

## TDS CONDUCTIVITY PROBE IN-LINE CONDUCTIVITY MEASUREMENT SPS-21

### DESCRIPTION

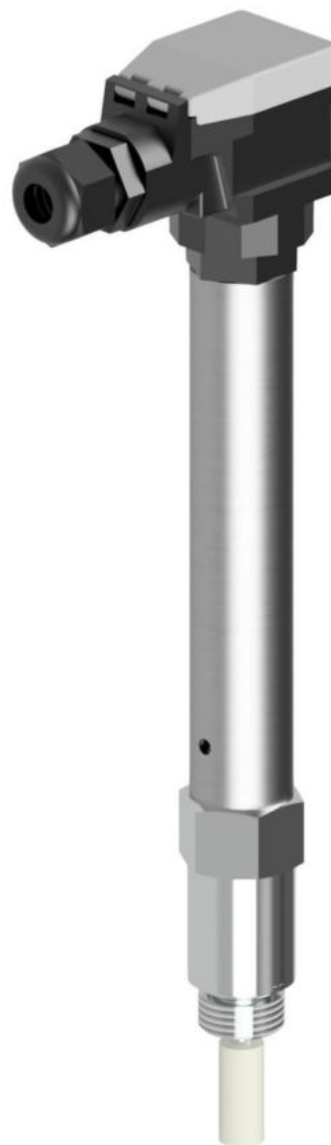
The ADCATROL SPS-21 conductivity probe is used to measure the conductivity (TDS) of the superheated water of boilers or condensate.

The probe is used in conjunction with an ADCATROL BCS-211 controller and VPC series blowdown valve.

The water contains impurities in form of dissolved solids and solids in suspension, whose concentration increases when it's vaporized. Water treatment can reduce impurities to a certain level, but it does not eliminate them completely and, in certain conditions, it might even increase them. As steam production starts, the concentration of total dissolved solids (TDS) increases in the boiler's water. If the concentration is too high, contamination of steam may occur, resulting in system damage further ahead, such as corrosion and salt incrustations on thermal transference surfaces, among other problems.

This high concentration is harmful and is not acceptable in applications where steam is used for treatment of food, drinks and sterilization processes.

In order to limit the concentration of TDS to a suitable level, a certain amount of boiler water must be periodically eliminated (purge action) and replaced by treated water.



- OPTIONS:** Flanged sensor chamber.
- USE:** Superheated boiler water and condensate.
- SIZES:** 1/2".
- PIPE CONNECTIONS:** Screwed ISO 7/1 RP (BS21).
- ELECTRICAL CONNECTIONS:** Plug connection with screw terminals, traction relief.
- INSTALLATION:** Horizontal installation.  
Vertical installation possible, under special request.

### TECHNICAL DATA

| TYPE                           | SPS-21             |
|--------------------------------|--------------------|
| Component mark                 | TUV ID: 0000006175 |
| Protection as per DIN VDE 0470 | IP 65              |

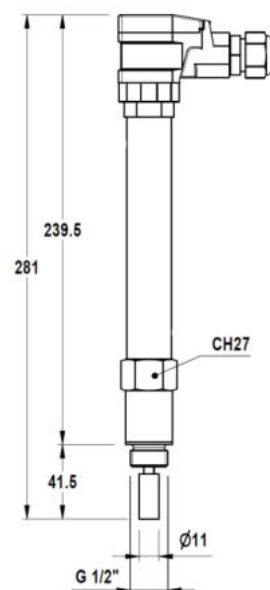
### LIMITING CONDITIONS

|                                 |           |
|---------------------------------|-----------|
| Maximum allowable pressure      | 32 bar    |
| Maximum temperature             | 239 °C    |
| Allowable temperature on plug   | 100 °C    |
| Min. distance from boiler tubes | 20 mm     |
| Maximum cable lenght            | 100 m     |
| Cable gland                     | M16 x 1,5 |
| Minimum conductivity *          | 1 uS/cm   |

\* Lower ranges available on request.

### MATERIALS

| DESIGNATION      | MATERIAL        |
|------------------|-----------------|
| Probe housing    | Stainless steel |
| Probe rod        | Stainless steel |
| Insulation       | PTFE            |
| Socket           | Polyamid        |
| Sealing ring     | Soft iron       |
| Measuring flange | 1.046           |

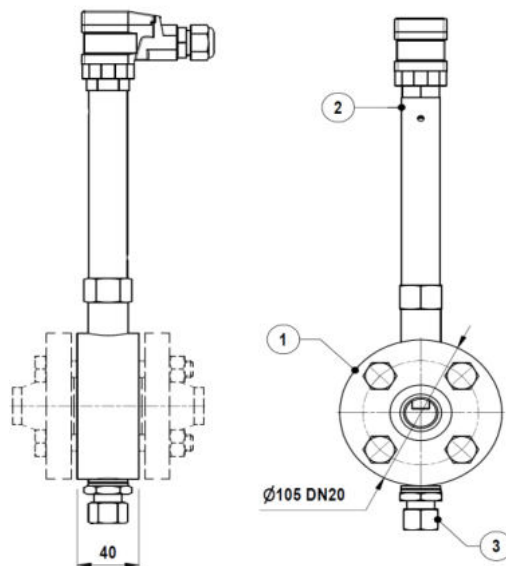


### TYPE F-2132 FLANGED SENSOR CHAMBER (SANDWICHED DESIGN)

### MATERIALS

| POS. N° | DESIGNATION                                 |
|---------|---|
| 1       | F-2132 flanged sensor chamber               |
| 2       | SPS-21 conductivity probe                   |
| 3       | Compression fitting for sample collecting * |

\* Optional



Remarks: Can be fitted into a "T" connection or into our standard chamber, providing that the probe is always in contact with the water. Any metallic parts near the probe must be at a minimum of 20 mm of distance from the central end pole.

## TYPICAL INSTALLATIONS

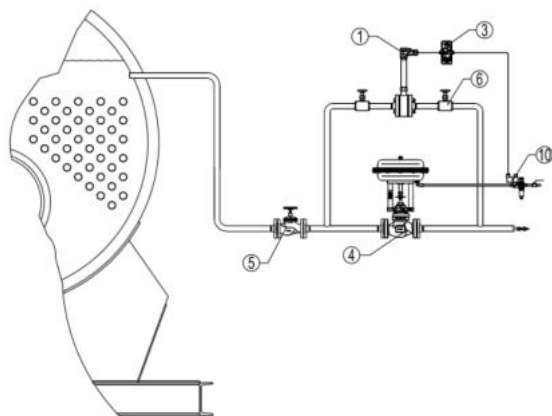
### FIRETUBE BOILER AND PNEUMATIC ACTUATED VALVE

#### OPERATION

The VPC blowdown valve is programmed to open periodically, in order to purge a certain amount of water. The BCS controller will then measure the electrical conductivity of boiler water (closely related to the TDS) and compare it with the set point selected in the controller. It closes the valve after the purge if the measured value is lower, or it will keep the valve open until the measured value is below the set point, if it is higher.

To avoid energy waste due to boiler stand-by or low load, it is recommended to relate the system operation to the burner firing.

It is also recommended to install a heat recovery system (flash vessel, heat exchanger, etc) before connecting the wasted water to the BEX.



#### MATERIALS

| POS.<br>Nº | DESIGNATION                        |
|------------|------------------------------------|
| 1          | Adcatrol SPS-21 TDS probe          |
| 3          | Adcatrol BCS-211 TDS controller    |
| 4          | Adcatrol VPC series blowdown valve |
| 5          | Adca VF bellows sealed globe valve |
| 6          | Adca NV-400 needle valve           |
| 10         | SV32C direct solenoid valve        |

Note: Sensor chamber is rotated 90° for catalogue only.

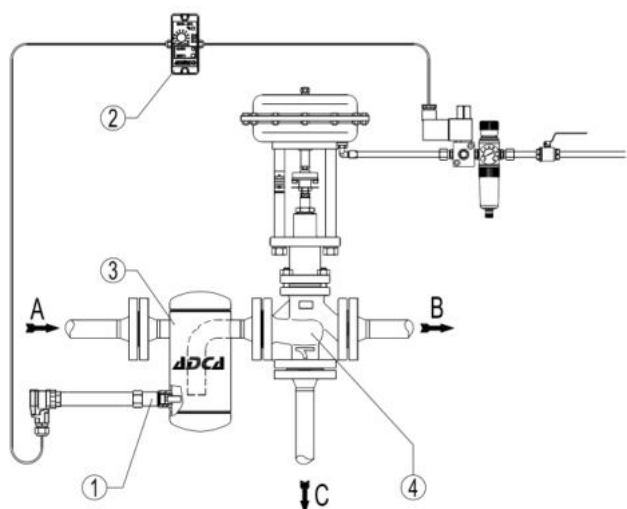
### WATER TUBE COIL BOILER – PROBE INSTALLED IN THE CONDENSATE RETURN LINE

#### OPERATION

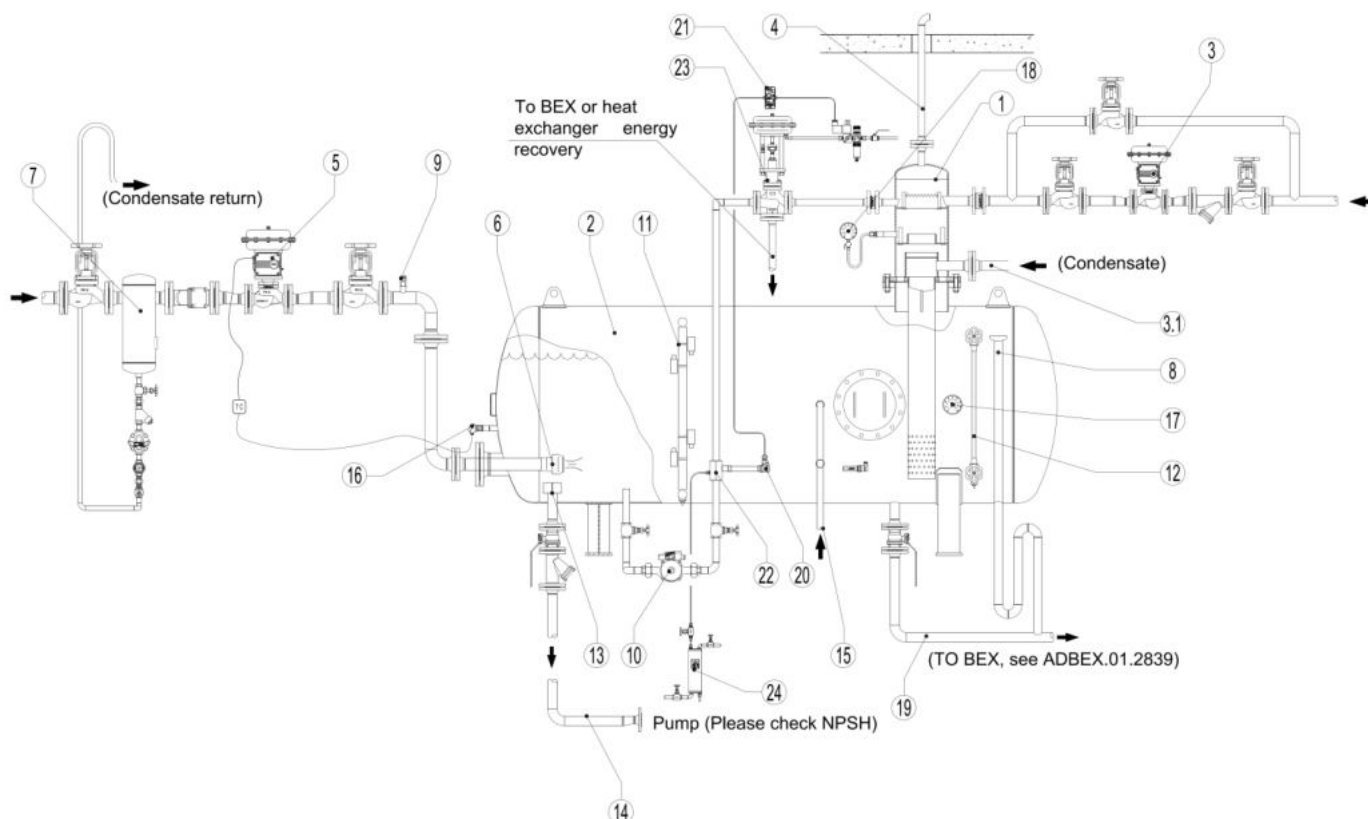
The BCS controller (2) is programmed to continuously measure (1) the electrical conductivity of boiler return condensate (closely related to the TDS) and compare it with the set point selected in the controller. It will invert the flow of the three way valve (4) from B to C if the measured value is higher, or keep the valve flow from A to B until the measured value exceed the set point.

The chamber (3) ensures that the probe (1) is always in contact with the measured medium (condensate).

It is recommended to install a heat recovery system (flash vessel, heat exchanger, etc.) before connecting the wasted condensate (C) to the BEX.



## WATER TUBE COIL BOILER – PROBE INSTALLED IN THE RECIRCULATING PIPE



| MATERIALS |                                    |
|-----------|------------------------------------|
| POS. Nº   | DESIGNATION                        |
| 20        | Adcatrol SPS-21 conductivity probe |
| 21        | BCS-211 TDS controller             |
| 22        | Probe chamber                      |
| 23        | Adcatrol PV253 3 way control valve |
| 24        | SC32 sample cooler system          |

For complete description, see ADADGV (Atmospheric semi-deaerator ADG-V assembly drawing).

## OPERATION

Similar to the previous example but, in this case, the pump (10) is re-circulating the make-up water across the probe (22).