



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.

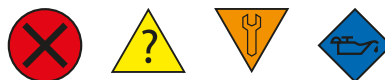
Protos II 4400 (X) features a unique modular design and freely accessible wiring with a clear layout. The option for easy retrofitting and upgrading ensure planning security today and in the future. Different Ethernet and Fieldbus modules enable digital communication and seamless integration into automation 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 4 measuring channels can be implemented in parallel.

### Status Messages acc. 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
- High-contrast graphic LC display
- USB memory card concept for data recording and firmware updates
- Freely combinable measuring, control and communication modules



# Protos II 4400 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**

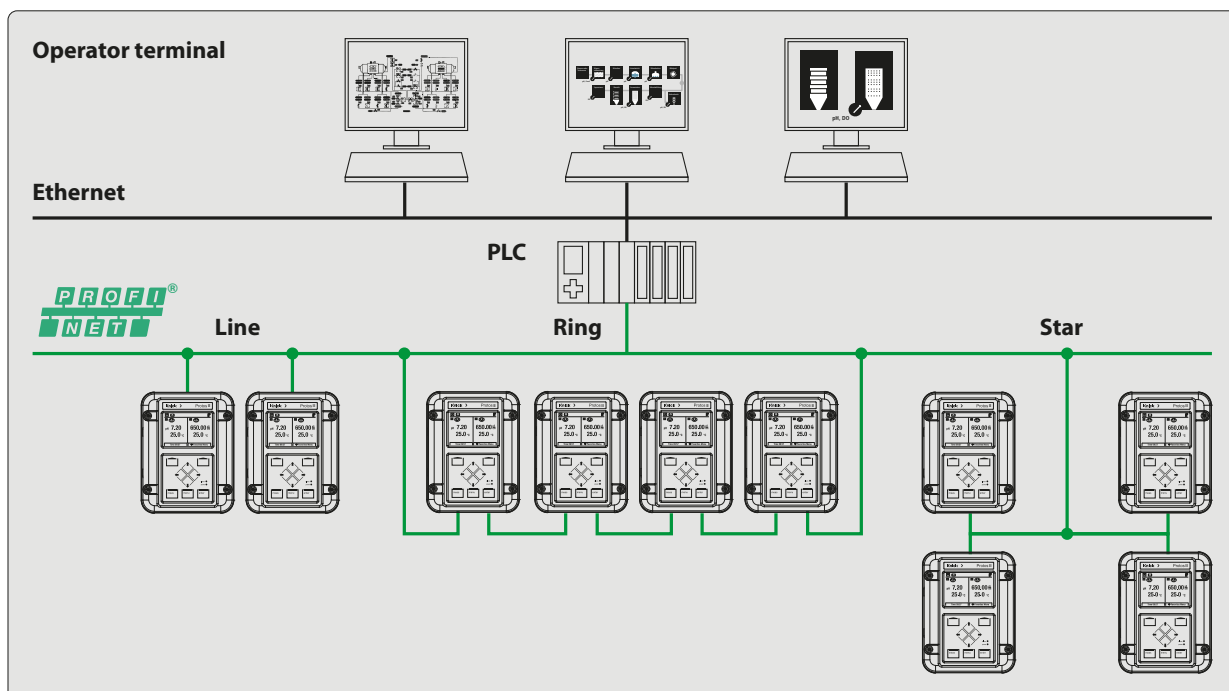
Use of a common and integrated network reduces the number of interfaces and thus potential sources of errors during installation. The amount of installation work required is minimized by the use of a PROFINET GSDML file (device master file).

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.

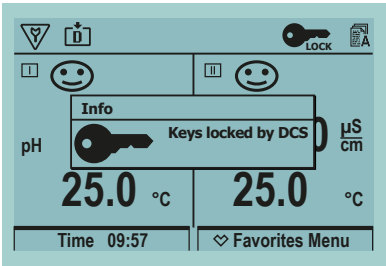
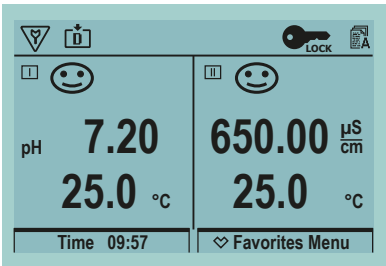
\*) PROFIBUS & PROFINET International

### **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 multi-channel 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.

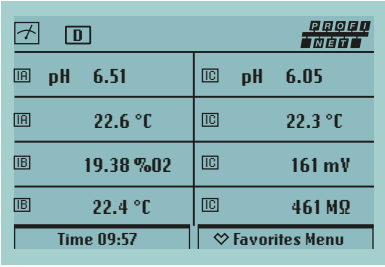
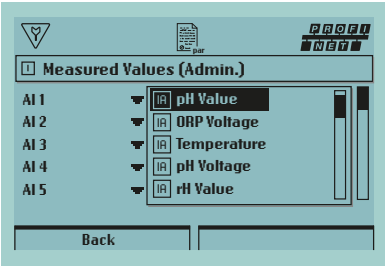
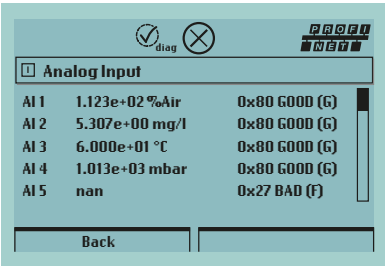
Diagnostics data such as Sensoface, wear, remaining life-time, operating time, calibration timer, SIP counter, CIP counter, etc.

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



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

# Protos II 4400 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.



**PROFI<sup>®</sup>**  
**NET**







pH  
ORP



Cond



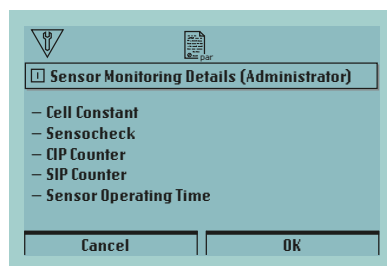
Oxy

## 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 multi-channel mode as well.



## Expandable Multi-Lingualism

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 / CI 1 Div 2
- High-resolution graphic display
- Parameter set switching 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-, or 4-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. Designs 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. Designs 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

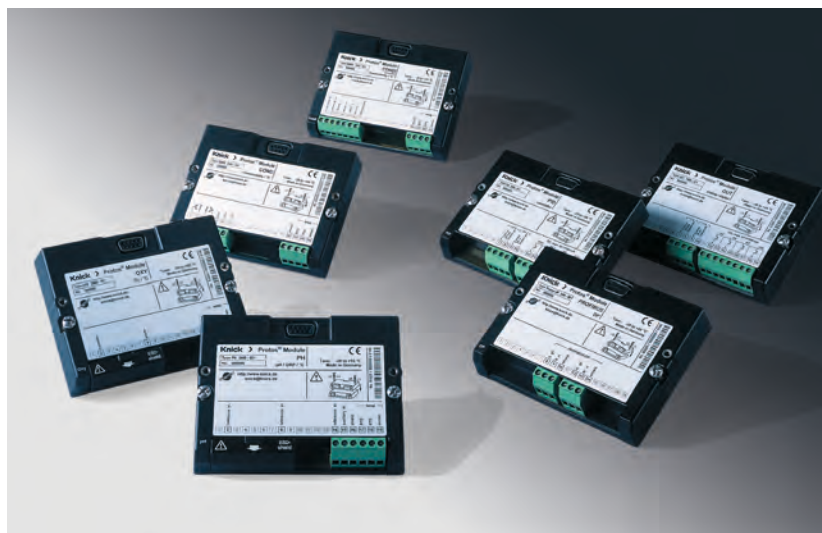
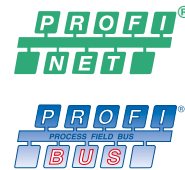
Ethernet and Fieldbus modules for digital communication and seamless integration into automation systems.

### 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.





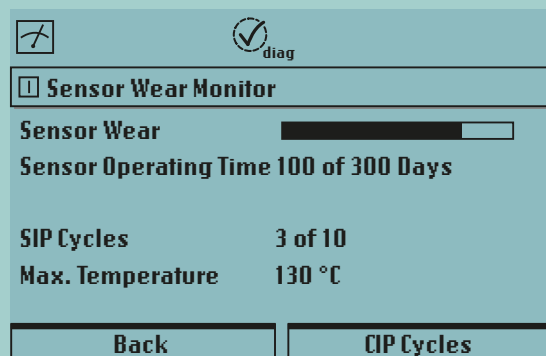
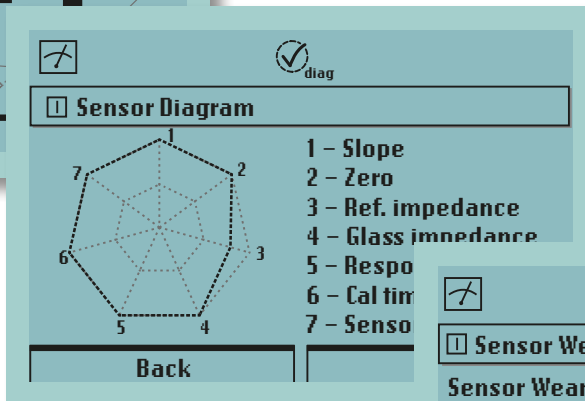
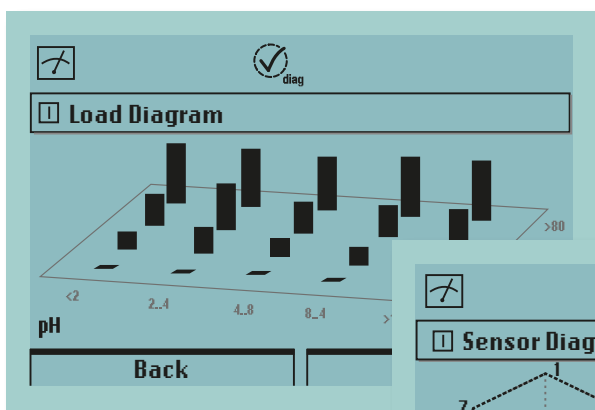
The smart diagnostic functions that Protos II provides for analyzing sensor life cycles mean a significant increase in sensor service life and availability.

## Sensor Diagram

Graphical presentation of the current sensor parameters for pH, ORP, and oxygen on the display in a clearly arranged radar chart — 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 state display, 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.



USB 

## 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 multi-channel 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

### For 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

### For 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

### **For 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 multi-parameter transmitters are used in this process on a daily basis.

## POWER PLANTS

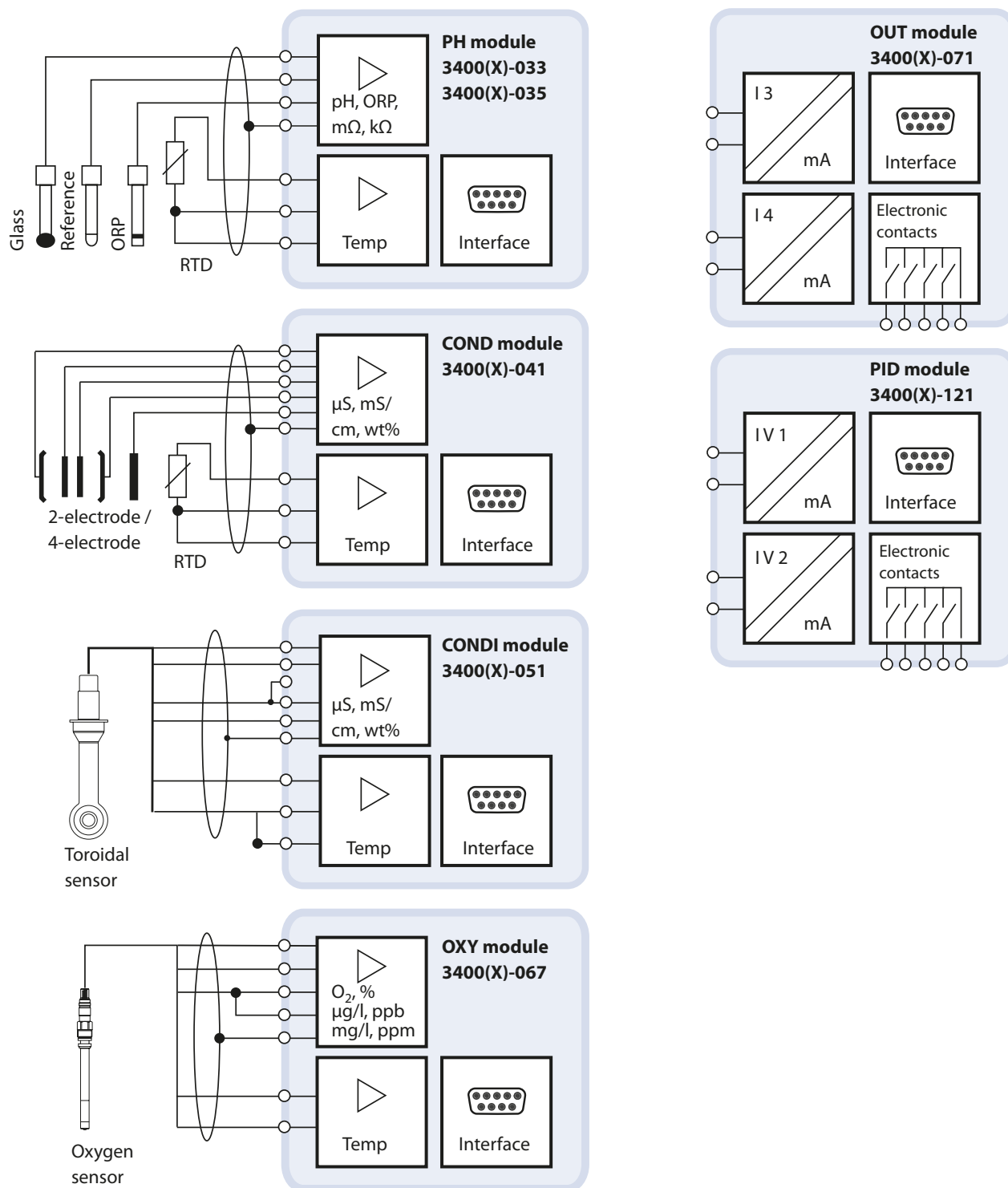
- Reliable water/steam monitoring
- Precise detection of oxygen traces
- Control of alkali feed to minimize corrosion

### **For Example:** **Flue Gas Purification**

The extreme conditions in a gas scrubber require high-maintenance measuring points, especially for flue gas desulfurization. Alongside in-crusting 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.

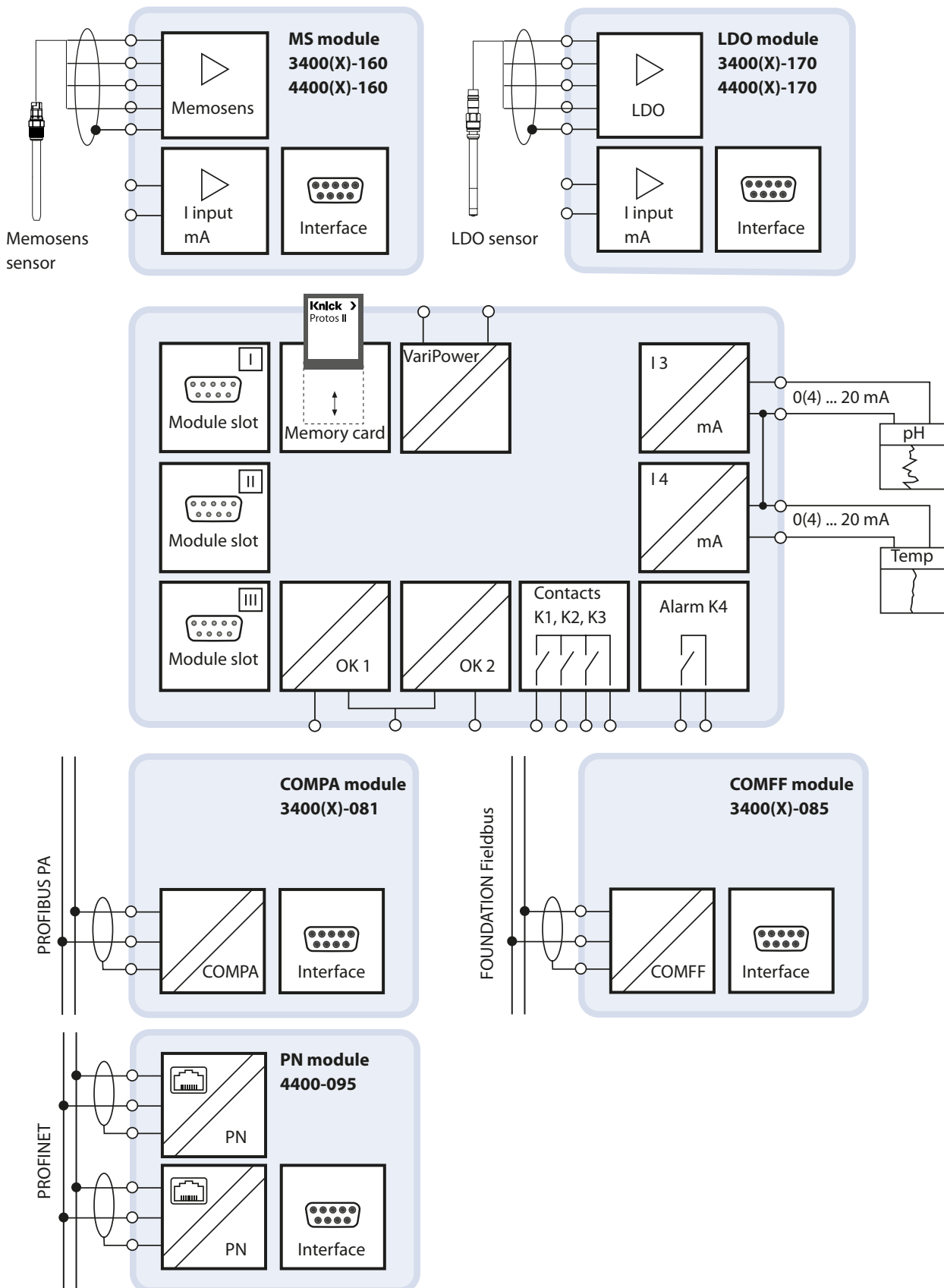


## System Overview



# 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 activatable via TAN)

MS 4400-160

### 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/24V

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 activatable via TAN)

### Order no.

PH 3400X-033  
 PH 3400X-035

COND 3400X-041  
 CONDI 3400X-051

OXY 3400X-067

MS 4400X-160

### 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**

Pipe-mount kit  
Panel-mount kit  
Protective hood

**Order no.**

ZU 0544  
ZU 0545  
ZU 0548

**Connector Plugs and Cables**

VP8 connector  
M12 socket, 8-pin

**Order no.**

ZU 0721  
ZU 0860

VP8 ST cable (both ends with VP socket)

Length 3 m  
Length 5 m  
Length 10 m

ZU 0710  
ZU 0711  
ZU 0712

M12 extension cord, 8-pin

Length 10 m

CA/M12-010M12-8

Cable gland for RJ45 cable (PROFINET) or other cable types  
Adapter cable RJ45/M12 D-type for PROFINET communication

ZU 1072  
ZU 1073

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

5 parameter sets  
Measurement recorder  
Logbook  
Firmware update

**Order no.**

FW4400-102  
FW4400-103  
FW4400-104  
FW4400-106

Buffer table for pH measurement  
Tolerance band recorder  
Current characteristic  
Ultrapure water: Temperature compensation for conductivity  
Concentration determination for use with conductivity sensors  
Oxygen measurement incl. trace measurement for MS 4400(X)-160

FW4400-002  
FW4400-005  
FW4400-006  
FW4400-008  
FW4400-009  
FW4400-015

Inspection certificate 3.1

ZU 0268/  
ANALYSE01

# Protos II 4400 (X)

## Accessories for Protos II 4400 (X)

### Memory Cards for Protos II 4400

ZU 1080- P - N - 

|              |                      |
|--------------|----------------------|
| Card version | Data Card            |
|              | Firmware Update Card |
|              | Firmware Repair Card |

D  
V  
R

### Memory Cards for Protos II 4400

ZU 1080- P - N -  -  -  - 

|              |                                                              |
|--------------|--------------------------------------------------------------|
| Card version | Custom Firmware Update Card (in conjunction with FW4400-106) |
|              | Custom Firmware Repair Card                                  |

S  
V

|                   |                 |
|-------------------|-----------------|
| Firmware versions | Device firmware |
|                   | MS 4400-160     |
|                   | MS 3400-160     |
|                   | COMPA 3400-081  |
|                   | COMFF 3400-085  |
|                   | LDO 4400-170    |
|                   | LDO 3400-170    |

B \* \*  
C \* \*  
D \* \*  
E \* \*  
F \* \*  
G \* \*  
H \* \*

### Memory Cards for Protos II 4400 X

ZU 1080- P - X - 

|              |                      |
|--------------|----------------------|
| Card version | Data Card            |
|              | Firmware Update Card |
|              | Firmware Repair Card |

D  
V  
R

### Memory Cards for Protos II 4400 X

ZU 1080- P - X -  -  -  - 

|              |                                                              |
|--------------|--------------------------------------------------------------|
| Card version | Custom Firmware Update Card (in conjunction with FW4400-106) |
|              | Custom Firmware Repair Card                                  |

S  
V

|                   |                 |
|-------------------|-----------------|
| Firmware versions | Device firmware |
|                   | MS 4400X-160    |
|                   | MS 3400X-160    |
|                   | COMPA 3400X-081 |
|                   | COMFF 3400X-085 |

B \* \*  
C \* \*  
D \* \*  
E \* \*  
F \* \*



**Protos II 4400 Specifications**

|                                                          |                                                                                                                                                                                                                               |                                                                                                                           |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Display <sup>1)</sup>                                    | 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<br>[meas] [menu] [cursor keys] [enter] [softkey 1] [softkey 2]<br>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<br>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<br>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<br>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)<br>(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<br>Single and stranded wires    0.2 ... 2.5 mm <sup>2</sup>                                                |
|                                                          | Wiring                                                                                                                                                                                                                        | Stripping length                      max. 7 mm<br>Ferrules                                  0.25 ... 2.5 mm <sup>2</sup> |
| Equipotential bonding clamp PA                           | Tightening torque                                                                                                                                                                                                             | 1 Nm                                                                                                                      |
|                                                          | Cross section                                                                                                                                                                                                                 | > 4 mm <sup>2</sup>                                                                                                       |
| Protection against electric shock<br>(terminal 17)       | Protective connection acc. to EN 61010-1                                                                                                                                                                                      |                                                                                                                           |

# Protos II 4400 (X)

## Protos II 4400 Specifications

|                                                         |                                                                                                                        |                                                                                                                                                                                                                     |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input OK 1 <sup>2)</sup> (terminals 11/13)              | Galvanically isolated (optocoupler)<br>$V_i \leq 30\text{ V}$ , floating, galvanic isolation up to 60 V                |                                                                                                                                                                                                                     |
|                                                         | Function                                                                                                               | Switches the device to HOLD mode (function check)                                                                                                                                                                   |
|                                                         | Switching voltage                                                                                                      | 0 ... 2 V AC/DC inactive<br>10 ... 30 V AC/DC active (can be inverted)<br>Control current 5 mA                                                                                                                      |
|                                                         |                                                                                                                        |                                                                                                                                                                                                                     |
| Input OK 2 <sup>2)</sup> (terminals 12/13)              | Galvanically isolated (optocoupler)<br>$V_i \leq 30\text{ V}$ , floating, galvanic isolation up to 60 V                |                                                                                                                                                                                                                     |
|                                                         | Function                                                                                                               | Switching to second parameter set                                                                                                                                                                                   |
|                                                         | Switching voltage                                                                                                      | 0 ... 2 V AC/DC inactive<br>10 ... 30 V AC/DC active (can be inverted)<br>Control current 5 mA                                                                                                                      |
|                                                         |                                                                                                                        |                                                                                                                                                                                                                     |
| Current output I1 <sup>2)</sup> (terminals 7/8)         | 0/4... 20 mA (22 mA), max. 10 V,<br>Galvanic isolation up to 60 V<br>(galvanically connected with output I2)           |                                                                                                                                                                                                                     |
|                                                         | Load monitoring                                                                                                        | Error message if load is exceeded                                                                                                                                                                                   |
|                                                         | Overrange                                                                                                              | 22 mA for messages                                                                                                                                                                                                  |
|                                                         | Measurement error <sup>3)</sup>                                                                                        | < 0.2 % of current value +0.02 mA                                                                                                                                                                                   |
|                                                         | Current source                                                                                                         | 0.00 ... 22.00 mA                                                                                                                                                                                                   |
| Current output I2 <sup>2)</sup> (terminals 9/10)        | 0/4 ... 20 mA (22 mA), max. 10 V<br>Galvanic isolation up to 60 V<br>(galvanically connected with output I1)           |                                                                                                                                                                                                                     |
|                                                         | Load monitoring                                                                                                        | Error message if load is exceeded                                                                                                                                                                                   |
|                                                         | Overrange                                                                                                              | 22 mA for messages                                                                                                                                                                                                  |
|                                                         | Measurement error <sup>3)</sup>                                                                                        | < 0.2 % of current value +0.02 mA                                                                                                                                                                                   |
|                                                         | Current source                                                                                                         | 0.00 ... 22.00 mA                                                                                                                                                                                                   |
| Relay contacts <sup>2)</sup><br>(terminals 1/2/3/4/5/6) | 4 relay contacts K1 ... K4, floating<br>Galvanic isolation up to 60 V<br><br>K1, K2, K3 are interconnected on one side |                                                                                                                                                                                                                     |
|                                                         | Load capability                                                                                                        | AC: < 30 V / < 3 A, < 90 VA<br>DC: < 30 V / < 3 A, < 90 W                                                                                                                                                           |
|                                                         | Usage                                                                                                                  | K1 - K3, user-definable as NAMUR maintenance request/HOLD, limit values, parameter set B active, rinse contact, USP output, Sensoface, controller alarm<br>K4 dedicated assignment as alarm contact (NAMUR failure) |
|                                                         |                                                                                                                        |                                                                                                                                                                                                                     |
|                                                         |                                                                                                                        |                                                                                                                                                                                                                     |

## Protos II 4400 Specifications

|                               |                                       |                                                                                                                                  |
|-------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| RoHS conformity               | According to EU directive 2011/65/EU  |                                                                                                                                  |
| EMC                           | EN 61326-1, EN 61326-2-3, NAMUR NE 21 |                                                                                                                                  |
|                               | Emitted interference                  | Industrial applications <sup>4)</sup><br>(EN 55011 Group 1 Class A)                                                              |
|                               | Immunity to interference              | Industrial applications                                                                                                          |
| Lightning protection          | to EN 61000-4-5, Installation class 2 |                                                                                                                                  |
| Rated 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                                                                                                |
|                               | Mounting                              | Wall mounting<br>Pipe mounting<br>Panel mounting                      Sealed against panel                                       |
|                               | Dimensions                            | See dimension drawing                                                                                                            |
|                               | Protection                            | IP65/NEMA 4X                                                                                                                     |
|                               | Cable glands                          | 5 cable glands                      M20 x 1.5 A/F 24<br>WISKA type ESKV M20                                                      |
|                               | Clamping ranges                       | Standard sealing insert:    6 ... 13 mm<br>Reduction sealing insert:    4 ... 8 mm<br>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 /<br>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-definable

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 <sup>1)</sup>                                            | 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<br>[meas] [menu] [cursor keys] [enter] [softkey 1] [softkey 2]<br>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<br>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<br>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 <a href="http://www.knick.de">www.knick.de</a>                                                                                                                        |                                                                                 |
| Power supply (terminals N/L/PE)<br>(BASE module 4400X-025/VPW)   | 100 (– 15 %) ... 230 (+ 10 %) V AC < 15 VA, 48 ... 62 Hz                                                                                                                                                                      |                                                                                 |
| Power supply (terminals L1/L2/PE)<br>(BASE module 4400X-026/24V) | AC: 24 V (– 15 %, + 10 %) < 15 VA, 48 ... 62 Hz                                                                                                                                                                               |                                                                                 |
|                                                                  | DC: 24 V (– 15 %, + 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 <sup>2</sup>                                                     |
|                                                                  | Wiring                                                                                                                                                                                                                        | Stripping length max. 7 mm<br>Ferrules 0.25 ... 2.5 mm <sup>2</sup>             |
| Equipotential bonding clamp PA                                   | Tightening torque                                                                                                                                                                                                             | 1 Nm                                                                            |
|                                                                  | Cross section                                                                                                                                                                                                                 | > 4 mm <sup>2</sup>                                                             |

## Protos II 4400 X Specifications

Protection against electric shock  
(terminal PE)

Protective conductor terminal acc. to EN 61010-1

Input OK 1<sup>2)</sup> (terminals 30/31)

Galvanically isolated (optocoupler)

$V_i \leq 30$  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<sup>2)</sup> (terminals 30/33)

Galvanically isolated (optocoupler)

$V_i \leq 30$  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<sup>2)</sup> (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 error<sup>3)</sup>

< 0.2 % of current value +0.02 mA

Current source

0.00 ... 22.00 mA

Current output I2<sup>2)</sup> (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 error<sup>3)</sup>

< 0.2 % of current value +0.02 mA

Current source

0.00 ... 22.00 mA

Relay contacts<sup>2)</sup>  
(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 <sup>4)</sup><br>(EN 55011 Group 1 Class A)           |
|                               | Immunity to interference              | Industrial applications                                                       |
|                               | Lightning protection                  | according to EN 61000-4-5 Installation class 2                                |
| Rated 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,<br>1.4305                                          |
|                               | Mounting                              | Wall mounting                                                                 |
|                               |                                       | Pipe mounting                                                                 |
|                               |                                       | Panel mounting                      Sealed against panel                      |
|                               | Dimensions                            | See dimension drawing                                                         |
|                               | Protection                            | IP65, type 4X                                                                 |
|                               | Cable glands                          | 5 cable glands                      M20 x 1.5 A/F 24<br>WISKA type ESKE/1 M20 |
|                               | 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 /<br>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-definable

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



Memory size

Connections

Explosion protection

Communication

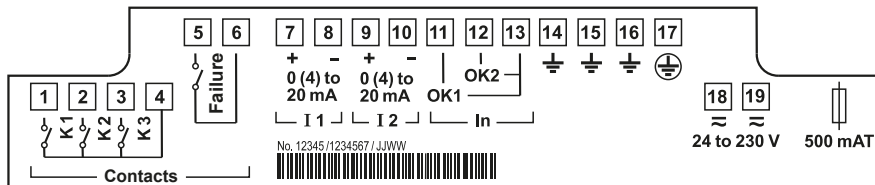
Dimensions

|                             |                                            |                              |
|-----------------------------|--------------------------------------------|------------------------------|
| 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              |                              |
| 32 MB                       |                                            |                              |
| Logbook                     | For exclusive use: approx. 200,000 entries |                              |
| Measurement recorder        | For exclusive use: approx. 400,000 entries |                              |
| Computer ports              | Micro USB                                  | USB-Kabel max. 2,90 m        |
| Connection to device        | Plug                                       |                              |
| Operation on computer       | $V_m = 250\text{ V}$                       |                              |
| Operation in device         | Intrinsically safe Ex ib                   |                              |
| USB 2.0                     | High speed                                 | 12 Mbits/s                   |
| USB profile                 | Data Card                                  | MSD (mass storage device)    |
|                             | Update Card<br>Repair Card                 | HID (human interface device) |
| L 32 mm x B 12 mm x H 30 mm |                                            |                              |

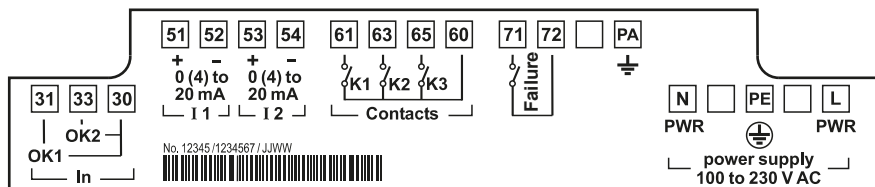
# Protos II 4400 (X)

## Terminal Assignments

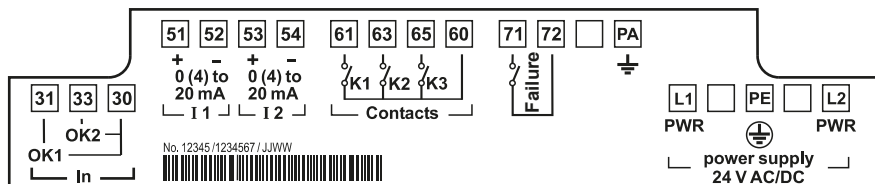
### Protos II 4400 20 ... 253 V AC



### 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<br>PH3400X-033: Ex ia IIC                    | pH measurement with pH differential probes (Pfaudler)<br>Measuring electrode input<br>Reference electrode input<br>Auxiliary electrode input |                                                                                                                                                                                                                                     |                           |
| Measuring range                                           | pH value                                                                                                                                     | -2.00 ... 16.00                                                                                                                                                                                                                     |                           |
|                                                           | ORP value                                                                                                                                    | -2000 ... 2000 mV                                                                                                                                                                                                                   |                           |
|                                                           | rH value                                                                                                                                     | 0.0 ... 42.5                                                                                                                                                                                                                        |                           |
|                                                           | Permissible cable capacitance                                                                                                                | < 2 nF                                                                                                                                                                                                                              |                           |
| Measuring electrode input <sup>2)</sup>                   | Input resistance                                                                                                                             | > 1 x 10 <sup>12</sup> Ω                                                                                                                                                                                                            |                           |
|                                                           | Input current <sup>4)</sup>                                                                                                                  | < 1 x 10 <sup>-12</sup> A                                                                                                                                                                                                           |                           |
|                                                           | Impedance range                                                                                                                              | 0.5 ... 1000 MΩ                                                                                                                                                                                                                     |                           |
| Reference electrode input <sup>2)</sup>                   | Input resistance                                                                                                                             | > 1 x 10 <sup>11</sup> Ω                                                                                                                                                                                                            |                           |
|                                                           | Input current <sup>4)</sup>                                                                                                                  | < 1 x 10 <sup>-11</sup> A                                                                                                                                                                                                           |                           |
|                                                           | Impedance range                                                                                                                              | 0.5 ... 1000 kΩ                                                                                                                                                                                                                     |                           |
| Measurement error <sup>3)</sup> (display)                 | pH value                                                                                                                                     | < 0.02                                                                                                                                                                                                                              | TC < 0.001 pH/K           |
|                                                           | mV value                                                                                                                                     | < 1 mV                                                                                                                                                                                                                              | TC < 0.05 mV/K            |
| Temperature input <sup>1)</sup><br>PH3400X-033: Ex ia IIC | PT 100 / PT 1000 / NTC 30 kΩ / 8.55 kΩ (Mitsubishi)<br>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 <sup>3)</sup>                                                                                                              | 0.2 % meas.val.+ 0.5 K (< 1 K at NTC > 100 °C / 212 °F)                                                                                                                                                                             |                           |
| Temperature compensation,<br>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 <sup>1)</sup>                           | Operating modes:                                                                                                                             | 1-/2-/3-point calibration (best fit line)<br>- Calimatic automatic buffer recognition<br>- Entry of individual buffer values<br>- Adjustable stability criterion<br>- Product calibration<br>- Data entry of premeasured electrodes |                           |
| Drift check <sup>1)</sup> (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 <sup>1)</sup>              | 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 <sup>1)</sup>                          | pH 0 ... 14                                                                                                                                                                                                                                         | Permissible span ΔpH = ±1     |                            |
| Nom. slope <sup>1)</sup>                         | 25 ... 61 mV/pH (25 °C)                                                                                                                                                                                                                             | Permissible span 80 ... 103 % |                            |
| pHis <sup>1)</sup>                               | 0 ... 14                                                                                                                                                                                                                                            |                               |                            |
| Calibration record                               | Recording of: zero point, slope, Vis, response time, calibration procedure with data and time                                                                                                                                                       |                               |                            |
| Statistics                                       | Recording of: zero point, slope, Vis, 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:<br>Zero point/slope, response time, calibration interval, Sensocheck, can be deactivated                                                                                                       |                               |                            |
| Sensor diagram                                   | Graphical representation of the current sensor parameters in a radar chart 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<br>pH input / glass electrode impedance / reference electrode impedance / RTD / temperature                                                                                            |                               |                            |
| Adaptive calibration timer <sup>1)</sup>         | 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 (Ex version of module only) | See Ex Certificates and EU Declaration of Conformity or <a href="http://www.knick.de">www.knick.de</a>                                                                                                                                              |                               |                            |
| RoHS conformity                                  | According to EU directive 2011/65/EU                                                                                                                                                                                                                |                               |                            |
| EMC                                              | EN 61326-1, EN 61326-2-3<br>NAMUR NE 21<br>Emitted interference      Industrial applications (EN 55011 Group 1 Class A)<br>Immunity to interference      Industrial applications<br>Lightning protection      to EN 61000-4-5, Installation class 2 |                               |                            |

## PH 3400(X)-033 Module Specifications

|                                                  |                               |                                                 |                               |
|--------------------------------------------------|-------------------------------|-------------------------------------------------|-------------------------------|
| Rated operating conditions<br>(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 housing                                   | Material                      | PC/ABS blend                                    |                               |
|                                                  | Color                         | Black                                           |                               |
|                                                  | Protection                    | IP20                                            |                               |
|                                                  | Dimensions (mm)               | W x L x H 118 x 91 x 21                         |                               |
|                                                  | Screw clamp connector         | Single or stranded wires up 2.5 mm <sup>2</sup> |                               |
|                                                  | Tightening torque             | 0.5 ... 0.6 Nm                                  |                               |
|                                                  | Wiring                        | Stripping length                                | Max. 7 mm                     |
|                                                  |                               | Temperature resistance                          | > 75 °C / 167 °F              |

<sup>1)</sup> User-definable

<sup>2)</sup> At rated operating conditions

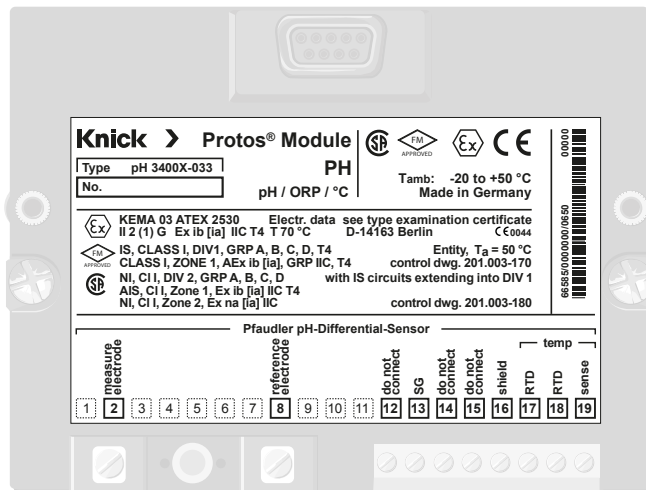
<sup>3)</sup> ± 1 count, plus sensor error

<sup>4)</sup> 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<br>ORP value<br>rH value                                                                                                                  | –2.00 ... 16.00<br>–2000 ... 2000 mV<br>0.0 ... 42.5 |
|                                            | Permissible voltage                                                                                    | ORP + pH [mV]                                                                                                                                      | 2000 mV                                              |
|                                            | Permissible cable capacitance                                                                          | < 2 nF                                                                                                                                             | (Max. cable length 20 m)                             |
| Glass electrode input <sup>2)</sup>        | Input resistance                                                                                       | > 1 x 10 <sup>12</sup> Ω                                                                                                                           |                                                      |
|                                            | Input current                                                                                          | < 1 x 10 <sup>–12</sup> A <sup>4)</sup>                                                                                                            |                                                      |
|                                            | Impedance range                                                                                        | 0.5 ... 1000 MΩ                                                                                                                                    |                                                      |
| Reference electrode input <sup>2)</sup>    | Input resistance                                                                                       | > 1 x 10 <sup>10</sup> Ω                                                                                                                           |                                                      |
|                                            | Input current                                                                                          | < 1 x 10 <sup>–10</sup> A <sup>4)</sup>                                                                                                            |                                                      |
|                                            | Impedance range                                                                                        | 0.5 ... 200 kΩ                                                                                                                                     |                                                      |
| Measurement error <sup>3)</sup> (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 <sup>1)</sup><br>3-wire connection, adjustable                      |                                                                                                                                                    |                                                      |
|                                            | Measuring range                                                                                        | –10 ... 150 °C / –4 ... 302 °F (Pt 100/Pt 1000/NTC 30 kΩ)<br>–10 ... 130 °C / 14 ... 266 °F (NTC 8.55 kΩ, Mitsubishi)                              |                                                      |
|                                            | Resolution                                                                                             | 0.1 °C / 1 °F                                                                                                                                      |                                                      |
|                                            | Measurement error <sup>3)</sup>                                                                        | 0.2 % meas. val. + 0.5 K (< 1 K at NTC > 100 °C / 212 °F)                                                                                          |                                                      |
| Temperature compensation,<br>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 <sup>1)</sup>                          | Automatic conversion to standard hydrogen electrode (SHE) on specification of reference electrode type |                                                                                                                                                    |                                                      |
|                                            | Sensor adjustment ORP <sup>1)</sup>                                                                    | Zero adjustment                                                                                                                                    | –200 ... 200 mV                                      |
| pH sensor adjustment <sup>1)</sup>         | 1-/2-/3-point calibration (best fit line)                                                              |                                                                                                                                                    |                                                      |
|                                            | Operating modes:                                                                                       | – Calimatic automatic buffer recognition<br>– Entry of individual buffer values<br>– Product calibration<br>– Data entry of premeasured electrodes |                                                      |
| Drift check <sup>1)</sup>                  | Fine / standard / coarse                                                                               |                                                                                                                                                    |                                                      |

# Protos II 4400 (X)

## PH 3400(X)-035 Module Specifications

|                                          |                                                                                                                                                                                |                         |                            |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------|
| Calimatic buffer sets <sup>1)</sup>      | 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<br>(Add-on function FW4400-002)                                                                                    |                         |                            |
| Nominal zero point <sup>1)</sup>         | pH 0 ... 14                                                                                                                                                                    | Calibration range       | $\Delta\text{pH} = \pm 1$  |
| Nominal slope <sup>1)</sup>              | 25 ... 61 mV/pH (25 °C)                                                                                                                                                        | Calibration range       | 80 ... 103 %               |
| $V_{IS}$ <sup>1)</sup>                   | –1000 ... 1000 mV                                                                                                                                                              |                         |                            |
| Calibration/adjustment record            | Recording of: zero point, slope, $V_{IS}$ , response time, calibration procedure with data and time                                                                            |                         |                            |
| Temp. offset log <sup>1)</sup>           | Display of current temperature probe adjustment and of temperature offset.                                                                                                     |                         |                            |
| Statistics                               | Recording of: zero point, slope, $V_{IS}$ , 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<br>pH input / ORP input / glass electrode impedance /<br>reference electrode impedance / RTD / temperature        |                         |                            |
| Adaptive calibration timer <sup>3)</sup> | Automatic calculation of calibration interface (Sensoface message) dependent on measured values                                                                                |                         |                            |
| Sensor wear monitor                      | Display of wear parameters<br>Sensor wear / sensor operating time / autoclaving cycles / SIP cycles /<br>CIP cycles                                                            |                         |                            |

## PH 3400(X)-035 Module Specifications

|                                                     |                                                                                                                                                                                                                                                       |                                                 |                                                                |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------------|
| Explosion protection<br>(Ex version of module only) | See Ex Certificates and EU Declaration of Conformity or <a href="http://www.knick.de">www.knick.de</a>                                                                                                                                                |                                                 |                                                                |
| RoHS conformity                                     | According to EU directive 2011/65/EU                                                                                                                                                                                                                  |                                                 |                                                                |
| EMC                                                 | EN 61326-1, EN 61326-2-3<br>NAMUR NE 21<br>Immunity to interference    Industrial applications (EN 55011 Group 1 Class A)<br>Emitted interference        Industrial applications<br>Lightning protection        to EN 61000-4-5, Installation class 2 |                                                 |                                                                |
| Rated operating conditions<br>(module installed)    | Ambient temperature                                                                                                                                                                                                                                   | Non Ex<br>Ex                                    | –20 ... 55 °C / –4 ... 131 °F<br>–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 housing                                      | Material                                                                                                                                                                                                                                              | PC/ABS blend                                    |                                                                |
|                                                     | Color                                                                                                                                                                                                                                                 | Black                                           |                                                                |
|                                                     | Protection                                                                                                                                                                                                                                            | IP20                                            |                                                                |
|                                                     | Dimensions (mm)                                                                                                                                                                                                                                       | W x L x H 118 x 91 x 21                         |                                                                |
|                                                     | Screw clamp connector                                                                                                                                                                                                                                 | Single or stranded wires up 2.5 mm <sup>2</sup> |                                                                |
|                                                     | Tightening torque                                                                                                                                                                                                                                     | 0.5 ... 0.6 Nm                                  |                                                                |
|                                                     | Wiring                                                                                                                                                                                                                                                | Stripping length                                | Max. 7 mm                                                      |
|                                                     |                                                                                                                                                                                                                                                       | Temperature resistance                          | > 75 °C / 167 °F                                               |

<sup>1)</sup> User-definable

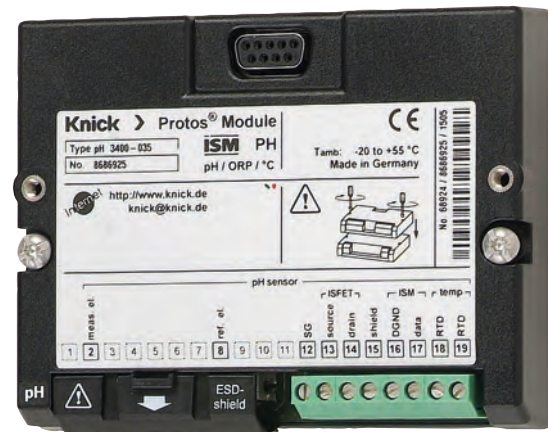
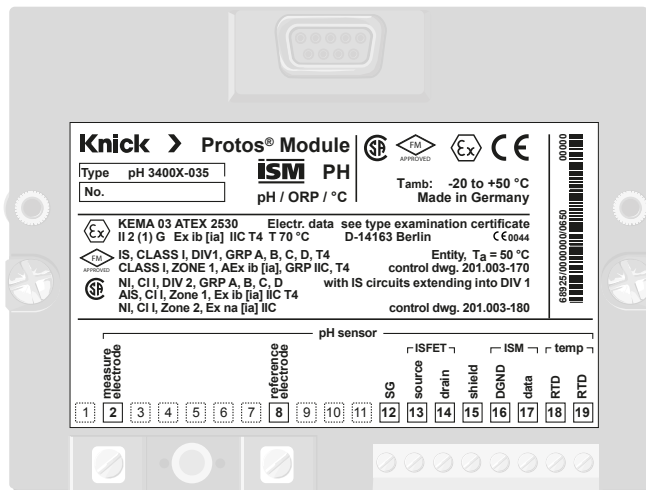
<sup>2)</sup> At rated operating conditions

<sup>3)</sup> ± 1 count, plus sensor error

<sup>4)</sup> 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 $\text{mS}/\text{cm}$             |                                                                              |
| Resistivity Resistance                 | 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                                                            | Conductivity resolution                                                      |
|                                        | < 0.1200 $\text{cm}^{-1}$                                                | 0.000 $\mu\text{S}/\text{cm}$                                                |
|                                        | < 1.200 $\text{cm}^{-1}$                                                 | 00.00 $\mu\text{S}/\text{cm}$                                                |
|                                        | < 12.00 $\text{cm}^{-1}$                                                 | 000.0 $\mu\text{S}/\text{cm}$                                                |
|                                        | < 120.0 $\text{cm}^{-1}$                                                 | 0.000 $\text{mS}/\text{cm}$                                                  |
|                                        | $\geq 120.0 \text{ cm}^{-1}$                                             | 00.00 $\text{mS}/\text{cm}$                                                  |
| Response time ( $T_{90}$ )             | Approx. 1 s                                                              |                                                                              |
| Measurement error <sup>3)</sup>        | < 0.5 % meas. val. + 0.2 $\mu\text{S} \times \text{c}^{(2)}$             |                                                                              |
| Temperature compensation <sup>1)</sup> | – None                                                                   |                                                                              |
|                                        | – Linear characteristic                                                  | 00.00 ... 19.99 %/K<br>(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) (ref. temperature 25 °C)                      |
|                                        | – Ultrapure water with HCl traces                                        | (0 ... 120 °C / 32 ... 248 °F) (ref. temperature 25 °C)                      |
|                                        | – Ultrapure water with NH <sub>3</sub> traces                            | (0 ... 120 °C / 32 ... 248 °F) (ref. temperature 25 °C)                      |
|                                        | – Ultrapure water with NaOH traces                                       | (0 ... 120 °C / 32 ... 248 °F) (ref. temperature 25 °C)                      |
| Temperature input                      | Temperature probe <sup>1)</sup>                                          | Pt100 / Pt1000 / NTC 30 k $\Omega$ / Ni 100                                  |
|                                        | 3-wire connection, adjustable                                            |                                                                              |
| Measuring range                        | PT 100 / PT 1000:                                                        | –50 ... 250 °C / –58 ... 482 °F                                              |
|                                        | NTC 30 k $\Omega$ :                                                      | –10 ... 150 °C / 14 ... 302 °F                                               |
|                                        | Ni 100:                                                                  | –50 ... 250 °C / –58 ... 356 °F                                              |
| Resolution                             | 0.1 °C / °F                                                              |                                                                              |
| Measurement error <sup>3)</sup>        | 0.2 % meas. val. + 0.5 K                                                 |                                                                              |

# Protos II 4400 (X)

## COND 3400(X)-041 Module Specifications

|                                                           |                                                                                                                                                                                                                                                                                    |                                                                          |     |                                             |
|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-----|---------------------------------------------|
| Concentration determination <sup>1)</sup><br>(FW4400-009) | For substances:                                                                                                                                                                                                                                                                    |                                                                          |     |                                             |
|                                                           | HNO <sub>3</sub>                                                                                                                                                                                                                                                                   | 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 <sub>2</sub> SO <sub>4</sub> <sup>3)</sup>                                                                                                                                                                                                                                       | 0 ... 37                                                                 | wt% | -17.8 ... 110 °C /<br>-0.04 ... 230 °F      |
|                                                           |                                                                                                                                                                                                                                                                                    | 28 ... 88                                                                | wt% | -17.8 ... 115.6 °C /<br>-0.04 ... 240.08 °F |
|                                                           |                                                                                                                                                                                                                                                                                    | 89 ... 99                                                                | wt% | -17.8 ... 115.6 °C /<br>-0.04 ... 240.08 °F |
|                                                           | NaOH <sup>5)</sup>                                                                                                                                                                                                                                                                 | 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 <sub>2</sub> SO <sub>4</sub> •SO <sub>3</sub> (Oleum)                                                                                                                                                                                                                            | 12 ... 45                                                                | wt% | 0 ... 120 °C / 32 ... 248 °F                |
|                                                           | Specifiable concentration table (5 x 5 values)                                                                                                                                                                                                                                     |                                                                          |     |                                             |
| Sensor monitoring <sup>1)</sup>                           | Sensocheck                                                                                                                                                                                                                                                                         | Polarization and cable capacity                                          |     |                                             |
| Sensorface                                                | Provides information on the condition of the sensor                                                                                                                                                                                                                                |                                                                          |     |                                             |
| Sensor adjustment <sup>1)</sup>                           | Operating modes:<br>– Automatic calibration with NaCl or KCl solution<br>– Manual: Specification of conductivity<br>– Product calibration / adjustment to container<br>– Input of cell constant with simultaneous display of conductivity value and temperature                    |                                                                          |     |                                             |
|                                                           | Permissible cell constant                                                                                                                                                                                                                                                          | 0.0050 ... 199.99 cm <sup>-1</sup>                                       |     |                                             |
|                                                           | Calibration record                                                                                                                                                                                                                                                                 | Recording of:<br>cell constant, calibration procedure with date and time |     |                                             |
| Output curve <sup>1)</sup>                                | – Linear<br>– Trilinear<br>– Function (logarithmic)<br>– 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<br>(Ex version of module only)       | See Ex Certificates and EU Declaration of Conformity or <a href="http://www.knick.de">www.knick.de</a>                                                                                                                                                                             |                                                                          |     |                                             |
| RoHS conformity                                           | According to EU directive 2011/65/EU                                                                                                                                                                                                                                               |                                                                          |     |                                             |
| EMC                                                       | EN 61326-1, EN 61326-2-3<br>NAMUR NE 21<br>Immunity to interference Industrial applications (EN 55011 Group 1 Class A)<br>Emitted interference Industrial applications<br>Lightning protection to EN 61000-4-5, Installation class 2                                               |                                                                          |     |                                             |



## COND 3400(X)-041 Module Specifications

|                                                  |                               |                                                      |                               |
|--------------------------------------------------|-------------------------------|------------------------------------------------------|-------------------------------|
| Rated operating conditions<br>(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 housing                                   | Material                      | PC/ABS blend                                         |                               |
|                                                  | Color                         | Black                                                |                               |
|                                                  | Protection                    | IP20                                                 |                               |
|                                                  | Dimensions (mm)               | W x L x H 118 x 91 x 21                              |                               |
|                                                  | Screw clamp connector         | Single or stranded wires 0.2 ... 2.5 mm <sup>2</sup> |                               |
|                                                  | Tightening torque             | 0.5 ... 0.6 Nm                                       |                               |
|                                                  | Wiring                        | Stripping length                                     | Max. 7 mm                     |
|                                                  |                               | Temperature resistance                               | > 75 °C / 167 °F              |

1) User-definable

2) c = 0.0050 ... 199.99 cm<sup>–1</sup>

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.



**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 $\mu$ S/cm ... 2000 mS/cm, resolution 1 $\mu$ 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 <sup>2)</sup>                                                                                  | < 0.5 % meas. val. + 2 $\mu$ S/cm                                                                                                                                                         |
|                                                           | Permissible cable length                                                                                         | Max. 20 m                                                                                                                                                                                 |
| Temperature compensation <sup>1)</sup>                    | – 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 <sup>1)</sup>                                                                                  | Pt 100 / Pt 1000 / NTC 30 k $\Omega$ / NTC 100 k $\Omega$<br>3-wire connection, adjustable                                                                                                |
|                                                           | Measuring range                                                                                                  | PT100 / PT1000:      –50 ... 250 °C / –58 ... 482 °F<br>NTC 30 k $\Omega$ , NTC 100 k $\Omega$ :      –10 ... 150 °C / 14 ... 302 °F                                                      |
|                                                           | Resolution                                                                                                       | 0.1 °C                                                                                                                                                                                    |
|                                                           | Measurement error <sup>3)</sup>                                                                                  | 0.2 % meas. val. + 0.5 K                                                                                                                                                                  |
| Concentration determination <sup>1)</sup><br>(FW4400-009) | For substances:                                                                                                  |                                                                                                                                                                                           |
|                                                           | HNO <sub>3</sub>                                                                                                 | 0 ... 30 wt%      –20 ... 50 °C / –4 ... 122 °F<br>35 ... 96 wt%      –20 ... 50 °C / –4 ... 122 °F                                                                                       |
|                                                           | HCl                                                                                                              | 0 ... 18 wt%      –20 ... 50 °C / –4 ... 122 °F<br>22 ... 39 wt%      –20 ... 50 °C / –4 ... 122 °F                                                                                       |
|                                                           | H <sub>2</sub> SO <sub>4</sub>                                                                                   | 0 ... 37 wt%      –17.8 ... 110 °C /<br>–0.04 ... 230 °F<br>28 ... 88 wt%      –17.8 ... 115.6 °C /<br>–0.04 ... 230 °F<br>89 ... 99 wt%      –17.8 ... 115.6 °C /<br>–0.04 ... 240.08 °F |
|                                                           | NaOH                                                                                                             | 0 ... 14 wt%      0 ... 100 °C / 32 ... 212 °F<br>18 ... 50 wt%      0 ... 100 °C / 32 ... 212 °F                                                                                         |
|                                                           | NaCl                                                                                                             | 0 ... 28 wt%      0 ... 100 °C / 32 ... 212 °F                                                                                                                                            |
|                                                           | H <sub>2</sub> SO <sub>4</sub> ·SO <sub>3</sub> (Oleum)                                                          | 12 ... 45 wt%      0 ... 120 °C / 32 ... 248 °F                                                                                                                                           |
|                                                           | Specifiable concentration table (5 x 5 values)                                                                   |                                                                                                                                                                                           |
| Sensor monitoring <sup>1)</sup>                           | 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 <sup>1)</sup>                           | Operating modes:                                                                                                 |                                                                                                                                                                                           |
|                                                           | – Automatic calibration with NaCl or KCl solution                                                                |                                                                                                                                                                                           |
|                                                           | – Manual: Input of cell constant with simultaneous display of conductivity value and temperature                 |                                                                                                                                                                                           |
|                                                           | – Product calibration / adjustment to container                                                                  |                                                                                                                                                                                           |
|                                                           | – Zero point adjustment                                                                                          |                                                                                                                                                                                           |
|                                                           | Permissible cell factor                                                                                          | 0.000 ... 19.99 cm <sup>–1</sup>                                                                                                                                                          |
|                                                           | Permissible transfer ratio                                                                                       | 0.00 ... 199.9                                                                                                                                                                            |

# Protos II 4400 (X)

## CONDI 3400(X)-051 Module Specifications

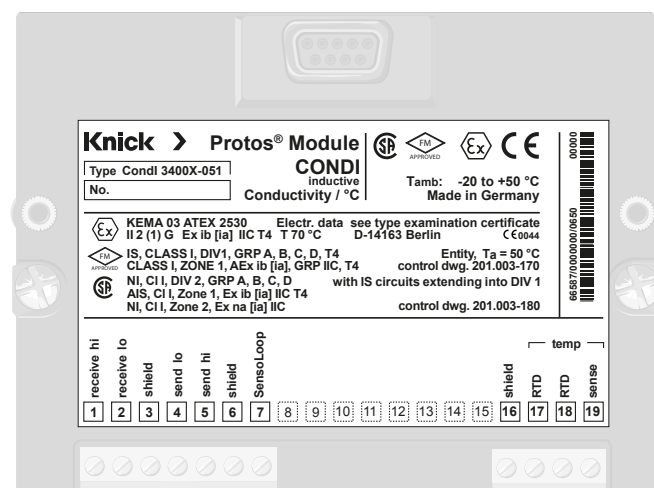
|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Calibration record                                  | Recording of:<br>cell factor, transfer ratio, zero point, calibration procedure with date and time                                                                                                                                                                                                                                                                                                                                                     |  |
| Output curve <sup>1)</sup>                          | – Linear<br>– Trilinear<br>– Function (logarithmic)<br>– As desired via table                                                                                                                                                                                                                                                                                                                                                                          |  |
| Explosion protection<br>(Ex version of module only) | See Ex Certificates and EU Declaration of Conformity or <a href="http://www.knick.de">www.knick.de</a>                                                                                                                                                                                                                                                                                                                                                 |  |
| RoHS conformity                                     | According to EU directive 2011/65/EU                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| EMC                                                 | EN 61326-1, EN 61326-2-3<br>NAMUR NE 21<br>Emitted interference      Industrial applications <sup>1)</sup> (EN 55011 Group 1 Class A)<br>Immunity to interference    Industrial applications<br>Lightning protection        to EN 61000-4-5, Installation class 2                                                                                                                                                                                      |  |
| Rated operating conditions<br>(module installed)    | Ambient temperature      Non Ex                              –20 ... 55 °C / –4 ... 131 °F<br>Ex                                      –20 ... 50 °C / –4 ... 122 °F<br>Relative humidity:          5 ... 95 %<br>Climatic class                3K5 according to EN 60721-3-3<br>Location class                C1 according to EN 60654-1                                                                                                               |  |
| Transport/storage temperature                       | –20 ... 70 °C / –4 ... 158 °F                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| Module housing                                      | Material                        PC/ABS blend<br>Color                             Black<br>Protection                    IP20<br>Dimensions (mm)            W x L x H 118 x 91 x 21<br>Screw clamp connector      Single or stranded wires 0.2 ... 2.5 mm <sup>2</sup><br>Tightening torque            0.5 ... 0.6 Nm<br>Wiring                            Stripping length                Max. 7 mm<br>Temperature resistance        > 75 °C / 167 °F |  |

1) User-definable

2) At rated operating conditions, ± 1 count

3) At rated operating conditions, ± 1 count, for NTC > 100 °C / 212 °F: 0.2 % meas. val. + 1 K

## CONDI 3400(X)-051 Module Terminal Assignments



## OXY 3400(X)-067 Module Specifications

|                                                     |                                                                                                                         |                                           |                                 |                                 |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------|---------------------------------|
| Input for sensors                                   | Analog amperometric oxygen sensors<br>Type SE 7*6 ... , SE 7*7 ... or “other” <sup>1)</sup><br>Actuation of ISM sensors |                                           |                                 |                                 |
| Automatic range selection:                          |                                                                                                                         |                                           |                                 |                                 |
| Input range 1                                       | Measuring current                                                                                                       | 0 ... 600 nA                              | Resolution 10 pA                |                                 |
|                                                     | Meas. error <sup>2)</sup>                                                                                               | < 0.5 % meas. val. + 0.05 nA + 0.005 nA/K |                                 |                                 |
| Input range 2                                       | Measuring current                                                                                                       | 0 ... 10000 nA                            | Resolution 166 pA               |                                 |
|                                                     | Meas. error <sup>2)</sup>                                                                                               | < 0.5 % meas. val. + 0.8 nA + 0.08 nA/K   |                                 |                                 |
| Display ranges                                      | Standard sensor                                                                                                         | Trace sensor 01                           | Trace sensor 001 <sup>3)</sup>  | 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 %O <sub>2</sub>           | 0.000 ... 9.999 %O <sub>2</sub> | 0.000 ... 9.999 %O <sub>2</sub> |
|                                                     | 00.00 ... 99.99 %O <sub>2</sub>                                                                                         | 00.00 ... 99.99 %O <sub>2</sub>           | 00.00 ... 99.99 %O <sub>2</sub> | 00.00 ... 99.99 %O <sub>2</sub> |
|                                                     | 000.0 ... 999.9 %O <sub>2</sub>                                                                                         | 000.0 ... 999.9 %O <sub>2</sub>           | 000.0 ... 999.9 %O <sub>2</sub> | 000.0 ... 999.9 %O <sub>2</sub> |
| Concentration (–10 ... 80 °C)<br>(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                       |                                 |                                 |
|                                                     | 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%            |
|                                                     |                                                                                                                         | 0.000 ... 9.999 mbar                      |                                 |                                 |
| Partial pressure                                    |                                                                                                                         | 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 ... 9999 mbar                                                                                                      | 0000 ... 9999 mbar                        | 0000 ... 9999 mbar              | 0000 ... 9999 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                                 | Barometric 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                                   | Temp. probe <sup>1)</sup><br>Measuring range<br>Resolution<br>Meas. error <sup>2)</sup>                             | NTC 22 kΩ / NTC 30 kΩ, 2-wire connection, adjustable<br>–20 ... 150 °C / –4 ... 302 °F<br>0.1 °C<br>0.2 % meas. val. + 0.5 K (< 1 K at T > 100 °C / 212 °F)                                                                                                                                               |
| Current input                                       | 0(4) ... 20 mA for absolute or differential pressure transmitter<br>Pressure range<br>Current range<br>Resolution   | 0 ... 9999 mbar<br>0(4) ... 20 mA / 50 Ω<br>Start/end user-definable within the pressure range<br>< 1%                                                                                                                                                                                                    |
| Sensor adjustment <sup>1)</sup>                     | Operating modes                                                                                                     | <ul style="list-style-type: none"> <li>– Automatic calibration in air-saturated water</li> <li>– Automatic calibration in air</li> <li>– Product calibration, saturation</li> <li>– Product calibration, concentration</li> <li>– Zero point/slope data entry</li> <li>– Zero point correction</li> </ul> |
| Diagnostic functions                                |                                                                                                                     |                                                                                                                                                                                                                                                                                                           |
| Calibration/adjustment record                       |                                                                                                                     | Recording of: zero point, slope, response time, calibration procedure with data 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:<br>sensor operating time / autoclaving cycles / SIP cycles / CIP cycles                                                                                                                                                                                                       |
| Explosion protection<br>(Ex version of module only) |                                                                                                                     | See Ex Certificates and EU Declaration of Conformity or <a href="http://www.knick.de">www.knick.de</a>                                                                                                                                                                                                    |
| RoHS conformity                                     |                                                                                                                     | According to EU directive 2011/65/EU                                                                                                                                                                                                                                                                      |
| EMC                                                 | EN 61326-1, EN 61326-2-3<br>NAMUR NE 21<br>Emitted interference<br>Immunity to interference<br>Lightning protection | Industrial applications <sup>1)</sup> (EN 55011 Group 1 Class A)<br>Industrial applications<br>to EN 61000-4-5, Installation class 2                                                                                                                                                                      |

## OXY 3400(X)-067 Module Specifications

|                                                  |                               |                                          |                               |
|--------------------------------------------------|-------------------------------|------------------------------------------|-------------------------------|
| Rated operating conditions<br>(module installed) | Ambient temp.                 | 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               |                               |
| <hr/>                                            |                               |                                          |                               |
| Transport/storage temperature                    | –20 ... 70 °C / –4 ... 158 °F |                                          |                               |
| <hr/>                                            |                               |                                          |                               |
| Module housing                                   | Material                      | PC/ABS blend                             |                               |
|                                                  | Color                         | Black                                    |                               |
|                                                  | Protection                    | IP20                                     |                               |
|                                                  | Dimensions (mm)               | W x L x H 118 x 91 x 21                  |                               |
|                                                  | Screw clamp connector         | Single or stranded wires 0.2 ... 2.5 mm² |                               |
|                                                  | Tightening torque             | 0.5 ... 0.6 Nm                           |                               |
|                                                  | Wiring                        | Stripping length                         | Max. 7 mm                     |
|                                                  |                               | Temperature resistance                   | > 75 °C / 167 °F              |

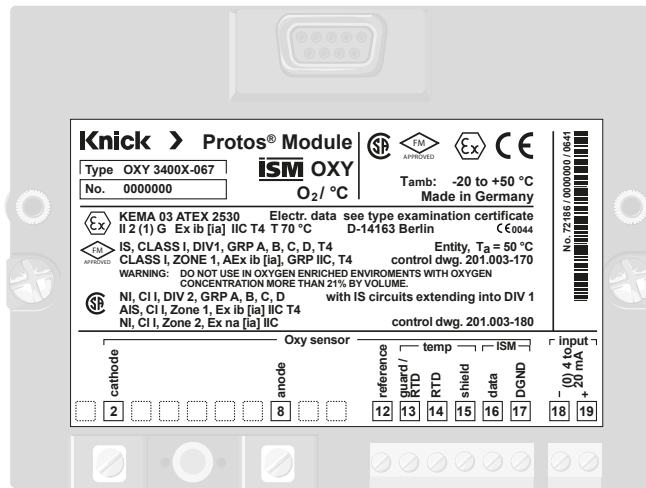
<sup>1)</sup> User-definable

<sup>2)</sup> 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                                  | (–10 ... 80 °C / 14 ... 176 °F)             |
|                                   |                                                                                                                             | 0.00 ... 99.99 % O <sub>2</sub>                      |                                             |
|                                   | Concentration                                                                                                               | 0.00 ... 99.99 mg/l (ppm)                            | (–10 ... 80 °C / 14 ... 176 °F)             |
|                                   | Volume concentration in gas                                                                                                 | 0.00 ... 99.99 vol%                                  |                                             |
| Pressure correction <sup>1)</sup> | Partial pressure                                                                                                            | 0.00 ... 500.0 mbar                                  |                                             |
|                                   | Barometric pressure                                                                                                         | 700 ... 1100 mbar                                    |                                             |
|                                   | Manual                                                                                                                      | 0 ... 9999 mbar                                      |                                             |
|                                   | External                                                                                                                    | 0 ... 9999 mbar                                      | (via current input<br>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 <sup>2)</sup>                                                                                             | 0.2 % meas. val. + 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 ... 9999 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 <sup>1)</sup>   | Sensocheck, sensor monitoring                                                                                               |                                                      |                                             |
| Sensorface                        | 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<br>Partial pressure / temperature / I input                    |                                                      |                                             |
| Wear monitor                      | Display of wear parameters                                                                                                  |                                                      |                                             |
|                                   | Sensor wear / sensor operating time / autoclaving cycles / SIP cycles / CIP cycles                                          |                                                      |                                             |
| Sensor adjustment <sup>1)</sup>   | Operating modes                                                                                                             |                                                      |                                             |
|                                   | – Automatic calibration in air-saturated water                                                                              |                                                      |                                             |
|                                   | – Automatic calibration in air                                                                                              |                                                      |                                             |
|                                   | – Product calibration, saturation                                                                                           |                                                      |                                             |
|                                   | – Product calibration, concentration and product calibration, partial pressure                                              |                                                      |                                             |
| Calibration record                | – 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)

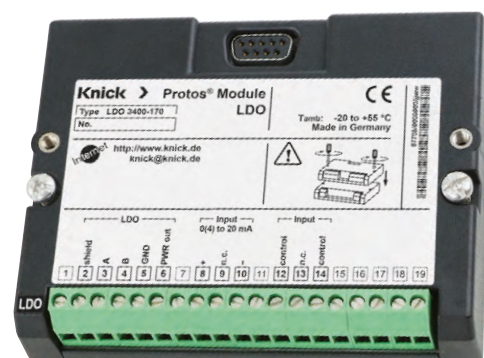
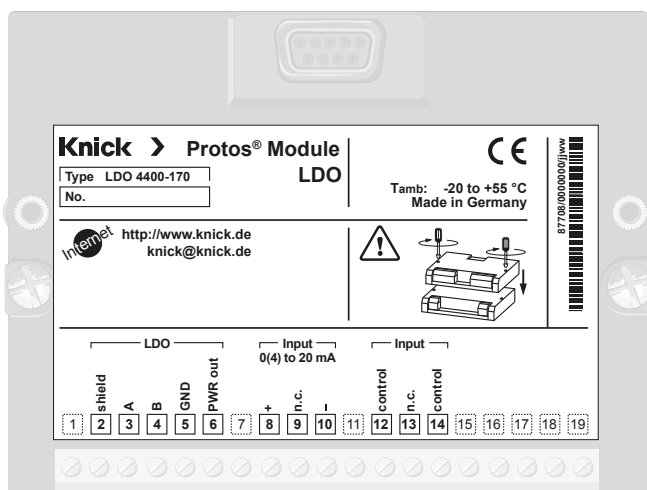
## LDO 4400-170 Module Specifications

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

1) User-definable

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

## LDO 4400-170 Module Terminal Assignments

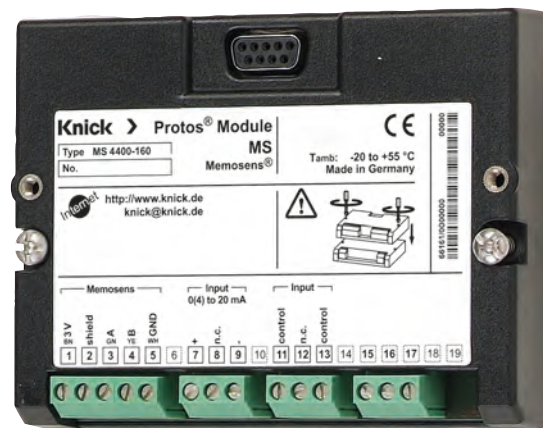
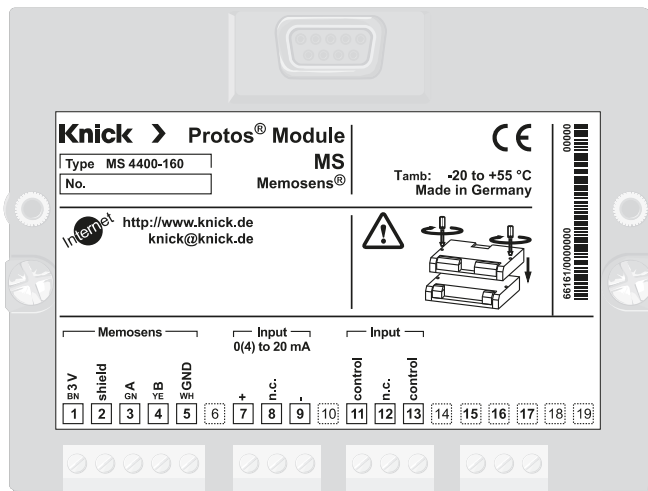


**MS 4400(X)-160 Module Specifications**

|                                                  |                                                                                                        |                                                                                         |                                                                                                                                                            |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Memosens                                         | Interface for Memosens                                                                                 |                                                                                         |                                                                                                                                                            |
|                                                  | Power supply                                                                                           | $V_0 = 3.05 \dots 3.15 \text{ V} / 6 \text{ mA}$ $R_i < 5 \Omega / I \leq 6 \text{ mA}$ |                                                                                                                                                            |
|                                                  | Ex ia IIC T4                                                                                           | $V_{\max} = 5.1 \text{ V} / I_{\max} = 130 \text{ mA} / P_{\max} = 166 \text{ mW}$      |                                                                                                                                                            |
|                                                  | Interface                                                                                              | RS 485                                                                                  |                                                                                                                                                            |
|                                                  | Transfer rate                                                                                          | 9600 Bd                                                                                 |                                                                                                                                                            |
|                                                  | Cable length                                                                                           | Max. 100 m                                                                              |                                                                                                                                                            |
| I input                                          | Current input 0/4 ... 20 mA / 100 $\Omega$<br>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<br>( $\pm 1$ count, plus sensor error)                  |                                                                                                                                                            |
| Explosion protection                             | See Ex Certificates and EU Declaration of Conformity or <a href="http://www.knick.de">www.knick.de</a> |                                                                                         |                                                                                                                                                            |
| RoHS conformity                                  | According to EU directive 2011/65/EU                                                                   |                                                                                         |                                                                                                                                                            |
| EMC                                              | EN 61326-1, EN 61326-2-3<br>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                                                   |                                                                                                                                                            |
| Rated operating conditions<br>(module installed) | Ambient temperature                                                                                    | Non Ex<br>Ex                                                                            | $-20 \dots 55 \text{ }^\circ\text{C} / -4 \dots 131 \text{ }^\circ\text{F}$<br>$-20 \dots 50 \text{ }^\circ\text{C} / -4 \dots 122 \text{ }^\circ\text{F}$ |
|                                                  | Relative humidity:                                                                                     | 5 ... 95 %                                                                              |                                                                                                                                                            |
|                                                  | Climatic class                                                                                         | 3K5 according to EN<br>60721-3-3                                                        |                                                                                                                                                            |
|                                                  | Location class                                                                                         | C1 according to EN<br>60654-1                                                           |                                                                                                                                                            |
| Transport/storage temperature                    | $-20 \dots 70 \text{ }^\circ\text{C} / -4 \dots 158 \text{ }^\circ\text{F}$                            |                                                                                         |                                                                                                                                                            |
| Module housing                                   | Material                                                                                               | PC/ABS blend                                                                            |                                                                                                                                                            |
|                                                  | Color                                                                                                  | Black                                                                                   |                                                                                                                                                            |
|                                                  | Protection                                                                                             | IP20                                                                                    |                                                                                                                                                            |
|                                                  | Dimensions (mm)                                                                                        | W x L x H 118 x 91 x 21                                                                 |                                                                                                                                                            |
|                                                  | Screw clamp connector                                                                                  | Single or stranded wires 0.2 ... 2.5 mm <sup>2</sup>                                    |                                                                                                                                                            |
|                                                  | Tightening torque                                                                                      | 0.5 ... 0.6 Nm                                                                          |                                                                                                                                                            |
|                                                  | Wiring                                                                                                 | Stripping length                                                                        | Max. 7 mm                                                                                                                                                  |
|                                                  |                                                                                                        | Temperature resistance                                                                  | > 75 $^\circ\text{C} / 167 \text{ }^\circ\text{F}$                                                                                                         |
| Power supply (KBUS)                              | 6.8 ... 8.0 V / 20 mA                                                                                  |                                                                                         |                                                                                                                                                            |

# Protos II 4400 (X)

## MS 4400(X)-160 Module Terminal Assignments



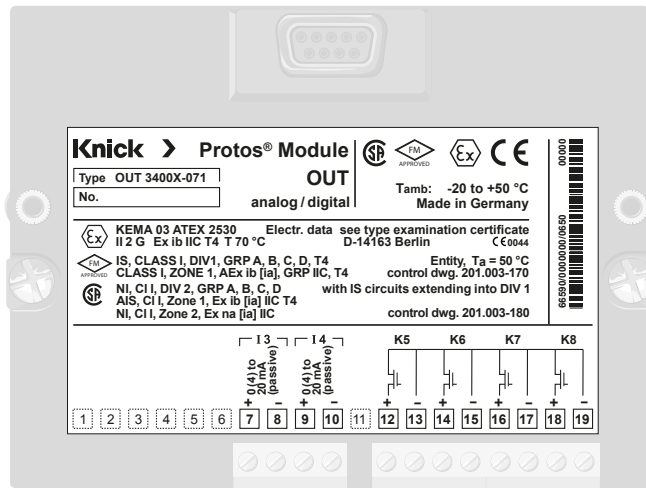
**OUT 3400(X)-071 Module Specifications**

|                                                  |                                                                     |                                                                                                                            |
|--------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| 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 <sup>1)</sup>                                             | 22 mA for messages                                                                                                         |
|                                                  | Measurement error <sup>2)</sup>                                     | < 0.25 % of current value + 0.05 mA                                                                                        |
|                                                  | Start/end of scale <sup>1)</sup>                                    | 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 <sup>1)</sup>                                             | 22 mA for messages                                                                                                         |
|                                                  | Measurement error <sup>2)</sup>                                     | < 0.25 % of current value + 0.05 mA                                                                                        |
|                                                  | Start/end of scale <sup>1)</sup>                                    | 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: $V_{\max} = 30 \text{ V}$ , $I_{\max} = 100 \text{ mA}$ , $P_{\max} = 0.8 \text{ W}$                                   |
| 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                                                                                      |
| Rated operating conditions<br>(module installed) | Ambient temperature                                                 | Non Ex                      -20 ... 55 °C / -4 ... 131 °F<br>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 housing                                   | Material                                                            | PC/ABS blend                                                                                                               |
|                                                  | Color                                                               | Black                                                                                                                      |
|                                                  | Protection                                                          | IP20                                                                                                                       |
|                                                  | Dimensions (mm)                                                     | W x L x H 118 x 91 x 21                                                                                                    |
|                                                  | Screw clamp connector                                               | Single or stranded wires 0.2 ... 2.5 mm <sup>2</sup>                                                                       |
|                                                  | Tightening torque                                                   | 0.5 ... 0.6 Nm                                                                                                             |
|                                                  | Wiring                                                              | Stripping length                      Max. 7 mm<br>Temperature resistance              > 75 °C / 167 °F                    |

<sup>1)</sup> User-definable<sup>2)</sup> 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 $I_{\max} = 100 \text{ mA}$                                                                                                                        |
|                                    | Load monitoring                                                                                                    | Error message if load is exceeded                                                                                                                             |
|                                    | Measurement error <sup>2)</sup>                                                                                    | < 0.25 % of current value + 0.05 mA                                                                                                                           |
| Digital controller output KV1/KV2  | Usage                                                                                                              | Actuation of analog control valves<br>IV1: Active below setpoint<br>(For straightway valves)<br>IV2: Active above setpoint<br>(For straightway valves)        |
|                                    | Electronic switching outputs, polarized, floating, connected to each other and to K9, K10                          |                                                                                                                                                               |
|                                    | Voltage drop                                                                                                       | < 1.2 V                                                                                                                                                       |
|                                    | Load capability                                                                                                    | DC: $V_{\max} = 30 \text{ V}$<br>$I_{\max} = 100 \text{ mA}$                                                                                                  |
| PID process controller             | Usage                                                                                                              | Actuation of straightway valves, metering pumps<br>KV1: Active below setpoint<br>KV2: Active above setpoint                                                   |
|                                    | Continuous controller via current outputs IV1, IV2, or/and quasi-continuous controller via relay contacts KV1, KV2 |                                                                                                                                                               |
|                                    | Controlled variable <sup>1)</sup>                                                                                  | User-defined, depending on measuring modules installed (only primary process variables<br>pH, ORP, °C, S/cm, %O <sub>2</sub> , %Air)                          |
|                                    | Setpoint specification <sup>1)</sup>                                                                               | As desired within range                                                                                                                                       |
|                                    | Neutral zone <sup>1)</sup>                                                                                         | As desired within range                                                                                                                                       |
|                                    | P action <sup>1)</sup>                                                                                             | Controller gain $K_P$ : 0010 ... 9999 %                                                                                                                       |
|                                    | I action <sup>1)</sup>                                                                                             | Reset time $T_I$ : 0000 ... 9999 s<br>(0000 s = no integral action)                                                                                           |
|                                    | D action <sup>1)</sup>                                                                                             | Rate time $T_D$ : 0000 ... 9999 s<br>(0000 s = no derivative action)                                                                                          |
|                                    | Pulse length controller <sup>1)</sup>                                                                              | 0001 ... 0600 s, Min. ON period 0.5 s                                                                                                                         |
|                                    | Pulse frequency controller <sup>1)</sup>                                                                           | 0001 ... 0180 min <sup>-1</sup>                                                                                                                               |
|                                    | Behavior during HOLD <sup>1)</sup>                                                                                 | 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 $\neq 0000 \text{ s}$                          |
|                                    | 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: $V_{\max} = 30 \text{ V}$<br>$I_{\max} = 100 \text{ mA}$                                                                                                  |
|                                    | 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)

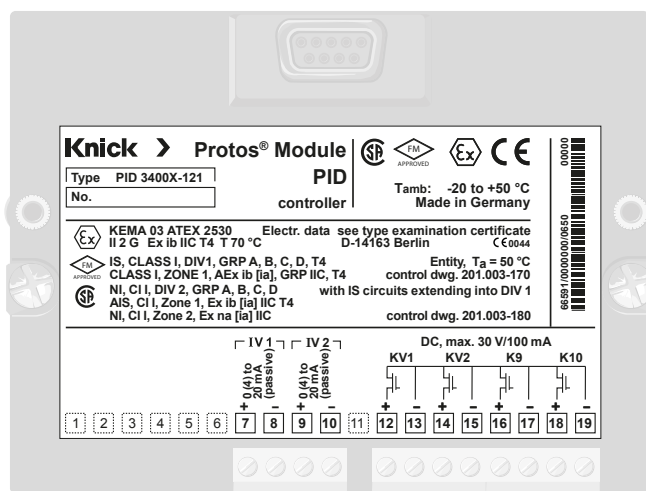
## PID 3400-121 Module Specifications

|                                                     |                                                                                                                                                                                                                                               |                                          |                                                                |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|----------------------------------------------------------------|
| Explosion protection<br>(Ex version of module only) | See Ex Certificates and EU Declaration of Conformity or <a href="http://www.knick.de">www.knick.de</a>                                                                                                                                        |                                          |                                                                |
| EMC                                                 | EN 61326-1, EN 61326-2-3<br>NAMUR NE 21<br>Emitted interference      Industrial applications (EN 55011 Group 1 Class A)<br>Immunity to interferenceIndustrial applications<br>Lightning protection      to EN 61000-4-5, installation class 2 |                                          |                                                                |
| Rated operating conditions<br>(module installed)    | Ambient temperature                                                                                                                                                                                                                           | Non Ex<br>Ex                             | -20 ... 55 °C / -4 ... 131 °F<br>-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 housing                                      | Material                                                                                                                                                                                                                                      | PC/ABS blend                             |                                                                |
|                                                     | Color                                                                                                                                                                                                                                         | Black                                    |                                                                |
|                                                     | Protection                                                                                                                                                                                                                                    | IP20                                     |                                                                |
|                                                     | Dimensions (mm)                                                                                                                                                                                                                               | W x L x H 118 x 91 x 21                  |                                                                |
|                                                     | Screw clamp connector                                                                                                                                                                                                                         | Single or stranded wires 0.2 ... 2.5 mm² |                                                                |
|                                                     | Tightening torque                                                                                                                                                                                                                             | 0.5 ... 0.6 Nm                           |                                                                |
|                                                     | Wiring                                                                                                                                                                                                                                        | Stripping length                         | Max. 7 mm                                                      |
|                                                     |                                                                                                                                                                                                                                               | Temperature resistance                   | > 75 °C / 167 °F                                               |

<sup>1)</sup> User-definable

<sup>2)</sup> At rated operating conditions

## PID 3400-121 Module Terminal Assignments

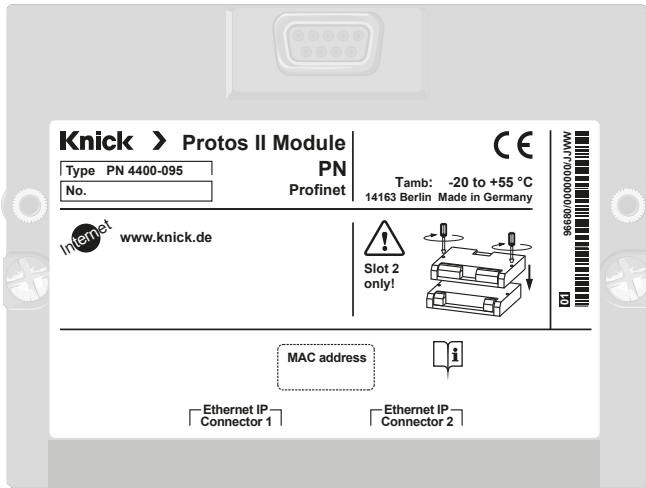


**PN 4400-095 Module Specifications**

|                                               |                                      |                                                           |                                          |
|-----------------------------------------------|--------------------------------------|-----------------------------------------------------------|------------------------------------------|
| 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                                   |                                          |
| Rated operating conditions (module installed) | Lightning protection                 | to EN 61000-4-5, Installation class 2                     |                                          |
|                                               | 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 housing                                | Material                             | PC/ABS blend                                              |                                          |
|                                               | Color                                | Black                                                     |                                          |
|                                               | Protection                           | IP20                                                      |                                          |
|                                               | Dimensions (mm)                      | W x L x H 118 x 91 x 21                                   |                                          |
|                                               | Screw clamp connector                | Single or stranded wires 0.2 ... 2.5 mm²                  |                                          |
|                                               | Tightening torque                    | 0.5 ... 0.6 Nm                                            |                                          |
|                                               | Wiring                               | Stripping length                                          | Max. 7 mm                                |
|                                               |                                      | Temperature resistance                                    | > 75 °C / 167 °F                         |

# Protos II 4400

## PN 4400-095 Module Terminal Assignments



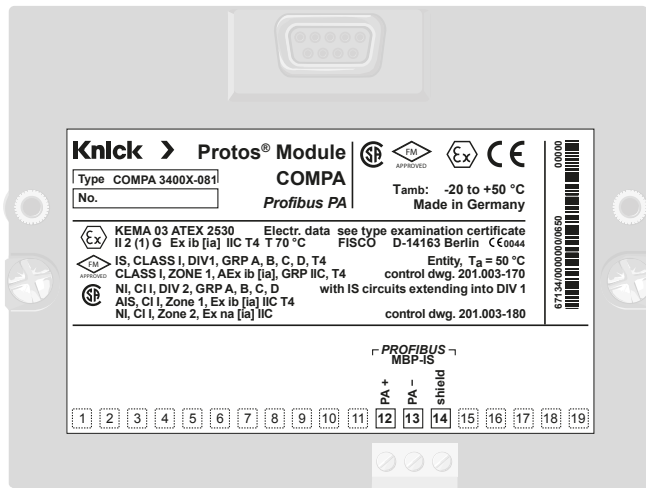
**PROFIBUS COMPA 3400(X)-081 Module Specifications**

|                                                     |                                                                                                                   |                                                                 |                                                                                        |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------------------------------------|
| PROFIBUS PA                                         | Galvanic isolation up to 60 V<br>COMPA 3400X-081: Digital communication in hazardous areas via current modulation |                                                                 |                                                                                        |
|                                                     | Physical interface                                                                                                | MBP-IS <sup>1)</sup> (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)<br>≤ 24 V (linear characteristic) |
|                                                     | Current consumption                                                                                               | < 12 mA                                                         |                                                                                        |
|                                                     | Max. current in case of fault (FDE)                                                                               | < 15 mA                                                         |                                                                                        |
| Explosion protection<br>(Ex version of module only) | See Ex Certificates and EU Declaration of Conformity or <a href="http://www.knick.de">www.knick.de</a>            |                                                                 |                                                                                        |
| RoHS conformity                                     | According to EU directive 2011/65/EU                                                                              |                                                                 |                                                                                        |
| EMC                                                 | EN 61326-1, EN 61326-2-3<br>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                           |                                                                                        |
| Rated operating conditions<br>(module installed)    | Ambient temperature                                                                                               | Non Ex<br>Ex                                                    | –20 ... 55 °C / –4 ... 131 °F<br>–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 housing                                      | Material                                                                                                          | PC/ABS blend                                                    |                                                                                        |
|                                                     | Color                                                                                                             | Black                                                           |                                                                                        |
|                                                     | Protection                                                                                                        | IP20                                                            |                                                                                        |
|                                                     | Dimensions (mm)                                                                                                   | W x L x H 118 x 91 x 21                                         |                                                                                        |
|                                                     | Screw clamp connector                                                                                             | Single or stranded wires 0.2 ... 2.5 mm <sup>2</sup>            |                                                                                        |
|                                                     | Tightening torque                                                                                                 | 0.5 ... 0.6 Nm                                                  |                                                                                        |
|                                                     | Wiring                                                                                                            | Stripping length                                                | Max. 7 mm                                                                              |
|                                                     |                                                                                                                   | Temperature resistance                                          | > 75 °C / 167 °F                                                                       |

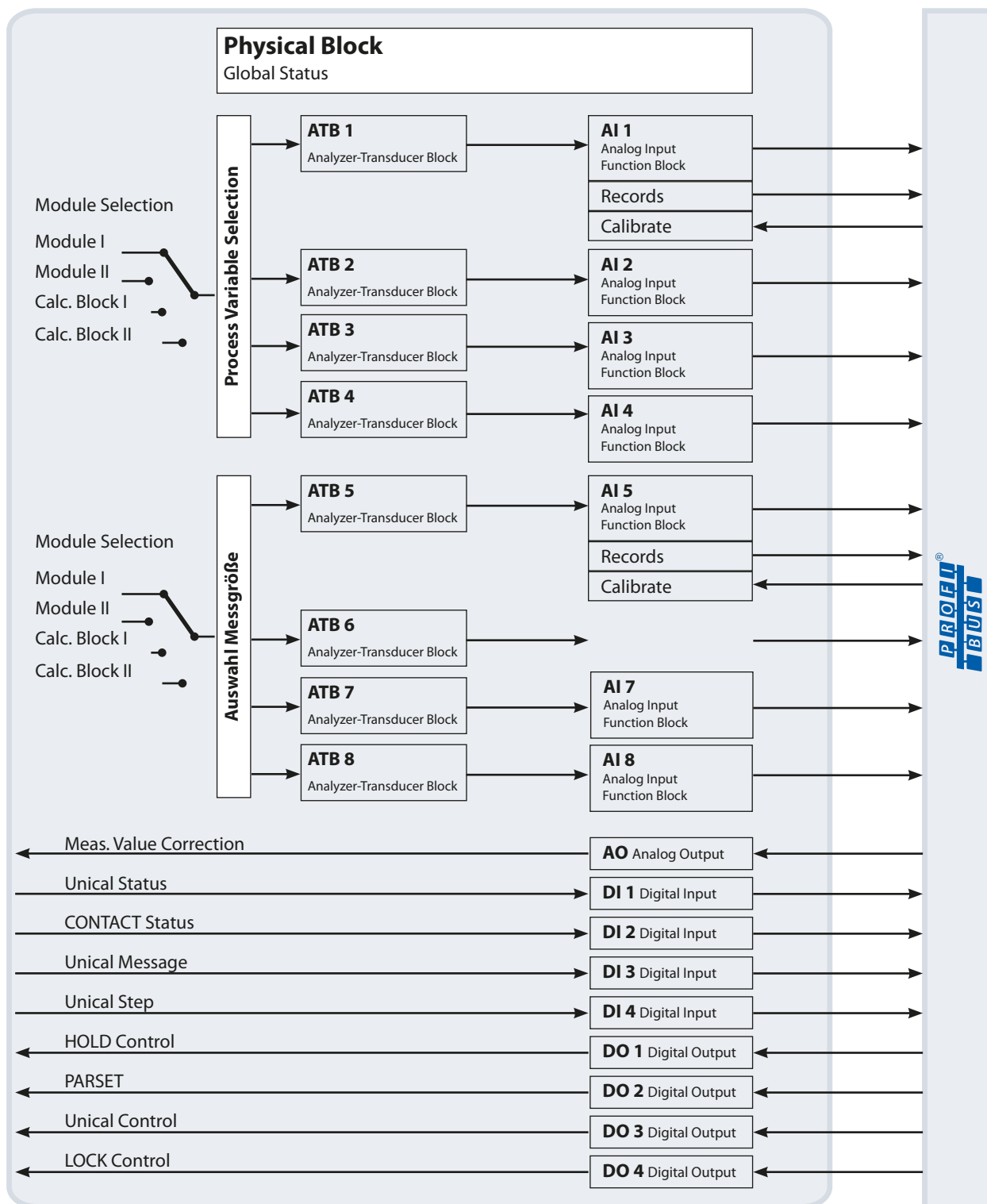
<sup>1)</sup> MBP-IS = Manchester Bus Powered – Intrinsic Safety

# Protos II 4400 (X)

## PROFIBUS COMPA 3400 X-081 Module Terminal Assignments



## Communication Model



## Protos II 4400(X)

**COMFF 3400(X)-085 Module Specifications**FOUNDATION Fieldbus H1<sup>1)</sup>

COMFF 3400X-085:

Digital communication in hazardous areas via current modulation (Ex ia IIC)

|                                     |                                                        |
|-------------------------------------|--------------------------------------------------------|
| 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<br>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<br>(e.g., O <sub>2</sub> process pressure) |

Explosion protection  
(Ex version of module only)See Ex Certificates and EU Declaration of Conformity or [www.knick.de](http://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              |



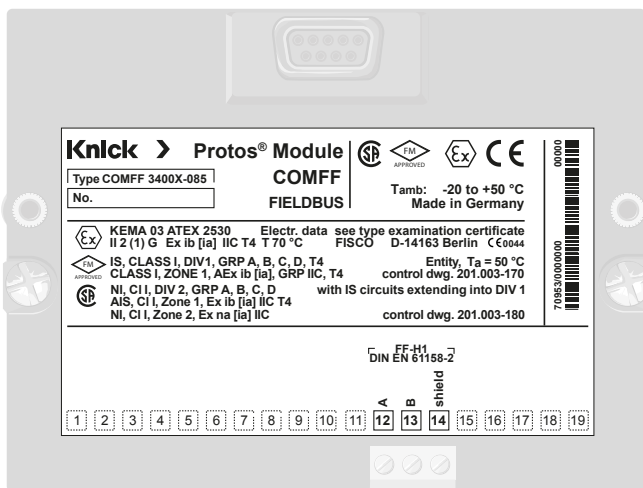
# Protos II 4400 (X)

## COMFF 3400(X)-085 Module Specifications

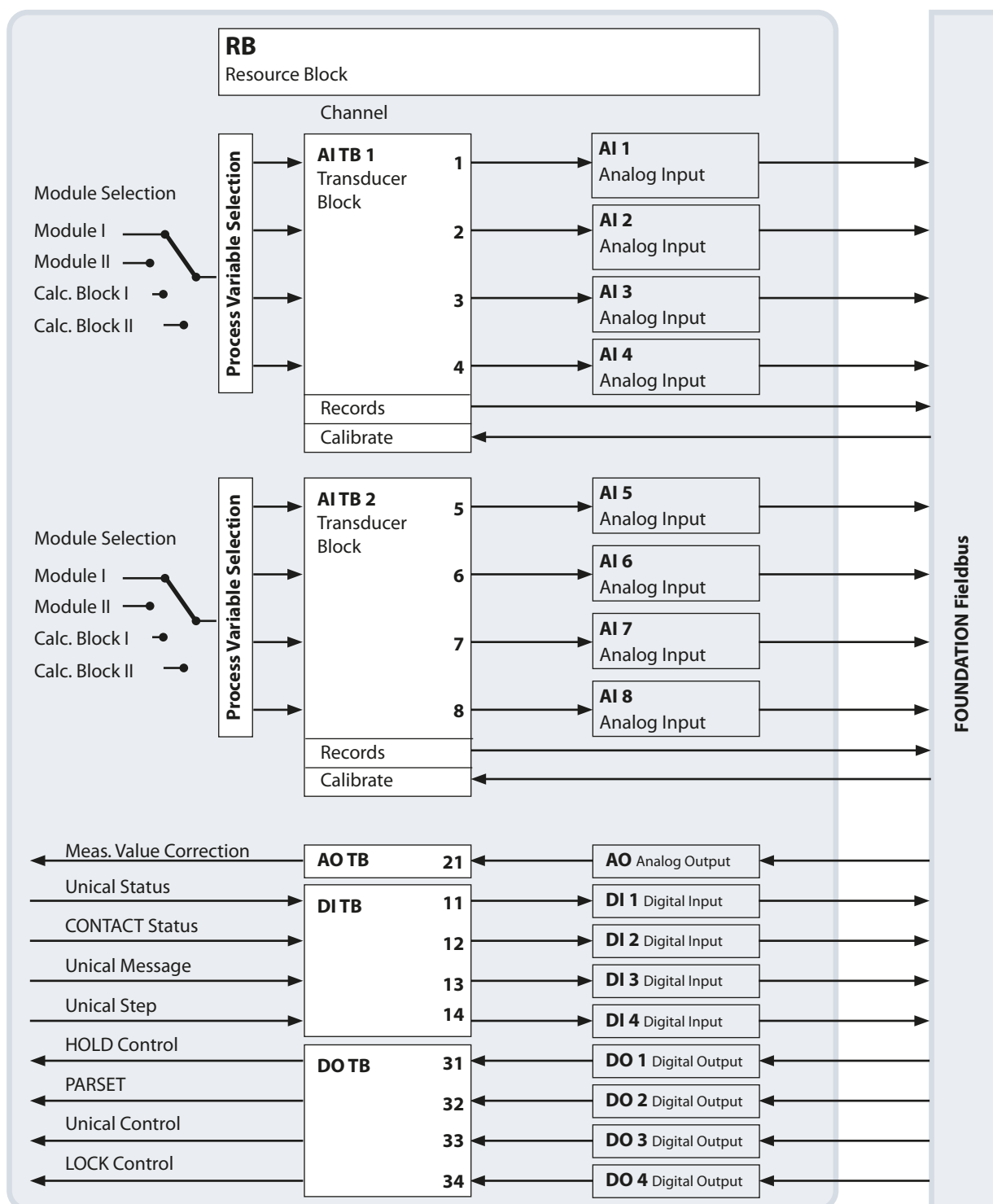
|                                                  |                       |                                                      |                               |
|--------------------------------------------------|-----------------------|------------------------------------------------------|-------------------------------|
| Rated operating conditions<br>(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                        |                               |
| Transport/storage temperature                    | Location class        | C1 according to EN 60654-1                           |                               |
|                                                  |                       |                                                      |                               |
| Module housing                                   | Material              | PC/ABS blend                                         |                               |
|                                                  | Color                 | Black                                                |                               |
|                                                  | Protection            | IP20                                                 |                               |
|                                                  | Dimensions (mm)       | W x L x H 118 x 91 x 21                              |                               |
|                                                  | Screw clamp connector | Single or stranded wires 0.2 ... 2.5 mm <sup>2</sup> |                               |
|                                                  | Tightening torque     | 0.5 ... 0.6 Nm                                       |                               |
|                                                  | Wiring                | Stripping length                                     | Max. 7 mm                     |
|                                                  |                       | Temperature resistance                               | > 75 °C / 167 °F              |

<sup>1)</sup> Galvanic isolation

## COMFF 3400 X-085 Module Terminal Assignments



## Communication Model



## Protos II 4400 (X)

## 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.



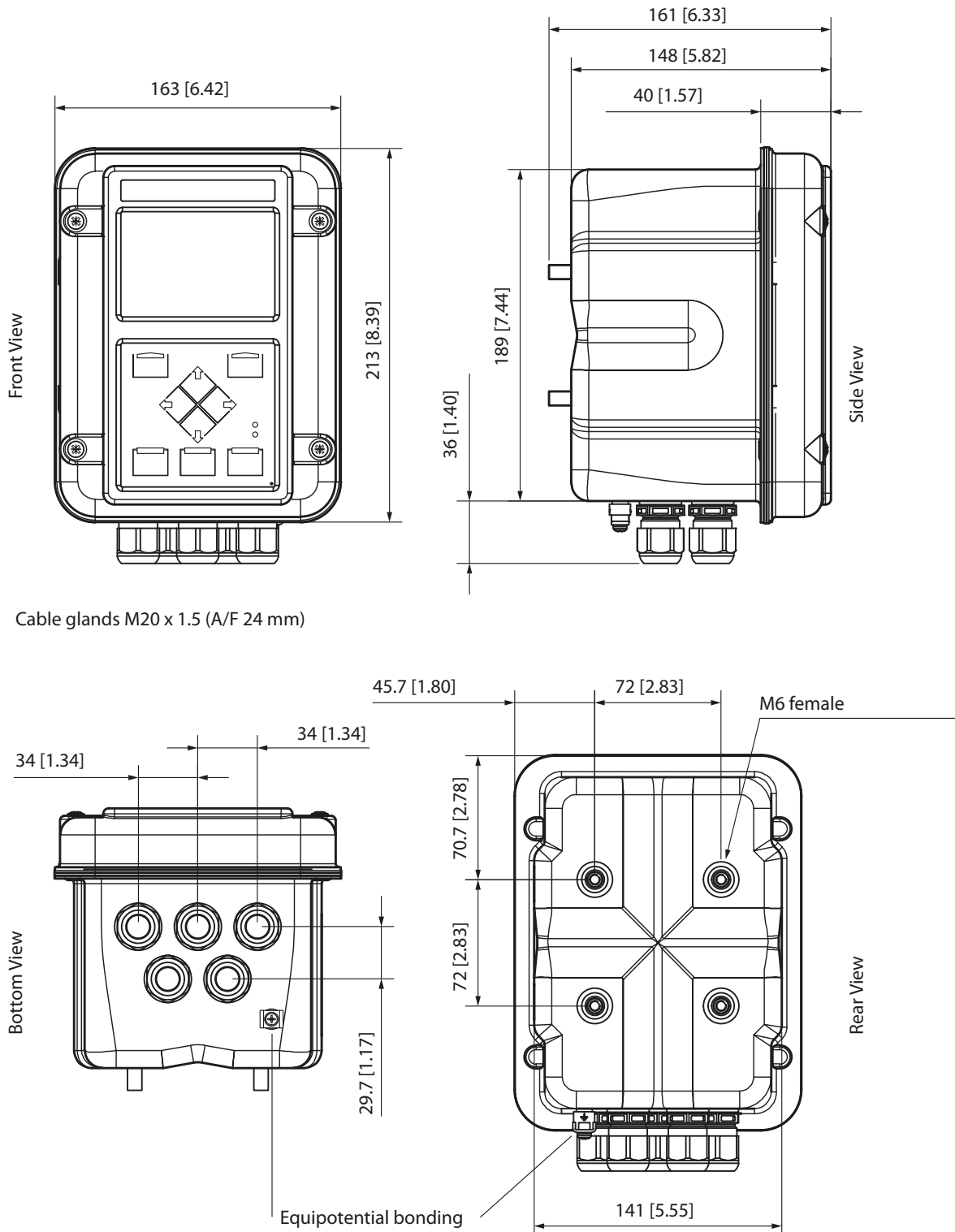
### ZU 0545 Panel-Mount Kit

For assembly in standardized panel cutout 144 x 194-mm.



# Protos II 4400 (X)

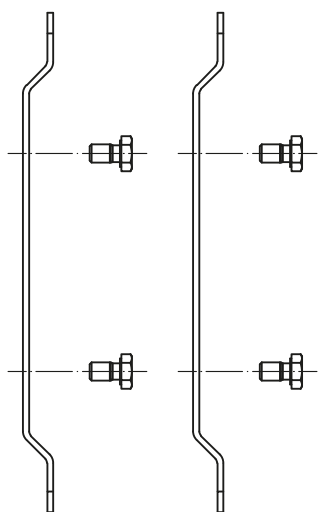
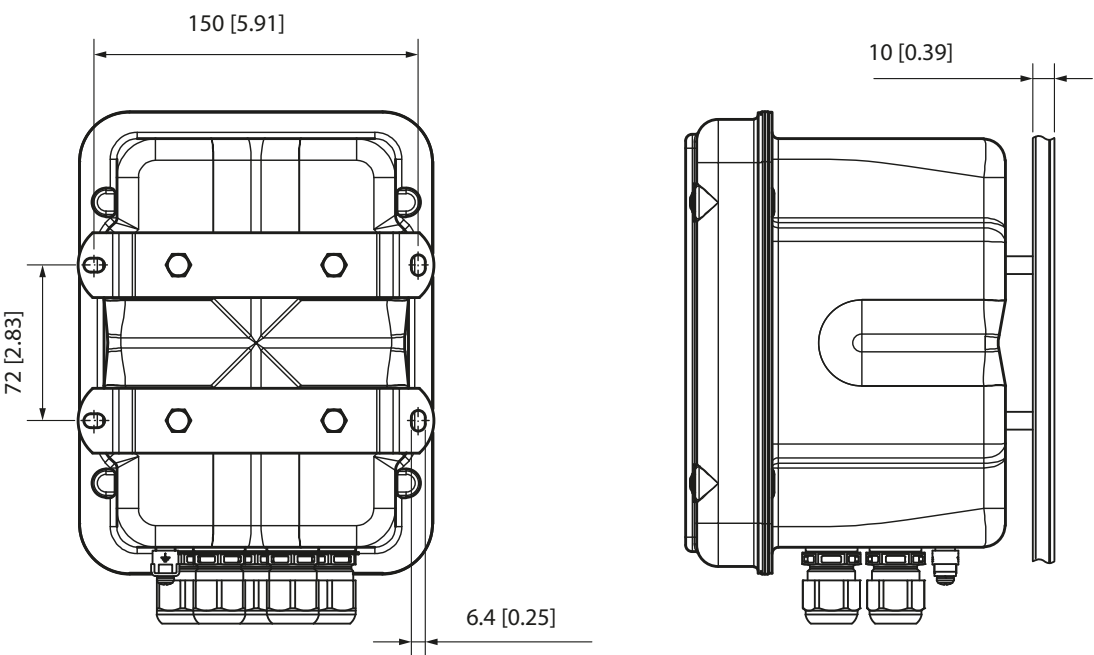
## Dimension Drawings



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

All dimensions in mm [inches]

Dimension Drawings — Wall Mounting

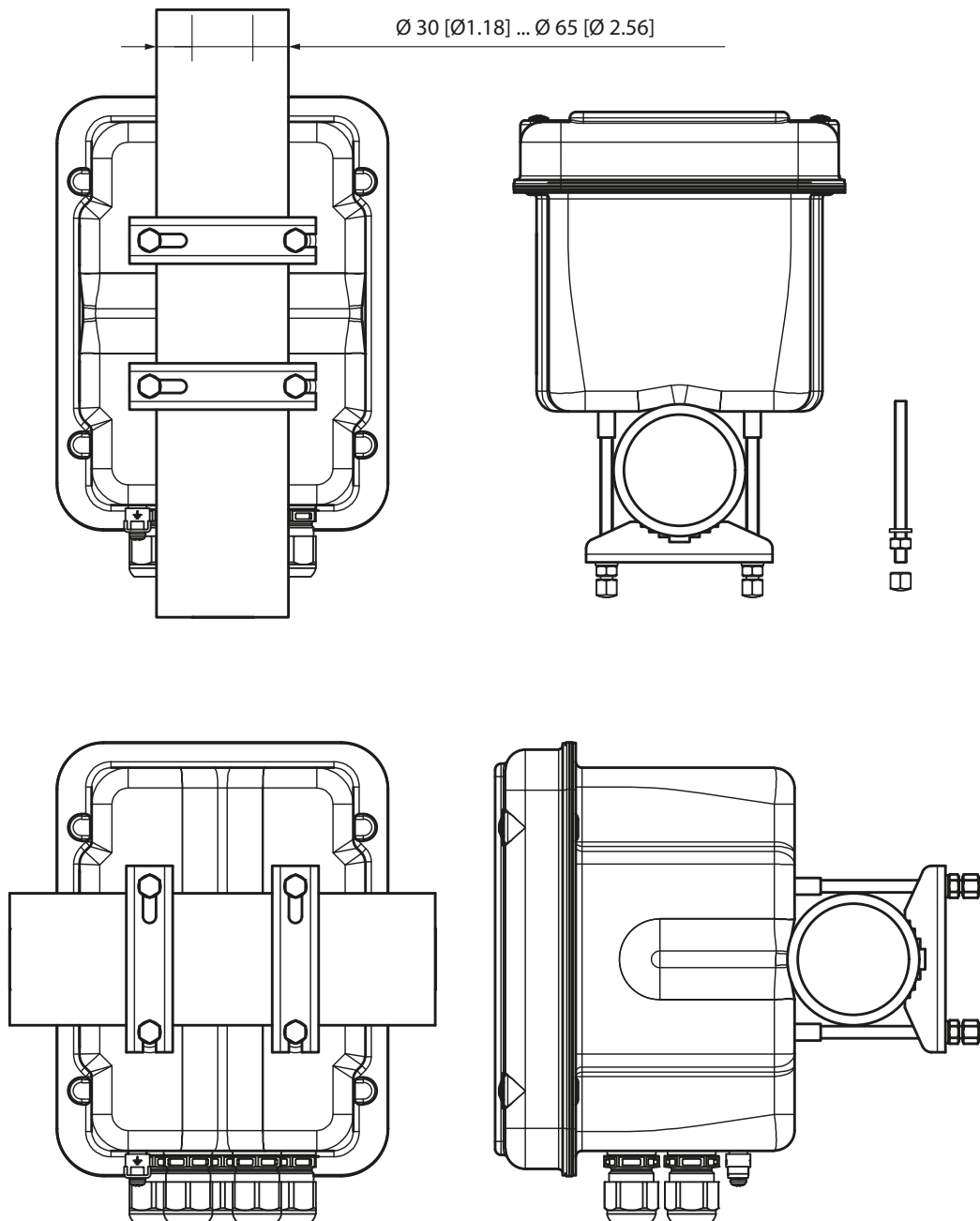


2x wall mounting brackets (stainless steel A4)  
4x hex bolt M6x10  
(A/F 10, stainless steel A4)  
(included in the package)

All dimensions in mm [inches]

# Protos II 4400 (X)

## Dimension Drawings — Pipe Mounting



ZU 0544 Pipe-Mount Kit:

2x pipe clamp (stainless steel A4)

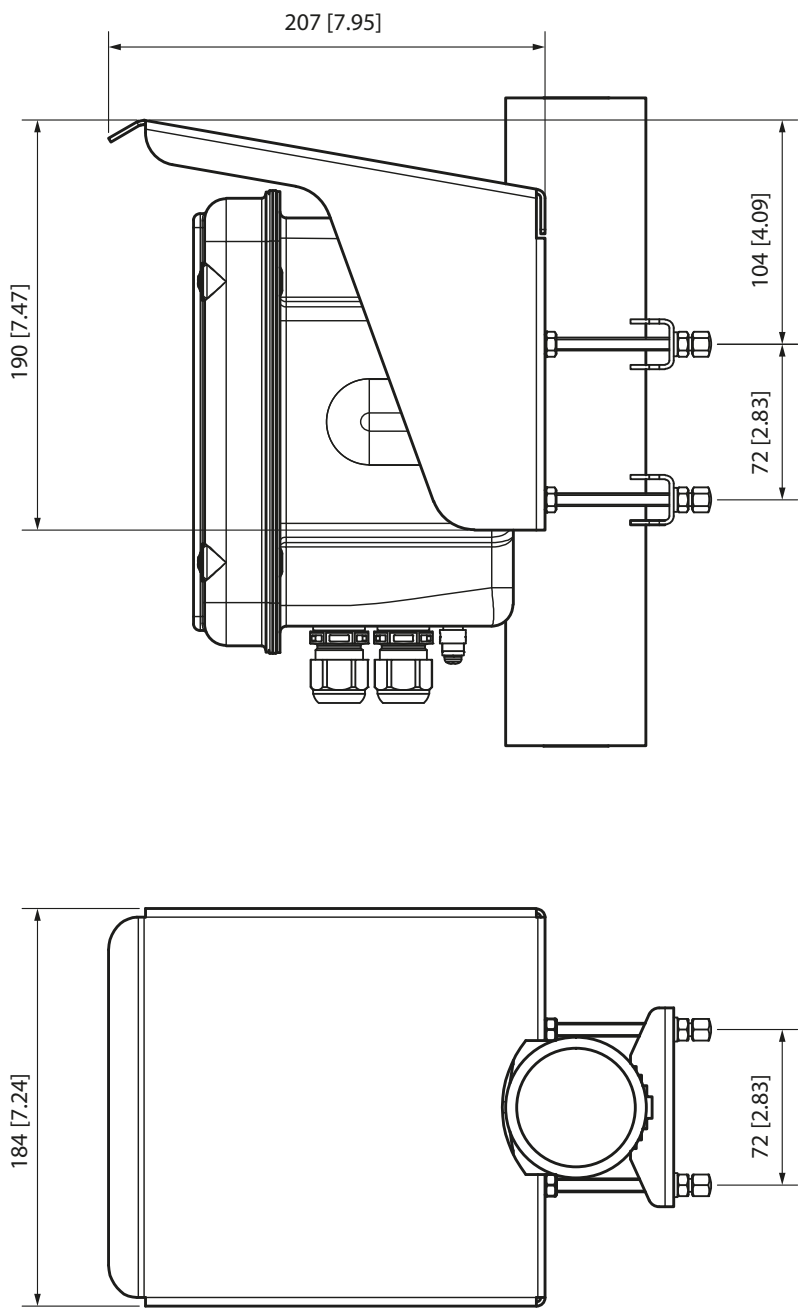
4x threaded bolt M6 (stainless steel A4)

4x washer, nut, cap nut (stainless steel A4)

All dimensions in mm [inches]

Dimension Drawings — ZU 0548 Protective Hood

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

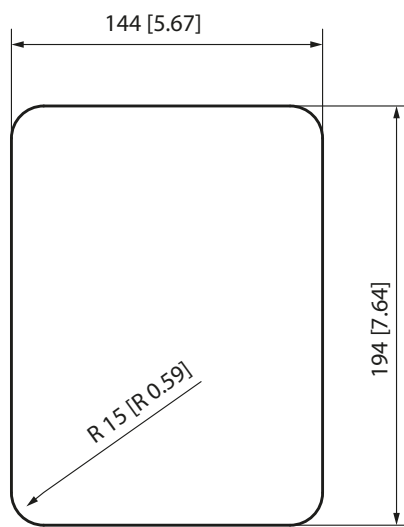
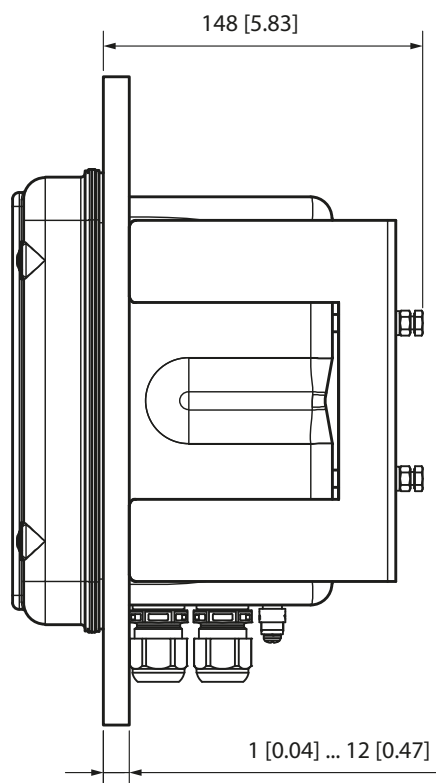


All dimensions in mm [inches]



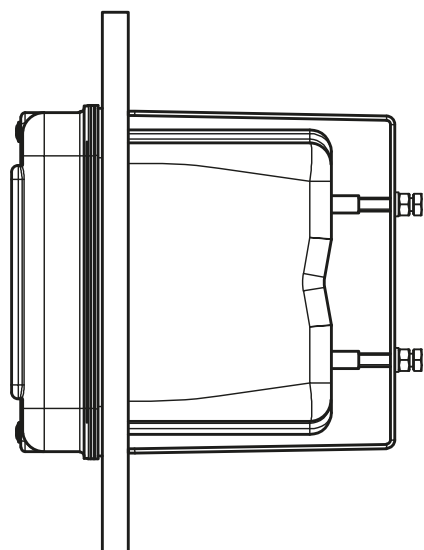
# Protos II 4400 (X)

## Dimension Drawings — ZU 0545 Panel-Mount Kit

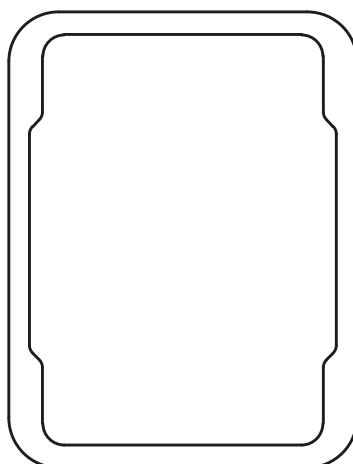


Control panel cutout

Panel mounting



Panel sealing



All dimensions in mm [inches]