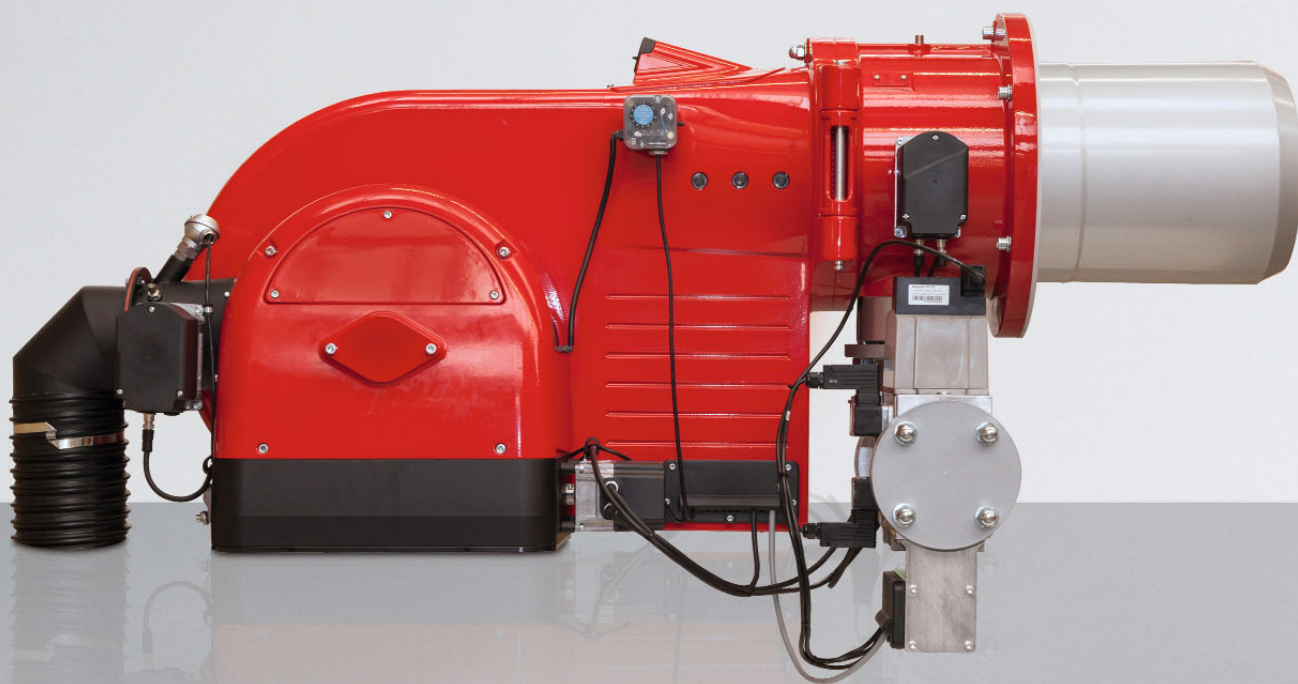


–weishaupt–

info

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网址：www.cncarl.com

Information on ultra-low NO_x gas burners



NO_x emissions < 30 mg/kWh

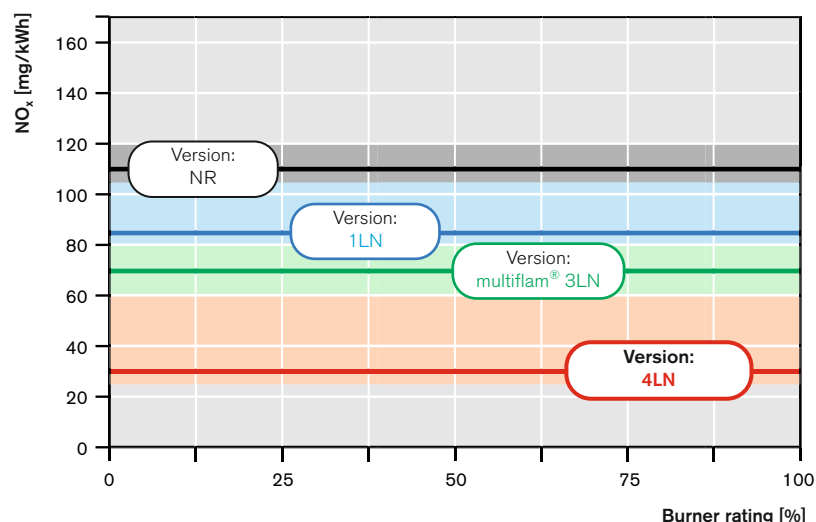
4LN-version gas burners (with flue gas recirculation)

NO_x emissions below 30 mg/kWh: 4LN-version Weishaupt monarch[®] burners

For many decades, the Weishaupt monarch[®] brand has been a byword for low emissions, robust equipment, and reliable operation.

The **4LN-version** of the current WM 20 to WM 50 range of Weishaupt monarch[®] burners can comply with the strictest environmental standards in force world-wide. A 4LN-version burner is equipped with a flue gas recirculation system whose control components are integrated with the burner.

Specially designed mixing assemblies and digital combustion management ensure that the key characteristics of Weishaupt burners – reliable ignition, a high degree of flame stability, and safe operation – remain very much to the fore.



The values are for the stated burner versions on three-pass combustion chambers with medium temperatures ≤ 110 °C. Weishaupt constraints based on the requirements of EN 676.

NO_x emissions achievable when firing natural gas

Burner executions

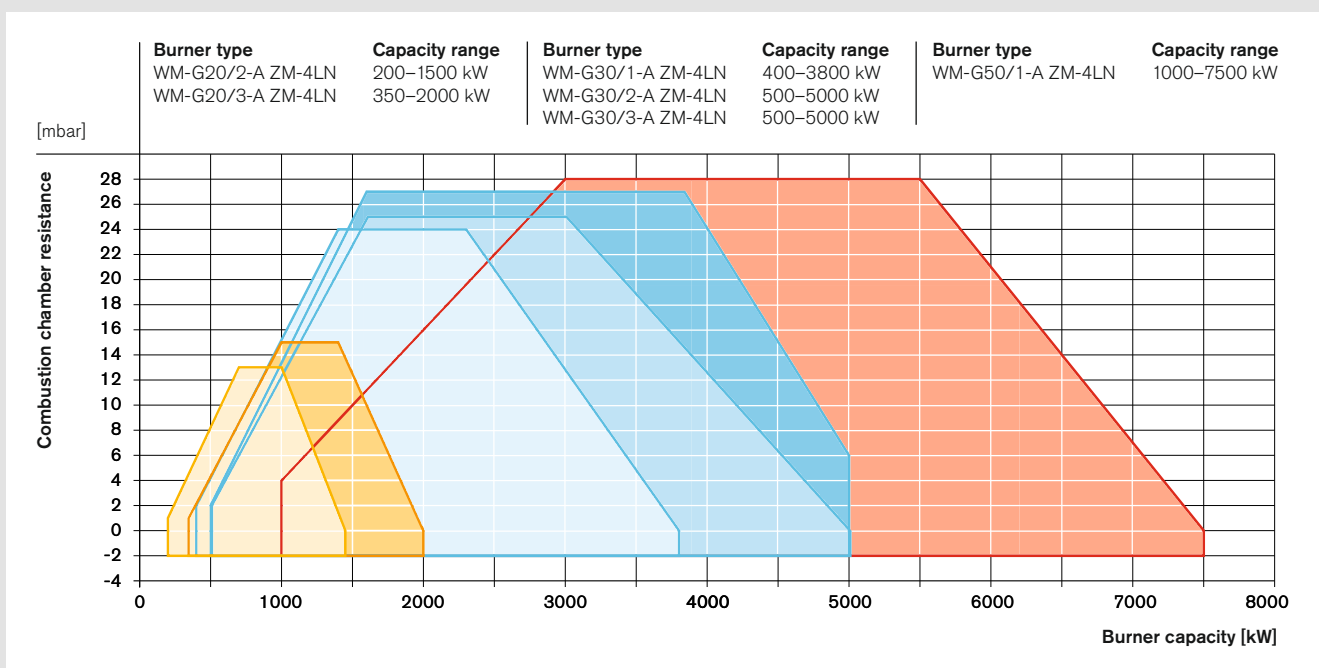
Version	Fuels		
	Gas	Oil	Dual-fuel
ZM-NR	●	●	●
ZM-LN	●	–	–
ZM-3LN	●	●	●
ZM-4LN	●	–	–

Version	Flue gas recirculation (FGR)	
	Gas	Oil
ZM-NR	○	–
ZM-LN	○	–
ZM-3LN	○	–
ZM-4LN	●	–

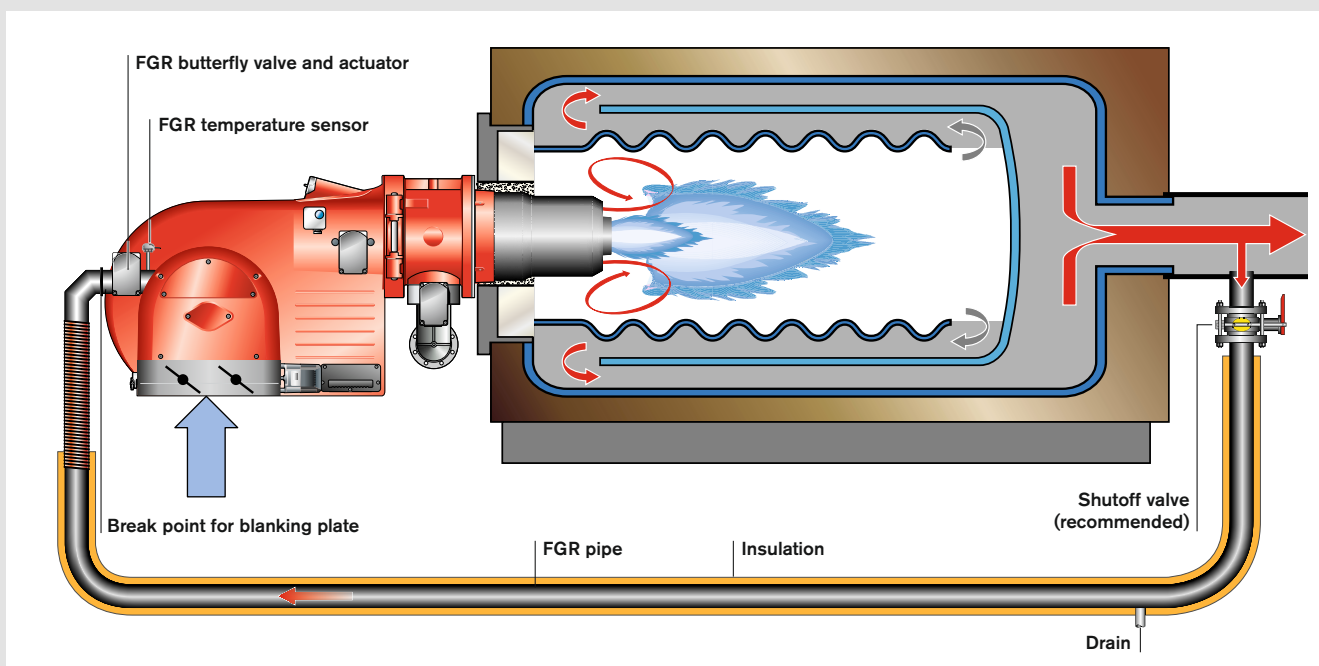
● Standard ○ Optional – Not available



Air inlet housing with factory-preassembled flue gas recirculation components

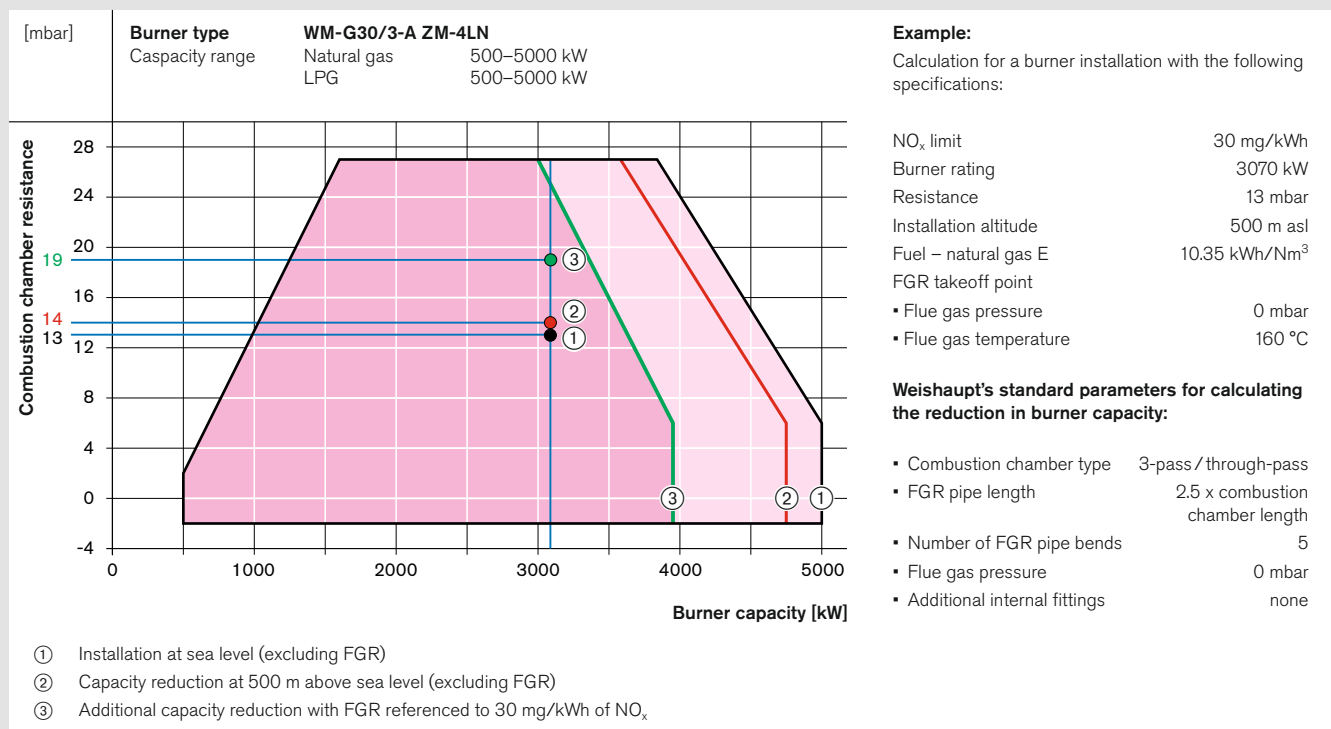


TÜV-certified capacity chart showing maximum burner capacity at a recirculation rate of 0 % – refer to page 4 for examples of capacity reductions with x % recirculation



General arrangement of a flue gas recirculation system with a WM-series burner

Capacity reduction with flue gas recirculation



Capacity graphs for gas burners certified in accordance with EN 676.

Stated ratings are based on an air temperature of 20 °C and an installation at sea level. For installations at higher altitudes, a reduction in capacity of 1 % per 100 m above sea level should be taken into account.

Why does burner capacity reduce?

Equipping a burner with flue gas recirculation reduces its capacity range. The extent of the reduction has to be calculated individually for each individual installation.

The burner fan was designed to supply combustion air. If a burner is equipped with flue gas recirculation, however, then the fan has to draw both air and flue gas and mix the two together. As a consequence, while the overall volume supplied by the fan remains the same, the addition of the flue gas reduces the total oxygen concentration. With less oxygen in the combustion air, the burner's capacity is reduced.

What does flue gas recirculation do?

- Reduce oxygen concentration per m³ of air
- Increase the air flow speed
- Shorten dwell times for combustion gases in the hot reaction zone
- Lower flame temperatures
- **Cut NO_x emissions**

Order numbers / availability

Gas burners

Burner type	Version	Valve train size	Order No.
WM-G20/2-A	ZM-4LN	R 1	217 218 11
		R 1 ½	217 218 12
		R 2	217 215 13
		DN 65	217 218 14
		DN 80	217 218 15
		DN 100	217 218 16
		DN 125	217 218 17
WM-G20/3-A	ZM-4LN	R 1	217 219 11
		R 1 ½	217 219 12
		R 2	217 219 13
		DN 65	217 219 14
		DN 80	217 219 15
		DN 100	217 219 16
		DN 125	217 219 17

CE-PIN: CE 0085BQ0032

Gas burners

Burner type	Version	Valve train size	Order No.
WM-G30/1-A	ZM-4LN	R 1 ½	217 322 12
		R 2	217 322 13
		DN 65	217 322 14
		DN 80	217 322 15
		DN 100	217 322 16
		DN 125	217 322 17
WM-G30/2-A	ZM-4LN	R 1 ½	217 323 12
		R 2	217 323 13
		DN 65	217 323 14
		DN 80	217 323 15
		DN 100	217 323 16
		DN 125	217 323 17
WM-G30/3-A	ZM-4LN	R 1 ½	217 324 12
		R 2	217 324 13
		DN 65	217 324 14
		DN 80	217 324 15
		DN 100	217 324 16
		DN 125	217 324 17
		DN 150	217 324 18

CE-PIN: CE-0085BU0359

Gas burners

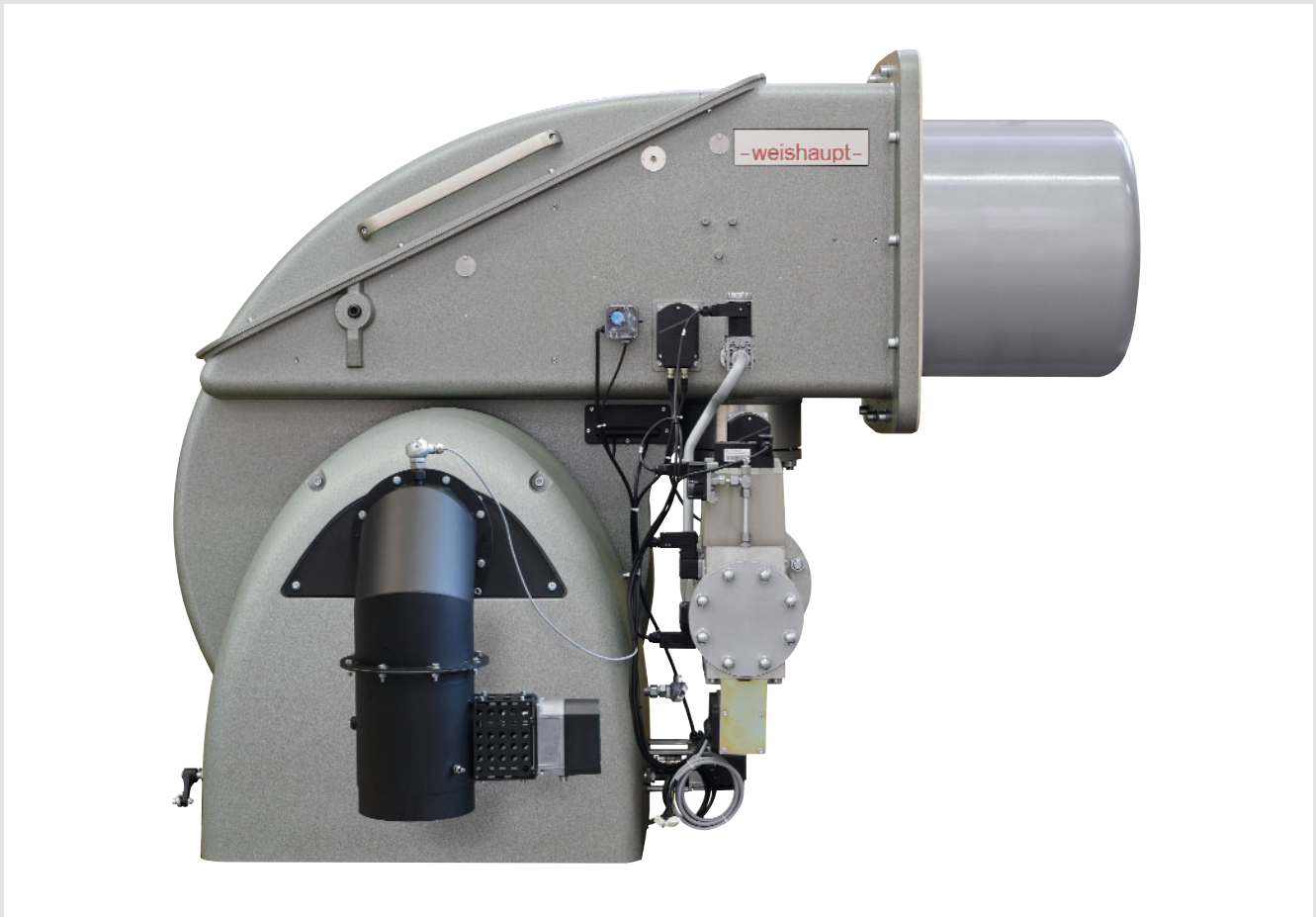
Burner type	Version	Valve train size	Order No.
WM-G50/1-A	ZM-4LN	R 2	217 523 13
		DN 65	217 523 14
		DN 80	217 523 15
		DN 100	217 523 16
		DN 125	217 523 17
		DN 150	217 523 18

CE-PIN: CE-0085 CP 0102

Availability

Burner type	Version	Available
WM-G20/2-A	ZM-4LN	Now
WM-G20/3-A	ZM-4LN	Now
WM-G30/1-A	ZM-4LN	Now
WM-G30/2-A	ZM-4LN	Now
WM-G30/3-A	ZM-4LN	Now
WM-G50/1-A	ZM-4LN	April 2017
WM-G50/2-A	ZM-4LN	2018

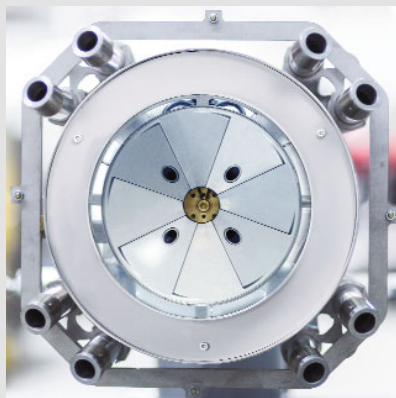
Very high capacity, very low emissions: The 4LN-version WKmono 80



WKmono-G80 with flue gas recirculation



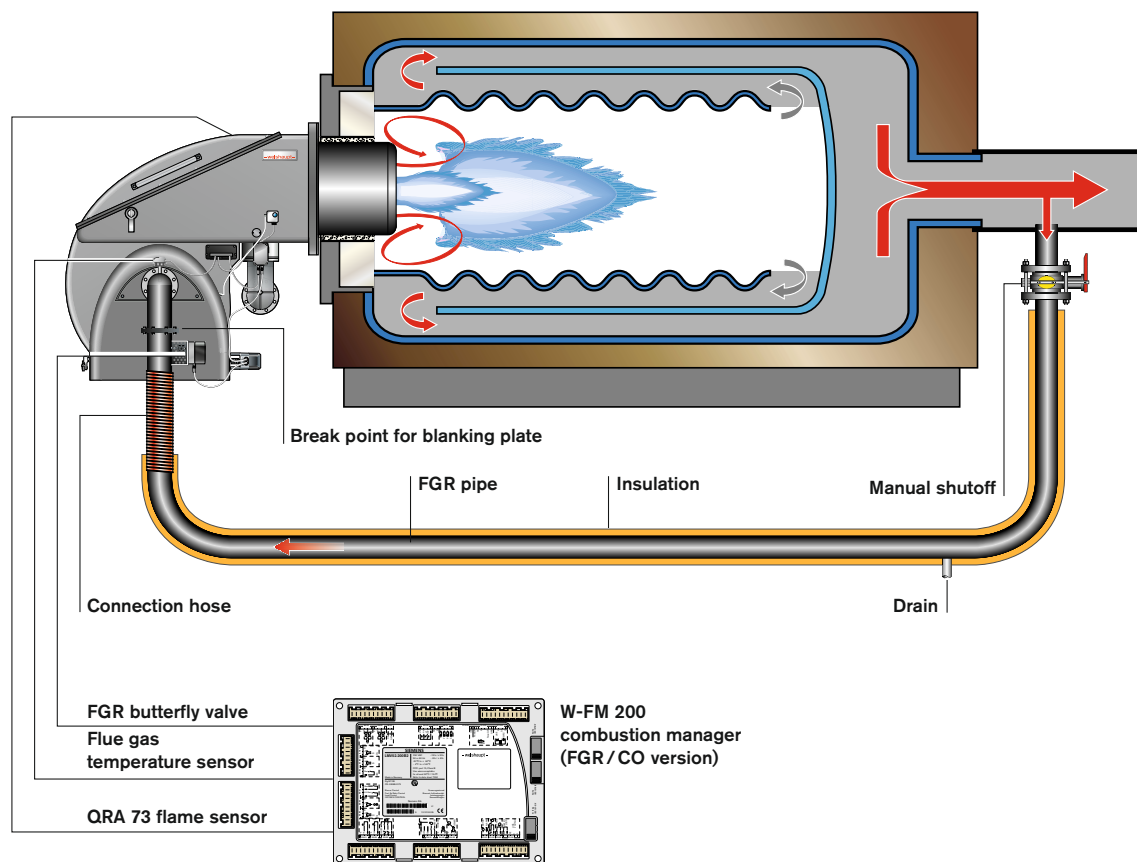
FGR connecting bend with actuator and Pt100



Gas-firing multiflam® mixing assembly

Flexibility with flue gas recirculation

Where stringent emission limits for oxides of nitrogen are in force, Weishaupt's multiflam® mixing assemblies for gas-fired burners can be combined with flue gas recirculation. Weishaupt takes advantage of the special properties of the flame geometry, and with it the adaption to the combustion chamber, to reduce NO_x levels.



General arrangement of a flue gas recirculation system with a WKmono-series burner

The multiflam® principle developed and patented by Weishaupt is a way to reduce nitrogen oxide emissions to a minimum.

At the heart of Weishaupt's multiflam® technology is a special mixing assembly design, which distributes the fuel among primary and secondary nozzles. This results in extremely efficient combustion thanks to recirculation of the flue gases directly at the mixing assembly.

If a specific market demands ultra-low NO_x emissions, Weishaupt combines multiflam® technology with external flue gas recirculation. This system, which is designed for gaseous fuels, reduces NO_x emissions to levels that will meet the most stringent of standards world-wide.

The compact FGR dosing unit is worth highlighting. The connecting bend incorporates the FGR butterfly valve and the associated temperature sensor. This packaged assembly allows the

system to be fully tested at the factory and avoids additional installation work on site.

The FGR system is controlled by the W-FM 200 combustion manager. An additional software module ensures the return of a temperature-compensated volume of flue gas at all operating stages, reliable cold start behaviour, and the highest degree of operational availability.

Very high capacity, very low emissions: WK-series burners with flue gas recirculation

Flue gas recirculation is of course also available for Weishaupt's WK-series industrial burners. The special modular design of the WK-series burners separates burner body from combustion air fan, thus facilitating innovative and customer-oriented solutions.

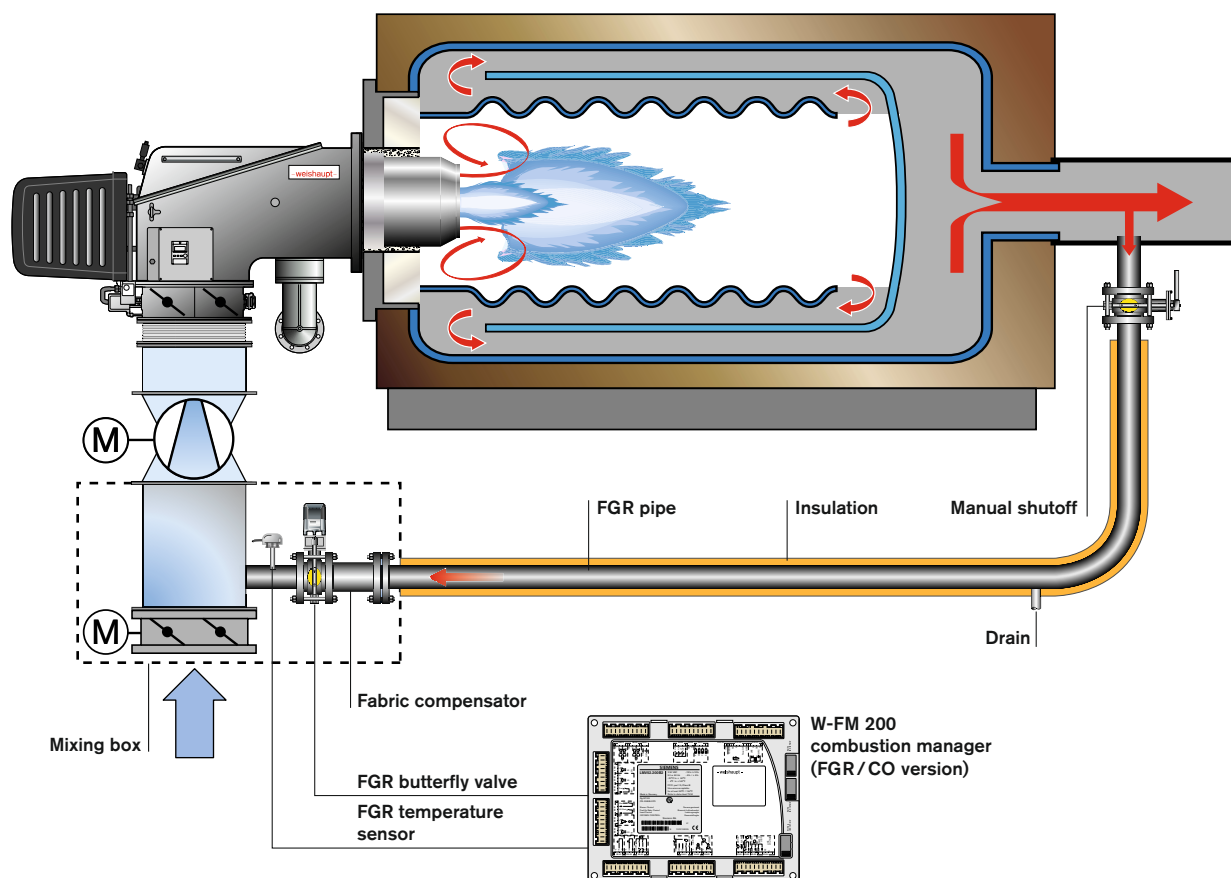
Weishaupt mixing box

The Weishaupt mixing box has been developed in a collaborative project with our combustion air fan manufacturer. It is fitted directly to the combustion air fan and forms a compact assembly with fixed dimensions. The mixing box consists of a housing with an 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.

Advantages

To the customer, the mixing box presents many advantages. Precise site plans can be drawn up, the manufacture of fully encapsulating sound absorbers can proceed without the need for on-site measurements, installation times are reduced, and – the crucial factor for functionality – everything is in the right place.

All in all, a convincing, fully packaged solution.

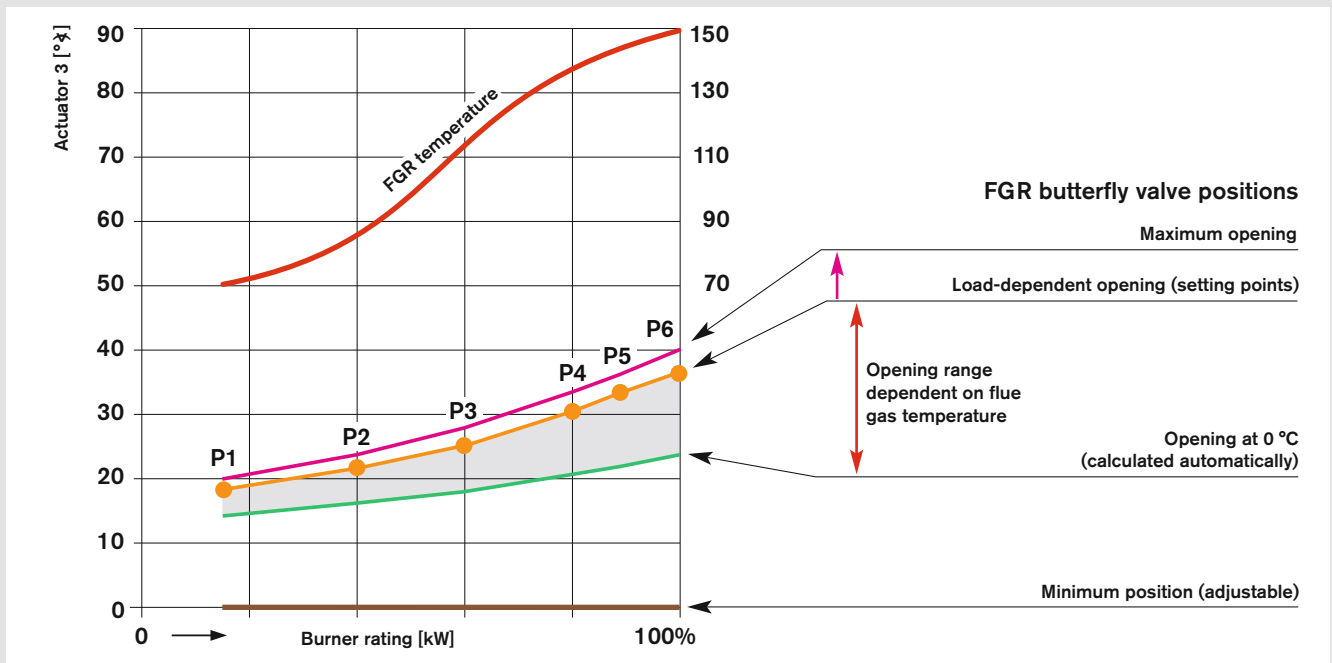


General arrangement of a flue gas recirculation system with WK-series burner and mixing box



Mixing box for flue gas recirculation at the combustion air fan

Functional and safe: Temperature-compensated flue gas dosing



Flue gas recirculation

You connect the burner's air inlet to the flue of the boiler with a hose, draw the flue gas off with the burner fan, and feed it back into the flame with the combustion air. The result: extremely low NO_x emissions.

However, the critical factor is the precise dosing of the recirculated flue gas. The W-FM 200 combustion manager is best placed to control this. With just two additional components – a flue gas temperature sensor and a butterfly valve – and some additional software, the W-FM 200 can control the flow of flue gas so that the correct amount will be fed into the combustion air under all operating conditions, providing reliable startup and operational behaviour – just as you would expect.

Simple commissioning

The W-FM 200's compound regulation provides up to 15 setting points which can be positioned as required throughout the burner's operating range. This allows the volume of recirculated flue gas to be matched precisely to the combustion conditions.

Flue gas temperature is also crucial in determining the volume of flue gas to be recirculated. The temperature of the flue gas affects its density and thus the mass flow rate.

The flue gas temperature is measured continuously to ensure stable burner operating behaviour and consistently low NO_x levels. Variations in temperature are compensated for automatically by adjustments to the FGR butterfly valve.

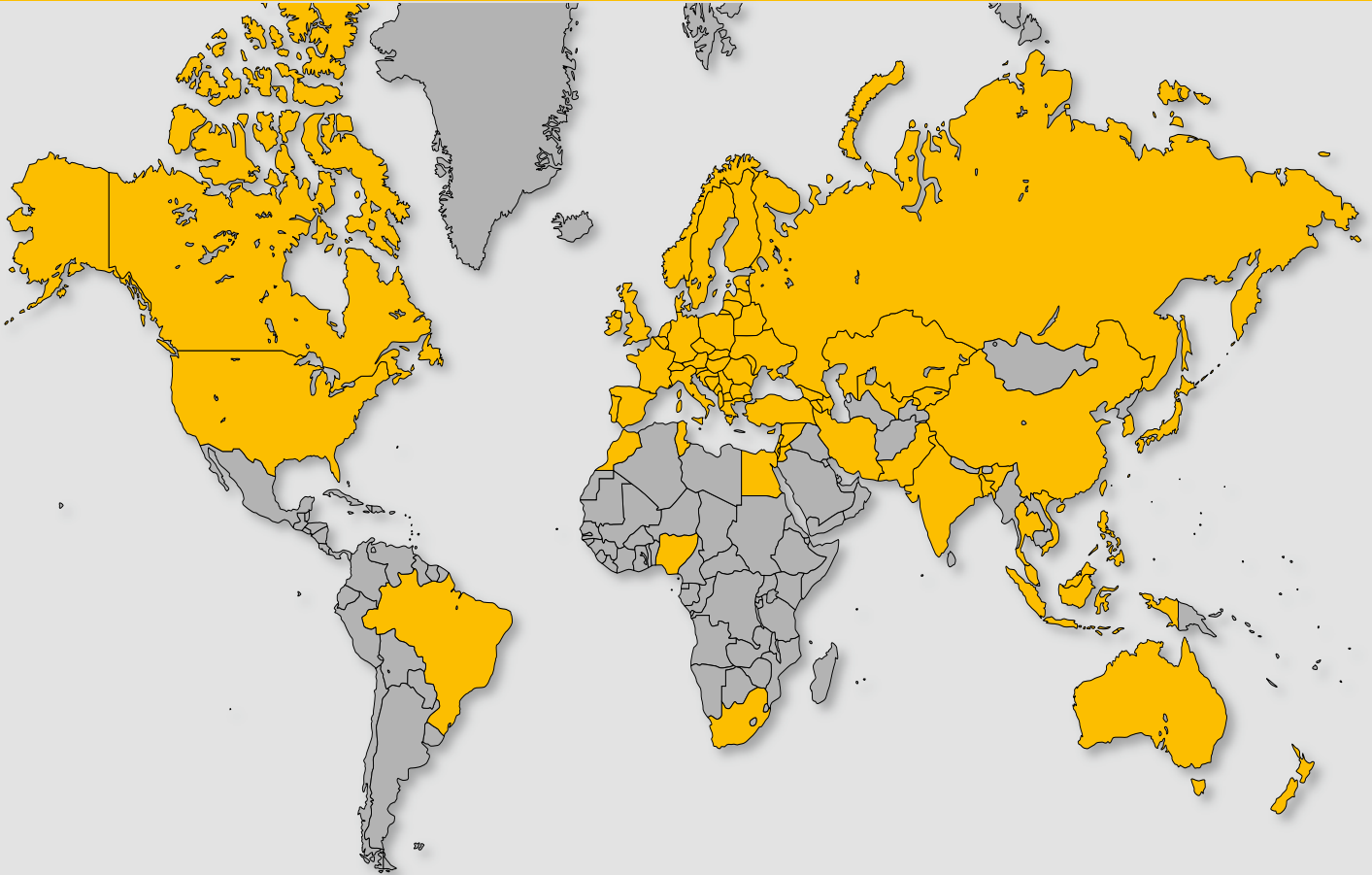
System-specific adaptations

As well as controlling the FGR butterfly valve, the W-FM 200 combustion manager's software has parameters at hand that allow additional adjustments to be made.

It is possible to define minimum and maximum FGR butterfly valve positions, and make adjustments via correction factors if the operational behaviour of the system as a whole calls for it.



Burners with FGR on long-term test in the Weishaupt factory's boiler room



Spain
Switzerland (W)
Syria
Taiwan
Thailand
Tunisia
Turkey
Ukraine
UAE
Vietnam