

IOM-MM-1102

MICROMIX[®] II

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

GRAHAM CORPORATION, P.O. Box 719, Batavia, NY 14021-0719
Corporate and Sales Headquarters: 20 Florence Avenue, Batavia, New York 14020
Tel.: 585-343-2216 Fax: 585--343-1097 E-MAIL: equipment@graham-mfg.com WEBSITE: <http://www.graham-mfg.com>



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SECTION I - INSTALLATION

1. Heater may be wall or floor stand mounted or can be suspended from the ceiling. Approximately 3' clearance from the floor is required to allow room for steam and condensate connections and the hot water outlet.
2. For optimal heater performance, the steam trap should discharge to 0 psig, below the level of the trap. If lift of condensate is required or the trap must discharge to a back pressure, contact Graham Corporation for correct sizing. In these cases, a discharge check valve is recommended.
3. Install a pressure relief valve set at 75 PSIG for MM-30 & MM-60 or 50 PSIG for MM 90-120 steam piping if steam pressure to the heat exchanger can exceed these limits.

Note the Heliflow[®] heat exchanger can be supplied with a steel shell to accommodate higher design pressures if required.

4. The heater incorporates an integral pressure relief valve (located on side of the MicroMix valve) to relieve excess water pressure caused by thermal expansion.
5. Install the temperature gauge provided in the hot water outlet piping.
6. Install the pressure gauge and pigtail fitting on the steam supply line, either directly on the heat exchanger or in close proximity.
7. Standard operating steam pressure to the exchanger is 15 PSIG or less. The pressure reducing valve should be set at 15 PSIG if furnished.
8. The water pressure must exceed the steam pressure by 15 PSI at all times for proper operation.
9. Check tightness of all connections.
10. See typical installation drawings in Part V. It is also advisable to install a drain/test valve close to the heater. This valve can be used to assist in initial temperature adjustment of the unit.

SECTION II - MICROMIX[®] II START-UP PROCEDURE

2.1 *Initial Startup*

1. Check all joints for tightness. If a recirculation system will be used, initial temperature adjustment of the MicroMix should be performed with the circulating pump turned “off.” After the MicroMix is set at the correct temperature, the circulator may be operated.
2. Turn on the cold water supply. Set flow at approximately 50% of the heater capacity. (Maximum water pressure 150 PSIG.)
3. Loosen the compression fitting on the sensing line at the upper diaphragm cover. Permit water to flow until free of any air. Retighten fitting.
4. A steam side vent valve should be installed on either of the vent connections located on top of the heat exchanger casing. Then slowly turn on the steam supply to the heat exchanger. Adjust the pressure regulator (if equipped) so steam pressure to the exchanger is 15 PSIG.

NOTE: Carefully vent any trapped air using the vent valve.

5. By loosening the setscrew and locking ring, the desired outlet temperature can be calibrated by sliding the control rod from left to right (hotter to colder).
6. The valve also features a temperature stabilizer which will fine-tune the proportion of hot and cold water through all rated flows. The stabilization adjustment is performed by rotating the control rod from vertical to 30 degrees. To rotate the control rod, insert a nail or similar object into the hole drilled in the rod. Then rotate to the approximate position as indicated in Table 1 or 1A.

Vary the flow to simulate high and low usage and note any variations in temperature based on flow rate.

If the outlet temperature increases with increased flow, rotation should be decreased (toward 0 degrees, the 12:00 o'clock position).

If the outlet temperature decreases with increased flow, the rotation of the stabilizer should be increased (toward 30 degrees, the 2:00 o'clock position). Correct adjustment will yield stable temperature output throughout the heater's flow capacities. Once the correct adjustments have been made, tighten the locking ring and set screw.

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7. The MicroMix II water heater should now be adjusted and operating. No further adjustments are required, unless there is a large fluctuation in the inlet water temperature. In climates with large seasonal temperature changes, a felt tip marker may be used to mark the summer and winter control rod positions.

NOTE: Every 3°F change in supply water temperature will yield approximately a 1°F change in the outlet water temperature.

8. Tighten all casing bolts on the heat exchanger after 2 to 3 hours of operation and check after 24 hours.

TABLE I

TEMPERATURE STABILIZATION ADJUSTMENT TABLE
 (Approximate setting in degrees of rotation. See illustration below.)

* Steam pressure measured at heat exchanger inlet, psig

INLET WATER TEMP. DEG. F	SET POINT DEG. F	MM - 30				MM - 60			
		2*	5*	10*	15*	2*	5*	10*	15*
40	120	25	24	23	22	15	14	13	12
	140	30	30	30	30	30	28	25	20
	150	30	30	30	30	30	30	27	25
	160	*	*	*	30	30	30	30	30
	180	*	*	*	30	30	30	30	30
60	120	22	21	20	19	12	11	10	9
	140	25	24	23	22	15	14	13	12
	150	28	27	27	26	23	21	18	16
	160	*	*	*	30	30	28	25	20
	180	*	*	*	30	30	30	30	30

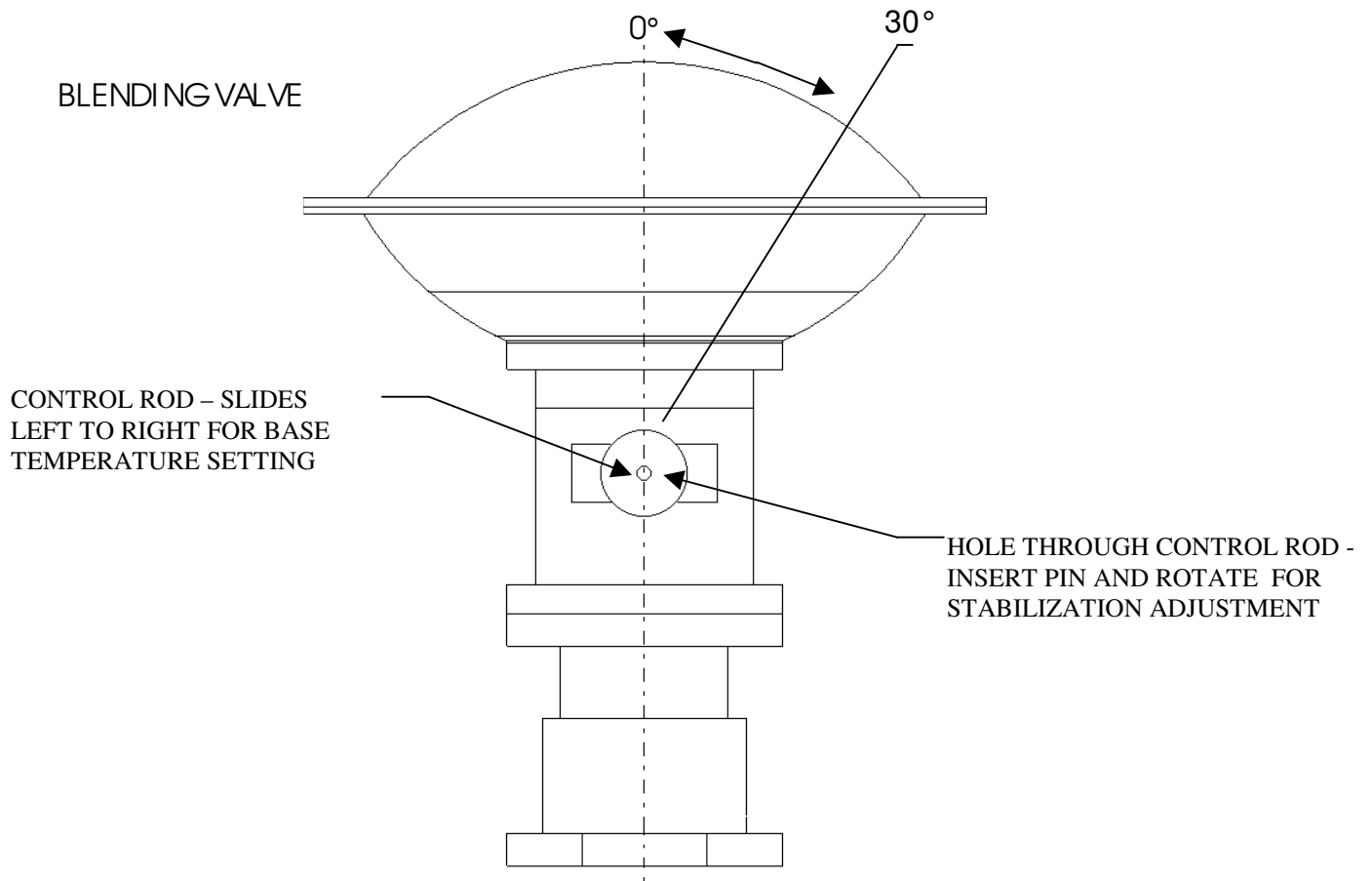


TABLE IA

TEMPERATURE STABILIZATION ADJUSTMENT TABLE

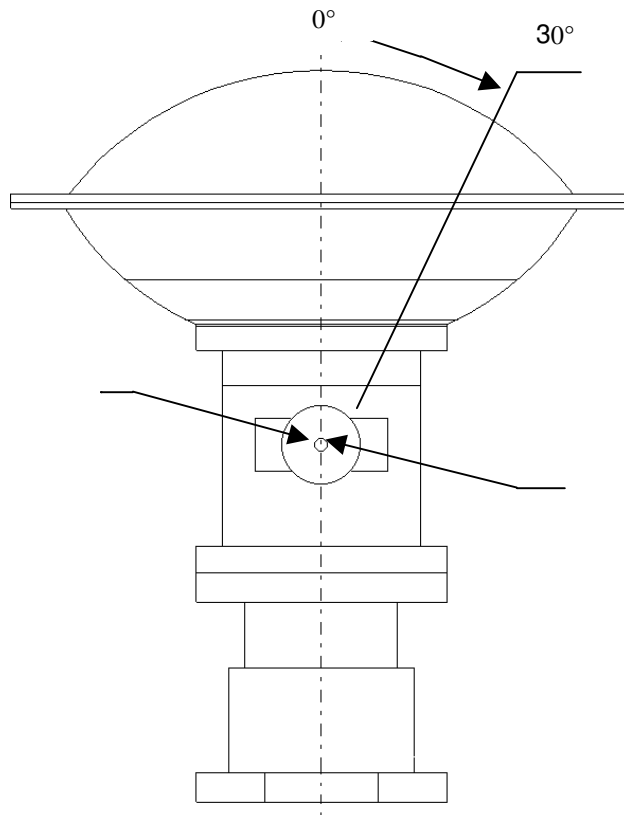
(Approximate setting in degrees of rotation. See illustration below.)

* Steam pressure measured at heat exchanger inlet

INLET WATER TEMP. DEG. F	SET POINT DEG. F	MM - 90				MM - 120			
		2*	5*	10*	15*	2*	5*	10*	15*
40	120	25	24	23	22	15	14	13	12
	140	27	27	25	24	22	22	23	20
	150	30	30	30	30	27	27	27	25
	160	30	30	30	30	30	30	30	30
	180	30	30	30	30	30	30	30	30
60	120	22	21	20	19	12	11	10	9
	140	25	24	23	22	15	14	13	12
	150	28	27	27	26	23	21	18	16
	160	30	30	30	30	30	28	25	20
	180	30	30	30	30	30	30	30	30

BLENDING VALVE

CONTROL ROD - SLIDES LEFT TO RIGHT FOR BASE TEMPERATURE SETTING



HOLE THROUGH CONTROL ROD - INSERT PIN AND ROTATE FOR STABILIZATION ADJUSTMENT

SECTION III - MAINTENANCE

3.1 *Blending Valve Disassembly*

Refer to Part IV of this manual for troubleshooting. Disassembly of the blending valve need only be undertaken if problems in performance or instability of temperature is linked to the blending valve. Be sure all work is performed in a clean environment to prevent the introduction of foreign matter into the valve mechanism. Part numbers below refer to the cross sectional drawings found in Part V (Drawings) of this manual.

Procedure

1. Close all steam and water supply lines.
2. Disconnect the sensing tube (46) from the lower valve body (42 or 43) and diaphragm cover (5). (Note position of notch in cover relative to the valve body.)
3. Disconnect Victaulic couplings at all valve connections and remove the valve.
4. Loosen and remove casing bolts (14) and lift off the diaphragm cover.
5. Hold the upper stem (1) by placing wrench on flats. Remove jam nuts (7) taking care not to turn the stem. Remove shouldered washer (8) and O-ring (9) along with diaphragm (13), diaphragm plate (11), spring (10) and guide washer (16).
6. Inspect diaphragm for any cracks or tears.
7. Remove retaining clip (19) from the temperature control rod (18). Unscrew the locking ring (21) and remove cover plate (22).
8. Compress the circlip (23) and remove from adjusting sleeve (27). Remove temperature control rod (18) and adjustor key cylinder (25).
9. Caution: Do not permit valve plug to drop from lower valve body. Hold valve stem (1) from above.
10. Unscrew retaining screw (35), remove spring (36), and spacer washers (37 & 38).
11. Remove the valve plug assembly through lower housing.

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12. Remove socket head cap screws (12) and lift off lower diaphragm case (5) Remove O-ring (15) taking care not to damage groove.
13. Unscrew cap screws (49) and remove lower valve body (42 or 43).
14. Push black teflon coated temperature-adjusting sleeve (27) out of upper valve body (17).
15. Remove main valve stem (1).

NOTES:

- a) Inspect all parts for wear or damage. Replace all gaskets and O-rings.
- b) Clean, flush and dry with clean cloth.
- c) See parts list for recommended overhaul parts. Gaskets and O-rings should be replaced during any repair procedure.

3.2 *Blending Valve Assembly*

Procedure

1. Install the temperature adjusting sleeve (27) into the upper valve body (17).
2. Assemble upper valve body (17) to lower valve body (42 or 43) and secure cap screws. Note the cold water inlet will be on same side as the control rod opening.
3. Insert main valve stem (1) into bottom of temperature adjusting sleeve (27) and push until the collar washer seats against upper valve body.
4. Insert valve assembly into adjusting sleeve (27) and push until it is fully seated.
5. On lower end of valve stem install spacer (2), washer (37), bearing washer (38), spring (36), and tighten retaining screw (35).
6. Install O-ring (15) in groove on upper valve body and install lower diaphragm case (5) securing it with cap screws (14) tightening in a sequential manner (note location of notch in relation to valve body).
7. Install adjustor key cylinder (25) on the pin located on the valve shaft. Replace O-ring on temperature control rod (18) and insert so adjustor key is centered in slot and notch on control rod fits with groove pin in adjusting sleeve (27). Install circlip (23) and locking ring (21).

8. Install, in order, the control valve spring (10), spring guide washer (16), diaphragm plate (11), diaphragm (13), O-ring (9), shouldered washer (8), and jam nuts (7), on main valve stem. Position diaphragm over holes and notch on lower case prior to tightening the jam nuts.
9. Install upper cover (6) and be sure notches in lower cover, diaphragm and upper cover line up. Install bolts and tighten sequentially.
10. Install valve on frame.
11. Install sensing tube (46) and Victaulic fittings. Check all fittings for tightness.
12. Refer to start-up procedures for temperature adjustment.

3.3 Heat Exchanger Inspection Disassembly

The Heliflow[®] heat exchanger coil is readily accessible for inspection and cleaning without disturbing the steam or water piping.

Procedure

1. Remove plug to drain the casing.
2. Remove all base plate nuts (93 or 94).
3. Lift off the casing (80 or 81), being careful not to damage the gasket (84 or 85).
4. If a leak in the tubing is suspected, water pressure can be turned on. Any leaks should be easily seen with the unit still in place.

To Clean the Coil

Depending on local water conditions, scale deposits from hard water can form inside the heat exchanger coil. The coil can be cleaned in place, following instructions per Graham Bulletin CC100.

If Removal of the Coil is Necessary

1. Disconnect water piping and remove the manifold nuts and lock rings.
2. Lift off the coil assembly (78 or 79), being careful not to damage the manifold gaskets.

3.4 Re-Assembly

Procedure

1. Replace manifold and baseplate gaskets.
2. Check that the tabs on the manifold lock rings fit into the base plate slots. These keep the manifold-coil assembly from turning when tightening the manifold nuts.
3. Be sure the bottoms of the manifolds are seated in pockets located inside the casing.
4. Install and tighten manifold nuts.
5. Install casing and tighten bolts sequentially.
6. Check nuts for tightness after an hour or two and again after 24 hours of operation.

SECTION IV - TROUBLESHOOTING

Observations regarding any problems should be recorded.

1. Does the problem present itself during no flow, low flow, or high flow conditions, etc?
2. High temperature or low temperature? Note the MicroMix is designed to prevent high temperature failures, however, recirculation system failures may lead to over-temperature situations during low flow conditions.
3. Unsteady temperature?
4. Is the unit new or what is length of service?
5. What is the local water hardness?
6. Is the problem repeatable, sporadic?

The first step in resolving a problem with a MicroMix water heater system should be to determine the source of the problem.

- The recirculation system
- The MicroMix blending valve
- The MicroMix Heliflow heat exchanger

1. Check the position of the water outlet temperature gauge. Has it been installed according to the recommended Piping & Instrumentation Diagram? The gauge should be downstream relative to the point where the recirculated water returns to the unit.
2. For facilities with recirculation systems, the circulating pump should be turned off to start the troubleshooting analysis.

Water Temperature Is Too High

1. Has inlet water temperature changed since the valve temperature setting was adjusted?
2. Is the MicroMix temperature adjustment set correctly?
3. Has steam pressure changed since the MicroMix temperature was adjusted?
4. If fitted with a recirculation system, turn the circulating pump off. If the problem is eliminated, the trouble is with the recirculation system.

For a new installation with a recirculation loop, check the setting of the thermostatic valve. The thermostatic element setting should be approximately 10°F below the normal operating temperature of the MicroMix. For example, if 120°F is the desired loop temperature, the thermostatic element should be set for 110°F.

Also for new installations, check that the thermostatic diverting valve has been piped in accordance with Graham Bulletin RS109. Because this valve is used in a non-typical manner, it is important to check against Bulletin RS109 “Recirculation Systems for MicroMix® II Water Heaters.”

If the problem developed in an existing system, the thermostatic element should be replaced.

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Water Temperature Is Too Low

1. Is the problem in the MicroMix valve or the MicroMix heat exchanger? The easiest method to answer this question is to check the temperature of the pipe which runs from the heat exchanger to the blending valve. At low flows and when the unit is idle, this pipe should be at a temperature about 200°F. At higher flow rates, check the surface temperature of the pipe which should remain above 150°F. If this pipe goes cold when water demand increases, the problem lies in the heat exchanger. Otherwise, the source of the problem is in the MicroMix blending valve.

Heat Exchanger Is Source of Problem

1. Has air been vented from the shell side of the heat exchanger?
2. Is steam supply at constant pressure? During high demand?
3. Is the condensate drain trap functioning correctly?
4. Is the coil fouled due to hard water?

MicroMix Blending Valve Is Source of Problem

1. Is temperature adjustment correct?
2. Disassemble valve - is the plug stuck in the open position?
3. Is the seal plate assembly and gasket in need of repair?

Restricted Water Flow

1. Is the valve diaphragm ruptured?
2. Is the sensing tube plugged?
3. Are there any restrictions in the water piping?

SECTION V – ORDERING SPARE PARTS

When ordering spare parts, please address your communication to:

GRAHAM CORPORATION
20 Florence Avenue
Batavia, New York 14020

Telephone: 585 / 343-2216
Spare Parts: 800 / 828-8150
Fax: 585 / 343-1097
E-MAIL: equipment@graham-mfg.com
WEBSITE: <http://www.graham-mfg.com>

IMPORTANT - The following information should be given in order to identify the spare parts required:

1. Serial number of unit (stamped on nameplate),
2. Name or description of part required,
3. Method of shipment (i.e. freight, express, etc.).

Graham Corporation presents the information in this manual as good engineering practice. We cannot be held responsible for any damage to equipment that may result from mal-operation nor for any personal injuries should they occur during normal or abnormal operation.

SECTION VI - DRAWINGS

<u>Item</u>	<u>Document Number</u>	<u>Page No.</u>
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MODEL MM-30 (30 GPM)

CAPACITY

Units(s) shall have the capacity to heat _____ GPM of water from _____ F to _____ F when supplied with _____ psig steam.

MATERIALS

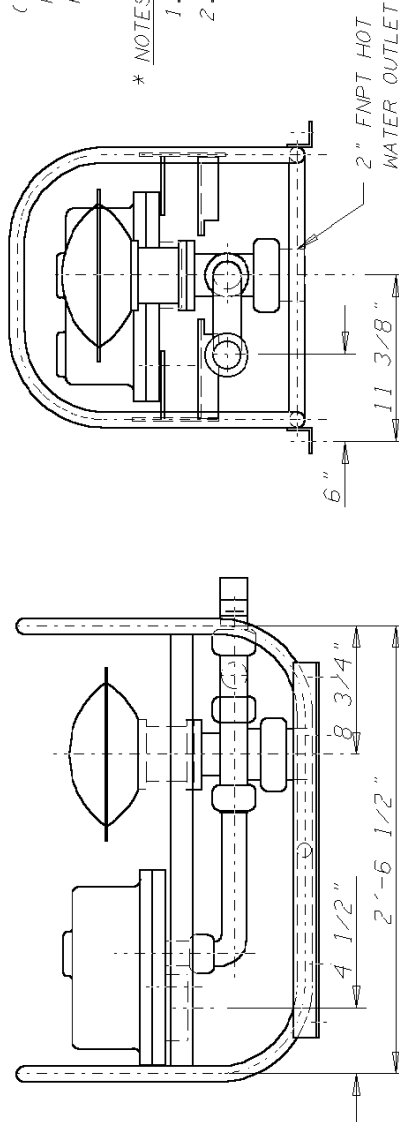
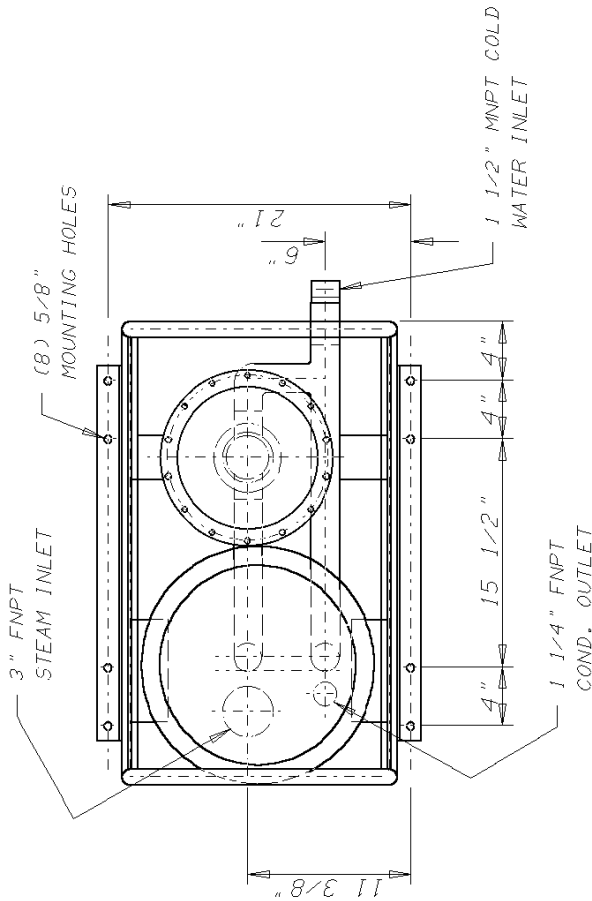
Heat Exchanger - cast iron shell _____ tubes
 ASME constructed and stamped
 Blending valve - cast bronze
 Frame - Structural Steel
 Approximate weight 300 lbs.

ACCESSORIES: STD

- (1) Main F&T Trap (1 1/2")
- (1) Strainer CI (1 1/2")
- (1) Drip Trap (1/2")
- (1) Strainer CI (1/2")
- Pressure Gauge
- Pigtail Fitting
- Thermometer

* NOTES:

1. See dwg A-49203-35 for piping details.
2. If steam supply pressure is above 15 psig, model MM-30H is required.



GRAHAM CORPORATION			
20 FLORENCE AVE., BATAVIA, NEW YORK			
MICRO MIX[®] II MODEL MM-30			
SCALE	MADE	CHKD	DATE
NONE	PRS	WJK	12-19-01
DWG. NO.	A-49203-31		REV.
			A



MODEL MM-30 (30 GPM)

CAPACITY

Units(s) shall have the capacity to heat _____ GPM of water from _____ F to _____ F when supplied with _____ psig steam.

MATERIALS

Heat Exchanger - cast steel shell tubes

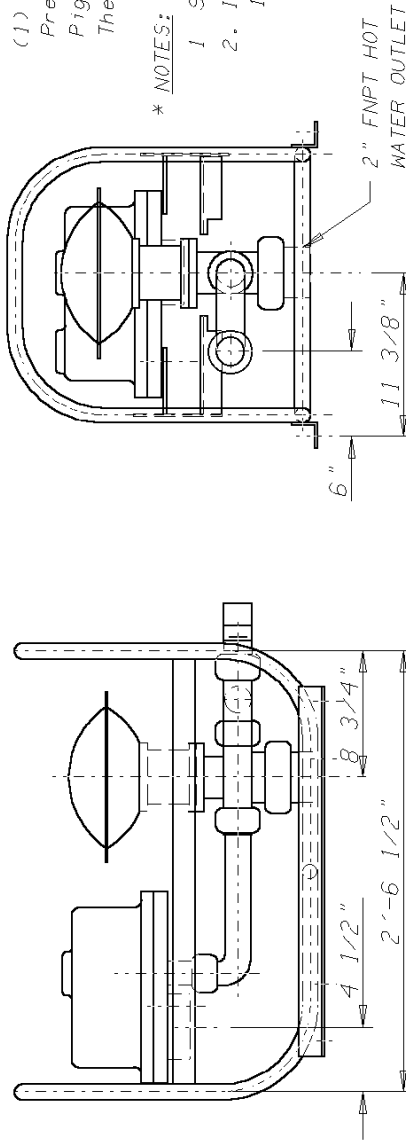
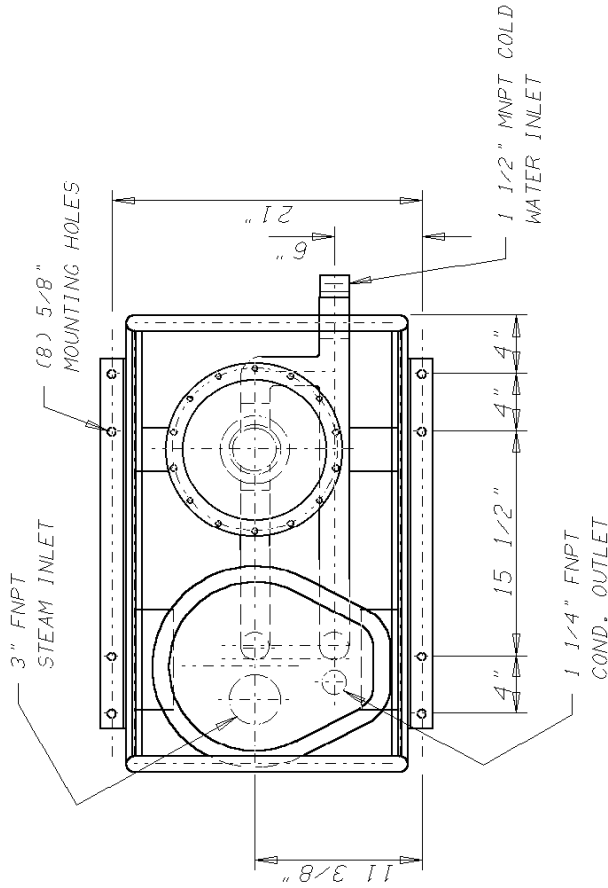
ASME constructed and stamped Blending valve - cast bronze
Frame - Structural Steel
Approximate weight 300 lbs.

ACCESSORIES: STD

- (1) Main F&T Trap (1 1/2")
- (1) Strainer CI (1 1/2")
- (1) Drip Trap (1/2")
- (1) Strainer CI (1/2")
- Pressure Gauge
- Pigtail Fitting
- Thermometer

* NOTES:

1. See dwg A-49203-35 for piping details.
2. If steam supply pressure is above 15 psig, model MM-30H is required.



GRAHAM CORPORATION
20 FLORENCE AVE. BATAVIA, NEW YORK

MICRO MIX[®] II MODEL MM-30S

SCALE	MADE	CHKD	DATE	DWG. NO.	REV.
NONE	PRS	WJK	12-19-01	A-49203-32	A

GRAHAM CORP. MICRO-MIX® II
MODEL MM-30D (30 GPM)

CAPACITY

Units(s) shall have the capacity to heat _____ GPM of water from _____ F to _____ F when supplied with _____ psig steam.

MATERIALS

Heat Exchanger - cast _____ shell _____ double-wall tubes
ASME constructed and stamped
Blending valve - cast bronze
Frame - Structural Steel
Approximate weight 380 lbs.

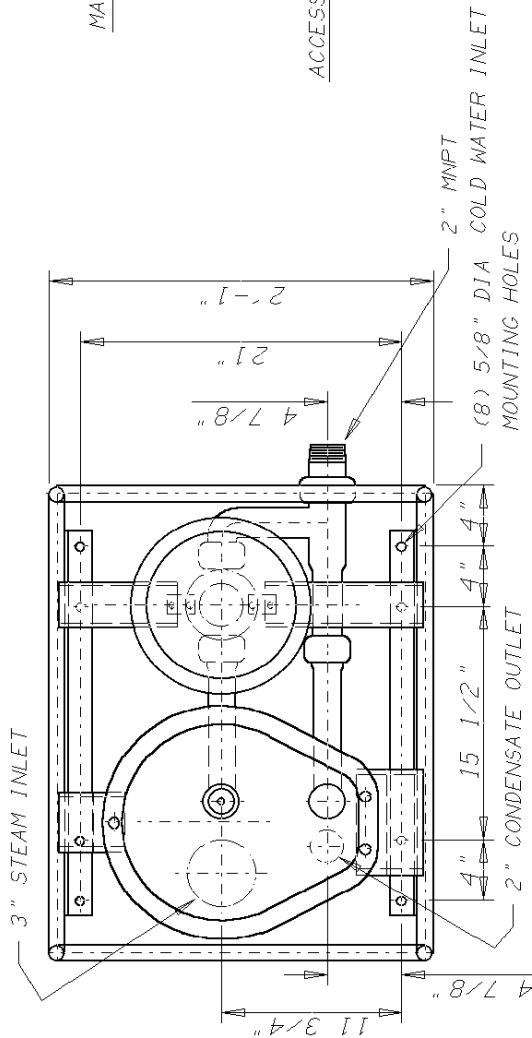
ACCESSORIES: STD

- (1) Main F&T Trap (1 1/2")
- (1) Strainer (1 1/2")
- (1) Drip Trap (1/2")
- (1) Strainer (1/2")
- Pressure Gauge
- Pigtail Fitting
- Thermometer

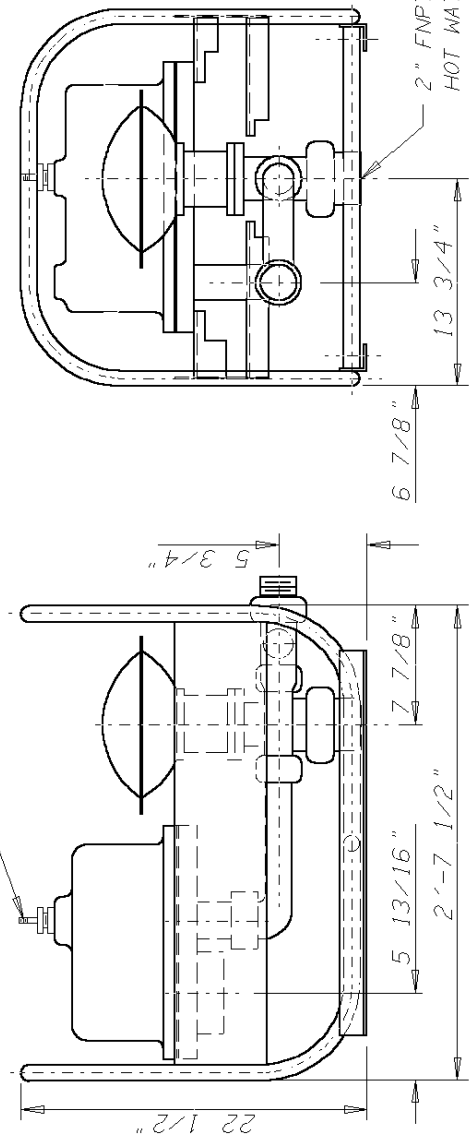
NOTES:

- 1 See dwg A-49203-35 for piping details.
2. If steam supply pressure is above 15 psig model MM-30DH is required.

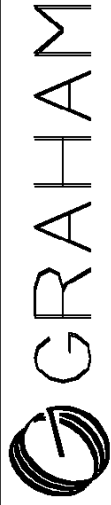
PROJECT: _____
ENGINEER: _____
REPRESENTATIVE: _____



LEAK DETECTION PORT

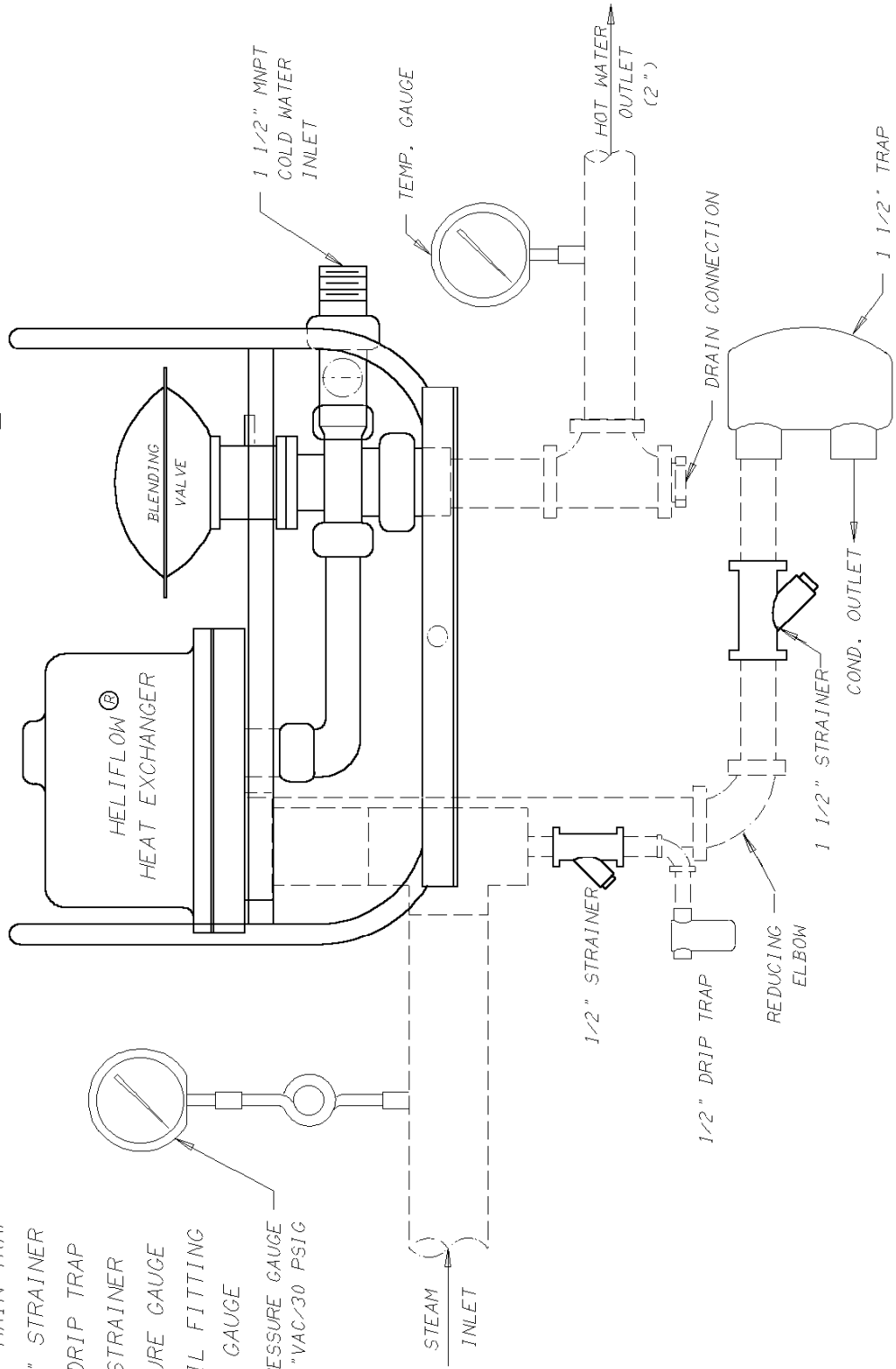


QUANTITY _____
MM-30D PLAN



STANDARD PACKAGE INCLUDES:

- 1) 1 1/2" MAIN TRAP
- 2) 1 1/2" STRAINER
- 3) 1/2" DRIP TRAP
- 4) 1/2" STRAINER
- 5) PRESSURE GAUGE
- 6) PIGTAIL FITTING
- 7) TEMP. GAUGE



GRAHAM CORPORATION
 20 FLORENCE AVE. BATAVIA, NEW YORK
 PIPING ARRANGEMENT FOR MM-30

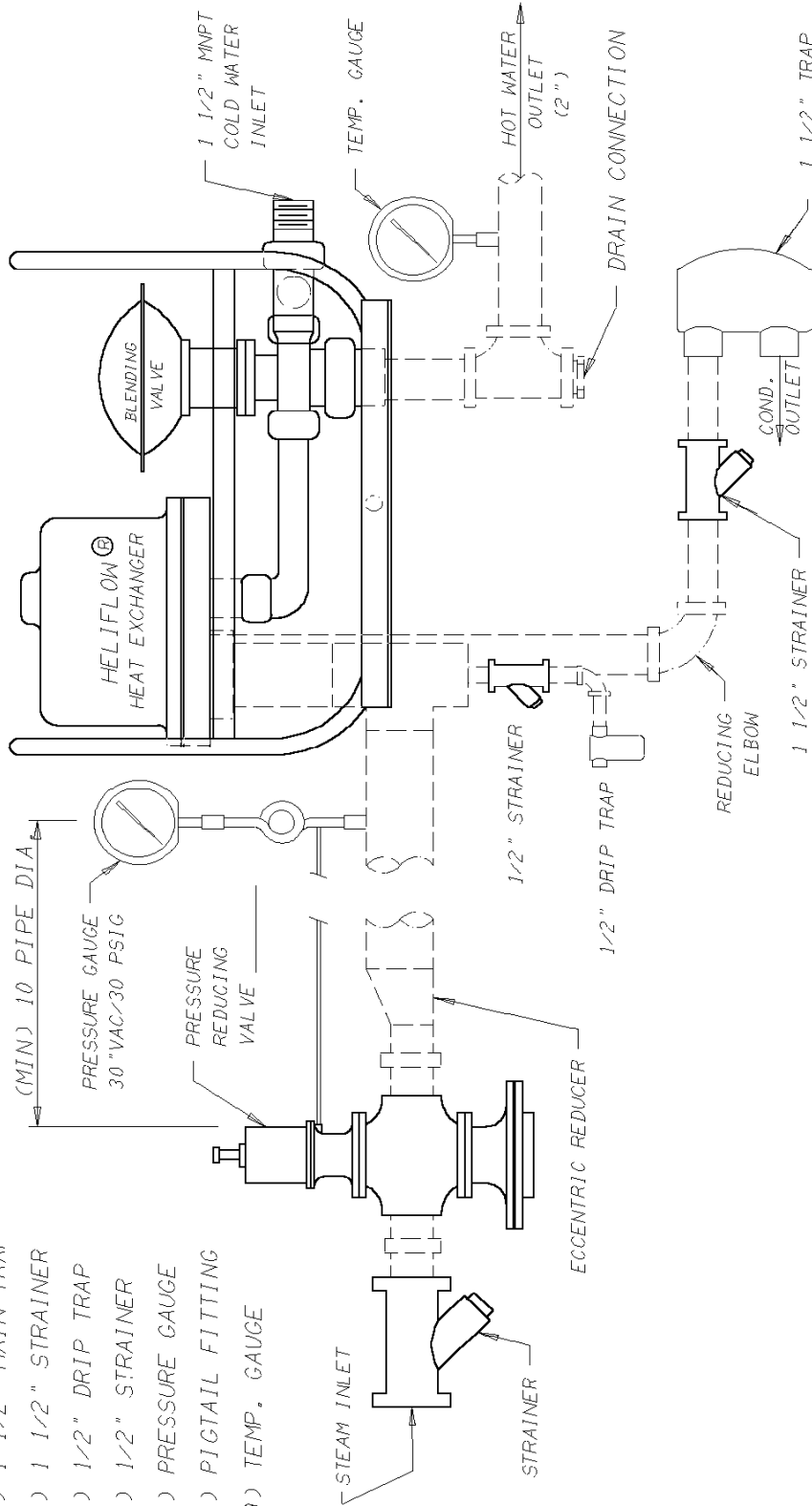
DOTTED LINE PIPING AND
 SUPPORT SUPPLIED BY INSTALLER

SCALE	MADE	CHKD	DATE	DWG. NO.	REV.
NONE	PRS	WJK	12-19-01	A-49203-35	B



STANDARD PACKAGE INCLUDES:

- 1) PRESSURE REDUCING VALVE _____
- 2) INLET STRAINER _____
- 3) 1 1/2" MAIN TRAP _____
- 4) 1 1/2" STRAINER _____
- 5) 1/2" DRIP TRAP _____
- 6) 1/2" STRAINER _____
- 7) PRESSURE GAUGE _____
- 8) PIGTAIL FITTING _____
- 9) TEMP. GAUGE _____



DOTTED LINE PIPING AND
SUPPORT SUPPLIED BY INSTALLER

NOTE: If steam supply pressure exceeds 75 psig, a suitable relieving device must be installed between pressure reducing valve and heat exchanger.

GRAHAM CORPORATION			
20 FLORENCE AVE. BATAVIA, NEW YORK			
PIPING ARRANGEMENT FOR MM-30H			
SCALE	MADE	CHKD	DATE
NONE	PRS	WJK	12-19-01
DWG. NO.	A-49203-36		REV.
			B



MODEL MM-60 (60 GPM)

CAPACITY

Units(s) shall have the capacity to heat _____ GPM of water from _____ F to _____ F when supplied with _____ psig steam.

MATERIALS

Heat Exchanger - cast iron shell, _____ tubes
 ASME constructed and stamped
 Blending valve - cast bronze
 Frame - Structural Steel
 Approximate weight 375 lbs.

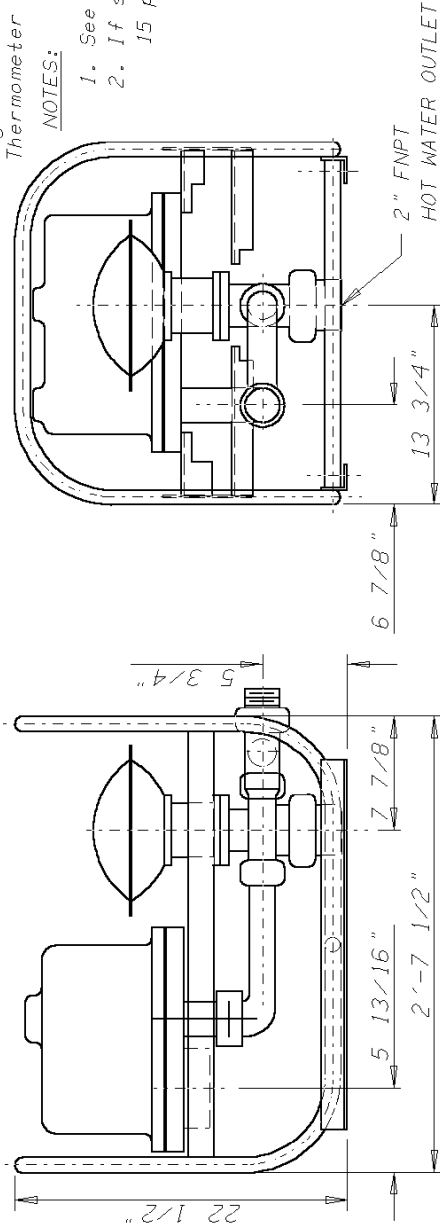
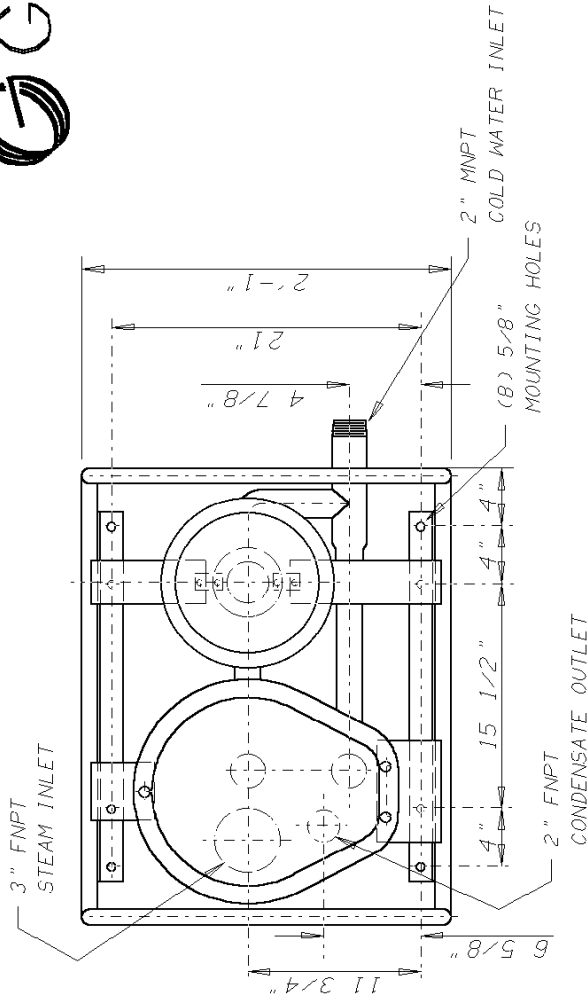
ACCESSORIES: STD

- (1) Main F&T Trap (1 1/2")
- (1) Strainer CI (1 1/2")
- (1) Drip Trap (1/2")
- (1) Strainer CI (1/2")

Pressure Gauge
 Pigtail Fitting
 Thermometer

NOTES:

1. See dug A-49203-65 for piping details.
2. If steam supply pressure is above 15 psig, model MM-60H is required.



GRAHAM CORPORATION				
20 FLORENCE AVE. BATAVIA, NEW YORK				
MICRO MIX II MODEL MM-60				
SCALE	MADE	CHKD	DATE	DWG. NO.
NONE	PRS	WJK	12-19-01	A-49203-61
				REV.
				A

GRAHAM

MODEL MM-60 (60 GPM)

CAPACITY

Units(s) shall have the capacity to heat _____ GPM of water from _____ F to _____ F when supplied with _____ psig steam.

MATERIALS

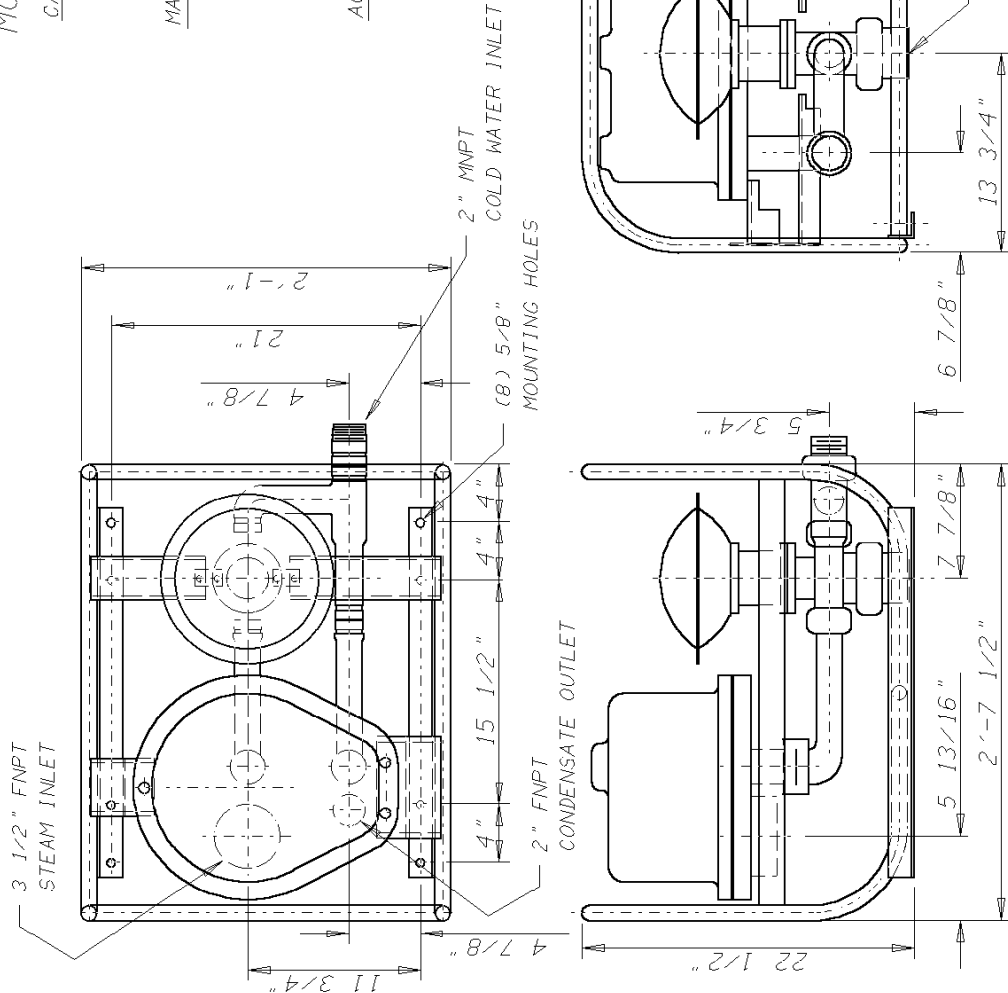
Heat Exchanger - cast steel shell, _____ tubes
 ASME constructed and stamped
 Blending valve - cast bronze
 Frame - Structural Steel
 Approximate weight 375 lbs.

ACCESSORIES: STD

- (1) Main F&T Trap (1 1/2")
- (1) Strainer CJ (1 1/2")
- (1) Drip Trap (1/2")
- (1) Strainer CJ (1/2")
- Pressure Gauge
- Pigtail Fitting
- Thermometer

NOTES:

1. See dwg A-49203-65 for piping details.
2. If steam supply pressure is above 15 psig, model MM-60H is required.



GRAHAM CORPORATION			
20 FLORENCE AVE. BATAVIA, NEW YORK			
MICRO MIX [®] II MODEL MM-60S			
SCALE	MADE	CHKD	DATE
NONE	PRS	WJK	12-19-01
		DWG. NO.	REV.
		A-49203-62	B

GRAHAM CORP. MICRO-MIX® II
 MODEL MM-60D (60 GPM)

CAPACITY

Units(s) shall have the capacity to heat _____ F to _____ F
 GPM of water from _____ F to _____ F
 when supplied with _____ psig steam.

MATERIALS

Heat Exchanger - cast _____ shell _____ double-wall tubes
 ASME constructed and stamped
 Blending valve - cast bronze
 Frame - Structural Steel
 Approximate weight 400 lbs.

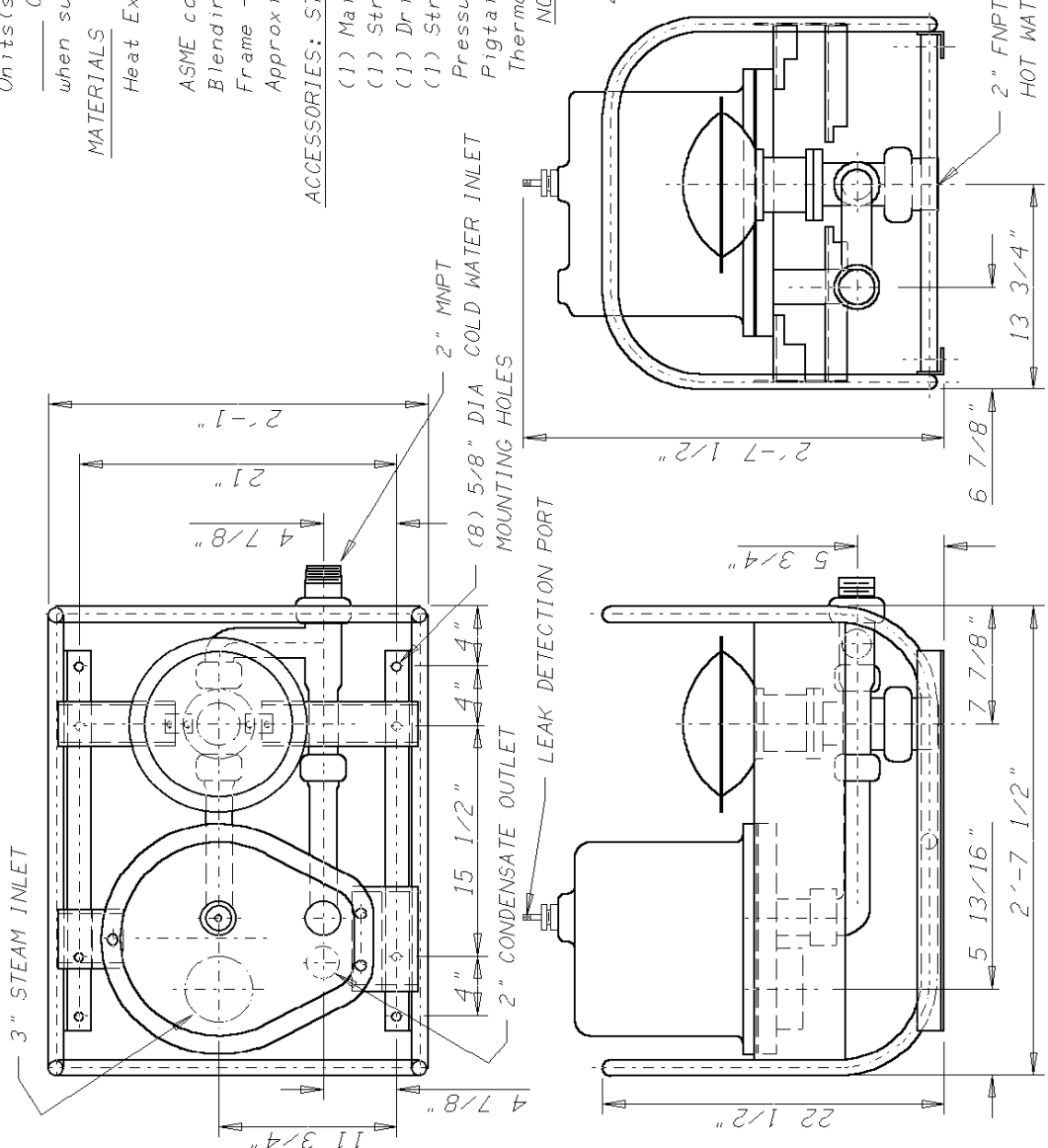
ACCESSORIES: STD

- (1) Main F&T Trap (1 1/2")
- (1) Strainer (1 1/2")
- (1) Drip Trap (1/2")
- (1) Strainer (1/2")
- Pressure Gauge
- Pigtail Gauge
- Thermometer

NOTES:

1. See dwg A-49203-66 for piping details.
2. If steam supply pressure is above 15 psig model MM-60DH is required.

PROJECT: _____
 ENGINEER: _____
 REPRESENTATIVE: _____

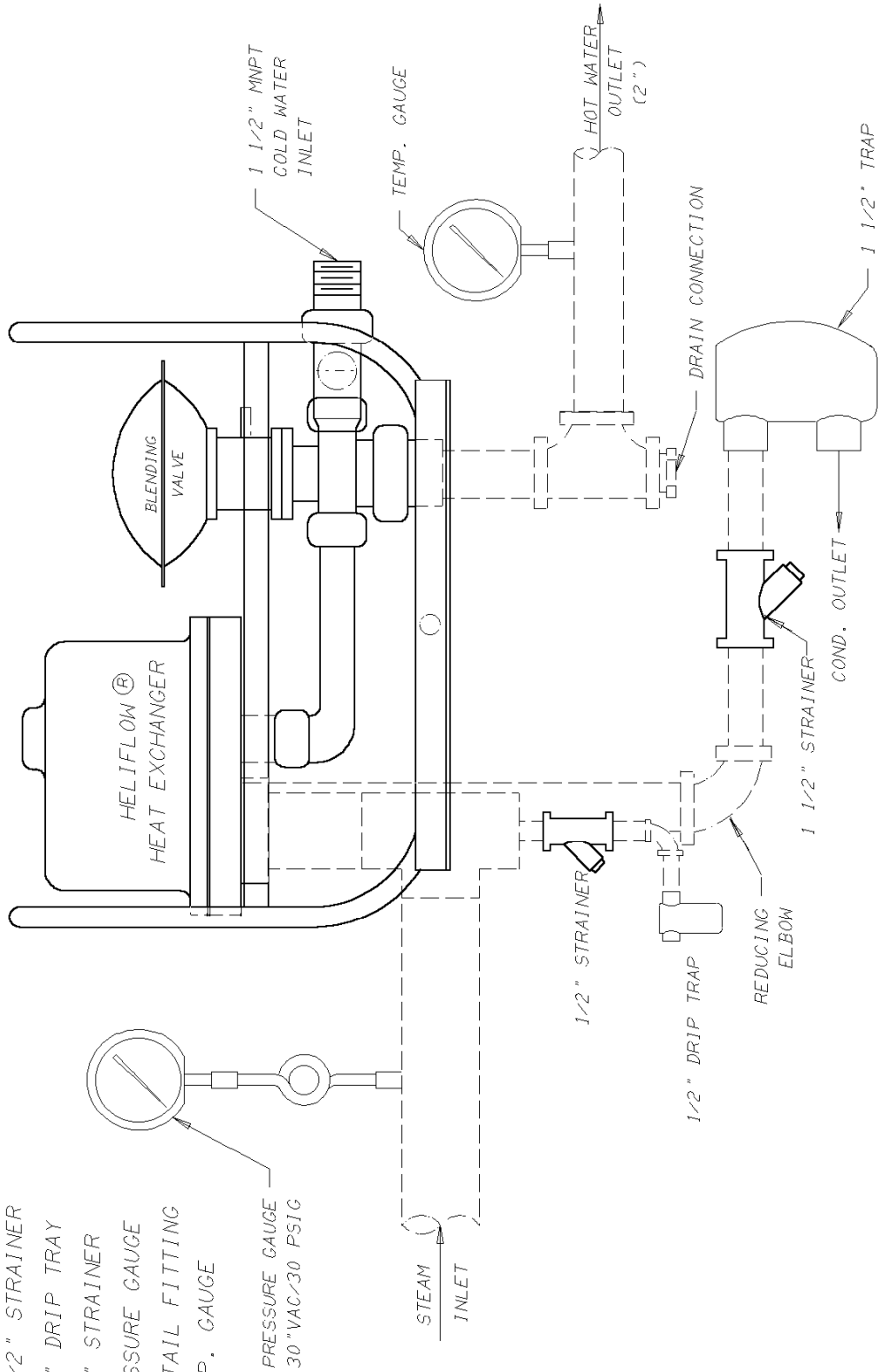


QUANTITY _____
 MM-60D PLAN



STANDARD PACKAGE INCLUDES:

- 1) 1 1/2" MAIN TRAP
- 2) 1 1/2" STRAINER
- 3) 1/2" DRIP TRAY
- 4) 1/2" STRAINER
- 5) PRESSURE GAUGE
- 6) PIGTAIL FITTING
- 7) TEMP. GAUGE



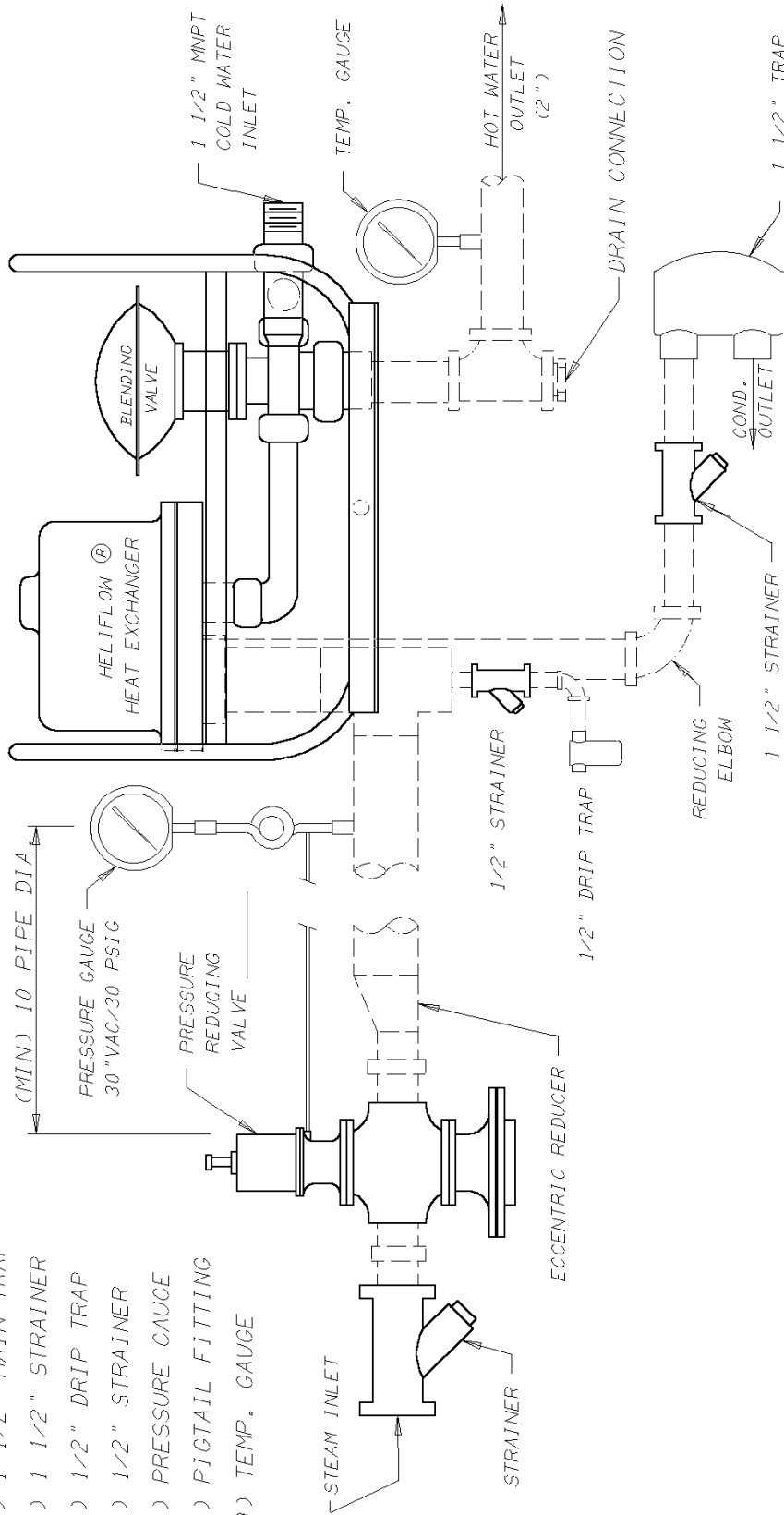
GRAHAM CORPORATION			
20 FLORENCE AVE. BATAVIA, NEW YORK			
PIPING ARRANGEMENT FOR MM-60			
SCALE	MADE	CHKD	DATE
NONE	PRS	WJK	12-19-01
DWG. NO.	REV.		
A-49203-65	B		

DOTTED LINE PIPING AND
SUPPORT SUPPLIED BY INSTALLER



STANDARD PACKAGE INCLUDES:

- 1) PRESSURE REDUCING VALVE _____
- 2) INLET STRAINER _____
- 3) 1 1/2" MAIN TRAP _____
- 4) 1 1/2" STRAINER _____
- 5) 1/2" DRIP TRAP _____
- 6) 1/2" STRAINER _____
- 7) PRESSURE GAUGE _____
- 8) PIGTAIL FITTING _____
- 9) TEMP. GAUGE _____



DOTTED LINE PIPING AND
SUPPORT SUPPLIED BY INSTALLER

NOTE: If steam supply pressure exceeds 75 psig, a suitable relieving device must be installed between pressure reducing valve and heat exchanger.

GRAHAM CORPORATION

20 FLORENCE AVE. BATAVIA, NEW YORK

PIPING ARRANGEMENT FOR MM-60H

SCALE	MADE	CHKD	DATE	DWG. NO.	REV.
NONE	PRS	WJK	12-19-01	A-49203-66	B



MODEL MM-90 (90 GPM)

CAPACITY

Units(s) shall have the capacity to heat _____ GPM of water from _____ F to _____ F when supplied with _____ psig steam.

MATERIALS

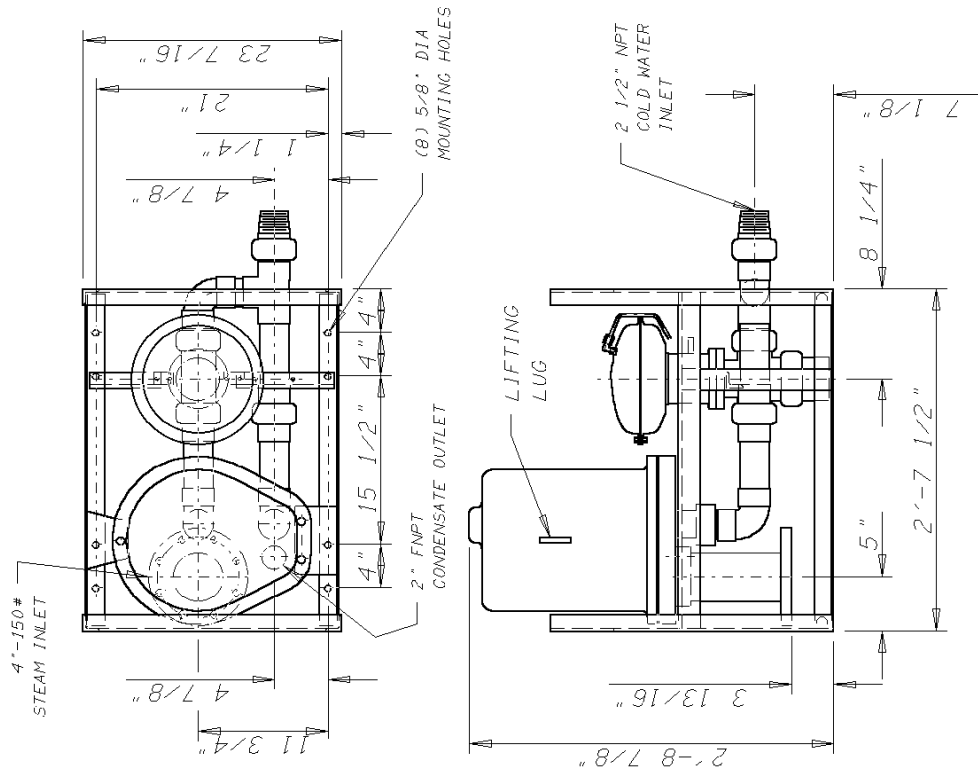
Heat Exchanger - cast _____ shell, _____ tubes
 ASME constructed and stamped
 Blending valve - cast bronze
 Frame - Structural Steel
 Approximate weight 650 lbs.

ACCESSORIES (STD):

- (1) 2" Main F&T Trap
- (1) 2" Strainer (Cast Iron)
- (1) 1/2" Drip Trap
- (1) 1/2" Strainer (Cast Iron)
- Pressure Gauge
- Pigtail Fitting
- Thermometer

NOTES:

1. See dwg A-49203-95 for piping details.
2. If steam supply pressure is above 15 psig, model MM-90H is required.

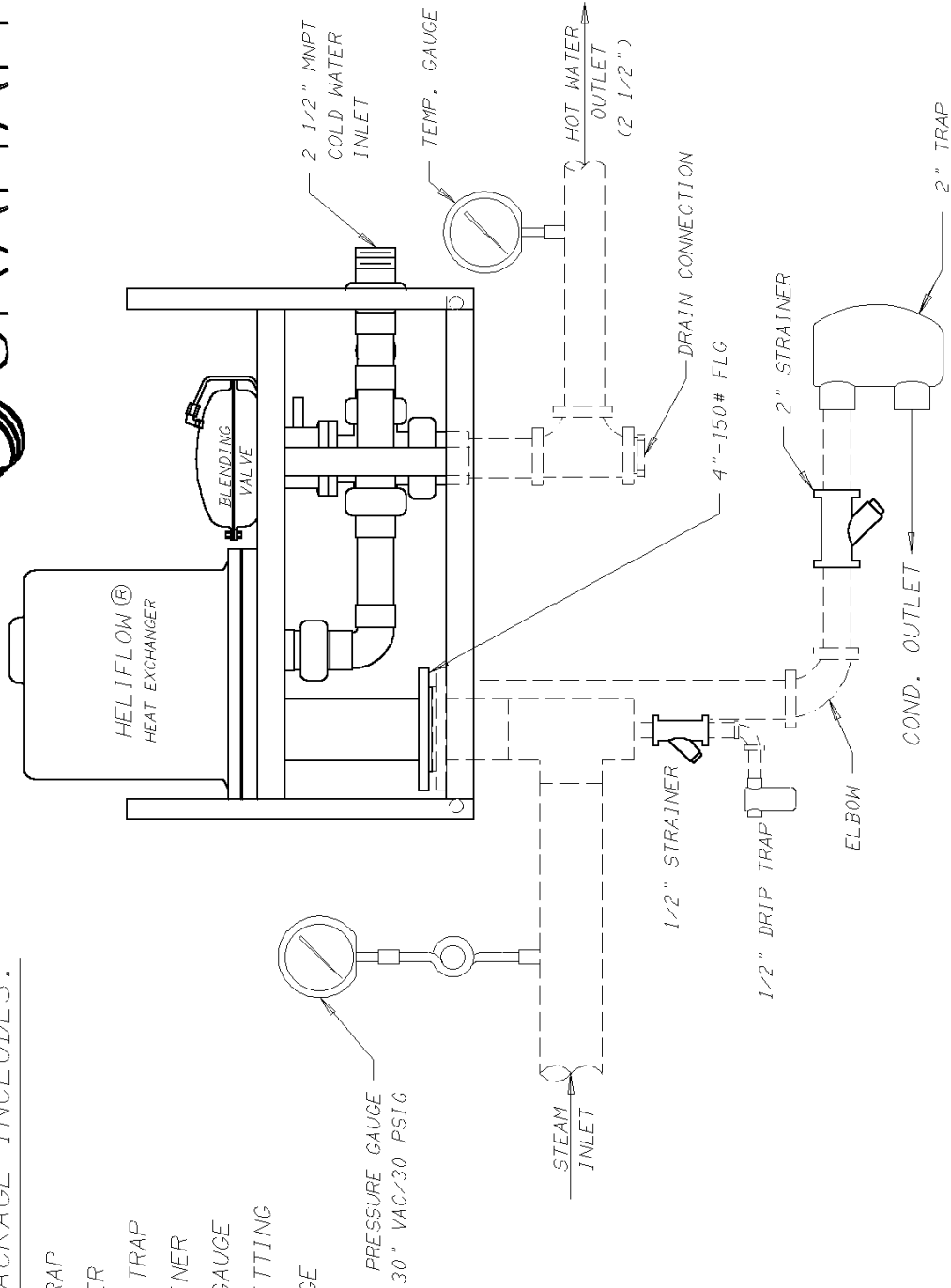


GRAHAM CORPORATION			
20 FLORENCE AVE. BATAVIA, NEW YORK			
MICRO MIX II MODEL MM-90			
SCALE	MADE	CHKD	DATE
NONE	PRS	WJK	12-19-01
DWG. NO.	REV.		
A-49203-91	A-49203-91		B



STANDARD PACKAGE INCLUDES:

- 1) 2" MAIN TRAP
- 2) 2" STRAINER
- 3) 1/2" DRIP TRAP
- 4) 1/2" STRAINER
- 5) PRESSURE GAUGE
- 6) PIGTAIL FITTING
- 7) TEMP. GAUGE



DOTTED LINE PIPING AND SUPPORT SUPPLIED BY INSTALLER

GRAHAM CORPORATION
 20 FLORENCE AVE. BATAVIA, NEW YORK

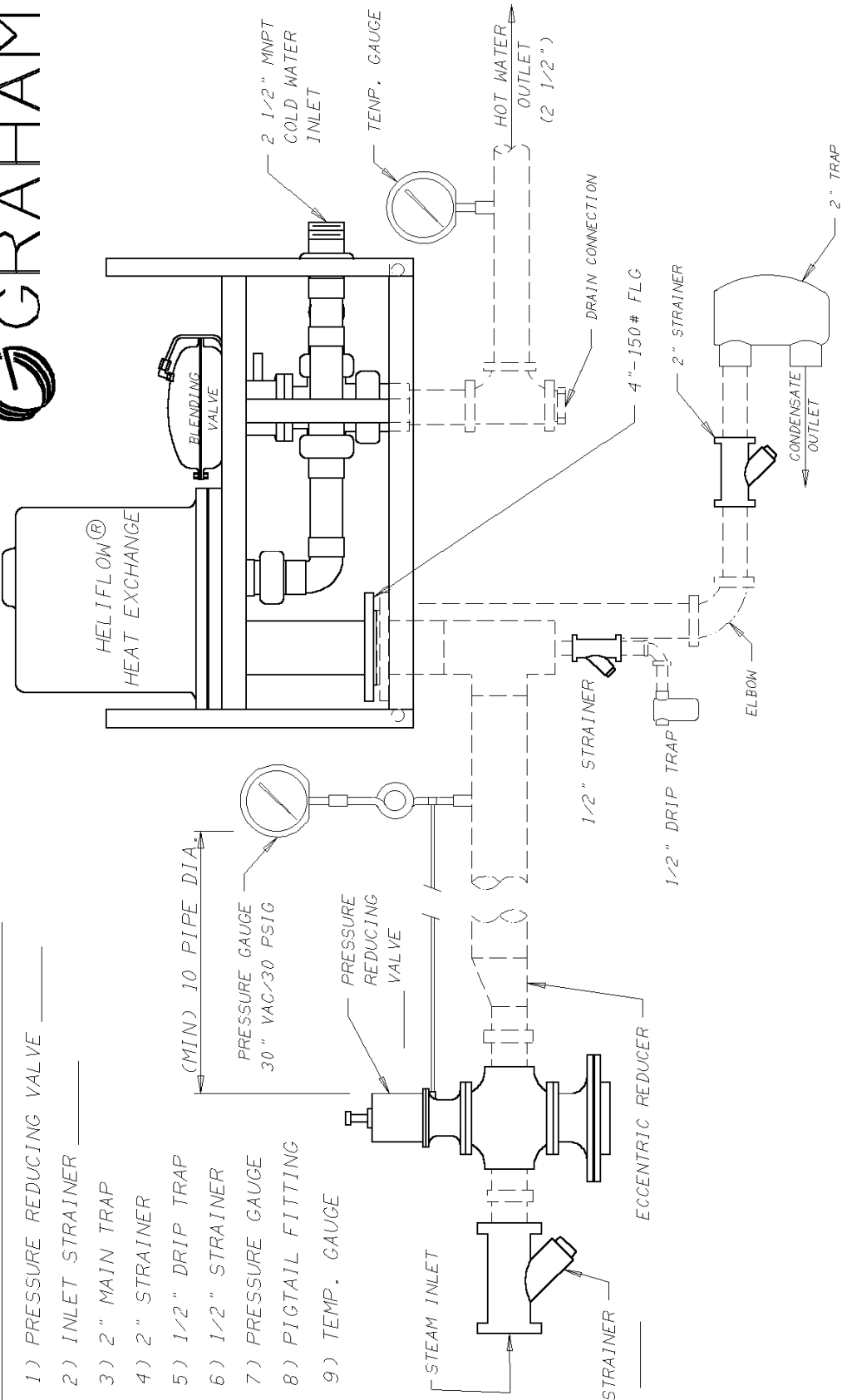
PIPING ARRANGEMENT FOR MM-90

SCALE	MADE	CHKD	DATE	DWG. NO.	REV.
NONE	PRS	WJK	12-19-01	A-49203-95	B



STANDARD PACKAGE INCLUDES:

- 1) PRESSURE REDUCING VALVE _____
- 2) INLET STRAINER _____
- 3) 2" MAIN TRAP _____
- 4) 2" STRAINER _____
- 5) 1/2" DRIP TRAP _____
- 6) 1/2" STRAINER _____
- 7) PRESSURE GAUGE _____
- 8) PIGTAIL FITTING _____
- 9) TEMP. GAUGE _____



DOTTED LINE PIPING AND SUPPORT
SUPPLIED BY INSTALLER

NOTE: If steam supply pressure exceeds 50 psig, a suitable relieving device must be installed between pressure reducing valve and heat exchanger.

GRAHAM CORPORATION			
20 FLORENCE AVE. BATAVIA, NEW YORK			
PIPING ARRANGEMENT FOR MM-90H			
SCALE	MADE	CHKD	DATE
NONE	PRS	WJK	12-19-01
DWG. NO.	A-49203-96		REV.
			B

GRAHAM

MODEL MM-120 (120 GPM)

CAPACITY

Units(s) shall have the capacity to heat _____ GPM of water from _____ F to _____ F when supplied with _____ psig steam.

MATERIALS

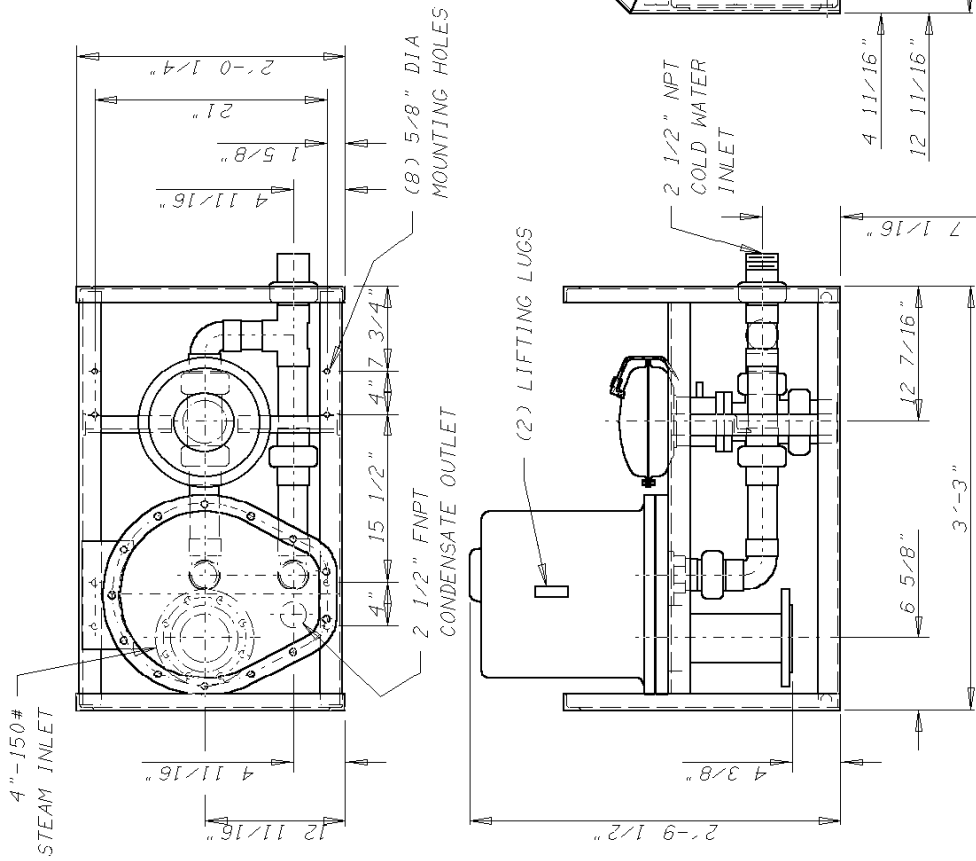
Heat Exchanger - cast _____ shell, _____ tubes
 ASME constructed and stamped
 Blending valve - cast bronze
 Frame - Structural Steel
 Approximate weight 775 lbs.

ACCESSORIES (STD):

- (1) 2" Main F&T Trap
- (1) 2" Strainer (Cast Iron)
- (1) 1/2" Drip Trap
- (1) 1/2" Strainer (Cast Iron)
- Pressure Gauge
- Pigtail Fitting
- Thermometer

NOTES:

- 1 See dwg A-49203-125 for piping details.
2. If steam supply pressure is above 15 psig, model MM-120H is required.

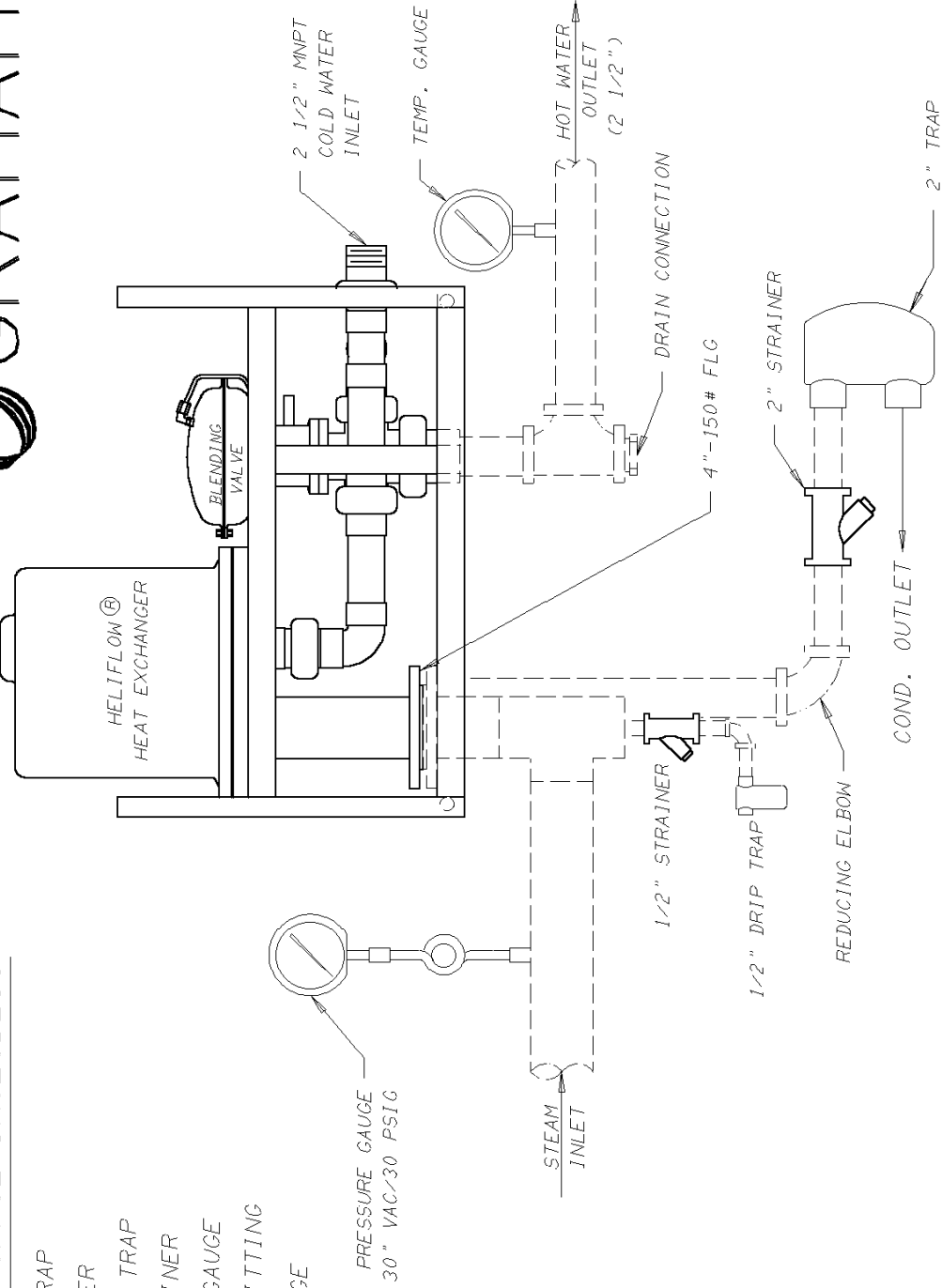


GRAHAM CORPORATION			
20 FLORENCE AVE. BATAVIA, NEW YORK			
MICRO MIX II MODEL MM-120			
SCALE	MADE	CHKD	DATE
NONE	PRS	WJK	12-19-01
DWG. NO.	REV.		
A-49203-121	A		



STANDARD PACKAGE INCLUDES:

- 1) 2" MAIN TRAP
- 2) 2" STRAINER
- 3) 1/2" DRIP TRAP
- 4) 1/2" STRAINER
- 5) PRESSURE GAUGE
- 6) PIGTAIL FITTING
- 7) TEMP. GAUGE



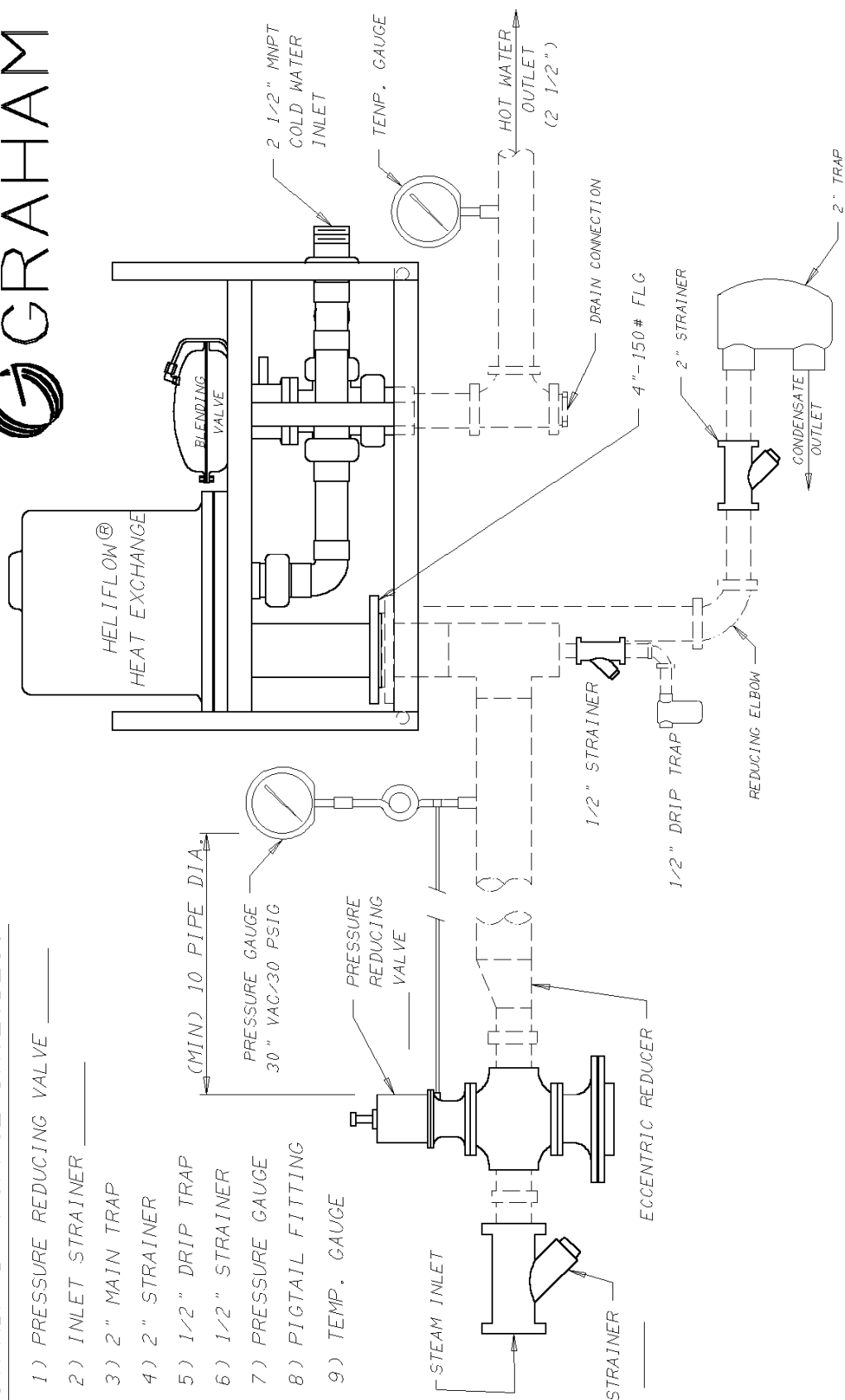
DOTTED LINE PIPING AND SUPPORT SUPPLIED BY INSTALLER

GRAHAM CORPORATION			
20 FLORENCE AVE. BATAVIA, NEW YORK			
PIPING ARRANGEMENT FOR MM-120			
SCALE	MADE	CHKD	DATE
NONE	PRS	WJK	12-19-01
DWG. NO.	REV.		
A-49203-125	B		



STANDARD PACKAGE INCLUDES:

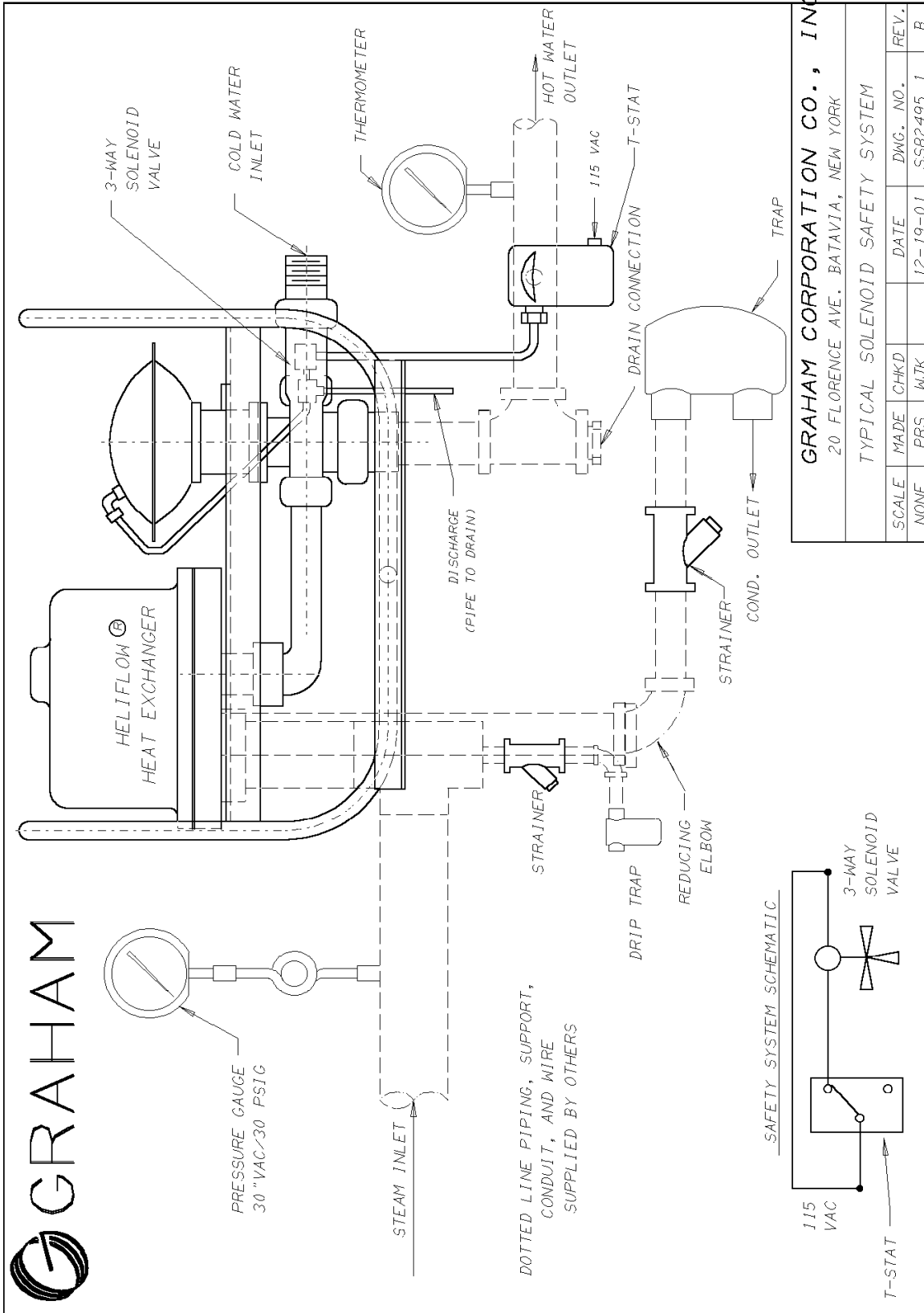
- 1) PRESSURE REDUCING VALVE _____
- 2) INLET STRAINER _____
- 3) 2" MAIN TRAP _____
- 4) 2" STRAINER _____
- 5) 1/2" DRIP TRAP _____
- 6) 1/2" STRAINER _____
- 7) PRESSURE GAUGE _____
- 8) PIGTAIL FITTING _____
- 9) TEMP. GAUGE _____



DOTTED LINE PIPING AND SUPPORT
SUPPLIED BY INSTALLER

NOTE: If steam supply pressure exceeds 50 psig, a suitable relieving device must be installed between pressure reducing valve and heat exchanger.

GRAHAM CORPORATION			
20 FLORENCE AVE. BATAVIA, NEW YORK			
PIPING ARRANGEMENT FOR MM-120H			
SCALE	MADE	CHKD	DATE
NONE	PRS	WJK	12-19-01
DWG. NO.	A-49203-126		REV.
			B



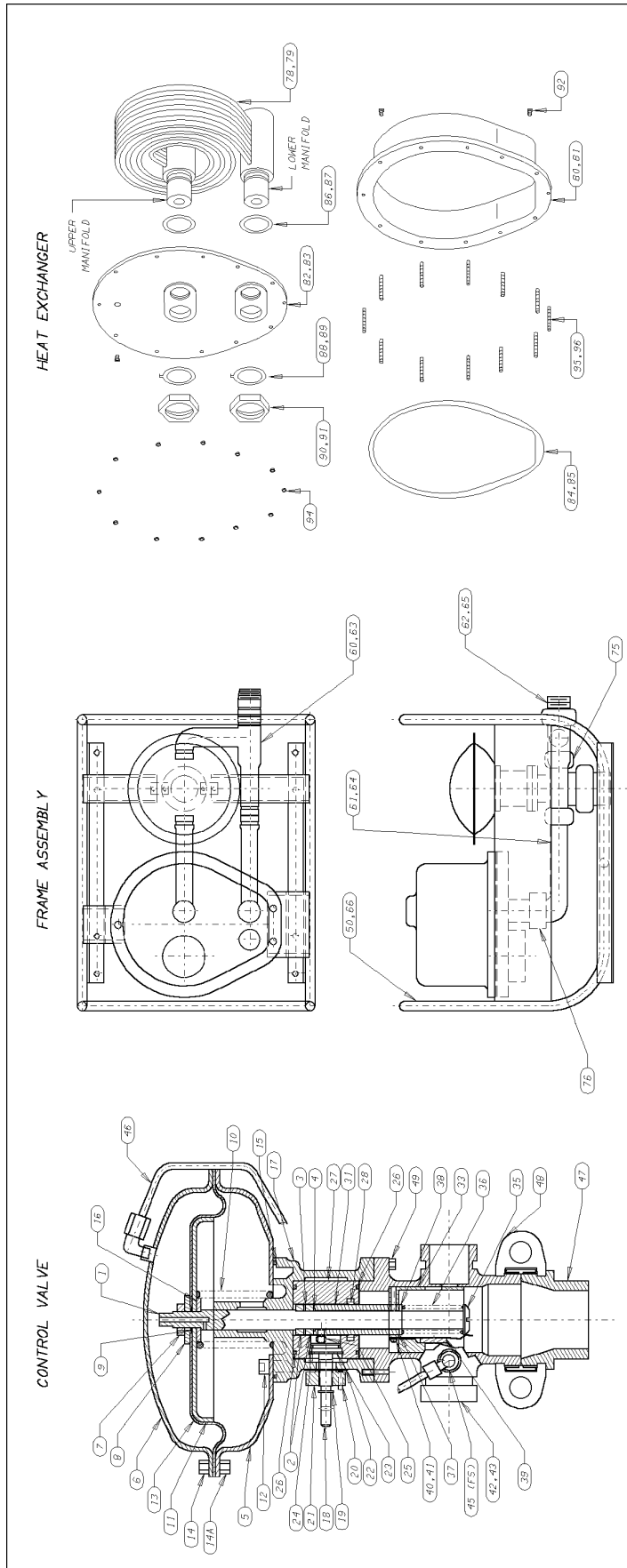
GRAHAM CORPORATION CO., INC.
 20 FLORENCE AVE. BATAVIA, NEW YORK

TYPICAL SOLENOID SAFETY SYSTEM

SCALE	MADE	CHKD	DATE	DWG. NO.	REV.
NONE	PRS	WJK	12-19-01	SS82495..1	B

SECTION VII - PARTS LISTS

<u>Item</u>	<u>Document Number</u>	<u>Page No.</u>
Models MM-30 & MM-60	B-49203-3060 Updated 2-20-01	32
Models MM-90 & MM-120	B-49203-90120 Updated 2-20-01	33



USE ONLY GENUINE GRAHAM REPLACEMENT PARTS
 *- RECOMMENDED SPARE PARTS
 ** - OVERHAUL PARTS IN ADDITION TO SPARES
 -ORDER BY PART NUMBER-

ITEM	PART #	DESCRIPTION
1	6000	VALVE STEM
2	60001	SPACER (2)
3	60002	SPACER (TEFLON)
4	60003*	SPIROLOX RING
5	60004	DIAPHRAGM
6	60005	LOWER CASE
7	60006	UPPER CASE
8	60007*	JAN NUT
9	60008	SHOULDER WASHER
10	60009	SPRING
11	60010	DIAPHRAGM PLATE
12	60011	CAP SCREWS (5)
13	60012*	DIAPHRAGM
14	60013	ROCKETS (6)
15	60014	NUTS (6)
16	60015	"O" RING
17	60016	SHOULDER WASHER
18	60017	STEM SCREW
19	60018	YIELDING SPRING
20	60019	SPACER WASHER (2) SS
21	60020**	SPACER WASHER (1) BRASS
22	60021**	SEAL PLATE
23	60022	SCREW (2)
24	60023	LOCK WASHER (2)

ITEM	PART #	DESCRIPTION
25	60024*	ADJUSTOR
26	60025*	UPPER VALVE BODY
27	60026*	CONTROL ROD
28	60027*	RETAINING CLIP
29	60028*	SET SCREW
30	60029*	LOCKING RING
31	60030*	PLATE COVER
32	60031*	RETAINING "C" CLIP
33	60032*	"O" RING
34	60033*	HEX NUT
35	60034*	"O" RING
36	60035**	TEMP ADJUSTING SLAVEE
37	60036**	GUIDE ENERGY
38	60037**	PLUG ASSEMBLY
39	60038**	PLUG STEM
40	60039**	PLUG
41	60040**	STEM SCREW
42	60041**	YIELDING SPRING
43	60042**	SPACER WASHER (2) SS
44	60043**	SPACER WASHER (1) BRASS
45	60044**	SEAL PLATE
46	60045**	SCREW (2)
47	60046**	LOCK WASHER (2)

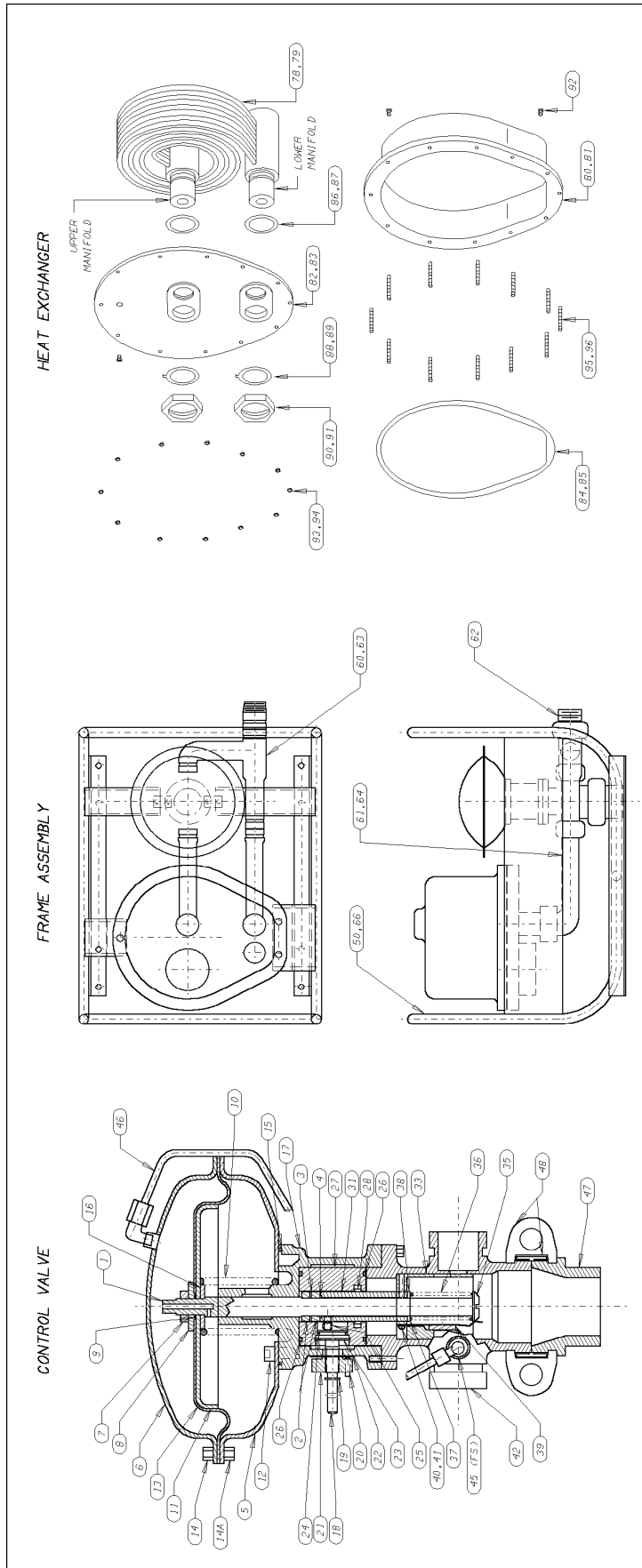
ITEM	PART #	DESCRIPTION
48	60047*	LOWER VALVE BODY
49	60048*	30 GPM VALVE BODY
50	60049*	RELIEF VALVE
51	60050*	SENSING TUBE
52	60051*	OUTLET ADAPTER
53	60052*	VICTAULIC 3" SCREWS (8)
54	60053*	MANIFOLD PIPES
55	60054*	1 1/2" MANIFOLD (30 GPM)
56	60055*	1 1/2" MANIFOLD (30 GPM)
57	60056*	ADAPTOR (30 GPM)
58	60057*	2" MANIFOLD (60 GPM)
59	60058*	2" ELBOW (2) (60 GPM)
60	60059*	ADAPTOR (60 GPM)

ITEM	PART #	DESCRIPTION
61	60060*	HEAT EXCHANGER (30 GPM)
62	60061*	COIL ASSEMBLY (COPPER TUBES)
63	60062*	CASING (UPPER)
64	60063*	BASE PLATE
65	60064*	CASING GASKET
66	60065*	MANIFOLD GASKETS
67	60066*	LOCKRINGS
68	60067*	MANIFOLD NUTS
69	60068*	PRAIN PLUGS
70	60069*	NUTS (12)
71	60070*	STUD BOLTS (12)
72	60071*	HEAT EXCHANGER (60 GPM)
73	60072*	COIL ASSEMBLY (COPPER TUBES)
74	60073*	CASING (UPPER)
75	60074*	BASE PLATE
76	60075*	CASING GASKET
77	60076*	MANIFOLD GASKETS
78	60077*	LOCKRINGS
79	60078*	MANIFOLD NUTS
80	60079*	PRAIN PLUGS
81	60080*	NUTS (12)
82	60081*	STUD BOLTS (12)

ITEM	PART #	DESCRIPTION
83	60082*	FRAME
84	60083*	ASSEMBLY (30 GPM)
85	60084*	ASSEMBLY (60 GPM)
86	60085*	MISCELLANEOUS
87	60086*	1 1/2" VICTAULIC
88	60087*	1 1/4" VICTAULIC
89	60088*	NUTS (13)
90	60089*	NAMEPLATE

GRAHAM CORPORATION
 20 FLORENCE AV., BATAVIA NY 14020
 PARTS LIST FOR MICRO-MIX 11
 MODELS MM-30 & MM-60
 UPDATED 2-20-61
 P-49203-3060





USE ONLY GENUINE GRAHAM REPLACEMENT PARTS
 * - RECOMMENDED SPARE PARTS
 ** - OVERHAUL PARTS IN ADDITION TO SPARES
-ORDER BY PART NUMBER-

ITEM	PART #	DESCRIPTION
1	60308	VALVE STEM
2	60309	VALVE STEM
3	60310	SPACER (2)
4	60003*	SPACER (TEELON)
5	60004	SPRING RING
6	60005	LOWER CASE
7	60006	JAM NUT
8	60018	SHOULDERED WASHER
9	60019*	O-RING
10	60022*	O-RING
11	60023*	DIAHRING
12	60024*	CAP SCREWS (6)
13	60045*	DIAHRING
14	60054	BOLTS (6)
15	60029	O-RING
16	60046	SHOULDER WASHER

ITEM	PART #	DESCRIPTION
17	60305	UPPER VALVE BODY
18	60312**	CONTROL ROD
19	60050*	RETAINING CLIP
20	60008	SET SCREW
21	60007	LOCKING RING
22	60314	PLATE (COVER)
23	60049*	RETAINING "C" CLIP
24	60213*	O-RING
25	60006	KEY CYLINDER
26	60324**	O-RINGS (2)
27	60318**	TEMP. ADJUSTING SLLEEVE
28	60025**	GUIDE ENERGIZER

ITEM	PART #	DESCRIPTION
42	60302	LOWER VALVE BODY
43	60044	RELIEF VALVE
44	60317	SENSING TUBE
45	60320	OUTLET ADAPTER
46	60326	VICTAULIC 3 1/2"
47	60054	SCREWS (6)
48	60360	MANIFOLD (30 GPM)
49	60363	ELBOW (2) (30 GPM)
50	60334	ADAPTER (30 X 120 GPM)
51	60332	MANIFOLD (120 GPM)
52	60333	ELBOW (2) (120 GPM)
53	60274*	FRAM ASSEMBLY (30 GPM)
54	60274*	ASSEMBLY (120 GPM)

ITEM	PART #	DESCRIPTION
78	60341*	HEAT EXCHANGER (30 GPM)
79	71509A	COIL ASSEMBLY (COPPER TUBES)
80	70609	CASING (UPPER)
81	51216*	BASE PLATE
82	28012*	CASING GASKET
83	28013*	MANIFOLD GASKETS
84	28014*	LOCKRINGS
85	28016	MANIFOLD NUTS
86	28018	DRAIN PLUGS
87	28019	STUD BOLTS (12)
88	14021	HEAT EXCHANGER (120 GPM)
89	71511	COIL ASSEMBLY (COPPER TUBES)
90	70612	BASE PLATE
91	51217*	CASING GASKET
92	28013*	MANIFOLD GASKETS
93	28014*	LOCKRINGS
94	73101	MANIFOLD NUTS
95	28136	DRAIN PLUGS
96	23007	NUTS (13)
97	14031	STUD BOLTS (13)

GRAHAM CORPORATION
 20 FLORENCE AV., BATAVIA NY 14020
 PARTS LIST FOR MICRO-MIX 11
 MODELS MM-90 & MM-120
 UPDATED
 2-20-01 B-49203-90 120



Graham Corporation

- NOTES -