



Stratos Multi

The latest generation of our proven Stratos process analyzers for Memosens, digital, and analog sensors. Multiparameter functionality provides flexibility. High-resolution display for an intuitive, self-explanatory user interface. Advanced Process Control with Ethernet interfaces.

Communicative

PROFINET can be used to transmit comprehensive process and diagnostic data directly to the process control system. Twenty AIs (analog input blocks) are available for this purpose.

Intuitive

Large widescreen display for a quick overview of all relevant measurement data. Self-explanatory user interface with intuitive icons and multi-color display.

Multiparameter

Freely combinable process variables pH, ORP, conductivity, and oxygen, also in 2-channel mode. For greater flexibility in use and easy storage.

Analog or other digital sensors can of course continue to be used for all parameters.

Intuitive operation with full-text menu navigation in several languages. Icons help you to quickly ascertain the device's condition. Guided automatic calibration provides greater reliability.

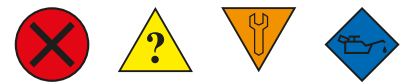
Allows for Worldwide Use

Menu navigation in several languages to assist the user in correct operation. Detailed information on all operating states simplifies usage.

Available languages: German, English, French, Italian, Spanish, Portuguese, Chinese, Swedish, Korean.

Status Messages According to NE 107

Standardized icons reduce the risk of confusion. All status messages for required maintenance, failure, out of specification, and function check (HOLD) are output as specified in NE 107. They can also be directly transmitted via PROFINET.



Stratos Multi Advanced Process Control

PROFINET enables easy integration in globally used process control systems and software architectures.

Stratos Multi E461N PROFINET
– easy connection to industrial Ethernet networks.

Industrial Ethernet networks enable smart communication via standardized communication interfaces, thereby optimizing process control and value creation throughout a plant system. All that is required is for the PCS, devices, and sensors to be securely interconnected.

Worldwide, Flexible Use

Stratos Multi E461N can be used with process control systems from any relevant supplier, such as Siemens, Honeywell, or Rockwell/Allen Bradley.

PROFINET

PROFINET is an innovative open standard for Industrial Ethernet and meets all automation engineering requirements.

Stratos Multi E461N complies with all the standards of the PI organization*) such as IEC 61158 and IEC 61784 for PROFINET communication in industrial networks.

Easy Integration

A common and integrated network for all PROFINET devices makes integration easy. Potential sources of errors during installation are minimized thanks to the small number of interfaces. Integration into the process control system is also a quick and easy affair when using the PROFINET GSDML file (device master file).

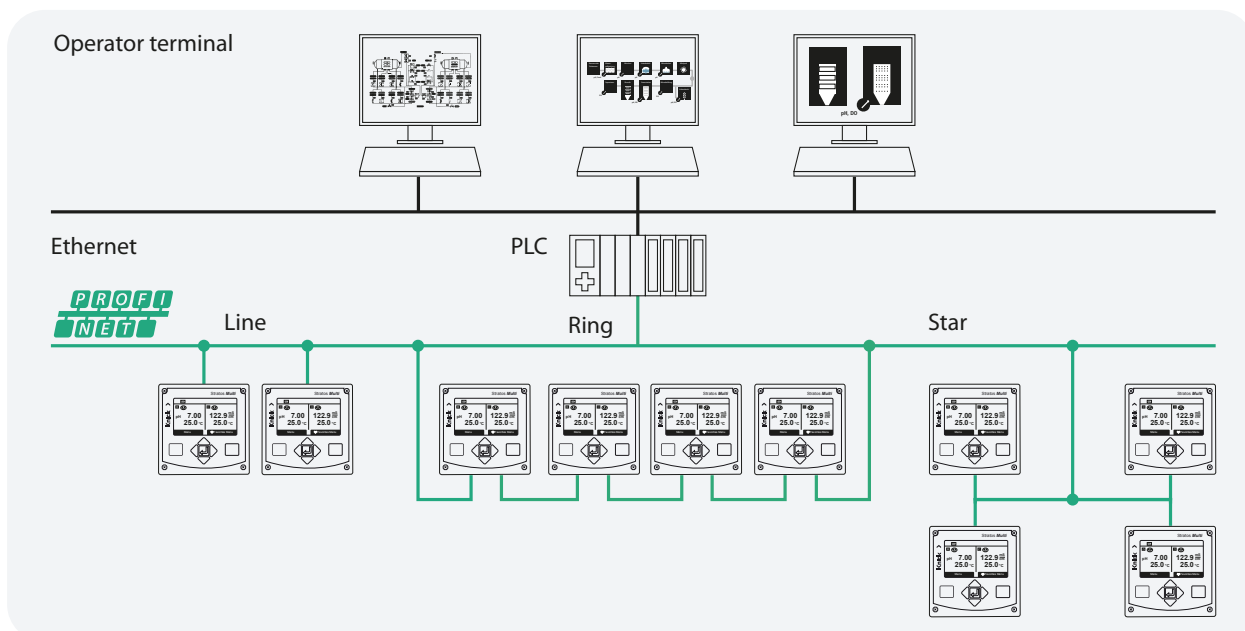
Various connection technologies enable branch, ring, and star wiring.

The device's Ethernet configuration is stored in the IO controller (PLC). If the system is expanded or a device fails, a new transmitter can be incorporated; the configuration is uploaded directly. The device configuration of the measuring point can be stored on the Data Card and uploaded to identical new devices.

*) Profibus & Profinet International

Facts and Features

- Secure digital interconnection of PCS, devices, and sensors via PROFINET
- 1- and 2-channel version
- Multiparameter for pH/ORP/conductivity/oxygen
- Self-explanatory, multi-lingual user interface
- TFT display with full-text menu
- 4-wire transmitter with broad-range power supply 24 ... 230 V AC/DC
- Predictive maintenance for optimal process management:
 - CIP/SIP and autoclaving counter
 - Sensor diagram
 - Remaining sensor service life
- Measurement with Memosens, digital, and analog sensors
- Memory cards for data recording or firmware update
- Passcode-controlled access to different levels



Uninterrupted Data Transmission in Real Time

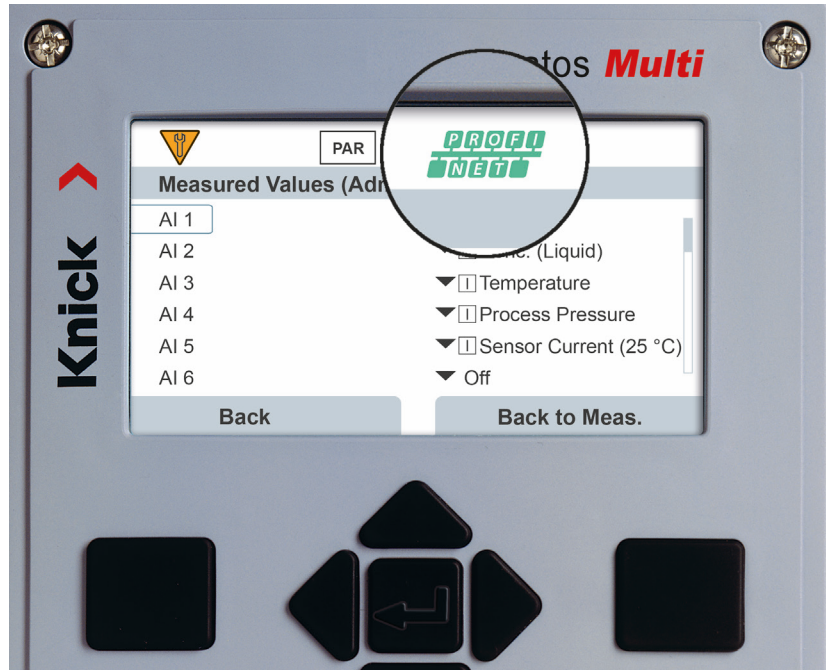
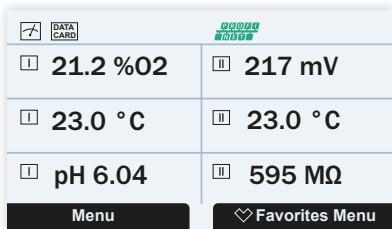
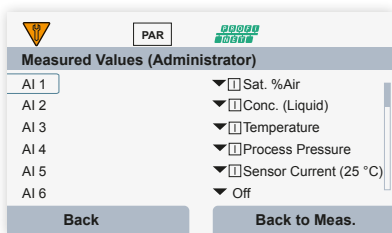
Significant time and cost savings can be achieved thanks to the reduced number of interfaces/gateways (protocol converters). This enables direct access to device and sensor data.

Optimized Process Control

The wealth of device and sensor data can be used to determine the efficiency of the plant, at the same time allowing for comparisons with other production sites.

Transfer of up to 20 values, freely configurable measured or diagnostics data as AI 1-20 (analog input blocks), also in multi-channel mode

Example of pH/ORP measurement: Measured values such as pH value, pH voltage, ORP voltage, etc. Calibration values such as zero point, slope, ORP offset, etc. Diagnostics data such as Sensoface, wear, remaining lifetime, operating time, calibration timer, SIP counter, CIP counter, etc.



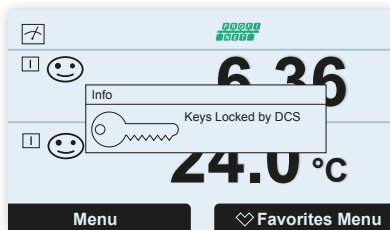
Smart Diagnostics Management

Seamless display of all messages via PROFINET. Standard diagnostics data is transferred directly from the transmitter to the process control system in accordance with the specifications of the PI organization^{*)}, as is the extended diagnostics data from the sensor and transmitter (NAMUR NE 107).

Increased Safety

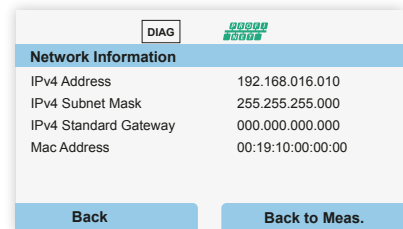
Access is controlled directly within the device on the basis of different passcode levels.

Local operation can be disabled using the key lock function, which can also be used for access control directly via the PLC.



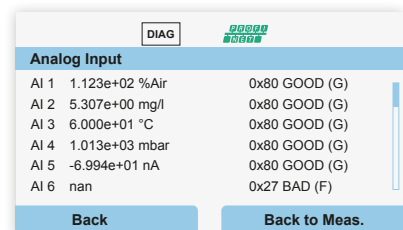
Network Information

All Ethernet communication is monitored directly in the Stratos Multi transmitter via PROFINET.



The PROFINET Monitor supplies a summary of all values from cyclic data exchange. All analog inputs and outputs are shown.

AIs: Values from transmitter to PCS
AOs: Values from PCS to transmitter



^{*)} Profibus & Profinet International

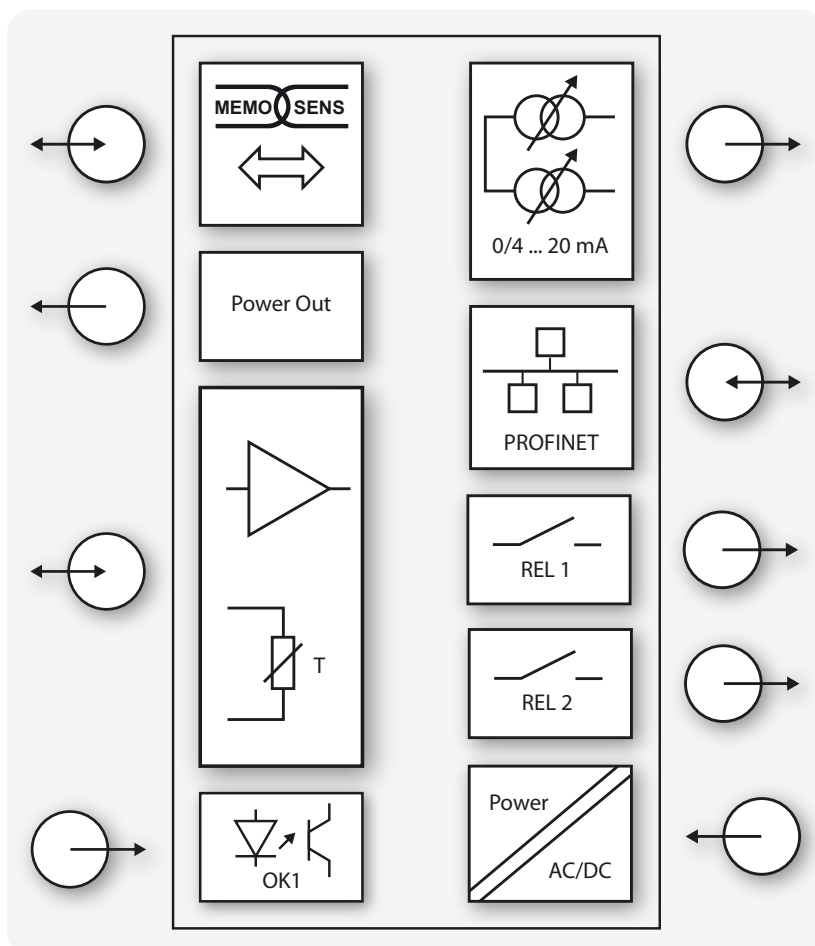
Stratos Multi Digital Intelligence.



Easy Handling

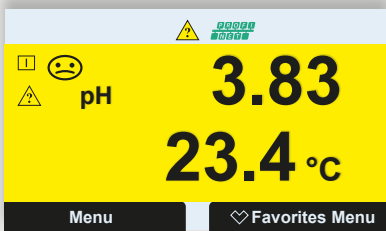
PROFINET communication can be used to perform product calibration via the PCS. The sensor can therefore be safely calibrated when installed.

System Overview

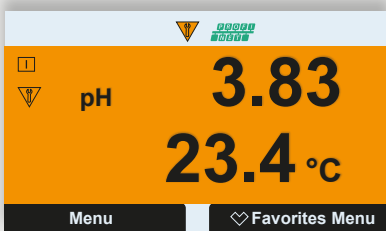




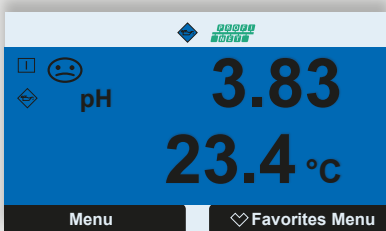
RED: NE 107 "Failure" status message



YELLOW: NE 107 "Out of Specification" status message



ORANGE: NE 107 "Function Check" status message



BLUE: NE 107 "Maintenance Required" status message

Reliable operation in all industrial environments with premium EPDM keypad. More dependable than a touchscreen. Rugged and UV-resistant housing with IP67. No protruding control elements.

Compact Housing and Rugged Keypad

Safe and shock-hazard-protected electronics, even with open housing. The large terminal compartment makes it easy to commission the device. Since all of the electronics are integrated into the front element, the rear unit can easily be removed for direct installation in the enclosure.

The specially sealed, premium EPDM keys, a high UV resistance, and IP66/67, TYPE 4X protection make installation possible in complex ambient conditions, even outdoors. Scratch-resistant display cover made of hardened 3-mm safety glass.

Visual Display of Sensor and Device Conditions

The color-coded user interface allows you to quickly ascertain the sensor condition. The display fields have different background colors based on the NE107 status messages, so users can identify sensor conditions and device modes at a glance. The sensor monitoring system indicates the sensor's maintenance needs using the established Sensoface and can also be configured with messages to that effect.



Memosens Sensors

Memosens sensors can easily be used with sensor cables up to 100 meters long. Since Memosens converts measured values and sensor data into digital signals in the sensor head, their transmission is not subject to the attenuation that typically affects analog signals over distance. Electromagnetic interference cannot distort the transmitted values, either.



Stratos Multi

The Multiparameter Transmitter

Smart Diagnostics Management

At a glance, users receive information on the sensor's condition and the remaining lifetime of the connected sensors.

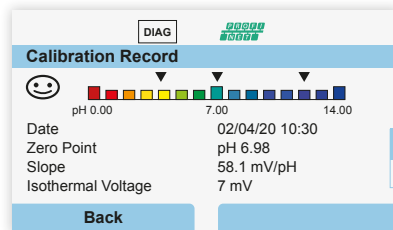
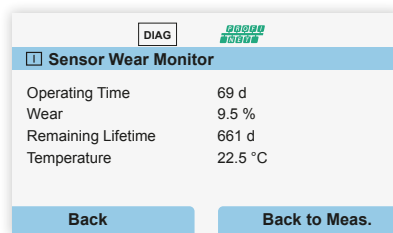
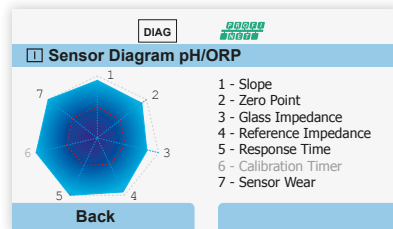
Alongside CIP, SIP, autoclaving counters, and the display elements noted above, a "sensor diagram" facilitates sensor monitoring. All the relevant sensor data, such as zero point, slope, life, calibration timer, impedance, and response times are clearly presented.

Optimized Maintenance Intervals

Efficient adjustment of calibration intervals using the adaptive calibration timer.

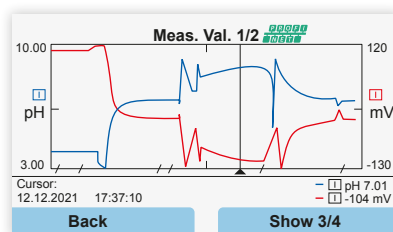
Seamless Data Recording

Messages and statuses can be recorded in the logbook and displayed on the screen. The measurement recorder enables full data recording, including a graphical display. All data can be stored on the Data Card.



Logbook

| | | | | |
|------|----------|-------|---|---------------------|
| F240 | 11/30/19 | 08:33 | ☒ | Cal Mode is Active |
| F240 | 11/30/19 | 08:21 | ☒ | Cal Mode is Active |
| F032 | 11/30/19 | 08:13 | ☒ | Sensor Identified |
| F029 | 11/30/19 | 08:13 | ☒ | No Sensor Connected |
| F029 | 11/30/19 | 08:05 | ☒ | No Sensor Connected |
| F227 | 11/30/19 | 08:05 | ☒ | Power Supply ON |



Memory Cards with USB

Quick and easy data transfer between device and PC via standardized USB interface.

This makes it easy to distribute and manage measured value records, firmware updates, and device configurations.

The card slot inside the housing makes it possible to connect a range of memory cards

- Data Card: Memory card for measured values, logbook, and device configurations
- FW Update Card: Firmware update with new features
- Firmware Repair Card: Easy on-site update of the device firmware for troubleshooting in case of warranty claims.



Product Line

Stratos Multi

Stratos Multi 4-wire, multiparameter, digital basic unit, 1-channel with PROFINET communication

Order no.

E461N

Stratos Multi 4-wire, multiparameter, digital basic unit, 2-channel with PROFINET communication (incl. MK-MS-095N Memosens measuring module)

E461N.010

Measuring Module for 2-Channel Version Memosens

Order no.

Memosens measuring module, 2nd channel multiparameter

MK-MS095N

Analog Measuring Modules

Order no.

pH/ORP measuring module

MK-PH015N

Module for contacting conductivity measurement

MK-CONDO25N

Module for toroidal conductivity measurement

MK-CONDI035N

Oxygen measuring module

MK-OXY046N

Dual conductivity measuring module, 2-channel

MK-CC065N

Ethernet Connection

Order no.

RJ45 socket

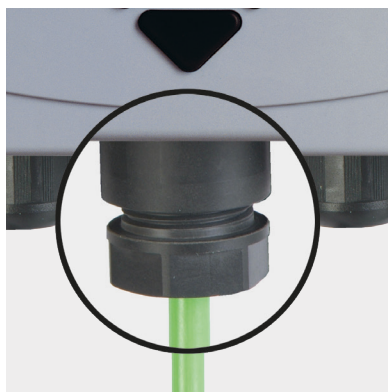
ZU1072

Adapter cable RJ45/M12 D-type

ZU1073

Y cable RJ45/M12 D-type

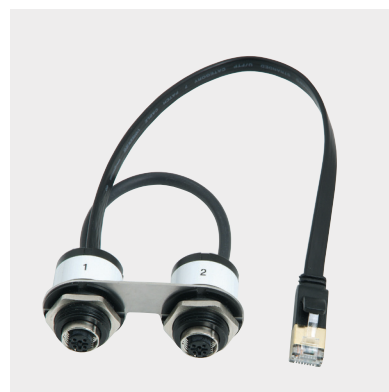
ZU1139



The ZU1072 RJ45 socket makes it possible to connect an Ethernet cable to Stratos Multi E461N



The ZU1073 adapter cable can be used to connect a network cable with M12 D-type connector to Stratos Multi E461N.



The Y cable connects an RJ45 socket on the Stratos Multi E461N to two D-coded M12 sockets and is used for PROFINET data transmission.

Stratos Multi

Product Line

| Mounting Kits | | Order no. |
|--|--------|-----------------|
| Pipe-mount kit | | ZU0274 |
| Panel-mount kit | | ZU0738 |
| Protective hood | | ZU0737 |
| Add-On Functions (Firmware via TAN) | | Order no. |
| pH buffer table: Entry of individual buffer set | | FW-E002 |
| Current characteristic | | FW-E006 |
| Concentration determination for use with conductivity sensors | | FW-E009 |
| Trace oxygen measurement | | FW-E016 |
| Operation with double high-impedance pH sensors/Pfaunder sensors | | FW-E017 |
| Calculation blocks | | FW-E020 |
| Digital ISM sensors | | FW-E053 |
| Parameter sets 1 to 5 | | FW-E102 |
| Measurement recorder | | FW-E103 |
| Logbook, in conjunction with Data Card (Data Card ZU1080-S-N-D not included in FW-E104) | | FW-E104 |
| Firmware update (FW Update Card ZU1080S-N-U not included in FW-E106) | | FW-E106 |
| Test Sockets, Connectors, Cables | Length | Order no. |
| VP8 connector | | ZU0721 |
| M12 socket, 8-pin | | ZU0860 |
| VP8 ST cable (both ends with VP socket) | 3 m | ZU0710 |
| | 5 m | ZU0711 |
| | 10 m | ZU0712 |
| M12 extension cord, 8-pin | 10 m | CA/M12-010M12-8 |
| Inspection certificate 3.1 | | ZU0268/analysis |

Memory Cards for Stratos Multi

| | | | | | | | | | |
|-------------------|-----------------------------|----------|---|---|---|---|--|--|-------|
| | | ZU 1080- | S | - | N | - | | | |
| Card version | Data Card | | | | | | | | D |
| | Firmware Update Card | | | | | | | | U |
| | Firmware Repair Card | | | | | | | | R |
| | | ZU 1080- | S | - | N | - | | | |
| Card version | Custom Firmware Update Card | | | | | | | | S |
| | Custom Firmware Repair Card | | | | | | | | V |
| Firmware versions | Device firmware | | | | | | | | * * * |

Specifications

Power

Power supply
Terminals 17, 18

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 II, pollution degree 2

Test voltage

Type test 3 kV AC 1 min after moisture pre-treatment
Routine test 1.4 kV for 2 s

Inputs and Outputs (SELV, PELV)

Sensor input 1

for Memosens/optical sensors (SE740), galvanically isolated
Data in/out Asynchronous interface, RS-485, 9600/19200 Bd
Power supply 3.08 V (3.02 ... 3.22 V)/10 mA, $R_i < 1 \Omega$, short-circuit-proof

Sensor input 2

for Memosens module or analog/ISM¹ measuring module, galvanically isolated
Data in/out Asynchronous interface RS-485, 9600 Bd
Power supply 3.08 V (3.02 ... 3.22 V)/10 mA, $R_i < 1 \Omega$, short-circuit-proof

Input OK1

Galvanically isolated (optocoupler)
Switching between parameter sets A/B, flow measurement, function check
Parameter set Relay input 0 ... 2 V (AC/DC) parameter set A
switching Relay input 10 ... 30 V (AC/DC) parameter set B
Control current 5 mA

Flow Pulse input for flow measurement
0 ... 100 pulses per second
Display, 00.0 ... 99.9 l/h
Message via 22 mA or relay contact

Power out

Power output, short-circuit-proof, 0.5 W, for operating the SE740 sensor
Off
3.1 V (2.99 ... 3.25 V)
14 V (12.0 ... 16.0 V)
24 V (23.5 ... 24.9 V)

Output 1, 2³
Out 1, Out 2

0/4 ... 20 mA, floating, load resistance up to 500 Ω
Galvanically connected
When using the current outputs, neither Ethernet nor the relay contacts can be used.
Failure message 3.6 mA or 22 mA, adjustable
Active max. 11 V
Passive Supply voltage 3 ... 24 V
Process variable Selection from all available process variables
Start/end of scale Configurable within selected range
Characteristic Linear, bi-/trilinear, or logarithmic
Output filter Pt₁ filter, filter time constant 0 ... 120 s
Measurement error² < 0.25 % of current value + 0.025 mA

Stratos Multi

Specifications

| | |
|---|--|
| Contact REL1, REL2 ⁴⁾ | Relay contact, floating |
| | Contact rating with ohmic load AC < 30 V _{rms} / < 15 VA DC < 30 V / < 15 W |
| | Max. switching current 3 A, max. 25 ms |
| | Max. continuous current 500 mA |
| | User-definable: Failure, maintenance required, function check, min/max limit, rinse contact, parameter set B signaling, USP output, Sensoface |
| Alarm contact | Contact response N/C (fail-safe type) |
| | Response delay 0000 ... 0600 s |
| Rinse contact | To control a simple cleaning system |
| | Contact rating with ohmic load AC < 30 V _{rms} / < 15 VA DC < 30 V / < 15 W |
| | Max. switching current 3 A, max. 25 ms |
| | Max. continuous current 500 mA |
| | Contact response N/C or N/O |
| | Interval 000.0 ... 999.9 h (000.0 h = cleaning function disabled) |
| | Cleaning time/relax time 0000 ... 1999 s |
| Limit values | Min/max contacts, floating, interconnected |
| Min/Max | Contact response N/C or N/O |
| | Response delay 0000 ... 9999 s |
| | Setpoints Within selected range |
| | Hysteresis User-defined |
| Service functions in the Maintenance menu | Sensor monitor Direct display of measured values (mV, temperature, resistance, ...) |
| | Current source ³⁾ Current specifiable for output 1 and 2 (00.00 ... 22.00 mA) |
| | Relay test ⁴⁾ Manual control of relay contacts |

¹⁾ ISM with TAN option FW-E053

²⁾ At rated operating conditions

³⁾ Not if PROFINET communication is enabled

⁴⁾ Only if PROFINET communication is enabled

Specifications

Device

| | | |
|------------------|---|--|
| Product name | Stratos Multi | |
| Product type | E461N | |
| Measurements | pH ORP Amperometric/optical oxygen Contacting/toroidal conductivity measurement Dual conductivity measurement | |
| 2 parameter sets | Parameter set A and B Switchover via digital control input OK1 or manually | |
| Memory card | Accessory for additional functions (firmware update, measurement recorder, logbook) | |
| | Memory size | 32 MB |
| | Logbook | If used exclusively: At least 20,000 entries |
| | Measurement recorder | If used exclusively: At least 20,000 entries |
| | Computer ports | Micro USB |
| | Connection to device | Plug |
| | Communication | USB 2.0, high-speed, 12 Mbits/s Data Card: MSD (mass storage device) FW Update Card, FW Repair Card: HID (human interface device) |
| | Dimensions | L 32 mm x W 12 mm x H 30 mm |
| Display | Graphical TFT color display, 4.3", white backlighting | |
| | Resolution | 480 x 272 pixels |
| | Language | German, English, French, Spanish, Italian, Portuguese, Chinese, Korean, Swedish |
| | Sensoface | Sensor status display: Happy, neutral, sad smileys |
| | Status indicators | Icons for parameter setting and messages |
| Keypad | Softkey 1 left, softkey 2 right, arrow keys (cursor), entry (enter) | |
| Door contact | When door is open: electric signal and logbook entry | |
| Real-time clock | Different time and date formats selectable, power reserve approx. 1 day | |
| Housing | Molded enclosure | Glass fiber reinforced Front unit material: PBT Rear unit material: PC |
| | Ingress protection | IP66/IP67/TYP E 4X outdoor (with pressure compensation) when the device is closed |
| | Flammability | UL 94 V-0 for external parts |
| | Weight | 1.2 kg (1.6 kg incl. accessories and packaging) |
| | Mounting | Wall, pipe/post or panel mounting |
| | Color | Gray RAL 7001 |
| | Dimensions | H 148 mm, W 148 mm, D 117 mm |
| | Control panel cutout | 138 mm x 138 mm acc. to DIN 43 700 |

Stratos Multi

Specifications

| | | |
|----------------------------|--|--|
| Cable glands | 5 knockouts for M20 x 1.5 cable glands 2 of 5 knockouts for NPT 1/2" or rigid metallic conduit (RMC) | |
| Terminals | Screw terminals | Single or stranded wires up to 2.5 mm ² |
| | Tightening torque | min. 0.5 Nm / max. 0.6 Nm |
| Wiring | Stripping length | Max. 7 mm |
| | Temperature resistance | > 75 °C / 167 °F |
| Rated operating conditions | Climatic class | 3K5 according to EN 60721-3-3 |
| | Location class | C1 according to EN 60654-1 |
| | Ambient temperature | -20 ... 60 °C / -4 ... 140 °F |
| | Altitude of installation site | Power supply max. 60 V DC from 2000 m altitude (AMSL) |
| | Relative humidity | 5 ... 95 % |
| Transport and storage | Transport / storage temperature | -30 ... 70 °C / -22 ... 158 °F |
| Conformity | EMC | EN 61326-1, NAMUR NE 21 |
| | Emitted interference | Class A (industrial applications) ¹⁾ |
| | Immunity to interference | Industrial applications |
| | RoHS conformity | According to EU directive 2011/65/EU |
| | Electrical safety | EN 61010-1 |
| | | Protection against electric shock by reinforced insulation of all extra-low-voltage circuits against mains |
| Interfaces | Communication interface | RJ45 |
| | Number of Ethernet interfaces | 2, via RJ45 to Y cable 2x M12 (ZU1139) |
| | Device type | IO device |
| | IO specification | V2.3 |
| | Conformance class | Class B |
| | Network load class | 2 |
| | Recommended cable | CAT 5, CAT 5e, CAT 6 |
| | Vendor ID | 97 (= Knick) |
| | Device ID | 0x0003 |
| | Min. cycle times | 1 ms |
| | Identification & maintenance | I&M1-3, 0 |
| | Number of AIs | 20 |
| | Number of AOs | 1 |
| Number of DOs | 2 | |

¹⁾ This equipment is not designed for domestic use, and is unable to guarantee adequate protection of the radio reception in such environments.

Specifications

pH Measuring Functions

Memosens input

Input for Memosens sensors (pH, ORP, pH/ORP)

Terminals 1 ... 5 or MK-MS095N module

| | | |
|----------------|----------------------|------------------------------------|
| Display ranges | Temperature | -20.0 ... 200.0 °C / -4 ... 392 °F |
| | pH value | -2.00 ... 16.00 |
| | ORP | -1999 ... 1999 mV |
| | rH value | 0 ... 42.5 |
| | (with pH/ORP sensor) | |

Measurement error Depending on sensor

Module input, analog or ISM¹⁾

For pH and ORP sensors with MK-PH015N

| | | |
|------------------|----------------------|------------------------------------|
| Measuring ranges | Temperature | -20.0 ... 200.0 °C / -4 ... 392 °F |
| | pH value | -2.00 ... 16.00 |
| | ORP | -1999 ... 1999 mV |
| | rH value | 0 ... 42.5 |
| | (with pH/ORP sensor) | |

| | | |
|-----------------------|------------------|---|
| Glass electrode input | Input resistance | $> 1 \times 10^{12} \Omega$ |
| | Input current | $< 1 \times 10^{-12} \text{ A}$ |
| | Impedance range | 0.5 ... 1000 M Ω ($\pm 20 \%$) |

| | | |
|---------------------------|------------------|--|
| Reference electrode input | Input resistance | $> 1 \times 10^{10} \Omega$ |
| | Input current | $< 1 \times 10^{-10} \text{ A}$ |
| | Impedance range | 0.5 ... 200 k Ω ($\pm 20 \%$) |

Measurement error²⁾³⁾ pH value < 0.02 , TC: 0.002 pH/K
 mV value $< 1 \text{ mV}$, TC: 0.1 mV/K

Temperature input via module

Pt100/Pt1000/NTC 30 k Ω /NTC 8.55 k Ω /Balco 3 k Ω

2-wire connection, adjustable

| | | |
|------------------|----------------------------------|------------------------------------|
| Measuring ranges | Pt100/Pt1000 | -20.0 ... 200.0 °C / -4 ... 392 °F |
| | NTC 30 k Ω | -20.0 ... 150.0 °C / -4 ... 302 °F |
| | NTC 8.55 k Ω (Mitsubishi) | -10.0 ... 130.0 °C / 14 ... 266 °F |
| | Balco 3 k Ω | -20.0 ... 130.0 °C / -4 ... 266 °F |

Adjustment range 10 K

Resolution 0.1 °C / 0.1 °F

Measurement error²⁾³⁾ $< 0.5 \text{ K}$ ($< 1 \text{ K}$ for Pt100)
 $< 1 \text{ K}$ for NTC $> 100 \text{ °C}$ / 212 °F)

Temperature compensation Off
 Linear characteristic 00.00 ... 19.99 %/K
 Ultrapure water
 Table: 0 ... 95°C, user-defined in 5 K steps

Ref. temperature 25 °C / 77 °F

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Specifications

| | | |
|--------------------------------|---|--|
| pH calibration and adjustment | Calibration with automatic buffer recognition (Calimatic) | |
| | Manual calibration with entry of individual buffer values | |
| | Product calibration | |
| | Data entry of premeasured sensors | |
| | ISFET zero point (with ISFET sensors) | |
| | Temperature probe adjustment | |
| | Calculation of nominal zero point | |
| | Max. calibration range | Asymmetry potential ± 60 mV |
| | | (zero point) |
| | | Slope 80 ... 103 % (47.5 ... 61 mV/pH) |
| | Zero offset ± 750 mV for Memosens ISFET | |
| Buffer sets | Knick CaliMat | 2.00/4.00/7.00/9.00/12.00 |
| | Mettler-Toledo | 2.00/4.01/7.00/9.21 |
| | Merck/Riedel | 2.00/4.00/7.00/9.00/12.00 |
| | DIN 19267 | 1.09/4.65/6.79/9.23/12.75 |
| | NIST Standard | 1.679/4.005/6.865/9.180 |
| | NIST technical | 1.68/4.00/7.00/10.01/12.46 |
| | Hamilton | 2.00/4.01/7.00/10.01/12.00 |
| | Kraft | 2.00/4.00/7.00/9.00/11.00 |
| | Hamilton A | 2.00/4.01/7.00/9.00/11.00 |
| | Hamilton B | 2.00/4.01/6.00/9.00/11.00 |
| | HACH | 4.01/7.00/10.01 |
| | Ciba (94) | 2.06/4.00/7.00/10.00 |
| | WTW techn. buffers | 2.00/4.01/7.00/10.00 |
| | Reagecon | 2.00/4.00/7.00/9.00/12.00 |
| Specifiable buffer set | TAN Option FW-E002 | |
| ORP calibration and adjustment | ORP data entry | |
| | ORP adjustment | |
| | ORP check | |
| | Temperature probe adjustment | |
| | Max. calibration range -700 ... 700 Δ mV | |
| Adaptive calibration timer | Interval | 0000 ... 9999 h |

¹⁾ ISM with TAN option FW-E053

²⁾ At rated operating conditions

³⁾ ± 1 count, plus sensor error

Specifications

Measuring Functions for Conductivity (Contacting)

| | | |
|------------------------------|--|--|
| Memosens input | Input for Memosens sensors Terminals 1 ... 5 or MK-MS095N module Measurement error Depending on sensor | |
| Module input, analog | Input for analog 2-electrode or 4-electrode sensors with MK-COND025N module Measuring ranges 2-electrode sensors: 0.2 $\mu\text{S} \cdot \text{cm}$... 200 $\text{mS} \cdot \text{cm}$ (conductance limited to 3500 mS) 4-electrode sensors: 0.2 $\mu\text{S} \cdot \text{cm}$... 1000 $\text{mS} \cdot \text{cm}$ Measurement error ^{1) 2)} < 1 % of measured value + 0.4 $\mu\text{S} \cdot \text{cm}$ | |
| Temperature input via module | Pt100/Pt1000/Ni100/NTC 30 k Ω /NTC 8.55 k Ω (Betatherm) 3-wire connection, adjustable Measuring ranges Pt100/Pt1000 -50.0 ... 250.0 °C / -58 ... 482 °F Ni100 -50.0 ... 180.0 °C / -58 ... 356 °F NTC 30 k Ω -20.0 ... 150.0 °C / -4 ... 302 °F NTC 8.55 k Ω (Mitsubishi) -10.0 ... 130.0 °C / 14 ... 266 °F Resolution 0.1 °C / 0.1 °F Measurement error ^{1) 2)} < 0.5 K (< 1 K for Pt100; < 1 K for NTC > 100 °C/212 °F) | |
| Display ranges | Conductivity 0.000 ... 9.999 $\mu\text{S}/\text{cm}$ 00.00 ... 99.99 $\mu\text{S}/\text{cm}$ 000.0 ... 999.9 $\mu\text{S}/\text{cm}$ 0.000 ... 9.999 mS/cm 00.00 ... 99.99 mS/cm 000.0 ... 999.9 mS/cm 0.000 ... 9.999 S/m 00.00 ... 99.99 S/m Resistivity 00.00 ... 99.99 $\text{M}\Omega \cdot \text{cm}$ Concentration 0.00 ... 99.99 % Salinity 0.0 ... 45.0‰ (0 ... 35 °C / 32 ... 95 °F) TDS 0 ... 5000 mg/l (10 ... 40 °C / 50 ... 104 °F) Temperature -20.0 ... 150.0 °C / -4 ... 302 °F Response time (T_{90}) Approx. 1 s | |
| USP Function | Water monitoring in the pharmaceutical industry (USP<645>) with additional specifiable limit value (%) Output via a relay contact | |
| Calibration and adjustment | Automatic with standard calibration solution Calibration by entry of cell constant Product calibration Temperature probe adjustment Permissible cell constant 00.0050 ... 19.9999 cm^{-1} | |

¹⁾ At rated operating conditions

²⁾ ± 1 count, plus sensor error

Stratos Multi

Specifications

Measuring Functions for Conductivity (Inductive)

| | |
|------------------------------|--|
| Digital input | Input for Memosens or SE670/SE680K toroidal conductivity sensors Terminals 1 ... 5 or MK-MS095N module Measurement error Depending on sensor |
| Module input, analog | Input for SE655/656/660 toroidal conductivity sensors with MK-CONDI035N module Measurement error ¹⁾²⁾ 1 % of measured value + 0.005 mS/cm |
| Temperature input via module | Pt100/Pt1000/NTC 30 kΩ, 3-wire connection, adjustable Measuring ranges Pt100/Pt1000 -50.0 ... 250.0 °C / -58 ... 482 °F NTC 30 kΩ -20.0 ... 150.0 °C / -4 ... 302 °F Resolution 0.1 °C / 0.1 °F Measurement error ¹⁾²⁾ < 0.5 K (< 1 K for Pt100; < 1 K for NTC > 100 °C/212 °F) |
| Display ranges | Conductivity 000.0 ... 999.9 μS/cm (not with SE660/SE670) 0.000 ... 9.999 mS/cm (not with SE660/SE670) 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) Temperature -20.0 ... 150.0 °C / -4 ... 302 °F Response time (T90) Approx. 1 s |
| USP Function | Water monitoring in the pharmaceutical industry (USP<645>) with additional specifiable limit value (%) Output via a relay contact |
| Calibration and adjustment | Automatic with standard calibration solution Calibration by input of cell factor Product calibration Installation factor Zero correction Temperature probe adjustment Permissible cell factor 00.0050 ... 19.9999 cm ⁻¹ Permissible transfer ratio 010.0 ... 199.9 Permissible offset ± 0.5 mS Permissible installation factor 0.100 ... 5.000 |

Specifications

| | | | |
|---|---|---|---|
| Temperature compensation (conductivity) | Off | None | |
| | Linear | Linear characteristic | 00.00 ... 19.99 %/K |
| | | Adjustable reference temperature | |
| | | Reference temperature | 25 °C/77 °F |
| | NLF | Natural waters acc. to EN 27888 | |
| | NaCl | NaCl from 0 (ultrapure water) to 26 wt% | (0 ... 120 °C / 32 ... 248 °F) |
| | HCl | Ultrapure water with HCl traces | (0 ... 120 °C / 32 ... 248 °F) |
| NH ₃ | Ultrapure water with NH ₃ traces | (0 ... 120 °C / 32 ... 248 °F) | |
| NaOH | Ultrapure water with NaOH traces | (0 ... 120 °C / 32 ... 248 °F) | |
| Concentration determination (conductivity) TAN option FW-E009 | NaCl | 0 ... 28 wt% | (0 ... 100 °C / 32 ... 212 °F) |
| | HCl | 0 ... 18 wt% | (-20 ... 50 °C / -4 ... 122 °F) |
| | | 22 ... 39 wt% | (-20 ... 50 °C / -4 ... 122 °F) |
| | NaOH | 0 ... 24 wt% | (0 ... 100 °C / 32 ... 212 °F) |
| | | 15 ... 50 wt% | (0 ... 100 °C / 32 ... 212 °F) |
| | H ₂ SO ₄ | 0 ... 37 wt% | (-17.8 ... 110 °C / -0.04 ... 230 °F) |
| | | 28 ... 88 wt% | (-17.8 ... 115.6 °C / -0.04 ... 240.08 °F) |
| | | 89 ... 99 wt% | (-17.8 ... 115.6 °C / -0.04 ... 240.08 °F) |
| | HNO ₃ | 0 ... 30 wt% | (-20 ... 50 °C / -4 ... 122 °F) |
| | | 35 ... 96 wt% | (-20 ... 50 °C / -4 ... 122 °F) |
| H ₂ SO ₄ • SO ₃ (Oleum) | 12 ... 45 wt% | (0 ... 120 °C / 32 ... 248 °F) | |
| Specifiable concentration table | | | |

¹⁾ At rated operating conditions

²⁾ ± 1 count, plus sensor error

Stratos Multi

Specifications

Measuring Functions for Conductivity (Dual)

| | |
|-------------------------------|--|
| Memosens input | Input for Memosens sensors Terminals 1 ... 5 and MK-MS095N module Also possible: Memosens sensor and analog sensor via MK-COND025N module Measurement error Depending on sensor |
| MK-CC05N module input, analog | Input for two analog 2-electrode sensors Measuring range 0 ... 30000 $\mu\text{S} \cdot \text{cm}$ Measurement error ^{1) 2)} < 1 % of measured value + 0.4 $\mu\text{S} \cdot \text{cm}$ Connection length Max. 3 m |
| Temperature input via module | Pt1000, 2-wire connection, adjustable Measuring range -50.0 ... 200.0 °C / -58 ... 392 °F Resolution 0.1 °C / 0.1 °F Measurement error ^{1) 2)} < 0.5 K (< 1 K at > 100 °C / 212 °F) |
| Display ranges | Conductivity 0.000 ... 9.999 $\mu\text{S}/\text{cm}$ 00.00 ... 99.99 $\mu\text{S}/\text{cm}$ 000.0 ... 999.9 $\mu\text{S}/\text{cm}$ 0000 ... 9999 $\mu\text{S}/\text{cm}$ Resistivity 00.00 ... 99.99 $\text{M}\Omega \cdot \text{cm}$ Response time (T90) Approx. 1 s |
| Calibration and adjustment | Automatic with standard calibration solution Calibration by entry of cell constant Product calibration Temperature probe adjustment Permissible cell constant 00.0050 ... 19.9999 cm^{-1} |

¹⁾ At rated operating conditions

²⁾ ± 1 count, plus sensor error

Specifications

Measuring Functions for Oxygen

| | | |
|---|--|--|
| Digital input, Memosens | Standard measurement | Input for amperometric Memosens sensors |
| | Trace measurement | TAN option FW-E016 |
| | Terminals | 1 ... 5 or MK-MS095N module |
| | Display range | Temperature: -20.0 ... 150.0 °C / -4 ... 302 °F |
| | Measurement error | Depending on sensor |
| Digital input, SE 740 | Input for SE 740 optical oxygen sensor | |
| | Trace measurement | TAN option FW-E016 |
| | Terminals | 1 ... 6 |
| | Measuring range | 0 ... 300 % air saturation |
| | Detection limit | 0.01 vol% |
| | Response time T98 | < 30 s (at 25 °C/77 °F, from air to nitrogen) |
| | Display range | Temperature: -10.0 ... 130.0 °C / 14 ... 266 °F The sensor does not supply measured oxygen values above 80 °C/176 °F. |
| | Measurement error | Depending on sensor |
| Module input, analog or ISM ¹⁾ | Standard | Sensors SE 706 InPro6800; Oxyferm |
| | Input range | Measuring current -600 ... 2 nA, resolution 10 pA |
| | Measurement error ²⁾ | < 0.5 % of measured value + 0.05 nA + 0.005 nA/K |
| | Trace measurement | Sensors SE 707 |
| | TAN option FW-E016 | InPro 6900 Oxyferm/Oxygold |
| | Input range I | Measuring current -600 ... 2 nA, resolution 10 pA Automatic range selection |
| | Measurement error ²⁾ | < 0.5 % of measured value + 0.05 nA + 0.005 nA/K |
| | Input range II | Measuring current -10000 ... 2 nA, resolution 166 pA Automatic range selection |
| | Measurement error ²⁾ | < 0.5 % of measured value + 0.8 nA + 0.08 nA/K |
| | Polarization voltage | -400 ... -1000 mV Presetting -675 mV Resolution < 5 mV |
| | Permissible guard current | ≤ 20 µA |
| Temperature input via module | 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 ²⁾³⁾ | < 0.5 K (< 1 K for Pt100; < 1 K for NTC > 100 °C/212 °F) |
| Operating modes | Measurement in gases | |
| | Measurement in liquids | |

Stratos Multi

Specifications

| | | |
|---|--|--|
| Measuring ranges | Standard sensor (Memosens, SE740, digital, analog) | |
| | Saturation ⁴⁾ | 0.0 ... 600.0 % |
| | Concentration ⁴⁾ (dissolved oxygen) | 0.00 ... 99.99 mg/l (ppm) |
| | Volume concentration in gas | 0.00 ... 99.99 vol% |
| | Trace sensor "01" (Memosens, SE740, digital, analog) | |
| | Saturation ⁴⁾ | 0.000 ... 150.0 % |
| | Concentration ⁴⁾ (dissolved oxygen) | 0000 ... 9999 µg/l / 10.00 ... 20.00 mg/l 0000 ... 9999 ppb/10.00 ... 20.00 ppm |
| | Volume concentration in gas | 000.0 ... 9999 ppm / 1.000 ... 50.00 vol% |
| | Trace sensor "001" (analog) | |
| | Saturation ⁴⁾ | 0.000 ... 150.0 % |
| Concentration ⁴⁾ (dissolved oxygen) | 0000 ... 9999 µg/l / 10.00 ... 20.00 mg/l 0000 ... 9999 ppb/10.00 ... 20.00 ppm | |
| Volume concentration in gas | 000.0 ... 9999 ppm / 1.000 ... 50.00 vol% | |
| Input correction | Pressure correction | 0.000 ... 9999 bar/999.9 kPa/145.0 psi (adjustable) manually or externally (via current input 0(4) ... 20 mA) |
| | Salinity correction | 0.0 ... 45.0 g/kg |
| Calibration and adjustment | Automatic calibration in air-saturated water Automatic calibration in air Saturation product calibration (with offset in SE740) Zero correction Temperature probe adjustment | |
| Calibration ranges | Standard sensor "10" | |
| | Zero point | ± 2 nA |
| | Slope | 25 ... 130 nA (at 25 °C / 77 °F, 1013 mbar) |
| | Trace sensor "01" | |
| | Zero point | ± 2 nA |
| | Slope | 200 ... 550 nA (at 25 °C / 77 °F, 1013 mbar) |
| | Trace sensor "001" | |
| | Zero point | ± 3 nA |
| | Slope | 2000 ... 9000 nA (at 25 °C / 77 °F, 1013 mbar) |
| Calibration timer | 0000 ... 9999 h | |

¹⁾ ISM with TAN option FW-E053

²⁾ At rated operating conditions

³⁾ ± 1 count, plus sensor error

⁴⁾ For temperature range -10 ... 80 °C / 14 ... 176 °F

Specifications

Diagnostics and Statistics

Diagnostic functions

| | |
|------------------|--|
| Calibration data | Calibration record |
| Device self-test | Automatic memory test (RAM, FLASH, EEPROM) |
| Display test | Display of all colors |
| Keypad test | Check of key functions |

Sensocheck

| | |
|---------------------|---|
| Delay: approx. 30 s | |
| pH | Automatic monitoring of glass and reference electrode (can be switched off) |
| Cond | Polarization detection and monitoring of cable capacitance |
| Condl | Monitoring of primary and secondary coils and lines for open circuit and of primary coil and lines for short circuit |
| Oxygen | With amperometric sensors only: Monitoring of membrane and electrolyte and the sensor wires for short circuits and open circuits (can be switched off) |

Sensoface

| | |
|--|--|
| Provides information on the sensor condition (can be switched off; happy, neutral, or sad smileys) | |
| pH | Evaluation of zero/slope, response, calibration interval, Sensocheck, wear |
| Cond | Evaluation of Sensocheck |
| Condl | Evaluation of zero point, cell factor, installation factor, Sensocheck |
| Oxygen | Evaluation of zero point/slope, response time, calibration interval, Sensocheck, and sensor wear for digital sensors |

Sensor monitor

| | |
|---|----------------------------|
| Display of direct sensor measured values: | |
| pH | pH/voltage/temperature |
| Cond | Resistance/temperature |
| Condl | Resistance/temperature |
| Oxygen | Sensor current/temperature |

Measurement recorder
TAN option FW-E103

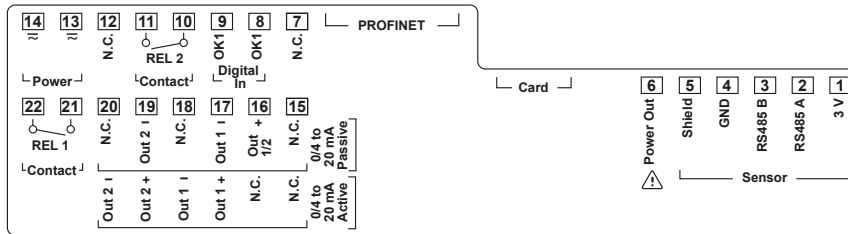
| | |
|---|---|
| 4-channel measurement recorder with marking of events (failure, maintenance required, function check, limit values) | |
| 1 measured value per second | |
| Storage capacity | 100 entries in device memory, at least 20,000 entries in conjunction with Data Card |
| Recording | Process variables and span freely adjustable |
| Type of recording | Current value |
| Time base | 10 s ... 10 h |

Logbook

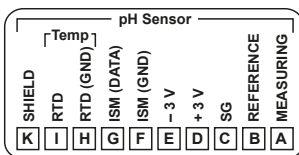
| | |
|---|---|
| Recording of function activations, appearance and disappearance of warning and failure messages, with date and time, 100 events with date and time, viewable on display | |
| TAN option FW-E104 | At least 20,000 entries in conjunction with Data Card |

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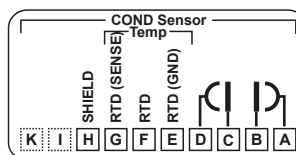
Stratos Multi E461 N Terminal Assignments



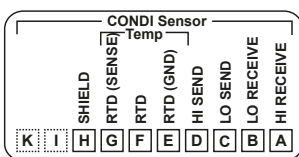
MK-PH 015N Module Terminal Assignments



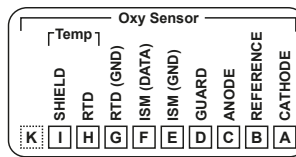
MK-COND 025N Module Terminal Assignments



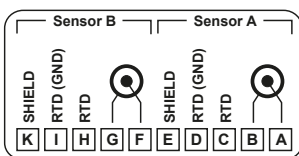
MK-CONDI 035N Module Terminal Assignments



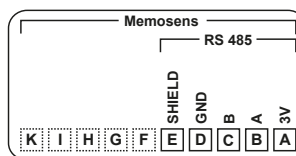
MK-OXY 046N Module Terminal Assignments



MK-CC 065N Module Terminal Assignments



MK-MS 095N Module Terminal Assignments

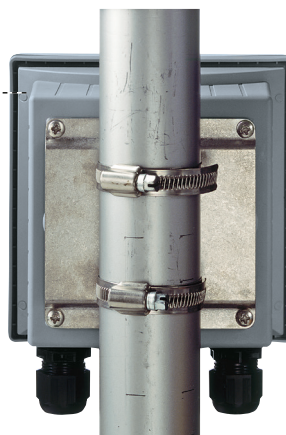


Easy Installation

- Wall-, pipe-, or panel-mount installation
- All parts are easily accessible
- Large terminal compartment
- Rear unit can be pre-installed
- Also suitable for rigid metallic conduits
- Replaceable plug-in terminals
- Replacement of 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

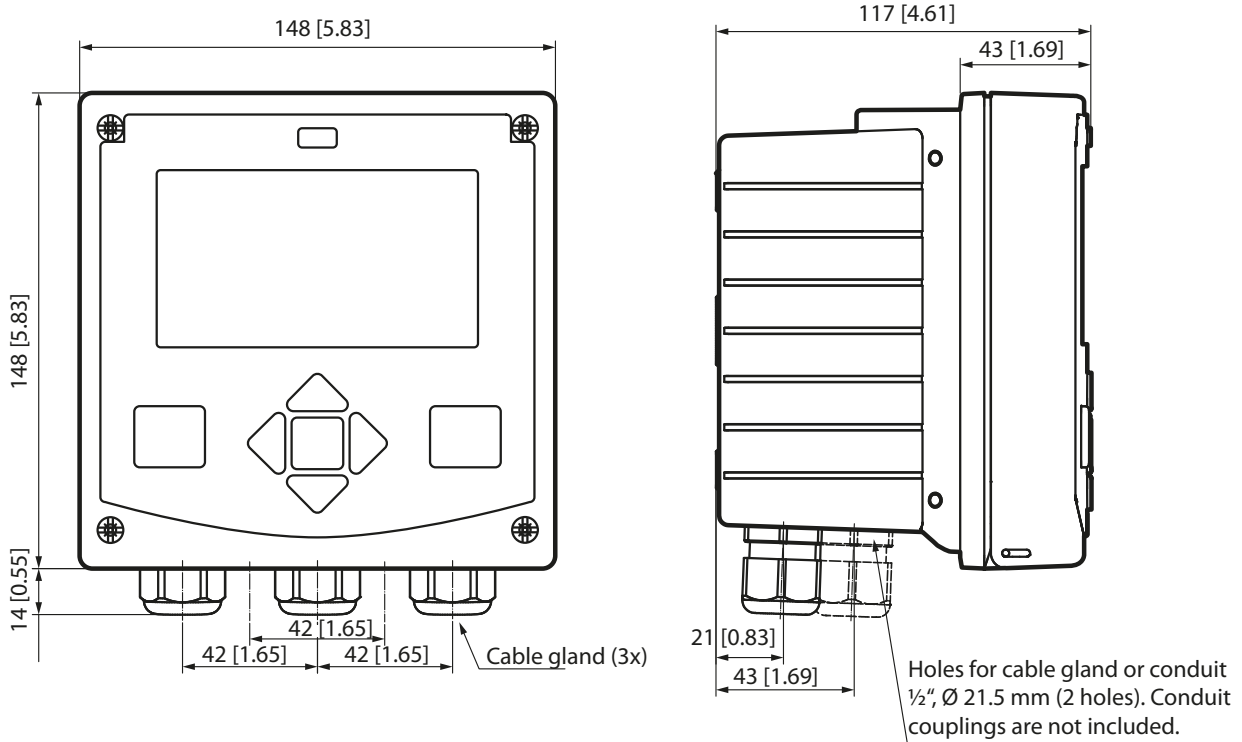
For installation in standardized panel cutout 138 x 138 mm (DIN 43700), sealed against panel.



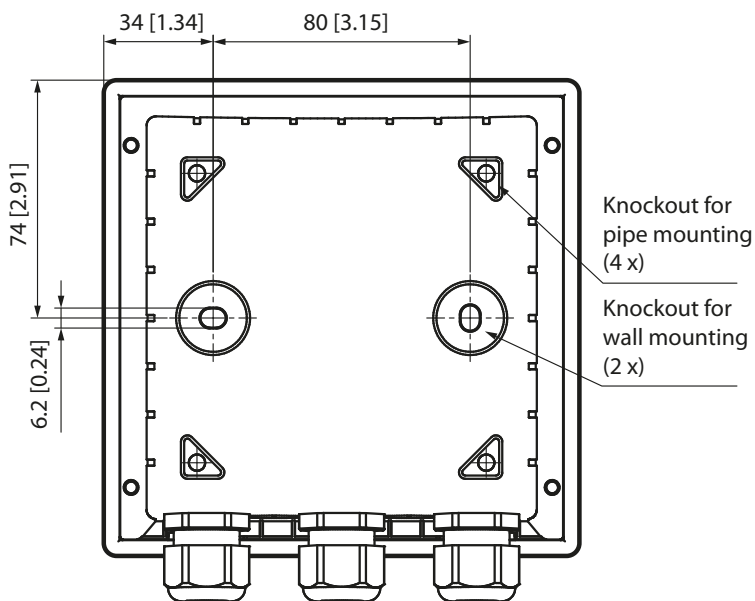
Stratos Multi

Dimension Drawings – Wall Mounting

Front and Side View



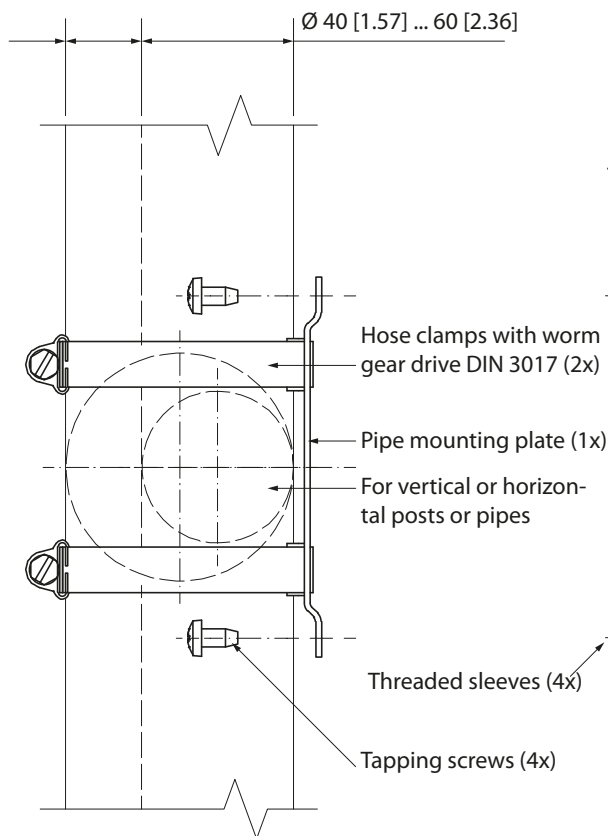
Rear View



All dimensions in mm [inches]

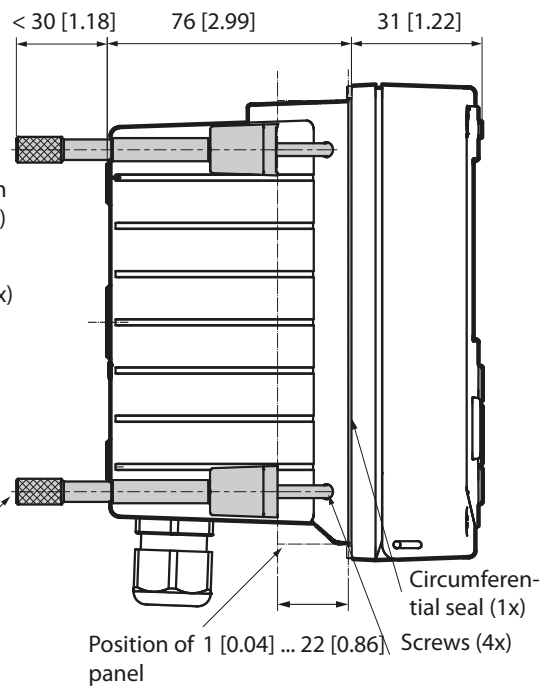
Dimension Drawings – Pipe/Panel Mounting

ZU 0274 Pipe-Mount Kit



ZU 0738 Panel-Mount Kit

Panel cutout 138 x 138 mm (DIN 43700)



All dimensions in mm [inches]

Stratos Multi

Dimension Drawings – Protective Hood

ZU 0737 Protective Hood

