

Installation

Öl-BW burner

Oil condensing system with SolvisMax stratified solar storage tank

Rated outputs (2 level):

- 10/17 kW
- 14/23 kW
- 20/28 kW



1 Information About These Instructions

These instructions are intended for you as a technician from an installation company. You will find the specifications for installation, start-up and maintenance of the system here.

Please keep these instructions with the system so they can be referred to when necessary.

We recommend that you participate in a Solvis training course to ensure safe and proper installation.

As we are interested in improving our technical documentation, we appreciate feedback of any kind.

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A list of our international representatives is provided at www.solvis.com.

Please understand that the telephone numbers are reserved for use by our installers.

Interested system operators should contact their installer.

Symbols used



DANGER

Immediate danger, with serious health consequences and even death.



WARNING

Danger, with potentially serious health consequences.



CAUTION

Possible risk of moderate or light injury.



CAUTION

Risk of damage to unit or system.



Useful information, notes and work tips.



Change of document, referring to another document.



Energy-saving tip with suggestions on how to save energy. This reduces costs and helps protect the environment.

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2 Notes

2.1 Safety Notes



Observe the safety notes

This is for your own safety

- Make sure that you are familiar with the safety notes before beginning work.
- Observe and adhere to the relevant safety regulations and the accident prevention regulations.

2.1.1 General Information



Work to be performed by qualified technicians

- Only trained specialist companies may install or maintain the system.
- Only qualified electricians may work on electrical equipment.



CAUTION

Observe instructions

Solvis is not liable for any damage resulting from non-observance of these instructions.

- Read the instructions carefully before operating or installing the system.
- Contact our Technical Sales department if you have any questions.



CAUTION

Do not make any unauthorised modifications

Otherwise, there is no guarantee that the system will function correctly.

- You must not make any changes to the components of the unit.
- Only use original spare parts.

2.1.2 Regulations

Observe the following specifications

- DIN EN 12828 Heating systems in buildings
- DIN EN 1717 Protection of drinking water (d. w.)
- DIN 1988-100 Codes of practice for d. w. installat. (TRWI)
- DIN EN 806 Specifications for installations inside buildings conveying water for human consumption
- VDI 2035 Part 1, Prevention of damage in water heating installations - Scale formation
- VDI 2035 Part 2, Prevention of damage in water heating installations - Water corrosion
- Directives of the German Institute for Structural Engineering
- German Building Regulations (LBO)
- VDE 0100/IEC 60364 Erection of low voltage systems
- Low Voltage Directive 2006/95/EC
- German Fireplace Regulations (FeuVo)
- Technical Regulations for Oil Systems (TRÖl)

- DIN EN 13384-1: Chimneys – thermal and fluid dynamic calculation methods
- Local discharge regulations
- ATV A 115 Notes for discharging waste water
- ATV M 251 Discharging condensate water

2.2 Burner design



Correct design of the burner performance is vital for cost-effective, low-emission and durable operation of the burner. In the case of renovation, a simple and practical estimate of the boiler performance can be made based on fuel consumption (Swiss Formula).



When designing the heating load using the Swiss Formula, be aware of the following:

- The formula generally provides good results with practical relevance.
- For buildings with a very high proportion of glass and/or new buildings (new construction insulation standard), the calculation is only applicable to a limited extent.
- The method may only be used with constant boundary conditions (heated building area, user behaviour).

Design based on the Swiss Formula

To estimate the heating load required for an existing building, the Swiss Formula is applied as follows:

$$\phi HL = \frac{\phi \text{Consumption} \cdot H_o \cdot \eta}{t_{\text{voll}}}$$

ϕHL	Heating load in [kW]
$\phi \text{Consumption}$	Average annual consumption in [l] heating oil / [m ³] gas
H_o	Higher heating value, 10.6 kWh/l
δ	Annual efficiency (condensing boiler approx. 0.95)
t_{voll}	Full load hours in [h] (for residential buildings with heating and hot water, approx. 2300 h)

The use of EL heating oil results in the simplified formula:

$$\phi HL = \frac{\phi \text{ Consumption per year}}{230}$$

Example:

The annual consumption in a single-family home with oil heating is approx. 3500 l (EL heating oil). Thus, the average heating load is: $\phi HL = 3500 / 230 = 15.2 \text{ kW}$.

Result: A17 kW burner is sufficient to heat the single-family home.

3 System Versions

The SolvisMax Öl is available with 3 different output capacities (each 2-level): 17, 23, and 28 kW.

It is based on the basic version (SolvisMax Solo) that is available in 3 storage tank sizes: 450, 750, and 950 litre.

Depending on the configuration, the SolvisMax may also include a solar heat transfer station in addition to a hot water station (choice of WWS-24 and WWS-36).

The solar heat transfer station can also be retrofitted at any time to utilise all of the benefits of solar thermal support.

4 Scope of Delivery

The basic kit is delivered in several packages plus documentation. Additional accessories are added to create an entire system.

All accessories are listed in the Solvis price list.

SolvisMax



See the → *chapter "Scope of delivery" in the SolvisMax installation instructions (MAL-MAX-7).*

SolvisMax Öl

Also includes:

Burner box

- 2-stage low NOx blue-flame burner, incl. 2 flexible oil pipes
- Air supply hose
- Burner plug
- Attachment nuts
- Burner sealing cable
- Documentation

Accessories box

- Exhaust connection elbow with siphon and condensate hose
- Boiler brush
- Exhaust connection fitting
- Assembly pack (with gaskets, attachment material, mSTL sensor, socket boards, etc.)
- Oil microfilter with vacuum manometer and retaining plate
- Reflective silencer
- Filling pipe cap with label (only for low-sulphur EL heating oil)

5 Installation

5.1 Installation part 1: Burner

Installing the burner

1. Insert the entire burner sealing cable into the groove of the combustion chamber flange.



WARNING

Prevent leaks on the burner seal

Risk of toxic gas leakage.

- Never operate the burner if the burner sealing cable is not inserted.
- Do not shorten the burner sealing cable.



Fig. 1: Inserting the burner sealing cable

2. Remove the burner from the box.
3. Remove the inserted flame tube (bayonet fastener).

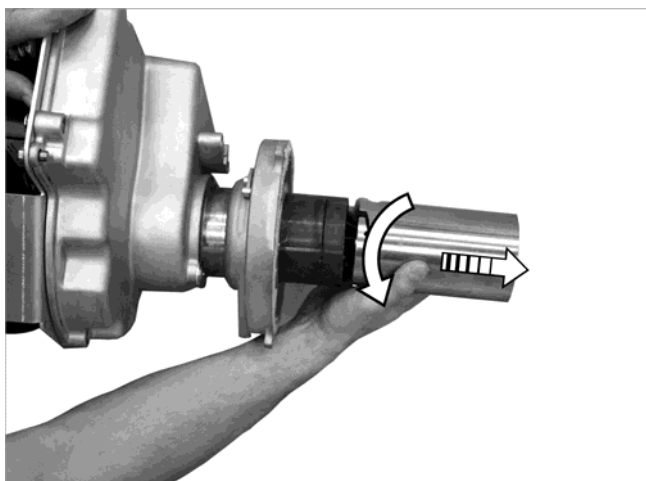


Fig. 2: Removing the flame tube

Before further assembly, check the following factory settings and adjust, if necessary:

4. Pull the nozzle fitting out of the housing.
5. Check the electrodes as shown in the figure and correct them by carefully bending them, if necessary.

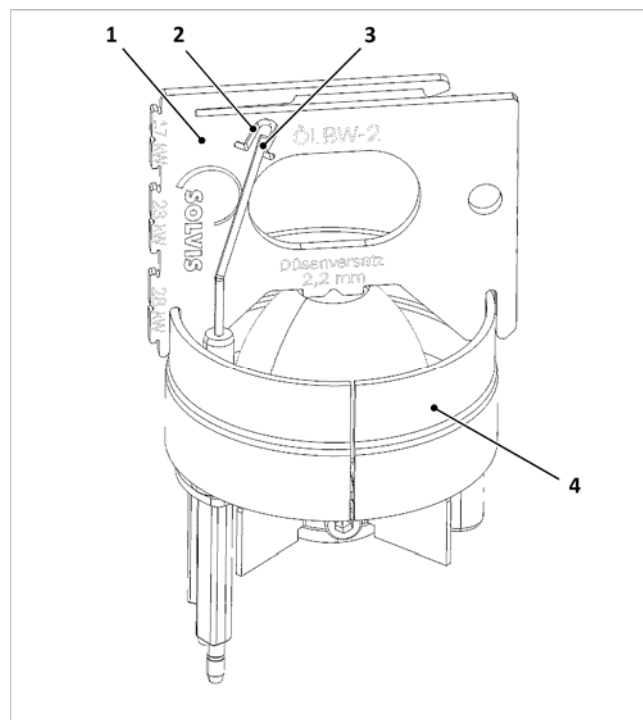


Fig. 3: Checking the position of the ignition electrodes

- | | |
|------------------|-----------------------|
| 1 Setting gauge | 3 Ignition electrodes |
| 2 Control window | 4 Mixer head |

6. Check the electrode gaps as shown in the figure and correct them by carefully bending them, if necessary.

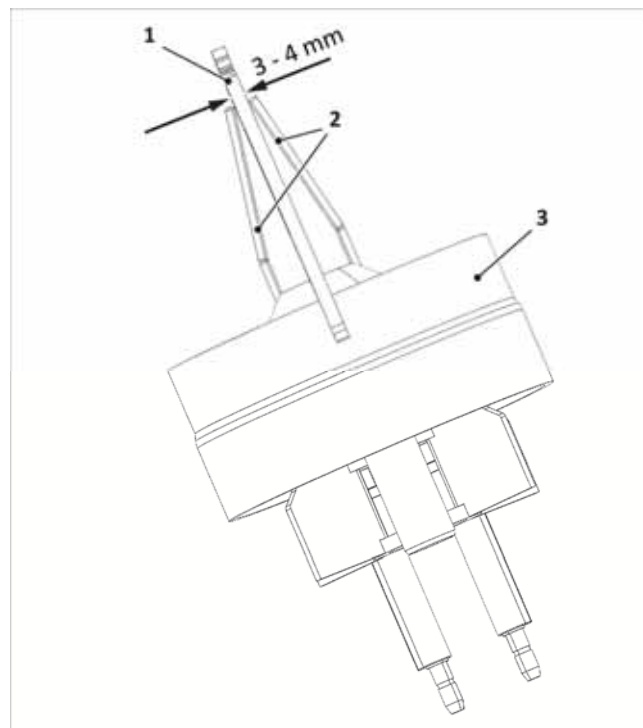


Fig. 4: Checking the ignition electrode gaps

- | | |
|-----------------------|--------------|
| 1 Setting gauge | 3 Mixer head |
| 2 Ignition electrodes | |

7. Re-insert nozzle fitting.
8. Put the door firebrick in place as shown.



Fig. 5: Putting the firebrick in place

9. Put the flame tube in place and secure.

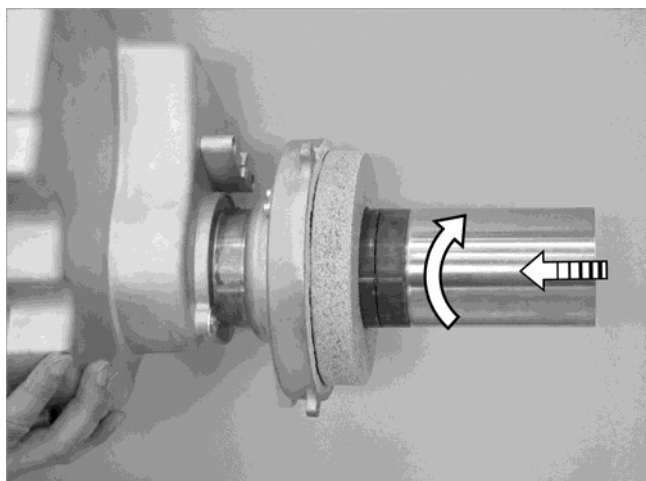


Fig. 6: Put the flame tube in place and secure

10. Place the burner onto the pre-fitted threaded bolts.
11. Fasten the burner flange with the three nuts supplied.
12. Tighten the nuts evenly using an 8 mm socket spanner.



Fig. 7: Fitting the burner



Continue with the installation. See the → section “Fitting the front flange insulation” in chapter “6.1.1 Storage tank” in the storage tank installation instructions (MAL-MAX-7).

5.2 Installat. part 2: Connections

5.2.1 Installing the connection pipes

Installing the air supply hose (part 1)

1. Attach the air supply hose to the blower and secure with a hose clip.

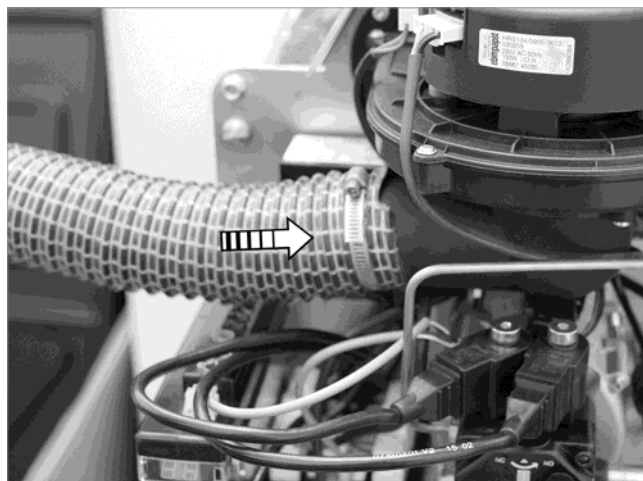


Fig. 8: Attaching the air supply hose to the blower

Fitting the air supply and blow out tube

1. Guide the air supply hose through the opening in the and attach it to the ingoing air support on the burner using the wiring hose clip.
2. Set the exhaust connection fitting onto the exhaust retaining plate. Observe the position for the installed storage tank size.

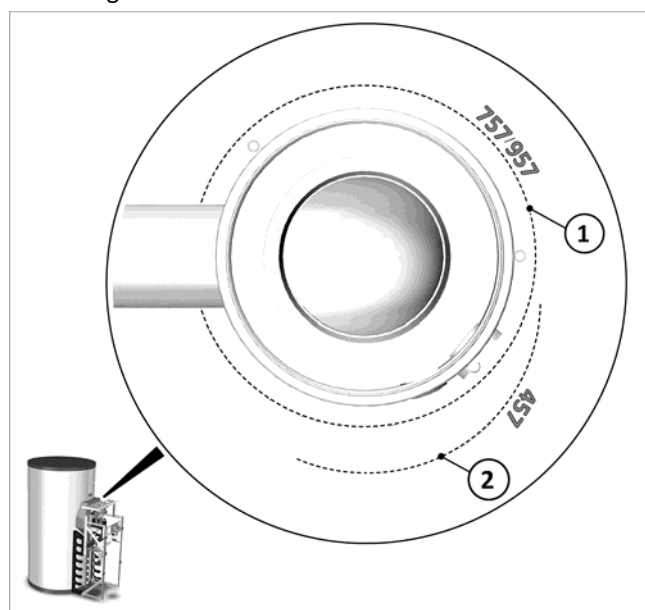


Fig.9: Position of the exhaust connection fitting

- 1 Position for storage tank sizes 757 and 957
- 2 Position for storage tank size 457

3. As shown in → *fig.10* slide the union nut (1), the snap ring (2) and the seal (3) onto the lower pipe end of the exhaust connection piece.



Fig. 10: Union attached

4. Insert the internal pipe silencer from below.



Fig. 11: Inserting the internal pipe silencer

5. Connect the exhaust connection piece (see → *fig. 10*) with the union nut pointing downwards.



Fig. 12: Connecting the exhaust connection piece

6. Align the exhaust connection piece so that it is pointing straight down.



Fig. 13: Aligning the exhaust connection piece

7. Insert the exhaust elbow into the lower opening on the exhaust heat exchanger until the spring pin is locked in the exhaust elbow (1).
8. Then, turn and align the exhaust elbow to the pipe end of the exhaust connection piece (2).

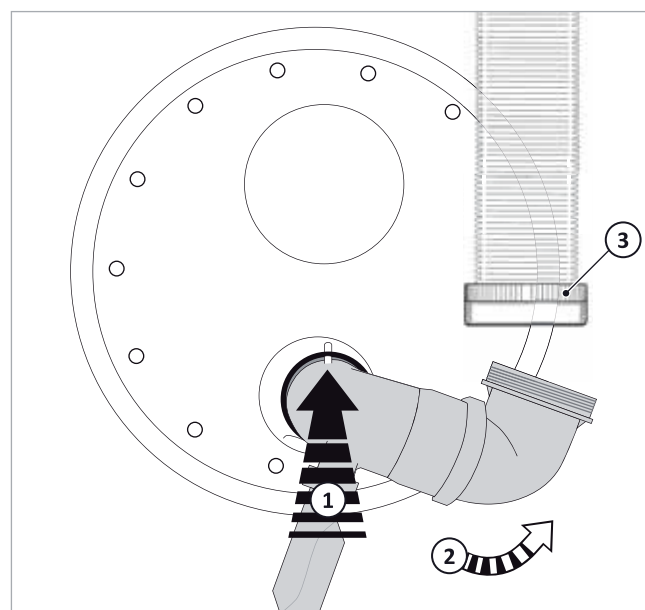


Fig. 14: Fitting the exhaust elbow

9. Place the upper pipe end of the exhaust connection piece onto the exhaust elbow union. Ensure that the sealing ring and snap ring are sitting straight in the union.



Fig. 15: Screwing on the straightly aligned exhaust elbow

10. Move the union nut (3) downwards and screw it onto the exhaust elbow.

i The exhaust elbow can be removed by turning it roughly 15° clockwise and then pulling it away. When turning the exhaust elbow, the spring lock is disengaged in the fitting.

Installing the oil filter and oil pipes

1. Attach the oil filter bracket to the console plate using the supplied Allen screw (-> assembly pack).

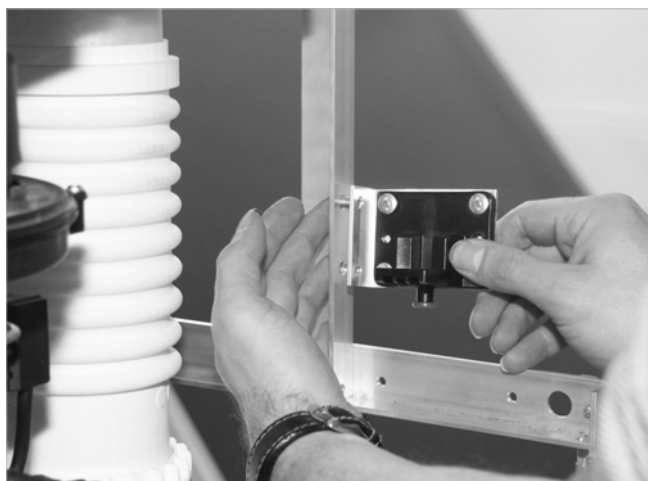


Fig. 16: Attaching the oil filter bracket

2. Fit the oil filter onto the bracket.



CAUTION

Do not suck the oil with the oil pump.

The oil pump will become damaged if it runs dry.

- Suck the oil into the filter using a hand pump.
- Never use an automatic bleeder to suck the oil.

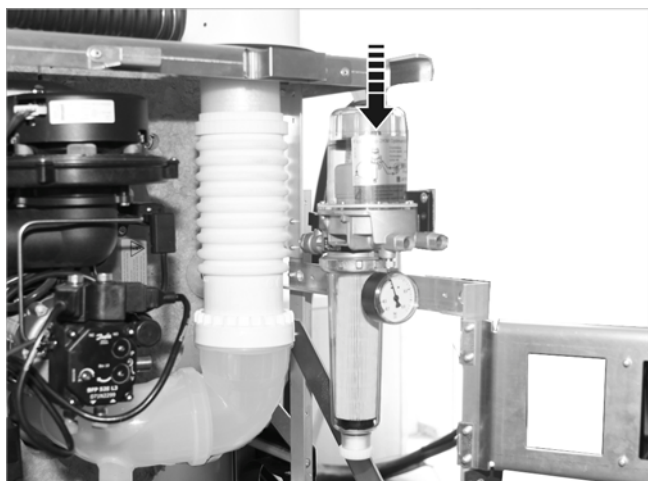


Fig. 17: Oil filter fitted

3. Connect the oil pipes from the pump to the filter.
4. Tightly screw on the flow and return according to the labels on the parts that show the direction of flow.

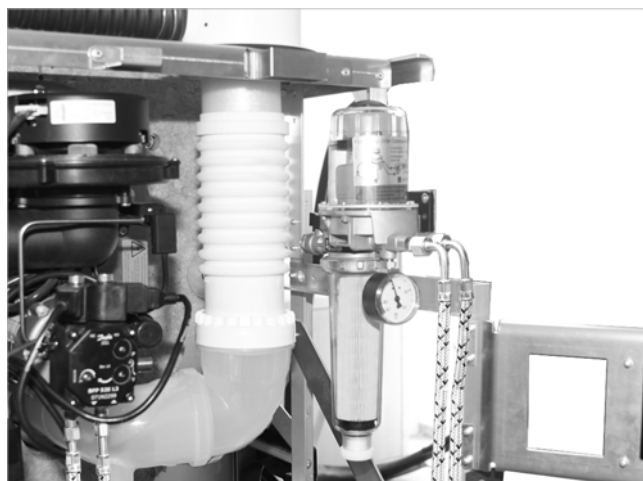


Fig. 18: Connecting the oil pipes

5. Use a 3x reducer (1) to guide the oil pipe through one of the upper pipe lead-throughs on the left or right side of the frame.

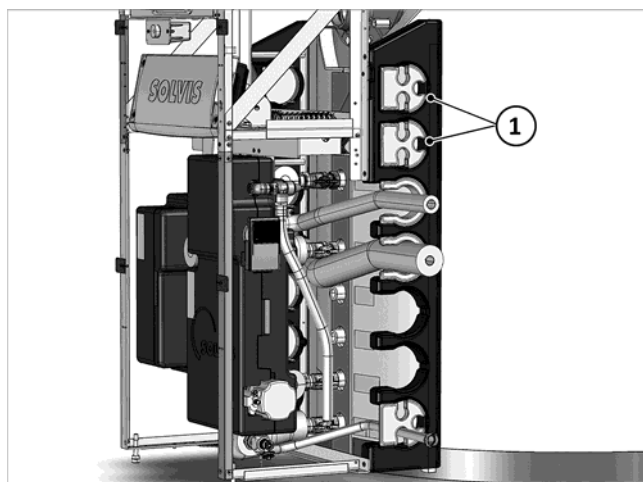


Fig. 19: Guiding the oil pipe using a 3x reducer

Installing the condensate hose

1. Fill the condensate siphon with water.
2. Connect the condensate hose to the condensate siphon.
3. Guide the condensate hose through one of the pipe lead-throughs on the left or right side of the frame using a 3 x reducer. Ensure a sufficient incline.
4. Guide the condensate hose to the discharge. If you are using a condensate lifting pump, place it on the floor in the lower area of the frame.



CAUTION

Prevent condensate back-up

Condensate may leak.

- Ensure that there are no bends ("second siphon") when laying the condensate hose.
- Always lay the condensate hose on an incline.

Fitting the mechanical safety temperature limiter (mSTL) on the burner

1. Insert the mSTL (-> assembly pack) into the immersion tube at the top right of the combustion chamber as far as it will go (front tip of the mSTL approx. 15 cm deep).
2. Tighten the screw fitting.



Fig. 20: Inserting the mSTL

3. Attach the mSTL unlocking switch to the bore hole provided on the left-hand retaining fitting on the mains module housing (1). To do this, unscrew the protective cap of the unlocking switch and the attachment nut beneath it, insert the thread, and fasten with the attachment nut. Screw the protective cap back on.

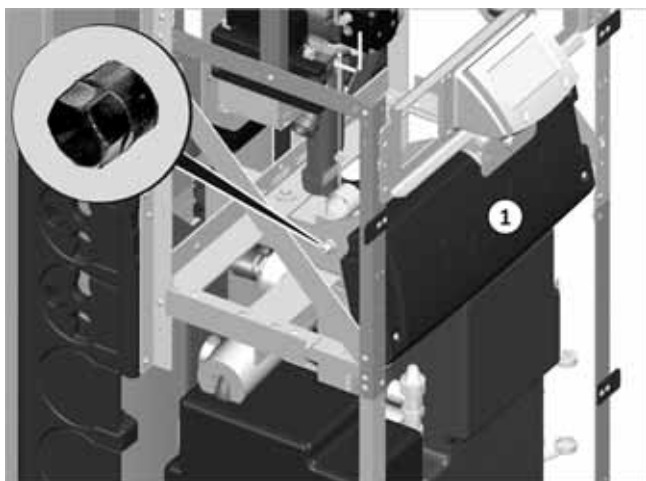


Fig. 21: mSTL unlocking switch

4. Guide the mSTL connection pipe on the side through the strain relief device on the control console and attach the socket board to the mains module (lower right) according to the labelling (ST 1 ST 2).
5. Secure the cable with the strain relief device.



Fig. 22: mSTL with connection line

Connecting the exhaust safety temperature limiter to the flue duct

Exhaust safety temperature limiter regulation in Switzerland.

- If a supplemental exhaust safety temperature limiter (ESTL) is specified, connect it to the malfunction input on the system controller of the SolvisControl (ESTL please order separately).
- The exhaust safety temperature limiter must have a floating 230 V~ switching contact.
- To install the exhaust temperature safety limiter in the exhaust line, replace the supplied exhaust elbow with the AB-ASTB (please order separately, see → Solvis price list).

1. Connect a connection line to two poles on the exhaust safety temperature limiter's switching contact.
2. Remove the jumper (ST 2) from the socket board of the mains module.
3. Lead the connection line on to the mains module and attach to the terminals (ST 2) on the socket board. The polarity is not important.

Connecting the burner plug to the burner

Two burner plugs are supplied in the burner box. These are connected to the interface of the automatic firing system as described below:

1. First connect the seven-pin burner plug.
2. Then connect the four-pin plug (for the second burner stage).
3. Finally, fit the two-pin reset plug connected to the plug.

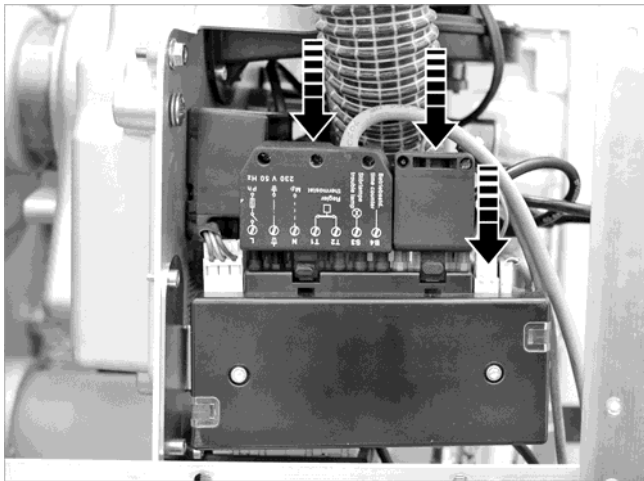


Fig. 23: Connecting the plugs

Plug the socket board onto mains module

1. Attach the socket boards included in the assembly pack onto any free slots of the mains module according to the labelling.



See → “Connection and system diagrams” document (ALS-MAX-7).

Securing the connection lines

1. Lead all the lines on the side through the strain relief devices of the control console.
2. Secure the lines with the strain relief devices.

5.2.2 Oil-side connection



CAUTION

Permitted fuel

To fulfil the terms of the warranty

- The SolvisMax / Ben Öl BW may only be operated with low-sulphur heating oil (max. 50 ppm sulphur). This also applies during start-up.
- We strongly recommend using premium-quality, low-sulphur heating oil, as per DIN 51603-1.
- In addition, all oil heating boilers for (low-sulphur) heating oils with an organic content of up to 10 % are approved, as per DIN SPEC 51603-6.



CAUTION

Observe the following information regarding the oil connection

- The oil pipes must always be routed in a single pipe system using 6 x 1 mm copper pipes.
- Always use oil filters with a filter mesh < 20 µm.
- During start-up, do not suck the heating oil into the burner with the oil pump. The oil pump will be damaged if it runs dry.

Fuel storage

We require that the on-site tank system be constructed according to the applicable local regulations, especially the TRÖI in Germany.

Cleaning the tank

When switching to low-sulphur heating oil, we require that the tank system be cleaned by a specialty firm according to the applicable regulations so that no residual sulphur-containing oil or sludge remains in the tank. We recommend that you replace the tank valves when you refurbish a boiler.

Fuel delivery

The boiler must be switched off (main switch) while oil is being delivered. After the tank has been filled, the boiler must not be switched on for at least another 2 to 4 hours. It is not possible to run the solar system and the hot water production during this time.

Oil supply



CAUTION

Vacuum on the oil manometer (vacuum gauge) below -0.35 bar

Loud running noise of the oil pump

Disruption of the oil supply

Potential damage to the pump

- Switch off the burner when the pressure drops below -0.35 bar.
- Do not switch the burner back on until the fault has been rectified.

Connecting an oil supply system

If an oil supply system is required due to structural factors, we recommend that you install a burner-independent suction supply system on-site.



For connecting and installing the oil supply system, see → *Operating instructions of the oil supply system*.

Oil pipe

The pipe diameter and length and the leak tightness of the heating oil pipe are extremely important for the proper functioning of the oil supply from the tank system to the boiler.

The maximum pipe length for Ø 6 x 1 mm copper pipe as a function of the height difference of the tank system is shown in the diagram, (see example).

The diagram applies under the following conditions:

- Copper pipe: Ø 6 x 1 mm
- Oil temperature >10°C
- EL heating oil up to 700 m above sea level
- 1 filter, 1 check valve, and 6 x 90° elbows are included in the diagram.

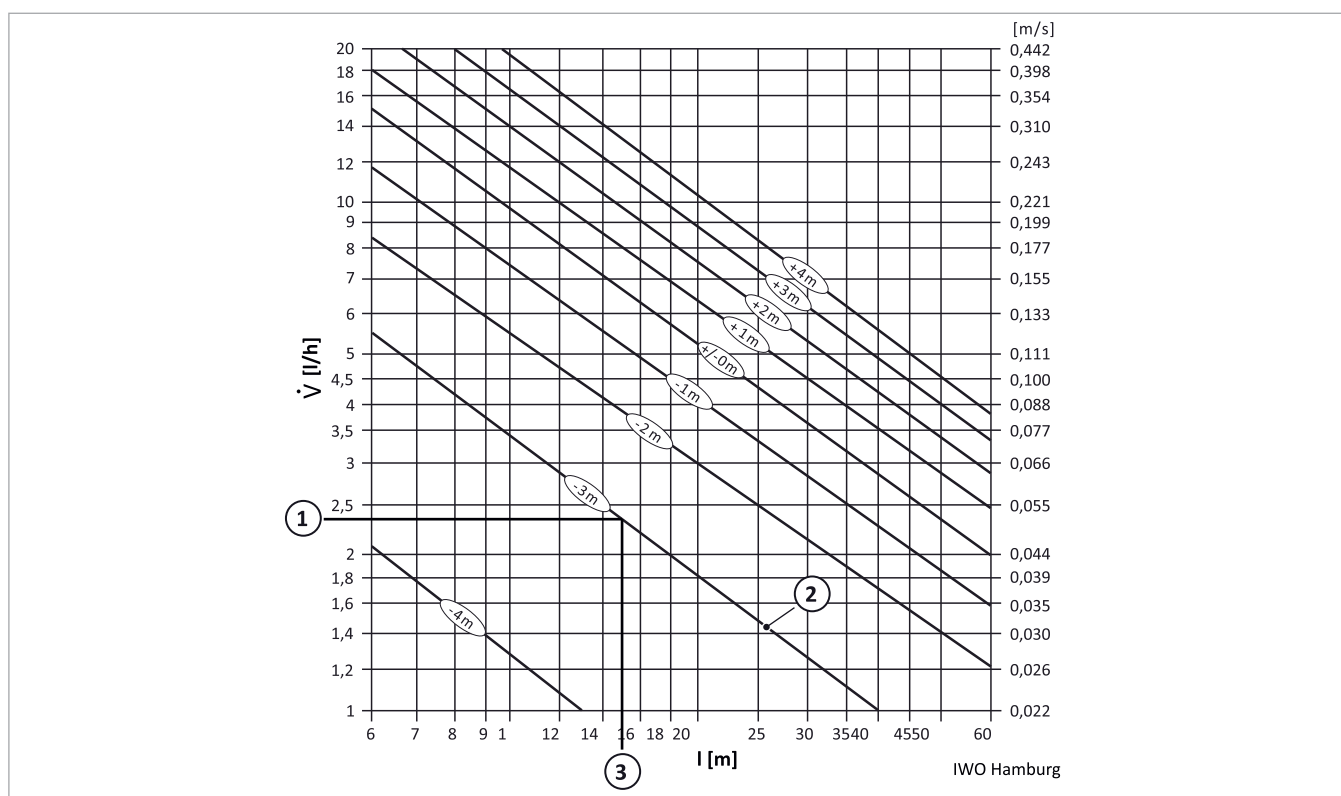


Fig. 24: Maximum pipe length in the single pipe system as a function of delivery height

- $\dot{V}$ Oil throughput
 l Max. suction pipe length
 (+) Inflow height
 (-) Suction height

Example for SÖ-BW with 23 kW burner performance:

According to the table, a performance of 23 kW results in an oil throughput of 1.95 kg/h. For EL heating oil with a specific gravity of $\delta = 0.86$, the oil throughput (l/h) is calculated as follows:

$$\frac{1,95 \text{ kg/h}}{0,86 \text{ kg/l}} = 2,3 \text{ [l/h]}$$

Horizontal line in diagram (1)

For example, the oil pump on the burner must overcome a maximum suction height of -3 m to the external underground tank (diagonal line on diagram (2)). The vertical line (3) from the intersection of the two other lines shows the maximum permitted pipe length. The result in this example is a maximum permitted suction pipe length of **15 m**.

5.2.3 Exhaust-side connection

General information on the exhaust system

The following information is authoritative for installing exhaust systems offered by Solvis.

Standards and regulations

As well as the recognised technical regulations, the following points must be observed in particular:

- Regulations from the approval certificate (supplied with the assembly pack).
- German federal state building regulations.

- The regulations for the exhaust routing can differ depending on the country and region.
- The responsible chimney sweep authority must therefore be included during system planning.

Application area of the CAS exhaust system

The pipes and fitting pieces of the CAS exhaust system are made of polypropylene, and the concentric outer pipes are made of white, powder-coated metal. Plug connections are used to fabricate the entire exhaust line out of pipes, fittings and seals. The exhaust lines can be installed in or on buildings. The maximum permitted exhaust temperature for the Centrotherm exhaust system (CES) is 120°C .

The number of maximum lengths are to be taken from the following tables.

Shaft requirements

The exhaust lines must be arranged outside of the installation room of the fireplace in separate, ventilated shafts. The shafts must be made of non-flammable, deformation-resistant materials and must be fire-resistant for 90 min. They may be fire-resistant for just 30 min for buildings with low heights.

The following internal dimensions are required for sufficient rear ventilation of the exhaust line DN 80.

- Rectangular: min. $135 \times 135 \text{ mm}$
- Round: min. $\varnothing 155 \text{ mm}$

5 Installation

Lower clearances can be selected between the line and shaft for ambient air-independent fireplaces that take in combustion air from the mouth via the annular gap if the furnace blower can withstand the intake resistance.

Shortening the flue duct

All flue ducts can be shortened.

The flue must protrude at least 100 mm out of the shaft cover when laid in a shaft.

Cleaning old flues

The flue must be thoroughly cleaned by a specialist company if combustion air is drawn from an existing flue shaft. This applies particularly when fireplaces for oil or solid fuel were previously connected. If dust from crumbling flue mortar is likely to be present again after cleaning, suitable countermeasures must be taken (e.g. centrifuge).

Spacers

Spacers must be mounted in the shaft at least every 2 m and at every elbow or T-piece. With a flexible flue duct, an additional spacer is required before and after each offset. The maximum shaft dimensions should not exceed a diameter or edge length of 240 mm to ensure that the spacers function properly.

Attachment of the exhaust lines

The exhaust lines must be attached with clamps every 1 m in the room.

Minimum gradient for exhaust lines

The exhaust line must be laid on a gradient toward the fireplace so that condensate water can run off the exhaust line to the central condensate water collector.

Minimum gradient:

- Horizontal exhaust line > 5% (5 cm per 1 m)

Cleaning and inspection openings

Exhaust systems must be easy and safe to clean and it must be possible to inspect the open cross section and check for leaks. To do this, at least one cleaning opening must be provided in the exhaust line in the installation room, and an additional one is required for each redirector. Exhaust systems that cannot be inspected and cleaned by accessing the mouth must have an additional cleaning opening in the attic. Shafts for the exhaust lines must not have any openings except the required cleaning and inspection openings as well as openings for the exhaust line rear ventilator.

Clearance to combustible parts

Maintain proper clearance to combustible components when installing the exhaust system. This is specified in the approval for the exhaust systems (clearance category), which can be found in the documentation that is included with the exhaust system.

Surface temperatures on the unit casing and exhaust line will be below 85°C when the system is running properly.

Approval

The individual components for the exhaust system are approved for construction by the German Institute for Building Technologies ("Deutsches Institut für Bautechnik" – "DIBT") in Berlin.

Installing the exhaust line

1. Connect the exhaust line to the pre-fitted exhaust measuring element.



CAUTION

- Only use approved components for the exhaust line.
- Only use the Centrocerin lubricant supplied with the basic kits for exhaust systems CAS-1 to CAS-8.

Reflective silencer

1. Remove the black exhaust end pipe from the chimney cap.
2. Insert the reflective silencer into the chimney cap from above.

The screw connection for the silencer (1) must be located above the chimney cap.

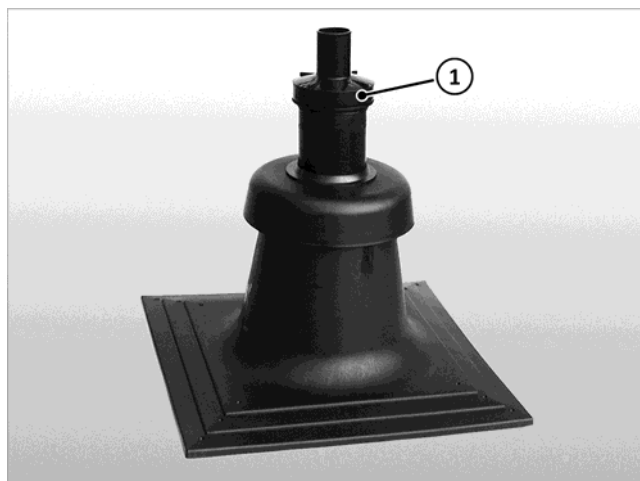


Fig. 25: Inserted reflective silencer

Acoustic emissions

If an excessive amount of noise develops in the exhaust system, a supplemental absorption-type silencer can be installed to reduce the noise.

Permitted lengths of the exhaust paths

The following tables give an overview of the permitted lengths of the individual exhaust systems.

The maximum exhaust lengths stated relate to:

- DN 60: SolvisBen/Max 10 and 18 kW
- DN 80: SolvisBen/Max 10, 18, 25 and 30 kW.

The minimum exhaust length is 1 m.

i If the exhaust lengths given do not suffice, then inquire with us for individualised calculations (see telephone number → p. 2).

Complete Solvis exhaust systems (system certified)

CAS-1 (B ₂₃) ambient air-dependent	
Shaft design	
Max. permissible length	20 m
Maximum horizontal length	4 m
CAS-2 (B ₃₃) ambient air-dependent	
Shaft design	
Max. permissible length	20 m
Maximum horizontal length	4 m
CAS-2 (C _{33x}) ambient air-independent	
Shaft design	
Max. permissible length	16 m
Maximum horizontal length	4 m
CAS-5-R/CAS-5-S (C _{33x}) ambient air-independent	
Concentric outlet turret	
Max. permissible length	15 m
Maximum horizontal length	4 m
CAS-7 (C _{33x}) ambient air-independent	
Concentric shaft outlet	
Max. permissible length	16 m
Maximum horizontal length	4 m
CAS-8 (C _{33x}) ambient air-independent	
External wall (not in DN 60)	
Max. permissible length	20 m
Maximum horizontal length	4 m

i The CAS-6 exhaust line set is **not** suitable for the SolvisMax Oil heat value.

Solvis exhaust systems in conjunction with approved flues (system certified)

The maximum effective length is calculated using the data from the exhaust gas mass flow and exhaust temperature at partial and full load in relation to the shaft/exhaust gas flue used. For burner and exhaust properties for the flue calculation, see → "Combustion data" table, sec. "Technical Data", p. 25.

CAS-3 (B ₂₃) ambient air-dependent	
Fireplace manufacturer performs calculation	
Connection only to a flue approved for the heating technology that is not sensitive to moisture	
CAS-4 (C _{43x}) ambient air-independent	
Fireplace manufacturer performs calculation	
Connection only to a flue approved for the heating technology that is not sensitive to moisture	

Offset measurements of the flue ducts

Angle/Diameter	Offset V	Length L
15° Bend: DN 60 / DN 80	22 / 20.0	167.1 / 150.0
30° Bend: DN 60 / DN 80	46.5 / 43.0	173.6 / 161.5
45° Bend: DN 60 / DN 80	74.9 / 69.5	175.9 / 168.0
87° Bend: DN 60 / DN 80	179.9 / 142.0	189.3 / 150.0

All dimension specifications in mm

i The measurements apply for the ambient air-dependent system and ambient air-independent system. Due to differences in the shank, the offset and length measurements for DN 60 are larger than those for DN 80.

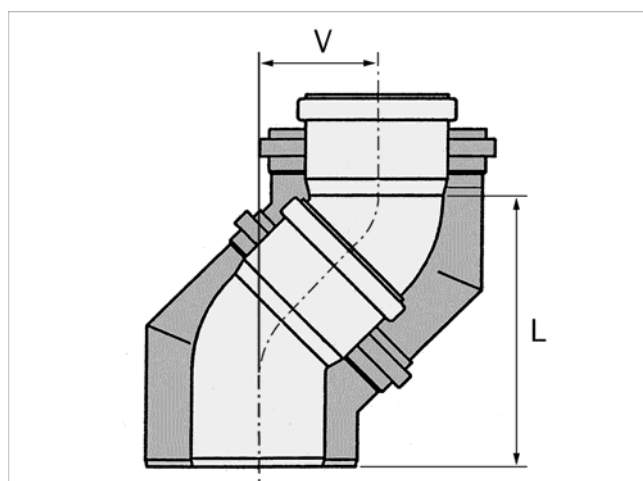


Fig. 26: Offset and length

5.2.4 Condensate discharge line connection



CAUTION

Observe the following information.

- Local regulations must be observed when delivering the accumulated condensate in public sewage systems.
- Acid-resistant condensate discharge lines must be used. The condensate discharge line must be laid on a gradient for run off.



CAUTION

Prevent condensate back-up
Condensate may leak.

- Ensure that there are no bends ("second siphon") when laying the condensate hose.
- Always lay the condensate hose on an incline.

Laying the condensate discharge line

Do not attach the condensate discharge line higher than 20 cm below the siphon height.

1. Guide the condensate hose out through the pipe lead-throughs of the base console on the left or right (use a 3 x reducer).
2. Connect the condensate discharge line to the waste water line of the building without hindrance.

Using a condensate lifting pump



- If the use of a condensate lifting pump is required due to structural factors, you can order it as an accessory.
- Observe the pump connection and installation instructions.



Continue the installation; see the → *chapter “Electrical connection” in the storage tank installation instructions (MAL-MAX-7).*

6 Start-Up



CAUTION

Permitted fuel

To fulfil the terms of the warranty

- The SolvisMax / Ben Öl BW may only be operated with low-sulphur heating oil (max. 50 ppm sulphur). This also applies during start-up.
- We strongly recommend using premium-quality, low-sulphur heating oil, as per DIN 51603-1.
- In addition, all oil heating boilers for (low-sulphur) heating oils with an organic content of up to 10 % are approved, as per DIN SPEC 51603-6.



CAUTION

Observe the following information regarding the oil connection

- The oil pipes must always be routed in a single pipe system using 6 x 1 mm copper pipes.
- Always use oil filters with a filter mesh < 20 µm.
- During start-up, do not suck the heating oil into the burner with the oil pump. The oil pump will be damaged if it runs dry.



CAUTION

Use prescribed parts only

Otherwise, failure or damage to the burner is possible.

- For a list of prescribed parts, see the → “Components used” table, p. 25
- Other components are not permitted.

Performance ranges for the burner



Within the specified performance ranges, (see → “Burner performance setting values” table, p. 26) the burner can be adapted to the building heat requirements. The burners are set to the following oil pressures in the factory:

- 10/17 kW burner: 8/18 bar
- 14/23 kW burner: 8/20 bar
- 20/28 kW burner: 10/18 bar.

Check the prerequisites for setting the burner:

1. The burner must run for at least 10 min. before taking the measurement.
2. The operating temperature is reached at the upper heating buffer (sensor S4).

Exhaust value to aim for:

- CO₂ 13.3%

Switching on the burner

Logging on to the SolvisControl as the installer:

1. Open the maintenance function
(“INSTALLER menu > Heating > Maintenance func-

tion”); refer also to the → chapter “Maintenance” in the operating instructions (BAL-SB-SM-I).

Set up the burner in the following order

For information on the burner performance setting values, see → “Burner performance setting values” table, page 26.

1. Start “Max. burner performance” in the maintenance function.
2. Set the pump pressure to level 2.
3. Set the blower speed to level 2.
4. Start “Min. burner performance” in the maintenance function.
5. Set the pump pressure to level 1.
6. Set the blower speed to level 1.

Setting the pump pressure

1. Use the pressure adjusting screw to set the pump pressure to the appropriate level.

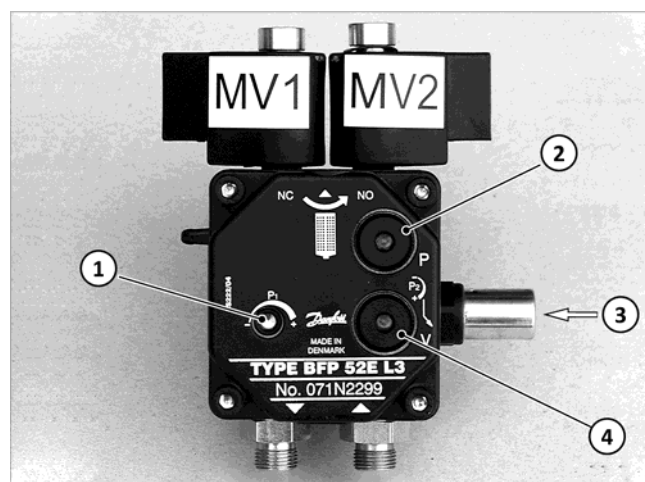


Fig. 27: Setting the pump pressure on the oil pump

- 1 Pressure setting for level 1
- 2 Pressure measurement connection
- 3 Pressure setting for level 2
- 4 Vacuum measurement connection

Setting the blower speed

The setting is made on the interface for the automatic firing system. Alternatively, the CoCo-Mobil SÖ-BW (ALG-COCO-MO-BW) reading unit can be used.



Fig. 28: Setting the blower speed on the interface

- | | |
|----------------------|--------------------|
| 1 Display, 2-digit | 3 Button |
| 2 Performance levels | 4 Rotary regulator |

1. Press the button (3) for 3 seconds.

The display switches to **R.8.** and both dots flash.

2. If the burner is in hibernation, the display "P" must be set in addition, using the rotary regulator (4). Use the Allen key supplied to do this.

3. Briefly press the button (3).

The display level switches to **P.1.**

4. Use the rotary regulator (4) to set it to the level required **P.1.** (level 1) or **P.2.** (level 2) using

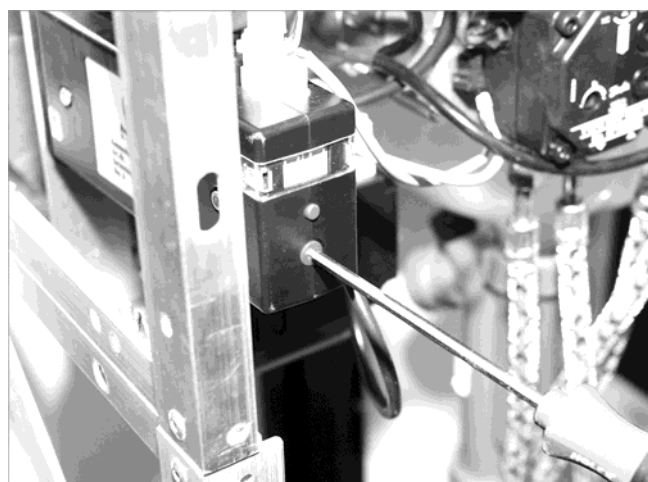


Fig. 29: Set the desired level

5. Briefly press the button.

The display level switches to the preset value for the speed level e.g. **6.8.** (level 1) or **9.5.** (level 2).

6. Briefly press the button to change the values.

The value on the display flashes.

7. Use the rotary regulator to adjust the value in the desired direction.

8. Press the button briefly to accept the set value.

9. Press the button again to display the set value.

10. Use a u-tube manometer to measure/check the blower pressure for the individual levels on the measurement connection (1) and adjust if necessary (repeat the steps beginning with 5. in the same manner).

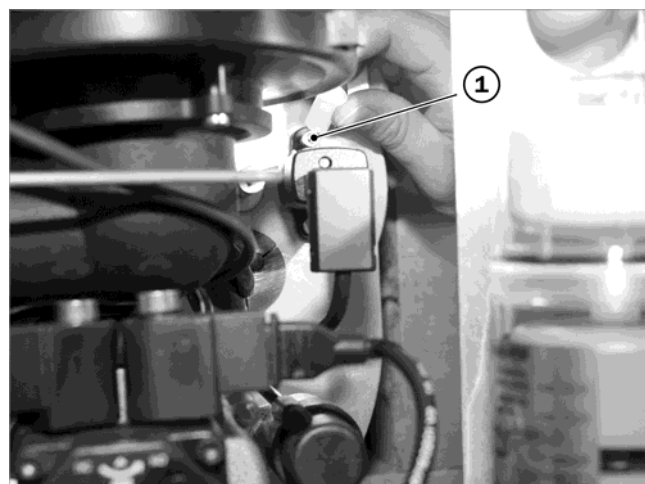


Fig. 30: Measuring the blower pressure

11. Set the rotary regulator to **E.C.** to set the other blower level.

12. Briefly press the button to return to the level selection (repeat the steps beginning with 3. in the same manner).

13. To exit programming mode, set the rotary regulator to **E.C.** on the respective level and briefly press the button (repeat until the display shows the operating status **8.**).



Continue the start-up; see the → chapter "Basic settings" in the storage tank installation instructions (MAL-MAX-7).

7 Maintenance

7.1 General maintenance



For a description of maintenance, see → sec. "Maintenance" in the installation instructions (MAL-MAX-7).

7.2 Burner maintenance



DANGER

Risk of electrical shock

Damage to health, cardiac arrest possible.

- Disconnect the system from the mains before carrying out work on it and ensure that it cannot be turned on again

Check the condensate siphon

1. Remove front and side casing.
2. Remove the upper screw connection of the siphon on the flue duct elbow and pull down the siphon.
3. Check and flush the condensate siphon.
4. Fill the siphon with water.
5. Check whether fluid can be discharged without hindrance. The condensate hose must be at a steady incline downward from the siphon to the discharge.

Removing the burner

1. Shut off the fuel supply.
2. Completely remove the front casing.
3. Remove the front flange insulation.
4. Remove the air supply hose on the burner.
5. Turn the knurled nut for the nozzle fitting (see → fig. 38, p. 21) anticlockwise by approx. 2 turns (nozzle fitting is pulled "backwards").
6. If necessary, remove the burner cable.
7. Remove the quick release screws on the burner insert.
8. Remove the burner insert and lay it down.

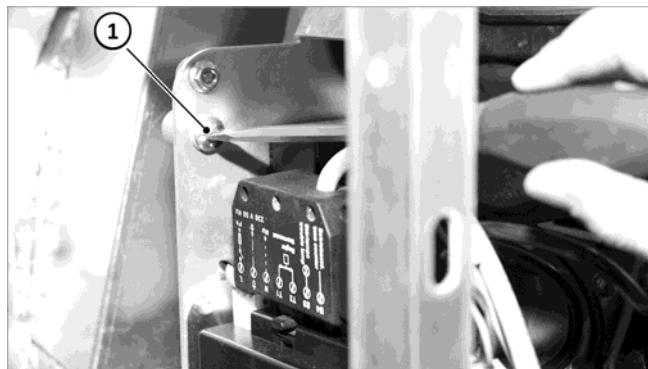


Fig. 31: Quick release screws on the burner insert

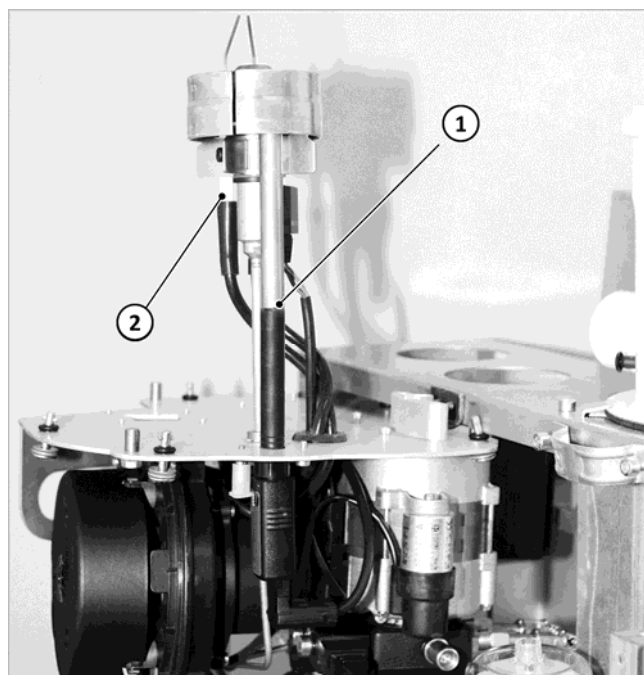


Fig. 32: Attaching the burner to the console

1 Viewing sleeve for the flame monitor

Replacing the oil nozzle



- Replace the oil nozzle once a year.
- Only use the specified oil nozzle.

1. Loosen the Allen screw (1) on the mixing head.
2. Pull both ignition cables off of the ignition electrodes.
3. Remove the mixing head (2).
4. Use an open-end wrench to secure the nozzle fitting and prevent it from turning. Use a size 16 **ring spanner** to loosen the oil nozzle.
5. Replace the oil nozzle.

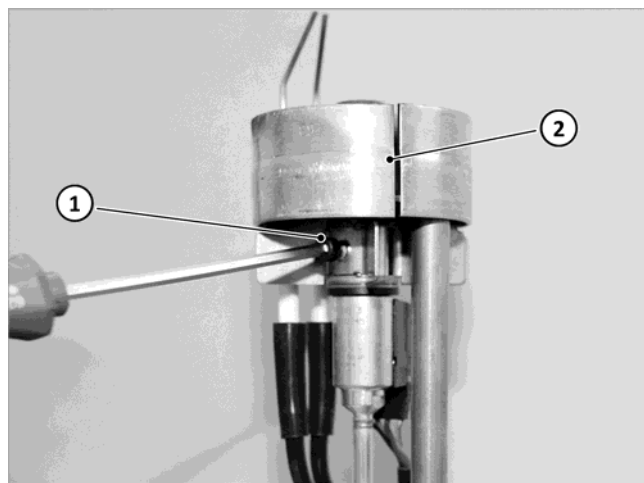


Fig. 33: Mixing head on nozzle fitting

Check the viewing sleeve

1. Remove the viewing sleeve; see → fig. 32 (1).

2. Check window for contamination; clean if necessary.
3. Attach the sleeve.

Setting the nozzle offset

- i** • Adjust the spacing between the oil nozzle and the front edge of the air nozzle (nozzle offset) to 2.2 mm using the setting gauge.

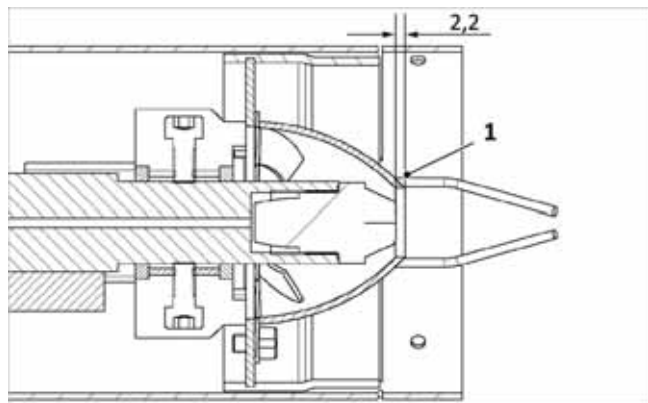


Fig. 34: Cross section of mixer head

- 1 Nozzle offset (2.2 mm)

1. Attach the setting gauge to the air nozzle.
2. Push the mixer head, including the attached setting gauge, against the oil nozzle and secure it with screws.
3. Afterwards, check the nozzle spacing using the setting gauge.

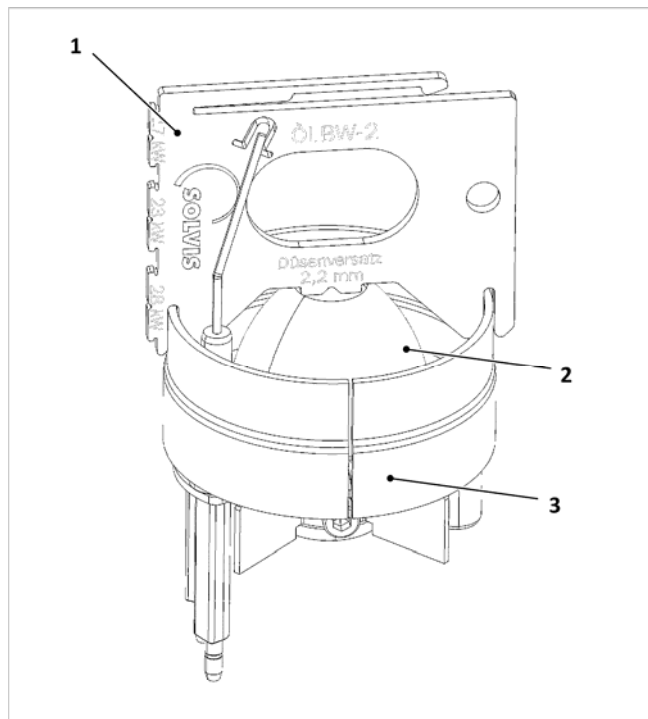


Fig. 35: Mixer head with the setting gauge attached

- 1 Setting gauge
2 Air nozzle
3 Mixer head

4. Reassemble the nozzle fitting in the reverse order.
5. Remount all the elements in the reverse order.

Check the ignition electrodes

1. Check the position of the electrodes (3) as shown in the figure and correct them by carefully bending them, if necessary.
2. Check the minimum length. The lower end of the control window (2) of the setting gauge specifies the minimum length of the ignition electrodes. If the length of the electrodes is only slightly longer, they should be replaced.

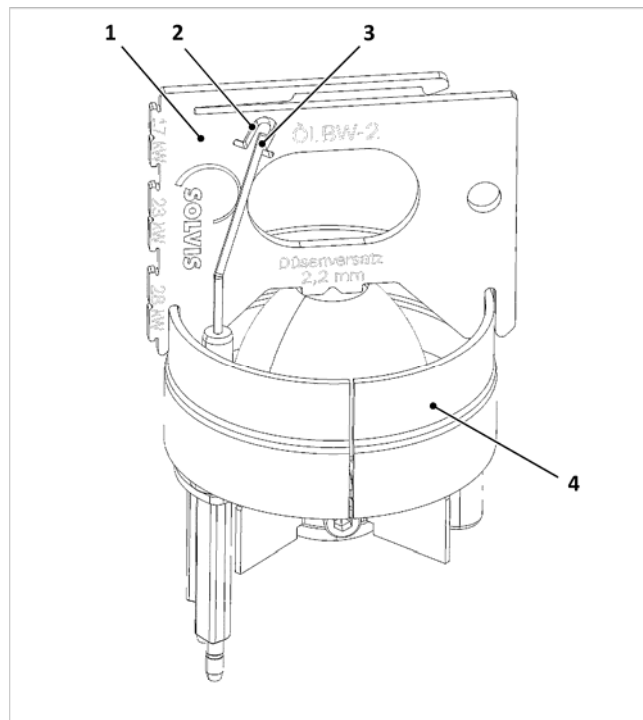


Fig. 36: Check the ignition electrodes

- 1 Setting gauge
2 Control window
3 Ignition electrodes
4 Mixer head

3. Check the electrode gaps as shown in → fig. 37 and correct by carefully bending them, if necessary.

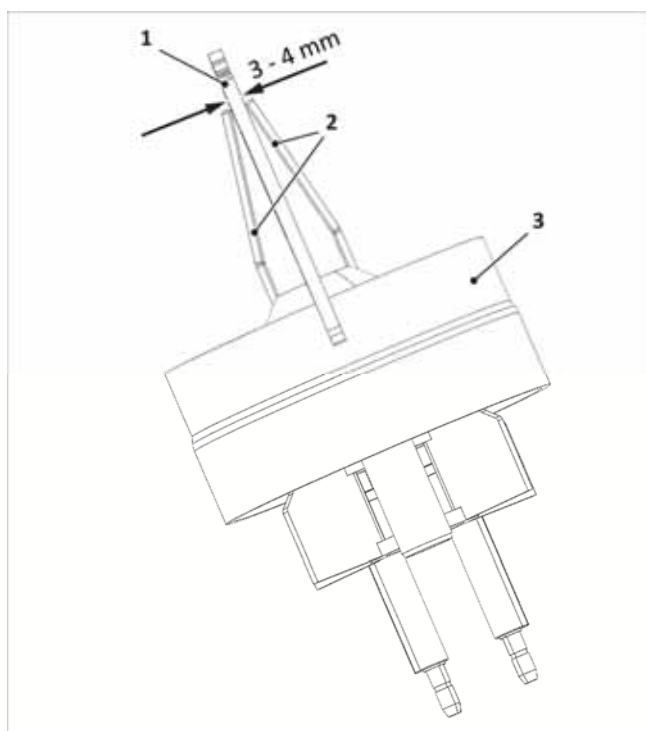


Fig. 37: Checking the ignition electrode gaps

- 1 Setting gauge
- 2 Ignition electrodes
- 3 Mixer head

Checking the flame tube

1. Check the flame tube for contamination and damage, and clean or replace as necessary.
2. Check if the flame tube is secure, tighten if necessary.

Inserting the burner

1. Slide the burner insert into the combustion chamber.
2. Secure the burner insert with the quick release screws.

Position of the nozzle fitting

1. A knurled nut is located in front of the burner base plate at the connection of the oil pipe and the nozzle fitting (→ fig. 38). You can use this to move the entire mixing unit forwards or backwards. The knurled nut can be adjusted up to a certain point (limit stop of the mixing unit in the flame tube). Adjust the knurled nut so that the mixing unit is touching the limit stop.

Caution Screw the knurled nut only lightly against the stop! If you screw in the knurled nut when the burner housing has been removed, the mixing unit will be moved further out. In this case, the burner housing will no longer fit together because the mixing unit is pressed against the limit stop in the flame tube.



Fig. 38: Knurled nut (limit stop for oil pipe/nozzle fitting)

Replacing the oil filter insert



CAUTION

Pay attention to the oil filter mesh.

- Only use oil filters with a filter mesh < 20 µm.

1. Remove the old oil filter insert.
2. Screw the new oil filter insert in tightly.
3. Before closing, fill the oil filter container with oil.

Check the ignition behaviour of the burner.

1. Open the oil supply and switch on the system.
2. Check that the burner ignites flawlessly.

Checking the oil supply line

1. Check the entire oil supply line for leaks.

Checking exhaust values

1. Check the exhaust values for the minimum and maximum performance level and adjust, if necessary, see → chapter "Start-Up", p. 17 or → tab. "Burner performance setting values", p. 26.

Checking the exhaust system

1. Check the exhaust system for leak tightness and correct positioning (with the housing closed, measure the annular gap for concentric exhaust systems).
2. Replace the seal on the exhaust connection of the combustion chamber.

8 Troubleshooting

 If the system is behaving illogically, reinitialise the system by switching it off and then back on again at the main switch.

 If you would like to receive a comprehensive checklist for systematic troubleshooting, please contact Solvis customer service (extension: 222).



Additional fault tables for room heating can be found in → *“Malfunctions with heating and hot water”* section in the *BAL-SB-SM-I* operating instructions.

8.1 General fault table

Fault	Cause	Remedy
Burner does not start	Power supply interrupted	Check fuse and plug
	Safety thermostat (mSTB) has triggered	Press the unlocking button
	No burner requirement from controller	Check requirement signal or controller settings
	Defective oil preheater	Check oil preheater; replace if necessary
Burner switches to fault during preaeration	Stray light / flame detected when there is no flame	Check flame monitoring and solenoid valves White deposits on the flame tube. Clean.
	Blower defective / blower speed not achieved	Check blower, power and signal cables, and replace if necessary
Burner starts but no flame is created	Ignition transformer switches off	Check the ignition system and the position of the ignition electrodes, and replace any faulty parts
	Normal function sequence, no burner start	Check nozzle offset and adjust if necessary
		Defective oil nozzle; replace
	Exhaust gas path blocked, condensate does not drain	Check exhaust system for blockages, and clean if necessary Clean the syphon and condensate line, check condensate lifting pump
	Solenoid valve does not open	Replace the solenoid coil or the entire solenoid
	Air in the oil supply, flame pulses	Check oil supply, provide for bubble-free, clean oil
	No oil being supplied	Oil pump defective, coupling sheared off, capacitor defective, replace if needed
		Oil preheater blocked, replace if necessary
		Open/check oil valves (e.g. syphon protection valves)
		Filter or oil pipe blocked, clean or replace if necessary Check oil level in tank
	Ignition transformer switches off	Replace ignition transformer, check setting
Burner starts but goes out after a short time (flame extinguished)	Flame tube loose	Check and secure
	Incorrect combustion settings	CO ₂ below 12.5%, calibrate burner according to setting table, see → <i>“Burner performance setting values”</i> table, p. 26
		Blower speed / oil pressure too high, calibrate burner in setting range according to setting table, see → <i>“Burner performance setting values”</i> table, p. 26
	Burner does not seal to boiler door	Check fastening and seal on combustion chamber
	Solenoid valves falling off	Replace the solenoid coil or the entire solenoid
Measured CO value too high	Flame monitor defective or dirty	Clean or replace flicker detector and viewing tubes
	Nozzle dirty or sprays at an angle	Replace nozzle
	Air in the oil supply, flame pulses	Check oil supply, provide for bubble-free, clean oil
	Exhaust system leaky	Measure the annular gap
	Throughput in the nozzle too high (pump pressure too high)	Check the size of the oil nozzle / air nozzle as per the setting table (see → <i>“Burner performance setting values”</i> tab., p. 26); Check pump pressure
Mechanical noise	Incorrect combustion settings	CO ₂ too high, calibrate burner according to setting table, see → <i>“Burner performance setting values”</i> table, p. 26
	Air in the oil pump	Check oil line and filter, seal or replace if needed
	Bearing damage on blower/motor	Replace motor
Loud combustion noises	Silencers not fitted	Fit the supplied silencers according to the installation instructions
	Incorrect combustion settings	Oil pressure and blower compression in level 1 too low, observe minimum values according to setting table (see → <i>“Burner performance setting values”</i> table, p. 26).

Fault table (continued)

Fault	Cause	Remedy
Burner switches to fault at irregular intervals	Solenoid valve coils defective	Replace
	Flame tube loose	Check and secure
	Oil pump condenser defective	Replace
	Air in the oil supply	Check oil supply, provide for bubble-free, clean oil
	Oil supply interrupted	Oil pump defective, coupling sheared off, capacitor defective, replace if needed
		Oil preheater blocked, replace if necessary
		Open/check oil valves (e.g. syphon protection valves, foot valve)
		Filter or oil pipe blocked, clean or replace if necessary
	Incorrect combustion settings	CO ₂ below 12.5%, calibrate burner according to setting table, see → <i>"Burner performance setting values" table, p. 26</i>
		Blower speed / oil pressure too high, calibrate burner in setting range according to setting table, see → <i>"Burner performance setting values" table, p. 26</i>
	Exhaust gas path blocked, condensate does not drain	Check exhaust system for blockages, and clean if necessary
		Clean the syphon and condensate line, check condensate lifting pump

8.2 Program sequence and fault display**Program sequence (normal mode)**

Display	Program status	Explanation
0	Standby	Waiting for heating requirement
1	Preheating	Oil preheater is "on"; waiting for oil preheater thermostat
2	Operating contact check	Blower speed check for preaeration
3	Preflushing time	Blower runs at preflushing speed
4	Waiting for ignition speed	Blower speed check for ignition speed
5	Pre-ignition time	Ignition is "on", blower runs at ignition speed
6	Safety period	Solenoid valves 1 and 2 are "open", blower runs at ignition speed
7	Flame stabilisation time	Blower runs at flame stabilisation speed
8	Controller enable	Blower runs at level 1 or 2; independent of the heating requirement
9	Waiting for flushing	Blower speed check for ignition speed
10	Flushing	Blower runs at flushing speed

Fault display

Display	Error	Explanation
3	Blower speed timeout	Blower speed deviation is too high
4	No flame generation	No flame signal during safety period
5	Flame failure	Flame failure during operation
10	Remote reset error	More than 5 remote resets within 15 minutes
11	Flame detected when there is no flame	Flame signal prior to safety period
15	Defective oil preheater	No response from oil preheater thermostat
31	CRC error for burner parameter	Incorrect internal parameter setting
32	Defective voltage supply	Undervoltage/overvoltage
48	Communication timeout	No eBus communication during the past 2 minutes
99	Safety shutdown	Internal safety check failed

8.3 Fault logging on the automatic firing system



CAUTION

- Never replace the automatic firing system with a standard unit (special model).
- Opening the automatic firing system is prohibited and damages the unit.

The interface for the automatic firing system is used for operation and to display malfunctions.



Fig. 39: Interface for automatic firing system CM 168

- | | |
|----------------------|--------------------|
| 1 Display | 3 Button |
| 2 Performance levels | 4 Rotary regulator |

General information on display and operation

- The normal operating status is indicated by **B.** The number of dots that are illuminated corresponds to the burner level (one dot: level 1, two dots: level 2).
- Press the button for 3 seconds to access the menu level. Press the button briefly to select or confirm.
- The rotary regulator is used to set values or select menu items. Use the supplied Allen key to turn the rotary regulator.
- Select **E.L.** to return to a previous level. Exiting programming mode is done level by level until the operating status is displayed.
- If there is no user input for approx. 1 minute, the display automatically returns to the operating status.

- Menu navigation is not interrupted when a boiler module fault occurs.
- A fault that occurs on the automatic firing system is indicated by an alternating display of **E.** (error) and the error code (e.g. **E.4**).

Accessing the error history

The automatic firing system saves the last 10 error values in the order that they occurred. This error history can be read as follows.

1. Starting from hibernation **B.0** (standby) or normal operating status of the burner **B.**, press the button for 3 seconds.

The display level switches to **R.** Both dots flash.

2. Use the supplied Allen key to turn the rotary regulator until **E.** (error) appears on the display.
3. Briefly press the button.

The display level switches to **E.1**. Both dots flash.

4. Use the rotary regulator to select a value between **E.1** and **E.0**. Note that **E.1** is the error that occurred most recently, **E.2** is the error before that, etc.).

5. Briefly press the button.

The relevant error code is now displayed.

6. Set the rotary regulator to **E.L.** to read additional error codes from the history.
7. Briefly press the button to return to the setting values (repeat the steps beginning with 4. in the same manner).
8. To exit programming mode, set the rotary regulator to **E.L.** on the respective level and briefly press the button (repeat until the display shows the operating status **B.** or hibernation **B.0**).



Alternatively, the accumulated messages can be queried and the starting behaviour of the burner can be viewed using the CoCo-Mobil SÖ-BW reading unit (ALG-COCO-MO-BW).

9 Technical Data

Combustion data

Burner type	10/17 kW		14/23 kW		20/28 kW	
	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2
Rated heat output (boiler performance at 50/30°C)	10.5 kW	17.0 kW	14.4 kW	23.4 kW	20.8 kW	27.0 kW
Rated heat output (boiler performance at 80/60°C)	10.0 kW	16.0 kW	13.4 kW	21.7 kW	19.5 kW	25.0 kW
Rated heat load (burner performance)	10 kW	15 - 17 kW	14 kW	20 - 23 kW	20 kW	26-28 kW
Standard efficiency coefficient ⁽¹⁾	104.6 %	104.6 %	104.1 %	104.1 %	103.1 %	103.1 %
Partial load energy coefficient at 23/21°C	105.1 %	105.1 %	104.4 %	104.4 %	-	-
Boiler efficiency at 80/60°C ⁽¹⁾	97.4 %	96.3 %	–	95.8 %	95.2 %	94.6 %
Boiler efficiency at 50/30°C ⁽¹⁾	103.1 %	102.6 %	–	101.7 %	101.3 %	100.5 %
Exhaust temperature at 80/60°C ⁽²⁾	62°C	63°C	63°C	64°C	64°C	69°C
CO ₂ for calculating the exhaust routing	13.5 %	13.5 %	13.5 %	13.5 %	13.5 %	13.5 %
CO	9 mg/kWh	10 mg/kWh	14 mg/kWh	15 mg/kWh	23 mg/kWh	36 mg/kWh
CO standard emission factor	3 mg/kWh	3 mg/kWh	5 mg/kWh	5 mg/kWh	12 mg/kWh	12 mg/kWh
NO _x	64 mg/kWh	56 mg/kWh	66 mg/kWh	66 mg/kWh	70 mg/kWh	70 mg/kWh
NO _x standard emission factor	60 mg/kWh	60 mg/kWh	63 mg/kWh	63 mg/kWh	68 mg/kWh	68 mg/kWh
Exhaust gas mass flow	15.7 kg/h	26.1 kg/h	21.5 kg/h	35.1 kg/h	27.8 kg/h	40.7 kg/h
Allowable remaining pump height	70 Pa					
Energy efficiency certification ⁽²⁾	★★★★				★★★	
Soot value	0					
Fuel	EL heating oil (low-sulphur, max. 50 ppm)					
Burner type	with blower					
Exhaust support diameter	DN 80					

Results according to certification test based on DIN 303, 304, EC Efficiency directive 92/42 EEC.

⁽¹⁾ Efficiency coefficient and utilisation ratio incl. losses for hot water production

⁽²⁾ SolvisMax Oil BW thus meets the requirements of EC Efficiency directive 92/42/EEC.

9 Technical Data

Burner performance setting values

Required rated heat output (boiler performance)		Rated heat load (burner performance)	Oil pressure	Oil throughput	Blower pressure (for checking)
at 80/60° C	at 50/30° C				
[kW]	[kW]	[kW]	[bar]	[kg/h]	[mbar]

Burner type 10/17 kW:

2nd stage:					
16.4	17.4	17.0	19	1.43	20
15.9	16.9	16.5	18	1.39	19
15.4	16.3	16.0	17	1.35	18
1. stage:					
10.6	11.4	10.9	10	0.92	12*

Burner type 14/23 kW:

2nd stage:					
21.7	23.4	23.0	23	1.95	28
21.3	22.9	22.5	22	1.91	26
20.6	22.1	21.9	21	1.85	25
20.3	21.8	21.5	20	1.82	24
1. stage:					
13.4	14.4	13.8	8	1.20	12*

Burner type 20/28 kW:

2nd stage:					
27.0	28.6	28.5	19	2.41	29
26.2	27.8	27.6	18	2.34	27
25.3	26.9	26.8	17	2.26	25
24.5	26.1	25.9	16	2.19	24
1. stage:					
19.8	21.1	20.9	10	1.76	16*

* Values must not fall below these minimum values for the blower pressure!

Components used

Burner variant	Oil nozzle	Air nozzle	recirculation duct
10/17 kW:	Danfoss, OD 0.30 gph, 60° S	15.5 mm	1 mm
14/23 kW:	Danfoss, OD 0.40 gph, 60° S	17.0 mm	1 mm
20/28 kW:	Danfoss, OD 0.50 gph, 60° S	18.5 mm	2 mm

Sound pressure level

	Burner type 10/17 kW		Burner type 14/23 kW		Burner type 20/28 kW	
	10 kW	17 kW	14 kW	23 kW	20 kW	28 kW
In installation room, 1 m in front of the unit, concentric exhaust system	46 dB (A)	54 dB (A)	47 dB (A)	54 dB (A)	46 dB (A)	55 dB (A)
At exhaust outlet, 1 m away, without silencer	69 dB (A)	77 dB (A)	71 dB (A)	79 dB (A)	71 dB (A)	81 dB (A)
At exhaust outlet, 1 m away, with reflective silencer	63 dB (A)	71 dB (A)	65 dB (A)	72 dB (A)	66 dB (A)	74 dB (A)
At exhaust outlet, 1 m away, with internal pipe silencer and reflective silencer	58 dB (A)	66 dB (A)	60 dB (A)	67 dB (A)	61 dB (A)	68 dB (A)

Electrical power consumption for the burner

Rated heat output (min./max.)	Power consumption*
10/17 kW	121/199 W
14/23 kW	123/201 W
20/28 kW	123/202 W

* Maximum electrical power consumption with blower and without pumps

Safety technology

Component	Function
Storage tank top (sensor S1)	Monitor function for boiler temperature > 95°C (automatically switches on again when the temperature decreases to < 90°C; factory setting)
Display in case of cable breakage in sensors	Sensor value 250 is displayed (e.g. in the "System status" menu)
Mechanical safety temperature limiter (mSTL)	Limiter function for boiler temperature > 105°C (can only be unlocked manually at the mSTL, see → Fig. 21, p. 11); function for water shortage and overtemperature
Flame monitor	Infrared flicker detector = flame detection

Qualifications

Designation	Explanation
CE marking	CE-0085 BP0376

10 Appendix

10.1 Spare parts overview

Oil burner SÖ-BW-2		
Item	Short description	Name
22993	KTS-BW	Door firebrick SÖ-BW
23976	DST-SOE-BW-2	Oil preheater SÖ-BW-2
22957	DI-BG-BW-2	Ignition electrodes SÖ-BW-2
22963	DUE-OE-23-BW-2	Oil nozzle 0.4 gph/60 S, 23 kW
22962	DUE-OE-17-BW-2	Oil nozzle 0.3 gph/60 S, 17kW
22964	DUE-OE-28-BW-2	Oil nozzle 0.5 gph/60 S, 28kW
22958	SIR-BW-2	Viewing tubes with glass, SÖ-BW-2
12169	UEW-KLC-NT/BW-2	Flicker detector SÖ-NT/-BW-2
22987	IF-GH-BW-2	Interface with housing, SÖ-BW-2
22966	GB-BW-2	Blower SÖ-BW-2
23518	FA-CM-BW-2	Automatic firing system CM168 SÖ-BW-2
23510	ZT-BW-2	Ignition transformer SÖ-BW-2
28770	PUOE-85-BW-2	Oil pump 85 SÖ-BW-2
18605	KBB-BR-BW-2	Burner cable harness SC-2 SÖ-BW-2
13698	KBB-BR-NT/BW	Burner cable harness SC-2 NT/BW
23624	KBS-BW-2	Cable set SÖ-BW-2
22975	DI-BG-BW-2	Burner housing O-ring SÖ-BW-2
19760	KD-PU-BW	Oil pump capacitor SÖ-BW
22997	KP-BW-2	Cap SÖ-BW-2
22976	ZA-BW-2	Pivot pin 50E61 22, SÖ-BW-2
22986	MO-PU-BW-2	Oil pump motor, SÖ-BW-2
23495	CC-17-BW-2	Burner chip card, 17kW, SÖ-BW-2
27605	CC-28-BW-2	Burner chip card, 28kW, SÖ-BW-2
23496	CC-23-BW-2	Burner chip card, 23kW, SÖ-BW-2
28769	SPU-MV-85-BW-2	Set of solenoid valve coils SÖ-BW-2
25820	MI-17-Z-BW-2	Mixing unit 17 kW, SÖ-BW-2
25821	MI-23-Z-BW-2	Mixing unit 23kW, SÖ-BW-2
27606	MI-28-Z-BW-2	Mixing unit 28kW, SÖ-BW-2
30171	RO-FL-BW-2	Flame tube SÖ-BW-2
27117	LE-BW-2	Setting gauge SÖ-BW 2
23515	SBD-BW2	Offset screwdriver 4
22817	ALG-COCO-MO-BW	Reading unit Coco-Mobil SÖ-BW

10.2 Accessories

All accessories are listed in the Solvis price list.

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