

GB **Dual fuel light oil/gas burners**
CN **双燃料轻油 / 燃气燃烧器**

Two-stage progressive or modulating operation gas side / two-stage light oil side
平滑两段火或比例调节燃气运行 / 两段火轻油运行



RLS

CODE - 代码	MODEL - 型号	TYPE - 类型
20079202	RLS 250/M MZ	1302 T



Original instructions

说明书原文翻译

DECLARATION	page 2
TECHNICAL DATA	3
Electrical data	3
Burner description	4
Packaging - Weight	4
Max. dimensions	4
Standard equipment	4
Firing rate	5
Test boiler	5
Commercial boilers	5
INSTALLATION	6
Boiler plate	6
Blast tube length	6
Securing the burner to the boiler	6
Choice of nozzles for the 1st and 2nd stage	6
Nozzle assembly	7
Adjustments before first firing (light oil operation)	8
Light oil supply	9
Hydraulic connections	9
Hydraulic system	10
Pump	10
Pump priming	10
Burner calibration (light oil operation)	11
Gas feeding	12
Gas train	12
Gas pressure	13
Adjustment before first firing (gas operation)	14
Burner starting	14
Burner firing	14
Servomotor	15
Burner calibration	15
Burner operation	19
MAINTENANCE	20
Gas combustion checks	21
FAULTS - POSSIBLE CAUSES - SOLUTIONS	22
ACCESSORIES	25
APPENDIX	26
Layout of electric panel board	26
Electrical connections	33
Calibration of the thermal relay	33

Declaration of conformity in accordance with ISO / IEC 17050-1

Manufacturer: RIELLO S.p.A.
Address: Via Pilade Riello, 7
37045 Legnago (VR)
Product: Dual fuel light oil/gas burner
Model: RLS 250/M MZ
These products are in compliance with the following Technical Standards:
EN 676
EN 267
EN 12100
and according to the European Directives:
MD 2006/42/EC Machine Directive
LVD 2006/95/EC Low Voltage Directive
EMC 2004/108/EC Electromagnetic Compatibility

The quality is guaranteed by a quality and management system certified in accordance with UNI EN ISO 9001.

Manufacturer's Declaration

RIELLO S.p.A. declares that the following products comply with the NOx emission limits specified by German standard "1. BImSchV release 26.01.2010".

Product	Type	Model	Power
Dual fuel light oil/gas burner	1302 T	RLS 250/M MZ	555 - 2460 kW

Legnago, 10.10.2013

Executive Director
RIELLO S.p.A. - Burner Department
Mr. G. Conticini



Research & Development Director
RIELLO S.p.A. - Burner Department
Mr. R. Cattaneo



TECHNICAL DATA

MODEL			RLS 250/M MZ
Output ⁽¹⁾	2nd stage	kW	1230 - 2460
Delivery ⁽¹⁾		kg/h	104 - 207
	min. 1st stage	kW	550
		kg/h	47.5
Fuel			LIGHT OIL, viscosity at 20 °C: 6 mm ² /s max (1,5 °E - 6 cSt) NATURAL GAS: G20 (methane) - G21 - G22 - G23 - G25
Gas pressure at maximum delivery ⁽²⁾ Gas: G20/G25		mbar	27.3/40.8
Operation			- Intermittent (min. 1 stop in 24 hours) - Light oil: Two-stage (high and low flame) and single-stage (all - nothing) - Gas: Progressive two-stage or modulating by kit (see ACCESSOIRES)
Nozzles		number	2
Standard applications			Boilers: water, steam, diathermic oil
Ambient temperatur		°C	0 - 40
Combustion air temperature		°C max	60
Pump delivery (at 12 bar)		kg/h	230
pressure range		bar	10 - 21
fuel temperatur		°C max	90
Noise levels ⁽³⁾	Sound pressure	dBA	85
	Sound power		96

⁽¹⁾ Reference conditions: Ambient temperature 20°C - Barometric pressure 1000 mbar - Altitude 100 m s.l.m.

⁽²⁾ Upstream pressure of the gas train 1)(A)p.12 as indicated by EN676 Standard, with 0 mbar in the combustion chamber and at the maximum burner output.

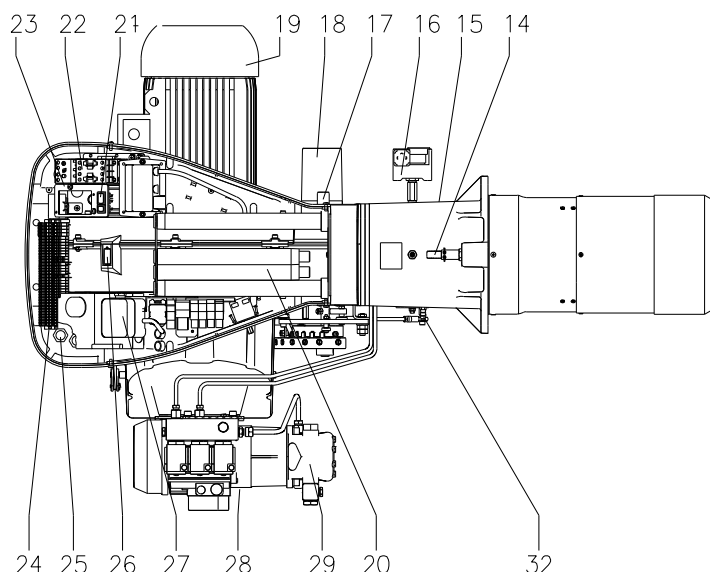
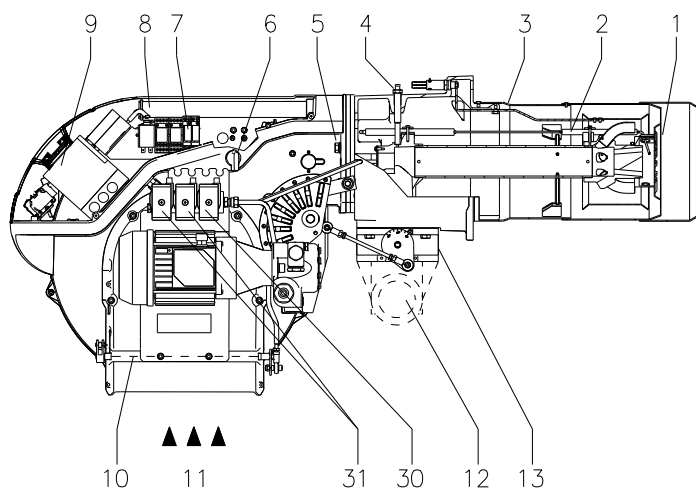
⁽³⁾ Sound pressure measured in manufacturer's combustion laboratory, with burner operating on test boiler and at maximum rated output. The sound power is evaluated, in line with the regulations, on a spherical surface centred on the burner and with a radius of 1 metre.

ELECTRICAL DATA

MODEL			RLS 250/M MZ
Main electrical supply			3 ~ 400V 50Hz
Control circuit power supply			1N ~ 230V 50Hz
Fan motor IE2	rpm Hz V W A		2920 50 230 / 400 5500 18.2/10.5
Pump motor	rpm Hz V W A		2700 50 230 550 3.6
Pump motor capacitor	µF		25
Ignition transformer	V1 - V2 I1 - I2		230 V - 2 x 5 kV 1,9 A - 35 mA
Absorbed electrical power	light oil gas	W max	7500 6000
Protection level			IP 44

BURNER CATEGORIES

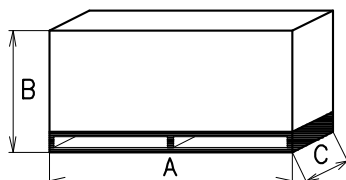
COUNTRY	CATEGORY
IT - AT - GR - DK - FI - SE	II _{2H3B} / P
ES - GB - IE - PT	II _{2H3P}
NL	II _{2L3B} / P
FR	II _{2Er3P}
DE	II _{2ELL3B} / P
BE	I _{2E(R)B} , I _{3P}
LU - PL	II _{2E3B/P}



(A)

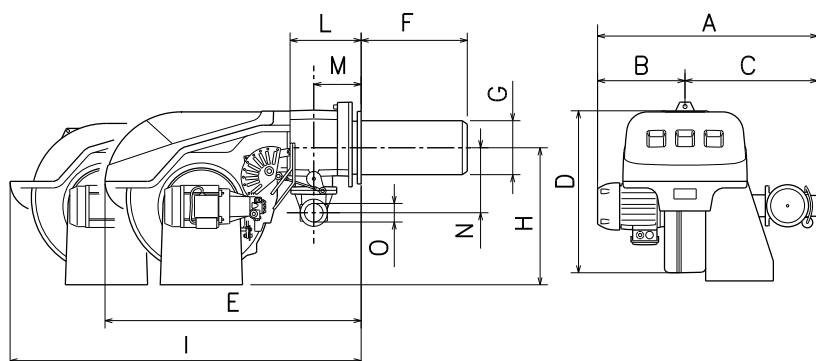
D8862

mm	A	B	C	kg
RLS 250/M MZ	1400	765	1000	95



(B)

D36



mm	A	B	C	D	E	F	G	H	I	L	M	N	O
RLS 250/M MZ	904	427	477	555	863	412	222	435	1442	237	141	186	Rp2

(C)

D3169

BURNER DESCRIPTION (A)

- 1 Flame stability disk
- 2 Ignition electrodes
- 3 Combustion head
- 4 Gas pressure test point and head fixing screw
- 5 Screw securing fan to sleeve
- 6 OIL/GAS selector
- 7 Relay
- 8 Slide bars for opening the burner and inspecting the combustion head
- 9 Control box with lock-out pilot light and lock-out reset button
- 10 Air gate valve
- 11 Air inlet to fan
- 12 Gas input pipework
- 13 Gas butterfly valve
- 14 Screw for combustion head adjustment
- 15 Sleeve with flange for securing the burner to the boiler
- 16 Max. gas pressure switch
- 17 Cell UV
- 18 Servomotor controlling the gas butterfly valve and of air gate valve (by means of a variable profile cam mechanism).
- 19 Fan motor
- 20 Extensions for slide bars (8)
- 21 Power switch for different operations:
automatic - manual - off
Button for:
Power increase - power reduction
- 22 Motor contactor and thermal cut-out with reset button
- 23 Bracket for mounting the power regulator RWF40
- 24 Terminal strip
- 25 Fairleads for electrical connections by installer
- 26 Flame inspection window
- 27 Minimum air pressure switch (differential operating type)
- 28 Pump motor
- 29 Pump
- 30 Safety solenoid valve
- 31 1st and 2nd stage valves
- 32 Air pressure test point

Two types of burner failure may occur:
Control Box Lock-out: if the control box 9)(A) pushbutton lights up, it indicates that the burner is in lock-out.
To reset, press the pushbutton.
Motor trip: release by pressing the pushbutton on thermal relay 22)(A).

PACKAGING - WEIGHT (B) - Approximate measurements

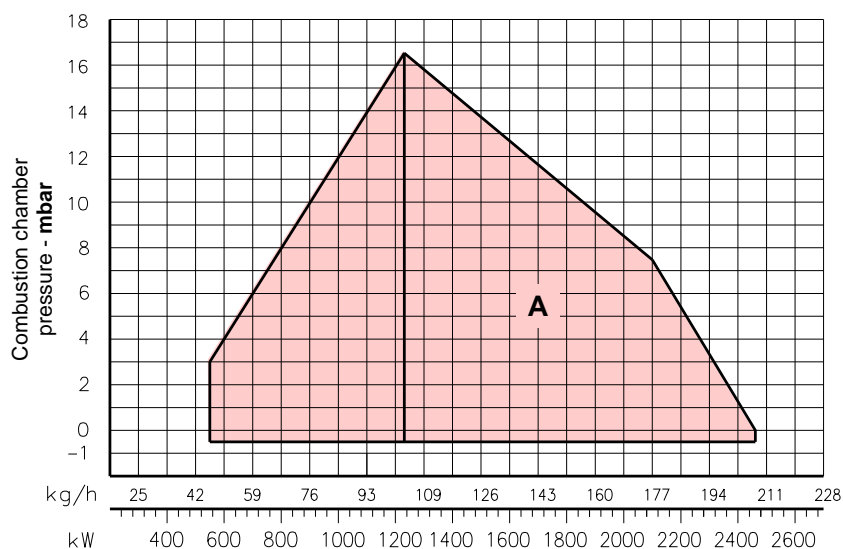
- The burners stand on a wooden base which can be lifted by fork-lifts. Outer dimensions of packaging are indicated in (B).
- The weight of the burner complete with packaging is indicated in Table (B).

MAX. DIMENSIONS (C) - Approximate measurements

The maximum dimensions of the burner are given in (C).
Bear in mind that inspection of the combustion head requires the burner to be opened and the rear part withdrawn on the slide bars.
The maximum dimension of the burner when open, without casing, is given in measurement I.

STANDARD EQUIPMENT

- 1 - Gas train flange
- 1 - Flange gasket
- 4 - Flange fixing screws M 10 x 40 to the butterfly valve
- 1 - Thermal insulation screen
- 4 - Screws to secure the burner sleeve with flange to the boiler: M 16 x 40
- 2 - Flexible hoses
- 2 - Nipples for flexible hoses with gasket
- 1 - Instruction booklet
- 1 - Spare parts list



FIRING RATE (A)

During operation, burner output varies between:

- a **MAXIMUM OUTPUT**, selected within area A,
- and a **MINIMUM OUTPUT**, which must not be lower than the minimum limit in the diagram.

RLS 250/M MZ = 550 kW

Important:

The FIRING RATE area values have been obtained considering a surrounding temperature of 20 °C, and an atmospheric pressure of 1000 mbar (approx. 100 m above sea level) and with the combustion head adjusted as shown on page 8.

MODULATION RATIO

The modulation ratio, determined using test boilers according to standard (EN 676 for gas, EN 267 for light oil), is:

- 4 : 1 (gas);
- 2 : 1 (light oil).

In case of gas operation the burner can be used with a different modulation ratio depending on the application - contact the manufacturer for further information.

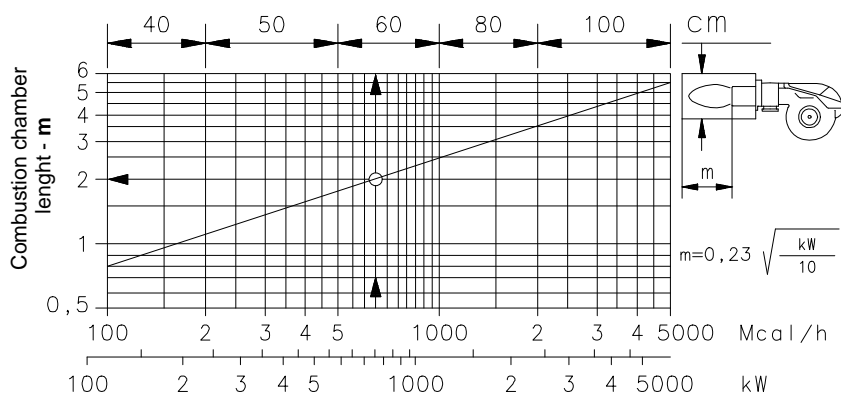
TEST BOILER (B)

The firing rate was set in relation to special test boilers, according to EN 676 regulations.

Figure (B) indicates the diameter and length of the test combustion chamber.

Example:

Output 650 Mcal/h:
diameter = 60 cm; length = 2 m.

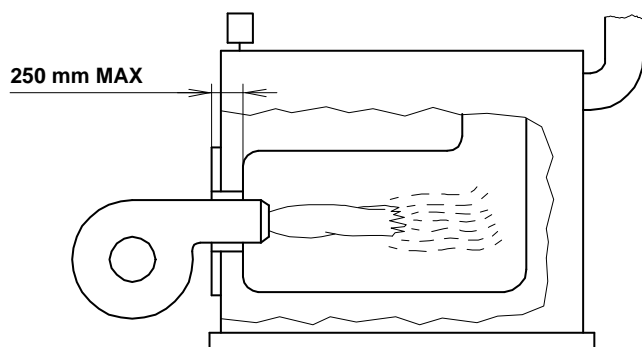


COMMERCIAL BOILERS (C) - IMPORTANT

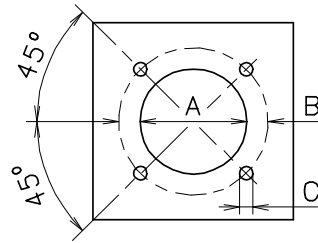
The burner is suitable for operation on boilers with combustion chambers featuring flow from the base (three flue passes) on which the best results are obtained in terms of low NOx emissions.

The maximum thickness of the boiler's front door must not exceed 250 mm (see fig. C).

The burner-boiler match is assured where the boiler is EC type-approved; for boilers and furnaces with combustion chambers featuring dimensions differing considerably from those given in the diagram (B), it is advisable to perform preliminary tests.

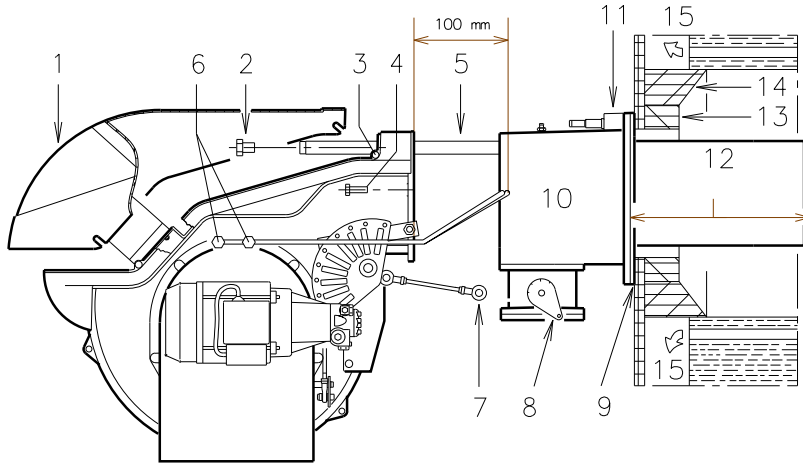


mm	A	B	C
RLS 250/M MZ	230	325-368	M 16



(A)

D455



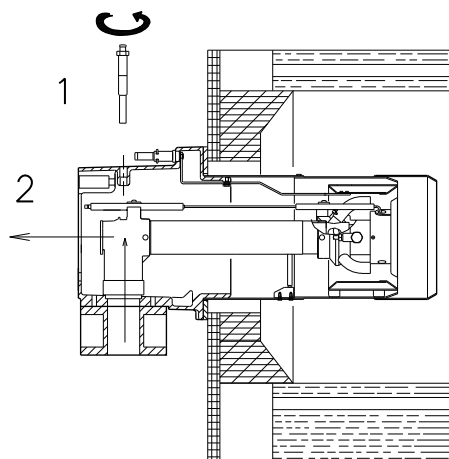
(B)

D8911

Nozzle type: **DELAVAL B 60°**

GPH	kg/h			kW 12 bar
	10 bar	12 bar	14 bar	
12.0	44.16	48.73	52.96	582.36
13.0	47.84	52.79	57.38	630.89
14.0	51.52	56.86	61.79	679.42
15.0	55.20	60.92	66.20	727.95
16.0	58.88	64.98	70.62	776.48
17.0	62.57	69.04	75.03	825.01
18.0	66.25	73.10	79.44	873.54
19.0	69.93	77.16	83.86	922.07
20.0	73.61	81.22	88.27	970.60
22.0	80.97	89.34	97.10	1067.66
24.0	88.33	97.47	105.93	1164.72
25.0	92.00	101.53	110.34	1198.00
26.0	95.69	105.59	114.75	1261.78
28.0	103.05	113.71	123.58	1358.84
30.0	110.41	121.83	132.41	1455.90
32.0	117.77	129.95	141.24	1533.47
34.0	125.13	138.08	150.06	1629.31
35.0	128.81	142.14	154.48	1667.23

(C)



(D)

D3172

INSTALLATION

BOILER PLATE (A)

Drill the combustion chamber locking plate as shown in (A). The position of the threaded holes can be marked using the thermal screen supplied with the burner.

BLAST TUBE LENGTH (B)

The length of the blast tube must be selected according to the indications provided by the manufacturer of the boiler, and in any case it must be greater than the thickness of the boiler door complete with its fettling. The range of lengths available, L (mm), is as follows:

Blast tube 12):	RLS 250/M MZ
• short	418
• long	548

For boilers with front flue passes 15) or flame inversion chambers, protective fettling in refractory material 13) must be inserted between the boiler fettling 14) and the blast tube 12).

This protective fettling must not compromise the extraction of the blast tube.

For boilers having a water-cooled front the refractory fettling 13)-14)(B) is not required unless it is expressly requested by the boiler manufacturer.

SECURING THE BURNER TO THE BOILER (B)

Detach the combustion head from the burner, fig. (B):

- Disconnect the oil pipes by unscrewing the two connectors 6)
- Disengage the articulated coupling 7) from the graduated sector 8).
- Loosen the 4 screws 3) and remove the cover 1)
- Remove the screws 2) from the slide bars 5)
- Remove the 2 screws 4) and pull the burner back on slide bars 5) by about 100 mm.
- Disconnect the electrode wires and then pull the burner completely off the slide bars.

Secure the sleeve with flange 11)(B) to the boiler plate, interposing the thermal insulating screen 9)(B) supplied with the burner. Use the 4 screws, also supplied with the unit, after first protecting the thread with an anti-locking product. The seal between burner and boiler must be airtight.

CHOICE OF NOZZLES FOR 1ST AND 2ND STAGE

The burner complies with the emission requirements of the EN 267 standard.

In order to guarantee that emissions do not vary, recommended and/or alternative nozzles specified by Riello in the Instruction and warning booklet should be used.



WARNING

It is advisable to replace the nozzle once a year during periodical maintenance.



CAUTION

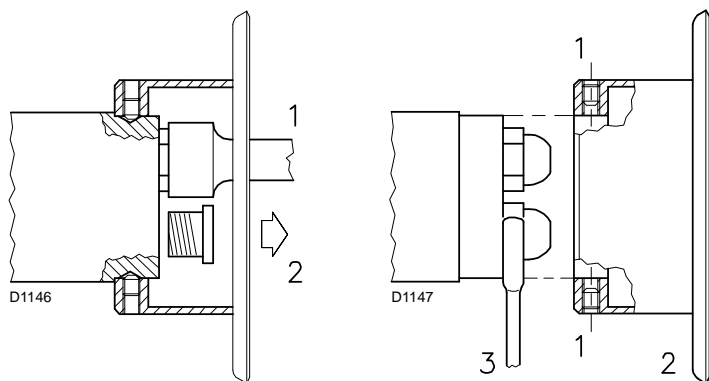
The use of nozzles other than those specified by Riello S.p.A. and inadequate regular maintenance may result into emission limits non-conforming to the values set forth by the regulations in force, and in extremely serious cases, into potential hazards to people and objects.

The manufacturing company shall not be liable for any such damage arising from nonobservance of the requirements contained in this manual.

Both nozzles must be chosen from among those listed in Table (C).

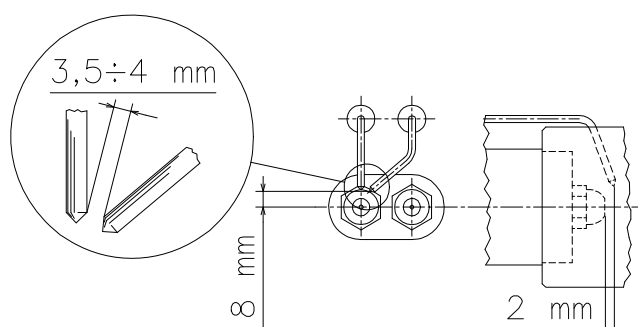
The first nozzle determines the delivery of the burner in the 1st stage.

The second nozzle works together with the 1st nozzle to determine the delivery of the burner in the 2nd stage.



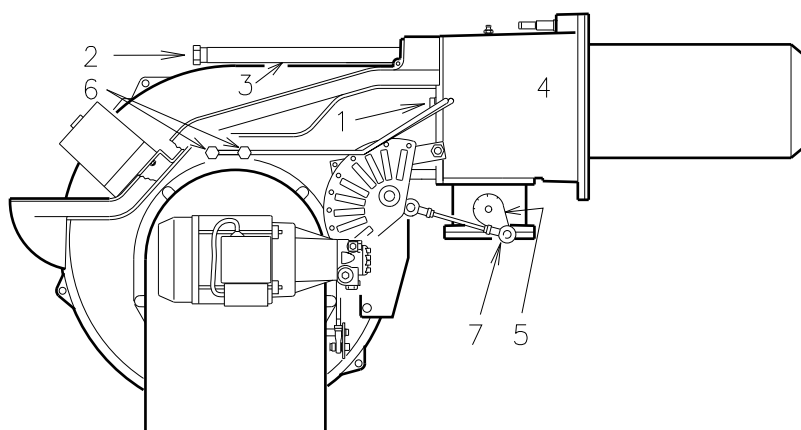
(A)

(B)



(C)

D2995



(D)

D8912

The deliveries of the 1st and 2nd stages must be contained within the value range indicated on page 3.

Use nozzles with a 60° spray angle at the recommended pressure of 12 bar.

As a rule the two nozzles have equal deliveries but the 1st stage nozzle may have a delivery less than 50% of the total delivery when a reduction of the counter-pressure peak is desired at the moment of starting (the burner allows good combustion rates also with a 40 - 100 % ratio between the 1st and 2nd stage).

Example

Boiler output = 1630 kW - efficiency 90 %

Output required by the burner =

$1630 : 0,9 = 1812 \text{ kW};$

$1812 : 2 = 906 \text{ KW per nozzle};$

therefore, two equal, 60°, 12 bar nozzles are required:

$1^\circ = 18 \text{ GPH} - 2^\circ = 18 \text{ GPH},$

or the following two different nozzles:

$1^\circ = 16 \text{ GPH} - 2^\circ = 20 \text{ GPH}.$

NOZZLE ASSEMBLY

Remove screw 1)(D)p.6 and extract the internal part 2)(D).

Fit two nozzles with the box spanner 1)(A) (16 mm), after having removed the plastic plugs 2)(A), fitting the spanner through the central hole in the flame stability disk or loosen screws 1)(B), remove disk 2)(B) and replace the nozzles using the wrench 3)(B).

Do not use any sealing products such as gaskets, sealing compound, or tape. Be careful to avoid damaging the nozzle sealing seat. The nozzles must be screwed into place tightly but not to the maximum torque value provided by the wrench.

The nozzle for the 1st stage of operation is the one lying beneath the firing electrodes Fig. (C).



Make sure that the electrodes are positioned as shown in figure (C).

Refit the burner to the slide bars 3)(D) at approximately 100 mm from the sleeve 4) - burner positioned as shown in fig. (B)p.6 - insert the ignition electrode cables and then slide the burner up to the sleeve so that it is positioned as shown in fig. (D).

Refit screws 2)(D) on slide bars 3).

Secure the burner to the sleeve by tightening screws 1).

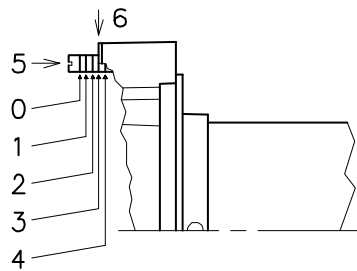
Connect the oil pipes again by screwing on the two connectors 6)(B)p.6.

Reconnect the articulation 7) to the graduated sector 8).



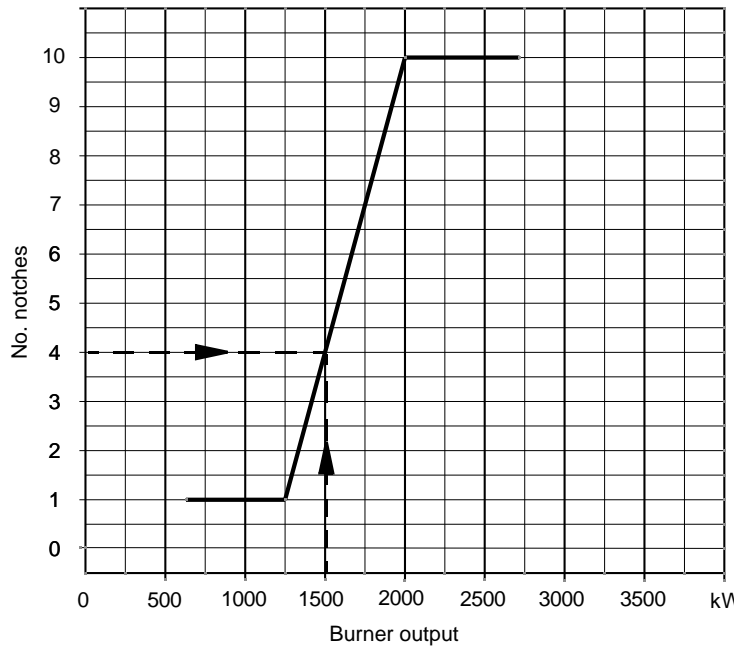
When fitting the burner on the two slide bars, it is advisable to gently draw out the high tension cables until they are slightly stretched.

SETTING THE COMBUSTION HEAD



(A)

D1149



(B)

D3948

ADJUSTMENTS BEFORE FIRST FIRING
(light oil operation)

• Combustion head setting

The setting of the combustion head depends exclusively on the maximum burner output. Turn screw 5)(A) until the notch shown in diagram (B) is level with the front surface of flange 6)(B).



In order to facilitate adjustment, loosen screw 1)(D)p.6, adjust and then tighten.

Example:

Maximum burner output = 1500 kW.

If diagram (B) is consulted it is clear that for this delivery, the combustion head must be adjusted using notch 4, as shown in fig. (B).

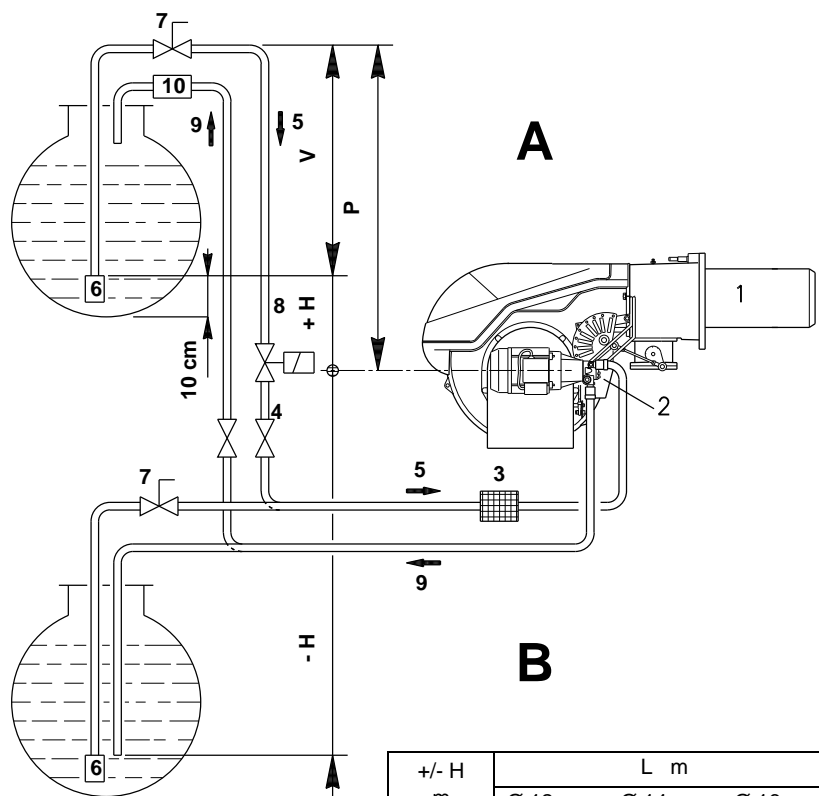
• Pump adjustment

No settings are required for the pump, which is set to 12 bar by the manufacturer. This pressure must be checked and adjusted (if required) after the burner has been ignited.

The only operation required in this phase is the application of a pressure gauge on the appropriate pump attachment.

• Fan gate adjustment

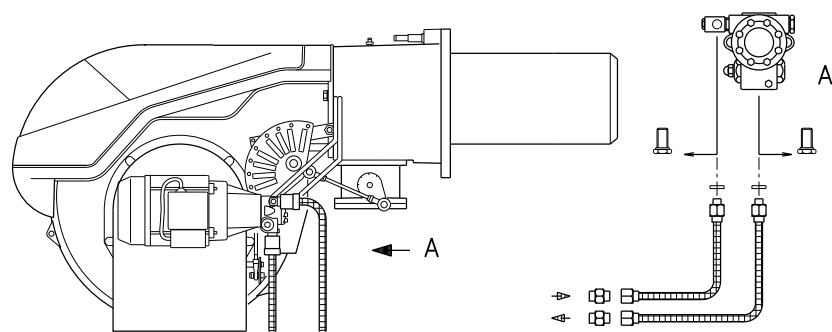
The first time the burner is fired leave the factory setting unchanged for both 1st stage and 2nd stage operation.



+/- H m	L m		
	Ø 12 mm	Ø 14 mm	Ø 16 mm
+ 4	71	138	150
+ 3	62	122	150
+ 2	53	106	150
+ 1	44	90	150
+ 0,5	40	82	150
0	36	74	137
- 0,5	32	66	123
- 1	28	58	109
- 2	19	42	81
- 3	10	26	53
- 4	-	10	25

(A)

D3175



(B)

D3176

LIGHT OIL SUPPLY (A)

The burner is equipped with a self-priming pump which is capable of feeding itself within the limits listed in the table at the side.

The tank higher than the burner A

The distance "P" must not exceed 10 meters in order to avoid subjecting the pump's seal to excessive strain; the distance "V" must not exceed 4 meters in order to permit pump self-priming even when the tank is almost completely empty.

The tank lower than the burner B

Pump depression values higher than 0.45 bar (35 cm Hg) must not be exceeded because at higher levels gas is released from the fuel, the pump starts making noise and its working life-span decreases.

It is good practice to ensure that the return and suction lines enter the burner from the same height; in this way it will be more improbable that the suction line fails to prime or stops priming.

Key (A)

H = Pump/Foot valve height difference

L = Piping length

Ø = Inside pipe diameter

1 = Burner

2 = Pump

3 = Filter

4 = Manual on/off valve

5 = Suction line

6 = Foot valve

7 = Rapid closing manual valve remote controlled (only Italy)

8 = On/off solenoid valve (only Italy)

9 = Return line

10 = Check valve (only Italy)

HYDRAULIC CONNECTIONS (B)

The pumps are equipped with a by-pass that connects return line and suction line. The pumps are installed on the burner with the by-pass closed by screw 6)(A)p.10.

It is therefore necessary to connect both hoses to the pump.

The pump will break immediately if it is run with the return line closed and the by-pass screw inserted.

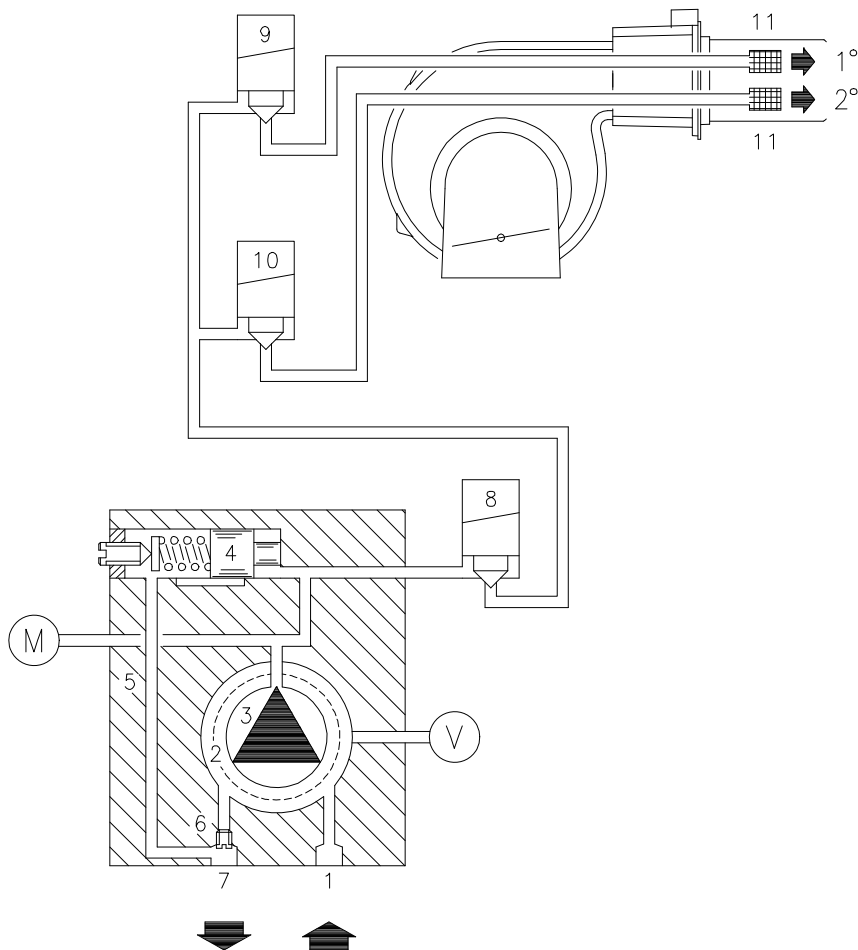
Remove the plugs from the suction and return connections of the pump.

Insert the hose connections with the supplied seals into the connections and screw them down.

Take care that the hoses are not stretched or twisted during installation.

Install the hoses where they cannot be stepped on or come into contact with hot surfaces of the boiler and where they do not hamper the opening of the burner.

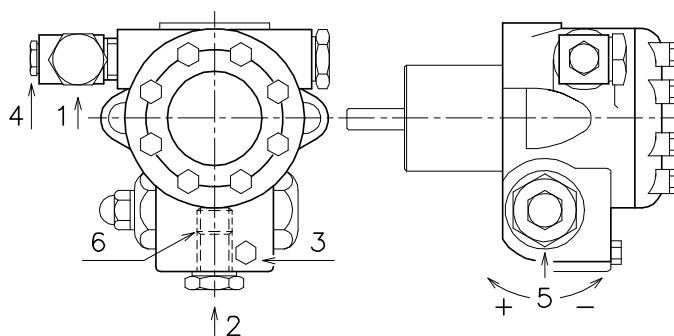
Now connect the other end of the hoses to the suction and return lines by using the supplied nipples.



(A)

D3006

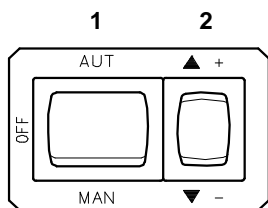
PUMP - SUNTEC J7 C



		J7 C
A	kg/h	230
B	bar	10 - 21
C	bar	0,45
D	cSt	2.8 - 200
E	°C	90
F	bar	1.5
G	bar	12
H	mm	0.17

(B)

D1251



(C)

D791

HYDRAULIC SYSTEM

Key (A)

- 1 Pump suction
- 2 Filter
- 3 Pump
- 4 Pressure governor
- 5 Return pipe
- 6 By-pass screw
- 7 Pump return
- 8 Safety solenoid
- 9 1st stage valve
- 10 2nd stage valve
- 11 Filter
- M Pressure gauge
- V Vacuum meter

PUMP (B)

- 1 - Suction G 1/2"
- 2 - Return G 1/2"
- 3 - Pressure gauge attachment G 1/8"
- 4 - Vacuum meter attachment G 1/8"
- 5 - Pressure adjustment screw
- 6 - By-pass screw

- A - Min. delivery rate at 12 bar pressure
- B - Delivery pressure range
- C - Max. suction depression
- D - Viscosity range
- E - Max light oil temperature
- F - Max. suction and return pressure
- G - Pressure calibration in the factory
- H - Filter mesh width

PUMP PRIMING

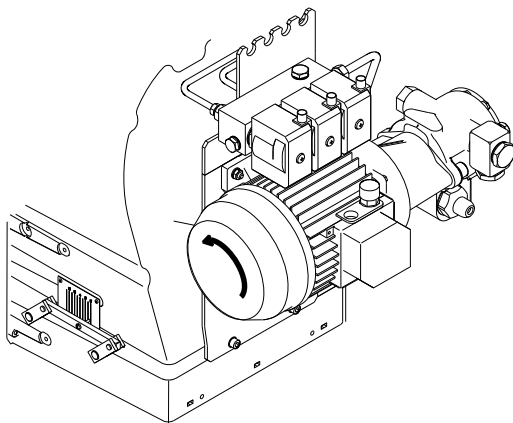
- Before starting the burner, make sure that the tank return line is not clogged. Obstructions in the line could cause the sealing organ located on the pump shaft to break. (The pump leaves the factory with the by-pass closed).
- Also check to make sure that the valves located on the suction line are open and that there is sufficient fuel in the tank.
- For self-priming to take place, the screw 3)(B) of the pump must be loosened in order to bleed off the air contained in the suction line.
- Start the burner by closing the control devices, with switch 1)(C) in the "MAN" position and with switch 6)(A)p.4 in the "OIL" position.
- The pump can be considered to be primed when the light oil starts coming out of the screw 3)(B).
- Stop the burner: switch 1)(C) set to "OFF" and tighten the screw 3)(B).

The time required for this operation depends upon the diameter and length of the suction tubing. If the pump fails to prime at the first starting of the burner and the burner locks out, wait approx. 15 seconds, reset the burner, and then repeat the starting operation as often as required.

After 5 or 6 starting operations allow 2 or 3 minutes for the transformer to cool.

Do not illuminate the UV cell or the burner will lock out; the burner should lock out anyway about 10 seconds after it starts.

Important: the a.m. operation is possible because the pump is already full of fuel when it leaves the factory. If the pump has been drained, fill it with fuel through the opening on the vacuum meter prior to starting; otherwise, the pump will seize. Whenever the length of the suction piping exceeds 20-30 meters, the supply line must be filled using a separate pump.



(A)

D8861

BURNER CALIBRATION (light-oil operation)

N.B.

It is advisable to first set the burner for operating on oil and then for gas.

WARNING

Execute the fuel exchange when the burner is off.



Rotation of pump motor

Refer to Fig. (A).

FIRING

Set switch 1)(C)p.10 to "MAN".

During the first firing, during the passage from the 1st to the 2nd stage, there is a momentary lowering of the fuel pressure caused by the filling of the 2nd stage nozzle tubing. This lowering of the fuel pressure can cause the burner to lock-out and can sometimes give rise to pulsations.

Once the following adjustments have been made, the firing of the burner must generate a noise similar to the noise generated during operation.

OPERATION

The optimum calibration of the burner requires an analysis of the flue gases at the boiler outlet and interventions on the following points.

• 1st and 2nd stage nozzles

See the information listed on page 6 and 7.

• Combustion head

The adjustment of the combustion head already carried out (page 8) need not be altered unless the 2nd stage delivery of the burner is changed.

• Pump pressure

12 bar: This is the pressure calibrated in the factory which is usually sufficient for most purposes. Sometimes, this pressure must be adjusted to:

10 bar in order to reduce fuel delivery. This adjustment is possible only if the surrounding temperature remains above 0 °C;

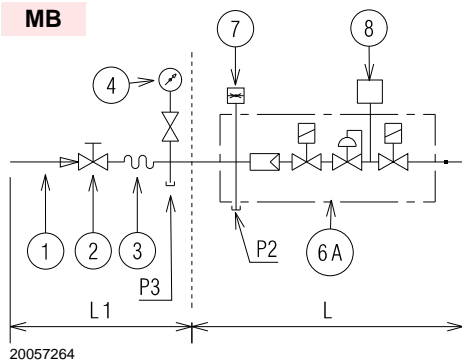
14 bar in order to increase fuel delivery or to ensure firings even at temperatures of less than 0 °C.

In order to adjust pump pressure, use the screw 5)(B)p.10.

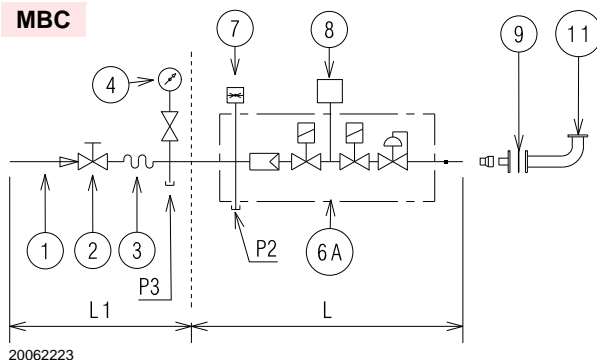
• 1st and 2nd stage fan air gate valve

See adjustments of servomotor on page 15.

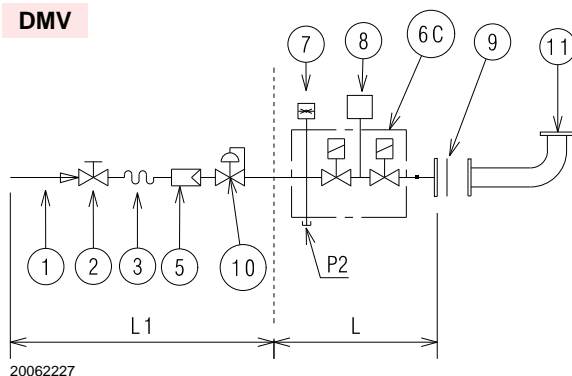
MB



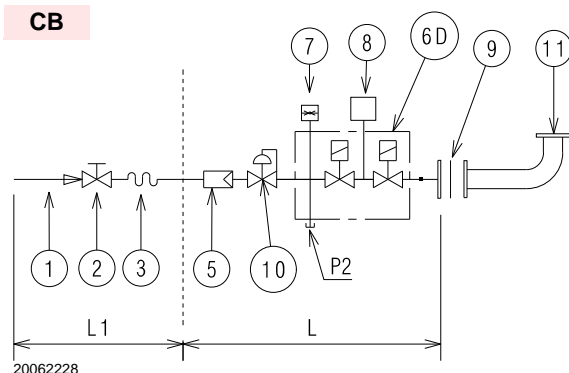
MBC



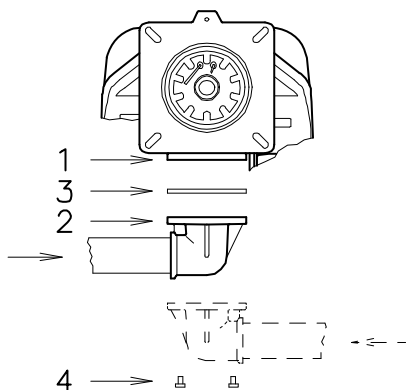
DMV



CB



(A)



(B)

GAS FEEDING



Explosion danger due to fuel leaks in the presence of a flammable source.

Precautions: avoid knocking, attrition, sparks and heat.

Make sure that the fuel interception tap is closed before performing any operation on the burner.



WARNING

The fuel supply line must be installed by qualified personnel, in compliance with current standards and laws.

KEY (A)

- 1 Gas input pipe
- 2 Manual valve
- 3 Vibration damping joint
- 4 Pressure gauge with pushbutton cock
- 5 Filter
- 6A Includes:
 - Filter
 - working valve
 - safety valve
 - pressure adjuster
- 6C Includes
 - safety valve
 - working valve
- 6D Includes:
 - safety valve
 - working valve
 - pressure adjuster
 - filter
- 7 Minimum gas pressure switch
- 8 Leak detection device, supplied as an accessory or incorporated, based on the gas train code. In compliance with the EN 676 standard, the leak detection control is compulsory for burners with maximum outputs over 1200 kW.
- 9 Gasket, for "flanged" versions only
- 10 Pressure adjuster
- 11 Train-burner adaptor, supplied separately
- P2 Upstream pressure of valves/adjuster
- P3 Upstream pressure of the filter
- L Gas train supplied separately
- L1 The responsibility of the installer

GAS TRAIN

Type-approved in accordance with EN 676 and supplied separately from the burner.

To select the correct model of the gas train, refer to the "burner-gas train combination" manual supplied.

See the accompanying instructions for the adjustment of the gas train.

GAS TRAIN INSTALLATION

- The gas train must be connected to the gas attachment 1(B), using flange 2), gasket 3) and screws 4) supplied with the burner.
- The gas train can enter the burner from the right or left side, depending on which is the most convenient.
- Make sure that the pressure governor calibration range (colour of the spring) comprises the pressure required by the burner.

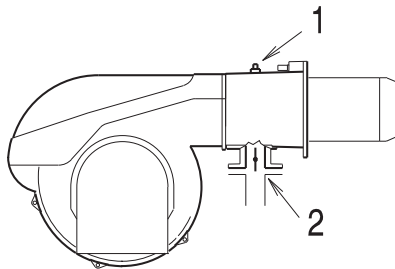


WARNING

The gas solenoids must be as close as possible to the burner, to ensure that the gas reaches the combustion head within the safety time of 3s.

kW	1 Δp (mbar)		2 Δp (mbar)	
	G 20	G 20	G 25	G 25
1230	8,5	12,7	1,9	2,8
1367	10,3	15,4	2,7	4,0
1503	12,2	18,2	3,5	5,2
1640	14,3	21,3	4,1	6,1
1777	16,5	24,6	4,6	6,9
1913	18,7	27,9	5,2	7,8
2050	21,0	31,3	5,9	8,8
2187	23,2	34,6	6,9	10,3
2323	25,5	38,0	7,8	11,6
2460	27,8	41,5	8,8	13,1

(A)



(B)

S8883

GAS PRESSURE

The adjacent table shows minimum pressure losses along the gas supply line depending on the maximum burner output operation.

The values shown in the table refer to:

- Natural gas G20 PCI 9.45 kWh/Sm³ (8.2 Mcal/Sm³)
- Natural gas G25 PCI 8,6 kWh/Nm³ (7,4 Mcal/Nm³)

Column 1

Pressure loss at combustion head.

Gas pressure measured at test point 1)(B), with:

- Combustion chamber at 0 mbar;
- Combustion head adjusted as indicated in diagram (B)p.8.

Column 2

Pressure loss at gas butterfly valve 2)(B) with maximum opening: 90°.

Calculate the approximate maximum output of the burner thus:

- subtract the combustion chamber pressure from the gas pressure measured at test point 1)(B).
- Find the nearest pressure value to your result in column 1 of the table (A).
- Read off the corresponding output on the left.

Example:

- Maximum output operation
 - Natural gas G 20 PCI 10 kWh/Nm³
 - Gas pressure at test point 1)(B) = 24.0 mbar
 - Pressure in combustion chamber = 3.0 mbar
- $$24.0 - 3.0 = 21.0 \text{ mbar}$$

A maximum output of 2050 kW shown in Table (A) corresponds to 21.0 mbar pressure, column 1.

This value serves as a rough guide, the effective delivery must be measured at the gas meter.

To calculate the required gas pressure at test point 1)(B), set the maximim output required from the burner operation:

- Find the nearest output value in the table (A).
- Read off the pressure at test point 1)(B) on the right in column 1.
- Add this value to the estimated pressure in the combustion chamber.

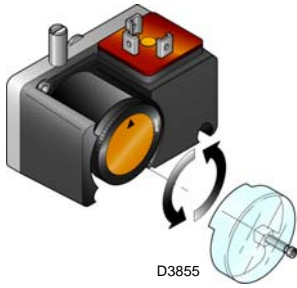
Example:

- Required burner maximum output operation: 2050 kW
 - Natural gas G 20 PCI 10 kWh/Nm³
 - Gas pressure at burner output of 2050 kW, taken from table (A), column 1= 21.0 mbar
 - Pressure in combustion chamber = 3.0 mbar
- $$21.0 + 3 = 24.0 \text{ mbar}$$
- pressure required at test point 1)(B).

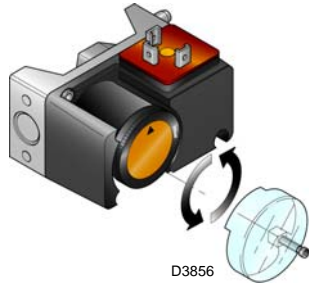
MIN GAS PRESSURE SWITCH

MAX GAS PRESSURE SWITCH

AIR PRESSURE SWITCH



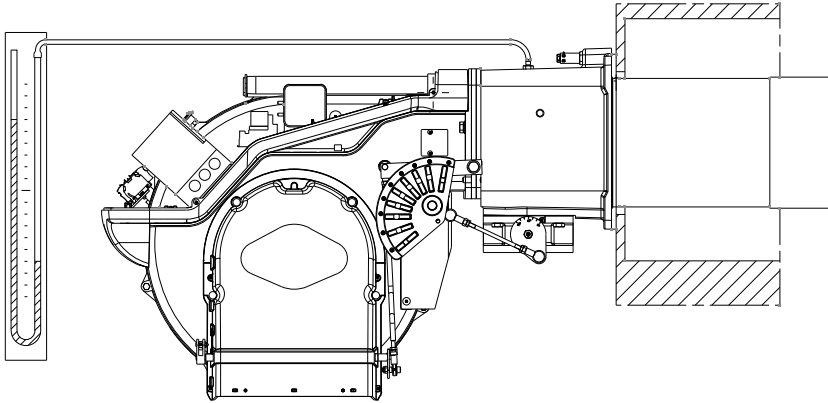
(A)



(B)

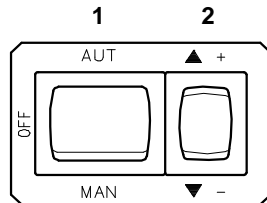


(C)



(D)

D3916



(E)

D791

ADJUSTMENTS BEFORE FIRST FIRING (gas operation)

Adjustment of the combustion head has been illustrated on page 8.

In addition, the following adjustments must also be made:

- Open manual valves up-line from the gas train.
- Adjust the minimum gas pressure switch to the start of the scale (A).
- Adjust the maximum gas pressure switch to the start of the scale (B).
- Adjust the air pressure switch to the zero position of the scale (C).
- Purge the air from the gas line.
Continue to purge the air (we recommend using a plastic tube routed outside the building) until gas is smelt.
- Fit a U-type manometer (D) to the gas pressure test point on the sleeve.
The manometer readings are used to calculate the 2nd MAX. burner power using the table (A)p.13.
- Connect two lamps or testers to the two gas line solenoid valves VR and VS to check the exact moment at which voltage is supplied.
This operation is unnecessary if each of the two solenoid valves is equipped with a pilot light that signals voltage passing through.

Before starting up the burner it is good practice to adjust the gas train so that ignition takes place in conditions of maximum safety, i.e. with gas delivery at the minimum.

BURNER STARTING (gas operation)

N.B.: It is advisable to first set the burner for operating on oil and then for gas.

WARNING

Execute the fuel exchange when the burner is off.

Close thermostats/pressure switches and set switch 1)(E) to "MAN" position.

As soon as the burner starts check the direction of rotation of the fan blade, looking through the flame inspection window 26)(A)p.4.

Make sure that the lamps or testers connected to the solenoids, or pilot lights on the solenoids themselves, indicate that no voltage is present. If voltage is present, then **immediately** stop the burner and check electrical connections.

BURNER FIRING (gas operation)

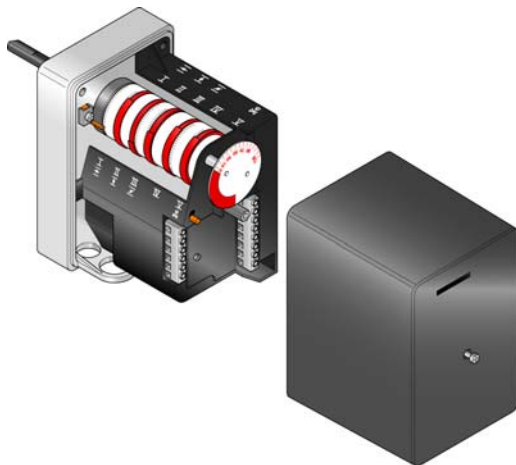
Having completed the checks indicated in the previous heading, the burner should fire. If the motor starts but the flame does not appear and the control box goes into lock-out, reset and wait for a new firing attempt.

If firing is still not achieved, it may be that gas is not reaching the combustion head within the safety time period of 3 seconds. In this case increase gas firing delivery.

The arrival of gas at the sleeve is indicated by the U-type manometer (D).

Once the burner has fired, now proceed with global calibration operations.

SERVOMOTOR



(A)

D3923

SERVOMOTOR (A)

The servomotor provides simultaneous adjustment of the air gate valve, by means of the variable profile cam, and the gas butterfly valve. The servomotor rotates through 130 degrees in 33 seconds.

Do not alter the factory setting for the 5 cams; simply check that they are set as indicated below:

Cam I : 130°

Limits rotation toward maximum position.

When the burner is at max output the gas butterfly valve must be fully open: 90°.

Cam II : 0°

Limits rotation toward the minimum position.

When the burner is shut down the air gate valve and the gas butterfly valve must be closed: 0°.

Cam III : 40° (gas)

Adjusts the ignition position and the MIN output.

Cam IV : 70° (oil)

Adjusts the ignition position and the 1st stage output.

Cam V : 100°

Determines when the 2nd-stage diesel oil valve opens.

BURNER CALIBRATION (gas operation)

The optimum calibration of the burner requires an analysis of the flue gases at the boiler outlet.

Adjust successively:

- 1 - First firing output;
- 2 - MAX burner output;
- 3 - MIN burner output;
- 4 - Intermediate outputs;
- 5 - Air pressure switch;
- 6 - Maximum gas pressure switch;
- 7 - Minimum gas pressure switch.

1 - FIRING OUTPUT

According to EN 676 Regulations:

Burners with MAX output up to 120 kW

Firing can be performed at the maximum operation output level. Example:

- Max. operation output : 120 kW
- Max. firing output : 120 kW

Burners with MAX output above 120 kW

Firing must be performed at a lower output than the max. operation output. If the firing output does not exceed 120 kW, no calculations are required. If firing output exceeds 120 kW, the regulations prescribe that the value be defined according to the control box safety time "ts":

- For ts = 2s, firing output must be equal to or lower than 1/2 of max. operation output.
- For ts = 3s, firing output must be equal to or lower than 1/3 of max. operation output.

Example: MAX operation output of 600 kW.

Firing output must be equal to or lower than:

- 300 kW con ts = 2s
- 200 kW con ts = 3s

In order to measure the firing output:

- Extract the UV cell 17)(A)p.4 (the burner will ignite and lock-out at the end of a safety period).
 - Perform 10 firings with consecutive lock-outs.
- On the meter read the quantity of gas burned.
- This quantity must be equal to or lower than the quantity given by the formula:

$$\frac{\text{Sm}^3/\text{h} \text{ (max. burner delivery)}}{360}$$

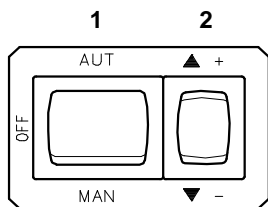
360

Example: for gas G 20 (10 kWh/Sm³):

Max. operation output: 600 kW corresponding to 60 Sm³/h

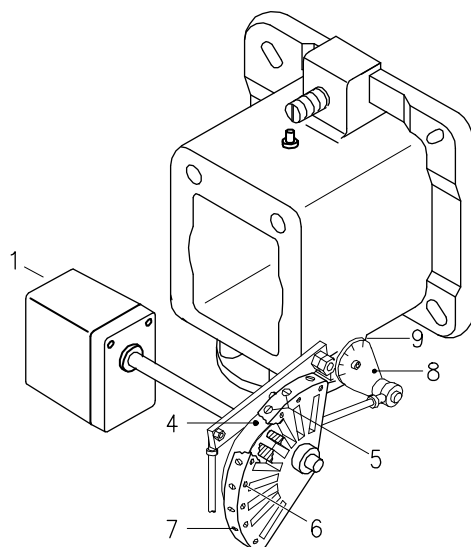
After 10 firings with lock-outs, the delivery read on the meter must be equal to or lower than:

$$60 : 360 = 0,166 \text{ Sm}^3$$



(A)

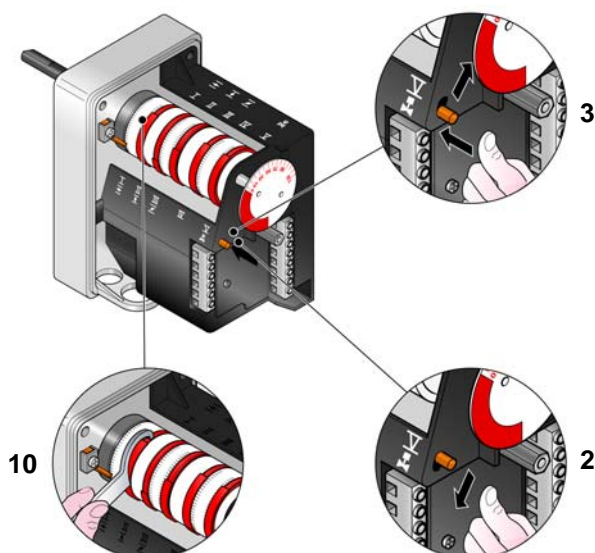
D791



- | | |
|--|--|
| 1 Servomotor | 7 Cam end profile adjustment screws |
| 2 Servomotor 1) - Cam 4): engaged | 8 Graduated sector for gas butterfly valve |
| 3 Servomotor 1) - Cam 4): disengaged | 9 Index for graduated sector 8 |
| 4 Adjustable profile cam | 10 Key for cam III adjustment |
| 5 Cam starting profile adjustment screws | |
| 6 Adjustment fixing screws | |

(B)

D1710



(C)

D3924

2 - MAX. OUTPUT

Max. output of the burner must be set within the firing rate range shown on page 5.
In the above instructions we left the burner running in MIN. output operation. Now press button 2)(A) "increase output" and keep it pressed until the servomotor has opened the air gate valve and the gas butterfly valve.

Gas calibration

Measure the gas delivery at the meter.
A guideline indication can be calculated from the table (A)p.13, simply read off the gas pressure on the U-type manometer, see fig. (D)p.14, and follow the instructions on page 13.

- If delivery needs to be reduced, diminish outlet gas pressure and, if it is already very low, slightly close adjustment valve VR.
- If delivery needs to be increased, increase outlet gas pressure.

Adjusting air delivery

Progressively adjust the end profile of cam 4)(B) by turning the screws 7)(B).

- Turn the screws clockwise to increase air delivery.
- Turn the screws counter-clockwise to reduce air delivery.

3 - MIN OUTPUT

Min output must be selected within the firing rate range shown on page 5.

Press button 2)(A) "output reduction" until the servomotor has closed the air gate valve and the gas butterfly valve to 30° (factory set adjustment).

Adjusting gas delivery

Measure the delivery of gas from the gas meter.

- If this value is to be reduced, decrease the angle of cam III (C) slightly by proceeding a little at a time until the angle is changed from 30° to 28° - 26°....
- If it has to be increased press the button "output increase" 2)(A) (i.e. open the gas butterfly valve by 10-15°), increase the cam III angle (C) with small successive movements, i.e. take it from angle 30° to 32° - 34°....

Then press the button "output decrease" until the servomotor is taken to the minimum opening position and measure the gas delivery.

Note

The servomotor follows the adjustment of cam III only when the cam angle is reduced. If it is necessary to increase the cam angle, first increase the servomotor angle with the key "output increase", then increase the cam III angle, and finally bring the servomotor back to the MIN output position with the key "output decrease".

In order to adjust cam III, especially for fine movements, the key, held by a magnet under the servomotor, can be used.

Adjustment of air delivery

Progressively adjust the starting profile of cam 4)(B) by turning the screws 5)(B).

It is preferable not to turn the first screw since this is used to set the air gate valve to its fully-closed position.

4 - INTERMEDIATE OUTPUTS

Adjustment of gas delivery

No adjustment of gas delivery is required.

Adjustment of air delivery

Press the button 2)(A)p.16 "output increase" a little so that the servomotor turns by about 15°.

Adjust the screws until optimal combustion is obtained.

Proceed in the same way with the other screws. Take care that the cam profile variation is progressive.

Switch off the burner using switch 1)(A)p.16, at "OFF" position, disengage the cam 4)(B)p.16 from the servomotor, by pressing the button 3)(B) and moving it to the right, and check more than once that the movement is soft and smooth, and does not grip, by rotating the cam 4) forward and backward by hand.

Engage the cam 4) to the servomotor again by moving the button 2) to the left.

As far as is possible, try not to move those screws at the ends of the cam that were previously adjusted for the opening of the air gate to MAX and MIN output.

Finally fix the adjustment by turning the screws 6)(B)p.16.

N.B.

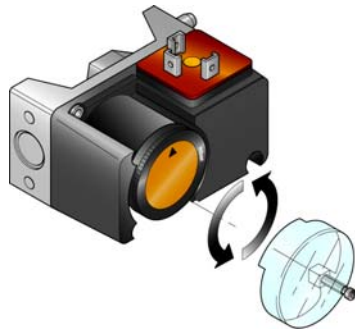
Once you have finished adjusting outputs MAX - MIN - INTERMEDIATE, check ignition once again: noise emission at this stage must be identical to the following stage of operation. If you notice any sign of pulsations, reduce the ignition stage delivery.



(A)

D3951

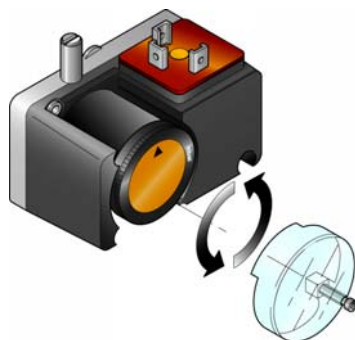
MAX. GAS PRESSURE SWITCH



(B)

D3856

MIN. GAS PRESSURE SWITCH



(C)

D3855

5 - AIR PRESSURE SWITCH (A)

Adjust the air pressure switch after having performed all other burner adjustments with the air pressure switch set to the start of the scale (A).

With the burner working at MIN output, insert a combustion analyser in the stack, slowly close the suction inlet of the fan (for example, with cardboard) until the CO value does not exceed 100 ppm.

Then slowly turn the appropriate knob clockwise until the burner reaches the lockout position.

Check the indication of the arrow pointing upwards on the graduated scale (A). Turn the knob clockwise again, until the value shown on the graduated scale corresponds with the arrow pointing downwards (A), and so recovering the hysteresis of the pressure switch (shown by the white mark on a blue background, between the two arrows).

Now check the correct start-up of the burner.

If the burner locks out again, turn the knob anti-clockwise a little bit more.

The incorporated air pressure switch can work in a 'differential' mode if connected with two pipes. If a negative pressure in the combustion chamber during pre-purging prevents the air pressure switch from switching. Switching may be obtained by fitting a second pipe between the air pressure switch and the suction inlet of the fan. In such a manner the air pressure switch operates as differential pressure switch.

Attention: the use of the air pressure switch with differential operation is allowed only in industrial applications and in places where national rules enable the air pressure switch to control only fan operation.

6 - MAXIMUM GAS PRESSURE SWITCH (B)

Adjust the maximum gas pressure switch after having performed all the other burner adjustments with the maximum gas pressure switch set at the end of the scale (B).

With the burner operating at MAX output, reduce the adjustment pressure by slowly turning the relative knob anticlockwise until the burner locks out.

Then turn the knob clockwise by 2 mbar and repeat burner firing.

If the burner locks out again, turn the knob again clockwise by 1 mbar.

7 - MINIMUM GAS PRESSURE SWITCH (C)

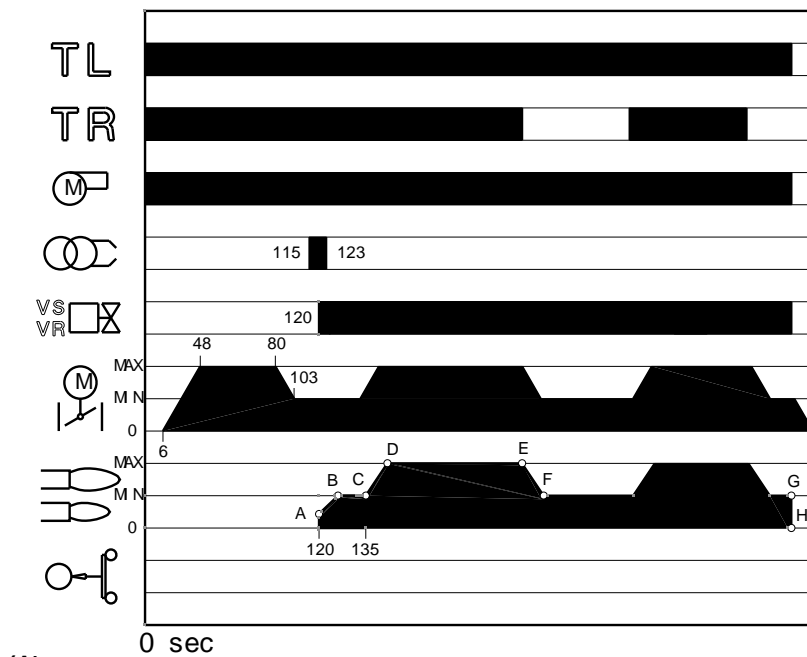
Adjust the minimum gas pressure switch after having performed all the other burner adjustments with the pressure switch set at the start of the scale (C).

With the burner operating at MAX output, increase adjustment pressure by slowly turning the relative knob clockwise until the burner locks out.

Then turn the knob anti-clockwise by 2 mbar and repeat burner starting to ensure it is uniform.

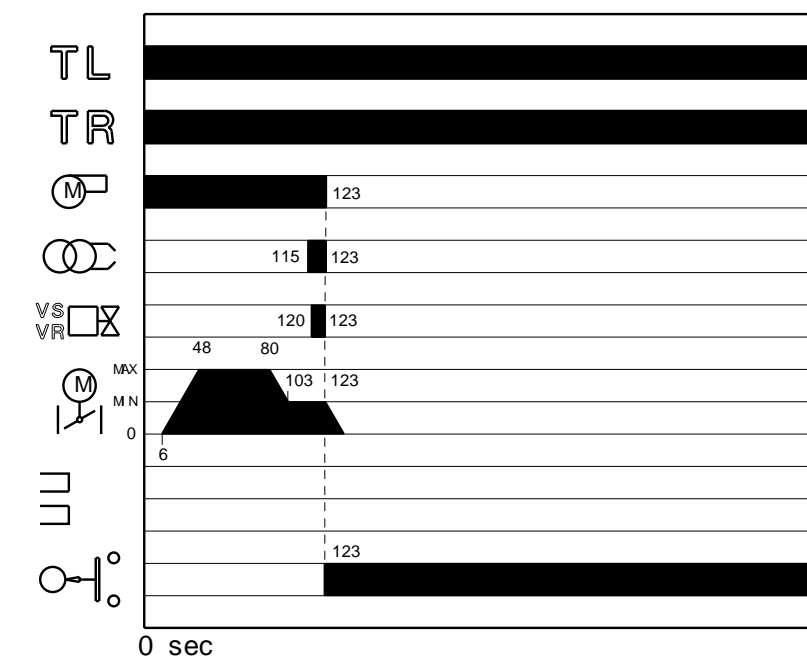
If the burner locks out again, turn the knob anti-clockwise again by 1 mbar.

NORMAL FIRING
(n° = seconds from instant 0)



D3918

NO FIRING



D3919

BURNER OPERATION

BURNER STARTING (A)

- 0s: TL closes.
Fan motor starts.
- 6s: Servomotor starts: 130° rotation to right, until contact is made on cam I (C)p.16.
The air gate valve is positioned to MAX. output.
- 48s: Pre-purge stage with air delivery at MAX. output.
Duration 32 seconds.
- 80s: Servomotor rotates to left up to the angle set on cam cam III (C)p.16 for MIN. output.
- 112s: The air gate valve and the gas butterfly are positioned to MIN. output (with cam III at 30°).
- 113s: Ignition electrode strikes a spark.
- 119s: Safety valve VS and adjustment valve VR (rapid opening) open.
The flame is ignited at a low output level, point A.
Output is then progressively increased, with the valve VR opening slowly up to MIN. output, point B.
- 122s: The spark goes out.
- 135s: The control box starting cycle ends.

STEADY STATE OPERATION (A)

Burner without modulating operation kit

Once the starting cycle has come to an end, control of the servomotor passes on to the TR that controls boiler temperature or pressure, point C.

(The control box will continue, however, to monitor flame presence and the correct position of the air and gas max. pressure switches).

- If the temperature or pressure is low (and the TR load control is consequently closed), the burner progressively increases its output to the MAX. value, section C-D.
- If subsequently the temperature or pressure increases until TR opens, the burner progressively decreases its output to the MIN. value (section E-F).
And so on.
- The burner locks out when the demand for heat is less than the heat supplied by the burner in min. output, section G-H. Load control TL opens. The servomotor returns to the 0° angle limited by contact with cam II (C)p.16. The air gate valve closes completely to reduce thermal dispersion to a minimum.

Every time output is changed, the servomotor automatically modifies gas delivery (gas butterfly valve) and air delivery (fan gate valve).

Burner with modulating operation kit

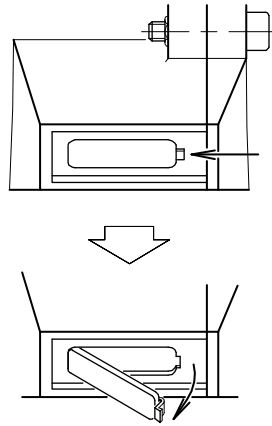
See the handbook enclosed with the regulator.

FIRING FAILURE (B)

If the burner does not fire, it goes into lock-out within 3 s of the opening of the gas solenoid valve and 122 s after the closing of control device TL.

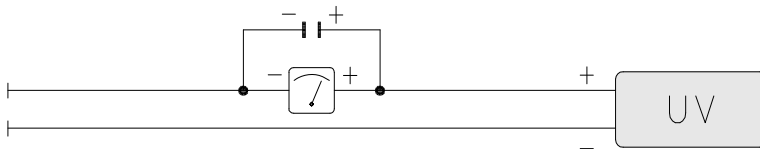
BURNER FLAME GOES OUT DURING OPERATION

If the flame should accidentally go out during operation, the burner will lock out within 1s.



(A)

D484



(B)

D1143

MAINTENANCE

NOTES ON SAFETY FOR THE MAINTENANCE

The periodic maintenance is essential for the good operation, safety, yield and duration of the burner.

It allows you to reduce consumption and polluting emissions and to keep the product in a reliable state over time.



DANGER

The maintenance interventions and the calibration of the burner must only be carried out by qualified, authorised personnel, in accordance with the contents of this manual and in compliance with the standards and regulations of current laws.

Before carrying out any maintenance, cleaning or checking operations:



DANGER

Disconnect the electrical supply from the burner by means of the main system switch.



DANGER

Close the fuel interception tap.

Combustion

The optimum calibration of the burner requires an analysis of the flue gases. Significant differences with respect to the previous measurements indicate the points where more care should be exercised during maintenance.

Flame inspection window

Clean the flame inspection window (A).

Combustion head

Open the burner and make sure that all components of the combustion head are in good condition, not deformed by the high temperatures, free of impurities from the surroundings and correctly positioned. If in doubt, extract the internal part 5)(A)p.21.

Nozzles (light oil)

Do not clean the nozzle openings; do not even open them. The nozzle filters however may be cleaned or replaced as required.

It is advisable to replace nozzles every year during regular maintenance operations. Combustion must be checked after the nozzles have been changed.

UV cell

Clean the glass cover from any dust that may have accumulated. The UV cell 17)(A)p.4 is held in position by a pressure fit and can therefore be removed by pulling it outward forcefully.

Current to the uv photocell (B)

Min value for a good work: 70 μ A.

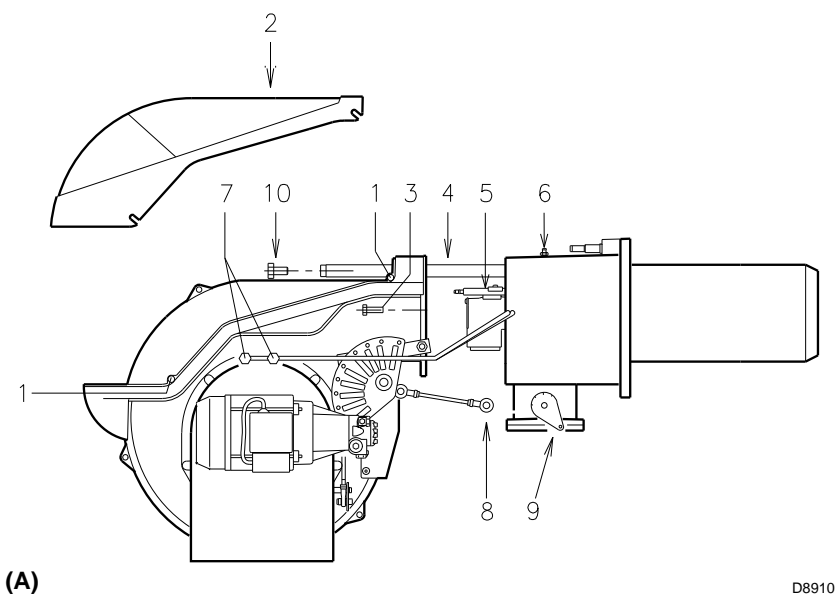
If the value is lower, it can depend on:

- exhausted photocell;
- low current (lower than 187 V);
- bad regulation of the burner.

In order to measure the current, use a microammeter of 100 μ A c.c., connected to the photocell, as in the scheme, with a capacitor of 100 μ F - 1V c.c. at the same level of the instrument.

Flexible hoses (light oil)

Check to make sure that the flexible hoses are still in good condition and that they are not crushed or otherwise deformed.



Gas leaks

Make sure that there are no gas leaks on the pipework between the gas meter and the burner.

Gas filter

Change the gas filter when it is dirty.

Servomotor

Disengage the cam 4)(B)p.16 from the servomotor, by pressing and moving button 3)(C)p.16 towards the right, and turn it backwards and forwards by hand to make sure it moves freely. Now engage the cam again by moving the button 2)(C)p.16 to the left.

Burner

Check for excess wear or loose screws in the mechanisms controlling the air gate valve and the gas butterfly valve. Also make sure that the screws securing the electrical leads in the burner terminal strip are fully tightened. Clean the outside of the burner, taking special care with the transmission joints and cam 4)(B)p.16.

Combustion

Adjust the burner if the combustion values found at the beginning of the operation do not comply with the regulations in force, or at any rate, do not correspond to good combustion. Use the appropriate card to record the new combustion values; they will be useful for subsequent controls.

GAS COMBUSTION CHECKS

CO₂

It is better to set the burner with CO₂ not higher than 10% (gas with Pci 8600 kcal/m³). this way avoiding a loss of calibration setting (for example draft variation) that could cause combustion with little air and the production of CO.

CO

It must be not higher than 100 mg/kWh.

TO OPEN THE BURNER (A)



Disconnect the electrical supply from the burner by means of the main system switch.

- Loosen screws 1) and withdraw the cover 2)
- Disconnect the light-oil pipes 7)
- Disengage the articulated coupling 8) from the graduated sector 9).
- Remove the screws 10) from the two slide bars 4).
- Fit the two extensions onto the slide bars 4).
- Replace the screws 10) onto the two slide bars.
- Remove screws 3) and pull the burner back by about 100 mm on the slide bars. Disconnect the electrode leads and then pull the burner fully back.
- Now extract the internal part 5) after having removed the screw 6).

TO CLOSE THE BURNER (A)

- Push the burner until it is about 100 mm from the sleeve.
- Re-connect the leads and slide in the burner until it comes to a stop.
- Refit screws 3), and pull the probe and electrode leads gently out until they are slightly stretched.
- Re-couple the articulated coupling 8) to the graduated sector 9).
- Reconnect the light-oil pipes 7).
- Remove the two extensions from the slide bars 4) and return them to their original position.

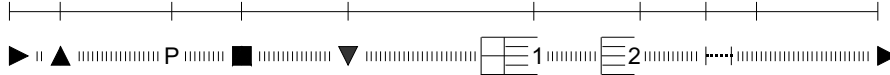


Lockout indicator

- a-b Start-up sequence
- b-b' Idle stages (without contact confirmation)
- b(b')-a Post-purging programme

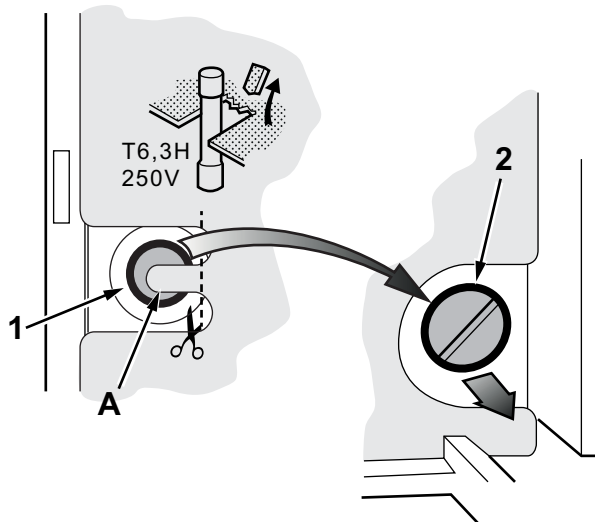
(A)

S8889



(B)

S8888



(C)

S8884

FAULTS - POSSIBLE CAUSES - SOLUTIONS

The control box is equipped with a lockout indicator (A) that turns during the start-up programme, and is visible from the small lockout window.

When the burner does not start or stops, due to a failure, the symbol that appears on the indicator indicates the type of interruption.

The positions of the lockout indicator are shown in (B).

Fuse replacement

The fuse 2)(C) is in the rear part of the control box. A spare fuse 1) is also available: it can be extracted after breaking the panel tab A) that houses it. In the event that fuse 2) has been tripped, replace it as shown in (C).

Find a list of faults, causes and possible solutions for a set of failures that may occur and result in irregular burner operation or no functioning at all.

If a burner malfunction is detected, first of all:

- check that the electrical wiring is adequately connected;
- check whether fuel is delivered;
- check that every adjustment parameter is adequately set.



WARNING

In the event the burner stops, in order to prevent any damage to the installation, do not unblock the burner more than twice in a row. If the burner locks out for a third time, contact the customer service.



DANGER

In the event there are further lockouts or faults with the burner, the maintenance interventions must only be carried out by qualified, authorised personnel, in accordance with the contents of this manual and in compliance with the standards and regulations of current laws.

SYMBOL	PROBLEM	POSSIBLE CAUSE	RECOMMENDED REMEDY
◀	The burner does not start	No electrical power supply	Close all switches and check connections
		A limit or safety thermostat/pressure switch open	Adjust or replace
		Control box lockout	Release the control box
		Control box fuse interrupted	Replace it
		Incorrect electrical wiring	Check
		Defective control box	Replace
		No gas supply	Open the manual valves between meter and train
		Mains gas pressure insufficient	Contact your gas company
		Minimum gas pressure switch fails to close	Adjust or replace
		Air pressure switch in operating position	Adjust or replace
		The servomotor contact does not intervene (closure cam 0°)	Adjust the closure cam 0° or replace the servomotor
	The burner does not switch on, and the lockout appears	Flame simulation	Replace the control box
		Faulty motor remote control switch	Replace
		Defective electrical motor	Replace
		Motor lockout	Release the thermal relay
▲	The burner starts up but stops at the damper maximum opening	The servomotor contact does not intervene (maximum cam opening)	Cam adjustment (maximum opening) or replace the servomotor
P	The burner switches on, but then stops in lockout	Air pressure switch does not switch owing to lack of air pressure:	
		Air pressure switch poorly adjusted	Adjust or replace
		Pressure switch pressure point pipe blocked	Clean
		Poorly adjusted head	Adjust
		Dirty fan	Clean
		High depression in the furnace	Contact our Technical Department
■	The burner turns on and then remains in lockout mode	Failure to the flame detection circuit	Replace the control box
▼	The burner remains in pre-purging phase	The servomotor contact does not intervene (minimum cam)	Cam adjustment (minimum) or replace the servomotor
1	Once the pre-purging and the safety time has elapsed the burner goes into lockout without the flame appearing	Gas pressure too low	Increase pressure at governor
		Ignition electrode incorrectly adjusted	Adjust it
		Electrode grounded due to broken insulation	Replace
		Faulty or grounded high voltage cable	Replace
		High voltage cable deformed by high temperature	Replace and protect
		Faulty ignition transformer	Replace
		Incorrect valve or ignition transformer connections	Redo them
		Defective control box	Replace
		A closed valve upline the gas train	Open
		Air in pipework	Bleed air
	Lockout with flame appearing	The VS or VR solenoids let too little gas through	Increase
		Dirty flame sensor	Check, replace flame sensor
		Faulty connection	Check, replace flame sensor
		Insufficient detection current (min. 6 µA)	Measure current, replace flame sensor
		Flame sensor exhausted, faulty	Replace
		Maximum gas pressure switch intervention	Adjust or replace
		Defective control box	Replace
	The burner continues to repeat the start-up cycle, without lockout	The gas pressure in the gas mains lies very close to the value to which the minimum gas pressure switch has been set.	Reduce the minimum gas pressure switch intervention pressure. Replace the gas filter cartridge
		The sudden drop in pressure after valve opening causes temporary opening of the pressure switch itself, the valve immediately closes and the burner comes to a halt.	
		Pressure increases again, the pressure switch closes again and the ignition cycle is repeated. The sequence repeats endlessly.	
	Lockout without symbol indication	Flame simulation	Replace the control box

SYMBOL	PROBLEM	POSSIBLE CAUSE	RECOMMENDED REMEDY
	Burner goes into lockout during operation	Faulty flame sensor	Replace worn parts
		Air pressure switch faulty	Replace
		Maximum gas pressure switch intervention	Adjust or replace
◀	Lockout when the burner stops	Permanent flame in the combustion head or flame simulation	Eliminate permanency of flame or replace the control box
	Ignition with pulsations	Poorly adjusted head	Adjust
		Ignition electrode incorrectly adjusted	Adjust it
		Incorrectly adjusted fan air damper: too much air	Adjust
		Output during ionisation phase is too high	Reduce

ACCESSORIES (optional):

• KIT FOR MODULATING OPERATION

Output power regulator kit RWF40

There are two components to order:

- the Output power regulator to install on the burner;
- the Probe to install on the heat generator

PARAMETER TO BE CHECKED		PROBE		POWER REGULATOR	
	Range	Type	Code	Type	Code
Temperature	- 100...+500°C	PT 100	3010110	RWF40	3010414
Pressure	0...2.5 bar	Output probe	3010213		
	0...16 bar	4...20 mA	3010214		
	0...25 bar	4...20 mA	3090873		

Output power regulator with signal 4-20 mA, 0-10V

There are two components to order:

- the Analogic signal converter;
- the Potentiometer

POTENTIOMETER		ANALOGIC SIGNAL CONVERTER	
Type	Code	Type	Code
ASZ...	3010416	E5202	3010415

• EXTENDED HEAD KIT

Burner	Standard length (mm)	Lenght obtainable with the kit (mm)	Code
RLS 250/M MZ	412	542	20029376

• SOUNDPROOFING BOX KIT

Burner	Box type	Code
RLS 250/M MZ	C4/5	3010404

• CONTINUOUS VENTILATION KIT

Burner	Code
RLS 250/M MZ	3010094

• SPACER KIT

Burner	Spacer Thickness (mm)	Code
RLS 250/M MZ	102	3000722

• GAS TRAINS IN COMPLIANCE WITH EN 676

Please refer to manual.

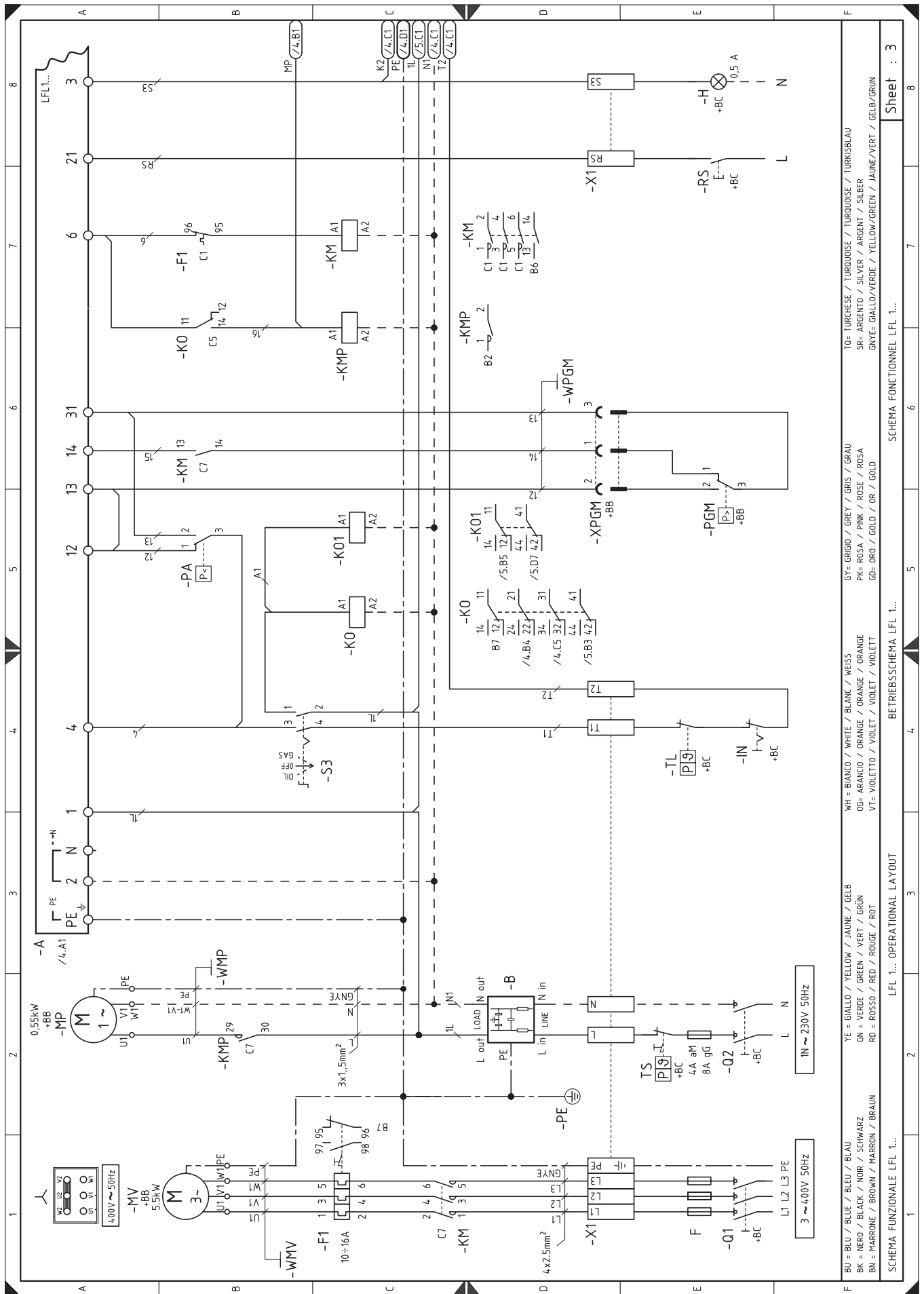
Important: the installer is responsible for the addition of any safety device not foreseen in the present manual.

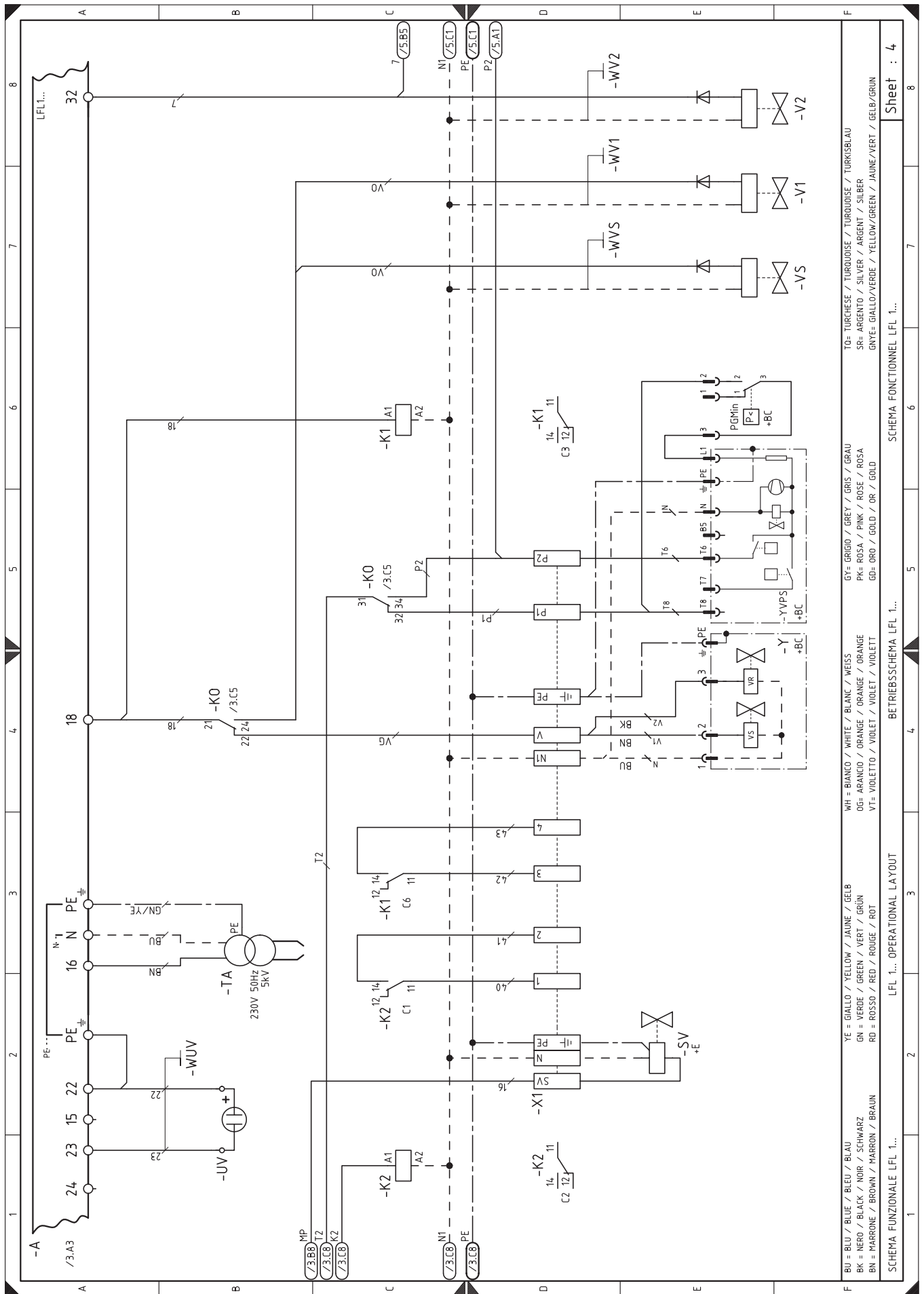
Layout of electric panel board

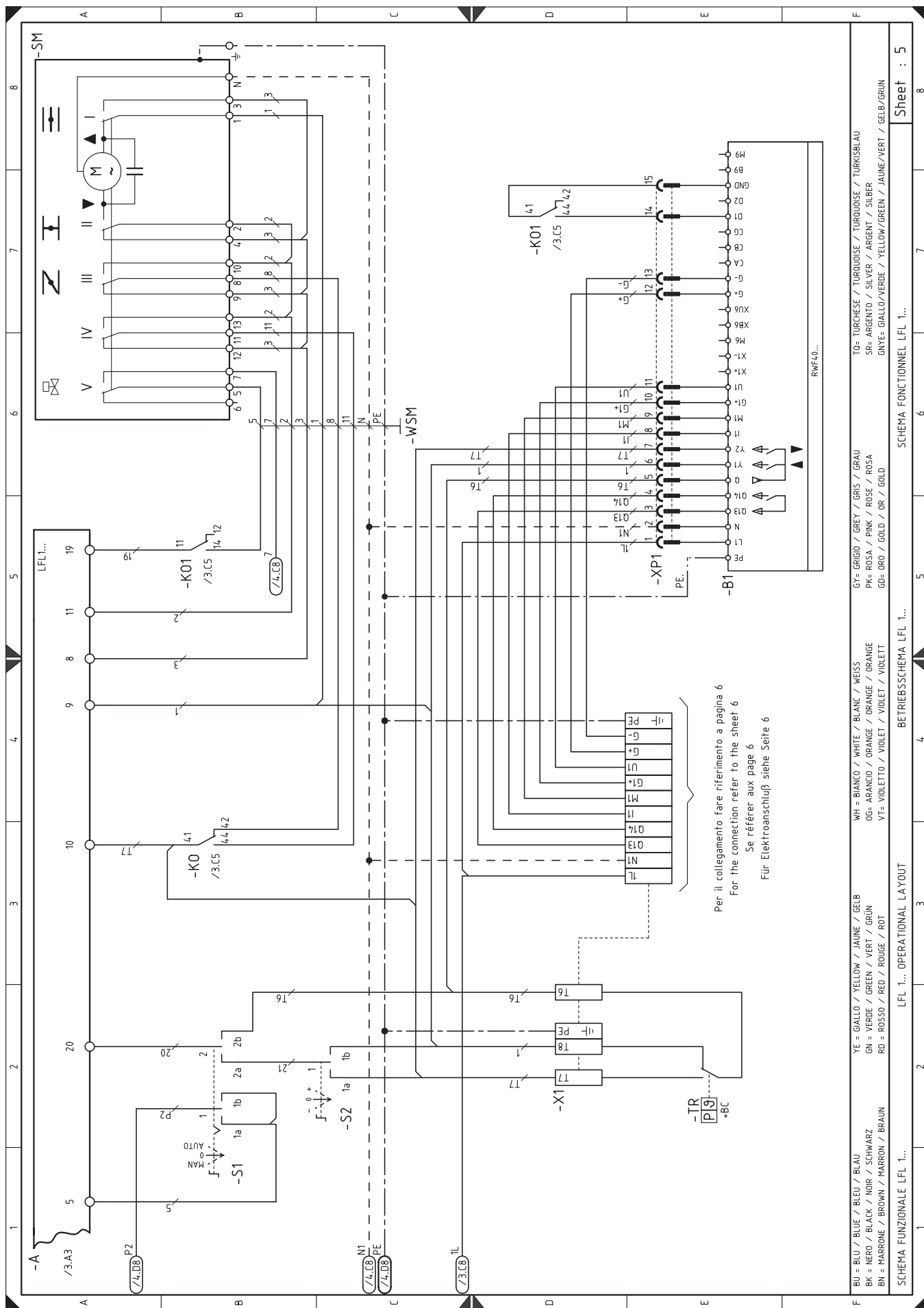
1	CONTENTS
2	References layout
3	LFL1... operational lay-out
4	LFL1... operational lay-out
5	LFL1... operational lay-out
6	Electrical connections set by installer
7	RWF40... operational lay-out

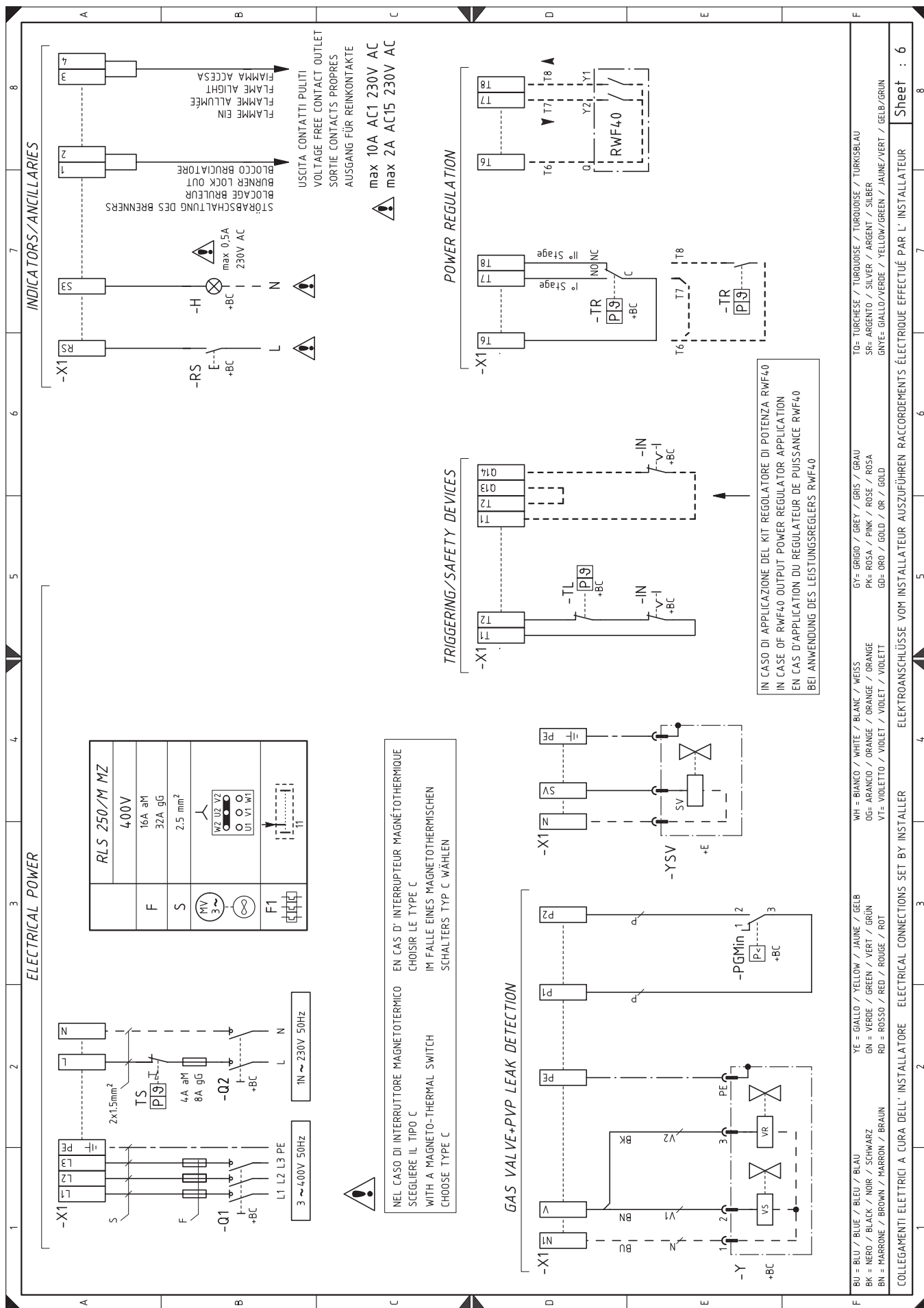
2 References layout





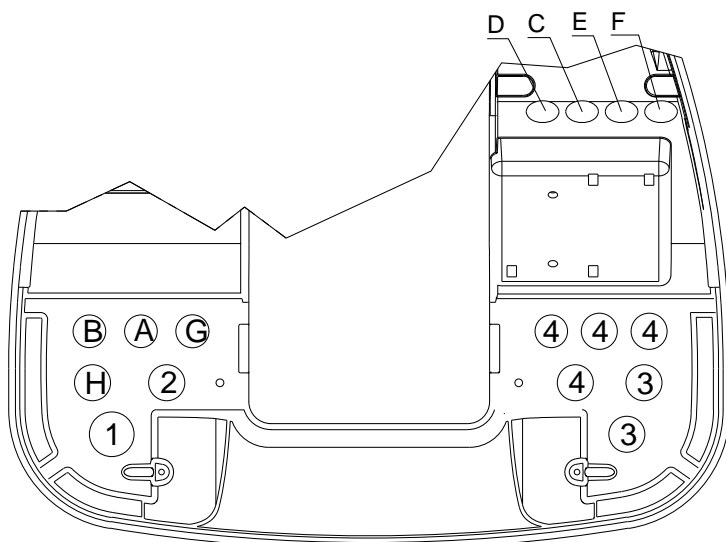






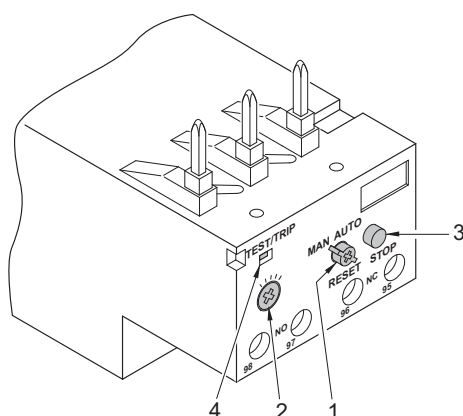
Key to layouts

+BB	Burner components
+BC	Boiler components
+E	External burner components
A	Control box
B	Protection against radio interference
B1	Output power regulator RWF40
BA	DC input 4...20 mA
BA1	DC input 4...20 mA for modifying the remote setpoint
BP	Pressure probe
BP1	Pressure probe
BR	Remote setpoint voltage divider
BT1	Thermocouple probe
BT2	Probe Pt100 with 2 wires
BT3	Probe Pt100 with 3 wires
BT4	Probe Pt100 with 3 wires
BTEXT	External probe for the climatic compensation of the setpoint
BV	DC voltage input 0...10 V
BV1	DC voltage input 0...10 V for modifying the remote setpoint
F	Protection fuses for three-phase line
F1	Fan motor thermal relay
H	Remote lock-out signal
K1	Burner on voltage free contact relay
K2	Burner lock-out voltage free contact relay
KM	Fan motor contactor
KMP	Relay
KO	KO relay
KO1	KO1 relay
IN	Switch for manual shut-off burner
MP	Pump motor
MV	Fan motor
PA	Air pressure switch
PE	Burner earth
PGM	Maximum gas pressure switch
PGMin	Minimum gas pressure switch
Q1	Switch/breaker for three-phase line
Q2	Switch/breaker for single-phase line
RS	Remote lock-out reset button
SM	Servomotor
SV	External oil valve
S1	Switch for following operations: MAN = manual AUT = automatic OFF
S2	Button for: - = power reduction + = power increase
S3	"Oil/OFF/Gas" selector
TA	Ignition transformer
TL	Limit pressure switch/thermostat
TR	Control pressure switch/thermostat
TS	Safety pressure switch/thermostat
UV	UV cell
VS	Safety valve
V1	1st stage adjustment valve
V2	2nd stage adjustment valve
X1	Main supply terminal strip
XP1	Socket for RWF40 kit
XPGM	Connector for maximum gas pressure switch
XRWF	RWF40 terminal strip
Y	Gas adjustment valve + gas safety valve
YSV	External valve unit
YVPS	Gas leak detection control device



(A)

D8880



(B)

D8885

ELECTRICAL CONNECTIONS (A)

Use flexible cables according to EN 60 335-1 regulations.

All the wires to connect to the burner must enter through the supplied fairleads.

The fairleads and hole press-outs can be used in various ways; the following lists show one possible solution:

- 1 - M25 - Three-phase powersupply
- 2 - M20 - Single-phase power supply
- 3 - M20 - Triggering / Safety devices
- 4 - Available

Cable grommets used in the factory:

- A - Fan motor
- B - Servomotor
- C - Pump motor
- D - Safety solenoid
- E - 1st stage solenoid valve
- F - 2nd stage solenoid valve
- G - Maximum gas pressure switch
- H - Flame sensor

The burner has been type- approved for intermittent operation. This means it should compulsorily be stopped at least once every 24 hours to enable the control box to perform checks of its own efficiency at start-up. Burner halts are normally provided for automatically by the boiler load control system.

If this is not the case, a time switch should be fitted in series to IN to provide for burner shut-down at least once every 24 hours.

Wiring must be performed by qualified personnel in accordance with the regulations in force in the country of destination.

Riello S.p.a. declines all responsibility for changes or wiring performed in any way other than that illustrated in these diagrams.



WARNING

Do not invert the neutral with the phase wire in the electricity supply line.

CALIBRATION OF THE THERMAL RELAY (B)

The thermal relay is used to avoid damage to the motor owing to a strong increase in absorption or the lack of a phase.

For the calibration 2), refer to the table given in electrical layout (Electrical connections set by installer).

To reset, in the case of an intervention of the thermal relay, press the button "RESET" 1).

The button "STOP" 3) opens the NC (95-96) contact and stops the motor.

To test the thermal relay, insert a screwdriver in the window "TEST/TRIP" 4) and move it in the sense of the arrow (towards right).



WARNING

Automatic resetting can be dangerous. This action is not provided for the burner operation.

声明	页码 2
技术数据	3
电气数据	3
燃烧器描述	4
包装 - 重量	4
最大尺寸	4
标准配置	4
出力范围	5
测试锅炉	5
商用锅炉	5
安装	6
锅炉钢板	6
燃烧筒长度	6
安装燃烧器到锅炉	6
1 段火及 2 段火喷嘴选择	6
喷嘴安装	7
首次点火前调节 (轻油运行)	8
轻油供应	9
液压连接	9
液压系统	10
油泵	10
油泵启动	10
燃烧器校准 (轻油运行)	11
燃气供应	12
燃气阀组	12
燃气压力	13
首次点火前调节 (燃气运行)	14
燃烧器启动	14
燃烧器点火	14
伺服马达	15
燃烧器校准	15
燃烧器运行	19
维护	20
燃气燃烧状态检测	21
故障 - 可能的原因 - 解决方案	22
配件	25
附录	26
电路板接线图	26
电气连接	33
热继电器校准	33

符合 ISO / IEC 17050-1 标准声明

制造商：RIELLO S.p.A.
地址：Via Pilade Riello, 7
37045 Legnago (VR)
产品名称：双燃料轻油 / 燃气燃烧器
型号：RLS 250/M MZ
以上产品符合如下技术标准：
EN 676
EN 267
EN 12100
且符合如下欧洲指令：
MD 2006/42/EC 机械指令
LVD 2006/95/EC 低电压指令
EMC 2004/108/EC 电磁兼容性

产品质量符合 UNI EN ISO 9001 质量管理体系标准。

制造商声明

RIELLO S.p.A. 声明以下产品符合德国 “1. BImSchV 版 26.01.2010” 之 NOx 排放限制标准。

产品名称	类型	型号	功率
双燃料轻油 / 燃气燃烧器	1302 T	RLS 250/M MZ	555 - 2460 kW

Legnago, 10.10.2013

执行总监
RIELLO S.p.A. - 燃烧器部
Mr. G. Conticini



研发总监
RIELLO S.p.A. - 燃烧器部
Mr. R. Cattaneo



技术数据

型号			RLS 250/M MZ
功率 ⁽¹⁾ 出力 ⁽¹⁾	2 段火	kW kg/h	1230 - 2460 104 - 207
	最小 1 段火	kW kg/h	550 47.5
燃料			轻油, 20 °C 时的粘度 : 6 mm ² /s 最大 (1,5 °E - 6 cSt) 天然气 : G20 (甲烷) - G21 - G22 - G23 - G25
最大出力时的燃气压力 ⁽²⁾ 燃气 : G20/G25		mbar	27.3/40.8
运行			- 间歇式运行 (每 24 小时至少停机一次) - 轻油 : 两段火 (高 - 低火焰) 以及单段火 (启动 - 停机) - 燃气 : 平滑两段火或加装组件 (见 “ 配件 ”) 后实现比例调节运行
喷嘴	数量		2
适用范围			锅炉 : 热水锅炉、蒸汽锅炉、导热油炉
环境温度		°C	0 - 40
助燃空气温度		°C 最高	60
油泵	流量 (压力为 12 bar 时)	kg/h	230
	压力范围	bar	10 - 21
	燃料温度	°C 最高	90
噪音水平 ⁽³⁾	声压	dBA	85
	声功率		96

(1) 参考条件 : 环境温度 20°C - 大气压力 1000 mbar - 海拔 100 m s.l.m.

(2) 燃气阀组上游压力 1)(A)p.12 如 EN676 标准所示, 炉膛内压力为零且燃烧器处于最大出力状态时。

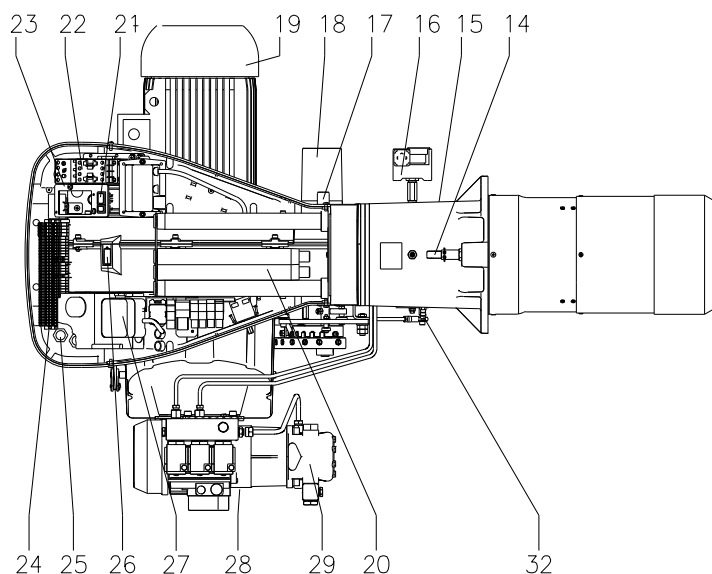
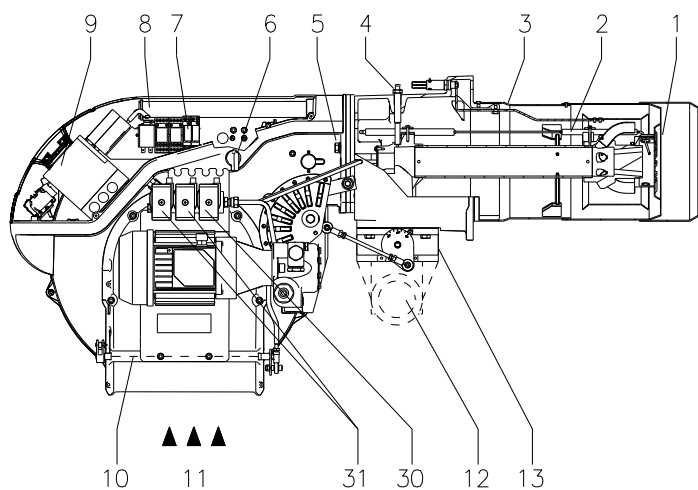
(3) 噪声值于制造商实验室内的测试锅炉上测得, 且燃烧器处于最大额定出力状态。根据相关规定, 声功率的测定集中在以燃烧器为中心、半径为 1 米的球形空间内。

电气数据

型号			RLS 250/M MZ
主电源			3 ~ 400V 50Hz
电源控制回路			1N ~ 230V 50Hz
风机马达 IE2		rpm	2920
		Hz	50
		V	230 / 400
		W	5500
		A	18.2/10.5
油泵马达		rpm	2700
		Hz	50
		V	230
		W	550
		A	3.6
油泵马达电容器		µF	25
点火变压器	V1 - V2		230 V - 2 x 5 kV
	I1 - I2		1,9 A - 35 mA
吸收电功率	轻油	W 最大	7500
	燃气		6000
电气保护等级			IP 44

燃烧器类别

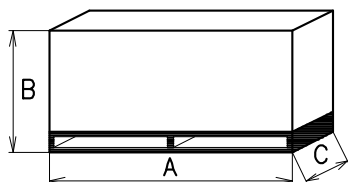
适用国家	类别
IT - AT - GR - DK - FI - SE	II _{2H3B} / P
ES - GB - IE - PT	II _{2H3P}
NL	II _{2L3B} / P
FR	II _{2Er3P}
DE	II _{2ELL3B} / P
BE	I _{2E(R)B} , I _{3P}
LU - PL	II _{2E3B/P}



(A)

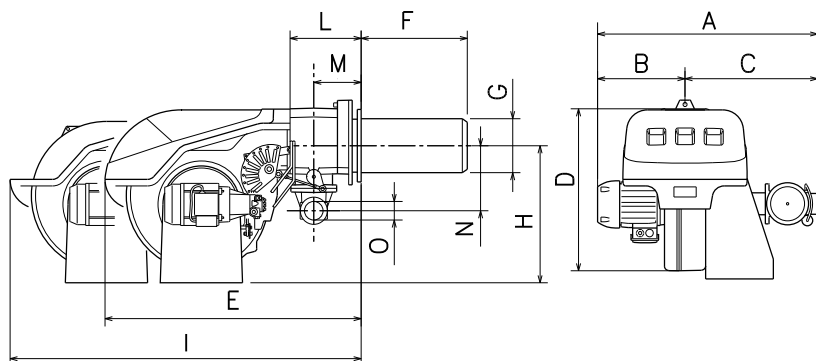
D8862

mm	A	B	C	kg
RLS 250/M MZ	1400	765	1000	95



(B)

D36



mm	A	B	C	D	E	F	G	H	I	L	M	N	O
RLS 250/M MZ	904	427	477	555	863	412	222	435	1442	237	141	186	Rp2

(C)

D3169

燃烧器描述 (A)

- 1 稳焰盘
- 2 点火电极
- 3 燃烧头
- 4 燃气压力测试点和燃烧头固定螺丝
- 5 固定风机到燃烧头用螺丝
- 6 燃油 / 燃气选择器
- 7 继电器
- 8 滑杆系统，用于打开燃烧器及检查燃烧头
- 9 控制盒，带锁定指示灯及锁定复位按钮
- 10 风门阀
- 11 风机进风口
- 12 燃气进气管路
- 13 燃气蝶阀
- 14 燃烧头调节螺丝
- 15 固定燃烧头到锅炉上的带法兰燃烧筒
- 16 最大燃气压力开关
- 17 Cell UV
- 18 伺服马达通过可变线凸轮控制燃气蝶阀和风门阀。
燃烧器停机时风门阀关闭以减少因风机开启产生气流所造成的锅炉热量损失。
- 19 风机马达
- 20 滑杆延长杆 8)
- 21 不同运行方式开关：
自动 - 手动 - 调节
如下操作按钮：
增大出力 - 降低出力
- 22 带复位按钮的马达接触器和热断路器
- 23 安装出力比调仪 RWF40 的支架
- 24 接线端子板
- 25 电气连接用导缆孔，由安装人员负责
- 26 火焰检查窗
- 27 最小风压开关
("微分"运行)
- 28 油泵马达
- 29 油泵
- 30 安全电磁阀
- 31 1 段火和 2 段火阀门
- 32 风压测试点

两种燃烧器故障：

控制盒锁定：如果控制盒 9)(A) 按钮指示灯亮起，则显示燃烧器锁定。

可按此按钮进行复位。

马达跳闸：按下热继电器 22)(A) 上的按钮可恢复供电。

包装 - 重量 (B) - 大概值

- 燃烧器整机放置于能由叉车吊起的木质底盘上。其带包装的外观尺寸如表 (B) 所示。
- 燃烧器带外包装的整体重量如表 (B) 所示。

最大尺寸 (C) - 大概值

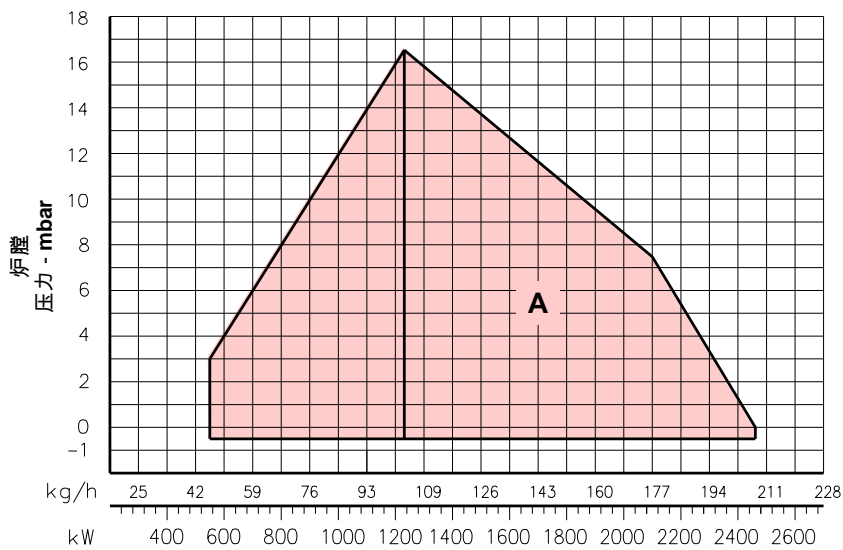
燃烧器最大尺寸如表 (C) 所示。

请谨记检查燃烧头时需要打开燃烧器，将其后部从滑杆上取下。

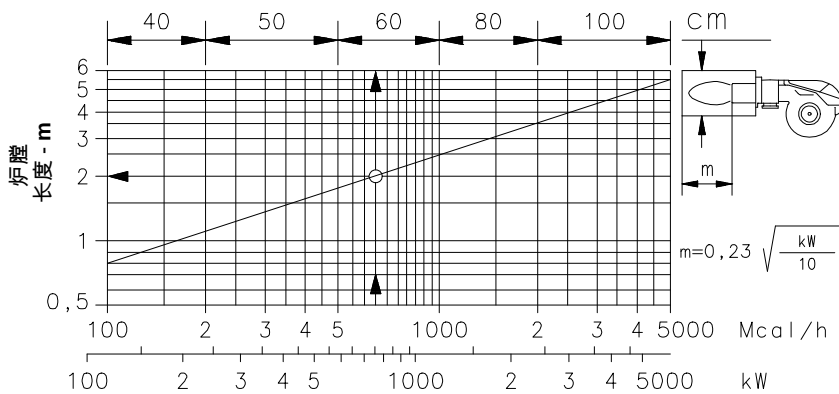
将燃烧器打开后，其不带外罩的最大尺寸如图 I 所示。

标准配置

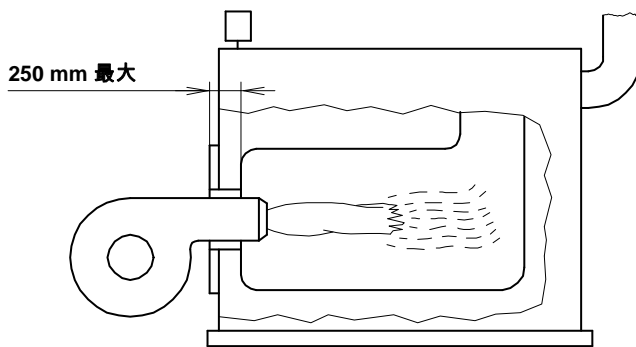
- 1 - 燃气阀组法兰
- 1 - 法兰垫片
- 4 - 安装到燃气蝶阀的法兰固定螺丝 M 10 x 40
- 1 - 隔热垫
- 4 - 将带法兰的燃烧筒安装到锅炉用螺丝：M 16 x 40
- 2 - 软管
- 2 - 带垫圈的软管接头
- 1 - 操作手册
- 1 - 零部件目录



D3170



D715



D1079

出力范围 (A)

在运行中，燃烧器的出力范围为：

- 最大出力，在 A 区内选择，
- 最小出力时，不得低于图中所示的最小值。

RLS 250/M MZ = 550 kW

重要提示：

出力范围内所示数值在以下条件下获得：环境温度为 20 °C，大气压力位 1000 mbar (大约海拔高度为 100 米)，燃烧头调整至如第 8 页所示状态。

调节比

调节比根据标准 (燃气符合 EN 676 标准，轻油符合 EN 267 标准) 在测试锅炉上取得：

- 4: 1 (燃气)；

- 2: 1 (轻油)。

采用燃气运行模式时，燃烧器的调节比可根据不同的应用环境进行调整 -- 详细信息请咨询生产商。

测试锅炉 (B)

出力曲线根据 EN 676 标准在专用测试锅炉上获得。

图 (B) 为测试锅炉的炉膛直径及长度。

举例：

出力 650 Mcal/h:

直径 = 60 cm; 长度 = 2 m。

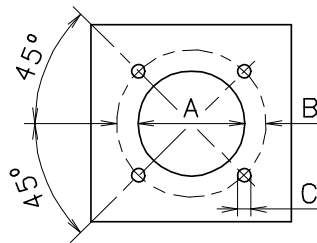
商用锅炉 (C) - 重要提示

该型号燃烧器适用于三回程烟管锅炉，NO_x 排放低。

锅炉前门的最大厚度不能超过 250 mm (见图 C)。

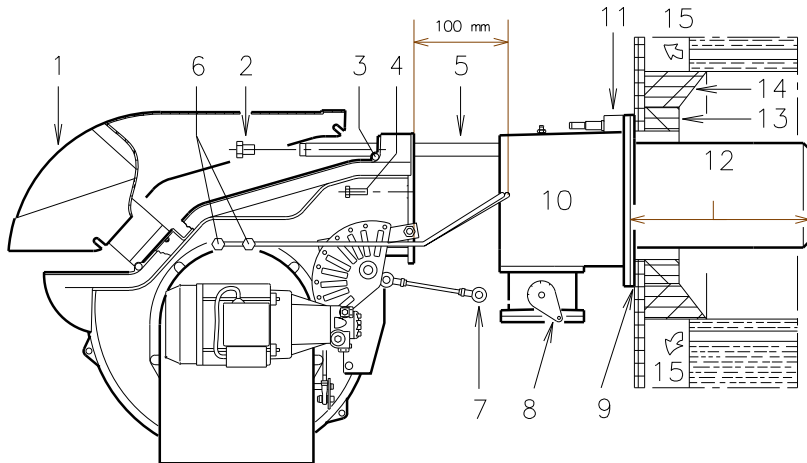
若锅炉符合 EC 类的认证标准，则燃烧器和锅炉相互匹配；如果锅炉的炉膛尺寸与图 (B) 所示数值相差很大，则需进行使用前的预备测试。

mm	A	B	C
RLS 250/M MZ	230	325-368	M 16



(A)

D455



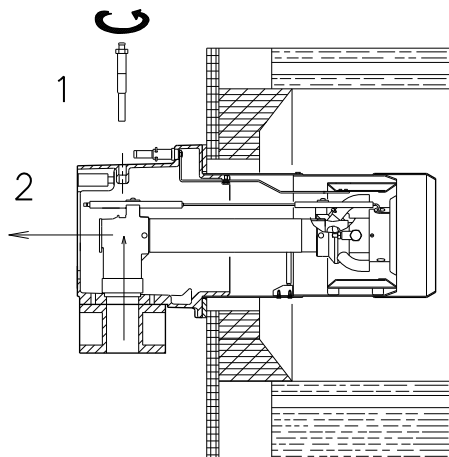
(B)

D8911

喷嘴类型：DELAVAL B 60°

GPH	kg/h			kW 12 bar
	10 bar	12 bar	14 bar	
12.0	44.16	48.73	52.96	582.36
13.0	47.84	52.79	57.38	630.89
14.0	51.52	56.86	61.79	679.42
15.0	55.20	60.92	66.20	727.95
16.0	58.88	64.98	70.62	776.48
17.0	62.57	69.04	75.03	825.01
18.0	66.25	73.10	79.44	873.54
19.0	69.93	77.16	83.86	922.07
20.0	73.61	81.22	88.27	970.60
22.0	80.97	89.34	97.10	1067.66
24.0	88.33	97.47	105.93	1164.72
25.0	92.00	101.53	110.34	1198.00
26.0	95.69	105.59	114.75	1261.78
28.0	103.05	113.71	123.58	1358.84
30.0	110.41	121.83	132.41	1455.90
32.0	117.77	129.95	141.24	1533.47
34.0	125.13	138.08	150.06	1629.31
35.0	128.81	142.14	154.48	1667.23

(C)



(D)

D3172

安装

锅炉钢板 (A)

如 (A) 所示，在炉膛定位板上钻孔。随燃烧器提供的隔热垫可帮助确定导缆孔的位置。

燃烧筒长度 (B)

必须根据锅炉生产商提供的数据选择合适长度的燃烧筒，且在任何情况下其厚度必须大于锅炉钢板加炉补的厚度之和。可选的长度范围 L (mm) 如下：

燃烧筒 12):	RLS 250/M MZ
• 标准	418
• 加长	548

带前烟道 (15) 或回焰炉膛的锅炉，其使用耐火材料制成的保护性炉补 (13) 必须装于锅炉炉补 (14) 和燃烧筒 (12) 之间。

此保护性炉补不得妨碍取下燃烧筒。
带水冷却前板的锅炉，则不需要耐火材料制成的炉补 (13)-(14)(B)，除非锅炉制造商另有要求。

固定燃烧器到锅炉上 (B)

从燃烧器上取下燃烧头，如图 (B)：

- 拧下两个连接器 (6) 的螺丝，取下输油管。
- 从刻度指示盘 (8) 解开连杆 (7) 的连接。
- 拧下 4 个螺丝 (3)，取下外罩 (1)
- 从滑杆 (5) 上取下螺丝 (2)
- 取下 2 个螺丝 (4)，将燃烧器沿滑杆 (5) 拉出大约 100 mm。
- 断开点火电极电缆，将燃烧器从滑杆上取下。

将带法兰 (11)(B) 的燃烧筒安装到锅炉钢板上，并在二者间安装随燃烧器附带的隔热垫 (9)(B)。使用随附的 4 个螺丝固定。燃烧器和锅炉之间的密封必须达到气密标准。

选择 1 段火和 2 段火喷嘴

燃烧器符合 EN 267 标准所规定的排放标准。

为了保证稳定排放，应使用利雅路操作手册中推荐使用的喷嘴。



WARNING

建议每年进行定期维护时更换喷嘴。



CAUTION

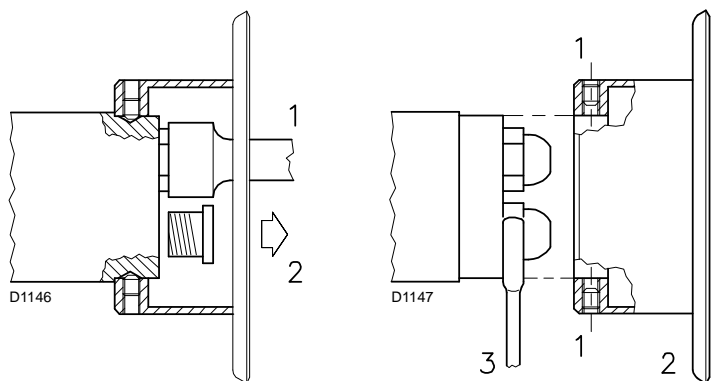
使用非利雅路公司指定喷嘴以及缺乏定期维护可能会导致排放超出强制标准规定的限值；严重时，还会导致人员伤亡及财产损失。

因未按本手册进行操作导致的任何损害，制造商将不承担任何责任。

两个喷嘴均需在表 (C) 中选择。

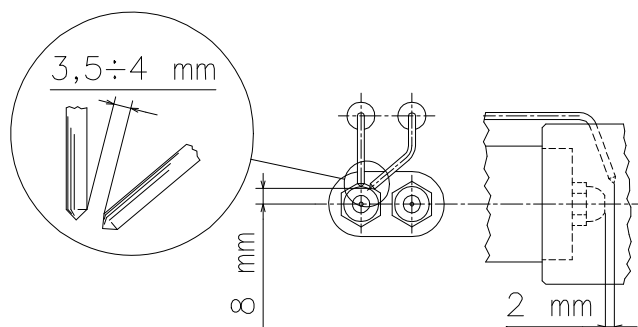
1号喷嘴控制燃烧器在1段火运行模式时的出力大小。

2号喷嘴与1号喷嘴一起控制燃烧器在2段火运行模式时的出力大小。



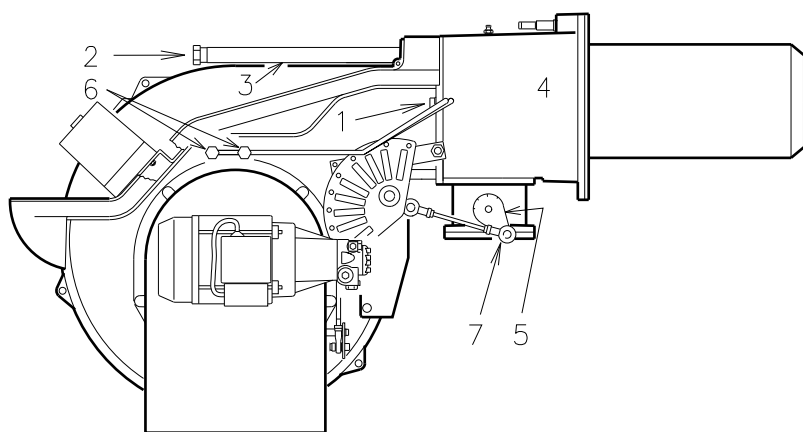
(A)

(B)



(C)

D2995



(D)

D8912

1 段火及 2 段火的出力大小必须在第 3 页所示的数值范围内。

建议压力为 12 bar 时，喷嘴喷射角度为 60°。通常，两个喷嘴的出力大小相同。但在点火时，需要背压峰值降低，此时 1 号喷嘴出力小于总出力的 50%。(在 1 段火及 2 段火运行中，燃烧器在 40 - 100 % 出力范围时，均可获得高燃烧率)。

举例

锅炉功率 = 1630 kW - 效率 90 %

燃烧器所需出力 =

$1630 : 0.9 = 1812 \text{ kW}$;

$1812 : 2 = 906 \text{ KW}$ 每一喷嘴;

因此，两个相同喷嘴，喷射角度为 60°，气压为 12 bar，所需喷嘴为：

$1^\circ = 18 \text{ GPH}$ - $2^\circ = 18 \text{ GPH}$,

或者使用两个不同喷嘴：

$1^\circ = 16 \text{ GPH}$ - $2^\circ = 20 \text{ GPH}$.

喷嘴安装

取下螺丝 1)(D)p.6 并且取出内部组件 2)(D)。

在取下塑料塞子 2)(A)，用扳手 1)(A) (16 mm)，安装两个喷嘴，将扳手伸入火焰稳定盘的中心孔或拆下螺丝 1)(B)，取下稳焰盘 2)(B) 并用扳手 3)(B) 装好喷嘴。

请勿使用任何密封材料，如密封垫、复合密封材料或密封胶带。注意不要损坏喷嘴的密封座。安装时必须将喷嘴拧到位，但不要拧脱扣。

1 段火运行时的喷嘴位于点火电极下，如图 (C)。



确认点火电极连接位置如图 (C) 所示。

WARNING

将燃烧器重新安装到滑杆 3)(D) 上，从燃烧筒 4) 处推进大约 100 mm - 燃烧器位置如图 (B) 页 6 所示 - 插入点火电极线，然后将燃烧器沿滑杆滑动至燃烧筒处，直至燃烧器位置如图 (D) 所示。

重新拧紧滑杆 3) 上的螺丝 2)(D)。

拧紧螺丝 1)，将燃烧器固定到燃烧头上。

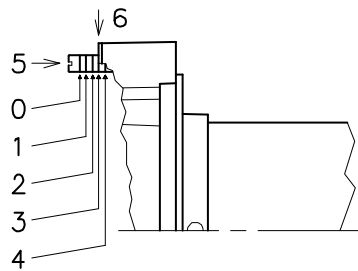
用螺丝拧紧两个连接器上，如图 6)(B) 页 6 所示，接好输油管。

将连杆 7) 与刻度指示盘 8) 重新连接。



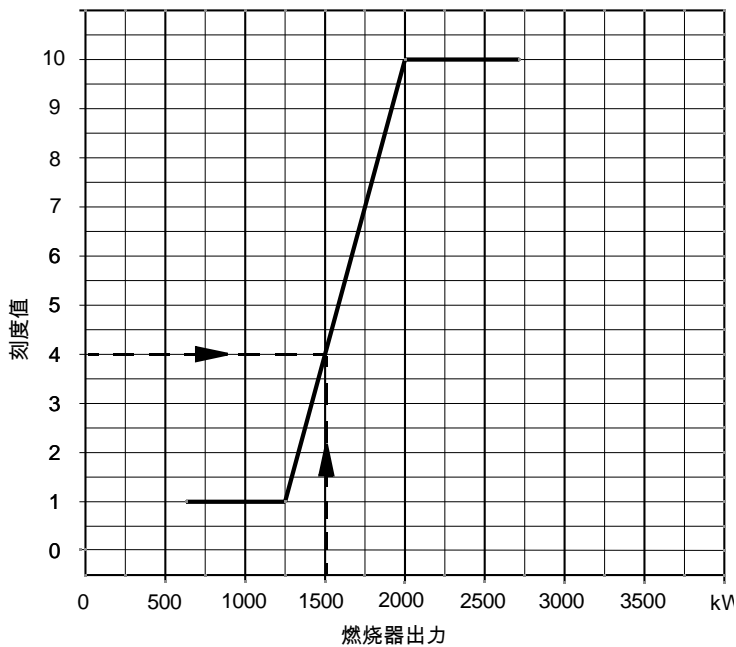
将燃烧器安装到两个滑杆上时，好后，建议轻轻的拉出点火电极的电缆，直至它们被轻轻的拉紧。

WARNING



(A)

D1149



(B)

D3948

点火前调节
(轻油运行)

• 燃烧头设定

燃烧头的设定完全取决于燃烧器的最大出力。
拧紧螺丝 5)(A) 直至图 (B) 所示刻度位置，此为法兰 6)(B) 外沿位置。



为了方便燃烧头的调整，可先拧松螺丝 1)(D) 页 6，调整位置，然后再拧紧螺丝。

举例：

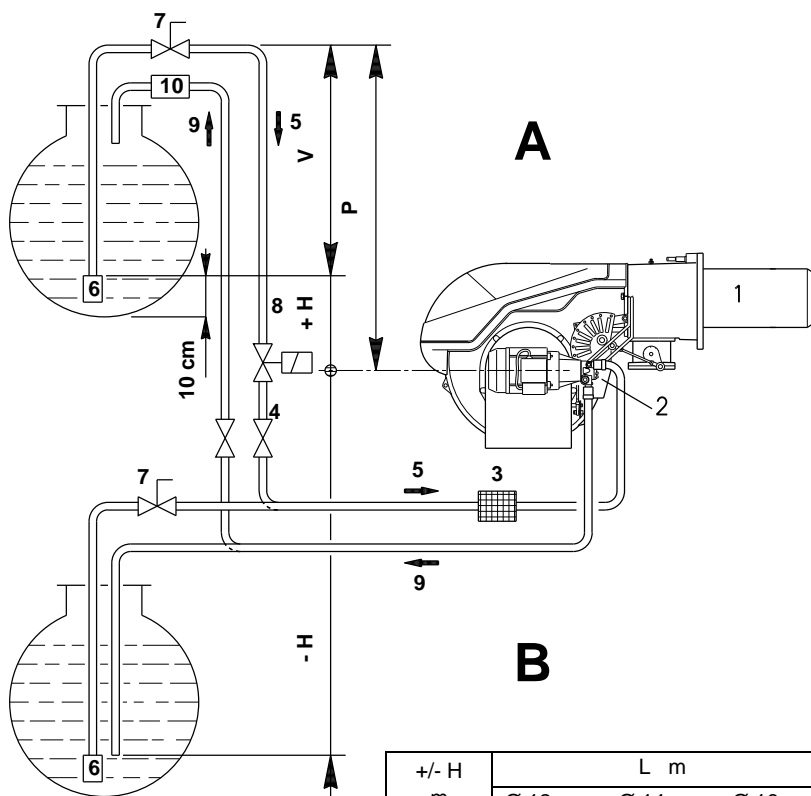
燃烧器最大出力 = 1500 kW。
查图 (B) 可知在此出力要求下，需将燃烧头调整至刻度 4，如图 (B) 所示。

• 油泵调节

油泵无需调节，出厂时已由制造商按气压 12 bar 的标准进行设定。燃烧器点火后需对这一压力进行检查，如有必要则需调整。
此阶段所需的唯一操作为油泵安装压力表。

• 风门调节

燃烧器初次点火时，请勿改变燃烧器出厂时工厂对 1 段火及 2 段火运行所设定的参数。



轻油供应 (A)

燃烧器配置一台自吸泵，可对燃烧器自动送油。
自吸泵的高度见左表。

高位油箱 A

为了避免破坏油泵密封，高度“P”不能超过 10 米；
为了油箱即使在油量极少的情況下能启动油泵，高度“V”不能超过 4 米。

低位油箱 B

油泵吸入口真空度不能超过 0.45 bar (35 cm Hg)，真空度过高会造成燃油汽化，油泵启动噪音大，且会降低油泵寿命。
保持燃烧器回油管和进油管在相同水平高度，这样可以避免进油管吸不到油。

图例 (A)

- H = 油泵 / 脚阀高度差
- L = 管路长度
- Ø = 管路内径
- 1 = 燃烧器
- 2 = 油泵
- 3 = 过滤器
- 4 = 手动 启动 / 停机 阀门
- 5 = 进油管
- 6 = 脚阀
- 7 = 快关手动阀远程控制 (仅适用于意大利)
- 8 = 开 / 关 电磁阀 (仅适用于意大利)
- 9 = 回油管
- 10 = 止回阀 (仅限意大利)

液压连接 (B)

油泵配有旁路系统可以连接进油管和回油管。油泵安装在燃烧器上时，旁路系统被螺丝 6)(A) p.10 封住。

需要连接两根软管到油泵上。
如回油管关闭且旁路系统螺丝为插入状态，此时运行油泵会立即损坏油泵。

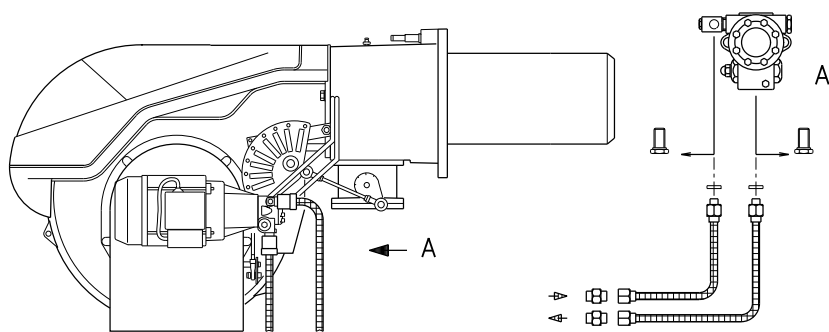
拆下油泵入口及回油口的堵头。
将所附的密封垫加入到连接管连接到油泵并拧紧。

注意安装软管时不要拉伸或扭曲软管。
软管应安装在不易被踩踏的位置，不能接触到锅炉的高温表面，亦不能妨碍打开燃烧器进行检修。
现在可以用随附的软管接头将软管的另一端与进油管路和回油管路相连接。

± H m	L m		
	Ø 12 mm	Ø 14 mm	Ø 16 mm
+ 4	71	138	150
+ 3	62	122	150
+ 2	53	106	150
+ 1	44	90	150
+ 0,5	40	82	150
0	36	74	137
- 0,5	32	66	123
- 1	28	58	109
- 2	19	42	81
- 3	10	26	53
- 4	-	10	25

(A)

D3175

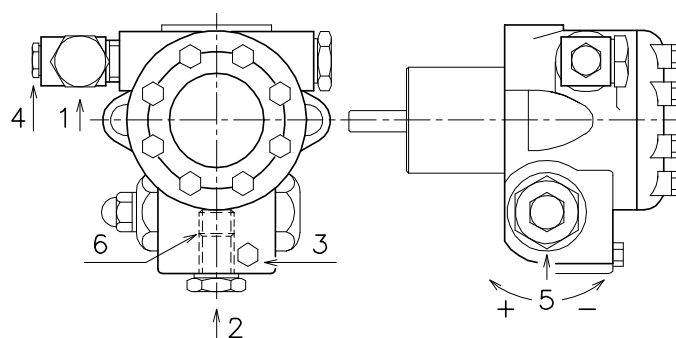


(B)

D3176

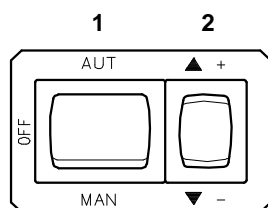
(A)

油泵 - SUNTEC J7 C



		J7 C
A	kg/h	230
B	bar	10 - 21
C	bar	0,45
D	cSt	2.8 - 200
E	°C	90
F	bar	1.5
G	bar	12
H	mm	0.17

(B)



(C)

液压系统

图例 (A)

- 1 油泵进油管
- 2 过滤器
- 3 油泵
- 4 调压阀
- 5 回油管
- 6 旁路螺丝
- 7 油泵回油管
- 8 安全电磁阀
- 9 1 段火阀门
- 10 2 段火阀门
- 11 过滤器
- M 压力计
- V 真空计

油泵 (B)

- | | |
|------------|--------|
| 1 - 进油管 | G 1/2" |
| 2 - 回路 | G 1/2" |
| 3 - 压力表附件 | G 1/8" |
| 4 - 真空计附件 | G 1/8" |
| 5 - 压力调节螺丝 | |
| 6 - 旁路螺丝 | |

- A - 气压为 12 bar 时的最小输油量
- B - 输油压力范围
- C - 油泵吸入口最大真空度
- D - 粘度范围
- E - 轻油最高温度
- F - 最大进油和回油压力
- G - 出厂时的压力校准
- H - 过滤网宽度

油泵启动

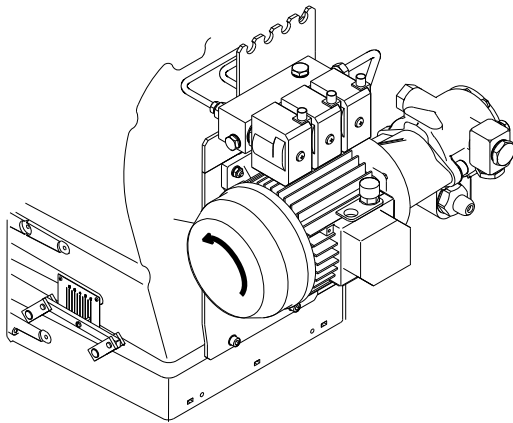
- 启动燃烧器前，确认油箱回油管路畅通。回油管路堵塞可能损坏油泵轴上的密封圈。（油泵出厂时旁路系统已被堵塞）。
- 检查确认进油管路上的阀门为开启状态，且油箱中有足够量的燃油。
- 启动自吸功能时，松开油泵上的螺丝 3)(B)，排出进油管路中的空气。
- 将控制盒电源闭合，启动燃烧器。将开关 1)(C) 置于 "MAN" 位置，同时开关 6)(A)p.4 置于 "OIL" 位置。
- 若从螺丝 3)(B) 处有油漏出，则可认为油泵运行正常。
- 将燃烧器停机时，将开关 1)(C) 置于 "OFF" 位置并拧紧螺丝 3)(B)。

启动所需时间取决于进油管直径及长度。如果首次启动油泵失败且燃烧器锁定,等待大约 15 秒后,复位燃烧器,之后按规定的启动间隔再次启动燃烧器。

启动 5 或 6 次后请间隔 2 至 3 分钟，以利于变压器的冷却。

不要调暗 UV 电眼，否则燃烧器会锁定；燃烧器将在启动后 10 秒锁定。

重要提示：油泵在出厂时已经注满油。如果有油泻出，请从油泵的真空测量孔处将油注满，否则会损坏油泵。当供油管的长度超过 20-30 米时，请另加一台独立的油泵。



(A)

D8861

燃烧器校准 (轻油运行)

注意

建议首次校准燃烧器时以轻油运行参数为准，之后再使用燃气运行。

警告

若将燃烧器燃料由燃油更换为燃气，必须在停机时进行。



油泵马达旋转方向
见图 (A)。

点火

将开关 1)(C)p.10 置于 "MAN" 位置。
首次点火时，当 1 段火运行转换为 2 段火运行时，会因燃油需将 2 段火喷嘴管路注满而出现短暂的油压下降现象。这一压力的下降可能会导致燃烧器锁定，有时还会引起燃烧器震动。

如果能进行如下调整，燃烧器点火时的噪音就会接近其运行时的噪音。

运行

燃烧器的优化校核需要在锅炉排气口安装烟气分析仪，并对以下部分进行调整：

• 1 段火和 2 段火喷嘴

内容详见第 6 页和第 7 页。

• 燃烧头

除改变 2 段火时燃烧器的送油量外，其它有关燃烧头调整之事宜按之前相关内容（第 8 页）进行操作。

• 油泵压力

12 bar: 此压力位出厂时的预设值，可以满足大部分用户的需求。有些情况下，也需对此压力做出调整，如：

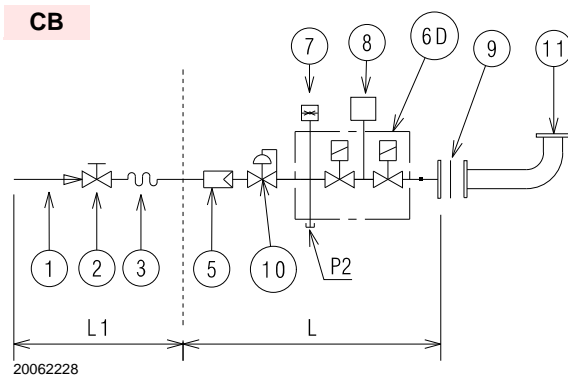
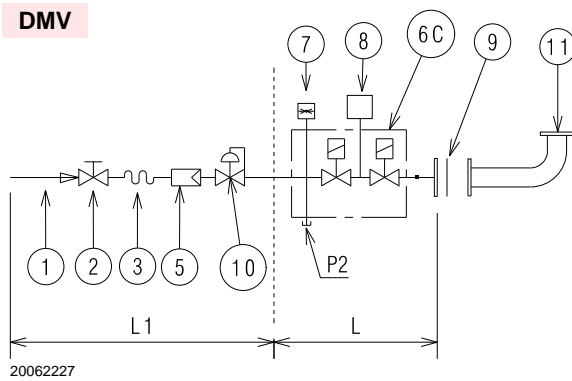
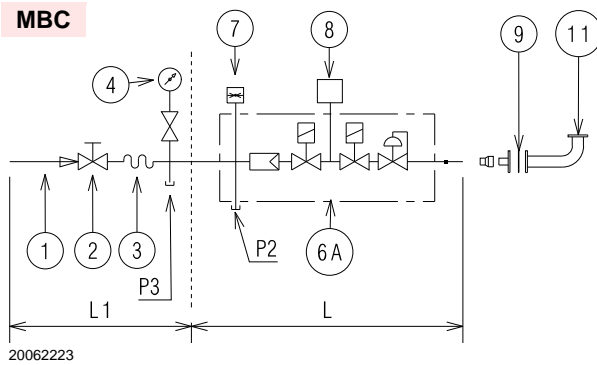
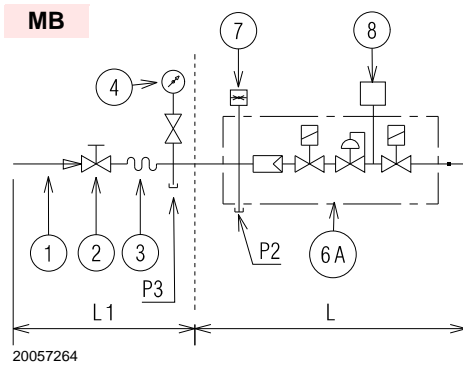
10 bar 在此压力下，可减小燃油输送量，但环境温度需在 0°C 以上。

14 bar 在此压力下，可增加燃油输送量。此压力还可保证温度低于 0°C 时，燃烧器仍能点火启动。

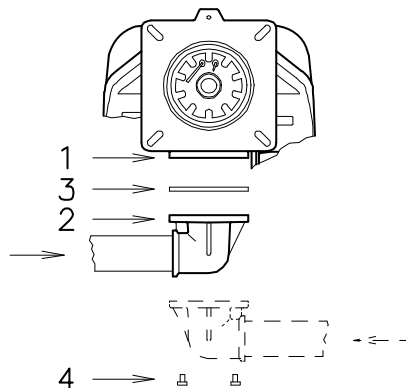
调整油泵压力，可使用螺丝 5)(B)p.10。

• 1 段火和 2 段火风门阀

见第 15 页“伺服马达调节”部分。



(A)



(B)

燃气供应



在有可燃物的环境中发生燃料泄漏时，可能会有爆炸危险。

注意：避免敲击、摩擦、火花及加热。
在对燃烧器进行任何操作前，检查确认燃料截止阀全关。



燃气供应管路必须由具有资质的人员安装，且符合安装地的强制标准。

图例 (A)

- 1 燃气输入管路
- 2 手动阀
- 3 减震器
- 4 带按键锁的压力表
- 5 过滤器
- 6A 包括：
 - 过滤器
 - 运行阀
 - 安全阀
 - 调压器
- 6C 包括：
 - 安全阀
 - 运行阀
- 6D 包括：
 - 安全阀
 - 运行阀
 - 调压器
 - 过滤器
- 7 最小燃气压力开关
- 8 燃气阀泄漏检测装置，根据燃气阀组代码，此装置为机内集成或随机配件。按 EN 676 标准要求，最大出力大于 1200 kW 的燃烧器必须强制安装泄漏检测装置。
- 9 垫片，仅适用于“法兰”型
- 10 调压器
- 11 燃气阀组 - 燃烧器适配器，需单独订购
- P2 阀门 / 调压器上游压力
- P3 过滤器上游压力
- L 燃气阀组需单独订购
- L1 由安装人员负

燃气阀组

燃气阀组符合 EN 676 标准,不包含在燃烧器内,
为单独订购组件。

请参考手册中“燃烧器 - 燃气阀组”一节选择正确的燃气阀组型号

查看随附的手册调节燃气阀组。

燃气阀组安装

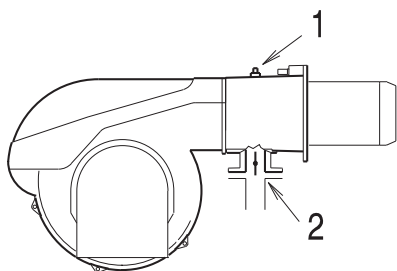
- 使用随附的法兰2), 垫片3) 和螺丝4) 将燃气阀组必须和其附件 1)(B) 进行连接。
- 燃气阀组可以安装在燃烧器右侧或左侧, 以方便为原则。
- 检查确认压力调节器校准范围 (弹簧颜色) 与燃烧器所需压力相符。



燃气电磁阀应尽可能靠近燃烧器，以保证燃气在 3 秒安全时间内到达燃烧头。

kW	1 Δp (mbar)		2 Δp (mbar)	
	G 20	G 20	G 25	G 25
1230	8,5	12,7	1,9	2,8
1367	10,3	15,4	2,7	4,0
1503	12,2	18,2	3,5	5,2
1640	14,3	21,3	4,1	6,1
1777	16,5	24,6	4,6	6,9
1913	18,7	27,9	5,2	7,8
2050	21,0	31,3	5,9	8,8
2187	23,2	34,6	6,9	10,3
2323	25,5	38,0	7,8	11,6
2460	27,8	41,5	8,8	13,1

(A)



(B)

S8883

燃气压力

左表列出燃烧器在最大出力运行时，燃气供应管路的最小压力损失。

表中所示数值为：

- 天然气 G20 PCI 9.45 kWh/Sm³ (8.2 Mcal/Sm³)
- 天然气 G25 PCI 8,6 kWh/Nm³ (7,4 Mcal/Nm³)

栏 1

燃烧头压力损失。

测试点 1)(B) 处燃气压力，此时：

- 炉膛背压为 0 mbar；
- 燃烧头应按表 (B) 页 8 所示进行调整。

栏 2

燃气蝶阀 2)(B) 在最大开度 90° 时的压力损失。

计算 燃烧器的最大出力，可按如下方法进行：

- 将测试点 1)(B) 处测得的燃气压力减去炉膛背压。
- 在表 (A) 的栏 1 找到与得数最接近的值。
- 读出左边的出力值即为近似出力值。

举例：

- 燃烧器以最大出力运行
- 天然气 G 20 PCI 10 kWh/Nm³
- 测试点 1)(B) 处的燃气压力 = 24.0 mbar
- 炉膛内压力 = 3.0 mbar
- 24.0 - 3.0 = 21.0 mbar

表 (A) 显示，栏 1 中，与 21.0 mba 压力近似的相应的最大出力为 2050 kW。

此值只能作为参考值，精确的出力值应根据燃气计量表测量。

为了计算 压力测试点 1)(B) 处的燃气压力，将燃烧器设定为最大出力运行：

- 在表 (A) 中找出最近似的出力值。
- 读出右边栏 1 中压力测试点 1)(B) 处的压力值。
- 将此压力值与与炉膛估计压力相加。

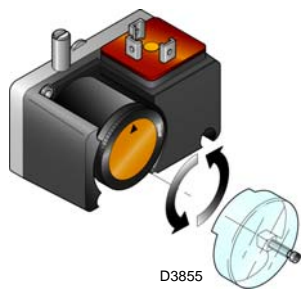
举例：

- 燃烧器运行所需最大出力：2050 kW
 - 天然气 G 20 PCI 10 kWh/Nm³
 - 燃烧器出力为 2050 kW 时，可从表 (A) 栏 1 查出燃气压力为 = 21.0 mbar
 - 炉膛内压力 = 3.0 mbar
 - 21.0 + 3 = 24.0 mbar
- 测试点 1)(B) 处所需燃气压力。

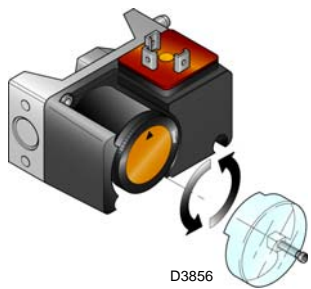
最小燃气压力开关

最大燃气压力开关

风压开关



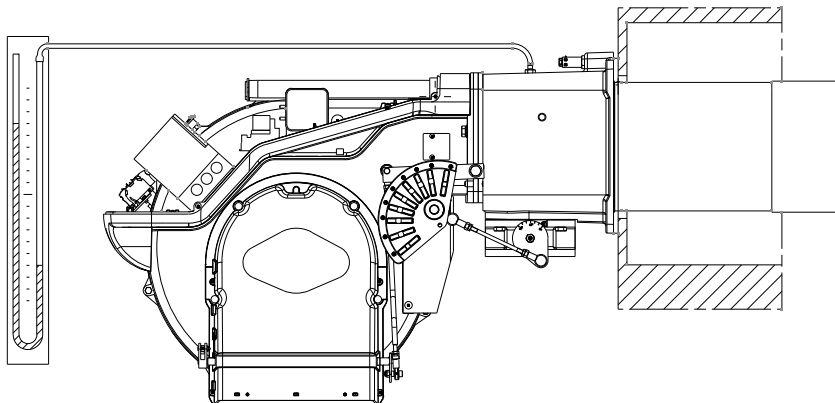
(A)



(B)

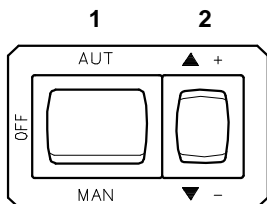


(C)



(D)

D3916



(E)

D791

点火前调节

(燃气运行)

燃烧头的调整已于第 8 页详述。

此外，还必须进行下列调整：

- 打开燃气阀组前的手动阀。
 - 调整最小燃气压力开关到量程的开始位置 (A)。
 - 调整最大燃气压力开关到量程的开始位置 (B)。
 - 调整风压开关到量程的开始位置 (C)。
 - 排尽燃气管路中的空气。
连续排放空气 (建议使用一根塑料管接到室外排放) 直至闻到燃气的味道。
 - 在燃烧头压力测试点处安装一个 U 型压力表 (D)。
- 根据表 (A) 页 13, 可用压力表上读数来计算燃烧器 2 段火最大出力。
- 连接两个灯泡或万用表到两个电磁阀 VR 和 VS 上, 用以检查何时给电磁阀供电。
如果两个电磁阀已安装了指示灯显示何时通过电流, 则无需进行此步骤。

启动燃烧器前, 最好先调整燃气阀组以便燃烧器能在最安全的情况下点火, 如使燃气流量最小。

燃烧器启动 (燃气运行)

注意: 建议首次运行燃烧器时使用燃油, 之后再使用燃气。

警告

必须在燃烧器停机更换燃料。

关闭温控器 / 压力开关, 并将开关 1)(E) 置于“MAN”位置。

燃烧器一启动, 通过火焰检查窗 26)(A)p.4 检查风机叶片旋转方向。

确认连接到电磁阀上的灯泡或万用表, 电磁阀自带的指示灯, 显示电磁阀未通电。如果显示电磁阀通电, 则应立即将燃烧器停机, 并检查电气连接。

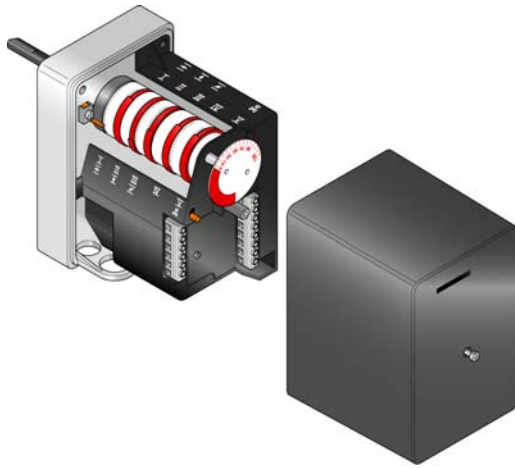
燃烧器点火 (燃气运行)

完成以上检查步骤后, 可进行燃烧器点火。如果电机启动, 但未产生火焰, 且控制盒锁定, 则复位并等待下一次点火。

如果点火仍未成功, 有可能是燃气在 3 秒的安全时间内未到达燃烧头。在此情况下, 应增加点火燃气量。

燃气是否到的燃烧头可通过 U 型压力表 (D) 查看。

一旦点火成功, 即可进行全面的校准工作。



(A)

D3923

伺服马达 (A)

伺服马达通过改变凸轮轮廓线调节风门，并可同时对燃气蝶阀进行调节。伺服马达在 33 秒内的旋转角度可达 130 度。
请勿改变以下 5 个凸轮的出厂设定值；只需检查各凸轮的设置是否与以下所述相符：

凸轮 I : 130°

最大旋转角度。
燃烧器以最大出力运行时，燃气蝶阀必须全开，角度为 90°。

凸轮 II : 0°

最小旋转角度。
燃烧器停机时，风门阀及燃气蝶阀必须全关，角度为 0°。

凸轮 III : 40° (燃气)

调整点火位置和最小出力。

凸轮 IV : 70° (燃油)

调整点火位置和 1 段火力出力。

凸轮 V : 100°

确定 2 段火力油阀开启位置。

燃烧器校准 (燃气运行)

在锅炉排放口使用烟气分析仪，以便对燃烧器进行最优校准。

继续调节：

- 1 - 首次点火出力；
- 2 - 燃烧器最大出力；
- 3 - 燃烧器最小出力；
- 4 - 中间出力；
- 5 - 风压开关；
- 6 - 最大燃气压力开关；
- 7 - 最小燃气压力开关。

1 - 点火出力

根据 EN 676 标准：

燃烧器最大出力为 120 kW

点火功率可以为燃烧器运行最大出力。举例：

- 运行最大出力 : 120 kW
- 点火最大出力 : 120 kW

燃烧器最大出力高于 120 kW

点火出力必须低于最大运行出力。
若点火出力低于 120 kW，无需进行另外计算。若点火出力高于 120 kW，EN 676 标准规定点火出力应根据控制盒所标明的安全时间“ts”进行调整：
• 当“ts”= 2s 时，点火出力必须小于等于燃烧器运行最大出力的 1/2。
- 当“ts”= 3s 时，点火出力必须小于等于燃烧器最大出力的 1/3。

举例：燃烧器最大出力为 600 kW。

点火出力必须小于等于：

- 300 kW，当 ts = 2 s 时；
- 200 kW，当 ts = 3 s 时。

如何测定点火出力：

- 取下 UV 电眼 17)(A)p.4 (燃烧器点火，安全时间后进入锁定状态)。
- 在持续的锁定状态下进行点火 10 次。
- 在燃气表上读出燃烧的燃气量。
此燃气量应小于或等于根据以下公式所计算出的数值：

Sm³/h (燃烧器最大供气量)

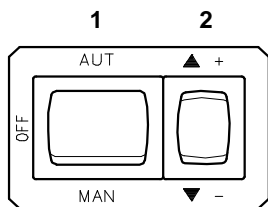
360

举例：以燃气 G 20 (10 kWh/Sm³) 为例：

最大运行出力为 600 kW，燃烧器供气量为 60 Nm³/h。

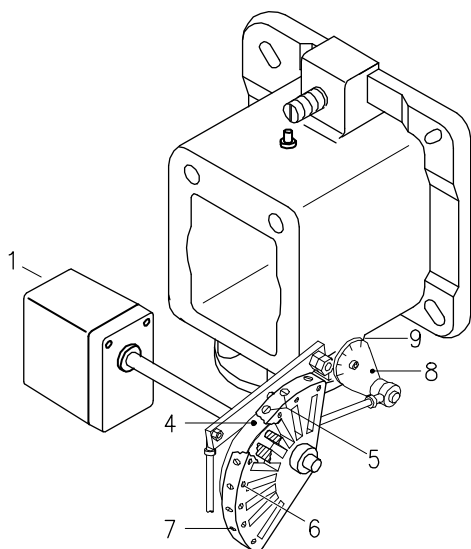
持续的锁定状态下进行点火 10 次后，燃气表上显示的供气量必须等于或小于：

60 : 360 = 0,166 Sm³



(A)

D791

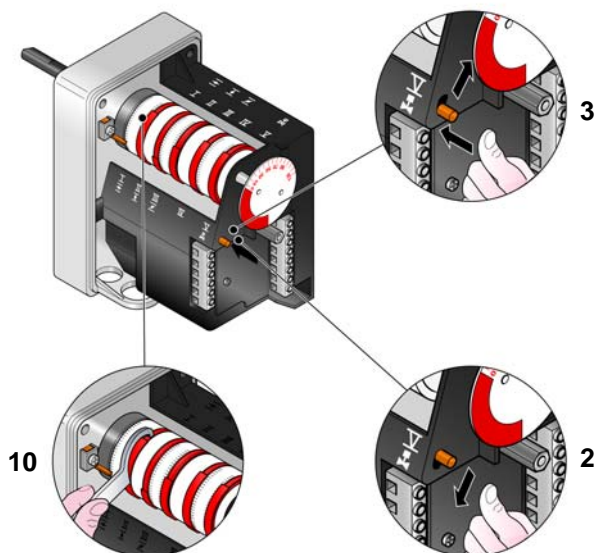


- 1 伺服马达
- 2 伺服马达 1) - 凸轮 4): 工作
- 3 伺服马达 1) - 凸轮 4): 停止工作
- 4 可变线凸轮
- 5 凸轮起始廓线调节螺丝
- 6 调整固定螺丝

- 7 凸轮终止廓线调节螺丝
- 8 燃气蝶阀开度指示盘
- 9 刻度盘 8 的刻度
- 10 凸轮 III 调节图示

(B)

D1710



(C)

D3924

2 - 最大出力

燃烧器的最大出力必须设定在第 5 页所示的出力范围之内。

按上述说明操作时，燃烧器处于最小运行出力。按下“加大出力”按钮 2)(A) 直至伺服马达开启风门阀及燃气蝶阀。

燃气校准

根据燃气表测定供气量。

可根据表 (A)p.13 计算出合理的供气量，在 U 型压力计上读出燃气压力，见 (D)p.14，然后按第 13 页上的说明进行计算。

- 如需减小供气量，则可降低燃气压力；如果此时压力已经较低，则可关闭调节阀 VR。
- 如需增大供气量，增大燃气压力。

风量调节

通过调节螺丝 7)(B) 逐步调整凸轮 4)(B) 的外廓线。

- 顺时针调节螺丝增大空气输送量。
- 逆时针调节螺丝减小空气输送量。

3 - 最小出力

燃烧器的最小出力必须设定在第 5 页所示出力范围内。

按下“减小出力”按钮 2)(A) 直至伺服马达关闭风门阀及燃气蝶阀至 30° 角 (此为工厂设定的调节位置)。

燃气量调节

根据气量计测定燃气供气量。

- 如需减小供气量，可逐步减小凸轮 III (C) 的角度 30° 至 28° 至 26°....
 - 如需增加供气量，可按下“加大出力”按钮 2)(A) (如燃气蝶阀开启 10-15° 角)，逐步增加凸轮 III 的角度 (C) 30° 至 32° 至 34°....
- 之后按下“减小出力”按钮直至伺服马达至最小开启位置，并测定燃气输送量。

注意

当凸轮 III 角度减小时，伺服马达随着凸轮的调节而调节。如需增大凸轮角度，首先通过“加大出力”按钮来增大伺服马达角度，然后再增大凸轮角度，最后在通过“减小出力”按钮使伺服马达回到最小出力时的位置。

对凸轮 III 进行调整时，特别是微调时，可使用由伺服马达下的磁铁控制的按钮。

风量调节

通过调节螺丝 5)(B) 逐步调整凸轮 4)(B) 的起始廓线。

最好不要调节第一个螺丝，因为此螺丝用于将风门阀完全关闭。

4 - 中间出力

燃气量调节

此时无需调整燃气供应量。

风量调节

轻轻按下“加大出力”按钮 2)(A)p.16，使伺服马达开启角度至 15°。

调节螺丝直至获得最优燃烧。

其它调节螺丝也如此操作。

注意凸轮廓线的调整需逐步进行。

将开关 1)(A)p.16 置于“OFF”位置，关闭燃烧器，按下按钮 3)(B)，向右移动，将凸轮 4)(B)p.16 从伺服马达上取下，之后用手前后转动凸轮 4)，检查其运转是否润滑且无阻滞。

按下按钮 2)，向左移动，将凸轮 4) 重新安装到伺服马达上。

调整螺丝时，不要将其调至凸轮内外边缘处，否则会开启风门阀至最大及最小出力位置。

最后调节螺丝 6)(B)p.16 以固定调整后状态。

请注意

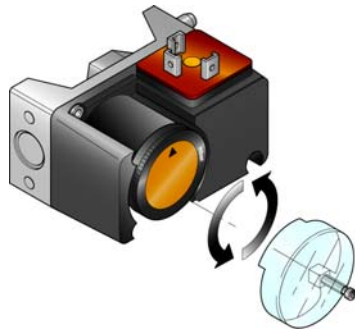
一旦完成对“最大 - 最小 - 中间”出力的调整，再次检查点火：此时的噪音水平应与燃烧器点火后运行时的噪音水平相当。如果燃烧器出现任何震动，应减小点火时的燃气供应量。



(A)

D3951

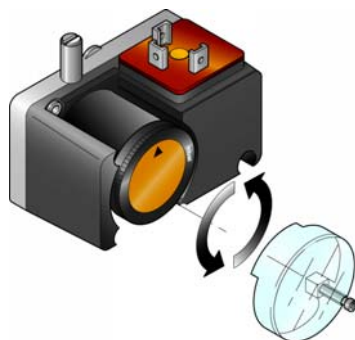
最大燃气压力开关



(B)

D3856

最小燃气压力开关



(C)

D3855

5 - 风压开关 (A)

在进行上述燃烧器各部分调节时，风压开关置于量程 (A) 的开始位置。上述所有调整结束后，方可调节风压开关。

燃烧器处于最小出力时，在烟囱中插入一个烟气分析仪，然后缓慢封闭风机入口（如可使用厚纸板），直至 CO 值不超过 100 ppm。

顺时针转动压力调节手柄，增大压力直至燃烧器锁定。

确认箭头向上所指刻度 (A) 位置。再次顺时针旋转手柄，直至刻度盘上所示值与箭头向下所指位置 (A) 一致，恢复压力开关的迟滞（用在两个箭头之间的蓝底白色标记显示）。

重新检查燃烧器启动是否正确。

如果燃烧器再次锁定，将手柄逆时针旋转一点。

如果用两个管子连接，内置的风压开关可以以“微分”模式运行。如果在预吹扫阶段，炉膛内负压阻碍风压开关开启，需要在风压开关和风机进风口之间安装第二根管子，才能开启开关。此时，风压开关作为“微分”压力开关运行。

注意：以“微分”模式工作时，风压开关只适用于工业领域，或符合当地允许风压开关仅控制风机运行的规定。

6 - 最大燃气压力开关 (B)

上述调整结束后，开始调节最大燃气压力开关，此时开关位置应置于量程开始位置 (B)。

当燃烧器以最大出力运行时，通过逆时针旋转压力调节手柄降低压力直至燃烧器锁定。

之后，顺时针旋转手柄调节 2 mbar，使燃烧器重新点火。

若此时燃烧器再次锁定，继续沿顺时针方向旋转手柄 1 mbar。

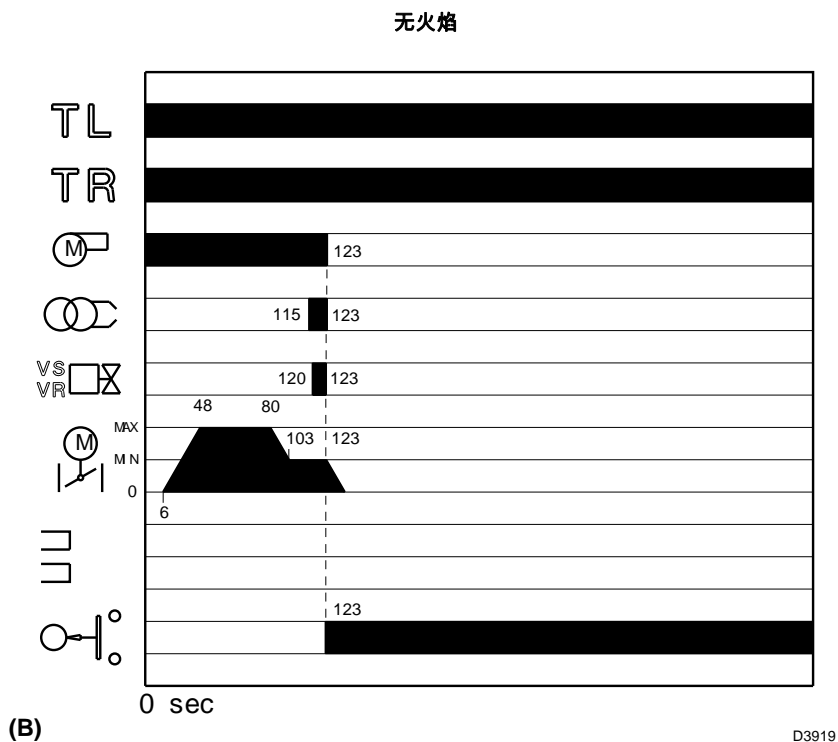
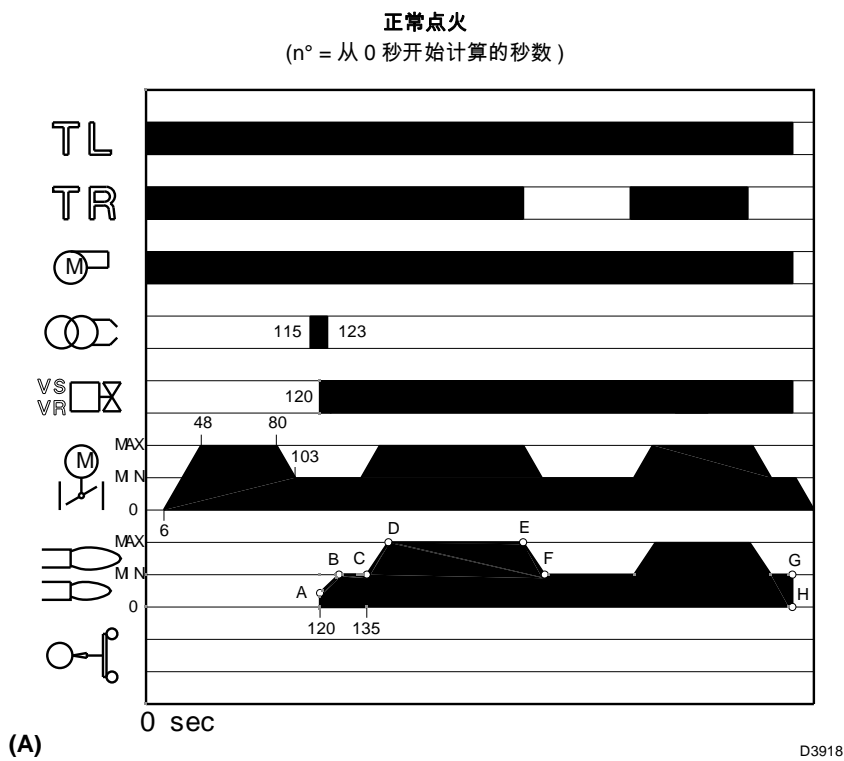
7 - 最小燃气压力开关 (C)

上述调整结束后，开始调节最小燃气压力开关，此时开关位置应置于量程开始位置 (C)。

当燃烧器以最大出力运行时，通过顺时针旋转压力调节手柄增大压力直至燃烧器锁定。

之后，逆时针旋转手柄调节 2 mbar，使燃烧器重新启动以确保燃烧器运行平稳。

若此时燃烧器再次锁定，继续沿逆时针方向旋转手柄 1 mbar。



燃烧器运行

燃烧器启动 (A)

- 0 秒: TL 闭合。
风机启动。
- 6 秒: 伺服马达启动: 向右旋转 130°, 直至与凸轮 I (C)p.16 接触。
风门阀位于最大出力 MAX 位置。
- 48 秒: 以最大风量进行预吹扫。
持续 32 秒。
- 80 秒: 伺服马达向左旋转, 开启角度至凸轮 III (C)p.16, 达到最小出力。
- 112 秒: 风门阀和燃气蝶阀位于最小出力 MIN 位置 (凸轮 III 角度为 30°)。
- 113 秒: 点火电极点燃火花。
- 119 秒: 安全阀 VS 和调节阀 VR (快速开启) 开启。
火焰在低出力水平, 即点 A, 被点燃。
缓慢将阀 VR 开启至最小出力水平, 即点 B 处, 燃烧器出力水平平稳增大。
- 122 秒: 火花熄灭。
- 135 秒: 控制盒启动周期结束。

运行状态稳定 (A)

不带比例调节运行组件的燃烧器

一旦启动周期结束, 将调节伺服马达改为调节 TR 以控制锅炉温度及压力, 点 C。

(控制盒将继续调节火焰以及最大风压开关和最大燃气压力开关的正确位置)。

- 如果温度或压力过低 (且 TR 负荷控制随后关), 燃烧器平稳增大其出力至最大值, 即 C-D 区域。
- 如果之后温度或压力增大直至 TR 开启, 燃烧器平稳降低其出力至最小值 (E-F 区域)。
- 以此类推。
- 如果热需求低于燃烧器最小出力时 (G-H 区域) 提供的热量, 则燃烧器锁定, 负荷控制 TL 开启。伺服马达旋转至角度 0°, 接触凸轮 II (C)p.16。风门阀完全闭合以将热量损失减到最低。

每次改变出力大小时, 伺服马达会自动调整燃气量 (燃气蝶阀) 和风量 (风门阀)。

带比例调节运行组件的燃烧器

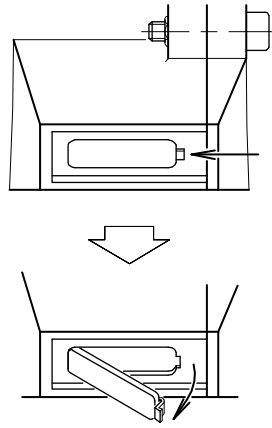
见随比调仪附带的手册。

点火失败 (B)

如果燃烧器点火失败, 则在控制装置 TL 闭合 122 秒后及燃气安全阀开启 3 秒内锁定。

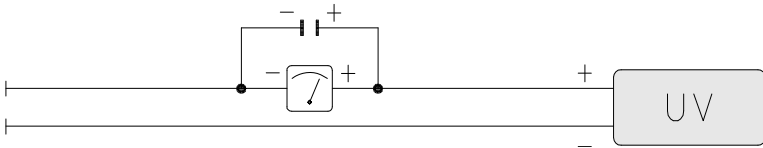
燃烧器运行中火焰失火

如果运行中火焰突然熄灭, 燃烧器将在 1 秒内锁定。



(A)

D484



(B)

D1143

维护

维护安全注意事项

定期维护对保持燃烧器良好的运行状态、安全性、工作效率及耐用性都非常重要。
定期维护可降低燃料消耗和污染排放，并且能保证产品的耐用性。



燃烧器的维护和校准必须由具有资质的专业技术人员操作，且符合本手册要求和安装地的强制标准。

在进行任何维护、清洁及检查之前，需做到：



通过切断系统主开关切断燃烧器电源。



关掉燃料截留开关。

燃烧状态

燃烧器的最优校准需要安装烟气分析仪。如果任何参数与之前测量数值出入较大，则需在维护时特别注意这些参数的校准。

火焰检查窗

清洁火焰检查窗 (A)。

燃烧头

打开燃烧器，确认燃烧头所有部件状态良好，没有出现因高温变形或有污物附着其上等情况，且燃烧头位置正确。如有疑问，应取出内部部件 5)(A)p.21 查看。

喷嘴 (轻油)

不要清洁喷嘴开口处。切记不得打开喷嘴。如需要，可清洁或更换喷嘴过滤网。
建议每年定期维护时更换喷嘴。更换喷嘴后必须重新检查燃烧状况。

UV 电眼

清洁 UV 电眼外的玻璃罩。在一定压力作用下，UV 电眼 17)(A)p.4 被安装到位，如需取下，可将其用力向外拉出。

UV 电眼处的电流 (B)

UV 电眼正常工作的最小电流为：70 μ A。

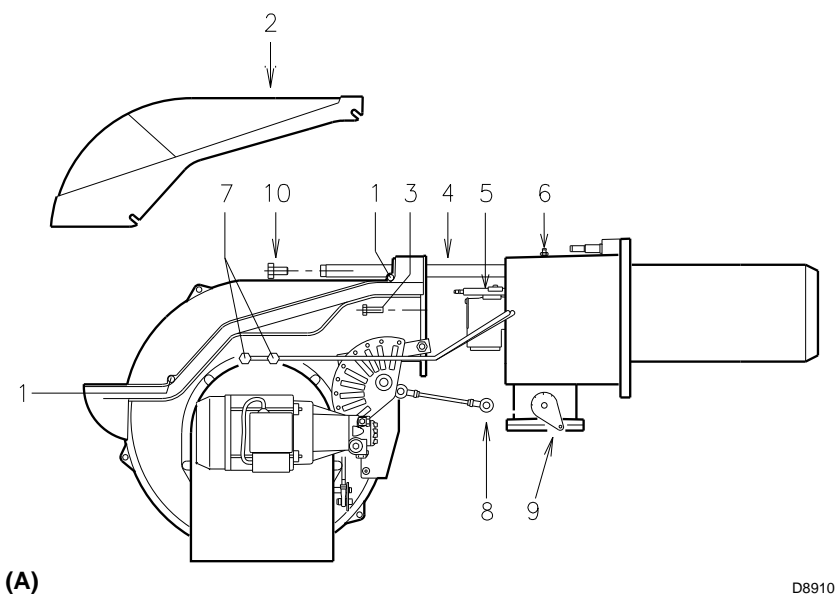
如果电流低于此值，可能由于以下原因造成：

- 光电管报废；
- 电压过低 (低于 187 V)；
- 燃烧器调节不当。

要测量电眼电流，可使用 100 μ A c.c. 的微安计，按电气连接图将其与电眼连接，同时在电眼同水平的位置，连接一个量程在 100 μ F - 1V c.c. 的电容器。

软管 (轻油)

检查软管以确认其状态良好，没有遭碾压或出现变形的情况。



燃气泄漏检测

确认燃气表和燃烧器之间的连接管路没有燃气泄漏。

燃气过滤器

过滤器脏时请更换。

伺服马达

按压按钮 3)(C)p.16 并将其向右移动。之后，可从伺服马达上取下凸轮 4)(B)p.16，用手前后转动凸轮，确认其转动平滑。现在将按钮 2)(C)p.16 向左移动，将凸轮重新安装到伺服马达上。

燃烧器

检查以确认控制风门阀及燃气蝶阀的机械装置是否有使用过度或螺丝松动的情况。同时确认固定燃烧器接线端子板电气导线的各螺丝没有任何松动。清洁燃烧器外部，清洁时需特别注意传送接头和凸轮 4)(B)p.16。

燃烧状态

如果在燃烧器运行的初始阶段获得的燃烧数据不符合当地强制标准，或者在任意出力下燃烧效果不好，则需调整燃烧器。用卡片记录新产生的燃烧数据，可作为之后对燃烧器进行维护的参考信息。

燃气燃烧状态检查

CO₂

最好将燃烧器的 CO₂ 排放量设定为低于 10%(燃气热值为 Pci 8600 kcal/m³)。这样可以避免校准设置不当 (如因校核标准改变) 以及由此产生的少量空气燃烧以及 CO 的排放。

CO

CO 排放量不得高于 100 mg/kWh。

打开燃烧器 (A)



通过切断系统主开关切断燃烧器电源。

- 拧松螺丝 1)，打开机盖 2)
- 拆下轻油管路 7)
- 从刻度指示盘 9) 解开连杆 8) 的连接。
- 从两个滑杆 4) 上取下螺丝 10)。
- 将两个加长杆安装到滑杆上 4)。
- 将螺丝 10) 安装到两个滑杆上。
- 取下螺丝 3)，沿滑杆拉出燃烧器约 100 mm。
- 断开电极导线，将燃烧器完全取下。
- 取下螺丝 6) 后，可将内部部件 5) 取出。

闭合燃烧器 (A)

- 将燃烧器推回大约 100 mm。
- 重新接通电极导线，将燃烧器沿滑杆滑动至不能再滑动为止。
- 重新拧紧螺丝 3)，将探针和电极导线向外轻轻拉紧。
- 重新连接连杆 8) 到刻度指示盘 9)。
- 重新连接轻油管路 7)。
- 从滑杆 4) 上拆下两个加长杆，并将其归位。

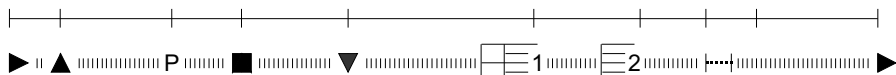


锁定指示器

- a-b 启动顺序
- b-b' 闲置状态 (无联系信息)
- b(b')-a 后吹扫程序

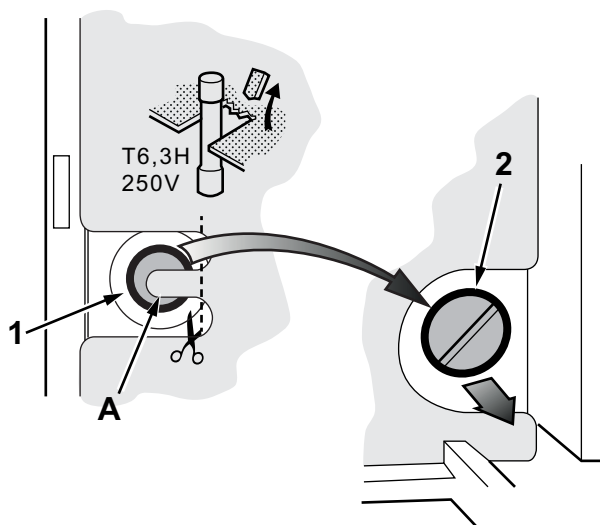
(A)

S8889



(B)

S8888



(C)

S8884

故障 - 可能的原因 - 解决方案

控制盒装配有锁定指示器 (A), 在燃烧器启动时即开启, 并可通过锁定窗口查看。

燃烧器出现无法启动或停机等故障时, 指示器上的信号提示故障类型。

锁定指示器的位置如图 (B)。

更换保险丝

保险丝 2)(C) 位于控制盒后部。另外还有一个备用保险丝 1), 可在打碎保护罩 A) 后将其取出。In 一旦保险丝 2) 跳闸, 需进行更换, 如图 (C) 所示。

下表列出了燃烧器发生一些列故障导致运行不稳或功能失灵时的表现、原因及可能的解决方案。

如果燃烧器出现故障, 首先检查:

- 确认电气连接正确;
- 确认燃料输送没有中断;
- 确认所有调整参数都进行了正确设定。



WARNING

如遇燃烧器停机, 为防止对已安装设备造成损坏, 不要连续超过两次重启燃烧器。如果燃烧器第三次锁定, 请联系客户服务部。



DANGER

如果燃烧器出现再次锁定或其它故障, 必须由具有资质且得到授权的人员按照本手册说明进行维护修理, 且该操作需符合安装地的现行强制标准。

信号	故障	可能的故障原因	建议解决方案
◀	燃烧器无法启动	无电源	闭合所有开关 - 检查电气连接
		限位或安全控制装置开启	调整或更换
		控制盒锁定	解锁控制盒
		控制盒保险丝熔断	更换
		电气连接错误	检查电气连接
		控制盒故障	更换
		无燃气	打开燃气表和燃气阀组件的手动阀
		主燃气管路压力不足	联系燃气公司
		最小燃气压力开关未能闭合	调整或更换
		风压开关在运行位置	调整或更换
		伺服马达触点不能运行 (0° 闭合 凸轮 0°)	调整 0° 闭合凸轮或更换伺服马达
	燃烧器无法启动并锁定	虚假火焰	更换控制盒
		马达远程控制开关故障	更换
		马达故障	更换
		马达锁定	复位热断路器
▲	燃烧器启动，但风门开启最大时停机	伺服马达触点不能运行 (凸轮 - 最大开启)	调整凸轮 (最大开启) 或更换伺服马达
P	燃烧器启动，随后锁定	因风压过小造成风压开关失灵：	
		风压开关调整不当	调节或更换
		压力开关测试点处管路堵塞	清洁
		燃烧头调整不当	调节
		风机脏	清洁
		炉膛内压力降过大	联系利雅路技术部
■	燃烧器启动，随后锁定	火焰检测回路故障	更换控制盒
▼	燃烧器一直处于预吹扫阶段	伺服马达触点不能运行 (最小凸轮)	调整 凸轮 (最小) 或更换伺服马达
1	预吹扫即安全时间后，燃烧器锁定，但未出现火焰	燃气压力过低	通过压力调节器增大压力
		点火电极调整不当	调节
		因绝缘损坏而使电极接地	更换
		高压电缆损坏或接地	更换
		高温使高压电缆变形	更换且保护
		点火变压器故障	更换
		阀门或点火变压器电气连接错误	重新连接
		控制盒故障	更换
		上行至燃气阀组的阀门关闭	打开
		管路中有空气	排出空气
	出现火焰后燃烧器立即锁定	电磁阀 VS 或 VR 允许通过的燃气量小	增大
		火焰传感器脏	检查，更换火焰传感器
		连接错误	检查，更换火焰传感器
		检测电流不足 (最小 6 μA)	测量电流，更换火焰传感器
		火焰传感器失灵或故障	更换
		最大燃气压力开关运行	调整或更换
		控制盒故障	更换
	燃烧器重复启动周期，未锁定	主管路燃气压力接近最小燃气压力开关设定的燃气压力值。 阀门开启之后压力不断下降，导致压力开关暂时开启，立即关闭阀门，燃烧器停机。 压力再次增大，压力开关再次闭合，点火周期重启。 此循环不断重复，不停止。	降低最小压力开关处的运行压力。 更换燃气过滤器
	燃烧器锁定，但未出现信号	虚假火焰	更换控制盒
	燃烧器运行中锁定	火焰传感器故障	更换磨损部件
		风压开关故障	更换
		最大燃气压力开关故障	调整或更换
◀	燃烧器停机时锁定	燃烧头处持续火焰或虚假火焰	消除持续火焰或更换控制盒
	脉冲点火	燃烧头调整不当	调节
		点火电极调整错误	调节
		风档调整不当：风量过大	调节
		电离阶段出力过大	减小

配件 (可选):

• **比调运行组件**

出力比调仪 RWF40

需订购两个部件：

- 安装于燃烧器上的出力比调仪；
- 安装于锅炉上的探针

参数检查		探针		出力比调仪	
	范围	类型	代码	类型	代码
温度	- 100...+500°C	PT 100	3010110	RWF40	3010414
压力	0...2.5 bar	出力调整	3010213		
	0...16 bar 0...25 bar	4...20 mA 4...20 mA	3010214 3090873		

出力比调仪，带 4-20 mA, 0-10V 信号

需订购两个部件：

- 模拟信号转换器；
- 电位计

电位计		模拟信号转换器	
类型	代码	类型	代码
ASZ...	3010416	E5202	3010415

• **加长燃烧头**

燃烧器	标准长度 (mm)	加长燃烧头 长度 (mm)	代码
RLS 250/M MZ	412	542	20029376

• **消音柜**

燃烧器	型号	代码
RLS 250/M MZ	C4/5	3010404

• **持续吹扫组件**

燃烧器	代码
RLS 250/M MZ	3010094

• **垫片**

燃烧器	垫片厚度 (mm)	代码
RLS 250/M MZ	102	3000722

• **符合 EN 676 标准的燃气阀组**

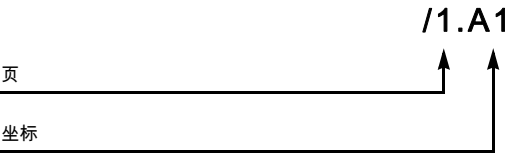
见手册。

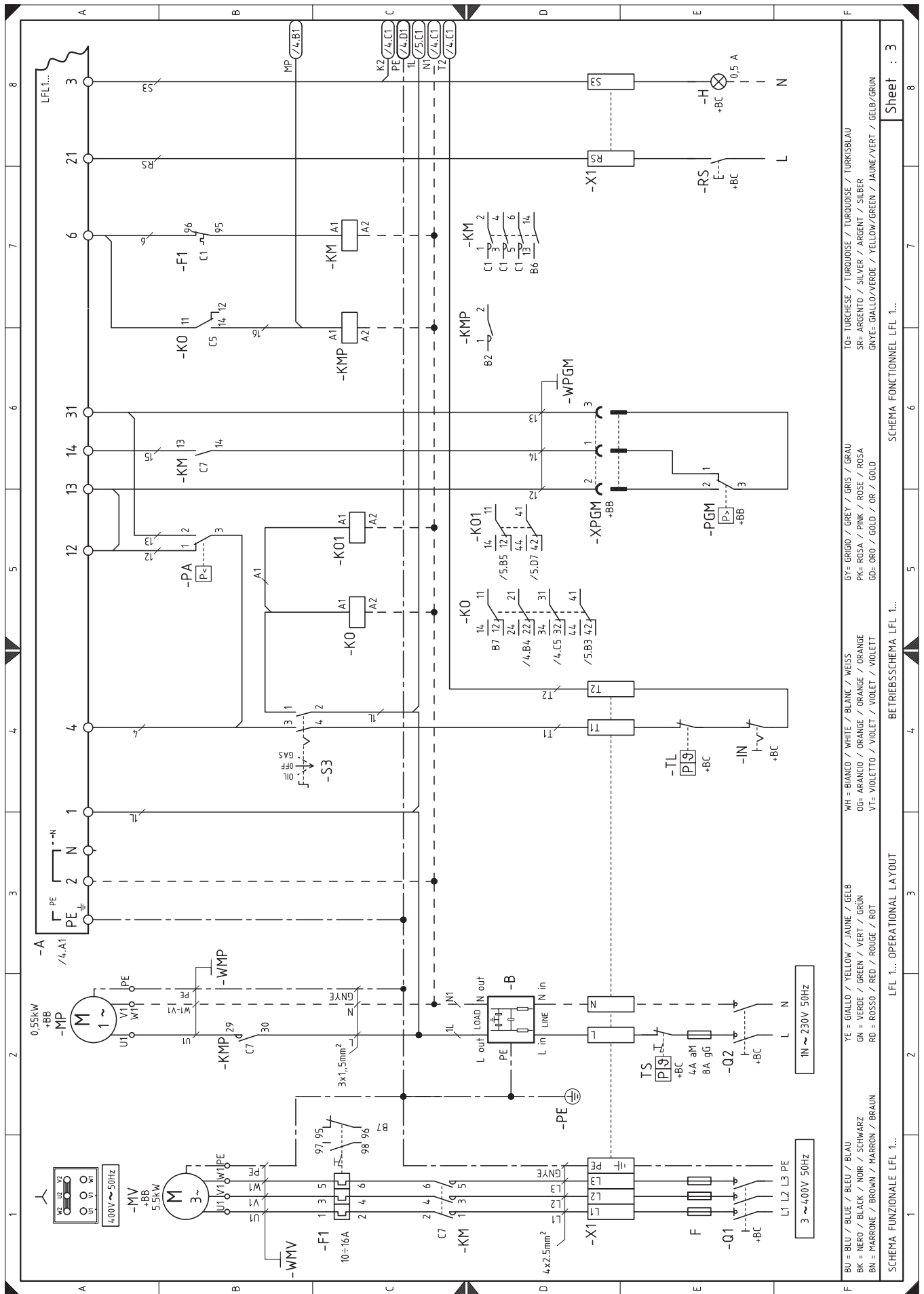
注意：由设备安装人员负责安装本手册未列出的安全装置。

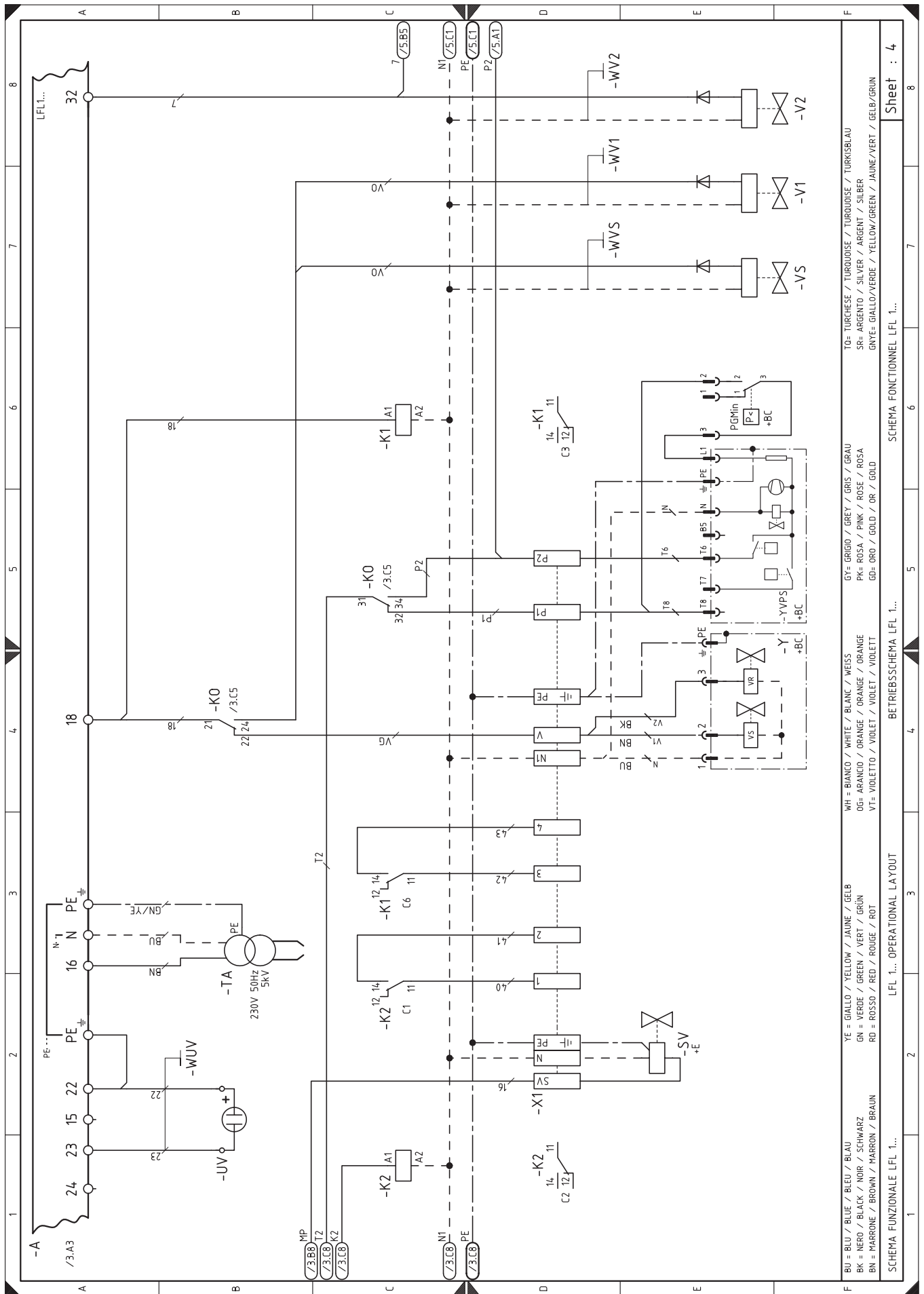
电气接线图

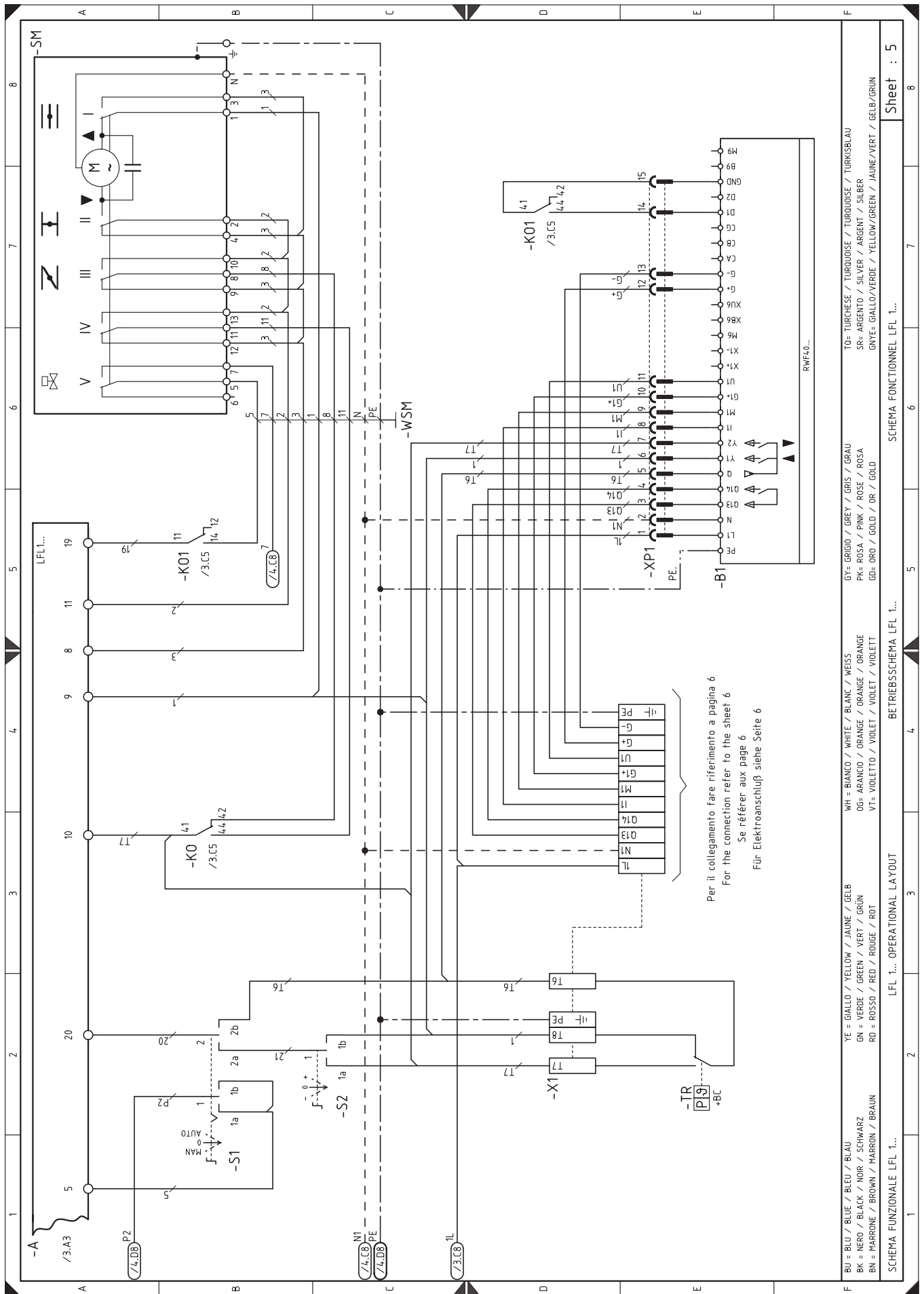
1	目录
2	参考图
3	LFL1... 原理图
4	LFL1... 原理图
5	LFL1... 原理图
6	安装方负责的接线图
7	RWF40... 原理图

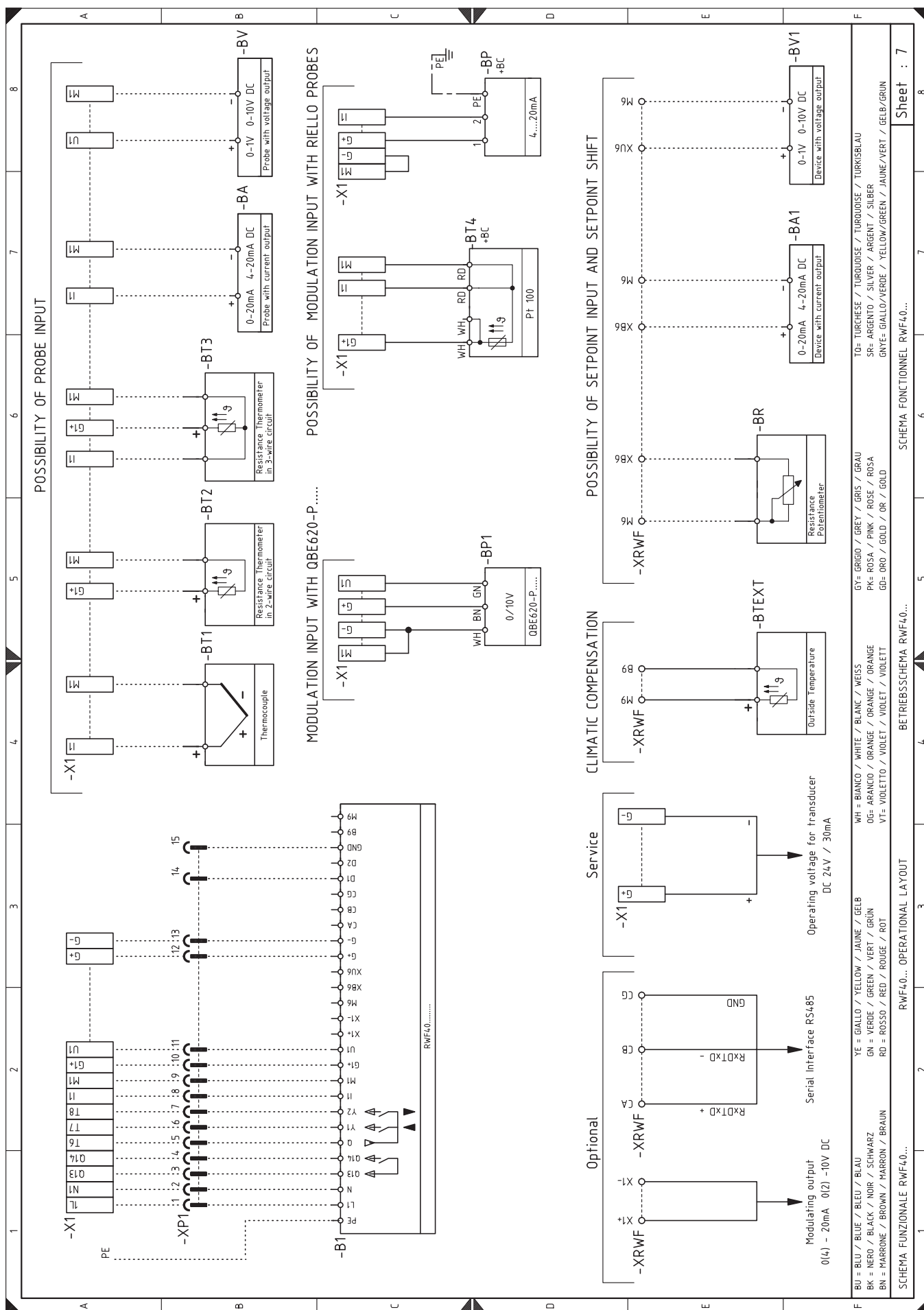
2 参考图





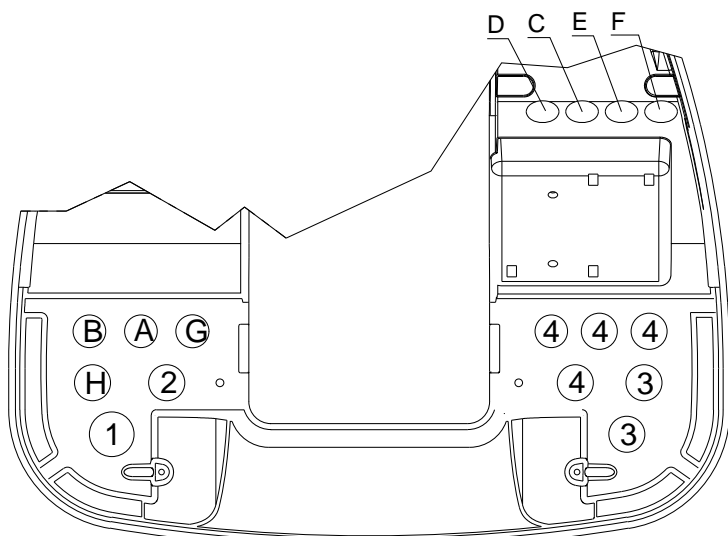






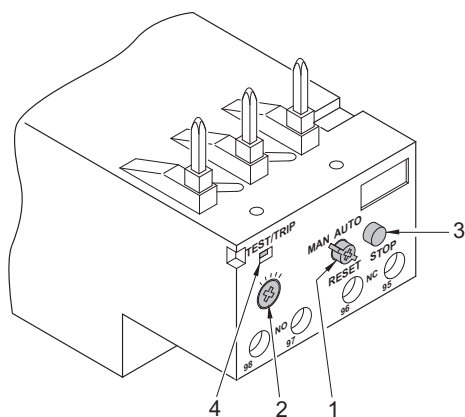
图例说明

+BB	燃烧器部件
+BC	锅炉部件
+E	燃烧器以外的部件
A	控制盒
B	抗电磁干扰过滤器
B1	RWF40 出力比调仪
BA	4...20 mA 直流输入信号
BA1	4...20 mA 直流输入信号修改远程设定点
BP	压力探针
BP1	压力探针
BR	远程设定分压器
BT1	热电偶
BT2	2 线 Pt100 探针
BT3	3 线 Pt100 探针
BT4	3 线 Pt100 探针
BTEXT	用于气候补偿的外部探针
BV	0...10 V 直流电压输入信号
BV1	0...10 V 直流电压输入信号，用于远程修改设定点
F	3 相电源保险丝
F1	风机电机继电器
H	远程锁定信号
K1	指示燃烧器启动的无源触点继电器
K2	指示燃烧器锁定的无源触点继电器
KM	风机马达接触器
KMP	继电器
KO	KO 继电器
KO1	KO1 继电器
IN	燃烧器手动启停开关
MP	油泵马达
MV	风机马达
PA	风压开关
PE	燃烧器接地
PGM	最大燃气压力开关
PGMin	最小燃气压力开关
Q1	3 相电源开关 / 断路器
Q2	单相电源开关 / 断路器
RS	远程复位开关
SM	伺服电机
SV	外部油开关
S1	开关： MAN = 手动 AUT = 自动 OFF
S2	按钮： - = 减少出力 + = 增加出力
S3	“油 / 停机 / 燃气”选择开关
TA	点火变压器
TL	压力开关 / 温控器极限开关
TR	压力开关 / 温控器控制开关
TS	压力开关 / 温控器安全开关
UV	UV 电眼
VS	安全阀
V1	1 段火调节阀
V2	2 段火调节阀
X1	主电源接线端子排
XP1	RWF40 插头
XPGM	最大燃气压力开关接头
XRWF	RWF40 端子排
Y	燃气调节阀 + 燃气安全阀
YSV	外部阀单元
YVPS	燃气泄露检测装置



(A)

D8880



(B)

D8685

电气接线 (A)

按 EN 60 335-1 规则需使用柔性电缆。
所有连接进入燃烧器的接线必须通过电缆紧固头固定。

电缆紧固头和预留孔可以有不同使用方法；下列表只是其中一种方法：

- 1 - M25 - 3 相电源
- 2 - M20 - 单相电源
- 3 - M20 - 安全装置
- 4 - 备用

工厂使用的电缆套管：

- A - 风机马达
- B - 伺服马达
- C - 油泵马达
- D - 安全电磁阀
- E - 1 段火电磁阀
- F - 2 段火电磁阀
- G - 最大燃气压力开关
- H - 火焰检测装置

燃烧器设计为间断运行。这就意味着每连续运行 24 小时至少要停机一次以便控制盒进行启动自检程序确认控制盒工作正常。燃烧器通常由锅炉控制系统自动停机。否则需要在燃烧器启动控制回路中接入一个时间开关保证燃烧器每 24 小时至少停机一次。

电气接线必须由具有资质的人员完成。
除了接线图中所示以外的接线已由利雅路公司完成。



不要将电源的零线和相线接反。

WARNING

热继电器的调校 (B)

热继电器的作用在于防止马达由于负荷增加或缺相而遭到的损坏。

调校 2) 时，参考电气接线图中给出的表（电气接线由安装方负责）。

热继电器保护后需要复位时，按按钮“RESET”1)。

停止按钮“STOP”3) 可以断开常闭触点 (95-96) 从而使电机停机。

测试热继电器时，在测试“TEST/TRIP”4) 孔中插入螺丝刀然后超箭头方向拨（向右）。



自动复位危险！燃烧器运行时不能自动复位。

WARNING



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