

Stratos®e 2402 pH



Warranty
3 years!

Warranty

Defects occurring within 3 years from delivery date shall be remedied free of charge at our works (carriage and insurance paid by sender).

Display

Simultaneous display of pH value/ORP and temperature; unit symbols as plaintext. Icons supply operating messages and signal unusual operating states. Status indicators provide information on the current operating status. Eye-catching alarm signaling by red, flashing LED.

Calibration

Reliable reminder due to integrated calibration timer. Automatic electrode standardization with check of response time and drift by Knick Calimatic®. All conventional buffer sets can be selected. Alternatively, also manual calibration or direct input of zero point and slope for service purposes. Display of the electrode data after every calibration. Evaluation of the electrode status with Sensoface®.

Sensor monitoring Sensoscheck®

Maximum reliability due to continual monitoring of glass and reference electrode. Recognition of electrode defects, indication and alarm triggering.

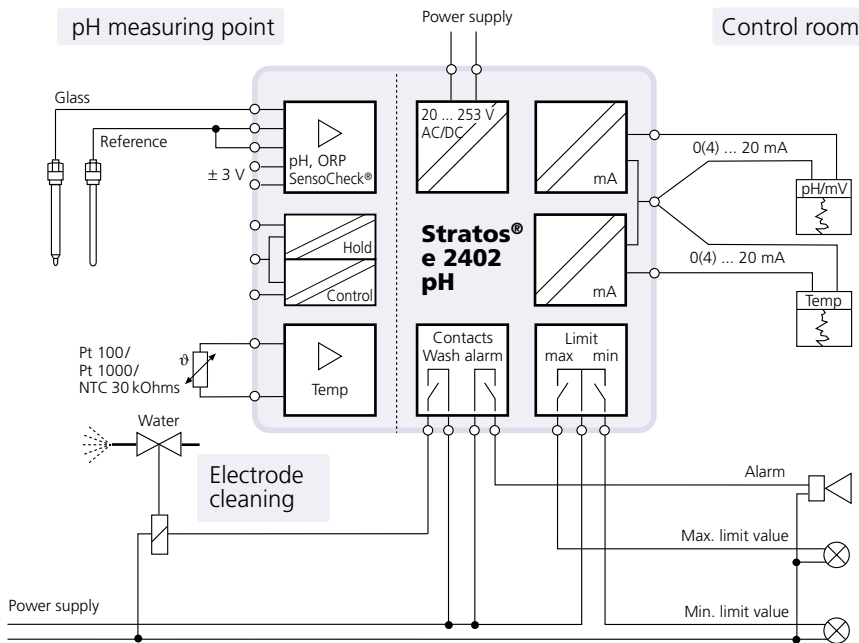
Interface

The AC/DC-VariPower® broad-range power supply 20 ... 253 V makes it internationally practical for every power supply. Measured value output via galvanically separated current output 0(4) ... 20 mA; with alarm 22 mA. Comfortable control of the peripherals through wash, alarm and limit contacts. Interval-controlled wash function.

The facts

- **Second current output for temperature measurement**
- **PID process controller via relay contacts (pulse frequency/pulse length)**
- **VariPower® power supply 20 ... 253 V AC/DC**
- **Two preset parameter sets for different applications**
- **Hold input, galvanically separated**
- **Use in hazardous areas (division 2 / zone 2 / FM, CSA)**
- **Four floating relay contacts**
- **Sensocheck® sensor monitoring**
- **Timer-controlled cleaning function**
- **Robust, tightly sealed PBT enclosure**
- **For wall, pipe/post or panel mounting**
- **Easy installation with pre-assembled enclosures**
- **Large, clear display**
- **°C/°F temperature scale**
- **Easy, intuitive operation**
- **Lightning protection**
- **Optical alarm signal by red LED**
- **Comprehensive service functions for monitoring the measuring equipment**

Connection



Product line

Stratos® e 2402 pH	Analyzer for measuring pH, ORP and temperature	Order No. 2402 pH
Mounting accessories	See Accessories chapter (page 121)	

Terminal assignment

20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1			
24 to 230 V ac/dc	wash	alarm	rel.2	rel.1	+	out 2	-	out 1	+	contr.	hold	+	3 V	3 V	aux. el.	ref. el.	meas. el.	RTD	RTD	shield		
power												output		input								
MAX. RELAY CONTACT RATING: AC < 253 V / < 3 A / < 750 VA																						
DC < 30 V / < 3 A / < 90 W, RESISTIVE																						
<small> NI, CLI, DIV2, GPA, B, C, D, T4 NI, CLI, ZN2, GPIIC, T4 ENCLASURE TYPE 2 Tamb -20 to +55 °C Control Dwg. 194.030-210 WARNING - EXPLOSION HAZARD- DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS. WARNING - BONDING BETWEEN CONDUIT IS NOT AUTOMATIC AND MUST BE PROVIDED AS PART OF THE INSTALLATION. SEE INSTALLATION INSTRUCTIONS. AVERTISSEMENT - RISQUE D'EXPLOSION- AVANT DE DECONNECTER L'EQUIPEMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DESIGNÉ NON DANGEREUX. </small>																						
00000/000000														F-2402PH								

Specifications

pH/mV input	Input for pH or ORP electrodes or ISFET																									
Measurement range	-1500 ... +1500 mV																									
Display range	pH value: -2.00 ... 16.00 ORP: -1999 ... +1999 mV																									
Glass electrode input ¹⁾	Input resistance	>0.5 x 10 ¹² Ohm																								
	Input current	<2 x 10 ⁻¹² A																								
Reference electrode input ¹⁾	Input resistance	>1 x 10 ¹⁰ Ohm																								
	Input current	<1 x 10 ⁻¹⁰ A																								
Measurement error ^{1, 2, 3)}	pH value: < 0.02	TC: 0.002 pH/K																								
	mV value: < 1 mV	TC: 0.1 mV/K																								
Sensor standardization pH^{*)}	pH calibration																									
Operating modes	BUF Calibration with Calimatic automatic buffer recognition: Buffer sets: <table border="0" style="margin-left: 20px;"> <tr> <td>-00-</td> <td>Knick</td> <td>2.00/4.01/7.00/9.21</td> </tr> <tr> <td>-01-</td> <td>Mettler-Toledo</td> <td>2.00/4.01/7.00/9.21</td> </tr> <tr> <td>-02-</td> <td>Merck/Riedel de Haen</td> <td>2.00/4.00/7.00/9.00/12.00</td> </tr> <tr> <td>-03-</td> <td>Ciba (94)</td> <td>2.06/4.00/7.00/10.00</td> </tr> <tr> <td>-04-</td> <td>NIST technical</td> <td>1.68/4.00/7.00/10.01/12.46</td> </tr> <tr> <td>-05-</td> <td>NIST standard</td> <td>1.679/4.006/6.865/9.180</td> </tr> <tr> <td>-06-</td> <td>HACH</td> <td>4.00/7.00/10.18</td> </tr> <tr> <td>-07-</td> <td>WTW technical buffers</td> <td>2.00/4.01/7.00/10.00</td> </tr> </table> MAN Manual calibration with input of individual buffer values DAT Data entry of premeasured electrodes		-00-	Knick	2.00/4.01/7.00/9.21	-01-	Mettler-Toledo	2.00/4.01/7.00/9.21	-02-	Merck/Riedel de Haen	2.00/4.00/7.00/9.00/12.00	-03-	Ciba (94)	2.06/4.00/7.00/10.00	-04-	NIST technical	1.68/4.00/7.00/10.01/12.46	-05-	NIST standard	1.679/4.006/6.865/9.180	-06-	HACH	4.00/7.00/10.18	-07-	WTW technical buffers	2.00/4.01/7.00/10.00
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Zero offset	±200 mV (for ISFET)																									
Max. calibration range	Asymmetry potential: ± 60 mV; slope: 80 ... 103 % (47.5 ... 61 mV/pH)																									
Sensor standardization ORP^{*)}	ORP calibration max. calibration range Δ: -700 ... +700 mV																									
Cal timer	0000 ... 9999 h																									
Sensocheck®	Automatic monitoring of glass and reference electrode (can be disabled)																									
Sensoface®	Provides information on the electrode condition Evaluation of zero point/slope, response time, calibration interval, Sensocheck®																									
Temperature input^{*)}	Pt100/Pt1000/NTC 30 kOhm/NTC 8.55 kOhm; 2-wire connection, adjustable																									
Measurement range	Pt 100/Pt 1000	-20.0 ... +200.0 °C (-4 ... +392 °F)																								
	NTC 30 kOhm	-20.0 ... +150.0 °C (-4 ... +302 °F)																								
	NTC 8.55 kOhm	-10.0 ... +130.0 °C (+14 ... +266 °F)																								
Adjustment range	10 K																									
Resolution	0.1 °C / 1 °F																									
Operational error ^{1, 2, 3)}	<0.5 K (<1 K with Pt100; <1K with NTC >100 °C)																									

*) User-defined
2) ± 1 count

1) According to IEC 746 part 1, at nominal operating conditions
3) Plus sensor error

Specifications, continued

Temp compensation of the process medium	Linear -19.99 ... +19.9 %/K (reference temperature 25 °C)
HOLD input	Galv. isolated (OPTO coupler)
Function	Switches device to HOLD mode
Switching voltage	0 ... 2 V (AC/DC) inactive 10 ... 30 V (AC/DC) active
CONTROL input	Galv. isolated (OPTO coupler) For controlling an automatic cleaning/calibration system
Switching voltage	Inactive 0 ... 2 V (AC/DC) Active 10 ... 30 V (AC/DC)
Output 1	0/4 ... 20 mA, max. 10 V, floating (galvanically connected to output 2)
Measured variable*)	pH or mV value
Overrange*)	22 mA with error messages
Output filter*)	PT ₁ filter, filter time constant: 0 ... 120 s
Measurement error ¹⁾	<0.3 % of current value +0.05 mA
Start/end of scale*)	Configurable within the measurement range for pH or ORP
Permissible span	pH 2.00 ... 18.00 / 200 ... 3000 mV
Output 2	0/4 ... 20 mA, max. 10 V, floating (galvanically connected to output 1)
Measured variable	Temperature
Overrange*)	22 mA with temperature error messages
Output filter*)	PT ₁ filter, filter time constant: 0 ... 120 s
Measurement error ¹⁾	<0.3% of current value +0.05 mA
Start/end of scale*)	20 ... 200 °C / -4 ... 392 °F
Permissible span	20 ... 220 K (36 ... 396 °F)
Power output	For operating an ISFET adapter +3 V / 0.5 mA, -3 V / 0.5 mA
Alarm contact	Relay contact, floating AC < 250 V / < 3 A / < 750 VA DC < 30 V / < 3 A / < 90 W
Contact response	N/C (fail-safe type)
Response delay*)	0000 ... 0600 s

*) User-defined
2) ± 1 count

1) According to IEC 746 part 1, at nominal operating conditions
3) Plus sensor error

Specifications, continued

Limit values	Output via relay contacts R1, R2 Contacts R1, R2 floating, but inter-connected
Contact ratings	AC < 250 V / < 3 A / < 750 VA DC < 30 V / < 3 A / < 90 W
Contact response*)	N/C or N/O
Response delay*)	0000 ... 9999 s
Switching points*)	Within the measurement range
Hysteresis*)	00.00 ... 05.00 pH / 0000 ... 0500 mV
PID process controller	Output via relay contacts R1, R2 (see limit values) (Relay R1 base valve, relay R2 acid valve)
Setpoint*)	pH -02.00 ... 16.00 / -1999 ... +1999 mV
Neutral zone*)	pH 00.00 ... 05.00 pH / 0000 ... 0500 mV
P-action*)	Controller gain K_p : 0010 ... 9999 %
I-action*)	Reset time T_r : 0000 ... 9999 s (0000 s = no integral action)
D-action*)	Rate time T_d : 0000 ... 9999 s (0000 s = no derivative action)
Controller type*)	Pulse length controller or pulse frequency controller
Pulse period*)	0001 ... 0600 s, min. ON time 0.5 s (pulse length controller)
Max. pulse frequency*)	0001 ... 0180 min ⁻¹ (pulse frequency controller)
Cleaning function*)	Relay contact, floating, for controlling a simple rinsing system or an automatic cleaning / calibration system
Contact ratings	AC < 250 V / < 3 A / < 750 VA DC < 30 V / < 3 A / < 90 W
Contact response*)	N/C or N/O
Rinse interval time*)	000.0 ... 999.9 h (000.0 h = cleaning function switched off)
Cleaning time*)	0000 ... 1999 s
Calibration interval*)	000.0 h ... 999.9 h
Cleaning interval*)	000.0 h ... 999.9 h
Display	LC display, 7 segment with symbols
Main display	Character height 17 mm, unit symbols 10 mm
Secondary display	Character height 10 mm, unit symbols 7 mm
Sensoface®	3 mode indicators (friendly, neutral, sad Smiley)

*) User-defined

1) According to IEC 746 part 1, at nominal operating conditions

Specifications, continued

Display	
Mode indication	5 mode indicators 'meas', 'cal', 'alarm', 'cleaning', 'config' 18 further icons for configuration and messages
Alarm indication	Red LED with alarm and HOLD, user-defined
Keypad	5 keys: [cal] [conf] [▶] [▲] [enter]
Service functions	
Current source	Current specifiable for output 1 and 2 (00.00 ... 22.00 mA)
Manual controller	Controller output entered directly (start of control process)
Device self-test	Automatic memory testing (RAM, FLASH, EEPROM)
Display test	Display of all segments
Last Error	Display of last error occurred
Sensor monitor	Display of direct, uncorrected sensor signal (electrode)
Relay test	Manual control of the four switching contacts
Parameter sets*)	Two selectable parameter sets for different applications
Data retention	Parameters and calibration data >10 years (EEPROM)
EMC	EN 61326 Emitted interference: Class B (residential area) Class A: for mains > 60 V DC Immunity to interference: Industry
Lightning protection	EN 61000-4-5, installation class 2
Protection against electrical shock	Protective separation of all extra-low voltage circuits through double insulation according to EN 61010-1
Explosion protection (USA/Canada)	FM NI, Class I, Div. 2, Groups A,B,C & D T4, T _a = 55 °C; type 2 NI, Class I, Zone 2, Group IIC T4, T _a = 55 °C; type 2 CSA Class I, Div. 2, Groups A, B, C and D, T4 Ex nA IIC T4
Power supply	24 (-15 %) ... 230 (+10 %) V AC/DC approx. 5 VA/2.5 W AC: 45 ... 65 Hz Overvoltage category II, protection class II
Nominal operating conditions	
Ambient temperature	-20 ... +55 °C
Transport/storage temp.	-20 ... +70 °C
Relative humidity	10 ... 95 % not condensing
Power supply	24 (-15 %) ... 230 (+10 %) V AC/DC
Frequency AC	45 ... 65 Hz

*) User-defined

Specifications, continued

Enclosure	Molded enclosure made of PBT (polybutylene terephthalate)
Color	Bluish gray RAL 7031
Assembly	<ul style="list-style-type: none"> – Wall mounting – Pipe mounting: Ø 40 ... 60 mm, □ 30 ... 45 mm – Panel mounting, cutout to DIN 43 700 Sealed against panel
Dimensions	H 144 mm, W 144 mm, D 105 mm
Ingress protection	IP 65/NEMA 4X
Cable glands	<ul style="list-style-type: none"> 3 breakthroughs for cable glands M20x1.5 2 breakthroughs for NPT 1/2" or Rigid Metallic Conduit
Weight	Approx. 1 kg

*) User-defined