–weishaupt–

product

Information on oil and dual-fuel burners

WM burners with oil preheating

WM-GS20–30 and WM-S10–30 monarch® burners (100–5600 kW)

A burning passion for quality

Test-firing chambers for medium and large-sized burners at the Weishaupt Research & Development Centre

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

WM-GS and WM-S burners are designed to fire liquid fuels which cannot be atomised without preheating because of their viscosity. That includes fossils fuels like MFO and HFO, and – subject to prior works approval – biogenic fuels.

All monarch® burners are renowned for their quality and their state-of-the-art technology. Choosing a Weishaupt burner is always a future-proof investment.

WM-GS20 for ratings up to 2200 kW

Fossil and biogenic fuels

Higher-viscosity liquid fuels have many different origins. Fossil fuels include residual oils, such as MFO and HFO. Liquid biogenic fuels are predominantly oils produced from rapeseed, soya beans, sunflowers, and oil palms.

Petroleum
The composition of the oils supplied by oilfields around the world vary greatly. They vary in viscosity, sulphur content, water content, and the mix of other constituents. However, they are all hydrocarbon compounds.

Heavy fuel oil
Heavy fuel oil, also referred to as HFO, is a high-viscosity residual fuel oil. HFO is the product remaining after the more valuable cuts of crude oil have been distilled. It is a particularly viscous, almost black oil.

Examples of biogenic fuels

Rapeseed oil
Cold-pressed rapeseed oil is extracted from various cultivars of rapeseed. Rapeseed oil is used as a raw material in the production of rapeseed methyl ester (RME) and is one of a group of oils known as fatty acid methyl esters (FAME).

Rapeseed oil has a viscosity of around 38 mm^2/s at 40 °C. However, the range of tolerance is quite large and so a fuel specification is always required.

Soya oil
Cold-pressed soya oil is extracted from soya beans, which are a type of legume (pulse). The main value of soya beans lies in their high protein and oil content (about 39 and 17 % respectively), the latter of which is unusually high for beans.

Generally
Higher viscosity oils, for example crude oils, reprocessed waste oils, or vegetable oils such as rapeseed or soya bean oil, need to be analysed in advance. Due to the different qualities of the fuels, the burner execution has to be matched to the fuel.

WM-S10
with staged load control

Weishaupt's high-quality production is not limited to a small number of models. It offers a complete range, including some niche products.

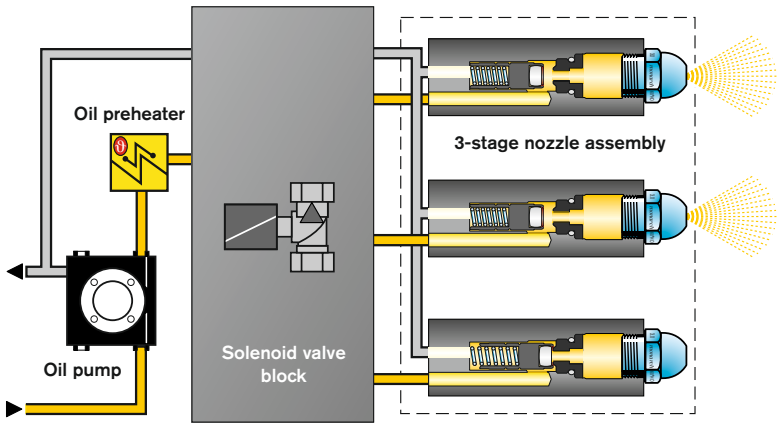
The monarch® WM-S burners, designed for the combustion of special fuels, are the modern sucessors to Weishaupt's legendary medium and heavy-oil burners.

WM-S burners share the many positive features of the WM-L burners on which they are based, including:
- A compact, aerodynamic design.
- Low operational noise levels.
- Digital combustion management with precise dosing of fuel and air.

In addition, they have many other key features, most notably:
- A choice between underslung or side-mounted oil preheater.
- A compact valve block, reducing oil lines to just a supply and return.
- Insulated oil lines.
- A specially designed recirculating nozzle assembly with two or three nozzles.
- A mixing assembly optimised for the fuel to ensure the best combustion results.

WM-S10 burners, which have staged load control, are suitable for oil viscosities up to 75 mm^2/s at 50 °C.

WM-S 10 monarch® burner with underslung (above) or side-mounted oil preheater (below)



The oil-side components of a three-stage WM-S10 burner

Compact solenoid valve block

Solenoid valve block
A new, compact solenoid valve block was developed for the hydraulic control of the nozzle assembly, bringing all of the solenoid valves together within a single unit. A new direction was taken in the type of solenoid valves chosen: They are all two-way valves.

WM-(G)S20 and WM-(G)S30 with modulating load control

Control
The following methods of regulation are available for Weishaupt WM-S 20–30 burners:
Oil: Sliding-two-stage or modulating (R), depending on the method of load control employed.

The following methods of regulation are available for Weishaupt WM-GS 20–30 burners:
Gas: Sliding-two-stage or modulating (ZM), depending on the method of load control employed.
Oil: Sliding-two-stage or modulating (R), depending on the method of load control employed.

The output of a modulating burner is matched – within its operating range – to current heat demand.

These multiple control options make the burner suitable for a wide range of applications and ensure a gentle and problem-free start up, along with a high degree of operational reliability.

Preheating
The burner's electric preheater is able to heat high-viscosity oil very rapidly to precisely the required atomisation temperature. This is due to its large heat-exchanging surface in comparison to the relatively small volume of oil. This rapid distribuition of heat prevents any localised overheating that would lead to the 'cracking' of the oil.

Other components, such as the solenoid valve block and the nozzle assembly, are compactly constructed and kept at standby temperature by a low-power heating cartridge.

The oil lines are thermally insulated to keep heat losses between the preheater and the nozzles to a minimum. If the setting point of the oil is close to or below the ambient temperature then the oil lines will need to be traced.

Recirculation
The recirculation of heated oil all the way up to the nozzle ensures that oil at the ideal atomisation temperature is available immediately at the time of fuel release / ignition.

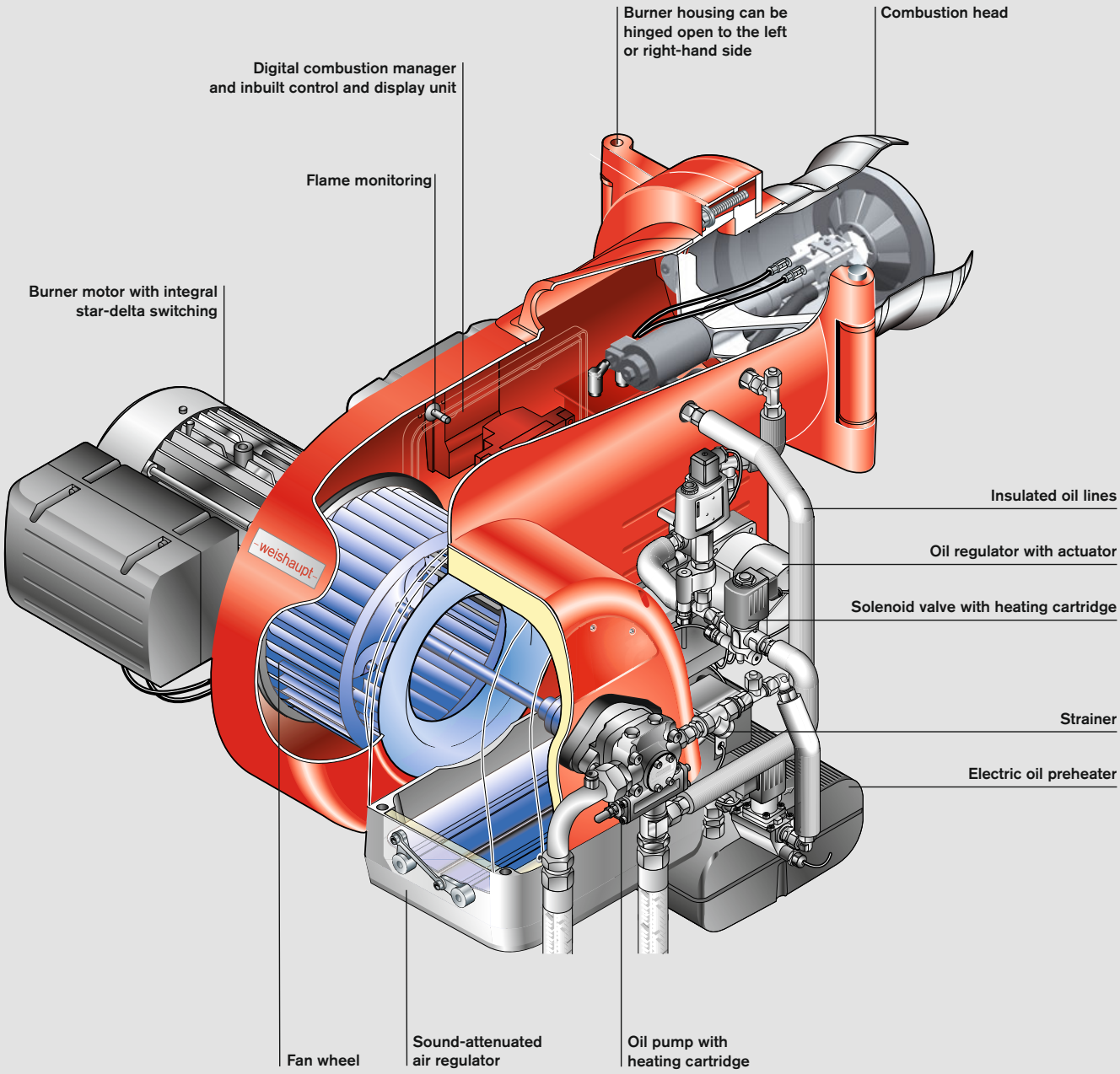
Electrical connection
Local regulations and fusing requirements must be observed when connecting gas, oil, and dual-fuel burners to the electrical power supply.

Some of a WM-(G)S burner's electrical components are not mounted on the burner itself. Consequently, these and any other project-related components have to be accommodated by others.

Weishaupt can offer wall-mounted or free-standing control panels for all electrical components. Alternatively, pre-assembled and tested switchgear can be supplied for integration with existing control panels.

The most important advantages:
- Burner-mounted oil preheater
- Insulated oil lines
- Recirculating nozzle assembly
- Easy changeover between gas and oil on dual-fuel burners
- Digital combustion management with electronic compound regulation at all ratings
- Compact design
- Sound-attenuated air inlet as standard for quieter operation
- Powerful fan with specially developed fan geometry and air damper control
- Electromagnetic clutch included as standard (WM-GS)
- Easy access to all components, such as the mixing assembly, air damper and combustion manager
- Reliable operation with sliding-two-stage or modulating operation, depending on the burner version and method of load control
- Computer-controlled function test of each individual burner at the factory
- Burners can be supplied with pre-wired plug connections
- Excellent price / capacity relationship
- Well-established, global service network

Trademark protection
Weishaupt WM-series burners are registered as a Community Trade Mark throughout Europe.

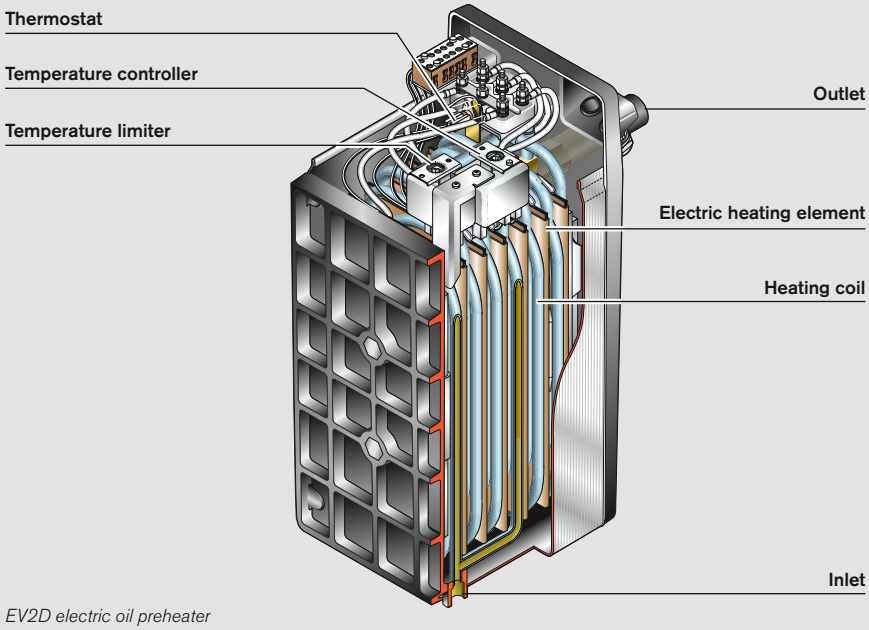

Burner housing can be hinged open to the left or right-hand side
Combustion head
Digital combustion manager and inbuilt control and display unit
Flame monitoring
Burner motor with integral star-delta switching
Insulated oil lines
Oil regulator with actuator
Solenoid valve with heating cartridge
Strainer
Electric oil preheater
Fan wheel
Sound-attenuated air regulator
Oil pump with heating cartridge

Oil preheater

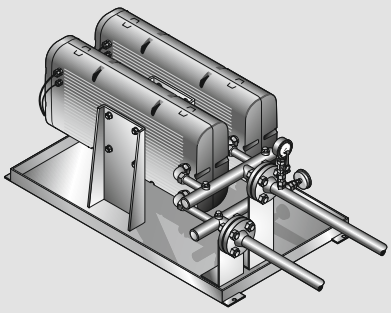
Viscosity is one of the key criteria for the combustion of liquid fuels.

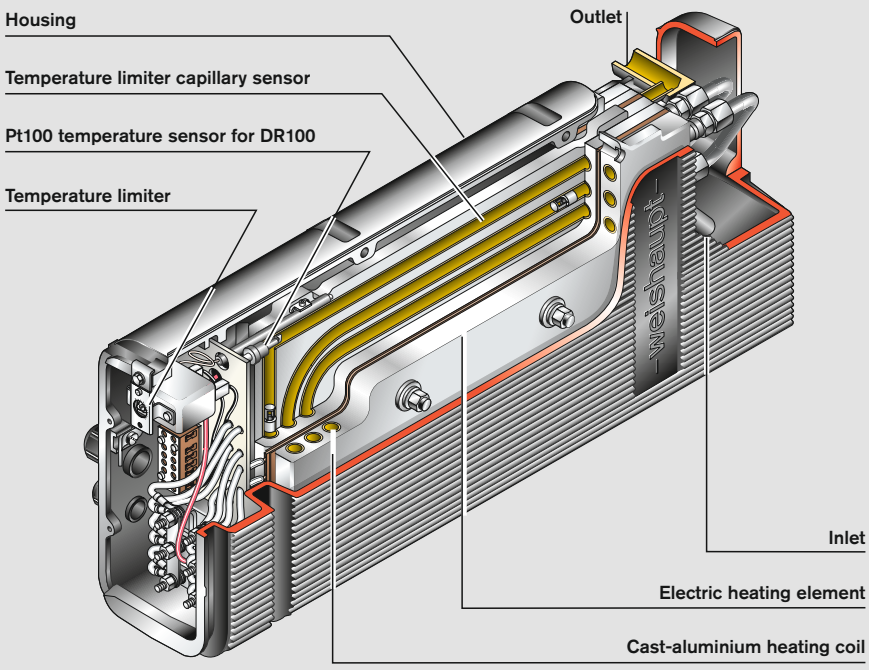
A viscosity of no more than 10 mm^2/s is appropriate for optimal atomisation. Low-viscosity fuels generally fulfil this criterion at a temperature of 20 °C. Medium and high-viscosity fuels, however, do not. Some thermal input is needed to ensure the optimal combustion of these fuels.

Weishaupt's electric preheaters are one way of bringing the oil up to a higher temperature, thereby bringing its viscosity to a suitable point. Weishaupt's electric oil preheaters offer the benefits of even heat transfer, ideal temperature sensor positioning, low pressure losses, and a compact design.

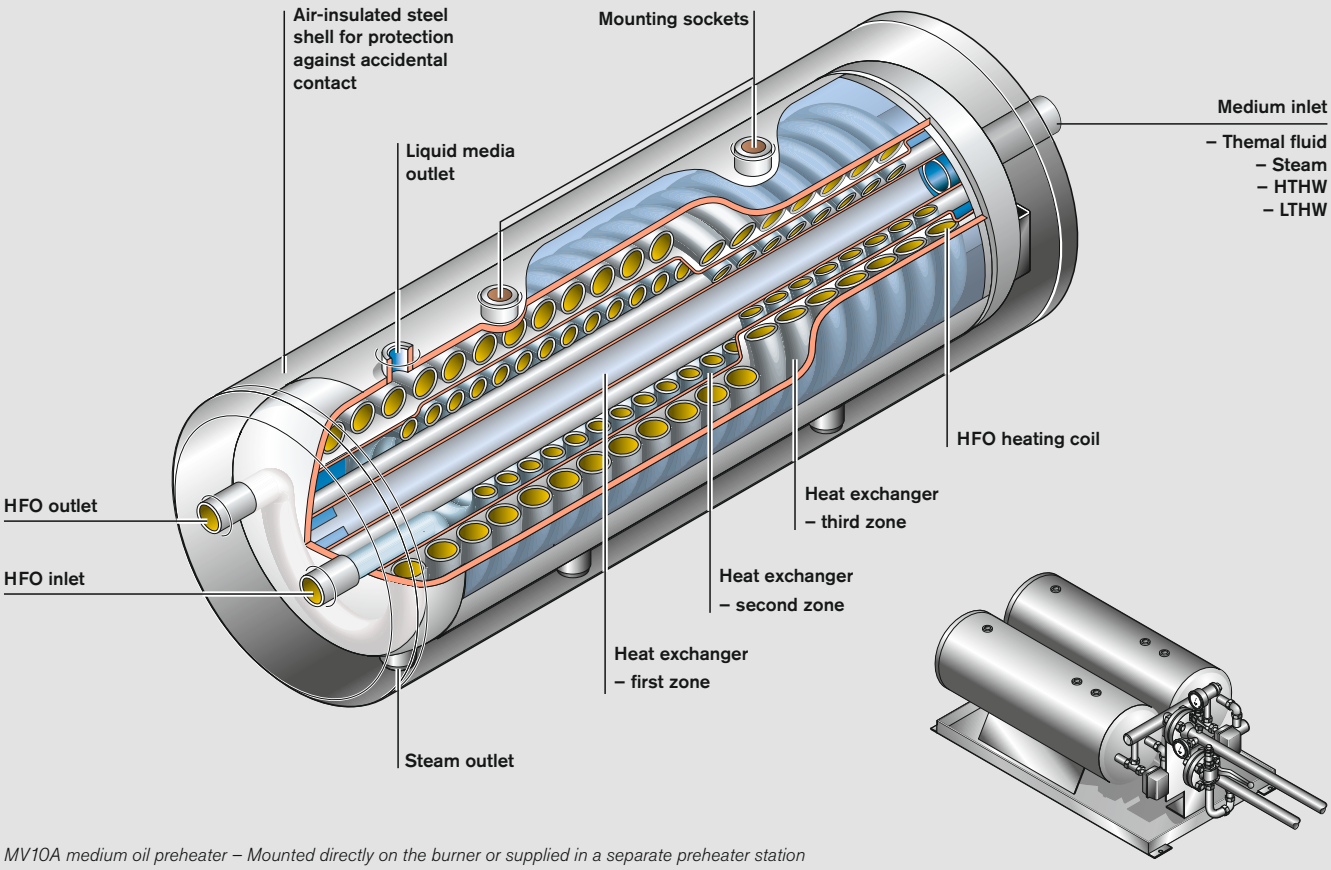


EV2D electric oil preheater





WEV2 electric oil preheater



MV10A medium oil preheater – Mounted directly on the burner or supplied in a separate preheater station

Medium preheaters are another way of bringing medium and high-viscosity fuels up to atomisation temperature. They can operate alone to preheat the oil or provide support to an electric preheater. The combined variant has the advantage that the system can be cold-started even with a single-fuel burner. If a medium preheater were to be used on its own, then an additional fuel (e.g. gas) would be needed to bring the system up to operating temperature.

Weishaupt's MV-type medium preheaters are suitable for various media, namely LTHW, HTHW, thermal fluid, and steam.

They operate on a three-pass basis, transferring heat to a double heat exchanger coil. Medium-specific and / or thermostatic controllers are used to maintain temperature by determining the flow rate of the medium.

The medium preheater is a complete assembly, with the safety and control thermostats needed for control of the burner integrated into its connection unit.

Preheating temperatures above 100 °C

Temperatures in excess of 100 °C are always needed when preheating HFO in order to reach the viscosity recommended for the oil nozzles.

That places many more demands on the oil supply system than a low-viscosity oil would, especially in regard to transfer.

HFO is permitted to contain a very small amount of water. Unpressurised, this water vaporises at temperatures above 100 °C. This causes pressure fluctuations which can have a detrimental effect on the operational reliability of the burner.

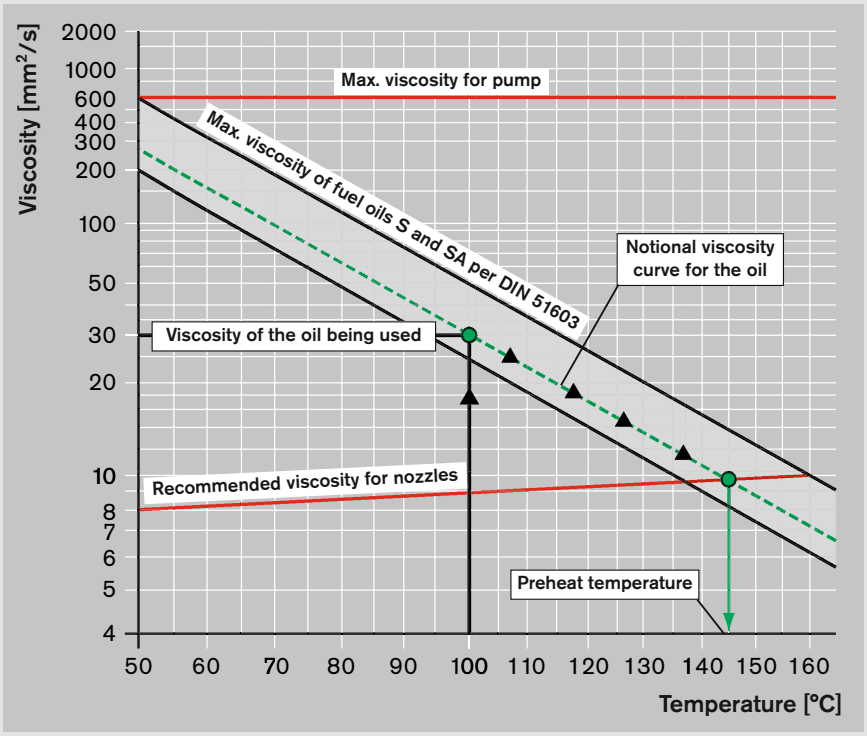
Weishaupt's wide range of accessories includes oil supply components that meet these temperature and pressure demands, in extreme cases even for preheating temperatures of 160 °C with a ring main pressure of at least 5 bar.

Given the above, maximum operational reliability and safety for the burner can only be achieved if the correct oil-side components are also supplied. Weishaupt, who offer a one-stop solution with competent advice and all the necessary equipment, are best-placed to meet this goal.

Twin-pump assembly

Oil circulation unit with oil meter

Air/gas separator



Viscosity/temperature chart

Fuels
Natural gas
LPG
MFO / HFO (max. 50 mm^2/s at 100 °C)

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

Applications
Weishaupt WM-(G)S 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 to + 40 °C for gas firing
  -10 to + 40 °C for oil firing
- Maximum 80 % relative humidity, no condensation
- The combustion air must be free of aggressive substances (halogens, chlorides, fluorides etc.) and impurities (dust, debris, vapours, etc.)
- Adequate ventilation is required 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.

Installation and use
Local regulations and all applicable standards must be observed when installing and using the equipment.

Max. viscosity – WM-S10
WM-S10 burners with staged load control are suitable for oil viscosities up to 75 mm^2/s at 50 °C.

Max. viscosity – WM-(G)S20 / 30
WM-(G)S20–30 burners with modulating load control are suitable for oil viscosities up to 50 mm^2/s at 100 °C.

The combustion of HFO with a viscosity in excess of 50 mm^2/s at 100 °C must be confirmed in advance with Weishaupt.

In order to maintain the highest degree of operational reliability, WM-(G)S20–30 burners should not be equipped with nozzles smaller than W100 kg S7 50° or W100 kg S4 50°.

Standards compliance
The burners are tested by an independent body and fulfil the applicable requirements of the following European Union directives and applied standards:

EMC EMC Directive 2014/30/EU
Applied standards:
- EN 61000-6-1 : 2007
- EN 61000-6-2 : 2005
- EN 61000-6-4 : 2007

LVD Low Voltage Directive 2014/35/EU
Applied standards:
- EN 60335-1 : 2010
- EN 60335-2-102 : 2010

MD Machinery Directive 2006/42/EC
Applied standards:
- EN 267 Annex J,
- EN 676 Annex J,

GAD Gas Appliance Directive 2009/142/EC
Applied standards:
- EN 676 : 2008

PED[1)] Pressure Equipment Directive 2014/68/EU
Applied standards:
- EN 267 Annex K,
- EN 676 Annex K,
- Conformity assessment procedure: Module B

The burners are labelled with
- CE Mark
- CE-PIN per 2009/142/EC
- DIN-CERTCO
- Identification No. of the notified body

[1)] With the appropriate choice of equipment.

Digital combustion management: Precise, simple, and reliable

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

Weishaupt WM-(G)S burners are equipped as standard with electronic compound regulation and digital combustion management. The latest combustion technologies demand a precise and continually reproducible dosing of fuel and combustion air. This optimises combustion efficiency and saves fuel.

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, depending on the type of combustion manager employed, either a language-neutral display or a clear text display with a choice of languages. An English / Chinese dual-screen version is available as an option with the latter should a Chinese-character display be desired.

Measures for saving energy and increasing safety and reliability

Variable speed drive reduces electrical consumption and facilitates a soft start of the combustion air fan. The use of VSD also reduces noise emissions by a considerable amount.

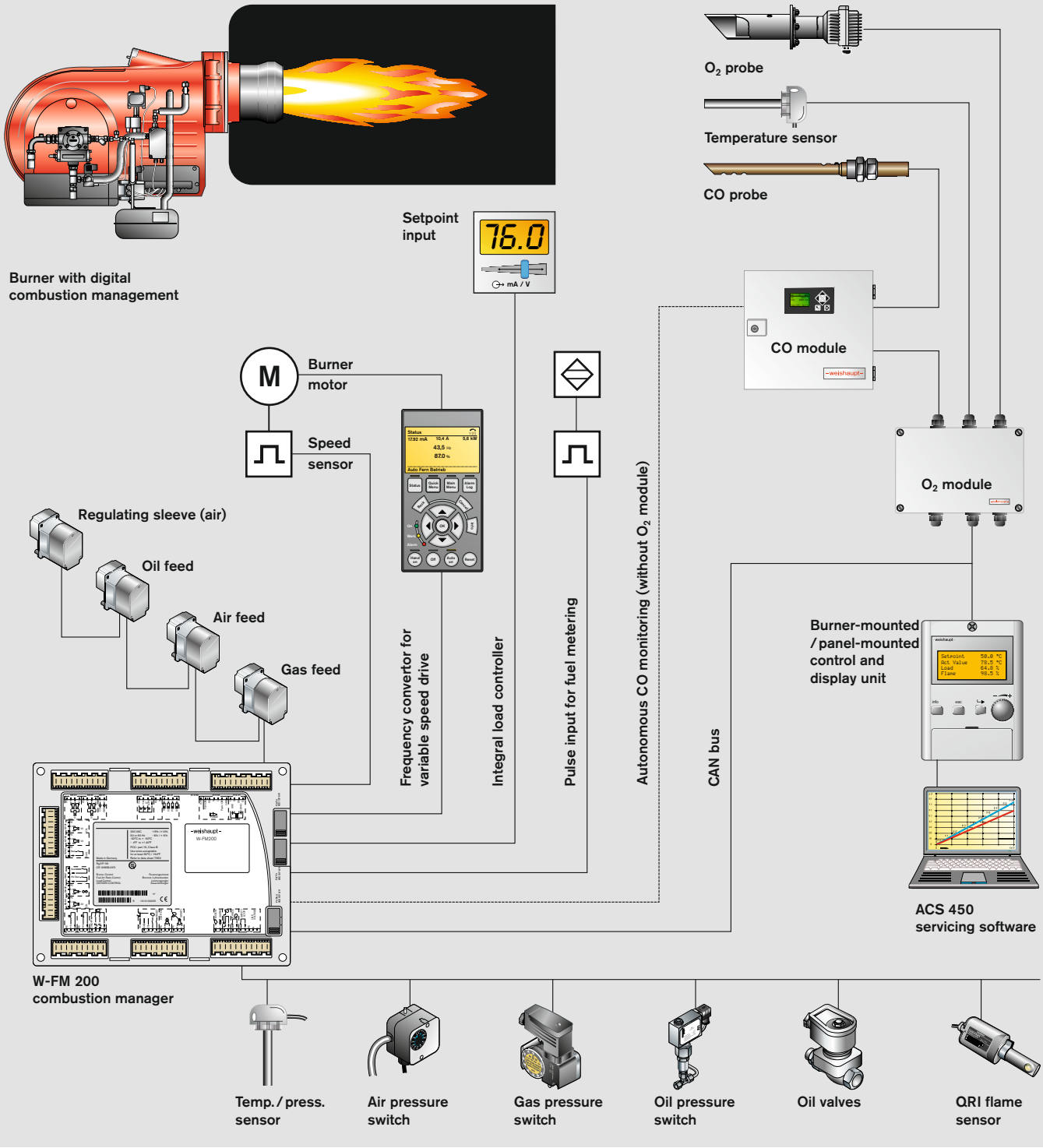
O_2 trim saves fuel through a continual and extremely efficient optimisation of the combustion air. Control is effected by a system with a Lambda probe, which continually measures the oxygen content of the flue gas.

CO monitoring executes a safety shut-down of the burner if a predefined CO limit is exceeded, thereby ensuring the very highest degree of safety.

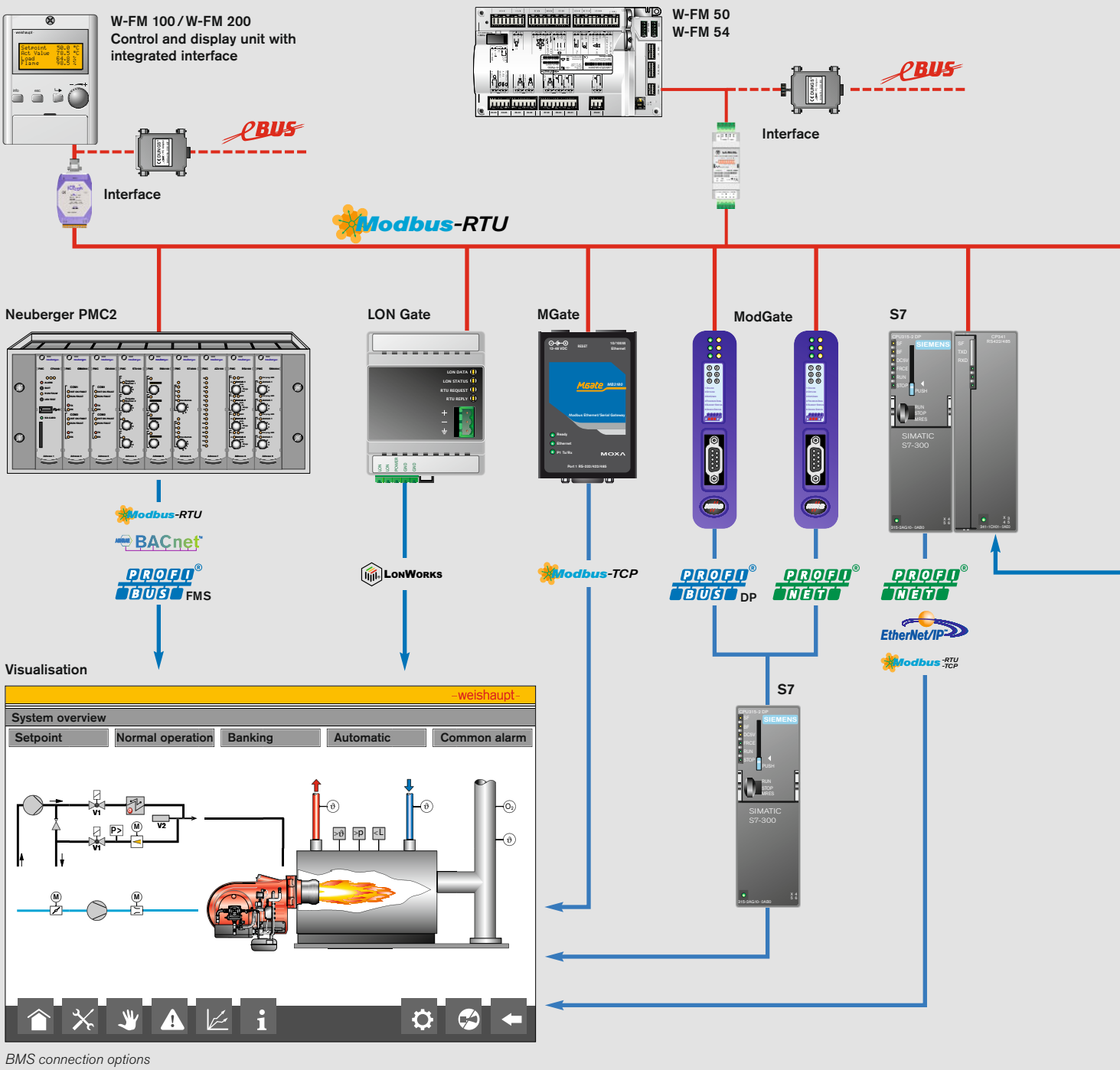
Combined CO/O_2 control ensures an ultimate degree of safety. CO emissions are continually monitored and, if the defined limit is exceeded, the burner is operated with an increased amount of excess air for a short period of time before the O_2 trim returns the burner to its preset O_2 set-point. Should external influences prevent a non-critical condition from being reached, then the burner will undergo a controlled shutdown.

Features – digital combustion management	W-FM50	W-FM100	W-FM200
Single-fuel operation	●	●	●
Dual-fuel operation	–	●	●
Intermittent firing	●	●	●
Continuous firing >24 h	● [1]	●	●
Variable speed drive available	●	–	●
O_2 trim available	–	–	●
CO monitoring	–	–	○
Combined O_2/CO control	–	–	○
Flame sensor for intermittent firing	QRA2/QRB	QRB	QRB
Flame sensor for continuous firing	ION [1]	ION/QRI/QRA 73	ION/QRI/QRA 73
Maximum number of actuators	2	4	6
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	–	○	●
Setpoint input (temperature / pressure)	–	○	●
Analogue signal input (0 / 2–10 V and 0 / 4–20 mA	– / ●	○	●
Configurable 0/4–20 mA analogue output	–	○	●
Language-neutral ABE control unit	●	–	–
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 line)	20 m	100 m	100 m
Fuel consumption meter (switchable)	● [2]	–	●
Combustion efficiency display in conjunction with O_2 trim	–	–	●
eBUS / Modbus RTU interface	●	●	●
PC-supported commissioning	●	●	●

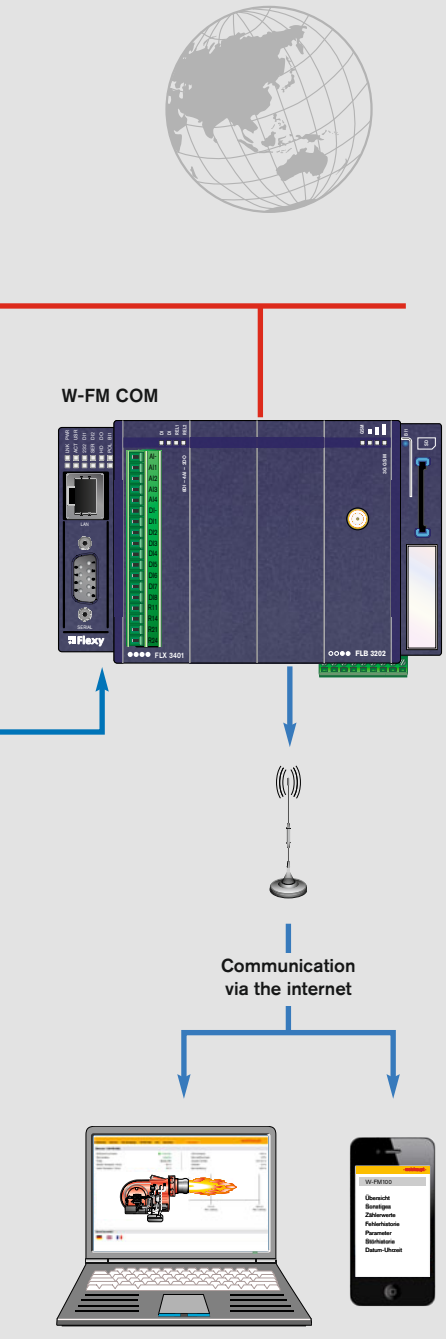
● Standard ○ Optional [1] Gas burner with ionisation probes only [2] Not in conjunction with VSD

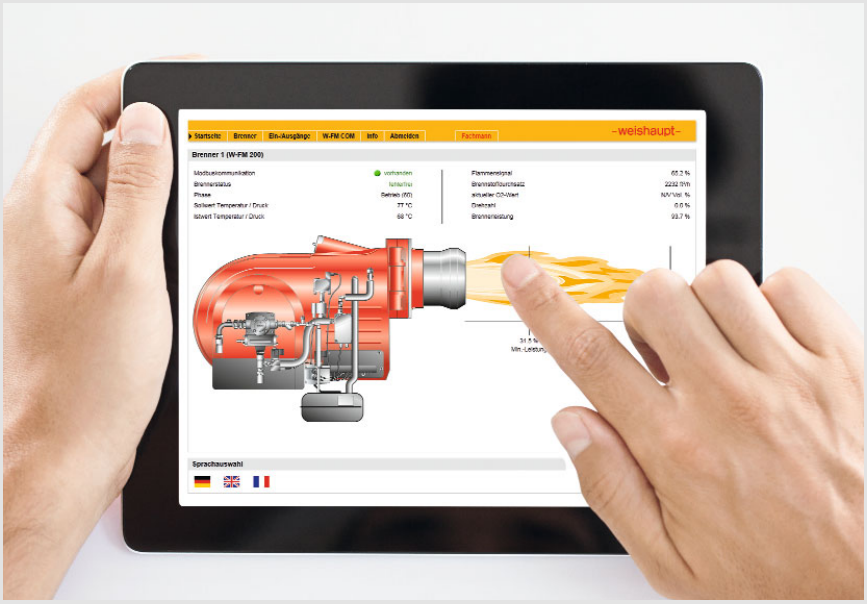

Burner with digital combustion management
Setpoint input
76.0
mA / V
O2 probe
Temperature sensor
CO probe
CO module
O2 module
M
Burner motor
Speed sensor
Regulating sleeve (air)
Oil feed
Air feed
Gas feed
Frequency convertor for variable speed drive
Integral load controller
Pulse input for fuel metering
Autonomous CO monitoring (without O2 module)
CAN bus
Burner-mounted / panel-mounted control and display unit
ACS 450 servicing software
W-FM 200 combustion manager
Temp. / press. sensor
Air pressure switch
Gas pressure switch
Oil pressure switch
Oil valves
QRI flame sensor

Flexible communications:
Compatible with building management systems



BMS connection options





Remote monitoring made easy via tablet or laptop

The digital combustion manager is the basis of communications with other superordinate systems. This is generally achieved using the eBus or Modbus protocols.

All the usual burner and boiler functions can be monitored and controlled through a direct connection with a building management system.

A graphical HMI is available as an option to provide a user-friendly overview of the boiler. The touchscreen display allows numerous functions to be adjusted and monitored, such as system parameters and setpoints of individual and multi-boiler plant and ancillary equipment.

The controls specialists, Neuberger, who are a part of the Weishaupt Group, are able to design and implement complex control solutions.

Further optional components enable connections to be made to systems using commonplace industrial standards, such as Profibus-DP, LON-Bus, and Modbus RTU, and network protocols such as Profinet I/O, Modbus TCP, BacNet, etc.

A recent addition to Weishaupt's portfolio is the W-FM COM communications module. It transmits data securely over the internet so that it can be called up and displayed in a browser window on a computer, tablet, or smartphone, facilitating 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 other predefined trigger, an SMS text message is sent automatically.

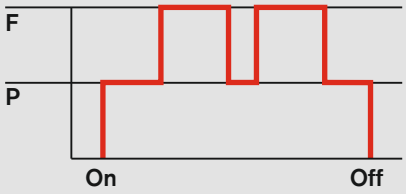
Overview of burner control
Model designation

Gas and oil-fired operation

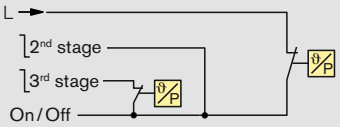
Two-stage control (Z)

- Two-term switching (e.g. temperature or pressure stat) causes actuators to drive the burner to partial load or full load in response to heat demand. Single-stage control with low-impact start can also be effected.

Two-stage



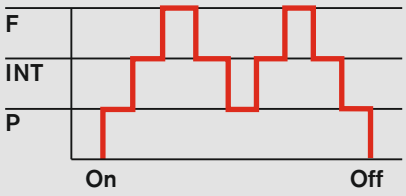
Control [1)]

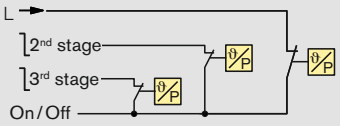


Three-stage control(T)

- Two-term switching (e.g. temperature or pressure stat) for each load point causes actuators to drive the burner to partial load, intermediate load, or full load in response to heat demand. Two-stage control with low-impact start or changeover can also be effected.

Three-stage

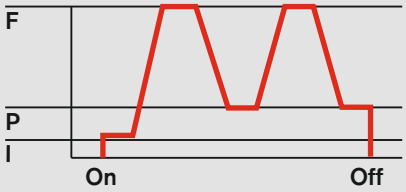


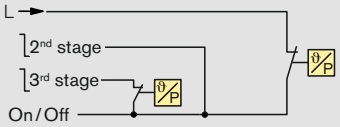


Sliding-two-stage control (ZM, R)

- Two-term switching (e.g. temperature or pressure stat) causes actuators to drive the burner to partial load or full load in response to heat demand. There is a gradual change between both load points. There are no sudden, large changes in fuel throughput.

Sliding-two-stage

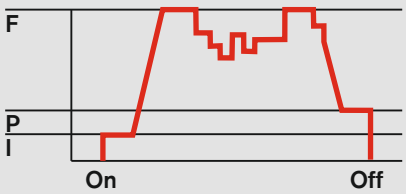


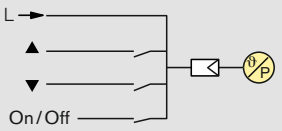


Modulating control (ZM, R)

- An electronic load controller causes actuators to make infinitely variable load adjustments in response to heat demand.
- Available modulation control options:
  – W-FM 100 with load controller
  – W-FM 200
- Alternatively, a PID controller can be fitted into the switching

Modulating





F = Full load (nominal load)
INT = Intermediate load
P = Partial load (minimum load)
I = Ignition load

[1)] Alternatively, staged control can also be effected by an electronic PID controller. In which case appropriate temperature sensors or pressure transducers will be required.

Burner version	Oil			Gas
	two-stage	three-stage	sliding-two-stage / modulating	sliding-two-stage / modulating
Z	●			
T		●		
R			●	
ZM-R			●	●

Model designation

WM - S 10 / 3 -A Z / T

- Z = two-stage
- T = three-stage
- Mark
- Capacity
- Size
- S = Higher-viscosity oil
- Weishaupt monarch® burner series

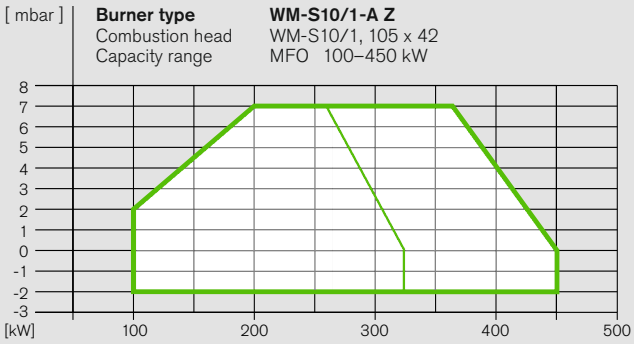
WM - S 30 / 3 -A R

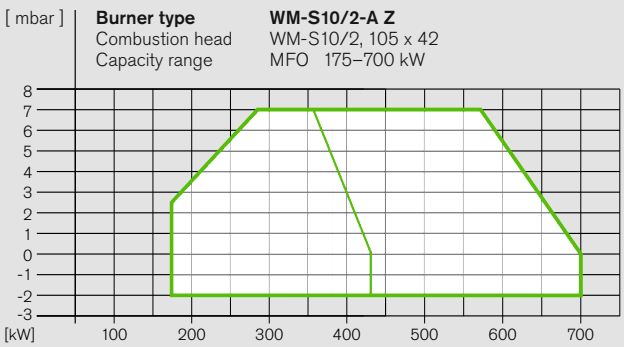
- R = sliding-two-stage / modulating
- Mark
- Capacity
- Size
- S = Higher-viscosity oil
- Weishaupt monarch® burner series

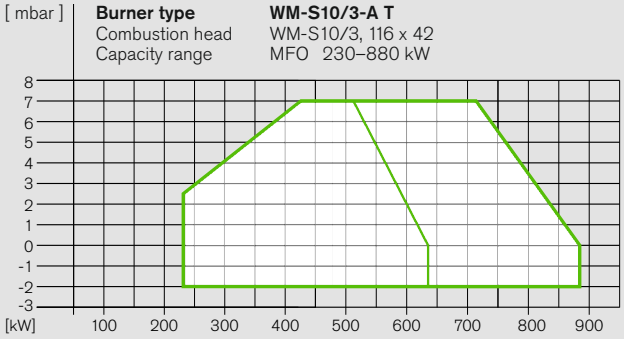
WM - GS 20 / 3 -A / ZM-R

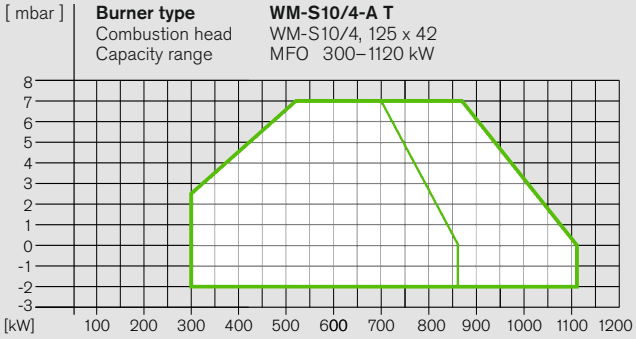
- ZM = sliding-two-stage / modulating on gas side
- R = sliding-two-stage / modulating on oil side
- Mark
- Capacity
- Size
- G = Gas
- S = Higher-viscosity oil
- Weishaupt monarch® burner series

Burner selection
WM-S10, versions Z and T









MFO: Capacity with combustion head
Closed
Open

Turndown:
MFO max. 3:1

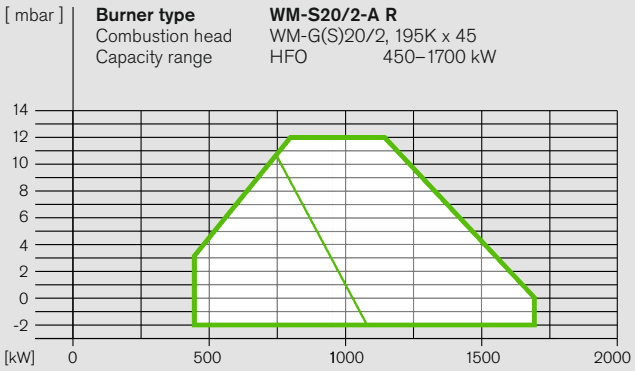
Capacity graphs for oil burners certified in accordance with EN 267.

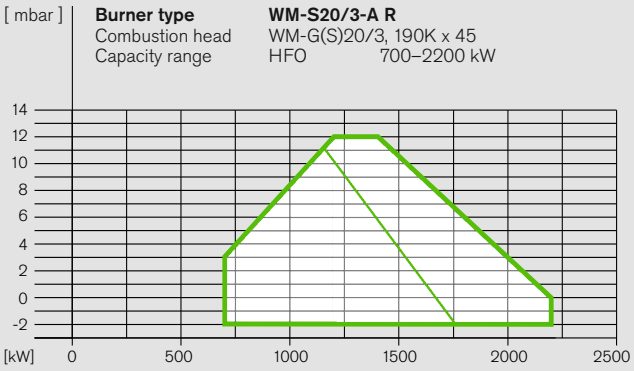
Stated ratings are based on an air temperature of 20 °C and an installation altitude of 500 m above sea level. For installations at higher altitudes, a reduction in capacity of 1 % per 100 m above sea level should be taken into account.

DIN CERTCO certification:
The burners have been type-tested by an independent body (TÜV-Süd) and certified by DIN CERTCO.

Every control panel is individually designed and produced

Burner selection
WM-S20, version R





The execution of the WM-S20 burner parallels that of the WM-GS20, save that an electromagnetic clutch, air pressure switch, double gas valve assembly, gas butterfly valve, and gas butterfly valve actuator are not included. The gas mixing chamber is closed off with a blanking flange.

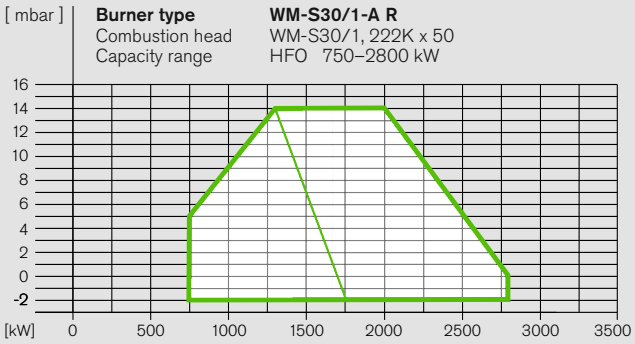
HFO: Capacity with combustion head
Closed
Open

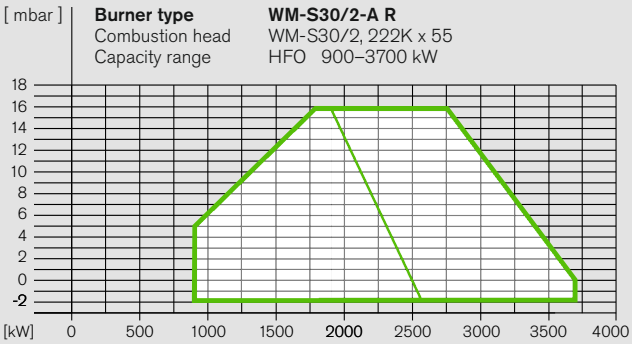
Turndown:
HFO max. 3:1

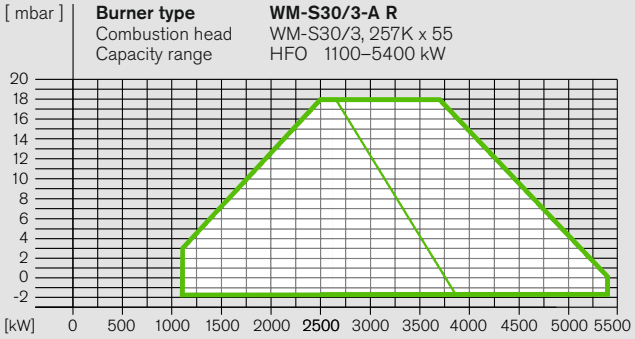
Capacity graphs for oil burners certified in accordance with EN 267.

Stated ratings are based on an air temperature of 20 °C and an installation altitude of 500 m above sea level. For installations at higher altitudes, a reduction in capacity of 1 % per 100 m above sea level should be taken into account.

Burner selection
WM-S30, version R







HFO: Capacity with combustion head
Closed
Open

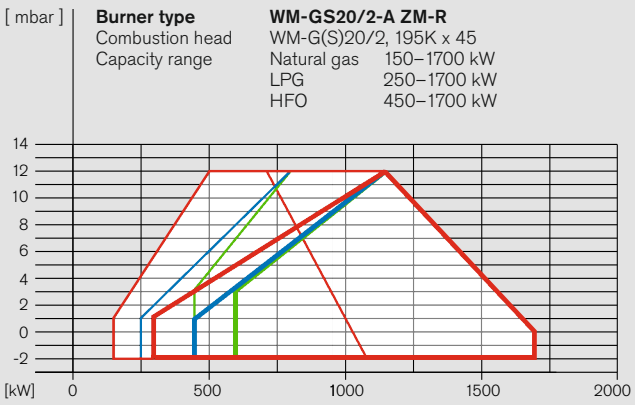
Turndown:
HFO max. 3:1

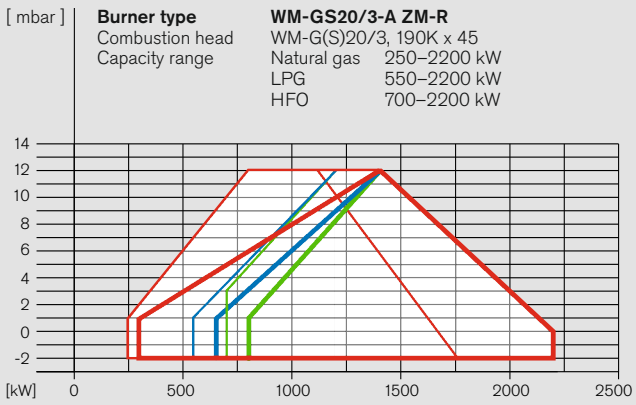
Capacity graphs for oil burners certified in accordance with EN 267.

Stated ratings are based on an air temperature of 20 °C and an installation altitude of 500 m above sea level. For installations at higher altitudes, a reduction in capacity of 1 % per 100 m above sea level should be taken into account.

DIN CERTCO certification:
The burners have been type-tested by an independent body (TÜV-Süd) and certified by DIN CERTCO.

Burner selection
WM-GS20, version ZM-R





Nat. gas: Capacity with comb. head
Closed
Open

LPG: Capacity with comb. head
Closed
Open

HFO: Capacity with comb. head
Closed
Open

Turndown:

Gas	max. 7:1
HFO	max. 3:1

Capacity graphs for gas and dual-fuel burners certified in accordance with EN 676 and EN 267.

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.

Gas valve train sizing
WM-GS20, version ZM-R

WM-GS20/2-A, version ZM-R

Burner rating kW	Low-pressure supply (FRS regulator) Flow pressure into shutoff valve **Nominal valve train diameter** 1"	1½"	2"	65	80	100	125	High-pressure supply (HP regulator) Flow pressure into shutoff valve **Nominal valve train diameter** 1"	1½"	2"	65	80	100	125
	Nominal gas butterfly diameter 65	65	65	65	65	65	65	Nominal gas butterfly diameter 65	65	65	65	65	65	65
Natural gas E LHV = 10.35 kWh/m³; d = 0.606														
720	59	24	11	–	–	–	–	17	12	6	–	–	–	–
900	90	36	17	12	10	9	9	27	20	9	7	6	6	6
1100	133	52	23	16	13	12	11	39	29	13	10	9	8	8
1300	183	69	29	19	15	13	12	53	38	16	12	10	9	9
1500	240	89	35	22	17	14	13	68	48	19	13	11	10	10
1700	–	111	43	25	18	15	14	85	60	22	15	12	11	10
Natural gas LL LHV = 8.83 kWh/m³; d = 0.641														
720	83	33	15	10	–	–	–	24	17	7	5	–	–	–
900	129	49	21	14	12	10	10	37	27	12	9	8	7	7
1100	190	72	30	19	15	13	12	55	39	17	12	11	10	9
1300	262	97	38	24	18	15	14	74	53	21	14	12	11	11
1500	–	126	48	28	21	16	15	96	68	25	17	14	12	12
1700	–	159	59	33	23	18	16	121	85	30	19	16	13	13
LPG* LHV = 25.89 kWh/m³; d = 1.555														
720	27	12	–	–	–	–	–	8	6	–	–	–	–	–
900	41	18	10	8	–	–	–	13	10	6	5	–	–	–
1100	59	26	14	11	10	9	9	19	15	9	7	7	7	6
1300	80	33	17	12	11	10	10	25	19	10	8	7	7	7
1500	103	41	19	14	11	10	10	31	23	11	9	8	7	7
1700	130	50	22	15	12	11	10	38	28	12	9	8	8	7

WM-GS20/3-A, version ZM-R

Burner rating kW	Low-pressure supply (FRS regulator) Flow pressure into shutoff valve **Nominal valve train diameter** 1"	1½"	2"	65	80	100	125	High-pressure supply (HP regulator) Flow pressure into shutoff valve **Nominal valve train diameter** 1"	1½"	2"	65	80	100	125
	Nominal gas butterfly diameter 65	65	65	65	65	65	65	Nominal gas butterfly diameter 65	65	65	65	65	65	65
Natural gas E LHV = 10.35 kWh/m³; d = 0.606														
1125	135	50	20	13	10	–	–	37	26	10	7	6	–	–
1300	180	66	26	16	12	10	9	50	35	13	9	7	7	6
1500	239	87	34	20	15	12	11	66	47	18	12	10	9	8
1700	–	111	42	25	18	14	13	84	59	22	14	12	11	10
1900	–	137	51	29	21	16	15	104	73	27	17	14	12	11
2200	–	181	65	36	25	19	17	137	96	33	20	16	14	13
Natural gas LL LHV = 8.83 kWh/m³; d = 0.641														
1125	195	71	28	17	12	10	9	54	38	14	9	7	6	6
1300	260	94	36	21	15	12	11	71	50	18	12	10	8	8
1500	–	124	47	27	19	15	14	95	66	24	15	13	11	10
1700	–	159	58	33	23	18	16	121	84	30	19	16	13	13
1900	–	196	71	39	27	20	18	–	104	36	22	18	15	14
2200	–	259	91	49	32	23	21	–	137	46	27	21	17	16
LPG* LHV = 25.89 kWh/m³; d = 1.555														
1125	59	24	11	–	–	–	–	17	12	6	–	–	–	–
1300	77	31	14	10	8	–	–	22	16	7	6	5	–	–
1500	102	40	18	12	10	9	9	30	22	10	7	7	6	6
1700	130	50	22	15	12	11	10	38	27	12	9	8	7	7
1900	161	61	26	17	13	12	11	46	33	14	10	9	8	8
2200	212	79	32	20	15	13	12	60	43	17	12	10	9	9

The LHV is referenced to 0 °C and 1013 mbar.
All pressures in mbar.
* The LPG charts are based on propane, but may also be used for butane.

Screwed		**Flanged**	
R 1	W-MF512	DN 65	DMV5065/12
R 1½	W-MF512	DN 80	DMV5080/12
R 2	DMV525/12	DN100	DMV5100/12
		DN 125	VGD 40.125

Stated flow pressures are based on a combustion chamber resistance of 0 mbar. The combustion chamber pressure of the heat generator must be added to the figure determined from the above chart when sizing the gas valve train. Minimum flow pressure 15 mbar.

For low-pressure supplies, EN 88-compliant governors with safety diaphragms are used.

For high-pressure supplies, an EN 334-compliant high-pressure regulator should be selected from the following technical booklets:
- Regulators up to 4 bar, Print No. 8300**12**02
- Regulators with safety devices, Print No. 83**1979**02

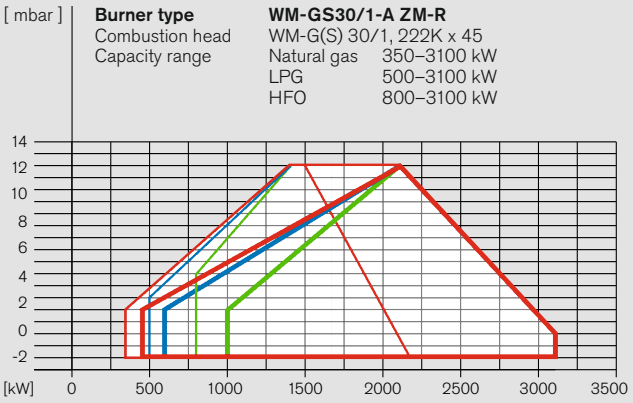
Refer to the burner's rating plate for the maximum connection pressure.

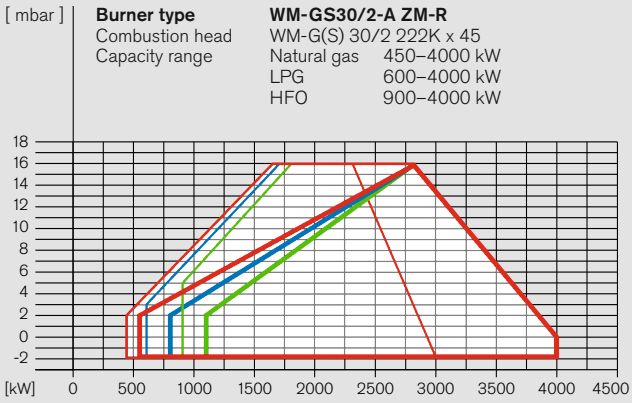
Maximum Operating Pressure (MOP)
The gas supplier must safeguard the gas supply such that the flow pressure will not exceed the MOP of the gas valve train components.

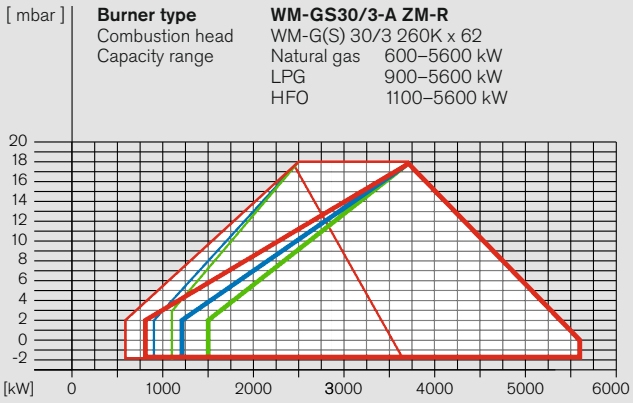
Valve train design
a) Low pressure:
Normally, low-pressure valve trains are used for gas flow pressures up to a maximum of 300 mbar and an MOP of 500 mbar. This allows for pressure losses between the transfer station and the valve train. Furthermore, it is assumed that the transfer station utilises components (SSV, SRV, regulator) that are not of the highest class of accuracy. In individual cases, following consideration and approval by Weishaupt's headquarters, a gas flow pressure of up to 360 mbar can be approved if the appropriate conditions exist.

b) High pressure:
Normally, high-pressure valve trains are used for gas flow pressures above 300 mbar.

Burner selection
WM-GS30, version ZM-R







Nat. gas: Capacity with comb. head
Closed
Open

LPG: Capacity with comb. head
Closed
Open

HFO: Capacity with comb. head
Closed
Open

Turndown:

Gas	max. 7:1
HFO	max. 3:1

Capacity graphs for gas and dual-fuel burners certified in accordance with EN 676 and EN 267.

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.

Gas valve train sizing
WM-GS30, version ZM-R

WM-GS30/1-A, version ZM-R

Burner rating kW	Low-pressure supply (FRS regulator) Flow pressure into shutoff valve **Nominal valve train diameter**							High-pressure supply (HP regulator) Flow pressure into shutoff valve **Nominal valve train diameter**						
	1"	**1½"**	**2"**	**65**	**80**	**100**	**125**	**1"**	**1½"**	**2"**	**65**	**80**	**100**	**125**
	Nominal gas butterfly diameter							Nominal gas butterfly diameter						
	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Natural gas E LHV = 10.35 kWh/m³; d = 0.606														
1400	209	78	31	19	14	12	11	59	42	16	11	10	8	8
1600	272	100	39	24	18	14	13	76	54	21	14	12	11	10
1800	–	125	48	28	21	17	15	95	67	26	17	14	13	12
2000	–	153	58	34	24	19	18	117	82	31	20	17	15	14
2250	–	191	70	40	28	22	19	–	102	37	23	19	16	16
2500	–	233	84	47	32	24	22	–	124	43	27	22	18	17
2800	–	290	103	56	37	27	24	–	–	52	31	25	21	20
3100	–	–	123	65	43	31	27	–	–	62	36	28	23	22
Natural gas LL LHV = 8.83 kWh/m³; d = 0.641														
1400	–	109	41	24	17	14	13	83	58	21	14	11	10	9
1600	–	141	53	30	21	17	15	107	75	27	17	14	12	12
1800	–	177	65	37	26	20	18	135	94	34	21	17	15	14
2000	–	217	79	44	30	23	20	–	116	41	25	20	17	16
2250	–	–	97	53	35	26	23	–	–	49	30	24	20	19
2500	–	–	117	62	41	29	26	–	–	59	35	27	22	21
2800	–	–	144	75	48	34	29	–	–	71	41	32	25	24
3100	–	–	173	89	56	38	33	–	–	85	48	36	29	27
LPG* LHV = 25.89 kWh/m³; d = 1.555														
1400	90	36	17	12	10	9	9	27	20	9	7	7	6	6
1600	116	46	21	14	12	11	10	35	25	12	9	8	8	8
1800	146	57	25	17	14	12	12	43	32	15	11	10	9	9
2000	179	69	30	20	16	14	13	53	38	17	13	12	11	10
2250	225	85	36	23	18	16	15	65	47	21	15	13	12	12
2500	276	103	42	27	21	17	16	79	57	24	17	15	14	13
2800	–	127	50	31	23	19	18	97	70	28	20	17	15	15
3100	–	153	59	36	26	21	20	118	84	33	22	19	17	16

The LHV is referenced to 0 °C and 1013 mbar.
All pressures in mbar.
* The LPG charts are based on propane, but may also be used for butane.

WM-GS30/2-A, version ZM-R

Burner rating kW	Low-pressure supply (FRS regulator) Flow pressure into shutoff valve **Nominal valve train diameter**							High-pressure supply (HP regulator) Flow pressure into shutoff valve **Nominal valve train diameter**						
	1"	**1½"**	**2"**	**65**	**80**	**100**	**125**	**1"**	**1½"**	**2"**	**65**	**80**	**100**	**125**
	Nominal gas butterfly diameter							Nominal gas butterfly diameter						
	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Natural gas E LHV = 10.35 kWh/m³; d = 0.606														
2100	–	166	61	34	24	19	17	127	88	31	20	16	14	13
2300	–	198	72	40	28	21	19	–	105	37	23	19	16	15
2500	–	233	84	46	32	24	21	–	124	43	26	21	18	17
2800	–	–	103	56	38	28	25	–	–	53	32	25	21	20
3100	–	–	125	67	44	32	28	–	–	63	38	30	24	23
3400	–	–	147	77	50	35	30	–	–	73	42	33	27	25
3700	–	–	171	88	56	39	33	–	–	84	48	37	29	27
4000	–	–	197	101	63	43	36	–	–	97	54	41	32	30
Natural gas LL LHV = 8.83 kWh/m³; d = 0.641														
2100	–	238	85	46	31	23	20	–	126	43	26	21	17	16
2300	–	–	101	54	36	26	23	–	–	51	30	24	20	19
2500	–	–	117	62	41	29	26	–	–	59	35	27	22	21
2800	–	–	145	76	49	35	30	–	–	72	42	33	26	25
3100	–	–	175	90	58	40	34	–	–	86	49	38	30	28
3400	–	–	207	105	66	45	38	–	–	101	56	43	34	31
3700	–	–	242	122	75	50	42	–	–	117	65	48	37	34
4000	–	–	280	140	85	56	46	–	–	135	73	54	41	38
LPG* LHV = 25.89 kWh/m³; d = 1.555														
2100	195	74	31	20	15	13	12	56	40	17	12	11	10	9
2300	233	87	36	23	17	15	14	67	48	20	14	12	11	11
2500	274	102	41	26	20	16	15	78	56	23	16	14	12	12
2800	–	126	50	30	23	19	17	97	69	28	19	16	15	14
3100	–	153	59	36	26	21	20	118	84	33	22	19	17	16
3400	–	182	69	41	30	24	22	140	99	38	25	21	19	18
3700	–	214	80	46	33	26	24	–	116	43	28	24	20	20
4000	–	248	92	52	36	28	25	–	133	49	31	26	22	21

Screwed		**Flanged**	
R 1	W-MF512	DN 65	DMV5065/12
R 1½	W-MF512	DN 80	DMV5080/12
R 2	DMV525/12	DN100	DMV5100/12
		DN 125	VGD 40.125

Stated flow pressures are based on a combustion chamber resistance of 0 mbar. The combustion chamber pressure of the heat generator must be added to the figure determined from the above chart when sizing the gas valve train. Minimum flow pressure 15 mbar.

For low-pressure supplies, EN 88-compliant governors with safety diaphragms are used.

For high-pressure supplies, an EN 334-compliant high-pressure regulator should be selected from the following technical booklets:
- Regulators up to 4 bar, Print No. 8300**12**02
- Regulators with safety devices, Print No. 83**1979**02

Refer to the burner's rating plate for the maximum connection pressure.

Maximum Operating Pressure (MOP)
The gas supplier must safeguard the gas supply such that the flow pressure will not exceed the MOP of the gas valve train components.

Valve train design
a) Low pressure:
Normally, low-pressure valve trains are used for gas flow pressures up to a maximum of 300 mbar and an MOP of 500 mbar. This allows for pressure losses between the transfer station and the valve train. Furthermore, it is assumed that the transfer station utilises components (SSV, SRV, regulator) that are not of the highest class of accuracy. In individual cases, following consideration and approval by Weishaupt's headquarters, a gas flow pressure of up to 360 mbar can be approved if the appropriate conditions exist.

b) High pressure:
Normally, high-pressure valve trains are used for gas flow pressures above 300 mbar.

Gas valve train sizing
WM-GS30, version ZM-R

WM-GS30/3-A, version ZM-R

Burner rating kW	Low-pressure supply (FRS regulator) Flow pressure into shutoff valve **Nominal valve train diameter** **1½"** **2"** **65** **80** **100** **125** **150** Nominal gas butterfly diameter 80 80 80 80 80 80 80							High-pressure supply (HP regulator) Flow pressure into shutoff valve **Nominal valve train diameter** **1½"** **2"** **65** **80** **100** **125** **150** Nominal gas butterfly diameter 80 80 80 80 80 80 80						
Natural gas E LHV = 10.35 kWh/m³; d = 0.606														
2500	227	78	40	25	18	15	14	118	37	20	15	12	11	11
2900	–	104	53	33	22	19	17	158	49	27	20	16	14	14
3300	–	133	67	41	27	23	21	–	63	34	25	19	18	17
3700	–	165	82	50	33	27	25	–	78	42	31	23	21	21
4100	–	200	98	59	37	31	28	–	94	49	36	26	24	23
4500	–	238	115	68	42	34	30	–	111	57	40	29	26	25
5000	–	290	138	80	48	38	33	–	133	67	47	33	29	28
5600	–	–	169	96	56	43	37	–	164	80	55	37	33	31
Natural gas LL LHV = 8.83 kWh/m³; d = 0.641														
2500	–	109	54	33	22	18	16	168	51	27	19	14	13	13
2900	–	146	72	43	28	23	21	–	68	36	26	19	17	17
3300	–	187	92	55	35	28	25	–	88	46	33	24	22	21
3700	–	234	114	67	42	34	30	–	109	56	40	29	26	25
4100	–	284	136	79	48	38	34	–	131	66	47	33	29	28
4500	–	–	161	92	55	43	37	–	155	77	53	37	33	31
5000	–	–	194	109	63	48	42	–	188	92	62	42	37	35
5600	–	–	239	132	74	56	47	–	–	111	74	48	42	39
LPG* LHV = 25.89 kWh/m³; d = 1.555														
2500	97	36	20	14	11	10	9	51	17	11	9	7	7	7
2900	129	47	26	18	14	12	12	68	23	14	11	9	9	9
3300	166	60	33	22	17	15	14	88	30	18	14	12	11	11
3700	208	74	40	27	20	17	16	109	37	22	17	14	13	13
4100	253	89	48	31	23	20	19	133	44	26	20	17	16	15
4500	–	105	55	35	25	21	20	159	51	29	23	18	17	16
5000	–	127	65	41	28	24	22	194	61	34	26	20	18	18
5600	–	156	78	48	31	26	24	–	74	40	30	22	21	20

The LHV is referenced to 0 °C and 1013 mbar.
All pressures in mbar.
* The LPG charts are based on propane, but may also be used for butane.

Screwed		**Flanged**	
R 1	W-MF512	DN 65	DMV5065/12
R 1½	W-MF512	DN 80	DMV5080/12
R2	DMV525/12	DN100	DMV5100/12
		DN 125	VGD 40.125
		DN150	VGD40.150

Stated flow pressures are based on a combustion chamber resistance of 0 mbar. The combustion chamber pressure of the heat generator must be added to the figure determined from the above chart when sizing the gas valve train. Minimum flow pressure 15 mbar.

For low-pressure supplies, EN 88-compliant governors with safety diaphragms are used.

For high-pressure supplies, an EN 334-compliant high-pressure regulator should be selected from the following technical booklets:
- Regulators up to 4 bar, Print No. 8300**12**02
- Regulators with safety devices, Print No. 83**1979**02

Refer to the burner's rating plate for the maximum connection pressure.

Maximum Operating Pressure (MOP)
The gas supplier must safeguard the gas supply such that the flow pressure will not exceed the MOP of the gas valve train components.

Valve train design
a) Low pressure:
Normally, low-pressure valve trains are used for gas flow pressures up to a maximum of 300 mbar and an MOP of 500 mbar. This allows for pressure losses between the transfer station and the valve train. Furthermore, it is assumed that the transfer station utilises components (SSV, SRV, regulator) that are not of the highest class of accuracy. In individual cases, following consideration and approval by Weishaupt's headquarters, a gas flow pressure of up to 360 mbar can be approved if the appropriate conditions exist.

b) High pressure:
Normally, high-pressure valve trains are used for gas flow pressures above 300 mbar.

Large and medium-sized burner assembly at the main factory in Schwendi, Germany

Scope of delivery and order numbers

Description		WM-S10	WM-S20	WM-S30	WM-GS20	WM-GS30
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 screw		●	●	●	●	●
Digital combustion manager	W-FM 50	●	–	●	–	–
	W-FM 100	○	●	○	●	●
	W-FM 200	○	○	○	○	○
Valve proving via the combustion manager		–	–	–	●	●
Class-A double gas valve assembly		–	–	–	●	●
Gas butterfly valve		–	–	–	●	●
Air pressure switch		○	○	○	●	●
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		–	●	●	●	●
Oil pump fitted to burner		●	●	●	●	●
Electromagnetic clutch		○	○	○	●	●
Oil hoses		●	●	●	●	●
Compact solenoid valve block with multi-stage oil-circulating nozzle assembly with preinstalled oil nozzles		●	–	–	–	–
2 oil solenoid valves, oil regulator, nozzle head with solenoid valve, preinstalled regulating nozzle and safety shutoff device		–	●	●	●	●
Oil preheater	type EV...	●	●	–	●	–
	type WEV...	–	–	●	–	●
Insulated oil lines on burner		●	●	●	●	●
Star-delta combination, fitted to motor		–	–	●	–	●
DOL motor contactor fitted to motor		●	●	–	●	–

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 special equipment section of this brochure for further burner executions.

● Standard
○ Optional

The execution of the WM-S20 burner parallels that of the WM-GS20, save that an electromagnetic clutch, air pressure switch, double gas valve assembly, gas butterfly valve, and gas butterfly valve actuator are not included. The gas mixing chamber is closed off with a blanking flange.

Oil burners, version Z

Burner type	Order No.
WM-S10/1-A Z	212 110 10
WM-S10/2-A Z	212 110 20

DIN CERTCO: 5G1053

Oil burners, version T

Burner type	Order No.
WM-S10/3-A T	212 110 30
WM-S10/4-A T	212 110 40

DIN CERTCO: 5G1053

Oil burners, version R

Burner type	Order No.
WM-S20/2-A R	Please enquire
WM-S20/3-A R	Please enquire

DIN CERTCO: –

WM-S30/1-A R	212 320 10
WM-S30/2-A R	212 320 20
WM-S30/3-A R	212 320 30

DIN CERTCO: 5G1046

Dual-fuel burners, version ZM-R

Burner type	Valve train size	Order No.
WM-GS20/2-A ZM-R	R 1	218 252 11
	R 1½	218 252 12
	R 2	218 252 13
	DN 65	218 252 14
	DN 80	218 252 15
	DN 100	218 252 16
	DN 125	218 252 17
WM-GS20/3-A ZM-R	R 1	218 253 11
	R 1½	218 253 12
	R 2	218 253 13
	DN 65	218 253 14
	DN 80	218 253 15
	DN 100	218 253 16
	DN 125	218 253 17

DIN CERTCO: 5G1032M
CE-PIN: CE-0085 BT 0133

WM-GS30/1-A ZM-R	R 1	218 351 11
	R 1½	218 351 12
	R 2	218 351 13
	DN 65	218 351 14
	DN 80	218 351 15
	DN 100	218 351 16
	DN 125	218 351 17
WM-GS30/2-A ZM-R	R 1	218 352 11
	R 1½	218 352 12
	R 2	218 352 13
	DN 65	218 352 14
	DN 80	218 352 15
	DN 100	218 352 16
	DN 125	218 352 17
WM-GS30/3-A ZM-R	R 1	218 353 11
	R 1½	218 353 12
	R 2	218 353 13
	DN 65	218 353 14
	DN 80	218 353 15
	DN 100	218 353 16
	DN 125	218 353 17

DIN CERTCO: 5G1044M
CE-PIN: CE-0085 BU 0360

Special equipment
WM-S10, versions Z and T

Versions Z (two-stage) and T (three-stage)		WM-S10/1-A Z	WM-S10/2-A Z	WM-S10/3-A T	WM-S10/4-A T
Combustion head extension by 100 mm		210 030 90	210 030 91	210 030 92	210 030 93
Side-mounted oil preheater		210 031 34	210 031 35	210 031 35	210 031 35
W-FM 100 (suitable for continuous firing) in lieu of W-FM 50 [1]	burner-mounted	210 031 50	210 031 50	210 031 50	210 031 50
	supplied loose	210 032 64	210 032 64	210 032 64	210 032 64
Integral load controller and analogue signal convertor for W-FM 100		110 017 18	110 017 18	110 017 18	110 017 18
W-FM 200 in lieu of W-FM 50, with integral load controller, analogue signal convertor, and VSD module, with optional fuel metering	burner-mounted	210 031 51	210 031 51	210 031 51	210 031 51
	supplied loose	210 032 62	210 032 62	210 032 62	210 032 62
LGW 50 air pressure switch [1]		210 030 08	210 030 08	210 030 08	210 030 08
DSB158 minimum pressure switch in supply [1]		Please enquire	Please enquire	Please enquire	Please enquire
QRI flame sensor in lieu of QRB [1]		210 030 24	210 030 24	210 031 24	210 031 24
Pressure gauge with ball valve		110 008 82	110 008 82	110 008 82	110 008 82
Vacuum gauge with ball valve		110 005 70	110 005 70	110 005 70	110 005 70
PON oil pump (hardened execution)		210 008 01	210 008 01	210 008 01	210 008 01
PON oil pump heating		210 032 37	210 032 37	210 032 37	210 032 37
Oil hoses, 1300 mm in lieu of 1000 mm		210 031 62	210 031 62	210 031 62	210 031 62
Heated, stainless-steel oil hoses, DN13 x 1300 mm		210 032 38	210 032 38	210 032 38	210 032 38

Country-specific executions and special voltages on application

[1] Required for PED (2014/68/EU) compliance.

Special equipment WM-S20, version R

Version R (sliding-two-stage or modulating)		WM-S20/2-A	WM-S20/3-A
Combustion head extension	by 100 mm	Please enquire	Please enquire
	by 200 mm	Please enquire	Please enquire
	by 300 mm	Please enquire	Please enquire
W-FM 100 supplied loose in lieu of fitted		210 032 59	210 032 59
Integral load controller and analogue signal convertor for W-FM 100		110 017 18	110 017 18
W-FM 200 in lieu of W-FM 100 with integral load controller, analogue signal convertor, and VSD module with optional fuel metering			
	burner-mounted	210 032 60	210 032 60
	supplied loose	210 032 61	210 032 61
VSD with integral frequency convertor (W-FM 200 required) [2]		210 030 40	210 030 40
VSD with separate frequency convertor (W-FM 200 required) (See accessories list for frequency convertor) [2]		210 030 41	210 030 41
ABE with Chinese-character display, supplied loose		110 018 53	110 018 53
SQM48 / 35 Nm oil regulator actuator		210 032 50	210 032 50
DSB158 pressure switch in supply [1]		210 032 52	210 032 52
Solenoid valve for air pressure switch test with continuous-run fan or post-purge		250 030 21	250 030 21
Air inlet with flange for ducted-air connection and LGW air pressure switch		210 030 47	210 030 47
Inverted air inlet, with flange for ducted-air connection and LGW air pressure switch		Please enquire	Please enquire
Pressure gauge with ball valve on pump		110 002 82	110 002 82
Pressure gauge with ball valve in return		110 011 50	110 011 50
Vacuum gauge with ball valve		110 017 00	110 017 00
UHE oil pump (hardened execution)		Please enquire	Please enquire
Heated oil lines between pump and solenoid valve		210 032 51	210 032 51
Oil hoses, 1300 mm in lieu of 1000 mm		Please enquire	Please enquire
Motor with star-delta combination and overload protection [3]		250 030 95	250 030 95

The execution of the WM-S20 burner parallels that of the WM-GS20, save that an electromagnetic clutch, air pressure switch, double gas valve assembly, gas butterfly valve, and gas butterfly valve actuator are not included. The gas mixing chamber is closed off with a blanking flange.

Country-specific executions and special voltages on application

[1] Required for PED (2014/68/EU) compliance.

[2] VSD with R version burners: General conditions for modulating load control when firing on oil:
– Frequency: min. 35 Hz
– Turndown: max. 3:1

[3] The necessary motor protection can be provided either by a motor protection switch (supplied and fitted into a panel by others), or with integral motor overload protection (see special equipment).

Special equipment WM-S30, version R

Version R (sliding-two-stage or modulating)		WM-S30/1-A	WM-S30/2-A	WM-S30/3-A
Combustion head extension	by 150 mm	Please enquire	Please enquire	Please enquire
	by 300 mm	Please enquire	Please enquire	Please enquire
Burner-mounted KS20 controller (W-FM 50)		250 033 15	250 033 15	250 033 15
W-FM 100 (suitable for continuous firing) in lieu of W-FM 50 [1]	burner-mounted	210 031 50	210 031 50	210 031 50
	supplied loose	210 032 64	210 032 64	210 032 64
Integral load controller and analogue signal convertor for W-FM 100		110 017 18	110 017 18	110 017 18
W-FM 200 in lieu of W-FM 50, with integral load controller, analogue signal convertor, and VSD module, with optional fuel metering	burner-mounted	210 031 51	210 031 51	210 031 51
	supplied loose	210 032 62	210 032 62	210 032 62
VSD with integral frequency convertor (W-FM 50 / 200 required) [2]		210 030 97	210 031 48	210 031 49
VSD with separate frequency convertor (W-FM 200 required) (See accessories list for frequency convertor) [2]		210 030 98	210 030 98	210 031 00
ABE with Chinese-character display, supplied loose (W-FM 100 / 200)		110 018 53	110 018 53	110 018 53
SQM48 / 35 Nm oil regulator actuator (W-FM100 / 200)		210 032 50	210 032 50	210 032 50
DSB158 minimum pressure switch in supply [1]		210 032 52	210 032 52	210 032 52
QRI flame sensor in lieu of QRB [1]		210 030 24	210 030 24	210 030 24
LGW 50 air pressure switch [1]		210 031 39	210 031 39	210 031 39
Inverted air inlet, with flange for ducted-air connection and LGW air pressure switch (LGW 50 also required)		210 031 18	210 031 18	210 031 18
WEV 3.1/01 oil preheater in lieu of WEV 2.2/01		210 032 53	210 032 53	–
WEV 3/01 oil preheater in lieu of WEV 2.2/01		–	210 032 54	–
Pressure gauge with ball valve on pump		110 002 82	110 002 82	110 002 82
Pressure gauge with ball valve in return		110 011 50	110 011 50	110 011 50
Vacuum meter with ball valve		110 017 00	110 017 00	110 017 00
UHE oil pump (hardened execution)		Please enquire	Please enquire	Please enquire
Heated oil lines between pump and solenoid valve		210 032 51	210 032 51	210 032 51
Heated oil hoses, 1300 mm in lieu of 1000 mm		210 032 48	–	–
Heated oil hoses, 1500 mm in lieu of 1300 mm		–	210 032 49	210 032 49

Country-specific executions and special voltages on application

[1] Required for PED (2014/68/EU) compliance.

[2] VSD with ZM-R version burners: General conditions for modulating load control when firing on oil
- Frequency: min. 35 Hz
- Turndown: max. 3:1

Special equipment
WM-GS20, version ZM-R

Version ZM-R		WM-GS20/2-A	WM-GS20/3-A
Combustion head extension	by 100 mm	Please enquire	Please enquire
	by 200 mm	Please enquire	Please enquire
	by 300 mm	Please enquire	Please enquire
W-FM 100 supplied loose in lieu of fitted		210 032 59	210 032 59
Integral load controller and analogue signal convertor for W-FM 100		110 017 18	110 017 18
W-FM 200 in lieu of W-FM 100 with integral load controller, analogue signal convertor, and VSD module with optional fuel metering	supplied loose	210 032 60	210 032 60
	supplied loose	210 032 61	210 032 61
VSD with integral frequency convertor (W-FM 200 required) [2]		210 030 40	210 030 40
VSD with separate frequency convertor (W-FM 200 required) (See accessories list for frequency convertor) [2]		210 030 41	210 030 41
ABE with Chinese-character display, supplied loose		110 018 53	110 018 53
SQM48 / 35 Nm oil regulator actuator		210 032 50	210 032 50
High gas pressure switch [1] (Screwed W-MF / DMV for low-pressure supplies)	GW 50 A6/1	250 033 30	250 033 30
	GW 150 A6/1	250 033 31	250 033 31
	GW 500 A6/1	250 033 32	250 033 32
High gas pressure switch [1] (Flanged DMV / VGD for low-pressure supplies)	GW 50 A6/1	150 017 49	150 017 49
	GW 150 A6/1	150 017 50	150 017 50
	GW 500 A6/1	150 017 51	150 017 51
High gas pressure switch [1] (Fitted to high-pressure regulator)	GW 50 A6/1	250 033 33	250 033 33
	GW 150 A6/1	250 033 34	250 033 34
	GW 500 A6/1	250 033 35	250 033 35
DSB158 pressure switch in supply [1]		210 032 52	210 032 52
Solenoid valve for air pressure switch test with continuous-run fan or post-purge		250 030 21	250 030 21
Air inlet flange for ducted-air connection, with LGW air pressure switch		210 030 47	210 030 47
Inverted air inlet, with flange for ducted-air connection and LGW air pressure switch		Please enquire	Please enquire
Pressure gauge with ball valve on pump		110 002 82	110 002 82
Pressure gauge with ball valve in return		110 011 50	110 011 50
Vacuum meter with ball valve		110 017 00	110 017 00
UHE oil pump (hardened execution)		Please enquire	Please enquire
Heated oil lines between pump and solenoid valve		210 032 51	210 032 51
Oil hoses, 1300 mm in lieu of 1000 mm		Please enquire	Please enquire
Motor with 230 V contactor and overload protection [3]		250 030 95	250 030 95

Country-specific executions and special voltages on application

[1] Required for PED (2014/68/EU) compliance.

[2] VSD with ZM-R version burners: General conditions for modulating load control when firing on oil:
– Frequency: min. 35 Hz
– Turndown: max. 3:1

[3] The necessary motor protection can be provided either by a motor protection switch (supplied and fitted into a panel by others), or with integral motor overload protection (see special equipment).

Special equipment
WM-GS30, version ZM-R

Version ZM-R		WM-GS30/1-A	WM-GS30/2-A	WM-GS30/3-A
Combustion head extension	by 150 mm	Please enquire	Please enquire	Please enquire
	by 300 mm	Please enquire	Please enquire	Please enquire
W-FM 100 supplied loose in lieu of fitted		210 032 59	210 032 59	210 032 59
Integral load controller and analogue signal convertor for W-FM 100		110 017 18	110 017 18	110 017 18
W-FM 200 in lieu of W-FM 100 with integral load controller, analogue signal convertor, and VSD module with optional fuel metering	burner-mounted	210 032 60	210 032 60	210 032 60
	supplied loose	210 032 61	210 032 61	210 032 61
VSD with integral frequency convertor (W-FM 200 required) [2]		210 030 97	210 031 48	210 031 49
VSD with separate frequency convertor (W-FM 200 required) (See accessories list for frequency convertor) [2]		210 030 98	210 030 98	210 031 00
ABE with Chinese-character display, supplied loose		110 018 53	110 018 53	110 018 53
SQM48 / 35 Nm oil regulator actuator		210 032 50	210 032 50	210 032 50
High gas pressure switch [1]	GW 50 A6/1	250 033 30	250 033 30	250 033 30
(Screwed W-MF / DMV for low-pressure supplies)	GW 150 A6/1	250 033 31	250 033 31	250 033 31
	GW 500 A6/1	250 033 32	250 033 32	250 033 32
High gas pressure switch [1]	GW 50 A6/1	150 017 49	150 017 49	150 017 49
(Flanged DMV / VGD for low-pressure supplies)	GW 150 A6/1	150 017 50	150 017 50	150 017 50
	GW 500 A6/1	150 017 51	150 017 51	150 017 51
High gas pressure switch [1]	GW 50 A6/1	250 033 33	250 033 33	250 033 33
(Fitted to high-pressure regulator)	GW 150 A6/1	250 033 34	250 033 34	250 033 34
	GW 500 A6/1	250 033 35	250 033 35	250 033 35
DSB158 pressure switch in supply 1)		210 032 52	210 032 52	210 032 52
Solenoid valve for air pressure switch test with continuous-run fan or post-purge		250 030 21	250 030 21	250 030 21
Inverted air inlet, with flange for ducted-air connection and LGW air pressure switch		210 031 18	210 031 18	210 031 18
Pressure gauge with ball valve on pump		110 002 82	110 002 82	110 002 82
Pressure gauge with ball valve in return		110 011 50	110 011 50	110 011 50
Vacuum meter with ball valve		110 017 00	110 017 00	110 017 00
UHE oil pump (hardened execution)		Please enquire	Please enquire	Please enquire
Heated oil lines between pump and solenoid valve		210 032 51	210 032 51	210 032 51
WEV 3.1/01 oil preheater in lieu of WEV 2.2/01		210 032 53	210 032 53	–
WEV 3/01 oil preheater in lieu of WEV 2.2/01		–	210 032 54	–
Oil hoses, 1300 mm in lieu of 1000 mm		Please enquire	–	–
Motor with star-delta combination and overload protection [3]		250 032 61	250 032 61	250 033 29

Country-specific executions and special voltages on application

[1] Required for PED (2014/68/EU) compliance.

[2] VSD with ZM-R version burners: General conditions for modulating load control when firing on oil:
– Frequency: min. 35 Hz
– Turndown: max. 3:1

[3] The necessary motor protection can be provided either by a motor protection switch (supplied and fitted into a panel by others), or with integral motor overload protection (see special equipment).

Technical data
Oil burners

Oil burners		WM-S10/1-A Z	WM-S10/2-A Z	WM-S10/3-A T	WM-S10/4-A T
Burner motor	Weishaupt type	WM-D 90/90-2/1K0	WM-D 90/90-2/1K0	WM-D 90/110-2/1K5	WM-D 90/110-2/1K5
Motor power output	kW	0.9	0.9	1.5	1.5
Nominal current	A	2.2	2.2	3.2	3.2
Motor protection switch [1] or motor prefusing [1]	type (e.g.) A minimum	PKE12/XTU-4 10 gG/T (by others)	PKE12/XTU-4 10 gG/T (by others)	PKE12/XTU-4 16 gG/T (by others)	PKE12/XTU-4 16 gG/T (by others)
Speed (50 Hz)	rpm	2900	2900	2900	2900
Combustion manager	type	W-FM 50	W-FM 50	W-FM 50	W-FM 50
Flame monitoring	type	QRB	QRB	QRB	QRB
Air damper actuator	type	STE 50	STE 50	STE 50	STE 50
Integral pump max. flow rate	type l/h	E4 200	E4 200	E4 200	E4 200
Oil preheater Electrical rating	type kW	EV2A 2.2	EV2B 4.5	EV2B 4.5	EV2B 4.5
Oil hoses	DN/length	13/1000	13/1000	13/1000	13/1000
Mass	kg	approx. 70	approx. 77	approx. 77	approx. 77

Oil burners		WM-S20/2-A R	WM-S20/3-A R
Burner motor	Weishaupt type	WM-D 112/140-2/3K5	WM-D 112/170-2/4K5
Motor power output	kW	3.5	4.5
Nominal current	A	7.2	9.2
Motor protection switch [1] or motor prefusing [1]	type (e.g.) A minimum	PKE12/XTU-12 25 A gG/T (by others)	PKE12/XTU-12 35 A gG/T (by others)
Speed (50 Hz)	rpm	2940	2930
Combustion manager	type	W-FM 100	W-FM 100
Flame monitoring	type	QRI	QRI
Air damper/oil actuator	type	SQM 45	SQM 45
Integral pump max . flow rate	type l/h	TA2 525	TA3 785
Oil preheater Electrical rating	type kW	EV2C 6.6	EV2D 13.2
Oil hoses	DN/length	20/1000	20/1000
Mass	kg	approx.140	approx. 155

[1] The necessary motor protection can be provided either by a motor protection switch (supplied and fitted into a panel by others), or with integral motor overload protection (see special equipment).

The execution of the WM-S20 burner parallels that of the WM-GS20, save that an electromagnetic clutch, air pressure switch, double gas valve assembly, gas butterfly valve, and gas butterfly valve actuator are not included. The gas mixing chamber is closed off with a blanking flange.

Voltages and frequencies:
The burners are equipped as standard for three-phase alternating current, 400 V, 3 ~, 50 Hz. Other voltages and frequencies are available on application.

Standard burner motor:
Insulation Class F, IP 55 protection.
IE3 Premium Efficiency.

Technical data
Oil burners

Oil burners		WM-S30/1-A R	WM-S30/2-A R	WM-S30/3-A R
Burner motor	Weishaupt type	WM-D 132/170-2/7K5	WM-D 132/210-2/10K0	WM-D 132/210-2/14K0
Motor power output	kW	7.5	10.0	14.0
Nominal current	A	15.0	22.0	28.0
Motor protection switch [1)] or motor prefusing [1)]	type (e.g.) A minimum	PKE32/XTU-32 25 A gG/T (by others)	PKE32/XTU-32 35 A gG/T (by others)	PKE32/XTU-32 50 A gG/T (by others)
Speed (50 Hz)	rpm	2940	2940	2920
Combustion manager	type	W-FM 50	W-FM 50	W-FM 50
Flame monitoring	type	QRB	QRB	QRB
Air damper/oil actuator	type	STE50	STE50	STE50
Integral pump max. flow rate	type l/h	TA3 785	TA4 1050	TA5 1410
Oil preheater Electrical rating	type kW	WEV 2.2/01 13.8	WEV 2.2/01 13.8	WEV 3/01 22.4
Oil hoses	DN/length	20/1000	25/1300	25/1300
Mass	kg	approx. 187	approx. 207	approx. 217

[1)] The necessary motor protection can be provided either by a motor protection switch (supplied and fitted into a panel by others), or with integral motor overload protection (see special equipment).

Voltages and frequencies:
The burners are equipped as standard for three-phase alternating current, 400 V, 3 ~, 50 Hz. Other voltages and frequencies are available on application.

Standard burner motor:
Insulation Class F, IP 55 protection.
IE3 Premium Efficiency.

Technical data
Dual-fuel burners

Dual-fuel burners		WM-GS20/2-A ZM-R	WM-GS20/3-A ZM-R
Burner motor	Weishaupt type	WM-D 112/140-2/3K5	WM-D 112/170-2/4K5
Motor power output	kW	3.5	4.5
Nominal current	A	7.2	9.2
Motor protection switch [1)] or motor prefusing [1)]	type (e.g.) A minimum	PKE12/XTU-12 25 A gG/T (by others)	PKE12/XTU-12 35 A gG/T (by others)
Speed (50 Hz)	rpm	2940	2930
Combustion manager	type	W-FM 100	W-FM 100
Flame monitoring	type	QRI	QRI
Air damper/gas/oil actuator	type	SQM 45	SQM 45
Integral pump max. flow rate	type l/h	TA2 525	TA3 785
Oil preheater Electrical rating	type kW	EV2C 6.6	EV2D 13.2
Oil hoses	DN/length	20/1000	20/1000
Mass (excluding double gas valve assembly and fittings)	kg	approx. 140	approx. 155

Dual-fuel burners		WM-GS30/1-A ZM-R	WM-GS30/2-A ZM-R	WM-GS30/3-A ZM-R
Burner motor	Weishaupt type	WM-D 132/170-2/7K5	WM-D 132/210-2/10K0	WM-D 132/210-2/14K0
Motor power output	kW	7.5	10.0	14.0
Nominal current	A	15.0	22.0	28.0
Motor protection switch[1)] or motor prefusing [1)]	type (e.g.) A minimum	PKE32/XTU-32 25 A gG/T (by others)	PKE32/XTU-32 35 A gG/T (by others)	PKE32/XTU-32 50 A gG/T (by others)
Speed (50 Hz)	rpm	2940	2940	2920
Combustion manager	type	W-FM 100	W-FM 100	W-FM 100
Flame monitoring	type	QRI	QRI	QRI
Air damper/gas/oil actuator	type	SQM45	SQM45	SQM45
Integral pump max. flow rate	type l/h	TA3 785	TA4 1050	TA5 1410
Oil preheater Electrical rating	type kW	WEV 2.2/01 13.8	WEV 2.2/01 13.8	WEV 3/01 22.4
Oil hoses	DN/length	20/1000	25/1300	25/1300
Mass (excluding double gas valve assembly and fittings)	kg	approx. 214	approx. 234	approx. 244

[1)] The necessary motor protection can be provided either by a motor protection switch (supplied and fitted into a panel by others), or with integral motor overload protection (see special equipment).

Voltages and frequencies:
The burners are equipped as standard for three-phase alternating current, 400 V, 3 ~, 50 Hz. Other voltages and frequencies are available on application.

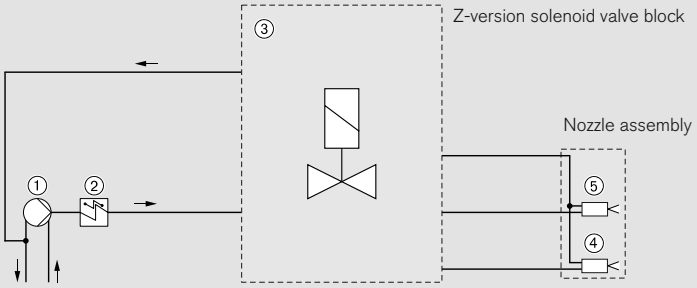
Standard burner motor:
Insulation Class F, IP 55 protection.
IE3 Premium Efficiency.

Fuel systems
WM-S10

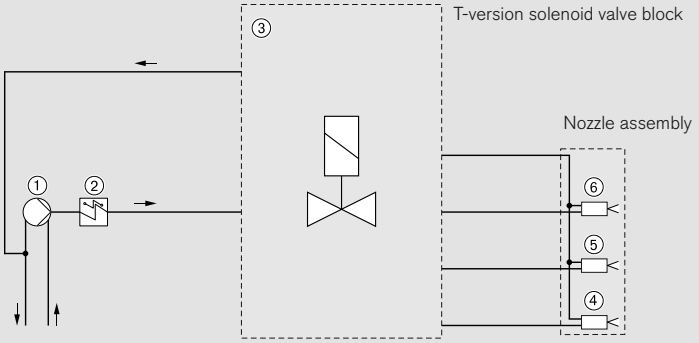
Operating sequence
Oil at pump pressure is present at the solenoid valves during pre-purge. When the pre-ignition sequence is started the oil begins to circulate. At the end of the circulation time (pre-ignition time), the solenoid valves are activated to ignite the burner.

The combustion manager switches the second-stage solenoid valve (or second and third-stage solenoid valves on three-stage burners) in response to heat demand.

Two-stage fuel system



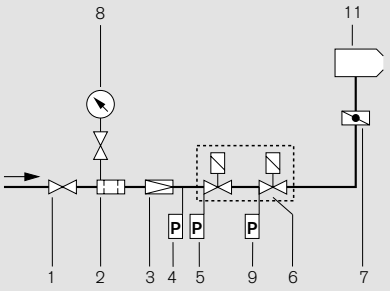
Three-stage fuel system



① Burner-mounted oil pump
② Oil preheater
③ Solenoid valve block
④ Stage 1 oil nozzle
⑤ Stage 2 oil nozzle
⑥ Stage 3 oil nozzle

Fuel systems
WM-(G)S20 and WM-(G)S30

Gas-side fuel system
W-FM 100 / 200



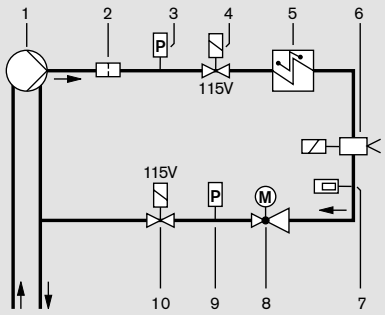
1 Ball valve *
2 Gas filter *
3 Pressure regulator, (LP) or (HP) *
4 High gas pressure switch *
5 Low gas pressure switch
6 Double gas valve assembly
7 Gas butterfly valve
8 Pressure gauge with push-button valve *
9 Valve-proving pressure switch
10 Low gas / valve-proving pressure switch
11 Burner

* Not included in burner price

Mounting position of the high gas pressure switch:
- On the regulator outlet of HP trains
- After the regulator of screwed LP trains
- On the valve assembly inlet of flanged LP trains

Cable length approx. 2.5 m.

Oil-side fuel system
Version (ZM-)R



1 Oil pump
2 Strainer
3 Min. oil pressure switch (optional)
4 Supply solenoid valve
(115 V with 230 V power supply, fitted in direction of flow)
5 Oil preheater
6 Nozzle head with regulating nozzle
7 Return temperature sensor
8 Oil regulator
9 Max. oil pressure switch
10 Return solenoid valve
(115 V with 230 V power supply, fitted against direction of flow)

Layout of the valve train
On boilers with hinged doors, the valve train must be mounted on the opposite side to the boiler-door hinges.

Compensator
To enable a tension free mounting of the valve train, the fitting of a compensator is strongly recommended.

Break points in the valve train
Break points in the valve train should be provided to enable the door of the heat generator to be swung open. The main gas line is best separated at the compensator.

Support of the valve train
The valve train should be properly supported in accordance with the site conditions. See the Weishaupt accessories list for various valve train support components.

Gas meter
A gas meter must be installed to measure gas consumption during commissioning and servicing.

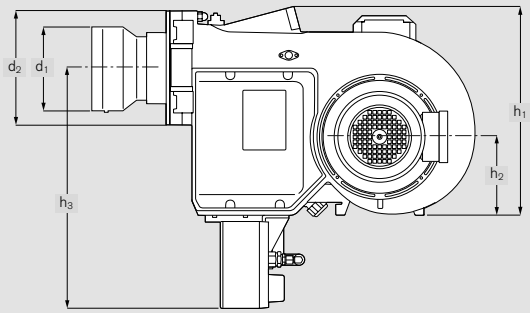
Optional thermal shutoff (when required by local regulations)
Integrated into the ball valve of screwed valve trains. A separate component with HTB seals fitted before the ball valve on flanged valve trains.

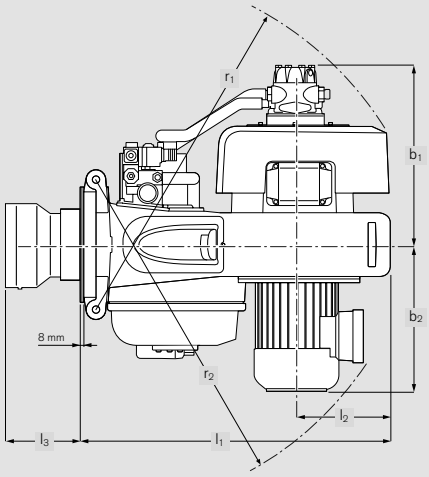
Oil circulation unit
An optional oil meter, to measure oil throughput and thus determine the burner's firing rate, is recommended for commissioning.

The oil circulation unit developed by Weishaupt only needs one oil meter, due to the separation of the burner supply loop from the oil ring main.

Dimensions

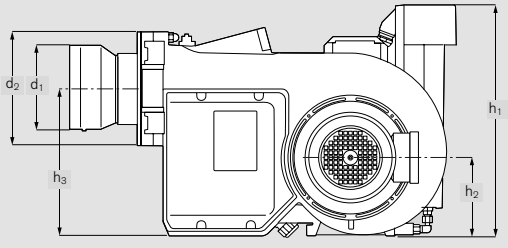
Underslung oil preheater (standard)

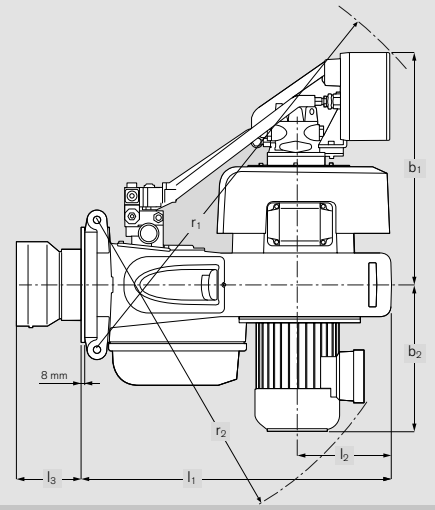




Burner type	Dimensions in mm															
	l_1	l_2	l_3	b_1	b_2	h_1	h_2	h_3	d_1	d_2	d_3	d_4	d_5	d_6	r_1	r_2
WM-S10/1-A Z	659	205	118–128	381	307	445	167	512	131	242	M10	165	186	170	718	682
WM-S10/2-A Z	659	205	113–133	381	307	445	167	512	140	242	M10	165	186	170	718	682
WM-S10/3-A T	659	205	133–153	381	335	445	167	512	160	242	M10	185	210	200	718	698
WM-S10/4-A T	659	205	138–158	381	335	445	167	512	180	242	M10	185	210	220	718	698

Side-mounted oil preheater (optional)



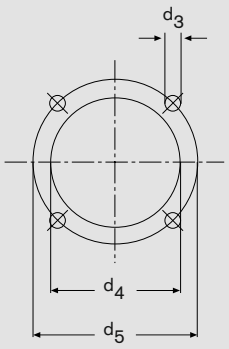


Burner type	Dimensions in mm															
	l_1	l_2	l_3	b_1	b_2	h_1	h_2	h_3	d_1	d_2	d_3	d_4	d_5	d_6	r_1	r_2
WM-S10/1-A Z	659	205	118–128	495	307	489	167	313	131	242	M10	165	186	170	881	682
WM-S10/2-A Z	659	205	113–133	495	307	489	167	313	140	242	M10	165	186	170	899	682
WM-S10/3-A T	659	205	133–153	495	335	489	167	313	160	242	M10	185	210	200	899	698
WM-S10/4-A T	659	205	138–158	495	335	489	167	313	180	242	M10	185	210	220	899	698

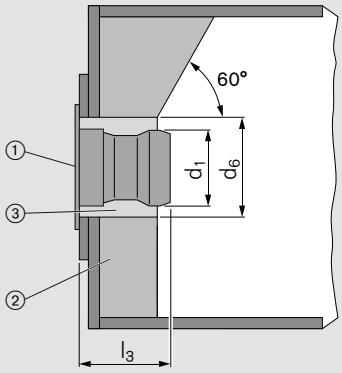
All dimensions are approximate.
Weishaupt reserve the right to make changes in light of future developments.

Burner mounting

Mounting-plate drilling dimensions



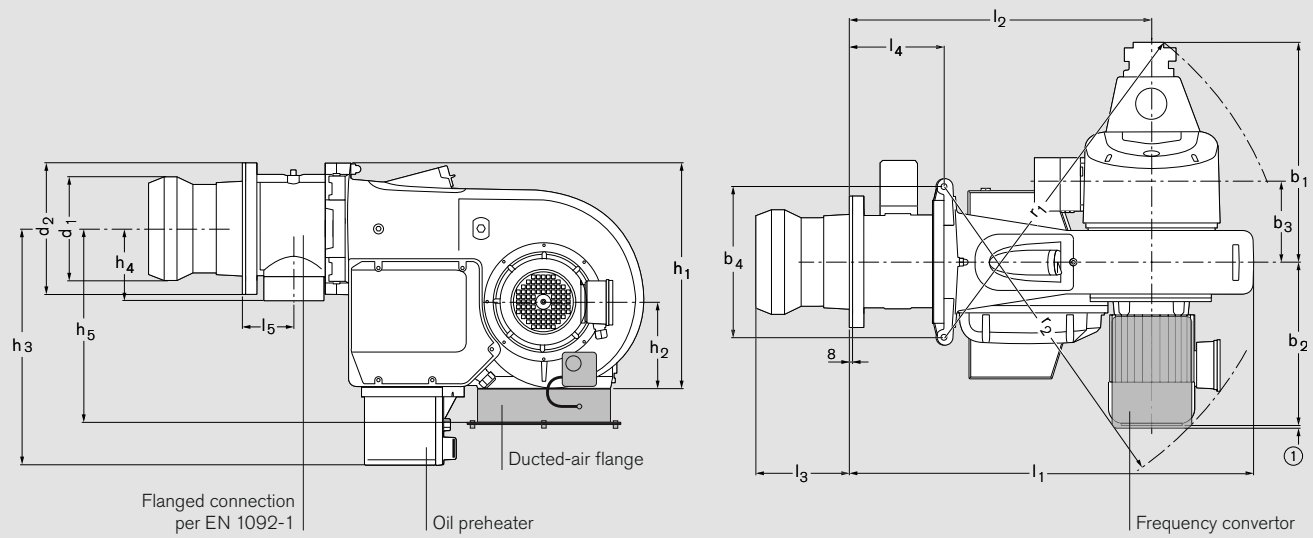
Heat generator preparation



① Flange gasket
② Refractory
③ Aperture

The refractory ② must not protrude beyond the front edge of the combustion head. It may however be tapered (min. 60°).

Dimensions



Optional

Burner type	Dimensions in mm l_1	l_2	l_3	l_4	l_5	b_1	b_2	b_3	b_4	h_1	h_2	h_3	h_4	h_5
WM-S20/2-A R	1010	757	231–266	238	128	420	424	209	380	573	225	600	182	470
WM-S20/3-A R	1010	757	231–256	238	128	420	464	209	380	573	225	600	182	470
WM-GS20/2-A ZM-R	1010	757	231–266	238	128	545	424	209	380	573	225	600	182	470
WM-GS20/3-A ZM-R	1010	757	231–256	238	128	545	464	209	380	573	225	600	182	470

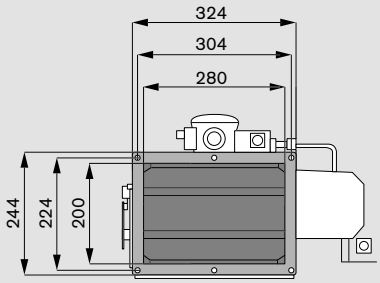
① Additional projection with frequency convertor approx. 20 mm

All dimensions are approximate.
Weishaupt reserve the right to make changes in light of future developments.

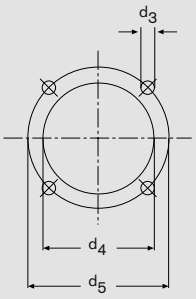
Note:
The execution of the WM-S20 burner parallels that of the WM-GS20, save that an electromagnetic clutch, air pressure switch, double gas valve assembly, gas butterfly valve, and gas butterfly valve actuator are not included. The gas mixing chamber is closed off with a blanking flange.

Burner mounting

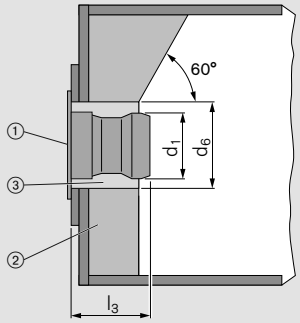
Underside of ducted-air flange



Mounting-plate drilling dimensions



Heat generator preparation



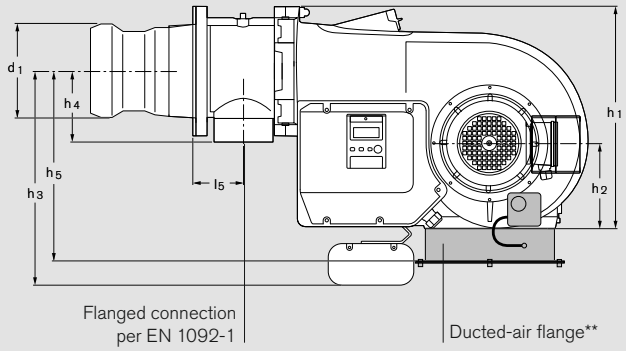
① Flange gasket
② Refractory
③ Aperture

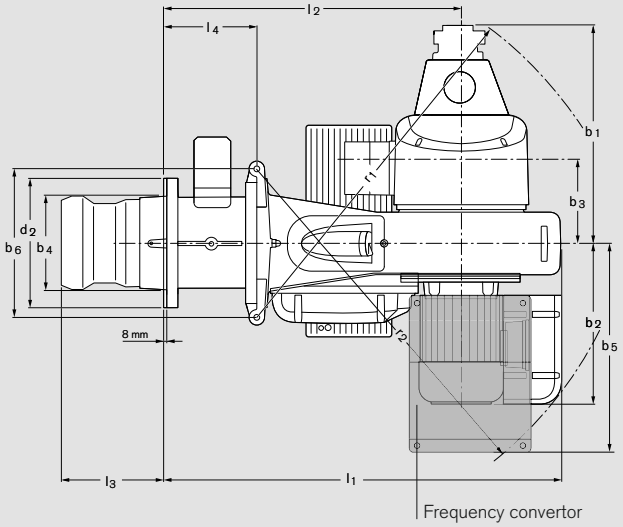
The refractory ② must not protrude beyond the front edge of the combustion head. It may however be tapered (min. 60°).

Burner type	Dimensions in mm r_1	r_2	d_1	d_2	d_3	d_4	d_5	d_6	Nominal diameter of the gas butterfly
WM-S20/2-A R	925	869	250	330	M12	270	298	290	Blanked flange
WM-S20/3-A R	925	883	260	330	M12	270	298	290	Blanked flange
WM-GS20/2-A ZM-R	925	869	250	330	M12	270	298	290	DN65
WM-GS20/3-A ZM-R	925	883	260	330	M12	270	298	290	DN65

All dimensions are approximate.
Weishaupt reserve the right to make changes in light of future developments.

Dimensions





Optional

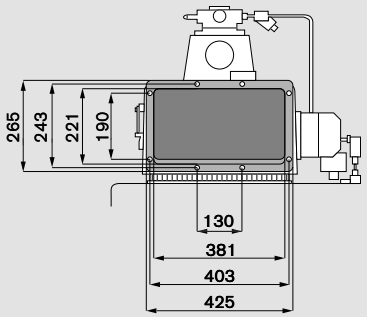
Burner type	Dimensions in mm l_1	l_2	l_3	l_4	l_5	b_1	b_2	b_3	b_4	b_5	b_6	r_1	r_2*
WM-S30/1-A R	941	622	301–326	43	–	484	508	261	301	570	440	992	1111
WM-S30/2-A R	941	622	301–326	43	–	488	548	261	301	670	440	992	1137
WM-S30/3-A R	956	637	285–325	58	–	494	548	261	301	670	440	992	1137
WM-GS30/1-A ZM-R	1146	827	349–374	248	128	615	508	261	301	570	440	1052	1111
WM-GS30/2-A ZM-R	1146	827	349–374	248	128	619	548	261	301	670	440	1055	1137
WM-GS30/3-A ZM-R	1166	847	349–389	268	148	625	548	261	348	670	440	1059	1137

* Excluding frequency convertor.
** Ducted-air flange only with inverted air inlet or free-standing oil preheater station.

All dimensions are approximate.
Weishaupt reserve the right to make changes in light of future developments.

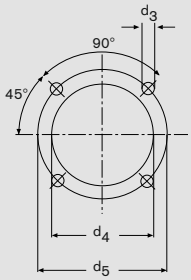
Burner mounting

Underside of ducted-air flange

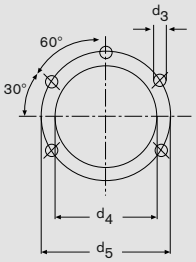


Mounting-plate drilling dimensions

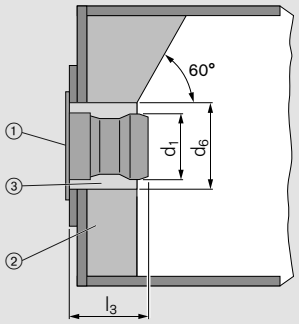
WM 30/1 and WM 30/2



WM 30/3



Heat generator preparation



① Flange gasket
② Refractory
③ Aperture

The refractory ② must not protrude beyond the front edge of the combustion head. It may however be tapered (min. 60°).

Burner type	Dimensions in mm h_1	h_2	h_3	h_4	h_5	d_1	d_2	d_3	d_4	d_5	d_6	Nominal diameter of the gas butterfly
WM-S30/1-A R	695	256	685	–	621	290	380	M12	305	330	360	–
WM-S30/2-A R	695	256	685	–	621	300	380	M12	305	330	360	–
WM-S30/3-A R	730	256	705	–	621	367	450	M12	375	400	420	–
WM-GS30/1-A ZM-R	695	256	685	212	621	290	380	M12	305	330	360	DN 80
WM-GS30/2-A ZM-R	695	256	685	212	621	300	380	M12	305	330	360	DN 80
WM-GS30/3-A ZM-R	730	256	705	232	621	367	450	M12	375	400	420	DN 80

*** Ducted-air flange only with inverted air inlet or free-standing oil preheater station.**

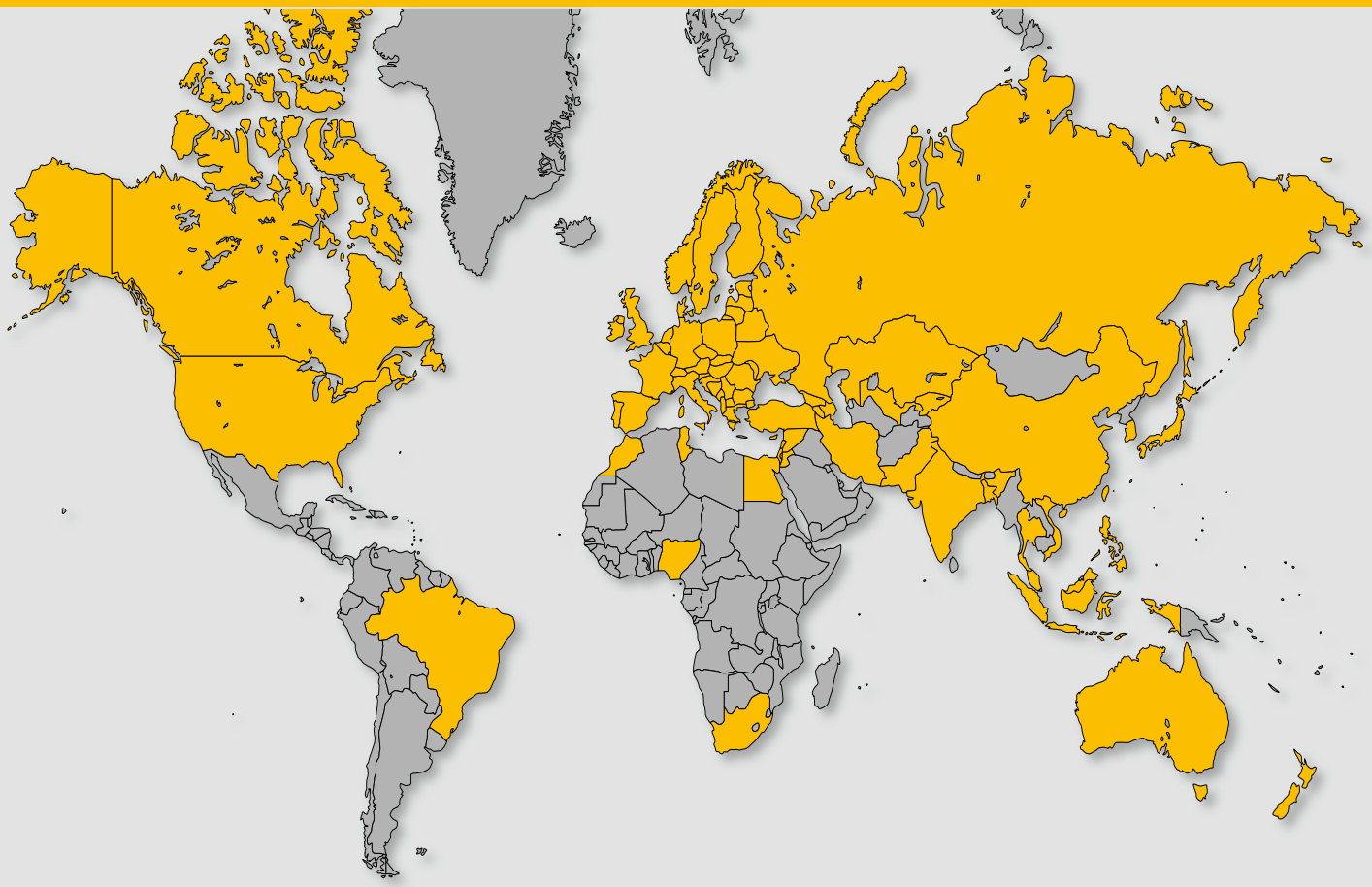
All dimensions are approximate.
Weishaupt reserve the right to make changes in light of future developments.

–weishaupt–

Max Weishaupt GmbH
88475 Schwendi
Tel +49 7353 830
Fax +49 7353 83358
www.weishaupt.de

Print No. 83**2121**02, December 2017

Neachells Lane, Willenhall, WV13 3RG
Tel (01902) 609841



Weishaupt worldwide:

Branch offices across Germany and numerous subsidiary companies, representatives and agents across the world provide local support.

Germany:
Augsburg
Berlin
Bremen
Cologne
Dortmund
Dresden
Erfurt
Frankfurt
Freiburg
Hamburg
Hanover
Karlsruhe
Kassel
Koblenz
Leipzig
Mannheim
Munich
Münster
Neuss
Nuremberg
Regensburg
Reutlingen
Rostock
Schwendi
Siegen
Stuttgart
Trier
Wangen
Würzburg

Subsidiaries:
Belgium
Bosnia
Brasil
Canada
Croatia
Czech Republic
Denmark
France
Hungary
Italy
Poland
Romania
Serbia
Slovakia
Slovenia
South Africa
Sweden
Switzerland (E)
United Kingdom
USA

Representation:
Bulgaria
China
Lithuania

Agencies:
Algeria
Australia
Austria
Bangladeh
Cyprus
Egypt
Estonia
Finland
Greece
India
Indonesia
Iran
Ireland
Israel
Japan
Jordan
Korea (South)
Kuwait
Latvia
Lebanon
Luxembourg
Malaysia
Macedonia
Moldova
Morocco
Netherlands
New Zealand
Nigeria
Norway
Pakistan
Philippines
Portugal
Russia
Singapore
Spain
Switzerland (W)
Syria
Taiwan
Thailand
Tunisia
Turkey
Ukraine
UAE
Vietnam