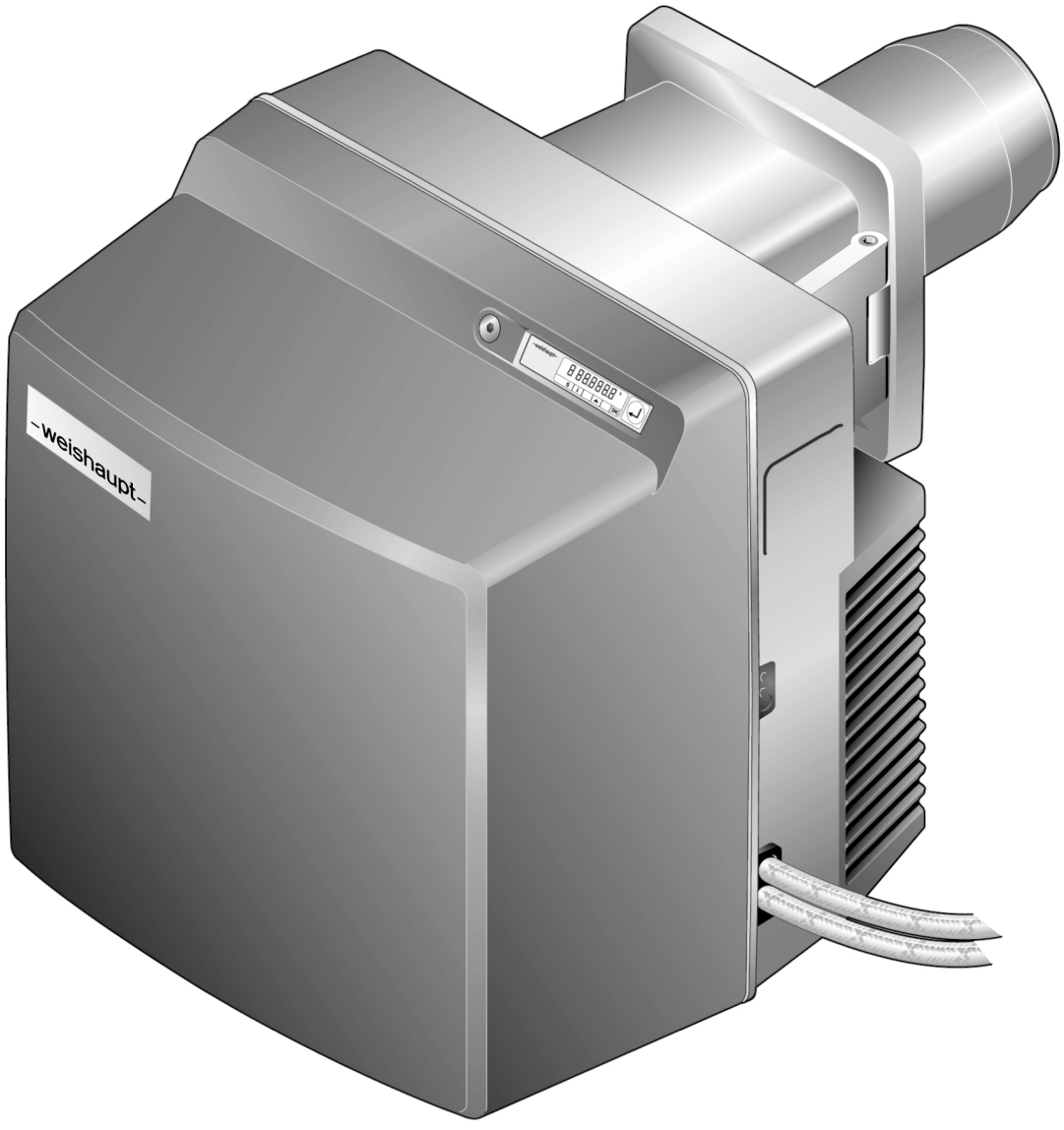
–weishaupt–

manual

Installation and operating instruction



Oil burner WL40/1-A Z-1LN-A

83319702 ▪ 1/2020-10

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. It should be observed by all personnel working with the unit.

Work on the unit must only be carried out by personnel who have had 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	Danger with high risk. Non observance can lead to serious injury or death.
 WARNING	Danger with medium risk. Non observance can lead to serious injury or death.
 CAUTION	Danger with low risk. Non observance can cause injury to personnel.
 NOTICE	Non observance can cause damage to the equipment and environmental damage.
	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 and EN 267.

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

2.2.1 Personal protective equipment (PPE)

Use the necessary personal protective equipment for all work.

2.2.2 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.

2.2.3 Electrical work

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.

The device contains components, which could be damaged by electrostatic discharge (ESD).
When working on circuit boards and contacts:
- do not touch circuit boards or contacts,
- if necessary, take ESD protective measures.

2.3 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.

2.4 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.

2.5 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

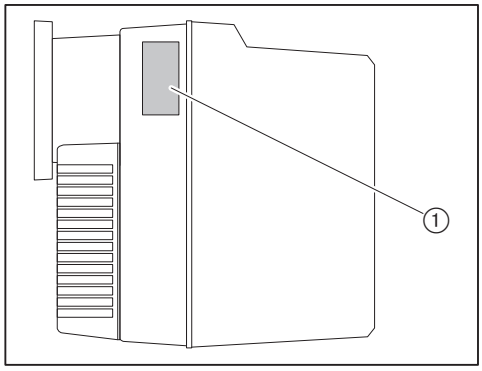
WL40/1-A Z-1LN-A

Type	
W	Series: Compact burner
L	Fuel: Oil EL
40	Size
1	Ratings size
A	Construction

Version	
Z	Type of control: two stage
1LN	Mixing head: LowNO_x
A	Mixing head version

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 air damper closes automatically. This reduces heat loss in the heat exchanger.

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 (optional)

Depending on the burner application, optional equipment may be required for optimum operation [ch. 12.3].

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

3.3.2 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 valve. Stage 2 solenoid valve opens or closes depending on heat demand.

Minimum oil pressure switch (optional)

Depending on the burner application, optional equipment may be required for optimum operation [ch. 12.3].

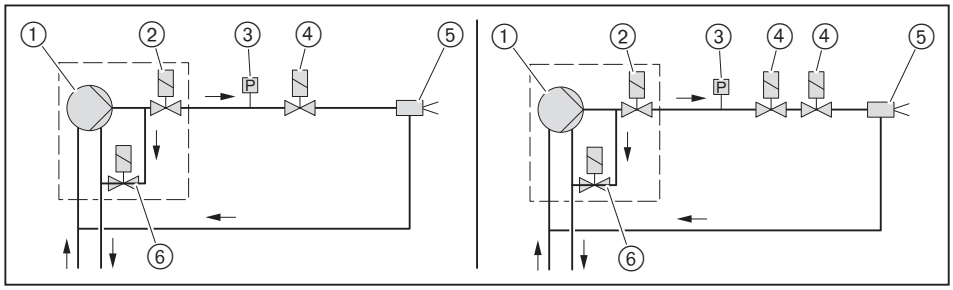
The minimum oil pressure switch monitors the pump pressure in the supply. If the preset pressure is not achieved, the combustion manager initiates a lockout.

Nozzle head with nozzle shut off

The nozzle shut off is integrated in the nozzle head. It prevents oil leaks after shutdown.

Sequence diagram

Standard / continuous operation	with oil pressure switch



① Oil pump on burner
② Stage 1 solenoid valve (normally closed) on the oil pump
③ Minimum oil pressure switch (optional)
④ Safety solenoid valve (normally closed)
⑤ Nozzle head with nozzle shut off and nozzle
⑥ Stage 2 solenoid valve (normally open) on the oil pump

3.3.3 Electrical components

Combustion Manager

The combustion manager W-FM is the control unit of the burner.

It controls the sequence of operation and monitors the flame.

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 and the oil pump.

With variable speed drive, a frequency converter is connected upstream.

Ignition unit

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

Flame sensor

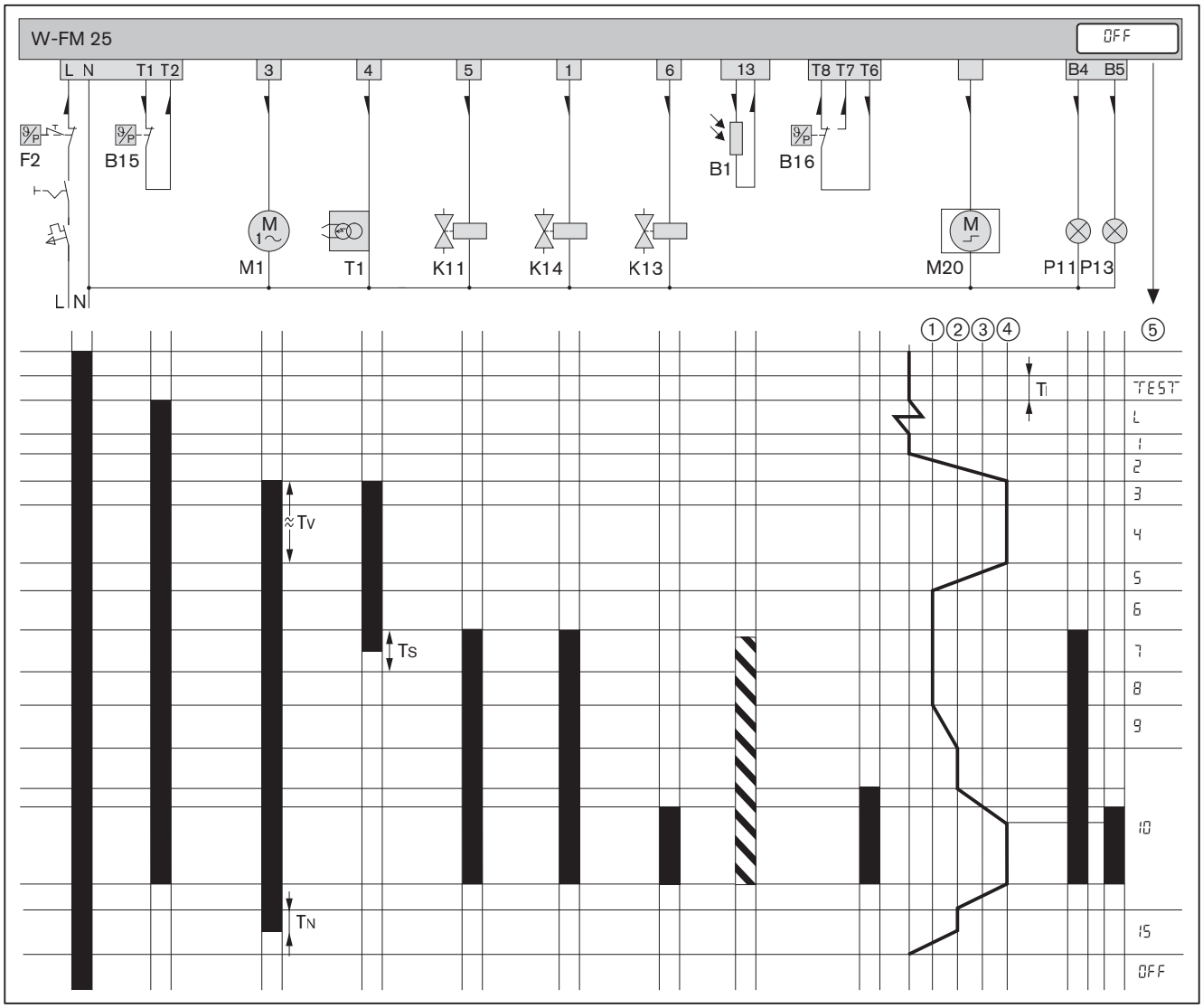
The combustion manager monitors the flame signal via the flame sensor.

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

3.3.4 Program sequence

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

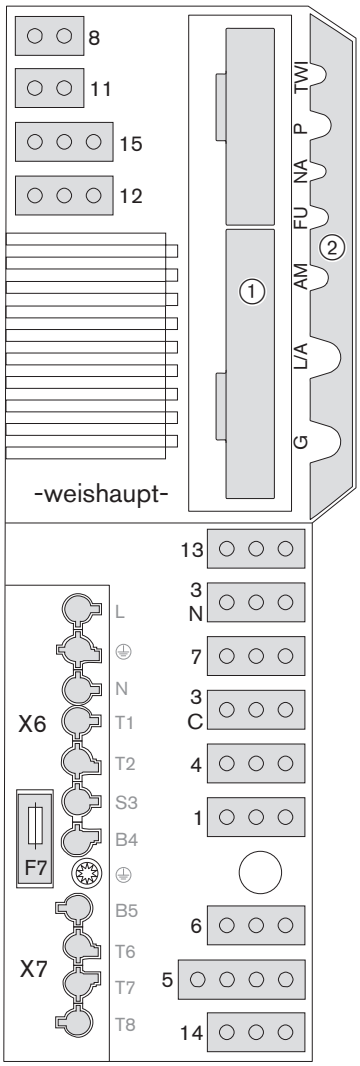
Phase	Function
TEST	After the power supply has been switched on the combustion manager performs a self-test.
L	At heat demand, the air damper actuator drives to the reference point.
1	The combustion manager monitors for extraneous light.
2	The air damper actuator drives to pre-purge, to air damper setting stage 2 (operating point P9).
3	Ignition and pre-purge is initiated.
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 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 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.



B1	Flame sensor	①	Operating point P0 (ignition position)
B15	Temperature or pressure regulator	②	Operating point P1 (stage 1)
B16	Temperature or pressure regulator stage 2	③	Operating point P2 (solenoid valve stage 2)
F2	Temperature or pressure limiter	④	Operating point P9 (stage 2)
K11	Stage 1 solenoid valve	⑤	Operating phase
K13	Stage 2 solenoid valve	T_I	Initialisation time (Test): 3 s
K14	Safety solenoid valve	T_N	Post-purge time: 2 s [ch. 6.2.3]
M1	Burner motor	T_S	Safety time: 3 s
M20	Air damper actuator	T_V	Pre-purge time: 20 s
P11	Control lamp operation (optional)		Voltage is applied
P13	Control lamp stage 2 (optional)		Flame signal present
T1	Ignition unit		Current path

3.3.5 Inputs and outputs

Observe wiring diagram supplied.



TWI	TWI interface (VisionBox, accessory)
P	O_2 sensor (accessory)
NA	Speed signal (Namur)
FC	Frequency converter
AM	Operating panel
L/A	Air damper actuator
G	Coded plug (black)
①	Slot for analogue module EM3/3 or fieldbus module EM3/2
②	W-FM cover
1	Safety solenoid valve (K14)
3C	Burner motor or frequency converter for continuous running fan / voltage supply flame sensor LFS1 (continuous operation)
3N	Burner motor or frequency converter
4	Ignition unit
5	Stage 1 solenoid valve (K11)
6	Stage 2 solenoid valve (K13)
7	Bridging plug No. 7
8	Oil meter (impulse generator)
11	Air pressure switch
12	Oil pressure switch
13	Flame sensor
14	Remote rest or switch contact flame sensor LFS1 (continuous operation)
15	Air pressure switch for ducted air intake (LDW2)
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

DIN CERTCO	5G820
Basic standards	EN 267:2011 Additional standards, see EU conformity certification.

3.4.2 Electrical data

Mains voltage / mains frequency	230 V/50 Hz
Consumption at start	max 901 W
Consumption during operation	max 801 W
Power consumption	max 4.0 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
Installation elevation	max 2000 m(2

(1 With the relevant suitable fuel oil and layout of oil supply.
(2 Consultation with Weishaupt is required for higher installation elevation.

3.4.4 Fuels

- 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

To EN 267 the burner complies with emission class 3.

The NO_x values are influenced by:
- combustion chamber dimensions
- flue gas system
- fuel
- combustion air (temperature and humidity)
- medium temperature

Combustion chamber dimensions, see Weishaupt Partner Portal / Documents and Applications / Online Applications / NO_x calculation for burners.

Sound levels

Dual number noise emission values	
Measured sound power level L_{WA} (re 1 pW)	78 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

Combustion heat rating	140 … 500 kW 11.8 … 42 kg/h(1
Combustion head	W40/1LN

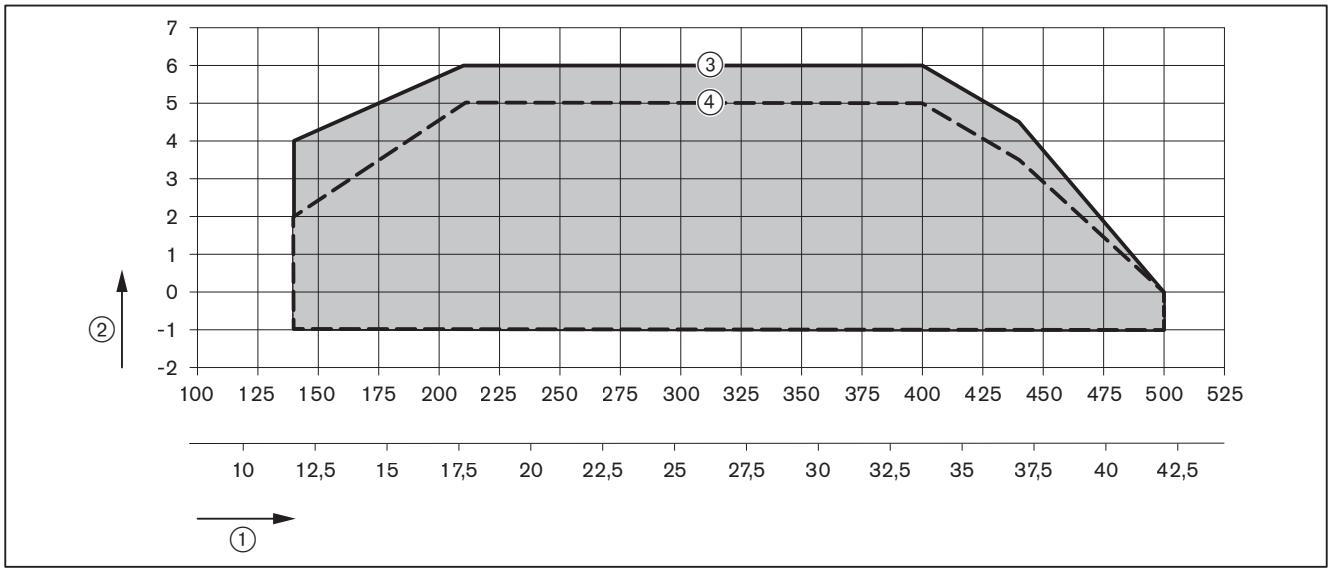
(1 The oil throughput data relates to a calorific value of 11.9 kWh/kg for fuel oil EL.

Capacity graph

Capacity graph to EN 267.

The capacity data given relates to an installation elevation of 500 m above sea level. For installation elevations above 500 m a capacity reduction of approx. 1 % per 100 m applies.

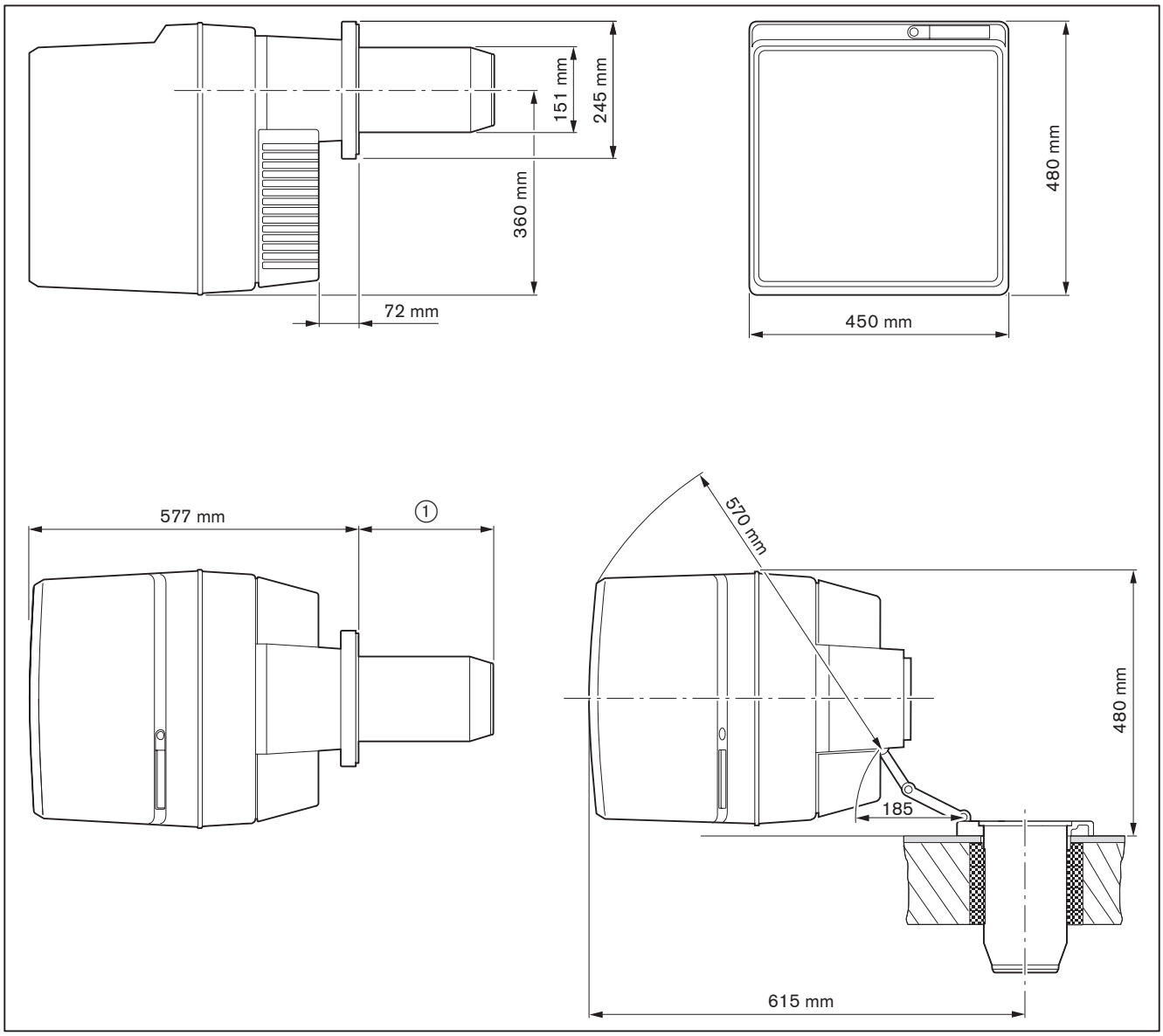
A limited capacity graph is valid for ducted air intake.



① Combustion heat rating [kW] or [kg/h]
② Combustion chamber pressure [mbar]
③ Capacity graph with flame sensor QRB4 (intermittent operation)
④ Capacity graph with flame sensor LFS1/RAR9 (continuous operation)

3.4.7 Dimensions

Burner



① 231 mm without combustion head extension
331 mm with combustion head extension (100 mm)

3.4.8 Weight

approx. 37 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,

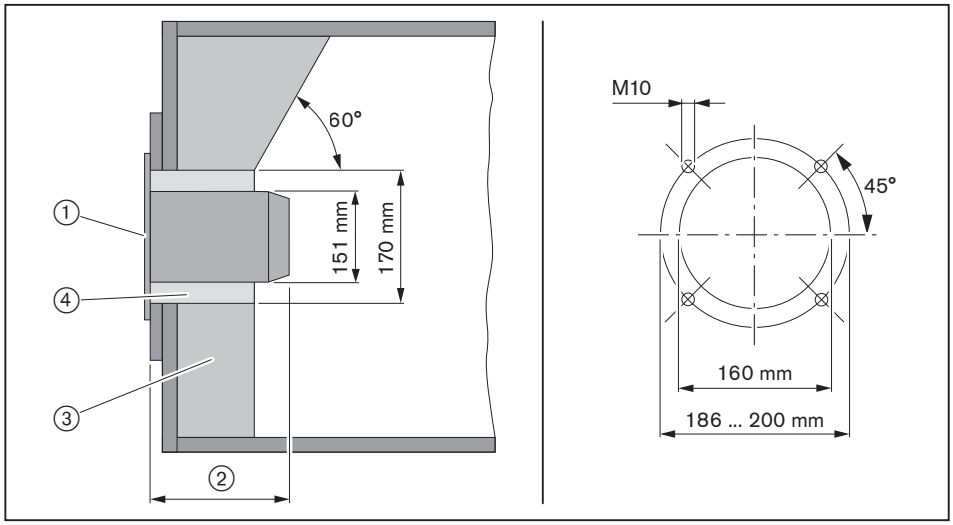
Prepare heat exchanger

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



① Flange gasket
② 231 mm
③ Refractory
④ Aperture

4.2 Selecting a nozzle

► Determine nozzle size.

Load distribution

The load distribution of the burner is made via a pressure change-over on the oil pump.

Generally, stage 1 takes on approx. 65 % of the maximum oil throughput, a different distribution may be necessary.

Example

Burner capacity required: approx. 415 kW

65 % of burner capacity required: 415 kW × 0.65 = 270 KW

Nozzle size 6.50 gph, see nozzle selection table:
- Stage 1: 10 bar (291 kW)
- Stage 2: 20 bar (415 kW)

Recommended nozzles

Make	Characteristics
Fluidics	45°HF
Fluidics	60°HF(1

(1 Alternative for short combustion chambers of if the flame in unstable.

Pump pressure setting

Stage 1	Stage 2
9 … **11** … 12 bar	17 … **20** … 22 bar

Spray characteristic and spray angle varies depending on pump pressure.

Nozzle selection table

Different load values are possible due to tolerances.

Stage 1	Burner capacity [kW] at pump pressure			
Nozzle size [gph]	**9 bar**	**10 bar**	**11 bar**	**12 bar**
3.00	–	–	143	149
3.50	149	158	165	174
4.00	171	181	189	199
4.50	192	204	213	223
5.00	213	226	237	248
5.50	235	249	261	273
6.00	257	271	284	298
6.50	278	291	308	321
7.00	299	317	332	346
7.50	320	338	355	370
8.00	343	361	380	395

Stage 2	Burner capacity [kW] at pump pressure			
Nozzle size [gph]	**17 bar**	**18 bar**	**20 bar**	**22 bar**
3.00	176	181	192	201
3.50	206	211	224	234
4.00	235	241	256	267
4.50	264	271	287	301
5.00	293	301	320	336
5.50	322	331	351	368
6.00	351	361	382	401
6.50	380	393	415	435
7.00	411	421	448	468
7.50	440	452	479	501
8.00	470	485	514	–

Conversion of burner capacity to oil throughput see formula below.

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

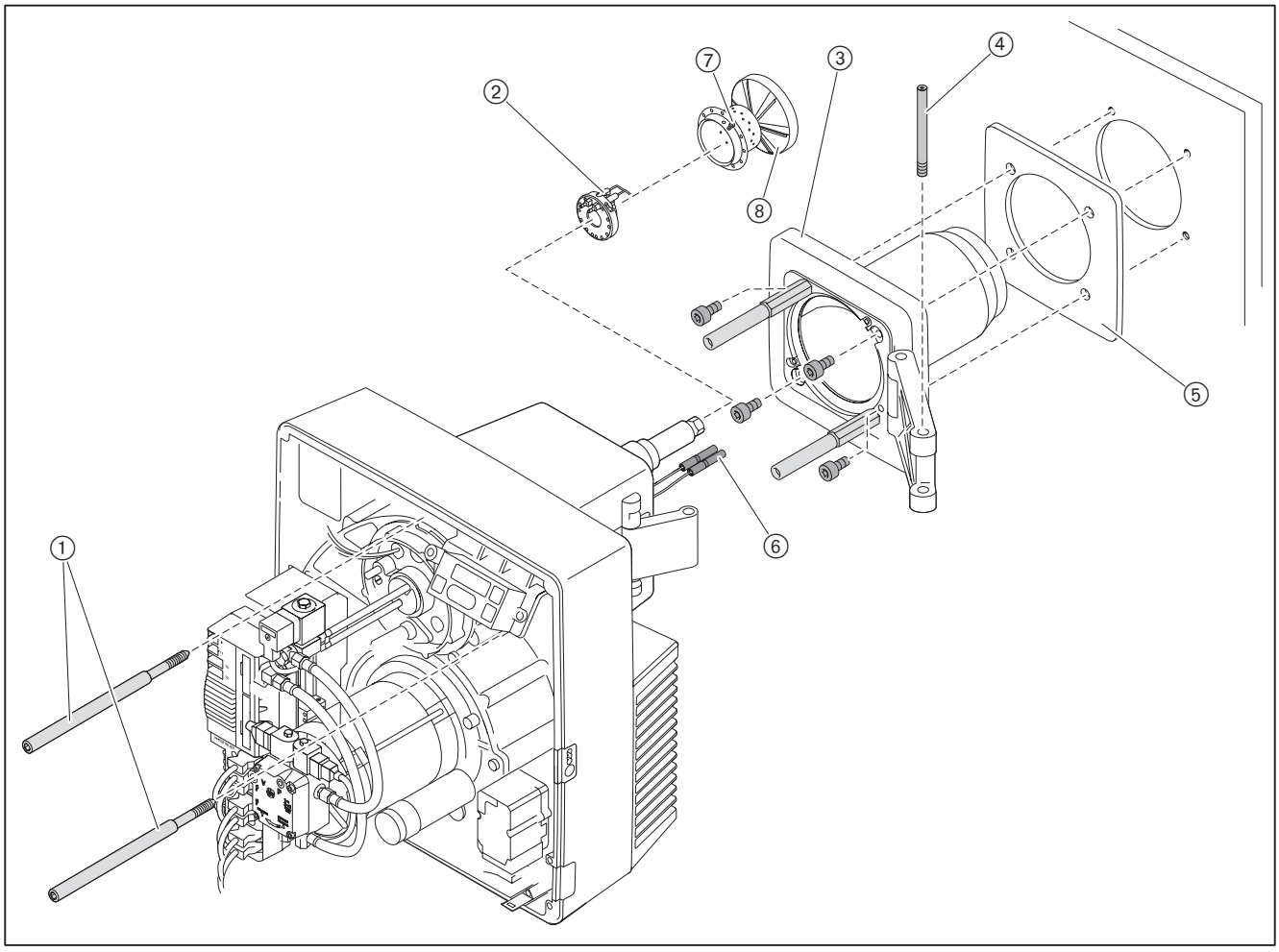
4.3 Burner installation

Observe health and safety regulations for lifting and carrying loads [ch. 3.4.8].

- ▶ Remove screws ①.
- ▶ Remove pin ④.
- ▶ Remove burner flange ③ from burner housing.

It is possible to install the burner rotated by 180 if space is limited. This requires conversion measures [ch. 4.3.1].

- ▶ Fit flange gasket ⑤ and burner flange ③ to the boiler using screws.
- ▶ The aperture between combustion head and refractory should be filled with flame-proof, resilient insulating material. Do not make solid.
- ▶ Unplug ignition cables ⑥.
- ▶ Remove screw ⑦ and remove diffuser ⑧.
- ▶ Undo screw ② and remove ignition electrode holder.
- ▶ Fit nozzle [ch. 9.4].
- ▶ Re-fit diffuser and ignition cables.
- ▶ Set ignition electrodes [ch. 9.6]
- ▶ Check nozzle distance and adjust if necessary [ch. 9.8].
- ▶ Push burner on to the stay bolts of the burner flange.
- ▶ Re-fit pin ④.
- ▶ Hinge burner closed and secure with screws ①.

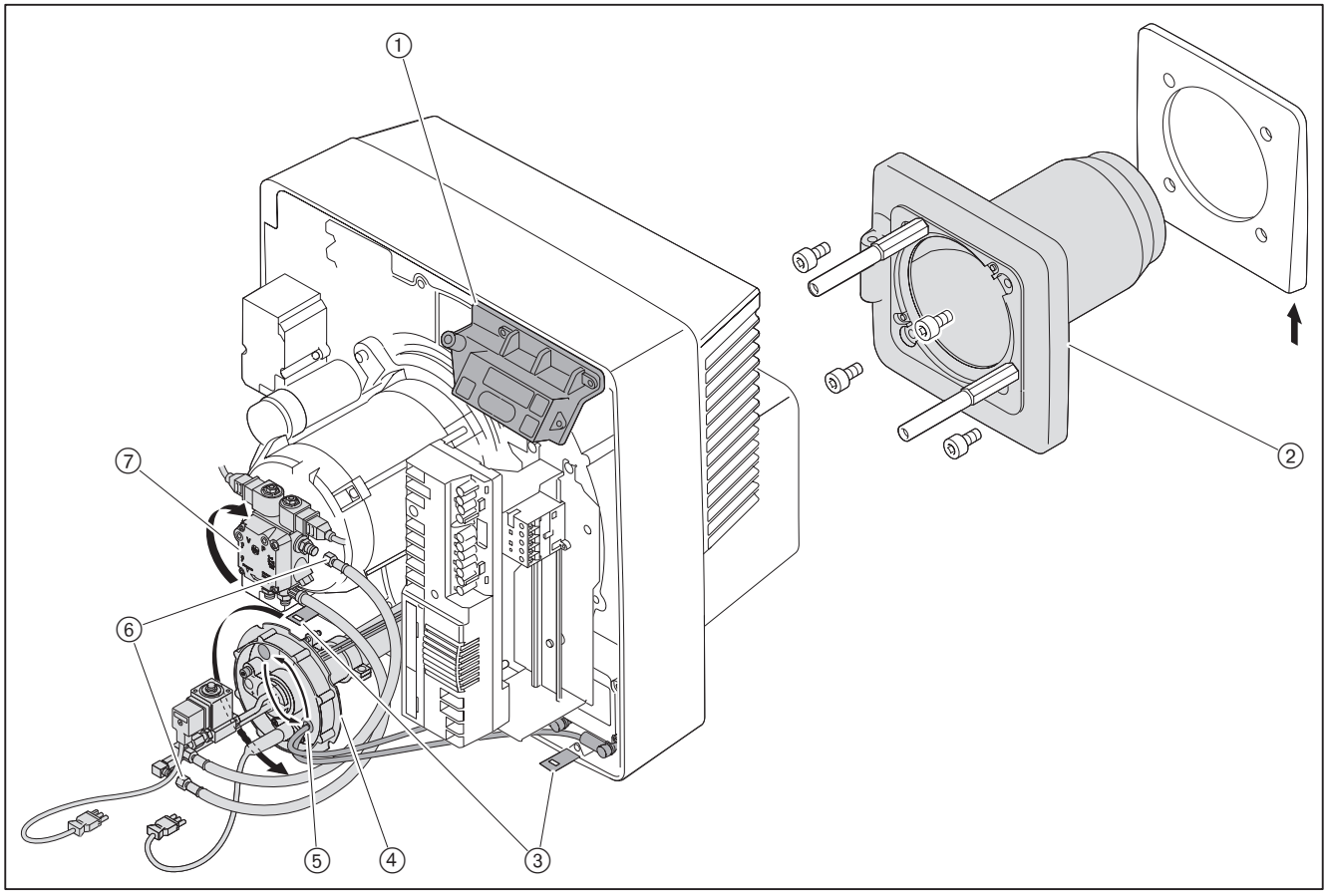


4.3.1 Rotate burner by 180° (optional)

- ► Mount operating panel ① on the opposite side of the housing.
- ► Mount fixing bracket ③ on the opposite side of the housing.
- ► Remove pressure hoses ⑥.
- ► Remove oil pump ⑦ and install rotated by 180° [ch. 9.10].
- ► Remove mixing head ④, see [ch. 9.7].
- ► Remove ignition cable ⑤ including grommet and guide it through the cable grommet opposite on the cover.
- ► Close open cable grommet with shut off grommet.
- ► Fit mixing head rotated by 180°.
- ► Connect pressure hoses ensuring correct allocation.

Wedge profile flange gasket required (Order No. 240 410 00 017).

- ► Rotate burner flange ② 180° and mount with flange gasket.



- ► Rotate burner by 180° and install [ch. 4.3].

5 Installation

5.1 Oil supply

Observe EN 12514-2, DIN 4755, TRÖl 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

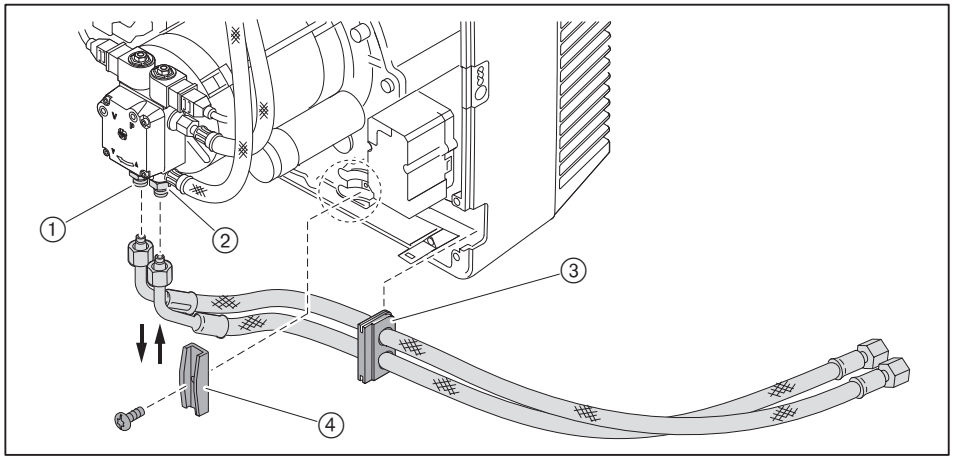
Length	1200 mm
Oil hose connection	G⅜
Nominal pressure	10 bar
Thermal load	max 100 °C

Connect oil supply

NOTICE

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.

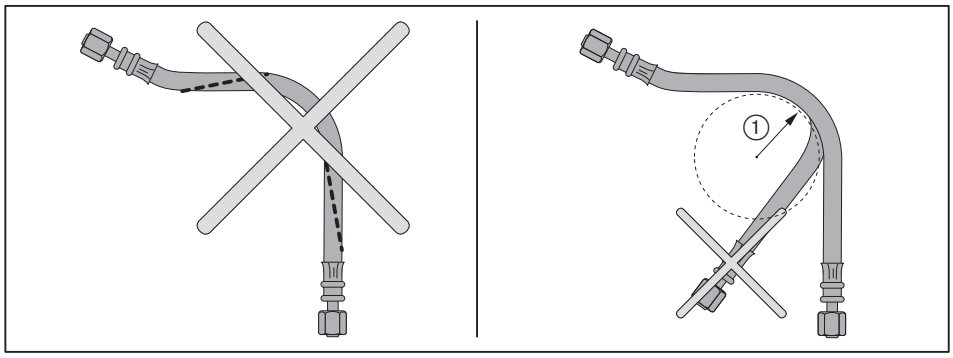
► Fit oil hoses with bracket ④ and grommet ③ to burner.



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

NOTICE

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

► Ensure oil supply is tight.

5.2 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.

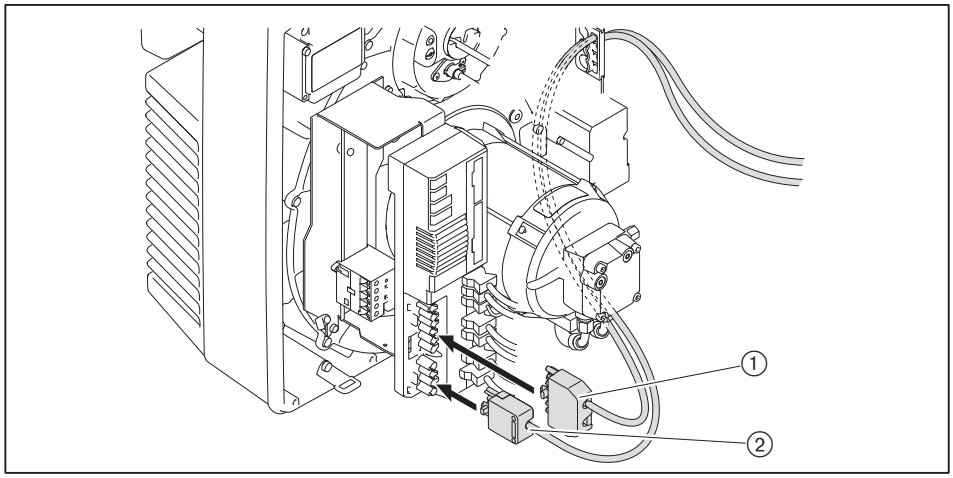
WARNING

Electric shock caused by frequency converter
It is possible that electrical components continue to carry voltage and cause electric shock even after the voltage supply has been disconnected.
► Wait approx. 5 minutes before commencing work.
✓ Electric voltage has dissipated.

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

Observe wiring diagram supplied.

► Check polarity and wiring of 7 pole connection plug ① and 4 pole connection plug ②.
► Plug in connection plugs.

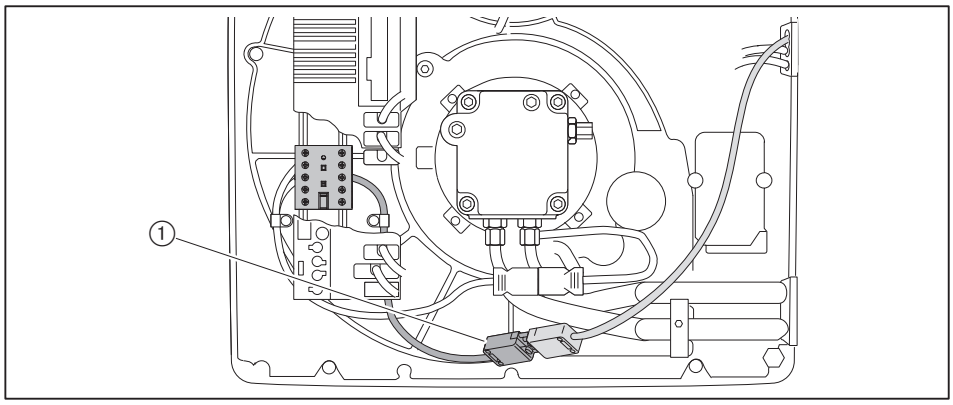


With remote reset, install connection line separately. Do not exceed maximum cable length of 50 metres.

Separate supply line for burner motor (not with variable speed drive)

Observe wiring diagram supplied.

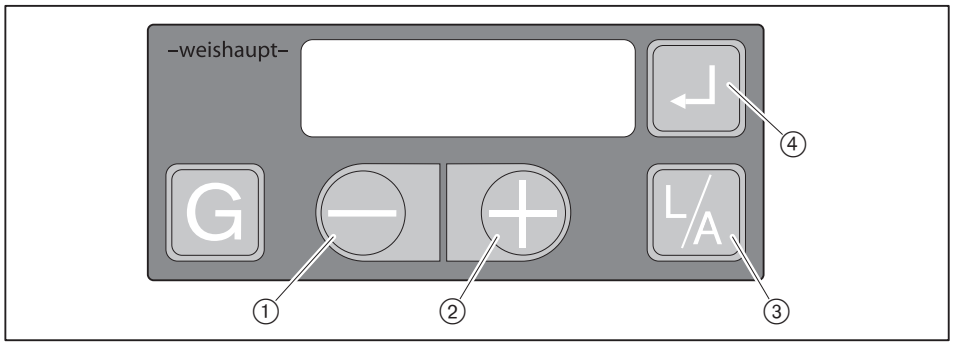
► Plug supply line for burner motor into connection plug ① of the contactor.



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

6 Operation

6.1 Operating panel



①	[–]	Change values
②	[+]	
③	[L/A] Air	Select air damper actuator
④	[Enter]	Reset burner: call up information press for approx. 0.5 seconds: Info level press for approx. 2 seconds: Service level
② and ④	[+] and [ENTER]	press simultaneously for approx. 2 seconds: Parameter level (only possible with display `OFF`)
③ and ④	[L/A] and [Enter]	press simultaneously: select fan speed (only in conjunction with variable speed drive)

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 air damper setting and/or the fan speed can be displayed in the operating level (`10`).

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

Displaying fan speed:
(only in conjunction with variable speed drive)
► Press [Enter] and [L/A] simultaneously.

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.

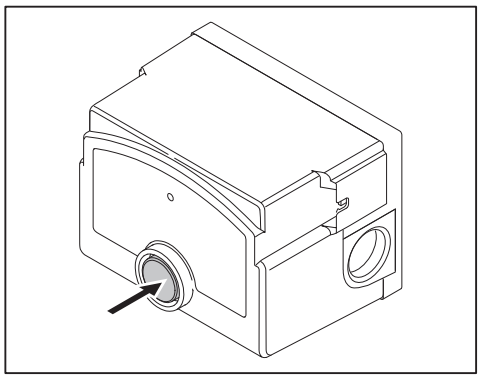
VisionBox Software (optional)

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

Flame sensor LFS1 (optional)

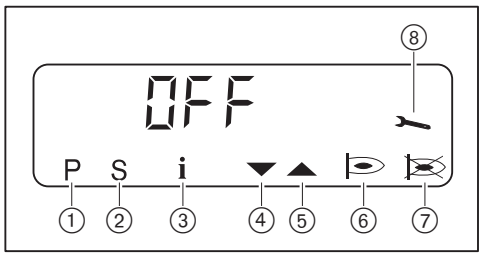
Only in conjunction with continuous operation.



Illuminated push button	Operating condition
yellow	Standby
Green	Flame signal OK
Flashing green	Flame signal too weak (< 10 µA) [ch. 10.3]
red	Lockout

6.2 Display

The display shows the current operating statuses and operating data.



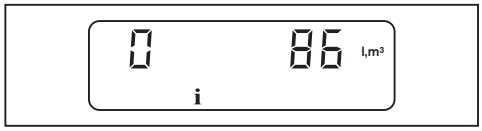
① Setting level activated
② Start phase activated
③ Info level activated
④ Actuator runs CLOSED
⑤ Actuator runs OPEN
⑥ Burner in operation
⑦ Lockout
⑧ Service level activated

TEST	Combustion manager performs self test [ch. 3.3.4]
OFF	Standby, no heat demand
OFF S	Shutdown via contact X3:7 (plug No. 7)
OFFUPr	Unprogrammed condition or programming not completed
OFF E	Standby, no heat demand, shutdown via fieldbus module
10	Current operating phase [ch. 3.3.4]
F1	Under-voltage in standby or internal device error, see error memory
F9	Connection to Fieldbus faulty Acknowledge error: Press [–] and [+] keys simultaneously.

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.



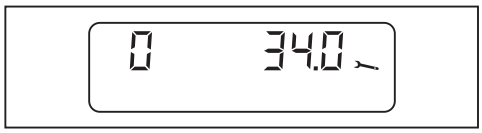
No.	Information
0	Total oil consumption in litres (via X3:8) Reset value: ► Press [L/A] and [+] simultaneously for approx. 2 seconds.
1	Hours run stage 1
2	Hours run stage 2
3	Burner starts
4	Device item number
5	Index of device item number
6	Device number
7	Production date (DDMMYY)
8	Fieldbus address
10	Oil pressure switch function
11	Current fan speed (only in conjunction with variable speed drive) Display of standardised speed: ► Press key [L/A].
12	Current oil consumption (0.1 l/h)
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

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.



Only in conjunction with variable speed drive
The speed set can be displayed at information 0 … 9.

Displaying the fan speed:
► Press key [L/A].

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	
	Flame sensor QRB4[1] (intermittent operation)	Flame sensor LFS1/RAR9 (continuous operation)
	▪ 255 … 121: no flame ▪ 30: high quality recommended value: < 40	▪ 1: flame present

[1] Flame sensor QRB4 is not suitable for continuous operation.

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 [–].	0.0
		0.0 … 100 % Change fan speed: (only in conjunction with variable speed drive) ► Press [Enter] and [L/A] simultaneously and press [+] 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	Factor for oil consumption Impulse rate of meter per litre	1 … 65535 200 impulses ≙ 1 litre ► Adjust factor depending on impulse rate of oil meter.	200
7	Oil pressure switch (X3:12)	0: not activated 1: activated	0(1
8	Air pressure switch (X3:11)	0: not activated 1: activated	0(2
9	Operating mode output X3:1	1: Safety solenoid valve 2: tank valve	1
d	Flame sensor	0: ionisation electrode or flame sensor FLW 1: switch input X3:14, flame sensor LFS1/RAR9 2: flame sensor QRB4	2

(1 If an oil pressure switch is fitted, set parameter 7 and parameter 8 to 1 and parameter 9 to 2.
(2 If an air pressure switch is fitted, set parameter 8 to 1.

6 Operation

Pno.	Parameters	Setting range	Factory setting
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 [–].	20.0
		0.0 … 100 % Change fan speed: (only in conjunction with variable speed drive) ► Press [Enter] and [L/A] simultaneously and press [+] or [–].	50.0
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
o	Operating mode O_2 trim (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

(1 If an oil pressure switch is fitted, set parameter 7 and parameter 8 to 1 and parameter 9 to 2.
(2 If an air pressure switch is fitted, set parameter 8 to 1.

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 … E4.

► 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 or flame sensor FLW 1: switch input X3:14, flame sensor LFS1/RAR9 2: flame sensor QRB4
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
E4	Pre-ignition delay	0 … 4094: the time (seconds) runs down from operating status 09, then ignition starts OFF: ignition only from operating status 15

7 Commissioning

7.1 Prerequisite

Commissioning must only be carried out by qualified personnel.

Only correctly carried out commissioning ensures the operational safety.

Do not operate the burner outside of the capacity graph [ch. 3.4.6].

► 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

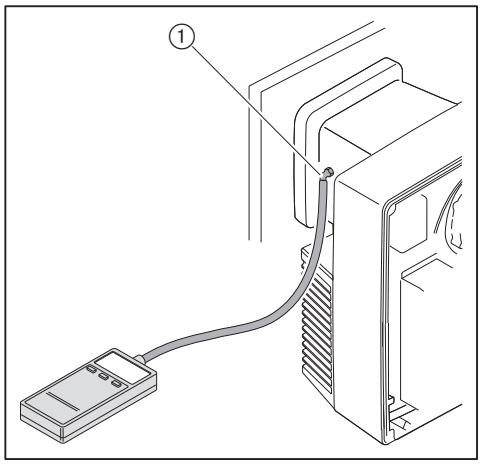
Additional system-related tests could be necessary. Please observe the operating guidelines for the individual components.

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.



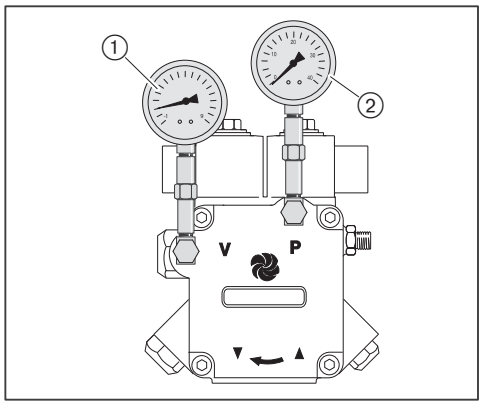
Oil pressure measuring devices on oil pump

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

NOTICE

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.

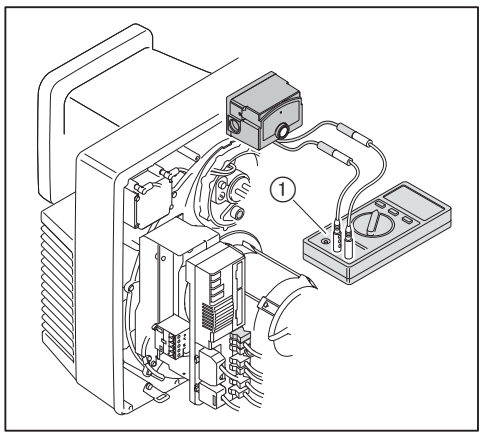


Measuring device for sensor current (continuous operation only)

- ► Disconnect plug coupling on flame sensor LFS1.
- ► Connect current measuring device ① in series.

Flame signal flame sensor LFS1/RAR9

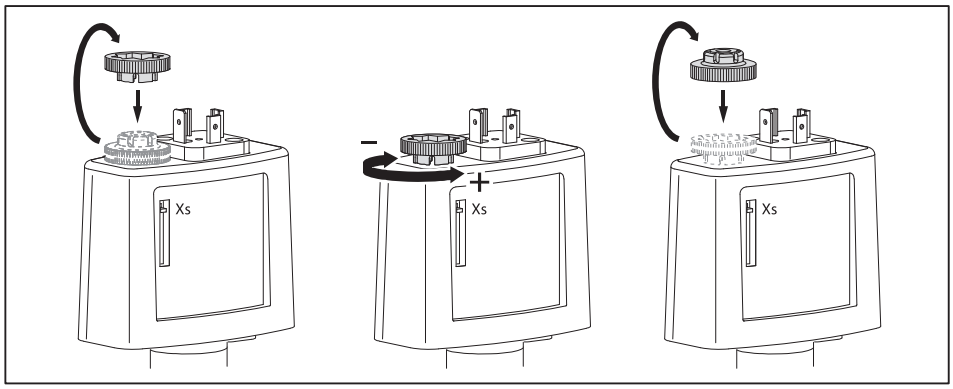
Extraneous light detection from	6.5 µA
Minimum flame signal	12 µA



7.1.2 Set minimum oil pressure switch (optional)

Depending on the burner application, optional equipment may be required for optimum operation [ch. 12.3].

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



7.1.3 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

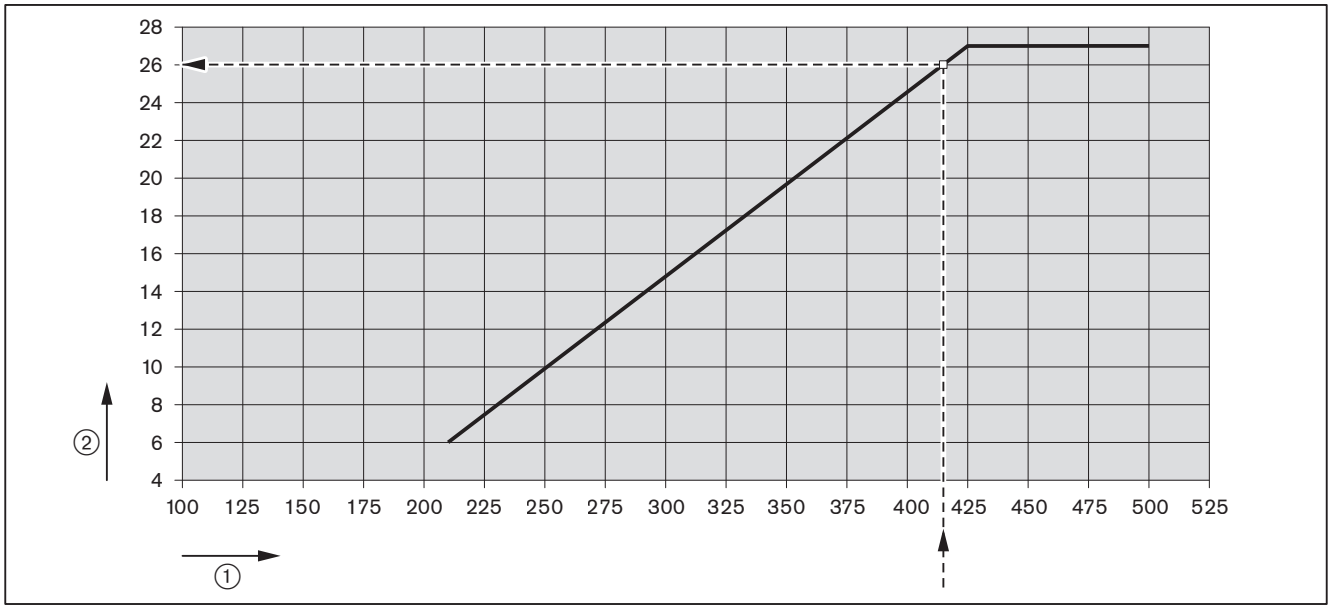
Do not operate the burner outside of the capacity graph [ch. 3.4.6].

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

Example

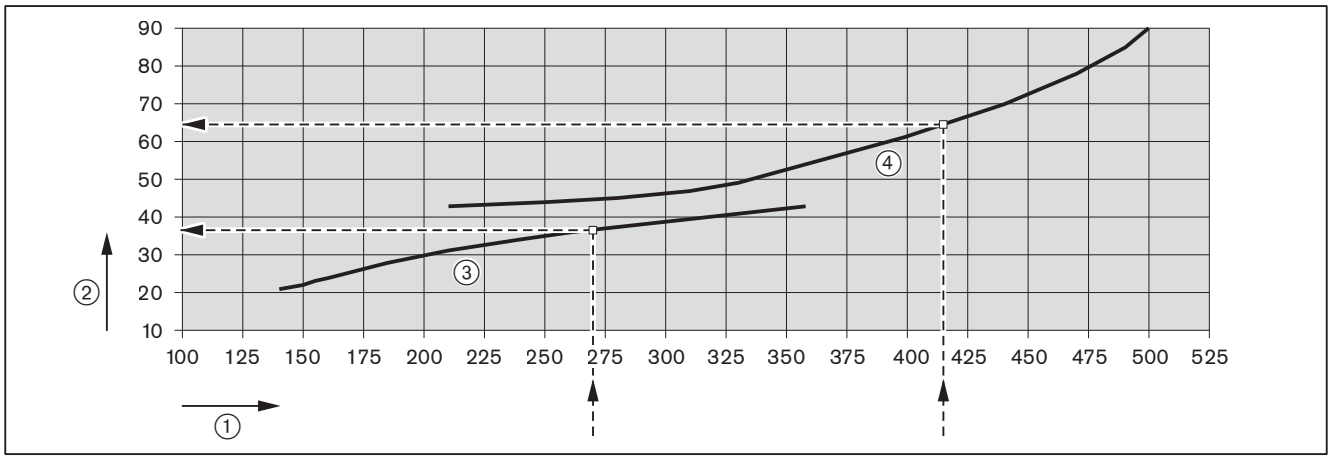
Burner capacity stage 2 / stage 1 required	415 kW / 270 kW
Diffuser setting (dimension X)	26.0 mm
Air damper setting stage 2 / stage 1	65° / 38°

Diffuser default settings



① Combustion heat rating [kW]
② Diffuser settings (dimension X) [mm]

Air damper default settings

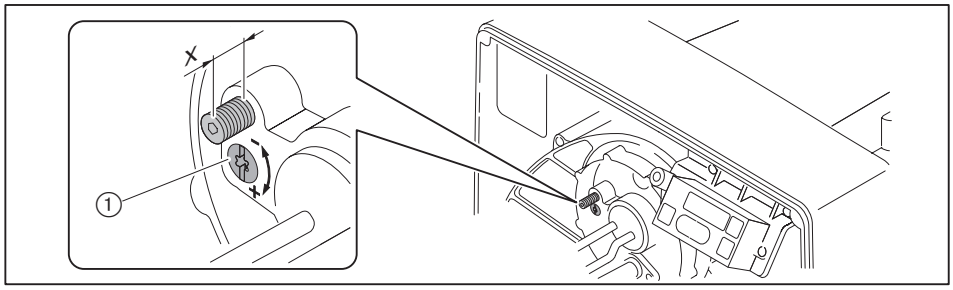


① Combustion heat rating [kW]
② Air damper setting [°]
③ Stage 1
④ Stage 2

Set diffuser

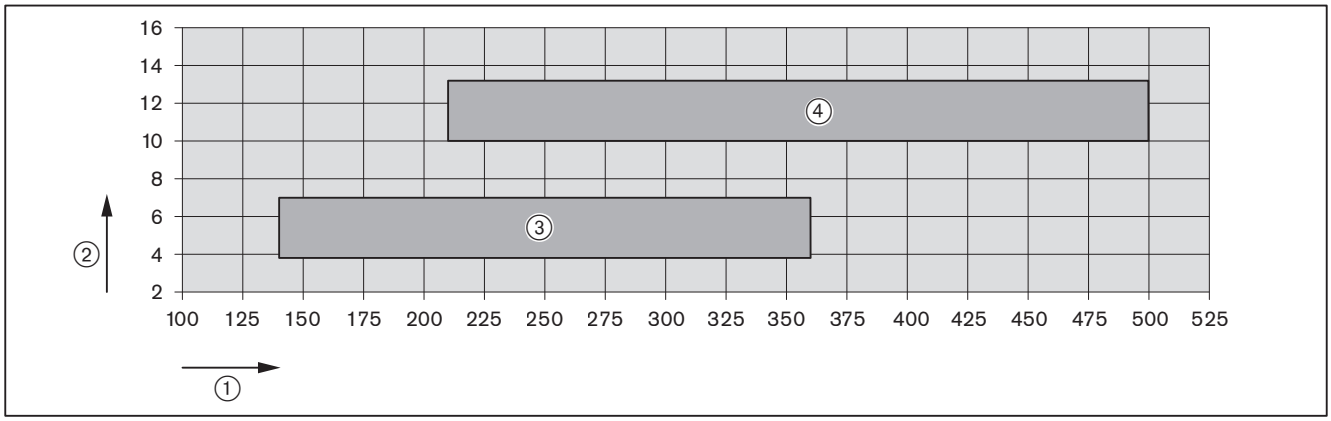
With dimension X = 0mm the indicating bolt is flush with nozzle assembly cover.

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



Determine mixing pressure

► Determine the mixing pressure required for the preset combustion heat rating from the diagram and note down.



① Combustion heat rating [kW]
② Mixing pressure [mbar]
③ Stage 1
④ Stage 2
Guide values, which could vary depend. on comb. chamber resistance.

7.2 Adjusting the burner

7.2.1 Burner without variable speed drive

DANGER

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

► During commissioning check:
- suction resistance or flow pressure of oil pump [ch. 5.1],
- 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. 7.1.3].

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. 7.1.3].

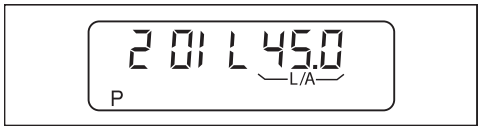
Preset P0

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

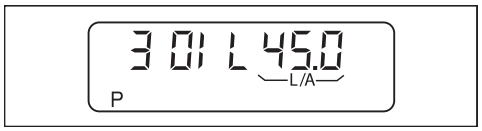
► Press and hold [L/A] key and set the same values as for P1 using the [-] or [+] key.

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.

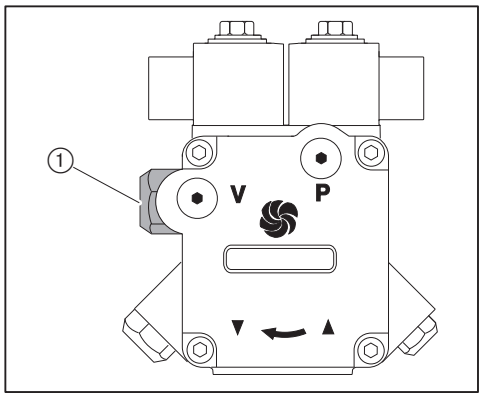
If a controlled shutdown or lockout occurs during setting:
► Briefly press [G] and [L/A] keys simultaneously.
► Press [+] key.
✓ Combustion manager changes to setting level.

► 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 for stage 1

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.



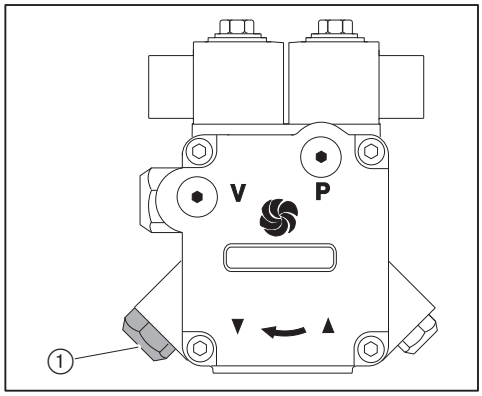
► Press [+] key.
✓ Burner drives to operating point P1.

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

Set pump pressure for stage 2

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.



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 3.0 5.0 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.

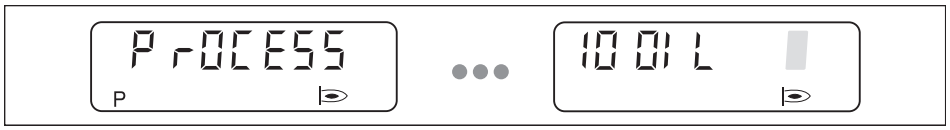
Set switch off point stage 2 when running closed (P2) to approx. 1/3 of the setting movement between P1 and P9.

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.

7.2.2 Burner with variable speed drive (optional)

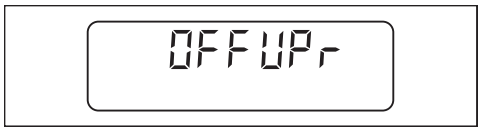
DANGER

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

► During commissioning check:
  ▪ suction resistance or flow pressure of oil pump [ch. 5.1],
  ▪ 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.



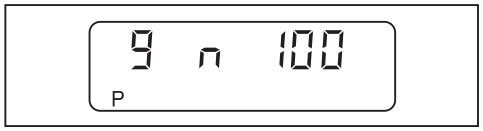
► Press [G] and [L/A] keys simultaneously.
✓ Combustion manager changes to access level.

► 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.

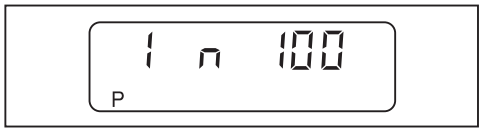
► Press and hold [L/A] key and set air damper setting determined using the [–] or [+] key [ch. 7.1.3].
► Press [Enter] and [L/A] simultaneously.
✓ Factory setting fan speed (100 %) is displayed.



Preset P1

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

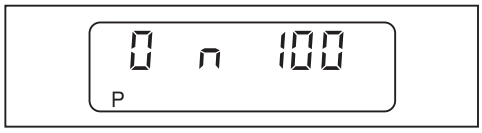
► Press and hold [L/A] key and set air damper setting determined using the [–] or [+] key [ch. 7.1.3].
► Press [Enter] and [L/A] simultaneously.
✓ Factory setting fan speed (100 %) is displayed.



Preset P0

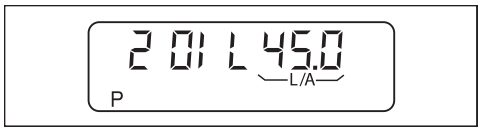
► Press [+] key.
✓ Factory setting operating point P0 (ignition position) is displayed.

► Press and hold [L/A] key and set the same values as for P1 using the [-] or [+] key.
► Press [Enter] and [L/A] simultaneously.
✓ Factory setting fan speed (100 %) is displayed.

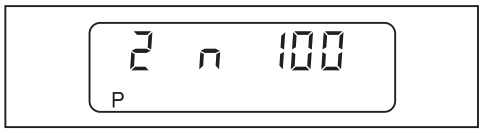


Preset P2 and P3

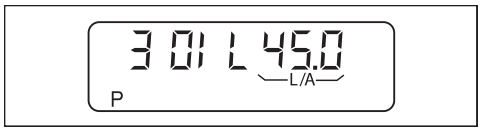
► Press [+] key.
✓ Factory setting operating point P2 (switch off point stage 2 when running closed) is displayed.



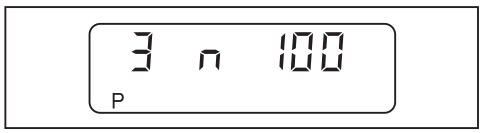
► Press and hold [L/A] key and set P2 approx. 3 … 8° above P1 using the [–] or [+] key.
► Press [Enter] and [L/A] simultaneously.
✓ Factory setting fan speed (100 %) is displayed.



► 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 [Enter] and [L/A] simultaneously.
✓ Factory setting fan speed (100 %) is displayed.



► Press [+] key.
✓ Combustion manager is preset.

2. Adjusting the operating points

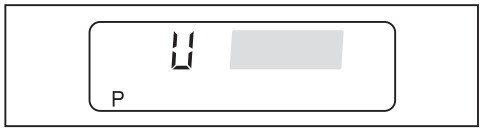
► Open oil shut off devices.

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.

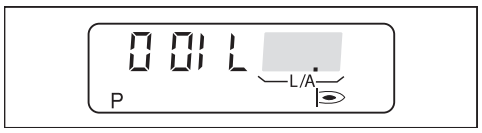
► Plug in bridging plug No. 7 on combustion manager.
✓ Burner starts.

Speed standardisation starts.

► Press [+] key within 20 seconds.
✓ Speed standardisation is carried out.
✓ U and the current fan speed are displayed.



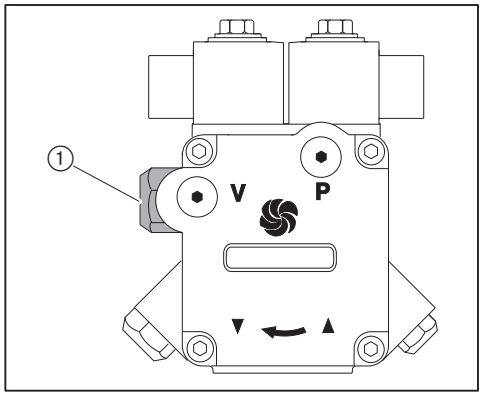
► Wait approx. 5 seconds, until the fan speed has stabilised.
► Press [+] key within 15 seconds.
✓ Speed standardisation is complete.
✓ Burner starts in accordance with program sequence and stops in operating point P0 (ignition position).



Set pump pressure for stage 1

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.

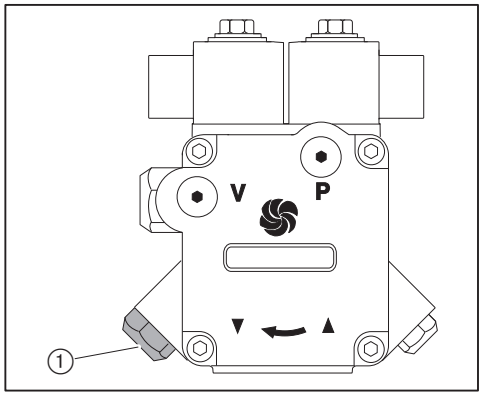
- ► Press [+] key.

✓ Burner drives to operating point P9.

Set pump pressure for stage 2

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.



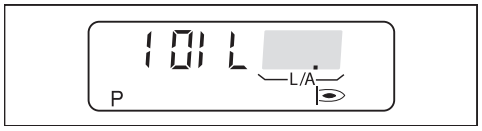
Adjust P9

Select speed at full load as low as possible, but not less than 80 %. In doing so:
- observe flame stability,
- maintain mixing pressure required [ch. 7.1.3].

- ► Check combustion values
- ► Determine combustion limit [ch. 7.5].
- ► Set excess air via air damper setting and speed.

Adjust P1

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



Reduce speed only so far as to ensure safe operating behaviour whilst:
- maintaining speed of 55 %,
- maintaining pump pressure of 9 bar,
- and not operating burner outside of the capacity graph.

- ► Slowly reduce speed using [L/A] and [ENTER] key, whilst opening air damper setting alternately using the [L/A] key.
- ► Check combustion values
- ► Determine combustion limit [ch. 7.5].
- ► Set excess air via air damper setting [L/A].

Adjust P0

The ignition speed should be 100 %.

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

► Check mixing pressure

The mixing pressure in ignition position must be between 3.0 5.0 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

A speed of 100% is recommended at the switch-off and switch-on point of stage 2.

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

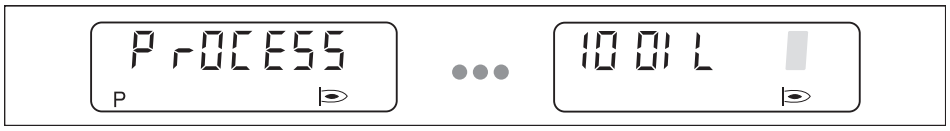
Set switch off point stage 2 when running closed (P2) to approx. 1/3 of the setting movement between P1 and P9.

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 air pressure switch (optional)

Depending on the burner application, optional equipment may be required for optimum operation [ch. 12.3].

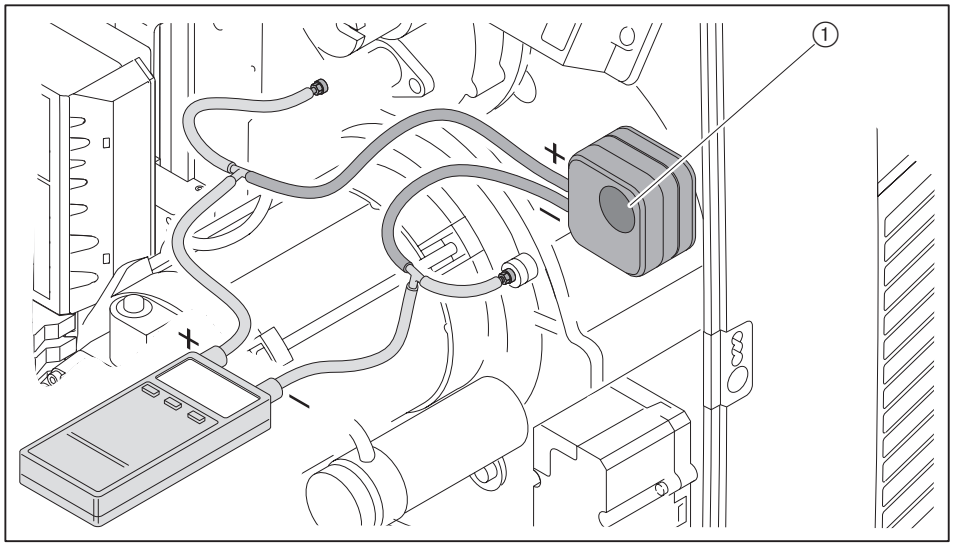
The switch point must be checked and if necessary adjusted during commissioning.

- ▶ 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	6.3 mbar
Switch point air pressure switch (80 %)	6.3 mbar × 0.8 = 5.0 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.

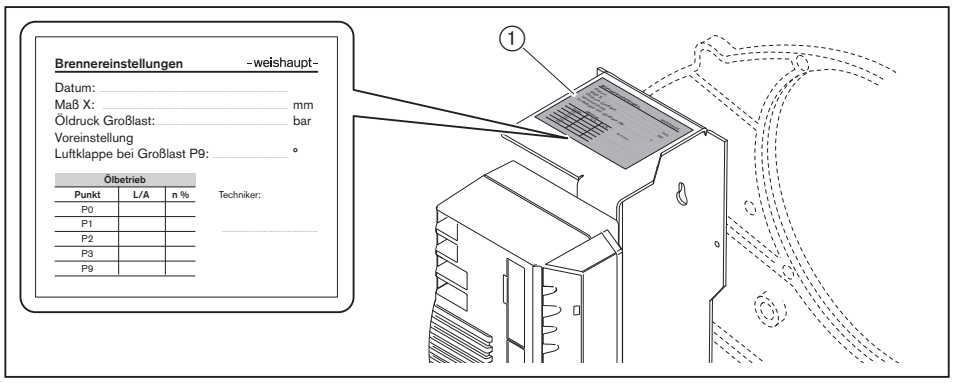


7.4 Concluding work

NOTICE

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.
- ▶ 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.
- ▶ Inform the operator about the use of the equipment.
- ▶ Hand the installation and operating manual to the operator and inform him that this should be kept with the appliance.
- ▶ Point out to operator that the installation should be serviced annually.



7.5 Check combustion

Determine excess air

- ► Slowly close air damper(s) in the relevant operating point, until the combustion limit is reached (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 … 0.20 (equates to 15 … 20 % excess air),
- by more than 0.20 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:

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

q_A Flue gas losses [%]

t_A Flue gas temperature [°C]

t_L Combustion air temperature [°C]

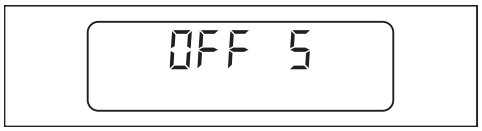
O_2 Volumetric content of oxygen in dry flue gas [%]

Fuel factors	Fuel oil
A2	0.68
B	0.007

7.6 Subsequent optimisation of operating points

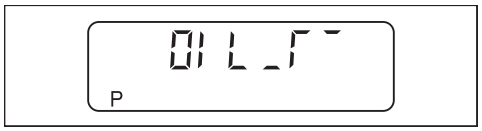
If necessary, the combustion values can subsequently be corrected.

► 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

► 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 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

Electric shock caused by frequency converter
It is possible that electrical components continue to carry voltage and cause electric shock even after the voltage supply has been disconnected.
► Wait approx. 5 minutes before commencing work.
✓ Electric voltage has dissipated.

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
- pressure switch,
- oil nozzle.

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 carrying components.
► Check function of:
  ▪ ignition,
  ▪ flame monitoring,
  ▪ oil pump (pump pressure and suction resistance),
  ▪ 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

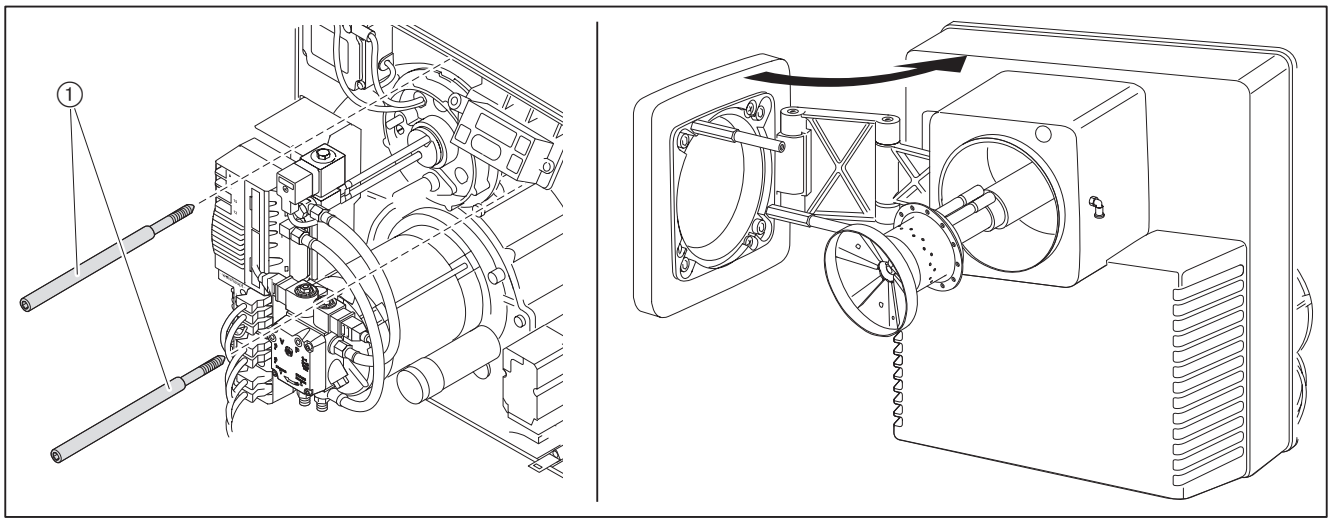
Components	Criteria / design lifespan[1]	Service procedure
Fan wheel	Soiling	▶ Clean
	Damage	▶ Replace
Air duct	Soiling	▶ Clean
Air damper	Soiling	▶ Clean
Air pressure switch	Switch point	▶ Check
	250 000 burner starts or 10 years[2]	▶ Replace
Ignition cable	Damage	▶ Replace
Ignition electrode	Soiling	▶ Clean
	Damage/wear	▶ Replace
Combustion Manager	250 000 burner starts or 10 years[2]	▶ Replacement recommended
Flame sensor QRB4 flame sensor RAR9	Soiling	▶ Clean
	Damage 250 000 burner starts or 10 years[2]	▶ Replace
Flame sensor LFS1	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
Nozzle shut off	Soundness	▶ Replace
Oil pump filter	Soiling	▶ Replace
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
Oil pressure switch	Switch point	▶ Check
	500 000 burner starts	▶ 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 Hinge open the burner

Observe notes on servicing [ch. 9.1].

- ▶ Remove screws ①.
- ▶ Hinge open the burner.

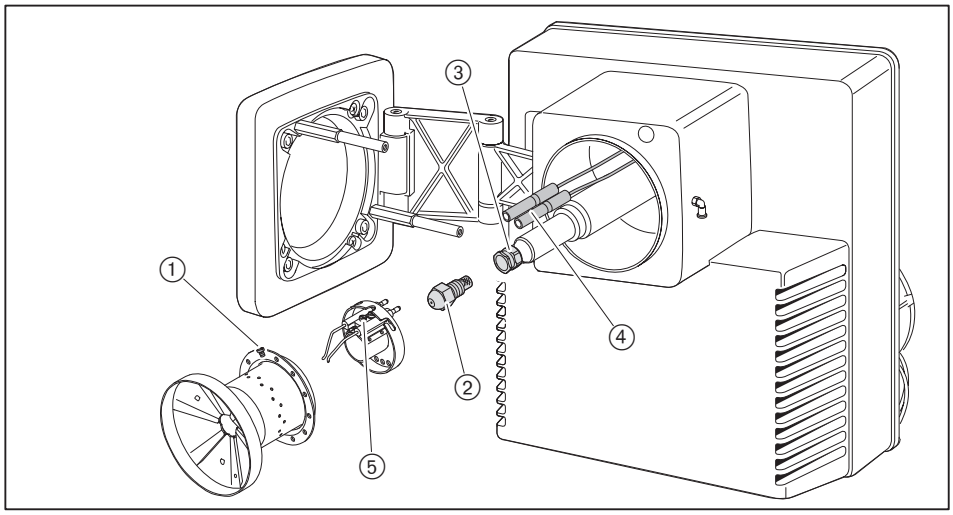


9.4 Replace nozzle

Observe notes on servicing [ch. 9.1].

Do not clean nozzles, always fit new nozzles.

- ▶ Hinge open the burner [ch. 9.3].
- ▶ Unplug ignition cable ④.
- ▶ Undo screw ① and remove diffuser.
- ▶ Undo screw ⑤ and remove ignition electrode holder.
- ▶ Counter-hold on the nozzle body ③ using a spanner and remove nozzle ②.
- ▶ Fit new nozzle ensuring it is seated tightly.
- ▶ Refit diffuser in reverse order.
- ▶ Set nozzle distance [ch. 9.8]
- ▶ Set ignition electrodes [ch. 9.6]

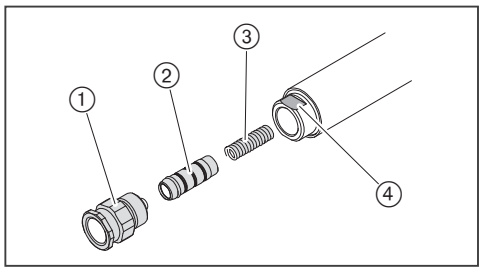


9.5 Removing and refitting nozzle shut off

Observe notes on servicing [ch. 9.1].

Removing

- ► Remove nozzle [ch. 9.4].
- ► Counter-hold the nozzle assembly ④ using a spanner and remove nozzle holder ①.
- ► Remove valve piston ② and compression spring ③ using a suitable tool (e. g. pliers), do not damage valve piston and O ring.



Refitting

Do not refit damaged valve pistons, replace as necessary.

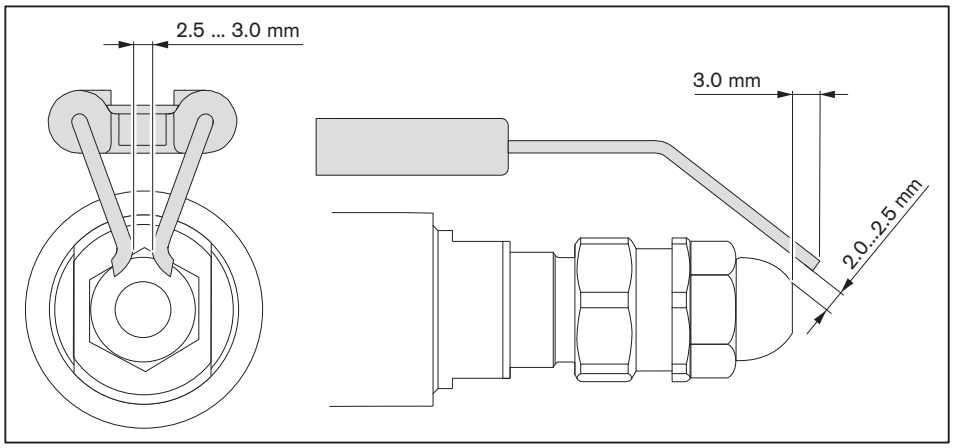
- ► Refit nozzle shut off in reverse order.
- ► Check nozzle distance [ch. 9.8].
- ► Set ignition electrodes [ch. 9.6]

9.6 Set ignition electrodes

Observe notes on servicing [ch. 9.1].

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

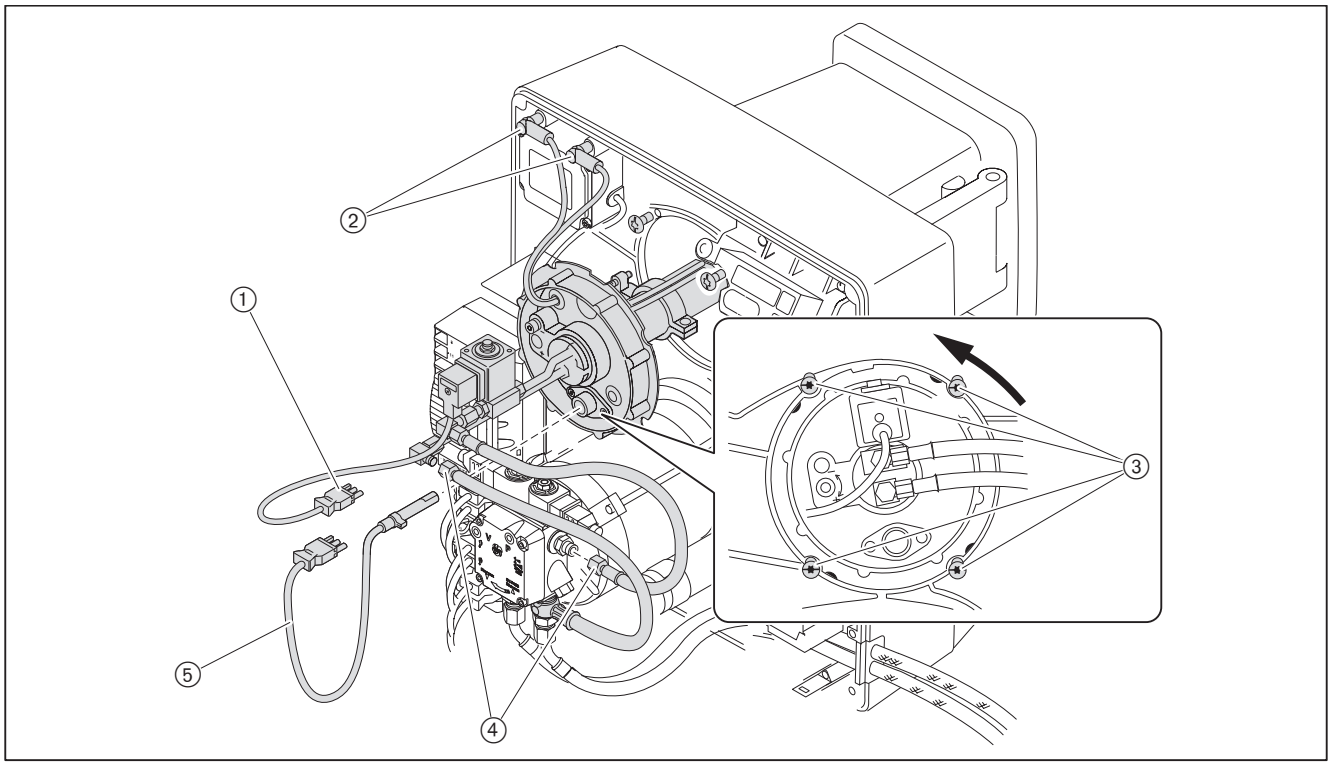
- ► Hinge open the burner [ch. 9.3].
- ► Check distance of ignition electrodes.
- ► If necessary adjust ignition electrodes by slightly bending.



9.7 Removing the mixing head

Observe notes on servicing [ch. 9.1].

- ► Remove flame sensor QRB4 ⑤ or flame sensor RAR9 (optional).
- ► Remove solenoid valve plug ①.
- ► Unplug ignition cable ②.
- ► Remove pressure hoses ④.
- ► Undo screws ③.
- ► Turn mixing head to the left up to the recess and remove.



9.8 Set mixing head

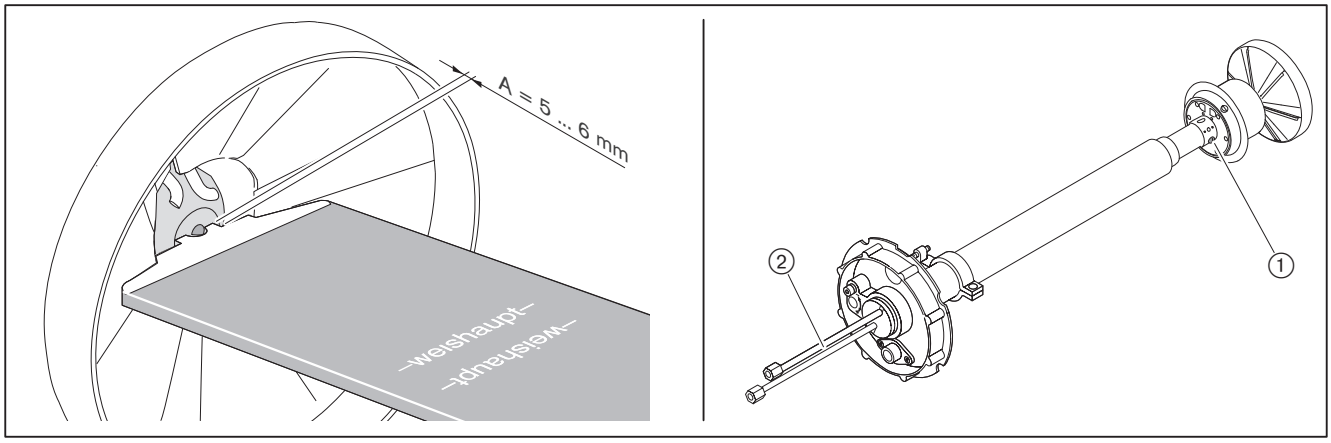
Observe notes on servicing [ch. 9.1].

Set nozzle distance

- ► Hinge open the burner [ch. 9.3].
- ► Insert setting gauge and check dimension A (5 … 6 mm).

If the value measured deviates from dimension A:

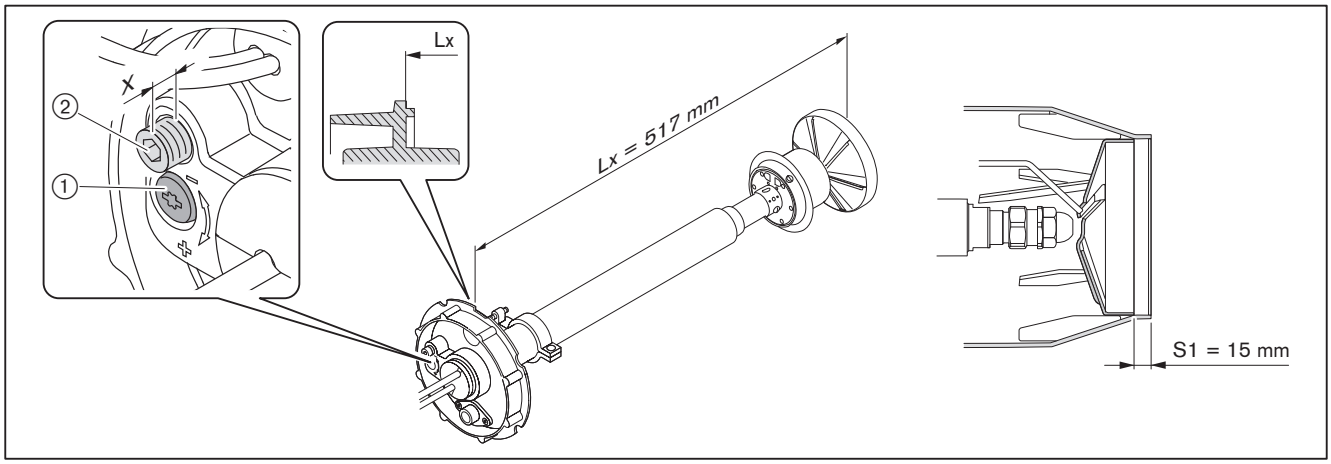
- ► Undo screw ①.
- ► Adjust nozzle body ② until dimension A is reached.
- ► Re-tighten screw ①.



Check basic setting

Dimension S1 can only be checked when the burner is mounted to a boiler door, which is hinged open.

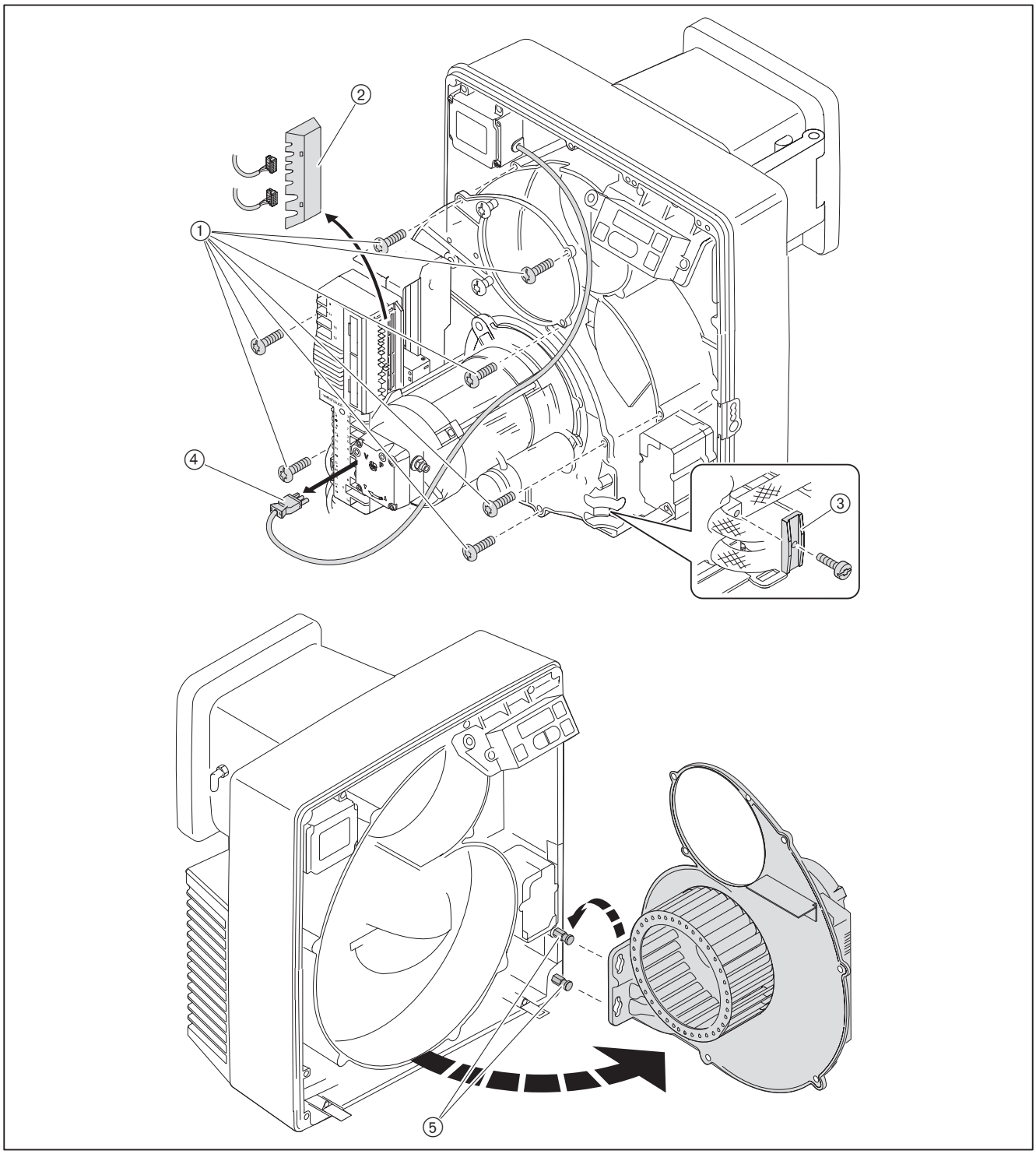
- ► Hinge open boiler door or if necessary remove mixing head [ch. 9.7].
- ► Turn setting screw ① until the indicating bolt ② is flush with the nozzle assembly cover (dimension X = 0 mm).
- ► Check dimension S1 and/or dimension Lx.
- ► Set dimension S1 and/or dimension Lx using setting screw ①.
- ► Remove plug from indicating bolt ②.
- ► Turn indicating bolt until it is flush with the nozzle assembly cover (dimension X = 0 mm).
- ► Replace plug.



9.9 Service position

Observe notes on servicing [ch. 9.1].

- ► Remove mixing head [ch. 9.7].
- ► Unplug plug ④ from ignition unit.
- ► Remove cover ② and remove plugs.
- ► Remove support ③ for oil hoses.
- ► Hold housing cover and remove screws ①.
- ► Place housing cover onto hanging bolts ⑤.



9.10 Removing and refitting oil pump

Observe notes on servicing [ch. 9.1].

Removing

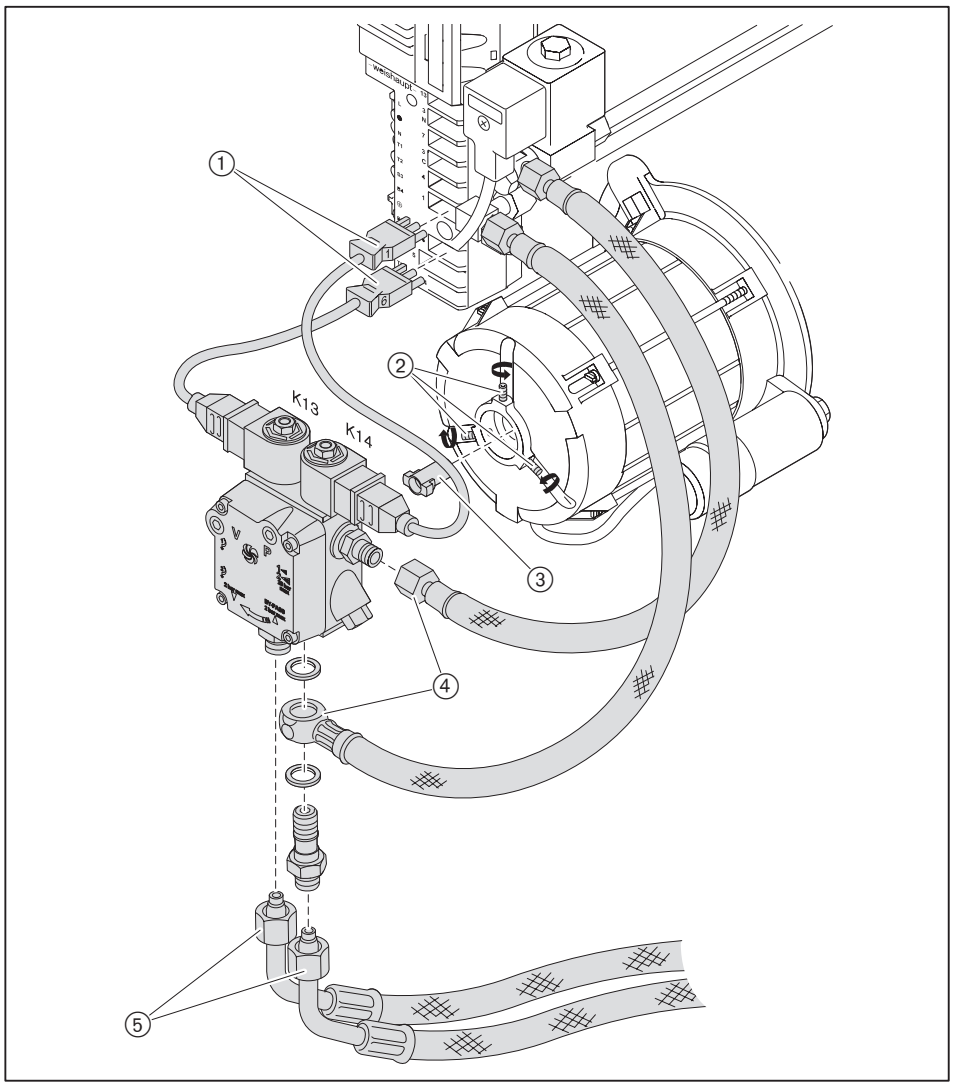
- ► Close fuel shut off devices.
- ► Unplug plug ①.
- ► Remove oil hoses ⑤ and pressure hoses ④.
- ► Undo screws ② and remove oil pump.

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.

NOTICE

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.



9.11 Removing and refitting fan wheel

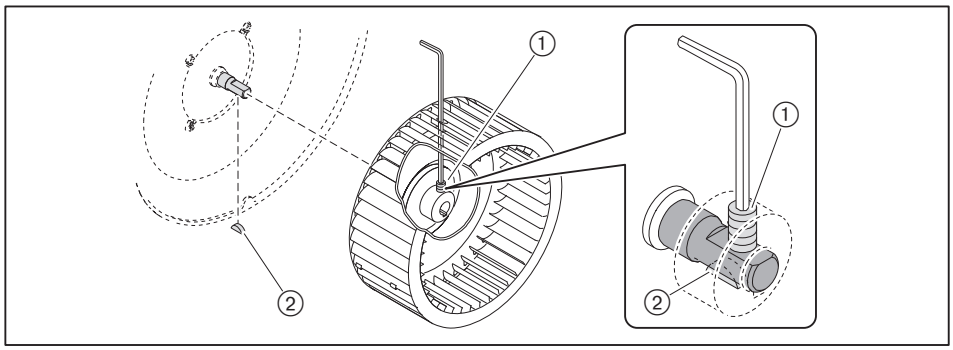
Observe notes on servicing [ch. 9.1].

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.

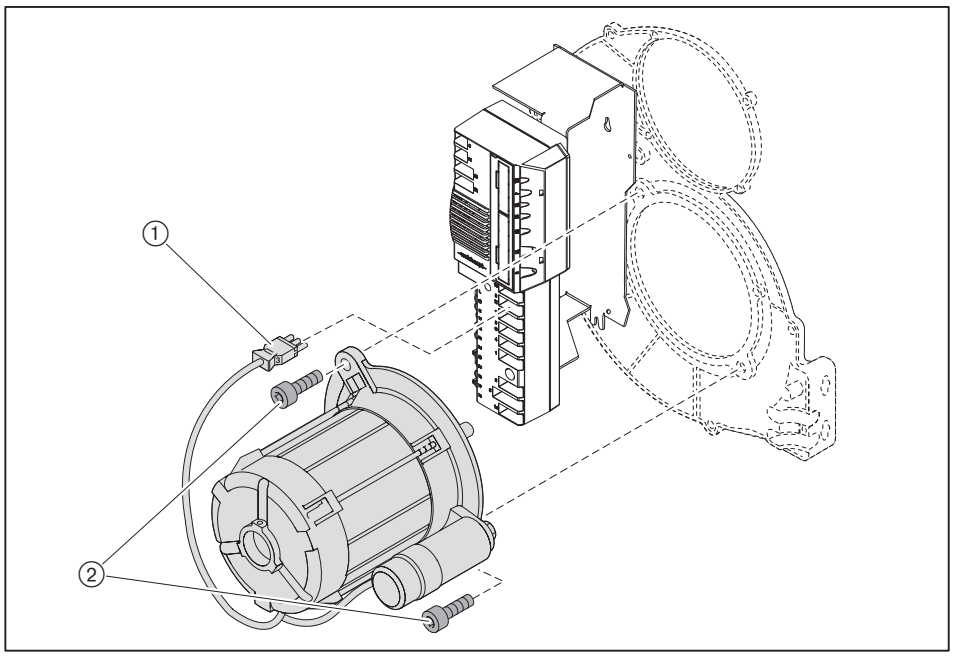


9.12 Remove burner motor

Observe notes on servicing [ch. 9.1].

- ► Remove the oil pump [ch. 9.10].
- ► Remove fan wheel [ch. 9.11].
- ► Unplug plug ①.
- ► Hold motor and remove screws ②.
- ► Remove motor.

Only in conjunction with variable speed drive
The variable speed drive sensor is fitted to the burner motor. If necessary remove variable speed drive sensor.

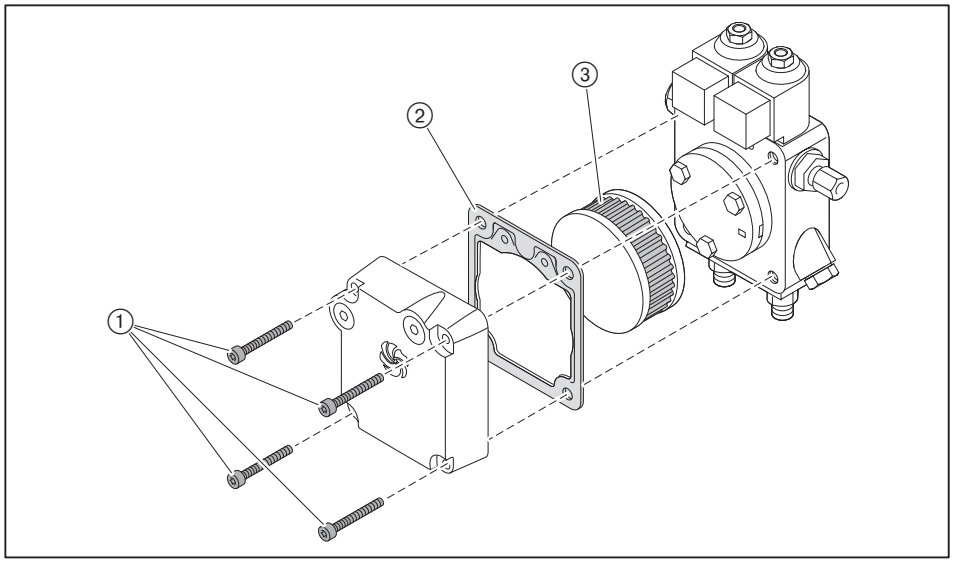


9.13 Removing and refitting oil pump filter

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.

9.14 Removing and refitting air damper actuator

Observe notes on servicing [ch. 9.1].

Removing

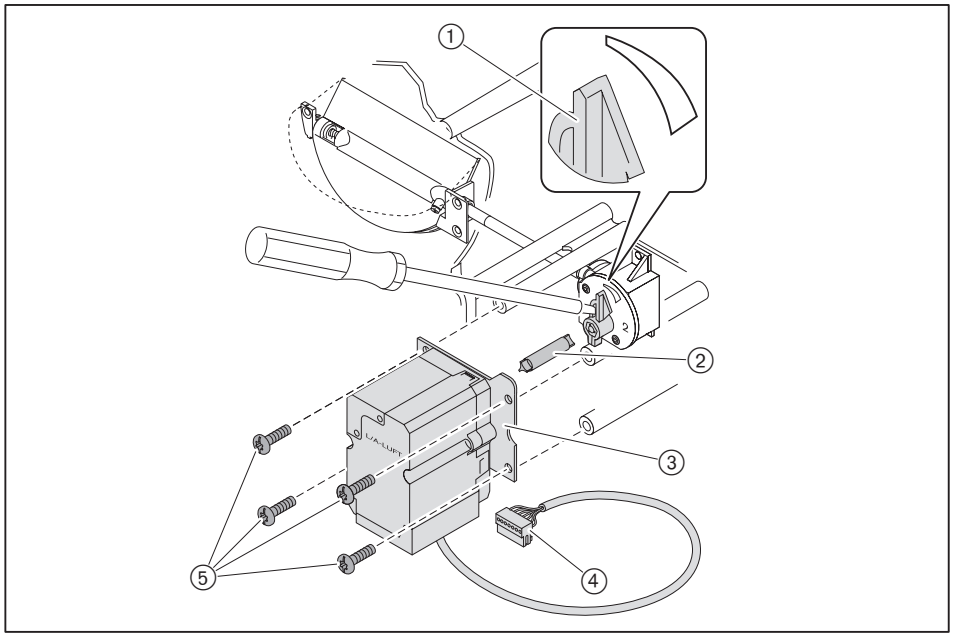
- ► Remove actuator plug ④ from combustion manager.
- ► Remove screws ⑤.
- ► Remove actuator with fixing plate ③ and shaft ②.

Refitting

NOTICE

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.



9.15 Removing and refitting angle drive

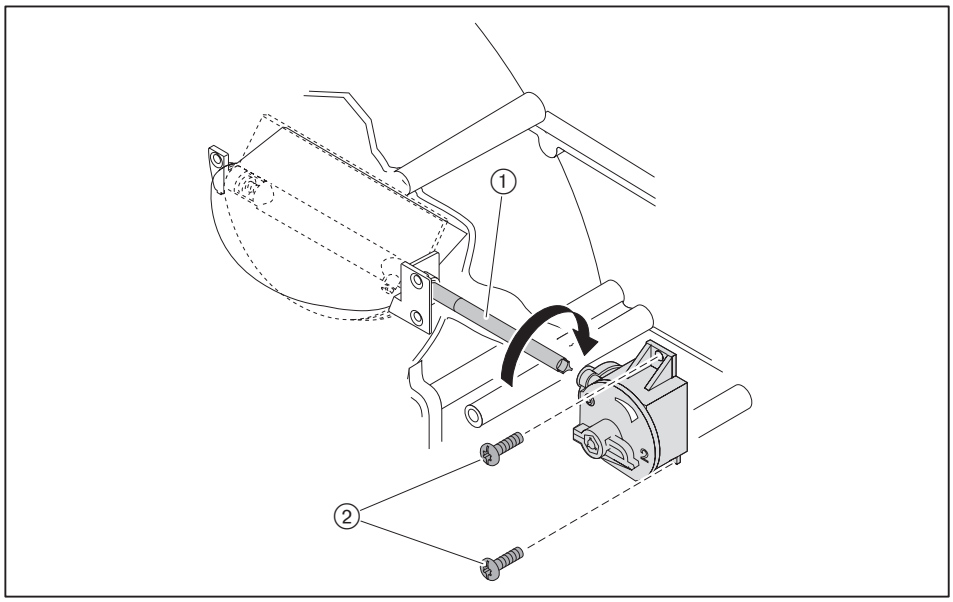
Observe notes on servicing [ch. 9.1].

Removing

- ► Remove air damper actuator [ch. 9.14].
- ► Remove screws ②.
- ► Remove angle drive.

Refitting

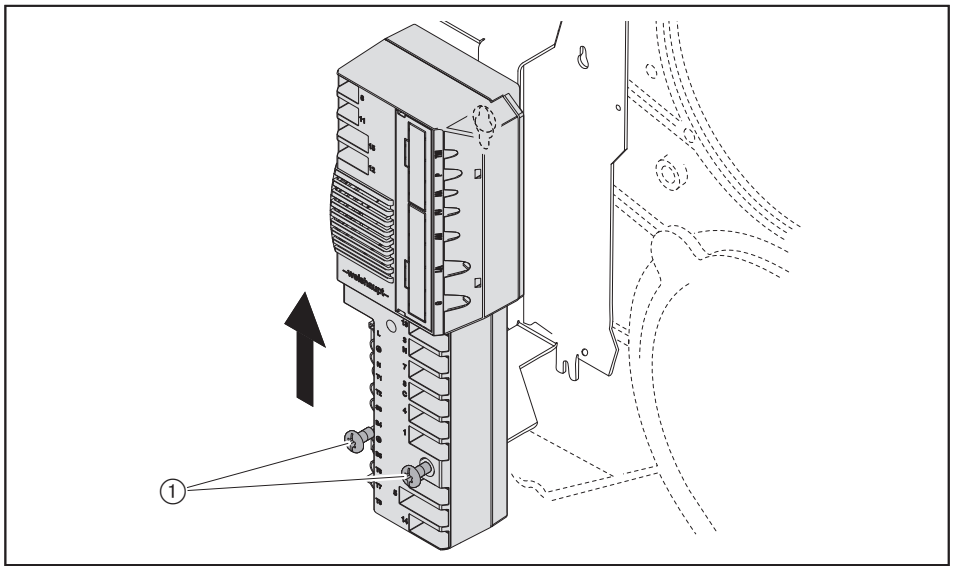
- ► Turn shaft ① to its stop (air damper Open) and hold.
- ► Fit angle drive to shaft.
- ► Secure angle drive.



9.16 Replacing the combustion manager

Observe notes on servicing [ch. 9.1].

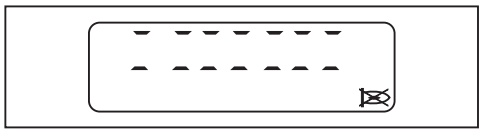
- ► Unplug all plugs.
- ► Undo screws ①.
- ► Push combustion manager upwards and replace.



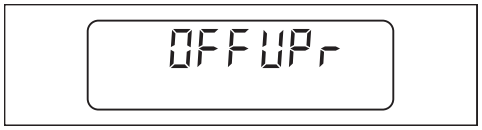
- ► Connect all plugs again.

Preset combustion manager

- ► 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.

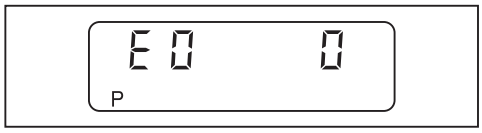


If an oil pressure switch is fitted, set parameter 7 and 8 to 1, see [ch. 6.2.3].
If an air pressure switch is fitted, set parameter 8 to 1, see [ch. 6.2.3].

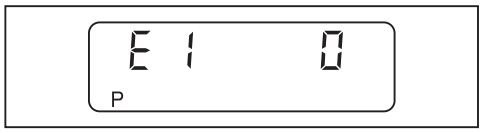
It is preferential to monitor O_2 trim with software ACS450.

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

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



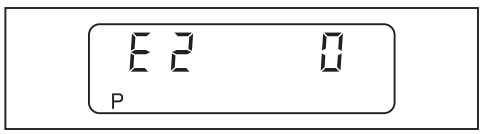
► Adopt value 0 (single fuel burner), if necessary adjust using [ENTER] and [-] key.
► Press [+].
✓ E1 is displayed.



The value of parameter E1 can not be altered.

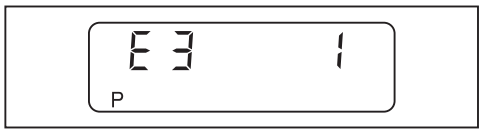
- 0: intermittent operation (Standard)
- 1: continuous operation

► Press [+].
✓ E2 is displayed.



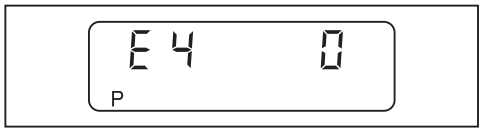
► Set value using [Enter] and [+].
- 1: switch input X3:14, flame sensor LFS1/RAR9
- 2: flame sensor QRB4

► Press [+].
✓ E3 is displayed.



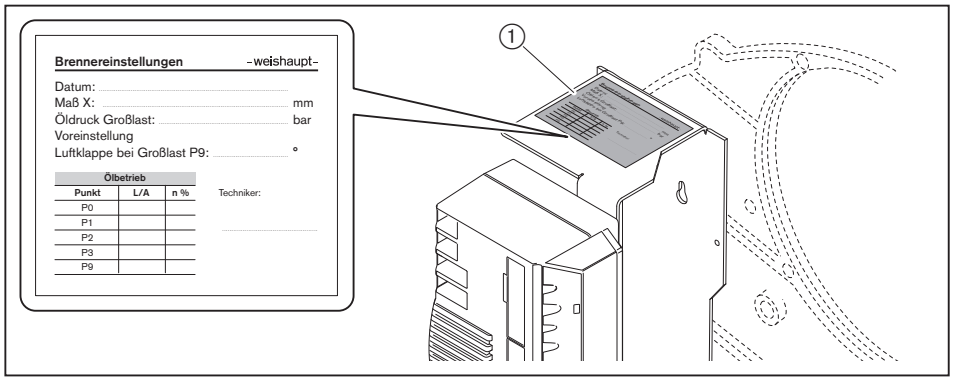
► If required, set value using [ENTER] and [+] keys.
- 1 (fan control): burner without variable speed drive
- 3 (variable speed drive): burner with variable speed drive

► Press [+].
✓ E4 is displayed.



► Adopt value 0 (no ignition delay), if necessary set using [Enter] and [-].
► Press [+].
✓ Combustion manager changes into the setting level for step points.

► Determine the operating points from the sticker ①.
► Set the burner using these operating points and adjust [ch. 7.2].



Deactivate E-Parameters

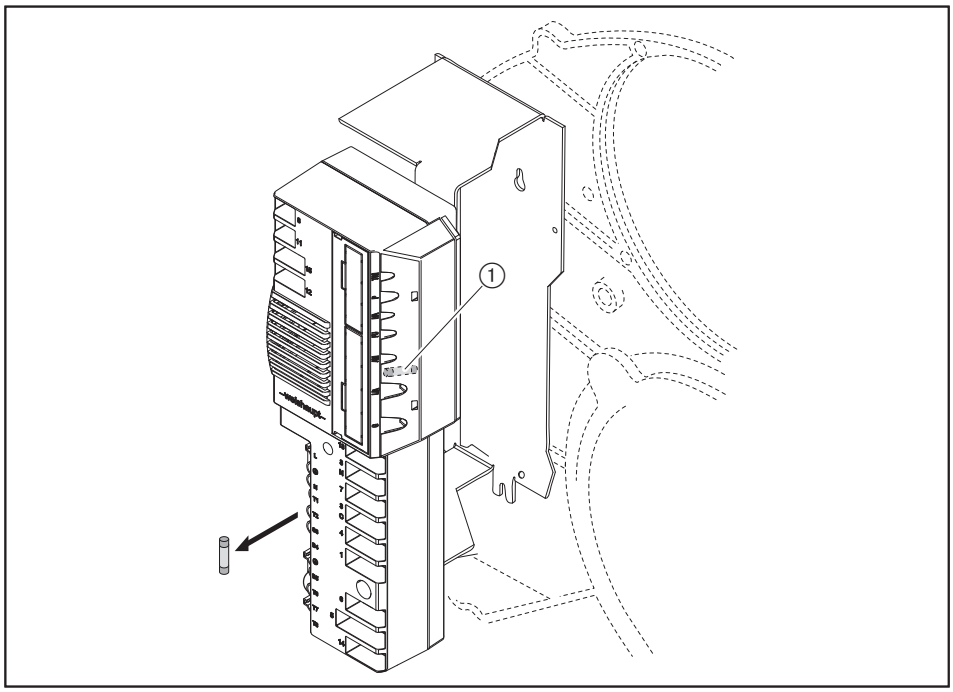
Following commissioning, set parameter E to 0.

► 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.

9.17 Replacing the fuse

Observe notes on servicing [ch. 9.1].

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



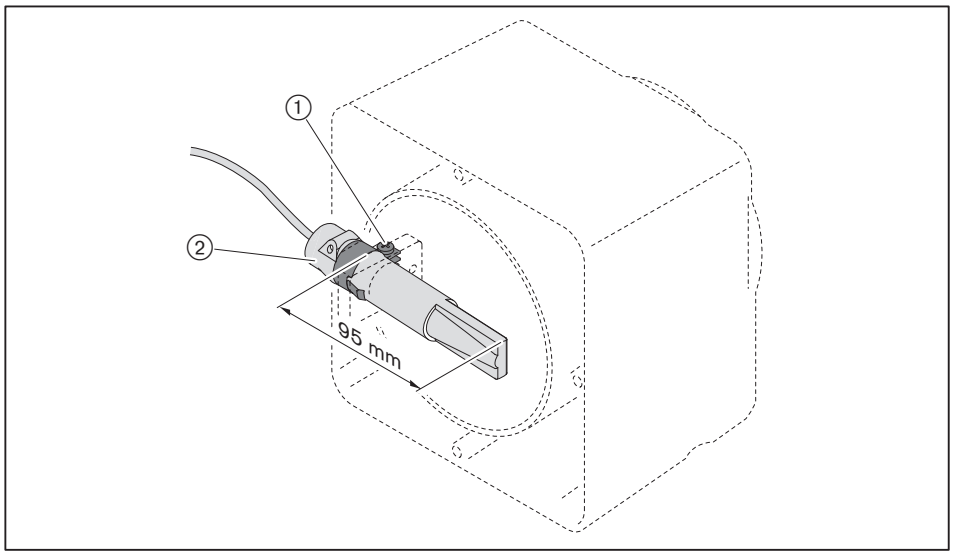
① Replacement fuse

9.18 Set flame senor RAR9 (optional)

Only in conjunction with continuous operation.

Observe notes on servicing [ch. 9.1].

- ▶ Remove flame sensor.
- ▶ Undo screw ①.
- ▶ Set flame sensor ②.
- ▶ Tighten screw ①.

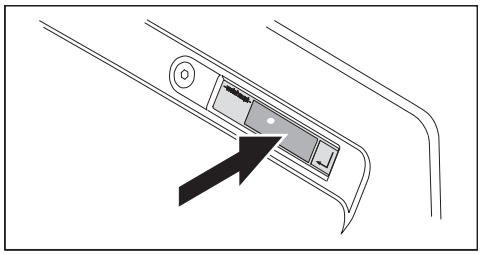


10 Troubleshooting

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].



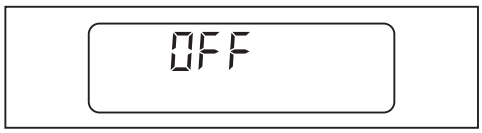
10.1.1 Display off

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

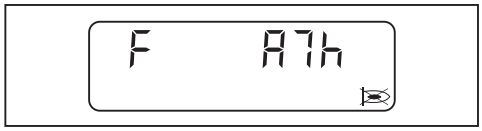


The following faults may be corrected by the operator:

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

NOTICE

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

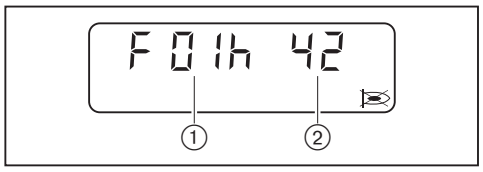
Additional information, which breaks down the error in more detail, can be displayed by pressing a button.

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.



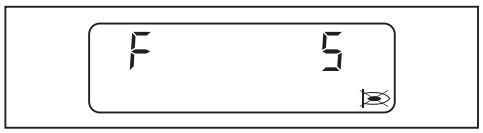
① First detailed fault code
② Operating status

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 0Eh … 10h 13h … 15h 17h 19h … 1Ch 1Eh 43h 45h 50h 56h 69h … A0h A4h … A5h ACh b0h … b2h b9h	Internal unit fault	▶ Interrupt the voltage supply temporarily ▶ Reset the burner, if fault reoccurs replace the combustion manager [ch. 9.16]

The following faults must only be rectified by qualified personnel:

Fault codes	Cause	Rectification
03h	First detailed fault code: 09h 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. 9.16]
	Internal unit fault	▶ Interrupt the voltage supply temporarily ▶ Reset the burner, if fault reoccurs replace the combustion manager [ch. 9.16]
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 parameter E0 … E4 [ch. 6.2.4]
	Pre-purge phase less than 5 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 EEPROM	–
	Second detailed fault code: A9h No Bus connection	▶ Check Bus connection
	Second detailed fault code: C1h Operating mode O_2 trim not permitted	▶ Check operating mode O_2 trim [ch. 6.2.3].
	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. 9.16]
	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.
40h	Speed standardisation outside of limits set	▶ Carry out speed standardisation
41h	First detailed fault code: 01h Speed differs for too long	▶ Check parameters 44 and 45
	First detailed fault code: 02h Speed difference is too great	▶ Check speed signal
	First detailed fault code: 03h Speed setting value outside of tolerance for too long	▶ Re-adjust burner ▶ Check parameters 44 and 45
42h	Speed signal (Namur) not plugged in	▶ Plug in speed signal
44h	Operating points were changed without approval	▶ Re-adjust burner
	Parameter E3 set incorrectly	▶ Check parameter E3 [ch. 6.2.4].
	Parameter 46 was changed and speed was not re-standardised	▶ Re-adjust burner
46h	Rotational direction of burner incorrect	▶ Check rotation direction of burner motor
47h	Type of air actuator invalid	▶ Check parameter 34 (only possible with Vision-Box).
48h	Tolerance fault actuator	▶ Check freedom of movement of air damper and / or angle drive ▶ Replace actuator [ch. 9.14]

The following faults must only be rectified by qualified personnel:

Fault codes	Cause	Rectification
49h	Actuator does not drive to reference point correctly	▶ Check freedom of movement of air damper and / or angle drive ▶ Replace actuator [ch. 9.14]
4Ah	Set parameter E0 to 1 and plug in coded plug	▶ Check parameter E0 [ch. 6.2.4].
63h	Speed learning curve incorrect	▶ Re-adjust burner
65h	First detailed fault code:00h Tolerance fault air actuator or frequency converter	▶ Check freedom of movement of air damper and / or angle drive ▶ Replace actuator [ch. 9.14] ▶ Check frequency converter or fan, replace if necessary
	First detailed fault code: 01h Tolerance fault air actuator	▶ Check freedom of movement of air damper and / or angle drive ▶ Replace actuator [ch. 9.14]
	First detailed fault code: 02h Tolerance fault frequency converter	▶ Check frequency converter or fan, replace if necessary
	First detailed fault code: 04h Tolerance fault air actuator or frequency converter	▶ Check freedom of movement of air damper and / or angle drive ▶ Replace actuator [ch. 9.14] ▶ Check frequency converter or fan, replace if necessary
	First detailed fault code: 05h Tolerance fault air actuator	▶ Check freedom of movement of air damper and / or angle drive ▶ Replace actuator [ch. 9.14]
	First detailed fault code: 06h Tolerance fault frequency converter	▶ Check frequency converter or fan, replace if necessary
	First detailed fault code: 07h Time run out during speed standardisation Time in setting mode run out	▶ Press [+] key within 20 seconds during speed standardisation ▶ Press key within 30 minutes in setting mode
67h	Flame sensor short circuit	▶ Replace flame sensor
A2h	Safety circuit is open	▶ Check safety circuit
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 ▶ 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. 9.16]
A8h	Flame failure during operation	▶ Check burner setting ▶ Check oil supply ▶ Check oil nozzles, if necessary replace ▶ 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 ▶ Check air pressure switch and cable, replace if necessary ▶ Replace combustion manager [ch. 9.16]

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 ▶ Check hoses on air pressure switch ▶ Check air pressure switch and cable, replace if necessary ▶ Check burner motor and cable, replace if necessary [ch. 9.12]
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)	–
CCh	Oil pressure switch does not switch	▶ Check oil supply ▶ Check oil pump, if necessary replace ▶ Check oil pressure switch and cable, if necessary replace ▶ Check burner motor and cable, replace if necessary [ch. 9.12]
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
CFh	No start release (X3:14)	▶ Check start release
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. 3.3.5].
	Coded plug on actuator slot missing	▶ Plug in coded plug
	Parameter E0 not configured correctly	▶ Check configuration of parameter E0 see [ch. 6.2.4].
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. 9.16]

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	▸ 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. 9.8]
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. 9.4]
	Nozzle worn	
Flame tube/diffuser has heavy soot deposit	Oil nozzle defective	▸ Replace nozzle [ch. 9.4]
	Mixing head set incorrectly	▸ Set mixing head [ch. 9.8]
	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. 9.8]
	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. 9.8]
Stability problems	Nozzle distance incorrect	▸ Check nozzle distance, adjust if necessary [ch. 9.8]
	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
Flame sensor LFS1 (optional) flashes green	Burner operation with weak flame signal (< 10 µA)	▸ Decrease mixing pressure ▸ Increase diffuser setting (increase air gap between flame tube and diffuser) ▸ Fit larger nozzle and reduce pump pressure. ▸ Check setting dimension flame sensor RAR9 [ch. 9.18], adjust if required. ▸ Check combustion head extension, maximal 100 mm.

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
OFFUPr	01	Unprogrammed condition or programming not completed
OFF	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
3	09	Waiting for speed standardisation confirmation
	10	Start burner motor and ignition oil operation
	11	Waiting for air pressure
4	12	Pre-purge
	13	Internal sequence
5	14	Driving to ignition position
6	15	Waiting time in ignition position.
	16	Waiting time in ignition position.
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 air damper setting stage 1 (operating point P1)
10	25	Operation (load control is activated)
15	26	Internal sequence
	27	Driving to stage 1
	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
L	40	Reference search air damper actuator
	42	Drive to Standby position
	43	Internal sequence
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

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

NOTICE

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.

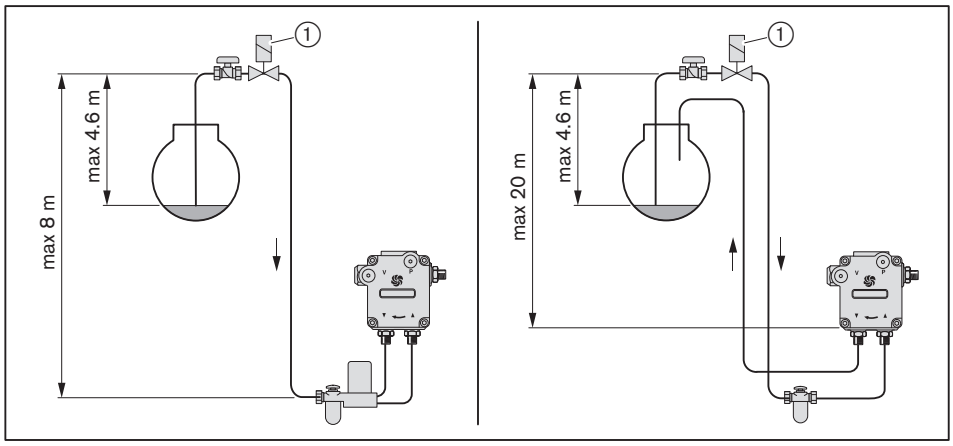
The suction resistance depends on:
- suction line length and diameter,
- pressure loss of oil filter and other components,
- lowest oil level in the oil storage tank (max 3.5 m below the oil pump).

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.

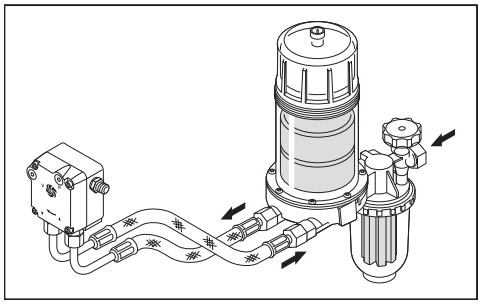


Single pipe system

NOTICE

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 Continuous running fan or post-purge

DANGER

Fire hazard due to failure of the combustion air fan
Failure of the combustion air fan (e.g. due to a power failure or defective motor) during operation with continuous running fan or increased post-purge may result in back radiation or hot flue gases flowing back into the burner housing. This could cause a fire.

If fail-safe continuous ventilation or post-purge is required, take appropriate measures, such as:

- ► installing compressed air flushing on site with:
  - sufficiently large compressed air tank,
  - normally open compressed air valve.

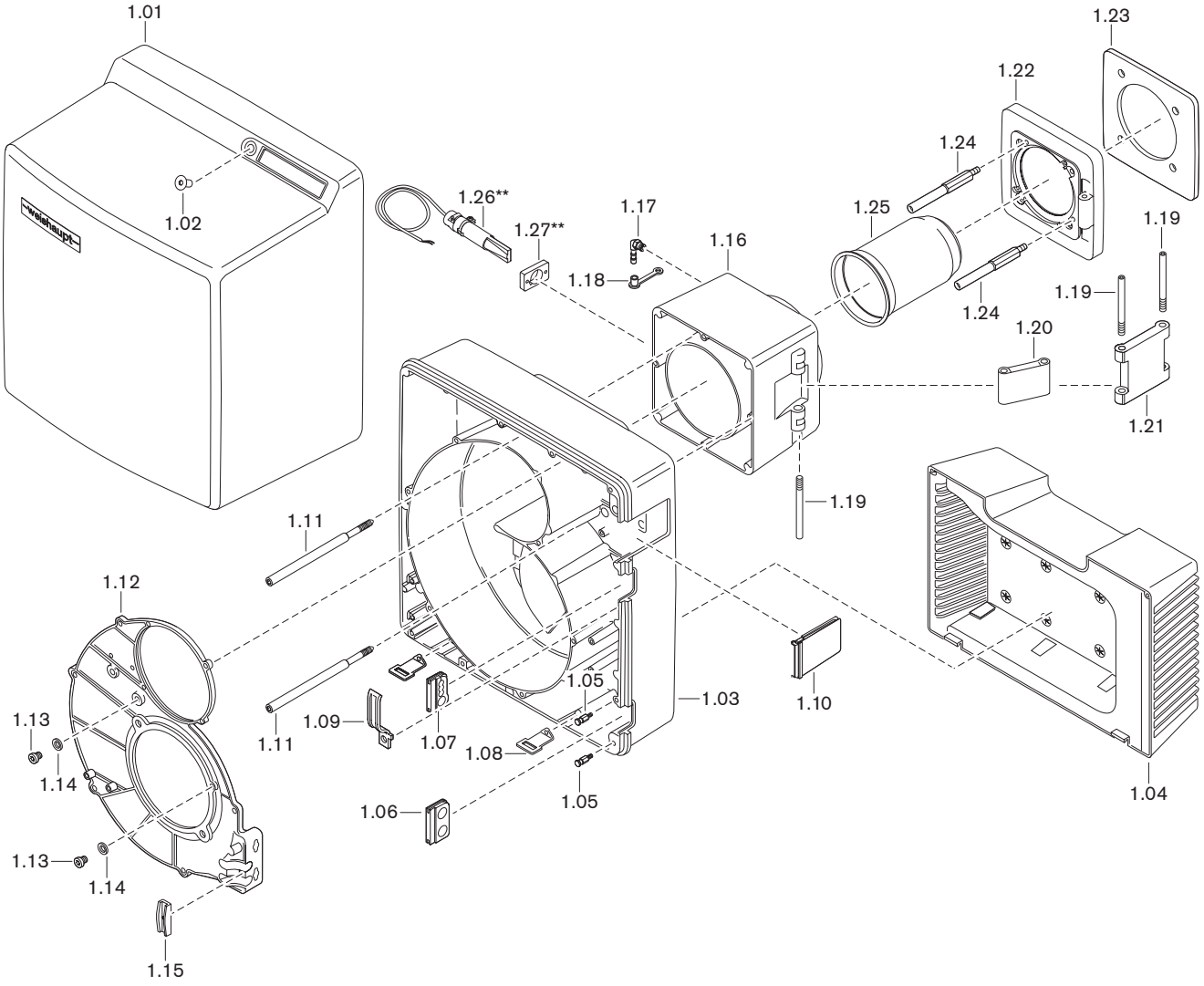
12.3 Additional requirements

Additional requirements for burners for liquid and gaseous fuels to EN 267:
- 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
X	X	X	Air monitoring device, air pressure switch	Min. pressure switch to EN 1854
X	X	X	Minimum fuel pressure monitoring device	Min. oil pressure switch(2
X	X	X	Maximum fuel pressure monitoring device	Max. oil pressure switch(1
		X	Oil solenoid valve	2 x flow, 2 x return, ISO 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.
(2 Only for continuous operation without monitoring.

13 Spares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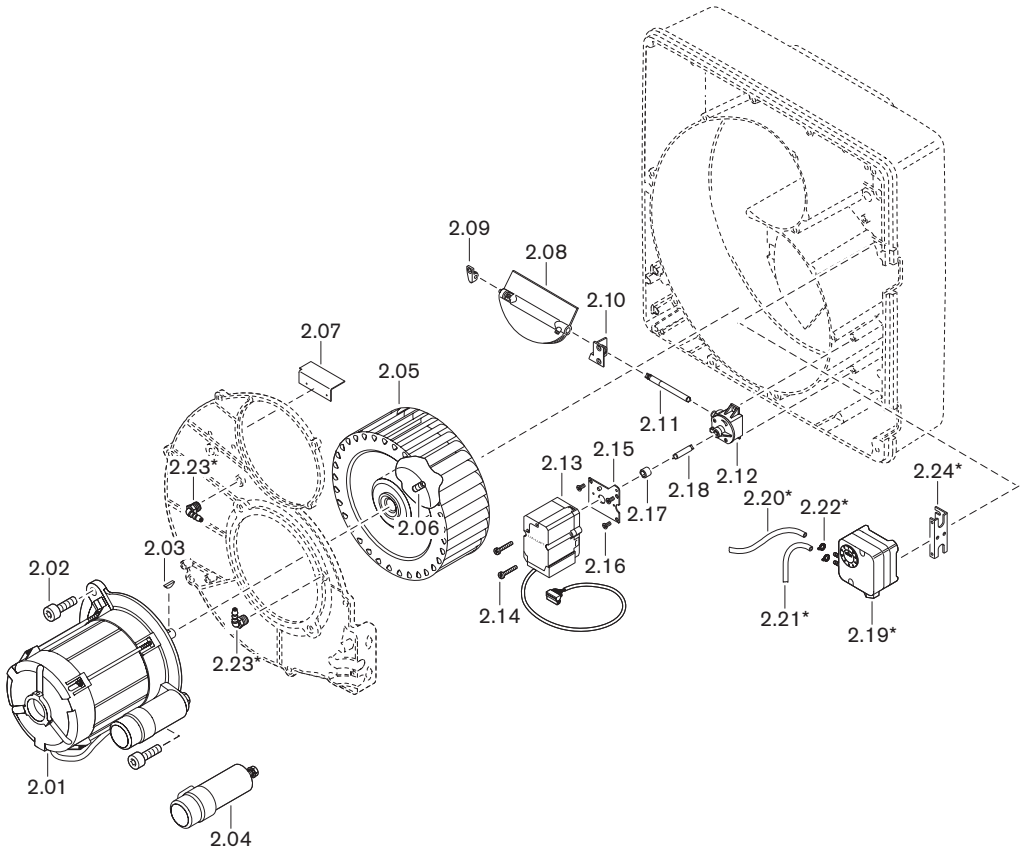
13 Spares

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	241 400 01 447
1.04	Intake housing complete	241 400 01 082
	– Screw 4 x 22 Torx-Plus Remform	409 307
1.05	Hanging bolt	241 400 01 327
1.06	Grommet for oil hose	241 400 01 177
1.07	Grommet for connection cable	241 200 01 247
1.08	Mounting bracket for cover	241 400 01 207
1.09	Clamp	241 400 01 357
1.10	Cover burner housing	241 400 01 387
1.11	Screw M8 burner housing	241 400 01 257
1.12	Housing cover	241 400 01 457
1.13	Screw G⅛A DIN 908	409 004
1.14	Sealing ring 10 x 13.5 x 1.5 DIN 7603	441 033
1.15	Bracket for oil hose	241 400 01 367
1.16	Intermediate flange	241 400 01 427
1.17	Threaded socket R⅛ WES6	453 010
1.18	Protective cap DN 6 SELF 50/2 CF	232 300 01 047
1.19	Pin M12 x 118	241 400 01 267
1.20	Joint 80 x 64.75	241 400 01 067
1.21	Joint 106.9 x 120	241 400 01 077
1.22	Burner flange	241 400 01 437
	– Screw M10 x 35 DIN 912	402 600
	– Washer A10.5 DIN 125	430 603
1.23	Flange gasket 8 x 238.5 x 238.5	
	– Standard	241 400 01 147
	– for rotated by 180°	240 410 00 017
1.24	Stay bolt M10 x 120 burner flange	241 400 01 247
1.25	Flame tube W40/1LN	
	– Standard	241 400 14 032
	– extended by 100 mm*	240 400 14 052
	– Screw M5 x 12 Combi-Torx-Plus 20IP	409 247
	– Washer 5.5 x 12 oval	241 400 14 077
1.26	Flame sensor RAR9**	240 310 12 222
1.27	Flange for RAR9**	600 602

* Only in conjunction with combustion head extension.
** Only in conjunction with continuous operation.

13 Spares

Burner without variable speed drive

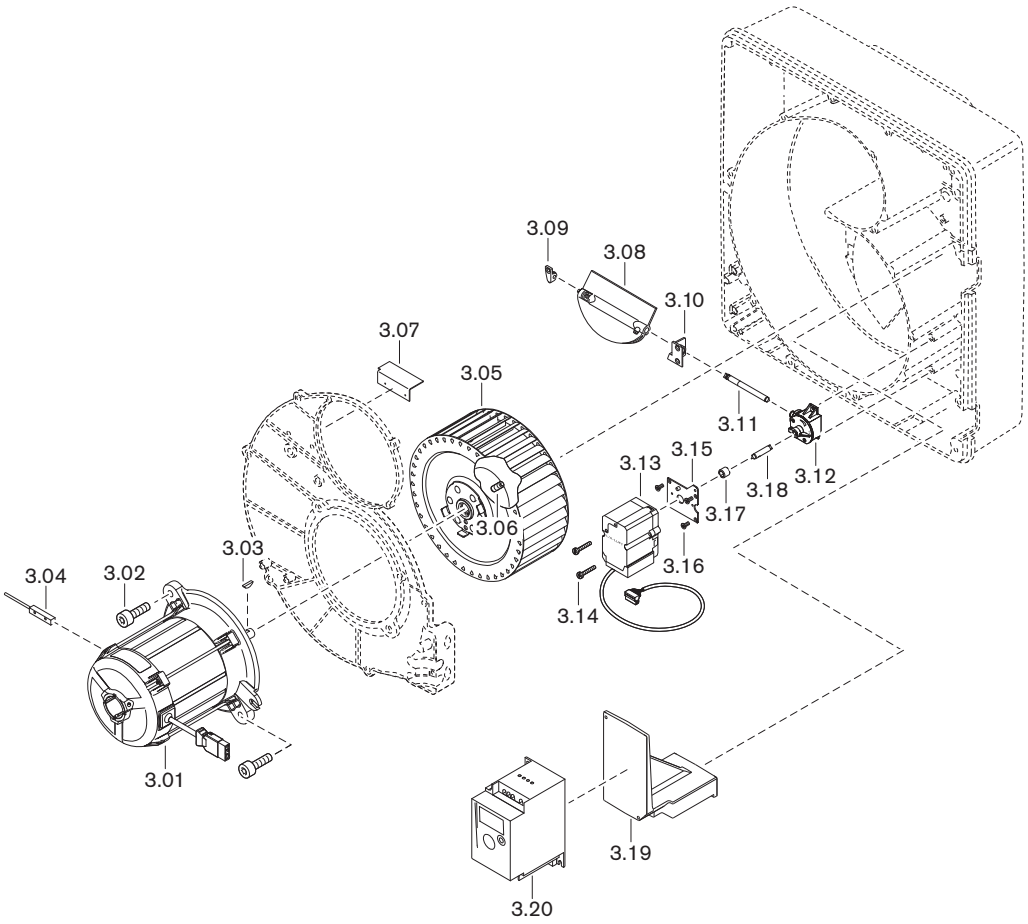


Pos.	Description	Order No.
2.01	Motor ECK 06/A-2 230 V / 50 Hz	240 400 07 032
2.02	Screw M8 x 20 DIN 912	402 511
2.03	Shaft key 4 x 5 DIN 6888	490 154
2.04	Capacitor set 16.0 µF 420V	713 479
2.05	Fan wheel TLR-S 190 x 81.8-L S1 50-60 Hz	241 400 08 032
2.06	Grub screw M8x8 w. ann. cut. edge (Tuflok)	420 550
2.07	Air guide	241 310 01 307
2.08	Air damper complete	241 400 02 012
2.09	Bearing left	241 400 02 037
2.10	Bearing right with bearing bush	241 210 02 032
2.11	Shaft air damper - angle drive	241 400 02 147
2.12	Angle drive	241 110 02 062
2.13	Air actuator STE 4.5 24 V	651 103
2.14	Screw M4 x 30 Torx-Plus metric	409 245
2.15	Fixing plate	241 400 02 222
2.16	Screw M4 x 10 Torx-Plus 20IP	409 236
2.17	Guide sleeve	241 400 02 207
2.18	Shaft angle drive - actuator	241 400 02 157
2.19	Pressure switch LGW 10 A2 1 - 10 mbar*	691 370
2.20	Hose 4.0 x 1.75 220 mm*	232 050 24 067
2.21	Hose 4.0 x 1.75 140 mm*	232 050 24 047
2.22	Hose clamp 7.5*	790 218
2.23	Threaded socket R⅛ WES4*	453 003
2.24	Pressure switch bracket*	230 200 24 017

* Only in conjunction with air pressure switch.

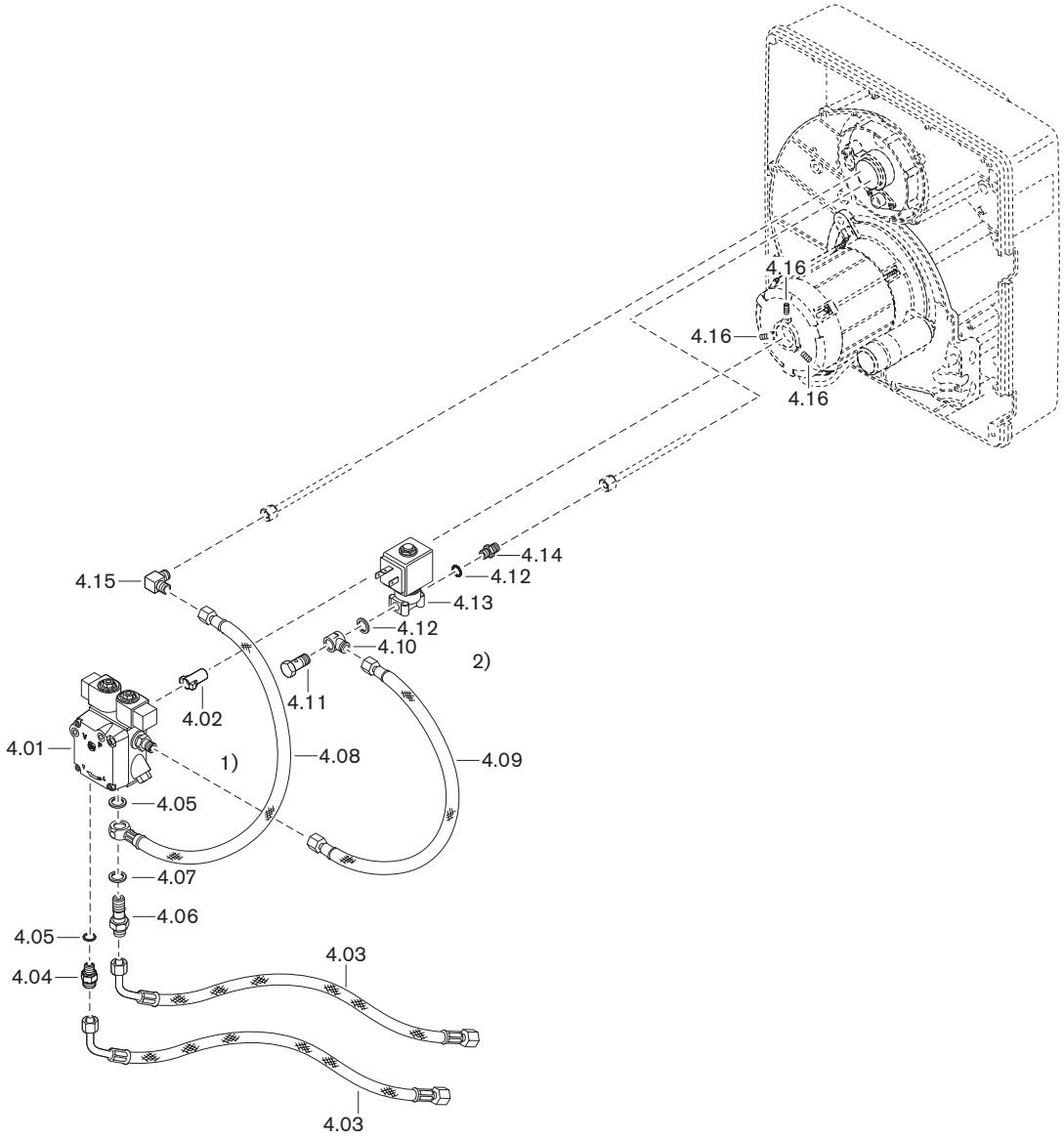
13 Spares

Burner with variable speed drive



Pos.	Description	Order No.
3.01	Motor DK06A-2 3~ 230 V / 50 Hz	230 400 07 032
3.02	Screw M8 x 20 DIN 912	402 511
3.03	Shaft key 4 x 5 DIN 6888	490 154
3.04	Speed sensor KJ1.5-Q8MB40-NA-X complete	230 310 12 552
3.05	Fan wheel VSD TLR-S 190 x 81.8-L S1	230 400 08 012
3.06	Grub screw M8x8 w. ann. cut. edge (Tuflok)	420 550
3.07	Air guide	241 310 01 307
3.08	Air damper complete	241 400 02 012
3.09	Bearing left	241 400 02 037
3.10	Bearing right with bearing bush	241 210 02 032
3.11	Shaft air damper - angle drive	241 400 02 147
3.12	Angle drive	241 110 02 062
3.13	Air actuator STE 4.5 24 V	651 103
3.14	Screw M4 x 30 Torx-Plus metric	409 245
3.15	Fixing plate	241 400 02 222
3.16	Screw M4 x 10 Torx-Plus 20IP	409 236
3.17	Guide sleeve	241 400 02 207
3.18	Shaft angle drive - actuator	241 400 02 157
3.19	Bracket for frequency converter	230 310 01 027
3.20	Frequency converter ATV 12	710 603

13 Spares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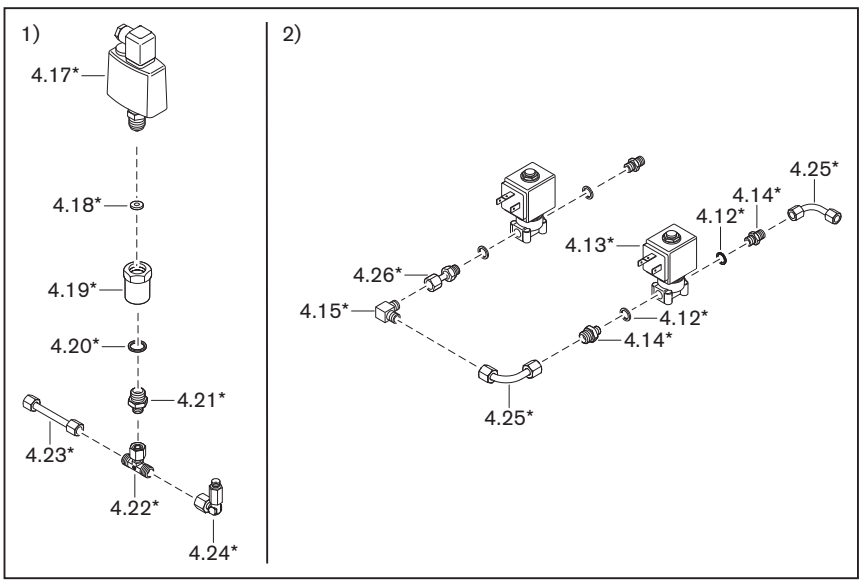
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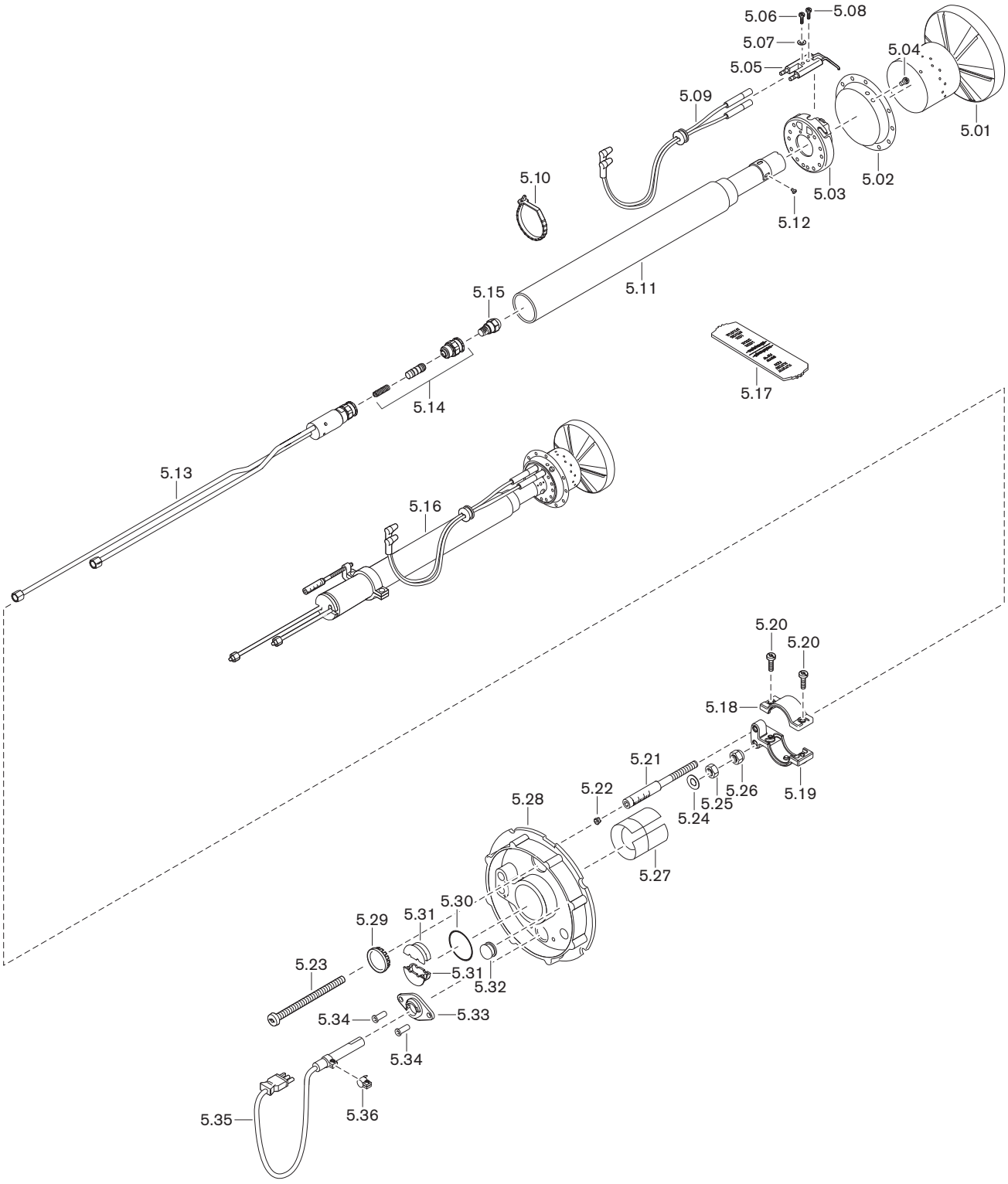
13 Spares

Pos.	Description	Order No.
4.01	Pump AT2V65CK 9606 4P0700	601 867
	– Solenoid coil T80 Suntec 220-240 V 50-60 Hz	604 495
	– Filter set with cover seal	601 107
4.02	Plug coupling	652 135
4.03	Oil hose DN 8, 1200 mm	491 128
4.04	Threaded socket 8LL M12 x 1 x G¼ x 28	140 250 06 067
4.05	Sealing ring A13.5 x 17 x 1.5 DIN 7603 Cu	440 010
4.06	Swivel screw G¼ x M12 x 1	241 400 06 097
4.07	Sealing ring A14 x 20 x 1.5 DIN 7603 Cu	440 041
4.08	Pressure hose DN 4, 410 mm Ermeto 6LL	491 248
4.09	Pressure hose DN 4, 380 mm, 6-LL/M10 x 1	491 130
4.10	Screwed union 24-BSEX-LL06-G⅛B-ST	452 618
4.11	Hollow core screw HS⅛ TN WEISH XCF	452 877
4.12	Sealing ring A10 x 13.5 x 1 DIN 7603 Cu	440 027
4.13	Solenoid valve 121Z2323 230V50Hz, 240V60Hz	604 480
	– Solenoid coil 483764 T1 230V50Hz, 240V60Hz	604 453
4.14	Screwed union 24-SDSX-LL06-G⅛A-ST-CH60	452 291
4.15	Screwed union 24-EX-LL06-P-ST	452 050
4.16	Grub screw M6 x 10 DIN 914	420 630
4.17	Pressure switch DSF 158 F001 0-25 bar*	640 109
4.18	Sealing ring C6.2 x 17.5 x 2 DIN16258 Cu*	440 007
4.19	Threaded socket IG ¼" x IG ½" x 40*	290 504 13 037
4.20	Sealing ring A13.5 x 17 x 1.5 DIN 7603 Cu*	440 010
4.21	Screwed union 24-SDSX-L08-G¼A-ST-CH60*	452 264
4.22	Screwed union 24-SWT-L08-ST*	452 500
4.23	Oil line 8 x 1.0 x 70 pump-VZ08*	110 564 06 118
4.24	Brazed union for mounting pressure switch*	240 310 13 022
4.25	Oil line 6 x 1.0 pump solenoid valve*	241 403 06 108
4.26	Threaded socket cpl. 6 x G⅛ x 35*	111 351 85 022

* Only in conjunction with min. oil pressure switch

13 Spares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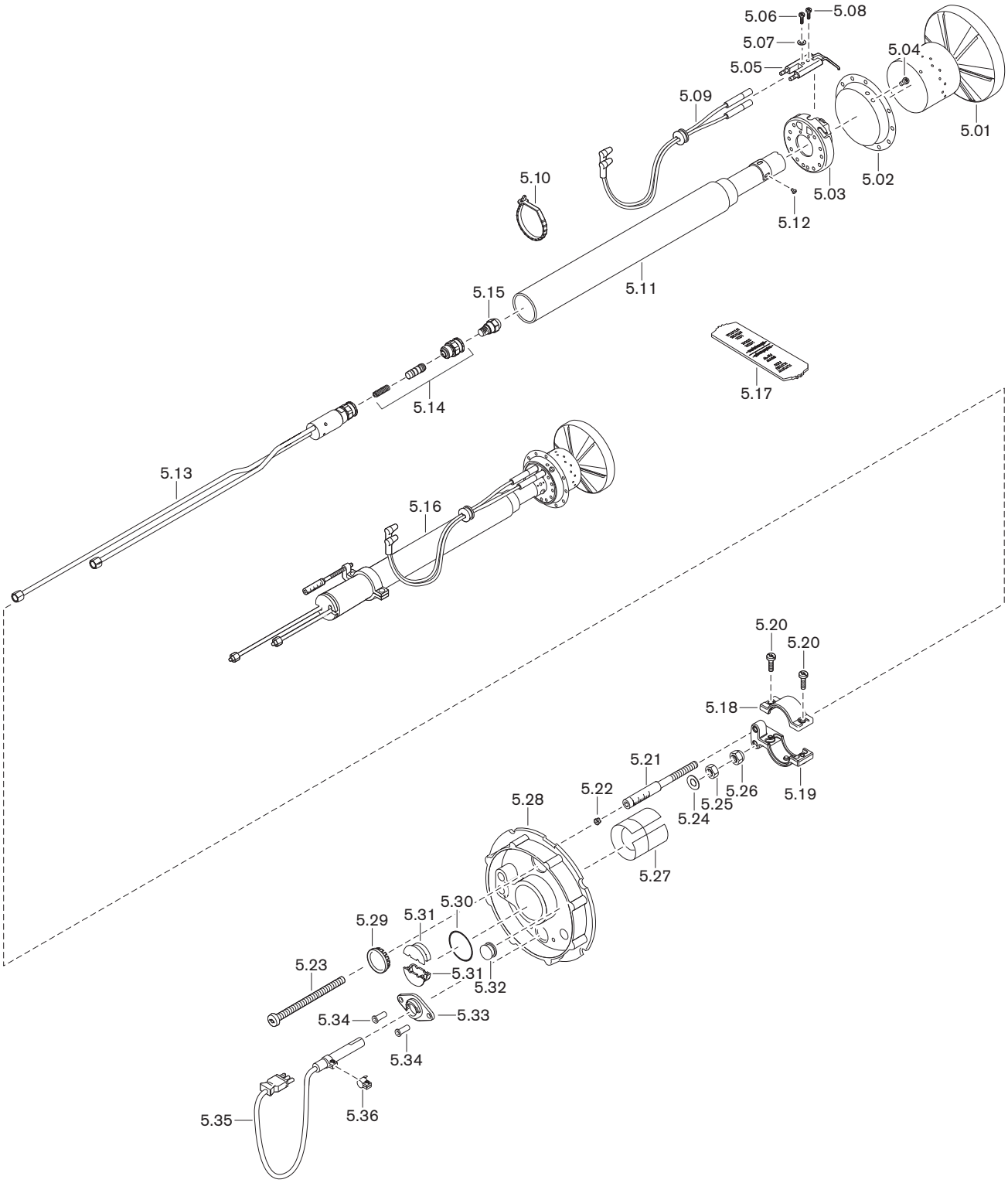
Pos.	Description	Order No.
5.01	Diffuser WL40/1-A 1LN-A	241 400 14 122
5.02	Aperture WL40/1-A 1LN-A	241 400 14 137
5.03	Ignition electrode holder	241 300 14 092
5.04	Screw M4 x 6 Torx-Plus 20IP	409 226
5.05	Ignition electrode	241 300 10 187
5.06	Screw M4 x 10 Torx-Plus 20IP	409 236
5.07	Spring washer A4 DIN 137	431 608
5.08	Screw M4 x 12 Torx-Plus 20IP	409 237
5.09	Ignition cable	
	– 700 mm (Standard)	241 400 11 042
	– 800mm (for 100 mm extension)*	240 310 11 092
5.10	Reopening belt 4.7 x 200	794 089
5.11	Guide tube	
	– Standard	241 400 10 042
	– extended by 100 mm*	240 400 10 072
5.12	Screw M4 x 6 Combi-Torx-Plus 20IP	409 362
5.13	Nozzle head with nozzle shut off	
	– Standard	241 400 10 212
	– extended by 100 mm*	240 400 10 082
5.14	Nozzle shut off set	240 100 10 042
5.15	Oil nozzle	
	– 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
	– 7.00 gph 45°HF Fluidics	602 695
	– 7.50 gph 45°HF Fluidics	602 696
	– 8.00 gph 45°HF Fluidics	602 697
	– 3.00 gph 60°HF Fluidics	602 739
	– 3.50 gph 60°HF Fluidics	602 760
	– 4.00 gph 60°HF Fluidics	602 761
	– 4.50 gph 60°HF Fluidics	602 762
	– 5.00 gph 60°HF Fluidics	602 763
	– 5.50 gph 60°HF Fluidics	602 764
	– 6.00 gph 60°HF Fluidics	602 765
	– 6.50 gph 60°HF Fluidics	602 855
	– 7.00 gph 60°HF Fluidics	602 856
	– 7.50 gph 60°HF Fluidics	602 857
	– 8.00 gph 60°HF Fluidics	602 858

* Only in conjunction with combustion head extension.

13 Spares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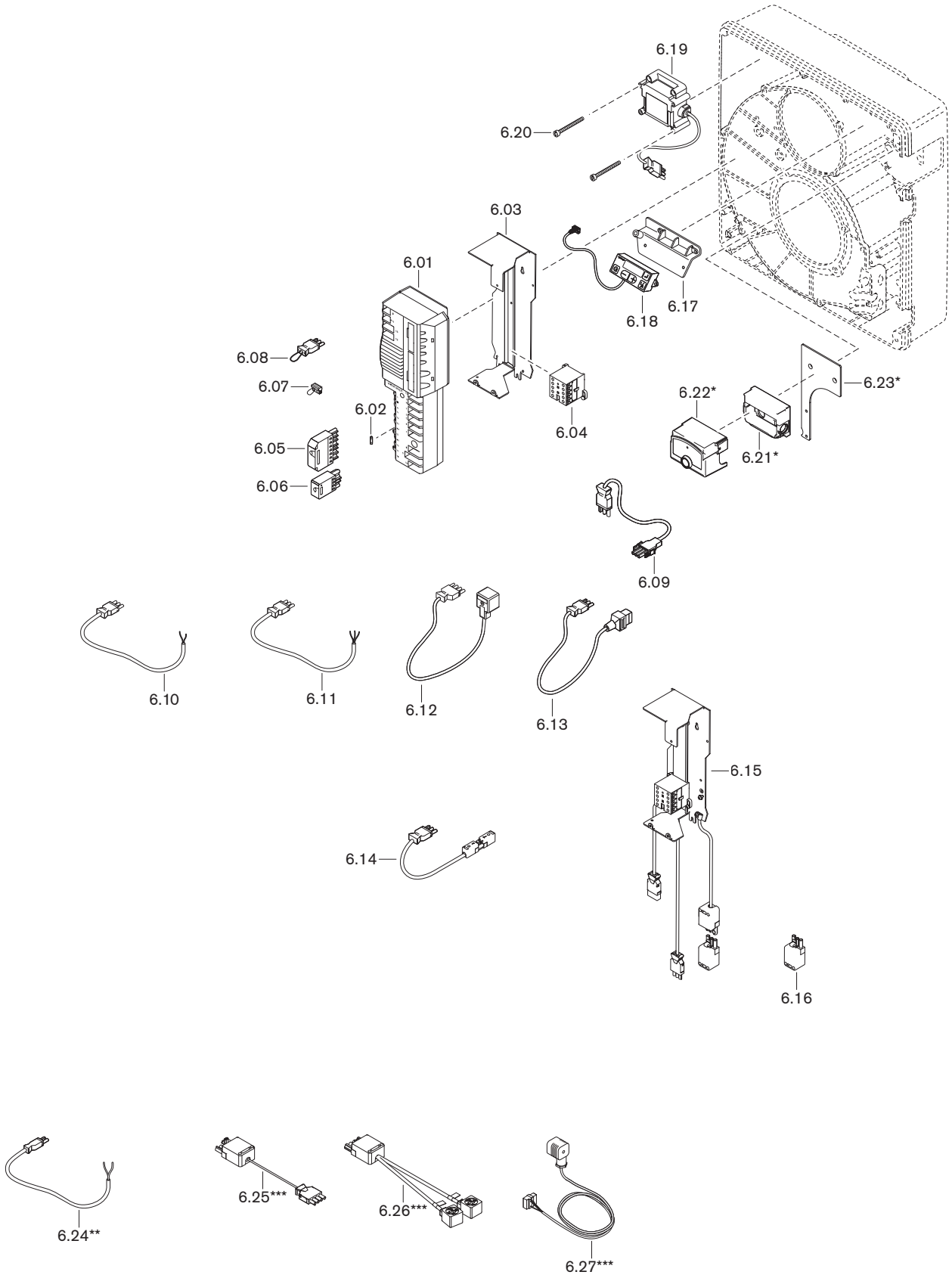
Pos.	Description	Order No.
5.16	Nozzle assembly complete	
	– Standard	241 403 10 040
	– extended by 100 mm*	240 403 10 050
5.17	Setting gauge	241 110 00 017
5.18	Adjusting lever top part	241 400 10 077
5.19	Adjusting lever bottom part	241 400 10 067
5.20	Screw M4 x 12 Torx-Plus 20IP	409 237
5.21	Indicating bolt M6 x 90	241 110 10 097
5.22	Cap 5.25 natural	241 110 10 087
5.23	Adjusting screw M6 x 88	241 400 10 097
5.24	Spring washer A6 DIN 137	431 615
5.25	Hexagonal nut M6 DIN 934	411 301
5.26	Hexagonal nut M6 DIN 985	411 302
5.27	Guide foil 7.8 x 134.8	241 300 01 027
5.28	Nozzle assembly cover complete (QRB4)	241 400 01 142
5.29	View port glass	241 400 01 377
5.30	O ring 33.5 x 3.55 NBR70 ISO 3601	445 177
5.31	Bracket for oil lines	241 310 14 067
5.32	Shut off grommet	756 159
5.33	Flange AGK42 QRB4	600 682
5.34	Blind rivet F4 x 10 Al	426 331
5.35	Flame sensor QRB4A**	241 210 12 052
5.36	Strap AKG43 for QRB4	600 681

* Only in conjunction with combustion head extension.
** Flame sensor QRB4 is not suitable for continuous operation.

13 Spares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13 Spares

Pos.	Description	Order No.
6.01	Combustion manager W-FM 25 / 230 V	
	– intermittent operation without O_2 trim	600 487
	– intermittent operation with O2 trim	600 491
	– Continuous operation / O_2 trim (PO-O2)	600 489
6.02	Micro fuse T6.3H, IEC 127-2/5	483 011 22 457
6.03	Bracket with carrier rail	232 310 12 022
6.04	Contactor B 7-30-10 220-240V	702 818
6.05	Plug unit ST18/7	716 549
6.06	Plug unit ST18/4	716 546
6.07	Coded plug 7 pole (black)	716 190
6.08	Bridging plug No. 7	241 400 12 042
6.09	Plug cable No. 3 motor	241 050 12 062
6.10	Plug cable No. 3/N frequency converter	230 310 12 122
6.11	Plug cable No. 3 motor supply (VSD)	230 310 12 142
6.12	Plug cable No. 5 stage 1 solenoid valve	241 400 12 062
6.13	Plug cable	
	– No. 1 safety solenoid valve	241 400 12 052
	– No. 6 stage 2 solenoid valve	241 400 12 142
6.14	Plug cable No. 14 for remote reset	230 110 12 362
6.15	Contactor 230 V with bracket	230 310 12 512
6.16	Plug unit ST18/3	716 543
6.17	Fixing bracket	241 400 12 017
6.18	ABE for W-FM 20 / 25 with 0.58 m cable	600 481
6.19	Ignition unit type W-ZG01 230 V 100 VA	603 229
6.20	Screw M4 x 42 Combi-Torx-Plus 20IP	409 260
6.21	Terminal socket AGK11.7 for LFS1*	600 678
6.22	Flame sensor LFS1.11A2 230V 50/60Hz*	600 674
6.23	Bracket for flame sensor LFS*	240 310 12 027
6.24	Plug cable No.11 for air pressure switch**	232 400 12 032
6.25	Adapter cable No.5 for branching***	230 310 12 152
6.26	Plug cable additional solenoid valve***	240 310 12 162
6.27	Plug cable No.12 for oil pressure switch***	240 310 12 072

* Only in conjunction with continuous operation.
** Only in conjunction with air pressure switch.
*** Only in conjunction with min. oil pressure switch

14 Notes

15 Key word index

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–weishaupt–

Max Weishaupt GmbH · 88475 Schwendi

Weishaupt close by? Addresses, telephone numbers etc. can be found at www.weishaupt.de

The complete program: Reliable technology and prompt, professional service

W Burners **up to 570 kW**

The compact burners, proven millions of times over, are economical and reliable. Available as gas, oil and dual fuel burners for domestic and commercial applications.
The purflam® burner version with special mixing head gives almost soot-free combustion of oil with greatly reduced NOx emissions.

monarch® WM Burners and Industrial Burners **up to 11,700 kW**

These legendary industrial burners are durable and versatile.
Numerous variations of oil, gas and dual fuel burners meet a wide range of applications and capacity requirements.

WKmono 80 Burners **up to 17,000 kW**

The WKmono 80 burners are the most powerful monoblock burners from Weishaupt. They are available as oil, gas or dual fuel burners and are designed for tough industrial application.

WK Burners **up to 32,000 kW**

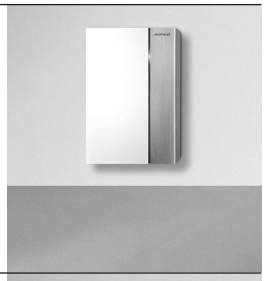
These industrial burners of modular construction are adaptable, robust and powerful.
Even on the toughest industrial applications these oil, gas and dual fuel burners operate reliably.

MCR Technology / Building Automation from Neuberger

From control panels to complete building management systems - at Weishaupt you can find the entire spectrum of modern control technology. Future orientated, economical and flexible.

Service

Weishaupt customers can be assured that specialist knowledge and tools are available whenever they are needed. Our service engineers are fully qualified and have extensive product knowledge, be it for burners, heat pumps, condensing boilers or solar collectors.



Wall-hung condensing boilers for gas **up to 800 kW**

The wall-hung condensing boilers WTC-GW have been developed to meet the highest demands in ease of operation and efficiency. Modulating operation means these units operate quietly and economically.

Floor-standing condensing boilers for oil and gas **up to 1,200 kW**

The floor-standing condensing boilers WTC-GB (up to 300 kW) and WTC-OB (up to 45 kW) are efficient, low in pollutants and versatile in use.
Even the largest capacities can be covered by cascading up to four gas condensing boilers.

Solar systems

The stylish flat-plate collectors are the ideal complement for any Weishaupt heating system. They are suitable for solar water heating and for combined heating support. With versions for on-roof, in-roof and flat roof installations, solar energy can be utilised on almost any roof.

Water heaters/Energy storage

The diverse program of potable water and energy storage for various heat sources includes storage volumes of 70 to 3,000 litres. In order to minimize storage losses, potable water cylinders from 140 to 500 litres are available with highly efficient insulation using vacuum insulation panels.

Heat pumps **up to 180 kW**

The heat pump range offers solutions for the utilisation of heat from the air, the soil or ground water.
Some systems are also suitable for cooling buildings.

Geothermal probe drilling

With its daughter company, BauGrund Süd, Weishaupt also offers geothermal probe and well drilling. With the experience of more than 10,000 systems and more than 2 million meters of drilling, BauGrund Süd offers a comprehensive service program.