

deltaSchwank

Radiant Tube Heater

with pneumatic gas-/air ratio control

310U / 320U / 625U / 635U / 950U / 1260U

modulating operation

single heater and flue gas collection system [herringbone] type F



Technical Manual

CE 0085CS0487

Technical Instructions
Operating Instructions
Legal Requirements
Assembly Instructions
Installation Instructions
Commissioning
Service Guide

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1 Introduction

Thank you for choosing a high efficiency SCHWANK radiant tube.

Your deltaSchwank is a modern and low-pollution tube heater for economic and comfortable heating of industrial and commercial buildings.

The design and operation of the heater are according to the requirements of the existing standards.

Please read this manual carefully before using the heater. Please follow carefully all instructions and warnings. The manufacturer will not be held responsible for damages resulting from installation errors or failure to comply with the manufacturer's instructions.

Follow carefully all warnings in chapter 2 "Your Safety".

These tube heaters are constructed exclusively for the application of large industrial and commercial space heating. Any other use is not permitted and therefore Schwank is not liable for any improper use.

2 Your safety

You will find the following symbols in this manual:#



Danger!

Note that you and others can be hurt.



Attention!

Note that the appliance can be damaged.



Danger!

Note that electrical shocks can be very dangerous. Pay attention while working on the electrical equipment.



Advice!

You find additional instructions about the application/handling of the heater.

Notes for your safety

This appliance is designed according to the requirements of the existing standards.

Nevertheless it is possible that dangers for you and others result from the installation and/or operating errors.

To avoid this, please read and follow the instructions carefully.

General Notes

Only use the radiant tube if it is in a technically faultless condition.

Make sure that all persons who operate, assemble, install, commission, maintain or repair this device have read this technical manual and keep the technical instructions in the field.

Observe the generally valid legal and other binding rules for accident prevention.

Do not make any modifications, attachments or conversions to the device without the express permission of Schwank GmbH. Interventions or repairs to this equipment should only be made by authorized installers using spare parts specially approved for use with this equipment. Otherwise, the valid EC-Type Examination Certificate and the operating permit for this device will cease to exist and the manufacturer's liability for the product and its functional safety will be void.

Safety for the electrical equipment

Danger of electrical shocks!

Electrical shocks can be very dangerous!

The electrical installation must be carried out by a qualified service engineer following the existing national and international standards.

Check the electrical equipment regularly.

Defect wires etc. must be replaced immediately.

The appliance must be cut off from the power supply while working with the electrical equipment.

Make sure that nobody can connect the appliance to the power supply while you are installing or maintaining the unit.

After-sales Service

For all installation operations, start-up, gas changes, etc. always consult a qualified service engineer.

In case of doubt, contact SCHWANK GmbH, phone + 49 [0] 221 / 7176 0.

3 Scope of Delivery

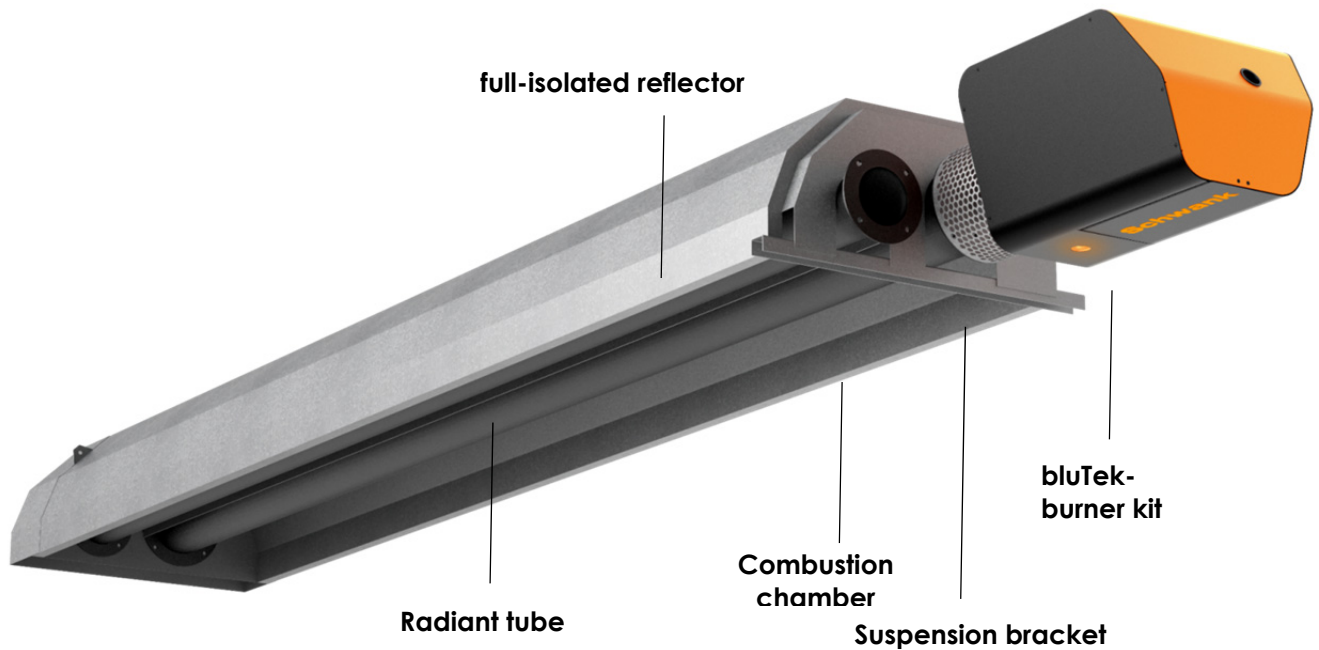


Fig 1: Radiant tube heater deltaSchwank

Scope of Delivery

The radiant tube deltaSchwank consists of following main kits:

- bluTek-burner kit:
with heat-input related bluTek-burner, gas-/air ratio control unit, automatic gas burner control IC 4000/1, wiring, operating indicator
- Radiant kit:
combustion chamber with double tube design, radiant tubes with U-bend element, flange gaskets, corrosion resistant, radiant-optimized and full-isolated reflector with end cap and suspension brackets

Accessories

- Central control unit SchwankControl Touch with temperatures and operating schedules, MODBUS control
- Gas hose connection unit with integrated gas cock and TSD
- Gas filter
- Supply air- / exhaust -system
- Exhaust gas heat exchanger for the utilisation of condensing technology - tetraSchwank
- Fastening-suspension set [system Gripple]

Structure of bluTek-burner kit

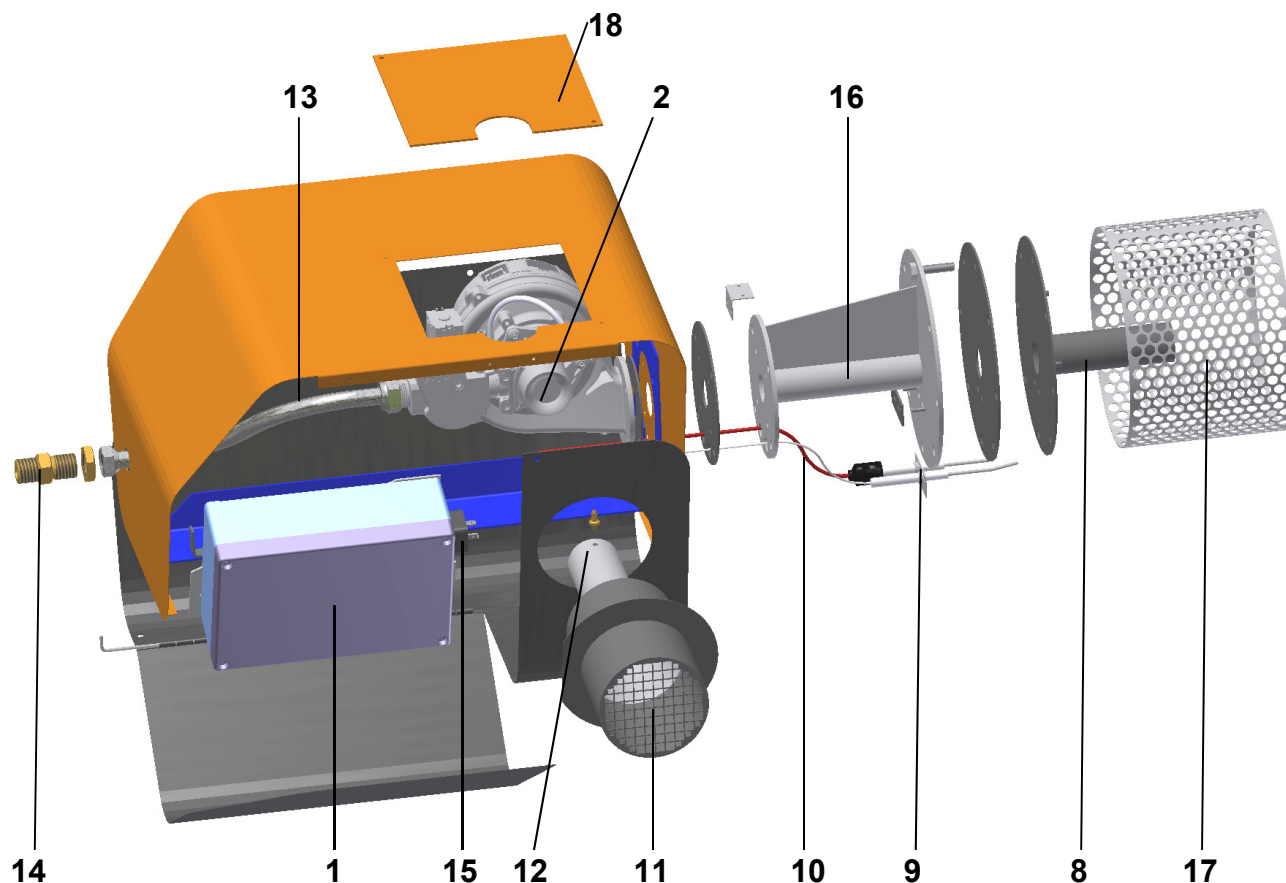


Fig 2: bluTek-burner kit

1. Automatic burner controller IC 4000/1
2. Gas-/air ratio control unit
3. Test nipple connection pressure
4. Throttle screw gas volume
5. Adjustment screw OFFSET
6. Test nipple OFFSET
7. Measuring pipe negative pressure air intake side
8. bluTek burner
9. Ignition and ionisation electrode
10. Ignition cable
11. Air intake connection element
12. Adapter air intake / venturi
13. Corrugated gas pipe
14. Gas connection [bulk head fitting]
15. 4-pin power supply socket
16. Adapter fan / bluTek-burner
17. Perforated cover adapter
18. Top lid [access to gas valve]

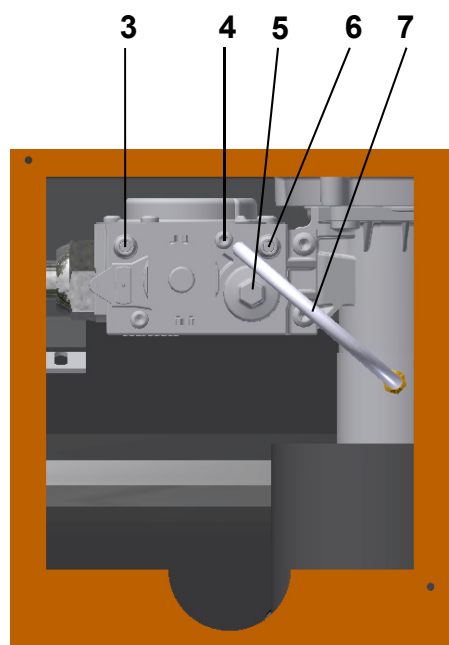


Fig 3: View from above gas combination valve
gas-/air ration control unit

4 Planning

Room temperature control

Radiant tube systems for the full heating of large rooms must be equipped with a temperature control.

Section heating is allowed without temperature control.

Position of suspension

Suspension height

Radiant tubes must be positioned so that no one in the radiation area is exposed to an extreme high heat level. This is ensured when the minimum suspension heights shown in the following table are adhered to:

Nominal thermal load in kW	Suspension height in m [max. radiation 200 W/m ²] according to G 638-2 [t _{Ambient} =15°C, full heating]*
	A = horizontal suspension
10	3,5 m
20	4,5 m
25	4,9 m
35	5,5 m
47	7,7 m
58	9,0 m

Tab 1: Minimum suspension heights [see Fig 4]

Key:

A = Minimum height when hanging horizontally

* Please contact Schwank for determination of suspension heights on other ambient temperatures

Type	a [cm]	b [cm]	d [cm]
deltaSchwank 310U	130	40	20
deltaSchwank 320U	130	40	20
deltaSchwank 625U	145	40	20
deltaSchwank 635U	180	40	20
deltaSchwank 950U	280	40	20
deltaSchwank 1260U	350	40	20

Tab 2: Safe distances [see Fig 4]

Key:

a = Minimum radial safety distance [inside radiation area]

b = Minimum upper safety distance when hanging horizontally

d = Minimum lateral distance to supply pipes outside radiation area

Distances to flammable materials in the radiant area

Radiant tubes must be positioned so that the surface temperature of:

- components with flammable materials,
- flammable equipment
- stored flammable materials

never rises above 85° C.

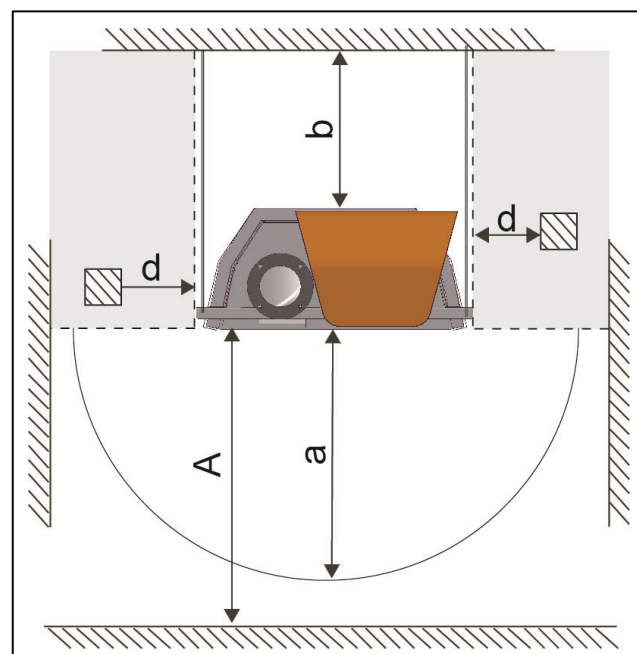


Fig 4: Suspension heights and distances for horizontal application

Direction of radiation

Radiant tubes deltaSchwank can be positioned only horizontal. For this purpose suspension steel chains and cables are installed at the suspension brackets.

Positioning

The radiant tube can be mounted with

- chain links [welded] min. 4 mm strong
- adjustable steel cable 3 mm strong [Schwank accessories]

If you chose chains please use bolts with lock nuts for fixing the chain to the suspension bracket.



The radiant tube has to be fixed by vertical chains etc. to the roof or to supporting devices.

Chains and steel cables have to be fixed in vertical direction or slightly diagonally outwards above the fixing points of the suspension brackets to the roof or to supporting devices. Fixing of the suspension cables or chains diagonally inwards to the centre of the heater is not permitted [see Fig 5].



Please note that the radiant tube being in operation expands several centimetres because of thermal expansion. Avoid therefore inflexible suspension.

Do not use fixing elements like open hooks etc.



When fastening to trapezoidal sheet roofs, make sure that the maximum surface load is not exceeded, if necessary. The load must be distributed over a larger area by means of a substructure.

Hang the heater in balance. We recommend the use of turnbuckles or adjustable steel cable grips for ease of adjustment and balance.

Fixing points for chains or steel cables on the heater are shown in Fig 16, 17, 18 and 19 on pages 21 and 22.

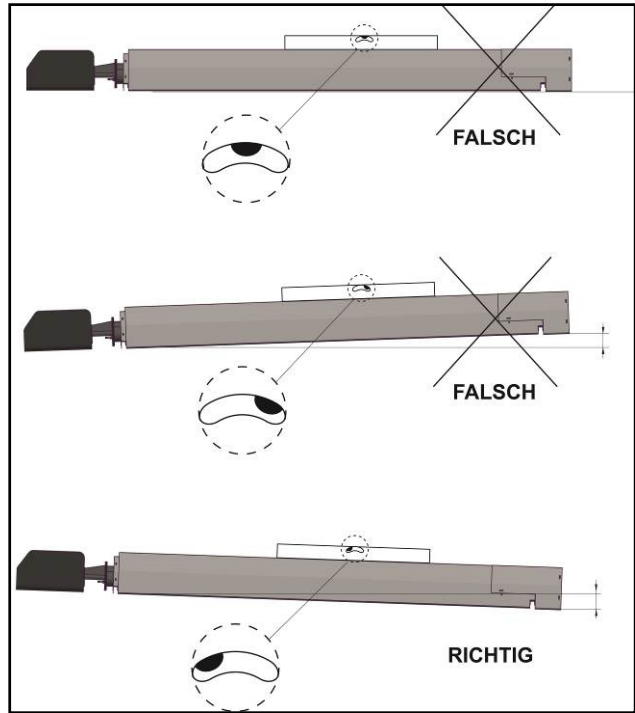


Fig 6: Slope of radiant tube heater



Attention!

If you do not align the bluTek-burner kit correctly the device can be damaged.



SCHWANK GmbH will not accept liability for damages caused by incorrect mounting of the burner unit. Correct mounting is the responsibility of the installer.

Attention!

Please note that the radiant tubes in longitudinal direction must have a small slope [3 mm per meter] to the U-bend [Fig 6].

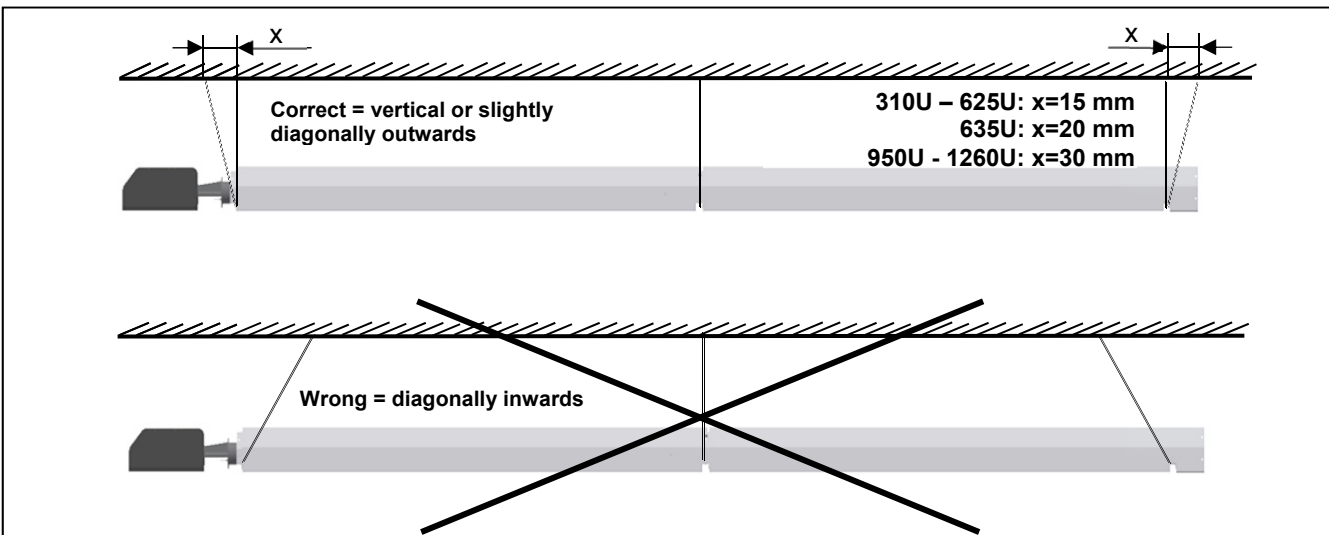


Fig 5: Chains / steel cable mounting

Air supply / Exhaust Requirements

The calculation of air supply / exhaust requirements of a building heated by radiant tube heaters is subject of European Directive EN 13410. Please follow local by-laws as well.

Please see the max. lengths of combustion air supply- and exhaust flue pipe on page 9 [Tab 3, point 3].

Place of Installation

The room to be heated must have an air volume of minimum 10 m³ for each kW of the nominal thermal load of the installed heater.

Air supply [combustion air from inside the room, types A3 and B23]

Heating installations with combustion air from inside the room are only allowed in rooms without string air pollution. Otherwise use system with combustion air from outside [type C].

In halls and buildings with a normal air change by means of joints and gaps it is not necessary to install additional equipment to ensure combustion air supply.

Air supply / exhaust systems

For the radiant tube deltaSchwank the following air supply / exhaust systems are possible:

1. **Indirect flue into the room**
[Type A3 without exhaust system, combustion air from inside the room]
2. **Flued with individual exhaust system,**
combustion air from inside the room
[Type B23]
3. **Flued with individual exhaust system,**
combustion air from outside the room
[Type C]
4. **Flued with exhaust collecting system and central flue fan – combustion air either from inside or from outside**
[according to EN 777, Type F]

1. **Indirect flue into the room**
[Type A3 without exhaust system combustion air from inside the room]

The exhaust gas of the tube heater has to be conducted from the inside of the room to the outside.

Conduction of the exhaust air may be carried out with one of the following 3 methods:

- a) **Thermal ventilation: Combustion air and exhaust gas are to be conducted through**
fixed outlets positioned on the roof or on the walls of the building.
- b) **Mechanical ventilation: Combustion air and exhaust gas are to be conducted through**
one or more fans positioned on the roof or on the walls of the building.
- c) **Natural ventilation: Combustion air and exhaust air are to be conducted through**
outlets as a result of differences in pressure and in temperature between the internal and external side of a building.



For exact dimensioning and positioning of supply air and exhaust gas outlet of the building according to EN 13410 or G638-2 please contact Schwank GmbH, phone +49 [0] 221 / 7176 0.

2. Exhaust flue with individual exhaust system - combustion air from inside the room
[Type B23]

Only use this system in rooms with no air pollution and without relevant pressure differences to outside. Otherwise use type C.

3. Exhaust flue with individual exhaust system - combustion air from outside the room
[Type C]

Combustion air and exhaust air are to be conducted by a temperature stable, concentric pipe from a wall or roof entrance.

Max. length of the concentric pipe can be 6 m plus two 90° elbows.

The concentric pipe ends at a bifurcated pipe. Please ensure that the connection for exhaust gas between heater and bifurcated pipe is a flexible pipe.

This also applies for the incoming air pipe that are connected to the air inlet adapter bluTek-burner kit.

Do not use back-pressure valves or dampers in the exhaust flue.

deltaSchwank		
Max. length between heater and roof/wall entrance	max. number of elbows (90°)	Ø of air/exhaust flue
6 m	2	100 mm

Tab 3: Air/exhaust routing

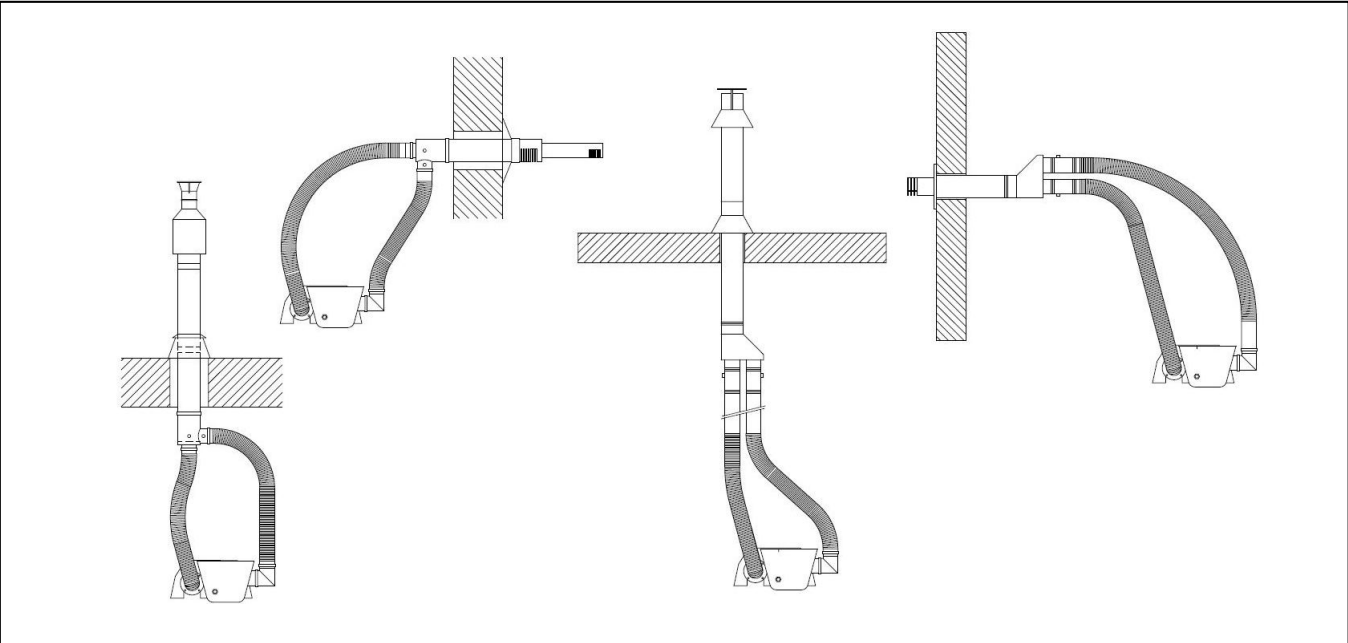


Fig 7: Air/exhaust--system, version aluminium or stainless steel

4. Exhaust flue with exhaust gas collection system and central flue fan
[according to EN 777, Type F]

The heating installation must not exceed 10 radiant tubes. The exhaust gas of each tube is collected via a central collecting tube system by a central flue fan and led to the chimney. Planning, construction and layout of such installations must be carried out by Schwank employees, as well as commissioning. The strict observance of the Schwank layout-drawings and calculation figures are the precondition of the manufacturer's warranty.

Please note that it be necessary to install in the collecting tube behind each radiant heater a throttle or a pressure-balancing device. This ensures a precise regulation and an even exhaust flue of each radiant tube.



see technical instruction
deltaSchwank with exhaust gas
collection system

Flexible exhaust system deltaSchwank [wall terminal]

- version aluminium -



Connection stainless steel flexible pipe to aluminium tube must be glued with heat-resistant sealing material and locked by means of self-tapping screws.

All socket connections on the exhaust and incoming air routes must be locked by means of self-tapping screws.

The 90° elbow at the sucking fan side is to mount with the opening on the top.

The wall terminal is mounted with a small gradient to outside to prevent intrusion of driving rain.

A vertical distance between exhaust gas outlet and wall terminal outlet of at least 50cm is mandatory.

For exhaust gas lengths > 1.5 m [without wall terminal] condensate drainage must be installed.

This is valid on principle for types deltaSchwank 310U and 320U.



Please note the safety distance to flammable materials:

- single-wall exhaust pipe: 40 mm
- double-wall exhaust pipe + wall terminal: 0 mm



System certification tube heater deltaSchwank with exhaust line system MUGRO
CE 0432-CPD-217915, System 0.2 / 0.5 [Muelink&Grol]



The wall terminal is fastened to the building wall with screws by means of the integrated flange plate. The flange plate supports and secures the wall terminal.

The following components are required for mounting the wall terminal aluminum design [Distance heater- terminal approx. 1.5 m]:

Wall terminal M&G: Article no. 12221797

Testing set C 15-20kW: Article no. 12676660

Testing set C 30-40kW: Article no. 12676750

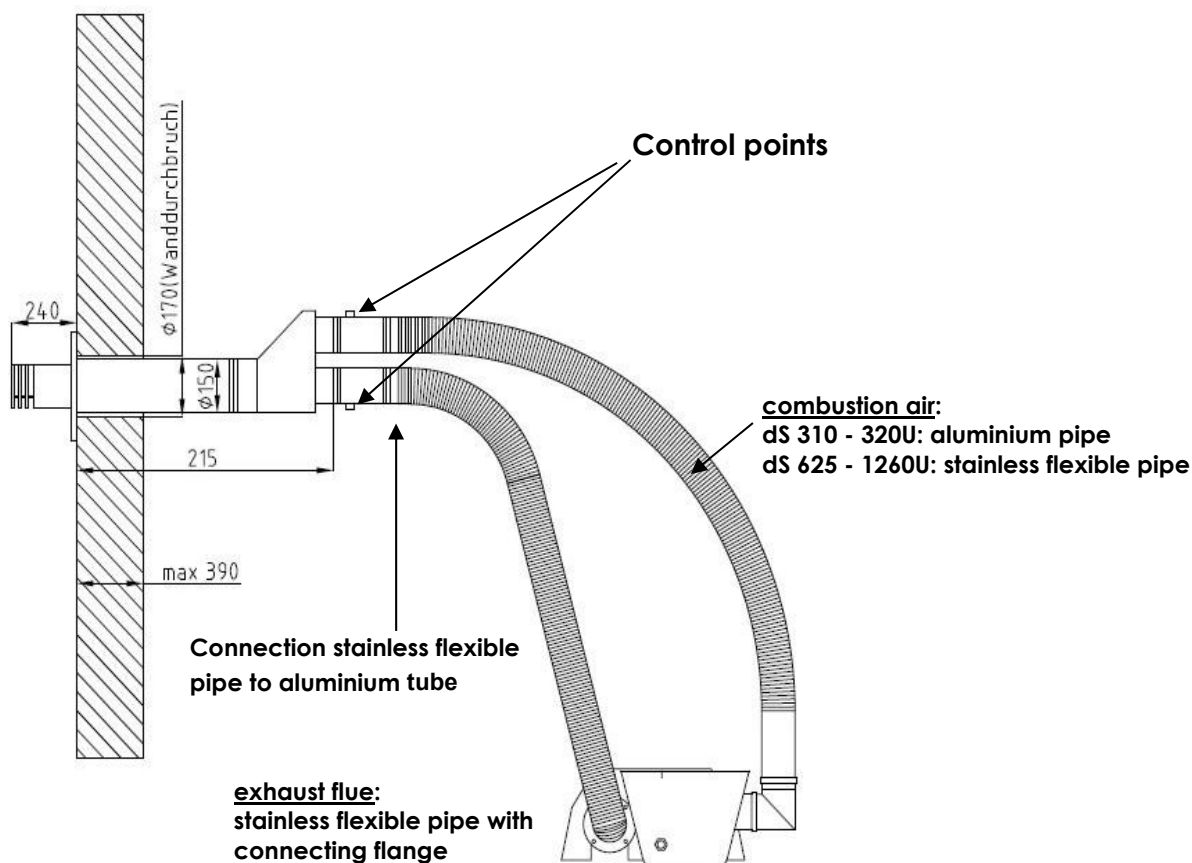


Fig 8: Position of control points [wall terminal], version aluminium

Flexible exhaust system deltaSchwank [roof terminal]

- version aluminium -



Install stainless steel flexible pipe without sink.

Connection stainless steel flexible pipe to aluminium tube must be glued with heat-resistant sealing material and locked by means of self-tapping screws.

All socket connections on the exhaust and incoming air routes must be locked by means of self-tapping screws.

The 90° elbow at the sucking fan side is to mount with the opening on the top.

A vertical distance between exhaust gas outlet and roof terminal outlet of at least 50cm is mandatory.

For exhaust gas lengths > 1.5 m [with roof terminal] condensate drainage must be installed.

This is valid on principle for types deltaSchwank 310U and 320U.

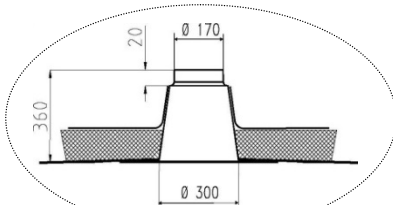
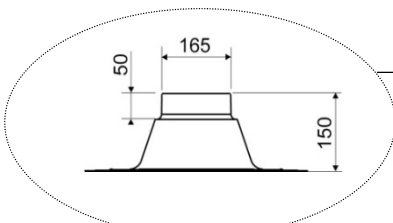
The following components are required for mounting the roof terminal aluminum design [Distance heater- terminal approx. 1.5 m]:

Roof terminal M&G: Article no. 12221770

Testing set C 15-20kW: Article no. 12676660

Testing set C 30-40kW: Article no. 12676750

Dimension flat roof sockets flat version



high version



Please note the safety distance to flammable materials:

- single-wall exhaust pipe: 40 mm
- double-wall exhaust pipe + wall terminal: 0 mm



System certification tube heater deltaSchwank with exhaust line system MUGRO

CE 0432-CPD-217915, System 0.2 / 0.5 [Muelink&Grol]



The roof terminal is slide in from above into the roof socket. in from above into the roof socket. The fixing inside the building takes place via a clamp to the building ceiling.

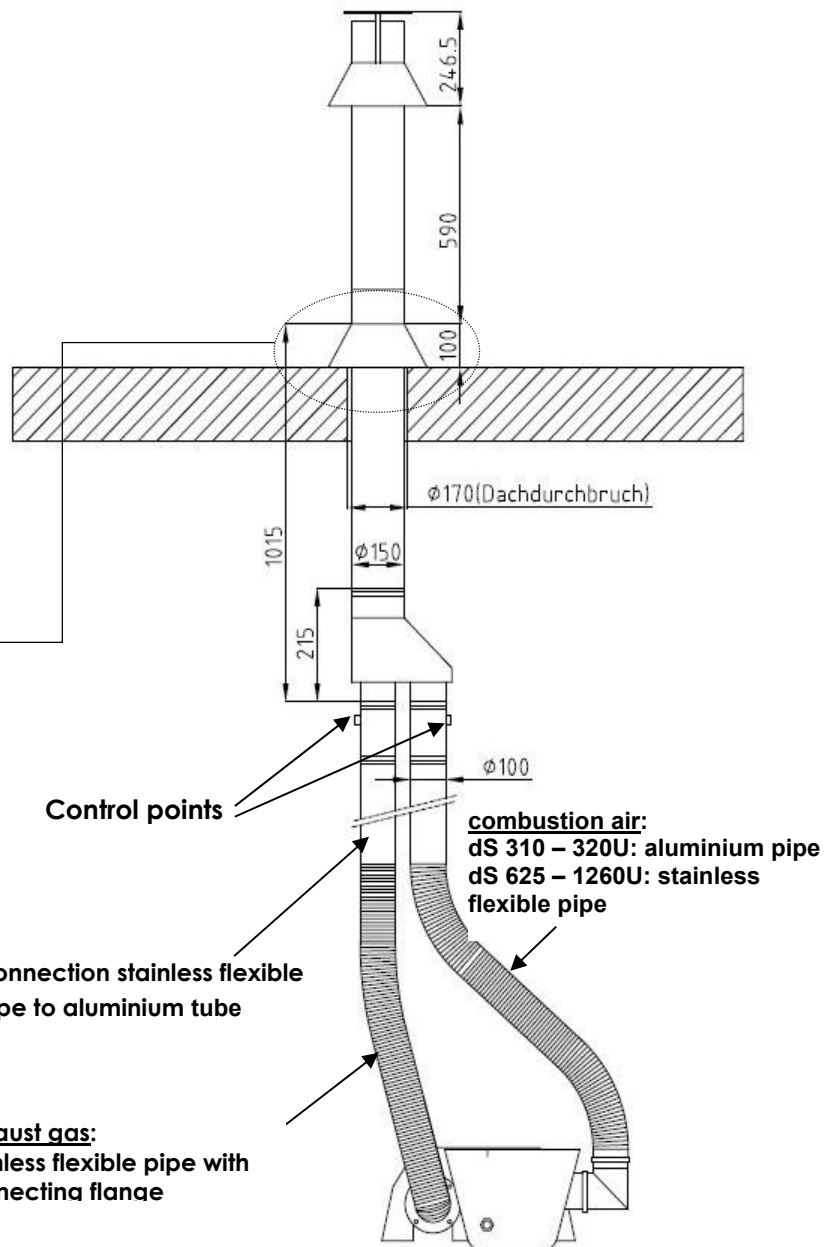


Fig 9: Position of control points [roof terminal], version al

Condensate drain deltaSchwank

- version aluminium -



For flue gas lengths > 1.5 m [exclusive chimney] a condensate line must be laid. In general this applies for types deltaSchwank 310U and 320U.

For this use a special cap with outlet spout for T-piece [Ø outdoor 32 mm] is available in order to connect a following condensate drainage.

A flexible stainless steel pipe as connection is recommended because higher temperatures in nominal load operation [200 ° C] can occur at the connection point.

Drain lines must be laid with a gradient to discharged inlet point into sewer.

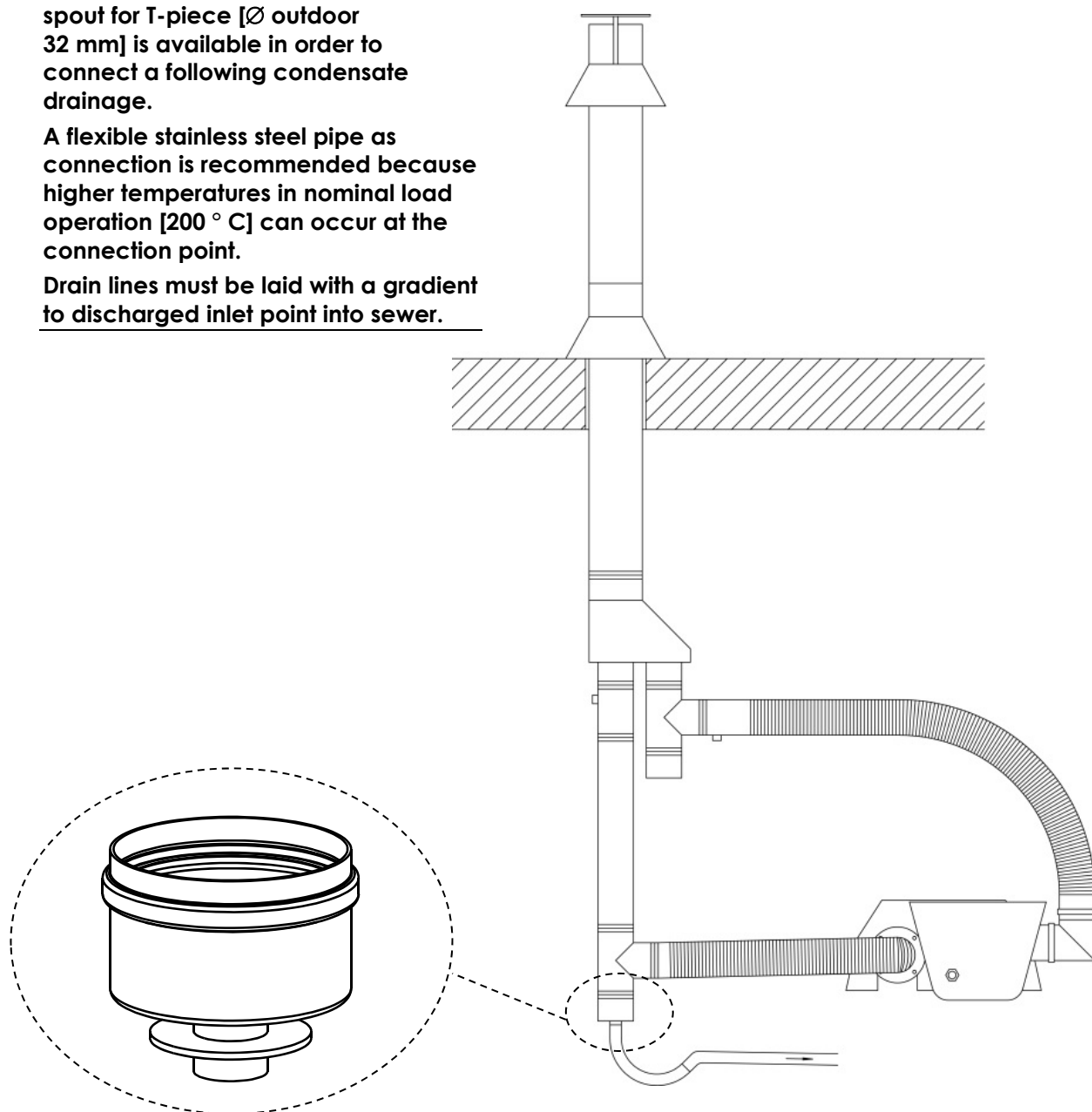


Fig. 10: Condensate drain deltaSchwank

Flexible exhaust system deltaSchwank [wall terminal]

- version stainless steel -



Install stainless steel flexible pipe without sink.

Join parts of the roof terminal strongly together by compression and using of jointing and sealing paste [e.g. Ceramax]!

All joints inside the building tighten securely with clamp fittings!

The 90° elbow at the sucking fan side is to mount with the opening on the top.

The wall terminal is mounted with a small gradient to outside to prevent intrusion of driving rain.

A vertical distance between exhaust gas outlet and wall terminal outlet of at least 50cm is mandatory.

For exhaust gas lengths > 1.5 m [without wall terminal] condensate drainage must be installed.

This is valid on principle for types deltaSchwank 310U and 320U.



Please note the safety distance to flammable materials:

- single-wall exhaust pipe: 80 mm
- double-wall exhaust pipe + wall terminal: 0 mm



System certification tube heater deltaSchwank with exhaust line system
 Future ew CE 0432-CPR-00055-209 /
 Future ew-flex CE 0036-CPR-00055-207 /
 Future dw CE 0432- CPR-00055-301
 [Schröder]



The wall terminal is fastened to the building wall with screws by means of the integrated flange plate. The flange plate supports and secures the wall terminal.

The following components are required for mounting the wall terminal stainless steel design [Distance heater- terminal approx. 1.5 m]:

Stainless steel exhaust system wall terminal DN 100/160: Article no. 12202220

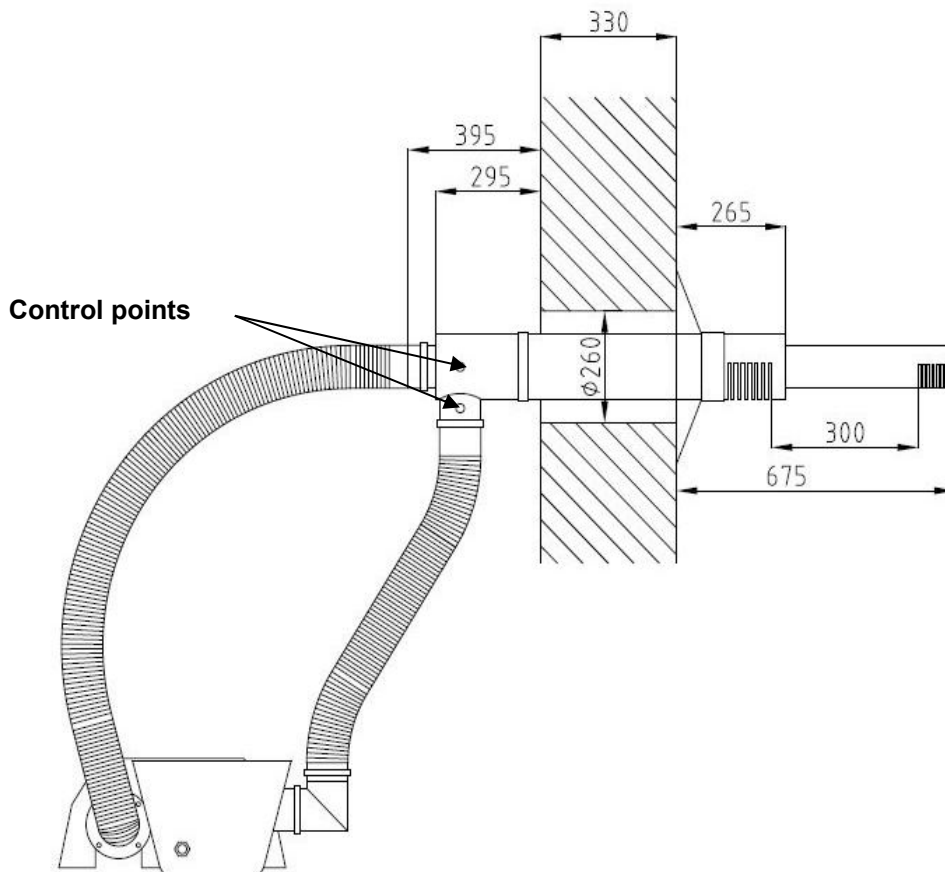


Fig 11: Position of control points [wall terminal], version stainless steel

Flexible exhaust system deltaSchwank [roof terminal]

- version stainless steel -



Install stainless steel flexible pipe without sink.

Join parts of the roof terminal strongly together by compression and using of jointing and sealing paste [e.g. Ceramax]!

All joints inside the building tighten securely with clamp fittings!

The 90° elbow at the sucking fan side is to mount with the opening on the top.

A vertical distance between exhaust gas outlet and wall terminal outlet of at least 50cm is mandatory.

For exhaust gas lengths > 1.5 m [without roof terminal] condensate drainage must be installed.

This is valid on principle for types deltaSchwank 310U and 320U.



Please note the safety distance to flammable materials:

- single-wall exhaust pipe: 80 mm
- double-wall exhaust pipe + roof terminal: 0 mm

The following components are required for mounting the roof terminal stainless steel design [Distance heater- terminal approx. 1.5 m]:

Stainless steel exhaust system roof terminal
DN 100/160 Article no. 12202080

System certification tube heater

deltaSchwank with exhaust line system

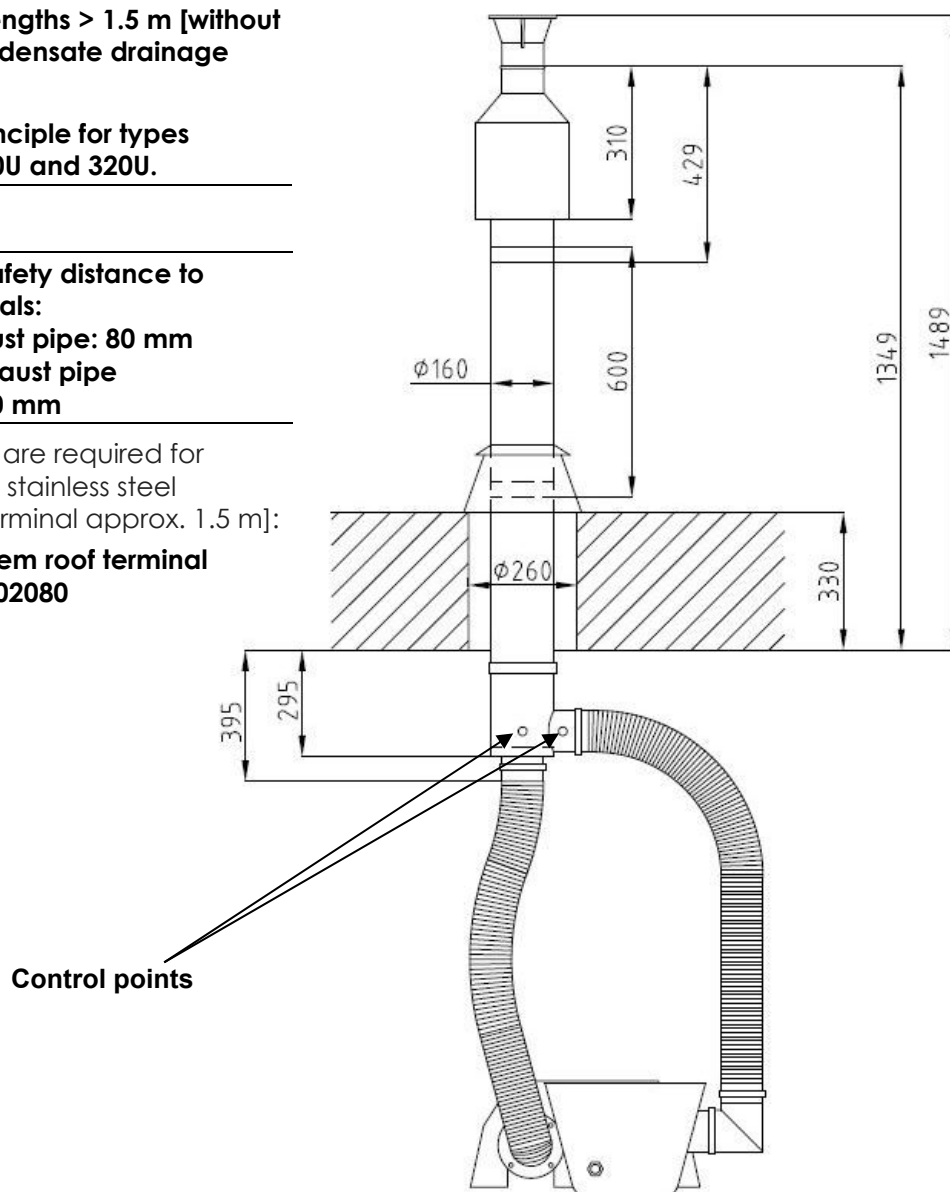
Future ew CE 0432-CPR-00055-209 /

Future ew-flex CE 0036-CPR-00055-207 /

Future dw CE 0432- CPR-00055-301

[Schröder]

The roof terminal is fastened with screws by means of the integrated flange plate on the building ceiling. The flange plate supports and secures the roof terminal.



Control points

Fig 12: Position of control points [roof terminal], version stainless steel

Exhaust system deltaSchwank [roof terminal]

with downstream heat exchanger tetraSchwank in room air operation and with outside air intake in fresh air operation

- version stainless steel -



Install stainless steel flexible pipe without sink.

Join parts of the roof terminal strongly together by compression and using of jointing and sealing paste [e.g. Ceramax]!

All joints inside the building tighten securely with clamp fittings!

tetraSchwank heat exchanger should be mounted with slight slope [3 mm/1m] to the T-piece.



Please note the safety distance to flammable materials:

- single-wall exhaust pipe: 80 mm
- double-wall exhaust pipe + roof terminal: 0 mm



System certification tube heater deltaSchwank with exhaust line system Future ew CE 0432-CPR-00055-209



The roof terminal is fastened with screws by means of the integrated flange plate on the building ceiling. The flange plate supports and secures the roof terminal.

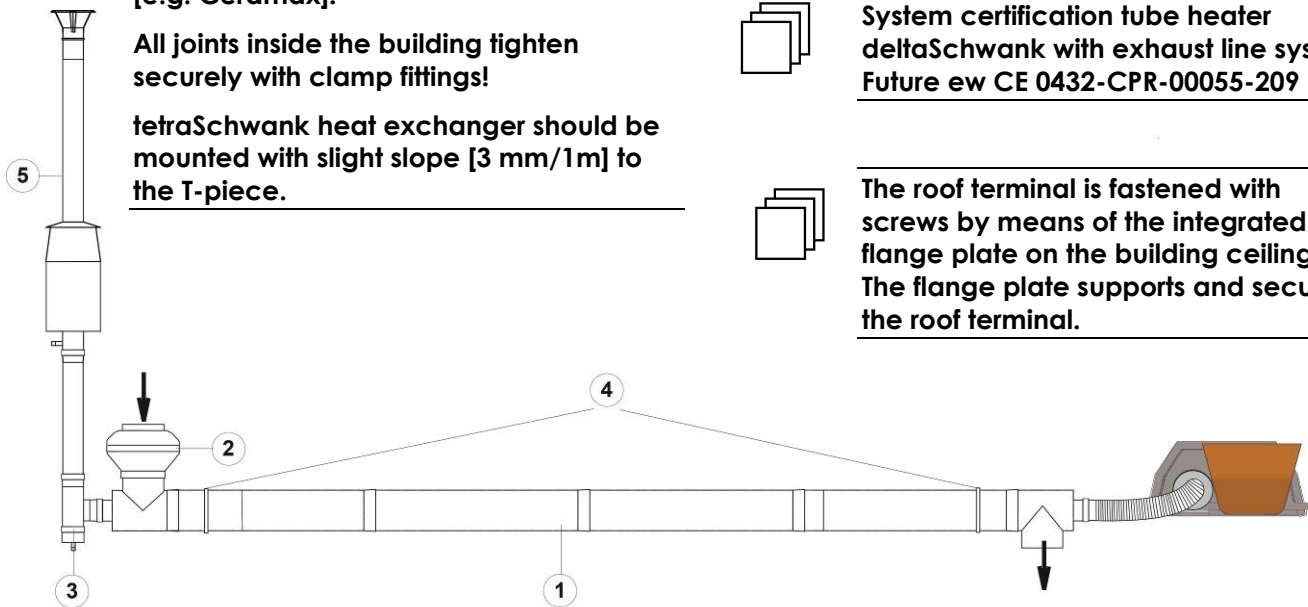


Fig 13: Installation tetraSchwank in room air operation, with roof terminal stainless steel

Installations exhaust system with heat recovery:

1. flue gas heat exchanger tetraSchwank
- pre-assembled
L= 4700 mm **Article no. 62000020**
2. ventilator tetraSchwank with protection grating
3. T-piece stainless steel with condensation outlet connection R 1/2"
4. fastening clamp for suspension, premounted
5. single-wall roof terminal with in room air operation **Article no. 12201941**
double wall roof terminal with outside air intake in fresh air operation **Article no. 62000090**

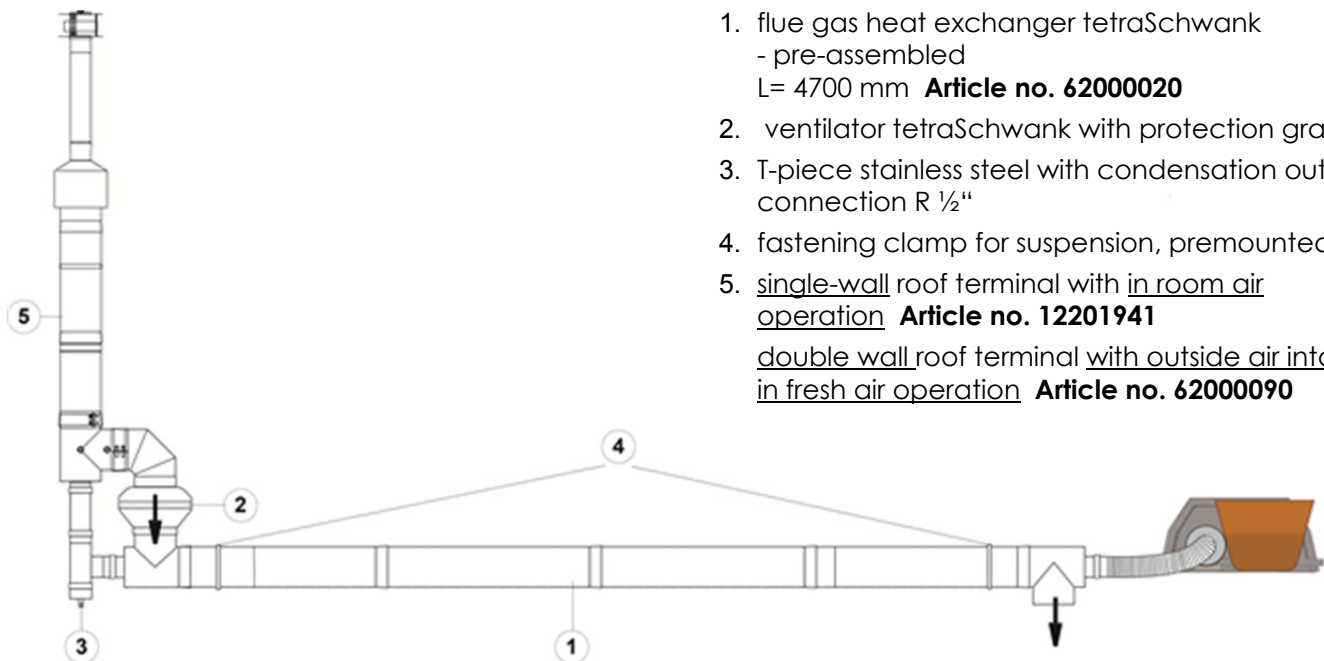


Fig 14: Installation tetraSchwank with outside air intake in fresh air operation, with roof terminal stainless steel

Exhaust pipe collecting system [herringbone] with central fan System F approved according to EN 777 and DIN EN 416

Exhaust pipe collecting system consist of following main components:

- ⇒ Tube heater deltaSchwank
- ⇒ Spiral duct and connection elements for exhaust collecting system [different dimensions]
- ⇒ Central low-pressure fan
- ⇒ Fan monitoring

Article no. 700 0012 0



Planning and calculation of the complete system including collecting pipes, fans and chimneys must only be done by Schwank. Planning details have to be strictly adhered to during mounting and assembly. Commissioning of the system should be carried out by Schwank.

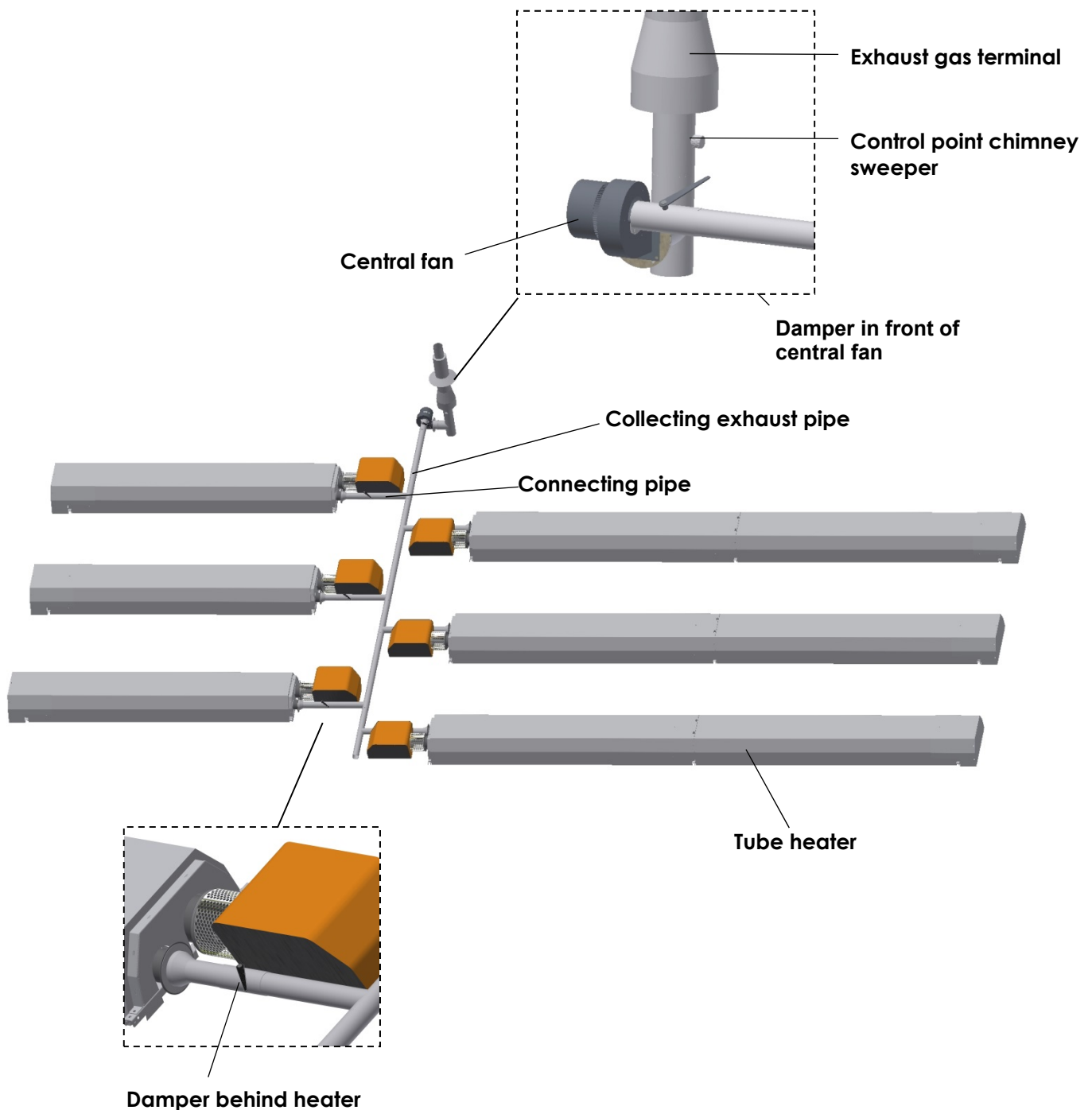


Fig. 15: Installation exhaust collecting system with central fan , system F [principle scheme]

5 Legal Requirements

We recommend that these installation guidelines should be observed with the relevant Building Standards Regulations of your country. Comply with any local by-laws and the current IEE Wiring Regulations.

Notwithstanding their limited scope, the appliance should be installed by a competent person in accordance with the relevant provisions of the Gas Safety [Installation and Use] Regulations. Caution must also be taken of any obligations arising from the Health and Safety of Work Act. Full compliance with all relevant regulations, including amendments in force at the time of installation is a requirement of our warranty.

In Germany the following rules, standards and regulations must be observed.

EnEV	Verordnung über energiesparenden Wärmeschutz und energiesparende Anlagentechnik bei Gebäuden
DIN EN 12831	Heizungsanlagen in Gebäuden Verfahren zur Berechnung der Norm-Heizlast
DIN EN 13384	Abgasanlagen
DIN V 18599	Energetische Bewertung von Gebäuden – Berechnung des
Nutz-	End- und Primärenergiebedarfs für Heizung, Kühlung, Trinkwasser und Beleuchtung
DVGW G 660	Technische Regeln für die mechanische Abführung der Abgase von Feuerstätten
VDE 0722	Elektrische Vorschriften
VDE 0100	Bestimmungen für das Errichten von Starkstromanlagen
Beachten Sie außerdem die Bestimmungen der jeweiligen	
LBO	Landesbauordnung
FeuVO	Feuerungsverordnung der Länder
TAB	Technische Anschlussbedingungen der örtlichen Energieversorgungsunternehmen

6 Operation



The installation must be carried out by a qualified engineer following the manufacturer's instructions.

SCHWANK will not accept liability damages caused by improper assembly and/ or operating of the heater. Proper assembly and operation is the responsibility of the user.

Maintenance

Servicing of the heater is essential for continued efficient operation. Servicing should be carried out not less than once a year by a qualified service engineer. After any servicing, the heater must be recommissioned as detailed in **Chapter 12.**

Switching on the heater

- ⇒ First switch on the central control unit SchwankControl Touch and activate a heating command.
After a pre-purge period of about 25 sec. the ignition starts.

Switching off the heater

- ⇒ Disable the heating command on central control unit SchwankControl Touch.

If the radiant tube is controlled by a thermostat the heater will be switched on and off automatically.

Fault

If no flame is reported during the pre-purge period and the safety time [approx. 30 sec.] the heater repeats the ignition process. If there is no flame after the second ignition process the heater switches off automatically and is locked.



Investigation and repair must be carried out by authorized personnel. After clearance of the fault the heater can be reset.

- ⇒ The cause of the fault / error code is displayed on the central control unit SchwankControl Touch or can read out via corresponding service software IC 4000. See chapter 12 for error codes.

Lock release [Reset]

- ⇒ Activate the reset command via the central control unit or interrupt the electric power supply for 3 seconds.

7 Technical specification

Appliance Automatic heating device, heat transfer by means of infrared dark radiation.

Fuel Types Natural gas
Propane

Minimum connection pressure in front of valve

Gas type	310 – 1260U
Natural Gas H	15 hPa
Natural Gas L	20 hPa
Propane	40 hPa



Attention!
Max. connection pressure: 65 hPa

Gas connection 15-35 kW R=1/2" male
50-60 kW R=3/4" male
[Connection fitting 3/4" enclosed in burner kit cardboard]

Electrical connection power supply

Single-phase AC 230 V, N, PE - 50Hz
The connecting cable for the power supply is connected to the IC 4000/1 burner control with the provided 4-pin plug.
The power supply for the heater must be flexible with maximal wire cross-section - 3x 1.5 mm² Ölflex- or silicone cable
To set the bluTek-burner kit free of voltage it is only necessary to remove the plug of the power supply.

Regulation

The heating system is controlled via the central control unit SchwankControl Touch.
The corresponding heating commands for the heater are sent via MODBUS.

Connection MODBUS control from SchwankControl Touch to IC 4000/1

Use for MODBUS transmission max. 3x 0.5 mm² cable.
Route the cable through the lower cable gland into the housing of burner control unit IC 4000/1 and connected to the corresponding spring terminals on the circuit board.

Exhaust gas connection

Flange at radiant tube end for exhaust connection Ø 100 [flexible stainless steel pipe / exhaust gas adapter]

deltaSchwank 310U / 320U

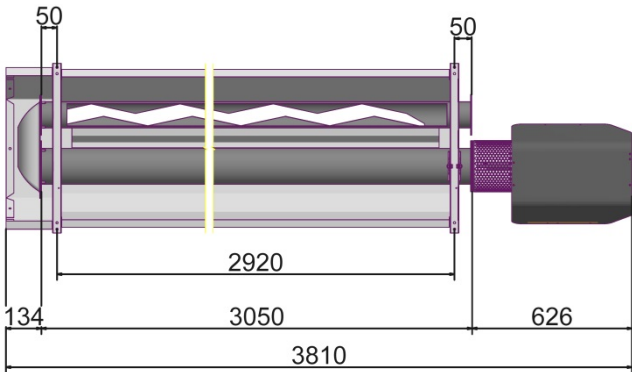
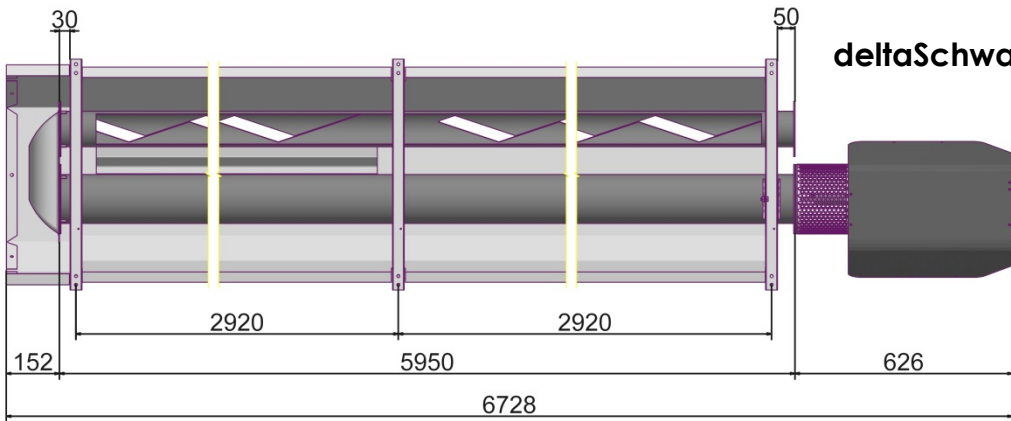


Fig 16: Dimension deltaSchwank 310U / 320U [view from below]



deltaSchwank 625U / 635U

Fig 17: Dimension deltaSchwank 625U / 635U [view from below]

deltaSchwank 950U

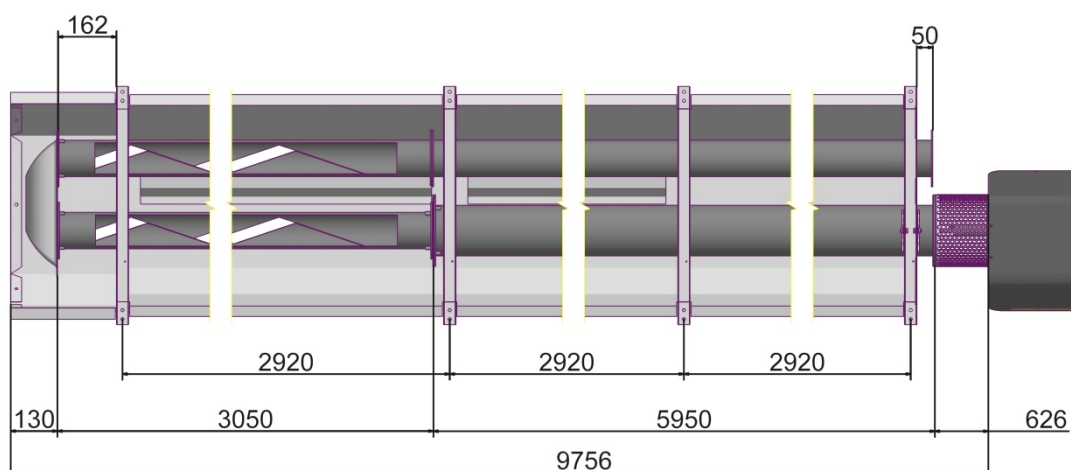


Fig 18: Dimension deltaSchwank 950U
[view from below]

deltaSchwank 1260U

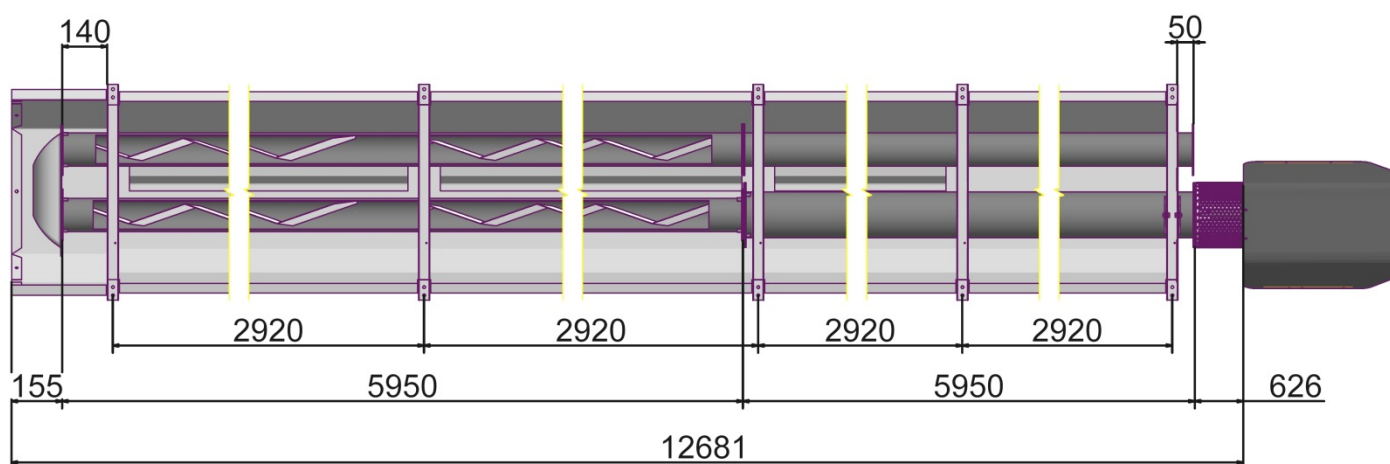
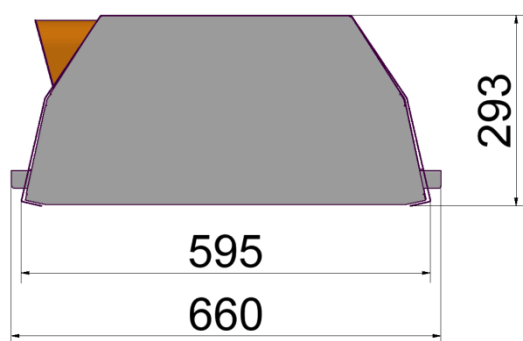


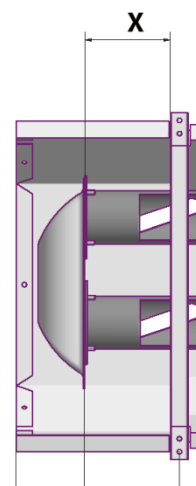
Fig 19: Dimension deltaSchwank 1260U
[view from below]

DETAIL A Cross dimension



DETAIL B Tube overhang x on last suspension bracket

deltaSchwank 310U / 320U – 50 mm
deltaSchwank 625U / 635U – 30 mm
deltaSchwank 950U – 162 mm
deltaSchwank 1260U – 140 mm



Technical data

Gasart		deltaSchwank					
		310	320	625	635	950	1260
Nat. Gas H G 20 ₁₎	Nominal heat input [kW]	10,0	20,0	25,0	35,0	48,0	58,0
	modulating max./min. [kW]	10,0 -7,5	20,0 - 10,0	25,0 - 12,5	35,0 - 17,5	48,0 - 25,0	58,0 -29,0
	Gas consumption [m³/h]	1,00	2,00	2,51	3,51	4,81	5,82
Nat. Gas L G 25 ₂₎	Nominal heat input [kW]	10,0	20,0	25,0	35,0	48,0	58,0
	modulating max./min. [kW]	10,0 -7,5	20,0 - 10,0	25,0 - 12,5	35,0 - 17,5	48,0 - 25,0	58,0 -29,0
	Gas consumption [m³/h]	1,17	2,33	2,92	4,08	5,60	6,77
Propane G 31 ₃₎	Nominal heat input [kW]	10,0	20,0	25,0	35,0	48,0	58,0
	modulating max./min. [kW]	10,0 -7,5	20,0 - 10,0	25,0 - 12,5	35,0 - 17,5	48,0 - 25,0	58,0 -29,0
	Gas consumption [m³/h]	0,78	1,55	1,94	2,72	3,73	4,51
Weight [kg]		114	114	181	186	254	326
Ø air-/ exhaust connection [mm]		Ø 100					
Electrical consumption [W]		30	45	55	75	175	300
Protection class		IP 20					
Gas connection [male thread]		R ¹ / ₂ "				R ³ / ₄ "	
Electrical supply		230 V/ 50 Hz ~					
Ignition / Control		Spark ignition and ionisation control by automatic burner control IC 4000/1					
CE-Identifikation		CE 0085CS0487					

Tab. 4: Technical data deltaSchwank

1] H_{i,n} = 9,97 kWh/m³ / 2] H_{i,n} = 8,57 kWh/m³ / 3] H_{i,n} = 12,87 kWh/kg

Gas	Characteristic values	310U	320U	625U	635U	950U	1260U
Nat. gas H G 20	Start fan speed PP04 [value / RPM]	30 / 1800	30 / 1800	30 / 1800	40 / 2400	40 / 2400	40 / 2400
	Minimum fan speed PP05 [value / RPM]	23 / 1380	30 / 1800	37 / 2250	50 / 3000	65 / 3900	65 / 3900
	Maximum fan speed PP06 [value / RPM] Installation C ₁₃ / C ₃₃ or B ₂₃	C: 30 / 1800 B: 30 / 1800	C: 60 / 3600 B: 57 / 3420	C: 72 / 4350 B: 68 / 4080	C: 100 / 6000 B: 95 / 5700	C: 123 / 7380 B: 117 / 7020	C: 135 / 8100 B: 130 / 7800
	Gas-/air ratio control unit	NRV 118	NRV 118	NRV 118	NRV 118	NRV 128	NRV 148
	Premix bluTek-burner length [mm]	128	128	128	212	288	288
	Volume flow fan nominal load [m ³ /h,n]	14,3	28,7	36,0	50,3	68,9	83,4
	OFFSET, effective [Pa]	10 +/-2 [0.1 hPa]	10 +/-2 [0.1 hPa]	10 +/-2 [0.1 hPa]	10 +/-2 [0.1 hPa]	10 +/-2 [0.1 hPa]	10 +/-2 [0.1 hPa]
	CO ₂ -value[%] @ max Installation C ₁₃ / C ₃₃	8,5 +/-0,1	8,5 +/-0,1	8,5 +/-0,1	8,5 +/-0,1	8,5 +/-0,1	8,5 +/-0,1
	CO ₂ -value[%] @ min Installation C ₁₃ / C ₃₃ @ PP05	9,0 +/-0,1 @ PP05	9,0 +/-0,1 @ PP04	9,0 +/-0,1 @ PP04	9,0 +/-0,1 @ PP04	9,0 +/-0,1 @ PP04	9,0 +/-0,1 @ PP04
	Exhaust temp. NL / PL [°C]	125 / 85	215 / 125	200 / 135	240 / 165	215 / 145	210 / 150
Nat. gas L G 25	Start fan speed PP04 [value / RPM]	30 / 1800	30 / 1800	30 / 1800	40 / 2400	40 / 2400	40 / 2400
	Minimum fan speed PP05 [value / RPM]	23 / 1380	30 / 1800	37 / 2250	50 / 3000	65 / 3900	65 / 3900
	Maximum fan speed PP06 [value / RPM] Installation C ₁₃ / C ₃₃ or B ₂₃	C: 30 / 1800 B: 30 / 1800	C: 60 / 3600 B: 57 / 3420	C: 72 / 4350 B: 68 / 4080	C: 100 / 6000 B: 95 / 5700	C: 123 / 7380 B: 117 / 7020	C: 135 / 8100 B: 130 / 7800
	Gas-/air ratio control unit	NRV 118	NRV 118	NRV 118	NRV 118	NRV 128	NRV 148
	Premix bluTek-burner length [mm]	128	128	128	212	288	288
	Volume flow fan nominal load [m ³ /h,n]	14,4	29,1	36,4	60,9	69,8	84,4
	OFFSET, effective [Pa]	10 +/-2 [0.1 hPa]	10 +/-2 [0.1 hPa]	10 +/-2 [0.1 hPa]	10 +/-2 [0.1 hPa]	10 +/-2 [0.1 hPa]	10 +/-2 [0.1 hPa]
	CO ₂ -value[%] @ max Installation C ₁₃ / C ₃₃	8,5 +/-0,1	8,5 +/-0,1	8,5 +/-0,1	8,5 +/-0,1	8,5 +/-0,1	8,5 +/-0,1
	CO ₂ -value[%] @ min Installation C ₁₃ / C ₃₃ @ PP05	9,0 +/-0,1 @ PP05	9,0 +/-0,1 @ PP04	9,0 +/-0,1 @ PP04	9,0 +/-0,1 @ PP04	9,0 +/-0,1 @ PP04	9,0 +/-0,1 @ PP04
	Exhaust temp. NL / PL [°C]	125 / 85	215 / 125	200 / 135	240 / 165	215 / 145	210 / 150
Propan e G 31	Start fan speed PP04 [value / RPM]	30 / 1800	30 / 1800	30 / 1800	40 / 2400	40 / 2400	40 / 2400
	Minimum fan speed PP05 [value / RPM]	23 / 1380	30 / 1800	37 / 2250	50 / 3000	65 / 3900	65 / 3900
	Maximum fan speed PP06 [value / RPM] Installation C ₁₃ / C ₃₃ or B ₂₃	C: 30 / 1800 B: 30 / 1800	C: 57 / 3420 B: 54 / 3240	C: 68 / 4350 B: 65 / 3900	C: 95 / 6000 B: 90 / 5400	C: 117 / 7020 B: 111 / 660	C: 130 / 7800 B: 124 / 7440
	Gas-/air ratio control unit	NRV 118	NRV 118	NRV 118	NRV 118	NRV 128	NRV 148
	Premix bluTek-burner length [mm]	128	128	128	212	288	288
	Volume flow fan nominal load [m ³ /h,n]	13,3	26,5	32,8	46,4	63,7	76,9
	OFFSET, effective [Pa]	10 +/-2 [0.1 hPa]	10 +/-2 [0.1 hPa]	10 +/-2 [0.1 hPa]	10 +/-2 [0.1 hPa]	10 +/-2 [0.1 hPa]	10 +/-2 [0.1 hPa]
	CO ₂ -value[%] @ max Installation C ₁₃ / C ₃₃	9,9 +/-0,1	9,9 +/-0,1	9,9 +/-0,1	9,9 +/-0,1	9,9 +/-0,1	9,9 +/-0,1
	CO ₂ -value[%] @ min Installation C ₁₃ / C ₃₃ @ PP05	10,4 +/-0,1 @ PP05	10,4 +/-0,1 @ PP04	10,4 +/-0,1 @ PP04	10,4 +/-0,1 @ PP04	10,4 +/-0,1 @ PP04	10,4 +/-0,1 @ PP04
	Exhaust temp. NL/PL [°C]	125 / 85	215 / 125	200 / 135	240 / 165	215 / 145	210 / 150

Tab 5: Characteristic values bluTek-burner kit deltaSchwank 1] H_{i,n} = 9,97 kWh/m³ / 2] H_{i,n} = 8,57 kWh/m³ / 3] H_{i,n} = 12,87 kWh/kg

8 Operating description

Start-up

If heat demand exists, the fan of gas-/ air ratio unit will start up automatically.

After a pre-purge period of 20 seconds in start speed [PP04] the automatic ignition starts [max. ignition time 5 sec.]. The gas valve with pressure regulator opens the gas supply to venturi mixer. The burner flame is controlled by an ionisation electrode. The ignition is switched off, if the ionisation electrode reports a flame to the burner control unit IC 4000/1 within the safety time.

If the ignition process fails, the burner control IC 4000/1 repeats the start-up for one more time.

Operation

The heater continues to run after successful ignition at the start speed for one minute, regardless of the heat requirement. Combustion takes place through the bluTek burner within the special combustion chamber design.

The hot flue gas heats the tube surface while being fed through the tubes by the fan. The hot radiant tubes emit long-waved infrared radiation which is optimal directed into the room by the reflector construction.

The heater is operated in a modulation ratio of 1:2 for optimum adaptation to the heat demand.

The heater starts always at start speed for a period of

1 minute and then according to the applied heating signal.

The radiant tube heater deltaSchwank works with a closed combustion system. The combustion air is taken from outside [or from the room]. The exhaust gas is evacuated directly by a special air/exhaust pipe system through roof, wall or indirectly into the room.

Fault

If no flame is reported during the pre-purge period [including 1 repetition of ignition process], the burner control unit IC 4000/1 will switch off the radiant tube, error will give, fan runs in post-purge time for 3 minutes in maximum speed [PP06] and then heater will lock it.

Investigation and repair must be carried out by authorized personnel only. After clearance of the fault, the lock can be reset.

The cause of the fault / error code is displayed on the central control unit SchwankControl Touch or can read out via corresponding service software.

See chapter 12 for error codes.

Lock release can carry out by activate the reset command via the central control unit SchwankControl Touch or an interruption of the electric power supply for 3 sec. A new start-up begins. If no flame signal is reported to the burner control unit IC 4000/1 during operation, the gas valve shuts and stops the gas supply immediately. A new start-up process is repeated.



Error codes and troubleshooting on pages 49 -50

9 Assembly instructions



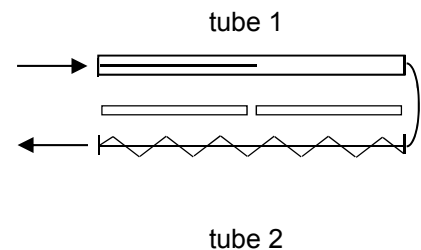
For the assembly of the heater is a lifting platform with work surface from min. 1.5m width and 4.0m length necessarily.
For the assembly are needed 2 people.

- 1x bluTek-burner kit in cardboard [including bluTek-burner, burner baffle + gasket]

Scope of delivery

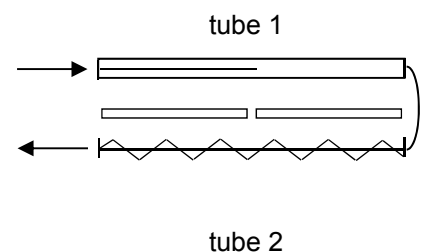
deltaSchwank 310U / 320U

- 1x Reflector section combustion chamber [FERAN]
- 1x Reflector end section L=440mm
- 1x Outer combustion chamber tube Ø140mm / L= 3050mm
- 1x Inner combustion chamber tube stainless steel L= 1500mm
- 1x Radiant tube L= 3050mm with turbulator [coloured ring marking]
- 2x Intermediate reflector
- 1x Mounting set deltaSchwank 310U / 320U
- 1x bluTek-burner kit in cardboard [including bluTek-burner, burner baffle + gasket]



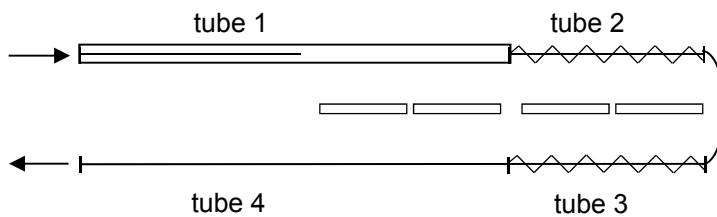
deltaSchwank 625U / 635U

- 1x Reflector section combustion chamber [FERAN]
- 1x Reflector section
- 1x Reflector end section L=440mm
- 1x Outer combustion chamber tube Ø140mm / L= 5950mm
- 1x Inner combustion chamber tube stainless steel
deltaSchwank 625: L= 1500mm
deltaSchwank 635: L= 2500mm
- 1x Radiant tube L= 5950mm with 2x turbulator [2x coloured ring marking]
- 2x Intermediate reflector
- 1x Mounting set deltaSchwank 625U / 635U



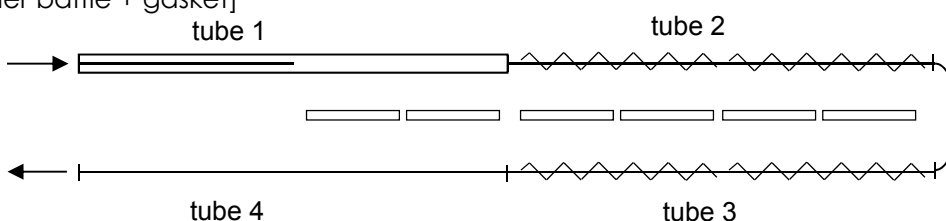
deltaSchwank 950U

- 1x Reflector section combustion chamber [FERAN]
- 2x Reflector section
- 1x Reflector end section L=550mm
- 1x Outer combustion chamber tube
Ø140mm / L= 5950mm
- 1x Inner combustion chamber tube
stainless steel L= 3000mm
- 2x Radiant tube L= 3050mm with turbulator
[coloured ring marking]
- 1x Radiant tube L= 5950mm
- 1x Trapezoidal sheet for combustion chamber
L=1000mm
- 4x Intermediate reflector
- 1x Mounting set deltaSchwank 950U
- 1x bluTek-burner kit in cardboard
[including bluTek-burner,
burner baffle + gasket]



deltaSchwank 1260U

- 1x Reflector section combustion chamber [FERAN]
- 2x Reflector section
- 1x Reflector end section L=550mm
- 1x Outer combustion chamber tube
Ø140mm / L= 5950mm
- 1x Inner combustion chamber tube
stainless steel L= 3000mm
- 2x Radiant tube L= 5950mm with 2x turbulator
[2x coloured ring marking]
- 1x Trapezoidal sheet for combustion chamber
L=1000mm
- 4x Intermediate reflector
- 1x Mounting set deltaSchwank 950U
- 1x bluTek-burner kit in cardboard
[including bluTek-burner,
burner baffle + gasket]



deltaSchwank 310U / 320U

**Tools you need**

- **hexagonal wrench or ratchet**
[width: 10, 13]
- **socket wrench** [width: 7 and 8]
- **hand riverter**

Note before mounting

- Hang first the suspension brackets and observe the specified distance dimension between them.
- Fix the guide shell on the first suspension bracket [direct after burner kit] with 2x screws M8x16 / washers / lock washers / nut for guide the outer combustion chamber tube.
- The outer tube combustion chamber L = 3050 mm has to be mount on the right side of the suspension bracket [in the flow direction] - check the correct stud bolt position on the bracket!
- Flanges are mounted with flange packing [each 8 or 4 screws/washers/lock washers/nuts M8].
- Observe the respective flange positions of the outer combustion chamber tube during assembly - 8-hole flange shows to the bluTek-burner kit!
- Turn welding seam of the tubes to the side.
- Tube with turbulator [*colored ring marking*] has to be mounted behind the turnaround box [in flow direction]. The coloured ring showing to the turnaround box!
- During mounting turnaround box to outer combustion chamber tube observe the position of the opposite 8-hole flange. Vertical position of a hole with simultaneous sideways position of the welding seam is to be kept.
- Inner combustion chamber tube [stainless steel] L=1500 mm will be slide in outer combustion chamber tube, position from inner to outer tube will be ensured with final assembly bluTek-burner kit and bluTek- burner!
- Tube bars and bracket bars have to be fixed by nuts/3D-washers/lock washers M8 on the suspension brackets.
- Clamping bars [black painted or with colored dot] for tubes Ø140 and 100 mm are mounted on the last suspension bracket. Observe the specified mounting distance between suspension bracket and turn aroundbox of 50mm before tightening!
- The intermediate reflectors have to be fixed into the reflector. At both ends of the reflector sheet the intermediate reflector will riveted with 2 stainless steel rivets [reflector has already holes to set the rivets]. An additional short angle bracket is to be fixed by rivets in the centre of the main reflector to hold the intermediate reflectors.
- The combustion chamber reflector is placed on suspension brackets and have to be fixed with the bracket bars by 6x M5 [screws/washers/self-locking nuts]. Reflector end with notch on sides shows to the turnaround box.
- The reflector end segment L = 440mm is placed on the reflector and have to be fixed with 3x M5 screws.
- Both front plates have to be fixed by 6x M5 [screws/washers/self-locking nuts].
- Insert bluTek-burner L=128 mm with its 3 stud bolts into the corresponding flange holes of inner combustion chamber tube. Place between tube flange and bluTek-burner a gasket.
- In addition a burner baffle together with gasket has to mount in front of the bluTek burner whereby the flap shows diagonally downwards.
- The bluTek-burner kit [first without mounted igniter] is mounted to 8-hole flange and burner gasket by 8x M8 [screws / washers / lock washers / nuts]. Now insert smoothly the igniter through the corresponding holes in the connection adapter, avoiding destruction of the igniter ceramic.
- Now firmly screw bluTek-burner kit with 8-hole flange.
- Fit the igniter and igniter gasket with 2x M4 nuts to the stud bolts of the connection adapter.
- Connect the straight ignition cable plug with igniter and ionisation cable with burner control unit IC 4000/1.
- Remove the protective foil from the housing flap bluTek-burner kit and stick the "Schwank" foil on bottom of this flap.
- Remove the remaining protective foils from bluTek-burner kit.
- The perforated adapter covering is to fit at the mounting angle of the bluTek-burner kit by means of tapping screws.
- For a quick external identification of the assigned MODBUS address stick the provided address-sticker [number] on the bottom bluTek-burner housing and enter there the corresponding address by number stickers or with marker.

- **Exhaust gas connection [Type B23, C]:**
Note that the stainless steel flexible pipe mounted at the end of the tube with a gasket.
- **Accessory**
Exhaust gas adapter code-no. 126 7035 0
Mount the exhaust gas adapter at the end of the tube with a gasket.
Ensure a vertical exhaust gas extension of at least 0.5m.

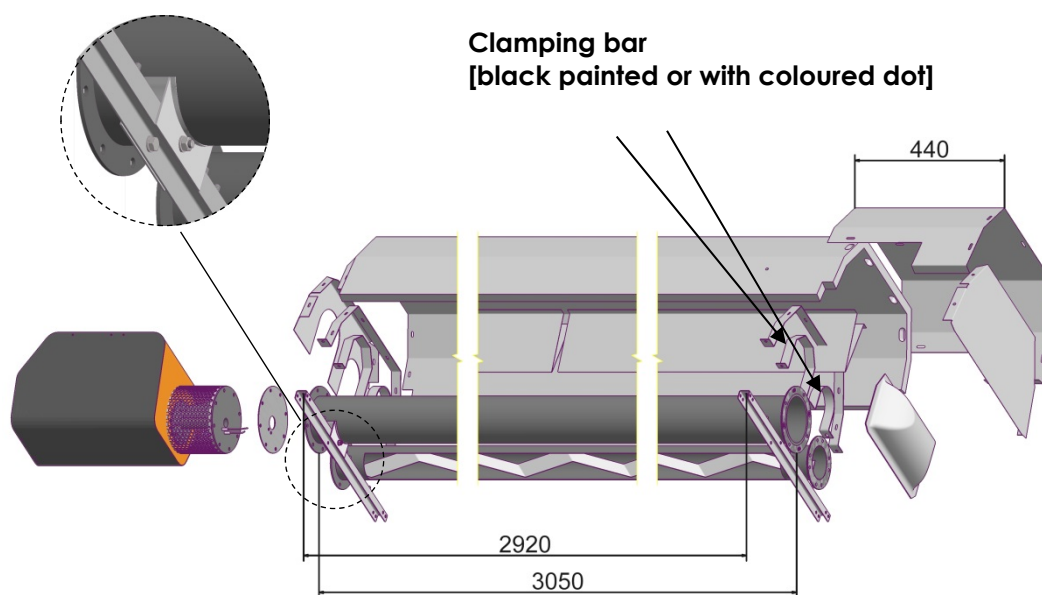
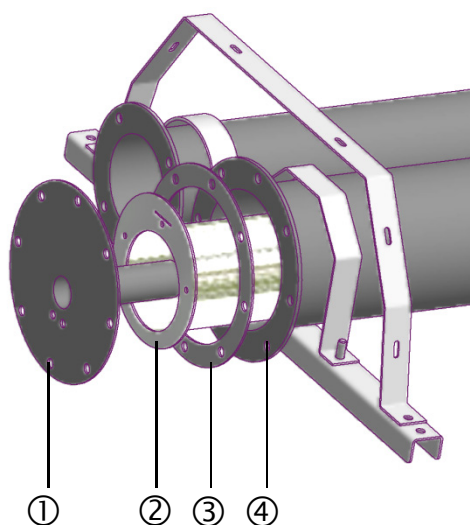


Fig 20: Mounting deltaSchwank 310U / 320U



- ① bluTek-burner L=128 mm
- ② Inner combustion chamber tube
stainless steel Ø100 mm, L=1500 mm
- ③ Gasket tube Ø140 mm
- ④ 8-hole flange outer tube combustion chamber

Fig 21: Mounting interface combustion chamber
deltaSchwank 310U / 320U

deltaSchwank 625U / 635U



Tools you need

- **hexagonal wrench or ratchet**
[width: 10, 13]
- **socket wrench** [width: 7 and 8]
- **hand rивerter**

Note before mounting

- Hang first the suspension brackets and observe the specified distance dimension between them.
- Fix the guide shell on the first suspension bracket [direct after burner kit] with 2x screws M8x16 / washers / lock washers / nut for guide the outer combustion chamber tube.
- The outer tube combustion chamber L= 5950 mm has to be mount on the right side of the suspension bracket [in the flow direction] - check the correct stud bolt position on the bracket!
- Flanges are mounted with flange packing [each 8 or 4 screws/washers/lock washers/nuts M8].
- Observe the respective flange positions of the outer combustion chamber tube during assembly - 8-hole flange shows to the bluTek-burner kit!
- Turn welding seam of the tubes to the side.
- Tube with turbulator [*colored ring marking*] has to be mounted behind the turnaround box [in flow direction]. The coloured ring showing to the turnaround box!
- During mounting turnaround box to outer combustion chamber tube observe the position of the opposite 8-hole flange. Vertical position of a hole with simultaneous sideways position of the welding seam is to be kept.
- Inner combustion chamber tube [stainless steel]
deltaSchwank 625U: L=1500 mm
deltaSchwank 635U: L=2500 mm
will be slide into outer combustion chamber tube, position from inner to outer tube will be ensured at final assembly bluTek-burner kit and bluTek- burner!
- Tube bars and bracket bars have to be fixed by M8 nuts/3D-washers/lock washers on the suspension brackets.
- Clamping bars [black painted or with colored dot] for tubes Ø140 and 100 mm are mounted on the last suspension bracket. Observe the specified mounting distance between suspension bracket and turnaround box of 30 mm before tightening!
- The intermediate reflectors have to be fixed into the second reflector [not combustion chamber reflector]. At both ends of the second reflector sheet the intermediate reflector will riveted with 2 stainless steel rivets [reflector has already holes to set the rivets]. An additional short angle bracket is to be fixed by rivets in the centre of the second reflector to hold the intermediate reflectors.
- Start the reflector mounting at the turnaround box side. Reflector with intermediate reflectors is placed on suspension brackets and have to be fixed with the bracket bars by 6x M5 [screws/washers/self-locking nuts]. Reflector end with notch on sides shows to the turnaround box.
- Following combustion chamber reflector is placed on suspension brackets and have to be fixed with the bracket bars by 6x M5 [screws/washers/self-locking nuts].
- The reflector end segment L= 440 mm is placed on the reflector and have to be fixed with 3x M5 screws.
- Both front plates have to be fixed by 6x M5 [screws/washers/self-locking nuts].
- Insert following bluTek-burner
deltaSchwank 625U: L=128 mm
deltaSchwank 635U: L=212 mm
with its 3 stud bolts into the corresponding flange holes of inner combustion chamber tube. Place between tube flange and bluTek-burner a gasket.
- In addition a burner baffle together with gasket has to mount in front of the bluTek burner whereby the flap shows diagonally downwards.
- The bluTek-burner kit [first without assembled igniter] is mounted to 8-hole flange and burner gasket by 8x M8 [screws / washers / lock washers / nuts].
- Now insert smoothly the igniter through the corresponding holes in the connection adapter, avoiding destruction of the igniter ceramic.
- Now firmly screw bluTek-burner kit with 8-hole flange.
- Fit the igniter and igniter gasket with 2x M4 nuts to the stud bolts of the connection adapter.
- Connect the straight ignition cable plug with igniter and ionisation cable with burner control unit IC 4000/1.
- Remove the protective foil from the housing flap bluTek-burner kit and stick the "Schwank" foil on bottom of this flap.
- Remove the remaining protective foils from bluTek-burner kit.

- The perforated adapter covering is to fit at the mounting angle of the bluTek-burner kit by means of tapping screws.
- For a quick external identification of the assigned MODBUS address stick the provided address-sticker [number] on the bottom bluTek-burner housing and enter there the corresponding address by number stickers or with marker.
- **Exhaust gas connection [Type B23, C]:**
Note that the stainless steel flexible pipe mounted at the end of the tube with a gasket.
- **Accessory**
Exhaust gas adapter code-no. 126 7035 0
Mount the exhaust gas adapter at the end of the tube with a gasket.
Ensure a vertical exhaust gas extension of at least 0.5m.

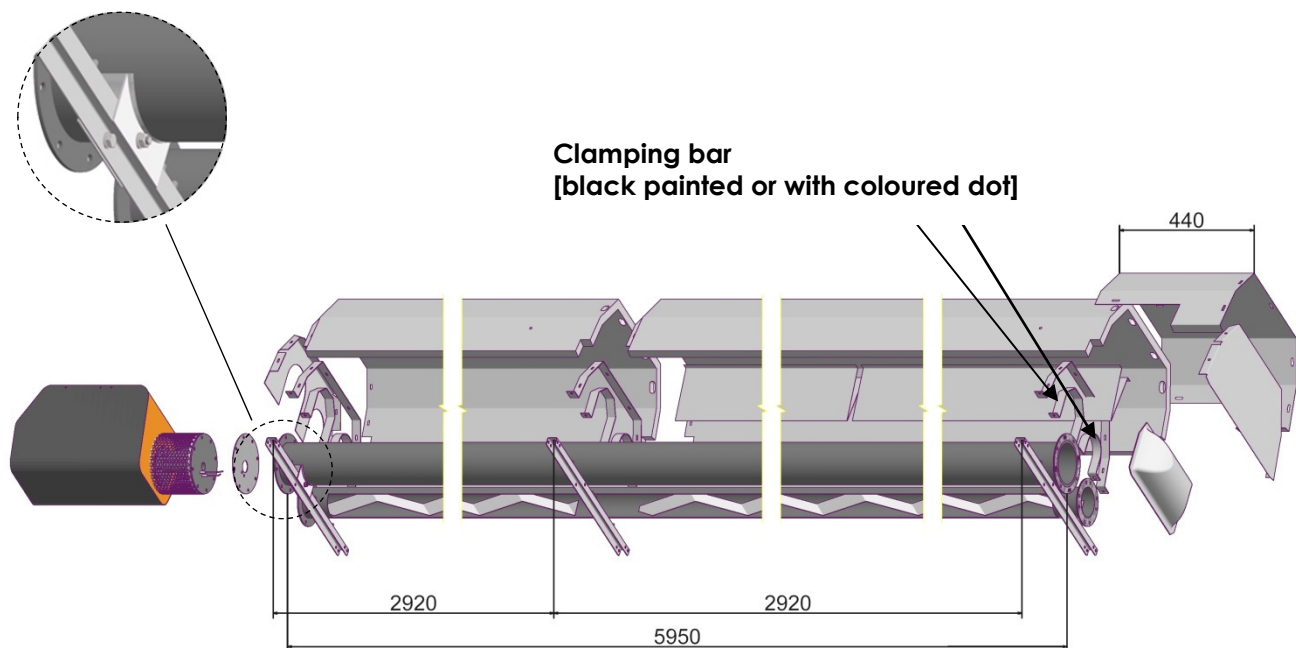
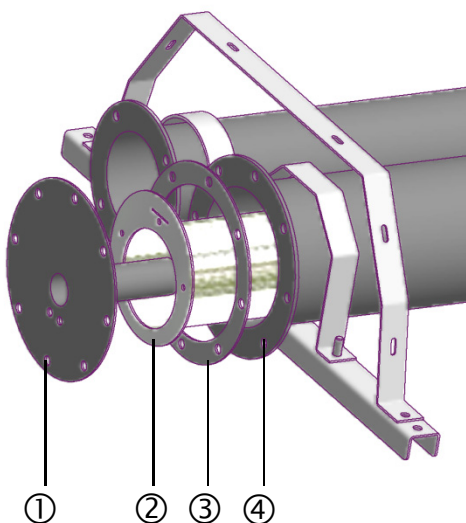


Fig 22 : Mounting deltaSchwank 625U / 635U



- ① bluTek-burner
deltaSchwank 625U L=128 mm
deltaSchwank 635U L=212 mm
- ② Inner combustion chamber tube, stainless steel
deltaSchwank 625U Ø100mm, L=1500 mm
deltaSchwank 635U Ø100mm, L=2500 mm
- ③ Gasket tube Ø140 mm
- ④ 8-hole flange outer tube combustion chamber

Fig 23: Mounting interface combustion chamber
deltaSchwank 625U / 635U

deltaSchwank 950U



Tools you need

- hexagonal wrench or ratchet [width: 10, 13]
- socket wrench [width: 7 and 8]
- hand riveter

Note before mounting

- Hang first the suspension brackets and observe the specified distance dimension between them. Note there are two different types of suspension brackets [tube pair combination Ø140/Ø100 mm or Ø100/Ø100 mm]! Optical distinctive feature is the hole on the left or right side of most right located stay bolt on suspension bracket. Hole on the left side identified tube pair combination Ø100 / Ø100 mm. Hole on the right side bolt identified tube pair combination Ø140 / Ø100 mm.
 - Fix the guide shell on the first suspension bracket [direct after burner kit] with 2x screws M8x16 / washers / lock washers / nut for guide the outer combustion chamber tube.
 - The outer tube combustion chamber L= 5950 mm has to be mount on the right side of the suspension bracket [in the flow direction] - check the correct stud bolt position on the bracket!
 - Flanges are mounted with flange packing [each 8 or 4 screws/washers/lock washers/nuts M8].
 - Observe the respective flange positions of the outer combustion chamber tube during assembly, 8-hole flange shows to the bluTek-burner kit!
 - Turn welding seam of the tubes to the side.
 - **Welding seam of outer combustion chamber tube is to be mounted upwards at 45°!**
 - Both tubes with turbulator [coloured ring marking] have to be mounted in front and behind the turnaround box. The coloured ring showing to the turnaround box! Joint between outer tube combustion chamber Ø140 mm and following radiant tube Ø100 mm is carried out by stainless steel flange adapter!
 - Place the enclosed stainless steel trapezoidal sheet on top of the inner combustion chamber tube and insert the flap through the slot of the flange and bend it over for fixation!
 - Inner combustion chamber tube [stainless steel] L=3000 mm inclusive trapezoidal sheet
- will be slide into outer combustion chamber tube, position from inner to outer tube will be ensured at final assembly bluTek-burner kit and bluTek- burner!
- Tube bars and bracket bars have to be fixed by M8 nuts/3D-washers/lock washers on the suspension brackets.
 - Clamping bars [black painted or with colored dot] for tubes Ø140 and 100 mm are mounted on the last suspension bracket. Observe the specified mounting distance between suspension bracket and turnaround box of 162 mm before tightening!
 - The intermediate reflectors have to be fixed into the second and third reflector [not combustion chamber reflector]. At both ends of the reflector sheets the intermediate reflector will riveted with 2 stainless steel rivets [reflector has already holes to set the rivets]. An additional short angle bracket is to be fixed by rivets in the centre of the second reflector to hold the intermediate reflectors.
 - Start the reflector mounting at the turnaround box side. Reflectors with intermediate reflectors are placed on suspension brackets and have to be fixed with the bracket bars by 6x M5 [screws/washers/self-locking nuts]. Reflector end with notch on sides shows to the turnaround box.
 - Following combustion chamber reflector is placed on suspension brackets and have to be fixed with the bracket bars by 6x M5 [screws/washers/self-locking nuts].
 - The reflector end segment L= 550 mm is placed on the reflector and have to be fixed with 3x M5 screws.
 - Both front plates have to be fixed by 6x M5 [screws/washers/self-locking nuts].
 - Insert following bluTek-burner L=288mm with its 3 stud bolts into the corresponding flange holes of inner combustion chamber tube. Place between tube flange and bluTek-burner a gasket.
 - In addition a burner baffle together with gasket has to mount in front of the bluTek burner whereby the flap shows diagonally downwards.
 - Now firmly screw bluTek-burner kit with 8-hole flange.
 - Fit the igniter and igniter gasket with 2x M4 nuts to the stud bolts of the connection adapter.
 - Connect the straight ignition cable plug with igniter and ionisation cable with burner control unit IC 4000/1.
 - Remove the protective foil from the housing flap bluTek-burner kit and stick the "Schwank" foil on bottom of this flap.

- Remove the remaining protective foils from bluTek-burner kit.
- The perforated adapter covering is to fit at the mounting angle of the bluTek-burner kit by means of tapping screws.
- For a quick external identification of the assigned MODBUS address stick the provided address-sticker [number] on the bottom bluTek-burner housing and enter there the corresponding address by number stickers or with marker.

- **Exhaust gas connection [Type B23, C]:**
Note that the stainless steel flexible pipe mounted at the end of the tube with a gasket.
- **Accessory**
Exhaust gas adapter code-no. 126 7035 0
Mount the exhaust gas adapter at the end of the tube with a gasket.
Ensure a vertical exhaust gas extension of at least 0.5m.

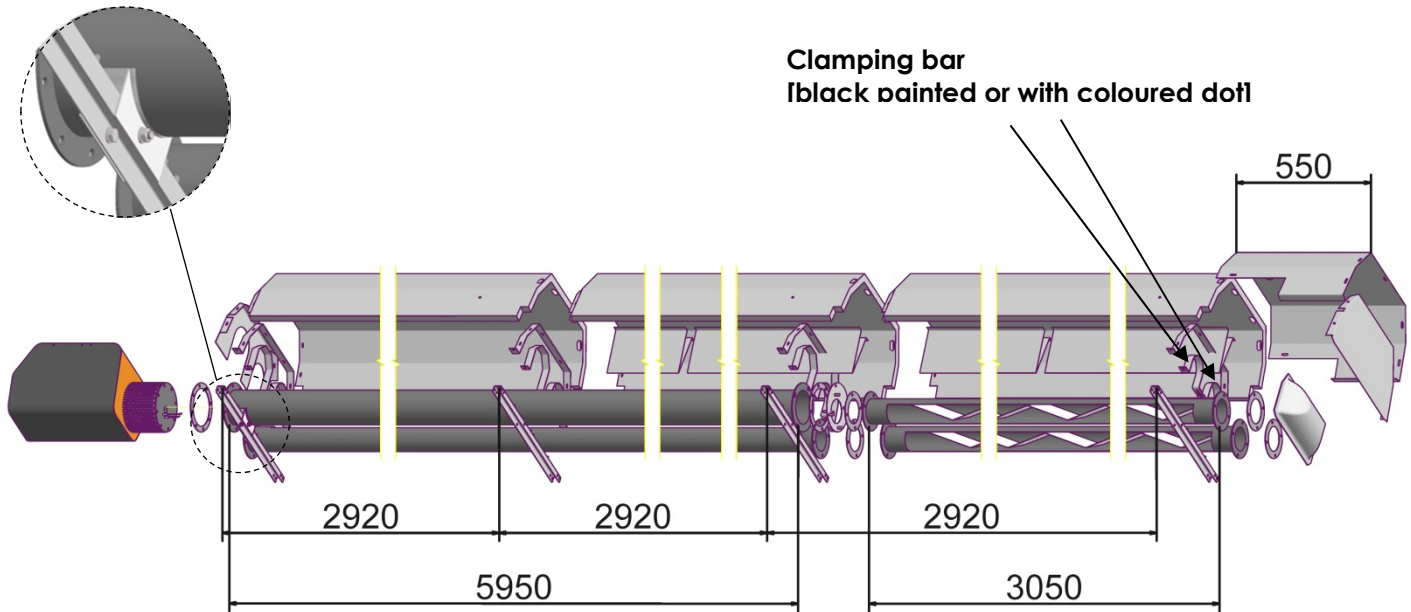


Fig 24: Mounting deltaSchwank 950U

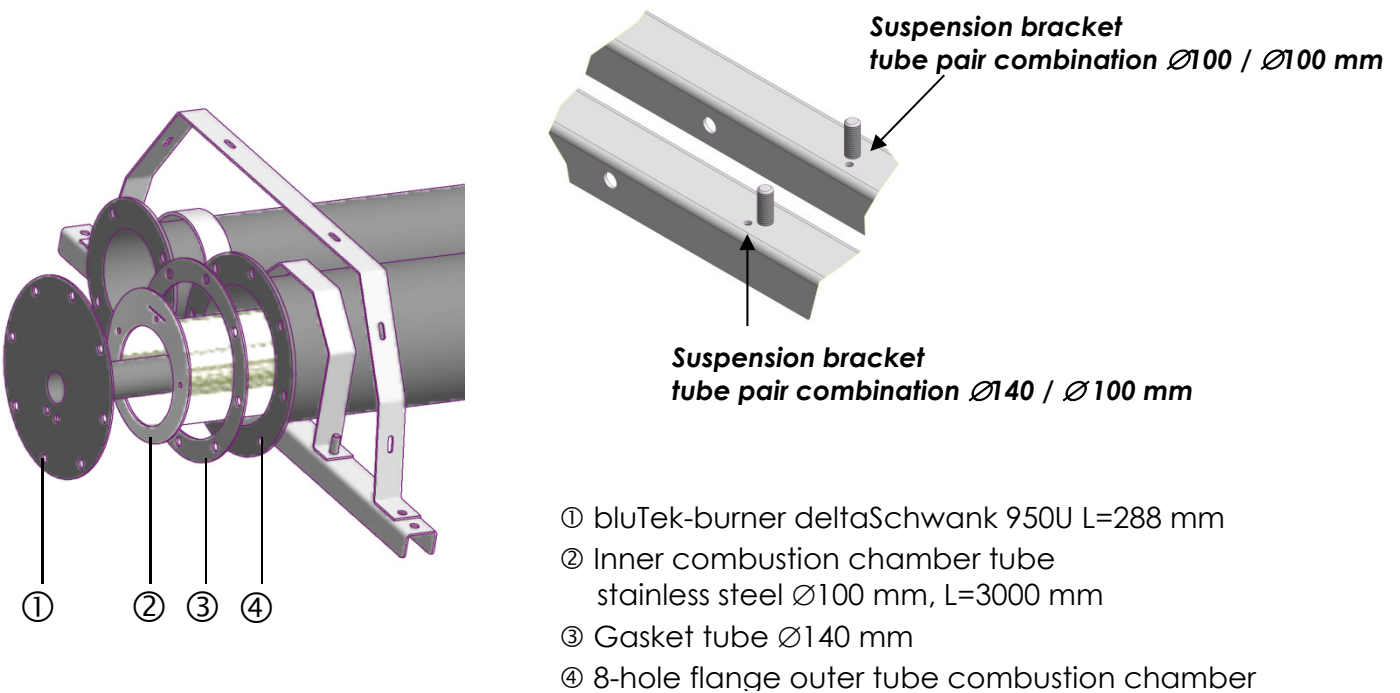


Fig 25 : Mounting interface combustion chamber deltaSchwank 950U

deltaSchwank 1260U



Tools you need

- hexagonal wrench or ratchet [width: 10, 13]
- socket wrench [width: 7 and 8]
- hand riveter

Note before mounting

- Hang first the suspension brackets and observe the specified distance dimension between them. Note there are two different types of suspension brackets [tube pair combination Ø140/Ø100 mm or Ø100/Ø100 mm]! Optical distinctive feature is the hole on the left or right side of most right located stay bolt on suspension bracket. Hole on the left side identified tube pair combination Ø100 / Ø100 mm. Hole on the right side bolt identified tube pair combination Ø140 / Ø100 mm.
 - Fix the guide shell on the first suspension bracket [direct after burner kit] with 2x screws M8x16 / washers / lock washers / nut for guide the outer combustion chamber tube.
 - The outer tube combustion chamber L= 5950 mm has to be mount on the right side of the suspension bracket [in the flow direction] - check the correct stud bolt position on the bracket!
 - Flanges are mounted with flange packing [each 8 or 4 screws/washers/lock washers/nuts M8].
 - Observe the respective flange positions of the outer combustion chamber tube during assembly - 8-hole flange shows to the bluTek-burner kit!
 - Turn welding seam of the tubes to the side.
 - **Welding seam of outer combustion chamber tube is to be mounted upwards at 45°!**
 - Both tubes with turbulator [coloured ring marking] have to be mounted in front and behind the turnaround box. The coloured ring showing to the turnaround box! Joint between outer tube combustion chamber Ø140 mm and following radiant tube Ø100 mm is carried out by stainless steel flange adapter!
 - Place the enclosed stainless steel trapezoidal sheet on top of the inner combustion chamber tube and insert the flap through the slot of the flange and bend it over for fixation!
 - Inner combustion chamber tube [stainless steel] L=3000mm inclusive trapezoidal sheet
- will be slide into outer combustion chamber tube, position from inner to outer tube will be ensured at final assembly bluTek-burner kit and bluTek- burner!
- Tube bars and bracket bars have to be fixed by M8 nuts/3D-washers/lock washers on the suspension brackets.
 - Clamping bars [black painted or with colored dot] for tubes Ø140 and 100 mm are mounted on the last suspension bracket. Observe the specified mounting distance between suspension bracket and turnaround box of 140 mm before tightening!
 - The intermediate reflectors have to be fixed into the second, third and fourth reflector [not combustion chamber reflector]. At both ends of the reflector sheets the intermediate reflector will riveted with 2 stainless steel rivets [reflector has already holes to set the rivets]. An additional short angle bracket is to be fixed by rivets in the centre of the second reflector to hold the intermediate reflectors.
 - Start the reflector mounting at the turnaround box side. Reflectors with intermediate reflectors are placed on suspension brackets and have to be fixed with the bracket bars by 6x M5 [screws/washers/self-locking nuts]. Reflector end with notch on sides shows to the turnaround box.
 - Following combustion chamber reflector is placed on suspension brackets and have to be fixed with the bracket bars by 6x M5 [screws/washers/self-locking nuts].
 - The reflector end segment L= 550 mm is placed on the reflector and have to be fixed with 3x M5 screws.
 - Both front plates have to be fixed by 6x M5 [screws/washers/self-locking nuts].
 - Insert following bluTek-burner L=288 mm with its 3 stud bolts into the corresponding flange holes of inner combustion chamber tube. Place between tube flange and bluTek-burner a gasket.
 - In addition a burner baffle together with gasket has to mount in front of the bluTek burner whereby the flap shows diagonally downwards.
 - Now firmly screw bluTek-burner kit with 8-hole flange.
 - Fit the igniter and igniter gasket with 2x M4 nuts to the stud bolts of the connection adapter.
 - Connect the straight ignition cable plug with igniter and ionisation cable with burner control unit IC 4000/1.
 - Remove the protective foil from the housing flap bluTek-burner kit and stick the "Schwank" foil on bottom of this flap.

- Remove the remaining protective foils from bluTek-burner kit.
- The perforated adapter covering is to fit at the mounting angle of the bluTek-burner kit by means of tapping screws.
- For a quick external identification of the assigned MODBUS address stick the provided address-sticker [number] on the bottom bluTek-burner housing and enter there the corresponding address by number stickers or with marker.

- **Exhaust gas connection [Type B23, C]:**
Note that the stainless steel flexible pipe mounted at the end of the tube with a gasket.
- **Accessory**
Exhaust gas adapter code-no. 126 7035 0
Mount the exhaust gas adapter at the end of the tube with a gasket.
Ensure a vertical exhaust gas extension of at least 0.5m.

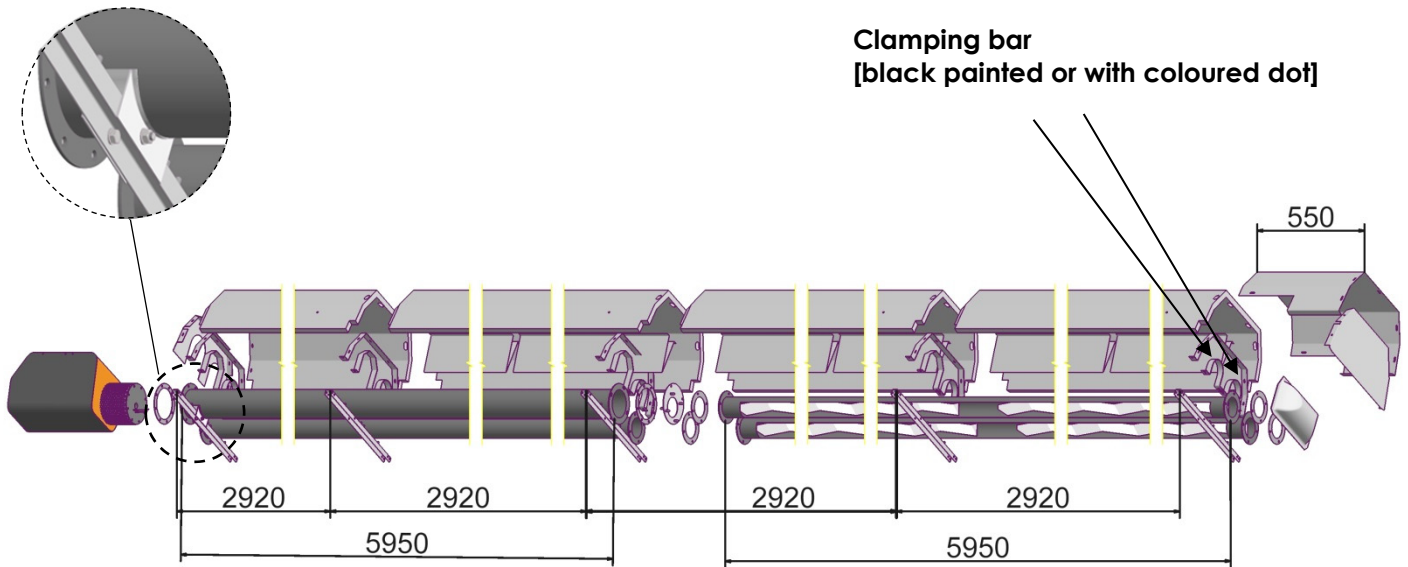


Fig 26: Mounting deltaSchwank 1260U

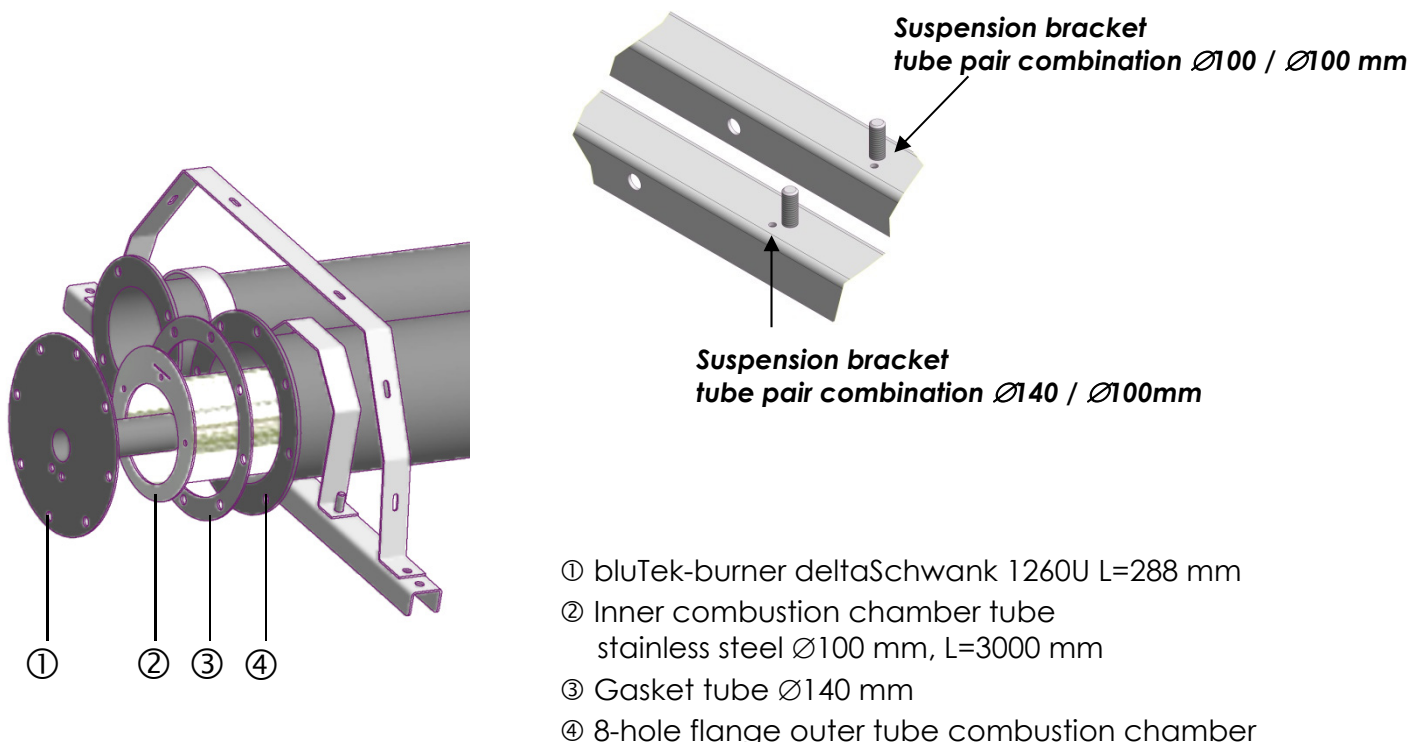


Fig 27: Mounting interface combustion chamber deltaSchwank 1260U

10 Installation instructions



Danger of fire and explosion!
Unprofessional handling of gas pipes, gas connections and the appliance can produce gas leaks. It is highly dangerous if gas is ignited!
Working on gas pipes and the appliances is only allowed by approved installers.



Expansion of the heater!
When installing the heater, take into account the thermal expansion of the heater during operation.

Mount the flexible connections so that those can compensate the longitudinal expansion of the tube. Only use flexible connections for the radiant tube regarding:

- gas
- electricity and
- air [if necessary]

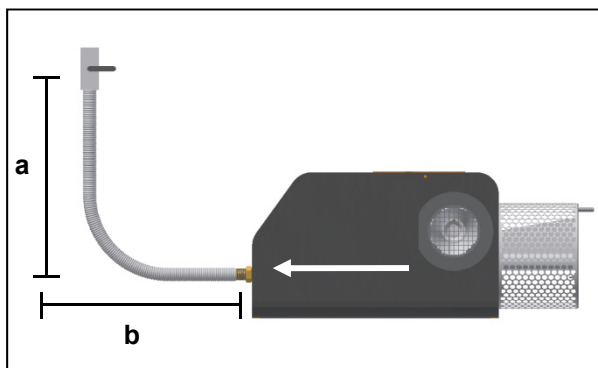


Fig 28: Longitudinal thermal expansion

Gas-pipe-system and mounting of heaters

Connection of gas pipes to the appliance, supply and the mounting of the appliance are only allowed by professional personnel who is registered, holding a current certificate of competence and in accordance with the relevant provisions of the gas safety [installation and use] regulations.

Additional installation notices of national or local institutions must be observed. The pipe must be dimensioned in a way that the minimum

connection pressure in front of the gas combination valve of the individual devices is available at the nominal thermal load of the entire system, according to table 6.

Please consider the pressure drop of the upstream mounted gas connection and gas filter. For the detailed pressure drop value of the Schwank gas-pipe-systems see table 7.

Minimum connection pressures in front of valve

deltaSchwank		
	heater type	min. connection pressure [hPa]
Nat. Gas H*	310U - 1260U	15
Nat. Gas L*	310U - 1260U	20
Propane	310U - 1260U	40

* Nat. Gas H: $H_{i,n}$: 9,97 kWh/m³ / Nat. Gas L: $H_{i,n}$: 8,57 kWh/m³

Tab 6: Min. connection pressures in front of gas combination valve

Pressure drop Schwank gas-pipe-systems

deltaschwank			
	heater type	connection unit	pressure drop [hPa]
Nat. Gas H*	310 - 635	1/2" / L=800 mm	2
	950 - 1260	3/4" / L=800 mm	2,5
Nat. Gas L*	310 - 635	1/2" / L=800 mm	2
	950 - 1260	3/4" / L=800 mm	3
Propane	310 - 635	1/2" / L=800 mm	1
	950 - 1260	3/4" / L=800 mm	1

* Nat. Gas H: $H_{i,n}$: 9,97 kWh/m³ / Nat. Gas L: $H_{i,n}$: 8,57 kWh/m³

Tab 7: Pressure drop Schwank gas-pipe-systems



The max. connection pressure is 65 hPa!



In case of contaminated gas pipes and generally at gas pipes of welded black steel have to be mounted gas filter-groups directly in front of the heater.

Note the following points while installing the gas-pipe-system:

- ⇒ Use only gas lines as per national standards.
- ⇒ Never hang heaters on the gas pipes.
- ⇒ Mount a manual gas cock upstream of every radiant tube.
- ⇒ Close all gas cocks before carrying out the leak test and disconnect the connection between the gas cock and the burner to avoid damages to the gas regulator and gas combination valve.
- ⇒ Clean gas pipes before the installation of the heater. Reconnection after pressure control and expansion.

Please observe the national standards.



Connect the heater with an approved flexible hose!

- ⇒ Use the following hose length for deltaSchwank:

310 - 635	R 1/2"	length 800 mm	Art.-No 192 0845 0
950 - 1260	R 3/4"	length 800 mm	Art.-No 192 0846 0

- ⇒ Mount a flexible hose only with 90° bend or with 2 x 90° elbow fittings in a 180° bend according to Fig 29, 30 and 31.
- ⇒ Keep the specified installation dimensions.
- ⇒ Wrong mounting of flexible hoses shown in Fig 32 [sketches ① to ③].

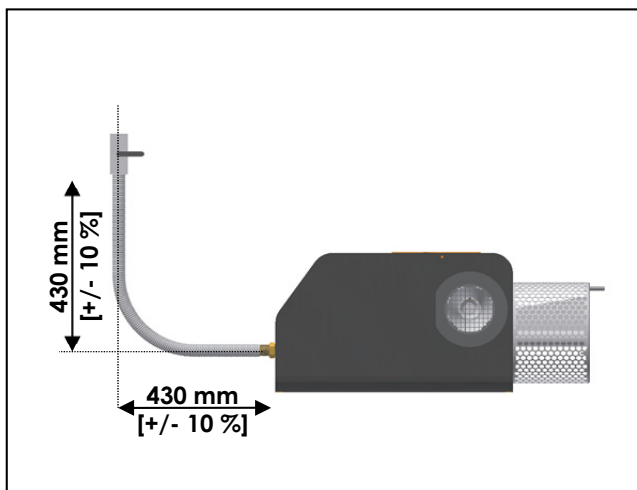


Fig 29: Vertical connection with 90° bend

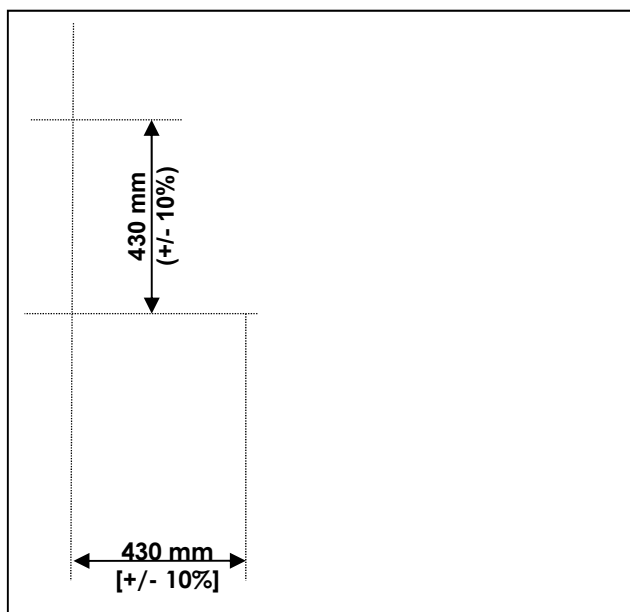


Fig 30: Sideward connection with 90° bend

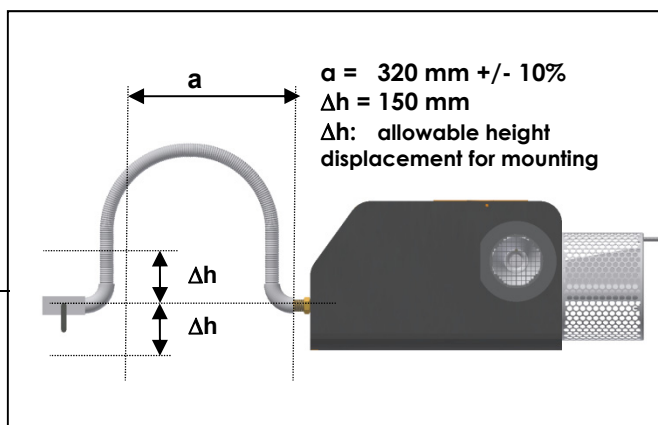


Fig 31: Alternative connection 180° -bend with 2 x 90° elbow fittings

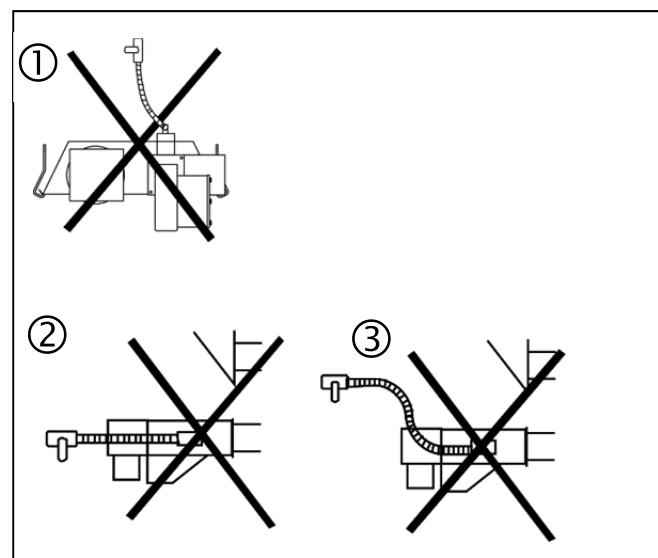


Fig 32: Wrong mounting of flexible hoses



Gas connection has to be positioned with 90° or 180° bend in the axle of the heater to compensate the thermal expansion of the heater. Otherwise torsional forces will operate on the hose!

Avoid twisting of the flexible hose!
When tightening the union, counter hold the nipple on the hose.

Pay attention that the flexible hose will not be mechanically damaged by tools etc. Do not buckle the hose.

Do not mount damaged flexible hoses!
Damaged hoses can break due to the movement of the heater.

Exhaust flue installation single heater

The exhaust system is available as variation of the radiant heaters. The flue system is connected at the end of the radiant tube. Note the information in chapter 4 "Planning".

Installation exhaust collecting system [herringbone]

The installation of the flue collecting system must be carried out according to the planning of Schwank.

- After mounting the heaters with their burner kits the connection sets F [adapter and damper] have to be mounted at the end of the tube heater. The adapter must be fixed with a gasket at the flange of the last radiant tube..
- The spiral tubes for the flue collecting system with different lengths and dimensions must be mounted according to Schwank planning. When assembling the tube elements any burrs or residue of oil and grease must be eliminated.
- All connecting tubes and collecting tubes must be mounted with a small slope towards the central exhaust fan [about 0,3 %, means 30 mm per 10m]. Any dips and sinks in the tubes must be avoided (to prevent collection of condensate).
- The spiral tube elements are connected by couplings. Each tube element must be fixed by two self-tapping screws at opposite sides. Screws may not be fixed at the bottom of the tubes.
- After fixing the tube elements with screws all tube connections must be sealed carefully with high temperature silicon [temperature resistant at least up to 200 °C, named f.e. NOVASIL]. When starting the central exhaust fan for the first time all tube connections have to be checked for tightness.
- If the Schwank planning requires a condensate run off, this part must be mounted directly in front of the exhaust fan [deepest point of the system]. The condensate run off has to be connected to a condensate pump or a siphon [min. water barrier height 30 cm].

Electrical installation [wiring diagram]



Danger of electric shock!
Electric shocks are highly dangerous!
Working at the electrical equipment of the appliance is only allowed by professional personnel observing the current IEE regulations.



Isolate the electrical supply while working at the electrical equipment of the appliance and safeguard the appliance against unintentional connection to the circuit.



The gas supply and electrical cable must be situated on the outside of the radiation and combustion heat. Only use heat-resistant cables near the tubes.



The power supply for the heater must be flexible connected with Ölflex- or silicone cable.

Electrical connection Operation with MODBUS control

Power supply

- ⇒ Route a flexible 3-wire electrical connection cable [max. 3 x 1.5 mm²] for power supply burner kit to the four-pin plug and connect the cable according to connecting scheme [Fig 33].
- ⇒ Connect 4-pin GDM socket with housing plug on burner control unit IC 4000/1 of the burner kit.
- ⇒ The power supply for the heater must be flexible with maximal wire cross-section of 3 x 1.5 mm² Ölflex- or silicone cable
- ⇒ In order to disconnect the bluTek burner kit from the electrical supply pull the plug out from IC 4000/1.



The 4-pin GDM plug for the power supply bluTek burner kit is included in delivery of the kit.

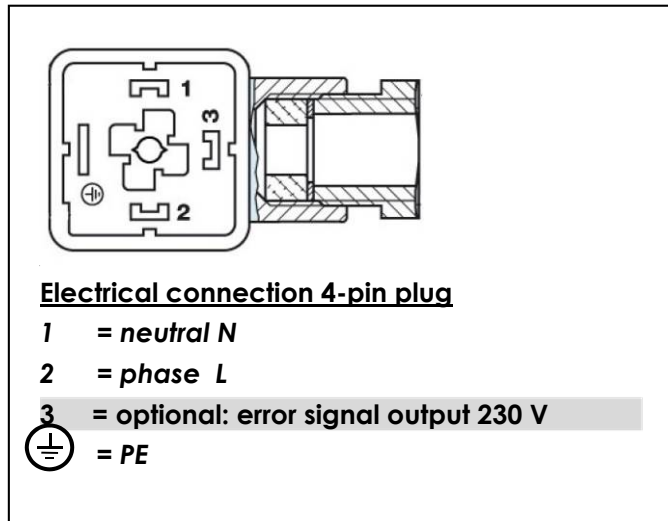


Fig 33: Electrical connection 4-pin plug

MODBUS communication

- ⇒ Route a flexible 3-wire MODBUS cable [max 3 x 0.5 mm²] for the Modbus connection into the free cable gland of the burner control unit IC 4000/1 and connect it according to the connection diagram [Fig 36].
- ⇒ Maximum length between junction box MODBUS and connection burner control unit IC 4000/1 may be 0.5 m.
- ⇒ At the of each MODBUS communication circuit a terminal resistance 120 Ω must be set on the relevant burner control unit IC 4000/1. Resistor is already loosely plugged into each socket KN 8 of the burner control unit IC 4000/1. This socket must then be closed with the resistor.
- ⇒ The necessary MODBUS address assignment is explained on page 45.

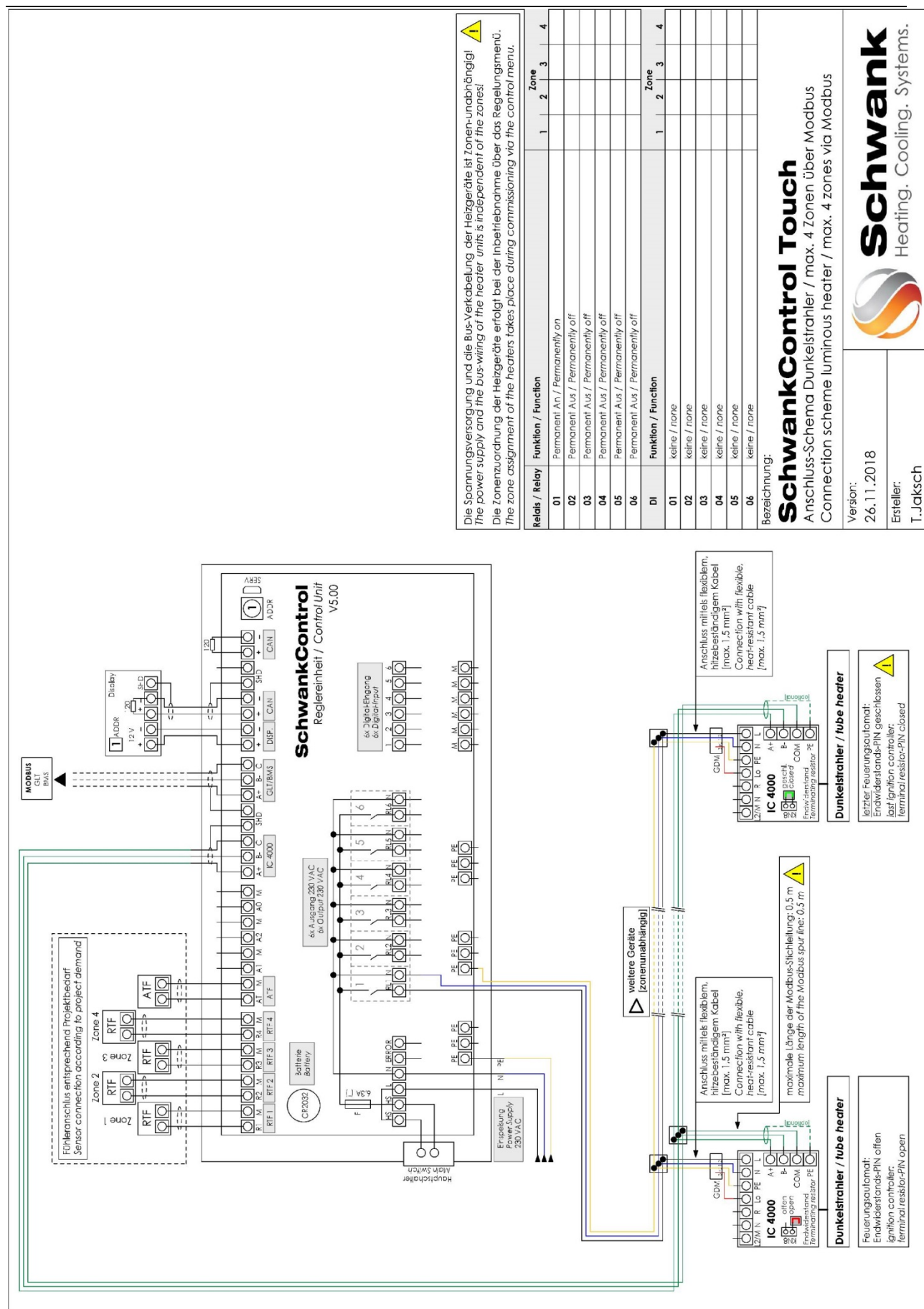
Electrical connection exhaust gas collecting system

After conversion of the heaters to operation with exhaust gas collection system they can be electrically connected as described above.

Fig. 35 shows the wiring diagram between the central control unit SchwankControl Touch control and the peripherally required SchwankControl SAV 1 extension kit and SAV fan monitoring kit.



Further information and wiring schemes for more different electrical connection options [e.g. multi-zone operation, grouping of several central control units SchwankControl Touch,...] can be found in „Electrical Compendium“.



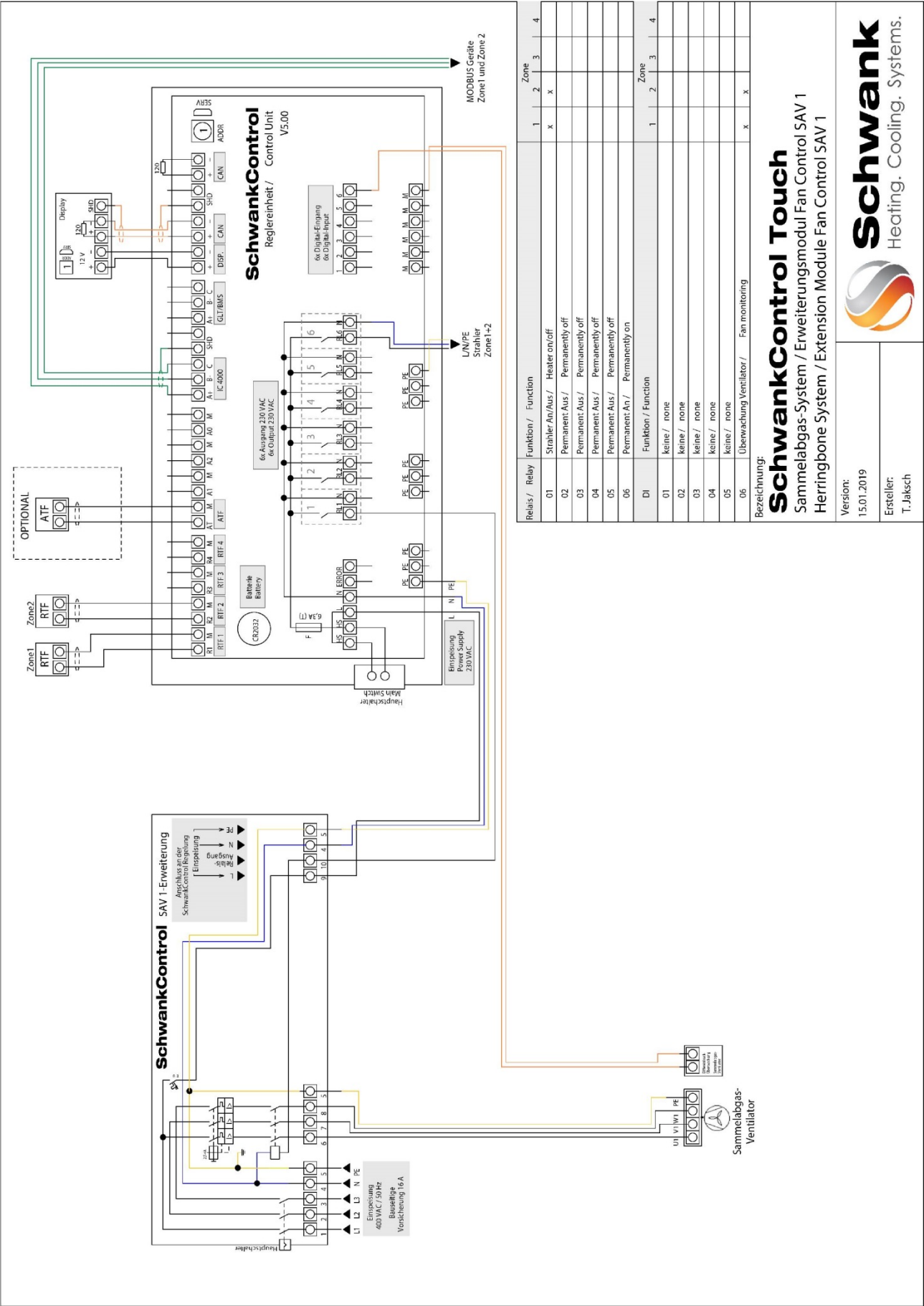


Fig. 35: Connection scheme bluTek burner kit exhaust collecting system with SchwankControl Touch / Extension kit Fan Control SAV1

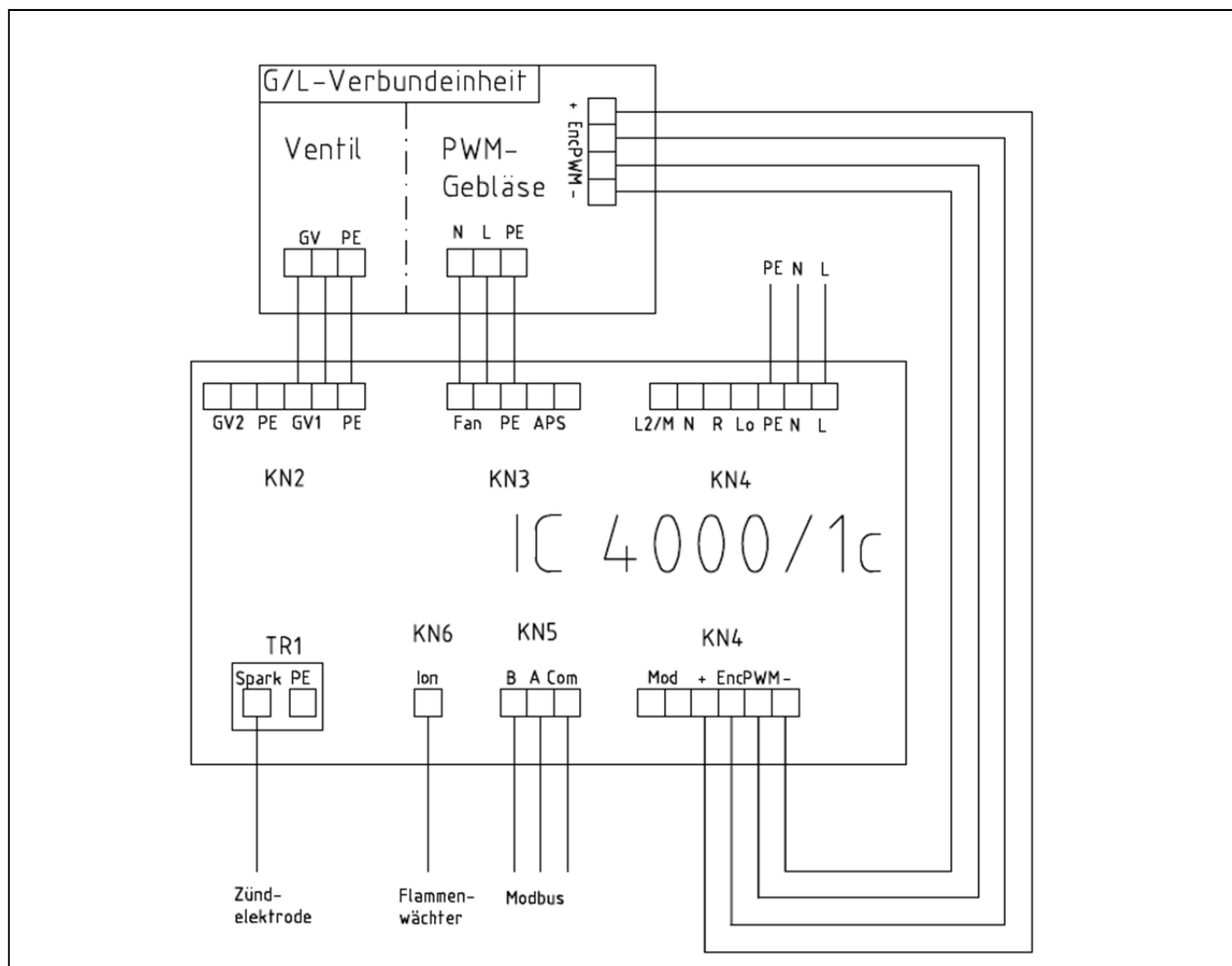


Fig 36: Internal wiring diagram bluTek-burner kit deltaschwank

11 Commissioning instructions

Before commissioning

A qualified service engineer must carry out this operation. The correct operation and fixing of the heater is prerequisite for the warranty. Checking gas lines and flue system is not included in this service.



The heaters are only pre-set by the manufacturer and must be adjusted for proper operation according to gas quality site on site.
For this information contact your local gas company.

Check the function of the following equipment:

- Exhaust flue
- Combustion air supply
- Control unit
- Safety equipment
- Safety of electrical circuit



Pay attention when commissioning!
Vaporization of remaining grease of metal units may cause greasy mist.
This kind of mist disperses after approx. 30 minutes. During this time the room has to be ventilated.

Parameter IC 4000/1 and setting

The burner control unit IC 4000/1 is already factory preset.

The parameters can be read out by the Schwank Service Software IC 4000 [RS-485 interface board] and if necessary to be changed.

Parameter selection and settings can made manually direct at IC 4000/1 by the two push buttons SW 2 and SW 3 and the 7-segment display.

For this, unscrew the lid of the IC 4000/1 burner control.

After power supply IC 4000/1 following sequence is shown on the 7-segment display:

1. segment test, all 7 segments light up
2. software version [two successive numbers]
3. burner control software: 1

Parameter	Parameter name and parameter value definitions	Factory setting	Set range
PP01	Setting Communication 0: No MODBUS control [e.g. ThermoControl M+] 1: MODBUS control by SchwankControl Touch	1	0 - 1
PP02	Drive Fan 0: Phase angle control driven 1: PWM driven	1	0 - 1
PP04	PWM FAN START SPEED 20 – ["PP06 PWM FAN MAX SPEED" or 180] [Note 1]	xx according to type see Tab 5, page 23	20 - 180
PP05	PWM FAN MIN SPEED 20 – ["PP06 Fan PWM FAN MAX SPEED" oder 130] [Note 2]	xx according to type see Tab 5, page 23	20 - 130
PP06	PWM FAN MAX SPEED ["PP04 PWM FAN START SPEED" or "PP05 PWM MIN SPEED or 30] – 180 [Note 1], [Note 2]	xx according to type see Tab 5, page 23	30 - 180
PP09	APS monitoring for PWM driven fan 0: APS disabled for PWM fan 1: APS enabled for PWM fan	0	0 - 1

Tab 8: Parameter level IC 4000/1

Note 1: PP06 >= PP04

Note 2: PP06 >= PP05

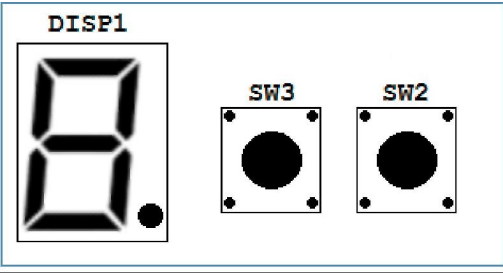


Fig 37: 7-segment display and push buttons IC 4000/1

ON normal working mode DISP1 is blank.

When you need to enter parameter setting:

- Press SW2 and SW3 buttons together for 3 seconds.
- Parameter number “1” is displayed on DISP1.
- Press SW2 to increase the parameter number, press SW3 to decrease the parameter number.
- When you reached the target parameter number, press SW2 and SW3 buttons together for 3 seconds to reach the **setting level for the value**.
- For parameters PP03, PP07, PP08 **parameter number** starts to flash on DISP1.
- For parameters PP01 und PP02 **parameter value** starts to flash on DISP1.
- Now you can increase the parameter value by pressing SW2, and decrease it by pressing SW3.
- To store the new parameter setting, press SW2 and SW3 buttons together for 3 seconds.
- Parameter menu is closed and DISP1 is blank again.



Parameter settings menu has 10 minutes timeout. If you don't press any button for 10 minutes, control exits from parameters menu automatically without saving the settings.

Assignment MODBUS address

For every heater [= burner control unit] it is mandatory to assign an MODBUS address if it controlled by SchwankControl Touch. All heaters are assigned with the MODBUS address 1 in the delivery state. To change the MODBUS address, the lid of the IC 4000/1 burner control unit must be opened. The MODBUS address is set by the DIP switches in the lower right side of the board. A maximum of 31 addresses can be assigned per heating zone.

Add.		Add.	
1		17	
2		18	
3		19	
4		20	
5		21	
6		22	
7		23	
8		24	
9		25	
10		26	
11		27	
12		28	
13		29	
14		30	
15		31	
16		32	

Fig 38: MODBUS addressing IC 4000/1 by DIP switches

- Dip switch position below
- Dip switch position above

External identification MODBUS address

For a quick external identification of the assigned MODBUS address, please enter the corresponding address [number] on the provided MODBUS-address label by number stickers or with marker pen. MODBUS-address label is to stick on the bottom side bluTek-burner kit housing.

Adjusting nominal heat load / Modulating range



Note!
Gas flow are factory set to natural gas
or propane. You may only commission
the system after adjustment.

Check connection pressure

- ⇒ Open first the gas cock which is at the end of the flexible gas hose [Fig.39].
- ⇒ Open the test nipple connection pressure. Connect the pressure measuring instrument to the test nipple ① and determine the connection pressure.
- ⇒ **Close the test nipple after the measurement and check if the test nipple is gas-tight.**

Adjusting nominal maximum load

[see Fig. 40]

- ⇒ **Switch heater in full load [MAX Speed PP06]**
means by of
 - a) activating chimney sweep mode on central control unit SchwankControl Touch or
 - b) selection PP06 on Schwank service software IC 4000 or
 - c) selection PP06 directly with pushbuttons on board IC 4000/1 [see page 44]
- ⇒ **Adjustment CO₂-value at gas throttling screw ④ after about ca. 10 minutes operation, according to values Tab 5, page 24**
by small slot screwdriver or hex wench 2mm
 - higher CO₂-value:
turn gas throttling screw ④ clockwise [+]
 - lower CO₂-value:
turn gas throttling screw ④ anti clockwise [-]

Adjusting OFFSET in lowest speed

[see Fig. 40]

- ⇒ **Switch heater in lowest speed**
means by of
 - a) selection START speed PP04 or MIN speed PP05 [whatever is lower] on central control unit SchwankControl Touch or
 - b) selection START speed PP04 or MIN speed PP05 directly with pushbuttons on board IC 4000/1 [see page 44] or
 - d) restart heater and use start speed sequence of 1 minute
- ⇒ **Control CO₂-value and Δp -OFFSET and if it necessary adjustment with OFFSET-screw ⑤, according to values Tab. 5, page 24**
by hex wench 2mm
- ⇒ Measure CO₂-value and effective OFFSET-pressure [differential pressure] via ② and ③-⑥.
[Recommendation to use differential pressure gauge with max. 5 hPa measuring range]
 - higher CO₂-value and Δp -OFFSET:
turn OFFSET-screw ⑤ clockwise [+]
 - lower CO₂-value and Δp -OFFSET:
turn OFFSET-screw ⑤ anti-clockwise [-]
- ⇒ Check adjustment CO₂-values in minimal and maximal speed again. If it necessary repeat procedure.
- ⇒ Close test nipple ② after the measurement and check if the test nipple is gas-tight. Reconnect the pressure air intake measuring tube to the regulator.



Fig. 39: Gas cock

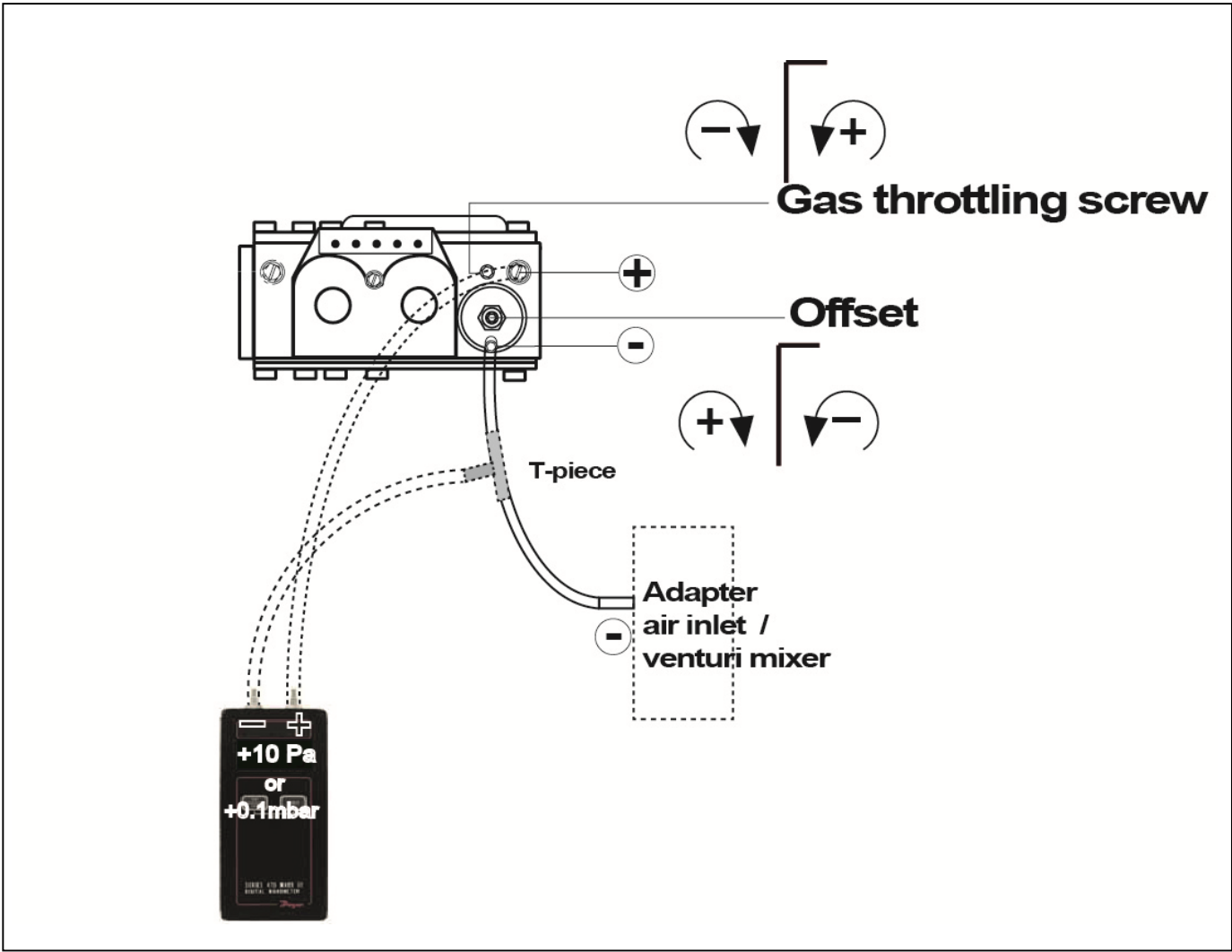


Fig 40: Measuring set up adjusting nominal load / modulating range

Commissioning exhaust gas collecting system [herringbone]

Before first start up

For first start up and commissioning of the system please request a Schwank service engineer to attend. Adjustment by Schwank is a condition of our warranty.

Gas fired radiant tube heater systems have to be installed by a qualified engineer according to local laws and rules in force.

Start up

- First check the complete electrical supply and connections of the system. All plugs at the burner units must be taken off. Check the correct connection of the plugs. After this the room temperature regulation system is switched on. Check the connection and the direction of the rotation of the central exhaust fan.
- Check the complete connecting and collecting tube system for a small slope towards the central fan [no sinks for condensate!].
- Check the slope from central exhaust fan to the chimney.
- Check the complete flue gas system for tightness with central exhaust fan on [burners off]. In case of leaks ensure tightness by high temperature silicon.

Correct start up and commissioning without system tightness is not possible!

- Now the negative pressure at test nipple nozzle pressure is checked [burners off, dampers at the end of the tubes completely open]. The minimum negative pressure under these conditions must be >1 hPa. In case the negative pressure level is lower please check again the tightness of the complete system. Also check that the damper in front of the central exhaust fan is open.

Commissioning

- The safe evacuation of the exhaust gases of all heaters is ensured by correct adjusting of negative pressure. This is done by fixing the dampers at the end of the heaters and may be also the damper in front of the central exhaust fan at the following values.

Required negative pressure level at test nipple OFFSET [cold conditions]:

- deltaSchwank 310U..1260U: -1.0 hPa

- Adjustment with central fan on, burners off.
- Start the adjustment with the heater furthest away from the central exhaust fan. Take the negative pressure at the measurement nipple at the bottom of the burner unit. Therefore take off the silicon tube between nipple and solenoid valve. Negative pressure is adjusted by moving the damper at the end of the tube heater. After adjustment the silicon tube has to be connected again between the nipple and solenoid valve.
- Adjustment of the other burner now follows with the same procedure.
- Having adjusted all the heaters the negative pressure of the units may have changed. A second thorough check and adjustment of the negative pressure of the units is necessary. Then the positions of the dampers must be fixed by the screw.
- Now the heaters can be started up [opposite sequence to adjustment].

12 Service guide / Trouble shooting

Maintenance and annual check [herringbone]

A regular maintenance is the requirement for a faultless operation of the appliance.

According to the National Standard Regulations, heating-systems with radiant tubes must be checked at least once a year.

Maintenance and troubleshooting is only allowed by professional personnel that is competent and instructed in radiant tubes.



Before starting work on the heater the gas cock has to be closed.

Maintenance must include the following checks:

- Check surface of combustion chamber tubes/radiant tubes and if fit necessary clean up.
- Check the slope of the tubes [3 mm/m in direction of the turnaround box connection]
- Check correct and firm connection of the reflectors and intermediate reflectors.
- Check tightness of gas-carrying parts and connections.
- Check the flexible gas hose for correct installation and tightness.
- Check electrical connection to the burner kit.
- Check the air/flue-system
- Check firm mounting and tightness of gas-/air ratio control unit within burner kit.
- Check condensation pipes.
- Check the safety functions of the ignition- and ionisation-controls, gas valves and operation indicator
- Check functionality Functional test of control and regulation equipment, switchgear and signal lights
- Check gas filter in case of reduced line pressure, in case of pollution change filter pad [spare part kits gas filter]
- Check correct parameter setting.
- Check safety distances and information boards.

Any deviations must be fixed immediately. Defect parts must be changed directly.

Maintenance work on gas valves, flame sensing and safety devices can only be maintained by the manufacturer or authorized personnel.



After the end of the maintenance work, the device must be put back into operation!

Error codes

If an error occurs, all gas valves are closed and the lockout message output [230 V] is activated and the error code is stored internally and transmitted by MODBUS to the central control unit SchwankControl Touch.

The fan still runs for 180 seconds in the post-purge time with maximum fan speed. After that, the heater is completely switched off and locked. The lock can be reset by activating the reset function SchwankControl Touch or switching off the power supply [min. 3 seconds] of the heater.

Error code "A" does not put the heater in a reset-requiring lock, but only switches off the heater.

7	Gas valve feedback error	Error in gas valve drive or feedback check circuitry
8	Ionization component error	Ionization signal is out of range
10	MODBUS signal missing error	If PP01=01 selected as MODBUS control and for more than 3 minutes no MODBUS signal has been received this error is given and heater switch off. Burner control is not locked.

Tab 9: Error code IC 4000/1

Error code	Error name	Description
1	Ionization error during start	If flame is not detected for the 2 ignition attempts during start
2	Ionization error during operation	If flame is not detected for the 2 ignition attempts after a flame loss
3	APS open error [APS= air pressure switch]	Error is given if phase angle control type is selected [PP02=0] Error is given if APS contact opens during start or operation
4	APS closed error	Error is given if phase angle control type is selected [PP02=0] Error is given if APS contact already closed during start
5	Encoder signal missing error	Error is given if PWM control is selected [PP02=1] Error is given if no encoder signal detected or fan speed < 10 RPS. This error is given after 3 sec.
6	Unexpected "encoder signal" error	Error is given if phase angle control type is selected [PP02=0] and encoder signal is detected > 30 RPS. This error is given after 3 sec.

Troubleshooting / Error cause

Error code 1:

- no gas [e.g. gas line not vented, gas cock closed]
- faulty gas valve
- Ignition and ionization electrodes damaged / dirty
- wrong setting gas throttling screw
- poor grounding

Error code 2:

- poor low ionization current [$<0,7\mu\text{A DC}$]
- too low connection pressure

Error code 5:

- PWM fan don't run
[e. g. impeller broken , motor broken]
- PWM cable broken

Error code 7 + 8:

- internal error IC 4000/1

Error code 9:

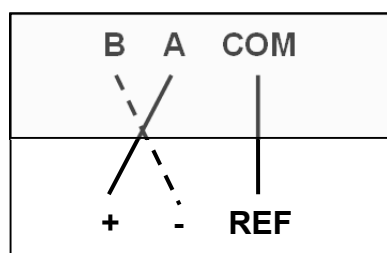
- Wrong setting fan speed parameters
[PP04, PP05, PP06]
- Damaged fan [e.g. bearing failure]

Error code 10:

- interruption MODBUS connection >3 minutes
- wrong wiring between IC4000/1 and SchwankControl Touch

Example: right connection B and - / A and +

MODBUS Assignment IC 4000/1



MODBUS Assignment SchwankControl

13 Change of gas type

In case of change of gas type the corresponding CO_2 value has to be set by means by of gas throttling screw and the parameters burner control IC 4000/1 according to Tab. 5, page 24.

Tab 10: Error causes

14 Accessory

tetraSchwank

Increase energy efficiency through utilisation of condensing technology from the exhaust gas heat by counterflow exchanger between the heater and wall/roof terminal.

Assembly instruction

- Before starting installation tetraschwank the ventilator must be plugged with high-temperature resistant sealing compound and secured with at least 3 sheet metal screws.
- Mount grating of suction opening and fixing bracket on the ventilator with sheet metal screws. Ventilator must be hang separately.
- Note the suction direction of the ventilator.
- Note the outflow direction downwards of the ventilator.
- tetraSchwank heat exchanger should be mounted with slight slope [3 mm/1m] to the T-piece.
- An extension of the flue gas installation is permitted only in exceptional cases.
- tetraSchwank must be suspended by two premounted fastening clamps. Chains or steel cables have to be fixed in vertical direction.
- A condensate drain must be fitted with a siphon at the T-piece.
- Condensate pipes must be installed with a slope to the discharge into the sewer system.
- Connect the ventilator as shown in Fig. 41 to the central control unit Schwank Control Touch.

Electrical connection ventilator

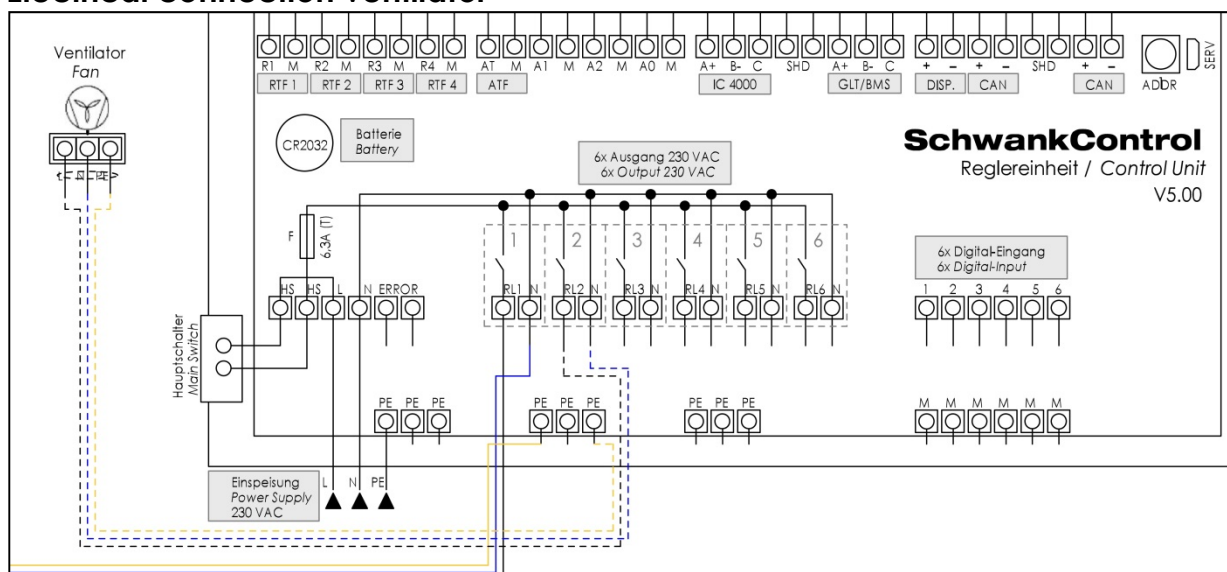


Fig. 41: Electrical connection tetraSchwank to SchwankControl Touch

15 Spare parts

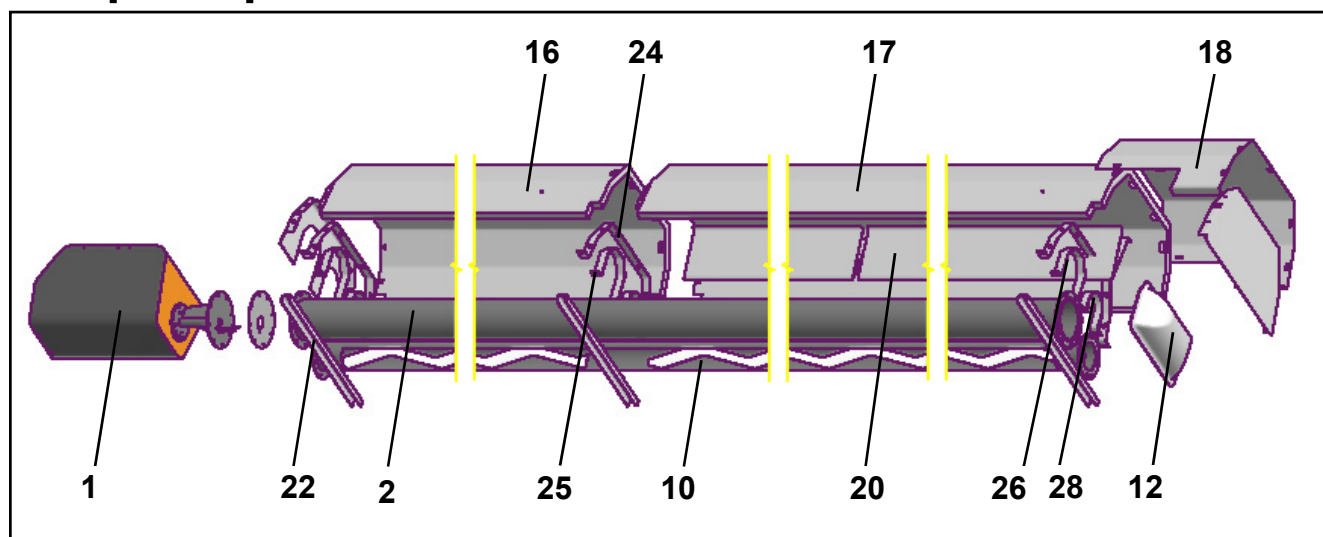


Fig 42: Spare parts deltaSchwank 635U

Spare parts radiant kit deltaSchwank

Pos.	Part	Art.-No
1	bluTek-burner kit deltaSchwank 310U Natural Gas	026 1000 0
	bluTek-burner kit deltaSchwank 320U Natural Gas	026 1001 0
	bluTek-burner kit deltaSchwank 625U Natural Gas	026 1002 0
	bluTek-burner kit deltaSchwank 635U Natural Gas	026 1003 0
	bluTek-burner kit deltaSchwank 950U Natural Gas	026 1004 0
	bluTek-burner kit deltaSchwank 1260U Natural Gas	026 1005 0
2	Outer combustion chamber radiant tube FAL Ø140 mm / L= 5950 mm	126 1001 0
3	Outer combustion chamber radiant tube FAL Ø140 mm / L= 3050 mm [not in Fig 42]	126 1000 0
4	Inner combustion chamber tube stainless steel Ø100 mm / L=3000 mm [not in Fig 42]	126 1069 0
5	Inner combustion tube stainless steel Ø100mm / L=2500 mm [not in Fig 42]	126 1068 0
6	Inner combustion chamber tube stainless steel Ø100 mm / L=1500 mm [not in Fig 42]	126 1067 0
7	Trapezoidal sheet for combustion chamber deltaschwank 950U und 1260U [not in Fig 42]	126 1074 0
8	Radiant tube FAL Ø100mm / L=3050 mm with turbulator [not in Fig 42]	126 7055 0
9	Radiant tube FAL Ø100mm / L=5950 mm [not in Fig 42]	126 7199 0
10	Radiant tube FAL Ø100mm / L=5950 mm with 2 turbulators	126 1057 0
11	Tube connector from Ø140mm to Ø100 mm [not in Fig 42]	126 1056 0
12	Turn around box tube combination Ø140 mm / Ø100 mm	126 1004 0
13	Turn around box tube combination Ø100 mm / Ø100 mm [not in Fig 42]	126 1003 0
14	Gasket tube Ø140 mm [8-holes] [not in Fig 42]	126 1005 0
15	Gasket tube Ø100 mm [not in Fig 41]	126 7048 0
16	Reflector section combustion chamber	126 1058 0
17	Reflector	126 1059 0
18	Reflector end section L=440 mm	126 1060 0
19	Reflector end section L=550 mm [not in Fig 42]	126 1061 0
20	Intermediate reflector	126 1062 0
21	Mounting bracketl intermediate reflector [not in Fig 42]	126 1062 1
22	Suspension bracket for tube combination Ø140 mm / Ø100 mm	126 1007 0
23	Suspension bracket for tube combination Ø100 mm / Ø100 mm [not in Fig 42]	126 1006 0
24	Suspension bracket bar	126 1078 0
25	Tube bar Ø140 mm	126 1008 0
26	Clamping tube bar Ø140 mm [black painted or with coloured dot]	126 1009 0
27	Tube bar Ø100mm	126 1008 0
28	Clamping tube bar Ø100mm [black painted or with coloured dot]	126 4529 5
29	Mounting set deltaSchwank 310U / 320U [not in Fig 42]	126 1063 0
30	Mounting set deltaSchwank 625U / 635U [not in Fig 42]	126 1064 0
31	Mounting set deltaSchwank 950U [not in Fig 42]	126 1065 0
32	Mounting set deltaSchwank 1260U [not in Fig 42]	126 1066 0

Spare part bluTek-burner kit deltaSchwank

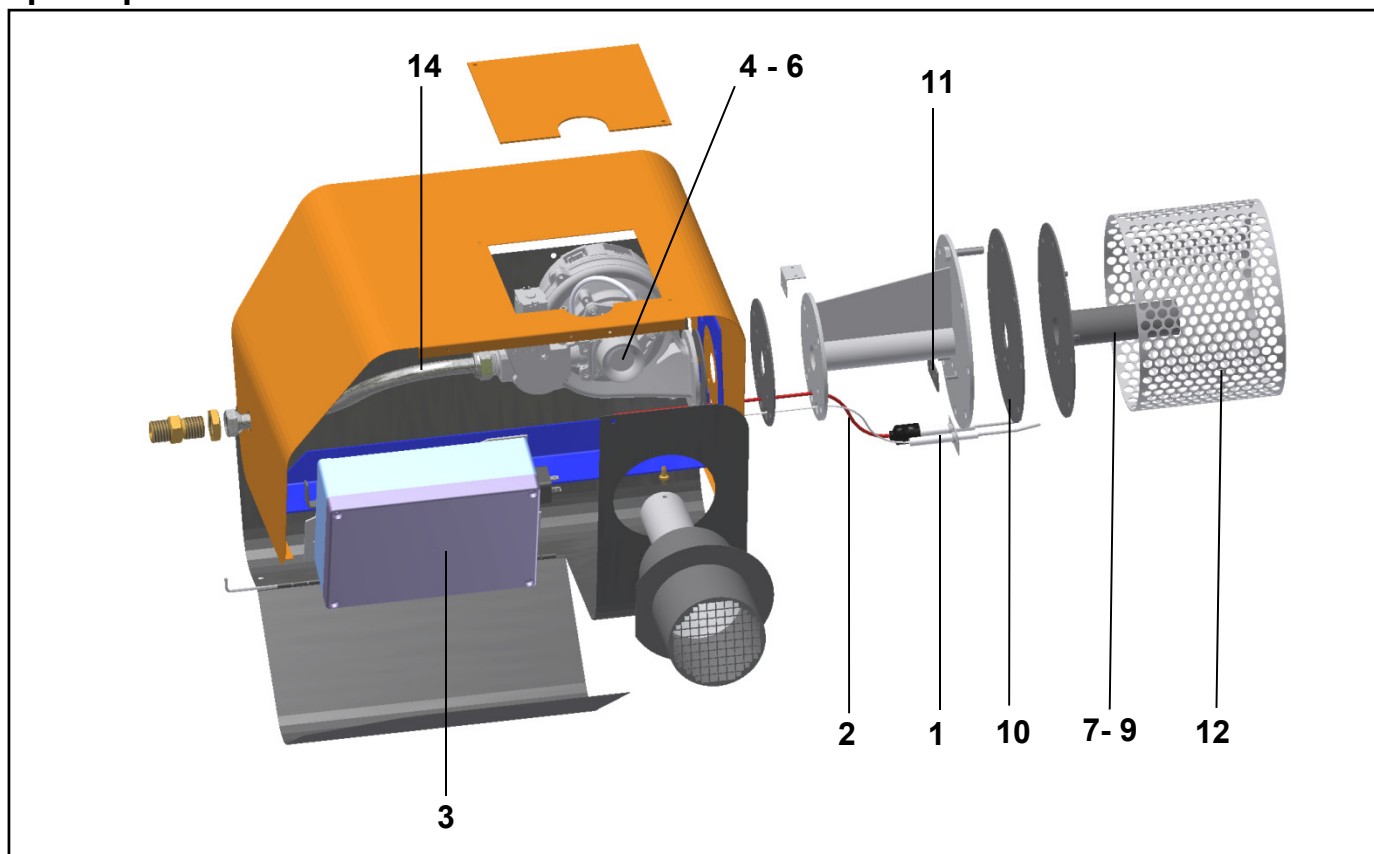


Fig 43: Spare part bluTek-burner kit

Pos.	Part	Art.-No
1	Spark igniter with ionisation cable deltaSchwank	126 1023 0
2	Ignition cable with straight plug	126 1051 0
3	Automatic burner control IC 4000/1 deltaSchwank [without mounting plate and wiring]	126 1091 1
4	Gas- / air ratio control unit NRV 118 [in cardboard]	126 1083 0
5	Gas- / air ratio control unit NRV 128 [in cardboard]	126 1083 1
6	Gas- / air ratio control unit NRV 148 [in cardboard]	126 1083 2
7	bluTek-burner L=128 mm	126 1013 1
8	bluTek-burner L=212 mm	126 1014 1
9	bluTek-burner L=288 mm	126 1015 1
10	Gasket bluTek-burner	126 1018 0
11	Gasket igniter	126 1019 0
12	Perforated cover adapter	126 1050 0
13	LED-operation indicator [not in Fig 43]	126 1024 0
14	Corrugated gas pipe with gaskets	126 1027 0
15	Spare part kits for gas filter 1/2" [not in Fig 43]	192 0758 0
16	Spare part kits for gas filter 3/4" [not in Fig 43]	192 0759 0



Please only use Schwank original spare parts.

The installation of spare parts which are not named or recommended by the manufacturer can lead to failure or damage of the heater.

16 EC type examination certificate

C € 0085



CERT

EU type examination certificate

EU-Baumusterprüfbescheinigung

CE-0085CS0487

Product Identification No.
Produkt-Identnummer

Field of Application <i>Anwendungsbereich</i>	EU Gas Appliances Regulation (EU/2016/426) <i>EU-Gasgeräteverordnung (EU/2016/426)</i>
Owner of Certificate <i>Zertifikatinhaber</i>	Schwank GmbH Bremerhavener Straße 43, D-50735 Köln
Distributor <i>Vertreiber</i>	Schwank GmbH Bremerhavener Straße 43, D-50735 Köln
Product Category <i>Produktart</i>	Heating or air conditioning appliances: Radiant heater (dark) (3311)
Product Description <i>Produktbezeichnung</i>	Single burner gas-fired overhead radiant tube heater, which can be combined to a multi-burner system F
Model <i>Modell</i>	deltaSchwank...
Countries of Destination <i>Bestimmungsländer</i>	AT, BE, BG, BY, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MT, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR, UA
Test Reports <i>Prüfberichte</i>	type testing: B 17/11/2512 from 20.12.2017 (DBI)
Test Basis <i>Prüfgrundlagen</i>	EU/2016/426 A III B (09.03.2016) DIN EN 416-1 (01.09.2009) DIN EN 416 (draft 01.12.2017) DIN EN 777-3 (01.09.2009)

17085-04-01-01

Date of Expiry / File No. 14.02.2028 / 18-0019-GEE
Ablaufdatum / AZ

03.05.2019 Rie A-1/2

Date, Issued by, Sheet, Head of Certification Body
Datum, Bearbeiter, Blatt, Leiter der Zertifizierungsstelle

DVGW CERT GmbH is an accredited body by DAkkS according to DIN EN ISO/IEC 17065:2013 and notified by the government of the Federal Republic of Germany for certification of gas appliances under EU Regulation

DVGW CERT GmbH ist von der DAkkS nach DIN EN ISO/IEC 17065:2013 akkreditierte und von der Deutschen Bundesregierung benannte Stelle für die Zertifizierung von Gasgeräten gemäß EU-Verordnung EU/2016/426.



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A-2/2

CE-0085CS0487

Elektrical Data 230 V AC, 50 Hz
Elektrische Daten

Appliance Categories <i>Gerätekategorien</i>	Supply Pressures <i>Versorgungsdrücke</i>	Countries of Destination <i>Bestimmungsländer</i>	Remarks <i>Bemerkungen</i>
I2E(R)	20/25 mbar	BE	
I3B/P	30 mbar	CY, IS, MT	
I3B/P	50 mbar	CY, IS, MT	
I3P	37 mbar	BE	
II2E3B/P	20, 37 mbar	PL	
II2ELL3B/P	20, 50 mbar	DE	
II2ELL3P	20, 50 mbar	DE	
II2ELw3P	20, 37 mbar	PL	
II2Er3P	20/25, 37 mbar	FR	
II2Er3P	20/25, 50 mbar	FR	
II2H3B/P	20, 30 mbar	DK, FI, LU, SE	
II2H3B/P	20, 50 mbar	AT, CH, CZ, GR, LU, RO	
II2H3B/P	25, 50 mbar	HU	
II2H3P	20, 30 mbar	EE, GR, LT, LV, NO, SK	
II2H3P	20, 37 mbar	ES, FR, GB, GR, HR, IE, IT, PT, SI, TR	
II2H3P	20, 50 mbar	CH, CZ, ES, FR, GB	
II2HS3B/P	25, 50 mbar	HU	
II2L3P	25, 50 mbar	NL	

Type <i>Typ</i>	Technical Data <i>Technische Daten</i>	Remarks <i>Bemerkungen</i>
deltaSchwank 310	heat input (Hi): 7,5...10,0 kW	radiant factor (min./max.): 80,9/80,6 %; annual performance ratio: 97,3 %
deltaSchwank 320	heat input (Hi): 10,0...20,0 kW	radiant factor (min./max.): 80,6/78,1 %; annual performance ratio: 99,0 %
deltaSchwank 625	heat input (Hi): 12,5...25,0 kW	radiant factor (min./max.): 82,2/80,3 %; annual performance ratio: 98,9 %
deltaSchwank 635	heat input (Hi): 17,5...35,0 kW	radiant factor (min./max.): 83,2/78,6 %; annual performance ratio: 97,4 %
deltaSchwank 950	heat input (Hi): 25,0...48,0 kW	radiant factor (min./max.): 82,0/83,7 %; annual performance ratio: 97,6 %
deltaSchwank 1260	heat input (Hi): 29,0...58,0 kW	radiant factor (min./max.): 83,4/80,9 %; annual performance ratio: 99,1 %

Type Variation <i>Ausführungsvariante</i>	Explanations <i>Erläuterungen</i>
...L	straight pattern radiator
...U	radiator in U-form

Hints of Utilization /Remarks

Verwendungshinweise / Bemerkungen

Installation codes: A3, B23, C13, C33 and C63

Installation codes B23, C13 and C33: with flue system Z-7.2-1602, 0432-CPD-217915 (Muelink & Grol), Future ew flex 0036-CPR-00055-209 (Schröder), Future ew 0432-CPR-00055-201 (Schröder), Future dw 0432-CPR-00055-301 (Schröder), Metaloterm ME 0432-CPD-2199901 (Ontop), Metaloterm UE 0432-CPD-99921 (Ontop) oder Metaloterm MF 0432-CPD-21999110 (Ontop)

The different models can be combined to a multi-burner system F according to DIN EN 777-3. The flue system can be implemented with a flue-gas heat exchanger. The layout of the multi-burner system F with their arm pipes, exhaust collecting pipes, exhaust chimneys and exhaust fans will be carried out by the Schwank GmbH.

Accessories: flexible hose according to DIN 3384: types RS331L (NG-4602AR0643, Fa. Witzmann), MW 22 U (NG-4602BL0115, Fa. Senior Berghöfer) and WSO (NG-4602BL0002, Fa. AZ-Pokorny)

Additionally tested appliance categories, supply pressures and countries of destination:

BY, RU, UA: II2H3P (20, 37 mbar); BG: II2H3B/P (20, 30 und 37 mbar)

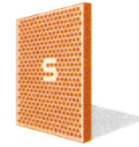
NO, provided that in Norway "Bio Methane" is equivalent to appliance category I2H and "Bio Propane" is equivalent to appliance category I3B/P; "Bio Methane" (20 mbar) and "Bio Propane" (30 mbar)

In Belarus, in the Ukraine and in the Russian Federation the CE-marking will be accepted as conformity approval if the Gas Appliance Regulation EU/2016/426 is transferred into national law by Belarus, Ukraine and Russian Federation.

NOx-class 4 (< 100 mg/kWh) according to DIN EN 419: draft 2017

17 EC declaration of conformity

Schwank
INNOVATIVE HEATING SOLUTIONS



EC Declaration of Conformity for type examined heaters

We declare that the following heaters are in conformance with the basic security and health requirements according to EC directives due to their conception and design.

Changes or modifications of the heaters without our authorization terminate the validity of this declaration.

Description:	Gas-fired Radiant Tube Heater
Model / Type:	deltaSchwank 310U / 320U / 625U / 635U / 950U / 1260U
Applied EC-Directives:	<ul style="list-style-type: none"> - EC-Machinery Directive 2006/42/EC - EC-Gas Appliance Regulation EU/2016/426 - EC-Low Voltage Directive (LVD) 2014/35/EC - EC-Electromagnetic Compatibility Directive (EMC) 2014/30/EC
EC-Type Examination Certificate:	CE-0085CS0487
Issued by:	DVGW Bonn / Germany
Basis of Harmonized Standards:	DIN EN 416-1, DIN EN 416-2 DIN EN 416 [2017-12 draft] DIN EN 777-3

SCHWANK GMBH
Cologne, 2018-04-20

Prof. Dr.-Ing. F. Schlößer
Managing Director

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Fax: 0049/(0)221-7276-288 • E-Mail: info@schwank.de

18 Product information related to Ecodesign Regulation No 2015/1188

Fuel Natural gas / Propane

Values	deltaSchwank					
	310U	320U	625U	635U	950U	1260U
Nominal heat input [kW] @ NCV	10,0	20,0	25,0	35,0	48,0	58,0
Minimum heat input [kW] @ NCV	7,5	10,0	12,5	17,5	25,0	29,0
Minimum heat input as percentage of nominal heat input [%]	25%	50%	50%	50%	48%	50%
η_{thermal} [%] @ GCV at nominal heat input	86,8%	83,2%	83,0%	80,9%	82,3%	83,1%
η_{thermal} [%] @ GCV at minimal heat input	87,2%	86,8%	85,9%	84,4%	84,6%	85,8%
Radiant factor RF_{nom} [%] @ NCV at nominal heat input	80,6%	78,1%	80,3%	78,6%	83,7%	80,9%
Radiant factor RF_{min} [%] @ NCV at minimal heat input	80,9%	80,6%	82,2%	83,2%	82,0%	83,4%
Auxiliary electricity consumption e_{max} [kW] at nominal heat input	0,03	0,04	0,04	0,08	0,17	0,29
Auxiliary electricity consumption e_{max} [kW] at minimal heat input	0,03	0,03	0,02	0,03	0,05	0,11
Heat output control type	modulating	modulating	modulating	modulating	modulating	modulating
Space heating emissions NOx @ GCV [mg/kWh]	60	60	60	60	60	60
Seasonal energy efficiency [%]	98,2%	99,0%	98,9%	97,4%	97,6%	99,0%

NCV= Net calorific value
GCV = Gross calorific value

Tab 11: Characteristic values energy performance deltaSchwank