Stratos *Evo*

The Multi-Talent for Process Analysis

One device – all parameters – all sensors

One device for pH, ORP, conductivity and oxygen

Stratos Evo is the latest evolutionary stage of analyzers. The 4-wire multi-parameter device for measuring pH value, ORP, conductivity (conductive or inductive) or dissolved oxygen. The high-performance HighPower broad-range power supply allows the operation with optical oxygen sensors.

Digital platform

The fully digital functionality eliminates interferences such as might occur with analog devices.

When using analog sensors, the device automatically recognizes the parameter as soon as the measuring module is inserted.

Power supply for external 2-wire transmitters

The HighPower supply offers another advantage thanks to the option of also supplying external 2-wire transmitters, for example pressure or flow transmitters. The respective signal can be displayed and processed via the 4 ... 20 mA input.

Signaling operating states by a multi-color backlit display

Stratos Evo features intuitive operation with color-coded user guidance.
The widescreen display with six different colors indicates the respective operating states: 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. Deep red indicates the alarm status and a red flashing display points out invalid input or incorrect passcodes.

Concise, self-explanatory icons provide an easy overview.

Facts and features

- Comprehensive features and flexibility enable universal application.
- One device for pH/ORP, conductivity or oxygen (configurable)
- Operation of Memosens sensors
- Interchangeable modules for operation with conventional analog sensors
- HighPower supply for operating digital optical oxygen sensors
- Power supply and signal processing for external 2-wire transmitters (pressure, temperature)
- A multi-color backlit display signals operating states
- Approved for Ex Zone 2 (IECEx, ATEX)
- HART
- Global use thanks to broad-range power supply

Knick

Stratos Evo

White:
Measuring mode

Red flashing:
Alarm, errors

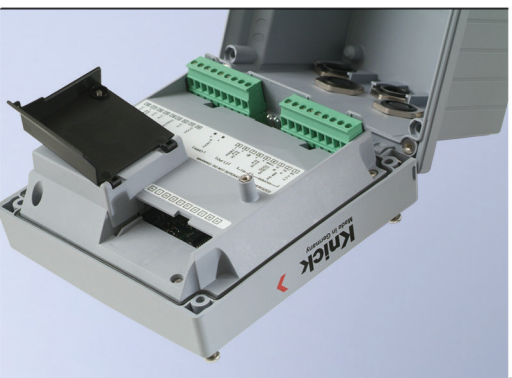
Orange:
HOLD mode

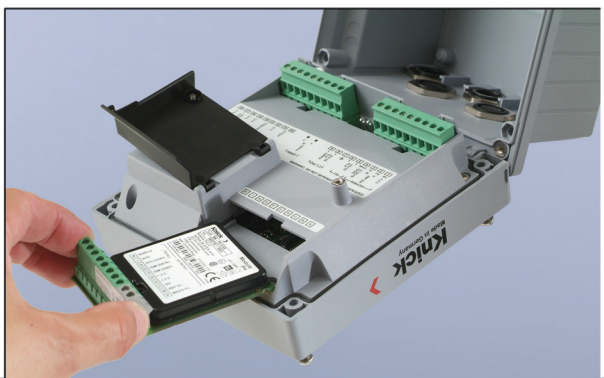
Magenta:
Maintenance request

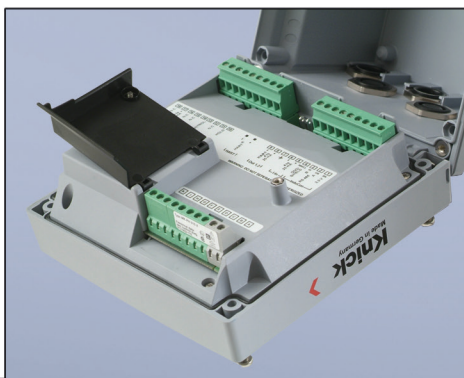
Turquoise:
Diagnostics

Green:
Info texts

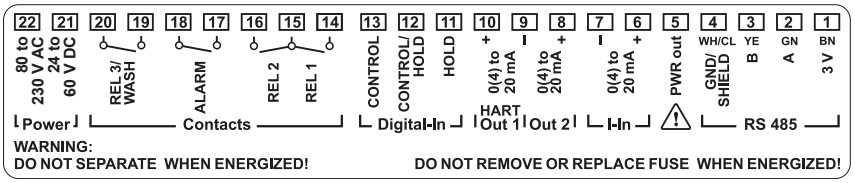
Optical oxygen sensor



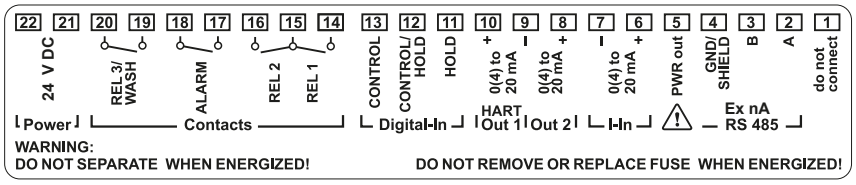


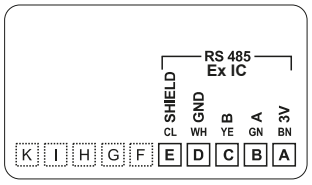


Terminal assignments of basic device A402N (non-Ex)

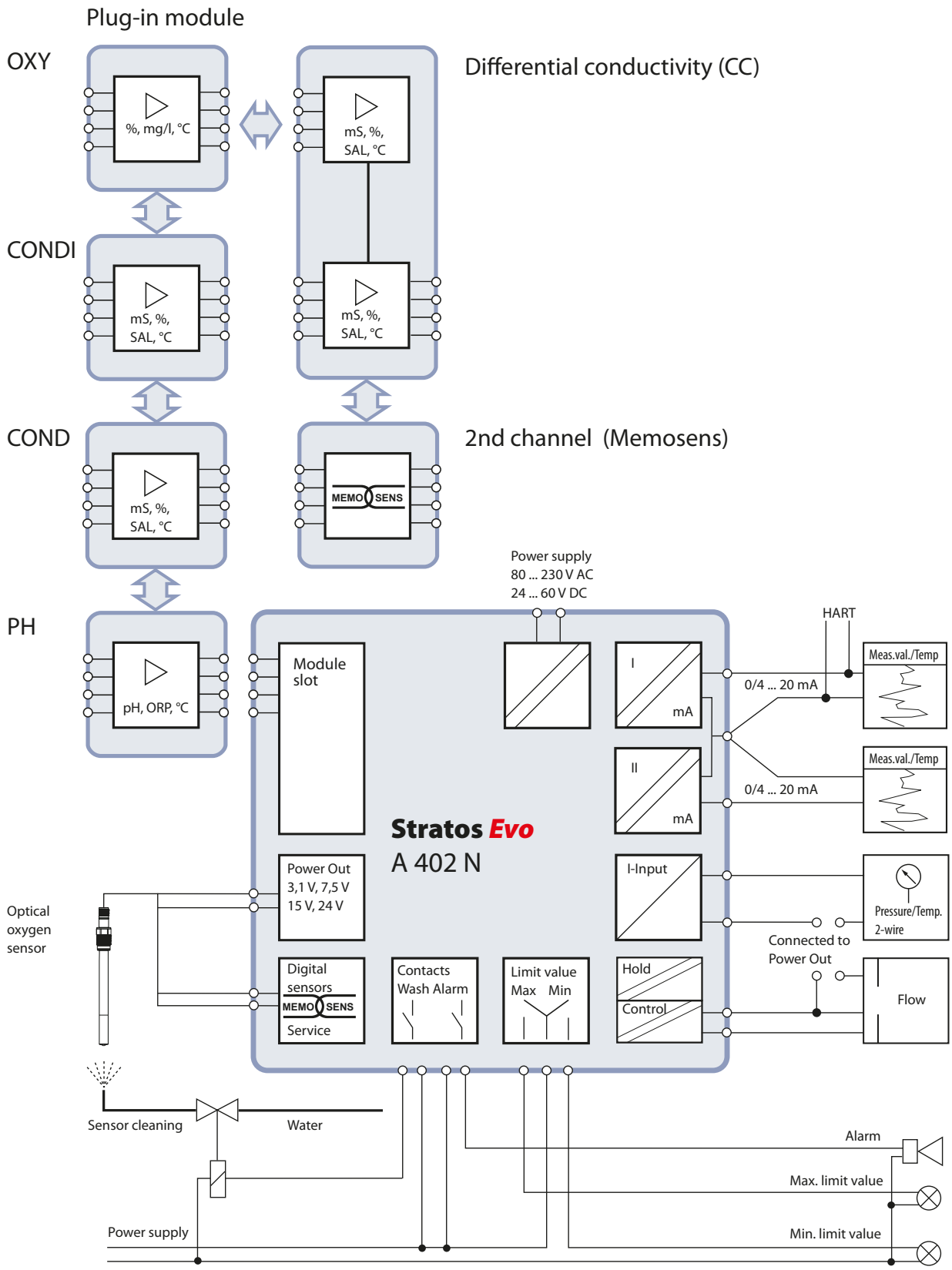


Terminal assignments of basic device A402B (Ex Zone 2)

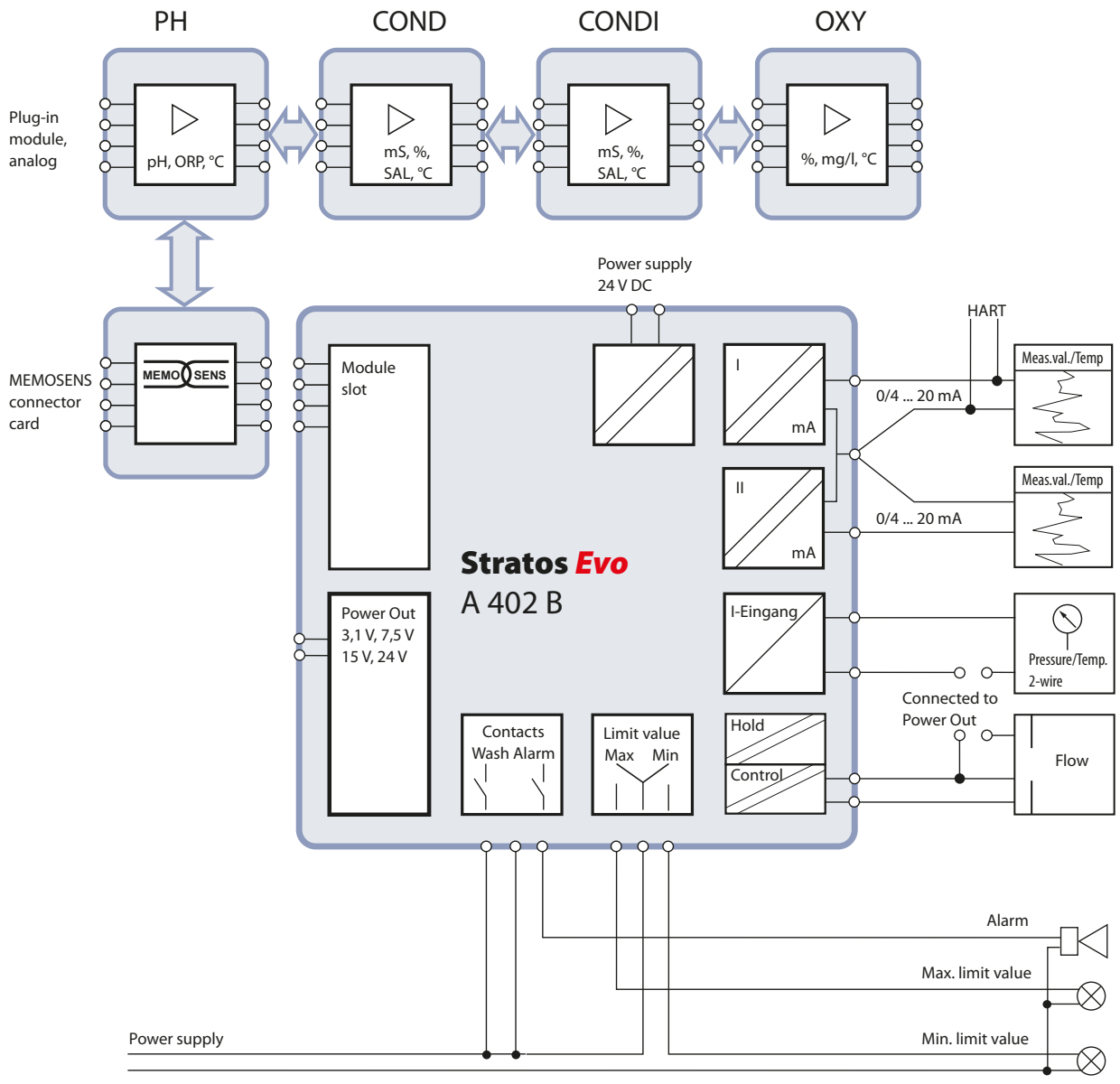




Wiring example (non-Ex)



Wiring example (Ex Zone 2)



Product Range

Stratos Evo	Order No.
Stratos Evo 4-wire, multiparameter, digital basic unit	A402N

Stratos Evo analog measuring modules	
pH/ORP module	MK-PH 015N
pH/ORP module, Ex Zone 2	MK-PH 015B
COND module	MK-COND 025N
COND module, Ex Zone 2	MK-COND 025B
CONDI module	MK-CONDI 035N
CONDI module, Ex Zone 2	MK-CONDI 035B
OXY module	MK-OXY 045N
OXY module, Ex Zone 2	MK-OXY 045B

Stratos Evo 2-channel modules, analog	
COND/CONDmodule	MK-CC 065N

Stratos Evo 2-channel modules, Memosens	
Memosens module, 2nd channel (pH/pH, pH/OXY)	MK-MS 095N

Stratos Evo ATEX/IECEx Zone 2 (only for pH/ORP with Memosens in conjunction with MK-MS 095B)	Order no.
Stratos Evo 4-wire, pH/ORP measurement, digital basic unit, Ex Zone 2	A402B
Memosens module for pH/ORP	MK-MS 095B

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

TAN options	
HART (for retrofitting devices without communication)	SW-A001
Logbook	SW-A002
Extended logbook (Audit Trail)	SW-A003
Trace-oxygen measurement	SW-A004
Current input and 2 digital inputs	SW-A005
ISM digital (for pH and oxygen measuring channels)	SW-A006
Operation with Pfaudler pH sensors	SW-A007

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)
	Extended calibration range (SW-A007)	Operation with Pfaudler sensors	
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

Specifications	"Device Type" Oxy		
Sensor input, digital	Memosens oxygen sensors or digital optical sensors (SE 740)		
	Operating modes	GAS (measurement in gases)	
		DO (measurement in liquids)	
Measuring ranges	**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 (TAN SW-A004)		
	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	
Input correction*)	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	
Sensor standardization*)	CAL_AIR	Automatic calibration in air	
	CAL_WTR	Automatic calibration in air-saturated water	
	P_CAL	Product calibration	
	CAL_ZERO	Zero calibration	
Calibration ranges	**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)	
	SE 740 optical oxygen sensor		
	Zero point	Phase shift	62 ... 75 deg
	Slope	Stern-Volmer constant	0.01 ... 0.035
	Calibration timer*)	Interval	0 ... 9999 h
	Pressure correction*)	Manual	0.000 ... 9.999 bars / 999.9 kPa / 145.0 PSI
Sensocheck	Sensor failure, sensor cap missing		
	Delay	Approx. 30 s	
Sensoface	Provides information on the sensor condition (can be switched off)		
	Evaluation of zero/slope, response, calibration interval, wear, Sensocheck		
Sensor monitor	Direct display of measured values from sensor for validation: sensor current or oxygen partial pressure / temperature		

*) user-defined

Specifications	**"Device Type" Cond**		
Sensor input, digital	Memosens conductivity sensors		
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	
		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 MΩ · cm	
	Concentration	0.00 ... 100 %	
	Salinity	0.0 ...45.0 ‰	
	Measurement error	See sensor specifications	
Measuring ranges	See Memosens sensor		
Temperature compensation*)	(OFF)	Without	
	(LIN) Ref. temp specifiable	Linear characteristic 00.00 ... 19.99 %/K	
	(NLF) Reference temp 25 °C	Natural waters 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)	
	(NH_3) Reference temp 25 °C	Ultrapure water with NH_3 traces (0... 120 °C)	
	(NaOH) Reference temp 25 °C	Ultrapure water with NaOH traces (0 ... 120 °C)	
Concentration determination*)	–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– H_2SO_4	0.00 … 9.99 % by wt	(-17 … 110 °C)
	–05– HNO_3	0.00 … 9.99 % by wt	(-17 … 50 °C)
USP <645> function	Water monitoring in the pharmaceutical industry (USP) with possibility to enter a limit value (%) Output via relay contact or HART		
Sensor standardization	– 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	
Sensocheck	Polarization detection		
	Delay	Approx. 30 s	
Sensoface	Provides information on the sensor condition		
Sensor monitor	Direct display of measured values from sensor for validation (resistance/temperature)		

*) user-defined

Specifications	**"Device Type" CondI**	
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 (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)
	Measurement error	See sensor specifications
Temperature compensation*)	(OFF)	Without
	(Lin)	Linear characteristic 00.00 to 19.99 %/K
	(NLF)	Natural waters 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% by wt (50 °C)
	–03– NaOH	0 – 13 % by wt (0 °C) ... 0 – 24% by wt (100 °C)
	–04– H_2SO_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_2SO_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_2SO_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

I input	0/4 ... 20 mA / 50 Ω		
(SW-A005)	Function	Input of pressure or temperature values from external sensors	
	Resolution	Approx. 0.05 mA	
	Characteristic	Linear, with conductivity measurement also bilinear or logarithmic	
	Measurement error[1)]	< 1% current value + 0.1 mA	
Door contact	Outputs a signal when the door is open Entry to extended logbook (FDA)		
HOLD input	Galvanically separated (OPTO coupler)		
(SW-A005)	Function	Switches device to HOLD mode	
	Switching voltage	0 ... 2 V (AC/DC)	HOLD inactive
		10 ... 30 V (AC/DC)	HOLD active
CONTROL input*)	Galvanically separated (OPTO coupler)		
(SW-A005)	Function	Selecting parameter set A/B or flow measurement (FLOW)	
	Switching voltage	0 ... 2 V (AC/DC)	Parameter set A
		10 ... 30 V (AC/DC)	Parameter set B
	FLOW	Pulse input for flow measurement	
		0 ... 100 pulses/sec	
	Display	00.0 … 99.9 l/h	
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	
	Start/end of scale*)	Configurable within the measuring range of the selected process variable	
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	
	Start/end of scale*)	Configurable within the measuring range of the selected process variable	
Power Out	Output for operating optical sensors (SE 740) oder supplying additional temperature or pressure transmitters (signal evaluation via I input)		
	Power supply	selectable between 3.1 V / 12 V / 15 V / 24 V, short-circuit-proof (for SE 740 fixed to 15 V)	
		Power	max. 1 W
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)	
	Response delay*)	0 … 600 s	

Specifications

Wash contact or parameter set A/B:	Relay contact, floating	
	Contact ratings	AC < 250 V / < 3 A / < 750 VA DC < 30 V / < 3 A / < 90 W
	Contact response*)	N/C or N/O
	Wash contact*)	Interval 0.0 ... 999.9 h (0.0 h = cleaning function switched off) Cleaning 0 … 1999 s
	Parameter set A/B	Signaling parameter set A/B
	Contact response	Contact open: Parameter set A active Contact closed: Parameter set B active
Min/max limits	Min/max contacts, 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
	Response delay*)	0 ... 9999 s
	Switching points*)	As desired within range
	Hysteresis*)	User-defined
PID process controller	Output via limit contacts	
	Setpoint specification*)	Within selected range
	Neutral zone pH*)	pH 0 … 5 / 0 … 500 mV / 0 … 50 K
	Neutral zone Cond / CondI*)	Max. 50 % of selected range / 0 … 50 K
	Neutral zone Oxy*)	0 … 25 % / 0 … 2.5 mg/l (ppm) / 0 … 2.5 %vol / 0 … 25 K
	Proportional action*)	Controller gain Kp: 10 ... 9999 %
	Integral action*)	Reset time Tr: 0 … 9999 s (0 s = no integral action)
	Derivative action*)	Rate time Td: 0 ... 9999 s (0 s = no derivative action)
	Controller type*)	Pulse length controller or pulse frequency controller
	Pulse period*)	1 ... 600 s, min. turn-on time 0.5 s (pulse length controller)
	Max. pulse frequency*)	1 ... 180/min (pulse frequency controller)
Real-time clock	Different time and date formats selectable	
	Power reserve	> 5 days
Display	LC display, 7-segment with icons, colored backlighting	
	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	meas, info, 4 cursor keys, enter
2 parameter sets	Parameter sets A and B, switchover via CONTROL input or manual	(not with MK-CC 065 module)
Diagnostics functions	Calibration data	Depending on the selected process variable
	Device self-test	Automatic memory test (RAM, FLASH, EEPROM)
	Display test	Display of all segments
	Logbook (SW-A002)	Recording of events, 100 entries
	Extended logbook (SW-A003)	Audit trail recording according to 21 CFR Part 11 200 entries

Specifications

HART communication (SW-A001)	Digital communication via FSK modulation of output current 1, HART version 6 Device identification, measured values, status and messages, parameter setting, calibration, records	
	Conditions	Output current ≥ 3.8 – load resistance ≥ 250 Ω
FDA 21 CFR Part 11	Access control by editable passcodes	
	Logbook entry and flag via HART in the case of configuration changes	
	Message and logbook entry when enclosure is opened	
Service functions	Current source	Current specifiable for output 1 / 2 (00.00 ... 22.00 mA)
	Manual controller	Controller output entered directly (start of control process)
	Sensor monitor	Display of direct sensor signals
	Relay test	Manual control of relay contacts
	Device type	Selecting the measuring function (pH, Cond, CondI, Oxy, CC, pH/pH, pH/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	
Explosion protection (A402B)	See EU Type Examination Certificate and EU Declaration of Conformity or www.knick.de	
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 402 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
Power supply A 402 B (Ex Zone 2)	24 V DC (–15% +10%); 10 W Overvoltage category II, protection class II	
	Test voltage	2.5 kV AC
Nominal operating conditions	Ambient temperature	-20 ... +55 °C
	Transport/Storage temp.	-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

Specifications	"Device Type" pH	A402N + MK-PH 015N A402B + MK-PH 015B	
Sensor input, analog	Analog pH and ORP sensors, simultaneous pH and ORP measurement possible		
	Measuring range	-1500 … +1500 mV	
	Display range	pH value	-2.00 ... 16.00
		ORP	-1999 ... 1999 mV
	Glass electrode input[4)]	Input resistance	> 1 • 10^{12} Ω
		Input current	< 1 • 10^{-12} A
	Impedance range	0.5 ... 1000 MΩ (± 20%)	
	Reference electrode input[4)]	Input resistance	> 1 • 10^{10} Ω
		Input current	< 1 • 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 / Balco*), 2-wire connection, adjustable		
	Pt 100/Pt 1000	-20.0 ... +200.0 °C	(-4 ... +392 °F)
	NTC 30 kΩ	-20.0 ... +150.0 °C	(-4 ... +302 °F)
	NTC 8.55 kΩ	-10.0 ... +130.0 °C	(+14 ... +266 °F)
	Balco 3 kΩ	-20.0 ... +130.0 °C	(-4 ... +266 °F)
	Adjustment range	10 K	
	Resolution	0.1 °C (0.1 °F)	
	Measurement error[1,2,3)]	<0.5 K (<1 K with Pt100; <1 K with NTC >100°C)	
ISM input	"One wire" interface for operation with ISM (digital sensors)		
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)
	Extended calibration range (SW-A007)	Operation with Pfaudler sensors	
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 and reference 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 (ISM)		

Specifications

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, ref. temp 25 °C
	Table	0 … 95 °C, user-defined in 5-K steps
Power output	for operating an ISFET adapter	±3 V / 0.5 mA
Explosion protection (MK-PH015B)	See EU Type Examination Certificate and EU Declaration of Conformity or www.knick.de	

*) user-defined

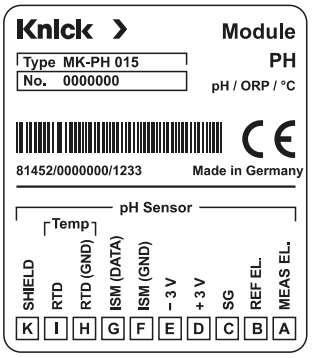
1) according to EN 60746-1, at nominal operating conditions

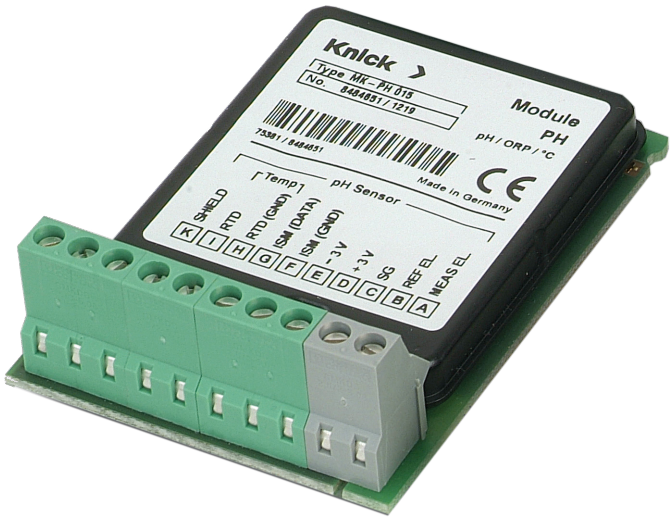
2) ± 1 count

3) plus sensor error

4) at room temperature

Terminal assignment of measuring module MK-PH 015





MK-PH 015 N module (non-Ex)
MK-PH 015 B module (Ex)

Specifications	"Device Type" Oxy	A402N + MK-OXY 045N A402B + MK-OXY 045B
Sensor input	Amperometric oxygen sensors	
	Operating modes	GAS (measurement in gases) DO (measurement in liquids)
Display ranges	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
Input range	**Standard sensors "10"**	
	Measuring current	-600 ... +2 nA
	Resolution	10 pA
	Measurement error[1,2,3)]	< 0.5% meas. val. + 0.05 nA + 0.005 nA/K
	Trace sensors "01" (TAN SW-A004)	
	Measuring current	-600 ... +2 nA
	Resolution	10 pA
	Measurement error[1,2,3)]	< 0.5% meas. val. + 0.05 nA + 0.005 nA/K
	Trace sensors "001" (TAN SW-A004)	
	Measuring current	-10000 ... +2 nA
	Resolution	166 pA
	Measurement error[1,2,3)]	< 0.5% meas. val. + 0.8 nA + 0.008 nA/K
Measuring ranges*)	**Standard sensors "10"**	
	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 "01" (TAN SW-A004)	
	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
	Trace sensors "001" (TAN SW-A004)	
	Saturation (–10 ... 80°C)	0.000 ... 150.0 %
	Concentration (–10 ... 80°C)	000.0 ... 9999 µg/l (ppb) / 10.00 ... 20.00 mg/l (ppm)
	Volume concentration in gas	000.0 ... 9999 ppm / 1.000 ... 50.00 %vol
Temperature input*)	NTC 22 kΩ / NTC 30 kΩ*)	2-wire connection, adjustable
	Measuring range	-20.0 ... +150.0 °C (-4 ... +302 °F)
	Adjustment range	10 K
	Resolution	0.1 °C (0.1 °F)
	Measurement error[1)]	< 0.5 K (< 1 K at > 100 °C)
ISM input	"One wire" interface for operation with ISM (digital sensors)	
Polarization voltage*)	–400 ... –1000 mV	
	0 ... –1000 mV (TAN SW-A004)	
	Default –675 mV (resolution < 5 mV)	
	Permissible guard current	≤ 20 µA
Input correction*)	Pressure correction	manually or through current input 0(4) ... 20 mA 0.000 ... 9.999 bars / 999.9 kPa / 145.0 PSI
	Salinity correction	0.0 ... 45.0 g/kg
Sensor standardization*)	CAL_AIR	Automatic calibration in air
	CAL_WTR	Automatic calibration in air-saturated water
	P_CAL	Product calibration
	CAL_ZERO	Zero calibration

Specifications

Calibration ranges	**Standard sensor "10"**	
	Zero point	± 2 nA
	Slope	25 ... 130 nA (at 25°C, 1013 mbars)
	Trace sensor "01"	
	Zero point	± 2 nA
	Slope	200 ... 550 nA (at 25°C, 1013 mbars)
	Trace sensor "001"	
	Zero point	± 3 nA
	Slope	2000 ... 9000 nA (at 25°C, 1013 mbars)
Calibration timer*)	Interval 0 ... 9999 h	
Sensocheck	Monitoring of membrane and electrolyte and the sensor wires for short circuits or open circuits (can be switched off)	
	Delay	Approx. 30 s
Sensoface	Provides information on the sensor condition (can be switched off)	
	Evaluation of zero/slope, response, calibration interval, wear, Sensocheck	
Sensor monitor	Direct display of measured values from sensor for validation (sensor current / temperature)	
Explosion protection (MK-OXY045B)	See EU Type Examination Certificate and EU Declaration of Conformity or www.knick.de	

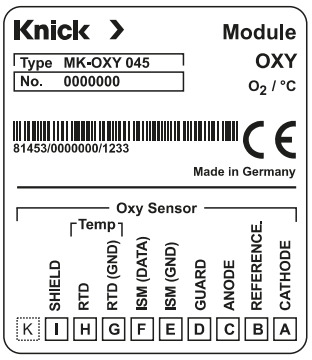
*) user-defined

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

2) ± 1 count

3) plus sensor error

Terminal assignment of measuring module MK-OXY 045



MK-OXY 045 N module (non-Ex)
MK-OXY 045 B module (Ex)

Specifications	**"Device Type" Cond**	A402N + MK-COND 025N A402B + MK-COND 025B	
Sensor input	Input for 2- or 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)		
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/cm	
		00.00 ... 99.99 S/cm	
	Resistivity	00.00 … 99.99 MΩ · cm	
	Concentration	0.00 ... 100 %	
	Salinity	0.0 ...45.0 ‰	
	Measurement error[1,2,3)]	< 1 % meas. val. + 0.4 µS • c	
Temperature input*)	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	-10 ... +130 °C	(14 ... +266 °F)
	Adjustment range	10 K	
	Resolution	0.1 °C (0.1 °F)	
	Measurement error[1,2,3)]	<0.5 K (<1 K with Pt100; <1 K with NTC >100°C)	
Temperature compensation*)	(OFF)	Without	
	(LIN) Ref. temp specifiable	Linear characteristic 00.00 ... 19.99 %/K	
	(NLF) Reference temp 25 °C	Natural waters 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)	
	(NH_3) Reference temp 25 °C	Ultrapure water with NH_3 traces (0... 120 °C)	
	(NaOH) Reference temp 25 °C	Ultrapure water with NaOH traces (0 ... 120 °C)	
Concentration determination*)	–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– H_2SO_4	0.00 … 9.99 % by wt	(-17 … 110 °C)
	–05– HNO_3	0.00 … 9.99 % by wt	(-17 … 50 °C)
USP <645> function	Water monitoring in the pharmaceutical industry (USP) with possibility to enter a limit value (%) Output via relay contact or HART		
Sensor standardization	– 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 – Temperature probe adjustment		
	Permissible cell constant	0.0050 … 19.9999/cm	

Specifications

Sensocheck	Polarization detection and monitoring of cable capacitance Delay Approx. 30 s
Sensoface	Provides information on the sensor condition
Sensor monitor	Direct display of measured values from sensor for validation (resistance/temperature)
Explosion protection (MK-COND025B)	See EU Type Examination Certificate and EU Declaration of Conformity or www.knick.de

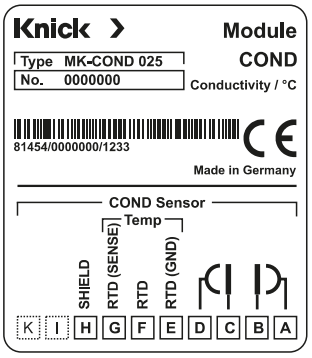
*) user-defined

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

2) ± 1 count

3) plus sensor error

Terminal assignment of measuring module MK-COND 025



MK-COND 025 N module (non-Ex)
MK-COND 025 B module (Ex)

Specifications	**"Device Type" CondI**	A402N + MK-CONDI 035N A402B + MK-CONDI 035B	
Sensor input	Analog toroidal conductivity sensors		
Measuring ranges	Conductivity	0.000 ... 1999 mS/cm	
	Concentration	0.00 ... 100.0 % by wt	
	Salinity	0.0 ... 45.0 ‰ (0 ... 35 °C)	
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)	
	Response (T90)	Approx. 1 s	
	Measurement error[1,2,3)]	< 1% meas. val. + 0.005 mS/cm	
Temperature input*)	Pt 100/Pt 1000	-50 ... +250 °C	(-58 ... +482 °F)
	NTC 30 kΩ	-20 ... +150 °C	(-4 ... +302 °F)
	Adjustment range	10 K	
	Resolution	0.1 °C (0.1 °F)	
	Measurement error[1,2,3)]	0.5 K (<1 K with Pt100; <1 K with NTC >100 °C)	
Temperature compensation*)	(OFF)	Without	
	(Lin)	Linear characteristic 00.00 to 19.99 %/K	
	(NLF)	Natural waters 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% by wt (50 °C)	
	-03– NaOH	0 – 13 % by wt (0 °C) ... 0 – 24% by wt (100 °C)	
	-04– H_2SO_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_2SO_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_2SO_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 – Temperature probe adjustment		
	Permissible cell factor	0.100 ... 19.999/cm	
	Permissible transfer ratio	10.0 ... 199.9	
	Permissible zero offset	±0.5 mS/cm	
	Permissible installation factor	0.100 ... 5.000	

Specifications

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)
Explosion protection (MK-CONDI035B)	See EU Type Examination Certificate and EU Declaration of Conformity or www.knick.de

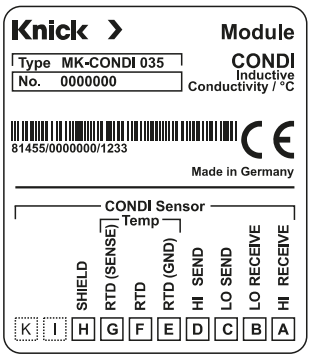
*) user-defined

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

2) ± 1 count

3) plus sensor error

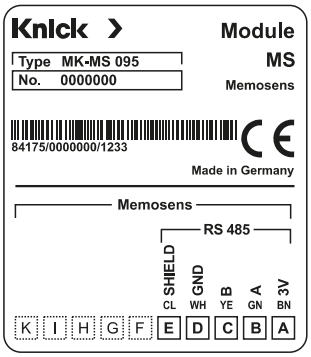
Terminal assignment of measuring module MK-CONDI 035

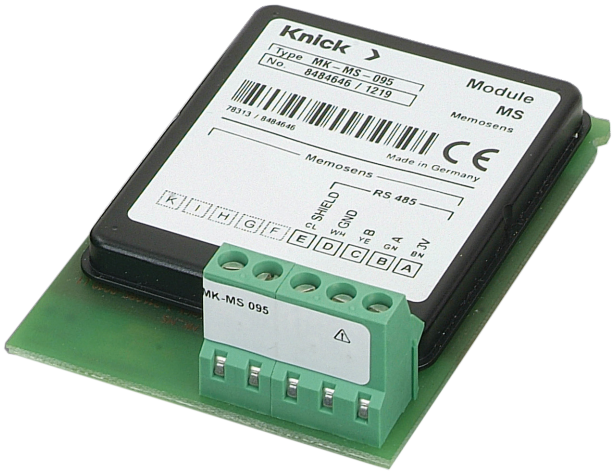


MK-CONDI 035 N module (non-Ex)
MK-CONDI 035 B module (Ex)

Specifications	**"Device Type" MSPH/MSPH**		A 402N + MK-MS 095N
Sensor input: pH measurement	Digital Memosens sensors, 2nd channel		
Display range	pH value	-2.00 ... 16.00	
	Temperature	-20.0 ... 200.0 °C	(-4 ... +392 °F)
	Measurement error	See Memosens sensor specifications	
pH sensor standardization	pH calibration		
Operating modes*)	AUTO	Calibration with automatic buffer recognition (Calimatic)	
	MAN	Manual calibration with entry of individual buffer values	
	DAT	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	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)
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, calibration interval, Sensocheck		
Sensor monitor	Direct display of measured values from sensor for validation (mV/temperature)		
pH/pH calculations*)	–C1–	Difference	pH A – pH B
	–C2–	Difference	mV A – mV B
	–C3–	Difference	Temp A – Temp B

Terminal assignment of measuring module MK-MS 095



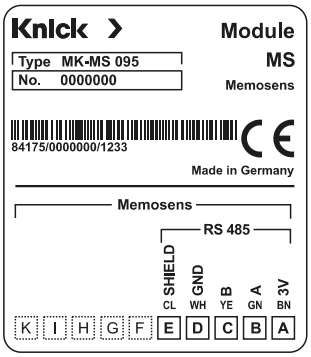


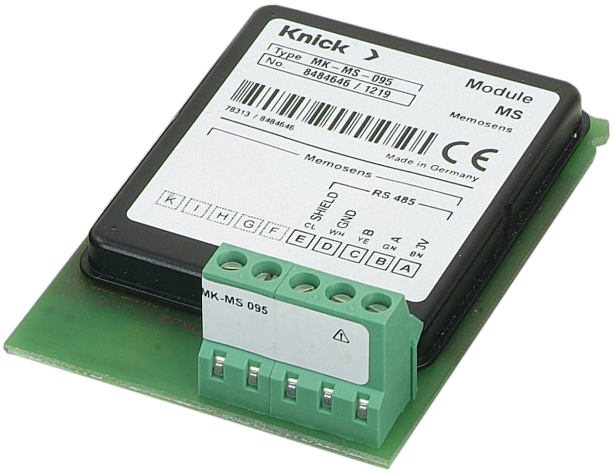
MK-MS 095 N module (non-Ex)

Specifications	"Device Type" MSPH/MSOXY	A 402N + MK-MS 095N
Sensor input: Oxy measurement	Digital Memosens sensors, 2nd channel	
Sensor input: pH measurement	Operating modes	GAS (measurement in gases)
See Pg 26		DO (measurement in liquids)
Measuring ranges	**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 Memosens sensor specifications
Input correction*)	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
Sensor standardization*)	CAL_AIR	Automatic calibration in air
	CAL_WTR	Automatic calibration in air-saturated water
	P_CAL	Product calibration
	CAL_ZERO	Zero calibration
Calibration ranges	**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	0000 ... 9999 h
Sensocheck	Sensor failure, sensor cap missing	
	Delay	Approx. 30 s
Sensoface	Provides information on the sensor condition (can be switched off)	
	Evaluation of zero/slope, response, calibration interval, wear, Sensocheck	
Sensor monitor	Direct display of measured values from sensor for validation	

*) user-defined

Terminal assignment of measuring module MK-MS 095





MK-MS 095 N module (non-Ex)

Specifications	**"Device Type" CC**	A 402N + MK-CC 065N	
Sensor inputs	Two inputs for two analog 2-electrode sensors		
	Measuring range	0 … 30000 µS • c	
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	
	Resistivity	00.00 … 99.99 MΩ · cm	
	Response (T90)	Approx. 1 s	
	Measurement error[1,2,3)]	< 1 % meas. val. + 0.4 µS • c	
Temperature compensation*)	(OFF)	Without	
(reference temp 25°C)	(LIN)	Linear characteristic 00.00 ... 19.99 %/K	
	(NLF)	Natural waters to EN 27888	
	(NaCl)	Ultrapure water with NaCl traces up to 26 % by wt NaCl	
	(HCl)	Ultrapure water with HCl traces (0 ... 120 °C)	
	(NH_3)	Ultrapure water with NH_3 traces (0... 120 °C)	
	(NaOH)	Ultrapure water with NaOH traces (0 ... 120 °C)	
Sensor standardization	Input of cell constant with simultaneous display of conductivity/temp.		
Sensor A / Sensor B	Permissible cell constant	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 VBG S-006 [pH]	
	–C7–	Variable pH value, factors specifiable [pH]	
	–C8–	User spec (DAC Degased Acid Conductivity) [µS/cm]	
	–C9–	Concentration of the alkalizing agent (VGB S-006)	
Sensocheck	Polarization detection and monitoring of cable capacitance		
	Delay	Approx. 30 s	
Sensoface	Provides information on the sensor condition, Sensocheck, flow monitoring		
Sensor monitor	Direct display of measured values from sensor for validation (resistance/temperature)		
Temperature input A/B	Pt 1000	2-wire connection	
	Measuring range	-50 ... +200 °C	(-58 ... +392 °F)
	Resolution	0.1 °C	(0.1 °F)
	Measurement error[1,2,3)]	0.5 K	(1 K > 100 °C)

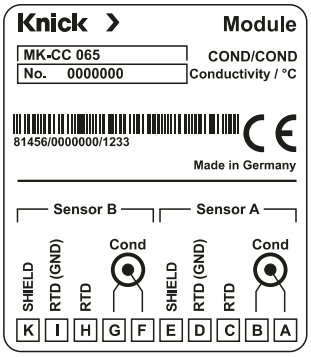
*) user-defined

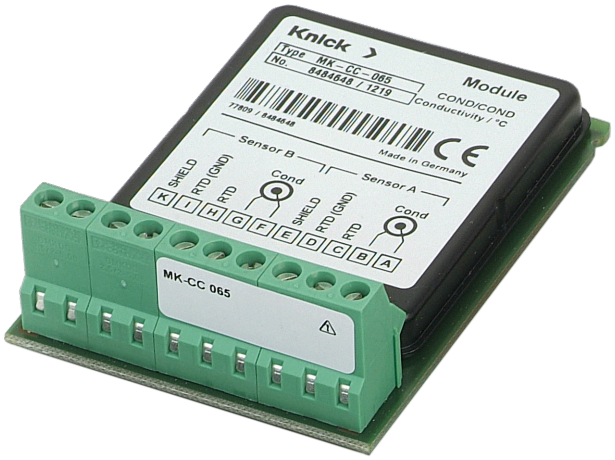
1) according to EN 60746-1, at nominal operating conditions

2) ± 1 count

3) plus sensor error

Terminal assignment of measuring module MK-CC 065





MK-CC 065 N module (non-Ex)

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

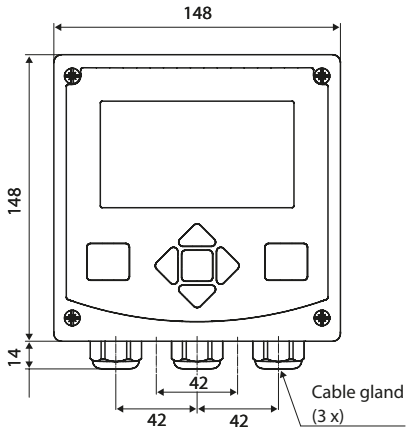
Additional protection from direct weather exposure and mechanical damage.

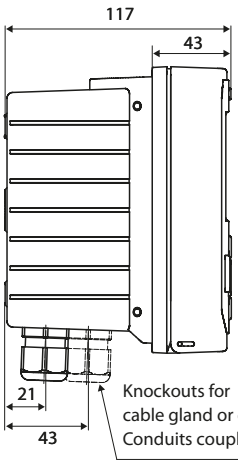
ZU 0738 panel-mount kit

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

Dimension drawings

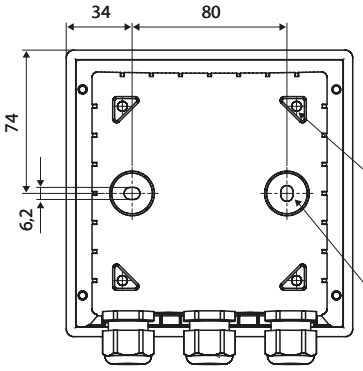
Front and side view



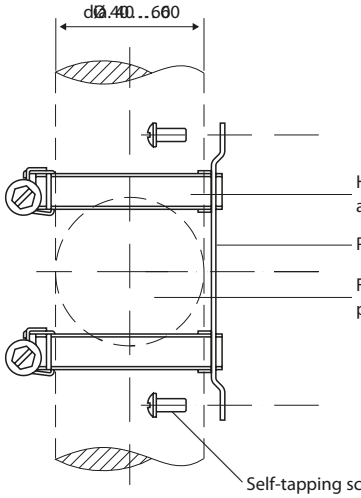


Knockouts for
cable gland or conduit 1/2", dia. 21.5 mm, (2 x)
Conduits couplings not included!

Rear side

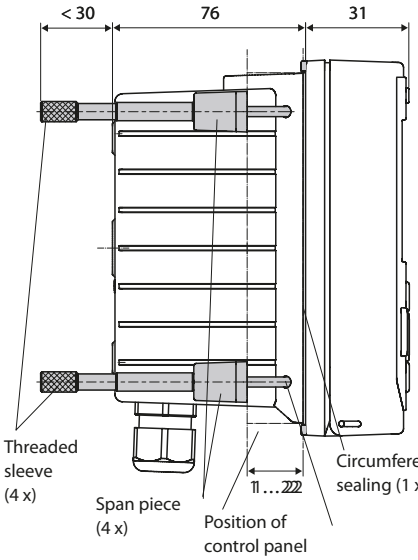


ZU 0274 pipe-mount kit

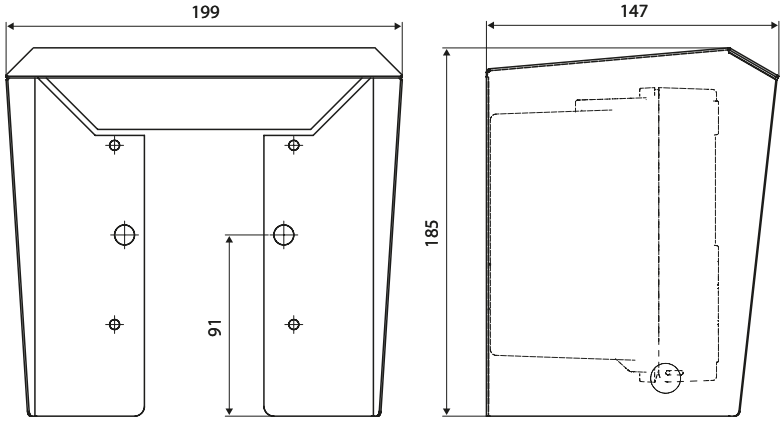


ZU 0738 panel-mount kit

Cutout 138 x 138 mm (DIN 43700)



ZU 0737 protective hood



All dimensions in mm

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