

oilon®

## Power Plant and Process Burners

Group

6

Capacity  
2-90 MW



Power plants  
District heating plants  
Pulp and paper  
Chemical industry  
Metallurgic processes  
Municipal waste incineration  
Odorous gas incineration  
Fluidized bed boilers  
Recovery boilers  
Marine boilers  
Steam boilers  
Hot water boilers  
Thermal oil boilers  
Process furnaces  
Hot air generators  
Other applications

# Oilon burner expertise for power plants and industrial processes

Oilon specializes in power plant and process burners which are capable of being used in several different plants and applications. The know-how of valve units, pumping stations and burner automation enables Oilon to deliver complete combustion systems. In group 6, the atomizing of fuel is done by means of steam or compressed air. The combustion air blower is a separate unit, which can also be included in the Oilon delivery.

## Benefits to plant owner

Oilon's experience of combustion technology dates back from 1961. The main objectives of research and development involve high efficiency, reliable operation, environmentally friendly combustion and low emissions. The fine tuning of the combustion process is realized by automation system giving the right kind of controls, based also on the extensive experience of Oilon. This combination of expertise guarantees the optimal performance and availability of the plant.



*Pulp and paper*



*Hazardous and municipal waste incineration*

## Applications

Oilon's burner technology is utilized in power plants and various industrial processes, such as steam and hot water boilers, district heating plants, pulp and paper, oil industry, metallurgical processes, hazardous and municipal waste incineration, hot air generators, and more.

## Fuels

In addition to standard, commercially available liquid and gaseous fuels, Oilon has experience in combustion of numerous other fuels. These include a wide variety of process gases, bio fuels and gases with low heating value as well as wastes. All Oilon burner families have a prearrangement to operate as multi-fuel burners in which liquids and gases can be combusted either separately or simultaneously.



*Metallurgical processes*

## World-wide expertise

Oilon has world-wide experience and equipment deliveries to every continent. Local legislation and standards will be observed and followed. In case of additional emission requirements coming for example from environmental permitting, the equipment and processes will be designed to meet those. The experts in Oilon know the circumstances in different plants and have competence to support in decisions concerning combustion.



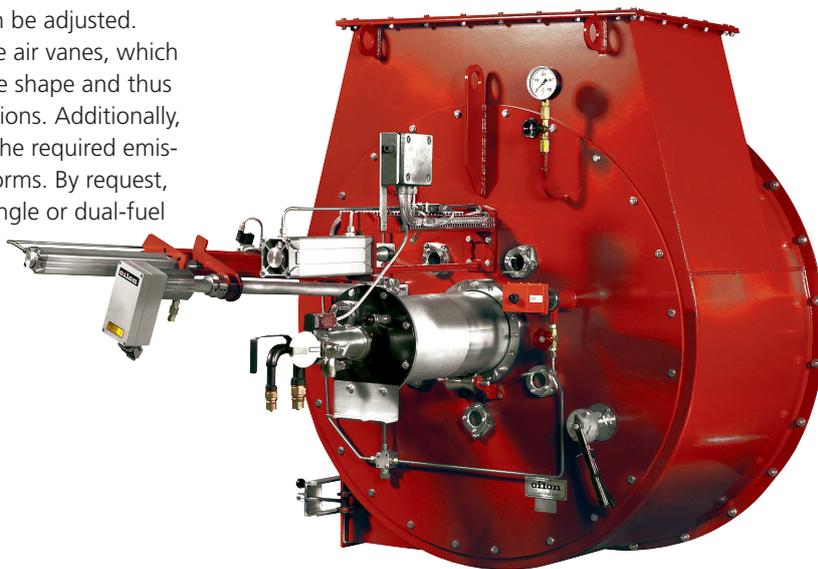
*Aluminium production*

# S-burners for a wide range of applications

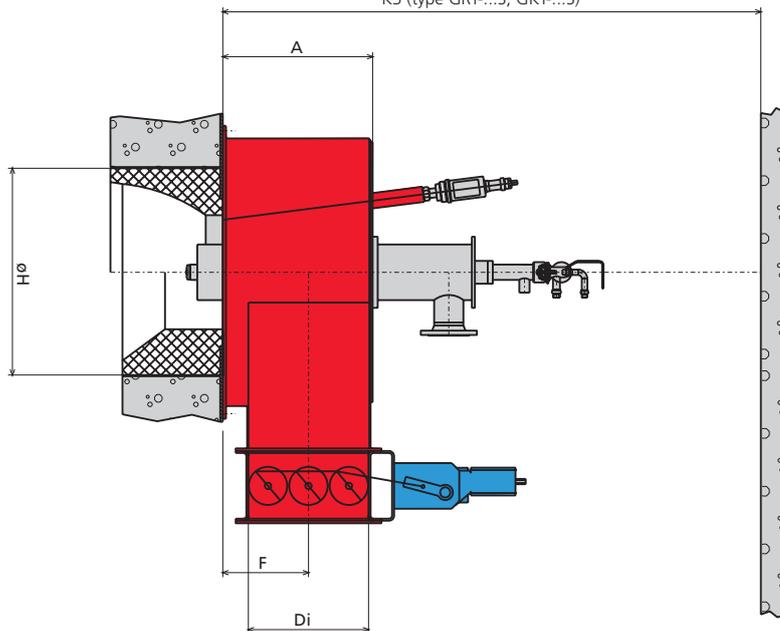
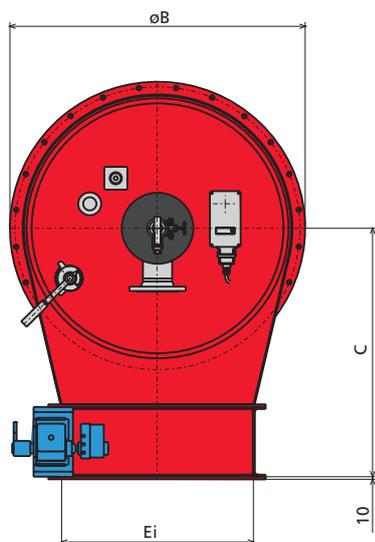
S-burner is typically used in hot water and steam boilers, but is suitable also in various further applications. The amount and ratio of primary and secondary air can be adjusted. Secondary air is guided through adjustable air vanes, which enables the formation of the desired flame shape and thus matching optimally to the furnace dimensions. Additionally, the adjustability contributes to achieving the required emission levels in different furnace sizes and forms. By request, S-burner is capable to be provided with single or dual-fuel liquid lance, gas lance and gas ring.

Maximum pressure loss 3.5 kPa.\*)

- KT...S = light fuel oil burner
- RT...S = heavy fuel oil burner
- GT...S = gas burner
- GKT...S = gas/light fuel oil burner
- GRT...S = gas/heavy fuel oil burner



K1 (type GT...S)  
K2 (type RT...S, KT...S)  
K3 (type GRT...S, GKT...S)



Burner	Nominal capacity *) MW	A mm	B mm	C mm	Di mm	Ei mm	F mm	H Typical mm	K1 mm	K2 mm	K3 mm
GT/RT/KT/GRT/GKT -5S	0,9 - 4,5	390	735	740	260	425	244	520	1700	2100	2700
GT/RT/KT/GRT/GKT -8S	1,4 - 7,0	460	865	795	310	500	289	600	1900	2300	2900
GT/RT/KT/GRT/GKT -12S	2,2 - 11,0	540	995	865	395	625	327	710	2100	2500	3300
GT/RT/KT/GRT/GKT -18S	3,2 - 16,0	586	1155	980	470	750	335	820	2500	2900	3500
GT/RT/KT/GRT/GKT -25S	4,4 - 22,0	739	1315	1100	530	900	454	940	2600	2900	4000
GT/RT/KT/GRT/GKT -35S	6,2 - 31,0	853	1610	1250	630	1025	530	1030	2900	3500	4300
GT/RT/KT/GRT/GKT -50S	9,0 - 42,0	1024	1750	1300	785	1200	610	1220	3250	3500	4650
GT/RT/KT/GRT/GKT -70S	12,6 - 63,0	1212	2100	1500	1050	1550	713	1410	3500	4100	4700

\*) Valid, when combustion air temperature is +35 °C, λ = 1,17 and ambient air pressure 1,013 bar a.

# LITEX - compact design and low NOx emissions

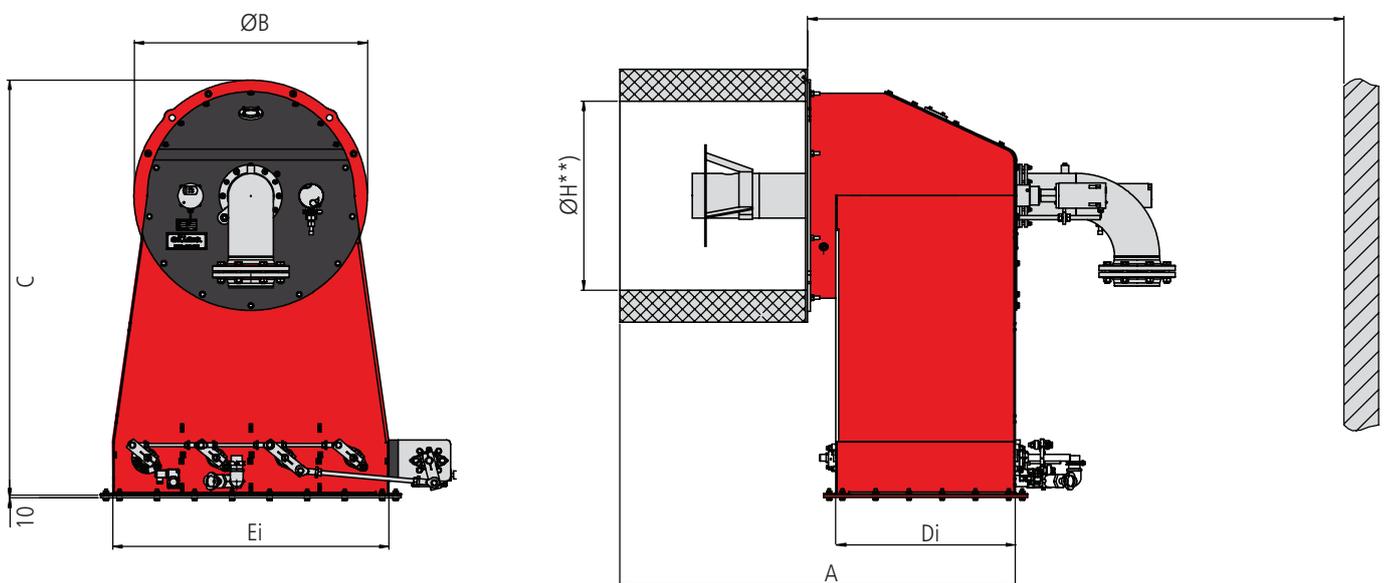
Litex brings a design focus to the form of the burner wind box: the burner shapes optimize air flows in the wind box and the combustion head. This advance, achieved through computational fluid dynamics (CFD), has resulted in stable combustion and low NOx emissions. And to reduce NOx emissions still further, it is possible to operate Litex units also with external flue gas recirculation (FGR): a small amount of flue gases means considerable NOx reductions. The burner is small and also extremely light for its burner capacity. With Litex, installation is easy too: for example, the burner refractory has a straight-cylinder design. An ideal solution for many fields of application, Litex burners are most typically used in hot water and steam boilers.

Maximum pressure loss  $\leq 2.5$  kPa.\*)

- KT...E = light fuel oil burner
- RT...E = heavy fuel oil burner
- GT...E = gas burner
- GKT...E = gas/light fuel oil burner
- GRT...E = gas/heavy fuel oil burner



K1 (type GT...E)  
K2 (type KT...E, RT...E)  
K3 (type GRT...E, GKT...E)



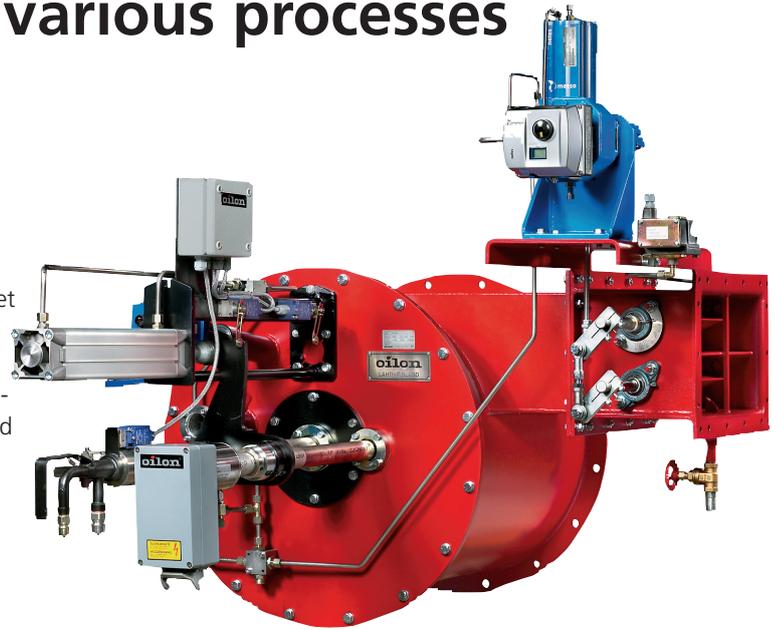
Burner	Nominal capacity *) MW	A min. mm	ØB mm	C mm	Di mm	Ei mm	ØH **) mm	K1 min. mm	K2 min. mm	K3 min. mm
KT/RT/GT/GKT/GRT-35E	35	1470	870	1560	660	1020	710	2700	3300	4100
KT/RT/GT/GKT/GRT-45E	45	1830	990	1895	830	1250	830	3450	4050	4850

\*) Valid, when combustion air temperature is +35 °C,  $\lambda = 1,17$  and ambient air pressure 1,013 bar a.

\*\*) ØH = Combustion head inner diameter

# K-burners for various processes

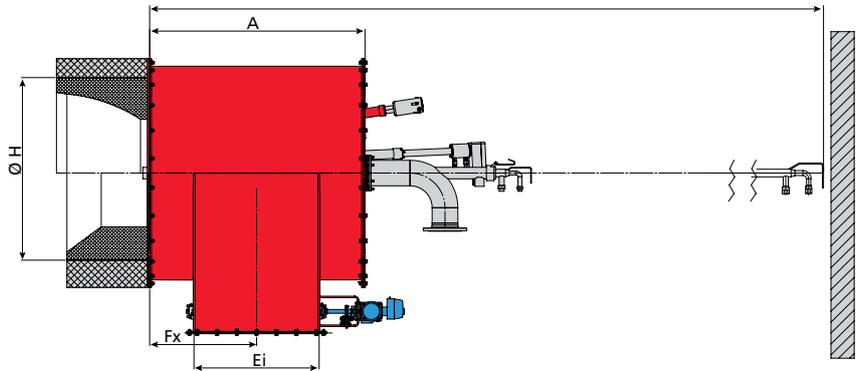
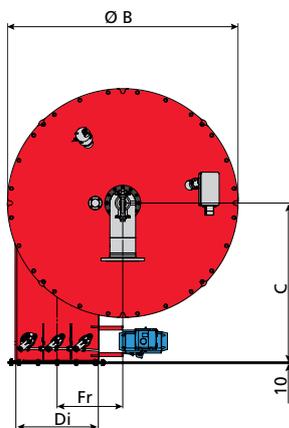
K-burner is the right choice for many different types of industrial processes, for example in hazardous waste and municipal waste incineration plants. The combustion air inlet is located eccentric on one side of the burner guiding the combustion air tangentially to the wind box, which causes a strong swirl and stable flame. The burner construction is designed for heavy duty operation to guarantee good availability in extreme process conditions. K-burner can be equipped with several lances according to the number of different fuels.



Maximum pressure loss 3.5 kPa.\*)

- KT-...K = light fuel oil burner
- RT-...K = heavy fuel oil burner
- GT-...K = gas burner
- GKT-...K = gas/light fuel oil burner
- GRT-...K = gas/heavy fuel oil burner

- K1 (type GT-...K)
- K2 (type RT-...K, KT-...K)
- K3 (type GRT-...K, GKT-...K)



Burner	Nominal capacity *) MW	A mm	B mm	C mm	Di mm	Ei mm	Fx mm	Fr mm	H Typical mm	K1 mm	K2 mm	K3 mm
GT/RT/KT/GRT/GKT -3K	0,5 - 2,7	430	520	520	230	155	210	128	500	2050	2400	2900
GT/RT/KT/GRT/GKT -5K	0,9 - 4,5	550	640	580	295	190	270	170	580	2150	2500	3100
GT/RT/KT/GRT/GKT -8K	1,4 - 7,0	690	780	710	375	250	340	210	670	2400	2700	3300
GT/RT/KT/GRT/GKT -12K	2,2 - 11,0	840	930	725	455	305	415	258	770	2800	2950	3550
GT/RT/KT/GRT/GKT -18K	3,2 - 16,0	1020	1110	815	555	370	505	315	900	3200	3500	4300
GT/RT/KT/GRT/GKT -25K	4,4 - 22,0	1200	1290	905	675	450	595	365	1030	3700	3900	4900
GT/RT/KT/GRT/GKT -35K	6,2 - 31,0	1410	1510	1050	820	540	700	430	1170	4100	4500	5500

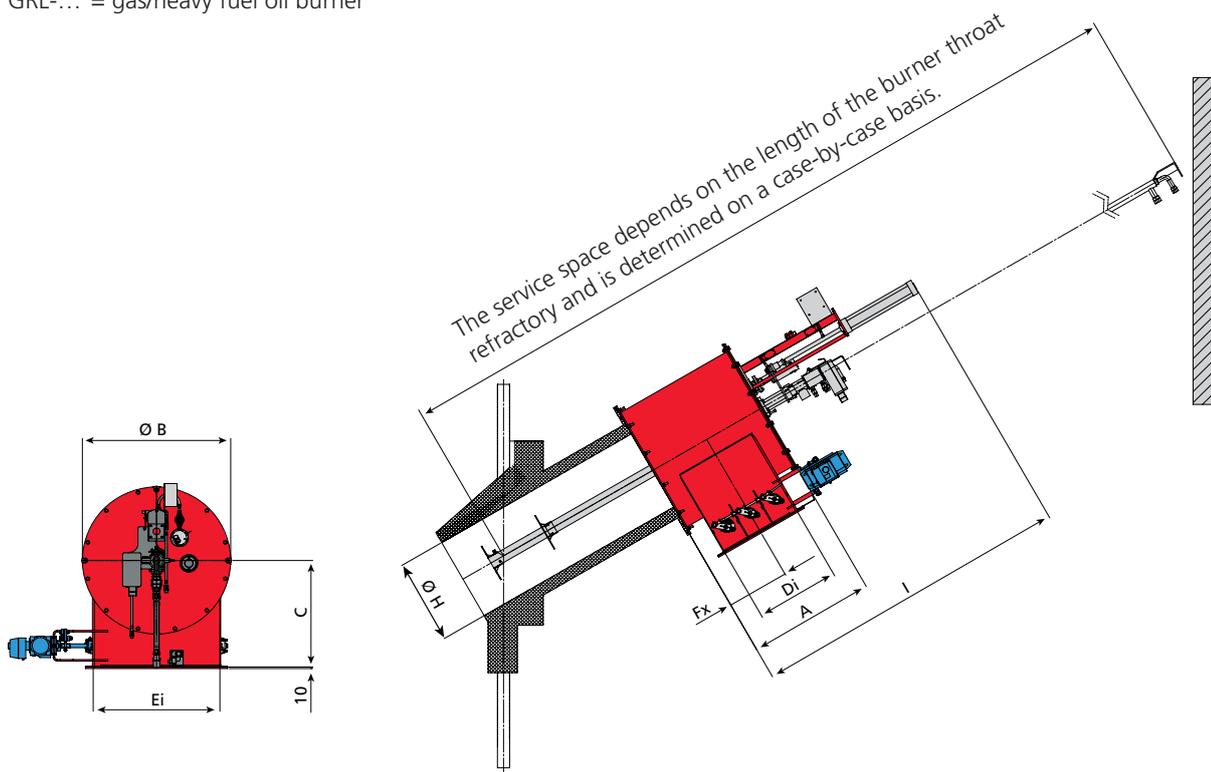
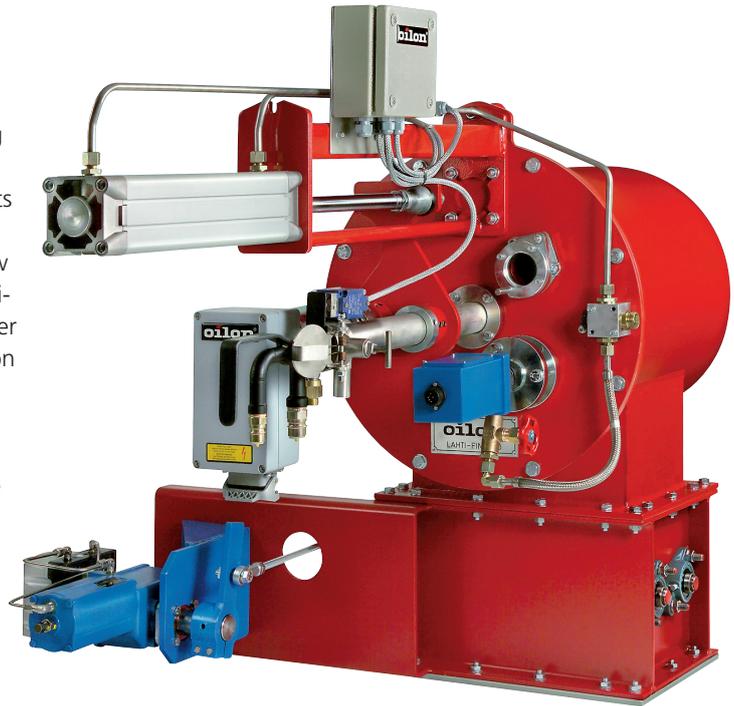
\*) Valid, when combustion air temperature is +35 °C, λ = 1,17 and ambient air pressure 1,013 bar a.

# Lance burners especially for fluidized bed boilers

Lance burner presents technology to different demanding industrial purposes, for example as start-up and support burner in fluidized bed boilers. It is essential, that the parts will tolerate the effects of the sand bed. This is achieved in lance burner by optimized cleaning and cooling air flow through the burner. When the burner is stand-by, the critical parts will be retracted automatically. The small diameter of the lance burner allows to minimize burner openings on the boiler walls.

Pressure loss is from 2.5 kPa upwards depending on the circumstances and, consequently, will be determined case by case.

- KL... = light fuel oil burner
- RL... = heavy fuel oil burner
- GL... = gas burner
- GKL... = gas/light fuel oil burner
- GRL... = gas/heavy fuel oil burner



Burner	Nominal capacity *) MW	A mm	B mm	C mm	Di mm	Ei mm	Fx mm	H mm	I Typical mm
GL/RL/KL -250	1,6 - 6,5	550	550	515	250	375	270	250	1603
GL/RL/KL/GRL/GKL-350	3,1 - 12,5	580	660	580	370	555	280	350	1623
GL/RL/KL/GRL/GKL -450	5,3 - 21,0	720	810	595	450	675	355	450	1982
GL/RL/KL/GRL/GKL -550	7,8 - 31,0	820	960	695	540	820	405	550	2082
GL/RL/KL/GRL/GKL -650	10,8 - 43,0	1005	1210	695	640	990	500	650	2282

\*) Valid, when combustion air temperature is +35 °C,  $\lambda = 0,8$  and ambient air pressure 1,013 bar a.

# Standard burner selection

Coding presented below covers only our standard burner selection. In addition, there are numerous other burner models in our product range and, when required, we provide tailor-made solutions for various needs.

GRT-35S-abcde

**GRT-35S burner type**  
(from pages 4 - 7)

**a ATEX classification**

- a=1 non-ATEX
- a=2 ATEX, Zone 2, complies with EN

**b Regulation method, type of air damper actuator**

- b=1 electronic compound regulation, pneumatic actuator, compatible with WiseDrive 2000
- b=2 mechanical compound regulation, electric actuator (only non-ATEX)
- b=3 electronic compound regulation, electric actuator compatible with WiseDrive 1000 (only non-ATEX)
- b=4 electronic compound regulator, electric actuator, compatible with WiseDrive 2000

**c Combustion air temperature**

- c=1 combustion air temperature < 120 °C
- c=2 combustion air temperature 120 °C < t < 320 °C

**d Secondary air swirl**

- d=1 counter-clockwise
- d=2 clockwise

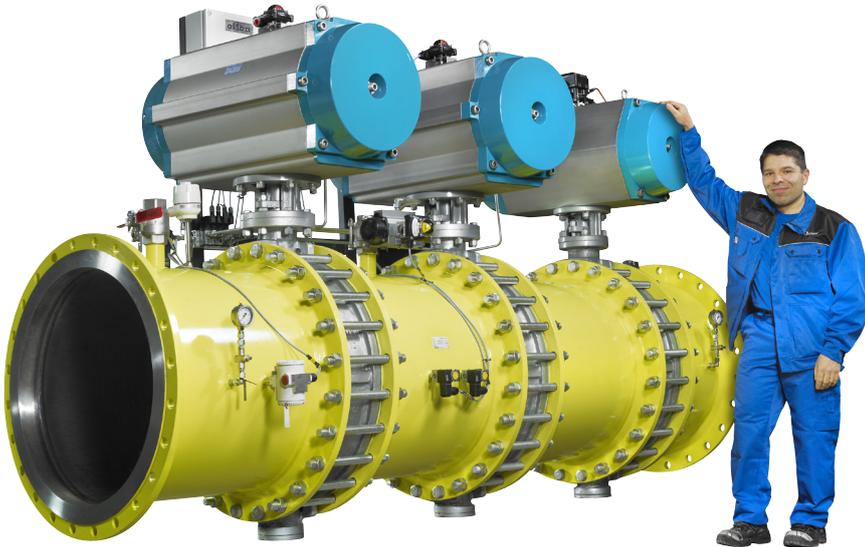
**e Pilot burner fuel**

- e=1 natural gas
- e=2 propane
- e=3 light fuel oil

E.g. GRT-35S-21111  
- ATEX, Zone 2  
- electronic compound regulation, pneumatic actuator  
- combustion air temperature < 120 °C  
- secondary air swirl counter-clockwise  
- pilot burner fuel: natural gas

# Auxiliary equipment

*Correctly dimensioned and designed auxiliary equipment is essential to guarantee optimal performance of the burner. The right instruments, piping materials and process values are chosen on the basis of our long experience. All the equipment is assembled and tested at the factory and includes the necessary wiring and instrument piping*



## Valve units for liquid fuels

Units for several burners can be assembled into one common rack. It is also possible to combine several different fuels into one unit.

## Valve units for process gases

The nature and amount of process gases vary considerably depending on the process in question. Corrosive gases, demanding conditions and surroundings etc. are taken into account.



## Valve units for natural gas

The natural gas filtering, measuring and controlling unit can be individual for each burner. Multi-burner installations, however, can be provided with a unit common for all burners or burner groups.



# Standard shut-off valve units

The coding presented on this spread covers our selection for standard shut-off valve units and standard measuring and control units. Our product range also includes numerous other models and, when required, we provide tailor-made solutions for various needs.



YXXPSR-abcde

## Fuel Y

K=light fuel oil  
R=heavy fuel oil  
G=natural gas

## Pipe size (DN) XX

For light and heavy fuel oil

15	< 1000 kg/h
20	1 000 - 2 000 kg/h
25	2 000 - 4 250 kg/h
32	4 250 - 7 500 kg/h

For natural gas  
(gas amount will be determined case by case)

40
50
65
80
100
125
150

## Shut-off valve unit PSR

## a

a=1  
a=2

## ATEX-classification

non-ATEX  
ATEX, Zone 2, complies with EN

## b

b=1  
  
b=2  
  
b=3

## Method of regulation, compatibility with burner automation

b=1 electronic compound regulation, pneumatic control valve (gas), compatible with WiseDrive 2000  
b=2 electronic compound regulation, electric control valve, compatible with WiseDrive 1000 (only non-ATEX)  
b=3 electronic compound regulation, electric control valve (gas), compatible with WiseDrive 2000

## c

c=1  
c=2

## Handedness

c=1 from left to right  
c=2 from right to left

## d

d=1  
d=2  
  
d=3

## Equipment for pilot burner fuel

d=1 no pilot burner fuel equipment  
d=2 includes pilot burner fuel equipment for gas (propane or natural gas)  
d=3 includes pilot burner fuel equipment for light fuel oil (oil inlet pressure 20 bar g)

## e

e=1 junction box  
e=2 local control panel oil or gas  
e=3 local control panel oil and gas

E.g.

K25PSR-21122

- Light fuel oil as fuel
- Pipe size DN 25
- ATEX, Zone 2
- electronic compound regulation, pneumatic control valve (gas), compatible with WiseDrive 2000
- handedness: from left to right
- includes pilot burner fuel equipment (suitable for propane and natural gas)
- local control panel for oil

# Standard measuring and control units



YXXMSR-abc

## Fuel Y

K=light fuel oil  
R=heavy fuel oil  
G=natural gas

## Pipe size (DN) XX

For heavy and light fuel oil  
15 < 1000 kg/h  
20 1 000 - 2 000 kg/h  
25 2 000 - 4 250 kg/h  
32 4 250 - 7 500 kg/h

For natural gas  
(gas amount will be determined case by case)

40  
50  
65  
80  
100  
125  
150

## Measuring and control unit MSR

a  
a=1  
a=2

### ATEX classification

non-ATEX  
ATEX, Zone 2, complies with EN

b

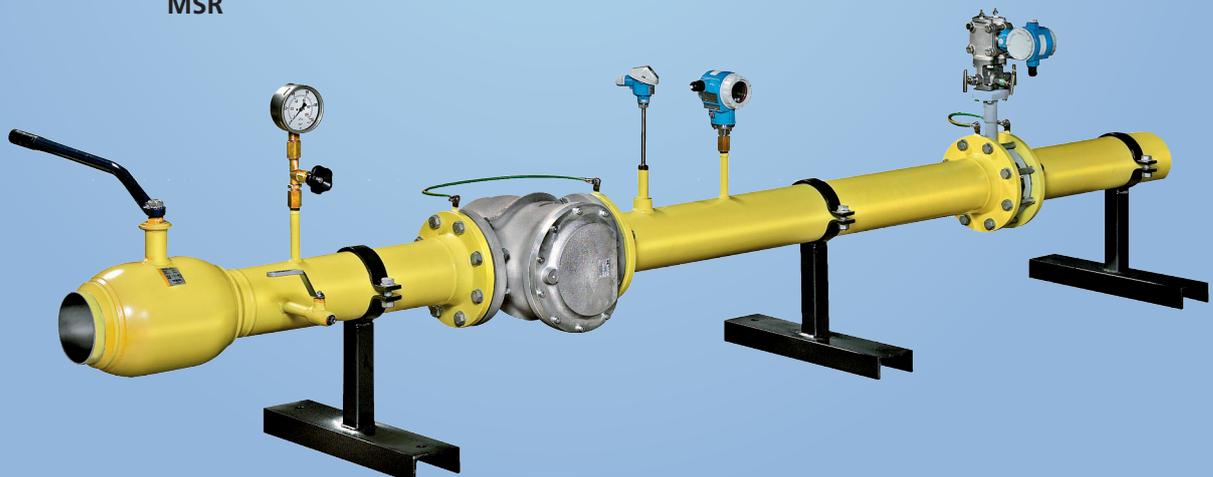
### method of regulation, compatibility with burner automation

b=1 electronic compound regulation, pneumatic control valve (oil), compatible with WiseDrive 2000  
b=2 electronic compound regulation, electric control valve (oil) compatible with WiseDrive 1000 (only non-ATEX)  
b=3 electronic compound regulation, electric control valve (oil) compatible with WiseDrive 2000

c

### Handedness

c=1 from left to right  
c=2 from right to left



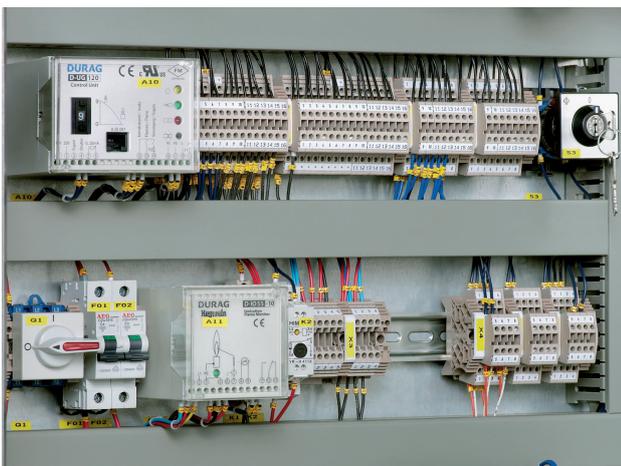
# Burner management systems

Oilon has a long experience in designing and manufacturing Burner Management Systems (BMS) to combustion processes. BMS of Oilon utilize optimized controls ensuring the right sequence and fine tuned timing. Consequently, the optimized performance of the combustion means high efficiency and low emissions.

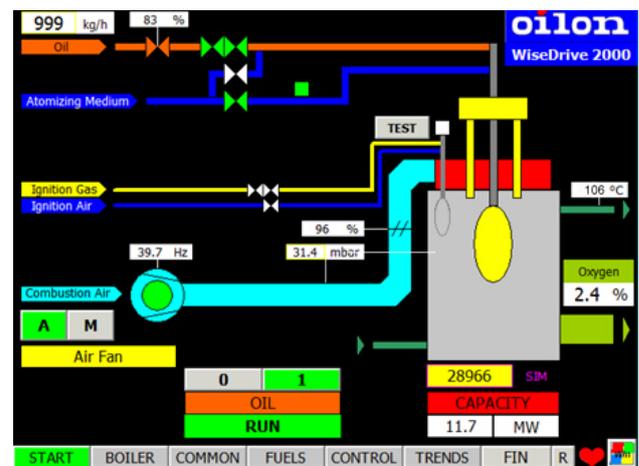
For typical solutions there are standard BMS packages available and for each specific requirement customized systems are worked out. The extent of the system is to be agreed case by case. Normally BMS will be implemented in the main control system of the Plant (DCS). BMS can be based on Programmable Logic Control (PLC), controller or control relay system. Safety and availability are in important role while designing and realizing an automation system. The right safety level and the need for redundant system will be determined to meet the requirements of the whole process. Every BMS is factory tested (FAT) to guarantee smooth and fast start-up of the combustion system in the plant.



BMS with touch panel for four burners.



BMS safety devices.



Touch panel screen for combustion system.

# Standard burner automations

The standard burner automation devices intended for the group 6 burners are WiseDrive 1000 ja WiseDrive 2000.

They both have the following features:

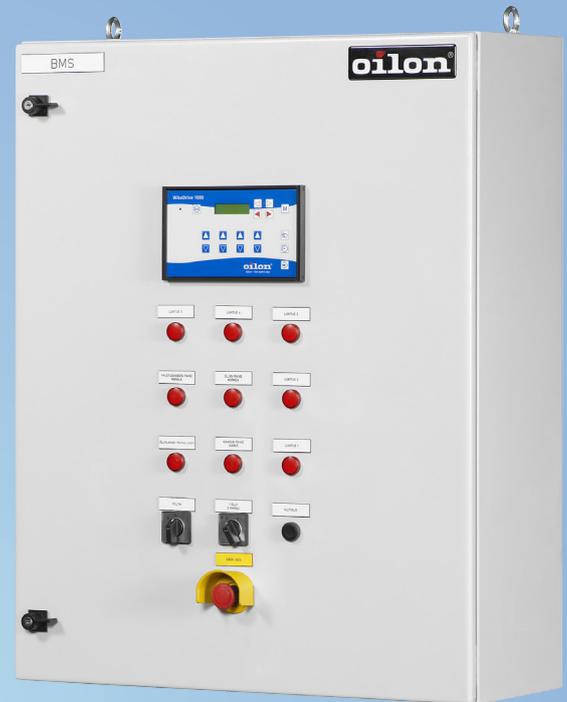
- Controls, interlocking, monitoring and regulation required by the burner are included
- Two types of fuel at maximum.
- Start and stop from the main automation system is performed with binary HW signals and/or local control panel.
- Power regulation is based on incoming 4-20 mA signal (for example, steam pressure, temperature of the boiler water, the output capacity of the burner).
- O<sub>2</sub> regulation may be added to burner automation.
- Burner automation may be installed either in a separate control room or near the boiler. The maximum temperature of the automation environment is +40 °C without separate cooling. Higher temperatures require instrument air extrusion or coolers. Cooling system can be provided as an option.

## WiseDrive 1000

- The burner control unit is EN 298, EN 230 and TÜV-approved.
- Compound regulation of fuel/combustion air is implemented on the basis of regulating units' position signals.
- CO regulation can be added to the automation system alongside O<sub>2</sub> regulation.
- 5 binary tripping circuits have been reserved for external interlocking.
- Supply voltage 230 VAC, internal and external controls 230 VAC. Includes a power supply unit 230 VAC / 24 VDC.
- Painted steel cabinet 800 x 1200 x 400 (W x x D), IP55, no ATEX classification for the cabinet itself.
- The whole system is always non-ATEX.

## WiseDrive 2000

- Based on programmable logic Siemens S7-315F.
- Logic has been approved for safety man-machine use in accordance with EN 61508 standard.
- Compound regulation of fuel/combustion air is implemented on the basis of fuel and combustion air flow measurements.
- The logic can be linked with the main automation system through a Profibus channel. Interruption in the operation of the channel will not interfere with the operation of the burner.
- 6 binary tripping circuits have been reserved for external interlocking.
- Supply voltage 230 VAC, internal and external controls 24 VDC. Includes a power supply unit 230 VAC / 24 VDC.
- Painted steel cabinet 800 x 1000 x 300 (W x H x D), IP55, no ATEX classification for the cabinet itself.
- The whole system can be either ATEX or non-ATEX.
- Includes an interface option for touchscreen (touchscreen may be delivered as an option).



In addition to these standard burner automations, we tailor burner automations for various customer and plant needs.

# Pumping units

## Pumping units for liquid fuels

Pumping units handle the filtering, pumping and pre-heating of fuel as required. In order to ensure high availability, our standard solutions have two parallel lines. Fuels with high viscosity are heated with steam or water to the optimal atomization temperature.

For cold starting a plant, the pumping units can be equipped with an electric heating exchanger.



*The below coding covers standard pumping units. In addition to them, our product range includes numerous other models and, when required, tailored solutions to meet various needs.*

X2000PK-abc

**Fuel X**  
K=light fuel oil  
R=heavy fuel oil

**Net capacity**

Fuel amount  
for burners

For light fuel oil  
(kg/h)  
4150  
5980  
6870  
9450  
12580

For heavy fuel oil  
(kg/h)  
4990  
7200  
8370  
12080  
15880

**Pumping unit PK**

**a ATEX classification**

a=1 non-ATEX  
a=2 ATEX, Zone 2, complies with EN

**b Pressure control**

b=1 mechanical pressure control  
(turn-down ratio 1:5)  
b=2 electro-pneumatic pressure control

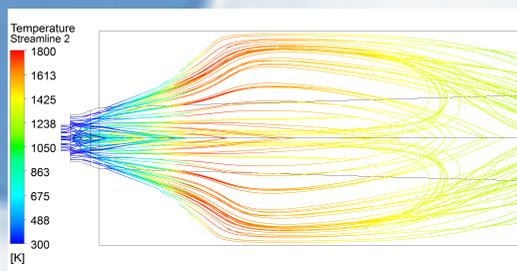
**c Handedness**

c=1 from left to right  
c=2 from right to left





*Oilon invests over 5% of its turnover in research and product development. A modern product development center meeting all European standards enables efficient combustion development with both liquid and gaseous fuels.*



*Computational fluid dynamics (CFD) is an essential part of our research and product development. CFD enables faster development of new products, and ensures critical factors in more extensive projects (combustion air channels, burner positioning, furnace temperatures, etc.). It is also used for the phenomenon of combustion in order to develop new applications.*



*Our production capacity enables the implementation of even larger orders and a short delivery cycle. Our products are comprehensively tested at the factory (FAT), which ensures the smooth commissioning of the burner system at the plant.*

**oilon**<sup>®</sup>

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