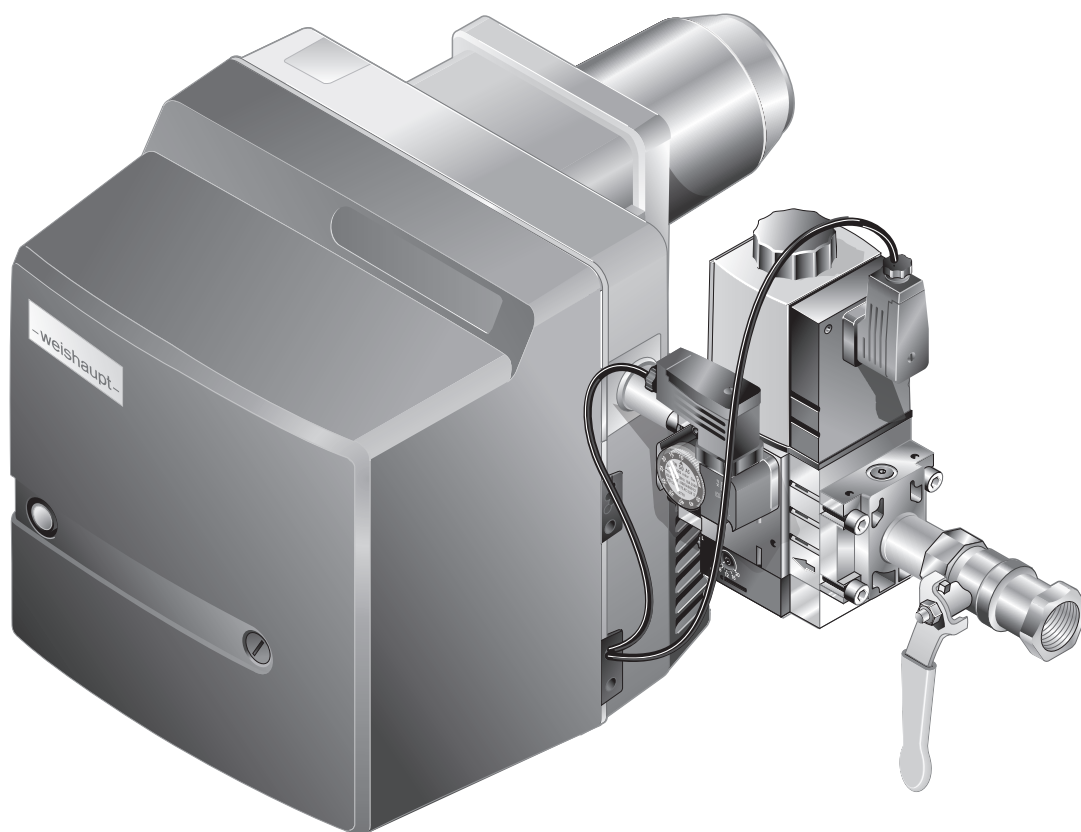


–weishaupt–

# manual

Installation and operating instruction

---



# EU conformity certification

Language 02

Product description	<b>Gas burner</b>
Type	<b>WG 10...-D Z</b> (W-FM 10)
Manufacturer	<b>Max Weishaupt GmbH</b>
Address	<b>Max-Weishaupt-Straße 14, DE-88475 Schwendi</b>

The sole responsibility for issuing this conformity declaration lies with the manufacturer.  
The content of the statement described above complies with the relevant harmonisation legislation of the European Union:

<b>EMC</b>	<b>2014/30/EU</b> Standards applied: EN 61000-6-1:2007, EN 61000-6-3:2007
<b>LVD</b>	<b>2014/35/EU</b> Standards applied: EN 60335-1:2010, EN 60335-2-102:2010
<b>MD</b>	<b>2006/42/EC</b> Standard applied: EN 676 Appendix J
<b>GAD</b>	<b>2009/142/EC</b> Standard applied: EN 676:2008

Schwendi, 20.04.2016

Signed for and on behalf of:

MAX WEISHAUPT GMBH

ppa.



Dr. Schloen  
Manager research and Development

ppa.



Denking  
Manager Production and Quality Management

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## 1 User instructions

### 1 User instructions

Translation of original  
operating instructions

These installation and operating instructions form part of the equipment and must be kept on site.

Carefully read the installation and operating manual prior to working on the unit.

#### 1.1 Target group





The installation and operating instructions are intended for the operator and qualified personnel. They should be observed by all personnel working with the unit.

Work on the unit must only be carried out by personnel who have the relevant training and instruction.

Persons with limited physical, sensory or mental capabilities may only work on the unit if they are supervised or have been trained by an authorised person.

Children must not play with the unit.

#### 1.2 Symbols

 <b>DANGER</b>	Immediate danger with high risk. Non observance can lead to serious injury or death.
 <b>WARNING</b>	Danger with medium risk. Non observance can lead to environmental damage, serious injury or death.
 <b>CAUTION</b>	Danger with low risk. Non observance can cause damage to the equipment and injury to personnel.
	Important information
►	Requires direct action
✓	Result after an action
▪	Itemisation
...	Range of values

## 1 User instructions

### 1.3 Guarantee and Liability

Guarantee and liability claims for personal and equipment damage are excluded, if they can be attributed to one or more of the following causes:

- non approved application,
- non-observance of the installation and operating instruction,
- operation with faulty safety equipment,
- continual operation despite a fault,
- improper installation, commissioning, operation and service,
- repairs, which have been carried out incorrectly,
- the use of non original Weishaupt parts,
- force majeure,
- unauthorised modifications made to the unit,
- the installation of additional components, which have not been tested with the unit,
- the installation of combustion chamber inserts, which impede full flame formation,
- unsuitable fuels,
- defects in the inlet lines.

## 2 Safety

## 2 Safety

### 2.1 Designated application

The burner is suitable for operation on heat exchangers to EN 303 and EN 676.

If the burner is not used on combustion chambers to EN 303 and EN 676, a safety assessment of combustion and flame stability during individual process conditions and of the shutdown limits of the combustion plant has to be carried out and documented.

The combustion air must be free from aggressive compounds (e.g. Halogens). If the combustion air in the boiler room is contaminated, increased cleaning and servicing will be required. In this case ducted air intake is recommended.

The burner should only be used in enclosed rooms.

Improper use could:

- endanger the health and safety of the user or third parties,
- cause damage to the unit or other material assets.

### 2.2 When gas can be smelled

Avoid open flames and spark generation, for example:

- do not operate light switches,
- do not operate electronic equipment,
- do not use mobile telephones.
- ▶ Open doors and windows.
- ▶ Close gas isolating valve.
- ▶ Warn the inhabitants, do not ring door bells.
- ▶ Leave the building.
- ▶ Inform the heating contractor or gas supplier from outside of the building.

### 2.3 Safety measures

Safety relevant fault conditions must be eliminated immediately.

Components, which show increased wear and tear or whose design lifespan is or will be exceeded prior to the next service should be replaced as a precaution.

The design lifespan of the components is listed in the service plan [ch. 9.2].

#### 2.3.1 Normal operation

- All labels on the unit must be kept in a legible condition.
- Stipulated settings, service and inspection work should be carried out at regular intervals.
- Only operate the unit with its cover closed.

#### 2.3.2 Electrical connection

For work carried out on live components:

- Observe the accident prevention instructions DGUV Regulation 3 and adhere to local directives,
- tools in accordance with EN 60900 should be used.

## **2 Safety**

### **2.3.3 Gas supply**

- Only the gas supply company or an approved agent may carry out installation, alteration and maintenance work on gas appliances in buildings and properties.
- Pipe work must be subject to a combined load and valve proving test and/or usability testing relative to the pressure range intended, e. g. DVGW-TRGI, worksheet G 600.
- Inform the gas supply company about the type and size of plant prior to installation.
- Local regulations and guidelines must be observed during installation (e. g. DVGW-TRGI, worksheet G 600; TRF Band 1 and Band 2).
- The gas supply pipe work should be suitable for the type and quality of gas and should be designed in such a way that it is not possible for liquids to form (e. g. condensate). Observe vaporisation pressure and vaporisation temperature of liquid petroleum gas.
- Use only tested and approved sealing materials, whilst observing all process information.
- Re-commission the appliance when changing to a different type of gas. Changing from LPG to Natural Gas and visa versa requires a conversion.
- Carry out soundness test after each service and fault rectification.

### **2.4 Alterations to the construction of the equipment**

All conversions require written approval from Max Weishaupt GmbH.

- No additional components may be fitted, which have not been tested for use with the equipment,
- do not use combustion chamber inserts, which hinder flame burnout,
- use only original Weishaupt replacement parts.

### **2.5 Noise emission**

The noise emissions are determined by the acoustic behaviour of all components fitted to the combustion system.

Prolonged exposure to high noise levels can lead to loss of hearing. Provide operating personnel with protective equipment.

Noise emissions can further be reduced with a sound attenuator.

### **2.6 Disposal**

Dispose of all materials and components in a safe and environmentally friendly way at an authorised location. Observe local regulations.



### 3 Product description

### 3 Product description

#### 3.1 Type key

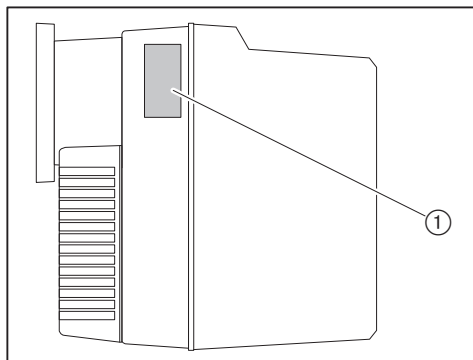
WG10N/1-D Z-LN

W	Type: W burner
G	Fuel: Gas
10	Size
N	N: Natural Gas F: Liquid Petroleum Gas
/1	Ratings size
-D	Construction
Z	Version: two stage
-LN	Version: LowNO <sub>x</sub>

### 3 Product description

#### 3.2 Serial number

The serial number on the name plate identifies the product. This is required by Weishaupt's customer service department.



① Name plate

Ser.No. \_\_\_\_\_

### **3 Product description**

#### **3.3 Function**

##### **3.3.1 Air supply**

###### **Air damper**

The air damper regulates the air quantity required for combustion. The combustion manager drives the air damper via actuator.

At burner shutdown the the actuator automatically closes the air damper. At burner shutdown the air dampers close automatically.

###### **Fan wheel**

The fan wheel supplies the air from the air intake housing to the combustion head.

###### **Diffuser**

The air gap between flame tube and diffuser is adjusted by positioning the diffuser. This adjusts the mixing pressure and the air quantity required for combustion.

###### **Air pressure switch**

The air pressure switch monitors the fan pressure. If the fan pressure is insufficient, the combustion manager initiates a lockout.

### 3 Product description

#### 3.3.2 Gas supply

##### Gas isolating valve ①

The gas isolating valve opens and shuts off the gas supply.

##### Multifunction assembly ⑧

The multifunction assembly:

Gas filter ②	The gas filter protects the subsequent valve train components from foreign particles.
Double gas valve ④	The double gas valve opens and shuts off the gas supply.
Pressure regulator ③	The pressure regulator reduces the connection pressure and ensures a constant setting pressure.

##### Gas butterfly valve ⑤

The gas butterfly valve regulates the gas quantity depending on the rating required. The air/gas ratio is adapted via mechanical compound to the air damper setting.

##### Low gas pressure switch/ valve proving gas pressure switch ⑦

The gas pressure switch monitors the gas connection pressure. If the preset pressure is not achieved, the combustion manager initiates a safety shutdown.

The gas pressure switch also monitors if the gas valves are tight. It signals the combustion manager if the pressure increases or decreases to an impermissible level during valve proving.

Valve proving is carried out automatically by the combustion manager:

- after every controlled shutdown,
- prior to burner start following lockout or power outage.

1. Test phase (function sequence for valve proving valve 1):

- Valve 1 closes,
- valve 2 closes after a delay,
- the gas escapes and the pressure between valve 1 and valve 2 reduces,
- both valves remain closed for 8 seconds.

If the pressure increases to above the value set during these 8 seconds, valve 1 is leaking. The combustion manager initiates a controlled shutdown.

2. Test phase (function sequence for valve proving valve 2):

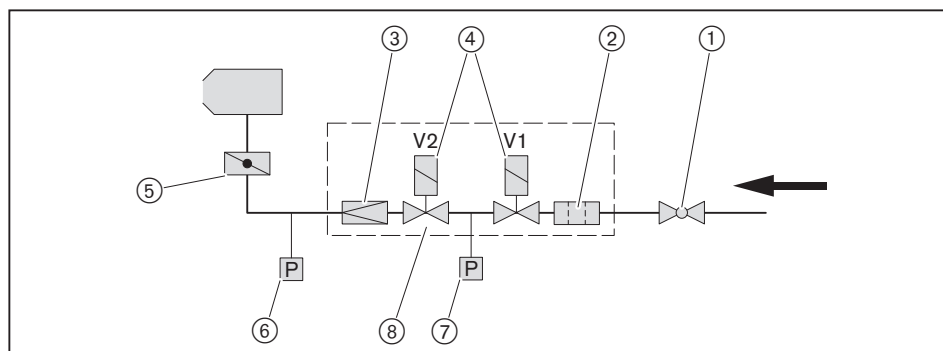
- Valve 1 opens, valve 2 remains closed,
- pressure between valve 1 and valve 2 increases,
- valve 1 closes again,
- both valves remain closed for 16 seconds.

If the pressure decreases to below the value set during these 16 seconds, valve 2 is leaking. The combustion manager initiates a controlled shutdown.

### 3 Product description

#### High gas pressure switch ⑥ (optional)

The high gas pressure switch monitors the setting pressure. If the setting pressure exceeds the value set, the combustion manager initiates a controlled shutdown.



### 3.3.3 Electrical components

#### Combustion Manager

The combustion manager W-FM is the control unit of the burner. It controls the sequence of operation and monitors the flame.

#### Burner motor

The burner motor drives the fan wheel.

#### Ignition unit

The electronic ignition unit creates a spark at the electrode, which ignites the fuel/air mixture.

#### Ionisation electrode

The combustion manager monitors the flame signal via the ionisation electrode. If the flame signal becomes too weak, the combustion manager carries out a controlled shutdown.

### 3 Product description

#### 3.3.4 Program sequence

##### Pre-purge

At heat demand, the actuator drives to full load position after the initialisation time ( $T_i$ ) has elapsed.

The burner motor starts and the air pressure switch reacts.

The combustion chamber is pre-purged.

##### Ignition

Following the pre-purge phase ( $T_v$ ) the actuator drives to ignition position.

Ignition starts.

##### Fuel release

Following pre-ignition time ( $T_{vz}$ ) valve 1 opens and the gas pressure switch reacts.

Valve 2 opens and releases the fuel.

##### Safety time

With fuel release, safety time ( $T_s$ ) and post-ignition time ( $T_{Nz}$ ) start.

The flame signal must be present within the safety time ( $T_s$ ).

##### Operation

The ionisation electrode monitors the flame.

The air damper actuator opens and closes depending on the regulator demand for full load.

The residence time partial load ( $T_{vk}$ ) prevents cycling between partial and full load.

##### Post-purge

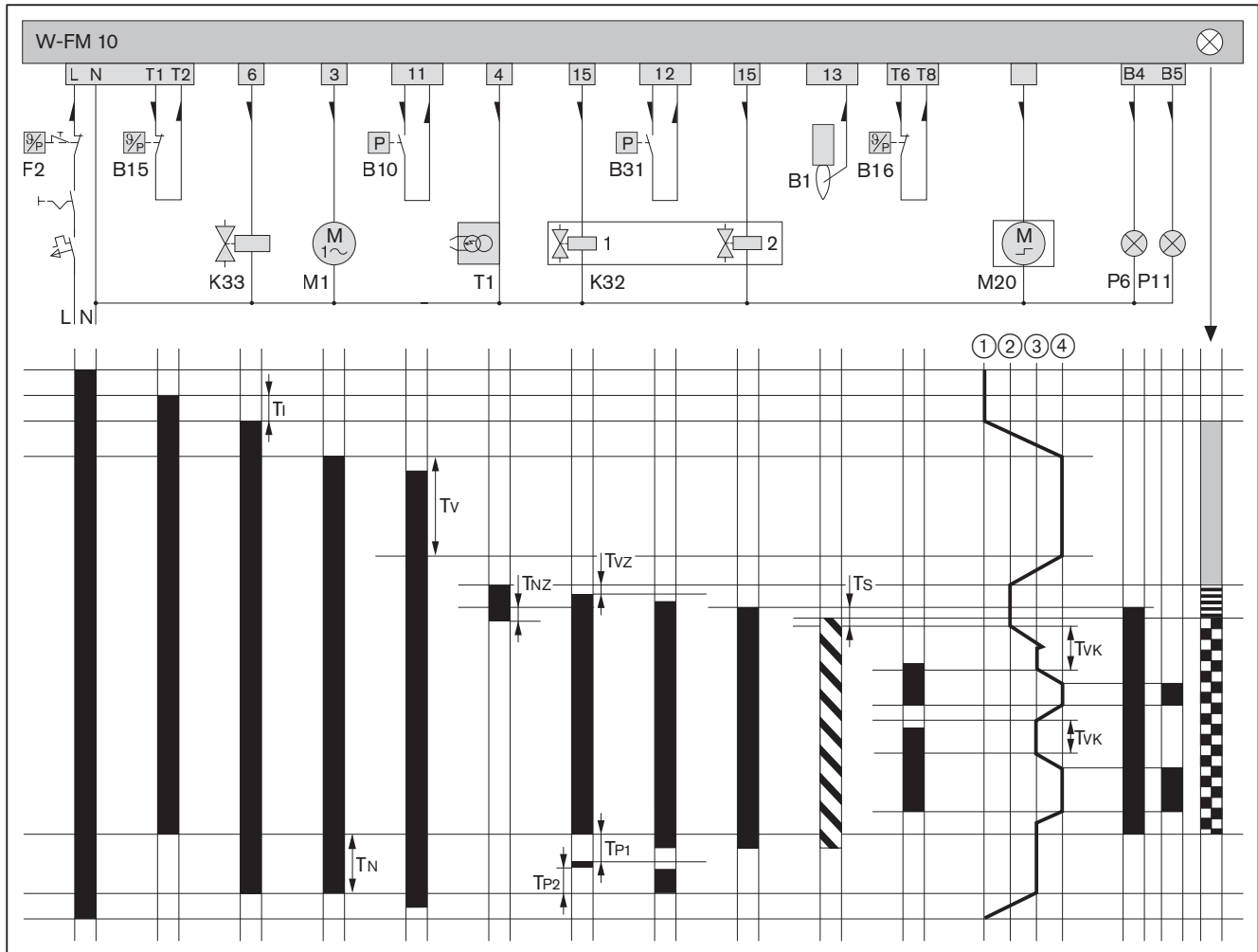
If there is no longer a heat demand, the solenoid valves close and stop the fuel supply.

Post-purge time ( $T_N$ ) and valve proving begins [ch. 3.3.2].

Following the post-purge time ( $T_N$ ) the burner motor switches off.

The air damper actuator drives to the Closed position.

### 3 Product description



- |     |   |     |   |
|-----|---|-----|---|
| B1  | Ionisation electrode                        | Ti  | Initialisation time (Test): 3 s                 |
| B10 | Air pressure switch                         | TN  | Post-purge time: 1.2 s                          |
| B15 | Temperature or pressure regulator           | TNZ | Post-purge time: 2.5 s                          |
| B16 | Temperature or pressure regulator full load | TP1 | First test phase: 9.3 s (valve proving valve 1) |
| B31 | Low gas pressure switch                     | TP2 | 2nd test phase: 9.7 s (valve proving valve 2)   |
| F2  | Temperature or pressure limiter             | Ts  | Safety time: 2.8 s                              |
| K32 | Double gas valve                            | Tv  | Pre-purge time: 21.5 s                          |
| K33 | External valve LPG                          | TvK | Residence time partial load: 5 s                |
| M1  | Burner motor                                | TvZ | Pre-ignition time: 2 s                          |
| M20 | Air damper actuator                         |     | Voltage is applied                              |
| P6  | Control lamp operation (optional)           |     | Flame signal present                            |
| P11 | Control lamp full load (optional)           |     | Current path                                    |
| T1  | Ignition unit                               |     | Start (orange)                                  |
| ①   | CLOSED position (ST0)                       |     | Ignition phase (flashing orange)                |
| ②   | Ignition load (ZL Gas)                      |     | Burner operation (green)                        |
| ③   | Partial load (ST1)                          |     |   |
| ④   | Full load (ST2)                             |     |   |

### 3 Product description

### 3.4 Technical data

#### 3.4.1 Approval data

PIN 2009/142/EC	CE-0085 BM 0481
Basic standards	EN 676:2008 Additional standards, see EU conformity certification [page 2].

#### 3.4.2 Electrical data

Mains voltage / mains frequency	230 V/50 Hz
Consumption at start	max 444 W
Consumption during operation	max 344 W
Power consumption	max 2.1 A
Internal unit fuse	6.3 AT, IEC 127-2/V
External fuse	max 16 AB

#### 3.4.3 Ambient conditions

Temperature in operation	–15 ... +40 °C
Temperature during transport / storage	–20 ... +70 °C
relative humidity	max 80 %, no dew point

#### 3.4.4 Fuels

- Natural Gas E/LL
- Liquid Petroleum Gas B/P



### 3 Product description

#### 3.4.5 Emissions

##### Flue gas

To EN 676 the burner complies with emission class 3.

The NO<sub>x</sub> values are influenced by:

- combustion chamber dimensions
- flue gas system
- combustion air (temperature and humidity)
- medium temperature

For combustion chamber dimensions see leaflet "Conditions for attaining the NO<sub>x</sub> emission values for Weishaupt burners" (Print No. 831539xx or 830972xx).

##### Sound levels

###### Dyad noise emission values to ISO 4871

Measured sound power level L <sub>WA</sub> (re 1 pW)	69 dB(A) <sup>(1)</sup>
Uncertainty value K <sub>WA</sub>	4 dB(A)
Measured sound pressure level L <sub>pA</sub> (re 20 µPa)	65 dB(A) <sup>(2)</sup>
Uncertainty value K <sub>pA</sub>	4 dB(A)

<sup>(1)</sup> Determined to noise level measurement standard ISO 9614-2.

<sup>(2)</sup> Determined at 1 metre distance from the front of the burner.

The measured noise levels plus uncertainty values form the upper limit value, which could occur when measuring.

### 3 Product description

#### 3.4.6 Rating

##### Combustion heat rating

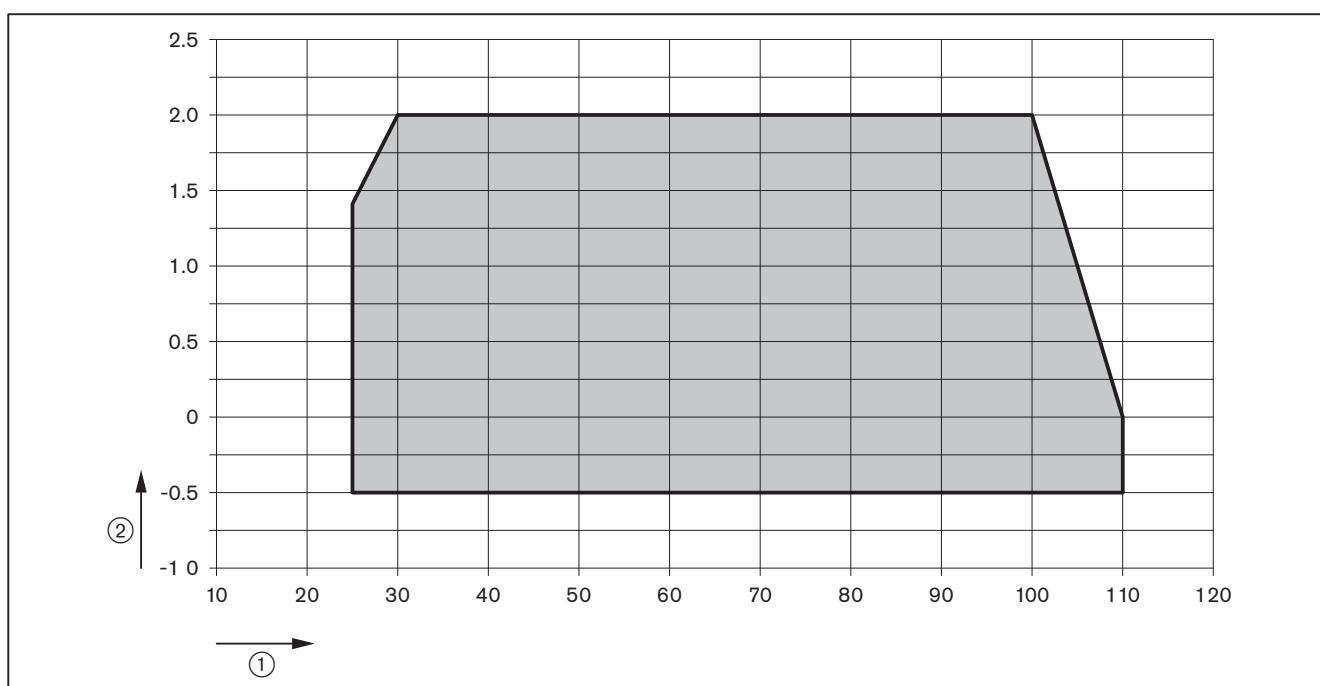
Natural Gas	25 ... 110 kW
Liquid Petroleum Gas	25 ... 110 kW
Combustion head	WG10-D

##### Capacity graph

Capacity graph to EN 676.

The ratings data given relates to an installation elevation of 0 m above sea level. For installation elevations above 0 m a ratings reduction of approx. 1 % per 100 m applies.

A limited capacity graph is valid for ducted air intake.



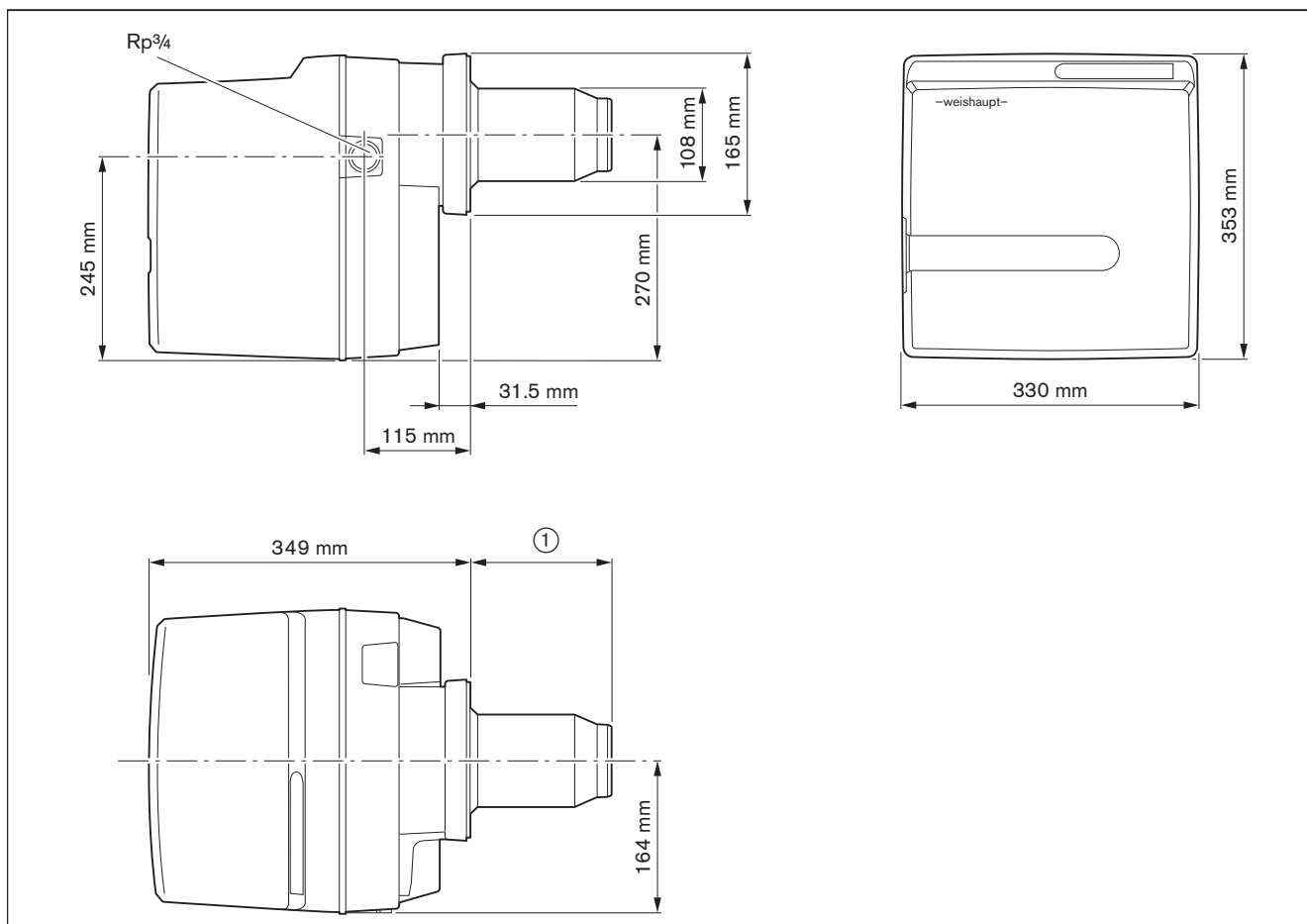
① Combustion heat rating [kW]

② Combustion chamber pressure [mbar]

### 3 Product description

#### 3.4.7 Dimensions

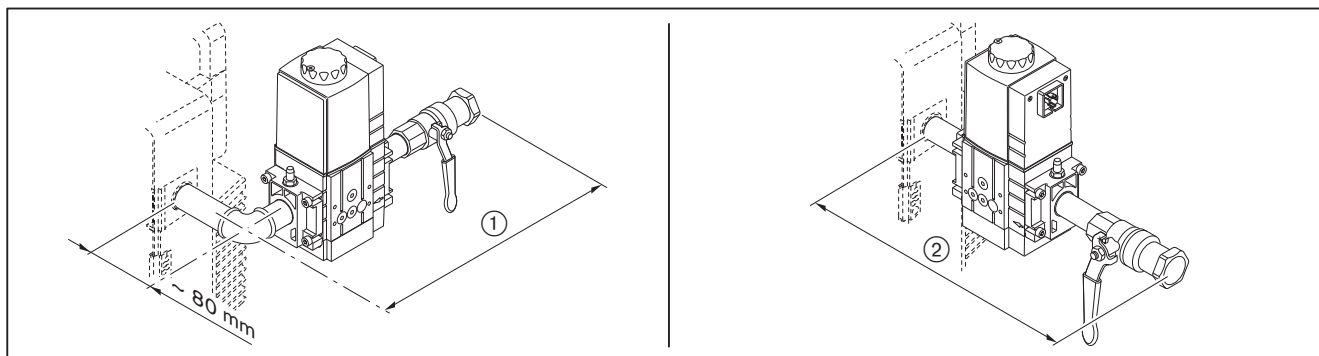
##### Burner



- ① 140 mm without combustion head extension  
 240 mm with combustion head extension (100 mm)  
 340 mm with combustion head extension (200 mm)  
 440 mm with combustion head extension (300 mm)

### 3 Product description

#### Gas valve train



	Isolating valve	With thermal shut off device	Without thermal shut off device
①	Rp $\frac{3}{4}$	approx. 310 mm	approx. 295 mm
	Rp1	approx. 320 mm	approx. 300 mm
②	Rp $\frac{3}{4}$	approx. 310 mm	approx. 295 mm
	Rp1	approx. 320 mm	approx. 300 mm

#### 3.4.8 Weight

approx. 14 kg

## 4 Installation

### 4 Installation

#### 4.1 Installation conditions

##### Burner type and capacity graph

Burner and heat exchanger must be matched.

- Check burner type and burner rating.

##### Installation location

- Prior to installation ensure that:
  - sufficient space is available for normal and service position [ch. 3.4.7],
  - sufficient combustion air is available, if necessary install ducted air intake.

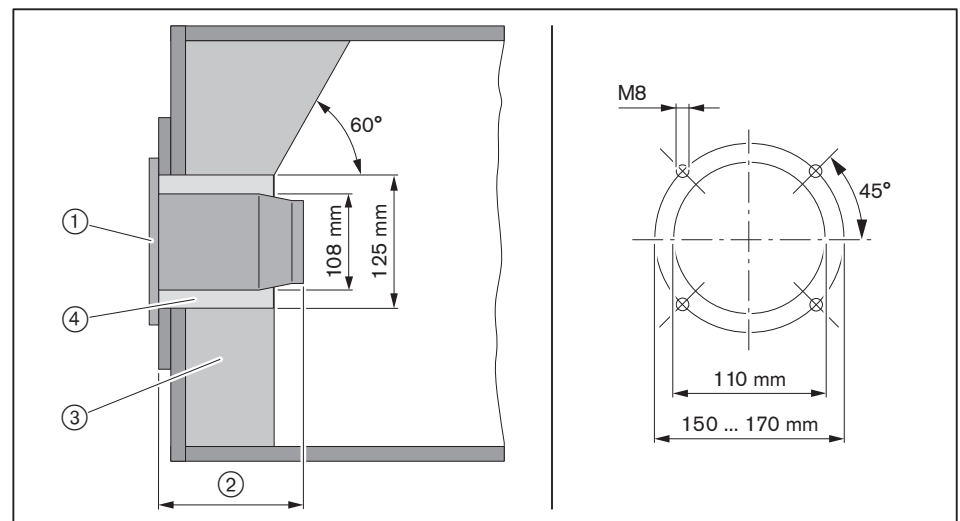
##### Prepare heat exchanger

The refractory ③ must not protrude beyond the front edge of the combustion head. The refractory can take a conical shape (min 60°).

Refractory may not be required on boilers with water-cooled front, unless the manufacturer gives other instructions.

Following installation, the aperture ④ between flame tube and refractory should be filled with flame-proof, resilient insulating material. Do not make solid.

Heat exchangers with deep refractories or thick doors, or heat exchangers with reverse flame combustion chambers may require a combustion head extension. Head extensions of 100, 200 and 300 mm are available. Dimension ② then changes according to the head extension used.



- ① Flange gasket
- ② 140 mm
- ③ Refractory
- ④ Aperture

## 4 Installation

### 4.2 Burner installation



#### Risk of electric shock

Working on the device when voltage is applied can lead to electric shock.

- ▶ Isolate the device from the power supply prior to starting any work.
- ▶ Safeguard against accidental re-start.



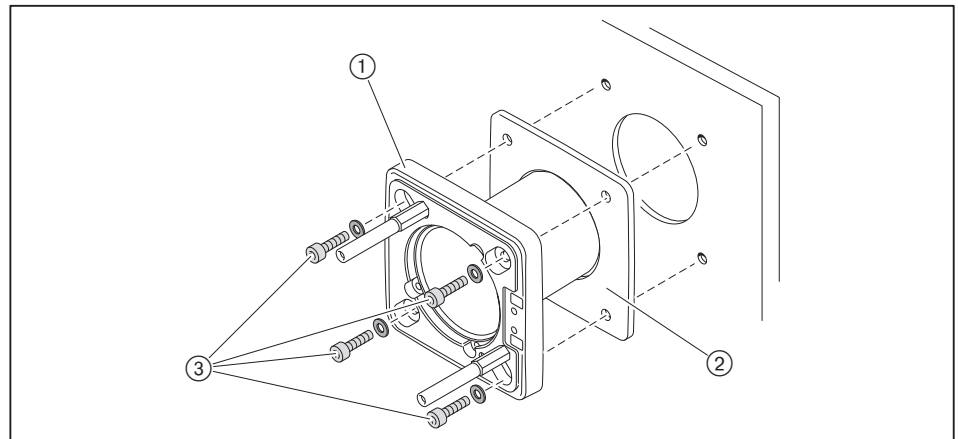
#### Only valid in Switzerland

When installing and operating in Switzerland the regulations of SVGW, VKF, local and Cantonal regulations and the EKAS guideline (LPG Guideline Part 2) must be observed.

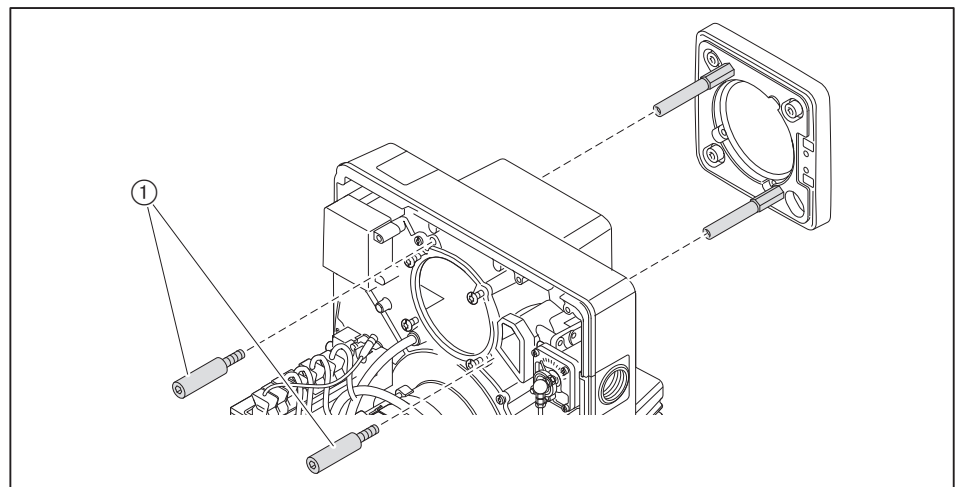


The burner in its standard version is designed for valve train connection from the right. For gas valve train connection from the left the burner has to be installed rotated by 180°. This requires conversion measures [ch. 5.1.1].

- ▶ Remove mixing head [ch. 9.3].
- ▶ Remove burner flange ① from burner housing.
- ▶ Fit flange gasket ② and burner flange ① to the heat exchanger using screws ③.
- ▶ The aperture between combustion head and refractory should be filled with flame-proof, resilient insulating material (do not make solid).



- ▶ Mount burner with screws ① to burner flange.



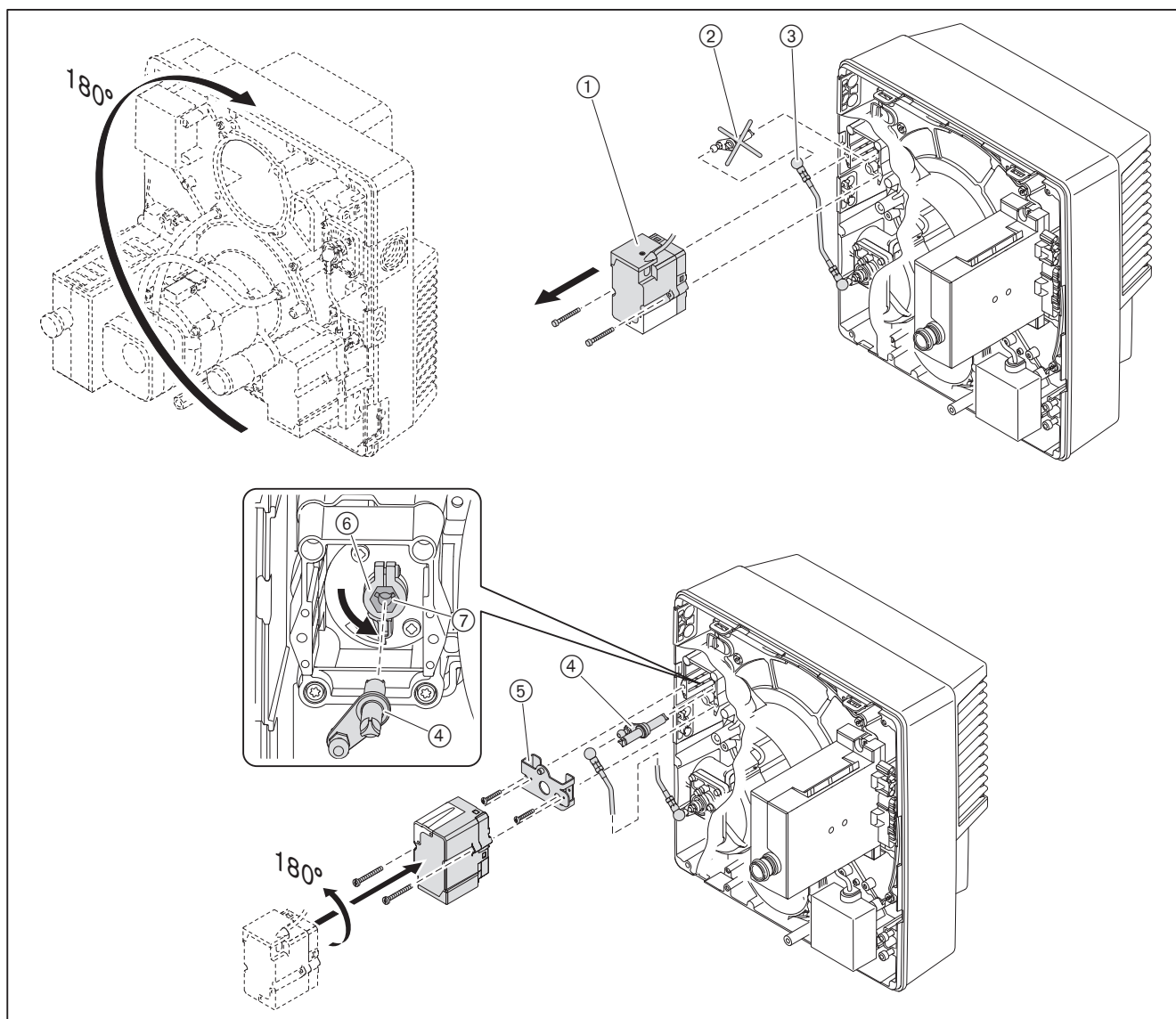
- ▶ Check setting of electrodes [ch. 9.5].
- ▶ Fit mixing head [ch. 9.3].

## 4 Installation

### 4.2.1 Rotate burner by 180° (optional)

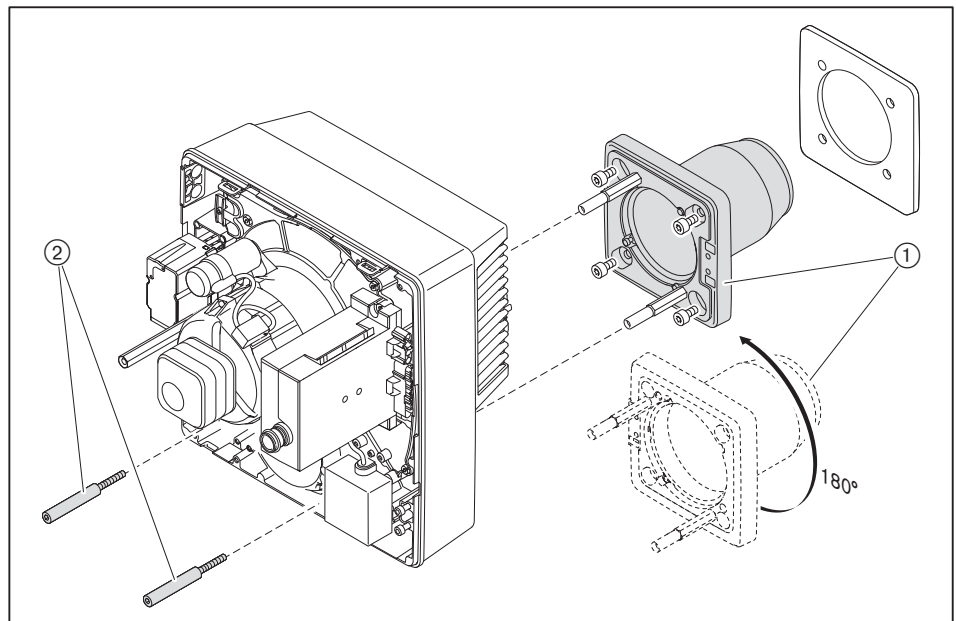
The following are required for the conversion:

- actuator adapter with fixing screws,
- lever with a longer shaft.
- Remove actuator ①.
- Disconnect linkage ③.
- Remove complete lever ②.
- Fit lever with longer shaft ④ to angle drive.
- Fit adapter ⑤.
- Turn indicator ⑥ to CLOSED position and hold.
- Mount actuator rotated by 180° whilst sliding the shaft ④ into the star shaped groove ⑦.



#### 4 Installation

- ▶ Rotate burner flange ① 180° and mount with flange gasket.
- ▶ Rotate burner 180° and fit screws ② to burner flange.
- ▶ The aperture between combustion head and refractory should be filled with flame-proof, resilient insulating material (do not make solid).



- ▶ Check setting of electrodes [ch. 9.5].
- ▶ Fit mixing head [ch. 9.3].



## 5 Installation

## 5 Installation

### 5.1 Gas supply



#### Risk of explosion due to leaking gas

Gas leaks can lead to a build-up of explosive gas/air mixture. With an ignition source present this can result in an explosion.

- ▶ Install gas supply with care.
- ▶ Observe all safety instructions.

Only an approved gas installer may carry out the gas side connection. Observe local regulations.

The following should be obtained from the gas supply company:

- Type of gas
- Gas connection pressure.
- Maximum CO<sub>2</sub> content in the flue gas.
- Calorific value in normal condition [kWh/m<sup>3</sup>].

Observe maximum permissible pressure of all components of the gas valve train.

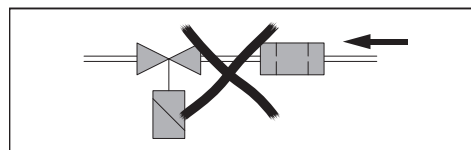
- ▶ Close all fuel shut off devices prior to commencing work and protect from accidental re-opening.

#### General installation instructions

- Install manually operated shut off device (gas isolating valve) in the supply.
- Ensure correct mounting alignment and cleanliness of sealing surfaces.
- Mount valve train free of vibration. It must not be allowed to swing. Suitable supports should be fitted.
- Mount gas valve train free of stresses.
- The distance between burner and multi-function assembly should be as small as possible. If the distance is too great, it is possible that a gas/air mixture is formed, which will influence burner start.
- Observe sequence and flow direction of gas valve train.
- If necessary, fit thermal shut off device (TAE) in front of the gas isolating valve.

#### Installation position

Multi-function assembly can be installed with the axis standing vertical to lying horizontal.



## 5 Installation

### 5.1.1 Installing the gas valve train



**Only in conjunction with W-MF and gas connection pressure > 150 mbar**

If the gas connection pressure is > 150 mbar, a pressure regulator has to be fitted upstream of the W-MF.

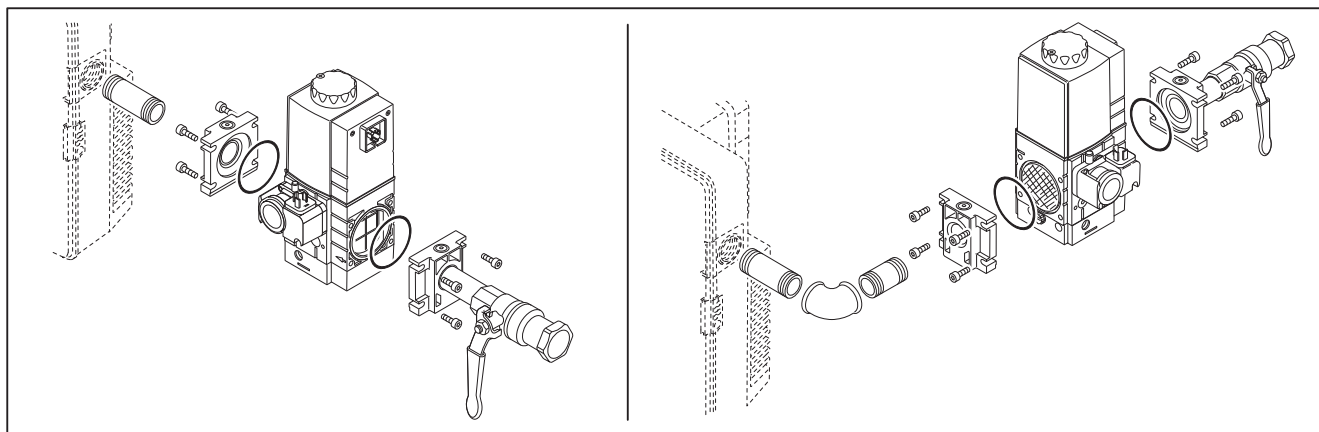
► Install the gas valve train, see additional sheet (Print No. 835109xx).

#### Installing the valve train from the right

- Remove protective foil from gas connection flange.
- Mount gas valve train free from stresses. Do not compensate for installation errors by over-tightening the flange screws.
- Ensure correct alignment of flange seals.
- Tighten screws evenly diagonally across.



No additional sealant is required if the thread is coated in blue.



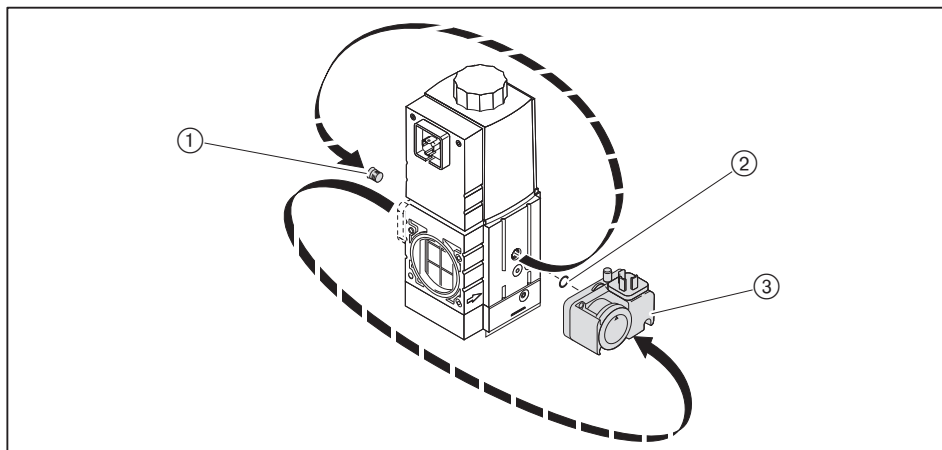
## 5 Installation

### Installing the gas valve train from the left

To fit the gas valve train to the burner from the left, the burner has to be installed rotated by 180°. To do this, additional conversion measures are required.

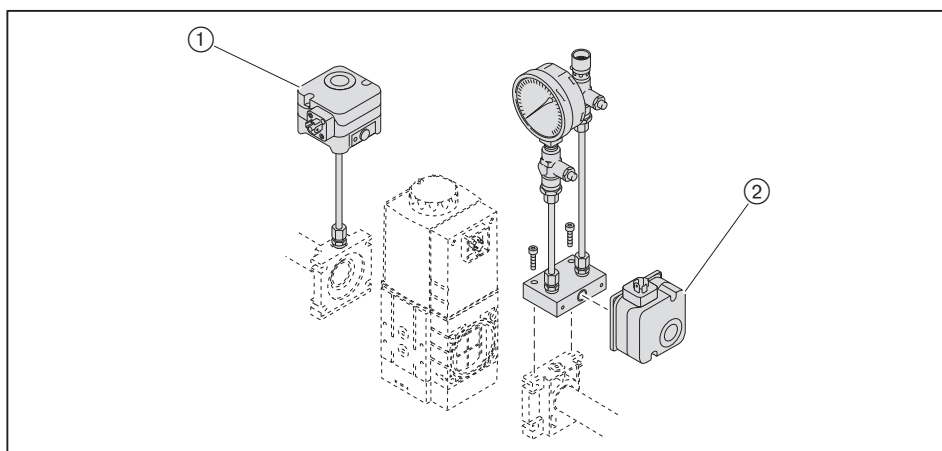
Move the gas pressure switch prior to installing the multifunction assembly:

- ▶ Remove closing plug ① and gas pressure switch ③.
- ▶ Mount gas pressure switch ③ and O ring ② on the opposite side.
- ▶ Mount closing plug ① on the opposite side.



- ▶ Continue installation in the same way as for "Mount gas valve train from the right".

### Accessories (optional)



- ① High gas pressure switch with mechanical interlock ÜB<sup>(1)</sup> (B33)
- ② Low gas pressure switch with mechanical interlock NB<sup>(2)</sup> (B34)

<sup>(1)</sup> Excess pressure limiter

<sup>(2)</sup> Low pressure limiter

## **5 Installation**

### **5.1.2 Carry out soundness test of gas supply line and vent**

Only the gas supply company or a contract installation company may carry out a soundness test and vent the gas line.

## 5 Installation

### 5.2 Electrical connection



#### Risk of electric shock

Working on the device when voltage is applied can lead to electric shock.

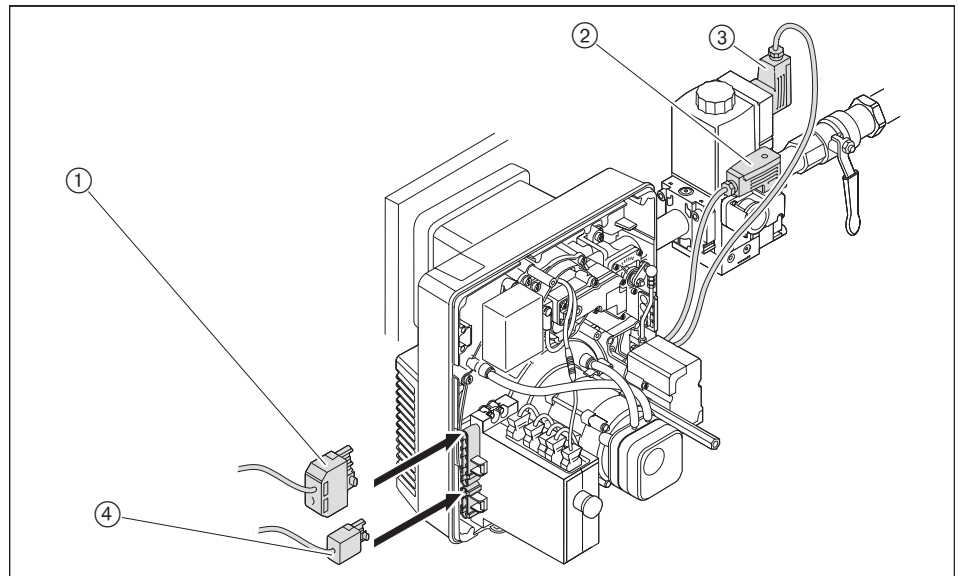
- ▶ Isolate the device from the power supply prior to starting any work.
- ▶ Safeguard against accidental re-start.

The electrical connection must only be carried out by qualified electricians. Observe local regulations.

For single stage operation, a bridge has to be connected in the connection plug ④ supplied as per wiring diagram.

Observe wiring diagram [ch. 12.1].

- ▶ Plug in plug for gas pressure switch ② and double gas valve ③ and secure with screws.
- ▶ Check polarity and wiring of 7 pole connection plug ①.
- ▶ Plug in connection plug ①.
- ▶ Check polarity and wiring of 4 pole connection plug ④.
- ▶ Plug in connection plug ④.



With remote reset, install connection line separately. Do not exceed maximum cable length of 30 metres.

## 6 Operation

## 6 Operation

### 6.1 Operating panel



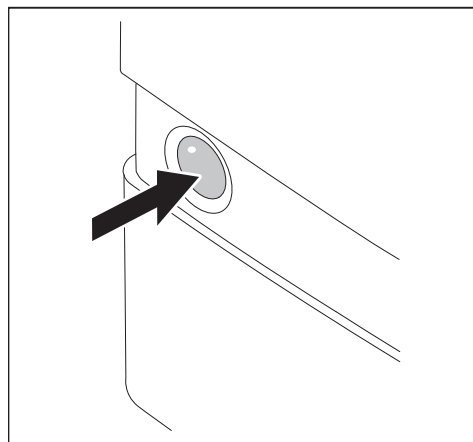
#### Damage to the combustion manager due to incorrect operation

Excessive pressure applied to the illuminated push button can damage the combustion manager.

- Only lightly press illuminated push button.

The illuminated push button on the combustion manager has the following functions:

- display operating condition [ch. 6.2],
- display error codes [ch. 10.1.2],
- reset burner lockout [ch. 10.1.2].



Re-starting the burner during burner operation:

- Press illuminated push button for 1 second.

### 6.2 Display

Illuminated push button	Operating condition
orange	Start phase
flashing orange	Ignition and pre-purge phase
green	Operation
red	Fault [ch. 10]

Additional flashing signals can be read off as error code [ch. 10].

## 7 Commissioning

## 7 Commissioning

### 7.1 Prerequisite

Commissioning must only be carried out by qualified personnel.

Only correctly carried out commissioning ensures the operational safety.

- ▶ Prior to commissioning ensure that:
  - all assembly and installation work has been carried out correctly
  - sufficient combustion air is available, if necessary install ducted air intake
  - the annulus between flame tube and heat exchanger is filled
  - the heat exchanger is filled with medium
  - all regulating, control and safety devices are functioning and set correctly
  - the flue gas ducts are unimpeded
  - a measuring point conforming to standards is available to measure the flue gas
  - the heat exchanger and flue gas ducting up to the test point are sound (extraneous air influences the test results)
  - the operating instructions of the heat exchanger are complied with
  - a heat demand is available

Additional system-related tests could be necessary. Please observe the operating guidelines for the individual components.

On installations with process equipment, the conditions for safe operation and commissioning must be met, see worksheet 8-1 (Print No. 831880xx).

## 7 Commissioning

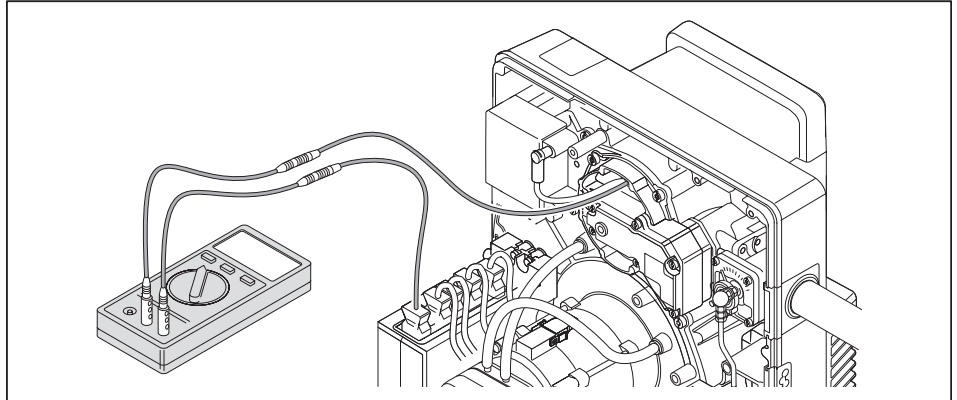
### 7.1.1 Connect measuring devices

#### Measuring device for ionisation current

- Remove ionisation cable from the plug coupling.
- Connect current measuring device in series.

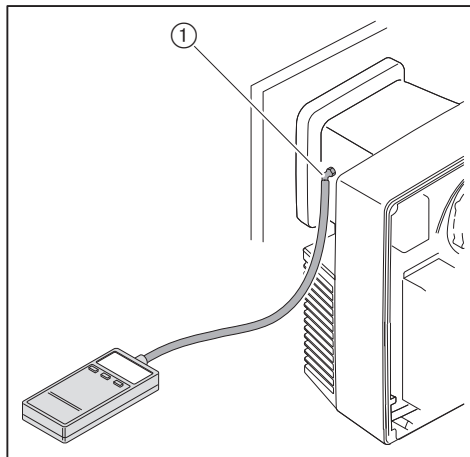
#### Ionisation current

Extraneous light detection from	0.8 $\mu\text{A}$
Minimum ionisation current	1.5 $\mu\text{A}$
Recommended ionisation current	5 ... 20 $\mu\text{A}$



#### Pressure measuring device for mixing pressure

- Open pressure test point for mixing pressure ① and connect pressure measuring device.





## 7 Commissioning

### 7.1.2 Check gas connection pressure

#### Minimum connection pressure



Add the combustion chamber pressure in mbar to the minimum connection pressure. The connection pressure should not fall below 15 mbar.

- Determine minimum connection pressure for low pressure installations from table [ch. 7.1.5].

#### Maximum connection pressure

Maximum connection pressure into isolating valve is 300 mbar.

#### Check connection pressure



#### Risk of explosion due to excess gas supply pressure

Exceeding the maximum connection pressure (see name plate) can damage the gas valve train and lead to an explosion.

Max. connection pressure see name plate.

- Check gas connection pressure



#### Only in conjunction with W-MF and gas connection pressure > 150 mbar

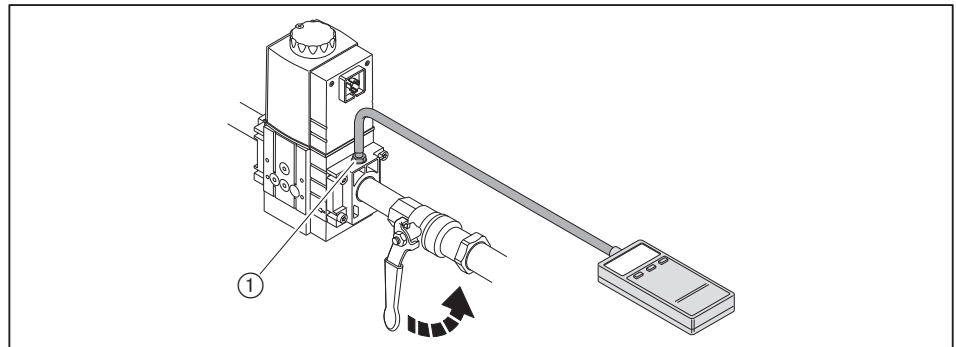
The pressure measuring device must be connected to the pressure regulator.

- Check gas connection pressure, see additional sheet (print No. 835109xx).

- Connect pressure measuring device to test point ①.
- Slowly open isolating valve whilst observing the pressure increase.

If the measured connection pressure exceeds the max. connection pressure:

- Immediately close isolating valve.
- Do not start plant.
- Inform system operator.



## 7 Commissioning

### 7.1.3 Check soundness of gas valve train

#### Soundness test

- ▶ Carry out soundness test:
  - prior to commissioning,
  - following all work on the unit.

Valid for all test phases:

Test pressure	100 ... 150 mbar
Waiting time for pressure equalisation	5 minutes
Test time	5 minutes
Permissible pressure loss	max 1 mbar

#### First test phase



#### Only in conjunction with W-MF and gas connection pressure > 150 mbar

In the first test phase, the testing device must be connected to the pressure regulator.

- ▶ Check soundness of gas valve train, see additional sheet (print No. 835109xx).

In the first phase the valve train section from the gas isolating valve up to the first valve of the multifunction assembly is tested.

- ▶ Switch off burner.
- ▶ Close gas isolating valve.
- ▶ Connect test equipment.
- ▶ Open test point between valve 1 and valve 2.
- ▶ Carry out soundness test.

#### Second test phase

In the second phase the interspace in the multifunction assembly is tested.

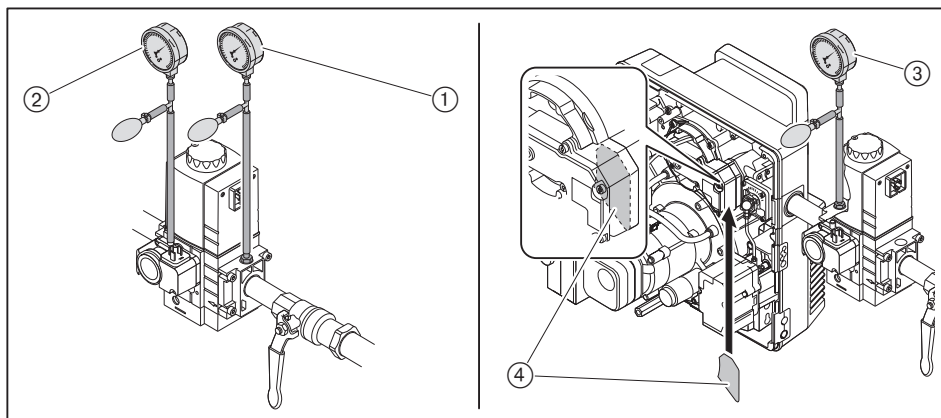
- ▶ Connect test equipment.
- ▶ Carry out soundness test.

## 7 Commissioning

### Third test phase

In the third phase the valve train section from the multifunction assembly up to the gas butterfly valve is tested.

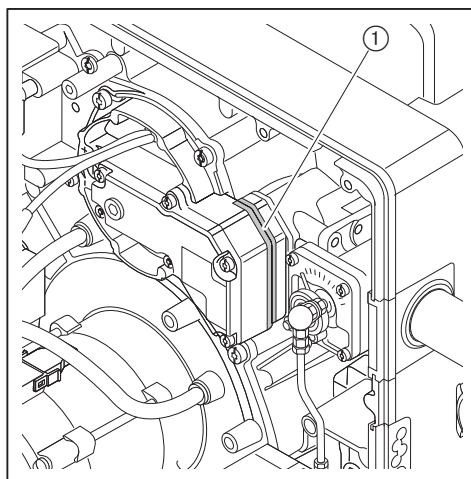
- Remove mixing head [ch. 9.3].
- Fit blanking plate ④.
- Fit mixing head.
- Connect test equipment.
- Carry out soundness test.
- Close all test points.
- Remove blanking plate.



- ① First test phase
- ② Second test phase
- ③ Third test phase
- ④ Blanking plate

### Fourth test phase

In the fourth test phase, the joint to the mixing head ① is tested for soundness. The test phase can only be carried out during or after burner commissioning. A leak detecting spray or electronic gas detector should be used for testing.

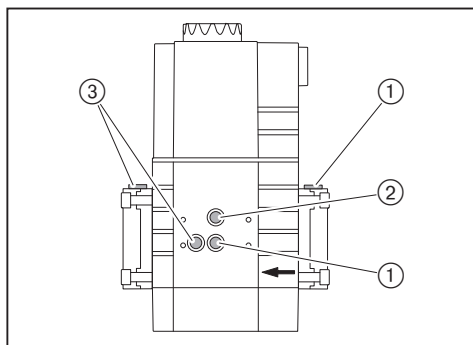


Use only leak detecting foam solutions, which do not cause corrosion, see DVGW-TRGI, worksheet G 600.

- Check all components, intersections and test points of the gas valve train between multifunction assembly and burner.
- Document result of the soundness test on the engineers report.

## 7 Commissioning

### Test points

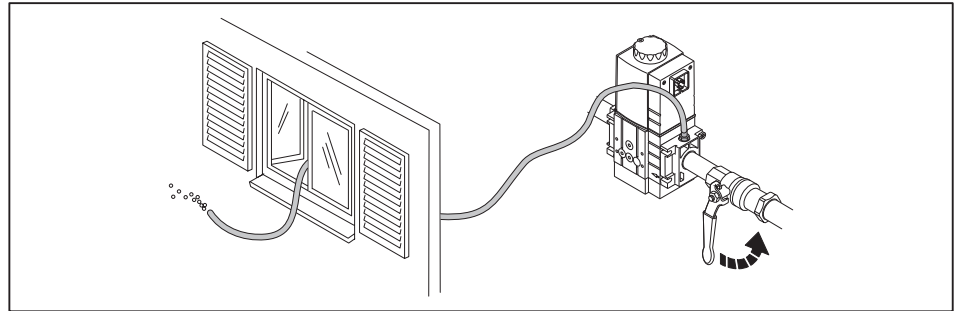


- ① Pressure into valve 1
- ② Pressure between valve 1 and valve 2
- ③ Pressure after valve 2

## 7 Commissioning

### 7.1.4 Venting the gas valve train

- ▶ Open test point into valve 1 [ch. 7.1.3].
- ▶ Connect an approved vent hose to the test point.
- ▶ Vent hose must lead to atmosphere.
- ▶ Slowly open gas isolating valve.
- ✓ The gas/air mixture in the valve train vents via the hose to safe atmosphere.
- ▶ Close gas isolating valve.
- ▶ Remove vent hose and immediately close test point.
- ▶ Use a test burner to ensure no air is present in the valve train.
- ✓ The line must be completely vented.



## 7 Commissioning

### 7.1.5 Preset pressure regulator

#### Determine setting pressure



Add the combustion chamber pressure in mbar to the setting pressure into the gas butterfly valve.

- Determine setting pressure from the table and note down.

The details given for calorific value  $H_i$  relate to 0 °C and 1013 mbar.

The table values have been calculated under ideal conditions. The values are therefore guide values for basic settings.

Full load [kW]	Setting pressure into gas butterfly valve [mbar]	Min. connection pressure [mbar] (low pressure supply)	
Nominal diameter valve train		3/4"	3/4"
Multifunction assembly W-MF SE		507	507
Isolating valve		3/4"	1"
Natural Gas E; $H_i = 10.35 \text{ kWh/m}^3$ ; $d = 0.606$			
40	6.2	10	10
50	6.4	10	10
60	6.4	10	10
70	6.6	10	10
80	7.0	10	10
90	7.2	11	11
100	7.4	12	11
110	7.6	13	12
Natural Gas LL; $H_i = 8.83 \text{ kWh/m}^3$ ; $d = 0.641$			
40	7.9	12	12
50	8.6	12	12
60	7.4	12	12
70	7.9	12	12
80	8.5	13	13
90	8.6	14	14
100	9.4	15 <sup>(1)</sup>	14
110	9.6	16 <sup>(1)</sup>	15
Liquid Petroleum Gas; $H_i = 25.89 \text{ kWh/m}^3$ ; $d = 1.555$ The selection is calculated for Propane, it can however, also be used for Butane.			
40	4.3	8	–
50	4.0	8	–
60	4.7	9	–
70	5.4	9	–
80	5.8	10	–
90	6.6	11	–
100	7.2	12	–
110	7.8	12	–

<sup>(1)</sup> Not TRGI compliant.

## 7 Commissioning

### Preset setting pressure

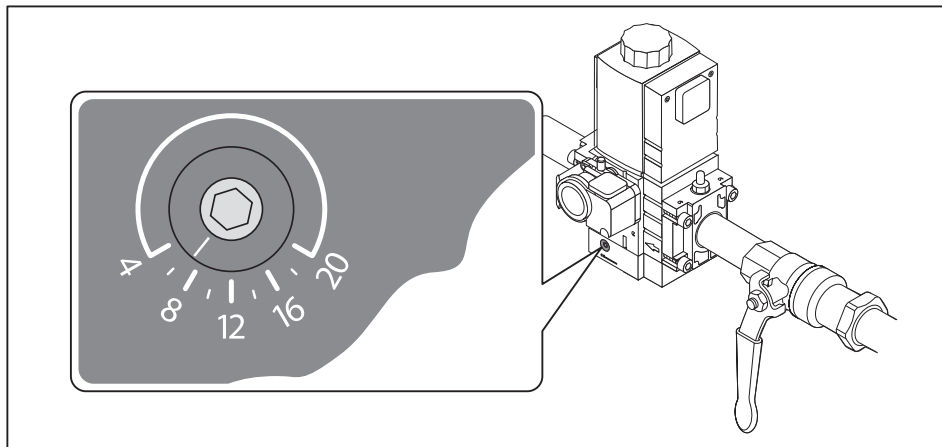


**Only in conjunction with W-MF and gas connection pressure > 150 mbar**

The pre-pressure must be set to approx. 90 mbar.

► Set FRS pressure regulator, see additional sheet (print No. 835109xx).

► Preset setting pressure determined at multifunction assembly.



## 7 Commissioning

### 7.1.6 Setting values

Set mixing head relative to the combustion heat rating required. For this, the diffuser setting and the air damper setting should be matched.

#### Determine diffuser setting and air damper setting

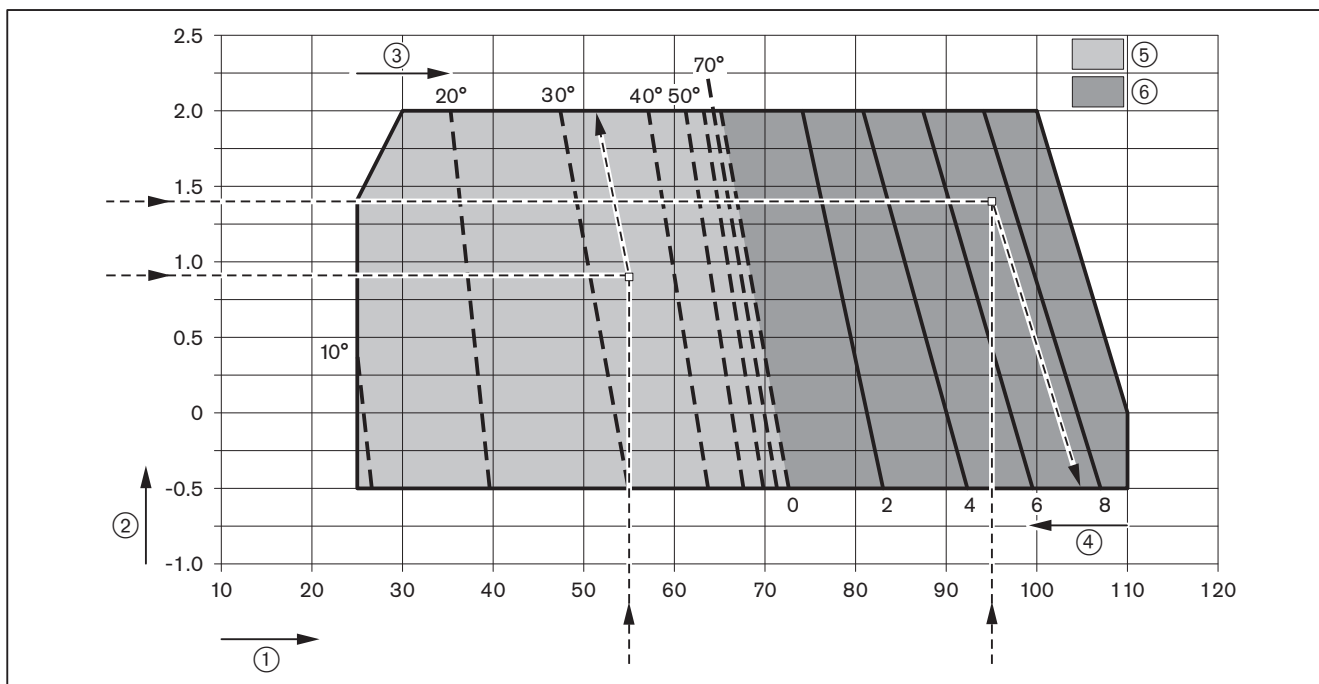


Do not operate the burner outside of the capacity graph.

- Determine the diffuser setting (dimension X) and air damper setting required from the diagram and note down.

#### Example

	Example 1	Example 2
Burner capacity required	55 kW	95 kW
Combustion chamber pressure	0.9 mbar	1.4 mbar
Diffuser setting (dimension X)	0 mm	7.4 mm
Air damper setting	34°	> 80°



- ① Combustion heat rating [kW]
- ② Combustion chamber pressure [mbar]
- ③ Air damper setting
- ④ Diffuser setting [mm] (dimension X)
- ⑤ Air damper setting range with diffuser setting closed (X = 0 mm)
- ⑥ Setting range dimension X with air damper setting > 80°

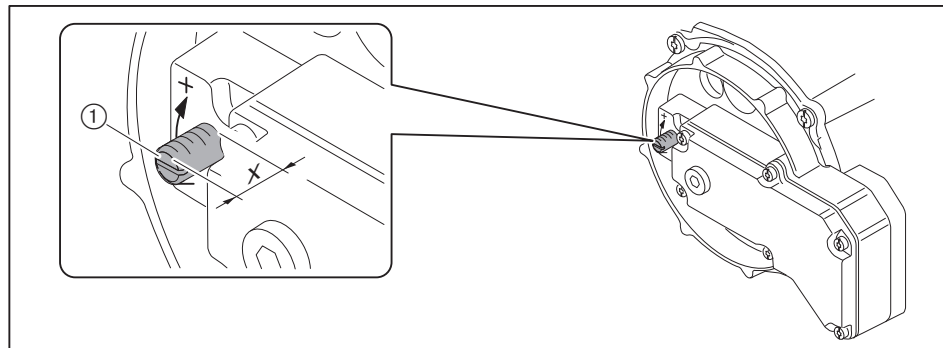


## 7 Commissioning

### Set diffuser

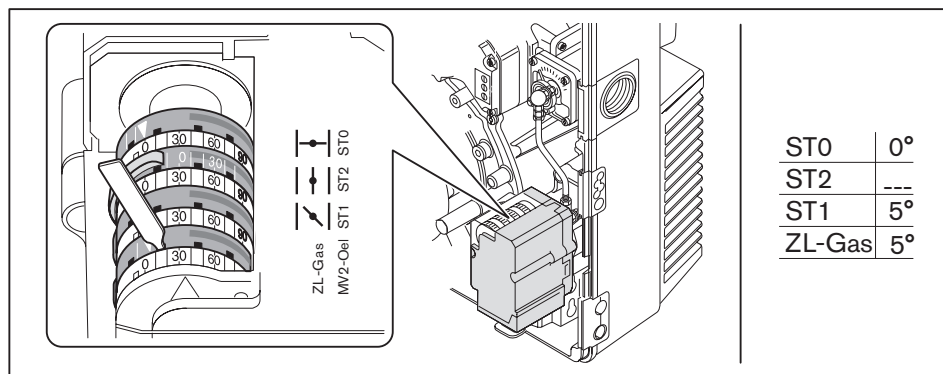
With dimension X = 0 mm the indicating bolt is flush with the cover of the nozzle assembly.

- Turn screw ①, until dimension X equals the value determined.



### Set air damper limit switch

- Check and if necessary adjust position of limit switches ST0, ST1 and ZL.
- Set air damper setting determined at limit switch ST2.



### 7.1.7 Preset gas and air pressure switch

The presetting of the pressure switches is only valid during commissioning. Once commissioning has been completed the pressure switches must be set correctly [ch. 7.3].

Air pressure switch	approx. 3.5 mbar
Low gas pressure switch/valve proving gas pressure switch	12 mbar
High gas pressure switch (optional)	approx. twice control pressure

## 7 Commissioning

### 7.2 Adjusting the burner



#### Risk of electric shock

Touching the ignition device can lead to electric shock.

- ▶ Do not touch ignition device during the ignition process.

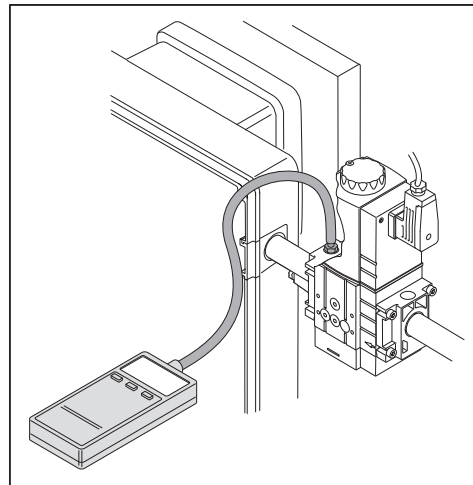
- ▶ Check flame signal during commissioning [ch. 7.1.1].

#### 1. Check sequence of operation

- ▶ Open gas isolating valve.
- ✓ Pressure in gas valve train increases.
- ▶ Close isolating valve.
- ▶ Switch on voltage supply.
- ✓ Illuminated push button lights up red.
- ▶ Press illuminated push button for 1 second.
- ✓ Burner starts in accordance with the programme sequence [ch. 3.3.4].
- ▶ Check sequence of operation:
  - Valves open.
  - Gas pressure switch reacts.
  - Burner start is interrupted.
  - Low gas programme starts, the illuminated button flashes red.

#### 2. Adjust setting pressure

- ▶ Open test point for setting pressure and connect pressure measuring device.

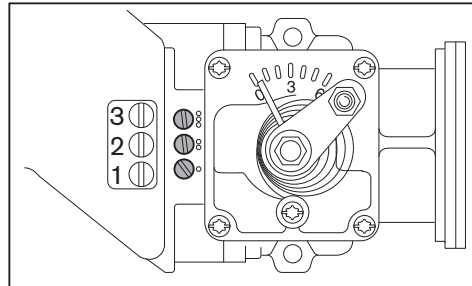


- ▶ Open gas isolating valve.
- ▶ Unplug 4 pole connection plug.
- ▶ Press illuminated push button on combustion manager.
- ✓ Low gas program is reset.
- ✓ Burner starts in line with the sequence of operation and stops in ignition load ZL  
Gas equal to partial load ST1.
- ▶ Preset setting pressure determined at multifunction assembly [ch. 7.1.5].

## 7 Commissioning

### 3. Adjust ignition load

- ▶ Check combustion values in ignition load.
- ▶ Set O<sub>2</sub> content of 4 ... 5 % via gas butterfly valve screw 1.



### 4. Adjust full load

- ▶ Select variation 1 or 2 depending on rating selected from setting diagram:

	Variation 1	Variation 2
<b>Setting diagram</b>		
<b>Actuator</b>	less than 80°	greater than 80°
<b>Diffuser</b>	0 mm	greater than 0 mm
<b>Set combustion via:</b>	Multifunction assembly setting pressure	Diffuser
<b>Set capacity via:</b>	Air damper setting ST2	Multifunction assembly setting pressure

Heat demand required for full load (contact T6/T8 closed).

- ▶ Plug in 4 pole connection plug.
- ✓ Burner drives to full load.

When adjusting, the ratings data given by the boiler manufacturer and the capacity graph of the burner should be observed [ch. 3.4.6].

#### Variation 1



Exit full load, if the air damper setting has to be adjusted. Any adjustment to the air damper setting for full load must be made in partial load.

- ▶ Check CO content of combustion and if necessary adjust combustion via the multifunction assembly setting pressure.
- ▶ Calculate gas throughput (operating volume V<sub>B</sub>) required [ch. 7.6].
- ▶ Optimise air damper setting ST2 until gas throughput (V<sub>B</sub>) is achieved.
- ▶ Check combustion values
- ▶ Determine combustion limit and set excess air via multifunction assembly setting pressure [ch. 7.5].
- ▶ Determine gas throughput once more and adjust if necessary.
- ▶ Re-set excess air.

#### Variation 2

- ▶ Check CO content of combustion and if necessary adjust combustion values via diffuser.
- ▶ Calculate gas throughput (operating volume V<sub>B</sub>) required [ch. 7.6].
- ▶ Optimise setting pressure until gas throughput (V<sub>B</sub>) is achieved.
- ▶ Check combustion values
- ▶ Determine combustion limit and set excess air via diffuser [ch. 7.5].
- ▶ Determine gas throughput once more and adjust if necessary.
- ▶ Re-set excess air.

## 7 Commissioning

### 5. Adjust partial load



The following steps must only be carried out for 2 stage operation. For single stage operation continue with step 7.

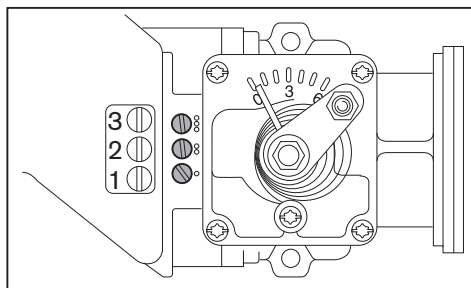


Exit partial load, if the air damper setting has to be adjusted. Any adjustment to the air damper setting for partial load must be made in full load.

- ▶ Define partial load, whilst:
  - observing data provided by boiler manufacturer,
  - observing the burner capacity graph [ch. 3.4.6].
- ▶ Set partial load via limit switch ST1.
- ▶ Unplug 4 pole connection plug.
- ✓ Burner drives to partial load.
- ▶ Check combustion values
- ▶ Determine combustion limit and if necessary re-set excess air via gas butterfly screws.
- ▶ Observe operational range of gas butterfly screws.

screw	Operational range
3	50° ... 80°
2	20° ... 50°
1	0° ... 20°

Factory setting: 3 rotations OPEN.



- ▶ Determine gas throughput and if necessary adjust.
- ▶ Re-set excess air.

### 6. Check full load



Adjustments to the gas setting screws in partial load can lead to combustion value changes in full load.

- ▶ Drive to full load.
- ▶ Check combustion values and if necessary adjust via gas setting screws whilst observing the operational range of the gas butterfly screws.

## 7 Commissioning

### 7. Check start behaviour

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**For single stage operation only**

If changing the ignition load setting ZL Gas, set limit switch ST1 to the same value as ZL Gas.

---

- ▶ Switch off and restart burner.
- ▶ Check start behaviour and if necessary correct ignition load setting.

If the ignition load setting has been altered:

- ▶ Re-check start behaviour.

## 7 Commissioning

### 7.3 Set pressure switches

#### 7.3.1 Set gas pressure switch

##### Low gas pressure switch/valve proving gas pressure switch

The switch point must be checked and if necessary adjusted during commissioning.

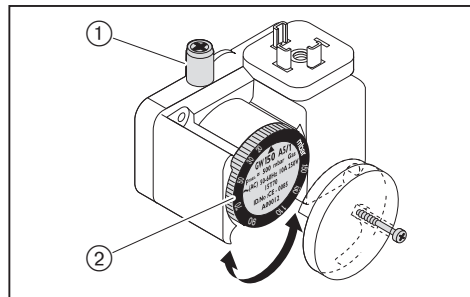
- ▶ Connect pressure measuring device to test point ① of the low gas pressure switch.
- ▶ Start burner and drive to full load.
- ▶ Slowly close gas isolating valve until either:
  - the O<sub>2</sub> content in the flue gas increases to above 7 %,
  - the flame stability considerably worsens,
  - the CO content increases,
  - the gas pressure reaches 12 mbar,
  - or the gas flow pressure drops to 50 %.
- ▶ Determine gas pressure.
- ▶ Slowly open gas isolating valve.
- ▶ Set the pressure determined as switch point at the setting cam ②, minimum value 12 mbar.

##### Check switch point

- ▶ Restart the burner.
- ▶ Slowly close gas isolating valve.
- ✓ If the low gas program starts, the gas pressure switch has been set correctly.
- ✓ If a lockout occurs, the low gas pressure switch reacts too late.

If lockout occurs:

- ▶ Increase switch point at setting cam ②.
- ▶ Slowly open gas isolating valve.
- ▶ Re-check switch point.



##### Set (optional) high gas pressure switch

- ▶ Set high gas pressure switch to  $1.3 \times P_{\text{Gas full load}}$  (flow pressure at full load).

## 7 Commissioning

### 7.3.2 Set air pressure switch

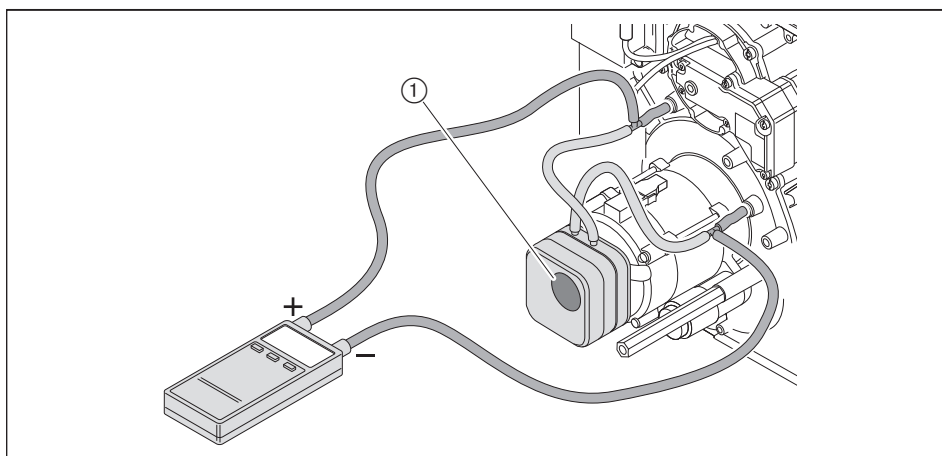
The switch point must be checked and if necessary adjusted during commissioning.

- ▶ Connect pressure measuring device for differential pressure measurement.
- ▶ Start the burner.
- ▶ Carry out differential pressure measurement across the whole capacity range of the burner and determine the lowest differential pressure.
- ▶ Calculate switch point (80 % of release pressure or lowest differential pressure).
- ▶ Set the switch point determined at the setting cam ①.

#### Example

Lowest differential pressure	3.2 mbar
Switch point air pressure switch (80 %)	$3.2 \text{ mbar} \times 0.8 = 2.6 \text{ mbar}$

Site specific influences on the air pressure, e.g. by the flue gas system, heat exchanger, installation location or air supply, may make it necessary to vary the setting of the air pressure switch.



## 7 Commissioning

### 7.4 Concluding work

- ▶ Check and adjust the function of all regulating, control and safety devices of the installation during operation.
- ▶ Remove gas pressure measuring devices and close all test points.
- ▶ Conclude valve proving of gas valve train (fourth test phase) [ch. 7.1.3].
- ▶ Enter combustion values and settings in the commissioning record and/or test sheet.
- ▶ Mount cover on burner.
- ▶ Inform the operator about the use of the equipment.
- ▶ Hand the installation and operating manual to the operator and inform him that this should be kept with the appliance.
- ▶ Point out to operator that the installation should be serviced annually.



## 7 Commissioning

### 7.5 Check combustion

#### Determine excess air

- ▶ Slowly close air damper(s) in the relevant stage, until the combustion limit is reached (CO content approx. 100 ppm).
- ▶ Measure and document O<sub>2</sub> content.
- ▶ Read air number (λ).

Increase air number to ensure sufficient excess air:

- by 0.15 ... 0.2 (equates to 15 ... 20 % excess air),
- by more than 0.2 for more difficult conditions, such as:
  - dirty combustion air,
  - fluctuating intake temperature,
  - fluctuating chimney draught.

#### Example

$$\lambda + 0.15 = \lambda^*$$

- ▶ Set air number (λ\*), do not exceed CO content of 50 ppm.
- ▶ Measure and document O<sub>2</sub> content.

#### Check flue gas temperature

- ▶ Check flue gas temperature.
- ▶ Ensure that the flue gas temperature complies with the data provided by the boiler manufacturer.
- ▶ If necessary adjust flue gas temperature, e.g.:
  - Increase burner rating in partial load to avoid condensation in the flue gas ducts, except on condensing units.
  - Reduce burner rating in full load to improve efficiency.
  - Adjust heat exchanger to the data provided by the manufacturer.

#### Determine flue gas losses

- ▶ Drive to full load.
- ▶ Measure combustion air temperature (t<sub>L</sub>) near the air damper(s).
- ▶ Measure oxygen content (O<sub>2</sub>) and flue gas temperature (t<sub>A</sub>) at the same time at one point.
- ▶ Determine flue gas losses using the following formula:

$$q_A = (t_A - t_L) \cdot \left( \frac{A_2}{21 - O_2} \right) + B$$

q<sub>A</sub> Flue gas losses [%]

t<sub>A</sub> Flue gas temperature [°C]

t<sub>L</sub> Combustion air temperature [°C]

O<sub>2</sub> Volumetric content of oxygen in dry flue gas [%]

Fuel factors	Natural Gas	Liquid Petroleum Gas
A2	0.66	0.63
B	0.009	0.008

## 7 Commissioning

### 7.6 Calculate gas throughput

Formula symbol	Explanation	Example values
$V_B$	Operating volume [m³/h] Volume measured at gas meter at current pressure and temperature (gas throughput).	-
$V_N$	Standard volume [m³/h] Volume gained by gas at 1013 mbar and 0 °C.	-
$f$	Conversion factor	-
$Q_N$	Heat rating [kW]	200 kW
$\eta$	Boiler efficiency (e. g. 92 % $\pm$ 0.92)	0.92
$H_i$	Calorific value [kWh/m³] (at 0 °C and 1013 mbar)	10.35 kW/m³ (Natural Gas E)
$t_{Gas}$	Gas temperature at gas meter [°C]	10 °C
$P_{Gas}$	Pressure at gas meter [mbar]	25 mbar
$P_{Baro}$	Barometric air pressure [mbar], see table	500 m $\pm$ 955 mbar
$V_G$	Gas throughput determined at gas meter	0.74 m³
$T_M$	Time measured during gas throughput ( $V_G$ )	120 seconds

#### Calculate normal volume

- Calculate the normal volume ( $V_N$ ) using the following formula.

$$V_N = \frac{Q_N}{\eta \cdot H_i} \quad V_N = \frac{200 \text{ kW}}{0.92 \cdot 10.35 \text{ kW/m}^3} = 21.0 \text{ m}^3/\text{h}$$

#### Calculate conversion factor

- Determine gas temperature ( $t_{Gas}$ ) and pressure ( $P_{Gas}$ ) at gas meter.
- Determine barometric air pressure ( $P_{Baro}$ ) from table.

Height above sea level [m]	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300
$P_{Baro}$ [mbar]	1013	1001	990	978	966	955	943	932	921	910	899	888	877	866

- Calculate conversion factor ( $f$ ) using the following formula.

$$f = \frac{P_{Baro} + P_{Gas}}{1013} \cdot \frac{273}{273 + t_{Gas}} \quad f = \frac{955 + 25}{1013} \cdot \frac{273}{273 + 10} = 0.933$$

#### Calculate operating volume (gas throughput) required

$$V_B = \frac{V_N}{f} \quad V_B = \frac{21.0 \text{ m}^3/\text{h}}{0.933} = 22.5 \text{ m}^3/\text{h}$$

#### Determine current operating volume (gas throughput)

- Measure gas throughput ( $V_G$ ) at gas meter, measuring time ( $T_M$ ) should be a minimum of 60 seconds.
- Calculate operating volume ( $V_B$ ) using the following formula.

$$V_B = \frac{3600 \cdot V_G}{T_M} \quad V_B = \frac{3600 \cdot 0.74 \text{ m}^3}{120 \text{ s}} = 22.2 \text{ m}^3/\text{h}$$

## **8 Shutdown**

### **8 Shutdown**

For breaks in operation:

- ▶ Switch off burner.
- ▶ Close fuel shut off devices.

---

## 9 Servicing

## 9 Servicing

### 9.1 Notes on servicing

---



#### **Risk of explosion due to leaking gas**

Improper service work can lead to escaping gas and explosion.

- ▶ Close fuel shut off devices prior to starting work.
  - ▶ Care should be taken when dismantling and assembling gas carrying components.
  - ▶ Close the screws on the test points ensuring the tests points are sealed.
- 



#### **Risk of electric shock**

Working on the device when voltage is applied can lead to electric shock.

- ▶ Isolate the device from the power supply prior to starting any work.
  - ▶ Safeguard against accidental re-start.
- 



#### **Danger of getting burned on hot components**

Hot components can lead to burns.

- ▶ Allow components to cool.
- 

Servicing must only be carried out by qualified personnel. The combustion plant should be serviced annually. Depending on site conditions more frequent checks may be required.

Components, which show increased wear and tear or whose design lifespan is or will be exceeded prior to the next service should be replaced as a precaution.

The design lifespan of the components is listed in the service plan [ch. 9.2].

---



Weishaupt recommends a service contract is entered into to ensure regular inspections.

---

The following components must only be replaced and must not be repaired:

- combustion manager
- flame sensor
- actuator (stepping motor)
- multifunction assembly
- pressure regulator
- pressure switch.

#### **Prior to every servicing**

- ▶ Inform the operator about the extent of service work to be carried out.
- ▶ Switch off mains switch of installation and safeguard against accidental reactivation.
- ▶ Close fuel shut off devices.
- ▶ Remove cover.
- ▶ Unplug boiler control connection plug from combustion manager.

## 9 Servicing

### Following servicing

---



#### **Risk of electric shock**

Touching the ignition device can lead to electric shock.

- ▶ Do not touch ignition device during the ignition process.

- 
- ▶ Check tightness of gas carrying components.
  - ▶ Check function of:
    - ignition,
    - flame monitoring,
    - gas carrying components (gas connection pressure and setting pressure),
    - pressure switch.
    - safety interlock circuit.
  - ▶ Check combustion values, if necessary re-adjust the burner.
  - ▶ Enter combustion values and settings in the commissioning record.
  - ▶ Refit cover.

## 9 Servicing

### 9.2 Service plan

Components	Criteria / design lifespan <sup>(1)</sup>	Service procedure
Fan wheel	Soiling	► Clean
	Damage	► Replace
Air duct	Soiling	► Clean
Air damper	Soiling	► Clean
Air pressure switch	Switch point	► Check
	250 000 burner starts or 10 years <sup>(2)</sup>	► Replace
Ignition cable	Damage	► Replace
Ignition electrode	Soiling	► Clean
	Damage/wear	► Replace
Combustion Manager	250 000 burner starts or 10 years <sup>(2)</sup>	► Replace
Ionisation cable	Damage	► Replace
Ionisation electrode	Soiling	► Clean
	Damage/wear	► Replace
		Recommendation: at least every 2 years
Flame tube/diffuser	Soiling	► Clean
	Damage	► Replace
Multifunction assembly with valve testing system (valve proving)	Fault identified	► Replace
Multifunction assembly without valve testing system (valve proving)	Function/soundness less than DN 25: 200 000 burner starts or 10 years <sup>(2)</sup> DN 25 to DN 65: 100 000 burner starts or 10 years <sup>(2)</sup>	► Replace
Breather plug multifunction assembly	Soiling	► Replace
Filter insert multifunction assembly	Soiling	► Replace
Gas pressure regulator	Setting pressure	► Check
	Function/soundness	► Replace
	15 years	► Replace
Gas pressure switch	Switch point	► Check
	50 000 burner starts or 10 years <sup>(2)</sup>	► Replace

<sup>(1)</sup> The specified design lifespan applies for typical use in heating, hot water and steam systems as well as for thermal process systems to EN 746.

<sup>(2)</sup> If a criterion is reached, carry out maintenance measures.

## 9 Servicing

### 9.3 Removing and refitting mixing head

Observe notes on servicing [ch. 9.1].



#### Risk of explosion due to leaking gas

It is possible for gas to leak out if the gasket ③ is seated incorrectly.

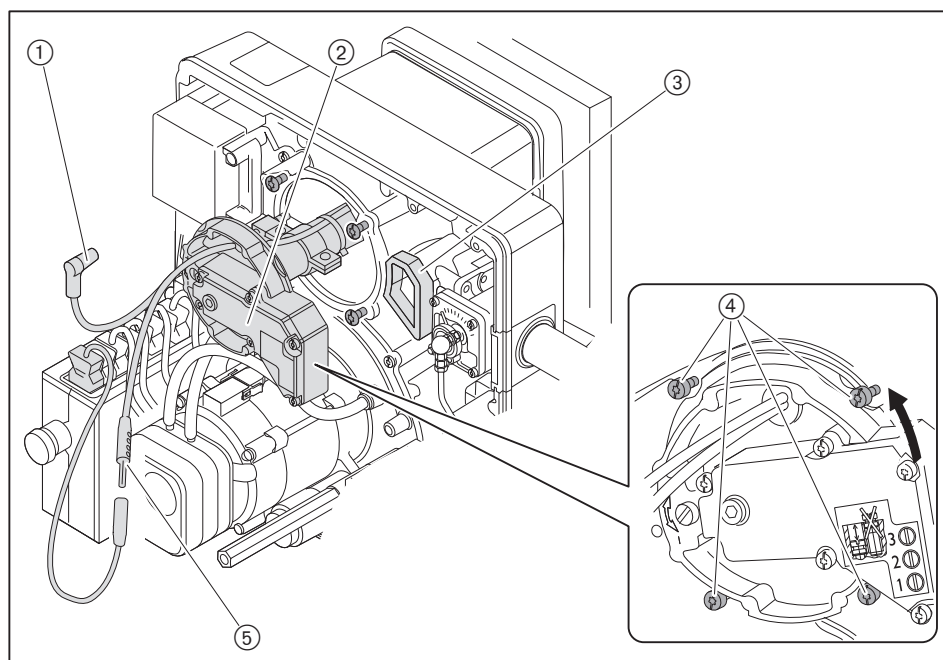
- ▶ Following work on the mixing head, ensure the gasket is clean and seated correctly, if necessary replace.
- ▶ Check for leaks, see Fourth test phase [ch. 7.1.3].

#### Removing

- ▶ Unplug ionisation cable ⑤.
- ▶ Unplug ignition cable ①.
- ▶ Undo screws ④.
- ▶ Turn mixing head ② to the left up to the recess and remove.

#### Refitting

- ▶ Refit mixing head in reverse order ensuring correct alignment and cleanliness of gasket ③.



## 9 Servicing

### 9.4 Set mixing head

Observe notes on servicing [ch. 9.1].

The distance between diffuser and flame tube front edge S1 can not be measured with the burner mounted. This is only possible indirectly with the mixing head removed, with dimension Lx.



Dimension Lx changes according to the combustion head extension used.

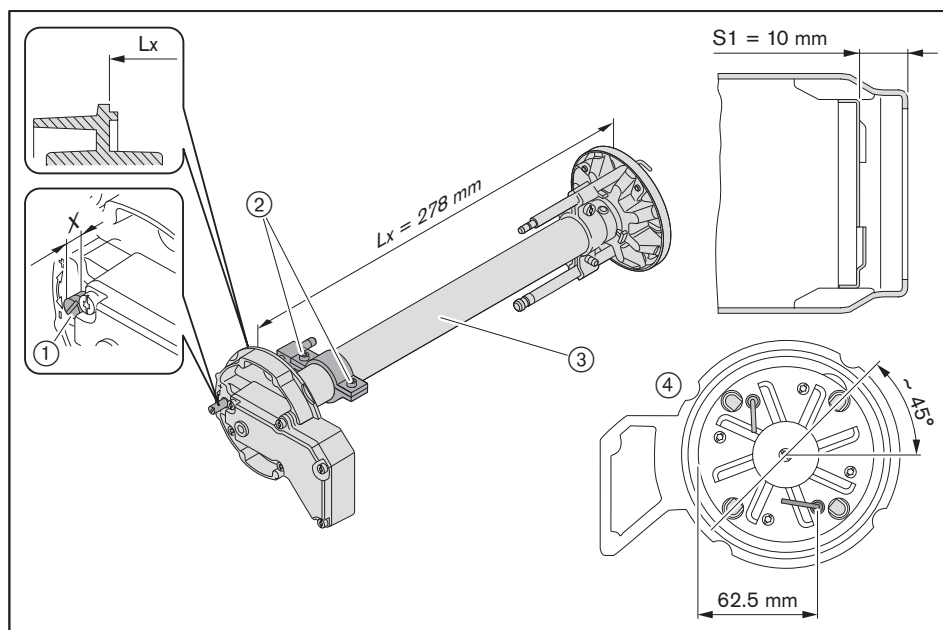
- ▶ Remove mixing head [ch. 9.3].
- ▶ Turn setting screw ① until it is flush with the nozzle assembly cover (dimension X = 0 mm).
- ▶ Check dimension Lx.

If the value measured deviates from dimension Lx:

- ▶ Undo screws ②.
- ▶ Adjust flame tube ③ until dimension Lx has been reached.
- ▶ Re-tighten screws ②.

If the screws ② have been loosened:

- ▶ Check position of electrodes and gas orifices ④.



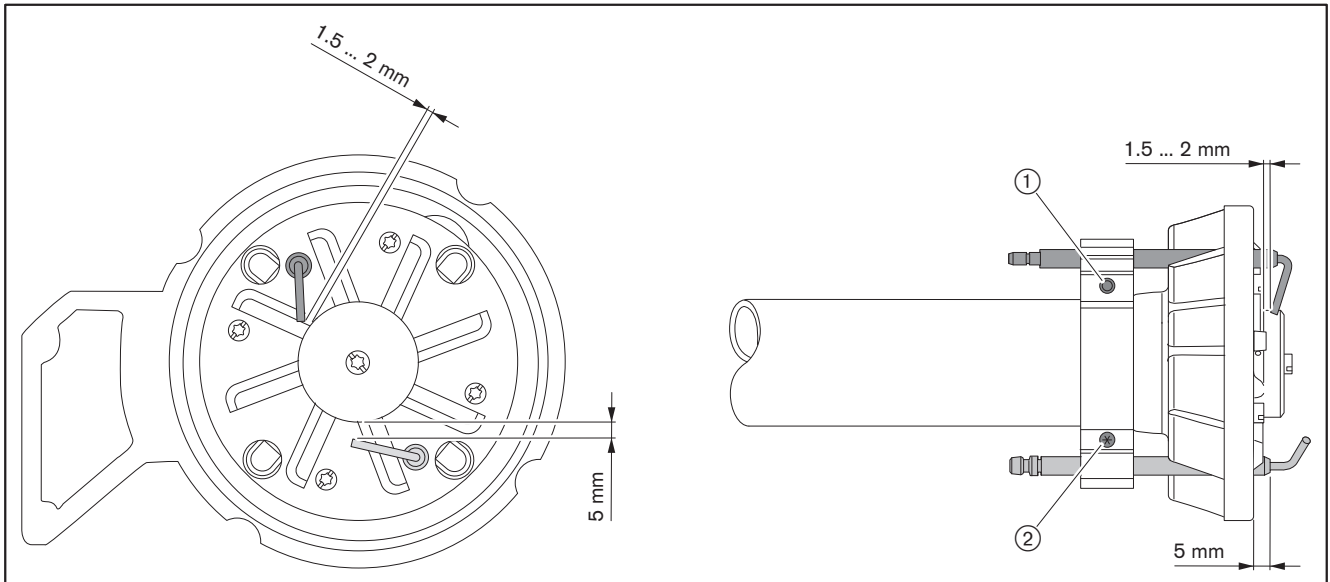


## 9 Servicing

### 9.5 Set ionisation and ignition electrodes

Observe notes on servicing [ch. 9.1].

- ▶ Remove mixing head [ch. 9.3].
- ▶ Undo screw ①.
- ▶ Set ignition electrode and re-tighten screw.
- ▶ Undo screw ②.
- ▶ Set ionisation electrode and re-tighten screw.



## 9 Servicing

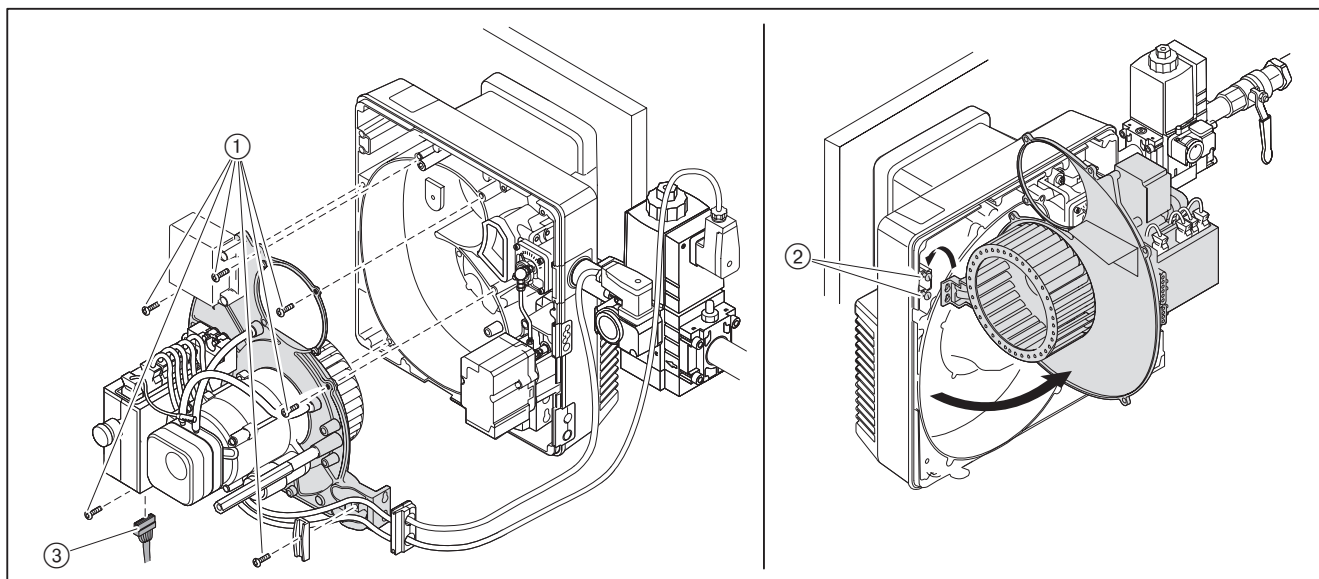
### 9.6 Service position

Observe notes on servicing [ch. 9.1].



The burner mounted rotated by 180° cannot be placed into the service position.

- ▶ Remove mixing head [ch. 9.3].
- ▶ Remove actuator plug ③.
- ▶ Hold housing cover and remove screws ①.
- ▶ Place housing cover into service position ②.



### 9.7 Removing and refitting fan wheel

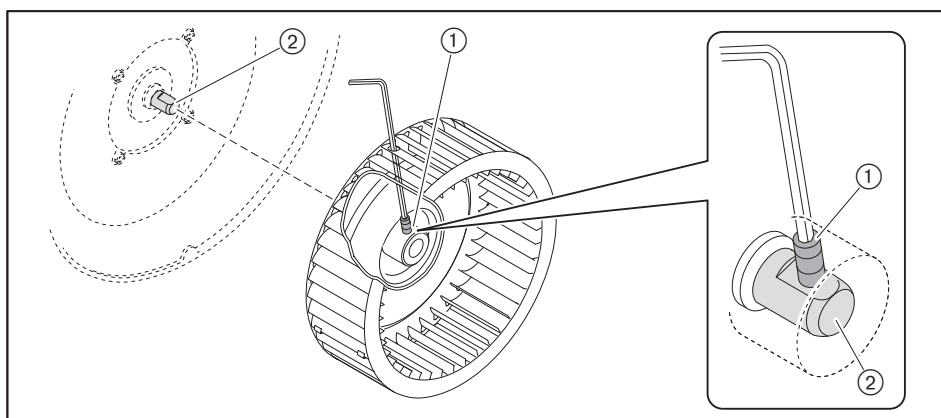
Observe notes on servicing [ch. 9.1].

#### Removing

- ▶ Place housing cover into service position [ch. 9.6].
- ▶ Remove grub screw ① and remove fan wheel.

#### Refitting

- ▶ Refit fan wheel in reverse order and
  - ensure correct alignment on the motor shaft ②,
  - screw in new grub screw ①,
  - turn fan wheel to ensure it moves freely.

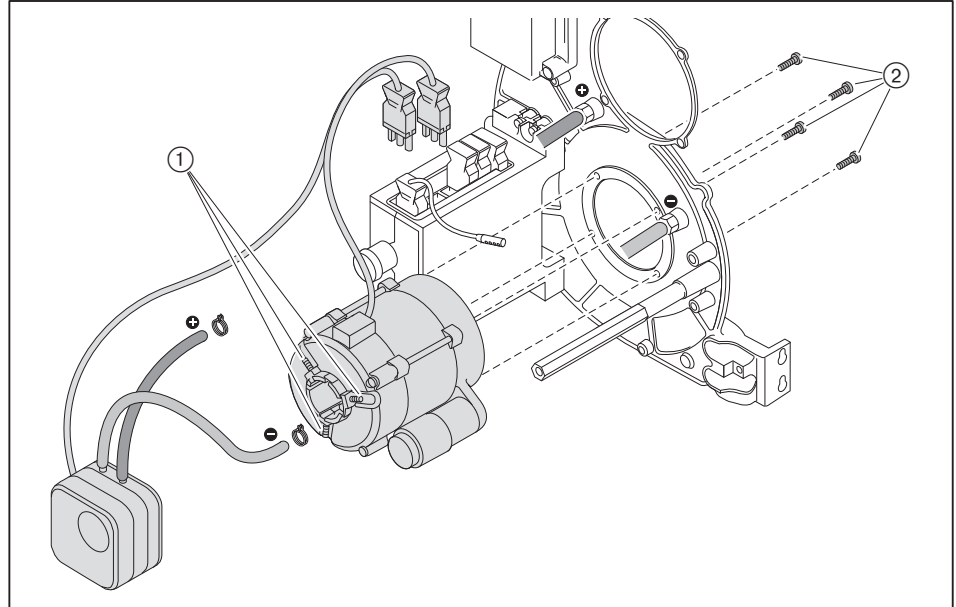


## 9 Servicing

### 9.8 Remove burner motor

Observe notes on servicing [ch. 9.1].

- ▶ Remove fan wheel [ch. 9.7].
- ▶ Unplug plug number 3 and 11.
- ▶ Disconnect + and - hoses.
- ▶ Undo screws ① and remove air pressure switch.
- ▶ Hold motor and remove screws ②.
- ▶ Remove motor.



## 9 Servicing

### 9.9 Removing and refitting air damper actuator

Observe notes on servicing [ch. 9.1].

#### Removing

- ▶ Remove actuator plug ① from combustion manager.
- ▶ Remove screws ②.
- ▶ Remove actuator.

#### Refitting

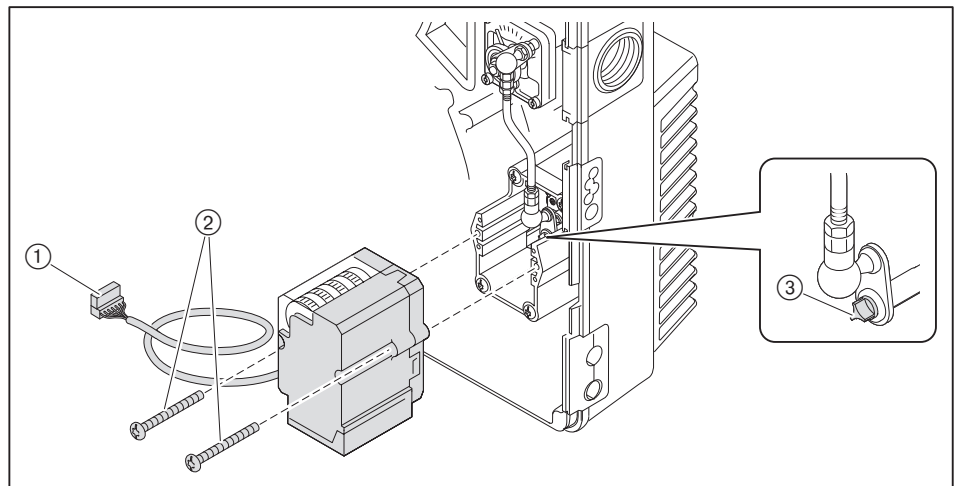


#### Damage to the actuator caused by turning the hub

Actuator could be damaged.

- ▶ Do not turn hub manually or with tool.

- ▶ Place actuator into the star shaped groove ③.
- ▶ Secure actuator.
- ▶ Plug in actuator plug ① at the combustion manager.



## 9 Servicing

### 9.10 Removing and refitting angle drive

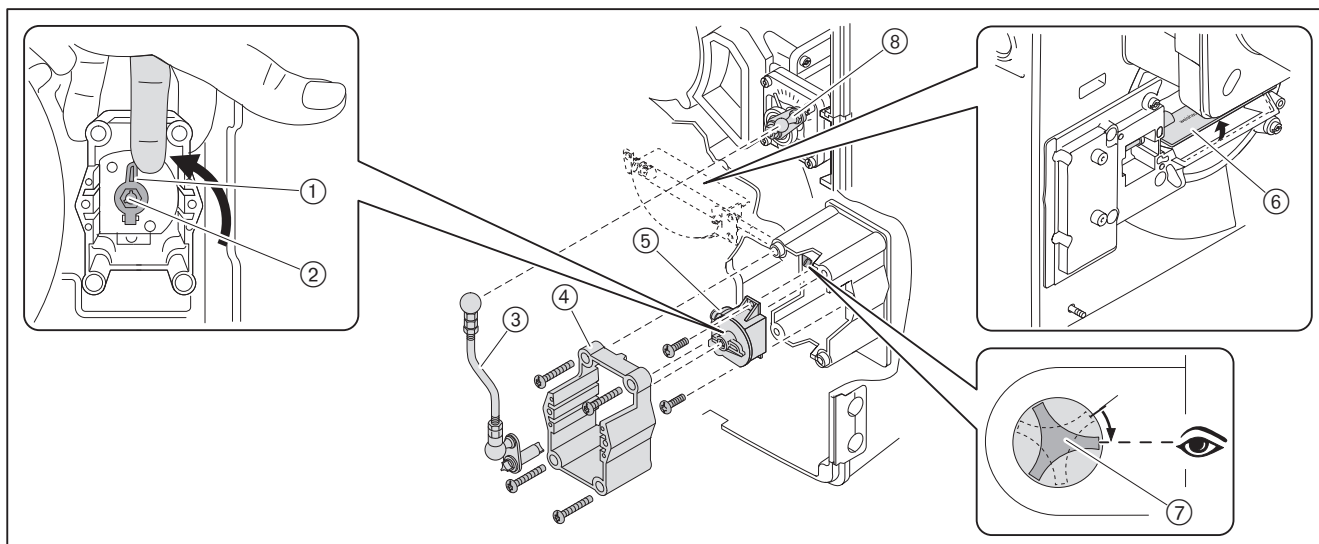
Observe notes on servicing [ch. 9.1].

#### Removing

- ▶ Remove air damper actuator [ch. 9.9].
- ▶ Pull drive rod ③ from the gas butterfly valve ⑧ and remove.
- ✓ Air damper is opened by the force of the spring.
- ▶ Remove frame ④.
- ▶ Remove angle drive ⑤.

#### Refitting

- ▶ Remove intake housing [ch. 9.12].
- ▶ Open air damper ⑥ until position ⑦ has been reached and hold tight.
- ▶ Fit angle drive to shaft.
- ▶ Secure angle drive.
- ▶ Mount intake housing.
- ▶ Fit frame ④.
- ▶ Place drive rod ③ into actuator.
- ▶ Turn indicator ① to CLOSED position and hold.
- ▶ Place actuator with drive rod ③ into the star shaped groove ② and secure.
- ▶ Engage drive rod on gas butterfly valve ⑧, ensuring correct alignment.



## 9 Servicing

### 9.11 Removing and refitting gas butterfly valve

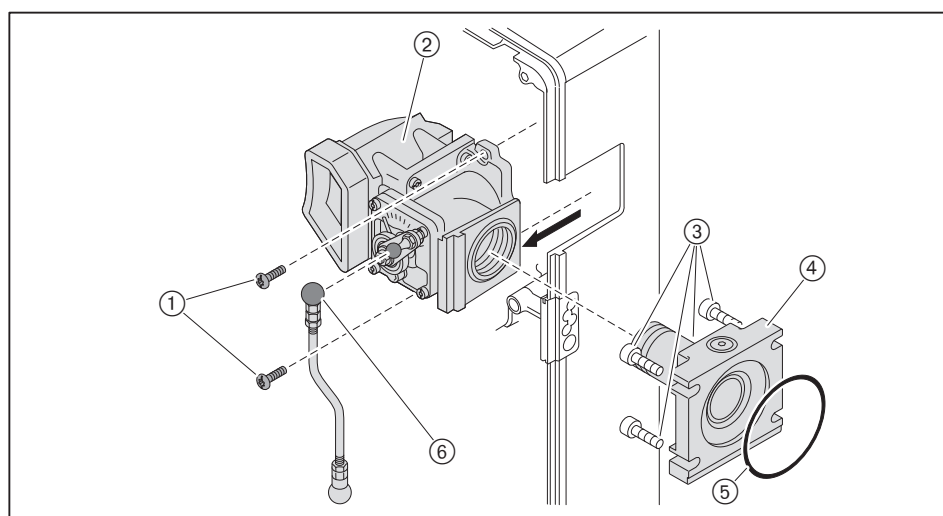
Observe notes on servicing [ch. 9.1].

#### Removing

- ▶ Remove screws ③.
- ▶ Unscrew flange with double nipple ④.
- ▶ Remove mixing head [ch. 9.3].
- ▶ Remove drive rod ⑥.
- ▶ Remove screws ① and remove gas butterfly valve ②.

#### Refitting

- ▶ Refit gas butterfly valve ② in reverse order and:
  - ensure correct alignment of drive rod ⑥ with gas butterfly valve,
  - secure flange to multifunction assembly whilst ensuring correct seating of O ring ⑤ on the flange.



- ▶ Carry out soundness test [ch. 7.1.3].

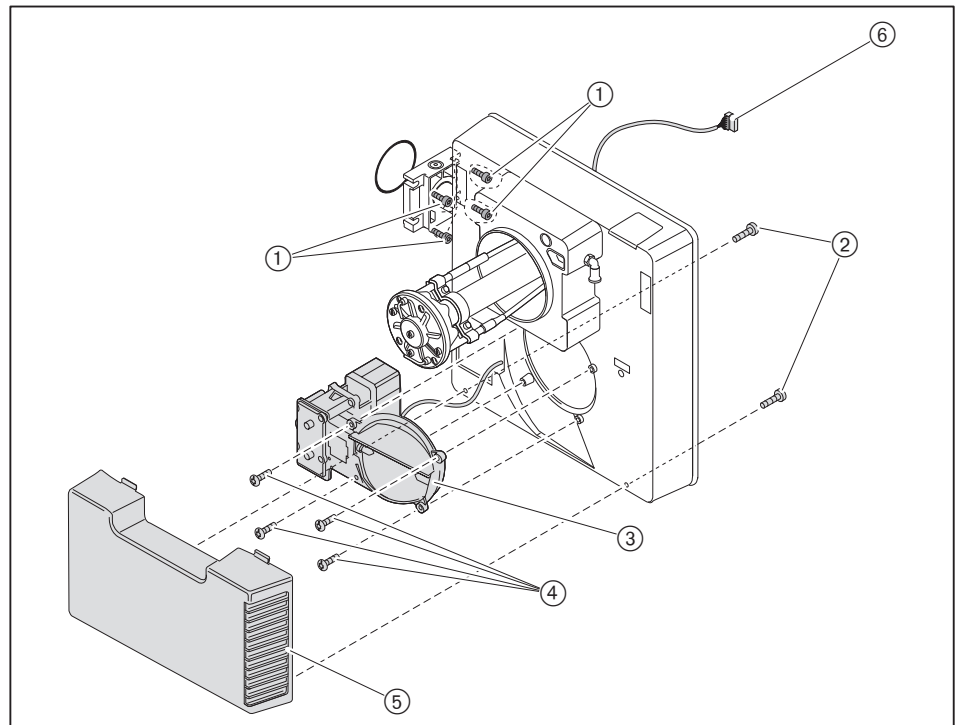
## 9 Servicing

### 9.12 Removing and refitting air regulator

Observe notes on servicing [ch. 9.1].

#### Removing

- ▶ Remove screws ①.
- ▶ Remove burner from heat exchanger [ch. 4.2].
- ▶ Remove actuator plug ⑥.
- ▶ Remove screws ②.
- ▶ Remove intake housing ⑤.
- ▶ Remove bolts ④.
- ▶ Remove air regulator ③.



#### Refitting

- ▶ Refit air regulator in reverse order.
- ▶ Carry out soundness test [ch. 7.1.3].

## 9 Servicing

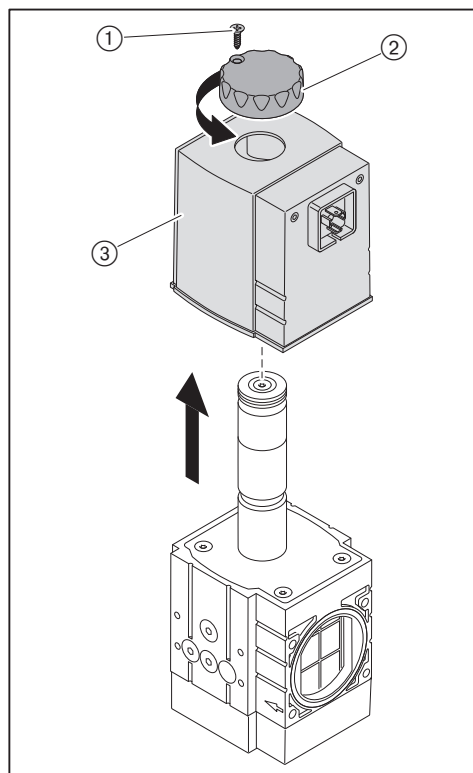
### 9.13 Replacing coil on multifunction assembly

Observe notes on servicing [ch. 9.1].



Ensure correct voltage and solenoid number when replacing the solenoid coil.

- Undo screw ①.
- Remove cap ②.
- Replace solenoid coil ③.

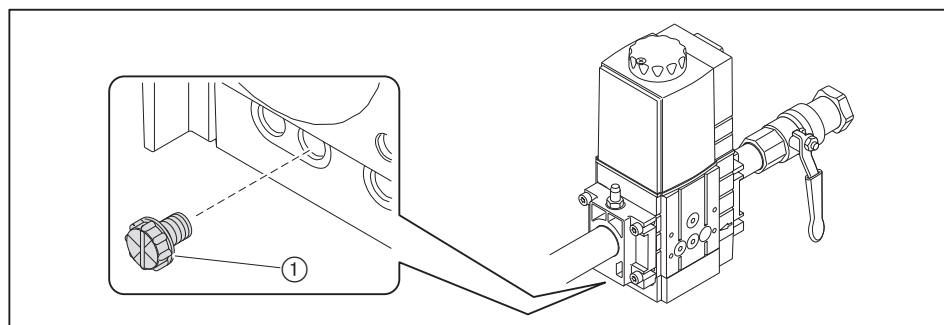


### 9.14 Replace breather plug of multifunction assembly

Observe notes on servicing [ch. 9.1].

A breather plug with integrated filter is fitted to protect the breather orifice against soiling.

- Replace breather plug ①.





## 9 Servicing

### 9.15 Removing and refitting filter insert of multifunction assembly

Observe notes on servicing [ch. 9.1].



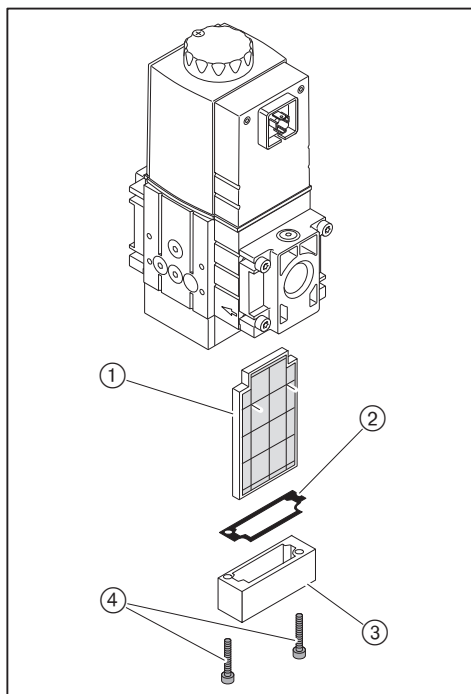
Ensure no dirt enters the multifunction assembly when removing and replacing the filter insert.

#### Removing

- ▶ Remove screws ④.
- ▶ Remove cover ③.
- ▶ Remove filter insert ①.
- ▶ If necessary replace filter insert ① and seal ②.

#### Refitting

- ▶ Refit in reverse order ensuring correct alignment of filter ① and seal ②.



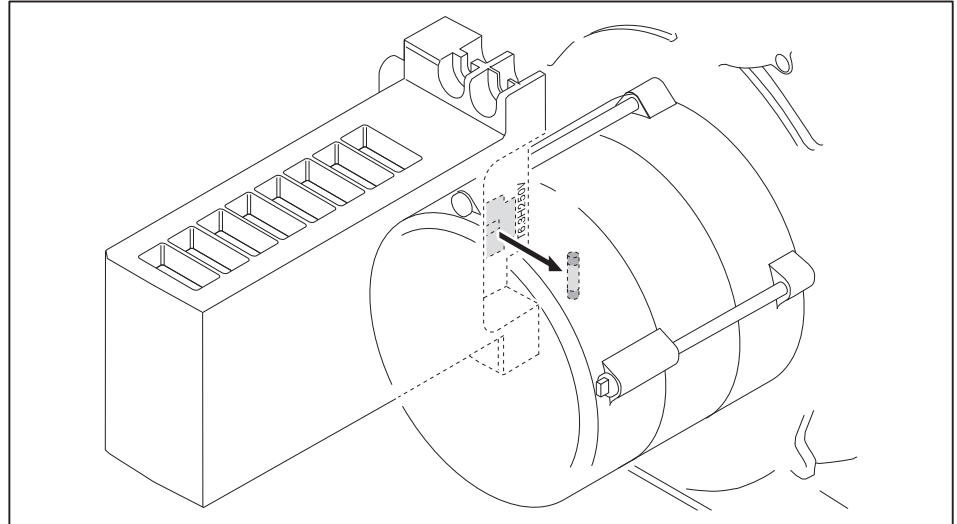
- ▶ Carry out soundness test [ch. 7.1.3].
- ▶ Vent gas valve train [ch. 7.1.4].

## 9 Servicing

### 9.16 Replacing the fuse

Observe notes on servicing [ch. 9.1].

- ▶ Remove all plugs from the combustion manager.
- ▶ Remove screws from the combustion manager.
- ▶ Remove combustion manager.
- ▶ Replace fuse (6.3 AT, IEC 127-2/V).



## 10 Troubleshooting

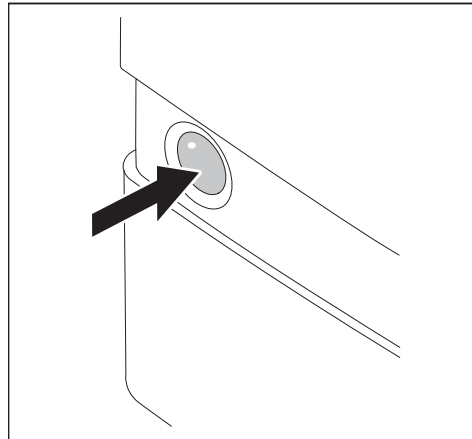
## 10 Troubleshooting

### 10.1 Procedures for fault conditions

The combustion manager recognises irregularities of the burner and indicates these with the illuminated push button.

The following conditions can occur:

- illuminated push button off [ch. 10.1.1],
- illuminated push button red [ch. 10.1.2],
- illuminated push button flashes [ch. 10.1.3].



#### 10.1.1 Illuminated push button off

The following faults may be corrected by the operator:

Fault	Cause	Rectification
Burner not operating	External fuse has tripped <sup>(1)</sup>	► Check fuse.
	Heating switch is set to Off	► Switch on heating switch.
	Temperature limiter or pressure limiter on heat exchanger has triggered <sup>(1)</sup>	► Reset temperature limiter or pressure limiter on heat exchanger.
	Low water safety interlock on heat exchanger has triggered <sup>(1)</sup>	► Top up water. ► Reset low water safety interlock on heat exchanger.
	Temperature regulator or pressure regulator on heat exchanger has been set incorrectly	► Adjust temperature regulator or pressure regulator on heat exchanger.
	Boiler or heating circuit control is not functioning or has not been set correctly	► Check function and setting of boiler or heating circuit control.

<sup>(1)</sup> Notify Weishaupt Customer Service or your heating contractor if the problem occurs repeatedly.

## 10 Troubleshooting

### 10.1.2 Illuminated push button red

A burner fault has occurred. The burner is in lockout. Prior to resetting, the error code can be called up and used to control the cause of the fault.

#### Read error code

Only 5 seconds after a fault occurred can it be analysed and read.

- ▶ Press illuminated push button for 5 seconds.
- ✓ Illuminated push button briefly lights up orange.
- ✓ Illuminated push button flashes red.
- ▶ Count between the flashing pauses and flashing signals and note down.
- ▶ Rectify cause of fault, see table.

#### Resetting



#### Damage resulting from incorrect servicing

The combustion plant could be damaged.

- ▶ Do not carry out more than 2 lockout resets successively.
- ▶ Faults must be rectified by qualified personnel.

- ▶ Press illuminated push button for 1 second.
- ✓ Red signal extinguishes.
- ✓ Burner has been reset.

#### Error codes with lockout

The following faults must only be rectified by qualified personnel:

Fault codes	Fault	Cause	Rectification
2 x flashing No flame, end of safety time	No ignition	Ignition electrode set incorrectly	▶ Set ignition electrode [ch. 9.5]
		Ignition electrode dirty or wet	▶ Clean ignition electrode
		Ceramic insulator defective	▶ Replace ignition electrode
		Ignition cable defective	▶ Replace ignition cable
		Ignition unit defective	▶ Replace ignition unit
	Double gas valve does not open	Cable defective	▶ Check cable, if necessary replace
		Coil defective	▶ Replace coil [ch. 9.13]
	Combustion manager does not detect a flame signal	No ionisation current present or insufficient	▶ Measure ionisation current [ch. 7.1.1]
			▶ Set ionisation electrode [ch. 9.5]
			▶ Check contact resistance (terminal, plug) ▶ Correct burner setting ▶ When using an un-earthed mains supply (control transformer) the pole which is to be used as neutral conductor must be earthed
		Ionisation electrode worn	▶ Replace ionisation electrode
		Ionisation cable defective	▶ Replace cable

## 10 Troubleshooting

The following faults must only be rectified by qualified personnel:

Fault codes	Fault	Cause	Rectification
Flashing 3 times Air pressure switch fault	Air pressure switch does not react	Hoses not attached tightly	► Check hoses on air pressure switch
		Air pressure switch set incorrectly	► Reset air pressure switch [ch. 7.3.2]
		Cable defective	► Check cable, if necessary replace
		Air pressure switch defective	► Check air pressure switch, if necessary replace
	Burner motor does not run	Capacitor defective	► Replace capacitor
		Cable defective	► Check cable, if necessary replace
		Burner motor defective	► Check burner motor, if necessary replace
Flashing 4 times Flame simulation/ extraneous light	Flame signal prior to or after operation	Ionisation current present	Extraneous light detection from 0.8 µA ► Find and eliminate perturbation
		Ionisation electrode defective	► Check the ionisation electrode, replace if necessary
Flashing 6 times Actuator fault	Actuator does not reach target position within 10 seconds	Actuator plug unplugged	► Plug in actuator plug
		Actuator defective	► Check actuator, replace if necessary
		Setting of limit switches incorrect	► Check position of limit switches
		Gas valve / air damper blocked	► Check freedom of movement of gas valve and air damper
Flashing 7 times Flame failure during operation (partial load)	Flame signal insufficient	Burner setting incorrect	► Check burner setting ► Check flame signal
		Ionisation electrode soiled	► Clean ionisation electrode
		Ionisation electrode set incorrectly	► Set ionisation electrode [ch. 9.5]
		Ionisation electrode defective	► Check the ionisation electrode, replace if necessary
Flashing 8 times Gas pressure switch fault	Gas pressure switch does not react	Gas pressure switch set incorrectly	► Set gas pressure switch [ch. 7.3.1]
		Gas pressure switch defective	► Check gas pressure switch, if necessary replace

## 10 Troubleshooting

The following faults must only be rectified by qualified personnel:

Fault codes	Fault	Cause	Rectification
Flashing 9 times Flame failure during operation (full load)	Flame signal insufficient	Burner setting incorrect	► Check burner setting ► Check flame signal
		Ionisation electrode soiled	► Clean ionisation electrode
		Ionisation electrode set incorrectly	► Set ionisation electrode
		Ionisation electrode defective	► Check the ionisation electrode, replace if necessary
Flashing 10 times Combustion manager fault	Burner does not start	Parameters have been changed	► Reset burner [ch. 10.1.2]
		Combustion manager defective	► Reset burner [ch. 10.1.2], if fault reoccurs replace combustion manager
Flashing 12 times Valve proving fault First test phase	Valve 1 leaking	Gas valve train leaking	► Check soundness of gas valve train [ch. 7.1.3]
		Gas pressure switch set incorrectly	► Set gas pressure switch
		Gas pressure switch defective	► Check gas pressure switch, if necessary replace
		Multifunction assembly defective	► Replace multifunction assembly
Flashing 13 times Valve proving fault Second test phase	Valve 2 leaking	Gas valve train leaking	► Check soundness of gas valve train [ch. 7.1.3]
		Gas pressure switch set incorrectly	► Set gas pressure switch [ch. 7.3.1]
		Gas pressure switch defective	► Check gas pressure switch, if necessary replace
		Multifunction assembly defective	► Replace multifunction assembly

## 10 Troubleshooting

### 10.1.3 Illuminated push button flashes

An irregularity is present. The burner does not go to lockout. Once the fault has been rectified, the error code ceases.

#### Error codes without lockout

The following faults must only be rectified by qualified personnel:

Fault codes	Cause	Rectification
Flashing green/red	Flame signal at heat demand	► Find and eliminate perturbation
Flashing red/orange with pause	Excess voltage	► Check external voltage supply
Flashing orange/red	Low voltage	► Check external voltage supply
	Internal unit fuse (F7) faulty	► Replace fuse [ch. 9.16]
	Combustion manager fault	► Replace combustion manager
flashing red	Low gas	► Check gas connection pressure ► Set gas pressure switch [ch. 7.3.1] ► Check gas pressure switch
orange, after 5 seconds red	Air pressure switch does not react	► Reset air pressure switch [ch. 7.3.2] ► Check air pressure switch ► With ducted air intake air pressure switch, check air supply
Flashing green	Burner operation with weak flame signal	Minimum ionisation current 1.5 µA ► Check burner setting
	Ionisation electrode soiled	► Clean ionisation electrode
	Ionisation electrode defective	► Replace ionisation electrode
Glimmering red	OCI mode activated (not used)	► Press illuminated push button for more than 5 seconds ✓ Combustion manager changes to operating mode

## 10 Troubleshooting

### 10.2 Operating problems

The following faults must only be rectified by qualified personnel:

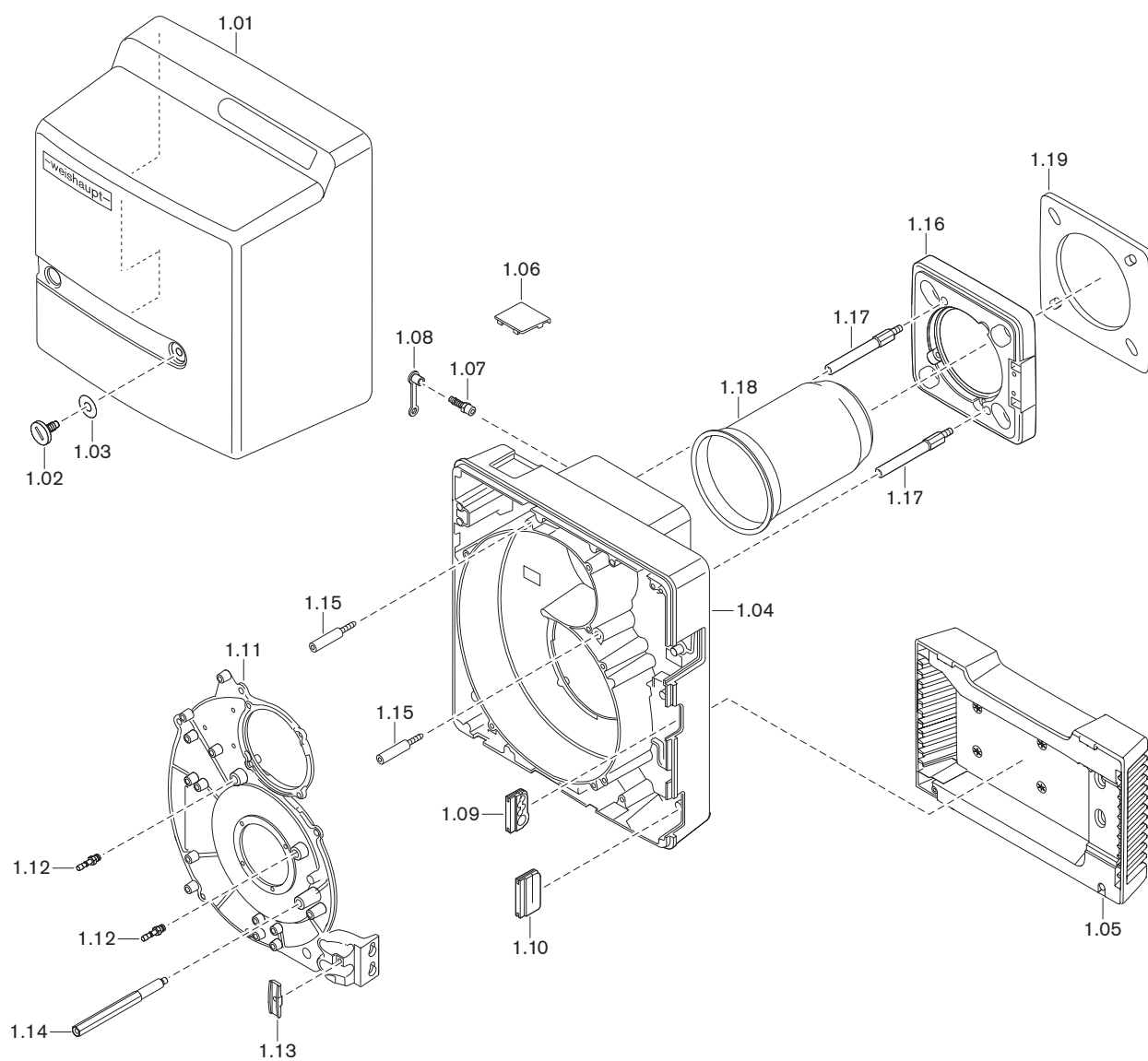
Observation	Cause	Rectification
Poor start behaviour of burner	Mixing pressure too high	► Decrease mixing pressure in ignition position
	Ignition electrode set incorrectly	► Set ignition electrode [ch. 9.5]
	Mixing head set incorrectly	► Set mixing head [ch. 9.4]
	Ignition load set incorrectly	► Set ignition load [ch. 7.2]
Combustion pulsating or burner booming	Mixing head set incorrectly	► Set mixing head [ch. 9.4]
	Incorrect combustion air quantity	► Adjust burner
Stability problems	Mixing pressure too high	► Decrease mixing pressure



## **10 Troubleshooting**

## 11 Spares

### 11 Spares

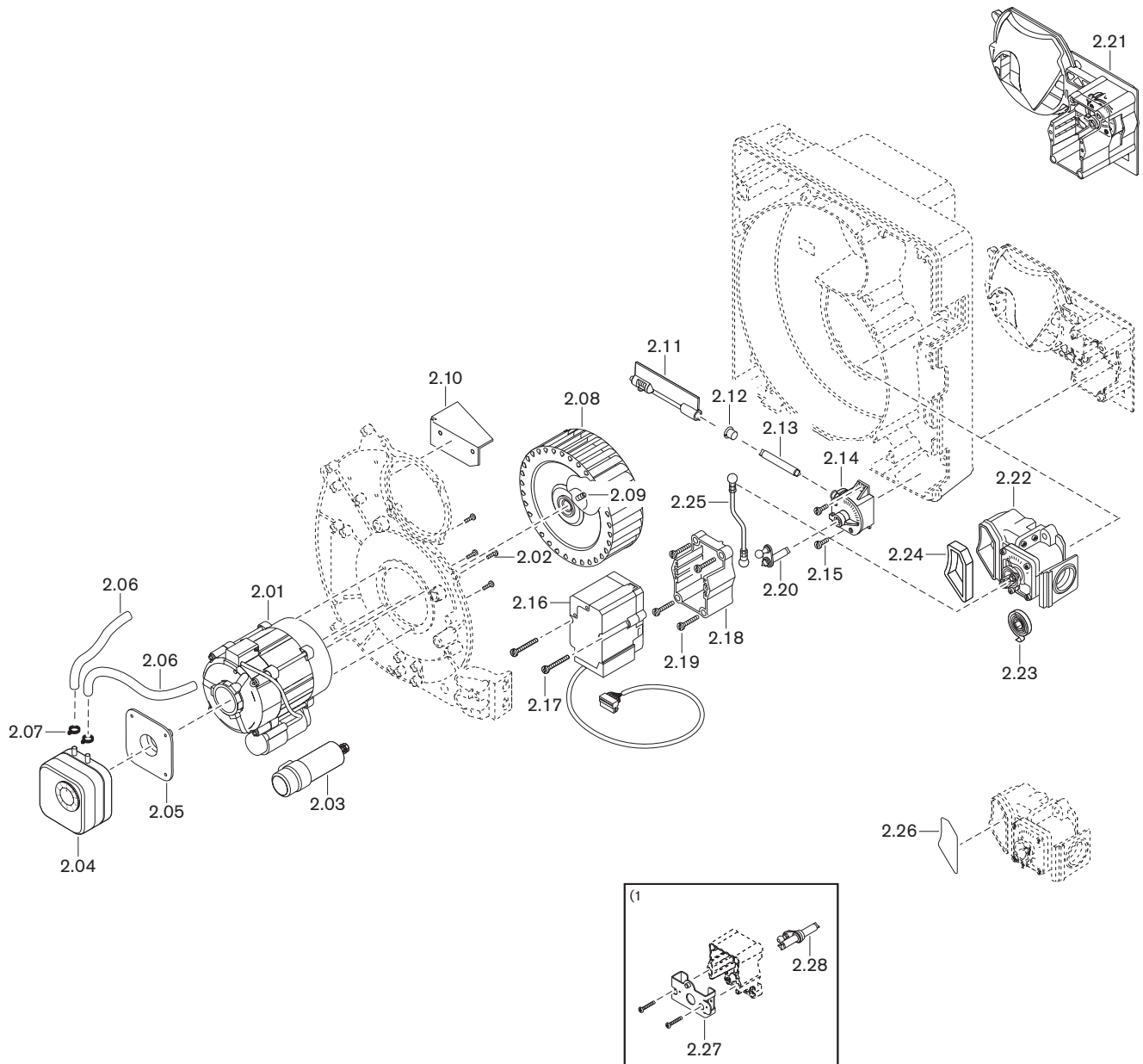


## 11 Spares

Pos.	Description	Order No.
1.01	Cover complete	241 110 01 11 2
1.02	Screw M8 x 15	142 013 01 15 7
1.03	Washer 7 x 18	430 016
1.04	Burner housing	241 110 01 30 7
1.05	Intake housing complete	241 110 01 08 2
	– Screw 4 x 30 Torx-Plus	409 325
1.06	View port on hours counter cover	241 210 01 19 7
1.07	Treaded socket R <sup>1</sup> / <sub>8</sub> GES6	453 017
1.08	Protective cap DN 6 SELF 50/2 CF	232 300 01 04 7
1.09	Grommet for connection cable	241 200 01 24 7
1.10	Grommet	241 400 01 17 7
1.11	Housing cover	241 110 01 31 7
1.12	Treaded socket R <sup>1</sup> / <sub>8</sub> GES4	453 004
1.13	Bracket for cable	241 400 01 36 7
1.14	Stay bolt cover	241 210 01 20 7
1.15	Screw M6 burner housing	241 110 01 29 7
1.16	Burner flange	241 110 01 05 7
	– Screw M8 x 30 DIN 912	402 517
	– Washer 8.4 DIN 433	430 504
1.17	Stay bolt for burner flange	241 050 01 18 7
1.18	Flame tube WG10-D	
	– Standard	232 110 14 12 2
	– extended by 100 mm*	230 110 14 13 2
	– extended by 200 mm*	230 110 14 14 2
	– extended by 300 mm*	230 110 14 15 2
1.19	Flange gasket	241 110 01 10 7

\* Only in conjunction with combustion head extension.

## 11 Spares

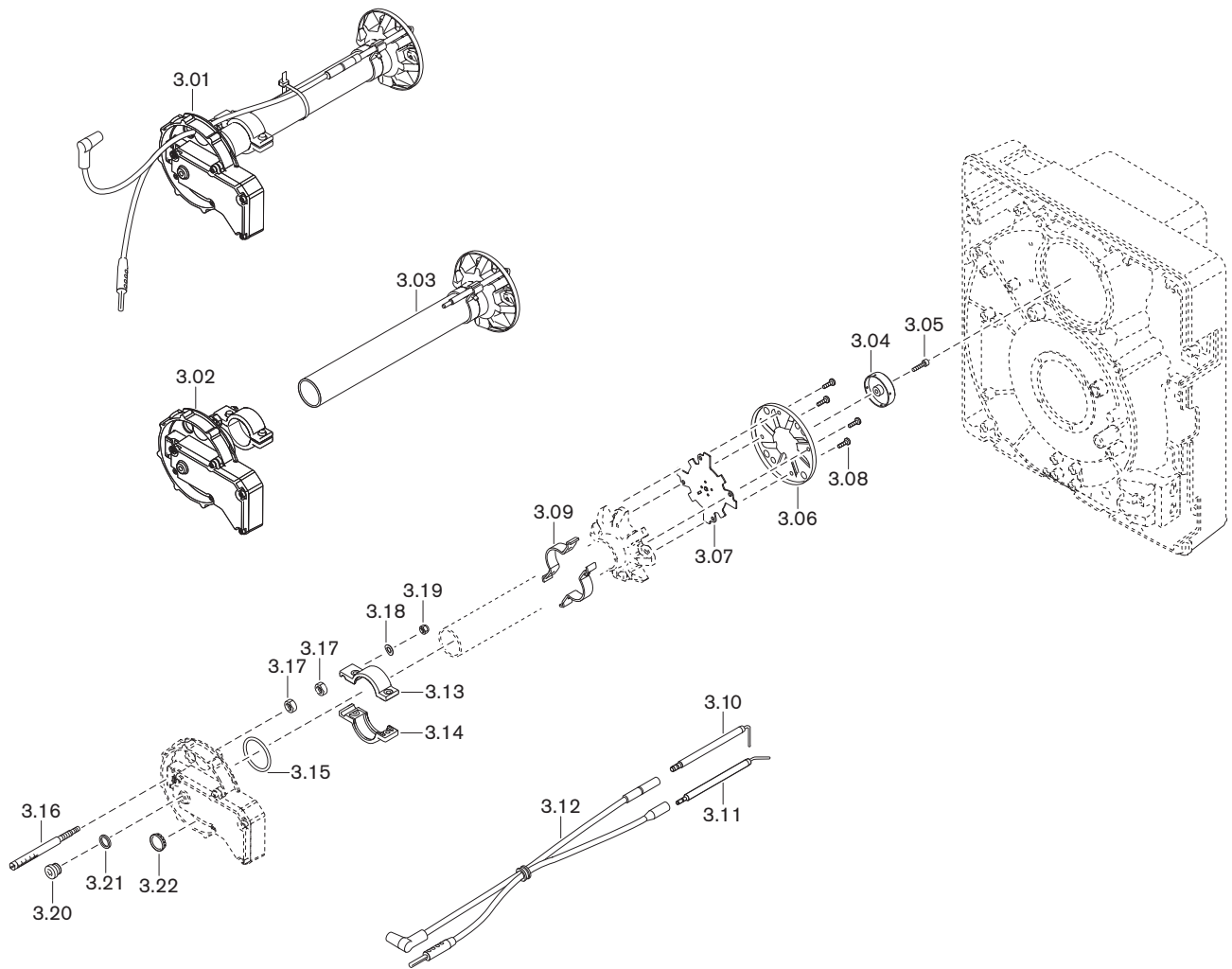


## 11 Spares

Pos.	Description	Order No.
2.01	Motor ECK03/H-2/1 230V 50Hz	652 113
2.02	Screw M4 x 10	409 323
2.03	Capacitor set	713 472
2.04	Pressure switch LGW 10 A2 1 - 10 mbar	691 370
2.05	Connection flange for LGW	605 243
2.06	Hose 4.0 x 1.75 190 mm	232 050 24 05 7
2.07	Hose clamp 7.5	790 218
2.08	Fan wheel TLR 157 x 47 -L S1 50Hz	241 110 08 04 2
2.09	Grub screw M6 x 8 w. an. cutter	420 549
2.10	Air guide	232 110 01 01 7
2.11	Air damper complete	241 110 02 10 2
2.12	Bearing for air damper shaft	241 110 02 10 7
2.13	Shaft air damper - angle drive	241 210 02 05 7
2.14	Angle drive	241 110 02 06 2
2.15	Screw 4 x 12 Torx-Plus Remform	409 320
2.16	Actuator STD 4.5, 24 V	651 102
2.17	Screw 4 x 35 Combi-Torx-Plus Remform	409 355
2.18	Frame for actuator	241 210 02 03 7
2.19	Screw 4 x 30 Torx-Plus Delta PT	409 325
2.20	Lever complete	232 210 02 01 2
2.21	Air regulator spring 2	241 110 02 09 2
2.22	Gas butterfly valve	
	– Natural Gas	232 110 25 01 0
	– Liquid Petroleum Gas	233 110 25 01 0
2.23	Spring 2	241 400 02 16 7
2.24	Seal connection channel	232 110 25 08 7
2.25	Treaded rod complete	232 110 25 01 2
2.26	Blanking plate valve proving	232 210 26 17 2
2.27	Adapter complete actuator rotated 180° <sup>(1)</sup>	230 110 02 01 2
2.28	Lever complete actuator rotated 180° <sup>(1)</sup>	230 110 02 02 2

<sup>(1)</sup> Only if rotated 180°.

## 11 Spares

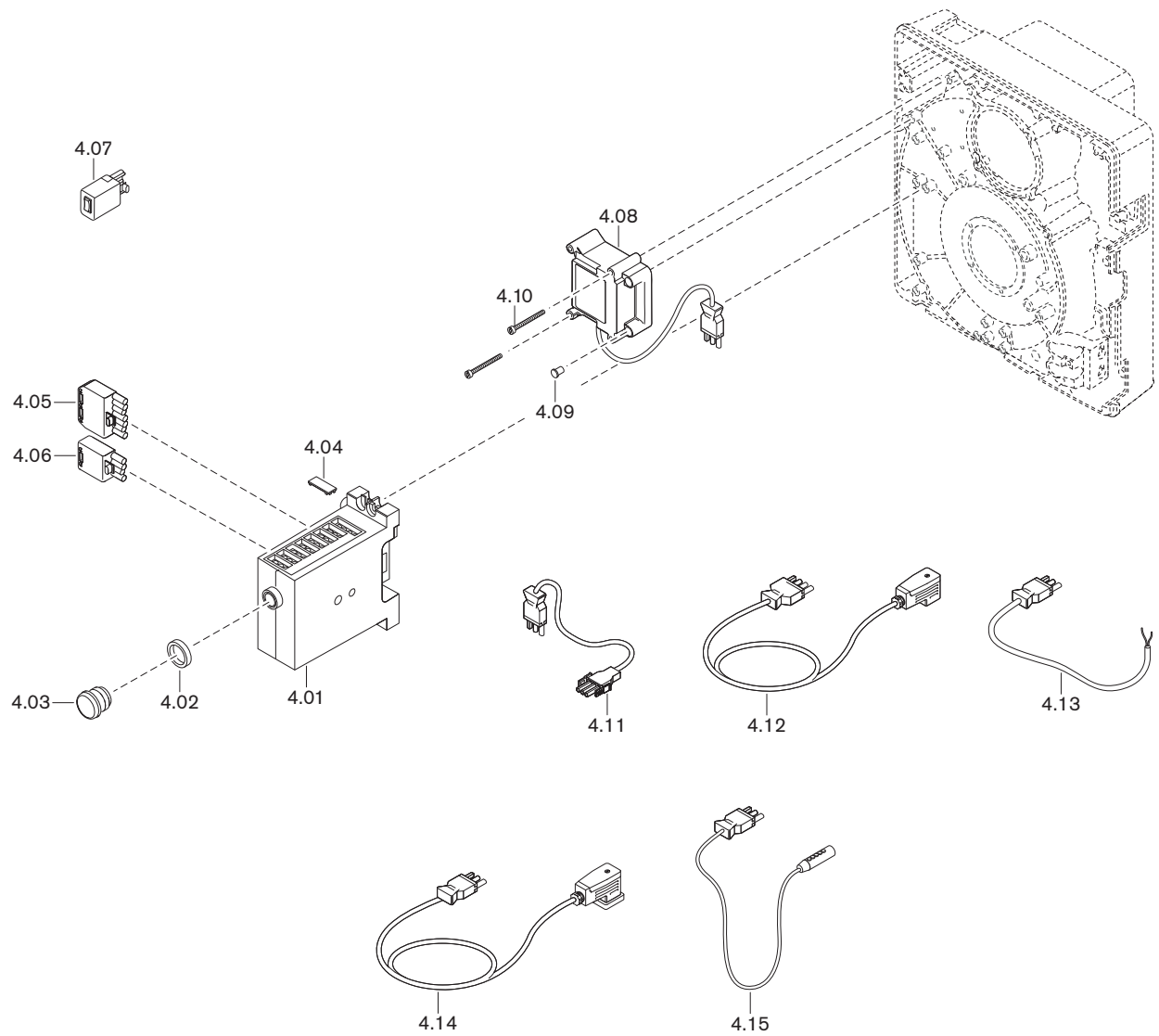


## 11 Spares

Pos.	Description	Order No.
3.01	Mixing head WG10N/... complete (Natural Gas)	
	– Standard	232 110 14 05 2
	– extended by 100 mm*	230 110 14 01 2
	– extended by 200 mm*	230 110 14 03 2
	– extended by 300 mm*	230 110 14 05 2
	Mixing head WG10F/... complete (LPG)	
	– Standard	233 110 14 01 2
	– extended by 100 mm*	230 110 14 07 2
	– extended by 200 mm*	230 110 14 09 2
	– extended by 300 mm*	230 110 14 11 2
3.02	Lock housing complete	232 110 14 02 2
3.03	Mixing tube WG10N/... complete (Natural Gas)	
	Ø internal 29 mm	
	– Standard	232 110 14 08 2
	– extended by 100 mm*	230 110 14 02 2
	– extended by 200 mm*	230 110 14 04 2
	– extended by 300 mm*	230 110 14 06 2
	Mixing tube WG10F/... complete (LPG)	
	Ø internal 12 mm	
	– Standard	233 110 14 02 2
	– extended by 100 mm*	230 110 14 08 2
	– extended by 200 mm*	230 110 14 10 2
	– extended by 300 mm*	230 110 14 12 2
3.04	Nozzle element	232 200 14 46 7
3.05	Screw M4 x 16 Torx-Plus 20IP	409 224
3.06	Diffuser 36 x 90	232 200 14 40 7
3.07	Nozzle insert	232 110 14 07 7
3.08	Screw M4 x 8 Torx-Plus 20IP	409 235
3.09	Bracket for electrodes	232 200 14 43 7
3.10	Ignition electrode isolator 6 x 80	232 200 14 21 7
3.11	Sensor electrode	232 100 14 20 7
3.12	Ignition and sensor cable	
	– 380 mm (Standard)	232 110 11 03 2
	– 480mm (for 100 mm extension)*	230 110 11 08 2
	– 540 mm (for 200 mm extension)*	230 110 11 09 2
	– 640 mm (for 300 mm extension)*	230 110 11 10 2
3.13	Carrier	232 200 14 03 7
3.14	Carrier	232 200 14 04 7
3.15	O ring 32 x 3 NBR70 DIN ISO 3601	445 095
3.16	Adjusting screw	232 210 14 04 7
3.17	Hexagonal nut M8 left DIN 934 -8	411 413
3.18	Spring washer A5 DIN 137	431 613
3.19	Hexagonal nut M5 DIN 985	411 203
3.20	Screw G <sup>1</sup> / <sub>8</sub> A DIN 908	409 004
3.21	Sealing ring 10 x 13.5 x 1.5 DIN 7603	441 033
3.22	View port glass	241 400 01 37 7

\* Only in conjunction with combustion head extension.

## 11 Spares

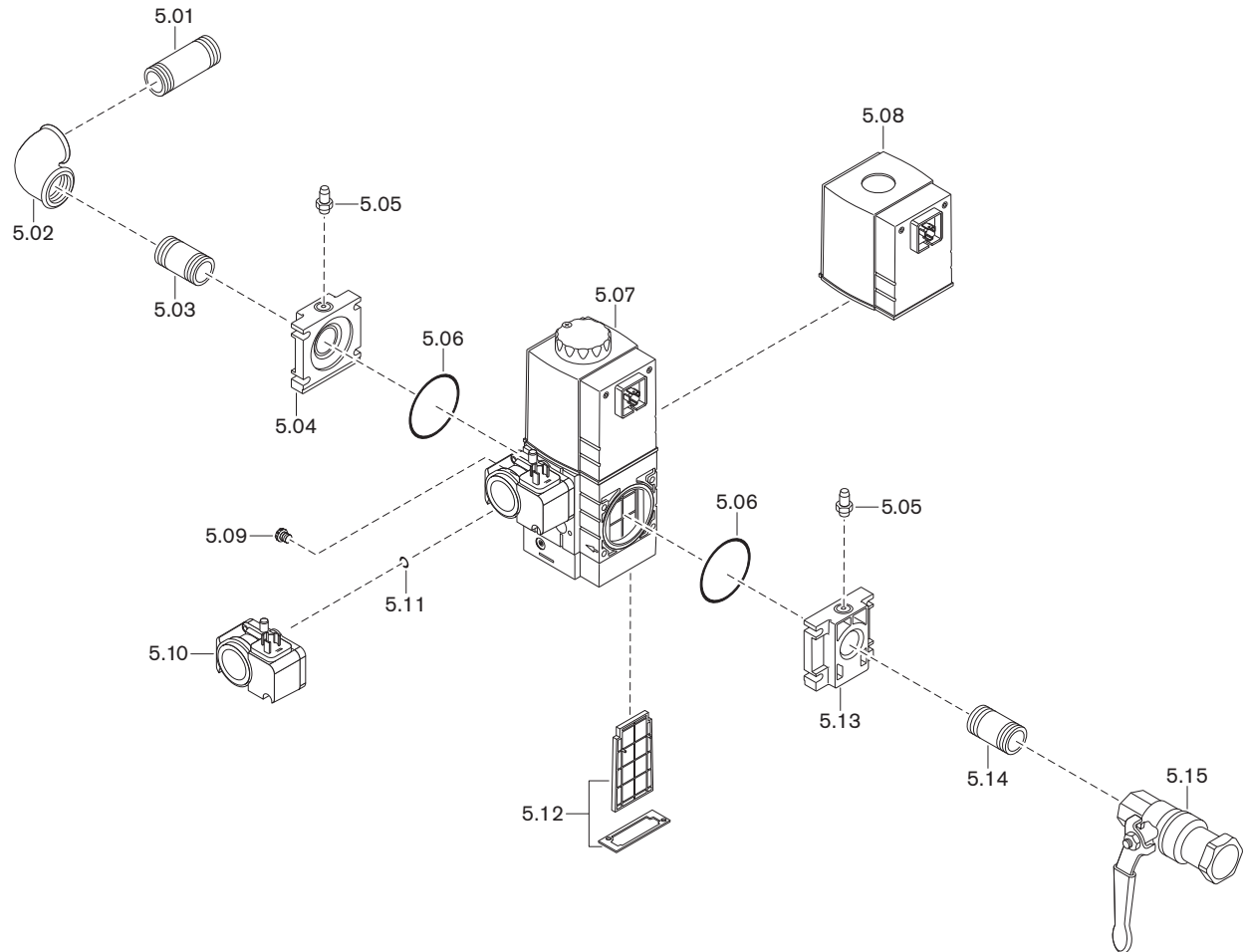




## 11 Spares

Pos.	Description	Order No.
4.01	Combustion manager W-FM10 230 V / 50/60 Hz	600 475
	– Micro fuse 6.3 A IEC 127-2/V, slow	722 024
4.02	Adapter ring 22 x 4 for extension	600 358
4.03	Reset button extension AGK20.19	600 357
4.04	Cover clip AGK63	600 312
4.05	Plug unit ST18/7	716 549
4.06	Plug unit ST18/4	716 546
4.07	Plug-in switch ST18/4 version Z	130 103 15 01 2
4.08	Ignition unit type W-ZG01 230V 100VA	603 221
4.09	Closing plug for ignition unit	603 224
4.10	Screw M4 x 42 Combi-Torx-Plus 20IP	409 260
4.11	Plug cable No. 3 fan motor	241 050 12 06 2
4.12	Plug cable No. 5 W-MF	232 110 12 05 2
4.13	Plug cable No. 11 air pressure switch	232 110 12 02 2
4.14	Plug cable No.12 gas pressure switch	232 050 12 02 2
4.15	Ionisation cable No. 13	232 310 12 01 2

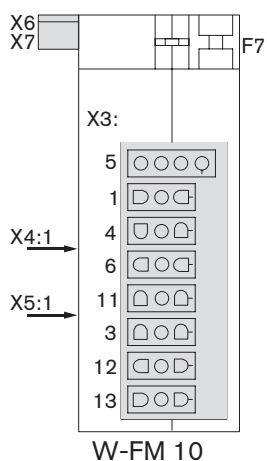
# 11 Spares



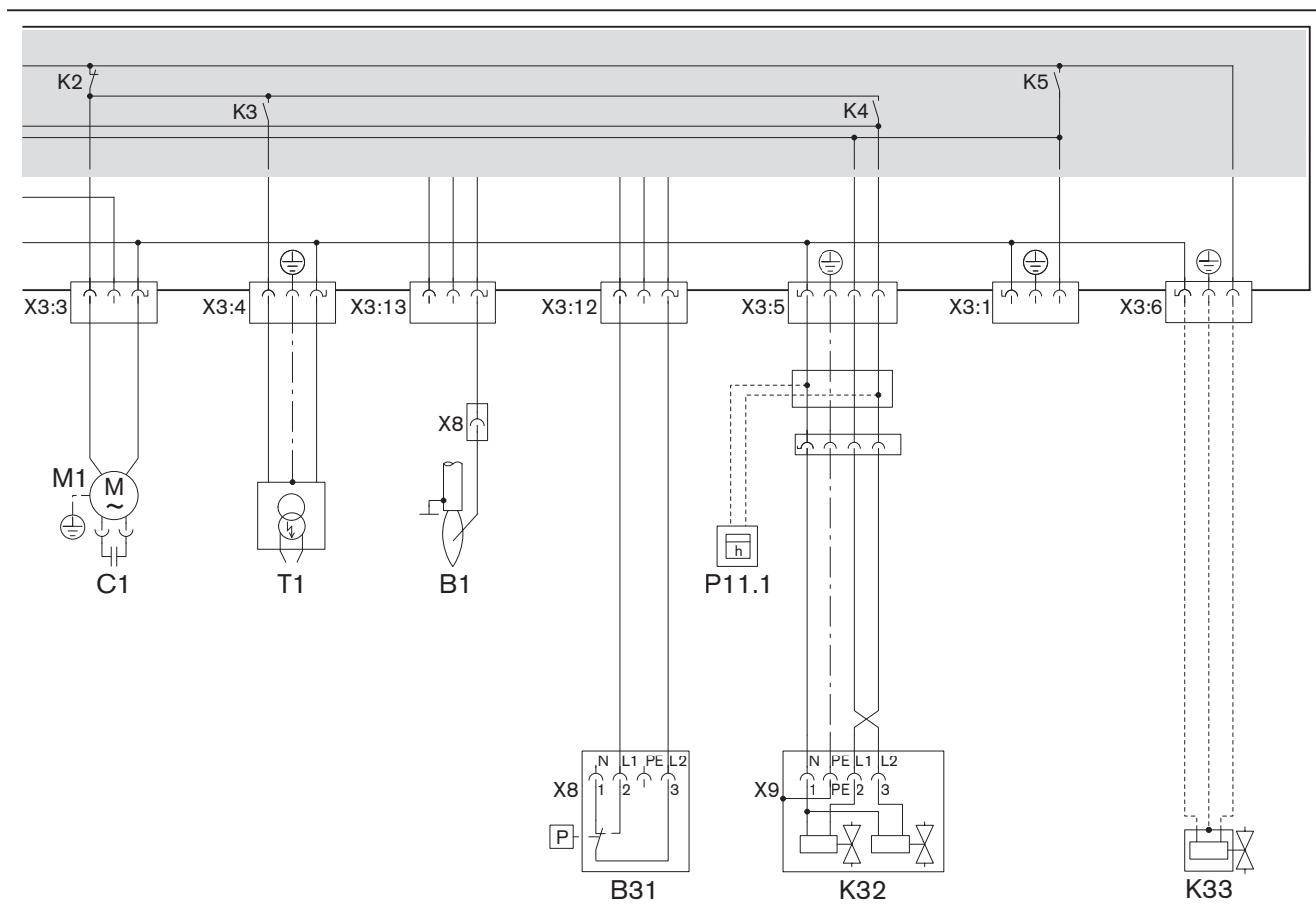
## 11 Spares

Pos.	Description	Order No.
5.01	Double nipple R $\frac{3}{4}$ x 80	139 000 26 78 7
5.02	Elbow A1 - $\frac{3}{4}$ -Zn-A	453 143
5.03	Double nipple R $\frac{3}{4}$ x 50	139 000 26 72 7
5.04	Flange W-MF 507 Rp $\frac{3}{4}$	605 227
5.05	Pressure test nipple G $\frac{1}{8}$ A	453 001
5.06	O ring 57 x 3 W-MF 507	445 519
5.07	Multifunction assembly W-MF SE 507 S22, 230 V with gas pressure switch	605 320
5.08	Solenoid coil W-MF 507 No. 032P, 230 V	605 255
5.09	Breather plug with filter element G $\frac{1}{8}$	605 302
5.10	Pressure switch GW 50 A5/1 5 ... 50 mbar with screws and O ring	691 378
5.11	O ring 10.5 x 2.25	445 512
5.12	Filter insert with seal W-MF 507	605 253
5.13	Flange W-MF 507 – Rp $\frac{3}{4}$	605 227
	– Rp1	605 233
5.14	Double nipple – R $\frac{3}{4}$ x 50	139 000 26 72 7
	– R1 x 50	139 000 26 73 7
5.15	Isolating valve with TAE – 998 N G $\frac{3}{4}$ CE-TAS for Gas PN1	454 596
	– 998 N G1 CE-TAS for Gas PN 1	454 597
	Isolating valve without TAE – 984 D Rp $\frac{3}{4}$ PN 40/MOP5	454 660
	– 984 D Rp1 PN 40/MOP5	454 661

For special version observe wiring diagram supplied.



- |     |   |
|-----|---|
| B10 | Air pressure switch                         |
| B15 | Temperature or pressure regulator           |
| B16 | Temperature or pressure regulator full load |
| F1  | External fuse (max 16 AB)                   |
| F2  | Temperature or pressure limiter             |
| F7  | Internal unit fuse (6.3 AT, IEC 127-2/V)    |
| M20 | Air damper actuator                         |
| P6  | Control lamp lockout (optional)             |
| P11 | Control lamp operation (optional)           |
| S1  | Operating switch                            |
| S2  | Remote reset (optional)                     |
| ①   | Bridge for single stage operation           |
| ②   | Bus interface (optional)                    |



B1	Flame sensor
B31	Low gas pressure switch/valve proving gas pressure switch
C1	Motor capacitor
K32	Double gas valve
K33	External valve LPG (optional)
M1	Burner motor
P11.1	Hours counter (optional)
T1	Ignition unit

## 12 Technical documentation

### 12.2 Appliance categories

#### Labelling of gas and dual fuel burners to EN 676

EN 676, "Automatic forced draught burner for gaseous fuels", is used for the implementation of the basic requirements of the Gas Appliance Directive 2009/142/EC.

Editions of EN 676 from November 2003 stipulate the following appliance categories for forced draught gas burners under point 4.4.9 (EN 676):

I2R	for Natural Gas
I3R	for Liquid Petroleum Gas
II2R/3R	for Natural Gas / Liquid Petroleum Gas

The test gases listed under point 5.1.1, table 4 (EN 676) and the minimum test pressures determined and listed under point 5.1.2, table 5 (EN 676) are used to provide the evidence of service performance of the burner during type testing.

As -weishaupt- gas and dual fuel burners fulfil this requirement completely, the appliance category, as well as the test gases used with the permissible connection pressure range, are listed on the name plate when labelling the burner to point 6.2 (EN 676). This clearly defines the suitability of the burner for use with second or third family gases.

On the basis of a type test report to EN 45001/ISO 17025 from an accredited test centre, the EU Type Testing Certificate to Gas Appliance Directive 2009/142/EC also quotes the appliance category, the supply pressure and the country of destination.

EN 437, "Test gases, test pressures, appliance categories", describes the interrelationships and the special national characteristics relating to this subject in detail.

The following tables give an overview of the interrelationships between the R Categories and the nationally used appliance categories with their types of gas and connection pressures.

## 12 Technical documentation

### Alternative appliance category to I2R

Country of destination	Appliance category	Test gas	Connection pressure mbar
AL (Albania)	I2H	G 20	20
AT (Austria)	I2H	G 20	20
BA (Bosnia)	I2H	G 20	20
BE (Belgium)	I2E+, I2N, I2E(R)B	G 20 + G 25	Pressures 20 / 25
BG (Bulgaria)	I2H	G 20	20
BY (Belarus)			
CH (Switzerland)	I2H	G 20	20
CY (Cyprus)	I2H	G 20	20
CZ (Czech Republic)	I2H	G 20	20
DE (Germany)	I2ELL, I2E, I2L	G 20 / G 25	20
DK (Denmark)	I2H	G 20	20
EE (Estonia)	I2H	G 20	
ES (Spain)	I2H	G 20	20
FI (Finland)	I2H	G 20	20
FR (France)	I2Esi, I2E+, I2L	G 20 + G 25	Pressures 20 / 25
GB (United Kingdom)	I2H	G 20	20
GR (Greece)	I2H	G 20	20
HR (Croatia)	I2H	G 20	20
HU (Hungary)	I2H	G 20	20
IE (Ireland)	I2H	G 20	20
IS (Iceland)	I2H	G 20	20
IT (Italy)	I2H	G 20	20
LT (Lithuania)			
LU (Luxembourg)	I2E	G 20	20
LV (Latvia)			
MD (Moldova)	I2H	G 20	20
MK (Macedonia)	I2H	G 20	20
MT (Malta)	I2H	G 20	20
NL (The Netherlands)	I2L	G 25	25
NO (Norway)	I2H	G 20	20
PL (Poland)	I2E	G 20 / GZ 410	20
PT (Portugal)	I2H	G 20	20
RO (Romania)	I2H	G 20	20
SE (Sweden)	I2H	G 20	20
SI (Slovenia)	I2H	G 20	20
SK (Slovakia)	I2H	G 20	20
SRB (Serbia)	I2H	G 20	20
TR (Turkey)	I2H	G 20	25
UA (Ukraine)	I2H	G 20	20

## 12 Technical documentation

### Alternative appliance category to I3R

Country of destination	Appliance category	Test gas	Connection pressure mbar
AL (Albania)	I3+, I3P, I3B	G 30 + G 31	Pressures 28 - 30 / 37
AT (Austria)	I3B/P, I3P	G 30 + G 31	50
BA (Bosnia)	I3B/P	G 30	30 (28-30)
BE (Belgium)	I3+, I3P, I3B, I3B/P	G 30 + G 31	Pressures 28 - 30 / 37
BG (Bulgaria)	I3+, I3P, I3B	G 30 + G 31	Pressures 28 - 30 / 37
BY (Belarus)			
CH (Switzerland)	I3B/P, I3+, I3P	G 30 + G 31	Pressures 28 - 30 / 37
CY (Cyprus)	I3B/P, I3+, I3P, I3B	G 30 + G 31	Pressures 28 - 30 / 37
CZ (Czech Republic)	I3B/P, I3+, I3P	G 30 + G 31	Pressures 28 - 30 / 37
DE (Germany)	I3B/P, I3P	G 30 + G 31	50
DK (Denmark)	I3B/P	G 30 + G 31	30 (28 - 30)
EE (Estonia)	I3B/P	G 30	
ES (Spain)	I3+, I3P, I3B	G 30 + G 31	Pressures 28 - 30 / 37
FI (Finland)	I3B/P	G 30 + G 31	30 (28 - 30)
FR (France)	I3+, I3P, I3B	G 30 G 31	Pressures 28 - 30 / 37 Pressures 112 / 148
GB (United Kingdom)	I3+, I3P, I3B	G 30 + G 31	Pressures 28 - 30 / 37
GR (Greece)	I3B/P, I3+, I3P, I3B	G 30 + G 31	Pressures 28 - 30 / 37
HR (Croatia)	I3B/P, I3P	G 30 + G 31	50
HU (Hungary)	I3B/P	G 30 + G 31	50
IE (Ireland)	I3+, I3P, I3B	G 30 + G 31	Pressures 28 - 30 / 37
IS (Iceland)	I3B/P		
IT (Italy)	I3B/P, I3+, I3P	G 30 + G 31	Pressures 28 - 30 / 37
LT (Lithuania)			
LU (Luxembourg)	I3B/P	G 30	
LV (Latvia)			
MD (Moldova)	I3+, I3P, I3B	G 30 + G 31	Pressures 28 - 30 / 37
MK (Macedonia)	I3+, I3P, I3B	G 30 + G 31	Pressures 28 - 30 / 37
MT (Malta)	I3+, I3P, I3B	G 30 + G 31	Pressures 28 - 30 / 37
NL (The Netherlands)	I3B/P, I3P	G 30 + G 31	30 (28 - 30)
NO (Norway)	I3B/P	G 30 + G 31	30 (28 - 30)
PL (Poland)	I3B/P	G 30	
PT (Portugal)	I3+, I3P, I3B	G 30 G 31	Pressures 28 - 30 / 37 Pressures 50 / 67
RO (Romania)	I3B/P	G 30	
SE (Sweden)	I3B/P	G 30 + G 31	30 (28 - 30)
SI (Slovenia)	I3B/P	G 30	30
SK (Slovakia)	I3B/P	G 30	30
SRB (Serbia)	I3B/P, I3P	G 30 + G 31	20
TR (Turkey)	I3B/P	G 30 + G 31	30
UA (Ukraine)	I3B/P, I3P	G 30 + G 31	50



## 12 Technical documentation

### Alternative appliance category to II2R/3R

Country of destination	Appliance category	Test gas	Connection pressure mbar	Test gas	Connection pressure mbar
AL (Albania)	II2H3+, II2H3P	G 20	20	G 31	30
AT (Austria)	II2H3B/P, II2H3P	G 20	20	G 30 + G 31	50
BA (Bosnia)	II2H3B/P	G 20	20	G 30	
BE (Belgium)	II2E+3P, II2H3B/P	G 20, G 25	Pressures 20 / 25	G 30 + G 31	Pressures 28 - 30 / 37
BG (Bulgaria)	II2H3+, II2H3P	G 20	20	G 30 + G 31	Pressures 28 - 30 / 37
BY (Belarus)					
CH (Switzerland)	II1a2H, II2H3B/P, II2H3+, II2H3P	G 20	20	G 30 + G 31	Pressures 28 - 30 / 37
CY (Cyprus)	II2H3B/P, II2H3+, II2H3P	G20	20	G 30 + G 31	Pressures 28 - 30 / 37
CZ (Czech Republic)	II2H3B/P, II2H3+, II2H3P	G 20	20	G 30 + G 31	Pressures 28 - 30 / 37
DE (Germany)	II2ELL3B/P, II2E3B/P	G 20	20	G 30 + G 31	50
DK (Denmark)	II1a2H, II2H3B/P	G 20	G 20	G 30 + G 31	30
EE (Estonia)	II2H3B/P	G 20	20	G 30	30
ES (Spain)	II2H3P, II2H3+	G 20	20	G 30 + G 31	Pressures 28 - 30 / 37
FI (Finland)	II2H3B/P	G 20	20	G 30 + G 31	30 (28 - 30)
FR (France)	II2E+3+, II2E+3P, II2Esi3B/P	G 20	20	G 30 G 31	Pressures 28 - 30 / 37 Pressures 112 / 148
GB (United Kingdom)	II2H3+, II2H3P	G 20	20	G 30 + G 31	Pressures 28 - 30 / 37
GR (Greece)	II2H3B/P, II2H3+, II2H3P	G 20	20	G 30 + G 31	Pressures 28 - 30 / 37
HR (Croatia)	II2H3B/P	G 20	20	G 30 + G 31	30 (28-30)
HU (Hungary)	II2H3B/P	G 20	20	G 30 + G 31	
IE (Ireland)	II2H3+, II2H3P	G 20	20		
IS (Iceland)	II2H3B/P	G 20	20	G 30 + G 31	30 (28 - 30)
IT (Italy)	II1a2H, II2H3B/P, II2H3+, II2H3P	G 20	20	G 30 + G 31	Pressures 28 - 30 / 37
LT (Lithuania)					
LU (Luxembourg)	II2E3B/P	G 20	20	G 30 + G 31	
LV (Latvia)					
MD (Moldova)	II2H3+, II2H3P	G 20	20	G 30 + G 31	Pressures 30 / 37
MK (Macedonia)	II2H3+, II2H3P	G 20	20	G 30 + G 31	Pressures 30 / 37
MT (Malta)	II2H3+, II2H3P	G 20	20	G 30 + G 31	Pressures 30 / 37
NL (The Netherlands)	II2L3B/P, II2L3P	G 25	25	G 30 + G 31	30
NO (Norway)	II2H3B/P	G 20	20	G 30 + G 31	30 (28 - 30)
PL (Poland)	II2E3B/P	G 20	20	G 30 + G 31	30 (28 - 30)
PT (Portugal)	II2H3+, II2H3P	G 20	20	G 30 G 31	Pressures 28 - 30 / 37 Pressures 50 / 67
RO (Romania)	II2H3B/P	G 20	20	G 30 + G 31	30 (28 - 30)
SE (Sweden)	II1a2H, II2H3B/P	G 20	20	G 30 + G 31	30 (28 - 30)
SI (Slovenia)	II2H3B/P	G 20	20	G 30	30
SK (Slovakia)	II2H3B/P	G 20	20	G 30	30
SRB (Serbia)	II2H3B/P	G 20	20	G 30 + G 31	30 (28 - 30)
TR (Turkey)	II2H3B/P	G 20	25	G 30 + G 31	30 + 37
UA (Ukraine)	II2H3B/P	G 20	20	G 30 + G 31	30 (28 - 30)

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## The complete program: Reliable technology and prompt, professional service

	<p><b>W Burners</b> <span style="float: right;"><b>up to 570 kW</b></span></p> <p>The compact burners, proven millions of times over, are economical and reliable. Available as gas, oil and dual fuel burners for domestic and commercial applications.</p> <p>The purflam® burner version with special mixing head gives almost soot-free combustion of oil with greatly reduced NOx emissions.</p>	<p><b>Wall-hung condensing boilers for oil and gas</b> <span style="float: right;"><b>up to 240 kW</b></span></p> <p>The wall-hung condensing boilers WTC-GW and WTC-OW have been developed to meet the highest demands in ease of operation and efficiency.</p> <p>Modulating operation means these units operate quietly and economically.</p>	
	<p><b>monarch® WM Burners and Industrial Burners</b> <span style="float: right;"><b>up to 11,700 kW</b></span></p> <p>These legendary industrial burners are durable and versatile.</p> <p>Numerous variations of oil, gas and dual fuel burners meet a wide range of applications and capacity requirements.</p>	<p><b>Floor standing condensing boiler for oil and gas</b> <span style="float: right;"><b>up to 1,200 kW</b></span></p> <p>The floor-standing boilers WTC-GB and WTC-OB are efficient, low in emissions and versatile. Higher capacities are achieved by cascading up to four gas-fired condensing boilers.</p>	
	<p><b>WK Burners</b> <span style="float: right;"><b>up to 28,000 kW</b></span></p> <p>These industrial burners of modular construction are adaptable, robust and powerful.</p> <p>Even on the toughest industrial applications these oil, gas and dual fuel burners operate reliably.</p>	<p><b>Solar systems</b></p> <p>The stylish flat-plate collectors are the ideal complement for any Weishaupt heating system. They are suitable for solar water heating and for combined heating support.</p> <p>With versions for on-roof, in-roof and flat roof installations, solar energy can be utilised on almost any roof.</p>	
	<p><b>multiflam® Burners</b> <span style="float: right;"><b>up to 17,000 kW</b></span></p> <p>This innovative Weishaupt technology for medium and large burners provides minimum emission values at capacities up to 17 MW.</p> <p>The burners with the patented mixing head are available for oil, gas and dual fuel operation.</p>	<p><b>Water heaters / energy storage tanks</b></p> <p>This attractive program for domestic water heating includes classic water heaters, solar storage tanks, heat pump storage tanks and energy storage tanks.</p>	
	<p><b>MCR Technology / Building Automation from Neuberger</b></p> <p>From control panels to complete building management systems - at Weishaupt you can find the entire spectrum of modern control technology. Future orientated, economical and flexible.</p>	<p><b>Heat pumps</b> <span style="float: right;"><b>up to 130 kW</b></span></p> <p>The heat pump range offers solutions for the utilisation of heat from the air, the soil or ground water.</p> <p>Some systems are also suitable for cooling buildings.</p>	
	<p><b>Service</b></p> <p>Weishaupt customers can be assured that specialist knowledge and tools are available whenever they are needed. Our service engineers are fully qualified and have extensive product knowledge, be it for burners, heat pumps, condensing boilers or solar collectors.</p>	<p><b>Geothermal probe drilling</b></p> <p>With its daughter company, BauGrund Süd, Weishaupt also offers geothermal probe and well drilling. With the experience of more than 10,000 systems and more than 2 million meters of drilling, BauGrund Süd offers a comprehensive service program.</p>	