



# LCSR2000

## Level Control Systems - Chamber Mounted

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

#### Typical installation

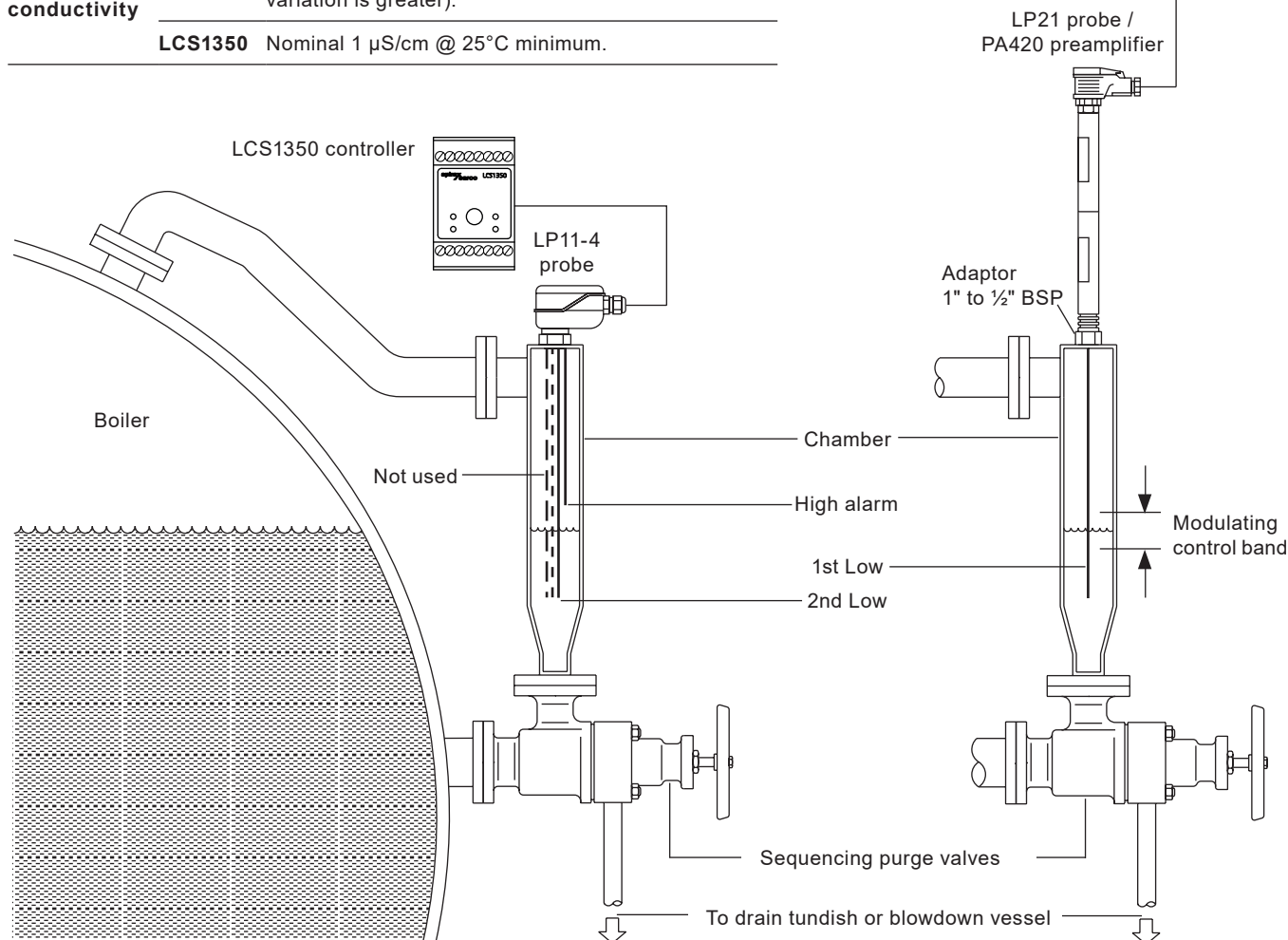
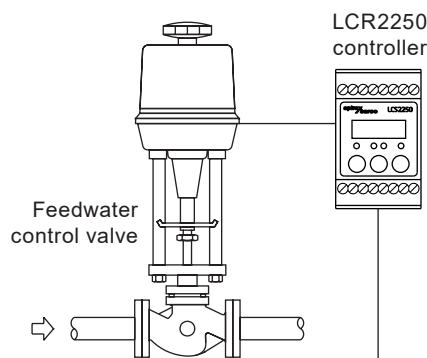
**Warning:** This document does not contain sufficient information to install the system safely. See the Installation and Maintenance Instructions supplied with the individual products for full details.

The Spirax Sarco LCSR2000 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 LCSR2000 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	LP21 and LCR2250	5 $\mu$ S/cm or 5 ppm but conductivity must not vary by more than 2:1 (consult Spirax Sarco if conductivity variation is greater).
	LCS1350	Nominal 1 $\mu$ S/cm @ 25°C minimum.



## 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 re-fire.
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 re-fire.
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.