Gas-Fired Condensing Hot Water Boiler

English 09/18

- Cast aluminum sectional boiler
- 10 to 1 turndown ratio
- Honeywell Sola boiler control system
- Touchscreen 7'' LCD control
- Compact lightweight packaged boiler
- Three models ranging from 900 to 1050 MBH
- Low NOx design

USER MANUAL

- INSTALLATION
- START-UP
- MAINTENANCE
- PARTS
- TROUBLESHOOTING

ABS Series

Models; 750, 900, 1050 MBH

Approved for installation in the Commonwealth of Massachusetts
Approval number G1-0118-258

AHRI CERTIFIED® www.ahridirectory.org
Globally Recognized. Industry Respected.

Installation Operation and Maintenance

Warning:

Before you operate this boiler, read this manual carefully and take extra precautions to all safety and warning symbols or important items. The operating manual is part of the documentation sent along with the boiler. The installer is required to explain the operation of the heating system and boiler operation instructions to the owner.

Notice:

Please read this manual carefully and retain a copy for future reference. Improper installation, adjustment, alteration service and maintenance can cause injury, loss or property damage. Refer to this manual for assistance or additional information or consult a qualified installer, service agency or the gas supplier.

ABSOLUTE BOILERS

3i innovative Industrial Inc.
185 B Durham Street West
Mount Forest, Ontario, Canada, N0G 2L1

519-650-0420

CAUTION

Before you install and operate this boiler, please read this manual carefully in its entirety. If for whatever reason you find instructions are unclear, please do not hesitate to contact us as shown below. Please read all safety and warnings symbols. The installation and service manual is part of the documentation along with the boiler. The installer is to explain the function of the boiler and heating system, before the boiler goes into full service.

For service or parts, contact your local sales representative.

Notice: In the interests of progress, the information in this installation and service manual is subject to change without prior notice from Innovative Industrial Inc.

Contents

1. SAFETY INSTRUCTIONS

1.1 Requirements for installations in the state of Massachusetts

Boiler Installations within the Commonwealth of Massachusetts must conform to the following requirements:

• Boiler must be installed by a plumber or a gas fitter who is licensed within the Commonwealth of Massachusetts.

• Prior to unit operation, the complete gas train and all connections must be leak tested using a non-corrosive soap.

• The vent termination must be located a minimum of 4 feet above grade level. If side-wall venting is used, the installation must conform to the following requirements **extracted from 248 CMR 5.08 (2):**

(a) For all side wall horizontally vented gas fueled equipment installed in every dwelling, building or structure used in whole or in part for residential purposes, including those owned or operated by the Commonwealth and where the side wall exhaust vent termination is less than seven (7) feet above finished grade in the area of the venting, including but not limited to decks and porches, the following requirements shall be satisfied:

1. INSTALLATION OF CARBON MONOXIDE DETECTORS: At the time of installation of the side wall horizontal vented gas fueled equipment, the installing plumber or gasfitter shall observe that a hard wired carbon monoxide detector with an alarm and battery back-up is installed on the floor level where the gas equipment is to be installed. In addition, the installing plumber or gasfitter shall observe that a battery operated or hard wired carbon monoxide detector with an alarm is installed on each additional level of the dwelling, building or structure served by the side wall horizontal vented gas fueled equipment. It shall be the responsibility of the property owner to secure the services of qualified licensed professionals for the installation of hard wired carbon monoxide detectors.

a. In the event that the side wall horizontally vented gas fueled equipment is installed in a crawl space or an attic, the hard wired carbon monoxide detector with alarm and battery back-up may be installed on the next adjacent floor level.

b. In the event that the requirements of this subdivision cannot be met at the time of completion of installation, the owner shall have a period of thirty (30) days to comply with the above requirements; provided, however, that during said thirty (30) day period, a battery operated carbon monoxide detector with an alarm shall be installed.

2. APPROVED CARBON MONOXIDE DETECTORS: *Each carbon monoxide detector as required in* accordance with the above provisions shall comply with NFPA 720 and be ANSI/UL 2034 listed and IAS certified.

3. SIGNAGE: A metal or plastic identification plate shall be permanently mounted to the exterior of the building at a minimum height of eight (8) feet above grade directly in line with the exhaust vent terminal for the horizontally vented gas fueled heating appliance or equipment. The sign shall read, in print size no less than one-half (1/2) inch in size, **"GAS VENT DIRECTLY BELOW. KEEP CLEAR OF ALL OBSTRUCTIONS". (Continued)**

1. SAFETY INSTRUCTIONS

1.1 Requirements for installations in the state of Massachusetts (continued)

4. INSPECTION: The state or local gas inspector of the side wall horizontally vented gas fueled equipment shall not approve the installation unless, upon inspection, the inspector observes carbon monoxide detectors and signage installed in accordance with the provisions of 248 CMR 5.08(2)(a)1 through 4.

(b) EXEMPTIONS: The following equipment is exempt from 248 CMR 5.08(2)(a)1 through 4:

1. The equipment listed in Section 10 entitled "Equipment Not Required To Be Vented" in the most current edition of NFPA 54 as adopted by the Board; and

2. Product Approved side wall horizontally vented gas fueled equipment installed in a room or structure separate from the dwelling, building or structure used in whole or in part for residential purposes.

(c) MANUFACTURER REQUIREMENTS - GAS EQUIPMENT VENTING SYSTEM PROVIDED. When the manufacturer of Product Approved side wall horizontally vented gas equipment provides a venting system design or venting system components with the equipment, the instructions provided by the manufacturer for installation of the equipment and the venting system shall include:

1. Detailed instructions for the installation of the venting system design or the venting system components; and

2. A complete parts list for the venting system design or venting system.

(d) MANUFACTURER REQUIREMENTS - GAS EQUIPMENT VENTING SYSTEM NOT PROVIDED. When the manufacturer of a Product Approved side wall horizontally vented gas fueled equipment does not provide the parts for venting the flue gases, but identifies "special venting systems", the following requirements shall be satisfied by the manufacturer:

1. The referenced "special venting system" instructions shall be included with the appliance or equipment installation instructions; and

2. The "special venting systems" shall be Product Approved by the Board, and the instructions for that system shall include a parts list and detailed installation instructions.

(e) A copy of all installation instructions for all Product Approved side wall horizontally vented gas fueled equipment, all venting instructions, all parts lists for venting instructions, and/or all venting design instructions shall remain with the appliance or equipment at the completion of the installation.

…….[End of Extracted Information From 248 CMR 5.08 (2)]……

1.1.2 Gastrain Requirements for the State of Massachusetts per CMR 248 Section 7.0

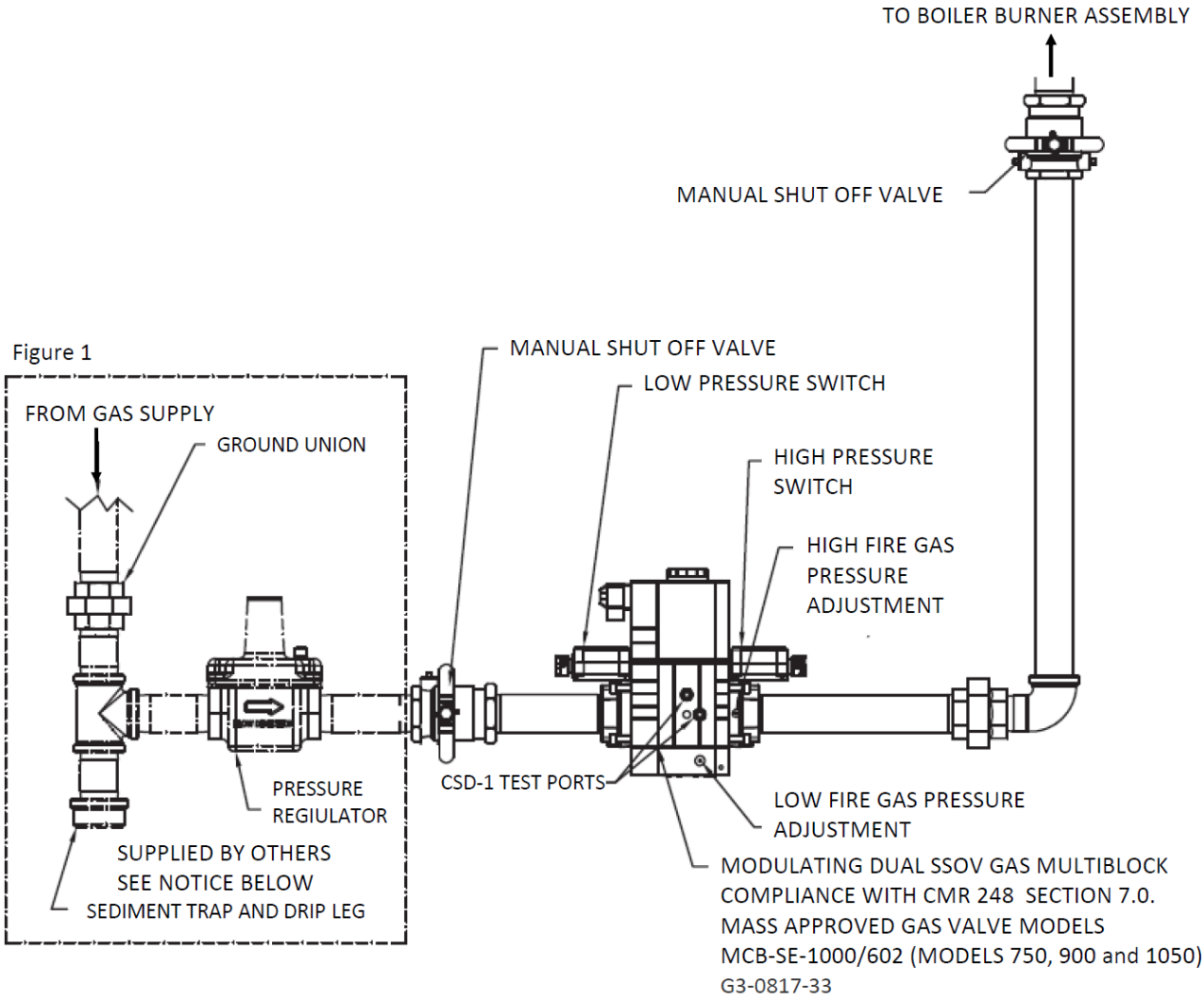


Figure 1

NOTICE

- A lockup style regulator, supplied by others, must be installed, see Figure 1, if gas pressure exceeds (14 in WC). The regulator, when installed as shown, must be installed at a distance of at least 10 pipe diameters from the boiler main gas valve. All boilers are calibrated and factory test fired at (7 in ± 22) WC.
- A minimum of (3.5 in WC) and maximum of (14 in WC) must be maintained to the inlet of the boiler gas train not to exceed a maximum of (1 in WC) drop when firing from minimum input to full load of the gas supply line and all the appliances running.
- Always use a wrench on the gas valve body when making gas connections to it. Never over-tighten the piping entering the gas valve body or gas valve failure may result!

ALSO REFER TO CHAPTER 6.0 PAGES 55 TO 60 FOR GAS PIPING ADDITIONAL INFORMATION.

1. SAFETY INSTRUCTIONS

1.2 Symbols

The following symbols are used in this document to emphasize certain instructions. This is in order to increase your personal safety and to safeguard the technical reliability of the boiler.

	CAUTION	Indicates a potentially hazardous situation which, if ignored, may result in minor injury or product/ property damage.
	WARNING	Indicates a potentially hazardous situation which, if ignored, can result in danger, serious injury or substantial product/property damage.
	DANGER	Indicates the presence of a hazardous situation which, if ignored, will result in **death, serious injury** or substantial product/property damage.
	READ	Indicates recommendations made by **EnerPro Boilers** for the installers which help to ensure optimum operation and longevity of the equipment.

Professional licensed heating contractor

The assembly, installation, adjustment, service and maintenance of this boiler must be performed by a professional licensed heating contractor.

Boiler Documentation

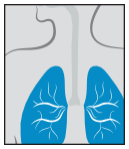
Make sure to read all documentation related to the product before starting the installation. The product documentation should be stored near the boiler where it can be accessed for future reference.

Advice for the owner

When the installation has been completed, the heating contractor has to familiarize the operator/owner with the installed equipment as well as any safety precautions and requirements, and shut-down procedures. The heating contractor also needs to inform the operator/owner of the need for professional annual servicing of the boiler prior to the heating season.

Contaminated air

Chemicals can contaminate the air and cause by-products during the combustion process. These by-products are poisonous to the occupants and very destructive to Absolute Boilers.



Carbon monoxide

Flue products can flow into living spaces if improperly installed, adjusted, serviced or maintained. The flue gases contain carbon monoxide which is poisonous.

Fresh air

Adequate ventilation and combustion air must be provided for the equipment as it requires fresh air for safe operation. Make sure the equipment is installed ensuring an adequate supply of fresh air.

Boiler venting

Always operate the boiler with an installed vent system. Carbon monoxide poisoning can be caused by an improperly installed vent system. All combustion products must be vented safely to the outdoors.

Warranty

The information in this manual and any other related manuals must be read and proper procedures followed. The warranty is rendered null and void if the procedures are not followed as prescribed.

Some products may not be exactly as illustrated. Information contained herein is deemed as accurate as possible. Clarification of material supply, pipe sizing, thread type, and typographical errors should be noted as soon as possible. Dimensions have been converted from the Metric standard. Fractional rounding may affect dimensional tolerances.

1.2 General safety notes

Installers and operational personnel must at all times observe all safety regulations. The following warnings and cautions are general and must be given the same attention as specific precautions included in these instructions.

The installation must conform to the requirements of their authority having jurisdiction or, in the absences of such requirements, with the National Fuel Gas Code ANSI Z223.1/NFPA 54 and /or Natural Gas and Propane Installation Code, CAN/CSA B149.1

Where required by the authority having jurisdiction, the installation must conform to the Standards for Control and Safety Devices for Automatically Fired Boiler, ANSI/ASME CSD1

Product is CSD-1 complaint. Authorities having jurisdiction should be contacted before installations begin.

DANGER

Flue gas products contain carbon monoxide gas which can cause nausea or asphyxiation, resulting in severe personnel injury or death!

WARNING

The boiler is connected to 120 VAC 1ph and and/or 230 VAC 3 ph. An improper installation or attempts to repair electrical components or controls may result in life threatening situation. Always disconnect main service to boiler before servicing.

WARNING

Only properly qualified personnel that hold all necessary licenses shall work on the installation and service of this boiler. Uses of unlicensed or untrained service technicians are strictly prohibits from installing or service this boiler

WARNING

Do not touch the boiler; hot surfaces can be a burn hazard.

WARNING

Pressure hazard! Annually test safety relief valve for proper operation. Do not operate boiler with faulty relief valve.

WARNING

The boiler must not be installed on carpet.

WARNING

Do not stand on top of this boiler, or place items on top of the boiler.

WARNING

The boiler must not be modified or fitted with non OEM spare parts without the express written approval of Innovative Industrial Inc.

WARNING

If you smell gas, turn the boiler off immediately, by shutting off the gas supply downstream of the boiler. Do not try to light or operate any appliances, evacuate all people. Do not touch any electric switch; do not use any phone in the building. If you cannot reach your gas supplier, call the fire department, using a phone outside the building.

WARNING

Lifting hazards! Use properly rated lifting equipment to lift and position the boiler.

WARNING

Pressure hazard! Hot fluids. Install isolation valves on boiler water inlet and outlet. Make sure isolation valves are closed before servicing boiler.

1.3 Lighting Instructions

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

A. 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.

B. 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 neighbor's phone. Follow the gas supplier's instructions.

. If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to turn lever operated manual gas shut-off valves. If the lever handle will not turn by hand, call a qualified service technician or the gas supplier.

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 thermostat or other operating control to lowest setting.

3- Turn off all electric power to the appliance

4- This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

5- Close main gas shut-off valve.

6- Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.

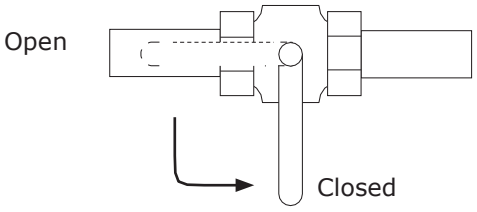
7- Open main gas shut-off valve.

8- Turn on all electric Power to the appliance.

9- Set thermostat of other operating control to desired setting.

10- If the appliance will not operate, Follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

Manual Gas Shut-off



TO TURN OFF GAS TO APPLIANCE

1- Set thermostat or other operating control to lowest setting.

2- Turn off all electric power to the appliance if service is to be performed.

3- Close main gas shut-off Valve.

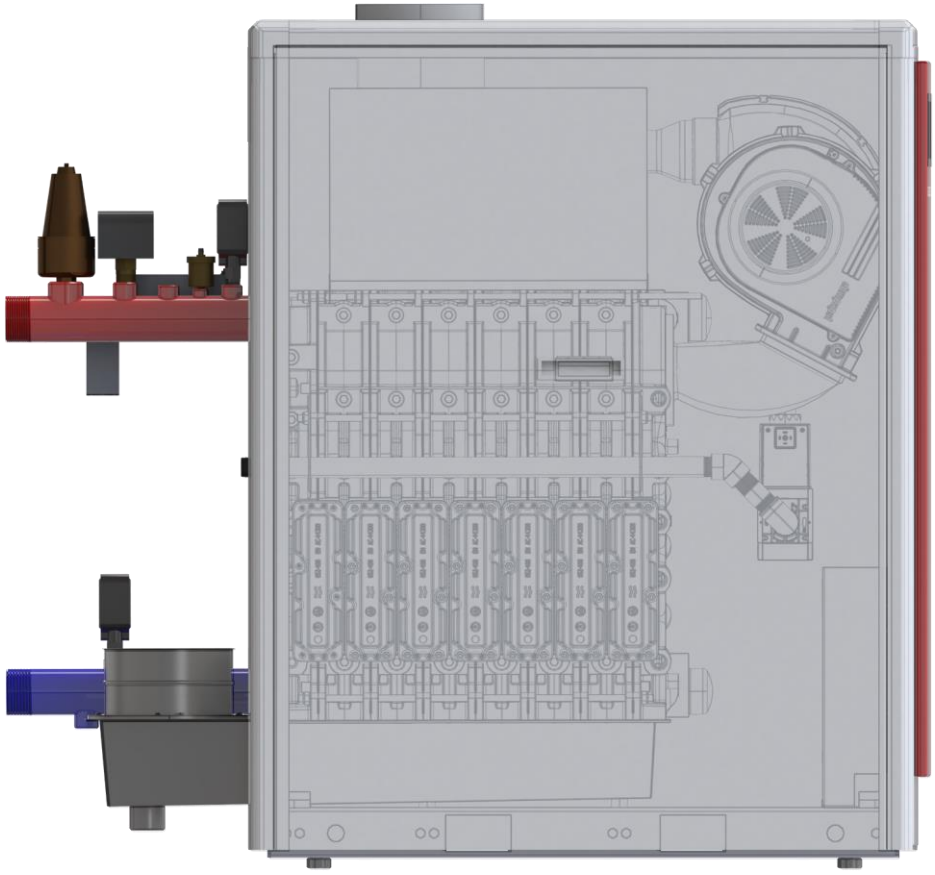
The **ABSOLUTE "ABS SERIES"** hydronic heating condensing boiler is a combination of more than 35 years of North American and European engineering experience in condensing boiler technology.

The **ABSOLUTE "ABS SERIES"** utilizes a durable sectional cast aluminum heat exchanger engineered and designed in Europe. The cast aluminum provides a robust corrosion resistant heat exchanger that allows for ultra-high efficiencies with the added benefit of a small, lightweight boiler foot print.

The **ABSOLUTE "ABS SERIES"** heat exchanger also provides additional efficiency from large water ways, reducing the pressure drop through the boiler! We are so confident in our heat exchanger; we provide an industry leading warranty.

The fully water cooled combustion chamber hosts a knitted metal fiber premix burner. A turndown ratio of 10:1 allows for ultimate combustion control and reduces short cycling of the boiler. With precise combustion control the **ABSOLUTE "ABS SERIES"** is able to achieve CO_2 levels which maximizes condensation of the natural gas. Low NO_X and CO emissions are the standard with the **ABSOLUTE "ABS SERIES"**.

The **ABSOLUTE "ABS SERIES"** incorporates the Honeywell Sola boiler control system for ultimate boiler control. The Sola allows for quick and easy set-up of the **ABSOLUTE "ABS SERIES"** condensing boilers. The user friendly touchscreen control ensures simplified monitoring and diagnostics along with: multiple boiler configuration (eight boilers), remote monitoring, fault history, trend analysis, boiler status, communicates via 3-wire RS-485 ModBus™ protocol, DHW priority.



The standard control package allows for external On/Off, local-remote switch. The built in digital display shows normal operating fault indications and allows actual and set values to be read and adjusted.

The intelligent, advanced boiler control continuously monitors the boiler operating conditions, varying the heat output to suit the system load. The control is able to react to external "negative" influences in the rest of the system (flow rates, air/gas supply problems) maintaining boiler output for as long as possible without resorting to a lock out condition. At worst the boiler will reduce its output and/or shut down (shut off mode) awaiting the "negative" conditions to return to normal before re-starting.

- The Sola controller has 4-20 MA, or mod-bus interface

- The Sola controls cannot override the standard flame safety controls. External controls or commands can modulate the boiler as required by the BMS.

- All Absolute boilers are fully test fired after assembly to ensure the boiler and controls comply with our strict quality policy.

- The packaged boiler is constructed and approved according to the following standards:

- ANSI Z21.13 / CSA 4.9 - 2014
- UL 795
- CGA CAN1-3.1
- ASME Section IV
- CRN for each Canadian Province (where applicable)
- Electrical according CSA 22.2 No 0.M91 & NEC/NFPA 70
- Gas Vent Category II & IV – Use vent type BH
- Consult factory for other certifications or qualifications.
- CSD-1 compliant

2.2 Boiler Standard Operation

Combustion air is drawn into the inlet connection from the plant room (room ventilated version) or from outside via the air inlet pipe.

On the inlet side of the fan is a specially designed chamber which takes gas from the multi-block and mixes it in the correct proportions with the incoming air. This mixing system ensures that the correct gas/air ratio is delivered to the pre-mix burner at all times.

Depending on demand (under the dictates of flow/return sensor and other external/internal control inputs) The Honeywell Sola Control varies the speed of the air supply fan which alters the volume of air/gas mixture that is delivered to the combustion chamber. The resultant controlled mixture is delivered to the premix burner.

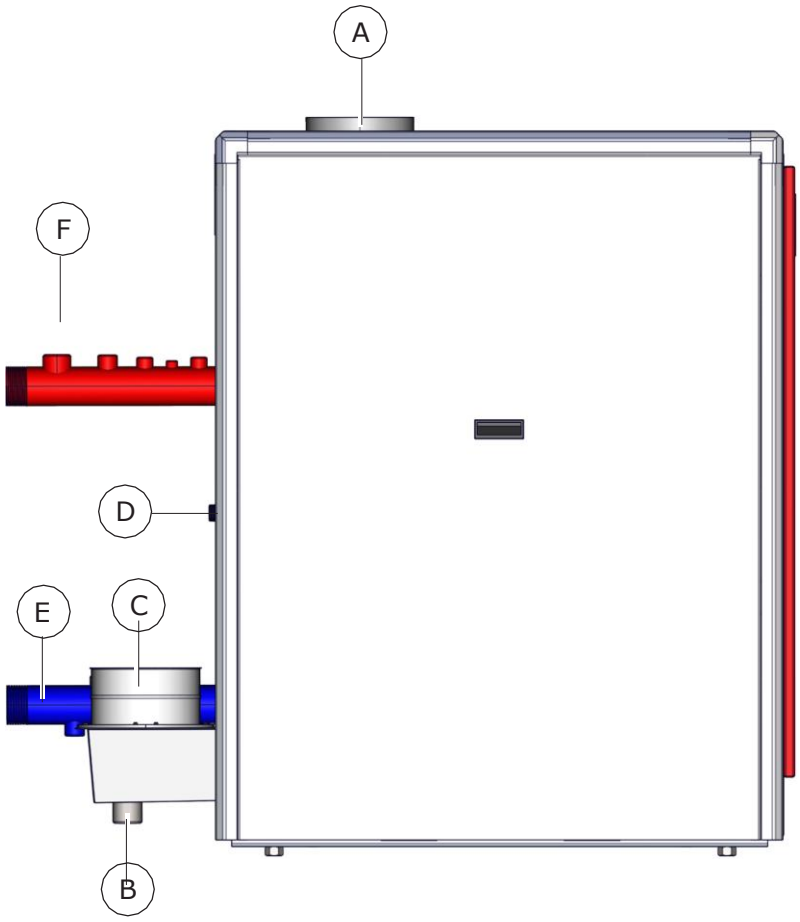
This mixture is initially ignited by the combined ignition/ionization probe which monitors the state of the flame. Should the flame be unstable or not ignite within the pre-set safety time cycle the controls will (after 3 attempts) shut the boiler down requiring manual intervention to reset the boiler. The display will indicate a flashing fault code 3 times confirming the reason for the failure.

The products of combustion in the form of hot flue gases are forced through the heat exchanger transferring their heat to the system water, (the flue gas temperature is reduced to approximately 9-14° F [5-8° C] above the temperature of the system return water) then discharged via the condensate collector, to the flue gas outlet connection, to atmosphere.

Because of the low flue gas exit temperature there will be a vapor cloud formed at the flue gas terminal – this is not smoke, simply water vapor formed during the combustion process.

If the flue gas temperature falls below the dew point of 131°F [55°C], water vapor (created during the combustion process) will begin to condense in the boiler, transferring its latent heat into the system water, thereby increasing the output of the boiler with-out increasing the gas consumption. Condensation formed within the boiler and flue system is discharged from the boiler to an external drain via the drain pan and siphon supplied.

2.3 View of boiler for service connections



A- Combustion air supply

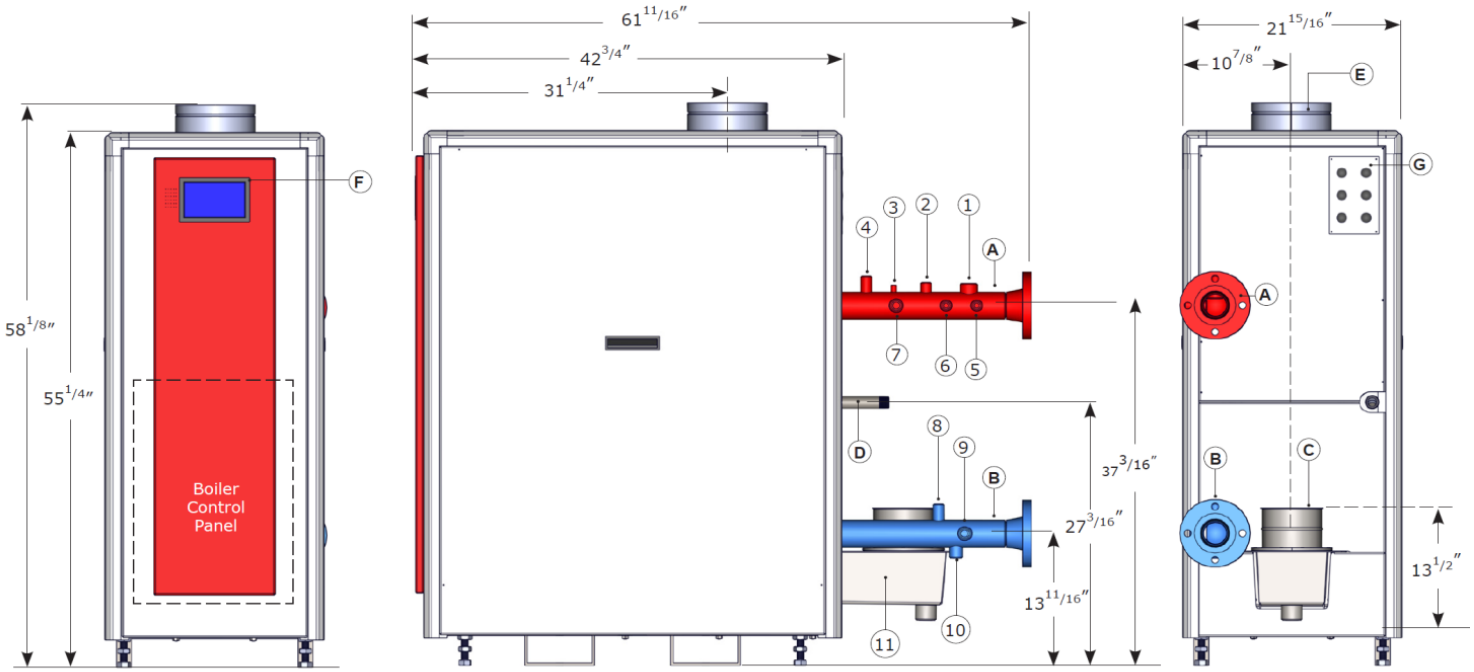
B- Condensate drain connection

C- Flue gas discharge

D- Gas connection

E- Return connection

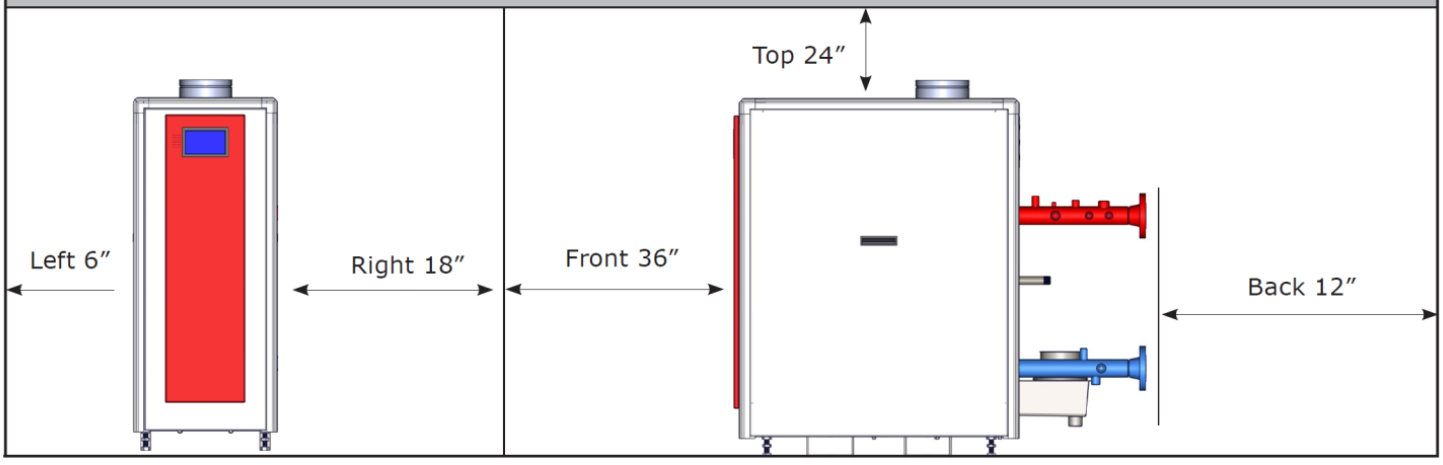
F- Supply connection

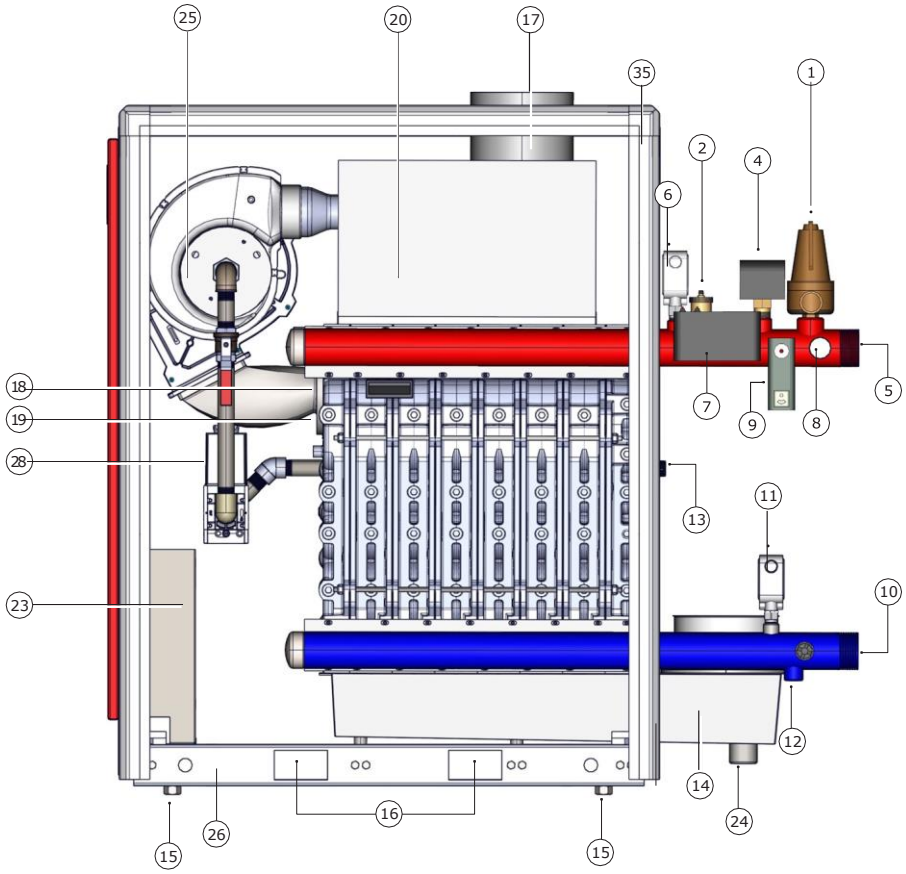


A	Boiler Water Supply	2 1/2"F	D	Gas Connection (NPT male)	1"	G	Wiring Junction	1/2"
B	Boiler Water Return	2 1/2" F	E	Combustion Air Inlet	8" ID	F	Honeywell Touch Screen	7"
C	Boiler Exhaust Connection (ABS1050)	8" ID	C	Boiler Exhaust Connection (ABS750/ABS900)				6" ID

Ref.	Description	Size	Ref.	Description	Size
1	Pressure Relief Valve	1"	7	Aquastat (Manual Reset)	1/2"
2	Flow Switch	3/4"	8	NTC Temperature Sensor (Return Water)	1/2"
3	Air Vent	1/4"	9	Spare	1/2"
4	NTC Temperature Sensor (Supply Water)	1/2"	10	Boiler Drain	3/4"
5	Temperature and Pressure Gauge	1/2"	11	Condensate Drain	1 1/4"
6	Low Water Cut Off (Manual Reset)	3/4"			

Service Clearance

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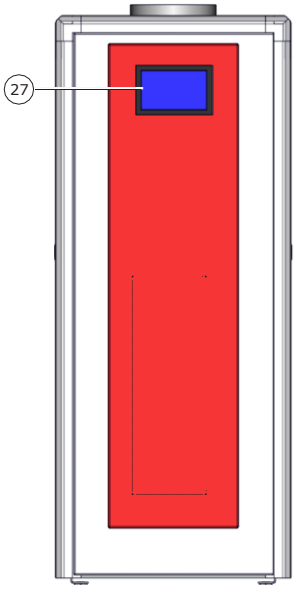
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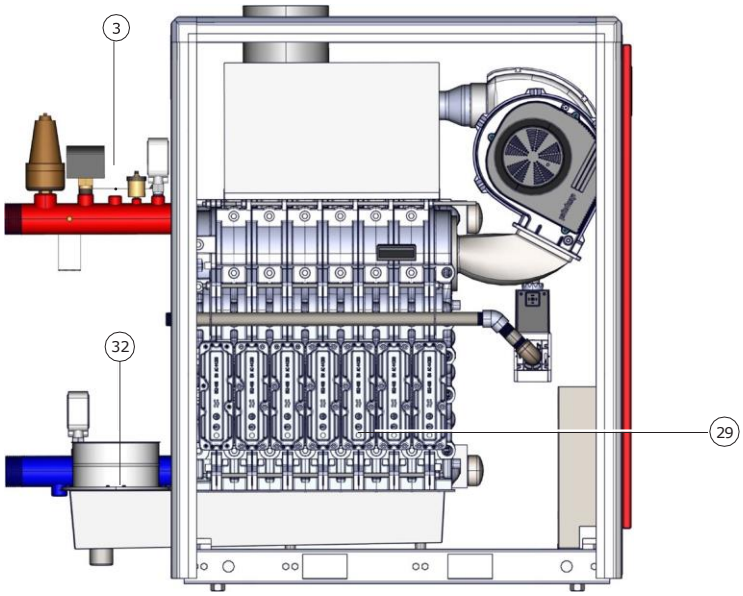
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The service side of the boiler (with the heat exchanger inspection cover) is the front.

1. Pressure Relief valve.
2. Air Vent.
3. Spare
4. Flow Switch (Optional)
5. Boiler Supply
6. NTC Temperature Sensor (Supply water)
7. Low Water Cut Off (Manual Reset)
8. Temperature and Pressure Gauge
9. Aqua-stat (Manual Reset)
10. Boiler Return
11. NTC Temperature Sensor (Return Water)
12. Boiler Drain
13. Gas Connection
14. Condensate Pan
15. Anchor Bolt
16. Fork Left Packet
17. Combustion Air Inlet
18. Inspection glass
19. Ignition/Ionization electrode
20. Air Box
23. Boiler Control Box
24. Condensate Pan Drain
25. Fan
26. Base Frame
27. Honeywell Touch Screen
28. Gas Valve
29. Heat Exchanger

3.2 Technical Data Sheet

ABS Model		750	900	1050
Performance Data	**unit**			
Maximum gas input	MBH (KW)	750(230)	900(264)	1050(308)
Minimum gas input	MBH (KW)	75(23)	90(26)	105(31)
Rated heat output AHRI at 100°F return	MBH (KW)	701(205)	842(247)	982(288)
Minimum Heat Output	MBH (KW)	70(21)	84(25)	98(29)
Gross output at 104°F supply / 86 °return (40°C /30°C)	MBH (KW)	724(212)	869(255)	1014(297)
Gross output at 176°F supply / 140 °return (80°C /60°C)	MBH (KW)	660(193)	792(232)	924(271)
Boiler horsepower	H.P.	21.7	26.1	30.4
Natural gas rated combustion efficiency 100°F return	%	93.5	93.5	93.5
Natural gas rated thermal efficiency(net) 100°F return	%	93.2	93.2	93.2
Firing sequence - turndown ratio		Full modulation - 10:1		
General Data				
Boiler category		Condensing		
Heat exchanger r construction		Aluminum / Stainless steel condensate pan		
Heating surface area water side	ft²(m²)	18.35(1.705)	22.02(2.05)	25.69(2.39)
Maximum allowable working pressure MAWP	PSIG (Bar)	80(5.5)		
Water content	Gallons(Liters)	5.9(22.3)	6.6(24.9)	7.3(27.6)
Boiler operating control		Honeywell Sola R910A		
Touch screen		Honeywell 7" S7999D1006		
Weight dry	Lbs.(KG)	650(295)	700(318)	750(341)
Shipping weight	Lbs.(KG)	670(304)	720(327)	770(350)
Operating weight	Lbs.(KG)	700(318)	755(343)	810(368)
Operational Data				
Water Pressure drop at 20°F ΔT	FT. H_2O (mbar)	9.75(291.4)	9.65(288.5)	10.80(322.8)
Water Pressure drop at 30°F ΔT	FT. H_2O (mbar)	4.33(129.4)	4.39(131.2)	4.87(145.6)
Water Pressure drop at 40°F ΔT	FT. H_2O (mbar)	2.436(72.8)	2.413(72.1)	2.718(81.2)
Nominal flow rate 20°F ΔT	GPM (LPM)	75(284)	90(340.5)	105(397.5)
Nominal flow rate 30°F ΔT	GPM (LPM)	48(182)	58(219)	67(253.6)
Nominal flow rate 40°F ΔT	GPM (LPM)	37.5(142)	45(170)	52.5(198.7)
Maximum flow rate	GPM (LPM)	87(326)	104(391)	121(458)
Minimum flow rate at ignition	GPM (LPM)	16.5(62.4)	20(75.7)	23(87)
Maximum supply temperature at 22 PSI minimum	°F (°C)	200(95)		
Normal operating temperature range	°F (°C)	68(20)-194(90)		
Maximum pressure loss in vent (sealed combustion)	Inch W.C.(mbar)	+0.20(0.5)		
Maximum pressure loss (combustion air duct)	Inch W.C.(mbar)	-0.22(0.55)		
Vent / Gas Connections sizes				
Flue gas vent diameter	Inches(mm)	6"	6"	8"
Combustion air inlet diameter	Inches(mm)	6"	6"	6"
Required combustion air CSA B-149- Forced draft	CFM(LPS)	119(56)	143(67.5)	167(78.8)
Gas inlet diameter	Inches(mm)	1"(25)	1"(25)	1"(25)
Gas inlet pressure range	Inch W.C.(mbar)	3.5-14"(8.8-34.9)		
Gas inlet pressure range	psi	0.13-0.51		
Venting category		II, IV		
Venting material		Approved UL 1978/ULC 636 - AL-294C, Polypropylene, CPVC		
Electrical data				
Electrical main supply	V/P/H	120/1/60- 15A Maximum		
Power consumption	Watts	480	600	1200
IP-IEC NEMA protection	Rating	IP20 – NEMA Type I		

3.3 Absolute Boiler Specifications:

- Fully assembled cast aluminum floor standing sectional hot water boiler.
- Premix burner with stainless steel cylinder with perforated holes for precise air-fuel mixture and velocity with a stainless tube with woven steel fiber for stable flame and heat insulation.
- Fully condensing boiler.
- ASME approved design, CRN for each Canadian Province.(where applicable)
- Precise air to fuel ratio through firing range with high turn down of 10 / 1 is possible.
- Boiler comes complete with a digital combination flame safe guard and a boiler control, with comprehensive operating, service and fault diagnostic capabilities.
- Firing capabilities, fully modulating [4-20MA].
- Capable of BMS control, 4-20MA
- Local-remote switch [enable/disable].(optional)
- Available for conventional chimney, direct vent and sealed combustion venting systems.
- Fully factory pressure and fire tested.
- Distinctive powder coated enamel steel,
- Removable casing, without the use of tools
- Rigid steel boiler frame with castors for easy of maneuvering into boiler's final position.
- Certified by CSA for USA and Canadian markets.
- High combustion and thermal efficiencies.
- No proven water flow requirements (no flow switch is required)
- No minimum temperature requirements
- Max 80 psi(10.8 bar) – System water operating pressure
- ASME safety relief valve
- Pressure & Temperature gauge
- LWCO
- Lead lag-Cascade (optional)
- BAC Net compatible (optional)
- Communication gateway (optional)
- CSD-1 compliant

3.4 Ordering options:

-- Available in inputs from 750 to 1050 MBH, 3 models
- Control options:
- Honeywell Sola control with touch screen control
- Service kits for heat exchanger
- Condensate neutralization system with or without pump
- Multiple boiler control
- Communication gateway
- DHW sensor
- Outdoor sensor
- Local Remote switch
- Seismic anchors
- Air filter strongly recommended when using boiler room air
- Annunciation LED,s /audible alarms
- Other parameters are available

3.5 Pressure relief valve requirements

Model	30 psi(std)	40 psi	50 psi	60 psi	70 psi	80 psi
ABS 750	10-605-05	10-605-07	10-605-10	10-604-12	10-604-14	10-604-16
ABS 900	10-606-05	10-606-07	10-606-10	10-605-12	10-605-14	10-604-16
ABS 1050	10-607-05	10-606-07	10-606-10	10-606-12	10-605-14	10-605-16

Note: 30 PSI is standard

Consult Innovative Industrial Inc. for other available options, all orders must be specified if optional controls are to be installed before shipment.

4. Installation:

4.1. General installation Instructions

NOTES:

All gas appliances must, by law including, this boiler must be installed by a competent trained and or licensed gas-heating technician, or gas supplier. It is in your own interest and that of safety to ensure that the local law is complied with. The following codes must be adhered to when the Absolute Boiler is installed:

-CSA B149 gas installation code & ANSI Z223.1 / NFPA 54 gas code.

In addition to the above regulations, this boiler must be installed in compliance with:

- National & local building codes
- ASME CSD-1 as required
- CSA & NEC electrical codes
- Other Regulations

WARNING

All Absolute boilers are CSA certified, and must not be modified or installed in any way contrary to these "Installation and operations manual.

4.2 Delivery and installation

The Absolute boiler is supplied fully assembled, plastic wrapped and crated on a pallet. The Unit should be completely inspected for evidence of shipping damage and shipping completeness at time of receipt. From the carrier and BEFORE the bill of ladling is signed. The carrier MUST be notified immediately if any damage is detected.

The overall dimensions of the crates are minimum 24'' (92cm) wide, 70'' (178 cm) high with a minimum length of 61"(155 cm). Excluding the crate, the boiler is 22 1/16'' (56 cm) wide complete with casing panels, the boiler will fit through most standard doors (minimum door opening width 34.5" (87 cm). The boiler itself has at least one swivel wheel(caster) so that, once the packaging has been removed, it can easily be moved around on a smooth surface. Once in position the boiler is fixed into position using the fitted jacking bolts which both raise the wheels of the ground and level the boiler. There are no loose components shipped with this boiler; siphon, relief valve and safety limits are all factory installed. Only the boiler IOM manuals are sent loose.

4.2.1 Site preparation

Ensure that the site selected for the installation has the following:

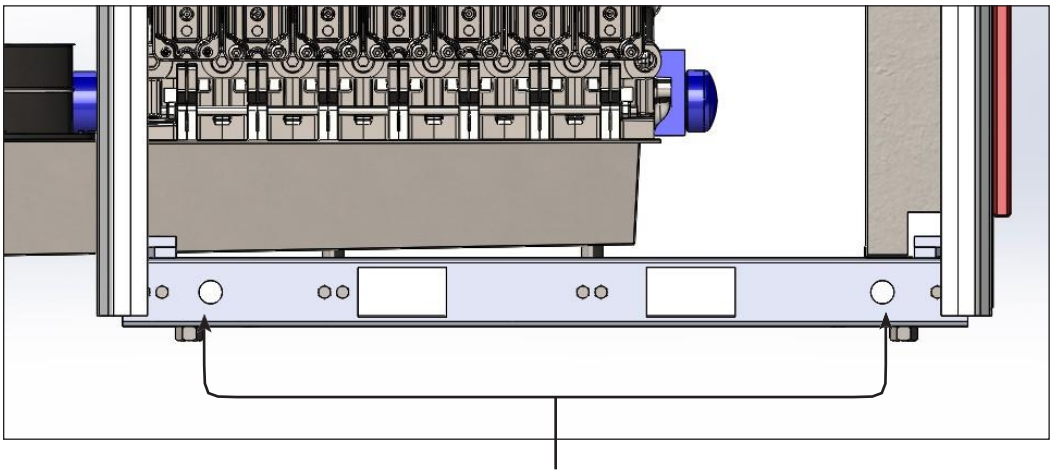
- Access to AC input power of 120 VAC.
- Access to a natural gas line at a minimum gas line pressure of 3.5 inch W.C. to a maximum of 14 W.C.
- Vent lengths as per Page 27
- Combustion air and dilution are as per local codes.
- Access for a drain for the condensation. See section 4.7
- All gas piping, water piping and electrical conduit or cable must be arranged in a manner that does not interfere with the removals of any panels or limit the access to service or maintenance of the unit.
- For multiple boiler installations, it is critical to plan the positioning of each unit in advance. Adequate space must be allowed for pre connections, and future service and maintenance requirements. All piping must include ample provisions for thermal expansion.
- If lead lag confirmations is to be utilized, it is important to identify the lead boiler and place this boiler in the area that allows the control to be easy access for both operator and service personnel.
- The water quality is crucial to the performance and longevity of this boiler. Ensure water quality is to the specifications outlined in the water quality manual or warranty will be voided. Contact factory for further clarification if needed

WARNING

Always keep the area free and clear of all combustible materials and flammable vapors or liquids'. Ensure there are no flammable items stored in the vicinity of the boiler.

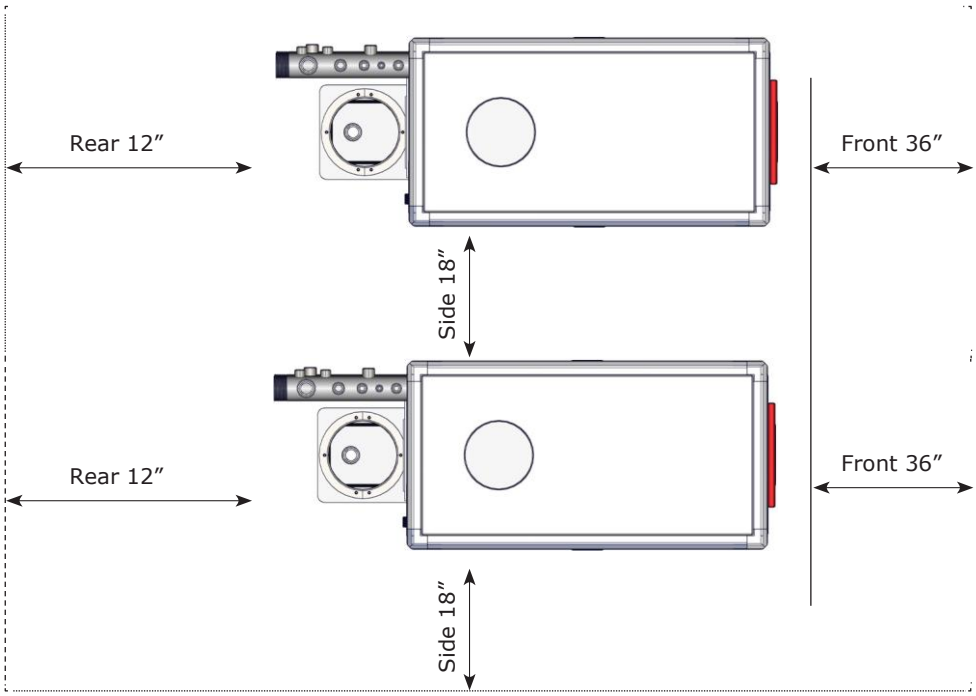
4.2.2 Hoisting the boiler

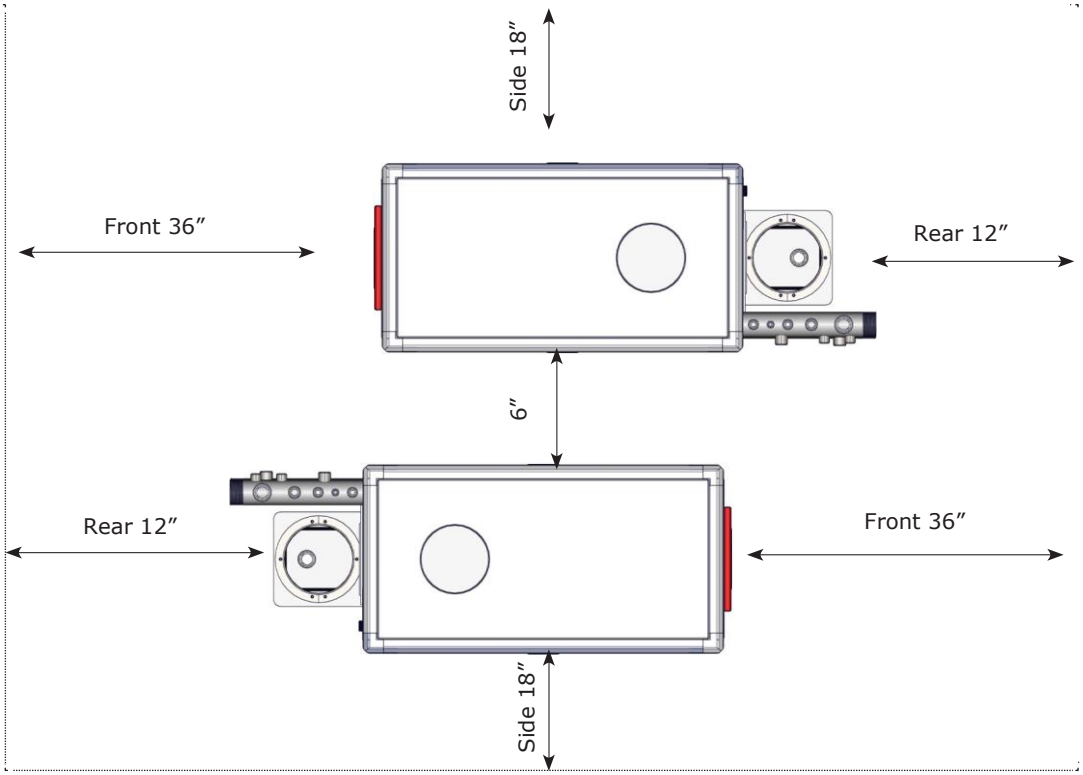
The boiler is designed to be hoist if required using two 1 inch diameter rods, 48 inches long that can be placed through the frame on either side of the fork lift slots. Ensure the lifting bars are properly placed through these holes and a sling is used that has a minimum rating of 6000 lbs per sling. One sling must be used on each bar. Ensure no personnel stands underneath the boiler as it is hoisted.



Lifting bar locations

4.2.3 Multiply boiler arrangements





4.2.4 Setting the boiler in place

It is recommended that a house keeping pad 4 to 6 inches high be installed to ensure proper condensate drainage.

If anchoring the boiler is required due to local codes for seismic activities potential, ensure 4 holes ¾ diameter by 4 inches deep are drilled in the house keeping pad as per the dimension shown in figure# 4

The boiler frame has been drilled with 4 holes of 7/8 diameter, allowing for a ¾ X 9 inch long concrete wedge anchor bolt to be placed thru the frame and into the concrete. Ensure to drill the 4 holes a minimum of 4 inches deep to allow the concrete wedge anchor bolt to securely fasten into the concrete.

- See Figure# 4

CAUTION

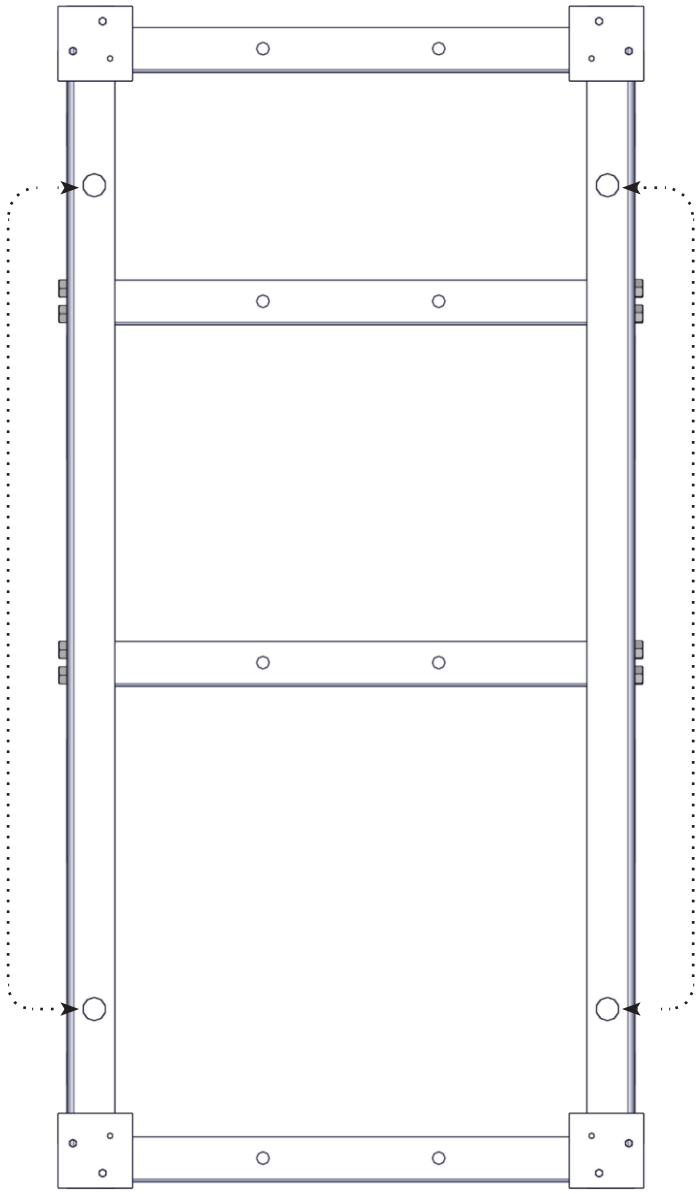
- Always transport the boiler in the protective packaging whenever possible.
- Remove fixing strips, packaging lid and all other packaging, leaving the boiler on the pallet.
- Place the packaging lid on the end of the pallet, creating a ramp – secure with screws.
- Roll the boiler, on its wheels, off the pallet and down the ramp to the boiler room floor.

CAUTION

The wheels are designed for transport purposes only and must not be used when the boiler is in its final position! Additional protection may be required if site conditions warrant it – overhead builders working, insulation, etc. Do not install boiler on carpet or other combustible materials. Never stand on the boiler. The boiler casing is not designed for excessive force or weight.

CAUTION

- Use retaining straps to control the rate of travel
- Do not stand in front of the boiler.
- Maneuver the boiler to required final position.
- The pallet lid can be used as a rocking ramp to convey the boiler over obstacles, such as thresholds, etc.



4.3 Flue gas discharge and air supply

The Absolute Boiler is suitable for both conventional room-supplied or sealed combustion. It is listed as a 100% sealed combustion boiler. Sealed combustion terminals should comply with the local and national codes. Any horizontal pipe-work in the flue gas discharge system should slope towards the boiler. This horizontal venting must be properly secured to the building as per the vent manufacturer's installation manual. The horizontal venting must not have low spots and must not sag. Horizontal pipe-work in the air supply system should slope towards the supply opening and may require a drain point at the low point. Care should be taken when locating flue exit positions as a vapor plume will be visible when the boiler is operational (flue gas temperature will be less than 170°F [77°C] resulting in the water vapor condensing out on contact with the air).

4.4 Boiler Venting Types

Flue gas venting:

- Use only an approved gas vent category II and IV type "BH." AL 29-4C venting must be used for the flue gas venting.
- The venting shall be sized by a chimney venting specialized or professional engineer using methods of vent calculations that are acceptable to the National and local codes have jurisdiction. The vent shall then extend vertically 5 ft (1.5M) minimum through the roof ceiling.
- Do not use any CPVC or PVC venting, or single wall unlisted metal pipe
- Category II-Negative breaching pressure ranging from 0 to -0.29 inches water column(0 to 22mbar)
- Category IV-Positive breeching pressure ranging from 0 to +0.20 inches water column (0 to 50 mbar)
- Follow the vent manufactures recommended and supplied instructions regarding; vent connection, cleaning, sealing and support.

DANGER

PVC or CPVC should never be used in the Absolute Boiler. PVC and CPVC is not rated for the potential flue temperatures and failure of this venting material can cause severe personnel injury or death! Use only AL 29-4C for the flue gases.

Conventional Chimney Applications:

A vertical chimney-vent system with the air supply, required for combustion, provided within the boiler room or combustion air source provided into the room.

Direct Vent [Side wall] Applications:

A horizontal vent system with the air supply, required for combustion, provided within the boiler room or combustion air sources provided into the room. Ensure proper reassembly and resealing of the vent-air intake system.

CLV – Sealed Combustion Systems Applications:

Vertical or horizontal venting systems for both, the flue gases and combustion air operating at two different pressure zones or vent terminal locations.

Seal Combustion System Applications:

A vertical or horizontal venting system for both, the flue gases

and combustion air at same termination and pressure level.

4.4.1 Venting options

The standard delivery of the Absolute boiler can be installed with any of the venting options listed above.

See each respective section for details; discard the air intake grill when using sealed combustion vent systems.

4.4.2 Vent Termination Inlet/Outlets

The vent terminals must be installed to provide suitable protection against wind, rain, snow or blockage along with a rodent/debris screen. Conventional chimney application can use a tapered cone, and for sidewall or direct venting, use a termination tee fitting.

4.4.3 Combustion Air Supply Requirements

The boiler requires a clean, fresh and adequate supply of combustion air, free of chlorine, halogenated hydrocarbons, or other chemicals that can be hazardous when used in gas combustion fired equipment. Failure to provide sufficient combustion air supply will result in carbon monoxide (CO) production that could lead to personnel injury including loss of life or damage to the boiler and property.

Not obstructing the flow of combustion and ventilation air.

It is strongly recommended to install an air filter on boiler air inlet if using boiler room supplied air. This is optional and must be purchased

Vent and air intake connection to the Boiler:

Ensure both vent and air intake is properly supported to the building. The boiler is not designed to take any weight vertically.

Horizontal sections of venting must be properly supported in a manner to prevent any sagging or low spots. For Category II AND IV ensure the slope is ¼ to ½ inch per inch towards the boiler, to prevent accumulation of condensate, and ensure there is a adequate drainage for the condensate.

Flue gas vent collar:

- Each Absolute boiler is supplied with a ½ inch NPT port to house a flue gas temperature sensor.
- Each Absolute boiler is supplied with a ¼ NPT test port for a combustion probe. Ensure the test port in sealed after combustion analysis.
- The flue gas vent collar is designed to accept venting that will fit inside the diameter and attach mechanical with 2 toggle clamps that latch on to the oversized ring at the top of the flue gas vent collar.

CAUTION

Do not install venting over top of the flue gas collar and do not drill into the side of the vent collar

Special attention:

- Quality of combustion air
- It is strongly recommended to install an air filter on the boiler air inlet if using boiler room supplied air. This is filter is optional and must be purchased
- Dust, fumes, corrosive elements, hydrocarbons, other unknown containments are harmful and must be avoided.
- Paint, beauty, automotive etc. shops are harmful and detrimental to the boiler.

WARNING

The flue gas vent pipe must be airtight and watertight. Horizontal sections of the venting must slope downward towards the boiler ½" per linear foot [12mm] and adequate vent support must be provided.

4.4.4 Room combustion air supply requirements:

The boiler must be provided with an adequate combustion air supply, the combustion air supply requirements must be determined and sized in accordance to national and local codes having jurisdiction. CSA B149 & ANSI Z223.1 – More than one combustion air source maybe required.

When air is taken from outside, maintain a minimum of one square inch of fresh air inlet for every 30,000 BTU/H of total burner input. The area must be free of any restrictions such as louvers, or screens. See local gas codes for more information. Also see page 29 for combustion air CFM requirements.

In non-sealed applications where combustion air is taken from the boiler room, an optional combustion air filter is recommended to be fitted to the boiler air intake. Ask your representative for availability.

Air supply venting materials:

Single wall aluminum, cpvc pps, and stainless steel material.

Air supply structure:

The air supply pipe must also be airtight. Horizontal sections in the air supply must slope away from the boiler towards the supply opening and incorporate a drain connection if the route rises from a lower point. It is necessary to provide

WARNING

Motorized louvers shall be interlocked with the appliance so that they are proven open prior to the main burner ignition and operation

4.4.5 Conventional vent system clearances

- Vent termination shall terminate at least 3 feet above any forced air inlet that is within 10 feet horizontally
- Vent system shall terminate at least 4 ft below, 4 ft horizontal from or 1 ft above any door, operable window or gravity inlet into a building.

Direct Vent (sealed combustion) systems clearances

- Vent termination shall be located a minimum of 36 inches from any opening in the building. The bottom of the vent termination shall be at least 12 inches above grade. Both air intake and vent termination must be 12 inches above the highest expected snow fall lines.
- Do not terminate venting over areas where condensate vapors can affect or be detrimental to the operations of regulators, relief valves or other equipment

WARNING

The boiler should never be operated in a negative building pressure. Caution should be exercised with exhaust fans, air handling & other devices, that could affect the buildings air pressure or combustion air supply. All venting must be arranged to avoid and prevent the accumulation of flue gas condensation.

WARNING

An improperly sealed venting system could result in carbon monoxide poisoning; ensure adequate support and fastening of the system. Ensure venting can safely exhaust all flue gases to the outside in a safe and effective manner. Do not puncture or drill holes in any portion of the venting, the boiler is equipped with a pressure and emission test port.

WARNING

Warning & Precautions for Co-venting: Only co-vent this boiler with another, category II appliance. Co-venting with other appliances shall conform and be sized in accordance to local and national codes [CSA B149 & ANSI Z223.1] according to appropriate tables in Part II of the above mentioned codes.

WARNING

Do not place intake or exhaust terminations above a walkway or sidewalk as the condensation can cause icing of walking surface. Maintains a minimum of 4 feet horizontal from any gas or electric meter.

WARNING

The boiler vent shall not be connected to any other portion of a mechanical draft system without consulting a vent manufacturer.

DANGER

Do not use a barometric damper, Harmful flue gases may leak into the room and cause serious injury or death.

DANGER

All boiler venting systems should be sized by a qualified venting professional experienced in venting system design. The information contained herein should be used as guide only, and is not intended to use in lieu of a qualified technical expertise in gas appliance venting

WARNING

Visually inspect the venting system for proper size and horizontal pitch and determine there is no blockage or restriction, leakage corrosion and other deficiencies which could cause an unsafe condition

WARNING

Keeping boiler area clear and free from combustible materials, gasoline and other flammable vapors and liquids.

Venting lengths must not exceed the minimum and maximum equivalent lengths show in chart below. Any horizontal runs of the venting must slope towards the boiler ¼ to½" per linear foot

Chimney applications:

This venting system uses a single vent to discharge all flue gases to the outside vertically, combustion air provided with the boiler room, the air source must be sized in accordance to national codes CSA B149 & ANSI Z223.1 or local codes having jurisdiction, more than one source may be required.

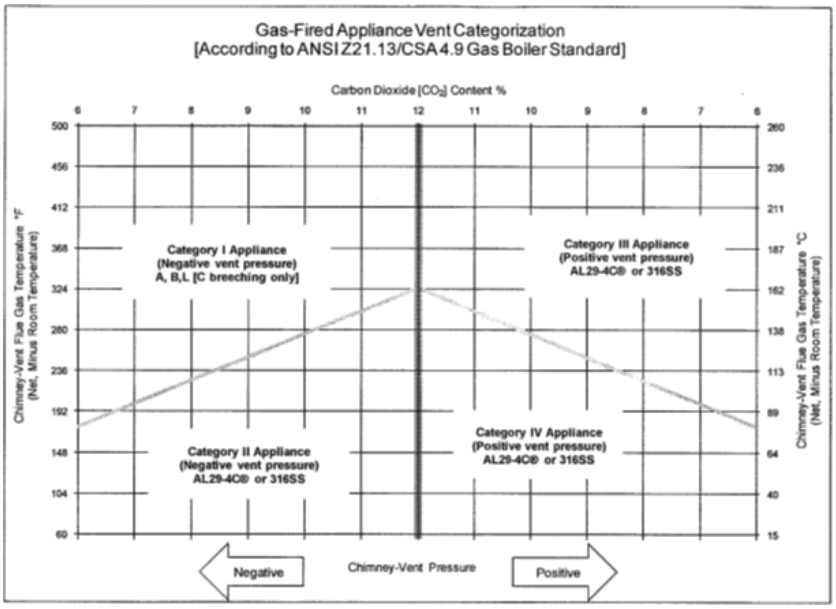
This venting system uses two separate vents, a vent for combustion air and another for the flue gases. Combustion air is not used within the boiler room. All combustion air is from the outdoor source. The vent terminal shall discharge flue gases away from the building structure so that the flue gases do not cause damage to the building. The vent terminal locations follow local and national codes requirements.

Model	Combustion Air required CFM	Combustion air ø*		Flue gas Vent ø**		Vent Length [Min]		Vent and combustion air duct equivalent length [Max]***		90° Elbow = Equivalent Length		45° Elbow = Equivalent Length	
		Inch	mm	Inch	mm	Ft.	m	Ft.	m	Ft.	m	Ft.	m
ABS750	123	6	150	8	200	5	1.5	100	30.5	10	3.05	5	1.5
ABS900	148	6	150	8	200	5	1.5	100	30.5	10	3.05	5	1.5
ABS1050	172	6	150	8	200	5	1.5	100	30.5	10	3.05	5	1.5

* Combustion air duct diameter and length shall be calculated so that friction loss does not exceed 0.22" w.c.
** Vent length and diameter shall be calculated so that the friction loss does not exceed 0.20" w.c.
*** Individual vent lengths for combustion air and flue gas vent.
Note: When combustion air or vent configuration exceed this table, vent and combustion air should be designed and calculated for larger diameter.

DANGER

At the time of removal of any existing boiler is removed from a common vent system, the following steps shall be performed with each remaining appliance connected to the common vent in operation and not in operation. Seal any unused opening in the common vent system. This boiler must not be co-vented with a category I or III appliance.



Application Note:

In all applications the venting must be between the minimum and maximum equivalent vent lengths shown in. For values not shown in the chart, consult your local sales representative

4.4.6 Co-venting – Retrofitting:

	DANGER
At the time of removal of any existing boiler is removed from a common vent system, the following steps shall be performed with each remaining appliance connected to the common vent in operation and not in operation. Seal any unused opening in the common vent system. This boiler must not be co-vented with a category I or III appliance.	

Any improper interconnection of venting systems may result in leakage of flue gases into the occupied space.

- Any unused opening of the vent system must be properly sealed.
- Visually inspect the venting system for proper size and horizontal pitch, determine there is no blockage, restriction,
- Leakage, corrosion and other deficiencies could cause an unsafe condition.
- Close all building doors, windows and all doors between the appliances which remain connected to the common venting system are located and other space of the building. Turn on clothes dryers, exhaust fan at maximum speed and any appliance not connected to the common vent system, close fireplace dampers. Do not operate a summer exhaust fan.
- Place in operation each of the appliances installed in the common vent system being inspected. Follow the lighting

Instructions: Adjust thermostat so appliance will operate continuously.

- Test for spillage near and around the each of the gas appliances after 5 minutes of main burner operation.
- After determining that each appliance remaining connected to the common venting system properly vents when tested as outlined above, return all doors, windows, exhaust fan, fireplace dampers and any other gas burning appliance to their normal positions.
- Any improper operating of the venting system must be corrected so the installation conforms to either ANSI Z223.1/ NFPA 54 or CAN/CSA B149.1 gas installation codes. When resizing any portion of the common venting system, the common venting system shall be resized to approach the minimum size as determined using the appropriate tables in Part II of ANSI Z223.1/NFPA 54 gas code &/or CAN/CSA B149.1 natural gas and propane installation code. When resizing any portion of the common venting system, the common vent system should be resized to approach the minimum size as determined using the appropriate tables in Appendix F in the National Fuel Gas code ANSI Z223.1/NFPA 54 and or CAN/CSA B149.1 Natural Gas and Propane Installation guide

4.4.7 Vent terminations installation precautions:

[Consult national & local codes for other requirements]

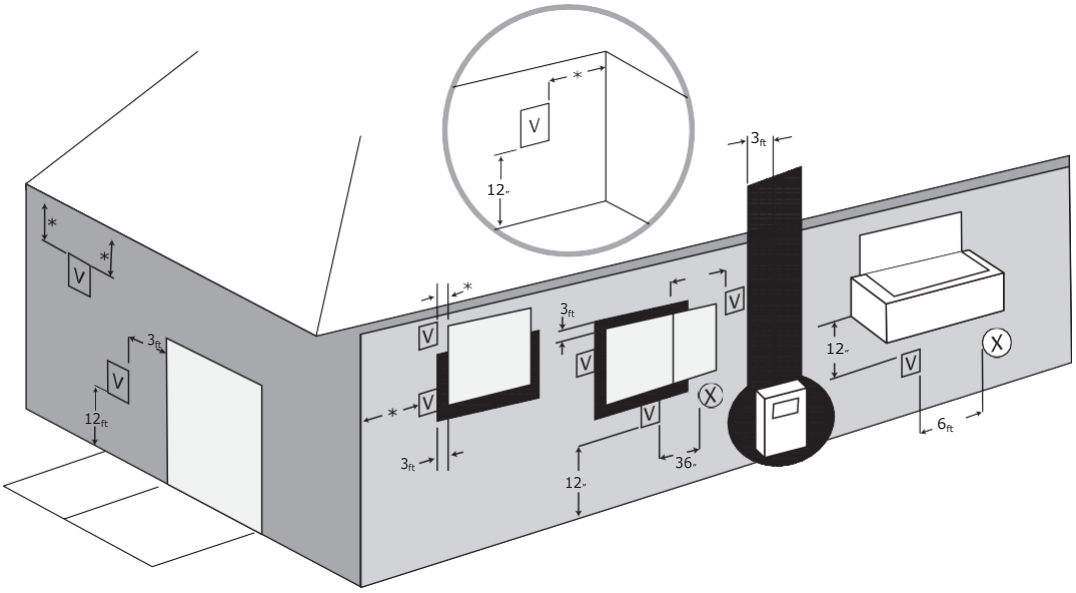
All exhaust terminations for conventional chimney must be finished with a finishing cone with tapered end, with a bird/ rodent screen. All sidewall, direct vent systems must be finished with a tee termination, the combustion air inlet must be a 90° and must be provided with a debris/bird-rodent screen. All terminals shall be arranged to avoid the directions of prevailing winds and prevent the accumulation of flue gas condensation.

WARNING

In all installations avoid vent termination locations where excessive debris or snow could accumulate leading to blocking of the vent terminals or where prevailing winds and rain could enter the vent terminal creating additional resistance to the venting system.

Vent terminals should avoid being installed where the building exterior could be tarnished from the flue gases, a shield or another location should be considered.

The vent terminals shall be installed according to the instructions as provided. Terminals shall not be less than 2 inches [50mm] from the wall surface or more than 10 inches [254mm] from the of terminal to the wall. For high traffic locations, the vent terminal shall be guarded to prevent personnel injury.



According to the national gas codes [CSA B149 & ANSI Z223.1/NFPA 54] a vent shall not terminate:

- Directly above a paved walkway or driveway which serves two or more buildings or where the flue gas condensation or vapor could create a hazard or improper operation of regulators, relief's or valves or any other device.
- Above or below any electric or gas meter, regulators & relief devices unless a 4ft [1.2m] horizontal clearance distance to be maintained.
- Less than 7ft [2.1m] above any paved sidewalk or driveway.
- Less than 3 feet (.9M) from any combustion air inlet source located within 3 feet.
- Less than 6ft [1.8m] from any combustion air inlet source.
- Less than 6 feet (1.8M) from any combustion air inlet sources of any nearby building.
- Less than 5 feet (1.4M) from the vent outlet of a supply tank.
- Less than 1 foot (.3M) from the roof or soffit
- Less than 6 feet (1.8M) from any window, door or mechanical or non-mechanical combustion air supply to any building.
- Less than 4 feet(1.2M) from an oil tank vent or oil fill inlet
- Within 6 feet (1.8M) of any property line.
- Less than 3 feet from any corner or L shape in the building structure.
- Less than 4 ft [1.2m] above a meter/regulator assembly horizontally from a vertical centerline of the regulator vent outlet to a maximum vertical distance of 15ft [4.6m].
- Less than 1ft [03m] above grade or normal snow level in the area is expected.
- Less than 3ft [0.9m] from windows, doorways, and combustion air supplies nearby buildings or other appliances.
- Under a veranda, porch or deck, unless [1] the veranda, porch or deck is fully open on at least 2 sides underneath. [2] The distance between the top of the terminal and the grade is greater than 1ft [0.3m].

4.5 Condensate drain connection and trap

The Absolute boiler is fitted with a 1 ¼ NPT drain port near the back and bottom face of the condensate pan. Discharge the condensate directly into a drain. Only use synthetic material for the connecting pipe-work because of the acidity of the condensate (pH 2-5) and allow a min. 1.2 inch per 3 ft. [30mm per meter fall], to ensure a good gravity siphon flow rate. Fill the siphon with clean water before firing the boiler. It is not advisable to discharge into an outside gutter because of the risk of freezing. If installed outdoors, it must be field heat traced. Consult local codes. A condensate neutralizer may be required by local code, and should always been used if the drain system is of a cast iron material.

4.6 Water connection

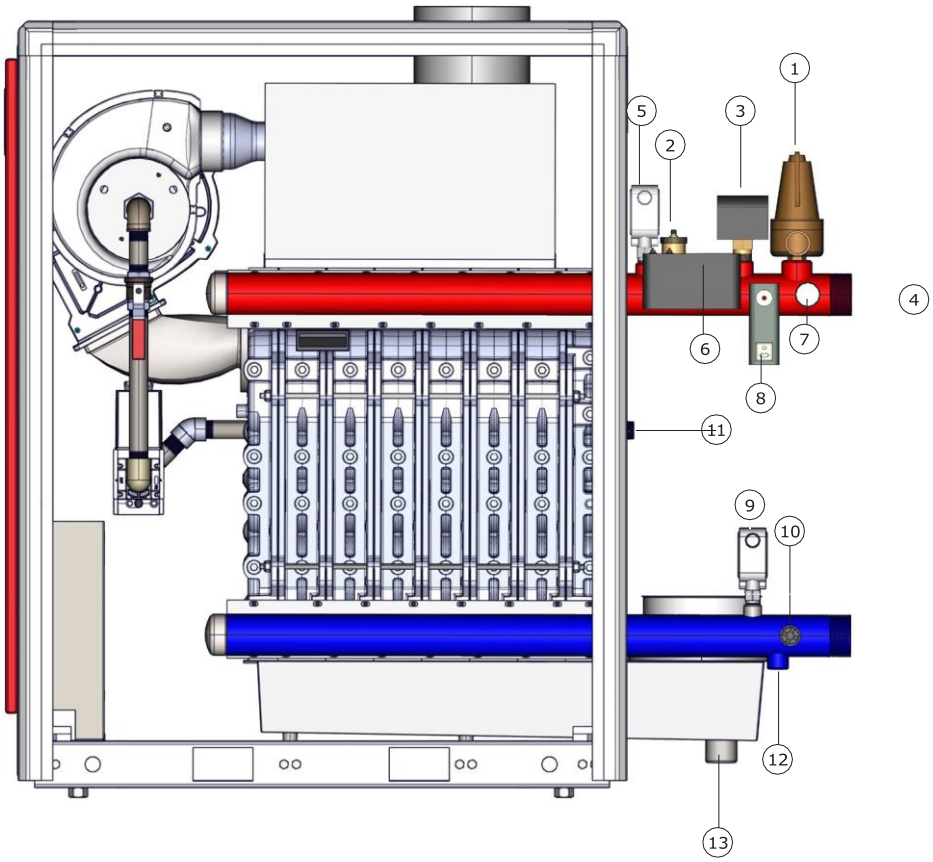
The Absolute boiler is supplied with $2^{1/2}$ inch NPT inlet and outlet manifolds. It is advisable to install a shut off valve for the both the supply and return to allow removal of the boiler in the future. All water connections should be in compliance with national and local code requirements. The boiler shall not be used as pipe anchor. The lower connection (blue) is for the return, the upper connection (red) is the supply.

The supply connection tube has the following ports connections for:

1. Pressure Relief valve
2. Air Vent.
3. Flow Switch
4. Boiler Supply ($2^{1/2}$ NPT male)
5. NTC Temperature Sensor (Supply Water)
6. Low Water Cut Off
7. Temperature and Pressure Gauge
8. Aquastat (Manual Reset)

The return connection tube has the following port connections:

9. NTC Temperature Sensor (Return Water)
10. Boiler Return $2^{1/2}$ NPT male
11. Gas Connection Supply
12. Boiler Drain
13. Condensate Drain



4.6.1 Water pressure

The boiler is suitable for a maximum working pressure of 80 psi [10.8 bar], the system pressure shall be at least 12 psi [0.8 bar]

4.6.2 Safety valve

A safety relief valve NB certified with V or HV symbol as supplied must be installed on the boiler supply piping without any obstructions. Do not install any valve or fitting that will restrict the relief valve. The relief must be not smaller than ¾" and no larger than 2 inch NPT. The pressure shall not exceed 10% above the MAWP and must be of an automatic reset type. The valve opening must be routed away so that no injury to persons or damage to property will result. Consult local codes. When replacing this safety relief valve, the relief capacity must be > than the minimum relief capacity as listed on the rating plate. Please see page # 19 for pressure relief valve selection, based on system pressure and input rating of boiler.

WARNING

Reducing couplings or other restrictions are not permitted in the discharge pipe. Ensure the discharge pipe faces down and into a floor drain where ever possible.

4.6.3 Water treatment

The heat exchanger is manufactured from aluminum alloys which will provide many years of excellent service, if maintained properly. All heat exchangers require proper water conditions to remain efficient and function properly. Failure to do so will lead to premature failures within the heat exchanger. The system should be filled with mains, cold water (this will usually have a pH of between 7 and 8). Pressurized installations with a boiler/system content ratio of 1:10 or less should not require water treatment, provided the following conditions apply:

1. The system is flushed thoroughly to remove all fluxes and debris and filled completely once.
2. Make up water is limited to 5% per annum.
3. The hardness of the water shall conform to the water quality document requirements (supplied with Boilers)
4. All scale deposits will reduce the efficiency of the boiler and should be prevented. However provided the above is complied with any scale produced will not be too detrimental to the boiler efficiency and will not reduce the anticipated life expectancy of the boiler.

WARNING

The boiler water shall be maintained between 7 and 8 ph at all times. Failures to do so will nullify any and all warranties implied.

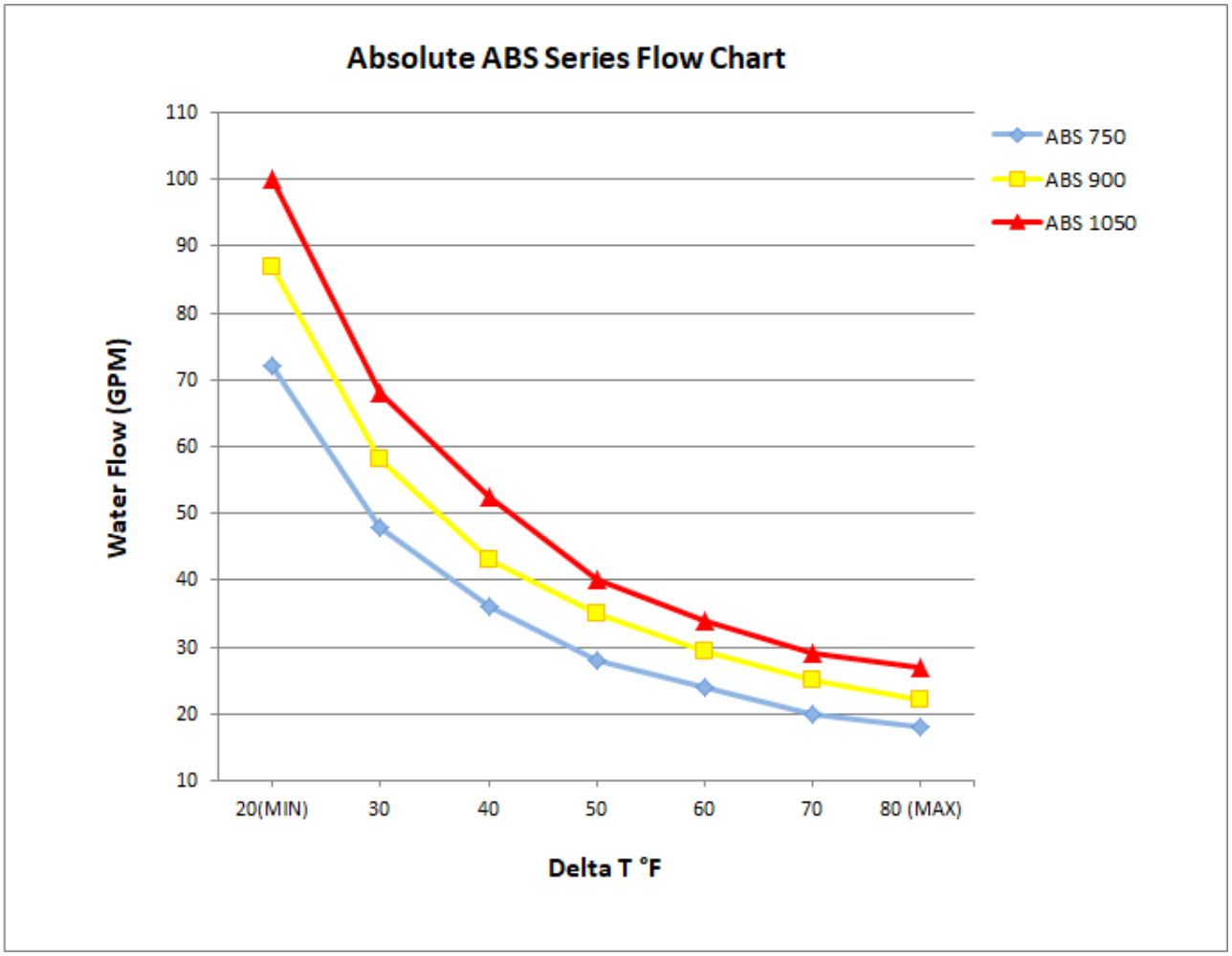
Suitable chemicals and their uses should be discussed with a specialist water treatment company before to carrying out any work. The specifications of the system and the manufactures recommendations must be taken into account, along with the age and condition of the entire system. New systems should be flushed thoroughly to remove any traces of flux debris grease and metal swarfs generated during installation and assembly of a new system

For old systems to ensure any black metallic iron oxide sludge and their corrosives residues are removed, again by power flushing, ensuring that the entire system is drained and completely clean of all possible debris.

4.6.4 Water Flow

See the chart below for proper water flow requirements. Incorrect flow may cause eventual damage or premature boiler failure that may not be covered under the warranty

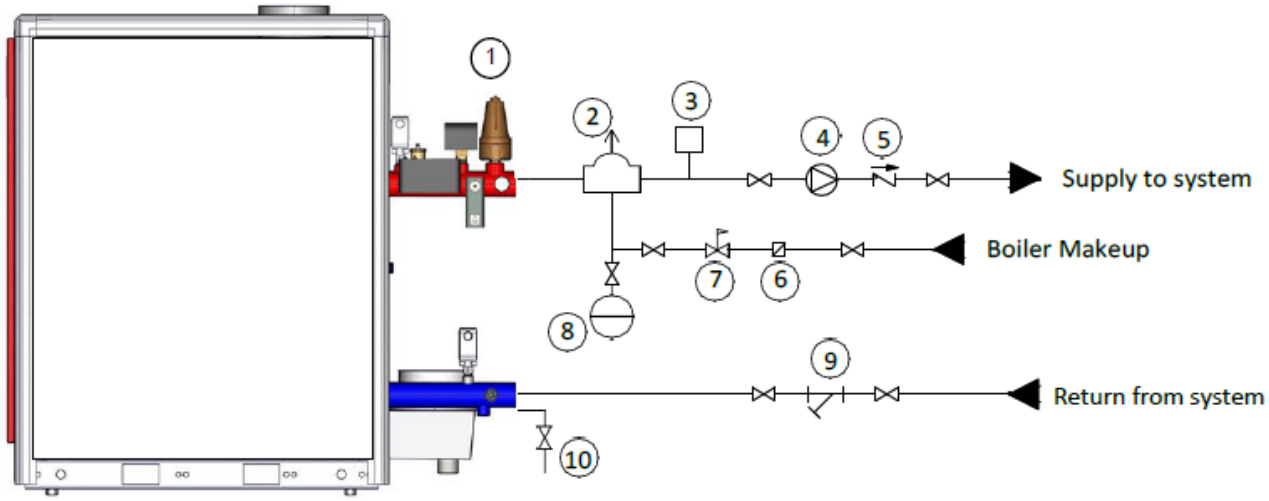
Proper flow rates may be achieved through a combination of primary and secondary flow loops. Multiple zones and pumps may result in different flow rates at different times Consideration must be given to all possible conditions and their consequences. The flow rate published for all boiler models are applicable @ 100% firing rate.



4.6.5 Typical water system layout

- The piping diagram illustrates the minimum boiler system controls needed, the by-pass system is not necessary, but can be used in multiple heating temperature circuits.
- Consult all national, local and building codes having jurisdiction for other requirements regarding the boiler system.
- It is strongly suggested a decoupling devise is used when the system flow is unknown. For multiple boilers, consult the factory.
- Check local codes regarding condensate discharge into a common drain.
- Water must be analyzed to ensure acceptable quality. If make water consumption is unknown, the system should be checked at regular intervals – consult water specialists for assistance.
- When the boiler is connected to a refrigeration system, it must be installed so the chilled medium is piped in parallel with the boiler with appropriate valve to present the chilled medium from entering the boiler.
- The boiler piping system of a hot water boiler connected to heating coils located in air handling units where they may be exposed to refrigeration air circulation must be equipped with flow controls valves or other automatic means to prevent gravity circulation of the boiler water during cooling operations.
- The boiler is only a part of the complete heating system. This boiler may be fully operational and yet because of poor circulation, control, or other operating characteristics not deliver heat to the desired location. Additional equipment such as temperature sensors, pumps, flow switches, balancing valves, and check valves will be required for satisfactory operation of any system. Innovative Industrial Inc, cannot be responsible for the design or operation of such systems and a qualified engineer or contractor must be consulted.

Typical piping layout



1. ASME rated pressure relief valve
2. Air separator with automatic air vent
3. Low water cut off
4. Circulating Pump
5. Flow check valve
6. Back flow preventer
7. Pressure regulating valve
8. Diaphragm style expansion tank
9. Strainer
10. Drain valve

4.6.6 Frost Protection

The boiler must be installed in a frost free area to prevent freezing of the condensate drain pan and pipe. If the temperature of the heating water drops to much, the built in unit protection activates.

If the boiler is decommissioned or stored for an extended period of time, where temperatures can reach below 2 C, the boiler will need to be:

- Drained,
- De activated
- Electrical power must be disconnected

When the boiler is to be placed back into service, a qualified service technician must be assigned to reconnect the boiler and re commission the unit.

CAUTION

All water piping and reliefs shall be piped to avoid any ingest of water near the boiler controls.

5 Electrical

5.1 General

The Absolute Boiler is supplied with an electronic flame ionization safety control, as standard equipment. A specially designed microprocessor is at the heart of the system. The boiler is pre-wired as shown in the wiring diagram in 12. All external connections can be made on the terminal strips (one low voltage 24V AC and one main power voltage 120V AC). Each boiler must be fused protected for a single phase power source 120/1/60 @ 15A, the circuit must be earth grounded and provided with a service switch that is within hand reach.

WARNING

Electrical shock hazard can cause personal injury or loss of life, including property damage. – All electrical wiring to the boiler and controls must be protected from ingest of water and be properly grounded and bonded according to CEC Part I CSA 22.1 & NEC NFPA 70.

CAUTION

Label all wires prior to servicing the controls. Wiring errors can cause improper and dangerous operations

5.2 Main power voltage

Absolute Boilers require electrical power as per chart below.

The boiler is sensitive to line/neutral and therefore has a facility to ensure that line and neutral are correctly connected. If line and neutral are crossed. The Sola control will alert/hold boiler until polarity has been corrected.

Ensure earth ground is provided and bonded correctly. The grounding must be bonded to the back panel of the control area.

Model	# Sections	Rated Voltage +10/-15%	Electrical Service required	Max Motor Amps	Max Control Amps	Nominal Operating Amps	Nominal Power (kW) Consumption
ABS750	6	120/60/1	120/60/1 - 15A fused disconnect	4	2	4	0.48
ABS900	7	120/60/1	120/60/1 - 15A fused disconnect	4	2	5	0.6
ABS1050	8	120/60/1	120/60/1 - 15A fused disconnect	10	2	10	1.2

5.2 Control unit

5.2.1 Sola Model R7910A-1027

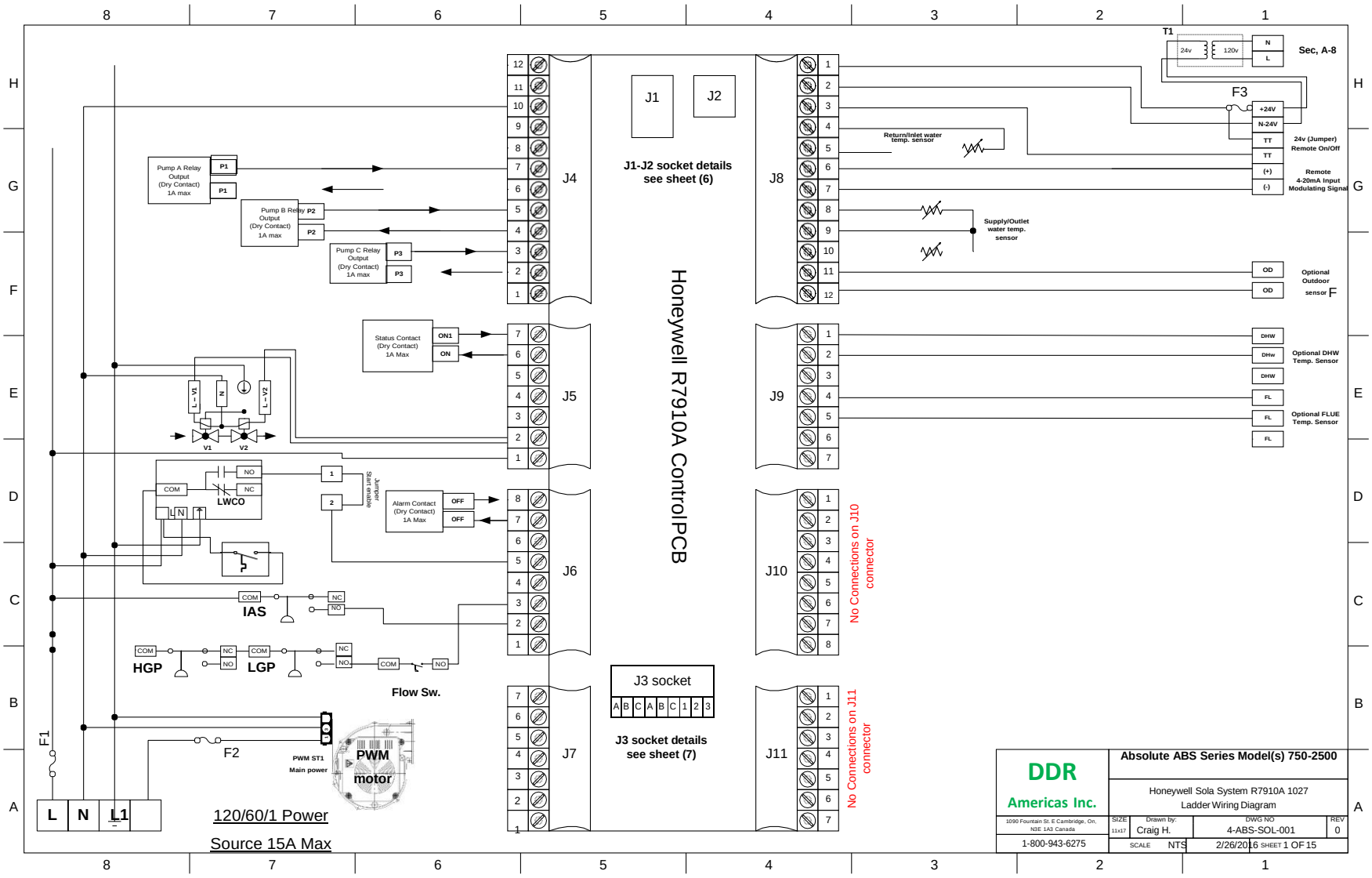
Voltage: 120V AC 60 Hz +10% -15%

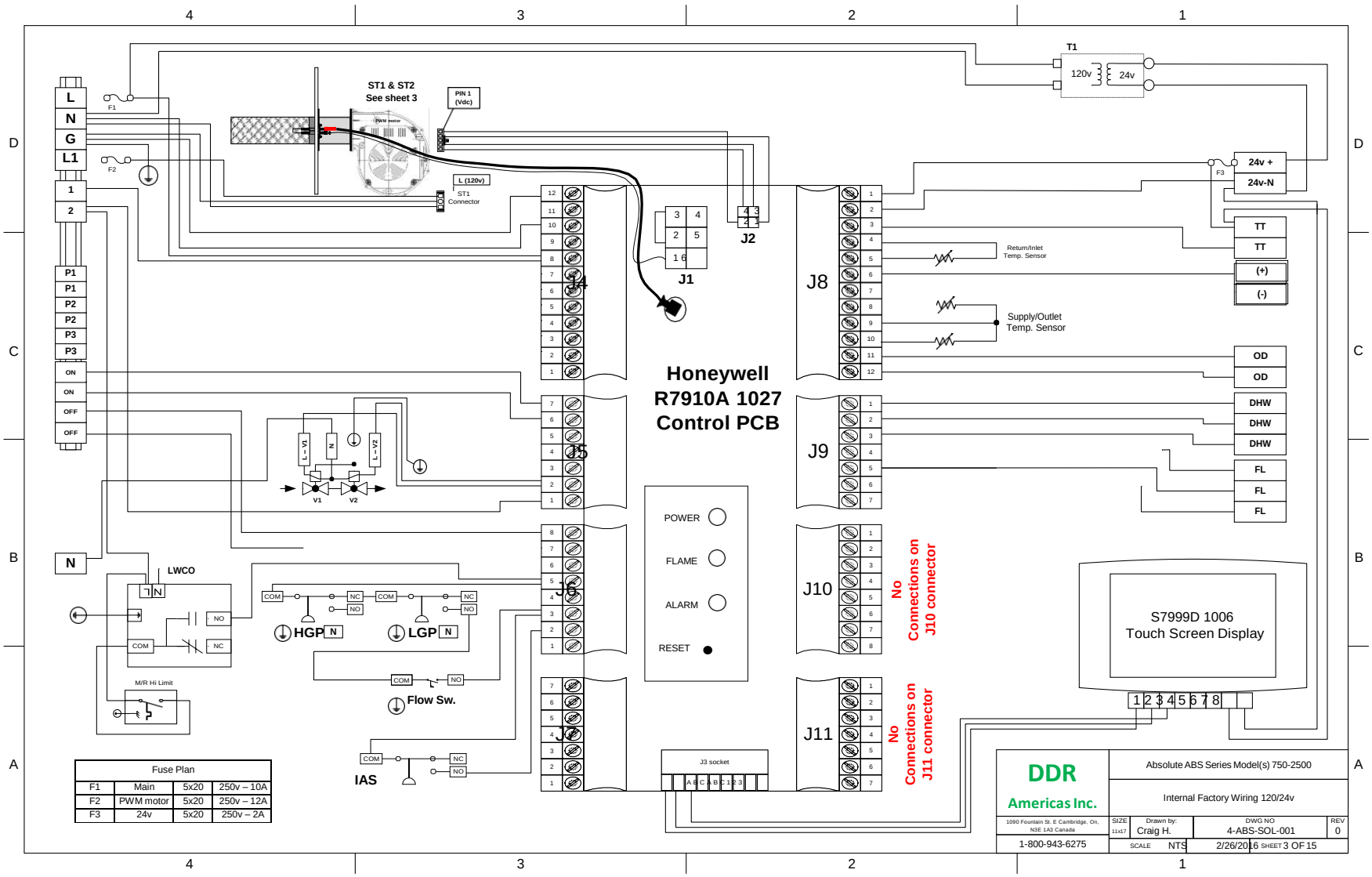
Safety time is 3 seconds

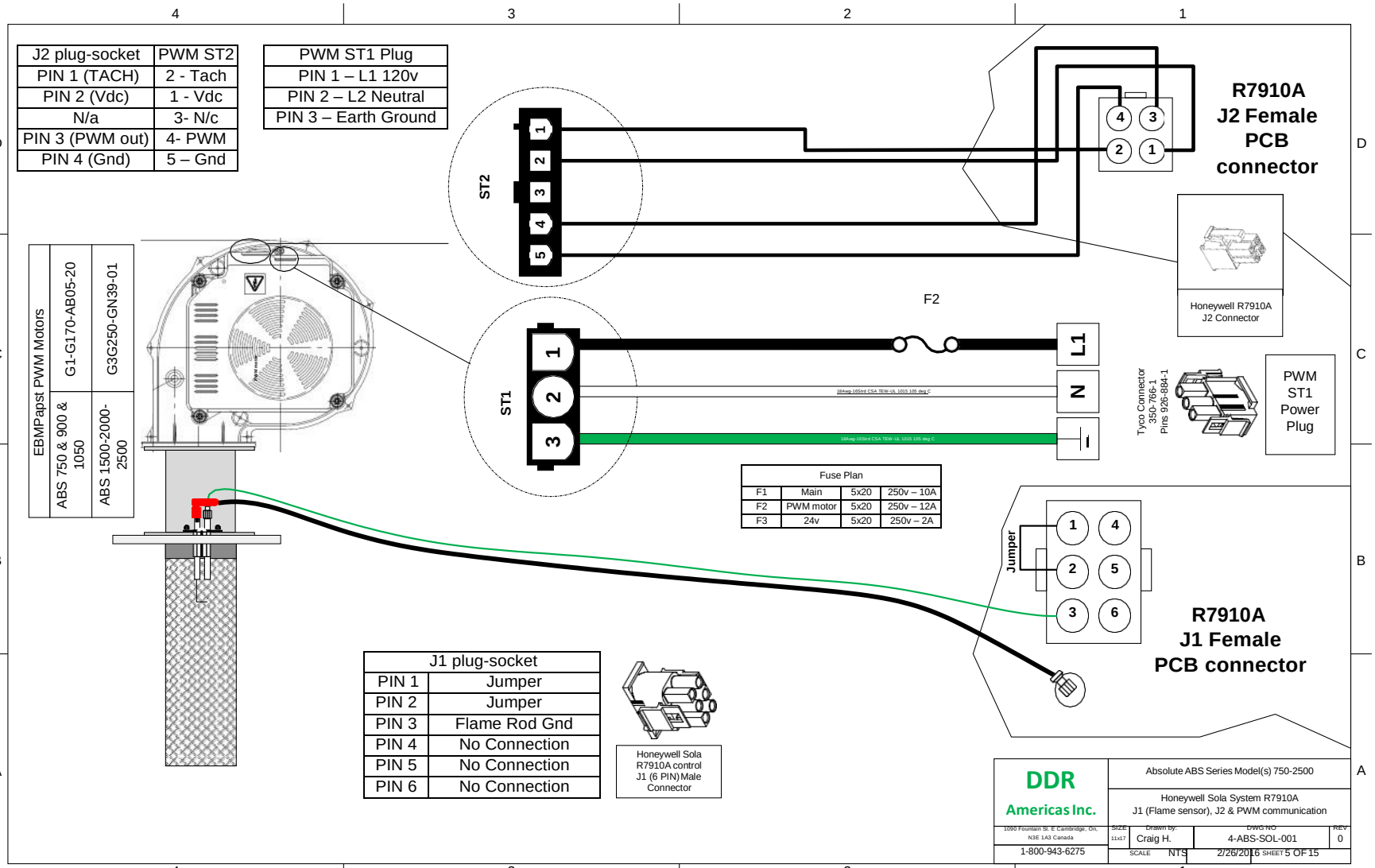
Control voltage: 24 Volt DC

5.2.2 Honeywell Sola R7910A 1027 control (sheet 1-12)

Honeywell Sola control with Touch screen S7999D 1006 display

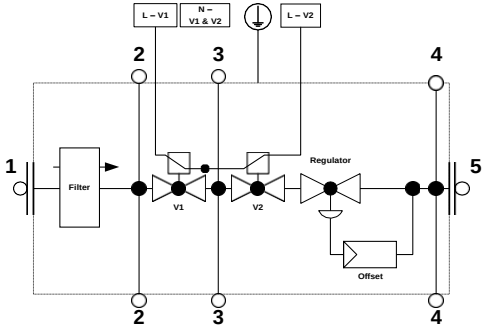

Honeywell R7910A ControlPCB
J1
J2
J1-J2 socket details see sheet (6)
J3 socket
J3 socket details see sheet (7)
J4
J5
J6
J7
J8
J9
J10
J11
No Connections on J10 connector
No Connections on J11 connector
Pump A Relay Output (Dry Contact) 1A max
Pump B Relay Output (Dry Contact) 1A max
Pump C Relay Output (Dry Contact) 1A max
Status Contact (Dry Contact) 1A Max
Alarm Contact (Dry Contact) 1A Max
LWCO
IAS
HGP
LGP
Flow Sw.
PWM motor
PWM ST1 Main power
F1
F2
F3
T1
120/60/1 Power
Source 15A Max
Return/Inlet water temp. sensor
Supply/Outlet water temp. sensor
24v (Jumper) Remote On/Off
Remote 4-20mA Input Modulating Signal
Optional Outdoor sensor
Optional DHW Temp. Sensor
Optional FLUE Temp. Sensor
Sec, A-8
DDR Americas Inc.
Absolute ABS Series Model(s) 750-2500
Honeywell Sola System R7910A 1027
Ladder Wiring Diagram
1-800-943-6275
Drawn by: Craig H.
DWG NO 4-ABS-SOL-001
REV 0
SCALE NTS
2/26/2016 SHEET 1 OF 15


Honeywell
R7910A 1027
Control PCB
ST1 & ST2
See sheet 3
PIN 1
(Vdc)
L (120v)
ST1
Connector
T1
120v
24v
F1
F2
F3
L
N
G
L1
1
2
P1
P2
P3
ON
OFF
J1
J2
J4
J5
J6
J8
J9
J10
J11
24v +
24v-N
TT
(+)
(-)
Return/Inlet
Temp. Sensor
Supply/Outlet
Temp. Sensor
OD
DHW
FL
POWER
FLAME
ALARM
RESET
No
Connections on
J10 connector
No
Connections on
J11 connector
S7999D 1006
Touch Screen Display
1 2 3 4 5 6 7 8
J3 socket
A B C A B C 1 2 3
LWCO
M/R Hi Limit
HGP
LGP
Flow Sw.
IAS
COM
NC
NO
V1
V2
Fuse Plan
F1 Main 5x20 250v – 10A
F2 PWM motor 5x20 250v – 12A
F3 24v 5x20 250v – 2A
DDR
Americas Inc.
1090 Fountain St. E Cambridge, On, N3E 1A3 Canada
1-800-943-6275
Absolute ABS Series Model(s) 750-2500
Internal Factory Wiring 120/24v
SIZE 11x17
Drawn by: Craig H.
DWG NO 4-ABS-SOL-001
REV 0
SCALE NTS
2/26/2016 SHEET 3 OF 15


J2 plug-socket | PWM ST2
PIN 1 (TACH) | 2 - Tach
PIN 2 (Vdc) | 1 - Vdc
N/a | 3- N/c
PIN 3 (PWM out) | 4- PWM
PIN 4 (Gnd) | 5 – Gnd
PWM ST1 Plug
PIN 1 – L1 120v
PIN 2 – L2 Neutral
PIN 3 – Earth Ground
ST2
ST1
F2
L1
N
R7910A J2 Female PCB connector
Honeywell R7910A J2 Connector
Tyco Connector 350-766-1 Pins 926-884-1
PWM ST1 Power Plug
EBMPapst PWM Motors
ABS 750 & 900 & 1050
G1-G170-AB05-20
ABS 1500-2000-2500
G3G250-GN39-01
Fuse Plan
F1 Main 5x20 250v – 10A
F2 PWM motor 5x20 250v – 12A
F3 24v 5x20 250v – 2A
Jumper
R7910A J1 Female PCB connector
J1 plug-socket
PIN 1 Jumper
PIN 2 Jumper
PIN 3 Flame Rod Gnd
PIN 4 No Connection
PIN 5 No Connection
PIN 6 No Connection
Honeywell Sola R7910A control J1 (6 PIN) Male Connector
DDR Americas Inc.
1090 Fountain St. E Cambridge, On, N3E 1A3 Canada
1-800-943-6275
Absolute ABS Series Model(s) 750-2500
Honeywell Sola System R7910A
J1 (Flame sensor), J2 & PWM communication
SIZE 11x17
Drawn by: Craig H.
DWG NO 4-ABS-SOL-001
REV 0
SCALE NTS
2/26/2016
SHEET 5 OF 15

Dungs MBC Gas Valve	
Port	**Description**
1	Inlet Gas Pressure
2	LGP switch
3	Down stream filter
4	Down stream V2
5	Burner Manifold

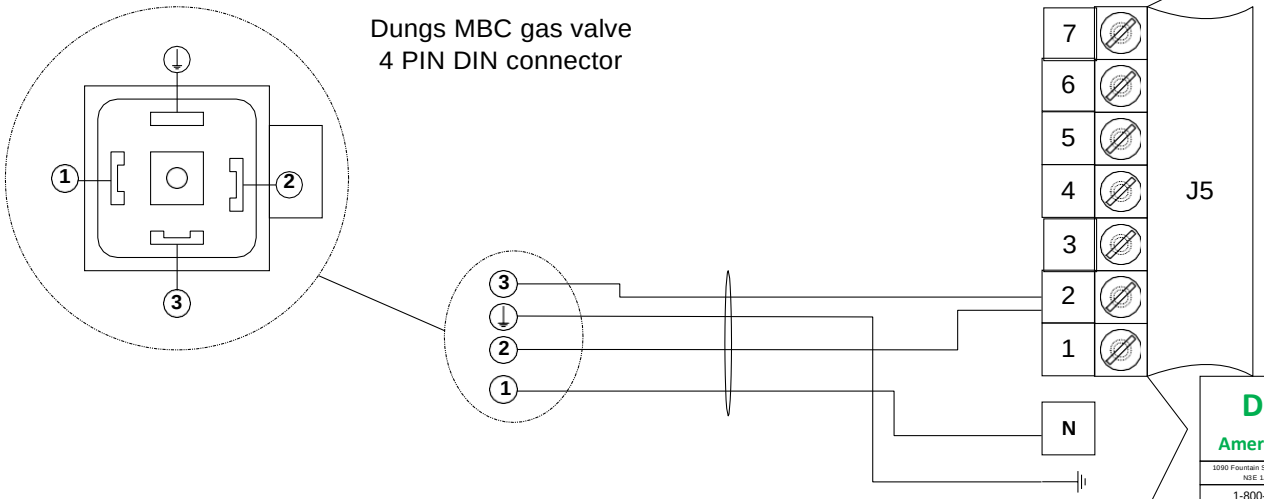
120/60/1 Power Gas Valve



1. Inlet of gas control 1.5" NPT
3. Low gas pressure switch port
5. Shutter Outlet of gas control

Dungs Multiblock Gas Valve – Absolute ABS Series Set-up				
ABS 750	MBC-1000	Inlet flange 1 inch 221-999	255749 Swirl Plate 15mm orifice	1 inch Shutter 253-205 kit 255-132
ABS 900	MBC-1000	Inlet flange 1 inch 221-999	255749 Swirl Plate 15mm orifice	1 inch Shutter 253-205 kit 255-132
ABS 1050	MBC-1000	Inlet flange 1 inch 221-999	255749 Swirl Plate 15mm orifice	1 inch Shutter 253-205 kit 255-132
ABS 1500	MBC-2500	Inlet flange 2 inch 221-997	255749 Swirl Plate 18mm orifice	1 inch Shutter 253-205 kit 256-791
ABS 2000	MBC-2500	Inlet flange 2 inch 221-997	255749 Swirl Plate 18mm orifice	1 inch Shutter 253-205 kit 256-791
ABS 2500	MBC-2500	Inlet flange 2 inch 221-997	255749 Swirl Plate 18mm orifice	1.5 inch Shutter 253-205 kit 255-133
ABS 3000	MBC-4000	Inlet flange 2 inch 221-997	255749 Swirl Plate 20mm orifice	1.5 inch Shutter 253-205 kit 255-133
ABS 4000	MBC-4000	Inlet flange 2 inch 221-997	NO ID Swirl Plate 22mm orifice	1.5 inch Shutter 253-205 kit 255-133

Dungs MBC gas valve
4 PIN DIN connector

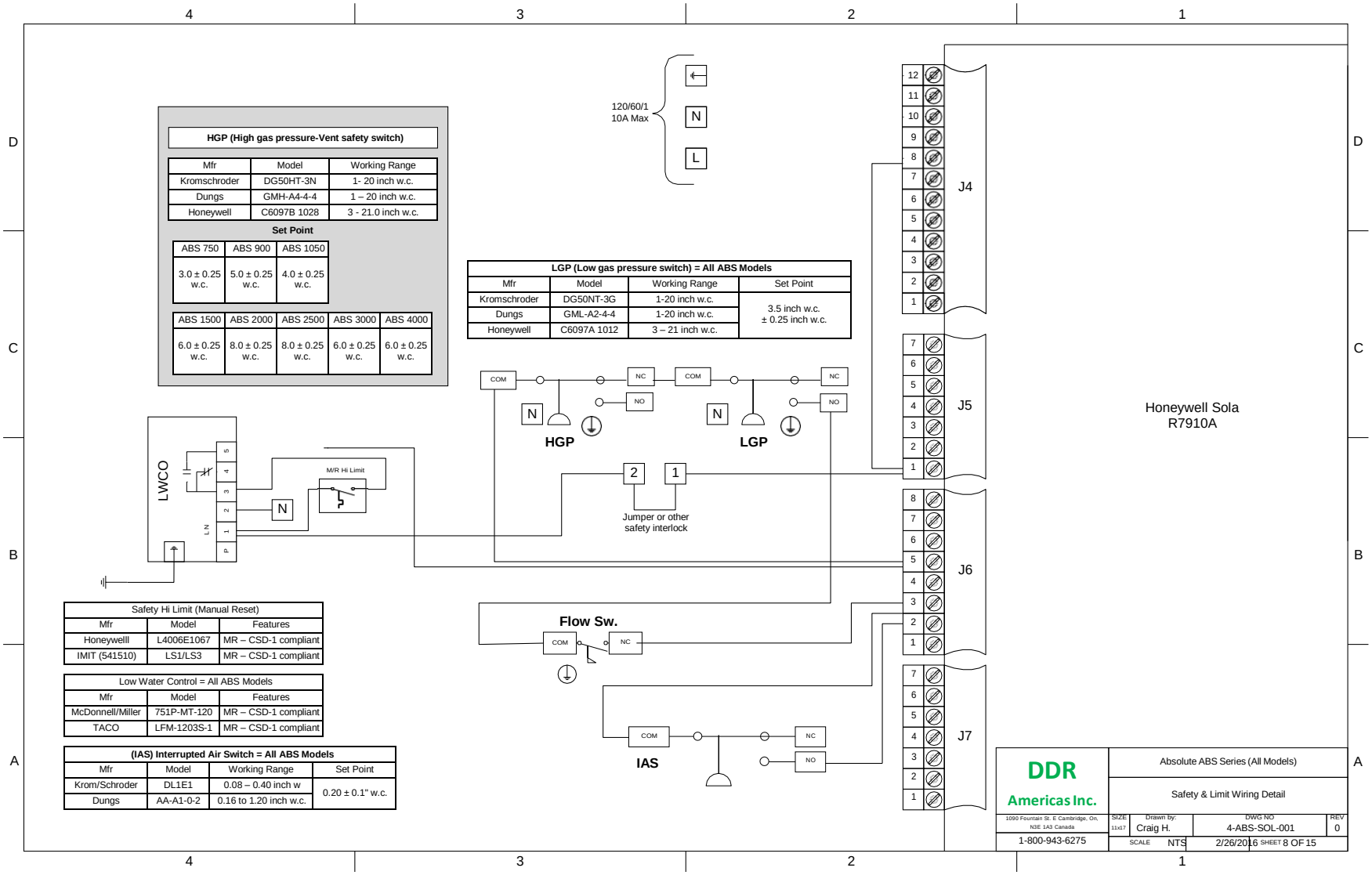


R7910A J5 Connector (Gas valve connection)

DDR Americas Inc.
1090 Fountain St. E Cambridge, On, N3E 1A3 Canada
1-800-943-6275

Absolute ABS Series (All Models)
Honeywell Sola R7910A
J5-2 = gas valve connection detail

SIZE 11x17 | Drawn by: Craig H. | DWG NO 4-ABS-SOL-001 | REV 0
SCALE NTS | 2/26/2016 | SHEET 7 OF 15



HGP (High gas pressure-Vent safety switch)

Mfr	Model	Working Range
Kromschroder	DG50HT-3N	1- 20 inch w.c.
Dungs	GMH-A4-4-4	1 – 20 inch w.c.
Honeywell	C6097B 1028	3 - 21.0 inch w.c.

Set Point

ABS 750	ABS 900	ABS 1050
3.0 ± 0.25 w.c.	5.0 ± 0.25 w.c.	4.0 ± 0.25 w.c.

ABS 1500	ABS 2000	ABS 2500	ABS 3000	ABS 4000
6.0 ± 0.25 w.c.	8.0 ± 0.25 w.c.	8.0 ± 0.25 w.c.	6.0 ± 0.25 w.c.	6.0 ± 0.25 w.c.

LGP (Low gas pressure switch) = All ABS Models

Mfr	Model	Working Range	Set Point
Kromschroder	DG50NT-3G	1-20 inch w.c.	3.5 inch w.c. ± 0.25 inch w.c.
Dungs	GML-A2-4-4	1-20 inch w.c.	
Honeywell	C6097A 1012	3 – 21 inch w.c.	

Safety Hi Limit (Manual Reset)

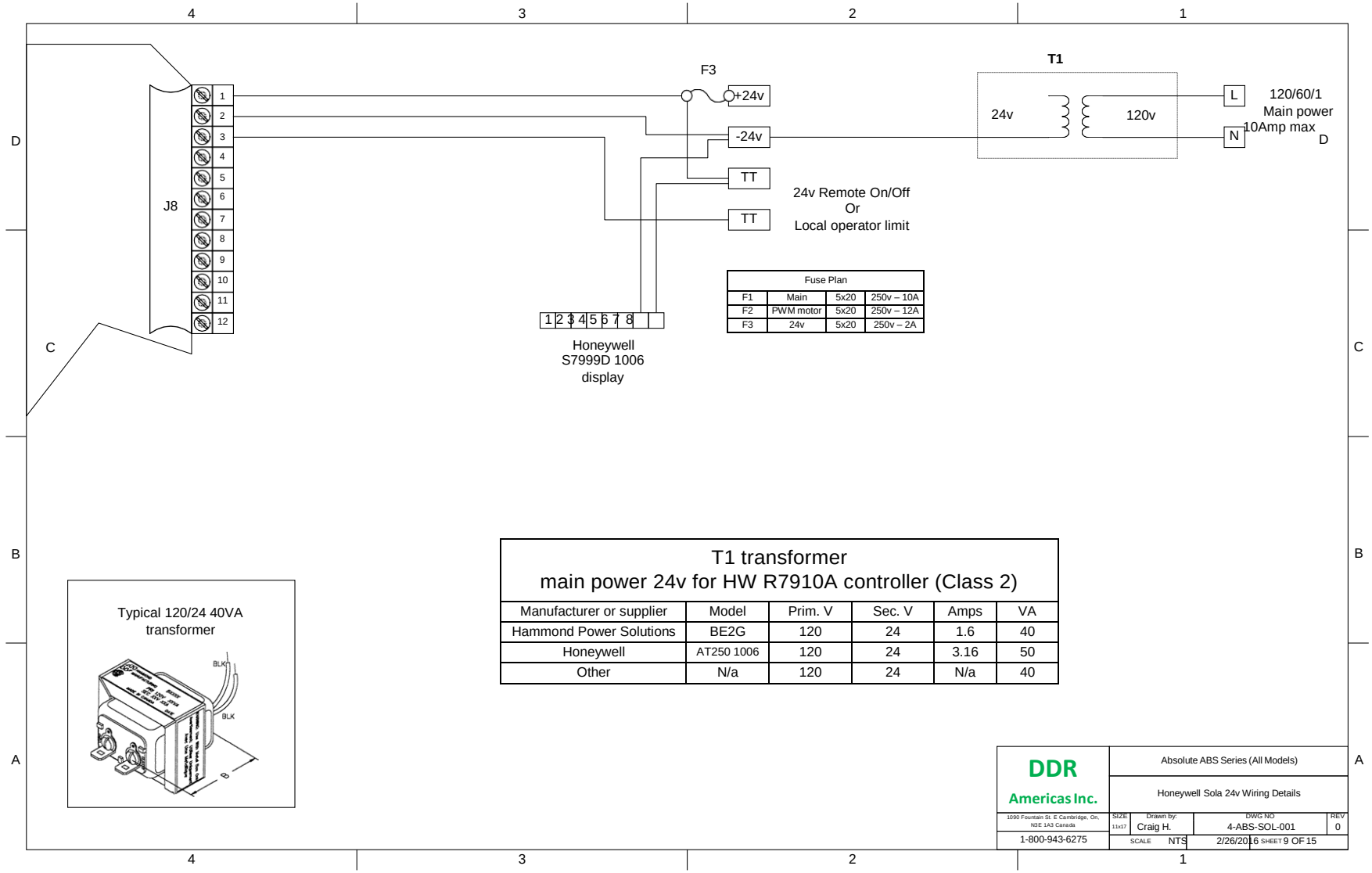
Mfr	Model	Features
Honeywelll	L4006E1067	MR – CSD-1 compliant
IMIT (541510)	LS1/LS3	MR – CSD-1 compliant

Low Water Control = All ABS Models

Mfr	Model	Features
McDonnell/Miller	751P-MT-120	MR – CSD-1 compliant
TACO	LFM-1203S-1	MR – CSD-1 compliant

(IAS) Interrupted Air Switch = All ABS Models

Mfr	Model	Working Range	Set Point
Krom/Schroder	DL1E1	0.08 – 0.40 inch w	0.20 ± 0.1" w.c.
Dungs	AA-A1-0-2	0.16 to 1.20 inch w.c.	



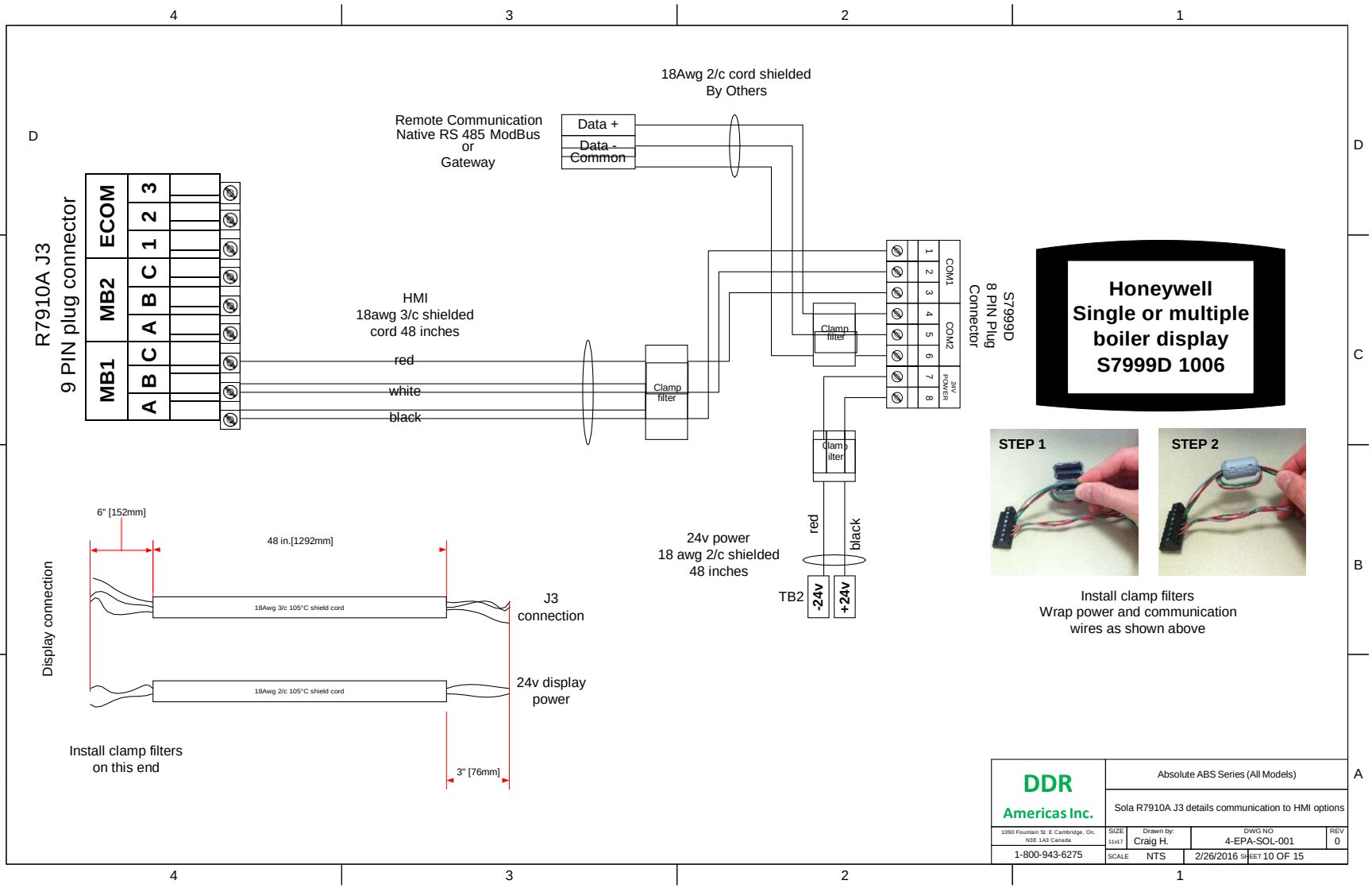
Typical 120/24 40VA transformer

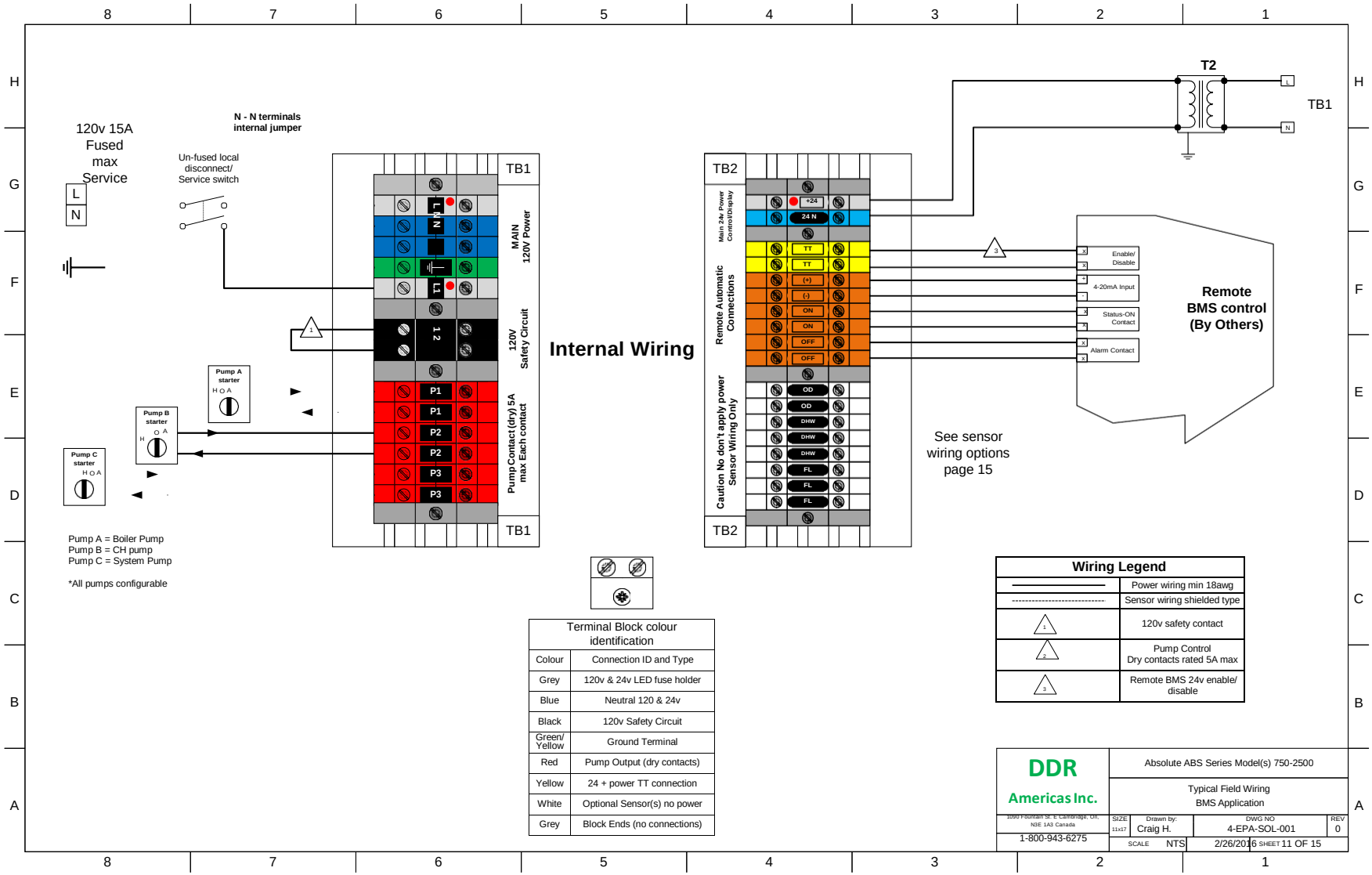
T1 transformer
main power 24v for HW R7910A controller (Class 2)

Manufacturer or supplier	Model	Prim. V	Sec. V	Amps	VA
Hammond Power Solutions	BE2G	120	24	1.6	40
Honeywell	AT250 1006	120	24	3.16	50
Other	N/a	120	24	N/a	40

DDR Americas Inc.
1090 Fountain St. E Cambridge, On, N3E 1A3 Canada
1-800-943-6275

Absolute ABS Series (All Models)
Honeywell Sola 24v Wiring Details
SIZE 11x17 | Drawn by: Craig H. | DWG NO 4-ABS-SOL-001 | REV 0
SCALE NTS | 2/26/2016 SHEET 9 OF 15


18Awg 2/c cord shielded
By Others
Remote Communication
Native RS 485 ModBus
or
Gateway
Data +
Data -
Common
R7910A J3
9 PIN plug connector
ECOM
MB2
MB1
HMI
18awg 3/c shielded
cord 48 inches
red
white
black
Clamp filter
S7999D
8 PIN Plug
Connector
COM1
COM2
24V POWER
24v power
18 awg 2/c shielded
48 inches
TB2
-24v
+24v
Honeywell
Single or multiple
boiler display
S7999D 1006
STEP 1
STEP 2
Install clamp filters
Wrap power and communication
wires as shown above
6" [152mm]
48 in.[1292mm]
Display connection
18Awg 3/c 105°C shield cord
18Awg 2/c 105°C shield cord
J3
connection
24v display
power
Install clamp filters
on this end
3" [76mm]
DDR
Americas Inc.
1090 Fountain St, E Cambridge, On, N3E 1A3 Canada
1-800-943-6275
Absolute ABS Series (All Models)
Sola R7910A J3 details communication to HMI options
SIZE 11x17
Drawn by: Craig H.
DWG NO 4-EPA-SOL-001
REV 0
SCALE NTS
2/26/2016 SHEET 10 OF 15



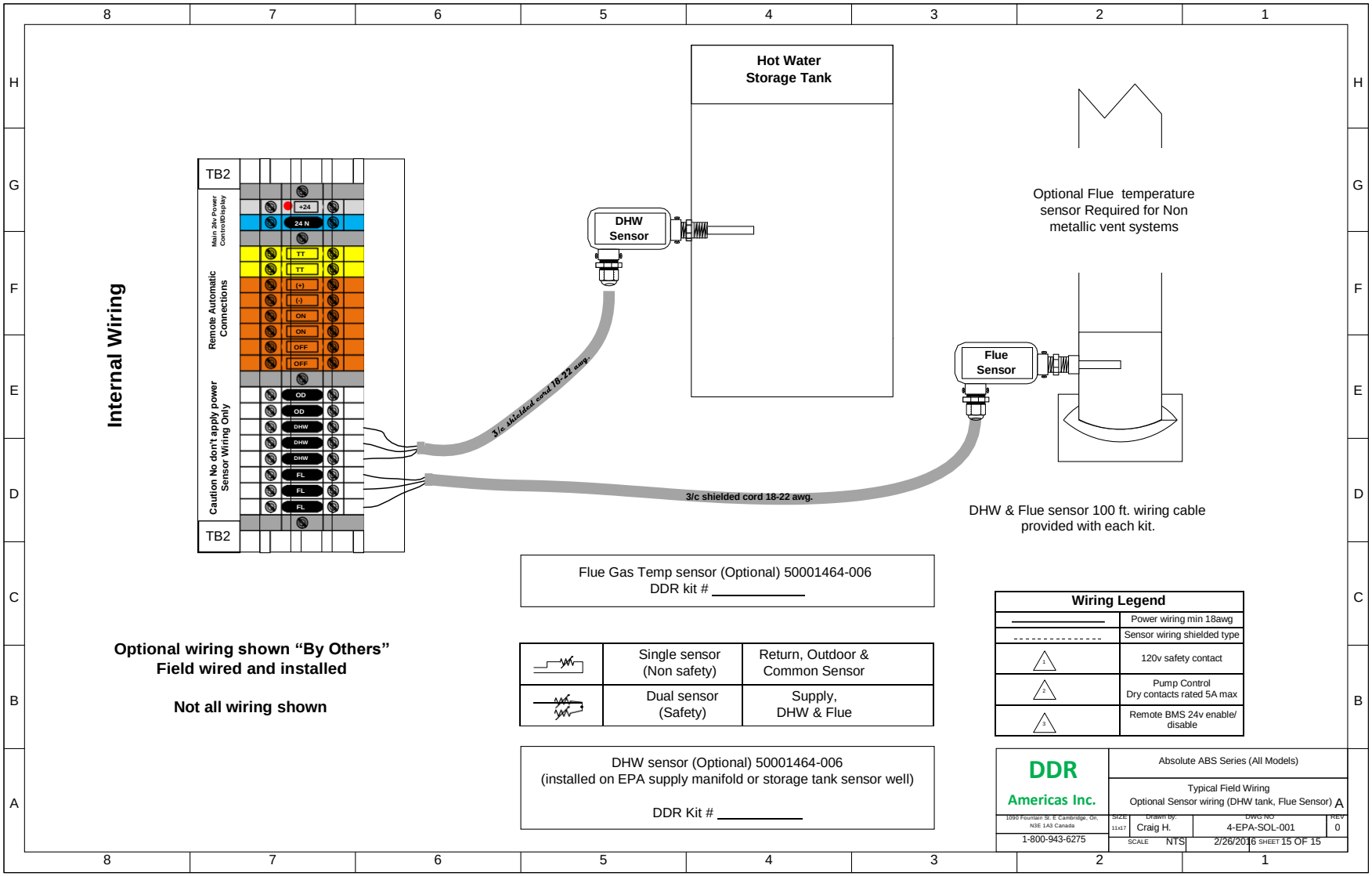
Terminal Block colour identification	
Colour	Connection ID and Type
Grey	120v & 24v LED fuse holder
Blue	Neutral 120 & 24v
Black	120v Safety Circuit
Green/ Yellow	Ground Terminal
Red	Pump Output (dry contacts)
Yellow	24 + power TT connection
White	Optional Sensor(s) no power
Grey	Block Ends (no connections)

Wiring Legend	
	Power wiring min 18awg
	Sensor wiring shielded type
1	120v safety contact
2	Pump Control Dry contacts rated 5A max
3	Remote BMS 24v enable/ disable

DDR
Americas Inc.
1090 Fountain St. E Cambridge, ON, N3E 1A3 Canada
1-800-943-6275

Absolute ABS Series Model(s) 750-2500
Typical Field Wiring
BMS Application

SIZE	Drawn by:	DWG NO	REV
11x17	Craig H.	4-EPA-SOL-001	0
SCALE NTS	2/26/2016	SHEET 11 OF 15	


Internal Wiring
TB2
Main 24v Power Control/Display
+24
24 N
Remote Automatic Connections
TT
TT
(+)
(-)
ON
ON
OFF
OFF
Caution No don't apply power Sensor Wiring Only
OD
OD
DHW
DHW
DHW
FL
FL
FL
TB2
3/c shielded cord 18-22 awg.
Hot Water Storage Tank
DHW Sensor
Flue Sensor
3/c shielded cord 18-22 awg.
Optional Flue temperature sensor Required for Non metallic vent systems
DHW & Flue sensor 100 ft. wiring cable provided with each kit.
Flue Gas Temp sensor (Optional) 50001464-006
DDR kit # _____
Optional wiring shown "By Others"
Field wired and installed
Not all wiring shown
Single sensor (Non safety)
Return, Outdoor & Common Sensor
Dual sensor (Safety)
Supply, DHW & Flue
DHW sensor (Optional) 50001464-006
(installed on EPA supply manifold or storage tank sensor well)
DDR Kit # _____
Wiring Legend
Power wiring min 18awg
Sensor wiring shielded type
120v safety contact
Pump Control Dry contacts rated 5A max
Remote BMS 24v enable/ disable
DDR
Americas Inc.
1090 Fountain St. E Cambridge, On, N3E 1A3 Canada
1-800-943-6275
Absolute ABS Series (All Models)
Typical Field Wiring
Optional Sensor wiring (DHW tank, Flue Sensor) A
SIZE 11x17
Drawn By: Craig H.
DWG NO 4-EPA-SOL-001
REV 0
SCALE NTS
2/26/2016 SHEET 15 OF 15

5.3 Limit Controls

5.3.1 Temperature control

The Absolute boiler is equipped with an electronic temperature limit control based on flow, return, and flue gas temperature sensors. The flow temperature is adjustable between 68-200°F [20- 93°C].

5.3.2 Low water level protection (LWCO) (flow and content)

The Absolute boiler is equipped with low water protection based on temperature differences (ΔT) between flow and return. When the ΔT = 45°F [25°C] (factory setting) the boiler starts modulating down so that it remains operational as long as possible. When the ΔT = 72°F [40°C] the boiler will be at part load.

If the ΔT continues to rise and reaches 81°F [45°C], the boiler shuts down, and will restart when conditions return to normal.

The boiler has been approved and has found to be in compliance to the LWCO protection, provided the factory preset high limit and flow temperatures are not altered and the modulating controls are used and no minimum flow rate is required as the Sola control system will monitor these conditions and reduce the boiler output, finally shutting down until flow conditions improve. As a result, the boiler is virtually unaffected by low water flow. Although boiler flow and content protection is provided, does not safeguard the entire heating system, additional low water content and temperature safety controls maybe needed in certain jurisdictions. In the event the low level is too low a RED light will flash on the low water cut off. To reset this device the technician needs to press the light.

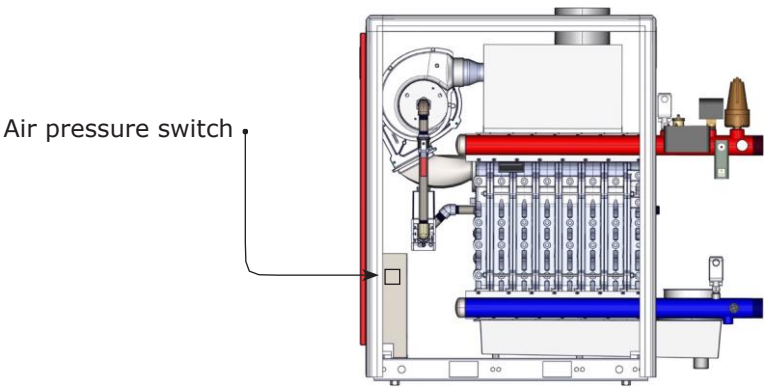
This limit device also has test button, when this button is pressed down the controls shuts the boiler down. To reset this again the operator needs to reset the device by pressing the re set button (red)

5.3.3 High limit protection

The high limit temperature protection device switches off and locks out the boiler when the flow temperature exceeds the maximum set point temperature.

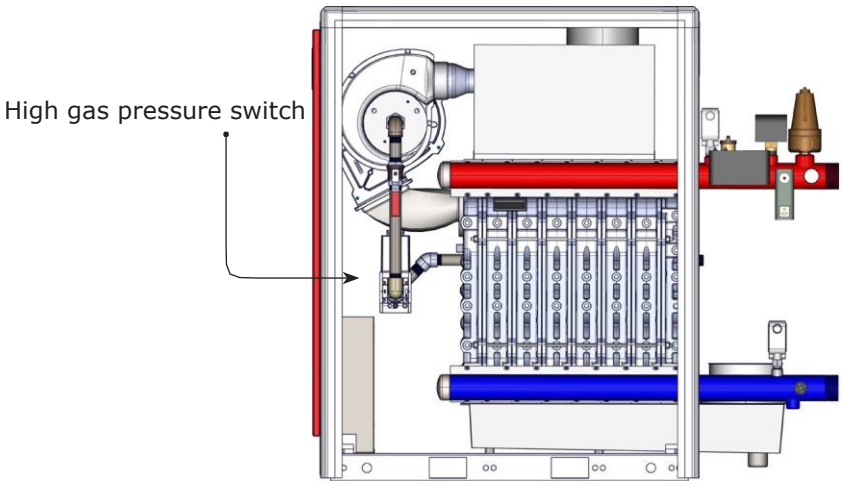
5.3.4 Air pressure switch

This device proves to the control the blower motor is on, and that airflow is flowing into the boiler. The adjustments screw is located on the back of the device. This should only be adjusted by a qualified technician. No adjustment in the field is required, as the boiler was test fired in the factory before shipment.



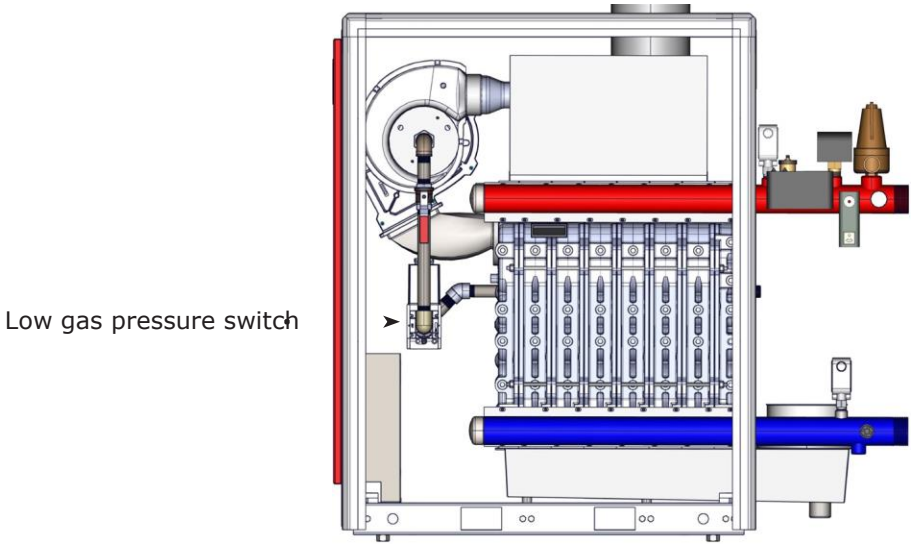
5.3.5 High gas pressure switch (HGP)

The boiler is equipped with a gas pressure switch that is mounted directly on the air intake housing. The gas pressure switch is preset at the factory and should not be adjusted.



5.3.6 Low gas pressure switch (LGP)

The boiler is equipped with a low gas pressure switch that is mounted directly on the mono block of the gas valve. The gas pressure switch is preset at the factory and should be checked per commissioning.



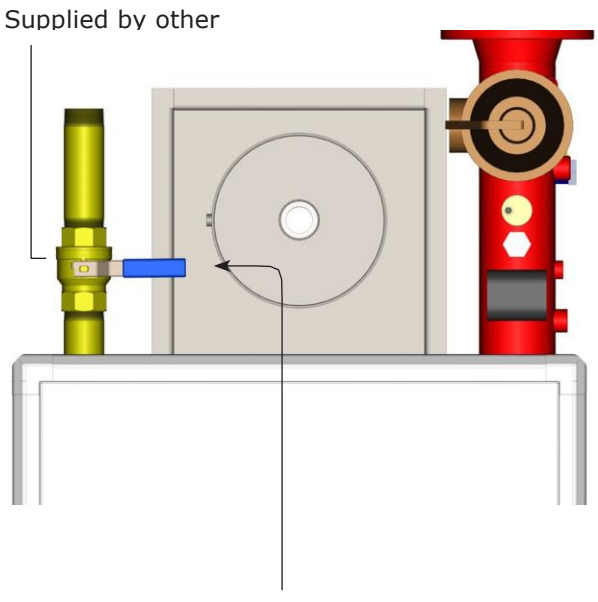
6 Gas connection

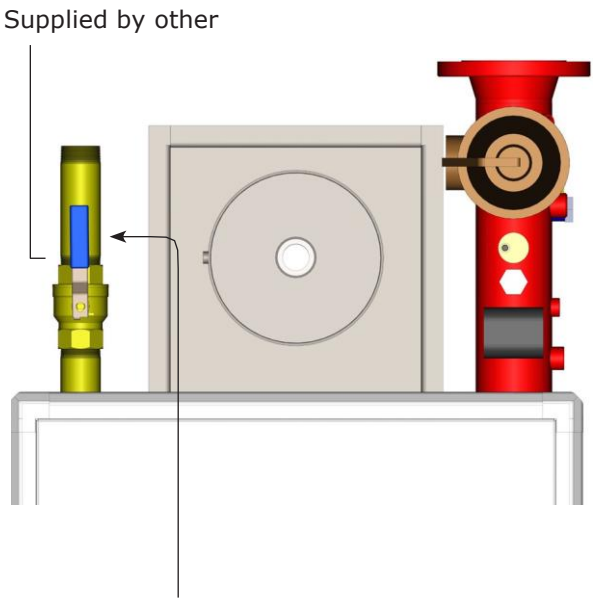
6.1 Gas connection

The Absolute boiler is suitable for use with natural gas only. The gas connection is at the back left side of the boiler. The boiler is fitted with a gas filter which is mounted within the mono block gas valve as standard to prevent dirt from contaminating the gas valve or burner assembly. An isolating main gas valve (supplied by other) must be installed in the vicinity of the boiler, upstream of the automatic gas valve.

- A main gas shutoff valve must be connected to the 2 Inch NPT connection on the boiler, and must be readily accessible and within hand reach.
- When connecting the gas line ensure to use 2 sets of pipe wrenches to connect to the service. Do not apply the tighten load to the gas line by itself, as damage can occur to the gas valve.
- A sediment trap must be installed upstream of the main gas cocks shutoff valve.
- The boiler fuel train does not require venting to the atmosphere, other regulators and safety shutoff valves may require venting and relief piping to the atmosphere, consult their documentation.
- Install a sediment trap (drip leg) and a union connection ahead of any primary manual shut off valve. Gas piping should be installed in accordance with the National Fuel Gas code ANSI Z223.1 latest edition and any other local codes which may apply; in Canada see CAN/CSA-B149.1, latest edition. In the commonwealth of Massachusetts, the gas valve must be a T handle type
- The boiler and gas line piping connection should be pressure tested and must be checked for leaks before being placed in service. Test with inert gas or compressed air.
- The boiler must be disconnected at the boiler manual shut off valve (located at the rear of the boiler) during any pressure testing of the system at pressures in excess of 1/2 PSI, (14 inches W.C.)
- Use of soap and water can cause corrosion of metallic parts, ensure these compounds are rinsed and wiped off after testing.

6.1.2 Manual gas valve upstream for boiler





6.1.3 Gas line piping to boiler

Ensure pipe sizing capability follows the recommend values based on an overall length of pipe from the meter plus the equivalent length of all fittings. Approximate sizing may be based on 1 cubic foot of natural gas supply per 1,000 BTU/ hour input. For example, a 1,000,000 BTU input boiler would require 1000 cubic feet of natural gas.

Nominal Iron Pipe Size (inches)	Internal Diameter (Inches)	Equivalent Length		Maximum Capacity in Cubic Feet of Natural Gas per Hour Pressure Drop of 0.5 inch Water Column/Equivalent of Pipe (in feet)						
		90 El (feet)	Tee (feet)	20	40	60	80	100	150	200
1/2	0.622	1.55	3.1	120	85	66	57	50	40	35
3/4	0.824	2.06	4.12	250	170	138	118	103	84	72
1	1.049	2.62	5.24	465	320	260	220	195	160	135
1-1/4	1.380	3.45	6.9	950	660	530	460	400	325	280
1-1/2	1.610	4.02	8.04	14600	990	810	690	620	500	430
2	2.067	5.17	10.3	2750	1900	1520	1300	1150	950	800
2-1/2	2.469	6.16	12.3	4350	3000	2400	2050	1850	1500	1280
3	3.088	7.67	15.3	7700	5300	4300	3700	3250	2650	2280
4	4.026	10.1	20.2	15000	10900	8800	8800	6700	5500	4600

6.2 Gas pressures

The boiler has been factory test fired and adjusted for proper combustion. The boilers main gas valve are certified and can accept a maximum inlet pressure up to ½ psi or 14 "w.c. [35 mbar], but MUST provide with a min. of 3.5 "w.c. [8 mbar] at the gas filter inlet test point when the boiler is operating at max output. Pressures below this level can result in lockouts (for multi gas appliance installations this minimum pressure must be available at each boiler with all gas appliances firing on max output).

WARNING

All threaded connections must be made using a pipe compound that is resistant to the action of liquefied petroleum gases. Use only approved gas line type pipe sealant

Gas system pressure checks:

- The boiler main gas supply shutoff valve and piping must be isolated from any gas piping pressure testing in excess of ½ psi or 14 "w.c. [35 mbar]
- The boiler main gas shutoff valve and piping must be isolated by closing the main gas shutoff valve during gas piping pressure testing less than ½ psi [3.5 kPa]
- The boiler main gas piping and gas train must be leak tested prior to placing the boiler in operation

6.3 Gas / air ratio control

The boiler has a pressure differential gas/air ratio control. This gas/air ratio control maintains the correct balance of gas and air quantities to the burner at a constant level under variable loads. This ensures clean and reliable combustion and high part load efficiency across the entire load range. Minimum airflow is monitored before a start by an air pressure sensor.

6.4 Gas valve adjustment

WARNING

Adjustments shall only be performed by a service representative specifically trained and certified by Innovative Industrial Inc. Verify proper operation after servicing.

CAUTION

For high altitude adjustment (greater than 2,000 feet above sea level) see page # 89

The gas valves are located directly underneath the pre-mix blower assembly. The gas valve is mounted on an adjustable stand that fully supports the gas valve.

Check the combustion using a calibrated combustion analyzer and adjust the fuel-air ratio of the valve being used according to the procedures below.

To adjust High fire:

Required tools: Flat head screw driver and combustion analyzer.

Start the boiler and observe the proper operating parameters for the system. Set the boiler to High FIRE, to achieve maximum firing rate of the boiler. Check combustion readings using the combustion analyzer. If combustion readings are not within the range specified, adjust as follows,

A- Open the front panel of the boiler

B- Locate the Karl Dungs gas valve

C- Adjusts the orifice adjustment screw, located on the downstream side of the gas valve. into the direction indicated on the sticker to either increase or decrease the flow of natural gas. Increasing the gas flow decreases the combustion exhaust O2, while decreases the natural gas flow increases the combustion exhaust O2. Note that there will be a slight delay of 30 seconds from the time the adjustment is made until the gas combustion reads alter. It is best to make small adjustments of 1 indication marker every 30 seconds to allow the combustion to stabilize before making further adjustments. When desired adjustments are complete, do a final test and adjust low fire if necessary.

To adjust low fire:

Required tools- 2.5 mm hex wrench and combustion analyzer

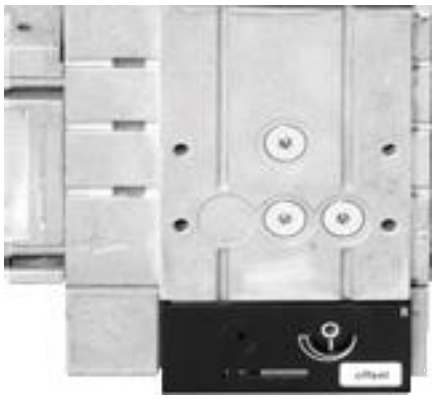
Start the boiler and observe proper settings for the system. Set the boiler to low fire, to achieve minimum firing rate of the boiler.

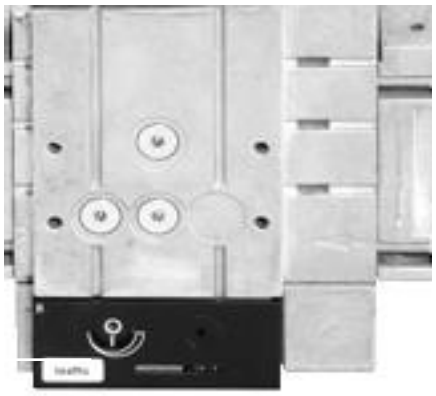
A- Check the combustion readings on the combustion analyzer. If the combustion readings are not within the not within the range specified, adjust as follows

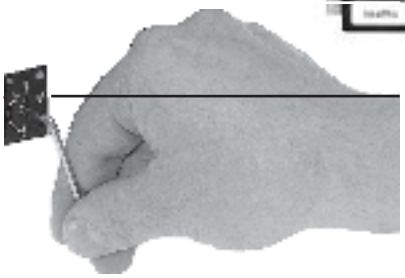
1- Open the front panel of the boiler

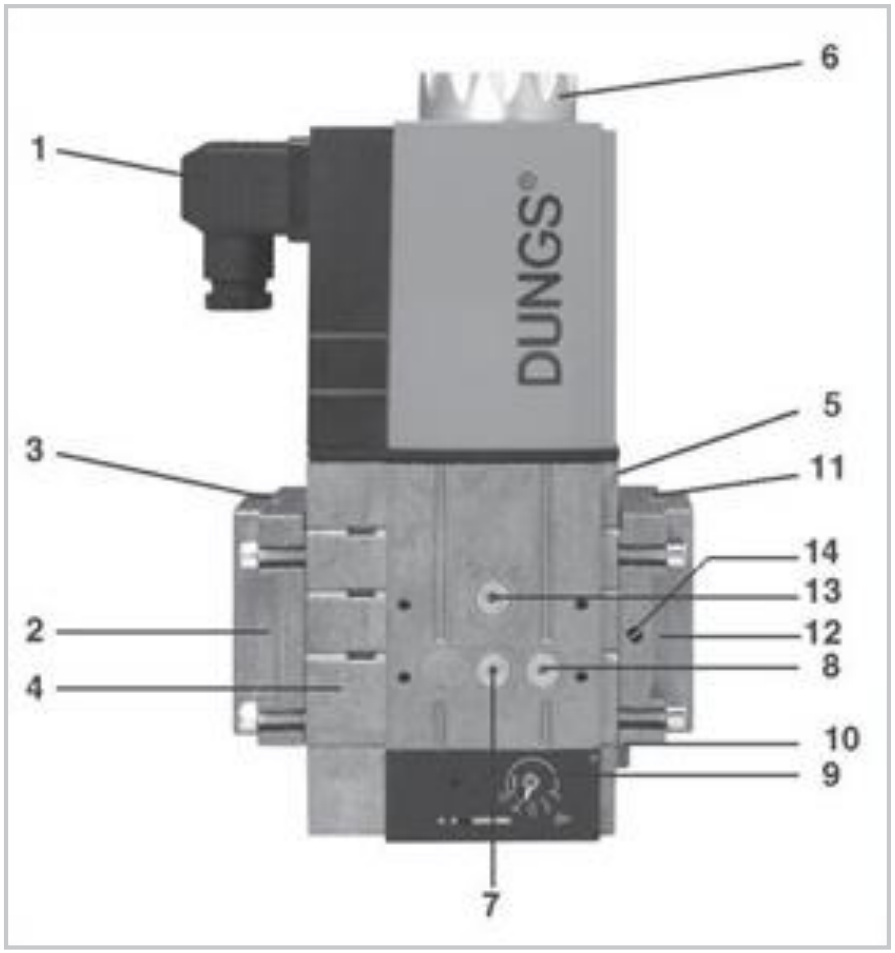
2- Locate the Karl Dungs gas valve

B- Turn the offset screw, located in the bottom center of the side of the valve, in the direction indicated on the label to increase or decrease the natural gas flow. Increasing the gas decreases the O2, while decreasing the gas increases the O2. There will be a slight delay of 30 seconds from the time the adjustment is made until the gas combustion reads alter. It is best to make small adjustments of 1 indication marker every 30 seconds to allow the combustion to stabilize before making further adjustments. When desired adjustments are complete, do a final test and adjust low fire if necessary.









1. Electrical DIN Connector
2. Upstream Flange
3. G1/8 inlet test port
4. Filter
5. Valve Body
6. Coil
7. Test port connection #2, G 1/8 between V1 and V2; both sides.
8. Test port connection #3, G1/8 downstream of V2; both sides.
9. Regulator outlet pressure adjustment screw; both side
10. Vent-less regulator vent connection is G1/8 threaded. The brass vent limiting orifice is 0.2mm in diameter.
11. Downstream flange
12. Test port connection #1, G1/8 upstream of V1; both sides.
13. Offset adjustment cover

7. Commissioning:

DANGER

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

7.1 Pre operational checks

1. Check power supply ensure fused and service disconnect provided as required by local code or authorities having jurisdiction.
2. Check gas connection to boiler and check for gas leaks, purge gas according to local codes or authorities having jurisdiction.
3. Check gas supply pressure on inlet of gas valve test point ID # 3, a test port with plug has been provided, loosen set screw and connect a manometer and confirm greater than 3.5 inch w.c. gas pressure is measured.
4. Check flue and air vent connections
5. Ensure boiler is fully filled with water and all air is purged, the boiler pressure shall be at least 11 psig.
6. Check pumps for correct flow capacity and flow direction
7. Ensure relief valve is properly connected, sized and piped to nearby drain
8. Fill condensate P trap assembly, if Ph neutralizer used, ensure no obstructed flow through neutralizer to drain. Ensure all piping of condensate is gravity feed to drain.
9. Check water connections to the system are correct and all isolation valves are open
10. Check to ensure boiler drain connection is provided.
11. Ensure boiler has been installed and properly mounted to the boiler pad if provided, anchoring of boiler per local codes and seismic
12. Ensure required service area has been provided around boiler as recommended.

7.2 Safety and lighting instructions

1. Turn ON main power supply
2. Turn OFF firing valve
3. Open the main gas valve
4. Check the gas connections for leaks
5. Ensure boiler is open to system, pumps ON and adequate flow is provided through boiler.
6. Adjust the boiler controls to heat demands > 11 psi).
7. The boiler should start and check start interlocks and start purge and pre-ventilation purge position
8. The boiler will automatically go into the ignition phase and then shut down on the ignition /flame failure
9. Reset the control duct or air supply connections.
10. Open the firing valve
11. Check the ignition quality and flame stability and flame signal, the minimum flame signal shall be at least 5 umA/V, normally the flame signal shall range from 8 to 32 umA/V

7.3 Combustion setting and adjustment

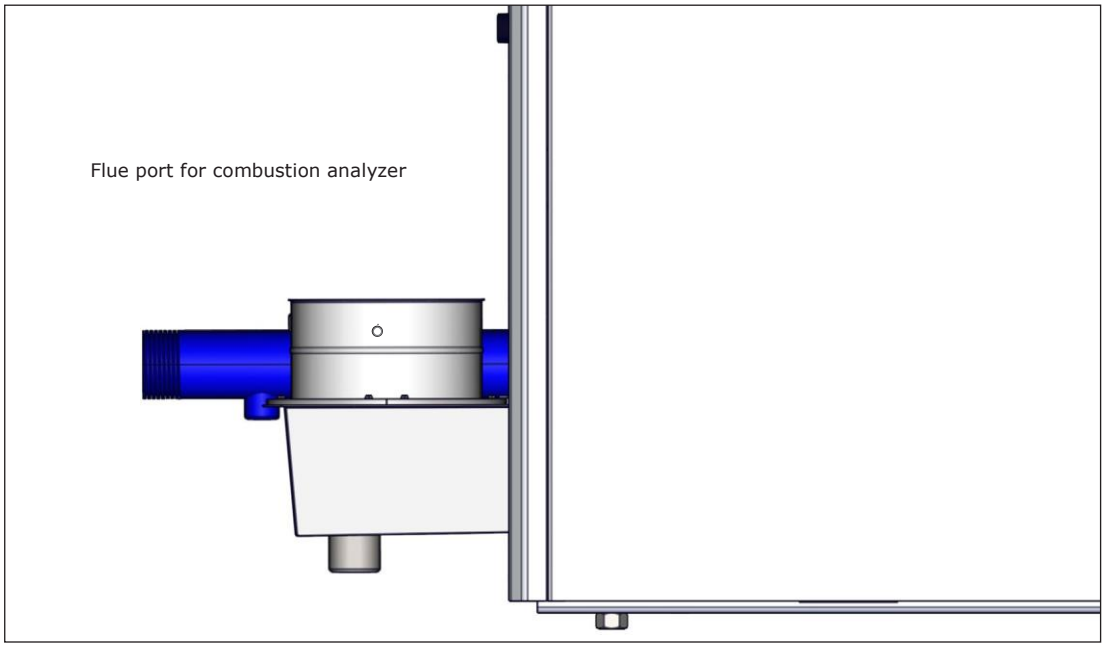
Chart 8 Combustion Tolerance Chart

Emission	Unit	Range	Part Load (20%)	Full Load (100%)
CO_2	%	6-9.5	8.0	9.0
O_2 ppm	%	8.0-4.0	7.0	5.0
CO_2	ppm	<100		

Check and correct, if necessary, the boiler for correct gas/ air ratio set-up. Checking takes place on full and part load, adjustment takes place only on the gas valve mono block. For checking and adjusting are required: an electronic CO2-gauge (on the basis of O2) and a gas pressure gauge. Note that the opening (see fig. 23) around the measuring probe is sealed properly during measurement. Note also that measuring the O2 levels in the flue gas is necessary; be-because direct measurement of CO2 can lead to inaccuracies due to varying CO2 levels in the natural gas. Connect the gas pressure meter between measuring point PG on the underside of the gas valve mono block and measuring point PL on the venturi (see fig. 23), ensuring the connections are gas tight.

Check CO2- percentage (O2-percentage) against table

8. If the values exceed the given tolerances, adjust according to fig. 23. Check the flame through the inspection glass, the flame must not blow off.



WARNING

The installation of the boiler is not completed until all controls and safety device have been tested and verified for correct function and operation. It is the sole responsibility of the installer to ensure that all safety control systems and gas ignition systems and any the associated safety control are tested.

8. Operator Interface Display

Warning

Explosion Hazard.

Improper configuration can cause fuel buildup and explosion. Operators of this display may move fuel and/or air actuators to positions that can create hazardous burner conditions. Improper user operation may result in PROPERTY LOSS, PHYSICAL INJURY or DEATH.

The S7999D System Display device is to be used only by experienced and/or licensed burner/boiler operators and mechanics.

Warning

Electrical shock hazard, can cause personal injury or loss of life, including property damage.

** All electrical wiring to the boiler and controls must be protected from ingest of water and be properly grounded and bonded according to CEC part I CSA 22.1 & NEC NFPA 70.

SAFETY FEATURES:

The S7999D contains software that incorporates many features that are designed to guide you safely through the commissioning process. Safety, however, is your responsibility. Read all documentation carefully and respond appropriately to all error messages.

Be aware that as you command the R7999 to open and close actuators, the R7999 is designed to prevent you from opening or closing them too rapidly. When any of the system actuators are below 20% of their open position, the R7999 effectively limits any actuator from traveling more than three degrees without moving the other actuators in the system. When all the actuators are over 20% of their open position, the limit increases to 10 degrees.

SPECIFICATIONS

Electrical Ratings:

Input Voltage: 18 – 30 Vac (24Vac nominal), 50/60 Hz

Input Current:

500 mA max

Power consumption:

12W max

Operating Temperature:

-4 to 158 ºF (-20 to 70 ºC)

Humidity: 90% RH, non-condensing

Enclosure rating: IP10 / NEMA 1

8.1 Honeywell Sola Control Programming/Configuration

The Honeywell control has been fully programmed and configured by the factory for most installations, in most installation no adjustments or configurations are required, please note that optional items like, Outdoor reset, DHW production and lead/lag systems require configuration, see separate instruction provide with the kits.

The Honeywell Sola has 3 different levels or access.

a. OEM – Factory = (factory only)

b. Service – (Service password or login = serial #)

c. User – (no password or login required)

A = OEM – Factory, access by authorized factory personnel only

B = Service – trained installers, operators (Access to configure optional items, lead/lag, etc.)

C = User – end user or operator (limited access)

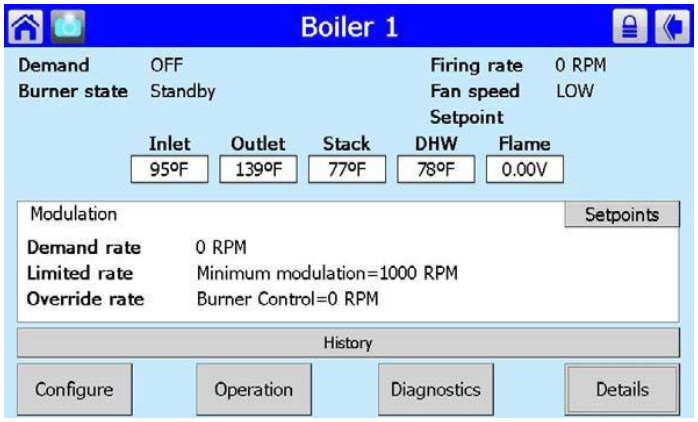
In the configuration menu the User no password required has access to view all parameters but user cannot change unless either a Service or OEM password is entered.

Login only required if specific parameters are required to be accessed, for example cascade or outdoor reset or DHW production all other parameter shall not be changed without consent from the Manufacturer.

8.2 Programming Access:

Step 1:

from the Home screen touch the Sola control icon. From the overview screen touch the configure button in the bottom left hand corner.



Step 2:

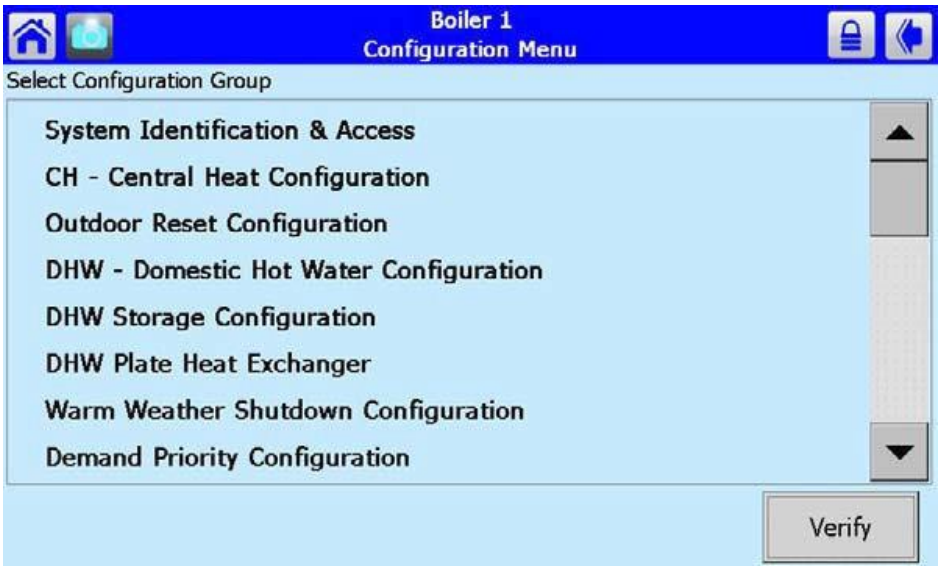
From the Configuration window, use the slide bar on the right hand side and select the group by touching the group name.

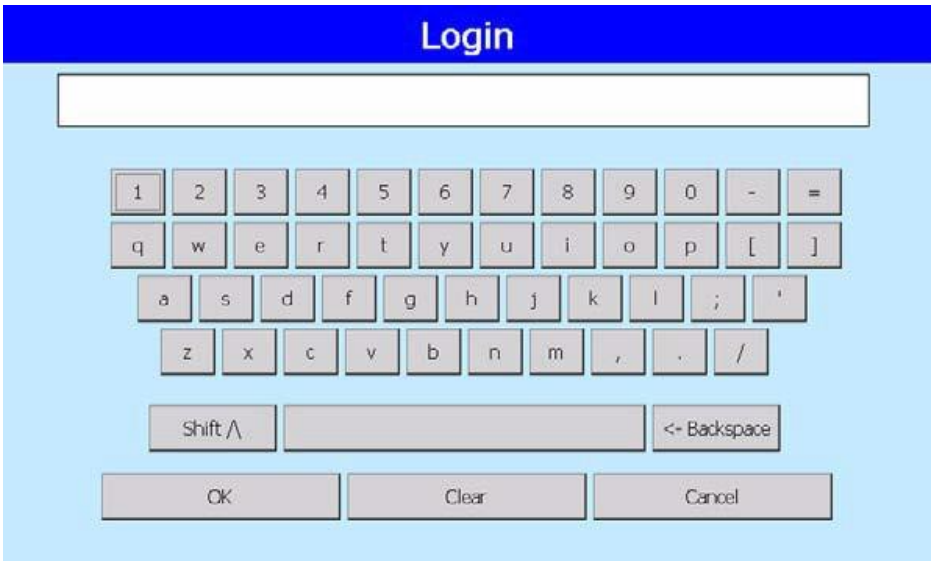
Step 3:

Verify in correct group and view setting, determine the parameter in the group you wish to either view (confirm) or change, if changes to a group parameter is needed, a service password will have to be entered.

Step 4:

Enter service password (Serial #) by touching the locked padlock icon near the top right hand corner, this will bring you to the login screen enter service password (serial #). The locked padlock icon will change to an unlock padlock icon and return back to the configuration menu, select the configuration group and then inside each group are specific parameters.





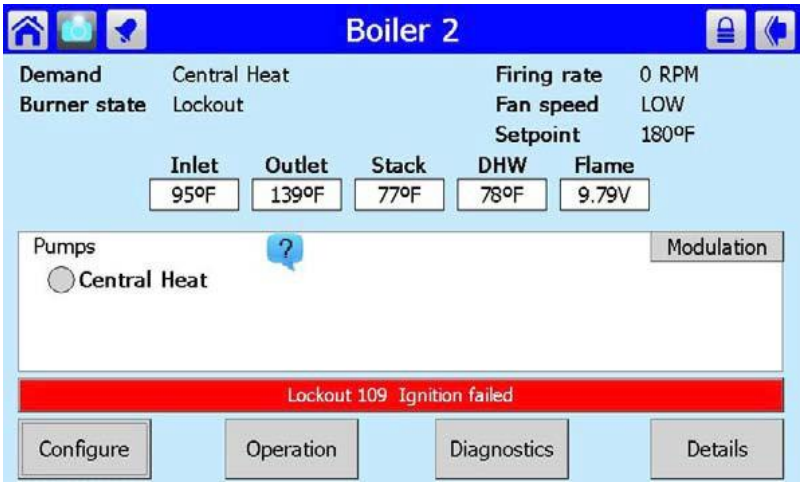
8.3 Commissioning Steps

NOTE

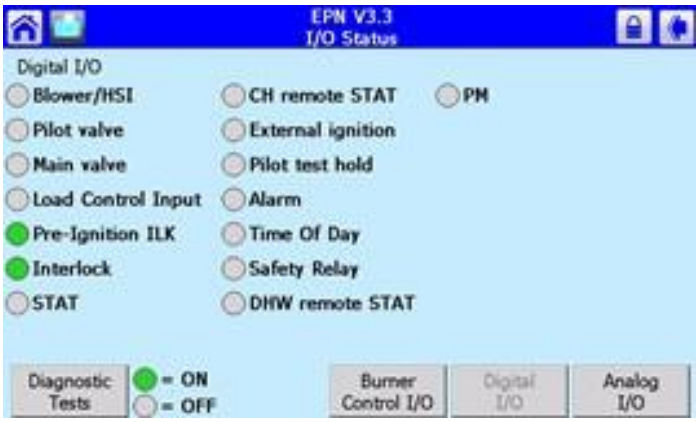
- Commissioning can only be performed with the Honeywell S7999D 1006 color touch screen display
- All units are fully factory tested, due to varying field conditions, boiler must be tested on final site for safety shutdown, operation, and combustion limits.
- The display maybe in a screen saver mode or in the home position (Sola control icon)

1. Start main screen touch the Sola control, this will bring you to the Operation Overview window.

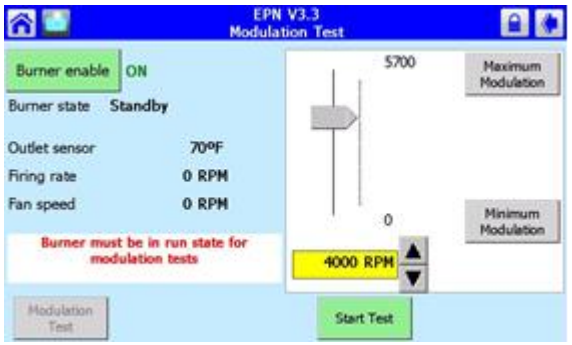
2. Touch the diagnostics button, screen changes to the I/O Status window

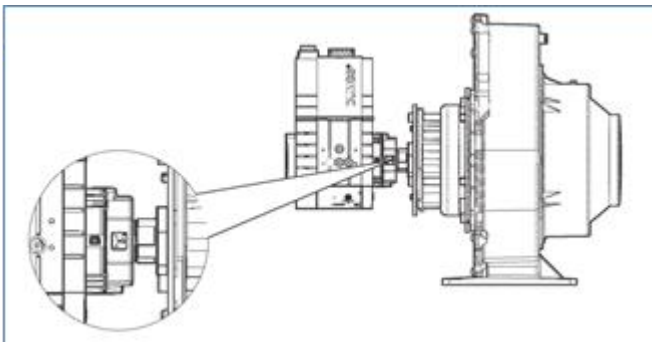


3. Touch the Diagnostics test button, screen changes to the Modulating Test window

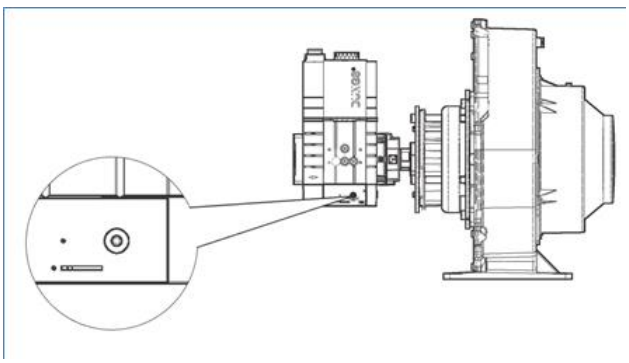


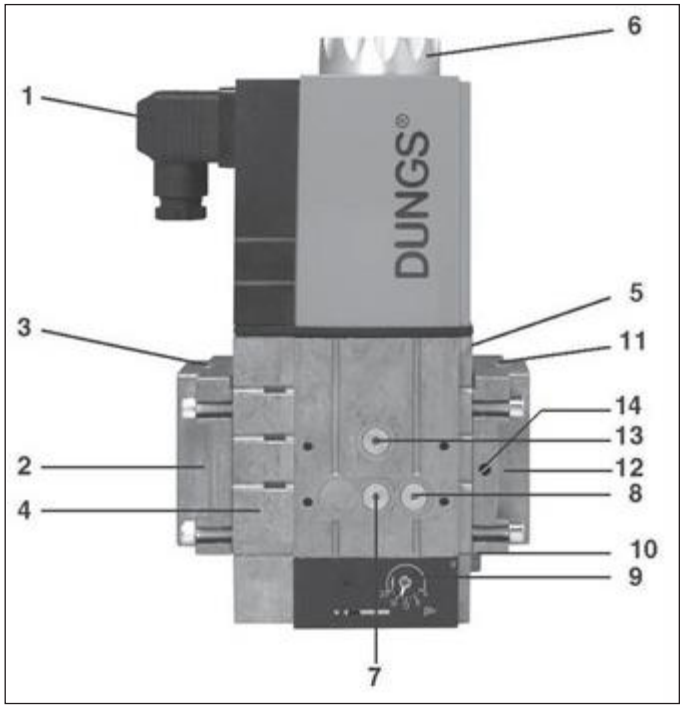
4. Press the Maximum Modulation button (High fire position), this will force the boiler into the High fire position. Once in the High fire postion and stable conditions are reached check the following:
   a. Check combustion (see table) for factory and field combustion limits
   b. Adjust main flow (High fire) as necessary via shutter adjustment slotted screw ±
   c. Measure breeching/vent draft condition
   d. Check flame signal on operation overview window and observe flame condition via sight glass.





5. Press the Minimum Modulation button, this will force the boiler into the Low fire position Once in the Low fire position and stable conditions are reached check the following:
   a. Check combustion (see table) for factory and field combustion limits
   b. Adjust offset (Low fire) as necessary via Offset 2.5mm hex screw ±
   c. Measure breeching/vent draft condition
   d. Check flame signal on operation overview window and observe flame condition via sight glass.





1. Electrical DIN Connector
2. Upstream Flange
3. G1/8 inlet test port
4. Filter
5. Valve Body
6. Coil
7. Test port connection #2, G 1/8 between V1 and V2; both sides.
8. Test port connection #3, G1/8 downstream of V2; both sides.
9. Regulator outlet pressure adjustment screw; both side
10. Vent-less regulator vent connection is G1/8 threaded. The brass vent limiting orifice is 0.2mm in diameter.
11. Downstream flange
12. Test port connection #1, G1/8 upstream of V1; both sides.
13. Offset adjustment cover

8.4 IMPORTANT SAFETY WARNING:

The installation of the boiler is not completed until all controls and safety device have been tested and verified for correct function and operation. It is the sole responsibility of the installer to ensure that safety control system and gas ignition system and any there safety control must be tested

Note:

Absolute is supplied with a number of factory default settings that should be correct for most installations. If there setting values are required: The following operating situations are now possible:

a. Local operation via internal set point, the output of the boiler modulates on the basis of the flow temperature.

b. Remote operation via external signal (4-20mA) for output or temperature set-point

c. Lead/Lag (Cascade master control) communicates directly to each boiler via Modbus communication protocol.

Important!! – No frost protection when the boiler power is turned off

6. Air pressure switch calibration and check

a. Check sensing tube, connected no cracks or splits

b. Command boiler on, disconnect sensing tube from switch our air shroud

c. Boiler shall shutdown on air pressure switch open

d. Reattach sensing line and restart boiler and confirm correct operation

7. Low gas pressure calibration and check (manual reset)

a. Check for leaks around the surface mount of low gas pressure switch for gas leaks

b. Command boiler on, while starting turn dial to the maximum setting or until boiler shutdown on LCI (operating interlocks); the switch is equipped with a LED indication when switch has activated.

c. Set switch setting back to 3.5" w.c., press the reset on switch and observe boiler shall start again automatically.

d. Confirm pressure via inlet test point of the gas valve (3), measure the pressure while operating in high fire position to confirm sufficient gas pressure if available, inlet gas pressure lower than 3 ½ inch w.c. will result in poor air/fuel ratio and reduce output. The gas pressure shall always be above the 3.5 inch w.c. at all times. The switch will activate in low gas supply pressure conditions and shall not be circumvented.

8. High gas/Vent Safety pressure switch calibration and check

   a. Check for leaks around the piping of high gas pressure switch for gas leaks

   b. Command boiler on, while starting turn dial to minimum setting or until the boiler shutdown on LCI (operating interlocks); the switch is equipped with a LED indication when switch has activated.

   c. Set switch setting back to (SEE TABLE), press the reset on switch and observe boiler shall start again automatically.

   d. Connect a manometer to the test point and observe pressure reading

9. Commission report

Absolute Boilers- ABS Series Boiler Start-up Form

Installation & Location Details

Project Name				Sart-up Date:	
Address				Start-up Tech.	
City/Town		Prov/State		Equipment Installer Contact Info.	
Country		Postal/Zip Code			

Equipment Information

Boiler Model		Serial #		CRN #	
Boiler/Burner Control		Serial # & SW			
Premix burner		Type		Motor Voltage	
Fuel Train				Size	
Firing Rate Control		BAS/BMS Control			
Boiler Pump				Voltage	
Relief Valve		Size		CRN #	
LWCO					
Vent Type		Size Ø		Height or Length	
Air Supply				Air filter	

Settings & Recordings

Fuel Type	Natural Gas		Propane	

Note: Propane (LP) not available on Gas310 boilers

	Min	Max	Unit
Air Setting - Index			RPM
Static Gas Pressure			In. w.c.
Dynamic Gas Supply			In. w.c.
Δp Manifold pressure			In. w.c.
Vent Pressure			In. w.c.
Δp Gas filter (optional)			In. w.c.
Return/Supply Temp.			

	MIN	MAX	
CO_2 %			
O_2 %			
CO ppm			
NO_x ppm			
Flame Signal			
Flue Temp.			
Ambient			

Firing Input Range	Unit
Min Rate	
Max Rate	

Gross Combustion Efficiency %	High fire (Full-load)	
	Low fire (Part-load)	

Safety & System Checks

	Setting	Tested
Safety Hi-Limit		
Hi-Limit (Internal)		
Operating Limit		
Firing Controller		

	Setting	Tested
LWCO control		
Low Fuel Pressure sw.		
High Fuel Pressure sw.		
Air pressure sw.		

	Setting	Tested
Vent Switch		
Lockout		
TFI		
FRT		

	Setting	Tested
Fuel Train Leakage Test		
Local/Remote switch function		
Boilerpressure		
P-Trap filled		

Analyzer Print outs

Other Checks/ Site Notes

Electrical Checks	
Volts L & Gnd.	
Volts N & Gnd.	
Amps @ High fire	

Safety Limit Cut-out test		
External safety limit function test (Model)	Set @ °F/C	Cut-out °F/C

Specific Site Note:

Code or installation violations or system deficiencies:

Boiler Installation By:

Company and Installer Name	Contractor #	Certificate #	Signature

Installer certifies that this boiler hereby mentioned in this report has been installed according to I-O manual provided and to all applicable national and local codes having jurisdiction.

ATTENTION Installer, for proper warranty entitlement please submit only completed startup forms along with a boiler/system water quality report.

10. Maintenance

10.1 General Maintenance

If during the annual inspection combustion results indicate that the boiler is no longer operating at the optimum level additional maintenance should be carried out as follows:

- The Absolute boiler or any of its components does not contain any crystalline silica.

Warning

Electrical Shock Hazard:

Please label all wires prior to disconnecting when servicing this boiler. Wiring errors can cause improper operation and dangerous operation. Verify boiler operation after service!

Warning

All service and maintenance must be completed by a trained and qualified service technician.

Warning

Keeping the boiler area clear and free from combustible materials, gasoline and other flammable vapor and liquids'

Please ensure that the gas supply and main power supply is isolated before any maintenance work is carried out on the boiler. Care should be taken when stripping the boiler for maintenance making sure that all parts, nuts, washers and gaskets, etc. are kept safe, clean and dry for re-assembly. Following maintenance/cleaning, the boiler should be re- assembled in the reverse order re-placing gaskets and joints where found necessary. All general cleaning should be carried out with compressed air, a soft brush or damp cloth to avoid damaging components. (Solvents must not be used). Remove front and end casing panels – lift casing panel slightly upwards and tilt toward you lift again clear of the bottom rail.

CAUTION

The sealing between the burner and the mixing blend may be sticky. Prevent the sealing from tearing. Damaged or hardened sealing must always be replaced.

10.1.1 Inspection of air box and dirt trap

The air box has a dirt trap on the inlet side. Check this for dirt, leaves, etc. If the boiler is closed, the clamping strip under the casing must be removed first, check using a mirror if necessary.

Check the air box for dirt using a lamp. If the air box is dirty, it must be dismantled and blown clean. If the air box is dirty, the following components must also be dismantled and blown clean:

10.1.2 Cleaning the Whirlwind

Use compressed air or a synthetic brush to clean the whirl wind mixing plate. Make sure not use oil based or varsol based cleaning products as this will damage the plastic fins, and could cause failure.

10.1.3 Cleaning the fan

Use compressed air or a synthetic brush to clean the fan, be careful not to disturb the balance clips on the vanes.

Warning

Ensure the balancing clips in the impeller stay in place!

10.1.4 Cleaning the heat exchanger

Release the retaining nuts from heat exchanger cover plate, remove plate, being careful not to damage the gasket, store safely. Heat exchanger can be washed with clean water, if badly contaminated, clean with a small stiff bristle "bottle type" brush or use the special cleaning tool (supplied optional). Care should be taken when using water in the confined space of the boiler casing to avoid contaminating the electrical controls. Compressed air can also be used but care should be taken to ensure disturbed dust, etc, does not contaminate the rest of the boiler and controls. Replace the heat exchange plate after cleaning and retighten the retaining nuts.

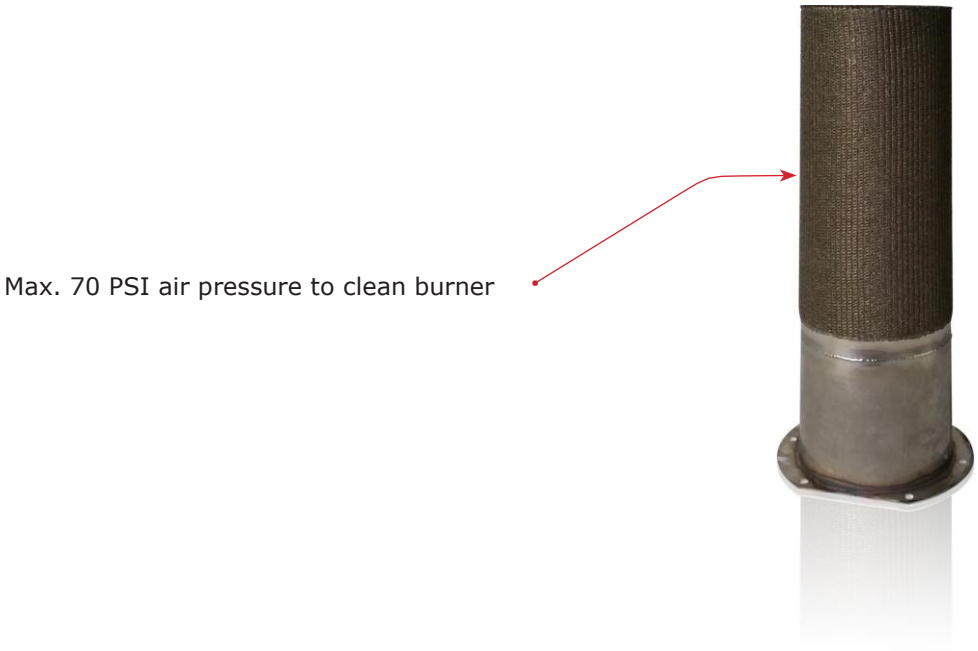
10.1.5 Cleaning the burner assembly

CAUTION

Turn electrical off, and then ensure gas has been shut off at the main shut off valve. Next purge all gas in the system as per code. The burner may be hot, allow enough time to allow the boiler to cool before removing the burner tube.

Upon removal of the burner tube, inspect it for any damage to the woven mesh and ensure no damage has been done to the tube from heat. If the burner is in good condition, clean the burner assembly by using compressed air only – between 30 – 70 psi [2-5 bar] with the nozzle positioned a min of 3/8" [10mm] away and towards the face of the burner.

If there is any damage to the mesh or tube, the burner must be replaced. Check the retaining bolts are tight. If the burner is removed from the front plate ensure burner-retaining screws are tight on re-assembly



10.1.6 Cleaning the siphon

Remove the complete siphon (located underneath condensate collector beneath the flue connection). Remove siphon, clean and refill with clean water and re-fit.

10.1.7 Cleaning/replacing the ignition/ionization rod

CAUTION

Turn electrical off, and then ensure gas has been shut off at the main shut off valve. Next purge all gas in the system as per code. The ignition/ionization rod may be hot, allow enough time to let boiler cool before removing the ignition/ionization rod.

To service the ignition and flame ionization rod, remove the two retaining screws on the electrode assembly, remove assembly and examine for wear and dirt, clean and re-gap electrode 1/8" [3mm] re-fit if in good condition (replace gasket if necessary).

Replace electrode assembly if necessary – then discard screws and gasket and fit replacement assembly c/w new gasket and screws making sure that the earth connection is in good condition and in contact with the base plate and refit safety bracket.

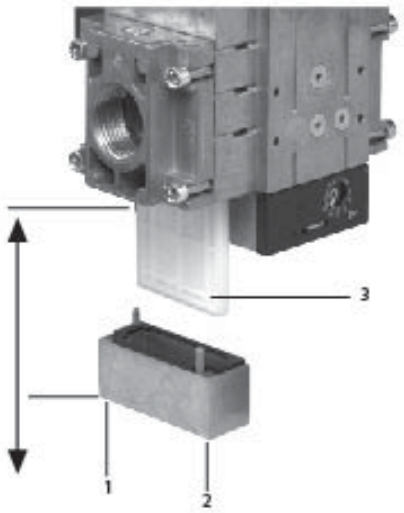
10.1.8 Filter maintenance and filter replacement

The filter shall be replaced under the following conditions:

1. The filter has been in service for more than one a year, or
2. The Δp between pressure connections 1 and 2 > 2" In. W.C., or
3. The Δp between pressure connections 1 and 2 is twice as high compared to the last inspection.

Procedure for replacing filter

1. Interrupt upstream gas supply by closing the manual shutoff valve.
2. Remove screws 1-2.
3. Change filter insert 3
4. Tighten screws 1-2 using a small force (5Nm).
5. Open the manual shutoff valve.
6. Perform leakage and function test, pmax = 5 PSI.



Space requirements for fitting filter:

MBC-1000-...: at least 6 inches
MBC-2500-...: at least 6 & 3/4 inches

10.1.9 Sight glass cleaning

CAUTION

Turn electrical off, and then ensure gas has been shut off at the main shut off valve. Next purge all gas in the system as
per code. The ignition/ionization rod may be hot, allow enough time to let boiler cool before removing the ignition/ ionization rod.

Remove the two retaining screws on the inspection glass holder, clean and replace. Re-assemble boiler in reverse order, check front plate gasket and insulation piece, replace if required. Also check the gasket on fan and on gas valve, replace if necessary. Ensure that all cables are routed correctly using existing clips and ties were possible to ensure that they do not touch any hot parts of the boiler.

CAUTION

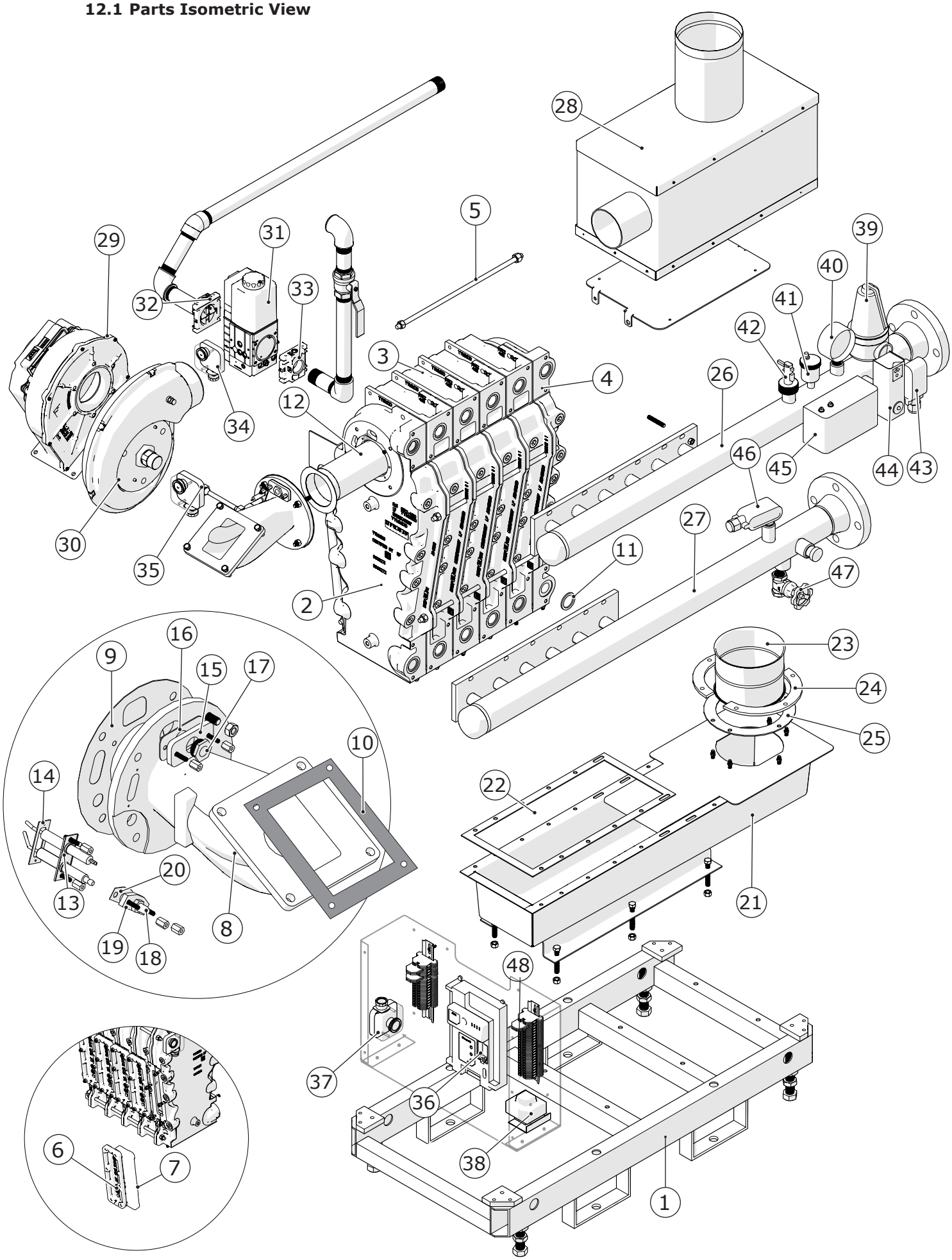
Ensure that wires do not come into contact with hot boiler parts. Commission boiler in accordance with section 10.1; complete site report and/or boiler log book if present

11. Maintenance Schedule

Description	**Schedule**
System pressure Monthly	Monthly
Control functioning	Monthly
Seals or evidence of leaks Monthly	Monthly
Unobstructed combustion air supply, no chemicals, garbage, gasoline, combustible materials, flammable liquids are stored near the boiler.	Monthly
Check for water on the floor – around relief, vent and other parts and piping of the water system	Monthly
Check operating limits for correct operation	Semi-annually
Ensure neutralization system is working	Semi-annually
Check exhaust terminals for ice, snow or debris buildup	Monthly
Check air inlet filter (Shall be done weekly if unit is operating in a construction zone)	Monthly
Check and test pressure relief safety valve	Annually
Test temperature Hi limit functions	Annually
Checks for system leaks	Annually
Check all auxiliary and other safety limits for function and correct operation.	Monthly
Check system water quality	Monthly
Check pump operation	Annually
Check fuel lines for leaks	Annually
Check combustion	Annually
Check control settings	Annually
Clean combustion chamber	Bi-Annually
Clean condensation collector and siphon	Annually
Clean Gas inlet filter	Semi-annually

12. Parts

12.1 Parts Isometric View



12.2 Parts Description and Part Numbers

Ref.	Part#	Description
1	M-300-100-C	ABS750-1050-Base Frame-750-1050
2	M500-150	ABS750-1050 Front Section
3	M500-155	ABS750-1050 Middle Section
4	M500-160	ABS750-1050 Back Section
5	M500-165	Threaded rod For ABS750 M10x398 (15.66 in)
5	M500-167	Threaded rod For ABS900 M10x482 WTB-7 (18.97 in)
5	M500-170	Threaded rod For ABS 1050 M10x566 ZP WTB 8 (22.28 in)
6	M500-177	Inspection cover WTB
7	M500-179	Seal inspection cover WTB
8	M500-180	Burner Hood WTB
9	M500-185	Seal for burner hood WTB
10	M500-187	Red Slicone Gasket.-Between Blower and Hood
11	M500-165	Headers Gasket
12	M500-170	ABS750 Burner Tube
12	M500-175	ABS900 Burner Tube
12	M500-180	ABS1050 Burner Tube
13	AB5000-6615	Ignition electrode with Flame Rod
14	AB5000-7100	Seal, ignition electrode
15	M500-189	Sight Glass Flange
16	M500-186	Sight Glass Gasket
17	S5000-6633	Glass inspection
18	AB5000-6635	G 1/8" test point Plug
19	M500-195	G 1/8" test point Flange
20	M500-1200	G 1/8" test point Flange-Gasket
21	M-350-200C	ABS750-Condensate Pan
21	M-350-220C	ABS900-Condensate Pan
21	M-350-227C	ABS1050-Condensate Pan
22	M-350-330	ABS750-Condensate Pan-Gasket
22	M-350-335	ABS900-Condensate Pan-Gasket
22	M-350-345	ABS1050-Condensate Pan-Gasket
23	M-350-350	ABS750-900-Exhaust Adapter 6" SS
23	M-350-352	ABS1050-Exhaust Adapter 8" SS
24	M-350-357	ABS750/900-Condensate Pan-Flange-6in
24	M-350-360	ABS1050-Condensate Pan-Flange-8in
25	M-350-367	ABS750/900-Gas Exhaust Connection gasket-6in
25	M-350-370	ABS1050-Gas Exhaust Connection gasket-8in
26	M600-100	Absolute ABS750- 6 sections - Outlet Manifold
26	M600-110	Absolute ABS900- 7 sections - Outlet Manifold
26	M600-120	Absolute ABS1050- 8 sections - Outlet Manifold
27	M600-180	Absolute ABS750- 6 sections - inlet Manifold - 2.5 inch
27	M600-190	Absolute ABS900- 7 sections - Inlet Manifold - 2.5 inch
27	M600-200	Absolute ABS1050- 8 sections - Inlet Manifold - 2.5 inch
28	M550-700	Absolute ABS750-1050-Air Box -Assembled
29	M700-210	G1G170-AB05-20 120 Volt blower fan asembly
30	M700-220	Swirl Plate with AIC 110
31	M700-300	Gas Valve - MBC-SE-1000-602 S02
32	M700-305	Inlet Flange 1"
33	M700-307	Adjustable Shutter (outlet) 1" NPT
34	EL-1600-155	Low gas pressure switch
35	EL-1600-150	High gas pressure switch
36	EL-705-100	Honeywell Sola R7910A

12.2 Parts Description and Part Numbers (continued)

Ref.	Part#	Description
37	EL-705-135	Differential Pressure air switch
38	EL-705-130	Transformer S1900-1042
39	T-530-110	Pressure relief valve
40	T-530-145-BO	Temperature/Pressure gauge (0/100)
41	T-530-80	Air Venting
42	T-530-81	Flow Switch F-43-114400
43	T-530-130	Outlet NTC (Supply Sensor)
44	T-530-157	Temperature High Limit Aquastat
45	T-530-100	LWCO
46	T-530-120	Inlet NTC (Return Sensor)
47	T-530-160	Drain valve
48	consult factory	Fuse
49	EL-705-230	Sola Display
50	consult factory	Flue test port plug(cap)
51	M700-211	Gas Valve Filter 241916

Technical support:

1-519-650-0420

9 am to 5 pm EST

For service or parts, contact your local sales representative.