OPERATING MANUAL

MHPH - 195/295/330

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SPECIFICATIONS

MHPH - 195

INSTANTANEOUS WATER HEATER	Propane or Nat. Gas Fired
HEATING COIL	98 Ft. Schedule 40
BURST PRESSURE	10,380 PSI
HYDROSTATIC TEST	4,000 PSI
WORKING PRESSURE	2,000 PSI
BURNER	Impinged Jet Type Atmospheric Draft
ORIFICE JETS	Propane: No 68 Drill Nat. Gas: No 55 Drill
IGNITION	Standing Pilot Standard Piezo Spark Pilot Ignitor
INPUT	Propane: 195,000 BTU Nat. Gas: 185,000 BTU
ALTITUDE RATING	0 To 4500 Ft. With No Orifice Change
MANIFOLD PRESSURE	Propane: 11 In. W.C. Nat. Gas: 3.5 In W.C.
TEMPERATURE RISE	100 F at 192 GPH
FLUE OUTLET	7 In. Diameter
C O EMISSIONS	Less than 50 PPM
AUTOMATIC GAS VALVE	Combination Type: Millivolt Operated
HIGH LIMIT SWITCH	Protects Against Overheating Set at 210 F (Hot Water) or 340 F (Steam)
PRESSURE SWITCH	Prevents Burner Operation Without Water Flow
TOGGLE SWITCH	Provides Manual ñOn-Offò Control
SAFETY RELIEF VALVE	Set at 2000 PSI

SPECIFICATIONS

MHPH - 295

INSTANTANEOUS WATER HEATER	Propane or Nat. Gas Fired
HEATING COIL	165 Ft. Schedule 40
BURST PRESSURE	10,380 PSI
HYDROSTATIC TEST	4,400 PSI
WORKING PRESSURE	2,200 PSI
BURNER	Impinged Jet Type Atmospheric Draft
ORIFICE JETS	Propane: No 67 Drill Nat. Gas: No 54 Drill
IGNITION	Standing Pilot Standard Piezo Spark Pilot Ingitor
INPUT	290,000 BTU
ALTITUDE RATING	0 To 4500 Ft. With No Orifice Change
MANIFOLD PRESSURE	Propane: 11 In. W.C. Nat. Gas: 3.4 In W.C.
TEMPERATURE RISE	100 F at 288 GPH
FLUE OUTLET	9 In. Diameter
C O EMISSIONS	85 ppm (.0085%)
AUTOMATIC GAS VALVE	Combination Type: Millivolt Operated
HIGH LIMIT SWITCH	Protects Against Overheating Set at 210 F (Hot Water) or 340 F (Steam)
PRESSURE SWITCH	Prevents Burner Operation Without Water Flow
TOGGLE SWITCH	Provides Manual ñOn-Offò Control
SAFETY RELIEF VALVE	Set at 2200 PSI

SPECIFICATIONS

MHPH - 330

INSTANTANEOUS WATER HEATER.....Propane or Nat. Gas Fired

HEATING COIL.....196 Ft. Schedule 80

BURST PRESSURE.....14,000 PSI

HYDROSTATIC TEST.....6,000 PSI

WORKING PRESSURE.....3,000 PSI

BURNER.....Impinged Jet Type Atmospheric Draft

ORIFICE JETS.....Propane: No 65 Drill
Nat. Gas No 53 Drill

IGNITION.....Standing Pilot
Standard Piezo Spark Pilot Ingitor

INPUT..... 330,000 BTU

ALTITUDE RATING.....0 To 4500 Ft. With No Orifice Change

MANIFOLD PRESSURE.....Propane: 11 In. W.C.
Nat. Gas: 3.5 In. W.C.

TEMPERATURE RISE.....100 F at 345 GPH

FLUE OUTLET.....9 In. Diameter

C O EMISSIONS.....120 ppm (.012%)

AUTOMATIC GAS VALVE.....Combination Type: Millivolt Operated

HIGH LIMIT SWITCH.....Protects Against Overheating Set at
210 F (Hot Water) or 340 F (Steam)

PRESSURE SWITCH.....Prevents Burner Operation
Without Water Flow

TOGGLE SWITCH.....Provides Manual ñOn-Offò Control

SAFETY RELIEF VALVE.....Set at 3000 PSI

EASY-KLEEN MODULAR WATER HEATERS

MODEL MHPH-195, MHPH-295, AND MHPH-330

INTRODUCTION

Thank you for selecting a quality EASY-KLEEN product. We are pleased to have you included among the many satisfied owners of an EASY-KLEEN SYSTEM.

Years of engineering have gone into the development of these fine products and only top quality components and materials are used throughout. Each machine is carefully tested and inspected before leaving our plant to ensure years of dependable service.

The rest is up to you. To continue to receive satisfactory performance, remember that this machine represents a substantial investment on your part, but properly cared for and maintained it will return this investment many times. As with all mechanical equipment, your machine requires proper installation, proper operation and maintenance as outlined in this manual.

PLEASE READ THIS MANUAL CAREFULLY BEFORE INSTALLING AND OPERATING MACHINE. EXAMINE THE MACHINE AND CRATE CAREFULLY FOR SHIPPING DAMAGE OR MISSING PARTS. REPORT PROMPTLY ANY SHORTAGES OR DAMAGE CLAIMS TO FREIGHT CARRIER.

SCOPE

These instantaneous Coil-type Industrial Water Heaters are designed primarily for use in conjunction with existing cold water washing systems, either as a field upgrade to a hot water washer or as integral component of a modular Hot Water System. Note: These water heaters are restricted to industrial use only and are not to be used as portable water heaters.

OPERATING CHARACTERISTICS

Maximum Working Pressure

The water heater coils are designed to operate safely at working pressures up to 2000 PSI (MHPH-195), 2200 PSI (MHPH-295), and 3000 PSI (MHPH-330). Each water heater is equipped with a safety pressure relief valve which prevents operation above this pressure. If the high pressure system requires a lower relieving pressure for pump and motor protection, then the unloader/bypass valve on the pumping unit should be adjusted to the desired pressure rating.

HIGH LIMIT TEMPERATURE CONTROL

The water heater is equipped with a ñhigh limit controlò present at 210 F. To shut down the burner in the event of excessive outlet temperature caused by insufficient water flow through the heater coil. This control can be adjusted to desired temperature up to but not exceeding 210 F.

PRESSURE SWITCH

A pressure switch is installed on the high pressure pump to prevent burner operation in the absence of water flow. When the heater is used with shutoff gun pumping systems, the pressure switch controls the burner in conjunction with operation of the trigger gun.

INSTALLATION INSTRUCTIONS

These water heaters are certified for installation on combustible flooring with clearance to combustible walls as follows: 6 inches at rear, 18 inches at end, 24 inches at front.

Installations must be performed in accordance with CAN1 B149.1 and 2 Codes requirements in Canada and/or prevailing state and local codes is the USA.

GAS SUPPLY

NATURAL GAS

Run a minimum 1 inch IPS gas supply line to the heater reducing to 3/4 IPS at the inlet of the combination gas valve (Item B). Install a gas shutoff cock in the supply line to provide for shutting off the gas for routine line maintenance or repairs. The gas supply pipe shall be a direct line from the gas burning equipment in the building.

PROPANE

For stationary installations run a minimum 3/4 IPS supply line as above. For portable applications, a hose and regulator assembly is included with the optional portability kit (Item 14, and 17). This includes a P01 tank connector, single stage regulator and CGA approved supply hose for connection to combination gas valve.

MHPH-195/295/330

Obtain one or more 100 lb. propane tank (s) and locate near the heater. Insert the male P01 connector on the regulator into the female receptacle located on the propane tank shutoff valve and tighten firmly (L.H. thread). Open tank valve to the first time, with soap solution. Before lighting pilot for the first time, turn gas cock knob on combination gas valve to ñpilotò position and depress for 3 minutes to purge air from supply hose. Release know and wait 5 minutes before lighting pilot in the normal fashion (see page 7).

Note: Continuous outdoor operation in freezing temperatures may require several tanks manifolded together to maintain consistent vaporization of the propane. Contact your local Lp gas distributor for multiple tank requirements and manifold assembly.

INPUT RATING

Model MHPH-195 Propane: 195,000 BTU/hour Nat. Gas 185,000 BTU/hour

Model MHPH-295 Propane/Natural Gas: 290,000 BTU/hour

Model MHPH-330 Propane/Natural Gas: 330,000 BTU/hour

REQUIRED GAS MANIFOLD PRESSURE

Natural Gas 3.5 in. WC at 1000 BTU per Cu. Ft.
Propane 11.0 in. WC at 2500 BTU per Cu. Ft.

Pressure tap located on automatic gas valve.

Certified for installation at 0 to 4500 Ft. altitude. Installations at over 4500 Ft. and up to 6000 Ft. require a 4% deration of input rating, achieved by a slight reduction of gas pressure regulator setting.

VENTING REQUIREMENTS

STATIONARY INSTALLATIONS

The optional draft diverter (Item 8) must be attached to the flue hood outlet. Use same size vent as drafthood outlet and avoid short turns. For horizontal runs, maintain 1/4 in. pitch per foot of vent. Horizontal runs are not to exceed 75% of vent height. Observe CAN1 B49.1 and 2 installation Code requirements. CAUTION; If the heater is left unused for extended periods during sub-zero weather, a column of freezing air will build up in the venting system. If the building has a negative pressure condition, some of the freezing air will be drawn over the drafthood, spilling onto the heating coil which will eventually cause it to rupture. Have installer ensure that correct draft conditions are maintained to prevent this costly occurrence.

PORTABLE PROPANE APPLICATIONS

An optional rain cap can be furnished to the flue outlet.

FREE AIR FOR COMBUSTION AND VENTING

If the unit is installed in an equipment room or other enclosure, care must be taken to supply sufficient free air for combustion and ventilation. Observe CAN1 B49.1 and 2 Installation Code Requirements. Care should be taken to keep the base of the unit clear of trash or any object that could interfere with combustion air to the burner.

RELIEF VALVE PIPING

The pressure relief valve is equipped with a drain hose to ensure discharge downwards beneath the water heater chassis in the unlikely event the valve should open. For stationary installations the drain hose can be extended to a flood drain or entrance location if desired.

BASIC CONTROLS

The water heaters are equipped with automatic gas valves that have self-generating millivolt controls. No outside source of electrical power is needed for operation. A temperature limit control protects the system against excessive outlet water temperature. A pressure switch prevents burner operation without water flow. A burner ñOn-Offò switch is provided for manual control.

OPERATING INSTRUCTIONS

TO LIGHT PILOT BURNER

Turn gas cock knob on combination gas valve to ñpilotò position. Depress and hold knob while lighting pilot burner by depressing Piezo Ignitor button until distinct click is heard. Repeat is pilot does not light on the first click. Continue holding knob in position for 30 seconds or until pilot remains burning when released. Turn knob to ñOnò position in readiness for controlled operation or main burner.

TO OPERATE MAIN BURNER

Be sure water is flowing through water heater coil before turning on burner switch. Start the pumping unit involved until a steady stream of water is flowing from the spray gun.

TO OPERATE MAIN BURNER (CONT.ò)

Turn burner switch to ñOnò position. Burner will ignite and remain in operation as long as there is sufficient water flow to satisfy the pressure switch and temperature limit control. To shut off main burner, turn burner switch to ñOffò. For complete shutdown of the water heater, turn knob on combination gas valve to ñOffò position. Should pilot outage occur, turn automatic gas valve to ñOffò. Wait 5 MINUTES before relighting to clear combustion chamber of accumulated gas.

CONDENSATION FROM COIL

When cold water is being pumped through the heater coil and the burner is firing, condensation may form at times on the coil and drip down the burner compartment. This can be particularly noticeable on cold, humid days giving the false appearance of a leaking coil.

TO CHECK HEATER COILS FOR LEAKS

Start the pumping unit and allow to run for a few minutes with the burner ñOffò. Check the burner compartment with a trouble light or flash light. If no leaks are visible, this will confirm that occasional water dripping from the coil is due to condensation of the flue gases, when the burner is firing.

BURNER MAINTENANCE

Due to periodic condensation dripping down onto the burner a scale build up may eventually occur in the burner jet orifices.

BURNER REMOVAL

Shut off the gas supply line to the water heater. Turn gas cock knob on combination gas valve to ñOffò position. Remove Boiler Assembly from frame. Disconnect the thermocouple and pilot line from the combination gas valve. Disconnect 3/4 pipe union in burner valve train. Remove the two burner retaining nuts.

TO CLEAN BURNER JETS

Select proper size drill for type of gas involved (see specifications, page 1). Use vise to hold drill and ream out each orifice.
CAUTION: Do not ream out jet orifices to a larger size than specified.

GENERAL MAINTENANCE AND CARE

WINTERIZATION

If the water heater is likely to be exposed to freezing weather, than it should be winterized with anti-freeze or the coil drained. Circulation of the anti-freeze solution through the coil by means of the pumping module is the most fail-safe method.

WATER CONDITION

Use a softener on your water system if local water is known to be high is mineral content. The advantages of soft water are very beneficial. Prevents scale buildup in heater coil, cleans better with considerably less detergent, prevents streaking on painted surfaces and glass when rinsing.

DESCALING HEATER COIL

If heater coils develop excessive scale buildup they should be acidized to remove the scale. Excessive scale in heater coils will reduce efficiency of the unit and affect recovery capacity.

DESCALING PROCEDURE

The best way to acidize the coil is with a circulation pump capable of handling acids:

1. Fill a plastic container with a suitable acid diluted with water to desired strength.

2. Connect the discharge from the circulating pump to the hot water outlet on the water heater with a suitable hose. Connect the inlet of the circulating pump to the acid container with suction hose (Item A) from the pump module and use it as a return hose to the acid container. As the acid dissolves the scale it becomes neutralized, so about every five minutes add more acid to the container until all the scale has been removed from the coil. Flush out coil thoroughly with water after descaling.

If no circulating pump is available, another good method can be used.

1. Remove high limit control and piping from the coil outlet. Install a standpipe on the outlet of the coil as shown in diagram over leaf. Disconnect the water heater inlet hose (Item A) from the pump module and run to a drain or suitable container.

2. Remove cap from standpipe and pour in about 1/2 gallon of acid diluted 50/50 with water. Screw cap back on standpipe immediately. Caution: Do not stand directly over chamber. Repeat same procedure until coil is free of scale. Flush out coil thoroughly with water after cleaning. Caution: Never allow acid to remain in coil for long periods of time.

TROUBLE SHOOTING GUIDE - BURNER SYSTEM

PROBLEM	CAUSE	REMEDY
1. Pilot Does Not Light	a. Gas leak in pilot tube.	a. Check all Fittings with soap solution.
	b. Low service supply pressure.	b. Ensure that gas supply pressure to machine is at least 3.5 In. WC for Nat. Gas and 11 In. WC for Propane. Check gas supplier if not within range.
	c. Insufficient gas flow to Pilot.	c. Adjust throttling screw on automatic gas valve until pilot receives adequate gas flow.
	d. Very high draft or down draft.	d. Correct draft extremes.
2. Pilot Ignites But Will Not Stay On When Knob Is Released After Two Minutes Hold Down	a. Insufficient pilot flame.	a. Increase pilot flame by adjusting throttling screw on automatic valve.
	b. Thermocoupler connection loose at automatic gas valve.	b. Tighten screw terminals.
	c. Thermocouple may be defective	c. Remove thermocouple and check output voltage with millivolt meter. Output should be 750 MV on pilot flame. If lower, check la, lb,lc before installing new thermocouple.

TROUBLE SHOOTING GUIDE - BURNER SYSTEM
(Continued)

PROBLEM	CAUSE	REMEDY
3. Nuisance Pilot Outage	a. Check items 1a, 1b, 1c, 1d, 2b, and 2c. b. Inadequate gas supply pipe size to machine.	b. If gas regulator has to be adjusted to maximum pressure to obtain desired water temperature, this can result in pilot gas pressure to dip extremely low on burner startup. Also excessive pressure can surge through on burner shutdown. Check 1b at burner manifold while firing.
4. Short Thermocouple Life	a. Excessive heat to thermo-couple from pilot.	a. Decrease pilot supply gas.
5. No Flame at Burner	a. Manual valve on gas supply line closed. b. Pilot is out.	a. Open valve. b. Light Pilot.
6. Burner Fails to Start	a. Check for loose electrical connections b. Pressure switch not operating c. Limit control inoperative. d. Automatic valve inoperative	a. Lighten electrical connections. b. Repair or replace flow switch. c. Replace high limit control d. Replace automatic gas valve.

W A R R A N T Y

The manufacturer warrants all original equipment of the manufacturer to be free from defects in material, workmanship and accessories for a period of 90 DAYS from date of shipment, (Coil has 1 year warranty). Within this period if at the discretion of the manufacturer there is shown to be a defect in material or workmanship, the defective part or parts will be repaired or replaced at the manufactures place of business or a factory authorized repair depot when returned PREPAID. This warranty is NOT valid for gas heated units unless the unit is installed and tested (including venting) by an authorized gas company. Proof of installation is required by the manufacturer to warrant this warranty valid. The owner is responsible for these papers of proof NOT the manufacturer. This warranty does NOT cover labor pertaining to repair or replacement of such defective part or parts and is not extended to any consequential damage or liability that may occur as result of the original defect. Normal wear parts (nozzles, valve seats, etc.) and elastomers (hoses, seals, mounts) are NOT covered by warranty. Damage resulting from freezing accident, neglect, tampering, abuse, alteration or improper installation voids this warranty.

FOR QUICK REFERENCE, RECORD YOUR MACHINE DATE HERE:

Model _____ Serial #_____ Volts_____

Phase _____ HP _____ Date Shipped _____