WARNING!

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. For assistance or additional info contact CEI.

This manual gives basic instructions which must be observed during installation, operation and maintenance of your tank. It is imperative that this manual be read by the responsible personnel/operator(s) prior to the commissioning of any liquid media storage system. It must always be kept available at the site of installation. It is not only the general safety instructions contained in this Safety section which must be observed, but also the specific information provided in the following sections and other applicable manuals.
For Service & Parts Support

**Service**
CEI maintains a fully-staffed service department, with factory-trained service technicians based across the United States for the fastest possible response to your service needs. For service work, including installation, startup, preventive maintenance and retrofits, contact the **CEI Service Dept** at **800.545.4034**.

**Parts**
CEI Enterprises has one of the largest spare parts warehouses in the asphalt industry, stocked with parts for not only CEI products, but parts for competitors products as well. Moreover, our parts representatives have a more comprehensive knowledge of the parts and components used on your CEI equipment than anyone... anywhere. Based near interstates I-40 and I-25, as well as the nearby Albuquerque International Airport, we are conveniently located to rapidly ship parts nationwide and internationally. For your parts needs, contact the **CEI Parts Dept** at **800.545.4034**.

**Training**
CEI offers annual service training at our facility in Albuquerque, New Mexico. Hands-on instruction is provided by our factory-trained service technicians, merely steps away from where your CEI equipment was designed and built. Sessions are typically held in January and February, during the winter off season. Our **Service Training Seminars** provide the highest quality training available on maintaining your CEI equipment in top working order. For owners and operators of asphalt plants large and small, this is an invaluable investment in the knowledge & experience of your crew. For more information, please visit our website at [cei enterprises.com](http://cei enterprises.com).
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Section 1: Introduction

Overview & Serial Number

Overview
This manual is intended to be used by owners, operators, and maintenance personnel to keep your tank in prime operating condition and to answer common questions regarding operating characteristics and capacities.

Serial Number
The tank serial and model numbers are located next to the electrical cabinet.

Note: Please supply the serial number when requesting service support or making reference to the tank for spare parts or operational questions.
Section 1: Introduction

Safety

Safety is of prime concern whenever using an electrically operated, fuel driven high temperature device. Please use proper safety precautions and follow all company, local, state and federal regulations for operating potentially dangerous equipment. Lock-out/tag-out equipment before performing maintenance.

Warning! Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. For assistance or additional information consult CEI, a qualified installer, gas supplier or a service agency.

If You Smell Gas

1. Open windows.
2. Do not touch electrical switches.
3. Extinguish any open flame.
4. Call your gas supplier immediately.

Important Precautions

1. Never attempt to light burner with paper or other materials.
2. Never experiment with the burner.
3. Never change the fuel or air adjustments without consulting with CEI or a qualified burner technician.
4. Never attempt to light the burner if combustion chamber contains any unburned fuel or gases.
5. Never throw waste paper, rags, garbage, or other waste materials into the combustion chamber.
6. Never wash out heating equipment room without first covering the burner with waterproof material.

This manual gives basic instructions which must be observed during installation, operation and maintenance of your CEI tank. It is imperative that this manual be read by the responsible personnel/operator(s) prior to assembly and commissioning of any heat transfer fluid system. It must always be kept available at the site of tank installation. It is not only the general safety instructions in this Safety section which must be observed, but also the specific information provided in the following sections and other applicable manuals.

Safety Symbols (some symbols shown may not be used in this manual)
Section 1: Introduction

Safety

WARNING!

This Product May Contain A Chemical Known To The State Of California To Cause Cancer, Or Birth Defects Or Other Reproductive Harm.

WARNING!

This Product Can Expose You To Chemicals Including Diesel Engine Exhaust, Which Is Known To The State Of California To Cause Cancer.
Section 1: Introduction

Basic Safety Instructions

• Lockout power to the equipment before working on it.
• All drive guards and hand rails must be in place.
• Check that the plant components are in good working condition prior to plant start up.
• Never remove, disable, defeat or bypass any safety device on the plant.
• Make no modifications to your plant without recommendation or approval of a representative of CEI Engineering or Service department.
• Account for all personnel on the job site before starting the plant.
• Avoid wearing loose clothing, necklaces, neckties or anything that could become entangled in rotating machinery.
• Avoid or tie up long hair.
• Never leave the controls unattended while the plant is in operation.
• Never walk on the material stockpiles or in the cold feed bins, to avoid engulfment by loose feed stock.
• Relieve internal pressure before disconnecting any high-pressure line. **Thoroughly tighten all fittings before reapplying pressure.**
• Keep away from power driven parts, even if they are not moving, unless they are locked out.
• Use extreme caution if you must approach running equipment.

Employees should never enter a tank until all the safety precautions are in place and they have been authorized to enter. Emergency procedures must be in place and ready before any employee enters a confined space.

In many jurisdictions, confined space regulations require all employers to have:

• A written confined space plan, including recognizing and marking all confined spaces on site;
• Procedures to test and monitor the air inside confined spaces before and during all employee entries;
• Procedures to prevent unauthorized entries and to have an attendant outside the space at all times;
• Effective controls of all existing atmospheric or safety hazards inside the confined space;
• Employee and supervisor training on safe work procedures, hazard controls, and rescue procedures; and
• Effective rescue procedures which are immediately available on site.
Main Components

CEI asphalt tanks consist of 4 primary components and may contain options:

Tank Section

The tank holds the AC until it is needed elsewhere. Tanks are insulated to help maintain contents at a stable, operator-selected temperature. Horizontal and portable tanks may also be split into multiple compartments with internal bulkheads. Where required, tank designs include reinforcements to address seismic safety and requirement.

- A manway provides entrance to the interior of the tank for maintenance.
- A High Level Switch, actuated by an attached float, is normally used to turn an unloading pump OFF when the level of AC approaches full.
- An optional Low Level Switch, also actuated by an attached float, helps prevent coil or heating element coking1 by interrupting the flow of electricity to a solenoid valve contactor, turning AC heating OFF before the heating components can be exposed to air.

Heating System

There are a variety of heating systems available for storage tanks. The systems listed below are the ones most commonly used by CEI.

Heat Transfer Fluid: AC is kept in a low viscosity state using Heat Transfer Fluid (Hot Oil) that flows through heating coils at the bottom and along the length of the tank. The heat transfer oil itself is heated by a circulating hot oil heater. The heater may be installed remotely, or in the case of some portable or horizontal tanks, the heater may be mounted on an extension of the tank itself.

Direct-Fired Burner Tube: Heat is provided by a burner that is mounted on the tank. The burner fires into a refractory-lined burner tube that extends along the bottom of the tank. The heated tube, as well as the exhaust piping, transfer heat to AC stored inside the tank.

Scavenger Coils are sometimes used inside direct-fired tanks. Heat transfer oil flowing through the scavenger coils is heated by the AC (which has been heated by the fire tube). This heat transfer fluid is then circulated to other plant components. This arrangement is typically seen on small portable asphalt plants.

Electric Heating Elements: With electrically-heated tanks, heating elements are fitted into tubes at the bottom of the tank. When heated, these elements then heat the tubes they are housed in. The heated tubes then transfer heat to AC inside the tank, much like the heating coils in a heat transfer oil system.

Temperature Control System

Tank media temperature is maintained through operator adjusted temperature sensing circuitry that controls the flow of hot oil through the heating coils. CEI tanks are available with either analog UE temperature controllers or digital Yokogawa UT150 controllers. Honeywell controllers may also be used in some cases.

---

1 Coking is the build up of solids on coils or heating elements when AC is present and coils or heating elements are exposed to air while being heated.
Section 1: Introduction

Main Components

Level Indicator

Knowing how much AC remains within a tank is important and CEI includes a method to monitor the AC level. Depending on the options included with your tank, one or more of the level indicator systems listed below will be used.

- **Mechanical Float**: Visually indicates the level of AC using a float connected to an external pole (often called a pogo stick).
- **Gauge Board**: A graduated gauge board gives a fairly accurate indication of the AC level. The board’s indicator is tied to an internal float.
- **Pressure Sensor**: Uses the pressure exerted by the weight of the AC remaining in the tank. The weight is converted into quantity and shown on a digital display.

Commonly Included Options:

The following components are optional and may or may not be included with your tank.

- **Variable Frequency Drive (VFD)**: A VFD controller, mounted within the control cabinet, accurately controls the speed of a pump motor (usually a metering pump motor) by varying the frequency of the power applied to the motor. The lower the supplied frequency the slower the pump motor rotates.
- **Hot Oil Heater**: Often mounted on the trailer gooseneck of a portable tank, the hot oil heater supplies hot oil to the tank and, when equipped, hot oil to external devices.
- **Hot Oil Heater Fuel Tank**: Normally mounted near the heater, the fuel tank is present only when a hot oil heater is running on fuel oil.
- **Auxiliary Side Pump(s)**: A hot oil heater of sufficient size can supply hot oil to additional locations, when desired, as well as the AC tank. To accommodate the additional locations auxiliary pumps are added adjacent to the heater. Controls for the auxiliary pumps are included in the electrical panel for the hot oil heater (auxiliary pumps can also be wired for control from a remote location).
- **Unloading Pump Assembly**: Normally located over the trailer gooseneck of a portable tank, the unloading pump assembly transfers AC from a tanker truck into the heated tank. The assembly consists of the pump, pump motor, filter and related components.
- **Metering Pump Assembly**: Supplying AC to external destinations, this assembly uses one pump to feed AC and another, driven by the flowing AC, to measure the quantity of AC going to the external destination.
- **Transfer Pump Assembly**: Used to move AC between tanks for continual mixing and load balance. The assembly includes pump, pump motor, filter, inlet and outlet valves.
- **Calibration Tank**: Accurately measures the quantity of AC pumped into it by the metering pump. The measured quantity is then used to calibrate the metering pump.
- **Mixer**: Normally mounted through the top of the tank, a mixer ensures the AC is uniformly distributed and heated within the tank.
- **Vent Condenser**: Used to reduce emissions. A vent condenser captures blue smoke emissions from AC stored and heated in the tank. It then cools and reliquefies these fumes, returning them to the tank.
Section 2: Installation

Inspection & Position

Inspection
CEI takes great care in the construction and shipping of each CEI tank so that it will arrive ready for installation and operation. However sometimes the unforeseen happens and damage to the tank occurs during loading, shipment and/or delivery.

We recommend a full inspection of the tank for any signs of damage and/or missing parts before installing the tank.

In the unlikely event that damage has occurred or a part (or parts) is missing, please contact your CEI representative before continuing with the heater installation.

Stationary Tanks

Site Preparation & Position

REMOVE the internal shipping bracket (or brackets) before erecting any tank equipped with a mixer. The bracket (or brackets) prevent mixer shaft damage during shipment. ¹

When equipped with an internal float, REMOVE the bailing wire from the float before erecting the tank. The bailing wire protects the float during shipment.²

When selecting a location for your tank, make certain that the selected site is level and capable of supporting its full operational weight.

Use a crane with sufficient weight capacity to lift the empty tank into its operating position and location. Consult the shipping documents for the system’s dry weight.³

Portable Tanks

Site Preparation
Site preparation must be completed before positioning the trailer. Site preparation normally begins with an engineering study followed by the necessary physical preparation. CEI does not provide these services.

Position the Trailer
Place the trailer on a level surface and positioned so its contents can be easily distributed and replenished. Level the trailer using the trailers jack stands.

Trailers need to be stable where placed. If necessary use trenching plates under each jack stand to increase stability.

¹ An internal shipping bracket is not present on 35K or larger tanks. A bearing midpoint on the mixer shaft serves the purpose of the bracket.

² A level indicating internal float is only present on tanks equipped with a media level gauge board.

³ Dry weight does not include the weight of any liquid media or heat transfer fluid.
Section 2: Installation

Connect Electrical & Plumbing

Standard Tanks

Connect Electrical

Verify that there is sufficient electrical power for your tank before proceeding. Consult the shipping documents for the system’s electrical requirements. Power requirements are also listed on the tank’s electrical schematic.

Connect the external electrical power while adhering to any applicable codes.

Connect Plumbing

Connect the required tank AC Fill, Return and Supply lines.
Connect the hot oil Supply and Return lines.

Note: If the tank is part of a tank farm connect the tank-to-tank plumbing first.

Portable Tanks with Hot Oil Heater

Connect Electrical

Verify that there is sufficient electrical power for your tank before proceeding. A schematic with electrical power requirements is included within the heater’s electrical control box.

Connect the external electrical power while adhering to any applicable codes.

Note: When the Portable AC Tank includes a hot oil heater connections are done in the heater’s electrical control box. Power is supplied into the control box and requires a power cable access point (hole) in that box. CEI suggests that the access point be on the bottom of the control box.

NOTE: Consult the heater manual for additional electrical startup procedures.
Section 2: Installation

System Initialization

Note: CEI thoroughly tested your equipment before shipment so it should arrive ready to connect and operate; however, unexpected problems can and do occur. CEI therefore strongly suggests that you perform the following System Initialization when the equipment is ready to operate and any time it has been moved from one location to another.

Apply Power

Apply power only after all connections (power, product, etc.) are complete.

Low Level Float

1. Observe that the LAL (Low Asphalt Level) relay’s indicator in the electrical cabinet is OFF.
2. Manually lift the low level float shaft and observe that the LAL relay’s indicator in the electrical cabinet goes ON.
3. Release the float.

High Level Float

1. Observe that HAL (High Asphalt Level) relay’s indicator in the electrical cabinet is ON.
2. Observe that the unloading pump motor is ON.
3. Manually lift the high level float shaft and observe that the HAL relay’s indicator in the electrical cabinet goes OFF.
4. Observe that the unloading pump motor is OFF.
5. Release the float.

Repeat the Low Level and High Level Float steps above for multi-compartment tanks. Note that the LAL and HAL relays will be numbered in accordance with the connected tank.

Unloading Pump (Optional)

Note: When the unloading pump assembly has a mechanical seal on the pump, fill its Oil Dispensing Reservoir approximately ¾ full with a lightweight oil such as heat transfer oil or WD-40. Mark the reservoir at ¼ to help monitor the mechanical seal condition; if the oil level goes above the mark it indicates that product is leaking around the seal.

Before adding any AC to the tank turn the switch for the Mixers ON and observe that both mixer DO NOT operate.

Failure to keep sufficient oil in the dispenser may cause a product pump failure.

1. If not already connected, connect the product source (supply truck, etc.) to the inlet for the unloading pump.
2. Open the valve next to the strainer assembly and any valve on the product source.
3. Turn the Unloading Pump ON and observe that product is flowing into the tank or the selected compartment on a multi-compartment tank.
4. As product continues to flow into the tank manually actuate the high level float/switch (to indicate that the tank is nearing capacity) and verify that the unloading pump turns OFF.
5. Release the high level float/switch and let the product continue to fill the tank.
Section 2: Installation

Optional Unloading Pump and Mixer Testing

Unloading Pump Testing

Note: An individual on the tank top is needed for the following test.

1. Connect the AC source (AC supply truck, etc.) to the inlet for the unloading pump.
2. Open the valve next to the strainer assembly and any valve on the AC source.
3. Turn the Unloading Pump ON and observe (through an open manway) that AC is flowing into the tank.
4. As AC continues to flow into the tank, manually actuate the high level float/switch to simulate that the tank is nearing capacity, and verify that the unloading pump turns OFF.
5. Release the high level float/switch and let the AC continue to fill the tank.

Mixer Testing

Note: An individual on the tank top is needed for the following test.

Before adding any AC to the tank turn the switch for the Mixers ON and observe that both mixer DO NOT operate.

1. When AC is enough above the heating coils to actuate the low level switch, activate tank heating.

Note: The following steps assume that the AC is well below the desired storage temperature.

2. Move the set point temperature down below the ambient temperature of the AC in the tank and observe that the Mixers turn ON.
3. Move the set point temperature well above the ambient temperature of the AC in the tank and observe that the mixers turn OFF.
Section 2: Installation

Initiate the Tank

Open the manual valve(s) that provide hot oil to the tank. Open the required valve(s) to add media to the tank.

Once the internal level of media is sufficiently above the top of the heating coils apply power and set the desired temperature.
Section 2: Installation

Optional Pressure Level Indicating System

Pressure System Setup

The tank must be properly installed, secured and EMPTY before doing this Pressure System Setup. For accurate tank level readout on the pressure transmitter, the “Zero” (mode 7) and “Specific Gravity” (mode 6) adjustments must be made.

The Pressure Level Indicating System for your CEI storage tank is a combination of a Pressure Transmitter and a Controller.

The Pressure Transmitter senses pressure exerted on its diaphragm and converts that pressure to a 4 to 20ma signal. The signal is sent to Controller, converted to inches and displayed. It is configured at CEI to display the milliampere signal as the tank level in inches. However, due to varying media specific gravity the pressure transmitter MUST be configured on site for accurate measurements.

The Controller also displays the level in inches and is normally configured to alarm at High and Low levels within a preset range. A High Level Alarm shuts the unloading pump OFF before the tank can overfill (when properly wired in series with the unloading pump). A Low Level Alarm shuts the heat transfer oil OFF before the product level in the tank exposes the heating coils. Exposed hot heating coils can lead to coking.

The controller is set up first.
### Setup for Yokogawa UT150 Pressure System Controller

*Note: The Controller is pre-programmed to the values listed below when ordered from CEI.*

<table>
<thead>
<tr>
<th>Item #</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SP2 lamp (green)</td>
<td>Lit when SP2 is being used for control operation.</td>
</tr>
<tr>
<td>2</td>
<td>Alarm 2 (AL2) lamp (red)</td>
<td>Lit when alarm 2 is activated.</td>
</tr>
<tr>
<td>3</td>
<td>Alarm 1 (AL1) lamp (red)</td>
<td>Lit when alarm 1 is activated.</td>
</tr>
</tbody>
</table>
| 4      | Output (OUT) display lamps Left: orange; Right: green | Lit while control output is being output.  
  - Left lamp is lit during control output of standard type.  
  - In heating/cooling control, the left lamp lights up when the heating-side output is active; while the right lamp lights up when the cooling-side output is active. |
| 5      | SET/ENT key (data registering key) | Registers the data value changed using the data change keys.  
  - Switches between operating display or parameter setting displays sequentially.  
  - Pressing the key for 3 seconds or longer in the operating display retrieves the operating parameter setting display.  
  - Pressing the key for 3 seconds or longer in either an operating or setup parameter setting display transfers back to operating display 1. |
| 6      | PV display (red)      | Indicates PV (measured value) and character information such as parameter codes and error codes. |
| 7      | SP display (green)    | Indicates SP (target setpoint) and parameter values.                     |
| 8      | Data change keys (Down / Up) | Changes SP and the parameter values.  
  - Pressing the down key decreases the data value and pressing the up key increases it. Holding down the key will gradually increase the speed of the change. |
Section 2: Installation

Optional Pressure Level Indicating System

Setup Parameters

Note: If the display shows that IN is OFF when you first apply power, the controller has not been programmed. Repeatedly press the UP arrow key until the display shows 22 then press the SET/ENT key.

1. Press and Hold the SET/ENT key for at least 3 seconds to enter the setup parameters (display shows A1).
2. Repeatedly press the SET/ENT key until the display shows LOC.
3. Press the Down Arrow key to change the display to –1.
   Note: If the LOC display shows 1, press the down key for a display of 0. Press the SET/ENT key, press the down arrow key for a display of –1.
4. Use the Down Arrow and Up Arrow keys to change the displayed value to those in the following table then press the SET/ENT key to save the value.
5. Press the SET/ENT key again to move to the next item.
6. Repeat steps 4 and 5 for all items in the following table:

<table>
<thead>
<tr>
<th>Prompt</th>
<th>Parameter Type</th>
<th>Value Vertical Tank</th>
<th>Value Horizontal Tank</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln</td>
<td>Input type</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>dp</td>
<td>Decimal Point Position</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>rH</td>
<td>Maximum Value of Input Scale</td>
<td>600</td>
<td>126.0</td>
</tr>
<tr>
<td>rL</td>
<td>Minimum Value of Measured Input Scale</td>
<td>11*</td>
<td>6.0*</td>
</tr>
<tr>
<td>SPH</td>
<td>Setpoint range maximum value</td>
<td>11.1</td>
<td>6.1</td>
</tr>
<tr>
<td>SPL</td>
<td>Setpoint range minimum value</td>
<td>11</td>
<td>6.0</td>
</tr>
<tr>
<td>UPr</td>
<td>Setpoint ramp-up rate</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>dnr</td>
<td>Setpoint ramp-down rate</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>tmU</td>
<td>Setpoint ramp-rate time unit</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>rtH</td>
<td>Retransmission maximum value</td>
<td>600</td>
<td>126.0</td>
</tr>
<tr>
<td>rtL</td>
<td>Retransmission minimum value</td>
<td>11</td>
<td>6.0</td>
</tr>
<tr>
<td>AL1</td>
<td>Alarm 1 type</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>AL2</td>
<td>Alarm 2 type</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>HY1</td>
<td>Alarm 1 hysteresis</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>HY2</td>
<td>Alarm 2 hysteresis</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>dr</td>
<td>Direct / reverse action</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

* This can vary, depending on the design of the tank. Values given here are for typical, hot oil-heated asphalt tanks. Contact the CEI Service department for assistance.

7. Adjust the Operating Parameters when finished with the Setup Parameters.
Section 2: Installation

Optional Pressure Level Indicating System

Operating Parameters

Note: The controller automatically returns to the Operator mode after 2 minutes if no buttons are pressed.

1. To enter Operating Parameters press and hold the SET/ENT key for approximately 3 seconds until the display shows A1.

2. Use the Down Arrow and Up Arrow keys to change the displayed value to those in the following table then press the SET/ENT key to save the value.

3. Press the SET/ENT key again to move to the next item.

4. Repeat steps 2 and 3 for all items in the following table:

5. When finished entering the Operating Parameters press and hold the SET/ENT key until the display returns to normal operations.

<table>
<thead>
<tr>
<th>Prompt</th>
<th>Parameter Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>A1 Alarm Value</td>
<td>See Fig.A &amp; B, Next Page</td>
</tr>
<tr>
<td>A2</td>
<td>A2 Alarm Value</td>
<td>See Fig.A &amp; B, Next Page</td>
</tr>
<tr>
<td>Ctl</td>
<td>Control Mode</td>
<td>onF</td>
</tr>
<tr>
<td>HYS</td>
<td>Hysteresis</td>
<td>0.0</td>
</tr>
<tr>
<td>FL</td>
<td>PV input filter</td>
<td>OFF</td>
</tr>
<tr>
<td>bS</td>
<td>PV input bias</td>
<td>0.0</td>
</tr>
<tr>
<td>LoC</td>
<td>Key lock</td>
<td>0 : No key lock</td>
</tr>
</tbody>
</table>
Section 2: Installation

Optional Pressure Level Indicating System

Operating Parameters, continued

**Figure A.** How the A1 and A2 alarm values are measured.

The Alarm 1, or A1 value is determined by the height at which the pressure sensor is mounted in the tank. The Alarm 1 value **MUST** be higher than the location of the pressure sensor, as well as higher than the heating coils. The minimum level of storage media in the tank **MUST** be 2 to 4 inches higher than the heating coils for safe operation of the tank.

The Alarm 2, or A2 value is determined by the vertical distance from the pressure sensor to the maximum allowable liquid level in the tank.

These values are given in inches, and vary depending on the size, capacity, heating system, and orientation (horizontal or vertical) of the tank.

See the chart in Figure B for these values among different sizes and models of CEI tanks.

### Asphalt Tanks

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>A1 Value (in.)</th>
<th>A2 Value (in.)</th>
<th>Model</th>
<th>Capacity</th>
<th>A1 Value</th>
<th>A2 Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAV-10</td>
<td>10,000 gal</td>
<td>28*</td>
<td>114</td>
<td>TAV-15</td>
<td>15,000 gal</td>
<td>28*</td>
<td>114</td>
</tr>
<tr>
<td>TAV-20</td>
<td>20,000 gal</td>
<td>28*</td>
<td>114</td>
<td>TAV-25</td>
<td>25,000 gal</td>
<td>28*</td>
<td>114</td>
</tr>
<tr>
<td>TAV-30</td>
<td>30,000 gal</td>
<td>28*</td>
<td>114</td>
<td>TAV-35</td>
<td>35,000 gal</td>
<td>28*</td>
<td>114</td>
</tr>
<tr>
<td>TAV-40</td>
<td>40,000 gal</td>
<td>28*</td>
<td>114</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure B.** Yokogawa UT150 Pressure Controller A1 and A2 values for CEI asphalt tanks.

* This value will vary depending on the height of the coils. This is generally 24" on most horizontal tanks. There **must** be at least 2 to 4 inches of storage media remaining above the heating coils for safe operation of the tank. Contact CEI Service Dept for assistance.

* This value will vary depending on tank model and some internal components. The Alarm 1 value is the distance from the bottom of the tank to 4" above the heating coils. The Alarm 2 value is the distance (in inches) from the Alarm 1 value to a point 36" below the top of the tank. Contact CEI Service Dept for assistance.
Section 2: Installation

Optional Pressure Level Indicating System

Pressure Transmitter

Before performing this Pressure Transmitter procedure make sure to have the specific gravity of the media to be stored in the tank. However, note that in many cases the specific gravity available from the media supplier may have been calculated at a temperature different from the media storage temperature.

Zero Point Setting

1. If there is NO isolation valve between the transmitter and the tank be sure to do this Zero Point Setting procedure before adding media to the tank. When there is an isolation valve between the transmitter and the tank close the valve.

2. Slightly loosen the 4 mounting bolts where the transmitter is mounted to the flange. Open the valve just enough to allow any pressure to vent while keeping the transmitter at 90° to the flange connection.

3. Remove the 2 cover screws and open the cover.
Section 2: Installation

Optional Pressure Level Indicating System

4. Press the Mode Select button enough times to display mode 07. With mode 7 displayed press both the UP and DOWN at the same time to set the upper display value to 0.0.

5. Press the mode button again to save the zero setting.

6. Tighten the 4 mounting bolts loosened in step 2 making sure the flange gasket is properly in place.

7. Open the isolation valve between the transmitter and the tank if present.

8. Begin adding media.

**Before continuing make sure the temperature of the media is at its storage temperature and the tank is filled with media, as near as possible to the top of the tank.**

Pressure Sensor Calibration

1. Press the Mode Select button enough times to display the Level Readout.

2. Make sure the media level is high enough in the tank (i.e. near the top) to be easily seen then physically check the media level in the tank.

   When the actual level in the tank and the indicated level on the Pressure Sensor are the same then the calibration is correct. End of procedure.

   If the actual level in the tank IS NOT the same as that indicated on the pressure sensor continue to step 3.
Section 2: Installation

Optional Pressure Level Indicating System

3. Press the Mode Select button enough times to display mode 06.

4. Adjust the Mode 6 value up or down until the actual and displayed values match.

5. Repeat from step 1 until the actual level in the tank and the indicated level on the Pressure Sensor are the same.

6. Close the button cover and reinstall the cover screws.
   Periodically check that the actual and displayed values are the same. Repeat this procedure as required.
Section 2: Installation

Temperature Control

Tank Temperature Control

Types of Controllers

CEI asphalt storage tanks are available with either analog UE temperature controllers or digital Yokogawa temperature controllers.

Procedures for both types of controllers are in the pages that follow.

UE Temperature Controller

Yokogawa Temperature Controller
Dual Set Point Controller Adjustment

The Dual Set Point Temperature Controller has a RED pointer used to set a maximum temperature and a GREEN pointer used to a minimum temperature.

1. Set the RED pointer to the desired temperature.
2. Insert a test thermometer into the AC and monitor its reading.
3. With sufficient AC in the tank turn the heater power ON.
   When the temperature on the test thermometer is at the desired maximum temperature the heater should turn OFF.
   When the temperature on the test thermometer reaches the desired minimum temperature the heater should turn ON.
   **Note:** If both maximum and minimum test thermometer temperatures are within ±5°F of the controller’s set points the adjustment is complete.
   If either measured temperature IS NOT within ±5°F continue to the next step.
4. Remove the temperature controller’s adjusting knobs and front cover. Locate the compensator and zero adjustment.
5. Use two 5/16” open end wrenches. While holding the compensator one wrench, adjust the zero adjustment with the other wrench so the BLACK pointer matches the reading on the test thermometer.
6. Replace the temperature controller’s front cover.
7. Repeat from step 1.

When the system operates as expected the temperature controller adjustment is complete.
**Note:** If the system DOES NOT operate as expected contact CEI for assistance.
Section 2: Installation

UT150 Temperature Controller Setup

Tank Temperature Set

<table>
<thead>
<tr>
<th>Item #</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SP2 lamp (green)</td>
<td>Lit when SP2 is being used for control operation.</td>
</tr>
<tr>
<td>2</td>
<td>Alarm 2 (AL2) lamp (red)</td>
<td>Lit when alarm 2 is activated</td>
</tr>
<tr>
<td>3</td>
<td>Alarm 1 (AL1) lamp (red)</td>
<td>Lit when alarm 1 is activated.</td>
</tr>
</tbody>
</table>
| 4      | Output (OUT) display lamps Left: orange; Right: green | Lit while control output is being output.  
  • Left lamp is lit during control output of standard type.  
  • In heating/cooling control, the left lamp lights up when the heating-side output is active; while the right lamp lights up when the cooling-side output is active. |
| 5      | SET/ENT key (data registering key) | Registers the data value changed using the data change keys.  
  • Switches between operating display or parameter setting displays sequentially.  
  • Pressing the key for 3 seconds or longer in the operating display retrieves the operating parameter setting display.  
  • Pressing the key for 3 seconds or longer in either an operating or setup parameter setting display transfers back to operating display 1. |
| 6      | PV display (red) | Indicates PV (measured value) and character information such as parameter codes and error codes. |
| 7      | SP display (green) | Indicates SP (target setpoint) and parameter values. |
| 8      | Data change keys (Down / Up) | Changes SP and the parameter values.  
  • Pressing the down key decreases the data value and pressing the up key increases it. Holding down the key will gradually increase the speed of the change. |
Section 2: Installation

UT150 Temperature Controller Setup

Setup Parameters

**Note:** If the display shows that IN is OFF when you first apply power, the controller has not been programmed. Repeatedly press the UP arrow key until the display shows 22 then press the SET/ENT key.

1. Press and Hold the SET/ENT key for approximately 3 seconds to enter the setup parameters (display shows A1).
2. Repeatedly press the SET/ENT key until the display shows LOC.
3. Press the Down Arrow key to change the display to –1.
   **Note:** If the LOC display shows 1, press the down key for a display of 0. Press the SET/ENT key then press the down arrow key for a display of –1.
4. Use the Down Arrow and Up Arrow keys to change the displayed value to those in the following table then press the SET/ENT key to save the value.
5. Press the SET/ENT key again to move to the next item.
6. Repeat steps 4 and 5 for all items in the following table:

<table>
<thead>
<tr>
<th>Prompt</th>
<th>Parameter Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>In</td>
<td>Input type</td>
<td>35</td>
</tr>
<tr>
<td>SPH</td>
<td>Setpoint range maximum value</td>
<td>400°F</td>
</tr>
<tr>
<td>SPL</td>
<td>Setpoint range minimum value</td>
<td>250°F</td>
</tr>
<tr>
<td>UPr</td>
<td>Setpoint ramp-up rate</td>
<td>OFF</td>
</tr>
<tr>
<td>dnr</td>
<td>Setpoint ramp-down rate</td>
<td>OFF</td>
</tr>
<tr>
<td>tmU</td>
<td>Setpoint ramp-rate time unit</td>
<td>1</td>
</tr>
<tr>
<td>rtH</td>
<td>Retransmission maximum value</td>
<td>0</td>
</tr>
<tr>
<td>rtL</td>
<td>Retransmission minimum value</td>
<td>-1</td>
</tr>
<tr>
<td>AL1</td>
<td>Alarm 1 type</td>
<td>9</td>
</tr>
<tr>
<td>AL2</td>
<td>Alarm 2 type</td>
<td>10</td>
</tr>
<tr>
<td>HY1</td>
<td>Alarm 1 hysteresis</td>
<td>1</td>
</tr>
<tr>
<td>HY2</td>
<td>Alarm 2 hysteresis</td>
<td>1</td>
</tr>
<tr>
<td>SC</td>
<td>SUPER Function</td>
<td>OFF</td>
</tr>
<tr>
<td>dr</td>
<td>Direct / reverse action</td>
<td>0</td>
</tr>
</tbody>
</table>

a. The Setpoint Range Maximum Value is used to shut off the flow of hot oil (Apollo Valve) when the programmed value (temperature) is reached. The value is adjustable and must match the Operating Parameter A1 value.

b. The Setpoint Range Minimum Value is used to keep the mixer from operating until the programmed value (temperature) is reached. The value is adjustable and must match the Operating Parameter A2 value.

7. When finished entering the Setup Parameters press and hold the SET/ENT key until the display returns to normal operations.
Section 2: Installation

UT150 Temperature Controller Setup

Operating Parameters

Note: The controller automatically returns to the Operator mode after 2 minutes if no buttons are pressed.

1. Press and Hold the SET/ENT key for at least 3 seconds to enter the setup parameters (display shows A1).
2. Use the Down Arrow and Up Arrow keys to change the displayed value to those in the following table then press the SET/ENT key to save the value.
3. Press the SET/ENT key again to move to the next item.
4. Repeat steps 2 and 3 for all items in the following table:

<table>
<thead>
<tr>
<th>Prompt</th>
<th>Parameter Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Alarm 1 Setpoint Value(^a)</td>
<td>400 (F°)</td>
</tr>
<tr>
<td>A2</td>
<td>Alarm 2 Setpoint Value(^b)</td>
<td>250 (F°)</td>
</tr>
<tr>
<td>Ctl</td>
<td>Control mode</td>
<td>onF</td>
</tr>
<tr>
<td>HYS</td>
<td>Hysteresis</td>
<td>10</td>
</tr>
<tr>
<td>FL</td>
<td>PV input filter</td>
<td>OFF</td>
</tr>
<tr>
<td>bS</td>
<td>PV input bias</td>
<td>0.0</td>
</tr>
<tr>
<td>LoC</td>
<td>Key Lock</td>
<td>0: No key lock</td>
</tr>
</tbody>
</table>

\(^a\) The Alarm 1 Setpoint Value is used to shut off the flow of hot oil (Apollo Valve) when the programmed value (temperature) is reached. The value is adjustable and must match the Setup Parameter SPH value.

\(^b\) The Alarm 2 Setpoint Value is used to keep the mixer from operating until the programmed value (temperature) is reached. The value is adjustable and must match the Setup Parameter SPL value.

5. When finished entering the Operating Parameters press and hold the SET/ENT key until the display returns to normal operations.
# Section 3: Maintenance

## Tank Maintenance Schedule

<table>
<thead>
<tr>
<th>Item</th>
<th>Frequency</th>
<th>Checked By</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure System for Monitoring Horizontal Tank Content Levels</td>
<td>As required</td>
<td>Service Technician</td>
<td>Use calibration to verify that the actual and displayed values are the same</td>
</tr>
<tr>
<td>Unloading Pump Assembly</td>
<td>Daily</td>
<td>Operator</td>
<td>Make sure Oil Dispensing Reservoir has sufficient oil Check belt tension</td>
</tr>
<tr>
<td></td>
<td>Weekly</td>
<td>Service Technician</td>
<td>Check the Mechanical Seal on the Pump shaft Check for vibrations Check for worn belts</td>
</tr>
<tr>
<td></td>
<td>Monthly</td>
<td>Service Technician</td>
<td>Check Bushings and Bearing for wear</td>
</tr>
<tr>
<td>Side Pump Assembly</td>
<td>Yearly</td>
<td>Service Technician</td>
<td>The side pump bearings consist of one outboard grease lubricated ball bearing and one internal liquid flushed carbon sleeve bearing. The ball bearing should be lubricated at the following intervals:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Pump speed</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3450~3600 rpm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Use the following quantities of grease:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Bearing bracket</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>35</td>
</tr>
<tr>
<td>Metering Pump Assembly</td>
<td>Daily</td>
<td>Operator</td>
<td>Check belt tension</td>
</tr>
<tr>
<td></td>
<td>Weekly</td>
<td>Service Technician</td>
<td>Check for vibrations Check for worn belts Check the Actuator operation</td>
</tr>
<tr>
<td></td>
<td>Monthly</td>
<td>Service Technician</td>
<td>Check Bushings and Bearing for wear Verify Encoder output</td>
</tr>
<tr>
<td>Calibration Tank</td>
<td>Daily</td>
<td>Operator</td>
<td>Check for dust and dirt caught between the Load Cells and the Upper Load Cell Pins and Rockers</td>
</tr>
<tr>
<td></td>
<td>Monthly</td>
<td>Service Technician</td>
<td>Test and Calibrate</td>
</tr>
<tr>
<td>Mixer Reducer</td>
<td>Daily</td>
<td>Operator</td>
<td>Check reducer oil level</td>
</tr>
<tr>
<td></td>
<td>3 years or 1000 hours</td>
<td>Service Technician</td>
<td>Change reducer oil</td>
</tr>
<tr>
<td>Mixer Motor</td>
<td>See nameplate</td>
<td>Service Technician</td>
<td>Check the motor and bearings</td>
</tr>
<tr>
<td>Vent Condenser</td>
<td>Yearly</td>
<td>Service Technician</td>
<td>Replace steel wool</td>
</tr>
</tbody>
</table>

>Note: This maintenance schedule includes optional components that may or may not be installed on your tank.
Section 3: Maintenance

Component Maintenance

Mixer Right Angle Gear Reducer & Motor (Optional)

Although CEI fills the gear reducer with ISO 220 EP type mineral oil to the correct oil level before shipment always check the oil level before startup and frequently thereafter with the unit at operating temperature if possible.

Check the oil level frequently, at least daily. Change the oil after 10000 operating hours, or three years whichever comes first (synthetic lubricants may be used for up to 2000 hours or six years). Change the lubricant more often if the unit is operating in a hostile environment.

Note: For ambient temperatures below −30°F (−34°C) special oil seals are required. Consult Application Engineering.

<table>
<thead>
<tr>
<th>Ambient Temperature Range</th>
<th>Lubricant Description</th>
<th>Approved Lubricants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>MOBIL</td>
</tr>
<tr>
<td>+14°F to +50°F</td>
<td>Mineral Oil ISOVG100 RL05</td>
<td>Mobilgear 627 RL05</td>
</tr>
<tr>
<td>-30°F to +14°F</td>
<td>Synthetic Oil ISOVG150</td>
<td>Mobil SHC-629 RL01</td>
</tr>
<tr>
<td>Mineral Grease (for ball and roller bearings)</td>
<td>Mobilith AW2, AW3</td>
<td>—</td>
</tr>
</tbody>
</table>

Gear Reducer
Section 3: Maintenance

Component Maintenance

Motor

Check the motor and motor bearings frequently as indicated on the motor name-plate. Specifically check the motor bearings for excessive noise, temperature and grease condition.

**Note:** The lubrication period and type of bearings are indicated on the motor nameplate.

*Lock out/Tag out the mixer motor before removing and/or disassembling the motor.*

CEI mixer motors generally DO NOT have bearing grease fittings. To lubricate these bearings do the following:

- Disassemble the motor.
- Clean out all the grease.
- Wash the bearing with kerosene or diesel.
- Hand dry the bearing and re-grease the bearing immediately.

<table>
<thead>
<tr>
<th>Supplier</th>
<th>Application</th>
<th>Grease</th>
<th>Temperature For Constant Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESSO</td>
<td>Normal</td>
<td>Polyrex EM (Polyurea Base)</td>
<td>-22°F to +338°F -30°C to +170°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unirex N2 (Lithium Base)</td>
<td>-22°F to +329°F -30°C to +165°C</td>
</tr>
<tr>
<td>SHELL</td>
<td></td>
<td>Alvânia R3 (Lithium Base) a</td>
<td>-31°F to +266°F -35°C to +130°C</td>
</tr>
<tr>
<td>KLÜBER</td>
<td>Low Temperatures</td>
<td>Isoflex NBU15 (Barium Complex)</td>
<td>-76°F to +266°F -60°C to +130°C</td>
</tr>
</tbody>
</table>

\[ a. \text{ When using the Alvânia R3 grease do the following correction:} \]

\[ \text{Lubrication Interval (Alvânia R3) = Normal Lubrication Interval x 0.65.} \]

Gauge Board

Monthly Checks

- Check the glycerin level and refill as required.
  The V-neck of the seal at the top of the tank must be filled with a glycerin anti-freeze to keep the wheels and wire from binding or freezing. This is especially important when mixer assemblies are installed in the tank.
- Check for wire wear and replace as required.
- Inspect limit switch and switch arm for damage. Replace as required.
Section 3: Maintenance

Component Maintenance

Unloading Pump Assembly (Optional)

Maintenance Schedule

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Checked By</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>Operator</td>
<td>Make sure Oil Dispensing Reservoir has sufficient oil</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check belt tension</td>
</tr>
<tr>
<td>Weekly</td>
<td>Service Technician</td>
<td>Check the Mechanical Seal on the Pump shaft</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check for vibrations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check for worn belts</td>
</tr>
<tr>
<td>Monthly</td>
<td>Service Technician</td>
<td>Check Bushings and Bearing for wear</td>
</tr>
</tbody>
</table>

Daily

Check the belt tension – belt tension is measured by deflection. Measure the distance between the sheave center lines (perpendicular to the belts) and parallel to the belt. The belt deflection should be approximately $\frac{1}{4}$" for each inch of span.

Note: When adjusting belt tension make sure the motor sheave remains parallel to the belt path. Tightening one slide base bolt more than the other can cause mis-alignment.
Section 3: Maintenance

Component Maintenance

Unloading Pump Assembly (Optional)

Weekly
- Check for vibrations
- Check for worn belts

Monthly
- Check the Bushings and Bearing for wear

Troubleshooting
If the belts are slipping, smoking and/or smelling an AC plug (AC that has cooled to a too stiff state for easily flow) may have develops within the pump. The AC plug will cause the pump to seize causing the belt slippage, smoking or smell.

1. Remove and lock out power to the pump motor.
2. Isolate the pump via inflow and outflow valves.
3. Disassembly the pump, clear the plug then reassembly the pump. Be sure to check the V-Belt(s) tension (see daily maintenance below).
4. Open the closed valves, remove the lock out and reapply power.
5. Verify AC flows through the pump.

Parts Replacement
1. Stop operations then lock-out tag-out the system power.
2. If necessary, remove the belt guard.
3. If necessary, loosen the belt tension using the slide base bolts under the motor.
4. Go to the heading below for the item being replaced.
Section 3: Maintenance

Component Maintenance

Unloading Pump Assembly (Optional)

Belts
1. Remove the worn belts and inspect the groves on both sheaves. Clean or replace the sheaves as necessary.
2. Install the new belts.
3. Adjust the belt tension – belt tension is measured by deflection. Measure the distance between the sheave center lines (perpendicular to the belts) and parallel to the belt. The belt deflection should be approximately \( \frac{1}{64} \)" for each inch of span.
4. Re-install the belt guard and remove the lock-out tag-out. Restart operations.

Motor
1. Remove the electrical access cover on the motor and label the incoming wires. Disconnect the wires and conduit and remove them from the motor.
2. Remove the belts. Take the sheave off the motor shaft.
3. Remove the nuts and washers holding the motor in place then remove the motor.
4. Install the new motor using the nuts and washer removed above. Remove the electrical access cover on the motor, connect the conduit and connect the wires labeled above. Re-install the electrical access cover.
5. Re-install the sheave and belts.
6. Do steps 3 and 4 under Belts (above).

Pump
1. Place a drip pan or absorbent material under the pump assembly and close any isolation valves.
2. Let the system cool before proceeding. Hot oil can cause severe burns.
3. Support the surrounding components then disconnect all plumbing attached to the pump.
4. Remove the sheave.
5. Remove the nuts and washers holding the pump in place then remove the pump. Discard the gaskets between the pump and other connections.
6. Install the new pump and new gaskets using the nuts and washer removed above.
7. Do steps 3 and 4 under Belts (above).
Section 3: Maintenance

Component Maintenance

Twin Metering Pump Assembly (Optional)

Maintenance Schedule

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Checked By</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>Operator</td>
<td>Check/replenish oil dispensing reservoirs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check belt tension</td>
</tr>
<tr>
<td>Weekly</td>
<td>Service Technician</td>
<td>Check for vibrations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check for worn belts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check the Actuator operation</td>
</tr>
<tr>
<td>Monthly</td>
<td>Service Technician</td>
<td>Check Bushings and Bearing for wear</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Verify Encoder output</td>
</tr>
</tbody>
</table>

**Daily**

Check the belt tension – belt tension is measured by deflection. Measure the distance between the sheave center lines (perpendicular to the belts) and parallel to the belt. The belt deflection should be approximately \(\frac{1}{4}\)" for each inch of span.

*Note:* When adjusting belt tension make sure the motor sheave remains parallel to the belt path. Tightening one slide base bolt more than the other can cause mis-alignment.
Section 3: Maintenance

Component Maintenance

Twin Metering Pump Assembly (Optional)

- Check the amount of oil in the Oil Dispensing Reservoirs. Replenish with a lightweight oil such as heat transfer oil. Failure to keep sufficient oil in the dispenser may cause a metering pump failure.

Weekly
- Check for vibrations
- Check for worn belt(s)
- Check the operation of the Actuator

Monthly
- Check the Bushings and Bearings for wear
- Verify the output of the Encoder

Troubleshooting

Belt(s)
If the belts are slipping, smoking and/or smelling an AC plug (AC that has cooled to a too stiff state for easily flow) may have develops within the one of the pumps or valves. The plug will cause a pump to seize causing belt slippage, smoking or smell.

1. Remove and lock out power to the pump motor.
2. Isolate the assembly via inflow and outflow valves.
3. Disassembly the belt driven pump, clear the plug then reassembly the pump. Be sure to check the V-Belt(s) tension (see daily maintenance below).
   - If no plug is found in the belt driven pump check the AC driven pump.
   - If no plug is found in the AC driven pump check the actuated valve.
4. Open the closed valves, remove the lock out and reapply power.
5. Verify AC flows through the entire metering pump assembly.
Section 3: Maintenance

Component Maintenance

Twin Metering Pump Assembly (Optional)

Encoder
The encoder provides an indication of the quantity flowing through Metering Pump. When the actual quantity DOES NOT match the indicated quantity consider replacing the encoder.

Thermocouple
If the readings from the thermocouple are incorrect replace it.

Parts Replacement
1. Stop operations then lock-out tag-out the system power.
2. If necessary, remove the belt guard.
3. If necessary, loosen the belt tension using the slide base bolts under the motor.
4. Go to the heading below for the item being replaced.

Belt
1. Remove the worn belts and inspect the groves on both sheaves. Clean or replace the sheaves as necessary.
2. Install the new belts.
3. Adjust the belt tension – belt tension is measured by deflection. Measure the distance between the sheave center lines (perpendicular to the belts) and parallel to the belt. The belt deflection should be approximately $\frac{1}{64}$" for each inch of span.

Motor
1. Remove the electrical access cover on the motor and label the incoming wires. Disconnect the wires and conduit and remove them from the motor.
2. Remove the belts. Take the sheave off the motor shaft.
3. Remove the nuts and washers holding the motor in place then remove the motor.
4. Install the new motor using the nuts and washer removed above. Remove the electrical access cover on the motor, connect the conduit and connect the wires labeled above. Re-install the electrical access cover.
5. Re-install the sheave and belts.
6. Do steps 2 and 3 under Belts (above).

Pump
Note: There are two pumps in the metering system. One pump is driven by the motor while the other is driven by AC flow. In the steps below some specific directions may apply to one pump and not the other.
1. Place a drip pan or absorbent material under the pump assembly and close any isolation valves.
2. Let the system cool before proceeding. Hot oil can cause severe burns.
3. Support the surrounding components then disconnect all plumbing attached to the pump.
4. Remove the sheave.
5. Remove the nuts and washers holding the pump in place then remove the pump. Discard the gaskets between the pump and other connections.
6. Install the new pump and new gaskets using the nuts and washer removed above.
7. Re-install the sheave and belts.
8. Do steps 2 and 3 under Belts (above) then bleed the hot oil system.

**Valve Actuator**
1. Remove the electrical access cover on the actuator and label the incoming wires. Disconnect the wires and conduit and remove them from the actuator.
2. Remove the actuator arm from the actuator, remove the bolts holding the actuator then remove the actuator.
3. Reverse the steps above to install the new actuator.

**Valve**

*Note: If replacing the actuated valve, do steps 1 and 2 under Valve Actuator above first.*

1. Support the surrounding components then disconnect all plumbing attached to the valve.
2. Remove the bolts, nuts and washers holding the valve in place then remove the valve. Discard the gaskets between the valve and other connections.
3. Install the new valve and new gaskets using the bolts, nuts and washers removed above.

*Note: If the actuated valve was replaced be sure to reinstall the actuator by reversing steps 1 and 2 under Valve Actuator above.*

**Thermocouple**
1. Let the system cool before proceeding. Hot oil can cause severe burns.
2. Remove the cover over the electrical connections, label the wiring (white is positive, red is negative) then disconnect the wiring. Disconnect the electrical conduit from the thermocouple and move it and its cable out of the way.
3. Unscrew the thermocouple assembly from the firebox and remove the unit.
4. Reverse the procedure to install the replacement thermocouple using gas/oil resistant pipe thread compound on the threads.
5. Remove the lockout and restore power.
High Level Switch Float Guide

Check that the float pipe moves freely through the pipe sleeve and tank top. If movement is restricted it is normally a buildup of AC between the pipe sleeve, pipe and tank. Use a diesel soaked rag to clean off the buildup AC.
Reference Materials

Note: What follows is a collection of Service & Troubleshooting Guides published by the CEI Service Dept. These documents retain their individual page numbers as originally published. Please visit cei enterprises.com for additional Service & Troubleshooting Guides and technical support documents.
Checking operation of Apollo valve actuators used on CEI asphalt storage tanks

Apollo valve actuators (Figure 1) are used on most CEI asphalt storage tanks. They perform a very important function:

If the temperature of the asphalt stored in the tank falls below the tank’s temperature set point, the Apollo actuator opens the hot oil valve to the tank. This allows heat transfer oil from the hot oil heater to flow through the tank’s coils and heat the asphalt stored in the tank.

In the same manner, the Apollo actuator closes the hot oil valve once the asphalt has reached the tank’s set point temperature set on the temperature controller (Figure 2).

Here’s how to check to make sure the Apollo actuator is working properly:

1. Check the asphalt temperature in the tank and change the set point on the tank’s temperature controller to a lower setting.
2. Watch the actuator for a full 90° movement to close the hot oil valve.
3. Once the valve has closed, change the set point to a higher setting than the tank’s current temperature.
4. Watch the actuator for a full 90° movement to open the hot oil valve.

These movements should take approximately 30 seconds for each direction. Longer times would indicate an actuator that is going bad.

If the actuator is worn out and needs to be replaced, you might consider replacing worn out thermometers, thermocouples or controllers as well.

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### CEI Replacement Part Numbers

<table>
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<tr>
<th>Part Description</th>
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<tbody>
<tr>
<td>Apollo Actuator</td>
<td>1304104</td>
</tr>
<tr>
<td>UE Temp. Controller (dual set point)</td>
<td>0103104</td>
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<tr>
<td>UE Temp. Controller (single set point)</td>
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<tr>
<td>Thermocouple</td>
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<td>Thermometer</td>
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CEI Service & Parts: 800.545.4034

245 Woodward Rd. SE | Albuquerque, New Mexico 87102 | USA
Office & Manufacturing Facility
CEI ENTERPRISES, INC.
An Astec Company
P.O. Box 9156
Albuquerque, New Mexico, U.S.A. 87119

CEI Service Department (General Contact)
Phone: (800) 545-4034 or (505) 842-5556
Fax: (505) 243-1422
www.ceienterprises.com

Departmental Contacts
Shanon Heath
Service Manager
Cell: (505) 908-8794

Sam D. Morgan
Engineering Director
Cell: (505) 400-8958

Johnny Romero
Parts Representative
Cell: (505) 235-2789