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Cemline® Unfired Steam Generator Level Controls

Cemline Unfired Steam Generators typically use one of three level controls.

- ALS-700 (Four Ball Float Level Control)
- McDonnel Miller 157 (Two Float Type Level Control)
- TR-420 (Modulating Level Control)

ALS-700 (Four Ball Float Level Control)

The most commonly used level control is the ALS-700 four ball float level control. The ALS-700 has four (4) reed switches bedded in epoxy within the stem. The reed switches are operated by a magnet in the corresponding float as it passes over the reed switch. The four floats from bottom to top are low water float, start feedwater float, stop feedwater float, and highwater float. The ALS-700 four float level control has five (5) wires from within the stem.

1. **BLACK** – Common for all four switches.
2. **RED** – Low water float. When the low water float is in the DOWN position you will see a short (0 Ω) between the Black wire and the RED wire when tested with an Ohmmeter. When the low water float is in the UP position you will see an open or Infinite resistance (∞ Ω) between the Black wire and the RED wire when tested with an Ohmmeter.
3. **YELLOW** – Start Water Feed Float. When the start water feed float is in the DOWN position you will see a short (0 Ω) between the Black wire and the YELLOW wire when tested with an Ohmmeter. When the start water feed float is in the UP position you will see an open or Infinite resistance (∞ Ω) between the Black wire and the YELLOW wire when tested with an Ohmmeter.
4. **BLUE** – Stop Water Feed Float. When the stop water feed float is in the DOWN position you will see a short (0 Ω) between the Black wire and the BLUE wire when tested with an Ohmmeter. When the stop water feed float is in the UP position you will see an open or Infinite resistance (∞ Ω) between the Black wire and the BLUE wire when tested with an Ohmmeter
5. **BROWN** – High Water Float. When the highwater float is in the DOWN position you will see an open or Infinite resistance (∞ Ω) between the Black wire and the BROWN wire when tested with an Ohmmeter. When the Highwater float is in the UP position you will see a short (0Ω) between the Black wire and the BROWN wire when tested with an Ohmmeter.

McDonnell Miller 157 (Two Float Type Level Control)

The McDonnell Miller 157 (Two Float) level controller uses a single float attached to a rod that operates two snap action switches within the level control. The lower switch (single pole, double throw) is used to indicate a low water condition. When the float is at the bottom of travel an open (∞ Ω) between terminals 5 and 6 when tested with an ohmmeter. This will indicate a low water condition. As the water level rises the lower switch closes causing there to be a short (0 Ω) between terminals 5 and 6 when tested with an ohmmeter, removing the low water alarm.

The second switch (single pole, double throw) is used to start and stop the water feed. When there is a demand for makeup water (Feedwater) there will be a short (0 Ω) between terminals 1 and 2 when tested with an ohmmeter, which will initiate the water feed by energizing the feedwater solenoid valve. When the float has reached the top of travel the switch will open causing an open (∞ Ω) between terminals 1 and 2 when tested with an ohmmeter. An open between terminals 1 and 2 will remove power from the makeup water (feedwater) valve and stop the water from entering the vessel.

The McDonnell Miller 157 does not have a high water switch so to monitor for a high water condition the USG controller will use a 3B1B probe. The 3B1B probe will have a piece of stainless steel all-thread threaded into it. The stainless steel all-thread is cut to length so that the end of it is 2 inches above the top of the coil. If the water continues to enter the USG vessel the water level will rise until it is in contact with the stainless steel all-thread in the 3B1B probe. This completes a path of continuity or short (0 Ω) between the 3B1B probe and the USG vessel. A short between the 3B1B probe and the USG vessel will cause a high-water alarm. When the short or continuity between the 3B1B probe and the USG vessel is removed the high-water alarm will also be removed.

TR-420 (Modulating Level Control)

The TR-420 modulating level control is used in conjunction with a modulating feed water valve to allow the make up (Feedwater) to enter the vessel at the same rate that it is converted into steam, thus providing a stable water level. This allows for a more consistent water level while reducing turbulence in the makeup water (feedwater).

The TR-420 level control uses a 12VDC supply voltage and a number of reed switches within the stem of the level control. The single float has a magnet within it and will operate the reed switches as it passes over them. By doing so the level control creates a 4-20 mA output signal that the Steam-Trol uses to determine the water level and generate a 4-20 mA signal that is used to control the position of the modulating feedwater valve.

- The TR-420 modulating level control will have a 4 mA output signal when the single float is at the top of travel (Unless otherwise specified).
- TheTR-420 Modulating level control will have a 20 mA output when the single float is at the bottom of travel (unless otherwise specified).