

Installation

Gas burner SX-LN-3

Gas condensing system with SolvisMax stratified solar storage tank

Rated outputs (modulating):

- 1.9 to 10 kW
- 2.9 to 18 kW
- 4.8 to 25 kW
- 4.8 to 30 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 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 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.

2.2 Regulations

Observe the following regulations

- German State Firing Ordinance (FeuVO)
- German technical rules for gas installation (TRGI) and, if necessary, technical rules for liquid gas (TRF)
- 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

Additional specifications in Switzerland

- SVGW (Swiss Gas and Water Industry Association) G1 guidelines for gas installations
- EKAS-Form. 1942: Liquid gas guideline, Part 2
- Specifications from cantonal authorities (e.g. fire service guidelines)

Certification and conformity

- Gas Appliances Regulation 2016/426/EU
- Electromagnetic Compatibility (EMC) Directive 2014/30/EU
- Test regulations used:
 - EN 15502-1:2015
 - EN 15502-2-1: 2017, EN 607301-1: 2011
 - EN 60730-2: 2009

3 System Versions

The gas burner is available with four different output capacities (each modulating). The rated outputs are: 10, 18, 25 and 30 kW.

It is installed in a solar heating system (SolvisMax Futur/Solo) that is available with three storage tank sizes: 450, 750, and 950 litres.

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 Gas

Also includes:

Burner box

- Pre-mixed, modulating low NOx radiant burner
- Burner cable
- Attachment nuts
- Burner sealing cable

Intake chamber box

- Intake chamber
- Installation material (seals, retaining plates, nuts, etc.)
- Intake chamber installation instructions

Accessories box

- Condensate hose
- Boiler brush
- Exhaust connection elbow
- Air supply hose
- Gas line
- Exhaust connection fitting
- Assembly pack (with gaskets, attachment material, safety temperature limiter (eSTL), socket boards, etc.)



The accessories box is included only with new systems or with refitting sets.

5 Installation

5.1 Gas supply



DANGER

Observe the gas connection rules

- The gas connection must only be performed by installers who are authorised by the gas supply company.
- Observe the DVGW worksheet G 600 (TRGI) and "Technical regulations for liquid gases" (TRF) when making a gas connection.
- According to heating regulations, a thermally triggered shut-off valve (TAE) must be added directly before the unit shut-off valve, see → sec. "Installation part 1: Burner", p. 9.



- To protect the gas solenoid valves in the burner, we recommend installing a gas filter in accordance with DIN 3386 in the supply line to the unit.
- SolvisMax / Ben Gas can be operated with fuel gases from gas categories 2 and 3.
- The refitting set for liquid gas (accessories, please order separately) must be installed when using gases from gas category 3 (liquid gases), see the section on → "Conversion to liquid gas" on page 7.

5.2 Conversion to liquid gas

Refitting set for liquid gas (if required)



The burner is preset for operation with natural gas "H". Order the appropriate refitting set for conversion to liquid gas:

- Burner 1.9 – 10 kW: UB-SX-LN-3-10-FG
- Burner 2.9 – 18 kW: UB-SX-LN-3-18-FG
- Burner 4.8 – 25 kW: UB-SX-LN-3-25-FG
- Burner 4.8 – 30 kW: UB-SX-LN-3-30-FG



CAUTION

- The flow pressure of the liquid gas at the input of the gas combination valve must not exceed 60 mbar.

Installing a liquid gas nozzle for burners

1. Remove gas combination valve with two screws (1).

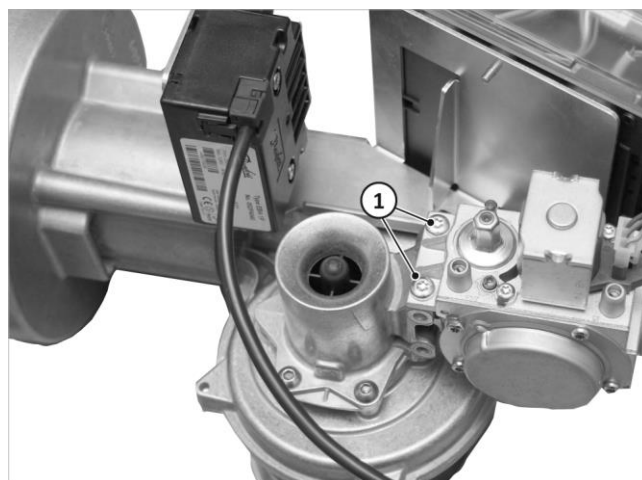


Fig. 1: Removing the gas combination valve

2. Pull the built-in seal (2) off of the gas combination valve.
3. Insert the liquid gas nozzle (ø 4.4 mm, 3) into the removed seal and then into the gas combination valve.

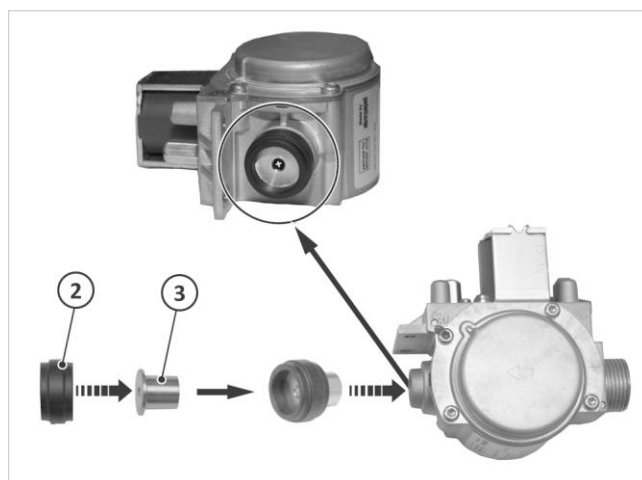


Fig. 2: Installing the liquid gas nozzle

4. Install the gas combination valve with the screws (1).

Presetting the burner for liquid gas

1. Turn the CO₂ adjusting screw (1) by 1¼ rotations in the minus direction (clockwise).

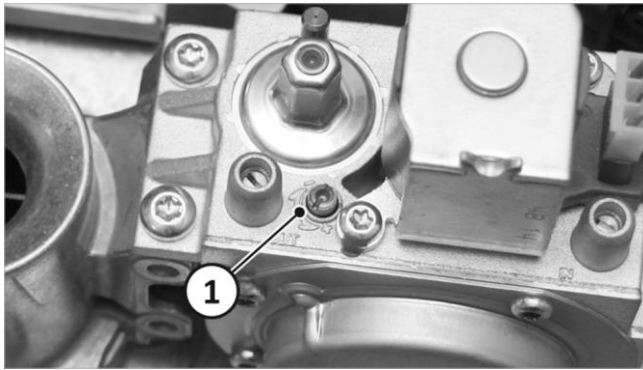


Fig. 3: Setting the burner

Installing the burner chip card

Install the burner chip card for operation with liquid gas.

1. Unscrew the housing cover from the automatic firing system.
2. Make the opening for the memory card at the predetermined breaking point.
3. Insert the burner chip card and screw the housing cover closed again.

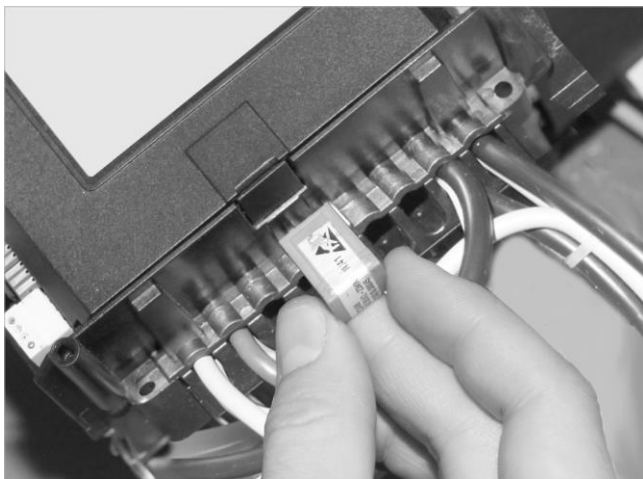


Fig. 4: Installing the burner chip card

i Perform a program update following conversion to liquid gas!

- Observe DVGW-TRGI 2008.
- For systems with fluid gas: Observe DVGW-TRF 2012.
- After the conversion, it is essential to check the CO₂ levels. See → "Setting the CO₂ value (max. burner performance)", section "Settings", p. 18.

5.3 Program update gas burner

i When handling the Burner Chip Card (BCC), observe the following:

- The BCC may **never** be inserted or removed while the system is switched on.
- Reversing the BCC update to reinstate the original parametrisation is not possible.
- An additional update using a new BCC (new BCC ID) is possible.
- If the BCC is activated in the automatic firing system, then it must always remain in the automatic firing system. Otherwise the system will go into safety shut-down (error message "F163") until the original BCC is inserted or another update is performed using a new BCC (new BCC ID).

Updating the Burner

When updating the burner using the burner chip card, you must always follow the steps below:

1. Switch off the system.
2. Remove the old chip card or panel.
3. Connect the new chip card.
4. Switch on the system.

Malfunction message (burner malfunction) "F050" appears.

5. Acknowledge the malfunction message in the usual way using SC-2.

Programming running (blower starts).

Malfunction message "F051" (burner malfunction) appears briefly and disappears again.

After error "F051" has disappeared automatically and the blower has switched off, the burner switches to normal mode and the update was successful.

Readout automatic firing system

After a successful update the automatic firing system must be read out by the SC-2.

1. On the SC-2, call up "Other" -> "Continue" -> "Change user".
2. Choose the user "Factory service" (Code 0128).
3. Call up the menu "Heating" -> "Burner performance".
4. Confirm "Query performance" (choose right arrow).

5.4 Installation part 1: Burner

Installing the front flange insulation

The front flange insulation consists of three sections:

1. Position and screw down the front left flange insulation.

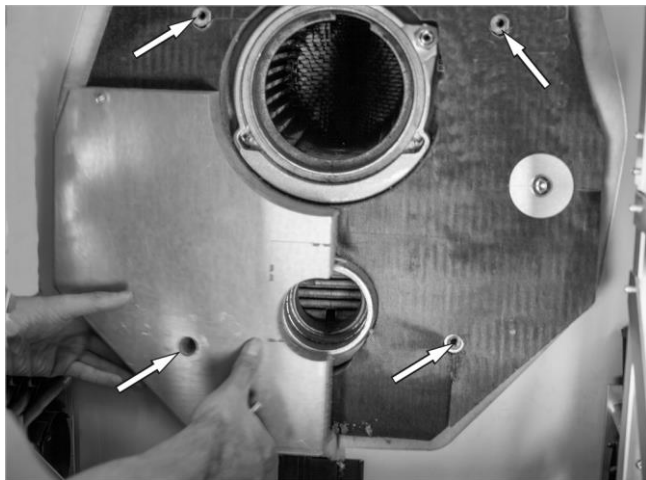


Fig. 5: Installing the front flange insulation

2. Then fit the right and front top flange insulation.

Installing the burner

1. Insert the entire burner sealing cable into the groove of the combustion chamber flange (push up).



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. 6: Inserting the burner sealing cable (push up)

2. Push the screw connection and insert onto the eSTB cable.

The electrical safety temperature limiter (eSTB) is connected to the burner by a red cable.

3. Insert the eSTB into the immersion tube on the top right of the combustion chamber as far as it will go (front tip of the eSTB approx. 15 cm deep).
4. Tighten the screw fitting.



Fig. 7: Inserting the eSTB

5. Attach the burner to the pre-fitted threaded bolts with the "Top" marking facing up.
6. Fasten the burner flange with the three nuts supplied.
7. Tighten the nuts evenly using an 8 mm socket spanner.



Fig. 8: Fitting the burner

Insulating the burner flange

Two burner scarves are provided for the burner flange insulation:

1. Wrap the first scarf around the flange.
2. Wrap the second scarf around the flange as well and use the two scarves to fill the gap between the burner flange and the front flange insulation.

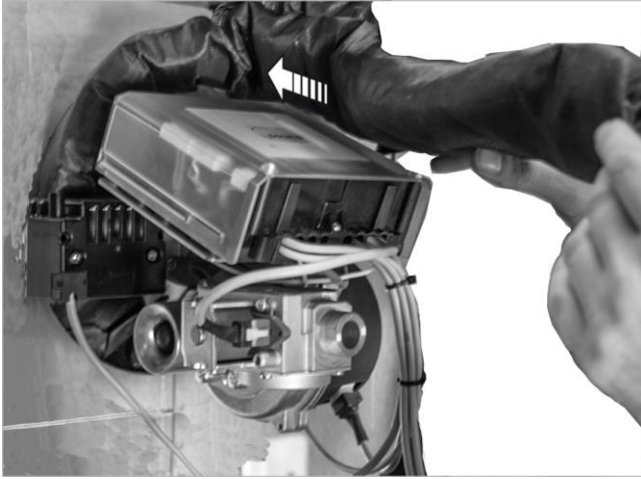


Fig. 9: Filling the recess on the burner flange



Continue with the installation. See the → section “Fitting the front bracket” in the chapter “Installation” in the storage tank installation instructions (MAL-MAX-7).

5.5 Installat. part 2: Connections

5.5.1 Installing the connection pipes

Fitting the intake chamber tray

1. Place the supplied protective caps onto the two screw heads on the console.



Fig. 10: Covering the screw heads on the console

2. Hook the bracket on the tray behind the screws (1) and press to the left.

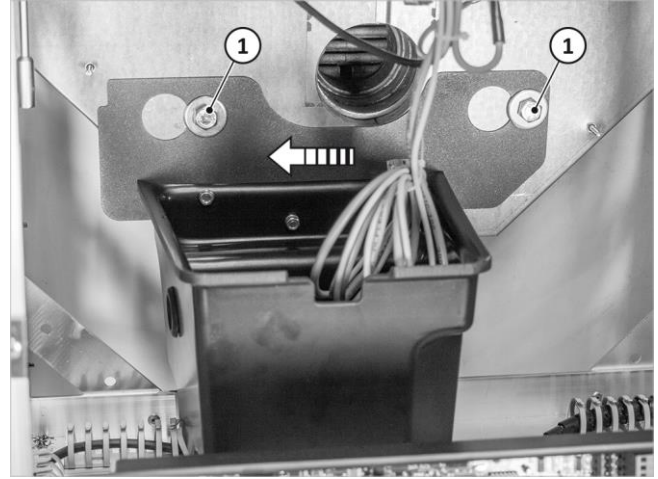


Fig. 11: Hooking on the intake chamber tray

3. Fit a cable lead-through to the burner cable, pull it through the hole on the right and press the cable lead-through into the hole. Ensure that the passage is sealed correctly.
4. Leave the cable that runs from the lead-through to the burner long enough for the burner to be easy to remove at a later stage.



Fig. 12: Airtight lead-through for the burner cable

Fitting the bellows seal bracket

1. Hook the bracket into the opening (1) using the hook (2).

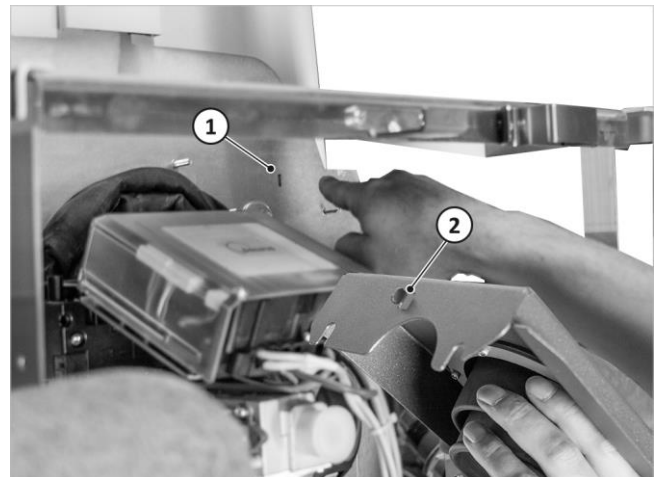


Fig. 13: Inserting the bellows seal bracket

2. Screw the bracket tightly.



Fig. 14: Screwing the bellows seal bracket tightly

Fitting the exhaust connection piece

1. Set the exhaust connection piece onto the exhaust retaining plate and fasten it with the supplied plastic expanding rivets. Observe the position for the installed storage tank size.

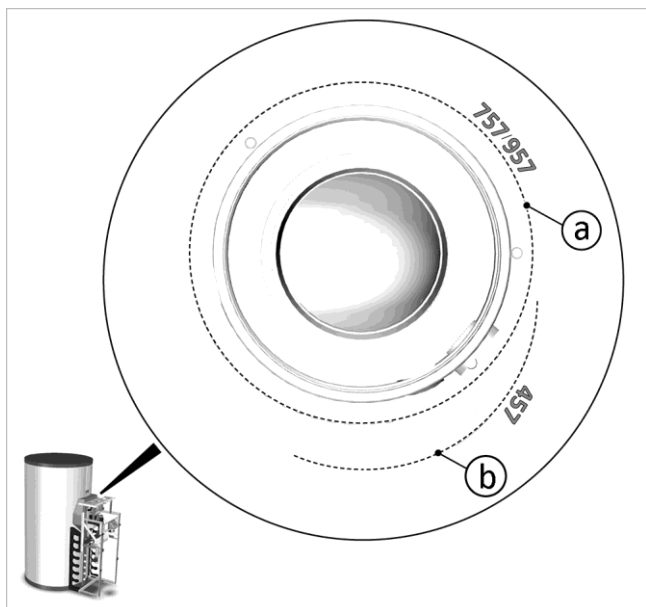


Fig.15: Position of the exhaust connection fitting

- a Position for storage tank sizes 757 and 957
b Position for storage tank size 457

Fitting the bellows seal and clamp

1. Slide the bellows seal and clamp over the end of the pipe.

2. Check that the clamp is resting on the ridge of the bellows seal and above the pipe socket (see the circle).
3. Fasten the clamp.

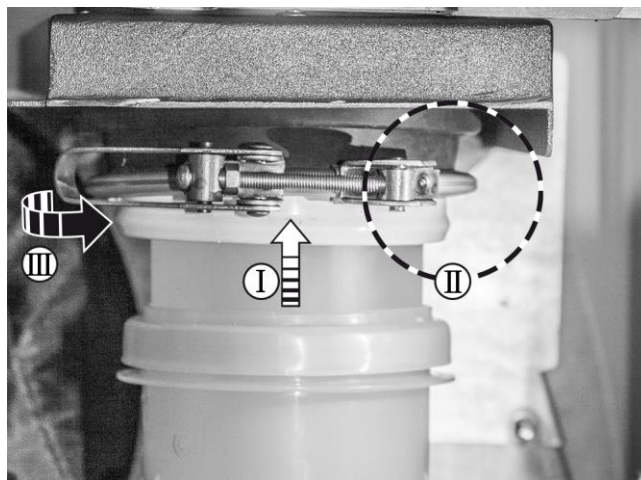


Fig. 16: Fitting the clamp

Fitting the exhaust elbow

1. As shown in → fig. 17, slide the union nut (1), the snap ring (2) and the seal (3) onto the lower pipe end of the exhaust connection piece.

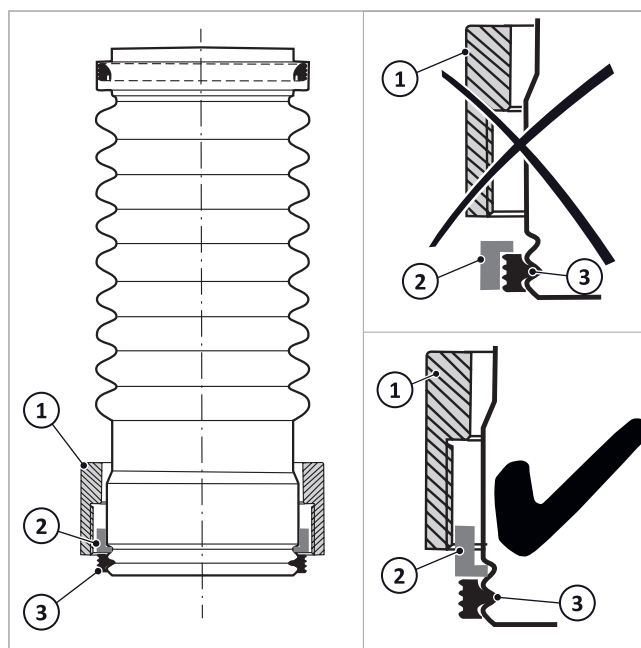


Fig. 17: Union attached

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

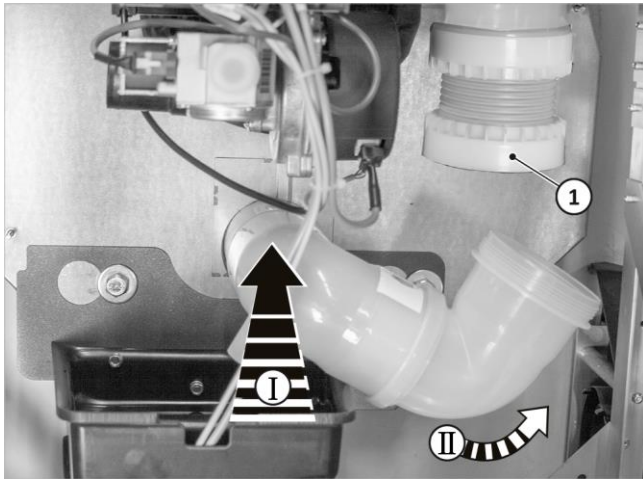


Fig. 18: Fitting the exhaust elbow

4. 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. 19: Screwing on the straightly aligned exhaust elbow

5. Move the union nut (see → fig. 181) downwards and screw it onto the exhaust elbow.



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 condensate hose

1. Fill the condensate siphon with water and fit it on the exhaust elbow (do not forget the seal).
2. Fit a cable lead-through to the condensate hose (4) (1) and seal the opening closed while pushing the condensate hose through.
3. Fit a union nut (3) and seal (2) to the condensate hose and screw it onto the siphon.

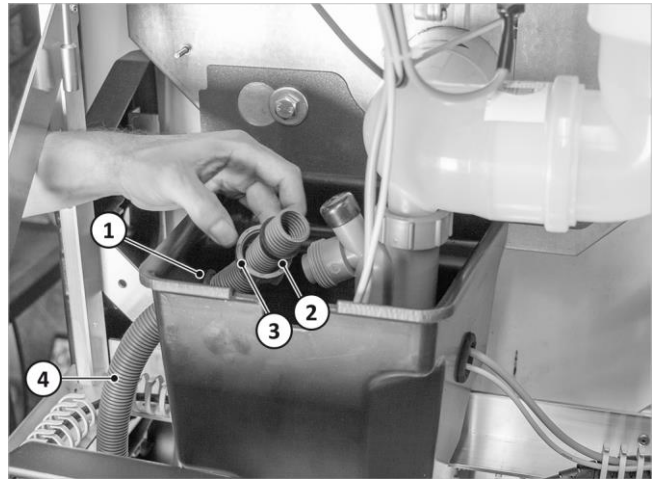


Fig. 20: Guiding the condensate hose through the opening and connecting it

4. Using a 3x reducer (see → fig. 21, 2), guide the other end through the pipe lead-through on either the left or right-hand side of the frame. Ensure that there is a sufficient incline.
5. 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.

Pipe lead-throughs

The pipe lead-throughs sit on the side of the frame to the left and right. They are adapted to the different lines using inserts.

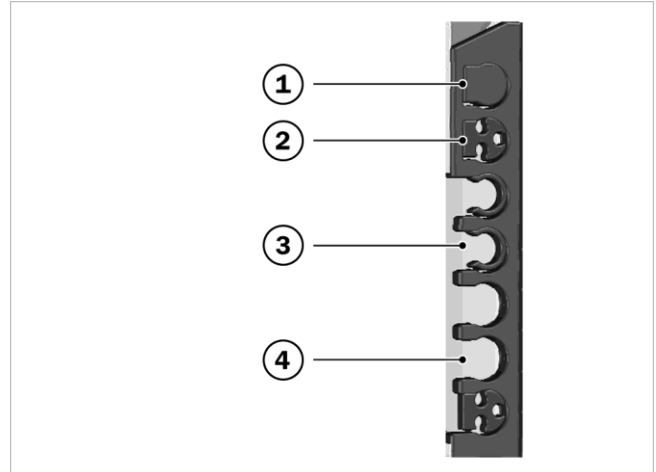


Fig. 21: Inserts for the pipe lead-throughs

- 1 Cover (closes the pipe lead-through)
- 2 3x reducer (for typical burner lines, electrical lines, etc.)
- 3 Reducer insert (e.g. for drinking water)
- 4 No insert (e.g. heating pipes)



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.

Connecting the exhaust safety temperature limiter

Exhaust safety temperature limiter (ASTB)



Regulation in Switzerland.

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

1. Connect a connection line to two poles on the ASTB 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.

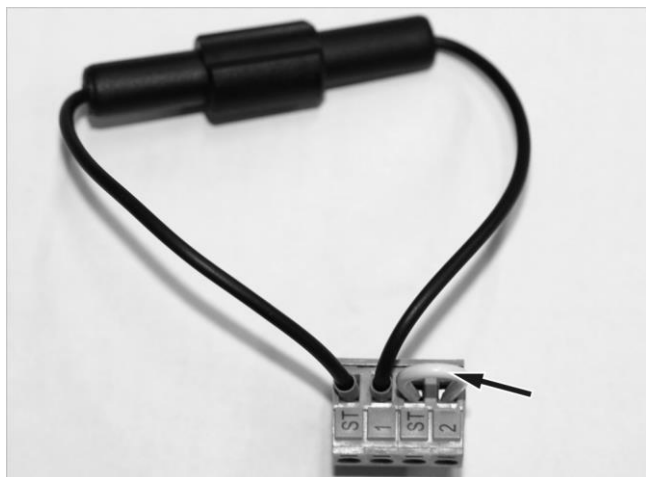


Fig. 22: Socket plug with fuse (black) for SX-LN-3 burner (for the ASTB connection, see the arrow)

Connecting the gas line to the burner

1. Install the corrugated hose onto the gas connection of the burner (flat seal --> assembly pack).

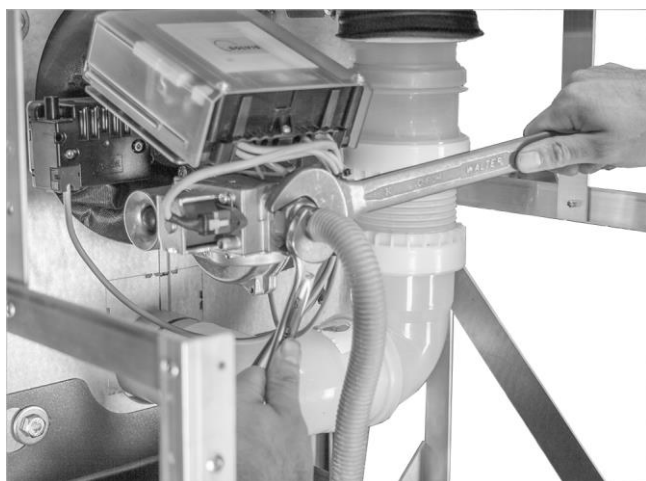


Fig. 23: Connecting the gas line



CAUTION

When installing the system:

- When tightening the screw connection, hold the connection still using a second wrench.

Routing and attaching the gas line

1. Route the gas line inside the station through the bottom and, when it is level with the tray, fasten it to the tray using the fastening clip.

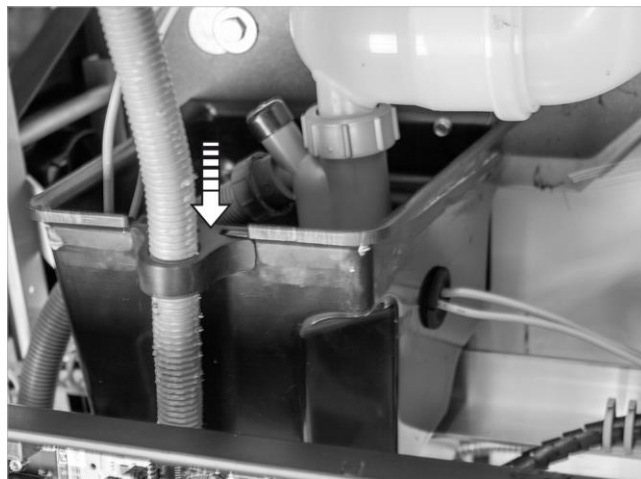


Fig. 24: Fastening the gas line to the tray using the fastening clip

2. Guide the gas line through one of the top pipe lead-throughs on the left or right-hand side of the frame using a 3x reducer (see → fig. 21, 2).

Fitting the intake chamber cover

1. Position the cover and fasten the five rotary flange nuts using the supplied socket spanner.

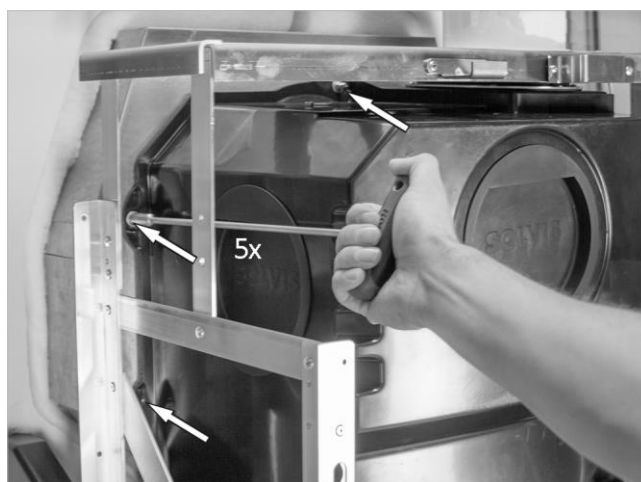


Fig. 25: Fastening the intake chamber cover

2. Store the socket spanner (1) on the plant.



Fig. 26: Socket spanner in its storage position

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).

Connecting the burner plug to the mains module

1. Guide the connection line to the side through the strain relief device for the mains module and attach it onto the mains module (observe the labelling).

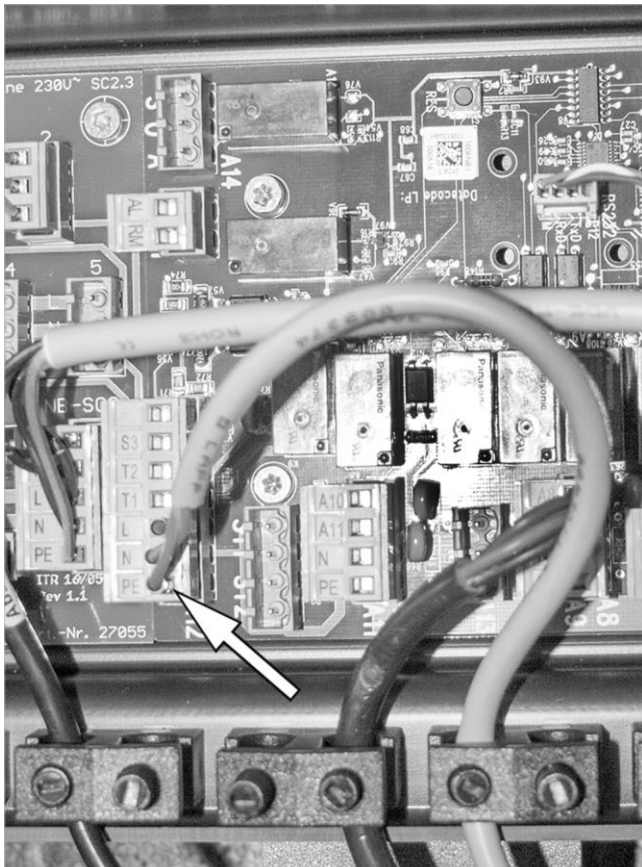


Fig. 27: Connecting the gas burner plug to A12

Connecting the bus plug to the mains module

1. Connect the bus plug from the SX-LN-3 burner to the mains module.

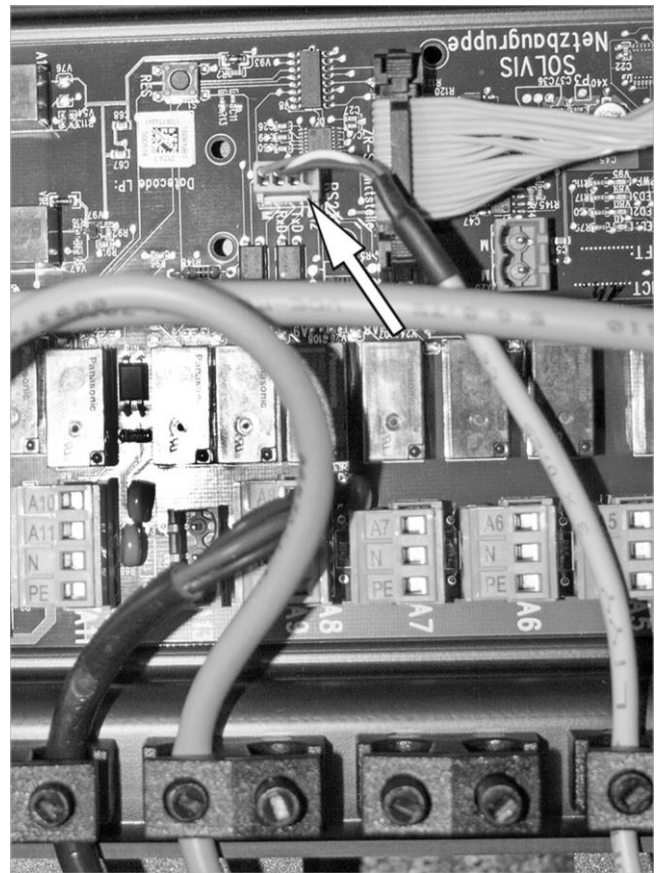


Fig. 28: Connecting the bus plug

Securing the connection lines

1. Guide all the lines from below through the strain relief devices for the control console.
2. Secure the lines with the strain relief devices.

5.5.2 Gas side connection



DANGER

Observe the gas connection rules

- The gas connection must only be performed by installers who are authorised by the gas supply company.
- Observe the DVGW worksheet G 600 (TRGI) and "Technical regulations for liquid gases" (TRF) when making a gas connection.
- According to heating regulations, a thermally triggered shut-off valve (TAE) must be added directly before the unit shut-off valve, see → sec. "Installation part 1: Burner", p. 9.



- To protect the gas solenoid valves in the burner, we recommend installing a gas filter in accordance with DIN 3386 in the supply line to the unit.
- SolvisMax / Ben Gas can be operated with fuel gases from gas categories 2 and 3.
- The refitting set for liquid gas (accessories, please order separately) must be installed when using gases from gas category 3 (liquid gases), see the section on → "Conversion to liquid gas" on page 7.

Connecting the gas line

1. Connect the gas line to the gas supply on site.

5.5.3 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, adequately ventilated shafts (see the → "Required minimum internal dimensions" table). 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.

Required minimum internal dimensions

Shaft type	DN 60	DN 80
Square	110 x 110	135 x 135
Round	ø 110	ø 155

All dimensions in mm

With ambient-air-independent fireplaces, lower distances can also be selected between the line and shaft. In this case, a custom design is required for the system. Please contact the customer centre (see page 2 for telephone number).

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.

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.



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

CAS-6 (C_{13x}) ambient air-independent

Horizontal external wall mouth	
Max. permissible length	10 m
	• This type of installation is only permitted in some German States under certain conditions. Observe the relevant regional building regulations.
	• The installer can limit the rated heat output.

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. 23.

CAS-3 (B₂₃) 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



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.

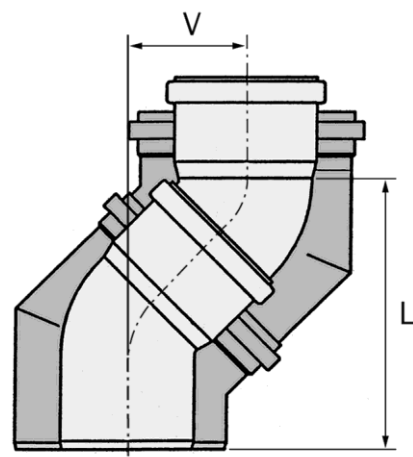


Fig. 29: Offset and length

5.5.4 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.

Laying the condensate hose

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 hose 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



- The burner is preset for operation with natural gas "H" and can also be operated with natural gas "L".
- In order to use liquid gas, it is necessary to install the refitting set first, see → "Installing the refitting set for liquid gas" in the section on "Conversion to liquid gas", on page 7.

6.1 Initialisation

After the burner is installed, it must be initialised.



For the Installer menu, enter Code 0064.

Initializing the burner

- Go to the "Installer" main menu, open the "Data" menu and select "Load factory settings".

You do not have to perform the above step the first time that you switch on the system.

- Select "Yes" to answer the safety prompt.

- After selecting the language and setting the time and date, select "Gas" and the burner performance "LN3".

- Continue with the appropriate initialisation for the relevant system. For more information, see the → *installer operating instructions (BAL-SBSX-I)*.

6.2 Burner activation



Switching the A12 output has no effect on the SX-LN-3 burner.

You can control the burner manually in the "Installer" main menu by going to the "Burner" or "Heating" menu and selecting "Maintenance function".

Switching on the burner

Logging on to the SolvisControl as the installer:

- Open the maintenance function ("INSTALLER menu > Heating > Maintenance function"); refer also to the → *chapter "Maintenance" in the operating instructions (BAL-SBSX-I)*.

6.3 Settings

Configuring the burner performance

In heating mode, the burner is restricted to "Max. performance". If required, the burner performance can be reduced as follows:

- Switch to the "INSTALLER MENU".
- Select "Heating".

* Only provided with SolvisMax Gas

- Select "Burner performance" (or "Blower speed").

* In systems manufactured before 06/2015, the display reads "Blower speed" rather than "Burner performance"

- Adjust the values, if necessary.

- **“Min. performance”**: Enter the minimum burner performance [kW]
- **“Max. performance”**: Enter the maximum burner performance according to the calculated heating demand in [kW]
- **“Current power”**: Show current burner performance (not in systems manufactured before 06/2015).

Setting the burner performance

In heating mode, the burner is limited to **“Max. performance”**. If required, the burner performance can be reduced as follows:

1. Select **“Burner performance”**.
2. Change the **“Max. performance”** value to meet your requirements.

i Do not change **“Min. performance”**.

Setting the CO₂ value (max. burner performance)

The CO₂ value is always set at full load. CO₂ value to set at maximum burner performance:

- For natural gas: 9.9%
 - For liquid gas: 12.0%
1. Set the CO₂ value using the adjusting screw (2) on the burner.
 2. Start **“Max. burner performance”** in the maintenance function.
 - Screwing in the adjusting screw = CO₂ value decreases
 - Loosening the adjusting screw = CO₂ value increases



Fig. 30: Setting the burner

- 1 Measuring supports
- 2 CO₂ adjusting screw

Only when moved: presetting the burner

If the adjusting screw for the CO₂ value was roughly displaced during start-up, proceed as follows:

1. Screw in the adjusting screw in the direction of the minus sign (clockwise) until it stops. Then, screw it out in an anticlockwise direction according to the table below:

Burner performance	Turns in an anticlockwise direction with	
	Natural gas	Liquid gas
10 kW	4	3
18 kW	4½	3½
25 kW	7½	6
30 kW	7½	6

Checking the CO₂ value (max. burner performance)

After setting the CO₂ value at full load, check the CO₂ value at minimum load

1. Start **“Min. burner performance”** in the maintenance function.

The CO₂ value must not drop below the following limit values when operating at minimum burner performance:

- for natural gas: not below 8.9%
- for liquid gas: not below 11.0%

i If minimum burner performance drops below these limit values, contact Solvis customer service.

- CO₂ value must not be corrected at minimum burner performance.

i Nitrogen is often still in the tank for liquid gas systems when first filling the liquid gas tank.

- The composition of the fuel gas can therefore change again after the second filling.
- The setting of the burner must be checked after filling the tank for a second time (CO₂ content in the exhaust).

i If the burner does not ignite at the first attempt at start-up, it may be due to the air still contained in the gas line.

- The ignition process can be repeated several times. After the fifth attempt, a malfunction message will appear on the display of the SolvisControl system controller; see → **“Unlocking the automatic firing system”**, **“Troubleshooting”** section, page 22.
- In case of burner malfunctions, the flow pressure is checked and should be between 20 and 60 mbar.
- The measurement connection is used to check the gas' flow pressure when the burner is in operation → fig. 30 (1).



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 hoses on the exhaust measuring device.
5. Remove the exhaust line from the exhaust heat exchanger.
6. Disconnect the fuel supply.
7. Pull the eSTL connector out of the immersion tube.
8. Loosen the 3 nuts.
9. Remove burner and hang it in the installation holder.



Fig. 31: Burner in maintenance position on the console

Cleaning the combustion chamber and condensation channel

1. Wipe out the combustion chamber without using liquids, or vacuum it.

Cleaning with liquids is not recommended.

2. Clean the condensation channel with a brush.

Checking the ignition and ionisation electrodes

1. Check the clearance of the ionisation electrode using an electrode gauge → fig. 33 (2) (if necessary, correct it by through careful bending).

Distance to burner fleece:

- Ionisation electrode → fig. 32 (1): 7.25 mm
- Ignition electrode → fig. 32 (2): 6.9 mm
- Electrodes below one another → fig. 33 (1): 3.5 mm

2. Assemble the burner in the reverse order as described above.

3. Switch on the voltage supply.

To carry out the following steps, log on to the SolvisControl as the installer:

4. Open the maintenance function. ("INSTALLER menu" -> "Heating" -> "Maintenance function"); see → section "Maintenance" in the BAL-SBSX-I operating instructions.
5. Start "Min. burner performance" in maintenance function.

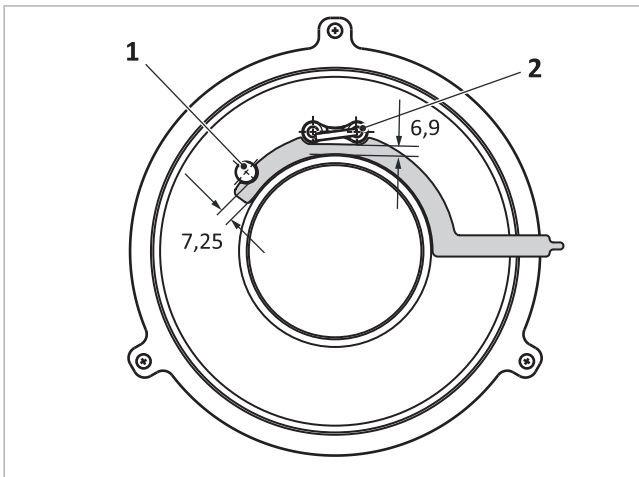


Fig. 32: Clearance from ionisation electrode and ignition electrode to burner tile

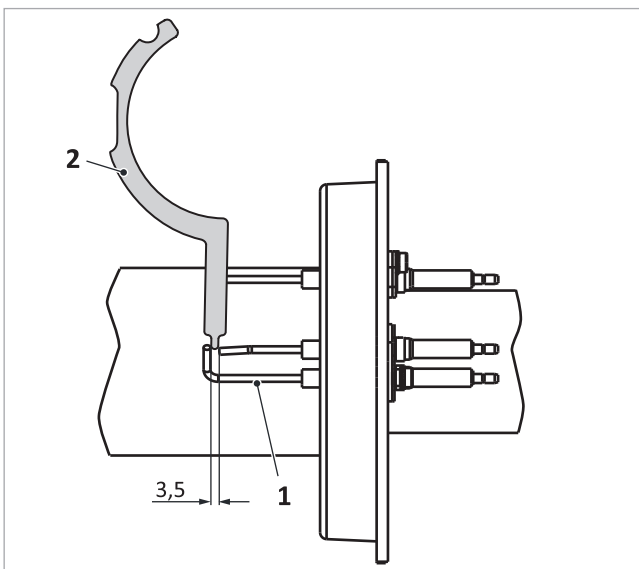


Fig. 33: Clearance from electrode to gauges on the ignition electrode

Plug the electrical safety temperature limiter (eSTL) into the combustion chamber

The eSTL is connected to the burner by a red cable.

1. Push the screw connection and insert onto the cable.
2. Insert the eSTL into the immersion tube on the top right of the combustion chamber as far as it will go (front tip of the eSTL approx. 15 cm deep).
3. Tighten the screw fitting.

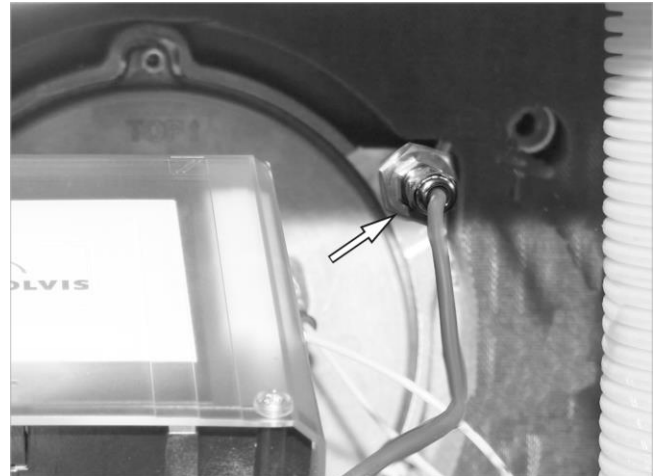


Fig. 34: Inserting the eSTL

Fitting the burner

1. Attach the burner to the pre-fitted threaded bolts with the "Top" marking facing up.
2. Fasten the burner flange with the three nuts supplied.
3. Tighten the nuts evenly using an 8 mm socket spanner.

Checking exhaust values

1. Check the exhaust values for the minimum and maximum performance level and adjust, if necessary, see → chapter "Settings", page 18.

Checking the gas supply line

1. Check the gas supply line for leaks.

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.



You can find the wiring diagram in the → *document Connection and System Diagrams (ALS-MAX-7)*.

Burner does not start

If the burner does not start despite a heating requirement, a malfunction message appears:

- **“F090 Bus timeout”**: The voltage supply is interrupted. Check whether A12, L and N are connected or whether the fuse between 1 and ST is blown.
- **“F004 No flame”** or: **“F132 No flame formation, lock-out”**: No flame formation at burner start. L and N are reversed on A12 or directly in the main supply.



If the burner does not start, the automatic firing system may be in the malfunction state.

- The automatic firing system must be unlocked to operate the burner again.
- The malfunction is not only displayed on the system controller but also on the automatic firing system (green flashing LED).

Unlocking the automatic firing system

1. Press the “Reset” button on the SolvisControl.
 - If the malfunction is unlocked: continue with → *tab. “Troubleshooting” at the end of this section*.
 - If the malfunction is not unlocked: switch the main switch off and back on.
 - If the malfunction is not unlocked, there is a communication error (malfunction message F090):
2. Is communication cable (mains module <--> SC-2) connected?
3. Load the factory settings in SolvisControl (“INSTALLER menu > Data”); see also the → *“Data” section in the BAL-SBSX-I operating instructions*.
4. If this does not correct the problem, please contact our customer service department; see → *tel. no. on page 2*.



Individual system settings are reset to the delivery state when the factory setting is loaded.



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

9 Technical Data

Combustion data

Burner performance	Unit	1,9 - 10 kW	2,9 - 18 kW	4,8 - 25 kW	4,8 - 30 kW
Fuel	–	Natural gas/liquid gas ⁽¹⁾			
Burner type	–	Blower burner			
Rated heat load (burner performance)	kW	1.9 - 10	2.9 - 18	4.8 - 25	4.8 - 30
Rated heat output (boiler performance) P _n at 80/60°C	kW	1.9 - 9.9	2.9 - 17.8	4.7 - 24.4	4.7 - 29.2
Exhaust temperature at 80/60°C and max. performance	°C	56	67	74	60
Exhaust temperature at 80/60°C and min. performance	°C	51	58	60	60
Exhaust gas mass flow at 80/60°C and max. performance	g/s	4	8	11	13
Exhaust gas mass flow at 80/60°C and min. performance	g/s	1	1	2	2
Max. supply pressure at boiler end	Pa	84	135	125	158
Installation types according to TRGI	–	B ₂₃ / B ₃₃ / C _{13x} / C _{33x} / C _{43x} / C _{53x} / C _{63x} / C _{83x} / C _{93x}			
CO ₂ content with natural gas at max. performance	%	9.9			
CO ₂ content with liquid gas at max. performance	%	12.0			
CO standard emission factor*	mg/kWh	21.8	6.9	7.4	4.4
NOx standard emission factor*	mg/kWh	52.3	46	35	42
NOx class	–	5	5	5	5
Burner noise indoors at distance of 1 m and max. performance**	dB (A)	45	53	51	58
Burner noise indoors at distance of 1 m and min. performance**	dB (A)	31	38	34	34
Exhaust support diameter	–	DN 80			
Electrical power consumption at min./max. performance ⁽²⁾	W	18 / 27	17 / 49	19 / 43	19 / 58

⁽¹⁾ The UBS-SX-LN-3-xx refitting set is required for operation with liquid gas

⁽²⁾ Total burner power consumption including control (for concentric exhaust systems)

^(*) according to DIN 15502

^(**) according to ISO 3744

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)
Electronic safety temperature limiter (eSTB)	Limiter function for boiler temperature > 105°C (only manual unlock on the SolvisControl or combustion system).
Rev check for blower	Compares target rev to actual rev
Two gas solenoid valves	Shuts off the gas supply gas-air compound control (dual safety)
Gas-air compound control	Regulates the gas supply in proportion to the air intake flow; this means that when there is no air flow, no gas can flow into the burner, even if the valves are open
Flame monitor	Measures the ionisation current = flame detection

10 Appendix

10.1 Gas burner error codes

Brief reason	Err.*	Description	Cause	Action by mechanic
Overheating flow	E1 / E129	E1 Safety shutdown temperature exceeded. Automatic firing system blocked for at least 60 s, automatic acknowledgement after cooling E129 Over-temperature switch-off triggered due to overheating. The safety shut-down temperature of the eSTL was exceeded.	Boiler temperature >105 °C due to water shortage	Check reason
			eSTL defective or positioned incorrectly	Fully insert eSTL and check whether it works
No flame	E4 / E132	E4 Blower starts, gas solenoid valve opens (clicking), ignition, no flame or only popping	Gas valve is closed or liquid gas tank is empty	Open gas valve or fill up tank
			Gas supply flow pressure is too low	Check admission pressure at "IN" fittings of gas combination valve: must be 20 to 60 mbar
			CO2 value is not set correctly	Correct the setting (see the → "Burner settings" section in the MAL-SX-LN-3 installation instructions)
			Ignition electrode	Incorrect position → "Burner maintenance" section in the MAL-SX-LN-3 installation instructions
			Faulty ignition cable	Check cable
			Ionisation current too low	Ionisation current (→ "Burner maintenance" section in the MAL-SX-LN-3 installation instructions) Check cable and phase direction (L+N reversed), replace ionisation electrode
			Air supply or exhaust gas path blocked	Check the air supply and exhaust gas path, as well as the Venturi nozzle, and clean if necessary
			Condensate discharge not secured	Check the syphon, condensate pump and pipe (water bag)
			Contact between the ignition electrode and the burner head (e.g. fibre from fabric)	Ensure there is no contact
No flame	E4 / E132	E4 Blower starts, gas solenoid valve does not open (no clicking), ignition, no flame or only popping	Faulty gas solenoid valve	Check/replace gas solenoid valve
			Automatic firing system defective	Check/replace automatic firing system
Flame goes out	E5 / E133	Flame goes out during stabilisation phase or operation. Malfunction message issued during forced ventilation.	Deposit on ionisation electrode	Check the ionisation electrode and clean or replace it if necessary
			Condensate discharge not secured	Check the syphon, condensate pump and pipe (water bag)
			Air supply or exhaust gas path blocked	Check the air supply and exhaust gas path, as well as the Venturi nozzle, and clean if necessary
			Gas supply flow pressure is too low	Check admission pressure at "IN" fittings of gas combination valve: must be between 20 and 60 mbar
			Gas flow controller too small or faulty	Replace gas flow controller
			Flame extinguishes due to CO in the supply air. Exhaust system leaky.	Annular gap measurement, pressure test the exhaust gas path
Defective sensor	E12 / E140	Temperature sensor eSTL faulty.	Defective sensor	Replace eSTL
Premature flame formation	E139	A flame signal was registered before the burner was started.	Short circuit of the ionisation electrode	Check the cable and ionisation electrode
Blower speed not achieved	E24	Blower speed not achieved in step 6 (control release)	Faulty blower or automatic firing system	Check/replace cable, plug, blower, automatic firing system
	E152	Automatic firing system locked if blower speed is not reached in steps 2, 3, 8.		
Implausible blower speed	E154	Blower did not come to a stop.	Faulty blower or automatic firing system	Check/replace cable, plug, blower, automatic firing system
Defective relay	E198	Defective relay	Defective relay	Replace automatic firing system

* The error code is displayed with "F" on the SolvisControl system controller and with "E" on the interface.

Gas burner error codes (continued)

Brief reason	Err.*	Description	Cause	Action by mechanic
Inadmissible mains voltage	E32	230 V voltage supply lies outside the permissible range.	Mains voltage is not 230 V or automatic firing system is faulty	If it is not possible to acknowledge the error, or if it occurs at normal mains voltage, replace the automatic firing system. Disconnect the automatic firing system from the mains, malfunction message in message logging with "Installer">"Messages">"Unlock burner malfunction"
Invalid parameter	E158, E159	Invalid EEPROM parameter for CM4 settings.	Automatic firing system defective	Replace chip card or automatic firing system
Device error	E89	CM424 did not pass the internal check.	Automatic firing system defective	Disconnect the automatic firing system from the mains, SC-2 factory reset, replace automatic firing system
Communication interrupted	E90	Time-out (10s) for the cyclic bus telegram.	Automatic firing system blocked	F90 extinguishes automatically if communication is present. Check status LED on the automatic firing system. Illuminated green: Voltage supply and communication present Flashing green: Voltage supply present but no communication Not illuminated: no voltage at the automatic firing system.
Programming mode	E95	Automatic firing system is in programming mode.	Automatic firing system blocked	Perform maintenance
Reset exceeded	E96	Too many modifications in the 0 to 1 Chipcom K1 mode bit 7 address (remote reset) within a certain period (15 min). Remote unlock deactivated.	Automatic firing system blocked	Disconnect the automatic firing system from the mains, error message in message logging with "Installer">"Messages">"Unlock burner malfunction" and replace automatic firing system
Internal error	E99, E227	Internal electronic error	Automatic firing system defective	
Activate burner chip card	E50	To activate the burner chip card, the reset button must be pushed.	Automatic firing system locked	Automatic firing system Reset
Activating burner chip card	E51	Please wait until the burner chip card has been fully activated.	Automatic firing system blocked	Perform maintenance
Cannot read burner chip card	E162, E164	The internal data of the EEPROM or the chip card is not correct.	Cannot read chip card	Replace chip card, reset automatic firing system
Burner chip card missing	E163	The activated burner chip card is no longer inserted in the automatic firing system.	Chip card missing	Insert chip card, reset automatic firing system
Burner chip card incompatible	F165	The firmware for the burner chip card and the automatic firing system are not compatible.	Incorrect chip card	Replace chip card, reset automatic firing system
Updating error	F38	Error during update.	Automatic firing system blocked	Reinitialise the system, leaving the burner disconnected from the mains.
Burner chip card could not be activated	E167	Error while activating the burner chip card	Automatic firing system locked	Initialise LN-3 manually. Then connect the burner to the power supply, reset the error in message logging and restart programming
Communication error	E48	Communication between the automatic firing system and the interface is faulty	Automatic firing system locked	Check the cable and connector between the automatic firing system and the interface, replace if necessary, reset automatic firing system

* The error code is displayed with **"F"** on the SolvisControl system controller and with **"E"** on the interface.

10.2 Connection Diagram

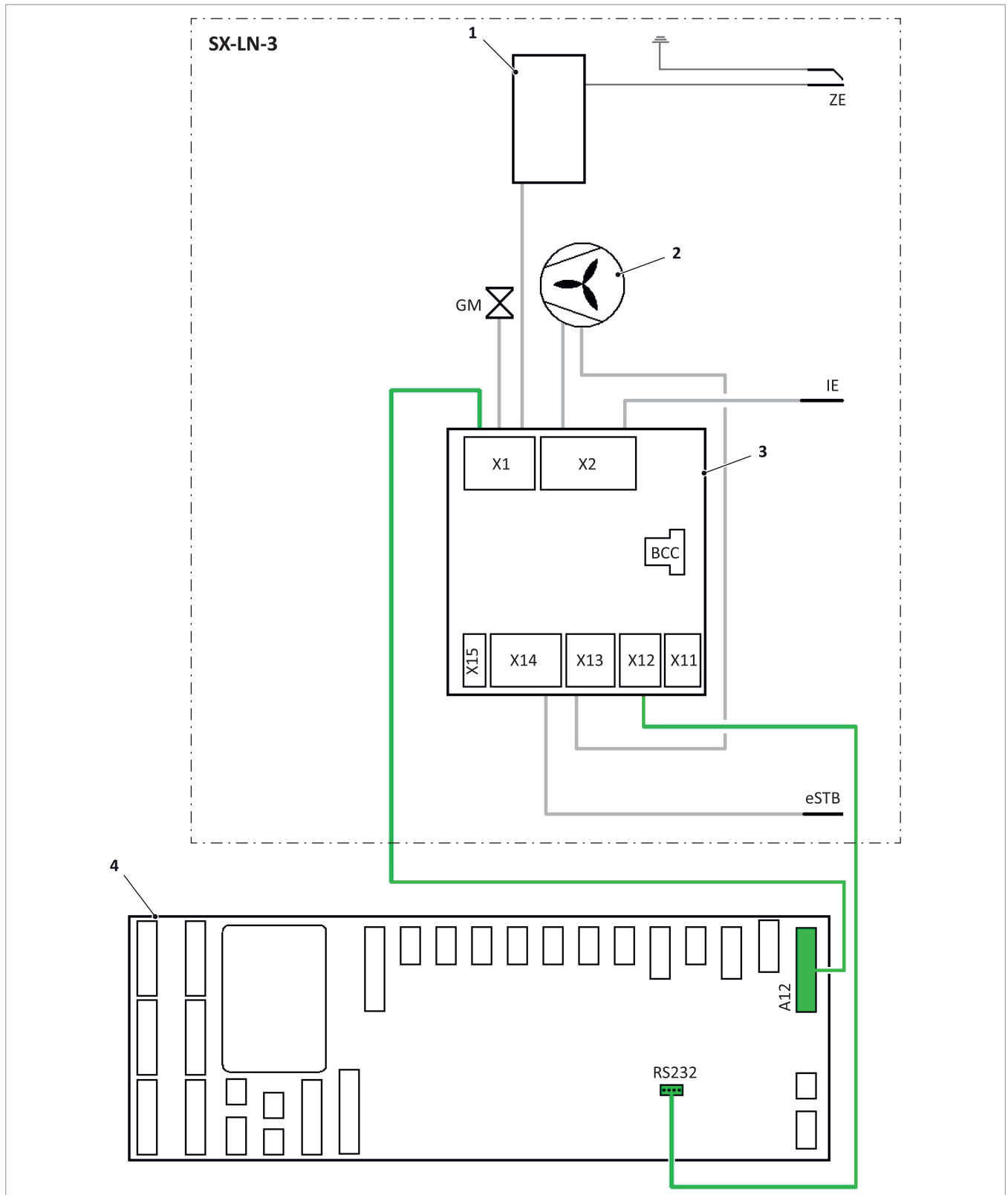


Fig. 35: SX-LN-3 connection diagram (without interface), gas automatic firing system and SolvisControl mains module

1	Burner head	BCC	Burner chip card
2	Blower	eSTL	Electric safety temperature limiter
3	CM424 automatic firing system	GM	Gas solenoid valve
4	Mains module	IE	Ionisation electrode
A12	Burner	O-1	0 – 10 V = power modulation
A14	Fault unlock	ZE	Ignition electrode

10.3 Nameplate

Each unit has a product-specific nameplate that indicates the most important parameters. The contents are explained using this example.

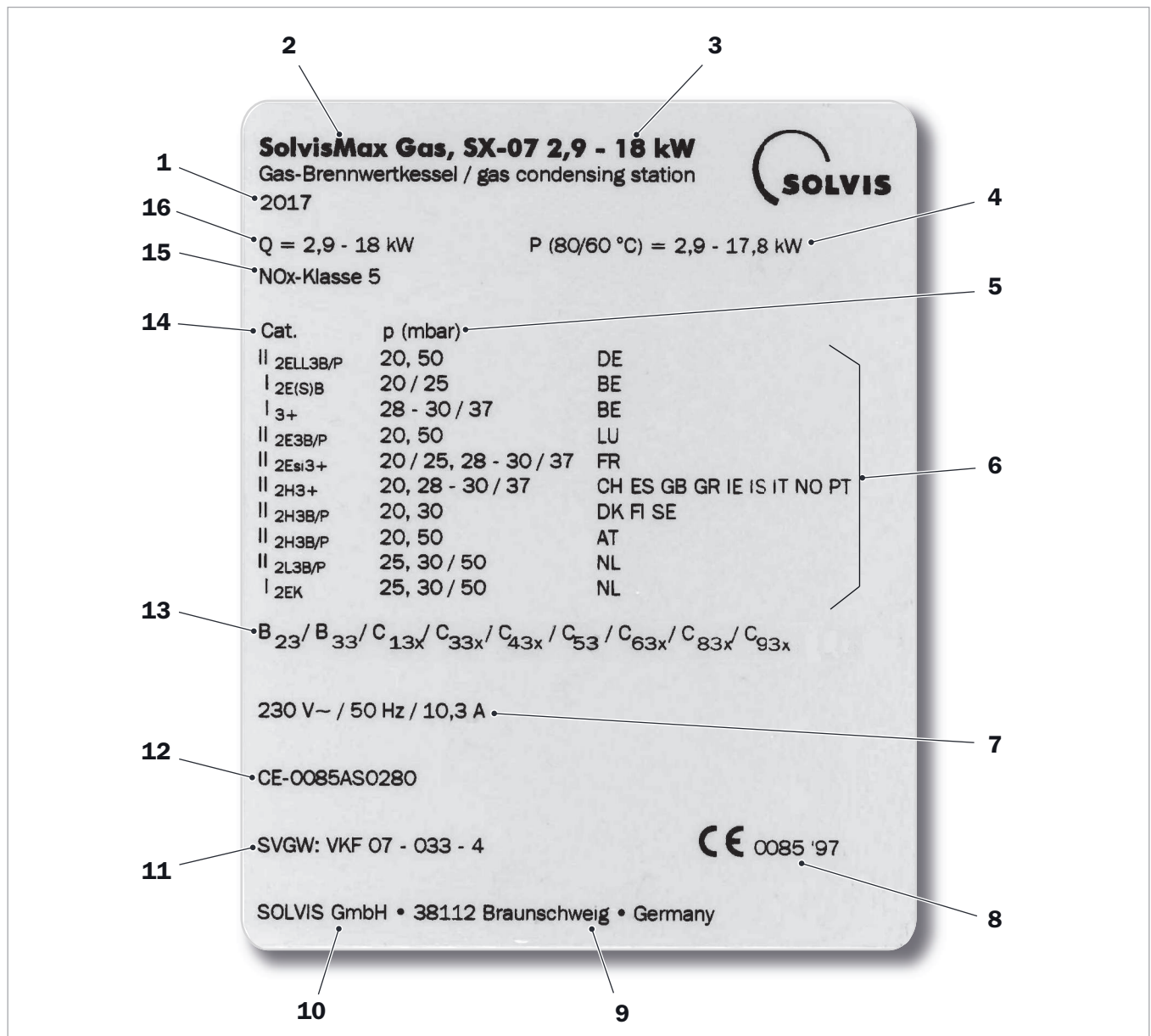


Fig. 36: SolvisMax Gas nameplate sample

- | | |
|--|--|
| 1 Year of manufacture | 9 Place of manufacture |
| 2 Type designation | 10 Manufacturer |
| 3 Rated heat output (minimum, maximum) | 11 VKF approval number of the SVGW |
| 4 Useful heat output (min., max.) at flow/return temperature | 12 Product ID number |
| 5 Supply pressures | 13 Installation types according to TRGI |
| 6 Countries of destination | 14 Device category |
| 7 Electrical connection data without pumps | 15 NO _x class |
| 8 CE marking | 16 Burner performance (minimum, maximum) |

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Notes



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