

MONITOR MZ 20-40 C

TECHNICAL INSTRUCTIONS



Wall Mounted, Fully Condensing Application Efficiency, 95%

MZ 20-40 C 142,000 Btu two-stage

ANSI Z21.10.3b - 2004 CSA 4.3b-2004 Gas Water Heaters Volume III Storage Water Heaters, With Input Ratings Above 75,000 BTU Per Hour, Circulation and Instantaneous



www.monitorproducts.com

"The availability of these manuals and instructions is not to be construed or interpreted as MPI's approval, consent, or authorization for any third party to install, repair, or advise on any actions taken on or with the MPI products described therein."

As part of its policy of continuous product improvement, Monitor Products, Inc reserves the right to make changes without notice

Revised 7/07

PART NO. 1133 COPYRIGHT © 2007 MONITOR PRODUCTS, INC

MZ 30-40C TECHNICAL INSTRUCTIONS

WARNING: If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

FOR YOUR SAFETY

- Do not store or use gasoline or other flammable, vapors and liquids in the vicinity of this or any other appliance.



WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

INSTALLATION AND SERVICE MUST BE PERFORMED BY A QUALIFIED INSTALLER, SERVICE AGENCY OR THE GAS SUPPLIER.

TABLE OF CONTENTS

I - PRESENTATION	2	4.3 - Condensate and venting connection	9
1. DESCRIPTION	2	4.4 - Pipe connections	9
2. RANGE	2	4.5 - Pressure/Flow rate curves	9
3. TECHNICAL SPECIFICATIONS	3	5. GAS CONNECTIONS	9
3.1 - Connection Dia.	3	6. ELECTRICAL CONNECTIONS	10
3.2 - Overall dimensions	3	6.1 - Original connection (no external control) with jumpers installed	10
II - OPERATION	4	6.2 - Connection to external control	10
1. PRINCIPLE OF OPERATION	4	6.3 - Wiring diagram (MZ 20-40 C)	11
1.1 - Operating schematic	4	6.4 - Circuit diagram (MZ 20-40 C)	12
2. CONTROL AND REGULATION	5	7. COMBUSTION PRODUCTS EXHAUSTED BY	
2.1 - Control panel	5	BALANCED FLUE	13
2.2 - Diagram showing operating cycles, space heat mode	5	7.1 - LEAKTIGHTNESS	15
2.3 - Thermal safety device	6	IV - COMMISSIONING	15
2.4 - Accessories	6	1. WARNING	15
3. BURNER	6	2. COMMISSIONING	16
3.1 - Introduction	6	2.1 - Check operating pressure	16
3.2 - Gas unit	6	2.2 - Check gas flow rate	16
4. FAN	7	2.3 - Changing gas type	16
5. HEAT EXCHANGER	7	V - SERVICING	17
III - INSTALLATION	7	1. RECOMMENDED SERVICE PARTS	18
1. GENERAL	7	VI - ASSEMBLY/DISMANTLING	18
2. MOUNTING THE MZ	8	1. COVER	18
3. FITTING THE SPACER BACK PLATE (Optional)	8	2. ELECTRICAL CONNECTION UNIT	18
4. PLUMBING CONNECTIONS	8	3. BURNER	18
4.1 - Relief valve	8	VIII - MONITOR PRODUCTS, INC. ("MPI") LIMITED ..	
4.2 - Low temperature floor heating	9	WARRANTIES	20

I. PRESENTATION

1 - DESCRIPTION

Wall-mounted, condensing, gas-fired instantaneous MZ for use with natural or LP gases in accordance with ANSI Z 223.1 or CGA B149.

The following parts come fitted in a plain and stylish cover:

- a high performance, condensing finned tube heat exchanger.
- a premixing burner with a heat-resistant steel grate.
- a gas valve.
- control panel and electrical fittings which regulate the water heater and ensure smooth
- operation
- a heating circuit safety valve (43.5 psi / 3 bars).

- a combined temperature/pressure gauge.
- a condensate drain.
- a circulating pump.
- an air eliminator.
- a bypass (to be adjusted if the installation flow rate is too low).

2 - RANGE

FEATURES:

- Compact (14,5 inches deep / 361 mm).
- Sturdiness ensured by using an oversized stainless steel exchanger.
- Very high operating efficiency.

3 - TECHNICAL SPECIFICATIONS

GAS PROPERTIES. rated heat input MZ 20-40C: 142,00 Btu/h (41.6 kW)*

	Natural gas	LP gas
Heating value H 60 °F / 15.5 °C BTU/foot ³ / Mj/m ³	1075 / 40.1	2500 / 93.1
P1 - Inlet pressure IWG / mmCE	7.0 / 177.8	11.0 / 279.4
Gas flow 60°F / 101.3 Kpa foot ³ /h / m ³ /h	132 / 3.74	56.9 / 4.20
Gas orifice inch / mm	no	0.1658 / 3.5
P2 (outlet pressure) IWG / mmCE	2.8 / 71	2.8 / 71
Air burner pressure IWG / mmCE	0.79 / 20	0.79 / 20
ΔP Air pressostat IWG / mmCE	0.87 / 22	0.87 / 22
Heat input L H BTU/h.kW	128000 / 37.5 94500 / 27.7	132850 / 38.9 142000 / 41.6
Air orifice Inch / mm	no	no

* Heat input calculated on the higher heating value: H

MINIMUM SYSTEM WATER FLOW RATE

264 gal/h - 1000 l/h

WATER PRESSURE

Heating pressure: maxi 43.5 PSI (3 bars) - mini 14.5 PSI (1 bar)

MAX OPERATING FLOW TEMPERATURE

176°F (80 °C)

ELECTRICAL SUPPLY

120V - 60 Hz

COMBUSTION PRODUCTS

Max temperature : 176°F (80 °C)

Flow rate 32°F (0°C) 14.7 PSI (1013 mbar): 1284 foot³/h - 59 m³/h

Balanced flue 3" (75 mm) diameter: Max temperature: 266°F (130°C).

3.1 - CONNECTION DETAIL

Note : The threads at 2 and 3, the gas and water connections, are European thread types and will not connect to US fittings. Each MZ is provided with a set of turndown elbows for gas and water connections that terminate in standard US male-pipe-thread fittings.

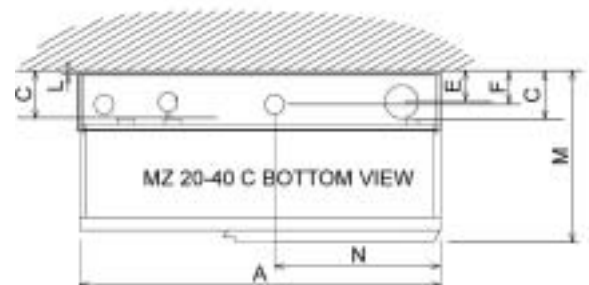
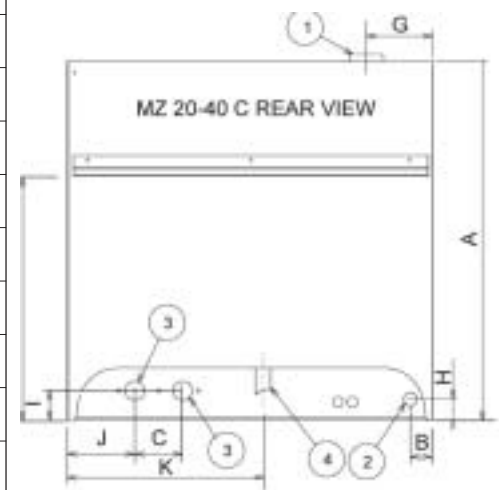
Models

MZ 20-40 C

Combustion Products	2.55 inches (75 mm) diameter PP MZ balanced flue - (1, fig. 1)
Gas connection	3/4" (0.79/1.06 inches) - (20/27 mm) diameter - (2, fig. 1)
Water heater connections	1" (1.02/1.34") - (26/34 mm) diameter - (3, fig. 1)
Domestic hot water connections	3/4" (0.79/1.06") - (20/27 mm) diameter - (4, fig. 1)
Condensate connections	1.26" (32 mm) diameter PVC - (5, fig. 1)

3.2 - OVERALL DIMENSIONS

	Inches mm	
A	29.9	760.0
B	1.8	45.0
C	3.9	100.0
D	20.9	530.0
E	2.6	66.0
F	31.0	78.0
G	5.4	137.5
H	1.7	44.5
I	2.5	62.5
J	5.6	141.5
K	16.2	410.5
L	0.24	6.0
M	14.2	361.0
N	13.7	349.5



II. OPERATION

1 - PRINCIPLE OF OPERATION

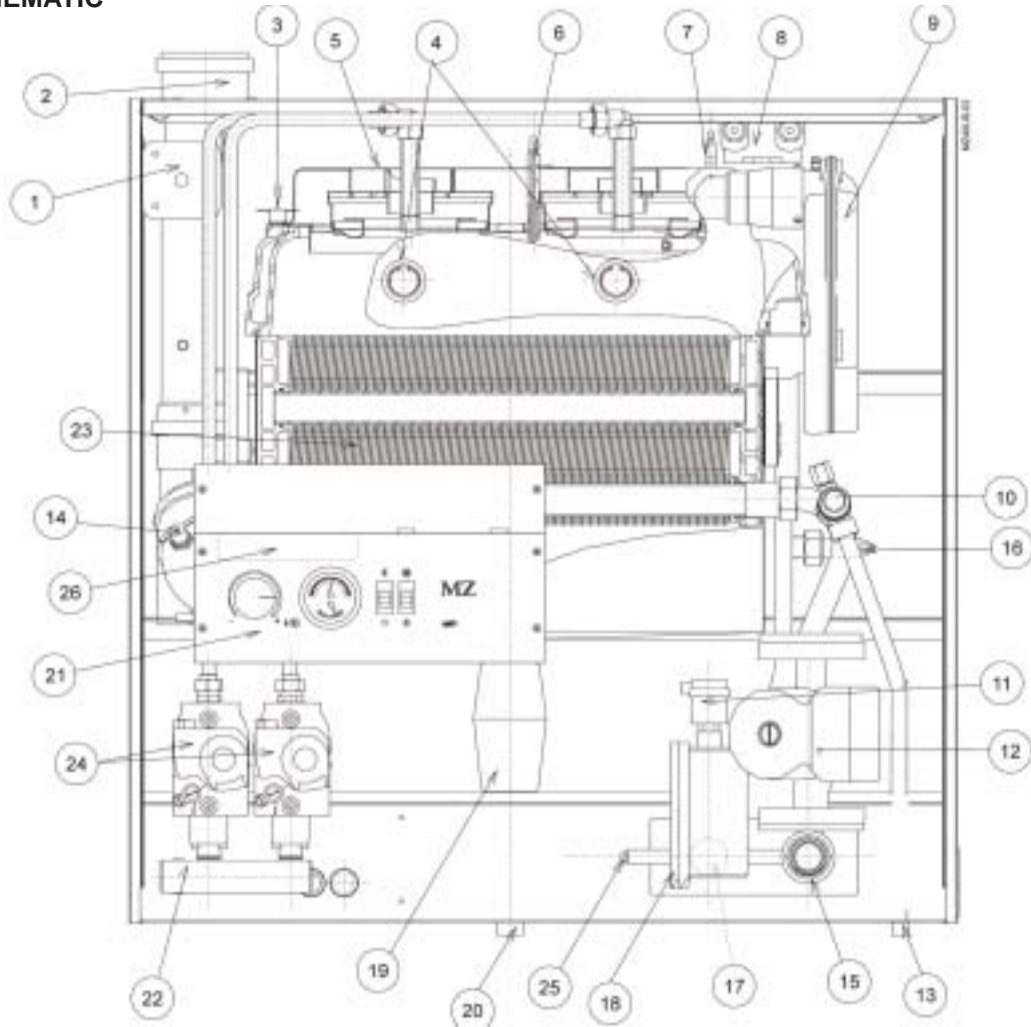
The wall-mounted condensing gas-fired MZ makes maximum use of the energy yielded by the gas combustion process. Using its "super-exchanger", the MZ recovers the sensible heat from the combustion products, with an efficiency of about 12% greater than that of a traditional heating system even without condensing. If the flue gases are evacuated at this stage of combustion, they are at temperatures of 392 °F to 572 °F (200 °C to 300 °C).

These flue gases still contain some of the sensible heat and

in particular appreciable amounts of latent heat in the form of water vapor. By routing the heating return through the bottom of the exchanger/condenser at a temperature of less than 127.4°F (53°C), the flue gases will condense. This condensation allied to the high performance of the exchanger results in an energy saving of 20 to 50% compared to conventional equipment. As the phenomenon of condensation only occurs for heating return temperatures of below 127.4°F (53 °C), the operating efficiency of the heating installation will increase as the average annual heating return temperature decreases.

1.1 - OPERATING SCHEMATIC

Fig. 2



- 1) Differential air pressure switch
- 2) Flue
- 3) Water high limit stat 195°F (90°C)
- 4) Sight glass
- 5) Dual-setting burner
- 6) Ionization electrode
- 7) Ignition electrode
- 8) Ignition transformer
- 9) Air Fan
- 10) Safety valve (3 bar)
- 11) Air eliminator
- 12) Circulating pump
- 13) Safety valve discharge

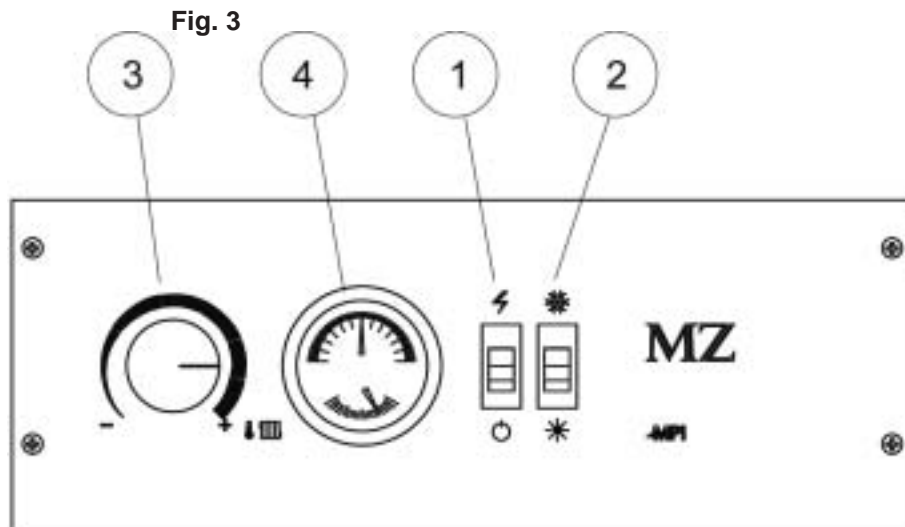
- 14) Flue high limit stat
- 15) Heating return + filter and water heater drain tap
- 16) Flow switch
- 17) Heating outlet
- 18) Aquastat and thermometer sensors
- 19) Condensate trap
- 20) Condensate drainage
- 21) Control panel
- 22) Gas supply
- 23) Exchanger/condenser finned tubes
- 24) Gas valves
- 25) bypass
- 26) Connection box

2 - CONTROL AND REGULATION

2.1 - CONTROL PANEL

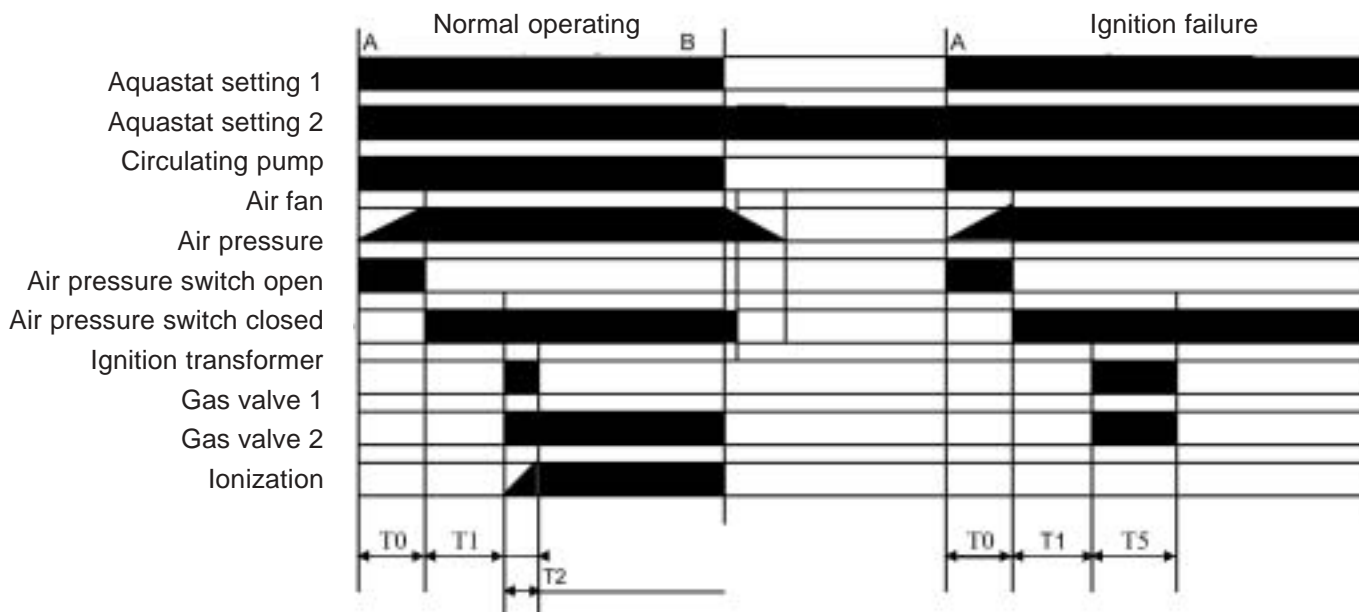
This is equipped with the following:

- A main on/off switch (1, fig. 3)
- A summer/winter switch (2, fig. 3)
- Winter setting provides heating and hot water
- Summer setting provides hot water only
- A temperature control knob (68°F to 176°F, 20 to 80°C) (3, fig. 3)
- A combined temperature and pressure gauge, showing the heating output temperature and the installation water pressure (minimum pressure 14.5 psi, 1 bar) (4, fig. 3).



2.2 - DIAGRAM SHOWING OPERATING CYCLES, SPACE HEAT MODE

Fig. 4



T0: Time required to reach nominal fan pressure (20 s)
T1: Prepurge time (10 s)
T2: Ignition time (0.5 s)
T5: Time required for safety device to function if no ignition ionization: max. 5 s
A : heating thermostat on
B : lag burner off
C : heating thermostat off

2.2.1 - OPERATION FLOW CHART (control unit S 89 E 1058 B)

2.3 - THERMAL SAFETY DEVICE

The unit is equipped with an overheat safety thermostat operating at 195°F (90°C) with manual reset (3, fig. 2)

2.4 - ACCESSORIES

The wall-mounted unit incorporates all of the accessories needed for smooth operation:

- circulating pump, safety valve, air eliminator, drain tap, pressure gauge, heating water filter and condensate drain trap.

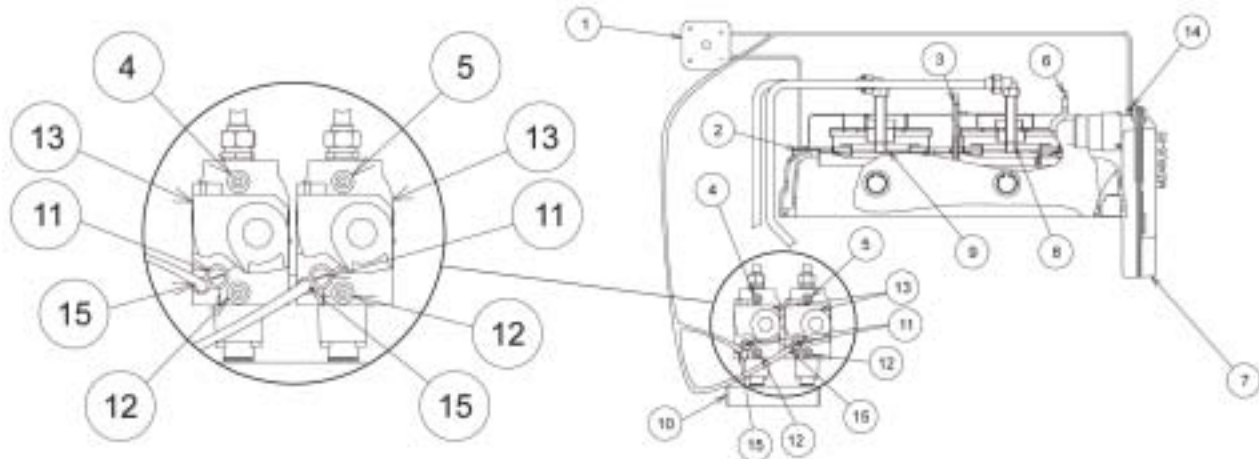
3 - BURNER

3.1 - INTRODUCTION

The unit's burner is a blown air burner with premixing. The flame burns on a grate made from heat-resistant steel. This technique gives a perfect gas mixture and a combustion which is sharp, silent, and well adapted to the combustion unit.

The burner is ignited in two stages. The right-hand burner is ignited first. It is checked by the control unit - 5 seconds later, gas is fed to the second burner and ignited by the first.

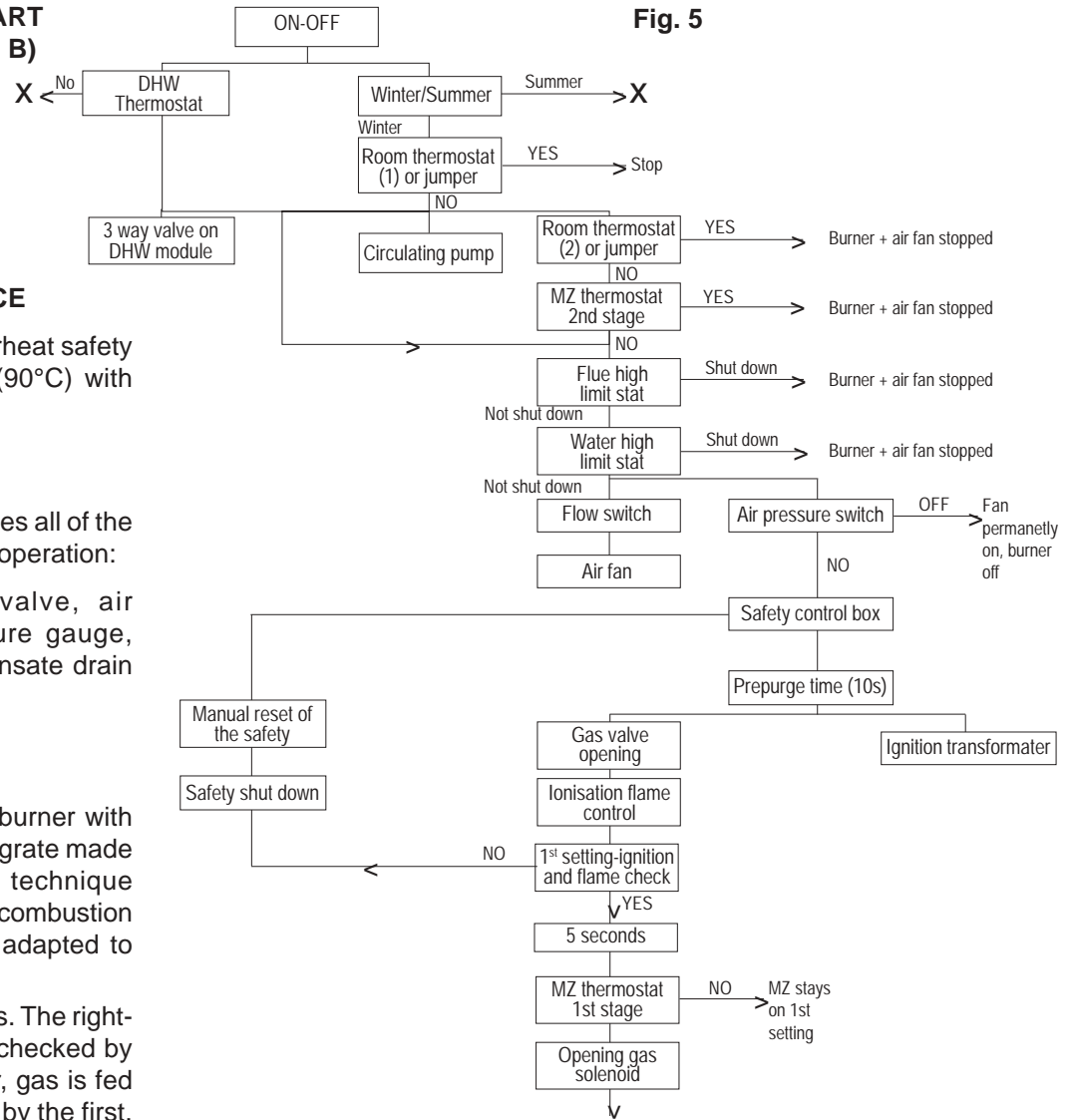
Fig. 6



- 1) Differential air pressure switch
- 2) Pressure test point/combustion chamber
- 3) Ionization electrode
- 4) P2 lag-burner gas outlet pressure test point
- 5) P2 lead-burner gas outlet pressure test point
- 6) Ignition electrode
- 7) Air fan
- 8) Burner N° 1, lead burner

- 9) Burner N° 2, lag burner
- 10) Gas supply
- 11) Gas regulator
- 12) P1 gas inlet pressure test point
- 13) Gas valve
- 14) Fan air inlet pressure test point
- 15) Adjustment of the air/gas ratio/pressure regulator

Fig. 5



3.2 - GAS UNIT

• Gas regulator

The gas regulator ensures the correct heat output from the appliance by regulating the gas burner pressure whatever the supply pressure (max input P = 20 IWG).

• Gas valve

The gas valve has a solenoid valve which controls the gas supply to the burner. This solenoid valve has a low power consumption and can operate constantly and silently.

• Filter

The unit input is fitted with a screen filter which protects it against any impurities carried in the gas supply.

4 - FAN

The fan, specially developed for the MZ, is very efficient and quiet. Its turbine provides a flow rate with a low sensitivity to pressure variations.

5 - HEAT EXCHANGER

The heating assembly has a particularly well-designed body consisting of two distinct parts:

- The square-section upper part constitutes the cold combustion chamber with its surrounding layer of water. A sight glass allows the flame to be observed.
- A "super exchanger" captures almost all the sensible heat and latent heat contained in the combustion products.

III. INSTALLATION

1 - GENERAL

The installation must conform with one or more of the following, as applicable :

- Local codes or, in the absence of local codes, the National Fuel Gas Code, ANSI Z 223.1/NFPA 54 or Natural Gas and Propane Installation Code CSA B249.1.
- Can - CGA B149 installation code and/or local installation codes.
- The National Electrical Code ANSI/NFPA No.70.
- CSA Standard C22.1 and Canadian Electrical Code PZ.1.

This appliance must be grounded in accordance with these codes.

The unit must be located in an area where water leakage from the unit or the connections will not result in damage to the area adjacent to the unit or to lower floors of the structure. When such locations cannot be avoided, it is recommended that a suitable noncorrosive drain pan, adequately drained, be installed under the unit.

The maximum inlet gas pressure must not exceed the value specified and the minimum value listed is for the purpose of input adjustment.

If the MZ is installed in a closed water supply system, such as one having a back flow prevented in the cold water supply line, means shall be provided to control thermal expansion.

Contact the water supplier or local plumbing inspector on how to control this situation.

If the MZ 25 C water pressure exceeds 40 psi install an approved pressure regulator set at 40 psi.

The installing technician shall install a relief valve in the supply pipe of primary hydronic heating circuit. The valve shall be readily accessible for servicing or replacement. The valve must comply with the ANSI/ASME Boiler and Pressure Vessel Code, section IV. One typical valve is Watts regulator model 100 XL-4, 150 psi. Equal alternate valves are also acceptable. When installing this valve no shut off valve is to be placed between the relief valve and the unit. The discharge from this relief valve must be conducted to a suitable place for disposal when relief occurs and no reducing coupling or other restriction shall be installed in the discharge line. This discharge line shall be installed to allow complete drainage of both the valve and the line.

The relief valve must be located so that if it operates all water will be discharged to a location which will not impinge on any person or damage any property. The preferred method is to pipe the relief valve discharge to a floor drain or a safe floor area near a floor drain.

Manually operate the pressure temperature relief valve at least once a year.

Note: Canadian units come equipped with a relief valve which must be installed by service technician.

If the temperature pressure relief valve on the appliance discharges periodically, this may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct this situation. Do not plug the temperature and pressure relief valve.

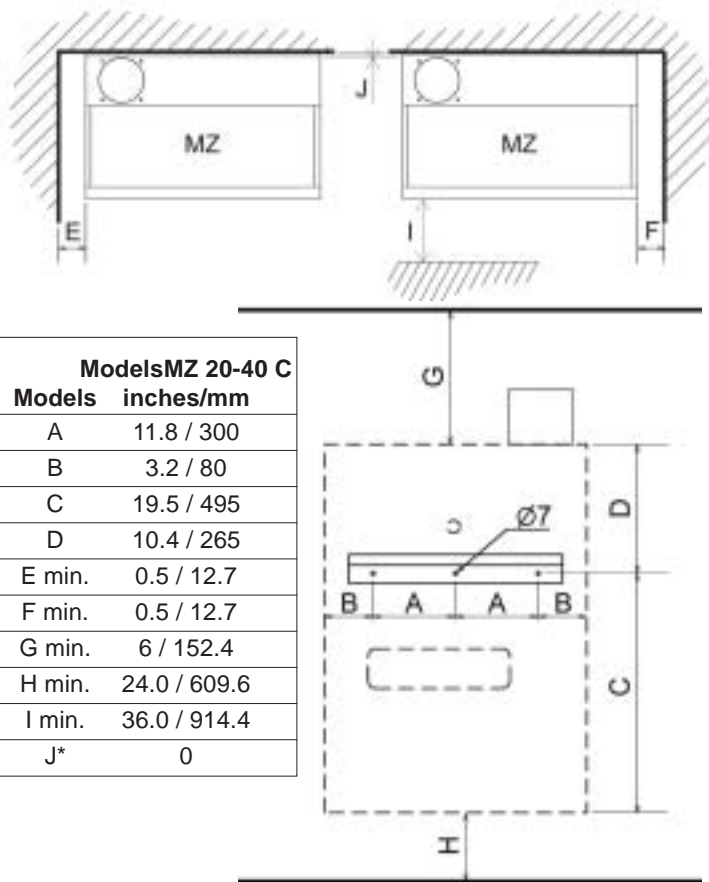
Lighting and Shutdown Instructions are detailed on a label located inside the hinged front cover of the unit. These must be read and understood by all service personnel.

WARNING ! - All areas adjacent to, and surrounding , this unit must be kept free from combustible materials, gasoline, and other flammable vapors and liquids

INSTALLATION

2 - MOUNTING THE MZ

Fig. 7



Models MZ 20-40 C	
Models	inches/mm
A	11.8 / 300
B	3.2 / 80
C	19.5 / 495
D	10.4 / 265
E min.	0.5 / 12.7
F min.	0.5 / 12.7
G min.	6 / 152.4
H min.	24.0 / 609.6
I min.	36.0 / 914.4
J*	0

*need 0.24 inches (6 mm) for mounting bracket

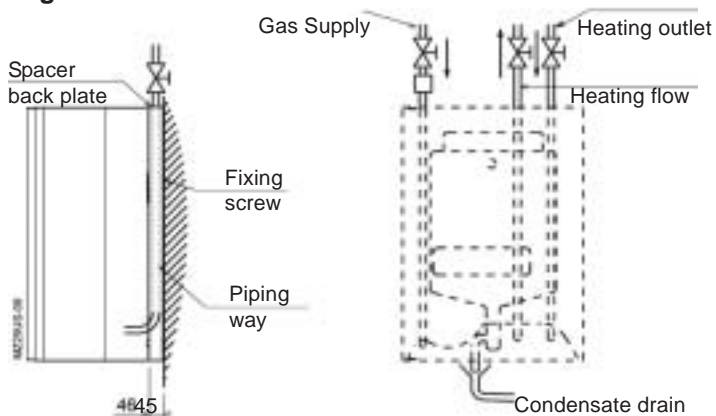
3 - FITTING THE SPACER BACK PLATE (OPTIONAL)

The spacer back plate allows pipe work to be passed behind the water heater where the installation pipes arrive from above.

ASSEMBLY

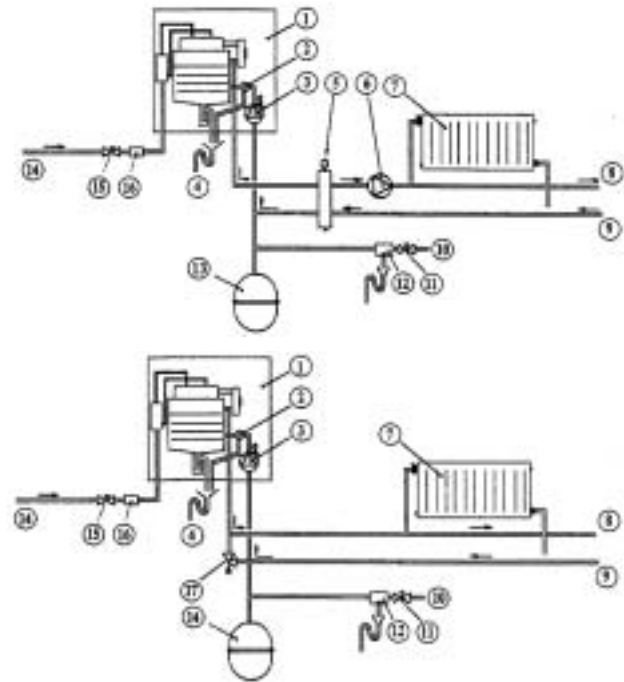
- Fit the mounting bracket to the wall (bracket delivered with the water heater).
- Hook the spacer back plate on to the angle mounting.
- Hook the water heater on to the spacer back plate.

Fig. 8



4 - PLUMBING CONNECTIONS

All connections are made at the bottom of the rear of the MZ. When operating the MZ, it is ESSENTIAL to maintain a CONSTANT minimum flow rate of 254 gal/h (1000 l/h) through the MZ. Consequently, if the heating installation has been designed for a lower flow rate, the bypass has to be adjusted (25, fig. 2) See section "Commissioning". When the installation is fitted with thermostatic valves and does not have a differential pressure overflow valve, adjust the bypass with the thermostatic valve closed.



- 1) MZ 20-40 water heater
- 2) 3 bar safety valve (built into heating system)
- 3) Heating pump (built into heating system)
- 4) Condensate and valve evacuation towards drain
- 5) Mixing cylinder
- 6) Heating pump (on "radiators" loop)
- 7) Radiators (including convectors and underfloor heating)
- 8) Output
- 9) Return
- 10) Domestic water circuit inlet
- 11) Stop valve
- 12) Temperature pressure relief valve
- 13) Expansion vessel with diaphragm
- 14) Gas inlet
- 15) Gas stop valve
- 16) Filter (not provided)
- 17) Differential valve

4.1 - RELIEF VALVE

A temperature and pressure relief valve listed as complying with the Standard for Relief Valves and Automatic Gas Shut off Devices for Hot Water Supply Systems, ANSI Z21.22, shall be installed at the time of installation of the heater in the locations provided or specified by the manufacturer. Local codes shall govern the installation of such relief devices. For safe operation of the MZ, the relief valve(s) must not be removed or plugged

4.2 - LOW TEMPERATURE FLOOR HEATING

The MZ is designed to be connected to a low temperature heating circuit. For most such applications 115 °F (45 °C) maximum output temperature is adequate. Therefore it is recommended that the unit's space heating thermostat control knob stops (ref. 3, fig.3) be set to 115 °F (45 °C). Put the stops at 25 and 12 (figures inside the knob). Turn the MZ on and check the maximum temperature on the thermometer. An additional 140 °F (60 °C) safety thermostat must also be fitted on the unit's heating circuit flow outlet.

4.3 - CONDENSATE AND VENTING CONNECTION

The unit is designed to drain condensate (from the bottom of the combustion chamber and the combustion products flue) by a condensate trap at the bottom of the heating unit. The condensate trap, which can be accessed for inspection, should be connected in PVC 1,26 inches (32 mm) Ø to the waste water system through a properly trapped drain. When installing, remember to fill the condensate traps with water before firing. They should be inspected twice a year. No reducing coupling or other restriction is allowed.

4.4 - PIPE CONNECTIONS

All the pipe junctions are located at the rear of the MZ water heater. Viewed from the rear, these are (from the left). The heating return , then the heating outlet 1 inch (26/34 mm) Ø. Finally on the right is the gas supply ¾ inch (20/27 mm) Ø. Note that the threads on these connections are European pipe threads and do not match US pipe threads. Each MZ comes with a set of turndown elbows that connect to the MZ and end in US male pipe thread.

4.4.1 - FILLING THE INSTALLATION WITH WATER

The MZ has an air eliminator on the heating inlet. Ensure that the MZ and installation are properly purged by increasing the water pressure to at least 14.5 psi (1 bar) (pressure gauge). Check that it is fully purged again a few days after commissioning. Thoroughly clean and flush the MZ and the heating system before filling. New systems are often contaminated with cutting oils, flux, and other material that can cause short component life and corrosion. Use a packaged system pre-cleaner or use a trisodium-phosphate solution of one pound of TSP per 50 gallons of water in the system. Fill and run the system for a few days and then drain the system completely and flush it completely. Drain the system and fill it with the purest clear, potable water available and the INIBAL corrosion inhibitor that ships with the MZ. We recommend softened water for filling when the water is too hard.

WARNING! The use of common, commercially-available anti-freeze solutions will void the MZ's warranty. Most of these anti-freeze compounds contain chemicals that will damage the MZ. We make a specially-formulated anti-freeze solution available. See the attached part's list for its designation.

4.5-PRESSURE/FLOW RATE CURVES

4.5.1-CIRCULATING PUMP

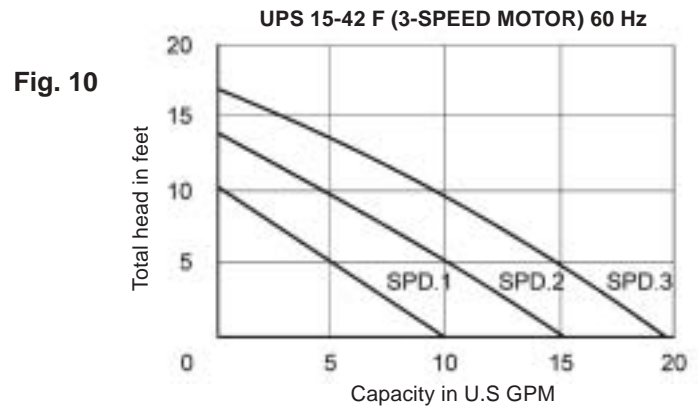


Fig. 10

4.5.2 - PRESSURE DROP

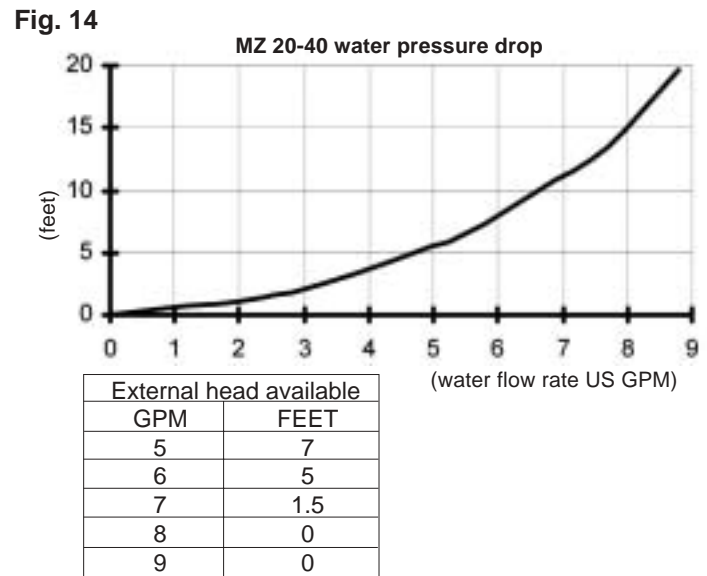


Fig. 14

5 - GAS CONNECTIONS

The appliance and its individual shut-off valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of ½ psi (3.5 kPa). The appliance must be isolated from the gas supply piping system by closing its individual manual shut-off valve during any pressure testing of the gas supply piping system at test pressures equal to or less than ½ psi (3.5 kPa).

- The appliance and its gas connection must be leak tested before placing the appliance in opera-The gas inlet diameter is ¾ inches (20/27 mm).

The gas supply pipe must be fitted with a ¼ turn stop valve located in an easily accessible place.

After commissioning, check that the pressure tapping points are properly closed and check the general leak tightness of the gas circuit (for example use a foaming product).

Always purge through the gas pipe work before commissioning the appliance (in order to get rid of any particles produced by welding or threaded joints).

- The pipe supplying gas to the MZ must not cause a pressure loss of more than 0.4 inches (1 mbar WG).

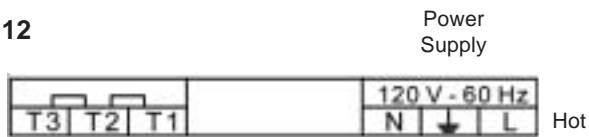
6 - ELECTRICAL CONNECTIONS

The appliance, when installed, must be grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Code, ANSI/NFPA 70 and the CSA standard "Canadian Electrical Code" C22.1.

6.1 - ORIGINAL CONNECTION (NO EXTERNAL CONTROL) WITH JUMPERS INSTALLED

Observe the correct polarity for live (L) and neutral (N)

Fig. 12



This appliance must be grounded

The power supply must be protected by a 6A fuse

All internal electrical components have been pre-wired. No attempt should be made to connect electrical wires to any other location except the terminals.

6.2 - CONNECTION TO EXTERNAL CONTROL

6.2.1 - USING A ROOM THERMOSTAT TO CONTROL THE BURNER AND HEATING CIRCULATING PUMP SIMULTANEOUSLY

- Burner stopped when the room thermostat switches off.
- Heating circulating pump continues to run after the thermostat switches off.

Fig. 13



Room thermostat connected between T2 and T3 after removing jumper T2/T3). Jumper T1/T2 remains in place.

6.2.2 - USING A ROOM THERMOSTAT TO CONTROL THE BURNER AND HEATING CIRCULATING PUMP SIMULTANEOUSLY

- Burner stopped when the room thermostat switches off.
- Heating circulating pump continues to run after the thermostat switches off.

Fig. 14



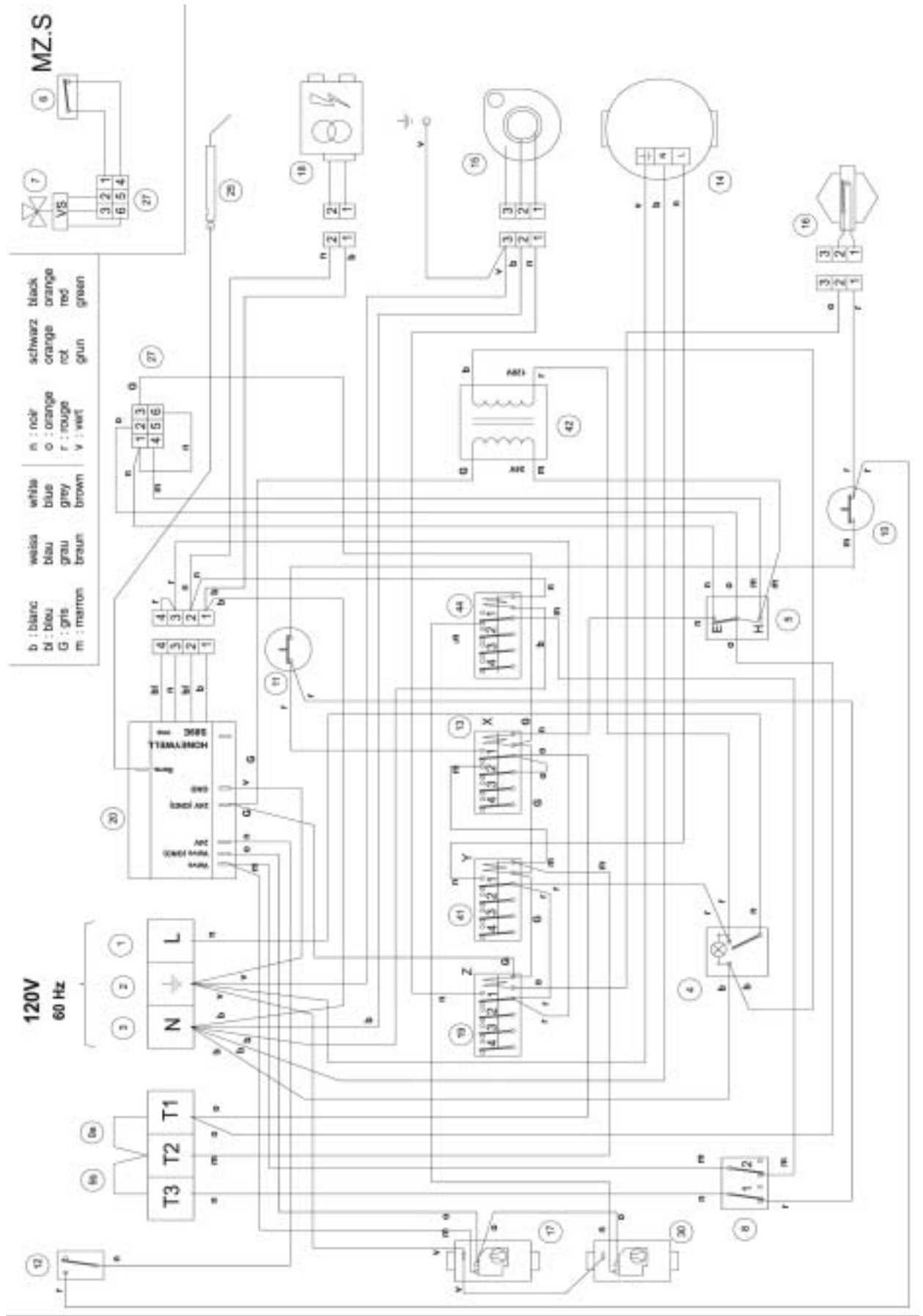
Room thermostat connected between T1 and T2 (after removing jumper T1/T2). Jumper T2/T3 remains in place.

Key for Fig. 15

1		Line voltage.
2		Ground.
3		Neutral.
4		On-off switch.
5		Summer (E), winter (H) switch.
6		Aquastat in indirect tank or other device given priority through the three-way valve.
7	a.	Three-way valve.
8		Two-stage adjustable aquastat for system-water.
9a		Placement of external temperature-control dry-contact (thermostat) wiring when it is desired to control both circulating pump and burner externally.
9a		Placement of external temperature-control dry-contact (thermostat) wiring when it is desired to control burner externally. In this mode, space heat will only be delivered when the summer-winter switch (#5) is set to winter. Winter = H.
10	9051 b.	Manual-reset flue-gas high-limit switch.
11	9023 c.	Manual-reset water-temperature high-limit switch.
12	b.	Combustion-air proving switch.
13	9001 c.	Primary low-voltage relay.
14	9006 c.	Water pump.
15	9019 c.	Combustion-air fan.
16	9039 b.	Water-flow proving switch.
17	9005 c.	Lead gas valve.
18	9020 c.	Ignition transformer.
19	9001 c.	Fan relay.
20	9016 c.	Ignition module.
25	9003 c.	Flame-proving rod.
27	9518 c.	Wiring harness for DHW control.
30	9005 c.	Lag gas valve.
41	9001 c.	Water-pump relay.
42	9043 c.	120 - 24 v. transformer.
44	9040 b.	Lag gas-valve relay.
a.		Consists of two parts, 9009, valve body and 9018, valve motor.
b.		Specific to the MZ 40.
c.		Interchangeable with same part on MZ 25 series

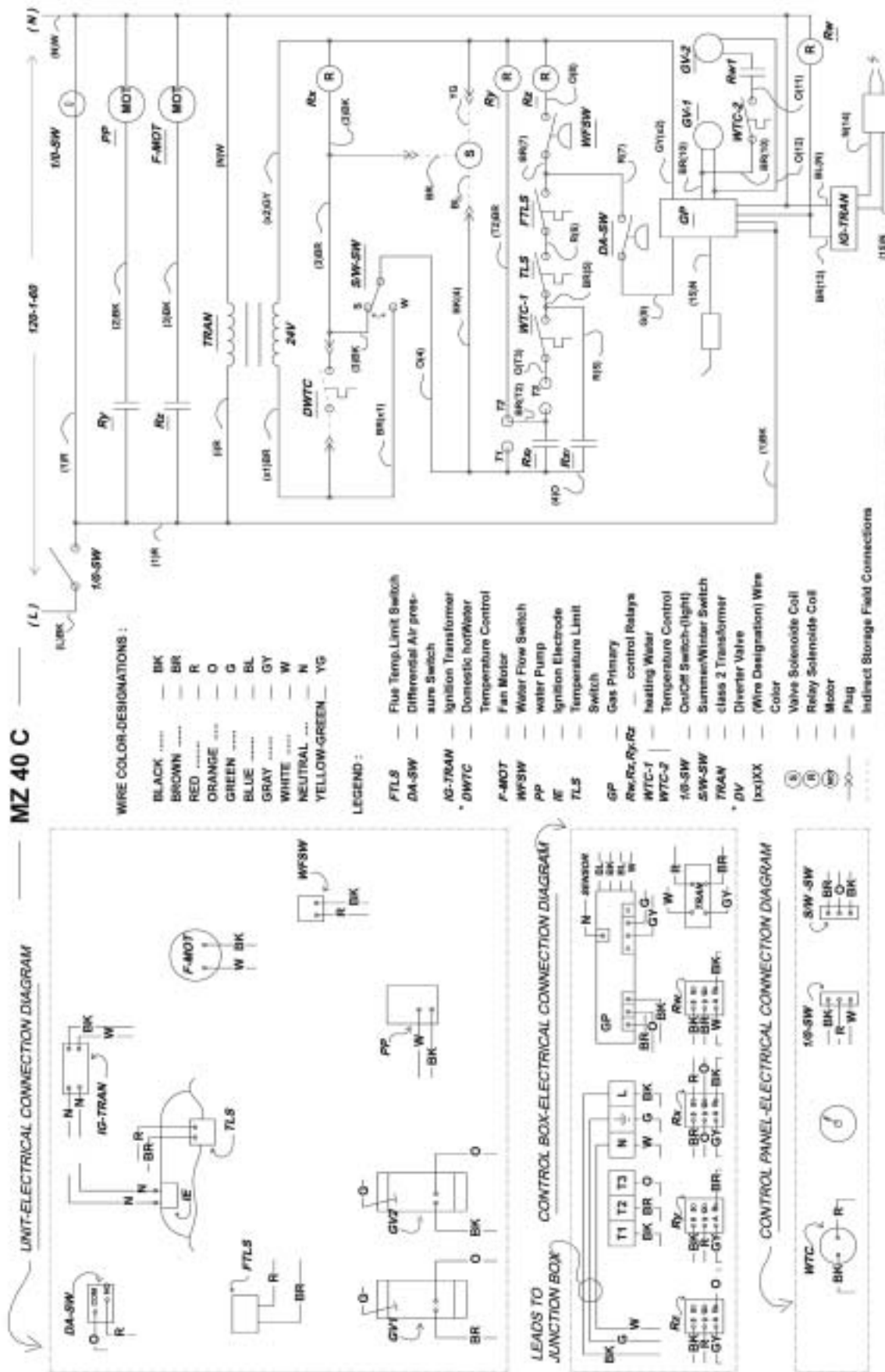
6.3 - WIRING DIAGRAM (MZ 20-40 C)

Fig. 15



INSTALLATION

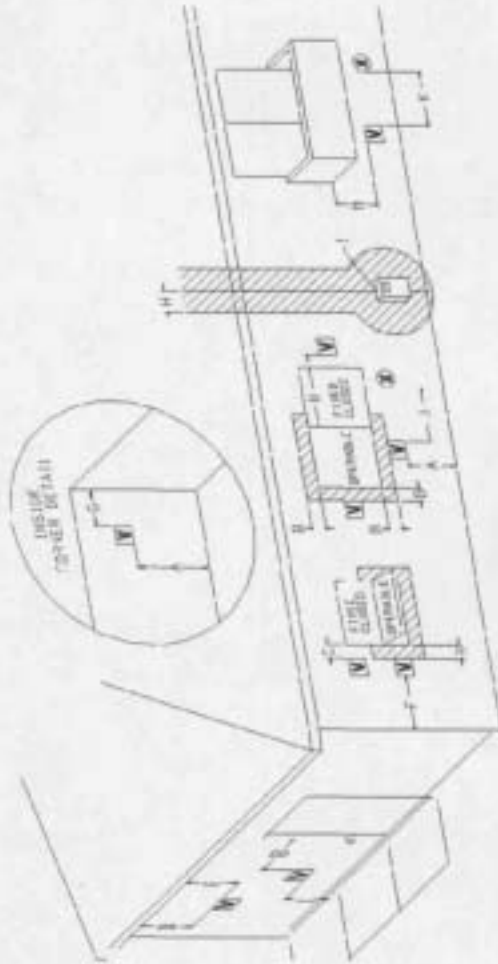
6.4 - CIRCUIT DIAGRAM (MZ 20-40C)



NOTES : CAUTION ;(1)LABEL ALL WIRES PRIOR TO DISCONNECTION WHEN SERVICING CONTROLS . WIRING ERRORS CAN CAUSE IMPROPER AND DANGEROUS OPERATION .
 (2)VERIFY PROPER OPERATION AFTER SERVICING .
 (3)IF ANY ORIGINAL WIRE AS SUPPLIED WITH THE APPLIANCE MUST BE REPLACED WITH TEW 105C WIRE OR ITS EQUIVALENT .

* : Supplied with indirect DWW Storage Tank

7 - COMBUSTION PRODUCTS EXHAUSTED BY BALANCED FLUE



(V) VENT TERMINAL

(X) AIR SUPPLY INLET

▨ AREA WHERE TERMINAL IS NOT PERMITTED

	Canadian Installations ¹ 12 inches (30 cm)	US Installations ² 12 inches (30 cm)
A=	Clearance above grade, veranda, porch, deck, or balcony	6 inches (15 cm) for appliances ≤ 10,000 Btuh (3 kW), 9 inches (23 cm) for appliances > 10,000 Btuh (3 kW) and ≤ 50,000 Btuh (15 kW), 12 inches (30 cm) for appliances > 100,00 Btuh (30 kW)
B=	Clearance to window or door that may be opened	6 inches (15 cm) for appliances ≤ 10,000 Btuh (3 kW), 9 inches (23 cm) for appliances > 10,000 Btuh (3 kW) and ≤ 50,000 Btuh (15 kW), 12 inches (30 cm) for appliances > 100,00 Btuh (30 kW)
C=	Clearance to permanently closed window	6 inches (15 cm) for appliances ≤ 10,000 Btuh (3 kW), 9 inches (23 cm) for appliances > 10,000 Btuh (3 kW) and ≤ 50,000 Btuh (15 kW), 12 inches (30 cm) for appliances > 100,00 Btuh (30 kW)
D=	Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet (61 cm) from the center line of the terminal	•
E=	Clearance to unventilated soffit	•
F=	Clearance to outside corner	•
G=	Clearance to inside corner	•
H=	Clearance to each side of center line extended above meter/regulator assembly	3 feet (91 cm) within a height 15 feet above the meter/regulator assembly
I=	Clearance to service regulator vent outlet	3 feet (1.83 m)

	Canadian Installations ¹ 6 inches (15 cm) for appliances ≤ 10,000 Btuh (3 kW), 12 inches (30 cm) for appliances > 10,000 Btuh (3 kW) and ≤ 100,00 Btuh (30 kW), 36 inches (91 cm) for appliances > 100,00 Btuh (30 kW)	US Installations ³ 6 inches (15 cm) for appliances ≤ 10,000 Btuh (3 kW), 9 inches (23 cm) for appliances > 10,000 Btuh (3 kW) and ≤ 50,000 Btuh (15 kW), 12 inches (30 cm) for appliances > 50,000 Btuh (15 kW)
J=	Clearance to nonmechanical air supply inlet to building or the combustion air inlet to any other appliance	6 inches (15 cm) for appliances ≤ 10,000 Btuh (3 kW), 9 inches (23 cm) for appliances > 10,000 Btuh (3 kW) and ≤ 50,000 Btuh (15 kW), 12 inches (30 cm) for appliances > 50,000 Btuh (15 kW)
K=	Clearance to a mechanical air supply inlet	3 feet (91 cm) above if within 10 feet (3 m) horizontally
L=	Clearance above paved sidewalk or paved driveway located on public property	7 feet (2.13 m) †
M=	Clearance under veranda, porch, deck, or balcony	12 inches (30 cm) ‡

¹ In accordance with the current CAN/CGA-B149 Installation Codes
² In accordance with the current ANSI Z223.1 / NFPA 54 National Fuel Gas Code
 † A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings.
 ‡ Permitted only if veranda, porch, deck, or balcony is fully open on a minimum of two sides beneath the floor.
 * For clearances not specified in ANSI Z223.1 / NFPA 54 or CAN/CGA-B149, one of the following shall be indicated:
 a) A minimum clearance value determined by testing in accordance with section 2.20, or;
 b) A reference to the following footnote:
 Clearance in accordance with local installation codes and the requirements of the gas supplier.

INSTALLATION

A balanced flue must be installed when the wall adjoining the water heater gives onto the outside in a well ventilated location. A water heater installed in this way possesses a sealed combustion circuit, completely independent of the ventilation circuit for the rooms.

The balanced flue outlet must be located at least 1.31 foot (0.4 m) from any opening window and 1.97 foot (0.6 m) from any air ventilation opening (see regulations). Two balanced flue outlets (from two distinct adjacent MZ units) must be at least 1.97 foot (0.6 m) apart.

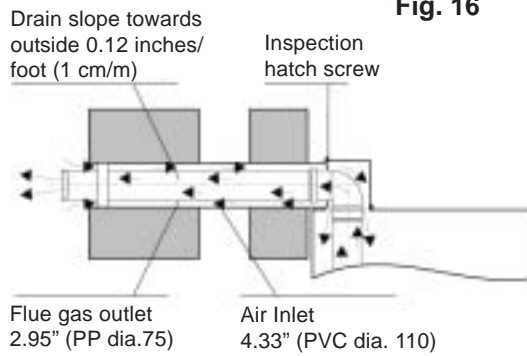
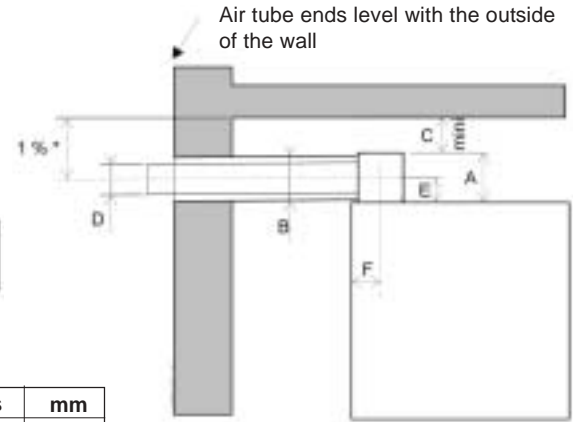


Fig. 16



Dimensions	Inches	mm
A	5.43	138
B	4.33	110
C mini	6.0	152.4
D	2.95	75
E	2.76	70
F	2.64	67

The flue may be mounted to the right, to the left, or directly behind the water heater. Its maximum length must not exceed 13.12 feet (4 meters). The flue gas exhaust tube Ø 2.95 inches (Ø 75 PP) must slope downward towards the outside at 0.12 inches/foot * (1 cm per meter) to avoid accumulation of rain water in the vent-air intake system.

The MZ is supplied with a standard length flue which can be used to run through a wall up to 1.64 foot thick (0.5 m) located directly behind the water heater. For greater lengths, or when the connection is to the right or left of the hot water heater (13.12 feet, up to 4 m), specify with your order.

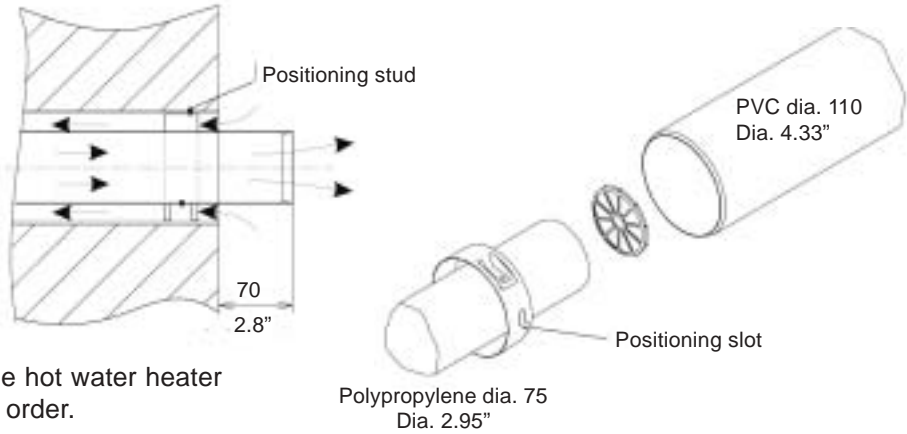
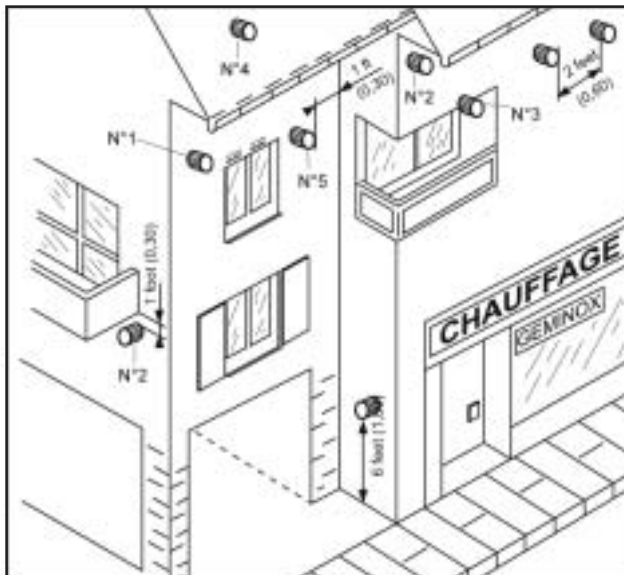
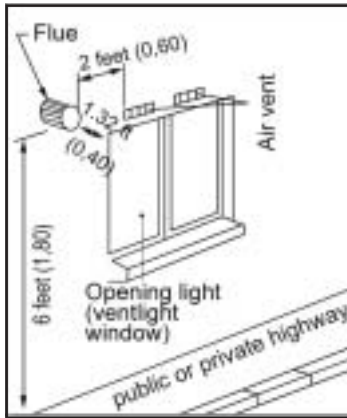


Fig. 17



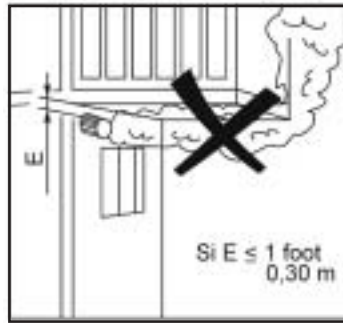
- 1) The three recommended distances (code of practice)
- 2) Outlet under balcony or roof
- 3) Outlet on a balcony
- 4) Roof outlet (refer to factory)
- 5) Outlet near to a corner

All dimensions are the minimum permissible

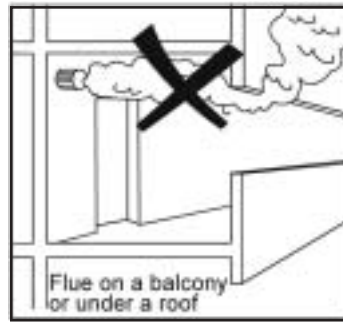
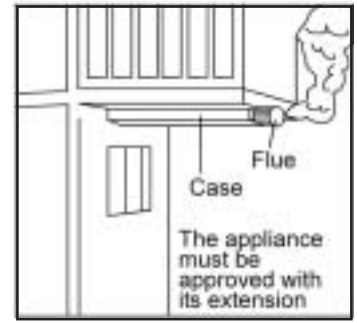


A public or private highway where a flue outlet is located includes:

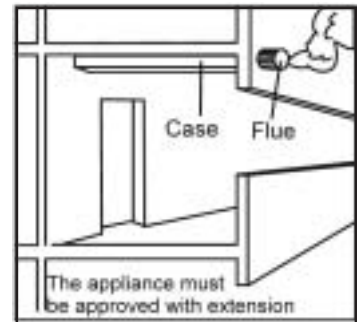
- public or private pavement
- pedestrian walkways
- traffic route
- alleyway
- stairway (including landings and steps)



(No.2) Approved extension : 13.12 feet (4m)



(No.3) Approved extension: 13.12 feet (4m)



7.1 - LEAK TIGHTNESS

The MZ water heater has a sealed combustion circuit. Take care to keep the various seals in good condition (cover, flue box, etc.). Replace if necessary. The various elbows and connection pieces located on the flue gas exhaust route and on the air intake must be fitted in a leak-tight manner in order to avoid flue gases recycling.

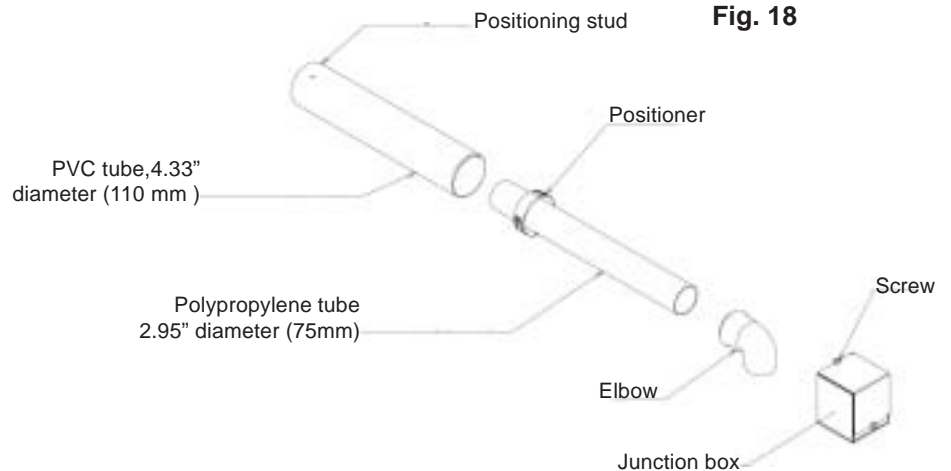


Fig. 18

IV. COMMISSIONING



1 - WARNING

If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the appliance.

Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

Before commissioning the appliance, the installer should:

- check that the gas circuit is leak-tight

- carefully flush out the gas pipes. Where the installation is new, the purge serves to evacuate the air that is contained in the pipes so that the water heater has sufficient fuel. The presence of air in the gas prevents the burner from lighting and results in the flame control unit safety device cutting in. This applies to a new installation running on either natural gas or LPG. For the latter, the storage tank must also be flushed properly before commissioning.



All necessary safety precautions should be taken when venting the gas.

Flushing the gas will also have the effect of removing any oxide particles from the pipes produced during brazing

- check that the flue gas outlet is leak-tight and that combustion products can pass freely through this conduit;

COMMISSIONING

- check the appearance of the flame through the round observation window inside the hinged door just above the controls. The flame's blue hue should almost completely fill the round observation window.
- check that the installation is filled with water. The water pressure should = 21.75 psi (1,5 bars), the radiators are purged and the valves open (**Attention!** the pressure must not drop below 14.5 psi (1 bar));
- check that the electricity supply is connected correctly: 120 V - 60 Hz, with correct polarity;
- check that the condensate outlet is connected,
- check that the siphon trap is filled with water.

When operating the appliance for the first time, the installer must verify

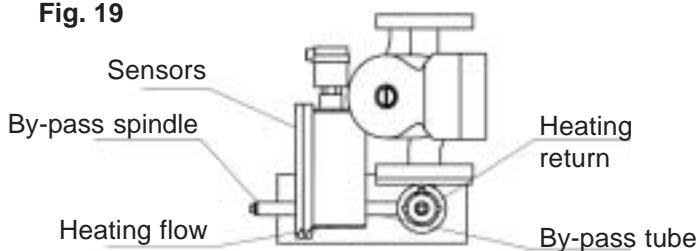
- that the governor works properly;
- that the flame control works properly;
- the burner setting: CO, CO2

After the unit is installed select the nearest hot water faucet and let the water run until it is as hot as it will get. If the temperature of the water has a risk of scald temperatures reduce the DHW thermostat safety limit setting until the water temperature has cooled to a safe level.

2 - COMMISSIONING

- Open the manual valve on the gas inlet
- Switch on the main heating switch
- Set the on/off switch on the control unit to the on position
- Put the CIRCULATING PUMP switch to the "winter" position. In the "summer" position, the circulating pump only works when the domestic hot water tank requires heating (on the Dual Function Model)
- Adjust the by-pass setting: on installations where the flow rate is less than 3,52 gpm (800 l/h), the water flow rate through the water heater heat exchanger has to be adjusted GRADUALLY, by means of the by-pass (23, fig. 2 and fig. 3) until the flow detector is triggered. All the thermostatic valves in the installation must be kept shut during this adjustment.

Fig. 19



- Burner adjustment: this is factory preset to obtain satisfactory operation. However, when commissioning, it is necessary to carry out the following checks, with the burner operating:

2.1 - CHECK OPERATING PRESSURE

- P1: Supply pressure
- P2: Regulator valve output pressure

- Adjusting gas pressure regulator:
 - Turn to the right to increase the pressure
 - Turn to the left to decrease the pressure.

2.2 - CHECK GAS FLOW RATE

Flow rate given at 59 °F (15 °C), 14.7 psi (1013 mbar)

Table of gas flow rates			
		Natural Gas	
		Natural Gas	LP gas
Ø Air reducer	inches/mm	1.14/29	1.22/31
Inlet pressure	P1 IWG/mmCE	7.0/177.8	11.0/279.4
Outlet pressure	P2 IWG/mmCE	2.8/71	5.5/140
Ø Reducer	inches/mm	0.213/5.4	0.138/3.5
Gas flow	Feet3/h	87.9	37.8
60°F 1.01,3 kPA	m3/h	2.49	1.07
CO2	%	9.5	10.7
CO	ppm	30	50

IWG = Inches of water pressure

2.3 - CHANGING GAS TYPE

The water heater is preset for natural gas. This operation must be carried out by a qualified person

When changing to propane gas (LP), use gas reducer in burner gas inlet (ref: conversion set).

Then check the P2 gas pressure (outlet gas valve) according to the framed indications.

Be careful to check P2 gas pressure with the cap properly screwed on the governor because of the air pressure action through the governor breather. (Gas pressure increase about 2 inches when cap mounted).

When the conversion is made, check the gas soundness with burner ignited and stick the label corresponding to the new gas.

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING : If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life

- This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
- BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

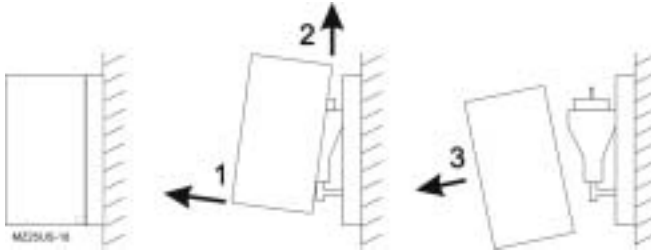
WHAT TO DO IF YOU SMELL GAS


 - Do not try to light any appliance.
 - Do not touch any electric switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbors phone. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the fire department.

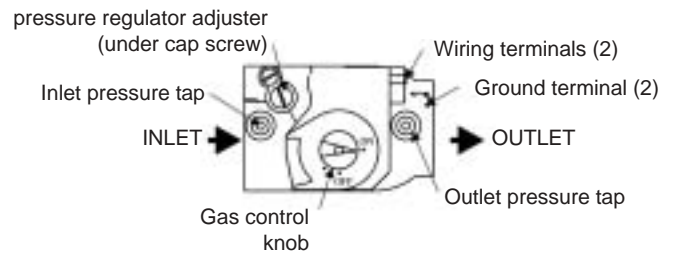
- C Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.


OPERATING INSTRUCTIONS

- 1 STOP! Read the safety information above on this label.
- 2 Set the thermostat to lowest setting
- 3 Turn off all electric power to the appliance.
- 4 This appliance has a sealed combustion chamber. DO NOT ATTEMPT TO LIGHT THE BURNER BY HAND.
- 5 To access the gas control the front cover must be removed. Remove screws and unlatch the retaining clips on the bottom of the front cover. To remove the front cover slightly lift the front cover while pulling it towards you. The gas control is located to the left of the burner.




- 6 Rotate the gas control knob clockwise  to the OFF position. See illustration to the right.



- 7 Wait (5) five minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
- 8 Rotate the gas control knob counterclockwise  to the ON position.
- 9 Replace the front cover (see section 5).
- 10 Turn on all electric power to the appliance.
- 11 Set thermostat to desired setting
- 12 If the appliance will not operate, follow the instructions "to turn off gas to appliance" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

- 1 Set the thermostat to lowest setting
- 2 Turn off all electric power to the appliance if service is to be performed.
- 3 Remove access cover per item 5 of the OPERATING INSTRUCTIONS above.
- 4 Push in gas control knob slightly and turn clockwise  (see diagram in item 6 of the operating instructions) to "OFF". Do not force.
- 5 Replace the access cover . See item 5 above.

V - SERVICING

A service visit must be carried out annually.

The main points to be verified are as follows:

- That the combustion gas circuit, the fan and burner are clean and that the ignition and ionization electrodes and seals are all in good condition.

The burner can be cleaned using a household vacuum cleaner, placing the suction pipe on the air intake, then on the gas intake (with the burner dismantled).

The exchanger can be cleaned by spraying with water with the burner dismantled (the water drains away via the condensate drainage siphon trap).

- Check the gas flow rate, pressure P2, CO and CO2.



The combustion products circuit is slightly pressurized.

Any holes drilled in this circuit should subsequently be closed off.

- Check the flame control by disconnecting the ionization electrodes (the safety device should activate after attempting to ignite the flame).

- Check the differential air pressure switch by blocking the air inlet or flue gas outlet (burner operation should be interrupted immediately).



The differential air pressure switch is a safety device. Never modify its setting (triggers off 40 mm WG / 1.57 inches WG).

- If the pressure switch triggers, this indicates insufficient air flow; in this event, check the fan and the air and combustion products circuits (flue, burner, exchanger, condensate chamber, etc.).
- Check the water flow detector (by stopping the circulating pump; burner operation should be interrupted immediately).
- **MANUAL OPERATION OF RELIEF VALVE:**
- Pressure relief valve must be manually operated at least once a year.

WARNING!: precautions must be taken prior to operating the relief valve to assure that hot water discharged from the relief valve will not contact people or damage property. Turn the knob by hand, let some water drain out, then turn it again to close it and make sure there is no water

SERVICING - ASSEMBLY/DISMANTLING

leakage.

- Inspect the condensate drainage trap.
- In hard water areas, the domestic water exchanger should be de-scaled regularly (carry out de-scaling as soon as a reduction in the domestic hot water flow rate is observed).

- All moving parts have sealed, permanently lubricated bearings. Therefore no periodic oiling is required.
- Flame visual check: the normal flame color is blue it could be slightly blue-orange during a few minutes just after a burner ignition. Yellow flame is not normal. In such a case stop the water heater and call your gas service company.

1 - RECOMMENDED SERVICE PARTS

DESCRIPTION	PART NUMBER
Gas valve	
Air pressure switch	
Ignition transformer	
Combustion air fan	
Circulating pump	
High limit switch	
Pressure relief valve	
Adjustable limit switch	
Pressure-temperature gauge	
On-Off switch	

DESCRIPTION	PART NUMBER
Summer-winter switch	
Flow switch	
Control relay	
Transformer	
Flue limit switch	
Ignition electrode	
Flame rod	
Strainer	
5 gallon sanibagel antifreeze	
55 gallon sanibagel antifreeze	

These service parts may be ordered directly from:

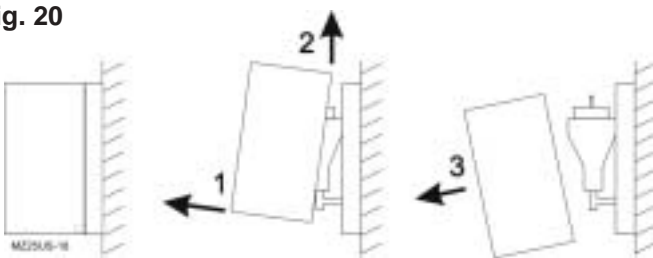
Monitor Products Inc. P.O. Box 3408
Princeton, NJ 08542
1.800-524.1102 • Fax 1.732.329.0904

VI - ASSEMBLY/DISMANTLING

1 - COVER

The hot water generator cover is fixed at the bottom by a clip on system.

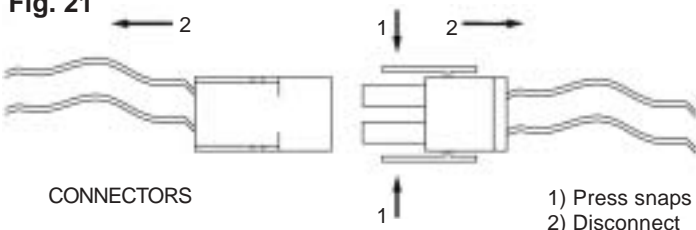
Fig. 20



2 - ELECTRICAL CONNECTION UNIT

The various electrical devices are all connected to the control unit by special connectors which prevent any incorrect connection after dismantling

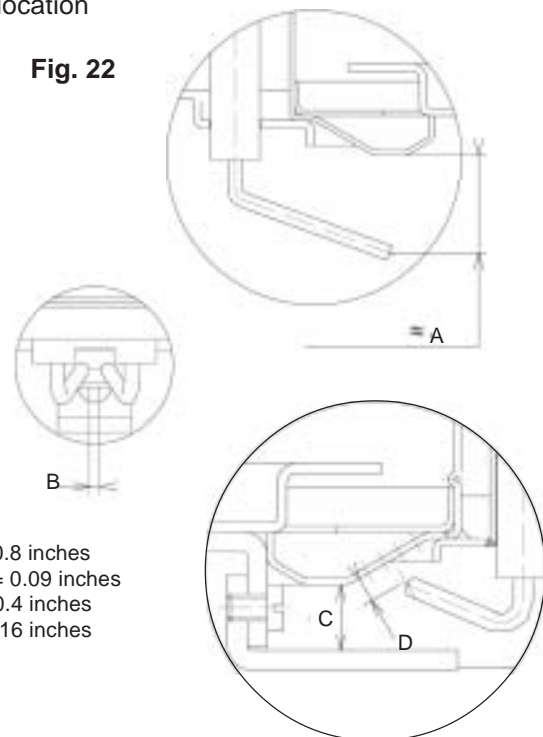
Fig. 21



3 - BURNER

Electrode location

Fig. 22



- A: 20 mm = 0.8 inches
- B: 2.25 mm = 0.09 inches
- C: 10 mm = 0.4 inches
- D: 4 mm = 0.16 inches

MONITOR PRODUCTS, INC.

7A Marlen Drive, Robbinsville, NJ 08691
www.monitorproducts.com

PHONE (609) 584-0505, FAX (609) 584-7629

MPI offers technical support to qualified licensed heating contractors during normal business hours. (Monday-Friday 8:30 A.M. to 4:30 P.M. Eastern Time) To help us serve you properly our technicians will require the following information:

- Fuel Type (Natural/Propane)
- Gas pressure in In. W.C. (Inlet and outlet with all appliances running)
- CO reading in PPM O₂ reading in %
- Flue Outlet Temperature °F
- Water Outlet temperature °F Water Return temperature °F
- System load: Radiant, high temperature, DHW. Total BTU requirement
- Input Voltage

VII - MONITOR PRODUCTS, INC. ("MPI") LIMITED WARRANTIES

First year-MPI warrants that each MZ Series Heating Systems sold by it to be free from defects in material and workmanship, under normal use and services, for a period of 1 year after date of purchase with an additional period of up to 3 months if unit is not installed at the time of purchase.

First through tenth year-MPI warrants that the primary heat exchanger assembly consisting of water-tube heat exchanger, water jacket and condensate collector is free from defects in material and workmanship for 10 years from the date of purchase.

MPI corrosion inhibitor must be used in every MZ series heating system. Failure to use this inhibitor will void this warranty.

NOTE: We will not accept any MZ heat exchangers for warranty consideration without an 8 ounce water sample from the system. This is required to test for the proper inhibitors. **No credit will be issued without a water sample.**

STANDARD PROVISIONS, TERMS AND CONDITIONS THAT ARE COMMON TO ALL MPI INDIVIDUAL PRODUCT WARRANTIES:

These warranties are subject to the condition that the MPI product(s) must have been installed in accordance with manufacturer's instructions. These warranties extend only to the first retail purchaser of the products and only to a product that has not been moved from its original installation site. These warranties do not apply to commercial applications.

In addition to each product warranty listed, MPI warranties do not cover:

- 1) Components that are part of the heating system but were not furnished by MPI as part of the heating system.
- 2) The workmanship of any installer of MPI's product(s). In addition, this warranty does not assume any liability of any nature for unsatisfactory performance caused by improper installation.
- 3) Any costs for labor for removal and reinstallation of the alleged defective part, the cost of shipping or transportation to MPI and back to the consumer, if necessary, and any other materials necessary to perform the exchange.
- 4) Replacement parts beyond the balance of the original warranty period.

REMEDY: If within the applicable warranty period, any product(s) or part(s) included in this warranty proves to be defective in material and/or workmanship, then MPI shall repair or replace, at its option, the defective product(s) or part(s) and return it to the consumer.

PROCEDURE FOR OBTAINING PERFORMANCE UNDER THIS WARRANTY: In order to obtain performance under this warranty, the original purchaser must promptly (in no event later than thirty (30) days after discovery of the defect) see to the return of the product(s) or part(s) in question, accompanied by a properly filled out MPI warranty claim form (Available from MPI by mail or phone). Any claim made under this warranty must be accompanied by proof of original purchase date, sales invoice or cancelled check showing the serial number as satisfactory evidence. Any replacements are made subject to validation by MPI of in-warranty coverage. An item to be replaced must be made available in exchange for the replacement.

SOLE REMEDY: The remedy and liability for any breach of warranty, express or implied, set forth herein is the sole and exclusive remedy and the limit of liability for any such breach.

EXCLUSIONS AND IMPLIED WARRANTIES: This warranty does not extend to any defect due to the negligence of others. Failure to install, operate or maintain the product(s) in accordance with the installation, operation and maintenance instructions furnished with each new product, unreasonable use, accidents, acts of god, fire, snow, floods, lightning, alteration, ordinary wear and tear, or the use of unauthorized or non-standard parts.

ALL IMPLIED WARRANTIES, IF ANY, ARISING UNDER LAW IN CONNECTION WITH THE SALES BY MPI OF ANY PRODUCT(S) ARE LIMITED IN EXTENT AND DURATION TO THE DURATION OF THIS WRITTEN WARRANTY. THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OTHER THAN AS EXPRESSLY STATED HEREIN. MPI SHALL NOT BE RESPONSIBLE FOR ANY INCIDENTAL, INDIRECT, PUNITIVE, OR CONSEQUENTIAL DAMAGES WHETHER AS A RESULT OF BREACH OF WARRANTY, NEGLIGENCE, STRICT LIABILITY IN TORT OR OTHERWISE.

Note: Some jurisdictions do not allow: (a) limitations on how long an implied warranty lasts; or (b) the exclusion or limitation of incidental, indirect, punitive or consequential damages, so the above limitations or exclusions may not apply to you.

NO VARIATION OF TERMS: the parties intend that this warranty be the exclusive and final expression of their agreement.

No person has the authority to orally, in writing or in any other way vary the terms, conditions or exclusions of this warranty, or to make any express warranties other than those contained herein.

LEGAL RIGHTS: This warranty gives you specific legal rights and you may also have other rights which vary from jurisdiction to jurisdiction.



As part of its policy of continuous product improvement, Monitor Products, Inc. reserves the right to make changes without notice COPYRIGHT © 2006 MONITOR PRODUCTS, INC.