Industrial Transmitters

Stainless Steel Design
for Hygienic Applications

Powder-coated design
for corrosive areas

3-Year
Warranty!

MEMOSENS

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 multichannel 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

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

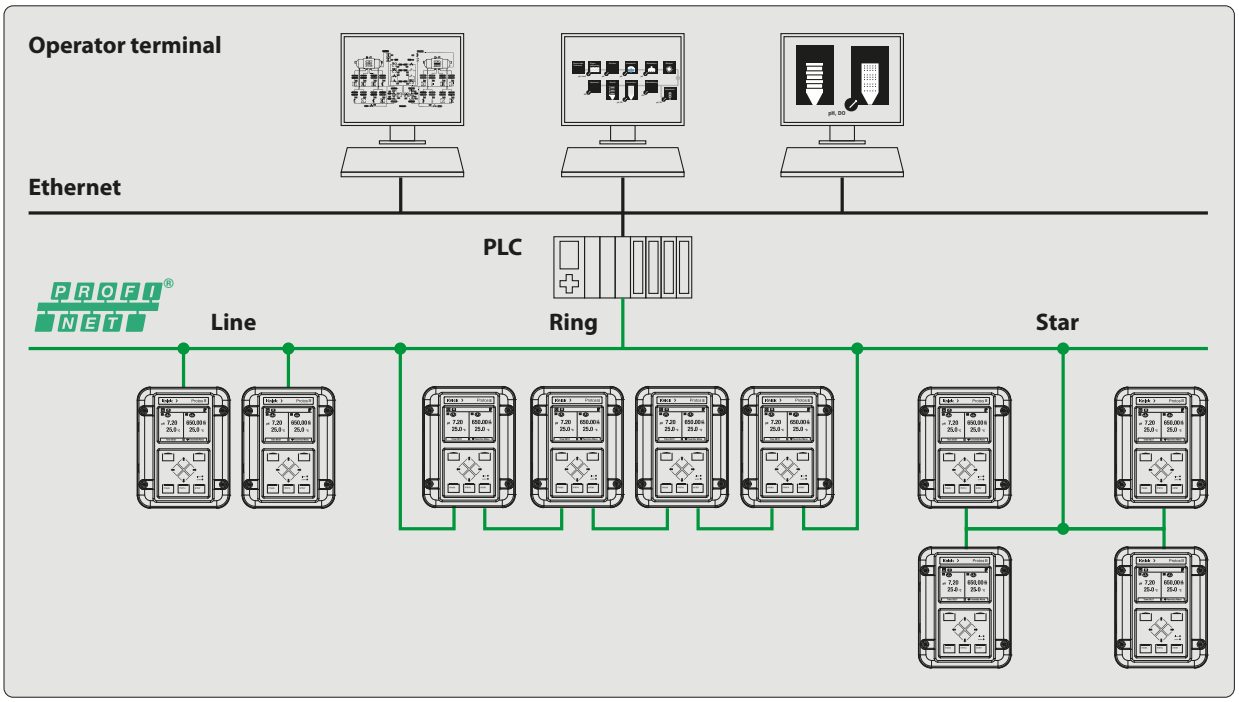
Use of a common and integrated network reduces the number of interfaces and thus potential sources of errors during installation. The amount of installation work required is minimized by the use of a PROFINET GSDML file (device master file).

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.

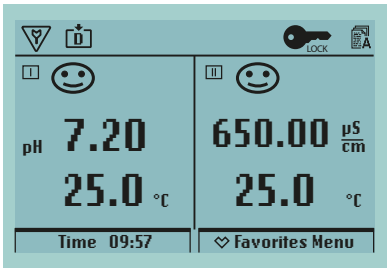
*) PROFIBUS & PROFINET International

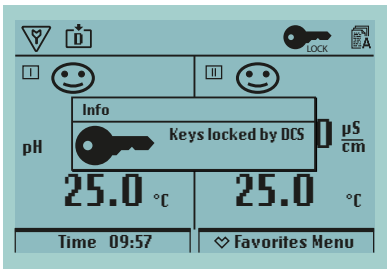
Integration of Protos II 4400 in PROFINET Industrial Ethernet network



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.

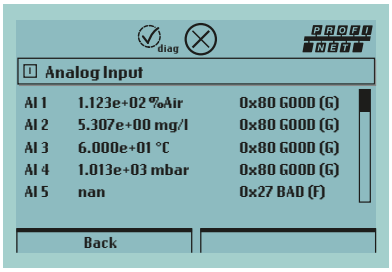
Transfer of up to 20 values, freely configurable measured or diagnostics data as AI 1-20 (analog input blocks), also in multichannel mode

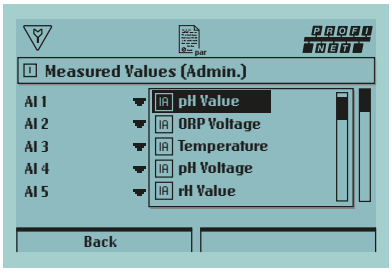
e.g., pH/ORP measurement:

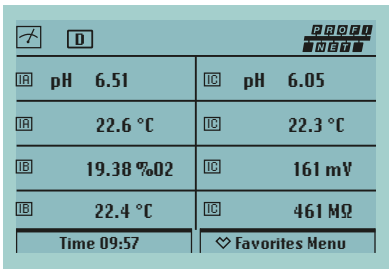
Measured values such as
pH value, pH voltage, ORP voltage, etc.

Calibration values
such as zero point, slope, ORP offset, etc.

Diagnostics data such as
Sensoface, wear, remaining lifetime, 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.
AIs: Values from transmitter to PCS
AOs: Values from PCS to transmitter

Multichannel and Multiparameter

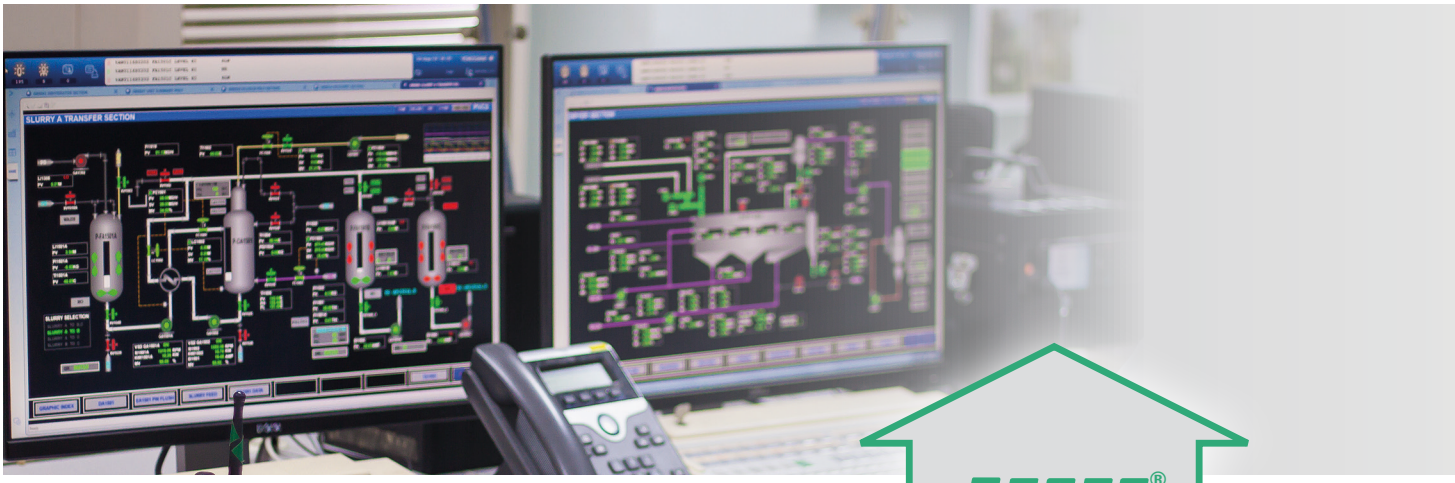
Up to three Memosens sensors can be connected to a module with the MSU 4400(X)-180 multichannel and multiparameter measuring module.
Protos II 4400(X) offers space for up to two measuring modules and can be easily and flexibly expanded into a multichannel transmitter for up to six Memosens sensors with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

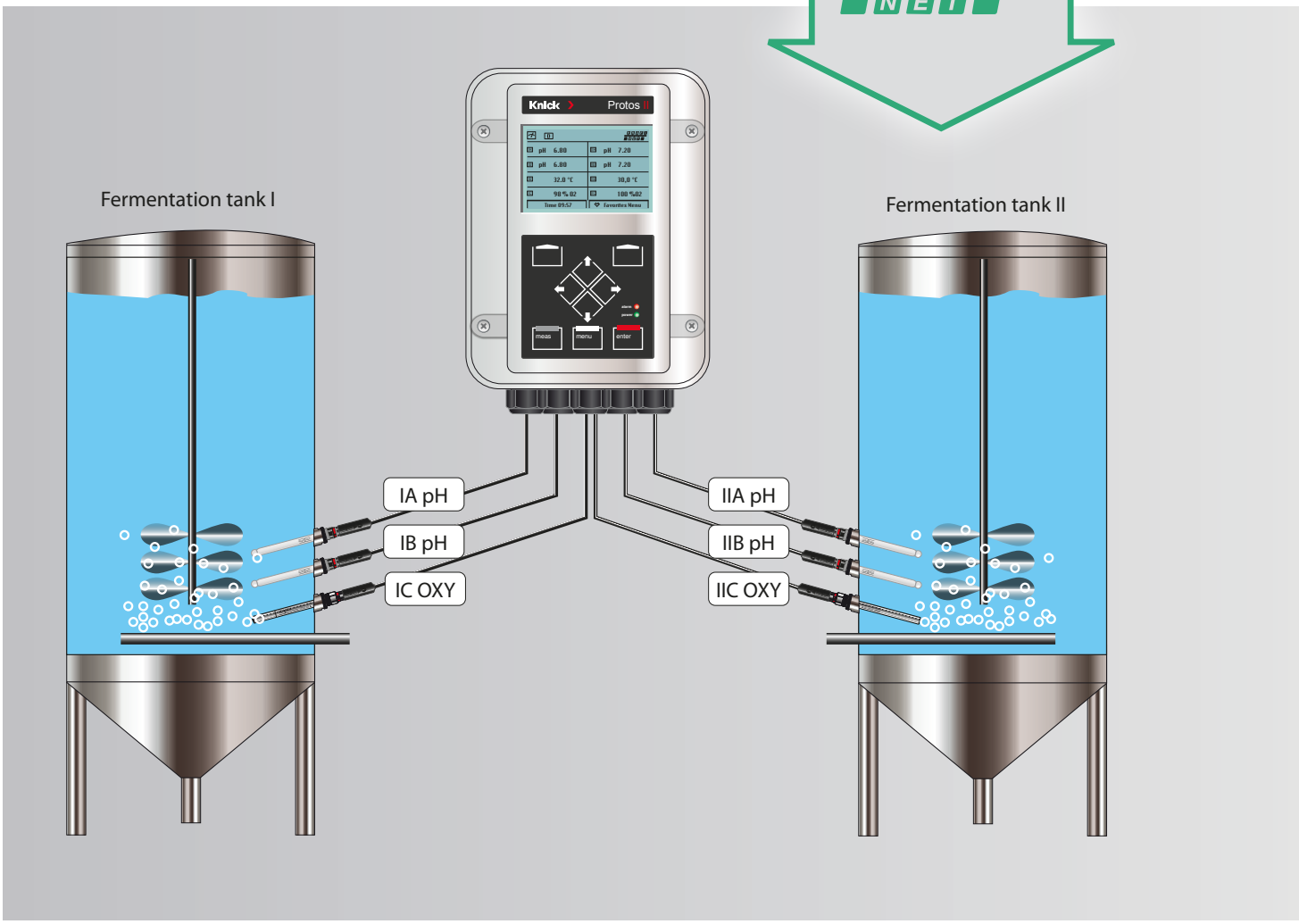
Protos II 4400
The Benchmark for the Most Demanding Measuring Tasks.

Easy Handling

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

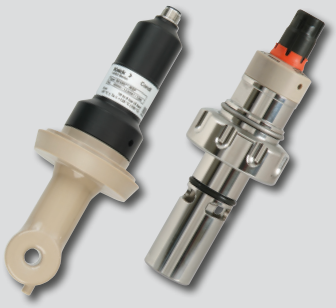
The sensor can therefore be safely calibrated when installed.





Industrial Transmitters

pH
ORP



Cond

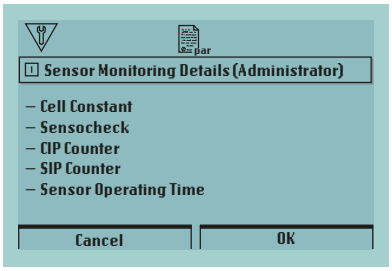
Oxy

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.



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.

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

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.

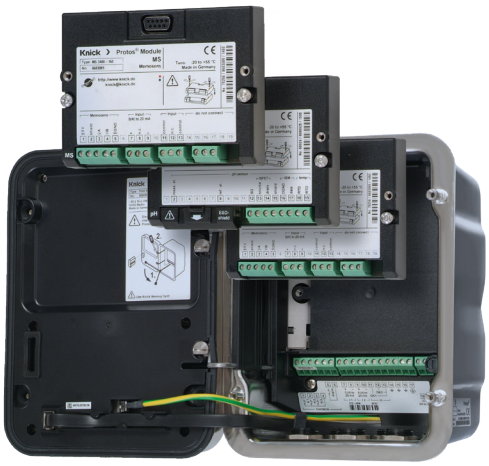
PID Controller Modules

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

PROFINET®

PROFIBUS® PROCESS FIELD BUS

Fieldbus Foundation



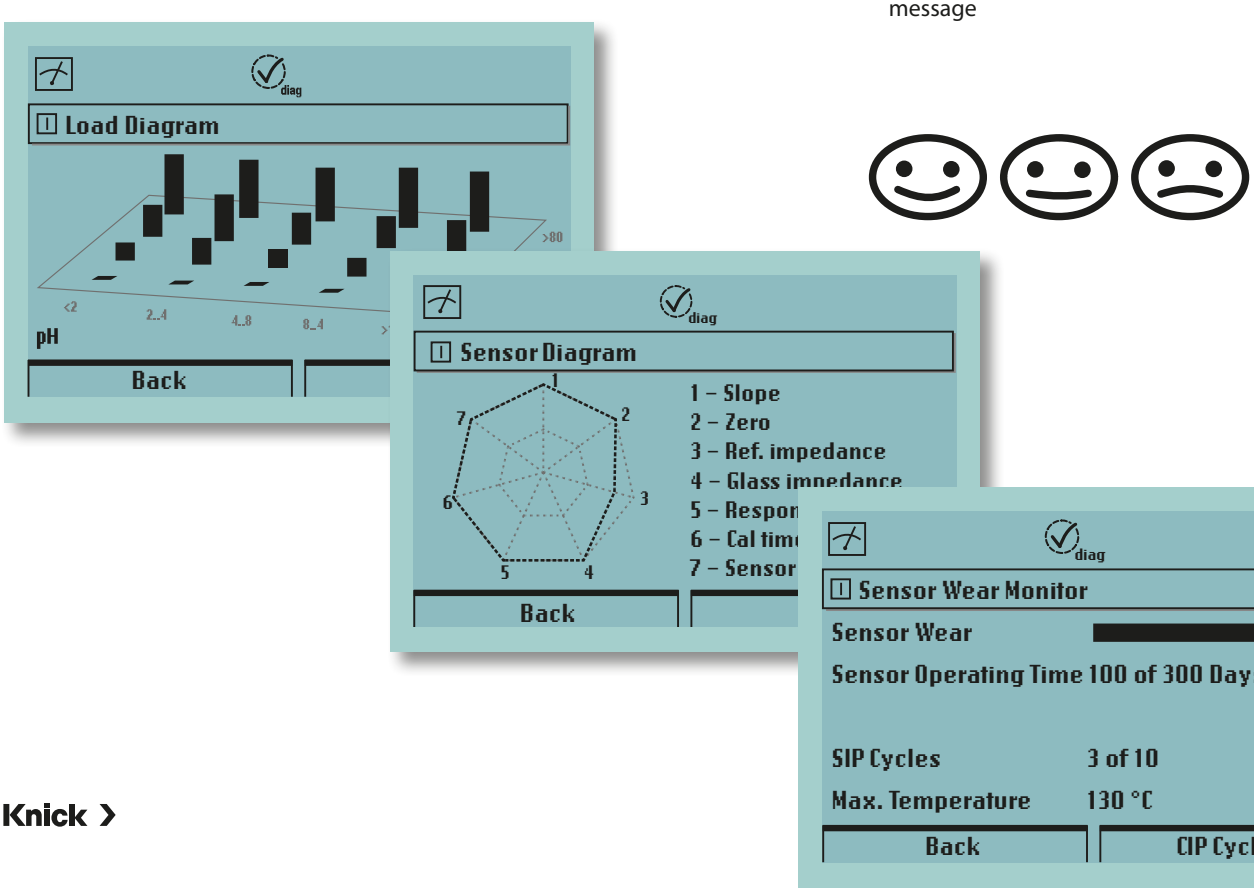
The smart diagnostic functions that Protos II provides for analyzing sensor life cycles mean a significant increase in sensor service life and availability.

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.

USB

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.

Progalog 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.

Industrial Transmitters

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.

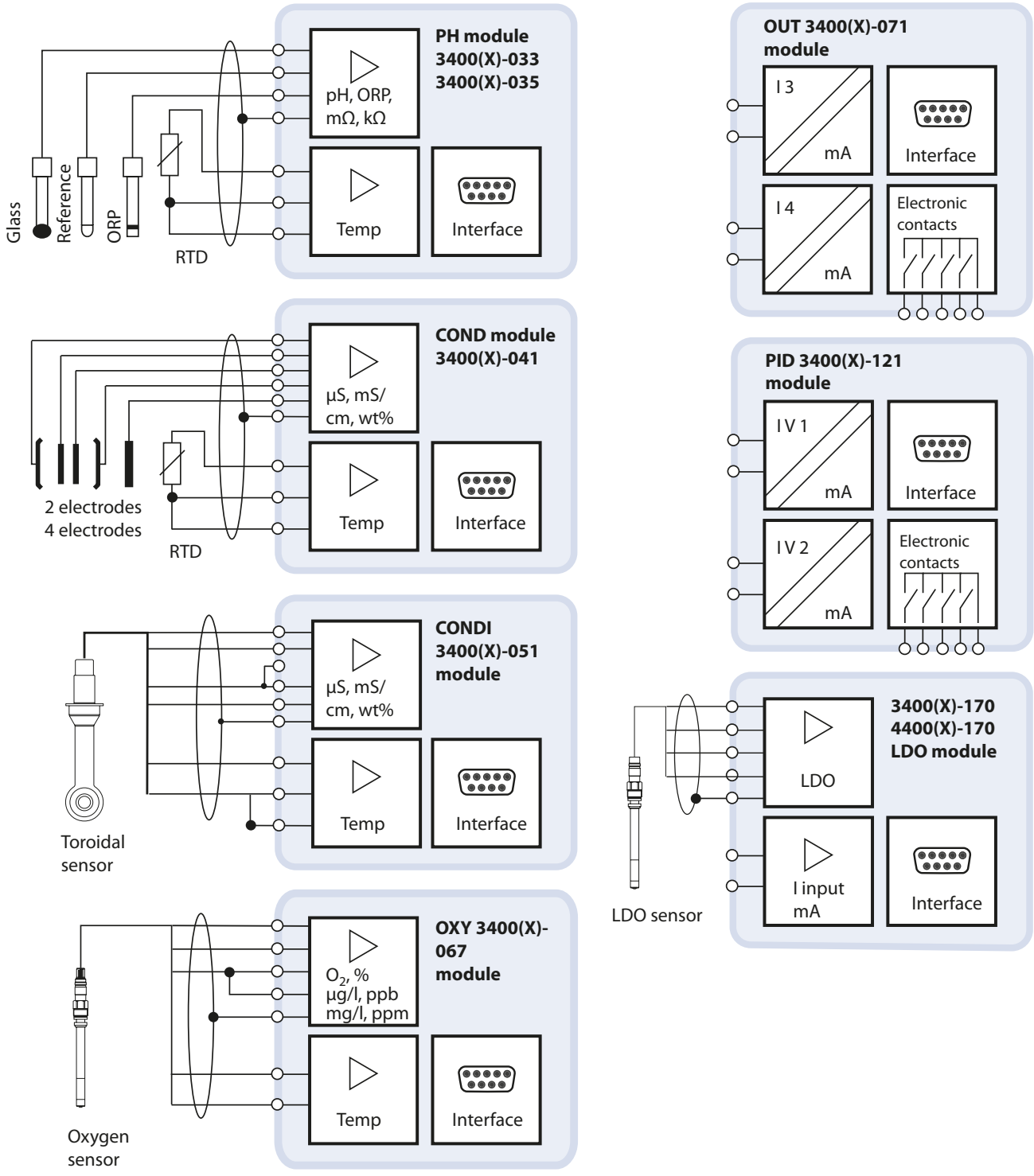
POWER PLANTS

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

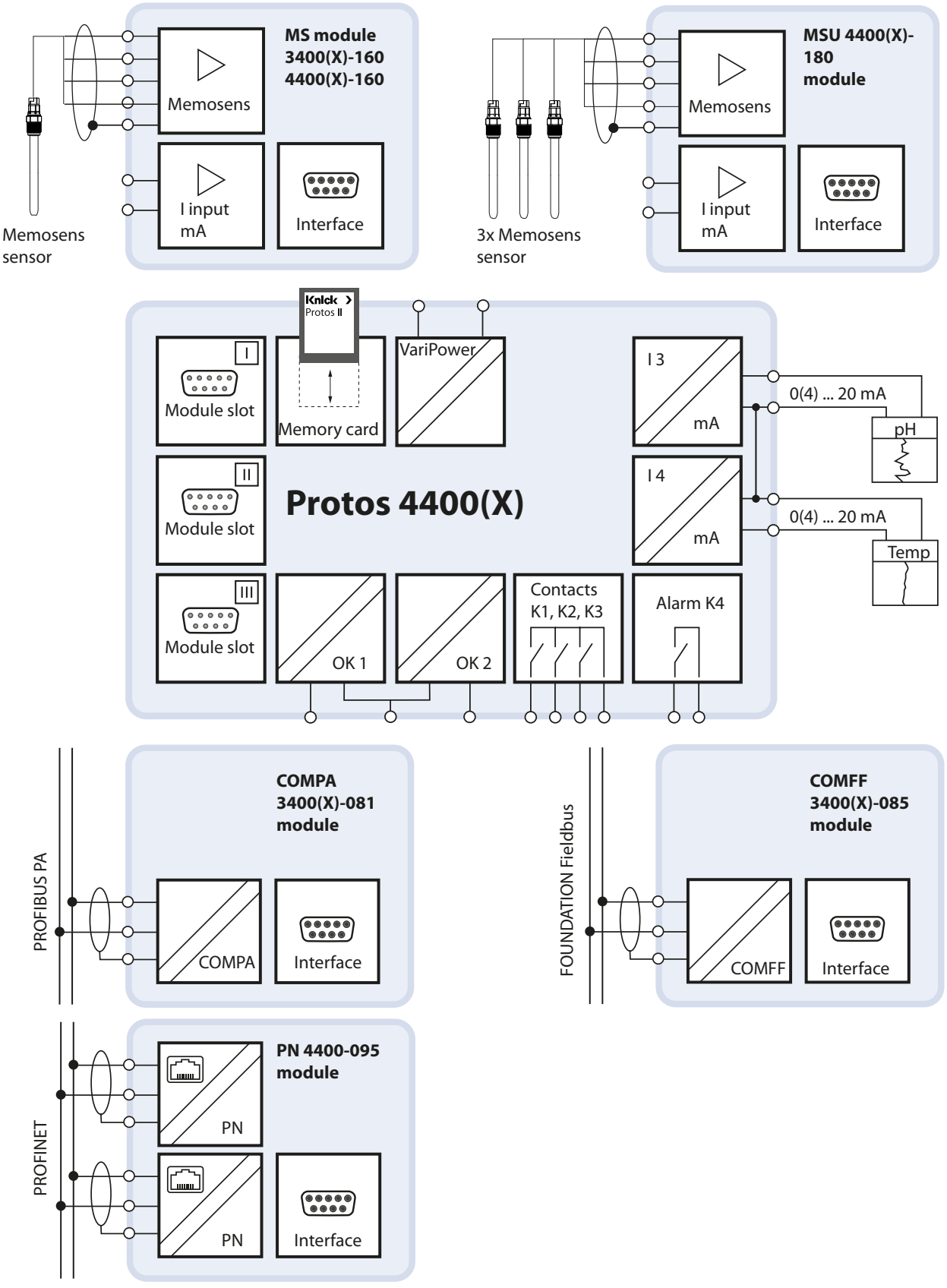
Example:
Flue Gas Purification

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



System Overview



Product Line

Protos II 4400	**Order No.**
Protos II 4400 S (basic unit, polished stainless steel), broad-range power supply	4400 S
Protos II 4400 C (basic unit, coated steel), broad-range power supply	4400 C

Measuring Modules	**Order No.**
PH 3400-033 measuring module (double high-resistance)	PH 3400-033
PH 3400-035 measuring module	PH 3400-035
COND 3400-041 measuring module	COND 3400-041
CONDI 3400-051 measuring module	CONDI 3400-051
OXY 3400-067 measuring module	OXY 3400-067
LDO 4400-170 measuring module	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	**Order No.**
OUT 3400-071 output module	OUT 3400-071
PID 3400-121 controller module	PID 3400-121
COMPA 3400-081 PROFIBUS PA communication module	COMPA 3400-081
COMFF 3400-085 FOUNDATION Fieldbus communication module	COMFF 3400-085
PN 4400-095 PROFINET communication module	PN 4400-095

Protos II 4400 (X)

Product Line

Protos II 4400 X	Order No.
Protos II 4400X S (basic unit, polished stainless steel, broad-range power supply)	4400 XS / VPW
Protos II 4400X S (basic unit, polished stainless steel, 24 V AC/DC)	4400 XS / 24 V
Protos II 4400X C (basic unit, coated steel, broad-range power supply)	4400 XC / VPW
Protos II 4400X C (basic unit, coated steel, 24 V AC/DC)	4400 XC/24V

Measuring Modules	Order No.
PH 3400X-033 measuring module (double high-resistance)	PH 3400X-033
PH 3400X-035 measuring module	PH 3400X-035
COND 3400X-041 measuring module	COND 3400X-041
CONDI 3400X-051 measuring module	CONDI 3400X-051
OXY 3400X-067 measuring module	OXY 3400X-067
MS 4400X-160 digital measuring and communication module for Memosens sensors (oxygen measurement can be activated via TAN)	MS 4400X-160
MSU 4400X-180 digital measuring and communication module for Memosens sensors (oxygen measurement, measuring channel B and C can be activated via TAN)	MSU 4400X-180

Communication Modules	Order No.
OUT 3400X-071 output module	OUT 3400X-071
PID 3400X-121 controller module	PID 3400X-121
COMPA 3400X-081 PROFIBUS PA communication module	COMPA 3400X-081
COMFF 3400X-085 FOUNDATION Fieldbus communication module	COMFF 3400X-085

Accessories for Protos II 4400 (X)

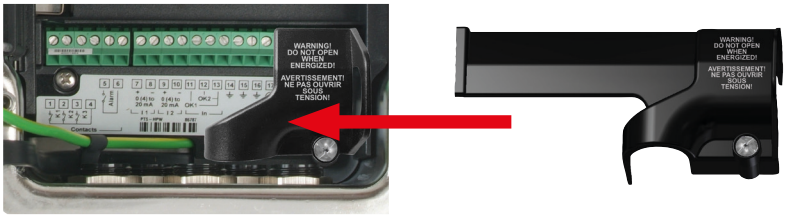
Mounting Kits		Order No.
Pipe-mount kit		ZU 0544
Panel-mount kit		ZU 0545
Protective hood		ZU 0548

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 Logbook, statistics, records, measurement recorder or memory card (optional)	> 10 years (EEPROM) > 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 Protection class	II I
Terminals, inside	Tightening torque	0.5 ... 0.6 Nm Single and stranded wires 0.2 ... 2.5 mm²
	Wiring	Stripping length max. 7 mm Ferrules 0.25 ... 2.5 mm²
Equipotential bonding clamp PA	Tightening torque Cross section	1 Nm > 4 mm²
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: Protos II 4400 S:	Steel, coated 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 Logbook, statistics, records, measurement recorder or memory card (optional)	> 10 years (EEPROM) > 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 mm²
	Wiring	Stripping length max. 7 mm Ferrules 0.25 ... 2.5 mm²
Equipotential bonding clamp PA	Tightening torque Cross section	1 Nm > 4 mm²

Protos II 4400 X Specifications

Protection against electric shock (terminal PE)	Protective conductor terminal acc. to EN 61010-1	
Input OK 1[2] (terminals 30/31)	Galvanically isolated (optocoupler) Ui ≤ 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 30/33)	Galvanically isolated (optocoupler) Ui ≤ 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 51/52)	0/4... 20 mA (22 mA), max. 10 V Galvanic isolation up to 60 V (galvanically connected with output I2)	
	Load monitoring Overrange Measurement error[3] Current source	Error message if load is exceeded 22 mA for messages < 0.2 % of current value +0.02 mA 0.00 ... 22.00 mA
Current output I2[2] (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 Overrange Measurement error[3] Current source	Error message if load is exceeded 22 mA for messages < 0.2 % of current value +0.02 mA 0.00 ... 22.00 mA
Relay contacts[2] (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: Protos II 4400X S:	Steel, coated 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 WISKA type ESKE/1 M20	M20 x 1.5 A/F 24
	Clamping ranges	Standard sealing insert: Reduction sealing insert: Multiple sealing insert:	7 ... 13 mm 4 ... 8 mm 5.85 ... 6.5 mm
	Tensile strain	Not permitted; Only suitable for "fixed installation"	
	Tightening torque	Connecting thread: Cap nut:	2.3 Nm 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

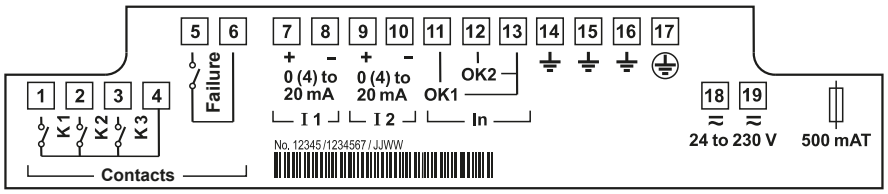
4) This equipment is not designed for domestic use, and is unable to guarantee adequate protection of the radio reception in such environments.

Memory Card Specifications

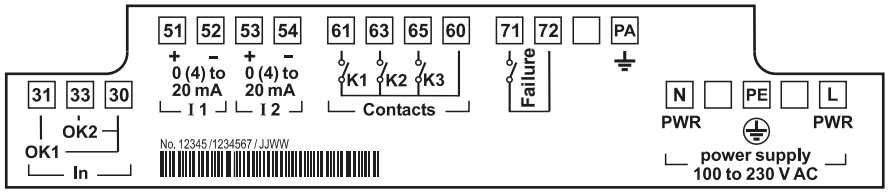
Memory card types	Data Card (X)	Records data	
	FW Update Card (X)	Firmware update for function expansion	
	FW Repair Card (X)	Firmware repair in case of malfunction	
	Custom FW Update Card	Customer-specific FW versions	
	Custom FW Repair Card	Customer-specific FW versions	
Memory size	32 MB		
	Logbook	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		

Terminal Assignments

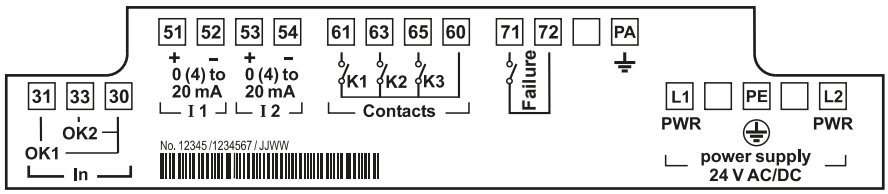
Protos II 4400 20 … 253 V AC



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

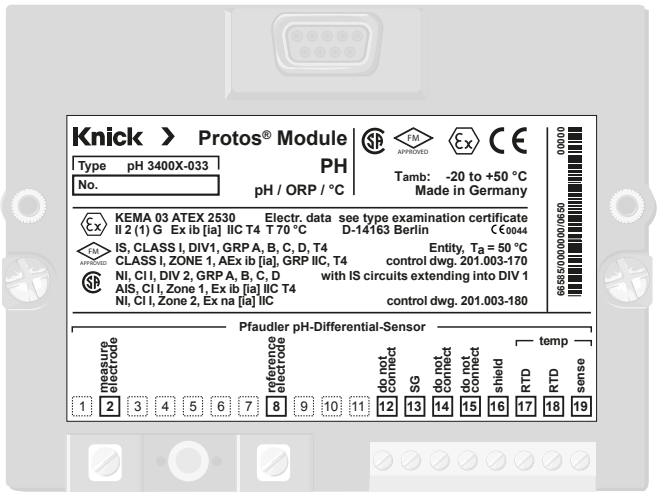
Calimatic buffer sets[1)]	Fixed buffer sets:	Mettler Toledo:	2.00/4.01/7.00/9.21
		Knick CaliMat	2.00/4.00/7.00/9.00/12.00
		DIN 19267:	1.09/4.65/6.79/9.23/12.75
		NIST standard:	1.680/4.008/6.865/9.184
		NIST technical buffers:	1.68/4.00/7.00/10.01/12.46
		Hamilton	2.00/4.01/7.00/10.01/12.00
		Kraft:	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 ΔpH = ±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 wwww.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

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 ORP value rH Value	-2.00 … 16.00 –2000 … 2000 mV 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 Input current Impedance range	> 1 x 10^{12} Ω < 1 x 10^{-12} A[4)] 0.5 … 1000 MΩ	
Reference electrode input[2)]	Input resistance Input current Impedance range	> 1 x 10^{10} Ω < 1 x 10^{-10} A[4)] 0.5 … 200 kΩ	
Measurement error[3)] (display)	pH Value ORP value	< 0.02 < 1 mV	TC < 0.001 pH/K 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 – Ultrapure water – Table	 0 ... 150 °C / 32 ... 302 °F 0 ... 95 °C / 32 ... 203 °F	 –19,00 … 19.99 %/K 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

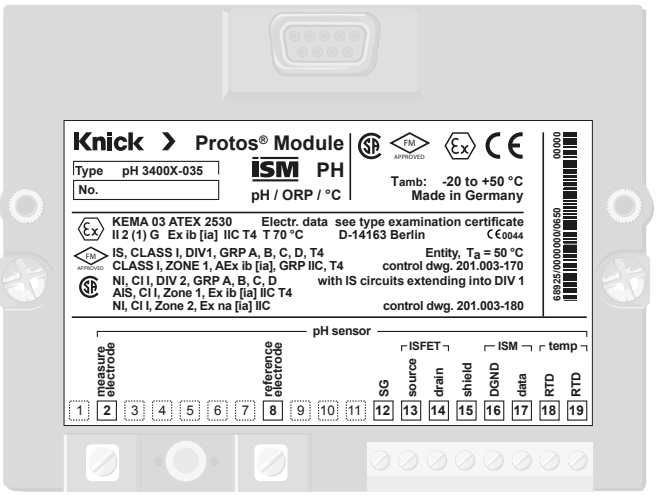
Calimatic buffer sets[1)]	Fixed buffer sets:	Mettler Toledo:	2.00/4.01/7.00/9.21
		Knick CaliMat:	2.00/4.00/7.00/9.00/12.00
		DIN 19267:	1.09/4.65/6.79/9.23/12.75
		NIST standard:	1.680/4.008/6.865/9.184
		NIST technical buffers:	1.68/4.00/7.00/10.01/12.46
		Hamilton:	2.00/4.01/7.00/10.01/12.00
		Kraft:	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 (Add-on function FW4400-002)		
Nominal zero point[1)]	pH 0 … 14	Calibration range	ΔpH = ±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, Uis, 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, Uis, 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		

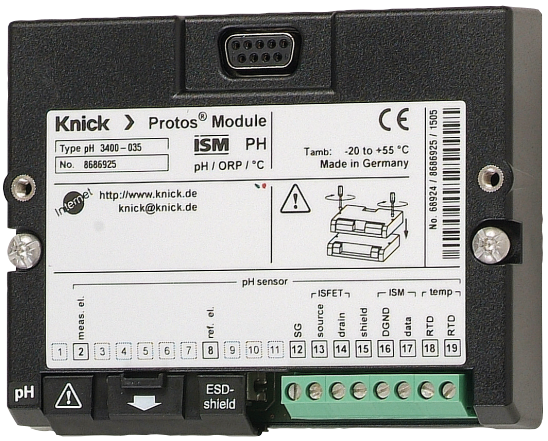
PH 3400(X)-035 Module Specifications

Explosion protection (PH 3400X-035)	For entity parameters, see attachment to certificates or control drawings on wwww.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	–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

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 µS/cm … 1999 mS/cm
	Resistivity	0.5 Ω · cm … 999 MΩ · cm
	Concentration	0.0 … 100.0 wt%
	Salinity	0.0 … 45.0 g/kg (0 … 35 °C)
	Measuring range	4-electrode sensors: 0.1 µS x c … 2000 mS x c[2)]
		2-electrode sensors: 0.1 µS x c … 200 mS x c[2)]
	Display ranges	Resolution is determined by cell constant
		Cell Constant / Resistivity conductivity
		< 0.1200 cm^{-1} / 0.000 µS/cm
		< 1.200 cm^{-1} / 00.00 µS/cm
		< 12.00 cm^{-1} / 000.0 µS/cm
		< 120.0 cm^{-1} / 0.000 mS/cm
		≥ 120.0 cm^{-1} / 00.00 mS/cm
	Response time (T_{90})	Approx. 1 s
	Measurement error[3)]	< 0.5 % of measured value + 0.2 µS x 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 kΩ / Ni 100
	3-wire connection, adjustable	
	Measuring range	PT 100 / PT 1000: –50 ... 250 °C / –58 ... 482 °F
		NTC 30 kΩ: –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

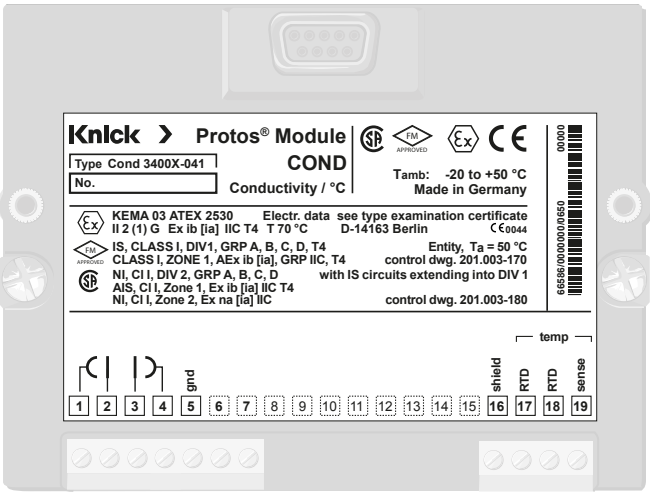
Concentration determination[1] (FW4400-009)	For substances:			
	HNO_3	0 ... 30	wt%	–20 ... 50 °C / –4 ... 122 °F
		35 ... 96	wt%	–20 ... 50 °C / –4 ... 122 °F
	HCl	0 ... 18	wt%	–20 ... 50 °C / –4 ... 122 °F
		22 ... 39	wt%	–20 ... 50 °C / –4 ... 122 °F
	H_2SO_4[3]	0 ... 37	wt%	–17.8 ... 110 °C / –0.04 ... 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
	$H_2SO_4 \cdot SO_3$ (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]	Operating modes: – 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]	– 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 wwww.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		

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.

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 µS/cm ... 2000 mS/cm, resolution 1 µS/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 µS/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)] 3-wire connection, adjustable	Pt 100 / Pt 1000 / NTC 30 kΩ / NTC 100 kΩ	
	Measuring range	PT100 / PT1000: NTC 30 kΩ, NTC 100 kΩ:	–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% 35 ... 96 wt%	–20 ... 50 °C / –4 ... 122 °F –20 ... 50 °C / –4 ... 122 °F
	HCl	0 ... 18 wt% 22 ... 39 wt%	–20 ... 50 °C / –4 ... 122 °F –20 ... 50 °C / –4 ... 122 °F
	H_2SO_4	0 ... 37 wt% 28 ... 88 wt% 89 ... 99 wt%	–17.8 ... 110 °C / –0.04 ... 230 °F –17.8 ... 115.6 °C / –0.04 ... 230 °F –17.8 … 115.6 °C / –0.04 ... 240.08 °F
	NaOH	0 ... 14 wt% 18 ... 50 wt%	0 ... 100 °C / 32 ... 212 °F 0 ... 100 °C / 32 ... 212 °F
	NaCl	0 ... 28 wt%	0 ... 100 °C / 32 ... 212 °F
	$H_2SO_4 \cdot SO_3$ (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	

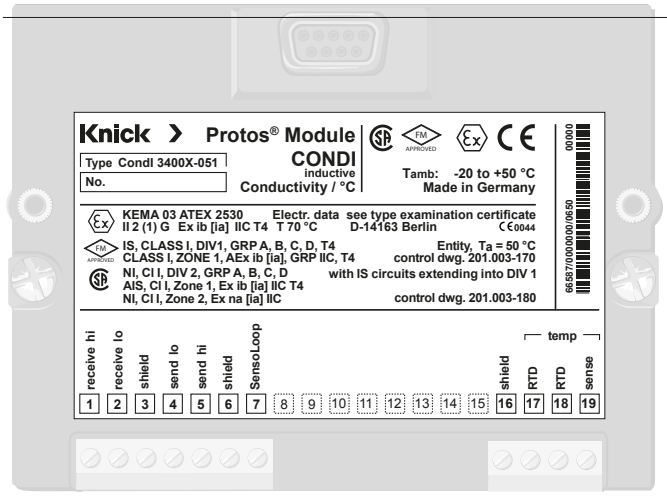
Protos II 4400 (X)

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)]	– Linear – Trilinear – Function (logarithmic) – As desired via table		
Explosion protection (CONDI 3400X-051)	For entity parameters, see attachment to certificates or control drawings on wwww.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 mm²
	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	000.0 ... 999.9 %air
		0,000 ... 9.999 %O2	0,000 ... 9.999 %O2	0,000 ... 9.999 %O2
	00.00 ... 99.99 %O2	00.00 ... 99.99 %O2	00.00 ... 99.99 %O2	00.00 ... 99.99 %O2
	000.0 ... 999.9 %O2	000.0 ... 999.9 %O2	000.0 ... 999.9 %O2	000.0 ... 999.9 %O2
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	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 ... 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	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%	00.00 ... 99.99 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	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
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

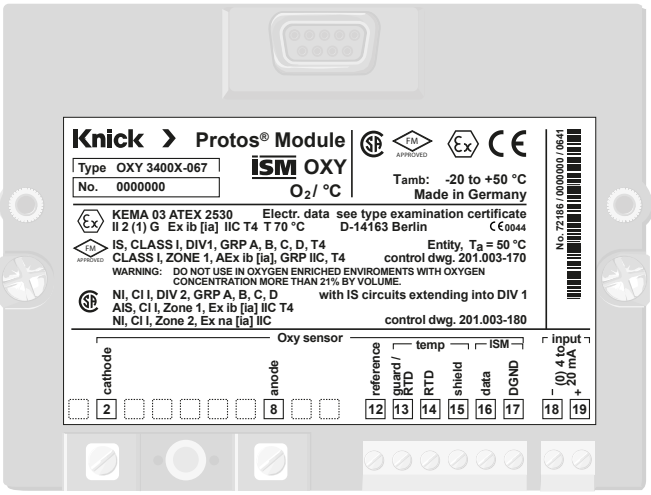
Temperature input	Temperature probe[1]	NTC 22 kΩ / NTC 30 kΩ, 2-wire connection, adjustable
	Measuring range	–20 ... 150 °C / –4 ... 302 °F
	Resolution	0.1 °C
	Measurement error[2]	0.2 % of measured value + 0.5 K (< 1 K at T > 100 °C / 212 °F)
Current Input	0(4) ... 20 mA for absolute or differential pressure transmitter	
	Pressure range	0 ... 9,999 mbar
	Current range	0(4) ... 20 mA / 50 Ω Start/end can be defined by the user within the pressure range
	Resolution	< 1%
Sensor adjustment[1]	Operating modes	– 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 wwww.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

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 mm²
	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

OXY 3400(X)-067 Module Terminal Assignments



LDO 4400-170 Module Specifications

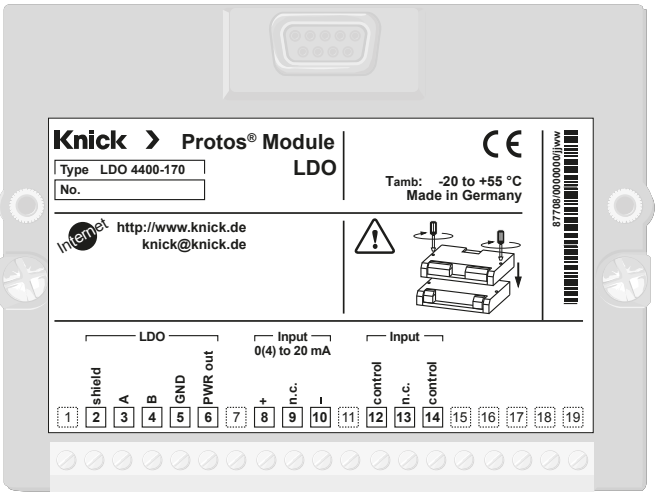
Input for sensor	SE 740 optical oxygen sensor		
Display ranges	Saturation (–10 ... 80 °C)	0.0 ... 999.9 % Air 0.00 ... 99.99 % O_2	(-10 ... 80 °C / 14 ... 176 °F)
	Concentration	0.00 ... 99.99 mg/l (ppm)	(-10 ... 80 °C / 14 ... 176 °F)
	Volume concentration in gas	0.00 ... 99.99 vol%	
	Partial pressure	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 + 0.5 K	(< 1K at T > 100 °C / 212 °F)
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 – Product calibration, concentration and product calibration, partial pressure – Zero point correction		
Calibration record	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	

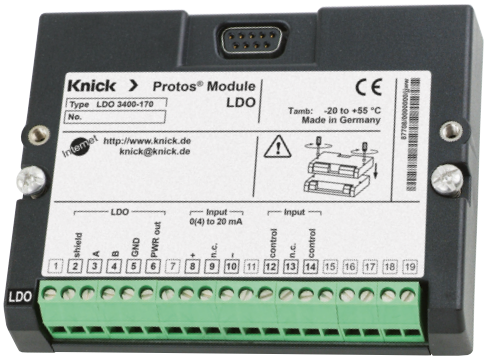
LDO 4400-170 Module Specifications

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 mm²
	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



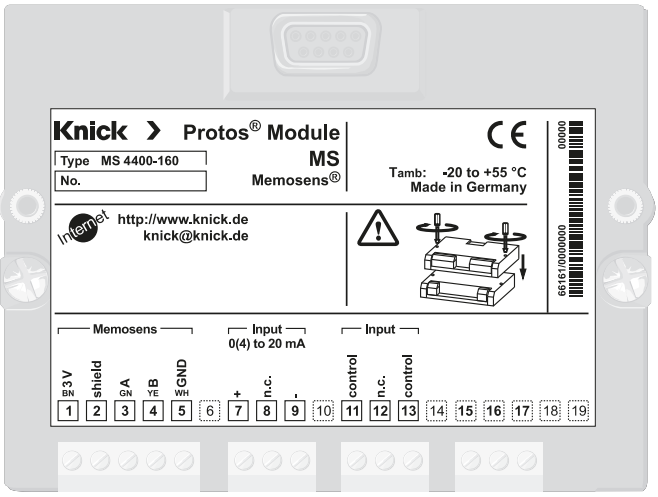


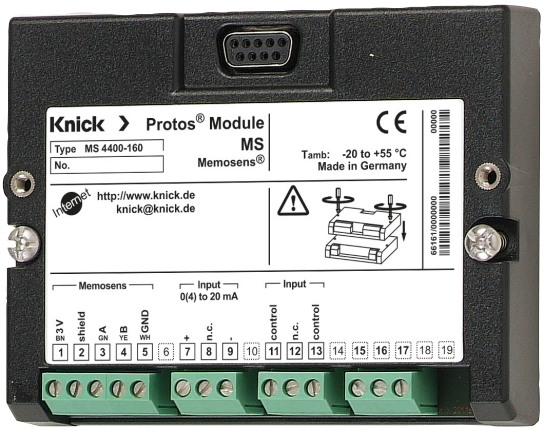
MS 4400(X)-160 Module Specifications

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 wwww.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.

MS 4400(X)-160 Module Terminal Assignments



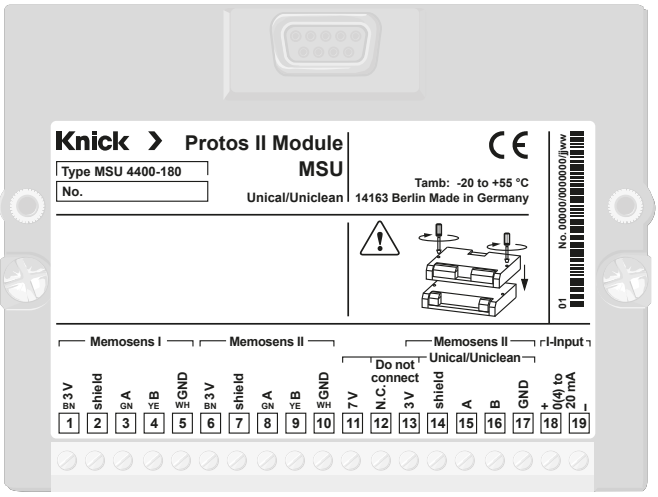


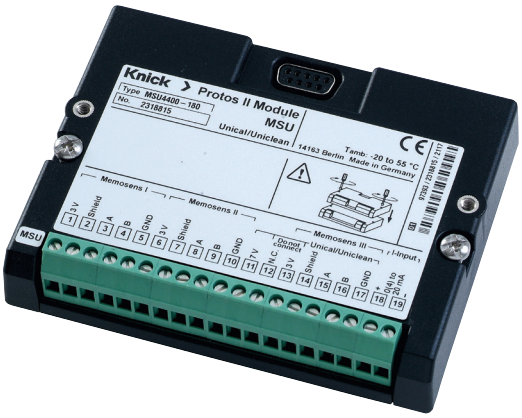
MSU 4400(X)-180 Module Specifications

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 entity parameters, see attachment to certificates or control drawings on wwww.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 mm²
	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.

MSU 4400(X)-180 Module Terminal Assignments



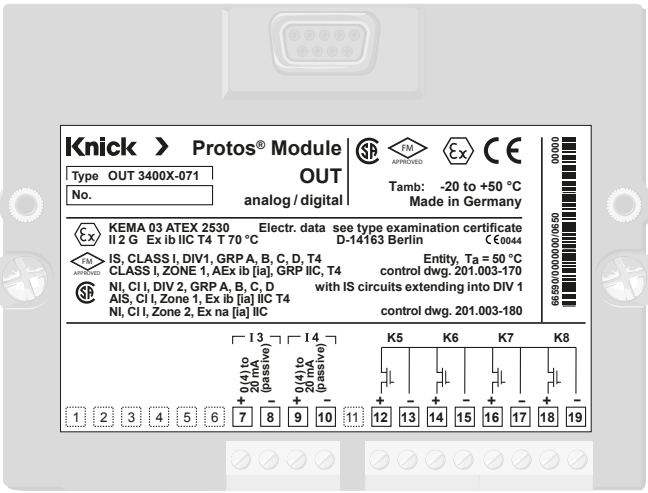


OUT 3400(X)-071 Module Specifications

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 mA, P_{max} = 0.8 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 mA, P_{max} = 0.8 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 V, I_{max} = 100 mA, P_{max} = 0.8 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 entity parameters, see attachment to certificates or control drawings on wwww.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 mm²
	Wiring	Stripping length	Max. 7 mm
		Temperature resistance	> 75 °C / 167 °F

[1)] User-defined
[2)] At rated operating conditions

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	Imax = 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_n:	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	

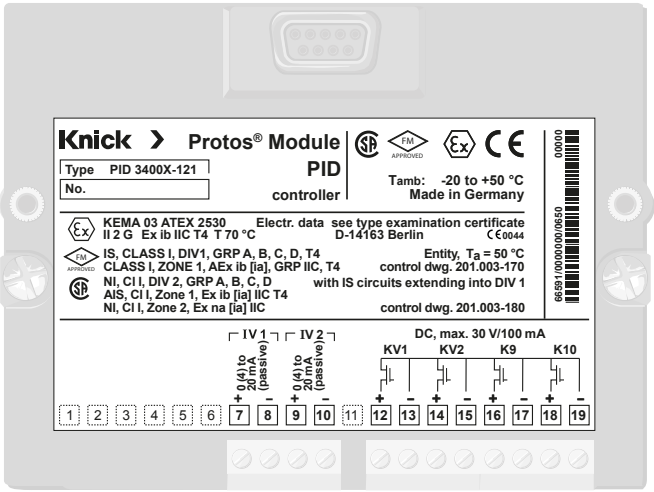
Protos II 4400 (X)

PID 3400-121 Module Specifications

Explosion protection (OUT 3400X-121)	For entity parameters, see attachment to certificates or control drawings on wwww.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	
	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 mm²
	Wiring	Stripping length	Max. 7 mm
		Temperature resistance	> 75 °C / 167 °F

[1] User-defined
[2] At rated operating conditions

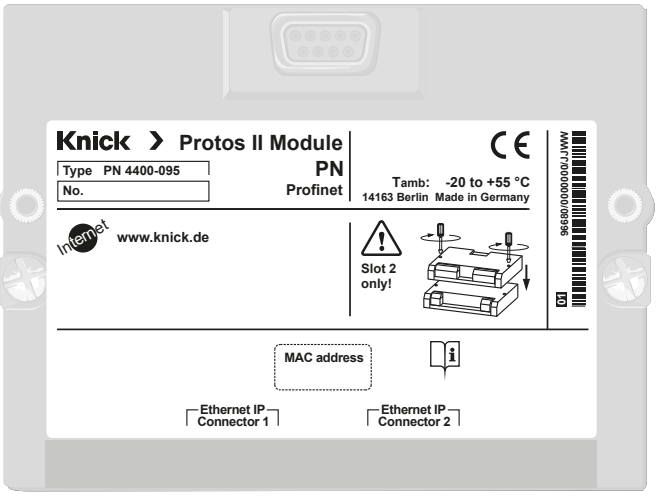
PID 3400-121 Module Terminal Assignments

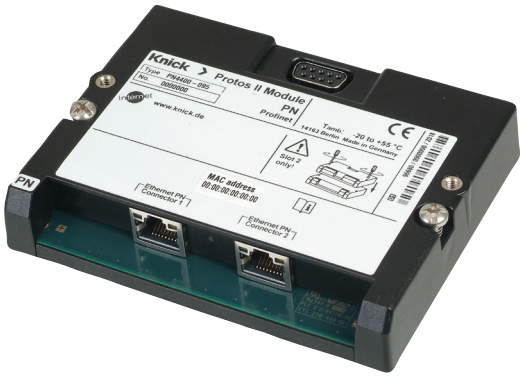


PN 4400-095 Module Specifications

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
		Single and stranded wires	0.2 ... 2.5 mm²
	Wiring	Stripping length	Max. 7 mm
		Temperature resistance	> 75 °C / 167 °F

PN 4400-095 Module Terminal Assignments



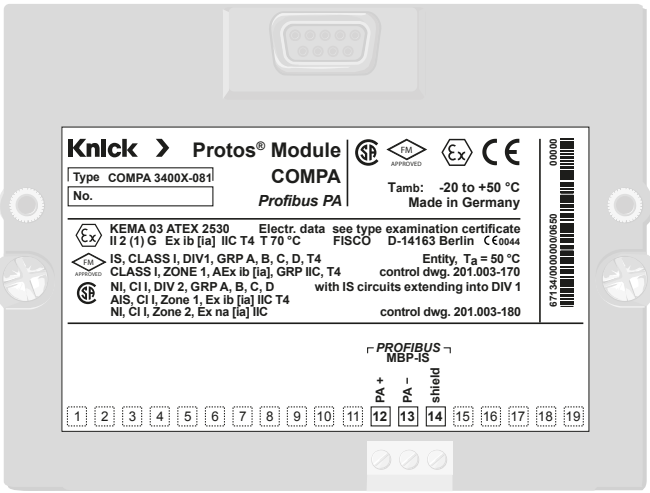


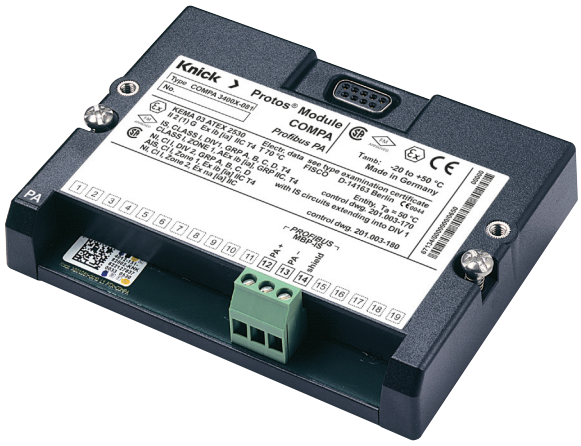
PROFIBUS COMPA 3400(X)-081 Module Specifications

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 wwww.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 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 mm²
	Wiring	Stripping length	Max. 7 mm
		Temperature resistance	> 75 °C / 167 °F

[1] MBP-IS = Manchester Bus Powered – Intrinsic Safety

PROFIBUS COMPA 3400 X-081 Module Terminal Assignments





COMFF 3400(X)-085 Module Specifications

FOUNDATION Fieldbus H1[1)]	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	

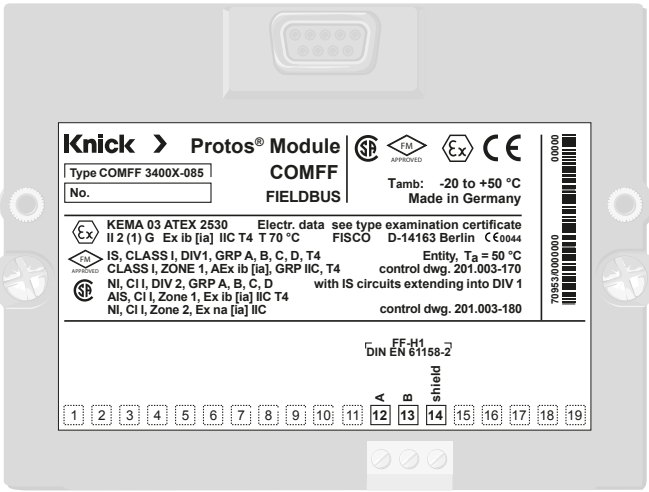
Protos II 4400 (X)

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 mm²
	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.

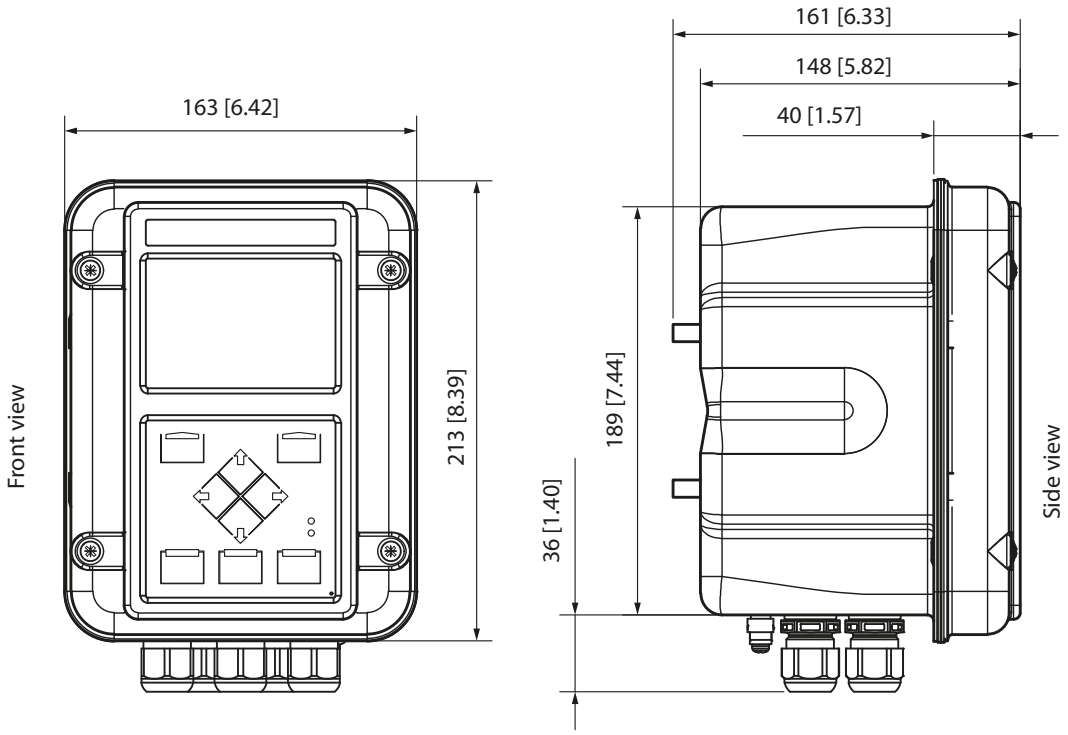
ZU 0548 Protective Hood

Additional protection from
direct weather exposure
and mechanical damage.

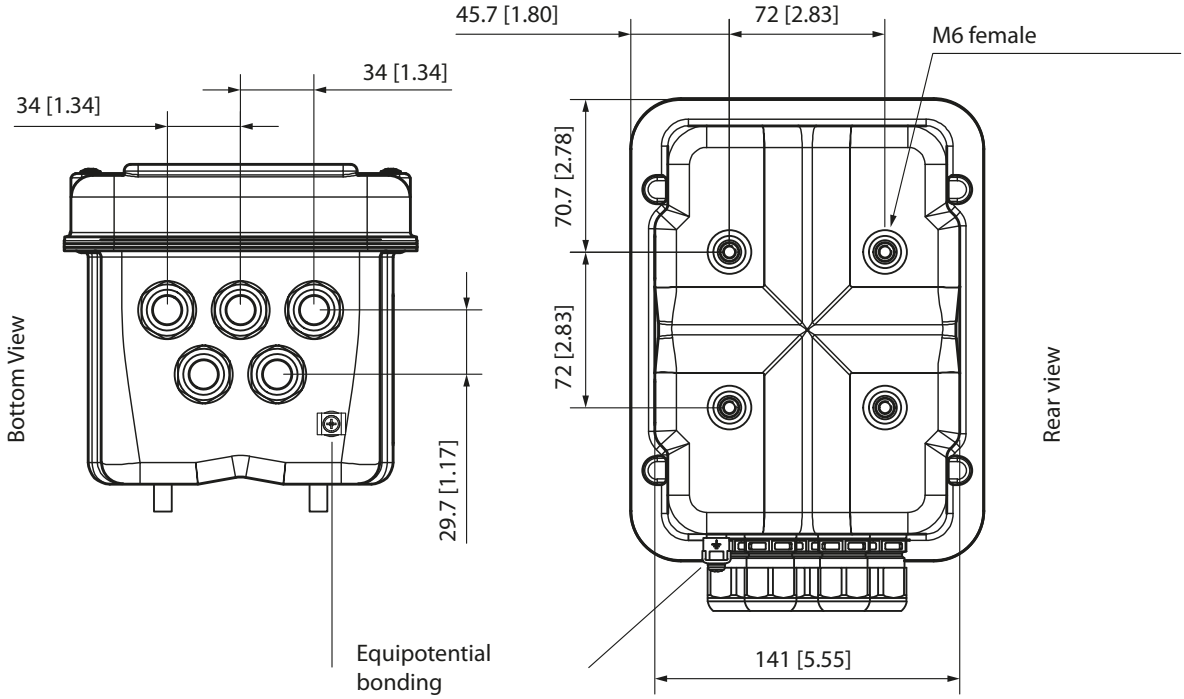
ZU 0545 Panel-Mount Kit

For assembly in
standardized panel cutout
144 x 194 mm.

Dimension drawings

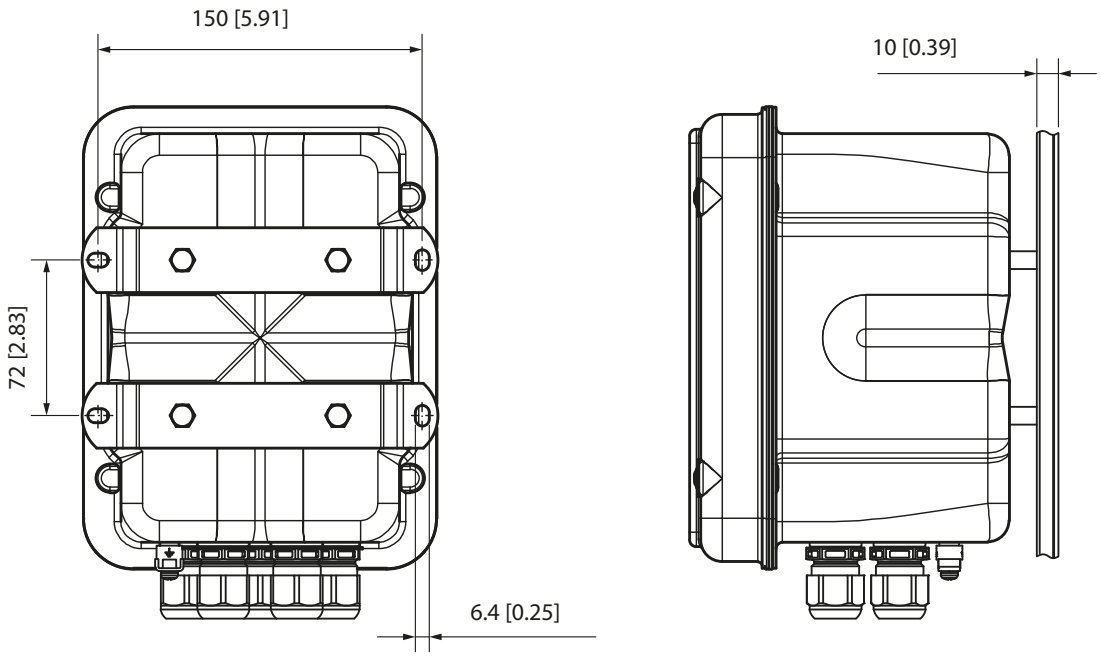


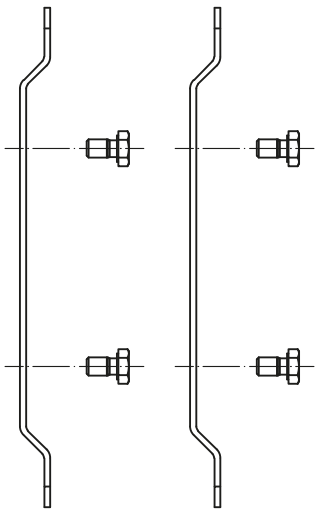
Cable glands M20 x 1.5 (A/F 24 mm)



All dimensions in mm [inches]

Dimension Drawings – Wall Mounting

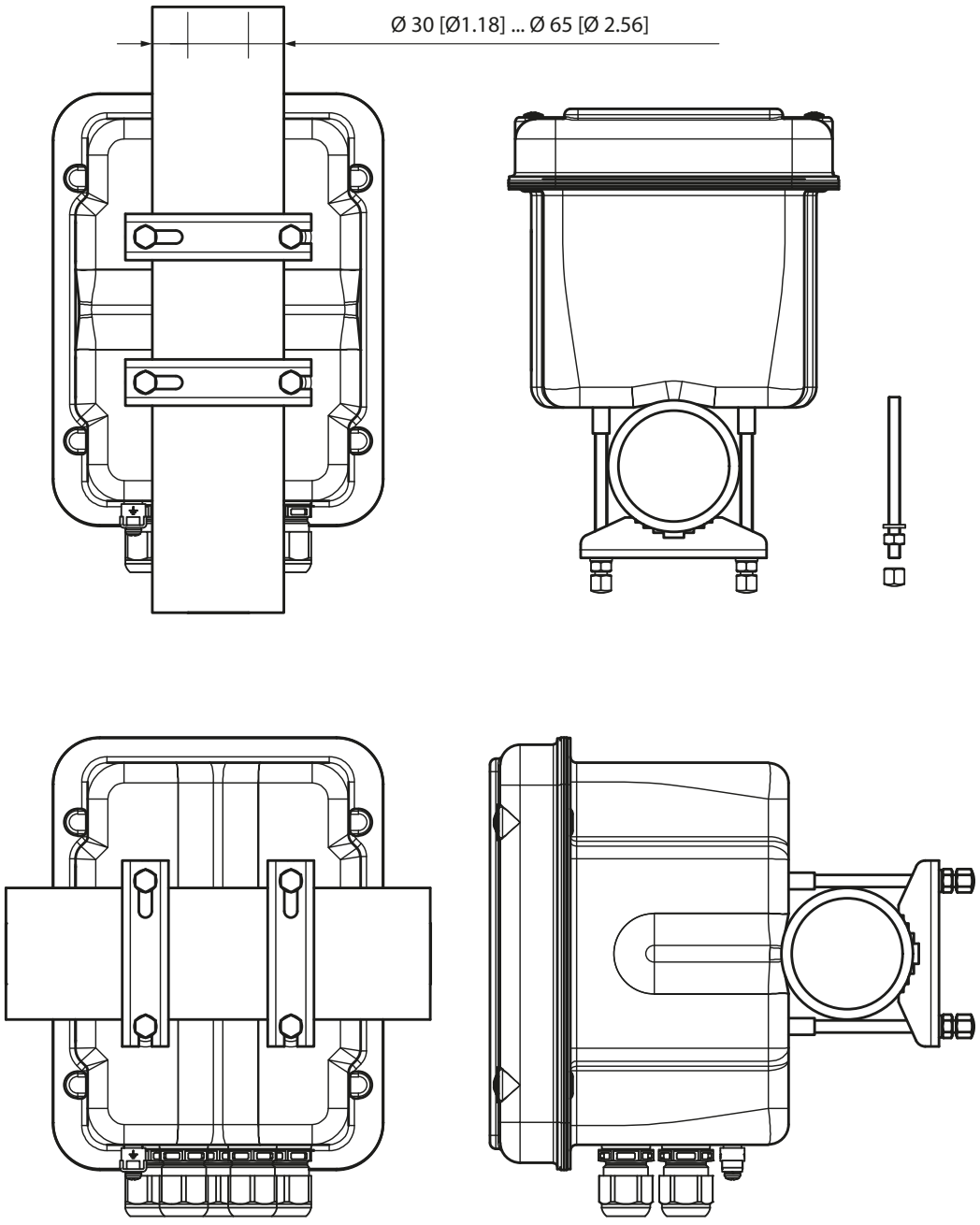




2 x wall-mount bracket (stainless steel A4)
4 x hex bolt M6x10
(A/F 10, stainless steel A4)
(included in package contents)

All dimensions in mm [inches]

Dimension Drawings – Pipe Mounting

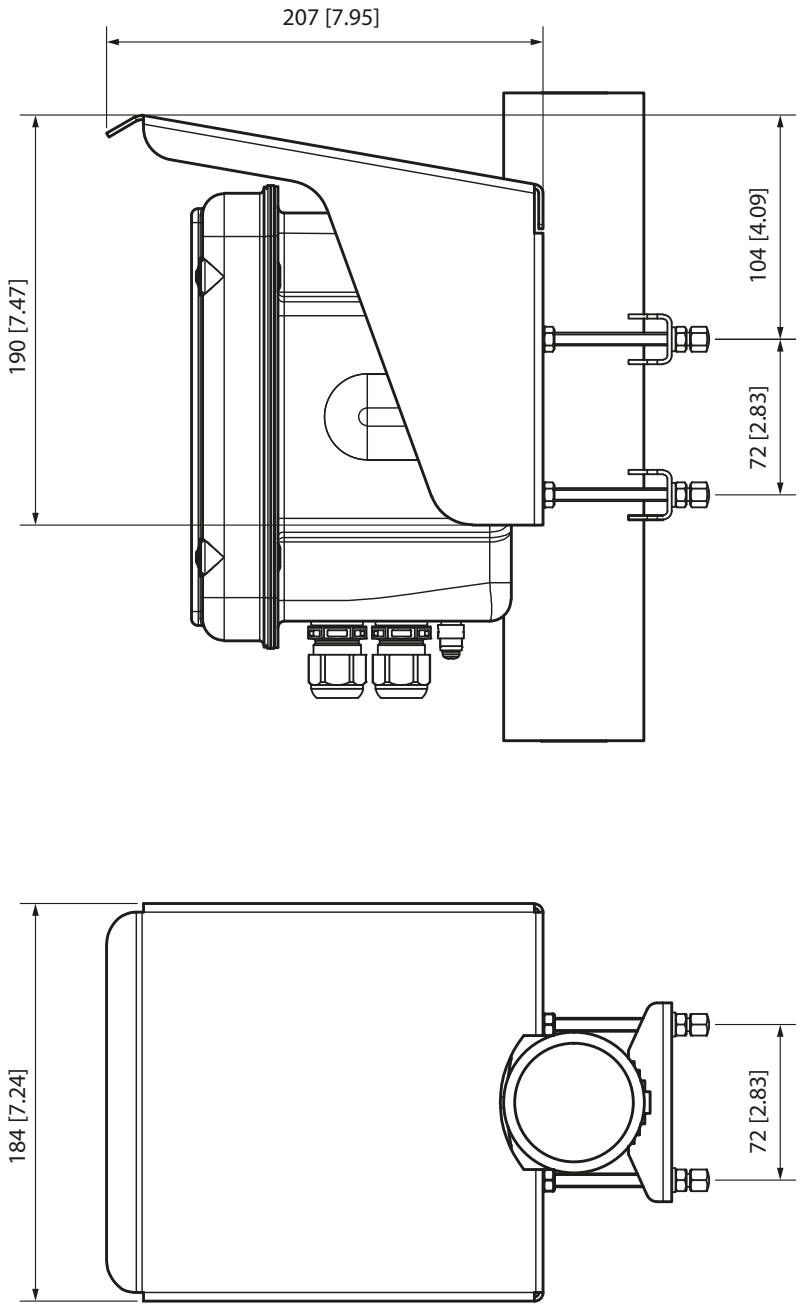


ZU 0544 Pipe-Mount Kit:
2 x pipe clamp (stainless steel A4)
4 x threaded rod M6 (stainless steel A4)
4 x washer, nut, cap nut (stainless steel A4)

All dimensions in mm [inches]

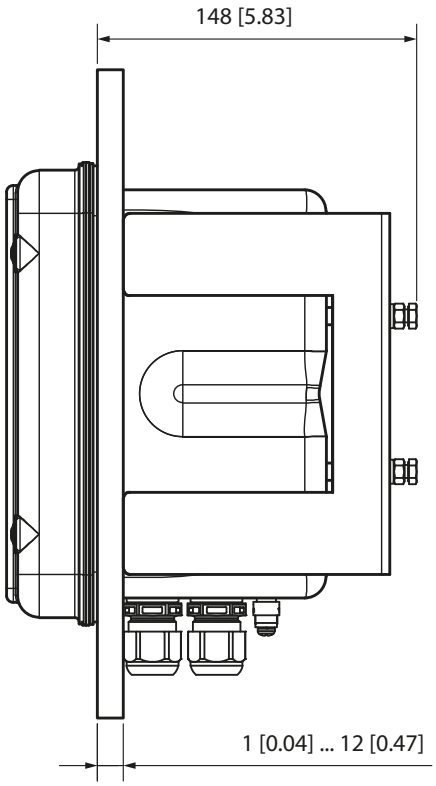
Dimension Drawings – ZU 0548 Protective Hood

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

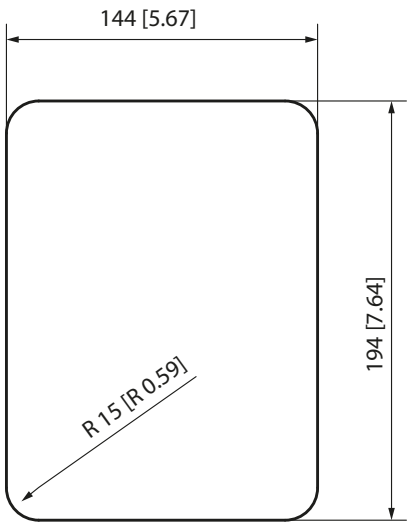


All dimensions in mm [inches]

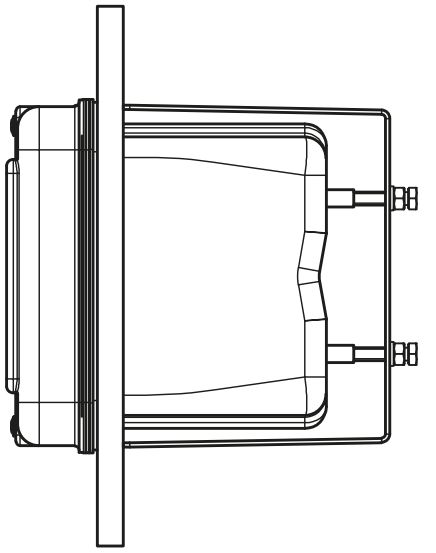
Dimension Drawings – ZU 0545 Panel-Mount Kit



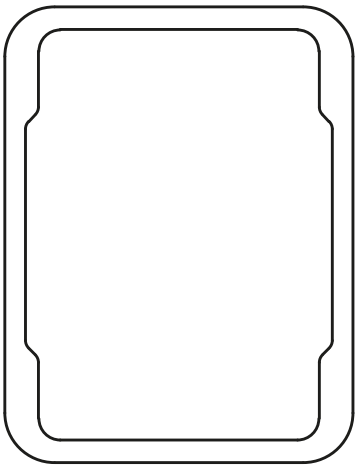
Panel mounting



Control panel cutout



Panel sealing



All dimensions in mm [inches]