

# VIRA

## BD 5400 Conductivity Probe

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### Installation, Operating and Maintenance Instructions

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Local regulations may restrict the use of this product to below the conditions quoted.  
In the interests of development and improvement of the product, we reserve the right to change  
the specification without notice.

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## 1. Safety Notes

The product is designed and constructed to withstand the forces encountered during normal use. Use of the product for any other purpose, or failure to install the product in accordance with these Installation and Maintenance Instructions, could cause damage to the product and may cause injury or fatality to personnel.

BD 5400 Conductivity probe and the BK 5000-T conductivity controller comply with the requirements of the pressure equipment directive and carry the CE mark.

If this product is not used in the manner specified by this user manual, then the protection provided may be impaired.

### 1.1 Intended Use

The conductivity probe BD 5400 is designed for use in conjunction with the Vira conductivity controller BK 5000-T. The conductivity probe BD 5400 is designed to measure conductivity of water, usually in steam boilers for purpose of monitoring and controlling blowdown.

Use this installation and operating instructions and the technical data sheet to check whether the device is suitable for the intended use/application. The device complies with the European Pressure Equipment Directive 2014/68/EU requirements.

The maximum values of the pressure and temperature range of the device must be checked before installation. If the maximum allowable operating values of the device are lower than those of the system on which it is to be installed, protective instruments for the device, such as pressure reducers or similar, must be provided to avoid limit situations.

Vira products are not designed to withstand the external stresses they may be exposed to in any system in which they are installed. It is the installer's responsibility to consider these stresses and take adequate measures to minimize them.

The operator of the facility is obliged to familiarise himself with the compatibility of the medium and the device. In case of doubt, contact the relevant installation manager or site manager. The correct installation position, alignment and flow direction of the device must be observed! Before installing the VIRA product on boilers or vessels, it is essential to remove all protective covers.

Safe operation of this product can only be guaranteed if these conditions are satisfied. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment, must also be complied with.

**Danger!**



When loosening the conductivity electrode steam or hot water might escape. This presents the danger of severe scalds to the whole body.  
 Do NOT remove the level probe unless the boiler pressure is verified to be 0 bar. The level switch becomes hot during operation.  
 Risk of severe burns to face, hands and arms.  
 Before carrying out installation and maintenance work make sure that the equipment is cold.



**Tools**

Before starting work, make sure that you have suitable tools and consumables available. Use only genuine Vira replacement parts.



**Temperature**

After isolation, let the temperature to cool down to avoid danger of burns.



**Freezing**

Required precautions must be taken to protect products in environments where they may be exposed to temperatures below freezing point.



**Pressure**

Ensure that any pressure is isolated and safely vented to atmospheric pressure. Do not assume that the system has depressurized even when the pressure gauge indicates zero. exposed to temperatures below freezing point.



**Access**

Ensure safe access and if necessary a safe working platform (suitably guarded) before attempting to work on the product. Arrange suitable lifting gear if required.



**Residual Hazards**

The external surface of the product may be very hot. Take essential care when removing the product from an installation.



**Hazardous Environment**

Plant rooms are explosion-risk areas. There may be a lack of oxygen, dangerous gases, extremes of temperature, hot surfaces, fire hazards excessive noise, and moving machinery.



**Protective Clothing**

In order to be protected against the hazards of chemicals, high temperature, radiation, noise, falling objects, and dangers to eyes and face, anyone around requires protective clothing suitable in the plant room.



**Supervision**

All work must be carried out or supervised by a suitably competent person. Installation and operating personnel should be trained in the correct use of the product according to the Installation and Operation Instructions.



**Disposal**

Unless otherwise stated in the Installation and Operation Instructions, this product is recyclable and no ecological hazard is anticipated with its disposal providing due care is taken.



**Returning Products**

When returning products to “Vira Isı ve Endüstriyel Ürünler A.Ş.” the customers must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk.

## 2. General Information

### 2.1 Description

The Vira BD 5400 conductivity probe is used in conjunction with BK 5000-T conductivity controller to measure the conductivity (closely related to TDS) of water, usually in a steam boiler, for the purpose of monitoring and controlling blowdown.

The BD 5400 is supplied in nominal tip length 500 mm, and has a 1/2" BSP thread for connecting to a Vira DG 5400 probe elbow, a screwed flange, or directly into a boiler connection. The BD 5400 conductivity probe cannot be cut to length. Different dimensions must be specified at the order phase.

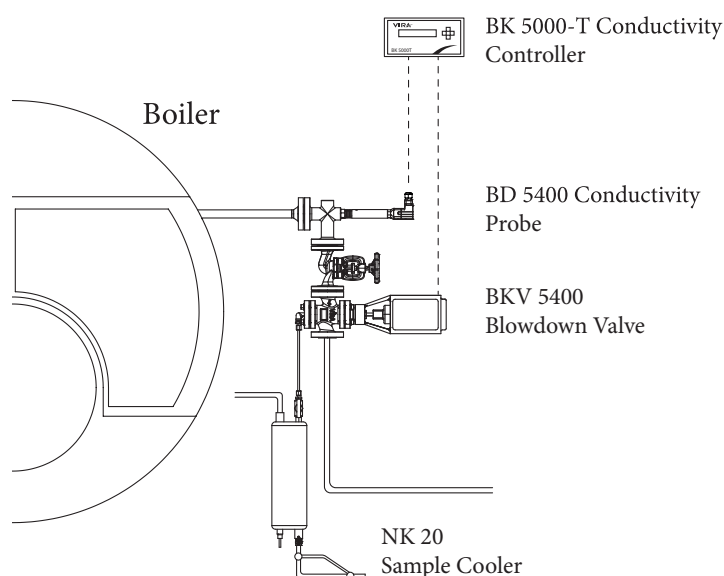


Figure 1 : TDS Blowdown System Application

### 2.2 Technical Data

#### Service Pressure and Temperature

PN 40, 32 Bar g at 239°C

#### Mechanical Connection

BSPT 1/2"

#### Materials

<b>Screw-in Body</b>	: Stainless Steel
<b>Electrode Rods</b>	: Stainless Steel
<b>Insulation of Electrode</b>	: PTFE
<b>Connector Housing</b>	: PA

**Minimum tip distance from boiler tubes : 10 mm**

**Minimum immersion depth (vertically installed probes) : 100 mm**

See controller installation, operating and maintenance instructions for wiring diagram.

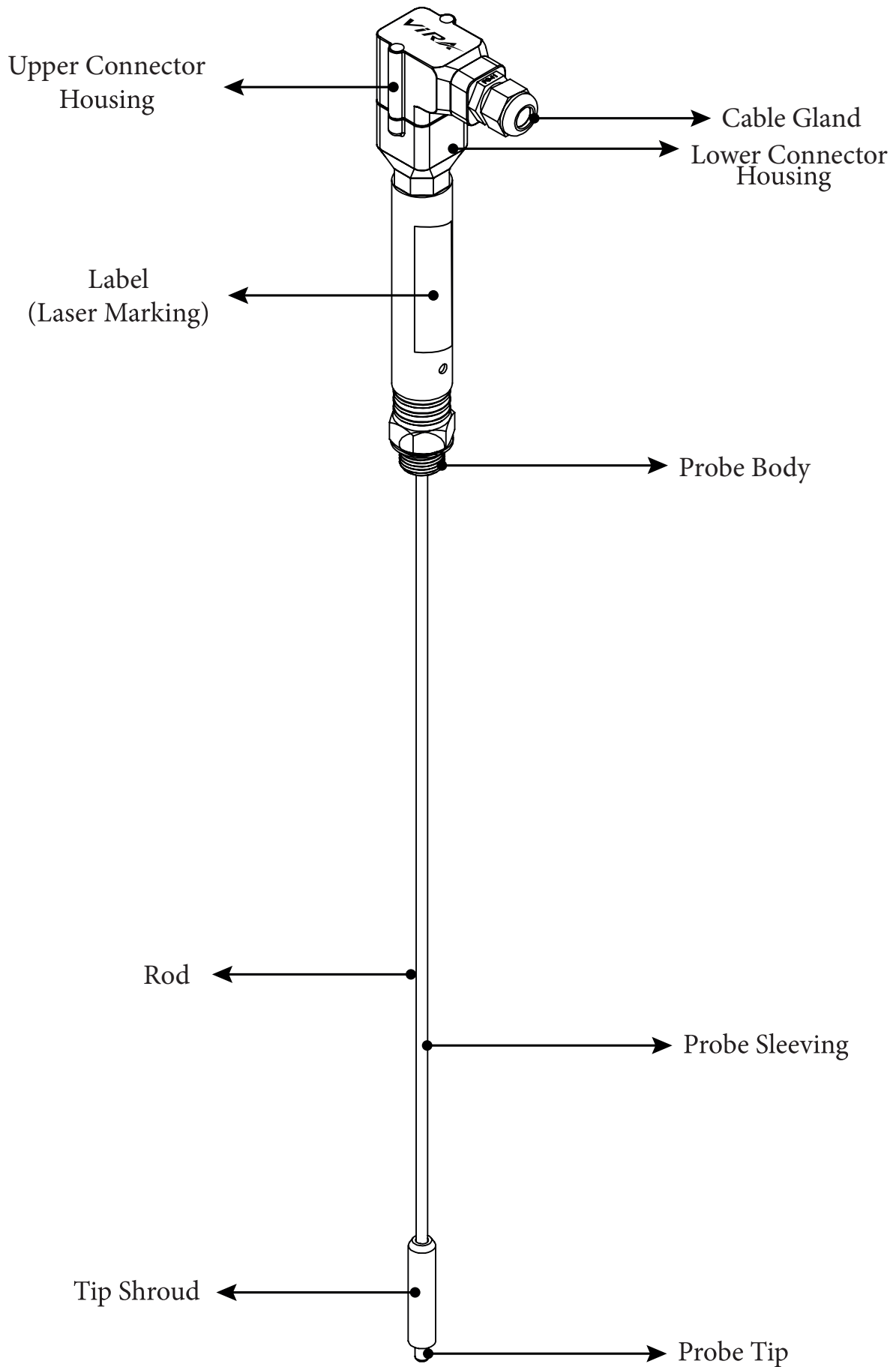


Figure 2 : Material description of BD 5400

### 3. Installation

The BD 5400 is supplied in nominal tip length of 500 mm as standard and cannot be cut to length. Different dimensions from 300 mm to 1000 mm is available.

The probes up to 500 mm can be installed vertically or horizontally. Longer dimensions must be installed vertically.

#### Warning !



Do not install probe outdoors without additional weather protection.

The boiler must be depressurised and vented to atmosphere before installation of the probe. Wherever possible the boiler manufacturer must be consulted for advice on the positioning of the probe and the optimum conductivity level.

#### 3.1 General

Always install the probe;

- As far away from the feedwater inlet as possible.
- In a position where it can sense the conductivity of the boiler water.
- As near the center line of the boiler as possible. This lowers the risk of it being in the steam bubbles normally found towards the top of the boiler, or in higher concentration of suspended solids found at the bottom of the boiler.

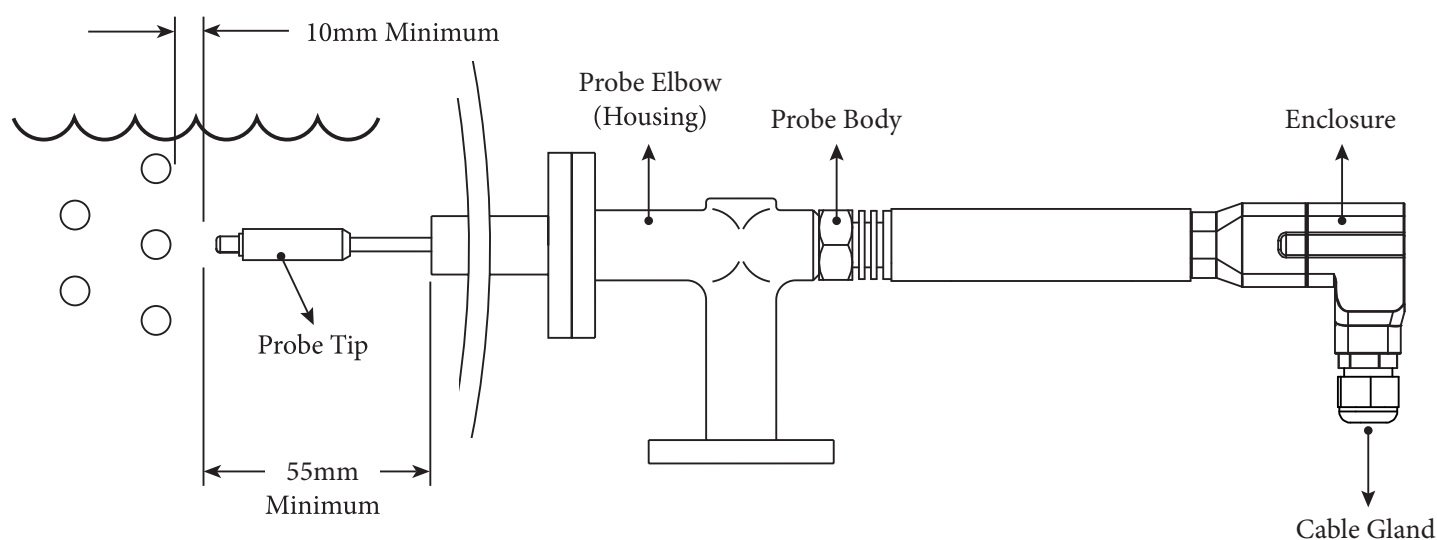


Figure 3 : Installation diagram

### 3.2 Installation Procedure

- Make sure threads of connections are in good condition.
- Use up to 3 turns of ptfе thread sealing tape on the probe thread.
- Fit and tighten the probe by hand initially.
- Screw the probe into thread and tighten with an open end spanner.
- Due to nature of tapered joint it is not possible to recommend tightening torque figures.
- Make sure probe insulation sleeve is not damaged when fitting the probe to the boiler body.



#### **Warning !**

Do not use paste type jointing compounds and excessive tape.

### 3.3 Replacement Of The Unit



#### **Warning !**

Ensure boiler or vessel is depressurised and vented to atmosphere before attempting to unscrew or remove the probe.

- Always use the correct size spanner.
- Inspect male and female threads for signs of damage, which may have occurred through overtightening, leading to torn threads or even localised cold welding (galling/picking up).
- If damage has occurred replace the probe.
- Check that the probe insulation is not torn or damaged.

## 4. Wiring

### 4.1 Connection

Use 3 core (2 core and earth) minimum 0.5 mm<sup>2</sup> high temperature cable. The cable must be screened. For detailed cable specification check BK 5000-T Conductivity Controller installation, operating and maintenance instructions. The BD 5400 is supplied with heavy duty connector with 5 terminal. 2 terminal is used for probe tips, other 2 terminal is empty and one terminal and one terminal is used for the probe body earth connection.

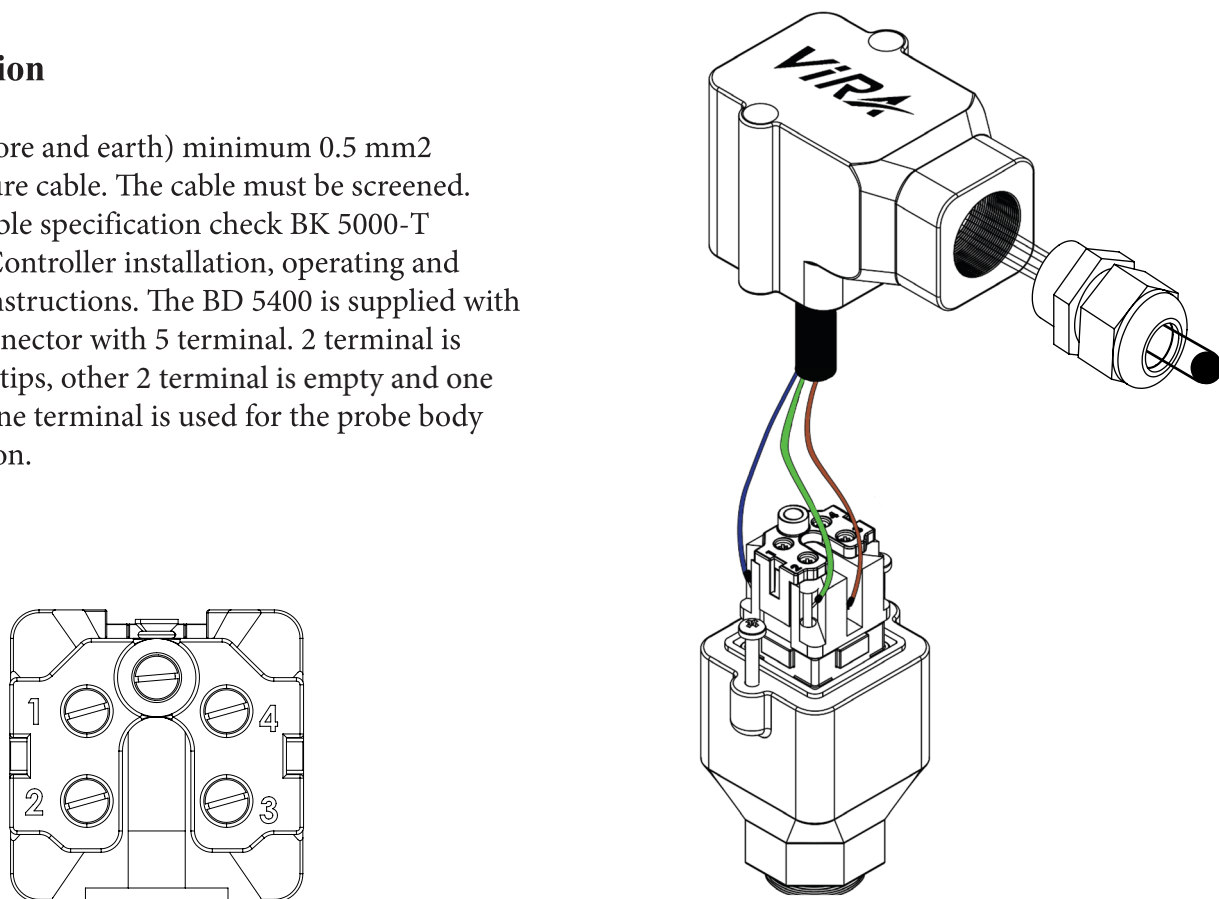


Figure 4 : BD 5400 Connector

**Note:** The wire colors are for illustration purposes only. Different colors can be used in the actual application.

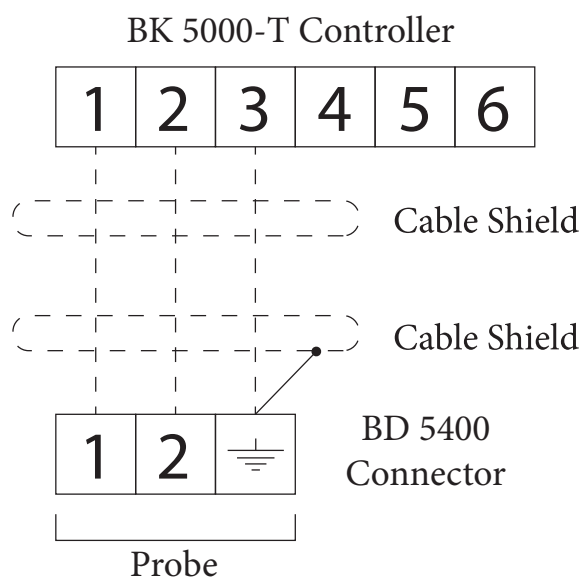


Figure 5 : Wiring diagram

**Note:** As shown in figure 5, the cable shield is left unconnected in controller side. Please only wire cable shield on the probe side.



### **Attention !**

Do not install low-voltage cables near high-voltage cables or switchgear, as this may reduce the performance of, or cause damage to the product. Probe cables must not use the same conduit / wiring trays as power cables or other wiring. Ensure internal wires have not been stressed or damaged during installation.

An earth current loop is created if a wire or screen is connected between two earth points that are at different potential (voltage). If the instructions are followed correctly, then the probe Cable screen will only be connected to earth at one end.

### **Attention !**

- Ensure that the cable shield is only connected to earth terminal of the probe.
- Do not connect the common terminal to earth local to the controller. To do so may induce an earth current loop, which may reduce performance or damage the product.

## **5. Maintenance**

The probe does not normally need regular maintenance. Remove, clean, and check the probe annually.

Where regular tests are carried out properly in a well run boiler house with good water treatment, it may be that only twice or an annual inspection of the probe is required. This inspection programme must be determined by the boiler inspector.

### **Please follow this procedure during the inspection;**

- Depressurise and vent boiler or vessel.
- Before carrying out installation and maintenance work make sure that the equipment is cold.
- Disconnect the electrical supply to controller.
- Remove probe upper connector.
- Remove probe. When loosening the level electrode steam or hot water might escape. This presents the danger of severe scalds to the whole body.
- Check condition of probe.
- Clean probe tips and insulation if necessary. Use a soft brush or cloth dampened with tap water. Use of other cleaning materials could damage the product and invalidate the warranty. Do not use abrasive or conductive products such as steel wool.
- Inspect the wiring between probe and controller, and the controller supply wiring.
- Check the controller for damage.
- Reassemble and carry out a full functional check of the equipment.

## 6. Spare Parts

<u>Stock Code</u>		<u>Description</u>
8801 0000 0007	:	Upper Connector
3210 3000 0004	:	Upper Connector Housing

## 7. Technical Assistance

For technical assistance or service requests, please directly contact Vira service center by making a phone call or sending an e-mail to [servis@viraisi.com](mailto:servis@viraisi.com).

Return faulty or service items to Vira itself or authorized agency in your area. Ensure all items are suitably packed for transit (preferably in the original cartons).

Where regular tests are carried out properly in a well run boiler house with good water treatment, it may be that only twice or an annual inspection of the probe is required. This inspection programme must be determined by the boiler inspector.

**Please provide the following information with any equipment being returned:**

- Your name, company name, address and telephone number, order number and invoice and return delivery address.
- Description and the serial number of equipment.
- Full description of the fault or repair required.
- If the equipment is being returned under warranty, please indicate the date of purchase.



The manufacturer reserves the right to make change without prior notification.

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