General:
The Low Water Cutoff (LTA-2) is a microprocessor based low water cutoff for detecting the presence of water in a boiler. The LTA-2 uses advanced signal processing to identify when the probe signal levels have decreased due to possible fouling. These advanced technologies permit extended operation for probe impedance up to 40K Ohms. The LTA-2 functions longer without requiring probe cleaning, and it functions normally under non-ideal installation conditions. The LTA-2 is designed for use with hot water boilers and hot water heating boilers. (See each boiler manufacturers' specifications for recommended minimum safe water levels.)

During a low water condition, the "Status" LED will illuminate RED. Under normal conditions, it will illuminate GREEN. See "Status LED States" table for details.

WARNING

- Installation must be performed by qualified personnel and in accordance with all national and local codes and ordinances.
- Read all instructions carefully and understand them before starting installation. Save instructions for future use.
- Instruct user how to test and operate this cutoff device as described in these instructions.
- Risk of explosion. Not for use in hazardous locations. Serious injury or death could result.
- The LWCO device must be installed in series ahead of other limit and operating controls installed on the boiler. When installations are complete, check for correct operation of ALL limit and operating controls.
- For use with hot water boilers and hot water heating boilers only. Use on steam boilers could cause improper operation resulting in property damage, serious injury, and death.
- Shock Hazard. Disconnect power source before servicing. Serious injury or death could result.
- Hot or pressurized boiler systems can discharge steam and hot water. Cool boiler system to 80°F (27°C) and to 0 psi (0 bar) before servicing.
- Failure to do so could result in serious burns.
LTA-2 Features:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status LED</td>
<td>Bi-color LED status indicator. See &quot;LED States&quot; table for details.</td>
</tr>
<tr>
<td>Service LED</td>
<td>Amber LED indicator that service is needed on LTA-2 or system.</td>
</tr>
<tr>
<td>Test Button</td>
<td>Push button switch for testing safety shutdown of boiler controls.</td>
</tr>
</tbody>
</table>

LED States:

<table>
<thead>
<tr>
<th>Status LED</th>
<th>Service LED</th>
<th>Contacts</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Off</td>
<td>Closed</td>
<td>Normal</td>
</tr>
<tr>
<td>Green</td>
<td>Amber</td>
<td>Closed</td>
<td>Safe water level, weak probe signal - Service soon.</td>
</tr>
<tr>
<td>Red</td>
<td>Off</td>
<td>Open</td>
<td>Low water condition, (LW)</td>
</tr>
<tr>
<td>Red</td>
<td>Amber</td>
<td>Open</td>
<td>Probe signal too weak, LW condition - Service now.</td>
</tr>
<tr>
<td>Blinking</td>
<td>Red</td>
<td>Open</td>
<td>Control failure. Lockout in LW condition.</td>
</tr>
<tr>
<td>Off</td>
<td>Off</td>
<td>Open</td>
<td>No power to LWCO.</td>
</tr>
</tbody>
</table>

Installation:

1. Install the probe above the minimum safe water level, as determined from the boiler manufacturer’s literature. (See Fig. 1)
   **NOTE:** This may be in a tapping on the boiler or in the boiler supply or return piping.
2. Install the probe to extend into the boiler cavity or piping to make contact with the water.
3. Install the probe so that the exposed portion of the stainless steel is a minimum of 1/4" from any grounding surface inside the boiler (to prevent the probe from shorting). (See Fig. 2)
4. Tighten probe securely with a wrench, using bushing flats provided. Use pipe thread sealant to seal the probe threads.

**MINIMUM SAFE WATER LEVEL**

**FIG. 1**

**PROBE SPACING REQUIREMENTS**

**FIG. 2**

⚠️ **CAUTION**

- Do not tighten by grasping the device enclosure. Use wrenching flats on the probe bushing only. Failure to install properly could damage the device and cause improper operation resulting in damage to equipment and property.
- Do not use manual reset low water cutoffs with automatic water feeders. Flooding, equipment damage, and property damage can result. Only use automatic water feeders with automatic reset low water cutoffs.
- Do not mount device with probe angled upward or deposits can accumulate on the probe.
- Mount only with probe facing horizontally or vertically downward and maintain 1/4" minimum clearance from electrode and pipe wall.
- Failure to install probe as directed can cause improper operation and damage to equipment and property.
CONTROL UNIT MOUNTED ON PROBE
FIG. 3

LWCO
FIG. 4

INSTALLATION
IMPORTANT NOTES FOR PROBE INSTALLATION:

**CAUTION**
Only use pipe thread sealant for sealing probe threads. Do not use Teflon tape. Use of Teflon tape can insulate probe electrically and can cause improper device operation and damage to equipment or property.

1. Be sure the probe is installed above the **minimum safe** water level, as previously determined from the boiler manufacturer’s literature.
2. Be sure the probe extends into the boiler cavity or piping so that contact with the water is made. Do not install in locations where air can be trapped.
3. Be sure the exposed portion of the stainless steel probe is a **minimum of 1/4”** from any grounding surface inside the boiler to prevent the probe from shorting (see Fig 1).

Control Unit Mounting onto Probe (See Fig. 3):
1. Tighten the probe into the tapped location of the boiler with a wrench, using the bushing flats provided.
2. Make sure the heads of the two mounting screws in the probe bushing are loosened approximately 1/8” from the bushing surface.
3. Then remove the first lock washer/nut from the probe threads.
4. Orient the slotted holes in the control unit over the heads of the mounting screws of the probe and turn control unit counter-clockwise so that the ends of the slots are fully under the mounting screw heads. Tighten mounting screws.
5. Replace the probe locknut onto the electrode threads and tighten.

LWCO OUTLINE DRAWING
FIG. 5

DWG# 3576-4

[Diagram of LWCO with dimensions shown]
Wire insulation must be rated at 167º F (75º C) or greater. Use at least 18 AWG copper conductors, or as required by code. Use of other wire or insulation types could result in fire causing property damage or serious injury.

NOTE: For 24 VAC LTA-2 models, LTA0243S-2, 24 VAC to be supplied by an EXTERNAL Class 2 power source to terminals H and N. For 120 VAC LTA-2 models, LTA1203S-2, 120 VAC is supplied by an external circuit to terminals H and N.

**LWCO Wiring Using the Burner Circuit Power Source** (See Fig. 6):
1. Connect the hot lead wire from the power source to terminal H.
2. Connect the neutral lead wire from the power source to terminal N.
3. Verify that factory installed jumper is present or connect an 18 AWG (min.) jumper wire from terminal H to terminal COM.
4. Connect the neutral wire of the power source to the neutral side of the burner circuit. Connect wire from the hot side of the burner circuit to terminal NC.
5. Connect the neutral wire of the power source to the neutral side of a water feeder or alarm. Connect wire from the hot side of the water feeder or alarm to terminal NO.

**LWCO Wiring Using a Power Source Other than Burner Circuit** (See Fig. 7):
1. Remove Factory installed jumper.
2. Connect the hot lead wire from the separate power source to terminal H.
3. Connect the neutral lead wire from the separate power source to terminal N.
4. Connect the hot lead wire from the burner circuit power source to terminal COM.
5. Connect the neutral wire of the burner circuit power source to the neutral side of the burner circuit. Connect wire from the hot side of the burner circuit to terminal NC.
6. Connect the neutral wire of the burner circuit power source to the neutral side of a water feeder or alarm. Connect wire from the hot side of the water feeder or alarm to terminal NO.

Be sure the power source for Control Unit and burner circuit are the same voltage. Make sure you are not introducing a second voltage source into the burner circuit via the jumper. This will bypass other operating limit, and/or safety controls, which may result in property damage, personal injury, or death.

**CAUTION**

Cleaning, Maintenance, and Replacement:
- Test the operation of the LTA-2 annually, or more frequently, by pressing the "TEST" button. The "STATUS" LED should turn RED and the boiler should shut down.
- Probe must be inspected every 5 years, (or sooner if "SERVICE" LED turns on), for scale build-up or coating. Clean all oils, fluxes, and scale from probe with a clean rag.
- The control unit should be replaced every 15 years. In areas of high humidity, heavy dust, or other airborne contaminants more frequent replacement may be required.
<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Device or Series</th>
<th>Power Connections</th>
<th>Output Contacts</th>
<th>To Water Feeder / Alarm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taco</td>
<td>LN/LTA-2 Series</td>
<td>Hot: H, Neutral: N, Common: COM, To Burner: NC, To NO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>McDonnell &amp; Miller</td>
<td>PS-801/851 (Older Models w/Red &amp; Amber LEDs)</td>
<td>1 2 3 5 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>McDonnell &amp; Miller</td>
<td>PS-801/851 (New Models w/Red &amp; Green LEDs)</td>
<td>H N C B W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>McDonnell &amp; Miller</td>
<td>PS-802/852 (Older Models w/Red &amp; Amber LEDs)</td>
<td>H N C B W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>McDonnell &amp; Miller</td>
<td>PS-802/852 (New Models w/Red &amp; Green LEDs)</td>
<td>H N C B W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>McDonnell &amp; Miller</td>
<td>Series 750</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>McDonnell &amp; Miller</td>
<td>RB - 122 (Black Wire)</td>
<td>H (Black Wire) N (White Wire) C (Yellow Wire) B (Yellow Wire)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>McDonnell &amp; Miller</td>
<td>RB - 120</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>McDonnell &amp; Miller</td>
<td>RB - 24</td>
<td>Red Wire White Wire Yellow Wire -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrolevel</td>
<td>24</td>
<td>Black Wire White Wire -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrolevel</td>
<td>170</td>
<td>H GN P1 P2 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrolevel</td>
<td>400, 500, 600, 700, 450, 550, 650, 750</td>
<td>1 2 P1 P2 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Honeywell</td>
<td>RW700 Series (Except RW700A1098)</td>
<td>L1 L2 - B A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Honeywell</td>
<td>RW700A1098</td>
<td>T1 T2 - B A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**LWCO Ordering**

- **LT** - Low Water Cutoff
- **TA** - Test Button
- **3S**
- **2**

**Probe Only Ordering**

- **P**
- **3**
- **S**
- **1**

- **Probe Styles**
  - S - Standard Probe Electrode (3/4" NPT only)
  - 3 - 3/4" NPT

- **Input Power**
  - 24 - 24 VAC
  - 120 - 120 VAC

- **Reset Type**
  - A - Automatic Reset
## Troubleshooting:

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiler will not fire</td>
<td>No power to LTA-2</td>
<td>Verify that the LTA-2 wiring is correct. Be sure power to boiler is turned on.</td>
</tr>
<tr>
<td></td>
<td>Low water level</td>
<td>Make sure that the water level has reached the LTA-2 probe.</td>
</tr>
<tr>
<td></td>
<td>Air pocket at LTA-2 probe</td>
<td>Turn off power to the boiler and slowly loosen, but do not remove the LTA-2. Allow any air to escape until water seeps past the LTA-2's threads. Promptly re-tighten the LTA-2 and apply power to the boiler.</td>
</tr>
<tr>
<td>Boiler will not shutdown</td>
<td>Dirty probe</td>
<td>Fluxes or oils used during the construction of the boiler or installation of system piping can coat the LTA-2 probe, preventing signals from being received by the LTA-2. Add a cleaning solution, (such as water and trisodium phosphate or consult the boiler manufacturer), to the system. Heat and circulate this solution for at least one hour before draining and completely flushing the system with clean water. Remove the LTA-2 probe and thoroughly wipe it with a clean rag. Refill the system and test for proper operation.</td>
</tr>
<tr>
<td></td>
<td>Improper ground</td>
<td>Make sure the green ground wire is electrically common to the boiler. Install the green ground wire to an unpainted/uncoated surface.</td>
</tr>
<tr>
<td></td>
<td>Improper wiring</td>
<td>Check all wiring to the LTA-2 and refer to the wiring diagrams. Using a multi-meter, verify that incoming power is 24 VAC.</td>
</tr>
<tr>
<td></td>
<td>Failed control</td>
<td>If the &quot;STATUS&quot; LED blinks RED, the safety circuits in the LTA-2 have detected a failure in the control. To remove any temporary conditions, turn off power to the LTA-2. After 30 seconds, turn on power to the LTA-2. If the &quot;STATUS&quot; LED continues to blink RED, the control must be replaced.</td>
</tr>
<tr>
<td></td>
<td>Shorted probe</td>
<td>Turn off power to the boiler and remove the LTA-2. Verify that there is at least 1/4&quot; clearance from all metal surfaces to the metal probe on the LTA-2. Metal from the boiler or piping must not come in contact with the metal probe on the LTA-2.</td>
</tr>
<tr>
<td></td>
<td>Improper wiring</td>
<td>Check all wiring to the LTA-2 and refer to the wiring diagrams. Using a multi-meter, verify that incoming power is 24 VAC for LTA024 models and 120 VAC for LTA120 models.</td>
</tr>
<tr>
<td>Amber &quot;SERVICE&quot; LED is on</td>
<td>Dirty probe</td>
<td>Deposits form over time in the system and can coat the LTA-2 probe, preventing signals from being received by the LTA-2. Remove the LTA-2 and thoroughly wipe it with a clean rag. Refill the system and test for proper operation. It may be necessary to clean the boiler and piping as noted above.</td>
</tr>
</tbody>
</table>

## Limited Warranty Statement

Taco, Inc. will repair or replace without charge (at the company’s option) any product or part which is proven defective under normal use within one (1) year from the date of start-up or one (1) year and six (6) months from date of shipment (whichever occurs first).

In order to obtain service under this warranty, it is the responsibility of the purchaser to promptly notify the local Taco stocking distributor or Taco in writing and promptly deliver the subject product or part, delivery prepaid, to the stocking distributor. For assistance on warranty returns, the purchaser may either contact the local Taco stocking distributor or Taco. If the subject product or part contains no defect as covered in this warranty, the purchaser will be billed for parts and labor charges in effect at time of factory examination and repair.

Any Taco product or part not installed or operated in conformity with Taco instructions or which has been subject to misuse, misapplication, the addition of petroleum-based fluids or certain chemical additives to the systems, or other abuse, will not be covered by this warranty.

If in doubt as to whether a particular substance is suitable for use with a Taco product or part, or for any application restrictions, consult the applicable Taco instruction sheets or contact Taco at [401-942-8000]. Taco reserves the right to provide replacement products and parts which are substantially similar in design and functionally equivalent to the defective product or part. Taco reserves the right to make changes in details of design, construction, or arrangement of materials of its products without notification.

**TACO OFFERS THIS WARRANTY IN LIEU OF ALL OTHER EXPRESS WARRANTIES. ANY WARRANTY IMPLIED BY LAW INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS IS IN EFFECT ONLY FOR THE DURATION OF THE EXPRESS WARRANTY SET FORTH IN THE FIRST PARAGRAPH ABOVE. THE ABOVE WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR STATUTORY, OR ANY OTHER WARRANTY OBLIGATION ON THE PART OF TACO.**

**TACO WILL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF ITS PRODUCTS OR ANY INCIDENTAL COSTS OF REMOVING OR REPLACING DEFECTIVE PRODUCTS.**

This warranty gives the purchaser specific rights, and the purchaser may have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts or on the exclusion of incidental or consequential damages, so these limitations or exclusions may not apply to you.