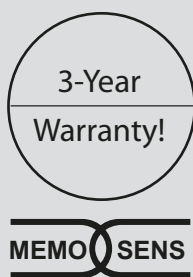




Stainless Steel Design
for Hygienic Applications



Powder-coated design
for corrosive areas



Protos II 4400 (X)

The new modular premium transmitter for all requirements.
Versatile. Expandable. Ensuring process safety.

The new Protos II 4400 (X) premium transmitter is a flexible, 4-wire device for the following process variables: pH, ORP, conductivity, and oxygen.

For monitoring and controlling processes even in the most complex applications – also in hazardous areas.

Retrofits Possible, Future-Proof.

Protos II 4400 (X) features a unique modular design and freely accessible wiring with a clear layout. The option for easy retrofitting and upgrading ensure planning security today and in the future. Different Ethernet and Fieldbus modules enable digital communication and seamless integration into automation systems.

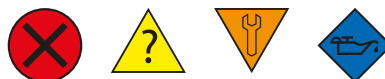
Wide Sensor Selection

Protos II 4400 (X) is the only process analysis system that can be flexibly combined with Memosens and other digital or analog sensors – in multi-channel mode as well. With Memosens technology, up to 6 measuring channels can be implemented in parallel.

Status Messages

According to NE 107

All status messages for maintenance requests, failure, out of specification, and function check (HOLD) are output as specified in NE 107.



Reliable and Safe Thanks to Memosens Technology

Digital sensors with inductive signal transmission – contactless sensor couplings ensure the reliable analysis of liquid in all environments. Sensors that are pre-calibrated in the laboratory provide maximum availability and reduced maintenance efforts at the point of measurement. Even non-specialist employees can replace sensors on site in just a matter of seconds.

- Perfect galvanic isolation
- Fully resistant to moisture, dirt, corrosion, and interference potentials
- Easy to use, even under harsh conditions
- Up to 100 m cable length

Facts and Features

- Stainless steel design with hygienically optimized surface. Ideal for pharmaceutical or food production
- Stainless steel design with corrosion-proof powder coating for harsh industrial areas
- Universal broad-range power supply 24 ... 230 V AC/DC
- Rugged; can also be used outdoors (with IP65 protection and UV resistance)
- Panel, wall or post/pipe mounting
- Multiparameter and multichannel function with up to 6 Memosens sensors
- High-contrast graphic LC display
- USB memory card concept for recording data and firmware updates
- Freely combinable measuring, control, and communication modules

Protos II 4400

The Benchmark for the Most Demanding Measuring Tasks.

Advanced Process Control

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

Protos II 4400 with PN 4400-095 PROFINET module – easy connection to an Industrial Ethernet network.

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.

PROFINET

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

The PROFINET PN 4400-095 module for Protos II 4400 complies with all the standards of the PI organization*) such as IEC 61158 and IEC 61784 for PROFINET communication in industrial networks.

Non-Proprietary

In combination with the PROFINET module, Protos II 4400 can be used with process control systems from any relevant supplier, such as Siemens, Honeywell, or Rockwell/Allen Bradley.

Easy Integration

Use of a common and integrated network reduces the number of interfaces and thus potential sources of errors during installation. The amount of installation work required is minimized by the use of a PROFINET GSDML file (device master file).

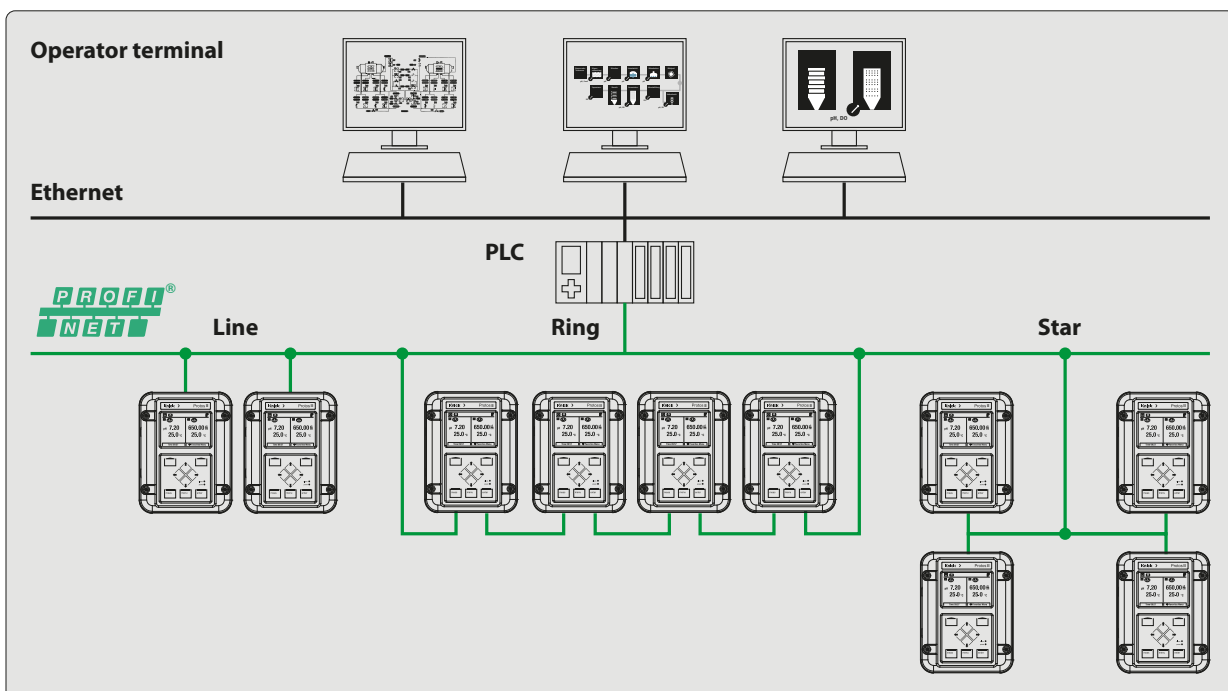
The device's configuration is stored in the IO controller (PLC).

If the system is expanded or a device fails, a new transmitter can be incorporated; the configuration is uploaded directly.

Configuration data specific to sensors can be saved on the Data Card via the transmitter and uploaded to identical new devices.

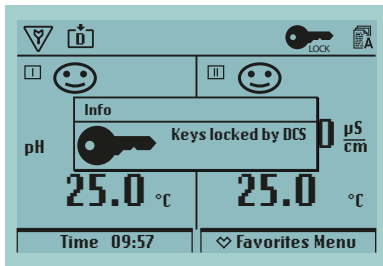
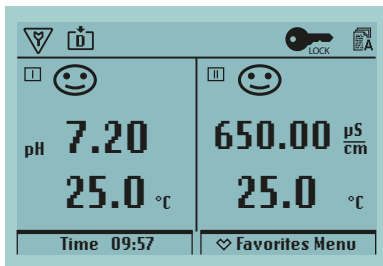
*) PROFIBUS & PROFINET International

Integration of Protos II 4400 in PROFINET Industrial Ethernet network



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.



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.

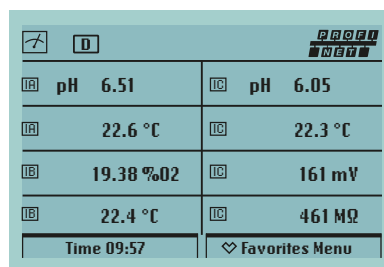
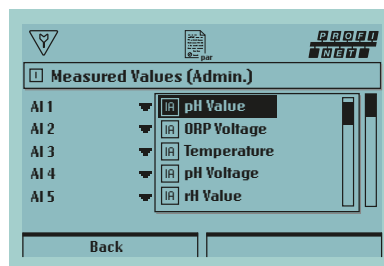
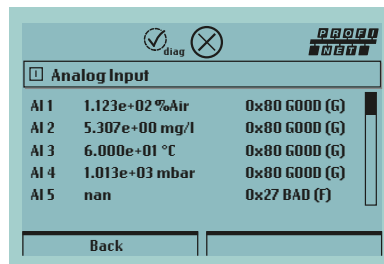
Transfer of up to 20 values, freely configurable measured or diagnostics data as AI 1-20 (analog input blocks), also in multichannel mode

e.g., 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 life-time, operating time, calibration timer, SIP counter, CIP counter, etc.



Real-time data transmission also enables simplified, predictive service.

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 PI specifications, as is the extended diagnostics data from the sensor and transmitter (NAMUR NE 107).

PROFINET diagnostics

All PROFINET communication is monitored directly in the Protos II 4400 transmitter via the PROFINET PN 4400-095 module.

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

Als: Values from transmitter to PCS
AOs: Values from PCS to transmitter

Multichannel and Multiparameter

Up to three Memosens sensors can be connected to a module with the MSU 4400(X)-180 multichannel and multiparameter measuring module.

Protos II 4400(X) offers space for up to two measuring modules and can be easily and flexibly expanded into a multichannel transmitter for up to six Memosens sensors with the MSU 4400(X)-180.

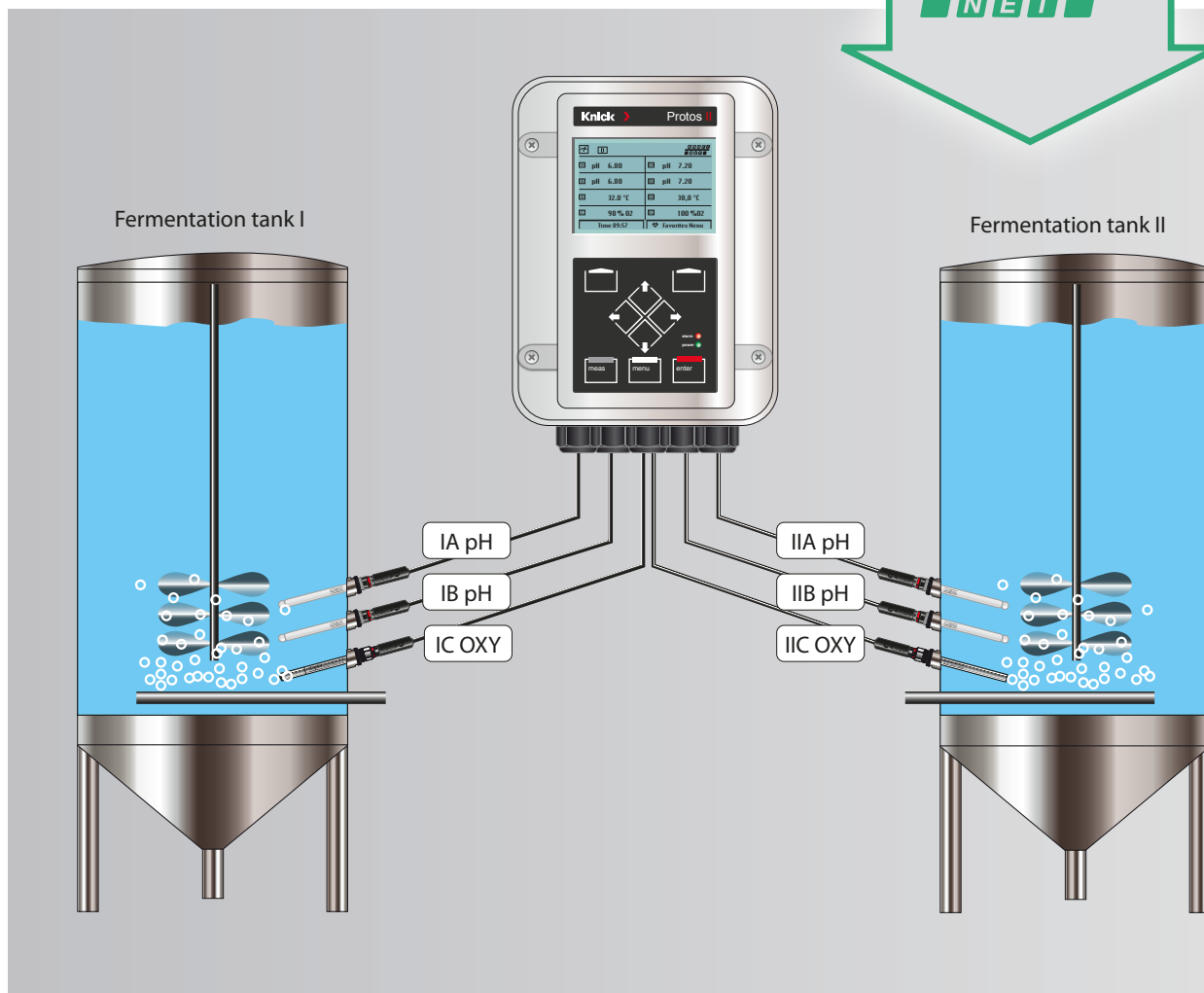
Protos II 4400

The Benchmark for the Most Demanding Measuring Tasks.

Easy Handling

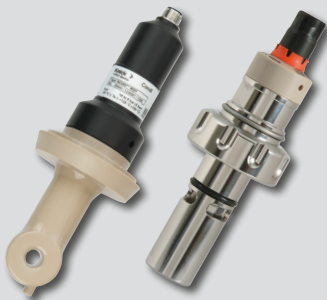
PROFINET communication can be used to perform product calibration via the PCS.

The sensor can therefore be safely calibrated when installed.





pH
ORP



Cond



Oxy

Conveniently Simple Operation

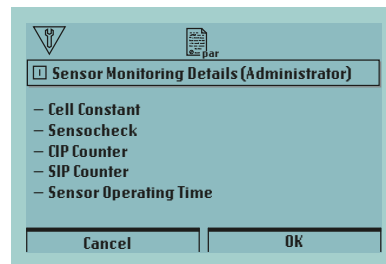
Users are guided through all menus and receive error messages and troubleshooting information on a clearly arranged display. Text can be displayed in a wide range of languages.

High-Resolution Graphic Display

White backlighting ensures optimal legibility even under poor light conditions. The self-explanatory plain text user interface in accordance with NAMUR ensures easy, intuitive handling and a clearly arranged display of sensor data – in multichannel mode as well.

Facts and Features

- 4-wire system with active current outputs (standard in BASE module)
- Application in hazardous locations Zone 1 / Cl 1 Div 2
- High-resolution graphic display
- Parameter set changeover for greater process control flexibility
- KI recorder for signaling faulty processes
- Softkeys for flexible, intuitive operation
- Flexible combination of sensors and process variables



Expandable Multilingualism

The menu texts are easy to switch among German, English, French, Portuguese, Italian, Spanish, and Asian languages.

Sensor Flexibility

Protos II 4400 (X) can operate Memosens, digital and analog sensors. For the following process variables:

- pH, ORP
- Contacting and inductive conductivity
- Amperometric and optical oxygen

Flexibly combined with one another.

Protos II 4400 (X) User-Friendly Functionality.

Comprehensive Variety.

Modular Concept

Protos II offers space for a total of three different, freely combinable measuring and communication modules. Later retrofits and modifications are no problem.

Plug & Play

The modules are simply plugged into slots in any sequence and are automatically detected. This enables easy retrofitting and conversion — always adapted to the special requirements of the measuring point.

A wide range of different measuring, control, and communication modules with various functions are available.

Measuring Modules

Multi

Multiparameter measuring modules for Memosens sensors, 1-, 2-, 4-, or 6-channel as required. For all parameters; expandable for new sensors.

pH Measurement

Modules for operation with analog or digital sensors as required: for simultaneous measurement of pH value, ORP, and temperature. Available in designs for glass, ISFET, and double high-resistance differential sensors (pNa).

Conductivity Measurement

Modules for conductivity measurement with 2-/4-electrode or toroidal sensors; module versions for analog and digital sensors. Simultaneous measurement of electrical conductivity, resistivity, concentration, salinity, and temperature.

Oxygen Measurement

Modules for measuring oxygen using the amperometric and optical measurement principles. For analog and digital sensors. Simultaneous measurement of oxygen partial pressure, saturation and concentration. For standard applications and trace measurements in both aqueous media and gases.

Communication Modules

Ethernet and Fieldbus modules for digital communication and seamless integration into automation systems.

Output Modules

For expanding the outputs available as standard by adding passive 4-20 mA outputs and relay outputs.

PID Controller Modules

For actuating control valves, straight-way valves, or metering pumps. With 2 free limit contacts for 3-point control of secondary control processes, for example.



Fieldbus
Foundation





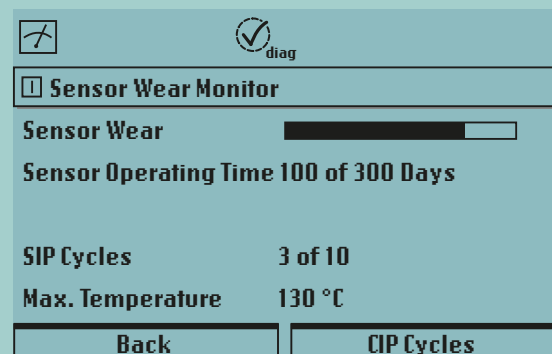
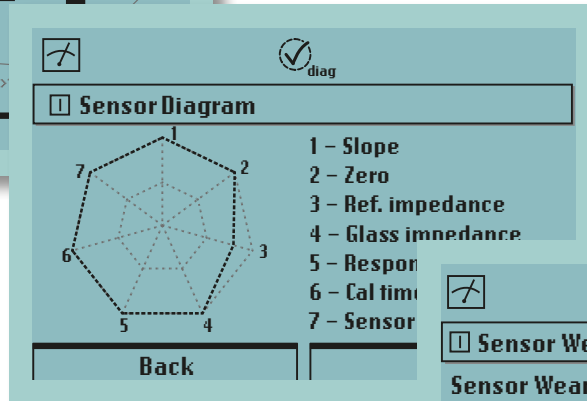
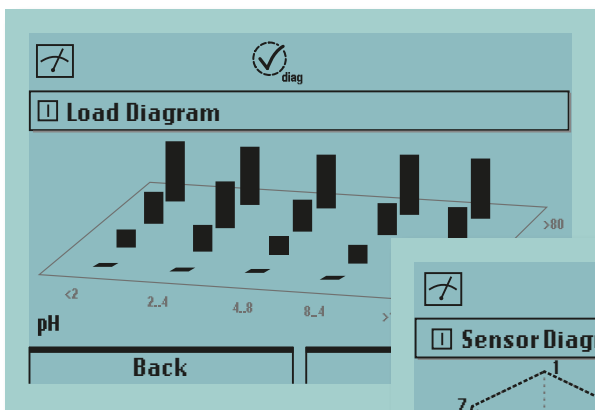
The smart diagnostic functions that Protos II provides for analyzing sensor life cycles mean a significant increase in sensor service life and availability.

Sensor Diagram

Graphical presentation of the current sensor parameters for pH, ORP, and oxygen on the display in a clearly arranged sensor diagram – for pH measurement with slope, zero point, reference impedance, glass impedance, response time, calibration timer, and sensor wear.

Smart Diagnostics Management for Optimal Process Control

- CIP, SIP, and autoclave counters and information from the sensor load matrix optimize the maintenance cycle.
- Sensor wear monitor
- Display of the sensor's remaining service life
- Adaptive calibration timer
- Guided calibration procedures
- Sensoface as a sensor status indicator, can be configured to alarm message



Protos II 4400 (X) Digital Intelligence.

Reliable Writing and Reading with USB Memory Cards

Data Card

For recording measured values, reading out and further processing recorded measurement data on a computer, and saving the configuration data of the device.



Firmware Update Card

Easy on-site update of device firmware in the case of function expansion.

Firmware Repair Card

Easy on-site update of the device firmware for troubleshooting in case of warranty claims.

Prolog 4000 Software

The computer software tool for offline configuration of Knick transmitters.

Device settings can easily and conveniently be configured in advance – also for multichannel transmitter systems. Thanks to a clearly arranged display and convenient processing in a variety of languages, Protos II can be configured for the measuring task.

The configuration data can be saved on the data card and only has to be copied to the transmitter on site.





CHEMISTRY

- Control of various chemical processes
- Use in explosive and aggressive environments
- Industrial wastewater

Example:

Production of Azo Dyes

During the uninterrupted dye synthesis process that is part of azo dye production, all of the key reaction steps depend on precise pH measurement. Even in this highly hydrochloric, corrosive environment, Protos transmitters, Unical probe controllers, and wear-resistant Ceramat retractable fittings ensure reliable, automatic pH measurement and long sensor service life. And a significant reduction in maintenance costs as well.

FOOD & BEVERAGE

- Monitoring and control of the entire production process
- Monitoring CIP systems / increasing the concentration of alkaline or acidic solutions
- Monitoring water treatment

Example:

Monitoring Sugar Production

In sugar production, continuous pH measurement in 2nd carbonatation is a major challenge – with high proportions of solids, temperatures of over 90 °C / 194 °F, and extreme buildup from lime, non-sugar particles, and sticky syrup. In conjunction with Unical controllers and Ceramat or SensoGate retractable fittings, Protos has set new global standards in the industry, ensuring fully automated measuring point operation during the entire sugar campaign.

Protos II 4400 (X)
For all applications.

PHARMACEUTICALS /
BIOTECHNOLOGY

- Seamless process monitoring in production and upstream and downstream areas
- Process control of pH values and oxygen content in the fermentation operation
- Monitoring CIP systems / increasing the concentration of alkaline or acidic solutions
- Ultrapure water monitoring (WFI) acc. to USP

Example:
Insulin Production

In the complex insulin production process, the pH value, temperature, and oxygen content must be measured simultaneously to precisely control the fermentation process. In the S Sepharose and high performance liquid chromatography (HPLC) phases, the pH value and conductivity must be simultaneously measured. Due to their high reliability and unique flexibility, Protos multiparameter transmitters are used in this process on a daily basis.

POWER PLANTS

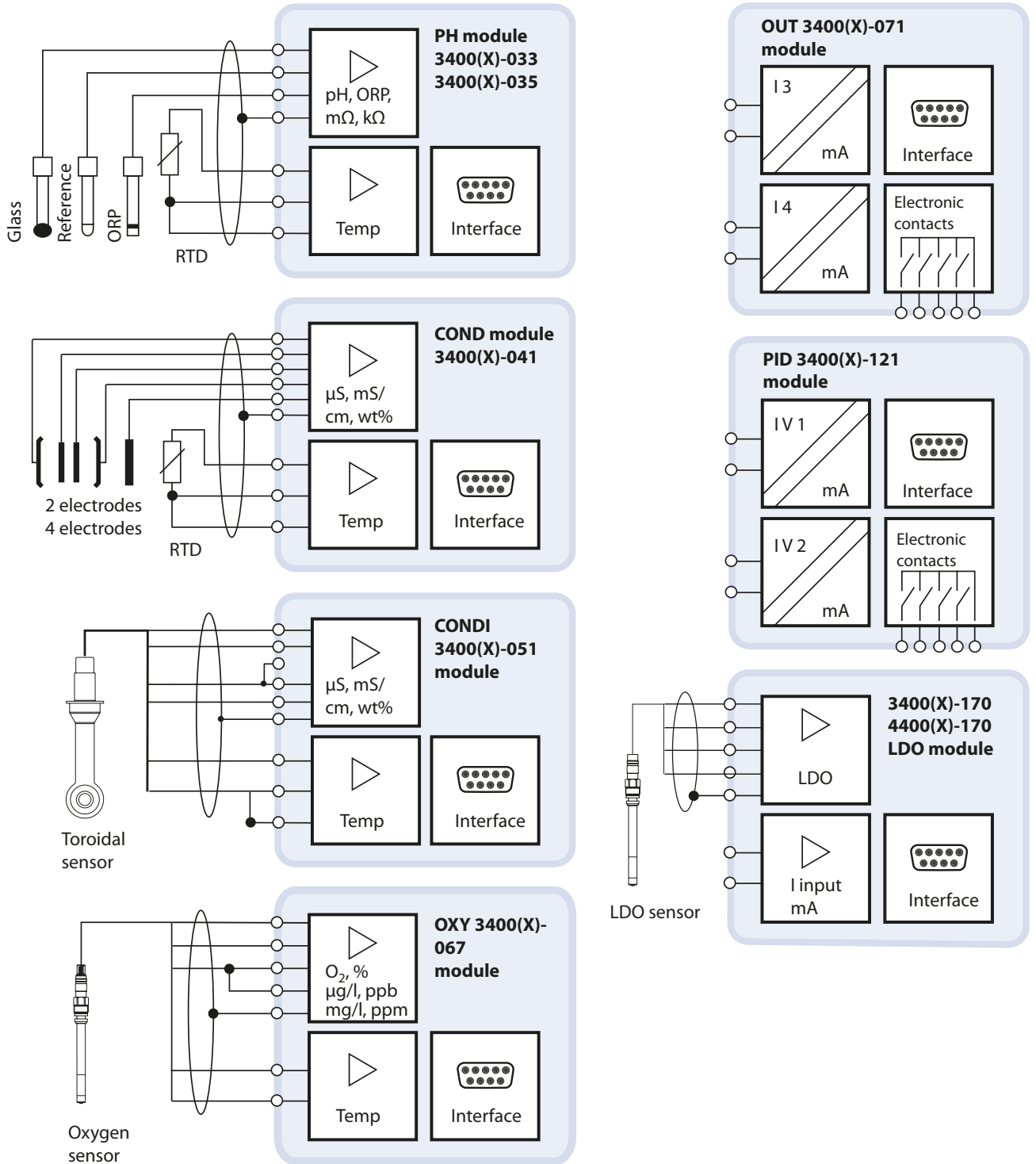
- Reliable water/steam monitoring
- Precise detection of oxygen traces
- Control of alkali feed to minimize corrosion

Example:
Flue Gas Purification

The extreme conditions in a gas scrubber require high-maintenance measuring points, especially for flue gas desulfurization. Alongside incrusting deposits, abrasive sludge is a special challenge for pH measurement in this process. The Protos measuring system also measures under extremely harsh conditions. For the care and extension of its service life, the sensor is automatically extended into the process medium for a short time only, and is then cleaned.

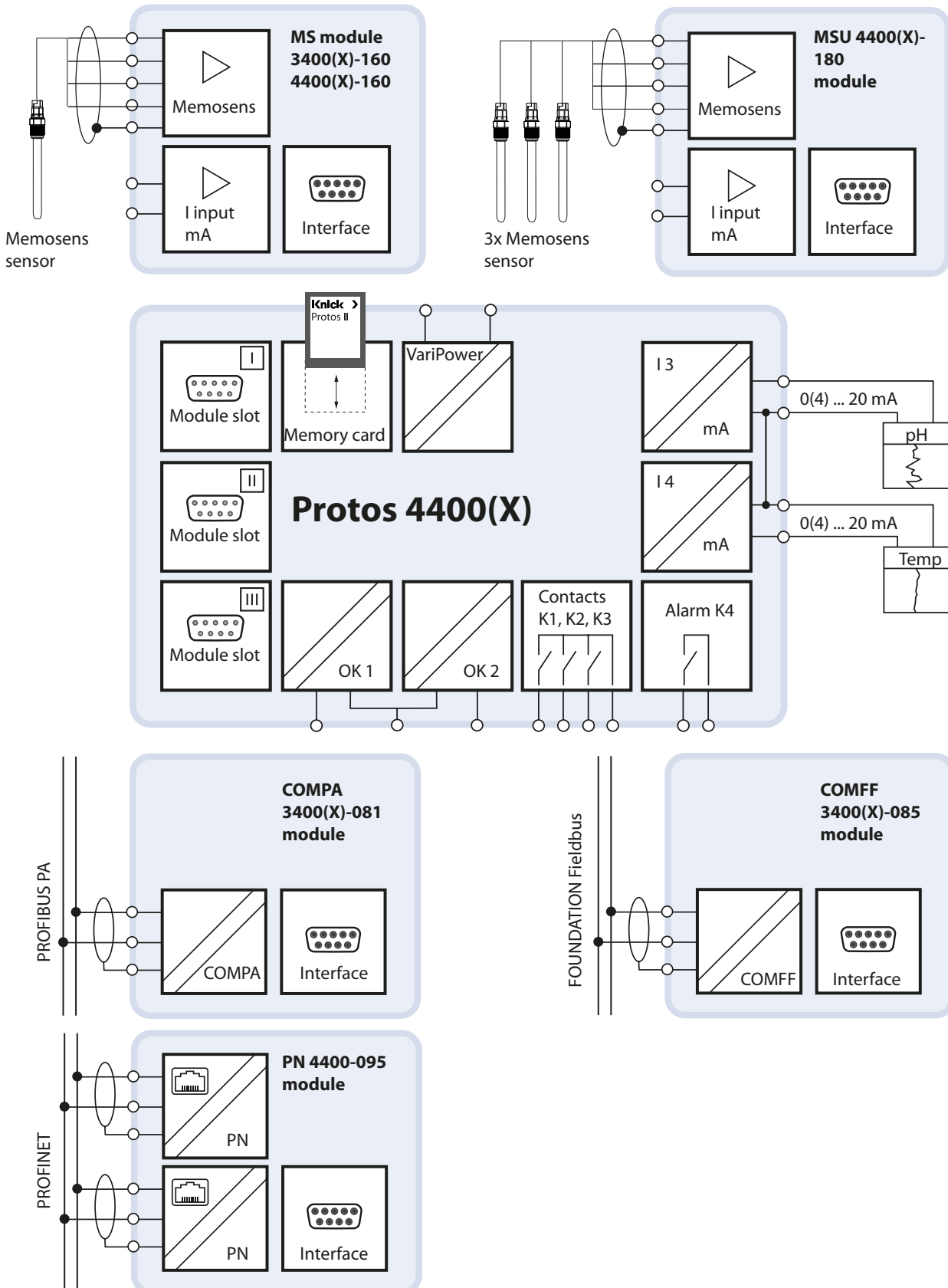


System Overview



Protos II 4400 (X)

System Overview



Product Line**Protos II 4400**

Protos II 4400 S (basic unit, polished stainless steel), broad-range power supply
 Protos II 4400 C (basic unit, coated steel), broad-range power supply

Order No.

4400 S
 4400 C

Measuring Modules

PH 3400-033 measuring module (double high-resistance)
 PH 3400-035 measuring module

Order No.

PH 3400-033
 PH 3400-035

COND 3400-041 measuring module
 CONDI 3400-051 measuring module

COND 3400-041
 CONDI 3400-051

OXY 3400-067 measuring module
 LDO 4400-170 measuring module

OXY 3400-067
 LDO 4400-170

MS 4400-160 digital measuring and communication module for Memosens sensors
 (oxygen measurement can be activated via TAN)

MS 4400-160

MSU 4400-180 digital measuring and communication module for Memosens sensors
 (oxygen measurement, measuring channel B and C can be activated via TAN)

MSU 4400-180

Communication Modules

OUT 3400-071 output module
 PID 3400-121 controller module

Order No.

OUT 3400-071
 PID 3400-121

COMPA 3400-081 PROFIBUS PA communication module
 COMFF 3400-085 FOUNDATION Fieldbus communication module
 PN 4400-095 PROFINET communication module

COMPA 3400-081
 COMFF 3400-085
 PN 4400-095

Protos II 4400 (X)

Product Line

Protos II 4400 X

Protos II 4400X S (basic unit, polished stainless steel, broad-range power supply)
 Protos II 4400X S (basic unit, polished stainless steel, 24 V AC/DC)

Protos II 4400X C (basic unit, coated steel, broad-range power supply)
 Protos II 4400X C (basic unit, coated steel, 24 V AC/DC)

Order No.

4400 XS / VPW
 4400 XS / 24 V

4400 XC / VPW
 4400 XC/24V

Measuring Modules

PH 3400X-033 measuring module (double high-resistance)
 PH 3400X-035 measuring module

COND 3400X-041 measuring module
 CONDI 3400X-051 measuring module

OXY 3400X-067 measuring module

MS 4400X-160 digital measuring and communication module for Memosens sensors
 (oxygen measurement can be activated via TAN)

MSU 4400X-180 digital measuring and communication module for Memosens sensors
 (oxygen measurement, measuring channel B and C can be activated via TAN)

Order No.

PH 3400X-033
 PH 3400X-035

COND 3400X-041
 CONDI 3400X-051

OXY 3400X-067

MS 4400X-160

MSU 4400X-180

Communication Modules

OUT 3400X-071 output module
 PID 3400X-121 controller module

COMPA 3400X-081 PROFIBUS PA communication module
 COMFF 3400X-085 FOUNDATION Fieldbus communication module

Order No.

OUT 3400X-071
 PID 3400X-121

COMPA 3400X-081
 COMFF 3400X-085

Accessories for Protos II 4400 (X)

Mounting Kits

	Order No.
Pipe-mount kit	ZU 0544
Panel-mount kit	ZU 0545
Protective hood	ZU 0548

Connector Plugs and Cables

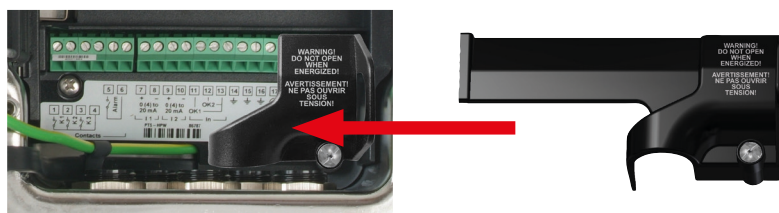
	Order No.	
VP8 connector	ZU 0721	
M12 socket, 8-pin	ZU 0860	
VP8 ST cable (both ends with VP socket)	Length 3 m	ZU 0710
	Length 5 m	ZU 0711
	Length 10 m	ZU 0712
M12 extension cord, 8-pin	Length 10 m	CA/M12-010M12-8
Cable gland for RJ45 cable (PROFINET) or other cable types	ZU 1072	
Adapter cable RJ45/M12 D-type for PROFINET communication	ZU 1073	
Terminal Cover	ZU 1042	

Device-Specific Add-On Functions for Expanding the Transmitter Functionality via TAN

	Order No.
5 parameter sets	FW4400-102
Measurement recorder	FW4400-103
Logbook	FW4400-104
Firmware update	FW4400-106
Buffer table for pH measurement	FW4400-002
Tolerance band recorder	FW4400-005
Current characteristic	FW4400-006
Ultrapure water: Temperature compensation for conductivity	FW4400-008
Concentration determination for use with conductivity sensors	FW4400-009
Sensor channel B for activating 2nd Memosens sensor on MSU 4400(X)-180	FW4400-014
Oxygen measurement incl. trace measurement for MS 4400(X)-160	FW4400-015
Sensor channel B + C for activating 2nd.+ 3rd Memosens sensors on MSU 4400(X)-180	FW4400-018
Inspection certificate 3.1	ZU 0268/ ANALYSE01

ZU 1042 Terminal Cover

ZU 1042 full-size terminal cover to replace cover in package contents.



Protos II 4400 (X)

Accessories for Protos II 4400 (X)

Memory Cards for Protos II 4400

ZU 1080- P - N -

Card version	Data Card	D
	Firmware Update Card	U
	Firmware Repair Card	R

Memory Cards for Protos II 4400

ZU 1080- P - N - - - -

Card version	Custom Firmware Update Card (in conjunction with FW4400-106)	S	
	Custom Firmware Repair Card	V	
Firmware versions	Device firmware	B	* *
	MS 4400-160	C	* *
	MS 3400-160	D	* *
	LDO 4400-170	G	* *
	LDO 3400-170	H	* *

Memory Cards for Protos II 4400 X

ZU 1080- P - X -

Card version	Data Card	D
	Firmware Update Card	U
	Firmware Repair Card	R

Memory Cards for Protos II 4400 X

ZU 1080- P - X - - - -

Card version	Custom Firmware Update Card (in conjunction with FW4400-106)	S	
	Custom Firmware Repair Card	V	
Firmware versions	Device firmware	B	* *
	MS 4400X-160	C	* *
	MS 3400X-160	D	* *

Protos II 4400 Specifications

Display ¹⁾	Graphic LC display, white backlighting	
	Resolution	240 x 160 pixels
	Language	German, English, French, Italian, Spanish, Portuguese, Chinese, Korean, Swedish
Keypad	NAMUR keypad, single keys, no double assignment [meas] [menu] [cursor keys] [enter] [softkey 1] [softkey 2] NAMUR LED red and green	
Logbook	Recording function calls, NAMUR messages upon occurrence and disappearance with date and time. The most recent 100 entries are shown in the Diagnostics menu, without the need for a memory card and irrespective of the TAN.	
	Storage capacity (FW4400-104)	At least 20,000 entries Depends on memory size of memory card
Measurement recorder (FW4400-103)	4-channel measurement recorder with marking of events (failure, maintenance request, function check, limit values) for a measured value	
	Recording medium	Memory card
	Recording capacity	At least 20,000 entries Depends on memory size of memory card
	Recording	Process variables and range freely adjustable
	Type of recording	Current value, min/max value, average
Device self-test	Test of RAM, FLASH, EEPROM, display and keypad	
Clock	Real-time clock with date Power reserve Approx. 1 day	
Data retention in case of power failure	Parameters and adjustment data	> 10 years (EEPROM)
	Logbook, statistics, records, measurement recorder or memory card (optional)	> 10 years (Flash)
Module slots	3	
Power supply (terminals 18/19) (BASE module 4400-029)	24 (-15 %) ... 230 (+10 %) V AC/DC approx. 18 VA/10 W AC: 48 ... 62 Hz	
	Overvoltage category	II
	Protection class	I
Terminals, inside	Tightening torque	0.5 ... 0.6 Nm Single and stranded wires 0.2 ... 2.5 mm ²
	Wiring	Stripping length max. 7 mm Ferrules 0.25 ... 2.5 mm ²
Equipotential bonding clamp PA	Tightening torque	1 Nm
	Cross section	> 4 mm ²
Protection against electric shock (terminal 17)	Protective connection acc. to EN 61010-1	

Protos II 4400 (X)

Protos II 4400 Specifications

Input OK 1 ²⁾ (terminals 11/13)	Galvanically isolated (optocoupler) Vi ≤ 30 V, floating, galvanic isolation up to 60 V	
	Function	Switches the device to HOLD mode (function check)
	Switching voltage	0 ... 2 V AC/DC inactive 10 ... 30 V AC/DC active (can be inverted) Control current 5 mA
Input OK 2 ²⁾ (terminals 12/13)	Galvanically isolated (optocoupler) Vi ≤ 30 V, floating, galvanic isolation up to 60 V	
	Function	Switching to second parameter set
	Switching voltage	0 ... 2 V AC/DC inactive 10 ... 30 V AC/DC active (can be inverted) Control current 5 mA
Current output I1 ²⁾ (terminals 7/8)	0/4... 20 mA (22 mA), max. 10 V, Galvanic isolation up to 60 V (galvanically connected with output I2)	
	Load monitoring	Error message if load is exceeded
	Overrange	22 mA for messages
	Measurement error ³⁾	< 0.2 % of current value +0.02 mA
	Current source	0.00 ... 22.00 mA
Current output I2 ²⁾ (terminals 9/10)	0/4 ... 20 mA (22 mA), max. 10 V Galvanic isolation up to 60 V (galvanically connected with output I1)	
	Load monitoring	Error message if load is exceeded
	Overrange	22 mA for messages
	Measurement error ³⁾	< 0.2 % of current value +0.02 mA
	Current source	0.00 ... 22.00 mA
Relay contacts ²⁾ (terminals 1/2/3/4/5/6)	4 relay contacts K1 ... K4, floating Galvanic isolation up to 60 V	
	K1, K2, K3 are interconnected on one side	
	Load capability	AC: < 30 V / < 3 A, < 90 VA DC: < 30 V / < 3 A, < 90 W
	Usage	K1 - K3, user-defined as NAMUR maintenance request/ HOLD, limit values, parameter set B active, rinse contact, USP output, Sensoface, controller alarm K4 dedicated assignment as alarm contact (NAMUR failure)
	RoHS conformity	According to EU directive 2011/65/EU
EMC	EN 61326-1, EN 61326-2-3, NAMUR NE 21	
	Emitted interference	Industrial applications ⁴⁾ (EN 55011 Group 1 Class A)
	Immunity to interference	Industrial applications

Protos II 4400 Specifications

Lightning protection	to EN 61000-4-5, Installation class 2	
Nominal operating conditions	Ambient temperature	-20 ... 55 °C / -4 ... 131 °F
	Relative humidity	10 ... 95 %
	Climatic class	3K5 according to EN 60721-3-3
	Location class	C1 according to EN 60654-1
	Pollution degree	2
Transport/storage temperature	-20 ... 70 °C / -4 ... 158 °F	
Housing	Protos II 4400 C:	Steel, coated
	Protos II 4400 S:	Stainless steel, polished, 1.4305
Installation	Wall mounting	
	Pipe mounting	
	Panel mounting	Sealed against panel
Dimensions	See dimension drawing	
Degree of protection	IP65/NEMA 4X	
Cable glands	5 cable glands	M20 x 1.5 A/F 24
	WISKA type ESKV M20	
Clamping ranges	Standard sealing insert:	6 ... 13 mm
	Reduction sealing insert:	4 ... 8 mm
	Multiple sealing insert:	5 ... 6.5 mm
Tensile strain	Not permitted; Only suitable for "fixed installation"	
Tightening torque	Connecting thread: 2.3 Nm Cap nut: 1.5 Nm	
Weight	Approx. 3.2 kg / 7.05 pounds	Plus approx. 160 g / 0.35 pounds per module

- 1) **NOTICE** Never expose the display to strong direct sunlight.
Readability of the LC display may be limited at ambient temperatures below 0 °C / 32 °F.
This will not adversely affect the device functions.
- 2) User-defined
- 3) At rated operating conditions
- 4) This equipment is not designed for domestic use, and is unable to guarantee adequate protection of the radio reception in such environments.

Protos II 4400 (X)

Protos II 4400 X Specifications

Display ¹⁾	Graphic LC display, white backlighting	
	Resolution	240 x 160 pixels
	Language	German, English, French, Italian, Spanish, Portuguese, Chinese, Korean, Swedish
Keypad	NAMUR keypad, single keys, no double assignment [meas] [menu] [cursor keys] [enter] [softkey 1] [softkey 2] NAMUR LED red and green	
Logbook	Recording function calls, NAMUR messages upon occurrence and disappearance with date and time. The most recent 100 entries are shown in the Diagnostics menu, without the need for a memory card and irrespective of the TAN.	
	Storage capacity (FW4400-104)	At least 20,000 entries Depends on memory size of memory card
Measurement recorder (FW4400-103)	4-channel measurement recorder with marking of events (failure, maintenance request, function check, limit values) for a measured value	
	Recording medium	Memory card
	Recording capacity	At least 20,000 entries Depends on memory size of memory card
	Recording	Process variables and range freely adjustable
	Type of recording	Current value, min/max value, average
Device self-test	Test of RAM, FLASH, EEPROM, display and keypad	
Clock	Real-time clock with date	
	Power reserve	Approx. 1 day
Data retention in case of power failure	Parameters and adjustment data	> 10 years (EEPROM)
	Logbook, statistics, records, measurement recorder or memory card (optional)	> 10 years (Flash)
Module slots	3	
Explosion protection	See Ex Certificates and EU Declaration of Conformity or www.knick.de	
Power supply (terminals N/L/PE) (BASE module 4400X-025/VPW)	100 (- 15 %) ... 230 (+ 10 %) V AC < 15 VA, 48 ... 62 Hz	
Power supply (terminals L1/L2/PE) (BASE module 4400X-026/24V)	AC: 24 V (- 15 %, + 10 %) < 15 VA, 48 ... 62 Hz	
	DC: 24 V (-1 5 %, + 20 %) < 8 W	
	Overvoltage category	II
	Protection class	I
Terminals, inside	Tightening torque	0.5 ... 0.6 Nm Single and stranded wires 0.2 ... 2.5 mm ²
	Wiring	Stripping length max. 7 mm
		Ferrules
Equipotential bonding clamp PA	Tightening torque	1 Nm
	Cross section	> 4 mm ²

Protos II 4400 X Specifications

Protection against electric shock (terminal PE)

Protective conductor terminal acc. to EN 61010-1

Input OK 1²⁾ (terminals 30/31)

Galvanically isolated (optocoupler)
 $U_i \leq 30\text{ V}$, floating Galvanic isolation up to 60 V

Function Switches the device to HOLD mode (function check)

Switching voltage 0 ... 2 V AC/DC inactive
 10 ... 30 V AC/DC active (can be inverted)
 Control current 5 mA

Input OK 2²⁾ (terminals 30/33)

Galvanically isolated (optocoupler)
 $U_i \leq 30\text{ V}$, floating Galvanic isolation up to 60 V

Function Switching to second parameter set

Switching voltage 0 ... 2 V AC/DC inactive
 10 ... 30 V AC/DC active (can be inverted)
 Control current 5 mA

Current output I1²⁾ (terminals 51/52)

0/4... 20 mA (22 mA), max. 10 V
 Galvanic isolation up to 60 V
 (galvanically connected with output I2)

Load monitoring Error message if load is exceeded
 Overrange 22 mA for messages
 Measurement error³⁾ < 0.2 % of current value +0.02 mA
 Current source 0.00 ... 22.00 mA

Current output I2²⁾ (terminals 53/54)

0/4 ... 20 mA (22 mA), max. 10 V
 Galvanic isolation up to 60 V
 (galvanically connected with output I1)

Load monitoring Error message if load is exceeded
 Overrange 22 mA for messages
 Measurement error³⁾ < 0.2 % of current value +0.02 mA
 Current source 0.00 ... 22.00 mA

Relay contacts²⁾
 (terminals 61/63/65/60/71/73)

4 relay contacts K1 ... K4, floating
 Galvanic isolation up to 60 V
 K1, K2, K3 are interconnected on one side

Load capability DC: < 30 V / < 500 mA < 10 W

Usage K1 - K3, user definable as NAMUR maintenance request/HOLD, limit values, parameter set B active, rinse contact, USP output, Sensoface

K4 dedicated assignment as alarm contact (NAMUR failure)

RoHS conformity

According to EU directive 2011/65/EU

Protos II 4400 (X)

Protos II 4400 X Specifications

EMC	EN 61326-1, EN 61326-2-3, NAMUR NE 21	
	Emitted interference	Industrial applications ⁴⁾ (EN 55011 Group 1 Class A)
	Immunity to interference	Industrial applications
	Lightning protection	according to EN 61000-4-5 Installation class 2
Nominal operating conditions	Ambient temperature	-20 ... 50 °C / -4 ... 122 °F
	Relative humidity	10 ... 95 %
	Climatic class	3K5 according to EN 60721-3-3
	Location class	C1 according to EN 60654-1
	Pollution degree	2
	Transport/storage temperature	-20 ... 70 °C / -4 ... 158 °F
Housing	Protos II 4400X C:	Steel, coated
	Protos II 4400X S:	Stainless steel, polished, 1.4305
Installation	Wall mounting	
	Pipe mounting	
	Panel mounting	Sealed against panel
Dimensions	See dimension drawing	
Degree of protection	IP65, type 4X	
Cable glands	5 cable glands	M20 x 1.5 A/F 24
Clamping ranges	Standard sealing insert:	7 ... 13 mm
	Reduction sealing insert:	4 ... 8 mm
	Multiple sealing insert:	5.85 ... 6.5 mm
Tensile strain	Not permitted; Only suitable for "fixed installation"	
Tightening torque	Connecting thread:	2.3 Nm
	Cap nut:	1.5 Nm
Weight	Approx. 3.9 kg / 8.6 pounds Plus approx. 160 g / 0.35 pounds per module	

1) **NOTICE** Never expose the display to strong direct sunlight.

Readability of the LC display may be limited at ambient temperatures below 0 °C / 32 °F.

This will not adversely affect the device functions.

2) User-defined

3) At rated operating conditions

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

Memory Card Specifications

Memory card types



Data Card (X)	Records data
FW Update Card (X)	Firmware update for function expansion
FW Repair Card (X)	Firmware repair in case of malfunction
Custom FW Update Card	Customer-specific FW versions
Custom FW Repair Card	Customer-specific FW versions

Memory size

32 MB	
Logbook	For exclusive use: approx. 200,000 entries
Measurement recorder	For exclusive use: approx. 400,000 entries

Connections

Computer ports	Micro USB	USB cable, max. 2.90 m
Connection to device	Plug	

Explosion protection

Operation on computer	$U_m = 250 V$
Operation in device	Intrinsically safe Ex ib

Communication

USB 2.0	High speed	12 Mbits/s
USB profile	Data Card	MSD (mass storage device)
	Update Card Repair Card	HID (human interface device)

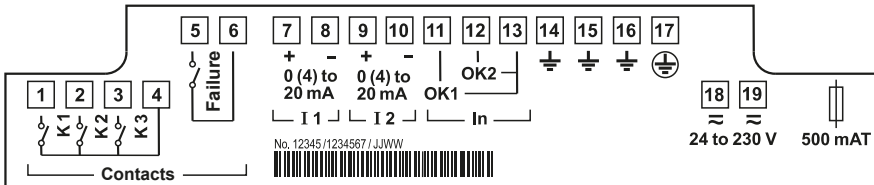
Dimensions

L 32 mm x W 12 mm x H 30 mm

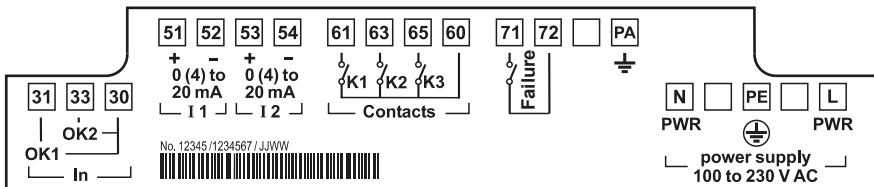
Protos II 4400 (X)

Terminal Assignments

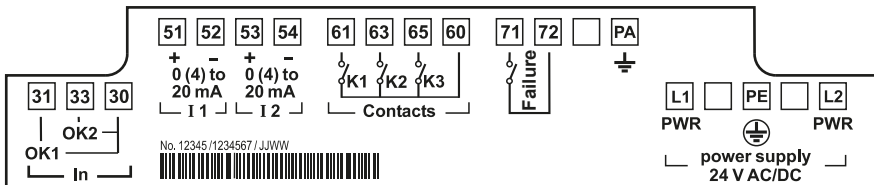
Protos II 4400 20 ... 253 V AC



Protos II 4400 X VPW 100 ... 253 V AC



Protos II 4400 X 24 V 24 V AC/DC



PH 3400(X)-033 Module Specifications

pH/ORP input	pH measurement with pH differential probes (Pfaudler) Measuring electrode input Reference electrode input Auxiliary electrode input		
Measuring range	pH Value	-2.00 ... 16.00	
	ORP value	-2000 ... 2000 mV	
	rH Value	0.0 ... 42.5	
	Permitted cable capacitance	< 2 nF	
Measuring electrode input ²⁾	Input resistance	> 1 x 10 ¹² Ω	
	Input current ⁴⁾	< 1 x 10 ⁻¹² A	
	Impedance range	0.5 ... 1000 MΩ	
Reference electrode input ²⁾	Input resistance	> 1 x 10 ¹¹ Ω	
	Input current ⁴⁾	< 1 x 10 ⁻¹¹ A	
	Impedance range	0.5 ... 1000 kΩ	
Measurement error ³⁾ (display)	pH Value	< 0.02	TC < 0.001 pH/K
	mV value	< 1 mV	TC < 0.05 mV/K
Temperature input ¹⁾	PT 100 / PT 1000 / NTC 30 kΩ / 8.55 kΩ (Mitsubishi) 3-wire connection, adjustable		
	Measuring range	-20 ... 150 °C / -4 ... 302 °F	PT100/PT1000/NTC 30 kΩ
		-10 ... 130 °C / 14 ... 266 °F	NTC 8.55 kΩ, Mitsubishi
	Resolution	0.1 °C	
	Measurement error ³⁾	0.2 % of measured value + 0.5 K (< 1 K at NTC > 100 °C / 212 °F)	
Temperature compensation media-related	Reference temperature 25 °C / 77 °F		
	- Linear temperature coefficient, specifiable		-19,00 ... 19.99 %/K
	- Ultrapure water	0 ... 150 °C / 32 ... 302 °F	
	- Table	0 ... 95 °C / 32 ... 203 °F	User-defined in 5 K steps
Sensor adjustment ¹⁾	Operating modes:	1-/2-/3-point calibration (best fit line) - Calimatic automatic buffer recognition - Entry of individual buffer values - Adjustable stability criterion - Product calibration - Data entry of premeasured electrodes	
Drift check ¹⁾ (stability criterion)	Fine:	1.2 mV/min	(abort after 180 s)
	Standard:	2.4 mV/min	(abort after 120 s)
	Coarse:	3.75 mV/min	(abort after 90 s)

Protos II 4400 (X)

PH 3400(X)-033 Module Specifications

Calimatic buffer sets ¹⁾	Fixed buffer sets:	Mettler Toledo:	2.00/4.01/7.00/9.21
		Knick CaliMat	2.00/4.00/7.00/9.00/12.00
		DIN 19267:	1.09/4.65/6.79/9.23/12.75
		NIST standard:	1.680/4.008/6.865/9.184
		NIST technical buffers:	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 buffer A:	2.00/4.01/7.00/9.00/11.00
		Hamilton buffer B:	2.00/4.01/6.00/9.00/11.00
		HACH:	4.01/7.00/10.00
		Ciba:	2.06/4.00/7.00/10.00
		Reagecon:	2.00/4.00/7.00/9.00/12.00
	– Manually specifiable buffer set with max. 3 buffer tables		
	– Buffer set can be loaded from Data Card (FW4400-002)		
Nom. zero ¹⁾	pH 0 ... 14	Permitted span Δ pH = \pm 1	
Nom. slope ¹⁾	25 ... 61 mV/pH (25 °C)	Permitted span 80 ... 103 %	
pHis ¹⁾	0 ... 14		
Calibration record	Recording of: Zero point, slope, Uis, response time, calibration procedure with date and time		
Statistics	Recording of: Zero point, slope, Uis, response time, glass and reference impedance with date and time for last three calibrations and first calibration		
Sensocheck	Automatic monitoring of measuring and reference electrode, message can be deactivated		
Sensoface	Provides information on the condition of the sensor: Zero point/slope, response time, calibration interval, Sensocheck, can be deactivated		
Sensor diagram	Graphical representation of the current sensor parameters in a sensor diagram on the display; Slope, zero point, reference impedance, glass impedance, response time, calibration timer		
Sensor monitor	Direct display of measured values from sensor for validation pH input / glass electrode impedance / reference electrode impedance / RTD / temperature		
Adaptive calibration timer ¹⁾	Automatic calculation of calibration interface (Sensoface message), dependent on measured values		
Tolerance band recorder (FW4400-005)	Tolerant calibration/adjustment, adjustable tolerance limits, recording of zero point and slope for the last 40 calibrations/adjustments		
Explosion protection (PH 3400X-033)	For entity parameters, see attachment to certificates or control drawings on www.knick.de		
RoHS conformity	According to EU directive 2011/65/EU		
EMC	EN 61326-1, EN 61326-2-3 NAMUR NE 21		
	Emitted interference	Industrial applications (EN 55011 Group 1 Class A)	
	Immunity to interference	Industrial applications	
	Lightning protection	to EN 61000-4-5, Installation class 2	

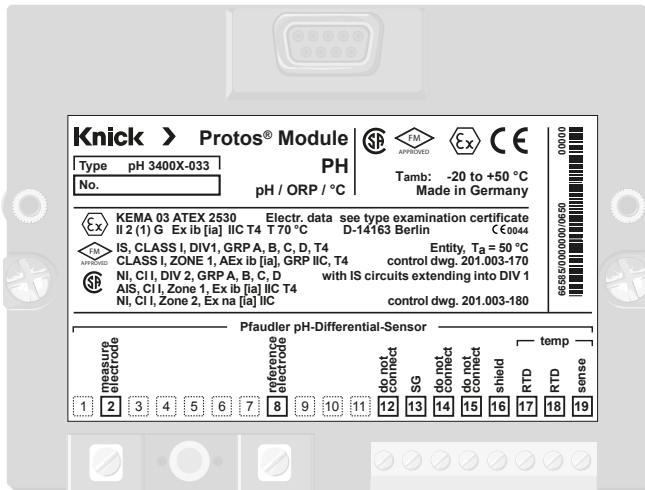
PH 3400(X)-033 Module Specifications

Nominal operating conditions (module installed)	Ambient temperature	Non Ex	-20 ... 55 °C / -4 ... 131 °F	
		Ex	-20 ... 50 °C / -4 ... 122 °F	
	Relative humidity:	5 ... 95 %		
	Climatic class	3K5 according to EN 60721-3-3		
	Location class	C1 according to EN 60654-1		
Transport / storage temperature	-20 ... 70 °C / -4 ... 158 °F			
Module enclosure	Material	PC/ABS blend		
	Color	Black		
	Degree of protection	IP20		
	Dimensions (mm)	W x L x H 118 x 91 x 21		
	Screw clamp connector	Tightening torque	0.5 ... 0.6 Nm	
		Single and stranded wires	0.2 ... 2.5 mm ²	
Wiring	Stripping length	Max. 7 mm		
	Temperature resistance	> 75 °C / 167 °F		

1) User-defined
 2) At rated operating conditions
 3) ± 1 count, plus sensor error
 4) At 20 °C, doubles every 10 K

Protos II 4400 (X)

PH 3400(X)-033 Terminal Assignments



PH 3400(X)-035 Module Specifications

pH/ORP input	Analog glass electrode or ORP sensor Glass electrode input Reference electrode input SG input: ORP sensor or auxiliary electrode	
	Measuring range	pH Value -2.00 ... 16.00 ORP value -2000 ... 2000 mV rH Value 0.0 ... 42.5
	Permitted voltage	ORP + pH [mV] 2000 mV
	Permitted cable capacitance	< 2 nF (Max. cable length 20 m)
Glass electrode input ²⁾	Input resistance	> 1 x 10 ¹² Ω
	Input current	< 1 x 10 ⁻¹² A ⁴⁾
	Impedance range	0.5 ... 1000 MΩ
Reference electrode input ²⁾	Input resistance	> 1 x 10 ¹⁰ Ω
	Input current	< 1 x 10 ⁻¹⁰ A ⁴⁾
	Impedance range	0.5 ... 200 kΩ
Measurement error ³⁾ (display)	pH Value	< 0.02 TC < 0.001 pH/K
	ORP value	< 1 mV TC < 0.05 mV/K
Temperature input	Pt100/Pt1000/NTC 30 kΩ/NTC 8.55 kΩ ¹⁾ 3-wire connection, adjustable	
	Measuring range	-20 ... 150 °C / -4 ... 302 °F (Pt 100/Pt 1000/NTC 30 kΩ) -10 ... 130 °C / 14 ... 266 °F (NTC 8.55 kΩ, Mitsubishi)
	Resolution	0.1 °C / 1 °F
	Measurement error ³⁾	0.2 % of measured value + 0.5 K (< 1 K at NTC > 100 °C / 212 °F)
Temperature compensation media-related	Reference temperature 25 °C / 77 °F - Linear temperature coefficient, specifiable -19.00 ... 19.99 %/K - Ultrapure water 0 ... 150 °C / 32 ... 302 °F - Table 0 ... 95 °C / 32 ... 203 °F User-defined in 5 K steps	
ORP ¹⁾	Automatic conversion to standard hydrogen electrode (SHE) on specification of reference electrode type Sensor adjustment ORP ¹⁾ Zero offset -200 ... 200 mV	
pH sensor adjustment ¹⁾	1-/2-/3-point calibration (best fit line) Operating modes: - Calimatic automatic buffer recognition - Entry of individual buffer values - Product calibration - Data entry of premeasured electrodes	
Drift check ¹⁾	Fine / standard / coarse	

Protos II 4400 (X)

PH 3400(X)-035 Module Specifications

Calimatic buffer sets ¹⁾	Fixed buffer sets:	Mettler Toledo:	2.00/4.01/7.00/9.21
		Knick CaliMat:	2.00/4.00/7.00/9.00/12.00
		DIN 19267:	1.09/4.65/6.79/9.23/12.75
		NIST standard:	1.68/4.008/6.865/9.184
		NIST technical buffers:	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 buffer A:	2.00/4.01/7.00/9.00/11.00
		Hamilton buffer B:	2.00/4.01/6.00/9.00/11.00
		HACH:	4.01/7.00/10.00
		Ciba:	2.06/4.00/7.00/10.00
		Reagecon:	2.00/4.00/7.00/9.00/12.00
	– Manually specifiable buffer set with max. 3 buffer tables (Add-on function FW4400-002)		
Nominal zero point ¹⁾	pH 0 ... 14	Calibration range	$\Delta\text{pH} = \pm 1$
Nominal slope ¹⁾	25 ... 61 mV/pH (25 °C)	Calibration range	80 ... 103 %
U_{IS} ¹⁾	–1000 ... 1000 mV		
Calibration/adjustment record	Recording of: Zero point, slope, U_{IS} , response time, calibration procedure with date and time		
Temp. offset log ¹⁾	Display of current temperature probe adjustment and of temperature offset.		
Statistics	Recording of: Zero point, slope, U_{IS} , response time, glass and reference impedance with date and time for last three adjustments and first adjustment		
Sensocheck	Automatic monitoring of glass and reference electrode, message can be deactivated		
Sensoface	Provides information on the condition of the sensor: Zero point/slope, response time, calibration interval, Sensocheck, can be deactivated		
Sensor diagram	Graphic display of the current sensor parameters in a sensor diagram on the display: Slope, zero point, reference impedance, glass impedance, response time, calibration timer		
Sensor monitor	Direct display of measured values from sensor for validation pH input / ORP input / glass electrode impedance / reference electrode impedance / RTD / temperature		
Adaptive calibration timer ³⁾	Automatic calculation of calibration interface (Sensoface message) dependent on measured values		
Sensor wear monitor	Display of wear parameters Sensor wear / sensor operating time / autoclaving cycles / SIP cycles / CIP cycles		

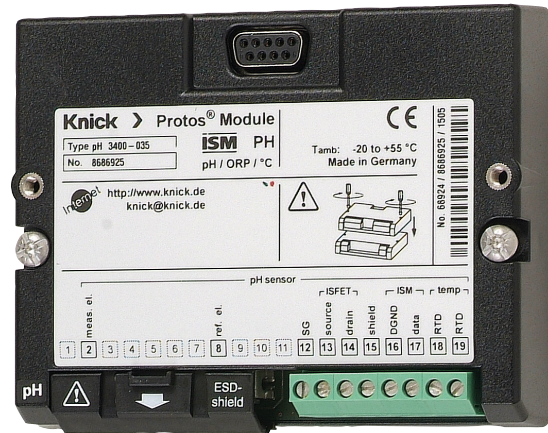
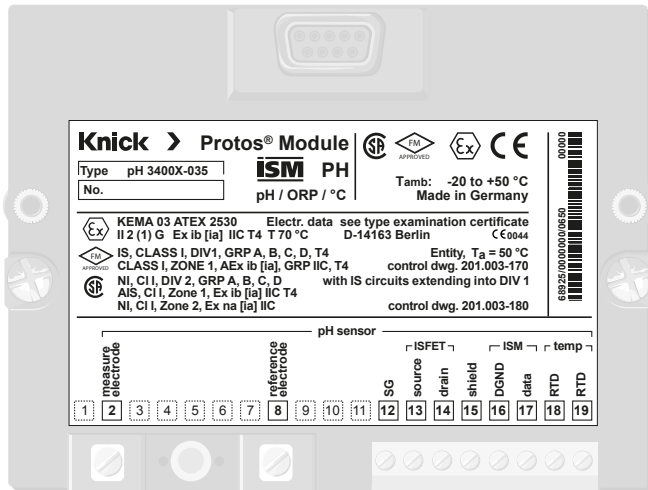
PH 3400(X)-035 Module Specifications

Explosion protection (PH 3400X-035)	For entity parameters, see attachment to certificates or control drawings on www.knick.de		
RoHS conformity	According to EU directive 2011/65/EU		
EMC	EN 61326-1, EN 61326-2-3 NAMUR NE 21 Immunity to interference Industrial applications (EN 55011 Group 1 Class A) Emitted interference Industrial applications Lightning protection to EN 61000-4-5, Installation class 2		
Nominal operating conditions (module installed)	Ambient temperature	Non Ex Ex	-20 ... 55 °C / -4 ... 131 °F -20 ... 50 °C / -4 ... 122 °F
	Relative humidity:	5 ... 95 %	
	Climatic class	3K5 according to EN 60721-3-3	
	Location class	C1 according to EN 60654-1	
Transport / storage temperature	-20 ... 70 °C / -4 ... 158 °F		
Module enclosure	Material	PC/ABS blend	
	Color	Black	
	Degree of protection	IP20	
	Dimensions (mm)	W x L x H 118 x 91 x 21	
	Screw clamp connector	Tightening torque	0.5 ... 0.6 Nm
		Single and stranded wires	0.2 ... 2.5 mm ²
	Wiring	Stripping length	Max. 7 mm
		Temperature resistance	> 75 °C / 167 °F

1) User-defined
 2) At rated operating conditions
 3) ± 1 count, plus sensor error
 4) At 20 °C, doubles every 10 K

Protos II 4400 (X)

PH 3400(X)-035 Terminal Assignments



COND 3400(X)-041 Module Specifications

Cond input	Operation with 2-electrode or 4-electrode sensors	
Conductivity	0.000 $\mu\text{S}/\text{cm}$... 1999 mS/cm	
Resistivity	0.5 $\Omega \cdot \text{cm}$... 999 $\text{M}\Omega \cdot \text{cm}$	
Concentration	0.0 ... 100.0 wt%	
Salinity	0.0 ... 45.0 g/kg (0 ... 35 °C)	
Measuring range	4-electrode sensors:	0.1 $\mu\text{S} \times \text{c}$... 2000 $\text{mS} \times \text{c}^2$
	2-electrode sensors:	0.1 $\mu\text{S} \times \text{c}$... 200 $\text{mS} \times \text{c}^2$
Display ranges	Resolution is determined by cell constant	
	Cell Constant	Resistivity conductivity
	< 0.1200 cm^{-1}	0.000 $\mu\text{S}/\text{cm}$
	< 1.200 cm^{-1}	00.00 $\mu\text{S}/\text{cm}$
	< 12.00 cm^{-1}	000.0 $\mu\text{S}/\text{cm}$
	< 120.0 cm^{-1}	0.000 mS/cm
	$\geq 120.0 \text{ cm}^{-1}$	00.00 mS/cm
Response time (T_{90})	Approx. 1 s	
Measurement error ³⁾	< 0.5 % of measured value + 0.2 $\mu\text{S} \times \text{c}^2$	
Temperature compensation ¹⁾	– None	
	– Linear characteristic	00.00 ... 19.99 %/K (User-defined reference temperature)
	– NLF natural waters according to EN 27888 (reference temperature 25 °C)	
	– Ultrapure water with NaCl traces	(0 ... 120 °C / 32 ... 248 °F) (Reference temperature 25 °C)
	– Ultrapure water with HCl traces	(0 ... 120 °C / 32 ... 248 °F) (Reference temperature 25 °C)
	– Ultrapure water with NH ₃ traces	(0 ... 120 °C / 32 ... 248 °F) (Reference temperature 25 °C)
	– Ultrapure Water with NaOH traces	(0 ... 120 °C / 32 ... 248 °F) (Reference temperature 25 °C)
Temperature input	Temperature probe ¹⁾	Pt100 / Pt1000 / NTC 30 k Ω / Ni 100
	3-wire connection, adjustable	
Measuring range	PT 100 / PT 1000:	–50 ... 250 °C / –58 ... 482 °F
	NTC 30 k Ω :	–10 ... 150 °C / 14 ... 302 °F
	Ni 100:	–50 ... 250 °C / –58 ... 356 °F
Resolution	0.1 °C / °F	
Measurement error ³⁾	0.2 % of measured value + 0.5 K	

Protos II 4400 (X)

COND 3400(X)-041 Module Specifications

Concentration determination ¹⁾ (FW4400-009)	For substances:																																							
	<table border="1"> <tr> <td rowspan="2">HNO₃</td> <td>0 ... 30</td> <td>wt%</td> <td>-20 ... 50 °C / -4 ... 122 °F</td> </tr> <tr> <td>35 ... 96</td> <td>wt%</td> <td>-20 ... 50 °C / -4 ... 122 °F</td> </tr> <tr> <td rowspan="2">HCl</td> <td>0 ... 18</td> <td>wt%</td> <td>-20 ... 50 °C / -4 ... 122 °F</td> </tr> <tr> <td>22 ... 39</td> <td>wt%</td> <td>-20 ... 50 °C / -4 ... 122 °F</td> </tr> <tr> <td rowspan="3">H₂SO₄³⁾</td> <td>0 ... 37</td> <td>wt%</td> <td>-17.8 ... 110 °C / -0.04 ... 230 °F</td> </tr> <tr> <td>28 ... 88</td> <td>wt%</td> <td>-17.8 ... 115.6 °C / -0.04 ... 240.08 °F</td> </tr> <tr> <td>89 ... 99</td> <td>wt%</td> <td>-17.8 ... 115.6 °C / -0.04 ... 240.08 °F</td> </tr> <tr> <td rowspan="2">NaOH⁵⁾</td> <td>0 ... 24</td> <td>wt%</td> <td>0 ... 100 °C / 32 ... 212 °F</td> </tr> <tr> <td>15 ... 50</td> <td>wt%</td> <td>0 ... 100 °C / 32 ... 212 °F</td> </tr> <tr> <td>NaCl</td> <td>0 ... 28</td> <td>wt%</td> <td>0 ... 100 °C / 32 ... 212 °F</td> </tr> <tr> <td>H₂SO₄•SO₃ (Oleum)</td> <td>12 ... 45</td> <td>wt%</td> <td>0 ... 120 °C / 32 ... 248 °F</td> </tr> </table>	HNO ₃	0 ... 30	wt%	-20 ... 50 °C / -4 ... 122 °F	35 ... 96	wt%	-20 ... 50 °C / -4 ... 122 °F	HCl	0 ... 18	wt%	-20 ... 50 °C / -4 ... 122 °F	22 ... 39	wt%	-20 ... 50 °C / -4 ... 122 °F	H ₂ SO ₄ ³⁾	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	NaOH ⁵⁾	0 ... 24	wt%	0 ... 100 °C / 32 ... 212 °F	15 ... 50	wt%	0 ... 100 °C / 32 ... 212 °F	NaCl	0 ... 28	wt%	0 ... 100 °C / 32 ... 212 °F	H ₂ SO ₄ •SO ₃ (Oleum)	12 ... 45	wt%	0 ... 120 °C / 32 ... 248 °F
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H ₂ SO ₄ •SO ₃ (Oleum)	12 ... 45	wt%	0 ... 120 °C / 32 ... 248 °F																																					
	Specifiable concentration table (5 x 5 values)																																							
Sensor monitoring ¹⁾	Sensocheck Polarization and cable capacity																																							
Sensoface	Provides information on the condition of the sensor																																							
Sensor adjustment ¹⁾	<p>Operating modes:</p> <ul style="list-style-type: none"> - Automatic calibration with NaCl or KCl solution - Manual: Specification of conductivity - Product calibration/vessel adjustment - Input of cell constant with simultaneous display of conductivity value and temperature 																																							
	Permissible cell constant 0.0050 ... 199.99 cm ⁻¹																																							
	Calibration record Recording of: Cell constant, calibration procedure with date and time																																							
Output curve ¹⁾	<ul style="list-style-type: none"> - Linear - Trilinear - Function (logarithmic) - As desired via table 																																							
USP Function	Water monitoring in the pharmaceutical industry (USP) with additionally specifiable limit (%), output possible via relay contact (K1 ... K3, BASE). The USP value is configured as a process variable USP % (adjustable for display, current output, limits, measurement recorder)																																							
Explosion protection (COND 3400X-041)	For entity parameters, see attachment to certificates or control drawings on www.knick.de																																							
RoHS conformity	According to EU directive 2011/65/EU																																							
EMC	<p>EN 61326-1, EN 61326-2-3 NAMUR NE 21</p> <p>Immunity to interference Industrial applications (EN 55011 Group 1 Class A)</p> <p>Emitted interference Industrial applications</p> <p>Lightning protection to EN 61000-4-5, Installation class 2</p>																																							

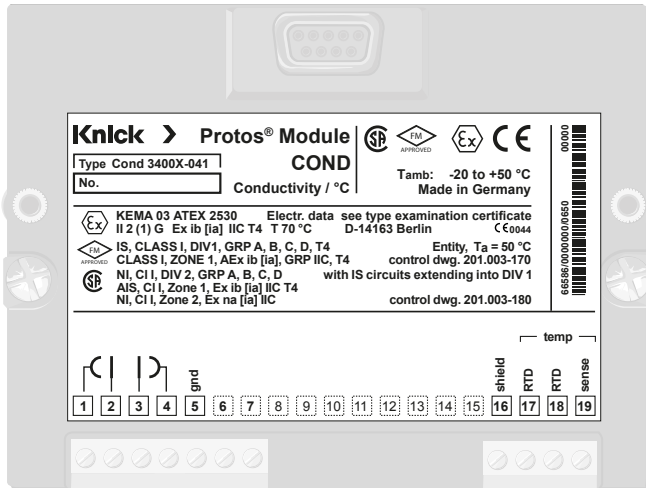
COND 3400(X)-041 Module Specifications

Nominal operating conditions (module installed)	Ambient temperature	Non Ex	-20 ... 55 °C / -4 ... 131 °F	
		Ex	-20 ... 50 °C / -4 ... 122 °F	
	Relative humidity:	5 ... 95 %		
	Climatic class	3K5 according to EN 60721-3-3		
	Location class	C1 according to EN 60654-1		
Transport / storage temperature	-20 ... 70 °C / -4 ... 158 °F			
Module enclosure	Material	PC/ABS blend		
	Color	Black		
	Degree of protection	IP20		
	Dimensions (mm)	W x L x H 118 x 91 x 21		
	Screw clamp connector	Tightening torque	0.5 ... 0.6 Nm	
		Single and stranded wires	0.2 ... 2.5 mm ²	
Wiring	Stripping length	Max. 7 mm		
	Temperature resistance	> 75 °C / 167 °F		

- 1) User-defined
- 2) c = 0.0050 ... 199.99 cm⁻¹
- 3) At rated operating conditions, ± 1 count, plus sensor error
- 4) The range limits apply to 27 °C.
- 5) The range limits apply to 25 °C.

Protos II 4400 (X)

COND 3400 (X)-041 Module Terminal Assignments



CONDI 3400(X)-051 Module Specifications

CONDI input	For SE 655 (X), SE 656 (X) toroidal sensors (and others)	
Measuring range	SE 655/SE 656	0000 μ S/cm ... 2000 mS/cm, resolution 1 μ S/cm
Concentration	0.0 ... 100.0 wt%	
Salinity	0.0 ... 45.0 g/kg (0 ... 35 °C)	
Response time (T_{90})	< 0.5 s	
Measurement error ²⁾	< 0.5 % of measured value + 2 μ S/cm	
Permissible cable length	Max. 20 m	
Temperature compensation ¹⁾	– None	
	– Linear characteristic	00,00 ... 19.99 %/K (reference temperature user-defined)
	– NLF natural waters	According to EN 27888 (Reference temperature 25 °C / 77 °F)
Temperature input	Temperature probe ¹⁾ Pt 100 / Pt 1000 / NTC 30 k Ω / NTC 100 k Ω 3-wire connection, adjustable	
Measuring range	PT100 / PT1000: NTC 30 k Ω , NTC 100 k Ω :	–50 ... 250 °C / –58 ... 482 °F –10 ... 150 °C / 14 ... 302 °F
Resolution	0.1 °C	
Measurement error ³⁾	0.2 % of measured value + 0.5 K	
Concentration determination ¹⁾ (FW4400-009)	For substances:	
	HNO ₃	0 ... 30 wt% –20 ... 50 °C / –4 ... 122 °F 35 ... 96 wt% –20 ... 50 °C / –4 ... 122 °F
	HCl	0 ... 18 wt% –20 ... 50 °C / –4 ... 122 °F 22 ... 39 wt% –20 ... 50 °C / –4 ... 122 °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 ... 230 °F 89 ... 99 wt% –17.8 ... 115.6 °C / –0.04 ... 240.08 °F
	NaOH	0 ... 14 wt% 0 ... 100 °C / 32 ... 212 °F 18 ... 50 wt% 0 ... 100 °C / 32 ... 212 °F
	NaCl	0 ... 28 wt% 0 ... 100 °C / 32 ... 212 °F
	H ₂ SO ₄ •SO ₃ (Oleum)	12 ... 45 wt% 0 ... 120 °C / 32 ... 248 °F
	Specifiable concentration table (5 x 5 values)	
Sensor monitoring ¹⁾	Sensocheck, monitoring of primary coil and wires for short circuits, and of the secondary coil for open circuits	
Sensoface	Provides information on the condition of the sensor	
Sensor adjustment ¹⁾	Operating modes: – Automatic calibration with NaCl or KCl solution – Manual: Input of cell constant with simultaneous display of conductivity value and temperature – Product calibration/vessel adjustment – Zero point adjustment	
	Permissible cell factor	0.000 ... 19.99 cm ⁻¹
	Permissible transfer ratio	0.00 ... 199.9

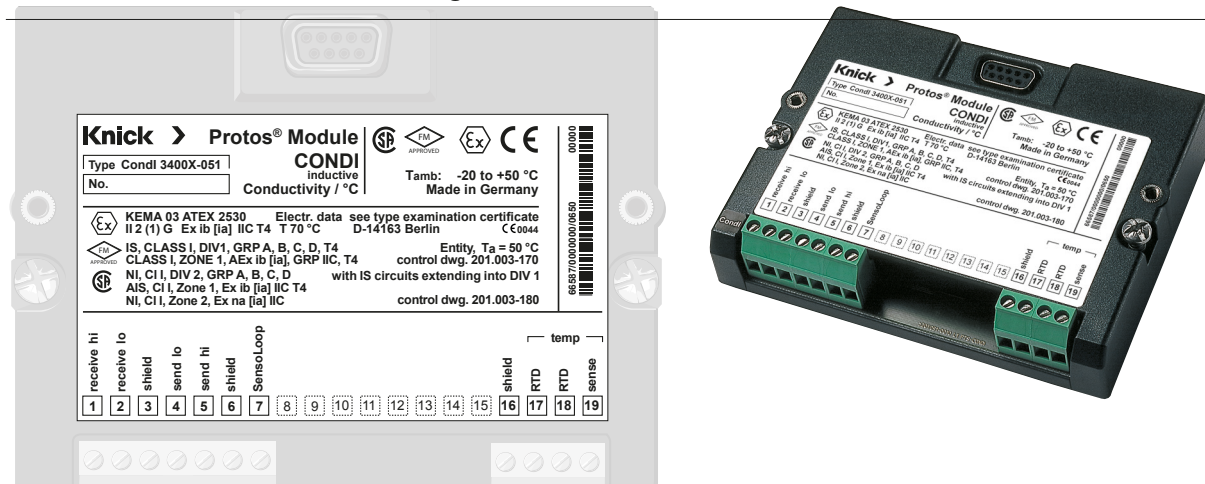
Protos II 4400 (X)

CONDI 3400(X)-051 Module Specifications

Calibration record	Recording of: Cell factor, transfer ratio, zero point, calibration procedure with date and time	
Output curve ¹⁾	<ul style="list-style-type: none"> - Linear - Trilinear - Function (logarithmic) - As desired via table 	
Explosion protection (CONDI 3400X-051)	For entity parameters, see attachment to certificates or control drawings on www.knick.de	
RoHS conformity	According to EU directive 2011/65/EU	
EMC	EN 61326-1, EN 61326-2-3 NAMUR NE 21	
	Emitted interference	Industrial applications ¹⁾ (EN 55011 Group 1 Class A)
	Immunity to interference	Industrial applications
	Lightning protection	to EN 61000-4-5, Installation class 2
Nominal operating conditions (module installed)	Ambient temperature	Non Ex -20 ... 55 °C / -4 ... 131 °F Ex -20 ... 50 °C / -4 ... 122 °F
	Relative humidity:	5 ... 95 %
	Climatic class	3K5 according to EN 60721-3-3
	Location class	C1 according to EN 60654-1
Transport / storage temperature	-20 ... 70 °C / -4 ... 158 °F	
Module enclosure	Material	PC/ABS blend
	Color	Black
	Degree of protection	IP20
	Dimensions (mm)	W x L x H 118 x 91 x 21
	Screw clamp connector	Tightening torque 0.5 ... 0.6 Nm Single and stranded wires 0.2 ... 2.5 mm ²
	Wiring	Stripping length Max. 7 mm Temperature resistance > 75 °C / 167 °F

- 1) User-defined
- 2) At rated operating conditions, ±1 count
- 3) At rated operating conditions, ±1 count, for NTC > 100 °C / 212 °F: 0.2 % of measured value + 1 K

CONDI 3400 (X)-051 Module Terminal Assignments



OXY 3400(X)-067 Module Specifications

Input for sensors	Analog amperometric oxygen sensors Type SE 7*6 ... , SE 7*7 ... or "other" ¹⁾ Actuation of ISM sensors			
Automatic range selection:				
Input range 1	Measuring current	0 ... 600 nA	Resolution	10 pA
	Measurement error ²⁾	< 0.5 % of measured value + 0.05 nA + 0.005 nA/K		
Input range 2	Measuring current	0 ... 10000 nA	Resolution	166 pA
	Measurement error ²⁾	< 0.5 % of measured value + 0.8 nA + 0.08 nA/K		
Display ranges	Standard sensor	Trace sensor 01	Trace sensor 001 ³⁾	Other
Saturation (-10 ... 80 °C)		0,000 ... 9,999 %air	0,000 ... 9,999 %air	0,000 ... 9,999 %air
		00.00 ... 99.99 %air	00.00 ... 99.99 %air	00.00 ... 99.99 %air
		000.0 ... 999.9 %air	000.0 ... 999.9 %air	000.0 ... 999.9 %air
		0,000 ... 9,999 %O ₂	0,000 ... 9,999 %O ₂	0,000 ... 9,999 %O ₂
		00.00 ... 99.99 %O ₂	00.00 ... 99.99 %O ₂	00.00 ... 99.99 %O ₂
		000.0 ... 999.9 %O ₂	000.0 ... 999.9 %O ₂	000.0 ... 999.9 %O ₂
Concentration (-10 ... 80 °C) (Dissolved oxygen)			000.0 ... 9,999 µg/l	
		0000 ... 9999 µg/l	0000 ... 9999 µg/l	0000 ... 9999 µg/l
		00.00 ... 99.99 mg/l	00.00 ... 99.99 mg/l	00.00 ... 99.99 mg/l
		000.0 ... 999.9 mg/l	000.0 ... 999.9 mg/l	000.0 ... 999.9 mg/l
			000.0 ... 9,999 ppb	
		0000 ... 9999 ppb	0000 ... 9999 ppb	0000 ... 9999 ppb
		00.00 ... 99.99 ppm	00.00 ... 99.99 ppm	00.00 ... 99.99 ppm
		000.0 ... 999.9 ppm	000.0 ... 999.9 ppm	000.0 ... 999.9 ppm
			000.0 ... 999.9 ppm	
Volume concentration in gas			000.0 ... 999.9 ppm	
		0000 ... 9999 ppm	0000 ... 9999 ppm	0000 ... 9999 ppm
		0,000 ... 9,999 vol%	0,000 ... 9,999 vol%	0,000 ... 9,999 vol%
		00.00 ... 99.99 vol%	00.00 ... 99.99 vol%	00.00 ... 99.99 vol%
		000.0 ... 999.9 vol%		000.0 ... 999.9 vol%
				000.0 ... 999.9 vol%
Partial pressure			0,000 ... 9,999 mbar	
		00.00 ... 00.00 mbar	00.00 ... 00.00 mbar	00.00 ... 00.00 mbar
		000.0 ... 000.0 mbar	000.0 ... 000.0 mbar	000.0 ... 000.0 mbar
		0000 ... 9,999 mbar	0000 ... 9,999 mbar	0000 ... 9,999 mbar
			0,000 ... 9,999 mmHg	
		00.00 ... 00.00 mmHg	00.00 ... 00.00 mmHg	00.00 ... 00.00 mmHg
		000.0 ... 000.0 mmHg	000.0 ... 000.0 mmHg	000.0 ... 000.0 mmHg
		0000 ... 9999 mmHg	0000 ... 9999 mmHg	0000 ... 9999 mmHg
		0000 ... 9999 mmHg	0000 ... 9999 mmHg	0000 ... 9999 mmHg
Permissible guard current	≤ 20 µA			
Polarization voltage	0 ... -1000 mV	Preset -675 mV (resolution 5 mV)		
Pressure correction	Air pressure	700... 1100 mbar		
	Manual	0... 9999 mbar		
	external	0... 9999 mbar		
	Via bus	0... 9999 mbar		
Salinity correction	0.0 ... 45.0 g/kg			

Protos II 4400 (X)

OXY 3400(X)-067 Module Specifications

Temperature input	Temperature probe ¹⁾ Measuring range Resolution Measurement error ²⁾	NTC 22 kΩ / NTC 30 kΩ, 2-wire connection, adjustable –20 ... 150 °C / –4 ... 302 °F 0.1 °C 0.2 % of measured (< 1 K at T > 100 °C / 212 °F) value + 0.5 K
Current Input	0(4) ... 20 mA for absolute or differential pressure transmitter Pressure range Current range Resolution	0 ... 9,999 mbar 0(4) ... 20 mA / 50 Ω Start/end can be defined by the user within the pressure range < 1%
Sensor adjustment ¹⁾	Operating modes	<ul style="list-style-type: none"> – Automatic calibration in air-saturated water – Automatic calibration in air – Product calibration, saturation – Product calibration, concentration – Zero point/slope data entry – Zero point correction
Diagnostic functions		
Calibration/adjustment record	Recording of:	Zero point, slope, response time, calibration procedure with date and time
Temp. offset log	Display of current temperature probe adjustment and of temperature offset.	
Statistics	Recording of:	Zero point, slope, response time, calibration procedure with date and time for last three adjustments and first adjustment
Sensocheck	Monitoring of membrane and electrolyte, message can be deactivated	
Sensoface	Provides information on the condition of the sensor: Zero point, slope, response time, calibration interval, Sensocheck, wear (ISM), can be deactivated	
Sensor Diagram	Graphic display of the current sensor parameters in a sensor diagram on the display	
Sensor monitor	Direct display of measured values from sensor for validation, sensor current / air pressure / temperature / I input	
Sensor wear monitor (ISM)	Display of wear parameters Sensor operating time / autoclaving cycles / SIP cycles / CIP cycles	
Explosion protection (OXY 3400X-067)	For entity parameters, see attachment to certificates or control drawings on www.knick.de	
RoHS conformity	According to EU directive 2011/65/EU	
EMC	EN 61326-1, EN 61326-2-3 NAMUR NE 21 Emitted interference Immunity to interference Lightning protection	Industrial applications ¹⁾ (EN 55011 Group 1 Class A) Industrial applications to EN 61000-4-5, Installation class 2

OXY 3400(X)-067 Module Specifications

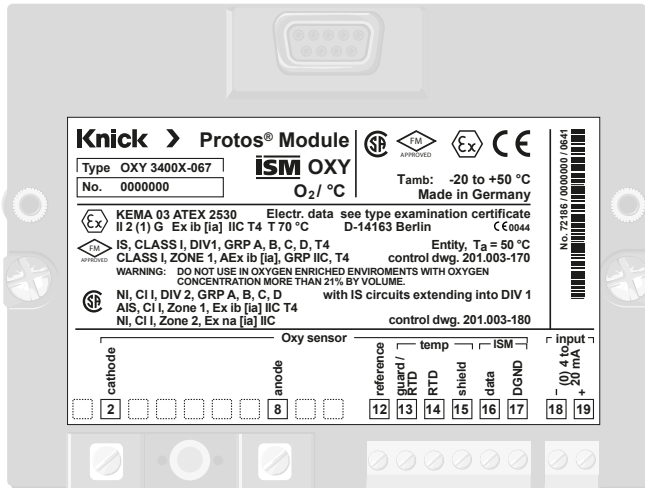
Nominal operating conditions (module installed)	Ambient temperature	Non Ex	-20 ... 55 °C / -4 ... 131 °F	
		Ex	-20 ... 50 °C / -4 ... 122 °F	
	Relative humidity:	5 ... 95 %		
	Climatic class	3K5 according to EN 60721-3-3		
	Location class	C1 according to EN 60654-1		
Transport / storage temperature	-20 ... 70 °C / -4 ... 158 °F			
Module enclosure	Material	PC/ABS blend		
	Color	Black		
	Degree of protection	IP20		
	Dimensions (mm)	W x L x H 118 x 91 x 21		
	Screw clamp connector	Tightening torque	0.5 ... 0.6 Nm	
		Single and stranded wires	0.2 ... 2.5 mm ²	
Wiring	Stripping length	Max. 7 mm		
	Temperature resistance	> 75 °C / 167 °F		

¹⁾ User-defined

²⁾ At rated operating conditions, ± 1 count, plus sensor error

Protos II 4400 (X)

OXY 3400(X)-067 Module Terminal Assignments



LDO 4400-170 Module Specifications

Input for sensor	SE 740 optical oxygen sensor		
Display ranges	Saturation (-10 ... 80 °C)	0.0 ... 999.9 % Air 0.00 ... 99.99 % O ₂	(-10 ... 80 °C / 14 ... 176 °F)
	Concentration	0.00 ... 99.99 mg/l (ppm)	(-10 ... 80 °C / 14 ... 176 °F)
	Volume concentration in gas	0.00 ... 99.99 vol%	
	Partial pressure	0.00 ... 500.0 mbar	
Pressure correction ¹⁾	Air pressure	700 ... 1100 mbar	
	Manual	0 ... 9,999 mbar	
	external	0 ... 9,999 mbar	(via current input 0(4) ... 20 mA input)
Salinity correction	0.0 ... 45.0 g/kg		
Temperature input	Measuring range	-10 ... 130 °C / 14 ... 266 °F	
	Resolution	0.1 °C	
	Measurement error ²⁾	0.2 % of measured value + (< 1K at T > 100 °C / 212 °F) 0.5 K	
Current Input	0(4) ... 20 mA for absolute or differential pressure transmitter		
	Pressure range	0 ... 9,999 mbar	
	Current range	0(4) ... 20 mA / 50 ohms	
	Start / end	Can be defined by the user within the pressure range	
	Resolution	< 1%	
Sensor monitoring ¹⁾	Sensocheck, sensor monitoring		
Sensoface	Provides information on the condition of the sensor: Zero point, slope, calibration interval, Sensocheck, wear		
Sensor diagram	Provides information on the condition of the sensor: Zero point, slope, calibration interval, Sensocheck, wear		
Sensor monitor	Direct display of measured values from sensor for validation Partial pressure / temperature / I input		
Wear monitor	Display of wear parameters		
	Sensor wear / sensor operating time / autoclaving cycles / SIP cycles / CIP cycles		
Sensor adjustment ¹⁾	Operating modes		
	– Automatic calibration in air-saturated water		
	– Automatic calibration in air		
	– Product calibration, saturation		
Calibration record	– Product calibration, concentration and product calibration, partial pressure		
	– Zero point correction		
	Recording of: Zero point, slope, calibration procedure with date and time for last three calibrations and first calibration		
RoHS conformity	According to EU directive 2011/65/EU		
EMC	EN 61326-1, EN 61326-2-3		
	NAMUR NE 21		
	Emitted interference	Industrial applications (EN 55011 Group 1 Class A)	
	Immunity to interference	Industrial applications	
	Lightning protection	to EN 61000-4-5, Installation class 2	

Protos II 4400 (X)

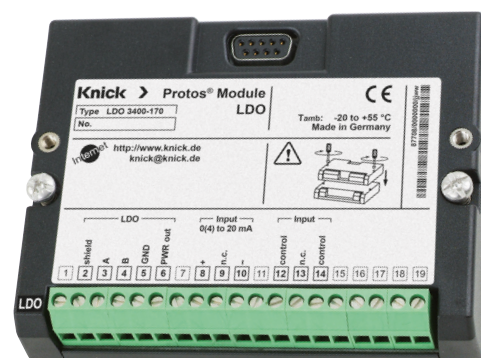
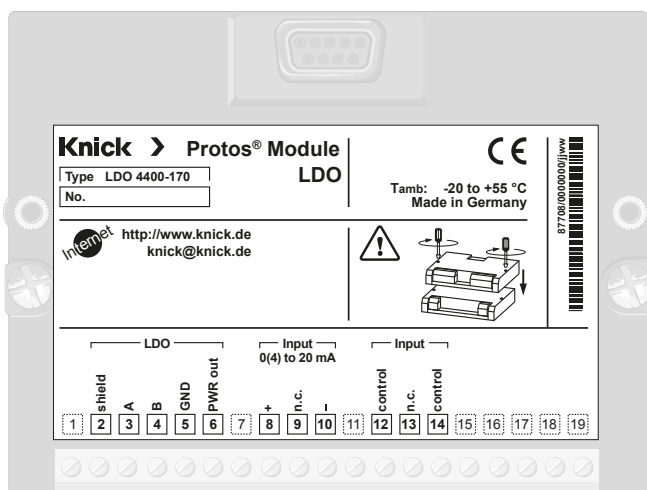
LDO 4400-170 Module Specifications

Nominal operating conditions (module installed)	Ambient temperature	Non Ex	-20 ... 55 °C / -4 ... 131 °F	
		Ex	-20 ... 50 °C / -4 ... 122 °F	
	Relative humidity:	5 ... 95 %		
	Climatic class	3K5 according to EN 60721-3-3		
	Location class	C1 according to EN 60654-1		
Transport / storage temperature	-20 ... 70 °C / -4 ... 158 °F			
Module enclosure	Material	PC/ABS blend		
	Color	Black		
	Degree of protection	IP20		
	Dimensions (mm)	W x L x H 118 x 91 x 21		
	Screw clamp connector	Tightening torque	0.5 ... 0.6 Nm	
		Single and stranded wires	0.2 ... 2.5 mm ²	
	Wiring	Stripping length	Max. 7 mm	
Temperature resistance		> 75 °C / 167 °F		

1) User-defined

2) At rated operating conditions, ± 1 count, plus sensor error

LDO 4400-170 Module Terminal Assignments



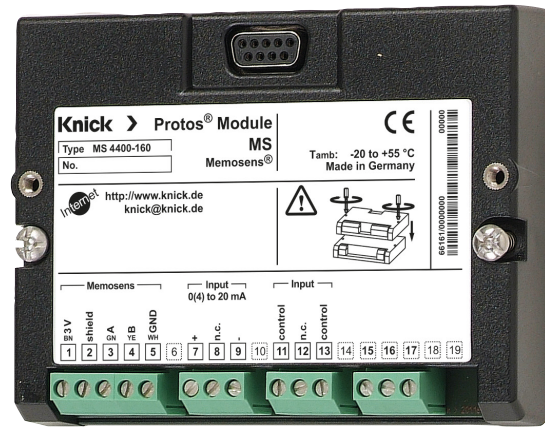
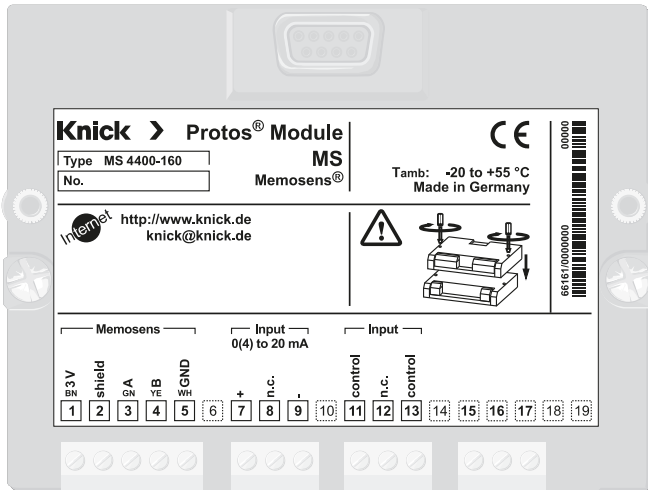
MS 4400(X)-160 Module Specifications

Sensor input	Interface for Memosens		
	Power supply	U = 2.99 ... 3.22 V	I _{max} = 6 mA
	Explosion protection (MS 4400X-160)	For entity parameters, see attachment to certificates or control drawings on www.knick.de	
	Interface	RS 485	
	Transfer rate	9,600 Bd	
	Cable length	Max. 100 m	
Current Input	Current input 0/4 ... 20 mA / 100 Ω e.g., for external pressure signal with OXY		
	Start/end of scale	Can be configured within range	
	Characteristic	Linear	
	Measurement error	< 1 % of current value + 0.1 mA (± 1 count, plus sensor error)	
RoHS conformity	According to EU directive 2011/65/EU		
EMC	EN 61326-1, EN 61326-2-3 NAMUR NE 21		
	Emitted interference	Industrial applications ¹⁾ (EN 55011 Group 1 Class A)	
	Immunity to interference	Industrial applications	
	Lightning protection	to EN 61000-4-5, Installation class 2	
Nominal operating conditions (module installed)	Ambient temperature	Non Ex	-20 ... 55 °C / -4 ... 131 °F
		Ex	-20 ... 50 °C / -4 ... 122 °F
	Relative humidity:	5 ... 95 %	
	Climatic class	3K5 according to EN 60721-3-3	
	Location class	C1 according to EN 60654-1	
Transport / storage temperature	-20 ... 70 °C / -4 ... 158 °F		
Module enclosure	Material	PC/ABS blend	
	Color	Black	
	Degree of protection	IP20	
	Dimensions (mm)	W x L x H 118 x 91 x 21	
	Screw clamp connector	Tightening torque	0.5 ... 0.6 Nm
		Single and stranded wires	0.2 ... 2.5 mm ²
	Wiring	Stripping length	Max. 7 mm
		Temperature resistance	> 75 °C / 167 °F
Power supply (KBUS)	6.8 ... 8.0 V / 20 mA		

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

Protos II 4400 (X)

MS 4400(X)-160 Module Terminal Assignments



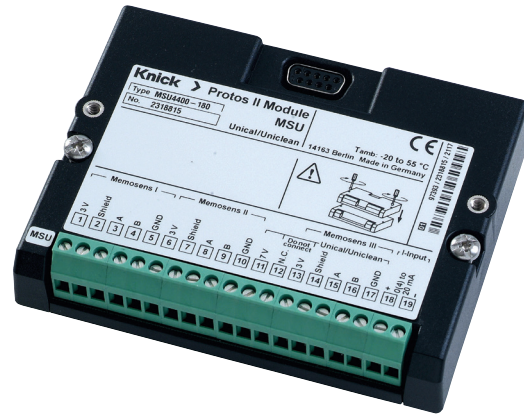
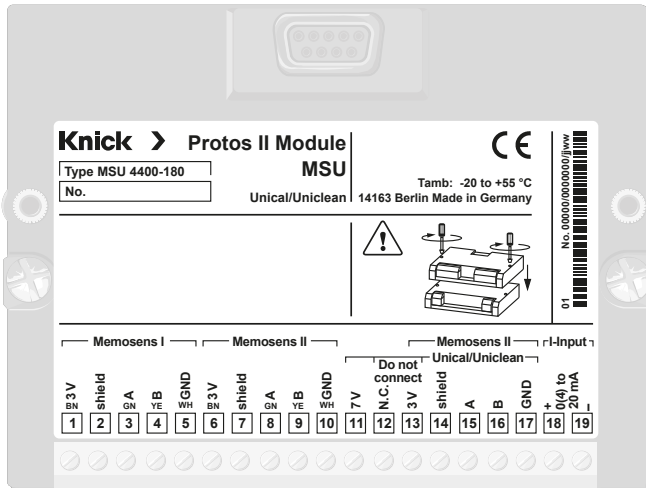
MSU 4400(X)-180 Module Specifications

Sensor input	Interface for Memosens I, II, III		(channels A, B, C)	
	Channel B:	Add-on function FW4400-014		
	Channels B+C:	Add-on function FW4400-018		
	Power supply	U = 2.99 ... 3.22 V	I _{max} = 6 mA	
	Explosion protection (MSU 4400X-180)	For entry parameters, see attachment to certificates or control drawings on www.knick.de		
	Interface	RS 485		
	Transfer rate	9,600 Bd		
	Cable length	Max. 100 m		
Current Input	Current input 0/4 ... 20 mA / 100 Ω e.g., for external pressure signal with OXY			
	Start/end of scale	Can be configured within range		
	Characteristic	Linear		
	Measurement error	< 1 % of current value + 0.1 mA (± 1 count, plus sensor error)		
RoHS conformity	According to EU directive 2011/65/EU			
EMC	EN 61326-1, EN 61326-2-3			
	NAMUR NE 21			
	Emitted interference	Industrial applications ¹⁾ (EN 55011 Group 1 Class A)		
	Immunity to interference	Industrial applications		
	Lightning protection	to EN 61000-4-5, Installation class 2		
Nominal operating conditions (module installed)	Ambient temperature	Non Ex	-20 ... 55 °C / -4 ... 131 °F	
		Ex	-20 ... 50 °C / -4 ... 122 °F	
	Relative humidity:	5 ... 95 %		
	Climatic class	3K5 according to EN 60721-3-3		
	Location class	C1 according to EN 60654-1		
Transport / storage temperature	-20 ... 70 °C / -4 ... 158 °F			
Module enclosure	Material	PC/ABS blend		
	Color	Black		
	Degree of protection	IP20		
	Dimensions (mm)	W x L x H 118 x 91 x 21		
	Screw clamp connector	Tightening torque	0.5 ... 0.6 Nm	
		Single and stranded wires	0.2 ... 2.5 mm ²	
	Wiring	Stripping length	Max. 7 mm	
Temperature resistance		> 75 °C / 167 °F		
Power supply (KBUS)	6.8 ... 8.0 V / 20 mA			

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

Protos II 4400 (X)

MSU 4400(X)-180 Module Terminal Assignments



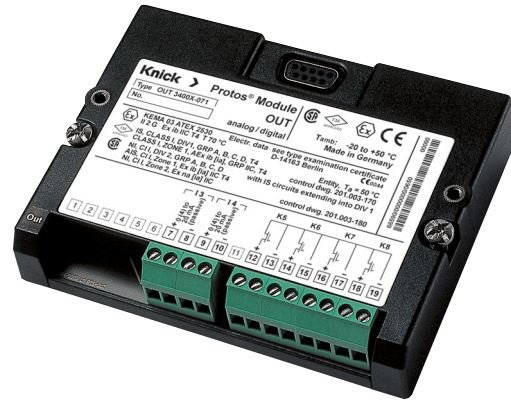
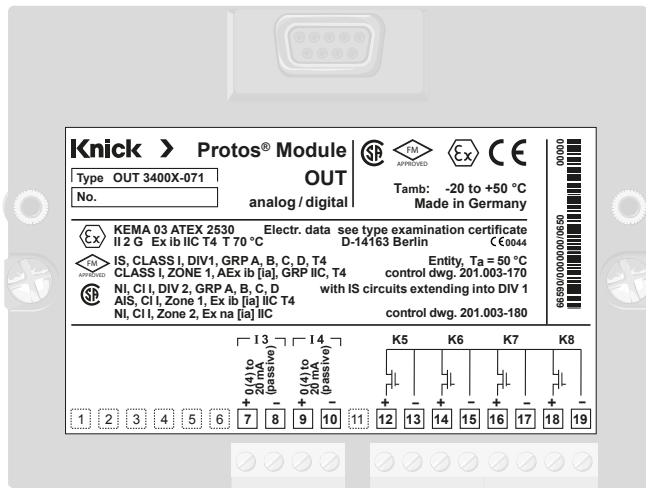
OUT 3400(X)-071 Module Specifications

Current output I 3 passive	0/4 ... 20 mA (22 mA)	Floating (galvanically connected with output I 4)		
	Supply voltage	3 ... 30 V, $I_{\max} = 100 \text{ mA}$, $P_{\max} = 0.8 \text{ W}$		
	Load monitoring	Error message if load is exceeded		
	Overrange ¹⁾	22 mA for messages		
	Measurement error ²⁾	< 0.25 % of current value + 0.05 mA		
	Start/end of scale ¹⁾	Within range		
	Current source	0.00 ... 22.00 mA		
Current output I 4, passive	0/4 ... 20 mA (22 mA)	Floating (galvanically connected with output I 3)		
	Supply voltage	3 ... 30 V, $I_{\max} = 100 \text{ mA}$, $P_{\max} = 0.8 \text{ W}$		
	Load monitoring	Error message if load is exceeded		
	Overrange ¹⁾	22 mA for messages		
	Measurement error ²⁾	< 0.25 % of current value + 0.05 mA		
	Start/end of scale ¹⁾	Within range		
	Current source	0.00 ... 22.00 mA		
Limit outputs K5 ... K8	4 electronic switching outputs, polarized, floating, interconnected			
	Voltage drop	< 1.2 V		
	Load capability	DC: $U_{\max} = 30 \text{ V}$, $I_{\max} = 100 \text{ mA}$, $P_{\max} = 0.8 \text{ W}$		
RoHS conformity	According to EU directive 2011/65/EU			
EMC	EN 61326-1, EN 61326-2-3			
	NAMUR NE 21			
	Emitted interference	Industrial applications (EN 55011 Group 1 Class A)		
	Immunity to interference	Industrial applications		
	Lightning protection	to EN 61000-4-5, Installation class 2		
Explosion protection (OUT 3400X-071)	For entry parameters, see attachment to certificates or control drawings on www.knick.de			
Nominal operating conditions (module installed)	Ambient temperature	Non Ex	-20 ... 55 °C / -4 ... 131 °F	
		Ex	-20 ... 50 °C / -4 ... 122 °F	
	Relative humidity:	5 ... 95 %		
	Climatic class	3K5 according to EN 60721-3-3		
	Location class	C1 according to EN 60654-1		
Transport / storage temperature	-20 ... 70 °C / -4 ... 158 °F			
Module enclosure	Material	PC/ABS blend		
	Color	Black		
	Degree of protection	IP20		
	Dimensions (mm)	W x L x H 118 x 91 x 21		
	Screw clamp connector	Tightening torque	0.5 ... 0.6 Nm	
		Single and stranded wires	0.2 ... 2.5 mm ²	
	Wiring	Stripping length	Max. 7 mm	
		Temperature resistance	> 75 °C / 167 °F	

¹⁾ User-defined²⁾ At rated operating conditions

Protos II 4400 (X)

OUT 3400(X)-071 Module Terminal Assignments



PID 3400-121 Module Specifications

Analog controller output IV 1/IV 2	0/4 ... 20 mA, passive		
	Supply voltage	3 ... 30 V I_{max} = 100 mA	
	Load monitoring	Error message if load is exceeded	
	Measurement error ²⁾	< 0.25 % of current value + 0.05 mA	
Usage	Actuation of analog control valves IV1: Active below setpoint (For straightway valves) IV2: Active above setpoint (For straightway valves)		
Digital controller output KV1/KV2	Electronic switching outputs, polarized, floating, connected to each other and to K9, K10		
	Voltage drop	< 1.2 V	
	Load capability	DC: U_{max} = 30 V I_{max} = 100 mA	
	Usage	Actuation of straightway valves, metering pumps KV1: Active below setpoint KV2: Active above setpoint	
PID process controller	Continuous controller via current outputs IV1, IV2, or/and quasi-continuous controller via relay contacts KV1, KV2		
	Controlled variable ¹⁾	User-defined, depending on measuring modules installed (only primary process variables pH, ORP, °C, S/cm, % O ₂ , % Air)	
	Setpoint specification ¹⁾	As desired within range	
	Neutral zone ¹⁾	As desired within range	
	P action ¹⁾	Controller gain K _P : 0010 ... 9999 %	
	I action ¹⁾	Reset time T _I : 0000 ... 9999 s (0000 s = no integral action)	
	D action ¹⁾	Rate time T _V : 0000 ... 9999 s (0000 s = no derivative action)	
	Pulse length controller ¹⁾	0001 ... 0600 s, Min. ON time 0.5 s	
	Pulse frequency controller ¹⁾	0001 ... 0180 min ⁻¹	
	Behavior during HOLD ¹⁾	Controller output Y = constant or controller output Y = 0	
	Man. controller output specification	Manual specification for testing or starting up a process, bumpless switchover to automatic mode when I action ≠ 0000 s	
	Pulse period	0001 s (pulse length controller)	
	Switching outputs K9/K10	Electronic switching outputs, polarized, floating, interconnected with KV1/ KV2	
		Voltage drop	< 1.2 V
		Load capability	DC: U_{max} = 30 V I_{max} = 100 mA
Usage		Limit monitoring or pre-control (3-point controller), process variable, threshold value, hysteresis, contact type (N/O or N/C), and user-defined ON/OFF delay	

Protos II 4400 (X)

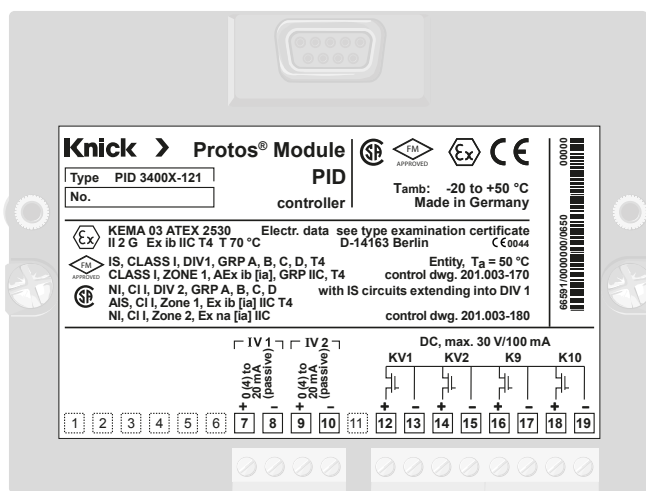
PID 3400-121 Module Specifications

Explosion protection (OUT 3400X-121)	For entity parameters, see attachment to certificates or control drawings on www.knick.de			
EMC	EN 61326-1, EN 61326-2-3			
	NAMUR NE 21			
	Emitted interference	Industrial applications (EN 55011 Group 1 Class A)		
	Immunity to interference	Industrial applications		
Nominal operating conditions (module installed)	Lightning protection	to EN 61000-4-5, Installation class 2		
	Ambient temperature	Non Ex	-20 ... 55 °C / -4 ... 131 °F	
		Ex	-20 ... 50 °C / -4 ... 122 °F	
	Relative humidity:	5 ... 95 %		
	Climatic class	3K5 according to EN 60721-3-3		
Transport / storage temperature	Location class	C1 according to EN 60654-1		
	-20 ... 70 °C / -4 ... 158 °F			
Module enclosure	Material	PC/ABS blend		
	Color	Black		
	Degree of protection	IP20		
	Dimensions (mm)	W x L x H 118 x 91 x 21		
	Screw clamp connector	Tightening torque	0.5 ... 0.6 Nm	
		Single and stranded wires	0.2 ... 2.5 mm ²	
	Wiring	Stripping length	Max. 7 mm	
Temperature resistance		> 75 °C / 167 °F		

¹⁾ User-defined

²⁾ At rated operating conditions

PID 3400-121 Module Terminal Assignments

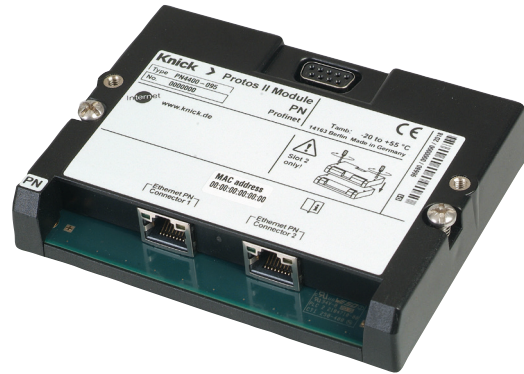
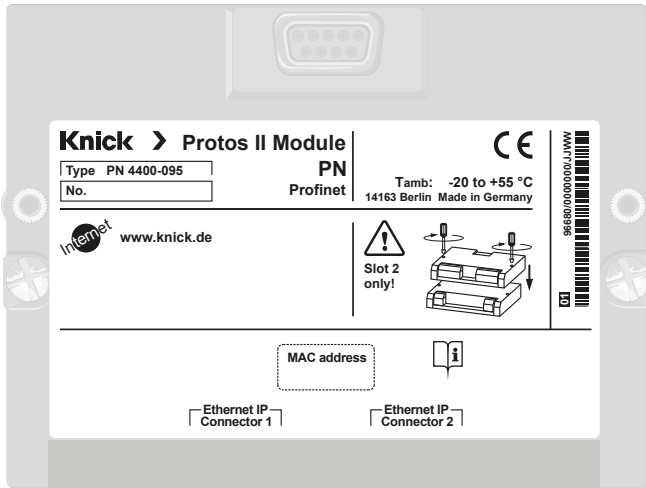


PN 4400-095 Module Specifications

PROFINET	IO specification	V2.34
	Conformance class	B (CC-B)
	Network load class	2
	Vendor ID	0x61 (= Knick)
	Device ID	0x0020
	Min. cycle times	1 ms
	Identification & maintenance	I&M1-3, 0
	Serial interface standard	100BASE-TX (IEEE802.3, IEC 61158, IEC 61784)
	Number of AIs	20
	Number of AOs	1
Communication interface	100BASE-TX	
	Connection socket type (1 and 2)	RJ45
	Input and output impedance	100 Ω
	Serial data rate	125 Mbits/s
	Data encoding	4B/5B
	Cable encoding	MLT-3 (Multi Level Transmission – 3 levels)
	Galvanic isolations, RJ45 port	MDI and cable shield to ground potential (device housing)
Insulation strength	MDI (all 8 internal RJ45 ports)	2250 V DC / 1.5 kV AC (50/60 Hz) for 60 s
	Cable shield	1000 V DC / 700 V AC (50/60 Hz) for 60 s
	Current consumption	≤ 146 mA
RoHS conformity	According to EU directive 2011/65/EU	
EMC	EN 61326-1, EN 61326-2-3 NAMUR NE 21	
	Emitted interference	Industrial applications (EN 55011 Group 1 Class A)
	Immunity to interference	Industrial applications
	Lightning protection	to EN 61000-4-5, Installation class 2
Nominal operating conditions (module installed)	Ambient temperature	-20 ... 55 °C / -4 ... 131 °F
	Relative humidity	5 ... 95 %
	Climatic class	3K5 according to EN 60721-3-3
	Location class	C1 according to EN 60654-1
Transport / storage temperature	-20 ... 70 °C / -4 ... 158 °F	
Module enclosure	Material	PC/ABS blend
	Color	Black
	Degree of protection	IP20
	Dimensions (mm)	W x L x H 118 x 91 x 21
	Screw clamp connector	Tightening torque 0.5 ... 0.6 Nm
	Wiring	Single and stranded wires 0.2 ... 2.5 mm ²
		Stripping length Max. 7 mm
		Temperature resistance > 75 °C / 167 °F

Protos II 4400

PN 4400-095 Module Terminal Assignments



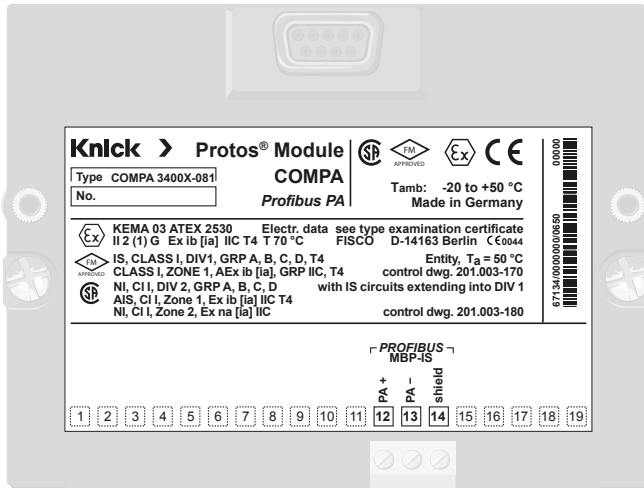
PROFIBUS COMPA 3400(X)-081 Module Specifications

PROFIBUS PA	Galvanic isolation up to 60 V COMPA 3400X-081: Digital communication in hazardous areas via current modulation		
	Physical interface	MBP-IS ¹⁾ (to EN 61158-2), for use in a FISCO system	
	Transfer rate	31.25 kbit/s	
	Communication protocol	PROFIBUS DP-V1	
	Profile	PROFIBUS PA 3.0	
	Address range	1 ... 126, factory setting 126, can be set on device	
	Supply voltage	FISCO	≤ 17.5 V (trapezoidal or rectangular characteristic) ≤ 24 V (linear characteristic)
	Current consumption	< 12 mA	
	Max. current in case of fault (FDE)	< 15 mA	
Explosion protection (OUT 3400X-081)	For entity parameters, see attachment to certificates or control drawings on www.knick.de		
RoHS conformity	According to EU directive 2011/65/EU		
EMC	EN 61326-1, EN 61326-2-3 NAMUR NE 21		
	Emitted interference	Industrial applications (EN 55011 Group 1 Class A)	
	Immunity to interference	Industrial applications	
	Lightning protection	to EN 61000-4-5, Installation class 2	
Nominal operating conditions (module installed)	Ambient temperature	Non Ex	-20 ... 55 °C / -4 ... 131 °F
		Ex	-20 ... 50 °C / -4 ... 122 °F
	Relative humidity	5 ... 95 %	
	Climatic class	3K5 according to EN 60721-3-3	
	Location class	C1 according to EN 60654-1	
Transport / storage temperature	-20 ... 70 °C / -4 ... 158 °F		
Module enclosure	Material	PC/ABS blend	
	Color	Black	
	Degree of protection	IP20	
	Dimensions (mm)	W x L x H 118 x 91 x 21	
	Screw clamp connector	Tightening torque	0.5 ... 0.6 Nm
		Single and stranded wires	0.2 ... 2.5 mm ²
	Wiring	Stripping length	Max. 7 mm
		Temperature resistance	> 75 °C / 167 °F

¹⁾ MBP-IS = Manchester Bus Powered – Intrinsic Safety

Protos II 4400 (X)

PROFIBUS COMPA 3400 X-081 Module Terminal Assignments



COMFF 3400(X)-085 Module SpecificationsFOUNDATION Fieldbus H1¹⁾COMFF 3400X-085:
Digital communication in hazardous areas via current modulation

Physical interface	According to IEC 61158-2	
Transfer rate	31.25 kbit/s	
Communication protocol	FF-816	
Profile	FF_H1 (Foundation Fieldbus)	
Bus address	Visible on the device, cannot be set	
Supply voltage (FISCO)	Bus supply:	9 ... 17.5 V
	Linear barrier:	9 ... 24 V
Current consumption	< 12 mA	
Max. current in case of fault (FDE)	< 17 mA	

FF communication model

Certified according to ITK 4.6

1 physical block	Device description
5 transducer blocks	Connection to measured value processing
8 AI function blocks	Output of measured values with status via fieldbus
4 DI function blocks	Output of messages and status via fieldbus
4 DO function blocks	Control via fieldbus
1 AO function block	For analog compensation signals (e.g., O ₂ process pressure)

Explosion protection
(COMFF 3400X-085)For entity parameters, see attachment to certificates or control drawings on www.knick.de

RoHS conformity

According to EU directive 2011/65/EU

EMC

EN 61326-1, EN 61326-2-3
NAMUR NE 21

Emitted interference	Industrial applications (EN 55011 Group 1 Class A)
Immunity to interference	Industrial applications
Lightning protection	to EN 61000-4-5, Installation class 2

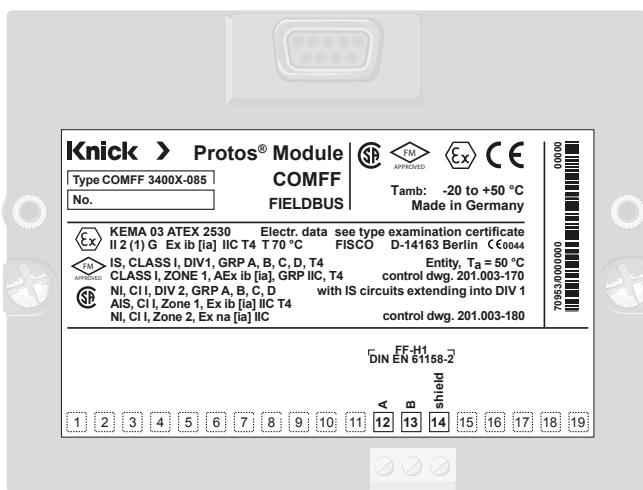
Protos II 4400 (X)

COMFF 3400(X)-085 Module Specifications

Nominal operating conditions (module installed)	Ambient temperature	Non Ex	-20 ... 55 °C / -4 ... 131 °F	
		Ex	-20 ... 50 °C / -4 ... 122 °F	
	Relative humidity:	5 ... 95 %		
	Climatic class	3K5 according to EN 60721-3-3		
	Location class	C1 according to EN 60654-1		
Transport / storage temperature	-20 ... 70 °C / -4 ... 158 °F			
Module enclosure	Material	PC/ABS blend		
	Color	Black		
	Degree of protection	IP20		
	Dimensions (mm)	W x L x H 118 x 91 x 21		
	Screw clamp connector	Tightening torque	0.5 ... 0.6 Nm	
		Single and stranded wires	0.2 ... 2.5 mm ²	
	Wiring	Stripping length	Max. 7 mm	
Temperature resistance		> 75 °C / 167 °F		

¹⁾ Galvanic isolation

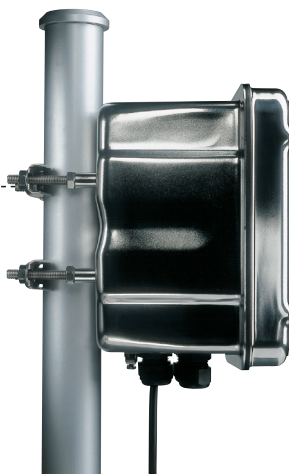
COMFF 3400 X-085 Module Terminal Assignments



Mounting Examples

ZU 0544 Pipe-Mount Kit

For mounting on vertical or horizontal posts or pipes.



ZU.0548 Protective Hood

Additional protection from direct weather exposure and mechanical damage.



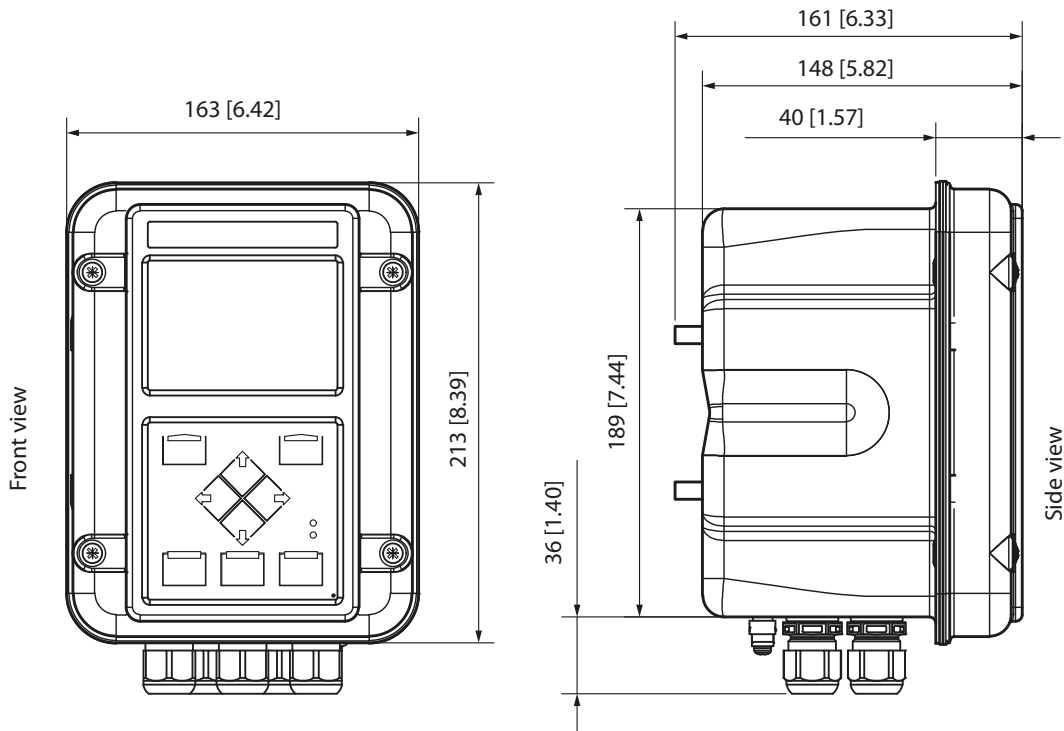
ZU.0545 Panel-Mount Kit

For assembly in standardized panel cutout 144 x 194 mm.

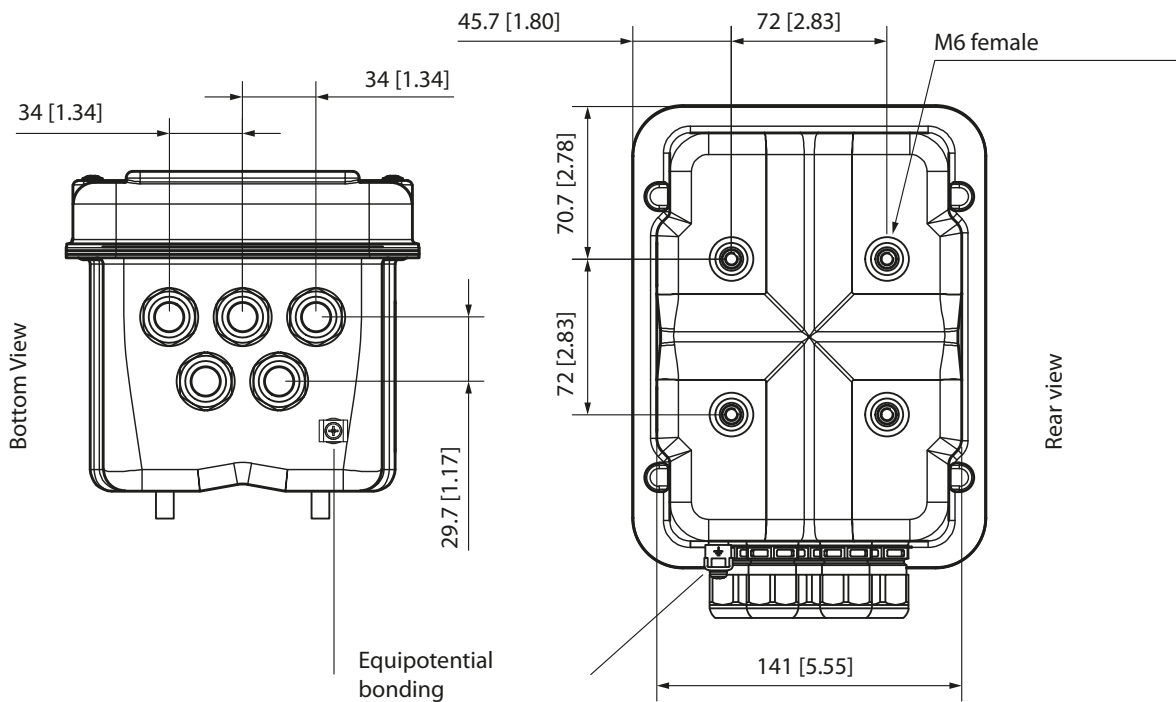


Protos II 4400 (X)

Dimension drawings

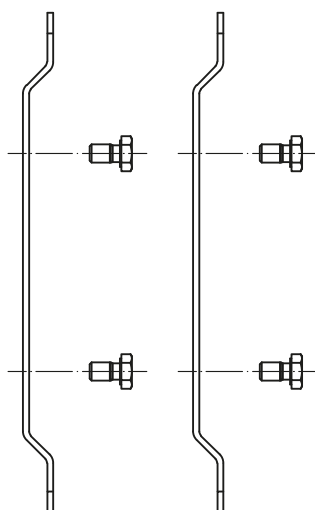
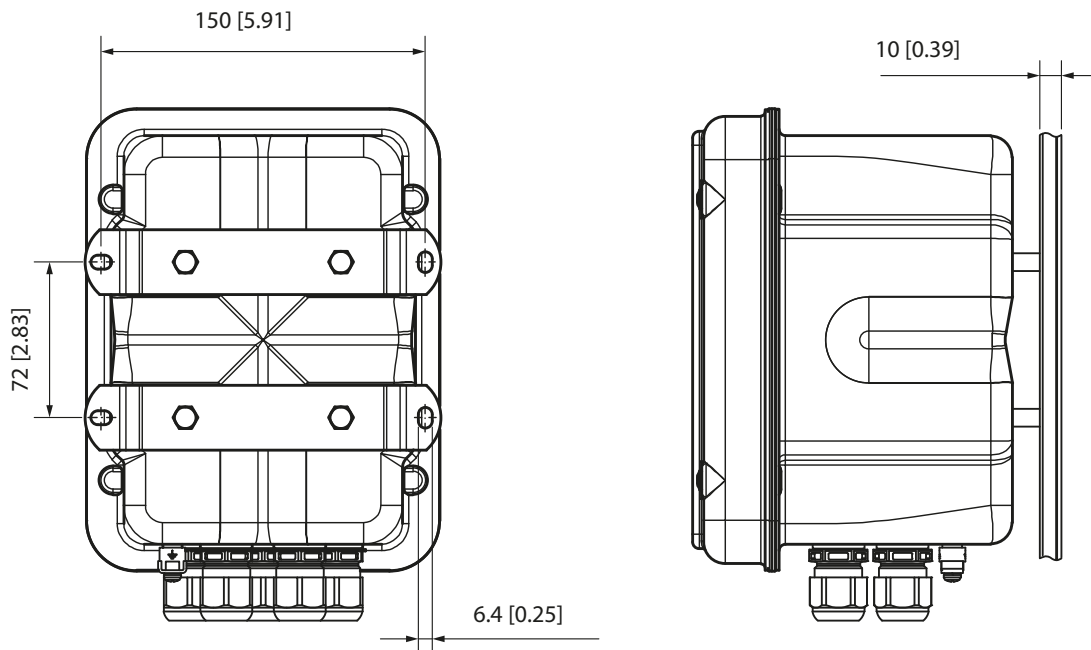


Cable glands M20 x 1.5 (A/F 24 mm)



All dimensions in mm [inches]

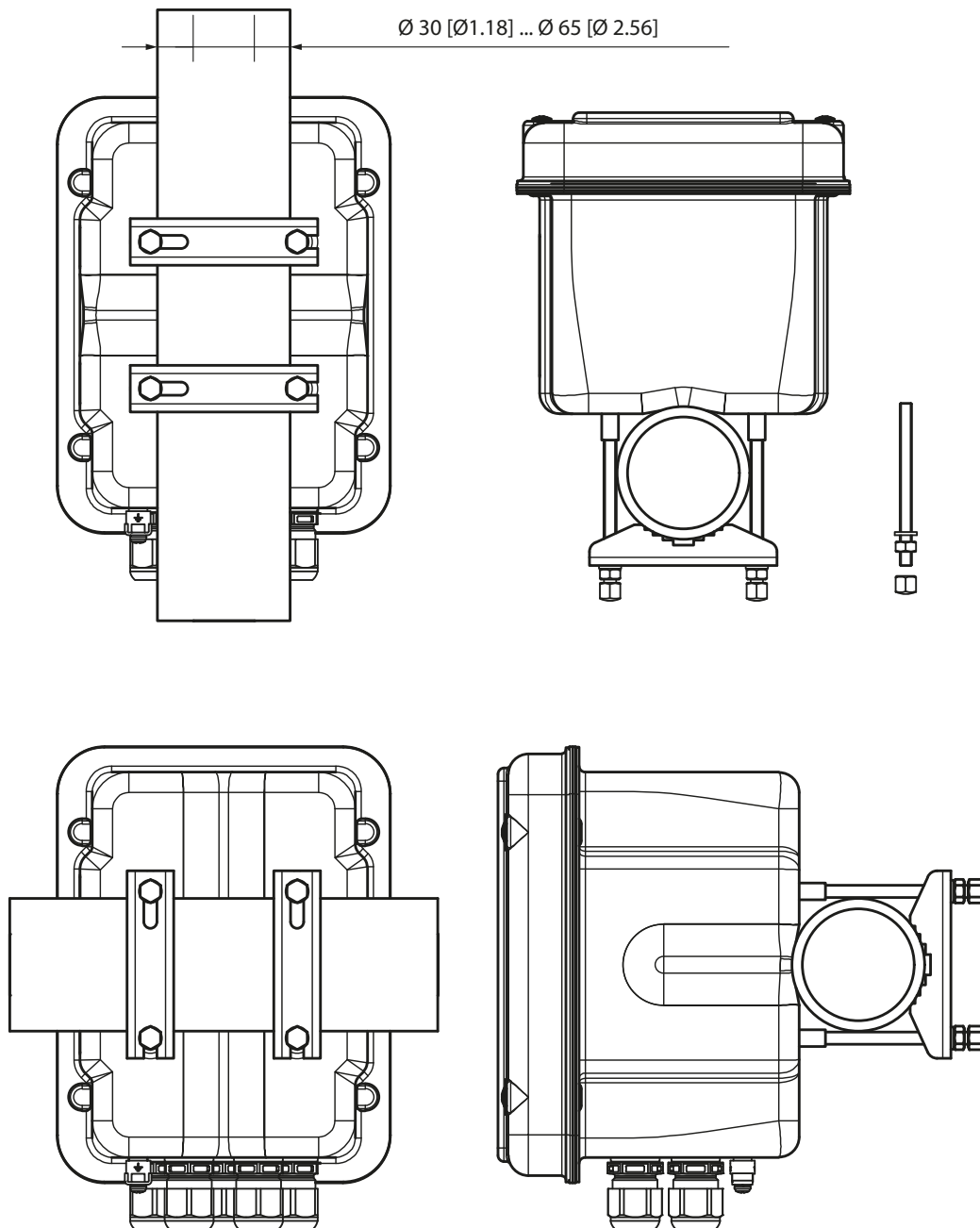
Dimension Drawings – Wall Mounting



2 x wall-mount bracket (stainless steel A4)
 4 x hex bolt M6x10
 (A/F 10, stainless steel A4)
 (included in package contents)

Protos II 4400 (X)

Dimension Drawings – Pipe Mounting

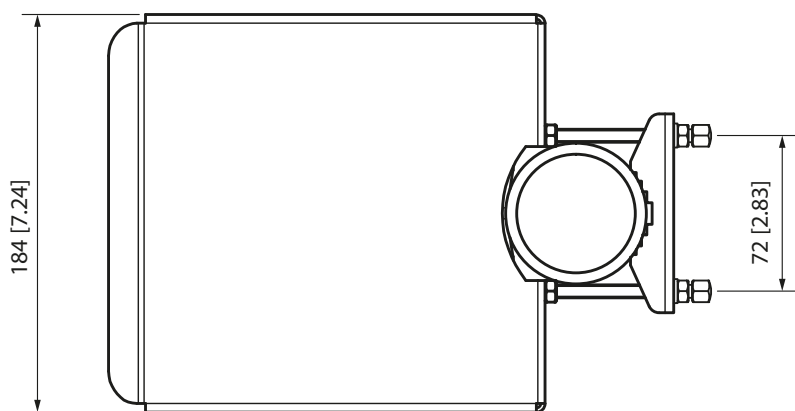
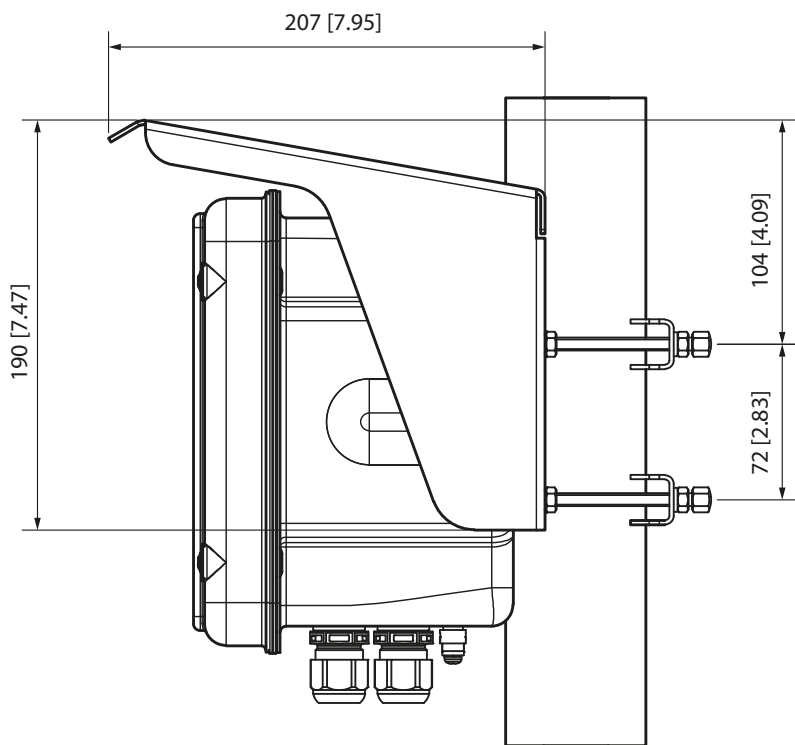


ZU 0544 Pipe-Mount Kit:
 2 x pipe clamp (stainless steel A4)
 4 x threaded rod M6 (stainless steel A4)
 4 x washer, nut, cap nut (stainless steel A4)

All dimensions in mm [inches]

Dimension Drawings – ZU 0548 Protective Hood

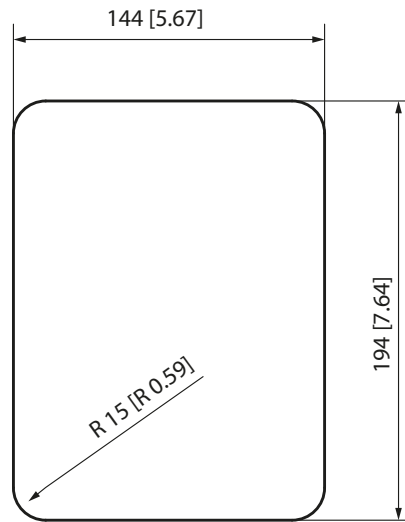
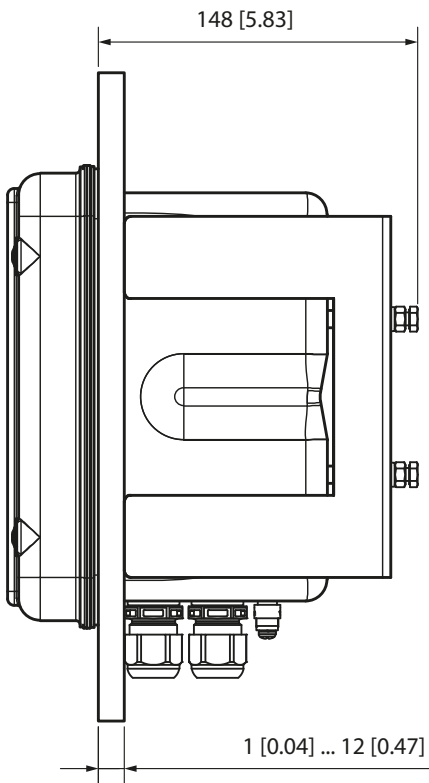
1 x protective hood (stainless steel A2)
 4 x nut M6 (stainless steel A4)



All dimensions in mm [inches]

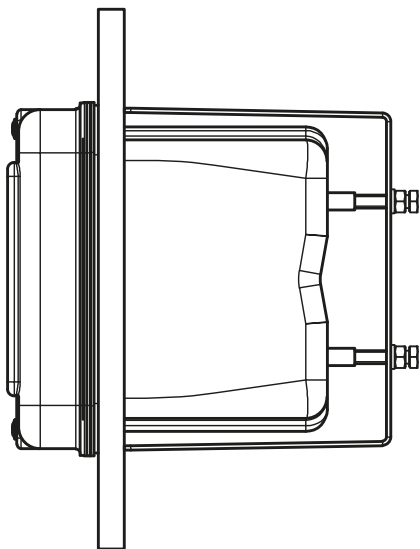
Protos II 4400 (X)

Dimension Drawings – ZU 0545 Panel-Mount Kit

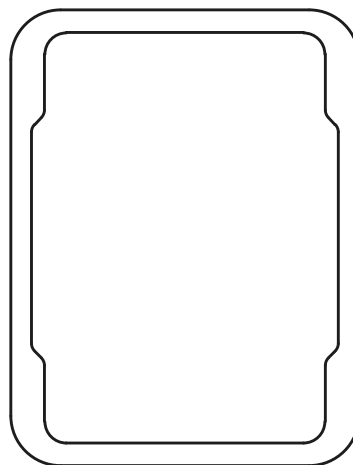


Control panel cutout

Panel mounting



Panel sealing



All dimensions in mm [inches]