

Stratos MS

Reasonably Priced Multi-Parameter Memosens Transmitter

The digital platform.

Multi-parameter transmitter

With the Stratos MS, Knick is now offering a low-cost, purely digital version of its Stratos analyzers that can be configured to measure pH value, ORP, conductivity (conductive or inductive) and dissolved oxygen.

Designed for digital Memosens sensors, the Stratos MS is the counterpart to the Stratos Eco analog analyzer.

Unique user interface

The self-explanatory user interface guarantees comfortable and intuitive handling.

2-color backlit display

A large, high-contrast LC display simultaneously indicates measured values and temperature in plain text as well as measurement symbols.

In normal measuring mode the display is backlit white.



3 years
warranty!

The alarm status has a particularly noticeable red display color and is also signaled by flashing display values. Invalid inputs or false passcodes cause the entire display to flash red so that operating errors are significantly reduced.

Internationally recognizable icons provide operating information and draw attention to unusual operating states.

Shatter-proof and corrosion-resistant housing

The robust PBT housing with IP 65 protection is suitable for wall, pipe or panel mounting. It is outdoor-rated and UV resistant. Empty polymer housings and plug terminals that can be pre-assembled make installation easier.

VariPower broad-range power supply

The included VariPower broad-range power supply is suitable for all standard supply voltages and guarantees trouble-free use even with large fluctuations in the power grid.

The Stratos MS by Knick is covered by a three-year warranty.

Facts and features

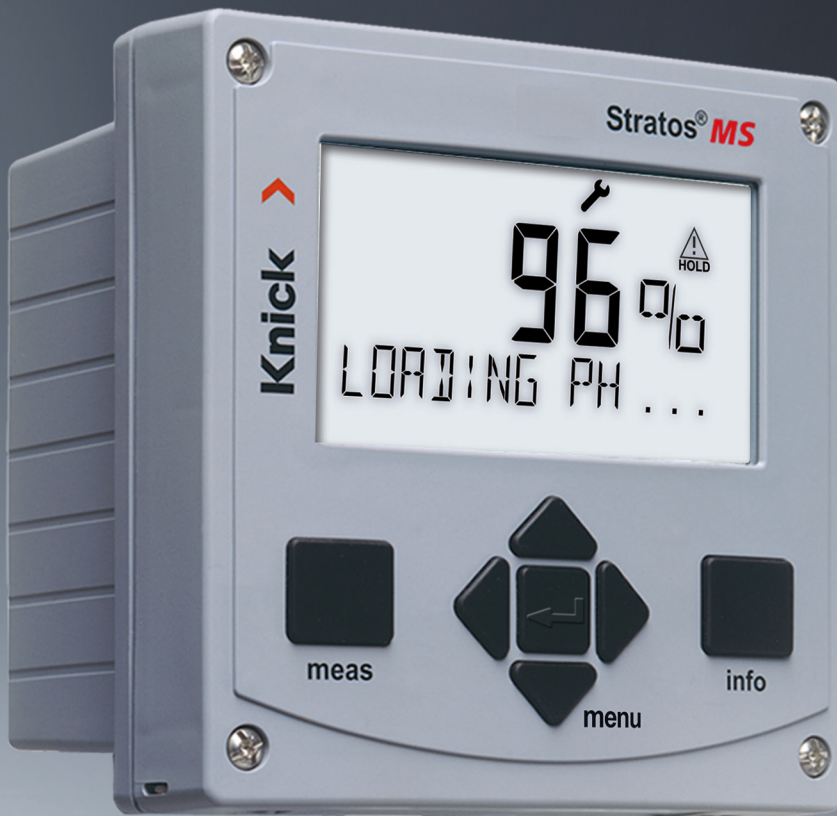
- Operation of digital Memosens sensors
- One device for pH/ORP, conductivity or oxygen (configurable)
- Comprehensive features and flexibility enable universal application.
- 2-color backlit display: white for measuring, red for alarm
- Logbook as standard
- Global use thanks to broad-range power supply
- Very simple ordering and inventory management

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White:
Measuring mode

Red flashing:
Alarm, error



PH

ORP

COND

COND!

OXY



Product range

Stratos MS

Stratos MS 4-wire, multiparameter, digital

Order No.

A405N

Accessories

Pipe-mount kit

ZU 0274

Panel-mount kit

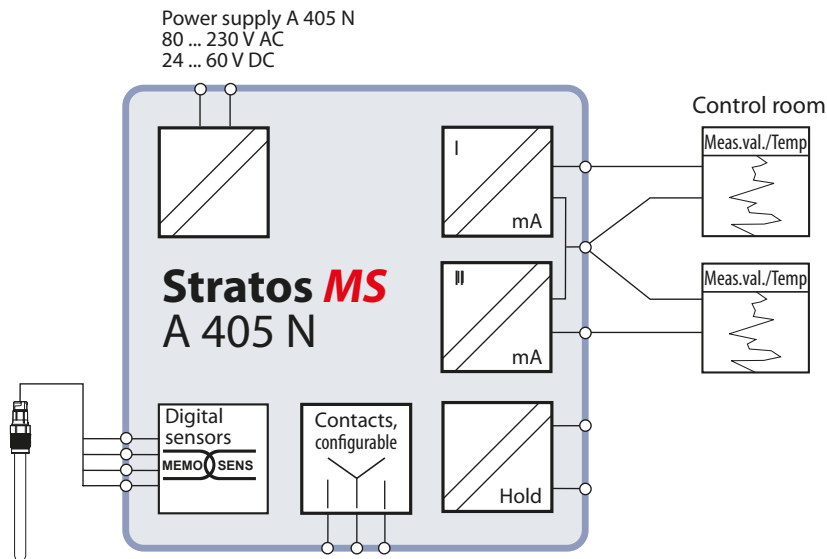
ZU 0738

Protective hood

ZU 0737

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Wiring example



Terminal assignments of A405N

22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
80 to 230 V AC	24 to 60 V DC	do not connect	do not connect	do not connect	do not connect	REL 2	REL 1	do not connect	HOLD	HOLD	+	0(4) to 20 mA	-	0(4) to 20 mA	+	do not connect	do not connect	do not connect	WH/CL SHIELD	YE B	GN A	BN 3 V
Power						Contacts		In		Digital		Out 1		Out 2		RS 485						
WARNING: DO NOT SEPARATE WHEN ENERGIZED!												DO NOT REMOVE OR REPLACE FUSE WHEN ENERGIZED!										

Specifications

“Device Type” pH

Sensor input, digital

Memosens pH or ORP sensors

Display range	pH value	-2.00 ... 16.00
	ORP	-1999 ... 1999 mV
	Temperature	-20.0 ... 200.0 °C (-4 ... +392 °F)

Measurement error See sensor specifications

pH sensor standardization*)

pH calibration

Operating modes

AUTO – Calibration with automatic buffer recognition (Calimatic)

MAN – Manual calibration with input of individual buffer values

DAT – Data entry of premeasured electrodes

Product calibration

Calimatic buffer sets*)

-01– Mettler-Toledo	2.00/4.01/7.00/9.21
-02– Knick CaliMat	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	4.01/7.00/10.01
-07– WTW techn. buffers	2.00/4.01/7.00/10.00
-08– Hamilton	4.01/7.00/10.01/12.00
-09– Reagecon	2.00/4.00/7.00/9.00/12.00
-10– DIN 19267	1.09/4.65/6.79/9.23/12.75
-U1– User defined	Specifiable buffer set with 2 buffer solutions
Max. calibration range	Asymmetry potential ±60 mV (±750 mV for Memosens ISFET)
	Slope 80 ... 103 % (47.5 ... 61 mV/pH)

ORP sensor standardization*)

ORP calibration (zero adjustment)

Max. calibration range -700 ... +700 ΔmV

Adaptive calibration timer

Interval 0 ... 9999 h

Sensocheck

Automatic monitoring of glass electrode

Delay Approx. 30 s

Sensoface

Provides information on the sensor condition (can be switched off)

Evaluation of zero/slope, response, calibration interval, Sensocheck, wear

Sensor monitor

Direct display of measured values from sensor for validation (mV/temperature)

TC of process medium*)

Linear -19.99 ... +19.99 %/K, ultrapure water, reference temp 25 °C
Table: 0 ... 95 °C, user-defined in 5-K steps

*) user-defined

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Specifications

Sensor input, digital

Measuring ranges

Input correction^{*)}

Sensor standardization^{*)}

Calibration ranges

Sensocheck

Sensoface

Sensor monitor

“Device Type” Oxy

Memosens oxygen sensors

Operating modes GAS (measurement in gases)
 DO (measurement in liquids)

Standard sensors

Saturation (-10 ... 80 °C) 0.0 ... 600.0 %
 Concentration (-10 ... 80 °C) 0.00 ... 99.99 mg/l (ppm)
 Volume concentration in gas 0.00 ... 99.99 %vol

Trace sensors

Saturation (-10 ... 80 °C) 0.000 ... 150.0 %
 Concentration (-10 ... 80 °C) 0000 ... 9999 µg/l (ppb) / 10.00 ... 20.00 mg/l (ppm)
 Volume concentration in gas 0000 ... 9999 ppm / 1.000 ... 50.00 %vol

Measurement error See sensor specifications

Pressure correction 0.000 ... 9.999 bars / 999.9 kPa / 145.0 PSI
 manually or through current input 0(4) ... 20 mA

Salinity correction 0.0 ... 45.0 g/kg

CAL_AIR Automatic calibration in air
 CAL_WTR Automatic calibration in air-saturated water
 P_CAL Product calibration
 CAL_ZERO Zero calibration

Standard sensors

Zero point ±2 nA
 Slope 25 ... 130 nA (at 25 °C, 1013 mbars)

Trace sensors

Zero point ±2 nA
 Slope 200 ... 550 nA (at 25 °C, 1013 mbars)
 Calibration timer^{*)} Interval 0 ... 9999 h
 Pressure correction^{*)} Manual 0.000 ... 9.999 bars / 999.9 kPa / 145.0 PSI

Sensor failure, sensor cap missing

Delay Approx. 30 s

Provides information on the sensor condition (can be switched off)
 Evaluation of zero/slope, response, calibration interval, Sensocheck

Direct display of measured values from sensor for validation:
 sensor current or oxygen partial pressure / temperature

^{*)} user-defined

Specifications

Sensor input, digital

Display ranges

Measuring ranges

Temperature compensation*)

Concentration determination*)

Sensor standardization

Sensocheck

Sensoface

Sensor monitor

"Device Type" Cond

Memosens conductivity sensors

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/cm

00.00 ... 99.99 S/cm

Resistivity

00.00 ... 99.99 $\text{M}\Omega \cdot \text{cm}$

Concentration

0.00 ... 100 %

Salinity

0.0 ... 45.0 ‰

Measurement error

See sensor specifications

See Memosens sensor

(OFF)

Without

(LIN) Ref. temp specifiable

Linear characteristic 00.00 ... 19.99 %/K

(NLF) Reference temp 25 °C

Natural waters acc. to EN 27888

(NaCl) Reference temp 25 °C

NaCl from 0 (ultrapure water) to 26% by wt

(HCl) Reference temp 25 °C

Ultrapure water with HCl traces (0 ... 120 °C)

(NH₃) Reference temp 25 °C

Ultrapure water with NH₃ traces (0 ... 120 °C)

(NaOH) Reference temp 25 °C

Ultrapure water with NaOH traces (0 ... 120 °C)

-01- NaCl

0.00 ... 9.99 % by wt (0 ... 100 °C)

-02- HCl

0.00 ... 9.99 % by wt (-20 ... 50 °C)

-03- NaOH

0.00 ... 9.99 % by wt (0 ... 100 °C)

-04- H₂SO₄

0.00 ... 9.99 % by wt (-17 ... 110 °C)

-05- HNO₃

0.00 ... 9.99 % by wt (-17 ... 50 °C)

- Input of cell constant with simultaneous display of conductivity/temp.

- Input of cal. solution conductivity with simultaneous display of cell constant/temp.

- Product calibration for conductivity

- Temp probe adjustment (10 K)

Permissible cell constant 0.0050 ... 19.9999/cm

Polarization detection

Delay

Approx. 30 s

Provides information on the sensor condition

Direct display of measured values from sensor for validation (resistance/temperature)

*) user-defined

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Specifications

"Device Type" Condl

Sensor input, digital	Digital toroidal conductivity sensors (SE 670 / SE 680)	
Measuring ranges	Conductivity	0.000 ... 1999 mS/cm
	Concentration	0.00 ... 100.0 % by wt
	Salinity	0.0 ... 45.0 ‰ (0 ... 35 °C)
Display ranges	Conductivity	0.000 ... 9.999 mS/cm
		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	0.00 ... 9.99 % / 10.0 ... 100.0 %
	Salinity	0.0 ... 45.0 ‰ (0 ... 35 °C)
	Response time (T90)	Approx. 1 s
	Temperature	-20 ... +150 °C (-4 ... +302 °F)
Temperature extrapolation	Quick extrapolation of the temperature using the TICK method in the case of a significant change (SE 670 / SE 680)	
Temperature compensation*)	Measurement error	See sensor specifications
	(OFF)	Without
	(Lin)	Linear characteristic 00.00 to 19.99 %/K
	(NLF)	Natural waters acc. to EN 27888
	(NaCl)	NaCl from 0 to 26% by wt (0 ... 120 °C)
Concentration determination*)	-01- NaCl	0 – 26% by wt (0 °C) ... 0 – 28% by wt (100 °C)
	-02- HCl	0 – 18% by wt (-20 °C) ... 0 – 18 Gew % (50 °C)
	-03- NaOH	0 – 13% by wt (0 °C) ... 0 – 24% by wt (100 °C)
	-04- H ₂ SO ₄	0 – 26% by wt (-17 °C) ... 0 – 37% by wt (110 °C)
	-05- HNO ₃	0 – 30% by wt (-20 °C) ... 0 – 30% by wt (50 °C)
	-06- H ₂ SO ₄	94 – 99% by wt (-17 °C) ... 89 – 99% by wt (115 °C)
	-07- HCl	22 – 39% by wt (-20 °C) ... 22 – 39% by wt (50 °C)
	-08- HNO ₃	35 – 96% by wt (-20 °C) ... 35 – 96% by wt (50 °C)
	-09- H ₂ SO ₄	28 – 88% by wt (-17 °C) ... 39 – 88% by wt (115 °C)
	-10- NaOH	15 – 50% by wt (0 °C) ... 35 – 50% by wt (100 °C)
Sensor standardization	– Input of cell factor with simultaneous display of conductivity/temperature	
	– Input of cal. solution conductivity with simultaneous display of cell factor/temp.	
	– Product calibration	
	– Zero adjustment	
	– Installation factor	
	– Temp probe adjustment (10 K)	
	Permissible cell factor	00.100 ... 19.999/cm
	Permissible transfer ratio	010.0 ... 199.9
	Permissible zero offset	±0.5 mS/cm
	Permissible installation factor	0.100 ... 5.000
Sensocheck	Monitoring of primary and secondary coils and lines for open circuit and of primary coil and lines for short circuit	
	Delay	Approx. 30 s
Sensoface	Provides information on the sensor condition (zero point, cell factor, installation factor, Sensocheck)	
Sensor monitor	Direct display of measured values from sensor for validation (resistance/temperature)	

*) user-defined

Specifications

HOLD input	Galvanically separated (OPTO coupler)	
	Function	Switches device to HOLD mode
	Switching voltage	0 ... 2 V (AC/DC) HOLD inactive 10 ... 30 V (AC/DC) HOLD active
	Output 1	0/4 ... 20 mA, max. 10 V, floating (galvanically connected to output 2)
	Overrange ^{*)}	22 mA in the case of error messages
	Characteristic	Linear, with conductivity measurement also bilinear or logarithmic
	Output filter ^{*)}	PT ₁ filter, time constant 0 ... 120 s
	Measurement error ¹⁾	< 0.25% current value + 0.025 mA
Output 2	0/4 ... 20 mA, max. 10 V, floating (galvanically connected to output 1)	
	Overrange ^{*)}	22 mA in the case of error messages
	Characteristic	Linear, with conductivity measurement also bilinear or logarithmic
	Output filter ^{*)}	PT ₁ filter, time constant 0 ... 120 s
	Measurement error ¹⁾	< 0.25% current value + 0.025 mA
Contact 1	Relay contact, floating, definable for alarm, wash or limit value	
	Contact ratings	AC < 250 V / < 3 A / < 750 VA DC < 30 V / < 3 A / < 90 W
	Contact response ^{*)}	N/C (fail-safe type)
	Response delay ^{*)}	0000 ... 9999 s
	Limit value: setpoint ^{*)}	As desired within range
	Limit value: hysteresis ^{*)}	User-defined
Contact 2	Relay contact, floating, definable for alarm, wash or limit value	
	Contact ratings	AC < 250 V / < 3 A / < 750 VA DC < 30 V / < 3 A / < 90 W
	Contact response ^{*)}	N/C or N/O
	Response delay ^{*)}	0000 ... 9999 s
	Limit value: setpoint ^{*)}	As desired within range
	Limit value: hysteresis ^{*)}	User-defined
Real-time clock	Different time and date formats selectable	
	Power reserve	> 5 days
Display	LC display, 7-segment with icons, white backlighting, red for alarm	
	Main display	Character height approx. 22 mm Unit symbols approx. 14 mm
	Secondary display	Character height approx. 10 mm
	Text line	14 characters, 14 segments
	Sensoface	3 status indicators (friendly, neutral, sad smiley).
	Mode Indicators	meas, cal, conf, diag Further icons for configuration and messages
	Alarm indication	Display blinks, red backlighting
Keypad	Buttons	
	Buttons	meas, info, 4 cursor keys, enter
Diagnosics functions	Calibration data	
	Calibration data	Depending on the selected process variable
	Device self-test	Automatic memory test (RAM, FLASH, EEPROM)
	Display test	Display of all segments
	Logbook	Recording of events, 100 entries

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Specifications

Service functions	Current source	Current specifiable for output 1 and 2 (00.00 ... 22.00 mA)
	Sensor monitor	Display of direct sensor signals
	Relay test	Manual control of relay contacts
	Device type	Selecting the measuring function (pH, Cond, Condi, Oxy)
Data retention	Parameters, calibration data, logbook > 10 years (EEPROM)	
Electrical safety	Protection against electric shock by protective separation of all extra-low-voltage circuits against mains according to EN 61010-1	
EMC	EN 61326	
	Emitted interference	Class B (residential area)
	Immunity to interference	Industry
RoHS conformity	according to EC directive 2002/95/EC	
Power supply A 405 N	80 V (-15%) ... 230 (+10%) V AC; ≤ 10 W ; 45 ... 65 Hz	
	24 V (-15%) ... 60 (+10%) V DC; 10 W	
	Overvoltage category II, protection class II Test voltage 2.5 kV AC	
Nominal operating conditions	Ambient temperature	-20 ... +55 °C
	Transport/Storage temperature	-30 ... +70 °C
	Relative humidity	10 ... 95% not condensing
Housing	Molded enclosure made of PBT/PC, glass-reinforced	
	Mounting	Wall, pipe/post or panel mounting
	Color	Gray, RAL 7001
	Ingress protection	IP 67 / NEMA 4X outdoor (with pressure compensation)
	Flammability	UL 94 V-0
	Dimensions	H 148 mm, W 148 mm, D 117 mm
	Control panel cutout	138 mm x 138 mm to DIN 43 700
	Weight	1.2 kg
	Cable glands	3 knockouts for M20 x 1.5 cable glands 2 knockouts for NPT ½" or rigid metallic conduit
	Connections	Terminals, conductor cross section max. 2.5 mm ²

*) user-defined

1) according to EN 60746-1, at nominal operating conditions

Easy installation

- Wall, post/pipe or panel mounting
- All parts are easily accessible
- Large terminal compartment
- Rear unit can be pre-installed
- Also suitable for rigid metallic conduits
- Replaceable screw terminals
- Replacing the electronics without new cabling

ZU 0274 pipe-mount kit

For mounting on vertical or horizontal posts or pipes.



ZU 0737 protective hood

Additional protection from direct weather exposure and mechanical damage.



ZU 0738 panel-mount kit

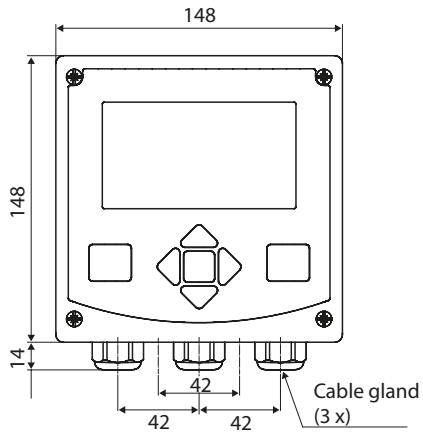
For mounting in standardized panel cutout 138 x 138 mm (DIN 43700), sealed against panel.



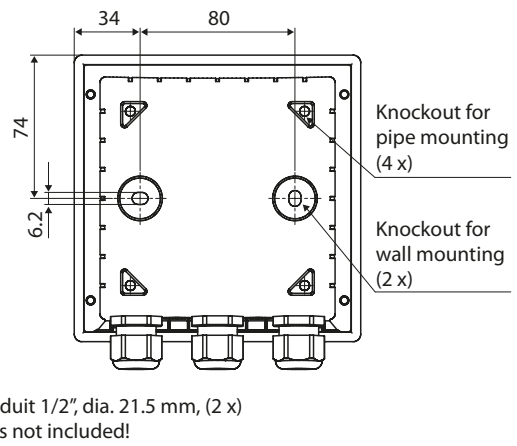
Stratos MS

Dimension drawings

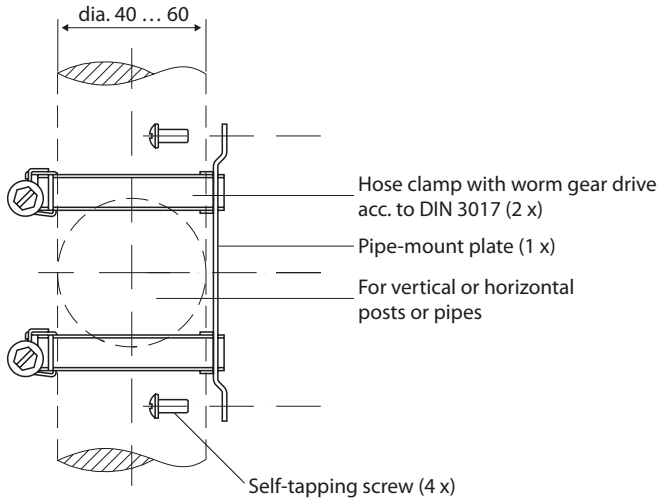
Front and side view



Rear side

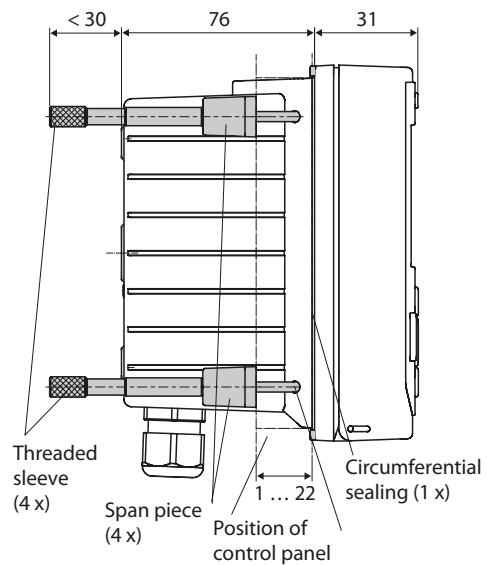


ZU 0274 pipe-mount kit

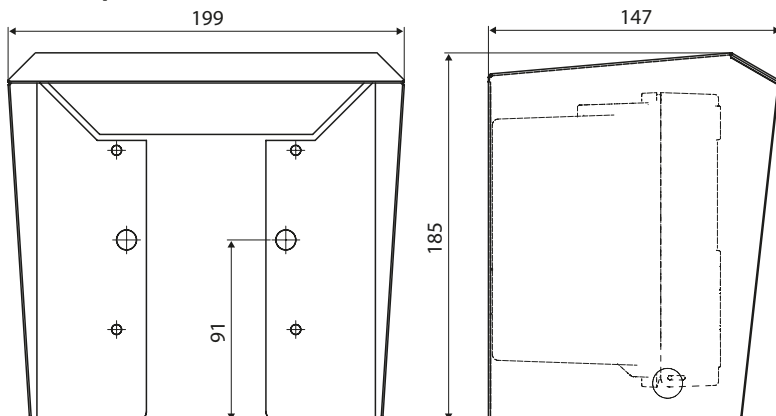


ZU 0738 panel-mount kit

Cutout 138 x 138 mm (DIN 43700)



ZU 0737 protective hood



All dimensions in mm