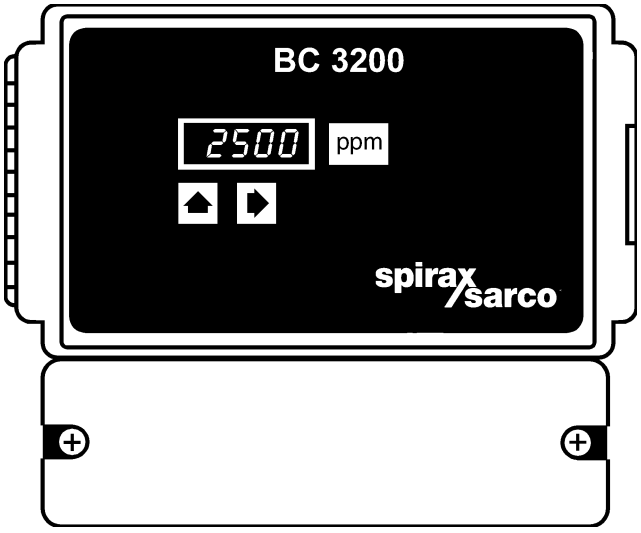
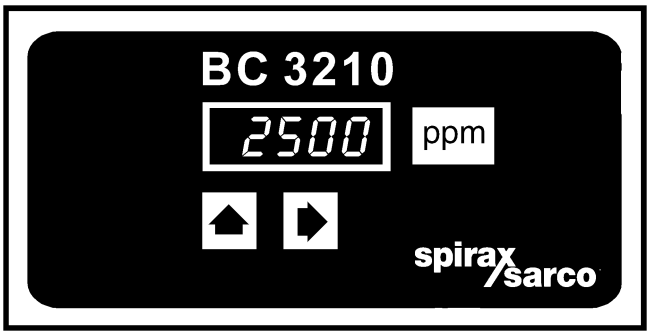
BC 3200 and BC 3210 Controllers

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





Application

The BC 3200 and BC 3210 controllers are used to monitor the conductivity of liquids. The BC 3200 is wall mounted, and the BC 3210 panel mounted. As they are identical in nearly all other respects, the following information will, for clarity, refer to the BC 3200. 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 BC 3200 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. A lockable cover assembly is available for the BC 3210. 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 adequate water treatment. 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 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." 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 or 4-20mA 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.

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)

Probe in boiler shell

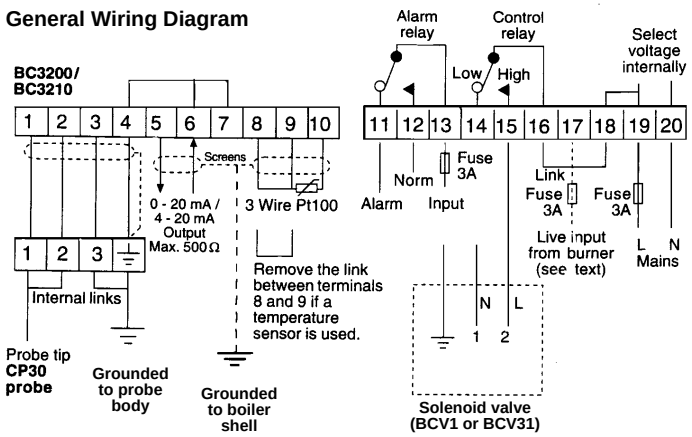
For systems where the TDS probe is fitted in the boiler shell, the BC 3200 will open the blowdown valve if the conductivity of the boiler exceeds a certain level (set point). As the contaminated water in the boiler is replaced by clean water from the feed tank, the TDS will fall to the set point (less the hysteresis value), when the controller will close the blowdown valve.

BC3200 and BC 3210 Controllers

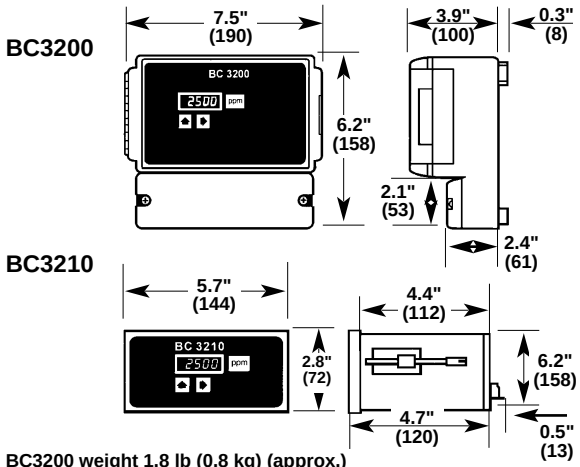
Probe in blowdown line

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 BC 3200 may be set to purge either half an hour from the last purge, or for every half hour of boiler firing, (useful for standby 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 feed tank. 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.

General Wiring Diagram



Dimensions (approximate) in inches and millimeters



BC3200 weight 1.8 lb (0.8 kg) (approx.)
BC3210 weight 1.7 lb (0.6 kg) (approx.)

BC3210 panel cut-out 5.4" x 2.6" (137mm x 67mm) (aprox.)

How to specify

Programmable TDS controller, wall/panel mounting (specify which), with digital display, high alarm, probe conditioning feature (Patented) Approved by Underwriters Laboratory as a Listed Product.

How to order

Spirax Sarco BC3200 UL Spirax Sarco BC3210 UL

Materials

BC3200	
Case	Polystyrene
Front panel	Aluminum
Label	Polyester
BC3210	
Case	Noryl (glass filled)
Front panel	Polyester

Approvals

UL	UL 3121-1
US Standard	Process Control Equipment Elec. E209497
ULC	C22.2 No. 1010.1
Canadian Standard	Process Control Equipment, Elec. E209497

Limiting conditions

BC 3200 protection rating	IP 65
BC 3210 protection rating	IP 65 (Front panel only, case normally inside boiler panel)
Indoor use only	
Altitude up to 2000 m	
Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.	
Pollution Degree:	2
Installation category (overvoltage category):	II
Minimum conductivity:	10uS/cm or ppm
Protection rating for BC3200 enclosure	IP 65, Type 1 or 12K
Ambient temperature range:	32 - 130°F (0-55°C)
Maximum cable length (Probe to controller)	300ft (100m)
Maximum resistance of 0/4-20mA (Negative is grounded to boiler at the probe)	500Ω

Technical data

Mains supply voltage	
115V setting	99V-132V
Frequency	50-60Hz
Fuse type	20mm cartridge 100mA anti-surge (T) **
Maximum power consumption	6VA

Relay Load	Rating
Lamp or Resistive @ 240Vac	3A
Tungsten Filament @ 240Vac	1A
AC Motor @ 240Vac	1/4HP (2.9A)
AC Motor @ 120Vac	1/10HP (3A)
Control circuits & Coils (Pilot Duty)	C300 (2.5A)

Relays and supply voltages must be protected with a 3 Amp quick blow fuse.The burner input must be protected with a 1 Amp quick blow fuse.

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
Time between purges	Every 30 min. or every 30 min. of boiler firing
Blowdown	Continuous or intermittent - (off for 20s/on for 10s)

* 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.

** Replacement fuses UL recognized Components to retain the integrity of the Approval.

Ranges (µS/cm or ppm, switch selectable)

10-99
100-999
1000-9999

Field Wiring/terminals details

Max wire gauge	14-22AWG
Conductor material	Copper

Spirax Sarco, Inc., 1150 Northpoint Blvd., Blythewood, SC 29016 Telephone: (803) 714-2000 FAX (803) 714-2200