DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK

CITY OF PORTLAND

BUILDING PERMIT

This is to certify that JENNIE & DAVID OULTON

Located At 1704 WASHINGTON AVE

Job ID: 2011-08-1856-ALTR

CBL: 351- A-012-001

2012-14802-HVAC

has permission to install an HVAC system (Single Family Residence).

provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statues of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of the buildings and structures, and of the application on file in the department.

Notification of inspection and written permission procured before this building or part thereof is lathed or otherwise closed-in. 48 HOUR NOTICE IS REQUIRED.	A final inspection must be completed by owner before this building or part thereof is occupied. If a certificate of occupancy is required, it must be

01/24/2012

Fire Prevention Officer **Code Enforcement Officer / Plan Reviewer**

THIS CARD MUST BE POSTED ON THE STREET SIDE OF THE PROPERTY

PENALTY FOR REMOVING THIS CARD

PORTLAND MAINE

Strengthening a Remarkable City. Building a Community for Life • www.portlandmaine.gov

Director of Planning and Urban Development

Job ID: 2011-08-1856-ALTR **Located At:** 1704 WASHINGTON AVE **CBL:** 351- A-012-001

Conditions of Approval:

Zoning

1. This permit is being approved on the basis of plans submitted. Any deviations shall require a separate approval before starting that work.
2. This is NOT an approval for an additional dwelling unit. You SHALL NOT add any additional kitchen equipment including, but not limited to items such as stoves, microwaves, refrigerators, or kitchen sinks, etc. without special approvals.
3. This property shall remain a single family dwelling. Any change of use shall require a separate permit application for review and approval.
4. Separate permits shall be required for future decks, sheds, pools, and/or garages.

Building

1. Separate permits are required for any electrical, plumbing, sprinkler, fire alarm HVAC systems, commercial hood exhaust systems and fuel tanks. Separate plans may need to be submitted for approval as a part of this process.
2. The installation must comply with UL, the Manufacturers' Listing, and State of Maine Gas Regulations.
3. Maintain proper setback(s) from property lines/buildings and proper clearances from vertical openings when direct venting.
4. M1804.2.5 Direct vent terminations. Vent terminals for direct-vent appliances shall be installed in accordance with the manufacturer's installation instructions.
5. A photoelectric Carbon Monoxide (CO) detector shall be installed in each area within or giving access to bedrooms. That detection must be powered by the electrical service (plug-in or hardwired) in the building and battery.
6. Hardwired photoelectric interconnected battery backup smoke detectors shall be installed in all bedrooms, protecting the bedrooms, and on every level. A field inspection will verify your current smoke detector arraignment and the City's minimal code requirements.

BUILDING PERMIT INSPECTION PROCEDURES

Please call 874-8703 or 874-8693 (ONLY)

or email: buildinginspections@portlandmaine.gov

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the city of Portland Inspections Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- **Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.**
- **Permits expire in 6 months. If the project is not started or ceases for 6 months.**
- **If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a "Stop Work Order" and subsequent release to continue.**

1. Close-In: (Electrical, Plumbing, Framing)
2. Final Inspection

The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OF CIRCUMSTANCES.

IF THE PERMIT REQUIRES A CERTIFICATE OF OCCUPANCY, IT MUST BE PAID FOR AND ISSUED TO THE OWNER OR DESIGNEE BEFORE THE SPACE MAY BE OCCUPIED.

City of Portland, Maine - Building or Use Permit Application

389 Congress Street, 04101 Tel: (207) 874-8703, FAX: (207) 8716

Job No:	Date Applied:	CBL:	
2011-08-1856-ALTR #2012-14802 HVAC	**1/17/2012**	**351- A-012-001**	
Location of Construction: **1704 WASHINGTON AVE**	Owner Name: **JENNIE & DAVID OULTON**	Owner Address: **1704 WASHINGTON AVE PORTLAND, ME 04103**	Phone:
Business Name:	Contractor Name: **DAVID J. SMALL**	Contractor Address: **198 GRAY ROAD, CUMBERLAND, ME 04021**	Phone: **829-5042**
Lessee/Buyer's Name:	Phone:	Permit Type: **HVAC**	Zone: **R-3**
Past Use: **Single Family Dwelling**	Proposed Use: **Same: Single Family Dwelling – to install Pensoti Heating System**	Cost of Work: **$13,0000.00**	CEO District:
		Fire Dept: ___ Approved ___ Denied ✓ N/A Signature:	Inspection: Use Group: HVAC Type: Maine Gas Reg Signature:
Proposed Project Description: **second floor addition/HVAC**		Pedestrian Activities District (P.A.D.)	
Permit Taken By: Brad			

1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.
2. Building Permits do not include plumbing, septic or electrial work.
3. Building permits are void if work is not started within six (6) months of the date of issuance. False informatin may invalidate a building permit and stop all work.

Zoning Approval

Special Zone or Reviews	Zoning Appeal	Historic Preservation
___ Shoreland	___ Variance	✓ Not in Dist or Landmark
___ Wetlands	___ Miscellaneous	___ Does not Require Review
___ Flood Zone	___ Conditional Use	___ Requires Review
___ Subdivision	___ Interpretation	___ Approved
___ Site Plan	___ Approved	___ Approved w/Conditions
___ Maj ___ Min ___ MM	___ Denied	___ Denied
Date: OK 1/17/12	Date:	Date:

CERTIFICATION

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the appication is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT ADDRESS DATE PHONE

RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE DATE PHONE

PENSOTTI® Solenne Series

Available in 3 distinct styles, **Solenne**, series boilers will accommodate most residential and light commercial heat and hot water applications. All **Solenne** boilers are wall-mounted, fully condensing with sealed combustion systems and a choice of 3 multiple venting options.

Unlike many other boilers, **Solenne** boilers are fully packaged making installation simpler, quicker, and less expensive. No matter which style you choose, every **Solenne** boiler offers a long list of standard features:

- Clean, appliance quality, metal cabinet
- Quality stainless steel heat exchanger
- Premix stainless steel gas burner
- Self diagnostic control system with digital display, heat and domestic water temperature control, freeze protection, circulator exercise function and outdoor temperature reset capability
- Dependable negative pressure gas valve
- Reliable direct spark ignition system
- Quiet, electronic variable speed blower
- Oversized stainless steel and copper brazed plate domestic hot water heat exchanger with electronic flow switch (combi and micro storage boilers)
- Built-in 3 speed circulator with automatic air vent
- Built-in expansion tank
- Internal low water safety switch
- Simple push button conversion to LP gas
- Convenient piping kit with isolation valves
- Service friendly design provides quick, easy access to all internal components
- Warranty; 2 year on parts and 10 years on the stainless steel heat exchanger

Pensotti LLC
34 Coffin Ave
PO Box 3358
Brewer, ME 04412
Tel: (207) 942-3636
Fax: (207) 942-3737

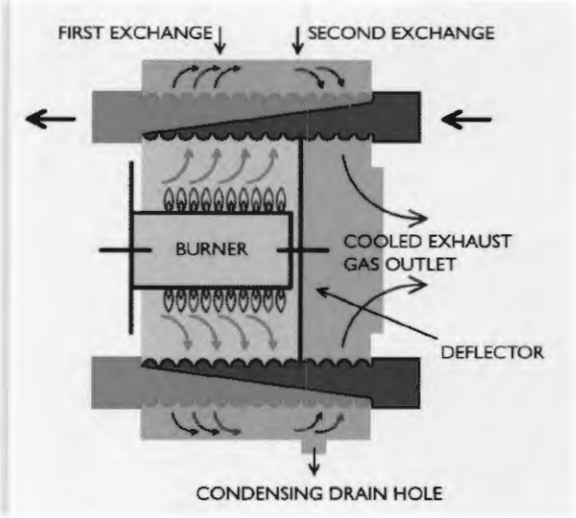
www.pensottiboiler.com

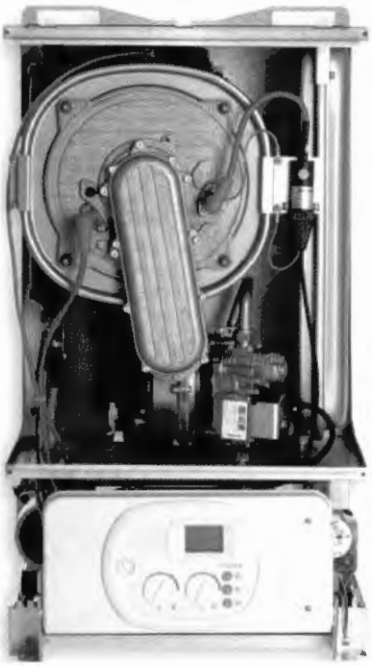
PENSOTTI® Solenne Series

PCH Series

Solenne PCH series boilers are heating only, wall mounted, gas condensing boilers, perfect for all hydronic heating systems. They perform effectively and efficiently with all types of systems including: radiant floor, panel radiators, conventional baseboard and hydro-air systems.

If domestic hot water is also desired the **Solenne PCH** series includes an internal 3-way valve, copper pipe fittings and a pre-wired temperature sensor for effortless connection to an indirect fired water heater.



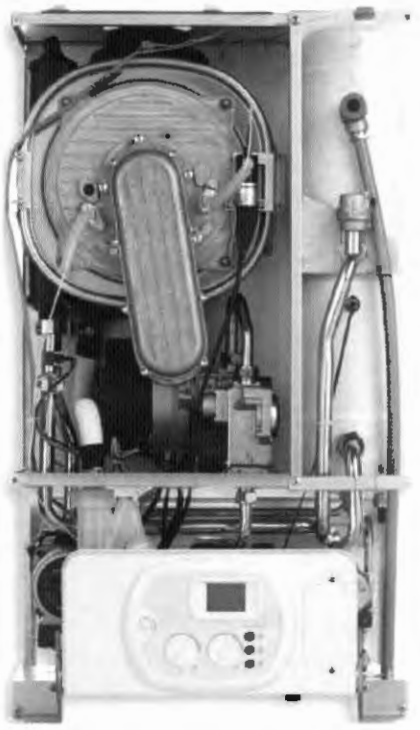


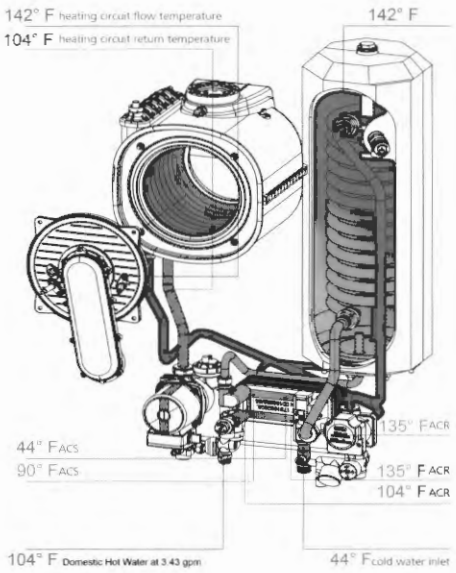
PCC Series

The **Solenne PCC** series are combination heat and instantaneous domestic hot water boilers. They can be used in conjunction with all hydronic heating systems and will also produce domestic hot water from the integrated stainless steel and copper brazed plate heat exchanger. Combining both heating and domestic hot water in one small appliance, the **Solenne PCC** series dramatically reduces the installation space that is typically required with traditional systems. With its whisper quiet operation and compact size, the **Solenne** series boilers can be installed nearly anywhere within the home.

MODEL	BTUH INPUT MAXIMUM	BTUH INPUT MINIMUM	WEIGHT (LBS.)	HEIGHT	WIDTH	DEPTH	DHW FLOW RATE @ 63°F RISE	HEAT TEMP. RANGE	DHW TEMP. RANGE	CONC. VENT SIZE
PCH 18B	61,419	8,014	80	28.7"	16.1"	11.2"	N/A	86-176°F	95-160°F	3.15''/5''
PCH 34B	116,013	34,121	88	28.7"	16.1"	12.2"	N/A	86-176°F	95-160°F	3.15''/5''
PCH 50B	174,019	40,946	114	27.6''	19.3''	18.5''	N/A	86-176°F	95-160°F	3.15''/5''
PCC 34	116,013	34,121	88	28.7''	16.1''	12.2''	3.77	86-176°F	95-160°F	3.15''/5''

PENSOTTI® Solenne Series





PCI Series

The **Solenne PCI** series is a wall-mounted, fully condensing, heat and micro-storage gas boiler with an internal stainless steel indirect water heater. Incorporating our patented Duopass system, the **PCI** series boiler will provide an abundant quantity of domestic hot water. This patented system consists of a stainless steel indirect water heater and a brazed plate heat exchanger.

Upon a demand for domestic hot water the **Solenne PCI** series boiler responds immediately, re-heating the water in the storage tank and pre-heating the entering cold water through the brazed plate heat exchanger.

With a ready supply of stored domestic hot water and the pre-heating of cold water entering the indirect water heater the **PCI** series has a dramatically increased recovery rate when compared to that of any standard combi-boiler. The **Solenne PCI** series is a viable alternative to many applications where an external indirect water heater would normally be required; saving valuable space while reducing material and installation costs.

MODEL	BTUH INPUT MAXIMUM	BTUH INPUT MINIMUM	WEIGHT (LBS.)	HEIGHT	WIDTH	DEPTH	DHW FLOW RATE @ 63°F RISE	DHW STORAGE (GALS.)	HEAT TEMP. RANGE	DHW TEMP. RANGE	CONC. VENT SIZE
PCI 18/8	61,419	8,014	114.5	31.1"	17.7"	13"	3.1 GPM	2.11	86-176°F	95-160°F	3.15"/5"
PCI 34/20	116,013	34,121	146	35.5"	19.5"	18.9"	4.5 GPM	5.30	86-176°F	95-160°F	3.15"/5"

orig: 2011-08-1856 FILL IN AND SIGN WITH INK

APPLICATION FOR PERMIT
HEATING OR POWER EQUIPMENT

2012-14802

R-3

To the INSPECTOR OF BUILDINGS, PORTLAND, ME.

The undersigned hereby applies for a permit to install the following heating, cooking or power equipment in accordance with the Laws of Maine, the Building Code of the City of Portland, and the following specifications:

Location / CBL 351 A012 001 Use of Building Home SF Date 1/17/12

Name and address of owner of appliance David Oulton 1704 Washington Ave Portland ME

Installer's name and address David Small 198 Gray Rd Cumb ME 04021 Telephone 829 5042

Location of appliance:
- ☒ Basement
- ☐ Floor
- ☐ Attic
- ☐ Roof

Type of Fuel:
- ☒ Gas
- ☐ Oil
- ☐ Solid

Appliance Name: PenSotti

U.L. Approved ☒ Yes ☐ No

Will appliance be installed in accordance with the manufacture's installation instructions? ☒ Yes ☐ No

IF NO Explain: _____

The Type of License of Installer:
- ☐ Master Plumber # 07603
- ☐ Solid Fuel # _____
- ☐ Oil # _____
- ☐ Gas # _____
- ☐ Other _____

Type of Chimney:
- ☐ Masonry Lined
  Factory built _____
- ☐ Metal
  Factory Built U.L. Listing # _____
- ☒ Direct Vent
  Type ~~PenSotti~~ mod PC118-8 UL# _____

Type of Fuel Tank
- ☐ Oil
- ☒ Gas

RECEIVED
JAN 17 2012
Dept. of Building Inspections
City of Portland, Maine

Size of Tank _____

Number of Tanks _____

Distance from Tank to Center of Flame _____ **feet.**

Cost of Work: $ 12,900.00

Permit Fee: $ 150.00

Approved

Fire: _____

Ele.: _____

Bldg.: _____

Approved with Conditions

☐ See attached letter or requirement

_____ Inspector's Signature

_____ Date Approved

Signature of Installer David J Small

White - Inspection Yellow - File Pink - Applicant's Gold - Assessor's Copy

PENSOTTI
NORTH AMERICA

Instruction Manual
for model

PCH 34B

Wall mounted heat only boiler
With indirect water heater provisions
Premix condensing boiler

This appliance must be installed by a licensed and/or qualified technician. Failure to properly install this appliance could result in property damage and possible injury or death to occupents.

Installation, operating, commissioning and maintenance instructions.

REV: 080910

ENGLISH

1. GENERAL INFORMATION

1.1 General warnings

⚠ **Professionally qualified personnel in accordance with current laws and standards and in line with the manufacturer's instructions must install the appliance.**

⚠ **The commissioning of the boiler and any subsequent work carried out on the appliance must be completed by an appropriately qualified technician.**

⚠ **The appliance must be used solely for the purpose for which it has been designed and manufactured: central heating and domestic hot water production. Any other use is deemed as improper and as such dangerous. Under no circumstances will the manufacturer be held responsible for property damage or injury to persons or animals caused by errors in the installation and/or use of the appliance, or through non-compliance with current local and national standards and/or the manufacturer's instructions.**

⚠ **The installation, operation and maintenance manual forms an integral and essential part of the product and must always be kept near the appliance.**

⚠ **This Manufacturer Installation and Maintenance manual must not be removed on completion of the installation; must be kept in a safe place and made available for future reference.**

⚠ **The warnings contained in this chapter have been written for the appliance user, the installer and the service engineer.**

⚠ **The "operating instructions" chapter of this manual must be read carefully as it provides information on the operation and the operating limits of the appliance.**

⚠ **This appliance must be used exclusively in a closed central heating system.**

- After the removal of all the packaging, check that the appliance has not been damaged. In case of doubt, do not attempt to use the product but refer to the supplier. Packing materials (cardboard box, wooden crate, nails, staples, plastic bags, polystyrene, etc.) must not be left within reach of children in that these items represent a potential hazard and must be disposed of in a responsible manner.
- Before carrying out any cleaning or maintenance operations, disconnect the appliance from the mains electricity supply by switching off at the main switch and/or any other isolating device.
- Do not obstruct the air intake or flue exhaust pipes.
- Do not obstruct the air intake or flue exhaust terminals.
- In the case of a fault and/or malfunction in the appliance, shut down the system. Do not interfere with or attempt any repairs. Call for professionally qualified technical assistance only.
- Any warranty repairs to the appliance must be carried out exclusively by the manufacturer's authorised service centre using original spare parts. Non-compliance with the above requirements may compromise the safety of the appliance and invalidate the warranty. In order to guarantee the efficiency of the appliance and its correct operation, it must be serviced regularly by professionally qualified personnel in line with the manufacturer's instructions.
- When the appliance is no longer required for use, any parts that may constitute potential sources of danger must be rendered harmless.
- Only original accessories or optional extras (including electrical parts) may be used with the appliance.
- Should there be a smell of gas present in the room where the appliance is installed, **DO NOT** attempt to activate any electric switches, telephones or any other equipment that may cause sparks. Open doors and windows immediately to create a current of air and ventilate the room. Shut-off the main gas supply valve (at the meter), or on the cylinder in the case of bottled gas, and call your gas supplier and/or emergency services.
- **Do not attempt to interfere with the appliance in any way.**
- As dictated by current legislation, this appliance **must be installed exclusively by qualified personnel.** Before starting the boiler for the first time, make sure that it is connected to a water supply and central heating system compatible with its performance characteristics.
- The room must be ventilated by means of an air intake positioned at floor level and protected with a grill. Make sure the grill does not reduce the free area.

- The air inflow from adjacent rooms is allowed providing that these rooms are adequate in volume and that **there are no fireplace or exhaust fans installed**.
- **Check the technical data reported on the packing and on the data plate** located on the inside of the front casing. Also check that the burner is appropriate for the type of gas being used.
- **Make sure that the pipes and fittings used for the gas service are perfectly tight and that there are no gas leaks**.
- Prior to start-up, the central heating pipes should be flushed to remove any residues that could compromise the operation of the appliance.
- The appliance can be regarded as being electrically safe when it has been connected to an efficient earth system installed in accordance with the requirements of current safety standards. This fundamental safety requirement must be checked and verified. In case of doubt, have the electrical system checked by a qualified electrician. The manufacturer will not be held liable for any damage or injury caused as a result of an ineffective or non-existent earth ground.
- The domestic power supply must be checked by a qualified electrician to ensure that it can support the maximum power absorption of the appliance, as indicated on the appliance data plate (positioned on the inside of the front casing). In particular, make sure that the wire ratings are adequate for the power absorbed.
- Do not use adapters; multiple sockets or extension leads to connect the appliance to the mains power supply.
- The appliance must be connected to the mains power supply through an appropriate electrical isolator in accordance with the current wiring regulations.
- When using an electrical appliance, a few fundamental rules must be observed:
- Do not touch the appliance with damp or wet parts of the body or when barefoot
- Do not pull on the electric wires
- Do not leave the appliance exposed to atmospheric elements (rain, sun, etc,).
- Do not allow the appliance to be used by children or anyone unfamiliar with its operation.
- The user must not replace the power supply cable.
- If the cable is damaged in any way, switch off the appliance and have the cable replaced by a suitably qualified electrician.
- **When the appliance is no longer required for use, switch off the main power supply, to switch all electrical components off (circulating pump, burner etc.)**

1.2 Product conformity

Pensotti North America declares that all its products are manufactured to a high specification and in compliance with the relevant standards.

All **PENSOTTI NORTH AMERICA** boilers are **CE** certified and possess technical and functional characteristics that comply with the following standards:

EN 483 for GAS-FIRED CENTRAL HEATING BOILERS TYPE C OF NOMINAL HEAT INPUT ≤ 70 kW

BOILERS WITH NOMINAL HEAT INPUT ≤ 70 kW

Gas fired boilers also comply with the following directives:

GAS APPLIANCES DIRECTIVE 90/396 CEE for CE compliance

LOW VOLTAGE DIRECTIVE 73/23 CEE

ELECTROMAGNETIC COMPATIBILITY DIRECTIVE 89/336 CEE

BOILER EFFICIENCY DIRECTIVE 92/42 CEE

The materials used such as copper, brass, stainless steel, etc. form a compact, homogeneous, highly functional unit that is easy to install and simple to operate. In its simplicity, the wall-mounted appliance is equipped with all the appropriate accessories required to make it a fully independent boiler capable of satisfying domestic hot water production and central heating needs. All boilers are fully inspected and are accompanied by a quality certificate, signed by the inspector, and a guarantee certificate. This manual must be kept in a safe place and must **accompany the boiler at all times.**

Pensotti North America will not be held responsible for any misinterpretation of this manual resulting from the inaccurate translation of same.

Pensotti North America will not be held responsible for the consequences in the case of non-observance of the instructions contained in this manual or in the case where actions not specifically described herein are undertaken.

Pensotti North America declare that no substances harmful to health are contained in the appliance or used during appliance manufacture and have not used or intend to use any of the following substances in the manufacture of Pensotti North America heating products.

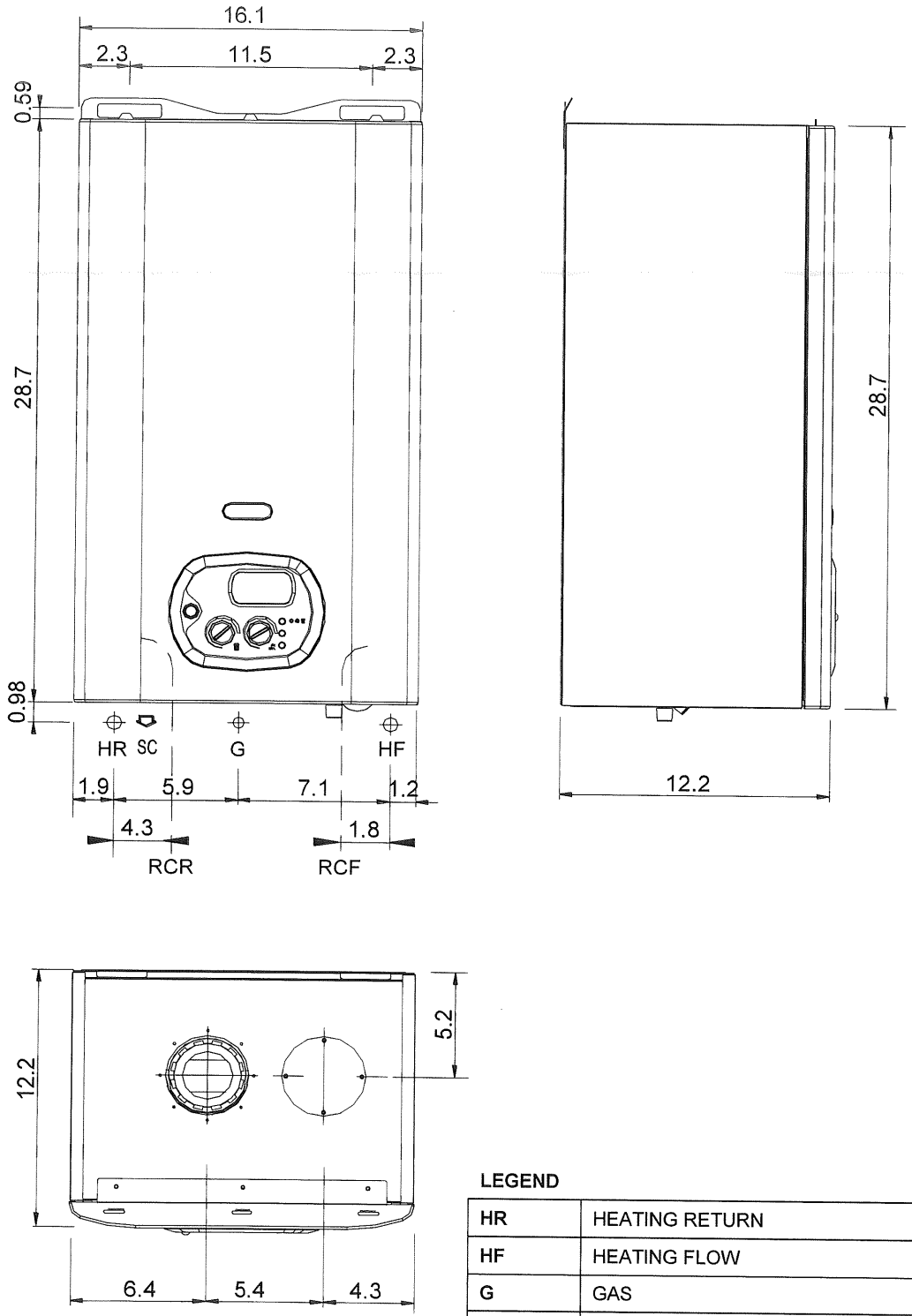
- **Asbestos**
- **Mercury**
- **CFC's.**

2. TECHNICAL CHARACTERISTICS

2.1 Technical data

Model		RK 34/B
CE Certification	n°	0694BN3485
Appliance Type		B23p-B33-C13-C33-C43-C53-C63-C83-C93
Appliance Category		II2H3B/P
Heat Input max	kW - BTU/hr	34 - 116013
Heat Input max - D.H.W. production working	kW - BTU/hr	35 - 119455
Heat Input min	kW - BTU/hr	10 - 34121
Heat Output max - 122/86°F	kW - BTU/hr	36.2 - 123670
Heat Output max - 176/140°F	kW - BTU/hr	33.4 - 114041
Heat Output max - D.H.W. production working - 176/140°F	kW - BTU/hr	34.4 - 117378
Heat Output min - 176/140°F	kW - BTU/hr	9.7 - 33200
Efficiency 100% (full load 122/86°F)	%	96
Efficiency 30% (partial load 122/86°F)	%	97
Efficiency 100% (full load 176/140°F)	%	87.7
Efficiency 30% (partial load 176/140°F)	%	88.8
GAS DIRECTIVE 92/42/ECC - Efficiency marking	stars	4
Sedbuk	band	A
Central Heating circuit		
Central Heating water temperature setting (min-max)	°C – °F	30-80 / 25-40 – 86-176 / 77-104
Max. heating working temperature	°C – °F	80 – 176
Expansion vessel capacity	gal	1.85
Max. working pressure (heating)	bar - psi	2.1 - 30
Min. working pressure (heating)	bar - psi	0.3 - 4.29
Domestic Hot Water circuit		
D.H.W. temperature setting (min-max)	°C – °F	35-70 – 95-160
Max. Hot water working pressure	bar - psi	6 – 86
Min. Hot water working pressure	bar - psi	0.5 - 7.16
Dimensions (Boiler casing size)		
Width	in	16.1
Height	in	28.7
Depth	in	12.2
Weight (net)	lb	88
Hydraulic connections		
Central Heating Flow connection	NPT	3/4"
Central heating Return connection	NPT	3/4"
Central heating flow connection to DHW storage cylinder	NPT	3/4"
Central heating return connection from DHW storage cylinder	NPT	3/4"
Gas connection	NPT	1/2"
Flue systems		
Horizontal-Concentric flue system	Ø mm - in	80/125 - 3.15/5
Max. Flue length	m - ft	8 - 26
Twin pipe flue system	Ø mm - in	80/80 - 3.15/3.15
Max. Flue length (from terminal to terminal)	m - ft	50 -164
Twin pipe flue system	Ø mm - in	60/60 - 2.4/2.4
Max. Flue length (from terminal to terminal)	m - ft	30 - 98
Vertical-Concentric flue system	Ø mm - in	80/125 - 3.15/5
Max. Flue length	m - ft	8 - 26
Gas Supply		
Natural gas G 20		
Inlet pressure	mbar - psi	20 - 0.29
Gas consumption	m^3/h - ft^3/h	3.60 – 127.13
Propane G31		
Inlet pressure	mbar - psi	37 - 0.53
Gas consumption	m^3/h - ft^3/h	1.38 – 48.73
Electrical specifications		
Power supply	V/Hz	110/60
Electrical power consumption	W	180
Electrical protection	IP	X4D

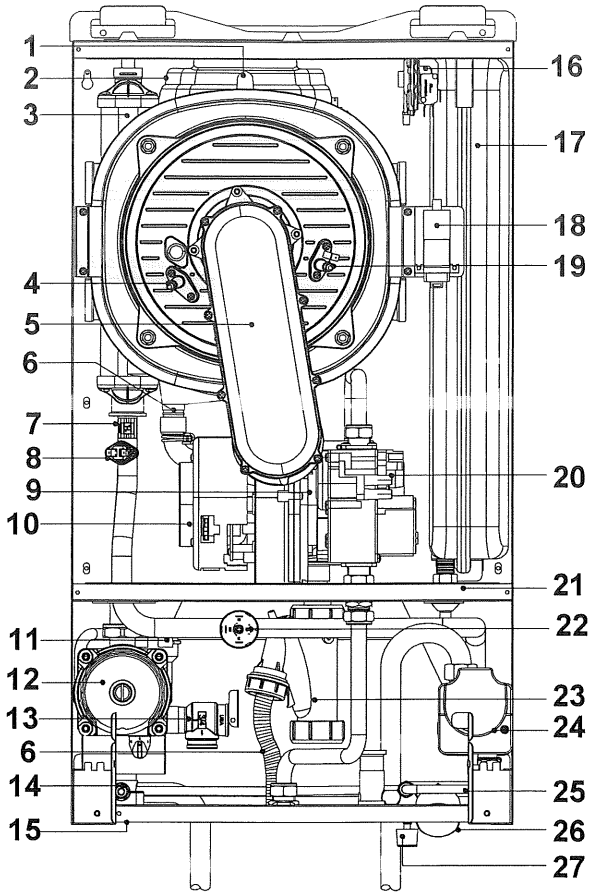
2.2 Dimensions



LEGEND

HR	HEATING RETURN	Ø 3/4"
HF	HEATING FLOW	Ø 3/4"
G	GAS	Ø 1/2"
RCR	REMOTE D.H.W. CYLINDER RETURN	Ø 3/4"
RCF	REMOTE D.H.W. CYLINDER FLOW	Ø 3/4"
SC	CONDENSATE DRAIN	Ø 0.98 in

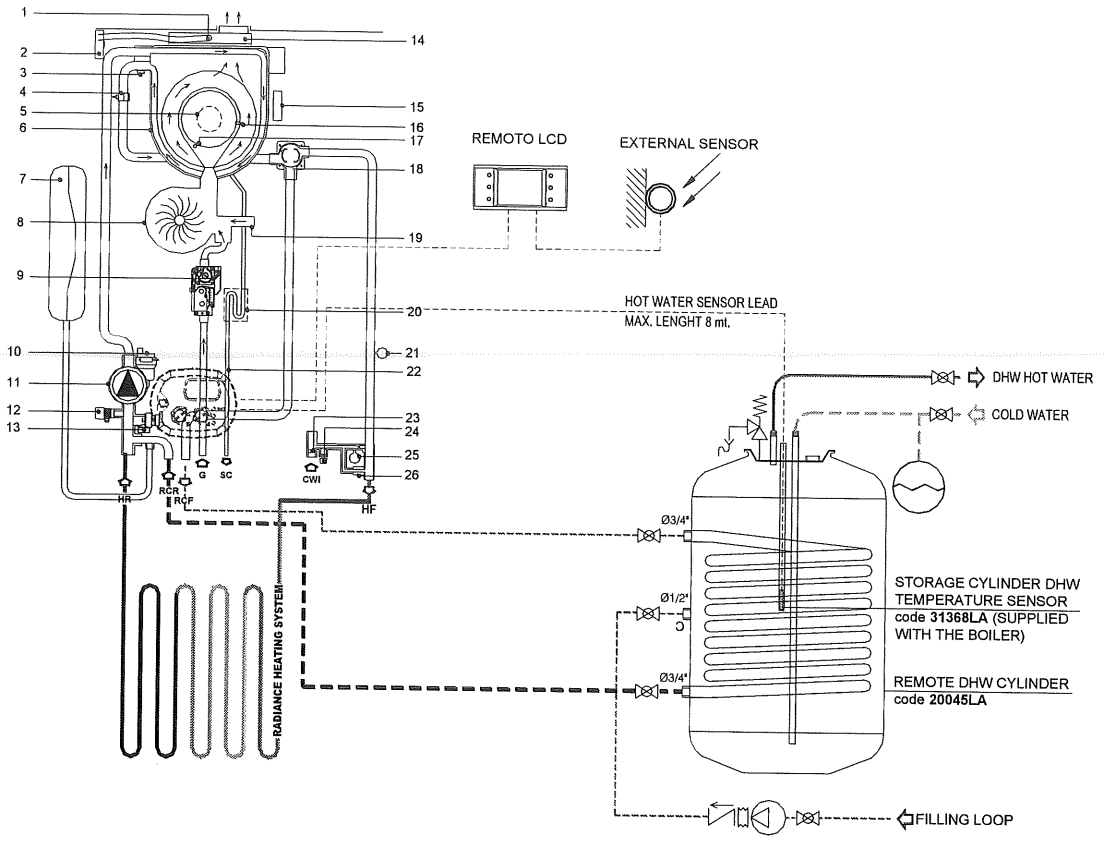
2.3 Internal parts of the boiler



LEGEND

1. SAFETY THERMOFUSE
2. FLUE HOOD
3. PRIMARY CONDENSING HEAT EXCHANGER
4. IONISATION ELECTRODE
5. PREMIX BURNER UNIT (GAS MANIFOLD + BURNER)
6. CONDENSATE DRAIN PIPE
7. HEATING SENSOR
8. HEATING SAFETY THERMOSTAT
9. VENTURI
10. FAN
11. AUTOMATIC AIR VENT VALVE
12. PUMP
13. SAFETY VALVE 3/4
14. SYSTEM DRAIN VALVE
15. AUTOMATIC BY-PASS
16. AIR PRESSURE SWITCH
17. EXPANSION VESSEL
18. IGNITION TRANSFORMER
19. IGNITION ELECTRODE
20. ELECTRONIC GAS VALVE
21. ROOM SEAL CHAMBER BACK SIDE
22. LOW WATER CUT OUT SWITCH
23. CONDENSATE TRAP
24. DIVERTER VALVE ACTUATOR UL/CSA
25. NO-RETURN VALVE
26. WATER PRESSURE GAUGE
27. FILLING TAP

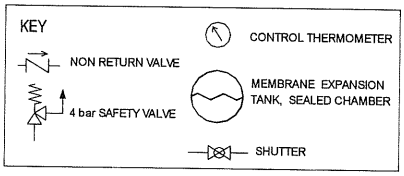
2.4 Water circuit



LEGEND

1. SAFETY THERMOFUSE
2. AIR PRESSURE SWITCH
3. HEATING SAFETY THERMOSTAT
4. HEATING SENSOR
5. PREMIX BURNER UNIT (GAS MANIFOLD+BURNER)
6. PRIMARY CONDENSING HEAT EXCHANGER
7. EXPANSION VESSEL
8. FAN
9. ELECTRONIC GAS VALVE
10. AUTOMATIC AIR VENT VALVE
11. PUMP
12. AIR VENT VALVE 1/4
13. SAFETY VALVE 3/4
14. FLUE HOOD
15. IGNITION TRANSFORMER
16. IGNITION ELECTRODE
17. IONISATION ELECTRODE
18. DIVERTER VALVE ACTUATOR UL/CSA
19. VENTURI
20. CONDENSATE TRAP
21. LOW WATER CUT OUT SWITCH
22. CONDENSATE DRAIN PIPE
23. FLOW LIMITER
24. FILLING TAP
25. WATER PRESSURE GAUGE
26. NO-RETURN VALVE

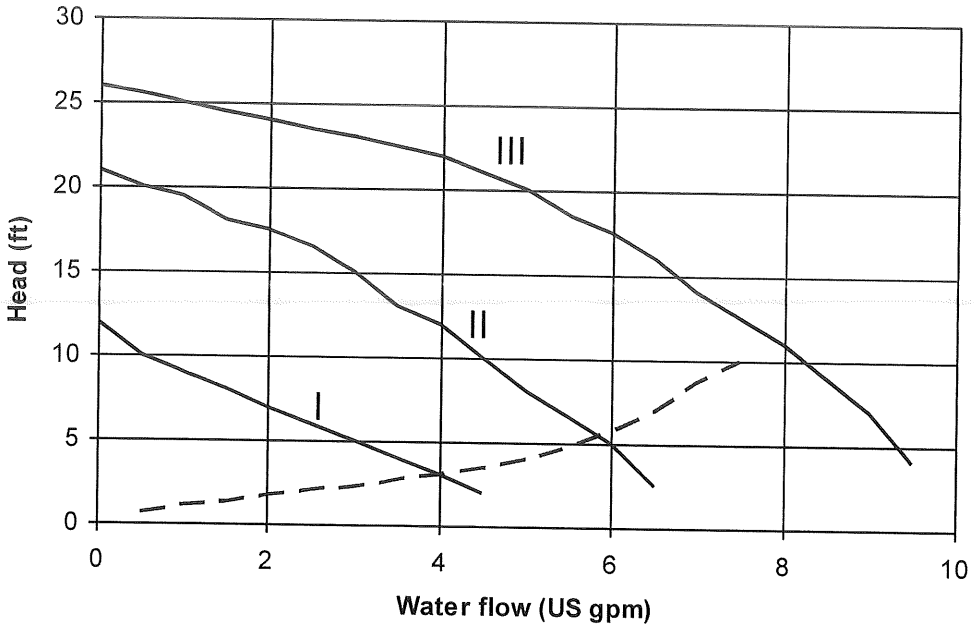
NOTE
THERE IS A STRAINER ON THE HEATING CIRCUIT..
THE INSTALLATION OF AN ADDITIONAL STRAINER ON THE SECONDARY CIRCUIT IS RECOMMENDED.



LEGEND

HR	HEATING RETURN
HF	HEATING FLOW
RCR	REMOTE D.H.W. CYLINDER RETURN
RCF	REMOTE D.H.W. CYLINDER FLOW
G	GAS
SC	CONDENSATE DRAIN

2.5 Circulation pump head/flow graph



—— **Pump head**

I, II, III Pump speed

—— **Boiler losses**

2.6 DIGITECH® printed circuit board – SM 20021

Technical characteristics

Adjustments possible by service personnel only

- Standard (86-176°F) / reduced (77-104°F) central heating temperature
- Water hammer prevention function
- Central Heating timer - (adjustable from 0 to 7,5 minutes)
- Central Heating pump overrun timer
- Domestic Hot Water pump overrun timer
- Minimum Gas pressure setting
- Maximum Heating Load

User settings

- On/Off
- Heating Temperature setting (86-176°F) – (77-104°F)
- D.H.W. temperature setting (95-160°F)
- Summer only mode / Winter only mode / Summer + Winter mode selection

Operation/Functions display

- Lock-Out
- Water deficiency indicator
- Temperature display

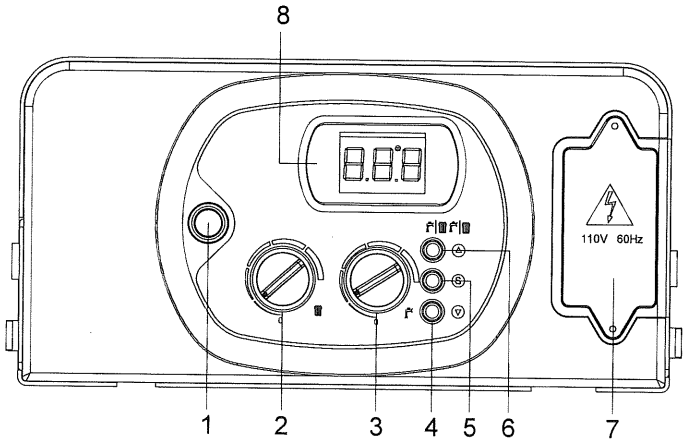
➔ ***When the boiler is switched off at the switch on the control panel, the word OFF appears on the display. The D.H.W and central heating frost protection system, nevertheless, remain enabled. If the boiler was previously on, it is switched off and the post-ventilation, pump overrun , circulation pump and three-way valve inactivity protection functions are enabled.***

➔ ***The remote control, where fitted, remains active and illuminated.***

2.7 Control panel

LEGEND

1. ON/OFF SWITCH
2. HEATING TEMPERATURE CONTROL KNOB
3. D.H.W TEMPERATURE CONTROL KNOB.
4. D.H.W TEMPERATURE BUTTON. KEEP PRESSED FOR 5 SECONDS TO DISPLAY OUTSIDE TEMPERATURE (ONLY WITH OPTIONAL OUTDOOR SENSOR)
5. SERVICE BUTTON.
6. SUMMER, WINTER OR SUMMER/WINTER MODE SELECTION BUTTON.
7. TERMINAL BOARD FOR EXTERNAL WIRING.
8. TEMPERATURE, ERROR CODE AND OPERATING STATUS DISPLAY



3. INSTALLATION (authorised personnel)

3.1 Reference standard

Install in accordance with CEC and NEC. All wiring shall conform to CEC, NEC and local building and electrical codes.

This appliance meets the requirements of:
- EMC DIRECTIVE 89/336 CEE
- LVD DIRECTIVE 73/23 CEE
- BOILER EFFICIENCY DIRECTIVE 92/42 CEE

Failure to install a gas appliance correctly and in accordance with the above codes could lead to prosecution. It is in the interest of the installer and safety that the law is complied with.

The manufacturers' instructions form an integral part of the installation and should be left with the appliance but do not over ride in anyway local and/or national statutory obligations.

Boiler room – Installation requirements

Please refer to local and national standards in force in the Country of destination of the product. In particular the manufacturer recommends:

⚠ **The presence of threaded connections on the gas line, require that the room in which the appliance is installed is ventilated by means of air intakes.**

3.2 Unpacking

- **The materials (cardboard) used for packing the appliance are fully recyclable.**
- **It is recommended that the packing material is only removed prior to installing the boiler. The manufacturer will not be held responsible for damage caused by incorrect storage of the product.**
- **Packing materials (plastic bags, polystyrene, nails, etc.) must not be left within reach of children, in that these items represent a potential hazard.**

A. Place the packed appliance on the floor (see fig. 1) making sure that the "up" arrow is facing down. Remove the staples and open outwards the four flaps of the box.

B. Rotate the boiler 90° while manually supporting it from underneath

C. Lift the box and remove the protections. Lift the boiler by grasping the rear part and proceed with the installation.

STORAGE & HANDLING

Please note that prior to installation the Pensotti North America boilers should be stored in the horizontal position with no more than three boilers to a stack;
Ensure that the boilers are stored in dry conditions and be aware that the carton is not designed to be moved with a tow-man lift;

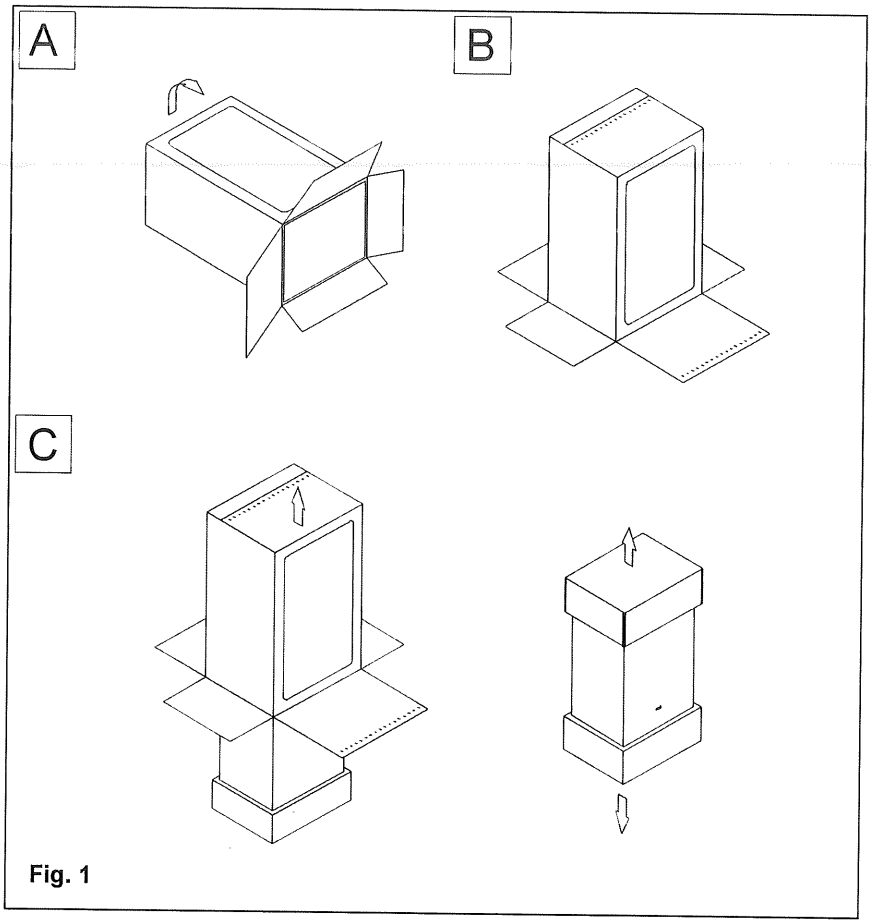
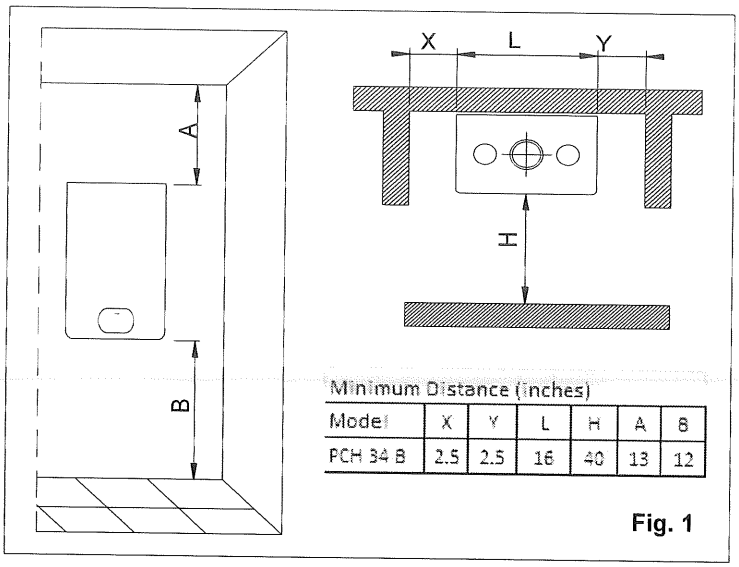


Fig. 1

3.3 Installing the boiler

- **The appliance must be installed exclusively on a flat vertical solid wall capable of supporting its weight.**
- The boiler should be fitted within the building unless otherwise protected by a suitable enclosure i.e. garage or outhouse. (the boiler may be fitted inside a cupboard.
- If the boiler is installed in an unheated enclosure then it is recommended to leave the power on to activate the frost protection (frost protection is active even with On/Off switch in Off position).
- If the boiler is installed in a room containing a bath or shower reference must be made to the relevant requirements.



Minimum Distance (inches)

Model	X	Y	L	H	A	B
PCH 34 B	2.5	2.5	16	40	13	12

Fig. 1

In order to allow access to the interior of the boiler for maintenance purposes, it is important that the necessary clearances indicated in figure 1 are respected. To make the installation easier, the boiler is supplied with a template to enable the pipe connections to be positioned prior to fixing the appliance to the wall.

To install the boiler, proceed as follows (see fig. 2):

a. Use a level (of not less than 24" long) to mark a horizontal line on the wall where the boiler is to be fitted.

b. Position the top of the template along the line drawn with the level, respecting the distances indicated. Then mark the centres of the positions of the two wall-plugs or anchors. Finally, mark the positions of the water and gas pipes.

c. Remove the template and install the domestic hot and cold water pipes, the gas supply pipe and the central heating pipes using the fittings supplied with the boiler.

Fix the boiler to the wall using the wall plugs or bracket and connect the pipes.

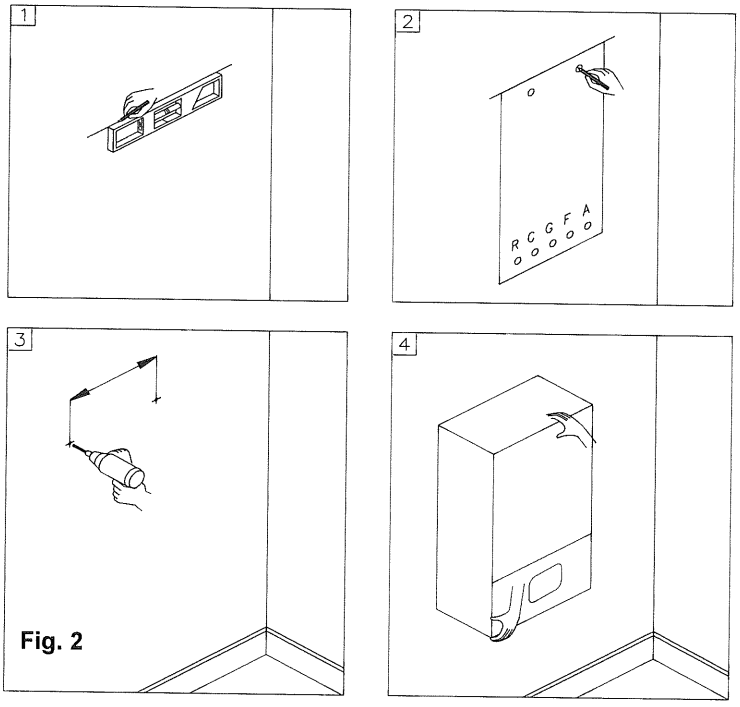
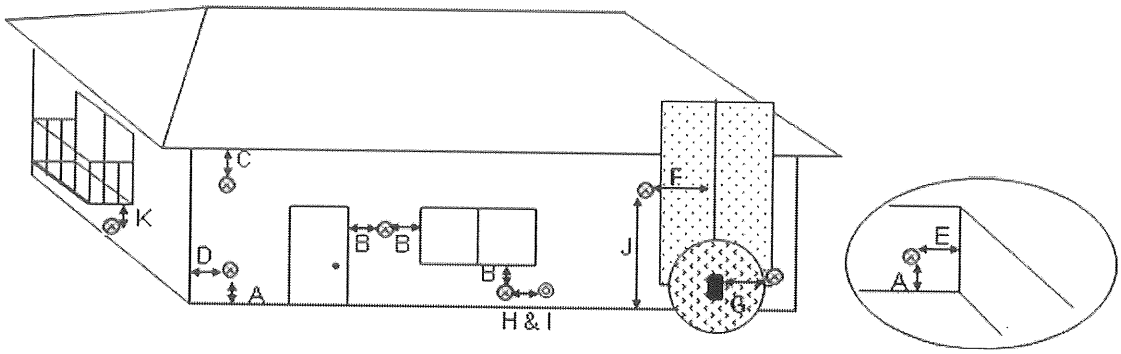


Fig. 2



Direct Vent Termination Minimum Clearances	
A = 12"	Clearance above grade, snowline, deck, porch or balcony
B = 12"	Clearance to window or door that may be opened
C = 24"	Vertical clearance to ventilated and unventilated soffit within a 2' distance horizontally from center line of DV termination
D = 12"	Minimum distance to outside corner
E = 18"	Minimum distance to inside corner, included walls and fences.
F = 48"	Not to be installed above a gas meter/regulator within F from the center line of the meter/regulator
G = 48"	Minimum clearance to service regulator vent outlet, gas meter or electrical meter
H = 12"	Clearance to non-mechanical inlet air opening into the building
I = 36"	Clearance to a mechanical air inlet into the building
J = 84"	Minimum distance above a paved sidewalk or driveway located on public property. If terminal is located between two single family residences with a sidewalk or driveway between; the same 84" clearance applies.
K = 24"	Minimum clearance beneath porch, deck, veranda or balcony, only if the area below is completely open on at least two sides.

State and local codes may require different clearances, consult the local authority having jurisdiction in each area for details.

The vent hood must be installed on the leeward side of the structure. Avoid installing the vent hood on the side of the structure receiving normal prevailing winds.

The termination shall be located so that flue gasses, or condensate from the flues gasses, are not directed as to jeopardize people, building materials, building construction, siding or soffits. Flue gasses from the termination shall not be allowed to enter any type of structure.

3.4 Water connections

⚠ **In order to safeguard the heat exchanger and circulation pump, especially in case of boiler replacement, it is recommended that the system is hot-flushed to remove any impurities (especially oil and grease) from the pipes and radiators.**

⚠ **Make sure that the domestic water and central heating pipes are not used to earth the electrical system. The pipes are unsuitable for this purpose.**

⚠ **Isolation Valves must be installed on the heating and D.H.W circuits. This will facilitate all maintenance and service operations when the boiler needs to be drained.**

- To prevent vibration and noise from the system, do not use pipes of reduced diameter, short radius elbows or severe reductions in the cross sections of the water passages.
- In order to guarantee the reliability of the boiler and prevent permanent damage in areas with high water inlet pressure, a pressure reducing valve should be installed.

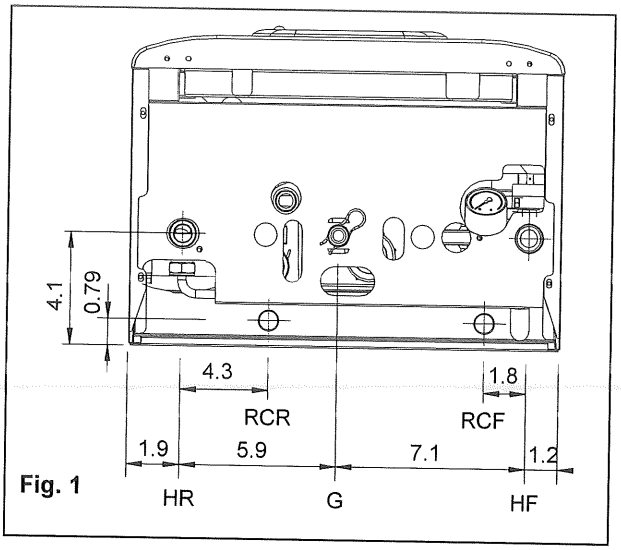


Fig. 1

LEGEND

HR	HEATING RETURN	Ø 3/4"
HF	HEATING FLOW	Ø 3/4"
G	GAS	Ø 1/2"
RCR	REMOTE D.H.W. CYLINDER RETURN	Ø 3/4"
RCF	REMOTE D.H.W. CYLINDER FLOW	Ø 3/4"
SC	CONDENSATE DRAIN	Ø 0.98 in

A pressure relief valve is installed in this dual purpose water heater that is rated in accordance with and complying with either The Standard for relief Valves and Automatic Shutoff Devices for Hot Water Supply Systems, AINSI Z21.22 or The ANSI/ASME Boiler and Pressure Vessel Code, Section IV (Heating Boilers).
The relief valve must be installed such that the discharge will be piped to a suitable place for disposal when relief occurs. The discharge line must be installed to allow complete drainage of both the valve and the line. If this unit is installed with a separate storage vessel, the separate vessel must have its own temperature and pressure relief valve. This valve must also comply with The Standard for Relief Valves and Automatic Shutoff Devices for Hot Water Supply Systems. AINSI Z21.22 (in the U.S. only). A temperature relief valve is not required but if one is used, do not install the valve with the probe directly in the flow of water. This may cause unwarranted discharge of the valve.

Internal Expansion Tank Size

Maximum. System Operating Temperature (F)	Maximum System Water Content (gal.)*
100	114
110	85
120	65
130	52
140	43
150	36
160	30
170	26
180	24

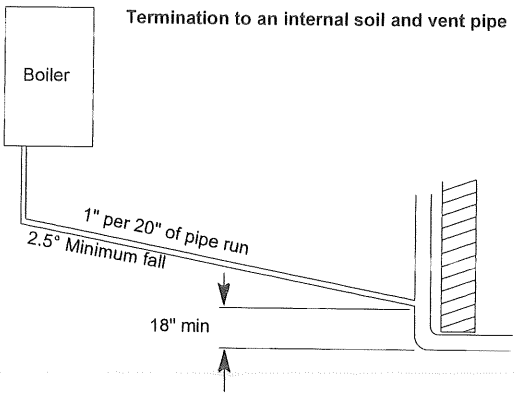
*Assuming the air pressure in the diaphragm tank is equal to the minimum operating water pressure in the system.

3.6 Condensate drain

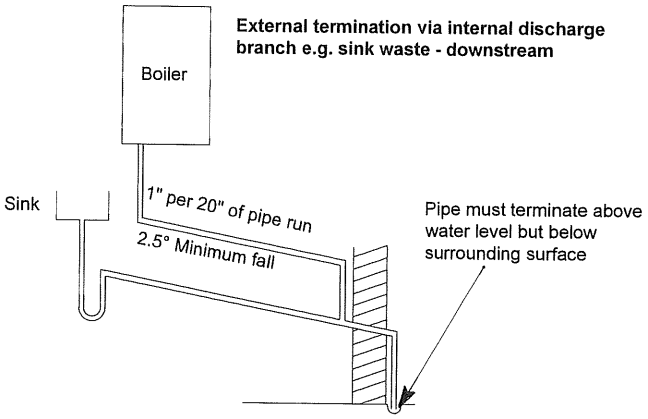
FAILURE TO INSTALL THE CONDENSATE DISCHARGE PIPEWORK CORRECTLY WILL AFFECT THE RELIABLE OPERATION OF THE BOILER The condensate discharge pipe MUST NOT RISE at any point along its length. There MUST be a fall of AT LEAST 2.5° (1" per 20") along the entire run.

I. The condensate outlet terminates in 7/8" nut and seal for the connection of 7/8" plastic overflow pipe which should generally discharge internally into the household drainage system. If this is not possible, discharge into an outside drain is acceptable.
2. Ensure the discharge of condensate complies with any national or local regulations in force.
3. The discharge pipe should be run in a proprietary drain pipe material e.g. PVC, PVC-U, ABS, PVC-C or PP.
4. Metal pipe work is NOT suitable for use in condensate discharge systems.
5. The pipe should be a minimum of 7/8" diameter and must be supported using suitably spaced clips to prevent sagging.
6. Any pipe fitted externally must not exceed 10 feets.
7 Any condensate discharge pipe work external to the building (or in an unheated part of it e.g. garage) must be insulated to protect against frost. It is also recommended that the pipe diameter is increased to 1 ¼".
8. If the boiler is fitted in an unheated location the entire condensate discharge pipe should be treated as an external run.
9. In all cases discharge pipe must be installed to aid disposal of the condensate. T o reduce the risk of condensate being trapped, as few bends and fittings as possible should be used.
10. When discharging condensate into a soil stack or waste pipe the effects of existing plumbing must be considered. If soil pipes or waste pipes are subjected to internal pressure fluctuations when WC's are flushed or sinks emptied then back-pressure may force water out of the boiler trap and cause appliance lockout.
Examples are shown of the following methods of termination:-
i) to an internal soil & vent pipe
ii) via an internal discharge branch (e.g. sink waste)
iii) to a drain or gully
iv) to a purpose made soak away

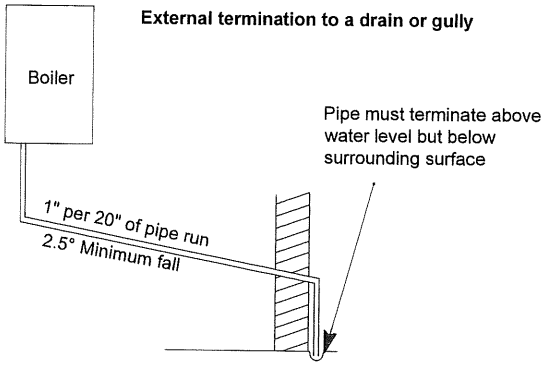
Termination to an internal soil and vent pipe



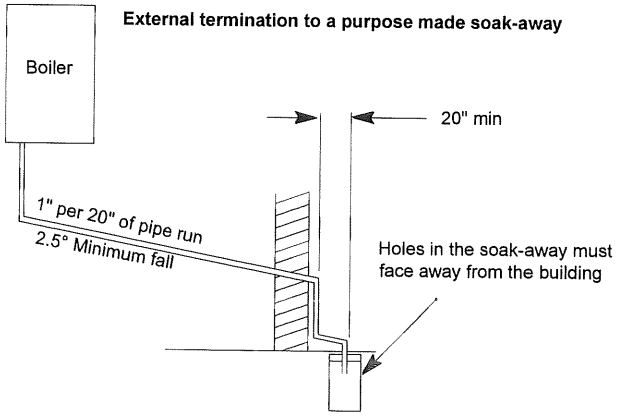
External termination via internal discharge branch e.g. sink waste - downstream



External termination to a drain or gully



External termination to a purpose made soak-away



3.7 Gas Connection

⚠ **The connection to the gas supply must be carried out by professionally qualified personnel in accordance with relevant standards:**

⚠ **When connecting the boiler to the gas supply pipe, only use appropriate washers and gas fittings. The use of hemp, Teflon tape and similar materials is not allowed.**

Before installing the boiler, check the following:

- The pipe work must be sized appropriately for the flow rates required and the pipe lengths installed, and must be fitted with all the safety and control devices provided for by current standards.
- The gas supply line must be a minimum of a 3/4 diameter pipe with an uninterrupted supply from meter to boiler and comply with current standards and regulations.
- ***Check the internal and external seals of the gas supply system.***
- A gas shut-off valve must be installed upstream of the appliance
- Before starting up the boiler, make sure that the type of gas corresponds to that for which the appliance has been set-up (see gas type label inside the boiler).
- The gas supply pressure must be between the values reported on the rating plate (see gas type label inside the boiler).
- Prior to installation, it is good practice to ensure that there are no machining residues on the gas supply pipe.
- Conversion of the appliance from natural gas to LPG or vice versa must be carried out by qualified personnel ;

WARNING: If gas line pressure exceeds ½ psi (14" WC) disconnect the gas line from the gas valve. This exessive gas pressure may damage the gas valve resulting in a gas leak and possible explosion and fire.

3.8 Electrical connections

General warnings

⚠ **The connection to the mains power supply must be carried out by professionally qualified personnel, registered in accordance with current legislation and authorized by Pensotti North America**

⚠ **Always check to make sure that the appliance has an efficient earth ground. This requirement is only satisfied if it has been properly connected to an efficient earth ground installed in accordance with the requirements of current safety standards and carried out by professionally qualified personnel.**

This basic safety measure must be checked, verified and carried out by professionally qualified personnel. In case of doubt, have the electrical system checked by a qualified electrician. The manufacturer will not be held liable for any damage or injury caused as a result of an inefficient or nonexistent earth ground;

- The boiler functions with an alternating current of 110 V and 60 Hz and has maximum power absorption of 160 W. **The appliance should be protected by a 4 A fuse.** The connection to the mains electricity supply must be via a single-pole switch, with at least 0.1 inches gap between open contacts, mounted upstream of the appliance. Make sure that the positions of the live and neutral wires correspond to the wiring diagram;
- Ensure the domestic power supply is checked by a qualified electrician to ensure that it can support the maximum power absorption of the appliance, as indicated on the rating plate. In particular, make sure that the wire sizes are adequate for the power absorbed by the appliance;
- The power supply cable must not be replaced by the user. If the cable is damaged in any way, switch off the appliance and have the cable replaced by a suitably qualified electrician;
- When replacing the power supply cable, only use cables of the same characteristics (HO5 VV-F 3x1) with maximum external Ø 0.3";

When using an electrical appliance, a few fundamental rules must be observed:

- Do not touch the appliance with damp or wet parts of the body or when barefoot.
- Do not pull on the electric wires.
- Do not leave the appliance exposed to atmospheric elements (rain, sun, etc,).
- Do not allow the appliance to be used by children or anyone unfamiliar with its operation;

Wire connections

Connect the power supply to the terminal board inside the control panel as follows:

a. Switch off the power supply at the main switch.
b. Remove the front case panel of the boiler.
c. Slacken the screws and remove plate A (see fig. 1).
d. With the plate removed, connect the wires to the terminal board B as follows:

- Connect the earth wire (normally coloured green/yellow) to the terminal marked with the earth symbol " ⏚ ".
- Connect the neutral wire (normally coloured white) to the terminal marked with the letter "N".
- Connect the live wire (normally coloured black) to the terminal marked with the letter "L".
- Terminals identified by the letters: Ta ⇒ Room thermostat
  Se ⇒ Outside temperature sensor

When the wires have been connected, place plate "A" back to position.

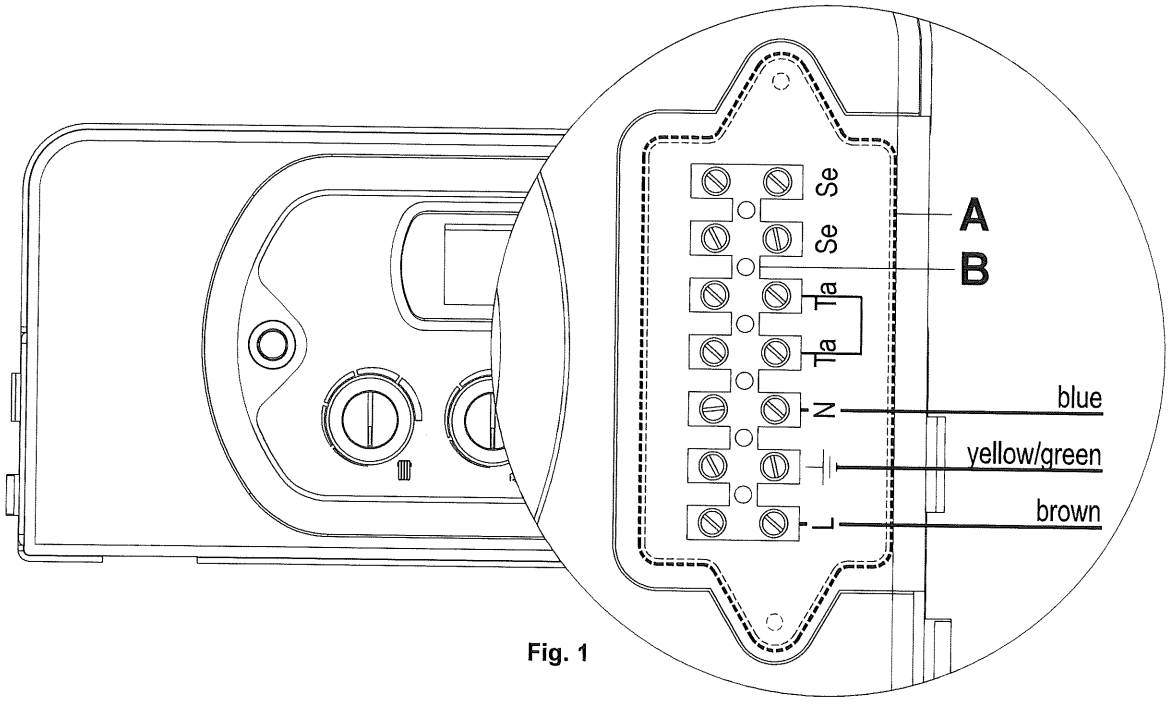


Fig. 1

3.9 Flue connections

⚠ **In order to ensure that the appliance functions correctly and efficiently, the flue connection between the boiler and the flue terminal must be made using original components specifically designed for condensing boilers.**

⚠ **Traditional flue components cannot be used for conveying exhaust fumes from condensing boilers, nor vice versa.**

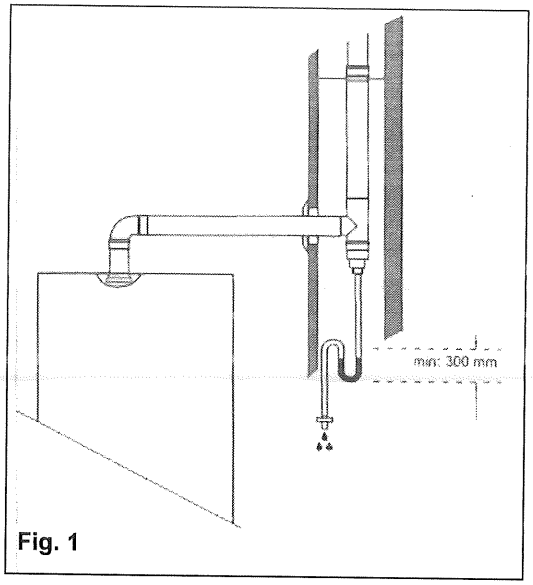


Fig. 1

- In order to make the choice of which flue to install easier, in addition to being drawn differently, the above-mentioned system is also differentiated in the flue catalogue and general price list by the insertion of the words "...in polypropylene..." .
- It is recommended that:
  - o for the exhaust discharge duct, the entire length of the flue slopes upwards towards the exterior in order to facilitate the flow of condensate back to the combustion chamber, which has been specifically designed to collect and drain the acidic condensate;
  - o for the air intake, the entire length of the duct slopes upwards towards the boiler to prevent the entry of rainwater, dust or foreign bodies into the pipe;
  - o in case of a vertical flue pipe installation, a condensate trap is fitted at the base of the flue installation and connected into drainage system (see fig. 1);
- In the case where a horizontal coaxial system is installed, the coaxial terminal must be positioned horizontally in that the exhaust duct has been specifically designed with the required slope and the air intake has been suitably protected against the weather;

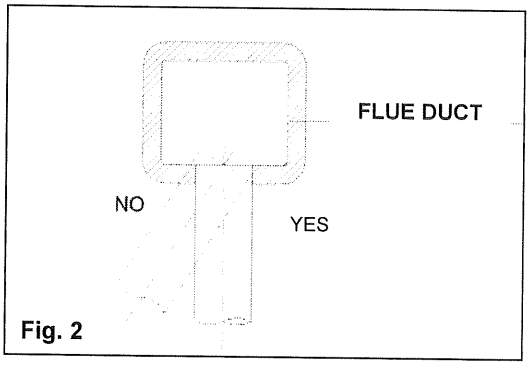


Fig. 2

Concentric Flue connections

It is mandatory that the manufacturers venting system be used.

Use only materials listed below for vent pipe and fittings. Failure to comply could result in personal injury, death or property damage and could void the boiler warranty.

Installations must comply with local code requirements and with U.S. ANSI Z223.1.

All venting must be properly supported. Boilers are not intended to support any type of vent system.

All vent pipe joints must be secured using ½" galvanized screws.

Item	Description
PAHVK	Standard 3/5" Vent Kit, includes Termination, 90° Ell, Wall sleeve and 2/4 to 3/5 adapter
PAHVKD	Deluxe 3/5" Vent Kit, includes Termination, Wall sleeve, 90° Ell, 10" Conc. Pipe, 39" Conc. Pipe & 2/4-3/5 Adapter w/ Test ports
PA27058LA	Pensotti Flat Roof Outlet Flashing
PA27059LA	Pensotti Pitched Roof Flashing
PA27088LA	Pensotti 45 Degree Co-Axial Elbow 3/5"
PA27089LA	Pensotti 90 Degree Co-Axial Elbow 3/5"
PA43186LA	Pensotti 5" Rubber Wall Plate
PA80020LA	Pensotti Horizontal Conc. Flue Terminal 3/5"
PA82112LP	Pensotti Vertical Conc. Flue Terminal 3/5"
PA82118LA	Pensotti 39" Conc. Pipe 3/5"
PA82254LA	Pensotti. 10" Conc. Pipe 3/5"

- The standard flue components above are suitable for horizontal and vertical applications.
- Maximum permissible equivalent flue lengths are;

  Horizontal: 8 meters / 26 feet
  Vertical: 8 meters / 26 feet

- Any additional turns in the flue system must be taken into consideration.
- Each elbow decreases the equivalent length as shown.

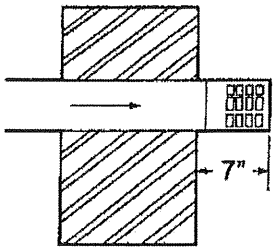
  45° Elbow equals .5 meters / 1.64 feet
  90° Elbow equals .8 meters / 2.6 feet

- Horizontal venting systems: The 2/4 to 3.15/5 test port adapter and the first 90° elbow are not included in the total equivalent length of the vent system.

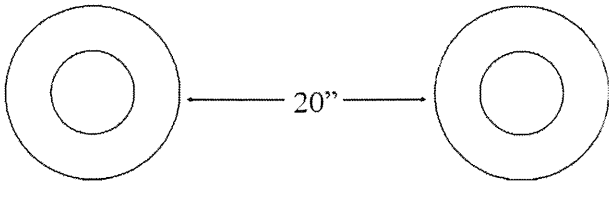
- Vertical venting systems: The vent termination is not included in the total equivalent length of the vent system.

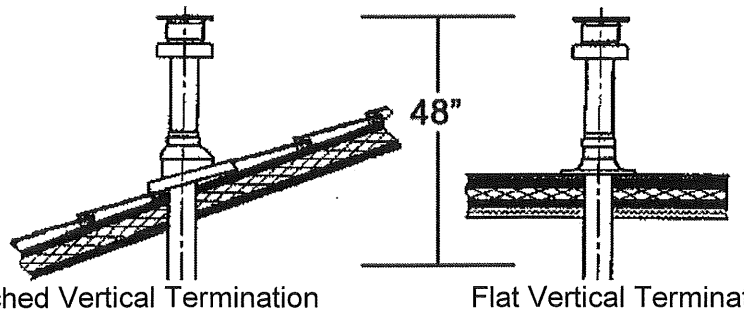
- Horizontal venting systems must be sloped back towards the boiler at approximately ¼" per linear foot of vent.

Horizontal vent termination: must terminate a minimum of 7" from the face of the outside wall in which it is installed.



Minimum distance between any two horizontal concentric vent terminations is 20" measured from the inner edge of each termination.





Pitched Vertical Termination Flat Vertical Termination

4. COMMISSIONING THE APPLIANCE

4.1 General warnings

⚠ **The following operations must be carried out by professionally qualified personnel, registered in accordance with current legislation.**

⚠ **The boiler leaves the factory pre-set and tested for burning either natural Gas or LPG. Nevertheless, when starting the boiler for the first time, make sure that the information on the rating plate corresponds to the type of gas being supplied to the boiler.**

⚠ **Once the system has been filled and the necessary adjustments made, remember to tighten the screws of the gas valve test point and make sure that there are no gas leaks from the test point and from any pipe fittings upstream of the gas valve.**

■ Preliminary operations

Switching the boiler on for the first time means checking that the installation, regulation and operation of the appliance are correct:

- If the gas supply system is newly installed, then the air present in the pipes can cause the boiler not to light at the first attempt. A number of attempts may be required in order to light the boiler;
- Check that the data on the data plate corresponds to that of the main supply networks (gas, electricity, water);
- Check that the power supply voltage to the boiler complies with the data plate (110 V – 60 Hz) and that the live, neutral and earth wires are connected properly. Also make sure that the earth connection is sound;
- Check the seals on the gas supply pipe from the mains, and make sure that the meter does not register any flow of gas;
- Test for gas soundness.
- Check that the gas supply is correctly sized for the flow rate required by the boiler and that it is fitted with all the safety and control devices as required by current regulations
- Check that the supply of combustion air, and check the exhaust and condensate discharge systems are functioning correctly and in line with current law and national and local standards;
- Check for the presence of permanent ventilation openings as required by current law for the type of appliances installed.
- Check that the flue duct and its connections to the terminal comply with the requirements of current law and national and local standards for the type of appliances installed.
- Make sure that any central heating shut-off valves are open.
- Check that the condensate drain system, including outside the boiler (flue system condensate collection devices), allows the condensate to flow freely to the collection devices. If the condensate is discharged to the domestic drainage system, install an inspection trap in the condensate system prior to it entering the drainage system to interrupt the continuity between the two systems.
- Check that there are no exhaust fumes discharged into the system itself.
- Check that there are no flammable materials or liquids in the immediate vicinity of the boiler;

- *Flush out both heating and domestic hot water circuits (see 4.3 "Flushing the system").*

4.2 Filling the system

⚠ **Check the properties of the water supply and install the appropriate treatment devices if the mains water has a hardness rating more than 17.5 °Ck in order to prevent scaling and eventual damage to the D.H.W heat exchanger.**

⚠ **Use only clean tap water to fill the system.**

Once the water pipes have been connected, close the gas feed valve and fill the system as follows:

- Check that the circulation pump runs freely;
- Check that the plug of the air vent valve has been slackened slightly to allow air to escape from the system (fig.1);
- Open the main domestic water supply valve;
- Open the filling tap **R** (fig. 2);
- Unscrew the plug on the pump to remove any trapped air, check that the pump is free then re-tighten it when water starts to flow out;
- Open the air vents on the radiators and monitor the air evacuation process. When water starts to flow out of the radiators, close the air vents;
- Use the pressure gauge **M** (fig. 2) to check that the system pressure reaches 1 bar and that the code H2O does NOT appear on the control panel display (see 2.7 section 'Control Panel');
- If, after the above operations, there is a reduction in the pressure, re-open the filling tap **R** until the pressure gauge reads 1 bar and that the code H2O disappears on the control panel display;

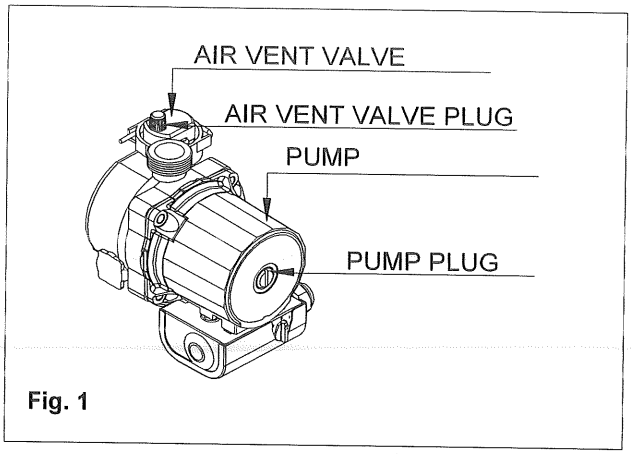


Fig. 1

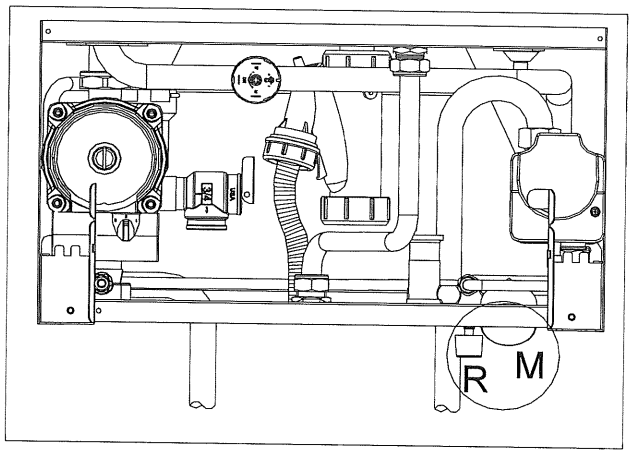


Fig. 2

- **On completion, make sure that the filling tap R is perfectly closed.**

Emptying the central heating system

Whenever it is necessary to empty the system, proceed as follows:
- turn off the main power supply switch;
- wait for the boiler to cool down;
- turn the system drain tap RS (see fig. 2) and use a container to collect the water that runs out;

Emptying the domestic hot water system

Whenever there is danger of freezing or any other occurrence, the hot water system could be emptied in the following way:
- Shut off the water at the mains;
- Open all hot and cold water taps;
- Empty from the lowest point (where possible).

4.3 Flushing the system

Failure to flush and add inhibitor to the system will invalidate the appliance warranty.
All systems must be thoroughly drained and flushed out using additives – corrosion inhibitors and flushing agents/descalers.

To flush the primary side of this unit.

a. Fill the boiler as per the filling instructions.
b. Using a drain cock on the lowest point of the system allow the water to drain from the system and boiler.
c. In order to flush the system correctly turn off all radiators, open the fill valve and drain cock simultaneously and allow the water to flow through the boiler.
d. Open each individual radiator allowing water to flow through them, then turn that radiator off and repeat for all radiators in the system.
e. Turn off the fill valve and close the drain cock, open all radiators and open the valve to fill the system.
f. Continue to fill the system until the pressure gauge reaches 14.5 psi (1 bar).

To flush the domestic hot water circuit.

a. Open all hot water faucets.
b. Turn on cold water supply so water enters the boiler, leave on until water is released from the hot water faucets. Turn off all hot water faucets.
c. Connect a hose to the drain cock and open the drain cock.
d. Allow water to flow through the boiler and out of the drain cock.
e. Turn off water supply, disconnect the hose, close the drain cock and refill the boiler.

4.4 Filling the condensate trap

The condensation trap must be **pre-filled** when starting the boiler for the first time in order to prevent flue gases from flowing back through the trap.

The filling operation is carried out as follows (see fig. 1):

- Remove plug **T** and fill the trap **S** three quarters full with water;
- Replace plug **T** and connect the drainpipe **P** into a condensate discharge trap conforming to current legislation;

Attention! It is recommended to clean the condensate trap, after a few months of boiler operation, to remove deposits/residuals left after the first condensate passage within the boiler new components that may interfere with the correct operation of the trap itself.

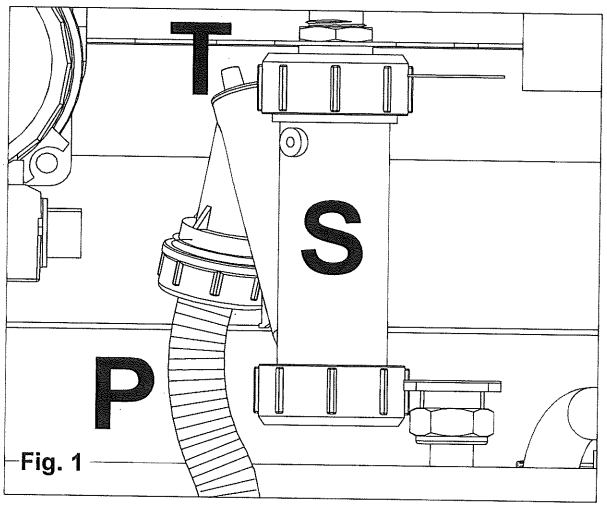


Fig. 1

4.5 Starting up the boiler

Once the system has been filled, proceed as follows:

- Check that the exhaust flue is free of obstructions and correctly connected to the boiler;
- Switch on the power supply to the boiler;
- Open the gas isolation valve;
- Place switch **1** in the ON **position** *(see 2.7 "Control Panel")*, after a few seconds the circulating pump will start to run;
- Use button **6** to set the SUMMER, WINTER or SUMMER/WINTER function. The symbols  will light up (fixed light) to indicate that the boiler is working;
- The automatic ignition system will then light the burner. This operation is repeated for 3 times. It may however be necessary to repeat the operation in order to eliminate all the air from the pipes. To repeat the operation, wait approximately three minutes before re-attempting to light the boiler. To reset the boiler Switch off switch **1** *(see 2.7 "Control Panel")* and switch it back on again and repeat the lighting procedure;
- With the boiler ignited, if the system still emits noises, the operations must be repeated until all the air has been removed;
- Check the pressure in the system. If the pressure has fallen, re-open the filling tap until the code H2O **disappears on the display** and the pressure gauge reads 1 bar on completion, close the filling tap;
- Unscrew the aluminium plug and insert an analyser in the exhaust sampling point **PF** (see fig. 1, air intake manifold is missing to get visible V screw) to check the CO2 value. Make sure that the value complies with that reported in table 1;
- If the CO2 value does not correspond to the specified value, adjust screw **V** (see fig. 1) on the venturi clockwise to reduce the CO2 value or counter-clockwise to increase it;

Table n°1

Gas type	CO_2 %
Methane - G20	9.18
Liquid Propane Gas - G 31	10.3

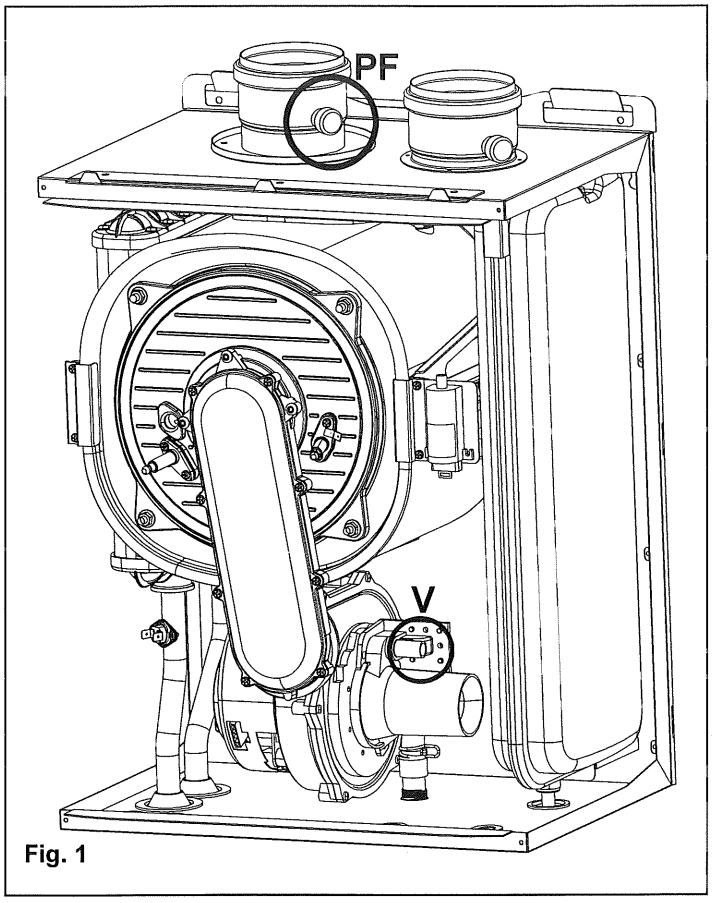


Fig. 1

5. REGULATING THE APPLIANCE

5.1 Parameters table

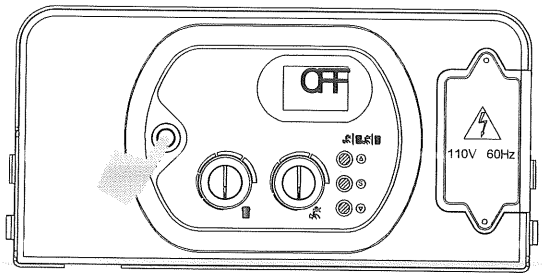
PARAMETER N°	TYPE OF OPERATION	PARAMETER VALUE	FUNCTION
1	Selects the type of boiler	00 01 02 03	Instantaneous Boiler with storage tank B. w/storage tank Comfort (+13°F) D.H.W. Temperature 95-160 °F
2	Selects the type of gas	00 01	Natural gas LPG
3	Sets the central heating temperature	00 01	Standard (86-176°F) Reduced (77-104°F)
4[1]	Selects pump mode during heating phase	00 01	Standard (3' pump overrun) Permanent (pump runs continuously)
5	Water hammer prevention	00 01	Off On
6	Central heating timer	00-90 (default = 36)	Delays the heating restart to prevent frequent On/Offs, Expressed in steps of 5 sec (factory set at 36 x 5 = 180")
7	Central heating pump overrun timer	00-90 (default = 36)	The overrun timer can be modified. Expressed in steps of 5 sec (factory set at 36 x 5 = 180")
8	D.H.W pump overrun timer	00-90 (default = 18)	The overrun timer can be modified. Expressed in steps of 5 sec (factory set at 18 x 5 = 90")
9	Minimum gas pressure setting	-	Not applicable for premix boilers
10	Minimum central heating output setting	-	Not applicable for premix boilers
11	Maximum gas pressure and maximum central heating output setting	-	Not applicable for premix boilers
12	Ignition sequence setting	-	Not applicable for premix boilers
13	D.H.W priority function (2 min delay on dhw function)	00 01	Off On
14[4]	Selects the type of burner	00 01 **02** 03	Atmospheric (not premix) Premix 25 kW **Premix 29-34 kW** Premix 50 kW
15[2]	Zone management board activation	00 01	Off On
16[3]	Telephone control activation	00 01	Off On
17	Minimum fan speed setting	60 Hz (Metano) 60 Hz (GPL)	To set the minimum frequency value (Hz) for the fan operation
18	Maximum fan speed setting	155 Hz (Metano) 143 Hz (GPL)	To set the maximum frequency value (Hz) for the fan operation
19	Minimum fan speed setting (Central Heating)	60 Hz (Metano) 60 Hz (GPL)	To set the minimum frequency value (Hz) for the fan operation in heating mode .
20	Maximum fan speed setting (Central Heating)	155Hz (Metano) 143 Hz (GPL)	To set the maximum frequency value (Hz) for the fan operation in heating mode
21	Ignition sequence setting	90 Hz (Metano) 110 Hz (GPL)	To set the fan frequency value (Hz) at the ignition
22	Fan frequency value display	00 01	Off On (for 10 min. time)

NOTES:

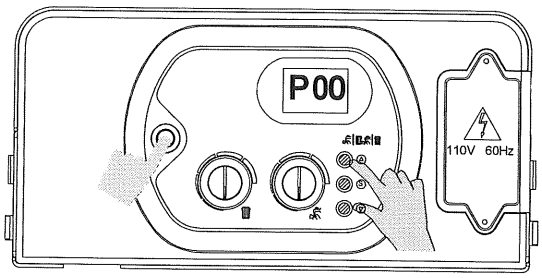
1 - Activate only for "heating only" boilers;
2 - If the heating system has more than one zone, an additional interface board (optional extra) must be installed on the circuit board and parameter 15 set at 01;
3 - To install the telephone control, use non-polarised conductors connected to contact TA of the terminal board in parallel with the remote control if fitted. Set the parameter 16 at 01.
4- When the parameter value 01/02/03 is set, parameters from no.17 to 22 are automatically activated and boiler settings are carried-out in through these parameters (in Hz) that replace parameters from no.9 to no.
Once the parameter value has been set according to the boiler output, the P.C.B will automatically adjust the maximum and minimum values.

5.2 Setting the parameters

To modify the preset values of the parameters reported in the previous table, open the parameter settings menu as follows:

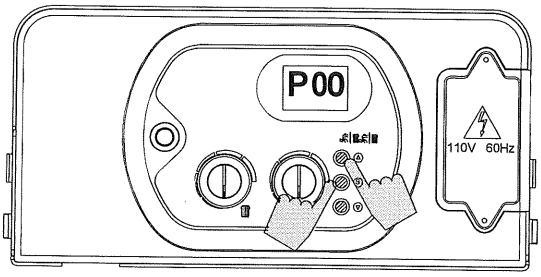


1. Place the On/Off switch in the OFF position.

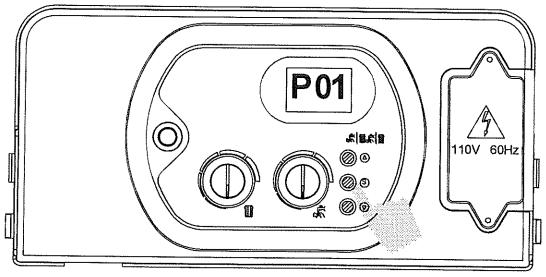


2. Activate the On/Off switch while keeping buttons '+' and "-" pressed. Wait for "P 00" to appear on the display.

3. Release buttons '+' and '-'.



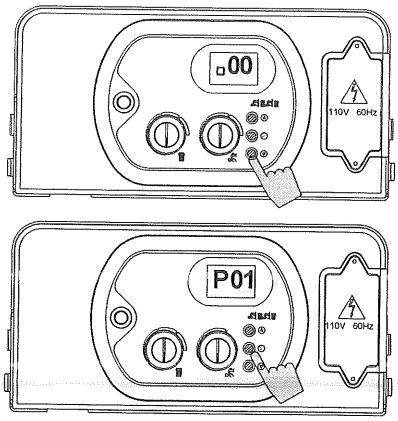
4. Keep button 'S' pressed and use button '+' and '-' to select the parameter to modify.



5. Release button 'S', then re-press and release it. The display will indicate the value of the parameter to modify.

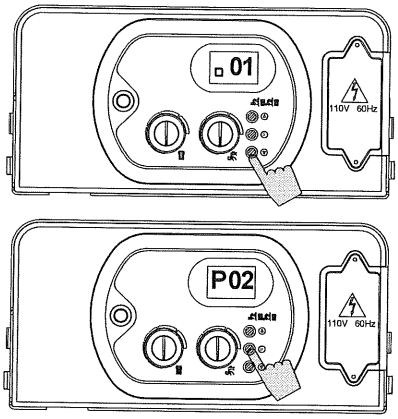
Adjust the value of the parameter using the procedure described in the following pages.

To enter the parameters menu, follow the previously described procedure (steps 1-5).



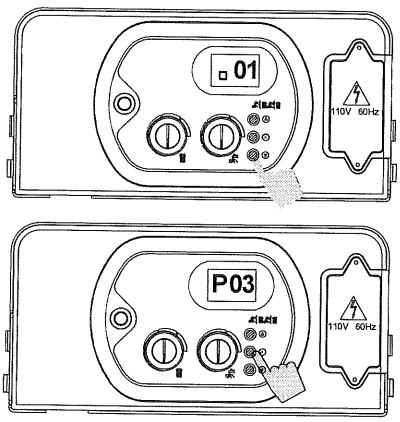
PARAMETER 1 – TYPE OF BOILER

6. Use buttons '+' and '-' to modify the value of the parameter:
   00 = Instantaneous boiler
   01 = Storage boiler;
   02 = Storage boiler 'comfort' (+45°F);
   03 = D.H.W. Temperature setting 95-160 °F
7. Press and release button 'S' to confirm. The parameter number (1) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



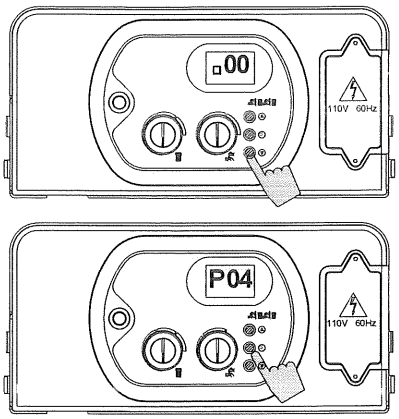
PARAMETER 2 - GAS SUPPLY

6. Use buttons '+' and '-' to modify the value of the parameter:
   00 = natural gas
   01 = lpg
7. Press and release button 'S' to confirm. The parameter number (2) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



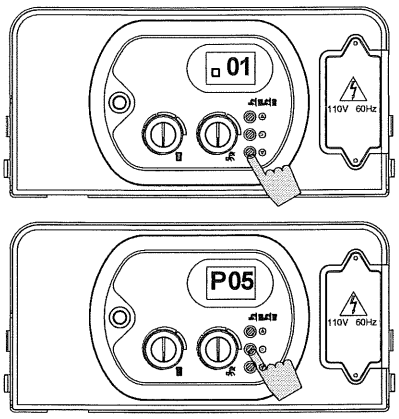
PARAMETER 3 – CENTRAL HEATING TEMPERATURE

6. Use buttons '+' and '-' to modify the value of the parameter:
   00 = standard (86 – 176°F)
   01 = reduced (77 – 104 °F) for under-floor heating
7. Press and release button 'S' to confirm. The parameter number (3) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



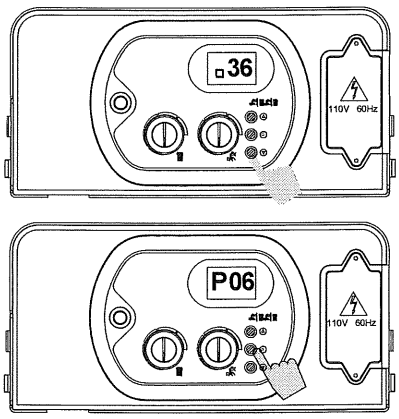
PARAMETER 4 – CENTRAL HEATING PUMP

6. Use buttons '+' and '-' to modify the value of the parameter:
   00 = standard (3" overrun)
   01 = permanent (always running)
7. Press and release button 'S' to confirm. The parameter number (4) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



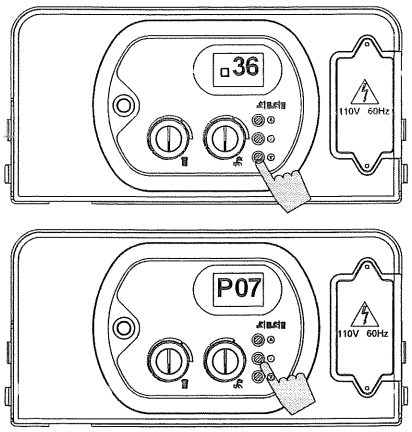
PARAMETER 5 – WATER HAMMER PREVENTION

6. Use buttons '+' and '-' to modify the value of the parameter:
   00 = off
   01 = on (default = 2")
7. Press and release button 'S' to confirm. The parameter number (5) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



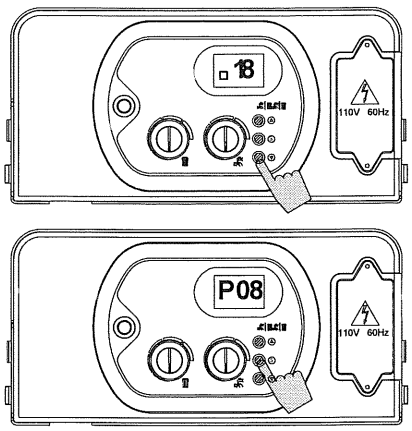
PARAMETER 6 – CENTRAL HEATING TIMER

6. Use buttons '+' and '-' to modify the value of the parameter within the prescribed limits
   00 = 0 x 5" = 0"
   90 = 90 x 5" = 450" (7.5 min)
   The default value is 36 = 180" = 3 min
7. Press and release button 'S' to confirm. The parameter number (6) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



PARAMETER 7 – CENTRAL HEATING PUMP OVERRUN TIMER

6. Use buttons '+' and '-' to modify the value of the parameter within the prescribed limits
   00 = 0 x 5" = 0"
   90 = 90 x 5" = 450" (7.5 min)
The default value is 36 = 180" = 3 min
7. Press and release button 'S' to confirm. The parameter number (7) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



PARAMETER 8 – D.H.W PUMP OVERRUN TIMER

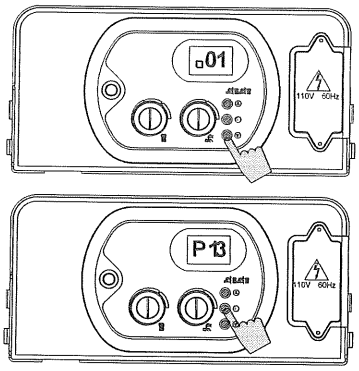
6. Use buttons '+' and '-' to modify the value of the parameter within the prescribed limits
   00 = 0 x 5" = 0"
   90 = 90 x 5" = 450" (7.5 min)
The default value is 18 = 90" = 1.5 min
7. Press and release button 'S' to confirm. The parameter number (8) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.

PARAMETER NO. 9 – MINIMUM GAS PRESSURE SETTING
Not applicable for premix burner (only for atmospheric burner)

PARAMETER NO.10 – MINIMUM CENTRAL HEATING OUTPUT SETTING
Not applicable for premix burner (only for atmospheric burner)

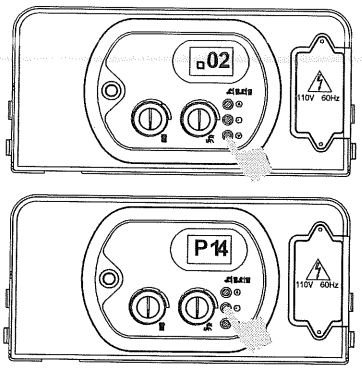
PARAMETER NO.11 – MAXIMUM GAS PRESSURE AND MAX. CENTRAL HEATING OUTPUT SETTING
Not applicable for premix burner (only for atmospheric burner)

PARAMETER NO.12 – IGNITION SEQUENCE SETTING
Not applicable for premix burner (only for atmospheric burner)



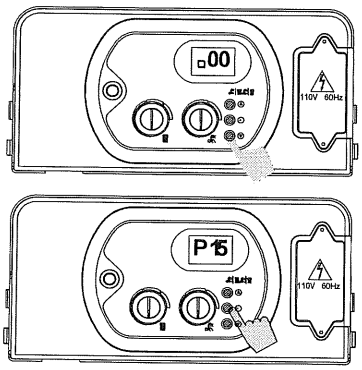
PARAMETER 13 – D.H.W PRIORITY

6. Use buttons '+' and '-' to modify the value of the parameter:
   00 = off
   01 = on (default = 120")
7. Press and release button 'S' to confirm. The parameter number (13) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



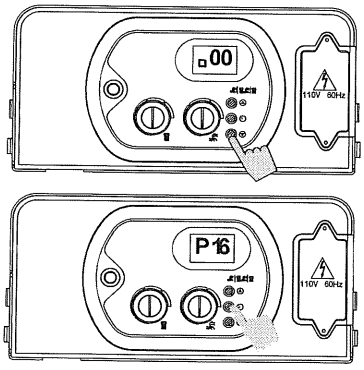
PARAMETER 14 – TYPE OF BURNER

6. Use buttons '+' o '-' to modify the value of the parameter:
   00 = boiler with atmospheric burner;
   01 = boiler with premix burner 25 kW;
   02 = boiler with premix burner 34 kW ;
   03 = boiler with premix burner 50 kW ;
7. Press and release button 'S' to confirm. The parameter number (14) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



PARAMETER 15 – ZONED SYSTEM

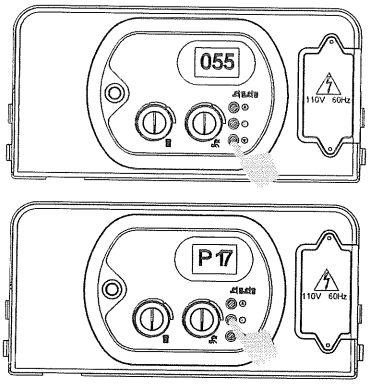
6. If the system is fitted with zone valves, set the parameter at '01'. If a remote control is installed, an extra interface board must be installed to control the zone valves. Then set the parameter at '01'.
7. Press and release button 'S' to confirm. The parameter number (15) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



PARAMETER 16 – TELEPHONE CONTROL

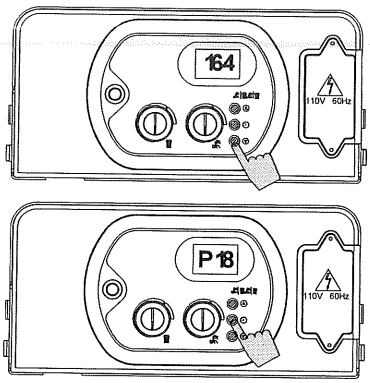
6. If a telephone interface is installed, enable the board by setting parameter 16 at '01';
7. Press and release button 'S' to confirm. The parameter number (16) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.

N.B.: The connection of the telephone interface to contact TA of the terminal board must be wired in parallel with the remote control using two non-polarised conductors.



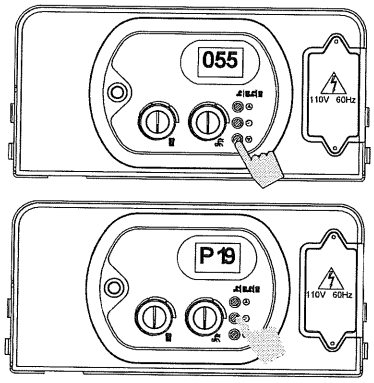
PARAMETER 17 – MINIMUM FAN SPEED SETTING

6. Use buttons '+' o '-' to modify the value of the parameter between: min = 33 Hz ; max = value of parameter 18
The default value is :
   - 66 Hz for Natural Gas;
   - 60 Hz for L.P.G.;
7. Press and release button 'S' to confirm. The parameter number (17) will appear in the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



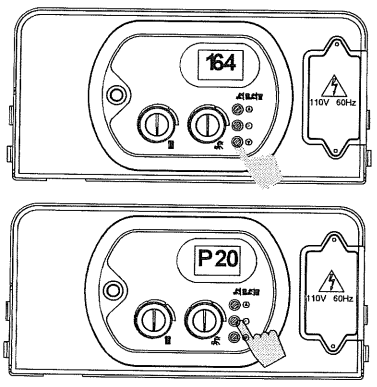
PARAMETER 18 – MAXIMUM FAN SPEED SETTING

6. Use buttons '+' o '-' to modify the value of the parameter between: min = value of parameter 17; max = 202 Hz.
The default value is:
   - 167 Hz for Natural Gas;
   - 154 Hz for L.P.G.;
7. Press and release button 'S' to confirm. The parameter number (18) will appear in the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



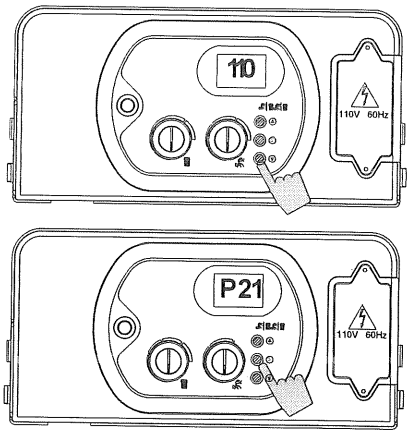
PARAMETER 19 – MINIMUM FAN SPEED SETTING CENTRAL HEATING MODE

6. Use buttons '+' o '-' to modify the value of the parameter between: min = 33 ; max = value of parameter 18.
The default value is:
   - 66 Hz for Natural Gas;
   - 60 Hz for L.P.G.;
7. Press and release button 'S' to confirm. The parameter number (19) will appear in the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



PARAMETER 20 – MAXIMUM FAN SPEED SETTING CENTRAL HEATING MODE

6. Use buttons '+' o '-' to modify the value of the parameter between: min = value of parameter 17; max = 202 Hz.
The default value is:
   - 162 Hz for Natural Gas;
   - 149 Hz for L.P.G.;
7. Press and release button 'S' to confirm. The parameter number (20) will appear in the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.

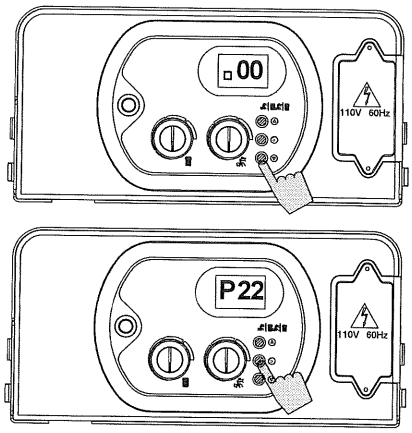


PARAMETER 21 – IGNITION SEQUENCE SETTING

6. Use buttons '+' o '-' to modify the value of the parameter between: min = value of parameter 17; max = value of parameter 18.

The default value is:
- 90 Hz for Natural Gas;
- 110 Hz for L.P.G.;

7. Press and release button 'S' to confirm. The parameter number (21) will appear in the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



PARAMETER 22 – FAN FREQUENCY VALUE DISPLAY

6. Use buttons '+' o '-' to modify the value of the parameter: - 00 = Off
- 01 = On

If parameter value 01 is selected, during the boiler operation, the display will show the fan frequency value for 10 min.

7. Press and release button 'S' to confirm. The parameter number (22) will appear in the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.

5.3 Gas data

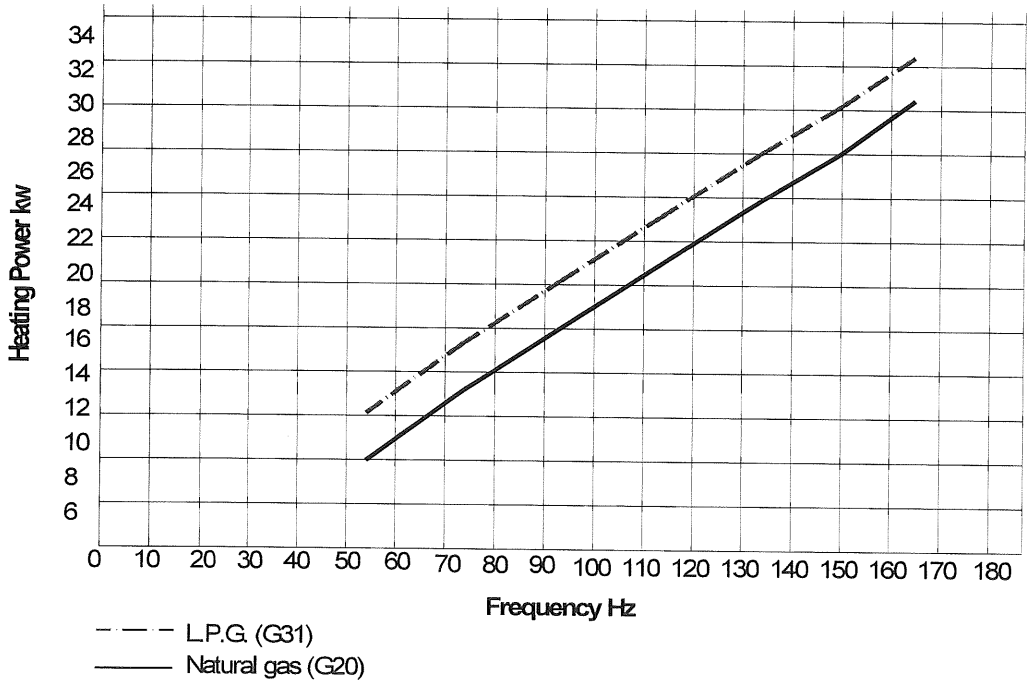
Technical data tables

Table no.1 - CO_2 Values	
Gas type	**CO_2 %**
Natural gas - G20	9.18
Liquid Propane Gas - G 31	10.3

Table no.2 - Frequency		
Gas type	**Minimum (Hz)**	**Maximum (Hz)**
Natural gas - G20	55	164
Liquid Propane Gas - G 31	52	155

Table no.3 - Gas data table			
		NATURAL GAS G20	LIQUID PROPANE GAS G31
Lower Wobbe Index (59°F; 14.5 psi)	MJ/Nm^3	45.67	70.69
Nominal supply gas pressure	mbar - psi	20 - 0.29	37 - 0.53
Consumi (59°F; 14.5 psi)	ft^3/hr	127.13	48.73

Heating Power (kW) – Fan frequency (Hz) diagram



5.4 Converting the boiler to a different gas type

⚠ **The conversion of a boiler from burning natural gas to LPG, or vice versa, must be carried out exclusively by professionally qualified personnel, registered in accordance with current legislation and authorized by Pensotti North America.**

⚠ **Check that the gas supply pipe is suitable for the new fuel type.**

Conversion is performed as follows:

- Select the new gas type by changing parameter no.P02 (see 'Parameters table' 5.2);
- Unscrew the aluminium plug and insert the analyser in the exhaust sampling point PF (see fig.1 paragraph 4.5) to check the CO value. Make sure that the value complies with that reported in table 1 (paragraph 4.5);
- If the CO2 value does not correspond to the specified value, adjust screw V (see fig. 1 paragraph 4.5) on the venturi clockwise to reduce the CO2 value or counter-clockwise to increase it;

6. MAINTENANCE (authorized personnel)

6.1 General Warnings

⚠ **All maintenance operations must be carried out by professionally qualified personnel, authorised by Pensotti North America.**

⚠ **The frequency of boiler maintenance must comply with current law and, nevertheless, should be carried out once a year.**

⚠ **In order to guarantee the long life of the appliance and in accordance with the current gas safety regulations, only use original spare parts**

⚠ **Before carrying out any type of maintenance operation, disconnect the appliance from the mains electricity supply and close the gas valve.**

6.2 Boiler inspection

In order to ensure that the boiler operates efficiently and safely, it is recommended that the appliance is inspected by a suitably competent technician at least once a year.
The following operations should be carried out annually

- Check the condition of the gas seals and replace where necessary.
- Check the condition of the water seals and replace where necessary.
- Visually inspect the condition of the combustion chamber and flame.
- When required, check that the combustion is correctly regulated and if necessary follow the directions within the section "Commissioning the boiler".
- Remove and clean any oxidation from the burner.
- Check that the seal of the room-sealed chamber is undamaged and positioned correctly.
- Check the primary heat exchanger and clean if necessary.
- Check the maximum and minimum modulation pressures and the modulation itself.
- Check the condition and operation of the ignition and gas safety systems. If necessary, remove and clean the scaling from the ignition and flame detection electrodes, paying particular attention to place them at the correct distance from the burner.
- Check the heating safety systems: temperature limit safety thermostat, pressure limit safety device.
- Check the pre-fill pressure of the expansion vessel (see expansion vessel data plate).
- For safety reasons, periodically check the integrity and operation of the flue gas exhaust system.
- Check that the connection to the main electricity supply complies with that reported in the boiler's instruction manual.
- Check the electrical connections inside the control panel.
- Check the D.H.W flow rate and temperature.
- Check that the condensate drain system is working correctly, including any parts of the system outside the boiler such as condensate collection devices along the length of the pipe and/or any acid neutralising devices.
- Check that the condensate flows freely and that there are no exhaust fumes present within the appliance.

6.3 Accessing the boiler

All maintenance operations require one or more of the boiler casing panels to be removed.

The side panels can only be removed after the front panel has been removed.

Front panel:

- Remove the fixing screws at the lower edge of the front panel.
- Grasp the lower part of the panel and pull it outwards (see fig. 1) and then up (see fig. 2).

Left and right side panel:

- Remove the fixing screws at the front and lower edge of the side panel to remove.
- Grasp the bottom of the panel, move it sideways and then upwards to remove it.

To access the electrical connections of the control panel, proceed as follows:

- Remove the front panel (see fig. 1 and fig. 2).
- Grasp the left and right control panel support brackets (see fig. 5) and pull them outwards, at the same time rotating the panel downwards.
- Unscrew the four fixing screws (see fig. 6) and remove the panel back piece.

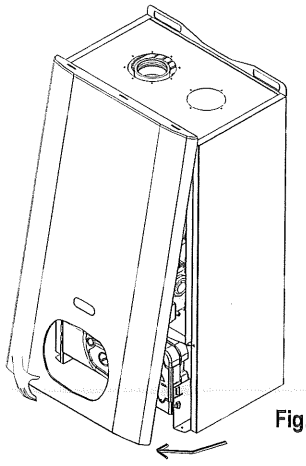


Fig. 1

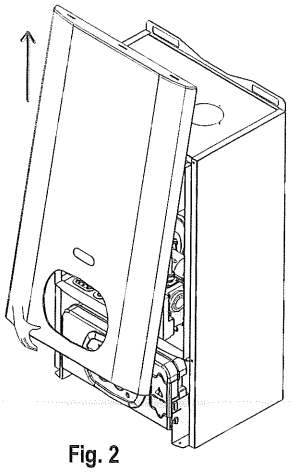


Fig. 2

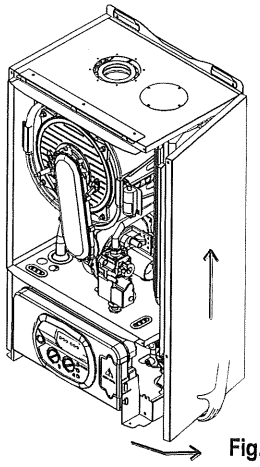


Fig. 3

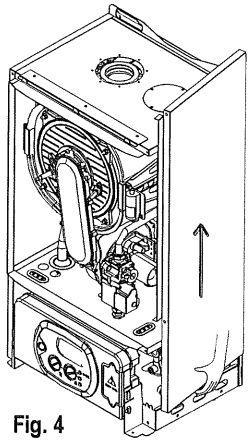


Fig. 4

6.4 Flushing out the primary side

- Fill the boiler as per the filling instructions.
- Using a drain cock on the lowest point of the system allow the water to drain from the system and boiler.
- In order to flush the system correctly turn off all radiators, open the fill valve and drain cock simultaneously and allow the water to flow through the boiler.
- Open each individual radiator allowing water to flow through then turn that radiator off and repeat for all radiators on the system.
- Turn off the fill valve and close the drain open all radiators and open the fill valve to fill the system.
- Continue to fill the system until the pressure gauge reaches 14.5 psi (1.0 bar).

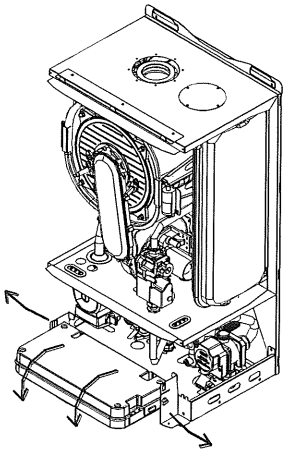


Fig. 5

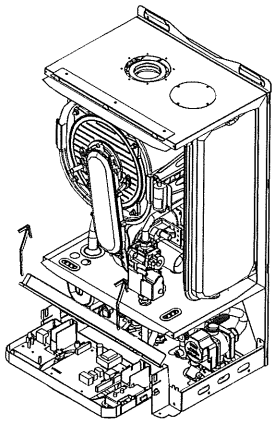


Fig. 6

6.5 Draining the central heating system

If the need arises to drain the system, this can be done as follows:

- Switch the system to "WINTER" mode and ignite the boiler.
- Switch off the power supply to the boiler.
- Wait for the boiler to cool down.
- Connect a hose to the system drain point **R** and locate the other end of the hose in a suitable drainage system.
- Open the system drain valve (fig. 1).
- Open the air vents on the radiators, starting with the highest and moving down the system to the lowest.
- When the system has been drained, close the radiator breather valves and the drain valve.
- **If only the boiler needs to be drained, close the flow/return isolating valves on the heating circuit and open the drain valve R located at the bottom of the boiler on the pump manifold (see fig. 1);**

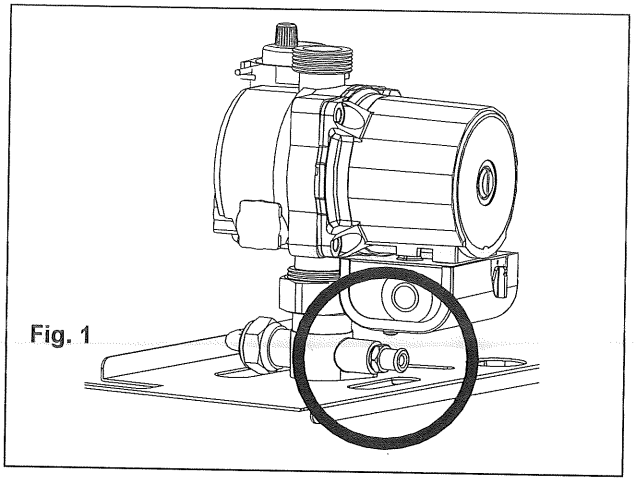


Fig. 1

Draining the domestic hot water system

If there is a danger of freezing, the domestic hot water system should be drained. This can be done as follows:

- Close the main water supply valve.
- Open all the hot and cold water taps.
- **On completion, close all the previously opened taps.**

6.6 Maintenance operations

⚠ **Before carrying out any cleaning or part replacement operations, ALWAYS turn off the ELECTRICITY, WATER and GAS supplies to the boiler.**

Pensotti North America will not be held responsible for damage to any of the boiler's components caused by non-compliance with this instruction.

For all maintenance operations requiring removal of the boiler casing, refer to the procedures described in paragraph *6.3 "Accessing the boiler"*.

Cleaning the main exchanger module and combustion unit (see fig. 1)

- Disconnect the electrical connections of the electric fan.
- Disconnect the joint and remove the pipe linking the gas valve to the injector unit (venturi).
- Disconnect the joint and remove the gas feed pipe from the gas valve.
- Un-plug the ignition electrode and flame detection wires from the ignition control unit.
- Unscrew the ring-nut at the bottom of the room-sealed chamber and remove the gas valve.
- Unscrew the nuts securing the burner unit (consisting of a fan, manifold and burner) to the primary heat exchanger.
- Remove the burner unit, paying particular attention not to remove the ceramic fibre protection from the bottom of the heat exchanger.
- Check that the burner is not affected by deposits, scaling or excessive oxidation. Check that all the holes in the burner are free;
- Clean the electrodes carefully without altering their positions with respect to the burner;
- Clean the burner cylinder using a non-metal brush and without damaging the ceramic fibre;
- Check the integrity of the washer on the cover of the burner;
- Clean the heat exchanger (see fig. 2) using a household detergent for stainless steel, distributing the product on the spirals of the exchanger using a brush. Do not wet the ceramic fibre coating. Wait a few minutes then remove the deposits using a non-metal brush. Then remove the residues under running water;
- Remove the pipe clip, remove the condensate drainpipe and clean under running water.
- Unscrew the joint to the condensate trap, remove the trap and wash under running water.
- With the cleaning completed, re-assemble the components following the above procedure in reverse order.
- Finally, check the boiler to make sure that all gas and exhaust joints are tight.

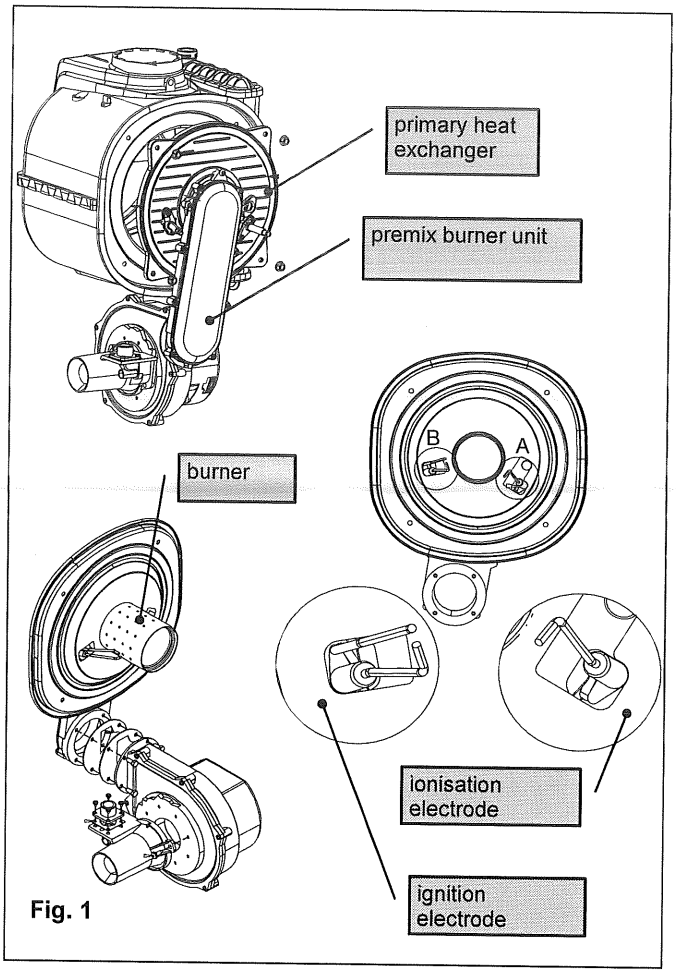


Fig. 1

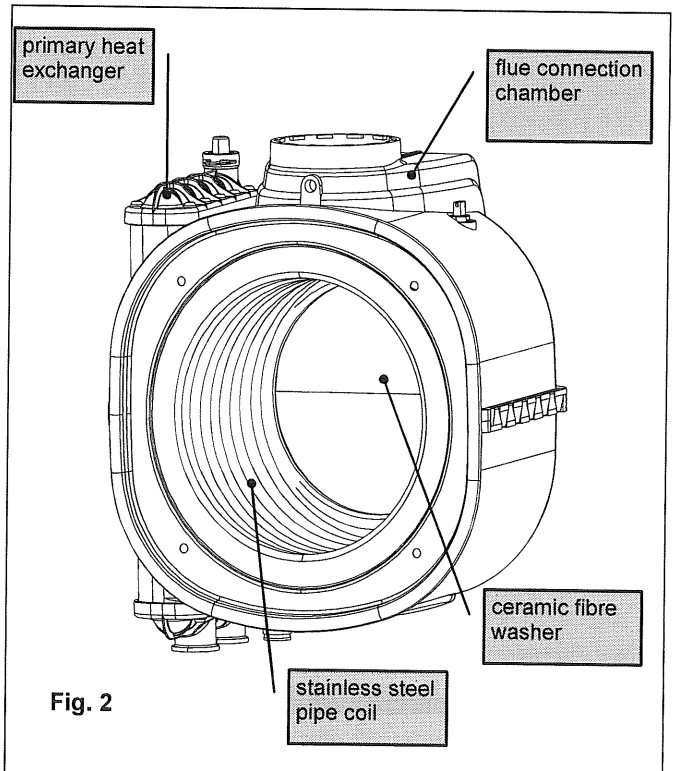


Fig. 2

Part replacement:

Ignition and/or flame detection electrodes
(see fig. 1)

- Un-Plug the electrode wires;
- Slacken the fixing screws;
- Remove the electrodes. When fitting the new ones, check that the seals are not damaged. Replace if necessary;
- Reconnect the wires and re-assemble the components following the above procedure in reverse order;
- Switch on the power supply and restart the appliance;

⚠ *If the boiler does not restart, check the positions of the electrodes (especially the ignition electrode). Make sure that original position and distances between the electrodes and the burner are respected to avoid a boiler malfunction).*

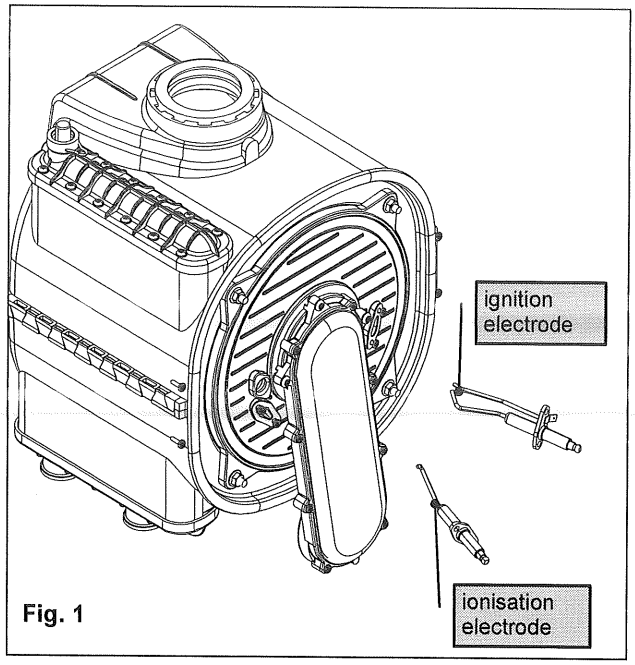


Fig. 1

Safety thermostat (see fig. 1)

- Disconnect the connecting wire;
- Unscrew the fixing screws and remove the thermostat;
- Replace the thermostat and re-assemble the components following the above procedure in reverse order;
- Switch on the electricity, water and gas supplies and restart the appliance.

Heating sensor (see fig. 1)

- Un-Plug the connecting wire;
- Replace the sensor and re-assemble the components following the above procedure in reverse order;
- Switch on the electricity, water and gas supplies, open the shut-off valves and fill the central heating circuit. Then restart the appliance, remembering to discharge any air that may be trapped in the system;

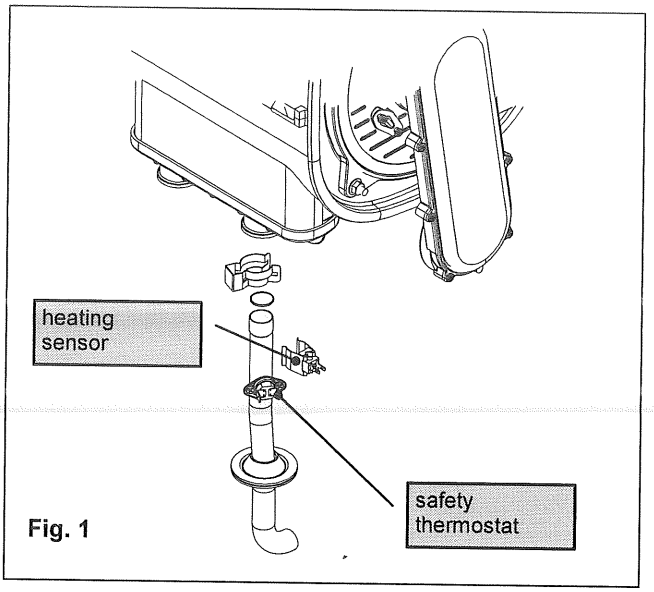


Fig. 1

Gas valve (see fig. 2)

- Disconnect the joints and remove the gas pipe connecting the gas valve to the venturi.
- Disconnect the gas feed pipe and valve ring-nut at the bottom of the room-sealed chamber.
- Remove the flanged elbow coupling of the existing valve and fit it to the new valve; also fit a new cork washer.
- Replace the gas valve and re-assemble the components following the above procedure in reverse order.
- Replace all the gas seals.
- Fully tighten the gas connections.
- Switch on the electricity, water and gas supplies and check for any gas leaks using a soapy solution or leak detector spray;

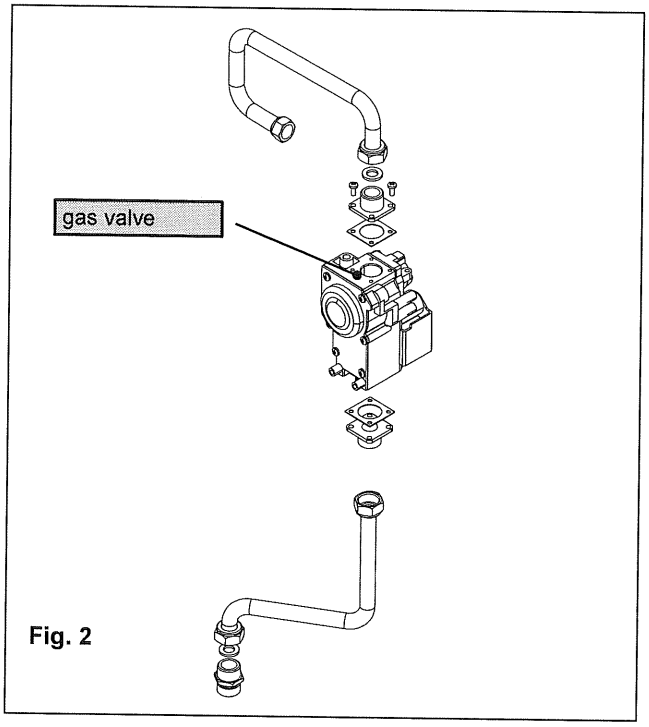


Fig. 2

Electric fan (see fig. 1)

- Remove and dismantle the entire burner unit *(see "Cleaning the burner unit")*.
- Use an 8 mm spanner to unscrew the four nuts securing the electric fan to the gas manifold and then remove the electric fan, noting the positions of the washer and diaphragm.
- Remove the air intake duct, unscrew the two fixing screws from the venturi and remove the electric fan, paying particular attention not to damage the cork gasket.
- Replace the electric fan and re-assemble the components following the above procedure in reverse order.
- Switch on the electricity, water and gas supplies and check the soundness of the joint by measuring the CO_2 levels;

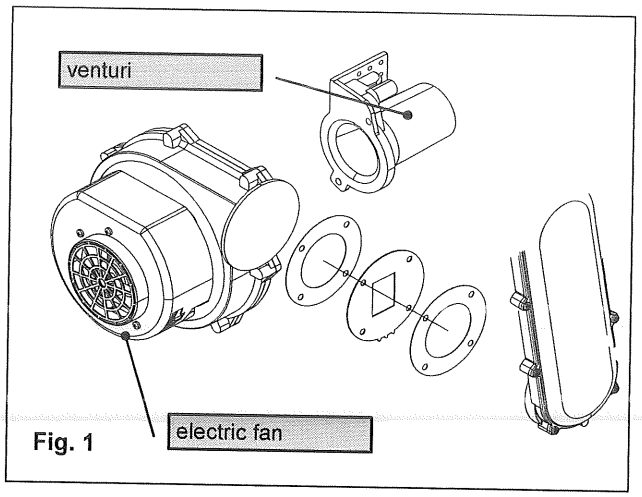


Fig. 1

Expansion vessel (see fig. 2)

- Close the shut-off valves and drain the central heating circuit of the boiler.
- Use a 19 mm spanner to unscrew the pipe coupling to the vessel.
- Unscrew the fixing screws and remove the upper mounting bracket. Remove the expansion vessel from the front of the boiler.
- Replace the expansion vessel and re-assemble the components following the above procedure in reverse order.
- Switch on the electricity, water and gas supplies and fill the system with water. Check for any leaks from the joints and bleed off any air from the circuit;

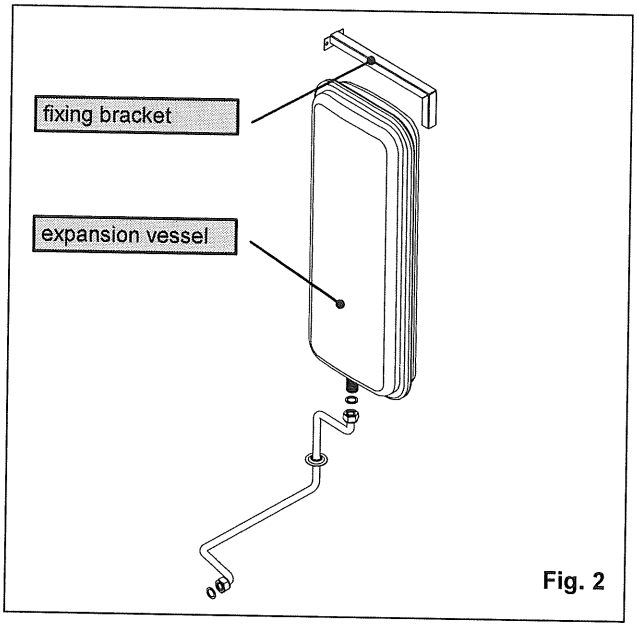


Fig. 2

Circulating pump (motor body) (see fig. 1)

- Close the shut-off valves and drain the central heating circuit of the boiler;
- Use a 5 mm Allen key to unscrew the four screws securing the motor body to the impeller body;
- Remove the motor body and check the condition of the washer. If necessary, replace the washer;
- Replace the circulation pump and re-assemble the components following the above procedure in reverse order;
- Switch on the electricity, water and gas supplies and fill the system with water. Check for any leaks from the joints and bleed off any air from the circuit. Restart the boiler.

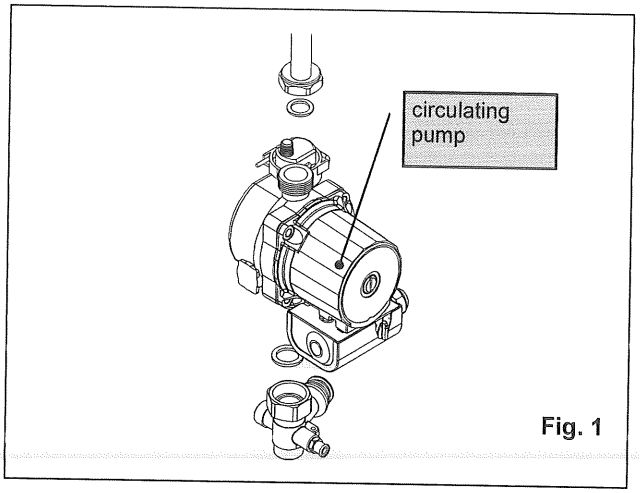


Fig. 1

Diverter valve (see fig. 2)

- Close the shut-off valves and drain the central heating circuit of the boiler;
- Unscrew the fixing screws securing the transparent cover of the diverter valve and remove the cover;
- Unscrew the four fixing screws and remove the diverter valve body and washer;
- Replace the valve body and re-assemble the components following the above procedure in reverse order;
- Switch on the electricity, water and gas supplies and fill the system with water. Check for any leaks from the joints and bleed off any air from the circuit. Restart the boiler.

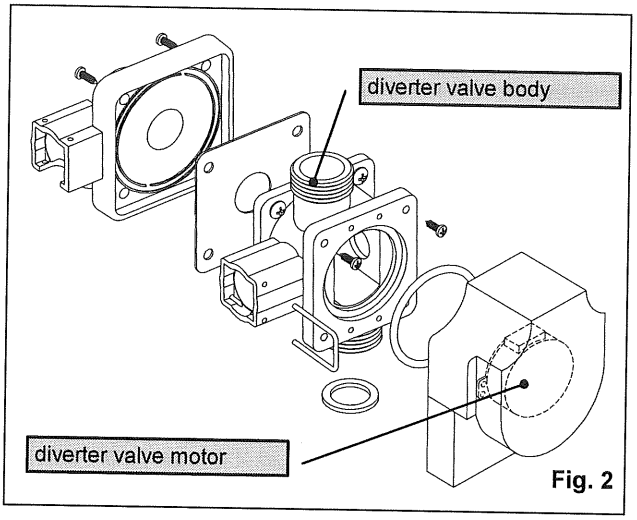


Fig. 2

Modulation circuit board (see fig. 1-2)

- Open the control panel *(see 6.3 "Accessing the boiler")*;
  - Disconnect all the connectors, remove the regulating knobs, unscrew the four fixing screws and remove the modulation circuit board;
- Replace the circuit board and re-assemble the components following the above procedure in reverse order;
- Switch on the electricity, water and gas supplies and regulate the boiler *(see 5.3 "Gas data")*;

⚠ *The preset parameters of the printed circuit board correspond to an instantaneous type boiler fed by natural gas.*

When replacing the modulation circuit board, check the "Minimum heating flow rate" – Parameter 19 and "Max Heating power" – Parameter 20.

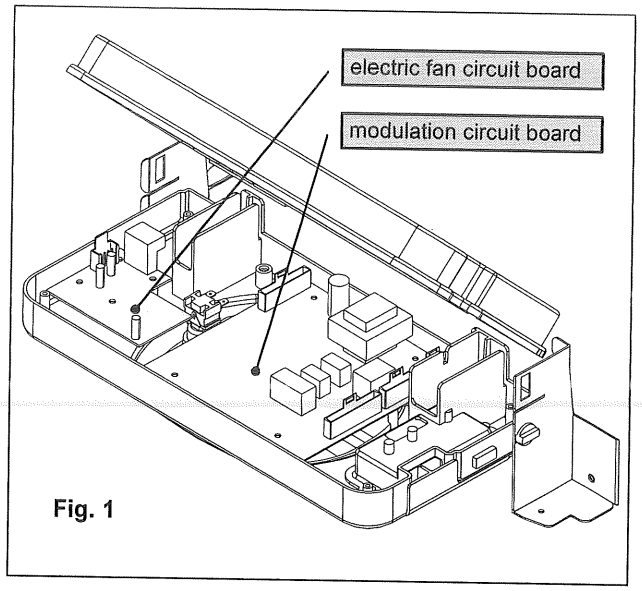


Fig. 1

Electric fan circuit board (see figs. 1-2)

- Open the control panel *(see 6.3 "Accessing the boiler")*;
- Disconnect the two connectors from the circuit board, unscrew the two fixing screws and remove the board;
- Replace the circuit board and re-assemble the components following the above procedure in reverse order;
- Switch on the electricity, water and gas supplies.

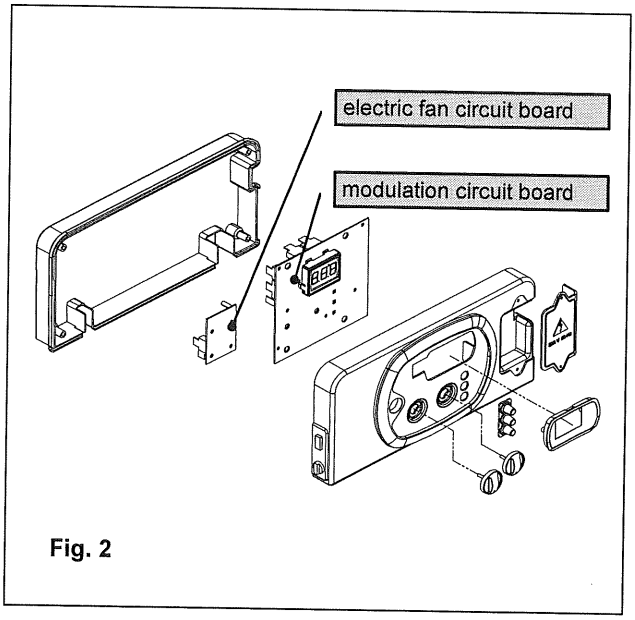


Fig. 2

Primary heat exchanger (see fig. 1)

- Close the shut-off valves and drain the central heating circuit of the boiler;
- Switch off the power and gas supply to the boiler;
- Remove and dismantle the entire burner unit *(see "Cleaning the condensation module and burner unit");*
- Remove the gas valve;
- Remove the spring and then the condensate drainpipe;
- Remove the fixing springs and then the delivery and return pipes;
- Remove the support brackets and pull out the heat exchanger;
- Remove the regulation sensor from the old heat exchanger and refit it together with the two condensate drainpipes to the new one;
- Replace the heat exchanger and re-assemble the components following the above procedure in reverse order;
- Switch on the electricity, water and gas supplies and fill the system with water. Check for any leaks from the joints and bleed off any air from the circuit. Restart the boiler, making sure that there are no gas leaks;

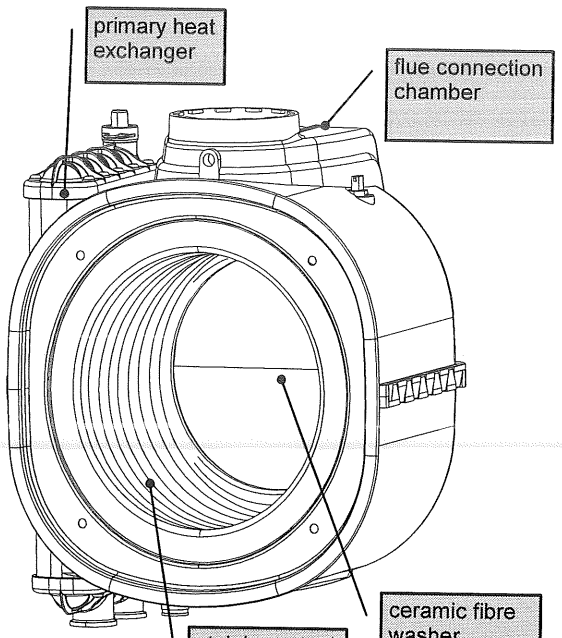
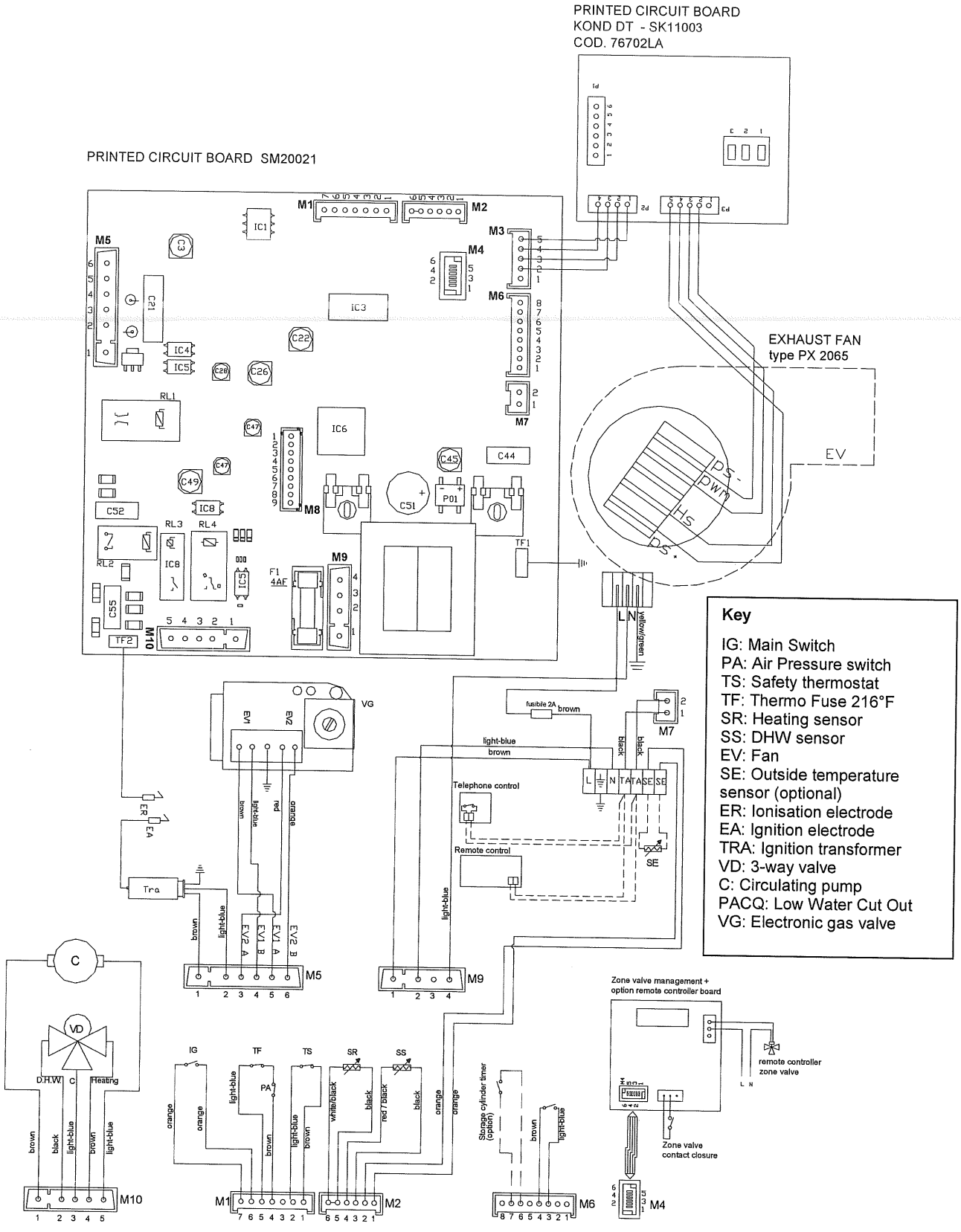


Fig. 1

6.7 Wiring diagrams



Connecting the room thermostat (Option)

Connect the wires to the terminal board inside the instrument panel as follows:

(Example with WEEK digital weekly chronostat):

a. switch off the power supply at the main switch.
b. remove the front case panel of the boiler.
c. slacken the screws and remove plate A (see fig.1).
d. remove jumper TA -TA from the terminal board B;
e. connect the room thermostat/chronostat wires;

When the wires have been connected, place plate "**A**" back to position and then the front case panel.

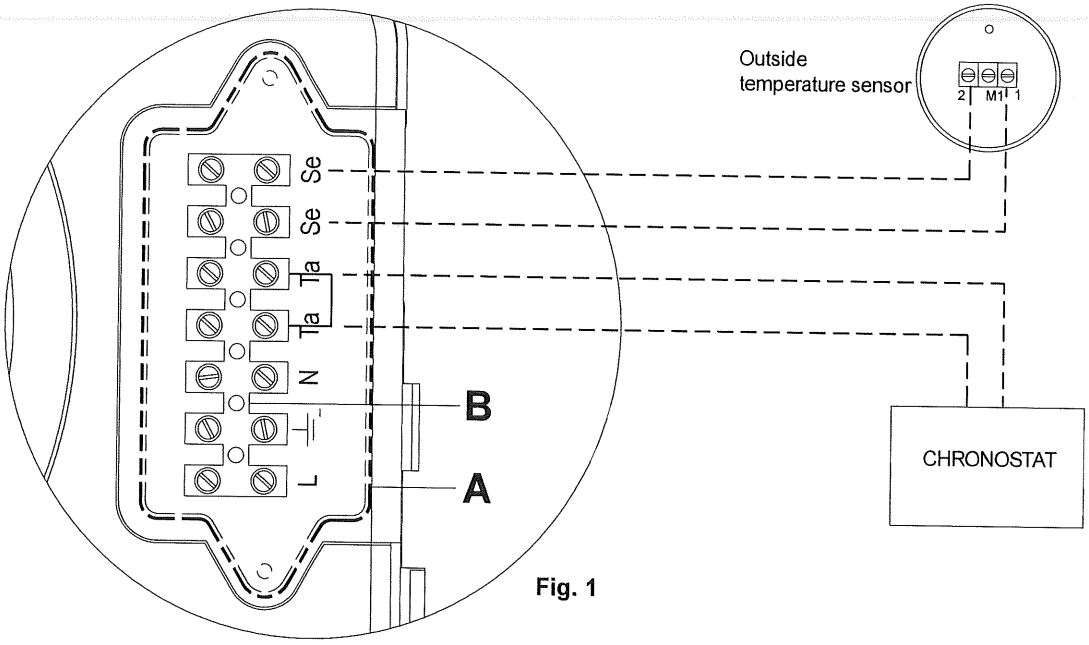


Fig. 1

Connecting the outside temperature sensor (Option)

Connect the wires to the terminal board inside the instrument panel as follows:

a. switch off the power supply at the main switch.
b. remove the front case panel of the boiler.
c. slacken the screws and remove plate A (see fig.1).
d. connect the outside temperature sensor on contacts marked as SE-SE on the terminal board B ;

When the wires have been connected, place plate "**A**" back to position and then the front case panel.

Connecting the remote controller the outside temperature sensor (option)

Connect the wires to the terminal board inside the instrument panel as follows:

a. switch off the power supply at the main switch.
b. remove the front case panel of the boiler.
c. slacken the screws and remove plate A (see fig.1).
d. remove jumper TA-TA from the terminal board B;
e. connect the remote controller wires;
f. connect the outside temperature sensor on contacts marked as SE-SE on the terminal board B .

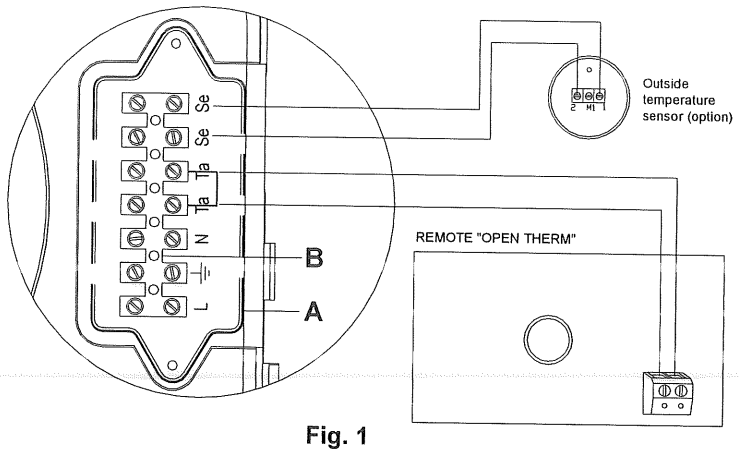


Fig. 1

When the wires have been connected, place plate "**A**" back to position and then the front case panel.

Connecting the remote controller and the telephone control (option)

Connect the wires to the terminal board inside the instrument panel as follows:

a. switch off the power supply at the main switch.
b. remove the front case panel of the boiler.
c. slacken the screws and remove plate A (see fig.1).
d. remove jumper TA-TA from the terminal board B;
e. connect the remote controller and the telephone control wires;
f. Active the telephone control through the parameter no.16 *(see 5.1 "Parameters Table")*

When the wires have been connected, place plate "**A**" back to position and then the front case panel.

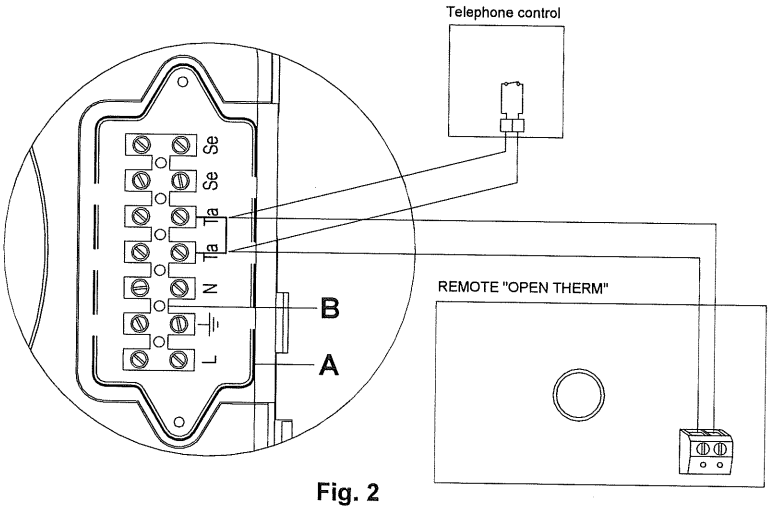
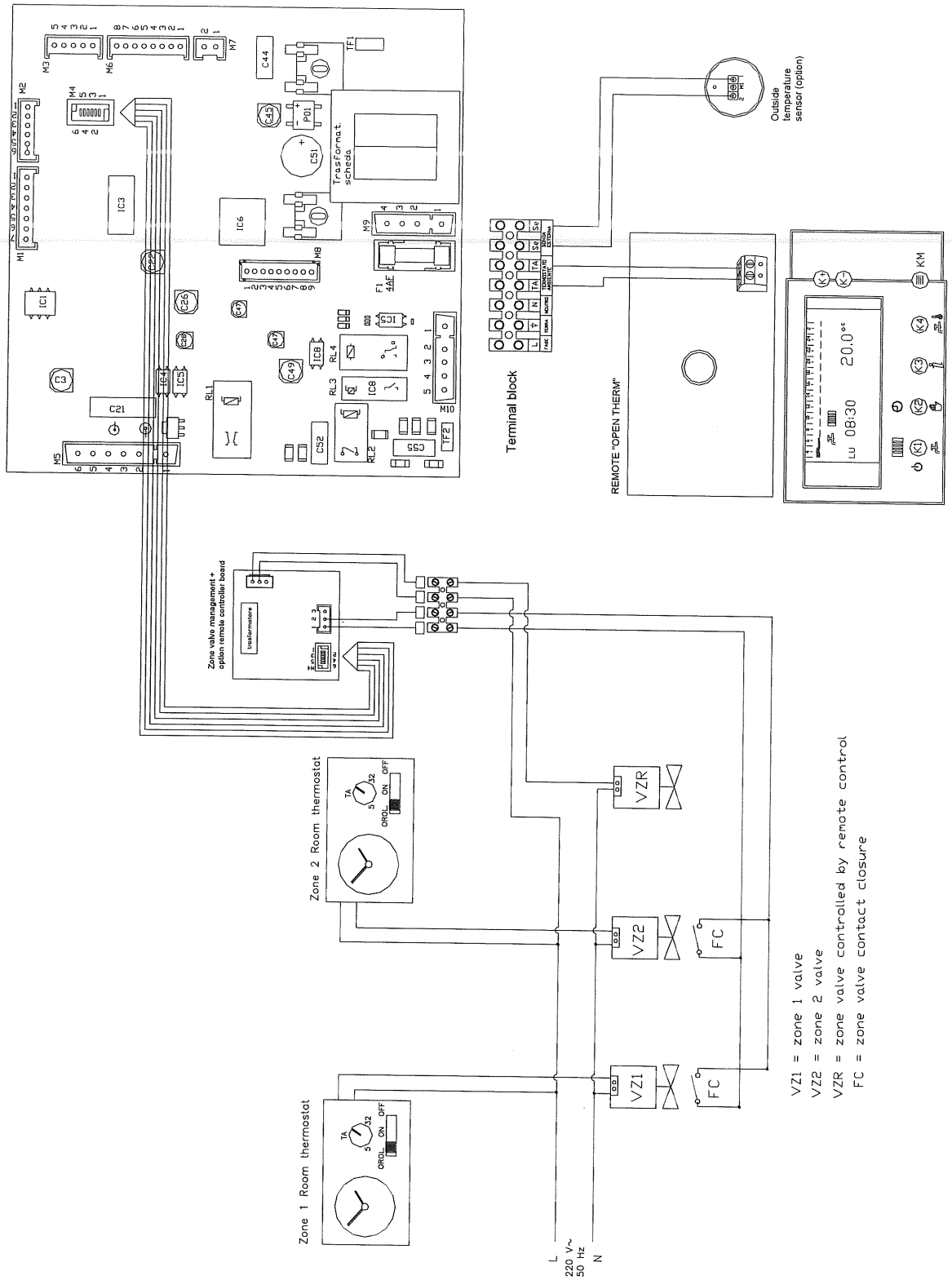


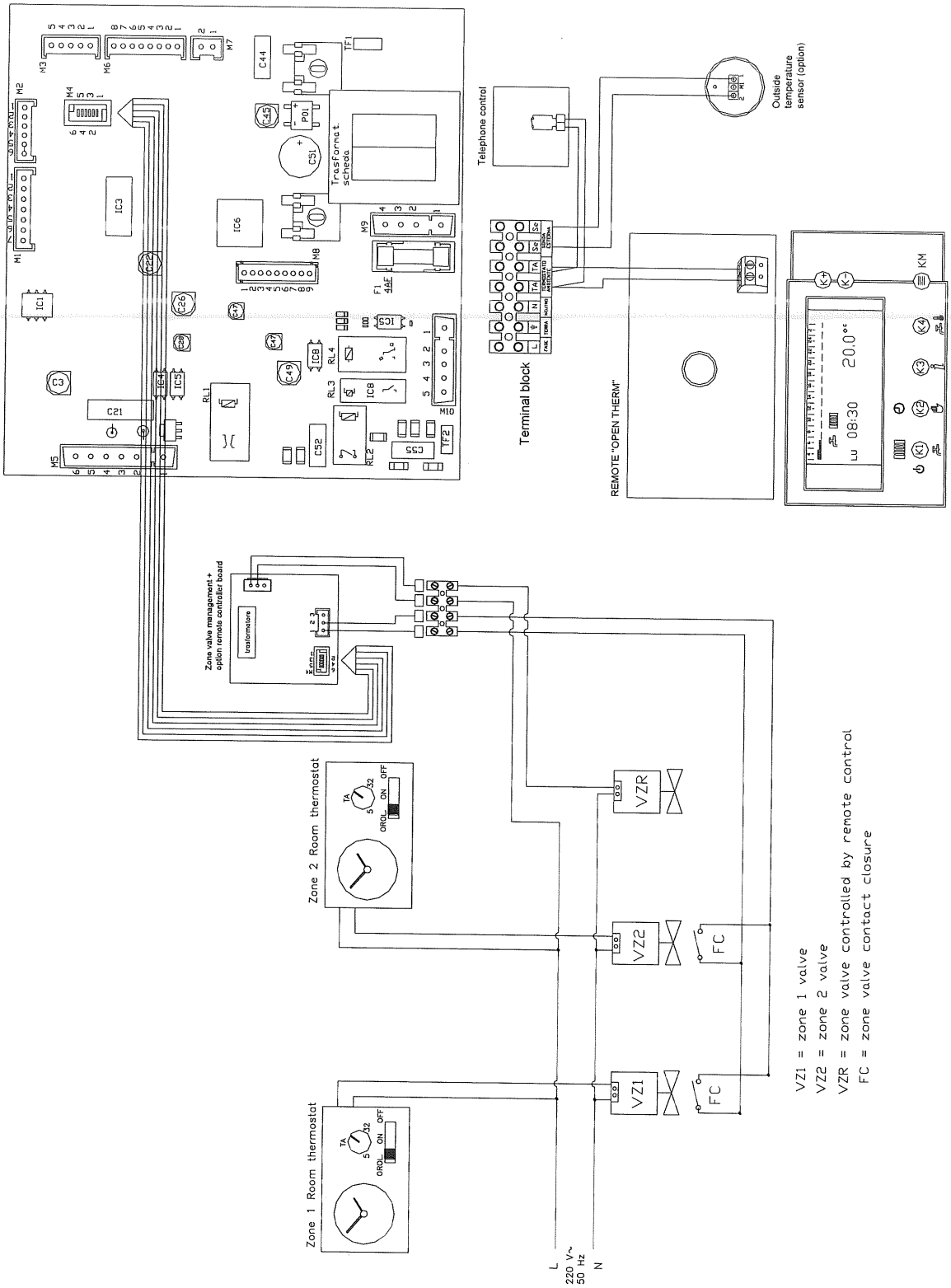
Fig. 2

Remote control and zone valves wiring

For the installation of a zone valve p.c.b, it is necessary to access the main p.c.b for electrical connection *(see 6.3 "Accessing the boiler")* and to activate the parameter no. 16 (see 5.1 "Parameters table").



Remote control, zone valves and telephone control wirings



Regulating the Flow temperature in accordance with the outdoor temperature

The outdoor sensor has to be connected directly to circuit board SM 20021. The sensor can thus be managed in one of two ways:

- In case of remote controller + outdoor temperature sensor installation, the climatic compensation curve is set by the remote itself (see remote control installation and operating manual).
- In case of outdoor temperature sensor only installation, the climatic compensation curve is set using the central heating control knob. As the knob (see fig. 2) is rotated, the numbers corresponding to the curve shown in figure 1 are displayed

The factors governing the correction is reported in figure 1.

The selection of the compensation curve is determined by the maximum delivery temperature Tm and the minimum outdoor temperature Te.

N.B. *The y-axis values of the delivery temperature Tm refer to standard 176-86 °F appliances or 104-77 °F floor-mounted appliances. The type of appliance can be programmed using parameter 3 (see 5.1 "Parameter programming").*

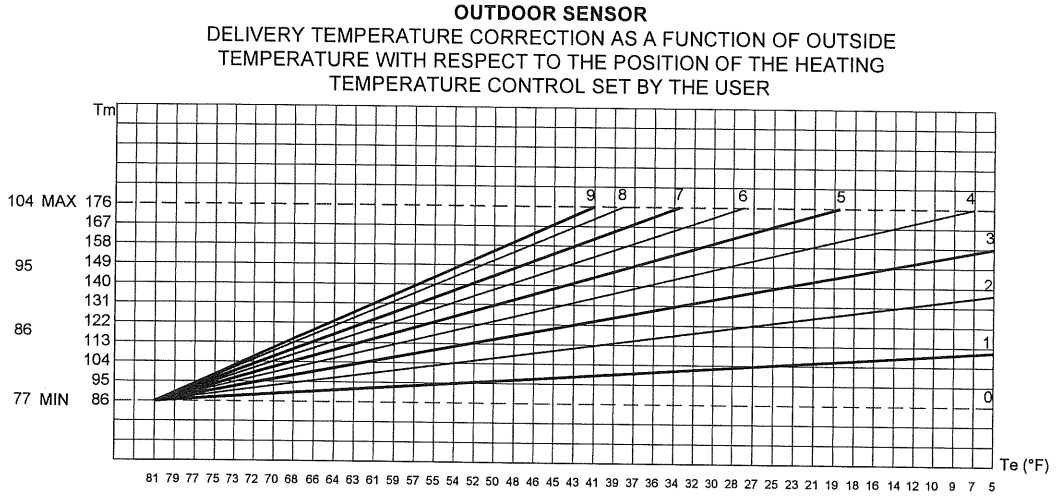


Fig. 1

TM-MAX/MIN = delivery temperature range selected

Te = Outdoor temperature Tm = delivery temperature

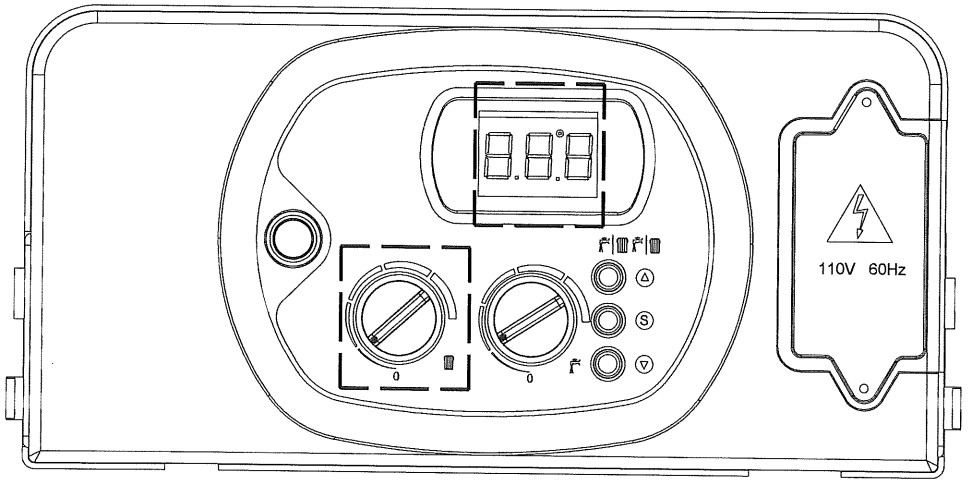
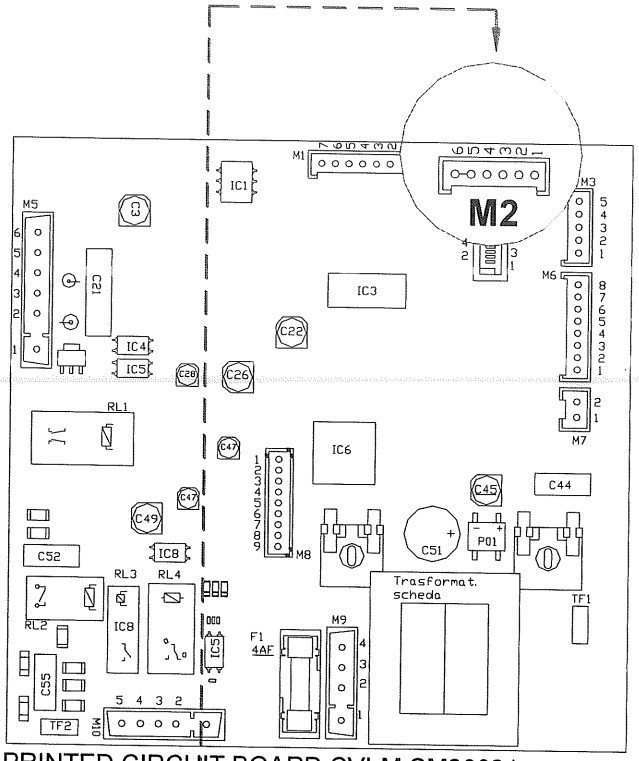


Fig. 2

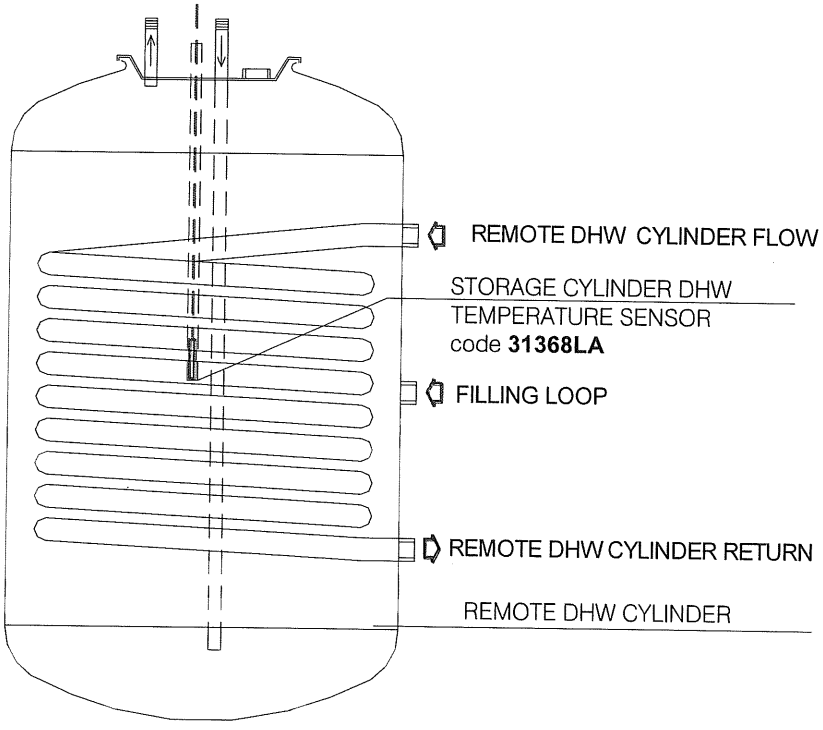
D.H.W. sensor connection



PRINTED CIRCUIT BOARD CVI-M SM20021

Fig. 1

HOT WATER SENSOR LEAD
MAX. LENGHT 8 mt.



REMOTE DHW CYLINDER FLOW

STORAGE CYLINDER DHW
TEMPERATURE SENSOR
code **31368LA**

FILLING LOOP

REMOTE DHW CYLINDER RETURN

REMOTE DHW CYLINDER

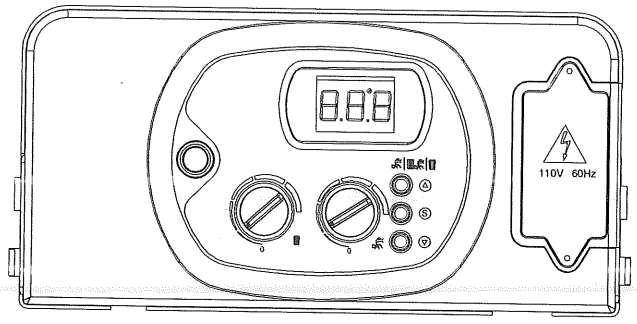
6.8 Troubleshooting

ERROR CODE	PROBLEM	POSSIBLE CAUSE	REMEDY
E01	NO FLAME	*WITH NO IGNITION* **a.** NO GAS. **b.** IGNITION ELECTRODE BROKEN OR EARTHED. **c.** GAS VALVE MALFUNCTION **d.** MECHANICAL MINIMUM ADJUSTMENT (ON GAS VALVE) SET TOO LOW OR SLOW IGNITION ADJUSTMENT SET TOO LOW. **e.** GAS VALVE INLET PRESSURE TOO HIGH (FOR LPG BOILERS ONLY); *WITH IGNITION* **f.** POWER SUPPLY LIVE AND NEUTRAL WIRES INVERTED. **g.** IONISATION ELECTRODE MALFUNCTION. **h.** IONISATION ELECTRODE CABLE DISCONNECTED.	**a.** CHECK MAINS SUPPLY. **b.** REPLACE PART. **c.** REPLACE PART **d.** REGULATE MECHANICAL MINIMUM OR SLOW IGNITION. **e.** CHECK THE MAXIMUM PRESSURE SETTING. **f.** CONNECT THE POWER SUPPLY WIRES CORRECTLY. **g.** REPLACE PART. **h.** CONNECT THE IONISATION ELECTRODE WIRE.
E02	SAFETY THERMOSTAT TRIPPED (203°F)	**i.** THERMOSTAT MALFUNCTION OR OUT OF CALIBRATION. **j.** THERMOSTAT CABLE DISCONNECTED.	**i.** REPLACE PART. **j.** CHECK THE WIRING ;
E03	FLUE SAFETY THERMOFUSE	**k.** THERMOFUSE BROKEN; **l.** THERMOFUSE CABLE DICONNECTED; **m.** THERMOFUSE LOCK OUT. (HIGH FLUE TEMPERATURE)	**k.** REPLACE PART; **l.** CHECK THE ELECTRICAL CONNECTION; **m.** RESTART AND CHECK THE THERMOFUSE
H20	NO WATER IN THE SYSTEM	**n.** INSUFFICIENT WATER PRESSURE IN THE SYSTEM (STOPS AT 4.5 PSI (0.3 BAR)). **o.** WATER PRESSURE SWITCH CABLE DISCONNECTED. **p.** WATER PRESSURE SWITCH MALFUNCTION.	**n.** FILL THE SYSTEM; **o.** CHECK THE WIRING; **p.** REPLACE PART;
E05	HEATING SENSOR	**q.** SENSOR MALFUNCTION OR OUT OF CALIBRATION (RESISTANCE VALUE 10 kOhms AT 77 °F). **r.** SENSOR CABLE DISCONNECTED OR WET.	**q.** REPLACE PART; **r.** CHECK THE ELECTRICAL CONNECTION;
E12	D.H.W STORAGE CYLINDER SENSOR	**s.** SENSOR MALFUNCTION OR INCORRECT (RESISTANCE VALUE 10 kOhms AT 25 °C). **t.** SENSOR CABLE DISCONNECTED OR WET.	**s.** REPLACE PART; **t.** CHECK THE ELECTRICAL CONNECTION ;
E16	FAN	**u.** BURNT FAN	**u.** REPLACE PART
E22	PARAMETER PROGRAMMING REQUEST	**v.** LOSS OF MICROPROCESSOR MEMORY;	**v.** REPROGRAM PARAMETERS;
E35	FLAME DETECTION MALFUNCTION	**w.** IONISATION ELECTRODE MALFUNCTION **x.** IONISATION ELECTRODE CABLE MALFUNCTION **y.** PRINTED CIRCUIT BOARD MALFUNCTION	**w.** CLEAN IT OR REPLACE PART **x.** REPLACE PART **y.** REPLACE PART
E42	FAN PRINTED CIRCUIT BOARD	**z.** FAN PRINTED CIRCUIT BOARD MALFUNCTION	**z.** REPLACE PART

6.9 Diagnostics

■ Error codes:

E01 Ionisation Lock Out
E02 Safety Thermostat Tripped
E03 Flue Gas Thermofuse Tripped
H2O Low Water Pressure Alarm
E05 Heating Sensor Malfunction
E12 D.H.W Storage Cylinder Sensor Malfunction
E16 Electric Fan Malfunction
E22 Parameter Programming Request
E35 Flame Detection Malfunction
E42 Fan Speed P.C.B. Malfunction



■ Function codes :

Code	Function	Description
07	Flue test function active (Chimney-Sweeper)	Pressing the "service" button for 7 seconds activates the Flue test function. Pressing the boiler off button deactivates the function. The Flue test function operates the boiler at the maximum heating pressure for 15 minutes without any modulation. The function is useful for combustion testing.
08	Frost Protection Central heating circuit	The function is activated when the heating sensor senses a temperature of 5 °C. The boiler operates at minimum gas pressure with the 3-way diverter valve in the winter position. The function is deactivated when the temperature detected by the sensor reaches 30°C.
13	Frost Protection D.H.W. circuit – for storage boilers	The function is activated when the sensor senses a temperature of 4°C. The boiler operates at minimum gas pressure. The 3-way diverter valve closes in the summer position and heats the D.H.W. circuit. The function is deactivated when the D.H.W. storage cylinder sensor detects a temperature of 8°C or when heating sensor detect a temperature in the heating circuit of 30°C.
28	Legionella Prevention Function	Function active for storage boilers only. It comes into operation every 7 days. It brings the hot water temperature of the storage cylinder up to 60°C whatever temperature value is set for hot water.
31	Incompatible Remote Control	Function active when the remote control connected is not compatible with the printed circuit board .

6.10 Parts List

Main components

CODE	DESCRIPTION
20086LA	ISOTERMIQUE 5+1 COMBUSTION CHAMBER BACK PANEL
21044LA	PRIMARY EXCHANGER 5+1 PREMIX 0.70
24060LA	PUMP STAR S 21 KU RSL-PL6 UL/CSA
25-00050	SAFETY VALVE 3/4"M - 3/4"F
27044LA	CONDENSATE TRAP
35031LA	IGNITION ELECTRODE
35032LA	IONISTATION ELECTRODE
36072LA	VENTURI MINIFOLD
36075LA	GAS VALVE UL/CSA
37033LA	FAN PX 2065 UL/CSA
59015LA	LOW WATER CUT OUT SWITCH PC 5411 BRASS
59020LA	AIR PRESSURE SWITCH 2.14 UL/CSA
73516LA	HTG CLIP SENSOR FOR PIPE 17/18 mm BLUE-T7335D1123B
73517LA	THERMO FUSE 102°C RED ISOTHERM . 1/4" 4X45
76702LA	PRINTED CIRCUIT BOARD KOND DT - SK11003
76719LA	MAIN PRINTED CIRCUIT BOARD UL/CSA - SM20021
86006LA	SAFETY THERMOSTAT 95°C
86014LA	WATER PRESSURE GAUGE
88022LA	TRANSFORMER UL/CSA
95013LA	EXPANSION VESSEL 7 lt. 3/8"
96018LA	NO-RETURN VALVE
96093LA	DIVERTER VALVE ACTUATOR UL/CSA