Utilizes patented, six-electrode measurement techniques to give accurate results at up to 90% cell fouling – enhanced performance and minimized maintenance

Unique cell alarm enables on-line diagnostics – assurance of integrity and performance of the system

Programmable ranges up to 400ms/cm with second current output – includes direct concentration read-out of acids and alkalis and enables retransmission of temperature

Choice of dip, insertion, flowline cells and hygienic fittings – provides installation solutions for a broad range of applications, including the food and brewing industries

Fast response temperature sensor – optimizes accuracy when rapid temperature fluctuations occur

2-year warranty – confidence in reliability

Remote range change option – enhances performance where two solutions are used for CIP

A unique conductivity measuring system with continuous on-line sensor diagnostics
4621 & 4626 Series Conductivity Analyzers
The ABB Model 4621 wall-mount and the 4626 panel-mount conductivity analyzers have been designed to work specifically with multi-electrode conductivity cells to provide reliable performance on high-level conductivity liquors, such as caustic solutions on bottle-washing plants and process lines.

The 4621 Series analyzer offers high performance and advanced functionality in a compact cost-effective package. It is rugged and reliable for safe operation in harsh environments, simple to install and use, and requires minimum maintenance.

The 4600 Series Universal Transmitter
The 4600 Series universal transmitter provides the operator interface and communications to other devices. The signal from the sensing system is converted by the transmitter and the information is presented on a large, custom designed, easy-to-read, backlit, liquid crystal display (LCD). The display units, conductivity or % concentration, are programmable.

A process retransmission signal and two alarm relay outputs are provided as standard, while an optional RS485 serial interface allows the transmitter to be easily incorporated into the ABB PC30 supervisory system.

Available in wall-mount or ¼ DIN panel-mount versions, the transmitter is protected to IP66, ensuring reliable operation in the most demanding situations. The same level of protection is maintained during programming and calibration.

User Friendly Operation
An easy-to-read display is used in conjunction with the four, tactile membrane keypads to prompt the user through the programming procedures. Range changing is particularly easy to achieve with a choice of fixed ranges for NaOH, HCl and H₂SO₄ being standard within the software capability of the instrument in addition to conductivity units.

Easy Installation, Commissioning and Maintenance
Compact panel- or wall-mount transmitters allow flexible and easy installation. The unique LCD is easy to read in all light conditions. Used in conjunction with the membrane keypad it prompts the user through the set up procedure. Range, alarm levels, set point adjustments and system calibration are easily set.

Confidence in Service
To complement the well proven design and unrivalled accuracy and reliability in service of the conductivity cells, the entire sensing loop is regularly self-monitored for short circuits and temperature element faults and most significantly, cell fouling which ensures correct performance even with 90% fouling of the cell. The transmitter can be configured to initiate an alarm when the cell requires cleaning, thereby providing continuous confidence in the loop performance.

Current Outputs
Analog outputs configured for conductivity can be set by the user as either linear or bi-linear. Selecting linear provides an output in direct proportion to the measuring range. Bi-linear enables excellent discrimination at both low and higher conductivity levels for monitoring two duties with one analyzer, for example, in product/water interface detection and CIP (Clean In Process) detergent monitoring.

![Bi-linear Output](image)

**Cell Fouling Alarm Indication**
Principle of Operation

The system utilizes a multi-electrode measuring cell whereby the current and voltage characteristics of the electrolyte are measured as separate parameters. This allows the electrode surfaces to become coated with low conductivity solute residue without impairing the operation of the measuring system.

The conductivity cell comprises six electrodes, as shown: two current electrodes (c and f), two voltage electrodes (d and e) and two screen electrodes (a and b). The two screen electrodes are connected to the measuring circuitry such that electrode b is driven at the same AC potential as electrode c by a buffer amplifier. The second screen electrode, a, is solidly connected to electrode f which is connected to earth. Maintaining the potential at electrode b equal to that of electrode c means that a current cannot flow between the two and, therefore, all the leakage current has to be supplied by a buffer amplifier external to the four electrode measuring system.

The 4600 and associated cell essentially form a constant voltage system. A current is driven through the outer pair of electrodes (c and f) and is regulated electronically to maintain a constant voltage at the inner pair of electrodes (d and e). It can be shown by a simple application of Ohm’s law that this current is directly proportional to the conductivity of that solution.

In practical terms the voltage across electrodes d and e is amplified by a high input impedance amplifier, the output of which is compared with a reference voltage. The resulting output difference signal is applied to the voltage-controlled generator and controls the output current to the outer pair of electrodes to maintain a constant voltage at the inner pair of electrodes. The output signal proportional to the conductivity is derived across a resistance connected in series with the outer electrodes. If the inner electrodes become fouled the measurement is virtually unaffected because voltage across them is measured by a very high input impedance amplifier which draws virtually no current. If the outer electrodes become fouled, the voltage across them is automatically increased to drive a current necessary to maintain a constant voltage across the inner electrodes. The system therefore continues to measure accurately until the fouling becomes so severe that the voltage-controlled generator reaches the end of its dynamic range.
Applications
With its ability to provide consistently accurate monitoring and control, under conditions which would adversely affect a standard two-terminal conductivity measuring system, the multi-electrode system can be used in many applications which would otherwise be labor-intensive, to ensure satisfactory operation. Among these applications are included:

a) Paper/pulp manufacture
b) Laundry wash
c) Oceanography
d) Paint and emulsion manufacture
e) Certain food manufacturing processes
f) Fertilizer feed control
g) Drilling mud (boreholes) etc.
h) Cement slurry
i) Industrial effluent
j) Water quality monitoring in tidal rivers, river and canal waters
k) Haemodialysate control in artificial kidney machines
l) Brewing and dairy wash plants
m) Monitoring salt water in tanker cleaning to determine presence of oil
n) Desalination plant

Schematic of Typical CIP Application
## Multi-electrode Conductivity Analyzers
### Models 4621 & 4626 SS/4621_7

## Specification - Transmitter

### Display

**Measured value**
- 5-digit x 7-segment backlit LCD

**Information**
- 16-character, single line, dot matrix, backlit LCD

### Ranges

**Conductivity Range Only - (mS/cm)**
- Measuring range programmable
  - 0 to 5mS/cm min.
  - 0 to 400mS/cm at 50°C (122°F) max.
  - 0 to 250mS/cm at 100°C (212°F) max.

**Scaling**
- Conductivity ranges configurable as linear and bi-linear

**Temperature measuring range**
- 0 to 100°C (32° to 212°F)

**Temperature compensation**
- 0 to 100°C (32° to 212°F)

**Temperature coefficient**
- 0.5 to 2.5%/°C

**Temperature sensor**
- Pt1000 resistance thermometer

**Reference temperature**
- 20 or 25°C (68° or 77°F)

### Accuracy
- ±1.0% of FSD
- Better than 1% FSD

### Sodium Hydroxide (NaOH) range only

**Measuring ranges**
- a) 0 to 8% by wt. at 0 to 50°C (32° to 122°F)
- b) 0 to 5% by wt. at 0 to 100°C (32° to 212°F)

**Accuracy**
- ±0.1% by wt.
- Better than 0.05% by wt.

### Sulfuric acid (H₂SO₄) and Hydrochloric acid (HCl) ranges only

**Measuring range**
- 0 to 6% by wt.

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

**Accuracy**
- ±0.1% by wt.
- Better than 0.05% by wt.

### Retransmission

**No. of retransmission signals**
- One fully isolated, supplied as standard
- Second fully isolated output optional

**Output current**
- 0 to 10mA, 0 to 20mA or 4 to 20mA programmable

**Output ranges**

**Retransmission 1**
- Zero 0, fixed
- Span 10 to 100% of the display range

**Retransmission 2 (optional)**
- Programmable conductivity or temperature
- Conductivity as Retransmission 1
- Temperature 0 to 100°C (32 to 212°F), min. span 20°C (36°F)

**Accuracy**
- ±0.25% FSD ±0.5% reading

**Resolution**
- 0.1% at 10mA, 0.05% at 20mA

**Max. load resistance**
- 750Ω (20mA max.)

---

### Notes

- This document provides specifications for Multi-electrode Conductivity Analyzers Models 4621 & 4626 SS/4621_7.
- The display features a 5-digit x 7-segment backlit LCD and an information screen with a 16-character, single line, dot matrix, backlit LCD.
- The conductivity ranges can be set programmably, with measuring ranges from 0 to 5mS/cm, 0 to 400mS/cm, and 0 to 250mS/cm.
- The temperature measuring range is 0 to 100°C, while the temperature compensation range is 0 to 100°C.
- The temperature coefficient is set between 0.5 to 2.5%/°C.
- The reference temperature options are 20 or 25°C.
- The accuracy is ±1.0% of FSD or better than 1% FSD.
- Sodium Hydroxide (NaOH) range is available with measuring ranges set at 8% and 5% by wt.
- Sulfuric acid (H₂SO₄) and Hydrochloric acid (HCl) ranges are also available with a measuring range of 6% by wt.
- Retransmission options include one fully isolated output as standard and a second fully isolated output as optional.
- Output currents range from 0 to 10mA, 0 to 20mA, or 4 to 20mA, with programmable output ranges.
- Accuracy for retransmission is ±0.25% FSD ±0.5% reading, with a resolution of 0.1% at 10mA and 0.05% at 20mA.
- The maximum load resistance is 750Ω for 20mA.
### Environmental Data

**Operating temperature limits**
-20°C to 55°C (−4°F to 131°F)

**Storage temperature limits**
-25°C to 55°C (-13°F to 131°F)

**Operating humidity limits**
Up to 95% RH non-condensing

### Power Supply

**Voltage requirements**
100 to 130V, 200 to 260V 50/60Hz

**Power consumption**
< 8VA AC

**Error due to power supply variation**
Less than 0.1% for +6% – 20% variation from nominal supply voltage

**Insulation**
Mains to earth (line to ground) 2kV RMS

### Outputs and Set Points

**No. of relays**
Two

**Relay contacts**
Single pole changeover
- **Rating**
  - 250V AC
  - 3A AC
- **Loading**
  - 750VA (noninductive)
  - 750VA (inductive)

**Insulation**
2kV RMS contacts to earth (ground)

**No. of set points**
Two (relay 2 programmable as cell-fouling alarm)

**Set points adjustment**
Programmable

**Set point hysteresis**
±1% of FSD (fixed)

**Local set point annunciation**
Red LED

**Remote range change facility**
Available ranges
- 0 – 10mS/cm to 0 – 100mS/cm (SP15)
- 0 – 20mS/cm to 0 – 200mS/cm (SP19)
- 0 – 25mS/cm to 0 – 250mS/cm (SP28)

### Mechanical Data

#### Model 4621
- Wall-mount, protection IP66/NEMA4X
- Dimensions: 160mm wide x 214mm high x 68mm deep (6.30 in. x 8.43 in. x 2.68 in.)
- Weight: 2kg (4½ lb)

#### Model 4626
- Panel-mount (1/4 DIN), protection IP66/NEMA4X front
- Dimensions: 96mm wide x 96mm high x 191mm deep (3.78 in. x 3.78 in. x 7.52 in.)
- Weight: 1.5kg (3¼ lb)
**Specification - Conductivity Cells**

### Dip Cells

**Process Conditions**
- Maximum temperature 100°C

**Ordering Information**
- Model 2221
  - Order under part number: 2221–6 0 5
  - Cell constant K = 1.0 6
  - Standard moulded stem: 0
  - Pt1000 temperature comp.: 5

![Dip Cell Diagram]

### Flow Cells

**Process Conditions**
- Maximum temperature 100°C
- Maximum pressure 7 bar (100lb/in²)

**Ordering Information**
- Model 2241
  - Order under part number: 2241–6 X 5
  - Cell constant K = 1.0 6
  - ½ in. BSP process conn.: 0
  - ½ in. NPT process conn.: 8
  - Pt1000 temperature comp.: 5

![Flow Cell Diagram]

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*...continued*
### Multi-electrode Conductivity Analyzers

**Models 4621 & 4626 SS/4621_7**

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### ...Specification — Conductivity Cells

#### Screw-in Cells

**Process Conditions**
- Maximum temperature 100°C
- Maximum pressure 7 bar (100lb/in²)

**Ordering Information**

**Model 2271**
- Order under part number 2271 – 6 X X
- Cell constant K = 1.0 6
- 1 in. BSP process conn. 0
- 1 in. NPT process conn. 8
- Pt1000 direct contact 6

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#### Hygienic Fitting Cells

**Process conditions**
- Maximum temperature 100°C
- Maximum pressure 7 bar (100lb/in²)

**Ordering Information**

**Model 2271**
- Order under part number 2271 – 6 X X
- Cell constant K = 1.0 6
- 2 in. Triclover fitting 2
- DIN50 Milk coupling 3
- Pt 1000 direct contact 6
Multi-electrode Conductivity Analyzers
Models 4621 & 4626

Overall Dimensions

Dimensions in mm (in.)

Model 4621 Wall-mount Version

Model 4626 Panel-mount Version
Electrical Connections

Model 4621 Wall-mount Version

Model 4626 Panel-mount Version

* Note. For SP15, SP19 and SP28 versions with Remote Range Change there is no Serial Interface option.

To connect Remote Range Change switch use terminal 4 and terminal 6 serial connections for Wall-mount versions. For Panel-mount versions use terminal 1 and terminal 4 Serial connections.
Multi-electrode Conductivity Analyzers
Models 4621 & 4626

Ordering Information

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<tr>
<th>Multi-electrode Conductivity Analyzer</th>
<th>462</th>
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<th>X</th>
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<td>Two isolated current outputs *</td>
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<td>Modbus serial data interface *</td>
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* Not available with Remote Range Change

Only for Remote Range Change facility select one of the following ranges:

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<td>0 – 10mS/cm to 0 – 100mS/cm</td>
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<tr>
<td>0 – 20mS/cm to 0 – 200mS/cm</td>
<td>SP19</td>
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<tr>
<td>0 – 25mS/cm to 0 – 250mS/cm</td>
<td>SP28</td>
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</tbody>
</table>

Conductivity Cells
Select the appropriate conductivity cell as shown on pages 7 and 8.

Connection Cable
Cell connection cable part no. 0233-820 (maximum length 100m [325 ft.]).