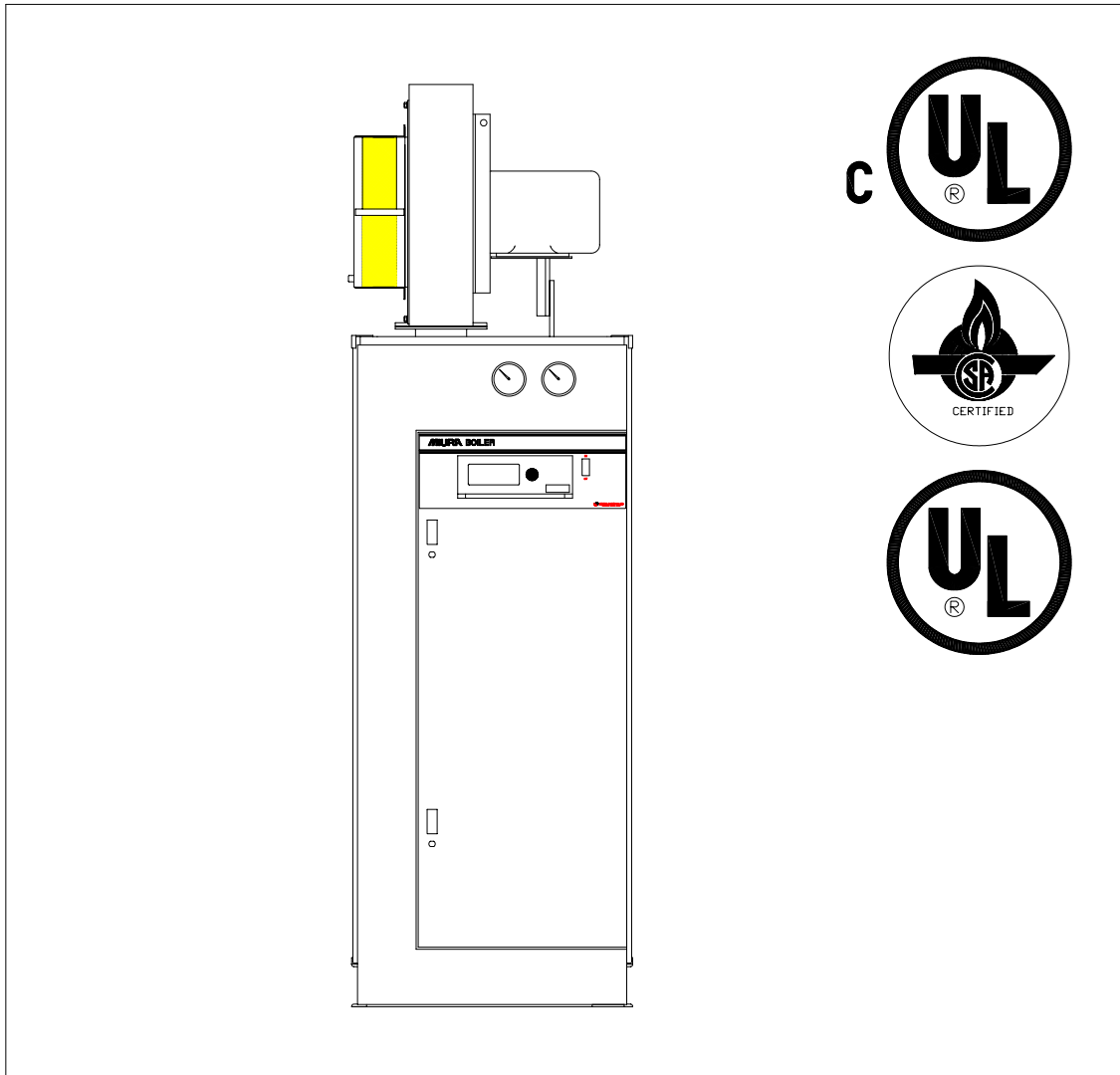


MIURA HOT WATER BOILER

INSTALLATION & OPERATION MANUAL

LXW – LOW NO_x SERIES



* INFORMATION IN THIS MANUAL MAY BE CHANGED WITHOUT NOTICE.



OWNER SHALL MAINTAIN THIS MANUAL IN LEGIBLE CONDITION FOR FUTURE REFERENCE.

Revised 02/22/05

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SECTION 1 INTRODUCTION

1.1 DEFINITIONS AND SYMBOLS

Note, Caution and Danger are used throughout this manual with the following definitions and symbols.

NOTE: Indicates an area or subject of special merit, emphasizing either the product capabilities or common errors in installation, operation or maintenance.

CAUTION: Indicates possible damage to equipment. It also indicates any condition or practice, which if not observed or remedied could result in damage or destruction of equipment.

DANGER: Indicates any condition or practice, which if not observed, could result in personal injury or possible death.

1.2 GUARANTEE

- Refer to warranty documents for specific details.
- SIX-MONTH labor warranty from boiler start up may be available, contact Local Sales and Service representatives for details. This labor warranty covers routine inspection and repairs at the job site. Travel and lodging expenses are not covered except within local representative service area.
- ONE YEAR Standard warranty for parts from boiler commissioning date or 18 months from shipping date whichever occurs first. Express shipping cost for overnight or next day delivery of parts is not included. Damage to the boiler or parts of the boiler after leaving the factory are not covered. Parts replaced under this warranty must be returned to MIURA. If the failed part is not returned, the customer will be charged for the new item.
- SEVEN-YEAR limited factory warranty on pressure vessel against material or workmanship defects.

1.3 INTRODUCTION

Miura Boiler Co., Ltd. began North American activities in 1988, when the manufacturing plant in Brantford, Ontario, was established. Their engineering department developed procedures to meet ASME codes and listing approval from UL, CSA. The United States corporate sales office, Miura Boiler West, Inc., was established and has developed relationships with national, state and city inspectors and agencies.

The North American network consists of branches in Chicago, Los Angeles and Ontario. The parent Company, Miura Boiler Ltd. in Japan, is the leading manufacturer of boilers and other

thermal equipment in the Pacific Rim holding more than 55% of the market. With factories in five countries, production now exceeds 14,000 units per year.

As a result of design necessities in Japan, such as limited space and total dependence on foreign energy, the MIURA BOILER has been engineered as a highly efficient, vertical water tube, once-through, forced-flow design. The MIURA Boiler features a compact unit with a low-water content and is designed to run with a minimum amount of maintenance with simple push-button controls. Operation is quiet, radiant heat losses are minimal. Miura Boilers are often installed in a multiple boiler network. MIURA Boilers, along with the patented MIURA Multiple Installation panel, allows appropriate horsepower to be brought on and off line quickly to meet sophisticated production needs with maximum fuel economy. The 40-year, field proven 'Miura Advantage' is the ability to reach full output steam from cold start in less than 5 minutes using the least amount of energy and having the lowest environmental impact. The high efficiency Miura Boiler has won numerous awards from Engineering Societies and Gas Associations because it is a compact, safe, cost-effective boiler.

1.4 FEATURES

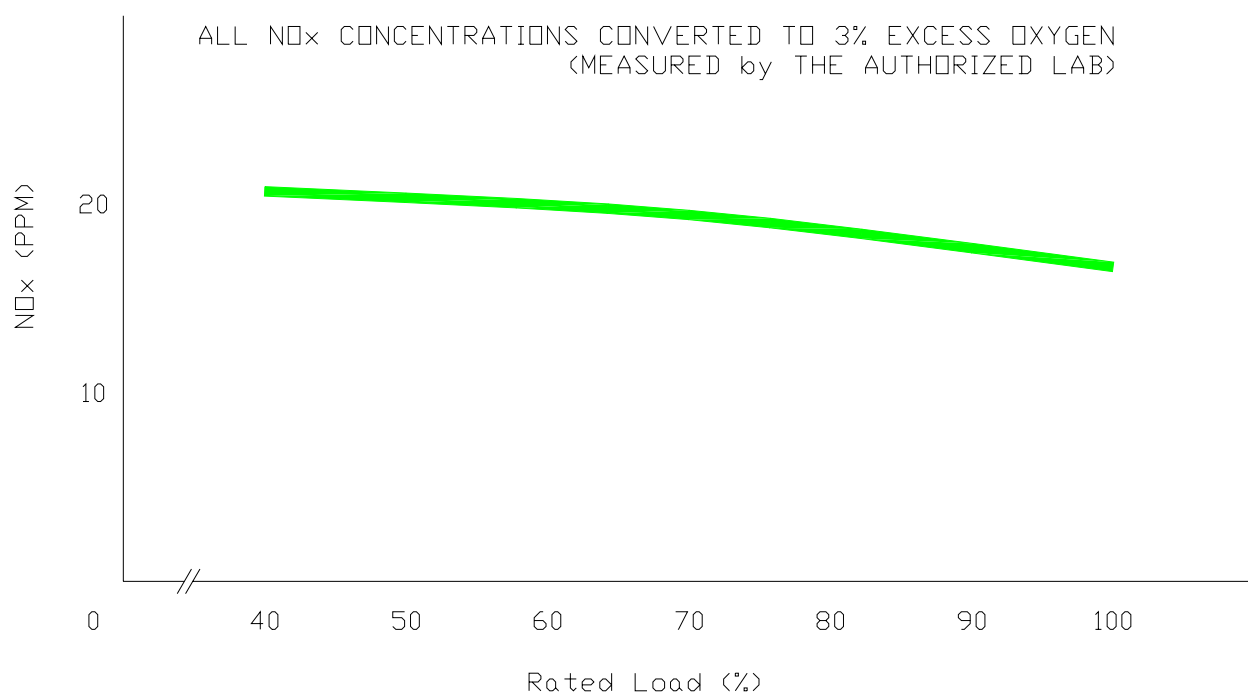
The MIURA BOILER is a low water content, water tube design, which provides full output within 5 minutes. In addition, it is a compact, safe, cost saving boiler. Such features contribute to the success of the boiler obtaining more than 50% of the market share in Japan, Korea and Taiwan.

Based on these features, Miura Boiler Co., Ltd. has developed the new Low NO_x Boiler by using the most advanced technical engineering and innovative designs. The flat shaped burner and the boiler vessel are uniquely designed for the LXW.

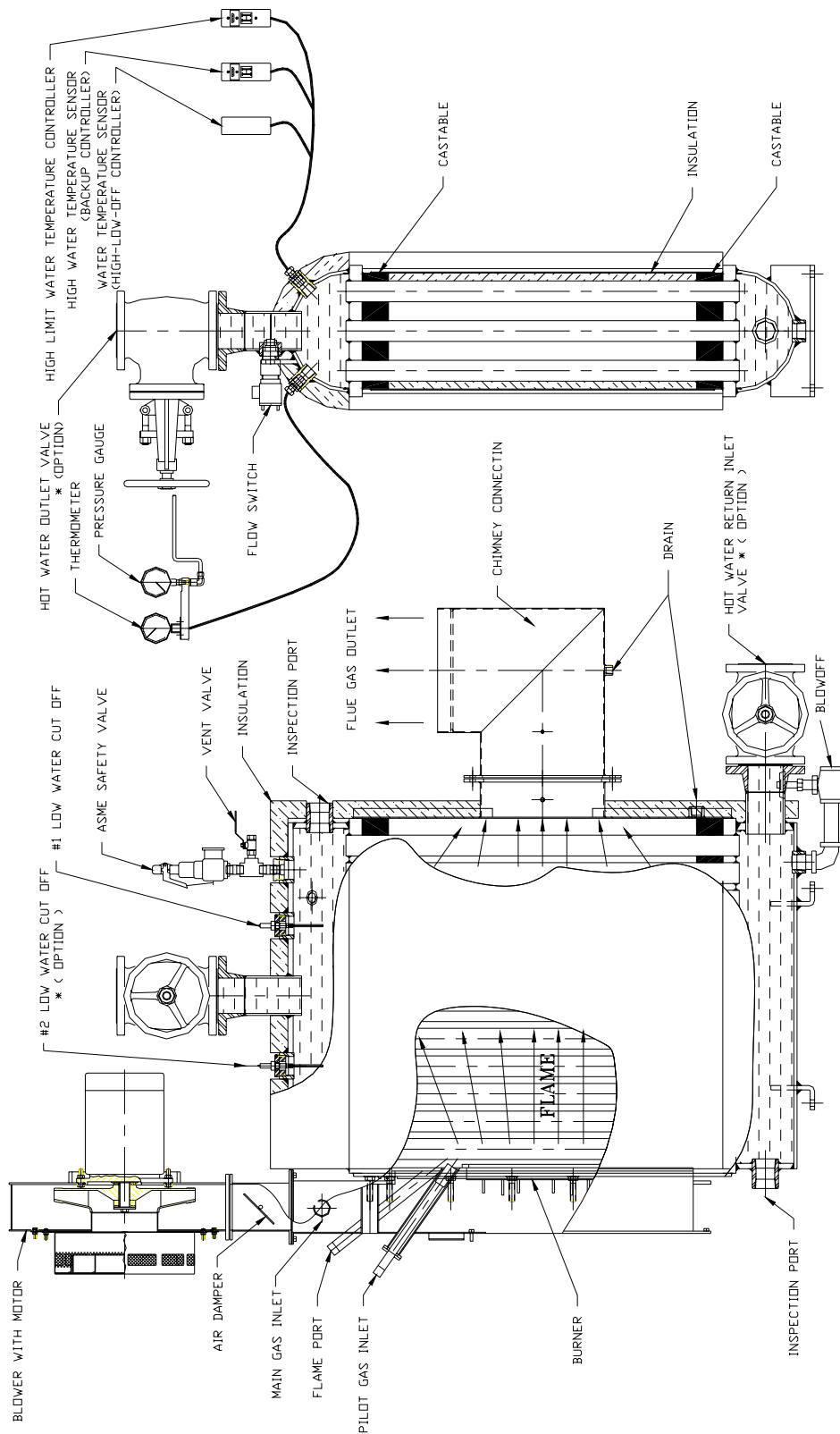
It is known that the temperature of combustion flames should be less than 3,272°F (1,800°C) to prevent NO_x generation. Generally, combustion flames will have some high temperature areas generating NO_x. Miura engineers have calculated the temperature distribution in the combustion and heat exchanging areas. From theoretical analysis and rigorous testing the designed temperature distribution is homogeneously less than 3,272°F (1,800°C). The burner surface is made as large as possible and the furnace volume as small as possible to optimize the combustion process. As a result, the LXW has NO_x emissions of less than 30 PPM at 3% converted O₂ (NO_x emissions of less than 20 PPM is available as an option). In addition, the LXW has a very narrow design. No need to destroy any doors or knock down any walls during installation; the LXW fits through a standard door opening. The completely packaged LXW has the following items as standard equipment:

- Boiler design is UL, c-UL and CSA/CGA approved and labelled (IRI and/or FM available)
- High-Low Gas pressure switch
- Low Air pressure switch
- Control water temperature by thermocouple with water temperature switch controls
- Water flow switch
- ASME safety relief valve
- Main gas line & Pilot line regulators
- Dual pilot gas solenoid valves

- Dual main gas fluid actuator valves and plugged leak test port (vent valve available)
- Forced draft blower and motor
- Completely enclosed, heavy gauge casing
- ASME stamped Pressure Vessel with internal Inspection ports
- Two independent high temperature limit controls
- Low-water fuel cutoff with manual reset
- Digital display water temperature with back up thermometer gauge
- Pressure gauge
- Friendly digital display
- Communication interface capability
- Display of hours of operation and record of five most recent faults
- Remote monitoring of boiler performance and trouble shooting by modem link with Miura factory is available.



CAUTION: All systems require continuous proper water treatment. This treatment is mandatory from the time your MIURA BOILER is installed. Failure to follow the recommended water treatment and maintenance procedures could shorten the life (as well as the efficiency) of your boiler and could affect the warranty.



LXW BOILER SECTION VIEW

1.5 SPECIFICATIONS

1.5.1 SPECIFICATION FOR LXW-50

ITEM	UNITS	LXW-50
Boiler type	Multiple water tubes	
Boiler Horsepower Rating	BHP	50
Maximum working pressure	PSIG (Kg/cm ²)	160 (11.25)
Max. working temperature	°F (°C)	250 (121)
Heat input	Btu/Hr	2,041,000 (514,500)
Heat output	(Kcal/Hr)	1,674,000 (421,800)
Efficiency	%	82
Heating surface area	Ft ² (m ²)	177 (16.4)
Full water content	Gal (L)	44 (166)
Operational Weight	Lb (Kg)	3,200 (1,450)
Shipping Weight		3,000 (1,360)
Combustion control	Step modulation: Hi-Low-Off	
Combustion system	Forced draft, Pre-mixed burner	
Ignition system	Automatic Pilot burner	
Spark system (15,000V)	High voltage electrical spark	
Power Supply	575, 460, or 230V, 3 phases, 60 Hz	
Max. Electric Consumption	KVA	3.8
Blower Motor Output	HP (KW)	3 (2.25)
Fuel Type	Natural Gas or Propane	
Fuel Supply Pressure	PSIG	3 - 5
Fuel consumption	SCFH (Nm ³ /Hr)	2,030 (54.5) *
Flue Gas Volume (Wet)		27,200 (730) *
Flue Gas Volume (Dry)		23,200 (620) *
Flue Gas Velocity	Ft/s (m/s)	16.3 (5.0) *
Flue Gas Temperature	°F (°C)	420 (216)
Main Water Inlet	Inches	3
Main Water Outlet		3
Safety Valve Outlet		1
Fuel Gas Inlet		1½
Drain		1½
Chimney Diameter		12
Flame Detector		Ultraviolet Flame eye
Overheating Protection	Low water cutoff, Flow switch & Thermocouple	

NOTE:

- i. Fuel consumption is based on Natural Gas with a High heating value of 1,004 Btu/SCF.
- ii. Efficiency is based on high heating values of fuels & operating at 140°F.

1.5.2 SPECIFICATION FOR LXW-100

ITEM	UNITS	LXW-100
Boiler type	Multiple water tubes	
Boiler Horsepower Rating	BHP	100
Maximum working pressure	PSIG (Kg/cm ²)	160 (11.25)
Max. working temperature	°F (°C)	250 (121)
Heat input	Btu/Hr (Kcal/Hr)	4,083,000 (1,029,000)
Heat output		3,348,000 (843,600)
Efficiency	%	82
Heating surface area	Ft ² (m ²)	247 (22.9)
Full water content	Gal (L)	64 (240)
Operational Weight	Lb (Kg)	4,650 (2,100)
Shipping Weight		4,100 (1,860)
Combustion control	Step modulation: Hi-Low-Off	
Combustion system	Forced draft, Pre-mixed burner	
Ignition system	Automatic Pilot burner	
Spark system (15,000V)	High voltage electrical spark	
Power Supply	575, 460, or 230V, 3 phases, 60 Hz	
Max. Electric Consumption	KVA	10.4
Blower Motor Output	HP (KW)	10 (7.5)
Fuel Type	Natural Gas or Propane	
Fuel Supply Pressure	PSIG	3 – 5
Fuel consumption	SCFH (Nm ³ /Hr)	4,070 (109) *
Flue Gas Volume (Wet)		54,500 (1,460) *
Flue Gas Volume (Dry)		46,600 (1,250) *
Flue Gas Velocity	Ft/s (m/s)	24 (7.3) *
Flue Gas Temperature	°F (°C)	420 (216)
Main Water Inlet	Inches	4
Main Water Outlet		4
Safety Valve Outlet		1
Fuel Gas Inlet		2
Drain		1½
Chimney Diameter		14
Flame Detector		Ultraviolet Flame eye
Overheating Protection	Low water cutoff, Flow switch & Thermocouple	

NOTE:

- i. Fuel consumption is based on Natural Gas with a High heating value of 1,004 Btu/SCF.
- ii. Efficiency is based on high heating values of fuels & operating at 140°F.

1.5.3 SPECIFICATION FOR LXW-150

ITEM	UNITS	LXW-150
Boiler type	Multiple water tubes	
Boiler Horsepower Rating	BHP	150
Maximum working pressure	PSIG (Kg/cm ²)	160 (11.25)
Max. working temperature	°F (°C)	250 (121)
Heat input	Btu/Hr (Kcal/Hr)	6,124,000 (1,582,000)
Heat output		5,022,000 (1,265,000)
Efficiency	%	82
Heating surface area	Ft ² (m ²)	404 (37.5)
Full water content	Gal (L)	90 (340)
Operational Weight	Lb (Kg)	5,800 (2,630)
Shipping Weight		5,000 (2,270)
Combustion control	Step modulation: Hi-Low-Off	
Combustion system	Forced draft, Pre-mixed burner	
Ignition system	Automatic Pilot burner	
Spark system (15,000V)	High voltage electrical spark	
Power Supply	575, 460, or 230V, 3 phases, 60 Hz	
Max. Electric Consumption	KVA	14.4
Blower Motor Output	HP (KW)	15 (11.25)
Fuel Type	Natural Gas or Propane	
Fuel Supply Pressure	PSIG	3 – 5
Fuel consumption	SCFH (Nm ³ /Hr)	6,100 (163) *
Flue Gas Volume (Wet)		81,700 (2,190) *
Flue Gas Volume (Dry)		69,800 (1,870) *
Flue Gas Velocity	Ft/s (m/s)	36 (11) *
Flue Gas Temperature	°F (°C)	420 (216)
Main Water Inlet	Inches	6
Main Water Outlet		6
Safety Valve Outlet		1½
Fuel Gas Inlet		2
Drain		1½
Chimney Diameter		14
Flame Detector		Ultraviolet Flame eye
Overheating Protection	Low water cutoff, Flow switch & Thermocouple	

NOTE:

- i. Fuel consumption is based on Natural Gas with a High heating value of 1,004 Btu/SCF.
- ii. Efficiency is based on high heating values of fuels & operating at 140°F.

1.5.4 SPECIFICATION FOR LXW-175

ITEM	UNITS	LXW-175
Boiler type	Multiple water tubes	
Boiler Horsepower Rating	BHP	175
Maximum working pressure	PSIG (Kg/cm ²)	160 (11.25)
Max. working temperature	°F (°C)	250 (121)
Heat input	Btu/Hr (Kcal/Hr)	7,145,000 (1,800,700)
Heat output		5,859,000 (1,476,000)
Efficiency	%	82
Heating surface area	Ft ² (m ²)	404 (37.5)
Full water content	Gal (L)	90 (340)
Operational Weight	Lb (Kg)	5,800 (2,630)
Shipping Weight		5,000 (2,270)
Combustion control	Step modulation: Hi-Low-Off	
Combustion system	Forced draft, Pre-mixed burner	
Ignition system	Automatic Pilot burner	
Spark system (15,000V)	High voltage electrical spark	
Power Supply	575, 460, or 230V, 3 phases, 60 Hz	
Max. Electric Consumption	KVA	14.4
Blower Motor Output	HP	15
Fuel Type	Natural Gas or Propane	
Fuel Supply Pressure	PSIG	3 – 5
Fuel consumption	SCFH (Nm ³ /Hr)	7,120 (190) *
Flue Gas Volume (Wet)		95,400 (2,560) *
Flue Gas Volume (Dry)		81,500 (2,180) *
Flue Gas Velocity	Ft/s (m/s)	20.6 (6.3) *
Flue Gas Temperature	°F (°C)	420 (216)
Main Water Inlet	Inches	6
Main Water Outlet		6
Safety Valve Outlet		2
Fuel Gas Inlet		2
Drain		1½
Chimney Diameter		20
Flame Detector		Ultraviolet Flame eye
Overheating Protection	Low water cutoff, Flow switch & Thermocouple	

NOTE:

- i. Fuel consumption is based on Natural Gas with a High heating value of 1,004 Btu/SCF.
- ii. Efficiency is based on high heating values of fuels & operating at 140°F.

1.5.5 SPECIFICATION FOR LXW-200

ITEM	UNITS	LXW-200
Boiler type	Multiple water tubes	
Boiler Horsepower Rating	BHP	200
Maximum working pressure	PSIG (Kg/cm ²)	160 (11.25)
Max. working temperature	°F (°C)	250 (121)
Heat input	Btu/Hr (Kcal/Hr)	8,370,000 (2,109,000)
Heat output		6,696,000 (1,687,000)
Efficiency	%	80
Heating surface area	Ft ² (m ²)	404 (37.5)
Full water content	Gal (L)	90 (340)
Operational Weight	Lb (Kg)	5,800 (2,630)
Shipping Weight		5,000 (2,270)
Combustion control	Step modulation: Hi-Low-Off	
Combustion system	Forced draft, Pre-mixed burner	
Ignition system	Automatic Pilot burner	
Spark system (15,000V)	High voltage electrical spark	
Power Supply	575, 460, or 230V, 3 phases, 60 Hz	
Max. Electric Consumption	KVA	14.4
Blower Motor Output	HP	15
Fuel Type	Natural Gas or Propane	
Fuel Supply Pressure	PSIG	3 – 5
Fuel consumption	SCFH (Nm ³ /Hr)	8,340 (223) *
Flue Gas Volume (Wet)		111,700 (2,990) *
Flue Gas Volume (Dry)		95,500 (2,560) *
Flue Gas Velocity	Ft/s (m/s)	25.4 (7.7) *
Flue Gas Temperature	°F (°C)	470 (243)
Main Water Inlet	Inches	6
Main Water Outlet		6
Safety Valve Outlet		2
Fuel Gas Inlet		2
Drain		1½
Chimney Diameter		20
Flame Detector		Ultraviolet Flame eye
Overheating Protection	Low water cutoff, Flow switch & Thermocouple	

NOTE:

- i. Fuel consumption is based on Natural Gas with a High heating value of 1,004 Btu/SCF.
- ii. Efficiency is based on high heating values of fuels & operating at 140°F.

SECTION 2 ACTS & REGULATIONS

2.1 ACTS & REGULATIONS

There are a number of codes, standards, laws and regulations for boilers and related equipment that should be considered. Regulatory requirements are dictated by a variety of sources and are focused primarily on safety. The equipment shall be installed in accordance with the current regulations, codes and specifications of the applicable City, Country, Provincial/State and Federal agencies. Authorities having jurisdiction should be consulted before installations are made. For more information on how the various rules affect boiler selection and operation, you may want to contact your local MIURA authorized representative or the engineering firm designing the boiler installation. Here are some essential rules to consider:

- a) The boiler industry is tightly regulated by the American Society of Mechanical Engineers (ASME) and ASME Codes, which controls boiler design, inspection, and quality assurance. All boilers' pressure vessels including economizers, deaerator, blowdown tank and other pressure vessels should have an ASME stamp.
- b) All pressure vessels should be inspected and registered with the National Board.
- c) In Canada, the design of all boilers, pressure vessels, fittings, and piping must be registered with local province as required in CSA B51.
- d) The insurance company insuring the facility or boiler may dictate additional requirements. Boiler manufacturers can provide special boiler trim according to the requirements of major insurance companies such as IRI, FM. Special boiler trim items usually pertain to added safety controls. Some industries, such as food processing, brewing, or pharmaceuticals may also have additional regulations that have an impact on the boiler and boiler room.
- e) CSA/CGA, c-UL, UL approval may be required to verify boiler safety performance.
- f) A full time boiler operator may be required. Operator requirements depend on the boiler's size, pressure, heating surface area and volume of water. Boilers can be selected to minimize the boiler operator requirements; either by choosing boiler that is exempt from the rules or by installing special equipment that gives the operator more freedom in the facility. Contact the local boiler inspector for details.
- g) Most state/province or local authorities require a permit to install and operate a boiler. Additional restrictions may apply in non-attainment areas where air quality does not meet the national ambient air quality standards and emission regulations are more stringent. Be sure to investigate these requirements before buying a boiler.
- h) Most states/provinces require an annual boiler inspection. There may be other requirements on piping as well.
- i) Most areas have established a maximum temperature at which water can be discharged to the sewer. In this case, a blowdown separator or blowdown tank is required.
- j) For all new boilers with inputs over 10 million Btu/Hr, U.S. Federal emission standards apply including permitting and reporting procedures.
- k) Ratings of boilers are based on sea level operation. For operation at elevations above 2,000 feet (600m), equipment ratings shall be reduced at the rate of 4 percent for each 1,000 feet (300m) above sea level.

2.2 NATIONAL REGULATORY ORGANIZATIONS

MIURA Boiler recommends contacting your actual insurance provider as well as the utility companies for assistance in identify and complying with codes and regulations.

A partial list of agencies having jurisdiction over boiler installation and operation is given below. This list is comprehensive but by no means all-inclusive.

UNDERWRITERS LABORATORIES

333 Pfingsten Rd.
Northbrook, IL
60062
(847) 272-8800

CSA INTERNATIONAL

178 Rexdale Blvd.
Etobicoke, Ontario
M9W 1R3
(416) 747-2300

NATIONAL BOARD

1055 Crupper Ave.
Columbus, OH
43229
(614) 888-8320

T.S.S.A.

3300 Bloor St., West
4th Floor, West Tower
Etobicoke, Ontario M8X 2X4
(416) 325-2000

A.S.M.E.

345 East 47th St.
New York, NY
10017
(212) 705-7800

N.F.P.A.

1 Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101
(800) 344-3555

INDUSTRIAL RISK INSURERS

85 Woodland Street,
Hartford, CT 06105-1226

FACTORY MUTUAL RESEARCH CORPORATION

1151 Boston-Providence Turnpike,
Norwood, MA 02062
(617) 762-4300

AMERICAN GAS ASSOCIATION

1515 Wilson Boulevard
Arlington, VA 22209

AMERICAN NATIONAL STANDARD INSTITUTE

11 West 42nd Street,
New York, NY 10036

OCCUPATIONAL SAFETY & HEALTH ADM.

ENVIRONMENT PROTECTION AGENCY

LOCAL FIRE MARSHALL

LOCAL BUILDING & CONSTRUCTION INSP.

LOCAL BOILER INSPECTION

FOOD & DRUG ADMINISTRATION

SECTION 3 INSTALLATION

CAUTION: All boiler prices are F.O.B. the factory at Brantford, Ontario. This means that MIURA Boiler is not responsible for damage to the boiler occurring during shipping. We strongly recommend a complete inspection of all boiler shipments at place and time of delivery. This inspection should include photographs of the boiler and ancillary equipment packing crates. If any damage is found, do not release the driver or unload the equipment until a satisfactory arrangement is made with shipping company to cover the damage. MIURA Boiler makes reasonable effort to ensure that no vibration or shock damage will occur. However, if such damage occurs and is not discovered and noted at the time of delivery, MIURA Boiler is not responsible to pay for the cost of repairs and any damaged parts will not be under warranty.

NOTE: It is customer's responsibility to confirm utility availability before ordering the boiler and follow all local regulations.

3.1 UNLOADING

For transportation the LXW boiler may be disassembled and shipped in separate components as follows:

- Boiler vessel with burner and control box (blower assembly may be shipped separated if required by customer)
- Optional parts such as silencer, filter box, valves etc.

NOTE: Some small parts, such as bolts and nuts etc. will be shipped inside associated control box for the boiler.

The LXW series boiler may be unloaded from the transport truck using a forklift. However, if a forklift is used, precautions should be taken to ensure that the boiler does not tip over. The boiler is top heavy and the weight is not centered. Because of the many variables involved such as model, size of forklift and size of the loading dock, MIURA is not able to recommend a specific method of unloading the boiler. As a general starting point, the boiler center of gravity will be the midpoint of the two lifting lugs. Securing the top of the boiler to the forklift with a chain or similar methods is strongly recommended.

3.2 ASSEMBLING

CAUTION: This is a completely shop tested, assembled and fully packaged boiler. Each unit and assembly has been well adjusted in the factory. It is very important not to make any adjustments without first consulting your nearest authorized MIURA dealer. Field reassemble is customer's responsibility.

3.2.1 BLOWER ASSEMBLY

Line up the blower outlet flange with the windbox inlet flange. Place the supplied rubber gasket between the two flanges. Tighten all bolts.

NOTE: Prior to installing pump, softener, and other equipment, review applicable instruction books.

3.2.2 FOUNDATION & ANCHORING

The recommended foundation is a 6" concrete slab. Reinforcement of slab is not necessary if the floor is solid. After positioning, anchor the boiler to the foundation using $5/8$ " anchor bolts (not supplied by MIURA).

NOTE: Installer and operator must identify emergency shut-off device, which includes power switch, main fuel, and water cock.

3.3 RECOMMENDED PIPING

3.3.1 CLOSED SYSTEM

A closed system should operate with little or no make-up. Consequently, very little water needs to be added over the years of servicing. Liming or scale build-up should be negligible unless the make-up is too great. The most common cause of problems due to excessive make-up is leaks in the system, automatic vent not valved off after start-up, improper air elimination and faulty pressure reducing valve. **It is important to realize that air elimination is a continuous process in a properly designed system.**

Simply venting off excessive air during start-up will not satisfy this requirement. The expansion tank provides the air cushion to accommodate the expansion and contraction of the system water. This tank should be sized to approximately 3/4 full when the system is at maximum operating temperature and 1/4 full when at ambient temperature. Therefore, 1/2 of the tank capacity must accommodate the expansion of the entire system. This would include the water content of the heater system piping and all heat users or loops.

When the expansion tank has little or no air in it, it is referred to as being "water logged" which means that air has either escaped or migrated to some other part of the system instead of being properly returned to the expansion tank. Greater amounts of air occurring in the tank, in spite of attempts to bleed down, indicates that air is being drawn into the system at some point where there is a leak and the system pressure is below that of the atmosphere. This condition cannot occur if the circulation pump **intake** is located at the outlet of the boiler (i.e., water is being pulled from the boiler rather than being pumped into the boiler). The cause for a water logged expansion tank must be quickly found and corrective action taken, otherwise there will be a constant loss of water from the relief valve, **constant make-up of water which will result in the liming of a system** that was intended to be closed.

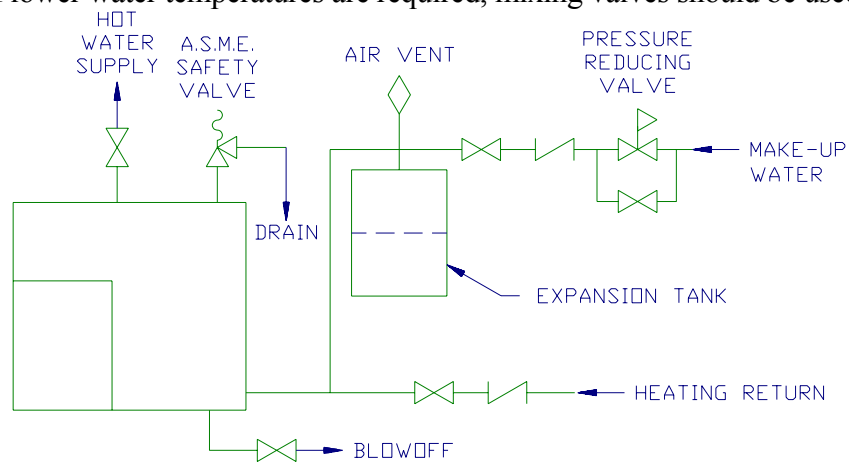
NOTE:

- **Dirt and scale from the entire system will tend to collect in the boiler and should be washed out until the system is clean.**
- **Periodic water analysis should be performed to see if additional treatment is needed.**

3.4 WATER PIPING

	LXW-50	LXW-100	LXW-150	LXW-175	LXW-200
Minimum flow (Gal/min.)	50	100	150	175	200
Water Inlet (150# Flange)	3"	4"	6"		
Water Outlet (150# Flange)					
Drain Outlet	1½" NPT				
Safety Valve Outlet	1" NPT		1½" NPT		

- Please Contact your nearest MIURA representative or Distributor about accessories.
- Before the boiler is fired for the first time after installation is completed, flush all piping. MIURA is not responsible for damage as a result of debris in piping such as stuck open check valve.
- Practical experience has proven that even though hot water boilers generally operate on closed systems, water losses and entrance of air may lead to pitting, corrosion and formation of sludge or scale. It is therefore essential to obtain suitable water treatment recommendations from specialists and to apply them rigidly. **A water meter is recommended to know the amount of make-up water used.**
- To avoid condensation in the boiler and the chimney, **do not operate boiler for extended periods of time at boiler outlet temperatures lower than 180°F** (minimum heating return temperature should be above 100°F). If the boiler is maintained at lower temperatures, the moisture in the flue gases will condense in the boiler tubes or chimney and form water. The net result is that corrosion occurs on the combustion side of the flues and in the vent stub and chimney. If lower water temperatures are required, mixing valves should be used.



- The maximum GPM circulating rate in relation to full boiler output and system temperature drop may be determined from the Performance Curve or from the following formula:

$$GPM = \frac{BoilerOutput(Btu / Hr)}{500 \times SystemTemperatureDrop(^{\circ}F)}$$

- Main hot water piping should slope upward. If the slope is downward, it must be properly vented to remove air.
- Relief valve discharge outlet must be piped toward the drain, leaving the pipe open so as to enable observation of water flow, when active.
- Follow all local regulations.

NOTE: In multiple installations of hot water boilers, the equalization of water flow to the boilers is an important consideration. This can be accomplished by using individual circulating pumps for the boilers with symmetrical piping to the boilers, or by using balancing valves or orifice plates and gauges in the piping to the individual boilers. If balancing valves or orifice plates are used, there must be a significant pressure drop across the balancing devices. If care is not taken to ensure equal flow, the unequal flow will cause an unequal-firing rate. The net result would be that the common header outlet water temperature would not be up to the desired temperature.

3.5 FUEL PIPING

FUEL TYPE: Natural & Propane Gas
 SUPPLY PRESSURE: 3 - 5 PSIG *

NOTE: 3 – 5 PSIG is the setting range, NOT the allowable fluctuation range. Maintain steady, set gas supply pressure within 0.2 PSIG but NEVER below 3 PSIG during operation. This pressure must be at the regulator supplied with MIURA Boiler gas piping. If necessary, use larger pipe for long piping runs. Failure to maintain required gas flow rate pressure will result in frequent boiler misfire!

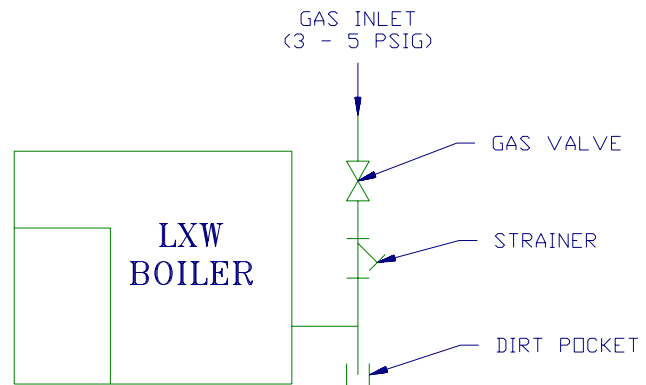
NOTE: Do not use any gas piping with a diameter smaller than the gas inlet piping to boiler. All main gas train piping to the burner is included, (except for individual regulator and pressure switch vents).

CAUTION: Do not attempt to change any part of this gas train without first consulting the nearest authorized MIURA representative.

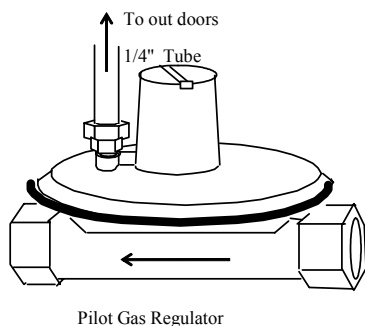
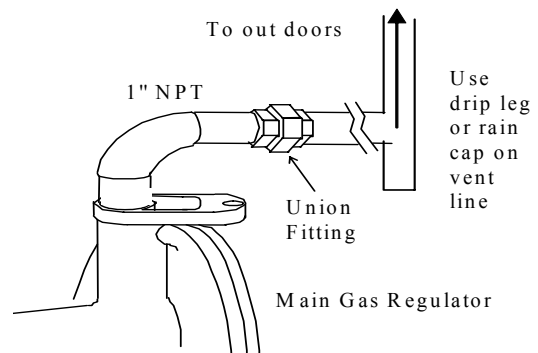
	LXW-50	LXW-100	LXW-150	LXW-175	LXW-200
Gas Inlet	1½" NPT	2" NPT			
Main Gas Regulator Vent	1" NPT				
Pilot Gas Regulator Vent	1/8" NPT				
Pressure Switches Vent	1/8" NPT				
Automatic Vent (option)	¾" NPT	1" NPT			

See specification tables for fuel consumption.

Supply pressure of 3 to 5 PSIG is required at boiler regulator inlet at full firing rate and when boiler combustion is stopped. Installation of a pressure gauge to monitor gas supply pressure is recommended. If the boiler is operated with propane fuel, MIURA Boiler STRONGLY recommends the use of a vaporizer. Collecting the propane gas from the top of the tank is possible, but not recommended due to variations in vapor space pressure depending on ambient air temperature. Also, ensure the vaporizer is sized for full boiler capacity even if the normal load is less than the maximum capacity of the boiler. This recommendation is based on the boiler operating at full rated fuel flow during the start up period.



If the supply gas pressure is above 5 PSIG, use only one approved reducing station per boiler room to meet the required specifications. Do not use a separate reducing valve to supply each boiler. This would result in pressure oscillations that could result in boiler flame failures or momentary over firing conditions. Consult pressure regulator application engineers for correct sizing and regulator model selection. Use an approved booster pump, if necessary, to meet the required minimum pressure specifications of 3 PSIG. To ensure an adequate volume of fuel is available to support combustion during firing rate changes, a 3 PSIG minimum is required at the inlet to the main regulator supplied with the boiler. Specifically, a change from burner Off to Low Fire, which is approximately 40% of rated fuel usage, occurs over a 10-15 second period. The fuel usage then goes from 40% to 100% rated consumption when the boiler goes to high fire. This change occurs in less than one second. Fuel consumption then changes from 100% to zero in less than one second when the boiler turns off. The utility gas regulator must maintain at least 3 PSIG and not exceed 5 PSIG under these conditions, and is to be installed as far away from the boiler regulator as possible. The maximum pressure of 5 PSIG is determined by UL and CSA approval of the MIURA standard gas train. Consult gas company for details.



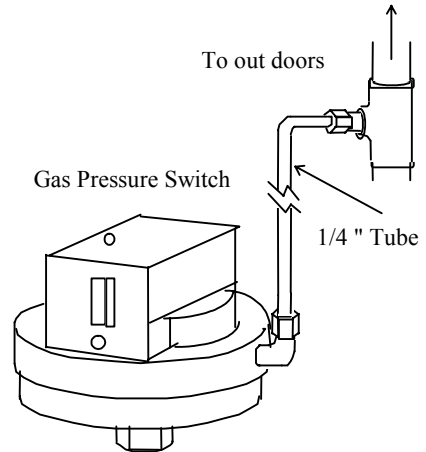
The copper gas line to the pilot regulator is tin lined and does not require replacement in jurisdictions that prohibit use of copper tubing on natural gas piping. The pilot gas regulator required to be vented to outside. Do not allow line to be crimped; frequent pilot flame failures will result.

Install dirt pocket on Main gas inlet piping immediately up stream of boiler.

Two pressure switches, HIGH and LOW gas pressure, may be required to be vented to atmosphere outside of the boiler room. Contact your local insurance provider and the gas company for specific requirements. Note that some boiler models may have ANTUNES RLGP-G 5~30' switches on the gas train which do not require venting to the atmosphere.

Typically, gas vent lines can be connected to a common vent line. The vent line will have a cross-sectional area not less than the area of the largest vent line plus 50 percent of the areas of all the additional vent lines.

An optional solenoid automatic vent valve located between the main gas blocking valves may be required for insurance purposes and is an additional cost option to meet IRI specifications. Ensure IRI is specified on the purchase order if necessary.



Follow all local regulations.

3.6 CLEARANCES AND VENTILATION

3.6.1 CLEARANCES

The LXW model is designed for non-combustible floors with minimum clearances from the unit and flue connector to combustible materials of:

Boiler Top	40" (1,020 mm)
Boiler Right Side	24" (610 mm)
Boiler Left Side	24" (610 mm)
Boiler Rear	24" (610 mm)
Boiler Front	48" (1,220 mm)

Follow all local regulations.

3.6.2 VENTILATION

The table below gives factory recommended minimums for ventilation of each boiler. The recommendation is based on Canadian Gas Association standards. However, please confirm with local building and safety codes as boiler room ventilation requirements vary by significant amounts. For multiple boiler installations, multiply the below areas by the number of boilers installed in the boiler room.

		LXW-50	LXW-100	LXW-150	LXW-175	LXW-200
Supply Air Area	Sq. In.	70	139	209	244	286
Ventilation Air Area		10	14	21	24	29

Chimney Diameter	Inch	12	14	20
------------------	------	----	----	----

Ventilation of the space occupied by the boiler should be provided by at least one opening directly in contact with the outdoors. Such an opening is to be located at the highest practical point for the purposes of generating natural convection processes of air circulation. The total cross-sectional area of such openings shall be at least equal to those values in the table above.

In addition to the required openings for required air ventilation, there shall be a permanent air supply via openings having a total cross-sectional area not less than what is required from the table above. The location of these openings shall not interfere with the openings intended for the purposes of ventilation. These air supply openings should be either located at, or ducted to, a point not more than 18 inches (450 mm), nor less than 6 inches (150 mm), above the floor level.

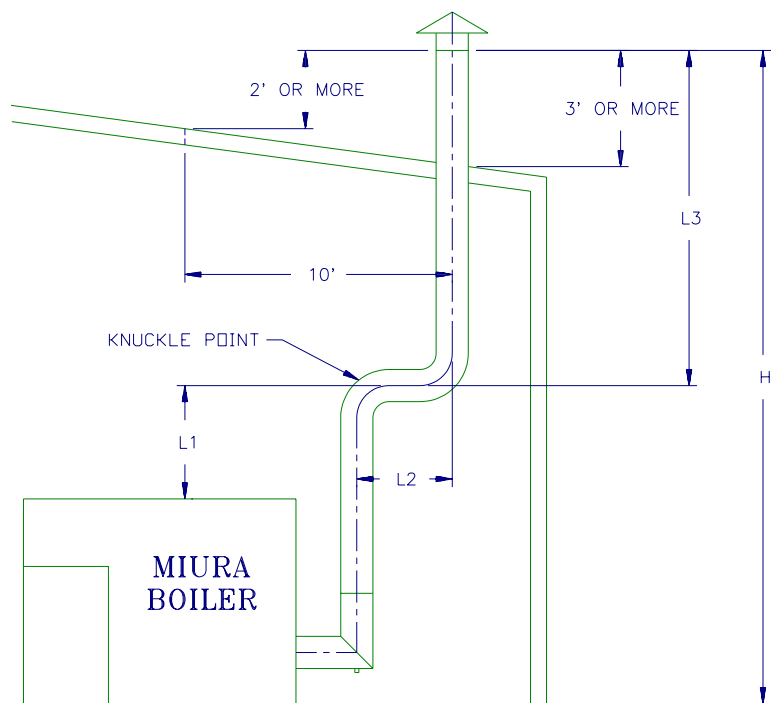
3.7 STACKS AND BREECHING INSTALLATION

NOTE: Consultation with your Engineering Company or Exhaust Stack provider will ensure a long lasting trouble free stack design. The stack must be designed to maintain available draft at the outlet of the boiler between zero to -0.05" of water throughout the whole firing range (i.e. for four boilers; all boilers at high-fire or only one boiler at low-fire). Failure to maintain this value will adversely affect boiler performance and is not the responsibility of MIURA

Each boiler should be equipped with a single stack. If this is not possible, Barometric dampers are required to prevent exceeding maximum draft on the boiler.

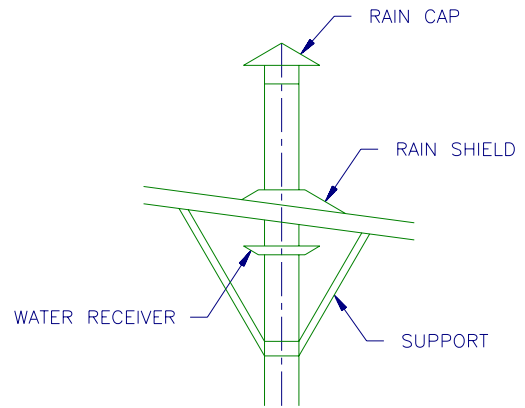
Proper installation of the chimney is a required for good boiler efficiency and safe operation. The following principles should be adhered to at all times when designing/installing chimneys:

1. Chimneys should be straight. Bends or offsets have a greater resistance to flow with consequent adverse effect on burner performance and thus, should be avoided whenever possible.
2. Chimneystack should extend beyond the height of nearby structures to avoid downdrafts or eddy current. If this is not possible, a stack hood designed to prevent downdrafts should be considered.
3. The stack should project at least:
 - a) Two feet above the horizontal plane drawn from a point at least 10



$$L = L1 + L2 + L3$$

- feet away from the stack; and
- b) Three feet above the lower side of the roof slope.
4. Include a rain hood for every stack and be sure to provide a rain shield for straight stacks, which penetrate through the roof.
 5. Do not make the stack diameter smaller than the flue gas outlet on the boiler.
 6. Provide supports if the stack exceeds 100 pounds. Also, clamp the stack firmly to the flue gas outlet.
 7. Install the stack where it will be clear of any combustible materials and utilize insulation around the opening in the wall or the roof. Flue gas sample fittings are provided from factory on boilers. Please do not cover these fittings when insulating the exhaust stack.
 8. When the boiler is installed in regions where temperatures fall to the freezing point, a stack damper should be installed to prevent down drafts from freezing the boiler tubes when it is not in operation. In addition, a chimney down draft will have a direct effect on main burner ignition reliability.
 9. Follow all local regulations. Check your building, fire and mechanical code as minimal guidelines.



The equation below states the relationship between chimney draft and the pressure drop of flue gas:

$$0.82H > 0.49L + 1.5N + 1.5$$

$$0.25H > 0.15L + 1.5N + 1.5$$

H: Height of chimney end (Ft)
 L: Total length of chimney (Ft)
 N: Quantity of knuckle points.

H: Height of chimney end (m)
 L: Total length of chimney (m)
 N: Quantity of knuckle points.

Please ensure that the equation above is satisfied in order to obtain the full capacity of the LXW-Series.

3.8 ELECTRICAL INSTALLATION

NOTE: MIURA recommends that an Alarm or Caution light be installed in the control room if possible.

	Voltages (V)	Input Rate (A)	Wire Gauge (AWG)	Disconnect Amperage
LXW-50	575	3.9	#14 x 3 + #14(G)	15
	460	4.8		
	230	9.6		
LXW-100	575	10.1	#10 x 3 + #14(G)	30
	460	13.1		
	230	25.2	#8 x 3 + #10(G)	40

	Voltages (V)	Input Rate (A)	Wire Gauge (AWG)	Disconnect Amperage
LXW-150	575	14.9	#10 x 3 + #12(G)	30
	460	18.1		
	230	36.2	#6 x 3 + #8(G)	60
LXW-175	575	14.9	#10 x 3 + #12(G)	30
	460	18.1		
	230	36.2	#6 x 3 + #8(G)	60
LXW-200	575	14.9	#10 x 3 + #12(G)	30
	460	18.1		
	230	36.2	#6 x 3 + #8(G)	60

- Other voltages are available by special order.
- Optional equipment such as MIURA Multiple Installation (MP1/MT1-200) system must be wired as specified in the individual instruction books.
- Comply with local building electrical codes.

SECTION 4 OPERATION & MAINTENANCE

DANGER: All cover plates, enclosures and guards must be in place at all times, except during maintenance and servicing.

CAUTION:

- This is a shop tested, assembled and fully packaged boiler. Each unit and assembly has been well adjusted at the factory. It is very important not to make any adjustments without first consulting your nearest authorized MIURA dealer.
- Daily water analysis should be performed to see if additional treatment is needed. Use a tester of 1 PPM or less sensitivity.

NOTE: See MIURA XJ1 manual for detailed operation of the control panel.

4.1 PREPARATION BEFORE START-UP

Check the following **everyday** before boiler start-up:

- a) Make sure all gauges are operating correctly.
- b) Make sure the boiler water is conditioned (for instructions on checking for soft water, refer to your water softener instruction manual).
- c) Make sure there are chemicals in the chemical feed tank.
- d) If using an independent circulation pump, makes sure it is working properly.

4.2 START-UP

CAUTION: The following start-up routine must be followed in sequence.

- a) Open all water inlet and outlet valves.
- b) Open the main gas cock and check that the required gas pressure (3 - 5 PSIG) is available.
- c) Turn the power source on. The "OPERATION" switch on the control panel will illuminate. The display on the panel will show "DISABLE" and supply water temperature.
- d) Make sure the drain valve is closed.
- e) Turn the "OPERATION" switch to "ON" and the display on the panel will show, "ENABLE".
- f) Push the "COMBUSTION ON/OFF" button. After a pre-purge cycle (for about 10 sec.), combustion will begin automatically.

NOTE: If the water volume is low or supply water temperature is high, the display on the panel will show "STANDBY". If there is anything wrong with any of the "INTERLOCK" sensor, the display on the panel will show "ALARM" with the alarm condition and the alarm will sound after pushing the "COMBUSTION ON/OFF" button.

- g) Combustion sequence to full fire is as follows:

- 1) Pre-purge
- 2) Pilot gas ignition
- 3) Pilot flame confirmation
- 4) Low fire main burner ignition
- 5) Low fire main burner confirmation
- 6) Pilot gas shut-off
- 7) High fire main burner (if required)

4.3 SHUT-DOWN

CAUTION: The following shutdown routine must be followed in sequence.

- a) Push the "COMBUSTION ON/OFF" button. Combustion will stop and post-purge will begin.
- b) Once post-purge has finished, turn the "OPERATION" switch to "OFF" position.
- c) Stop the circulation pump, if using an independent pump.
- d) Close all water inlet and outlet valves.
- e) Close the fuel valve.
- f) Turn off the main power supply to the boiler.
- g) After a prolonged shutdown, follow start up procedure to re-start the boiler.

IN AN EMERGENCY, PUSH THE "COMBUSTION ON/OFF" BUTTON FIRST, CLOSE THE GAS VALVE SECOND, AND THEN CUT OUT THE MAIN POWER SUPPLY TO THE BOILER.

4.4 CAUTIONS DURING OPERATION

DANGER: The following points MUST be followed to avoid damage or injury.

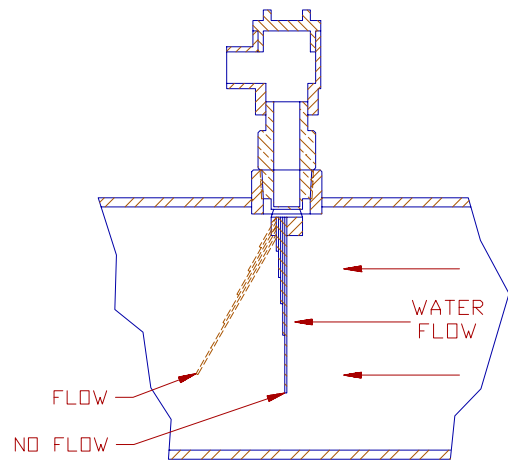
- a) Always open the main inlet and outlet valves before running the boiler.
- b) If there is a misfire or flame failure, locate the cause of the problem, (as discussed in Section 5.3 - Troubleshooting) fix it, push "COMBUSTION ON/OFF" button, then push the reset button on the panel and re-start the boiler. If the same problem persists, shut the boiler down and call the nearest MIURA representative or distributor.
- c) Whenever fuses need replacing, use only specified ratings. When replacing a circuit breaker or magnetic contactor, ensure that trip settings are set correctly on the new component.
- d) If the circuit breaker tripped, check it, and then reset it. In this case, re-test the low water interlock by blowing down as described in the section on blowdown. If the alarm does not ring when tested, then call the nearest MIURA representative or distributor.
- e) Proper balance of gas and airflow is needed to assure complete combustion and optimum efficiency. Adjust the airflow as needed. MIURA recommends a combustion tune up every three to four months to maintain optimum efficiency due to air temperature and humidity changes every season. Contact your nearest MIURA representative or distributor to adjust air flow.

- f) Do not change the setting on the high temperature limit.
- g) When unsure of any boiler trouble, shutdown the boiler, turn the power source off and contact your nearest MIURA representative or distributor.
- h) If you smell gas, immediately shut down the boiler, turn off all power sources, and close all main gas valves.** Immediately locate and repair the source of leak and contact your gas company and then a MIURA representative.
- i) Be careful when you take a sample of water from the boiler. Please be sure to open the valve very slowly. A water sample cooler is strongly recommended.
- j) Do not re-light pilot or start burner with the combustion chamber full of gas or with a very hot combustion chamber.**
- k) For dual fuel boiler, make sure to close the main gas valve of the fuel that not required before start the boiler. Also check to make sure neither actuator of that gas train is open during main combustion.

4.5 SAFETY ATTACHMENTS

4.5.1 NO FLOW CUT-OFF

If water flow, for any reason, falls below the predetermined flow, combustion will immediately be stopped and a warning alarm will sound. The display will show "ALARM" and "LOW FLOW".



4.5.2 LOW WATER VOLUME CUT-OFF

If the water volume, for any reason, falls below the predetermined water volume, combustion will immediately be stopped and a warning alarm will be activated. The display will show "ALARM" and "LOW WATER LEVEL".

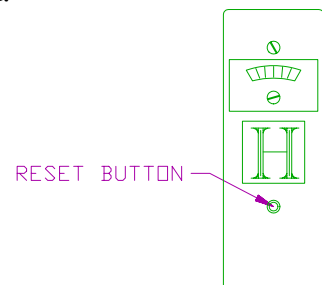
4.5.3 OVER HEAT MONITOR TEMPERATURE

If the temperature of the overheat thermocouple on the water tubes should, for any reason rise above the pre-set temperature, the XJ1 Microcomputer will shut down the boiler, activating the alarm. The display will also show "HIGH W TUBE TEMP".

For testing these functions, use the "Set Clock" menu. Record the present setting temperature then set it to lower than the tube temperature. It will shut down the boiler when the tube temperature reaches the new preset value. We suggest changing only the hundreds value. After testing, do not forget to reset to original setting or the boiler will not run.

4.5.4 HIGH TEMPERATURE LIMIT CUT-OFF

If the water temperature should, for any reason, rise above the pre-set temperature (Max. 250°F), the High Temperature Limit switch will be activated, the boiler will shutdown, and the alarm will sound. The display will show "ALARM" and "EMERGENCY STOP".



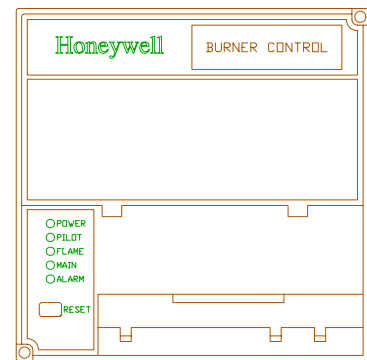
If the boiler shuts down due to high temperature, you need to press the reset on the temperature switch in order to restart the boiler. Please check the thermocouple and setting of the XJ1 Microcomputer as well as the Control Temperature switch for any malfunction or incorrect setting. The Control Temperature switch should have a lower setting than the High Temperature Limit switch.

For testing the High Temperature Limit switch, set it lower than the XJ1 Microcomputer setting. It will shutdown the boiler when the boiler temperature reaches the set temperature. After testing, be sure to set it back to the original setting and reset the High Temperature Limit Switch.

4.5.5 MISFIRE

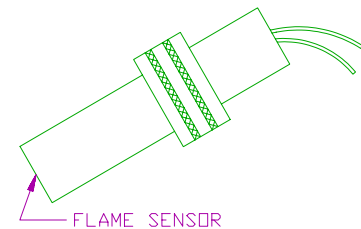
If ignition is not achieved after the ignition period, burner operation will immediately be stopped. After a purge cycle, the safety switch of the Flame Safeguard will be activated and a warning alarm will sound. The display will show "ALARM" and "FLAME FAILURE".

For testing the Flame Safeguard, close the pilot gas valve, and then start the boiler. Misfire will happen after the first or second attempt for pilot. After testing, don't forget to open the pilot valve and reset the XJ1 Microcomputer.

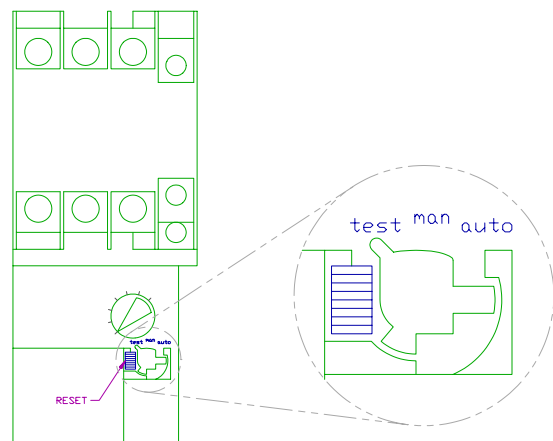


4.5.6 FALSE SIGNALS

Should there be any false signals emitted during ignition, pre-purge, or should pre-purge timing be off, the safety switch of the Flame Safeguard will be activated, the boiler will be shut-down, and a warning alarm will sound. The display will show the reason for interlock.



For testing, during pre-purge, take the flame eye out and point it to a flame (of a cigarette lighter for example). The boiler will continue to purge, but the pilot will not come on. After testing, do not forget to put the flame eye back to its original position and reset the XJ1 Microcomputer.



4.5.7 POWER OVERLOAD

Overload or short-circuiting of blower motor will result in boiler shutdown, the alarm will sound and the display will show "ALARM" and "AIR PRESS FAULT". Some motors have an internal stator winding thermal overload feature. If thermal overload – 49F has not tripped in the boiler control panel, operation will not resume until the blower motor has cooled down.

4.5.8 DAMPER MICRO-SWITCH

If damper should for any reason stay in the wrong position, the micro-switch on the damper will shut down the boiler, activating the alarm and the display will also show “ALARM” and “AIR PRESS FAULT”.

4.5.9 AIR PRESSURE

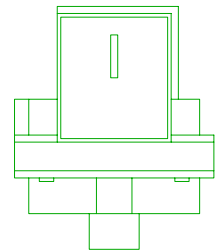
If the air pressure in the air duct, for any reason, falls below the predetermined pressure, combustion will be immediately be stopped and a warning alarm will sound. The display will show “ALARM” and “AIR PRESS FAULT”.

For testing, turn the setting of overload protector #88F to "TEST". During combustion, press and hold the reset button of overload protector #88F. The blower will slow down to a stop, as there will not be enough airflow and the boiler will shut down. Release the reset button and set overload protection #88F back to manual and reset the boiler.

NOTE: MIURA recommends installing optional air filter box to prevent the burner from dust.

4.5.10 FUEL GAS PRESSURE

When the "COMBUSTION ON/OFF" button is pushed prior to combustion, if there is not enough gas pressure, the burner cannot ignite and the warning alarm will sound. If, during the process of boiler operation, gas pressure falls below the required range, combustion will stop, and the alarm will sound. In addition, the display will show “ALARM” and "LOW GAS PRESS" or "HIGH GAS PRESS".



For testing the Low Gas pressure switch, close the main gas valve up-stream of the gas train during combustion. Boiler will shut off because of low gas pressure and Misfire. After resetting the XJ1 Microcomputer, the boiler still cannot restart because of low gas pressure until the main gas valve is opened again.

For testing the High Gas pressure switch, close the main gas burner inlet valve down-stream of the gas train during combustion. Boiler will shut off because of high gas pressure and Misfire. After resetting the XJ1 Microcomputer, the boiler still cannot restart because of high gas pressure until the main gas valve is opened again.

4.6 WATER TREATMENT

CAUTION: Check with your water treatment representative for details.

NOTE: Miura Boiler Co., Ltd. cannot be responsible for any problems encountered with the boiler due to unsuitable water treatment. Please contact a reliable water treatment company

and follow their directions.

4.6.1 PREVENTATIVE MAINTENANCE FOR EXTENDED BOILER SHUT-DOWN

To prevent internal corrosion during periods of extended shutdown (7 days or more), the following must be done:

- a) Raise the boiler water pH level between 11-12 to reduce corrosion OR
- b) Drain the water and dry the boiler completely. Add an inert gas or a deoxidizing agent.

Since the LXW is a small water content boiler series, keeping the water in the boiler and raising the pH is the preferred preventative method. However, in places where freezing is a problem and shutdown is more than 7 days, it is preferred that the boiler be drained of all water. Contact your nearest MIURA representative or distributors for further details.

Finally, check to make sure all manual valves (water inlet & outlet, main & pilot gas,...) are closed tightly and turn off the main power supply to boiler during shutdown.

4.6.2 BOILER MAKE-UP WATER MAINTENANCE

CAUTION: Proper water treatment MUST be used from the time the boiler is first operated. MIURA has no warranties to cover damage due to poor water treatment and failure to maintain these specifications listed below.

MIURA MAKE-UP WATER MAINTENANCE CHECK

In order to keep your LXW Series running in top condition, be sure to check the following daily:

- a) CHEMICAL FEED PUMP
 - i. Proper chemical feed.
 - ii. Sufficient liquids to properly dissolve chemicals.
 - iii. No air in the chemical feed pump or lines.
- b) WATER SOFTENER
 - i. Boiler Make-up water is completely soft (use a test kit sensitive to less than 1.0 PPM).
 - ii. Check to make sure the water softener timer is working every day.
 - iii. Make sure there is no hardening of the salt. In case of salt hardening or “bridging” break the salt into small pieces.
 - iv. Check to make sure the by-pass valve is closed and the inlet and outlet valves are open.

STANDARD BOILER WATER SPECIFICATIONS FOR THE LXW SERIES

The chemistry values given in the table below are specific guidelines established by MIURA Boiler. Analysis is to be performed by the customer or a boiler water treatment company

ITEM			STANDARD RANGE
pH (at 25°C)			7.0 - 8.6
Conductivity (at 25°C)		μS/cm	Below 200
Hardness	CaCO ₃	PPM	≈ 0
M Alkalinity	CaCO ₃	PPM	50 - 100
Silica	SiO ₂	PPM	Below 30
Iron	Fe	PPM	Below 0.3
Chloride	Cl ⁻	PPM	Below 30
Sulfur trioxide ion	SO ₃ ²⁻	PPM	Below 20
Copper	Cu	PPM	Below 0.05
Magnesium	Mg	PPM	Below 0.3
Carbonate Ion	CO ₃ ²⁻	PPM	Below 4

SECTION 5 MAINTENANCE

5.1 MAINTENANCE & CLEANING SCHEDULE

In order to protect the high efficiency and to prevent costly breakdowns of your LXW Series, perform the following maintenance and cleaning.

MAINTENANCE ITEM	EVERY DAY	EVERY 3-4 MONTHS	AS NEEDED	CHECK POINTS	REMARKS
Combustion conditions	Visual	Tune up by analyzer		Check combustion, sound & flame color.	Cause of misfire.
Flow switch	☺			Check flow.	For overheat protection.
Check gas pressure	☺			Check gas pressure gauge needle for any abnormalities.	Poor combustion.
Check blower cover	☺			Clean blower cover.	Poor combustion.
Boiler inside inspection (upper and lower holes)		☺		Check for scale & sludge.	Overheating, pitting.
Expansion tank		☺		Check leakage.	Waste water.
Check windbox flange bolts		☺		Check for tightness.	Cause of flue gas leakage.
Check air duct		☺		Check for air leakage.	Cause of poor combustion.
Check damper setting bolts		☺		Check for tightness.	Cause of poor combustion.
Check damper motor & limit switch		☺		Coupling & operation.	Cause of poor combustion.
Pilot burner condition and combustion		☺		Check electrode wear and ceramic condition.	Cause of poor ignition.
Check water quality			☺	Is water good?	Scale, corrosion.
Low water cut-off			☺	Check electrode, wire, ...	For overheat protection.
Strainer			☺	Clean inside.	Cause of low water.
Electrical wiring			☺	Check for loose wires.	
Check pressure gauge & thermometer			☺	Compare zero point to pressure gauge.	Unsuitable for operation.
Check burner element			note 1	Check for dust on burner element.	Cause of poor combustion.

Notes:

1. The burner element should be cleaned at least once per year in order to prevent a build-up of particles on the burner element surface. It is important to keep the burner element surface clean to prevent poor combustion. All particles should be removed from the burner element surface using compressed air and/or vacuum. This cleaning should be done by taking off the wind box

cover and do NOT remove the burner element to avoid damaging the fire barrier. Contact MIURA representative if burner element requires service.

2. This is a basic maintenance schedule. If the fuel or the water is of exceptionally poor quality, maintenance checks will naturally increase. Compare the water quality with our standards and adjust the schedule accordingly.
3. Electric motors are pre-lubricated at the factory and do not require additional lubrication at start up. Motors with grease fittings should only be lubricated with lithium-base grease at the time intervals given in the table below:

TYPE OF SERVICE	FREQUENCY OF GREASING
Seasonal (Motor/Boiler is idle for more than 6 months)	Yearly
Intermittently (normal daily operation of Boiler)	Semi-annually
Continuous	Quarterly

Do not over grease the bearings. Over greasing will cause increased bearing heat and can result in bearing and motor failure. Follow instructions on the motor nameplate.

The battery in the XJ1 Microcomputer should be replaced as soon as possible if the display shows “REPLACE BATTERY”.

It is recommended to replace the battery every 3 years.

- a) Turn off the power supply.
- b) Open CPU panel covers.
- c) Remove the battery from holder and remove the connector.
- d) Insert the connector of a new battery immediately.
- e) Fit a compatible battery into the holder and replace the panel cover.

5.2 SPARE PARTS

After the end of the parts warranty, it is not necessary to order replacement parts from MIURA. One of our design advantages is the use of non-proprietary parts. The electrical control components and assorted valves may be purchased from any industrial part supplier.

The list below is not all-inclusive and in general is more than required. If the customer does not have a stand by Boiler or is some distance away from the service representative or simply desires to maintain a more comprehensive selection of spare parts, contact MIURA for a more customized list.

The customer is reminded that standard ground shipment of a Warranty Replacement Part is at MIURA Expense. Express shipping charges will be billed to the Customer. In addition, return of the defective part to MIURA must be done at Customer expense. If a Warranty Replacement defective part is not returned to MIURA the customer will be invoiced for the replacement sent. In addition, if the defective part failure is determined to NOT be a manufacturing defect the Customer will be invoiced by MIURA.

NO	PART NAME	PART NUMBER	LXW-50	LXW-100	LXW-150	LXW-175	LXW-200
1	Damper coupling rubber assembly	Lovejoy 5/8" x 7/16" L070	1	1	1	1	1
2	Flame eye	Honeywell C7035A1031	1	1	1	1	1
3	Floatless switch	26A1BO-03	1	1	1	1	1
4	Relay	LY-2, CSA, 120V	1	1	1	1	1
5	Magnetic contactor for blower.	CA7-85-19-120					
		CA7-72-11-120					
	Manufactured by Sprecher	CA7-60-11-120			208 V	208 V	208 V
		CA7-43-11-120		208 V	230 V	230 V	230 V
		CA7-30-10-120		230 V	460 V 575 V	460 V 575 V	460 V 575 V
		Quantity is one each depending on boiler model and voltage	CA7-16-10-120	208 V 230 V	460 V 575 V		
	CA7-12-10-120	460 V 575 V					
6	Spark rod	SR100300	1	1	1	1	1
7	Level sensor *	Warrick 3H1C	1	1	1	1	1
8	Thermocouple	Type K ungrounded	1	1	1	1	1
9	Compression Fitting	CF 100000 (for thermocouple)	1	1	1	1	1
10	Burner element packing	FB 100200 (not pre-cut) (issue quantity is sq. ft.)	2	2	2	2	2

The above listed spare parts are not initially included with the boiler.

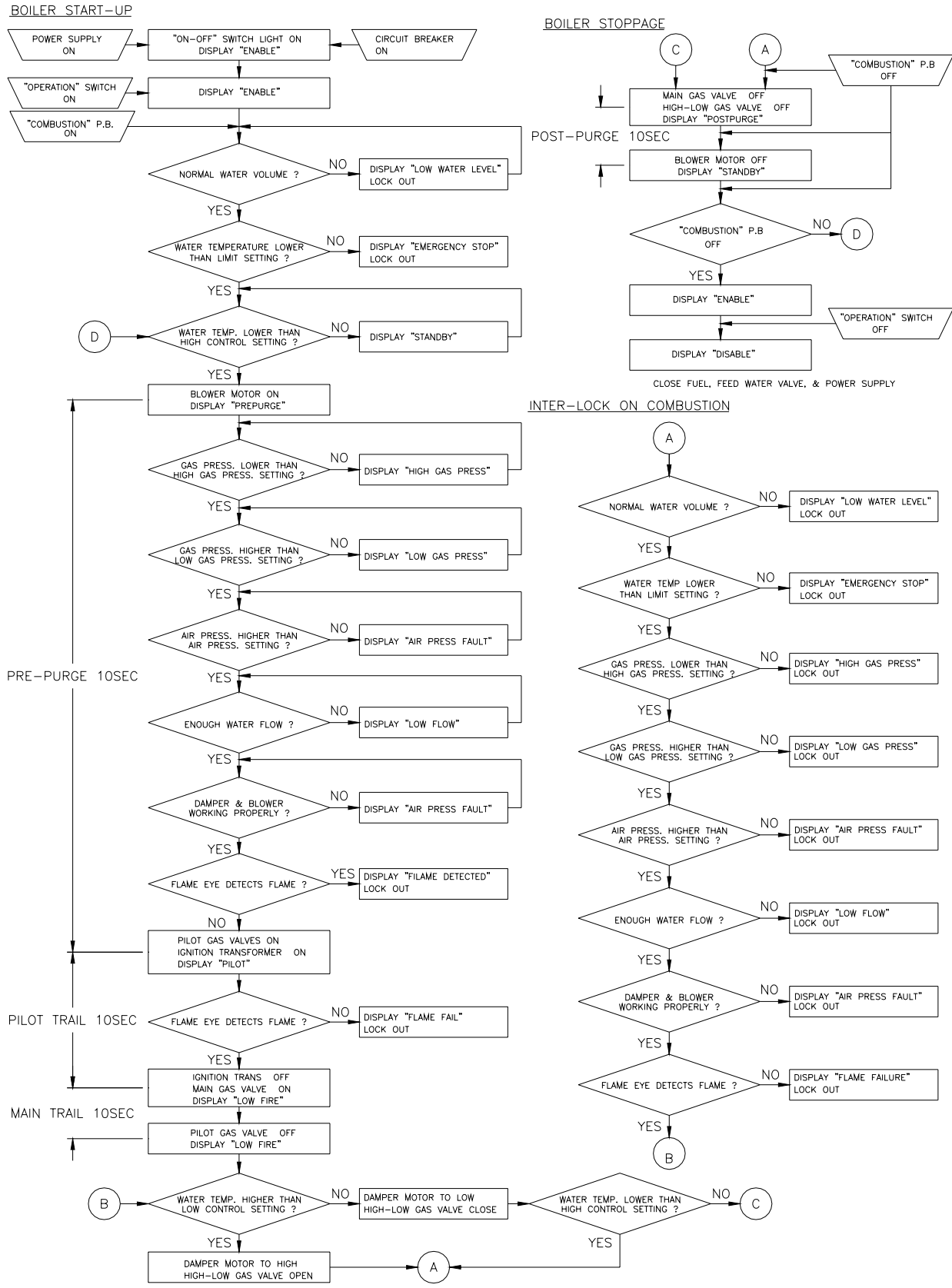
5.3 TROUBLESHOOTING

PROBLEM	ITEM TO CHECK	CAUSE	REMEDY
1. No light in "ON-OFF" switch.	a) Main power switch on?		Turn main power breaker on
	b) Main power fuse tripped?	Short circuiting	Find the cause of short circuit repair/replace fuse
	c) Circuit breaker broken OR Wires are loose?		Replace circuit breaker OR tighten terminal wires *
2. No display on panel.	a) No display inside control box?	Short circuiting OR Circuit breaker triple	Find the cause of short circuit repair/reset circuit breaker.
	b) Still display inside control box?	Loose wires OR Broken display	Tighten terminal wires OR Replace display *
		Wrong direction connect	Reconnect cable
3. Circulation water pump runs but water not being fed into boiler OR water flow is too small.	a) Main water circulation valve open?		Open main boiler inlet & outlet water valves
	b) Water in the system?		Add water.
	c) Completely release air from air release valve?	Air in circulation pump has stopped water from flowing	Release air completely
	d) Pump motor's rotated in right direction?		Reverse wires for circulation water pump
	e) Water strainer plugged?		Clean the strainer
	f) None of the above?	Pump capacity is too low	Change pump *
4. Even after "OPERATION" switch turn "ON" & "COMBUSTION ON/OFF" button is pushed, boiler doesn't start.	a) No alarm & display show "STANDBY"?	Enough water temperature	Will automatic start when temperature drop
	b) Alarm on? Check problem show on display		Fix the problem & reset boiler
5. Combustion will not start.	a) Main gas cock open?	No gas for combustion	Open main gas valve
	b) Damper setting adjusted?	Insufficient air flow	Adjust to proper setting
	c) Fan cover clean?		
	d) Main gas valve open?	Loose wiring OR Faulty gas valve	Tighten wires OR Replace
		e) Spark rod working properly?	Loose wire
		Faulty cord on spark plug	Replace spark plug cord *
		Carbon on spark rod	Clean up
		Faulty spark plug	Replace *
f) Ultraviolet flame eye registering the flame?	Flame eye wire is loose OR Faulty flame eye	Tighten wires OR Replace *	
6. There is ignition but the flame dies out.	a) Main gas cock open?	No gas for combustion	Open gas cock
	b) Incorrect gas pressure OR damper setting?		Adjust to proper setting
7. Too much smoke from chimney. Misfire becomes a problem.	a) Too high gas pressure?	Too much gas for combustion	Set accordingly
	b) Damper setting is off? OR Retainer is loose?	Not enough air for combustion	Set accordingly OR Replace *

PROBLEM	ITEM TO CHECK	CAUSE	REMEDY
	c) Is blower cover clean?		
8. Strange sound occurs during combustion	a) Too low gas pressure?	Not enough gas	Adjust accordingly
	b) Damper setting properly?	Too much air for combustion	
9. Flame dies out when going from high-fire to low-fire.	a) Too low gas pressure?	Not enough gas	Adjust accordingly
	b) Damper setting properly?	Too much air for combustion	
10. Boiler cannot go from low-fire to high-fire.	a) Too high gas pressure?	Too much gas for combustion	Adjust accordingly
	b) Damper setting properly?	Not enough air	
	c) High-fire Solenoid valve working properly?	Not enough gas	Tighten wires OR Replace
	d) Air duct fixture	Air leakage	Tighten OR replace
	e) Aquastat control setting	Reached setting temperature OR Wrong wiring	
11. Fan motor runs but no ignition.	a) Check air pressure switch	Incorrect setting, broken, OR loose wiring	Replace, reset, OR tighten terminal contacts
	b) Check fan rotation	Reversed rotation	Reverse wire
	c) Check spark rod	Faulty	Replace
	d) "RUN/TEST" switch of primary protect relay in TEST position?	Boiler in manual purge	Set this switch to "TEST" position
	e) Faulty primary protect relay?		Tighten wires OR Replace
12. Water is escaping from boiler's safety valve.	a) Safety valve pressure setting wrong?	Setting pressure lower than operating pressure	Replace if required OR Change operating pressure
	b) High Limit or Control switch setting?	Too high setting OR Broken	Adjust setting OR Replace if required

* ALWAYS CONTACT YOUR NEAREST MIURA REPRESENTATIVE.

5.4 FLOW CHART OF LXW SEQUENCE OPERATION



DISTRIBUTOR INFORMATION	
NAME	
ADDRESS	
TELEPHONE	
FAX	
DATE OF INSTALLATION	
BOILER MODEL	

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