Cert. No. LRQ 0963008
ISO 9001

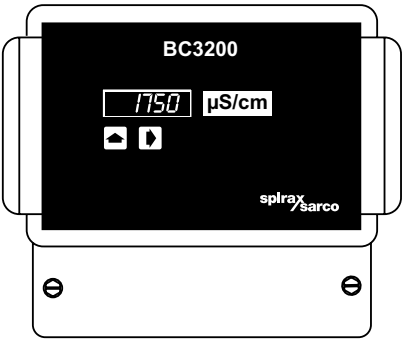
spirax sarco

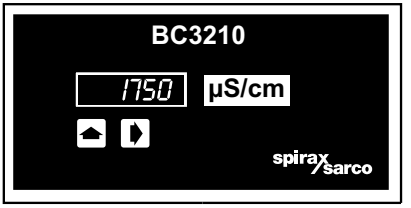
TI-P403-52 / 4033xxB 1/5
AB Issue 3

Από το 1882
ΧΡΥΣΑΦΙΔΗΣ Α.Ε.

BC3200 and BC3210 Blowdown Controllers

- Compact unit for TDS control on large or small boilers.
- Wall or panel mounted versions.
- 4 digit LED display (ppm or µS/cm).
- 4 - 20 mA output and high TDS alarm. Temperature compensated.
- Probe cleaning circuit (UK patent No. 2276943).
- No batteries - settings stored in non-volatile memory.





Safety warning
This document does not give enough information to install the equipment safely. For further information see Installation and Maintenance Instructions (IM-P403-53).

Application

The BC3200 and BC3210 controllers are used to monitor the conductivity of liquids.
The BC3200 is wall mounted, and the BC3210 panel mounted. As they are identical in nearly all other respects, the following information will, for clarity, refer to the BC3200.
The main application of the unit is for boiler blowdown control, where it monitors the level of total dissolved solids (TDS), causing a blowdown valve to open if the TDS rises above a set point, and an alarm to be signalled at a higher TDS level. The TDS probe may be mounted in the boiler or in the blowdown line.
The controller may also be used for monitoring condensate return, signalling a dump valve to open if the conductivity of the condensate exceeds a pre-set level.

Description

The BC3200 is a dual voltage controller for use with a blowdown valve or dump valve to monitor and control TDS levels, usually as part of a steam boiler installation. The front panel has a four digit LED display and two push buttons to select, view, and change functions. An optional front cover lock is available for the BC3200, and a lockable cover assembly is available for the BC3210.
In normal operation the display shows the actual TDS value.
Voltage, ranges, and other operating parameters are set on installation using internal switches.
The controller has a programmable probe cleaning (conditioning) circuit (UK Patent No. 2276943), which allows the system to maintain its accuracy even when some boiler scaling is taking place. It should not, however, be regarded as a substitute for a proper water treatment regime. The cleaning (conditioning) time can be adjusted.
The controller has adjustable set point, alarm, and calibration. The set point hysteresis is adjustable, providing a damping effect where changes of water circulation at the probe may otherwise cause over-frequent switching of the blowdown or dump valve.
An additional filter can be selected to increase the damping effect where the TDS probe is fitted directly in the boiler.
A conductivity probe with a built-in Pt100 temperature sensor may be connected to the controller to provide temperature compensation (2%/°C) where the boiler is working at varying pressures. For other applications such as condensate monitoring or coil boilers where the temperature may vary, a separate temperature sensor may be used.

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For smaller boilers where the capacity of the blowdown valve is relatively high compared to the boiler size, the blowdown may be set to pulsed, rather than continuous output, opening for 10 seconds, and closing for 20 seconds. This slows the rate at which the boiler water is removed so that the level is not unduly affected, avoiding the risk of triggering a low water alarm.
A 0 - 20 mA or 4 - 20 mA output is provided as standard, and may be used for remote display of TDS level or as an output to a computerised management system.
A security feature allows parameters to be viewed but not adjusted.

Probe in boiler shell
For systems where the TDS probe is fitted in the boiler shell, the BC3200 will open the blowdown valve if the conductivity of the boiler exceeds a certain level (set point). As the contaminated water in the boiler is replaced by clean water from the feedtank, the TDS will fall to the set point (less the hysteresis value), when the controller will close the blowdown valve.

Probe in blowdown line
For systems where the sensor is mounted in the blowdown line, the controller periodically opens the blowdown valve to allow a sample of water from the boiler to pass the sensor (purge).
If the TDS is below the set point, the valve will close after the purge time has elapsed. The purge time is adjustable for different blowdown installations, to ensure that all water from the previous sample has been removed from the system, and that the sample is at a similar temperature to the water in the boiler. The BC3200 may be set to purge either half an hour from the last purge, or for every half hour of boiler firing, (useful for stand-by boilers).
If the TDS level is above the set point, the blowdown valve will remain open to allow the high TDS water to be replaced by clean water from the feedtank.
The valve will close when the TDS level falls to the set point (less the hysteresis value). When the valve is closed, the controller stores the TDS level in memory so that the last true value is always shown on the display and is output as the mA signal.

Limiting conditions

BC3200 protection rating	IP65
BC3210 protection rating	IP65 (Front panel only as the case is normally inside a boiler panel)
Maximum ambient temperature	55°C
Maximum cable length (Probe to controller)	100 m
Maximum resistance of 0/4 - 20 mA (Negative is earthed to boiler at the probe)	500 Ω
Minimum conductivity setting	10 µS/cm or 10 ppm

Technical data

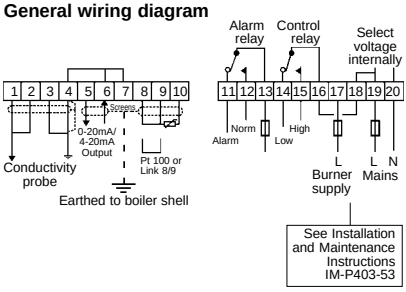
Mains supply voltage	
230 V setting	198 V - 264 V
115 V setting	99 V - 121 V
Frequency	50 - 60 Hz
Fuse type	20 mm cartridge 100 mA anti-surge
Maximum power consumption	6 VA
Alarm hysteresis	3%
Probe cleaning (conditioning) frequency*	Every 12 hours
Probe cleaning (conditioning) duration*	0 - 99 seconds
Purge time	0 - 99 seconds or * 0 - 0.99 hour
Cumulative purge time	Every 30 min. or every 30 min. of boiler firing
Blowdown	Continuous or intermittent - (off for 20 s / on for 10 s)

Ranges (µS/cm or ppm, switch selectable)

10 - 99
100 - 999
1000 - 9990

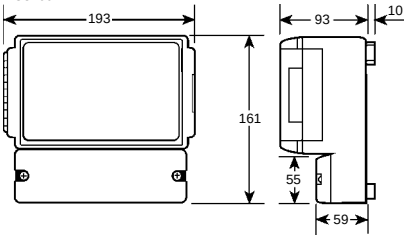
*If the purge time is set to anything other than zero, cleaning (conditioning) time is automatically limited to 9 seconds to avoid bubbles forming on the probe.

General wiring diagram

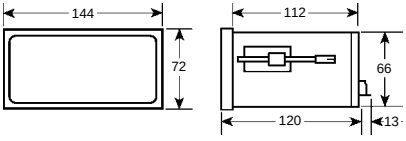


Dimensions (approximate) in millimetres

BC3200



BC3210



BC3210 panel cut-out 137 x 67 (approx.)

Weights (approximate) in kg

BC3200	0.8
BC3210	0.6

How to specify
Programmable TDS controller, wall/panel mounting (specify which), with digital display, high alarm, probe cleaning (conditioning) feature (Patented), 4 - 20 mA output, and temperature compensation.

How to order
Spirax Sarco BC3200
Spirax Sarco BC3210

Materials

BC3200

Case	Polystyrene
Front panel	Polycarbonate

BC3210

Case	Noryl (glass filled)
Front panel	Polyester

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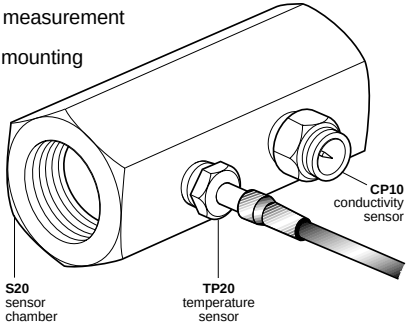
AB Issue 5

Από το 1882
ΧΡΥΣΑΦΙΔΗΣ Α.Ε.

S20
Sensor Chamber and Sensors

- Allows continuous temperature compensated measurement
- Purpose designed sensor chamber for in-line mounting
- Simple removal of sensors for cleaning



Description

The Spirax Sarco S20 sensor chamber is fitted with conductivity and temperature sensors used to determine the conductivity of liquids. The use of a temperature sensor enables an accurate measurement to be made when the temperature varies, as in the case of condensate return monitoring systems.
The hexagonal in-line sensor chamber is available screwed 1¼" BSP or 1" NPT.
Adjacent radial female screwed connections are provided for:-
CP10 conductivity sensor (⅜" BSP).
TP20 temperature sensor (½" BSP).
An additional ¼" BSP (¼" NPT) connection is provided on the other side of the chamber for taking a sample if required.
Spirax Sarco can supply a sample cooler for cooling hot samples, or a blanking plug if the connection is not required.

Limiting conditions

The sensor chamber assembly inclusive of sensors is limited to:-

Maximum pressure	11 bar g
Maximum temperature	150°C
Minimum conductivity	10 µS/cm or 10 ppm

Materials

S20 sensor chamber

Stainless steel	BS 970 303 S31

CP10 conductivity sensor

Body	Stainless steel	BS 970 303 S31
Insulator	PEEK	
Pin	Stainless steel	BS 970 303 S31
Seal	PTFE	
Disc springs	Stainless steel	DIN 1.4122
Washer	Stainless steel	A2 BS 4320

TP20 temperature sensor

Body and probe	Stainless steel 316	ASTM A269 Gr. 316
Cable insulation	PFA	

Safety information

This document does not contain enough information to install the product safely. Refer to the Installation and Maintenance Instructions provided with the product.
The CP10 sensor contains PTFE wich can give off toxic fumes if exposed to excessive heat.

Installation

Caution: Do not install the sensor outdoors without additional weather protection.
The sensor chamber may be fitted in a vertical or horizontal pipeline with suitable isolation valves to allow inspection/cleaning of the sensors. Reducers may be fitted if required. Flow can be in either direction. The sensors themselves must be horizontal. For full information see the Installation and Maintenance Instructions.
Caution: **Ensure the PT2 wire is not exposed to a temperature greater than 120°C.**

Maintenance

The equipment requires no specific maintenance other than periodic inspection and cleaning as described in the Installation and Maintenance Instructions.

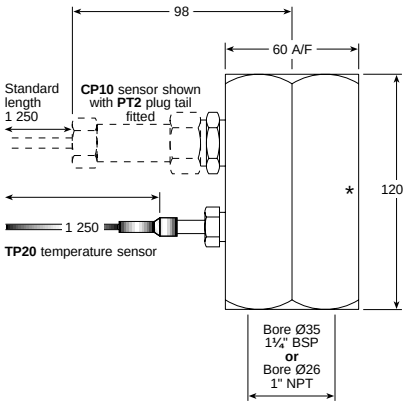
How to specify

In-line sensor chamber with conductivity and temperature sensors.

How to order

Example: 1 off Spirax Sarco S20 sensor chamber complete with CP10 sensor, PT2 plug tail, ¼" BSP blanking plug, and TP20 temperature sensor.

Dimensions (approximate) in millimetres



Weight 1.9 kg

* ¼" BSP sample connection

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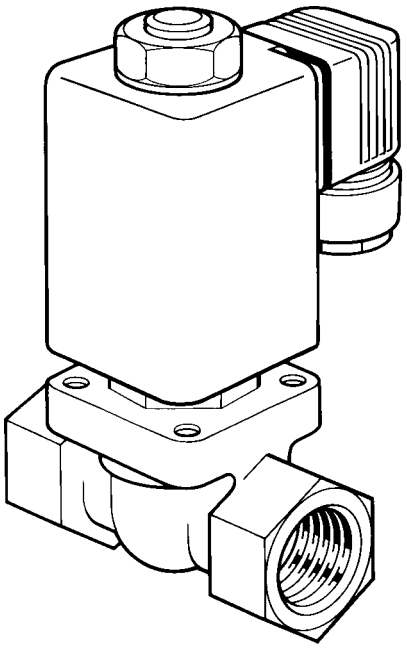
AB Issue 3

Από το 1882
ΧΡΥΣΑΦΙΔΗΣ Α.Ε.

BCV1 and BCV20 Blowdown Valves

- For boiler blowdown duties
- Wide, non-critical voltage ranges
- Normally closed operation



Description

The BCV1 and BCV20 valves are small bore, normally closed valves with a brass body and corrosion resistant internal components. They are primarily intended for low and medium pressure boiler blowdown applications.
BCV1 and BCV20 valves are identical apart from the orifice size, the BCV1 having a 3 mm (⅛") orifice and the BCV20 a 6 mm (¼") orifice. Valves are supplied complete with a mains connector, which is protected to IP65 and is suitable for 3 x 1 mm² (18 AWG) cable.

Available sizes and pipe connections

½" screwed BSP - 230 V version
½" screwed BSP - 110 V version
½" screwed NPT - 120 V version
½" screwed NPT - 120 V version (UL/CSA Listed)

Limiting conditions

BCV1	
Maximum boiler or steam pressure	14 bar g (203 psi g) (Intermittent operation)
Medium temperature range	-40 to +200°C (-40 to +392°F)
Medium	Water and steam
Maximum ambient temperature	55°C (130°F)
BCV1 (UL/CSA)	
Maximum boiler or steam pressure	9 bar g (130 psi g)
Medium temperature range	-40 to +180°C (-40 to +356°F)
Medium	Water and steam
Maximum ambient temperature	55°C (130°F)
BCV20	
Maximum boiler or steam pressure	4 bar g (58 psi g)
Medium temperature range	-40 to +180°C (-40 to +356°F)
Medium	Water and steam
Maximum ambient temperature	55°C (130°F)

Electrical data

230 V version	207 V to 253 V
110 V version	99 V to 121 V
120 V version	108 V to 132 V
Frequency	50 - 60 Hz
Maximum power consumption	40 VA (inrush)
	16 VA/12 W (hold)
Protection rating	IP65 (Nema 4)

Materials

Body	Brass
Soft seal	PTFE
Internal components	Stainless steel

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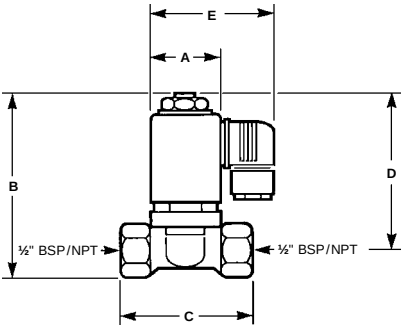
Dimensions/weight (approximate) in mm (ins) and kg (lbs)

A	B	C	D	E	Weight
40 (1.57)	110 (4.33)	74.5 (2.93)	94.5 (3.72)	73 (2.87)	0.75 (1.65)



Capacities

Model	BCV1	BCV20
Orifice size	3 mm (⅛")	6 mm (¼")
K_V value	0.25	0.8

For conversion C_V (UK) = K_V x 0.97 C_V (US) = K_V x 1.17

When used for boiler blowdown purposes, the valve will be controlling a mixture of water and flash steam, so the following capacity table applies:-

Boiler pressure bar g (psi g)	Capacity kg/h (lb/h) BCV1	BCV20
1 (14.5)	175 (385)	560 (1232)
2 (290)	250 (550)	790 (1738)
4 (580)	350 (770)	1120 (2464)
6 (870)	385 (847)	-
8 (1160)	445 (979)	-
10 (1450)	495 (1089)-	
14 (2030)	590 (1298)-	

When the BCV20 valve is used as part of the BCS2 blowdown control system, downstream of a steam trap, the following capacity table applies:-

Head across valve m (ft)	Cold water capacity kg/h (lb/h)	Hot water capacity with flash steam kg/h (lb/h)
1 (3)	253 (557)	63 (138)
2 (6)	358 (787)	90 (198)
3 (9)	438 (963)	110 (242)
5 (15)	566 (1245)	142 (312)
10 (30)	800 (1760)	200 (440)

How to specify

BCV1
Solenoid valves shall be Spirax Sarco normally closed blowdown valve type BCV1 or BCV1 (UL/CSA) with brass bodies and stainless steel valve seat with a PTFE seal.

BCV20
Solenoid valves shall be Spirax Sarco normally closed, low pressure blowdown valve type BCV20 with brass bodies and stainless steel valve seat with a PTFE seal.

How to order

Example: 1 off Spirax Sarco BCV1 or BCV20 blowdown valve having screwed BSP connections, 230 V 50-60 Hz.

Spare parts

The spare parts available are detailed below. No other parts are supplied as spares.

Available spares

Armature and spring set (kit).	Stock No. 4034080
Solenoid coil 230 V	Stock No. 4034081
Solenoid coil 110/120 V	Stock No. 4034082

How to order spares
Always order spares by using the description given in the column headed 'Available spares' and state the valve type.
Example: 1 off Armature and spring set (Stock No. 4034080) for a Spirax Spirax BCV20 blowdown valve.