

# Advanced boiler control system

## Simple, safe and reliable

Modern boilers are designed to meet the needs of a variety of industries and their associated processes. Consequently the engineers at Spirax Sarco have developed an advanced electronic boiler control system to match the performance and operating requirements of most boiler houses.

Spirax Sarco's electronic boiler control systems are designed for simple installation and can be integrated into existing systems. It provides safe and trouble free operation.

The range has been approved to many national standards, relevant codes of practice and local regulations.

Spirax Sarco's sensing probes have no moving parts, can be easily mounted, directly into the boiler shell and require very little or no maintenance.

Level, TDS and Bottom blowdown controls can be viewed through a central HMI removing the need for manual processes.



- High resolution, touch screen display
- Simple BMS connectivity using Modbus RTU or TCP/IP
- Will display both Level and TDS measurement
- Monitor trends and historical alarms to identify and react to potential issues that could reduce boiler



SIL3 approved water level limiters provides increases the safety level of the boiler system



- Provides auto probe cleaning and contamination detection increasing the service life
- Blowdown functionality with interlocking

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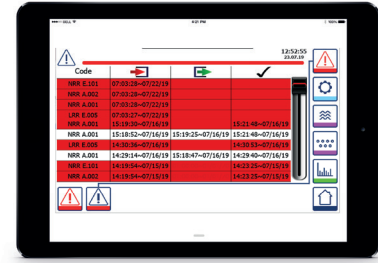
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Our BHC systems and display panels allow fast and automatic provision of data, as well as connectivity to energy management systems so you can remotely monitor trends and identify areas for improvement.



Our automatic BHC systems will take the manual processes (and risk of human error) out of blowdown and level control in your boilerhouse, to free up your team and ensure safety.



Stringent regulations mean that energy managers are required to reduce energy usage. Our intelligent controls automatically monitor water level and contamination therefore improving the efficiency of your boiler.

For accurate control of water levels in boilers and tanks select the LP21/ PA420 capacitance probe and LCR2652 multi-functional level controller. This system is ideal for controlling the boiler water levels in modern steam boilers where there is a difficult balance between steam pressure, load and feed water flowrate.

Incorrect level control can result in boiler lockouts or carryover of boiler water into the steam system. The LP21 / PA420 level probe and LCR2652 control system is well matched for medium to large steam boiler installations with a varying steam demand.

This control system is ideal for applications where close control of tank or boiler water levels is required. The system can be easily configured to provide:


- On /off water level control within tanks.
- Modulating control for electrically or pneumatically actuated control valves.

A feature of this control system is the adjustable integral action giving closer control of water level, reducing the risk of carryover and spurious alarms.

Another important feature of the LCR2652 is the 2 and 3 element control capability.

By configuring 2 element control the system utilises a signal output from a steam flowmeter as a feed forward signal, for applications wheresudden load swings can be experienced in, for example, breweries and laundries.

Where a number of boilers share a common feed water supply the differential pressure can vary across the feedwater valve, changing the flowrate. This change can be compensated for by configuring 3 element control, taking an additional signal from a feed water flowmeter.


Level Controls and Alarms	Input Signal Range	Control Characteristics	Communication	Mounting		
 LCR2652	4-20mA	2 and 3 element control Adjustable on/off Modulating	Modbus EIA (RS) 485 Modbus TCP/IP through BHD50	DIN rail		

To protect your steam boiler from low water conditions select the LP40 conductivity probe and LCS3050 controller. This system monitors the water level on the probe tip activating the low level alarm and shutting down the boiler.

This system enables operators to increase boiler house automation for greater productivity without sacrificing safety. High integrity, self-monitoring alarms will give warnings of system faults and allow safe shutdown of plant.

The system normally consists of two completely independent self-monitoring LP40 probes for 1st and 2nd low water level limiters. Each probe must be mounted in a separate protection tube within the boiler shell, the LCS3050 will connect to both independent probes.

Many National Standards state that boilers fitted with high integrity, self-monitoring controls can be run without the need for a trained boiler attendant to be on site at all times.

Level Controls and Alarms	Input Signal Range	Control Characteristics	Communication	Mounting		
 LCS3050	Minimum: 10 µS/cm or 5ppm @ 25°C	SIL3 rated* High Integrity Limiter Low Alarm/ Limiter	Modbus EIA (RS) 485 Modbus TCP/IP through BHD50	DIN rail		*When LCS3050 &LP40 are installed as a system

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To protect your steam boiler from high water conditions, and provide a safeguard against poor quality steam production select the LP41 conductivity probe and LCS3051 controller.

If the water level rises to touch the probe tip, the resistance to earth becomes low, causing the alarm relays in the controller to be de-energised and the alarms to sound. The probe is normally installed directly in the boiler shell in a protection tube, but it can be mounted in an external chamber, if local regulations permit.

Reasons for protection against high water level:

- Increased carryover of water into the steam will result in poor operation and / or malfunction of steam system components.
- Wet steam can lower processing temperatures. This can interfere with proper sterilisation of food products or processing of pharmaceuticals and cause wastage.
- Increased risk of water hammer in the steam system, damage to plant and even injury to personnel.

Level Controls and Alarms	Input Signal Range	Control Characteristics	Communication	Mounting		
 LCS3051	Minimum: 10 $\mu$ S/cm or 5ppm @ 25°C	High Integrity Limiter High Alarm/ Limiter	Modbus EIA (RS) 485 Modbus TCP/IP through BHD50	DIN rail		

Level Probes	Probe Type	Control Characteristics	Probe Connection	Nominal Length	Body Design rating	
 LP21/PA420	Capacitance	2 and 3 element control Adjustable on/off Modulating	1/2" taper BSP	370mm- 1500mm	PN40	
 LP40	Conductivity	SIL3 rated* High Integrity Limiter Low Alarm/ Limiter	1/2" taper BSP	500mm 1000mm 1500mm	PN40	*When LCS3050 & LP40 are installed as a system
 LP41	Conductivity	High Integrity Limiter High Alarm/ Limiter	1/2" taper BSP	500mm 1000mm 1500mm	PN40	

The (BCS) blowdown control system is suitable for all shell and tube boilers. The control system measures the electrical conductivity of the boiler water which is directly related to the level of total dissolved solids (TDS).

The BCS system can easily be linked to energy / building management systems through the use of the BHD50 HMI

Accurate control of TDS minimises blowdown and reduces the risk of carryover. Automatic TDS control can significantly reduce operating costs whilst ensuring the quality of steam production. The conductivity of the boiler water is compared with the Set Point in the controller. If it is lower than the Set Point the blowdown valve closes at the end of the purge time and remains closed. If the conductivity is higher than the Set Point the blowdown valve will remain open, the high TDS boiler water is replenished by clean make-up water, lowering the measured conductivity and the blowdown valve closes.

The BCR3250 has an integrated automatic blowdown timer with Real Time' clock / calendar that allows blowdown cycles at 30 minute intervals.


The Spirax Sarco automatic boiler bottom blowdown system is designed to be efficient and cost effective.



The advantages of automatic boiler blowdown are:

- Automatic timed blowdown avoids wasted heat.
- Choose the exact time and duration of blowdown.
- Repetition or omission of blowdown is avoided.

Time controlled bottom blowdown systems bring many benefits to your plant and business. Minimised energy loss from the boiler blowdown can save approximately 2% of a facilities total energy use, with an average simple pay back in one year.

The system can be used for single and multi-boiler installations. Less water, fuel and water treatment chemicals are required, providing a cleaner and more efficient boiler. Reduced operating costs, reduced labour cost and a safer boiler.

TDS/Bottom Blowdown Controls	Input Signal Range	Control Characteristics	Communication	Mounting		
 BCR3250	Minimum 10µS/cm	Monitor Limiter Integrated Blowdown with real-time clock	Modbus EIA (RS) 485 Modbus TCP/IP through BHD50	DIN rail		

Level Probes	Probe Type	Control Characteristics	Probe Connection	Nominal Length	Body Design rating	
	CP10	Conductivity	on/off	3/8" BSP taper	50mm	PN40
	CP40	Conductivity	on/off	3/8" BSP taper	300mm 500mm 1000mm 1500mm	PN40
	CP42	Conductivity	on/off	3/8" BSP taper	300mm 500mm 1000mm	PN40

For more information visit our website [spiraxsarco.com](http://spiraxsarco.com)

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