AP100
pH/Redox (ORP) cartridge sensors with water-wash option
Measurement made easy
Tough and durable sensors for on-line pH measurement

Compact 'all-in-one' cartridge design
• simplifies sensor replacement, minimizing downtime

Detachable cable option
• ensures rapid and easy installation and commissioning

'Wetted' sensor
• ready-to-go straight from the box

Low resistance 'blue-glass' version
• unique solution for cold water applications

Flow, dip, insertion and submersible systems
• satisfies a wide range of applications

Small-bore flow system
• for use on applications where only small volumes of sample are available

Stainless steel flow system option
• for use on low conductivity samples

Water-wash option
• minimizes maintenance where coating of the glass electrode is a problem

Replaceable liquid junction
• maximizes sensor life and enables replacement of the electrolyte
The cartridge

The cartridge sensing system has a proven track record in a wide range of applications. New features such as the low resistance 'blue-glass' and the small-bore flow version for low volume samples reinforces the performance and extends the applications that can be fulfilled using this versatile and well-tested system.

Manufactured in glass-coupled polypropylene, the all-in-one sensor can be supplied for flow-through, dip and submersible applications.

**Flow systems** – can be supplied with a choice of process connections and materials to meet the demands of the sample to be measured. The bayonet snap-fit enables rapid and convenient access for calibration – just twist and turn and the sensor is released for easy and quick calibration.

**Pipeline adaptor (7670/063)** – is available to enable the sensor to be inserted directly into a pipe.

**Dip systems** – available in 1, 2 and 3 m (39, 78 and 117 in) lengths for use in open channels and tanks.

**Submersible systems** – available with an integral sealed connection cable enabling the sensor to be completely submerged – ideal for boreholes or where there is a large rise and fall in the sample to be measured. Provision is made for a support chain to be attached to the system. A wide range of standard cable lengths is available.

**Water-wash options** – available for flow and dip systems where coating of the pH glass causes maintenance issues. Water-wash has proven very successful in many applications.

**Detachable cables** – an option that makes replacing the sensor a simple, easy-to-do operation. The use of IP67 plug and socket connectors ensures that problems caused by moisture ingress do not occur and enables reliable operation in the most demanding applications.
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**...The cartridge**

**Double-junction PTFE reference** – a key feature to minimize the risk of blocking of the junction and protect against poisoning of the electrolyte.

**Supplied ready-to-go** – fitted with a wetted teat to ensure the sensor is in optimum condition and requires no preconditioning prior to installing and commissioning.

**Small-bore flow systems** – ideal for applications where only small sample volumes are available (between 100 and 500 ml/minute [0.176 and 0.88 pints/minute]) for continuous analysis. These flow systems are offered in a choice of two materials, stainless steel and Delrin, both widely used on low conductivity water. Being small and compact they help to keep the panel size to a minimum when used on multi-parameter packages and are a very cost effective solution.

**Low resistance glass** – a unique glass designed particularly for cold water samples where conventional sensors perform sluggishly due to low sample temperatures (below 10 °C down to 0 °C [below 50 °F down to 32 °F]). This sensor is used extensively on potable water treatment works where the sample temperature is commonly below 10 °C (50 °F). A further benefit of the low resistance glass is improved speed of response where the sample has a low conductivity (less than 100 µS/cm and down to 20 µS/cm).

**Water-wash systems** – have proven extremely successful on potable water treatment plants where iron or manganese coat the glass electrode, increasing maintenance levels. The frequency and duration of the clean is controlled via the AX400 Analyzer and during the clean cycle the current output and alarms are frozen to prevent spurious alarms.

**Redox (ORP) sensors** – supplied in flow, dip and submersible systems, with water-wash options available for flow and dip systems. They are used widely in the treatment of waste water and, in particular, for electro-plating for the treatment of cyanide and chromate waste liquor.
Reference electrode refurbishment kit

To allow the maximum working life of the sensor to be achieved, a refurbishment kit is available (Part No. 7670/088). The kit contains a replacement PTFE liquid junction, a bottle of 3.5M KCl reference electrolyte solution and pipette, a liquid junction removal/refitting tool and all necessary O-rings.

Many sensors are replaced because the liquid junction becomes blocked due to the nature of the sample or because the electrolyte solution is exhausted. Replacing the junction and electrolyte extends sensor life and reduces the cost of ownership.
...Systems

Dip systems

Submersible systems

Cartridge with 7670-063 pipeline adaptor
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**Overall dimensions**

Dimensions in mm (in).

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Flow systems (including water-wash versions)

- **Dimension A (overall length)**
  - C763/1: 1060 mm (41.75 in)
  - C763/2: 2060 mm (81.10 in)
  - C763/3: 3060 mm (120.50 in)

Dip systems

- **Cable Anchor point for additional support**
  - (light chain or flexible cable)
  - 176 mm (6.92 in)

Submersible system

- **Dimension A (overall length)**
  - C7670-063 adaptor
  - Ø 48 (1.875)

- **7670-063 adaptor Ø 48 (1.875)**
  - 82 mm (3.23 in)
  - 60 mm (2.36 in)

- **1½ in BSP thread**

Bayonet cartridge with 7670-063 pipeline adapter

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**Note.** Allow an additional 130 mm (5.125 in) for connectors and cartridge removal.

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**Ø 48 (1.875)**

- 176 mm (7)
- 102 mm (4)
- 76 mm (3)

**Ø 48 (1.875)**

- 200 mm (7.875) see note
- 86 mm (3.375) see note

**Ø 48 (1.875)**

- 1/2 in BSPT female thread
- 1 in BSP or 1 in NPT
Specification – non water-wash version

### Flow systems

**pH range**
- 0 to 14 pH – standard glass
- 0 to 10 pH – low resistance glass

**Temperature range**
- 0 to 100 °C (32 to 212 °F) – standard glass
- 0 to 70 °C (32 to 158 °F) – low resistance glass

**Pressure**
- 0 to 100 psi at 25 °C (77 °F)

**Process connections**
- ½ in or 1 in BSP
- ½ in or 1 in NPT
- ¾ in NPT (low volume version)

**O-ring material**
- Viton

**Temperature compensation**
- 3-wire Pt100

**Material of construction**
- Glass-coupled polypropylene
- Stainless steel or Delrin (low volume version)

### Dip systems

**pH range**
- 0 to 14 pH – standard glass
- 0 to 10 pH – low resistance glass

**Temperature range**
- 0 to 100 °C (32 to 212 °F) – standard glass
- 0 to 70 °C (32 to 158 °F) – low resistance glass

**Fixing bracket**
- Not supplied

**Immersion length**
- 1 m (39 in), 2 m (78 in) or 3 m (118 in)

**O-ring material**
- Viton

**Material of construction**
- Glass-coupled polypropylene and polypropylene (dip tube)

**Temperature compensation**
- 3-wire Pt100

### Submersible systems

**pH range**
- 2 to 12 pH

**Temperature range**
- 0 to 50 °C (32 to 122 °F)

**Immersion length**
- Dependent on cable length:
  - Minimum cable length supplied 10 m (32.5 ft)
  - Maximum cable length supplied 30 m (98 ft)

**Temperature compensation**
- 3-wire Pt100

**Material of construction**
- Glass-coupled polypropylene

**Support chain**
- Not supplied
Specification – water-wash version

Flow systems
pH range
- 0 to 14 pH – standard glass
- 0 to 10 pH – low resistance glass
Temperature range
- 0 to 100 °C (32 to 212 °F) – standard glass
- 0 to 70 °C (32 to 158 °F) – low resistance glass
Pressure (flow)
0 to 60 psi at 25 °C (77 °F)
Process connections
- ½ in or 1 in BSP
- ½ in or 1 in NPT

Dip systems
Immersion length
1 m (39 in), 2 m (78 in) or 3 m (118 in)
Material of construction
Glass-coupled polypropylene and polypropylene
pH range
- 0 to 14 pH – standard glass
- 0 to 10 pH – low resistance glass
Temperature range
- 0 to 80 °C (32 to 176 °F) – standard glass
- 0 to 70 °C (32 to 158 °F) – low resistance glass
O-ring material
Viton
Water supply
Mains water
Line pressure
1 to 4 bar

Note. ABB does not supply the solenoid valve and recommends that the tubing between the valve and the sensor is ¼ in ID PVC for both dip and flow systems. The solenoid valve must be mounted as close as possible to the pH system in order to reduce pressure loss in the supply line.
# Ordering information

<table>
<thead>
<tr>
<th>AP100 pH/Redox (ORP) cartridge sensor</th>
<th>AP10</th>
<th>X/</th>
<th>X</th>
<th>XX</th>
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For cartridge sensor only no further coding options are required.

For full system continue selecting options.

<table>
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<tr>
<th>Dip type (operating temperature 0 to 80 °C (32 to 176 °F))</th>
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<td>1 m (39 in) dip + water-wash</td>
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<td>3 m (117 in) dip + water-wash</td>
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Flow sensor type (operating temperature 0 to 100 °C [32 to 212 °F])

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<td>Bayonet ½ in BSP process connection glass-coupled polypropylene</td>
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<td>Screw-in ½ in BSP process connection glass-coupled polypropylene</td>
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<td>Screw-in ½ in NPT process connection glass-coupled polypropylene</td>
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<td>Bayonet ¾ in NPT process connection stainless steel low volume</td>
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<td>Bayonet ⅔ in NPT process connection Delrin low volume</td>
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<td>Pipe-line adapter process connection ¼ in BSP (bayonet fitting)</td>
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Manual

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<td>French</td>
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<tr>
<td>Spanish</td>
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<tr>
<td>Other</td>
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</table>

* Submersible cartridge type available only with either sensor type option 1 (standard glass), 3 (low resistance glass) or 5 (redox [ORP]).

Submersible cartridge type available only with cable length of 10 m (32.5 ft) or over.
**Cartridge part number changes**

The number of options available in the cartridge series has been increased significantly. To accommodate the new models it has been necessary to restructure the part numbers as shown in the table below. The new part numbers must be used when ordering replacements.

<table>
<thead>
<tr>
<th>Old Part Number</th>
<th>Cartridge description</th>
<th>New part number</th>
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<tbody>
<tr>
<td>7670/101</td>
<td>Bayonet cartridge</td>
<td>AP101/100</td>
</tr>
<tr>
<td>7670/102</td>
<td>Screw-in cartridge</td>
<td>AP103/100</td>
</tr>
<tr>
<td>7670/301</td>
<td>Bayonet with water wash</td>
<td>AP101/200</td>
</tr>
<tr>
<td>7670/302</td>
<td>Screw-in with water wash</td>
<td>AP103/200</td>
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<tr>
<td>7670/211</td>
<td>Bayonet cartridge redox (ORP)</td>
<td>AP101/500</td>
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<tr>
<td>7670/311</td>
<td>Bayonet cartridge redox (ORP) with water wash</td>
<td>AP101/600</td>
</tr>
<tr>
<td>7670/212</td>
<td>Screw-in cartridge redox (ORP)</td>
<td>AP103/500</td>
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<td>7670/601</td>
<td>Submersible system with 15 m (48.75 ft) cable</td>
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</tr>
<tr>
<td>7670/602</td>
<td>Submersible system with 20 m (65 ft) cable</td>
<td>AP104/120</td>
</tr>
<tr>
<td>7670/603</td>
<td>Submersible system with 25 m (81.25 ft) cable</td>
<td>AP104/125</td>
</tr>
<tr>
<td>7670/604</td>
<td>Submersible system with 30 m (97.5 ft) cable</td>
<td>AP104/130</td>
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</table>