

Read before installation.
 Keep for future use.

www.knick.de

Safety

Read the user manual for the basic unit (FRONT and BASE modules) and the corresponding measuring and communication modules, observe the technical specifications and follow the safety instructions in the safety guide (Package Contents for the basic unit Protos II 4400(X)) – for Ex versions, additionally the information provided in the documents in the Package Contents.

The user manual, safety guide and other product information can be downloaded from www.knick.de.

Maintenance

Protos modules cannot be repaired by the user. For inquiries regarding module repair, please contact Knick Elektronische Messgeräte GmbH & Co. KG at www.knick.de.

Intended Use

The module is used for the simultaneous measurement of pH, ORP, and temperature with analog glass electrodes or ISM sensors (Intelligent Sensor Management).

Note: The specifications on the module's rating plate take precedence.

Package Contents

- Measuring module
 - Installation Guide
 - Test Report 2.2 acc. to EN 10204
 - Adhesive label with terminal assignments
- For Ex-version PH3400X-035:
- Appendix to certificates (KEMA 03ATEX2530, IECEx DEK 11.0054)
 - EU Declaration of Conformity
 - Control Drawings

Check all components for damage upon receipt.
 Do not use damaged parts.

Operating States

The function check (HOLD) operating state is active:

- During calibration (only the corresponding channel)
- During maintenance
- During parameter setting
- During the automatic rinse cycle
- (use of the rinse contact)

The behavior of the current outputs depends on the parameter setting, i.e., they may be frozen at the last measurement or set to a fixed value.

For detailed information, refer to the user manual of the basic unit (FRONT and BASE modules).

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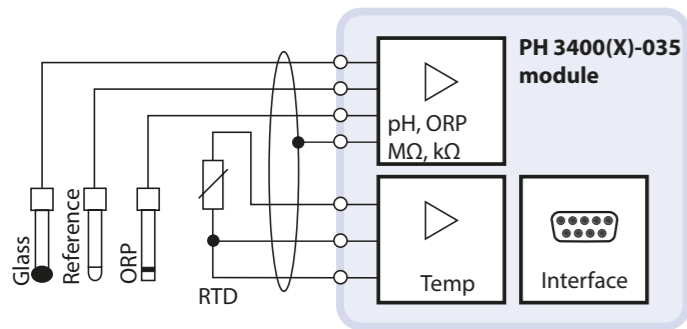
This document was published on November 13, 2020
 The latest documents are available for download on the website under the corresponding product description.



TI-201.035-KNEN02

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Device Overview/Module Concept

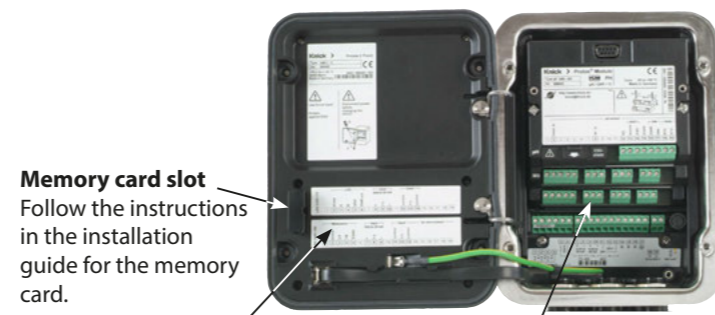


Module Compatibility

	Protos 3400	Protos 3400X	Protos II 4400	Protos II 4400X
Protos PH 3400-035 module	x		x	
Protos PH 3400X-035 module		x		x

Information on the firmware version history can be found at www.knick.de.

⚠ WARNING! Shock potential.
 Make sure the device is de-energized before reaching into the terminal compartment.



Memory card slot
 Follow the instructions in the installation guide for the memory card.

Terminal plate adhesive label ("concealed" modules)
 The adhesive labels (Package Contents) for the modules at slot 1 or slot 2 can be affixed here. This simplifies maintenance and service.

Module configuration
 Any combination of up to 3 measuring and communication modules is possible. Module identification: Plug & Play

Inserting the Module

⚠ CAUTION! Electrostatic discharge (ESD).
 The modules' signal inputs are sensitive to electrostatic discharge. Take measures to protect against ESD before inserting the module and wiring the inputs.

Note: Strip the insulation from the wires using a suitable tool to prevent damage.

1. Switch off the power supply to the device.
2. Open the device (loosen the 4 screws on the front).
3. Plug the module into the slot (D-SUB connector), see figure on the right.
4. Tighten the module's fastening screws.
5. Open the ESD shield (covering terminals 2 and 8).
6. Connect the sensor and separate temperature probe if necessary, see "Wiring" on the next page.
Note: To avoid interferences, the cable shielding must be completely covered by the ESD shield.
7. Fit the ESD shield back into place (covering terminals 2 and 8).
8. Check whether all connections are correctly wired.
9. Close the device by tightening the screws on the front.
10. Switch on the power supply.

⚠ CAUTION! Incorrect parameter settings or adjustments can result in incorrect outputs. Protos II 4400(X) must therefore be commissioned by a system specialist, all its parameters must be set, and it must be fully adjusted.



⚠ CAUTION! Risk of losing the specified ingress protection.
 Fasten the cable glands and screw together the housing correctly. Observe the permissible cable diameters and tightening torques (see the specifications of the basic unit). Insert blanking plugs or sealing inserts if necessary.

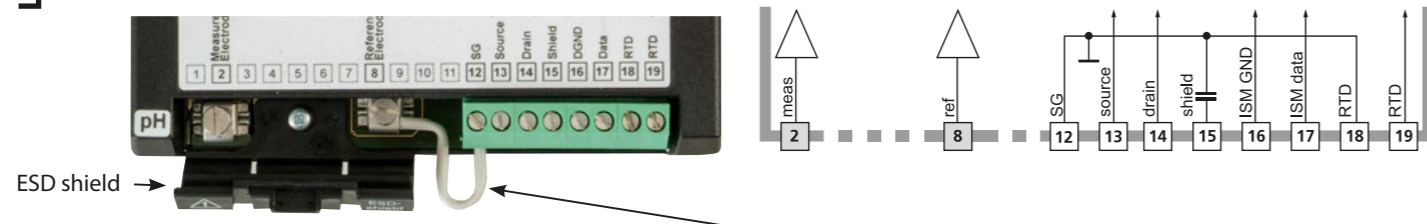
Wiring

(for detailed diagrams, see the user manual)

Note: Be sure to connect the shielding properly

	pH measurement, separate temperature probe	pH/ORP measurement, separate temperature probe	pH/ORP measurement, combination sensor with VP connection	ORP measurement	Digital sensor (ISM)
2 Meas	Coax core (pH)	Coax core (pH)	Coax core (pH)	Coax core	
8 Ref	Coax shield (pH)	Coax shield (pH)	Coax shield (pH)		
12 SG*)		Coax core (ORP)	Platinum electrode (blue)	Coax shield	
13 Source					
14 Drain					
15 Shield	Shield Temperature probe	Coax shield (ORP)/shield Temperature probe	Outer shield (yellow/green)	Shield Temperature probe	
16 ISM GND					Coax shield black
17 ISM Data					Coax core transparent
18 RTD	Temperature probe	Temperature probe	Temperature probe (green)	Temperature probe	
19 RTD	Temperature probe	Temperature probe	Temperature probe (white)	Temperature probe	

]= Insert jumper



*) **Note:** Terminal 12 (Solution Ground SG) must always be wired. Otherwise set a jumper.

Messages/Troubleshooting

(for detailed tables, see the user manual)

Error	Message (Diagnostics Menu: Message List)	Possible Causes	Remedy
	Display is blank	FRONT or BASE power supply interrupted Input fuse has tripped Display switch-off is active	Check the power supply Replace the fuse (500 mA T) Deactivate the display switch-off
	No measurement, no error message	Module not plugged in correctly	Install the module correctly Check the measurement display under "Parameter setting > Administrator level > FRONT Module"
	Sensoface ☹️	Sensor not calibrated/adjusted Glass impedance too high, sensor cable defective Glass impedance too low: Possible glass breakage on sensor, sensor cable defective	Calibrate and adjust Calibrate and adjust Check the sensor connection Clean and replace the sensor if necessary Replace the sensor cable Replace the sensor Replace the sensor cable
B073/ B078	Current I1/I2, load error	Open current output I1/I2: Current loop not closed, cable interrupted	Check the current loop Deactivate the current outputs
F232	Module configuration Ex/safe area	Ex and safe area modules have been inserted.	Select a uniform configuration (either Ex or safe area)
P010	pH range	No sensor connected, sensor cable defective, sensor connected incorrectly, wrong operating mode selected	Connect the sensor, check the sensor cable, and replace if necessary Check the sensor connection Adjust the operating mode
P015	Temperature range		
P120	Wrong sensor	Sensor does not match the selected process variable	Replace the sensor, change the process variable
P121	Sensor error	Error in factory/characteristic data, sensor is defective.	Replace the sensor

Menu Overview for the PH 3400(X)-035 Module

Parameter Setting	
Input filter	Pulse suppression
Sensor data	Select sensor type, temperature detection, Sensoface, sensor monitoring
Cal presets	Select buffer set, drift check, calibration timer, Cal tolerance band ¹⁾
TC process medium	Set the temperature compensation
ORP/rH value	Select reference electrode type, conversion to SHE, calculate rH with factor
Delta function	(Output value = measurement - delta value)
Messages	pH, ORP, rH, temperature, mV: Off, device limits max., variable limits
Devaluate ISM sensor ²⁾	

Calibration/Adjustment

- Calimatic – automatic calibration/adjustment
- Manual – entry of buffer values
- Product calibration/adjustment
- Data entry – premeasured sensors
- ORP calibration/adjustment
- Temperature probe adjustment (with Protos II 4400(X))

1) With Protos 3400(X) and add-on function SW3400-005

Maintenance	
Sensor monitor	For validation of sensor and complete signal processing
Temperature probe adjustment	(with Protos 3400(X))
Diagnostics	
Message list	List of all messages
Logbook	Shows the last 50 events with date and time
Meas. point description	Shows the tag number and annotation (input in system control)
Device description	Hardware version, serial number, (module) firmware, options
Module diagnostics	Internal function test
Sensor monitor	Shows the values currently measured by the sensor
Cal/adj record	Dates of the last adjustment/calibration
Sensor diagram	Graphic display of the current sensor parameters
Statistics	Shows the first adjustment and difference of the last 3 adjustments
Sensor wear monitor, load matrix ²⁾	

2) For ISM only

Specifications (Excerpt)

pH/ORP input	Glass electrode or ORP sensor, actuation of ISM sensors Glass electrode input Reference electrode input SG input: ORP sensor or auxiliary electrode
Explosion protection (PH 3400X-035)	For entity parameters, see attachment to certificates or control drawings.
Measuring range	pH value -2.00 ... 16.00 ORP value -2000 ... 2000 mV rH value 0.0 ... 42.5
Adm. voltage	2000 mV
ORP + pH [mV]	
Adm. cable capacitance	< 2 nF (cable length max. 20 m)
Glass electrode input ¹⁾	Input resistance > 1 x 10 ¹² Ω Input current < 1 x 10 ⁻¹² A ³⁾ Impedance range 0.5 ... 1000 MΩ
Reference electrode input ¹⁾	Input resistance > 1 x 10 ¹⁰ Ω Input current < 1 x 10 ⁻¹⁰ A ³⁾ Impedance range 0.5 ... 200 kΩ
Measurement error ^{1) 2)} (display)	pH value < 0.02 TC < 0.001 pH/K ORP value < 1 mV TC < 0.05 mV/K
Temperature input ⁴⁾	Pt 100/Pt 1000/NTC 30 kΩ/NTC 8.55 kΩ 2-wire connection, adjustable
Measuring range	-20 ... 150 °C / -4 ... 302 °F (Pt 100/Pt 1000/NTC 30 kΩ) -10 ... 130 °C / 14 ... 266 °F (NTC 8.55 kΩ, Mitsubishi)
Resolution	0.1 °C
Measurement error ^{1) 2)}	0.2 % meas. value + 0.5 K (< 1 K with NTC > 100 °C/212°F)

Temperature compensation, media-related ⁴⁾	Reference temperature 25 °C/77 °F Linear temperature coefficient, user-defined from -19.99 to 19.99 %/K Ultrapure water 0 ... 150 °C / 32 ... 302 °F Table 0 ... 95 °C / 32 ... 203 °F, user-defined in 5 K steps
Nominal zero ⁴⁾	pH 0 ... 14; calibration range ΔpH = ± 1
Nominal slope (25 °C) ⁴⁾ Vis ⁴⁾	25 ... 61 mV/pH; calibration range 80 ... 103 % -1000 ... 1000 mV
RoHS conformity	According to EU directive 2011/65/EU
EMC	EN 61326-1, EN 61326-2-3 NAMUR NE 21
Emitted interference	Industrial applications ⁵⁾ (EN 55011 Group 1 Class A)
Interference immunity	Industrial applications
Lightning protection	to EN 61000-4-5, Installation class 2
Rated operating conditions (module installed)	
Ambient temperature	Safe area: -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
Screw clamp connector	Tightening torque 0.5 ... 0.6 Nm Single or stranded wires 0.2 ... 2.5 mm ² Stripping length max. 7 mm
Wiring	Temperature resistance > 75 °C / 167 °F

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

3) At 20 °C, doubles every 10 K 4) User-definable

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