oilon®

Oil, Gas and Dual Fuel Burners

Burner series 400...2500 ME

Group
5
Capacity
1200-29500 kW

Table of contents

Oil, gas and dual fuel burners

Burner series 400...2500 ME

Oilon oil, gas, and dual fuel burners are fully automatic, safe, and reliable. The fundamentals of the design and manufacturing of the burners are economy, safety, service and environmental friendliness. Our gas burners comply with the standard EN 676, oil burners with the standards EN 230 and EN 267, and dual fuel burners with all of these standards.

Construction

A housing of welded steel sheets with a surface finish with durable, high-gloss paint. A removable cover located on top of the burner makes it easy to carry out maintenance on the nozzle and ignition electrodes as this does not require removal of the burner. The combustion head and diffuser disc, which are made from a stainless steel alloy, withstand a temperature of approx. 1,200 °C. The flow of air in the combustion head is automatically controlled (optimisation of the pressure loss at the combustion head) to achieve optimum combustion parameters throughout the capacity range. The burner contains a sight glass for flame observation. An air damper assembly on the suction side of the fan automatically controls, together with the servomotor, the fuel and air flows according to the required output.

Suitable applications

The burners are suitable for warm and hot water boilers, steam boilers, hot air generators and various types of process heating equipment. They can be mounted in horizontal, vertical and upward-facing, or vertical and downward-facing orientation.

The structure, materials and enclosure class of the burners require indoors operation.

Fuels

Different fuels can be used depending on the burner model:
KP models:
- light fuel oil, viscosity 4-12 mm²/s, +20 °C

RP models:
- heavy fuel oil, viscosity max. 250 mm²/s, +50 °C
- heavy fuel oil, viscosity max. 450 mm²/s, +50 °C heating cartridge for pump and nozzle
- heavy fuel oil, viscosity max. 650 mm²/s, +50 °C heating cartridges as above + trace heating for the oil piping

GP models:
- natural gas, gases of 2nd family, groups H and E (equipment category I_{2R})

GKP and GRP dual fuel burners:
- fuel properties as above, natural gas/light fuel oil
- fuel properties as above, natural gas/heavy fuel oil

Burners using other fuels are available on request.

Capacity regulation methods

All burners are modulating. They are equipped with an air damper servomotor with a transition time of 60 s/90 °. The servomotor is connected to the oil regulator and compound regulator via an axle. The burner operates on the entire capacity range according to the load. The burners are controlled according to the flue gas analysis.

Booster unit PKYK for light fuel oil

The models KP and GKP are equipped with a separate booster unit, which includes an oil filter and a booster pump with complete piping.

Booster unit PKYR for heavy fuel oil

The models RP and GRP are equipped with a separate preheater and booster unit, which comprises an oil filter, booster pump and an electric mass preheater.

The preheater is made from a cast aluminium alloy, and includes embedded oil piping and electric resistance coils. The capacity of one preheater is 6 kW. The preheater is controlled by solid-state relays and by an electronic regulator, which keeps the oil temperature stable. A stable oil temperature helps to ensure that the oil mixes adequately with the combustion air, helping to obtain optimal combustion parameters. Depending on the model, the PKYR may have three or more preheating units.

In the heavy oil burners, the oil heated during the pre-purge phase flows to the nozzle through the preheater to ensure that the oil temperature is high enough in the nozzle during the ignition phase.

Gas equipment

The gas-related components of the gas and dual fuel burners comply with the standard EN 676: two shut-off valves, pressure switches (min./max.) and an automatic valve leak tester. Other piping-related equipment is available on request.

Oil piping

The oil piping is installed mainly in the burner, and includes three solenoid valves. The oil regulator is located on the oil line returning from the nozzle. The piping between the burner and the PKYK/PKYR is to be built on site.

Flame monitoring

All models are equipped with automatic flame monitoring. In KP and RP models, flame monitoring is carried out by a photocell; in GP, GKP, and GRP models, it is carried out by an UV cell.

Control devices

The burner control automatics are assembled in a separate control cabinet, which contains a control unit, signal lamps, the capacity controller and operating switches. The control unit automatically carries out all the function phases of the burner.

In the event of a burner failure, the system automatically stops the burner. The modulating burners also incorporate a pre-installed capacity controller. If required, the burner can also be supplied with electronic fuel/air ratio control at an added cost.

Accessories

Each of the fuel control valves and the air damper may be equipped with a servomotor (electronic fuel/air ratio control). An air distribution box should be installed under the burner, in case of air duct cannot be installed vertically (length of straight vertical part should be at least 1.5 m) under the burner.

How to choose a burner

A. Procedure

1 Establish relevant boiler and application information
- boiler capacity and efficiency, or required burner capacity
- back pressure of the furnace
- fuel(s) to be used
- fuel inlet pressure to the burner
- capacity regulation method of the burner

2 Calculate the burner capacity. Burner capacity = boiler capacity/efficiency. Example: boiler capacity = 10,000 kW, efficiency = 90 % → Burner capacity = 10,000 kW / 0.9 = 11,110 kW.

3 Gas burners: Calculate the required gas flow [m^3n/h]. The required gas flow [m^3n/h] = (burner capacity [kW] x 3.6)/the calorific value of the gas [MJ/m^3n]. Example: the required burner capacity = 11,110 kW → the required gas flow = (11,110 kW x 3.6) / 35.8 MJ/m^3n = 1,117 m^3n/h, where 35.8 MJ/m^3n is the calorific value of natural gas. Oil burners: Calculate the required oil flow [kg/h]. The required oil flow [kg/h] = (burner capacity [kW] x 3.6)/the calorific value of oil [MJ/kg]. Example: the required burner capacity = 11,110 kW → the required oil flow = (11,110 kW x 3.6)/ 40.5 MJ/kg = 988 kg/h, where 40.5 MJ/kg is the calorific value of heavy fuel oil.

4 See the brochure for a burner with a sufficient range of capacity.
Example: A burner of 11,110 kW of capacity, firing natural gas and heavy fuel oil is needed. The appropriate burner for these specifications is GRP-1000 ME.

5 Calculate the required combustion air flow and pressure. Example: the required burner capacity = 11,110 kW, the pressure loss of the boiler and chimney at this burner capacity is 15 mbar.

Example: The combustion air flow required when using natural gas with a flue gas oxygen value of 3 % is calculated. To combust 1 m^3n of natural gas to produce a 3 % oxygen content in the flue gas, approximately 11.3 m^3 n of air is required (see diagram 2, page 9). The required combustion air flow = 1,117 m^3n/h x 11.3 m^3n/m^3n = 12,620 m^3n/h. The combustion air flow is also to be calculated when using heavy fuel oil. To combust 1 kg of heavy fuel oil producing a flue gas oxygen content of 3 %, approximately 12.4 m^3n of air is required (see diagram 1, page 9). The required combustion air flow = 988 kg/h x 12.4 m^3n/kg = 12,250 m^3n/h. The required fan output is calculated by multiplying the required combustion air flow with the safety factor 1.05. The larger figure is selected for the combustion air flow, i.e. 12,620 m^3n/h, and the fan output required for this flow is approximately 1.05 x 12,620 m^3n/h = 13,250 m^3n/h. The required fan pressure is calculated using the max. air flow. The required flow pressure p [mbar] = (the pressure loss generated by the boiler and the chimney + the pressure loss of the air ducts + max. pressure loss in the burner, 35 mbar) x safety factor 1.05. Example: The pressure loss generated by the boiler and the chimney = 15 mbar, the pressure loss of the air ducts = 5 mbar, max. pressure loss of the burner = 35 mbar. The required fan pressure p = (15 mbar + 5 mbar + 35 mbar) x 1.05 = 58 mbar. A fan applicable in this case has to produce a flow of approximately 13,250 m^3n/h at a pressure of 58 mbar.

N.B: The air duct to be connected with the burner should run directly from below the burner, and it should be straight for a distance of no less than 1.5 metres before the burner. If the duct cannot be installed in this way, an air distribution box should be used. For information on air distribution boxes, see page 9.

6 Gas burners: From the selection table for gas valves, select a sufficient valve size according to the burner capacity. Note that the values in the selection table apply when the furnace back pressure is 0 mbar. Therefore you must subtract the furnace back pressure from the actual gas inlet pressure, and select the valve according to the value thus obtained. The ratings shown in the table apply to natural gas.

Example: The gas inlet pressure of the burner = 200 mbar, the boiler back pressure = 18 mbar and the required burner capacity = 11,110 kW. The effective pressure is therefore 200 mbar - 18 mbar = 182 mbar. For the burner GRP-1000 ME, for example, a valve generating a capacity of no less than 11,110 kW with a gas inlet pressure of 182 mbar should be chosen. The valve DN 80 is selected for this burner.

7 Oil burners: Select an appropriate booster unit according to the burner capacity. The light fuel oil burners use the model PKYK and the heavy fuel oil burners PKYR. The booster unit for light fuel oil is selected using the diagram 3. The booster unit for heavy fuel oil is selected using the diagram 4. For burner capacity of 988 kg/h, for example, the required temperature difference in the booster unit is 45 °C. The diagram shows that the appropriate booster unit is PKYR3.

8 Check that the external dimensions of the burner, particularly the length of the combustion head, are suitable for the application. The combustion head length should be such that the head is flush with the furnace wall or approx. 10-20 mm inside the furnace (see 'Masonry figure').

9 Check the dimensions of the flame in the flame dimensions diagram. Note that the flame must not touch the furnace walls.

10 Do not forget the accessories: gas pressure regulator, oil pumping and preheating unit, boiler thermostats/ pressostats.

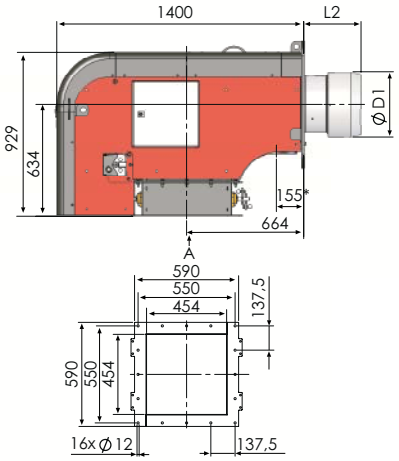
Our sales department will be happy to help you with any questions related to burner selection and operation.

B. Equations and rules of thumb

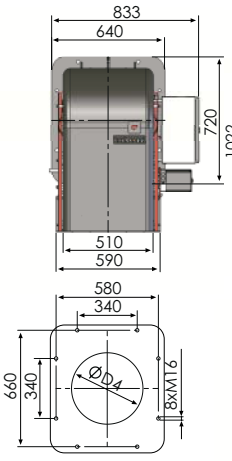
1 Burner capacity = boiler capacity / 0.9 (when boiler efficiency is 90 %)
2 Steam boilers: 1 ton/h steam ≈ 700 kW boiler capacity
3 Light fuel oil: 1 kg/h ≈ 11.86 kW burner capacity with calorific value 42.7 MJ/kg
4 Heavy fuel oil: 1 kg/h ≈ 11.22 kW burner capacity with calorific value 40.5 MJ/kg
5 Natural gas: 1 m^3n/h ≈ 10 kW burner capacity with calorific value 35.84 MJ/m^3n
6 Oil pumping, filtering, and preheating unit (Oilon Hot-Box) is required when firing heavy fuel oil. When the burner capacity is more than 2 MW, a transfer pump unit (Oilon SPY) is always needed, even when firing light fuel oil. The required minimum pump output [kg/h] can be calculated as follows:

Required minimum output [kg/h] = (oil flow to be burned [kg/h] + 150 kg/h) x 1.2. The clause in brackets refers to the preheated oil flow to each burner.

KP/RP/GP/GKP/GRP-400...600 ME

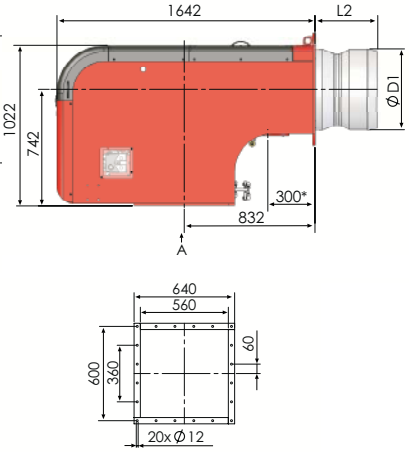


VIEWED FROM DIRECTION A
Air duct installation flange

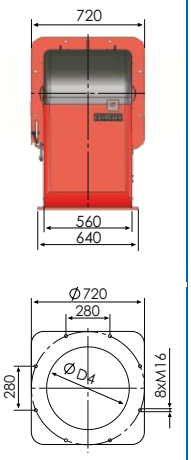


Installation of the burner to a boiler

KP/RP/GP/GKP/GRP-800...1200 ME



VIEWED FROM DIRECTION A
Air duct installation flange

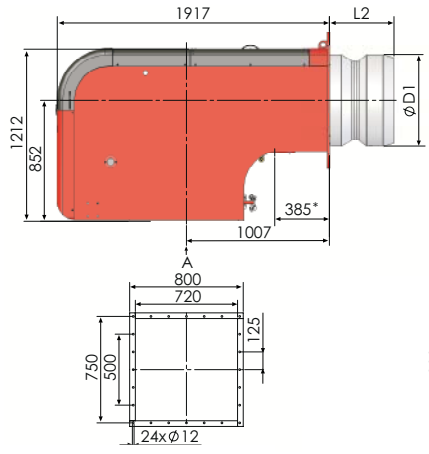


Installation of the burner to a boiler

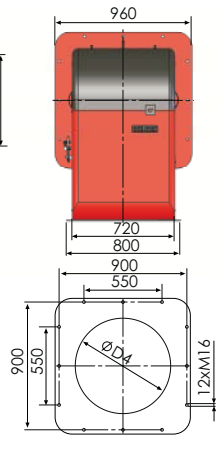
BURNER	L2	ØD1	ØD4
400 ME	325	370	430
600 ME	335	395	455
800 ME	360	422	482
1000 ME	390	496	556
1200 ME	400	520	580

* Only in gas and dual fuel burners

KP/RP/GP/GKP/GRP-1600...2000 ME

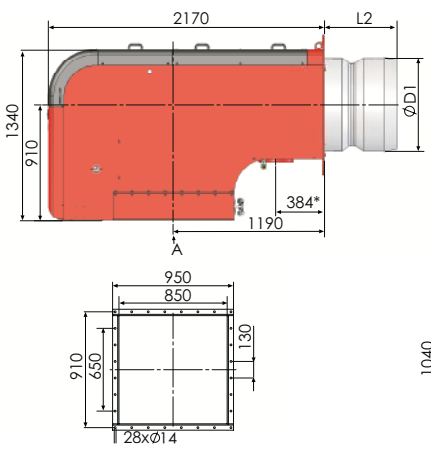


VIEWED FROM DIRECTION A
Air duct installation flange

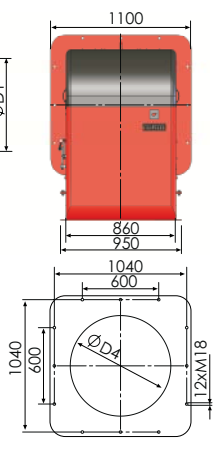


Installation of the burner to a boiler

KP/RP/GP/GKP/GRP-2500 ME



VIEWED FROM DIRECTION A
Air duct installation flange



Installation of the burner to a boiler

BURNER	L2	ØD1	ØD4
1600 ME	450	594	654
2000 ME	450	650	710
2500 ME	570	740	800

* Only in gas and dual fuel burners

KP/RP/GP/GKP/GRP-400...-2500 ME

Technical data

BURNER	KP-400 ME	KP-600 ME	KP-800 ME	KP-1000 ME	KP-1200 ME	KP-1600 ME	KP-2000 ME	KP-2500 ME
Capacity MW kg/h Connections	1,2 - 5,0 100 - 420 2 x Ø 22	1,7 - 6,8 143 - 573 2 x Ø 22	2,4 - 9,5 200 - 800 2 x Ø 22	3,0 - 12,0 250 - 1000 2 x Ø 22	3,5 - 14,0 300 - 1200 2 x Ø 22	4,2 - 16,5 350 - 1400 2 x Ø 22	5,6 - 22,5 470 - 1900 2 x Ø 22	7,4-29,5 621 – 2490 Ø 22/28
Pilot burner - fuel - connection	- -	- -	light fuel oil (LPG) (Ø 22)	light fuel oil (LPG) (Ø 22)	light fuel oil (LPG) (Ø 22)	light fuel oil (LPG) (Ø 22)	light fuel oil (LPG) (Ø 22)	light fuel oil (LPG) (Ø 22)

BURNER	RP-400 ME	RP-600 ME	RP-800 ME	RP-1000 ME	RP-1200 ME	RP-1600 ME	RP-2000 ME	RP-2500 ME
Capacity MW kg/h Connections	1,2 - 4,7 106 - 417 2 x Ø 22	1,7 - 6,8 150 - 600 2 x Ø 22	2,2 - 9,0 200 - 800 2 x Ø 22	2,8 - 11,0 250 - 1000 2 x Ø 22	3,4 - 13,0 300 - 1200 2 x Ø 22	3,9 - 15,5 350 - 1400 2 x Ø 22	5,3 - 21,0 470 - 1900 2 x Ø 22	8,0 – 28,0 710 – 2530 Ø 22/28
Pilot burner - fuel - connection	- -	liquid gas Ø 18	LPG (light fuel oil) Ø 22 (Ø 8)	LPG (light fuel oil) Ø 22 (Ø 8)	LPG (light fuel oil) Ø 22 (Ø 8)	LPG (light fuel oil) Ø 22 (Ø 8)	LPG (light fuel oil) Ø 22 (Ø 8)	LPG (light fuel oil) Ø 22 (Ø 8)

BURNER	GP-400 ME	GP-600 ME	GP-800 ME	GP-1000 ME	GP-1200 ME	GP-1600 ME	GP-2000 ME	GP-2500 ME
Capacity MW - connection	1,2 - 5,0 DN50 - 100	1,7 - 6,8 DN50 - 100	1,9 - 9,5 DN65 - 125	2,0 - 12,0 DN65 - 125	2,8 - 14,0 DN80 - 125	3,3 - 16,5 DN100 - 125	4,5 - 22,5 DN100 - 125	5,9 – 29,5 DN125
Pilot burner - connection	Ø 18	Ø 18	Ø 22	Ø 22	Ø 22	Ø 22	Ø 22	Ø 22

BURNER	GKP-400 ME	GKP-600 ME	GKP-800 ME	GKP-1000 ME	GKP-1200 ME	GKP-1600 ME	GKP-2000 ME	GKP-2500 ME
Capacity - gas MW - oil MW kg/h Connections - gas - oil	 1,2 - 5,0 1,2 - 5,0 100 - 420 DN50 - 100 2 x Ø 22	 1,7 - 6,8 1,7 - 6,8 143 - 573 DN50 -100 2 x Ø 22	 1,9 - 9,5 2,4 - 9,5 200 - 800 DN65 - 125 2 x Ø 22	 2,0 - 12,0 3,0 - 12,0 250 - 1000 DN65 - 125 2 x Ø 22	 2,8 - 14,0 3,5 - 14,0 300 - 1200 DN80 - 125 2 x Ø 22	 3,3 - 16,5 4,2 - 16,5 350 - 1400 DN100 - 125 2 x Ø 22	 4,5 - 22,5 5,6 - 22,5 470 - 1900 DN100 - 125 2 x Ø 22	 5,9 – 29,5 7,4 – 29,5 621 – 2490 DN125 Ø 22/28
Pilot burner - fuel - connection	natural gas Ø 18	natural gas Ø 18	natural gas/ light fuel oil (LPG) (Ø 22)	natural gas/ light fuel oil (LPG) (Ø 22)	natural gas/ light fuel oil (LPG) (Ø 22)	natural gas/ light fuel oil (LPG) (Ø 22)	natural gas/ light fuel oil (LPG) (Ø 22)	natural gas/ light fuel oil (LPG) (Ø 22)

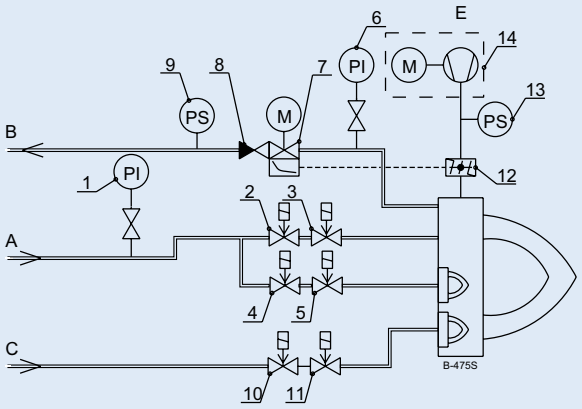
BURNER	GRP-400 ME	GRP-600 ME	GRP-800 ME	GRP-1000 ME	GRP-1200 ME	GRP-1600 ME	GRP-2000 ME	GRP-2500 ME
Capacity - gas MW - oil MW kg/h Connections - gas - oil	 1,2 - 5,0 1,2 - 4,7 106 - 417 DN50 - 100 2 x Ø 22	 1,7 - 6,8 1,7 - 6,8 150 - 600 DN50 -100 2 x Ø 22	 1,9 - 9,5 2,2 - 9,0 200 - 800 DN65 - 125 2 x Ø 22	 2,0 - 12,0 2,8 - 11,0 250 - 1000 DN65 - 125 2 x Ø 22	 2,8 - 14,0 3,4 - 13,0 300 - 1200 DN80 - 125 2 x Ø 22	 3,3 - 16,5 3,9 - 15,5 350 - 1400 DN100 - 125 2 x Ø 22	 4,5 - 22,5 5,3 - 21,0 470 - 1900 DN100 - 125 2 x Ø 22	 5,9 – 29,5 8,0 – 28,0 710 – 2530 DN125 Ø 22/28
Pilot burner - fuel - connection	natural/liquid gas Ø 18	natural/liquid gas Ø 18	light fuel oil (LPG) Ø 22 (Ø 8)	light fuel oil (LPG) Ø 22 (Ø 8)	light fuel oil (LPG) Ø 22 (Ø 8)	light fuel oil (LPG) Ø 22 (Ø 8)	light fuel oil (LPG) Ø 22 (Ø 8)	light fuel oil (LPG) Ø 22 (Ø 8)

Light fuel oil: 1 kg/h ≅ 11,86 kW
1 kW ≅ 860 kcal/h
Heavy fuel oil: 1 kg/h ≅ 11,22 kW
1 kW ≅ 860 kcal/h
Natural gas: caloric value Hμ = 9,5 kWh/m³n (34,3 MJ/m³n)
density p = 0,723 kg/m³n

Regulating range:
Light fuel oil: 1:3 (100 - 33 %)
Heavy fuel oil: 1:2,5 (100 - 40 %)
Gas: 1:5 (100 - 20 % , 1:4 /400/600)

PI diagrams

Light oil burners KP-400...2500 ME

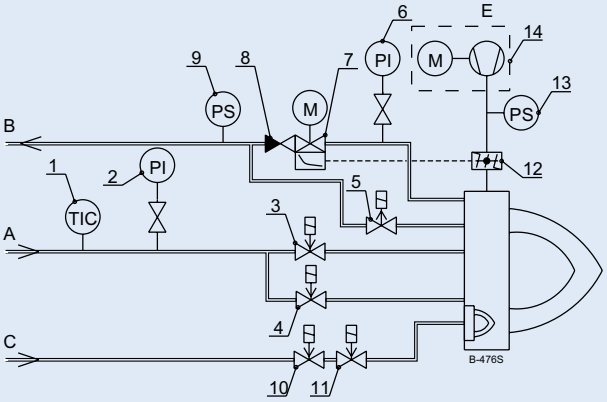


1. Pressure gauge
2. Solenoid valve, NC
3. Solenoid valve, NC
4. Solenoid valve, NC
5. Solenoid valve, NC
6. Pressure gauge
7. Oil regulator
8. Non-return valve
9. Oil presssure switch, max.
10. Solenoid valve, NC*
11. Solenoid valve, NC*
12. Air damper assembly
13. Air pressure switch
14. Separate combustion air fan

A Oil, inlet
B Oil, return
C LPG, inlet*
E Air to the burner

*) Alternative for light fuel oil ignition (optional).

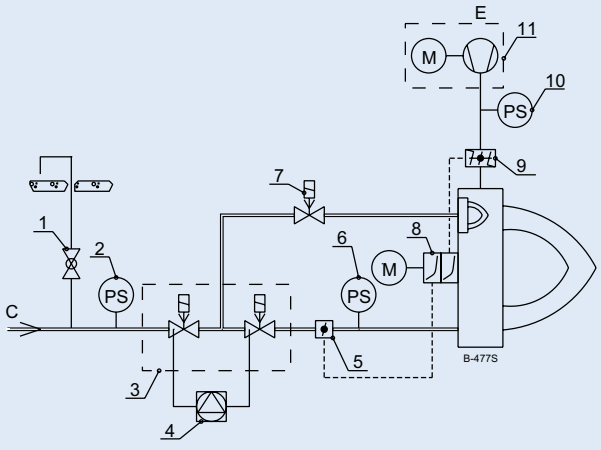
Heavy oil burners RP-400...2500 ME



1. Temperature regulator
2. Pressure gauge
3. Solenoid valve, NC
4. Solenoid valve, NC
5. Solenoid valve, NO
6. Pressure gauge
7. Oil regulator
8. Non-return valve
9. Oil pressure switch, max.
10. Solenoid valve, NC
11. Solenoid valve, NC
12. Air damper assembly
13. Air pressure switch
14. Separate combustion air fan

A Oil, inlet
B Oil, return
C LPG, inlet
E Air to the burner

Gas burners GP-400...2500 ME



1. Ball valve, blow-off
2. Pressure switch, min.
3. Double solenoid valve, NC
4. Valve leak tester
5. Gas butterfly valve
6. Pressure switch, max.
7. Solenoid valve, ignition gas, NC
8. Controller unit
9. Air damper assembly
10. Air pressure switch
11. Separate combustion air fan

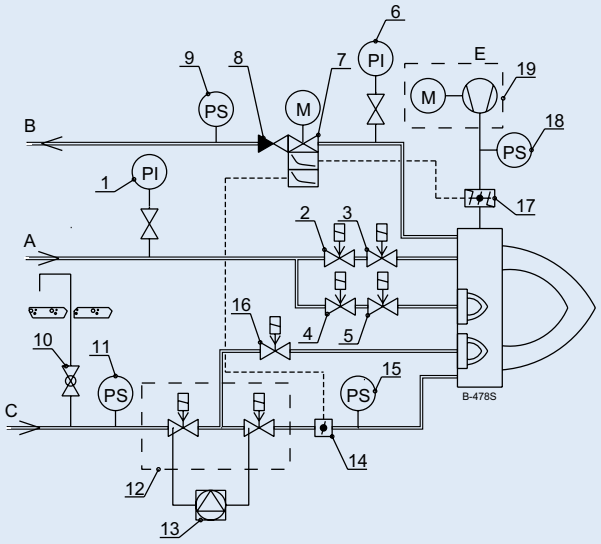
C Gas, inlet
E Air to the burner

PI diagrams

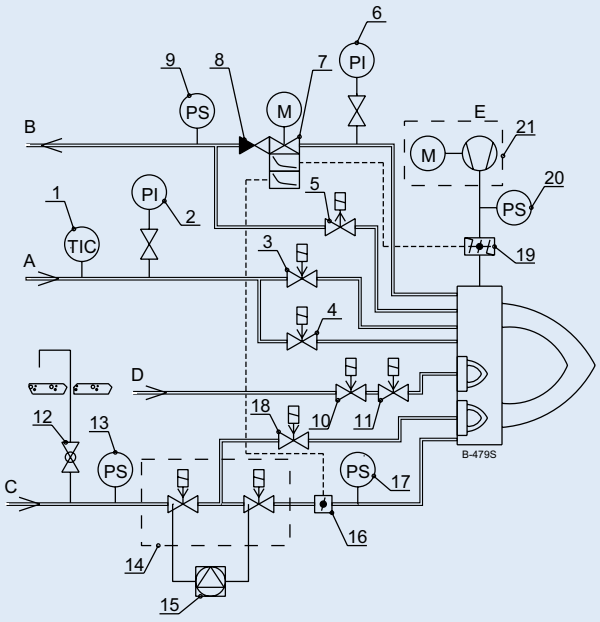
Dual fuel burners, light fuel oil/gas
GKP-400...2500 ME

1. Pressure gauge
2. Solenoid valve, NC
3. Solenoid valve, NC
4. Solenoid valve, NC
5. Solenoid valve, NC
6. Pressure gauge
7. Oil regulator
8. Non-return valve
9. Oil pressure switch, max.
10. Ball valve, blow-off
11. Pressure switch, min.
12. Double solenoid valve, NC
13. Valve leak tester
14. Gas butterfly valve
15. Pressure switch, max.
16. Solenoid valve, NC, ignition gas
17. Air damper assembly
18. Air pressure switch
19. Separate combustion air fan

A Oil, inlet
B Oil, return
C Gas, inlet
E Air to the burner



Dual fuel burners, heavy fuel oil/gas
GRP-400...2500 ME



1. Temperature regulator
2. Pressure gauge
3. Solenoid valve, NC
4. Solenoid valve, NC
5. Solenoid valve, NO
6. Pressure gauge
7. Oil regulator
8. Non-return valve
9. Oil pressure switch, max.
10. Solenoid valve, NC
11. Solenoid valve, NC
12. Ball valve, blow-off
13. Pressure switch, min.
14. Double solenoid valve, NC
15. Valve leak tester
16. Gas butterfly valve
17. Pressure switch, max.
18. Solenoid valve, NC, ignition gas
19. Air damper assembly
20. Air pressure switch
21. Separate combustion air fan

A Oil, inlet
B Oil, return
C Gas, inlet
D LPG, inlet
(ignition when using oil)
E Air to the burner

KP/RP/GP/GKP/GRP-400...-2500 ME

Scope of delivery

Burners include following equipment:

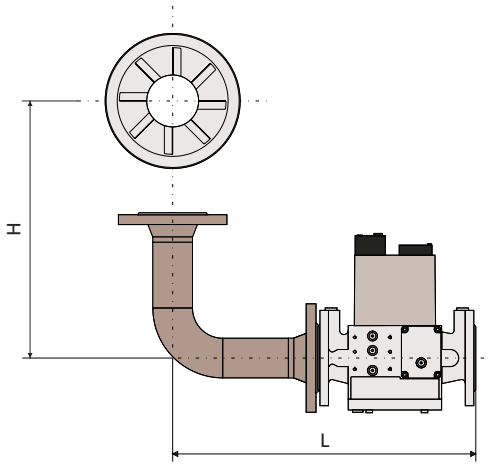
• standard delivery o option

	KP-... ME	RP-... ME	GP-... ME	GKP-... ME	GRP-... ME
Burner flange gasket	•	•	•	•	•
Oil nozzle	•	•		•	•
Heating cartridge for oil nozzle		o			o
Solenoid valves for oil	•	•		•	•
Heating cartridge for solenoid valves		•			•
Non-return valve	•	•		•	•
2 pressure gauges for oil	•	•		•	•
Thermometer		•			•
Pressure switch for return oil	•	•		•	•
Electric tracing cables for burner oil pipes	o	o		o	o
Controller unit for regulating the air/oil ratio, incl.: - oil regulator - servomotor	•	•			
Controller unit for regulating the air/gas ratio, incl.: - gas butterfly valve - servomotor			•		
Controller unit for regulating the air/oil/gas ratio, incl.: - oil regulator - gas butterfly valve - servomotor				•	•
WiseDrive (electronic ratio control) for regulating the air/oil ratio, incl.: - oil regulator - servomotor for oil regulator - servomotor for air dampers - servomotor for combustion head regulation	o	o			
WiseDrive (electronic ratio control) for regulating the air/gas ratio, incl.: - gas butterfly valve - servomotor for gas butterfly valve - servomotor for air dampers - servomotor for combustion head regulation			o		
WiseDrive (electronic ratio control) for regulating the air/oil/gas ratio, incl.: - oil regulator - gas butterfly valve - servomotors for oil regulator and gas butterfly valve - servomotor for air dampers - servomotor for combustion head regulation				o	o
Potentiometer fitted in servomotor	o	o	o	o	o
Gas nozzle			•	•	•
Pressure gauge for measuring the pressure in gas nozzle			o	o	o
Gas pressure switch, max.			•	•	•
Air pressure switch	•	•	•	•	•
Ignition transformer	•	•	•	•	•
Ignition cables and electrodes	•	•	•	•	•
Flame sensor	•	•	•	•	•
Air dampers	•	•	•	•	•
Pressure gauge for fan pressure	o	o	o	o	o
Elbow 90°			•	•	•
Double solenoid valve for gas incl.: - gas pressure switch, min. - 2 gas valves - automatic valve leak tester - ball valve, blow-off (loose)			•	•	•
Solenoid valve for ignition gas			•	•	•
Solenoid valves for ignition gas (LPG)	o	•			•
Solenoid valves for light fuel oil ignition	•			•	
Manual	•	•	•	•	•

Gas elbow

	GAS ELBOW DIMENSIONS WITH DIFFERENT VALVES					
		DN50	DN65	DN80	DN100	DN125
	H	L	L	L	L	L
GP/GKP/GRP-400/600 ME	535	635	690	710	750	-
GP/GKP/GRP-800 ME	663	-	805	730	772	825
GP/GKP/GRP-1000…1200 ME	620	-	805	730	772	825
GP/GKP/GRP-1600...2000 ME	700	-	-	-	772	825
GP/GKP/GRP-2500 ME	738	-	-	-	-	895

Other dimensions available on special request



Gas valve selection table

BURNER	GAS VALVE SIZE DN	TYPE **)	BURNER MAX. CAPACITY kW*) GAS INLET PRESSURE mbar 100	150	200	250
GP/GKP/GRP-400 ME	50	DMV-D5050/11	3200	3920	4700	4700
	65	DMV-5065/11	4700	4700	4700	4700
GP/GKP/GRP-600 ME	65	DMV-5065/11	4850	5940	6800	6800
	80	DMV-5080/11	6750	6800	6800	6800
GP/GKP/GRP-800 ME	80	DMV-5080/11	7500	9200	9500	9500
	100	DMV-5100/11	9500	9500	9500	9500
GP/GKP/GRP-1000 ME	100	DMV-5100/11	7500	10000	12000	12000
	125	DMV-5125/11	12000	12000	12000	12000
GP/GKP/GRP-1200 ME	100	DMV-5100/11	8000	10500	14000	14000
	125	DMV-5125/11	12000	14000	14000	14000
GP/GKP/GRP-1600 ME	100	DMV-5100/11	8000	10500	14000	16500
	125	DMV-5125/11	12000	15500	16500	16500
GP/GKP/GRP-2000 ME	125	DMV-5125/11	12000	16000	20000	22500
GP/GKP/GRP-400 ME	2″	DMV-D 525/12	4700	4700	4700	4700
	65	DMV-D5065/12	4700	4700	4700	4700
GP/GKP/GRP-600 ME	2″	DMV-D 525/12	4850	5940	6800	6800
	65	DMV-D5065/12	6750	6800	6800	6800
	80	DMV-D5080/12	6750	6800	6800	6800
GP/GKP/GRP-800 ME	65	DMV-D5065/12	5500	7900	9500	9500
	80	DMV-D5080/12	8500	9500	9500	9500
GP/GKP/GRP-1000 ME	65	DMV-D5065/12	6000	8000	10000	12000
	80	DMV-D5080/12	8500	10000	12000	12000
	100	DMV-D5100/12	12000	12000	12000	12000
GP/GKP/GRP-1200 ME	80	DMV-D5080/12	9000	10000	14000	14000
	100	DMV-D5100/12	13000	14000	14000	14000
	125	DMV-D5125/12	14000	14000	14000	14000
GP/GKP/GRP-1600 ME	100	DMV-D5100/12	13000	16000	16500	16500
	125	DMV-D5125/12	16500	16500	16500	16500
GP/GKP/GRP-2000 ME	100	DMV-D5100/12	13400	17000	19000	22500
	125	DMV-D5125/12	16000	22500	22500	22500
GP/GKP/GRP-2500 ME	125	DMV-D5125/12	16000	22500	29500	29500

NOTE! The max. capacities shown in the table are achieved when the boiler back pressure is 0.
Natural gas 1m³ n/h ≅ 10 kW

*) or corresponding type

**) Gas inlet pressure (Pmax) at burner
- max. 500 mbar when using DMV-(D) valve

Combustion air fan

The burner series ME requires a separate combustion air fan.

Scope of the fan delivery:
- electric motor
- platform
- flexible connector, pressurised side
- 2 connector flanges
- vibration dampers
- surface finish
- suction noise silencer (optional)
- silencer for the entire fan (optional)
- PT-100 temperature sensors for the motor phases (optional)

Required combustion air flow

Diagrams 1 and 2 indicate the required combustion air flow for each kilogram of oil or cubic meter of natural gas. For detailed calculation instructions, see page 2.

Diagram 1
Required combustion air flow, $m^3n/1$ kg of oil

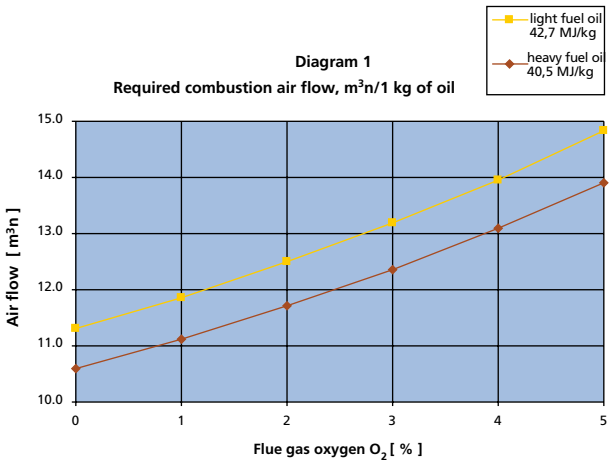
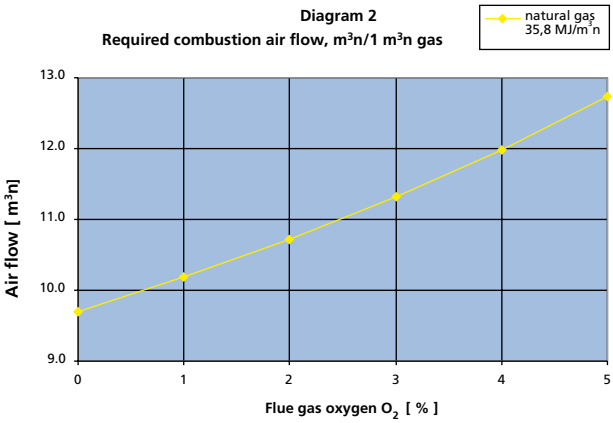
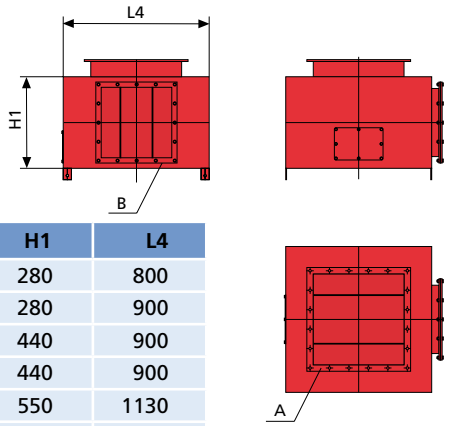


Diagram 2
Required combustion air flow, $m^3n/1$ m^3n gas



Air distribution box for the ME series burners

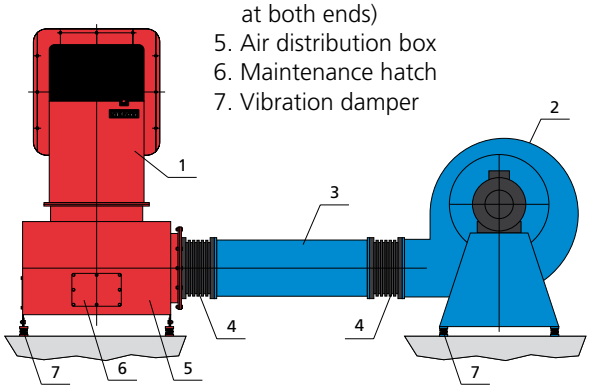
The air duct to be connected with the burner should run directly from below the burner, and it should be straight for a distance of no less than 1.5 metres before the burner. If the duct cannot be installed as instructed above, an air distribution box should be used.



BURNER	H1	L4
400/600	280	800
800	280	900
1000	440	900
1200	440	900
1600	550	1130
2000	550	1130
2500	650	1300

The dimensions H1 and L4 are recommended minimum values.

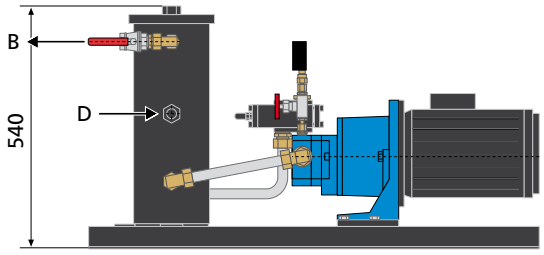
1. Burner
2. Fan
3. Air duct
4. Bellows (not necessary at both ends)
5. Air distribution box
6. Maintenance hatch
7. Vibration damper

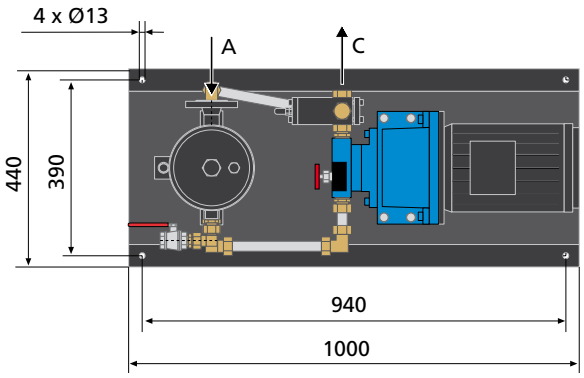


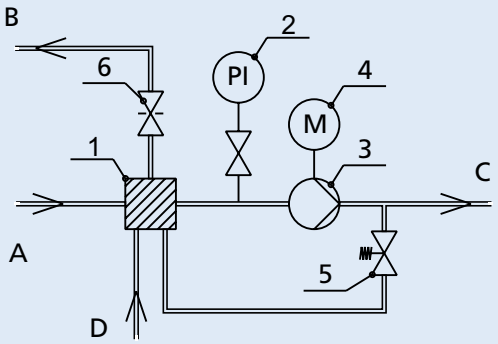
A. To be dimensioned according to the air duct of the burner.
B. To be dimensioned as ordered.

Booster unit PKYK 1...5 for light fuel oil

The booster unit lends itself for pumping light fuel oil with viscosity of 4...12 mm²/s, +20 °C. The oil coming to the booster unit must be filtered, max. filtration degree = 400 µm.







1. Oil filter
2. Pressure gauge
3. Oil pump
4. Electric motor
5. Pressure regulating valve
6. Drilled ball valve

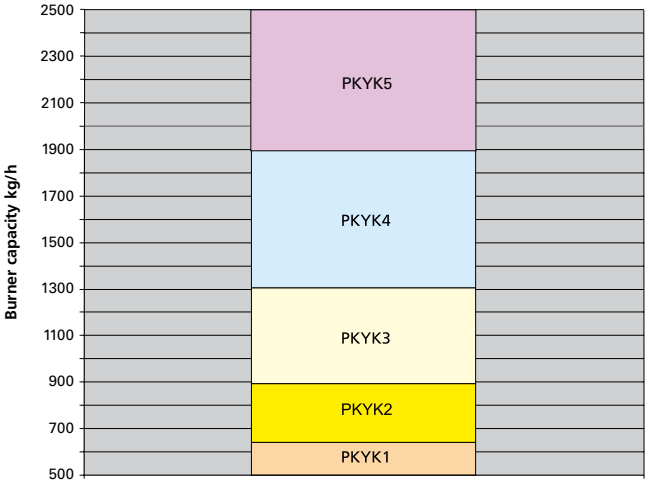
A. Inlet to the booster unit DN25, 1...5 bar 4...12 mm²/s
B. Return from the booster unit R 1/2"
C. Inlet to the burner Ø 22
D. Return from the burner Ø 22

Booster unit	Motor 400 V/50 Hz kW	r/min	Oil pump Type	Pump output 12 mm²/s 25 bar kg/h
PKYK 1	4	3000	T3 C	1420
PKYK 2	4	3000	T4 C	1980
PKYK 3	4	3000	T5 C	2900
PKYK 4	5,5	3000	AFI40R46	4230
PKYK 5	5,5	3000	AFI40R54	5500

The output has been calculated using a density of 850 kg/m³ for the light fuel oil.

Diagram 3

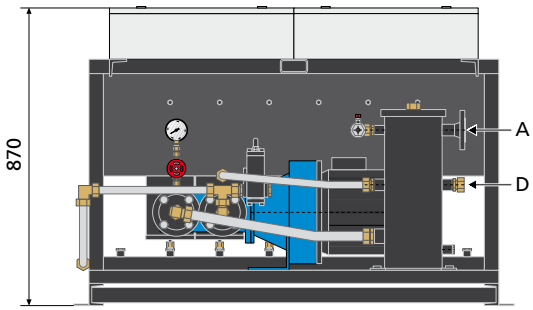
Selection of the booster unit for light fuel oil

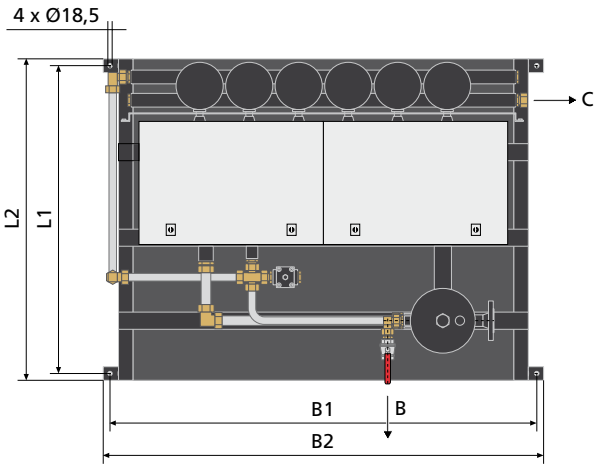


PKYK booster units may be selected using the diagram 3.

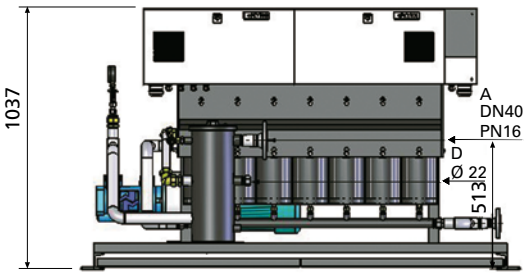
Booster unit PKYR 1...8 for heavy fuel oil

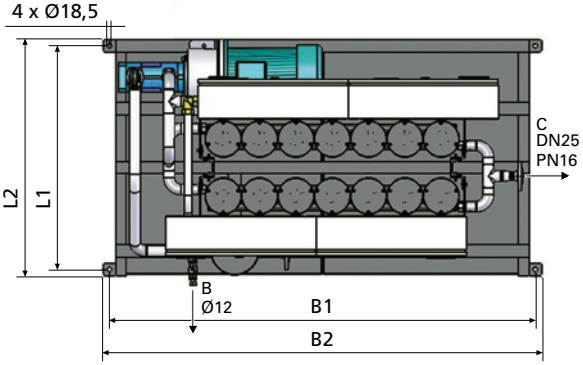
The booster unit lends itself for pumping and heating heavy fuel oil with a maximum viscosity of 650 mm²/s, +50 °C. The oil coming to the booster unit must be filtered, max. filtration degree = 400 µm.



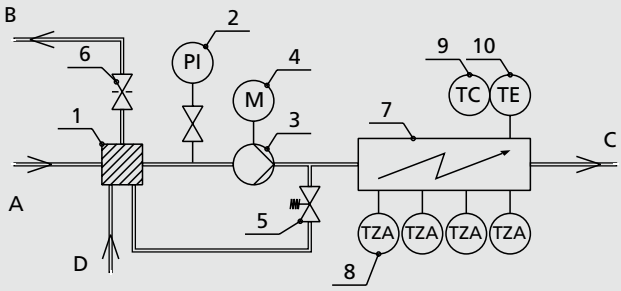


PKYR 1...6





PKYR 7...8

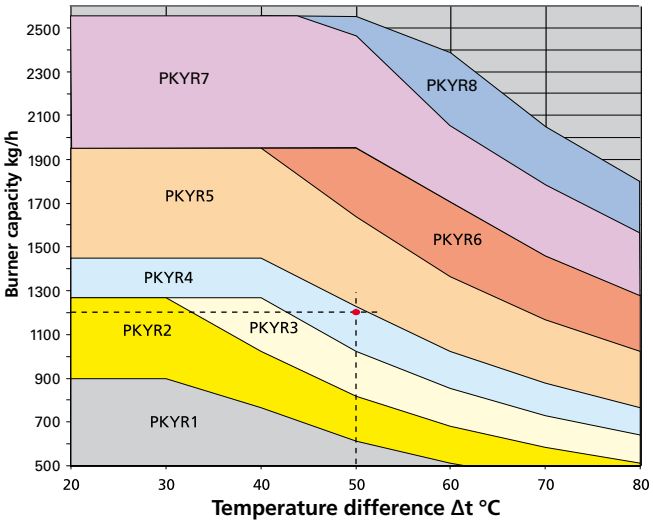


1. Oil filter
2. Pressure gauge
3. Oil pump
4. Electric motor
5. Pressure regulating valve
6. Drilled ball valve
7. Preheater
8. Limit thermostat
9. Temperature regulator and lower limit thermostat
10. Temperature sensor

A. Inlet to the booster unit DN25, 3...5 bar 4...70 mm²/s
B. Return from the booster unit R 1/2"
C. Inlet to the burner Ø 22
D. Return from the burner Ø 22

Diagram 4

Selection of the booster unit for heavy fuel oil



Booster unit	L1	L2	B1	B2
PKYR 1	840	880	815	855
PKYR 2	840	880	815	855
PKYR 3	840	880	815	855
PKYR 4	900	940	1250	1290
PKYR 5	900	940	1250	1290
PKYR 6	900	940	1540	1580
PKYR 7	890	940	1700	1750
PKYR 8	890	940	1700	1750

Booster unit PKYR 1...8 for heavy fuel oil

Booster unit	Heat exchanger 400 V/50 Hz kW	Motor 400 V/50 Hz kW	r/min	Oil pump Type	Pump output 12 mm²/s 25 bar kg/h
PKYR 1	18	3	3000	AFI20R46	2030
PKYR 2	24	4	3000	AFI20R56	2880
PKYR 3	30	4	3000	AFI20R56	2880
PKYR 4	36	5,5	3000	AFI40R38	3280
PKYR 5	48	5,5	3000	AFI40R46	4430
PKYR 6	60	5,5	3000	AFI40R46	4430
PKYR 7	72	7,5	3000	AFI40R54	5500
PKYR 8	84	7,5	3000	AFI40R54	5500

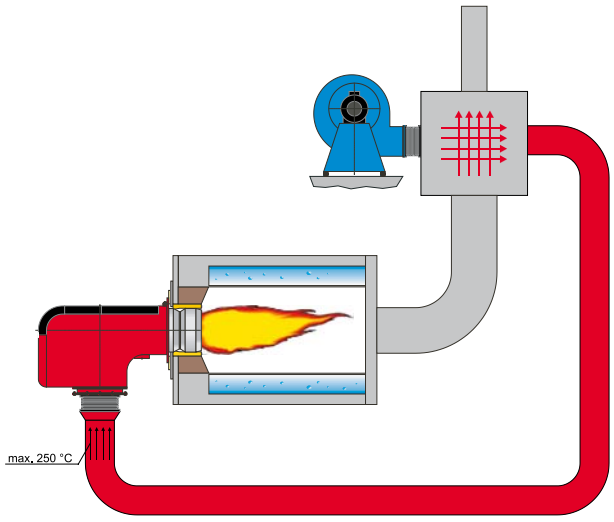
The output has been calculated using a density of 980 kg/m³ for the heavy fuel oil.

PKYR booster units may be selected using the diagram 4.

Scope of delivery

Booster units include following equipment: • standard delivery o optional

	PKYK	PKYR
Oil filter	•	•
Pressure gauge	•	•
Oil pump	•	•
Electric motor	•	•
Pressure regulating valve	•	•
Drilled ball valve	•	•
Preheater		•
Limiter thermostats		•
Temperature regulator and lower limit thermostat		•
Temperature sensor		•
Trace heating of the piping		o
Pressure gauge for monitoring oil inlet pressure	o	o
Pressure switch	o	o
Operating and maintenance manual	•	•



Schematic drawing of the principle of a plant using preheated combustion air.

Burners for preheated combustion air

By using preheated combustion air, the overall efficiency rate of the plant improves remarkably.

Preheated combustion air can be used up to the temperature of +250 °C in ME series burners (optional). When a burner is built to use preheated combustion air, its electric and mechanical parts are to be protected from heat. The burners may use combustion air of up to +50 °C without modification.

Diagram 5

Maximum capacities of the burners as a function of combustion air temperature

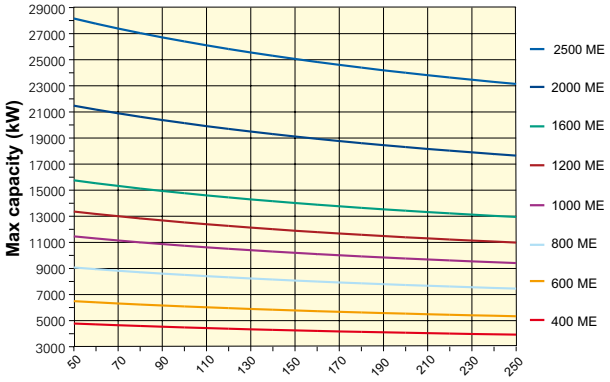
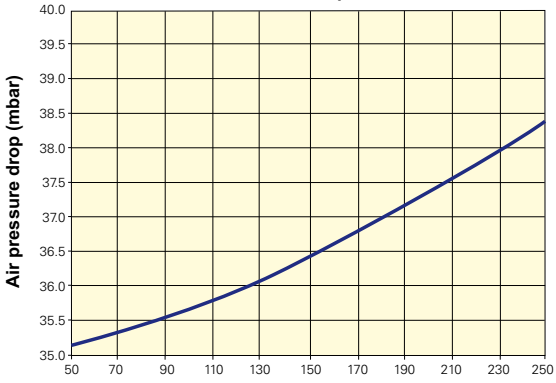


Diagram 6

Air pressure drop of ME burners depending on combustion air temperature



Control panels and supply cabinets

This burner series incorporates separate control panels and power supply cabinets.
The standard panels and cabinets are designed for voltages 3~400 V 50 Hz, control voltage 1~230 V 50 Hz. Enclosure class IP 40. Outer dimensions are 600 x 600 x 210 mm.

When necessary, panels and cabinets can be built according to the customer's needs.

Type marking of the control panels: OK100
Type marking of the supply cabinets: RK100

Fuel-specific type markings of the control panels:

Control panel for light fuel oil burner	OK100-KPME0
Control panel for heavy fuel oil burner	OK100-RPME0
Control panel for gas burner	OK100-GPME1
Control panel for dual fuel burner light fuel oil/gas	OK100-GKPME1
Control panel for dual fuel burner heavy fuel oil/gas	OK100-GRPME1

Control panel OK100

Scope of delivery Control panels include the following items:

• standard delivery o optional

	OK100-KPME0	OK100-RPME0	OK100-GPME1	OK100-GKPME1	OK100-GRPME1
Control unit LAL	•	•			
Control unit LFL			•	•	•
Capacity controller RWF-40	•	•	•	•	•
Capacity controller, other	o	o	o	o	o
Auxiliary relays	•	•	•	•	•
Burner control switch	•	•	•	•	•
Run hour counter for oil	•	•		•	•
Run hour counter for gas			•	•	•
Failure reset button	•	•	•	•	•
Signal lamps	•	•	•	•	•
Preheater temperature controller CAL					
Preheater operating switch		•			•
Remote start/stop	o	o	o	o	o
Capacity information for remote use (potentiometer with servomotor)	o	o	o	o	o
Potential-free alarms	o	o	o	o	o
Steam/water boiler automatics integrated into the control panel	o	o	o	o	o
O_2 display/alarm	o	o	o	o	o
Elevated IP class	o	o	o	o	o
Other voltage	o	o	o	o	o
Built according to the requirements of classification societies	o	o			
PLC control and/or electronic fuel/air ratio control	o	o	o	o	o
Flue gas damper control	o	o	o	o	o
Oil leakage alarm	o	o		o	o

Supply cabinet RK100

Scope of delivery Supply cabinets include the following items:

	RK100
Main switch	•
Automatic circuit breakers	•
Contactor outputs	•
Thermal relays	•
Star-delta starter	o
Soft starter	o
Boiler automation power-current outputs	o

Control panel OK100

All-inclusive burner automatics: oxygen (O_2)/pressure difference/ cascade control


Supply cabinet RK100

WiseDrive

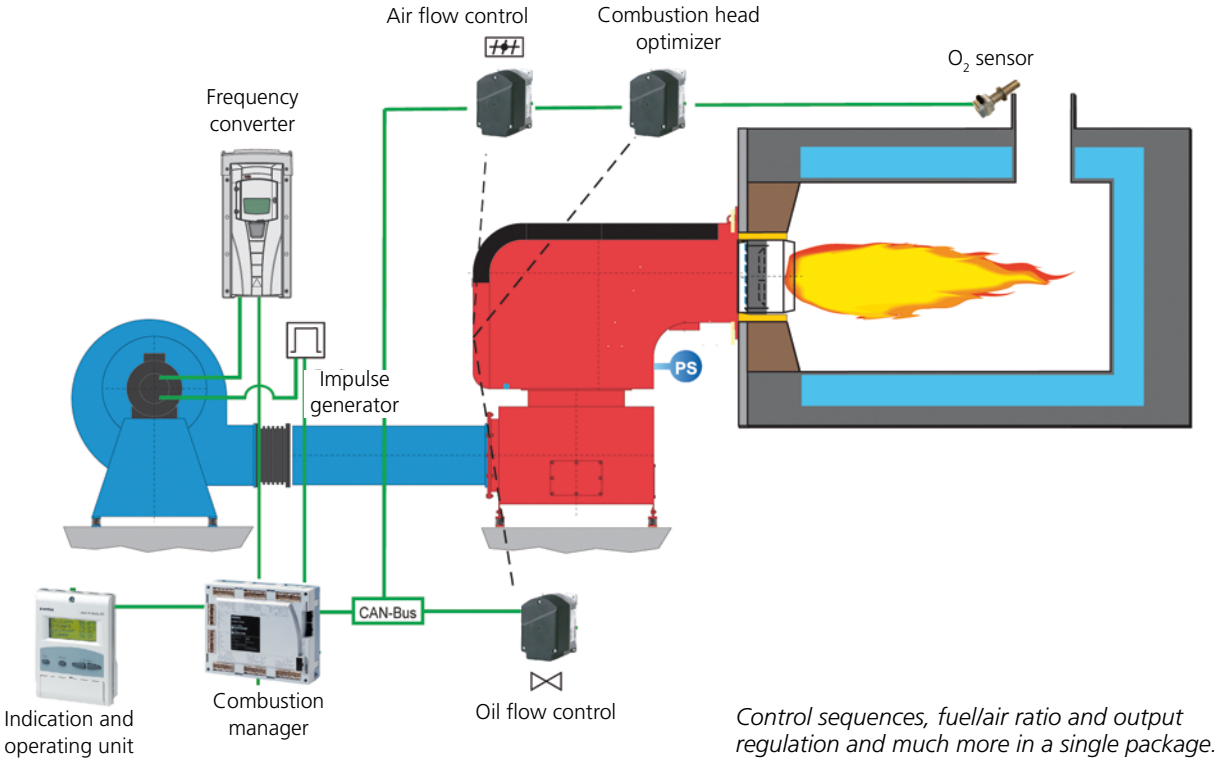
WiseDrive (WD), an electronic regulator for controlling the fuel/air ratio – an energy-efficient and environmentally friendly solution

Electronic fuel/air ratio control of the burner (optional) brings the benefits of lower flue gas emissions, decreased consumption of energy and improved technical characteristics of the burner, such as more accurate regulation.

Examples of the WiseDrive's functions:

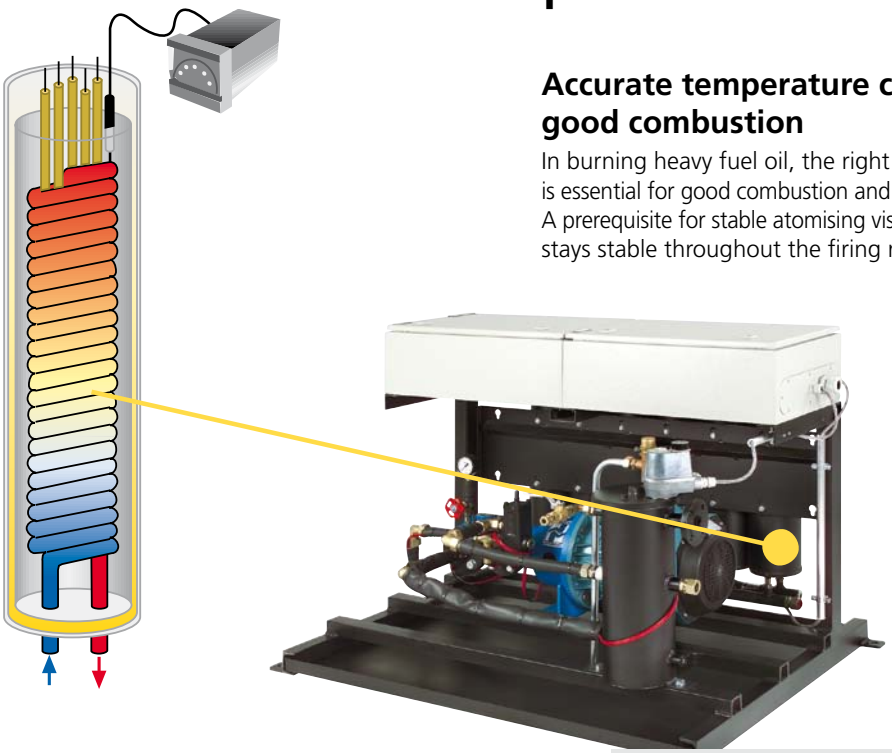
- Control sequences of the burner, conventional control unit deleted
- Fuel/air ratio control with dedicated servo motors, which can be set accurately for each control device
- Output regulator (PID) as standard, output regulation also by an external 4...20 mA signal
- When combusting gas, leak testing of the main gas valves carried out by the WiseDrive
- O_2 and fan motor RPM regulation according to the output
- Reading of the consumption signals from fuel gauges
- Can be connected with external plant automation via a ModBuss
- 4 operating levels
- Input of parameters via a character display panel and an operating panel. Also comes with a graphical touch screen at extra cost.

Example
WiseDrive 200
+ frequency converter



Control sequences, fuel/air ratio and output regulation and much more in a single package.

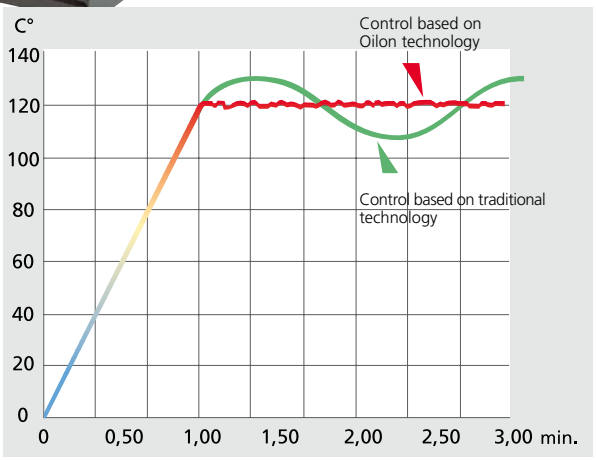
Burner preheater



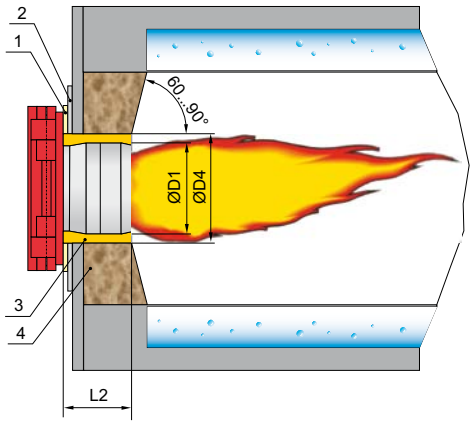
Accurate temperature control guarantees good combustion

In burning heavy fuel oil, the right atomising viscosity of the oil is essential for good combustion and low combustion gas emissions. A prerequisite for stable atomising viscosity is that the oil temperature stays stable throughout the firing rate.

Oilon ML mass preheater keeps the oil temperature stable even if the incoming temperature fluctuates. On account of the construction and the electronic regulator, the temperature of the oil flowing to the nozzle remains stable. The burner may, depending on the capacity and model, have one or more 6-kW heaters equipped with a safety device to guard against overheating. The electronic regulator has an integrated minimum temperature limiter as well; this prevents the burner from starting if the oil is too cold.

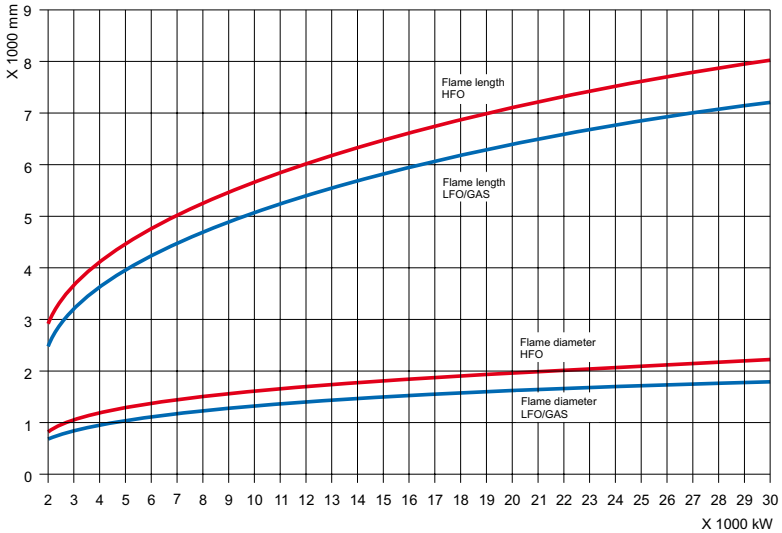


Masonry figure



1	*Gasket*
2	*Mounting panel*
3	*Ceramic wool or equivalent*
4	*Masonry*
Ø D1, Ø D4, L2	*See burner dimension diagram*

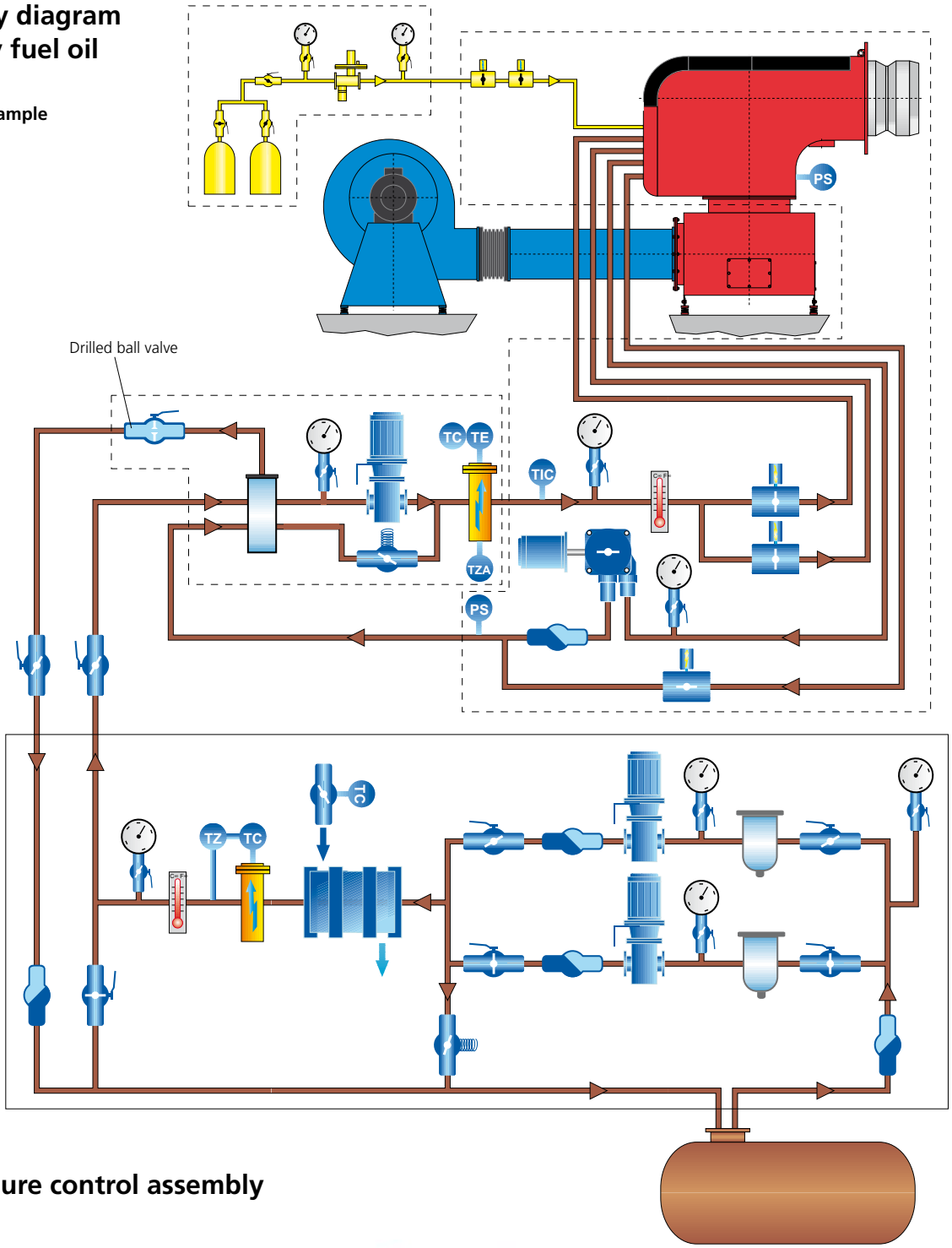
Flame dimensions



Lower diagrams for light fuel oil and gas, upper diagrams for heavy fuel oil.

Oil supply diagram for heavy fuel oil

Example



Gas pressure control assembly

Example

Oilon invests in product development and research. A modern product development centre meeting all European standards enables us to carry out a wide range of burning tests and accurate oil and gas measurements.

We supply burners for ships according to the requirements of classification societies such as ABS, BV, CCS, DNV, GL, KR, LR, NKK, RINA and RS.

Each year, we participate in various trade shows around the world.

EN5/4.00/022012

OILON OY
Metsä-Pietilänkatu 1
P.O. Box 5
FI-15801 Lahti, Finland
Tel. +358 3 85 761
Fax +358 3 857 6239
info@oilon.com

oilon®

www.oilon.com