Servicio de Att. al Cliente

Boiler house

Level controls

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LCSR1000 Level Control Systems - Chamber Mounted

Installation and testing of on/off boiler water level controls in external chambers

Typical installation

Warning: This document does not contain sufficient information to install the system safely. See the Installation and Maintenance Instructions supplied with the products for full details. 222222222 00000000 LCSR1000 boiler level control systems are suitable for automatically LCS1350 LCS1350 Irax pirax sarco controlled steam boilers and provide the control and alarm functions specified by HSE/CEA/SAFed Guidance BG01 arrangement 1. The LCSR1000 systems require daily manual testing as specified in BG01 0 0 0 (0 \bigcirc 0 and a competent boiler operator should be on site at all times the boiler 0 0 is in operation. 000000000 000000000 The level controls and level alarms are probably the most important controls on the boiler for ensuring safety and should only be installed and LCS1350 LCS1350 maintained by suitably trained personnel. Spirax Sarco can install, commission and provide a regular maintenance service. LP11-4 LP11-4 probe probe Boiler Chamber Not used Not used High alarm Pump off Pump on 1st low 2nd low Sequencing purge valves To drain tundish or blowdown vessel

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Boiler house

Level controls

Daily test (or once per shift)

- 1. With the burner firing, operate the sequencing purge valve on the 1st low alarm chamber to purge through the water connection to the chamber and to empty the chamber to drain. Check that the burner shuts down and that the 1st low alarm lamp and bell operates.
- 2. Return the sequencing purge valve to 'normal'. The alarm should cancel and the burner refire.
- 3. With the burner firing repeat the test on the 2nd low alarm chamber. The alarm should 'lockout' and should require manual resetting before the burner will refire
- 4. On completion of the test, check that all valves and controls are in their normal operating position and that the water level is correct in the level gauge glass. The boiler should not be left until the person carrying out the test is satisfied it is operating normally.

Weekly test

The weekly test should be carried out or witnessed by a responsible person who appreciates the hazards involved and has been suitably trained in the safe operation of the boiler and its controls. At no time during the test should the water be lowered to the extent that it disappears from the gauge glass.

- With the feedpump switched off, allow the water level to fall by evaporation until the burner shuts down at 1st low alarm.
- 2. Blow down the boiler until the 2nd low alarm sounds and the burner controls go to lockout.
- Raise the water level to normal, reset the lockout, then continue to raise the water level to the high alarm level. Check that the high 3. alarm sounds.
- 4. Return all valves and controls to normal and monitor the boiler until satisfied that it is operating normally.

Quarterly inspection

The Health and Safety Executive recommend from experience that the boiler controls should be serviced at least at quarterly intervals. Where the regular tests are carried out properly in a well run boiler house with good water treatment, it may be that only an annual inspection of the probes etc. is required. This is a matter, however, for the user to decide in liaison with his insurance company inspector in order to determine a sensible inspection programme to suit the individual boiler plant. We recommend a regular inspection as follows:

- 2. Unscrew the probes and wipe away any dirt from the probe tips. If any hard scale is present it may be an indication of more serious scale formation elsewhere in the boiler. Investigate water treatment.
- 3. Remove the covers from the sequencing purge valves and inspect the water connections to the boiler. Clean as necessary.
- 4. Inspect the wiring and controllers for damage.
- 5. Reassemble, refill the boiler and carry out a full functional check.



LCSR1000 Level Control Systems - Chamber Mounted

Servicio de Att. al Cliente

Boiler house Level controls

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LCSR1100 **Level Control Systems**

Installation and testing of on/off boiler water level controls direct mounted in the boiler

Typical installation

Warning: This document does not contain sufficient information to install the system safely. See the Installation and Maintenance Instructions supplied with the individual products for full details.

The Spirax Sarco LCSR1100 boiler water level control systems are suitable for automatically controlled steam boilers and provide the control and alarm functions specified by HSE/CEA/ SAFed Guidance BG01 arrangement 1.

The LCSR1100 series systems require daily manual testing as specified in BG01 and a competent boiler operator should be on site at all times the boiler is in operation.

The level controls and level alarms are probably the most important controls on the boiler for ensuring safety and should only be installed and maintained by suitably trained personnel. Spirax Sarco can install, commission and provide a regular maintenance service.

Minimum conductivity Nominal 1 µS/cm @ 25°C minimum

Daily test

The test should be carried out or witnessed by a responsible person who appreciates the hazards involved and has been suitably trained in the safe operation of the boiler and its controls. At no time during the test should the water be lowered to the extent that it disappears from the gauge glass.

- 1. With the feedpump switched off, allow the water level to fall by evaporation until the burner shuts down at 1st low alarm.
- 2. Blow down the boiler until the 2nd low alarm sounds and the burner controls go to lockout.
- 3. Raise the water level to normal, reset the lockout and allow the burner to refire
- 4. Under hand control raise the water level to the high alarm level. Check that the high alarm sounds.
- 5. Return all valves and controls to normal and monitor the boiler until satisfied that it is operating normally.

Quarterly inspection

The Health and Safety Executive recommend from experience that the boiler controls should be serviced at least at quarterly intervals. Where the regular tests are carried out properly in a well run boiler house with good water treatment, it may be that only an annual inspection of the probes etc. is required. This is a matter, however, for the user to decide in liaison with his insurance company inspector in order to determine a sensible inspection programme to suit the individual boiler plant. We recommend a regular inspection as follows:

- 1. Inspect the probe plugs for moisture.
- 2. Unscrew the probes and wipe away any dirt from the probe tips. If any hard scale is present it may be an indication of more serious scale formation elsewhere in the boiler. Investigate water treatment.
- 3. Inspect the wiring and controllers for damage.
- 4. Reassemble and carry out a full functional check.



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LCSR2000 Level Control Systems - Chamber Mounted

Installation and testing of modulating boiler water level controls in external chambers

Typical installation



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Daily test (or once per shift)

- 1. With the burner firing, operate the sequencing purge valve on the 1st low alarm chamber to purge through the water connection to the chamber and to empty the chamber to drain. Check that burner shuts down and that the 1st low alarm lamp and bell operates.
- 2. Return the sequencing purge valve to normal. The alarm should cancel and the burner refire.
- 3. With the burner firing repeat the test on the 2nd low alarm chamber. The alarm should 'lockout' and should require manual resetting before the burner will refire.
- 4. On completion of the test check that all valves and controls are in their normal operating position and that the water level is correct in the level gauge glasses. The boiler should not be left until the person carrying out the test is satisfied it is operating normally.

Weekly test

The weekly test should be carried out or witnessed by a responsible person who appreciates the hazards involved and has been suitably trained in the safe operation of the boiler and its controls. At no time during the test should the water be lowered to the extent that it disappears from the gauge glass.

- 1. With the feedwater isolated, allow the water level to fall by evaporation until the burner shuts down at the 1st low alarm.
- 2. Blowdown the boiler until the 2nd low alarm sounds and the burner controls go to lockout.
- 3. Raise the water level to normal, reset the lockout, then continue to raise the water level to the high alarm level. Check that the high alarm sounds.
- 4. Return all valves and controls to normal and monitor the boiler until satisfied that it is operating normally.

Quarterly inspection

The Health and Safety Executive recommend that boiler controls should be serviced at least at quarterly intervals. Where the regular tests are carried out properly in a well run boiler house with good water treatment, it may be that only an annual inspection of the probes etc. is required. This is a matter, however, for the user to decide in liaison with their insurance company inspector in order to determine a sensible inspection programme to suit the individual boiler plant. We recommend a regular inspection as follows:

- 1. Inspect the probe plugs for moisture.
- 2. Unscrew the probes and wipe away any dirt from the probe tips. If any hard scale is present it may be an indication of more serious scale formation elsewhere in the boiler. Investigate water treatment.
- 3. Remove the covers from the sequencing purge valves and inspect the water connections to the boiler. Clean as necessary.
- 4. Inspect the wiring and controllers for damage.
- 5. Remove the actuator cover from the feedwater control valve, inspect actuator linkages etc. For tightness and correct operation, and inspect the wiring. Test the feedwater control valve for correct operation over its full stroke, for gland leakage and for tight shut-off.
- 6. Reassemble, refill the boiler and carry out a full functional check.



LCSR2000 Level Control Systems - Chamber Mounted

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Boiler house Level controls

AI-P693-29

EMM Issue 1



LCSR3000 **Level Control Systems**

Installation and testing of self-monitoring low level alarms on/off level controls

Typical installation

Warning: This document does not contain sufficient information to install the system safely. See the Installation and Maintenance Instructions supplied with the products for full details.

The Spirax Sarco LCSR3000 boiler water level control systems are suitable for automatically controlled steam boilers and provide the control and alarm functions specified by Standard BS EN12953 and in the BG01 which is a joint document by the CEA and SAFed, originally produced in consultation with the HSE.

The LCSR3000 low level alarms are of the high integrity type and whilst a competent boiler operator should check the boiler plant daily, he need not be on site at all times. There should, however, always be someone available on site who is suitably trained to respond to alarms and take appropriate action.

The level controls and level alarms are probably the most important controls on the boiler for ensuring safety and should only be installed and maintained by suitably trained personnel. Spirax Sarco can install, commission and provide a regular maintenance service.

Minimum conductivity	LCS3050 30 µS/cm or 30 ppm
	LCS1350 Nominal 1 uS/cm @ 25 °C minimum

Weekly test

High integrity self-monitoring level controls do not require daily testing but the weekly test should be carried out or witnessed by a responsible person who appreciates the hazards involved and has been suitably trained in the safe operation of the boiler and its controls.

At no time during the test should the water be lowered to the extent that it disappears from the gauge glass.

- 1. With the feedpump switched off, or the control valve forced closed, allow the water level to fall by evaporation until the burner and the panel lockout at the low alarms.
- 2. Raise the water level to normal, reset the lockout and allow the burner to refire.
- 3. To independently test inputs of a 2 probe system external test buttons have to be installed that create low level alarms on each probe input For each probe input press the test button and ensure the burner shuts down, afterwards reset the lockout and allow burner to refire.
- 4. Include in monthly test Under hand control raise the water level to the high alarm level. Check that the high alarm sounds.
- 5. Return all valves and controls to normal and monitor the boiler until satisfied that it is operating normally.

Quarterly inspection

The Health and Safety Executive recommend from experience that the boiler controls should be serviced at least at quarterly intervals. Where the regular tests are carried out properly in a well run boiler house with good water treatment, it may be that only an annual inspection of the probes etc. is required.



This is a matter, however, for the user to decide in liaison with his insurance company inspector in order to determine a sensible inspection programme to suit the individual boiler plant. We recommend a regular inspection as follows:

- 1. Inspect the probe plugs for moisture.
- 2. Unscrew the probes and wipe away any dirt from the probe tips. If any hard scale is present it may be an indication of more serious scale formation elsewhere in the boiler. Investigate water treatment.
- 3. Inspect the wiring and controllers for damage.
- 4. Reassemble and carry out a full functional check.

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Boiler house Level controls



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LCSR4000 **Level Control Systems**

Typical installation

This document does not contain sufficient information to install the system safely. See the Installation and Maintenance Instructions supplied with the products for full details.

The Spirax Sarco LCSR4000 boiler water level control and alarm system is suitable for automatically controlled steam boilers and provides the control and alarm functions specified by Standard BS EN12953 and in the BG01 which is a joint document by the CEA and SAFed, originally produced in consultation with the HSE. The low level alarms are of the high integrity type and whilst a competent boiler operator should check the plant daily. he need not be on site at all times. There should, however, always be someone available on site who is suitably trained to respond to alarms and take appropriate action.

The level controls and level alarms are probably the most important controls on the boiler for ensuring safety and should only be installed and maintained by suitable trained personnel. Spirax Sarco can install, commission and provide a regular maintenance service.

	LCS3050	30 µS/cm or 30 ppm
Minimum conductivity	LCR2652/ BHD50 and LCR2250	$5\ \mu\text{S/cm}$ or $5\ \text{ppm}$ Note: Consult Spirax Sarco if conductivity is less than 100 $\mu\text{S/cm}$ and is likely to vary by more than 2:1

Weekly test

High integrity self-monitoring level alarms do not require daily testing but the weekly test should be carried out or witnessed by a responsible person who appreciates the hazards involved and has been suitably trained in the safe operation of the boiler and its controls. At no time during the test should the water be lowered to the extent that it disappears from the gauge glass.

- With the feedpump switched off, or the control valve forced 1. closed, allow the water level to fall by evaporation until the burner and the panel lockout at the low alarms.
- 2. Raise the water level to normal, reset the lockout and allow the burner to refire.
- To independantly test inputs of a 2 probe system external 3. test buttons have to be installed that create low level alarms on each probe input. For each probe input press the test button and ensure the burner shuts down, afterwards reset the lockout and allow burner to refire.
- 4. Include in monthly test - Under hand control raise the water level to the high alarm level. Check that the high alarm sounds.
- 5. Return all valves and controls to normal and monitor the boiler until satisfied that it is operating normally.



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Boiler house Level controls

Quarterly inspection

The Health and Safety Executive recommend that boiler controls should be serviced at least at quarterly intervals. Where the regular tests are carried out properly in a well run boiler house with good water treatment, it may be that only an annual inspection of the probes etc. is required. This is a matter, however, for the user to decide in liaison with their insurance company inspector in order to determine a sensible inspection programme to suit the individual boiler plant. We recommend a regular inspection as follows:

- 1. Inspect the probe plugs for moisture.
- 2. Unscrew the probes and wipe away any dirt from the probe tips. If any hard scale is present it may be an indication of more serious scale formation elsewhere in the boiler. Investigate water treatment.
- 3. Remove the actuator cover from the feedwater control valve and inspect the actuator linkages etc. for tightness and correct operation, and inspect wiring. Test the feedwater control valve for correct operation over its full stroke, for gland leakage and for tight shut-off.
- 4. Inspect the wiring and controllers for damage.
- 6. Reassemble, refill the boiler and carry out a full functional check.



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LCSR5000 Level Control Systems

Installation and testing of self-monitoring low level alarms on/off boiler water level controls

Typical installation

The Spirax Sarco LCSR5000 series boiler water level control systems are suitable for automatically controlled steam boilers and provide the control and alarm functions specified by Standard BS EN12953 and in the BG01 which is a joint document by the CEA and SAFed, originally produced in consultation with the HSE.

The LCSR5000 series low level alarms are of the high integrity type and whilst a competent boiler operator should check the boiler plant daily, he need not be on site at all times. There should, however, always be someone available on site who is suitably trained to respond to alarms and take appropriate action.

The level controls and level alarms are probably the most important controls on the boiler for ensuring safety and should only be installed and maintained by suitably trained personnel. Spirax Sarco can install, commission and provide a regular maintenance service. For details of installation, wiring and maintenance see the Installation and Maintenance Instructions of the individual components of the system.



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Boiler house Level controls

Weekly test

High integrity self-monitoring level controls do not require daily testing but the weekly test should be carried out or witnessed by a responsible person who appreciates the hazards involved and has been suitably trained in the safe operation of the boiler and its controls.

At no time during the test should the water be lowered to the extent that it disappears from the gauge glass.

- 1. With the feedpump switched off, or the control valve forced closed, allow the water level to fall by evaporation until the burner and the panel lockout at the low alarms.
- 2. Raise the water level to normal, reset the lockout and allow the burner to refire.
- 3. To independantly test inputs of a 2 probe system external test buttons have to be installed that create low level alarms on each probe input. For each probe input press the test button and ensure the burner shuts down, afterwards reset the lockout and allow burner to refire.
- 4. Include in monthly test Under hand control raise the water level to the high alarm level. Check that the high alarm sounds.
- 5. Return all valves and controls to normal and monitor the boiler until satisfied that it is operating normally.

Quarterly inspection

The Health and Safety Executive recommend from experience that the boiler controls should be serviced at least at quarterly intervals. Where the regular tests are carried out properly in a well run boiler house with good water treatment, it may be that only an annual inspection of the probes etc. is required.

This is a matter, however, for the user to decide in liaison with his insurance company inspector in order to determine a sensible inspection programme to suit the individual boiler plant. We recommend a regular inspection as follows:

- 1. Inspect the probe plugs for moisture.
- 2. Unscrew the probes and wipe away any dirt from the probe tips. If any hard scale is present it may be an indication of more serious scale formation elsewhere in the boiler. Investigate water treatment.
- 3. Inspect the wiring and controllers for damage.
- 4. Reassemble and carry out a full functional check.