**Specifications** PHU 3400 (X)-110 module

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|---|---|---|
| pH input*)<br>(Ex ia IIC) | simultaneous pH and ORP measurement with glass electrodes and<br>Unical® 9000 (X)/Uniclean® 900 (X) communication module<br>integrated pH isolation amplifier, coupling capacitance < 100 pF | |
| | input | glass electrode |
| | input | reference electrode |
| | input | (SG) solution GND or redox (ORP) electrode |
| Measuring range | pH value | –2.00 … 16.00 |
| | ORP value | –2000 … 2000 mV |
| | rH value | 0.0 … 42.5 |
| Permissible voltage | ORP + pH [mV] | 2000 mV |
| Permissible cable capacitance | < 2 nF | |
| Glass electrode input[1)] | input resistance | > 1 x $10^{12}$ ohms |
| | input current | < 1 x $10^{-12}$ A[4)] |
| | impedance range | 0.5 … 1000 Mohms |
| Reference electrode input[1)] | input resistance | > 1 x $10^{10}$ ohms |
| | input current | < 1 x $10^{-10}$ A[4)] |
| | 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*) **)<br>(Ex ia IIC) | Pt100/Pt1000/NTC 30 kohms/NTC 8.55 kohms (Mitsubishi)*)<br>2-wire connection, adjustable | |
| Measuring range | –20 … +150 °C<br>–10 … +130 °C (NTC 8.55 kohms) | |
| Resolution | 0.1 °C | |
| Measurement error[1,2,3)] | 0.2 % meas. val. + 0.5 K (< 1 K with NTC > 100 °C) | |
| Temperature compensation media-related | reference temperature 25 °C<br>– linear temperature coefficient, user-defined –19.99 … 19.99 %/K<br>– ultrapure water 0 … 150 °C<br>– table 0 … 95 °C, user-defined in 5-K steps | |
| ORP*) | automatic conversion to standard hydrogen electrode when type of reference electrode is entered | |
| ORP sensor standardization | zero adjustment –200 … 200 mV | |
| Sensor standardization pH*) | 3-point calibration (best-fit line)<br>operating modes:<br>– Calimatic® automatic buffer recognition<br>– input of individual buffer values<br>– product calibration<br>– data entry of premeasured electrodes | |

**Specifications** PHU 3400 (X)-110 module – continued

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|---|---|
| pH sensor standardization*) with Unical® | Unical® 9000 (X) program start |
| Drift check*) (stability criterion) | fine: 1.2 mV/min (abort after 180 sec)<br>standard: 2.4 mV/min (abort after 120 sec)<br>coarse: 3.75 mV/min (abort after 90 sec) |
| Calimatic® buffer sets*) | fixed buffer sets:<br>Knick/Mettler Toledo: 2.00/4.01/7.00/9.21<br>Merck/Riedel: 2.00/4.00/7.00/9.00/12.00<br>DIN 19267: 1.09/4.65/6.79/9.23/12.75<br>NIST standard: 4.006/6.865/9,180<br>Techn. buffers to NIST: 1.68/4.00/7.00/10.01/12.46<br>Hamilton A: 2.00/4.01/7.00/9.00/11.00<br>Hamilton B: 2.00/4.00/6.00/9.00/11.00<br>Kraft: 2.00/4.00/7.00/9.00/11.00<br>HACH: 4.01/7.00/10.00<br>Ciba (94): 2.06/4.00/7.00/10.00<br>Reagecon:2.00/4.00/7.00/9.00/12.00 |
| | – manually enterable buffer set with max. three buffer tables<br>– buffer set loadable from SMARTMEDIA card (SW 3400-002) |
| Nom. zero*) | pH 0 … 14, permissible calibration range ΔpH = ± 1 |
| Nom. slope (25 °C)*) | 25 … 61 mV/pH; permissible calibration range 80 … 103 % |
| $V_{iso}$*) | –1000 … 1000 mV |
| Calibration record | recording of: zero point, slope $V_{iso}$, response time, calibration process with date and time |
| Statistics | recording of: zero, slope, $V_{iso}$, response time, glass and reference impedance with date and time of the last three calibrations and the first calibration |
| Sensocheck® | automatic monitoring of glass and reference electrode, messages can be disabled |
| Sensoface® | provides information on the sensor condition: zero/slope, response time, calibration interval, Sensocheck®, can be switched off |
| Sensor network diagram | graphical representation of current sensor parameters in a network diagram on the display |
| Sensor monitor | direct display of measured values from sensor for validation<br>pH input/ORP input/glass el. impedance/ref. el. impedance/temperature, RTD |
| KI recorder (SW 3400-001) | adaptive representation of process flow with monitoring and signaling of critical process parameters |
| Adaptive calibration timer*) (SW 3400-003) | automatic adjustment of calibration interval (Sensoface® message), depending on process variables |
| Tolerance band recorder (SW 3400-005) | tolerant calibration, tolerance limits adjustable<br>graphical recording of zero point and slope of the last 40 calibrations |
| ServiceScope®*) (SW 3400-004) | monitoring the inputs for overdrive,<br>presentation on the display |
| Sensor monitoring*) adjustable (SW 3400-010) | criteria for sensor network diagram, Sensoface® and NAMUR messages individually adjustable |

**Specifications** PHU 3400 (X)-110 module – continued

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|---|---|
| RS 485**) (Ex ia IIC) | bidirectional serial interface to Unical® 9000 (X) / Uniclean® 900 (X) |
| Transfer rate | 1200 Bd for Unical® 9000 (X) (9600 Bd)<br>8 data bits / 1 stop bit / no parity |
| Monitoring | CRC16 |
| Power supply output**) (Ex ia IIC) | for operation of von Unical® 9000 (X) / Uniclean® 900 (X) |
| Operating data | 6.8 V (±10 %) / 15 mA |
| Unical® / Uniclean® control | manual, interval- and time-controlled start of calibration and rinsing programs |
| Programs | 8 programs are available<br>– 5 programs with fixed sequences, times can be changed<br>– 3 freely configurable programs |
| Diagnostics | Unical® network diagram, graphical representation of the Unical® status |
| System forecast | provides valuable information on the status of components in the retractable fitting and the Unical®/Uniclean® system |
| Maintenance | control of the individual valves and pumps with status indication |
| Explosion protection | IECEX: Ex ib [ia] IIC T4<br>ATEX: II 2 (1) G Ex ib [ia] IIC T4<br>FM: IS, Class 1, Div 1, GRP A, B, C, D, T4, Entity<br>Class I, Zone 1, A Ex ib [ia], GRP IIC, T4<br>CSA: NI, Class I, Div 2, GRP A, B, C, D, with IS circuits extending into Div 1<br>AIS, Class I, Zone 1, Ex ib [ia] IIC T4<br>NI, Class I, Zone 2, Ex nA [ia] IIC<br>GOST: 1 Ex ib [ia] IIC T4<br>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 (Ex: max. 50 °C)<br>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 |

*) user-defined
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
**) pH input, 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.

**Terminal Assignments** PHU 3400 (X)-110 module