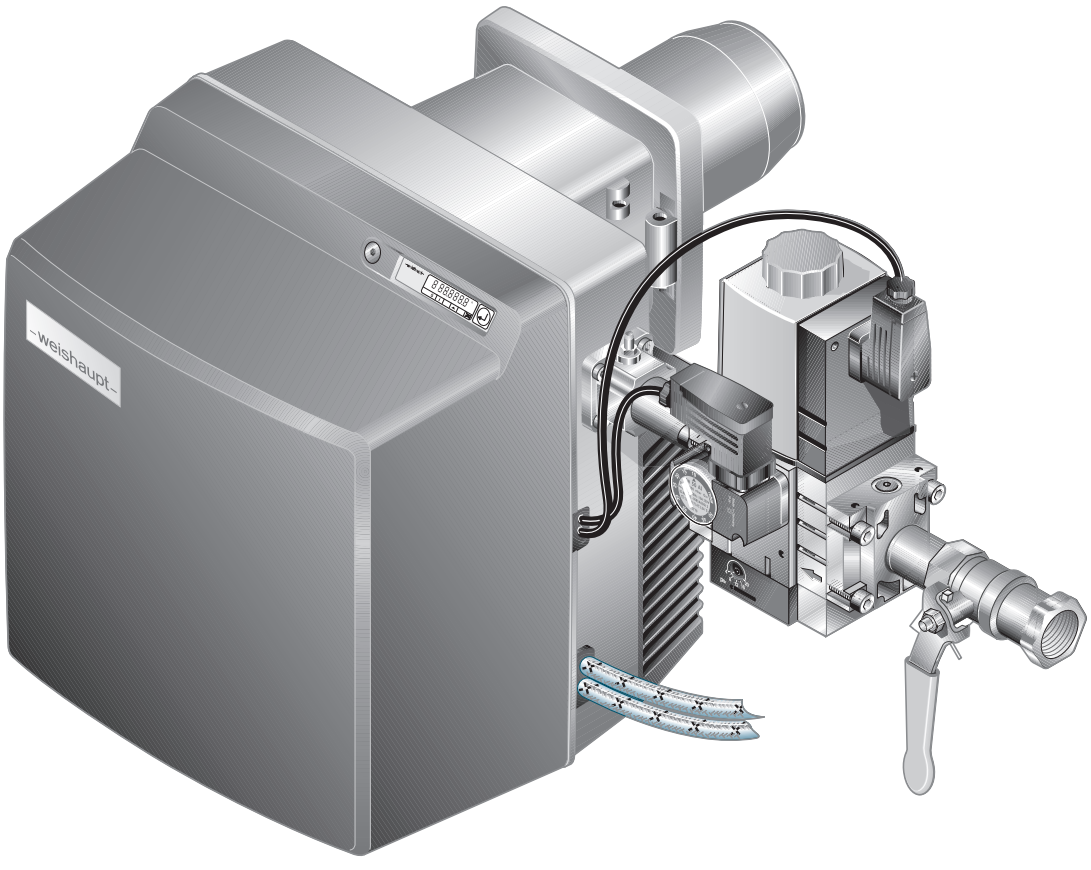
–weishaupt–

manual

Installation and operating instruction



Dual fuel burner WGL40/1-A ZM

83273402 ▪ 1/2019-02

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1 User instructions

Translation of original operating instructions

This manual forms part of the equipment and must be kept on site.

Carefully read the manual prior to working on the unit.

1.1 Target group

The manual is 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

 DANGER	Immediate danger with high risk. Non observance can lead to serious injury or death.
 WARNING	Danger with medium risk. Non observance can lead to environmental damage, serious injury or death.
 CAUTION	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

1.3 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 manual,
- 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

2.1 Designated application

The burner is suitable for operation on heat exchangers to EN 303, EN 267 and EN 676.

If the burner is not used on combustion chambers to EN 303, EN 267 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.

2.3.3 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.
- Pipework 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 pipework 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.
- 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

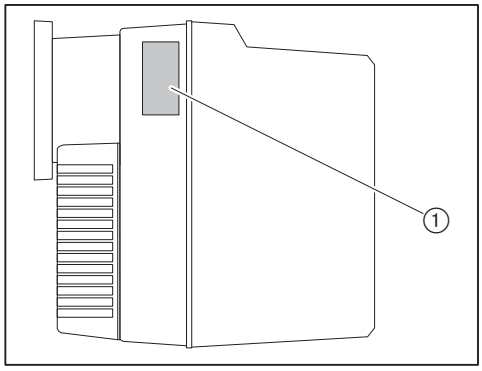
3.1 Type key

WGL40N/1-A ZM

W	Type: W burner
G	Fuel: Gas
L	Fuel: Oil EL
40	Size
N	N: Natural Gas F: Liquid Petroleum Gas
1	Ratings size
A	Construction
ZM	Version: two stage (Oil), modulating (Gas)

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. _____

3.3 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.

3.3.2 Gas supply

Gas isolating valve ①

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

Multifunction assembly ⑧

The multifunction assembly contains:
- Gas filter
- Double gas valve
- Pressure regulators

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 combustion manager drives the gas butterfly valve via actuator.

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.

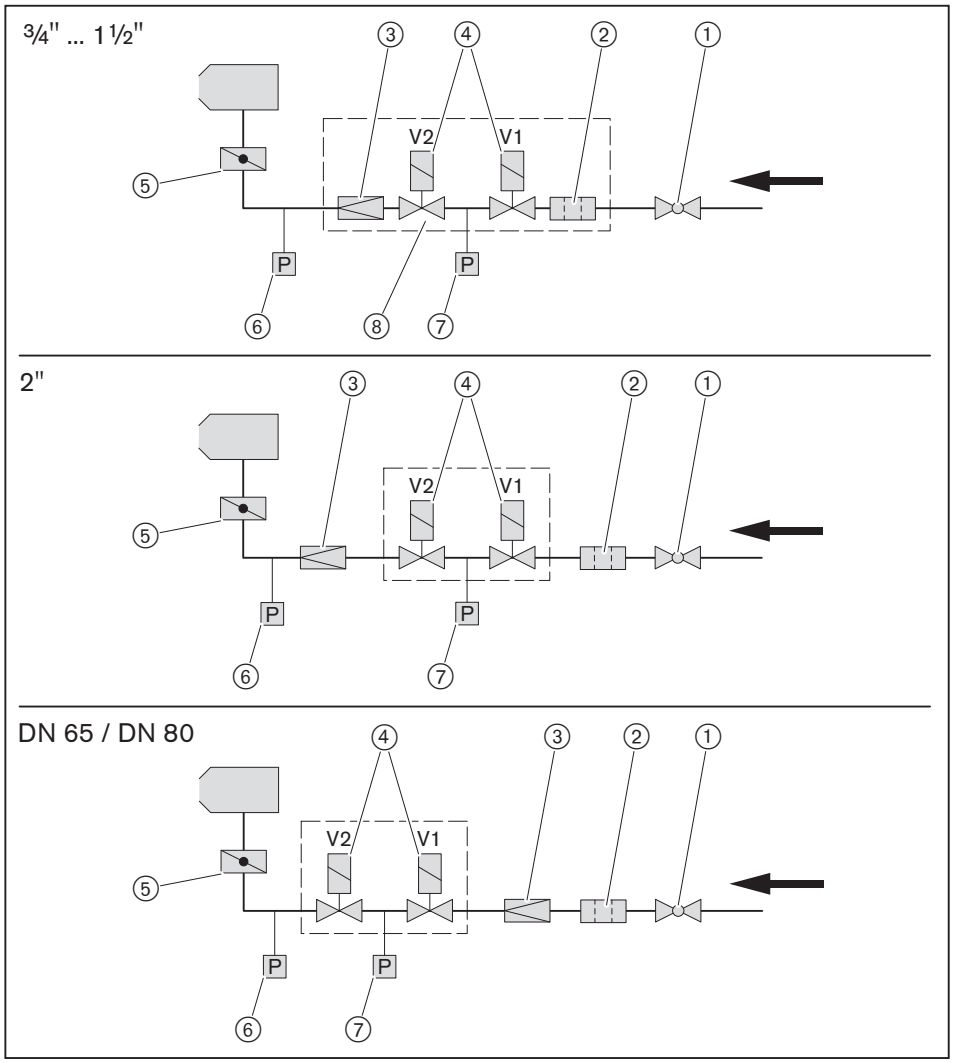
2. Test phase (function sequence for valve proving valve 2):
- Valve 1 opens, valve 2 remains closed,
- pressure between valve 1 and valve 2 increases,
- valve 1 closes again,
- both valves remain closed for 16 seconds.

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

High gas pressure switch ⑥ (optional)

Depending on the burner application, optional equipment may be required for optimum operation [ch. 12.2].

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 Oil supply

Oil pump

The pump draws the oil through the supply line and carries it under pressure to the oil nozzle. The pressure regulating valve keeps the oil pressure constant.

Solenoid valves

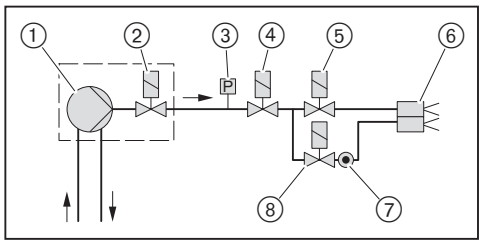
The solenoid valves open and close the oil supply.

For ignition, the combustion manager opens the stage 1 solenoid valve and the safety solenoid valves. Stage 2 solenoid valve opens or closes depending on heat demand.

Minimum oil pressure switch

The minimum oil pressure switch monitors the pump pressure in the supply. If the preset pressure is not achieved, the combustion manager initiates a lockout.

Sequence diagram



① Oil pump on burner
② Additional safety solenoid valve on the oil pump
③ Minimum oil pressure switch
④ Additional safety solenoid valve
⑤ Stage 1 solenoid valve
⑥ Nozzle head with 2 nozzles
⑦ Throttle orifice (Ø 1.2 mm) incorporated in screwed union
⑧ Stage 2 solenoid valve

3.3.4 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.

Operating panel

The values and parameters of the combustion manager can be displayed and changed at the operating panel.

Burner motor

The burner motor drives the fan wheel.

Pump motor

The pump motor drives the oil pump.

Ignition unit

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

Flame sensor

The combustion manager monitors the flame signal via the flame sensor.

If the flame signal becomes too weak, the combustion manager carries out a controlled shutdown.

Fuel selection switch

The relevant fuel is pre-selected using the fuel selection switch. If the fuel selection switch is set to REMOTE, fuel selection via building management system or external fuel selection switch is possible.

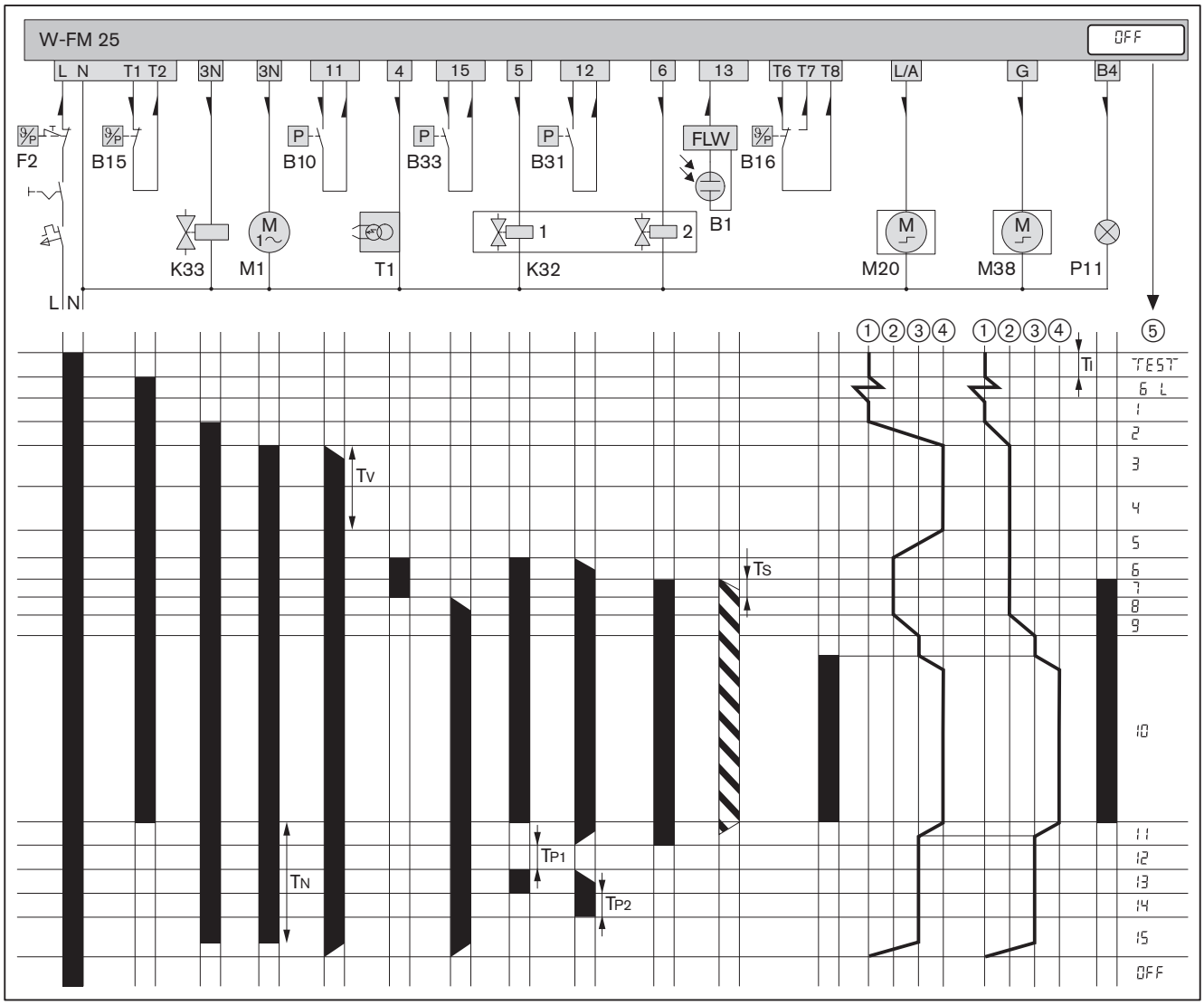
3.3.5 Program sequence

Gas operation

The operating phases for commissioning the burner are shown on the display.

Phase	Function
TEST	After the power supply has been switched on the combustion manager performs a self-test.
G L	At heat demand, the actuators for the air damper and the gas butterfly valve drive to the reference point.
1	The combustion manager monitors for extraneous light.
2	The air damper actuators drives to pre-purge (operating point P9). The gas butterfly valve actuator drives to ignition position (operating point P0).
3	Pre-purge is initiated. The air pressure switch reacts.
4	Pre-purge. The remaining pre-purge time is displayed.
5	The air damper actuator drives to ignition position (operating point P0).
6	Gas valve 1 opens. The gas pressure switch reacts. Ignition starts.
7	Gas valve 2 opens. The fuel is released. The safety time begins. The display shows symbol
8	Flame stabilisation.
9	The actuators for the air damper and gas butterfly valve drive to partial load.
10	The burner is in operation. Load control is activated.
11	If heat demand is no longer available, the actuators for air damper and gas butterfly valve drive to partial load. Valve proving starts. 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.
12	Test time valve 1.
13	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.
14	Test time valve 2.
15	Following the post-purge phase the burner motor switches off. The air damper and gas butterfly valve actuators close.
OFF	Standby, no heat demand.

Gas operation



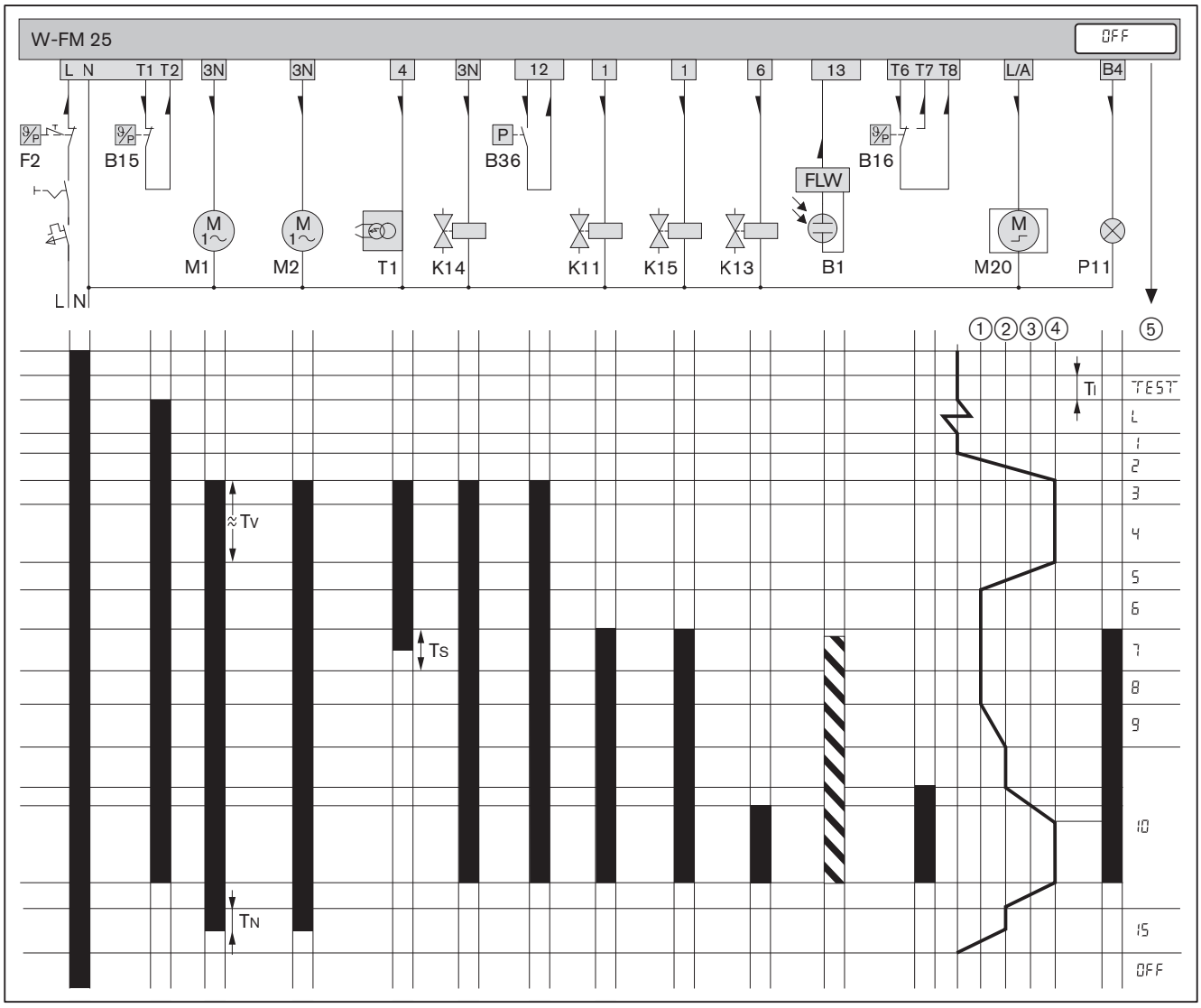
B1	Flame sensor	①	CLOSED position
B10	Air pressure switch	②	Ignition position
B15	Temperature or pressure regulator	③	Partial load
B16	Temperature or pressure regulator full load	④	Full load
B31	Low gas pressure switch/valve proving gas pressure switch	⑤	Operating phase
B33	High gas pressure switch (optional)	T_I	Initialisation time (Test): 3 s
F2	Temperature or pressure limiter	T_N	Post-purge time: 2 s [ch. 6.2.3]
K32	Double gas valve	T_{P1}	1. Test phase: 8 s (valve proving valve 1)
K33	External valve LPG	T_{P2}	2. Test phase: 16 s (valve proving valve 2)
M1	Burner motor	T_V	Pre-purge time: 20 s
M20	Air damper actuator	T_S	Safety time: 3 s
M38	Gas butterfly valve actuator		Voltage is applied
P11	Control lamp operation (optional)		Flame signal present
T1	Ignition unit		Current path

Oil operation

The operating phases for commissioning the burner are shown on the display.

Phase	Function
TEST	After the power supply has been switched on the combustion manager performs a self-test.
L	At heat demand, the air damper actuator drives to the reference point.
1	The combustion manager monitors for extraneous light.
2	The air damper actuator drives to pre-purge, to air damper setting stage 2 (operating point P9).
3	The burner motor, pump motor and ignition starts. The oil safety solenoid valve on the oil pump opens. The min. oil pressure switch is activated.
4	Pre-purge. The remaining pre-purge time is displayed.
5	The air damper actuator drives to ignition position (operating point P0).
6	Waiting time in ignition position.
7	Stage 1 oil solenoid valve and the safety valve open. The fuel is released. The safety time begins. The display shows symbol ⌲.
8	Post-ignition time starts, this aids flame stabilisation.
9	The air damper actuator drives to air damper setting stage 1 (operating point P1).
10	The burner is in operation. Depending on the regulator demand for stage 2, the stage 2 oil solenoid valve opens or closes.
15	If there is no longer a heat demand, the solenoid valves close and stop the fuel supply. Following the post-purge phase the burner motor switches off. The air damper actuator closes.
OFF	Standby, no heat demand.

Oil operation

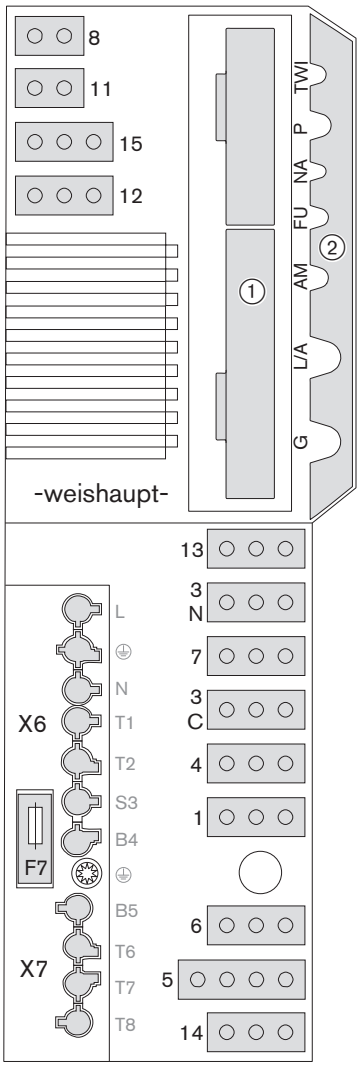


B1	Flame sensor
B15	Temperature or pressure regulator
B16	Temperature or pressure regulator stage 2
B36	Minimum oil pressure switch
F2	Temperature or pressure limiter
K11	Stage 1 oil solenoid valve
K13	Stage 2 oil solenoid valve
K14	Oil safety solenoid valve on the oil pump
K15	Oil safety solenoid valve
M1	Burner motor
M2	Pump motor
M20	Air damper actuator
P11	Control lamp operation (optional)
T1	Ignition unit

①	Operating point P0 (ignition position)
②	Operating point P1 (stage 1)
③	Operating point P2 (solenoid valve stage 2)
④	Operating point P9 (stage 2)
⑤	Operating phase
T_I	Initialisation time (Test): 3 s
T_N	Post-purge time: 2 s [ch. 6.2.3]
T_S	Safety time: 3 s
T_V	Pre-purge time: 20 s
▬	Voltage is applied
▨	Flame signal present
⎯◣	Current path

3.3.6 Inputs and outputs

Observe wiring diagram supplied.



TWI	TWI interface (VisionBox, accessory)
P	O_2 sensor (accessory)
NA	not used
FC	not used
AM	Operating panel
L/A	Air damper actuator
G	Gas butterfly valve actuator
①	Slot for analogue module EM3/3 or fieldbus module EM3/2
②	W-FM cover
1	Stage 1 oil solenoid valve and safety valve
3C	Voltage supply fuel change-over and connection plug continuous running fan
3N	Burner motor and pump motor and oil safety shut off valve on the oil pump and external LPG valve
4	Ignition unit
5	Gas valve 1
6	Stage 2 oil solenoid valve and gas valve 2
7	Bridging plug No. 7
8	Fuel change-over
11	Air pressure switch / air pressure switch for ducted air intake (LDW2)
12	Low / valve proving gas pressure switch and oil pressure switch
13	Flame sensor
14	Remote reset or low gas pressure switch (optional)
15	Bridging plug No. 15 or high gas pressure switch
X6	7 pole connection plug
X7	4 pole connection plug
F7	Internal unit fuse (T6.3H, IEC 127-2/5)

3.4 Technical data

3.4.1 Approval data

PIN (EU) 2016/426	CE-0085CM0252
PIN 2014/68/EU	Z-IS-TAF-MUC-14-05-376456-004
DIN CERTCO	5G1050M
Basic standards	EN 267:2011 EN 676:2008 Additional standards, see EU conformity certification.

3.4.2 Electrical data

Mains voltage / mains frequency	230 V/50 Hz
Consumption at start	max 965 W
Consumption during operation	max 865 W
Power consumption	max 4.3 A
Internal unit fuse	T6.3H, IEC 127-2/5
External fuse	max 16 AB

3.4.3 Ambient conditions

Temperature in operation	–10(1 … +40 °C
Temperature during transport / storage	–20 … +70 °C
relative humidity	max 80 %, no dew point

(1 with the relevant suitable fuel oil and layout of oil supply.

3.4.4 Fuels

- Natural Gas E/LL
- Liquid Petroleum Gas B/P
- Fuel oil EL to DIN 51603-1
- Fuel oil EL A Bio 10 to DIN 51603-6
- Fuel oil EL to ÖNORM-C1109 (Austria)
- Fuel oil EL to SN 181 160-2 (Switzerland)

3.4.5 Emissions

Flue gas

- Emission class 3 for fuel oil EL to EN 267
- Emission Class 2 for Natural Gas to EN 676
- Emission class 3 for Liquid Petroleum Gas to EN 676

The NO_x values are influenced by:

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

Sound levels

Dual number noise emission values	
Measured sound power level L_{WA} (re 1 pW)	79 dB(A)(1
Uncertainty value K_{WA}	4 dB(A)
Measured sound pressure level L_{pA} (re 20 µPa)	73 dB(A)(2
Uncertainty value K_{pA}	4 dB(A)

(1 Determined to ISO 9614-2.
(2 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.

3.4.6 Rating

Combustion heat rating

Natural Gas Liquid Petroleum Gas	125 … 550 kW 125 … 550 kW
Fuel oil	125 … 550 kW 10.5 … 46.0 kg/h(1
Combustion head	W40/1

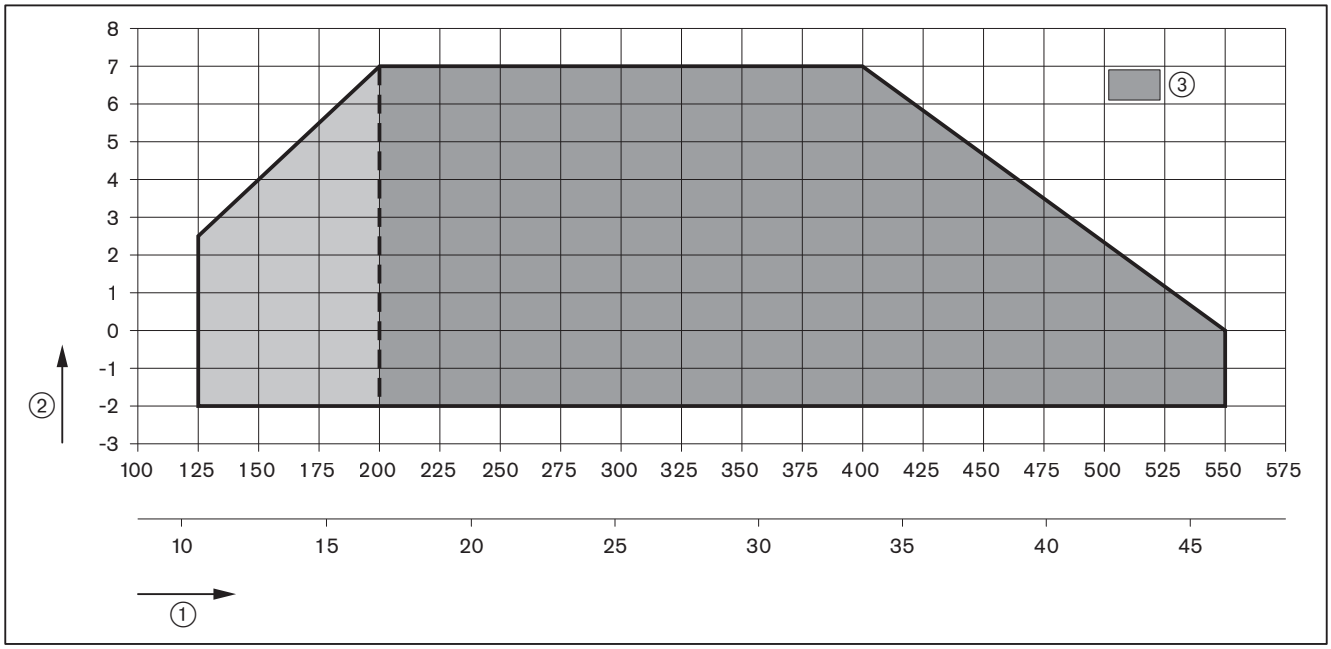
(1 The oil throughput data relates to a calorific value of 11.9 kWh/kg for fuel oil EL.

Capacity graph

Capacity graph to EN 267 and EN 676.

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

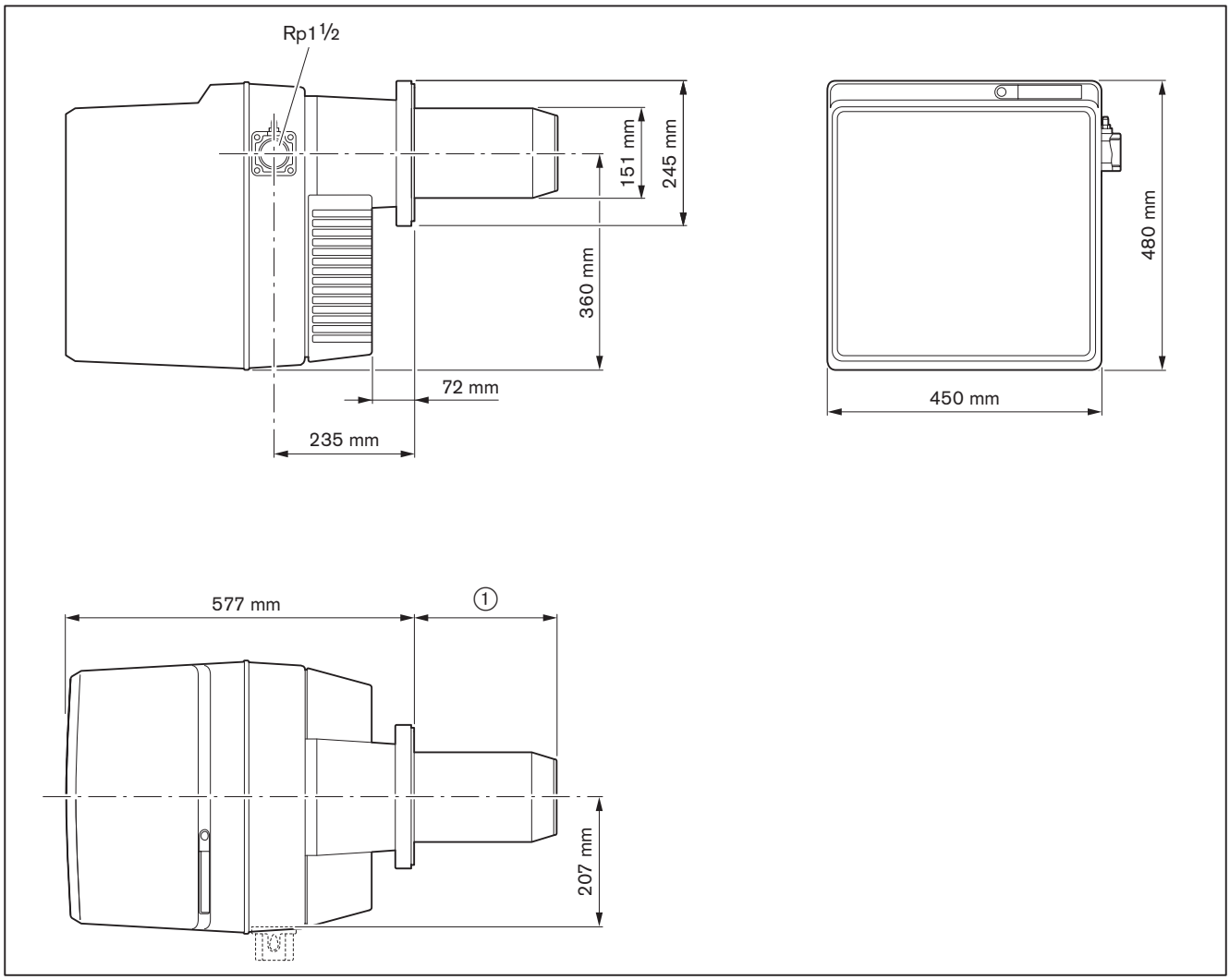
A limited capacity graph is valid for ducted air intake.



① Combustion heat rating [kW] or [kg/h]
② Combustion chamber pressure [mbar]
③ Full load range

3.4.7 Dimensions

Burner



① 235 mm without combustion head extension
335 mm with combustion head extension (100 mm)
435 mm with combustion head extension (200 mm)

3.4.8 Weight

approx. 47 kg

4 Installation

4.1 Installation conditions

Burner type and capacity graph

Burner and heat exchanger must be matched.

► Check burner type and burner capacity.

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,

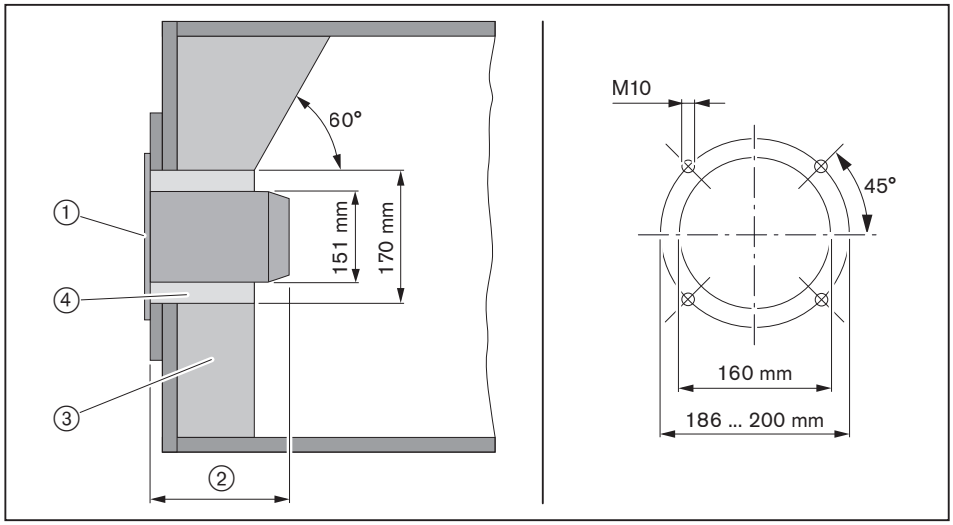
Prepare heat exchanger

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 and 200 mm are available. Dimension ② then changes according to the head extension used.



① Flange gasket
② 235 mm
③ Refractory
④ Aperture

4.2 Selecting the nozzles

► Determine the size of the nozzle relative to the load distribution.

Load distribution

The oil throughput at stage 2 equates to 100 % of the total load.

► Divide total load (100 %) between the 2 oil nozzles:
- stage 1 must lie within the capacity graph,
- observe capacity range of boiler,
- observe flue gas temperature (boiler, chimney),
- observe heat demand,
- observe start behaviour of burner.

Typical distribution of load, a different distribution may be required:
- Nozzle 1: 55 %
- Nozzle 2: 45 %

Example

Burner capacity required: approx. 440 kW

55 % of burner capacity required: 440 kW × 0.55 = 242 KW

45 % of burner capacity required: 440 kW × 0.45 = 198 kW

Nozzle size at 12 bar, see nozzle selection table:
- Nozzle 1 (247.5 kW): 5.00 gph
- Nozzle 2 (198.7 kW): 4.00 gph

Recommended nozzles

Make	Characteristics
Fluidics	45°HF

Pump pressure setting

10 … **12** … 14 bar

Spray characteristic and spray angle varies depending on pump pressure.

Nozzle selection table

Different load values are possible due to tolerances.

	Burner capacity [kW] at pump pressure				
Nozzle size [gph]	**10 bar**	**11 bar**	**12 bar**	**13 bar**	**14 bar**
1.10	49.5	52.4	54.7	57.1	58.3
1.25	55.9	59.5	61.9	64.3	66.6
1.35	60.7	64.3	66.6	69.0	72.6
1.50	67.8	71.4	73.8	77.4	79.7
1.65	75.0	78.5	82.1	85.7	88.1
1.75	78.5	83.3	86.9	90.4	94.0
2.00	90.4	95.2	98.8	102.3	107.1
2.25	101.2	107.1	111.9	116.6	120.2
2.50	113.1	119.0	123.8	128.5	133.3
2.75	123.8	130.9	135.7	141.6	146.4
3.00	135.7	142.8	148.8	154.7	159.5
3.50	158.3	165.4	173.7	180.9	186.8
4.00	180.9	189.2	198.7	205.9	213.0
4.50	203.5	213.0	222.5	232.1	240.4
5.00	226.1	236.8	247.5	257.0	266.6
5.50	248.7	260.6	272.5	282.0	292.7
6.00	271.3	284.4	297.5	309.4	320.1
6.50	293.9	308.2	321.3	334.4	346.3

Conversion of burner capacity to oil throughput see formula below.

$$\text{Oil throughput in kg/h} = \frac{\text{Burner capacity in kW}}{11.9\ \text{kWh/kg}}$$

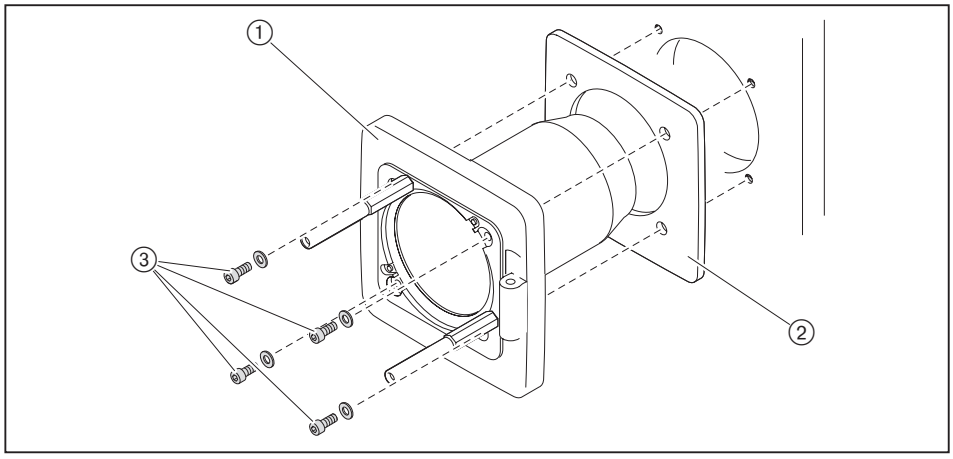
4.3 Burner installation

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

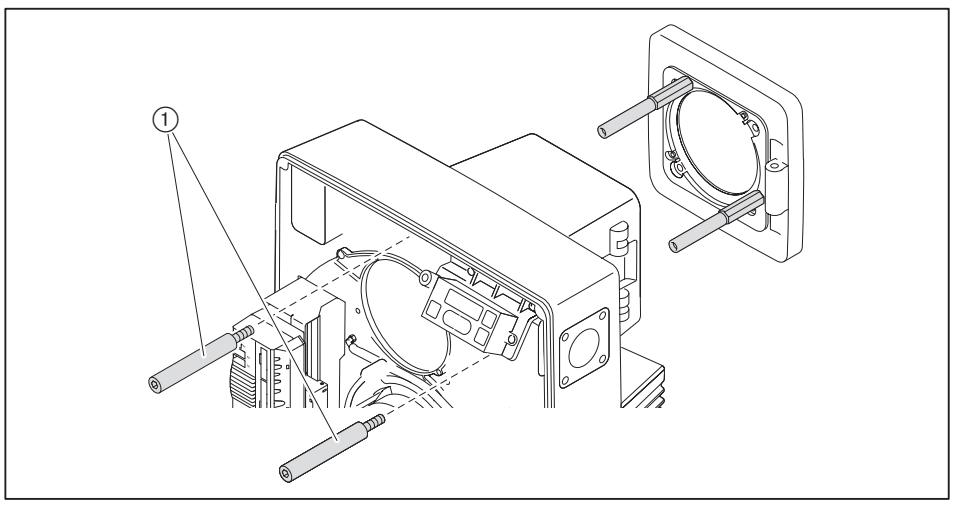
- ► Remove mixing head [ch. 9.3].
- ► Remove burner flange ① from burner housing.

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° [ch. 4.3.1]. To do this, additional conversion measures are required [ch. 5.1.1].

- ► 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).

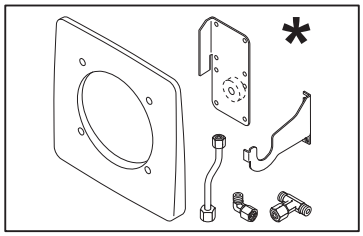


- ► Mount burner with screws ① to burner flange.



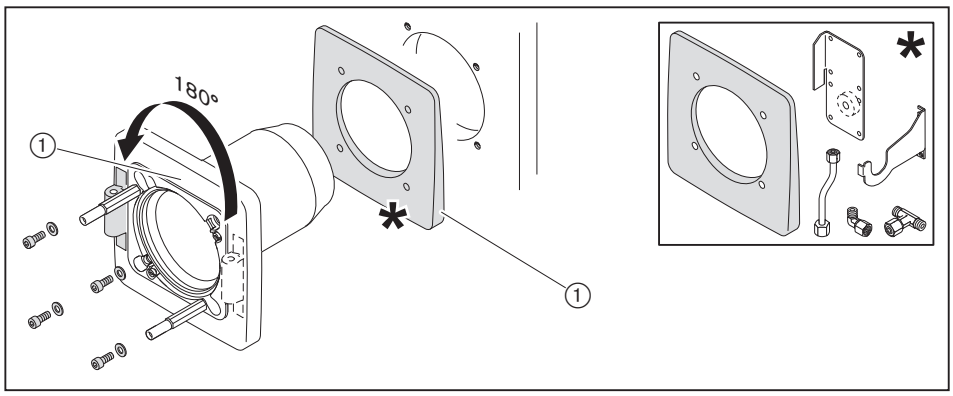
- ► Check setting of electrodes [ch. 9.6].
- ► Fit mixing head [ch. 9.3].

4.3.1 Rotate burner by 180° (optional)

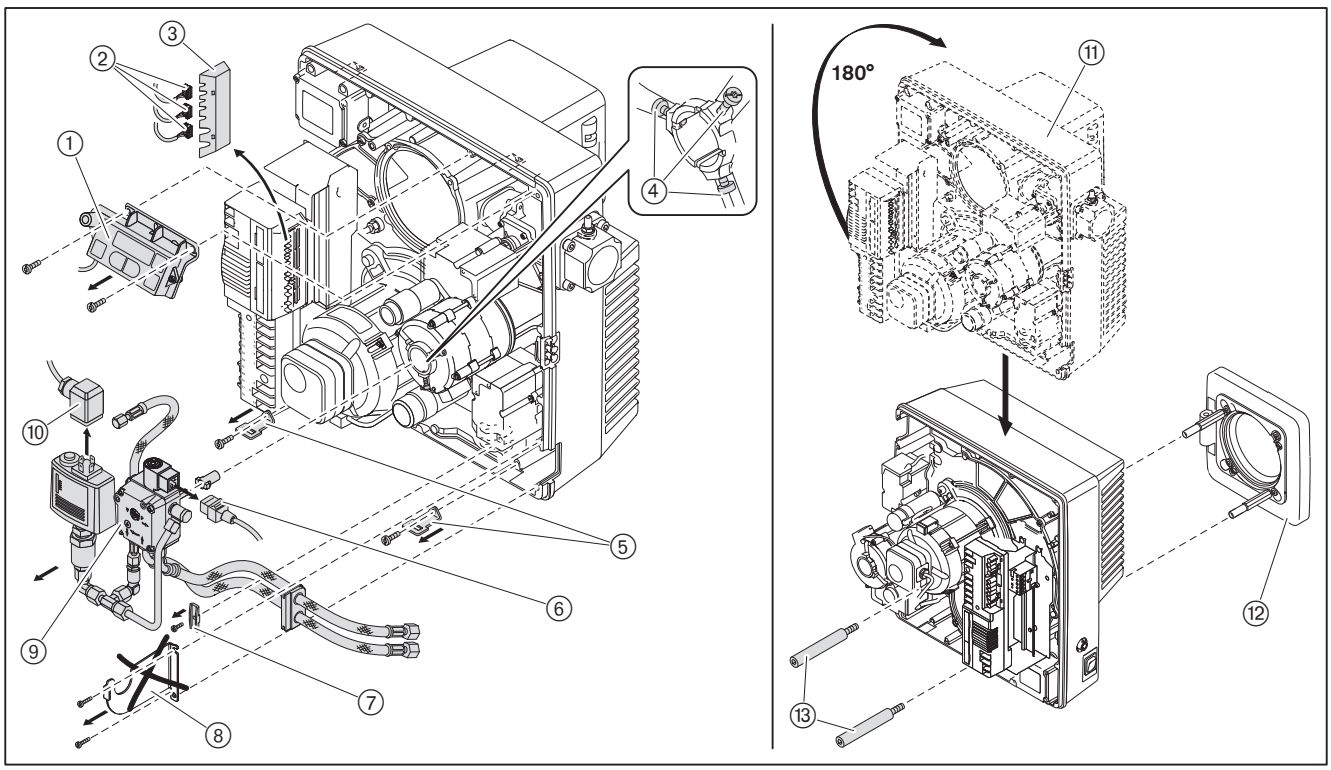


The following are required for the conversion:
- Wedge profile flange gasket
- Brackets for two air pressure switches
- Bracket (short) for oil pump servicing
- Oil line 8 x 1.0
- Screwed union EVW 08-PL
- Screwed union EVT 08-PL

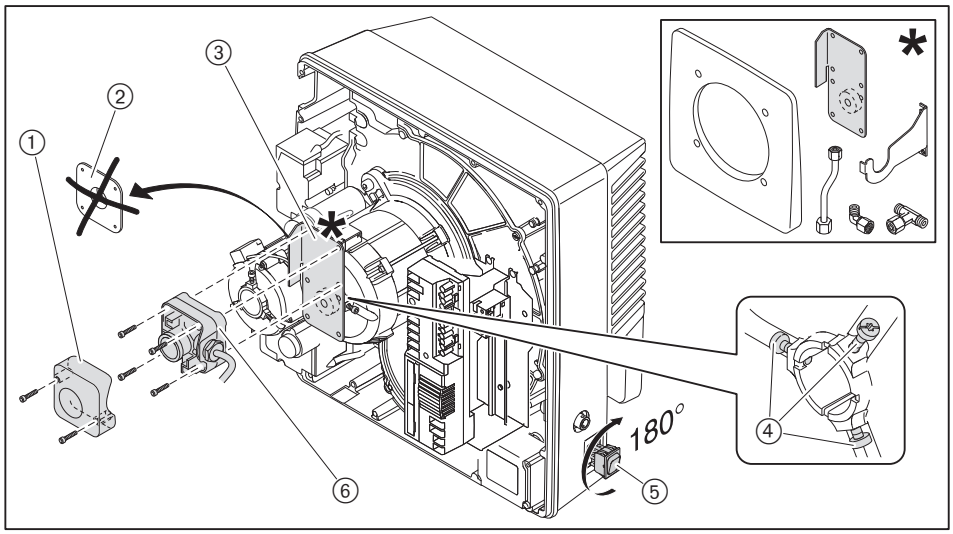
▶ Rotate burner flange ① by 180° and mount with flange gasket ②.
▶ The aperture between combustion head and refractory should be filled with flame-proof, resilient insulating material (do not make solid).



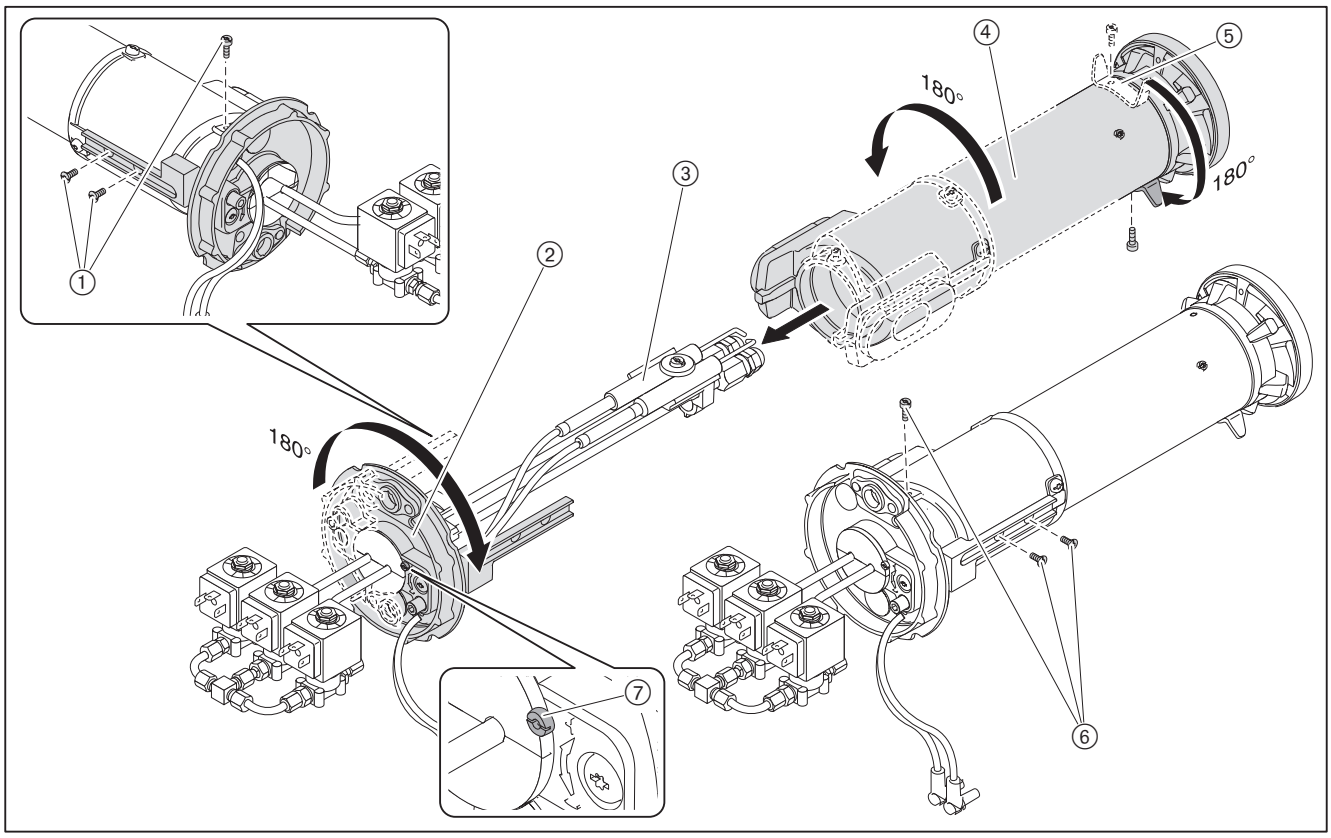
▶ Remove operating panel ①.
▶ Remove cover ③ and unplug plug ②.
▶ Remove support ⑦ for oil hoses and bracket ⑧.
▶ Unplug plugs ⑥ and ⑩.
▶ Undo screws ④ and remove the complete oil pump ⑨.
▶ Remove fastening angle ⑤.
▶ Rotate burner ⑪ by 180° and mount to burner flange ⑫ securing with screws ⑬.



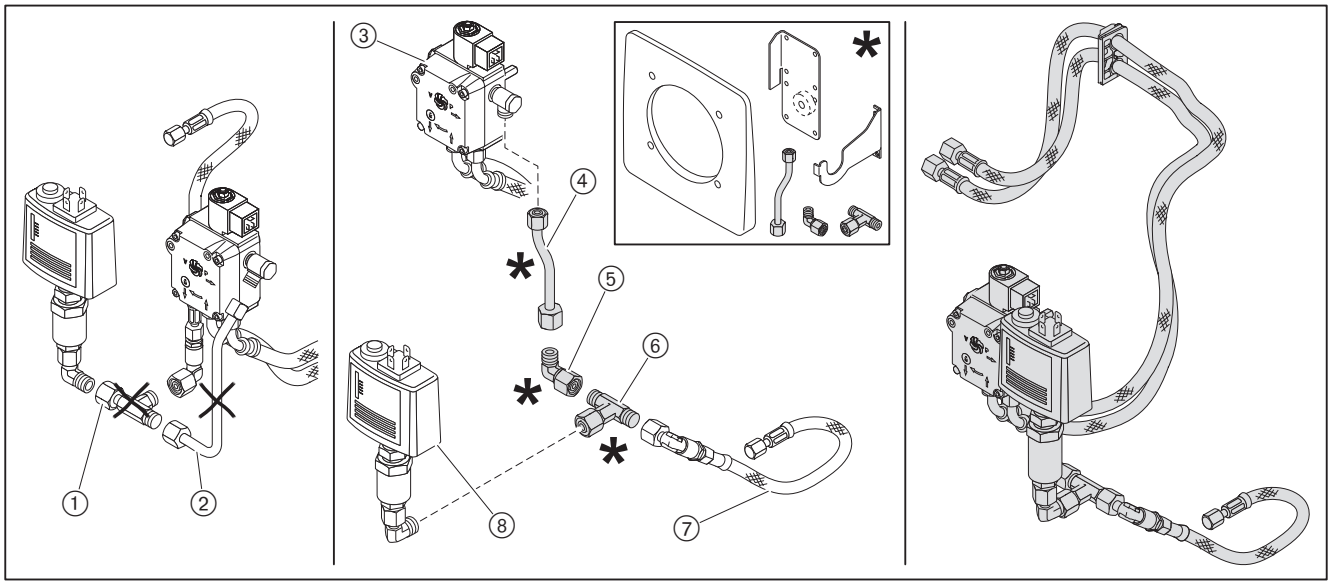
- ► Remove cover ① and pressure switch ⑥.
- ► Undo screws ④ and remove flange ②.
- ► Fit bracket ③.
- ► Fit pressure switch ⑥ and cover ①.
- ► Lever out fuel selection switch ⑤, rotate by 180° and refit.



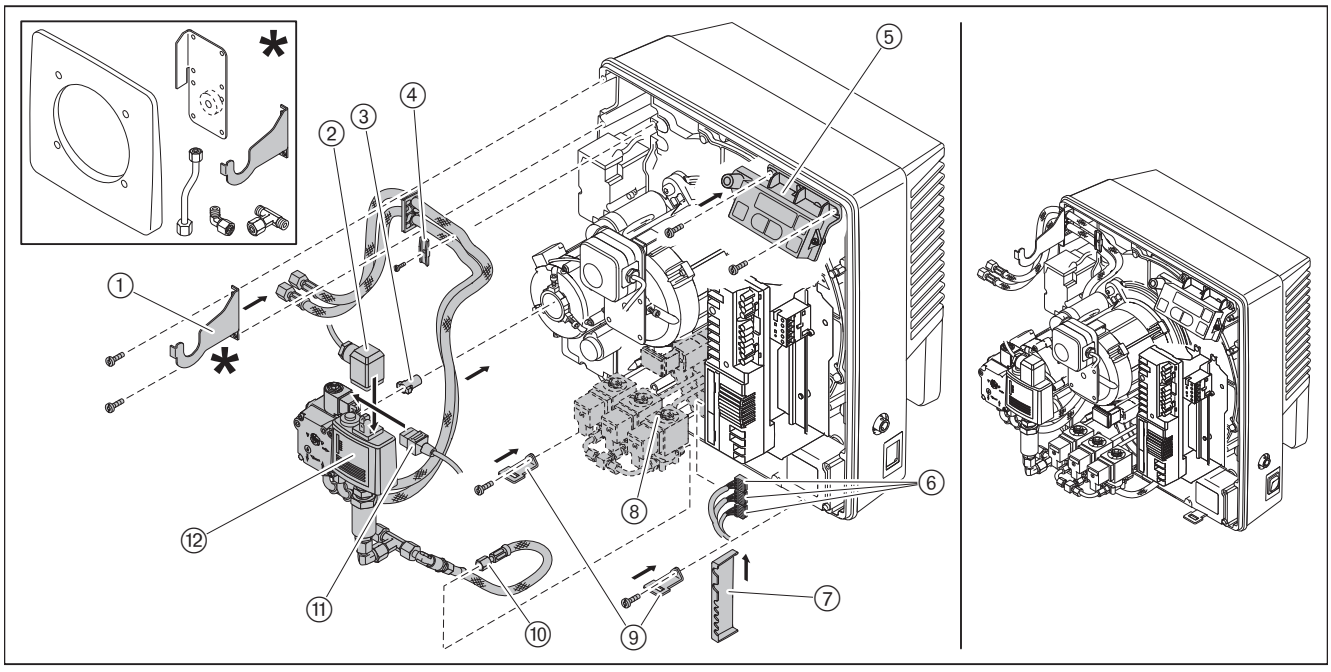
- ► Remove screws ①.
- ► Remove nozzle assembly ③ from mixing head ④.
- ► Undo screw ⑦.
- ► Rotate nozzle assembly cover ② by 180° and tighten screw ⑦.
- ► Remove support plate ⑤ and fit on opposite side.
- ► Fit nozzle assembly ③ to mixing head ④ and secure with screws ⑥.



- ▶ Remove T piece ① and pressure line ②.
- ▶ Rearrange oil pump ③, pressure hose ⑦ and pressure switch ⑧ and refit using parts ④ to ⑥.



- ▶ Check setting of ignition electrodes [ch. 9.6].
- ▶ Fit mixing head ⑧, see [ch. 9.3].
- ▶ Fit complete oil pump ⑫ ensuring correct alignment of coupling ③.
- ▶ Connect pressure hose ⑩ to mixing head.
- ▶ Plug in plugs ② and ⑪.
- ▶ Fit support ④ for oil hoses and bracket ①.
- ▶ Fit operating panel ⑤.
- ▶ Plug in plug ⑥.
- ▶ Fit cover ⑦.
- ▶ Fit fastening angle ⑨.



5 Installation

5.1 Gas supply



DANGER

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_2 content in the flue gas.
- Calorific value in normal condition [kWh/m^3].

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

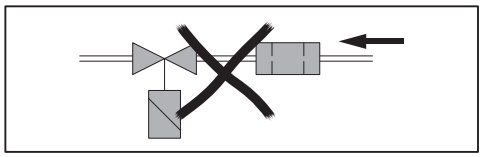
- ► Close all fuel shut off devices prior to commencing work and protect from accidental re-opening.

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 Multifunction assembly and/or double gas valve and pressure regulator 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

Multifunction assembly and/or double gas valve and pressure regulator can be installed with the axis standing vertical to lying horizontal.



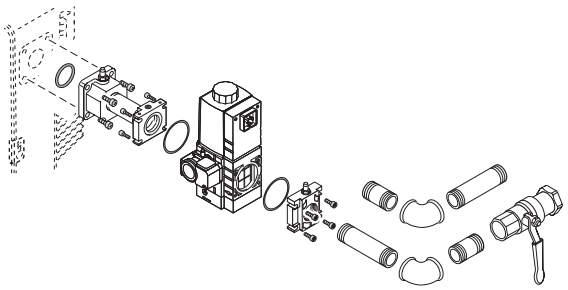
5.1.1 Installing the gas valve train

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).

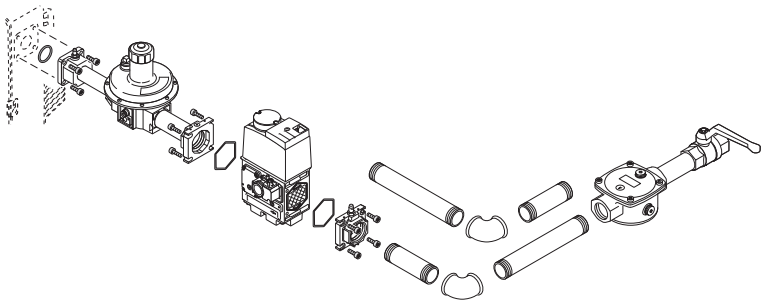
Installing the valve train from the right

- ▶ 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.

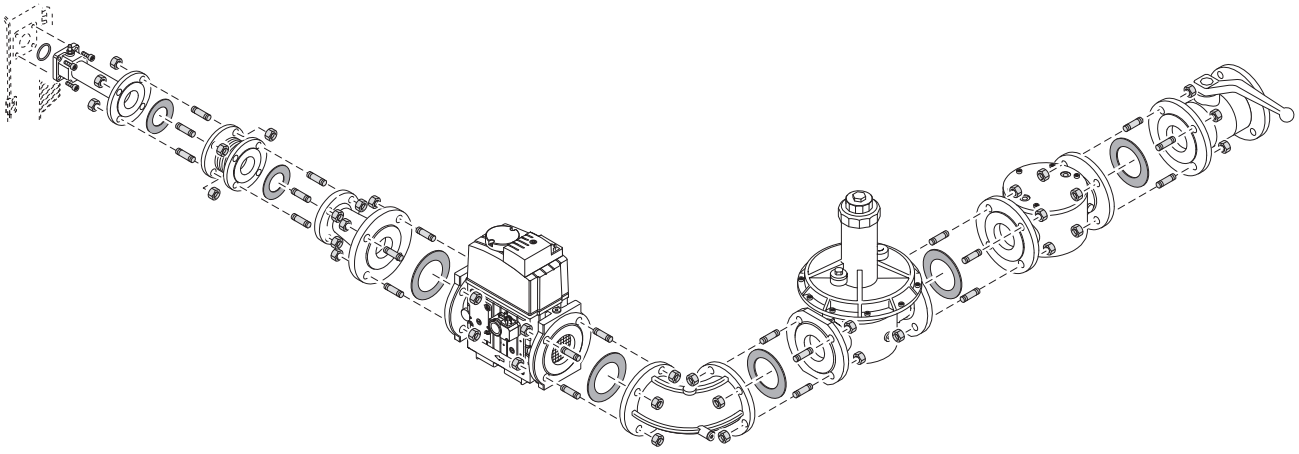
¾" ... 1½"



2"



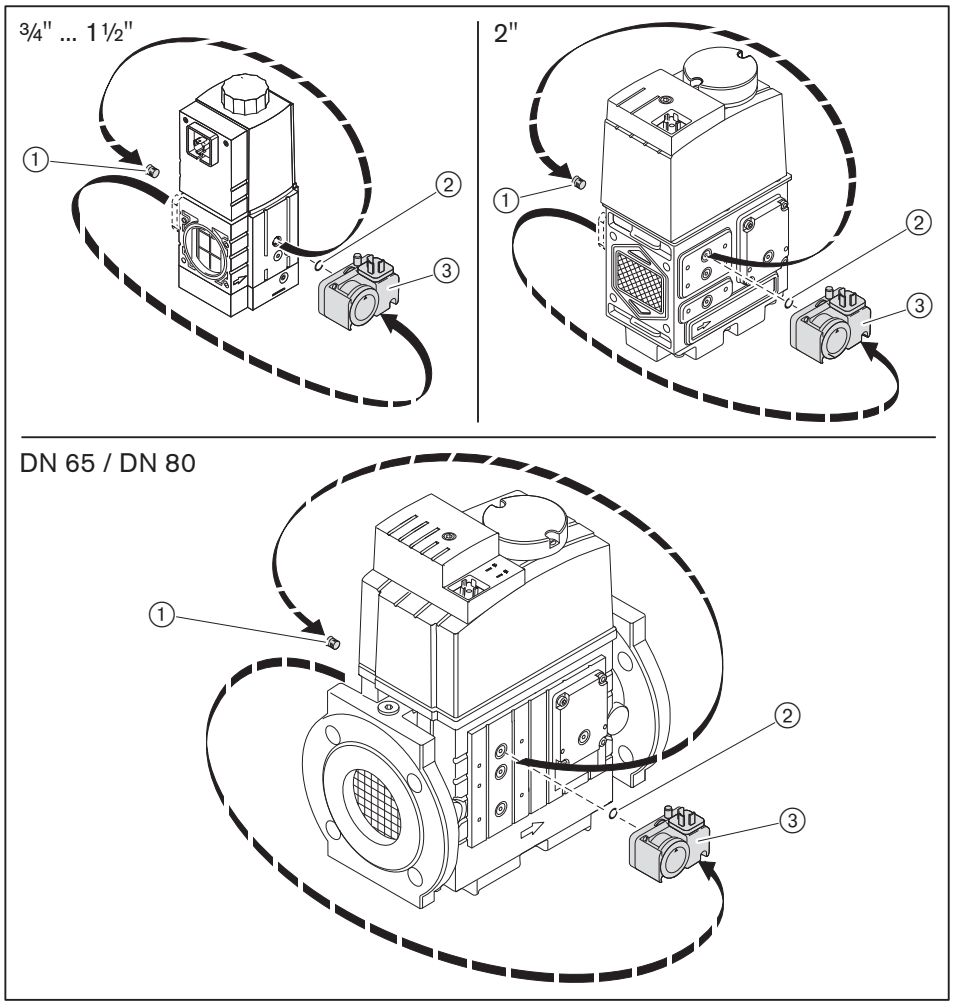
DN 65
DN 80



Installing the gas valve train from the left

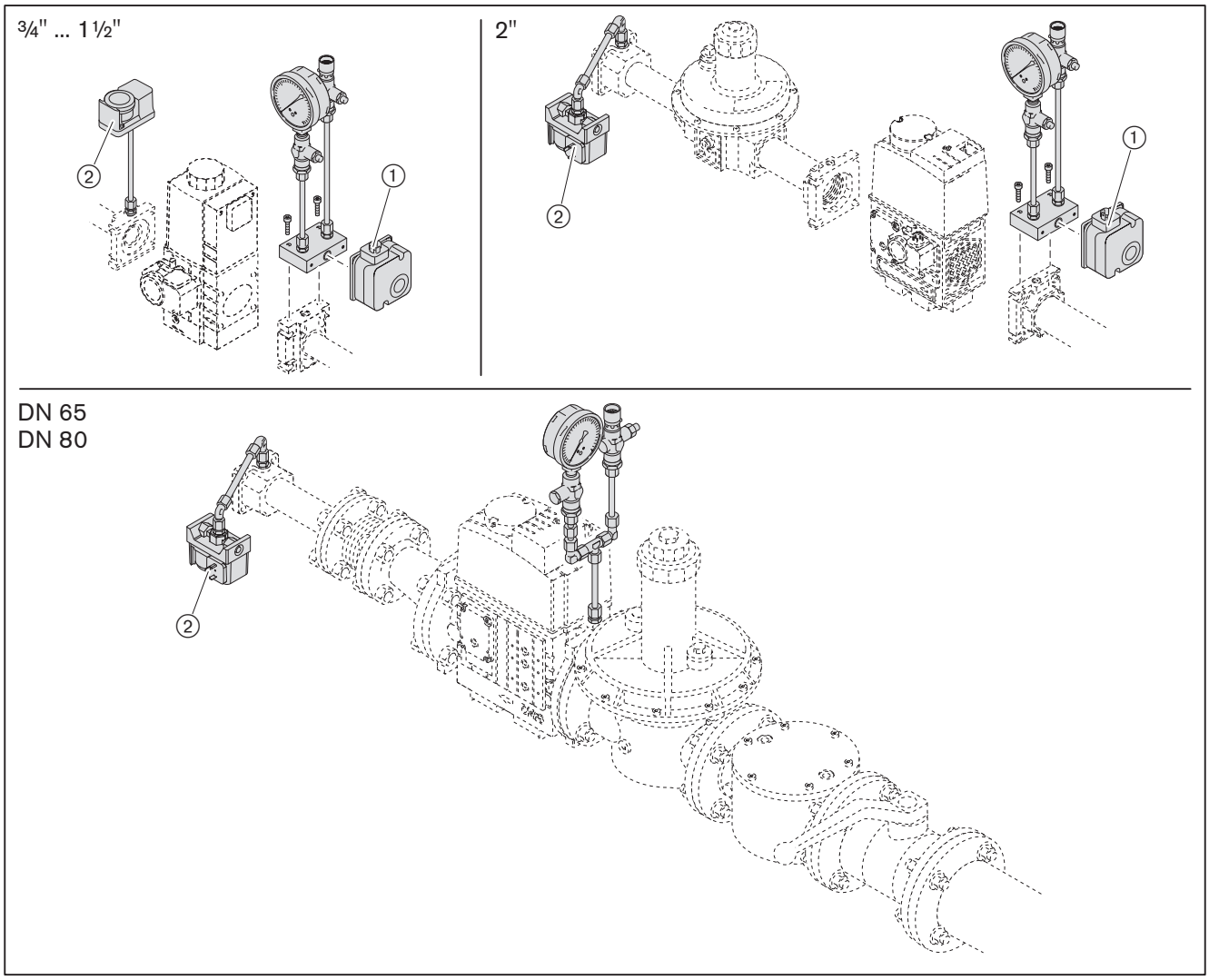
To fit the gas valve train to the burner from the left, the burner has to be installed rotated by 180°. To do this, additional conversion measures are required.

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



① Low gas pressure switch with mechanical interlock (B34)
② High gas pressure switch (B33)

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.

5.2 Oil supply

Observe EN 12514-2, DIN 4755, TRÖI and local regulations.

Check conditions for oil pump

Suction resistance	max 0.4 bar(1
Supply pressure	max 2 bar(1
Supply temperature	max 60 °C(1

(1 Measured at the pump.

Check conditions for oil hoses

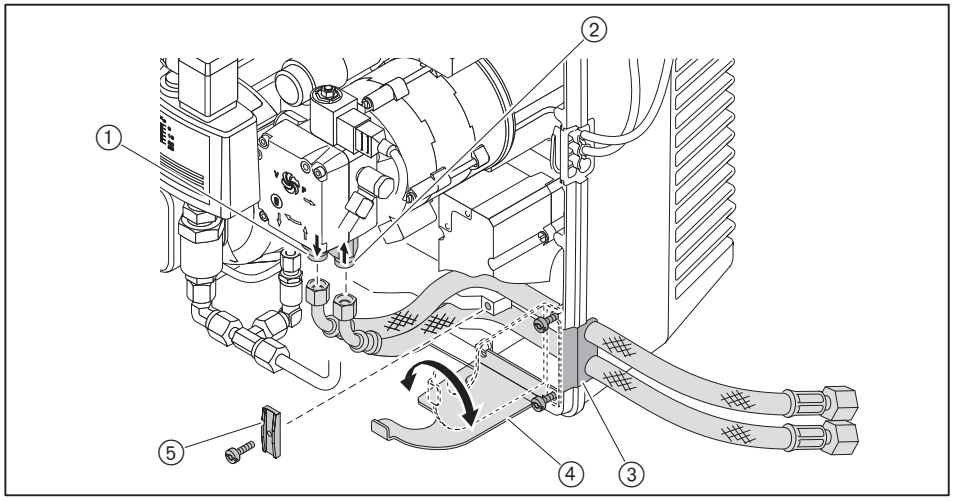
Length	1200 mm
Oil hose connection	G⅜
Nominal pressure	10 bar
Thermal load	max 100 °C

Connect oil supply

CAUTION

Damage to the oil pump caused by incorrect connection
Mixing up supply and return can damage the oil pump.
- ► Ensure correct connection of oil hoses to the supply and return of the pump.

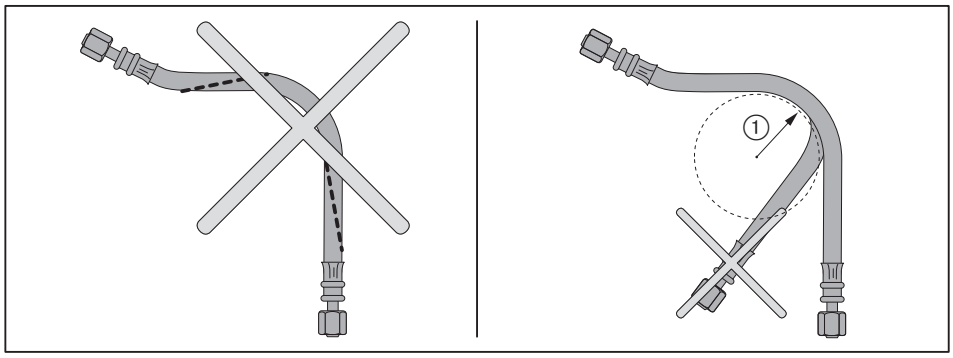
- ► Connect oil hoses to the supply and return.
- ► Remove service retaining plate ④.
- ► Fit oil hoses with bracket ⑤ and grommet ③ to burner.
- ► Refit service retaining plate.



① Return
② Supply

► Connect oil supply and observe:
- do not twist oil hoses
- avoid mechanical tension
- consider length of hose required for the service position,
- do not kink oil hoses (curve radius ① of 75 mm must be maintained).

If these conditions for connection can not be met:
► Adapt oil supply on site.



Purge oil supply and ensure it is tight

CAUTION

Oil pump seized due to running dry
Pump could be damaged.
► Fill oil supply with oil and purge.

► Ensure oil supply is tight.

5.3 Electrical connection

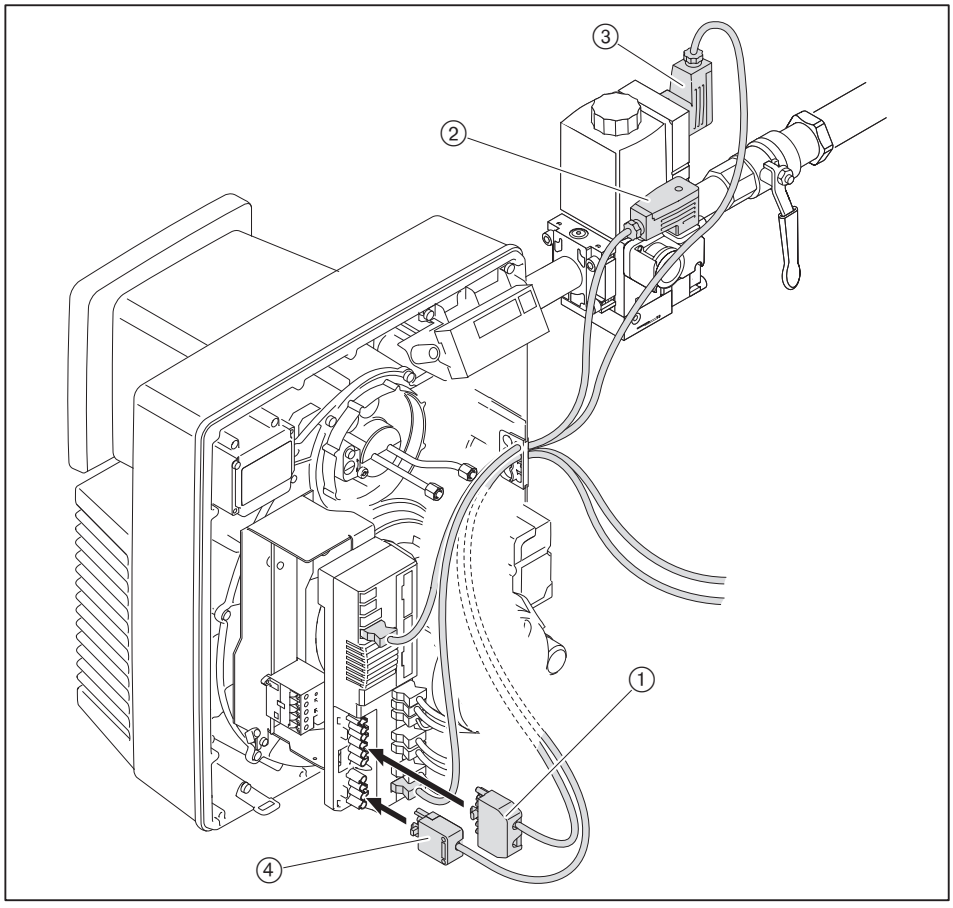
DANGER

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 restart.

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

Observe wiring diagram supplied.

- ► 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.

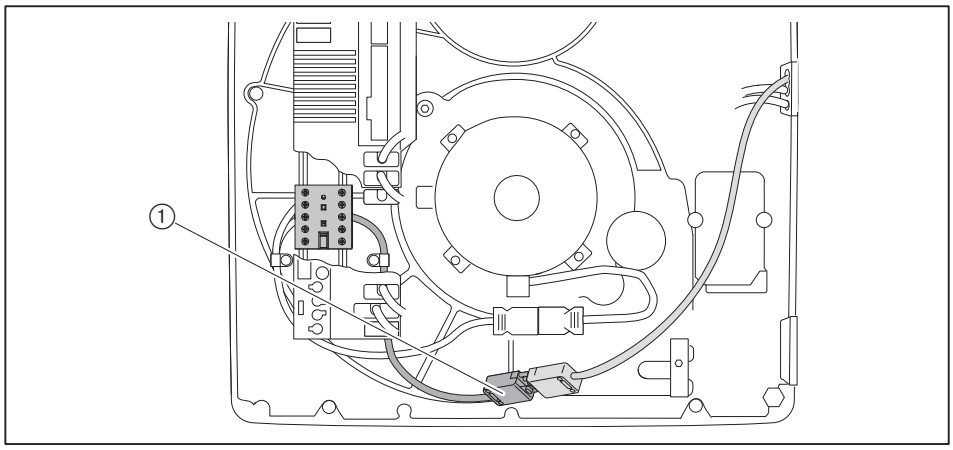


With remote reset, install connection line separately. Do not exceed maximum cable length of 50 metres.

Separate supply line for burner motor

Observe wiring diagram supplied.

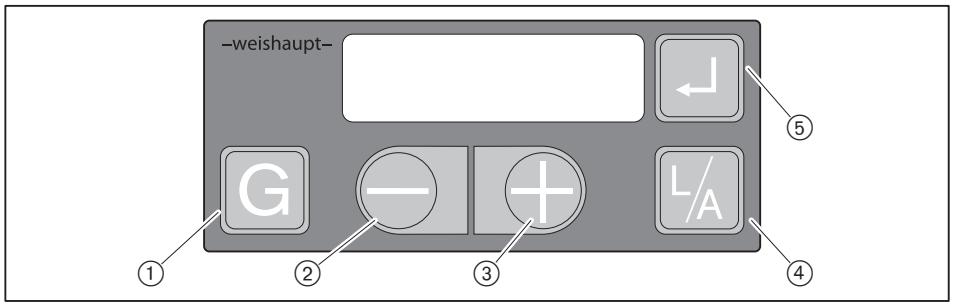
► Plug supply line for burner motor into connection plug ① of the contactor.



External fuse of separate supply line:
- min 10 AT
- max 16 AT

6 Operation

6.1 Operating panel



①	[G] Gas	Select gas butterfly valve actuator
②	[–]	Change values
③	[+]	
④	[L/A] Air	Select air damper actuator
⑤	[Enter]	Reset burner: call up information press for approx. 0.5 seconds: Info level press for approx. 2 seconds: Service level
③ and ⑤	[+] and [ENTER]	press simultaneously for approx. 2 seconds: Parameter level (only possible with display OFF)

Various actions are only triggered when the key is released, for example changing the display, reset.

OFF function

► Press [ENTER], [L/A] and [G] keys simultaneously.
✓ Immediate lockout with error 18h.

Operating level

The current actuator position can be displayed in the operating level (10).

Displaying gas butterfly valve setting:
► Press key [G].

Displaying air damper setting:
► Press key [L/A].

Flame signal

The flame signal can be displayed during commissioning (setting level) by using a combination of keys.

► Press [Enter], [L/A] and [G] keys simultaneously.
✓ The flame signal is displayed.

Recommended flame signal, see Service level information 19 [ch. 6.2.2].

Operating status

The exact operating status of the combustion manager can also be displayed. This simplifies determining the cause of a fault during troubleshooting [ch. 11.1].

► Press and hold [–] and [+] simultaneously for approx. 3 seconds.
✓ The combustion manager changes to operating display. The display shows current operating status with a number.

Back to standard display:
► Press and hold [–] and [+] simultaneously for approx. 3 seconds.

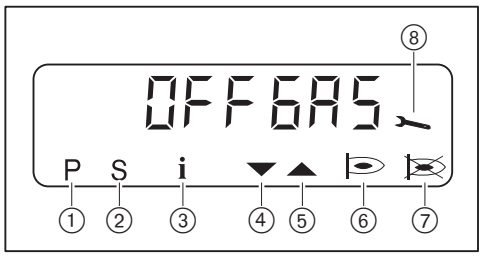
VisionBox Software

If the VisionBox Software is connected, change-over to the access level must be confirmed via the operating panel.

► Press [+]
✓ Software changes to the access level

6.2 Display

The display shows the current operating statuses and operating data.



① Setting level activated
② Start phase activated
③ Info level activated
④ Actuator runs CLOSED
⑤ Actuator runs OPEN
⑥ Burner in operation
⑦ Lockout
⑧ Service level activated

TEST	Combustion manager performs self test [ch. 3.3.5]
OFF GAS	Standby, no heat demand, fuel selected: Gas
OFF OIL	Standby, no heat demand, fuel selected: Oil
OFF S	Shutdown via contact X3:7 (plug No. 7)
UPr GAS	Unprogrammed condition or programming of gas side not completed
UPr OIL	Unprogrammed condition or programming of oil side not completed
OFF E	Standby, no heat demand, shutdown via fieldbus module
OFF d	Insufficient gas low gas pressure switch
10	Current operating phase [ch. 3.3.5]
F 1	Under-voltage in standby or internal device error, see error memory
F 9	Connection to Fieldbus faulty Acknowledge error: Press [–] and [+] keys simultaneously.

Flame sensor

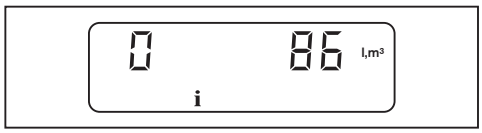
A light emitting diode on the flame sensor indicates the current operating status.

LED off	Flame sensor not activated.
LED flashing	No flame.
LED continuously illuminated	Flame present.

6.2.1 Info level

Burner data can be interrogated in the Info level .

► Press [Enter] for approx. 0.5 seconds.
✓ The Info level is activated.
► Press [Enter] to reach the next information.



No.	Information
0	– no function –
1	Hours run gas operation or oil operation stage 1
2	Hours run oil operation stage 2
3	Total burner starts
4	Device item number
5	Index of device item number
6	Device number
7	Production date (DDMMYY)
8	Fieldbus address
9	Valve proving behaviour
10	Oil pressure switch function
11	Not used
12	Not used
13	Analogue module EM3/3 or Fieldbus module EM3/2 available 0: no 1: yes

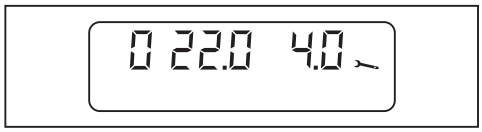
After information 13 or a waiting time of approx. 20 seconds the combustion manager changes over to the operating level.

6.2.2 Service level

Gas operation

The service level gives information about:
- Actuator position of the individual operating points,
- the most recent fault,
- flame signal during burner operation.

► Press [Enter] for approx. 2 seconds.
✓ The service level is activated.
► Press [Enter] to reach the next information.



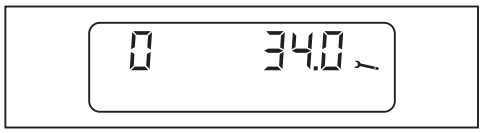
No.	Information
0	Actuator position in operating point P0
1	Actuator position in operating point P1
2	Actuator position in operating point P2
3	Actuator position in operating point P3
4	Actuator position in operating point P4
5	Actuator position in operating point P5
6	Actuator position in operating point P6
7	Actuator position in operating point P7
8	Actuator position in operating point P8
9	Actuator position in operating point P9
10 … 18	Fault memory most recent fault … ninth last occurred fault Display additional information: 1. Detailed error codes / operating status: ► Press [+] key. 2. Detailed error codes: ► Press [–] and [+] keys simultaneously. Repetition counter: ► Press key [G].
19	Flame Signal Range: 00 … 58 ▪ < 50: poor quality ▪ 50 … 58: high quality recommended value: > 50

After information 19 or a waiting time of approx. 20 seconds the combustion manager changes over to the operating level.

Oil operation

The service level gives information about:
- Actuator position of the individual operating points,
- the most recent fault,
- flame signal during burner operation.

► Press [Enter] for approx. 2 seconds.
✓ The service level is activated.
► Press [Enter] to reach the next information.



No.	Information
0	Actuator position in operating point P0
1	Actuator position in operating point P1
2	Actuator position in operating point P2 (switch off point stage 2 when running closed)
3	Actuator position in operating point P3 (switch on point stage 2 when running open)
9	Actuator position in operating point P9
10 … 18	Fault memory most recent fault … ninth last occurred fault Display additional information: 1. Detailed error codes / operating status: ► Press [+] key. 2. Detailed error codes: ► Press [–] and [+] keys simultaneously. Repetition counter: ► Press key [G].
19	Flame Signal Range: 00 … 58 ▪ < 50: poor quality ▪ 50 … 58: high quality recommended value: > 50

After information 19 or a waiting time of approx. 20 seconds the combustion manager changes over to the operating level.

6.2.3 Parameter level

The parameter level can only be called up in Standby (OFF) mode.

► Press [+] and [Enter] keys simultaneously for approx. 2 seconds.
✓ The parameter level is activated.



► Press [+] key.
► Press [Enter] to reach the next parameter.
✓ Only then will the value be stored.

Pno.	Parameters	Setting range	Factory setting
1	Fieldbus address	0 … 254 / OFF Switch over to OFF and to address: ► Briefly press [–] and [+] simultaneously.	OFF
2	Actuator position in Standby	0.0 … 90.0° Change air damper setting: ► Press [L/A] and [+] or [–]. Change gas butterfly valve setting: ► Press [G] and [+] or [–].	0.0
3	Function fieldbus module –or– function analogue module	The parameter is dependent on the module used. Setting range of parameters, see installation and operating manual of module. Fieldbus module (response to heat demand): 2: Bus default and control circuit (T1/T2) activated Analogue module: 2: DIP switches activated	2
4	Post-purge time	0 … 4095 s	2
5	Fault memory	0: fault memory is empty 1: fault memory contains data Delete fault memory: ► Press [L/A] and [+] simultaneously for approx. 2 seconds.	–
6	– no function –	–	–
7	Oil pressure switch (X3:12)	0: not activated 1: activated	1
8	Air pressure switch for oil operation (X3:11)	0: not activated 1: activated	1
9	Operating mode output X3:1 for oil operation	1: Safety solenoid valve 2: tank valve	1
A	Low gas pressure switch/valve proving gas pressure switch (X3:12)	0: not activated 1: Proof-of-closure (valve 1) 2: without low gas pressure switch 3: with low gas pressure switch	3
b	Air pressure switch for gas operation (X3:11) (display only, no adjustment possible)	0: not activated 1: activated	1

Pno.	Parameters	Setting range	Factory setting
C	Operating mode output X3:1 for gas operation	0: not activated 1: with pilot valve not interrupted 2: with pilot valve interrupted 3: Standard (external LPG valve)	3
d	Flame sensor	0: ionisation electrode / flame sensor FLW 1: switch input (X3:14) 2: flame sensor QRB	0
E	Display mode	0: E-parameter is not activated in the access level 1: E-parameter is activated in the access level Settings 2 and 3 are required for O_2 trim, see supplementary sheet O_2 trim W burners (Print No. 835587xx).	0
F	Restart attempts following flame failure	0 … 1	1
H	Actuator setting for post-purge	0.0 … 90.0° Change air damper setting: ► Press [L/A] and [+] or [–].	0
L	Load shutdown	0.0 … 4095 seconds If there is no longer a demand for heat, the W-FM reduces the burner capacity and closes the fuel valves after the time set has elapsed. If partial load is reached before the time has elapsed, the fuel valves close immediately.	0
n	Operating mode O_2 trim gas operation (only in conjunction with O_2 trim)	0: not activated Additional parameters can be displayed with setting 1 … 4, see supplementary sheet O_2 trim W burners (Print No. 83yyyyxx).	0
o	Operating mode O_2 trim oil operation (only in conjunction with O_2 trim)	0: not activated Additional parameters can be displayed with setting 1 … 4, see supplementary sheet O_2 trim W burners (Print No. 835587xx).	0

After the last parameter or a waiting time of approx. 20 seconds the combustion manager changes over to the operating level.

6.2.4 Access level

In the access level, the configuration can be adapted relative to the burner type or version.

In the parameter level, the display mode must be configured to `1`, to enable access to parameters E0 … E3 [ch. 6.2.3].

► Press [G] and [L/A] simultaneously.
✓ The access level is activated.



► Press [+] key.
✓ Parameter `E0` is displayed.
► Press and hold [Enter] key and set the parameter using [+] or [–].
► Press [+] to reach the next parameter.

Parameters	Information	Setting range
`E0`	Burner type	`0`: single fuel burner `1`: dual fue burner
`E1`	Operating mode (display only, no adjustment possible)	`0`: intermittent operation `1`: continuous operation
`E2`	Flame sensor type	`0`: ionisation electrode / flame sensor FLW `1`: switch input (X3:14) `2`: flame sensor QRB
`E3`	Fan configuration	`0`: Off `1`: fan control `2`: fan control with fan monitoring `3`: VSD `4`: fan control according to modulating degree specified `5`: DAU control `6 … 255`: off

6.3 Linearisation

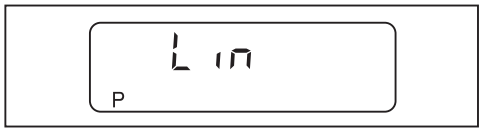
During commissioning it is possible to carry out linearisation of the operating points in gas operation.

During linearisation a straight line is generated from the operating point displayed to P9. The values on the straight are adopted as the new operating points.

Initiate a calculation after P9

► Press [ENTER].
✓ Combustion manager changes to linearisation mode.

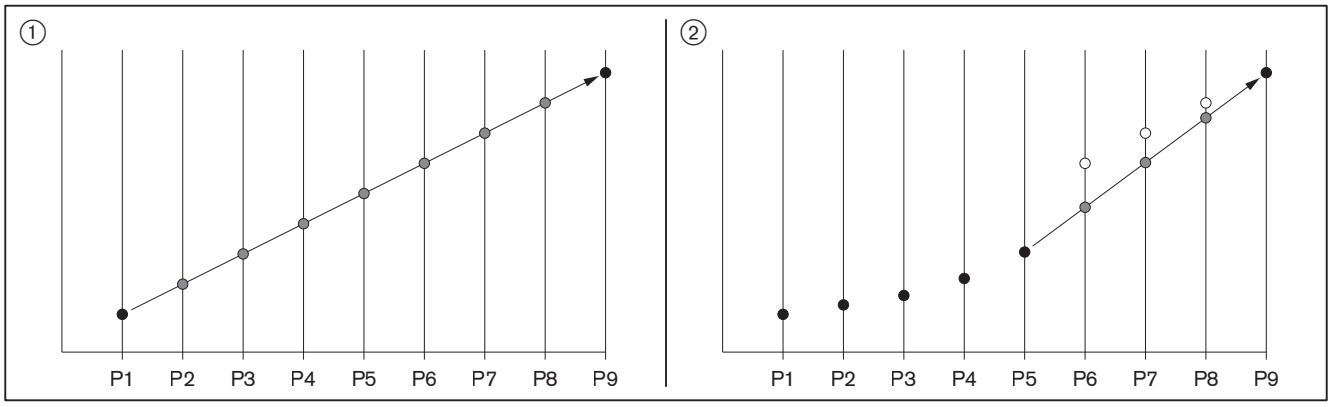
The linearisation mode can be interrupted using the [-] key.



► Confirm with [+] key.
✓ Linearisation is initiated.



Example:



① Calculation from P1 to P9
② Calculation from P5 to P9

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
- the 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

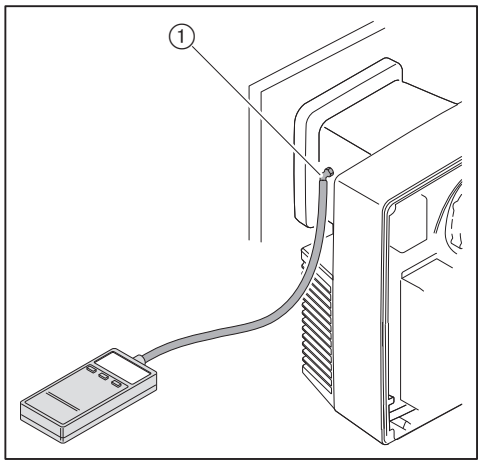
Additional system-related tests could be necessary. Please observe the operating guidelines for the individual components.

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

7.1.1 Connect measuring devices

Pressure measuring device for mixing pressure

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



Guide values for mixing pressure

Partial load	Mixing pressure(1	Full load	Mixing pressure(1
125 … 200 kW	1 … 4 mbar	200 kW	3 … 4 mbar
		240 kW	5 … 6 mbar
		270 kW	6 … 7 mbar
		310 kW	8 … 9 mbar
		340 kW	11 … 12 mbar
		370 kW	12 … 13 mbar
		400 kW	13 … 14 mbar
		440 kW	13 … 14 mbar
		470 kW	11 … 12 mbar
		500 kW	11 … 12 mbar
		530 kW	11 … 12 mbar
		550 kW	10 … 11 mbar

(1 Guide values, which could deviate depending on combustion chamber resistance.

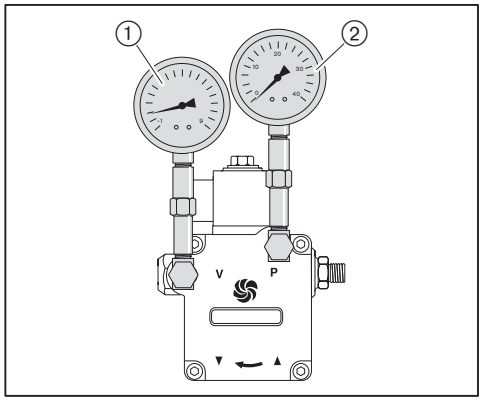
Oil pressure measuring devices on oil pump

- Vacuum gauge for suction resistance/supply pressure.
- Pressure gauge for pump pressure.

WARNING

Oil leakage from oil pressure measuring devices due to constant load
Oil pressure measuring devices could be damaged and cause environmental pollution through leakage.
► Remove oil measuring devices once commissioning is complete.

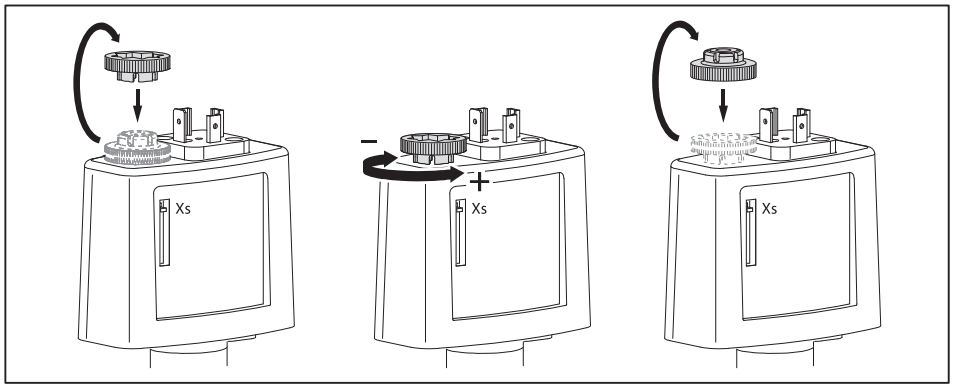
► Close fuel shut off devices.
► Remove closing plug on the pump.
► Connect vacuum gauge ① and pressure gauge ②.



7.1.2 Set oil pressure switch

Minimum oil pressure switch in the supply

- ► Remove end cap.
- ► Set minimum oil pressure switch to 8 bar using the setting screw.
- ► Refit end cap.



7.1.3 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. 7.1.6].

Maximum connection pressure

Maximum connection pressure into isolating valve is 300 mbar.

Check connection pressure

DANGER

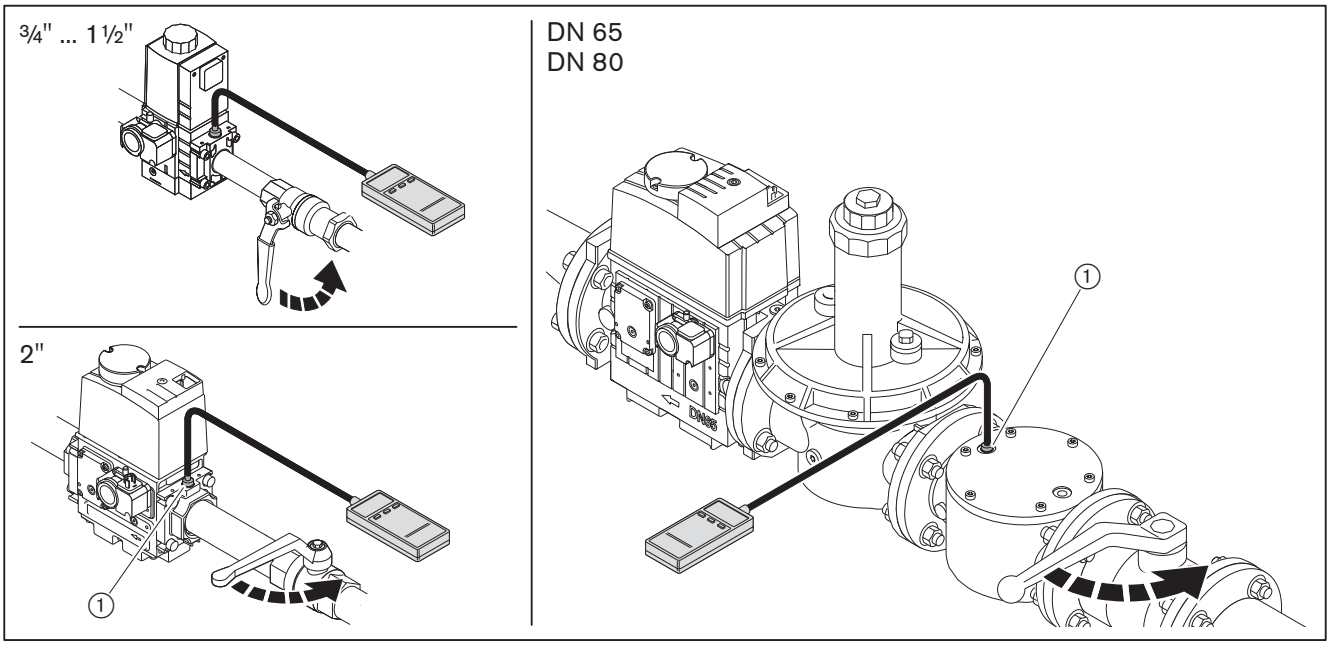
Risk of explosion due to excess gas supply pressure
Exceeding the maximum connection pressure (see name plate) can damage the gas valve train and lead to an explosion.
Max. connection pressure see name plate.
► Check gas connection pressure

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 connection pressure exceeds the max. connection pressure:
► Immediately close isolating valve.
► Do not start plant.
► Notify system operator.

If the connection pressure does not maintain the min. connection pressure:
► Do not start plant.
► Notify system operator.



7.1.4 Check soundness of gas valve train

Carry out soundness test:
- prior to commissioning,
- after all service and maintenance work.

	First test phase	Second and third test phase
Test pressure	100 mbar ±10 %	100 mbar ±10 %
Waiting time for pressure equalisation	5 minutes	5 minutes
Test time	5 minutes	5 minutes
Permissible pressure loss	1 mbar	5 mbar (¾" … 2")
		1 mbar (DN 65 … 150)

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 test to table.

Second test phase

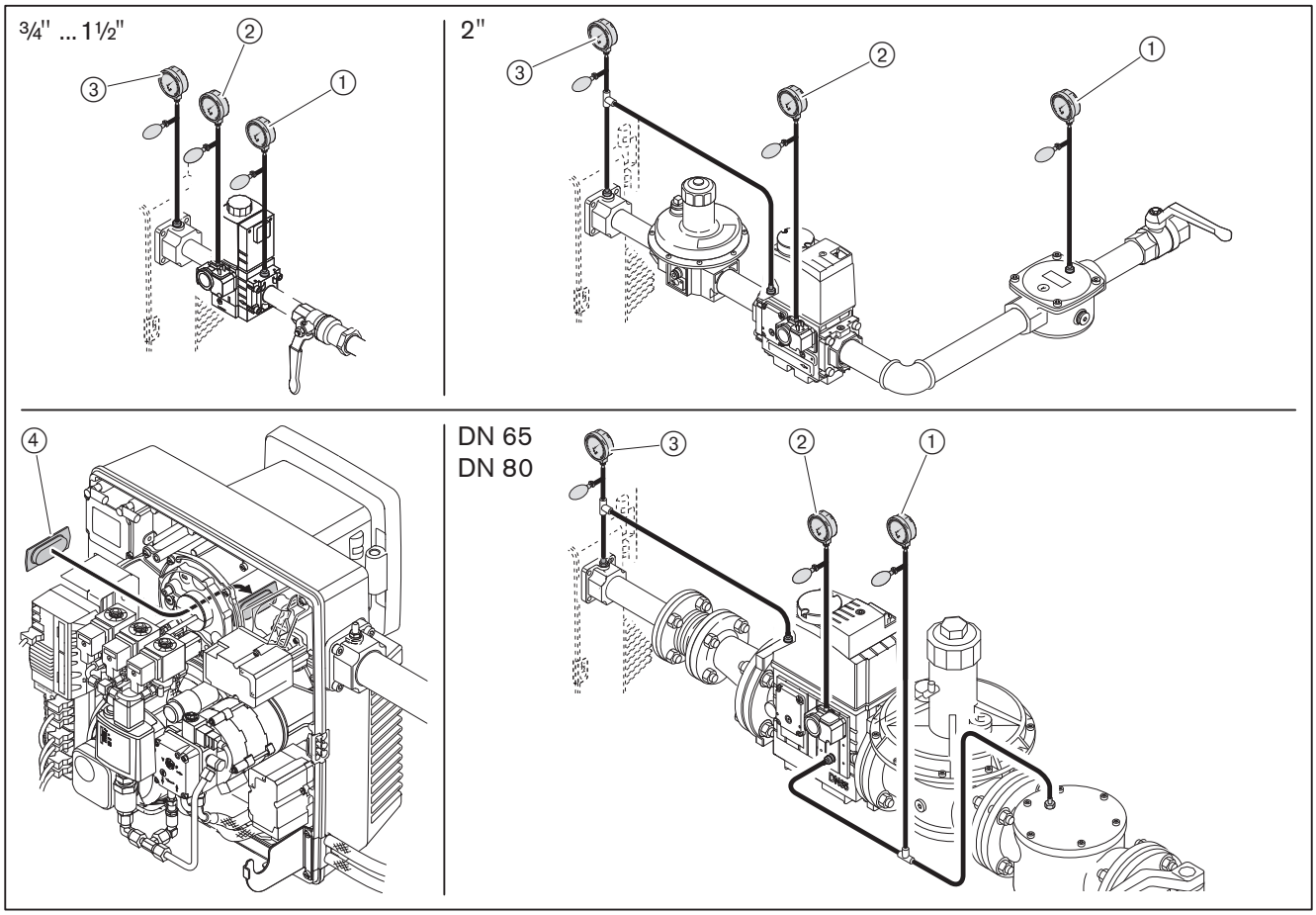
In the second phase the interspace in the multifunction assembly is tested.

► Connect test equipment.
► Carry out test to table.

Third test phase

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

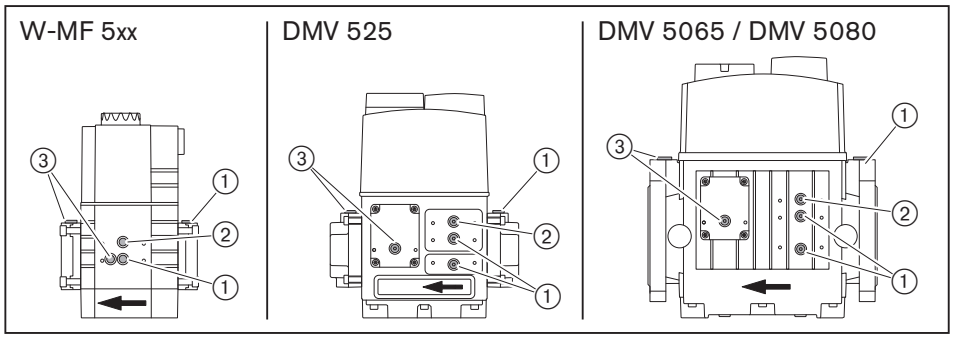
► Remove mixing head [ch. 9.3].
► Fit blanking plate ④.
► Fit mixing head.
► Connect test equipment.
► Carry out test to table.
► Close all test points.
► Remove blanking plate.



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

▶ Document result of the soundness test on the engineers report.

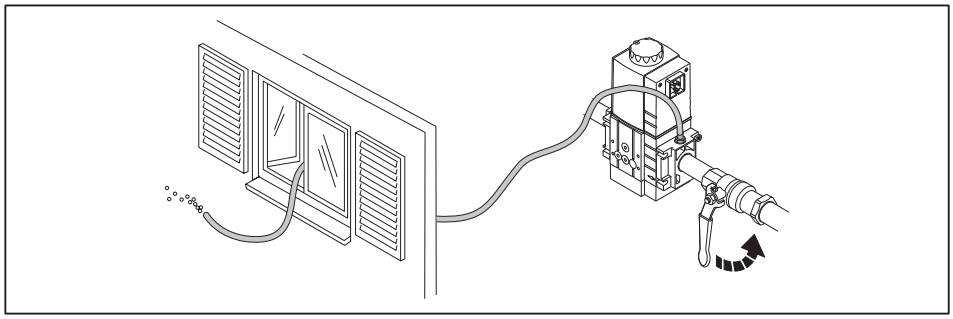
Test points



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

7.1.5 Purging the gas valve train

- ▶ Open test point into valve 1 [ch. 7.1.4].
- ▶ 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.



7.1.6 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.

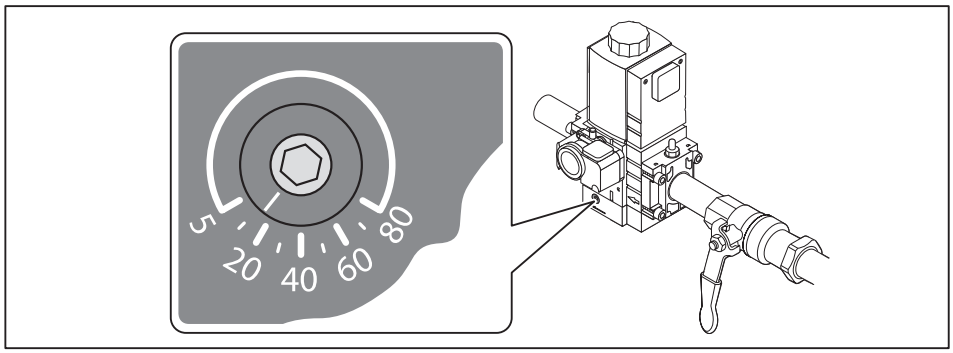
Full load [kW]	**Setting pressure into gas butterfly valve [mbar]**	**Min. connection pressure into isolating valve [mbar]** (low pressure supply)					
Nominal diameter valve train		¾"	1"	1½"	2"	DN 65	DN 80
		W-MF 507	W-MF 512	W-MF 512	DMV 525	DMV 5065	DMV 5080
	Natural Gas E: H_i = 10.35 kWh/m³, d = 0.606						
200	10.5	18	14	13	11	11	11
225	10.7	20	15	14	12	11	11
250	11.2	22	16	15	12	12	12
275	12.0	25	18	16	13	13	13
300	13.0	28	19	18	14	14	14
325	14.4	32	22	20	15	15	15
350	16.1	37	24	22	18	17	17
375	18.0	41	27	24	20	19	19
400	19.1	45	29	25	21	20	20
425	19.0	48	30	26	21	20	20
450	19.0	52	31	26	22	21	20
500	19.4	60	34	28	23	21	21
550	20.3	69	38	31	24	23	22
	Natural Gas LL: H_i = 8.83 kWh/m³, d = 0.641						
200	12.3	23	17	16	14	14	14
225	12.7	26	18	17	15	15	14
250	13.3	29	20	18	16	15	15
275	14.1	33	22	19	17	16	16
300	15.3	37	24	21	18	17	17
325	16.7	42	26	23	20	19	19
350	18.3	47	29	26	22	21	20
375	20.3	53	33	29	24	23	22
400	21.0	58	35	30	25	24	23
425	21.3	63	37	32	26	24	23
450	21.7	69	39	33	26	25	24
500	23.0	81	44	37	28	26	25
550	24.8	94	50	41	31	29	27

Full load [kW]	**Setting pressure into gas butterfly valve [mbar]**	**Min. connection pressure into isolating valve [mbar]** (low pressure supply)					
Nominal diameter valve train		¾"	1"	1½"	2"	DN 65	DN 80
		W-MF 507	W-MF 512	W-MF 512	DMV 525	DMV 5065	DMV 5080
	Liquid Petroleum Gas: H_i = 25.89 kWh/m³, d = 1.555 The selection is calculated for Propane, it can however, also be used for Butane.						
200	6.2	10	9	8	–	–	–
225	7.0	12	10	9	–	–	–
250	7.9	13	11	10	–	–	–
275	9.0	15	12	12	–	–	–
300	10.2	17	14	13	–	–	–
325	11.5	20	15	15	–	–	–
350	13.0	22	17	16	–	–	–
375	14.6	25	19	18	–	–	–
400	15.8	27	21	20	–	–	–
425	15.8	29	21	20	–	–	–
450	16.0	30	22	20	–	–	–
500	16.5	34	24	22	–	–	–
550	17.6	38	26	23	–	–	–

Preset setting pressure

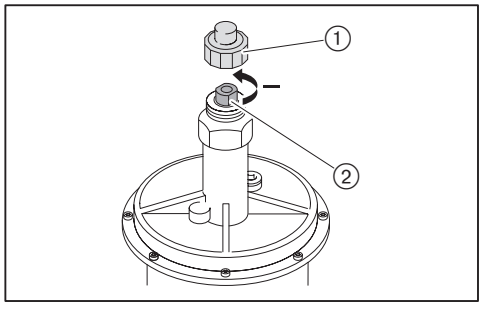
Only in conjunction with W-MF and gas connection pressure > 150 mbar
The pre-pressure must be set to approx. 90 mbar.
► Set FRS pressure regulator, see additional sheet (print No. 835109xx).

► Preset setting pressure determined at multifunction assembly.



De-energise pressure regulator (2" … DN 80)

► Remove closing cap ① and de-energise spring ②.



7.1.7 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.

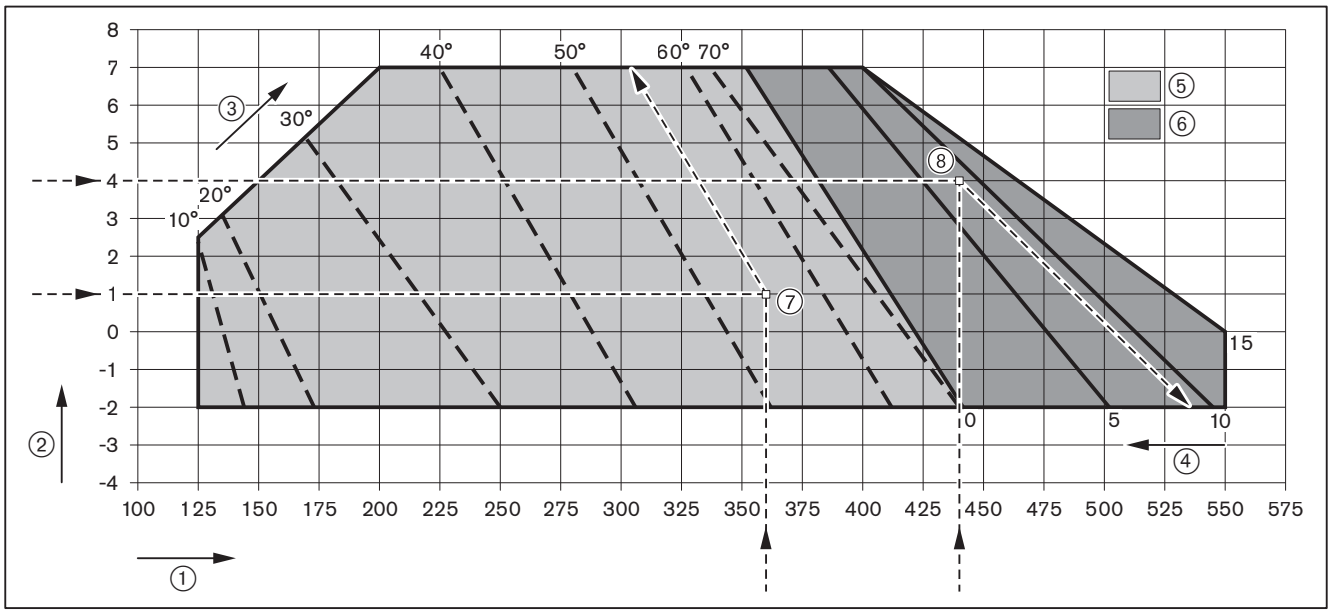
Determine diffuser setting and air damper setting

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

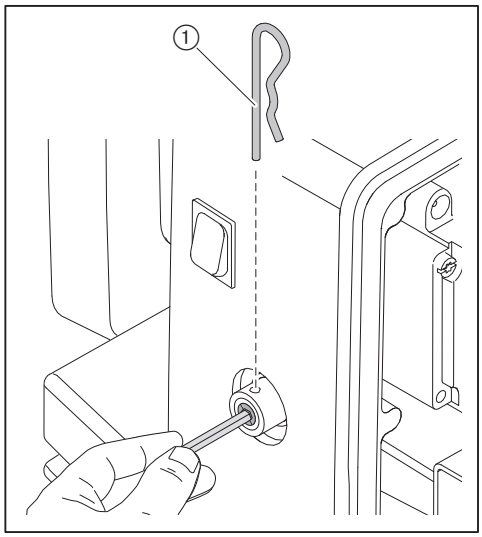
	Example 1	Example 2
Burner capacity required	360 kW	440 kW
Combustion chamber pressure	1.0 mbar	4.0 mbar
Diffuser setting (dimension X)	0 mm	9 mm
Air damper setting	55°	> 80°



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°

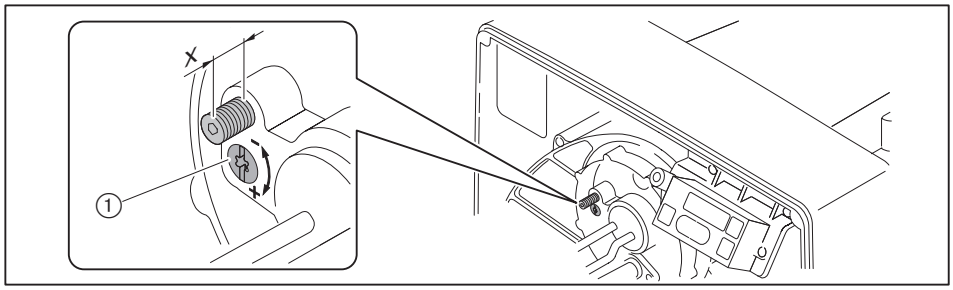
Set diffuser

- ► Remove spring cotter ①.
- ► Loosen locknut by two rotations.



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.



- ► Tighten locknut.
- ► Refit spring cotter.

7.1.8 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. 6 mbar
Low gas pressure switch/valve proving gas pressure switch	12 mbar
High gas pressure switch (optional)	approx. twice control pressure

7.2 Adjusting the burner

7.2.1 Adjusting gas side

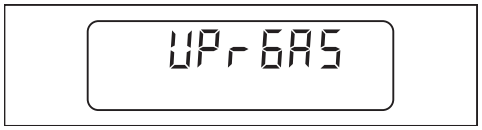
DANGER

Risk of electric shock
Touching the ignition device can lead to electric shock.
► Do not touch ignition device during the ignition process.

► Set fuel selection switch to GAS.
► Check mixing pressure during commissioning [ch. 7.1.1].

1. Preset combustion manager

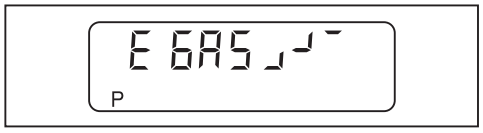
► Unplug bridging plug No. 7 on combustion manager.
► Switch on voltage supply.
✓ Combustion manager drives to Standby.



► Press [G] and [L/A] keys simultaneously.
✓ Combustion manager changes to access level.



► Press [+] key.
✓ Combustion manager changes into the setting level for step points.



► Press [+] key.
✓ Factory setting operating point P9 (full load) is displayed.



► Press and hold [L/A] key and set air damper setting determined using the [–] or [+] key [ch. 7.1.7].
► Press and hold [G] key using [–] or [+] key set gas butterfly valve to the same value.

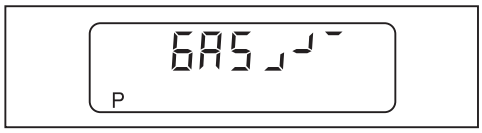
► Press [+] key.
✓ Factory setting operating point P1 (partial load) is displayed.



► Press [+] key to confirm factory setting.
✓ Factory setting operating point P0 (ignition position) is displayed.

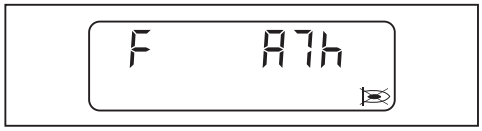


► Press [+] key to confirm factory setting.
✓ Combustion manager is preset.

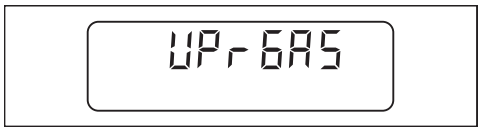


2. Check sequence of operation

► Open gas isolating valve.
✓ Pressure in gas valve train increases.
► Close isolating valve.
► Plug in bridging plug No. 7 on combustion manager.
✓ Burner starts.
✓ Valve proving is carried out.
► Check sequence of operation:
- Valves open.
- Gas pressure switch reacts.
- Burner start is interrupted.
- Burner does not detect a flame and goes to lockout.



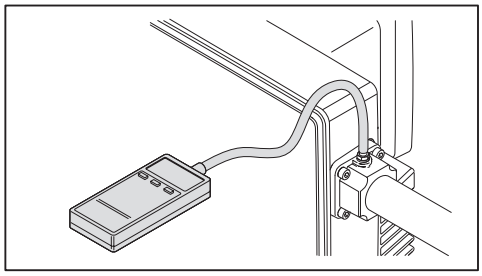
► Reset burner using the [ENTER] key.
✓ Combustion manager drives to Standby.



3. Preset setting pressure

If a controlled shutdown or lockout occurs during setting:
- ► Briefly press [G] and [L/A] keys simultaneously.
- ► Press [+] key.
- ✓ Combustion manager changes to setting level.

► Open test point for setting pressure and connect pressure measuring device.

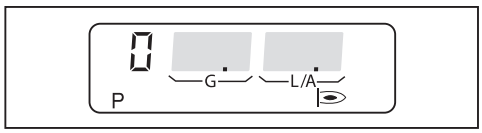


► Open gas isolating valve.
► Briefly press [–] and [+] keys simultaneously.
✓ The display shows `E ACCESS`.



► Press [+] key.

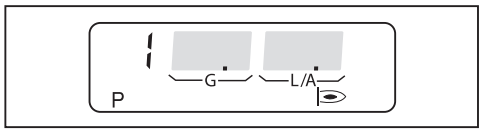
Burner starts according to the sequence of operation and stops at operating point `P0` (ignition position).



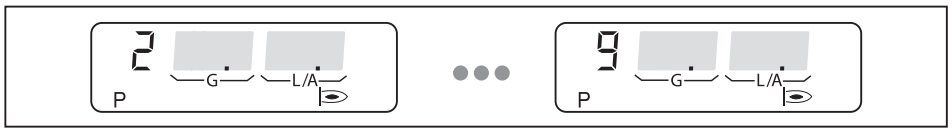
► Preset setting pressure determined at multifunction assembly [ch. 7.1.6].
► Check CO content of combustion and if necessary adjust combustion values via gas butterfly valve setting [G].

4. Drive to full load

► Press [+] key.
✓ Burner drives to operating point P1.



► Check CO content of combustion and if necessary adjust combustion values via gas butterfly valve setting [G].
► Press [+] key.
✓ Next operating point is initiated.
► Repeat steps at each operating point until P9 has been reached.



5. Adjust 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].

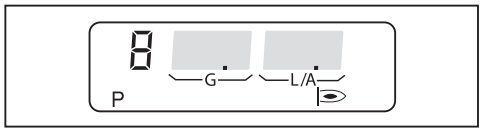
► Calculate gas throughput (operating volume V_B) required [ch. 7.6].
► Optimise setting pressure and/or gas butterfly valve setting [G] until gas throughput (V_B) has been reached.
► Check combustion values
► Determine combustion limit and set excess air via air damper setting [L/A], see [ch. 7.5].
► Determine gas throughput once more and adjust if necessary.
► Re-set excess air.



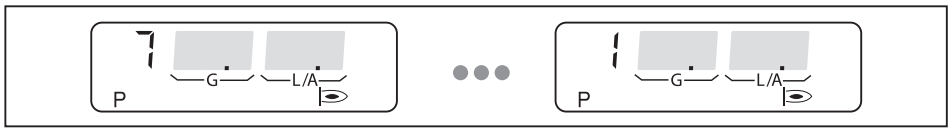
The setting pressure must not be altered once this work has been completed.

6. Adjusting operating point P1

► Press [-] key.
✓ P9 is saved.
✓ Burner drives to operating point P8.



► Check CO content of combustion and if necessary adjust combustion values via gas butterfly valve setting [G].
► Press [-] key.
✓ Next operating point is initiated.
► Repeat steps at each operating point until P1 has been reached.

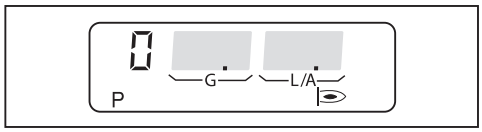


Operating point P1 must lie within the capacity graph [ch. 3.4.6].

► Determine gas throughput and if necessary adjust via gas butterfly valve setting [G].
► Check combustion values
► Determine combustion limit and set excess air of approx. 20 … 25 % via air damper setting [L/A].

7. Adjust ignition load

► Press [-] key.
✓ Burner drives to operating point P0 (ignition position).



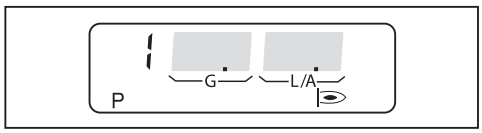
► Check combustion values in operating point P0 (ignition position).
► Set O_2 content of 4 … 5 % above gas butterfly valve setting [G].
► Check mixing pressure

The mixing pressure in ignition position must be between 0.5 2.0 mbar.

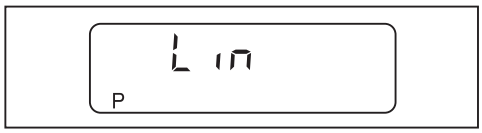
► If necessary, adjust mixing pressure via air damper setting [L/A].

8. Perform linearisation [ch. 6.3]

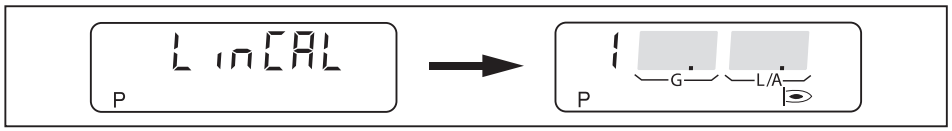
► Press [+] key.
✓ Burner drives to operating point P1.



► Press [ENTER].
✓ Combustion manager changes to linearisation mode.

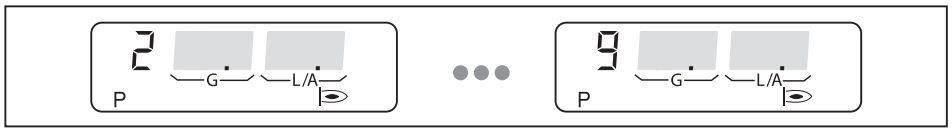


► Confirm with [+] key.
✓ Linearisation is initiated.
✓ The display then shows operating point P1.
✓ Calculation from P1 to P9 was carried out.

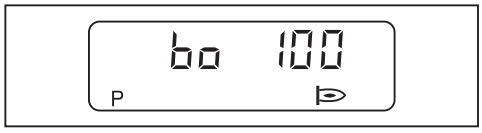


9. Optimising the operating points

► Check combustion values
► Press and hold [G] and optimise combustion values using [–] or [+] key.
► Press [+] key.
✓ Next operating point is initiated.
► Repeat steps at each operating point until P9 has been reached.

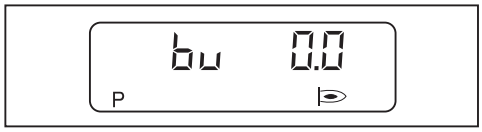


► Press [G] and [L/A] keys simultaneously.
✓ The upper operating limit (bo) is displayed.

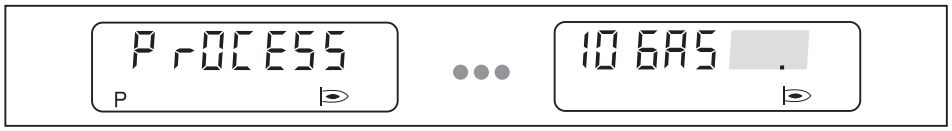


10. Adjust partial load

► Press [G] and [L/A] keys simultaneously.
✓ Burner drives to partial load.
✓ The lower operating limit is displayed (bu).



► Define partial load whilst observing:
  ▪ data supplied by boiler manufacturer,
  ▪ burner capacity graph [ch. 3.4.6].
► Determine gas throughput, if necessary adjust partial load (bu) using [+] key.
► Press [G] and [L/A] keys simultaneously.
✓ Combustion manager changes to operating level (10).
✓ Combustion manager is programmed.



11. Check start behaviour

► Switch off and restart burner.
► Check start behaviour and if necessary correct operating point P0 (ignition position).

If the ignition position has been altered:
► Re-check start behaviour.

7.2.2 Adjusting oil side



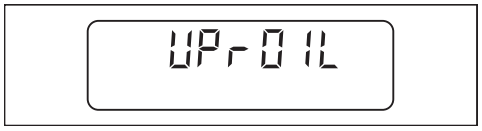
DANGER

Risk of electric shock
Touching the ignition device can lead to electric shock.
► Do not touch ignition device during the ignition process.

► Set fuel selection switch to OIL.
► During commissioning check:
  ▪ suction resistance or flow pressure of oil pump [ch. 5.2],
  ▪ mixing pressure [ch. 7.1.1].

1. Preset combustion manager

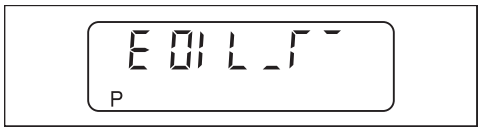
► Unplug bridging plug No. 7 on combustion manager.
► Switch on voltage supply.
✓ Combustion manager drives to Standby.



► Press [G] and [L/A] keys simultaneously.
✓ Combustion manager changes to access level.

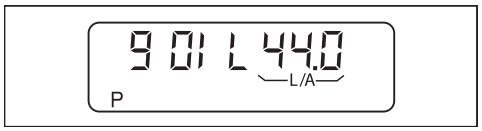


► Press [+] key.
✓ Combustion manager changes into the setting level for step points.



Preset P9

► Press [+] key.
✓ Factory setting operating point P9 (stage 2) is displayed.



► Press and hold [L/A] key and set air damper setting determined using the [–] or [+] key [ch. 7.1.7].

Preset P1

► Press [+] key.
✓ Factory setting operating point P1 (stage 1) is displayed.



► Press and hold [L/A] key and set air damper setting determined using the [–] or [+] key [ch. 7.1.7].

Preset P0

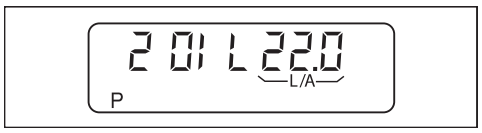
► Press [+] key.
✓ Factory setting operating point P0 (ignition position) is displayed.



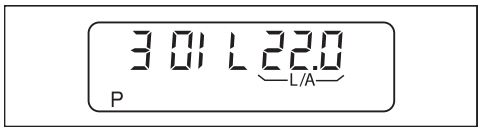
► Press and hold [L/A] key and set the same values as for P1 using the [-] or [+] key.

Preset P2 and P3

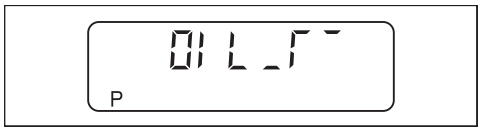
► Press [+] key.
✓ Factory setting operating point P2 (switch off point stage 2 when running closed) is displayed.



► Press and hold [L/A] key and set P2 approx. 3 … 8° above P1 using the [–] or [+] key.
► Press [+] key.
✓ Factory setting operating point P3 (switch on point stage 2 when running open) is displayed.



► Press and hold [L/A] key and set the same values as for P2 using the [-] or [+] key.
► Press [+] key.
✓ Combustion manager is preset.



2. Adjusting the operating points

► Open oil shut off devices.

If a controlled shutdown or lockout occurs during setting:
► Briefly press [G] and [L/A] keys simultaneously.
► Press [+] key.
✓ Combustion manager changes to setting level.

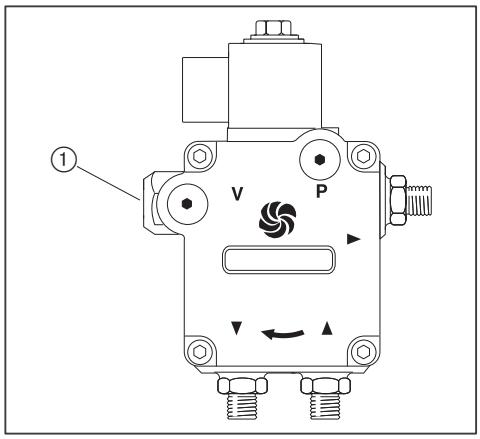
► Plug in bridging plug No. 7 on combustion manager.
✓ Burner starts in accordance with program sequence and stops in operating point P0 (ignition position).



Set pump pressure

The pump pressure must be set according to the nozzle selected [ch. 4.2].

► Check pump pressure at pressure gauge.
► Set pressure using pressure regulating screw ①:
- increase pressure: clockwise rotation,
- decrease pressure: anticlockwise rotation.



► Press [+] key.
✓ Burner drives to operating point P1.



► Press [+] key.
✓ Burner drives to operating point P9.

Adjust P9



- ► Check combustion values
- ► Determine combustion limit [ch. 7.5].
- ► Set excess air via air damper setting [L/A].

Adjust P1

- ► Press [-] key.
- ✓ Burner drives to stage 1 (P1).



- ► Check combustion values
- ► Determine combustion limit [ch. 7.5].
- ► Set excess air via air damper setting [L/A].

Adjust P0

- ► Press [-] key.
- ✓ Burner drives to operating point P0 (ignition position).



- ► Press and hold [L/A] key and set P0 to the same value as P1 using the [-] or [+] key.
- ► Check mixing pressure

The mixing pressure in ignition position must be between 1.0 4.0 mbar.

- ► If necessary, adjust mixing pressure via air damper setting [L/A].
- ► Press [-] key.
- ✓ Burner drives to stage 1 (P1).



- ► Press [+] key.
- ✓ Burner drives to stage 2 (P9).



Adjust P2 and P3

► Press [+] key.
✓ Switch off point stage 2 when running closed (P2) is displayed.



Set switch off point stage 2 when running closed (P2) to approx. 1/3 of the setting movement between P1 and P9.

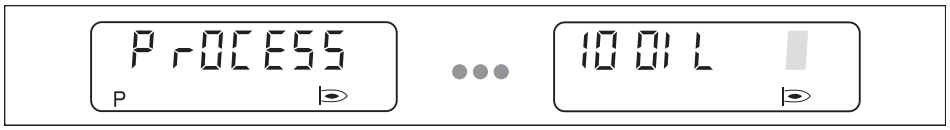
Formula

$$P2 = (P9 - P1) \cdot 0{,}33 + P1$$

► Press and hold [L/A] key and set P2 using [–] or [+] key.
► Press [+] key.
✓ Switch on point stage 2 when running open (P3) is displayed.



► Press and hold [L/A] key and set the same values as for P2 using the [-] or [+] key.
► Press [G] and [L/A] keys simultaneously.
✓ Combustion manager changes to operating level (10), depending on heat demand stage 1 or stage 2 is displayed.



3. Check start behaviour and on/off switch points

► Switch off and restart burner.
► Check start behaviour
► Check on and off switch point stage 2:
  ▪ excess air phase (CO content) prior to switch over must not be too long,
  ▪ flame must not fail.
► If necessary correct ignition position P0.
► If necessary correct switch on point P3 and switch off point P2.

If the existing settings have been changed:
► re-check start behaviour and on and off switch points.

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.

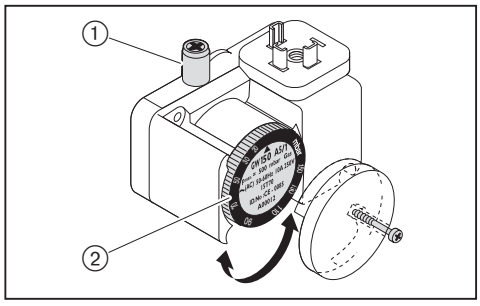
- ► Connect pressure measuring device to test point ① of the low gas pressure switch.
- ► Start burner and drive to full load.
- ► Slowly close gas isolating valve until either:
  - the O_2 content in the flue gas increases to above 7 %,
  - the flame stability considerably worsens,
  - the CO content 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 or if the combustion reaches a critical condition, 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

Depending on the burner application, optional equipment may be required for optimum operation [ch. 12.2].

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

7.3.2 Set air pressure switch

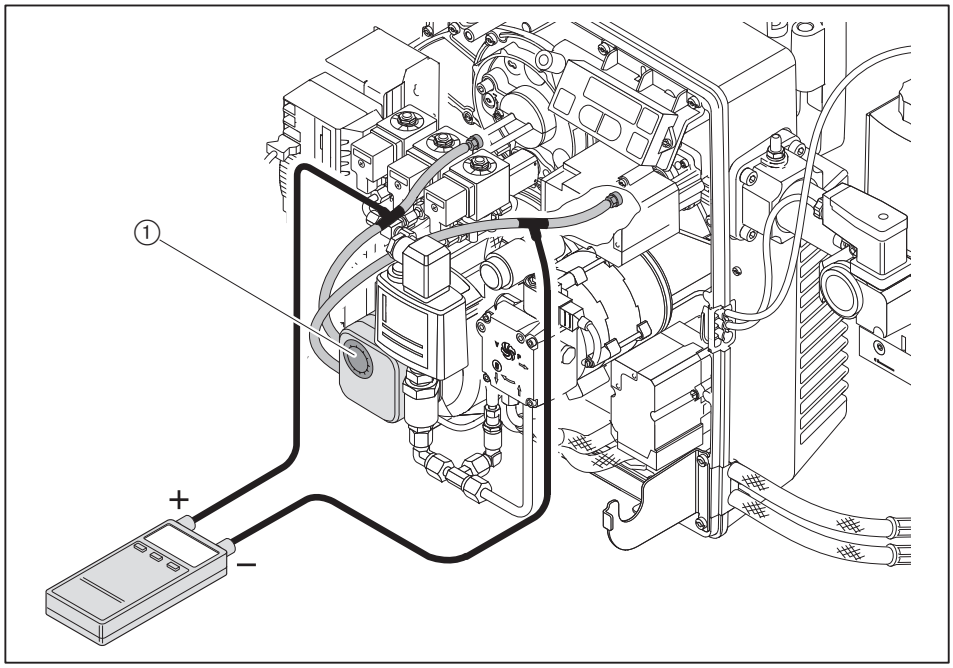
The switch point must be checked and if necessary adjusted during commissioning.

- ▶ 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	7.5 mbar
Switch point air pressure switch (80 %)	7.5 mbar × 0.8 = 6.0 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.

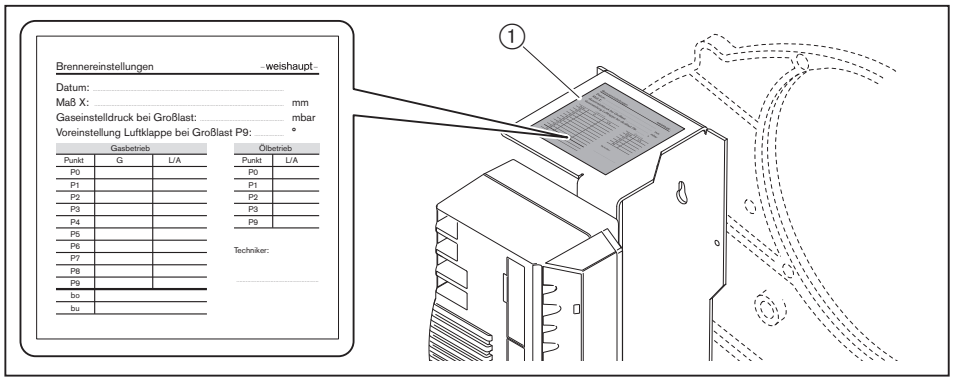


7.4 Concluding work

WARNING

Oil leakage from oil pressure measuring devices due to constant load
Oil pressure measuring devices could be damaged and cause environmental pollution through leakage.
► Remove oil measuring devices once commissioning is complete.

- ► Check control and safety devices.
- ► Remove gas pressure measuring devices and close all test points.
- ► Check soundness of test points.
- ► Check tightness of oil carrying components.
- ► Enter combustion values and settings in the commissioning record and/or test sheet.
- ► Enter setting values on the sticker ① supplied.
- ► Adhere sticker to the burner.
- ► Mount cover on burner.
- ► Set fuel selection switch to the required position.
- ► 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.



Gasbetrieb		
Punkt	G	L/A
P0		
P1		
P2		
P3		
P4		
P5		
P6		
P7		
P8		
P9		
bo		
bu		

Ölbetrieb	
Punkt	L/A
P0	
P1	
P2	
P3	
P9	

7.5 Check combustion

Determine excess air

- ► Slowly close air damper(s) in the relevant operating point, until the combustion limit is reached (CO content approx. 100 ppm or soot number approx. 1).
- ► Measure and document O_2 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_2 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 capacity in partial load to avoid condensation in the flue gas ducts, except on condensing units.
  - Reduce burner capacity 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_L) near the air damper(s).
- ► Measure oxygen content (O_2) and flue gas temperature (t_A) 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_A Flue gas losses [%]

t_A Flue gas temperature [°C]

t_L Combustion air temperature [°C]

O_2 Volumetric content of oxygen in dry flue gas [%]

Fuel factors	Natural Gas	Liquid Petroleum Gas	Fuel oil
A2	0.66	0.63	0.68
B	0.009	0.008	0.007

7.6 Calculate gas throughput

Formula symbol	Explanation	Example values
V_B	Operating volume [m^3/h] Volume measured at gas meter at current pressure and temperature (gas throughput).	–
V_N	Standard volume [m^3/h] Volume gained by gas at 1013 mbar and 0 °C.	–
f	Conversion factor	–
Q_N	Heat rating [kW]	500 kW
η	Boiler efficiency (e. g. 92 % ≙ 0.92)	0.92
H_i	Calorific value [kWh/m^3] at 0 °C and 1013 mbar	10.35 kW/m^3 (Natural Gas E)
t_{Gas}	Gas temperature at gas meter [°C]	10 °C
P_{Gas}	Pressure at gas meter [mbar]	30 mbar
P_{Baro}	Barometric air pressure [mbar], see table	500 m ≙ 955 mbar
V_G	Gas throughput determined at gas meter	1.85 m^3
T_M	Measuring time [seconds]	120 seconds

Calculate normal volume

► Calculate the normal volume (V_N) using the following formula.

$$V_N = \frac{Q_N}{\eta \cdot H_i} \qquad V_N = \frac{500\ kW}{0.92 \cdot 10.35\ kW/m^3} = 52.5\ m^3/h$$

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.

$$f = \frac{P_{Baro} + P_{Gas}}{1013} \cdot \frac{273}{273 + t_{Gas}} \qquad f = \frac{955 + 30}{1013} \cdot \frac{273}{273 + 10} = 0.938$$

Calculate operating volume (gas throughput) required

$$V_B = \frac{V_N}{f} \qquad V_B = \frac{52.5\ m^3/h}{0.938} = 56.0\ m^3/h$$

Determine current operating volume (gas throughput)

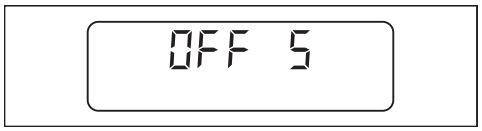
► Measure gas throughput (V_G) at gas meter, measuring time (T_M) should be a minimum of 60 seconds.
► Calculate operating volume (V_B) using the following formula.

$$V_B = \frac{3600 \cdot V_G}{T_M} \qquad V_B = \frac{3600 \cdot 1.85\ m^3}{120\ s} = 55.5\ m^3/h$$

7.7 Subsequent optimisation of operating points

If necessary, the combustion values can subsequently be corrected.

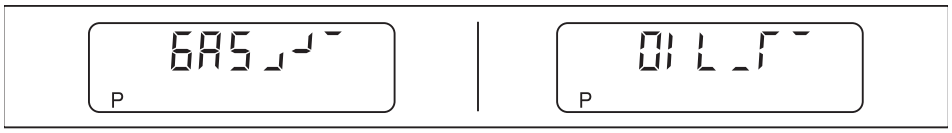
► Unplug bridging plug No. 7 on combustion manager.
✓ Combustion manager drives to Standby.



► Briefly press [–] and [+] simultaneously.
✓ Combustion manager changes to access level.



► Press [+].
✓ Combustion manager changes to setting level.



► Plug in bridging plug No. 7 on combustion manager.
✓ Burner starts and stops in operating point P0 (ignition position).
► Initiate the other operating points using the [+] or [-] key and optimise if required.

Exit setting level

Gas operation	Oil operation
► Press [G] and [L/A] simultaneously. ✓ The upper operating limit (bo) is displayed. ► Press [G] and [L/A] simultaneously. ✓ The lower operating limit is displayed (bu). ► Press [G] and [L/A] simultaneously. ✓ The combustion manager changes to operating level.	► Press [G] and [L/A] simultaneously. ✓ The combustion manager changes to operating level.

8 Shutdown

For breaks in operation:
- ► Switch off burner.
- ► Close fuel shut off devices.

9 Servicing

9.1 Notes on servicing



DANGER

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.



DANGER

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 restart.



WARNING

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
- oil solenoid valve
- multifunction assembly / double gas valve,
- 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.

Following servicing



DANGER

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 oil and gas carrying components.
► Check function of:
- ignition,
- flame monitoring,
- oil pump (pump pressure and suction resistance),
- gas carrying components (gas connection pressure and setting pressure),
- pressure switch,
- control and safety devices.

► Check combustion values, if necessary re-adjust the burner.
► Enter combustion values and settings in the commissioning record.
► Enter setting values on the sticker supplied.
► Adhere sticker to the burner.
► Refit cover.

9.2 Service plan

Components	Criteria / design lifespan(1	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(2	► Replace
Ignition cable	Damage	► Replace
Ignition electrode	Soiling	► Clean
	Damage/wear	► Replace
Combustion Manager	250 000 burner starts or 10 years(2	► Replacement recommended
Flame sensor	Soiling	► Clean
	Damage 250 000 burner starts or 10 years(2	► Replace
Flame tube/diffuser	Soiling	► Clean
	Damage	► Replace
Oil nozzle	Soiling/wear	► Replace Recommendation: at least every 2 years
Oil pump filter	Soiling	► Clean
Oil hose	Damage/oil escaping	► Replace Recommendation: every 5 years
Pressure hose nozzle assembly	Damage/oil escaping 5 years	► Replace
Oil solenoid valve	Soundness 250 000 burner starts or 10 years(2	► Replace oil pump or solenoid valve

(1 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.
(2 If a criterion is reached, carry out maintenance measures.

Components	Criteria / design lifespan[1]	Service procedure
Oil pressure switch	Switch point	▶ Check
	250 000 burner starts or 10 years[2]	▶ Replace
Double gas valve, multifunction assembly with valve testing system (valve proving)	Fault identified	▶ Replace
Double gas valve, multifunction assembly without valve testing system (valve proving)	Function / soundness less than DN 25: 200 000 burner starts or 10 years[2] DN 25 to DN 65: 100 000 burner starts or 10 years[2] DN 80 50 000 burner starts or 10 years[2]	▶ Replace
Breather plug multifunction assembly	Soiling	▶ Replace
Filter insert multifunction assembly, gas filter	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[2]	▶ Replace

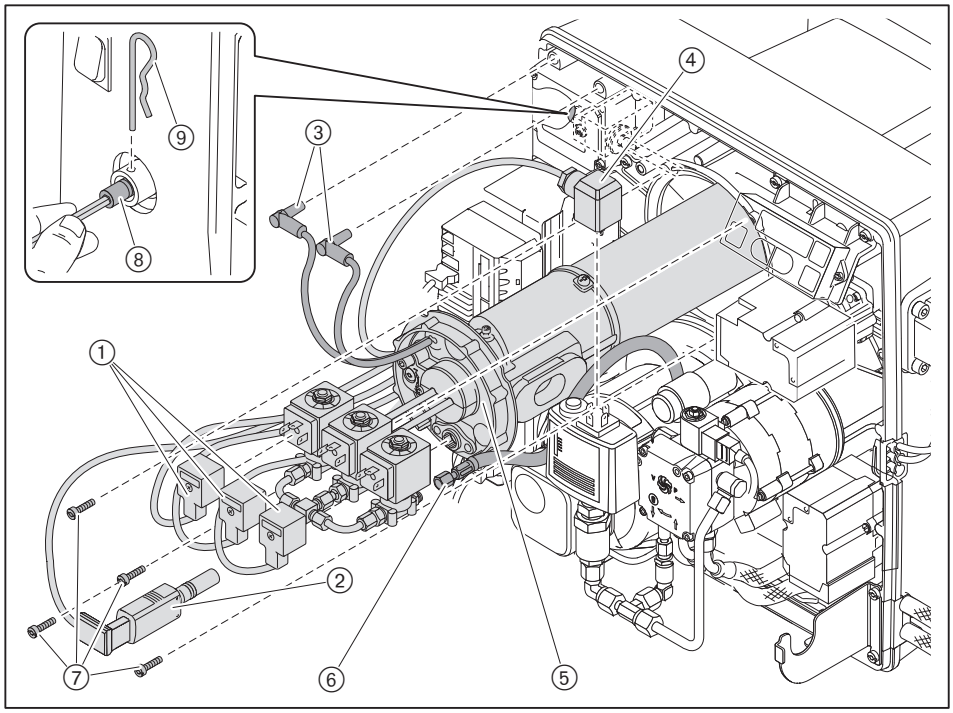
[1] The specified design lifespan applies for typical use in heating, hot water and steam systems as well as for thermal process systems to EN 746.
[2] If a criterion is reached, carry out maintenance measures.

9.3 Removing and refitting mixing head

Observe notes on servicing [ch. 9.1].

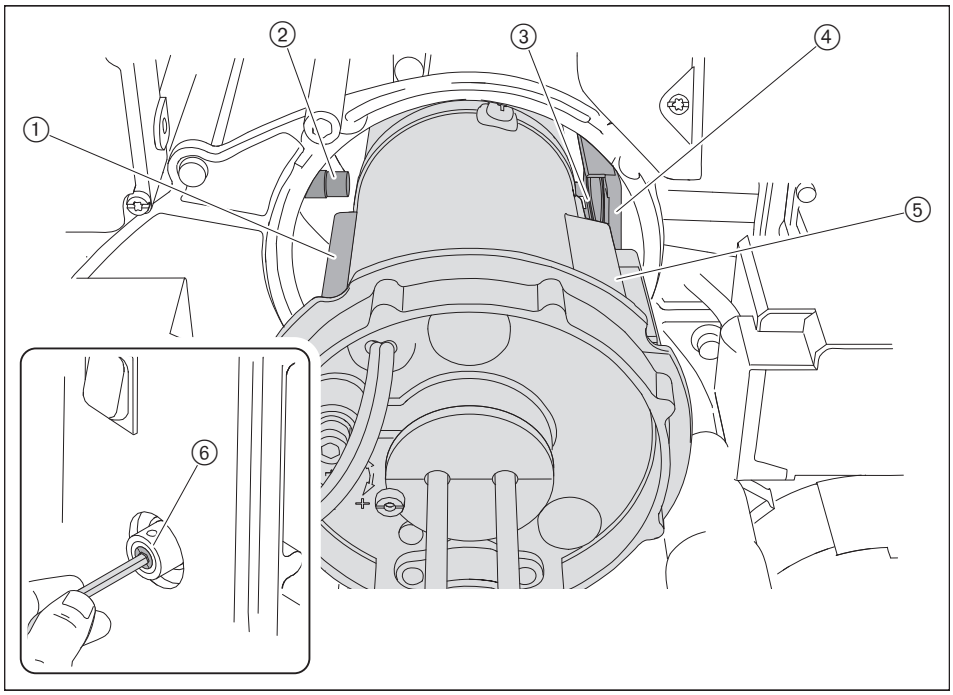
Removing

- ► Remove plug for solenoid valves ① and oil pressure switch ④.
- ► Remove flame sensor ②.
- ► Unplug ignition cables ③ from ignition unit.
- ► Loosen oil hoses ⑥.
- ► Remove spring cotter ⑨.
- ► Unscrew locknut ⑧ up to the start of the thread.
- ► Remove screws ⑦.
- ► Remove mixing head ⑤.



Refitting

- ► Check O ring ③ is clean and correctly seated, replace if necessary.
- ► Install mixing head correctly:
  - ▪ the locknut ② is positioned in the guide rail ①,
  - ▪ the combustion head ⑤ is positioned in the gas connection section ④.
- ► Screw in locknut ② until it is flush with the bearing block ⑥.
- ► Insert mixing head completely and secure with screws.
- ► Tighten locknut ②.
- ► Refit spring cotter.
- ► Refit oil hose, flame sensor and plugs.



9.4 Set mixing head

Observe notes on servicing [ch. 9.1].

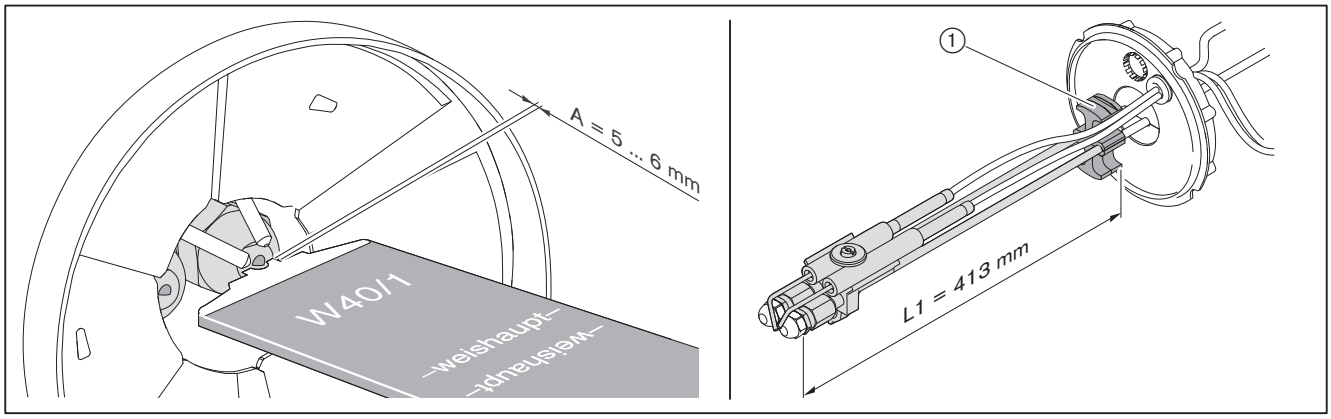
Dimension L1 and Lx changes according to the combustion head extension used.

► Remove mixing head [ch. 9.3].

Set nozzle distance

► Insert setting gauge and check dimension A (5 … 6 mm).

If the value measured deviates from dimension A:
► Remove nozzle assembly [ch. 9.5].
► Check dimension L1 and if necessary adjust by moving the carrier ①.

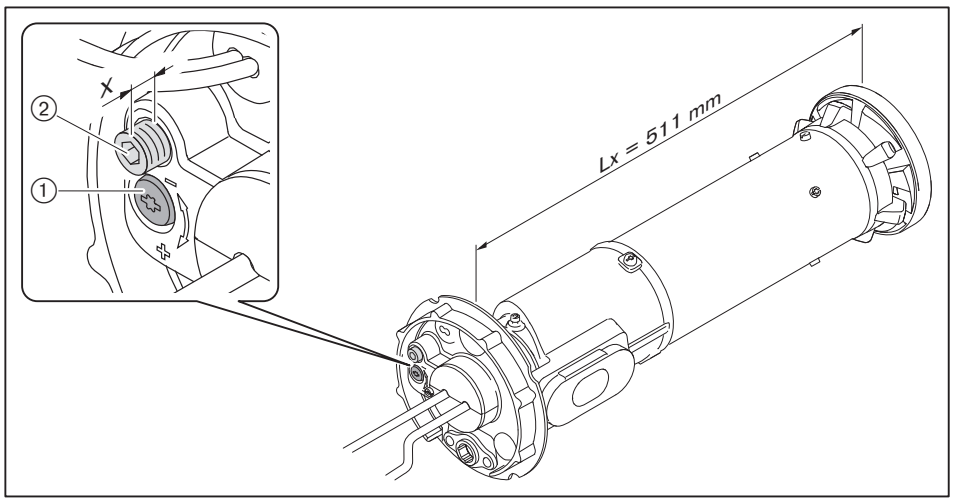


Check basic setting

► Turn setting screw ① until the indicating bolt ② is flush with the nozzle assembly cover (dimension X = 0 mm).
► Check dimension Lx.

If the value measured deviates from dimension Lx:
► Check position of diffuser [ch. 9.7].

If the measured value still deviates:
► Set dimension Lx by turning the setting screw ①.
► Remove plug from indicating bolt ②.
► Turn indicating bolt until it is flush with the nozzle assembly cover (dimension X = 0 mm).
► Replace plug.



9.5 Removing and refitting nozzle assembly

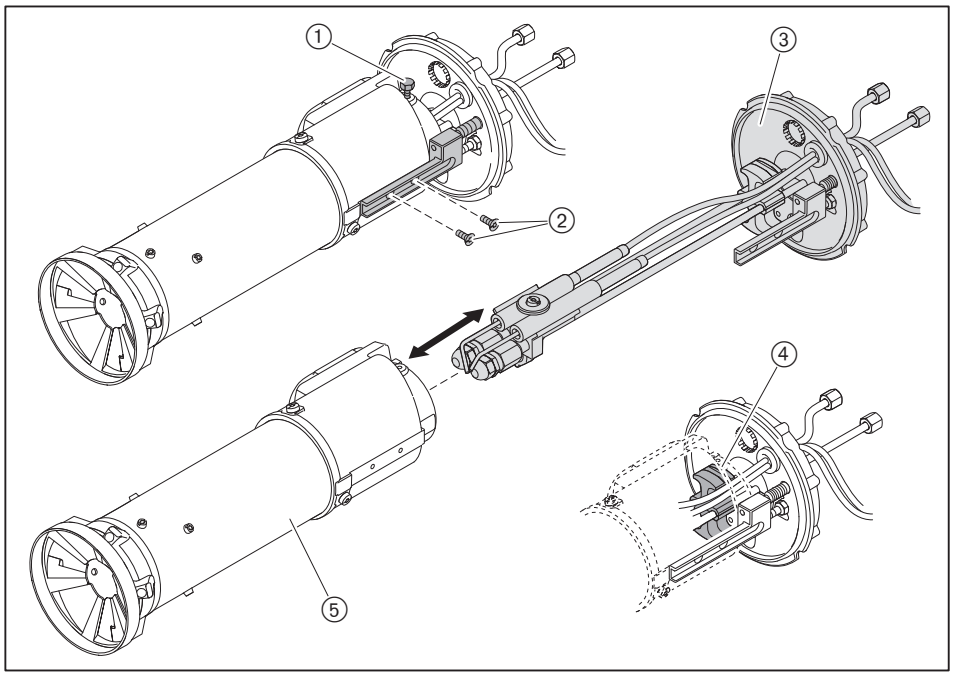
Observe notes on servicing [ch. 9.1].

Removing

- ► Remove mixing head [ch. 9.3].
- ► Undo screw ①.
- ► Remove screws ②.
- ► Remove nozzle assembly ③ from combustion head ⑤.

Refitting

- ► Refit nozzle assembly in reverse order ensuring that screw ① is positioned in the groove of the retaining ring ④.

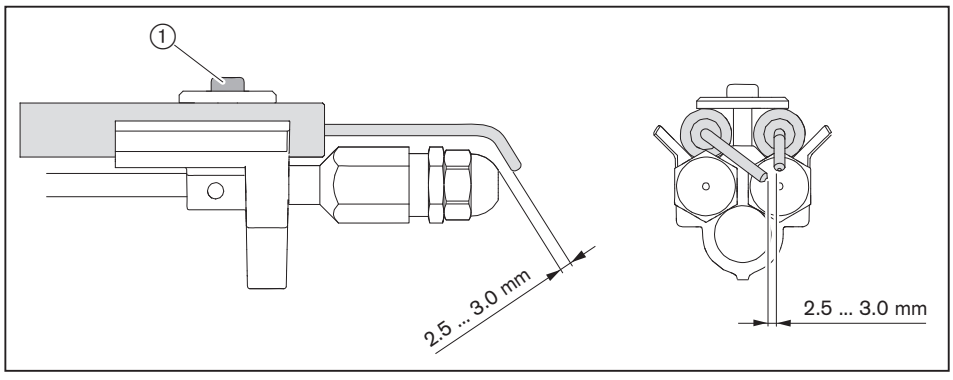


9.6 Set ignition electrodes

Observe notes on servicing [ch. 9.1].

The ignition electrodes must not touch the nozzle's atomising cone.

- ► Remove mixing head [ch. 9.3].
- ► Remove nozzle assembly [ch. 9.5].
- ► Undo screw ①.
- ► Set ignition electrodes and tighten screw.

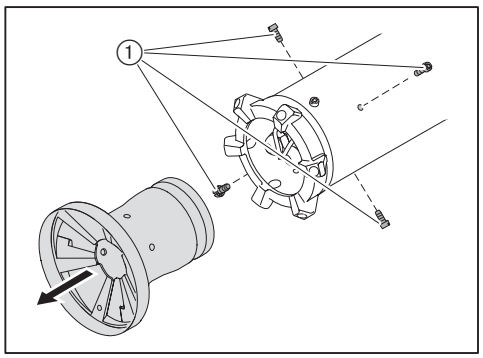


9.7 Removing and refitting diffuser

Observe notes on servicing [ch. 9.1].

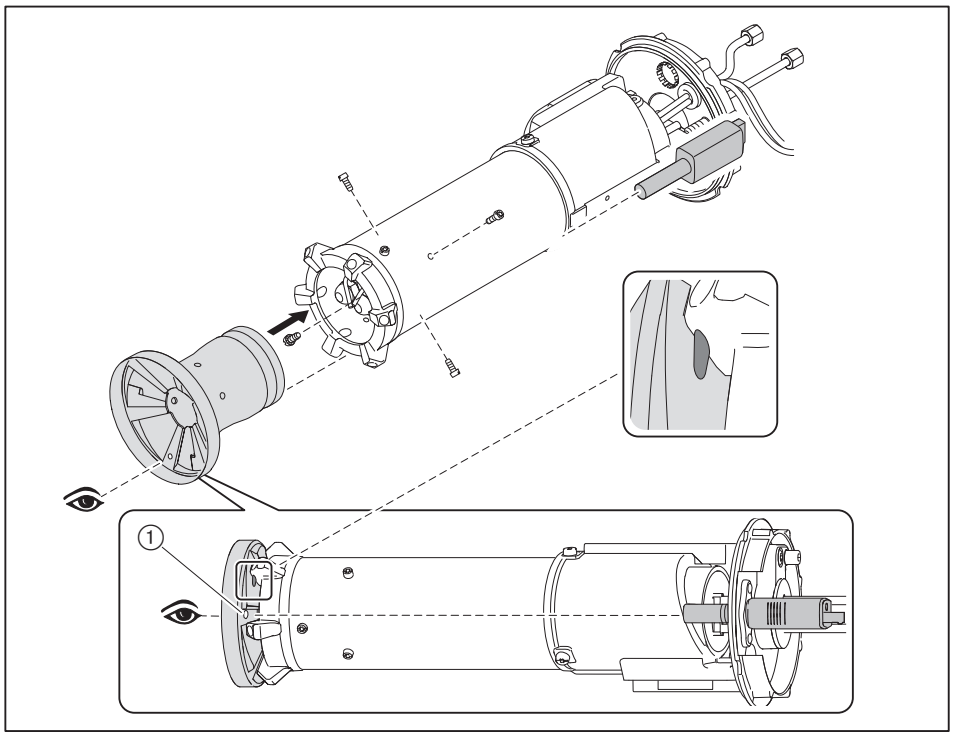
Removing

- ► Remove mixing head [ch. 9.3].
- ► Remove the 4 screws ① on the mixing tube.
- ► Remove the diffuser.



Refitting

- ► Refit diffuser in reverse order, and:
  - align exposure hole ① with flame sensor,
  - position diffuser on distributor ring and turn to stop.

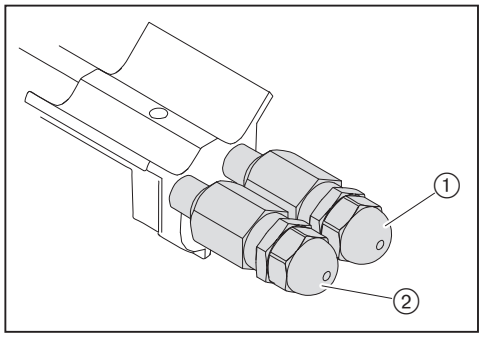


9.8 Replace nozzles

Observe notes on servicing [ch. 9.1].

Do not clean nozzles, always fit new nozzles.

- ► Remove mixing head [ch. 9.3].
- ► Remove nozzle assembly [ch. 9.5].
- ► Remove ignition electrodes.
- ► Fit new nozzles ensuring the are seated tightly.
- ► Fit and adjust ignition electrodes [ch. 9.6].

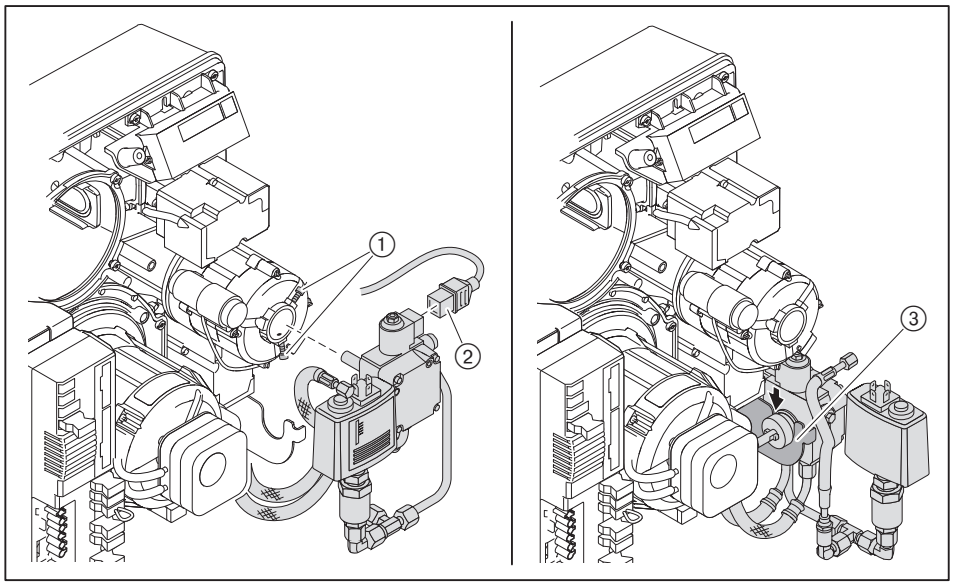


① Stage 1 nozzle
② Stage 2 nozzle

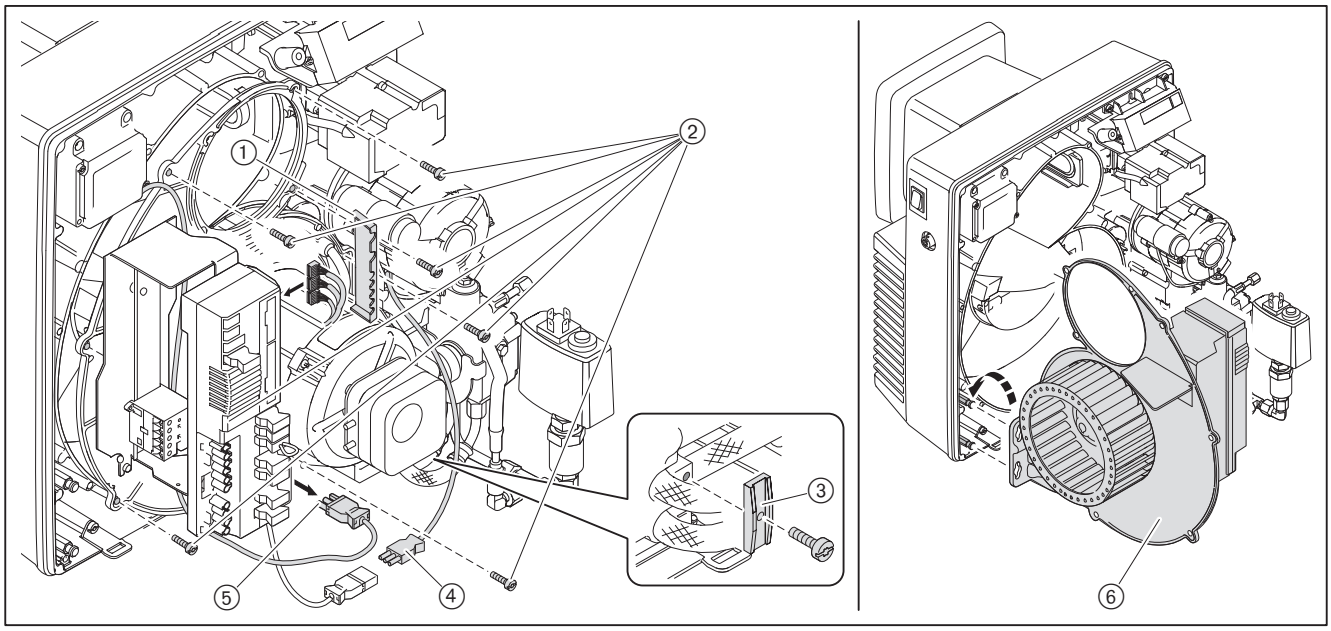
9.9 Service position

Observe notes on servicing [ch. 9.1].

- ► Remove mixing head [ch. 9.3].
- ► Remove solenoid valve plug ②.
- ► Undo screws ①.
- ► Remove pump and place it on to the bracket ③.



- ► Remove cover ① and unplug all plugs.
- ► Unplug plugs ④ and ⑤.
- ► Remove support ③ for oil hoses.
- ► Hold housing cover and remove screws ②.
- ► Place housing cover ⑥ into service position



- ► When refitting the oil pump ensure correct alignment of the coupling [ch. 9.11].

9.10 Removing and refitting fan wheel

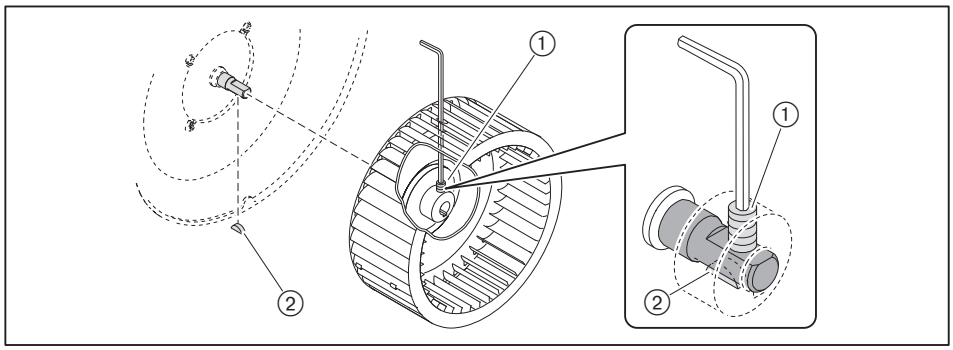
Observe notes on servicing [ch. 9.1].

Removing

- ► Place housing cover into service position [ch. 9.9].
- ► Remove grub screw ① and remove fan wheel.

Refitting

- ► Refit fan wheel in reverse order and
  - ensure correct alignment of the spring washer ②,
  - screw in new grub screw ①,
  - turn fan wheel to ensure it moves freely.



9.11 Removing and refitting oil pump

Observe notes on servicing [ch. 9.1].

Removing

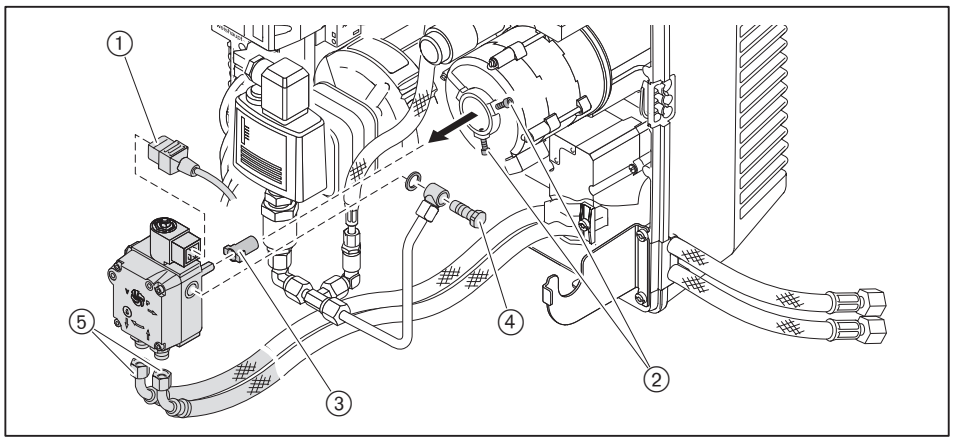
- ► Close fuel shut off devices.
- ► Remove plug ①.
- ► Undo screws ②.
- ► Remove oil hoses ⑤ and screwed unions ④.

Refitting

- ► Install oil pump in reverse order and:
  - ensure correct alignment of coupling ③,
  - ensure correct allocation of flow and return of the oil hoses.

CAUTION

Damage to the oil pump caused by incorrect connection
Mixing up supply and return can damage the oil pump.
- ► Ensure correct connection of oil hoses to the supply and return of the pump.

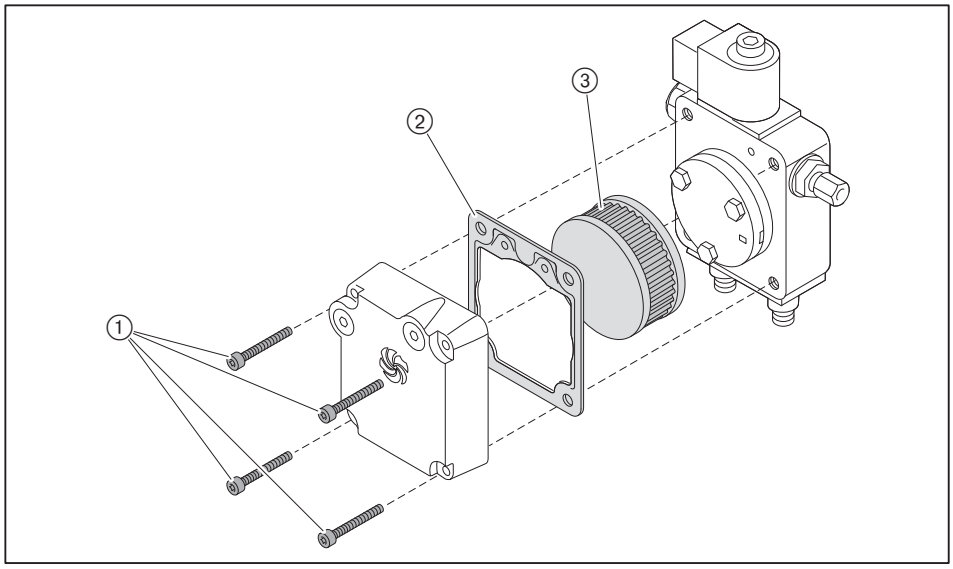


9.12 Removing and refitting oil pump filter

Observe notes on servicing [ch. 9.1].

Removing

- ► Close fuel shut off devices.
- ► Remove bolts ①.
- ► Remove pump cover.
- ► Replace filter ③ and gasket ②.



Refitting

- ► Refit filter in reverse order ensuring sealing surfaces are clean.

9.13 Removing and refitting air damper actuator

Observe notes on servicing [ch. 9.1].

Removing

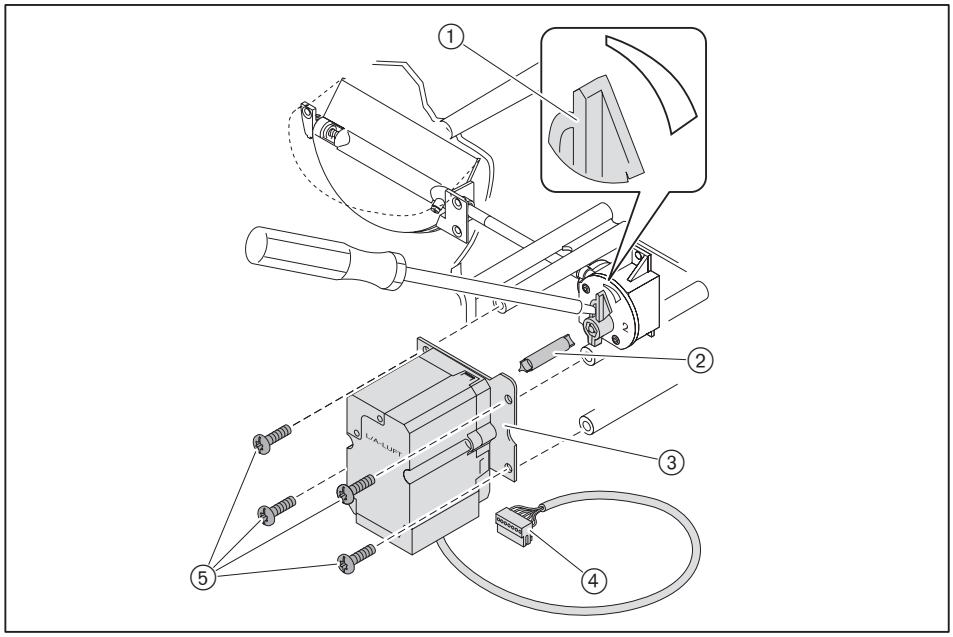
- ► Remove actuator plug ④ from combustion manager.
- ► Remove screws ⑤.
- ► Remove actuator with fixing plate ③ and shaft ②.

Refitting

CAUTION

Damage to the actuator caused by turning the hub
Actuator could be damaged.
- ► Do not turn hub manually or with tool.

- ► Plug in actuator plug ④ at the combustion manager.
- ► Unplug bridging plug No. 7 on combustion manager.
- ► Switch on voltage supply.
- ✓ The combustion manager checks the actuator and drives to the reference point.
- ► Interrupt voltage supply.
- ► Fit shaft ② to actuator.
- ► Set indicator ① on angle drive to 0 (air damper Closed) and hold.
- ► Fit shaft with actuator to angle drive.
- ► Secure actuator.
- ► Plug in bridging plug No. 7 on combustion manager.



9.14 Removing and refitting angle drive

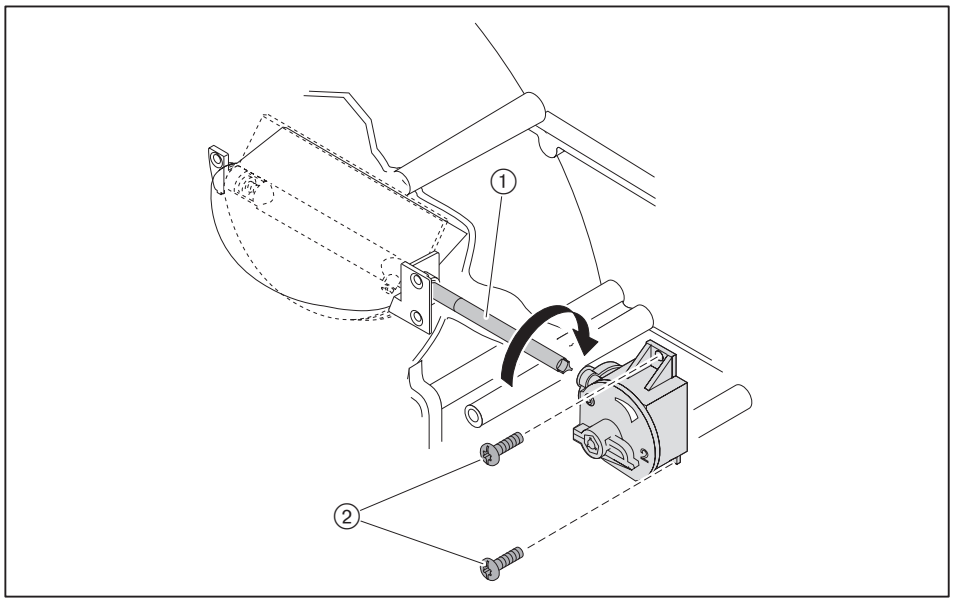
Observe notes on servicing [ch. 9.1].

Removing

- ► Remove air damper actuator [ch. 9.13].
- ► Remove screws ②.
- ► Remove angle drive.

Refitting

- ► Turn shaft ① to its stop (air damper Open) and hold.
- ► Fit angle drive to shaft.
- ► Secure angle drive.



9.15 Removing and refitting gas butterfly valve actuator

Observe notes on servicing [ch. 9.1].

Removing

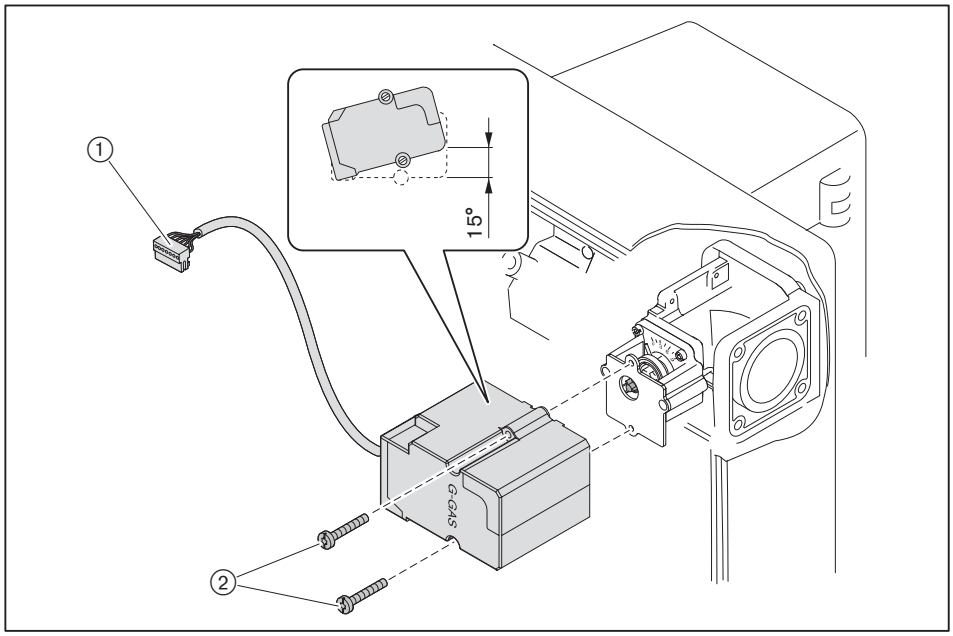
- ► Remove actuator plug ① from combustion manager.
- ► Remove screws ②.
- ► Remove actuator.

Refitting

CAUTION

Damage to the actuator caused by turning the hub
Actuator could be damaged.
- ► Do not turn hub manually or with tool.

- ► Plug in actuator plug ① at the combustion manager.
- ► Unplug bridging plug No. 7 on combustion manager.
- ► Switch on voltage supply.
- ✓ The combustion manager checks the actuator and drives to the reference point.
- ► Interrupt voltage supply.
- ► Fit actuator rotated by approx. 15°.
- ► Secure actuator.
- ► Plug in bridging plug No. 7 on combustion manager.



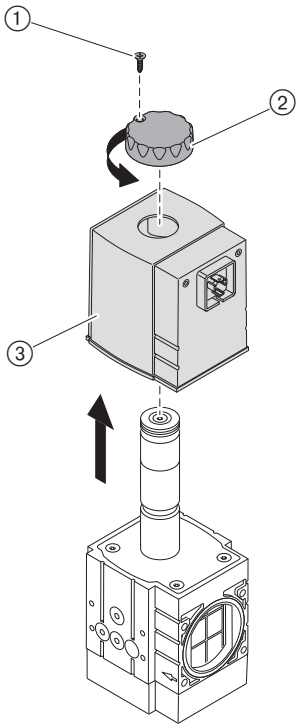
9.16 Replacing double gas valve coil

Observe notes on servicing [ch. 9.1].

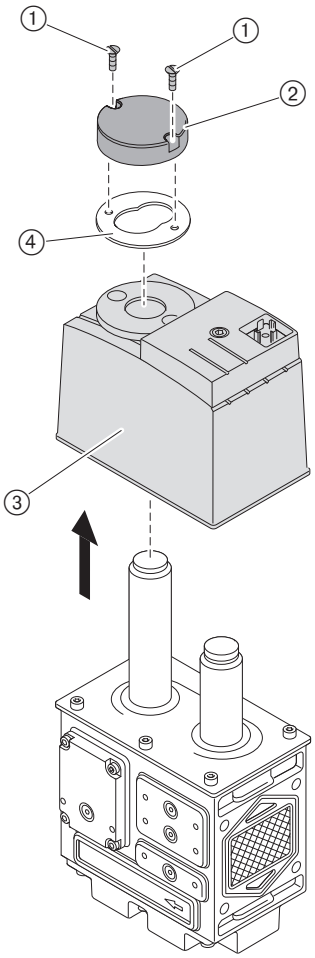
Ensure correct voltage and solenoid number when replacing the solenoid coil.

- ► Undo screw(s) ①.
- ► Remove cap ②.
- ► With DMV also remove metal plate ④.
- ► Replace solenoid coil ③.

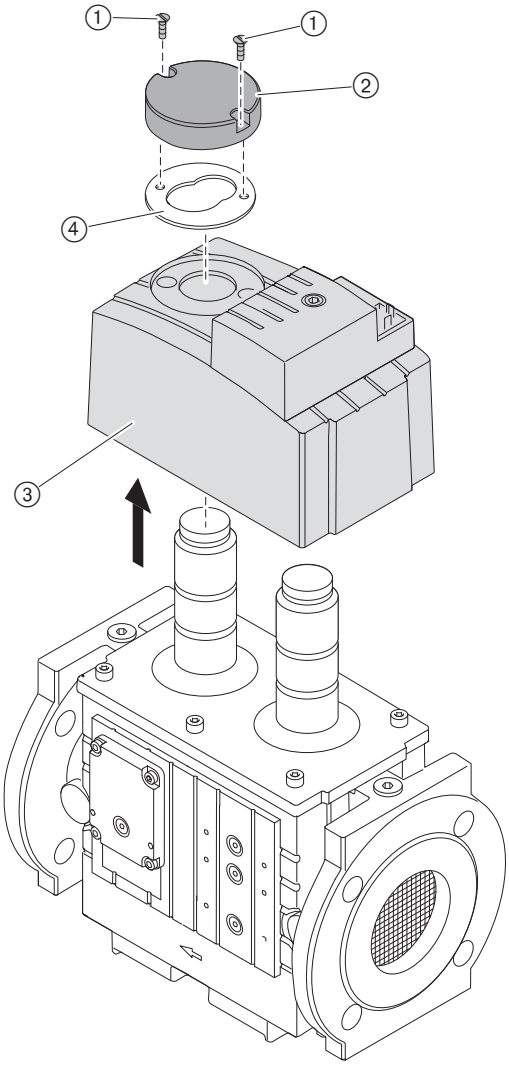
W-MF 5xx



DMV 525



DMV 5065 / DMV 5080

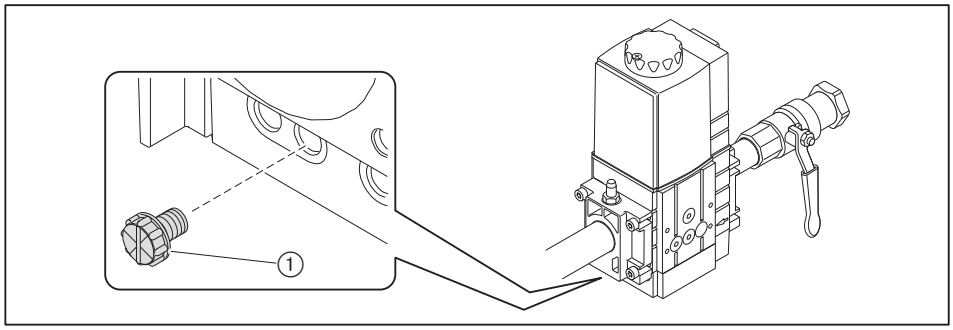


9.17 Replace breather plug of multifunction assembly

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.



9.18 Removing and refitting filter insert of multifunction assembly

Observe notes on servicing [ch. 9.1].

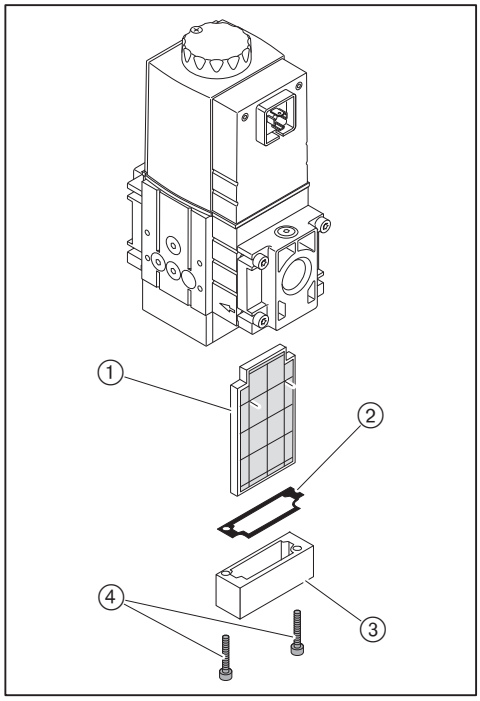
Ensure no dirt enters the multifunction assembly when removing and replacing the filter insert.

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. 7.1.4].
- ► Vent gas valve train [ch. 7.1.5].

9.19 Removing and refitting filter insert in gas filter

Observe notes on servicing [ch. 9.1].

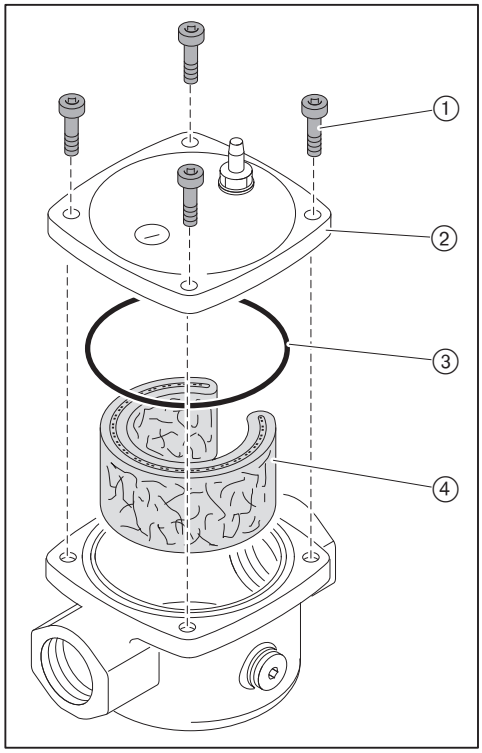
Ensure no dirt enters the multifunction assembly when removing and replacing the filter insert.

Removing

- ► Remove screws ①.
- ► Remove cover ②.
- ► Remove filter insert ④.
- ► If necessary replace filter insert ④ and O ring ③.

Refitting

- ► Refit in reverse order ensuring correct alignment of filter insert ④ and O ring ③.



- ► Carry out soundness test [ch. 7.1.4].
- ► Vent gas valve train [ch. 7.1.5].

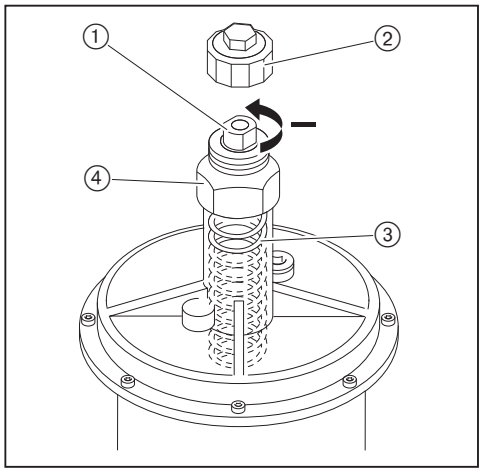
9.20 Replace spring on pressure regulator

Observe notes on servicing [ch. 9.1].

If the setting range of the spring used in the pressure regulator is insufficient, a different type of spring can be selected.

Low pressure regulator

- ▶ Remove end cap ②.
- ▶ Turn adjusting screw ① anticlockwise.
- ✓ The spring ③ is de-energised.
- ▶ Remove complete setting mechanism ④.
- ▶ Change spring.
- ▶ Stick info label for new spring to name plate.

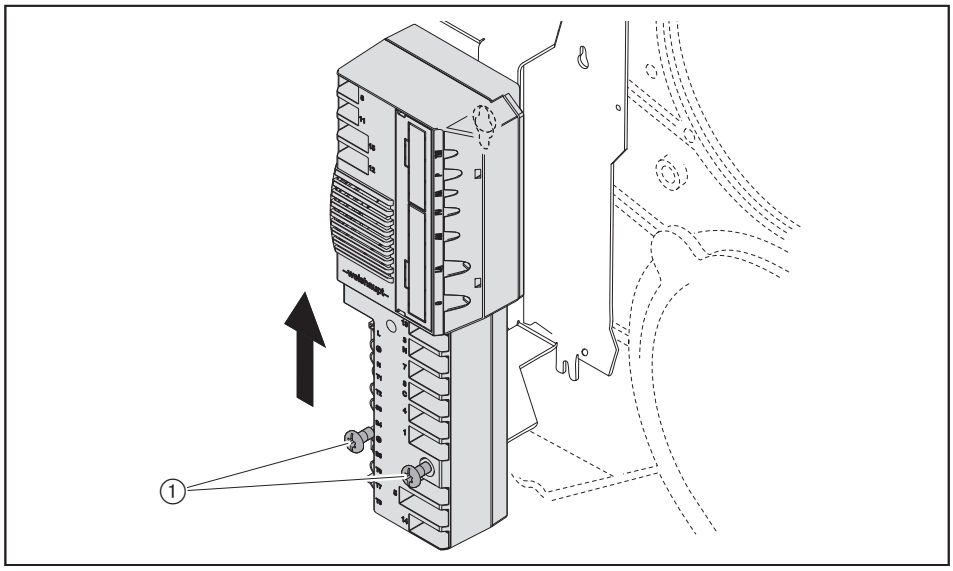


Spring type/colour	Setting pressure range
orange	5 … 20 mbar
blue	10 … 30 mbar

9.21 Replacing the combustion manager

Observe notes on servicing [ch. 9.1].

- ► Unplug all plugs.
- ► Undo screws ①.
- ► Push combustion manager upwards and replace.

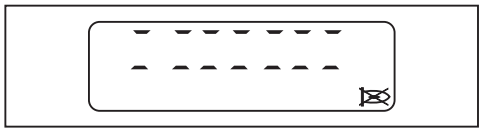


- ► Connect all plugs again.

1. Preset gas side and adjust

- ► Set fuel selection switch to GAS.
- ► Unplug bridging plug No. 7 on combustion manager.
- ► Switch on voltage supply.

✓ The unprogrammed condition of the combustion manager is indicated by a flashing display.
The burner goes to lockout.



- ► Press [ENTER].

✓ Burner has been reset.
✓ Combustion manager drives to Standby.

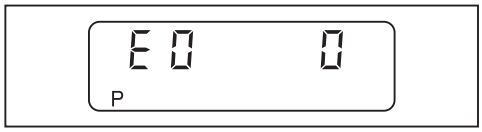


- ► Activate parameter level [ch. 6.2.3].
- ► Set parameter 7 and 8 to 1.
- ► Press [G] and [L/A] simultaneously.

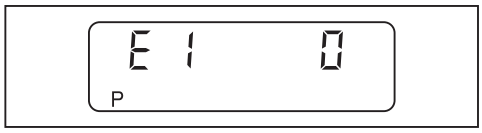
✓ Combustion manager changes to access level.



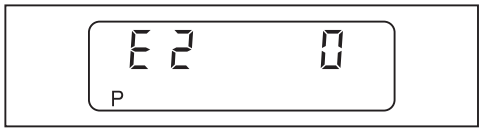
► Press [+].
✓ Setting level (parameter E0) is displayed.



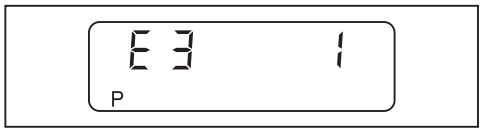
► Set value 1 (dual fuel burner) using [Enter] and [+] key.
► Press [+].
✓ E1 is displayed.



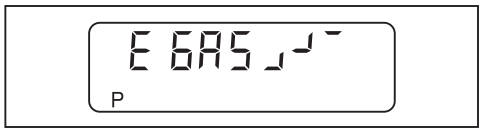
► Adopt value 0 (intermittent operation).
► Press [+].
✓ E2 is displayed.



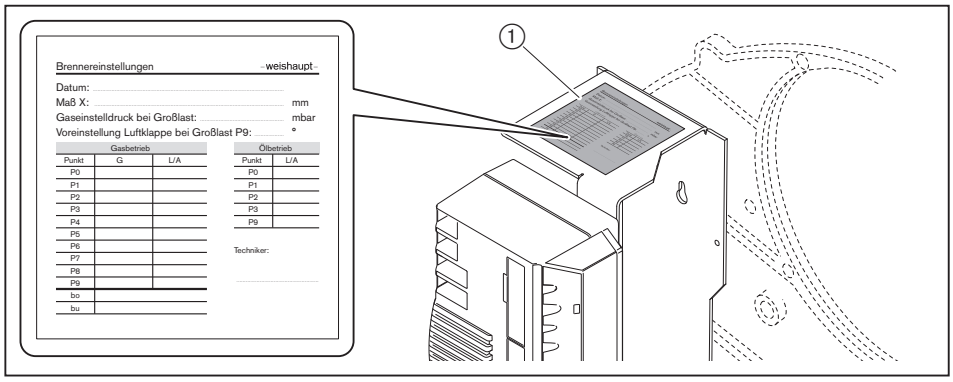
► Adopt value 0 (flame sensor FLW), if necessary adjust using [Enter] and [-] key.
► Press [+].
✓ E3 is displayed.



► Adopt value 1 (fan control), if necessary set using [ENTER] and [–] or [+] key.
► Press [+].
✓ Combustion manager changes into the setting level for step points.



► Determine the operating points for gas operation from the sticker ①.
► Set the burner using these operating points and adjust [ch. 7.2.1].



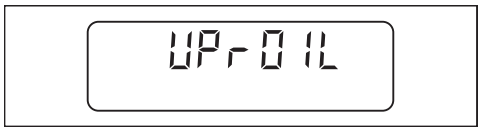
Deactivate E-Parameters

Following commissioning, set parameter E to 0.

► Press [Enter] and [+] keys simultaneously for approx. 2 seconds.
✓ The parameter level is activated.
► Press [+].
► Press [Enter] key until parameter E is displayed.
► Set parameter E to 0 .
✓ E-Parameters are not shown in the setting level.
► Press [Enter] key twice.
✓ The combustion manager returns to the operating level.

2. Preset oil side and adjust

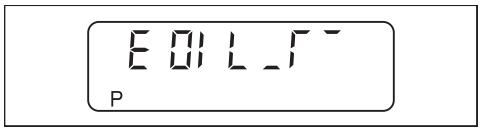
► Set fuel selection switch to OIL.
► Unplug bridging plug No. 7 on combustion manager.
► Switch on voltage supply.
✓ The display shows the unprogrammed condition of the combustion manager.



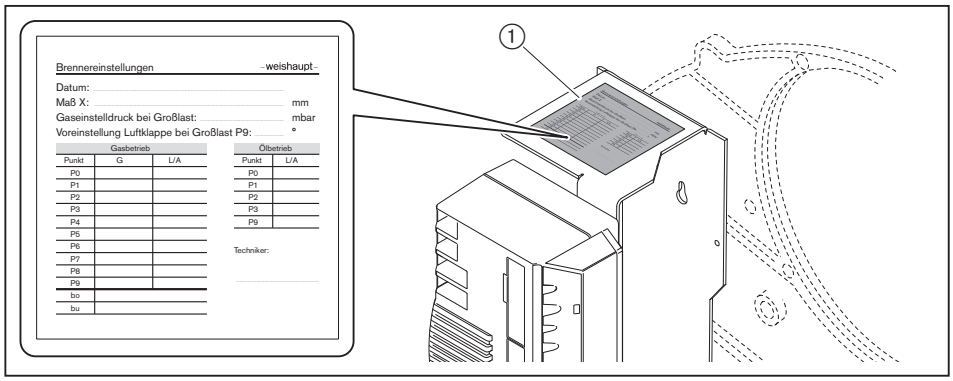
► Press [G] and [L/A] simultaneously.
✓ Combustion manager changes to access level.



► Press [+].
✓ Combustion manager changes into the setting level for step points.



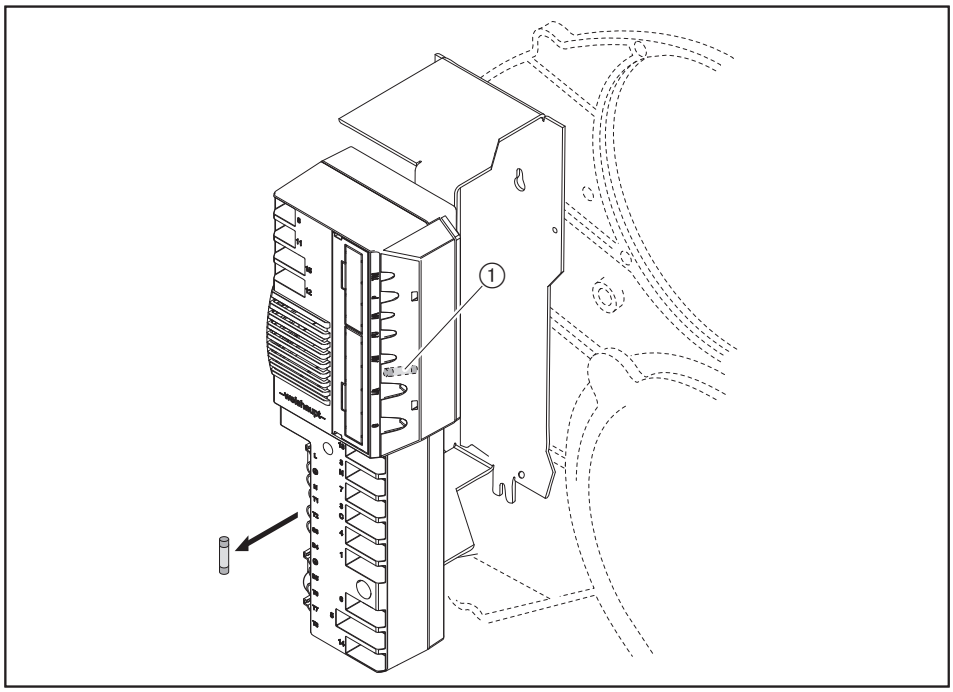
► Determine the operating points for oil operation from the sticker ①.
► Set the burner using these operating points and adjust [ch. 7.2.2].



9.22 Replacing the fuse

Observe notes on servicing [ch. 9.1].

- ▶ Unplug connection plug from combustion manager.
- ▶ Replace fuse (T6,3H, IEC 127-2/5).



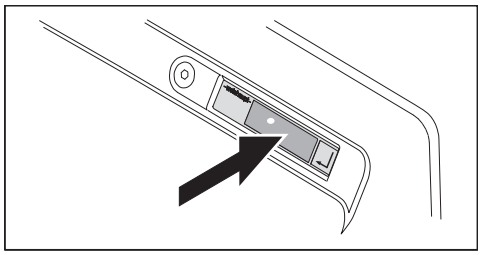
① Replacement fuse

10 Troubleshooting

10.1 Procedures for fault conditions

The combustion manager recognises irregularities of the burner and displays these on the display and operating unit.

The following conditions can occur:
- Display off [ch. 10.1.1],
- Display OFF [ch. 10.1.2]
- Display flashes [ch. 10.1.3].



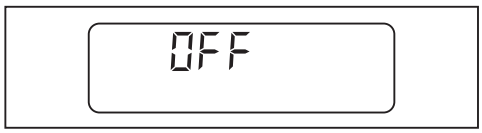
10.1.1 Display off

The following faults may be corrected by the operator:

Fault	Cause	Rectification
Burner not operating	External fuse has tripped(1	▸ Check fuse.
	Heating switch is set to Off	▸ Switch on heating switch.
	Temperature limiter or pressure limiter on heat exchanger has triggered(1	▸ Reset temperature limiter or pressure limiter on heat exchanger.
	Low water safety interlock on heat exchanger has triggered(1	▸ Top up water. ▸ Reset low water safety interlock on heat exchanger.

(1 Notify your heating contractor or Weishaupt Customer Service if the problem occurs repeatedly.

10.1.2 Display OFF

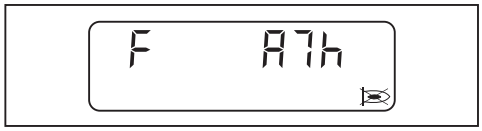


The following faults may be corrected by the operator:

Fault	Cause	Rectification
Burner not operating	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.

10.1.3 Display flashes

A burner fault has occurred. The burner is in lockout. The error code is displayed flashing.



- ► Read error code, e. g. `A7h`.
- ► Rectify cause of fault [ch. 10.2].

Resetting



WARNING

Damage resulting from incorrect fault repair
Incorrect fault repair can cause damage to the equipment and injure personnel.
- ► Do not carry out more than 2 lockout resets successively.
- ► Faults must be rectified by qualified personnel.

- ► Press [ENTER].
- ✓ Burner has been reset.

Fault memory

The last 9 faults are saved in the fault memory [ch. 6.2.2].

10.1.4 Detailed fault codes

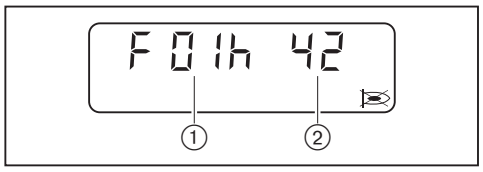
Additional information, which breaks down the error in more detail, can be displayed by pressing a button.

The first detailed fault code and the second detailed fault code are only relevant for the following faults:

- 03h,
- 18h,
- 41h,
- 65h.

First detailed fault code / operating status

► Press [+] key.



① First detailed fault code
② Operating status

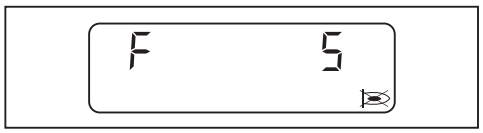
Second detailed fault code

► Press [–] and [+] keys simultaneously.



Repetition counter

► Press key [G].



10.2 Rectifying faults

The following faults must only be rectified by qualified personnel:

Fault codes	Cause	Rectification
01h … 02h 05h … 0bh 0dh … 10h 13h … 15h 17h 19h … 1Ch 1Eh 43h 45h 50h 56h A0h ACh b0h … b2h b9h	Internal unit fault	▶ Interrupt the voltage supply temporarily ▶ Reset the burner, if fault reoccurs replace the combustion manager [ch. 9.21]

The following faults must only be rectified by qualified personnel:

Fault codes	Cause	Rectification
03h	Ambient temperature too high	▶ Interrupt the voltage supply temporarily ▶ Check ambient temperature [ch. 3.4.3] ▶ Reset the burner, if fault reoccurs replace the combustion manager [ch. 9.21]
	Internal unit fault	▶ Interrupt the voltage supply temporarily ▶ Reset the burner, if fault reoccurs replace the combustion manager [ch. 9.21]
04h	More than 5 resets in the last 15 minutes	▶ Press and hold reset key for 5 seconds. ✓ Display flashes. ▶ Reset burner
0Ch	Burner configuration incorrect	▶ Check burner configuration ▶ Check values in parameter level [ch. 6.2.3] ▶ Check parameters E0 … E3 [ch. 6.2.4]
	Pre-purge phase less than 20 seconds (sum from parameters 60 and 61).	▶ Increase pre-purge phase (only possible with VisionBox).
11h	Low voltage	▶ Check voltage supply
12h	Voltage supply was temporarily interrupted	▶ Check voltage supply
16h	Communication with TWI interface (VisionBox) incorrect	▶ Plug in and unplug participants on the TWI Bus only when de-energised ▶ Reduce the number of participants on the TWI Bus ▶ Reduce cable length

10 Troubleshooting

The following faults must only be rectified by qualified personnel:

Fault codes	Cause	Rectification
18h	Switch off via PC Software	–
	Second detailed fault code: A1h Invalid Bus address	▶ Check Bus address
	Second detailed fault code: A5h Configuration at output B4 incorrect	▶ Check configuration at output B4
	Second detailed fault code: A6h No keystrokes where made for 30 minutes in the setting mode	–
	Second detailed fault code: A7h Off function was activated	–
	Second detailed fault code: A8h No calibration values were stored in the EEP-ROM	–
	Second detailed fault code: A9h No Bus connection	▶ Check Bus connection
	Second detailed fault code: C2h … C3h Operating mode O_2 trim not permitted	▶ Check operating mode O_2 trim.
	Second detailed fault code: 01h … 1Bh Internal unit fault	▶ Interrupt the voltage supply temporarily ▶ Reset the burner, if fault reoccurs replace the combustion manager [ch. 9.21]
	Second detailed fault code: E1h … E7h Calibration values in EEPROM incorrect	–
	Second detailed fault code: EEh Communication to W-FM 25 failed	–
	Second detailed fault code: EFh Extension module to W-FM 25 not compatible	▶ Check version
1dh	EMC interference	▶ Optimise EMC measures.
44h	Operating points were changed without approval	▶ Re-adjust burner
	Parameter E3 set incorrectly	▶ Check parameter E3 [ch. 6.2.4]
47h	Type of air actuator invalid	▶ Check parameter 34 (only possible with Vision-Box).
	Type of gas actuator invalid	▶ Check parameter 35 (only possible with Vision-Box).
48h	Plugs of actuators for gas and air mixed up	▶ Change over plugs
	Tolerance fault actuator	▶ Check freedom of movement of air damper and / or angle drive and gas butterfly valve ▶ Replace actuator
49h	Actuator does not drive to reference point correctly	▶ Check freedom of movement of air damper and / or angle drive and gas butterfly valve ▶ Replace actuator
53h	Insufficient gas, low gas pressure switch/ valve proving gas pressure switch	▶ Check gas connection pressure [ch. 7.1.6] ▶ Set gas pressure switch [ch. 7.3.1] ▶ Check gas pressure switch

The following faults must only be rectified by qualified personnel:

Fault codes	Cause	Rectification
65h	First detailed fault code: 00h Tolerance fault air actuator or gas actuator	▶ Check freedom of movement of air damper and / or angle drive ▶ Check freedom of movement of gas butterfly valve ▶ Replace actuator
	First detailed fault code: 01h Tolerance fault air actuator or gas actuator	▶ Check freedom of movement of air damper and / or angle drive ▶ Check freedom of movement of gas butterfly valve ▶ Replace actuator
	First detailed fault code: 02h Tolerance fault gas actuator	▶ Check freedom of movement of gas butterfly valve ▶ Replace actuator [ch. 9.15]
	First detailed fault code: 03h Tolerance fault gas actuator	▶ Check freedom of movement of gas butterfly valve ▶ Replace actuator [ch. 9.15]
	First detailed fault code: 04h Tolerance fault air actuator	▶ Check freedom of movement of air damper and / or angle drive ▶ Replace actuator [ch. 9.13]
	First detailed fault code: 05h Tolerance fault air actuator	▶ Check freedom of movement of air damper and / or angle drive ▶ Replace actuator [ch. 9.13]
	First detailed fault code: 07h Time in setting mode run out Plugs of actuators for gas and air mixed up	▶ Press key within 30 minutes in setting mode ▶ Change over plugs
A2h	Safety circuit is open	▶ Check safety circuit
A4h	Reverse voltage valve 1	▶ Check wiring to double solenoid valve
A5h	Reverse voltage valve 2	▶ Check wiring to double solenoid valve
A6h	Flame simulation/extraneous light	▶ Find and eliminate extraneous light source ▶ Check flame sensor
A7h	No flame signal after safety time	▶ Check oil nozzles, if necessary replace [ch. 9.8] ▶ Set ignition electrodes [ch. 9.6] ▶ Check the ignition unit and replace if necessary ▶ Check solenoid valve coil and cable, replace if necessary ▶ Check flame sensor and cable, if necessary replace ▶ Check mixing pressure, if necessary reduce ▶ Check burner setting ▶ Replace combustion manager [ch. 9.21]
A8h	Flame failure during operation	▶ Check burner setting ▶ Check oil supply ▶ Check oil nozzles, if necessary replace [ch. 9.8] ▶ Check flame sensor, if necessary replace
A9h	Flame failure during stabilisation time	▶ see A7h
AAh	Switch contact of air pressure switch not in Standby	▶ Check air pressure influences ▶ Check air pressure switch setting [ch. 7.3.2] ▶ Check air pressure switch and cable, replace if necessary ▶ Replace combustion manager [ch. 9.21]

10 Troubleshooting

The following faults must only be rectified by qualified personnel:

Fault codes	Cause	Rectification
Abh	Air pressure switch does not react	▶ Check air pressure switch setting [ch. 7.3.2] ▶ Check hoses on air pressure switch ▶ Check air pressure switch and cable, replace if necessary ▶ Check burner motor and cable, replace if necessary
Adh	Insufficient gas low gas pressure switch	▶ Check gas connection pressure [ch. 7.1.6] ▶ Set gas pressure switch [ch. 7.3.1] ▶ Check gas pressure switch
AEh	Valve 1 leaking during valve proving	▶ Check soundness of gas valve train [ch. 7.1.4] ▶ Check setting and function of gas pressure switch [ch. 7.3.1] ▶ Replace double gas valve ▶ Check parameter E0 [ch. 6.2.4].
AFh	Valve 2 leaking during valve proving	▶ Check soundness of gas valve train [ch. 7.1.4] ▶ Check setting and function of gas pressure switch [ch. 7.3.1] ▶ Replace double gas valve
b6h	Fault POC contact	▶ Check POC contact ▶ Check double gas valve (valve 1)
bAh	Flame simulation/extraneous light at start-up	▶ Find and eliminate extraneous light source ▶ Check flame sensor
bbh	Burner shutdown via contact X3:7 (plug No. 7)	–
CAh	Valve proving faulty	▶ Check low gas pressure switch/valve proving gas pressure switch ▶ Check double gas valve
CCh	Oil pressure switch does not switch	▶ Check oil supply ▶ Check oil pump, if necessary replace [ch. 9.11] ▶ Check oil pressure switch and cable, if necessary replace ▶ Check pump motor and cable, if necessary replace
Cdh	Air pressure switch 2 does not react	▶ Check air pressure switch setting ▶ Check hoses on air pressure switch ▶ Check air pressure switch and cable, replace if necessary
CEh	Bridging plug No. 15 is missing	▶ Plug in bridging plug
	High gas pressure switch does not react	▶ Check gas connection pressure [ch. 7.1.6] ▶ Set gas pressure switch ▶ Check gas pressure switch
CFh	No start release (X3:14)	▶ Check start release
d0h	Fuel change-over during ignition phase	▶ Check fuel change-over
d1h	Connection to actuator faulty	▶ Rectify the fault using the following procedure: ▪ Interrupt voltage supply. ▪ Plug in plug on combustion manager correctly ▪ Fit W-FM cover [ch. 3.3.6].
	Parameter E0 not configured correctly	▶ Check configuration of parameter E0 see [ch. 6.2.4].

The following faults must only be rectified by qualified personnel:

Fault codes	Cause	Rectification
d2h	More than 5 resets in the past 15 minutes by remote reset (X3:14)	▶ Rectify cause of fault ▶ Reset via operating panel on burner. ▶ Press and hold reset key for 5 seconds. ✓ Display flashes. ▶ Reset burner
d4h	External voltage at operating signal X7:B5	▶ Find and eliminate external voltage source
	Internal unit fault	▶ Interrupt the voltage supply temporarily ▶ Reset the burner, if fault reoccurs replace the combustion manager [ch. 9.21]

10.3 Operating problems

The following faults must only be rectified by qualified personnel:

Observation	Cause	Rectification
Poor start behaviour of burner	Mixing pressure too high	▶ Reduce mixing pressure in ignition position ▶ Correct mixing pressure in ignition load, if necessary set P0 different to P1
	Ignition electrodes set incorrectly	▶ Set ignition electrodes [ch. 9.6]
	Mixing head set incorrectly	▶ Set mixing head [ch. 9.4]
Oil pump makes severe mechanical noise	Oil pump sucks air	▶ Ensure oil supply is tight
	Suction resistance in oil line too high	▶ Clean filter ▶ Check oil supply
Oil nozzle atomisation uneven	Nozzle blocked/soiled	▶ Replace nozzle [ch. 9.8]
	Nozzle worn	
Flame tube/diffuser has heavy soot deposit	Oil nozzle defective	▶ Replace nozzle [ch. 9.8]
	Mixing head set incorrectly	▶ Set mixing head [ch. 9.4]
	Incorrect combustion air quantity	▶ Adjust burner
	Boiler room ventilated insufficient	▶ Ensure sufficient boiler room ventilation
	Wrong oil nozzle	▶ Check nozzle type [ch. 4.2]
Combustion pulsating or burner booming	Mixing head set incorrectly	▶ Set mixing head [ch. 9.4]
	Incorrect combustion air quantity	▶ Adjust burner
	Wrong oil nozzle	▶ Check nozzle type [ch. 4.2]
CO content too high	Nozzle distance too big	▶ Check nozzle distance, adjust if necessary [ch. 9.4]
Stability problems	Mixing pressure too high	▶ Decrease mixing pressure
	Nozzle distance incorrect	▶ Check nozzle distance, adjust if necessary [ch. 9.4]
	Wrong oil nozzle	▶ Check nozzle type [ch. 4.2]
No display at operating panel	Plug from operating panel not properly plugged in	▶ Plug in plug on combustion manager correctly
	Operating panel defective	▶ Replace operating panel

11 Technical documentation

11.1 Program sequence

The exact operating status of the combustion manager can also be displayed. Activate operating status [ch. 6].

Operating phase	Operating status	Condition / function
F ..	00	Fault present
UPrGAS UPrOIL	01	Unprogrammed condition or programming not completed
OFFGAS OFFOIL	02	Standby, no heat demand
1	03	Extraneous light check
2	04	Shutdown check air pressure switch
	05	Initialisation W-FM
	06	Waiting for start release / waiting time O_2 trim
	07	Internal sequence
	08	Driving air damper actuator to pre-purge and gas butterfly valve actuator to ignition position
3	09	Internal sequence
	10	Start burner motor and ignition oil operation
	11	Waiting for air pressure
4	12	Pre-purge
	13	Internal sequence
5	14	Driving air damper actuator to ignition position
6	15	Gas pressure check on low / valve proving gas pressure switch
	16	Ignition gas operation
7	17	First safety time - fuel release
	18	First safety time - flame detection
8	19	First stabilisation time
	20	Stop setting mode: P0 -A
	21	Second safety time
	22	Second stabilisation time
	23	End setting mode: P0 -B
9	24	Driving to partial load
10	25	Operation (load control is activated)
11	34	Valve proving - venting valve interspace
12	35	Valve proving - test time valve 1
	36	Internal sequence
13	37	Valve proving - filling valve interspace
14	38	Valve proving - test time valve 2
	39	Internal sequence

Operating phase	Operating status	Condition / function
15	26	Internal sequence
	27	Driving to partial load
	28	Close fuel valves
	29	Internal sequence
	30	Start post burn time / post-purge
	31	Post-purge contact dependent (X3:14)
	32	Post burn time
16	33	Restart interlock
G L	40	Reference search actuator - air damper and gas butterfly valve
G	41	Test gas butterfly valve actuator 105°
G L	42	Drive to Standby position
	43	Internal sequence
OFFGd	44	Insufficient gas, low gas pressure switch (X3:14)
16	45	Low gas programme
OFF S	46	Safety circuit open (X3:7)

11.2 Conversion table unit of pressure

Bar	Pascal			
	Pa	**hPa**	**kPa**	**MPa**
0.1 mbar	10	0.1	0.01	0.00001
1 mbar	100	1	0.1	0.0001
10 mbar	1 000	10	1	0.001
100 mbar	10 000	100	10	0.01
1 bar	100 000	1 000	100	0.1
10 bar	1 000 000	10 000	1 000	1

11.3 Appliance categories

Labelling of gas and dual fuel burners to EN 676

EN 676, "Forced draught burners for gaseous fuels", is used for the implementation of the basic requirements of the directive (EU) 2016/426.

EN 676 stipulate the following appliance categories for forced draught gas burners under Point 4.4.9:

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 and the minimum test pressures determined and listed under point 5.1.2, table 5 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 . 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 ISO 17025 from an accredited test centre, the EU Type Testing Certificate to Directive (EU) 2016/426 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.

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, I2EK	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

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 + G31	50
HU (Hungary)	I3B/P	G 30 + G31	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

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, II2EK3B/P, II2EK3P	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)

12 Project planning

12.1 Oil supply

Observe EN 12514-2, DIN 4755, TRÖI and local regulations.

General information relating to the oil supply

- Do not use cathode protection system with steel tanks.
- With oil temperatures < 5 °C, the separation of paraffin can cause oil lines, oil filters and nozzles to become blocked. Avoid placing oil tanks and pipelines in areas subject to frost.
- The oil supply should be installed in such a way that the oil hoses can be connected free of tension.
- Fit oil filter in front of pump, recommended mesh aperture 70 µm.

Suction resistance and supply pressure



CAUTION

Pump damage due to excessive suction resistance
A suction resistance greater than 0.4 bar can damage the pump.
► Reduce suction resistance – or – install oil supply pump or suction unit, whilst observing the maximum supply pressure at the oil filter.

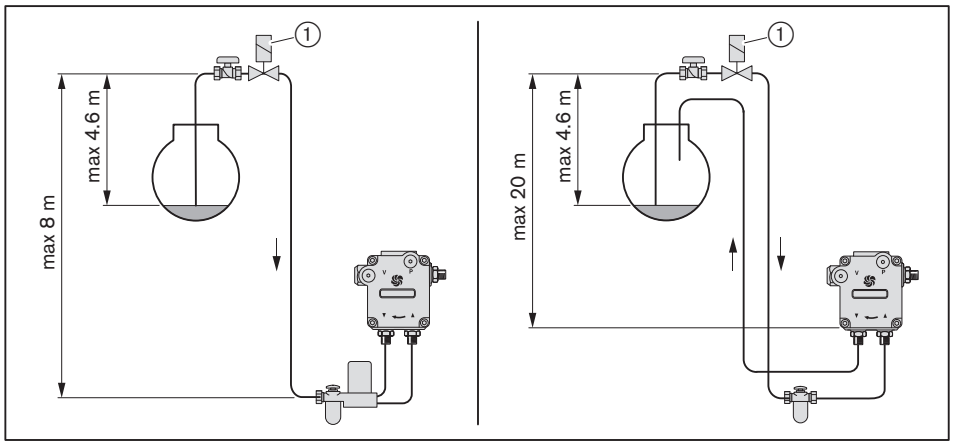
The suction resistance depends on:
- suction line length and diameter,
- pressure loss of oil filter and other components,
- lowest oil level in the oil storage tank (max 3.5 m below the oil pump).

If an oil feeder pump is installed:
- max 1.5 bar supply pressure at oil filter,
- max 0.7 bar supply pressure into automatic de-aerator.

Elevated oil level

- If the suction line is leaking the tank can be siphoned dry. An electric anti siphon valve ① can prevent this.
- Observe manufacturers instructions regarding pressure loss caused by anti siphon valve.
- The anti siphon valve must close with a delay and show a pressure relief towards the oil storage tank.

Maintain height differences:
- max 4.6 m between oil level and anti siphon valve,
- on single pipe system max 8 m between anti siphon valve and automatic de-aerator,
- on two pipe system max 20 m between anti siphon valve and oil pump.

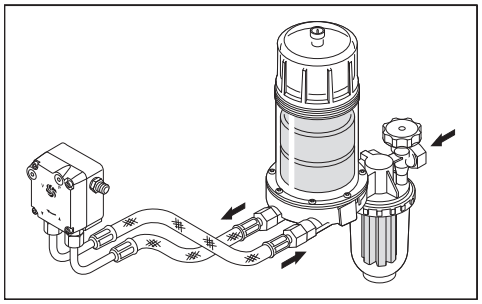


Single pipe system

CAUTION

Damage to the oil pump caused by incorrect connection
Mixing up supply and return can damage the oil pump.
► Ensure correct connection of oil hoses to the supply and return of the pump.

If the oil is supplied via a single pipe system, and automatic de-aerator must be installed in front of the oil pump.



Two pipe system

In a two pipe system the oil pump is vented automatically.

Ring main operation

Weishaupt recommends the use of a ring main when operating several burners.

12.2 Additional requirements

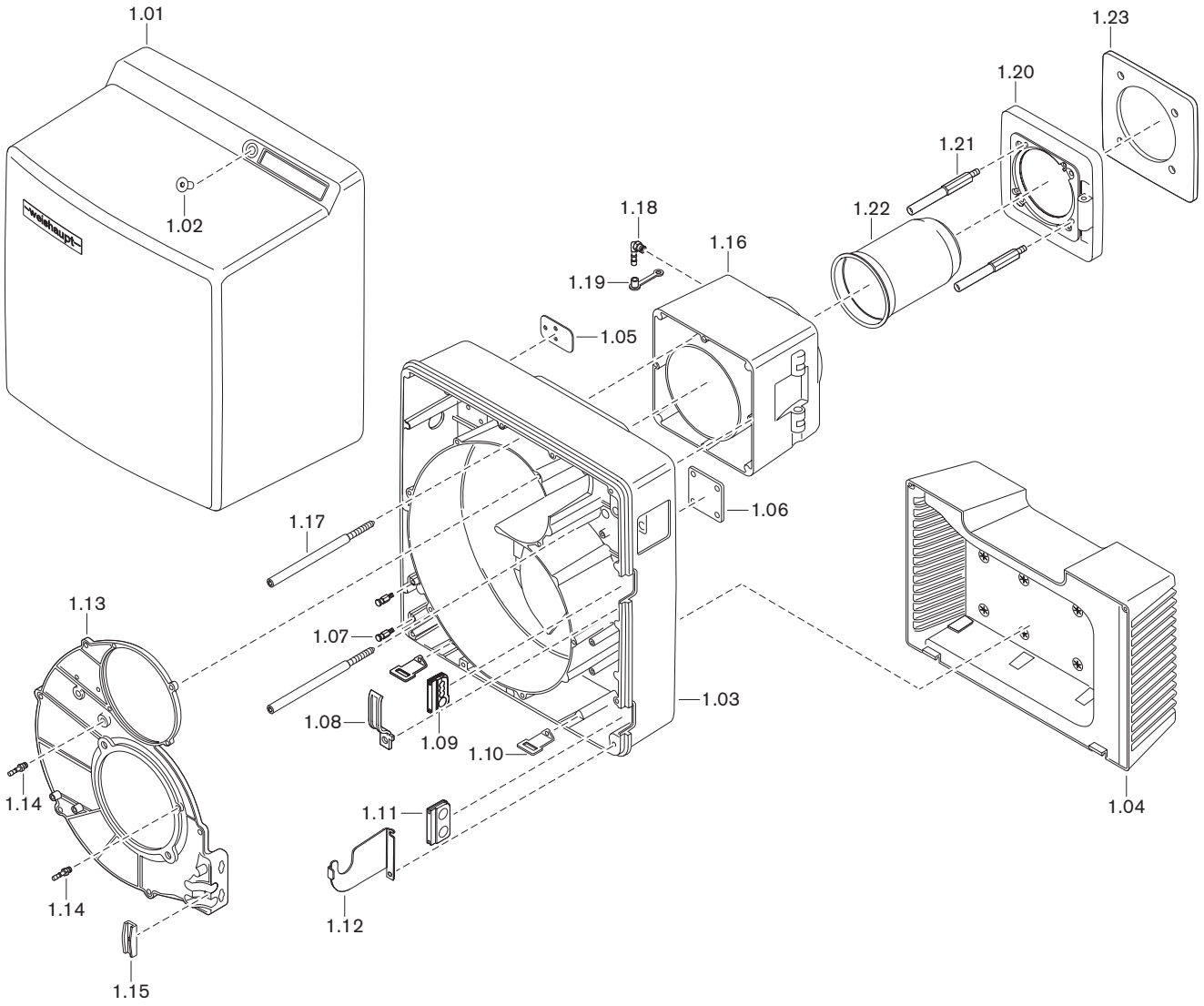
Additional requirements for burner for liquid and gaseous fuels in accordance with EN 267 and EN 676:

- the pressure equipment operates in accordance with the Pressure Equipment Directive 2014/68/EU,
- as components of industrial thermal process plants in accordance with EN 746-2,
- on steam and hot water water-tube boilers in accordance with EN 12952-8.

PED 2014/68/EU	EN 746-2	EN 12952-8	Components	Requirement
X			Burner control, combustion manager	Designed for continuous operation greater than 1200 kW
		X	Flame monitor, flame sensor	self-checking
X			Control device air/fuel ratio	ISO 23552-1 (oil) EN 12067-2 (gas)
X	X	X	Air monitoring device, air pressure switch	Min. pressure switch to EN 1854
X	X	X	Minimum fuel pressure monitoring device	Low gas pressure switch to EN 1854, Min. oil pressure switch
X	X	X	Maximum fuel pressure monitoring device	High gas pressure switch to EN 1854, Max. oil pressure switch(1
X	X	X	Valve monitoring system, valve proving gas pressure switch	EN 1643
X	X	X	Gas pressure regulator	EN 88, EN 334
X	X	X	Automatic safety shut off valves (PED: for aggressive media)	2 x Group A, EN 161
		X	Oil solenoid valve	2 x flow, 2 x return, EN 23553-1
	X		Manual shut off device for all fuels	Isolating valve
	X		Safety devices for save operation	Connected to the input of the combustion manager in the closed circuit current principle
		X	Electrical equipment	EN 50156

(1 Only for burners with return flow nozzle.

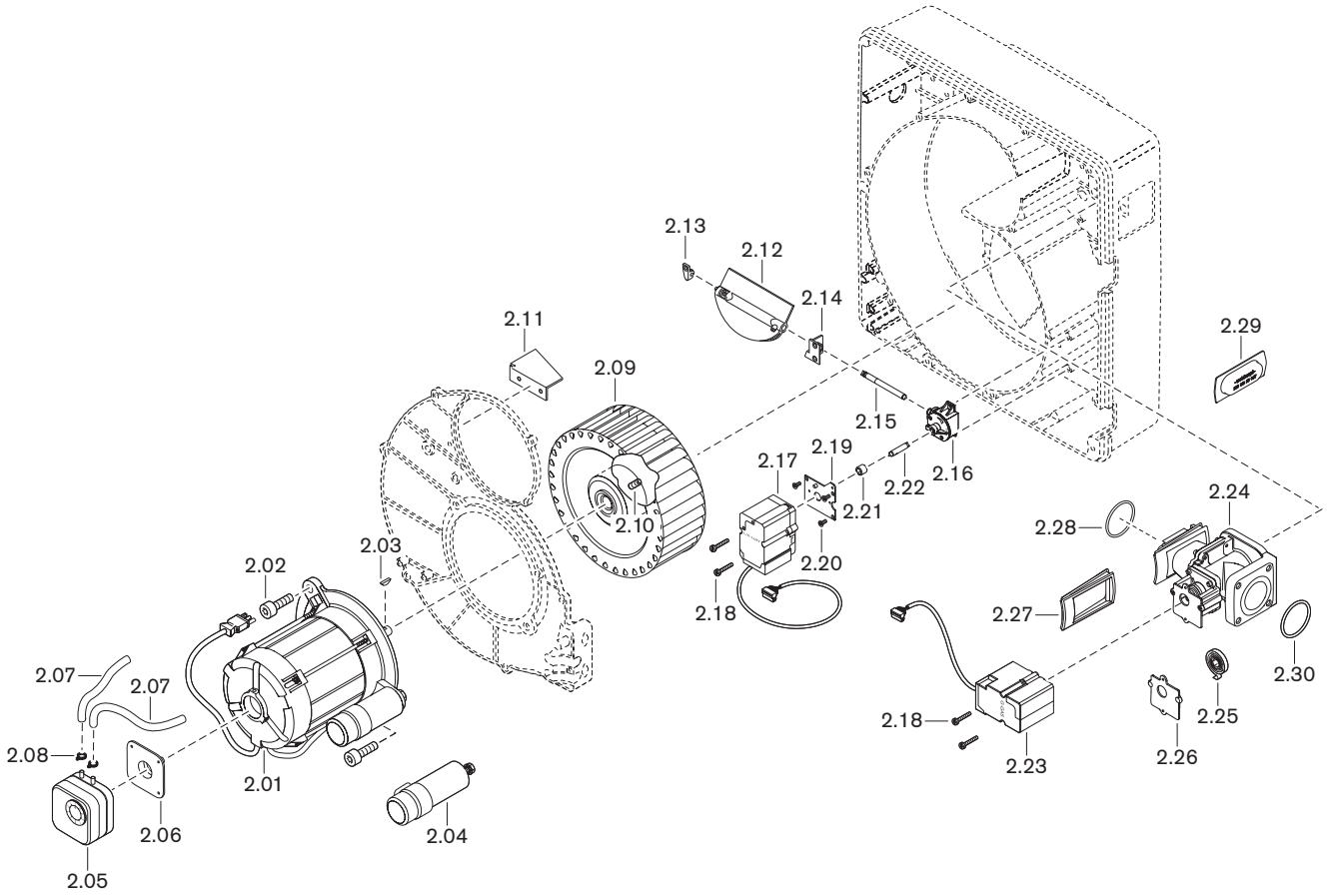
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Pos.	Description	Order No.
1.01	Cover	241 400 01 112
1.02	Screw M8 x 16 DIN 7991	404 412
1.03	Burner housing	235 410 01 017
1.04	Intake housing complete	241 400 01 082
	– Screw 4 x 22 Torx-Plus Remform	409 307
1.05	Fixing plate for bearing block	235 310 01 057
1.06	Fixing plate for gas butterfly valve	232 400 01 057
1.07	Hanging bolt	241 400 01 327
1.08	Clamp	241 400 01 357
1.09	Grommet for connection cable	241 200 01 247
1.10	Mounting bracket for cover	241 400 01 207
1.11	Grommet	241 400 01 177
1.12	Service retaining plate for oil pump	235 310 01 037
1.13	Housing cover	241 400 01 457
1.14	Treaded socket $R^1/_8$ GES4	453 004
1.15	Bracket for oil hose	241 400 01 367
1.16	Intermediate flange	241 400 01 427
1.17	Screw M8 burner housing	235 310 01 047
1.18	Threaded socket $R^1/_8$ WES6	453 010
1.19	Protective cap DN 6 SELF 50/2 CF	232 300 01 047
1.20	Burner flange	241 400 01 437
	– Screw M8 x 35 DIN 912	402 600
	– Washer A10.5 DIN 125 A4	430 603
1.21	Stay bolt M10 x 120 burner flange	241 400 01 247
1.22	Flame tube W40/1	
	– Standard	241 400 14 012
	– extended by 100 mm*	240 400 14 012
	– extended by 200 mm*	240 400 14 022
	– Screw M5 x 12 Combi-Torx-Plus 20IP	409 247
	– Washer 5.5 x 12 oval	241 400 14 077
1.23	Flange gasket 8 x 238.5 x 238.5	
	– Standard	241 400 01 147
	– for rotated by 180°	240 410 00 017

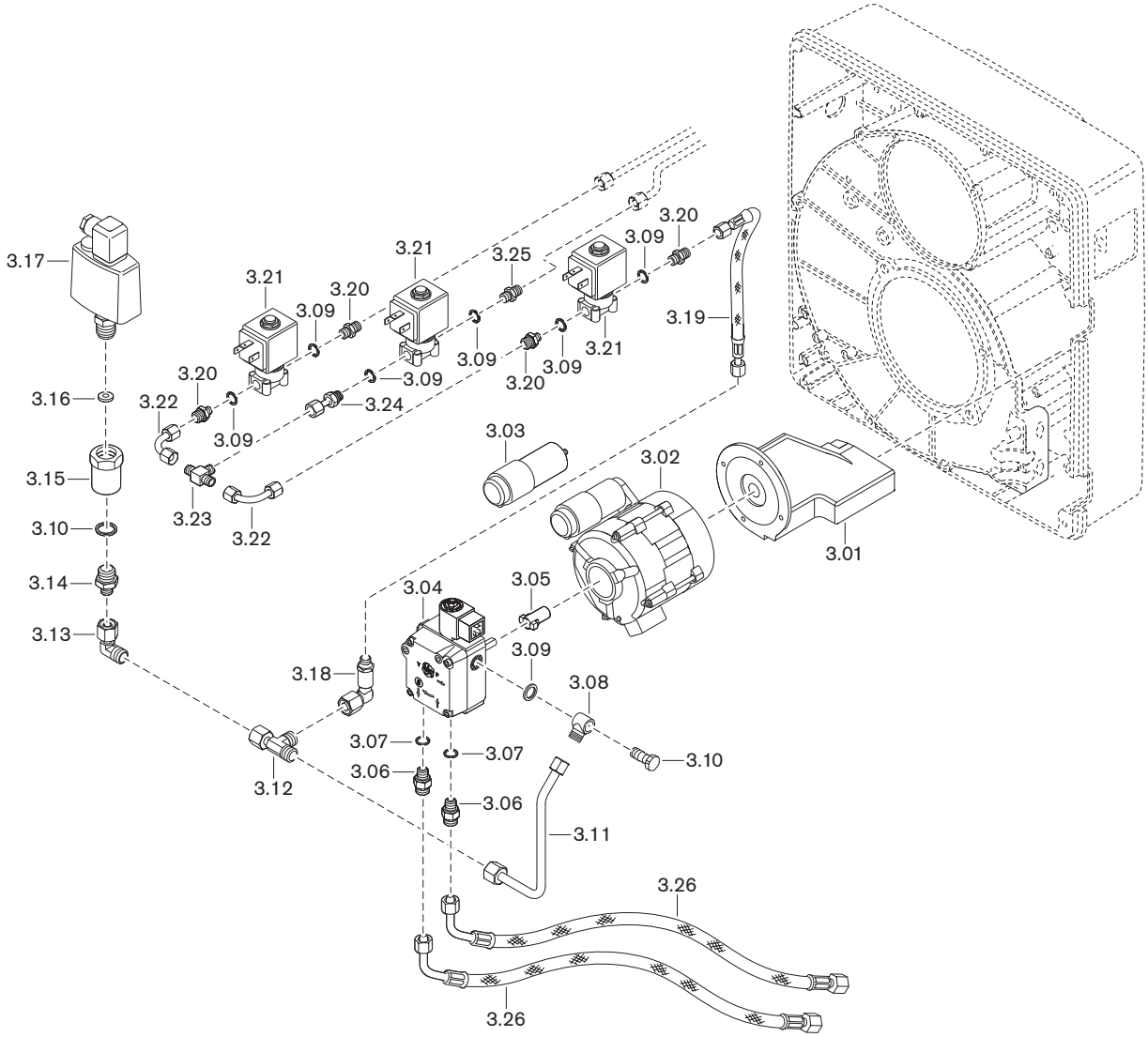
* Only in conjunction with combustion head extension.

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Pos.	Description	Order No.
2.01	Motor ECK06/A-2 230 V / 50 Hz	652 055
2.02	Screw M8 x 20 DIN 912	402 511
2.03	Shaft key 4 x 5 DIN 6888	490 154
2.04	Capacitor set 16.0 µF 420 V	713 479
2.05	Pressure switch LGW 10 A2 1 - 10 mbar	691 370
2.06	Connection flange for LGW	605 243
2.07	Hose 4.0 x 1.75 250 mm	232 110 24 037
2.08	Hose clamp 7.5	790 218
2.09	Fan wheel TLR-S 190 x 81.8-L S1 50-60 Hz	241 400 08 032
2.10	Grub screw M8 x 8 w. an. cutter (Tuflok)	420 550
2.11	Air guide	232 400 01 047
2.12	Air damper complete	241 400 02 012
2.13	Bearing left	241 400 02 037
2.14	Bearing right with bearing bush	241 210 02 032
2.15	Shaft air damper - angle drive	241 400 02 147
2.16	Angle drive	241 110 02 062
2.17	Air actuator STE 4.5 24 V	651 103
2.18	Screw M4 x 30 Torx-Plus metric	409 245
2.19	Fixing plate	241 400 02 222
2.20	Screw M4 x 10 Torx-Plus 20IP	409 236
2.21	Guide sleeve	241 400 02 207
2.22	Shaft angle drive - actuator	241 400 02 157
2.23	Gas actuator STE 4.5 24 V	651 101
2.24	Gas butterfly valve	235 410 25 010
2.25	Torsion spring 2 heavy duty version	241 400 02 167
2.26	Angle drive retaining plate	235 310 25 077
2.27	Gasket burner housing connection duct	235 410 25 017
2.28	O ring 46 x 3.5 NBR70 ISO 3601	445 169
2.29	Blanking plate valve proving	235 310 25 097
2.30	O ring 45 x 3 NBR70 ISO 3601	445 518

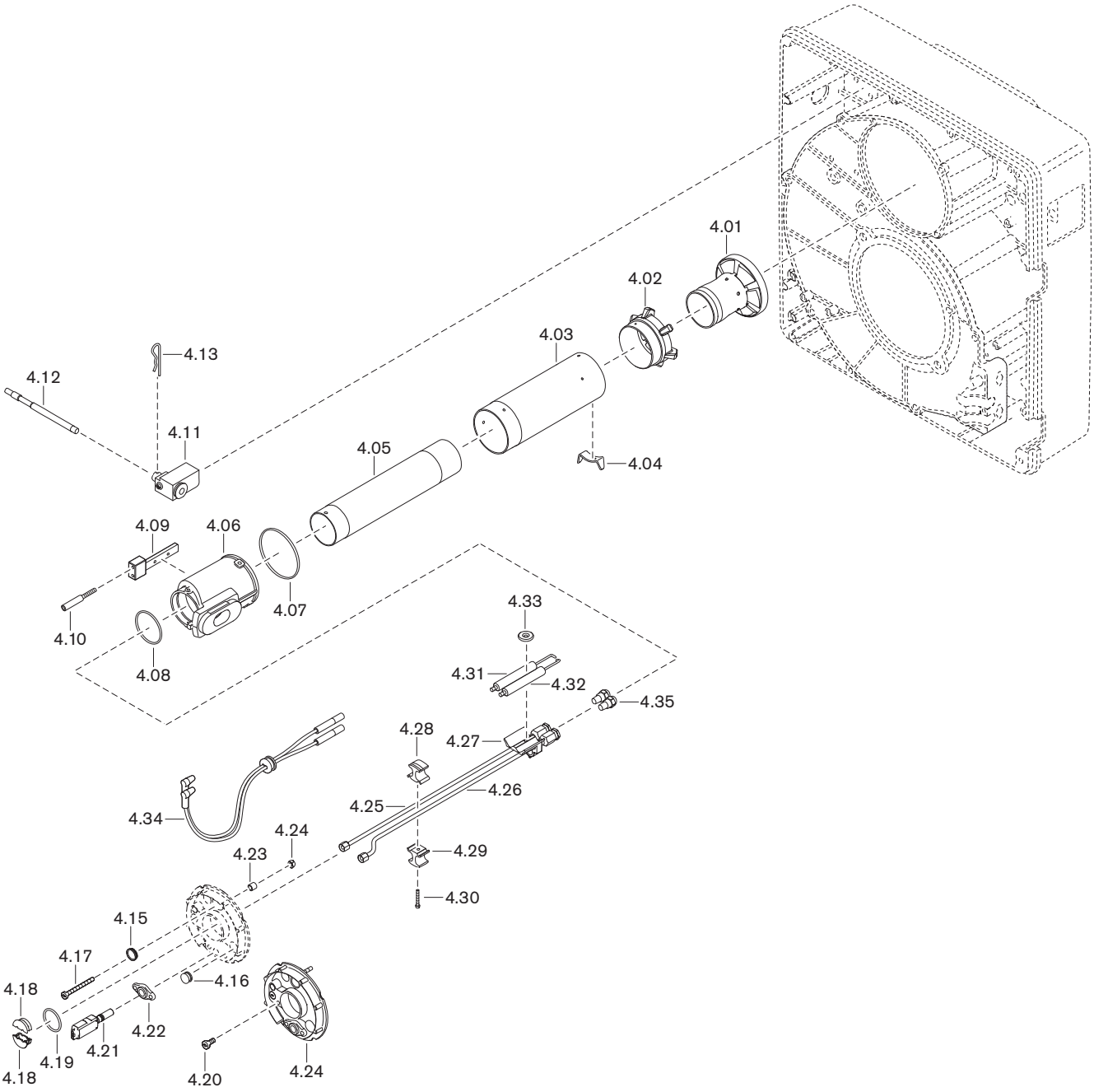
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13 Spares

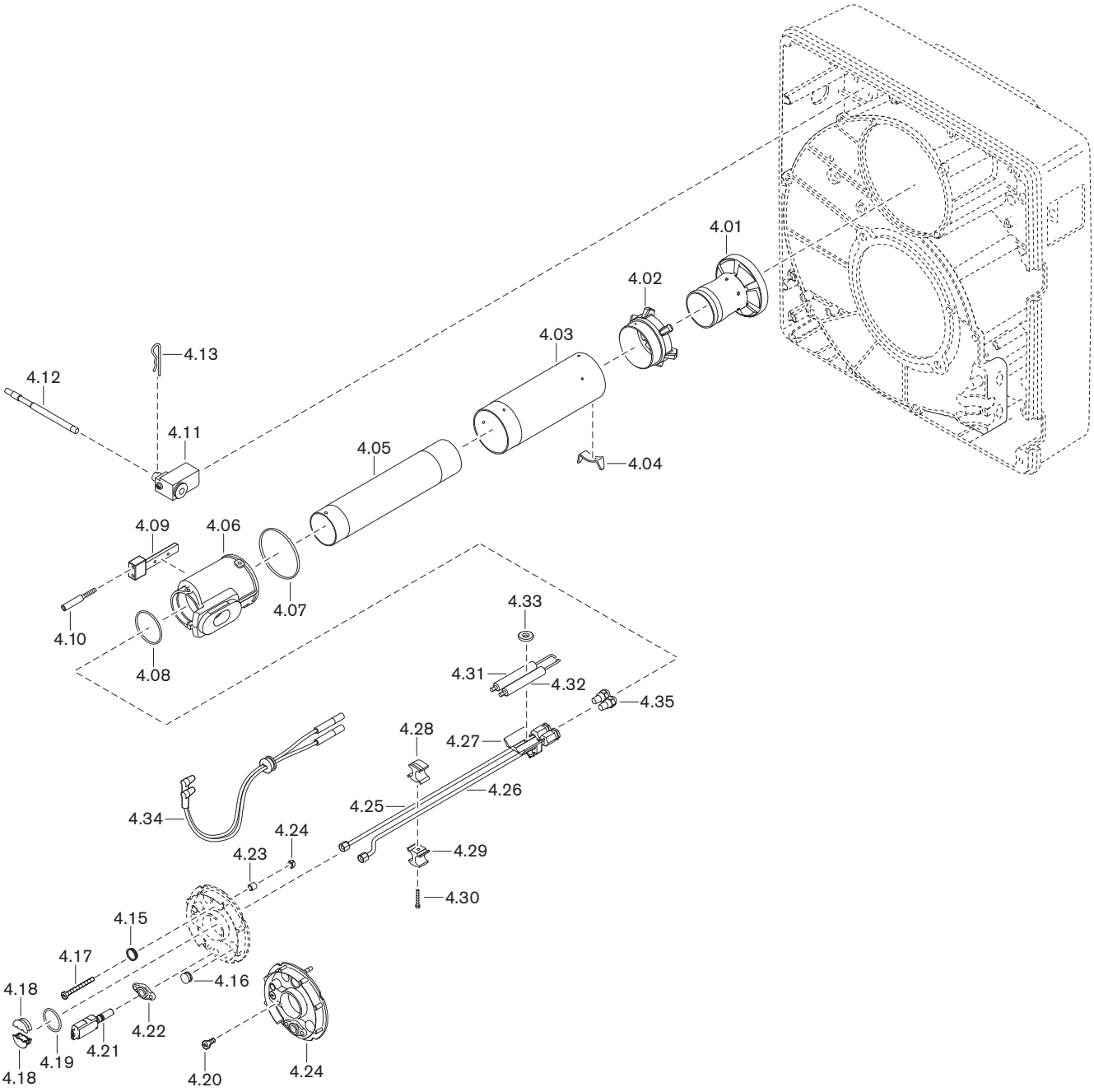
Pos.	Description	Order No.
3.01	Pump motor fixing bracket	235 310 07 017
3.02	Motor ECK02/H-2P 230 V / 50 Hz 75W	652 098
3.03	Capacitor set 4.0 µF 420V	713 473
3.04	Pump ALV65C 9609 6P0700R	601 860
	– Solenoid coil T80 Suntec 220-240 V 50-60 Hz	604 495
	– Filter set with cover seal	601 107
3.05	Plug coupling	652 135
3.06	Threaded socket 8LL M12 x 1 x G¼ x 28	140 250 06 067
3.07	Sealing ring A13.5 x 17 x 1.5 DIN 7603 Cu	440 010
3.08	Screwed union 24-BSEX-LL08-G⅛B-ST	452 619
3.09	Sealing ring A 10 x 13.5 x 1 DIN 7603 Cu	440 027
3.10	Hollow core screw HS⅛TNWEISHXCF	452 877
3.11	Oil line 8 x 1.0 x 150	240 310 06 018
3.12	Screwed union EVL 08-PL	452 550
3.13	Screwed union EVW 08-PL	452 450
3.14	Screwed union 24-SDSX-L08-G¼A-ST-CH60	452 264
3.15	Threaded socket IG ¼" x IG ½" x 40	290 504 13 037
3.16	Sealing ring C 6.2 x 17.5 x 2 DIN 16258 Cu	440 007
3.17	Pressure switch DSF 158 F001 0-25 bar	640 109
3.18	Brazed union complete	240 310 13 022
3.19	Pressure hose DN 4, 380 mm, 6-LL/M10 x 1	491 130
3.20	Screwed union 24-SDSX-LL06-G⅛A-ST-CH60	452 291
3.21	Solenoid valve 121Z2323 230V50Hz / 240V60Hz	604 480
	– Solenoid coil 483764 T1	604 453
3.22	Oil line 6 x 1.0	241 403 06 108
3.23	Screwed union 24-TX-LL06-P-ST	452 104
3.24	Threaded socket cpl. 6 x G1/8" x 35	111 351 85 022
3.25	Screwed union XGE G1/8A-6LL with aperture 1.2	255 303 13 017
3.26	Oil hose DN 8, 1200 long	491 128

13 Spares


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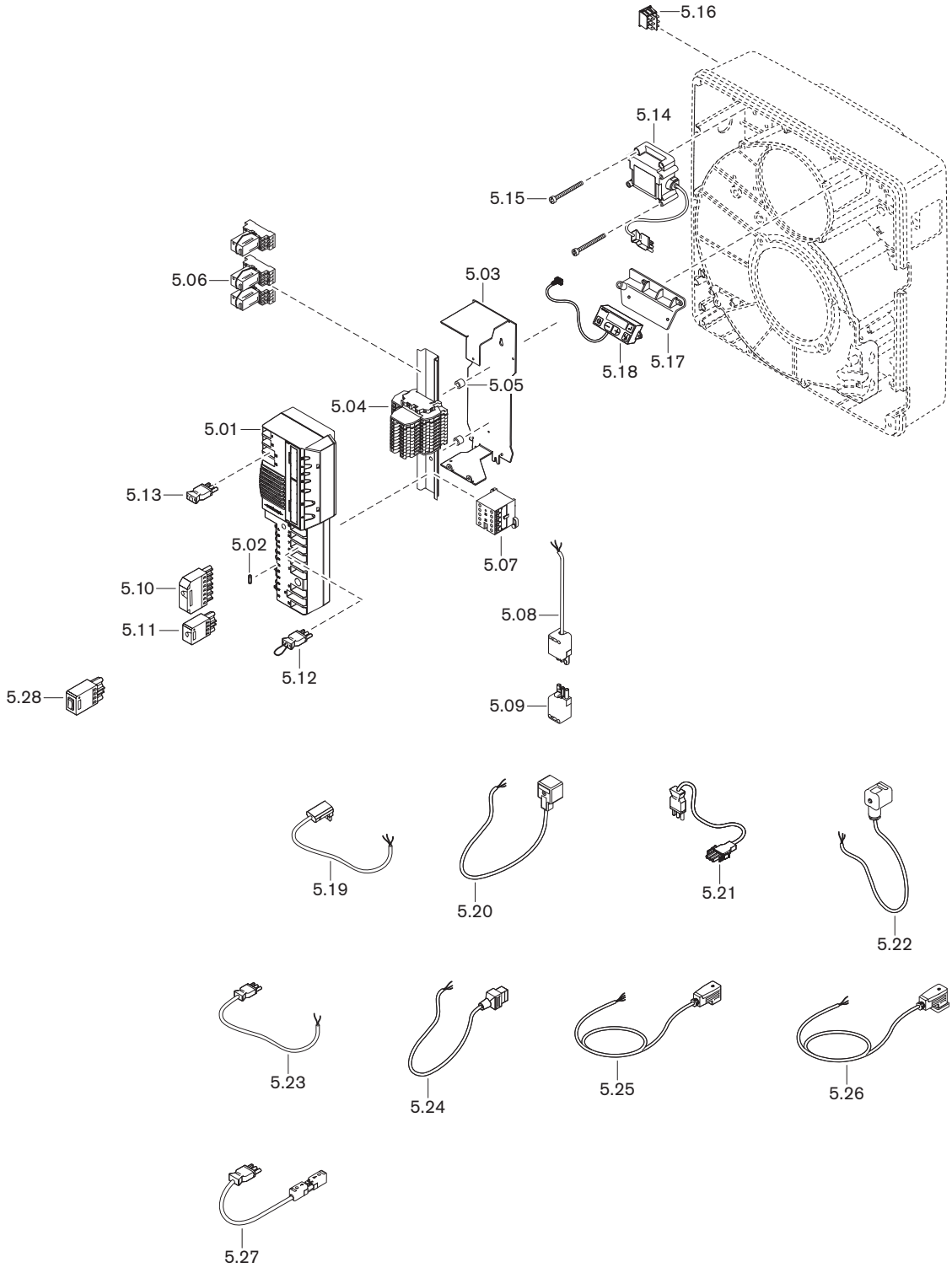
Pos.	Description	Order No.
4.01	Diffuser 115 x 33	235 410 14 012
4.02	Distributor ring	235 410 14 017
4.03	Mixing tube external	
	– Standard	235 410 14 047
	– extended by 100 mm*	230 410 14 027
	– extended by 200 mm*	230 410 14 047
4.04	Support plate combustion head/flame tube	235 410 14 077
4.05	Mixing tube internal	
	– Standard	235 410 14 057
	– extended by 100 mm*	230 410 14 017
	– extended by 200 mm*	230 410 14 037
4.06	Mixing head	235 410 14 027
4.07	O ring 79 x 2	445 168
4.08	O ring 59 x 2	445 167
4.09	Guide rail	235 310 14 037
4.10	Indicating bolt M6 x 90	241 110 10 097
4.11	Bearing block complete	235 310 14 012
4.12	Spindle M10 x 173	235 410 14 037
4.13	Spring cotter 3 mm	428 403
4.14	Nozzle assembly cover pre-mounted	235 410 01 012
4.15	View port glass	241 400 01 377
4.16	Shut off grommet	756 159
4.17	Adjusting screw M6 x 72	235 410 10 017
4.18	Bracket for oil lines	235 310 14 097
4.19	O ring 37.5 x 3.55 NBR 70 DIN 3771	445 156
4.20	Screw M5 x 12 Combi-Torx-Plus 20IP	409 247
4.21	Flame sensor FLW 10 IR V 2.1	600 639
4.22	Flange for flame sensor	600 637
4.23	Spacer sleeve	235 310 10 067
4.24	Hexagonal nut M6 DIN 985 -6	411 302
4.25	Nozzle head stage 1	
	– Standard	230 310 10 022
	– extended by 100 mm*	230 310 10 052
	– extended by 200 mm*	230 310 10 082
4.26	Nozzle head stage 2	
	– Standard	230 310 10 032
	– extended by 100 mm*	230 310 10 062
	– extended by 200 mm*	230 310 10 092

13 Spares


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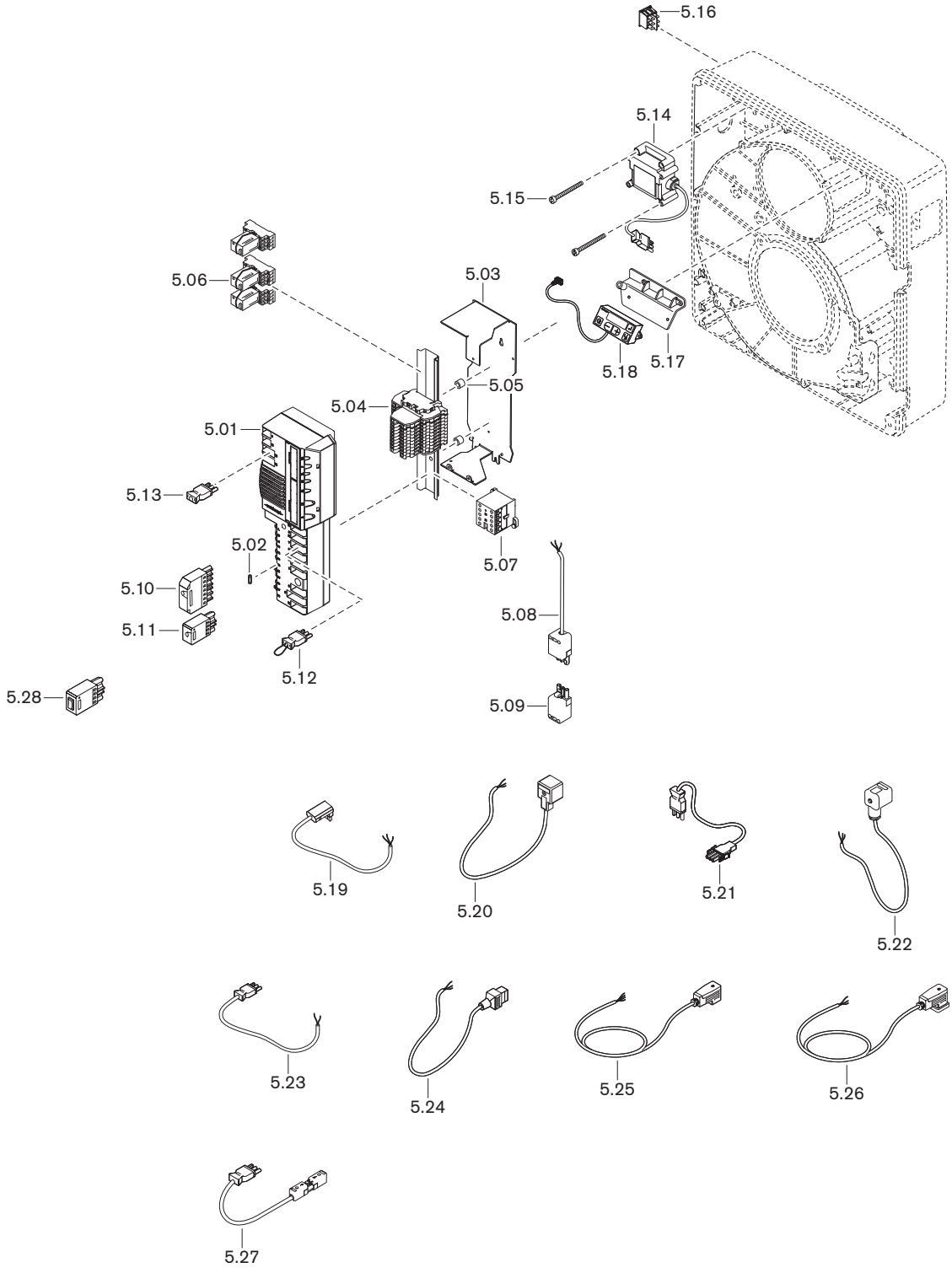
Pos.	Description	Order No.
4.27	Electrode holder	232 300 14 027
4.28	Carrier top	235 310 14 087
4.29	Carrier bottom	235 310 14 077
4.30	Screw M4 x 30 Torx-Plus metric	409 245
4.31	Ignition electrode left	235 310 14 137
4.32	Ignition electrode right	235 310 14 127
4.33	Washer	151 327 14 367
4.34	Ignition cable	
	– 700 mm (Standard)	235 310 11 062
	– 800mm (for 100 mm extension)*	235 310 11 072
	– 900mm (for 200 mm extension)*	235 310 11 082
4.35	Oil nozzle	
	– 1.10 gph 45°HF Fluidics	602 711
	– 1.25 gph 45°HF Fluidics	602 713
	– 1.35 gph 45°HF Fluidics	602 714
	– 1.50 gph 45°HF Fluidics	602 715
	– 1.65 gph 45°HF Fluidics	602 716
	– 1.75 gph 45°HF Fluidics	602 717
	– 2.00 gph 45°HF Fluidics	602 718
	– 2.25 gph 45°HF Fluidics	602 719
	– 2.50 gph 45°HF Fluidics	602 685
	– 2.75 gph 45°HF Fluidics	602 686
	– 3.00 gph 45°HF Fluidics	602 687
	– 3.50 gph 45°HF Fluidics	602 688
	– 4.00 gph 45°HF Fluidics	602 689
	– 4.50 gph 45°HF Fluidics	602 690
	– 5.00 gph 45°HF Fluidics	602 692
	– 5.50 gph 45°HF Fluidics	602 691
	– 6.00 gph 45°HF Fluidics	602 693
	– 6.50 gph 45°HF Fluidics	602 694

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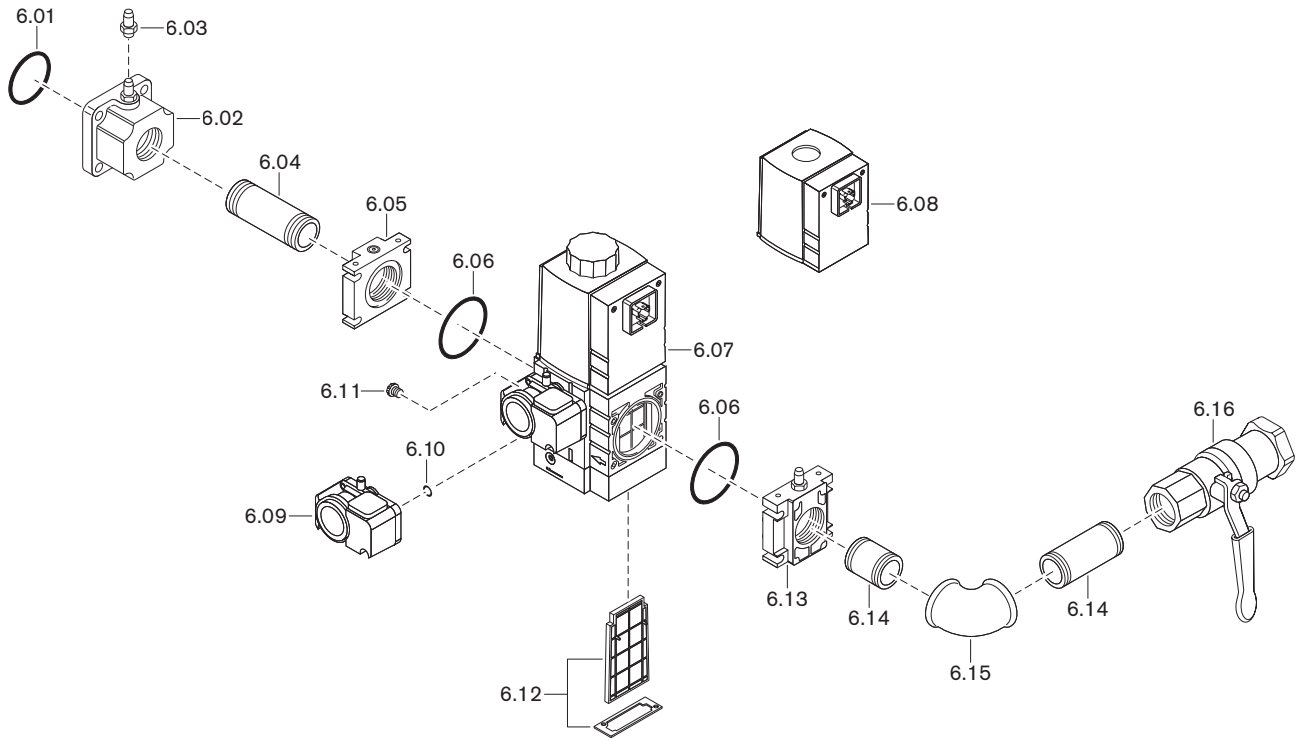
Pos.	Description	Order No.
5.01	Combustion manager W-FM 25 / 230 V	
	– intermittent operation without O_2 trim	600 487
	– intermittent operation with O_2 trim	600 491
5.02	Micro fuse T6.3H, IEC 127-2/5	483 011 22 457
5.03	Bracket	240 310 12 017
5.04	Terminal rail 22 pole	235 310 12 472
5.05	Spacer tube 6 x 12 x 10	311 101 02 027
5.06	Coupler component 59.34.8.230.00WH	704 295
5.07	Contactor B 7-30-10 220-240V	702 818
5.08	Plug cable for contactor	230 310 12 482
5.09	Plug unit ST18/3	716 543
5.10	Plug unit ST18/7	716 549
5.11	Plug unit ST18/4	716 546
5.12	Bridging plug No. 7	241 400 12 042
5.13	Bridging plug No. 15	232 110 12 082
5.14	Ignition unit type W-ZG01V 230 V 100 VA	603 221
5.15	Screw M4 x 42 Combi-Torx-Plus 20IP	409 260
5.16	Fuel selection switch	235 310 12 222
5.17	Fixing bracket display	241 400 12 017
5.18	ABE for W-FM 20 / 25 with 0.58 m cable	600 481
5.19	Plug cable flame sensor	235 310 12 132
5.20	Plug cable	
	– Stage 1 oil solenoid valve (K11)	235 310 12 192
	– Stage 2 oil solenoid valve (K13)	235 310 12 202
	– Oil safety solenoid valve (K15)	235 310 12 492
5.21	Plug cable	
	– Pump motor (No. 2)	245 050 12 082
	– Fan motor (No. 3)	241 050 12 062
5.22	Plug cable oil pressure switch	235 310 12 212
5.23	Plug cable	
	– No. 1 W-FM/terminal	235 310 12 412
	– No. 2 pump motor	235 310 12 032
	– No. 3 fan motor	235 310 12 042
	– No. 3 W-FM/terminal	235 310 12 422
	– No. 3 (X31) cont. run fan/terminal	230 310 12 442
	– No. 3 (X32) motor	235 310 12 252
	– N3. 3N W-FM/terminal	235 310 12 062
	– No. 3N	235 310 12 262
	– No. 5 W-FM/terminal	235 310 12 432
	– No. 6 W-FM/terminal	235 310 12 442
	– No. 8 W-FM/terminal	235 310 12 452
	– No. 11 air pressure switch	232 110 12 032
	– No. 12 W-FM/terminal	235 310 12 462
	– No. 13 W-FM/terminal	235 310 12 122

13 Spares


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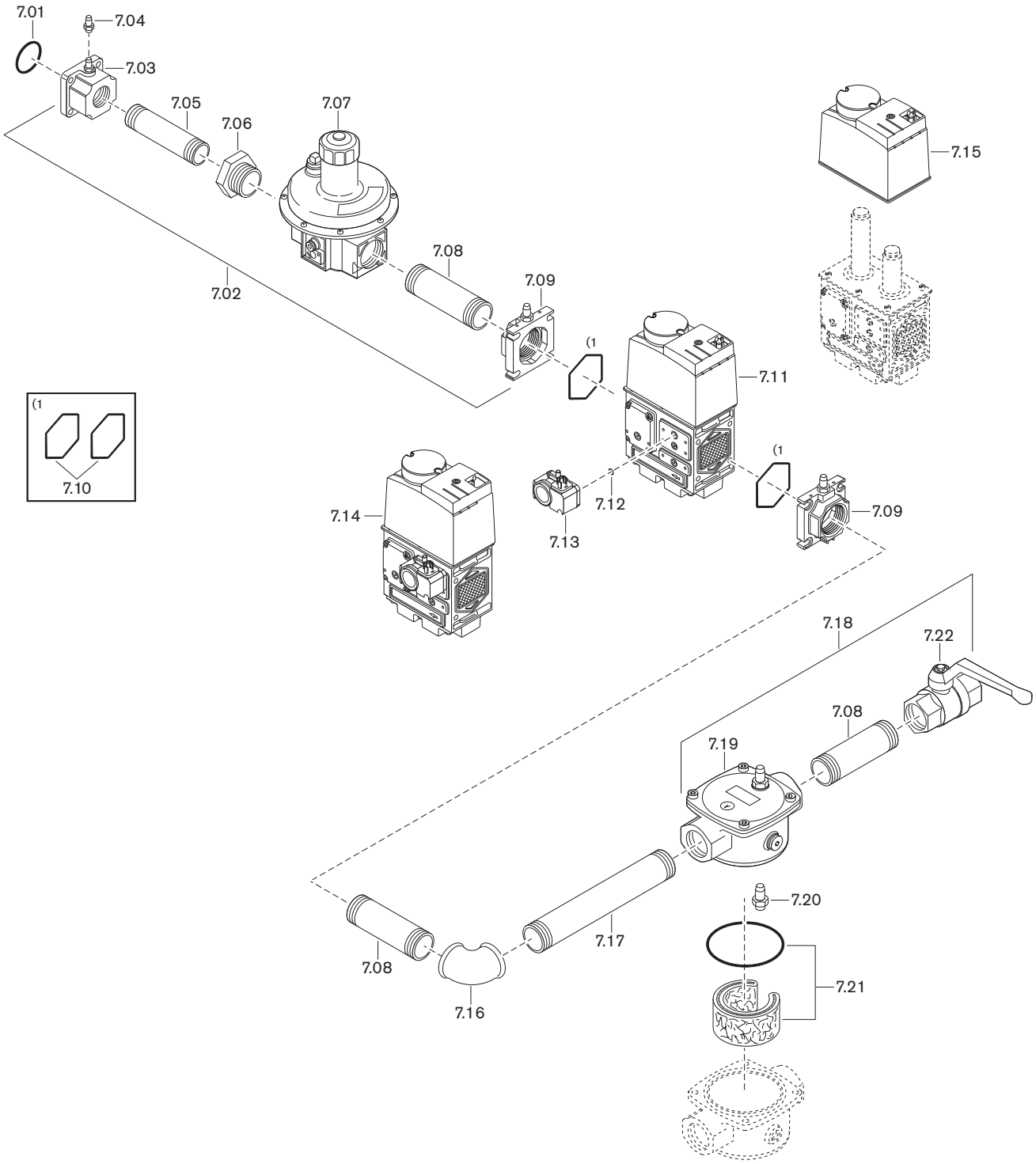
Pos.	Description	Order No.
5.24	Plug cable oil safety solenoid valve (K14)	235 310 12 182
5.25	Plug cable gas valves (K32)	235 310 12 162
5.26	Plug cable gas pressure switch (B31)	235 310 12 172
5.27	Plug cable No. 14 remote reset	230 110 12 362
5.28	Plug-in switch ST18/4	130 103 15 012

13 Spares


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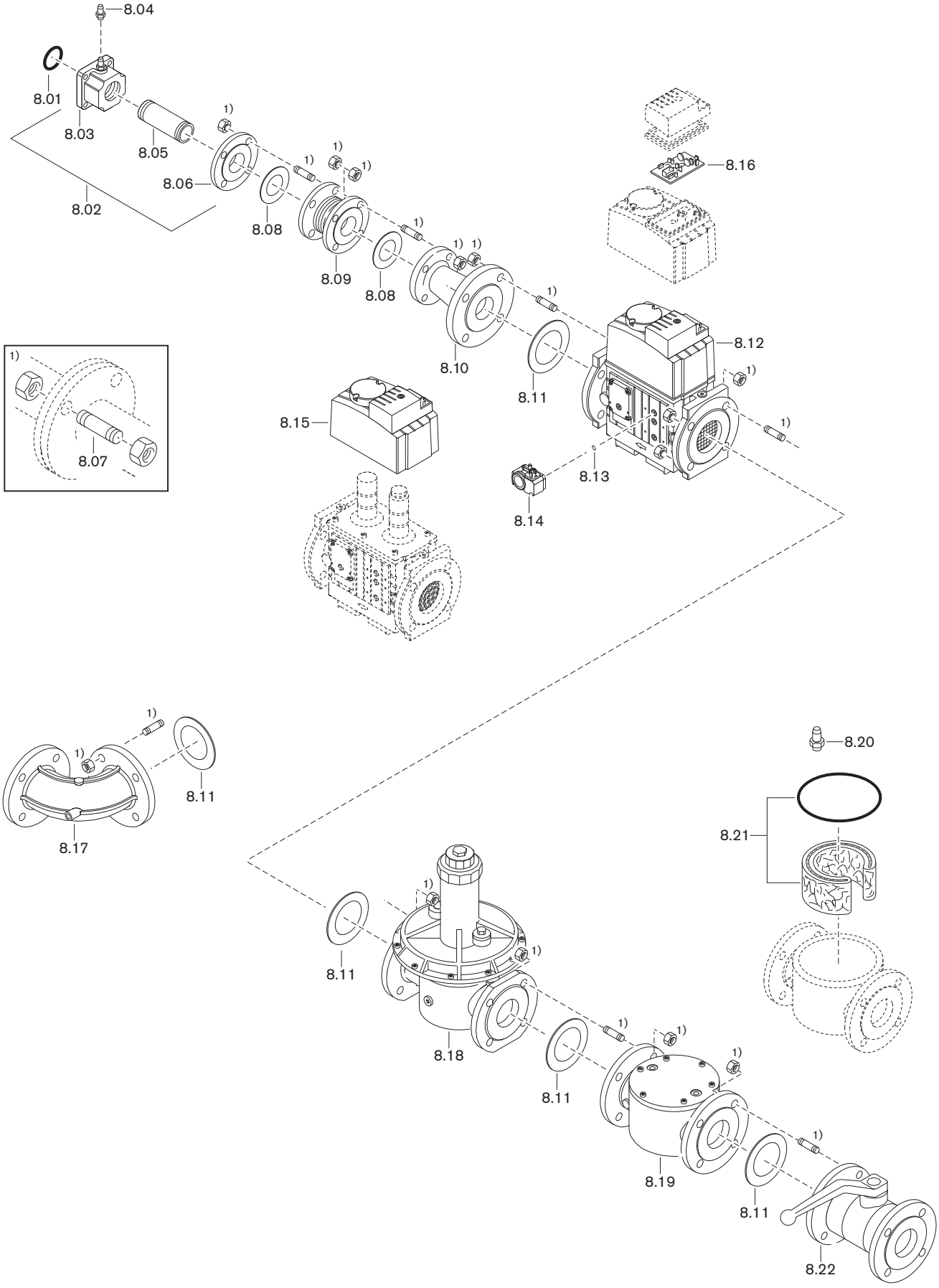
Pos.	Description	Order No.
6.01	O ring 45 x 3 NBR 70, DIN 3771	445 518
6.02	Flange Rp1½	232 400 26 027
6.03	Pressure test nipple G¹/₈A	453 001
6.04	Double nipple R1½ x 80	139 000 26 677
6.05	Flange	
	– DMV 507 Rp1½	605 234
	– DMV 512 Rp1½	605 230
6.06	O ring	
	– 57 x 3 W-MF 507	445 519
	– 75 x 3.5 W-MF 512	445 520
6.07	Multifunction assembly	
	with gas pressure switch	
	– W-MF SE 507 S82 230 V	605 332
	– W-MF SE 512 S82 230 V	605 333
6.08	Solenoid coil	
	– W-MF 507 No. 032P 230 V	605 255
	– W-MF 512 No. 042P 230 V	605 257
6.09	Pressure switch GW 50 A5/1 5 … 50 mbar	691 378
	with screws and O ring	
6.10	O ring 10.5 x 2.25 for pressure switch	445 512
6.11	Breather plug with filter element G¹/₈	605 302
6.12	Filter insert	
	– W-MF 507	605 253
	– W-MF 512	605 254
6.13	Flange with pressure test nipple	
	– DMV 507 Rp¾	232 110 26 092
	– DMV 512 Rp1	232 210 26 252
	– DMV 512 Rp1½	232 310 26 062
6.14	Double nipple	
	– R¾ x 50	139 000 26 117
	– R¾ x 100	139 000 26 627
	– R1 x 50	139 000 26 177
	– R1 x 100	139 000 26 187
	– R1½ x 80	139 000 26 677
	– R1½ x 120	139 000 26 237
6.15	Elbow A1	
	– ¾-Zn-A	453 143
	– 1-Zn-A	453 123
	– 1½-Zn-A	453 137
6.16	Isolating valve with TAE	
	– 998NG-¾-CE-TAS for Gas PN1	454 596
	– 998NG-1-CE-TAS for Gas PN1	454 597
	– 984 1½-CE-TAS MOP5	454 911
	Isolating valve without TAE	
	– 984D- ¾ PN 40/MOP5	454 660
	– 984D-1 PN 40/MOP5	454 661
	– 984D-1½ PN 40/MOP5	454 663

13 Spares


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Pos.	Description	Order No.
7.01	O ring 45 x 3 NBR 70, DIN 3771	445 518
7.02	Valve train gr. press. reg. R2 DMV 525/12	232 400 26 252
7.03	Flange Rp1½	232 400 26 027
7.04	Pressure test nipple G$^{1}/_{8}$A	453 001
7.05	Double nipple R1½ x 80	139 000 26 677
7.06	Nipple N4-2 x 1½ Zn-A EN10242	453 718
7.07	Pressure regulator FRS 520-2S Rp2	640 553
7.08	Double nipple R2 x 80	139 000 26 267
7.09	Flange w. p. test nipple Rp2 DMV 525/12	625 031
7.10	Gasket set for flange DMV 525/12	625 033
7.11	Solenoid valve DMV 525/12 220-240 V	625 040
7.12	O ring 10.5 x 2.25 for pressure switch	445 512
7.13	Pressure switch GW 50 A5/1, 5-50 mbar	691 378
7.14	Valve train group DMV 525 R2 w. GW 230 V	232 400 26 242
7.15	Solenoid coil DMV 525/12 220-240 V	625 022
7.16	Elbow A1-2 Zn-A EN10242	453 112
7.17	Double nipple R2 x160	139 000 26 277
7.18	Valve train group filter R2	230 310 26 132
7.19	Filter RP2 WF 520/1 for all gases PB	151 223 40 160
7.20	Pressure test nipple G¼A	453 005
7.21	Filter insert set WF 520/1	151 334 26 112
7.22	Isolating valve with TAE	
	– 984 2 -CE-TAS MOP5	454 912
	Isolating valve without TAE	
	– 984D-2 PN 40/MOP5	454 664

13 Spares


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13 Spares

Pos.	Description	Order No.
8.01	O ring 45 x 3 NBR 70, DIN 3771	445 518
8.02	Valve train flange DN 40	232 400 26 212
8.03	Flange Rp1½	232 400 26 027
8.04	Pressure test nipple G$^{1}/_{8}$A	453 001
8.05	Double nipple R1½ x 80	139 000 26 677
8.06	Screwed flange Rp1½ St37 C40, DIN 2566	452 920
8.07	Stud screw M16Fo v 50 DIN 939 5.6	421 057
	– hexagonal nut M16 DIN 934 -8	411 801
8.08	Sealing ring 49 x 92 x 2 EN 1514-1	441 859
8.09	Compensator DN 40, PN 10, length 97 mm	454 342
8.10	Reducing flange eccentric	
	– DMV 5065/12, 40/65	151 327 26 517
	– DMV 5080/12, 40/80	151 327 26 737
8.11	Sealing ring EN 1514-1	
	– DMV 5065/12, 77 x 127 x 2	441 861
	– DMV 5080/12, 90 x 142 x 2	441 044
8.12	Solenoid valve	
	– DMV 5065/12 220-240 V	625 007
	– DMV 5080/12 220-240 V	625 009
8.13	O ring 10.5 x 2.25 for pressure switch	445 512
8.14	Pressure switch GW 50 A5/1, 5-50 mbar	691 378
8.15	Solenoid coil	
	– DMV 5065/12 220-240 V	625 024
	– DMV 5080/12 220-240 V	625 026
8.16	Circuit board DMV 5065/12, 5080/12 220-240	605 989
8.17	Flange elbow	
	– DN 65 x 90 DEG	151 327 26 342
	– DN 80 x 90 DEG	151 327 26 362
8.18	Pressure regulator	
	– FRS 5065 DN 65	640 672
	– FRS 5080 DN 80	640 673
8.19	Filter WF 3065/1 for all gases PB	
	– DN 65	151 223 40 190
	– DN 80	151 223 40 200
8.20	Pressure test nipple G¼A	453 005
8.21	Filter insert set	
	– WF 3065/1	151 334 26 152
	– WF 3080/1	151 334 26 162
8.22	Isolating valve without TAE	
	– DN 65 PN16 for Gas	454 640
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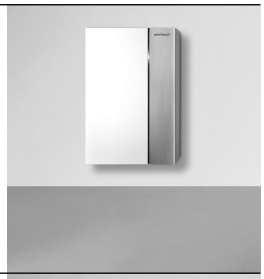
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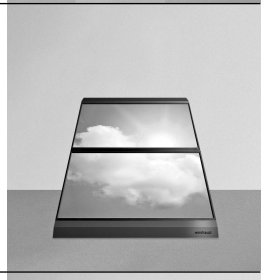
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