

THE HX2 SERIES

SEMI-INSTANTANEOUS WATER HEATERS

TECHNICAL DATA

1.1 HX2 Overview

The **HX2** is RECO Commercial Systems' next generation of compact, semi-instantaneous water heaters using available steam as the heating medium. Designed to the guidelines of TEMA, BOCA and IAPMO, these heaters can heat up to 150 GPM from 40 °F to 140 °F as standard, with higher capacities possible.

At the heart of the control system is the Control Master II® panel with a digital PID controller. The standard Control Master has an easy-to-navigate LED panel for local and remote monitoring and set point adjustment. It accepts remote set point changes and can re-transmit water temperature by analog or digital signals via standard Modbus® or available BACnet® network communications protocols.

An electrically operated, fast-acting V-ball control valve is used to modulate the flow of the heating fluid. It has a 100:1 rangeability which gives excellent control at all flow rates. Capacitors integrated into the actuator housing close the valve in the event of loss of main power. Soft valve seats provide tight valve shut-off and prevent temperature rises at low load due to valve seat leakage.

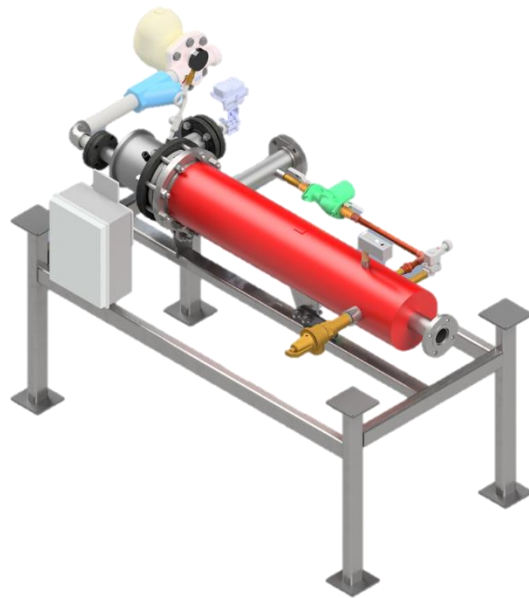


Fig. 1 – A horizontal HX2 unit (not all piping shown or insulation jacket shown)

1.2 Standard Flow, Pressure, and Temperature Ratings

- Heated water recovery rate 5 to 150 GPM
 - Steam supply pressure..... Up to 100 PSIG
 - Cold water inlet pressure..... Up to 150 PSIG
 - Heated water outlet temperature..... Up to 210 °F
 - Design rating ASME Boiler & PV Code "U" stamped
- Higher flow and pressure ratings available. Contact factory.

1.3 Materials of Construction

The standard materials used with the HX2 Series are shown below.

| TABLE 1-1 STANDARD MATERIAL SPECIFICATIONS | | |
|---|---------------------|---|
| Component | Material | ASME / ASTM Material Specification |
| Baffles | Naval brass | SB-171-C464 |
| Couplings | Stainless steel | SA-182-F316L (shell) |
| | Carbon steel | SA-105 (element head) |
| Element head cap | Carbon steel | SA-516-70 |
| Flanges | Stainless steel | SA-182-F316L (shell) |
| | Carbon steel | SA-105 (element head) |
| Hardware | Carbon steel | SA-193-B7 (bolts) |
| | | SA-194-2H (nuts) |
| Pipe | Stainless steel | SA-312-TP316L (shell) |
| | Carbon steel | SA-106-B (element head) |
| Shell / Tank | Stainless steel | SA-312-TP316L |
| | Copper-nickel alloy | SB 466 (seamless) or SB 467 (welded) |
| Supports | Carbon steel | SA-36 |
| Tubes | Copper | SB-111-C122 (Double wall) |
| | | SB-75-C122 (Single wall) |
| Tubesheets | Stainless steel | SA-240-304/304L (inner) |
| | Carbon steel | SA-516-70 (outer) |
| | Carbon steel | SA-36 (spacer ring) |
| Weld cap | Stainless steel | SA-403-316L (formed 2:1 head) |
| | Copper-nickel alloy | SB -171-C706 |

1.4 Heat Transfer Surface Area

Technical data for the standard HX2 heating bundles are given below. Note that tube bundles are designed in standard "U" tube arrangement, with the number of tube openings seen at the tubesheet double the amount of individual tubes actually used.

| TABLE 1-2 TUBE BUNDLE HEAT TRANSFER DATA | | | | | | |
|--|-------------------|--------------|---------------------------------|-------------------|--------------|---------------------------------|
| HX2 Size | Single Wall Tubes | | | Double Wall Tubes | | |
| | Nominal O.D. | No. of Tubes | Surface Area (ft ²) | Nominal O.D. | No. of Tubes | Surface Area (ft ²) |
| 06 030 | 1/2" | 28 | 17.6 | 3/4" | 13 | 11.5 |
| 06 036 | | | 21.3 | | | 14.1 |
| 08 030 | 1/2" | 51 | 31.7 | 3/4" | 24 | 21.1 |
| 08 036 | | | 38.3 | | | 25.9 |
| 10 030 | 1/2" | 88 | 53.6 | 3/4" | 41 | 36.0 |
| 10 036 | | | 65.1 | | | 44.0 |
| 12 030 | 1/2" | 133 | 82.1 | 3/4" | 59 | 51.5 |
| 12 036 | | | 99.5 | | | 63.1 |

1.5 HX2 Rating Charts

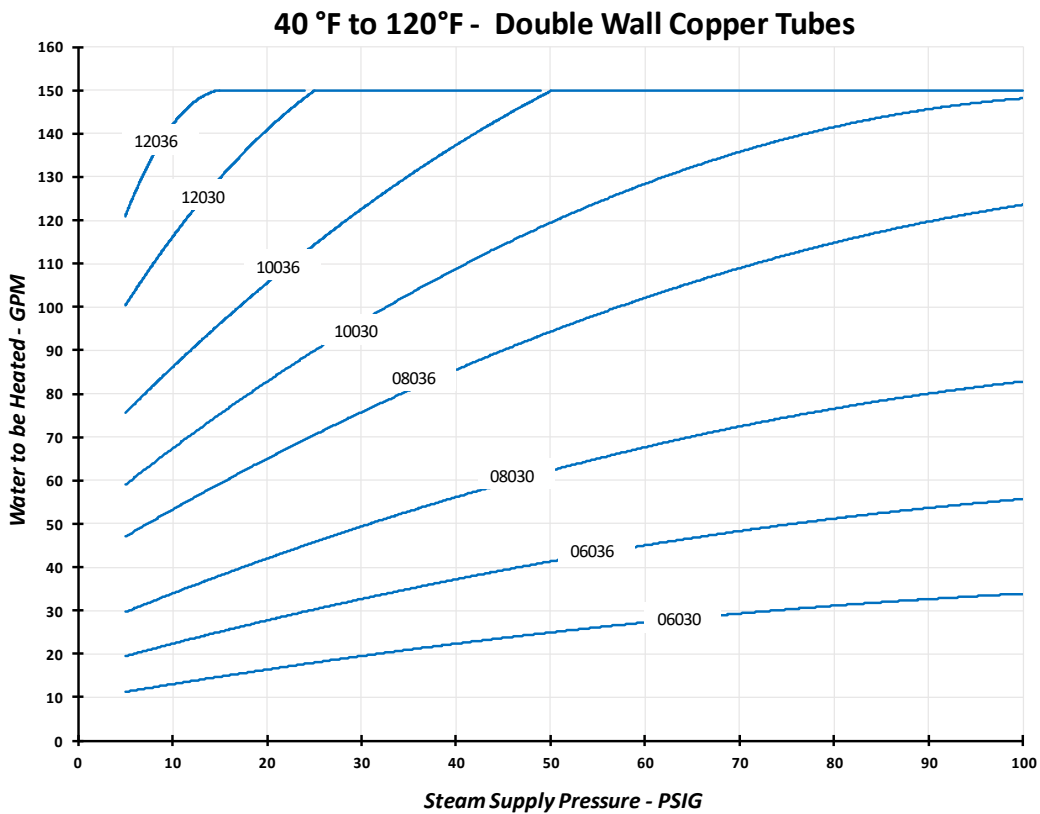
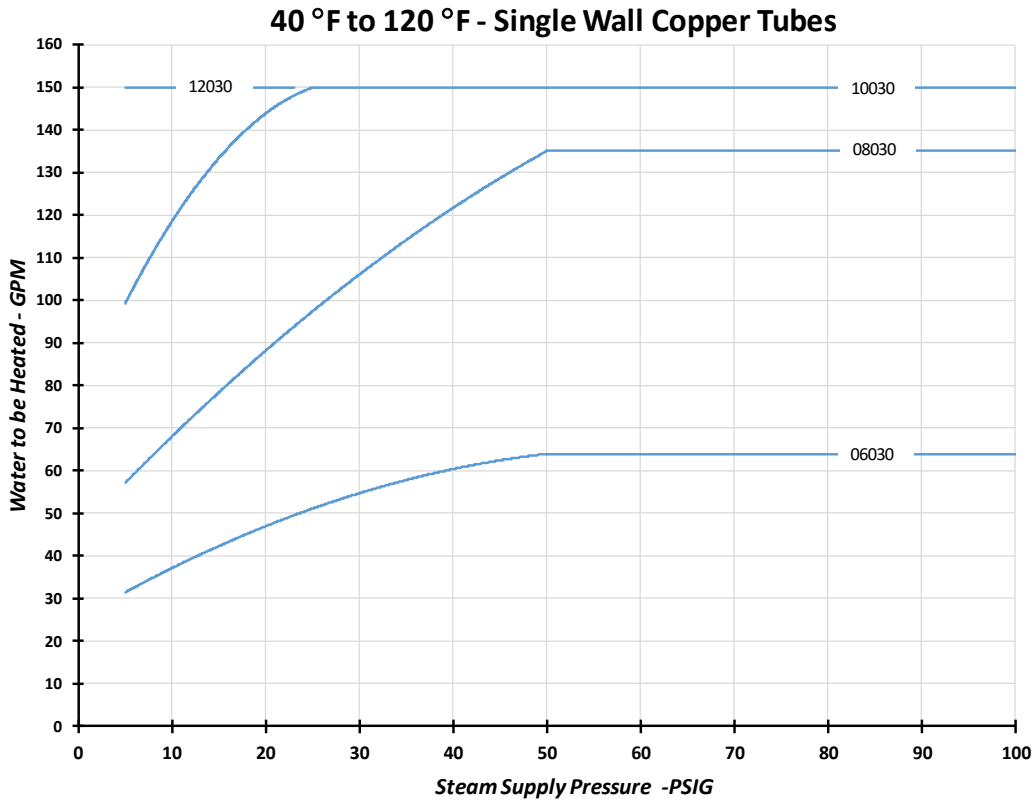
To select an HX2 the steam pressure (PSIG) available, amount of water (GPM) to be heated, and amount of heating (°F) to be done must be known. Heating is commonly specified in increments of 80 °F (40 °F to 120 °F) or 100 °F (40 °F to 140 °F).

The first step is to locate the correct chart from the four that follow. Next locate the appropriate Steam Supply Pressure available (PSIG) along the X-axis, and the amount of water to be heated (GPM) along the Y-axis. Where the two intersect, find the rating curve corresponding to those conditions. If this intersection lies between two rating curves, choose the larger unit (higher curve).

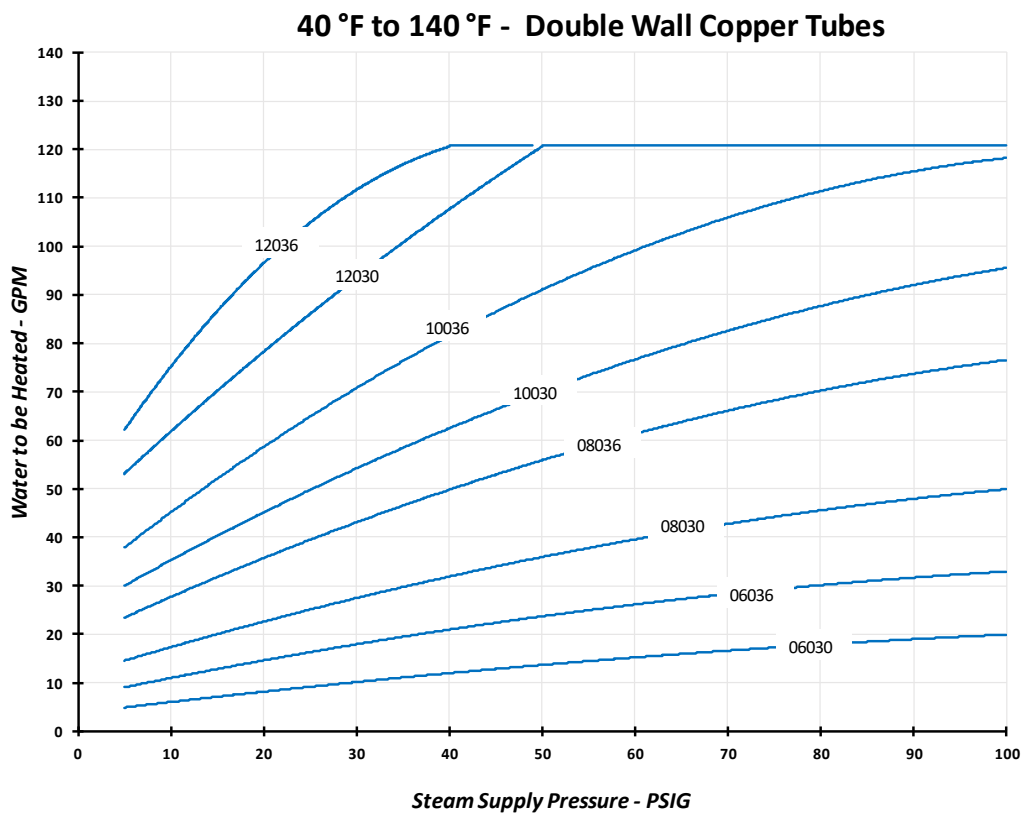
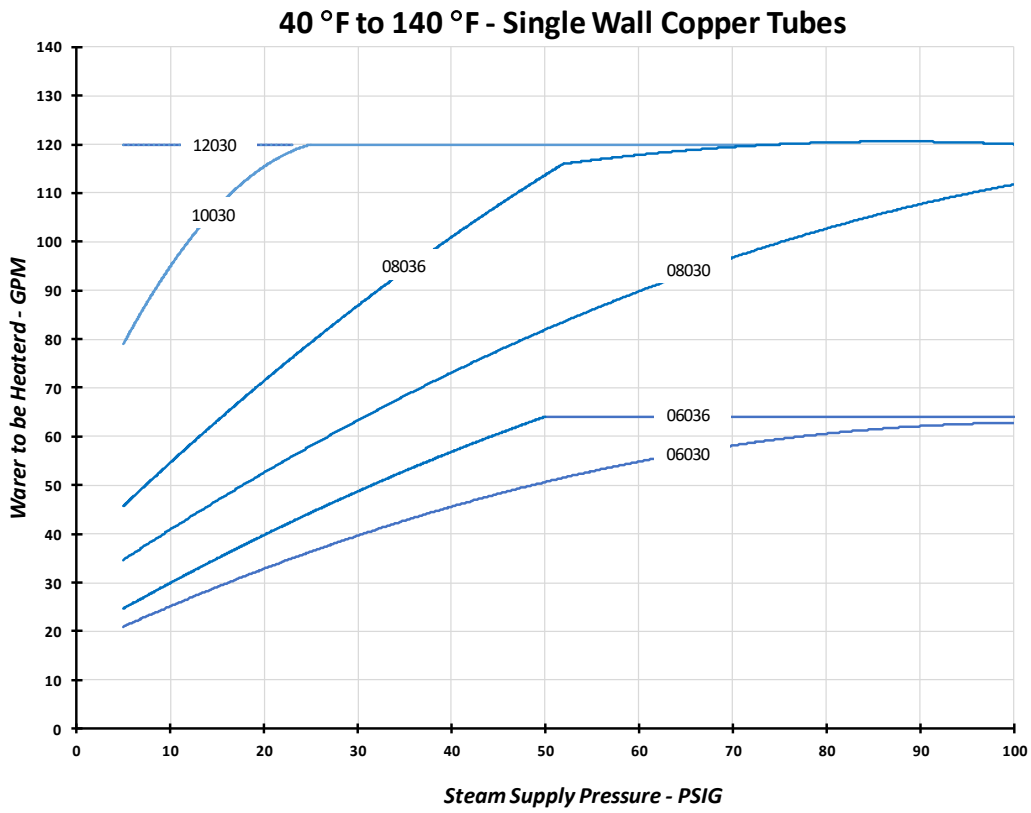
Notes:

1. For copper-nickel tubes, de-rate the copper tube ratings shown by 20%.
2. The ratings curves shown assume a tube bundle fouling factor of 0.00025 (hr. x ft² x °F / BTU).
3. For applications with water as the heating source, contact RECO USA Sales Department.

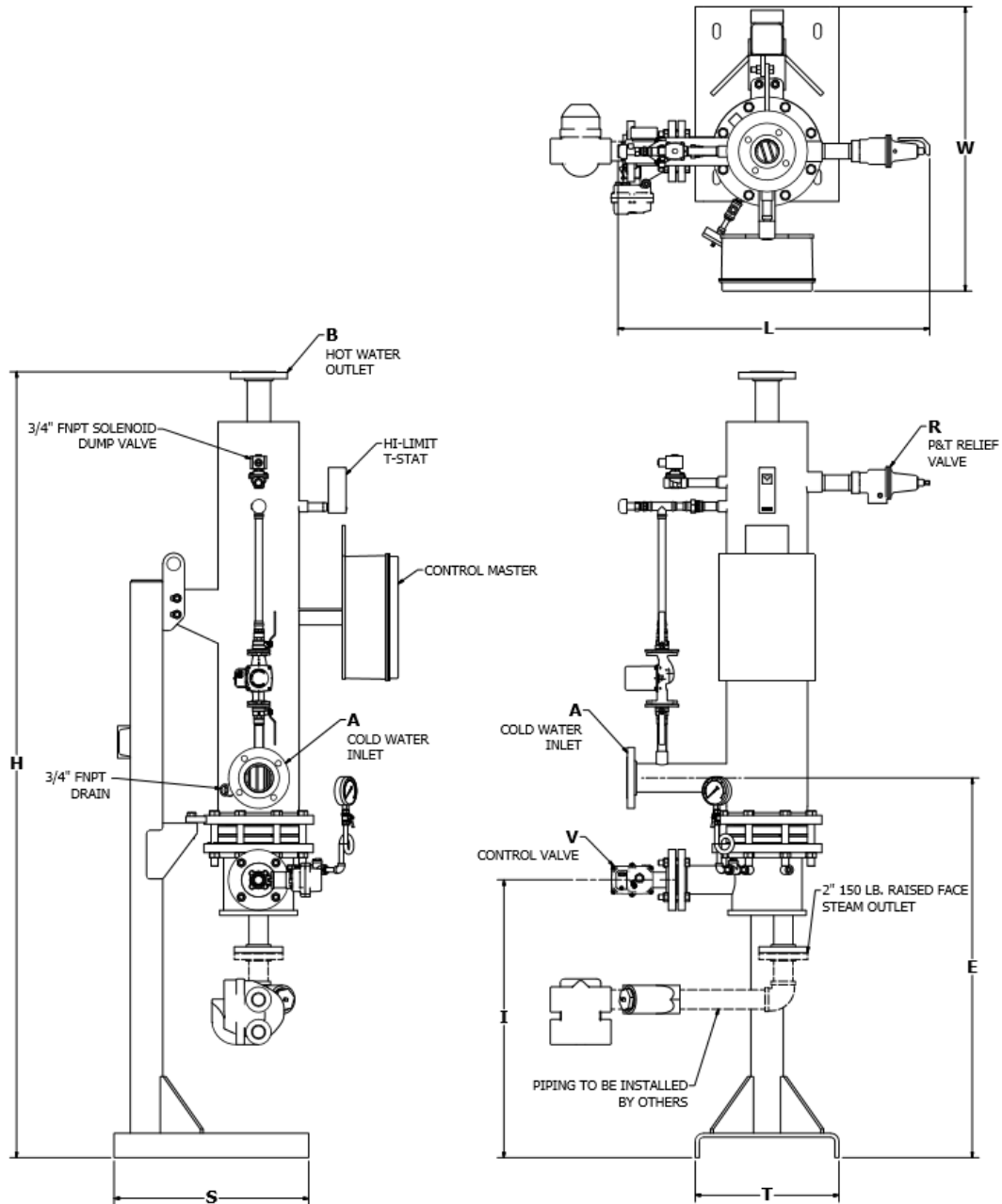
1.5a Rating Charts for 80 °F Heating



1.5b Rating Charts for 100 °F Heating



1.6 General Arrangement Dimensions and Weights – Vertical Units

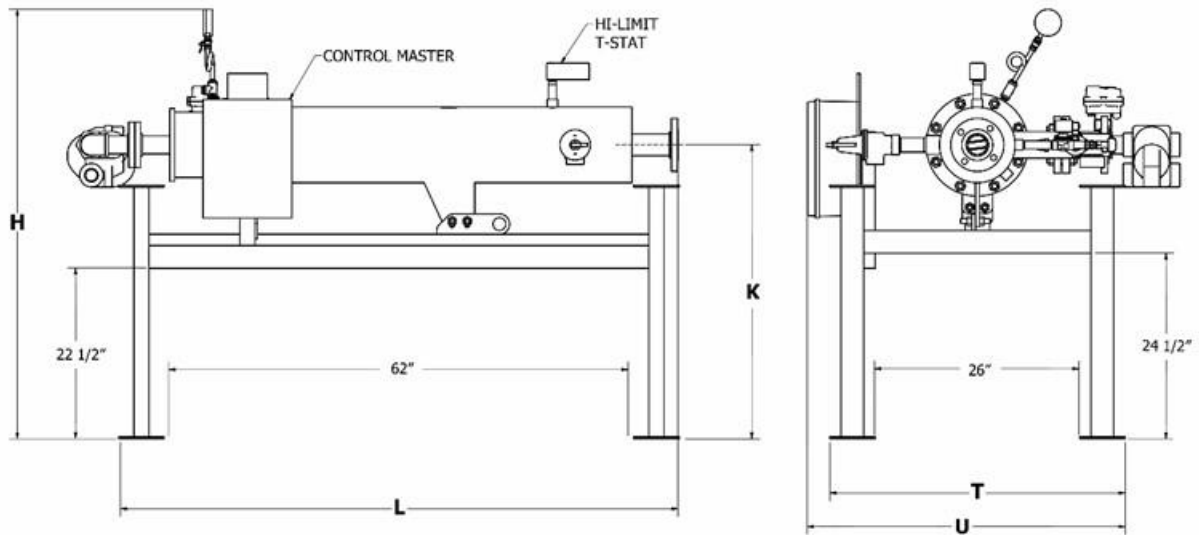
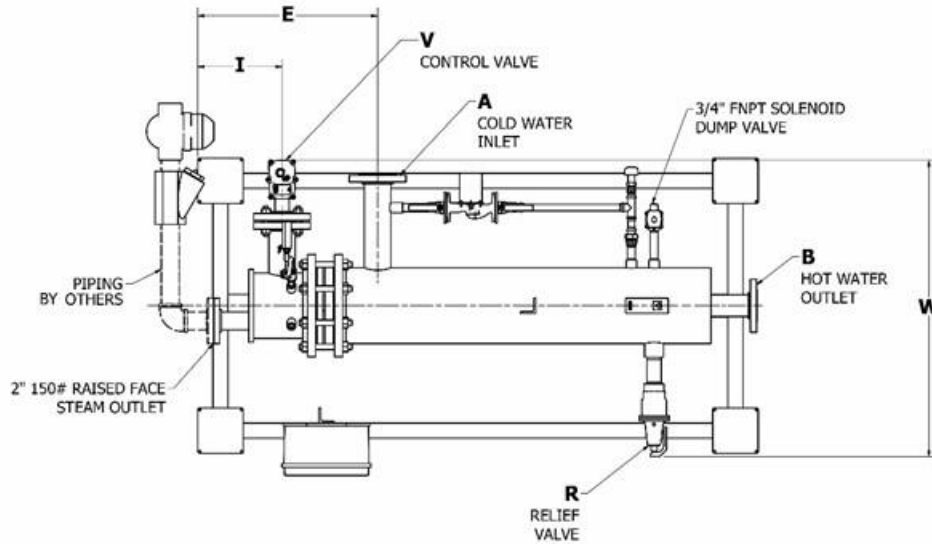


| TABLE 1-3 VERTICAL UNIT DIMENSIONS | | | | | | | | | | | | |
|------------------------------------|----|--------|-------|-------|-------|------|------------|------|-------|----------------------|------|---------------|
| Basic Size | A | B | E | H | I | L | R | S | T | V | W | Wt. (lbs.) |
| 06030 / 06036 | 2" | 1 1/2" | 46.75 | 95.0 | 34.25 | 32.0 | 3/4" NPT | 24.0 | 17.75 | 1" FNPT / 1.25" FNPT | 33.0 | 930 / 950 |
| 08030 / 08036 | 3" | 2 1/2" | 46.75 | 97.0 | 34.25 | 38.0 | 1 1/2" NPT | 24.0 | 17.75 | 1" FNPT / 1.25" FNPT | 35.0 | 1,125 / 1,155 |
| 10030 / 10036 | 4" | 3" | 46.75 | 99.0 | 33.75 | 49.0 | 1 1/2" NPT | 24.0 | 17.75 | 2 1/2" 150 Lb. RFSO | 37.0 | 1,380 / 1,420 |
| 12030 / 12036 | 4" | 3" | 46.75 | 100.0 | 33.75 | 51.0 | 1 1/2" NPT | 24.0 | 17.75 | 3" 150 Lb. RFSO | 39.0 | 1,655 / 1,705 |

Notes:

1. Dimensions "A" and "B" are nominal sizes for ANSI 150 lb. raised face, slip on (RFSO) flange.
2. All dimensions in inches, unless noted otherwise.
3. Weights shown are net empty weight for a standard HX2 unit. Crating or shipping materials not included.

1.7 General Arrangement Dimensions and Weights – Horizontal Units



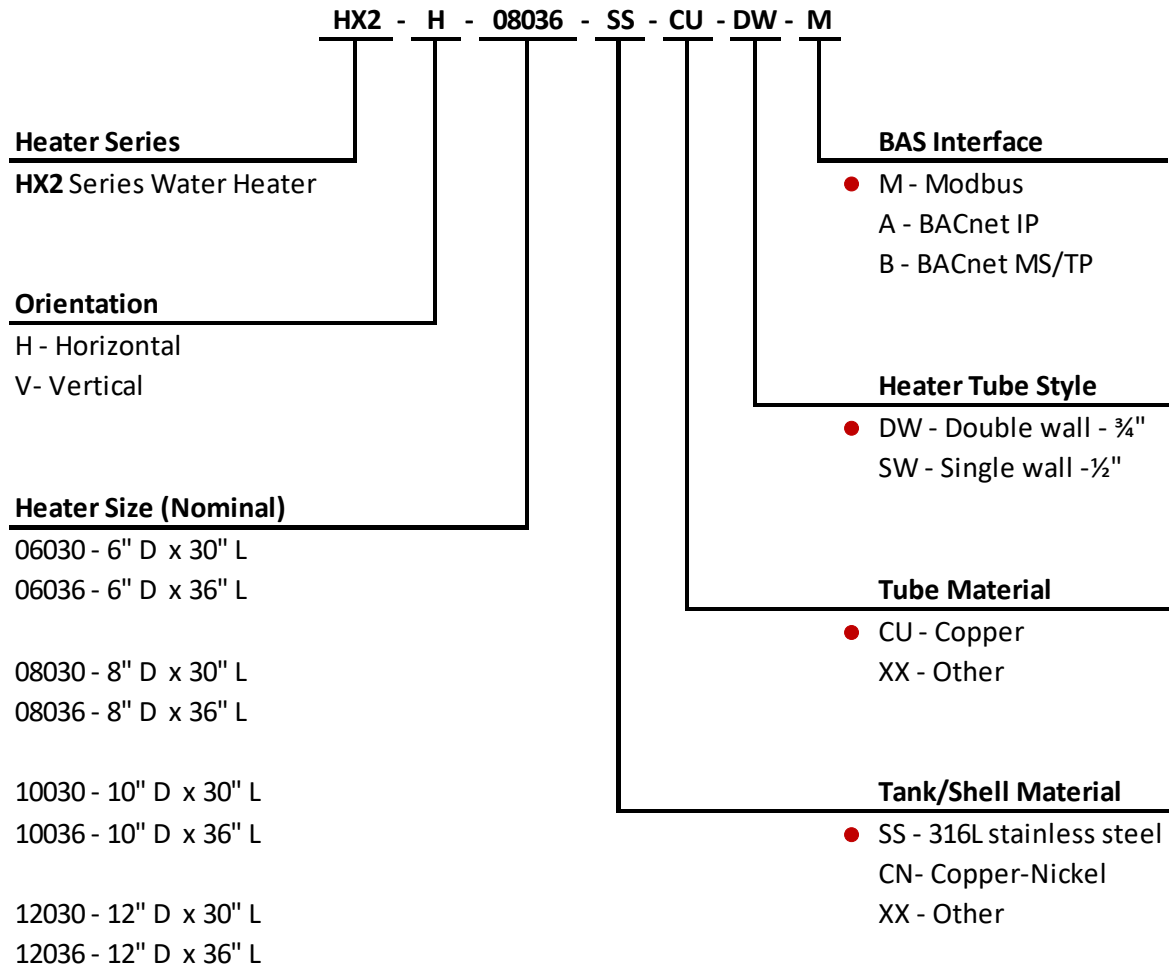
| TABLE 1-4 HORIZONTAL UNIT DIMENSIONS | | | | | | | | | | | | | | |
|--------------------------------------|----|--------|-------|-------|-------|-------|-------|----------|----|----|----|-------------------|----|---------------|
| Basic Size | A | B | E | H | I | K | L | R | S | T | U | V | W | Wt. (lbs.) |
| 06030 / 06036 | 2" | 1 1/2" | 23.75 | 95.0 | 34.25 | 37.75 | 71.75 | 3/4 FNPT | 24 | 39 | 41 | 1" / 1.25" FNPT | 33 | 985 / 1,005 |
| 08030 / 08036 | 3" | 2 1/2" | 23.75 | 97.0 | 34.25 | 38.75 | 73.5 | 1.5 FNPT | 24 | 39 | 41 | 1.5" / 2" FNPT | 35 | 1,180 / 1,210 |
| 10030 / 10036 | 4" | 3" | 23.75 | 99.0 | 33.75 | 39.75 | 74 | 1.5 FNPT | 24 | 39 | 41 | 2.5" 150 Lb. RFSO | 37 | 1,435 / 1,475 |
| 12030 / 12036 | 4" | 3" | 23.75 | 100.0 | 33.75 | 40.75 | 77 | 1.5 FNPT | 24 | 39 | 41 | 3" 150 Lb. RFSO | 39 | 1,710 / 1,765 |

Notes:

1. Dimensions "A" and "B" are nominal sizes for ANSI 150 lb. raised face, slip on (RFSO) flanges.
2. All dimensions in inches, unless noted otherwise.
3. Weights shown are net empty weight for a standard HX2 unit. Crating or shipping materials not included.
4. Allow "L" dimension plus 6 inches for tube bundle removal clearance.

1.8 HX2 Configuration and Ordering Code

The following Configuration and Ordering Code defines the **HX2** and can be found on the unit nameplate. When inquiring about a HX2 this code must be used. Doing so enables us to handle requests quicker and assure the correct unit is being discussed.



● *Denotes standard configuration*

1.8a Sample Selection:

The selected unit is a RECO HX2 series water heater model **HX2-H-0836-SS-CU-DW-M** horizontal water heater with 8" diameter x 36" long heating element, 316L stainless steel tank, 3/4" copper double-wall tubes, and standard Modbus® communication interface with the building automation system.

1.9 How to Specify

The water heater shall be a **RECO Series HX2** capable of heating (x) GPM of water from 40 °F to (x) °F with (x) PSIG of incoming saturated steam. The unit shall be an ASME Code "U" stamped pressure vessel rated for safe operation to 150 PSIG and be in full accordance with the Section VIII, Division 1 of the latest ASME code. It shall be constructed with a 316L stainless steel tank, passivated for added corrosion resistance to ASTM A380 and A967 requirements, with stainless steel connections and 3/4" O.D. copper tubes. All steam and condensate piping shall be carbon steel, welded or threaded as appropriate.

The copper heating tubes shall be double walled with a vented leakage path between the heating medium and water being heated to prevent contamination of the water. All wetted parts on the water (heated) side shall be lead-free and comply with NSF Standard 61 and conform to all requirements of the U.S. Safe Drinking Water Act.

The heating bundle shall include an ASTM 304L stainless steel inner tube sheet, carbon steel spacer ring, and carbon steel outer tube sheet. For added protection and durability the element head and support stand shall be powder coated to a minimum of 5 mils dry film thickness (DFT). The heater tank shall be mounted on a rigid steel support skid and insulated with a heavy-duty silicon coated fiberglass outer jacket meeting the latest ASHRAE requirements. The tank shall also allow for easy removal and inspection of the heating bundle without the need for dismantling of the heater from the support stand.

The unit shall include a mechanical pressure/temperature (P/T) relief valve, solenoid dump valve at the tank controlled by an independent, high temperature limit switch, and automatic, fail-closed, steam inlet control valve. A continuously operating recirculation pump shall also be provided to ensure a uniform temperature distribution across all temperature sensors while preventing the build-up of sediment in the tank bottom or on the heating tubes.

An electrically operated, fast-acting V-ball control with full 100:1 rangeability shall be used to modulate the flow of heating medium to the unit. It shall provide accurate control at all heating conditions and the valve actuator shall be tied into the PID control loop to fail closed in the event of a loss of power.

The control panel shall be a complete, pre-assembled and pre-wired unit housed in a NEMA 4 enclosure with a programmable temperature controller and easy to navigate LCD panel capable of local or remote set point and alarm. It shall incorporate a PID control loop that sends a modulating signal to the steam control valve. Valve signaling shall be 0-10 VDC as standard. The control panel shall utilize RS485 communication interface for full compatibility with Modbus® and BACnet® IP or MS/TP building automation communications protocols.

The HX2 Series water heater shall carry a full **5-year warranty** against defects in material and workmanship of the pressure vessel. The tube bundle shall carry a full **1-year warranty** against failure due to defects in material, workmanship, thermal shock, or mechanical failure.

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