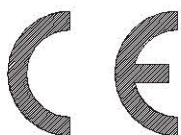
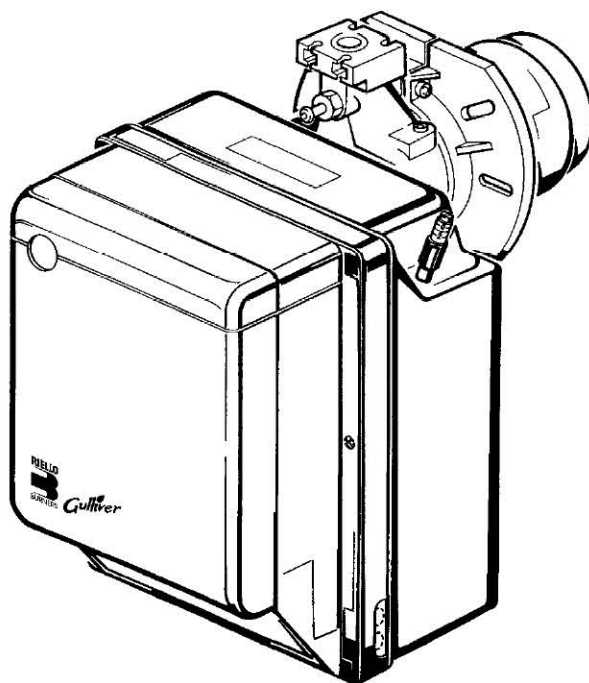


- I** Bruciatori di gas ad aria soffziata
D Gas-Gebläsebrenner
F Brûleurs gaz à air soufflé
GB Forced draught gas burners
GR Πιεστικοί καυστήρες αερίου

Funzionamento bistadio
Zweistufiger Betrieb
Fonctionnement à 2 allures
Two stage operation
Διβάθμια λειτουργία



Gulliver



CODICE - CODE ΚΩΔΙΚΟΣ	MODELLO - MODELL - MODELE MODEL - MONTEΛΟ	TIPO - TYP TYPE - ΤΥΠΟΣ
3761550	BS1D	915 T1
3761650	BS2D	916 T1
3761750	BS3D	917 T1
3761770	BS3D	917 T1
3761850	BS4D	918 T1

Dichiarazione del produttore secondo la normativa 1. BImSchV, 1996

RIELLO S.p.A. dichiara che i seguenti prodotti rispettano i valori limite degli NOx imposti dalla normativa 1. BImSchV, 1996, § 7 (2):

Herstellerbescheinigung gemäß 1. BImSchV, 1996

RIELLO S.p.A. bestätigt, daß folgende Produkte, die von der 1. BImSchV, 1996, § 7 (2) geforderten NOx - Grenzwerte einhalten:

Déclaration du producteur selon la directive 1. BImSchV, 1996

RIELLO S.p.A. déclare que les brûleurs suivants respectent les valeurs limites de NOx imposées par la directive 1. BImSchV, 1996, § 7 (2):

Producer declaration according to 1. BImSchV, 1996

RIELLO S.p.A. declares, that the following products comply with the NOx limit values indicated in the 1. BImSchV. 1996 § 7 (2) standard:

Δήλωση κατασκευαστή βάσει του κανονισμού 1.BImSchV, 1996

RIELLO S.p.A. δηλώνει ότι τα ακόλουθα προϊόντα ανταποκρίνονται στα όρια των NOx που επιβάλλονται από τον κανονισμό 1.BImSchV, 1996, παρ. 7(2):

Prodotto - Produktreihe Produit - Product - Προϊόν	Tipo - Typ Type - Τύπος	Modello - Ausführung Modèle - Model - Μοντέλο
Bruciatori di gas ad aria soffiata	915 T1	BS1D
Gas-Gebläsebrenner	916 T1	BS2D
Brûleurs gaz à air soufflé	917 T1	BS3D
Forced draught gas burners	918 T1	BS4D
Καυστήρες αερίου με φυσητήρα		

RIELLO S.p.A.



INDEX

1. BURNER DESCRIPTION	1	3.4 Gas feeding line	5
1.1 Burner equipment	1	3.5 Electrical wiring	6
2. TECHNICAL DATA	2	4. WORKING	7
2.1 Technical data	2	4.1 Combustion adjustment.....	7
2.2 Overall dimensions.....	2	4.2 Combustion check.....	8
2.3 Working fields	3	4.3 Burner start-up cycle.....	9
3. INSTALLATION	4	4.4 Air pressure switch	9
3.1 Boiler fixing	4	5. MAINTENANCE	9
3.2 Probe-electrode positioning	5	6. FAULTS / SOLUTIONS	10
3.3 Gas feeding	5		

1. BURNER DESCRIPTION

Two stage gas burner.

- 1 – Pressure switch
- 2 – 6 pole socket for gas train
- 3 – Control box with 7 pole socket
- 4 – Reset button with lock-out lamp
- 5 – Head holder assembly
- 6 – Pressure test point
- 7 – Flange with insulating gasket
- 8 – Air damper adjustment assembly
- 9 – Air damper opener motor
- 10 – 4 pole socket for 2nd stage burner

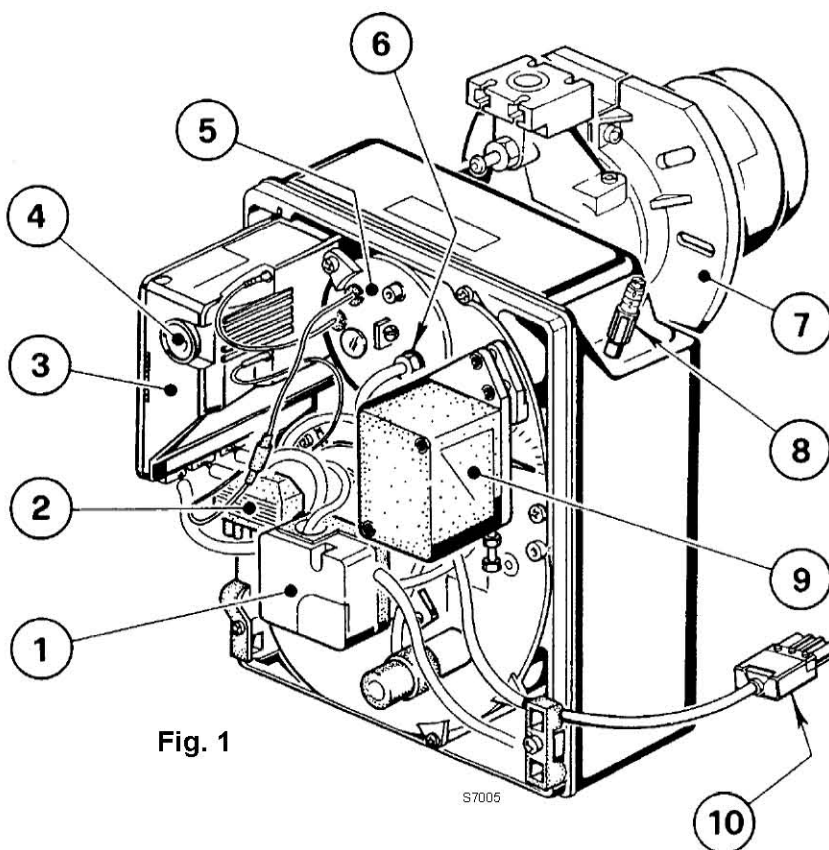


Fig. 1

- BUWAL approval No.: 100010.
- **Note for Switzerland.**
Swiss provisions, local and cantonal provisions, the provisions of the SVGW authorities for the use of gas, as well as those of the Fire Brigade (VKF), must all be complied with.
- The burner meets protection level of IP 40, EN 60529.
- CE marking according to Gas Appliance directive 90/396/EEC; PIN 0085AQ0409.
According to directives: EMC 89/336/EEC, Low Voltage 73/23/EEC, Machines 98/37/EEC and Efficiency 92/42/EEC.
- Gas train according to EN 676.

1.1 BURNER EQUIPMENT

Flange with insulating gasket	N° 1	Screws and nuts for flange to be fixed to boiler. . .	N° 4
Screw and nut for flange	N° 1	7 pin plug	N° 1
4 pin plug	N° 1	Capacitor	N° 1

2. TECHNICAL DATA

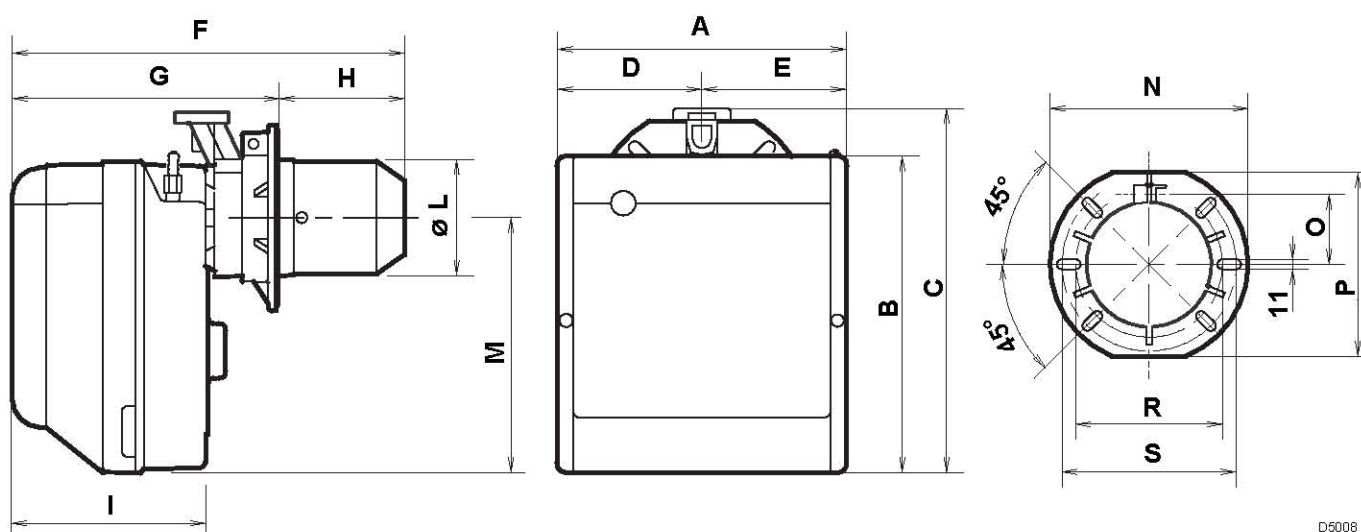
2.1 TECHNICAL DATA

TYPE		915 T1	916 T1	917 T1	918 T1
Thermal power (1) as EN 267	kW	16/19 – 52	35/40 – 91	65/75 – 189	110/140 – 246
	Mcal/h	13.8/16.3 – 44.7	30.1/34.4 – 78.2	55.9/64.5 – 162.5	94.6/120.4 – 211.6
Thermal power (1) as LRV 92	kW	22/29 – 49	40/47 – 88	65/80 – 180	113/148 – 250
	Mcal/h	18.9/24.9 – 42.1	34.4/40.4 – 75.7	55.9/68.8 – 154.8	97.2/127.3 – 215
Natural gas (Family 2)		Net heat value: 8 – 12 kWh/Nm ³ = 7000 – 10,340 kcal/Nm ³			
		Pressure: min. 20 mbar – max. 100 mbar			
Electrical supply		Single phase, 230V ± 10% ~ 50Hz			
Motor	Run current 0.64A	Run current 0.67A	Run current 1.4A	Run current 2A	
	2750 rpm – 289 rad/s				
Capacitor	4 µF	4 µF	6.3 µF	8 µF	
Ignition transformer	Primary 230V / 0.2A – Secondary 8 kV / 12 mA				
Absorbed electrical power	0.15 kW	0.18 kW	0.35 kW	0.53 kW	
(1) Reference conditions: Temp. 20°C - Barometric pressure 1013 mbar – Altitude 0 m above sea level.					

For gas family 3 (LPG) ask for separate kit.

COUNTRY			IT - AT - DK	CH	GB	DE	FR	NL	BE	IE
GAS CATEGORY			I12H3B/P	I2H	I12H3P	I12ELL3B/P	I12Er3P	I12L3B/P	I2E(R)B, I3P	I12H3P
GAS PRESSURE	G20	H	20	20	20	–	–	–	–	20
	G25	L	–	–	–	20	–	25	–	–
	G20	E	–	–	–	20	20/25	–	20/25	–

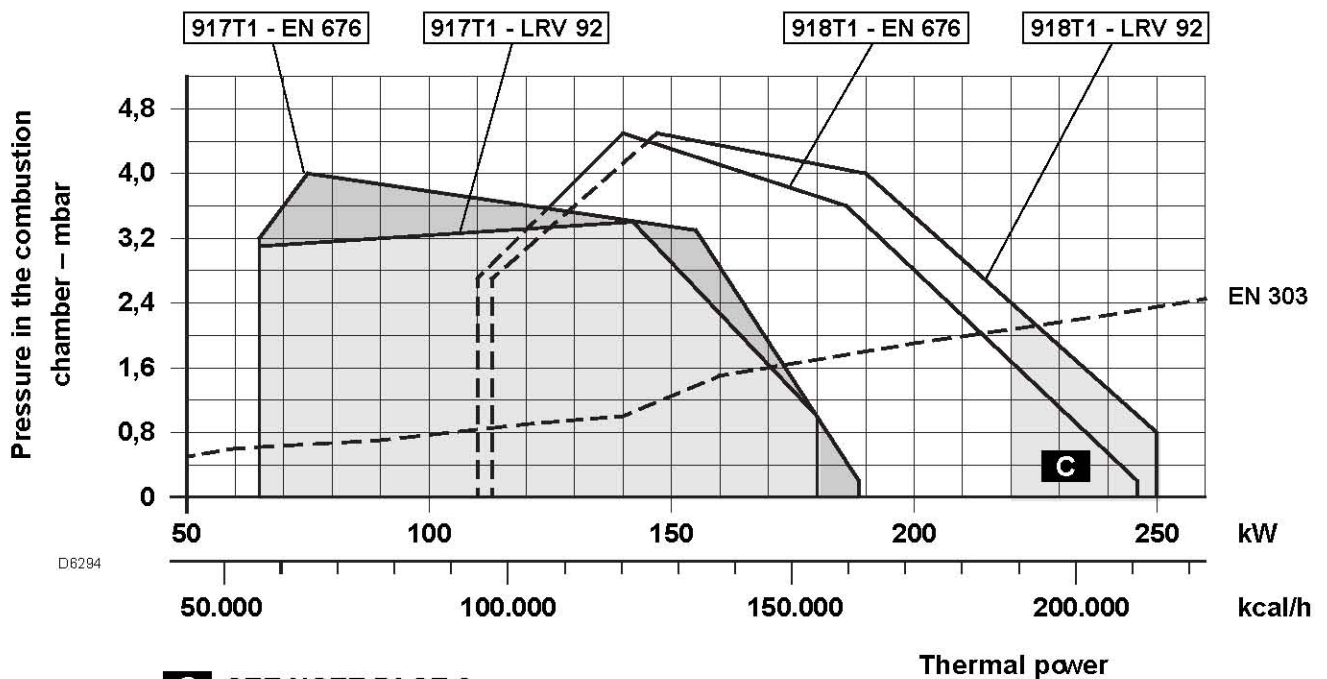
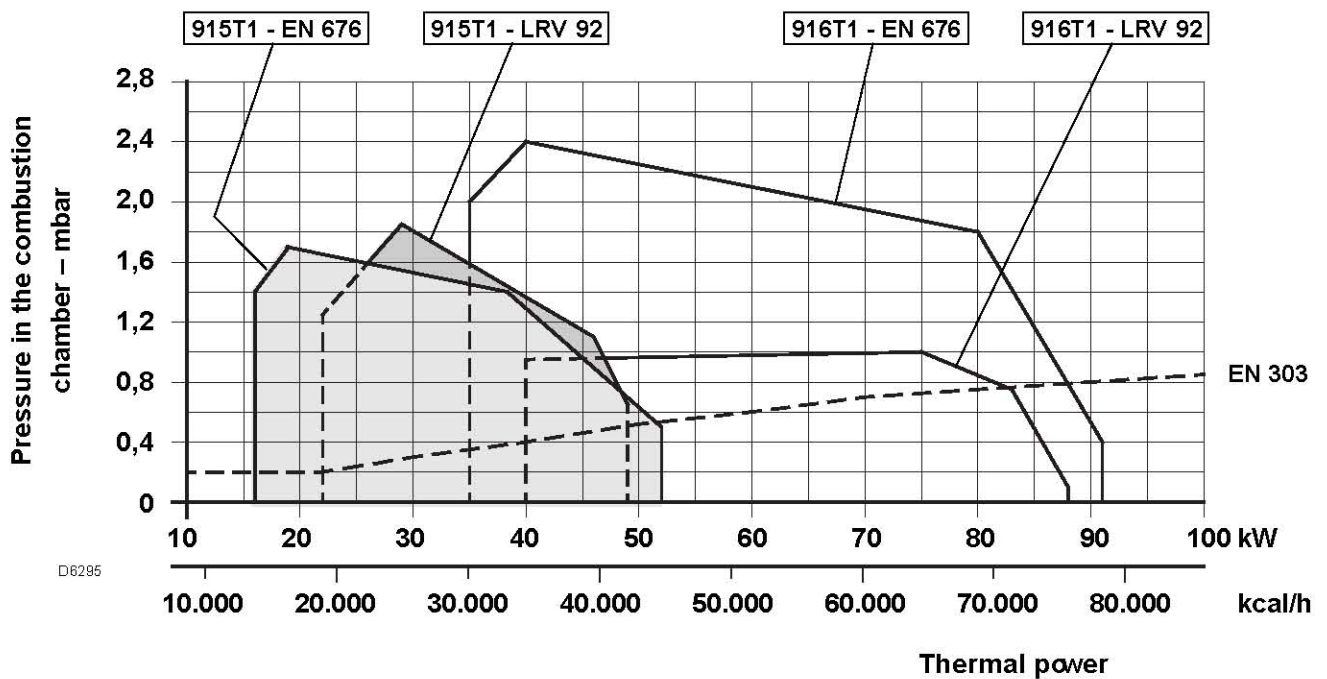
2.2 OVERALL DIMENSIONS



D5008

TYPE	CODE	A	B	C	D	E	F	G	H	I	L	M	N	O	P	R	S
915T1	3761550	234	254	295	122.0	112.0	346	230 – 276	116 – 70	174	89	210	192	66	167	140	170
916T1	3761650	255	280	325	125.5	125.5	352	238 – 252	114 – 100	174	106	230	192	66	167	140	170
917T1	3761750	300	345	391	150.0	150.0	390	262 – 280	128 – 110	196	129	285	216	76.5	201	160	190
917T1	3761770	300	345	391	150.0	150.0	447	262 – 277	185 – 170	196	129	285	216	76.5	201	160	190
918T1	3761850	300	345	392	150.0	150.0	446	278 – 301	168 – 145	216	137	286	218	80.5	203	170	200

2.3 WORKING FIELDS



C SEE NOTE PAGE 8

TEST BOILER

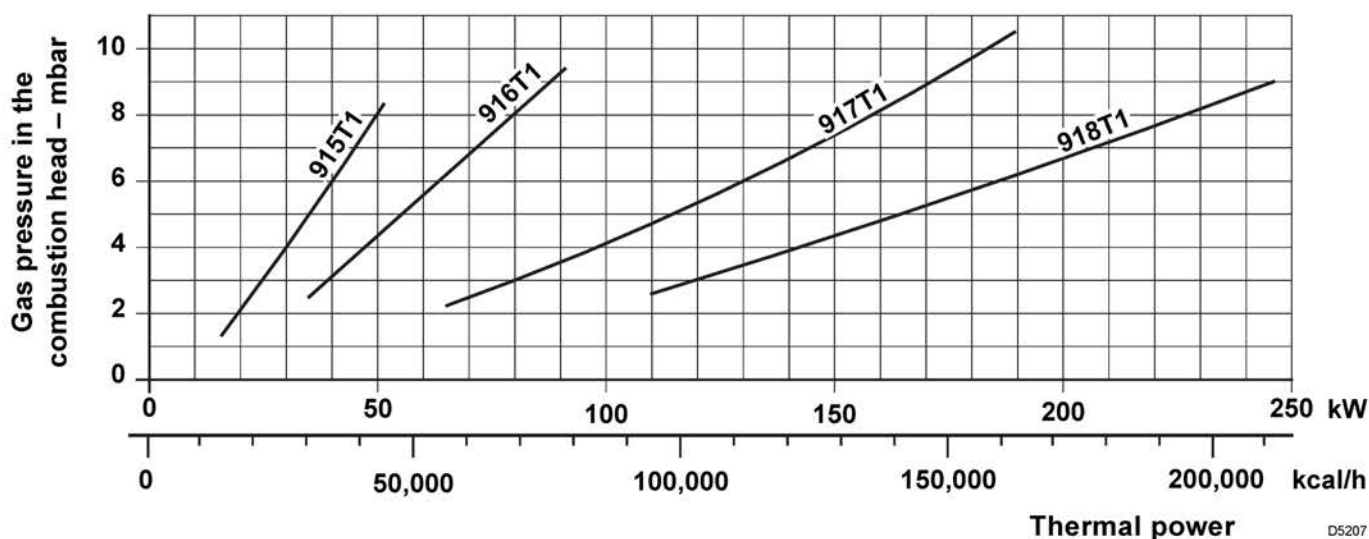
The working field has been defined according to EN 676 and LRV92 standards.

COMMERCIAL BOILERS

The burner-boiler matching is assured if the boiler is according to EN 303 and the combustion chamber dimensions are similar to those shown in the diagram EN 676. For applications where the boiler is not according to EN 303, or where the combustion chamber dimensions differ from those shown in EN 676, please consult the manufacturers.

CORRELATION BETWEEN GAS PRESSURE AND BURNER OUTPUT

To obtain the maximum output, a gas head pressure of 9.3 mbar, relatively to 916T1 model, is measured (M2, see chapter 3.4, page 5) with the combustion chamber at 0 mbar using gas G20 with a net heat value of 10 kWh/Nm³ (8.570 kcal/Nm³).

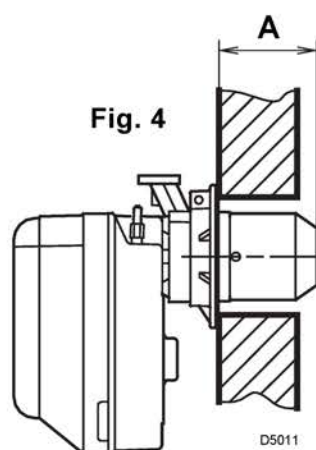
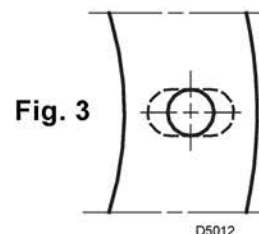
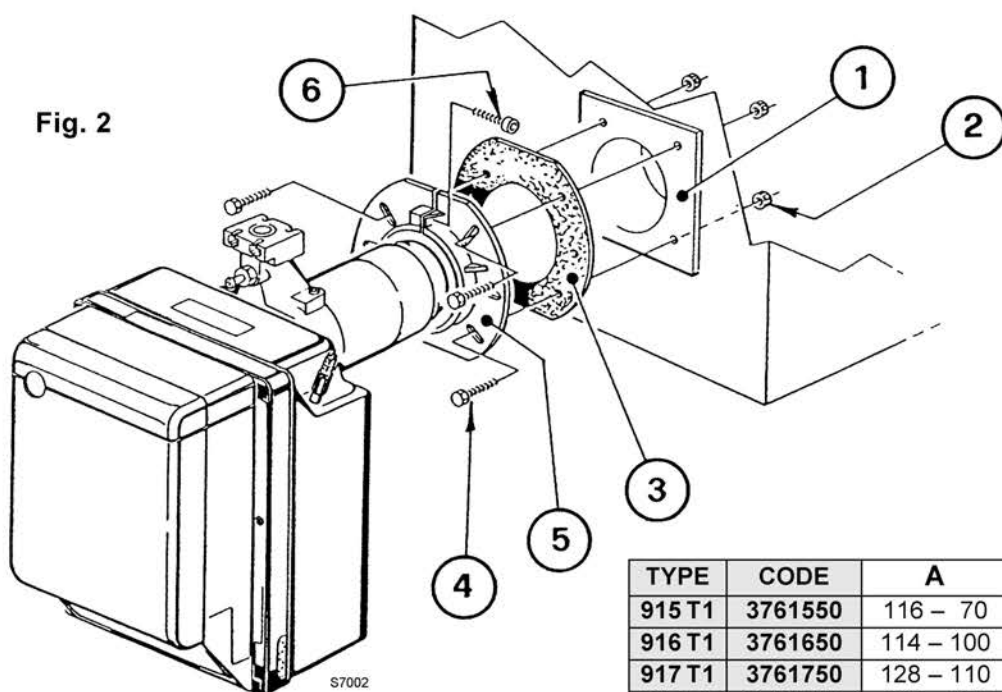


3. INSTALLATION

3.1 BOILER FIXING

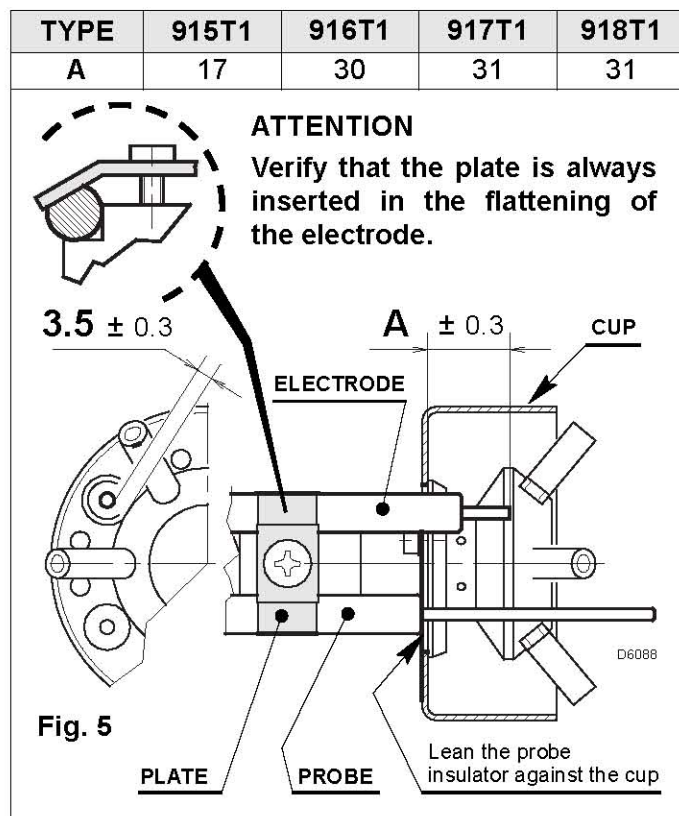
- ♦ Widen, if necessary, the insulating gasket holes (3) (see fig. 3).
- ♦ Fix the flange (5) to the boiler door (1) using four screws (4) and (if necessary) the nuts (2) **interposing the insulating gasket (3)** but keep unloosening one of the two upper screws (4) (see fig. 2).
- ♦ Put on the flange pos. 5 the burner combustion head, tighten the flange with the screws pos. 6 and lock the loose screw pos. 4.

N.B.: The burner can be fixed with the variable dimension (A) (see fig. 4). Anyway, make sure that the combustion head crosses completely the boiler door thickness.



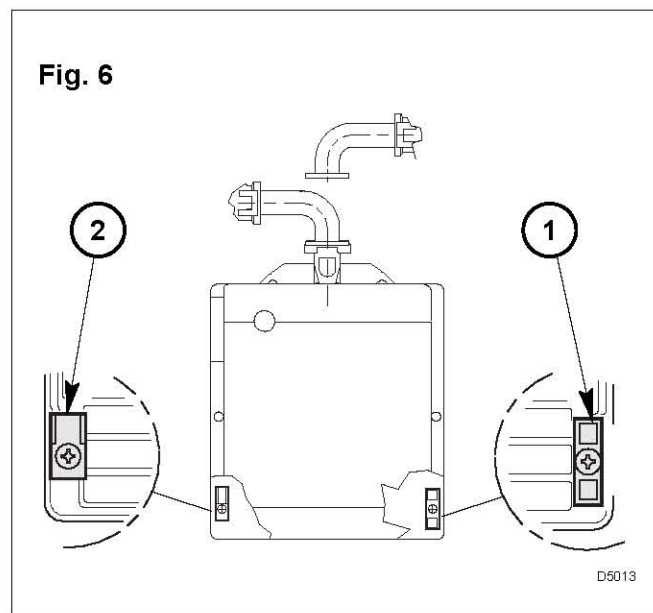
TYPE	CODE	A
915 T1	3761550	116 – 70
916 T1	3761650	114 – 100
917 T1	3761750	128 – 110
917 T1	3761770	185 – 170
918 T1	3761850	167,5 – 145

3.2 PROBE - ELECTRODE POSITIONING

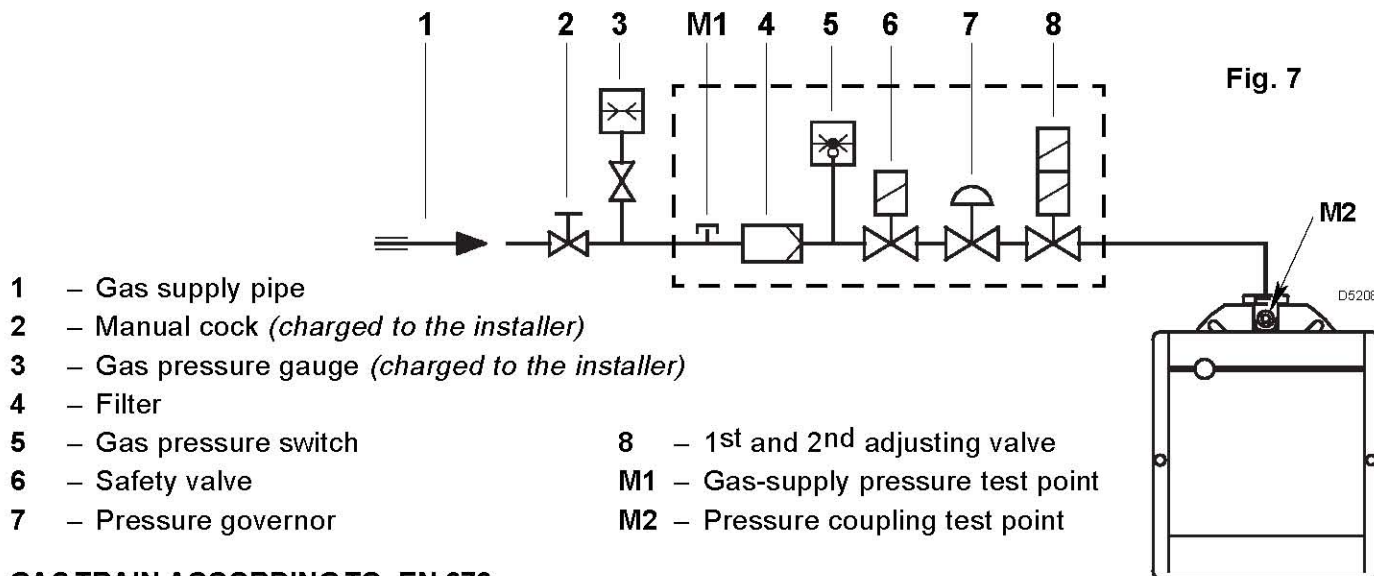


3.3 GAS FEEDING

According to the gas-train cables position on the right or left side of the burner, reverse the 2 cable wrenches (1) and (2) (see fig. 6).



3.4 GAS FEEDING LINE



GAS TRAIN ACCORDING TO EN 676

GAS TRAIN		MATCHED BURNER	CONNECTIONS		USE
TYPE	CODE		INLET	OUTLET	
MBZRDLE 405 B01	3970539	BS1D	Rp 1/2	Flange 1	Natural gas and LPG
MBZRDLE 405 B01	3970540	BS2D	Rp 3/4	Flange 2	Natural gas and LPG
MBZRDLE 407 B01	3970538	BS2D	Rp 3/4	Flange 2	Natural gas and LPG
MBZRDLE 407 B01	3970541	BS3D - BS4D	Rp 3/4	Flange 3	Natural gas ≤ 150kW and LPG
MBZRDLE 410 B01	3970542	BS3D - BS4D	Rp 1 1/4	Flange 3	Natural gas and LPG
MBZRDLE 412 B01	3970543	BS3D - BS4D	Rp 1 1/4	Flange 3	Natural gas

The gas train is supplied separately, for its adjustment see the enclosed instructions.

3.5 ELECTRICAL WIRING

230V ~ 50Hz

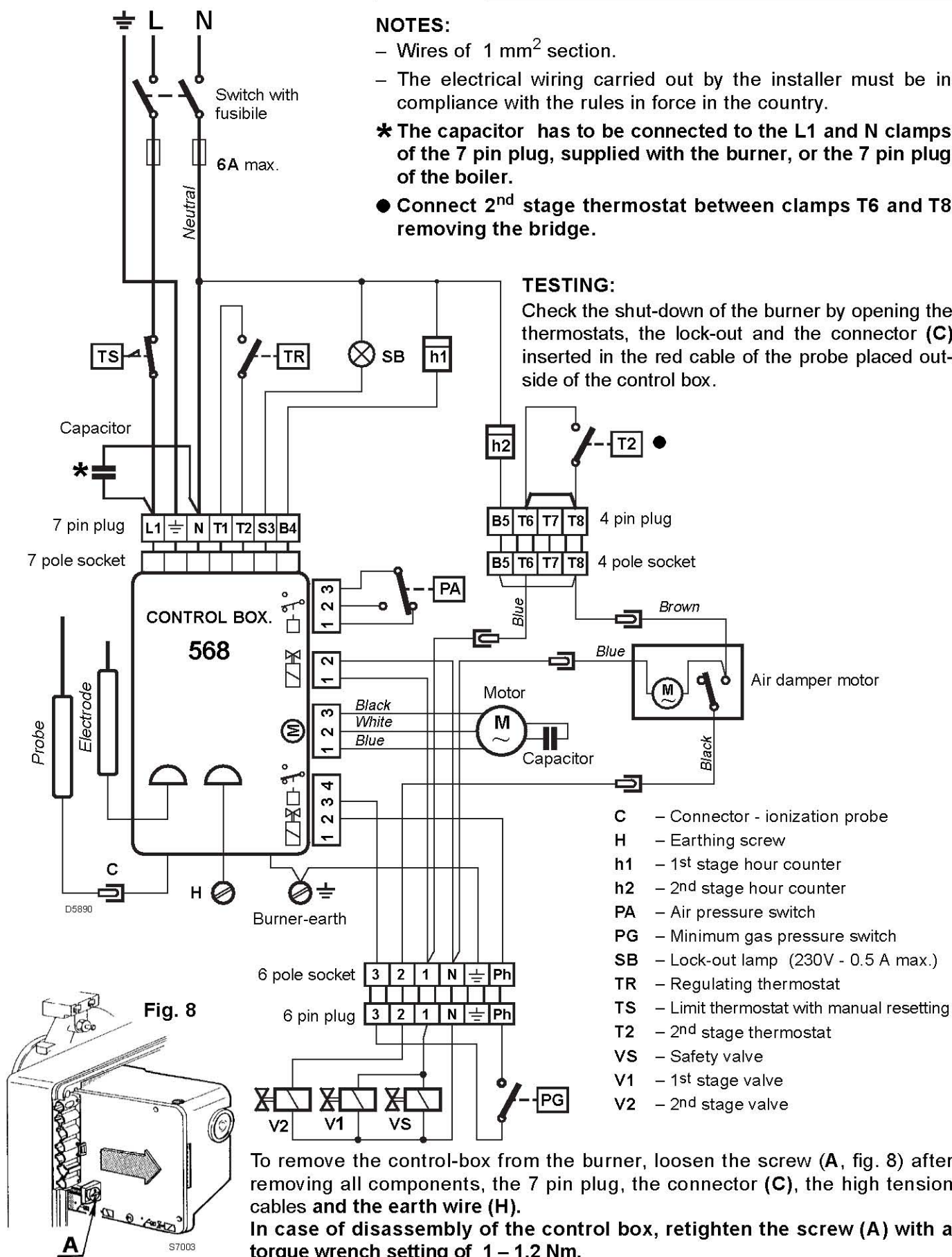
WARNING DO NOT EXCHANGE NEUTRAL WITH PHASE

NOTES:

- Wires of 1 mm² section.
- The electrical wiring carried out by the installer must be in compliance with the rules in force in the country.
- * The capacitor has to be connected to the L1 and N clamps of the 7 pin plug, supplied with the burner, or the 7 pin plug of the boiler.
- Connect 2nd stage thermostat between clamps T6 and T8 removing the bridge.

TESTING:

Check the shut-down of the burner by opening the thermostats, the lock-out and the connector (C) inserted in the red cable of the probe placed outside of the control box.



4. WORKING

4.1 COMBUSTION ADJUSTMENT

In conformity with Efficiency Directive 92/42/EEC the application of the burner on the boiler, adjustment and testing must be carried out observing the instruction manual of the boiler, including verification of the CO and CO₂ concentration in the flue gases, their temperatures and the average temperature of the water in the boiler.

To suit the required appliance output, choose the proper setting of the combustion head, and the air damper opening.

COMBUSTION HEAD SETTING

It depends on the output of the burner and is carried out by rotating clockwise or counter-clockwise the setting screw (6) until the set-point marked on the regulating rod (2) is level with the outside plane of the head assembly (1) (see fig. 9).

NOTE

The diagram is orientative; to assure a good working of the burner, we suggest to adjust the combustion head according to the boiler.

HEAD ASSEMBLY REMOVING

To remove the head assembly, carry out the following operations:

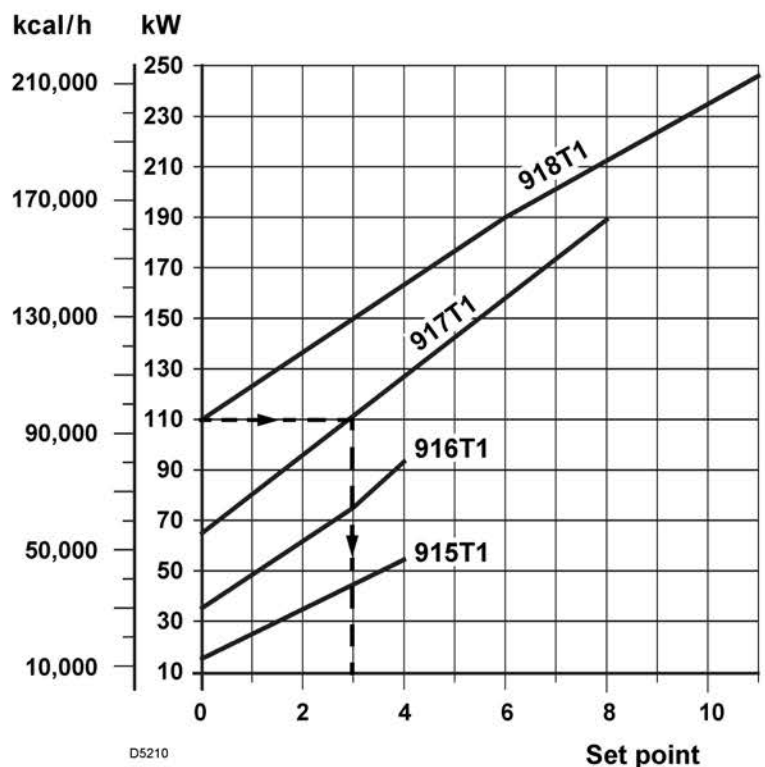
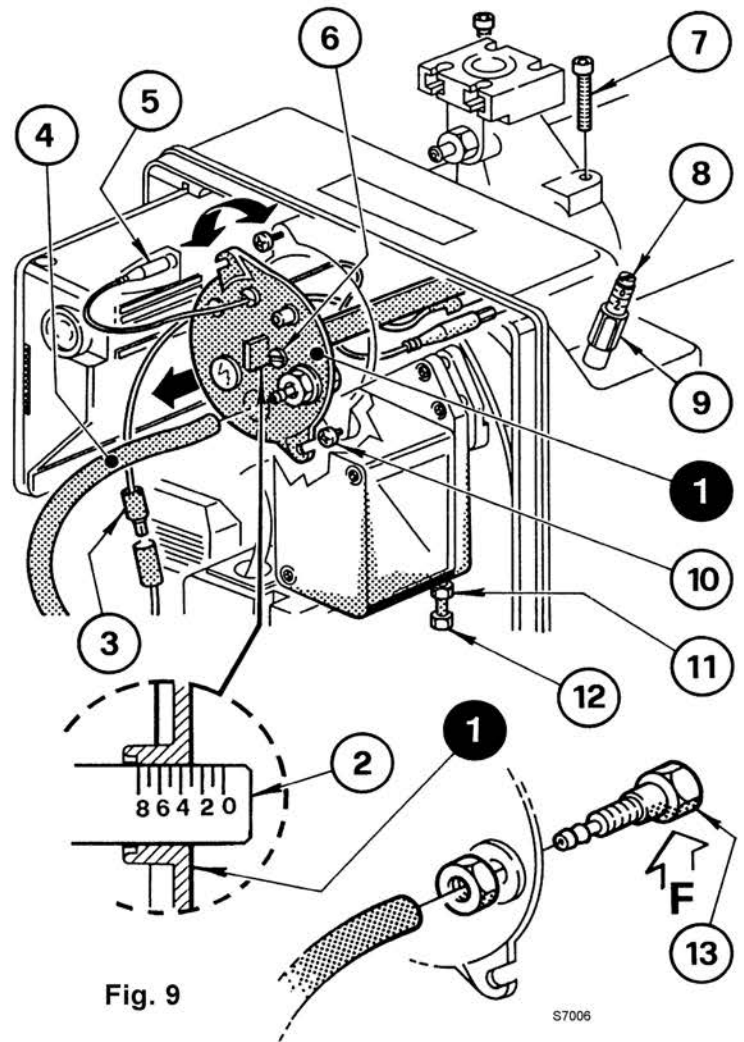
Remove the head-older assembly (1), after taking away the screws (7), disconnect the connections (3 and 5), extract the small tube (4) and loose the screws (10).

Do not modify the setting position of the bracket-elbow during the disassembly.

REASSEMBLY OF THE HEAD SYSTEM

WARNING

- During the reassembly of the system, tighten the screws (7) completely (*without locking them*); then lock them with a torque wrench setting of 3 - 4 Nm.
- Control that, during the working, there are not gas losses coming from the screws.
- If casually the pressure test point (13) loosens, fix correctly and be sure that the hole (F), placed in the external side of the head-assembly (1) turns towards the lower part.



In the sketch at page 7, fig. 9 the combustion head is set for an output of 110 kW, with reference to the BS3D burner type 917T1. The set point 3 marked of the regulating rod is at the same level with the outside plane of the head-assembly as indicated in the diagram.

Example:

The BS3D burner type 917T1 is installed in a 100 kW boiler.
The burner will have to deliver about 110 kW, considering an efficiency of 90%.
The diagram indicates, that for this efficiency the adjustment has to be effected on the set-point 3.

AIR DAMPER ADJUSTMENT (Fig. 9, page 7)

- a) Take the burner at the 2nd stage. The air damper, due to the fan thrust, opens totally and assures the maximum air capacity.
- b) Adjust the 2nd stage air burner acting on the screw (8) after loosening the nut (9). The burner leaves the factory with the 2nd stage air adjustment on the set point 3.
- c) Take the 1st stage burner acting on the screw (12) after loosening (clockwise) the nut (11).
Once you reach the optimum adjustment, lock the nut (11) (counterclockwise). The burner leaves the factory with a 1st stage adjustment on the set point 1.
During the burner shut down, the air damper, due to its weight, closes automatically, until a new max. depression of 0.5 mbar at the chimney.

NOTE:
DO NOT CARRY OUT THE FIRST IGNITION WITH THE AIR DAMPER LOWER THAN SET POINT 1.

C In the BS4D model type 918T1, in order to guarantee the working with an output of 220 - 250 kW, remove the blank deadening to free the supplementary slits of the air inlet on the cover (see fig. 10).

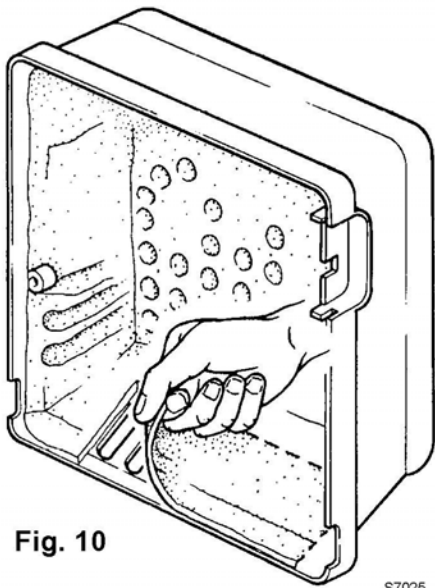


Fig. 10

S7025

ATTENTION

- For the output adjustment of the 1st and 2nd stage, respect the following indications:
- The output ratio between 1st and 2nd stage has to be at least 1 : 2.
 - In any case the minimum burner output, in the 1st stage, has not to be lower than the value indicated in the working field.

4.2 COMBUSTION CHECK

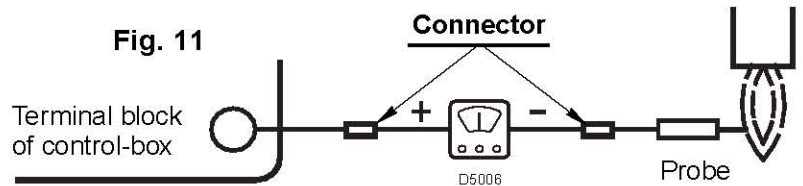
It is advisable to set the burner according to the type of gas used and following the indications of the table:

EN 676		AIR EXCESS: max. output $\lambda \leq 1.2$ – min. output $\lambda \leq 1.3$			
GAS	Theoretical max. CO ₂ 0 % O ₂	Setting CO ₂ %		CO mg/kWh	NO _x mg/kWh
		$\lambda = 1.2$	$\lambda = 1.3$		
G 20	11.7	9.7	9.0	≤ 100	≤ 170
G 25	11.5	9.5	8.8	≤ 100	≤ 170
G 30	14.0	11.6	10.7	≤ 100	≤ 230
G 31	13.7	11.4	10.5	≤ 100	≤ 230

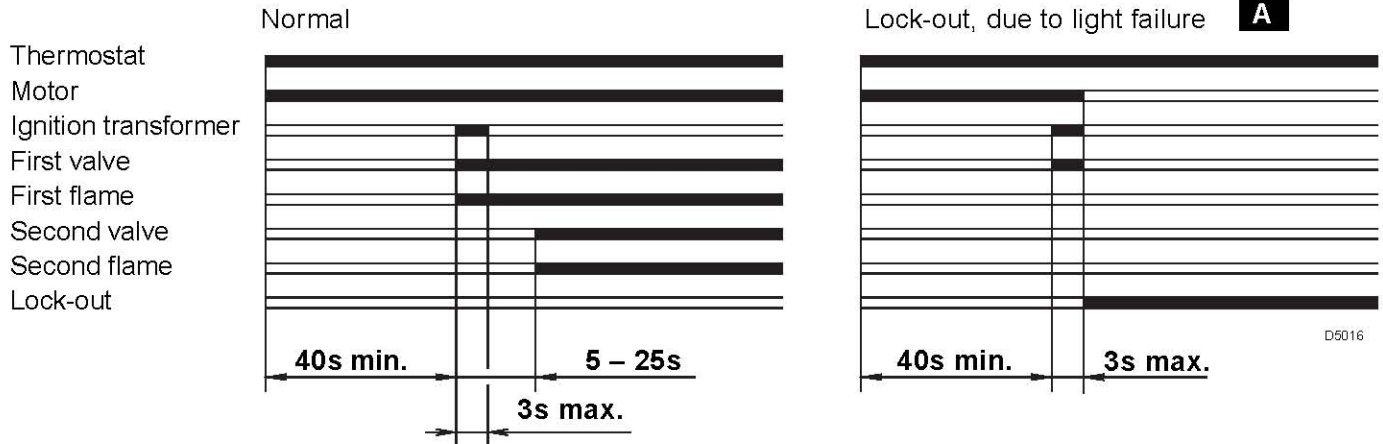
IONIZATION CURRENT

The minimum current necessary for the control box operation is 5 μA .
The burner normally supplies a higher current value, so that no check is needed.

Anyway, if you want to measure the ionization current, you have to open the connector (C) (see electrical scheme page 6) fitted on the wire and insert a microammeter. (See fig. 11).



4.3 BURNER START-UP CYCLE



A Lock-out is indicated by a lamp on the control box (4, fig. 1, page 1).

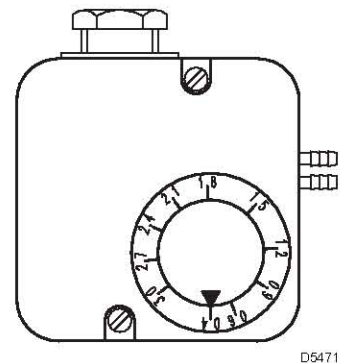
When the flame-failure occurs during working, shut down takes place within one second.

4.4 AIR PRESSURE SWITCH

The air pressure switch is set after all other adjustments have been made.
Begin with the switch at the lowest setting.

With the burner working at the required output, adjust the dial clockwise, increasing its value until the burner shuts down. Now reduce the value by one set point, turning the dial anti-clockwise.

Check for reliable burner operation, if the burner shuts down, reduce the value by a half set point.



ATTENTION:

To comply with the standard, the air pressure switch must operate when the CO value exceeds 1% (10,000 ppm). To check this, insert a combustion analyser in the flue, slowly reduce the burner air setting and verify that the burner shuts down by the action of the air pressure switch before the CO value exceeds 1%.

5. MAINTENANCE

Burner requires a periodic maintenance, which is essential for the reliability of the burner, avoiding the excessive consumption of fuel and consequent pollution.

THE BASIC CHECKS ARE:

Leave the burner working without interruptions for 10 min. and checking the right 1st and 2nd stage settings of all the components stated in this manual. **Then carry out a combustion check verifying:**

- Content of CO₂(%)
- Content of CO (ppm)
- Smoke temperature at the chimney.

6. FAULTS / SOLUTIONS

Here below you can find some causes and the possible solutions for some problems that could cause a failure to start or a bad working of the burner.

A fault usually makes the lock-out lamp light which is situated inside the reset button of the control box (pos. 4, fig. 1, page 1).

When lock out lamp lights the burner will attempt to light only after pushing the reset button. After this if the burner functions correctly, the lock-out can be attributed to a temporary fault.

If however the lock out continues the cause must be determined and the solution found.

BURNER STARTING DIFFICULTIES

FAULTS	POSSIBLE CAUSES	SOLUTION
The burner will not start when the adjustment thermostat closes.	Lack of electrical supply.	Check presence of voltage in the L1 - N clamps of the 7 pin plug.
		Check the condition of the fuses.
		Check that thermostat of max. is not lock out.
	Lack of gas.	Check the manual cock opening.
		Check that the valves change over to the opening position and there are not short circuits.
	The gas pressure switch does not close its contact.	Adjust them.
	The connections in the control box are wrongly inserted.	Check and connect all the plugs.
The burner runs normally in the prepurge and ignition cycle and locks out after about 3 seconds.	The air pressure switch is changed over to the operational position.	Replace the pressure switch.
	Phase and neutral connection is inverted.	Invert them.
	The earth connection lacks or is inefficient.	Make the earth connection efficient.
	The ionization probe is earthed or not in contact with the flame, or its wiring to the control box is broken, or there is a fault on its insulation to the earth.	Check the right position and if necessary set it according to the instructions of this manual.
		Reset the electrical connection.
The burner starts with an ignition delay.	Replace the faulty connection.	
	The ignition electrodes is wrongly positioned.	Adjust it according to the instructions of this manual.
	Air output is too high.	Set the air output according to the instructions of this manual.
The burner doesn't change over the 2nd stage.	Valve brake is too close with insufficient gas output.	Adjust it
	The air damper is locked.	Check the right working.
		Check the right electrical connection.
	The 2nd stage gas valve doesn't pull in.	Failed valve: replace it.
		The air damper doesn't close completely and therefore it doesn't pull in the 2nd stage valve micro: check the micro working.

FAULTS	POSSIBLE CAUSES	SOLUTION
The burner locks out after the prepurge phase due to flame-failure.	The solenoid valves is passing too little gas.	Check the pressure in the network and/or adjust the solenoid valve according to the instructions of this manual.
	The solenoid valves are defective.	Change them
	The ignition arc is irregular or has failed.	Check the right insertion of the connectors.
		Check the right position of the electrode according to the instructions of this manual.
	The pipe has not been purged from the air.	Carry out a complete breathing of the line of gas-supply.
The burner locks out during the prepurge phase.	The air pressure switch does not change over to the operational position.	The pressure switch is faulty, change it.
		The air pressure is too low, (the head is bad adjusted).
	The flame exists.	Faulty valves: replace them.
	The pressure test point (pos. 13, fig. 9, page 7) is badly positioned.	Place it in the right position according to the instructions of this manual on page 7, chapter 4.1.
The burner continues to repeat the starting cycle without going on lock-out.	The gas pressure in the gas-mains lies very close to the value to which the gas pressure switch has been set. The sudden falling-off pressure at the opening of the valve causes the opening of the pressure switch. However this only temporarily, because the valve immediately closes again, so then does the pressure switch, because the pressure builds-up again, causing the cycle to be repeated over and over.	Lower and set the pressure switch.

OPERATING FAULTS

Burner lock-out due to :

- Flame failure
- Earth probe
- Air pressure switch opening

Burner shut down due to:

- Gas pressure switch opening.