

**Technical information**  
**Monobloc burners**

**–weishaupt–**

Weishaupt monarch<sup>®</sup> burners  
WM20 80–3000 kW

**WM 20**

**Gas**

**Oil**

**Dual-fuel**



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# Progress and tradition.



*For decades, the monarch® trademark has stood for burner power and quality.*

Weishaupt's monarch®-series burners have been used on a wide variety of heat generators and industrial plant for more than six decades and their success has helped underpin Weishaupt's outstanding reputation.

The latest monarch® series is writing the next chapter in this success story. State-of-the-art technology and a compact design combine to make these powerful burners suitable for a wide range of applications.

## Use.

### Fuels

- Natural gas
- LPG
- Class D gas oil per BS 2869/IS 251
- Class A2 gas oil per BS 2869/IS 251
- Green fuels

Further details on green fuel specifications can be found on page 27.

The suitability of fuels of differing quality must be confirmed in advance with Weishaupt.

### Applications

Weishaupt WM20 burners are suitable for intermittent firing and continuous firing on:

- EN 303-compliant heat generators
- LTHW boilers
- HTHW boilers
- Steam boilers
- Air heaters
- Certain process applications



### Permissible ambient conditions

- Ambient temperature
  - 15 °C to +40 °C for gas firing
  - 10 °C to +40 °C for oil firing
- 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:

**EMC** EMC Directive  
2014/30/EU

**LVD** Low-Voltage Directive  
2014/35/EU

**MD** Machinery Directive  
2006/42/EC

**GAR** Gas Appliance Regulations  
(EU) 2016/426

**PED<sup>1)</sup>** Pressure Equipment Directive  
2014/68/EU

**RoHS** Restriction of Hazardous Substances  
Directive  
2011/65/EU

<sup>1)</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.

# The right version for every application.

**The latest WM-series burners are compact, powerful, and quiet. They are writing the next chapter in the decades-long success story of Weishaupt's legendary monarch® burners.**

## **Groundbreaking fan technology**

Right from the very earliest stages of burner development, particular emphasis was placed on a compact, aerodynamic design and low operational noise levels.

To realise this goal a completely new air inlet and air damper control were developed. This special housing design with its self-opening air inlet and the new air-damper technology result in increased fan pressure and thus in greater capacity despite the burner's more compact form.

Air damper control provides a high degree of linearity even at the lower end of the burner's operating range and, combined with the sound-attenuated air inlet which is included as standard, ensures quieter operation.

## **Fast commissioning, simple servicing**

All WM20 burners are delivered with their mixing assembly preset for the required output, provided all relevant appliance details are known. Final adjustments are made using the menu-controlled commissioning program.

All of the burner's components, such as its mixing assembly, air damper, and combustion manager, are readily accessible despite its compact form. This enables maintenance and servicing work to be carried out quickly and easily, aided by the standard hinged flange which provides a perfect servicing position.

Adjustment to suit different combustion chamber conditions can easily be made with

the burner in its installed position. The integral sightglass enables ignition behaviour and the flame to be observed.

## **Burner versions**

Various burner versions are available to meet differing emission limits and operational requirements:

### **ZM version**

Gas, oil, and dual-fuel burners tested for Class 2 emissions.

### **LN version (Low-NO<sub>x</sub>)**

Gas burners tested for Class 3 emissions.

### **3LN version**

Gas, oil, and dual-fuel burners with multiflam® mixing assemblies. The burners, which are tested for Class 3 emissions, are for use on three-pass and through-pass boilers only and are suitable for the combustion of natural gas, LPG, and gas oil.

### **4LN version**

Gas and dual-fuel burners with FGR (flue gas recirculation) that can meet the world's most stringent emissions limits. Good emission values depend on the specific combustion chamber geometry, the thermal loading of the combustion chamber, and its configuration (three-pass or reverse-flame).

### **PLN version**

Gas burners with special premix technology for NO<sub>x</sub> values below 30 mg/kWh without flue gas recirculation. The burners are also suitable for small combustion chambers.

### **ZMI version**

Gas burners with an extended turndown range for special industrial applications.

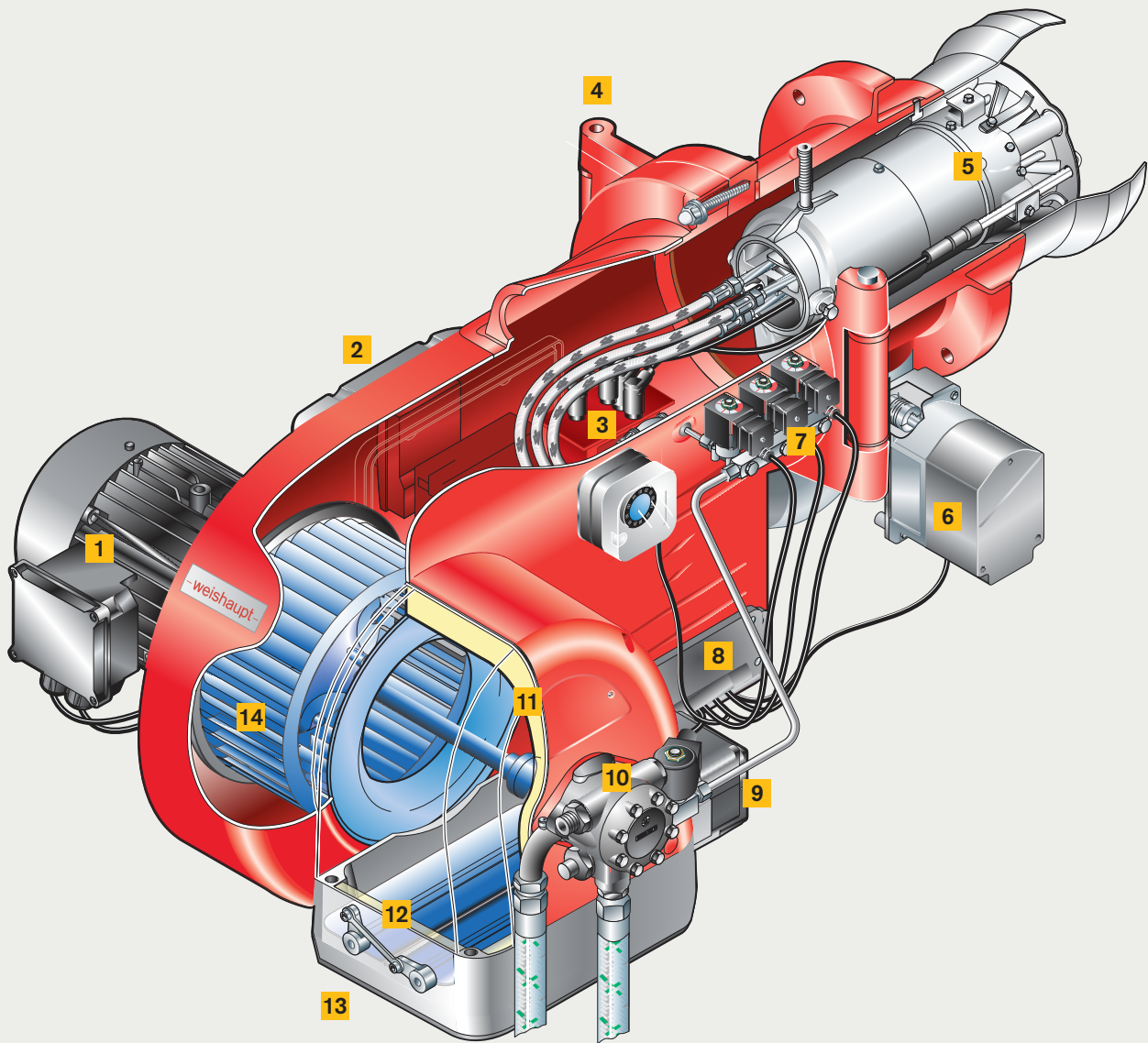
## **The key benefits:**

- Digital combustion management with electronic compound regulation
- Compact design
- Easy access to all components
- Sound-attenuated air inlet as standard for quieter operation
- IP 54 protection
- Can be used with a wide variety of gases, such as natural gas, LPG, town gas, coke-oven gas\*, biogas\*, sewage gas\*, or coal-mine methane\* (\*gas analysis required)
- Various mixing assemblies to suit different emission limit requirements
- Suitable for intermittent and continuous firing
- Load control can be effected via thermostat, pressure transducer, or current/voltage signals
- Sliding-two-stage or modulating operation when firing on gas
- Either three-stage, sliding-two-stage, or modulating operation when firing on oil, depending on the burner version and the method of load control
- When the necessary data are provided, all WM burners are supplied with the mixing assembly preset for the required output of the burner. WM-L burners are also supplied with their oil nozzles fitted
- Electromagnetic clutch for decoupling of the oil pump (optional in lieu of standard on some models)
- Computer-controlled function test of each individual burner at the factory
- Well-established, global service network

## **Additional optional features**

- VSD (variable-speed drive)
- Integral KS 20 load controller (burners with W-FM50/54)
- Air inlet for ducted air supply



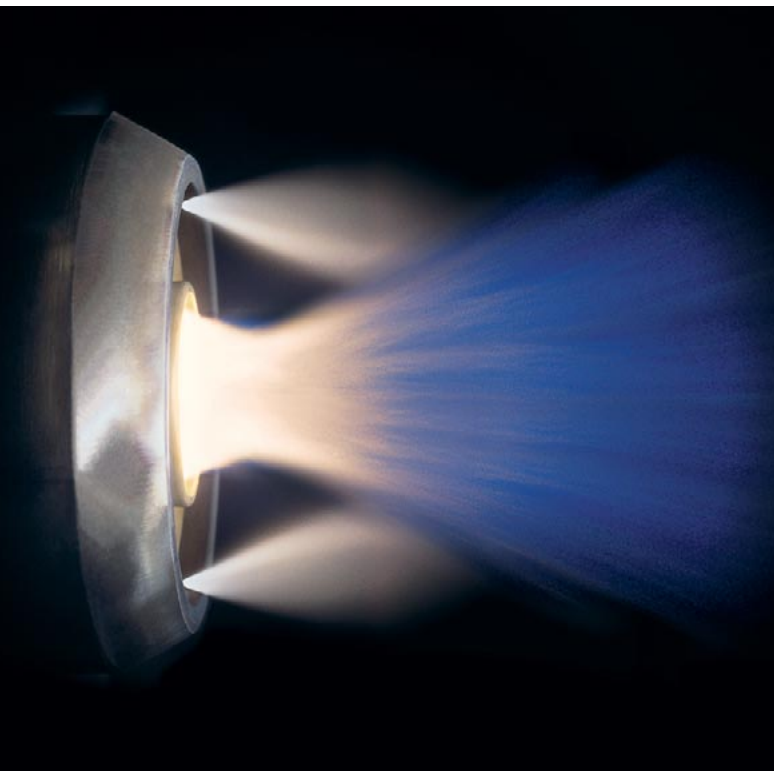


WM-GL20 version ZM-T

- |   |  |  |
|---|--|--|
| <b>1</b> Burner motor with integral contactor                             | <b>5</b> Mixing assembly                     | <b>10</b> Oil pump                           |
| <b>2</b> Digital combustion manager and inbuilt control and display unit  | <b>6</b> Gas butterfly valve actuator        | <b>11</b> Sound-attenuated air inlet housing |
| <b>3</b> Electronic ignition unit (three-pole)                            | <b>7</b> Oil solenoid valves                 | <b>12</b> Air damper                         |
| <b>4</b> Burner housing can be hinged open to the left or right-hand side | <b>8</b> Installation-friendly cable routing | <b>13</b> Protective grille                  |
|   | <b>9</b> Air damper actuator                 | <b>14</b> Fan wheel                          |

# Reduced emissions with 3LN burners.

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*Typical flame pattern of a multiflam® burner*

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

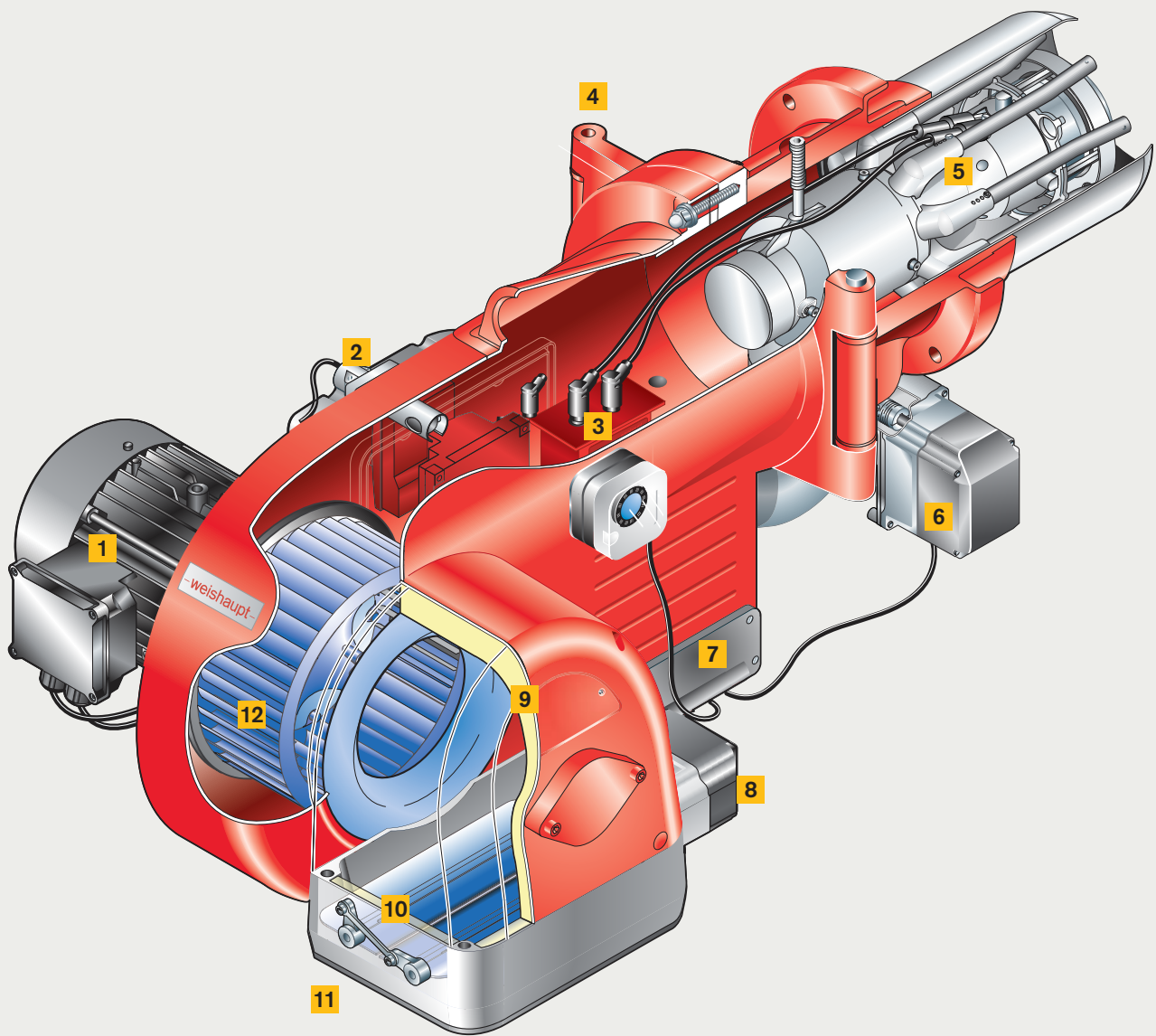
Right at the core of Weishaupt's multiflam® technology lies its special mixing assembly design. Fuel is distributed among several nozzles and then combusted in a primary and a secondary flame. Temperature in the flame's core is considerably reduced, which results in an effective reduction of nitrogen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

The wide range of ratings across which multiflam® burners are now available is equally outstanding. All the way from the WM10 monarch®-series burner right up to the WK80 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 limit 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).

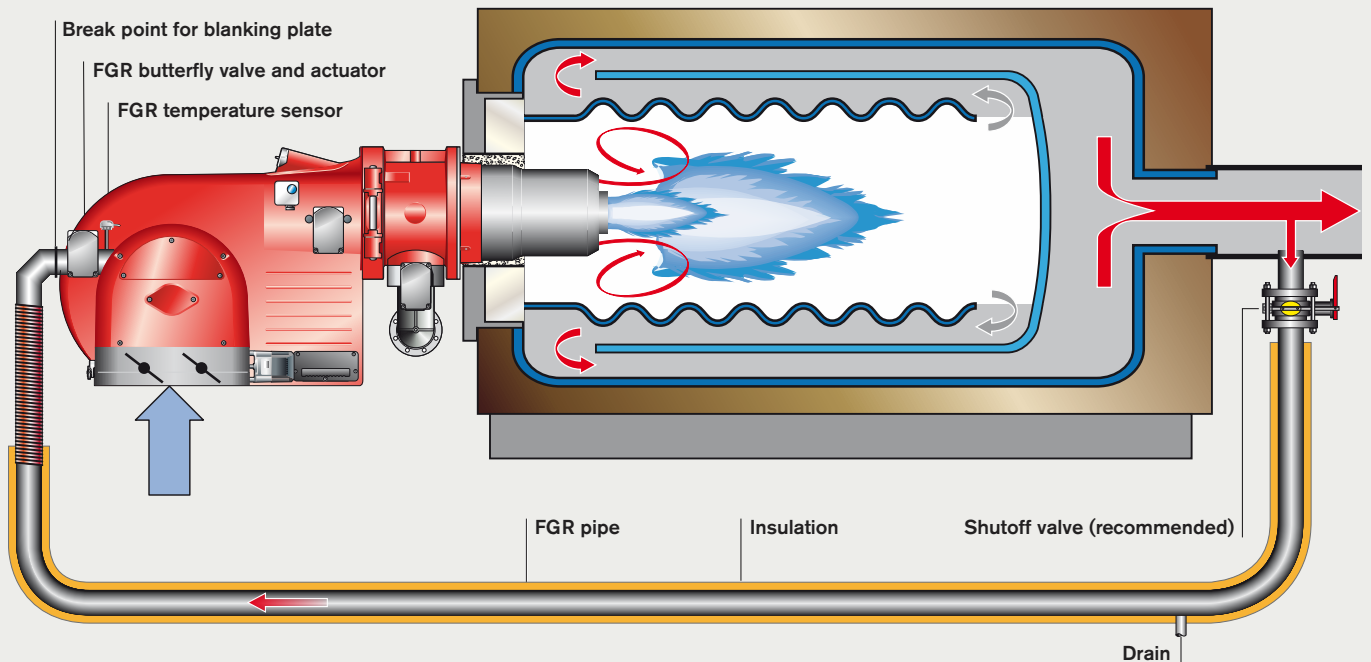
When Weishaupt guarantees the NO<sub>x</sub> emissions for a particular application, the guarantee can only be made with reference to certain predefined constraints, including thermal loading, the combustion air temperature and humidity, medium temperature, measurement tolerances, etc.



WM-G20 version ZM-3LN

- |   |  |   |
|---|--|---|
| <b>1</b> Burner motor with integral contactor                             | <b>5</b> Mixing assembly                     | <b>9</b> Sound-attenuated air inlet housing |
| <b>2</b> Digital combustion manager and inbuilt control and display unit  | <b>6</b> Gas butterfly valve actuator        | <b>10</b> Air damper                        |
| <b>3</b> Electronic ignition unit (three-pole)                            | <b>7</b> Installation-friendly cable routing | <b>11</b> Protective grille                 |
| <b>4</b> Burner housing can be hinged open to the left or right-hand side | <b>8</b> Air damper actuator                 | <b>12</b> Fan wheel                         |

# Reduced emissions with 4LN burners.



General arrangement of an FGR system  
with a WM-series burner

**Weishaupt 4LN-version burners are an innovative further development of patented multiflam® technology combined with flue gas recirculation (FGR).**

At the heart of this further development of larger multiflam® burners lies a swirl body in the secondary air area and a longer flame on the primary diffuser.

In combination with external FGR, the swirl body generates an intensive mixing of the fuel, air, and recirculated flue gas. The primary flame, which is adapted for high flue gas recirculation rates, ensures the flame remains stable at all stages of operation.

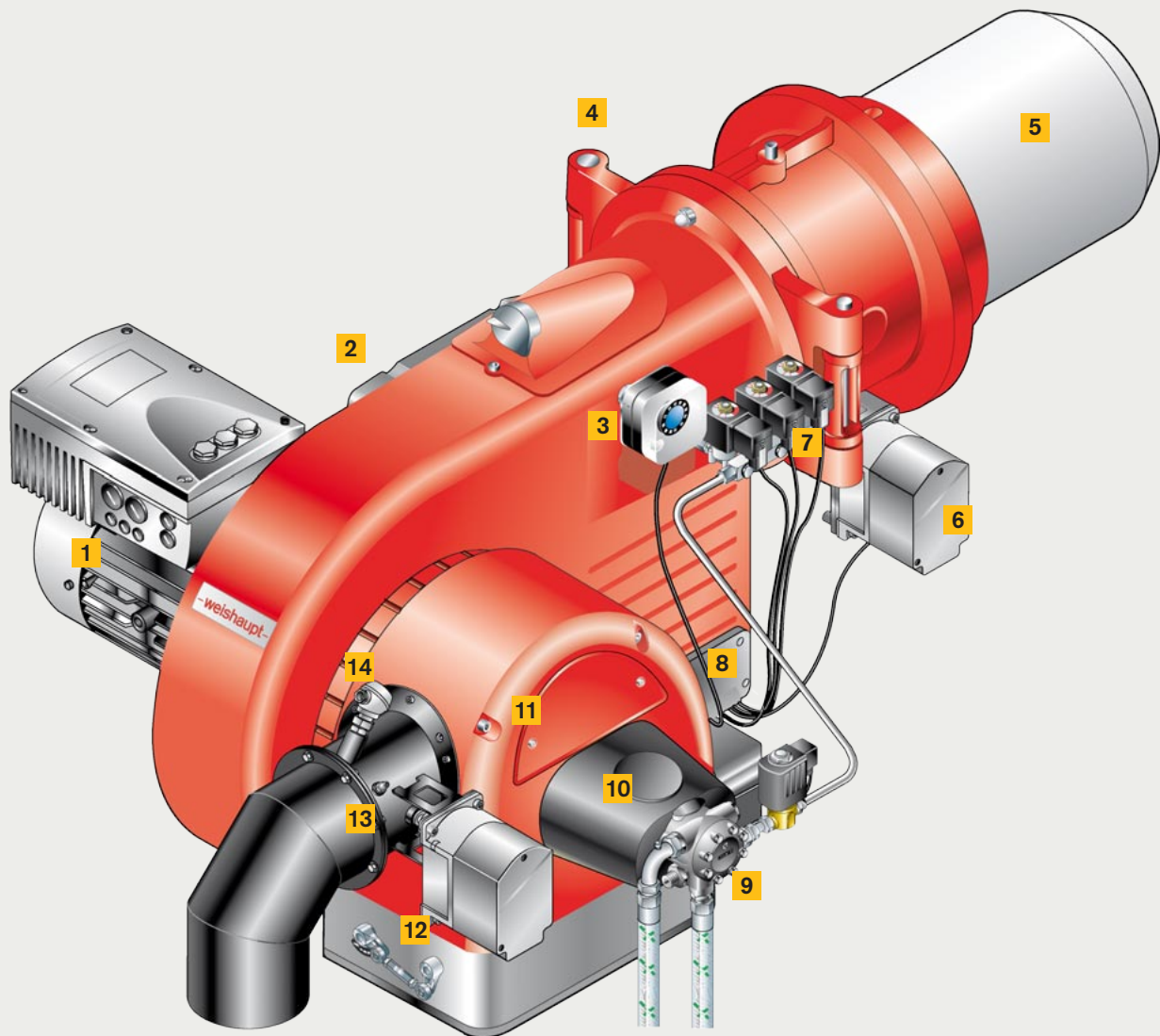
## How does FGR work?

Flue gas recirculation affects the formation of thermal NO<sub>x</sub> by reducing the concentration of oxygen in the combustion air. This results in increased air flow speed, which reduces the dwell time of the combustion gases in the hot reaction zone and thereby lowers the flame temperature.

## Note for oil firing

When a dual-fuel burner is firing on oil, the FGR system should normally be closed off by means of a separate shutoff assembly that is installed at the takeoff point and monitored by a limit switch.

Operating the FGR system while the burner is firing on oil is only possible if the fuel meets specific prerequisites and must be approved in advance by Weishaupt.

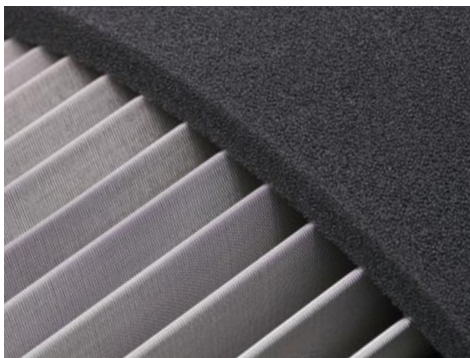


WM-GL20 version ZM-T-4LN

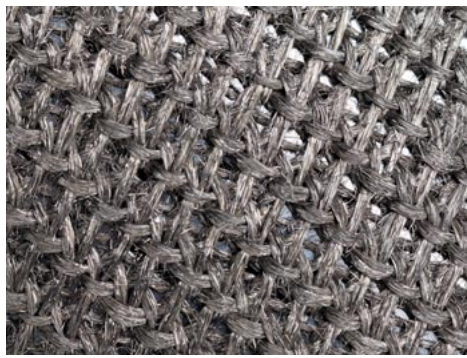
- |   |  |  |
|---|--|--|
| <b>1</b> Burner motor with optional frequency converter                   | <b>5</b> Flame tube with mixing assembly     | <b>10</b> Electromagnetic clutch             |
| <b>2</b> Digital combustion manager and inbuilt control and display unit  | <b>6</b> Gas butterfly valve actuator        | <b>11</b> Sound-attenuated air inlet housing |
| <b>3</b> Air pressure switch  | <b>7</b> Oil solenoid valves                 | <b>12</b> FGR butterfly valve actuator       |
| <b>4</b> Burner housing can be hinged open to the left or right-hand side | <b>8</b> Installation-friendly cable routing | <b>13</b> Flue gas recirculation             |
|   | <b>9</b> Oil pump                            | <b>14</b> Temperature sensor                 |



# Reduced emissions with PLN burners.



*The metal gauze air filter is protected from dust by an additional pre-filter sleeve*



*A microweave mat made from a high-quality alloy permits the right amount of gas / air mix to pass*



*Weishaupt PLN-version burners can also be used in very small combustion chambers*

**Everywhere in the world, emission limits are becoming ever tighter, with a focus on NO<sub>x</sub> emissions in particular. A new generation of ultra-low-NO<sub>x</sub> burners has therefore been developed by Weishaupt to fulfil these demands.**

Weishaupt burners have always been particularly efficient and environmentally friendly. Premix engineering is used to achieve NO<sub>x</sub> emissions below 30 mg/kWh.

Premixing followed by surface-stabilised combustion has been state of the art for many years in small condensing boilers. It is environmentally friendly, reliable, and efficient. Extending these benefits to typical heat generators with larger outputs was the developmental goal for these PLN-version burners.

#### **Special gas / air mix**

Stabilised surface combustion relies on a homogeneous gas/air mixture. For that reason, a completely new mixing assembly was developed for the PLN-version burners. A key feature is the separated gas and air feeds, with the two media not being brought together before the burner tube. At that point, a uniform mix is produced from the gas that is flowing out through the distributor and the combustion air that has been set in rotation by the swirl plate.

#### **Stabilised surface combustion**

The gas/air mix, which is under pressure, permeates the microweave alloy mat and combusts at its surface. The flame carpet thereby created has flame temperatures below 1 200 °C and thus the formation of thermal NO<sub>x</sub> is inhibited. NO<sub>x</sub> emission levels below 30 mg/kWh are now also a reality for medium-capacity burners.

One substantial benefit of this technology is to be found in the combustion chamber requirements. These can be considerably smaller than those found in typical boilers.

Weishaupt's PLN-version premix burners also have similar turndowns to their forced-draught stablemates. The burners' W-FM 50, W-FM 100 and W-FM 200 digital combustion managers control the electronic compound regulation, which can achieve turndown ratios of up to 7:1.

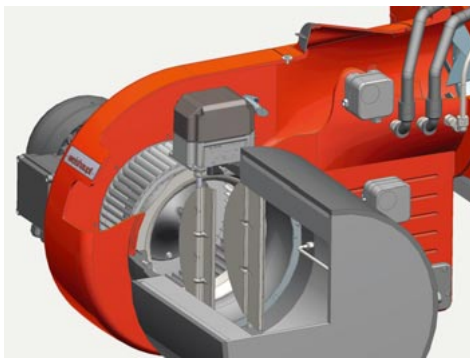
- 1** Burner motor with integral contactor
- 2** Additional UV flicker detector for increased safety
- 3** Burner housing can be hinged open to the left or right-hand side
- 4** Monitoring unit with ignition and ionisation electrodes
- 5** Combustion surface made from high-quality alloy
- 6** Insulator
- 7** Air pressure switch 1 (inlet pressure)
- 8** Air pressure switch 2 (mixing pressure)
- 9** Two-stage air filtration (metal gauze with prefilter)
- 10** Air damper actuator



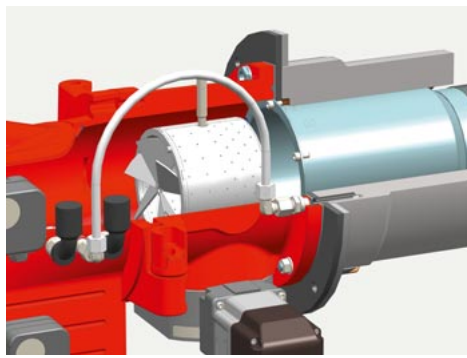
*Weishaupt premix technology meets  
ultra-low NO<sub>x</sub> emission limits*



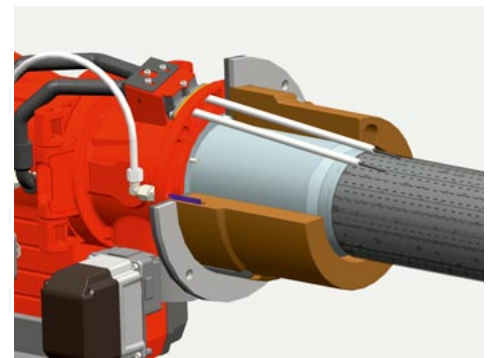
# Safety first.



*The air damper has been designed to be particularly aerodynamic*



*The special mixing of gas and air is conducive to reliable ignition behaviour*



*An insulator provides optimal heat shielding to the mixing assembly and electrode unit*

## Clean combustion air

The combustion surface's alloy microweave mat is only able to distribute the gas/air mixture evenly if its pores are not blocked by particles. Weishaupt therefore employs a special metal gauze air filter. An additional pre-filter sleeve is used to keep larger dust particles at bay. This sleeve can be washed or replaced as required.

## Ignition and monitoring

The burner's ignition electrode and ionisation electrode are brought together as a monitoring unit. The electrodes are fed through the insulator to protect them from the heat and are also air cooled.

## Optimal safety and reliability

The PLN-version burners are especially equipped with two monitoring systems. An ionisation electrode monitors the combustion surface, while an infra-red flicker detector secures the premix chamber and the burner tube.

## Uninterrupted monitoring

The air volume, and thus the cleanliness of the air filter, is continuously monitored during burner operation by an additional air pressure switch. The necessary air volume is thereby always guaranteed.

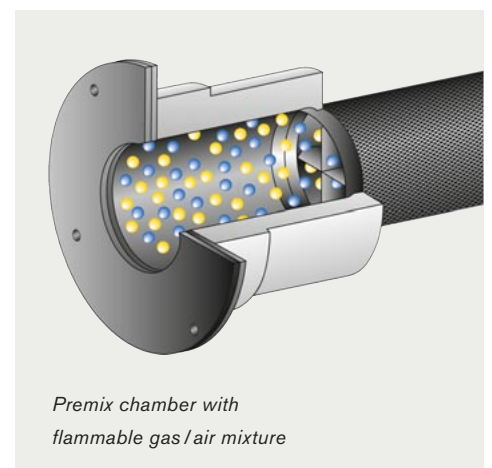
## Thermal insulators

Thermal protection of the premix chamber, which contains the flammable gas/air mixture, is a safety-critical aspect of PLN-version burners.

Conscious of their importance, Weishaupt has developed precisely tailored insulators that are suited to the thermal conditions. The insulators provide optimal protection against any uncontrolled heat influences in this very sensitive area.

An insulator designed for temperatures up to 850 °C is suitable for burners used on low-temperature hot-water boilers with through-pass or three-pass combustion chambers.

Steam boilers and thermal fluid heaters will place a considerably higher demand on the insulator, as will reverse-flame boilers (which will require OEM approval of the application). Weishaupt offers a high-temperature ceramic insulator for such plant, providing optimal protection for temperatures up to 1 200 °C.

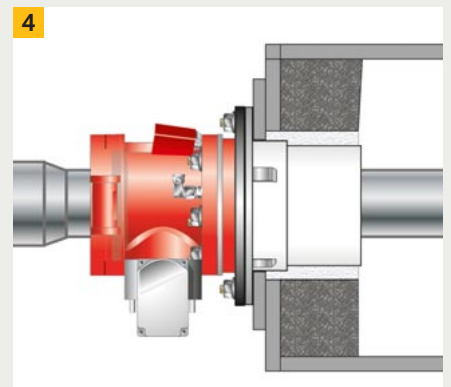
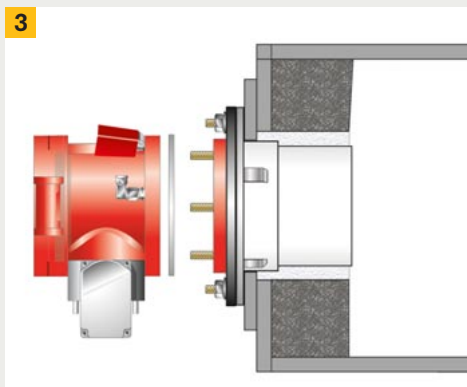
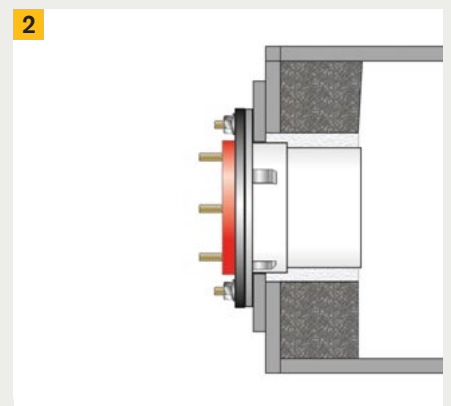
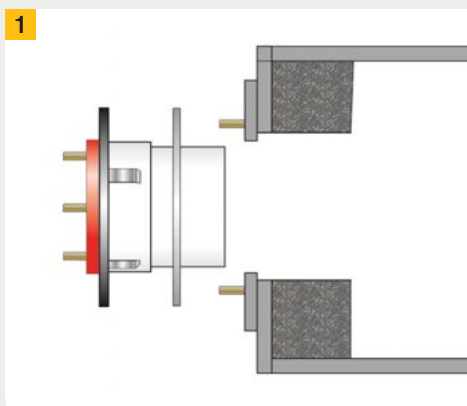


*Premix chamber with flammable gas/air mixture*

## Easy installation, simple servicing.

The burner is installed in five easy steps:

- 1 Installation of the insulator
- 2 Checking of the insertion depth and insulation of the annulus
- 3 Mounting of the hinged flange
- 4 Insertion of the combustion surface (optional installation aid available)
- 5 Attachment of the burner to the hinged flange.



The burner hinges a full 90°, enabling the burner tube to be withdrawn through the mounted flange

# ZMI burners with high turndowns.

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**The ZMI version of Weishaupt's WM-G20 monarch® burner was developed with industrial applications particularly in mind. It has a large turndown range and is designed for use on process plant.**

The burner can achieve a turndown of up to 15:1 and its output is matched – within its operating range – to current heat demand.

#### **Zero governor**

ZMI versions of Weishaupt WM-G20 gas burners are additionally equipped with a zero governor, which has a flexible impulse line connecting it to the airflow upstream of the burner's fan. This compensates for drops in gas pressure between partial and full load.

#### **Fuels**

Natural gas  
LPG

The suitability of fuels of differing quality must be confirmed in advance with Weishaupt.

#### **Applications**

ZMI versions of Weishaupt WM-G20 gas burners are suitable for intermittent firing and continuous firing on:

- Air heaters
- Process plant

#### **Approvals**

The ZMI version of the Weishaupt WM-G20 burner is not type tested. The burner's safety equipment meets the requirements of EN 676. If an approval inspection is required, this should be arranged with an appropriate body by the plant operator.

#### **EU directives and regulations**

The burners fulfil the applicable requirements of EU directives and regulations, with the exception of the Gas Appliances Regulation (EU) 2016/426. The applied standards are detailed in the declaration of conformity. The burners are labelled with a CE mark.



*The large turndown range of up to 15:1 makes ZMI-version burners ideal for thermal process plant*

# Options for more flexibility.

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**The best products can be made even better if they are equipped with the right options.**

The **7-pin and 4-pin plugs** so familiar on the W-series burners can also be supplied on WM20 burners. Many boilers are equipped with the appropriate mating connectors for these. The optional plugs make connecting the burner to the electrical power supply straightforward, and also enable the burner to be electrically isolated with ease for servicing.

Sliding-two-stage burners can be equipped with a **load controller** in order to benefit from the advantages of modulating operation. It is integrated into the cover over the burner's electronics and is supplied fitted and wired. The load controller is preconfigured at the factory and adapts to the behaviour of the system automatically.

In addition to a contactor, the burner motor's **large electrical junction box** can also be equipped, if required, with electronic over-current protection.

All industrial burners have options available to improve their efficiency, emissions, and safety. Equipping a burner with **VSD** (variable speed drive) will considerably reduce both its electrical consumption and noise emissions at partial load.

**O<sub>2</sub> trim and CO control** increase a system's safety and efficiency. A temperature sensor in the flue gas system will indicate that a limit value has been exceeded, which points to a fouling of the heat generator.

The **length of combustion head** required is determined by criteria such as the mounting depth of the burner, the boiler design, or the technical application. The burner's standard-length combustion head can be extended by 100, 200, or 300 mm, covering the majority of requirements. Of course, longer extensions are possible upon request.

If high combustion chamber temperatures would otherwise radiate back through the burner while the plant is not operating, the burner fan will be set up to run continuously. During this time, an **electromagnetic clutch** is used to decouple the oil pump, which is driven by the fan axle. This has the advantage of keeping the pump cool and reducing wear. Additionally, the electrical power consumption of the burner motor is reduced during this continuously running fan phase.

In many applications, it is not always possible to guarantee that the combustion air being supplied to the burner will be clean and free of pollutants. For situations such as these, Weishaupt can equip the WM20 burner with an **air inlet flange**. By connecting a ducted extraneous air supply to this inlet flange, it is possible to draw combustion air from a "clean" and temperature-controlled zone.

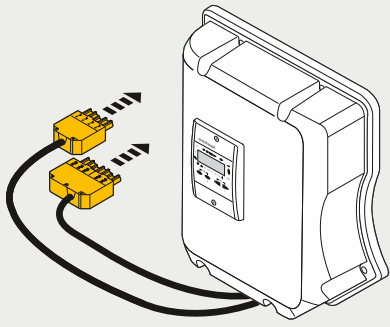
The air inlet flange comes as standard with an additional air pressure switch that protects against low inlet pressure and ensures the burner is supplied with a sufficient volume of air at all times.

The W-FM 100 and W-FM200 combustion manager's **CAN bus system** enables them to be installed either onboard the burner or, optionally, inside a separate control panel. This allows for an optimal adaptation to the operating conditions of the plant.

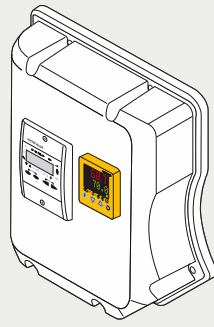
Depending on execution, a Weishaupt **sound absorber** could reduce noise emissions by up to 25 dB(A). Consider, for example, the WM-G20/2-A ZM-LN with a sound pressure level of 79 dB(A). With a sound-absorbing shroud, this can be reduced to 54 dB(A).



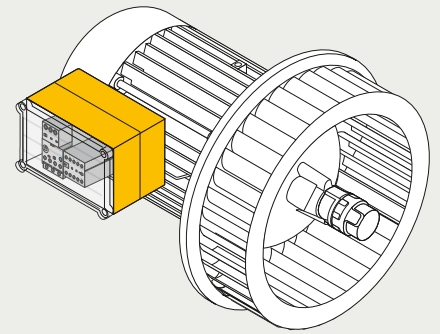
7-pin and 4-pin plug connections



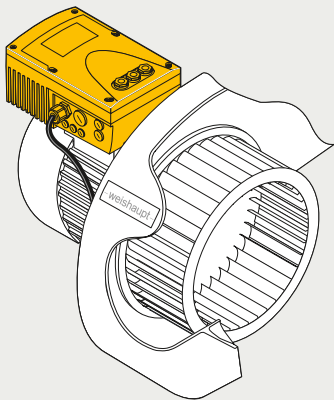
Integral KS20 load controller



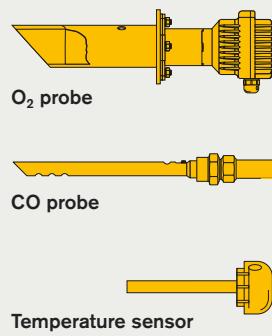
Motor junction box with contactor and optional electronic overcurrent protection



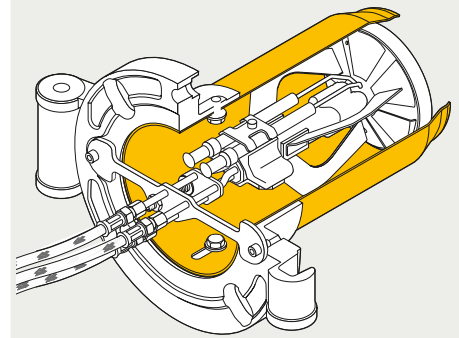
Motor-mounted frequency converter for VSD



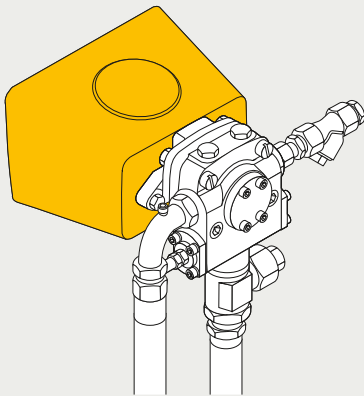
Monitoring and control of flue gases for O<sub>2</sub>, CO and temperature



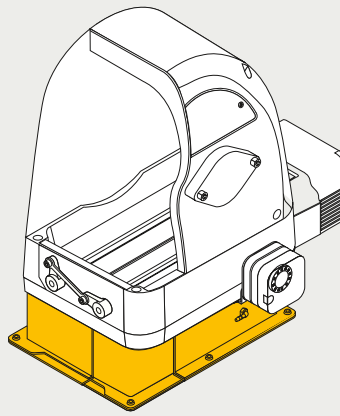
Combustion head extension for matching to the boiler door / insulation



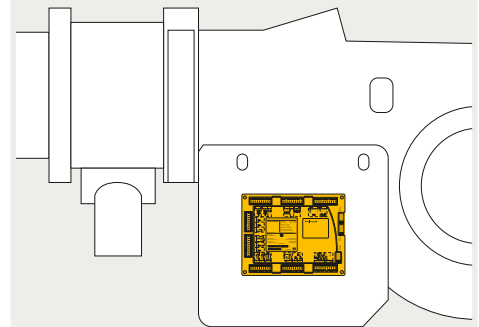
Electromagnetic clutch for oil-firing burners with continuously running fan



Combustion air ducted from clean areas



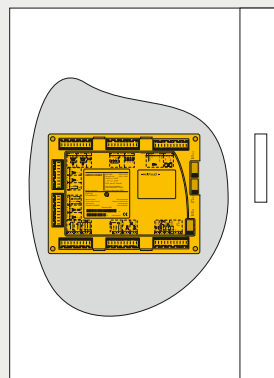
Burner-mounted W-FM 100 or W-FM 200 combustion manager



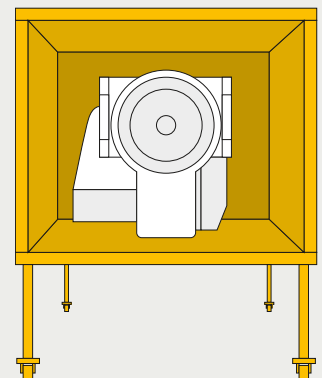
ACS 410 and ACS 450 commissioning software



Panel-mounted W-FM 100 or W-FM 200 combustion manager



Sound-absorbing shroud



# Reliable and safe.

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

Weishaupt WM20-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 the burner's control and display unit. The W-FM50 and W-FM54 combustion managers are both equipped with a language-neutral control and display unit that is easy to understand and enables all of the data set on the combustion manager to be saved, changed, and printed.

## The key benefits

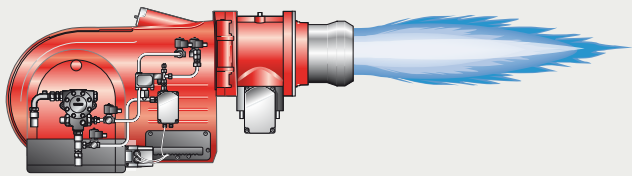
- Digital combustion management makes burner operation simple and reliable
- No additional burner controls are necessary as control is effected by the combustion manager
- Commissioning and servicing takes less time. Servicing software or the combustion manager's menu-driven commissioning program is used to run through final site-specific adjustments and the combustion emission checks

| General system overview<br>Digital combustion management   | W-FM 50         | W-FM 54         | W-FM 100        | W-FM 200        | W-FM 1000 CMS   |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|
| Single-fuel operation                                      | ●               | –               | ●               | ●               | ●               |
| Dual-fuel operation  | –               | ●               | ●               | ●               | ●               |
| Combustion manager for intermittent firing                 | ●               | ●               | ●               | ●               | ●               |
| Combustion manager for continuous firing >24 h             | ● <sup>2)</sup> | –               | ●               | ●               | ●               |
| Flame sensor for intermittent firing                       | ION/QRA2/ORB    | QRA2            | ION/QRI/ORB/QRA | ION/QRI/ORB/QRA | ION/FFS08/FFS07 |
| Flame sensor for continuous firing > 24 h                  | ION             | –               | ION/QRI/QRA 73  | ION/QRI/QRA 73  | ION/FFS08/FFS07 |
| Max. number of actuators in electronic compound            | 2               | 3               | 4               | 6               | 8               |
| VSD available  | ●               | ●               | –               | ●               | ●               |
| O <sub>2</sub> trim available                              | –               | –               | –               | ●               | ●               |
| Gas valve proving  | ●               | ●               | ●               | ●               | ●               |
| 4-20 mA input signal                                       | ●               | ●               | ○               | ●               | ●               |
| Self-regulating PID controller for temperature or pressure | ○               | ○               | ○               | ●               | ○               |
| Language-neutral control and display unit                  | ●               | ●               | –               | –               | –               |
| Clear text control and display unit                        | –               | –               | ●               | ●               | –               |
| Control and display unit with colour graphical display     | –               | –               | –               | –               | ●               |
| Removable control unit (max. distance)                     | 20 m            | 20 m            | 100 m           | 100 m           | 100 m           |
| Fuel consumption meter (switchable)                        | ● <sup>1)</sup> | ● <sup>1)</sup> | –               | ●               | ●               |
| Combustion efficiency display                              | –               | –               | –               | ●               | ●               |
| eBUS/Modbus interface                                      | ●               | ●               | ●               | ●               | ○/●             |
| PC-supported commissioning                                 | ●               | ●               | ●               | ●               | ●               |

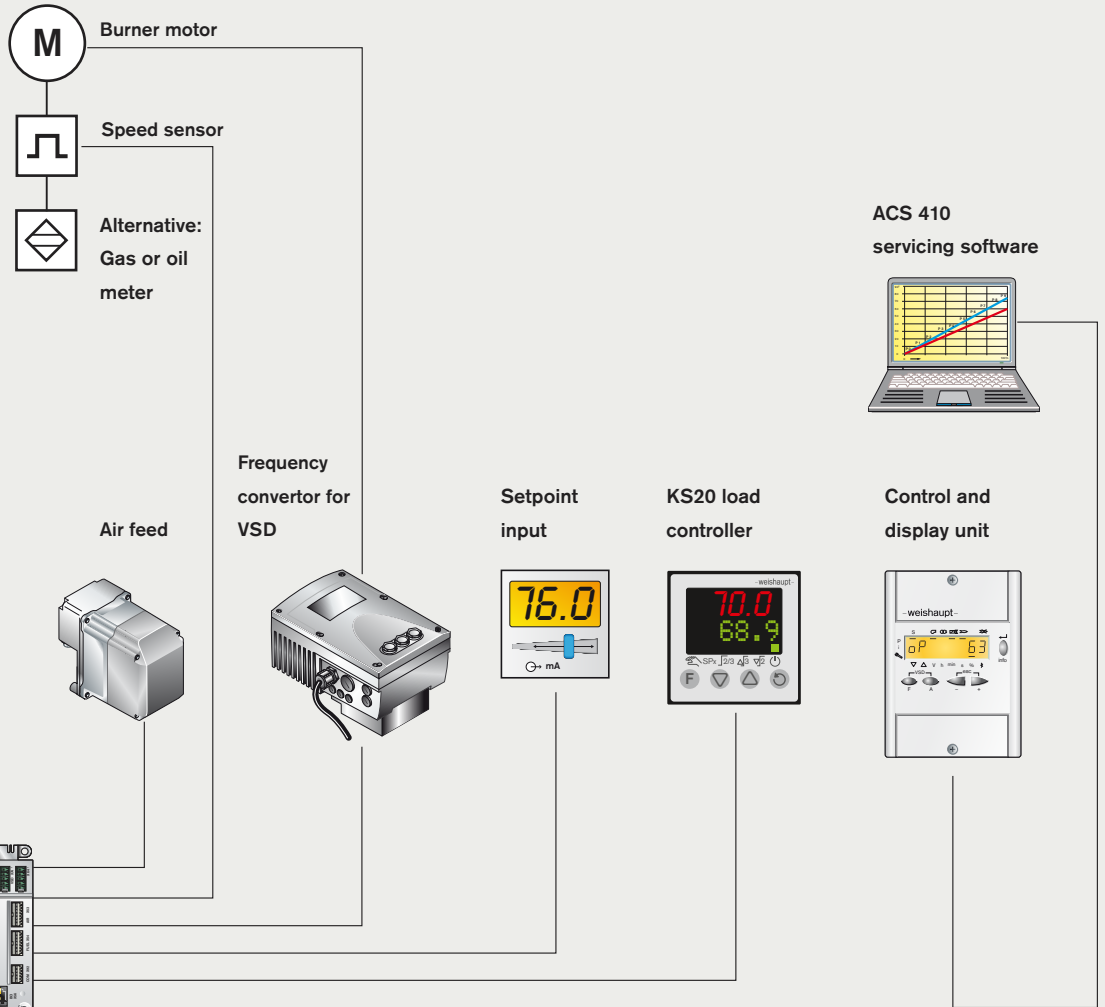
Please enquire regarding connections available for additional functions, e.g. flue gas dampers, oil shutoff assemblies, etc.

- Standard    <sup>1)</sup> Not in conjunction with VSD  
○ Optional    <sup>2)</sup> Gas burners with ionisation probes only

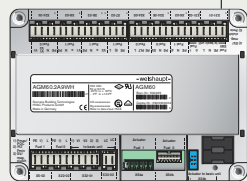




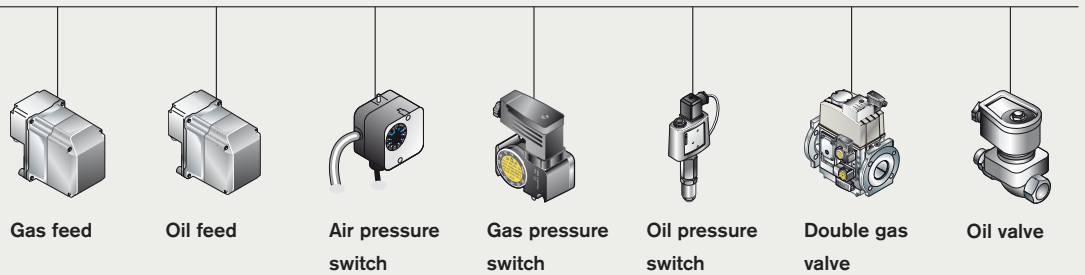
Burner with digital combustion management



W-FM 54 combustion manager and switch unit

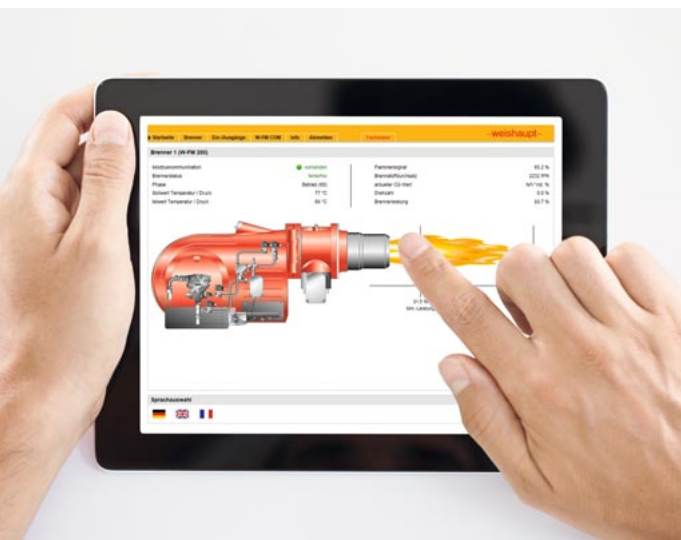


Switching of actuators, pressure switches, and valves



Schematic representation with W-FM 54

# 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.

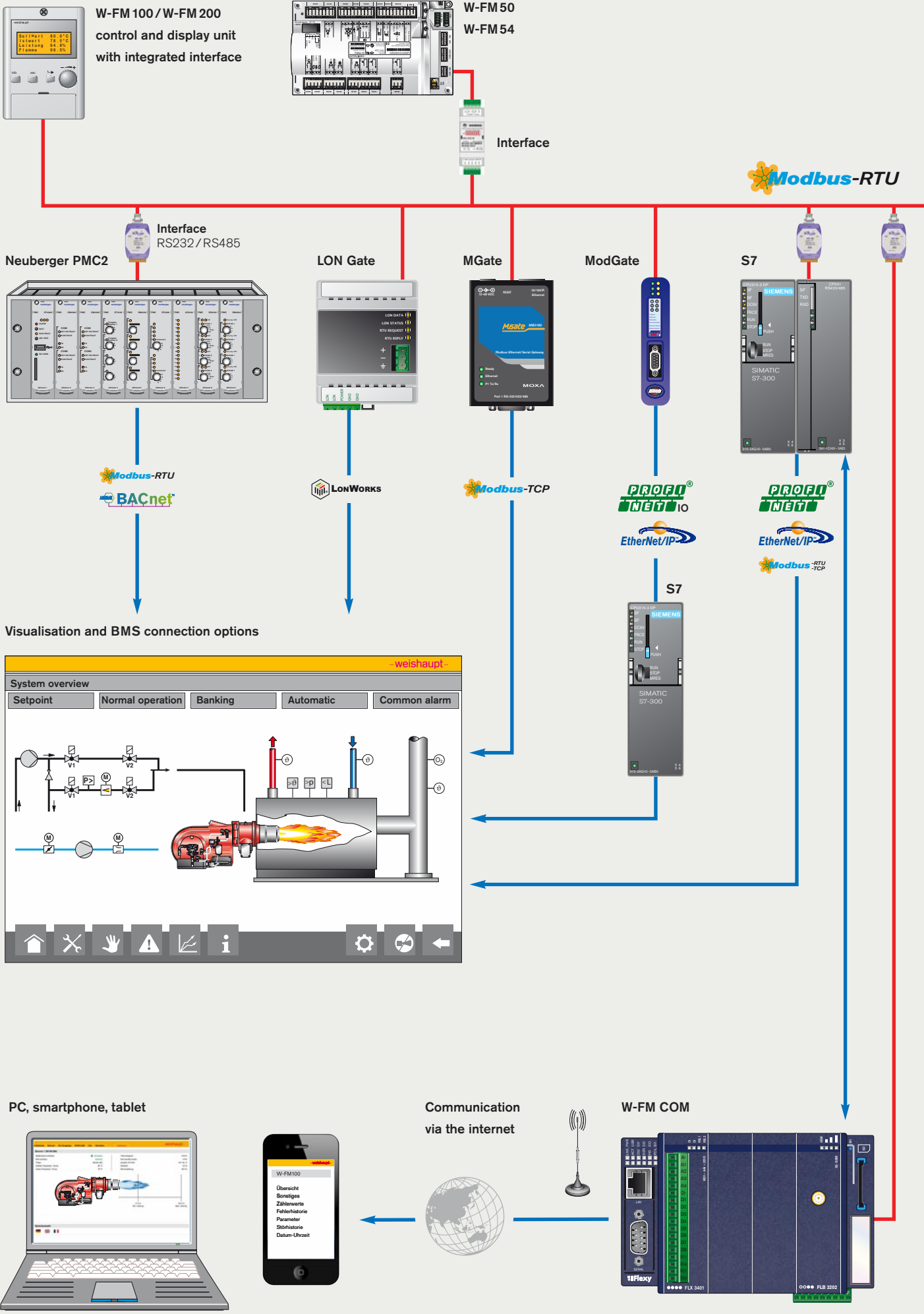
A graphical HMI is available to provide a user-friendly overview of the system with its setpoints and measured values. The touch-screen display allows specific functions to be adjusted and monitored, such as the system parameters and the setpoints of individual and multi-boiler plant and other ancillary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



# Load control

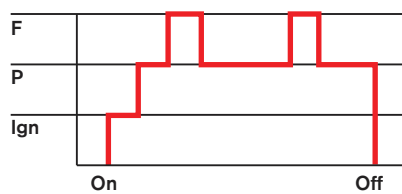
## Model designation

### WM 20

#### Two-stage (Z) with low-impact start

- 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. The burner undergoes a low-impact start with nozzle 1.

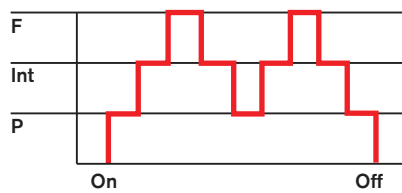
Two-stage



#### Three-stage (T)

- The burner is driven, via a two-point signal (e.g. thermostat or pressure control) to full, intermediate, or partial load in response to heat demand. Two-stage load control with low-impact start or low-impact changeover is also possible.

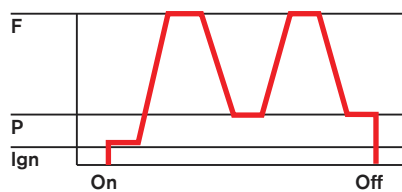
Three-stage



#### 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.

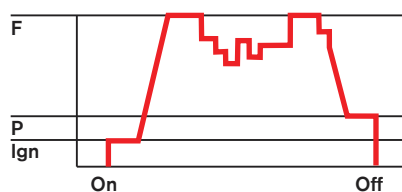
Sliding-two-stage



#### Modulating (ZM)

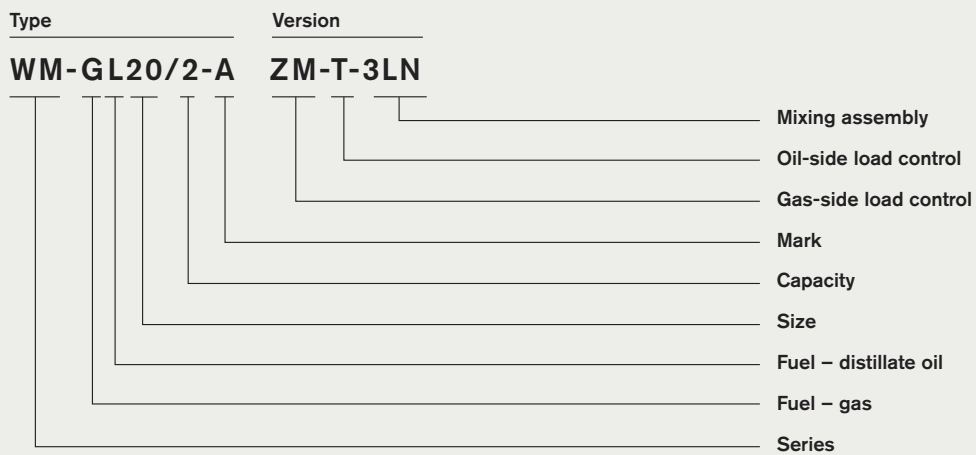
- An electronic controller makes infinitely variable load adjustments in response to heat demand.
- Available modulating executions:
  - W-FM 100 with optional load controller
  - W-FM 200 with standard load controller
- Alternatively, a controller can be mounted in the cover over the burner's integral electronic controls or in a separate control panel.

Modulating



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

## Model designation

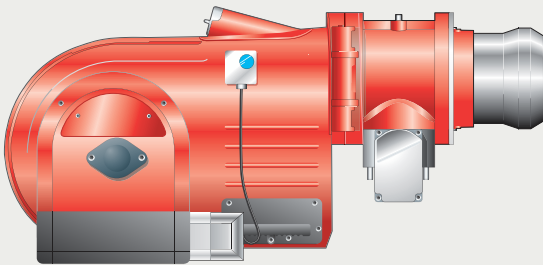


| Details         | Code  | Meaning  | Associated fuel  |
|-----------------|---|--|--|
| Series          | <b>WM</b>   | <b>Weishaupt monarch® burner</b>   |  |
| Fuel *          | <b>G</b><br><b>L</b>  | <b>Gas</b><br><b>Class D / Class A2 oil</b>  |  |
| Load control *  | <b>ZM</b><br><b>ZMI</b><br><b>Z</b><br><b>T</b><br><b>R</b>     | <b>Sliding-two-stage / modulating</b><br><b>High-turndown, sl.-2-st. / mod.</b><br><b>Two-stage</b><br><b>Three-stage</b><br><b>Sliding-two-stage / modulating</b> | <b>Gas</b><br><b>Gas</b><br><b>Oil</b><br><b>Oil</b><br><b>Oil</b>                   |
| Mixing assembly | <b>–</b><br><b>LN</b><br><b>3LN</b><br><b>4LN</b><br><b>PLN</b> | <b>Standard</b><br><b>Low-NO<sub>x</sub></b><br><b>multiflam®</b><br><b>multiflam® for FGR</b><br><b>Premix Low-NO<sub>x</sub></b>                                 | <b>Gas / oil</b><br><b>Gas</b><br><b>Gas / oil</b><br><b>Gas / oil</b><br><b>Gas</b> |

\*) Dual-fuel burners use a combination of codes (GL, ZM-T, ZM-R).

# Operating ranges

## WM 20

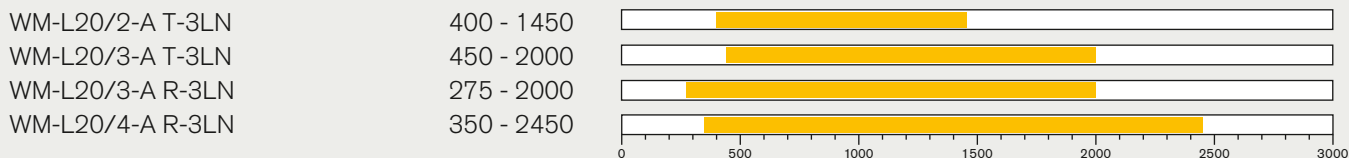


| Model  | Rating (kW)      |  |
|--|------------------|--|
| <b>Standard, LN and ZMI versions</b>             | <b>80 - 2600</b> |  |
| <b>Oil burners, version T and R</b>              |                  |  |
| WM-L20/1-A T and R                               | 400 - 1400       |  |
| WM-L20/2-A T and R                               | 600 - 2100       |  |
| WM-L20/3-A T and R                               | 800 - 2600       |  |
| <b>Gas burners, version ZM</b>                   |                  |  |
| WM-G20/2-A ZM                                    | 150 - 2100       |  |
| WM-G20/3-A ZM                                    | 350 - 2600       |  |
| <b>Gas burners, version ZM-LN</b>                |                  |  |
| WM-G20/2-A ZM-LN                                 | 250 - 1600       |  |
| WM-G20/3-A ZM-LN                                 | 300 - 2000       |  |
| <b>Dual-fuel burners, versions ZM-T and ZM-R</b> |                  |  |
| WM-GL20/2-A ZM-T and R                           | 150 - 2000       |  |
| WM-GL20/3-A ZM-T and R                           | 250 - 2450       |  |
| <b>Gas burner, version ZMI</b>                   |                  |  |
| WM-G20/2-A ZMI                                   | 80 - 2000        |  |

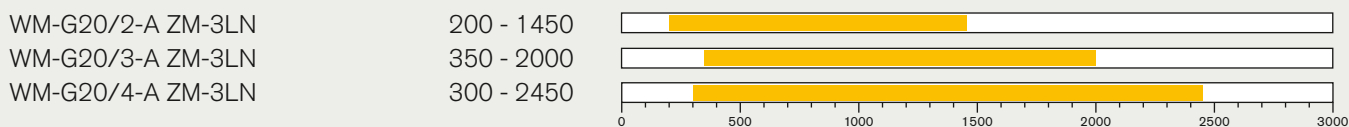
**Model Rating (kW)**



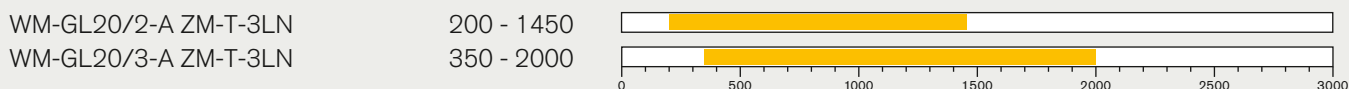
**Oil burners, version T-3LN and R-3LN**



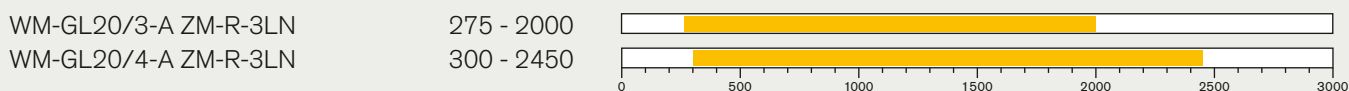
**Gas burners, version ZM-3LN**



**Dual-fuel burners, version ZM-T-3LN**



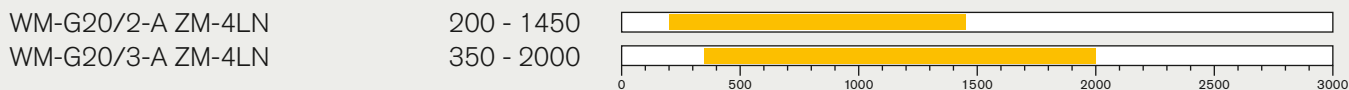
**Dual-fuel burners, version ZM-R-3LN**



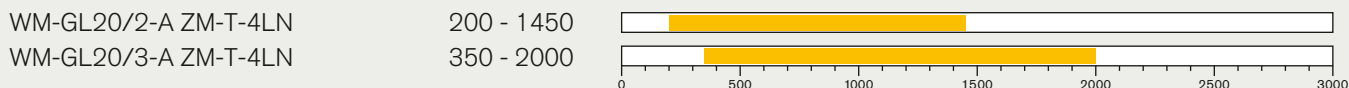
**Model Rating (kW)**



**Gas burners, version ZM-4LN**



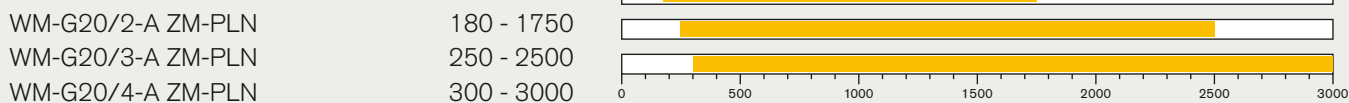
**Dual-fuel burners, version ZMT-T-4LN**



**Model Rating (kW)**



**Gas burners, version ZM-PLN**





# Scope of delivery

## WM 20

### Standard, ZMI, LN, 4LN, and PLN versions

| Fuel Version  | Oil T/R          | Gas    | Dual-fuel ZM-T/ZM-R |
|---|------------------|--------|---------------------|
| Burner housing, hinged flange, housing cover, Weishaupt burner motor, air inlet housing, fan wheel, combustion head, ignition unit, ignition cable, ignition electrodes, combustion manager with control unit, flame sensor, actuators, flange gasket, limit switch on hinged flange, fixing screws | ●                | ●      | ●                   |
| Digital combustion management   | W-FM50<br>W-FM54 | ●<br>- | -<br>●              |
| Class-A double gas valve assembly with valve proving effected via W-FM and pressure switch  | -                | ●      | ●                   |
| Gas butterfly valve   | -                | ●      | ●                   |
| Air pressure switch (required for PED compliance)   | ○                | ●      | ●                   |
| Low gas pressure switch   | -                | ●      | ●                   |
| Preset, capacity-based mixing assembly  | ●                | ●      | ●                   |
| Actuators for compound regulation of fuel and air via W-FM:   |                  |        |                     |
| Air damper actuator   | ●                | ●      | ●                   |
| Gas butterfly valve actuator  | -                | ●      | ●                   |
| Oil regulator actuator  | - / ●            | -      | - / ●               |
| Oil pressure switch in return   | - / ●            | -      | - / ●               |
| Burner-mounted oil pump   | ●                | -      | ●                   |
| Oil hoses (1000 mm)   | ●                | -      | ●                   |
| 4 oil solenoid valves, oil regulator, nozzle head with pre-installed regulating nozzle  | - / ●            | -      | - / ●               |
| 3 oil solenoid valves, 1 safety valve, three-stage nozzle head with pre-installed oil nozzles   | ● / -            | -      | ● / -               |
| Electromagnetic clutch  | ○                | -      | ○ / ●               |
| Motor-mounted contactor for DOL start   | ●                | ●      | ●                   |
| IP 54 protection  | ●                | ●      | ●                   |

**EN 676 stipulates that ball valves, gas filters, and gas pressure regulators form part of the burner supply (see Weishaupt accessories list). Please enquire or see the extra-equipment section of this brochure for further burner executions.**

- Standard
- Optional
- Not available

## 3LN version

| Fuel Version                               | Oil<br>T-3LN / R-3LN | Gas<br>ZM-3LN   | Dual-fuel<br>ZM-T / ZM-R<br>3LN |
|--|----------------------|-----------------|---------------------------------|
| Digital combustion management W-FM50       | ● / -                | ●               | -                               |
| W-FM54                                     | -                    | -               | ●                               |
| W-FM100                                    | ○ / ●                | ○               | ○                               |
| W-FM200                                    | ○ / ● <sup>2)</sup>  | ● <sup>2)</sup> | ○ / ● <sup>2)</sup>             |
| VSD with motor-mounted frequency convertor | ○ / ● <sup>2)</sup>  | ● <sup>2)</sup> | ○ / ● <sup>2)</sup>             |

## Green Fuels (GF)

| Fuel Version   | Oil<br>Std. / 3LN |  | Dual-fuel<br>Std. / 3LN / 4LN |
|--|-------------------|--|-------------------------------|
| <b>GF-M Blended bio-oil (3.0–20.9%)</b><br>Blend of mineral and esterified oils<br>in accordance with fuel standard DIN SPEC 51603-6     | ●                 |  | ●                             |
| <b>GF-P Paraffinic oil</b><br>in accordance with fuel standard DIN/TS 51603-8  | ●                 |  | ●                             |
| <b>GF-B30 Blended bio-oil (21.0–30.9%)</b><br>Blend of mineral and esterified oils<br>in accordance with fuel standard DIN SPEC 51603-6  | ○                 |  | ○                             |
| <b>GF-B100 Blended bio-oil (31.0–99.9%)</b><br>Blend of mineral and esterified oils<br>in accordance with fuel standard DIN SPEC 51603-6 | ○ / -             |  | ○ / - / -                     |
| <b>GF-B100 Bio-oil (FAME)</b><br>Fatty Acid Methyl Ester<br>in accordance with fuel standard EN 14214                                    | ○ / -             |  | ○ / - / -                     |

- Standard
- Optional
- Not available

<sup>2)</sup> 20/4 only

# Extra equipment

## WM 20

| Fuel Version  |           | Oil T/R | Gas | Dual-fuel ZM-T/ZM-R |
|---|-----------|---------|-----|---------------------|
| <b>Combustion head extension</b>  | by 100 mm | ○       | ○   | ○                   |
|   | by 200 mm | ○       | ○   | ○                   |
|   | by 300 mm | ○       | ○   | ○                   |
| <b>W-FM 100 in lieu of W-FM 50 / 54</b>   | inbuilt   | ○       | ○   | ○                   |
|   | loose     | ○       | ○   | ○                   |
| <b>Analogue signal convertor</b> with load controller for W-FM 100  |           | ○       | ○   | ○                   |
| <b>W-FM 200 in lieu of W-FM 50 / 54</b><br>with load controller, analogue signal convertor, VSD module,<br>and optional connection of fuel meter  | inbuilt   | ○       | ○   | ○                   |
|   | loose     | ○       | ○   | ○                   |
| <b>Extended functionality</b> W-FM 200 for CO control / FGR   |           | ○       | ○   | ○                   |
| <b>W-FM 1000 CMS in lieu of W-FM 50 / W-FM 54</b><br>with colour graphical display (multi-lingual), and optional<br>integration of customer-specific open and closed-loop control processes |           | ○       | ○   | ○                   |
| <b>KS20 controller</b> mounted in the burner – W-FM 50 / 54   |           | ○       | ○   | ○                   |
| <b>ABE</b> with Chinese and English-language display, supplied loose<br>W-FM 100 / W-FM 200   |           | ○       | ○   | ○                   |
| <b>QRI flame sensor</b> in lieu of QRB  |           | ○       | ○   | ○                   |
| <b>Plug connection</b><br>ST18/7 and ST18/4 – W-FM 50 / 54 / 100 / 200<br>ST18/7 – W-FM 50 / 54 with KS20   |           | ○       | ○   | ○                   |
|   |           | ○       | ○   | ○                   |
| <b>VSD</b><br>with motor-mounted frequency convertor<br>W-FM 50 / 200 / 1000 CMS<br>with separate frequency convertor, FC as accessory equipment<br>W-FM 200 / 1000 CMS                     |           | ○       | ○   | ○                   |
|   |           | ○       | ○   | ○                   |
| <b>Oil hoses</b> 1300 mm long in lieu of 1000 mm  |           | ○       | –   | ○                   |
| <b>DSB158 low oil pressure switch</b> in supply   |           | ○       | –   | ○                   |
| <b>Oil pressure gauge</b> with ball valve, pump-mounted<br>with ball valve, in return   |           | ○       | –   | ○                   |
|   |           | – / ○   | –   | – / ○               |
| <b>Vacuum pressure gauge</b> -1 to +9 bar with ball valve, in supply  |           | ○       | –   | ○                   |
| <b>SMG pump assembly</b> (hardened version)   |           | ○       | –   | ○                   |

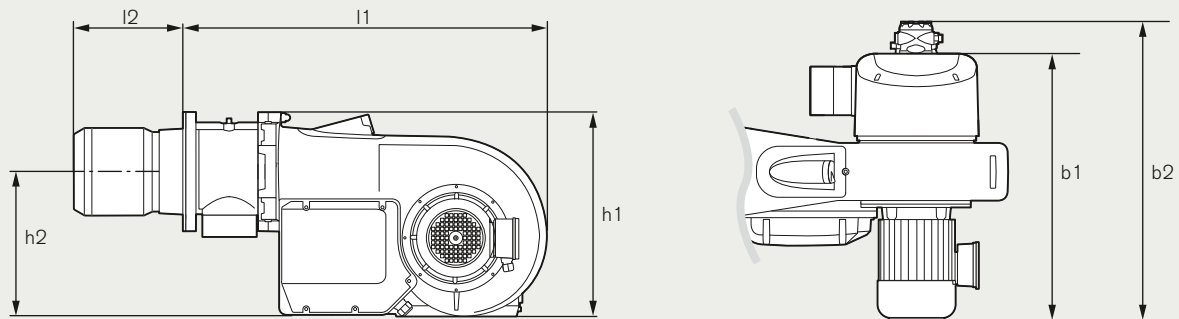
| Fuel Version  |                     | Oil T/R | Gas | Dual-fuel ZM-T/ZM-R |
|---|---------------------|---------|-----|---------------------|
| <b>VZO8 oil meter</b> ≤ 150 kg/h  | without transmitter | ○ / -   | -   | ○ / -               |
|   | with transmitter    | ○ / -   | -   | ○ / -               |
| <b>VZO20 oil meter</b> > 150 kg/h   | without transmitter | ○ / -   | -   | ○ / -               |
|   | with transmitter    | ○ / -   | -   | ○ / -               |
| <b>Air inlet flange</b> for ducted-air connection<br>with LGW air pressure switch (additional LGW50 required)   |                     | ○       | ○   | ○                   |
| <b>Motor</b> with 230 V contactor and overcurrent protection  |                     | ○       | ○   | ○                   |
| <b>Special voltages</b> (please enquire)  |                     | ○       | ○   | ○                   |
| <b>Control voltage</b> 110 V  |                     | ○       | ○   | ○                   |
| <b>Control voltage</b> 24 V with W-FM 1000 CMS  |                     | ○       | ○   | ○                   |
| <b>Solenoid valve</b><br>for air pressure switch test with continuously running fan or post-purge   |                     | ○       | ○   | ○                   |
| <b>High gas pressure switch</b> for screwed W-MF / DMV with low-pressure supplies<br>for flanged DMV / VGD with low-pressure supplies<br>for fitting to regulator with high-pressure supplies |                     | -       | ○   | ○                   |
|   |                     | -       | ○   | ○                   |
|   |                     | -       | ○   | ○                   |
| <b>Offset gas butterfly valve and DMV</b> for vertical-firing execution   |                     | -       | ○   | ○                   |
| <b>Electromagnetic clutch</b>   |                     | ○       | -   | ○                   |
| <b>High gas pressure switch for ZMI-version burners</b><br>for fitting to flanged elbow   |                     | -       | ○   | -                   |
| <b>External temperature-compensated flue gas recirculation</b> with FGR butterfly valve (4LN)   |                     | -       | ○   | ○ / -               |

- Standard
- Optional
- Not available

# Dimensions

## WM 20

### Standard, LN, and ZMI versions



#### Dimensions – Standard and LN versions

| Dimension  | Oil T/R           | Gas ZM/ZM-LN    | Dual-fuel ZM-T/ZM-R     |
|--|-------------------|-----------------|-------------------------|
| <b>l1</b> – Burner length excluding combustion head  | 810               | 1010            | 1010                    |
| <b>l2</b> – Combustion head length   | 217–257           | 231–272         | 231–266                 |
| <b>h1</b> – Overall burner height<br>(excluding optional air inlet flange, excluding underslung oil pump)          | 573               | 573             | 573                     |
| <b>h2</b> - Height to centreline of combustion head  | 408               | 408             | 408                     |
| <b>b1</b> – Overall burner width excluding oil pump<br>(incl. 20 mm additional projection for frequency convertor) | 810               | 770             | 810                     |
| <b>b2</b> – Overall burner width including oil pump  | 895 <sup>1)</sup> | –               | 895 / 899 <sup>1)</sup> |
| VSD with motor-mounted frequency convertor   | –                 | ● <sup>2)</sup> | –                       |

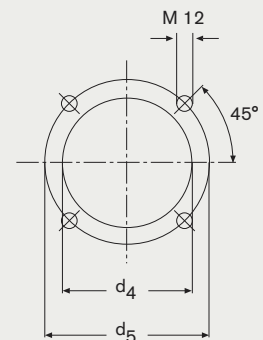
<sup>1)</sup> Additional 130 mm projection for pump with electromagnetic clutch

① Electromagnetic clutch is standard on ZM-R-version dual-fuel burners

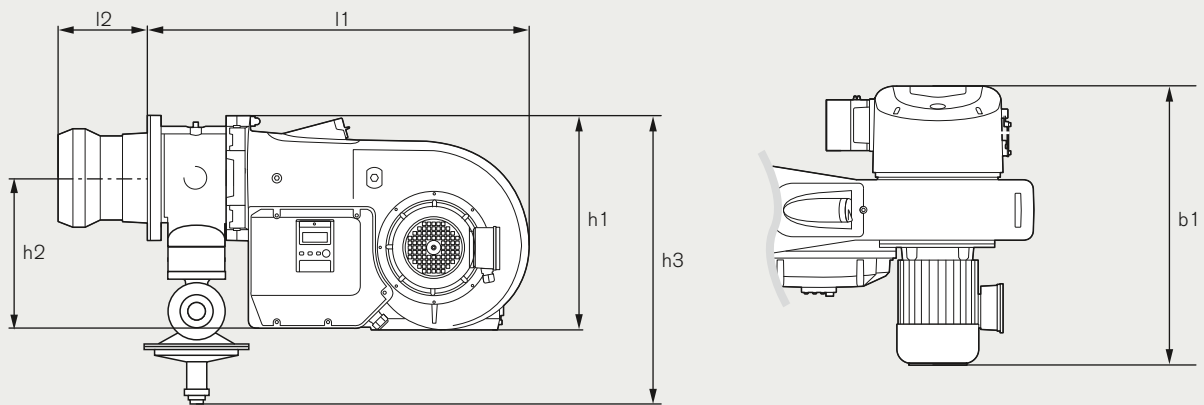
<sup>2)</sup> 20/4 only

#### Mounting plate drilling dimensions

| Dimension                  | Version Standard / LN | Version ZMI |
|----------------------------|-----------------------|-------------|
| <b>d4</b> – Inner diameter | 240–270               | 270         |
| <b>d5</b> – Outer diameter | 298                   | 298         |



Dimensions in mm



## Dimensions – ZMI version

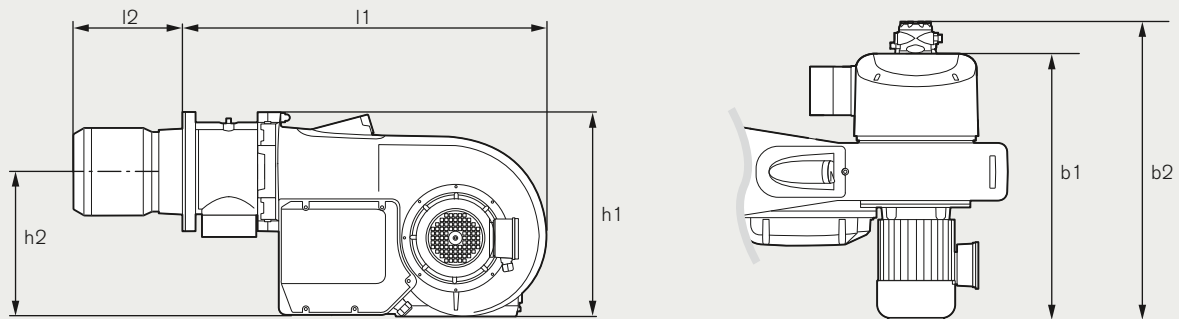
| Dimension   | Version ZMI |
|---|-------------|
| <b>l1</b> – Burner length excluding combustion head   | 1010        |
| <b>l2</b> – Combustion head length  | 231–266     |
| <b>h1</b> – Overall burner height without zero governor (excluding optional air inlet flange)                   | 573         |
| <b>h2</b> - Height to centreline of combustion head   | 408         |
| <b>h3</b> - Overall burner height with zero governor – sizes Rp1 to DN125 (excluding optional air inlet flange) | 646–999     |
| <b>b1</b> – Overall burner width (incl. 20 mm additional projection for frequency convertor)                    | 770         |

Dimensions in mm

# Dimensions

## WM 20

### 3LN and 4LN versions, FGR



#### Dimensions – 3LN and 4LN versions

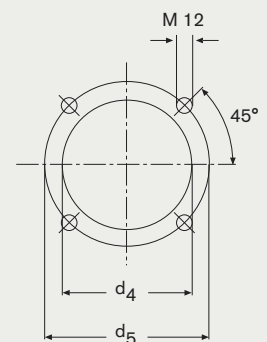
| Dimension   | Oil<br>T/R            | Gas<br>ZM | Dual-fuel<br>ZM-T/ZM-R |
|---|-----------------------|-----------|------------------------|
| <b>l1</b> – Burner length excluding combustion head   | 810                   | 1010      | 1010                   |
| <b>l2</b> – Combustion head length  | 295–320 / 361         | 295–320   | 231–325 / 361          |
| <b>h1</b> – Overall burner height<br>(excluding optional air inlet flange, excluding underslung oil pump) | 573                   | 573       | 573                    |
| <b>h2</b> - Height to centreline of combustion head   | 408                   | 408       | 408                    |
| <b>b1</b> - Overall burner width excluding oil pump   | 810/867               | 867       | 790/867                |
| <b>b2</b> – Overall burner width including oil pump   | 895/937 <sup>1)</sup> | -         | 875/937 <sup>1)</sup>  |

<sup>1)</sup> Additional 130 mm projection for pump with electromagnetic clutch

ⓘ Electromagnetic clutch is standard on ZM-R-version dual-fuel burners

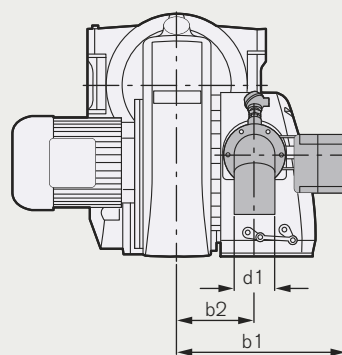
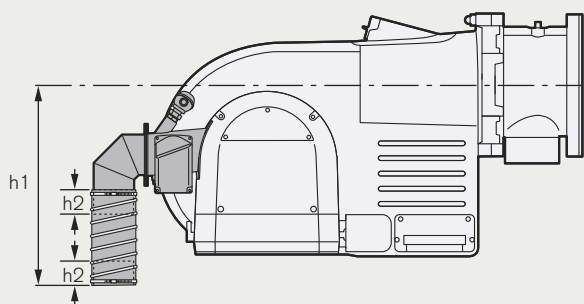
#### Mounting plate drilling dimensions

| Dimension                  | Version<br>T/ZM/ZM-T | Version<br>R/ZM-R |
|----------------------------|----------------------|-------------------|
| <b>d4</b> - Inner diameter | 270                  | 305               |
| <b>d5</b> - Outer diameter | 298                  | 330               |



Dimensions in mm





### Dimensions – FGR (flue gas recirculation)

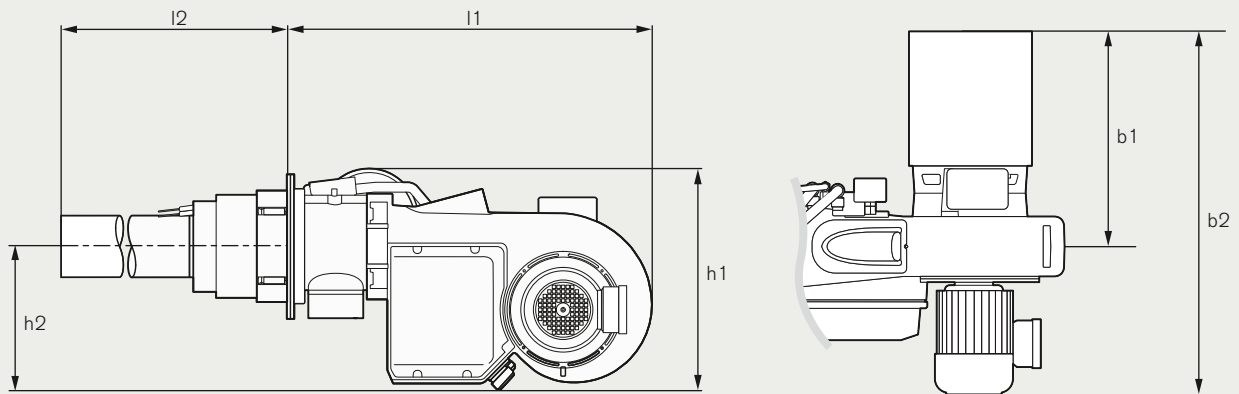
| Dimension   | Version<br>4LN |
|---|----------------|
| <b>h1</b> – Centreline of burner mounting flange to bottom edge of hose         | 614 ±10        |
| <b>h2</b> – Flanged elbow insertion depth                                       | 60 ±10         |
| <b>b1</b> – Centreline of burner mounting flange to outer edge of actuator      | 397            |
| <b>b2</b> – Centreline of burner mounting flange to centreline of flanged elbow | 182            |
| <b>d1</b> – Flanged elbow diameter  | 95             |

Dimensions in mm

# Dimensions

## WM 20

### PLN version

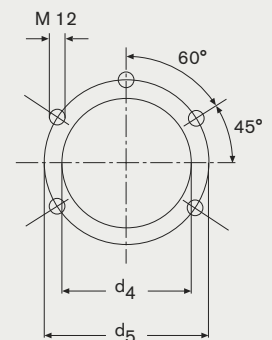


#### Dimensions – PLN version

| Dimension  | Version<br>ZM-PLN  |
|--|--------------------|
| $l_1$ – Burner length excluding burner tube                            | 1012               |
| $l_2$ – Burner tube length: WM-G20/2, ...20/3, ...20/4                 | 1023 / 1423 / 1623 |
| $h_1$ – Overall burner height  | 625                |
| $h_2$ – Height to centreline of burner tube                            | 400                |
| $b_1$ – Width from burner centreline to outer edge of air inlet filter | 545                |
| $b_2$ – Overall burner width: WM-G20/2, ...20/3, ...20/4               | 969 / 1009 / 1066  |

#### Mounting plate drilling dimensions

| Dimension              | Version<br>ZM-PLN |
|------------------------|-------------------|
| $d_4$ – Inner diameter | 370               |
| $d_5$ – Outer diameter | 400               |



Dimensions in mm

# That's reliability.

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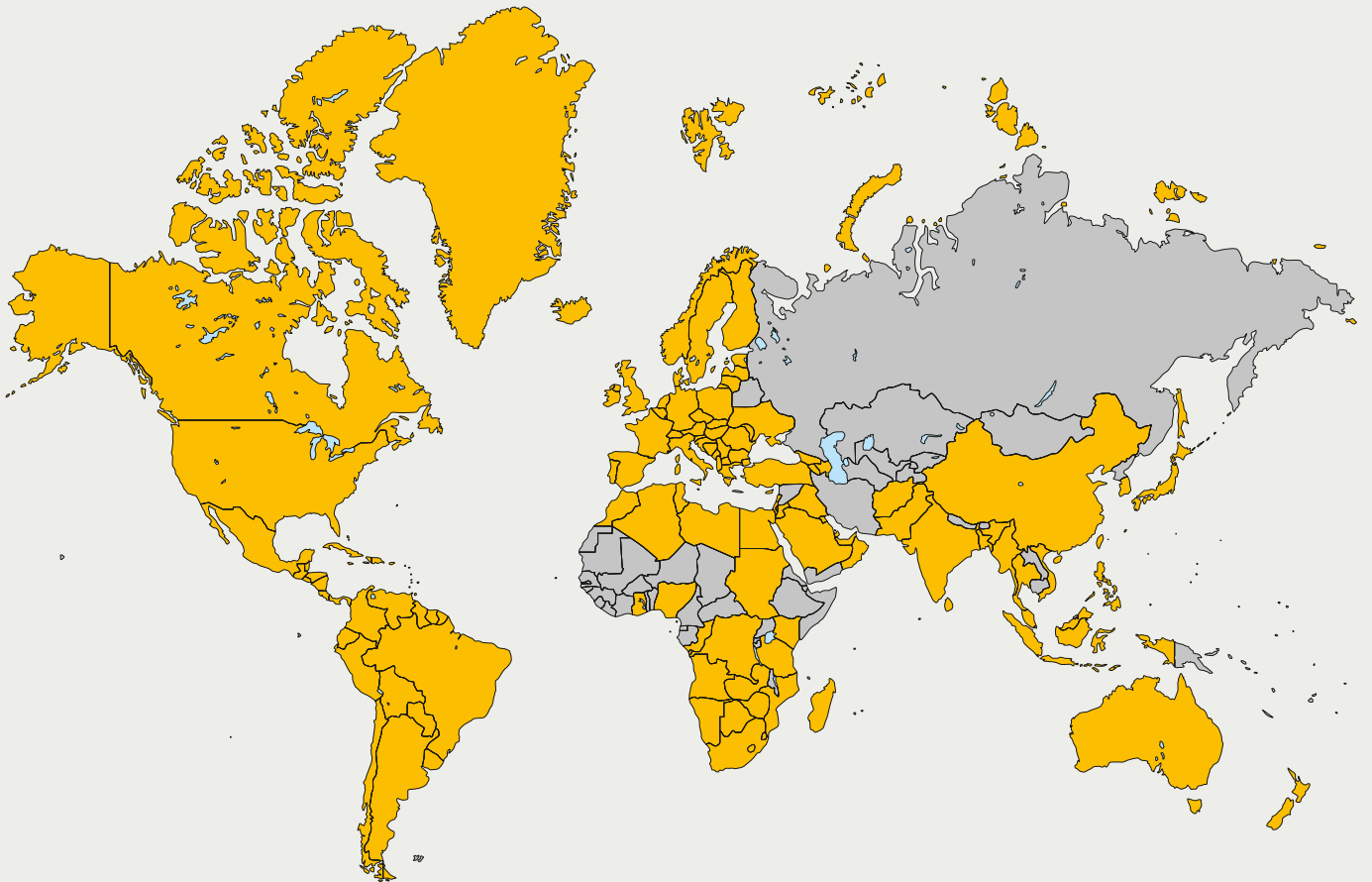
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