

Laboratory Meters

pH/ORP Measurement

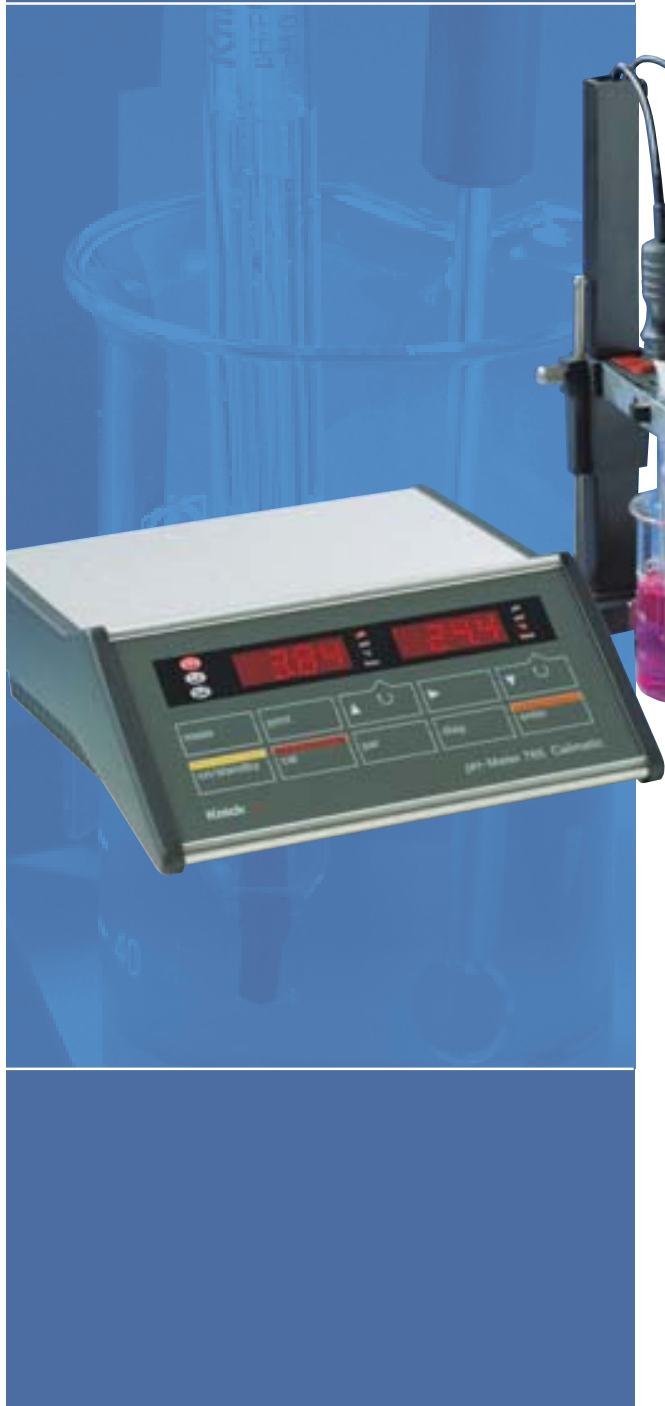
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765 Laboratory pH Meter



Quality assurance does not stop at your lab door.

To make reliable pH measurements easier than ever, Knick has equipped the Model 765 Laboratory pH Meter with an exemplary package of safety functions.

Fullcheck®

automatically checks the device functions during power-on. Also during operation, a complete instrument check can be carried out at a single keystroke. Here, also display and keypad are checked besides the electrical characteristics.

Record printouts

With record printouts of the device self-test, the calibration, and the parameter settings, it is possible (as part of quality management to ISO 9000 and GLP) to document the serviceability and the regular maintenance and calibration of the unit.

Sensoface®

checks the electrode and provides information on the electrode condition. The zero, slope, response time, and glass impedance of the electrode as well as the calibration interval are evaluated.

Calimatic®

automatically recognizes the right buffer. It allows calibration at the stroke of a key, providing ease of use and – above all – safety. You simply immerse the electrode in two buffers of the selected set, no matter which one you take first, and press the cal key. The meter automatically recognizes the buffer and calibrates itself. It does not matter which buffer solution is taken first.

Trueline®

delivers a calibrated analog recorder signal, of course electrically isolated. This provides you with a true pH signal, calibrated for the electrode and without disturbing quantizing levels, permitting undistorted recording of pH curves.

Sockets

Robust gold plated sockets are standard equipment.

EMC

EMC design protects the meter from electromagnetic interferences, ensuring reliable measurement results even under unfavorable conditions.



Numerous practical features allow comfortable and safe pH measurement.

Temperature compensation manual or automatic

Temperature compensation is either automatic with Pt 100 or Pt 1000 temperature probes or manual, as selected.



Standard RS 232 interface

Via the standard RS 232 interface your data can be immediately processed by a computer. Even direct output to a printer is no problem.

Displaymatic® for easier reading

Displaymatic® facilitates readout. If the measured signal changes rapidly, the running characters are blanked in order to allow easy reading. This allows you to read the currently measured value without problems.

Easy-to read LED display for two measured values

The large, bright LED display allows simultaneous readout of two measured values, such as pH and temperature. LED display for alphanumeric characters allows.



Double insulation provides electrical safety in wet locations

The well-designed enclosure has proved successful in practical use. A waterproof membrane keyboard and drain grooves protect the meter from moisture. The robust, stainless steel covered enclosure resists even strong mechanical stress.

The facts

- Fullcheck® automatic device test
- Records for QM documentation to ISO 9000 and GLP
- Trueline® calibrated analog recorder output, galvanically isolated
- Electrode monitoring with Sensoface® icons
- Automatic calibration with patented Calimatic®
- EMC to NAMUR
- Electrode statistics
- RS 232 interface for computer and printer
- Displaymatic®
- Two user-defined measured value displays, simultaneous
- Dead-stop operation
- Self-contained clock
- Liquid-proof membrane keypad
- Robust enclosure
- IP 54 protection
- 3-year warranty

Warranty
3 years!

*Defects occurring within 3 years from delivery date shall be remedied free of charge at our plant (carriage and insurance paid by sender).
Sensors and accessories: 1 year*

Keypad

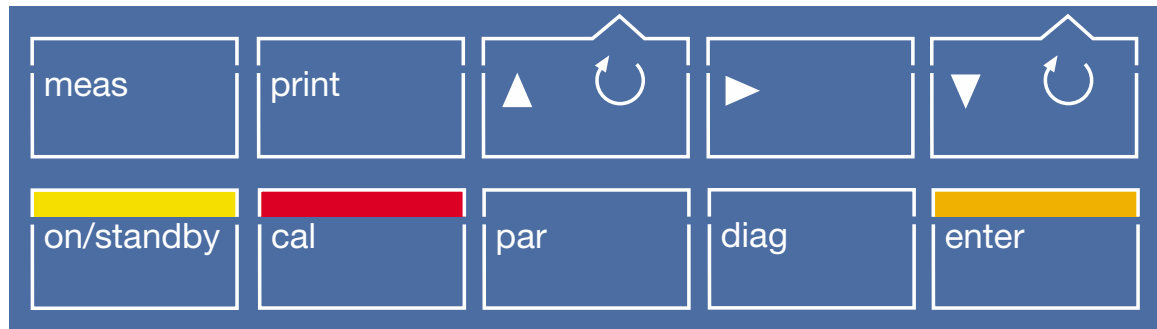
Exit function and return to measuring mode

Print currently measured values or function data

Select line, edit value or select variable

Select parameter or position

Select line, edit value or select variable



On/off (standby)

Activate calibration

Activate parameter setting

Activate diagnostics

Take over value or entry

Record printouts

Records of parameter setting, calibration, and diagnostics are particularly helpful for QM documentation to ISO 9000 and GLP.

The records can be printed out directly to any commercially available printer with a serial port at the press of a key.

```

Knick 765 Parameter Setting 15.01.03
-----
Serial Number: 81125464
Software Version: 3.3
Hardware Version: 11
Options :

Manual Temperature: 25.0CEl
Sensoface: On
Displacement: Off
Buffer Set: -01-
Cal Timer: 40h
Recorder Output: pH
Baud Rate: 4000
Data Bits/Parity: 7 Even
Protocol: On/Off
Interface: Printer
Printer Timer: 0.0min

Time: 12:00
Date: 15.01.
Year: 2003
    
```

```

Knick 765 Diagnostics 14.01.03
-----
Serial Number: 81125464
Software Version: 3.3
Hardware Version: 11
Options :

Last Fullcheck: 14.01.03 14:18

pH: -ok-
pHON: -ok-
EEPROM: -ok-
Amplifier: -ok-
Impedance: -ok-
Display: -tested-
Keyst: -ok-

Sensoface(++/oo/--)

Zero Point/Slope: ++
EL Response Time: ++
Glass Impedance: ++
Drycheck: ++
Cal Timer: ++

Electrode System Data

Zero Point: 7.00pH
Slope: 59.200V/pH

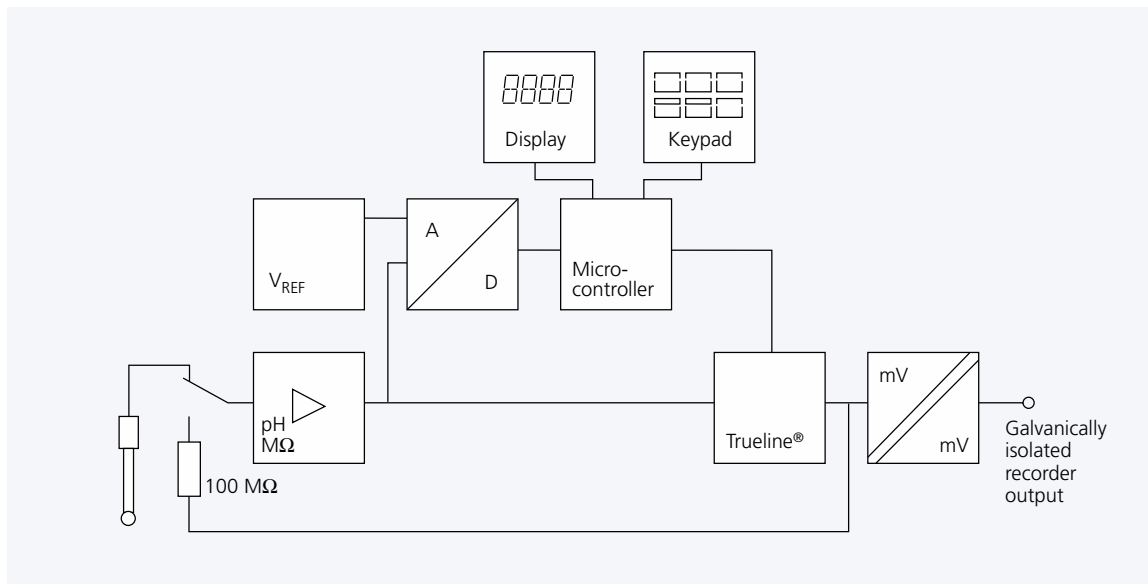
Next Calibration in 40h
    
```

Fullcheck® device self-test

For the self test, the electrode is automatically switched off and the input internally connected to the recorder output over a 100 MΩ resistor.

The microcontroller sends defined voltage steps to the recorder output. These are measured with the input amplifier and the A/D converter and compared with a highly accurate reference voltage. The 100 MΩ resistor at the same time serves as reference for the impedance measuring circuit, which thus is tested as well.

This means, a complete test of the signal path is implemented with a pH meter for the first time. In addition, all memories, the display, and the keypad are tested.



Specifications Laboratory pH Meter 765

Laboratory pH Meter 765

Equipment	Meter with power cord, without electrode
Ranges	pH: -2.00 ... +16.00 / mV: -1999 ... +1999 / °C: -50.0 ... +150.0
Display	Alphanumeric 2 x 4 digits, 14-segment LED, 13 mm high characters, measurement symbols pH/mV/°C/man, 3 Sensoface® status indicators inform on the condition of electrode and equipment (GLP) ³⁾
Measuring cycle	Approx. 1/sec
Accuracy ¹⁾	pH: < 0.01 / mV: < 0.1 % ±0.3 mV / °C: < 0.3 K
Input	DIN 19262
Input resistance	> 1 x 10 ¹² Ohm
	Input current (20 °C) ²⁾ < 1 x 10 ⁻¹² A
Temperature coefficient	< 0.1 count/K
Electrode standardization (Option 346)	Calimatic® automatic calibration and buffer recognition (German patent 29 37 227) For buffer sets, see Page 65, permitted calibration ranges: Zero: pH 6 ... 8 Slope: 47 ... 61 mV/pH (25 °C) Nominal zero / slope/V _{iso} *) Zero: pH 0 to 14 Slope: 25 ... 61 mV/pH V _{iso} : -500 ... +500 mV
Electrode monitoring	Sensoface® evaluates zero, slope, response time, and glass impedance of the electrode, as well as the calibration interval, electrode condition displayed as good / average / poor, can be disabled Cal timer monitors the calibration interval
Fullcheck® device self-test	Tests complete measurement electronics incl. analog output, segment and keypad test in diagnostics mode, automatic short-check at power-on
Records	Records of parameter setting, calibration, and diagnostics, records for QM documentation to ISO 9000 and GLP ³⁾ , retrievable in diagnostics mode or via interface (printer)
Displaymatic®	Digit suppression according to signal change, can be disabled
Temperature compensation	Pt 100/Pt 1000, automatic selection / manual: -50.0 ... +150.0 °C *)
Dead stop current	-10 µA
Recorder output *)	Galvanically isolated mV: 1 mV/mV / pH: 100 mV/pH / °C: 10 mV/°C
Interface	RS 232 without control lines, galvanically isolated, can be used either as printer or computer interface, Baud rate: 600 / 1200 / 2400 / 4800 / 9600 *) Data formats: 7 Bit, even/odd parity *) 8 Bit, no parity *) Protocol: none, xon/xoff *) Stop bits: 1
Software	Control of the Model 765 pH Meter is integrated in the automation software for lab meters "labworldsoft" (Fisher Scientific) for display and control of device functions for Version 4.0 or higher.

Specifications 765 Laboratory pH Meter, continued

Printer control	For standard printer with serial port, printing at keystroke, via print interval timer 0.1 ... 999.9 min*), or external floating contact
Clock	Real-time clock with date, self-contained
Calibration data storage	Automatic storage of calibration data, self-contained
Data retention	Parameters, statistics, and factory settings: > 10 years (EEPROM) Clock: reserve power > 1 year (battery-backed)
Electrode statistics	Storage of zero and slope of first calibration, as well as data of last 3 calibrations with time and date stamp, self-contained, output via interface to printer or computer
Protection against electrical shock	Protective separation as defined in DIN 57100/VDE 0100 Part 410 and DIN VDE 0106 Part 101, power supply against all other inputs and outputs, in accordance with the NAMUR recommendation "Extra-low voltage circuits with protective separation"
EMC directive	89/336/EEC
Standards	EN 61326 / VDE 0843 Part 20: 2002-3
Ambient temperature	0 ... +45 °C
Storage and transport temp	-20 ... +70 °C
Power supply	230 V –15 % +10 %, 48 ... 62 Hz, < 10 VA, Option 363: 115 V AC
Protection class	II
Sensor connection	The meter allows connection of any commercial electrodes with DIN plug or banana plug
Enclosure	Glass-reinforced polyamide 12, stainless steel cover, IP 54 protection, prepared for connecting ZU 6954 attachable stand
Dimensions (W x H x D)	244 x 95 x 255 mm
Weight	Approx. 2 kg

*) User defined 1) ±1 count 2) 45 °C: factor 10 3) Good Laboratory Practice

Buffer sets

Buffer set – 00 –	Knick technical buffers, nominals 25 °C: 2.00/4.01/7.00/9.21
Buffer set – 01 –	Mettler-Toledo (Ingold) technical buffers, nominal values 25 °C: 2.00/4.01/7.00/9.21
Buffer set – 02 –	Merck, Riedel, nominal values 20 °C: 2.00/4.00/7.00/9.00/12.00
Buffer set – 03 –	Technical buffer solutions to DIN 19 267, nominal values 25 °C: 1.09/3.06/4.65/6.79/9.23/12.75
Buffer set – 04 –	DIN 19 266 and NIST (NBS), nominal values 25 °C: 1.679/4.006/6.865/9.180/12.454
Buffer set – 05 –	Merck, Riedel, nominal values 20 °C: 1.00/3.00/6.00/8.00/10.00/13.00
Buffer set – 06 –	Merck, nominal values 20 °C: 4.66/6.88/9.22
Buffer set – 07 –	Ciba (94), nominal values: 2.06/4.00/7.00/10.00
Buffer set – 10 –	Mettler-Toledo (USA), nominal values 25 °C: 4.00/7.00/10.01

Specifications Accessories

Printer

Order No.: ZU 0244

Type	Matrix printer
Interface	Serial RS 232 port
Paper	Standard paper, width: 57.5 mm (2.25 inches)
Baud rate	4800 bauds
Data bits	7, 1 stop bit
Parity	Even
Protocol	No
Power supply	230 V AC $\pm 10\%$
Dimensions (W x H x D)	197 x 73 x 153 mm
Weight	Approx. 1.2 kg (incl. power pack)

Stand

Order No.: ZU 6954

Material	Pillar: anodized aluminum; carriage and base: polyamide 12 glass reinforced; Beaker stop, vertical stop, and electrode clasp: stainless steel
Carriage stroke	190 mm
Clamping possibilities Stop for sample beakers	2 x 12 ± 0.5 mm; 1 x 4 ... 14 mm; 1 x 6 ... 16 mm from $\varnothing 30$... 150 mm
Beaker height	Up to 130 mm
Dimensions (W x H x D)	130 x 300 x 145 mm
Weight	Approx. 410 g

Plug-in power pack for immersion stirrer

Order No.: ZU 6956

Power supply	230 V AC -15% $+6\%$ < 8 VA
Cable length	2 m
Weight	Approx. 380 g

Immersion stirrer

Order No.: ZU 6955

Material	Enclosure: PVC; impeller and shaft: stainless steel
Dimensions	Unit: 250 x $\varnothing 25/12$ mm; impeller: $\varnothing 12$ mm; immersion depth: approx. 90 mm
Weight	Approx. 140 g

Combination pH electrodes for lab and field units

The SE 100 and SE 103 electrodes with a glass body are combination electrodes for standard applications in the lab. The Model SE 100 has an integrated Pt 1000 temperature probe. The Model SE 103 with its high-temperature dissipation system is suitable for measurements in media up to 100 °C.

For use in rougher environments, Knick offers the SE 101 electrode with plastic body. It is also equipped with an integrated Pt 1000 temperature probe. In addition, Knick also offers the SE 104 puncture electrode. This thin, gel-filled combination electrode is particularly robust and insensitive to pollution. Therefore, it is suited especially for measurements in semi-solid substances such as meat or cheese.

Specifications Combination pH electrodes

Combination pH electrodes	SE 100	SE 101	SE 103	SE 104
Temperature probe	Pt 1000	Pt 1000	–	–
Body material	Glass	Plastic (PEEK)	Glass	Plastic (PEEK)
Body length	165 mm	110 mm	165 mm	99 mm
Body diameter	12 mm	12 mm	12 mm	6 ... 16 mm
Junction	Ceramic	2-hole junction	Ceramic	Hole junction
Electrolyte	3 mol/l KCl, refillable	Polymer	3 mol/l KCl, refillable	Polymer
pH measurement range	0 ... 14	0 ... 14	0 ... 14	2 ... 11
Temperature range	0 ... 80 °C	0 ... 80 °C	0 ... 100 °C	0 ... 80 °C
Recommended temp probe	Integrated	Integrated	ZU 6959	ZU 0156
Remarks	–	–	High-temperature dissipation system	Puncture electrode



Product line Laboratory pH meters and combination pH electrodes

		Order No.
765 Laboratory pH Meter 	Unit with power cord, without electrode	765
Set 	765 Laboratory pH Meter, SE 100 pH/Pt 1000 combination electrode, ZU 6954 attachable stand and ZU 6928 buffer set (no further optional equipment possible)	765-Set
Options		
Power supply	115 V AC	363
Electrode zero point	Nominal electrode zero point and slope user defined	346
<p>pH/Pt 1000 combination electrode</p> 	(Glass body, length 165 mm)	SE 100
<p>pH/Pt 1000 combination electrode</p> 	(Plastic body, length 110 mm)	SE 101
<p>Combination pH electrode</p> 	(Glass body, length 165 mm)	SE 103
<p>Combination pH puncture electrode</p> 	(Plastic body, length 99 mm)	SE 104

766 Laboratory pH Meter



The Laboratory pH Meter with uncompromising ease of use.

The 766 Laboratory pH Meter is designed for standard applications in everyday lab routines. It combines practical functionality and easy operation with comprehensive safety functions.

Gaincheck®

Gaincheck® performs a complete instrument check. At a keystroke, it not only checks electrical characteristics, but also display and keypad. At power-on, a short check automatically tests device functions. This ensures the device operability, as part of quality management to ISO 9000 and GLP.

Sensoface®

checks the electrode and provides information on the electrode condition. Zero point, slope, response time, and glass impedance of the electrode are evaluated.

Trueline®

delivers a calibrated analog recorder signal, of course electrically isolated. This provides you with a true pH signal, calibrated for the electrode and without disturbing quantizing levels, permitting undistorted recording of pH curves.

Calimatic®

automatically recognizes the right buffer. It allows calibration at the stroke of a key, providing ease of use and – above all – safety. You simply immerse the electrode in two buffers of the selected set, no matter which one you take first, and press the cal key. The meter automatically recognizes the buffer and calibrates itself. It does not matter which buffer solution is taken first.

EMC

EMC design protects the meter from electromagnetic interferences, ensuring reliable measurement results even under unfavorable conditions.



Easy operation with five keys

Even with its comprehensive safety functions, the Model 766 remains easy to operate. Just five keys give access to all functions you require for easy and precise routine measurements.

Temperature compensation manual or automatic

Temperature is automatically compensated. A pH/Pt 1000 electrode detects the temperature and the Model 766 automatically calculates it into the measured value. Of course, you can also measure the temperature using a separate sensor or enter it manually.

Easy-to-read LED display for pH and temperature

The large, bright 14-segment LED display for alphanumeric characters allows simultaneous readout of pH/mV and temperature.

Safe and robust enclosure

The well-designed enclosure has proved successful in practical use. A waterproof membrane keyboard and drain grooves protect the meter from moisture. The robust, stainless steel covered enclosure resists even strong mechanical stress.

The facts

- Gaincheck® automatic device test
- Trueline® calibrated analog recorder output
- Electrode monitoring with Sensoface® icons
- Automatic calibration with patented Calimatic®
- EMC to NAMUR
- Simultaneous pH and temperature display
- Easy operation
- Liquid-proof membrane keypad
- Robust enclosure
- IP 54 protection
- 3-year warranty



Warranty
3 years!

*Defects occurring within 3 years from delivery date shall be remedied free of charge at our plant (carriage and insurance paid by sender).
Sensors and accessories: 1 year*

Keypad

on/off
(standby)

Activate
calibration

Exit function
and return to
measuring mode

Activate
diagnostics

Step through or
edit value



Gaincheck® device self-test

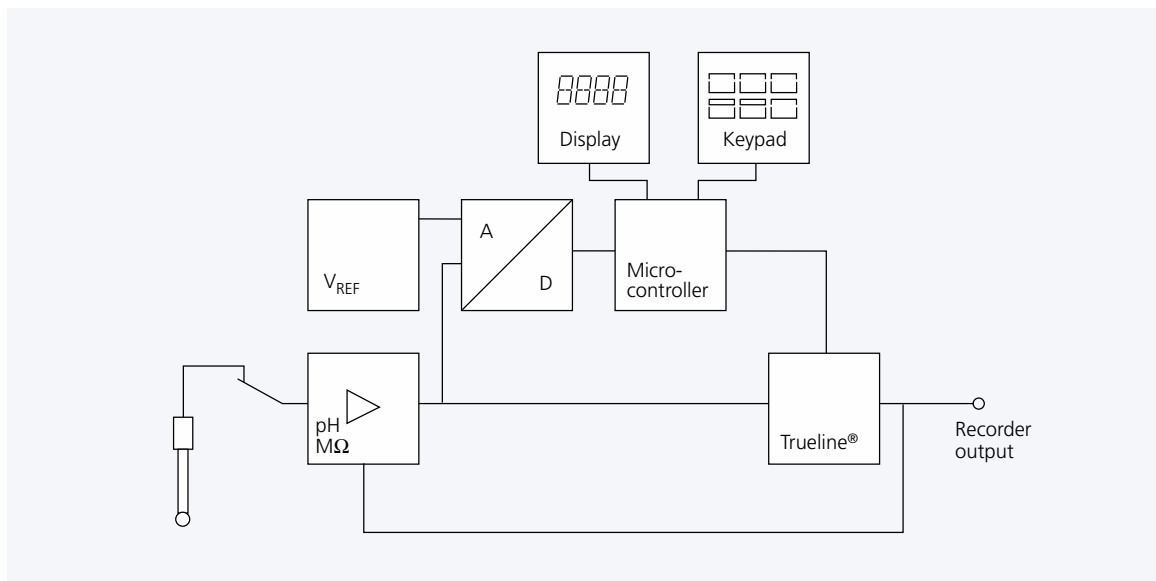
For the self test, the measuring circuit is connected to the recorder output.

The microcontroller sends defined voltage steps to the recorder output. These are measured with the measuring circuit and the A/D converter and compared with a highly accurate reference voltage.

This ensures reliable checking of the signal path. In addition, the Model 766 tests all Sensoface® criteria, all memories, the display, and the keypad.

Gaincheck® allows you to check your instrument's operability for quality management to ISO 9000 and GLP.

Gaincheck® is only available from Knick.



Specifications 766 Laboratory pH Meter

766 Laboratory pH Meter

Equipment	Meter with power cord, without electrode
Ranges	pH: -2.00 ... +16.00 mV: -1999 ... +1999 °C: -50.0 ... +150.0
Display	Alphanumeric 2 x 4 digits, 14-segment LED, character height 13 mm; Measurement symbols pH/mV/°C/man, 3 Sensoface® icons inform on the condition of electrode and measuring equipment (GLP) ³⁾
Measuring cycle	Approx. 1.5/sec
Accuracy ¹⁾	pH: < 0.01 mV: < 0.1 % ±0.3 mV °C: < 0.3 K
Input	DIN 19262
Input resistance	> 1 x 10 ¹² Ohm
Input current (20 °C) ²⁾	< 1 x 10 ⁻¹² A
Temperature coefficient	< 0.1 count/K
Electrode standardization	Calimatic® automatic calibration and buffer recognition (German patent 29 37 227), For buffer sets, see Page 76, permitted calibration ranges: Zero: pH 6 ... 8 Slope: 47 ... 61 mV/pH (25 °C)
Electrode monitoring	Sensoface® evaluates zero, slope, response time, and glass impedance of the electrode, electrode condition displayed as good / average / poor, can be disabled
Device self-test Gaincheck®	Displays all Sensoface® criteria and electrode data, tests measurement electronics including memories, measured value processing, and recorder output, checks display and keypad during diagnostics, automatic short check at power-on
Temperature compensation	Pt 1000, automatic selection Manual: 0.0 ... +100.0 °C *)
Recorder output *) Trueline®	pH-compensated, no quantizing levels mV: 1 mV/mV pH: 100 mV/pH Automatic matching to measured value setting
Calibration data storage	Automatic storage of calibration data and settings, self-contained
Data retention	> 10 years (EEPROM)
Protection against electrical shock	Protective separation of all extra-low-voltage circuits against power supply to DIN VDE 0100 Part 410 as defined in DIN VDE 0106 Part 101 and according to EN 61010 Part 1

*) User defined

2) 45 °C: factor 10

1) ±1 count

3) Good Laboratory Practice

Specifications 766 Laboratory pH Meter, continued

766 Laboratory pH Meter

EMC directive	89/336/EEC
Standards	EN 61326 VDE 0843 Part 20: 2002-3
Ambient temperature	0 ... +45 °C
Storage and transport temp	-20 ... +70 °C
Power supply	230 V -15 % +10 %, 48 ... 62 Hz, < 10 VA, Option 363: 115 V AC
Sensor connection	The meter allows connection of any commercial electrodes with DIN plug or banana plug
Enclosure	Glass-reinforced polyamide 12, stainless steel cover, IP 54 protection, prepared for connecting ZU 6954 attachable stand
Dimensions (W x H x D)	244 x 95 x 255 mm
Weight	Approx. 2 kg

Buffer sets

Buffer set -00-	Knick technical buffers, nominals 25 °C: 2.00/4.01/7.00/9.21
Buffer set -01-	Mettler-Toledo (Ingold) technical buffers, nominal values 25 °C: 2.00/4.01/7.00/9.21
Buffer set -02-	Merck, Riedel, nominal values 20 °C: 2.00/4.00/7.00/9.00/12.00
Buffer set -03-	Techn. buffer solutions to DIN 19 267, nom. values 25°C: 1.09/3.06/4.65/6.79/9.23/12.75
Buffer set -04-	DIN 19 266 and NIST (NBS), nominal values 25 °C: 1.679/4.006/6.865/9.180/12.454
Buffer set -05-	Merck, Riedel, nominal values 20 °C: 1.00/3.00/6.00/8.00/10.00/13.00
Buffer set -06-	Merck, nominal values 20 °C: 4.66/6.88/9.22
Buffer set -07-	Ciba (94), nominal values: 2.06/4.00/7.00/10.00
Buffer set -10-	Mettler-Toledo (USA), nominal values 25 °C: 4.00/7.00/10.01

Specifications Accessories

Stand

Order No.: ZU 6954

Material

Pillar: anodized aluminum; carriage and base: polyamide 12 glass reinforced;
Beaker stop, vertical stop, and electrode clasp: stainless steel

Carriage stroke

190 mm

Clamping possibilities
Stop for sample beakers

2 x 12 ± 0.5 mm; 1 x 4 ... 14 mm; 1 x 6 ... 16 mm
from Ø 30 ... 150 mm

Beaker height

Up to 130 mm

Dimensions (W x H x D)

130 x 300 x 145 mm

Weight

Approx. 410 g

Plug-in power pack for immersion stirrer

Order No.: ZU 6956

Power supply

230 V AC -15 % +6 % < 8 VA

Cable length

2 m

Weight

Approx. 380 g

Immersion stirrer

Order No.: ZU 6955

Material

Enclosure: PVC; impeller and shaft: stainless steel

Dimensions

Unit: 250 x Ø 25/12 mm; impeller: Ø 12 mm; immersion depth: approx. 90 mm

Weight

Approx. 140 g

Combination pH electrode for lab and field units

The SE 100 and SE 103 electrodes with a glass body are combination electrodes for standard applications in the lab. The Model SE 100 has an integrated Pt 1000 temperature probe. The Model SE 103 with its high-temperature dissipation system is suitable for measurements in media up to 100 °C.

For use in rougher environments, Knick offers the SE 101 electrode with plastic body. It is also equipped with an integrated Pt 1000 temperature probe. In addition, Knick also offers the SE 104 puncture electrode. This thin, gel-filled combination electrode is particularly robust and insensitive to pollution. Therefore, it is suited especially for measurements in semi-solid substances such as meat or cheese.

Product line Combination pH electrodes

Combination pH electrodes	SE 100	SE 101	SE 103	SE 104
Temperature probe	Pt 1000	Pt 1000	–	–
Body material	Glass	Plastic (PEEK)	Glass	Plastic (PEEK)
Body length	165 mm	110 mm	165 mm	99 mm
Body diameter	12 mm	12 mm	12 mm	16 mm
Junction	Ceramic	2-hole junction	Ceramic	Hole junction
Electrolyte	3 mol/l KCl, refillable	Polymer	3 mol/l KCl, refillable	Polymer
pH measurement range	0 ... 14	0 ... 14	0 ... 14	2 ... 11
Temperature range	0 ... 80 °C	0 ... 80 °C	0 ... 100 °C	0 ... 80 °C
Recommended temp probe	–	–	ZU 6959	ZU 0156
Remarks	–	–	High-temperature dissipation system	Puncture electrode

