

The COROLLA PACK 75-100
Condensing Heating Group

COMMISSIONING PROCEDURE



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1. Introduction

In the following pages, FONTECAL has put together a series of indications and technical advice for its Servicing Centres relating to the control and measurements that are to be carried-out when the boiler is started up for the first time.

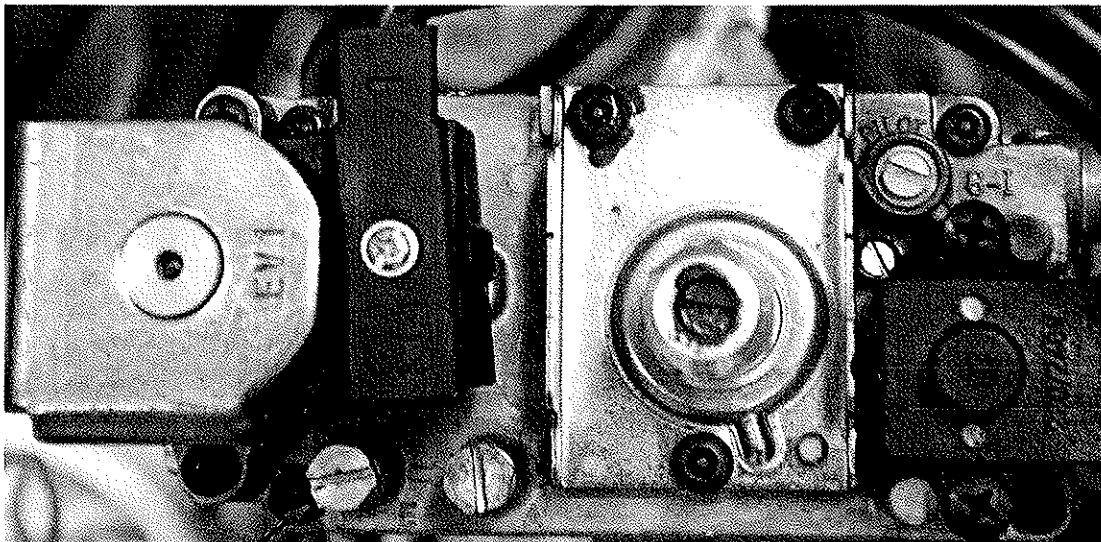
The suggestions listed below have a double purpose:

- to individuate eventual installation mistakes which could compromise the correct service of the boiler unit;
- to guarantee to the Customer that the boiler's performances are respondent to those stated as factory performances in terms of consumption, emissions and reliability.

2. Preliminary check-up

Before putting the heating group into function, we recommend that the following check-up procedures are carried-out:

- Check that the Pack unit is already set for the type of combustible gas available;
- Open the gas tap of each individual module;
- Check that the system has been cleaned with a scale removing liquid or that a water filter has been mounted on the water return line;
- Check by means of a manometer that the pressure of the primary circuit is correct;
- Make sure that all the gate valves are open;
- Check that the air inlet and flue pipes are clear from eventual obstructions;
- Make sure that there is no air in the gas feed pipe. If necessary, de-aeration can be carried out at the pressure measuring point on top of every gas valve ("IN") as shown in Picture 1;



"IN" Pressure measuring point

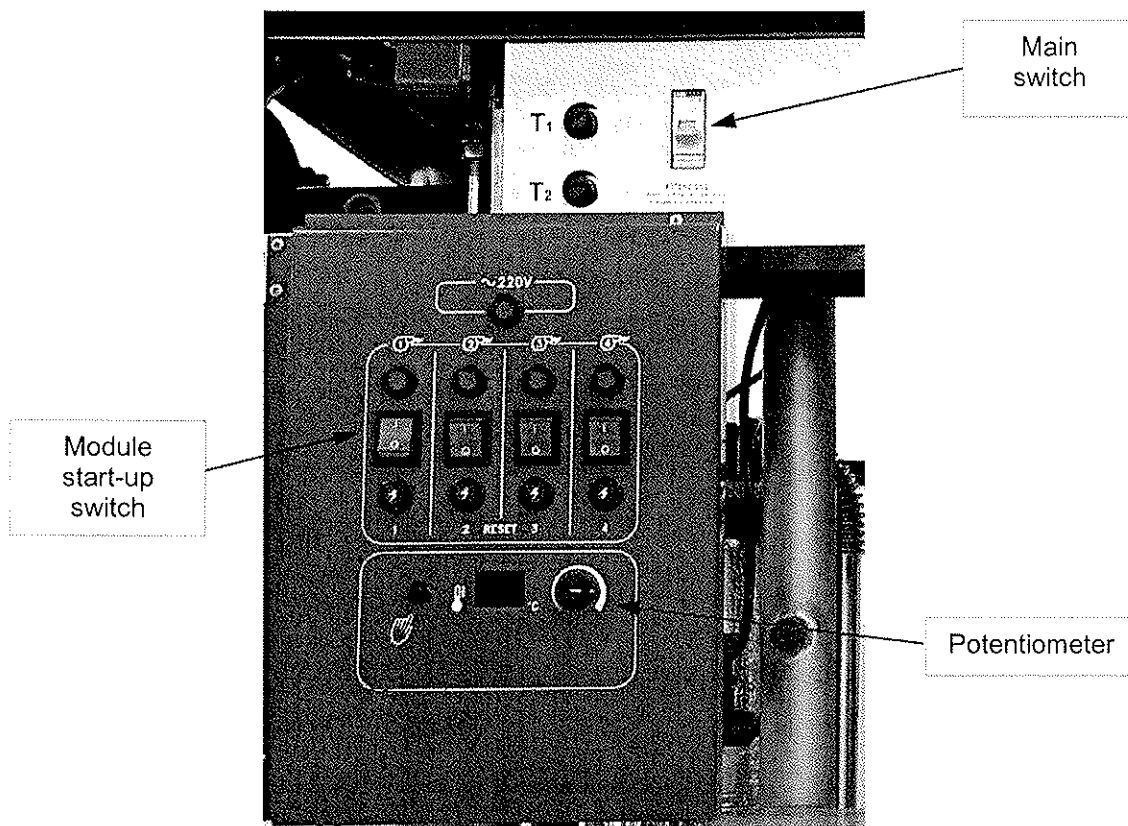
Picture 1: detail of the gas valve (seen from above).

- Check that all the electric connections have been carried out correctly. In particular, the ON/OFF switch of the Pack unit must be connected to the Slave board through clean contacts.
- Check that the electronic devices (control boxes and Slave board) have not been tampered with.

3. Procedures to follow for the commissioning of the unit

In order to start-up the heating group, once the preliminary check-up has been done, the following instructions must be followed:

- turn the main switch of each Pack unit to ON (see picture 2);
- bring the set-point temperature to its maximum value (80°C) by using the dedicated potentiometer on the control panel (see picture 2);
- start-up every module by switching the related switches on the control panel to the ON ("I") position (see picture 2).

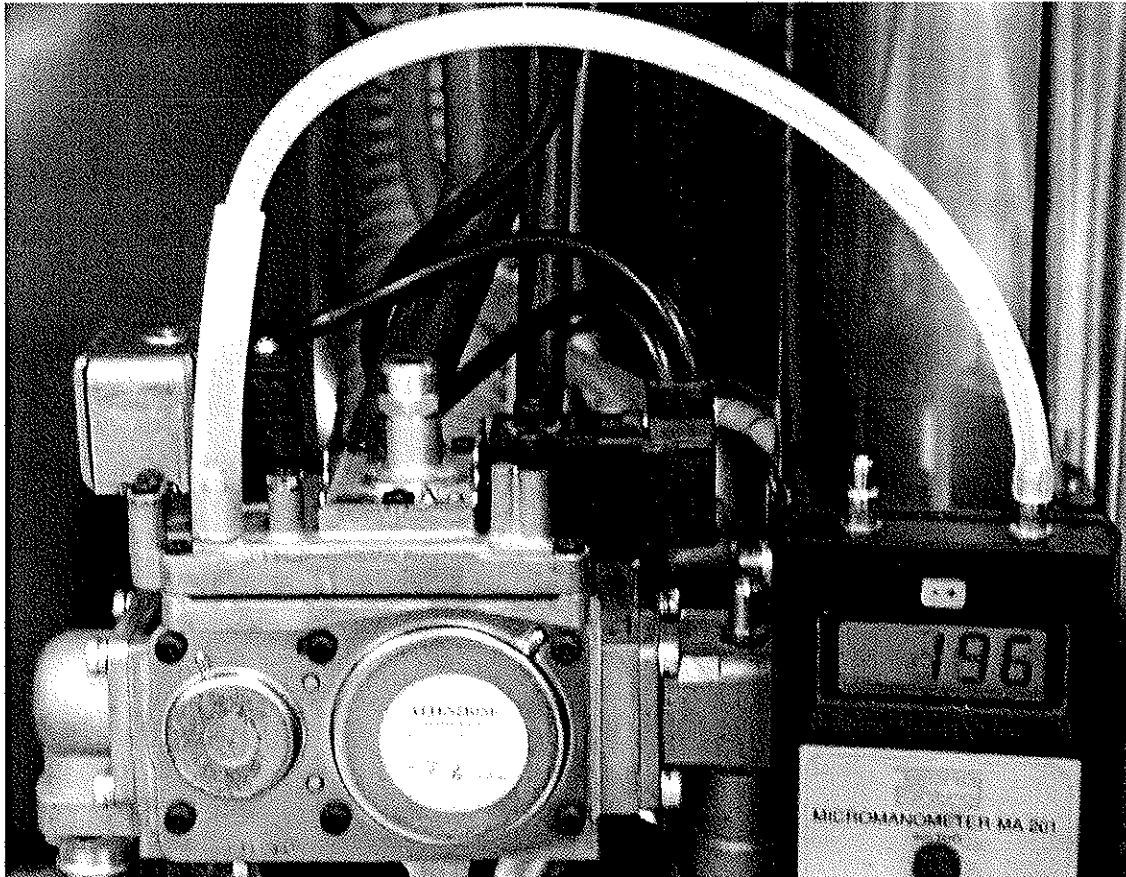


Picture 2: detail of the Slave control panel and main switch.

3.1 Pressure of the gas at the gas valve inlet on each individual module

The first value to measure is the pressure of the gas at the inlet point (see picture 3) to make sure that it is always constant. This measurement has to be done both when the burner is lit and when it is off.

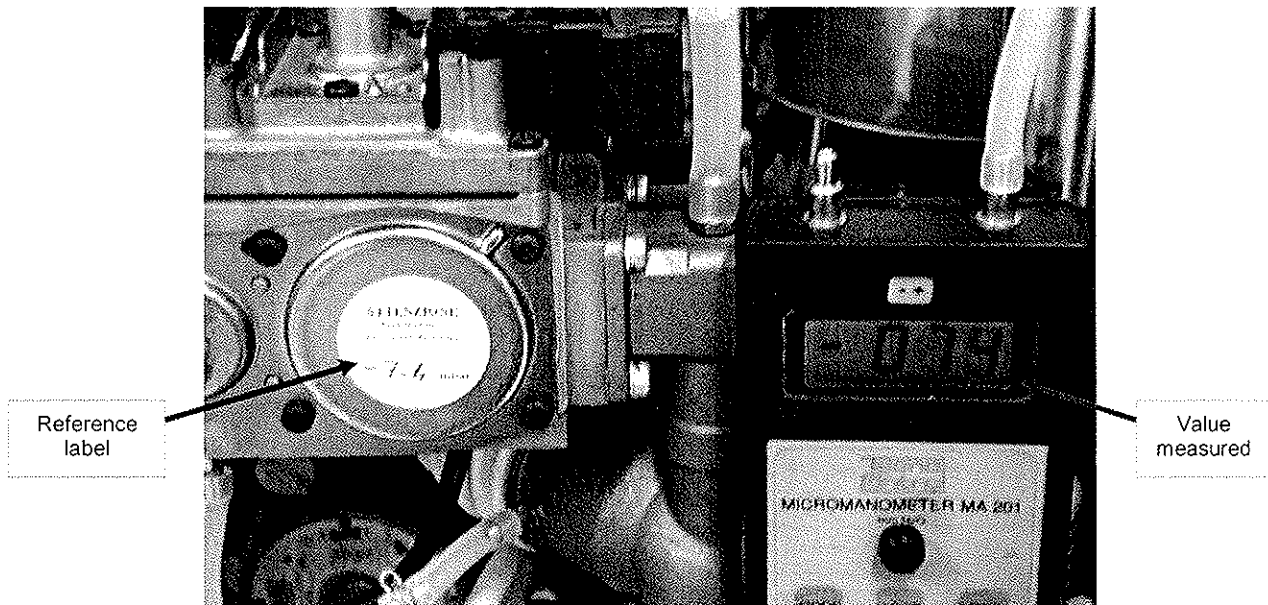
The correct functioning of the gas valve is not altered if the pressure of the gas entering the valve – when the burner is lit – oscillates within the range of 10-15 mmH₂O for natural gas and within the range of 25-30 mmH₂O for LPG. In case the oscillations should result to be of a wider range, a pressure stabilizer must be added to the circuit at a setting equal to the lowest pressure value measured.



Picture 3: example of measurement of the pressure of the gas at the inlet point using a digital manometer

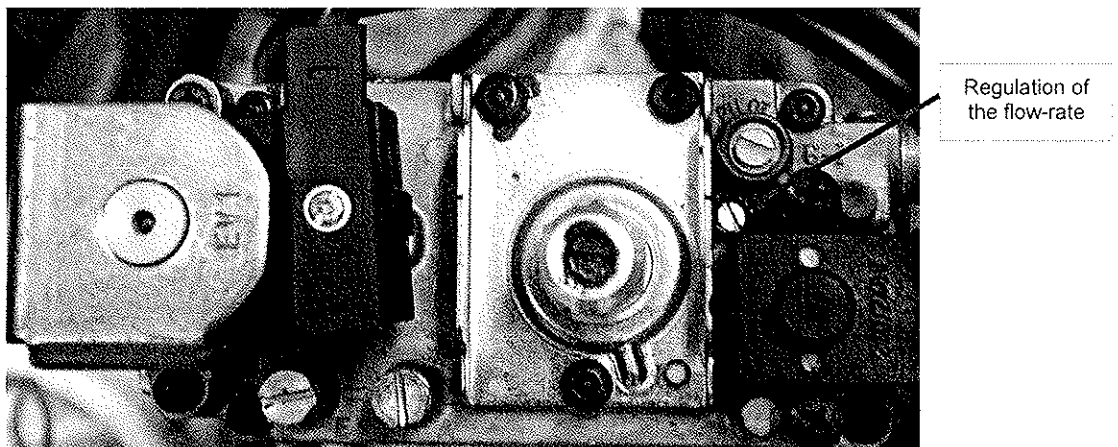
3.2 Pressure of the gas at the gas valve outlet on each individual module

The second value to measure is the pressure of the gas at its exit from the gas valve (as shown in picture 4) to check whether the value appearing on the manometer matches the value written on the yellow label showing at the back of the gas valve.



Picture 4: example of measurement of the pressure of the gas at the outlet point using a digital manometer

The tolerance is about ± 5 mmH₂O respect to the value showing on the label. If the value measured exceeds such a tolerance, before intervening with the regulator, it is recommended that the measurements listed in paragraph 3.3 herein are carried-out in order to make sure that there are no objects obstructing the air feed pipe or the flue pipe.



Picture 5: detail of the gas valve (seen from above).

Only once it is certain that the value measured falls within the range listed in the calibration table (Table 1), the flow-rate regulator only (see picture 5) can then be used to adjust the pressure at the outlet of the gas valve to bring the pressure to the factory value showing on the label on the back of the valve.

Table 1: Settings (calibration) and capacities of the individual module

	NATURAL GAS	
	kW	24
Nozzle	mm	20 5.5
Pressure at gas valve outlet	mm c.w.	from -30 to -60
Pressure at gas valve inlet	mm c.w.	200-220
Intervention setting of the air pressure switch (Δp)	mm c.w.	30
Blower	type	24
Burner	type	long
Δp during boiler functioning	mm c.w.	110-110
Δp when the boiler is switched off	mm c.w.	110-125

	LPG	
	kW	24
Nozzle	mm	18 3.25
Pressure at gas valve outlet	mm c.w.	from -20 to -40
Pressure at gas valve inlet	mm c.w.	300-320
Intervention setting of the air pressure switch (Δp)	mm c.w.	45
Blower	type	24
Burner	type	long
Δp during boiler functioning	mm c.w.	145-155
Δp when the boiler is switched off	mm c.w.	155-165

3.3 *Measurement of the different pressure values on the air-gas circuit of each module*

In order to immediately identify an eventual obstruction of the air-gas circuit, during the commissioning of the unit and also during its future servicing, it is recommended that the following differences in pressure are measured, by using a differential manometer:

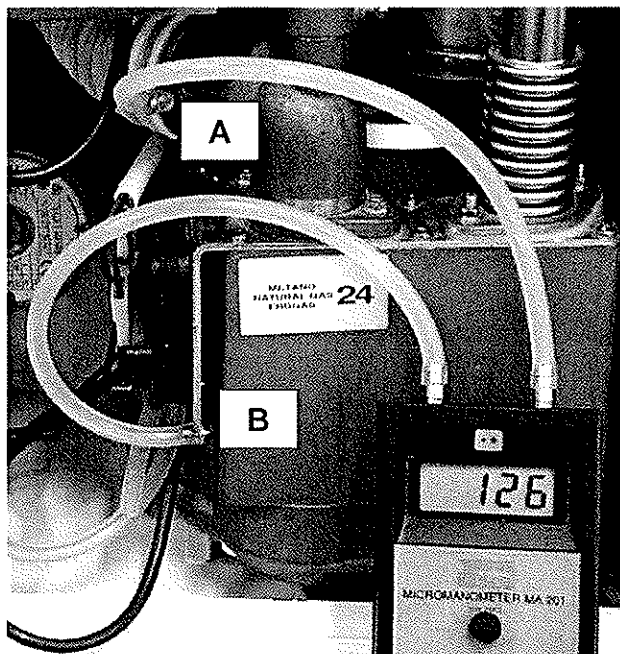
- a) " Δp " values before and after the air nozzle, as shown in picture 6;
- b) Vacuum pressure "- P" at point "B" of the blower, as shown in picture 7.

Example: supposing that during the commissioning of the unit, a vacuum pressure of $-140 \text{ mmH}_2\text{O}$ is measured at point "B"; if at the subsequent measurement the value has increased (e.g. to $-180 \text{ mmH}_2\text{O}$), this means that there is something obstructing the air inlet circuit, and more specifically, before the air nozzle. Therefore, in this case, the following parts have to be checked:

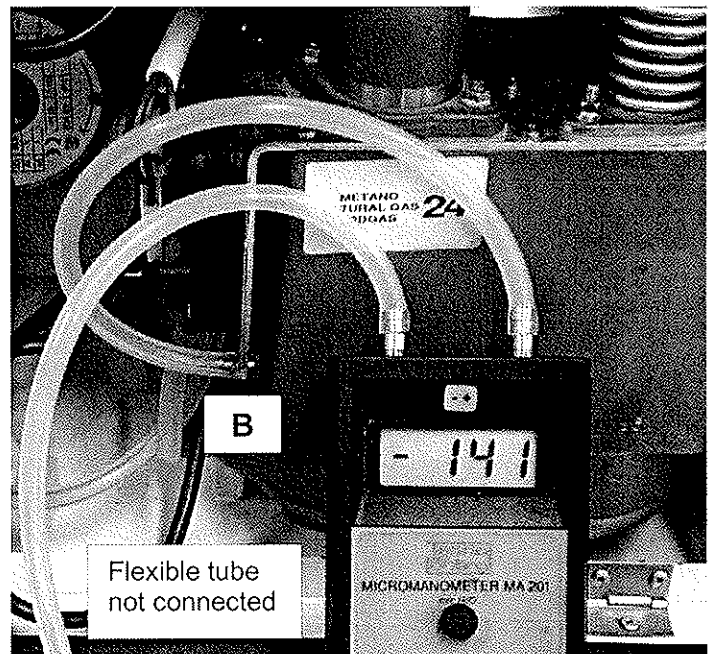
- a) air filter;
- b) air intake pipe above the air filter.

If on the contrary, the following measurement reads a lower value respect to the one measured during the unit's commissioning (e.g. to $-90 \text{ mmH}_2\text{O}$), the obstruction is to be looked for in the flue circuit. Hence, the following parts have to be checked:

- a) noise-deadening sponge lining the blower outlet;
- b) burner;
- c) heat-exchanger;
- d) flue outlet pipe.



Picture 6: example of measurement of the Δp .



Picture 7: example of measurement of the vacuum pressure

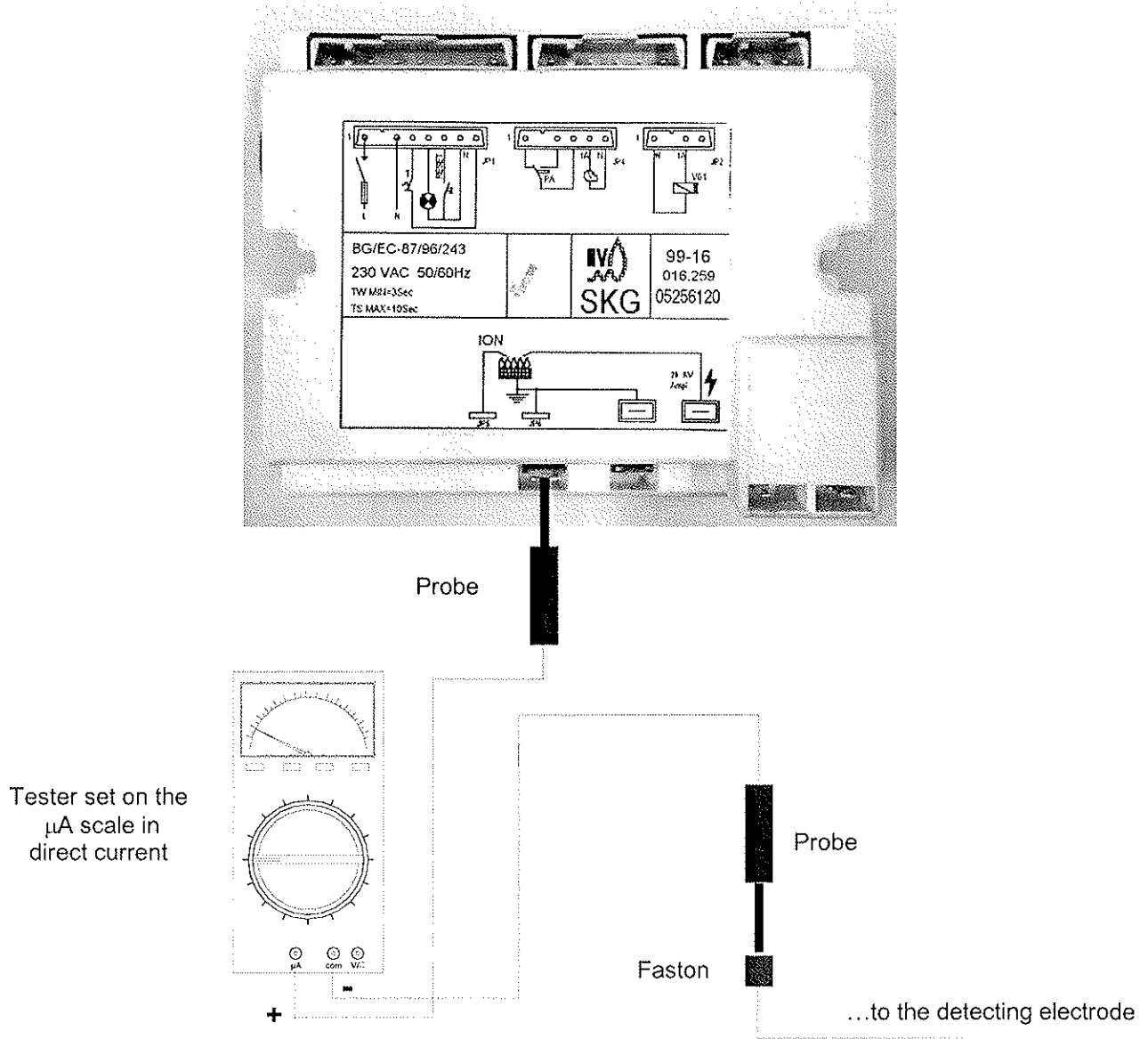
3.4 Measurement of the ionization current

This measurement, combined with the previous ones, provides useful information about the quality of the combustion. To measure the ionization current, coming from the sensor that detects the presence or less of the flame, the following procedure applies:

- a) disconnect the heating group from the electric power supply;
- b) disconnect the connector of the ionization sensor;

- c) insert the probes of the tester in series with the connector, as shown in picture 8;
- d) set the tester on the "μA" scale in direct current;
- e) switch the heating group on.

While the unit is functioning, the value measured must fall between 9 and 12 μA.



Picture 8: measurement of the ionization current

We recommend that the various values measured during commissioning are written down on a label which is then applied onto the side of the blower (for example) so that when the time comes for the next servicing to be done, all the information needed in order to detect and identify any eventual defect is promptly available.

Inlet pressure of the gas valve [mmH ₂ O]:
Outlet pressure of the gas valve [mmH ₂ O]:
ΔP between air inlet and outlet nozzles [mmH ₂ O]:
Vacuum pressure on the pressure measuring point of the blower [mmH ₂ O]:
Ionization current [μA]:

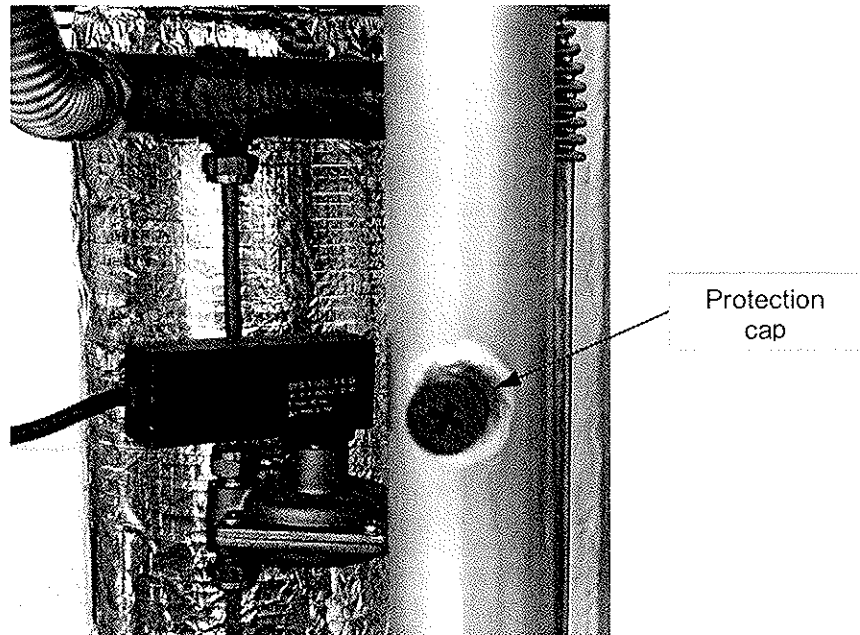
3.5 Checking the concentration of Fernox MB-1 in the heating circuit

While the system is being filled up with water, the Fernox MB-1 liquid (supplied upon request together with the heating group) has to be added to the system in order to protect the unit from the corrosive attacks of the water; this procedure is entrusted to the installer who has to know, with the utmost precision possible, how much water is contained in the system.

The Servicing Centre has, first of all, the duty to check whether the additive is existing in the system water and then to check its concentration level in the heat-conveying fluid, in order to make sure that the concentration is equal to 4% as established by FONTECAL.

3.6 Combustion analysis

The analysis on the composition of the combustion products has to be carried-out on each individual module by inserting the analysing device into the dedicated aperture on the flue pipe which is protected by a red plastic cap as shown in picture 10.



Picture 10: Detail of the pocket designed to allow combustion testing on each individual module.

The resulting values of carbon oxide (CO), carbon dioxide (CO₂) and oxygen (O₂) measured, must fall within the ranges listed in Table 2.

Table 2: reference values for the combustion analysis on each individual module

	NATURAL GAS	
Carbon oxide (CO)	ppm	50 - 80
Carbon dioxide (CO ₂)	%	8,5 - 9,0
Oxygen (O ₂)	%	5,5 - 6,0

	LPG	
Carbon oxide (CO)	ppm	70 - 100
Carbon dioxide (CO ₂)	%	9,0 - 10,0
Oxygen (O ₂)	%	5,5 - 6,3

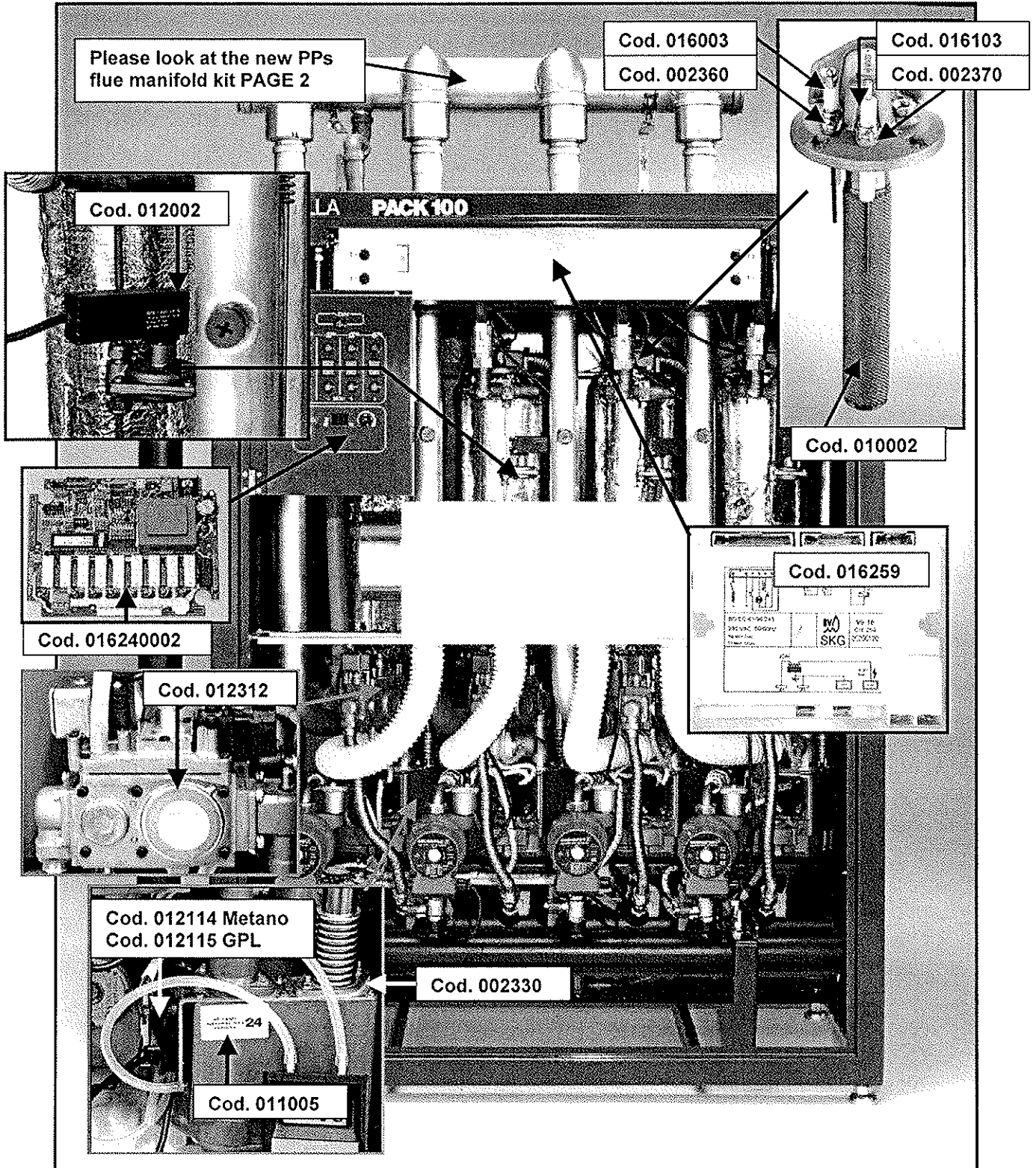
In case one or more values detected during the measurement should result to be out of the ranges indicated in Table 2, the flow-rate regulator situated on the gas valve has to be adjusted (see paragraph 3.2 "Pressure of the gas at the gas valve outlet on each individual module" of the present document) by modifying the value of the pressure at the gas valve outlet (remaining however within the +/- 5 mmH₂O tolerance respect to the value showing on the yellow label), in order to bring the values back within the ranges listed.

FONTECAL S.p.A.

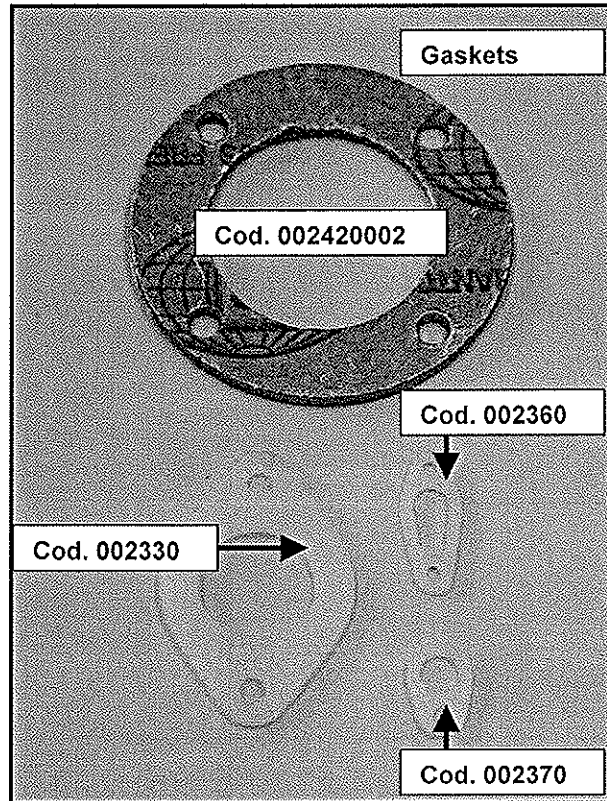
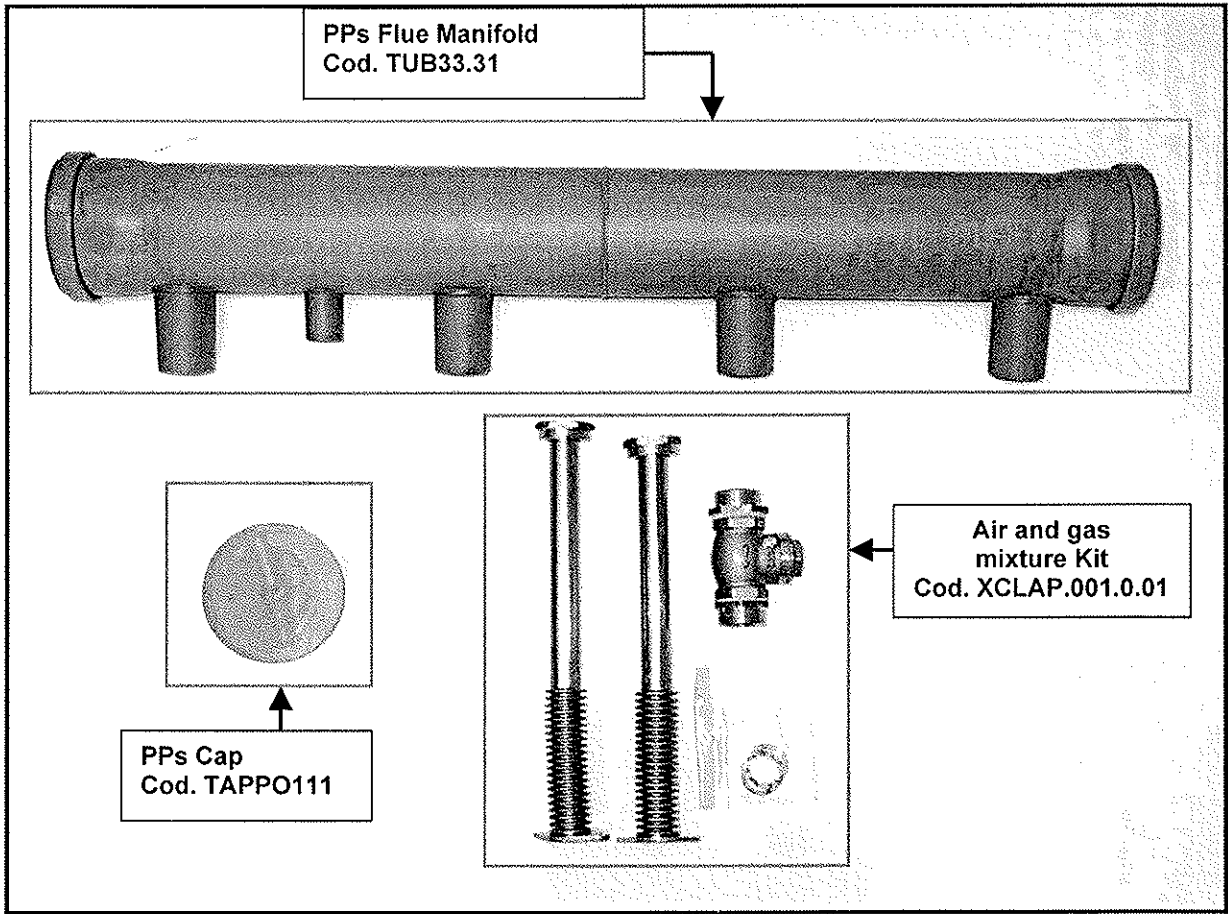
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Date of issue 28/09/1999

MANTAINANCE KIT FOR COROLLA PACK 75-100



New PPs flue manifold kit with non return valves. Please look at page 4 for instructions



SPARE PARTS LIST

FONTECAL CODE	HAMWORTHY CODE	DESCRIPTION
016003	573407152	Spark Elektrode
002360		Basket
016103	573407153	Flame Probe
002370	573407187	Basket
012002	573407035	Diff. Pressare Switch
010002	573407196	Burner Bar
016240.002		Electronic board with display
012114	573407209	Pressure switch 3,0 Mbar
012115	573407210	Pressure switch 4,5 Mbar
002330	573407170	Basket
011005	573407151	Fan assembly
016259		Control Box
012312	573407164	Gas valve sit
BOBINA30	573407183	Gas valve solenoid
BOBINA20	573407184	Gas valve solenoid
012729	573407199	Flue gas temp. Sens,
TUB3331		PPs flue manifold
XCLAP001.0.01		Non return valve
TAPPO111		PPs cap
002420002		Basket burner
016054	573407175	H. T. cap
016153	573407176	Flame Probe Cable
019210	573407208	Filter fan chamber

New flue Manifold with non return valve for old Pack 75-100 kW.

Product :

Condensing Thermal Group :

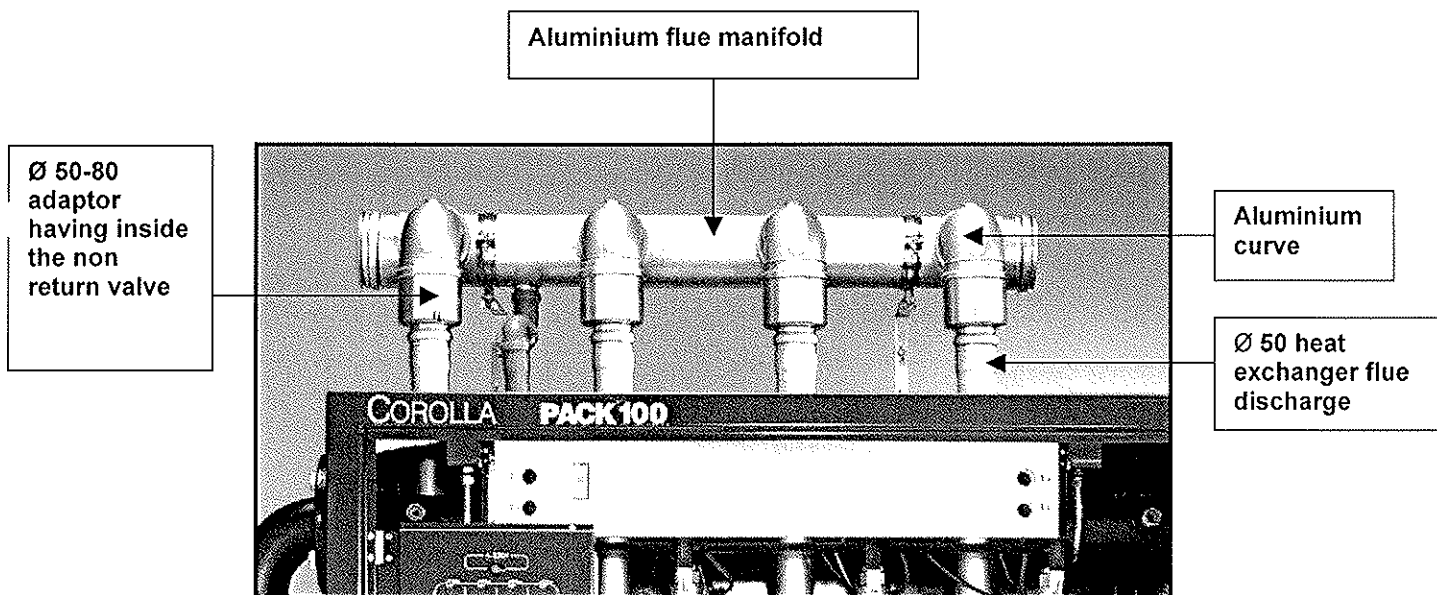
- Pack100
- Pack75

Issues

from 004 to 007

A) Manifold substitution actions

- 1) Remove the old aluminium manifold together with curves and the adaptor (see Picture 1)



Picture1

- 2) Insert the new PPs manifold where the old one was, putting the 3 or 4 \varnothing 50 male hoses into the flue discharge hoses \varnothing 50 of the heat exchangers (see Picture 2);

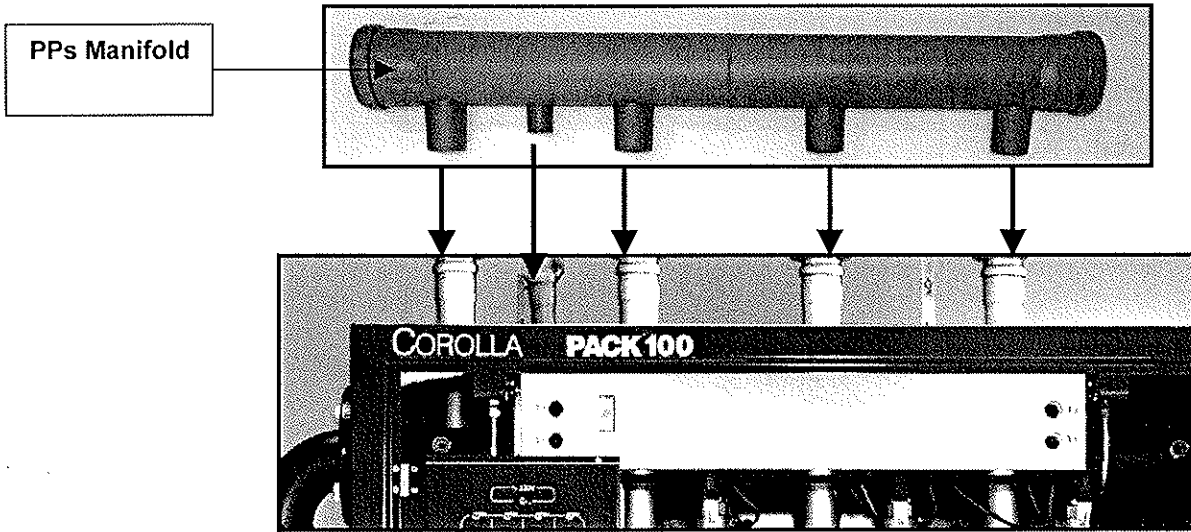
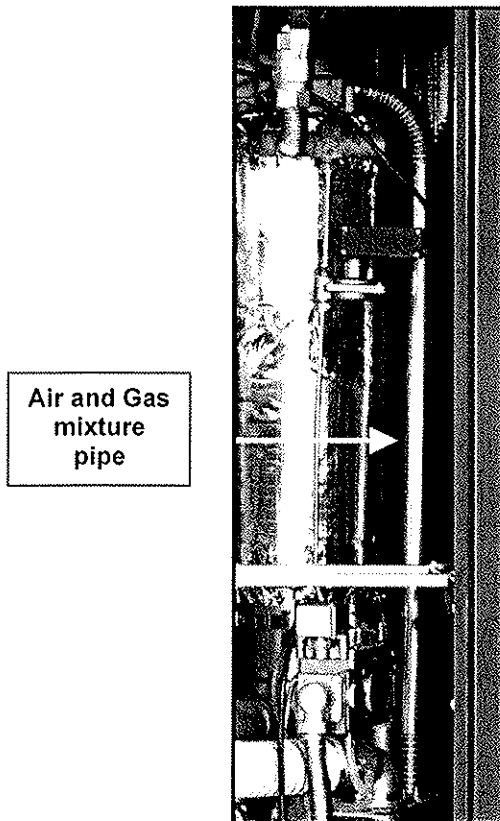
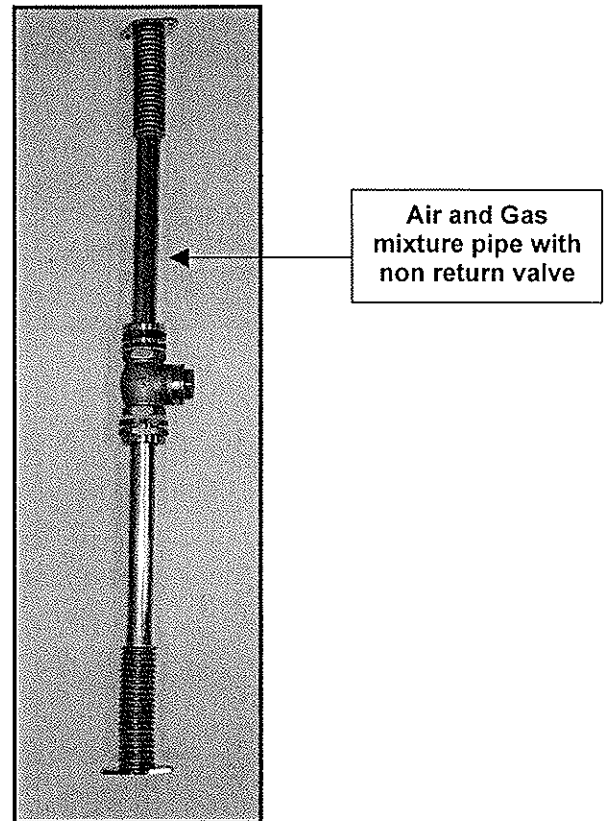


Fig.2

- 3) Remove the 3 or 4 air and gas mixture pipes (see Picture 3) and insert the new air and gas mixture pipes with non return valves (see Picture 4) ;



Picture 3



Picture 4

4) Kit data

The new kit (see Picture 5) is set up as follows:

PPs Flue Manifold cod. TUB33.31;

- a) Air and gas mixture pipe kit cod XCLAP001.0.01 one for each unit (heat exchanger);
- b) PPs cap cod. TAPPO111.

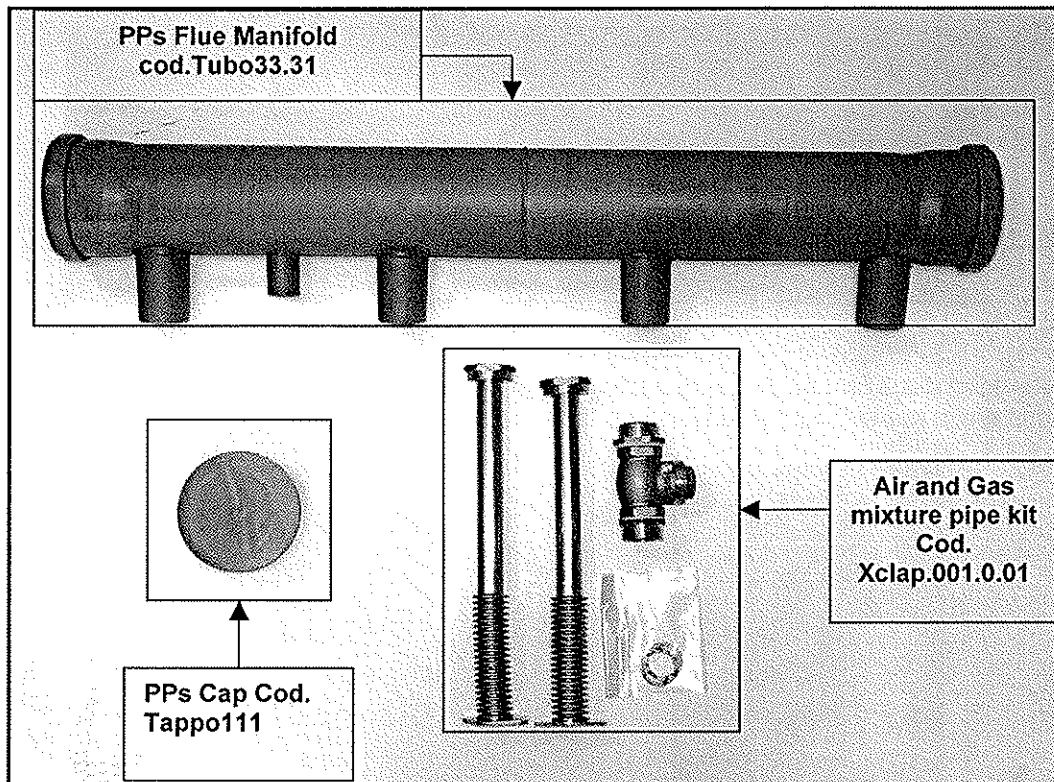


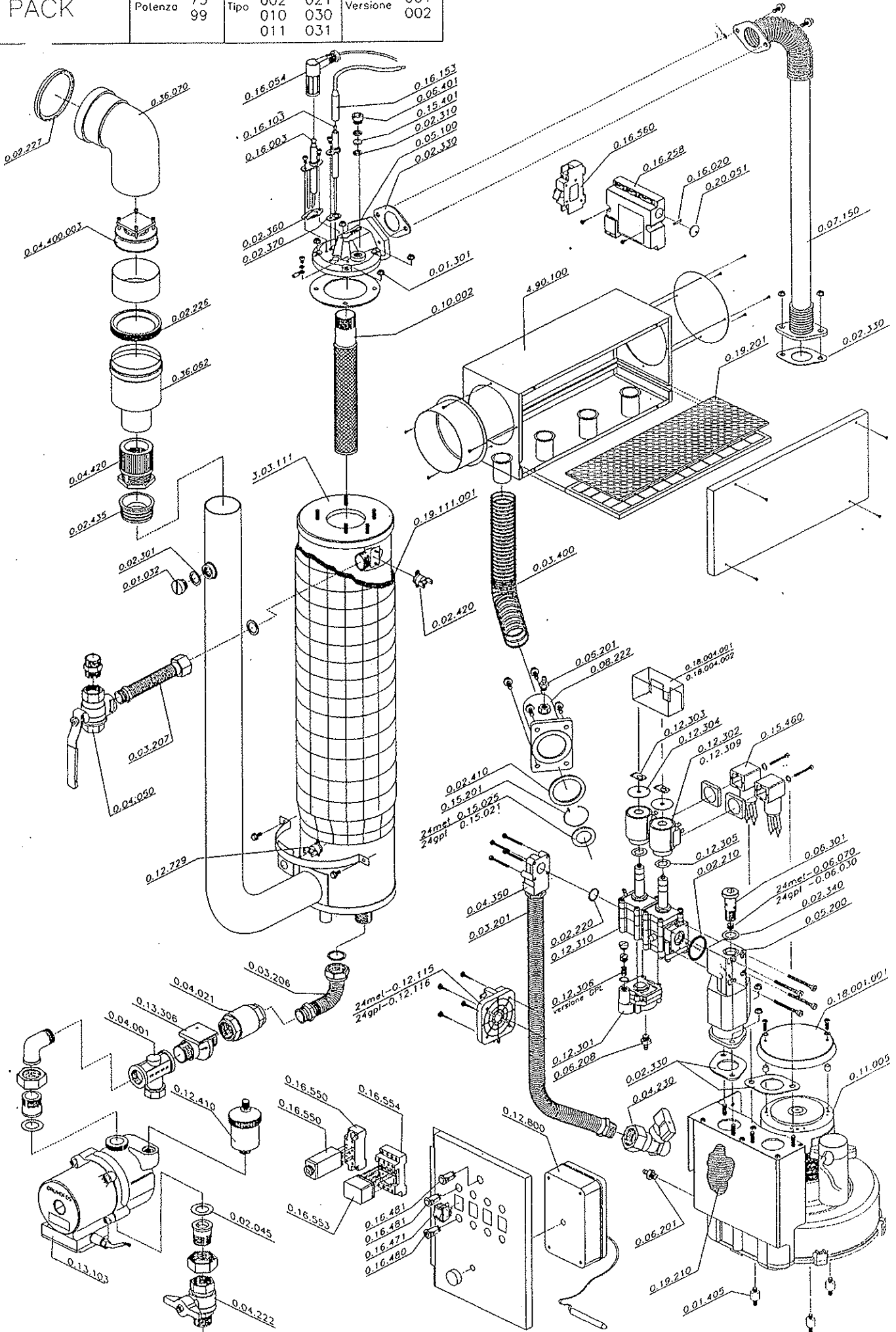
Fig.5

PACK

Potenza 75
99

Tipo 001 020
002 021
010 030
011 031

Versione 001
002



TECHNICAL DATA

COROLLA PACK	75	100
Thermal capacity at the furnace (referred to G.H.V.)	72 kW	96 kW
Minimum thermal capacity available ($T_R = 60\text{ }^\circ\text{C}$)	69,2 kW	92,2 kW
Instantaneous efficiency ($T_R = 35\text{ }^\circ\text{C}$)	106 %	106 %
Instantaneous efficiency ($T_R = 60\text{ }^\circ\text{C}$)	96 %	96 %
BASIC MODULE EFFICIENCIES		
Efficiency at nominal capacity with 70 °C water temperature	96,3%	96,3 %
Efficiency at 30 % reduced load with 50 °C water temperature	97,1%	97,1 %
Combustion efficiency (60 - 80 °C water temperature)	98,5%	98,5 %
Combustion efficiency (30 - 40 °C water temperature)	99,8%	99,8 %
Energy lost through the chimney with burner functioning (60 - 80 °C)	1,5 %	1,5 %
Energy lost through the chimney with burner functioning (30 - 40 °C)	0,2 %	0,2 %
Energy lost through the chimney without burner functioning	0,1 %	0,1 %
Energy lost through the casing (with water at 70 °C)	0,4 %	0,4 %
WATER CONNECTIONS *		
Upper water manifold (flanged) **	2" 1/2 Ø	2" 1/2 Ø
Lower water manifold (flanged) **	2" 1/2 Ø	2" 1/2 Ø
Water content	22,8 l	25,8 l
Maximum pressure of the water in service	3 bar	3 bar
Pressure of water during tests	4,5 bar	4,5 bar
GAS CONNECTIONS		
Gas manifold (flanged)	2" 1/2 Ø	2" 1/2 Ø
Air manifold (socket ended pipe)	150 mm Ø	150 mm Ø
Flue gas manifold (socket ended pipe)	100 mm Ø	100 mm Ø
DIMENSIONS		
Height	1500 mm	1500 mm
Width	1100 mm	1100 mm
Depth	600 mm	600 mm
Weight	170 kg	200 kg
Electric power supply	220V/50Hz	220V/50Hz
Electric power absorbed by the pumps (max.)	0,285 kW	0,380 kW
Electric power absorbed by the blower (max.)	0,465 kW	0,620 kW

T_R : Temperature of the return water

* A kit of connection for the manifolds is available (Recycler)

** Upon request there are also 3" water manifolds and relative kit of connection available

The above listed data may be subject to amendments without any prior advice

Thermal Efficiency Available

Certified by ITALGAS with test reports No. 1365/UTIL and No. 1366/UTIL

- at nominal power = 98 % with an average water temperature of 70 °C
- at reduced load (30 %) = 97 % with an average water temperature of 50 °C

The basic heating module has passed the most severe tests in compliance with the European regulations, obtaining the following certifications:

DVGW n 94.01 cAAF Germany
 ÖVGW n 62.161 Austria
 SVGW n 92.054-4 Switzerland

CE in course of issue.

For the electric parts

VDE No. 46/94

ÖVE No. PA36156

Germany

Austria



