

– weishaupt –

product

Information on oil burners



WM-S10 for special fuels

WM-S10 monarch[®] burner (100 – 1120 kW) • for special applications

Progress and tradition: The latest monarch[®] burner



For more than 60 years the monarch[®] trademark has stood for power and quality

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.

The latest monarch[®] series is writing the next chapter in this success story. Its combination of ultra-modern technology and compact construction helps to make this burner universally employable.

Digital.

Digital combustion management for economical and reliable burner operation. The controls are easy to use.

Compact.

The aerodynamic housing and special air feed enable a higher capacity within smaller dimensions.

Quiet.

The latest monarch burners operate with considerably reduced noise levels, thanks to a specially developed fan unit.



Digital

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

Weishaupt WM-S10-series oil burners are equipped as standard with electronic compound regulation and digital combustion management. Modern combustion technologies demand a precise and continually reproducible dosing of fuel and combustion air. This is the only way optimal combustion figures can be ensured over extended periods.

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.

Flexible communication options

The integrated interface enables all necessary data and functions to be relayed to a master control system. If required, a modem can be installed to allow for remote operation, monitoring, and diagnosis.

Bus communication with external controls and building management

Several bus systems are available via E-Gate or Mod-Gate if data from the burner are to be exchanged with a PLC unit, or if control of the burner is to be integrated into a building management system.

For the control and management levels Weishaupt offers ProGraf NT, a real-time software product that meets any and all requirements.

Technological edge

Digital combustion management makes burner operation simple and reliable.

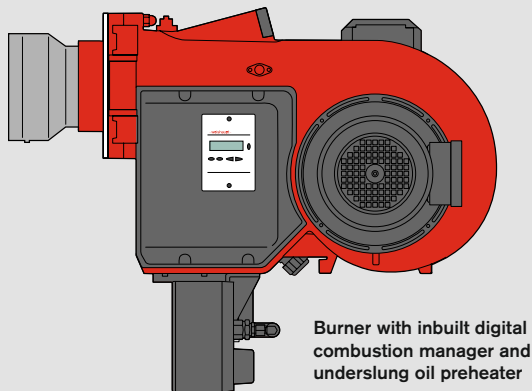
The most important advantages:

- No additional burner controls are necessary as control is effected by the combustion manager. The only additional requirements are external control and motor fuses.
- Reduced installation expense. Each burner is tested and supplied as a complete unit.
- Commissioning and servicing takes less time. The burner's basic parameters are set at the factory. The combustion manager's menu-driven commissioning program is used to run through the final site-specific adjustments and the combustion emission checks.

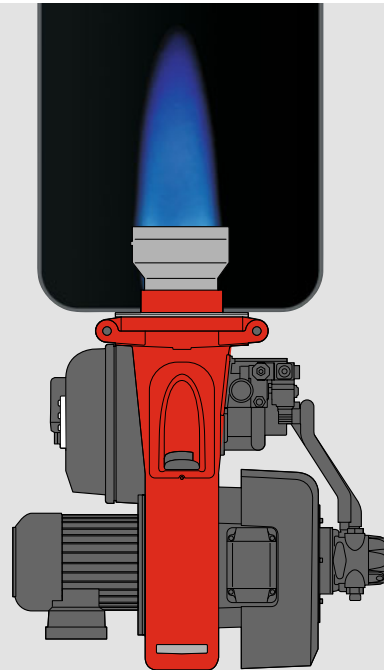
Digital combustion management General system overview	W-FM 50	W-FM 100	W-FM 200
Single-fuel operation	●	●	●
Dual-fuel operation		●	●
Controller for intermittent operation	●	●	●
Controller for continuous operation		●	●
Flame sensor for intermittent operation	ION/QRA2/QRB	ION/QRI/QRB/QRA	ION/QRI/QRB/QRA
Flame sensor for continuous operation		ION/QRI	ION/QRI
Servomotors in electronic compound (max.)	x 2	x 4	x 6
Servomotors with stepping motors	●	●	●
Variable speed drive available	●		●
O ₂ trim available			●
Gas valve proving	●	●	●
4-20 mA input signal	●	Optional	●
Integrated, self-setting PID controller for temperature or pressure		Optional	●
Removable control unit (max. distance)	20 m	100 m	100 m
Fuel consumption meter (switchable)	● ¹⁾		●
Combustion efficiency display			●
eBUS / MOD BUS interface	●	●	●
PC-supported commissioning	●	●	●

Please enquire regarding connections available for additional functions, e.g. flue gas dampers, oil shut-off assemblies etc.
¹⁾ Not with variable speed drive

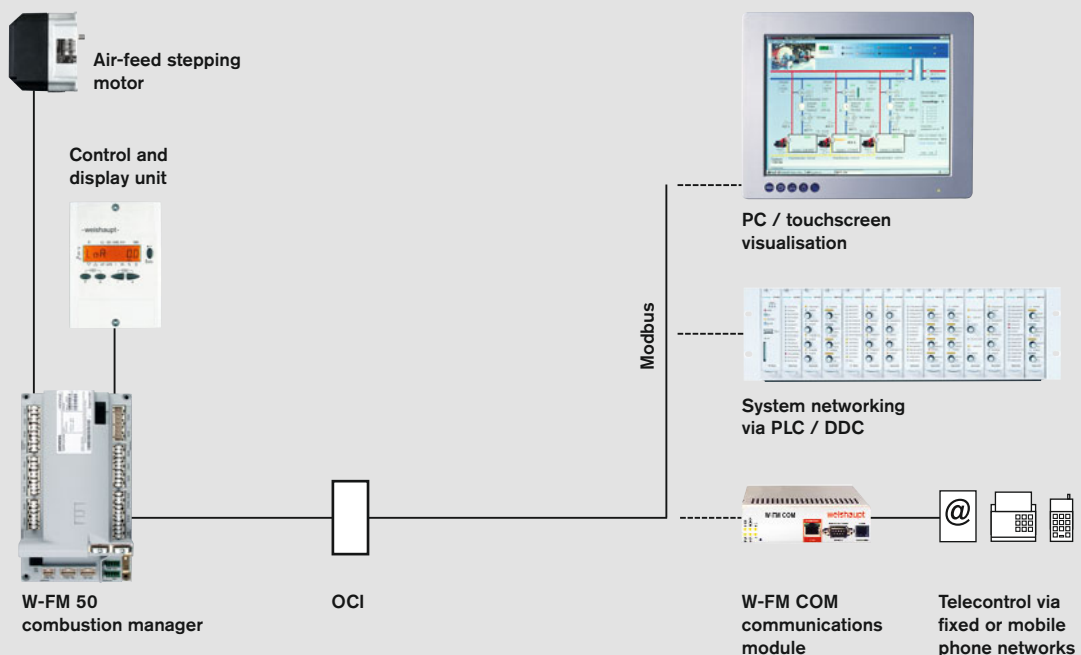
Schematic representation of the WM-S10



Burner with inbuilt digital combustion manager and underslung oil preheater



Digital combustion manager



Schematic representation with W-FM 50

Compact and quiet

The latest Weishaupt WM-series monarch[®] burner is compact, powerful, and quiet. It is writing the next chapter in the 60-year-long success story of the legendary monarch[®] series.

Futuristic fan technology

From the very earliest stages of development, particular emphasis was placed on a compact, aerodynamic construction 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 results in increased fan pressure and thus in greater capacity despite the burner's more compact form.

The 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 WM-S10 burners are delivered with the mixing assembly preset for the required output of the burner. A final adjustment is made using the combustion manager's menu-controlled commissioning program.

All of the burner's components, such as the 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 enable ignition and the flame to be observed.



Regulation

Depending on the burner rating: 2-stage (Z) or 3-stage / 2-stage with low-impact start (T).

Preheating

The burner-mounted, electric preheater is able to heat higher viscosity oil very rapidly to precisely the required atomisation temperature, due to its large heat-exchanging surface in comparison to the relatively small volume of oil. This rapid distribution 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 in order to keep heat losses between the preheater and the nozzles to a minimum. If the pour point of the oil is close to or below 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. Completely new, two and three-stage version nozzle heads with shut-off assemblies were developed to provide this oil recirculation functionality.

During recirculation the nozzle shut-off assembly is kept tightly closed by the recirculation pressure, thereby ensuring that no oil can enter the combustion

chamber. A new, more compact solenoid valve block that unites all the solenoid valves within a single assembly was developed for the hydraulic control of the nozzle head.

Fuels

Medium fuel oils meeting the specifications of DIN 51603-3 and DIN 51603-5, with a maximum viscosity of 75 mm²/s at 50 °C.

Special fuels, such as crude oil, reclaimed oils, and vegetable oils (e.g. rapeseed and soya oil), may also be suitable, subject to approval. Due to the varying quality of such fuels, a specially matched burner execution will be required.

Installations must observe all applicable local standards and regulations.

Applications

EN 267-approved Weishaupt WM-S10 oil burners are suitable for:

- Installation on EN 303-compliant heat exchangers
- Hot-water plant
- Steam boilers and high-pressure hot-water plant
- Intermittent and continuous operation
- Installation on air heaters

The combustion air must be free of aggressive substances (halogens, chlorides, fluorides etc.) and impurities (dust, debris, vapours etc.). For many applications, the use of an extraneous air supply is recommended (additional cost).

Permissible ambient conditions

- Ambient temperature during operation: -10 to +40 °C
- Humidity: max. 80 % relative humidity, no condensation
- Suitable for operation indoors only
- For plant in unheated areas, certain further measures may be required (please enquire).

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.

Certification

The burners are tested by an independent body and conform to the following standards and EU directives:

- EN 267
- Machinery Directive, 2006/42/EC
- Electromagnetic Compatibility Directive, 2004/108/EC
- Low Voltage Directive, 2006/95/EC
- Pressure Equipment Directive, 97/23/EC
- The burners carry CE marks

The most important advantages:

- Burner-mounted oil preheater
- Insulated oil lines
- Recirculating nozzle assembly
- Digital combustion management with electronic compound regulation at all ratings
- Compact construction
- Sound-attenuated air inlet as standard for quieter operation
- Powerful fan with specially developed fan geometry and air-damper control
- All WM 10 burners are delivered with the mixing assembly preset for the required output of the burner
- Easy access to all components, such as the mixing head, air damper and combustion manager
- Computer-controlled function test of each individual burner at the factory
- Burners can be supplied with pre-wired plug connections
- Excellent price / capacity ratio
- Well-established, global service network

Trademark

Weishaupt WM 10 monarch® burners are registered as a trademark throughout Europe.

Fuels

The WM-S10 monarch[®] burner is suitable for diverse fuels. Due to differing fuel specifications, the suitability of any fuel must be agreed with the works in advance. Installations must observe all local standards and regulations.

Examples of special fuels



MFO

Medium fuel oils which comply with the requirements of DIN 51603-3 and DIN 51603-5, with a maximum viscosity of 75 mm²/s at 50 °C.



Crude oil

Crude oil quality varies from oilfield to oilfield. Some crude oils are heavy, others light. Some contain a lot of sulphur (sour crude), others hardly any (sweet crude). However, they all consist almost entirely of hydrocarbon compounds.



Rapeseed oil

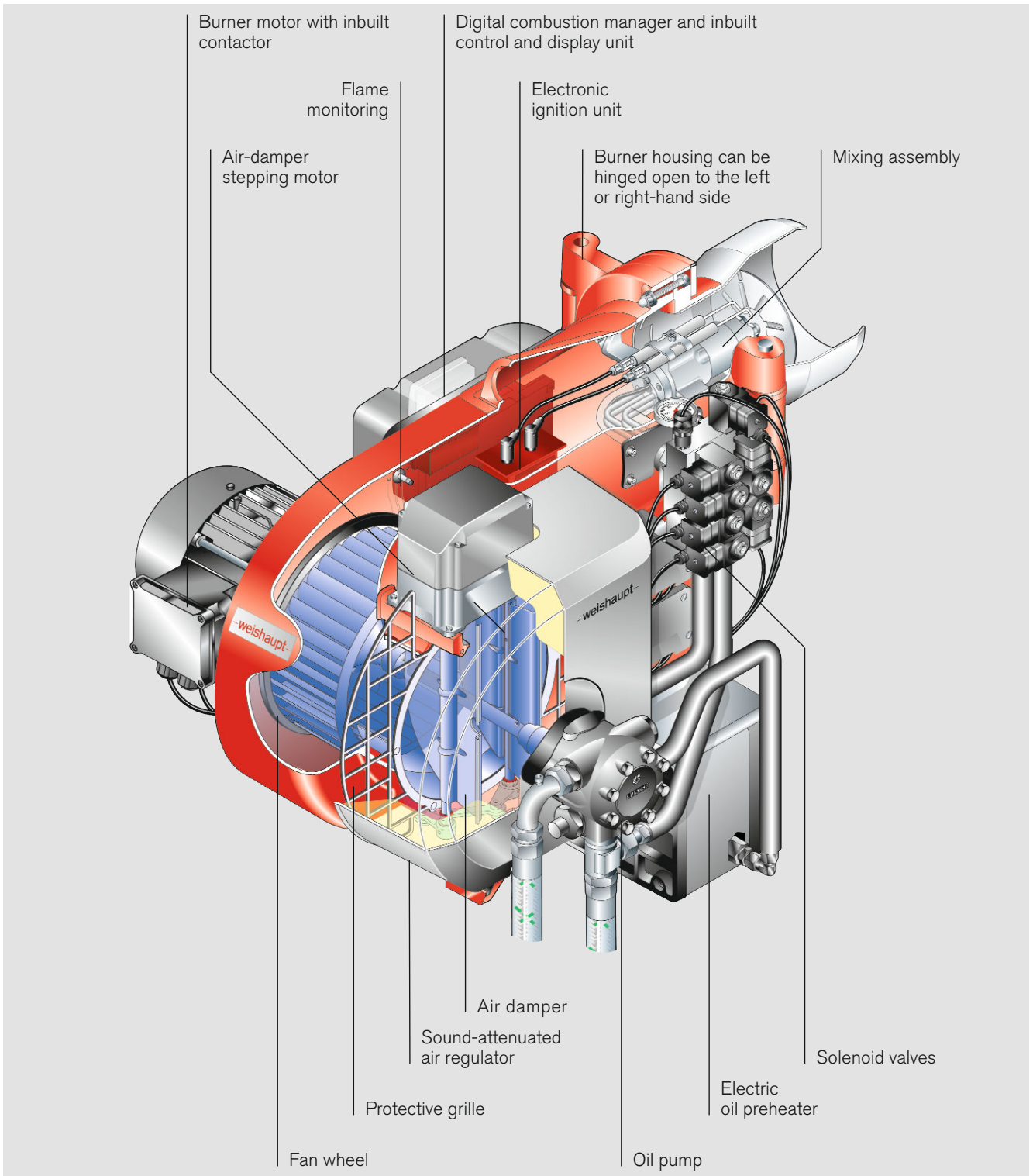
Cold-pressed rapeseed oil is extracted from various cultivars of rapeseed. Rapeseed oil is used as a raw material in the production of RME (Rapeseed Methyl Ester) – see also FAME.



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.

Other fuels on application.



Overview of burner regulation

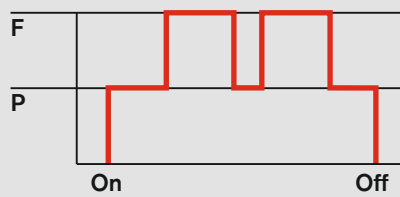
Model designation

Oil-fired operation

Two-stage operation (Z)

- Oil is released during start up by the opening of solenoid valve 1
- Full load is reached by the opening of solenoid valve 2
- Load control is achieved by opening and closing solenoid valve 2

Two-stage

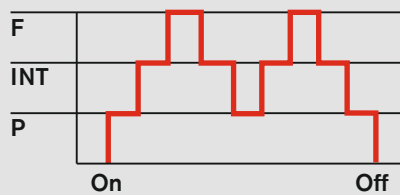


F = Full load (nominal load)
 P = Partial load (min. load)
 I = Ignition load

Three-stage operation (T)

- Oil is released during start up by the opening of solenoid valve 1
- Full load is reached by the opening of solenoid valves 2 and 3
- Load control is achieved by opening and closing solenoid valves 2 and 3

Three-stage

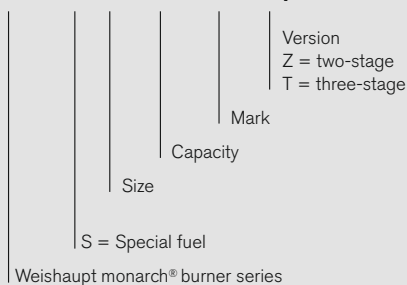


F = Full load (nominal load)
 INT = Intermediate load
 P = Partial load (min. load)
 I = Ignition load

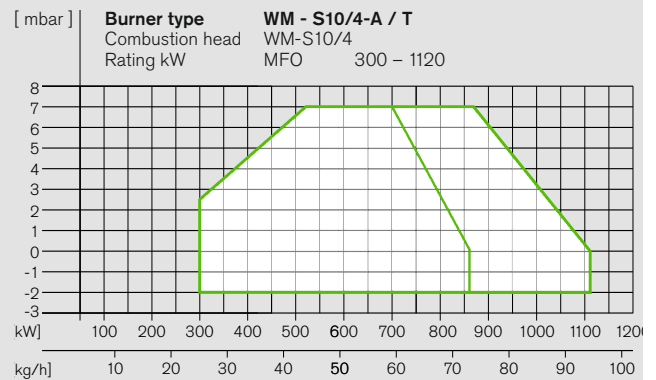
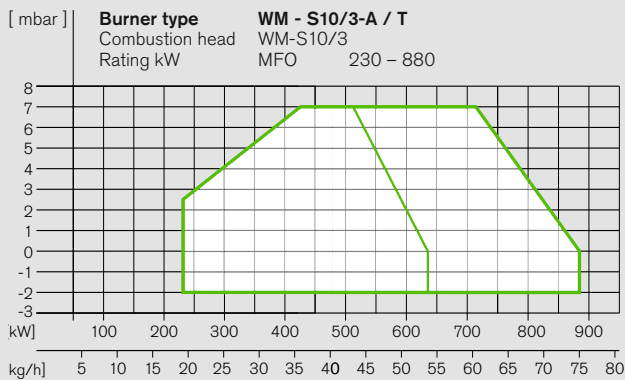
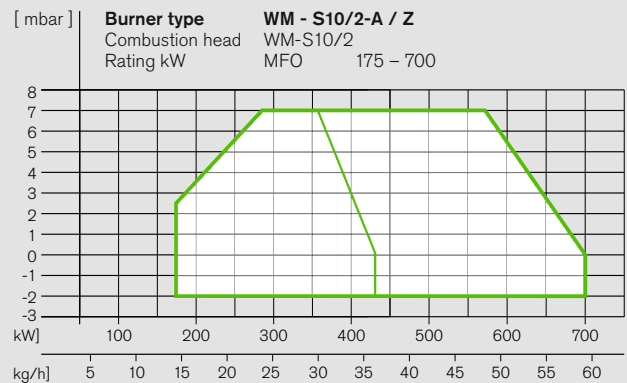
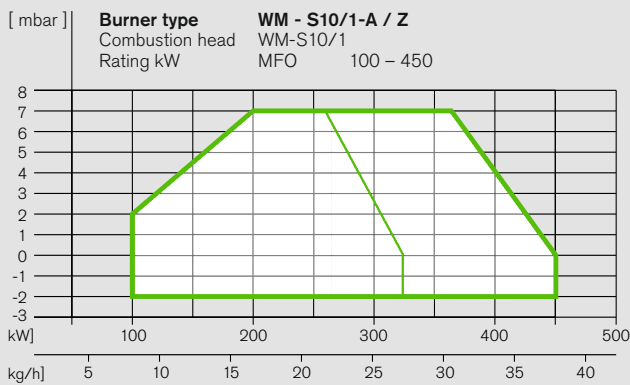
Fuel Burner type	Oil WM-S10/1-A	WM-S10/2-A	WM-S10/3-A	WM-S10/4-A
Version Z	●	●		
Version T			●	●

Model designation

WM - S 10 / 3 -A / Z
 T



Burner selection WM-S10, versions Z and T



MFO: Capacity with combustion head

Closed
 Open

Capacity graphs 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.

Stated oil throughputs are based on a calorific value of 11.6 kWh/kg for MFO.

DIN CERTCO certification:

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

Scope of delivery

Description	WM-S10/1-A / Z	WM-S10/2-A / Z	WM-S10/3-A / T	WM-S10/4-A / T
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, stepping motors, flange gasket, limit switch on hinged flange, fixing screws	●	●	●	●
Digital combustion manager W-FM 50	●	●	●	●
Preset, capacity-based mixing assembly	●	●	●	●
Compound regulation of fuel and air via W-FM Stepping motor for air regulator	●	●	●	●
Oil pump fitted to burner	●	●	●	●
Oil hoses	●	●	●	●
Compact oil solenoid valve block with 6 oil solenoid valves Compact oil solenoid valve block with 7 oil solenoid valves	●	●	●	●
2-stage recirculating nozzle assembly with premounted oil nozzles 3-stage recirculating nozzle assembly with premounted oil nozzles	●	●	●	●
Oil preheater EV2A EV2B	●	●	●	●
Heat cartridge Pump Solenoid valve block Nozzle assembly	○ ● ●	○ ● ●	○ ● ●	○ ● ●
DOL motor contactor fitted to motor ¹⁾	●	●	●	●
IP 54 protection	●	●	●	●

Please enquire or see the special equipment section of this brochure for further burner executions, such as TRD 604, 24 h/72 h, etc.

- Standard
- Optional

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).

Order numbers

Special equipment / Technical data

Order numbers

Two-stage burner type	Order No.	Three-stage burner type	Order No.
WM-S10/1-A / Z	212 110 10	WM-S10/3-A / T	212 110 30
WM-S10/2-A / Z	212 110 20	WM-S10/4-A / T	212 110 40

Special equipment

Oil burners	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

Please enquire regarding further items of special equipment.

Technical data

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 90/90-2/1K5	WM-D 90/90-2/1K5
Nominal rating	kW	1.0	1.0	1.5	1.5
Nominal current	A	2.1	2.1	3.5	3.5
Protection	IP	54	54	54	54
Motor protection switch ²⁾ or motor prefusing ²⁾ (with overload protection)	Type (e.g.)	MS132 - 2,5	MS132 - 2,5	MS132 - 4,0	MS132 - 4,0
	A minimum	10 A slow (external)	10 A slow (external)	10 A slow (external)	10 A slow (external)
Speed (50 Hz)	rpm	2850	2850	2800	2800
Combustion manager	Type	W-FM 50	W-FM 50	W-FM 50	W-FM 50
Flame monitoring	Type	QRB	QRB	QRB	QRB
Air stepping motor	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	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
Weight	kg	approx. 70	approx. 77	approx. 77	approx. 77

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).

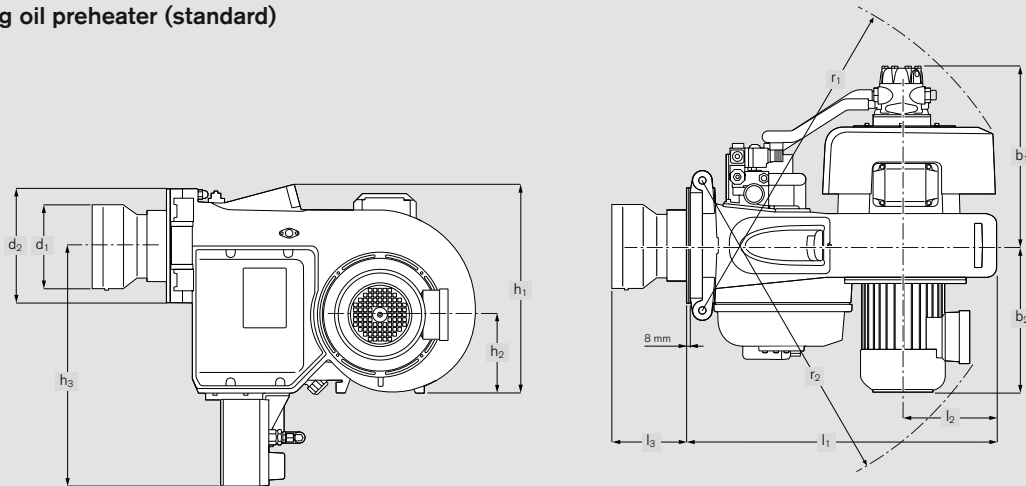
Voltages and frequencies:

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

The electrical motors are high-efficiency IE2 motors in accordance with Commission Regulation (EC) No. 640/2009.

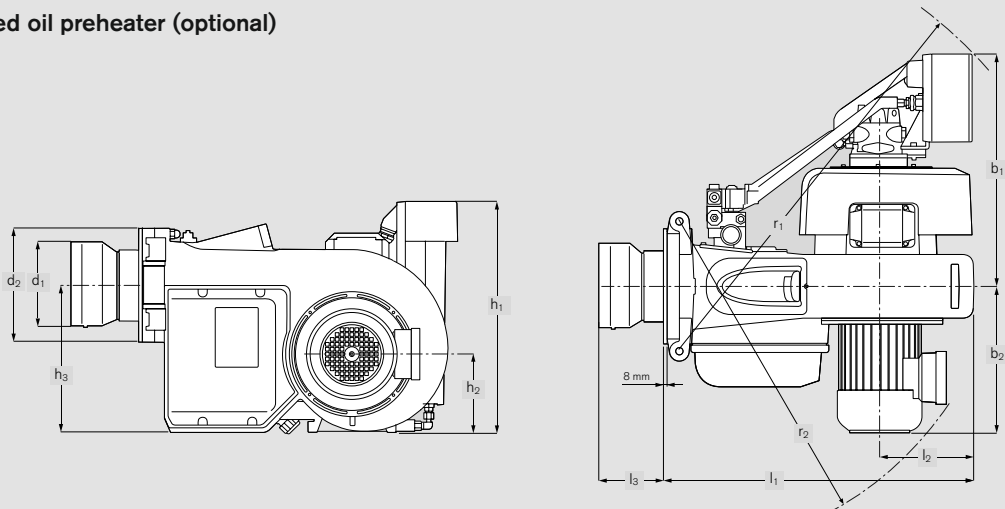
Dimensions

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	307	445	167	512	160	242	M10	185	210	200	718	682
WM-S10/4-A / T	659	205	138 – 158	381	307	445	167	512	180	242	M10	185	210	220	718	682

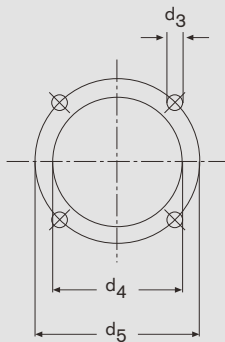
Side-mounted oil preheater (optional)



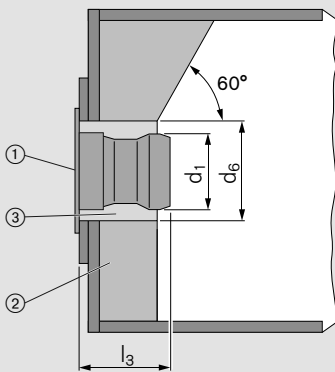
Burner type	Dimensions in mm															
	l_1	l_2	l_3	b_1	b_2	h_1	h_2	h_3	d_1	d_2	d_3	d_4	d_5	d_6	r_1	r_2
WM-S10/1-A / Z	659	205	118 – 128	495	307	489	167	313	131	242	M10	165	186	170	881	682
WM-S10/2-A / Z	659	205	113 – 133	495	307	489	167	313	140	242	M10	165	186	170	899	682
WM-S10/3-A / T	659	205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

Burner mounting / fuel systems

Mounting-plate drilling dimensions



Heat-exchanger preparation



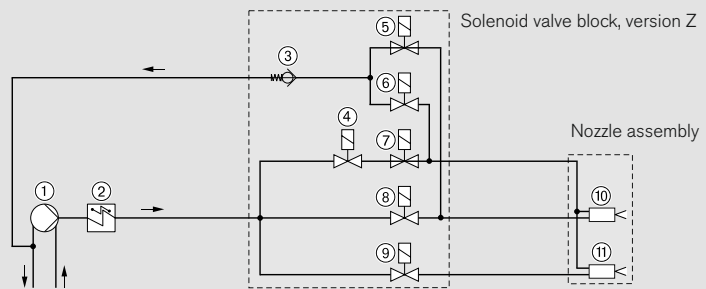
- ① Flange gasket
- ② Refractory
- ③ Aperture

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

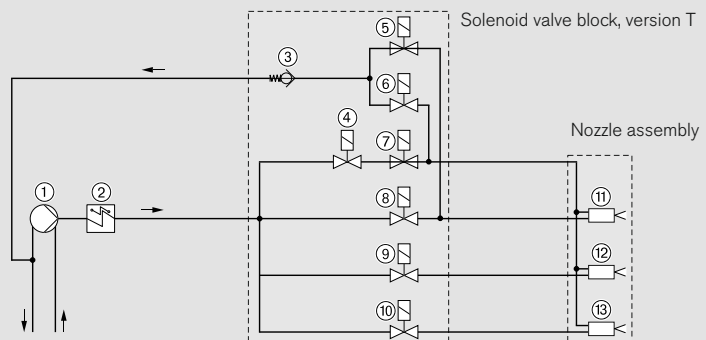
Operating sequence

Oil at pump pressure is present at the solenoid valves during prepurge. When the pre-ignition sequence is started, solenoid valve ④ opens and the oil begins to circulate. At the end of the circulation time (pre-ignition time), solenoid valves ⑤, ⑥, ⑦ and ⑧ are controlled to ignite the burner and adjust the direction of the oil flow. The combustion manager switches the stage 2 solenoid valve (or stage 2 and stage 3 solenoid valves on 3-stage burners) in accordance with the heat demand.

Two-stage fuel system



Three-stage fuel system



- ① Burner-mounted oil pump
- ② Oil preheater
- ③ Non-return valve
- ④ Spill-back nozzle, 230 V
- ⑤ Stage 1 solenoid valve, 115 V, normally open
- ⑥ Stage 1 solenoid valve, 115 V, normally closed
- ⑦ Stage 1 solenoid valve, 115 V, normally open
- ⑧ Stage 1 solenoid valve, 115 V, normally closed
- ⑨ Stage 2 solenoid valve, 230 V
- ⑩ Stage 3 solenoid valve, 230 V
- ⑪ Stage 1 oil nozzle
- ⑫ Stage 2 oil nozzle
- ⑬ Stage 3 oil nozzle

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Weishaupt equipment is available from good HVAC specialists, with whom Weishaupt works in close partnership. To support the specialists, Weishaupt maintains a large sales and service network, ensuring equipment, spares and service are always available.

Weishaupt are there when you need them. The service department is available to Weishaupt customers around the clock, 365 days a year. A Weishaupt office near you is standing by to answer all your heating questions.

