

# PEEK Inductive Conductivity Sensor TCSP 3020 Series



## USER MANUAL

**BAMO** INTERNATIONAL

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PEEK Inductive Conductivity  
Sensor

**TCSP 3020 Series**

21-08-2026

M-364.06-EN-AA

**RES**

**364-06 /1**

# SUMMARY

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## 1. MEASUREMENT PRINCIPLE

### Inductive conductivity measurement

In inductive conductivity measurement, a transmitter coil (1) generates an alternating magnetic field in the liquid. This field induces electrical currents in the conductive liquid, the intensity of which depends on the ion concentration. These induced currents in turn generate a second magnetic field, which is detected by the receiver coil (2), in which a voltage is induced. This signal is then measured and used to determine the conductivity of the liquid.

### In other words, in a purely electronic circuit:

Coil (1) is supplied with a constant alternating voltage.  
The liquid acts as the secondary winding of coil (1) and as the primary winding of coil (2).  
The current induced in coil (2) is proportional to the conductivity of the liquid.

### Cell constant and installation factor:

The electrical conductivity of the liquid mainly depends on the ion concentration. During measurement, the installation and geometry of the sensor must also be taken into account. Strictly speaking, there is no cell coefficient. All our cells and BAMOPHAR units are calibrated to operate without recalibration. The installation factor is negligible when the distance from the wall is sufficient ( $a > 30$  mm). For smaller distances, this factor increases in the case of electrically insulating pipes and decreases when the pipes are conductive.

It is recommended to avoid any installation that does not comply with this minimum distance of 30 mm.

This means the sensor must be installed:

- a) either in the supplied DN50 tees
  - b) or at the end of an immersion tube, provided that the sensor is at least 30 mm away from any wall
- Any other configuration is prohibited.

## 2. APPLICATIONS

The TCSP 3020 sensor is mainly designed for applications requiring high chemical or temperature resistance:

- Monitoring at wastewater treatment plant outlets
- Acid and base concentration measurement
- Industrial process fluids: CIP/SIP solutions
- Industrial hot water circuits
- NaOH concentration measurement (0 to 10%)

## 3. DESCRIPTION

The TCSP 3020 sensor enables conductivity measurement over a range from 10  $\mu$ S/cm to 2000 mS/cm.

It operates according to an inductive (toroidal) measurement principle, ensuring complete galvanic isolation between the measurement electronics and the fluid. This technology ensures reliable measurement, even with fouling, corrosive or highly loaded fluids.

The sensor body is made of PEEK (unfilled polyether ether ketone), providing excellent chemical resistance as well as good thermal stability.

### Installation

- Immersion: installation at the end of a 500 to 2000 mm immersion tube, with optional flange mounting
- In-line: installation in a DN50 tee on the pipeline

### Measurement system

A complete measurement system includes:

- One TCSP 3020 inductive conductivity sensor
- One mounting system for immersion or in-line installation
- One BAMOPHAR 364 type display
- One factory-calibrated measurement converter associated with the BAMOPHAR

### Display

The BAMOPHAR 364 is dedicated to inductive sensors.

The programmable ranges are:

- 0- 2 mS /cm
- 0- 20 mS/cm
- 0- 200 mS /cm
- 0- 2000 mS /cm

Temperature compensation is provided via the integrated PT100 sensor, with a 4–20 mA output representing the measurement. Calibration is performed at the factory to ensure simple and quick commissioning on site.



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## 4. TECHNICAL FEATURES

|                    |                                              |
|--------------------|----------------------------------------------|
| Measuring range    | 0... 2,000,000 $\mu$ S/cm (0 ... 2000 mS/cm) |
| Body material      | PEEK (polyether ether ketone)                |
| Connection         | 3/4" MNPT                                    |
| Temperature        | Maximum 125 °C                               |
| Pressure           | Maximum 20 bar                               |
| Temperature sensor | Integrated Pt100                             |
| Cable length       | 5 metres as standard (overmoulded)           |

## 5. INSTALLATION

Make sure that the central opening does not act as an air bubble trap.

### Mounting position:

- During installation, orient the sensor so that the product flows through the sensor opening in the direction of product flow.
- or
- Position the sensor at an angle when immersing it in a stagnant fluid.

**Caution: For immersion or flow-through installation, the sensor head must be fully immersed in the product.**

### Installation recommendations

- The IP68 protection rating only guarantees the watertightness of the sensor under the conditions defined by the standard.
- Never suspend the sensor by its cable.
- The sensor must be mounted on an immersion tube or directly on the pipeline, in accordance with the manufacturer's recommendations.
- Failure to comply with these instructions may result in mechanical damage to the sensor and compromise measurement reliability.

### CAUTION

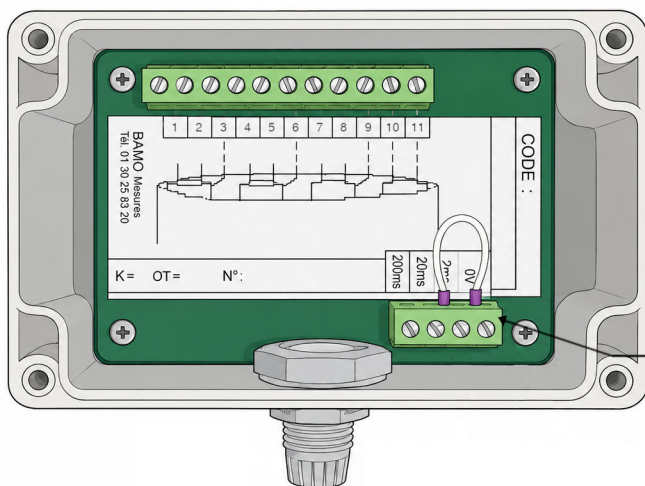
Each TOR sensor is factory-configured with its BAMOPHAR.

In the case of multiple installations, it is essential to match each sensor with the corresponding BAMOPHAR by identifying them using the serial number.

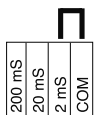
Example: If a BAMOPHAR has serial number 21285-02, the sensor associated with it must have the same serial number followed by an alphabetical character, i.e. 21285-02A.

## 6. ELECTRICAL CONNECTION

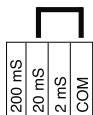
### 6.1 Range selection



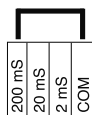
**Selector**  
Ranges:  
0-2 mS  
0-20 mS  
0-200 mS  
0-2000 mS



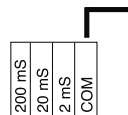
Plage 0-2 mS



Plage 0-20 mS



Plage 0-200 mS



Plage 0-2000 mS

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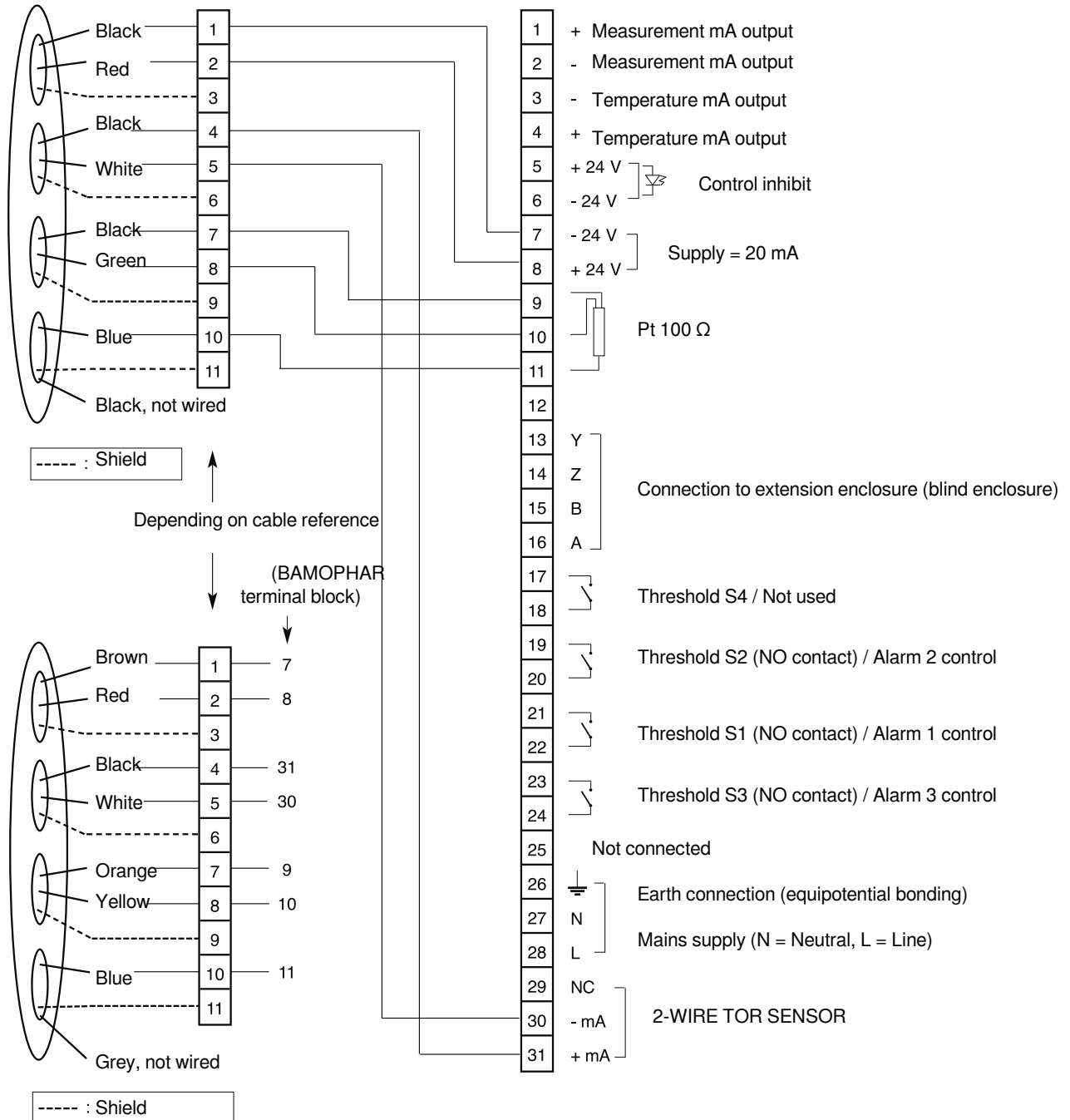
RES

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## 6.2 Connection with 230 V AC BAMOPHAR model

Converter terminal block (sensor side)

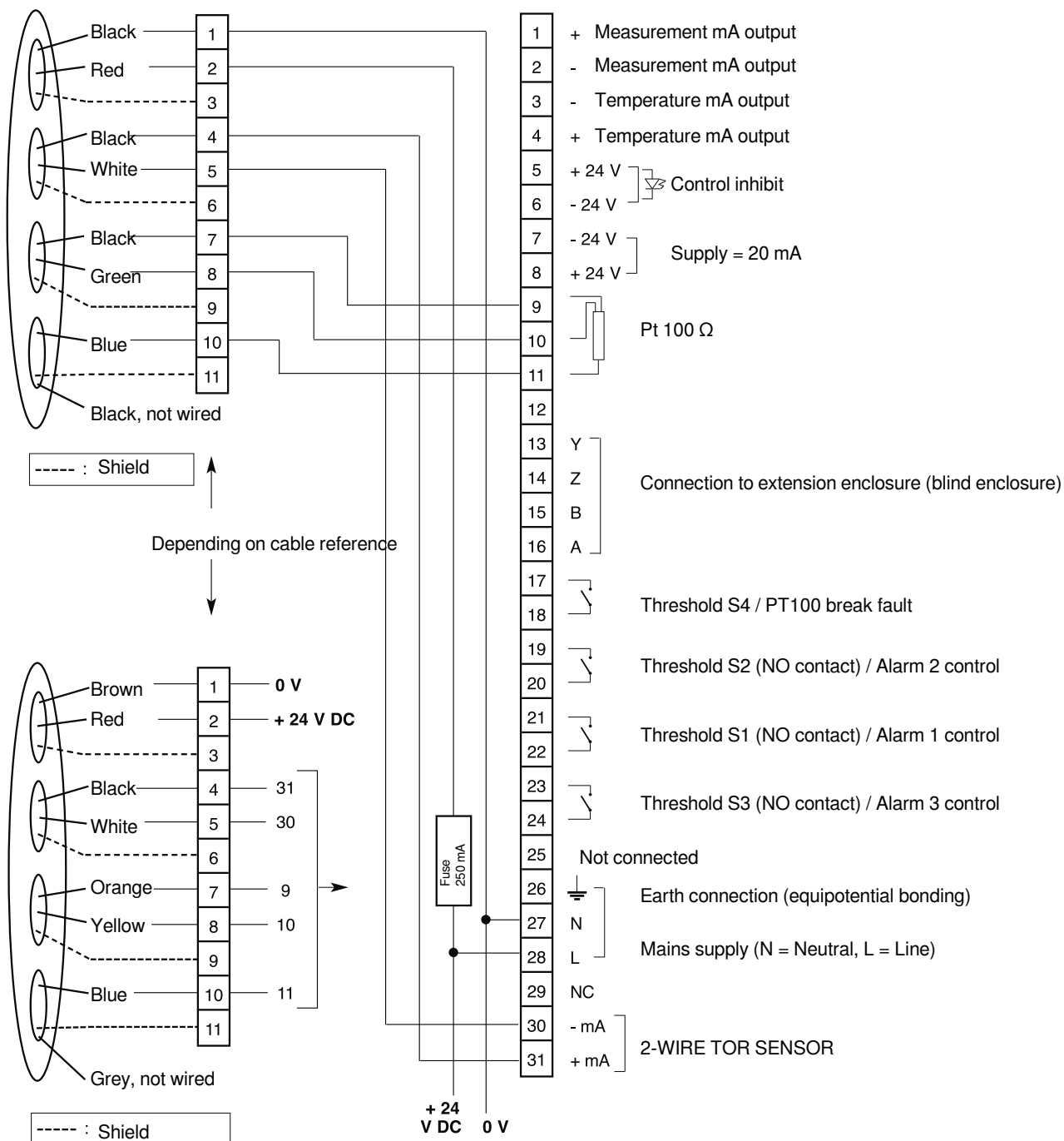
BAMOPHAR terminal block



### 6.3 Connection with 24 V DC BAMOPHAR model

#### Converter terminal block (sensor side)

#### BAMOPHAR terminal block



## 7. MAINTENANCE

The only maintenance required is to check that the sensor opening is not obstructed.

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