

SentrON-Line probe series **User manual**

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1. Introduction

Congratulations! You have just purchased a quality Sentron product. By following the instructions included in this manual, you are likely to enjoy your *SentrOn-Line Probe* for a long time.

The *Sentron On-Line Probe* series are designed to be built into an on-line pH system and for general purpose applications up to 70°C. Within these series there are three different output configurations:

- voltage output
- current loop
- isolated configuration

Only the tip of the probe is waterproof, so the probe housing can NOT be immersed in liquid.

To avoid disappointment, please make sure you have selected the right member of the comprehensive SENTRON probe family.

All other members of the Sentron probe family are:

- The SENTRON Hot-Line probe series, for use in demanding applications where higher sample temperatures, up to 105°C, or contact with more aggressive chemicals are to be expected. Probe should be used with a Sentron meter.
- The SENTRON Stream-Line probe series, specially designed for low conductivity applications or highly contaminating samples, this probe features a refillable reference-liquid compartment with a constant reference liquid outlet through a large area, porous PTFE-diaphragm. The Stream-Line probes are equally resistant to temperatures and chemicals as the SENTRON Hot-Line probes. Probe should be used with a Sentron meter.
- The SENTRON *Intelliprobe* for use with conventional glass electrode pH meters.

All SENTRON pH-probes contain an Ion Sensitive Field Effect Transistor (ISFET) sensor, a silver/silverchloride – potassium chloride reference system and, except for the SentrOn-line probe, a thermistor for Automatic Temperature Compensation. The compensation for temperature is done internally for the *SentrOn-Line Probe* series.

To make sure your *SentrOn-Line Probe* can be connected to your system with the use of a cable adapter box. This box is shown at the end of this manual.

2. Cleaning tips

When the probe is not cleaned regularly, it is possible that the diaphragm will block the build-in reference electrode. In that case there will be no electrical contact between the electrode and the ISFET chip and the probe will not function.

A not bright white diaphragm is an indication for a polluted diaphragm.

The best cleaning method is as follows ("soapy water method"):

Put the tip of the probe for about 5 minutes in some water with a little soap on a constant temperature of about 60°C. If necessary, the tip of the probe can be cleaned with a toothbrush after this procedure.

Put the probe after this step in a saturated KCL solution of about 20°C. Keep the probe in this solution for about 30 minutes.

To prevent getting scratches on the chip, a toothbrush should only be used after the above described cleaning step. Most of the scratches occur when hard particles are extra rubbed with the toothbrush on the chip surface, producing irreversible damage to the probe.

If the probe is not that dirty, a simple clean with flushing water and after that cleaning with the toothbrush can be sufficient.

After cleaning, a calibration has to be done.

3. Safety

The pH-sensitive element in the SentrOn-Line probe is an ISFET semi-conductor. This sensing element needs to be driven by an electronic circuit that is built into the handle of the probe. This probe can only perform up to its specifications if connected in the right way to a meter and/or logging device. Any other combination might cause loss of performance and irreversible damage to both probe and meter and/or logging device.

The fact that SENTRON probes are ruggedly built to last, even in harsh conditions, does not mean that the probe needs no maintenance at all. Read the cleaning tips well, to ensure long lasting satisfaction.

When samples are measured that contain a lot of proteins, the frequency of cleaning should be higher.

Do not use the probe outside the specified temperature range as this might result in probe failure or irreversible damage to the probe.

Samples must be aqueous liquids or semi-solids and compatible with the probe's wetted materials. If information is required regarding the chemical resistance of the probe, please contact your local dealer.

4. Specifications of the On-Line series

The *Sentron On-Line probe* has the following general specifications:

Sensor:	Ion Sensitive Field Effect Transistor (ISFET) sensor with patented ESD protection circuit.
Operating temperature:	0 °C to 70 °C
pH range:	pH 0 to pH 14
Accuracy:	0,1 pH with 2 point calibration
Response time:	200msec < $t_{67\%}$ < 500msec.
Reference compartment:	saturated KCL-gel, non refillable
Probe material:	Tip/barrel: PEI, (Poly-ether-imide) Handle: POM
Sizes:	Tip diameter: 12 mm, -0 mm +0,2 mm Shaft length (incl. tip) 85 mm Handle diameter: 20 mm (max) Handle length: 85 mm Handle length of the isolated type: 112 mm
Allowed (static) water pressure	0 .. 3 bar
IP 67	Only tip, probe housing is not waterproof

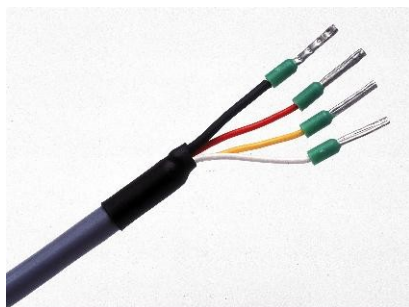
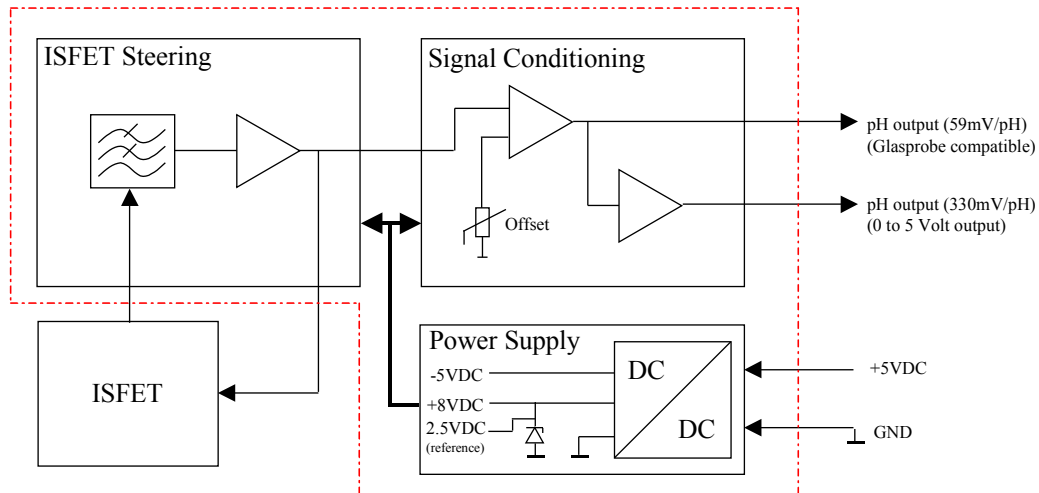
The series of On-Line probes can have the following output configurations:

Voltage output:	Supply voltage: +4.5 .. +5.5. VDC Supply current: 2 mA nominal Supply isolated: 52 mA nominal Output range (output A) -600 mV .. + 600 mV with a sensitivity of -50 ..-59 mV/pH at 25°C (glass electrode compatible output) Output range (output B) 0 mV .. +5000 mV +2700 mV output offset at pH 7, at 25°C with a sensitivity of 270 mV .. 330 mV/pH at 25°C
Current output:	Supply voltage: powered by the current loop Supply current: powered by the current loop Output range 4 – 20 mA, with a sensitivity of 0.9 .. 1.1 mA/pH at 25°C, 12 mA at pH 7

5. Overview of the different configurations

The next figures demonstrate an overview of the electronics that are integrated in the handle of the probe.

Standard configuration (8100-100)

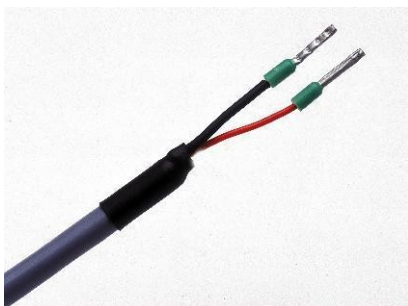


The connections of the cable are:

Red:	+5VDC
Black (Shielded wire):	GND
Yellow:	Output A
White:	Output B

Standard configuration (8100-200)

In this configuration the probe is powered by the current loop. The amount of current flowing through the loop is a value for the pH. At 25° C and in pH 7 the current that will be flowing is around 12mA.



The cable connections are:

Red:	Current loop positive pin
Black:	Current loop negative pin

6. Trouble shooting

The next list gives an overview of the problems that can occur. If your problem is not listed, please contact your dealer.

Problem	Possible reason	Action
Output signal of probe is at its maximum value	<ul style="list-style-type: none">- Probe is not in fluid- Chip is polluted- Diaphragm is polluted- Chip has scratches on its surface.	<ul style="list-style-type: none">- Put probe in fluid- Clean probe with soapy water method- Probe can not be fixed
Probe response is very slow	<ul style="list-style-type: none">- Diaphragm or chip is polluted	<ul style="list-style-type: none">- Clean probe with soapy water method
Slope of the probe is low	<ul style="list-style-type: none">- Diaphragm or chip is polluted	<ul style="list-style-type: none">- Clean probe with soapy water method
The probe signal is drifting	<ul style="list-style-type: none">- Diaphragm can be dried out- Chip can have scratches on surface	<ul style="list-style-type: none">- Soak probe for 10 minutes in saturated KCL- Probe can not be fixed
Probe gives no signal at all	<ul style="list-style-type: none">- Used wrong probe- Used wrong adapter cable- No power supply connected	<ul style="list-style-type: none">- Make sure the right probe with the right configuration is selected- Use other adapter cable- Connect right power supply

7. Accessories

To get the basic probe (8100 series) in your system, two holders are available:



The PVC Bayonet Fitting



The POM Elongated Fitting (3/4" NPT)

For the 8100 and 80xx series:

In case no power supply is available, the cable adapter box can be used. A power adapter supplies the probe and the pH signal is passed to a cable with selectable connector.



The Adapter Cable Box, available with different connectors.

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8. Warranty

This SENTRON probe is produced, packed and shipped with the utmost care. If, notwithstanding, defects do arise, be advised that this SENTRON probe is warranted to be free from defects in material and craftsmanship for the period of half a year.

SENTRON will repair or replace, at SENTRON's option, any defective part free of charge if this product fails within 6 months from the date of purchase, provided that the failure is due to defective material or lack of craftsmanship and has occurred under normal conditions of usage, to be judged by SENTRON.

SENTRON disclaims any liability to customers, to users of its products, or to any other person or persons for any special or consequential damage that might arise out of, or that might in any way be connected with, the use of this probe or its accessories.

While SENTRON provides applications assistance personally, through our website and our literature it is up to the customer to determine the suitability of the product in the application.

The warranty described in this paragraph shall be in lieu of any other warranty, expressed or implied, including but not limited to any implied warranty or merchantability or fitness for a particular purpose. The buyer's sole and exclusive remedy is for repair or replacement of defective parts as provided therein.

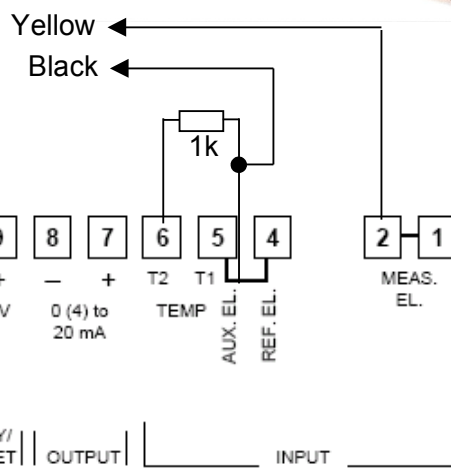
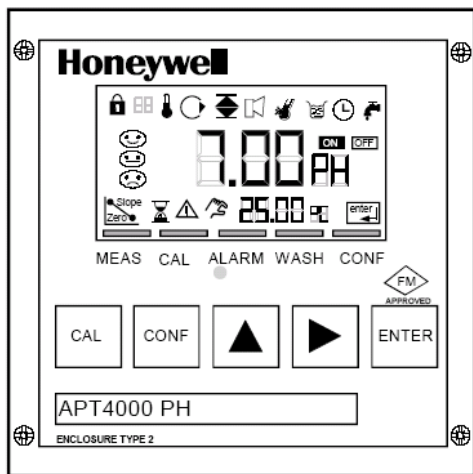
Representations and warranties made by any person, including dealers, representatives and employees of SENTRON, which are inconsistent or in conflict with the terms of this warranty, shall not be binding upon SENTRON unless in writing and signed by one of its officers.

SENTRON reserves the right to ask for proof of purchase, such as the original invoice or packing slip.

All information contained in this manual is current at the time of publication. Our commitment to product improvement requires that we reserve the right to change equipment, procedures and specifications at any time.

ATTACHEMENT 1

The Online probe connected to a Honeywell APT4000

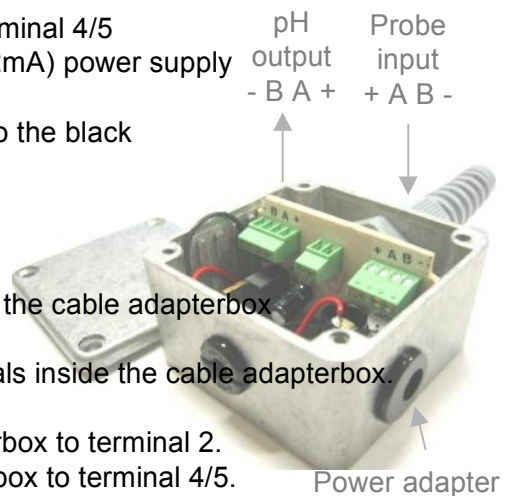


Rear terminals of the APT4000

Connecting the Online probe to Honeywell APT4000

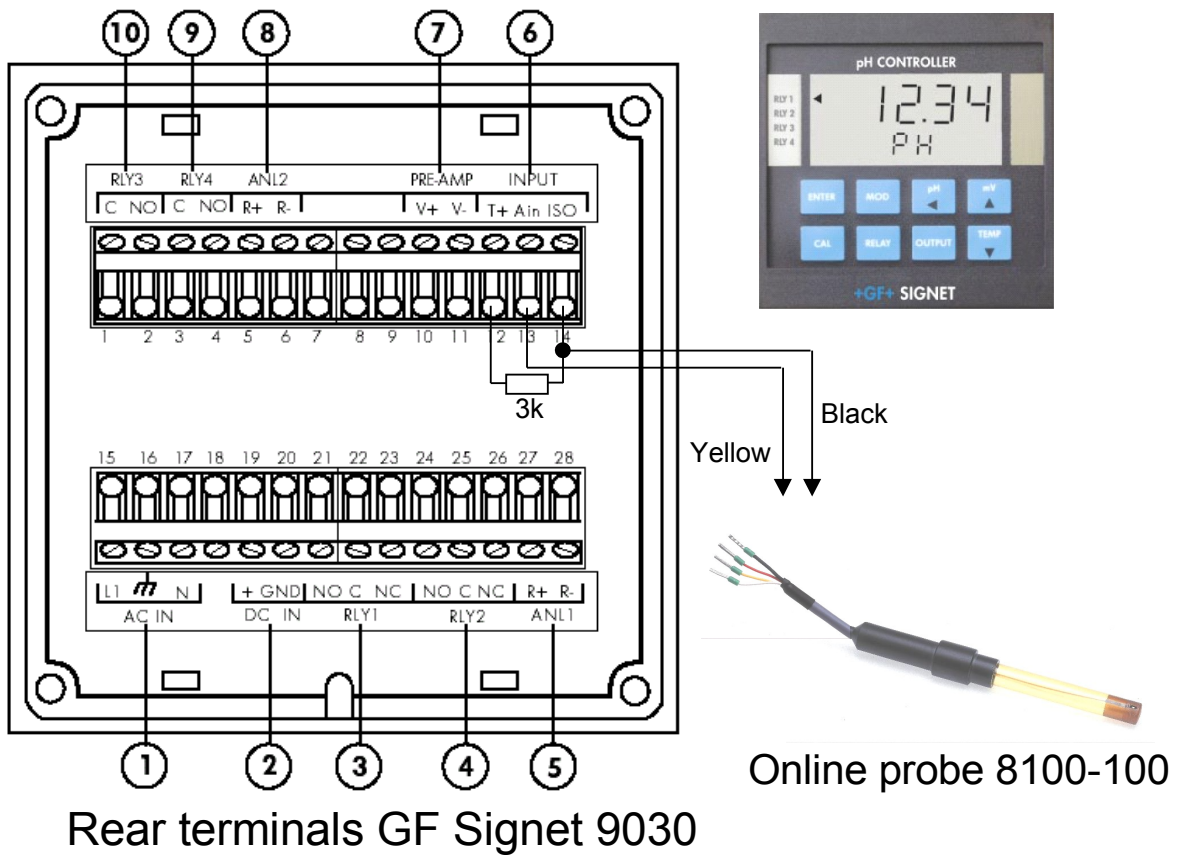
1. Open the Honeywell APT4000
2. Connect a 1k resistor between terminal 6 and 4/5
3. Connect the yellow wire of the probe to terminal 2
4. Connect the black (shield-) wire of the probe to terminal 4/5
5. Connect the positive signal of an external 5VDC (2mA) power supply to the red wire of the probe. *)
6. Connect the ground of the external 5VDC supply to the black (shield-) wire of the probe
7. Power up the APT4000
8. Perform a calibration.

- *) If no external power supply is available please use the cable adapterbox catalog number 8900-000.
 Connect the probe wires to the probe input terminals inside the cable adapterbox. (Red to +, Black to -, Yellow to A, White to B)
 Connect terminal A of the pH output of the adapterbox to terminal 2.
 Connect terminal - of the pH output of the adapterbox to terminal 4/5.
 Plug-in the supplied power adapter to the cable adapterbox.



ATTACHEMENT 2

The Online probe connected to a GF Signet 9030



Connecting the Online probe to GF Signet 9030

1. Open rear panel of GF Signet 9030
2. Connect a 3k resistor between terminal 12 and 14
3. Connect the yellow wire of the probe to terminal 13
4. Connect the black (shield-) wire of the probe to terminal 14
5. Connect the positive signal of an external 5VDC (2mA) power supply to the red wire of the probe. *)
6. Connect the ground of the external 5VDC supply to the black (shield-) wire of the probe
7. Power up the GF Signet 9030
8. Perform a calibration.

*) If no external power supply is available please use the cable adapterbox catalog number 8900-000.

Connect the probe wires to the probe input terminals inside the cable adapterbox. (Red to +, Black to -, Yellow to A, White to B)

Connect terminal A of the pH output of the adapterbox to terminal 13.

Connect terminal - of the pH output of the adapterbox to terminal 14.

Plug-in the supplied power adapter to the cable adapterbox.

