

- **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 1/4 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

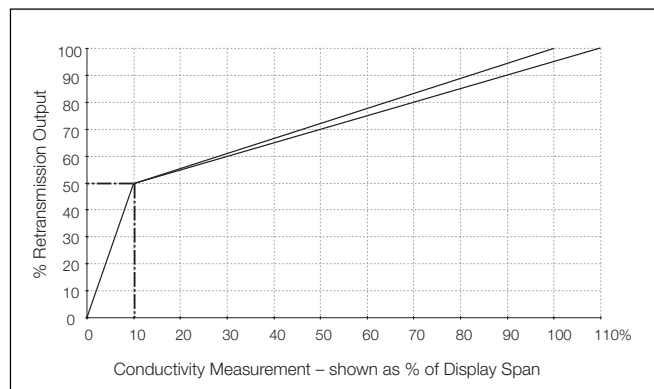
Compact panel- or wall-mount transmitters allow flexible and easy installation. The unique LCD is easy to read in all light conditions. Used in conjunction with the membrane keypad it prompts the user through the set up procedure. Range, alarm levels, set point adjustments and system calibration are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



Cell Fouling Alarm Indication

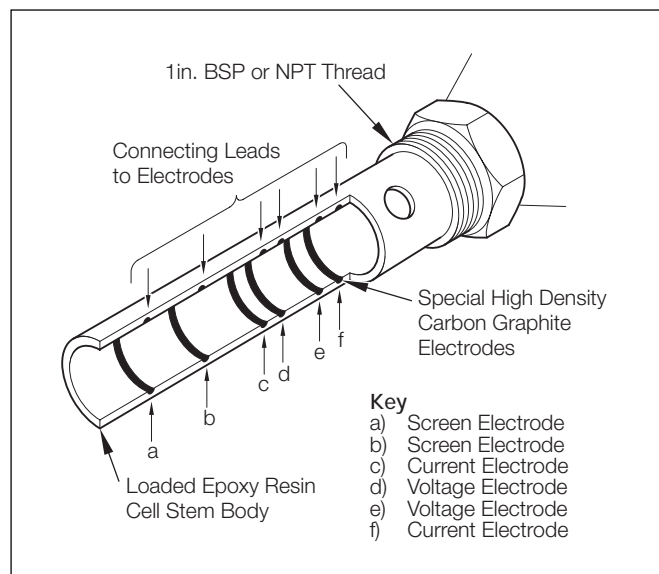
Principle of Operation

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.

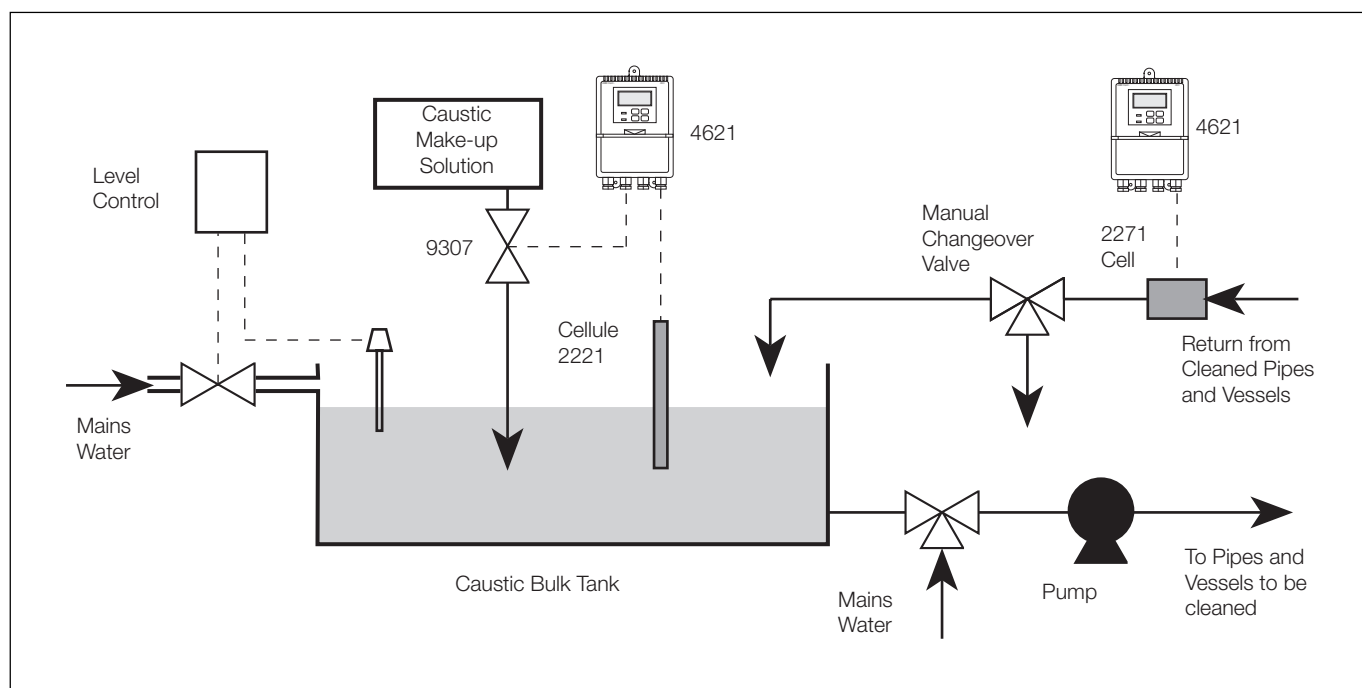


Cross-section through Multi-electrode Cell

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

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

Linearity

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.

Linearity

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.

Linearity

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.)

...Specification — Transmitter**Environmental Data****Operating temperature limits**

-20° to 55°C (-4° to 131°F)

Storage temperature limits

-25° to 55°C (-13° 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	250V DC max.
	3A AC	3A DC max.
Loading (noninductive)	750VA	30W max.
(inductive)	750VA	3W max.

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 (¼ 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

<p>Process Conditions Maximum temperature 100°C</p> <p>Ordering Information</p> <p>Model 2221</p> <p>Order under part number 2221-6 0 5</p> <p>Cell constant K = 1.0 6</p> <p>Standard moulded stem 0</p> <p>Pt1000 temperature comp. 5</p>		<p>Dimensions in mm (in.)</p> <p>Cable Length 4 to 6 m (15ft)</p> <p>Retaining 'O' Rings</p> <p>Adjustable Mounting Bracket</p> <p>736.6 (29)</p> <p>138.1 (5.437)</p> <p>28.6 (1.125) dia.</p>
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Flow Cells

<p>Process Conditions Maximum temperature 100°C Maximum pressure 7 bar (100lb/in²)</p> <p>Ordering Information</p> <p>Model 2241</p> <p>Order under part number 2241-6 X 5</p> <p>Cell constant K = 1.0 6</p> <p>1/2 in. BSP process conn. 0</p> <p>1/2 in. NPT process conn. 8</p> <p>Pt1000 temperature comp. 5</p>		<p>Dimensions in mm (in.)</p> <p>146 (5.75)</p> <p>92 (3.625)</p> <p>36.5 (1.437)</p> <p>32 (1.25)</p> <p>2 Fixing Screws 44 (1.73) Between Centres</p> <p>1/2 in. BSP Thread</p>
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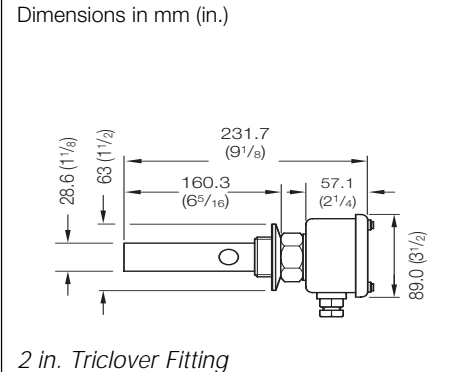
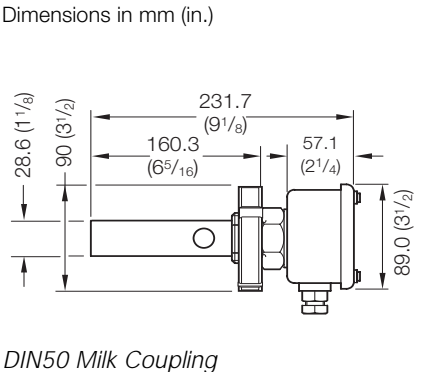
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...Specification — Conductivity Cells

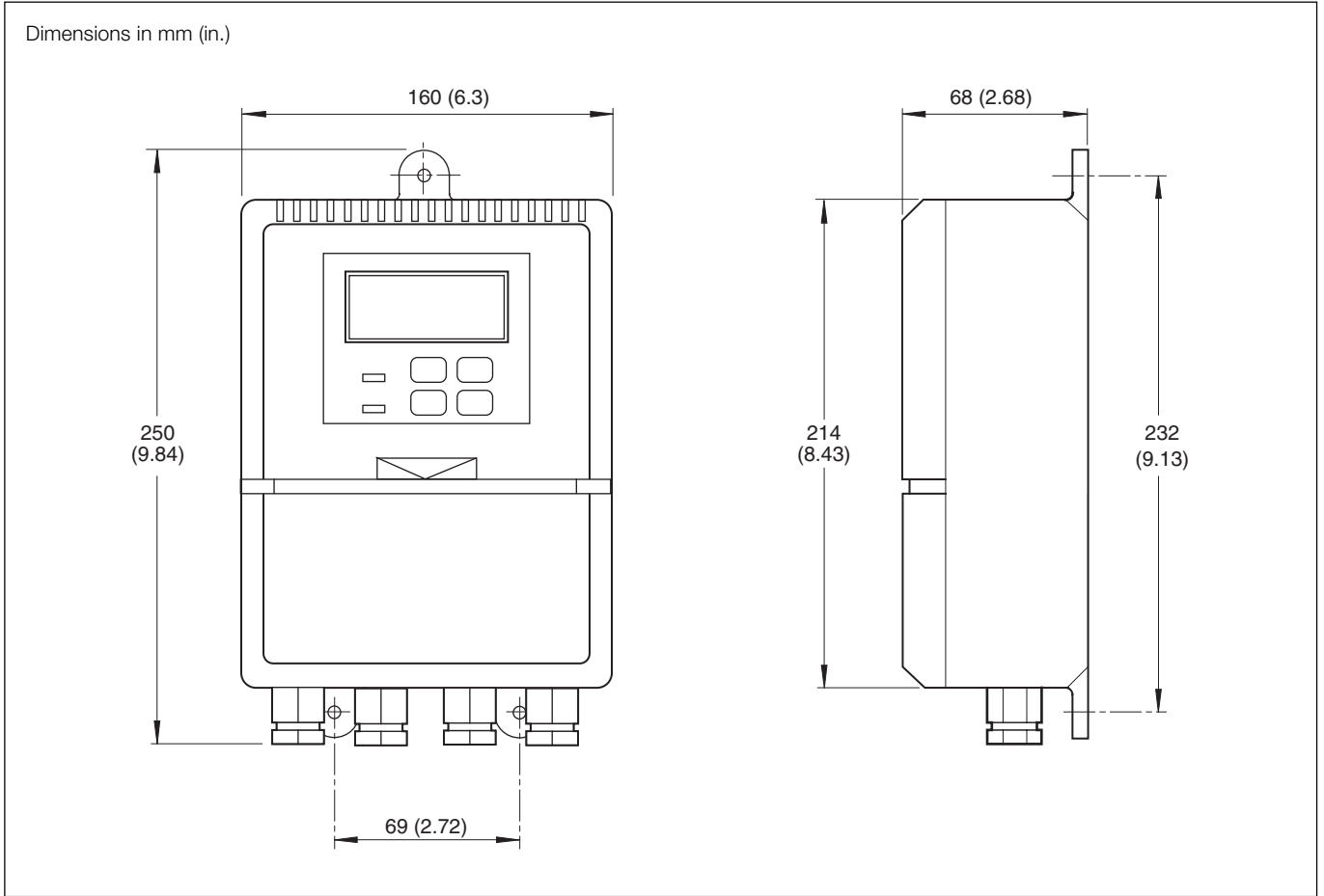
Screw-in Cells

<p>Process Conditions Maximum temperature 100°C Maximum pressure 7 bar (100lb/in²) Ordering Information</p> <p>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</p>		<p>Dimensions in mm (in.)</p> 
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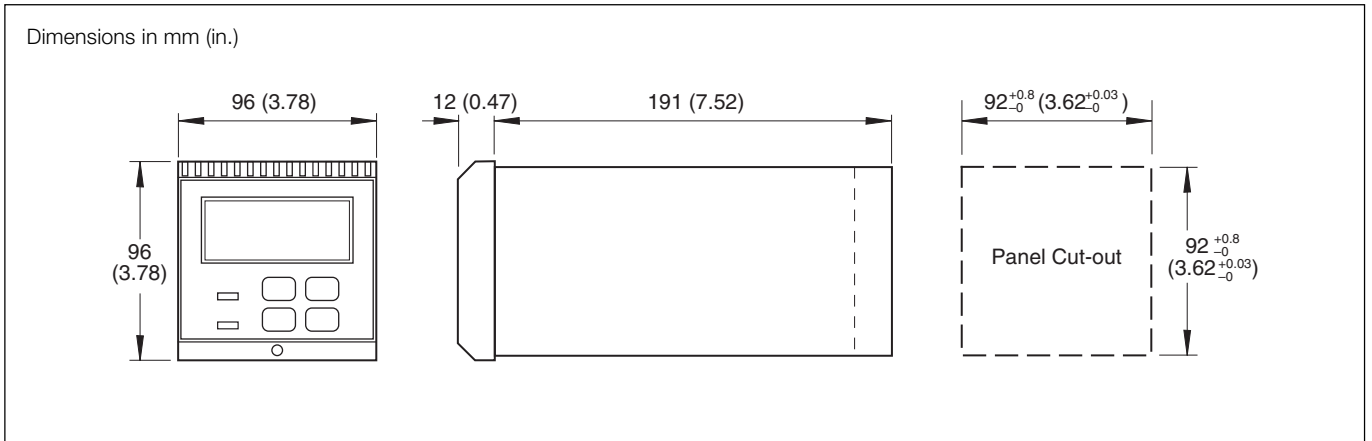
Hygienic Fitting Cells

<p>Process conditions Maximum temperature 100°C Maximum pressure 7 bar (100lb/in²) Ordering Information</p> <p>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</p>	<p>Dimensions in mm (in.)</p>  <p><i>2 in. Triclover Fitting</i></p>	<p>Dimensions in mm (in.)</p>  <p><i>DIN50 Milk Coupling</i></p>
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Overall Dimensions

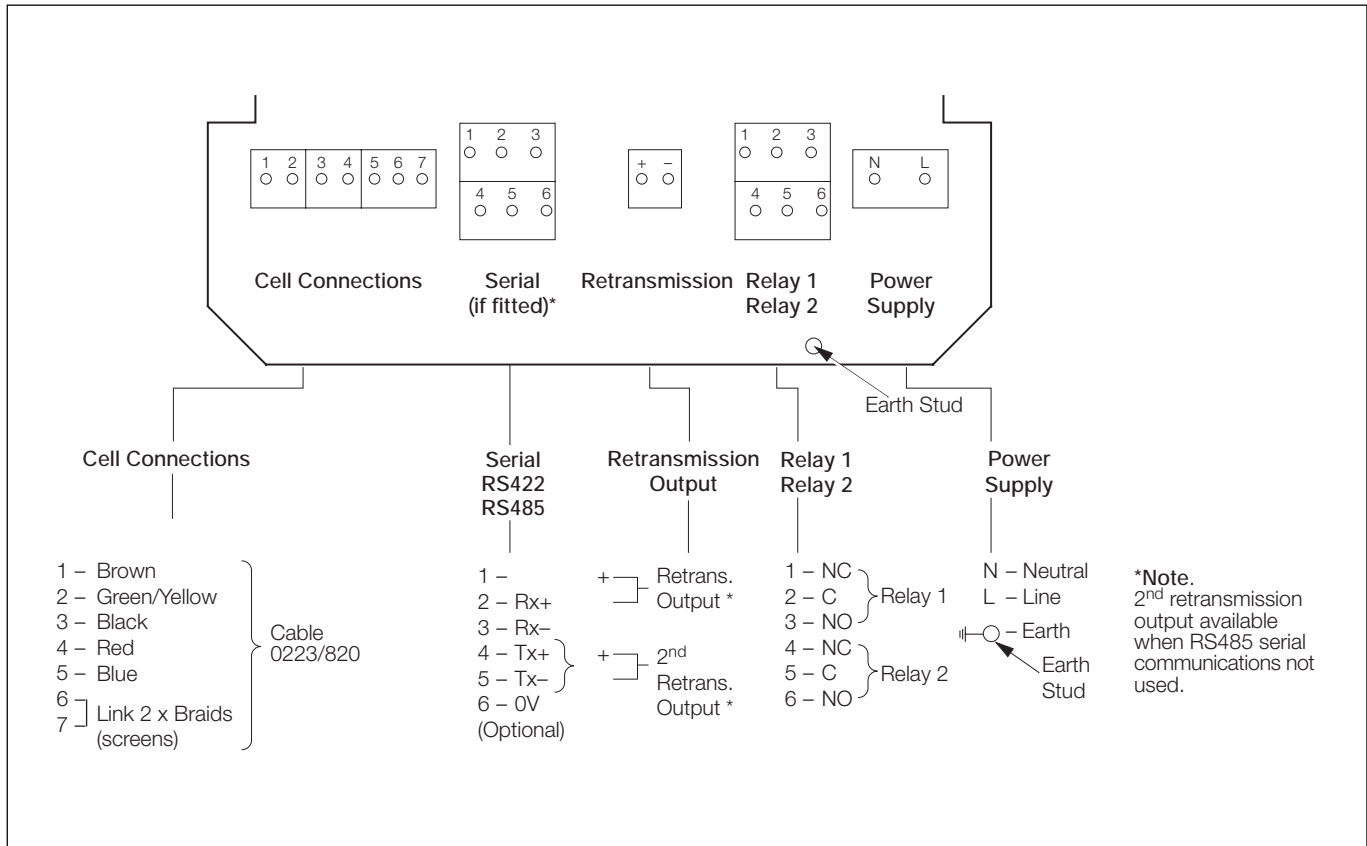


Model 4621 Wall-mount Version

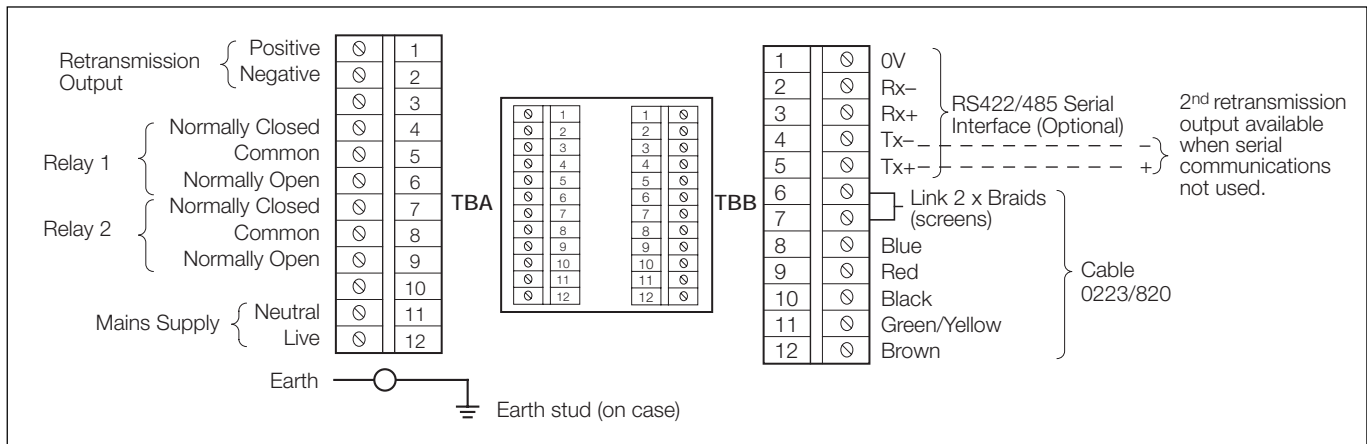


Model 4626 Panel-mount Version

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.

Ordering Information

Multi-electrode Conductivity Analyzer Power supply 110V/240V 50/60Hz, high and low alarms	462	X-	X	0	0	XXXX
Case						
Wall-mount IP66		1				
Panel-mount IP66		6				
Output						
Single isolated current output			5			
Two isolated current outputs *			8			
Modbus serial data interface *			7			
* Not available with Remote Range Change						
Only for Remote Range Change facility select one of the following ranges:						
Remote Range Change						
0 – 10mS/cm to 0 – 100mS/cm						SP15
0 – 20mS/cm to 0 – 200mS/cm						SP19
0 – 25mS/cm to 0 – 250mS/cm						SP28

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.]).

ABB has Sales & Customer Support
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