

«Advanced Line» 2-wire Transmitter, for pH, O₂ and Conductivity

Transmitters for reliable measurements and for harsh conditions in Ex and non-Ex versions with HART®, Profibus® and FOUNDATION™ Fieldbus interface.

Technical Data



Short description

The cost-effective 2-wire transmitters 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 the function operation and advise any signal or functional irregularities.

Features

- ATEX/FM approval for Ex instruments
- Product calibration
- Continuous monitoring of sensor and transmitter performance
- Sensor diagnostics
- Easy to operate with help of pictographs
- HART®, Profibus®PA and FOUNDATION™ Fieldbus communication
- FDA 21 CFR Part 11 conformity



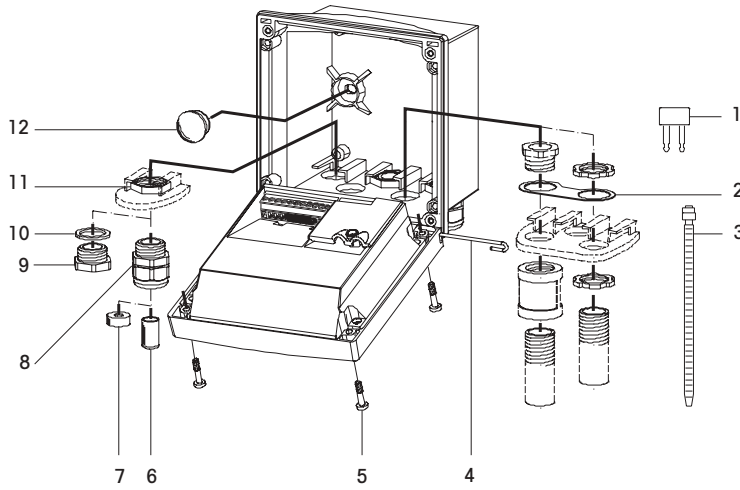
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METTLER TOLEDO

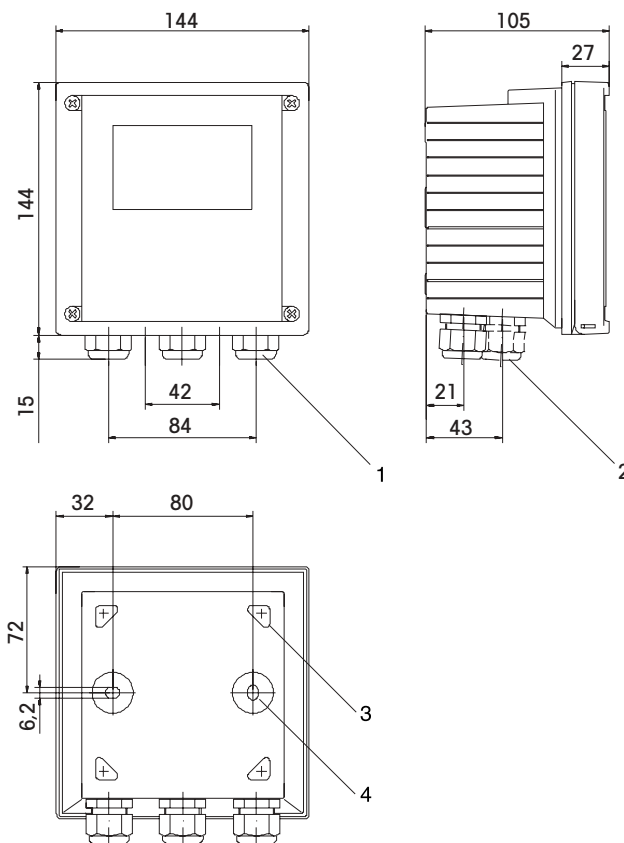
Drawings

Assembly



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

Mounting

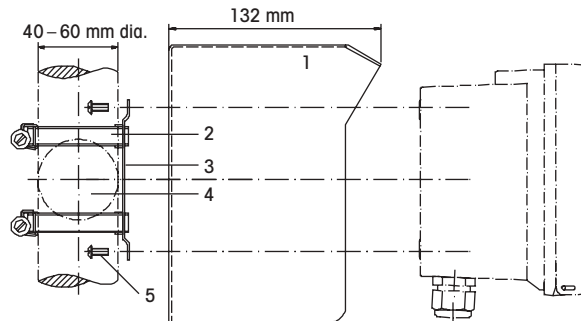


- 1 Cable gland (3 pieces)
- 2 Breakthroughs for cable gland or conduit $\frac{1}{2}$ ", \varnothing 21.5 mm (2 breakthroughs).
Conduits not included!
- 3 Holes for post mounting
- 4 Holes for wall mounting

All dimensions in mm

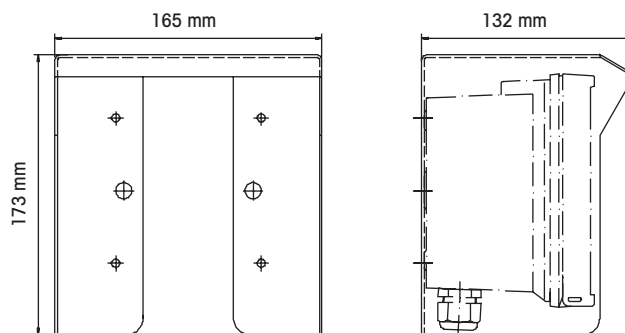
Drawings

Pipe mounting with ZU 0274 bracket kit

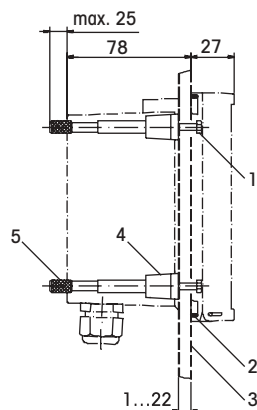


- 1 Protective hood (if required)
- 2 Hose clamps with worm gear drive to DIN 3017 (2 pieces)
- 3 Pipe mount plate (1 piece)
- 4 For vertical or horizontal post/pipe mounting
- 5 Self-tapping screws (4 pieces)

Protective hood ZU 0276 for wall and pipe mounting



Panel-mount kit ZU 0275



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

All dimensions in mm

Specifications

«Advanced Line» transmitters for pH measurement

Transmitters	2-wire HART FOUNDATION™ Fieldbus Profibus PA	pH 2100e/2(X)H pH 2100e FF pH 2100 PA
pH/mV input	Input pH or ORP electrodes or ISFET ⁴⁾ Measurement range Display range Glass electrode input ¹⁾ Input resistance Input current Reference electrode input ¹⁾ Input resistance Input current error Measurement error ^{1,2,3)} pH value/mV value:	-1500 ... +1500 mV -1500 ... +1000 mV for FF version pH value -2.00 ... 16.00 ORP: -1999 ... +1999 mV ORP: -1500 ... +1000 mV for FF version > 0.5 x 10 ¹² Ohms < 2 x 10 ⁻¹² A > 1 x 10 ¹⁰ Ohms < 1 x 10 ⁻¹⁰ A < 0,02 / < 1 mV
Sensor standardization pH*) Operating modes	pH calibration -BUF Calibration with Calimatic automatic buffer recognition: Buffer sets -01- -02- -03- -04- -05- -06- -07- -MAN -DAT -PRD	METTLER TOLEDO 2.00/4.01/7.00/9.21 Merck/Riedel de Haen 2.00/4.00/7.00/9.00/12.00 Ciba (94) 2.06/4.00/7.00/10.0 NIST technical 1.68/4.00/7.00/10.01/12.46 NIST standard 1.679/4.006/6.865/9.180 HACH 4.00/7.00/10.18 WTW techn. buffer 2.00/4.01/7.00/10.00 Manual calibration with input of individual buffer values Data entry of premeasured electrodes Product calibration
Zero offset Max. calibration range	± 200 mV Asymmetry potential: ± 60 mV Slope: 80 ... 103% (47.5 ... 61 mV/pH)	
Sensor standardization ORP*)	ORP calibration max. calibration range	-700 ... +700 mV
Calibration timer	0000 ... 9999 h	
Sensocheck	Automatic monitoring of glass and reference electrode (can be disabled)	
Sensoface	Provides information on the electrode status Evaluation of zero/slope, response, calibration interval, Sensocheck	
Sensor monitor	Direct display of measured values from sensor for validation resistance/ temperature	

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

*) User-defined

1) According to IEC 746 part 1, at nominal operating conditions

2) ± 1 count

3) Plus sensor error

4) Not valid for pH 2100 PA

Specifications

«Advanced Line» transmitters for O₂ measurement

Transmitters	2-wire HART FOUNDATION™ Fieldbus Profibus PA	O ₂ 4100e/2(X)H O ₂ 4100e FF O ₂ 4100 PA
O₂ input	Sensor Typ A Sensor Typ B	InPro 6800 InPro 6900
O₂ 4100e /2(X)H	Measuring current Saturation (−10 ... 80 °C) Meas. error ^{1,2,3)} Concentration (−10 ... 80 °C) Volume concentration in gas (−10 ... 80 °C) Adm. guard current	0 ... 1200 nA, resolution 20 pA 0.0 ... 199.9 % / 200 ... 500 % 0.5 % meas.val. +0.05 nA, TC: 0.005 nA/K 0.00 ... 50.00 mg/l 0.00 ... 50.00 ppm 0000 ... 9999 µg/l 0000 ... 9999 ppb 0500 ... 9999 ppm 0 % ... 120 % ≤ 20 µA
O₂ 4100 PA, O₂ 4100e FF		
Ranges	Measuring range 1 (low level)	Measuring range 2 (high level)
Measuring current	−2 ... 600 nA, resolution 10 pA	−2 ... 1800 nA, resolution 30 pA
Saturation*)	0.0 ... 120.0 %	0 ... 500 %
Meas. error ^{1,2,3)}	0.5 % meas. val. +0.1 % sat.	0.5 % meas. val. +0.5 % saturation
Concentration	0000 ... 9999 µg/l 0000 ... 9999 ppb 0.000 ... 9.999 ppm 0.000 ... 9.999 mg/l	0.0 ... 50.0 mg/l 0.0 ... 50.0 ppm
Meas. error ^{1,2,3)}	0.5 % meas. val. +5 µg/l or 5 ppb 0.05 % meas.val. +0.05 mg/l or 0.05 ppm	
Volume concentration in gas ⁴⁾ (−10...80 °C)	0000 ... 9999 ppm 0.00 % ... 120.0 % (0.00 % ... 29.99 % 30.0 % ... 120.0 %)	0000 ... 9999 ppm 0.00 % ... 120.0 % (0.00 % ... 29.99 % 30.0 % ... 120.0 %)
Meas. error ^{1,2,3)}	0.5 % meas.val. +0.02 % or 200 ppm	0.5 % meas.val.+0.1 or 1000 ppm
Sensor standardization	Polarization voltage*) Process pressure*) Salinity correction*) Operating modes Calibration range Sensor Type A Calibration range Sensor Type B Calibration timer*) Pressure correction*)	(0) 400... 1000 mV/ 10 mV steps 0.000 ... 9.999 bars (... 999.9 kPa / ... 145.0 psi) 00.00 ... 45.00 g/kg O ₂ saturation (automatic), O ₂ concentration (automatic), Volume concentration in gas ⁴⁾ , Product calibration, Zero calibration Zero point ±2 nA Slope 25 ... 130 nA (at 25 °C, 1013 mbar) Zero point ±2 nA Slope 200 ... 550 nA (at 25 °C, 1013 mbar) 0000 ... 9999 h 0.000 ... 9.999 bar (... 999.9 kPa / ... 145.0 psi)

Sensocheck	Monitoring for short circuits/open circuits (can be disabled)
Sensoface	Provides information on the condition of the sensor, evaluation of zero point/slope, response time, calibration interval, Sensocheck
Temperature input^{*)}	NTC 22 kOhm/NTC 30 kOhm ^{*)} 2-wire connection, adjustable Measurement range –20.0 to +150.0 °C (–4 to +302 °F) Adjustment range 10 K Resolution 0.1 °C / 1 °F Measurement error ^{1,2,3)} <0.5 K (<1 K at 100 °C)

^{*)} User-defined

1) According to IEC 746 part 1, at nominal operating conditions

2) ±1 count

3) Plus sensor error

4) Not valid for O₂ 4100 PA

Specifications

«Advanced Line» transmitters for conductivity measurement

Transmitters	2-wire HART FOUNDATION™ Fieldbus Profibus PA	Cond 7100e/2(X)H Cond 7100e FF Cond 7100 PA
Conductivity input	Input for 2- or 4-electrode sensors	
Working ranges	4-electrode 2-electrode (Display range limited to 3500 mS)	0.2 $\mu\text{S} \cdot \text{c} \dots 1000 \text{ mS} \cdot \text{c}$ (c = cell constant) 0.2 $\mu\text{S} \cdot \text{c} \dots 200 \text{ mS} \cdot \text{c}$
Effective ranges*)	Conductivity	0.000 ... 9.999 $\mu\text{S}/\text{cm}$ 00.00 ... 99.99 $\mu\text{S}/\text{cm}$ 000.0 ... 999.9 $\mu\text{S}/\text{cm}$ 0000 ... 9999 $\mu\text{S}/\text{cm}$ 0.000 ... 9.999 mS/cm 00.00 ... 99.99 mS/cm 000.0 ... 999.9 mS/cm 0.000 ... 9.999 S/m 00.00 ... 99.99 S/m
	Resistivity	00.00 ... 99.99 $\text{M}\Omega\text{cm}$
	Concentration	00.00 ... 9.99 %
	Salinity	0.0 ... 45.0‰ (0 ... 35 °C)
	USP ⁴⁾	00.00 ... 99.99 $\mu\text{S}/\text{cm}$
	Measurement error ^{1,2,3)}	<1 % meas. val + 0.4 $\mu\text{S} \cdot \text{c}$ (c = cell constant)
Concentration⁴⁾	-01- NaCl -02- HCl -03- NaOH -04- H ₂ SO ₄ -05- HNO ₃	0.00 ... 9.99 by wt % (0 ... 60 °C) 0.00 ... 9.99 by wt % (-20 ... 50 °C) 0.00 ... 9.99 by wt % (0 ... 100 °C) 0.00 ... 9.99 by wt % (-17 ... 110 °C) 0.00 ... 9.99 by wt % (-17 ... 50 °C)
Sensor standardization	Input of cell constant with simultaneous display of conductivity and temperature Input of conductivity of calibration solution with simultaneous display of cell constant and temperature ⁴⁾ Product calibration ⁴⁾ Temperature probe adjustment	
Permissible cell constant	00.0050 ... 19.9999 cm^{-1}	
USP function⁴⁾	Water monitoring in the pharmaceutical industry	
Sensocheck	Polarization detection and monitoring of the cable capacitance (can be disabled)	
Sensoface	Provides information on the condition of the sensor, evaluation of Sensocheck	
Sensor monitor	Direct display of measured values from sensor for validation, resistance/temperature	
Temperature input*)	Pt 100/ Pt 1000/NTC 30 kOhm/NTC 8.55 kOhm 2-wire connection, adjustable Measurement ranges Pt 100/Pt 1000 -20.0 ... +200.0 °C (-4 ... +392 °F) NTC 30 kOhm -20.0 ... +150.0 °C (-4 ... +302 °F) NTC 8.55 kOhm -10.0 ... +130.0 °C (+14 ... +266 °F) Resolution 0.1 °C/1 °F Measurement error ^{1,2,3)} <0.5 K (<1 K with Pt100; <1K with NTC >100 °C)	

Specifications

«Advanced Line» transmitters for conductivity measurement

Temperature compensation*)	(OFF) no compensation	
reference	(Lin) Linear characteristic 00.00 ... 19.99 %/K	-20 ... 130 °C
temperature 25 °C	(NLF) Natural waters to EN 27888	0 ... 36 °C
	(nACL) Ultrapure water with NaCl traces	0 ... 120 °C
	(HCL) Ultrapure water with HCl traces	0 ... 120 °C
	(nH3) Ultrapure water with NH3 traces	0 ... 120 °C

*) User-defined

1) According to IEC 746 part 1, at nominal operating conditions

2) ± 1 count

3) Plus sensor error

4) Not valid for Cond 7100 PA

Specifications

«Advanced Line» transmitters for conductivity measurement

Transmitters	2-wire HART FOUNDATION™ Fieldbus Profibus PA	Cond Ind 7100 e/2(X)H Cond Ind 7100 e FF ⁵⁾ Cond Ind 7100 PA
Cond input	input for inductive sensors METTLER TOLEDO	
Working ranges	Conductivity	0.000...9.999 mS/cm
Effective ranges*)		00.00...99.99 mS/cm 000.0...999.9 mS/cm 0000...1999 mS/cm 0.000...9.999 S/m 00.00...99.99 S/m
	Concentration	00.00...9.99 %, 10.0...100.0 %
	Salinity	0.0...45.0 ‰ (0...35°C)
	Measurement error ^{1,2,3)}	<1 % meas. val + 0.02 mS/cm
Concentration determination	-01- NaCl -02- HCl -03- NaOH -04- H ₂ SO ₄ -05- HNO ₃ -06- H ₂ SO ₄ -07- HCl -08- HNO ₃ -09- H ₂ SO ₄ -10- NaOH	0–26 bywt% (0°C) ... 0–28 bywt% (100°C) 0–18 bywt% (–20°C) ... 0–18 bywt% (50°C) 0–13 bywt% (0°C) ... 0–24 bywt% (100°C) 0–26 bywt% (–17°C) ... 0–37 bywt% (110°C) 0–30 bywt% (–20°C) ... 0–30 bywt% (50°C) 94–99 bywt% (–17°C) ... 89–99 bywt% (115°C) 22–39 bywt% (–20°C) ... 22–39 bywt% (50°C) 35–96 bywt% (–20°C) ... 35–96 bywt% (50°C) 28–77 bywt% (–17°C) ... 39–88 bywt% (115°C) 15–50 bywt% (0°C) ... 35–50 by wt % (100°C)
Sensor standardization	Input of cell factor with simultaneous display of conductivity value and temperature Input of conductivity value with simultaneous display of cell factor and temperature Product calibration ⁴⁾ Zero point calibration Temperature probe adjustment	
Permissible cell factor	00.100...19.999	
Permissible transfer ratio	01.00...199.99	
Permissible zero point deviation	±0.5 mS/cm	
Sensocheck	Monitoring of sender coil and leads for short circuiting, and of the receiver coil for circuits (can be disabled)	
Sensoface	Indicates sensor status (zero point, Sensocheck)	
Sensor monitor	Display of direct measurement values for validation purpose (resistance/temperature)	

Specifications

«Advanced Line» transmitters for conductivity measurement

Temperature input *)	Pt 100/ Pt 1000/NTC 30 kOhm/NTC 100 kOhm
	2-wire connection, adjustable
	Measurement ranges
	Pt 100/Pt 1000 –20.0 ... +200.0 °C (–4 ... +392 °F)
	NTC 100 kOhm –20.0 ... +130.0 °C (–4 ... +266 °F)
	NTC 30 kOhm –20.0 ... +150.0 °C (–4 ... +302 °F)
	Resolution 0.1 °C / 1 °F
	Measurement error ^{1,2,3)} <0.5 K (<1 K with Pt100; <1K with NTC >100 °C)

Temperature compensation *)	(OFF) Without
(reference temperature 25 °C)	(LIN) linear, 0.00 ... 19.99 %/K
	(NLF) Natural waters to EN 27888

*) User-defined

1) According to IEC 746 part 1, at nominal operating conditions

2) ± 1 count

3) Plus sensor error

4) Not valid for Cond Ind 7100 PA

5) Available Q2 2005

Transmitter pH 2100e/2(X)H, pH 2100 PA and pH 2100e FF

19	18	17	16	15	14	8	7	6	5	4	2	1
+ 3V	0	- 3V	⏏	+	4 to 20 mA	RTD	RTD	n.c.	aux. el.	ref. el.		meas. el.
L supply/ ISFET						input						
J output												
<p>NI, CLI, DIV2, GRP A, B, C, D, T4 ENCLOSURE TYPE 2 Tamb -20 to +55 °C</p> <p>WARNING - EXPLOSION HAZARD - NO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS. WARNING - BONDING BETWEEN CONDUIT IS NOT AUTOMATIC AND MUST BE PROVIDED AS PART OF THE INSTALLATION. SEE INSTALLATION INSTRUCTIONS. AVERTISSEMENT - RISQUE D'EXPLOSION. AVANT DE DECONNECTER L'EQUIPEMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DESIGNÉ. NON DANGEREUX.</p>						shield observe grounding conditions CE 67159 54270/8144133/0430						

19	18	17	16	15	14	8	7	6	5	4	2	1
+ 3V	0	- 3V	⏏	+	4 to 20 mA	RTD	RTD	n.c.	aux. el.	ref. el.		meas. el.
L supply/ ISFET						input						
J output												
<p>TÜV 99 ATEX 1447 II 2(1) G EEx ib [ia] IIC T6 Tamb -20 to +55°C CE 0032 Elektrische Daten siehe Baumusterprüfbescheinigung FM IS, CLI, DIV1, GRP A, B, C, D, T4, Ta = 55 °C, Entity, Type 2 Control Drawing 194.120-170</p>						<p>BONDING BETWEEN CONDUIT IS NOT AUTOMATIC AND MUST BE PROVIDED AS PART OF THE INSTALLATION. SEE INSTALLATION INSTRUCTIONS.</p> 00000 00000/00000000						

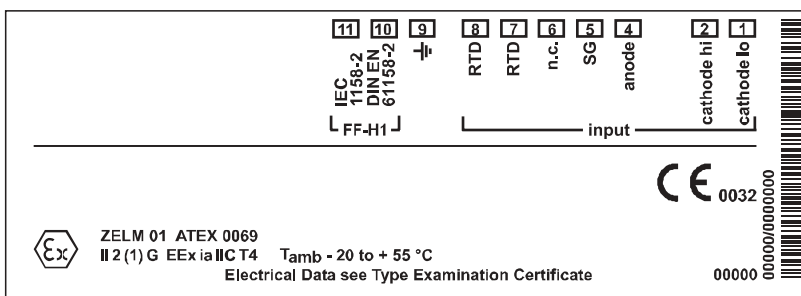
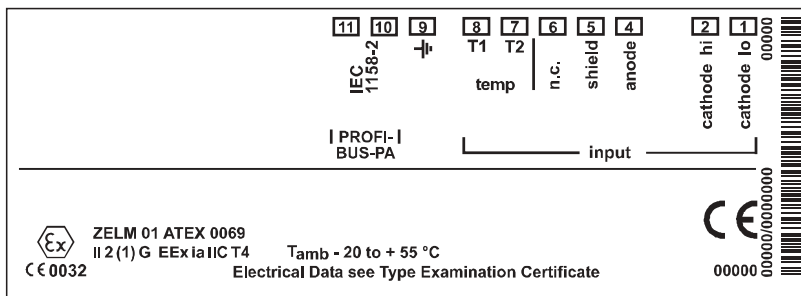
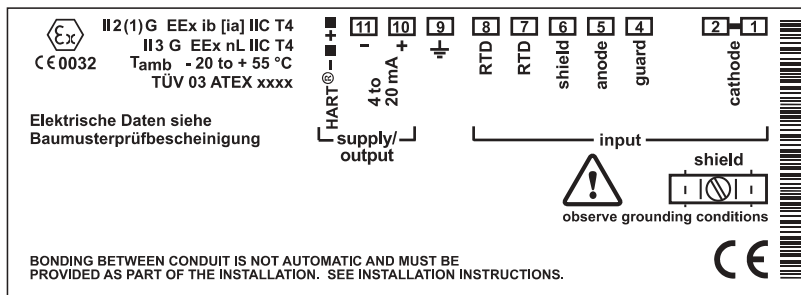
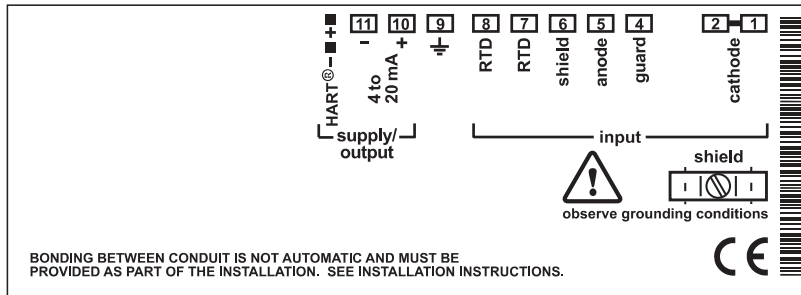
						11	10	9	8	7	6	5	4	2	1
								⏏			n.c.	aux. el.	ref. el.		meas. el.
						input									
<p>ZELM 99 ATEX xxxxx II 2 (1) G EEx ia IIC T4 Tamb -20 to +55 °C CE 0032 Electrical Data see Type Examination Certificate</p>						shield observe grounding conditions CE 00000 00000/00000000									

19	18	17	16	15	14	8	7	6	5	4	2	1
+ 3V	0	- 3V	⏏	+	IEC 1158-2 DIN EN 61158-2	RTD	RTD	n.c.	SG	ref. el.		meas. el.
L supply/ ISFET						input						
J FF-H1												
<p>ZELM 99 ATEX 0016 II 2(1) G EEx ia IIC T4 Tamb -20 to +55 °C CE 0032 Electrical Data see Type Examination Certificate</p>						shield observe grounding conditions CE 00000 00000/00000000						


Terminal assignment

«Advanced Line» Transmitter

Transmitter O₂ 4100 e/2(X)H, O₂ 4100 PA and O₂ 4100 e FF



Transmitter Cond 7100 e / 2(X)H, Cond 7100 PA and 7100 e FF


 APPROVED
 NI, CL I, DIV2, GRP A, B, C, D, T4
 Tamb - 20 to + 55 °C
 ENCLOSURE TYPE 2


HART® - 4 to 20 mA
 11 10 9
 8 RTD
 7 RTD
 6 n.c.
 5 shield
 4 3 2 1

supply/output
 2-/4- electrode conductivity sensor

WARNING -EXPLOSION HAZARD- SUBSTITUTION OF COMPONENTS MAY IMPAIR CLASS I DIV. 2 SUITABILITY. DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS. BONDING BETWEEN CONDUIT IS NOT AUTOMATIC AND MUST BE PROVIDED AS PART OF THE INSTALLATION. SEE INSTALLATION INSTRUCTIONS.
 AVERTISSEMENT -RISQUE D'EXPLOSION- LA SUBSTITUTION DE COMPOSANTS PEUT RENDRE CE MATÉRIEL INACCEPTABLE POUR LES EMBLEMES DE CLASSE I DIVISION 2. AVANT DE CONNECTER L'EQUIPEMENT. COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DÉSIGNÉ NON DANGEREUX.

CE

 II 2(1) G EEx ib [ia] IIC T6
 Tamb - 20 to + 55 °C
 CE 0032 TÜV 99 ATEX 1433

Elektrische Daten siehe Baumusterprüfbescheinigung
 IS, CL I, DIV1, GRP A, B, C, D, T4
 Ta + 55 °C, Entity, Type 2
 APPROVED
 HAZARDOUS LOCATION per Control Drawing 194.220-190

HART® - 4 to 20 mA
 11 10 9
 8 RTD
 7 RTD
 6 n.c.
 5 shield
 4 3 2 1


supply/output
 2-/4- electrode conductivity sensor

BONDING BETWEEN CONDUIT IS NOT AUTOMATIC AND MUST BE PROVIDED AS PART OF THE INSTALLATION. SEE INSTALLATION INSTRUCTIONS.

CE

IEC 1158-2
 T1 T2
 temp
 6 n.c.
 5 shield
 4 3 2 1


I PROFI- I BUS-PA
 2-/4- electrode conductivity sensor

 ZELM 00 ATEX 0033
 CE 0032 II 2(1) G EEx ia IIC T4 Tamb - 20 to + 55 °C
 Electrical Data see Type Examination Certificate

CE 00000 0000000000000000

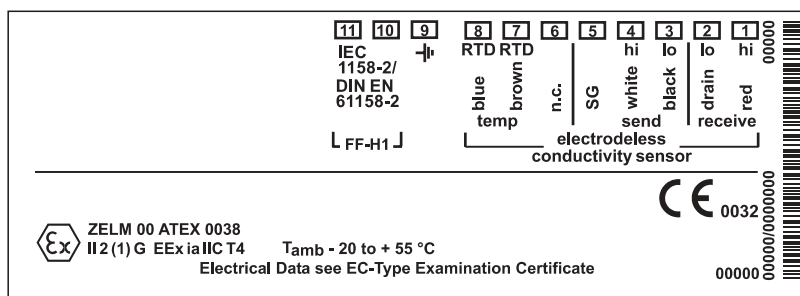
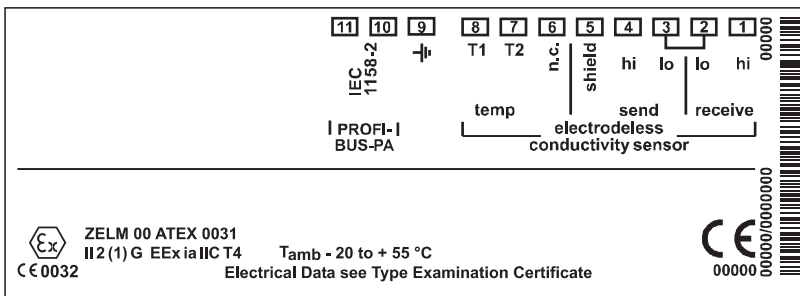
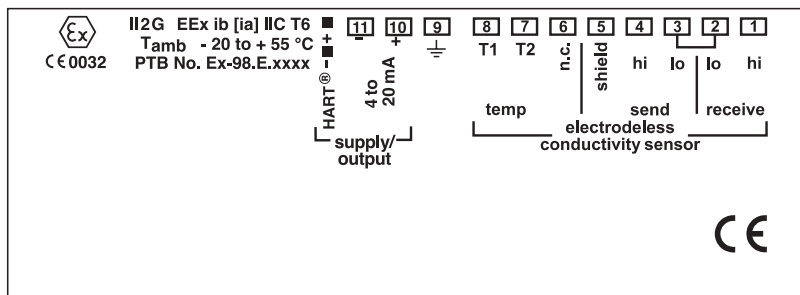
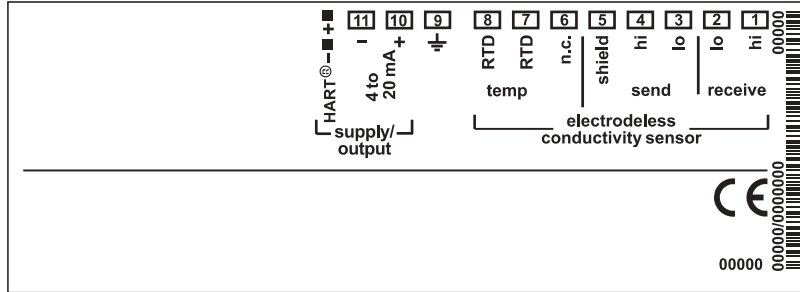
IEC 1158-2/
 DIN EN 61158-2
 FF-H1
 8 RTD
 7 RTD
 6 n.c.
 5 SG
 4 3 2 1

2-/4- electrode conductivity sensor

 ZELM 00 ATEX 0037
 CE 0032 II 2(1) G EEx ia IIC T4 Tamb - 20 to + 55 °C
 Electrical Data see EC-Type Examination Certificate

CE 00000 0000000000000000

Transmitter Cond Ind 7100 e / 2(X)H, Cond Ind 7100 PA and Cond Ind 7100e FF



Loop current⁴⁾	Supply voltage	4 ... 20 mA (3.8 ... 20.5 mA), floating
	Characteristic	Linear
	Supply voltage	12 ... 30 V $I_{max} = 100$ mA, $P_{max} = 0.8$ W
	Overrange ^{*)}	22 mA in the case of error messages
	Output filter ^{*)}	PT ₁ -filter, filter time constant 0 ... 120 s
	Meas. error ¹⁾	<0.3 % of current value +0.05 mA
	Start/End of scale ^{*)}	as desired within measuring range
<hr/>		
HART communication	Digital communication via FSK modulation of the loop current, reading of device identification, measured values, status and messages reading and writing parameters, starting product calibration, signaling configuration amendment according to FDA 21 CFR Part 11.	
<hr/>		
Profibus communication	Protocol	Profibus PA via segment coupler/link to PLC
	Interface Profile	Profile for Analyzers Version 3.0 (PNO directive)
	Supply voltage	FISCO ≤ 17.5 V (trapezoidal or rectangular characteristic) ≤ 24 V (linear characteristic)
	Current consumption	pH 2100 PA < 12.7 mA, O ₂ 4100 PA < 13.3 mA Cond/Cond Ind 7100 PA < 16.0 mA
	Physical interface	according to EN 61158-2
	Max. current in case of fault	(FDE) < 17.6 mA
	Limit 1 and 2	Cyclical, discrete signal (DI) via Profibus, user-defined for the process variables.
<hr/>		
FF communication	FF_H1	Foundation Fieldbus
	Physical interface	To EN 61158-2 (IEC 1158-2)
	Address range	017 ... 246, Factory setting: 026
	Mode of operation	Bus-powered device with constant current consumption
	Supply voltage	FISCO ≤ 17.5 V (trapezoidal or rectangular characteristic) ≤ 24 V (linear characteristic)
	Current consumption	pH 2100e FF < 12.7 mA O ₂ 4100e FF < 12.2 mA Cond 7100e FF < 16 mA Cond Ind 7100e FF < 16.1 mA
	Max. current in case of fault (FDE)	pH 2100e FF < 21.4 mA O ₂ 4100e FF < 17.6 mA Cond 7100e FF < 17.6 mA Cond Ind 7100e FF < 21.8 mA
	Certified to ITK 4.6	1 resource block 1 transducer block 3 AI function blocks
	Channel definition	pH, ORP, temperature, R _{glass} , R _{ref.} , asymmetry potential, slope
	O ₂	O ₂ saturation, O ₂ concentration, temperature, zero, slope, volume concentration in gas
	Cond	Conductivity, resistivity, concentration, salinity, temperature, cell constant
	Cond Ind	Conductivity, concentration, salinity, temperature, cell factor

Device description (DD)	FOUNDATION™ Fieldbus DD for AMS Profibus PA DD for SIMATIC PDM HART DD for AMS and SIMATIC PDM	
Display	LC display Main display Secondary display Sensoface Mode indicators Alarm indication	7-segment with icons Character height 17 mm, unit symbols 10 mm Character height 10 mm, unit symbols 7 mm 3 status indicators (friendly, neutral, sad smiley) 5 mode indicators "meas", "cal", "alarm", "digital communication", "config" 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	Device self-test Display test Last error Sensor monitor	Automatic memory test (RAM, ROM, EEPROM) Display of all segments Display of last error occurred Display of direct, uncorrected sensor (resistance/ temperature)
Data retention	Parameters and calibration data >10 years (EEPROM) EMC Emitted interference Immunity to interference	DIN EN 61326 Class B; Class A: for >60 V DC Industrial sector
Explosion protection	X100/2XH X100 PA X100e FF	ATEX II 2 (1) G EEx ib (ia) IIC T6 FM IS, Class 1, Div 1, Group A, B, C, D T4 NI, Class 1, Div 2, Group A, B, C, D T4 ATEX II 2 (I) G EEx ia IIC T4 ATEX II 2 (1) G EEx ia IIC T4 FM IS, Class 1, Div 1, Group A, B, C, D T4 NI, Class 1, Div 1, Group A, B, C, D T4
Nominal operation conditions	Ambient temperature Transport/Storage temp.	-20 ... +55 °C -20 ... +70 °C
Enclosure	Molded enclosure made of PBT (polybutylene terephthalat) Color Assembly Dimensions Protection Cable glands Weight	Bluish gray RAL 7031 Wall mounting Pipe mounting Ø 40 ... 60 mm, 30 ... 45 mm Panel mounting cutout to DIN 43 700, Sealed against panel H 144 mm, W 144 mm, D 105 mm IP 65/NEMA 4X 3 breakthroughs for cable glands M20x1.5 2 breakthroughs for NPT 1/2" or Rigid Metallic Conduit Approx. 1 kg

*) User-defined

1) According to IEC 746 part 1, at nominal operating conditions

2) ± 1 count

3) Plus sensor error

4) Not available for Profibus® PA and FOUNDATION™
Fieldbus versions

Description	Designation	Order no.
2-wire instruments		
Transmitter pH 2100e/2H	pH 2100e/2H	52 120 724
Transmitter pH 2100e/2XH	pH 2100e/2XH	52 120 758
Transmitter pH 2100e FF	pH 2100e FF	52 121 245
Transmitter pH 2100 PA	pH 2100 PA	52 121 042
Transmitter O ₂ 4100e/2H	O ₂ 4100e/2H	52 121 215
Transmitter O ₂ 4100e/2XH	O ₂ 4100e/2XH	52 121 168
Transmitter O ₂ 4100e FF	O ₂ 4100e FF	52 121 246
Transmitter O ₂ 4100 PA	O ₂ 4100 PA	52 121 091
Transmitter Cond 7100e/2H	Cond 7100e/2H	52 120 903
Transmitter Cond 7100e/2XH	Cond 7100e/2XH	52 120 905
Transmitter Cond 7100e FF	Cond 7100e FF	52 121 247
Transmitter Cond 7100 PA	Cond 7100 PA	52 121 047
Transmitter Cond Ind 7100e/2H	Cond Ind 7100e/2H	52 120 908
Transmitter Cond Ind 7100e/2XH	Cond Ind 7100e/2XH	52 120 910
Transmitter Cond Ind 7100e FF	Cond Ind 7100e FF	52 121 248 ¹⁾
Transmitter Cond I 7100 PA	Cond Ind 7100 PA	52 121 048
Mounting accessories		
Bracket kit	ZU 0274	52 120 741
Panel-mount kit	ZU 0275	52 120 740
Protective hood	ZU 0276	52 120 739

¹⁾Available Q2 2005

METTLER TOLEDO Market Organizations

Sales and Service:

Australia

Mettler-Toledo Ltd.
220 Turner Street
Port Melbourne
AUS - 3207 Victoria
Phone +61 31300 659 761
Fax +61 3 9645 3935
e-mail mtausprocess@mt.com

Austria

Mettler-Toledo GmbH
Südrandstrasse 17
AT - 1230 Wien
Phone +43 1 604 19 80
Fax +43 1 604 28 80
e-mail infoprocess.mtat@mt.com

Brazil

Mettler-Toledo Ind. e Com. Ltda.
Alameda Araguaia
451 - Alphaville
BR - 06455-000 Barueri/SP
Phone +55 11 4166 74 00
Fax +55 11 4166 74 01
e-mail sales@mettler.com.br
service@mettler.com.br

China

Mettler-Toledo Instruments
(Shanghai) Co. Ltd.
589 Gui Ping Road
Cao He Jing
CN - 200233 Shanghai
Phone +86 21 64 85 04 35
Fax +86 21 64 85 33 51
e-mail mtcs@public.sta.net.cn

Croatia

Mettler-Toledo d.o.o.
Mandlova 3
HR - 10000 Zagreb
Phone +385 1 292 06 33
Fax +385 1 295 81 40
e-mail mt-zagreb@mt.com

Czech Republic

Mettler-Toledo spol s.r.o.
Trebohosticka 2283/2
CZ - 100 00 Praha 10
Phone +420 2 72 123 150
Fax +420 2 72 123 170
e-mail sales.mtcz@mt.com

Denmark

Mettler-Toledo A/S
Naverland 8
DK - 2600 Glostrup
Phone +45 43 27 08 00
Fax +45 43 27 08 28
e-mail info.mtdk@mt.com

France

Mettler-Toledo
Analyse Industrielle Sàrl
30, Boulevard de Douaumont
BP 949
F - 75829 Paris Cedex 17
Phone +33 1 47 37 06 00
Fax +33 1 47 37 46 26
e-mail mtpro-f@mt.com

Germany

Mettler-Toledo GmbH
Prozeßanalytik
Ockerweg 3
D - 35396 Gießen
Phone +49 641 507 333
Fax +49 641 507 397
e-mail prozess@mt.com

Great Britain

Mettler-Toledo LTD
64 Boston Road, Beaumont Leys
GB - LE4 1AW Leicester
Phone +44 116 235 7070
Fax +44 116 236 5500
e-mail enquire.mtuk@mt.com

Hungary

Mettler-Toledo Kereskedelmi KFT
Teve u. 41
HU - 1139 Budapest
Phone +36 1 288 40 40
Fax +36 1 288 40 50
e-mail mthu@axelero.hu

India

Mettler-Toledo India Private Limited
Amar Hill, Saki Vihar Road
Powai
IN - 400 072 Mumbai
Phone +91 22 2857 0808
Fax +91 22 2857 5071
e-mail sales.mtin@mt.com

Italy

Mettler-Toledo S.p.A.
Via Vialba 42
I - 20026 Novate Milanese
Phone +39 02 333 321
Fax +39 02 356 2973
e-mail customercare.italia@mt.com

Japan

Mettler-Toledo K.K.
Process Division
5F Tokyo Ryutsu Center, Annex B
6-1-1 Heiwajima, Ohta-ku
JP - 143-0006 Tokyo
Phone +81 3 5762 07 06
Fax +81 3 5762 09 71
e-mail helpdesk.ing.jp@mt.com

Malaysia

Mettler-Toledo (M) Sdn Bhd
Bangunan Electroscon Holding
Lot 8 Jalan Astaka U8/84
Seksyen U8, Bukit Jelutong
MY - 40150 Shah Alam Selangor
Malaysia
Phone +60 3 78 45 57 73
Fax +60 3 78 45 87 73
e-mail ahmad.rashidi@mt.com

Mexico

Mettler-Toledo S.A. de C.V.
Pino No. 350, Col. Sta.
MA. Insurgentes, Col Atlampa
MX - 06450 México D.F.
Phone +52 55 55 47 57 00
Fax +52 55 55 41 22 28
e-mail mario.roca@mt.com

Poland

Mettler-Toledo (Poland) Sp.z.o.o.
ul. Poleczki 21
PL - 02-822 Warszawa
Phone +48 22 545 06 80
Fax +48 22 545 06 88
e-mail polska@mt.com

Russia

Mettler-Toledo Vostok ZAO
Sretenskij Bulvar 6/1
Office 6
RU - 101000 Moscow
Phone +7 095 921 92 11
Fax +7 095 921 63 53
+7 095 921 78 68
e-mail inforus@mt.com

Singapore

Mettler-Toledo (S) Pte. Ltd.
Block 28
Ayer Rajah Crescent #05-01
SG - 139959 Singapore
Phone +65 6890 00 11
Fax +65 6890 00 12
+65 6890 00 13
e-mail ashley.kong@mt.com

Slovakia

Mettler-Toledo s.r.o.
Bulharska 61
SK - 82104 Bratislava
Phone +421 243 42 74 96
Fax +421 243 33 71 90
e-mail predaj@mt.com

Slovenia

Mettler-Toledo d.o.o.
Peske 12
SI - 1236 Trzin
Phone +386 1 530 80 50
Fax +386 1 562 17 89
e-mail cipot@mtslo.mt.com
racman@mettler-toledo.si

South Korea

Mettler-Toledo (Korea) Ltd.
Yeil Building 1 & 2 F
124-5, YangJe-Dong
SeCho-Ku
KR - 137-130 Seoul
Phone +82 2 3498 3500
Fax +82 2 3498 3556
e-mail Sales_MTKR@mt.com

Spain

Mettler-Toledo S.A.E.
C/ Miguel Hernández, 69-71
ES - 08908 L'Hospitalet de Llobregat
(Barcelona)
Phone +34 93 223 76 00
Fax +34 93 223 76 01
e-mail bcn.centralita@mt.com

Sweden

Mettler-Toledo AB
Virkesvägen 10
Box 92161
SE - 12008 Stockholm
Phone +46 8 702 50 00
Fax +46 8 642 45 62
e-mail sales.mts@mt.com

Switzerland

Mettler-Toledo (Schweiz) AG
Im Langacher
Postfach
CH - 8606 Greifensee
Phone +41 44 944 45 45
Fax +41 44 944 45 10
e-mail info.ch@mt.com
info.ola.ch@mt.com

Thailand

Mettler-Toledo (Thailand) Ltd.
272 Soi Soonvijai 4
Rama 9 Rd., Bangkok
Huay Kwang
TH - 10320 Bangkok
Phone +66 2 723 03 00
Fax +66 2 719 64 79
e-mail mettler@samart.co.th

USA/Canada

Mettler-Toledo Ingold, Inc.
36 Middlesex Turnpike
Bedford, MA 01730, USA
Phone +1 781 301 8800
Toll free +1 800 352 8763
Fax +1 781 271 0681
e-mail mtprou@mt.com
ingold@mt.com



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Mettler-Toledo GmbH, Process Analytics
Industrie Nord, CH - 8902 Urdorf
Phone + 41 44 736 22 11, Fax +41 44 736 26 36

www.mtpro.com