

# THERMALINE



## Hot Water Set Installation and Operation Manual

**Thermaline**

1531 14<sup>th</sup> St NW, Auburn, WA 98001

Toll Free: 1.800.767.6720 / Phone: 253.833.7118 / Fax: 253.833.7168 / [www.thermaline.com](http://www.thermaline.com)

## Table of Contents

Description .....	2
1.1 Safety precautions: .....	2
1.2 Application .....	2
1.3 Working principle.....	2
1.4 Corrosion.....	3
Installation .....	3
2.1 Clearance.....	3
2.2 Foundations .....	3
2.3 Leveling .....	3
2.4 Cleanliness .....	3
2.5 Fittings and piping.....	3
Operation .....	4
3.1 General.....	4
3.2 Startup.....	4
Tuning and adjustments .....	4
4.1 Components may vary .....	4
4.2 Setting the temperature controller (ABB Model CM10).....	5
4.3 Adjusting pressure reducing valve (Watson McDaniel's series HD & HDP).....	7
4.4 Adjusting air pressure . .....	<b>Error! Bookmark not defined.</b>
Maintenance .....	8
4.1 Inspection.....	8
4.2 Fouling.....	8
4.3 CIP Clean in place .....	8
4.4 Inspection and manual cleaning .....	8
4.5 Leaks internal and external.....	8

# Description

## 1.1 Safety precautions:

- Always read the installation instructions thoroughly. (See chapter, installation)
- Always use a lifting crane or device when handling the hot water set.

### Operation

- Always read the operation section thoroughly (See chapter, operation)
- Never introduce hot fluid suddenly when the system is empty or cold.
- Never shock the system with cold fluid when hot.

### Transportation

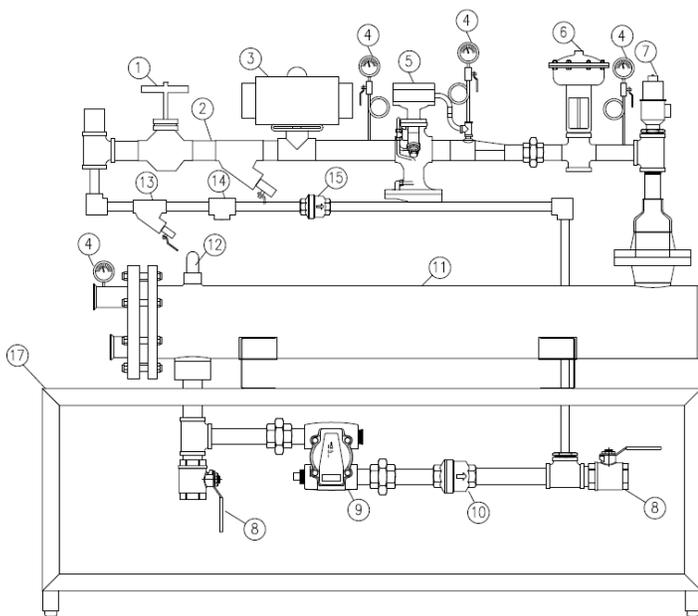
- Always transport the hot water set in a protected position.
- Always ensure that the unit is securely fixed during transportation.
- Never lift or elevate in any way other than described in this manual.

## 1.2 Application

-Thermaline hot water sets are designed to heat process or utility water using plant supplied steam. Hot water sets are either closed loop or continuous flow design.

## 1.3 Working principle

-Hot water sets utilize a series of shutoff and modulating valves to feed a precise quantity of steam to a shell & tube or plate style heat exchanger to indirectly heat water for a process. The type, size, configuration of the valves and heat exchanger varies per application.



For a typical hot water set refer to your assembly documentation for specific configuration

1. Globe Valve
2. "Y" Strainer with blowdown valve
3. Pneumatic shutoff valve
4. Pressure gauge
5. Pressure reducing valve
6. Modulating valve
7. Pressure relief valve
8. Ball valve
9. Steam trap
10. Check valve
11. Heat exchanger
12. Vacuum breaker
13. "Y" Strainer
14. Pressure reducing valve
15. Check valve

## 1.4 Corrosion

-Corrosion is a function of the process and environment. Material selection is ultimately the customer's responsibility and materials selected should be compatible with the process.

## Installation

Thermaline hot water sets are designed to be freestanding with adjustable ball feet or fixed mount with provisions to bolt the frame to floors, walls or ceilings. Most models have provisions for lifting and transportation. Frames are standard design or built to customer specifications.

### 2.1 Clearance

-When installing the hot water set, be sure to provide sufficient clearance to allow for servicing of the steam components, pumps, heat exchanger and valves.

### 2.2 Foundations

-Foundations must be adequate so that the hot water set will not settle and impose excessive strains on the frame and attached components. Foundation bolts should be set to allow for setting inaccuracies.

### 2.3 Leveling

-The hot water set must be set so that pipe connections can be made without forcing. However, small forces might be unavoidable, small forces are then acceptable.

### 2.4 Cleanliness

- Protective plugs should not be removed from connections until just prior to installation.

- The entire system should be cleaned before starting operation. All exchanger openings should be inspected for foreign material before operation.

### 2.5 Fittings and piping

*-By-pass valves.*

User may install additional valves and by-passes in the piping system to permit inspection and repairs.

*-Vents.*

The user may install vent valves in their piping.

*-Pulsation and vibration.*

Care should be taken to eliminate or minimize transmission of fluid pulsations and mechanical vibrations.

*-Safety relief devices.*

Steam pressure relief valves are installed on most hot water sets, it is the user's responsibility to install the required safety devices on the fluid side.

## Operation

### 3.1 General

The hot water set must not be operated at conditions, which exceed those specified on the heat exchanger data plate.

**Caution:** The heat exchanger surface temperature will be hot during operation. It is the users responsibility to identify local regulations related to surface temperature and comply with those regulations.

**Special Instructions:** Before placing the hot water set in operation, reference should be made to the as built documentation for any special instruction.

**Regulations:** Local safety and health regulations must be considered.

Improper start-up or shutdown sequences may cause leaking. It is the customer's responsibility to carefully pay attention and ensure a proper start-up and operation.

### 3.2 Startup

**-During start-up** all vent valves should be opened and left open until all passages have been purged of air and are filled with fluid. Fluid must be introduced in a manner to minimize differential expansion.

**Caution:** Adjustments of flow rates should be made slowly to avoid the risk of pressure surge or water hammer. Water hammer can cause considerable damage to the equipment.

**-Shutdown operation:** The hot water set must be shut down in a manner that minimizes different expansions. When shutting down the system, shut the steam off to cool the loop.

**-Temperature shocks:** The hot water set should not be subjected to abrupt temperature fluctuations. Hot fluid must not be suddenly introduced when the unit is cold nor cold fluid suddenly introduced when the unit is hot.

**-Gaskets:** The hot water set is pressure tested before leaving the manufacturers shop in accordance with various standards. However, normal relaxing of the gasketed joints may occur in the interval between testing in the manufacturer's shop and installation at the job site. Therefore, all external joints may require retightening after installation and, if necessary, after the system has reached operating temperature.

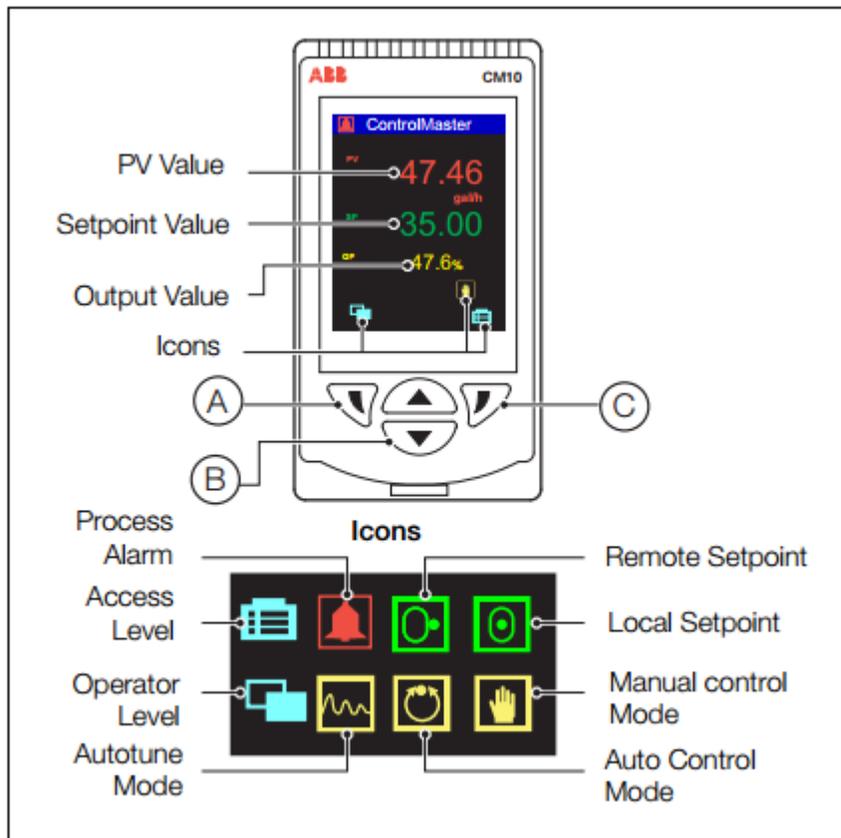
## Tuning and adjustments

### 4.1 Components may vary

Hot water sets feature a Thermaline heat exchanger and components manufactured by others. Tuning and adjustments are for standard components. Your unit may differ; always refer to your assembly documentation for detailed instructions of the various components.

## 4.2 Setting the temperature controller (ABB Model CM10)

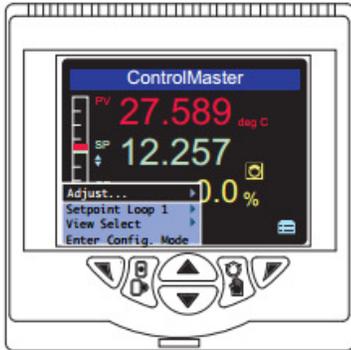
(for all other makes and models refer to OEM procedures)



CM 10 Temperature controller  
Icons and keys

Ⓐ	Navigation (left) / <i>Operator Level</i> access key –
Ⓑ	Up / Down keys – highlight menu items and increase / decrease displayed values.
Ⓒ	Navigation key (right) / programmable <i>Soft Key</i> –

## Operator level menus



Operator level menus are used to adjust setpoint(s) and output(s), select setpoints, select the view and to enter *Basic* and *Advanced* modes (via the *Access* level) – see page 27.

To access Operator Level menus:

1. From the *Operator Page*, press to view the available menus.
2. Use the / keys to scroll through the menus and menu options.
3. Press to expand menu levels and to select menu options or press to return to the previous menu.

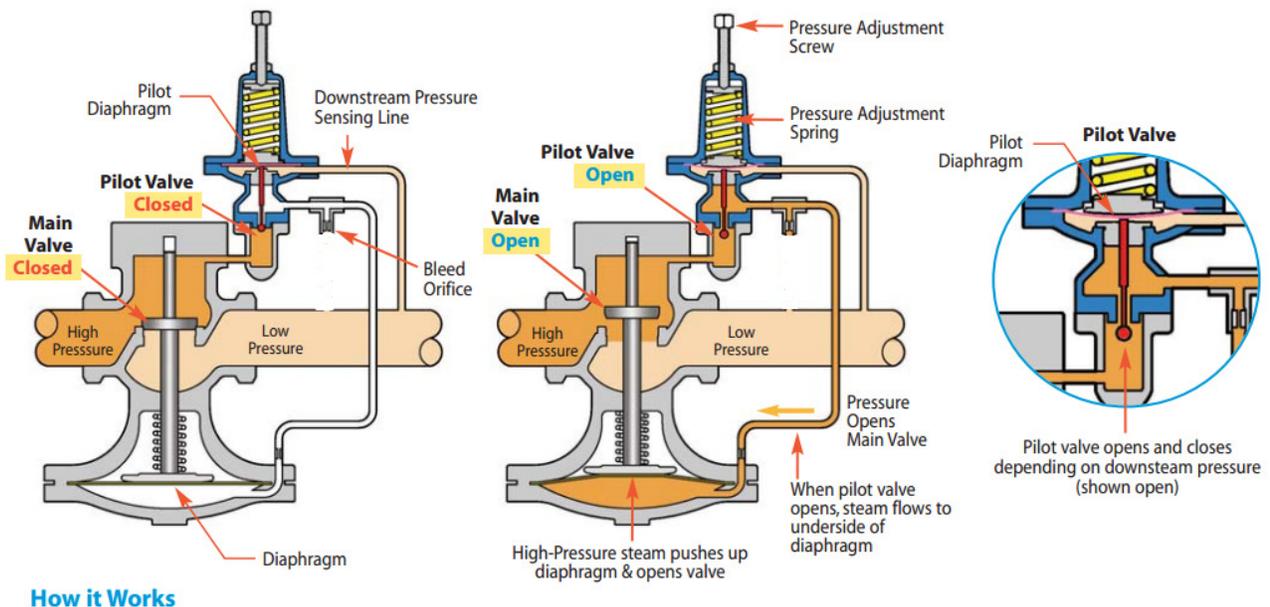
## Adjustments

<b>Autotune</b>	Used to start or stop an <i>Autotune</i> routine. This menu is enabled only if <i>Autotune</i> mode is <i>On</i> – see page 30.
<b>Adjust</b>	Enables a value to be adjusted using the  /  keys. The  icon next to a value indicates the current adjustable selection.
<b>Setpoint Select</b>	Selects the local setpoint to be used (displayed only if more than 1 local setpoint is configured).
<b>Alarm Acknowledge</b>	Acknowledges any active but unacknowledged alarms.
<b>View Select</b>	Selects the <i>Operator</i> view to be displayed.
<b>Enter Advanced Level</b>	Displays the <i>Access Level</i> selection views – see section 5.4, page 27 for security options.

### 4.3 Adjusting pressure reducing valve (Watson McDaniel's series HD & HDP)

(For all other makes and models refer to OEM procedures)

1. Make sure all lines have been blown down to remove initial dirt and scale from system.
2. Close all blowdown valves in installation.
3. Loosen locknut on pilot, then loosen adjusting screw enough to release all tension on adjusting spring.
4. Open valve ahead of steam trap or other drain valve to make sure all condensate is drained from inlet piping. If this is not done, serious damage to the piping system/Shell and Tube can occur as a result of water hammer.
5. After all condensate is removed open valve in pilot line.
6. Open inlet gate valve slowly. Watch for possible water hammer.
7. Turn pilot adjusting screw slowly clockwise until valve opens and passes steam. Adjust pilot spring until desired downstream pressure is obtained. A time period may be involved to fill the downstream pipe system with steam before adjusting spring can be adjusted for correct pressure setting.
8. After system has stabilized readjust spring setting to obtain exact desired pressure and tighten adjusting screw locknut.
9. Inspect all piping connections and valve for possible leaks and tighten as required. Check and retighten main valve diaphragm bolts.



## Maintenance

### 4.1 Inspection

At regular intervals and as frequently as experience indicates, an examination should be made of the interior and exterior condition of the unit. Neglect in keeping all components clean may result in decreased performance.

### 4.2 Fouling

Heat exchangers are subject to fouling or scaling and should be cleaned periodically. A light sludge or scale coating on the surfaces greatly reduces its thermal efficiency not only on the product side but the steam side as well. An increase in pressure drop and/or reduction in performance usually indicate that cleaning is necessary.

### 4.3 CIP Clean in place

-Heat exchangers are designed to be chemically cleaned in place. CIP is a function of the process and adequate time, temperature, flow and concentrations are needed for satisfactory cleaning.

**Caution:** Chemicals used for cleaning must be compatible with materials of construction.

### 4.4 Inspection and manual cleaning

Before disassembly the user must assure that the unit has been locked out, de-pressurized, ambient temperature and drained.

### 4.5 Leaks internal and external

-**External leaks:** Identify the leak and follow disassembly/assembly procedures to repair or replace as necessary.

-**Internal leaks:** Internal leakage can cause intermixing of fluids and will not be visible. Hot water sets with heat exchangers used in sanitary applications should be tested regularly with the Thermaline Cross Contamination Tester (CCT 4.0) Visit [www.Thermaline.com/cct](http://www.Thermaline.com/cct) to find out more.



CCT 4.0 Installed on heat exchanger testing for internal defects

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