The Art of Measuring. Knick

Multiparameter analyzers with Fieldbus technology. For Memosens, analog and digital sensors.

Stratos

Stratos

Multi-Talents with Bus Communication

With their exceptional functionality, reliability and application-oriented design, Stratos analyzers are well established in the chemical industry, in process and power plant engineering, and in the pharmaceutical and biotechnology industries.

The models that are equipped with proven bus technologies can be perfectly integrated in new and existing control systems (PROFIBUS: PA profile 3.02 and FOUNDATION Fieldbus: ITK 6.1.1).
All settings can be configured directly on the device or via Enhanced EDD or DTM using well-established engineering tools. Compatibility and interoperability tests ensure that the Stratos bus devices can be integrated in all standard automation systems.

Process data as well as the current level of sensor wear and information for predictive maintenance (CIP/SIP) are reliably communicated via the bus systems.
The devices comply with NAMUR NE 107 and provide the corresponding proactive diagnostic features.

IP 67

NEMA 4X

Memosens sensors: pH/ORP, conductivity, oxygen

Digital toroidal conductivity sensor

Analog sensors: pH/ORP, conductivity, oxygen

Digital optical oxygen sensor

Stratos Bus Devices

Multiparameter Devices for Measuring pH/ORP, Conductivity or Oxygen

Simple Switchover to Different Process Variables

Easy connection of Memosens, analog, and digital sensors.

For measurements with analog sensors, the devices can be adapted to the desired process variable by using different measuring modules.

Stratos Evo PROFIBUS DP provides an integrated HighPower sensor supply to enable the operation of the SE 740 flow-independent optical oxygen sensor. It can also supply power to external 2-wire transmitters – such as pressure or flow transmitters.

Digital Platform

Digital signal transmission from the sensor to the control system eliminates a large number of interferences from the outset. The use of sensor cables with a length of up to 100 m and the advanced diagnostics options are just two of the advantages provided by digital technology.

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White:
Measuring mode

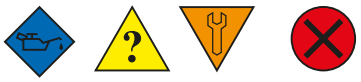
Red blinking:
Alarm, error

Orange:
HOLD mode

Magenta:
Maintenance request

Turquoise: Diagnostics

Green: Info texts



The device status (as per NAMUR NE 107) is transmitted via the bus:

– maintenance required
– out of specification
– function check
– failure

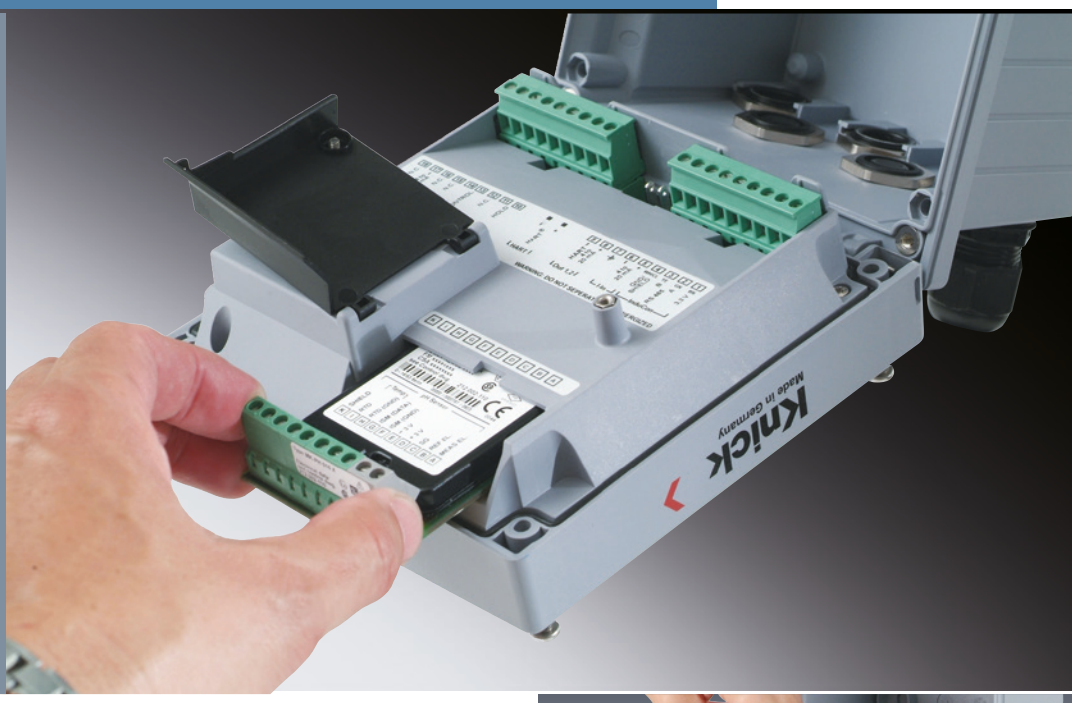
Device Status at a Glance

The Stratos bus devices enable intuitive operation with color-coded user guidance. The high-contrast widescreen display indicates the respective operating states in six different colors: Normal measuring mode is backlit in white while information mode displays are illuminated in green. The diagnostics menu, maintenance request and the hold mode are each indicated by unique colors. The alarm status is indicated in a vibrant red, a flashing red display is a sign of impermissible entries or incorrect passcodes. Scrolling plain text messages and self-explanatory icons simplify operation.

The Facts

- Multiparameter analyzers with Field-bus communication (PROFIBUS DP, PA, FOUNDATION Fieldbus)
- Process variable selectable on the device: pH/ORP, conductivity or oxygen
- For contactless digital Memosens sensors as well as for analog and digital sensors
- Information for Memosens and digital sensors (serial number, sensor TAG, reference number, CIP/SIP cycles, wear, remaining lifetime, operating time)
- Plug-in modules for operation with conventional analog sensors
- Parallel transmission of up to 8 measured values
- Pressure compensation or temperature data can be fed through the bus
- Monitoring of conductivity measurement according to USP <645>
- Adaptive cal timer
- 2 bus-controllable relays (Stratos Evo DP)
- Operating states signaled by a multi-color backlit display
- Protective pane made of safety glass
- Device status transmission acc. to NAMUR NE 107
- Logbook (AuditTrail); 100 entries
- Extremely robust, UV-resistant molded enclosure (IP 67 / NEMA 4X)

3-year warranty!

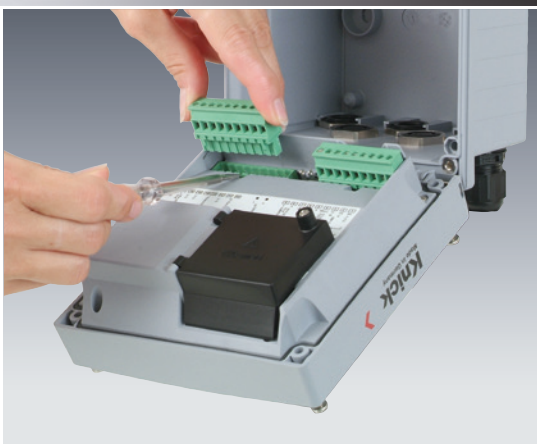


Mounting

Stratos devices are suitable for wall, pipe or panel mounting. The rear unit can be pre-assembled. All parts are easily accessible thanks to the large terminal compartment.

Measuring Modules for Operation with Analog Sensors

By simply plugging in a measuring module, the Stratos bus devices can be extended to work with analog sensors.

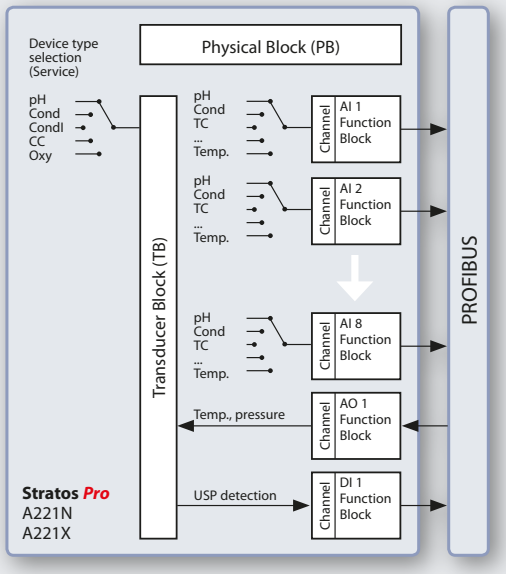


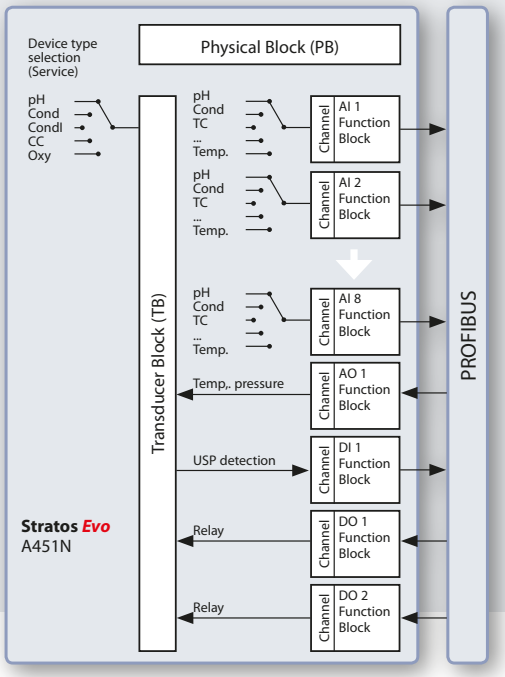
Pipe mounting

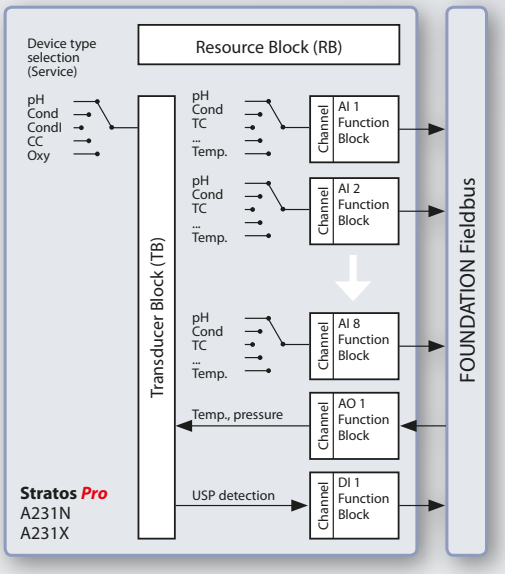
Panel mounting

Protective hood

Stratos







Function Blocks

Overview of the data to be transmitted depending on the process variable.*

F Block	PH	OXY	COND	CONDI	CC
AI 1	pH value	DO saturation, air	Conductivity	Conductivity	Conductivity 1
AI 2	mV value	DO concentration	Resistivity	Resistivity	Conductivity 2
AI 3	Glass impedance	Glass V concentration	Concentration	Concentration	Temperature 1
AI 4	Temperature	Temperature	Temperature	Temperature	Temperature 2
AI 5	Cal timer	Cal timer	Salinity	Salinity	pH value
AI 6	Wear	Wear	TDS	TDS	Calculations
AI 7	Flow	Flow	Flow	Flow	Flow
AI 8	Zero, slope, sensor operating time	Zero, slope, sensor operating time	Cell constant, sensor operating time	Cell constant, sensor operating time	–
AO 1	Temperature	Pressure	Temperature	Temperature	–
DI 1	–	–	USP	–	–
DO1**	Relay 1	Relay 1	Relay 1	Relay 1	Relay 1
DO2**	Relay 2	Relay 2	Relay 2	Relay 2	Relay 2

* Typical assignments of process variables

** PROFIBUS DP only (Stratos A451N)

Product Range

Stratos Evo DP	Order No.
PROFIBUS DP Digital basic device Non-Ex Multiparameter	A451N
Analog Measuring Modules	
pH/ORP module	MK-PH 015 N
COND module	MK-COND 025N
CONDI module	MK-CONDI 035N
OXY module	MK-OXY 045N
COND/COND module	MK-CC 065N

Accessories	Order No.
Pipe-mount kit	ZU 0274
Panel-mount kit	ZU 0738
Protective hood	ZU 0737

Stratos Pro PA	Order No.
PROFIBUS PA Digital basic device Non-Ex Multiparameter	A221N
Analog Measuring Modules	
pH/ORP module	MK-PH 015 N
COND module	MK-COND 025N
CONDI module	MK-CONDI 035N
OXY module	MK-OXY 045N
COND/COND module	MK-CC 065N
Stratos Pro PA Ex	
PROFIBUS PA Digital basic device Ex Multiparameter	A221X
Analog Measuring Modules Ex	
pH/ORP module	MK-PH 015X
COND module	MK-COND 025X
CONDI module	MK-CONDI 035X
OXY module	MK-OXY 045X

Accessories	Order No.
Pipe-mount kit	ZU 0274
Panel-mount kit	ZU 0738
Protective hood	ZU 0737

Stratos Pro FF	Order No.
FOUNDATION Fieldbus Digital basic device Non-Ex Multiparameter	A231N
Analog Measuring Modules	
pH/ORP module	MK-PH 015 N
COND module	MK-COND 025N
CONDI module	MK-CONDI 035N
OXY module	MK-OXY 045N
COND/COND module	MK-CC 065N
Stratos Pro FF Ex	
FOUNDATION Fieldbus Digital basic device Ex Multiparameter	A231X
Analog Measuring Modules Ex	
pH/ORP module	MK-PH 015X
COND module	MK-COND 025X
CONDI module	MK-CONDI 035X
OXY module	MK-OXY 045X

Accessories	Order No.
Pipe-mount kit	ZU 0274
Panel-mount kit	ZU 0738
Protective hood	ZU 0737

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Overview

General Specifications

Display	LC display, 7-segment with icons	
	Primary display	character height approx. 22 mm, unit symbols approx. 14 mm
	Secondary display	character height approx. 10 mm
	Backlighting	multi-color
	Text line	14 characters, 14 segments
	Sensoface	3 status indicators (friendly, neutral, sad)
	Mode indicators	meas, cal, conf, diag
		further icons for configuration and messages
	Alarm indication	red backlighting in case of alarm
Keypad	Keys	meas, info, 4 cursor keys, enter
	Material	EPDM
FDA 21 CFR Part 11	Access control by editable passcodes	
	Logbook entry in the case of configuration changes	
	Message and logbook entry when enclosure is opened	
Diagnostics functions	Calibration data	calibration date, zero, slope, cell constant, response time
	Device self-test	automatic memory test (RAM, FLASH, EEPROM)
	Display test	display of all segments
	Logbook	Audit Trail: 100 events with date and time
	Data retention	parameters and calibration data > 10 years (EEPROM)

Specifications

Overview

General Specifications

Service functions	Sensor monitor	display of direct sensor signals	
	Device type	selecting the process parameter	
Control input	Pulse input for flow measurement 0 ... 100 pulses/s		
	Galvanically separated		
	Switching voltage:	0 ... 2 V (AC/DC) inactive	10 … 30 V (AC/DC) active
	Display:	00.0 … 99.9 l/h	
Real-time clock	Adjustable via bus		
	Different time and date formats selectable		
	Power reserve	> 5 days	
Housing	Molded enclosure made of PBT/PC, glass fiber 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 (1.6 kg incl. accessories and packaging)	
	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	
RoHS conformity	According to EU directive 2011/65/EU		

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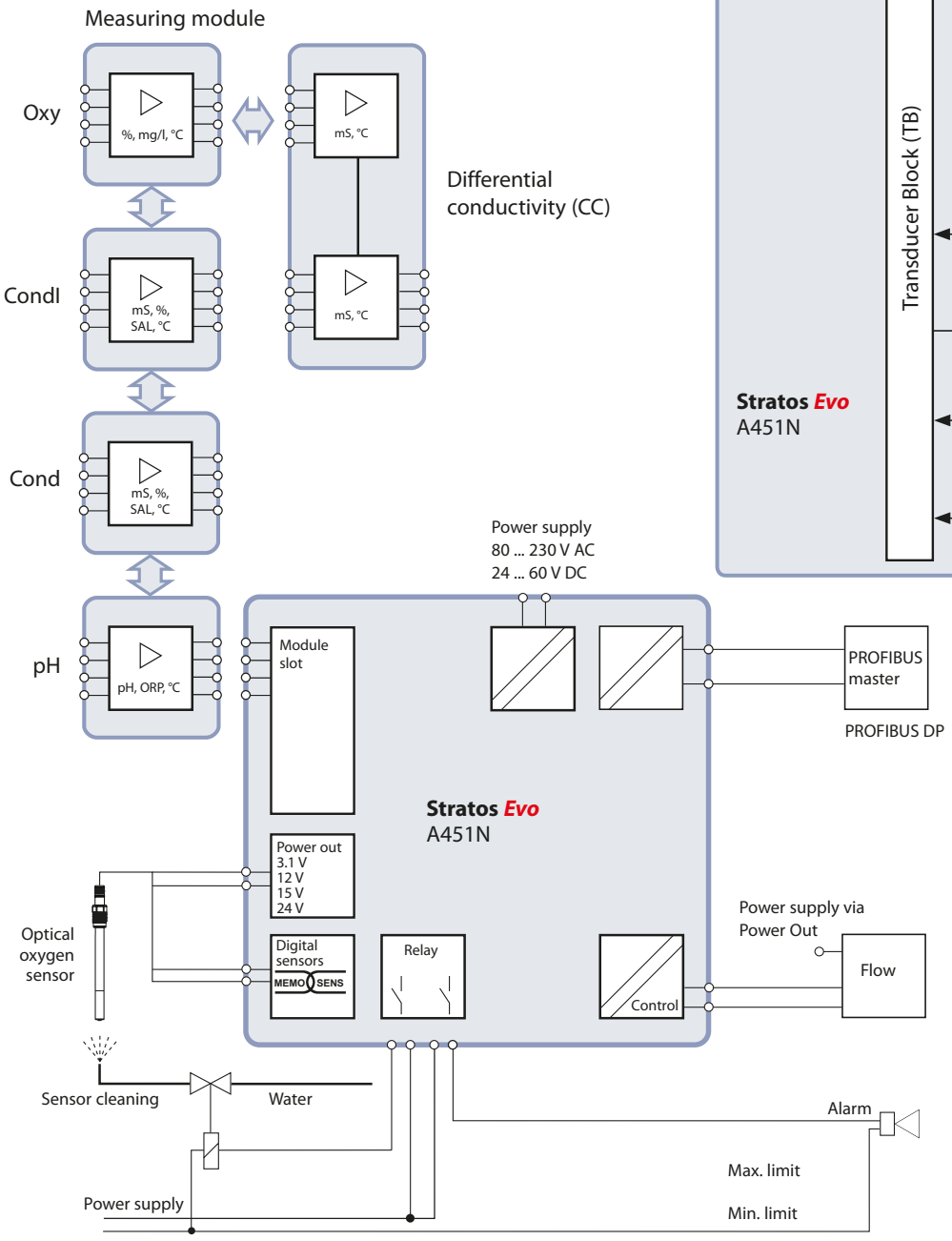
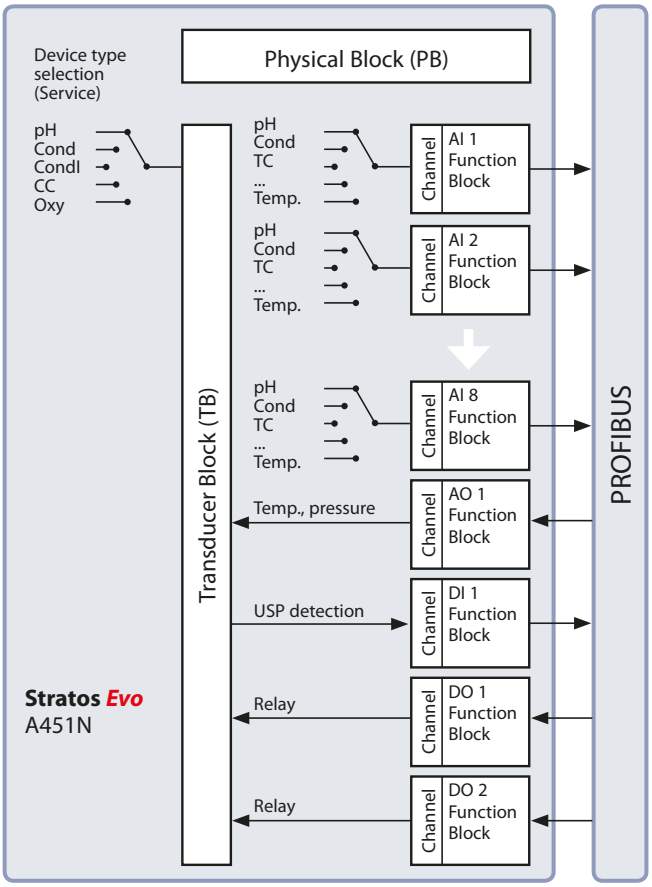
PROFIBUS • PROFINET

Typical Wiring
PROFIBUS DP



Block Structure
PROFIBUS DP

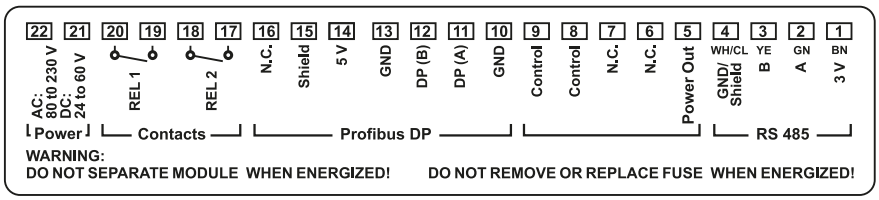


Specifications

Stratos Evo A451N

BUS communication	PROFIBUS DP (DP-V1)	
	Physical interface	RS-485
	Baud rate	9.6 kbits/s … 1.5 Mbits/s
	Power supply	80 V (– 15 %) … 230 (+ 10 %) V AC, approx. 15 VA, 45 … 65 Hz
		24 V (– 15 %) … 60 (+ 10 %) V DC, 10 W
		Overvoltage Category II Protection Class I
	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 A (industry)
	Immunity to interference	industrial environment
Nominal operating conditions	Ambient temperature	–20 … +55 °C (–4 … +131 °F)
	Transport/Storage temp.	–20 … +70 °C (–4 … +158 °F)
	Relative humidity	10 ... 95 % not condensing
Bus connection	3 pluggable terminals	
Relay 1/2	Relay 1 and Relay 2 contacts, floating	
	Contact ratings	AC < 250 V /< 3 A / < 750 VA
		DC < 30 V /< 3 A / < 90 W
	Contact response	The relays are individually controllable by PROFIBUS via the DO1 and DO2 function blocks.
Power Out	Software-adjustable voltage for supplying the sensor (SE 740)	
	Voltages	3.1 V / 12 V / 15 V / 24 V
	Power	max. 1 W

Terminal Assignments



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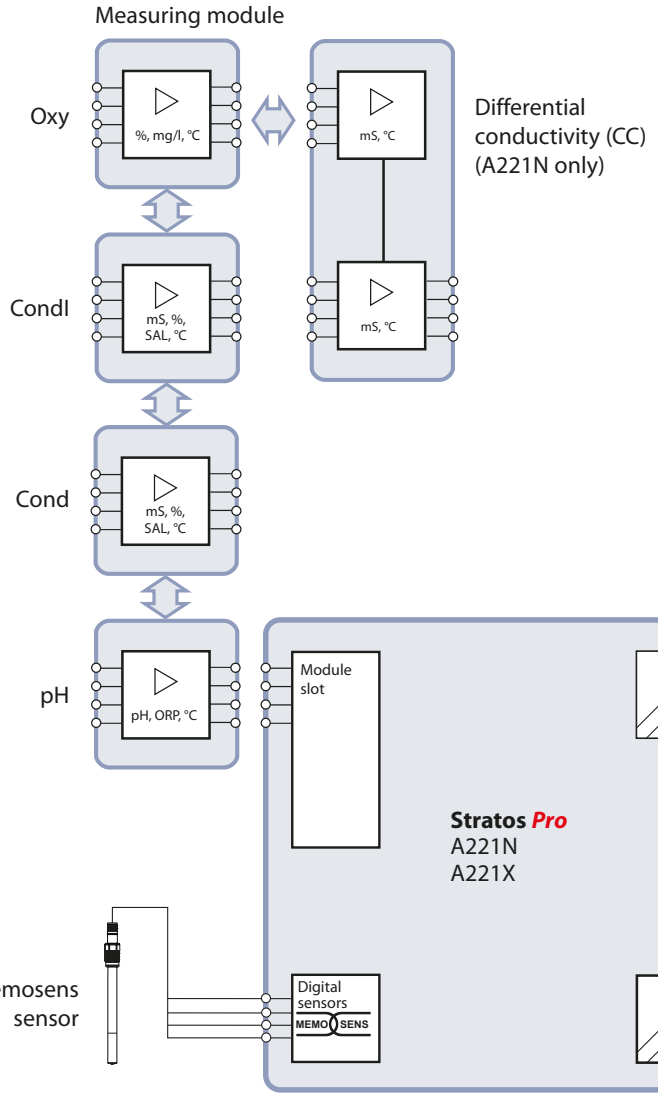
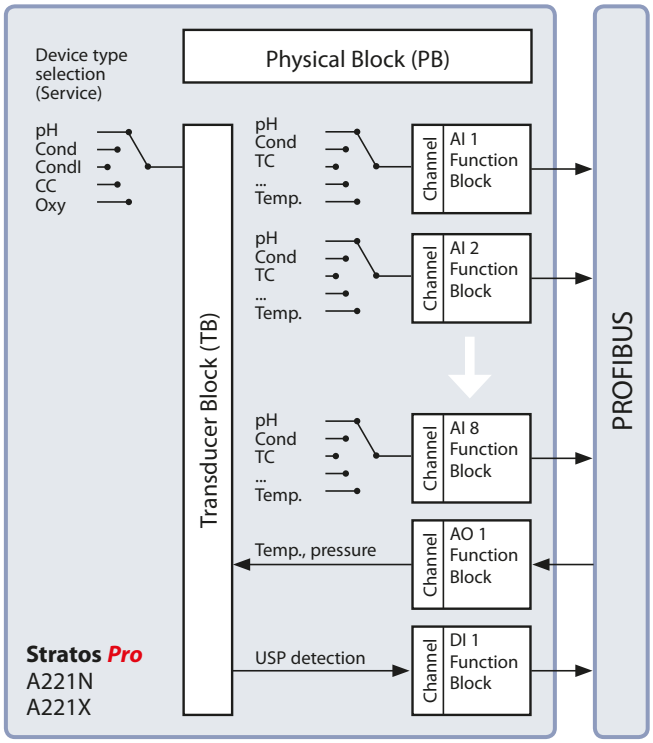
Typical Wiring
PROFIBUS PA



Block Structure
PROFIBUS PA



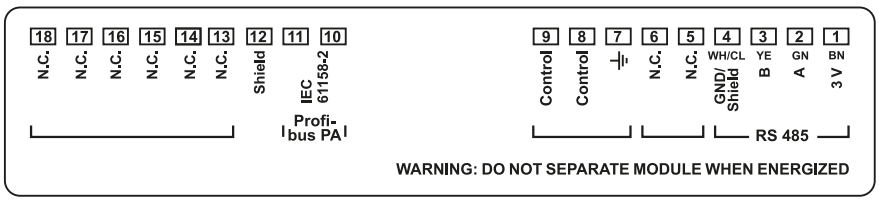
Specifications

Stratos Pro A221N / A221X

BUS communication	PROFIBUS PA (DP-V1)		
	Physical interface	to EN 61158-2 (IEC 61158-2), MBP-IS	
	Operating mode	bus-powered with constant current consumption	
	Supply voltage	FISCO	≤ 17.5 V
		linear characteristic	≤ 26 V
		min. supply voltage	9 V
		max. supply voltage	32 V (non-Ex)
	Current consumption	< 20 mA	
	Max. current in case of fault *	20.4 mA	
Explosion protection Stratos A221X	ATEX	KEMA 08 ATEX 0100 FISCO field device II 1G Ex ia IIC T6/T4 Ga II 2(1)G Ex ib [ia Ga] IIC T6/T4 Gb II 3(1)G Ex ic [ia Ga] IIC T6/T4 Gc II 1D Ex ia IIIC T80°C Da	
	IECEx	IECEx KEM 08 0020 FISCO field device Ex ia IIC T6/T4 Ga Ex ib [ia Ga] IIC T6/T4 Gb Ex ic [ia Ga] IIC T6/T4 Gc Ex ia IIIC T80°C Da	
EMC	EN 61326		
	Emitted interference	Class B (residential environment)	
	Immunity to interference	industrial environment	
Nominal operating conditions	Ambient temperature	–20 … +65 °C (–4 … +149 °F)	
	For hazardous areas, T4	–20 … +65 °C (–4 … +149 °F)	
	For hazardous areas, T6	–20 … +50 °C (–4 … +122 °F)	
	For hazardous areas, dust	–20 … +65 °C (–4 … +149 °F)	
	Transport/Storage temp.	–20 … +70 °C (–4 … +158 °F)	
	Relative humidity	10 ... 95 % not condensing	
Bus connection	3 pluggable terminals		
Equipotential bonding	1 terminal		

* including current increase due to the integrated Fault Disconnection Electronic (FDE)

Terminal Assignments



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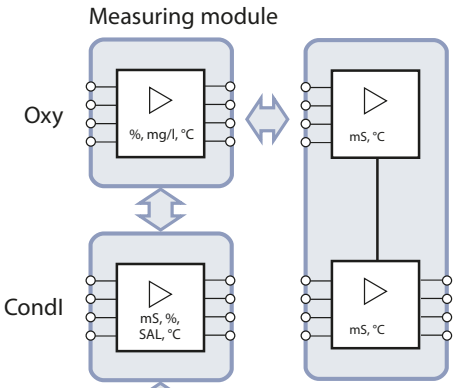
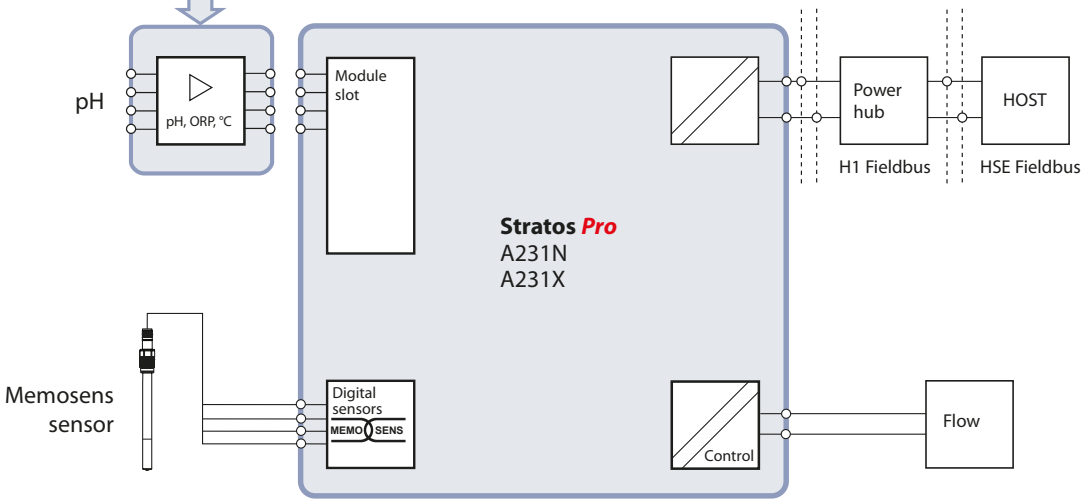
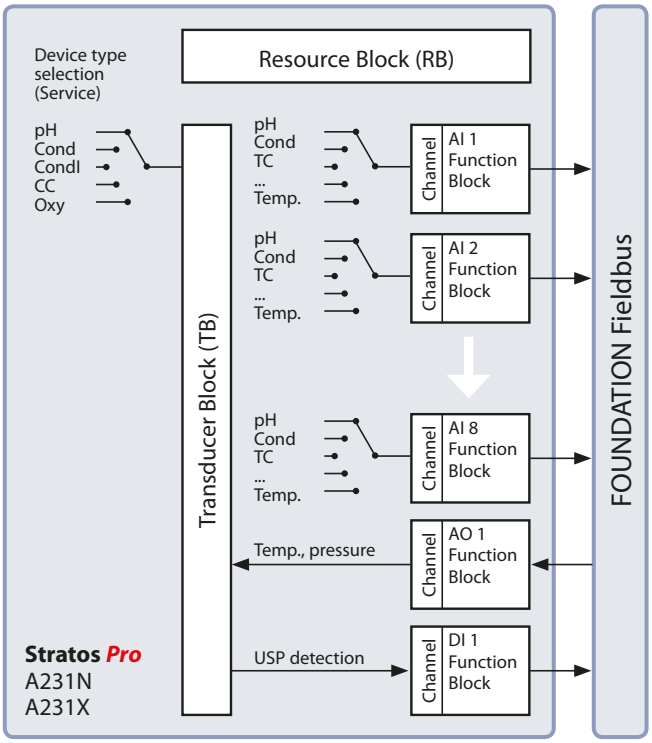
Fieldbus Foundation

Block Structure
FOUNDATION Fieldbus FF





Block Structure
FOUNDATION Fieldbus FF



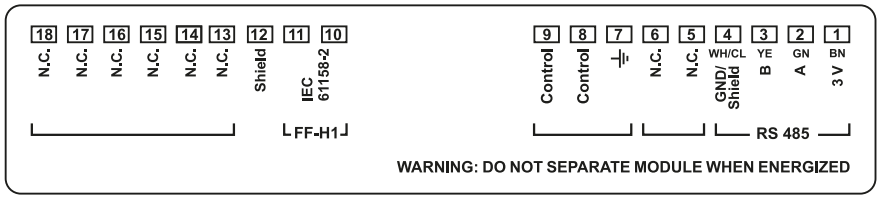
Specifications

Stratos Pro A231N / A231X

BUS communication	FOUNDATION Fieldbus FF-H1		
	Physical interface	to EN 61158-2 (IEC 61158-2), MBP-IS	
	Operating mode	bus-powered with constant current consumption	
	Supply voltage	FISCO	≤ 17.5 V
		linear characteristic	≤ 26 V
		min. supply voltage	9 V
		max. supply voltage	32 V (non-Ex)
	Current consumption	< 20 mA	
	Max. current in case of fault *	20.4 mA	
Explosion protection Stratos A231X	ATEX	KEMA 08 ATEX 0100	
		FISCO field device	
		II 1G Ex ia IIC T6/T4 Ga	
		II 2(1)G Ex ib [ia Ga] IIC T6/T4 Gb	
		II 3(1)G Ex ic [ia Ga] IIC T6/T4 Gc	
		II 1D Ex ia IIIC T80°C Da	
	IECEx	IECEx KEM 08 0020	
		FISCO field device	
		Ex ia IIC T6/T4 Ga	
		Ex ib [ia Ga] IIC T6/T4 Gb	
		Ex ic [ia Ga] IIC T6/T4 Gc	
		Ex ia IIIC T80°C Da	
EMC	EN 61326		
	Emitted interference	Class B (residential environment)	
	Immunity to interference	industrial environment	
Nominal operating conditions	Ambient temperature	–20 … +65 °C (–4 … +149 °F)	
	For hazardous areas, T4	–20 … +65 °C (–4 … +149 °F)	
	For hazardous areas, T6	–20 … +50 °C (–4 … +122 °F)	
	For hazardous areas, dust	–20 … +65 °C (–4 … +149 °F)	
	Transport/Storage temp.	–20 … +70 °C (–4 … +158 °F)	
	Relative humidity	10 ... 95 % not condensing	
Bus connection	3 pluggable terminals		
Equipotential bonding	1 terminal		

* including current increase due to the integrated Fault Disconnection Electronic (FDE)

Terminal Assignments



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Digital Basic Device, pH/ORP Measurement Selected

Sensor input	pH and ORP sensors with Memosens technology	
Display range	pH value	–2.00 … +16.00
	ORP	–1999 … +1999 mV
	Temperature	–20 … +200 °C (–4 … +392 °F)
pH sensor standardization	pH calibration	
Operating modes	Calibration with automatic buffer recognition (Calimatic) Manual calibration with entry of individual buffer values Data entry of pre-measured 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	2.00/4.01/7.00/10.01/12.00
	–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	specifiable buffer set with 2 buffer solutions
Zero adjustment	± 750 mV for Memosens ISFET	
Max. calibration range	Asymmetry potential	±60 mV (±750 mV for Memosens ISFET)
	Slope	80 ... 103 % (47.5 ... 61.0 mV/pH)
	(possibly restricting notes from Sensoface)	
ORP sensor standardization	ORP calibration (zero adjustment)	
	Max. calibration range	–700 … +700 ΔmV
TC of process medium	Linear	–19.99 … +19.99 %/K, ultrapure water, reference temp +25 °C (+77 °F)
	Table	0 … +95 °C, user-defined in 5 °C steps
Adaptive calibration timer	Interval 0000 … 9999 h (German patent DE 101 41 408)	
Diagnostics functions	Calibration data	calibration date, zero, slope, response time
	Sensocheck	automatic monitoring of glass and reference electrode delay approx. 30 s
	Sensoface	provides information on the sensor condition (can be switched off) evaluation of zero/slope, calibration interval, Sensocheck, wear
	Sensor monitor	direct display of measured values from sensor for validation of mV / temperature

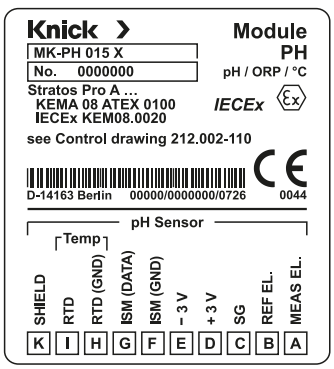
Specifications

Module for Analog pH/ORP Measurement

Sensor input	Analog pH or ORP sensors		
Measuring range	–1500 … +1500 mV		
Glass electrode input[4]	Input resistance	> 1 x 10^{12} Ω	
	Input current	< 1 x 10^{-12} A	
	Impedance range	0.5 … 1000 MΩ (± 20 %)	
Reference electrode input[4]	Input resistance	> 1 x 10^{10} Ω	
	Input current	< 1 x 10^{-10} A	
	Impedance range	0.5 … 200 kΩ (± 20 %)	
Measurement error[1,2,3]	pH value	< 0.02	TC: 0.002 pH/K
	mV value	< 1 mV	TC: 0.1 mV/K
Temperature input	Pt100 / Pt1000 / NTC 30 kΩ / NTC 8.55 kΩ (Mitsubishi) / Balco 3 kΩ 2-wire connection, adjustable		
Measuring range	Pt100 / Pt1000	–20 … +200 °C (–4 … +392 °F)	
	NTC 30 kΩ	–20 … +150 °C (–4 … +302 °F)	
	NTC 8.55 kΩ (Mitsubishi)	–10 … +130 °C (+14 … +266 °F)	
	Balco 3 kΩ	–20 … +130 °C (–4 … +266 °F)	
Adjustment range	± 5 K		
Resolution	0.1 °C (0.1 °F)		
Measurement error[1,2,3]	< 0.5 K (< 1 K for Pt100; < 1 K for NTC 30 kΩ > +100 °C / +212 °F)		
ISM input	"One wire" interface for operation with ISM (digital sensors) (6 V / Ri= approx. 1.2 kΩ)		

[1] to EN 60746-1, at nominal operating conditions
[2] ± 1 count
[3] plus sensor error
[4] at room temperature

Terminal Assignments



Stratos

Digital Basic Device, Oxygen Measurement Selected

Sensor input	Amperometric oxygen sensors with Memosens technology		
	SE 740 optical oxygen sensor (Stratos Evo A451N only)		
Operating modes	Measurement in liquids		
	Measurement in gases		
Display ranges	Saturation	0.0 ... 600.0 %	(–10 … +80 °C / +14 … +176 °F)
	Concentration	0.00 ... 99.99 mg/l (ppm)	(–10 … +80 °C / +14 … +176 °F)
	Volume concentration in gas	0000 … 9999 µg/l (ppb)	
		0.00 ... 99.99 %vol	
Input correction	Pressure correction	0.000 ... 9.999 bar / 999.9 kPa / 145.0 PSI	
		manually or through BUS AO1 function block	
	Salinity correction	0.0 … 45.0 g/kg	
Sensor standardization			
Operating modes	Automatic calibration in air		
	Automatic calibration in air-saturated water		
	Product calibration		
	Zero calibration		
Calibration range Standard sensor "10"	Zero point	±2 nA	
	Slope	25 ... 130 nA (at +25 °C, 1013 mbar / +77 °F, 14.7 PSI)	
Calibration range Trace sensor "01"	Zero point	±2 nA	
	Slope	200 ... 550 nA (at +25 °C, 1013 mbar / +77 °F, 14.7 PSI)	
Calibration range SE 740	Optical sensor (Stratos Evo A451N only)		
	Zero point	Phase angle	62 … 75°
	Slope	Stern-Volmer constant	0.0100 … 0.0350
Calibration timer	Interval 0000 … 9999 h		
Pressure correction	Manually 0.000 ... 9.999 bar / 999.9 kPa / 145.0 PSI		
Sensoface	Provides information on the sensor condition (can be switched off)		
	Evaluation of zero/slope, calibration interval, Sensocheck, wear		
Sensor monitor	Direct display of measured values from sensor for validation (nA / temperature)		

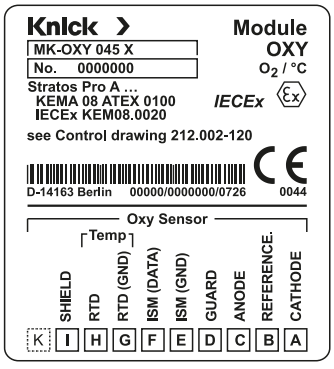
Specifications

Module for Analog Oxygen Measurement

Sensor input	Analog amperometric oxygen sensors
Temperature input	NTC 22 kΩ, NTC 30 kΩ
Standard input range	Meas. current: -600 … +2 nA Resolution: 10 pA
Measurement error[1,2,3)]	< 0.5 % meas. val. + 0.05 nA + 0.005 nA/K
Polarization voltage	–400 ... –1000 mV, default –675 mV (resolution < 5 mV)
Permissible guard current	≤ 20 µA
Trace input range I	Meas. current: –600 … +2 nA Resolution: 10 pA
Measurement error[1,2,3)]	< 0.5 % meas. val. + 0.05 nA + 0.005 nA/K
Trace input range II	Meas. current: –10,000 … +3 nA Resolution: 166 pA
Measurement error[1,2,3)]	< 0.5 % meas. val. + 0.8 nA + 0.08 nA/K
Polarization voltage	0 ... –1000 mV, default -675 mV (resolution < 5 mV)
Permissible guard current	≤ 20 µA
ISM input	"One wire" interface for operation with ISM (digital sensors) (6 V / Ri= approx. 1.2 kΩ)

[1)] to EN 60746-1, at nominal operating conditions
[2)] ± 1 count
[3)] plus sensor error

Terminal Assignments



Stratos

Digital Basic Device, Conductivity Measurement Selected

Sensor input	2-/4-electrode conductivity sensors with Memosens technology	
Measuring ranges	Conductivity	0.000 ... 9.999 µS/cm 00.00 ... 99.99 µS/cm 000.0 ... 999.9 µS/cm 0000 ... 9999 µS/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 MΩ * cm
	Concentration	0.00 ... 100 %
	Temperature	–20 … +150 °C (–4 … +302 °F)
	Salinity	0.0 … 45.0 ‰ (0 … +35 °C / +32 … +95 °F)
Response time (t90)	Approx. 1 s	
Measurement error[1,2,3)]	< 1 % meas. val. + 0.4 µS • c	
Temperature compensation (Reference temp user defined) (Ref. temp 25 °C / 77 °F)	Without Linear characteristic 0.0...19.99 %/K Natural waters acc. to EN 27888 NaCl from 0 (ultrapure water) to 26 wt% (0 … +120 °C / +32 … +248 °F) Ultrapure water with HCl traces (0 … +120 °C / +32 … +248 °F) Ultrapure water with NH_3traces (0 … +120 °C / +32 … +248 °F) Ultrapure water with NaOH traces (0 … +120 °C / +32 … +248 °F)	
Concentration determination	–01– NaCl	0 – 26 wt% (0 °C / +32 °F) … 0 – 28 wt% (+100 °C / +212 °F)
	–02– HCl	0 – 18 wt% (–20 °C / –4 °F) … 0 – 18 wt% (+50 °C / +122 °F)
	–03– NaOH	0 – 13 wt% (0 °C / +32 °F) … 0 – 24 wt% (+100 °C / +212 °F)
	–04– H_2SO_4	0 – 26 wt% (–17 °C /–1.4 °F) … 0 – 37 wt% (+110 °C / +230 °F)
	–05– HNO_3	0 – 30 wt% (–20 °C / –4 °F) … 0 – 30 wt% (+50 °C / +122 °F)
	–06– H_2SO_4	94 – 99 wt% (–17 °C/–1.4 °F) … 89 – 99 wt% (+115 °C / +239 °F)
	–07– HCl	22 – 39 wt% (–20 °C / –4 °F) … 22 – 39 wt% (+50 °C / +122 °F)
	–08– HNO_3	35 – 96 wt% (–20 °C / –4 °F) … 35 – 96 wt% (+50 °C / +122 °F)
	–09– H_2SO_4	28 – 88 wt% (–17 °C /–14 °F) … 39 – 88 wt% (+115 °C / +239 °F)
	–10– NaOH	15 – 50 wt% (0 °C / +32 °F) … 35 – 50 wt% (+100 °C / +212 °F)
Sensor standardization	Input of cell factor with simultaneous display of selected process variable and temperature Input of conductivity of calibration solution, simultaneous display of cell factor / temp Product calibration for conductivity Temp probe adjustment (± 5 K)	
Permissible cell factor	0.005 ... 19.9999 cm^{-1}	
Sensoface	Provides information on the sensor condition (can be switched off) Evaluation of Sensocheck	
Sensor monitor	Direct display of measured values from sensor for validation of resistance / temperature	

[1)] to EN 60746-1, at nominal operating conditions
[2)] ± 1 count
[3)] plus sensor error

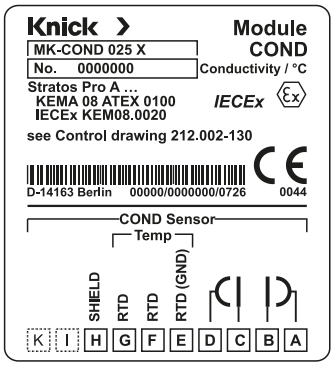
Specifications

Module for Analog Conductivity Measurement (Conductive)

Sensor input	Analog 2-/4-electrode conductivity sensors	
Measuring ranges	2-electrode sensors: 0.2 µS * c … 200 mS * c 4-electrode sensors: 0.2 µS * c … 1000 mS * c (Conductance limited to 3500 mS)	
Measurement error[1,2,3)]	< 1 % meas. val. + 0.4 µS/cm * c	
Temperature input	Pt100 / Pt1000 / Ni100 / NTC 30 kΩ / NTC 8.55 kΩ (Betatherm) 3-wire connection, adjustable	
Measuring range	Pt100 / Pt1000	–50 … +250 °C (–58 … +482 °F)
	Ni100	–50 … +180 °C (–58 … +356 °F)
	NTC 30 kΩ	–20 … +150 °C (–4 … +302 °F)
	NTC 8.55 kΩ (Betatherm)	–10 … +130 °C (+14 … +266 °F)
Adjustment range	± 5 K	
Measurement error[1,2,3)]	0.5 K (< 1 K for Pt100; < 1 K for NTC > +100 °C / +212 °F)	

[1)] to EN 60746-1, at nominal operating conditions
[2)] ± 1 count
[3)] plus sensor error

Terminal Assignments



Stratos

Digital Basic Device, Conductivity Measurement Selected

Sensor input	Toroidal conductivity sensors with Memosens protocol	
Measuring ranges	Conductivity	0.000 ... 1999 mS/cm
	Concentration	0.00 … 100.0 % by wt
	Salinity	0.0 … 45.0 ‰ (0 … +35 °C / +32 … +95 °F)
Measuring 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 / +32 … +95 °F)
	Response time (t90)	approx. 1 s
Measurement error[1,2,3)]	< 1 % meas. val. + 0.005 mS/cm	
Temperature compensation (Reference temp user defined) (Ref. temp 25 °C / 77 °F)	Without Linear characteristic 0.0 ... 19.99 %/K Natural waters acc. to EN 27888 NaCl from 0 (ultrapure water) to 26 wt% (0 … +120 °C / +32 … +248 °F)	
Concentration determination	–01– NaCl	0 – 26 wt% (0 °C / +32 °F) … 0 – 28 wt% (+100 °C / +212 °F)
	–02– HCl	0 – 18 wt% (–20 °C / –4 °F) … 0 – 18 wt% (+50 °C / +122 °F)
	–03– NaOH	0 – 13 wt% (0 °C / +32 °F) … 0 – 24 wt% (+100 °C / +212 °F)
	–04– H_2SO_4	0 – 26 wt% (–17 °C /–1.4 °F) … 0 – 37 wt% (+110 °C / +230 °F)
	–05– HNO_3	0 – 30 wt% (–20 °C / –4 °F) … 0 – 30 wt% (+50 °C / +122 °F)
	–06– H_2SO_4	94 – 99 wt% (–17 °C/–1.4 °F) … 89 – 99 wt% (+115 °C / +239 °F)
	–07– HCl	22 – 39 wt% (–20 °C / –4 °F) … 22 – 39 wt% (+50 °C / +122 °F)
	–08– HNO_3	35 – 96 wt% (–20 °C / –4 °F) … 35 – 96 wt% (+50 °C / +122 °F)
	–09– H_2SO_4	28 – 88 wt% (–17 °C /–1.4 °F) … 39 – 88 wt% (+115 °C / +239 °F)
	–10– NaOH	15 – 50 wt% (0 °C / +32 °F) … 35 – 50 wt% (+100 °C / +212 °F)
Sensor standardization	Input of cell factor with simultaneous display of selected process variable and temperature Input of conductivity of calibration solution, simultaneous display of cell factor / temp Product calibration Zero adjustment Installation factor Temp probe adjustment (± 5 K)	
	Permissible cell factor	00.100...19.999 cm^{-1}
	Permissible transfer ratio	010.0 … 199.9
	Permissible offset	± 0.5 mS
	Permissible installation factor	0.100 … 5.000
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)	

[1)] to EN 60746-1, at nominal operating conditions
[2)] ± 1 count
[3)] plus sensor error

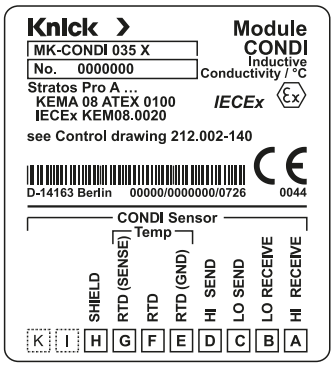
Specifications

Module for Analog Conductivity Measurement (Inductive)

Sensor input	Analog toroidal conductivity sensors	
Measuring range	0.000 ... 1999 mS/cm	
Measurement error[1,2,3)]	< 1 % meas. val. + 0.005 mS/cm	
Sensocheck	Monitoring of primary and secondary coils and lines for open circuit and of primary coil and lines for short circuit	
Temperature input	Pt100 / Pt1000 / NTC 30 kΩ 3-wire connection, adjustable	
Measuring range	Pt100 / Pt1000	–50 … +250 °C (–58 … +482 °F)
	NTC 30 kΩ	–20 … +150 °C (–4 … +302 °F)
Measurement error[1,2,3)]	0.5 K (<1 K with Pt100; <1 K with NTC >+100 °C)	

[1)] to EN 60746-1, at nominal operating conditions
[2)] ± 1 count
[3)] plus sensor error

Terminal Assignments



Stratos

Dual Conductivity Measurement Selected

Sensor input	Operation with CC module only (see page 25)		
Display ranges	Conductivity	0.000 ... 9.999 µS/cm 00.00 ... 99.99 µS/cm 000.0 ... 999.9 µS/cm 0000 ... 9999 µS/cm 00.00 … 99.99 MΩ cm	
	Response time (t90)	approx. 1 s	
Measurement error[1,2,3]	< 1 % meas. val. + 0.4 µS * c		
Temperature compensation (ref. temp 25 °C / 77 °F)	Without Linear characteristic 00.00 ... 19.99 %/K Natural waters acc. to EN 27888 NaCl from 0 (ultrapure water) to 26 wt% (0 … +120 °C / +32 … +248 °F) Ultrapure water with HCl traces (0 … +120 °C / +32 … +248 °F) Ultrapure water with NH_3traces (0 … +120 °C / +32 … +248 °F) Ultrapure water with NaOH traces (0 … +120 °C / +32 … +248 °F)		
Sensor standardization	Channel A/B	input of cell factor with simultaneous display of conductivity and temperature	
	Permissible cell factor	0.0050 ... 1.9999 cm^{-1}	
Calculations (CALC)	–C1– Difference	A–B	[µS/cm]
	–C2– Ratio	A/B	00.00 … 19.99
	–C3– Passage	B/A * 100	000.0 ... 199.9 %
	–C4– Rejection	(A–B)/A * 100	–199.9 ... +199.9 %
	–C5– Deviation	(B–A)/A * 100	–199.9 ... +199.9 %
	–C6– pH value	acc. to directive VGB S-006	[pH]
	–C7– pH value	variable, specifiable factors	[pH]
	–C8– USER spec	(DAC Degassed Acid Conductivity)	[µS/cm]
	–C9– Concentration of the alkalizing agent	acc. to directive VGB S-006	[mmol/l]
Sensoface	Provides information on the sensor condition Sensocheck, flow monitoring, ion exchanger monitoring		
Sensor monitor	Direct display of measured values from sensor for validation of resistance / temperature		
Control input	Pulse input for flow measurement 0 ... 100 pulses/s Galvanically separated		
	Switching voltage:	0 ... 2 V (AC/DC) inactive	10 … 30 V (AC/DC) active
	Display:	0.0 … 99.9 l/h	

[1] to EN 60746-1, at nominal operating conditions
[2] ± 1 count
[3] plus sensor error

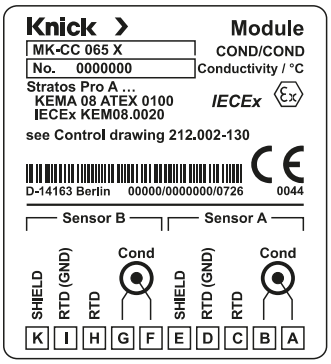
Specifications

Module for Analog Dual Conductivity Measurement

Sensor input	2 x analog 2-electrode conductivity sensors
Measuring range	0 … 30,000 µS * c
Measurement error[1,2,3)]	< 1 % meas. val. + 0.4 µS * c
Sensocheck	Polarization detection and monitoring of cable capacitance
Temperature input A/B	Pt1000, 2-wire connection
Measuring range	–50 … +200 °C (–58 … +392 °F)
Measurement error[1,2,3)]	0.5 K (1 K > +100 °C / +212 °F)

[1)] to EN 60746-1, at nominal operating conditions
[2)] ± 1 count
[3)] plus sensor error

Terminal Assignments



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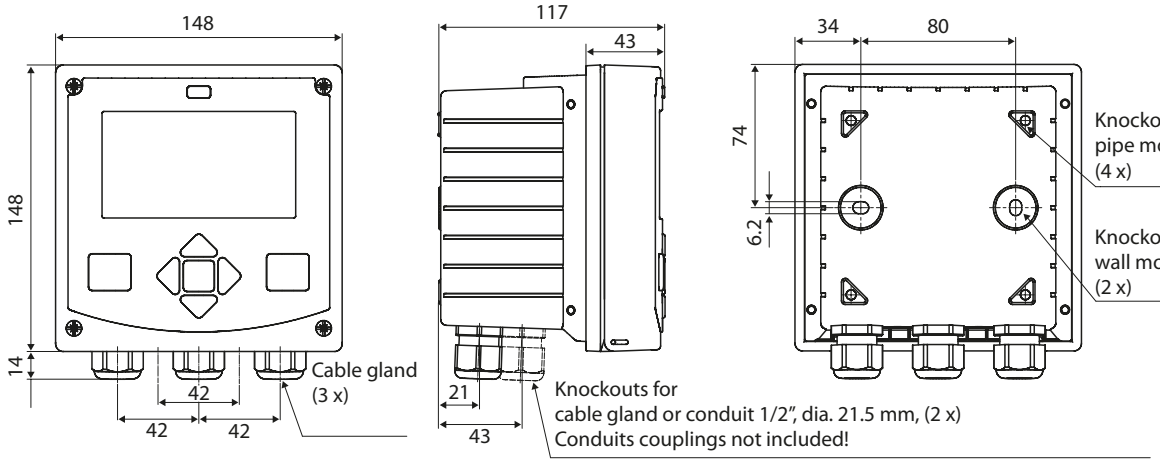
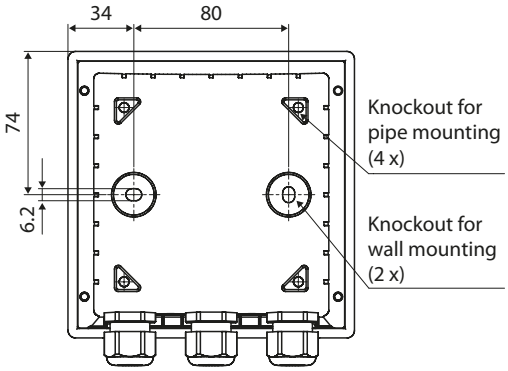
Dimension Drawings

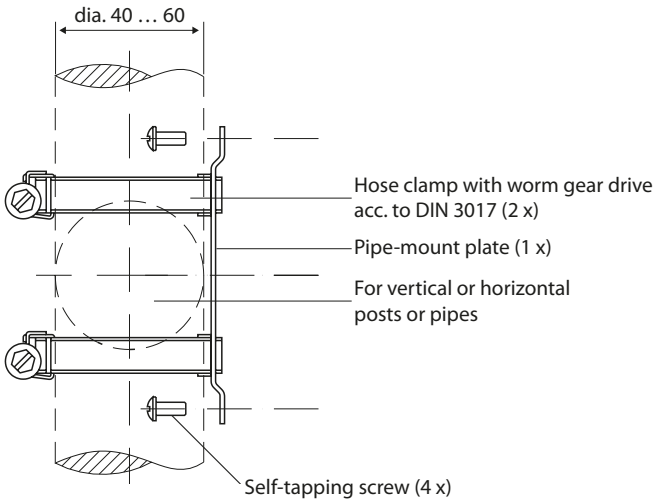
Front and Side View



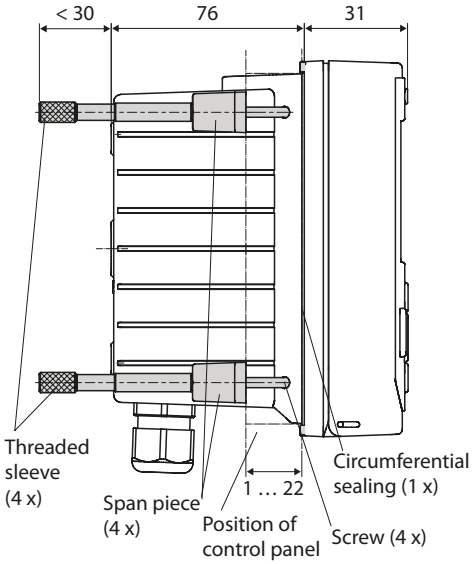
Rear View



ZU 0274 Pipe-Mount Kit



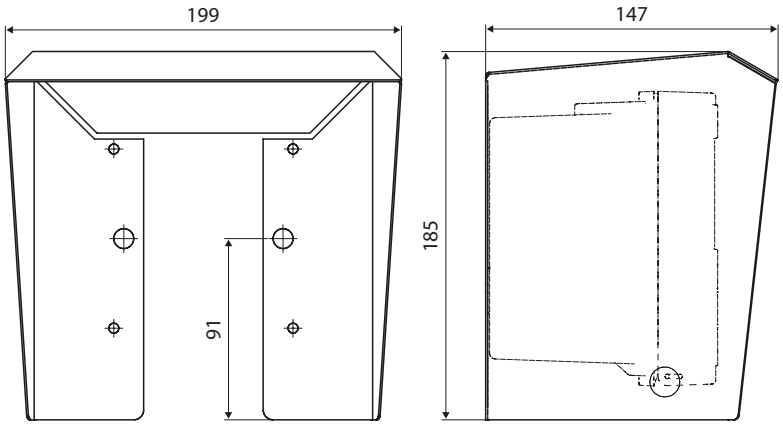
ZU 0738 Panel-Mount Kit
Cutout 138 x 138 mm (DIN 43700)



All dimensions in mm

Dimension Drawings

ZU 0737 Protective Hood



All dimensions in mm

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