C, 1013 mbars)
Calibration timer*	0000...9999 h	
Pressure correction *	0.000...9.999 bars/999.9 kPa/145.0 psi	
Sensocheck	Monitoring for short circuits/open circuits (can be disabled)	
Sensoface	Provides information on the sensor condition Evaluation of zero/slope, response, calibration interval, Sensocheck	
Temperature input		
	NTC 22 kOhms/NTC 30 kOhms*	
	2-wire connection, adjustable	
Measurement range	-20.0...+150.0 °C/-4...+ 302 °F	
Adjustment range	10 K	
Resolution	0.1 °C/1 °F	
Meas. error ^{1,2,3)}	< 0.5 K (< 1 K at >100 °C)	

* User-defined

1) To IEC 746 Part 1, at nominal operating conditions

2) ± 1 count

3) Plus sensor error

Dissolved Oxygen input	Sensor Type A:	InPro 6000...6800
	Sensor Type B:	Inpro 6900
	Measuring current	0...600 nA,
	Resolution	0.01 nA (with V _{pol} = 500 mV and V _{ref} = 200 mV)
	Saturation (-10...80 °C)	0.0...120.0 %
	Meas. error ^{1,2,3)}	0.5 % meas. val. +0.1 %
	Concentration (-10...80 °C)	0000...9999 µg/l 0000...9999 ppb 0.0000...9.999 mg/l 0.0000...9.999 ppm
	Meas. error ^{1,2,3)}	0.5 % v. M. + 0.005 mg/l or 0.005 ppm
	Adm. guard current	≤ 20 µA
	Polarization voltage*	0...1000 mV,
Process pressure*	0.000...9.999 bars (to 999.9 kPa/...145.0 psi)	
Salt correction*	00.00...45.00 g/kg	
Sensor standardization		
Operating modes *	DO saturation (automatic) DO concentration (automatic) Product calibration Zero point calibration	
Calibration range Sensor Type A	Zero point	± 2 nA
	Slope	25...130 nA (at 25 °C, 1013 mbars)
Calibration range Sensor Type B	Zero point	± 2 nA
	Slope	200...550 nA (at 25 °C, 1013 mbars)
Calibration timer*	0000...9999 h	
Pressure correction *	0.000...9.999 bars/999.9 kPa/145.0 psi	
Sensocheck	Monitoring for short circuits/open circuits (can be disabled)	
Sensoface	Provides information on the sensor condition Evaluation of zero/slope, response, calibration interval, Sensocheck	
Temperature input		
	NTC 22 kOhms/NTC 30 kOhms*	
	2-wire connection, adjustable	
Measurement range	-20.0...+150.0 °C/-4...+ 302 °F	
Adjustment range	10 K	
Resolution	0.1 °C/1 °F	
Meas. error ^{1,2,3)}	< 0.5 K (< 1 K at >100 °C)	

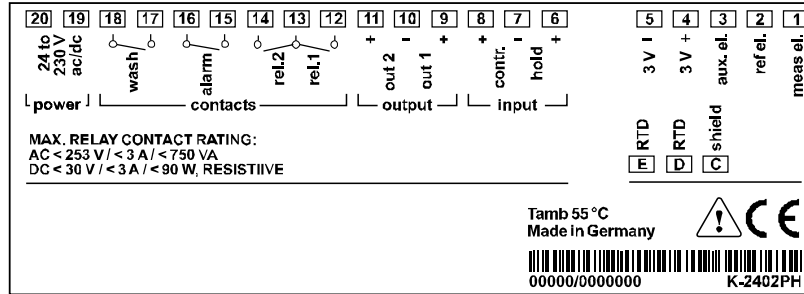
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1) To IEC 746 Part 1, at nominal operating conditions

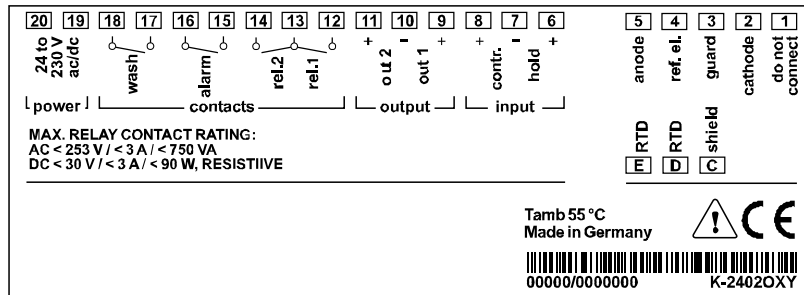
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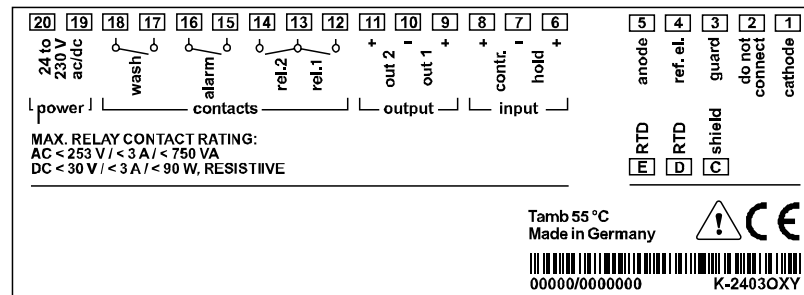
Transmitter pH 2100 e



Transmitter O₂ 4100 e



Transmitter O₂ 4100 ppb



HOLD input	Galv. separated (OPTO coupler)
Function	Switches device to HOLD state
Switching voltage	0...2 V (AC/DC) inactive 10...30 V (AC/DC) active
CONTROL input	Galv. separated (OPTO coupler)
Function	Control input for automatic cleaning/calibration system
Switching voltage	0...2 V (AC/DC) inactive 10...30 V (AC/DC) active
Output 1	0/4...20 mA, max. 10 V, floating (galv. connected to output 2)
Process variable	pH/mV/O ₂
Overrange *	22 mA in the case of error messages
Output filter *	Low-pass, filter time constant 0...120 s
Meas. error ¹⁾	< 0.3 % current value + 0.05 mA
Start/end of scale	As desired within range for pH, mV or DO
Adm. span	pH 2100 e 2.00...18.00/200...3000 mV O ₂ 4100 e 5...500%, 0.5...50 mg/l O ₂ 4100 ppb 0...200%, 0.2...10 mg/l
Output 2	0/4...20 mA, max. 10 V, floating (galv. connected to output 1)
Process variable	Temperature
Overrange *	22 mA in the case of temp error messages
Output filter *	Low-pass, filter time constant 0...120 s
Meas. error ¹⁾	< 0.3 % current value + 0.05 mA
Start/end of scale *	20...200 °C/-4...392 °F
Adm. span	20...220 K (36...396 °F)
Alarm contact	Relay contact, floating
Contact ratings	AC < 250 V/< 3 A/< 750 VA DC < 30 V/< 3 A/< 90 W
Contact response	N/C (fail-safe type)
Alarm delay	0000...0600 s
Limit values	Output via relay contacts R1, R2 Contacts R1, R2 floating, but inter-connected
Contact ratings	AC < 250 V/< 3 A/< 750 VA DC < 30 V/< 3 A/< 90 W
Contact response *	N/C or N/O
Delay *	0000...9999 s
Switching points *	As desired within range
Hysteresis *	pH 2100 e 0...5.00 pH/0...500 mV O ₂ 4100 e 0...50% O ₂ 4100 ppb 0...5.00 mg/l (ppm)

PID process controller	Output via relay contacts R1, R2 (see limit values) (Relay R1 base valve, relay R2 acid valve)
Setpoint specification *	pH 2100 e -02.00...16.00/-1500...+1500 mV O ₂ 4100 e 0...500%/0...50 mg/l O ₂ 4100 ppb 0...120% / 0...10 mg/l
Neutral zone *	pH 2100 e 0...5.00 pH/0...0500 mV O ₂ 4100 e 0...50%/0...5 mg/l O ₂ 4100 ppb 0...50%/0...5 mg/l (ppm)
P-action *	Controller gain K _R : 0010...9999 %
I-action component *	Reset time Tr: 0000...9999 s (0000 s = no integral action)
D-action component *	Derivative-action time Td: 0000...9999 s (0000 s = no derivative action)
Controller type*	Pulse length controller or pulse frequency controller
Pulse period *	0001...0600 s, min. ON time 0.5 s (pulse length controller)
Max. pulse frequency *	0001...0180 min ⁻¹ (Pulse frequency controller)
Cleaning function *	Relay contact, floating for controlling a simple rinsing system or an automatic cleaning system
Contact ratings	AC < 250 V/< 3 A/< 750 VA DC < 30 V/< 3 A/< 90 W
Contact response *	N/C oder N/O
Rinsing interval *	000.0...999.9 h (000.0 h = cleaning function switched off)
Cleaning time *	0000...1999 s
Calibration interval *	000.0...999.9 h
Cleaning interval*	000.0...999.9 h
Display	LC display, 7-segment with icons
Main display	Character height 17 mm, unit symbols 10 mm
Secondary display	Character height 10 mm, unit symbols 7 mm
Sensoface	3 status indicators (friendly, neutral, sad Smiley)
Mode indicators	5 status bars: «meas», «cal», «alarm», «cleaning», «config»
Alarm indication	18 further icons for configuration and messages Red LED in case of alarm or HOLD, user defined
Keypad	5 keys: [cal] [conf] [▲] [▶] [enter]
Service functions	
Current source	Current specifiable for output 1 and 2 (00.00...22.00mA)
Manual controller	Controller output entered directly (start of control process)
Device self-test	Automatic memory test (RAM, FLASH, EEPROM)
Display test	Display of all segments
Last Error	Display of last error occurred
Sensor monitor	Display of direct, uncorrected sensor signal (electrode)
Relay test	Manual control of the four switching contacts
Parameter sets *	Two selectable parameter sets for different applications
Data retention	Parameters and calibration data > 10 years (EEPROM)

EMC	EN 61326 EN 61326/A1
Lightning protection	EN 61000-4-5, Installation Class 2
Protection against electrical shock	Protective separation of all extra-low-voltage circuits against mains as per EN 61010
Power supply	24 (-15%)...230 (+ 10%) V AC/DC; approx. 2 VA AC: 45...65 Hz Overvoltage category II, Class II
Nominal operating conditions	
Ambient temperature	-20...+55 °C
Transport/Storage temp	-20...+70 °C
Relative humidity	10...95 % not condensing
Power supply	24 (-15%)...230 (+ 10 %) V AC/DC
Frequency for AC	45...65 Hz
Enclosure	molded enclosure made of PBT (polybutylene terephthalate)
Color	Bluish gray RAL 7031
Assembly	<ul style="list-style-type: none"> • Wall mounting • Pipe mounting: dia 40...60 mm, Ø 30...45 mm • Panel mounting, cutout to DIN 43 700, Sealed against panel
Dimensions	H 144 mm, W 144 mm, D 105 mm
Ingress protection	IP 65/NEMA 4X
Cable glands	3 breakthroughs for cable glands M20 x 1.5 2 breakthroughs for NPT 1/2" or Rigid Metallic Conduit
Weight	approx. 1 kg

* User-defined

1) To IEC 746 Part 1, at nominal operating conditions

2) ± 1 count

3) Plus sensor error

Ordering information

Item	Designation	Order number
AC/DC version (20...253 V AC/DC)		
pH Transmitter 2100 e	pH 2100 e	52 121 102
O ₂ Transmitter 4100 e	O ₂ 4100 e	52 121 103
O ₂ Transmitter 4100 ppb	O ₂ 4100 ppb	52 121 104
2-wire non ex version		
pH Transmitter 2100/2 with HART®	pH 2100/2H	52 120 724
2-wire EEX ib [ia] IIC T6 version		
pH Transmitter 2100/2X with HART®	pH 2100/2XH	52 120 758
Installation accessories		
Bracket kit	ZU 0274	52 120 741
Panel-mount kit	ZU 0275	52 120 740
Protective hood	ZU 0276	52 120 739

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Management System
certified according to
ISO 9001 / ISO 14001



INTERNET

<http://www.mtpro.com>

Subject to technical changes.
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05/02 Printed in Switzerland. 52 121 132

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