



BURNERS  
BRULEURS  
BRENNER  
QUEMADORES  
BRUCIATORI

# MANUAL OF INSTALLATION OPERATION MAINTENANCE

## LIGHT OIL BURNERS

**G18 SP**  
**PG25 SP**  
**PG30 TN**

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M03978AA Rev. 0 05/04

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Complying with  
EMC 79/336/CEE  
LV 73/23/CEE

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## NOTICES

**THIS MANUAL IS SUPPLIED AS AN INTEGRAL AND ESSENTIAL PART OF THE PRODUCT AND MUST BE DELIVERED TO THE USER.**

**INFORMATION INCLUDED IN THIS SECTION ARE DEDICATED BOTH TO THE USER AND TO PERSONNEL FOLLOWING PRODUCT INSTALLATION AND MAINTENANCE.**

**THE USER WILL FIND FURTHER INFORMATION ABOUT OPERATING AND USE RESTRICTIONS, IN THE SECOND SECTION OF THIS MANUAL. WE HIGHLY RECOMMEND TO READ IT.**

**CAREFULLY KEEP THIS MANUAL FOR FUTURE REFERENCE.**

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### 1) GENERAL INTRODUCTION

- The equipment must be installed in compliance with the regulations in force, following the manufacturer's instructions, by qualified personnel.
- Qualified personnel means those having technical knowledge in the field of components for civil or industrial heating systems, sanitary hot water generation and particularly service centres authorised by the manufacturer.
- Improper installation may cause injury to people and animals, or damage to property, for which the manufacturer cannot be held liable.
- Remove all packaging material and inspect the equipment for integrity.

In case of any doubt, do not use the unit - contact the supplier. The packaging materials (wooden crate, nails, fastening devices, plastic bags, foamed polystyrene, etc), should not be left within the reach of children, as they may prove harmful.

- Before any cleaning or servicing operation, disconnect the unit from the mains by turning the master switch OFF, and/or through the cut-out devices that are provided.
- Make sure that inlet or exhaust grilles are unobstructed.
- In case of breakdown and/or defective unit operation, disconnect the unit. Make no attempt to repair the unit or take any direct action.

Contact qualified personnel only.

Units shall be repaired exclusively by a servicing centre, duly authorised by the manufacturer, with original spare parts.

Failure to comply with the above instructions is likely to impair the unit's safety.

To ensure equipment efficiency and proper operation, it is essential that maintenance operations are performed by qualified personnel at regular intervals, following the manufacturer's instructions.

- When a decision is made to discontinue the use of the equipment, those parts likely to constitute sources of danger shall be made harmless.
- In case the equipment is to be sold or transferred to another user, or in case the original user should move and leave the unit behind, make sure that these instructions accompany the equipment at all times so that they can be consulted by the new owner and/or the installer.
- For all the units that have been modified or have options fitted then original accessory equipment only shall be used.
- This unit shall be employed exclusively for the use for which it is meant. Any other use shall be considered as improper and, therefore, dangerous.

The manufacturer shall not be held liable, by agreement or otherwise, for damages resulting from improper installation, use and failure to comply with the instructions supplied by the manufacturer.

### 2) SPECIAL INSTRUCTIONS FOR BURNERS

- The burner should be installed in a suitable room, with ventilation openings complying with the requirements of the regulations in force, and sufficient for good combustion.
- Only burners designed according to the regulations in force should be used.
- This burner should be employed exclusively for the use for which it was designed.
- Before connecting the burner, make sure that the unit rating is the same as delivery mains (electricity, gas oil, or other fuel).
- Observe caution with hot burner components. These are, usually, near to the flame and the fuel pre-heating system, they become hot during the unit operation and will remain hot for some time after the burner has stopped.

When the decision is made to discontinue the use of the burner, the user shall have qualified personnel carry out the following operations:

- a) Remove the power supply by disconnecting the power cord from the mains.
- b) Disconnect the fuel supply by means of the hand-operated shut-off valve and remove the control handwheels from their spindles.

#### Special warnings

- Make sure that the burner has, on installation, been firmly secured to the appliance, so that the flame is generated inside the appliance firebox.
- Before the burner is started and, thereafter, at least once a year, have qualified personnel perform the following operations:
  - a) set the burner fuel flow rate depending on the heat input of the appliance;
  - b) set the flow rate of the combustion-supporting air to obtain a combustion efficiency level at least equal to the lower level required by the regulations in force;
  - c) check the unit operation for proper combustion, to avoid any harmful or polluting unburnt gases in excess of the limits permitted by the regulations in force;
  - d) make sure that control and safety devices are operating properly;
  - e) make sure that exhaust ducts intended to discharge the products of combustion are operating properly;
  - f) on completion of setting and adjustment operations, make sure that all mechanical locking devices of controls have been duly tightened;
  - g) make sure that a copy of the burner use and maintenance instructions is available in the boiler room.
- In case of repeated burner shut-downs, do not continue re-setting the unit manually. Contact qualified personnel to take care of such defects.
- The unit shall be operated and serviced by qualified personnel only, in compliance with the regulations in force.

### 3) GENERAL INSTRUCTIONS DEPENDING ON FUEL USED

#### 3a) ELECTRICAL CONNECTION

- For safety reasons the unit must be efficiently earthed and installed as required by current safety regulations.
  - It is vital that all safety requirements are met. In case of any doubt, ask for an accurate inspection of electrics by qualified personnel, since the manufacturer cannot be held liable for damages that may be caused by failure to correctly earth the equipment.
  - Qualified personnel must inspect the system to make sure that it is adequate to take the maximum power used by the equipment shown on the equipment rating plate. In particular, make sure that the system cable cross section is adequate for the power absorbed by the unit.
  - No adaptors, multiple outlet sockets and/or extension cables are permitted to connect the unit to the electric mains.
  - An omnipolar switch shall be provided for connection to mains, as required by the current safety regulations.
  - The use of any power-operated component implies observance of a few basic rules, for example:
    - ◆ do not touch the unit with wet or damp parts of the body and/or with bare feet;
    - ◆ do not pull electric cables;
    - ◆ do not leave the equipment exposed to weather (rain, sun, etc.) unless expressly required to do so;
    - ◆ do not allow children or inexperienced persons to use equipment;
  - The unit input cable shall not be replaced by the user. In case of damage to the cable, switch off the unit and contact qualified personnel to replace.
- When the unit is out of use for some time the electric switch supplying all the power-driven components in the system (i.e. pumps, burner, etc.) should be switched off.

#### 3b) FIRING WITH GAS, LIGHT OIL OR OTHER FUELS GENERAL

- The burner shall be installed by qualified personnel and in compliance with regulations and provisions in force; wrong installation can cause injuries to people and animals, or damage to property, for which the manufacturer cannot be held liable.
- Before installation, it is recommended that all the fuel supply system pipes be carefully cleaned inside, to remove foreign matter that might impair the burner operation.
- Before the burner is commissioned, qualified personnel should inspect the following:
  - a) the fuel supply system, for proper sealing;
  - b) the fuel flow rate, to make sure that it has been set based on the firing rate required of the burner;
  - c) the burner firing system, to make sure that it is supplied for the designed fuel type;
  - d) the fuel supply pressure, to make sure that it is included in the range shown on the rating plate;
  - e) the fuel supply system, to make sure that the system dimensions are adequate to the burner firing rate, and that the system is equipped with all the safety and control devices required by the regulations in force.
- When the burner is to remain idle for some time, the fuel supply tap or taps should be closed.

#### SPECIAL INSTRUCTIONS FOR USING GAS

Have qualified personnel inspect the installation to ensure that:

- a) the gas delivery line and train are in compliance with the regulations and provisions in force;
  - b) all gas connections are tight;
  - c) the boiler room ventilation openings are such that they ensure the air supply flow required by the current regulations, and in any case are sufficient for proper combustion.
- Do not use gas pipes to earth electrical equipment.
  - Never leave the burner connected when not in use. Always shut the gas valve off.
  - In case of prolonged absence of the user, the main gas delivery valve to the burner should be shut off.

#### Precautions if you can smell gas

- a) do not operate electric switches, the telephone, or any other item likely to generate sparks;
  - b) immediately open doors and windows to create an air flow to purge the room;
  - c) close the gas valves;
  - d) contact qualified personnel.
- Do not obstruct the ventilation openings of the room where gas appliances are installed, to avoid dangerous conditions such as the development of toxic or explosive mixtures.

## SPECIFICATIONS

BURNER TYPE		G18 SP	PG25 SP	PG30 TN
Output	min. kcal/h	90.300	140.200	140.200
	max. kcal/h	180.000	250.200	300.000
	min. kW	105	163	163
	max. kW	209	291	349
Oil rate	kg/h min.	9	14	14
	kg/h max.	18	25	30
Fuel		Light oil	Light oil	Light oil
Power supply		230V	230V	230V
Frequency		50 Hz	50 Hz	50 Hz
Electrical motor 2800 g/1	'kW	0.25	0.37	0.37
Current absorption	A	1.5	2.2	2.2
Total consumption	kW	0.55	0.87	0.87
Operation		Soft start	Soft start	Single stage

## BURNER MODEL IDENTIFICATION

Burners are identified by burner type and model. Burner type identification is described as follow:

Type: <b>G18</b>	Model: <b>G-.</b>	<b>SP.</b>	<b>S.</b>	<b>*.</b>	<b>A.</b>
(1)	(2)	(3)	(4)	(5)	(6)
1- BURNER TYPE					
2- FUEL			G - Light oil		
3- OPERATION			SP - Soft start		
			TN - Single stage		
4- BLAST TUBE LENGHT			S - Standard		
			L - Long		
5- DESTINATION COUNTRY			* - See data plate		
6- SPECIAL VERSION			A - Standard		

OVERALL DIMENSIONS

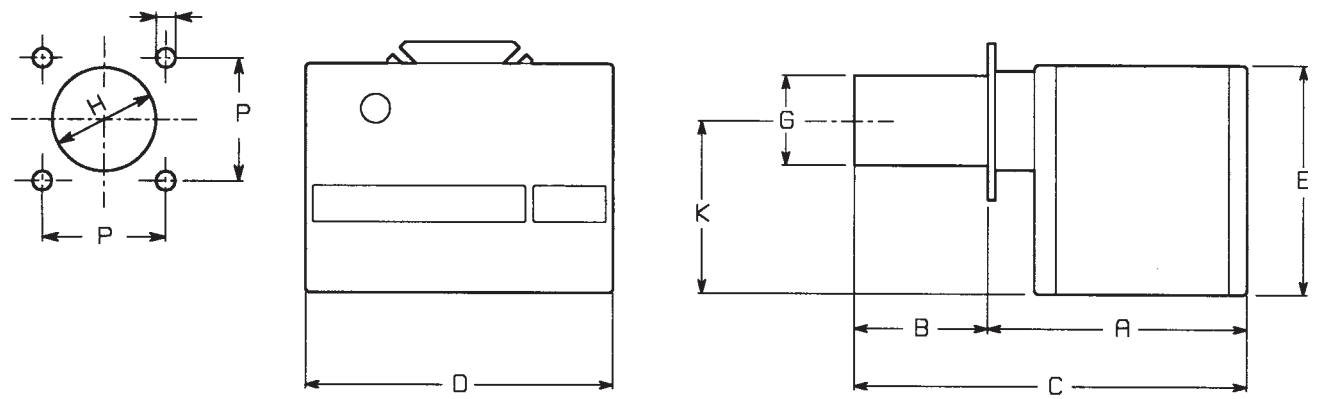


Fig. 1

	A	BL	CL	D	E	G	K	H	P	M
G18SP	275	200	475	340	255	115	230	125	121÷134	M8

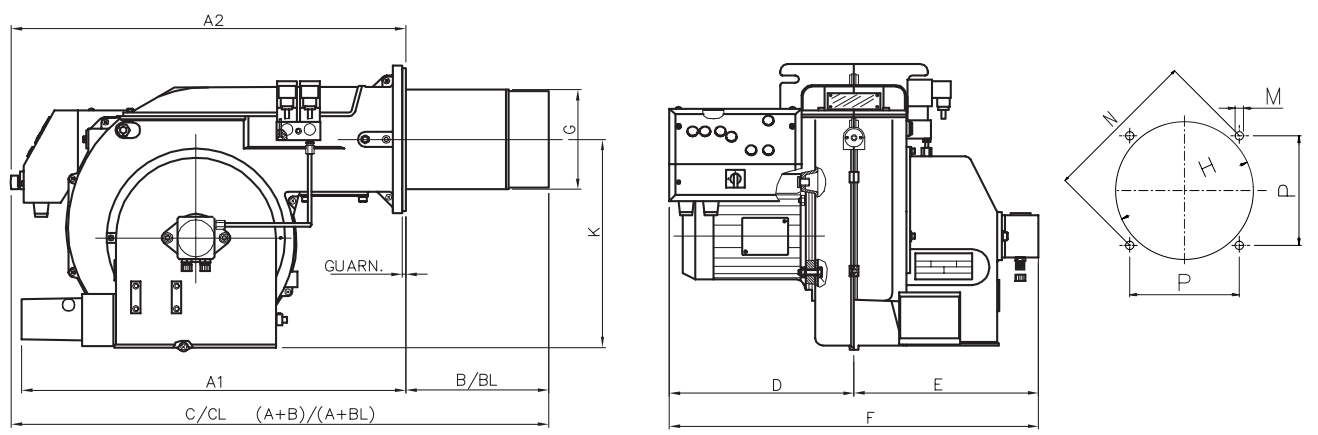


Fig. 2

	A1	A2	B	BL	C	CL	D	E	F	G	K	H	P	M	N
PG25 SP PG30 TN	-	510	155	345	665	855	268	227	495	131	285	160	155	M10	219

PERFORMANCE CURVES

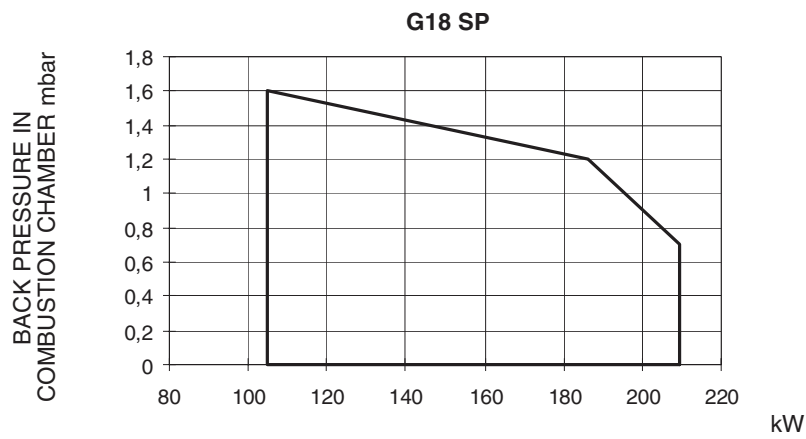


Fig. 3

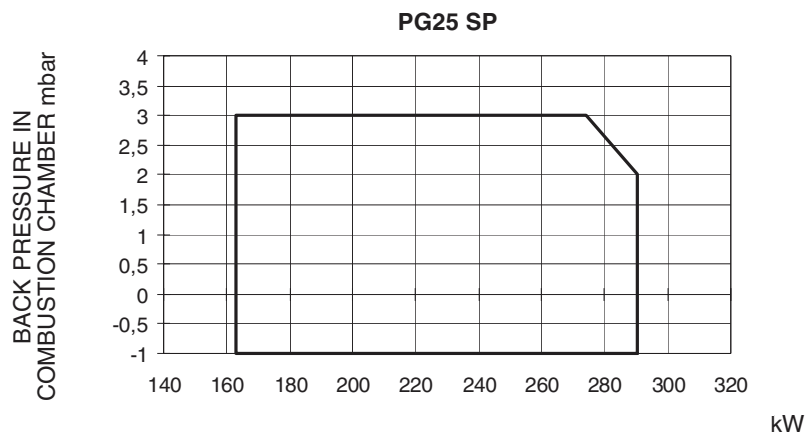


Fig. 4

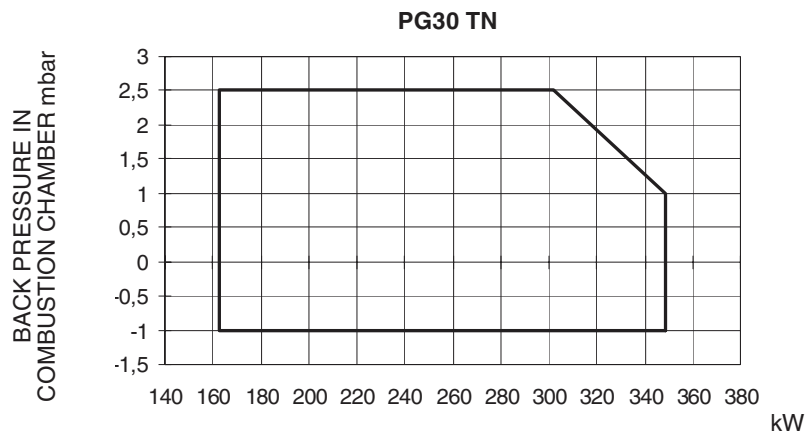


Fig. 5

## MOUNTINGS AND CONNECTIONS

The burners are despatched in cardboard packages with the following dimensions:

G18 G-.TN.S...: 420 x 350 x 420 mm (W x H x D)

G18 G-.TN.L...: 420 x 350 x 620 mm (W x H x D)

PG25 - PG30: 980 x 460 x 550 mm (W x H x D)

The following are placed in each packing:

- 1 burner;
- 2 flexible light oil tubes;
- 1 light oil filter;
- 1 gasket to be inserted between the burner and the boiler;
- 1 envelope with this manual.

To get rid of the burner's packing and in the event of scrapping of the latter, follow the procedures laid down by current laws on disposal of materials

### G18 SP

#### Fitting the burner to the boiler

Fix the flange of the burner to the boiler as shown in Fig. 6.

This allow a correct inclination towards the combustion chamber. If necessary, after fitting the burner to the boiler, seal the space between the blast tube and the refractory lining with appropriate insulating material (ceramic fibre cord or refractory cement).

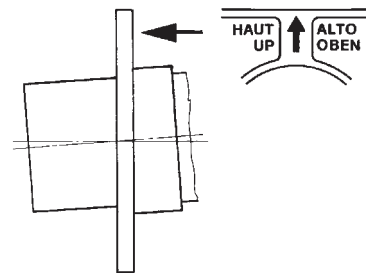


Fig. 6

### PG25 SP - PG30 TN

#### Fitting the burner to the boiler

After fitting the burner to the boiler ensure that the space between the blast tube and the refractory lining is sealed with appropriate insulating material (ceramic fibre cord or refractory cement).

#### Key

- 1 Burner
- 2 Fixing nut
- 3 Washer
- 4 Seal
- 5 Stud bolt
- 6 Sightglass cleaning tube
- 7 Blast tube

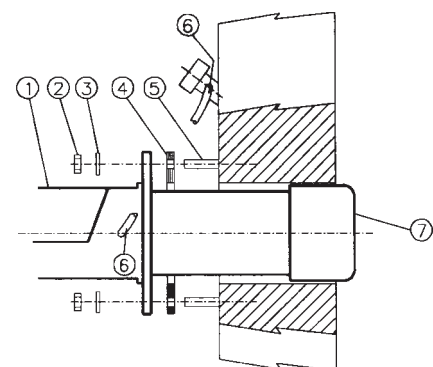


Fig. 7

## Electrical wiring

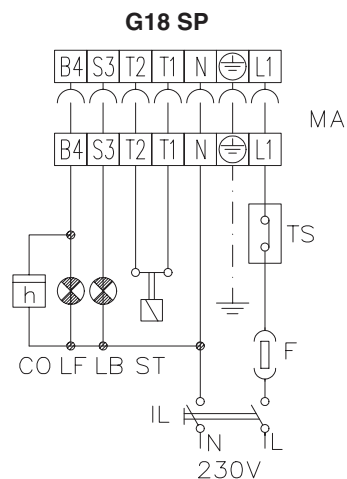


Fig. 8a

- Remove the burner's cover;
- effect the connections to the supply terminal board, as shown in Fig. 8a;
- refit the burner's cover.

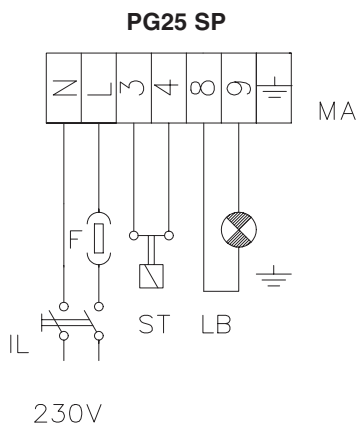


Fig. 8b

- Remove the cover of the electrical board fitted on the burner.
- Effect the connections to the supply terminal board following the diagrams in Fig. 8b and Fig. 8c; refit the cover on the electrical board.

**IMPORTANT: in connecting electric supply wires to burner terminal board, be sure that ground wire should be longer than phase and neutral ones**

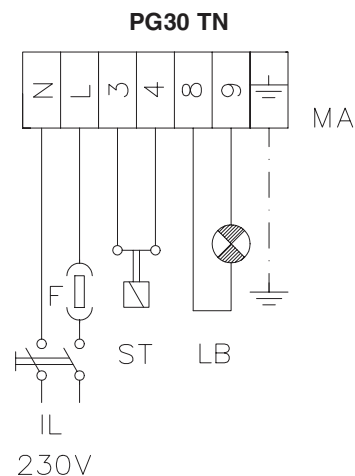


Fig. 8c



**RESPECT THE BASIC SAFETY RULES. MAKE SURE OF THE CONNECTION TO THE EARTHING SYSTEM. DO NOT REVERSE THE PHASE AND NEUTRAL CONNECTIONS. FIT A DIFFERENTIAL THERMAL MAGNET SWITCH ADEQUATE FOR CONNECTION TO THE MAINS.**

## Light oil piping installation diagram

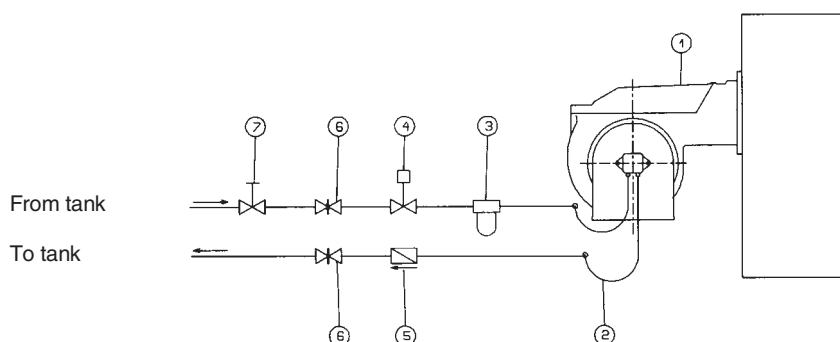


Fig. 9

### Key

- 1 Burner
- 2 Flexible hoses (fitted)
- 3 Light oil filter (fitted)
- 4 Automatic interceptor (\*)
- 5 One-way valve (\*)
- 6 Gate valve
- 7 Quick-closing gate-valve (not in vicinity of tank or boiler)

(\*) Only for installations with gravity, siphon or forced circulation feed systems. If the device installed is a solenoid valve, a timer must be installed to delay the valve opening.

The direct connection of the device without a timer may cause pump breaks



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## SETTINGS

### G18 SP - PG25 SP

These burners are fitted with a double-regulation pump. The flame control device, a twin-stage one, after the pre-purge stage, energized the valve EV1 and the burner starts up.

After few seconds, the intervention of the second stage caused the energizing of the valve EV2, so the burner is feeded with a maximum pressure of about 18 bar..

### PG30 TN

Before carry out the settings, start-up the light oil pump proceeding as follows:

Before starting up the burner, be sure that the return pipe to the tank is not obstructed; any obstruction would cause the pump seal to break.

start up the burner, light the photoresistor after the solenoid valve opening and leak the air from the manometer gauge.\

### Light oil rate setting

The light oil rate is adjusted by chosing a nozzle with appropriate dimensions and setting the inlet pump pressure; to chose the nozzle, refer to the tables below.

### Light oil pump settings

#### G18 SP - PG25 SP

Adjust the pump for the ignition, to a pressure value of about 8-10 bar. After 10", the safety device drives the second stage; set the pump to a pressure value of 18 bar, by means of the regulation screw.

#### PG30 TN

Set the pump to a pressure value from 10 to 14 bar, depending by the nozzle fitted (see Tab. 2).

**Tab. 1 - Burners G18 SP - PG25 SP**

	Pressure (bar)										
GPH	8	9	10	11	12	13	14	15	16	17	18
1.75	6.02	6.38	6.73	7.05	7.37	7.67	7.96	8.24	8.51	8.77	9.02
2.00	6.88	7.29	7.69	8.06	8.42	8.77	9.10	9.42	9.72	10.02	10.31
2.25	7.74	8.20	8.65	9.07	9.47	9.86	10.23	10.59	10.94	11.28	11.60
2.50	8.59	9.12	9.61	10.08	10.53	10.96	11.37	11.77	12.16	12.53	12.89
3.00	10.31	10.94	11.53	12.09	12.63	13.15	13.64	14.12	14.59	15.03	15.47
3.50	12.03	12.76	13.45	14.11	14.74	15.34	15.92	16.48	17.02	17.54	18.05
4.00	13.75	14.59	15.37	16.13	16.84	17.53	18.19	18.83	19.45	20.05	20.63
4.50	15.47	16.41	17.30	18.14	18.95	19.72	20.47	21.18	21.88	22.55	23.21
5.00	17.19	18.23	19.22	20.16	21.05	21.91	22.74	23.54	24.31	25.06	25.78

**Tab. 2 - Burner PG30 TN**

	Pressure (bar)		
GPH	10	12	14
3.50	13.45	14.74	15.92
4.00	15.37	16.84	18.19
4.50	17.30	18.95	20.47
5.00	19.22	21.05	22.74
5.50	21.14	23.16	25.01
6.00	23.06	25.26	27.29
6.50	24.98	27.37	29.56
7.00	26.91	29.47	31.84

## LIGHT OIL PUMPS

### Pump Suntec AS57 C

Viscosity range	2 - 12 mm <sup>2</sup> /s (cSt)
Oil temperature	0 - 60°C into the pump.
Inlet pressure	2 bar max.
Return pressure	2 bar max.
Suction height	max. 0,45 bar to avoid air separation from oil.
Speed	3600 gpm max.(AS 47/AS57) - 2850 gpm max. (AS 67)

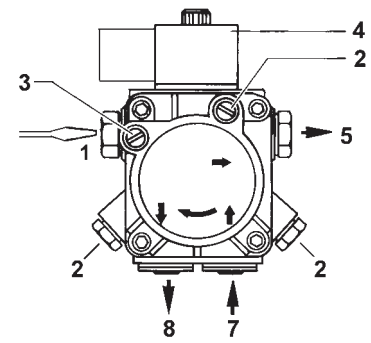


Fig. 10

### Pumps Delta VM

Viscosity	2 ÷ 50 cSt
Oil temperature	60°C max
Inlet pressure	0,7 bar max.
Return pressure	1,5 bar max.
Suction height	max. 0,5 bar to avoid air separation from oil.
Rated speed	3500 rpm

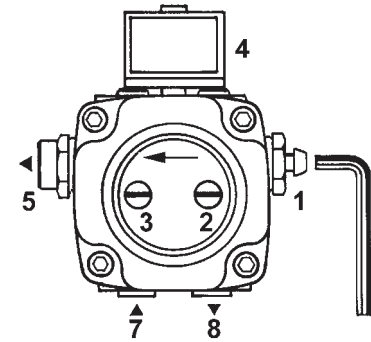


Fig. 11

### Pump Suntec AT2 45C

Viscosity	2 ÷ 12 cSt
Oil temperature	60°C max
Inlet pressure	2 bar max.
Return pressure	2 bar max.
Suction height	max. 0,45 bar to avoid air separation from oil
Rated speed	3600 rpm

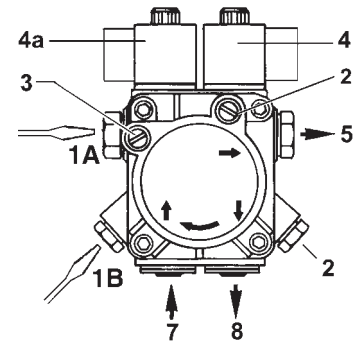


Fig. 12

### Key

- 1 Pressure regulator
- 1A Low pressure regulation
- 1B High pressure regulator
- 2 Pressure gauge
- 3 Vacuum gauge
- 4 Solenoid valve
- 4a Low pressure solenoid valve
- 5 Nozzle
- 7 Suction
- 8 Return

## AIR RATE SETTING

### G18 SP

Loose the screw VBS and rotate the air damper in the desired position, to set the air flow.

At the end of settings, tight the screw VBS.

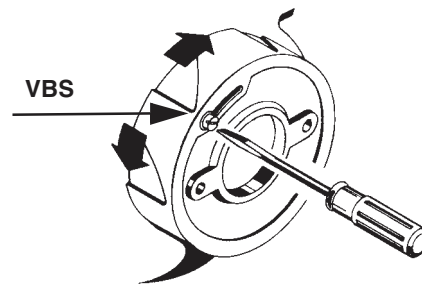


Fig. 13

### PG25 SP - PG30 TN

Loose the screw VBS and set the air flow, working directly on the air damper.

At the end of settings, tight the screw VBS.

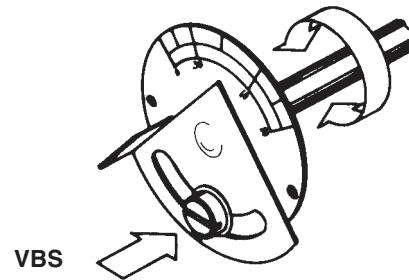


Fig. 14

## ADJUSTING THE COMBUSTION HEAD

The burner is set in the factory with the combustion head in the "MAX." position, corresponding to the maximum output. To operate the burner at a lowest output, drive the combustion head back towards the "MIN." position, rotating the screw VRT clockwise.

### G18 SP

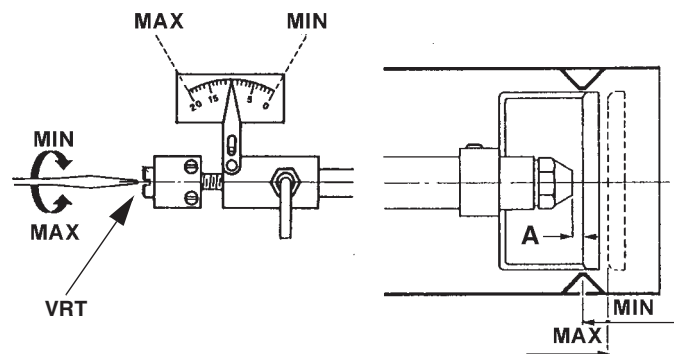


Fig. 15

### PG25 SP - PG30 TN

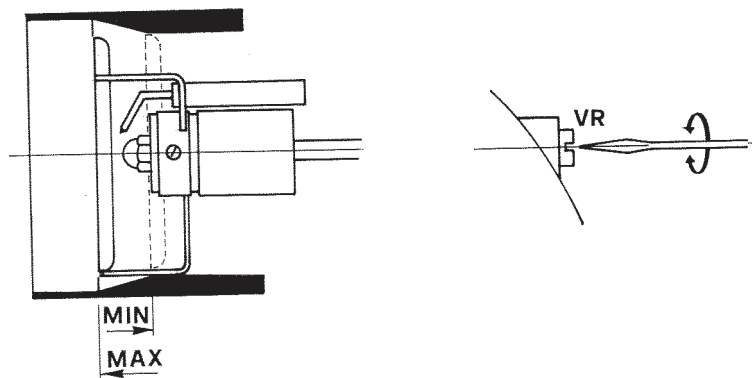


Fig. 16

**LIMITATIONS OF USE**

**THE BURNER IS AN APPLIANCE DESIGNED AND CONSTRUCTED TO OPERATE ONLY AFTER BEING CORRECTLY CONNECTED TO A HEAT GENERATOR (E.G. BOILER, HOT AIR GENERATOR, FURNACE, ETC.), ANY OTHER USE IS TO BE CONSIDERED IMPROPER AND THEREFORE DANGEROUS.**

**THE USER MUST GUARANTEE THE CORRECT FITTING OF THE APPLIANCE, ENTRUSTING THE INSTALLATION OF IT TO QUALIFIED PERSONNEL AND HAVING THE FIRST COMMISSIONING OF IT CARRIED OUT BY A SERVICE CENTRE AUTHORISED BY THE COMPANY MANUFACTURING THE BURNER.**

**A FUNDAMENTAL FACTOR IN THIS RESPECT IS THE ELECTRICAL CONNECTION TO THE GENERATOR'S CONTROL AND SAFETY UNITS (CONTROL THERMOSTAT, SAFETY, ETC.) WHICH GUARANTEES CORRECT AND SAFE FUNCTIONING OF THE BURNER.**

**THEREFORE, ANY OPERATION OF THE APPLIANCE MUST BE PREVENTED WHICH DEPARTS FROM THE INSTALLATION OPERATIONS OR WHICH HAPPENS AFTER TOTAL OR PARTIAL TAMPERING WITH THESE (E.G. DISCONNECTION, EVEN PARTIAL, OF THE ELECTRICAL LEADS, OPENING THE GENERATOR DOOR, DISMANTLING OF PART OF THE BURNER).**

**NEVER OPEN OR DISMANTLE ANY COMPONENT OF THE MACHINE.**

**OPERATE ONLY THE MAIN SWITCH, WHICH THROUGH ITS EASY ACCESSIBILITY AND RAPIDITY OF OPERATION ALSO FUNCTIONS AS AN EMERGENCY SWITCH, AND ON THE RESET BUTTON.**

**IN THE EVENT OF REPEATED LOCKOUTS, DO NOT PERSIST WITH THE RESET BUTTON AND CONTACT QUALIFIED PERSONNEL WHO WILL PROCEED TO ELIMINATE THE MALFUNCTION.**

**WARNING: DURING NORMAL OPERATION THE PARTS OF THE BURNER NEAREST TO THE GENERATOR (COUPLING FLANGE) CAN BECOME VERY HOT, AVOID TOUCHING THEM SO AS NOT TO GET BURNT**

At least once a year carry out the maintenance operations listed below. In the case of seasonal servicing, it is recommended to carry out the maintenance at the end of each heating season; in the case of continuous operation the maintenance is carried out every 6 months.



**WARNING: All operations on the burner must be carried out with the mains disconnected!**

## ● PERIODICAL SERVICING

- Clean and examine the oil filter cartridge and replace it if necessary;
- Examine the condition of the oil flexible pipeworks and check for possible leaks;
- Clean and examine the filter inside the oil pump;
- Dismantle, examine and clean the combustion head. When reassembling respect the measures reported in Tab. 9;
- Esame elettrodi di accensione e relativi isolatori in ceramica, pulizia, eventuale registrazione e se necessario, sostituzione vedere Fig. 18.
- Dismantle and clean the oil nozzle (important: use solvents for cleaning and not metal utensils).
- At the end of the maintenance procedures replace the burner, light it and check the shape of the flame: if in doubt replace the nozzle(s);
- Where the burner is used intensively it is recommended to replace the nozzles at the beginning of the operating season;
- Examine and carefully clean the flame detector cell and replace if necessary. If in doubt light the burner and check the detector circuit as shown in Fig. 19.

## Correct position of electrodes and combustion head - G18 SP

- Prepare a stable surface where lying the burner during maintenance.
- To gain access to the combustion head and to the nozzles, loose the screw which lock the blast tube and remove it from the part that remains fixed to the boiler.
- To guarantee a good ignition, respect the measures indicated in Tab. 3.
- Be sure to lock the screw that fix the electrodes group, before reassembly the burner.

## Removal of the combustion head - PG25 SP - PG30 TN

- Remove the cap C.
- Take out the photoresistance from its housing.
- Unscrew the floating pipe-fitting E from the oil pipe, using 2 spanners, to avoid to loose the pipefittings from the distribution block;
- Remove the screws V and unscrew the screw VRT until the threaded rod AR is free;
- Remove the complete assembly as shown in Fig. 17a.

Note: To re-assemble reverse the order of procedures described above.

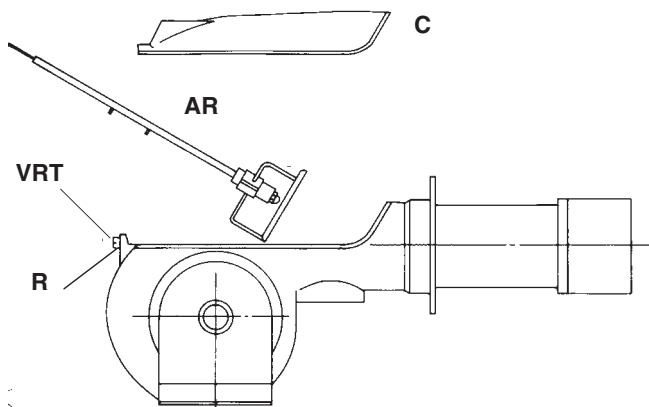


Fig. 17a

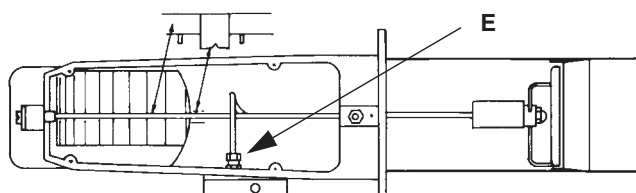


Fig. 17b

## Correct position of electrodes and combustion head

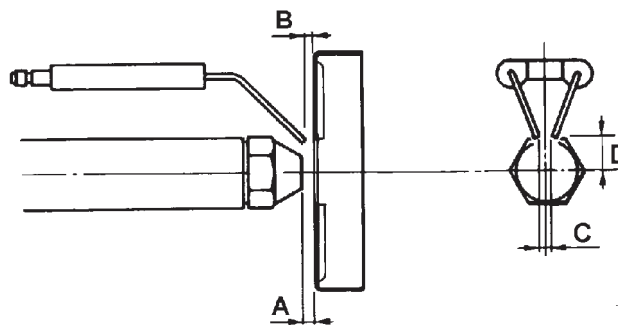


Fig. 18

Tab. 3

Mod.	A	B	C	D
G18 SP PG25 SP PG30 TN	8 mm	4 mm	5,5-6,5 mm	8-10 mm

## CHECK OF THE IONIZATION CURRENT

To check the detector signal follow the procedure shown in Fig. 19. If the signal is not within the prescribed range, check the electrical contacts; check also that the combustion head is clean and the photoelectric sensor is correctly positioned. Replace it if necessary.

Minimum current with flame: 65  $\mu$ A

Maximum current without flame: 5  $\mu$ A

Maximum possible current with flame: 200  $\mu$ A

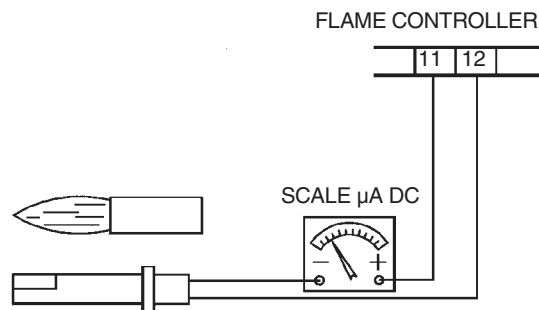


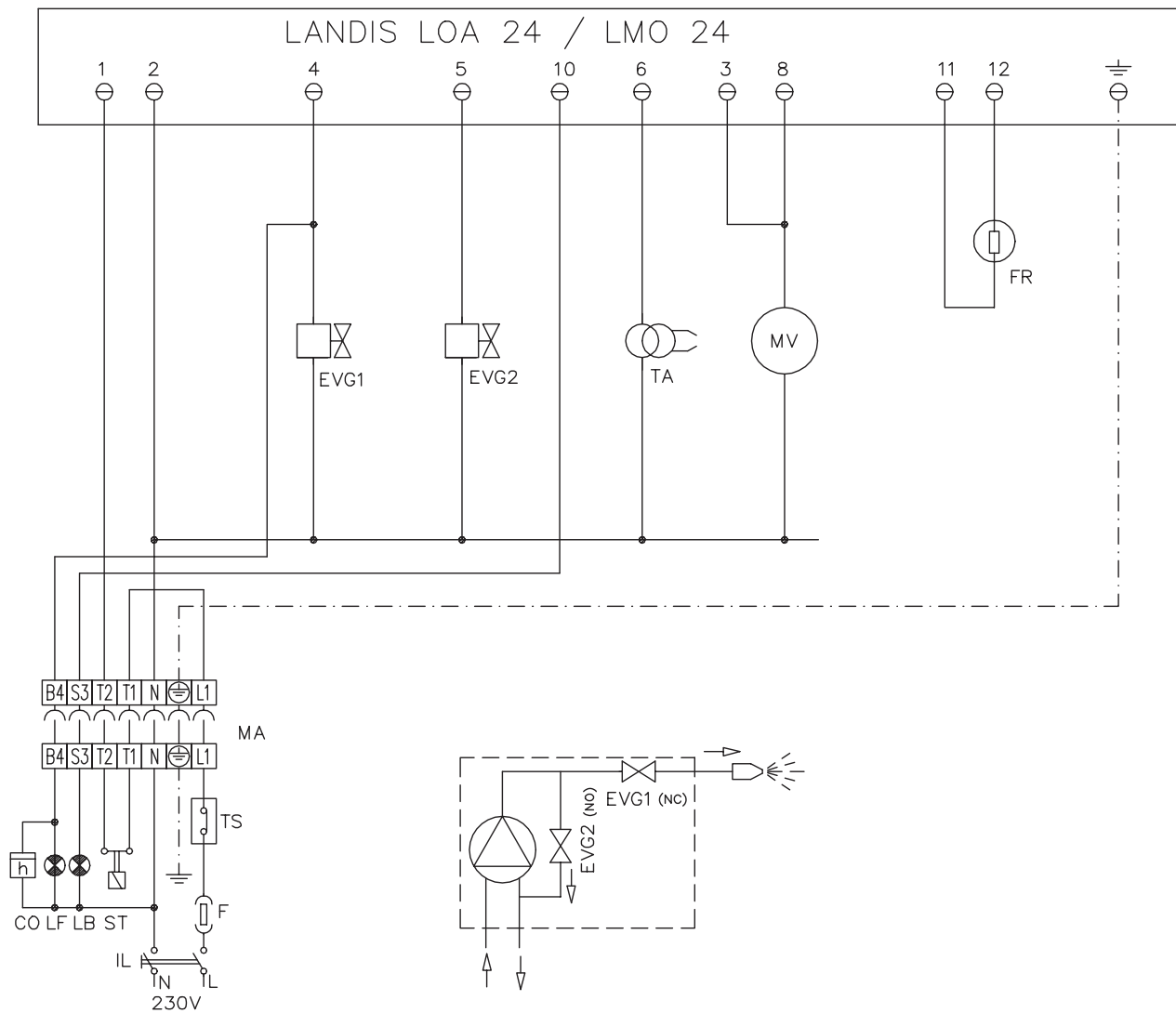
Fig. 19

## TROUBLESHOOTING

	THE BURNER DOESN'T START	THE BURNER REPEATS THE PREPURGE STAGE	NOISY OIL PUMP	THE BURNER DOESN'T START AND LOCKS	THE BURNER STARTS THEN LOCKS	THE BURNER LOCKS DURING OPERATION	THE BURNER LOCKS AND REPEATS THE CYCLE DURING OPERATION
MAIN SWITCH OPEN	●						
LINE FUSES INTERRUPTION	●						
MAX. THERMOSTAT FAILURE	●						●
AUXILIARY FUSE INTERRUPTION	●						
FLAME CONTROLLER FAILURE	●	●		●	●	●	
SMOKY FLAME					●	●	
IGNITION TRANSFORMER FAILURE				●			
DIRTY IGNITION ELECTRODES OR BADLY POSITIONED				●			
DIRTY NOZZLE				●			
DEFECTIVE LIGHT OIL VALVE				●		●	
PHOTORESISTANCE DIRTY OR DEFECTIVE					●	●	
LIGHT OIL LOW PRESSURE				●			
DIRTY LIGHT OIL FILTERS			●	●		●	

## ELECTRICAL DIAGRAMS

Electrical diagram cod. 01-369 Rev. 1 - Burners G18 SP



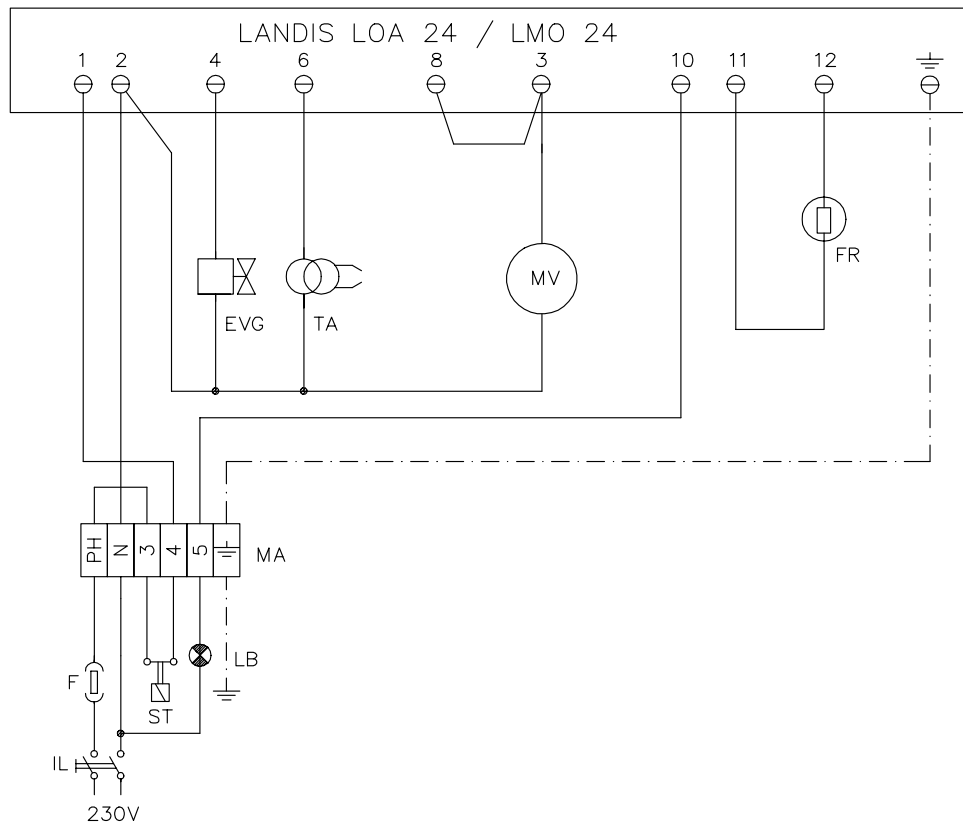
### Key

CO	Time counter
EVG1	Light oil solenoid valve 1st stage
EVG2	Light oil solenoid valve 2nd stage
F	Fuse
FR	Photoresistor
IL	Main switch
L1	Phase
LF	Burner operation light
LB	Burner lockout light
LOA24/BOA64	Flame monitor device
MA	Power supply terminal block
MV	Fan motor
N	Neutral
ST	Thermostats or pressure switches
TA	Ignition transformer
TS	Boiler thermostat or pressure switch

### ATTENTION :

- 1 - Electric supply 230V 50Hz 2N a.c.
- 2 - Don't reverse Phase and Neutral
- 3 - Make sure that the burner is properly hearted

## Electrical diagram cod. 04-575 - Burners PG25 SP



### Legenda

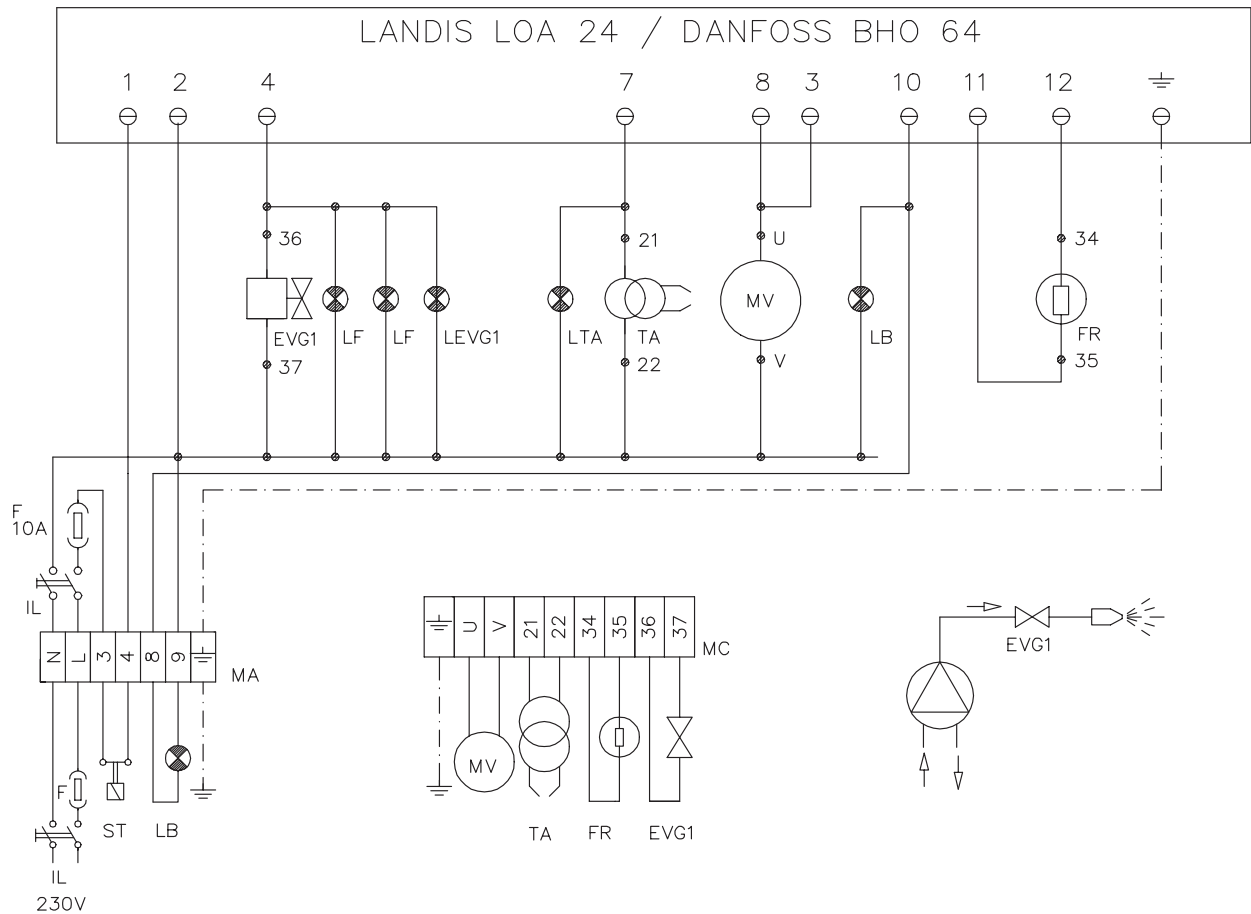
CO	Time counter
EVG1	Light oil solenoid valve 1st stage
EVG2	Light oil solenoid valve 2nd stage
F	Fuse
FR	Photoresistor
IL	Main switch
L	Phase
LB	Burner lockout light
LEV1	Opening of EVG1 signalization light
LEV2	Opening of EVG2 signalization light
LF	Burner operation signalization light
LOA24/BHO64	Flame monitor device
LTA	Ignition transformer signalization light
MA	Power supply terminal block
MC	Terminal block for burner components connection
MV	Fan motor
N	Neutral
ST	Thermostats or pressure switches
TA	Ignition transformer

### ATTENTION

- 1- Electric supply 230V 50Hz 2N a.c.
- 2- Don't reverse Phase and Neutral
- 3- Make sure that the burner is properly heated



## Electrical diagram cod. 04-574 - Burner PG30 TN



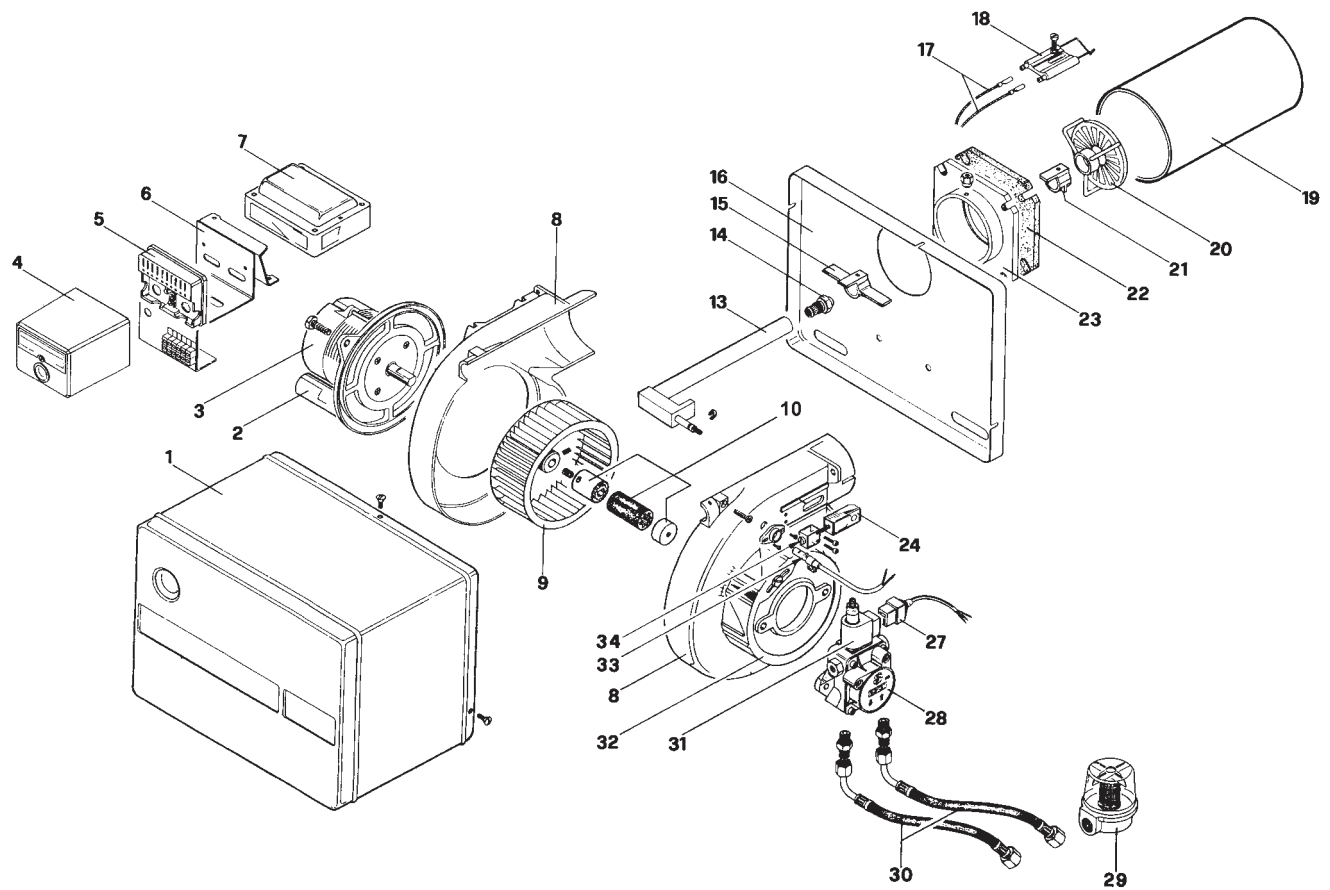
### Key

EVG1	Light oil solenoid valve
F	Fuses
FR	Photoresistor
IL	Main switch
L	Phase
LB	Burner lockout light
LEVG1	EVG1 opening signalization light
LF	Burner operation light
LOA24/BHO64	Flame monitor device
LTA	Ignition transformer light
MA	Power supply terminal block
MC	Terminal block for burner components connection
MV	Fan motor
N	Neutral
ST	Thermostats or pressure switches
TA	Ignition transformer

### ATTENTION

- 1- Electric supply 230V 50Hz 2N a.c.
- 2- Don't reverse Phase and Neutral
- 3- Make sure that the burner is properly heated

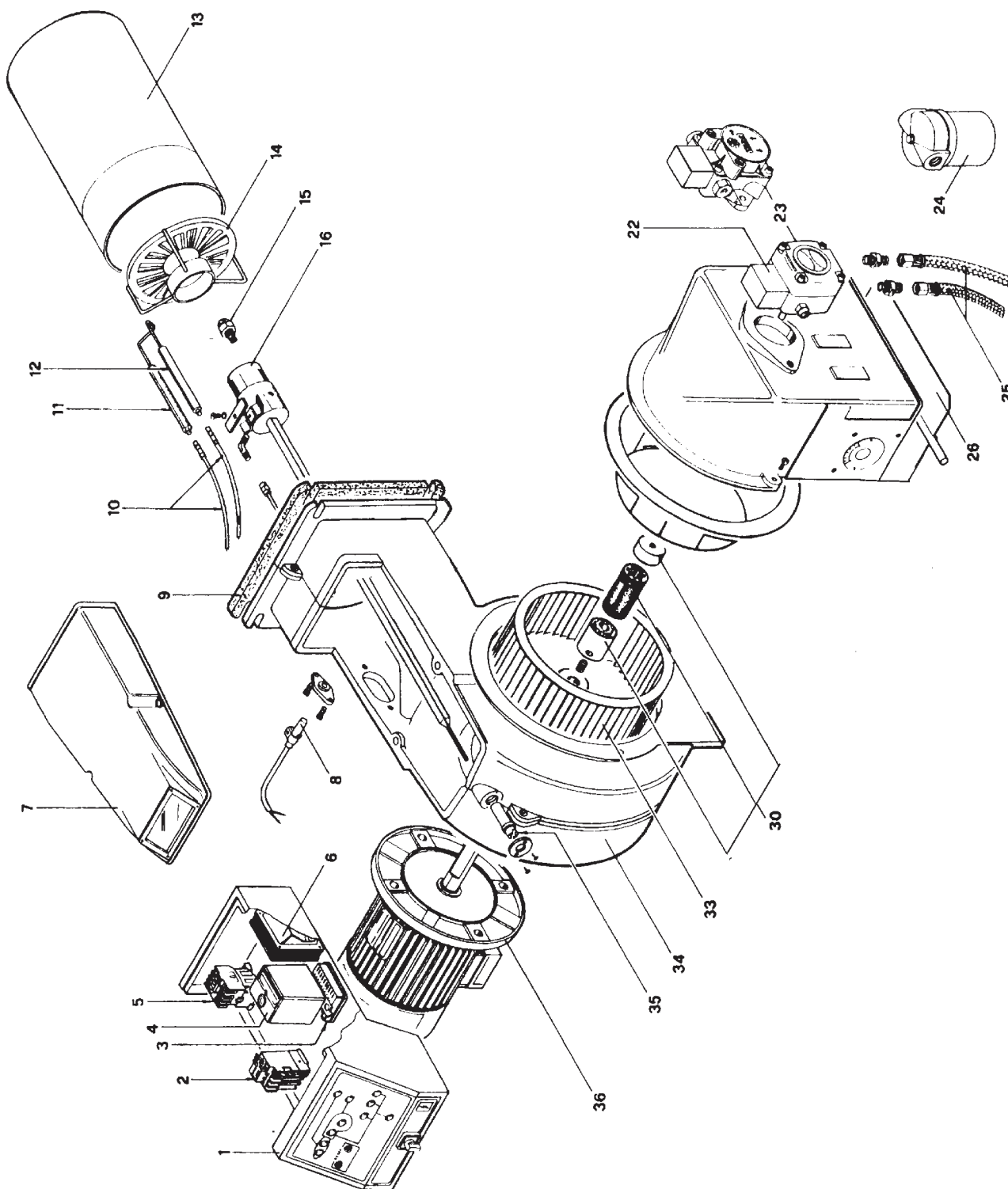
**SPARE PARTS**  
**Burner G18 SP**



---

**G18 SP**

POS.	DESCRIPTION	CODE
1	HOUSING	301.00.19
2	CONDENSER	603.00.04
3	MOTOR	218.00.09
4	FLAME CONTROL DEVICE LOA24	202.04.45
5	SOCKET FOR LOA24	203.04.09
6	SUPPORT BRACKET	243.00.04
7	TRANSFORMER	217.01.06
8	BURNER CASING	205.02.28
9	FAN	215.00.04
10	COMPLETE JOINT	254
13	ATOMIZER	302.00.20
14	NOZZLE	261...
15	ATOMIZER SUPPORT	228.00.06
16	BOTTOM	201.01.02
17	IGNITION CABLES	605.01.22
18	IGNITION ELECTRODE	208.02.03
19	BLAST TUBE	309.00.55
20	COMBUSTION HEAD	306.01.15
21	ELECTRODE SUPPORT	228.00.16
22	GASKET	211.00.31
23	FLANGE	210.00.11
24	DISTRIBUTION MOVING BLOCK	232.00.12
25	LIGHT OIL PIPE	222.01.25
27	CONNECTOR	620.00.08
28	SUNTEC AT2 45C PUMP	259.01.47
29	FILTER	209.00.16
30	FLEXIBLE HOSE	234.00.01
31	SOLENOID VALVE COIL	258.04.02
32	AIR DAMPER	101.07.02
33	PHOTORESISTOR QRB1B	251.00.08
34	ADJUSTING SCREW	232.00.11



POS.	DESCRIPTION	PG25 SP	PG30 TN
1	ELECTRIC BOARD	610.00.86	610.00.86
3	SOCKET FOR FLAME CONTROL DEVICE	203.04.15	203.04.15
4	FLAME CONTROL DEVICE	202.04.45	202.04.45
6	IGNITION TRANSFORMER	217.01.07	217.01.07
7	TOP COVER	221.01.03	221.01.03
8	LANDIS PHOTORESISTOR	251.00.03	251.00.03
9	GASKET	211.00.04	211.00.04
10	IGNITION CABLES	605.01.09	605.01.09
12	SHORT ELECTRODE	208.02.08	208.02.08
13	STANDARD BLAST TUBE	309.00.33	309.00.33
13	LONG BLAST TUBE	309.00.35	309.00.35
14	DIFFUSER	306.01.79	306.01.79
15	NOZZLE	261...	261...
16	STANDARD NOZZLE SUPPORT	302.00.09	302.00.09
16	LONG NOZZLE SUPPORT	302.00.17	302.00.17
17	STANDARD LIGHT OIL PIPE	307.10.03	307.10.03
17	LONG LIGHT OIL PIPE	307.10.21	307.10.21
22	COIL FOR SUNTEC PUMP	258.04.02	258.04.02
22	COIL FOR DELTA PUMP		258.04.06
23	SUNTEC PUMP	259.01.47	259.01.44
23	DELTA PUMP		259.00.09
24	LIGHT OIL FILTER	209.00.16	209.00.16
25	FLEXIBLE HOSES	234.00.01	234.00.01
26	AIR DAMPER	214.00.05	214.00.05
30	COMPLETE JOINT FOR SUNTEC PUMP	254.01.09	254.01.09
30	COMPLETE JOINT FOR DELTA PUMP		254.01.03
33	FAN	215.00.06	215.00.06
34	BURNER CASING	205.01.17	205.01.17
35	HEAD ADJUSTING SCREW	232.05.03	232.05.03
36	ELECTRIC MOTOR	218.07.04	218.07.04

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## APPENDICX: COMPONENTS CHARACTERISTICS

LANDIS OIL BURNERS AUTOMATIC CONTROLLER LOA24	23
SUNTEC PUMPS AS 47 - 57 - 67	25
DELTA VM PUMPS	26
SUNTEC AT2 PUMP	27
NOTES FOR USE AND MAINTENANCE OF FUEL PUMPS	28

## LANDIS OIL BURNERS AUTOMATIC CONTROLLER LOA24

### Use

LOA... safety devices are intended for use solely with QRB... photore-sistors, for lighting and controlling low capacity forced air light oil burn-ers with max. capacity 30 kg/h in accordance with standard DIN 4787.

The One or two flames are lit through electrical connections with or without post-ignition.

### To replace LAI... AND LAB.. WITH LOA...

LOA... models can be used as replacement for LAI... and LAB.. con-trollers by means of the adapter KF8819 and without the need to change the electrical wiring. Because the LOA is smaller in dimen-sions, when it is used with the adapter the external dimensions are almost identical, which means that there is no need to move the reset button.

### Performance

The controllers just need plugging in, so they can be mounted in almost any position: on the burner, on the electrical panel or on the control panel. The casing is made of robust heat-resistant plastic and contains:

- the thermic programmer operating a multiple switch control system with ambient temperature compensator
- flame signal amplifier with flame relay
- warning light indicating lockout and associated sealed reset but-ton.

The plug-in socket, also made of robust heat-resistant plastic, con-tains the 12 terminals and also:

- 3 neutral terminals, ready wired up to terminal 2
- 4 earth terminals for earthing the burner
- 2 supplementary terminals numbered "31" and "32".

The socket has two openings at the bottom for the leads; 5 others with threaded connection for cable holders PG11 or 3/4UNP for non-metallic sleeves are located on a mobile stuffing box, one on either side and 3 on the front.

There are two flexible metal tongues on the sides of the socket for mounting.

To dismantle it only requires gentle pressure with a screw driver in the slot of the mounting guide. The base dimensions of the socket are exactly the same as for types LAB/LAI and there is no difference in the diameter of the reset button, the two mounting screws and the flange of the burner earth.

### Safety at low voltage levels

Safety devices against any reduction in the mains voltage operate on a special electronic circuit which, in the event of the power supply fal-ling below 165V~, stops the burner switching on without releasing the fuel and locks out the apparatus.

## Wiring diagram of the programme

To ensure correct wiring it is essential to observe local standards and follow the instructions of the burner manufacturer with regard to assembly and start-up.

### Program's legend:

- Controller output signals
- ▨ Required input signals
- A' Burner start up with light oil pre-heater OH
- A Burner start-up without light oil pre-heater
- B Flame lit
- C Normal operation
- D Normal stop through R
- tw Oil pre-heating time until operational all clear given through contact OW
- t1 Pre-purge time
- t3 Pre-ignition time
- t2 Safety time
- t3n Post-ignition time
- t4 Interval between the flame lighting and energising of solenoid 2a at terminal 5

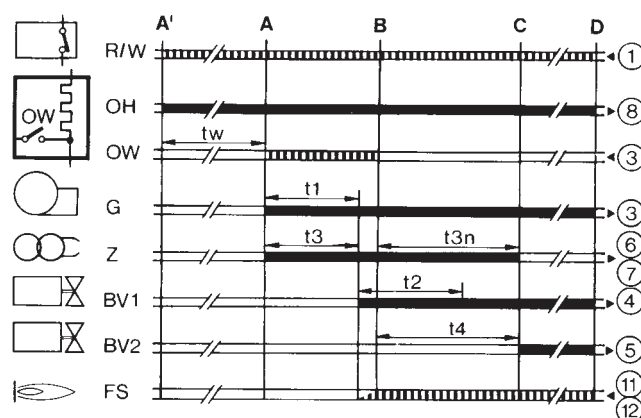
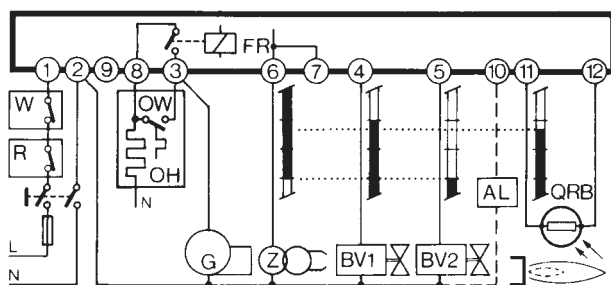
### Internal layout

- AL Optical alarm
- BV. Fuel valve
- EK Reset button
- FR Flame relay
- fr Flame relay contacts
- FS Flame alight signal
- G Burner motor
- K Flame relay anchor to delay the tzl command in the event of a premature flame signal or endorse it where the signal is correct.
- OH light oil pre-heater
- OW Operational all-clear contact
- QRB Photo-resistant cell (flame detector)
- R Thermostat or pressure switch
- TZ Thermo-electric programmer (bimetal system)
- tz.. TZ contacts
- V Flame signal amplifier
- W Safety thermostat or pressure switch
- Z Ignition transformer

### The above are safety devices!

To tamper with them in any way may have unforeseeable conse-quences!

Do not open them!



Voltage	220V -15%...240V+10% or 100V -15%...110V+10%
Frequency	50...60Hz +/- 6%
External fuse	max.10A slow action
Contact flow:	
- terminal 1	5A
- terminal 3	5A (incl.capacity absorbed by motor and pre-heater)
Terminal flow:	
terminals 4, 5 &10	1A
terminals 6&7	2A
terminal 8	5A
Absorbed cap	3VA
Protection	IP40
Premitted temp:	
operational	-20...+60°C
transport & storage	-50...+60°C
Emplacement	any
Mass (weight)	controller 180g, socket 50g, AGK accessories 12 g.

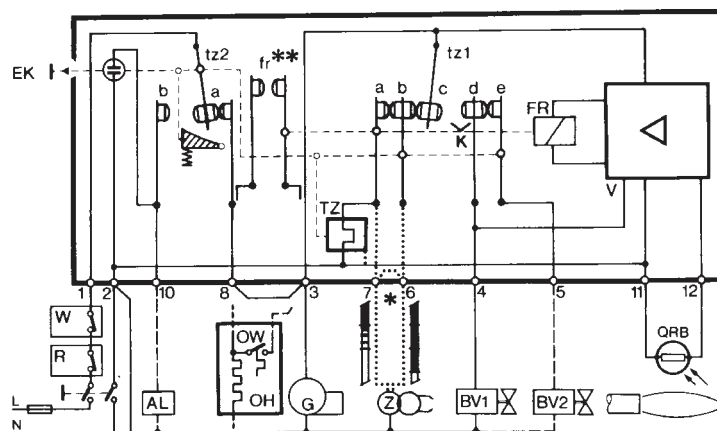
### Stray light/premature ignition

During pre-purge and/or pre-ignition there should be no flamesignal. If there is a flame signal, eg from premature ignition due to a faulty solenoid, external light, short circuit in the photoresisto or wiring, malfunction in the flame signal amplifier, etc., at the end of pre-purge and safety time the controller locks out the burner and stops the fuel flow even during safety time.

If there is no flame at the end of safety time the controller locks out immediately.

If there is no flame during operation the controller cuts off the supply of fuel and automatically initiates a fresh start-up programme: at the end of  $t_4$  the start-up programme ends.

Whenever there is a safety stop, terminals 3-8 and 11 are de-energised in less than 1 second; at the same time a remote lockout signal is transmitted through terminal 10. The controller can be reset after c. 50 seconds.





## SUNTEC PUMPS AS 47 - 57 - 67

### Operating principle

The gear set draws oil from the tank through the built-in filter and transfers it to the valve that regulates the oil pressure to the nozzle line. All oil that does not go through the nozzle line will be dumped through the valve back to the return line in two pipe installation or, if it is a one-pipe installation, back to suction port in the gear set. In that case, the by-pass plug must be removed from the return port, and the return port sealed by steel plug and washer. The solenoid valve of the AS pump is of the "normally opened" type. When the solenoid valve is non-activated, the by-pass channel between the pressure and return sides of the valve is open. No pressure will then be built up to open the valve; it does not matter which speed the gear set has. When the solenoid is activated, this by-pass channel is closed and because of the full speed of the gear set, the pressure necessary to open the valve will be built up very rapidly, which gives a very sharp cut-on function.

### Cut-off

When the burner stops, the solenoid opens the by-pass at the same moment, which drains all the oil down to the return, and the nozzle valve closes immediately. This gives a very sharp cut-off function. The cut-on and cut-off can be actuated regardless of motor speed and have an extremely fast response. When the solenoid is not activated, the torque requirement is low up to full motor speed.

### Bleed

Bleeding in two pipe operation is automatic, but it may be accelerated by opening a pressure port. In one pipe operation, a pressure port must be opened to bleed the system.

### Technical data

Mounting: flange or hub mounting according to EN 225.

Connection: threads cylindrical according to ISO 228/1.

Inlet and return G 1/4 (with facilities for conical sealing on revision 5 models)

Nozzle outlet G 1/8

Pressure gauge ports G 1/8

Vacuum gauge port G 1/8

Valve function Pressure regulation and cut-off\*.

\* cut-off function only assured for model pressure range.

Strainer open area 14 cm<sup>2</sup> - opening size: 150 µm.

Shaft: Ø 8 mm according to European standard EN 225.

By-pass plug inserted in return port for two-pipe system; to be removed with a 4 mm Allen key for one pipe system.

Weight 1,1- 1,5 kg (depending on the model).

### Hydraulic Data

Gear size: Nozzle pressure range \* Factory setting

47/57 7- 14 bar 9 bar; 67 10 - 15 bars 10 bar

\* other ranges available on request, refer to the specified range of the particular fuel unit.

Operating viscosity 2 - 12 mm<sup>2</sup>/s (cSt)

Oil temperature 0 - 60°C in the pump.

Inlet pressure 2 bar max.

Return pressure 2 bar max.

Suction height: 0,45 bar max. vacuum to prevent air separation from oil.

Rated speed: 3600 rpm max. (AS 47, AS 57\*) - 2850 rpm max (AS 67)

\* except for AS 57 with code date before 000101 (pumps manufactured before Jan. 1st, 2000) = 2850 rpm max.

Torque (@ 45 rpm) 0,10 N.m (AS 47/57) - 0,12 N.m (AS67)

### Solenoid valve characteristics

Voltage 220-240 or 110-120 or 24 V; 50/60 Hz.

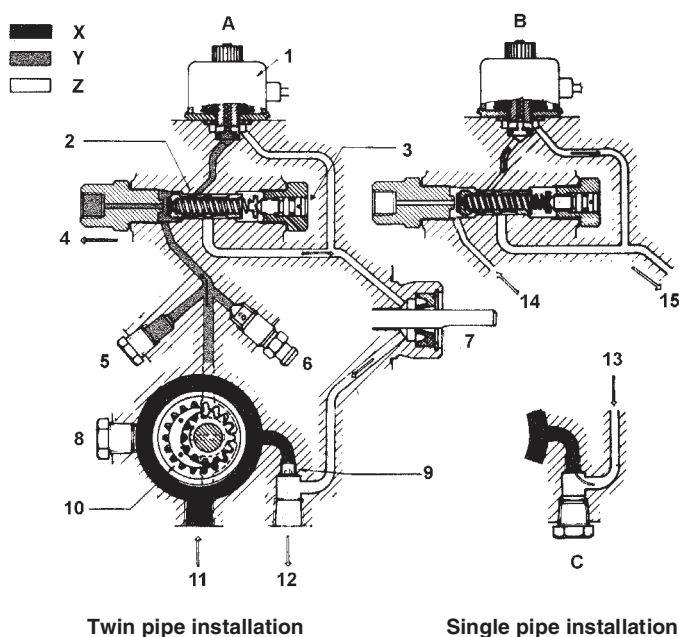
Consumption 9 V.A (@ voltage = 220 or 110 or 24 V).

Ambient temperature 0 - 60°C

Maximum pressure 15 bar

Certified TÜV Nr. stamped on pump body.

Protection class IP 41 according to IEC 529, when used with SUNTEC connector cable.



- A Closed solenoid valve
- B Open solenoid valve (NO)
- C Closed return
- 1 Solenoid valve
- 2 Pressure regulating valve
- 3 Pressure adjustment
- 4 To nozzle
- 5 Pressure gauge port
- 6 Escape valve
- 7 Shaft seal
- 8 Vacuum gauge port
- 9 By-pass plug "P"
- 10 Gear set
- 11 Inlet
- 12 Return
- 13 Back to suction
- 14 From gear set
- 15 To shaft seal and return
- X Oil under suction
- Y Oil under pressure
- Z By-passed oil returned to tank or to suction

## DELTA VM PUMPS

In the VM series of DELTA pumps the pressurised flow of oil P is shut off by a built in solenoid and may therefore be switched on for startup of the motor pre-purge) or off before the motor itself switches off (flame goes out instantly when the spray from the nozzle stops).

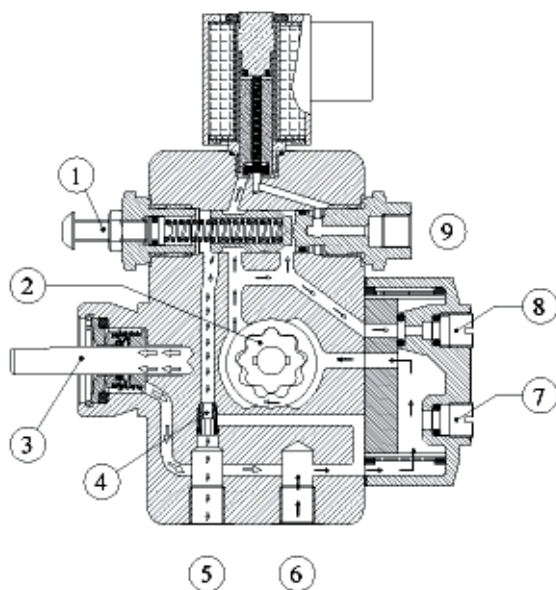
Oil pressure is regulated and kept constant by the piston valve which is activated when the light comes on to signify that the oil discharged exceeds nozzle capacity and is being returned to the tank (twin-pipe system) or being returned to the suction pipe through a bypass in the pipe (single-pipe system).

In this model both the single-pipe and twin-pipe versions have automatic priming. It is recommended that in either case a standard external filter be installed.

All twin-pipe models can be used as single-pipe systems with the simple removal of a nylon plug and by closing the return pipe.

### Technical data

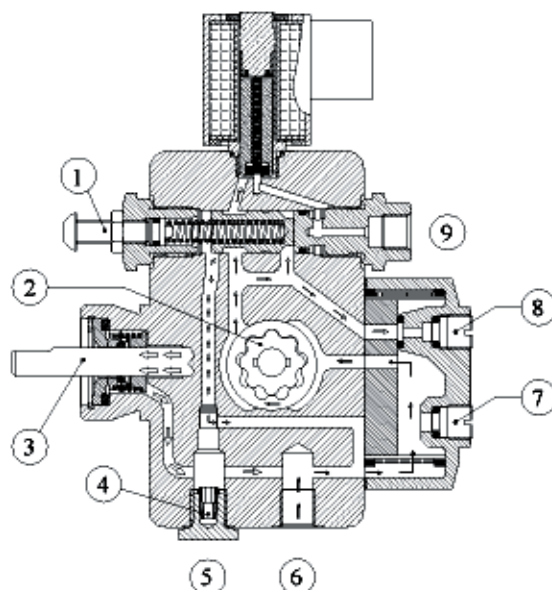
Oil viscosity	2 ÷ 50 cSt (1,1 ÷ 6,5°E)
Oil temperature	60°C (140°F) max
Suction line vacuum	0,5 bar (15 inHg) max
Suction line pressure	0,7 bar (10 psi) max
Return line pressure	1,5 bar (21 psi) max
Cut-Off pressure	4 bar
Rotation speed	3500 RPM max
Filter	Nylon cloth 150 m, 20 cm <sup>2</sup> Optional: Stainless steel 110m, 65 cm <sup>2</sup>
Dimensions	Hub dia. 32 mm, shaft dia. 8 mm Optional: flange hub dia. 54 mm Optional: 7/16" shaft
Connections	Inlet - Return port: G1/4" Nozzle port : G1/8" Pressure - Vacuum gauge: G1/8"
Weight	1100 gr



**TWIN TUBE INSTALLATION**

#### Key

- 1 Pressure regulator
- 2 Gear
- 3 Shaft seal
- 4 By-pass plug, mounted
- 5 Return
- 6 Suction
- 7 Vacuumeter gauge
- 8 Manometer gauge
- 9 Nozzle



**SINGLE TUBE INSTALLATION**

#### Key

- 1 Pressure regulator
- 2 Gear
- 3 Shaft seal
- 4 By-pass plug, not inserted
- 5 Return
- 6 Suction
- 7 Vacuumeter gauge
- 8 Manometer gauge
- 9 Nozzle

## SUNTEC AT2 PUMP

The SUNTEC AT2 oil pump features 2 mode pressure operation and incorporates a blocking solenoid valve with in-line cut-off function. Switching between low and high modes is assured by a 2nd integral solenoid valve.

### Operation

The gear set draws oil from the tank through the built-in filter and transfers it to the nozzle line via the cut-off solenoid valve. Pressure regulation is assured by two spool valves, one for each pressure mode. Switching between low and high pressure is assured by a "normally open" by-pass solenoid valve. When this solenoid is non-activated, a by-pass channel is open, allowing the normal functioning of the low pressure valve which sets the nozzle pressure. When this solenoid is activated, the by-pass channel is closed, thus pressure will build up on both sides of the low pressure valve eliminating its effect, and the high pressure valve now determines the nozzle pressure.

The blocking solenoid valve of the nozzle line is of the "normally closed" type. This design ensures extremely fast response and the switching can be selected according to the burner operating sequence and is independant of motor speed. When this solenoid is non-activated, the valve is closed and all oil pressurised by the gear set passes through the regulators to suction or to the return line, depending upon pipe arrangement.

As soon as this solenoid is activated, oil passes to the nozzle line at the pressure set by the pressure regulating valves.

In two pipe operation, the by-pass plug must be fitted in the return port, which ensures that the oil dumped by the regulating valves is returned to the tank and the suction line flow is equal to the gear set capacity. Bleeding in two pipe operation is automatic (it is assured by a bleed flat on the pistons), but it may be accelerated by opening a pressure port.

In one pipe operation, the by-pass plug must be removed, and the return plugged. Oil which is not required at the nozzle is returned directly to the gear inlet via the pressure regulating valves, and the suction line flow is equal to the nozzle flow. A pressure port must be opened to bleed the system.

### TECHNICAL SPECIFICATIONS

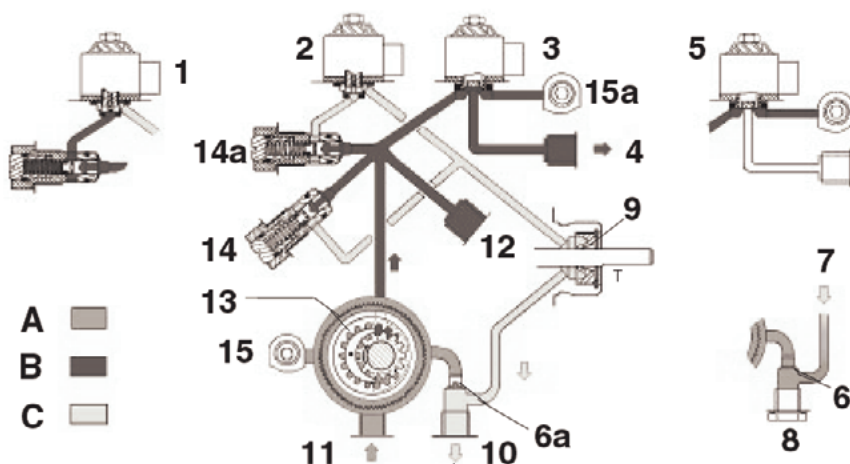
Mounting	hub mounting according to standard EN 225
Connection threads	cylindrical according to ISO 228/1
Inlet and return	G 1/4"
Nozzle outlet	G 1/8"
Pressure gauge port	G 1/8"
Vacuum gauge port	G 1/8"
Valve function	pressure regulation
Strainer:	open area: 14 cm <sup>2</sup> (AT2 45/55/65) 20 cm <sup>2</sup> (AT2 75/95)
opening size:	150 µm
Shaft	Ø 8 mm according to EN 225
By-pass plug	inserted in return port for two-pipe system; for one pipe system
Weight	1,3 kg

### HYDRAULIC SPECIFICATIONS

Nozzle pressure range	Factory setting
Low pressure: 8-15 bar	9 bar
High pressure: 12-25 bar	22 bar
* AT2 75/95 : ppressure obtained with 10,5 GPH open nozzle	
Viscosity range	2 - 12 cSt
Max. fuel temperature.	60°C into the pump
Inlet pressure	2 bar max.
Return pressure	2 bar max.
Suction height	max. 0,45 bar to avoid air separation from oil
Rated speed	3600 rpm max.
Starting torque	0,10 N.m (AT2 45/55) -

### Key

- 1 By-pass solenoid valve, closed
- 2 By-pass solenoid valve, open
- 3 Blocking solenoid valve, open
- 4 Nozzle
- 5 Blocking solenoid valve, closed
- 6 By-pass plug, removed
- 6A By-pass plug, inserted
- 7 Return to suction
- 8 Closed return
- 9 Shaft seal
- 10 Return
- 11 Suction
- 12 Pressure outlet or pressure gauge port
- 13 Gear set
- 14 High pressure adjusting screw
- 14a Low pressure adjusting screw
- 15 Vacuumer port
- A Oil under suction
- B Oil under pressure
- C By-passed oil returned to tank or to suction



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## NOTES FOR USE AND MAINTENANCE OF FUEL PUMPS

- Make sure that the by-pass plug is not used in a single pipe installation, because the fuel unit will not function properly and damage to the pump and burner motor could result.
- Do not use fuel with additives to avoid the possible formation over time of compounds which may deposit between the gear teeth, thus obstructing them.
- After filling the tank, wait before starting the burner. This will give any suspended impurities time to deposit on the bottom of the tank, thus avoiding the possibility that they might be sucked into the pump.
- On initial commissioning a "dry" operation is foreseen for a considerable length of time (for example, when there is a long suction line to bleed). To avoid damages inject some lubrication oil into the vacuum inlet.
- Care must be taken when installing the pump not to force the pump shaft along its axis or laterally to avoid excessive wear on the joint, noise and overloading the gears.
- Pipes should not contain air pockets. Rapid attachment joint should therefore be avoided and threaded or mechanical seal junctions preferred. Junction threads, elbow joints and couplings should be sealed with removable seal component. The number of junctions should be kept to a minimum as they are a possible source of leakage.
- Do not use PTFE tape on the suction and return line pipes to avoid the possibility that particles enter circulation. These could deposit on the pump filter or the nozzle, reducing efficiency. Always use O-Rings or mechanical seal (copper or aluminium gaskets) junctions if possible.
- Filter must be thoroughly cleaned at least once in a season to ensure correct working of the fuel unit. To remove the filter, unscrew the four screws on the cover. When reassemble, make sure that the filter is mounted with the feet toward the pump body. If the gasket between cover and pump housing should be damaged, it must be replaced. An external filter should always be installed in the suction line upstream of the fuel unit.









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