

**Technical information**  
**Duobloc burners**

–weishaupt–

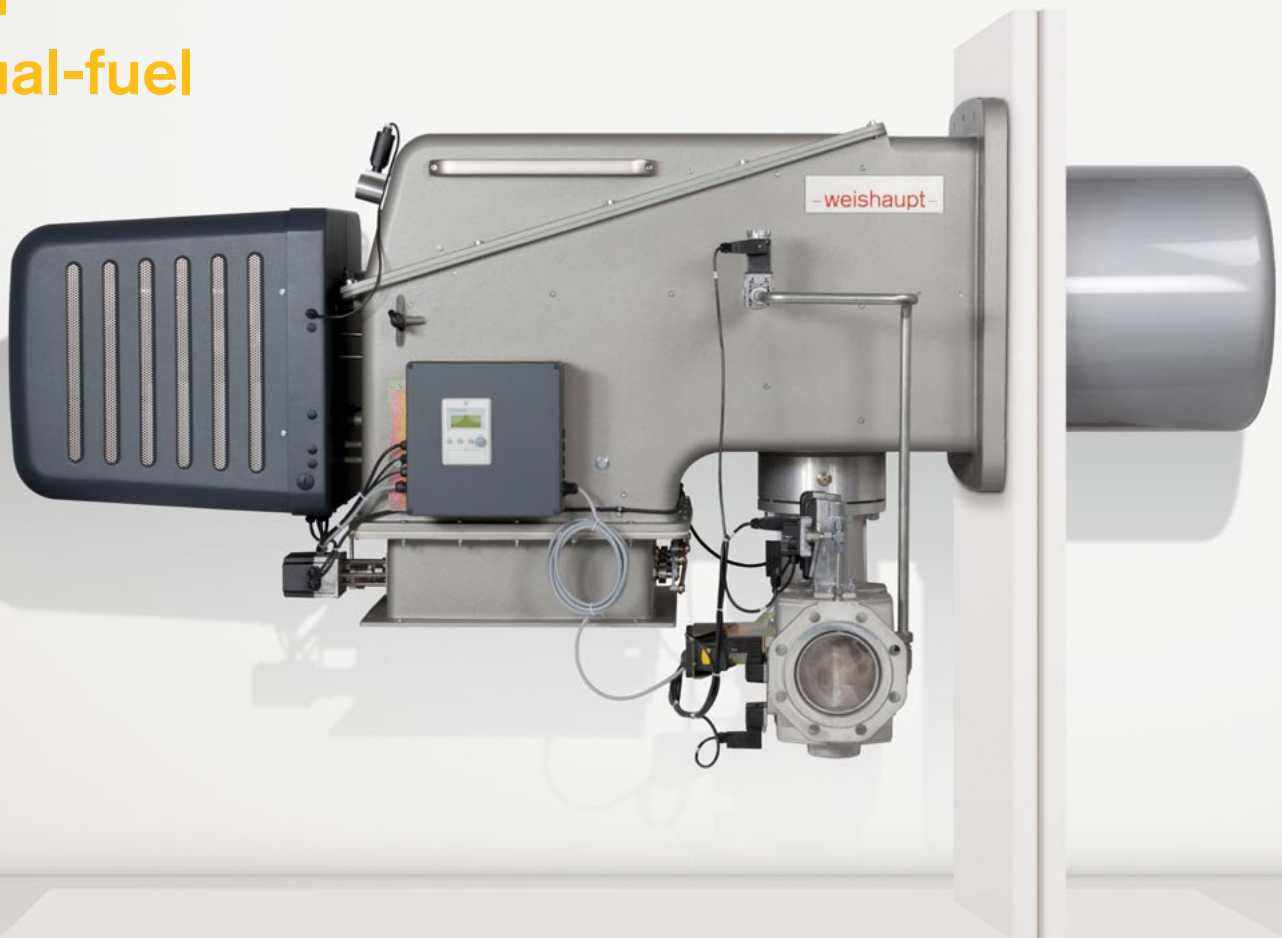
Weishaupt industrial burners  
WK 40–80 200–32000 kW

**WK 40–80**

**Gas**

**Oil**

**Dual-fuel**



# Decades of reliability

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**WK40** (up to 3 MW)



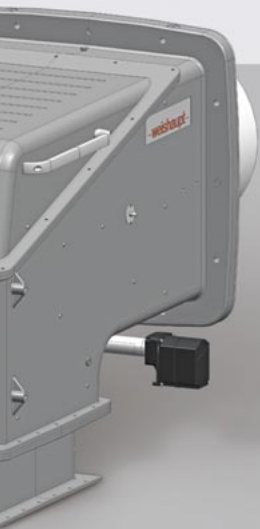
**WK50** (up to 6 MW)



**WK70** (up to 13 MW)



**WK80** (up to 32 MW)



**For more than six decades, Weishaupt burners have proven themselves on a wide variety of heat generators and process plant. Their success stems from Weishaupt's relentless demand for high-quality materials and workmanship, and from uncompromising quality control standards.**

Weishaupt continually establishes new benchmarks with its well-engineered products, facilitated by the ever-constant efforts of its own in-house Research and Development Centre.

Weishaupt WK-series burners have been designed especially for industrial use. The modular design of the burners and their very large capacity range – 300 to 32000 kW – means they are ideally suited to a broad range of special applications.

All Weishaupt burners are manufactured at the company's main plant in Schwendi in southwestern Germany. Not only does this extremely modern production facility serve as a beacon of safety, precision, and cleanliness, it also allows for a rapid response when assembling small, medium and large-sized burners.

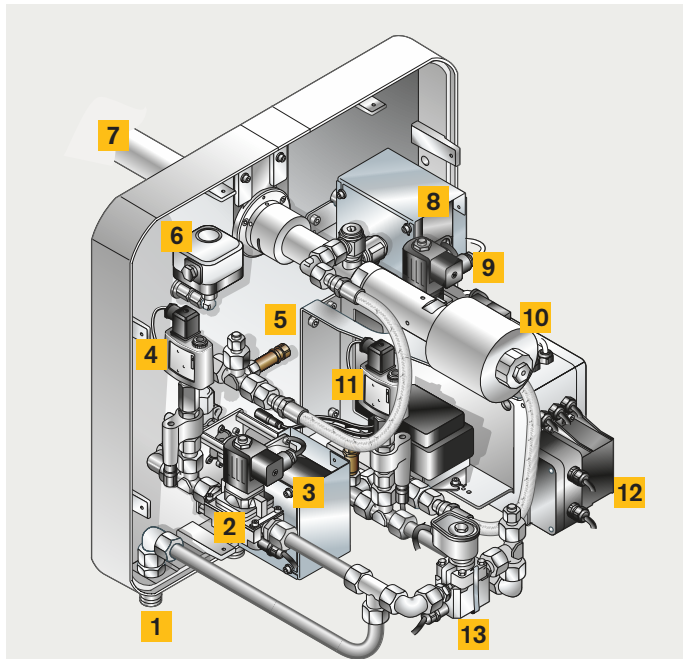
Experienced employees and a high proportion of in-house production allow Weishaupt to meet its own demands for the highest levels of quality.

Weishaupt's high level of quality is reflected by its ISO 9001-2015 certification, which covers the development, production, sale, and servicing of burners and control panels.

Weishaupt offers individualised solutions for the supply of fuel and the control of burners and boilers. Of course, its product range also runs the gamut of modern instrumentation and control equipment, all the way through to fully comprehensive solutions for complex building automation projects.

**Future-oriented, economical, flexible.**

# The powerful duobloc burner



Controls assembly for a residual-oil WK-series burner

- 1** Oil return
- 2** Oil return solenoid valve (heated)
- 3** Oil regulator actuator (cooled)
- 4** Max. oil pressure switch (heated)
- 5** Pt100 return temperature sensor
- 6** Air pressure switch
- 7** Nozzle lance
- 8** Regulating sleeve and nozzle lance actuator (cooled)
- 9** Oil supply solenoid valve (heated)
- 10** Nozzle lance with solenoid coil
- 11** Min. oil pressure switch (heated)
- 12** Power transformer
- 13** Solenoid valve bypass for recirculation (heated)

## Modular principle

Weishaupt WK-series industrial burners are of modular design. That means that the fan, pump station, and preheater station are all selected independently of the burner. This concept offers a high degree of flexibility in matching to the most diverse applications.

## Insulated burner housing

The burner housing is fitted with internal insulation that reduces the surface temperature of the housing. The housing insulation also helps to provide effective noise reduction.

## Heat recovery with the use of preheated combustion air

Many industrial processes create high flue gas temperatures due to the high temperature of the medium used. A heat exchanger in the flue can be used to reclaim a large amount of energy from these hot flue gases. WK-series burners can be operated with combustion air temperatures of up to 250 °C, which increases efficiency by up to 10 %.

## Accessibility

The controls assembly on a WK-series burner is generously dimensioned. The components and fuel lines are clearly laid out, ensuring excellent accessibility for maintenance work. A cover, which can be rotated by 90°, provides optimal ventilation and cooling of a residual-oil burner's components.

## Maintenance-friendly

WK 80 burners have an integrated rail system and servicing position that makes it very much easier to insert and remove the mixing assembly.

## Nozzle lance and regulating sleeve

WK 80 burners have a nozzle lance and regulating sleeve whose positions are adjusted by an actuator in response to the current firing rate. This ensures optimal flame stability and mixing energy throughout the entire turndown range.

## Nozzle head shutoff

Oil leakage from the nozzle bore during standby or recirculation through the nozzle is prevented by safety shutoff devices. Thus any influences on the fuel from atmospheric oxygen or heat are prevented.

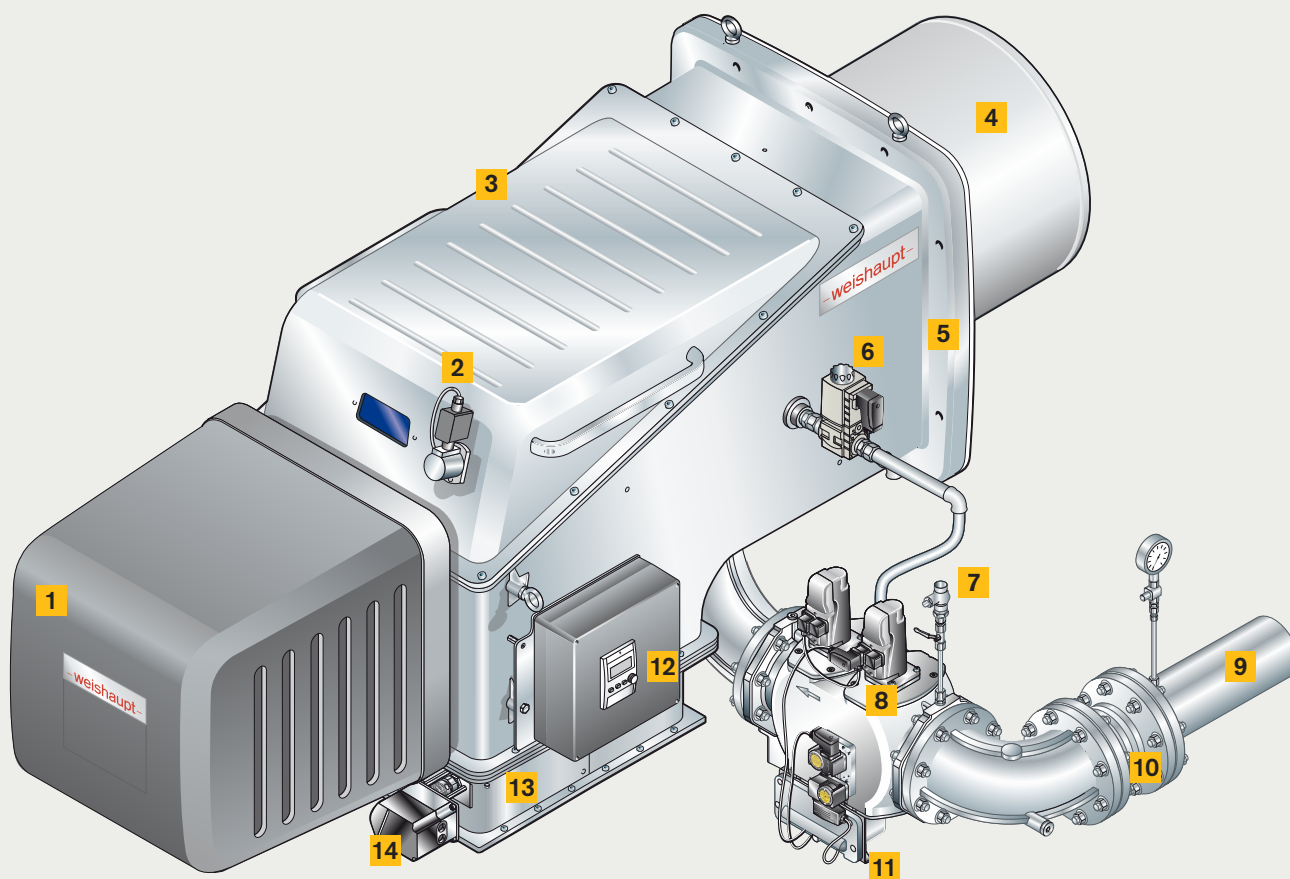
## Ignition load

The W-FM combustion manager has parameters that allow for a special setting of the ignition load position. This guarantees reliable ignition under the most varied of conditions.

## Controlled burner shutdown from partial load

Controlled shutdown always takes place from the burner's partial-load position. This prevents any impact on the gas main or in the combustion chamber.





*WK-series burners can be matched to a wide variety of applications – even under the hardest of conditions*

- |   |                                      |                                   |
|---|--------------------------------------|-----------------------------------|
| <b>1</b> Cover                                | <b>6</b> Ignition gas valve          | <b>11</b> Electrical junction box |
| <b>2</b> QRI flame monitoring                 | <b>7</b> Test burner with ball valve | <b>12</b> W-FM 100/200 with ABE   |
| <b>3</b> Housing cover with integrated gasket | <b>8</b> Double gas valve assembly   | <b>13</b> Air damper housing      |
| <b>4</b> Combustion head                      | <b>9</b> LP or HP gas supply         | <b>14</b> Air damper actuator     |
| <b>5</b> Burner housing                       | <b>10</b> Axial compensator          |                                   |

# Reliable and safe.

## Digital combustion management means optimal combustion figures, continuously reproducible setpoints, and ease of use.

Weishaupt WK-series gas, oil, and dual-fuel burners are equipped as standard with electronic compound regulation and digital combustion management. Today's modern combustion technologies demand a precise and continually reproducible dosing of fuel and combustion air. This is the only way to ensure optimal combustion figures over a long period of time.

## Simple operation

Setting and control of the burner is achieved using a control and display unit. This is linked to the combustion manager via a bus system, enabling the user-friendly setting of the burner. The control and display unit has a

clear text display with a choice of languages. An English / Chinese dual-screen version is available as an option if a Chinese-character display is desired.

## Features to save energy and increase safety and reliability

VSD provides several benefits. It facilitates a soft start of the burner fan, keeping the start current to a minimum, and matches the speed of the fan to combustion air volume during operation, which saves electrical energy and reduces noise emissions.

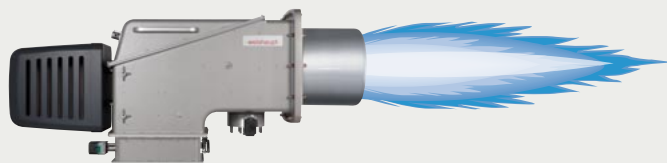
O<sub>2</sub> trim saves fuel by means of a continual and extremely efficient optimisation of the combustion air. The system is controlled by a Lambda probe, which continually measures the oxygen content of the flue gas.

CO monitoring executes a safety shutdown of the burner should a predefined CO limit be exceeded, thereby ensuring the very highest degree of safety.

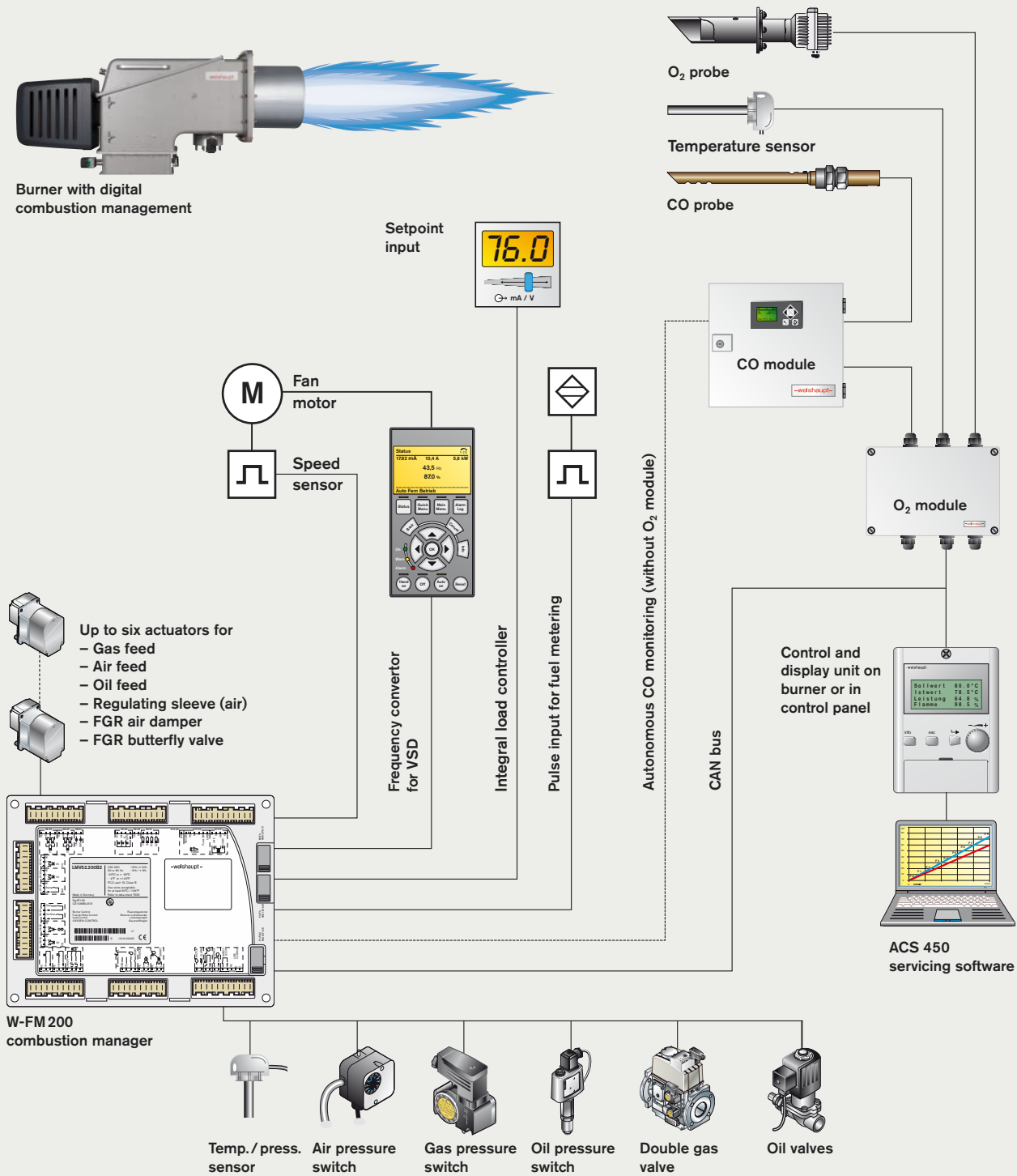
Combined CO control / O<sub>2</sub> trim ensures an ultimate degree of safety. CO emissions are continually monitored and, if the defined limit is exceeded, the burner is operated with an increased amount of excess air for a short period of time before the O<sub>2</sub> trim returns the burner to its preset O<sub>2</sub> setpoint. However, should external influences be preventing a non-critical condition from being reached, then the burner will undergo a controlled shutdown.

General system overview Digital combustion management	W-FM 100	W-FM 200	W-FM 1000 CMS
Single-fuel operation	●	●	●
Dual-fuel operation	●	●	●
Continuous firing >24 h	●	●	●
VSD –	●	●	
O <sub>2</sub> trim	–	●	●
CO monitoring	–	○	●
Combined O <sub>2</sub> trim and CO control	–	○	●
Temperature-compensated flue gas recirculation	–	○	●
LPG ignition unit activation (WKMS40–70)	●	●	●
LPG ignition burner activation (WK(G)MS80)	–	●	●
Gas oil ignition burner activation (WKMS80)	●	●	●
ION / QRI / QRA 73 flame sensor for continuous firing	●	●	●
W-FC 4.0 flame monitoring	●	●	●
W-FC 5.0 flame monitoring	–	●	●
Max. numbers of actuators in electronic compound	4	6	8
Gas valve proving	●	●	●
Integrated PID controller with automatic adaption. Pt / Ni temperature sensor, 0 / 2–10 V, and 0 / 4–20 mA inputs for temperature / pressure	○	●	● / ○
0 / 2–10 V and 0 / 4–20 mA setpoint input for temperature / pressure	○	●	● / ○
Configurable 0 / 4–20 mA analogue output	○	●	●
ABE control unit with 20 available languages (any one ABE limited to 6)	●	●	●
Dual-language / script ABE control unit (Chinese / English)	○	○	○
Removable ABE control unit (max. length of connecting bus line)	< 100 m	< 100 m	< 100 m
Fuel consumption meter (switchable)	–	●	●
Combustion efficiency display	–	●	●
eBUS / Modbus-RTU interface	●	●	○ / ●
PC-supported commissioning	●	●	●

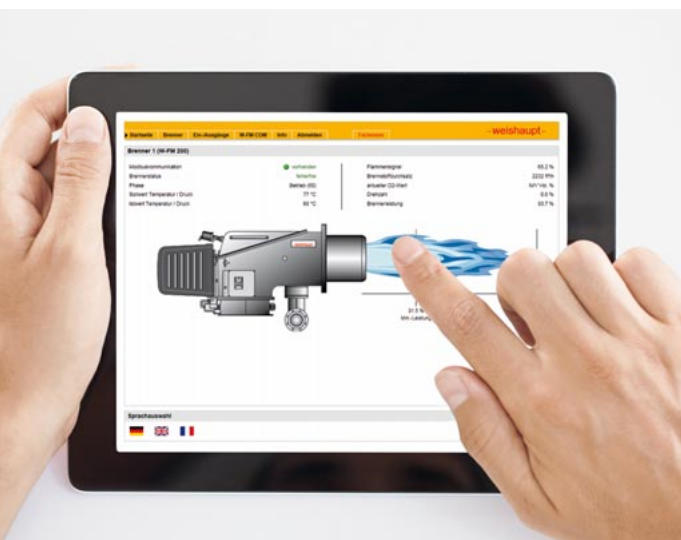
● Standard    ○ Optional    – Not available



Burner with digital combustion management



# Integration with building management.



*Remote monitoring made easy via tablet or laptop*

**Digital combustion managers provide the basis for burner communications with other, higher-level systems. The eBus and Modbus protocols are available through coupling components.**

All of the usual burner and, optionally, boiler functions can be monitored and controlled through a direct, digital connection to a building management system.

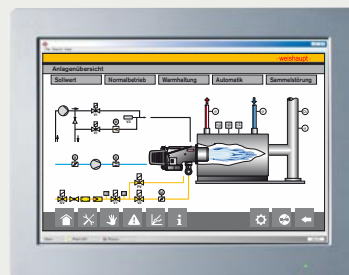
A graphical HMI is available to provide a user-friendly overview of the system with its setpoints and measured values. The touch-screen display allows specific functions to be adjusted and monitored, such as the system parameters and the setpoints of individual and multi-boiler plant and other ancillary equipment.

Controls specialists, Neuberger, are a part of the Weishaupt Group and they are able to design and implement complex control solutions.

Additional optional components enable connections to be made to systems using commonplace industrial standards, such as:

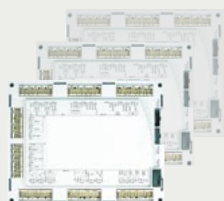
- Modbus TCP/IP
- Profinet I/O
- Modbus RTU
- BacNet
- etc.

Also available in Weishaupt's product range is the W-FM COM communications module. This transmits data securely over the internet so that it can be called up and displayed in a browser window on a PC, tablet, or smartphone, which facilitates accurate service planning for example. Even away from the internet you can be kept up to date with the operation of the burner: In the event of a safety shutdown or some other predefined trigger, an SMS text message will be sent automatically.



PC / touchscreen  
visualisation

W-FM combustion manager



ABE control and  
display unit



Optional dual-script  
display for ABE



CAN-Bus

Ethernet

Modbus RTU

Other burners



System networking via PLC / DDC

Various bus systems, e.g. Modbus TCP/IP, Profinet I/O

Gateway

W-FM COM communications module

Modbus RTU

Other burners

Digital / analogue  
inputs and outputs

GSM /  
web server

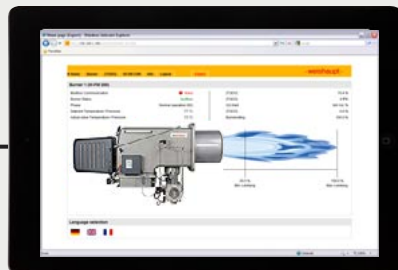
GSM aerial (optional)

LAN / W-LAN

Email  
SMS



Smartphone



Laptop /  
tablet

Various bus systems

Various bus systems

Optional

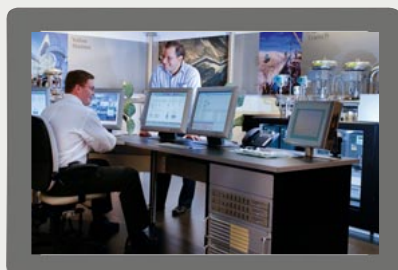


Null  
modem  
cable

- Commissioning support
- Fault analysis
- Data storage











Camera



SCADA  
Super Control and  
Data Acquisition

- Monitoring and alarms
- Read fault and lockout history
- Read process and meter values
- Controllable digital inputs and outputs
- Adjust setpoints

# The right mixing assembly for every application




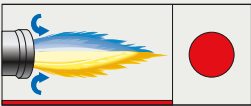

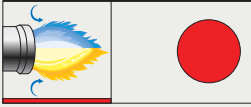

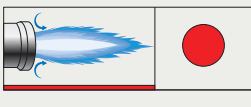

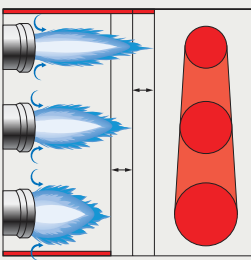
Mixing assembly type	Flame geometry		Burner type	Load-dependent air regulation in the M.A. 3)	Fuels				NO <sub>x</sub> Class <sup>1)</sup>		
	Length	Diameter			Natural gas	LPG	Gas oil	Residual oils	EN 676	LPG	EN 267
Maintenance-friendly construction: On all burner versions, the standard-length combustion head (i.e. the flame tube and mixing assembly) can be inserted and withdrawn through the service opening in the burner housing. To further assist removal, the mixing assemblies on WK 80 burners are guided by rail.											
<p><b>ZM(H)</b> Mixing assembly for gas, oil, and dual-fuel burners on plant with no particular NO<sub>x</sub> requirements.</p> <p><b>ZM(H) - NR</b> Mixing assembly for gas and dual-fuel burners.</p> <p>Provides a gas-side reduction in NO<sub>x</sub> emissions compared to ZM version burners.</p>			WK 40 WK 50 WK 70 WK 80/3  WK 50/1 WK 50/2 WK 70/1 WK 70/3 WK 80/3	✓ ✓ ✓ ✓  ✓ ✓ ✓ ✓ ✓	○ ○ - -  ○ ● ● ● ●	○ ○ ● ○  ○ ● ● ○ ○	○ ○ ○ ○  ○ ○ ○ ○ ○	- - - -  - 3 2 3 3	- - - -  - 3 3 3 3	- - 1 1  - 2 2 1 1	
<p><b>ZM(H) - LN</b> Low-NO<sub>x</sub> mixing assembly for gas burners.</p> <p>Provides a further reduction in NO<sub>x</sub> emissions compared to 1LN-version burners.</p>			WK 40	-	○	-	-	-	-	-	
<p><b>ZM(H) - 1LN</b> Low-NO<sub>x</sub> mixing assembly for gas and dual-fuel burners.</p> <p>Provides gas-side and oil-side reductions in NO<sub>x</sub> emissions.</p>			WK 50 WK 70	- -	○ ●	○ ●	○ ●	- -	3 3	- 2	
<p><b>ZM(H) - 3LN</b> Low-NO<sub>x</sub> mixing assembly for gas, oil, and dual-fuel burners.</p> <p>For plant with low gas-side and oil-side NO<sub>x</sub> requirements.</p>			WK 40 WK 50 WK 70 WK 80/1 WK 80/2	✓ ✓ ✓ ✓ ✓	● ● ● ● ○	● ● ● ● -	- - - - -	3 3 3 3 -	- -	3 3 3 3 -	

● With type approval ○ Without type approval - Not available

<sup>1)</sup> Combustion-air temperatures < 40 °C

<sup>2)</sup> Minimum requirements for the combustion chamber geometry must be agreed with Max Weishaupt GmbH, Schwendi

<sup>3)</sup> M.A. = Mixing assembly

Mixing assembly type	Flame geometry	Burner type	Load-dependent air regulation in the M.A. <sup>3)</sup>	Fuels				NO <sub>x</sub> Class <sup>1)</sup>		
				Natural gas	LPG	Gas oil	Residual oils	EN 676	EN 267	EN 267
	Length 	Diameter 								
<b>ZM(H)-4LN</b> Low-NO <sub>x</sub> mixing assembly for gas and dual-fuel burners with flue gas recirculation.  For plant with ultra-low NO <sub>x</sub> requirements when firing on gas and low NO <sub>x</sub> requirements when firing on oil. Lowest NO <sub>x</sub> emissions in comparison with all other versions. 		WK 40 WK 50 WK 70 WK 80	- ✓ ✓ ✓	● ● ● ●	- - - -	- ● ● ●	- - - -	3 3 3 3	- - - -	- 3 3 3
<b>ZM(H) - 1SF</b> Swirl-flame mixing assembly for gas, oil, and dual-fuel burners.  For plant with extremely short combustion chambers, such as water-tube boilers. 		WK 50/2 WK 70 WK 80/3	✓ ✓ ✓	○ ○ ○	- - -	○ ○ ○	○ ○ ○	- - -	- - -	- - -
<b>ZM(H) - 3SF</b> Swirl-flame mixing assembly for gas burners.  For plant with longer combustion chambers. The flame length is comparable to the NR version. 		WK 80/6	✓	○	-	-	-	-	-	-
<b>ZM(H) - VSF</b> Swirl-flame mixing assembly for gas burners.  For plant with extremely short combustion chambers or with elongated, D-type combustion chambers with low cross-sectional loads. Internal fittings (circular blanks) can be used to optimise flame geometry. <sup>2)</sup> 		WK 80/4 WK 80/5	✓ ✓	● ●	● -	- -	- -	3 2	3 -	- -

● With type approval ○ Without type approval - Not available

## EN 676 / EN 267 emission classes

Fuel	Natural Gas (EN 676)			LPG (EN 676)			Gas Oil (EN 267)		
Emission Class	1	2	3	1	2	3	1	2	3
NO <sub>x</sub> emissions in mg/kWh	≤ 170	≤ 120	≤ 80	≤ 230	≤ 170	≤ 140	≤ 250	≤ 185	≤ 120



# Use

## Fuels

- Natural gas
- LPG
- Class D gas oil per BS 2869/IS 251
- Class A2 gas oil per BS 2869/IS 251
- Class E LFO per BS 2869/IS 251
- Class F MFO oil per BS 2869/IS 251
- Class G HFO oil per BS 2869/IS 251
- Class H fuel oil per BS 2869/IS 251<sup>1)</sup>
- Green fuels

<sup>1)</sup> Max. kinematic viscosity 50 mm<sup>2</sup>/s at 100 °C  
(approx 570 mm<sup>2</sup>/s at 50 °C)

## Applications

Weishaupt WK-series burners are suitable for intermittent firing and continuous firing on:

- LTHW boilers
- HTHW boilers
- Steam boilers
- Air heaters
- Thermal fluid heaters
- Process applications

## Burner mounting position

When installed horizontally, the burner can be positioned in 90° rotational increments to suit a combustion air supply from above, below, or either side. The burner can also be installed to fire vertically upwards or downwards (please refer to the WK Planning Handbook, Print No. 83112402, for further details and exceptions).



## Permissible ambient conditions

- Ambient temperature
  - 15 °C to +40 °C for gas firing
  - 10 °C to +40 °C for oil firing
- Combustion air temperature up to 250 °C for ZMH-version burners
- Maximum 80 % relative humidity, no condensation
- Combustion air must be free of aggressive substances (halogens, chlorides, fluorides, etc.) and impurities (dust, debris, vapours, etc.)
- Adequate ventilation must be ensured for operation in enclosed spaces
- For plant in unheated areas, certain further measures may be required

Use of the burner for other applications or in ambient conditions not detailed above is not permitted without the prior written agreement of Max Weishaupt GmbH. Service intervals will be reduced in accordance with the more extreme operational conditions.

## Protection class

IP 54

## EU directives and regulations

The burners are independently tested and certified by a Notified Body. They fulfil the applicable requirements of the following EU directives and regulations:

<b>EMC</b>	EMC Directive 2014/30/EU
<b>LVD</b>	Low-Voltage Directive 2014/35/EU
<b>MD</b>	Machinery Directive 2006/42/EC
<b>GAR</b>	Gas Appliance Regulations (EU) 2016/426
<b>PED<sup>2)</sup></b>	Pressure Equipment Directive 2014/68/EU
<b>RoHS</b>	Restriction of Hazardous Substances Directive 2011/65/EU

<sup>2)</sup> With the appropriate choice of equipment.

The relevant applied standards are detailed in the declaration of conformity.

All burners are labelled with:

- CE mark

Type-tested gas burners are labelled with:

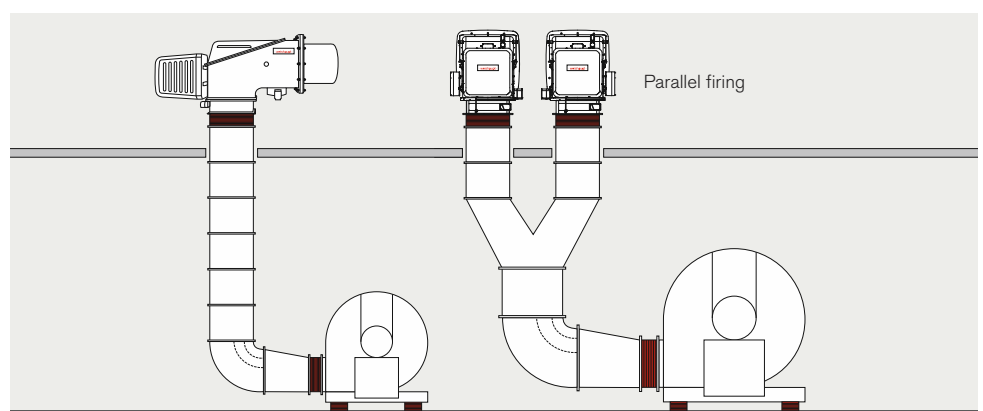
- CE-PIN per Regulation (EU) 2016/426
- Identification number of the Notified Body

Type-tested oil burners are labelled with:

- DIN CERTCO label and Reg. No.

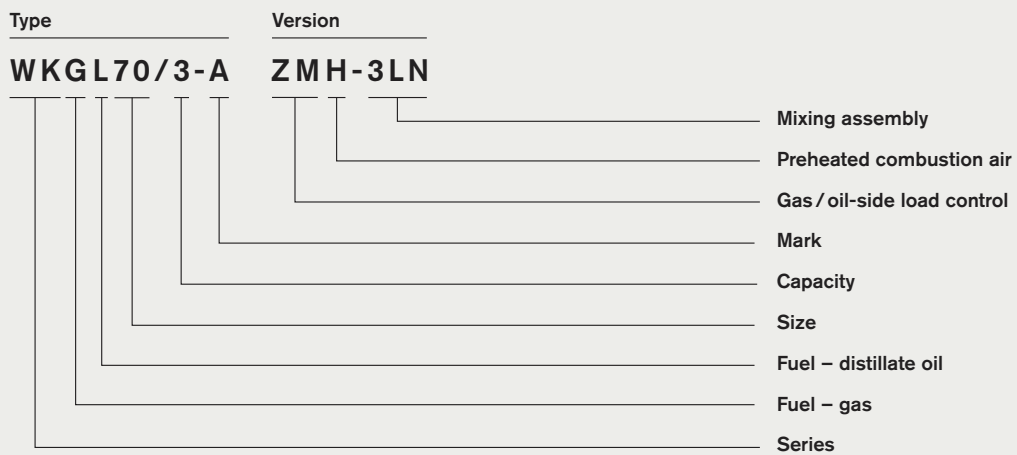
Type-tested dual-fuel (gas/oil) burners are labelled with:

- CE-PIN per Regulation (EU) 2016/426
- Identification number of the Notified Body
- DIN CERTCO label and Reg. No.



Combustion air ducting

## Model designation



Details	Code	Meaning	Associated fuel
Series	<b>WK</b>	<b>Weishaupt duoblock burner</b>	
Fuel	<b>G</b> <b>L, MS</b>	<b>Natural gas / LPG</b> <b>Gas oil, residual oils</b>	
Load control	<b>ZM</b>	<b>Sliding-two-stage / modulating</b>	<b>Gas / oil</b>
Mixing assembly	<b>–</b> <b>NR</b> <b>LN</b> <b>1LN</b> <b>3LN</b> <b>4LN</b> <b>1SF</b> <b>3SF</b> <b>VSF</b>	<b>Standard</b> <b>NO<sub>x</sub> Reduced (gas-side)</b> <b>LowNO<sub>x</sub></b> <b>LowNO<sub>x</sub></b> <b>multiflam®</b> <b>multiflam® for FGR</b> <b>Swirlflame</b> <b>Swirlflame</b> <b>Variable swirlflame</b>	<b>Gas / oil</b> <b>Gas / oil</b> <b>Gas</b> <b>Gas / oil</b> <b>Gas / oil</b> <b>Gas / oil</b> <b>Gas / oil</b> <b>Gas</b> <b>Gas</b>
Additional	<b>H</b>	<b>Preheated combustion air</b>	<b>Gas / oil</b>



# Load control

## WK40–80

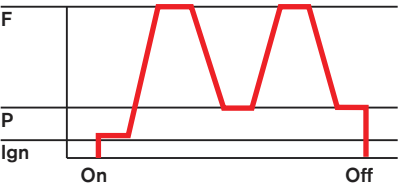
### Gas and oil-fired operation

Weishaupt WK-series burners can have sliding-two-stage or modulating operation when firing gas or oil, depending on the method of load control employed.

#### Sliding-two-stage (ZM)

- The burner is driven, via a two-point signal (e.g. thermostat or pressure control), to full or partial load in response to heat demand. Combustion remains CO and soot-free between load points.

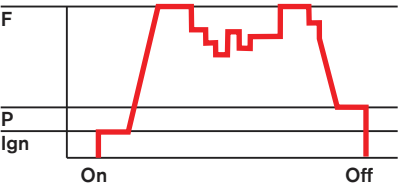
Sliding-two-stage



#### Modulating (ZM)

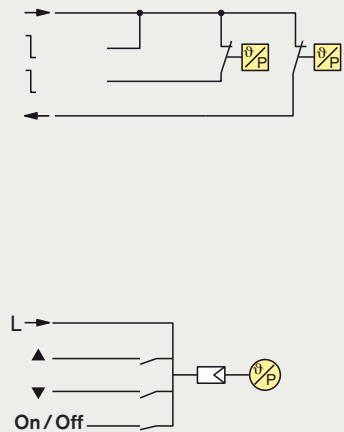
- An electronic controller makes infinitely variable load adjustments in response to heat demand.
- Available modulating executions:
  - W-FM 100 with optional load controller
  - W-FM 200 with standard load controller
- Alternatively, a controller can be mounted in a separate control panel.

Modulating



F = Full load (nominal load)  
P = Partial load (min. load)  
Ign = Ignition load

Control <sup>1)</sup>



<sup>1)</sup> Alternatively, staged load control can also be effected by an electronic PID controller. In this case, suitable temperature sensors or pressure transducers will be required.

# Maximum turndown

## Gas burners

Burner, version <sup>1)</sup>	Natural gas	LPG <sup>2)</sup>		
WK40, standard	6:1	5:1		
WK40-70, NR / 1LN / 3LN / 4LN	8:1	6:1		
WK50-70, 1SF	8:1	6:1		
WK80, 3LN / 4LN / VSF / 3SF	8:1	6:1		

<sup>1)</sup> Not every mixing assembly version is available for each burner size.

<sup>2)</sup> Not every mixing assembly version is suitable for LPG.

## Oil burners

Burner, version <sup>1)</sup>			Distillate oil	Residual oil
WK40-50, standard			4:1	3:1
WK70-80, standard			5:1	3.5:1
WK40-80, 3LN			5:1	–
WK50-80, 1SF			4:1	3:1

<sup>1)</sup> Not every mixing assembly version is available for each burner size.

## Dual-fuel burners

Burner, version <sup>1)</sup>	Natural gas	LPG <sup>2)</sup>	Distillate oil	Residual oil <sup>3)</sup>
WK40-50, standard / NR / 3LN / 4LN	6:1	5:1	4:1	3:1
WK70-80, standard / NR / 1LN / 3LN / 4LN	8:1	6:1	5:1	3.5:1
WK50-80, 1SF	8:1	6:1	4:1	3:1

<sup>1)</sup> Not every mixing assembly version is available for each burner size.

<sup>2)</sup> Not every mixing assembly version is suitable for LPG.

<sup>3)</sup> Not suitable for 1LN or multiflam® 3LN / 4LN.

### Constraints:

Without excess air limitations. Combustion values not guaranteed through the entire turndown range. All operational points must lie within the burner's capacity chart. Higher turndowns may be achievable in certain cases (subject to agreement with Max Weishaupt GmbH, Schwendi).

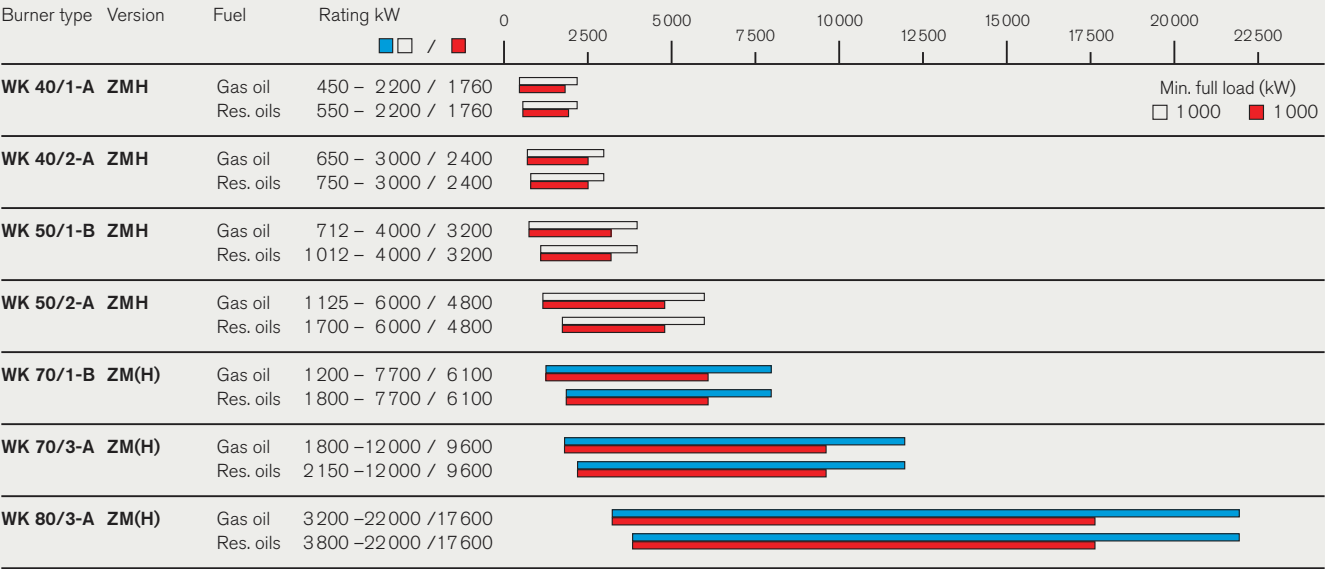


# Operating ranges

## Oil burners

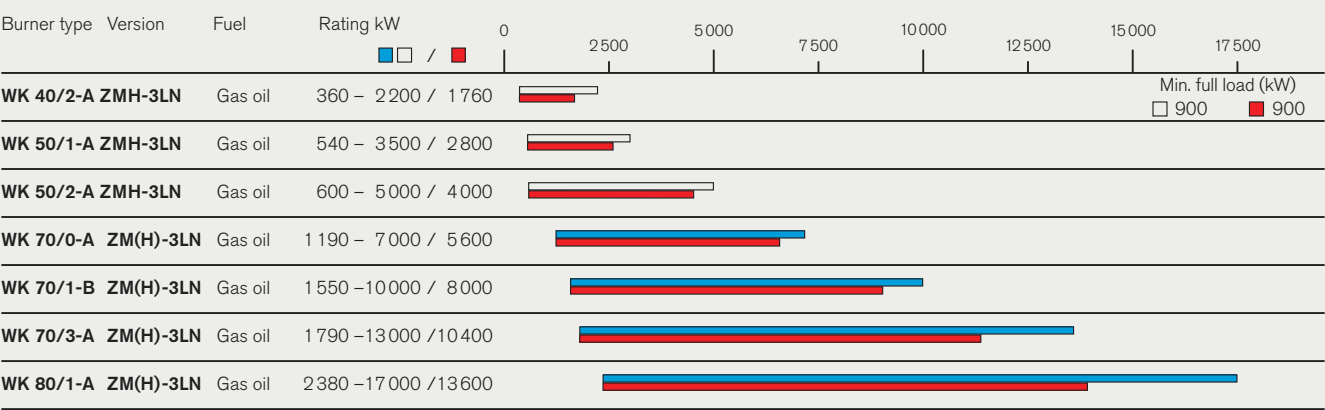
### Standard version

#### WKL and WKMS gas oil and residual oil burners



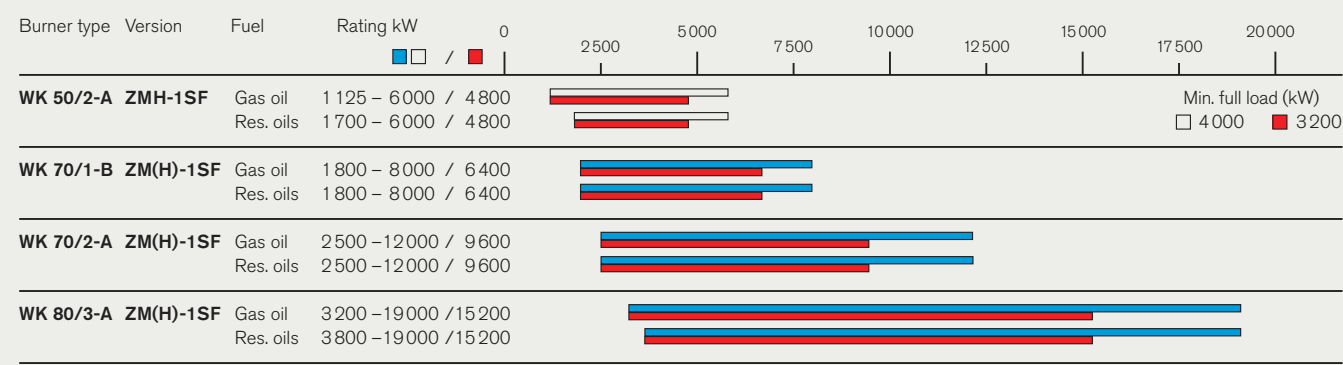
### 3LN multiflam® version

#### WKL gas oil burners (WKGL-based)



1SF version

WKL and WKMS gas oil and residual oil burners



Burner-selection criteria:

The minimum full-load rating within a burner's capacity range corresponds to the maximum rating of the next-smallest size of the same version burner. Please refer to the planning and installation handbook for fan selection and arrangement, gas valve trains, special equipment, technical data, and dimensions.

- Version ZM:

□ Version ZMH:

■ Version ZMH
- Combustion air temperatures up to 40 °C

Combustion air temperatures up to 40 °C

Combustion air temperatures up to 250 °C

Burner ratings can be interpolated linearly for combustion air temperatures between 40 °C and 250 °C.

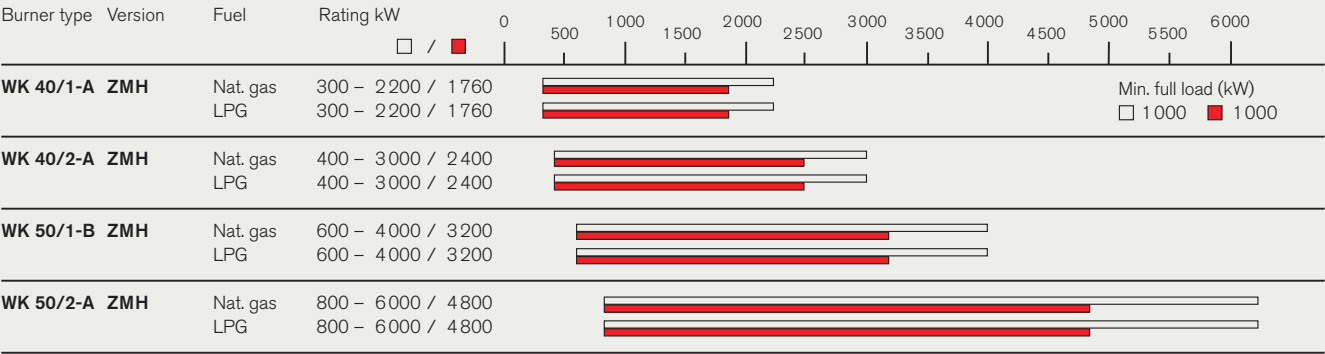


# Operating ranges

## Gas burners

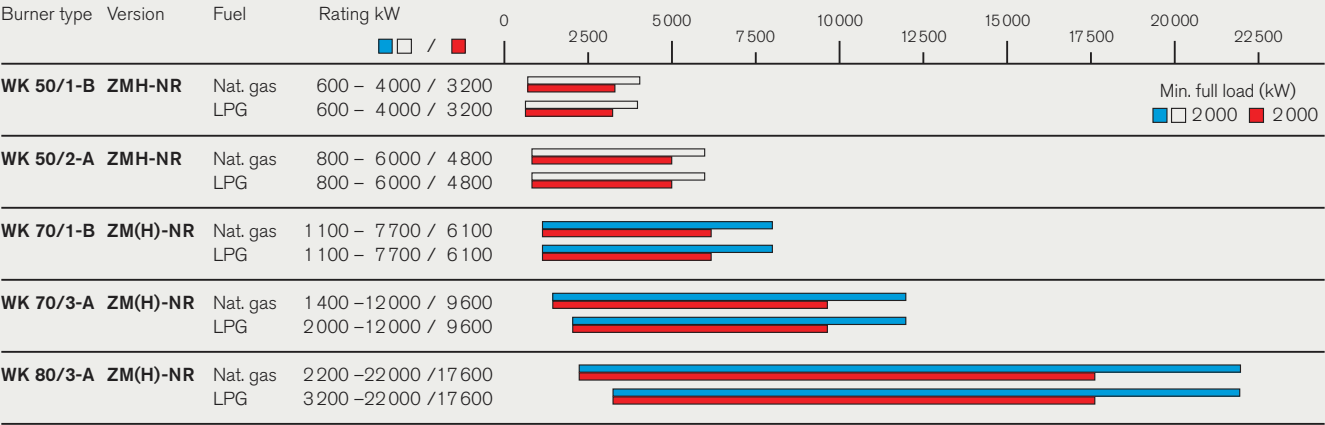
### Standard version

#### WKG natural gas and LPG burners



### NR version

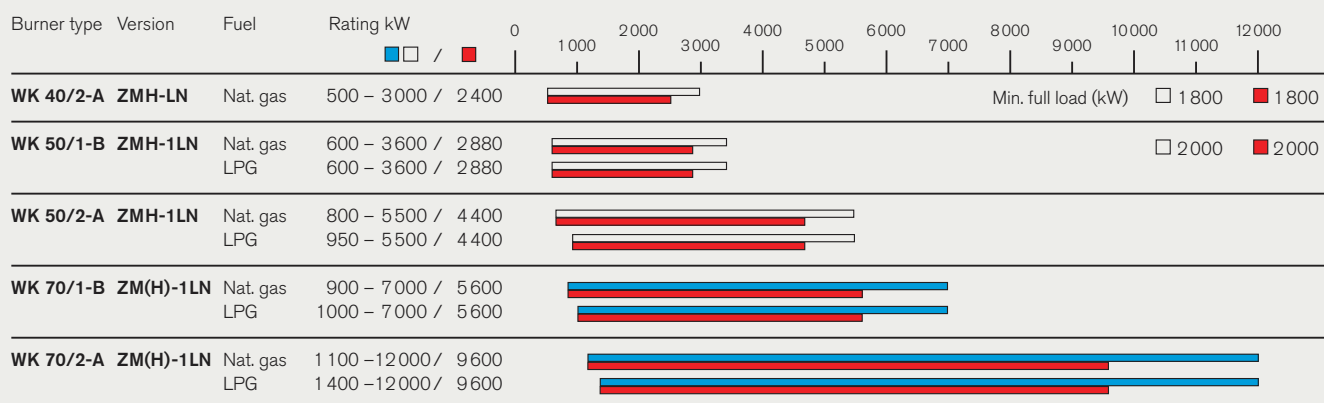
#### WKG natural gas and LPG burners





## LN / 1LN versions

### WKG natural gas and LPG burners



#### Burner-selection criteria:

The minimum full-load rating within a burner's capacity range corresponds to the maximum rating of the next-smallest size of the same version burner. Please refer to the planning and installation handbook for fan selection and arrangement, gas valve trains, special equipment, technical data, and dimensions.

- Version ZM: Combustion air temperatures up to 40 °C
- Version ZMH: Combustion air temperatures up to 40 °C
- Version ZMH: Combustion air temperatures up to 250 °C

Burner ratings can be interpolated linearly for combustion air temperatures between 40 °C and 250 °C.

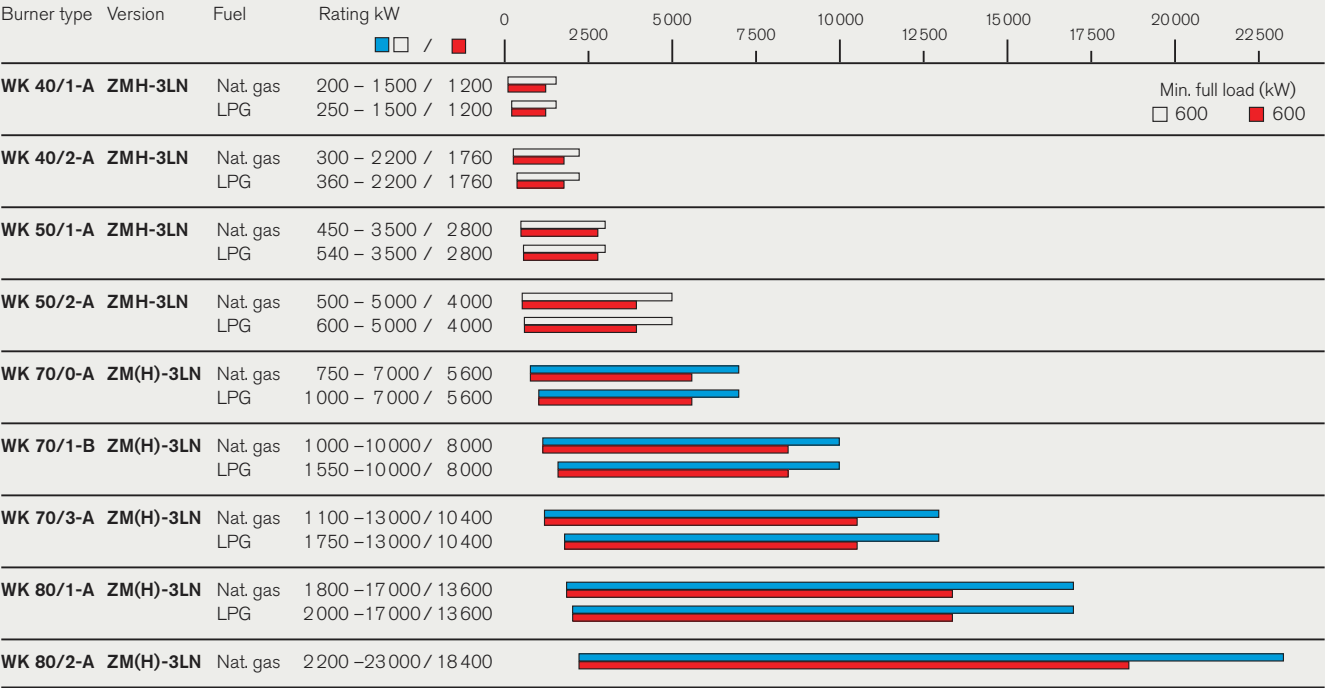


# Operating ranges

## Gas burners

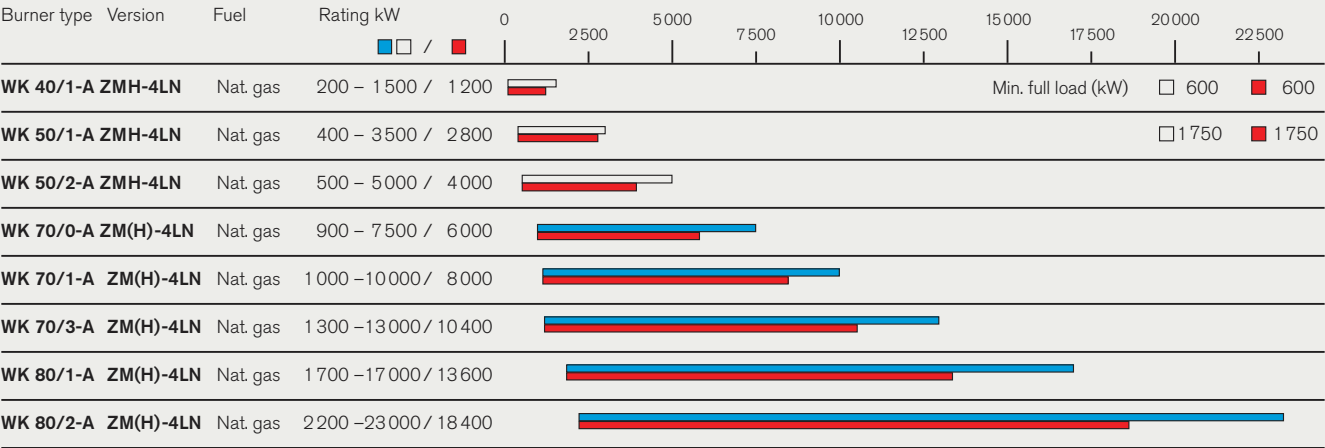
### 3LN multiflam® version

#### WKG natural gas and LPG burners



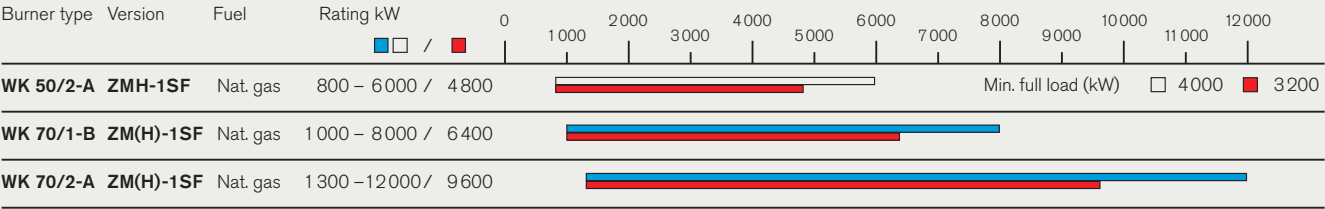
### 4LN multiflam® version for flue gas recirculation

#### WKG natural gas burners



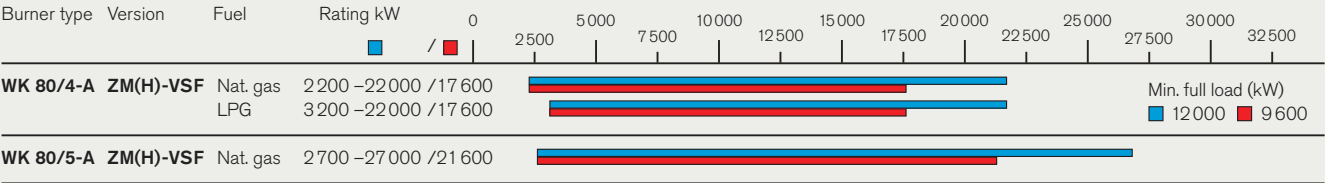
# 1SF version

## WKG natural gas burners



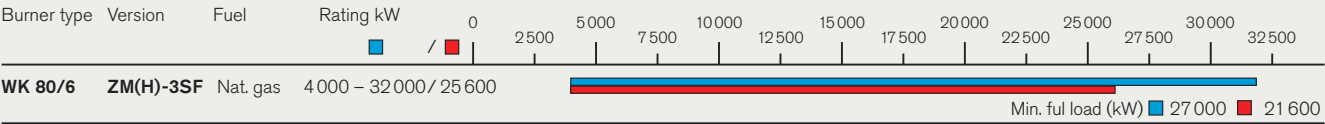
# VSF version

## WKG natural gas and LPG burners



# 3SF version

## WKG natural gas burners



### Burner-selection criteria:

The minimum full-load rating within a burner's capacity range corresponds to the maximum rating of the next-smallest size of the same version burner. Please refer to the planning and installation handbook for fan selection and arrangement, gas valve trains, special equipment, technical data, and dimensions.

### Note for 4LN burners:

The hot-air version (ZMH-4LN) must be used if the mixing temperature of the combustion air and flue gas is greater than 80 °C.

- Version ZM: Combustion air temperatures up to 40 °C
- Version ZMH: Combustion air temperatures up to 40 °C
- Version ZMH: Combustion air temperatures up to 250 °C

Burner ratings can be interpolated linearly for combustion air temperatures between 40 °C and 250 °C.

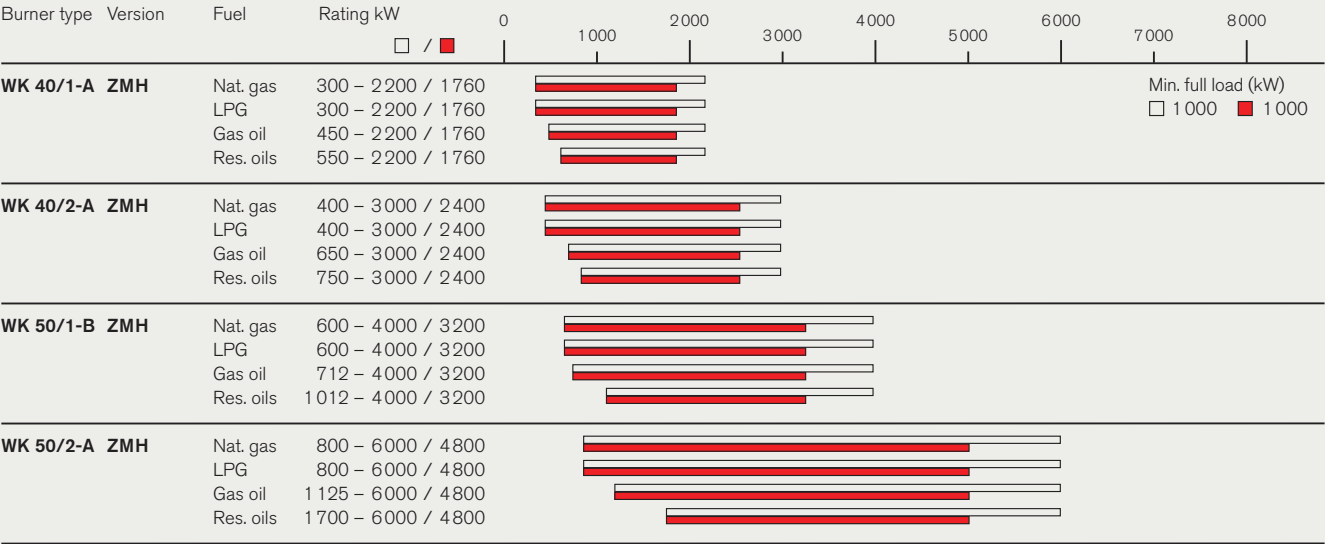


# Operating ranges

## Dual-fuel burners

### Standard version

#### WKGL and WKGMS dual-fuel burners



## NR version

### WKGL and WKGMS dual-fuel burners



#### Burner-selection criteria:

The minimum full-load rating within a burner's capacity range corresponds to the maximum rating of the next-smallest size of the same version burner. Please refer to the planning and installation handbook for fan selection and arrangement, gas valve trains, special equipment, technical data, and dimensions.

- Version ZM: Combustion air temperatures up to 40 °C
- Version ZMH: Combustion air temperatures up to 40 °C
- Version ZMH: Combustion air temperatures up to 250 °C

Burner ratings can be interpolated linearly for combustion air temperatures between 40 °C and 250 °C.

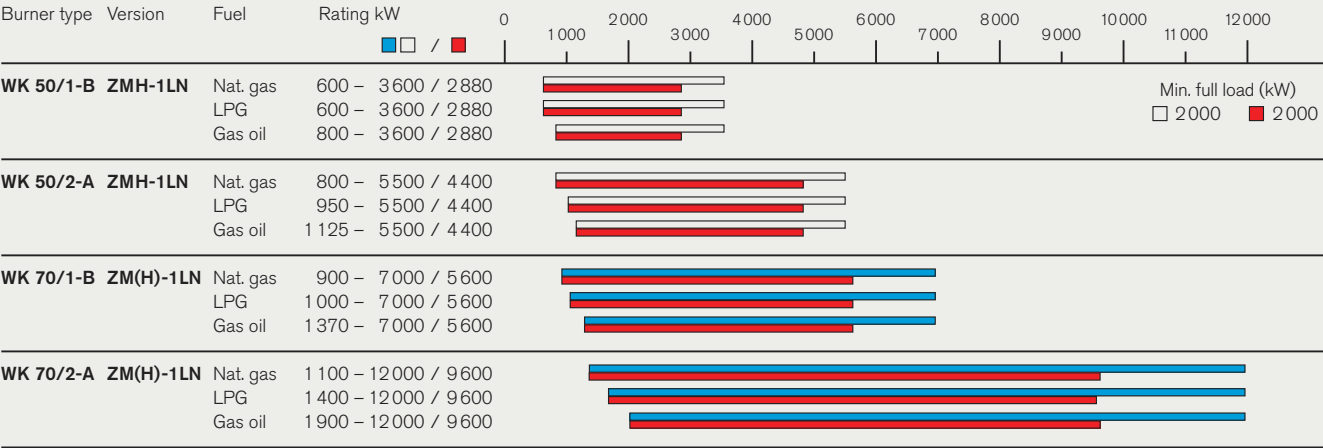


# Operating ranges

## Dual-fuel burners

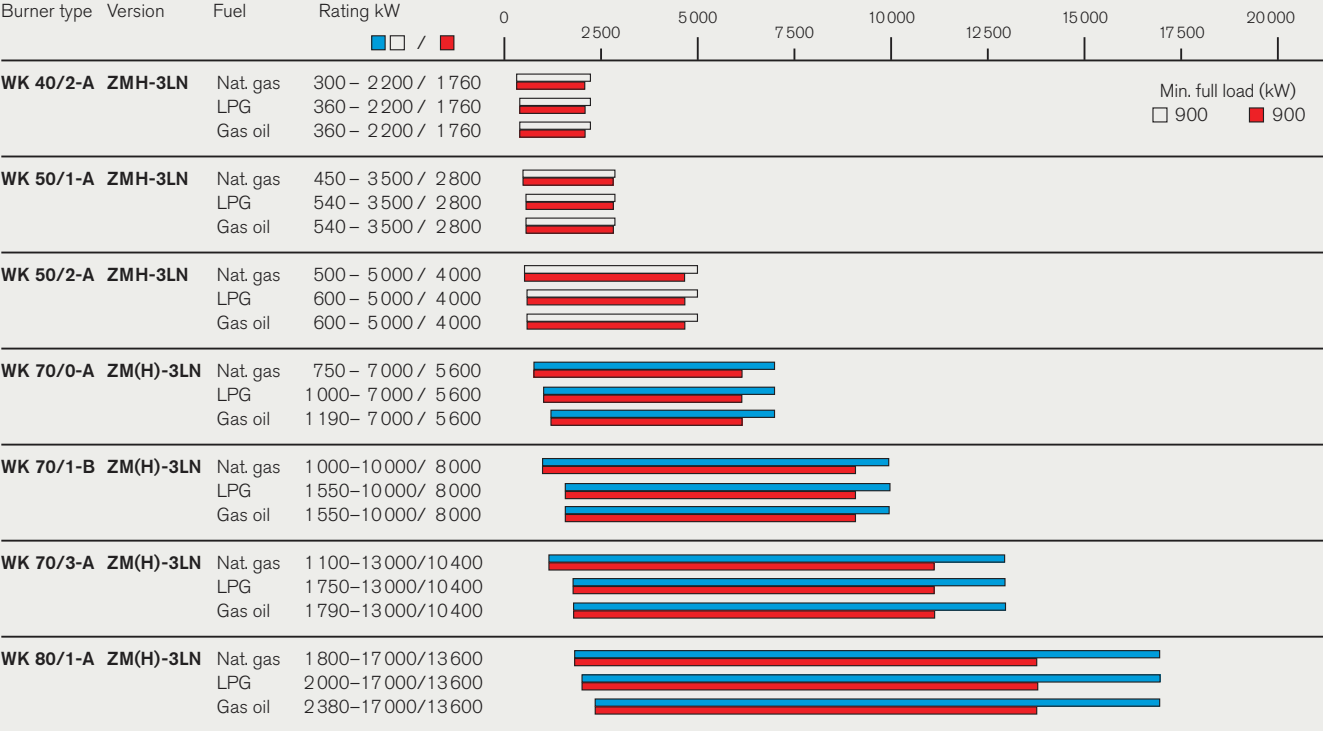
### 1LN version

#### WKGL dual-fuel burners



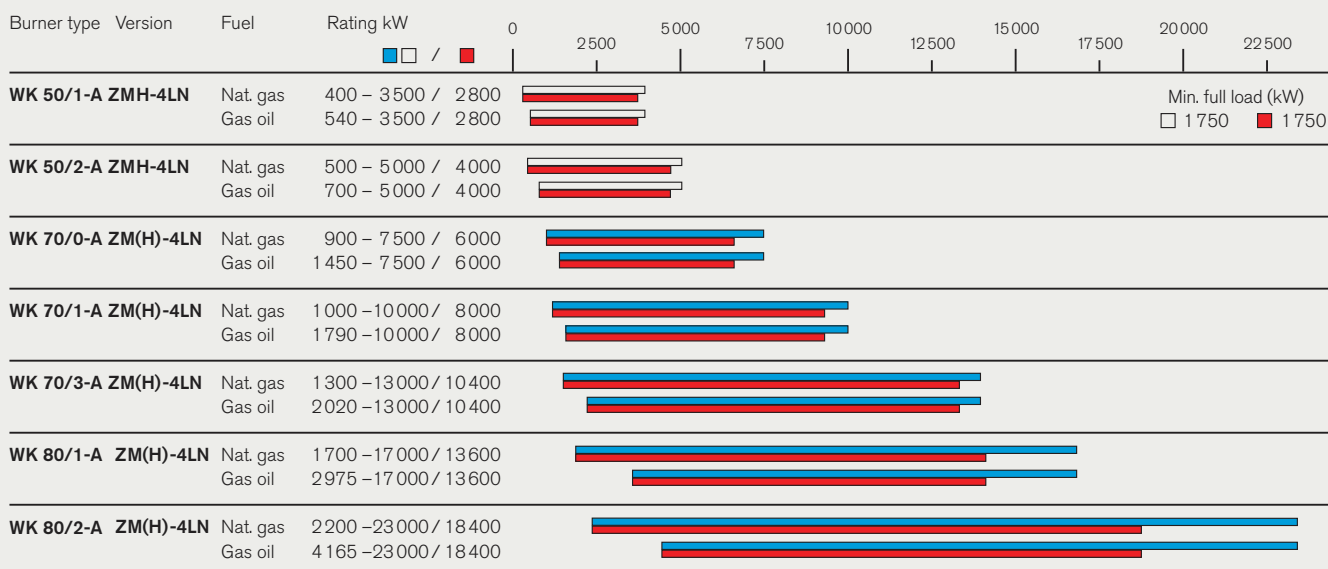
### 3LN multiflam® version

#### WKGL dual-fuel burners



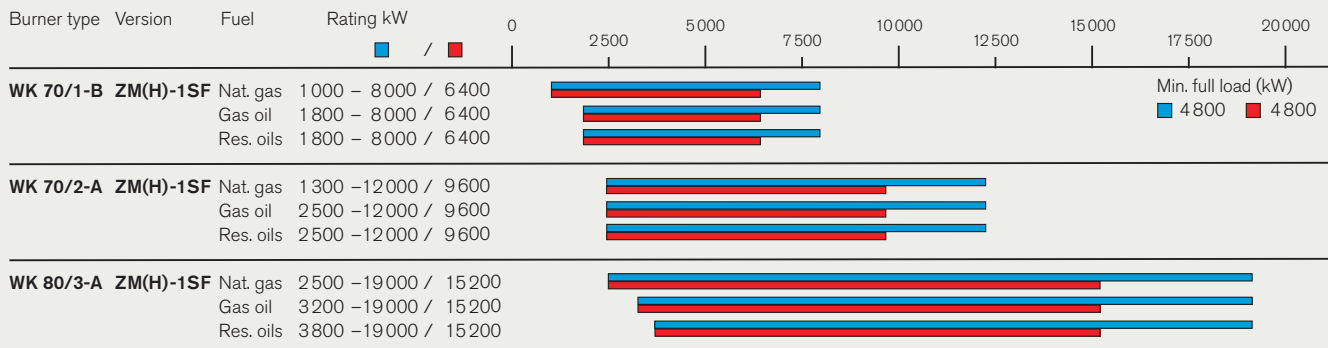
## 4LN multiflam® version for flue gas recirculation

### WKGL dual-fuel burners



## 1SF version

### WKGL and WKGMS dual-fuel burners



#### Burner-selection criteria:

The minimum full-load rating within a burner's capacity range corresponds to the maximum rating of the next-smallest size of the same version burner. Please refer to the planning and installation handbook for fan selection and arrangement, gas valve trains, special equipment, technical data, and dimensions.

#### Note for 4LN burners:

The hot-air version (ZMH-4LN) must be used if the mixing temperature of the combustion air and flue gas is greater than 80 °C.

- Version ZM:
- Version ZMH:
- Version ZMH

Combustion air temperatures up to 40 °C  
Combustion air temperatures up to 40 °C  
Combustion air temperatures up to 250 °C

Burner ratings can be interpolated linearly for combustion air temperatures between 40 °C and 250 °C.



# Fuel systems

## Gas and dual-fuel burners (gas side)

Limits						LP1	LP2	LP3	HP		
									Standard	So	SoH
Gas flow pressure into shutoff valve at maximum burner load						≤ 300 <sup>1)</sup> mbar	≤ 300 <sup>1)</sup> mbar	300–500 mbar	300–10 000 <sup>2)</sup> mbar		
Setting pressure p <sub>d</sub>						≤ 200 mbar	≤ 250 mbar	≤ 360 mbar	≤ 210 mbar	210–350 mbar	350–500 mbar
Maximum operating pressure (MOP) of the gas supply						500 mbar	500 mbar	700 mbar	1 000 / 5 000 / 10 000 / 16 000 <sup>3)</sup> mbar		
Minimum MOP rating for components downstream of the gas pressure regulator						500 mbar	500 mbar	700 <sup>4)</sup> mbar	500 mbar	500 mbar	700 <sup>4)</sup> mbar
Minimal valve train diameter	Gas valve assembly type	WK burner size				Low-pressure supply with FRS regulator	Low-pressure supply with SKP25 regulator on the VGD valve block	Low-pressure supply with SKP25 regulator on the VGD valve block	High-pressure supply with HP regulator		
		40	50	70	80						
1 1/2"	W-MF 512	●				●			●		
2"	DMV 525/12	●	●			●			●		
DN65	DMV 5065/12	●	●	●		●			●	●	
DN80	DMV 5080/12	●	●	●	●	●			●	●	
DN100	DMV 5100/12	●	●	●	●	●			●	●	
DN125	VGD 40.125	●	●	●		●			●		
					●	●	●	● <sup>4)</sup>	●	●	● <sup>4)</sup>
DN150	VGD 40.150		●	●		●			●		
					●	●	●	● <sup>4)</sup>	●	●	● <sup>4)</sup>

<sup>1)</sup> See page 27 for exceptions

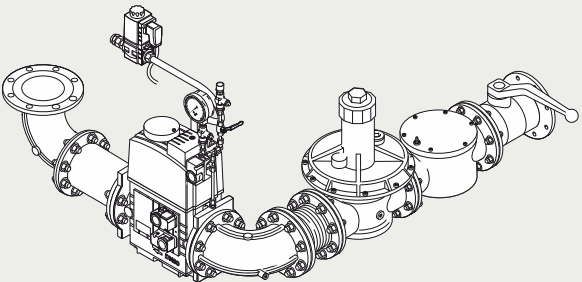
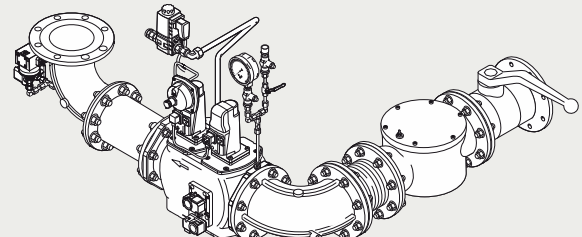
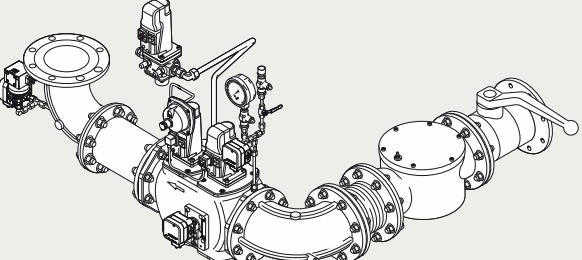
<sup>2)</sup> Dependent on the MOP of the high-pressure gas regulator

<sup>3)</sup> Specific MOP depends on high-pressure gas regulator type

<sup>4)</sup> Requires the use of pressure switches and ignition gas valves rated for ≥ 700 mbar MOP

# Valve train selection

## Notes on low-pressure (LP) gas supplies

LP1	<p><b>Low-pressure gas supply with FRS regulator</b></p> <p>Used when:</p> <ul style="list-style-type: none"> <li>– The gas flow pressure at maximum burner load is <math>\leq 300</math> mbar.<sup>1)</sup></li> <li>– The regulated pressure <math>p_d</math> together with the combustion chamber resistance does not exceed 200 mbar.</li> <li>– The MOP <sup>2)</sup> does not exceed 500 mbar.</li> </ul>	
LP2	<p><b>Low-pressure gas supply with SKP25 regulator</b></p> <p>For VGD valve assemblies. Used when:</p> <ul style="list-style-type: none"> <li>– The gas flow pressure at maximum burner load is <math>\leq 300</math> mbar.<sup>1)</sup></li> <li>– The regulated pressure <math>p_d</math> together with the combustion chamber resistance does not exceed 250 mbar.</li> <li>– The MOP <sup>2)</sup> does not exceed 500 mbar.</li> </ul>	
LP3	<p><b>Low-pressure gas supply with SKP25 regulator</b></p> <p>For VGD valve assemblies. Used when:</p> <ul style="list-style-type: none"> <li>– The gas flow pressure at maximum burner load is in the range of 300–500 mbar.</li> <li>– The regulated pressure <math>p_d</math> together with the combustion chamber resistance does not exceed 360 mbar.</li> <li>– The MOP <sup>2)</sup> does not exceed 700 mbar.</li> </ul>	

### Arrangement of the gas valve train on vertical burner installations

The "offset gas butterfly and valve assembly" option is very strongly recommended because of the increased heat radiation that stems from vertical boiler designs and the high temperatures of media such as thermal fluid.

### Support of the valve train

The gas valve train should be properly supported in accordance with the site conditions. Please refer to the Weishaupt accessories list for various valve train support components.

### Compensator

To enable a tension-free mounting of the valve train, the inclusion of an axial compensator is strongly recommended.

### Gas meter

A gas meter must be installed to enable the measurement of gas consumption during burner commissioning and servicing.

### Thermal shutoff device (when required by local regulations)

The optional thermal shutoff is integrated into the ball valve of screwed valve trains. On flanged valve trains, it is a separate component with HTB seals that is fitted before the inlet ball valve.

### Safeguarding of the high-pressure gas supply in the event of a failure

The gas supplier must safeguard the gas flow pressure such that, in the event of failure, it cannot exceed the MOP <sup>2)</sup> of the burner's gas valve train.

### <sup>1)</sup> Exceptions

Normally, valve train layouts LP1 and LP2 are used for gas flow pressures up to a maximum of 300 mbar. This allows for pressure losses between the transfer station and the valve train. Furthermore, it is assumed that the transfer station will be utilising components (SSV, SRV, regulator) that are not of the highest class of accuracy. In individual cases however, following consideration and approval by Max Weishaupt GmbH in Schwendi, a gas flow pressure of up to 360 mbar can be approved, provided that appropriate conditions exist.

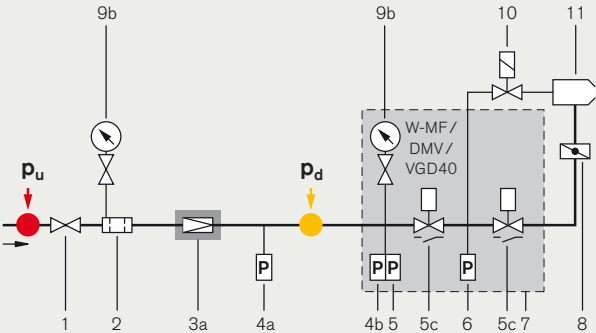
<sup>2)</sup> MOP = Maximum Operating Pressure

Fuel systems

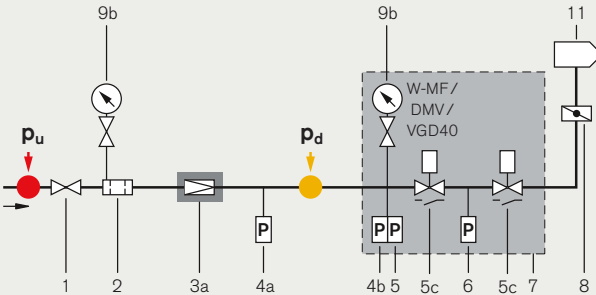
Gas and dual-fuel  
burners (gas side)

LP1

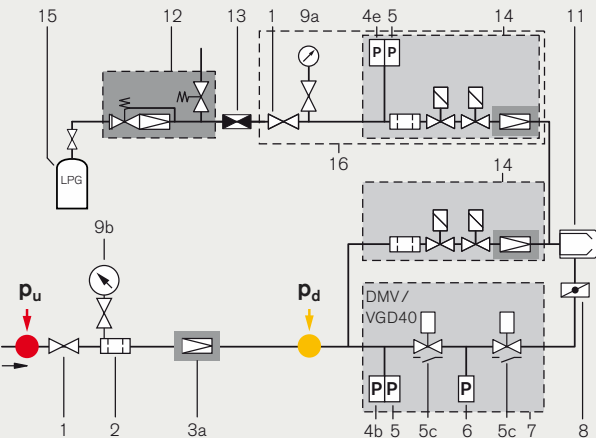
WKG(L) 40–80, WKGMS 40–70  
versions ZM / NR / 1LN / 3LN / 4LN / 1SF / VSF



WKG 40  
versions LN / 3LN / 4LN

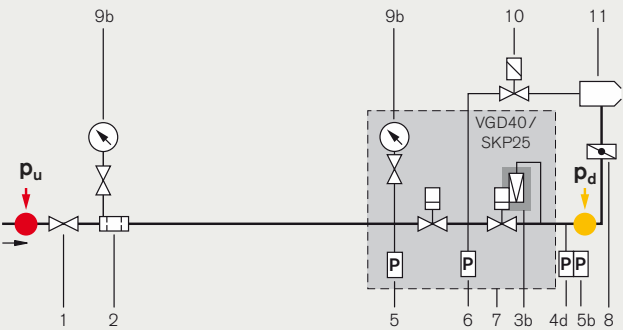


WKGMS 80  
versions NR / 1SF

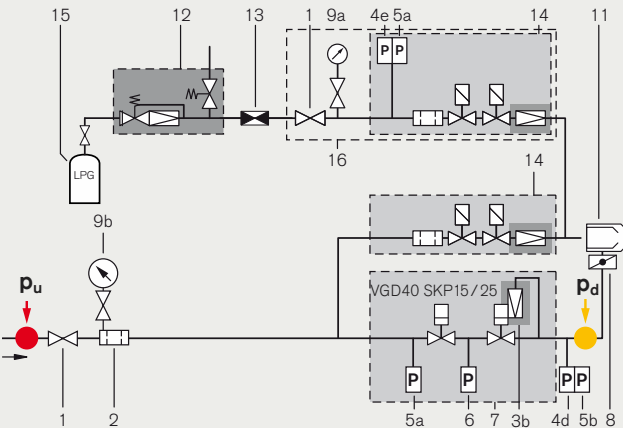


LP2

WKG(L) 80  
versions NR / 3LN / 4LN / 1SF / VSF / 3SF



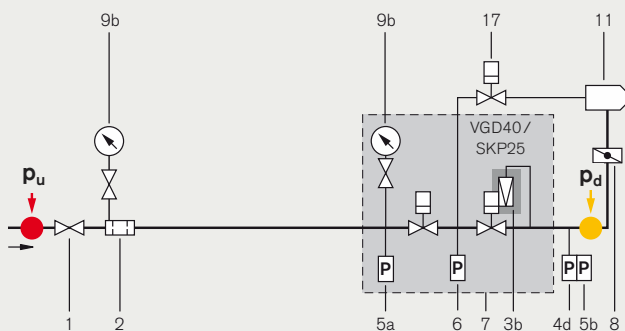
WKGMS 80  
versions NR / 1SF



## LP3

### WKG(L) 80

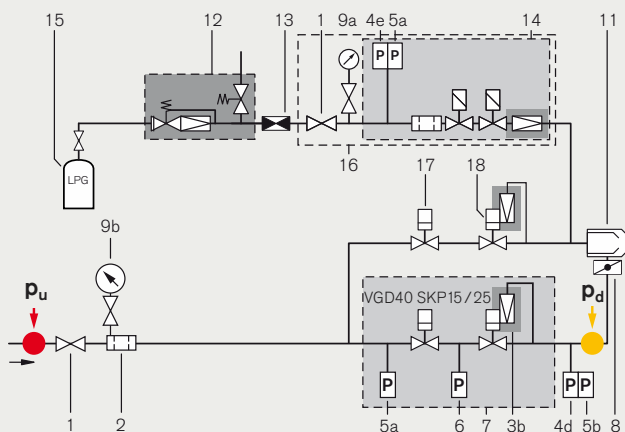
versions NR / 3LN / 4LN / 1SF / VSF / 3SF



- 1 Ball valve
- 2 Gas filter
- 3a Low-pressure FRS regulator
- 3b Low-pressure SKP25 regulator
- 4a High gas pressure switch on screwed valve trains (mounted immediately after the regulator)
- 4b High gas pressure switch on flanged valve trains (mounted on the valve assembly inlet)
- 4d High gas pressure switch on flanged valve train (mounted on the elbow)
- 4e High gas pressure switch (mounted on the LPG ignition burner assembly)
- 5 Low gas pressure switch
- 5a Low gas pressure switch (mounted on the valve assembly inlet)
- 5b Additional low gas pressure switch in conjunction with VGD40 and SKP15 & 25 (mounted on the elbow)
- 5c "Open" position indicator switch in conjunction with VGD40 and 2x SKP15
- 6 Valve proving pressure switch (mounted on the valve assembly)
- 7 Double gas valve assembly
- 8 Gas butterfly valve
- 9a Pressure gauge with push-button valve (standard)
- 9b Pressure gauge with push-button valve (accessory)
- 10 SV-D ignition gas solenoid valve
- 11 Burner
- 12 LPG pressure regulator (accessory)
- 13 Hose rupture protection (accessory)
- 14 W-MF SE multi-function assembly
- 15 LPG tank (by others)
- 16 Sub-assembly fitted to burner at works
- 17 VGG10 ignition gas valve with SKP15
- 18 VGG10 ignition gas valve with SKP25





### WKGMS 80

versions NR / 1SF



Note:

See pages 34–35 for optional ignition arrangements.

-  General actuator / coil
-  Solenoid coil
-  Hydraulic actuator
-  Burner with separate ignition burner (variants D–F, page 35)

$p_u$  = Gas flow pressure into the inlet ball valve

$p_d$  = Regulated gas pressure

 Pressure regulator

 Shutoff assembly

# Valve train selection

## Notes on high-pressure (HP) gas supplies

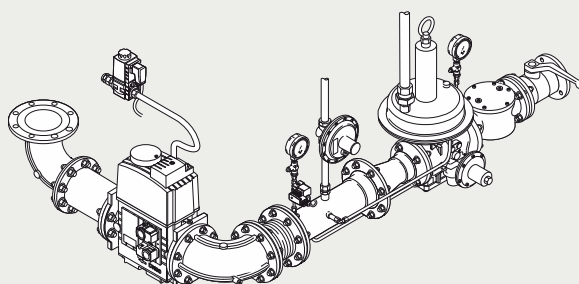
### HP Standard

#### High-pressure gas supply, standard version

Used when:

- The gas flow pressure at maximum burner load is > 300 mbar.
- The regulated pressure  $p_d$  together with the combustion chamber resistance does not exceed 210 mbar.
- The MOP <sup>5)</sup> does not exceed either 1 000, 2 500, 4 000, or 5 000 mbar, depending on regulator type.

Refer to Print No. 83001202 for component layout.



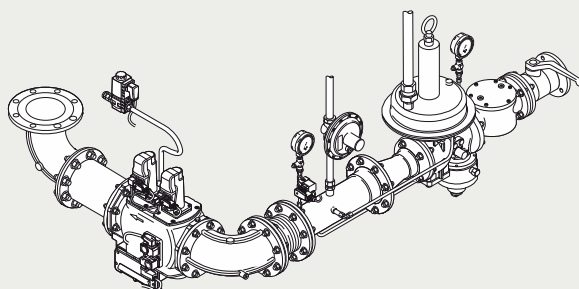
### HP So

#### High-pressure gas supply, So version

Used when:

- The gas flow pressure at maximum burner load is > 500 mbar.
- The regulated pressure  $p_o$  together with the combustion chamber resistance is in the range of 210–350 mbar.
- The MOP <sup>5)</sup> does not exceed either 4 000, 5 000, 10 000, or 16 000 mbar, depending on regulator type.

Refer to Print No. 83525902 for component layout.



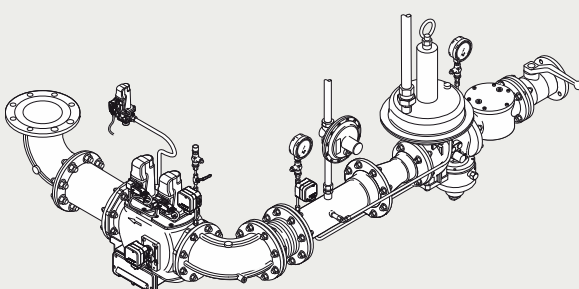
### HP SoH

#### High-pressure gas supply, SoH version

Used when:

- The gas flow pressure at maximum burner load is > 500 mbar.
- The regulated pressure  $p_o$  together with the combustion chamber resistance is in the range of 350–500 mbar.
- The MOP <sup>5)</sup> does not exceed either 4 000, 5 000, 10 000, or 16 000 mbar, depending on regulator type.

Refer to Print No. 83525902 for component layout.



#### Arrangement of the gas valve train on vertical burner installations

The "offset gas butterfly and valve assembly" option is very strongly recommended because of the increased heat radiation that stems from vertical boiler designs and the high temperatures of media such as thermal fluid.

#### Support of the valve train

The gas valve train should be properly supported in accordance with the site conditions. Please refer to the Weishaupt accessories list for various valve train support components.

#### Compensator

To enable a tension-free mounting of the valve train, the inclusion of an axial compensator is strongly recommended.

#### Gas meter

A gas meter must be installed to enable the measurement of gas consumption during burner commissioning and servicing.

#### Thermal shutoff device (when required by local regulations)

The optional thermal shutoff is integrated into the ball valve of screwed valve trains. On flanged valve trains, it is a separate component with HTB seals that is fitted before the inlet ball valve.

#### Safeguarding of the high-pressure gas supply in the event of a failure

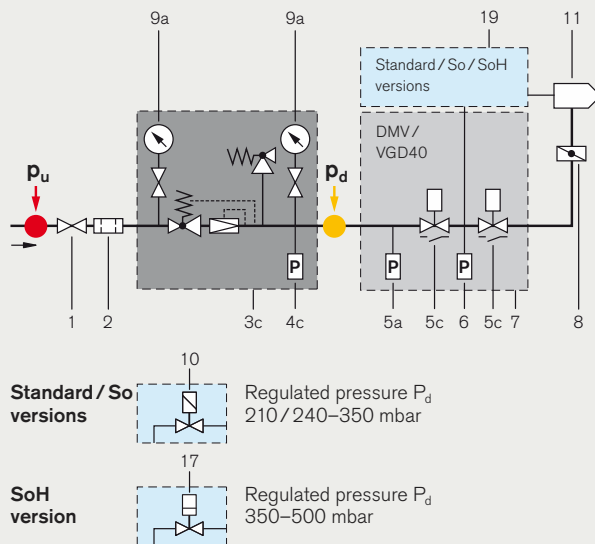
The gas supplier must safeguard the gas flow pressure such that, in the event of failure, it cannot exceed the MIP <sup>2)</sup> of the burner's gas valve train.

<sup>1)</sup> MOP = Maximum Operating Pressure

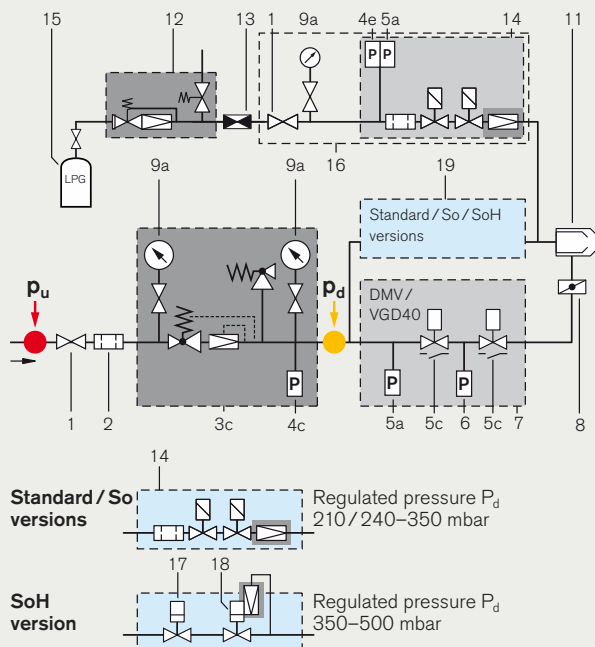
<sup>2)</sup> MIP = Maximum Incidental Pressure (= MOP x 1.1)

## HP Standard / So / SoH

WKG(L) 40–80, WKGMS 40–70  
versions ZM / NR / 1LN / 3LN / 4LN / 1SF / VSF / 3SF



WKGMS 80 versions NR / 1SF



- 1 Ball valve
- 2 Gas filter
- 3c High-pressure regulator incl. SSV/SRV
- 4c High gas pressure switch on screwed and flanged valve trains (mounted on the outlet side of the assembly)
- 4e High gas pressure switch (mounted on the LPG ignition burner assembly)
- 5a Low gas pressure switch (mounted on the valve assembly inset, SoH version only)
- 5c Additional low gas pressure switch in conjunction with VGD40
- 6 Valve proving pressure switch (mounted on the valve assembly)
- 7 Double gas valve assembly
- 8 Gas butterfly valve
- 9a Pressure gauge with push-button valve (standard)
- 10 SV-D ignition gas solenoid valve
- 11 Burner
- 12 LPG pressure regulator (accessory)
- 13 Hose rupture protection (accessory)
- 14 W-MF SE multi-function assembly
- 15 LPG tank (by others)
- 16 Sub-assembly fitted to burner at works
- 17 VGG10 ignition gas valve with SKP15
- 18 VGG10 ignition gas valve with SKP25
- 19 Standard / So / SoH version ignition assembly variants

Note:

See pages 36–37 for optional gas ignition arrangements.

- General actuator / coil
- Solenoid coil
- Hydraulic actuator
- Burner with separate ignition burner (variants D–F, page 35)

$p_u$  = Gas flow pressure into the inlet ball valve

$p_d$  = Regulated gas pressure

Pressure regulator

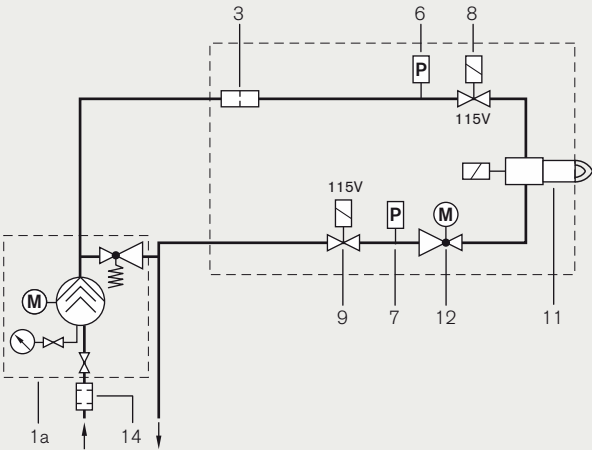
Shutoff assembly



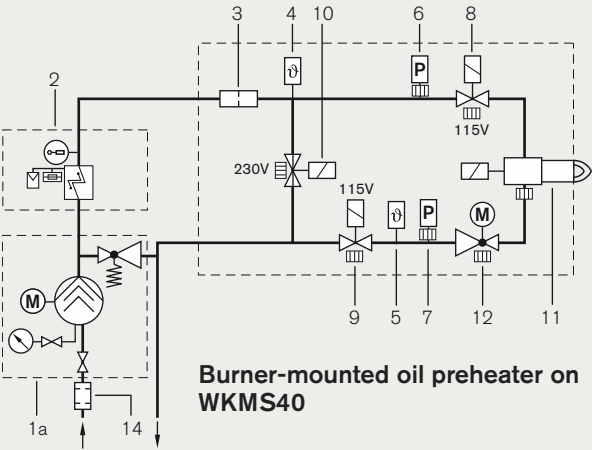
# Fuel systems

## Oil and dual-fuel burners (oil side)

WKL 40–80

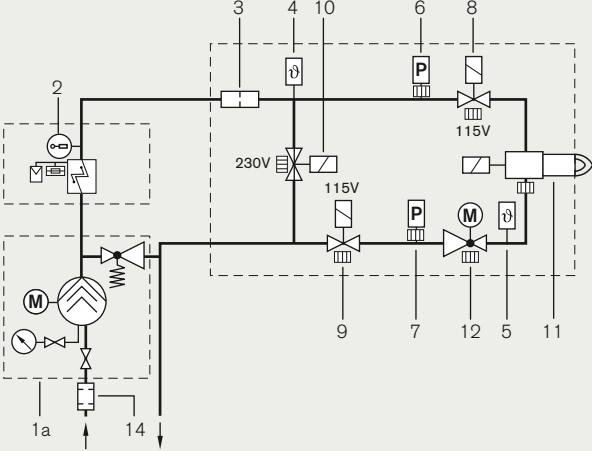


WKMS 40–50

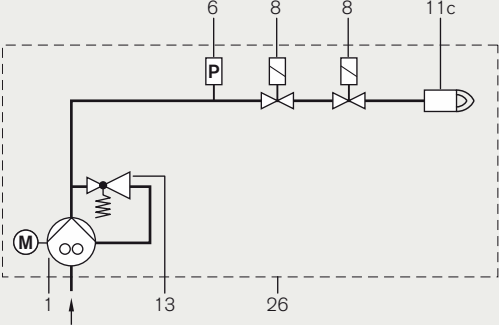


Burner-mounted oil preheater on WKMS40

WKMS 70–80

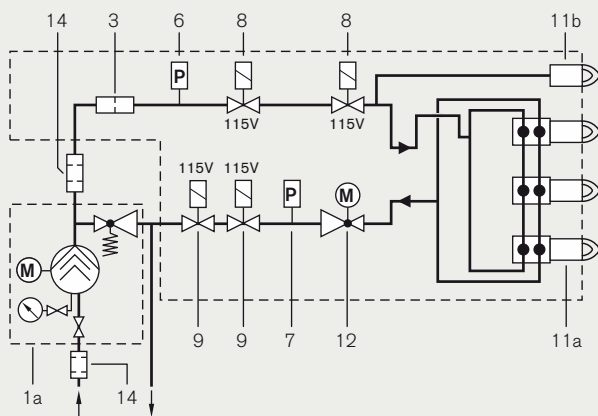


Gas oil ignition burner, WKMS 80

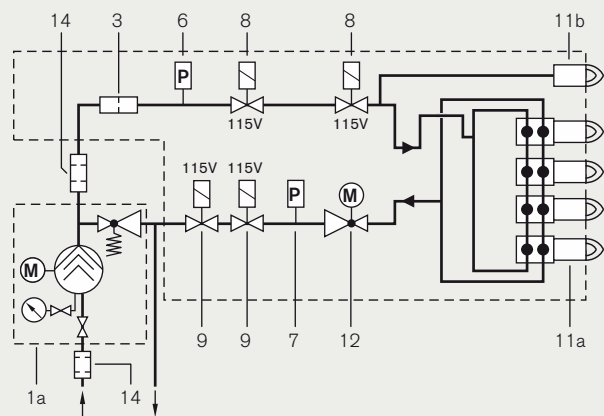




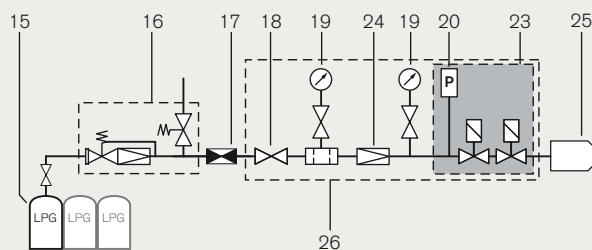
### WKL 40–70/0 version 3LN



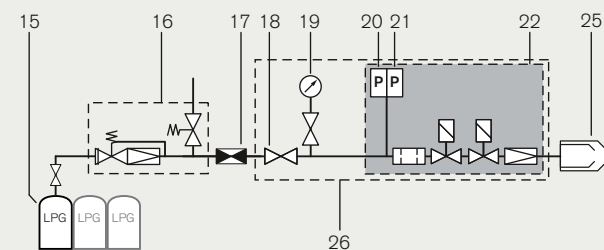
### WKL 70–80 version 3LN



### LPG ignition pilot, WKMS 40–70



### LPG ignition burner, WKMS 80



### Oil firing burner with gas ignition

- 1 Oil pump
- 1a External pump station with pressure maintenance
- 2 Oil preheater
- 3 Strainer
- 4 Temperature sensor in supply
- 5 Temperature sensor in return
- 6 Low-pressure switch
- 7 High-pressure switch
- 8 Solenoid valve in supply (fitted in the direction of flow)
- 9 Solenoid valve in return (fitted against the direction of flow)
- 10 Bypass solenoid valve (normally open)
- 11 Solenoid valve assembly
- 11a Nozzle head with secondary nozzles
- 11b Nozzle head with primary nozzle
- 11c Nozzle head

### Oil firing burner with gas ignition

- 12 Oil regulator
- 13 Pressure regulating valve
- 14 Filter
- 15 LPG tank (by others)
- 16 LPG pressure regulator (accessory)
- 17 Hose rupture protection (accessory)
- 18 Ball valve
- 19 Pressure gauge with push-button valve
- 20 Low gas pressure switch
- 21 High gas pressure switch
- 22 W-MF SE multi-function assembly
- 23 Double gas valve assembly
- 24 FRS gas pressure regulator
- 25 Burner
- 26 Sub-assembly fitted to burner at works

# Perfect ignition of residual oils

**The reliable ignition of a broad range of fuel types and volumes calls for the use of suitable ignition devices with the necessary control programs.**

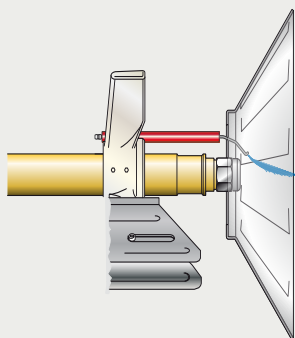
The W-FM 200 combustion manager has various control variants which affect at what point an ignition spark is created and when fuel valves open and close.

Gaseous and low-viscosity liquid fuels are easily ignited. Modern electronic ignition units and high-voltage electrodes are used to create an electric arc, and the heat of that spark sets fire to the gas or to the oil vapour.

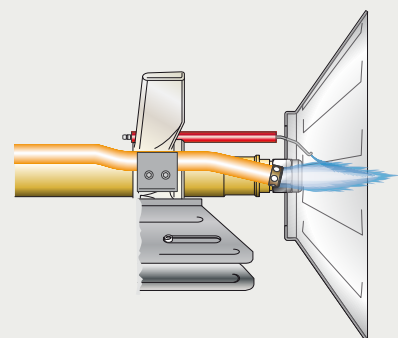
Igniting high-viscosity liquid fuels with minimal emissions, however, requires a different type of ignition system. Weishaupt offers several special units, from which the best-suited for any given application can be selected.

The main consideration is always which fuels are available. Dual-fuel burners can make use of their gas ignition pilot when firing heavy oil. Furthermore, by equipping the system with two ignition gas lines, there is always a choice to be made between either natural gas or LPG ignition as required.

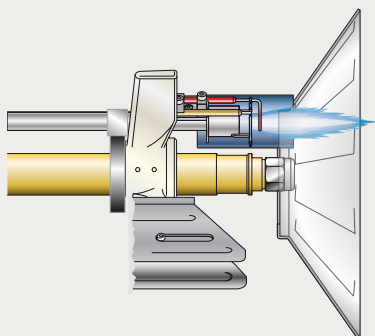
Direct oil ignition  
Version 1.1



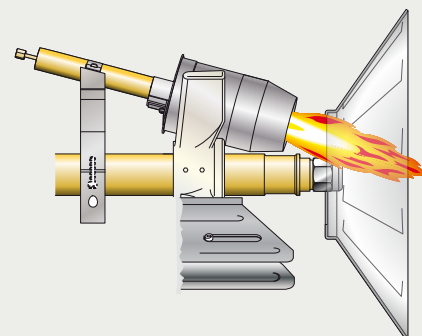
Residual oil ignition with gas ignition pilot  
Version 1.2



Residual oil ignition with gas ignition burner  
Version 2

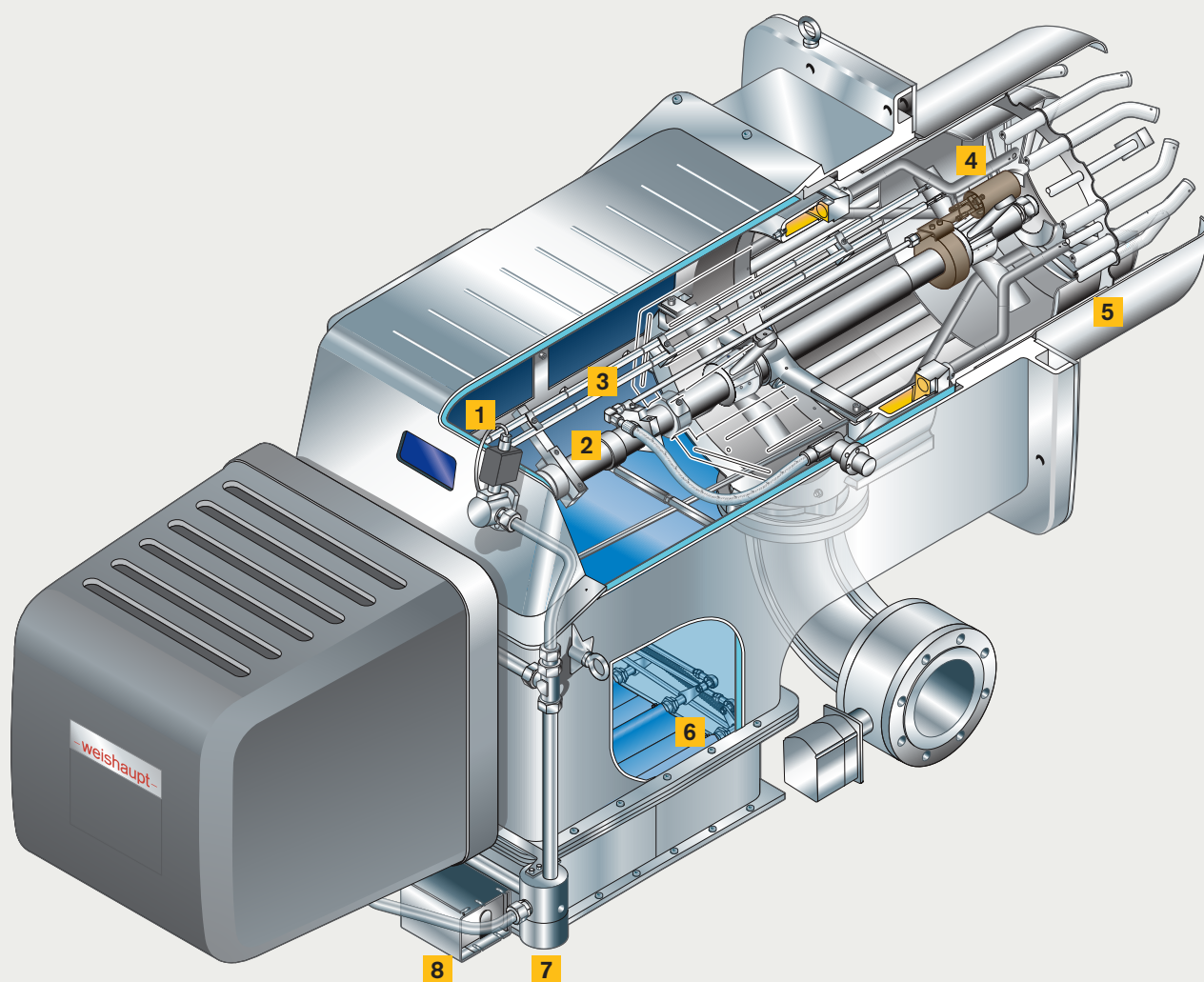


Residual oil ignition with gas oil ignition burner  
Version 3



There are two ignition burner options available for the WKMS80 single-fuel burner. The gas version is a self-contained ignition burner with diffuser, flame tube, ignition electrode and flame monitoring. Depending on the design of the installation, it can be fired using either LPG or natural gas. The oil version is used when, for example, regulations preclude the use of gas. It too is a complete burner unit comprising oil pump, oil nozzle, ignition unit,

diffuser, and flame tube. The ignition burner fires gas oil and has a rating of approximately 50 kW. Its flame ignites the pre-warmed, high-viscosity oil quickly, cleanly, and reliably.



- 1** Flame monitoring (cooled)
- 2** Motorised nozzle lance (WK 80)
- 3** Gas butterfly valve (cooled)
- 4** Gas ignition burner
- 5** Motorised regulating sleeve
- 6** Air inlet louvres with connecting mechanism
- 7** Cooling air fan connection
- 8** Air damper actuator (cooled)

*WK-series dual-fuel burner, preheated-air  
version with gas ignition burner*

## Ignition variants – General arrangement for gas, oil, and dual-fuel burners

**A1**

Gas:  
Direct ignition via electrode  
**Version 1.1**

**A2**

Oil:  
Direct ignition via electrode (standard)  
**Version 1.1**

**B**

Gas:  
Ignition via main gas pilot  
WKGL/WKGMS in combination with A2  
**Version 1.2**

**C**

Residual oils:  
Ignition via LPG ignition unit  
WKGMS in combination with B  
**Version 1...**

**D**

Residual oils:  
Ignition via LPG ignition burner  
**Version 2**

**E**

Residual oils:  
Ignition via gas oil ignition burner  
**Version 3**

**F**

Dual-fuel:  
Gas and residual oil ignition via  
main gas ignition burner  
**Version 2**

**G**

Dual-fuel:  
Gas and residual oil ignition via  
main gas ignition burner  
Additional oil ignition via LPG ignition burner  
**Version 2**

- ① Main gas
- ② LPG
- ③ High-viscosity liquid fuel
- ④ Low-viscosity liquid fuel

Details regarding the valves and governors used on different sizes and versions of WK-series burners are available upon enquiry.

### Accessory for LPG ignition

- ⑤ Complete set  
(Part No. 271 805 2601 2) comprising:



- ⑥ Pressure regulator for 11 / 33 kg  
LPG bottle
- ⑦ Hose rupture protection
- ⑧ 3 m hose



# Ignition variants by burner size and version

Variant	WK 40					Variant
	WKL	WKMS	WKG	WKGL	WKGMS	
A <sub>1</sub>			● <sup>3)</sup>	●	●	A <sub>2</sub>
A <sub>2</sub>	●	●				+ B
B			●		○	+ B
C		○				+ C

● Standard  
○ Optional

<sup>3)</sup> WKG40 ZMH-LN ignites from the main gas line  
WKG40/1ZMH-3LN + 4LN

Variant	WK 50					Variant
	WKL	WKMS	WKG	WKGL	WKGMS	
A <sub>1</sub>				●	●	A <sub>2</sub>
A <sub>2</sub>	●	●				+ B
B			●		○	+ B
C		○				+ C

● Standard  
○ Optional

Variant	WK 70					Variant
	WKL	WKMS	WKG	WKGL	WKGMS	
		70/2 vers. 1SF			70/2 vers. 1SF	
A <sub>1</sub>				●	●	A <sub>2</sub>
A <sub>2</sub>	●	●				+ B
B			●			+ B
C		○			○	+ C
D		○ <sup>1)</sup>				D
F					○ <sup>1)</sup>	F
G					○ <sup>1)</sup>	G

● Standard  
○ Optional

<sup>1)</sup> W-FM 200 combustion manager required

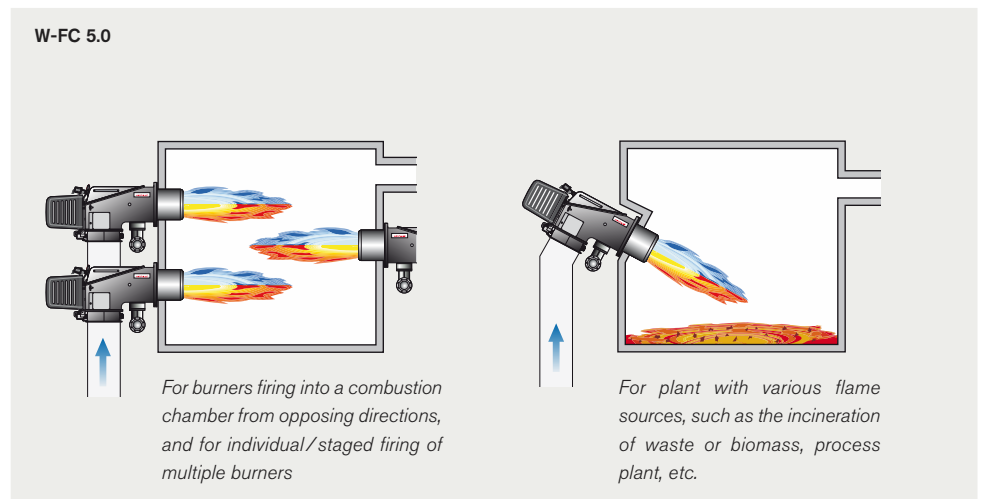
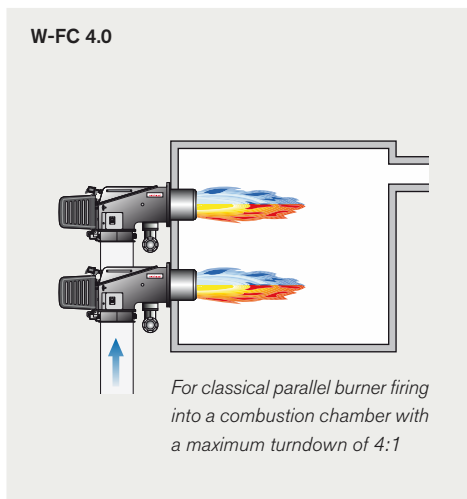
Variant	WK 80					Variant
	WKL	WKMS	WKG	WKGL	WKGMS	
		17.5 MW < >			17.5 MW < >	
A <sub>1</sub>						A <sub>1</sub>
A <sub>2</sub>	●	● <sup>2)</sup>				A <sub>2</sub>
B			●	● <sup>4)</sup>	● <sup>2)</sup>	+ B
D		○ <sup>1)</sup>	● <sup>1)</sup>			D
E		●				E
F					○ <sup>1)</sup>	● <sup>1)</sup>
G					○ <sup>1)</sup>	○ <sup>1)</sup>

● Standard  
○ Optional

<sup>1)</sup> W-FM 200 combustion manager required  
<sup>2)</sup> 1SF version excluded

# W-FC

# flame control



**Weishaupt Flame Control – W-FC – is a reliable flame monitoring system for plant with challenging safety demands that meets the requirements of EN 298 for continuous operation.**

## W-FC 4.0

W-FC 4.0 is for plant that has multiple burners firing from the same direction into a single combustion chamber. The W-FC assembly utilises flame frequency to monitor each flame separately via a load-independent on and off threshold for each fuel. The W-FC system's CFC3... flame detector functions in series with the QRA73 flame sensor linked to the W-FM 100 or W-FM 200 combustion manager.

### Note:

If a turndown in excess of 4:1 or single-burner operation is required, then the higher-specification W-FC 5.0 must be selected.

## W-FC 5.0

W-FC 5.0 is for plant that has multiple burners firing from different directions into a single combustion chamber, or for process plant with various flame sources. The W-FC assembly monitors each flame separately, using up to ten load-dependent switching thresholds for each fuel. The electronic VLoad module and its user-friendly software establishes a distinct differentiation from extraneous light sources specific to that plant. The CFC3... flame detector functions in parallel with the QRA73 flame sensor on the W-FM 200 combustion manager.

## Flame monitoring

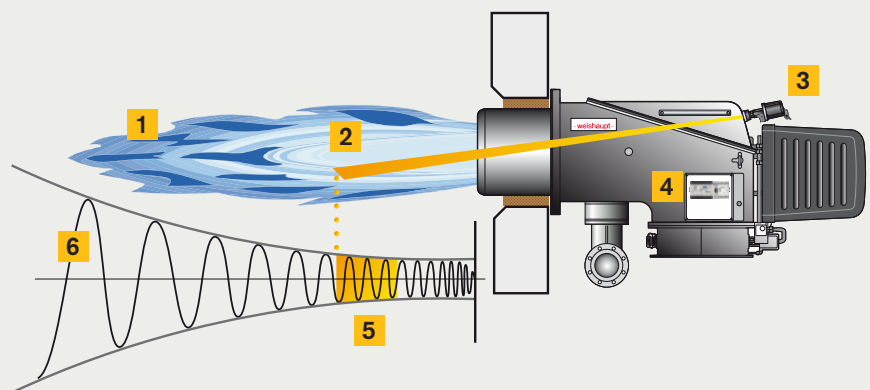
**Flame monitoring plays a crucial role when it comes to reliability and safety.**

Determination of the best method of flame monitoring takes into account not only the burner and the fuel to be used, but also how the system operates and the conditions inside the combustion chamber.

Heat generators that have one flame per combustion chamber are easier to monitor than those with multiple flames. In the latter case, it also depends whether the flames are firing into the combustion chamber from the same or opposing directions.

Biomass plant and waste incinerators need a flame monitoring system that is not affected by extraneous flames.

Weishaupt offers flame monitoring systems for gas, oil, and dual-fuel burners with a wide range of operating conditions.



*The constructive arrangement of the CFC3... facilitates optimisation of the detection range*

**1** Combustion zone

**2** Flame root

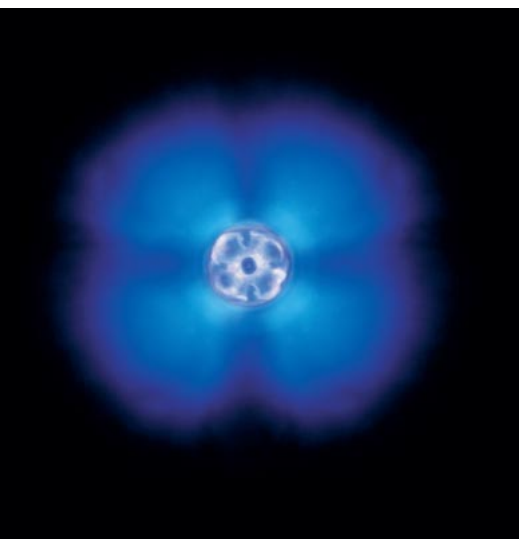
**3** CFC3... flame detector

**4** Electronic VLoad module

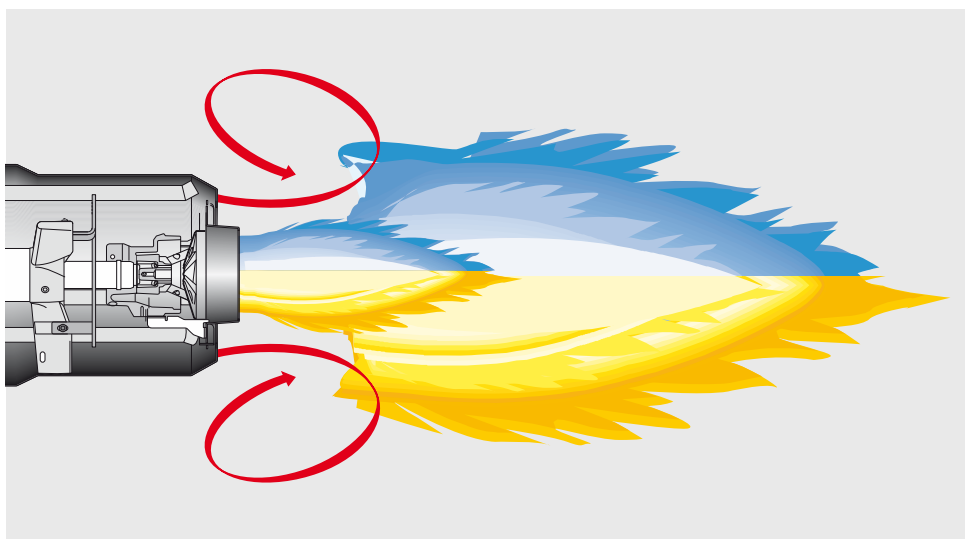
**5** Frequency

**6** Amplitude

# Reduced emissions with 3LN burners.



*A multiflam® flame image  
showing efficient combustion*



*The principle of primary and secondary flames  
with internal recirculation*

**The multiflam® principle, developed and patented by Weishaupt, is an innovative way of greatly reducing the emission of nitrogen oxides from combustion plant.**

Right at the core of Weishaupt's multiflam® technology lies its special mixing assembly design. Fuel is distributed among several nozzles and then combusted in a primary and a secondary flame. Temperature in the flame's core is considerably reduced, which results in an effective reduction of nitrogen oxides.

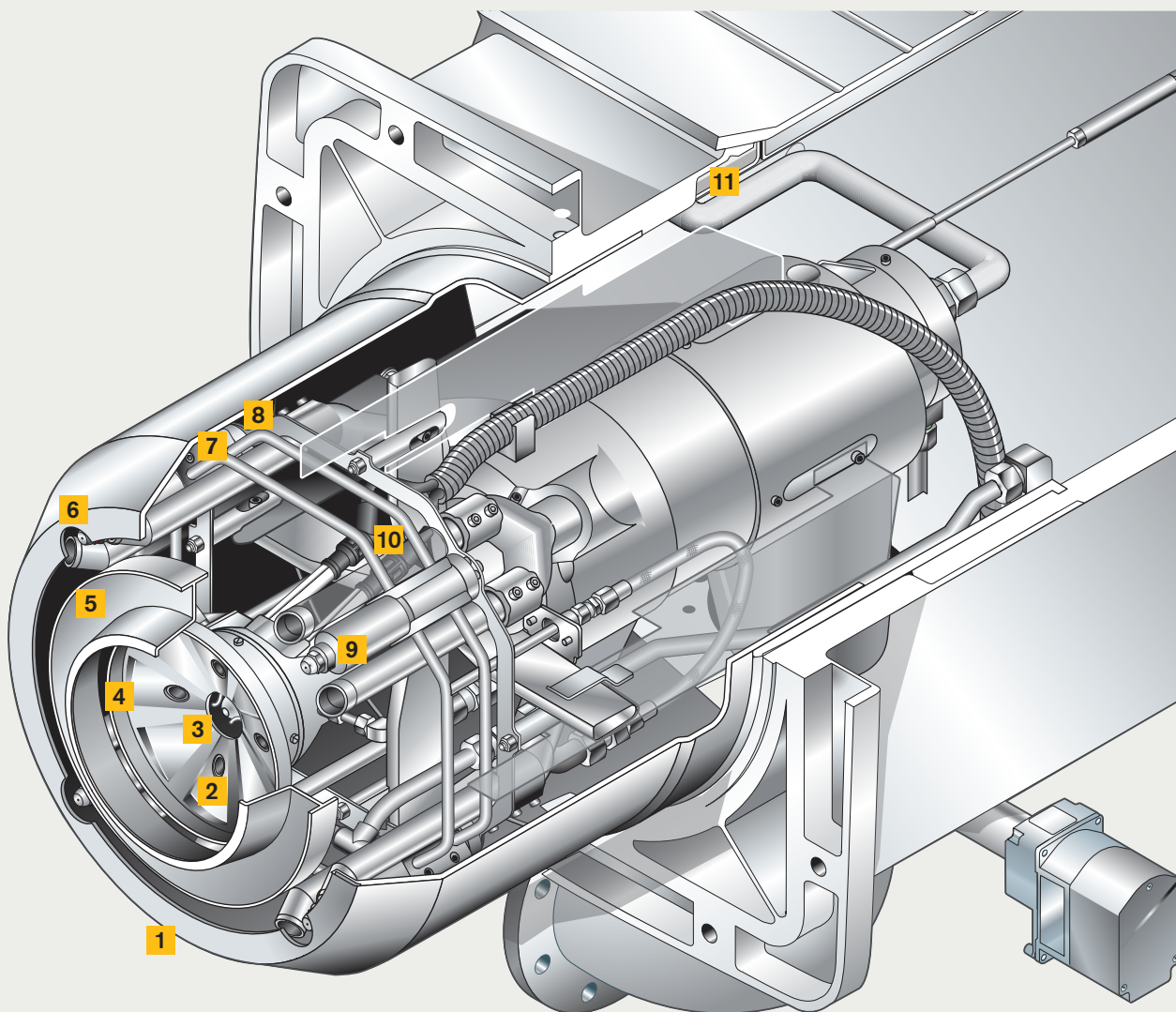
The range of ratings across which multiflam® burners are available is equally outstanding. All the way from the WM 10 monarch®-series burner right up to the WK 80 industrial-series burner, there is now a multiflam® burner for outputs ranging from 100 up to 23 000 kW.

Weishaupt multiflam® burners have been proving themselves in the field for many years. As fully fledged gas, oil, and dual-fuel burners, they are always the first choice for achieving low NO<sub>x</sub> emission values without resorting to external measures.

Good combustion figures are dependent on more than just the burner. They also depend on the combustion chamber geometry and its thermal loading, and the design of the heat generator (three-pass / through-pass type).

When Weishaupt guarantees the NO<sub>x</sub> emissions for a particular application, the guarantee can only be made with reference to certain predefined constraints, including thermal loading, combustion air temperature and humidity, medium temperature, measurement tolerances, etc.

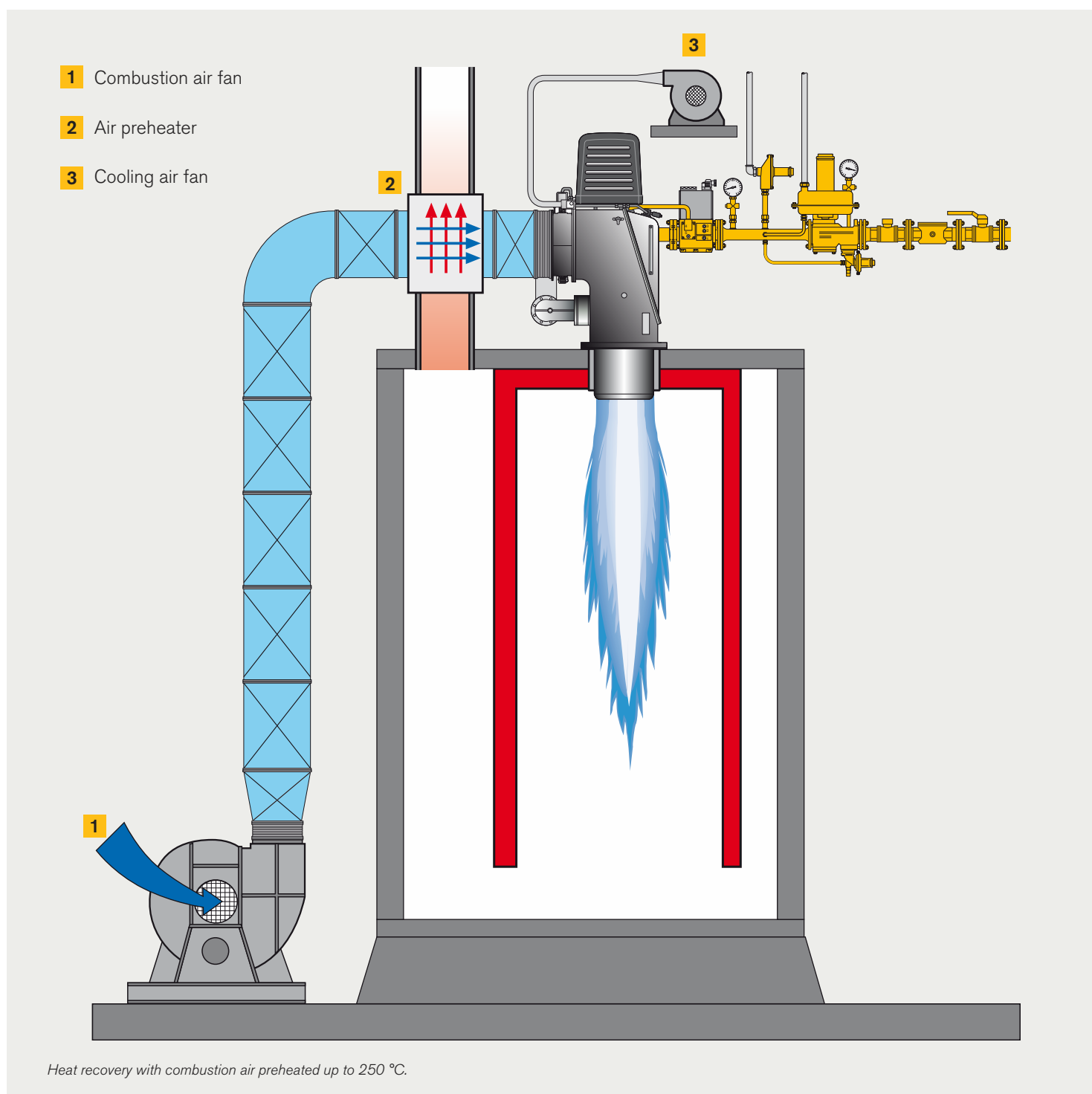




*The multiflam® mixing assembly of a dual-fuel burner*

- |                                |  |                                |
|--------------------------------|--|--------------------------------|
| <b>1</b> Flame tube            | <b>5</b> Secondary diffuser disc         | <b>9</b> Secondary oil nozzles |
| <b>2</b> Primary gas nozzle    | <b>6</b> Secondary gas nozzles           | <b>10</b> Ignition electrodes  |
| <b>3</b> Primary oil nozzle    | <b>7</b> Ring distributor for oil return | <b>11</b> Ignition pilot line  |
| <b>4</b> Primary diffuser disc | <b>8</b> Ring distributor for oil supply |                                |

# WK burners with preheated air



# NO<sub>x</sub> reduction with multiflam<sup>®</sup> burners



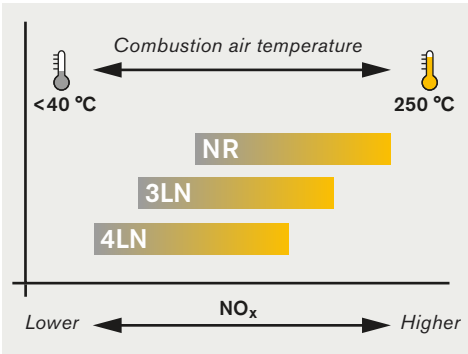
Cooling air for actuators and flame monitoring

Weishaupt 3LN (multiflam<sup>®</sup>) and 4LN-version burners can utilise preheated combustion air.

Heat generators that have very high medium temperatures can exploit less of the heat in the flue gases. This results in a lot of energy being lost to atmosphere. One way to make use of this energy is employ hot-air versions of the WK-series duobloc burners.

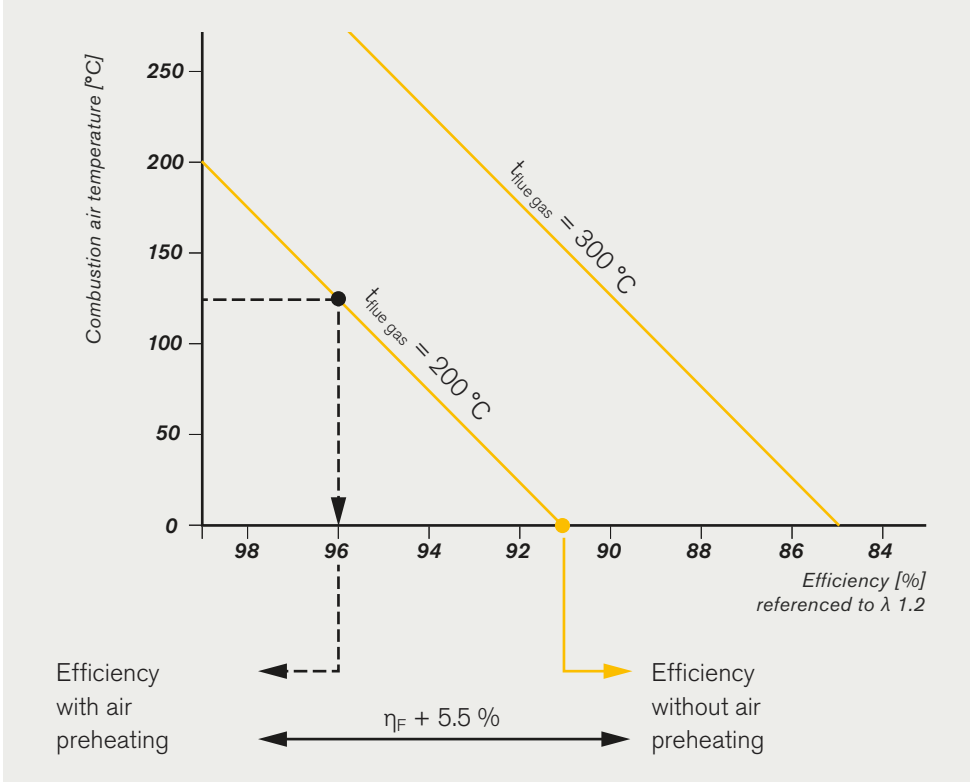
A heat exchanger between the combustion air duct and the flue gas system draws heat from the hot flue gas and transfers it to the combustion air. Combustion air can be heated to temperatures of up to 250 °C in this way, resulting in potenital efficiency increases of up to 10 percent.

Impressively, despite the extreme conditions, the burners can achieve NO<sub>x</sub> emission values that meet many standards.

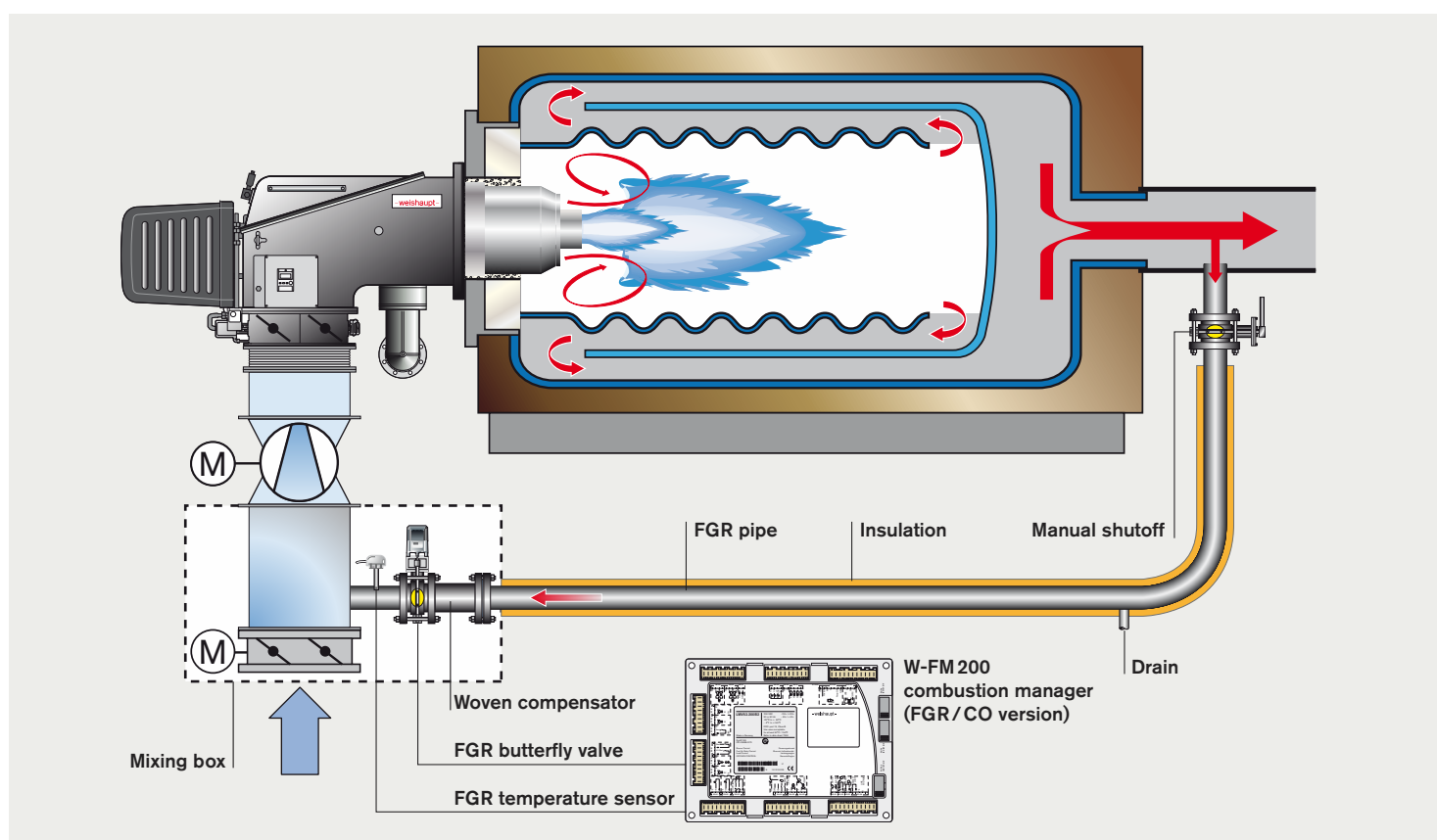


NO<sub>x</sub> emissions on WK-series burners with preheated air, comparing NR and multiflam<sup>®</sup> 3LN-version burners without flue gas recirculation and 4LN-version burners with flue gas recirculation

Improved efficiency with combustion air preheating



# Reduced emissions with 4LN burners.



General arrangement of an FGR system  
with a WK burner

**Weishaupt 4LN-version gas burners are an innovative development that enables the world's most stringent NO<sub>x</sub> emission limits to be met.**

This development brings about the general integration of external flue gas recirculation. The mixing assembly of the burner is based on familiar multiflam® technology that has been especially optimised for the admixture of flue gases. Results from the lab and the field prove that this technology can always meet NO<sub>x</sub> limit values of 30 mg/kWh (natural gas E), provided certain conditions are met.

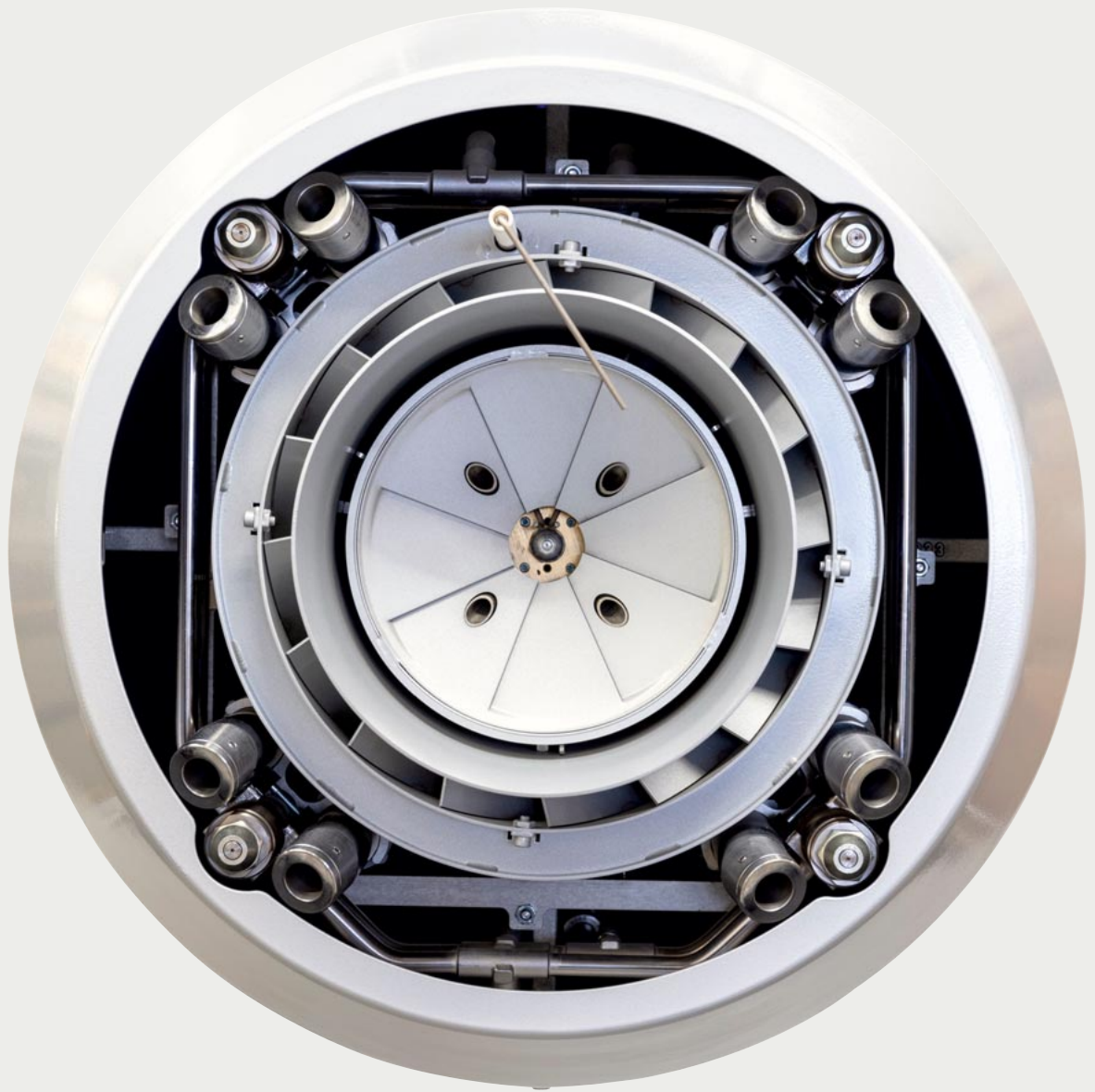
## No additional fan

The Weishaupt FGR system does not require an additional fan to feed the flue gas to the burner.

The flue gases are instead drawn in by the combustion air fan. Low pressure develops in the mixing box, which allows flue gas to flow down the FGR pipe and into the fan. The burner's combustion manager controls the FGR butterfly valve, thus ensuring the flue gas volume is precisely dosed.

## Servicing remains as simple as ever.

Only the fan is equipped with additional FGR components. The burner remains unchanged, making it easier to handle during commissioning and maintenance works. That saves both time and money.



# Weishaupt FGR system

---



*Mixing box – Execution is dependent on the air feed arrangement*

## **Weishaupt mixing box**

Weishaupt worked with its combustion air fan manufacturer to develop the mixing box. It is fitted directly to the combustion air fan and forms a compact assembly with predetermined dimensions. The mixing box consists of a housing with integrated air damper register for suction control, a flanged connection for easy installation of the FGR butterfly valve, and a sleeve with inbuilt temperature sensor.

## **Benefits:**

- Precise site plans can be drawn up.
- The manufacture of fully encapsulating sound absorbers can proceed without the need for on-site measurements.
- The fan is supplied fully pre-assembled.
- Installation times are reduced and, the crucial factor for functionality, everything is in the right place.



*Fan motor with speed sensor for VSD*

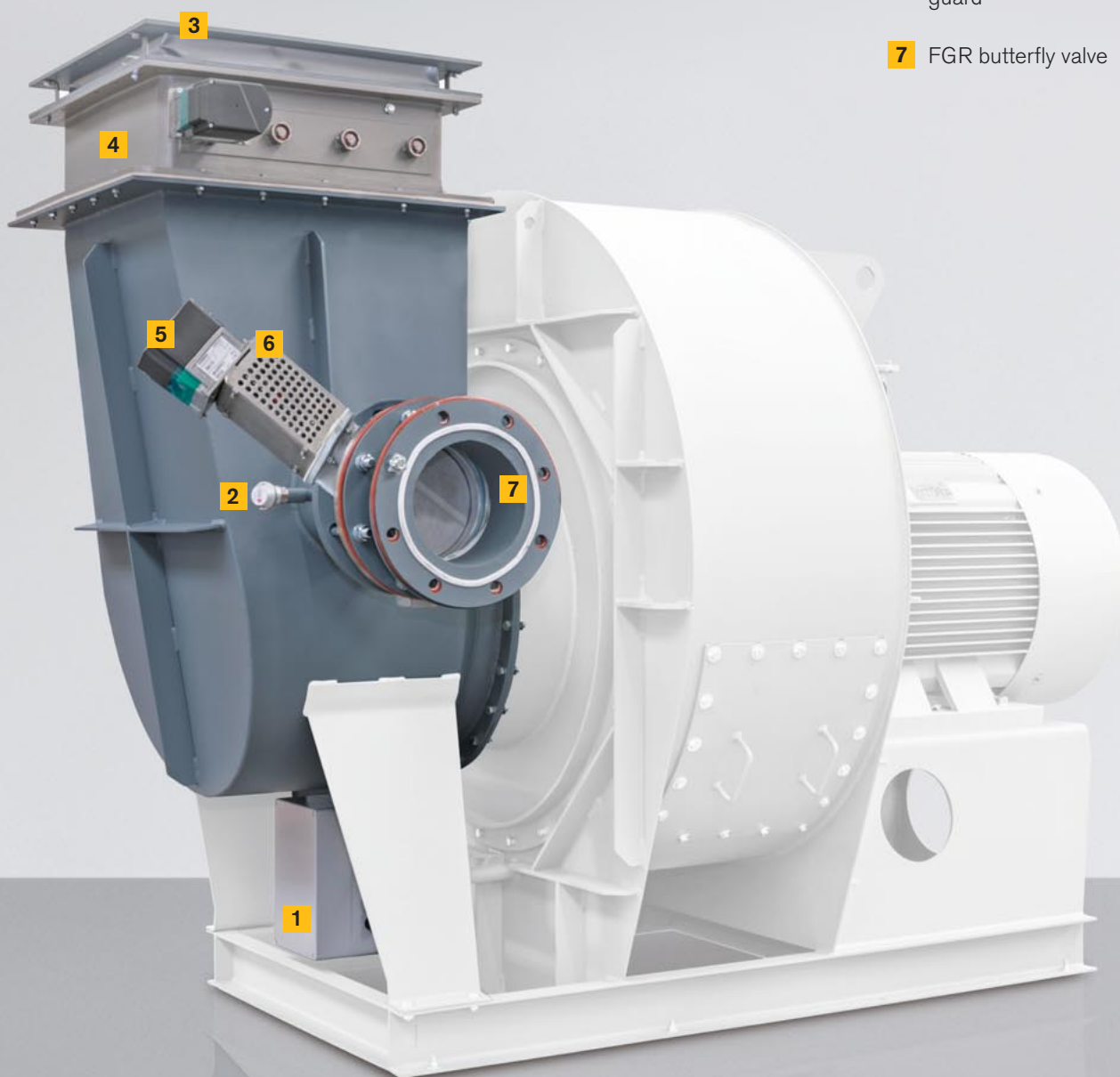
## **Variable speed drive**

Small details guarantee uncompromising quality and so Weishaupt goes a step further with its optional VSD that includes additional features such as:

- Fan motor with direction of rotation detection
- Earthed motor connections to prevent EMC interference
- Insulated motor bearings from 45 kW to prevent leakage current

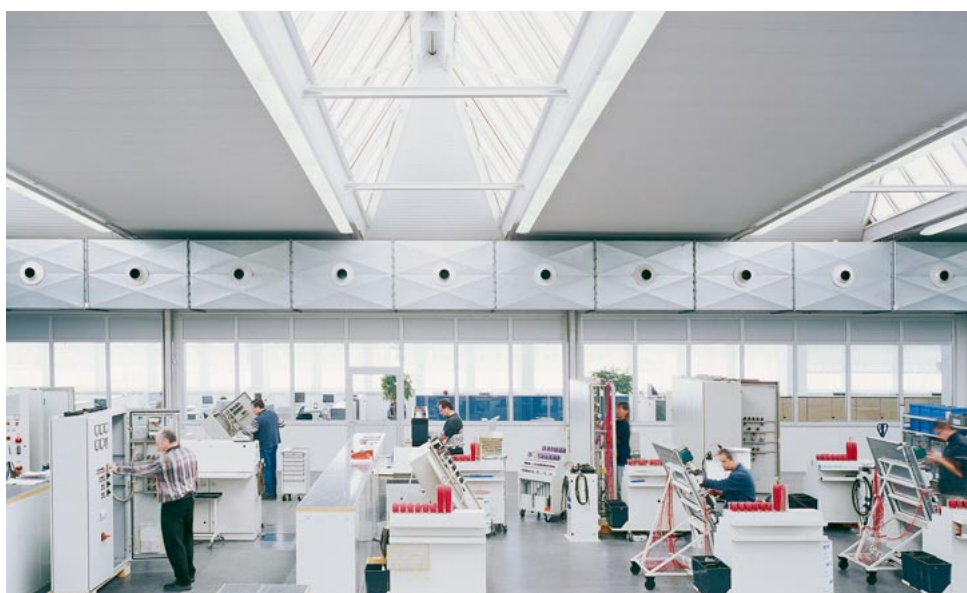


- 1** Junction box for the electrical components
- 2** Temperature sensor
- 3** Woven compensator (only with air duct)
- 4** Air damper register for flue gas suction control
- 5** Actuator
- 6** Thermal isolation of the actuator with protective guard
- 7** FGR butterfly valve



*Mixing box for flue gas recirculation at the combustion air fan – air inlet from above (optional)*

# The right control panel



*Every control panel is individually designed and built in the separate control panel production area*

## Tailor-made to your specifications

Ever since its founding, Weishaupt has been designing and manufacturing bespoke control panels of all kinds, not only for your typical heating systems but also for complex building automation systems and for thermal process plant.

The core areas for Weishaupt control panels are:

### Burners

Burner and control panel from the same manufacturer, matched to each other at the factory:

- Manufactured to European and various other international standards
- Digital combustion management with eBUS and Modbus interfacing (can be expanded to other bus protocols)
- Safety-oriented programmable logic control (PLC)

### Boilers

Safety-related requirements to comply with EN standards and country-specific regulations greatly affect the controls needed.

Weishaupt offers solutions for:

- LTHW boilers
- HTHW boilers
- Steam boilers
- Boiler sequencing
- Optimisation of multi-boiler systems with the Weishaupt MBC system

### Thermal process plant

Thermal process technology calls for numerous controls and regulators in addition to all of the appropriate burner controls. Typical applications include:

- Thermal fluid heaters
- Salt heaters
- Dryers
- Paint ovens
- Smelters

### Marine

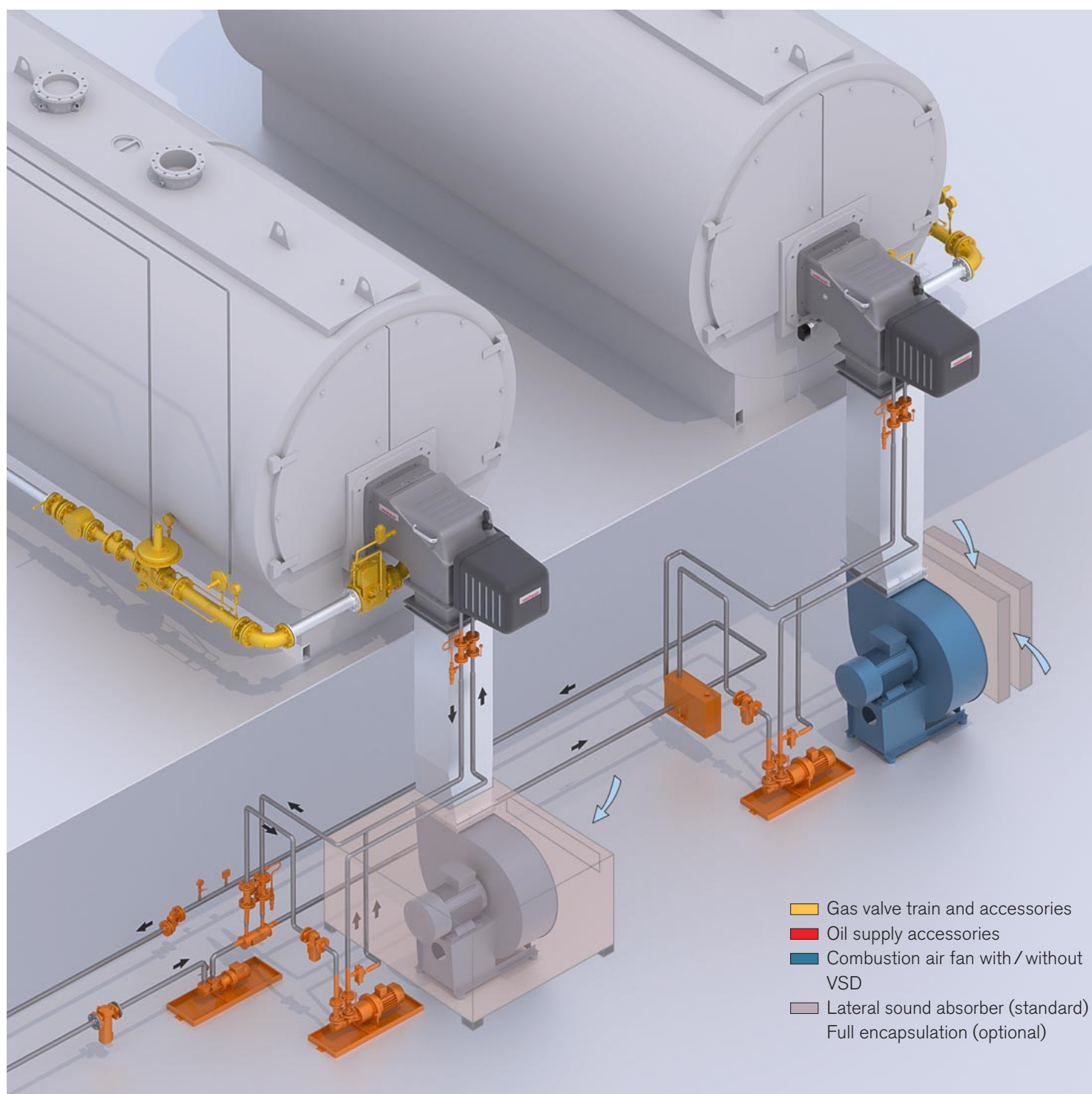
This highly specialised field places very particular demands on equipment.

Weishaupt offers solutions for the control of:

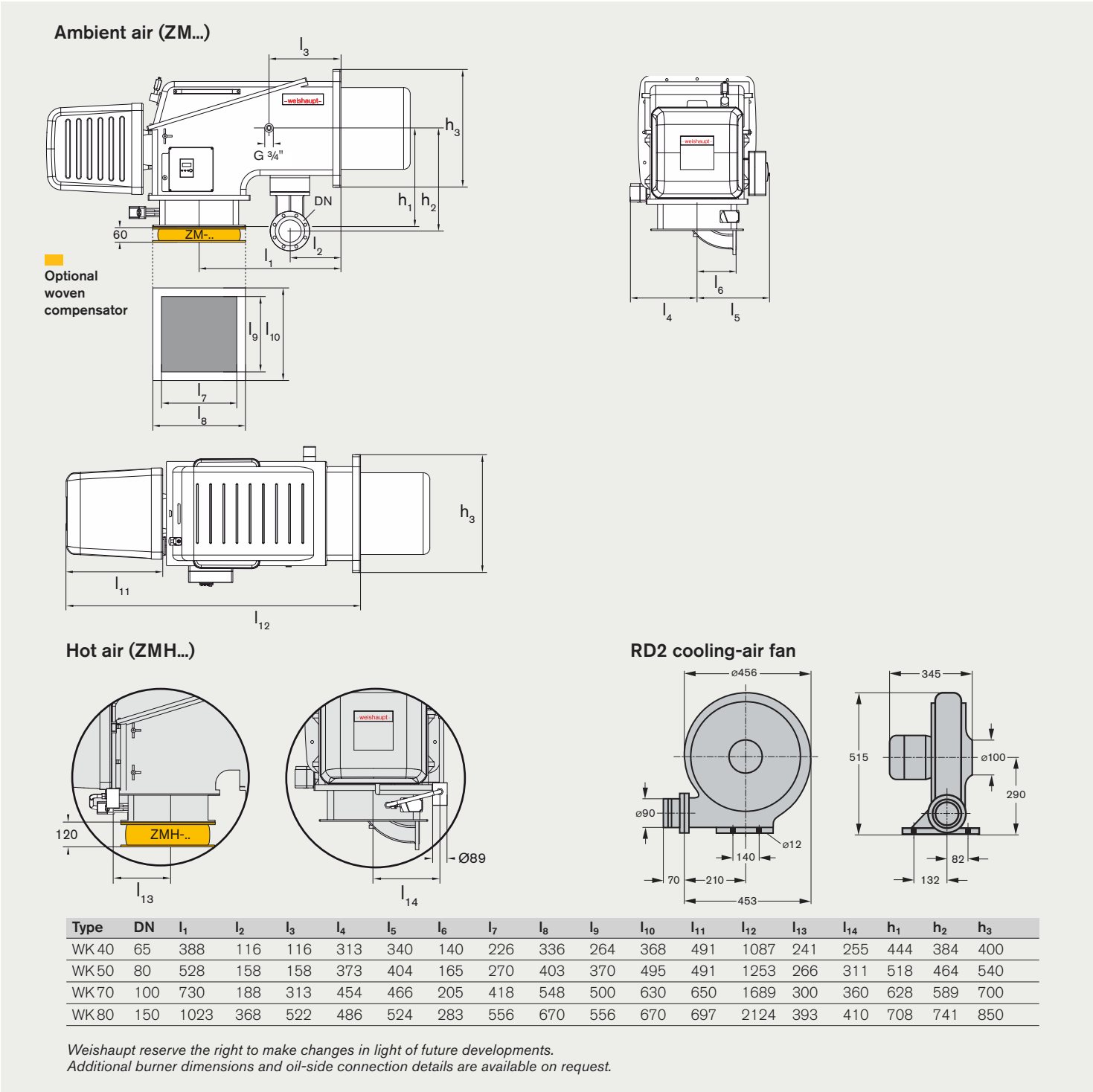
- Auxillary boiler systems
- Inert gas treatment
- Heating

We can comply with requirements of all of the usual classification societies (DNV-GL, LRS, ABS, RS, PRS, BV etc.).

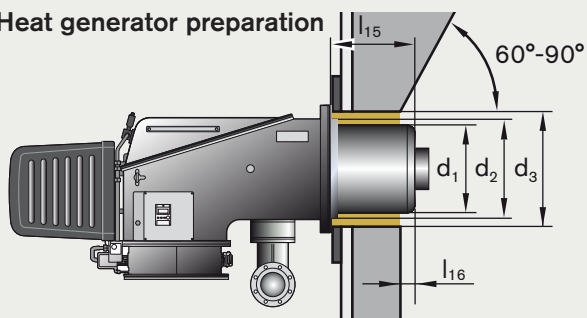




Key dimensions  
at a glance



## Heat generator preparation



The space between the combustion head and the refractory should be filled with a resilient, non-solid insulating material, such as Cerafelt.

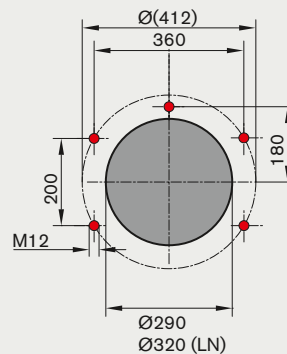
### Maintenance-friendly combustion head:

The standard-length combustion head can be inserted and withdrawn through the service opening in the burner housing on all versions.

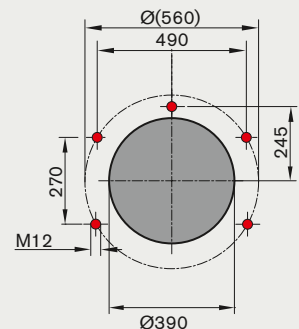
<sup>1)</sup> Please enquire regarding combustion head extensions.

Type	Size	Vers. ZM(H)...	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>15</sub> <sup>1)</sup>	l <sub>16</sub>
WK..	40/1		250	280	290	260	≥ 0
WKG	40/1	3LN / 4LN	242	280	290	307	≥ 40
WK..	40/2		261	280	290	260	≥ 0
WKG	40/2	LN	296	280	320	424	≥ 0
WKG(L)	40/2	3LN	256	280	290	375	≥ 50
WK..	50/1	NR / 1LN	290	380	390	307	≥ 0
WKG(L)	50/1	3LN	296	380	390	355	≥ 50
WKG(L)	50/1	4LN	296	380	390	463	≥ 50
WK..	50/2	NR	350	380	390	337	≥ 0
WKG(L)	50/2	1LN	350	380	390	452	≥ 0
WKG(L)	50/2	3LN	334	380	390	450	≥ 50
WKG(L)	50/2	4LN	322	380	390	470	≥ 50
WKL(MS)	50/1		290	380	390	337	≥ 0
WKL(MS)	50/2		350	380	390	392	≥ 0
WK..	50/2	1SF	350	380	390	392	≥ 0
WK..	70/1	NR	400	518	530	347	≥ 0
WK..	70/3	NR	480	518	530	462	≥ 0
WKG(L)	70/1	1LN	406	518	530	439	≥ 0
WKG(L)	70/2	1LN	480	518	530	477	≥ 0
WKG(L)	70/0	3LN	376	518	530	472	≥ 60
WKG(L)	70/0	4LN	403	518	530	486	≥ 60
WKG(L)	70/1	3LN / 4LN	444	518	530	475	≥ 60
WKG(L)	70/3	3LN / 4LN	480	518	530	475	≥ 60
WK..	70/1	1SF	400	518	530	347	≥ 0
WK..	70/2	1SF	480	518	530	362	≥ 0
WKL(MS)	70/1		400	518	530	417	≥ 0
WKL(MS)	70/2		480	518	530	422	≥ 0
WK..	80/3	NR	590	590	640	500	≥ 0
WKG(L)	80/1	3LN / 4LN	540	558	640	510	≥ 70
WKG(L)	80/2	3LN / 4LN	580	603	640	510	≥ 70
WK..	80/3	1SF	600	600	640	480	≥ 0
WKG	80/4	VSF	590	590	640	500	≥ 0
WKG	80/5	VSF	590	590	640	500	≥ 0
WKG	80/6	3SF	618	618	650	500	≥ 0

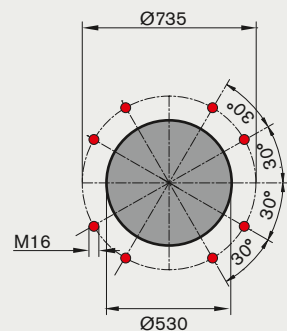
## Mounting-plate drilling dimensions



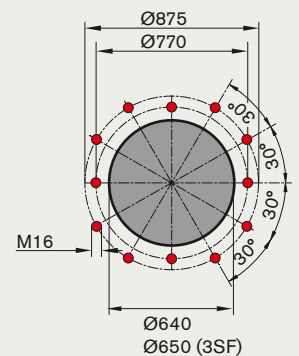
WK40



WK50



WK70



WK80

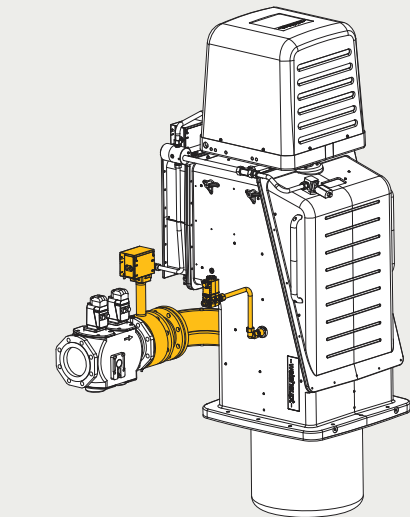
# Overview of options, installation positions, and weights

Vertically firing Weishaupt burners, which are based on ZMH-versions, have been especially designed for use on vertical plant such as steam boilers, thermal fluid heaters, and process applications.

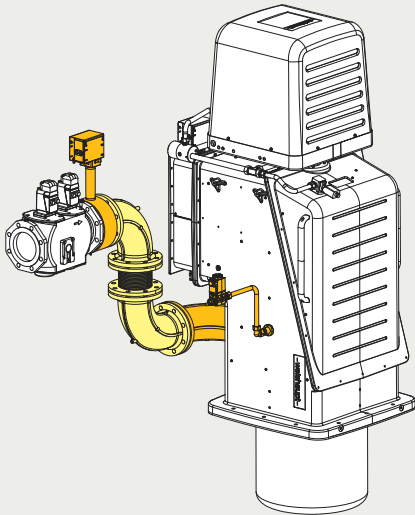
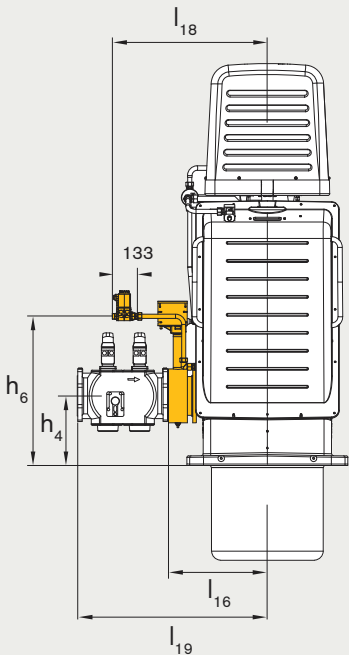
**Safe and reliable operation:**

The safety-critical components, such as the gas butterfly valve and its actuator, gas valve assembly, and gas pressure switches, are all securely located away from high-temperature zones to ensure their reliable operation. The offset position of the burner's ignition gas valve protects it from high levels of radiant heat from the heat exchanger.

Vertical execution

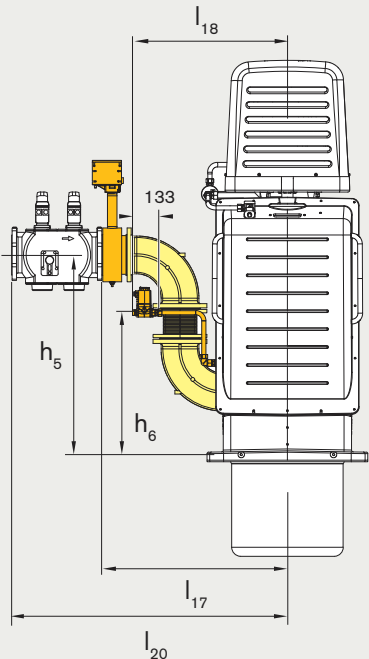


Optional



Optional

Extended option (with accessory components)



## Vertical-execution dimensions

	Butterfly valve diameter	Double gas valve assembly diameter	$l_{16}^{1)}$	$l_{17}$	$l_{18}$	$l_{19}^{1)}$	$l_{20}$	$h_4$	$h_5$	$h_6$
WK 40	DN65	1 1/2"	492	686	641	841 <sup>2)</sup>	1035 <sup>2)</sup>	116	502	382
		2"	492	686	641	881 <sup>2)</sup>	1075 <sup>2)</sup>	116	502	382
		DN65	492	686	641	784	978	116	502	382
		DN80	492	686	641	991 <sup>2)</sup>	1185 <sup>2)</sup>	124	510	382
		DN100	–	686	641	–	1237 <sup>2)</sup>	–	521	382
		DN125	–	686	641	–	1317 <sup>2)</sup>	–	533	382
WK 50	DN80	2"	469	801	697	862 <sup>2)</sup>	1192 <sup>2)</sup>	158	594	424
		DN65	469	801	697	948 <sup>2)</sup>	1280 <sup>2)</sup>	166	601	424
		DN80	469	801	697	781	1113	158	594	424
		DN100	469	801	697	1030 <sup>2)</sup>	1362 <sup>2)</sup>	169	605	424
		DN125	469	801	697	1105 <sup>2)</sup>	1437 <sup>2)</sup>	182	617	424
WK 70	DN100	DN65	589	1001	760	1080 <sup>2)</sup>	1492 <sup>2)</sup>	207	723	579
		DN80	589	1001	760	1110 <sup>2)</sup>	1522 <sup>2)</sup>	199	715	579
		DN100	589	1001	760	941	1353	188	704	579
		DN125	589	1001	760	1227 <sup>2)</sup>	1639 <sup>2)</sup>	201	717	579
		DN150	589	1001	760	1320 <sup>2)</sup>	1732 <sup>2)</sup>	215	731	579
WK 80	DN150	DN100	522	976	815	1123 <sup>2)</sup>	1577 <sup>2)</sup>	395	1121	788
		DN125	522	976	815	1160 <sup>2)</sup>	1630 <sup>2)</sup>	382	1108	788
		DN150	522	976	815	1004	1458	368	1094	788

<sup>1)</sup> Including horizontal intermediate flange (not shown)

<sup>2)</sup> Including concentric reducer (not shown)

## Burner weights<sup>5)</sup> (kg)

	WKG	WKL	WKMS	WKGL	WKGMS
WK 40	120	125	150 <sup>3)</sup> / 130 <sup>4)</sup>	135	155 <sup>3)</sup> / 140 <sup>4)</sup>
WK 50	165	160	165	165	170
WK 70	290	290	300	310	320
WK 80	440	420	430	460	470

<sup>3)</sup> Burner-mounted oil preheater

<sup>4)</sup> Separate oil preheater

<sup>5)</sup> Weights are approximate and exclude gas valve trains

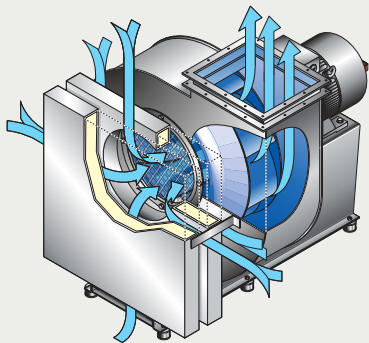
## Gas valve train weights<sup>6)</sup> (kg)

	1 1/2"	2"	DN65	DN80	DN100	DN125	DN150
WK 40	13	14	26	32	44	–	–
WK 50	–	14	30	31	46	41	–
WK 70	–	–	33	37	46	43	52
WK 80	–	–	–	–	59	54	50

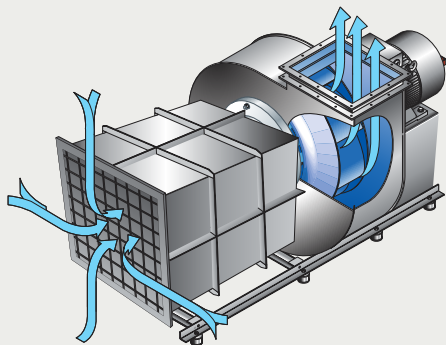
<sup>6)</sup> Approximate weight of the double gas valve assembly (incl. gas ignition pilot, if applicable) and connecting pipework to the gas butterfly valve.

Sound attenuation  
and orientation of  
combustion air fans

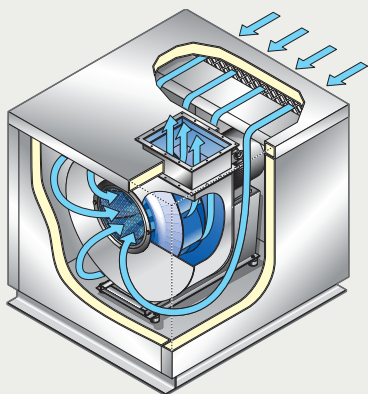
Lateral sound absorber



Lateral sound absorber



Full encapsulation



Combustion air fan housing orientation

Type L 90



Type L 180



Type L 270



Type L 360



Type R 90



Type R 180



Type R 270



Type R 360



Air outlets at other angles are available on request.

Housing orientation

The housing arrangement is to be considered as viewed from the drive side of the fan. Subsequent alteration of the alignment of the fan to its base is not possible, as the two parts are welded together during manufacture.



*Burners rated up to 32 MW are tested on the world's largest test-firing chamber in the R&D Centre*



*Precisely dimensioned burner sound absorber for the best possible attenuation*



*Xi'an, central China:  
The seven WKG gas burners in this heating centre provide more than 50 000 residents in the Zi Wei garden district with 115 MW of heat*

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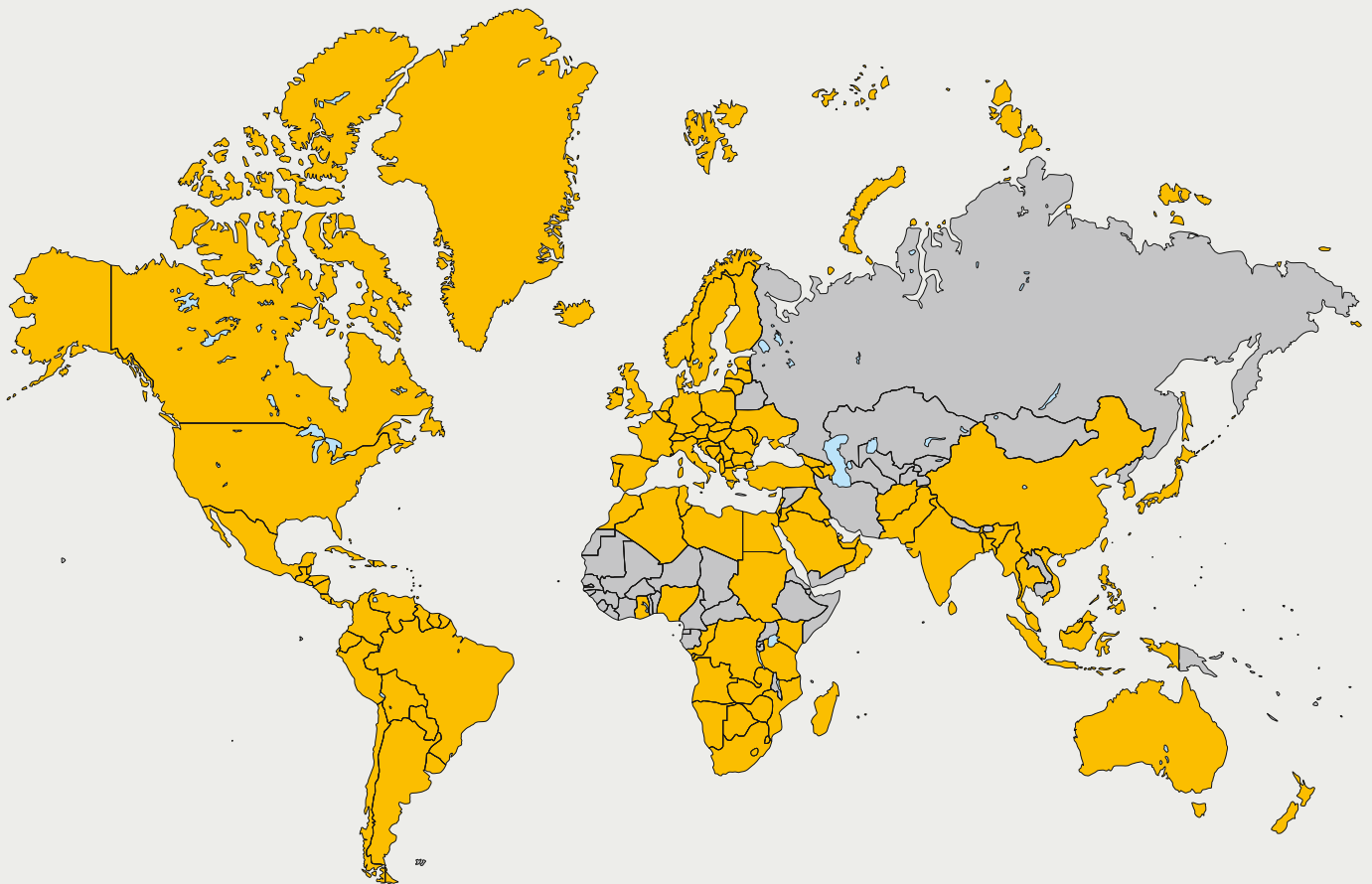
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Print No. 83159802, January 2023

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