

Process Analysis Systems

Chem

Energy

Pharm

Food

Water

Protos® 3400 (X)

Specifications pH 3400 (X)-032 module

pH/ORP input***) (Ex ia IIC)	simultaneous pH and ORP measurement integrated pH isolation amplifier, coupling capacitance < 100 pF
Measuring range (MR)	pH value -2.00 ... 16.00 ORP value -2000 ... 2000 mV rH value 0.0 ... 42.5
Permissible voltage	ORP and pH [mV] 2000 mV
Permissible cable capacitance	< 2 nF
Glass electrode input ¹⁾	input resistance > 1 x 10 ¹² ohms input current ⁴⁾ < 1 x 10 ⁻¹² A impedance range 0.5 ... 1000 Mohms
Reference electrode input ¹⁾	input resistance > 1 x 10 ¹⁰ ohms input current ⁴⁾ < 1 x 10 ⁻¹⁰ A impedance range 0.5 ... 200 kohms
Measurement error ^{1,2,3)} (Display)	pH value < 0.02 TC: 0.001 pH/K ORP value < 1 mV TC: 0.05 mV/K
Temperature input (Ex ia IIC)	Pt 100 / Pt 1000 / NTC 8.55 kohms / NTC 30 kohms*) 3-wire connection, adjustable
Measuring range	-20 ... +150 °C (Pt 100 / Pt 1000 / NTC 30 kohms) -10 ... +130 °C (NTC 8.55 kohms, Mitsubishi)
Resolution	0.1 °C
Measurement error ^{1,2,3)}	0.2 % meas. val. + 0.5 K (< 1 K with NTC > 100 °C)
ORP*)	automatic conversion to standard hydrogen electrode when type of reference electrode is entered
Sensocheck®	automatic monitoring of glass and reference electrode, message can be switched off
ServiceScope®*) (SW 3400-004)	noise level monitoring of the pH input signal, representation on display
Sensoface®	provides information on the sensor condition, zero/slope, response time, calibration interval, Sensocheck®, can be switched off
Adaptive calibration timer*)	automatic adjustment of calibration interval (Sensoface® message), depending on process variables
Sensor network diagram	graphical representation of the current sensor parameters in a network diagram on the display; slope, zero, reference impedance, glass impedance, response time, calibration timer
Sensor monitor	display of primary measured values from sensor for validation pH input/ORP input/glass el. impedance/ref. el. impedance/RTD/temperature
KI recorder (SW 3400-001)	adaptive representation of process flow with monitoring and signaling of critical process parameters
Tolerance band recorder (SW 3400-005)	registers zero and slope of the electrode and the selected tolerance bands, graphical representation

Specifications pH 3400 (X)-032 module – *continued*

Sensor standardization*)	operating modes: 1-/2-/3-point calibration (best-fit line) – Calimatic® automatic buffer recognition – input of individual buffer values – stability criteria can be set – product calibration – data entry of premeasured electrodes
Drift check*) (stability criterion) interruptible	fine: 1.2 mV/min (abort after 180 sec) standard: 2.4 mV/min (abort after 120 sec) coarse: 3.75 mV/min (abort after 90 sec)
Calimatic® buffer sets*)	fixed buffer sets: Knick/Mettler Toledo: 2.00/4.01/7.00/9.21 Merck/Riedel: 2.00/4.00/7.00/9.00/12.00 DIN 19267: 1.09/4.65/6.79/9.23/12.75 NIST standard: 1.680/4.008/6.865/9.184 Techn. buffers to NIST: 1.68/4.00/7.00/10.01/12.46 Hamilton A: 2.00/4.01/7.00/9.00/11.00 Hamilton B: 2.00/4.01/6.00/9.00/11.00 Kraft: 2.00/4.00/7.00/9.00/11.00 HACH: 4.01/7.00/10.00 Ciba (94): 2.06/4.00/7.00/10.00 Reagecon: 2.00/4.00/7.00/9.00/12.00 – manually enterable buffer set with max. three buffer tables – buffer set loadable from SMARTMEDIA card (SW 3400-002)
Nom. zero*)	pH 0 ... 14, permissible span $\Delta\text{pH} = \pm 1$
Nom. slope*)	25 ... 61 mV/pH (25 °C), permissible span 80 ... 103 %
Zero adjustment	–200 ... 200 mV (for ISFET)
ORP	automatic conversion to standard hydrogen electrode SHE when type of reference electrode is entered
ORP sensor standardization (drift check)	zero adjustable from –200 ... 200 mV
V_{iso} *)	–1000 ... 1000 mV
Calibration record/statistics	recording of: zero, slope, V_{iso} , response time, calibration method with date and time of the last three calibrations and the first calibration
Temperature compensation media-related	reference temperature 25 °C – linear temperature coefficient, user-defined –19.00 ... 19.99 %/K – ultrapure water 0 ... 120 °C – table 0 ... 95 °C, user-defined in 5-K steps
Power output	for operating the ISFET adapter ZU 0582/0583 for operation of the SE 545 sensor +3 V/0.5 mA ($U_o = 2.9 \dots 3.1 \text{ V}/R_i = 360 \text{ ohms}$) –3 V/0.5 mA ($U_o = -3.5 \dots -3.0 \text{ V}/R_i = 360 \text{ ohms}$)

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Specifications pH 3400 (X)-032 module – continued

Explosion protection

IECEX: Ex ib [ia] IIC T4
 ATEX: II 2 (1) G Ex ib [ia] IIC T4
 FM: IS, Class 1, Div 1, GRP A, B, C, D, T4, Entity
 Class I, Zone 1, A Ex ib [ia], GRP IIC, T4
 CSA: NI, Class I, Div 2, GRP A, B, C, D, with IS circuits extending into Div 1
 AIS, Class I, Zone 1, Ex ib [ia] IIC T4
 NI, Class I, Zone 2, Ex nA [ia] IIC
 GOST: 1 Ex ib [ia] IIC T4
 NEPSI: Ex ib [ia] IIC T4

EMC

NAMUR NE 21 and EN 61326

Emitted interference

Class B

Immunity to interference

Industry

Lightning protection

EN 61000-4-5, Installation Class 2

Nominal operating conditions

ambient temperature: -20 ... +55 °C (hazardous areas: max 50 °C)
 relative humidity: 10 ... 95 % not condensing

Transport/Storage temperature

-20 ... +70 °C

Module enclosure

material: PC/ABS blend

Color

black

Protection

IP 20

Dimensions (mm)

w x h x d: 118 x 91 x 21

Terminals

screw clamp connection, single wires and flexible leads up to 2.5 mm²

¹⁾ to IEC 746 Part 1, at nominal operating conditions

²⁾ ± 1 count

³⁾ plus sensor error

⁴⁾ at 20 °C, doubles every 10 K

*¹⁾ user-defined

**¹⁾ pH/ORP input, ISFET supply voltage, temperature input galvanically connected, galvanically isolated up to 60 V against the other inputs, outputs, relay contacts (protective separation due to double insulation in accordance with EN 61010-1). Ex ia IIC: galvanic isolation up to 60 V.

For up-to-date information, please visit www.knick.de

Knick 

Terminal Assignments pH 3400 (X)-032 module

