

INSTRUCTIONS
FOR
INSTALLATION AND OPERATION

"INSTANTROL"
Steam-Fluid Heater Package

HA-361 Series
HA-364 Series

Note to Installer: After intalling this heater, give this instruction folder to operating personnel or see that it is filed for future reference.

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INSTRUCTION MANUAL NUMBER

P-2149

Rev. A

This steam heater package must be installed properly to give satisfactory service. Read these instructions carefully and follow them in detail. If in doubt, contact the local representative.

Section I — PRINCIPLES OF OPERATION

The INSTANTROL Steam-Fluid Heater Package series is designed to provide hot fluid at a setpoint within the temperature range indicated on the nameplate of the temperature regulator at the capacities shown on pages 6 through 8 of this manual. On hot fluid demand, the INSTANTROL control bulb instructs the steam valve as to the amount of steam required in the shell of the heater to provide controlled tempered hot fluid.

Generally, the lower the steam pressure and the higher the flow through the package, the better the control of the hot fluid temperature. Maximum steam pressure is 40 psig. If steam supply pressure is in excess of 40 psig, place a pressure regulator in the steam line just before the temperature regulator.

If the flow is shut down frequently due to intermittent demand, it is advisable to insulate the INSTANTROL control bulb casing to prevent "overshoot" when demand is renewed.

NOTE: Loss of thermal charge will result in overheating. A high temperature shutdown system; such as Robertshaw's ZT-100, should be used when overheating must be avoided.

Section II — DESCRIPTION

HA-361 Series
INSTANTROL Heater Package 3/4″ through 2″ sizes. U-tube, 4 pass for normal applications.

HA-364 Series
Same as HA-361 except with straight tube, 4-pass heater for "hard water" service where periodic tube-rodding may be required.

Section III — INSTALLATION

The heater package is disassembled for shipment. Refer to Figure 2 for proper assembly. This package is designed to support its own piping and is equipped with adjustable feet for attachment to wall brackets, solid surfaces, etc., for support of the package.

The package must be installed in an upright position as shown in Figure 2. Do not remove the temperature regulator frame from the steam valve during installation. Care must be taken to prevent damage to the connecting tubing and INSTANTROL temperature sensing bulb.

A high quality, dry steam must be supplied to the heater package. *There must be no pressure* on the condensate return which can be accomplished by a fall to a sump, a vacuum return system, venting to atmosphere, etc.

Section IV — TEMPERATURE ADJUSTMENTS

After installation, open hot fluid outlets for a few minutes to allow stabilization of the control temperature. If warmer water is desired, rotate the adjusting handwheel on the temperature regulator (Figure 2) to the right. Cooler water is obtained by rotating the adjusting handwheel to the left. The scale on the regulator frame is arbitrarily graduated and serves as an aid in making adjustments.

INSTANTROL Heater Package Pipe Connection Sizes
HA-361, 364 Series

Suffix Letter	Steam Inlet	Condensate Outlet	Cold Water Inlet	Heated Water Outlet
A	3/4″	1/2″	1″	1″
B	1″	1/2″	1½″	1½″
C	1¼″	1/2″	1½″	1½″
D	1½″	1″	2″	2″
E	2″	1″	2½″	2½″

*Flanged. All other sizes NPT.

Section V — MAINTENANCE

TEMPERATURE REGULATOR

The regulator used on the heater package is the 1001-B1 basic construction with a special bulb and tubing arrangement, a pressure connection in the valve body, and with an adjustable range span of 70° F.

In disconnecting the temperature regulator, remove the quick-disconnect pin and nut which connects the topworks stem to the valve stem and loosen frame nut.

CAUTION

DO NOT loosen stroke adjustment locknut on topworks stem above pinned construction as the valve stroke, which is factory set, will be altered.

PACKING

The valve stem is sealed with self-lubricating, spring-loaded, teflon chevron packing for long, trouble-free service. Valve stem packing nut should be kept only finger tight. If valve stem packing must be replaced follow steps below (see Figure 1).

Cut off the steam supply and:

1. Remove lock pin.
2. Remove lock nut and separate control from valve.
3. Remove packing nut and packing gland.
4. Remove bonnet from valve.
5. Remove packing, spring plate and spring.
6. Clean out packing box with a clean rag or soft paper.
7. Wipe off stem with clean rag. **Do not** attempt to polish. If stem is scratched or nicked around the packing area, it should be replaced.
8. Replace bonnet on valve.
9. Carefully place new packing in packing box. If chevron packing is not available, in an emergency, repack with good grade of graphited string packing. Put a small amount of good packing lubricant in the stuffing box while repacking. This packing, however, should be replaced with teflon chevron packing as soon as possible.
10. Replace packing gland.
11. Replace packing nut and tighten.
12. Connect valve to control and tighten lock nut.
13. Insert lock pin.

REMOVING OR INSTALLING THE THERMOSTATIC ASSEMBLY

The thermostatic assembly (Figure 2) consists of the INSTANTROL control bulb (a), flexible tubing (b), and bellows assembly with cup cover (c). This unit contains the thermostatic charge. In event the charge is lost, a new thermostatic assembly must be purchased and installed as a complete unit. The assembly is not repairable in the field.

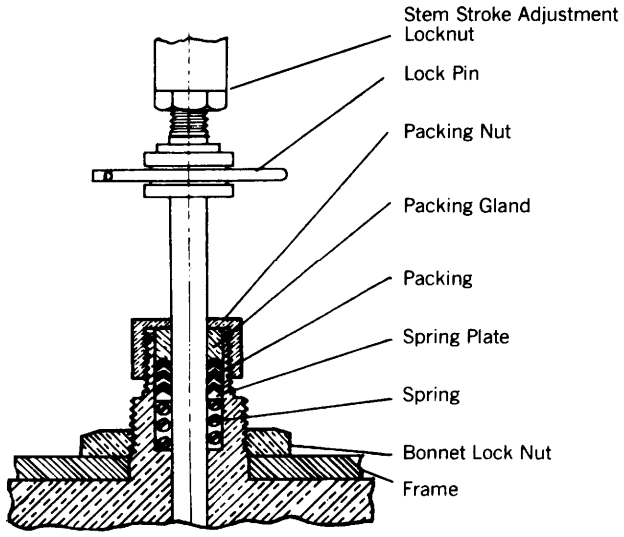


Figure 1

CAUTION

Never remove or install the thermostatic cup assembly on the top of the regulator frame when the temperature of the INSTANTROL bulb is at, or above, the lowest temperature indicated for the range stamped on the nameplate.

To remove the thermostatic assembly, first cut off the steam supply and break the copper tubing connections between the steam valve and the modulation adjustment valve and the INSTANTROL control bulb flange (d). Remove the thermostatic cup assembly from the regulator frame. Turn off the water supply and remove cap screws from INSTANTROL control bulb flange and slip or pull bulb out of housing.

Reverse the foregoing proceedings for installation, being sure that the INSTANTROL control bulb is inserted in the casing with the "up" position indicated on the flange on top.

SPARE PARTS

A parts list for the temperature regulator is not provided for the reason that the thermostatic assembly must be purchased and installed as a unit and the other parts rarely require replacement. A valve repair kit, which includes all of the internal valve assembly parts, is available. When contacting the factory, give the serial number of the regulator and other information appearing on the temperature regulator nameplate.

Section VI — TROUBLESHOOTING

The regulator supplied with the series is built to operate within the temperature range indicated on the nameplate and the valve has been ground to shut off tight against the pressure specified on the order. If trouble develops after the valve has operated satisfactorily for some time, the following information may be of assistance:

EXCESSIVE FLUID TEMPERATURE

If condition persists, the thermostatic assembly may have failed. To check this possibility, turn off steam supply, disconnect the copper tubing from control bulb flange; cut off the fluid supply, remove cap screws and pull out the control bulb. Alternately, submerge bulb in cold water (temperature well below temperature range of regulator) and then hot water (temperature well above temperature range of regulator) and observe steam valve stem travel. Bulb must be fully submerged in a horizontal position with word "up" on the flange on top.

If no movement is detected, and the valve is properly packed, the thermostatic assembly must be replaced (see section entitled: "Removing or Installing Thermostatic Assembly").

EXCESSIVE HOT WATER SURGE

A short excessive hot water surge experienced just after a period of shutdown can frequently be eliminated by insulating the casing of the control bulb.

If surge is experienced after long satisfactory service, a valve repair kit may be needed or the stem packing may be binding the stem, or the valve interior may need cleaning.

CYCLING CONTROL

The control of the hot fluid temperature can be smoothed out by adjustments of the INSTANTROL action adjustment valve (Figure 2). The valve should approach the open position for applications with a high steam demand due either to high flow requirements or high desired temperature, or both. Conversely, the valve should approach the closed position if low steam demand is involved. The valve is shipped in the half open position.

If cycling persists, it may be necessary to add a pressure regulator ahead of the temperature regulator to lower the steam pressure, provided capacity can be maintained. Cycling may be due to back pressure (refer to section entitled "Installation").

HOT FLUID TEMPERATURE TOO HIGH OR TOO LOW

Refer to section entitled "Temperature Adjustments." If steam valve remains open, the steam quality may be low and it may be necessary to increase the steam pressure.

LOW TEMPERATURE FLUID

Trap Failure: Low temperature hot fluid may be due to failure of the inverted bucket trap which would cause the shell to completely or partially fill with condensate.

For repair trap parts or replacement, contact the local representative or distributor for trap manufacturer.

CONDENSATE REQUIREMENTS

"Rule of Thumb." The condensate load on a heater can be figured as follows:

One pound of steam will be required for every 100 gallons of water heated 1°F.

This method provides a small safety factor of excess trap capacity.

MISCELLANEOUS

Check and clean copper tubing lines.

Check and clean strainer on steam line.

Check steam supply to insure that high quality steam is reaching the heater package.

Check the heater to determine if formation of scale (lime deposits) on the tubes is reducing heat transfer.

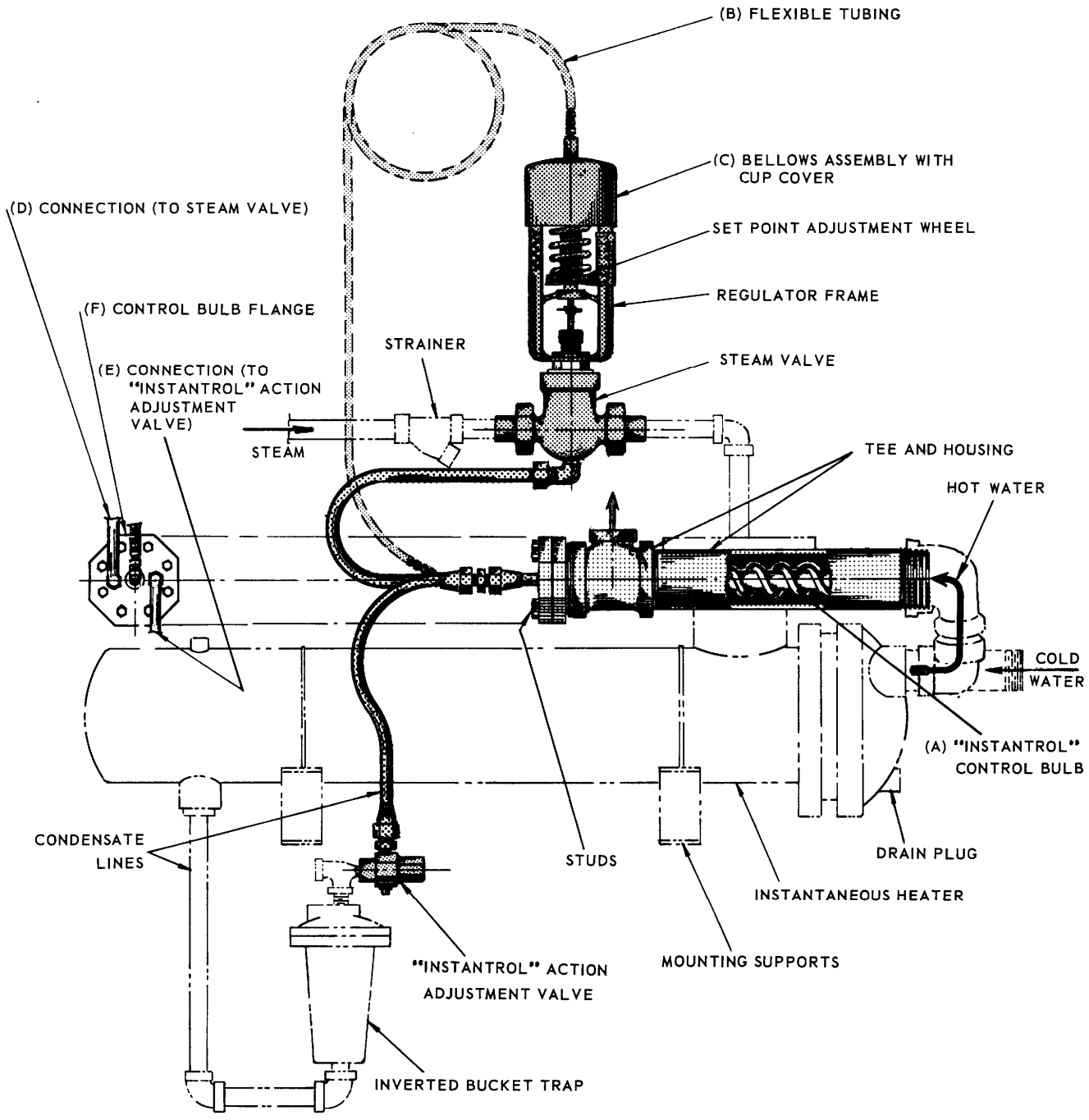
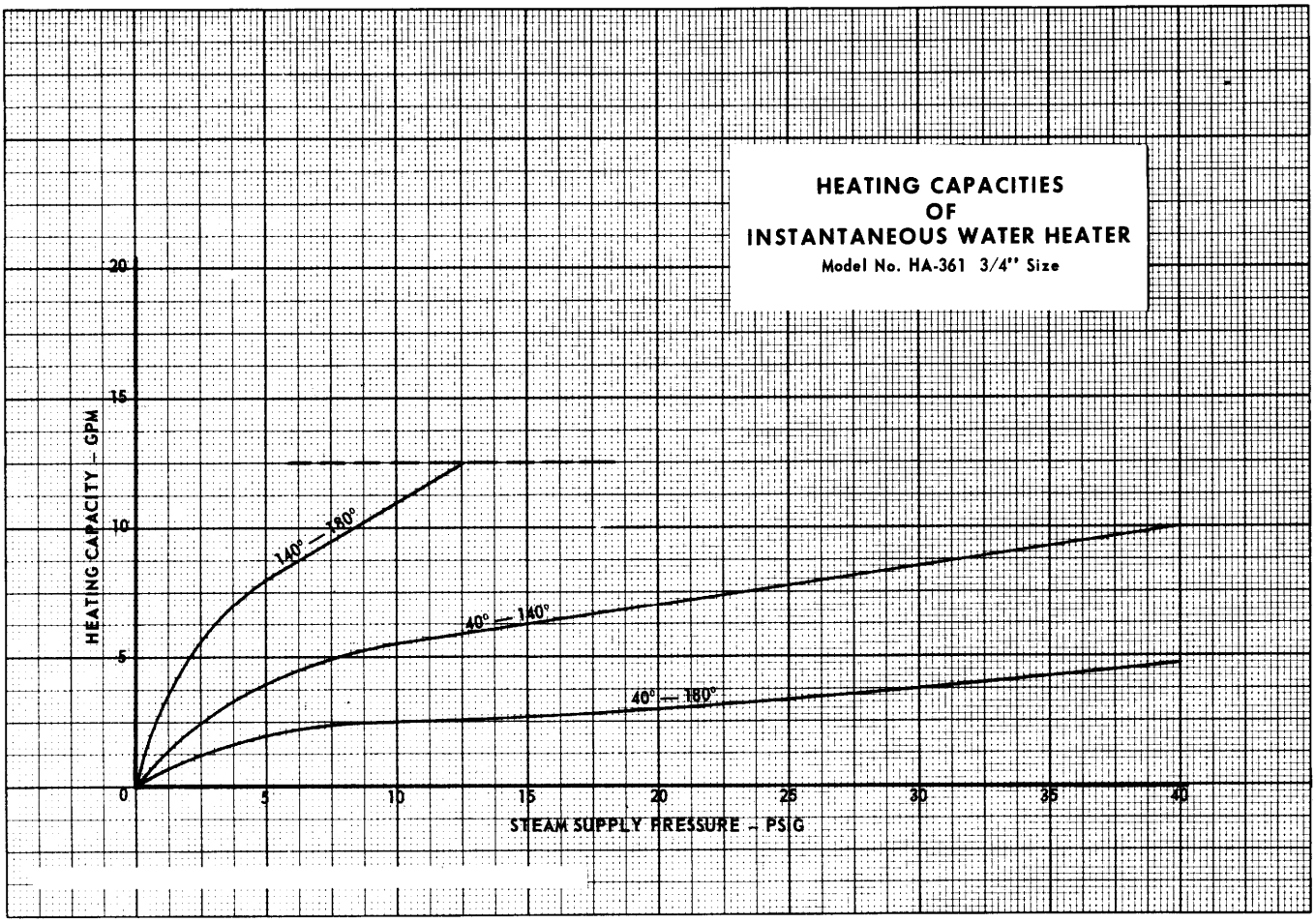
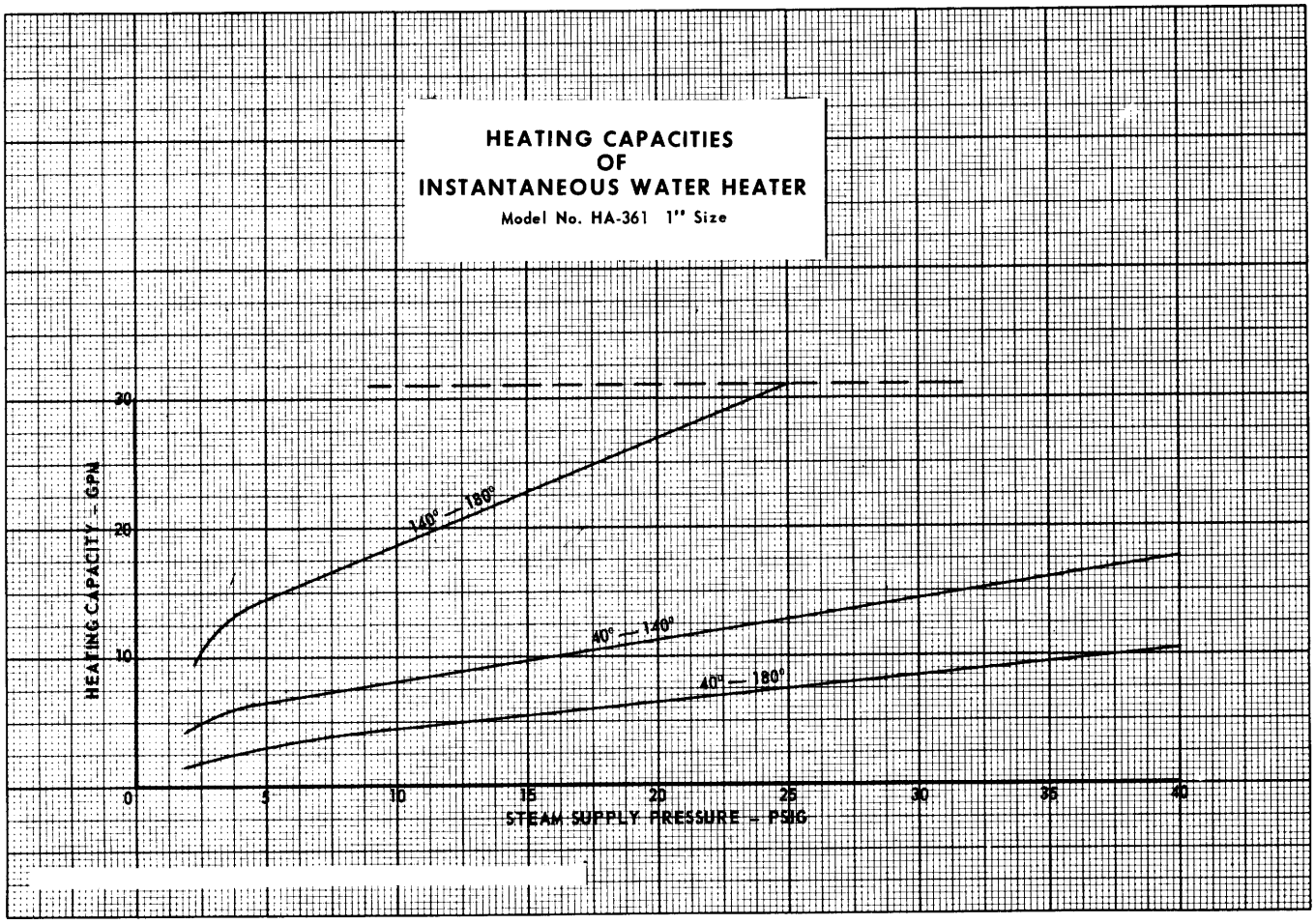
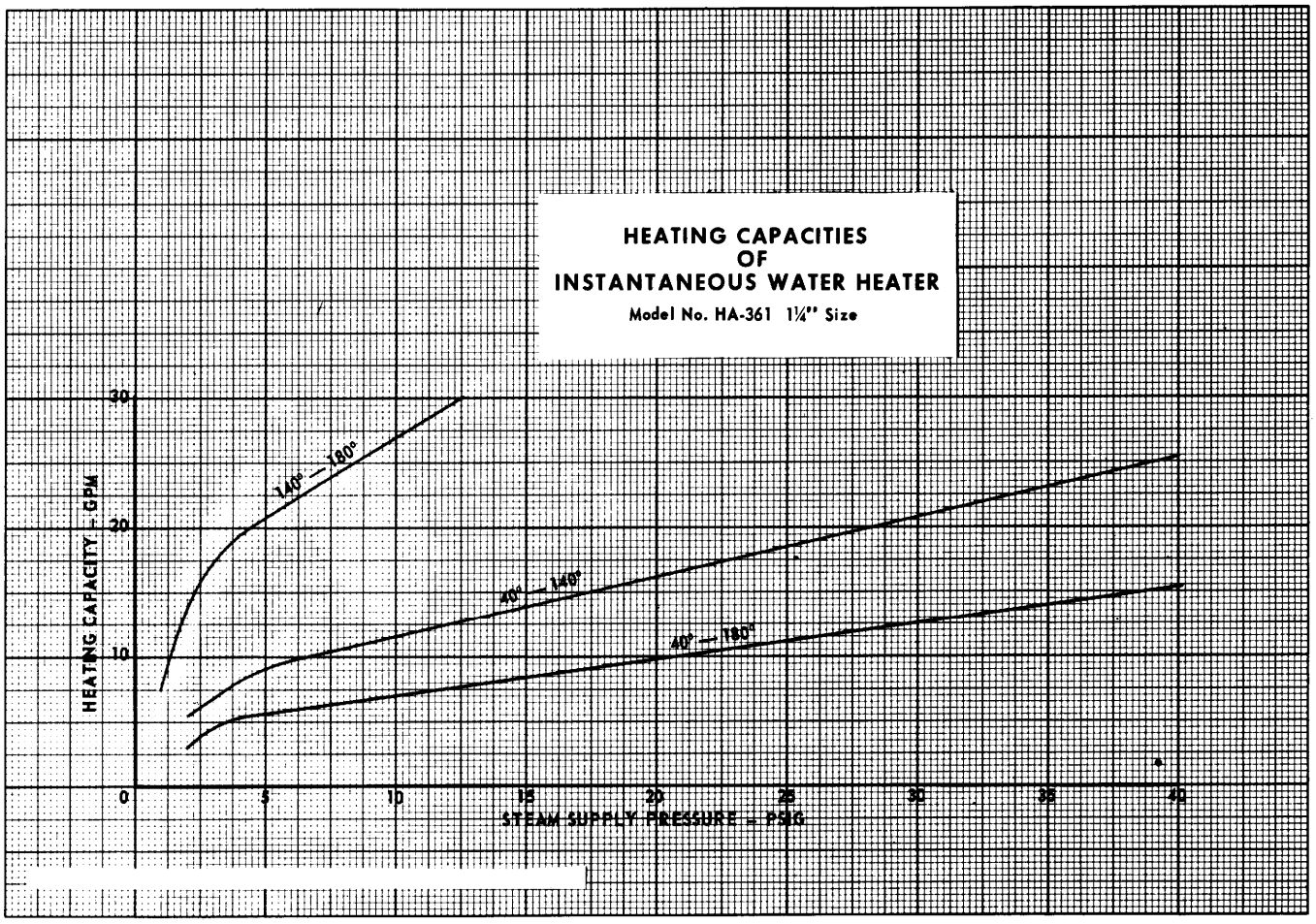
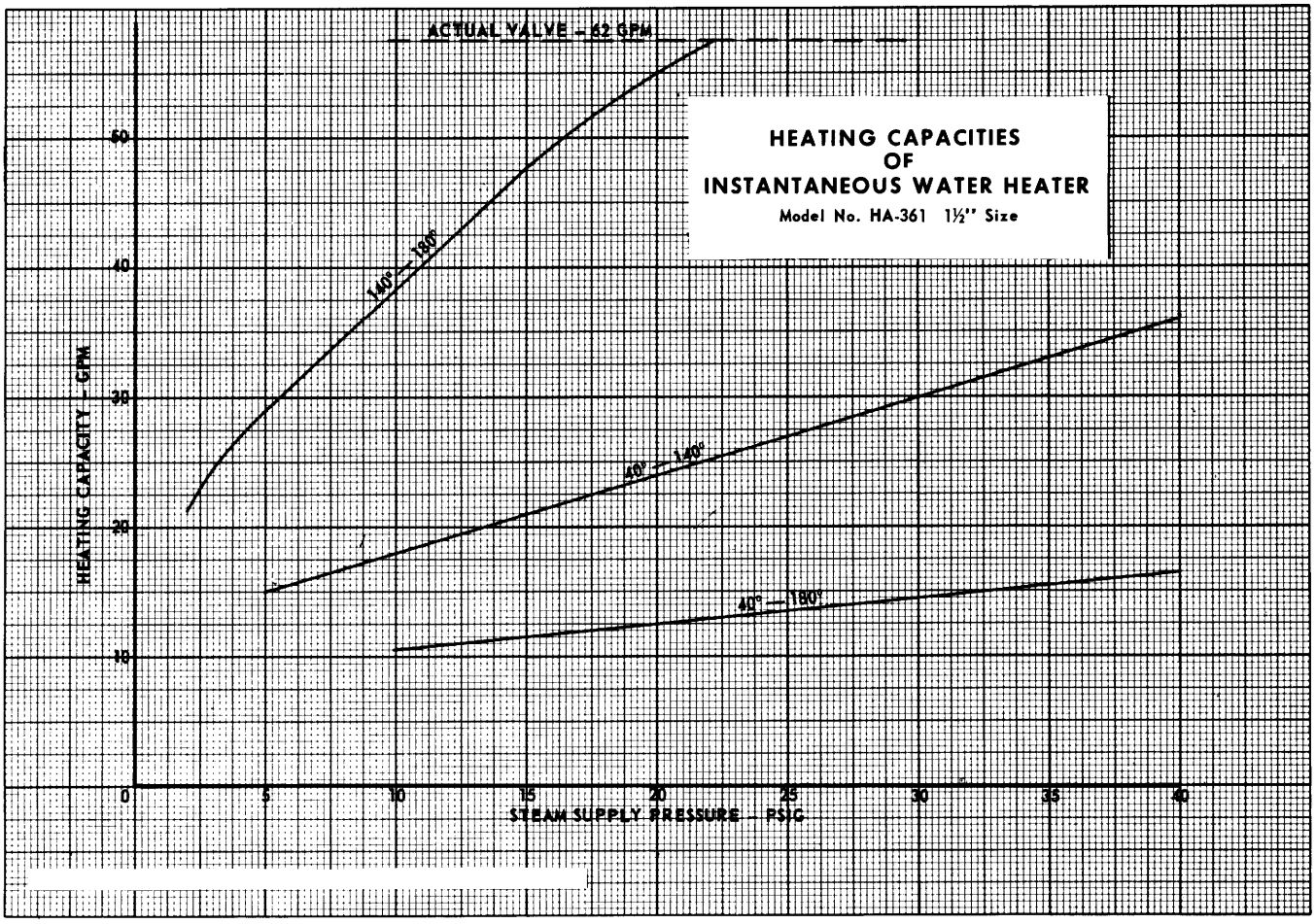

(B) FLEXIBLE TUBING
(C) BELLOWS ASSEMBLY WITH CUP COVER
(D) CONNECTION (TO STEAM VALVE)
SET POINT ADJUSTMENT WHEEL
REGULATOR FRAME
(F) CONTROL BULB FLANGE
STRAINER
STEAM VALVE
(E) CONNECTION (TO "INSTANTROL" ACTION ADJUSTMENT VALVE)
STEAM
TEE AND HOUSING
HOT WATER
COLD WATER
(A) "INSTANTROL" CONTROL BULB
CONDENSATE LINES
STUDS
DRAIN PLUG
INSTANTANEOUS HEATER
"INSTANTROL" ACTION ADJUSTMENT VALVE
MOUNTING SUPPORTS
INVERTED BUCKET TRAP

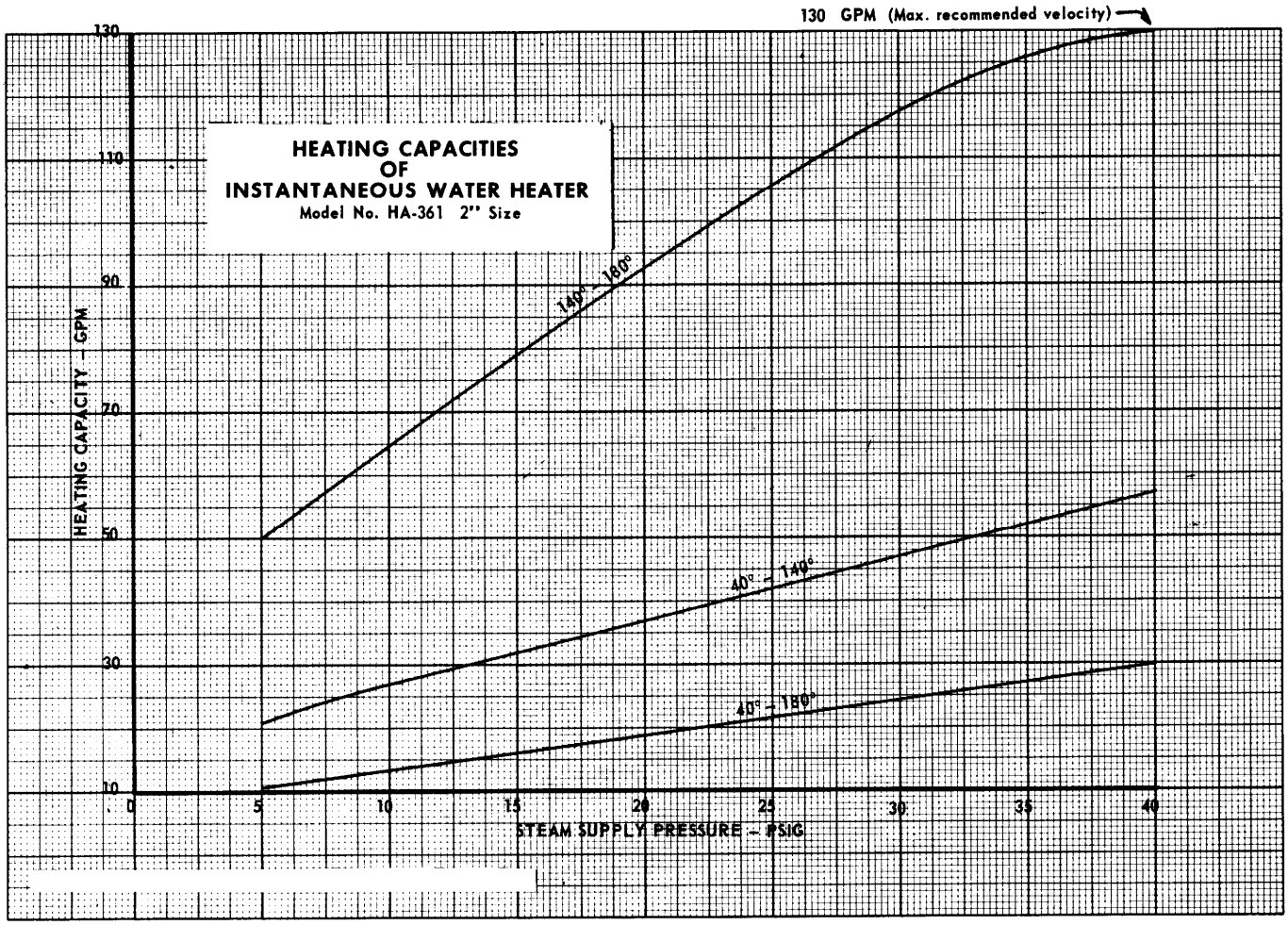
Figure 2


HEATING CAPACITIES
OF
INSTANTANEOUS WATER HEATER
Model No. HA-361 3/4" Size
HEATING CAPACITY – GPM
20
15
10
5
0
140° — 180°
40° — 140°
40° — 180°
5
10
15
20
25
30
35
40
STEAM SUPPLY PRESSURE – PSIG


HEATING CAPACITIES
OF
INSTANTANEOUS WATER HEATER
Model No. HA-361 1" Size
HEATING CAPACITY – GPM
30
20
10
0
140° — 180°
40° — 140°
40° — 180°
5
10
15
20
25
30
35
40
STEAM SUPPLY PRESSURE – PSIG


HEATING CAPACITIES
OF
INSTANTANEOUS WATER HEATER
Model No. HA-361 1¼" Size
HEATING CAPACITY - GPM
30
20
10
0
140° — 180°
40° — 140°
40° — 180°
5
10
15
20
25
30
35
40
STEAM SUPPLY PRESSURE - PSIG


ACTUAL VALVE - 62 GPM
HEATING CAPACITIES
OF
INSTANTANEOUS WATER HEATER
Model No. HA-361 1½" Size
HEATING CAPACITY - GPM
60
40
30
20
10
0
140° — 180°
40° — 140°
40° — 180°
5
10
15
20
25
30
35
40
STEAM SUPPLY PRESSURE - PSIG



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