

PHOENIX

assembling and operating manual

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1 Foreword







SCHARR TEC Combustion technology emerged in 2018 from the merger of all technical divisions of the SCHARR Group to form SCHARR TEC, from the former THERMOTEC Engineering GmbH. The Stuttgart-based company has been producing the Phoenix gas-blowing burner since 1996 and successfully distributes it to various drying-system manufacturers worldwide.

The operating instructions are to be regarded as part of the PHOENIX gas-blowing burner and therefore must be made available to the operator.

To ensure proper operation of the burner, it is also necessary to have read and understood the operating instructions. This applies to every person working on the burner.

1.1 Notes for the operator

The following symbols are used within the instructions:

Symbol	Explanation
	The danger symbol indicates a life-threatening situation. Failure to comply will result in serious bodily injury or death.
	The warning symbol indicates possible danger to life and injury. Disregarding it may result in moderate bodily injury and/or damage to property.
	The lightbulb symbol indicates additional important information
	Bullet-point symbol (used in lists)
	Symbol indicates that action should be taken
	Symbol indicates that action has been taken

2 Product description

2.1 Product label

The product label identifies the burner. It is located above the gas inlet on the PHOENIX gas-blowing burner. The most important information can be read off the product label:

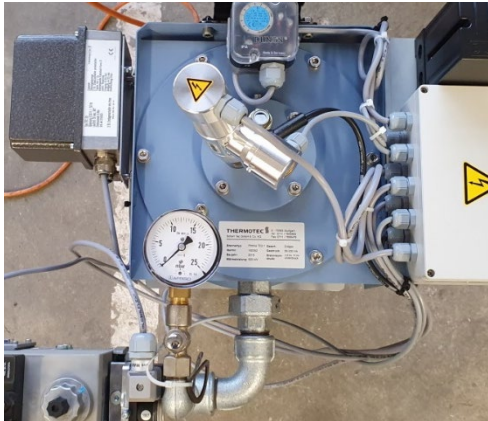


Diagram 1: PHOENIX from bird's eye view



Diagram 2: PHOENIX product label

Term	Description
Type of burner	Designates the size or shape of the burner.
ID no.	Unique serial number of the burner
Year of construction	Year of construction of the burner
Thermal output	Maximum thermal output of the burner
Gas type	Burner gas type
Gas pressure	Gas inlet pressure of the burner
Combustion chamber pressure	Under-pressure or overpressure in the combustion chamber of the thermo-processing unit

2.1.1 Identification number

Since the identification number is a unique serial number of the burner, it is necessary to have the number on hand when communicating with SCHARR TEC customer services or when enquiring about spare parts.

2.2 Function of the burner components

2.2.1 Burner air supply

Fan

The burner is supplied with the necessary combustion air via a combustion air fan. The fan is connected separately from the burner by means of 400 V and directly controlled by the higher-level control system.

Air pressure switch

The air pressure switch monitors the fan pressure. If the fan pressure is too low, the automatic burner control performs a safety shutdown. The air pressure switch is directly supplied with air from the fan by means of a pipe bend on the casing.

Air flap

The air flap regulates the amount of air for combustion. The air damper is opened or closed via the actuator. The actuator is controlled by the user (3-point step, 4-20 mA, 0-10 V).

When the burner is at a standstill, make sure that the air flap moves to the closed position to allow the burner to ignite again.

2.2.2 Burner gas supply

Gas ball valve

The gas ball valve opens and shuts off the gas supply to the burner.

Gasmultiblock

The Gasmultiblock is constructed as follows:

Component	Function
Gas strainer on the inlet side	The gas strainer protects the downstream fitting from foreign bodies or production residues from pipeline construction.
Double gas solenoid valve	The double gas solenoid valve opens and closes the gas supply to the burner.
Pressure regulator	The pressure regulator reduces the connection pressure and ensures the gas supply to the burner with the necessary gas inlet pressure.

Gas flap in the gas block

The gas flap regulates the gas quantity according to the required output.

The gas flap is mechanically connected to the air flap, which regulates the output of the burner via the actuator.

Gas pressure switch-min.

The gas pressure switch min. monitors the gas connection pressure. If the pressure falls below the set value, the automatic burner control performs a safety shutdown.

Gas pressure switch-max.

The gas pressure switch-max. monitors the gas outlet pressure of the pressure regulator in the gas multi-block. If the outlet pressure of the multi-block exceeds the set value, the automatic burner control system performs a safety shutdown.

Valve proving system (VPS)

The valve proving system checks the tightness of the double solenoid valve (Gasmultiblock) before the burner is started. The function of the VPS can be found in the operating instructions. See Dungs VPS 504.

2.2.3 Electrical components

Automatic burner control unit

The burner control unit is the control unit of the burner. It controls the operating sequence and monitors the flame. Values and parameters of the automatic burner control can be displayed and changed on the control panel.

Ignition transformer incl. ignition electrode

The ignition transformer generates an ignition spark at the ignition electrode, which ignites the fuel-air mixture.

UV-Scanner/ ionisation electrode

The automatic burner control monitors the flame signal via the UV sensor or the ionisation electrode. If the flame signal is too weak, the automatic burner control unit performs a safety shutdown.

Shutter

The shutter is an optional component with the help of which the burner can be used for continuous operation (24/7). The shutter checks the UV-Scanner for function every 10 minutes. If the UV-Scanner does not work properly, the automatic burner control performs a safety shutdown.

2/3-way Solenoid valve

The 2/3-way solenoid valve shuts off the air supply to the air pressure switch until it is released by the automatic burner control. In this way, the air pressure switch is checked for functionality every time it is started.

Actuator

The actuator of the burner regulates the desired output. The power is transmitted to the air shaft, which is mechanically connected to the gas shaft. In the actuator, cam 3 ensures that the burner can only start at low position.

Cam assignment in the actuator:

Cam	Function
Cam 1	Limits the actuator in the small position. Maximum closing angle. Optimisation can influence the ignition behaviour as well as the light position.
Cam 2	Limits the actuator in the large position. Maximum opening angle. Optimisation influences the maximum output of the burner. Cam 2 can be used to limit the burner's maximum output.
Cam 3	Cam 3 ensures that the burner cannot be ignited in the high position. The cam is set at the factory to approx. 20 to 30% burner capacity. Above this setting, the burner cannot start. During operation, cam 3 must be bridged by the user via a normally open contact. See circuit diagram. (chapter 2.4)
Cam 4	Cam 4 has no function

The actuator can be controlled in different ways. The following actuators are currently used according to client's request:

Actuator	Function
TEC 3	Actuator with 3-step control without feedback. Control via 230 V voltage. Manual operation possible with continuous voltage.
TEC 3 P	Actuator with 3-step control with feedback. Control via 230 V voltage. Manual operation possible with continuous voltage. Feedback via 0-1000 Ohm potentiometer.
TEC 10	Actuator with control via 0-10 V signal. Manual operation possible with continuous voltage.
TEC 20	Actuator with control via 4-20 mA signal. Manual operation possible with continuous voltage.

2.3 Programme sequence at burner start

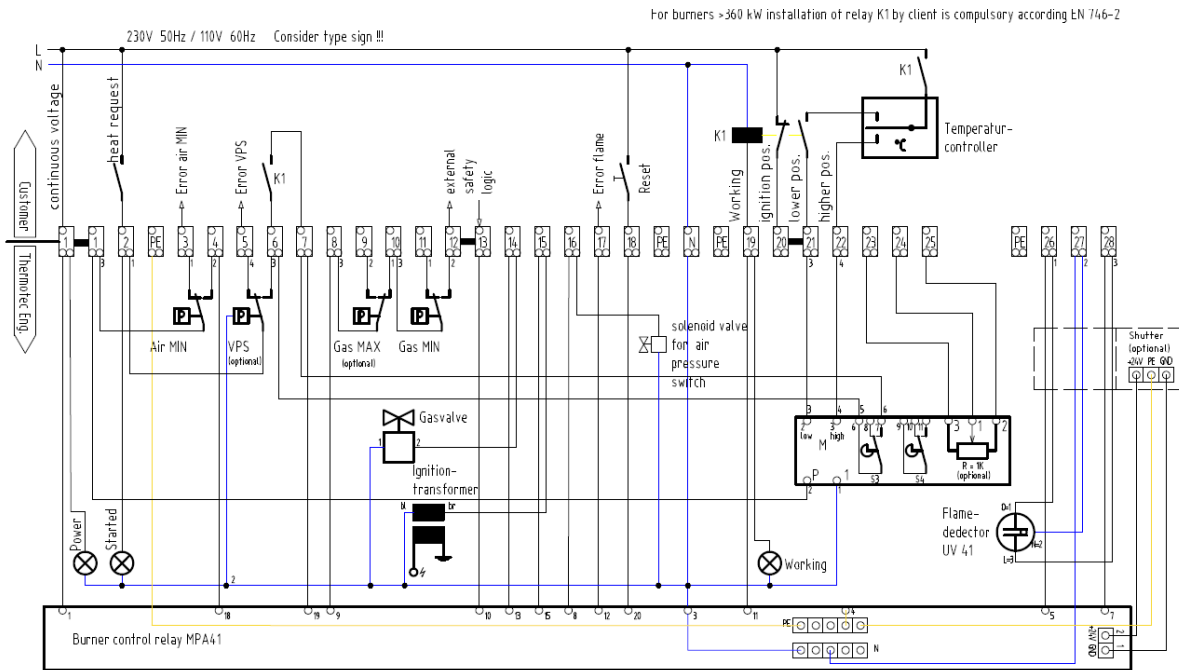
The following table shows the operating phases for starting up the burner. For further information, please refer to the operating instructions of the burner control unit:

Phase / display on the automatic burner control unit	State number / display on the automatic burner control unit after pressing + and – simultaneously	Functional description	Result
0	2	Waiting for heat request	No voltage at the burner control unit, Possibly leakage check on the burner by VPS
1	3	Retirement control LDW	Voltage at the automatic stoker
1	4	Review safety chain	Gas max. and gas min. pressure switches are being tested
1	5	Watchdog charging phase	
1	6	Waiting for air pressure	Air pressure switch must detect air pressure, 2/3 way solenoid valve opens
1	7	Stray light control	UV-Scanner checks combustion chamber for foreign light
1	8	Pre-ventilation	Fan ventilates the burner housing
1	10	Pre-ignition	Ignition spark arises
1	11	First safety period - ignition	Main ignition, gas solenoid valve opens
1	12	First safety period - flame detection	No more ignition, UV scanner must detect flame
2	13	Flame stabilisation	UV-Scanner has detected flame and waits for stable signal
2	15	Second safety period	Optional for second flame detection
2	16	Second safety period - flame detection	Optional for second flame detection
3	17	Stabilisation - Flame B	Optional for second flame detection
3	18	Operation	Burner burns and reports operation
4	20	Post-ventilation	Burner switched off Post-ventilation of the burner housing
4	21	After-burn time	Max. after-burning time of the burner. The flame must go out within this time
4	22	Restart lock	During this time, it is not possible to restart the burner

2.4 Circuit diagram burner

The circuit diagrams shown here correspond to the SCHARR TEC standard configuration. Deviation from this configuration is possible at the customer's request. In this case, the original circuit diagram of the burner is decisive. See the complete documentation of the burner on delivery.

The original circuit diagram must remain on the burner. When delivered, the circuit diagram is located in the terminal box of the burner.



 Liebknechtstraße 50 70565 Stuttgart bringt Energie ins Leben	Liebknechtstr. 50, 70565 Stuttgart brennertechnik@scharr-tec.de www.scharr-tec.de Tel: 0711 / 7866-809 Fax: 0711 / 7866-470	SCHARR-TEC Gasburner		Proj. Nr.	X	Design	T.Schemel	
		connection-diagram with control-motor TEC 3P and MPA41		Drawing No.	X	Drawing	C. Steger	
				Scale	---	Check	C. Steger	
				Date	13.11.2019			

Diagram 3: Standard circuit diagram PHOENIX burner with 3-step actuator

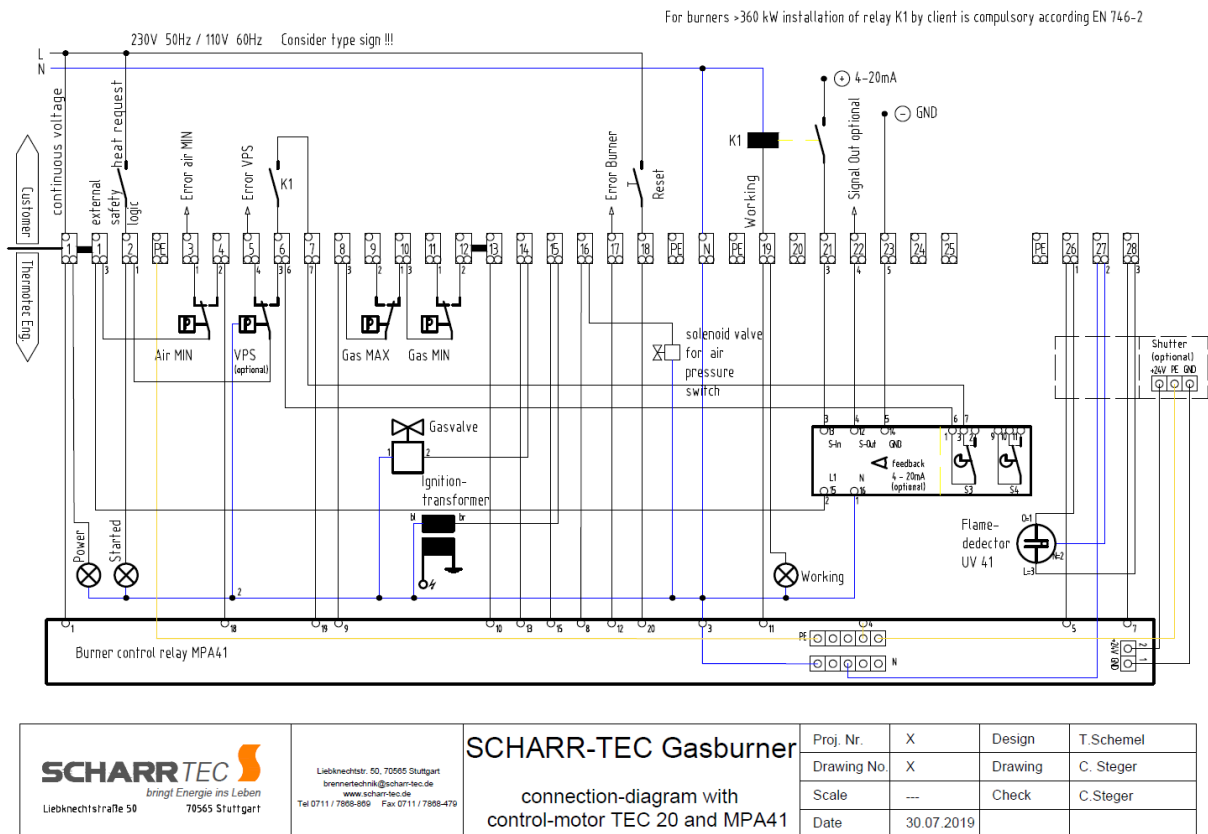



Diagram 4: Standard circuit diagram PHOENIX burner with continuous control via 0-10 V or 4-20 mA

2.4.1 Customer connection on the burner

Clamp	Funktion
Clamp 1	The phase of the 115 V / 230 V power supply is connected to this terminal. Permanent voltage should be applied here to enable the evaluation of the automatic burner control. Thanks to the permanent voltage, the manual mode of the actuator is also always available.
Clamp 2	The 115 V / 230 V heat requirement is connected to this terminal. Appropriate conditions for the operation of the burner can be connected in series in front of it.
Clamp N	The neutral conductor is connected to this terminal. This offers the possibility of a current flow which can be established if required.
Clamp PE	The protection conductor is connected to this terminal. All electrically conductive parts are connected to the potential "earth" after connecting the protective earth conductor.
Clamp 3	Evaluation Fault Air Minimum. Output 230 V continuous in the event of a fault.
Clamp 5	Evaluation fault VPS. Output 230 V continuous in the event of a fault.
Clamp 6	Connection for contact of the operating signal contactor. This normally open contact is mandatory if power beyond the light load is to be used. For burners < 360 kW power, a jumper can be used between terminals 6 and 7.
Clamp 7	Connection for contact of the operating signal contactor. This normally open contact is mandatory if power beyond the light load is to be used. For burners < 360 kW power, a jumper can be used between terminals 6 and 7.
Clamp 9	Evaluation of gas maximum fault. Output 230 V as a short pulse before the safety chain is de-energised.
Clamp 11	Evaluation of gas maximum fault. Output 230 V as a short pulse before the safety chain is de-energised.

Clamp 12	Connection option for potential-free safety chain. e.g. STB, air pressure monitor process air, etc. When using this connection, the factory jumper between terminals 12 and 13 must be removed.
Clamp 13	Connection option for potential-free safety chain. e.g. STB, air pressure monitor process air, etc. When using this connection, the factory jumper between terminals 12 and 13 must be removed.
Clamp 17	Fault signal output of the burner. Output 230 V continuous in the event of a fault.
Clamp 18	Connection remote acknowledgement. Input 230 V as pulse. Voltage must be present for at least 0.5 seconds and may be present for a maximum of 5.0 seconds.  Continuous acknowledgement is neither possible nor permitted!
Clamp 19	Operating message of the burner. Output 230 V continuous in operation. Connection for coil of the operating signal contactor. See terminal 6 / 7.
Clamp 20	Forced closing with 3-step control. A continuous voltage must be connected here when the burner is switched off to ensure that the actuator closes. Input 230 V continuous in off-state.
Clamp 21	<u>For 3-step control:</u> Close contact of the actuator. Input 230 V. When voltage is applied, the burner moves to the low load. <u>With continuous control signal:</u> The input signal line is connected to this terminal. Set-point input in 4-20mA or 0-10V.
Clamp 22	<u>For 3-step control</u> Open contact of the actuator. Input 230 V. When voltage is applied, the burner moves to the high load. <u>With continuous control signal</u> The feedback signal is output at this terminal. (4-20mA or 0-10V)
Clamp 23	<u>With continuous control signal</u> The reference signal GND is connected to this terminal. Set-point input in 4-20 mA or 0-10 V.
Clamp 23/24/25	<u>For 3-step control with feedback signal:</u> Connection of optional potentiometer for 3-step control with feedback.

2.4.2 Customer-side connection combustion fan

The combustion fan must be connected directly on site.



Note that suitable motor protection must be installed.

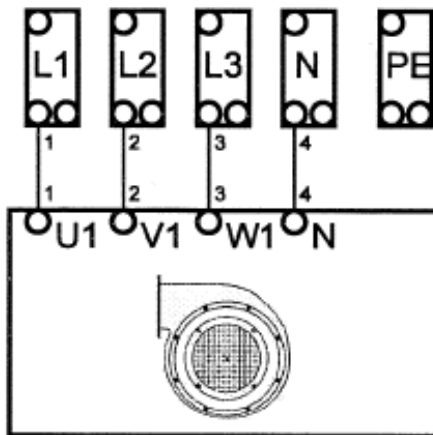


Diagram 4: Electrical connection of the combustion air fan

Fan sizes

Fan designation	Power	Power consumption
DNG 3-6	90 W	0,3 A
DNG 4-14	180 W	0,6 A
DNG 6-22,5	370 W	1,2 A
DNG 6-25	550 W	1,4 A
DNG 6-40	750 W	1,9 A
DNG 7-60	1500 W	3,4 A
DNG 8-80	2200 W	4,6 A
DMV 250	120 W	0,41 A
DMV 280	250 W	0,8 A
DMV 300	550 W	1,33 A
DMV 330	750 W	1,73 A
DMV 350	1100 W	2,8 A



For more detailed information, refer to the documentation of the combustion air fan.

2.5 Technical data of the burner type

2.5.1 Electrical data

Label	Description
Line voltage	230 V /115 V Depending on version, see type plates Field units
Power frequency	50 Hz /60 Hz Depending on version see type plates Field devices
Power consumption	max. 1,0 A
Device fuse fire manager	T 6,3 A
line voltage combustion fan	400 V
Current consumption of the combustion air fan	see tool identification plate from fan
Protection class burner	IP54

2.5.2 Ambient temperatures

Area	Temperature [°C]
Operating temperature	-10°C - +50°C
Temperature during transport/storage	-20°C - +70°C

2.5.3 Fuels

- ⊕ Natural gas E
- ⊕ Natural gas LL
- ⊕ Liquefied petroleum gas
- ⊕ Special gases on request



Fuel gases that deviate from the order can damage the burner and affect the performance.

2.5.4 Gas connection

Gas inlet pressure	Pressure [mbar]
minimum Gas inlet pressure	50,0 mbar
maximum Gas inlet pressure	360,0 mbar



The maximum gas inlet pressure must not be exceeded even in the event of a fault.

2.5.5 Burner size performance

Label Burner size	max. Thermal output [kW]	min. Thermal output [kW]	Gas differential pressure burner inlet to combustion chamber at max. Power [mBar].
Phoenix TE1_150	150	3,5	6
Phoenix TE2_350	350	7	6
Phoenix TE2.1_500	500	8	11
Phoenix TE3_750	750	15	6
Phoenix TE3_1000	1000	15	8
Phoenix TE3.1_1300	1300	18	13
Phoenix TE3.1_1750	1750	22	20
Phoenix TE3.1_2000	2000	40	32
Phoenix TE3.1_2500	2500	60	40

2.5.6 Flame lengths from various burners

The indicated flame lengths refer to a neutral combustion chamber pressure. Under-pressure or over-pressure in the combustion chamber can influence the flame length.

Label Burner size	max. Thermal output [kW]	Flame length in mm at maximum power.
Phoenix TE1_150	150	400
Phoenix TE2_350	350	550
Phoenix TE2.1_500	500	600
Phoenix TE3_750	750	800
Phoenix TE3_1000	1000	1000
Phoenix TE3.1_1300	1300	1200
Phoenix TE3.1_1750	1750	1700
Phoenix TE3.1_2000	2000	2000
Phoenix TE3.1_2500	2500	2200

2.5.7 Emissions

Exhaust fumes

The limit values according to TA-Air lie for

- CO at 100 mg/m³ (80 ppm)
- NO_x at 200 mg/m³ (98 ppm)

Our burners fall below these limits.

The exhaust fume values of the burner are influenced by:

- Combustion chamber dimensions
- Combustion air
- Type of gas
- Combustion chamber pressures
- Recirculation air volume of the



process air system

Sound

Sound emissions have a potentially damaging effect on hearing. Furthermore, sound emissions can lead to insomnia, increased blood pressure, metabolic disorders and similar impairments.

The sound emissions are influenced by:

- ⊕ Pressure ratios in the combustion chamber
- ⊕ Power of the burner type
- ⊕ Type of combustion fan
- ⊕ Length of flame tube
- ⊕ Combustion chamber size



2.5.8 Dimensions

The drawings shown here correspond to the SCHARR TEC standard configuration. Deviation from the standard is possible at the customer's request. In this case, the original drawings of the burner are decisive. See the complete documentation of the burner on delivery.

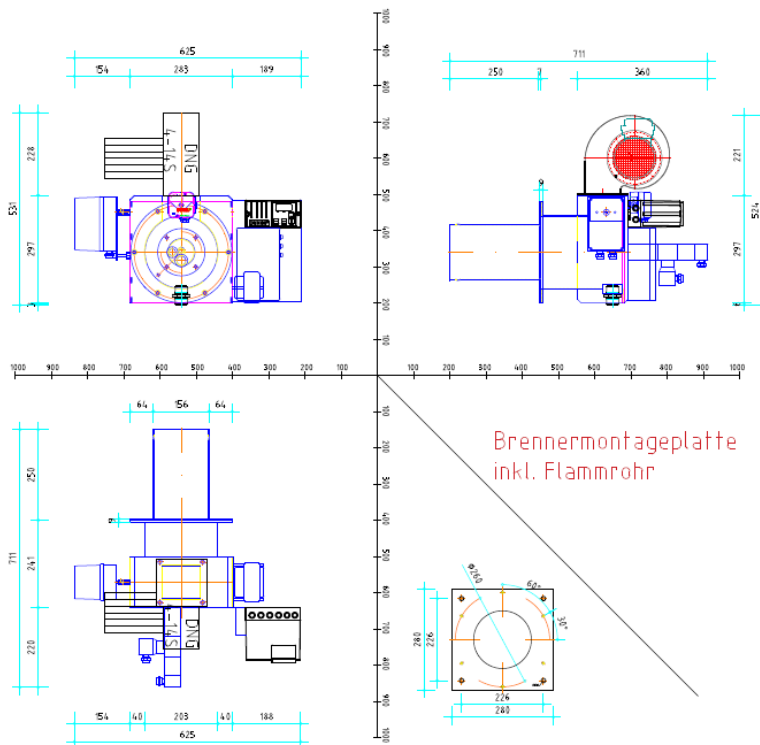


Diagram 5: Example drawing PHOENIX TE1 without gas control line

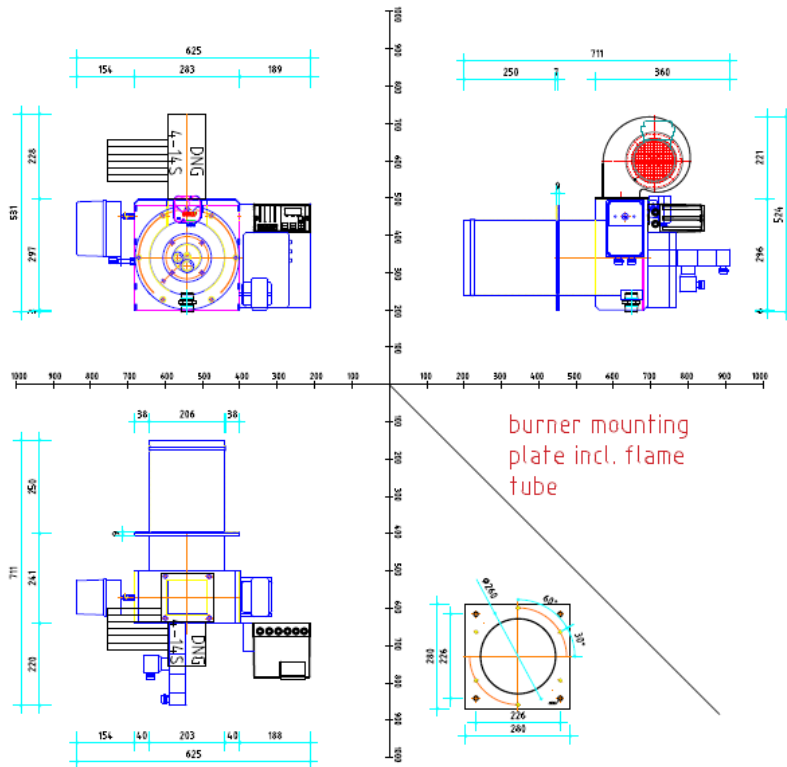


Diagram 6: Example drawing Phoenix TE2 / 2.1 without gas control line

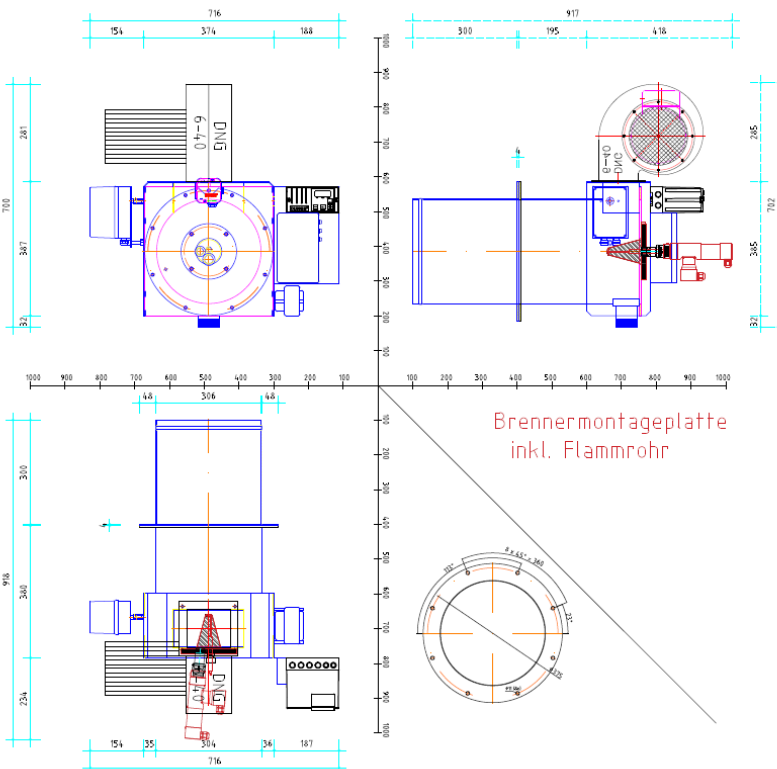


Diagram 7: Example drawing Phoenix TE3 / 3.1 without gas control line

2.6 Gas control line

The gas control line is packed separately from the burner housing to avoid damage during transport. It must be connected to the burner housing when the burner is put into operation. A corresponding screw connection incl. seal is part of the scope of delivery.

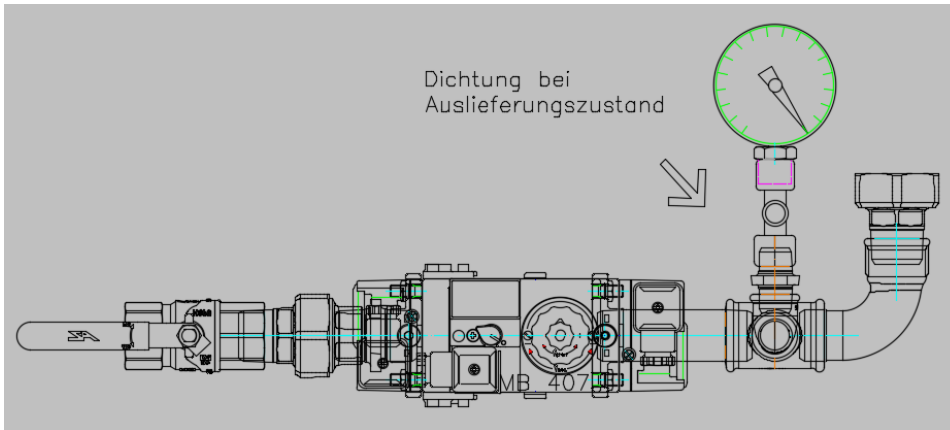


Diagram 8: Scope of delivery standard gas control system

2.6.1 R+I-Diagram Gas control line

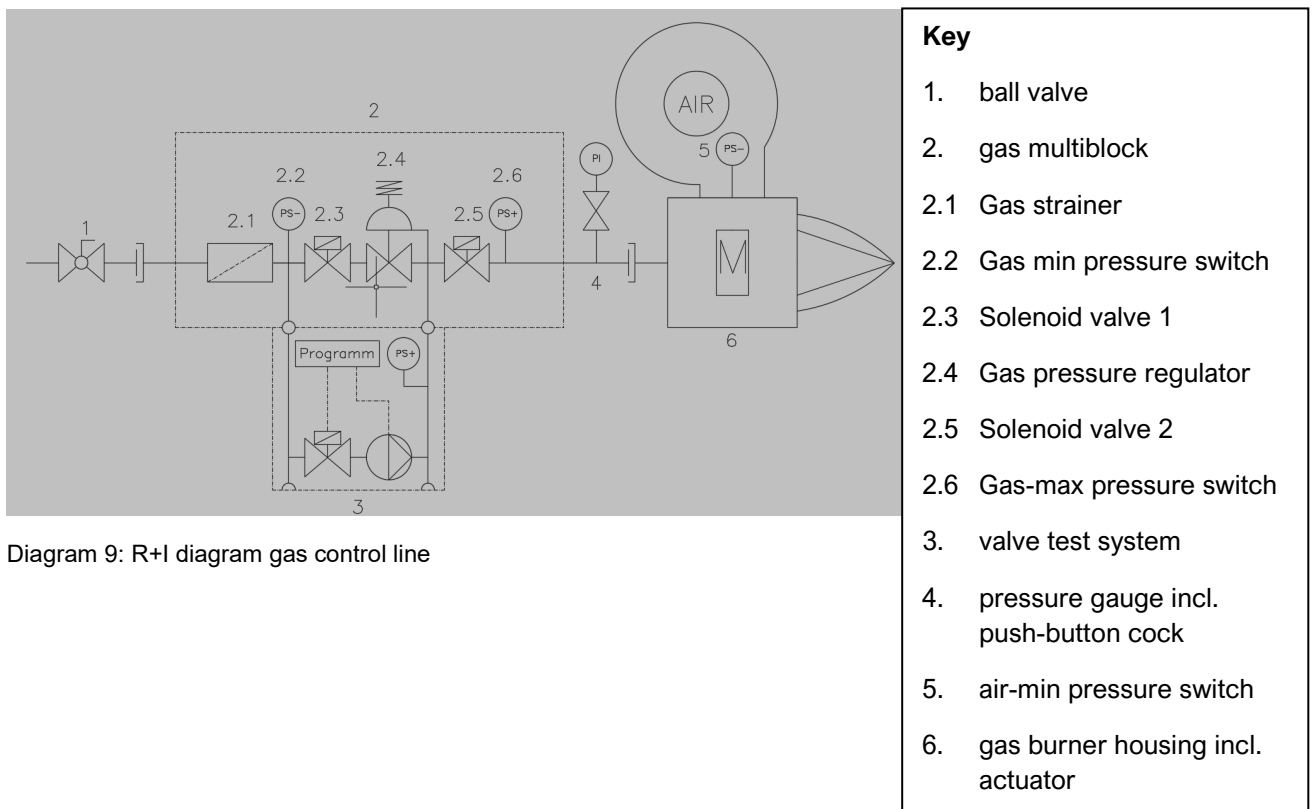


Diagram 9: R+I diagram gas control line

3 Safety instructions

3.1 Appropriate use

To ensure the safety of life and limb as well as property, the burner must be used as intended. The gas blower burner PHOENIX is intended for operation in industrial thermos-processing air systems according to EN746 1-2 as well as painting and ventilation systems according to EN 17082.

If the burner is not operated in accordance with the above-mentioned regulations, a safety assessment of the combustion and flame stability in the various process states and at the shutdown limits of the combustion system is mandatory and must be documented. An outside air intake and/or a combustion filter are recommended if there is an increased need for cleaning and maintenance due to polluted combustion air in the installation room. In general, the combustion air should be free of aggressive substances.

3.2 Safety requirements for working on the burner

3.2.1 Gas supply

The following safety requirements must be ensured in order to protect life, limb and property:

Before start-up

- ⊕ The gas supply company must be informed of the type and scope of the planned system before installation.
- ⊕ Pipeline systems must be designed in accordance with standards.
- ⊕ The local regulations and directives, such as DVGW TRGI, worksheet G 600, TRF Volume 1 and TRF Volume 2, must be observed during installation.
- ⊕ Only use tested sealing materials in compliance with the processing instructions.

After start-up

- ⊕ Depending on the type and quality of gas, the gas supply must be designed in such a way that no liquid substances, such as condensate, are produced. For liquid gas, the evaporation pressure and evaporation temperature must be observed.
- ⊕ The appliance must be readjusted when the gas type is changed. If a changeover is made between natural gas and liquid gas, a conversion may be necessary.
- ⊕ A leak test must be carried out after each maintenance or fault rectification operation.

3.2.2 Procedure if gas odour is detected

If there is an impression of a gas odour, the following action plan must be followed:

1. Avoid flying sparks or fire under all circumstances
 - 1.1 Do not switch lights on or off
 - 1.2 Do not operate electrical appliances
 - 1.3 Do not use mobile phones
 - 1.4. do not smoke
2. close the gas ball valve
3. open windows and doors to create a draught
4. inform people present of the possible danger
5. leave the burner area

Notify emergency services and/or specialist companies outside the burner area.

3.2.3 Voltage-carrying components

To ensure safety for life, limb and property when working on live components, the accident prevention regulation DGUV Regulation 3, as well as the locally applicable regulations, must be observed. In addition, work must be carried out with tools in accordance with EN 6900.

3.2.4 Modification to the structure

Only original parts may be used for repair. Combustion chamber inserts which hinder or negatively influence the flame burnout must not be used.

Modifications to the superstructure are only permitted with the written consent of SCHARR TEC GmbH & Co. KG.

3.3 Waste management

The proper and environmentally friendly disposal of the materials and components, in compliance with local regulations, must be carried out at an authorized location.

4 Assembly

4.1 Assembly conditions

Burner type and thermo-processing air system

Burner and thermo-processing air system must be compatible. Burner type and capacity must be checked before installation.

Assembly location

Make sure that there is sufficient space for assembly and subsequent service tasks. The burner must be safely accessible at all times in the event of a malfunction or for service tasks. Make sure that the combustion air supply is sufficient, install outside air intake if necessary.

Thermo-processing air system

The wall thickness of the thermo-processing air unit must not exceed the length of the burner flame tube.

(See drawing)

The length of the flame tubes can be taken from the drawings (chapter 2.5.7).

If necessary, special flame tubes can be used.

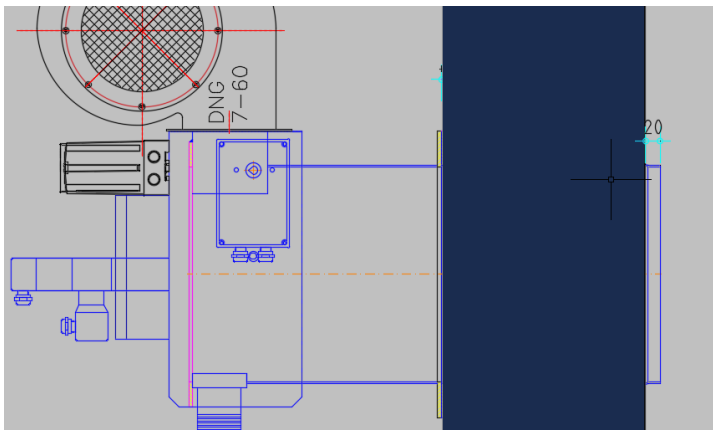


Diagram 10: Flame tube projection from inner wall at least 20 mm

4.2 Lifting instructions and weight of casing

Lifting instructions

Only lift the burner by the burner casing. All lifting via attachments such as actuators or similar parts can lead to damage to the attachments.

Weight of burner sizes (without controlled system and fan)

Burner	Weight
Phoenix TE1	25 kg
Phoenix TE2 / 2.1	28 kg
Phoenix TE3 / 3.1	42 kg

4.3 Burner assembly

The burner is to be mounted on the thermo-processing air system at the intersections provided for this purpose on the casing. For dimensions, see the following diagrams.

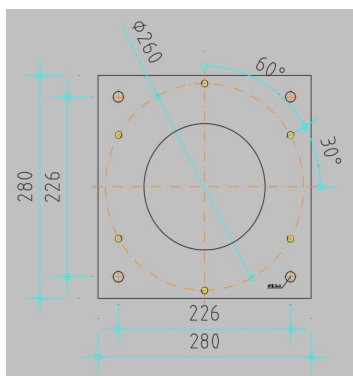


Diagram 11: Phoenix TE1 mounting flange

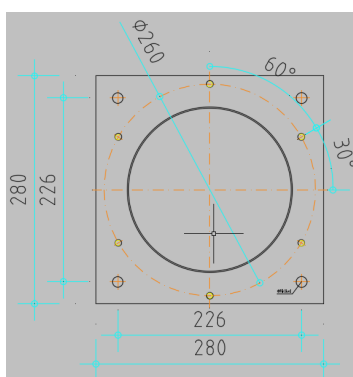


Diagram 12: Mounting flange Phoenix TE2 / 2.1

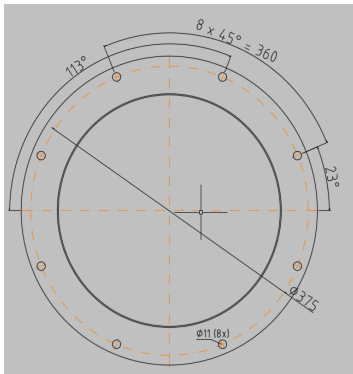


Diagram 13: Mounting flange Phoenix TE3 / 3.1

Sealing

A seal that meets the requirements of the thermo-processing air system must be used between the installation flange and the thermo-processing air system.



The seal must correspond to the maximum temperature occurring in the process air system.

Screws

The screw quality to be used must be in accordance with the requirements of the thermo-processing air system.

- ⊙ **We recommend using a suitable lubricant during assembly, e.g. copper paste.**



4.3.1 Burner installation position

In principle, the burner can be installed in any position on the thermo-processing air system.

The flame is not expected to be affected by the installation position.



However, care must be taken to ensure that the controlled system is installed correctly. The gas multi-block must not be installed upside down.

4.3.2 Assembly of gas control line

Connect the gas control line to the burner at the screw connection provided (see sketch).



Make sure that a seal approved for gas is used!

When delivered, a suitable seal is attached to the pressure gauge of the gas pressure regulator section by means of a cable tie.

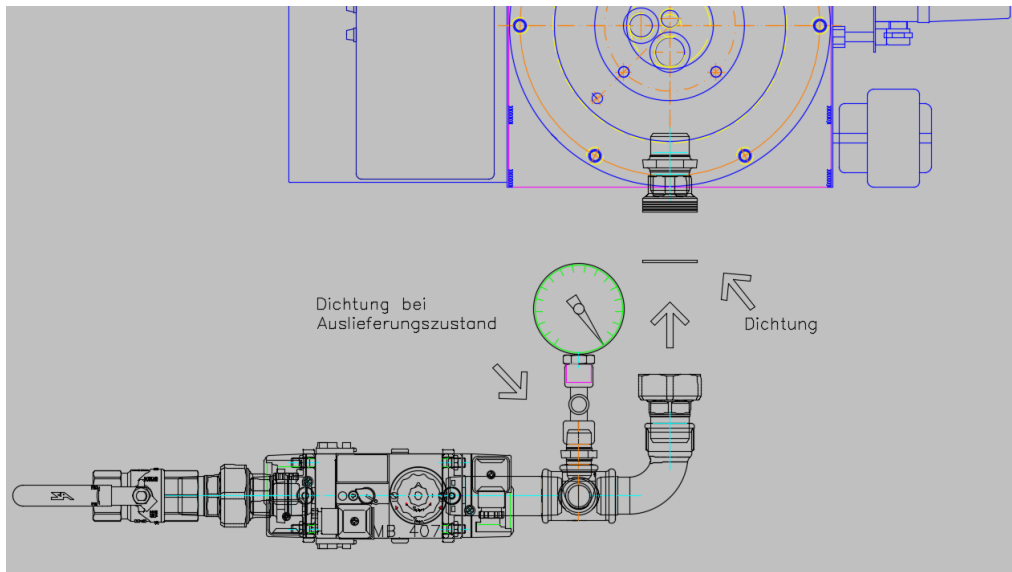


Diagram 14: Example of a controlled system when mounted on the burner casing

- ⊙ After commissioning, carry out a leak test on the screw connection while the burner is in operation.

4.3.3 Assembling the combustion fan

Attach the separately supplied combustion fan to the burner casing. You can use the screws provided for this purpose, which are attached to the casing. There is no need to fit an additional seal.



After installing the combustion fan, make sure that sufficient air can be drawn in. The fan must not be negatively affected by insulation or other installations.

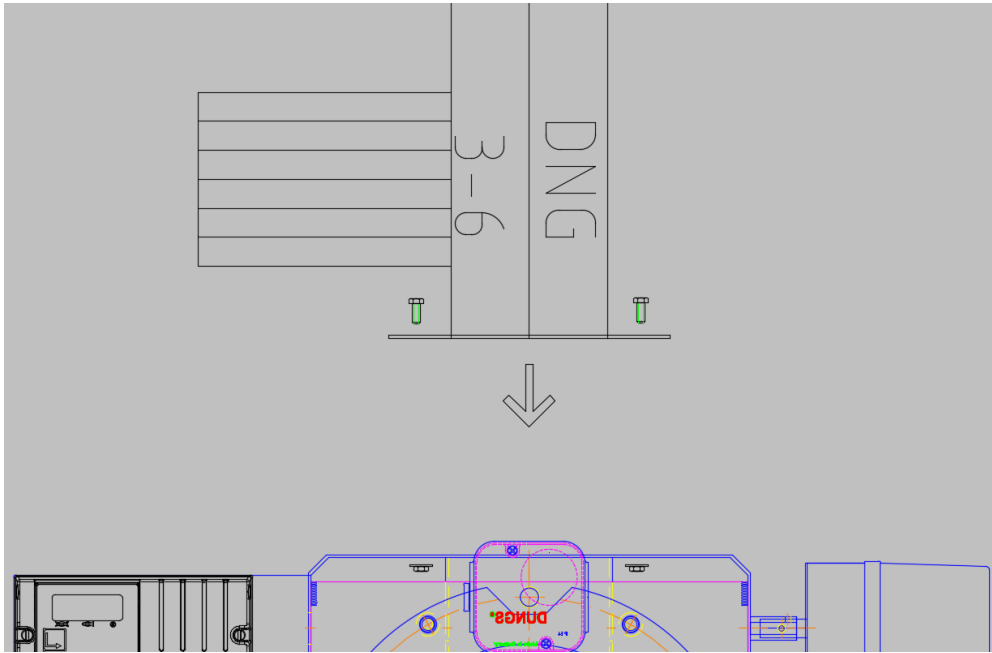


Diagram 15: Combustion fan during assembly on the burner casing

5 Installation

5.1 Gas supply

Explosion hazard due to escaping gas

An ignition source can cause a gas-air mixture to explode. Therefore, the following steps must be taken into account:

- ⊗ Carefully install gas supply
- ⊗ Follow all safety instructions

General installation instructions

- ⊕ Ensure that the fitting is aligned and the sealing surfaces are clean
- ⊕ Assemble the fitting free of vibrations
- ⊕ Assemble the fitting free of stress
- ⊕ Use suitable supports
- ⊕ Observe the flow direction of the fittings
- ⊕ If necessary, install a thermal shut-off device upstream of the gas ball valve

5.1.1 Connecting the gas control line on the gas side



Only an approved contract installer may carry out the gas connection. Observe the local regulations.

The intersection point of the gas line to the burner is the gas ball valve included in the scope of delivery. The gas line must be connected in the appropriate dimension. It must be ensured that the gas line provides a sufficient quantity of gas for the burner.

5.1.2 Check the gas supply line for leaks and vent it.

The gas supply line must be checked for leaks.



Before putting the burner into operation, make sure that the gas line is vented and fully filled with the appropriate fuel.

5.2 Electrical connection

Life-threatening danger: Electrocutation

Working under voltage can lead to electric shocks.



- ⤷ Before starting work, disconnect the unit from the power supply.
- ⤷ Secure against unexpected restarting.

The electrical connection may only be carried out by qualified personnel trained in electrical engineering. The local regulations must be observed.

5.2.1 Electrical connection terminal box

The burner or the terminal box must be connected according to the circuit diagram supplied. See also chapter 2.4 or 2.4.1.



A suitable fuse must be installed.

5.2.2 Electrical connection of the burner's field devices

The burner's field devices, such as the double solenoid valve or pressure monitor, are connected via the prefabricated DIN connectors. The DIN connectors and the field devices are labelled accordingly. Where possible, the plug connections must then be secured against disconnection using the screw.

5.2.3 Electrical connection combustion fan

The combustion fan must be wired by the user.

See also chapter 2.4.2.

6 Start-up

6.1 Requirements

Commissioning may only be carried out by qualified personnel.

Only a correctly performed commissioning guarantees the operational safety in the required parameters.

Before commissioning, make sure that:

- ⊕ all assembly and installation work has been carried out properly,
- ⊕ the combustion air supply is sufficient,
- ⊕ the control and safety devices of the higher-level control system are functional and correctly set (e.g. STB, etc.).
- ⊕ the process air system is functional,
- ⊕ heat loss exists.

Further system-related tests may be required. Therefore, it is necessary to observe the relevant instructions for the individual system components.

6.1.1 Check gas connection pressure

Min. connection pressure

The minimum input pressure should not fall below 50.0 mbar. If unavoidable, the minimum input pressure may fall below 50.0 mbar. In this case, this must be stated when ordering the burner and will be explicitly noted on the burner's type label. The gas control line will then be designed accordingly.

Max. connection pressure

The maximum input pressure must not exceed 360.0 mbar even in the event of a controlled system malfunction.



Danger of explosion due to excessive gas connection pressure!

Exceeding the maximum connection pressure can damage the fitting and lead to explosion.

Check the connection pressure

- ⊗ Connect the pressure gauge to the measuring point (see drawing fig. 21).
- ⊗ Slowly open the gas ball valve, observing the pressure rise.

If the connection pressure exceeds the maximum connection pressure:

- ⊗ Close the gas ball valve immediately.
- ⊗ Do not put the system into operation.
- ⊗ Notify the operator of the system.

If the connection pressure falls below the connection pressure min:

- ⊗ Do not put the system into operation.
- ⊗ Notify the operator of the system.
- ⊗ Consult the burner manufacturer.

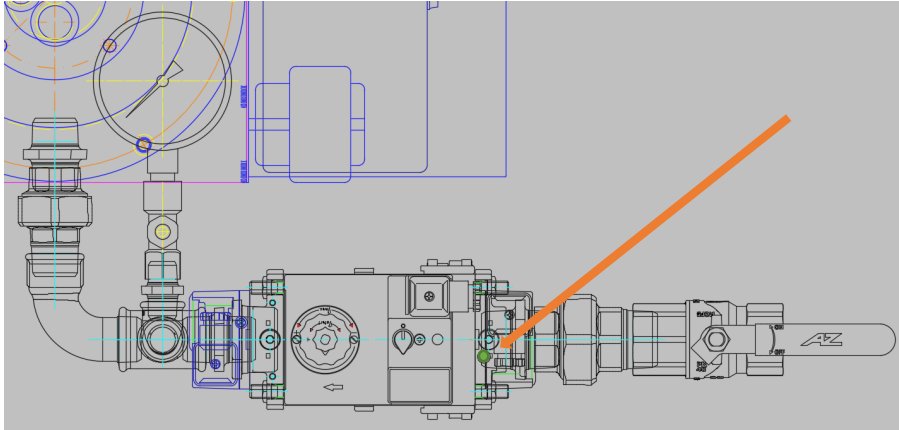


Figure 21: Gas control line, measuring point at the gas pressure switch min.

6.1.2 Check the gas fitting for leaks

The gas fitting has already been checked for leaks at the factory. However, the gas screw connection and the connection on the ball valve in particular must be checked for leaks on site using leak detection spray or a suitable gas measuring device.

If you notice a leak, do not operate the burner.

- Immediately close the gas ball valve and notify the operator.



After the burner has been put into operation, the screw connection on the burner casing must also be checked for leaks.

6.1.3 Venting the gas fitting

If not done by the company constructing the pipe, the gas connection pipe must be vented.

- ⊗ open measuring point from chapter 6.1.1
- ⊗ connect a suitable hose to the measuring point
- ⊗ lead the venting hose safely into the open air
- ⊗ slowly open the gas ball valve
- ⊗ the gas-air mixture in the fitting flows out into the open via the vent hoses
- ✓ gas-air mixture should be constantly monitored for concentration
- ⊗ as soon as the concentration rises above 95% gas content, the gas fitting has been successfully vented
- ⊗ close gas ball valve
- ⊗ remove the venting hose and close the measuring point immediately.

Long and large-dimensioned pipes in particular cannot be vented in this way because of the low drainage volume. In this case, the pipe builder must install a venting ball valve or similar upstream of the burner.

6.1.4 Record combustion chamber pressure

Check the combustion chamber pressure at the nipple provided on the burner housing.

The burner as well as the combustion fan must remain switched off for the combustion chamber pressure measurement; otherwise the measurement result will be influenced.



If the combustion chamber pressure deviates from the pressure stated on the type plate by more than 25 %, contact the burner manufacturer.

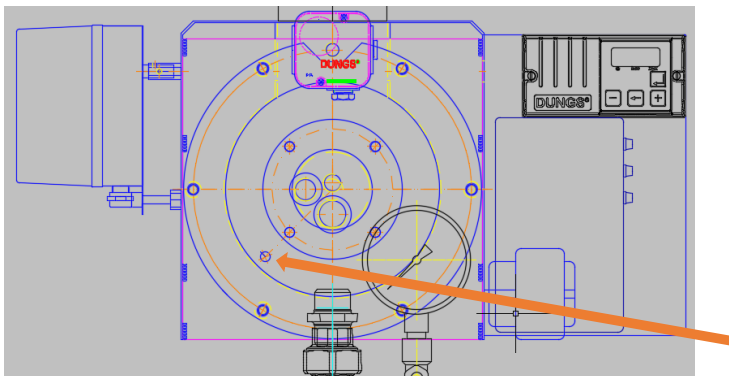


Figure 22: Measuring nipple for combustion chamber pressure

6.1.5 Pre-setting the gas and air pressure monitors

The pre-setting of the pressure switches is only valid for commissioning. The settings are intended to simplify commissioning for you. After commissioning, the pressure switches must be set correctly. (see chapter 6.3)

Guardian	Setting
Air pressure switch	Set the air pressure switch to 2.0 mbar
Gas min-pressure switch	Set the gas min pressure switch to 10.0 mbar
Gas Max pressure switch	Set the gas max pressure switch to the maximum setting value

6.2 Putting the burner into operation

The burner must now be started.

- ⊗ Apply voltage to terminal 2 in the burner terminal box.
- ⊗ The burner starts with the ignition sequence (see chapter 2.3)

Under certain circumstances, several ignition attempts may be necessary when starting for the first time. If the burner does not start despite repeated ignition attempts, the actuator can be opened slightly in manual mode to provide more power during ignition. (see chapter 7.2)

The burner has started successfully as soon as "03" is displayed on the burner control unit..

- ⊗ Regular operation will then commence

6.2.1 Determining the gas pressure

The pressure to be set on the burner can be determined yourself using the following instructions. Alternatively, you can ask the burner manufacturer for the required setting pressure. In order to do this, please have the burner ID number ready.

Determining the gas pressure for the burner

The gas pressure consists of:

- ⊕ Combustion chamber pressure (see chapter 6.1.4)
- ⊕ Differential pressure burner inlet (see chapter 2.5.5)
- ⊕ Line losses (flat rate with 4.0 mbar)

To obtain the required gas pressure, which should be set at the max. output, add these 3 values.

Example

Combustion chamber pressure:	-2,0 mbar	} 8,0 mbar Set pressure at full capacity
Gas pressure burner TE1_150KW:	6,0 mbar	
Conduction losses:	4,0 mbar	

6.2.2 Adjusting the burner power

Move the burner to the maximum opening angle (90°). This can be done using the manual mode of the actuator or via the higher-level control. Then, set the required gas pressure on the gas multi-block using a screwdriver.

The gas pressure can be read on the pressure gauge of the gas control line.



Figure 23: Adjusting the gas pressure on the gas multi-block

After the setting has been made, the burner has been successfully put into operation. The burner should now ignite safely at the preset low load.

6.2.3 Limiting burner capacity

If necessary or desired, the maximum burner output can then be limited. To do this, limit the maximum opening angle of cam 2 in the actuator according to the operating instructions. (See Schimpf operating instructions series 00-01-02-03).

6.2.4 Check UV scanner / ionisation electrode for function

Check the functionality of the flame monitor:

UV-Scanner

- ⊗ Using a flat-blade screwdriver, loosen the attachment of the UV-Scanner.
- ⊗ Remove the UV-Scanner at the burner and cover it by hand.
- ⊗ The burner goes into malfunction.
- ⊗ Reattach the UV-Sensor to the burner and acknowledge the fault.
- ⊗ The burner restarts.

Ionisation electrode

- ⊗ Unplug the ionisation electrode.
- ⊗ The burner goes into malfunction.
- ⊗ Reattach the plug to the ionisation electrode and acknowledge the fault.
- ⊗ The burner restarts.

6.3 Setting and testing the pressure monitor

6.3.1 Setting and testing the min. gas pressure monitor

Testing the functionality of the min. gas pressure monitor

- ⊗ Close the inlet ball valve while the burner is on
- ☑ The burner malfunctions (F 13 or F A2)

Setting up the min. gas pressure monitor

- ⊗ Set the min. gas pressure monitor to the gas pressure determined in section 6.2.1. Independent of the gas pressure, but at least 10.0 mbar.

6.3.2 Setting and testing max. Gas pressure monitor

Testing the functionality of the max. gas pressure monitor

- ⊗ Turn the max. pressure switch down to the smallest possible value
- ☑ The burner malfunctions (F 13 or F A2)

Determining the max. Gas pressure monitor value

- ⊗ Run the burner at the lowest possible load and then check the output pressure of the gas multi-block using a pressure gauge.
- ⊗ Outlet pressure + 10.0 mbar = set value gas pressure switch max.

Setting up the max. gas pressure monitor

- ⊗ Set the gas pressure monitor to the determined setting value

6.3.3 Setting and testing min. air pressure monitor

Testing the functionality of the min. air pressure monitor

- ⊗ Block off the intake of the combustion fan
- ☑ The burner malfunctions (F AB)

Setting up min. air pressure monitor

If there is **negative pressure** inside the combustion chamber: Set the air pressure monitor to 2.5mbar.

In the case of **overpressure** inside the combustion chamber: Set the air pressure switch to the sum of 2.5 mbar + counter-pressure.

7 Operation

7.1 Operation of the automatic burner control

This overview briefly describes the standard functions of the automatic burner control. For more detailed information, please refer to the manufacturer's documentation (see Dungs MPA41xx).

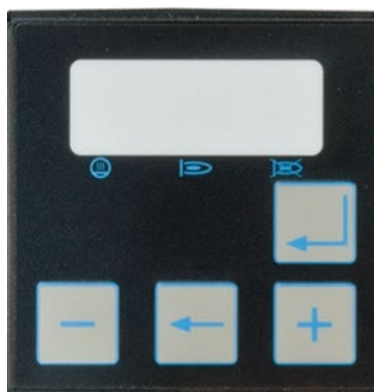
Basically, no operating inputs are necessary for fault-free operation of the burner. Only in the event of a malfunction can the burner be acknowledged via the operating buttons.



We recommend that you make a note of all fault messages in advance and then send them to the service technician.

7.1.1 Control panel

Description of automatic burner control functions incl. display



Display 3 x 7 Segment

LED:

Blue: Heat requirement

Yellow: Flame quality (flashes when flame is poor)

Red: Malfunction

Figure 16: Control panel



Release button Reset function and confirmation of input



Back



Plus increase of the displayed value



Minus Decrease of the displayed value



- ⦿ **Press plus and minus at the same time. (While operating or “error” shows)**
- ⦿ **You will receive further information**

7.1.2 Display

The display can show different information depending on the operating status of the automatic burner control system.

Mode	Shows when/if
Operating display	In normal cases of operation when there is no defect.
Error display	The machine is in the malfunction interlock.
Information display	from the operating display by pressing the key combination: Plus and release key
Error memory display	from the operating display by pressing the key combination: Plus and Back
Configuration display	from the operating display by pressing the key combination: Release key and Back
Reset display	from the operating display by pressing the key combination: Minus and Back
Flashing display	depending on the display mode: 1. Prompt to confirm the change of access level. 2. press and hold the unlock button for more than 5 seconds to deliberately restart the MPA ("extended unlocking") 3. processor 2 error, see error list MPA41xx 4. new password after password change 5. restart of the machine, all segments and LEDs flashing

Caution notice on 7-Segment display

2. Buchstaben	1. Ziffern
B oder b = b	6 = 6
D oder d = d	8 = 8
O oder o = o	0 = 0

Figure 17: 7-Segment Display

7.2 Actuator operation



Please note that 230 V are applied to the contacts in the actuator. Therefore, operate the actuator with caution and only if you are competent to do so.

This description only describes the function of the cam switches and the way to and from manual mode. For more detailed information on the actuator, please refer to the manufacturer's documentation. (See Schimpf operating instructions series 00-01-02-03).

7.2.1 Cam switch actuator

Cam switch allocation

Cam	Allocation
Cam 1	Limits the actuator in the small load. Maximum closing angle. Optimisation can influence the ignition behaviour as well as the light load.
Cam 2	Limits the actuator in the large load. Maximum opening angle. Optimisation influences the maximum output of the burner. Cam 2 can be used to limit the burner's maximum output.
Cam 3	Cam 3 ensures that the burner cannot be ignited in the high load. The cam is set at the factory to approx. 20 to 30 % burner capacity. Above this setting, the burner cannot start. During operation, cam 3 must be bridged by the customer via a normally open contact. See circuit diagram (chapter 3.5).
Cam 4	Cam 4 has no function.

Setting the cam switches

The cam switches are set at the factory according to the above table. The fine adjustment can be done with a screwdriver at screw F.

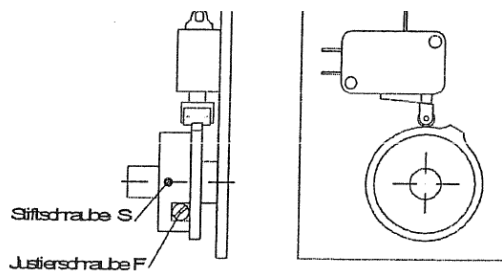


Figure 18: Cam switch inside the actuator

7.2.2 Manual operation of Actuator

Hand mode actuator TEC3/P

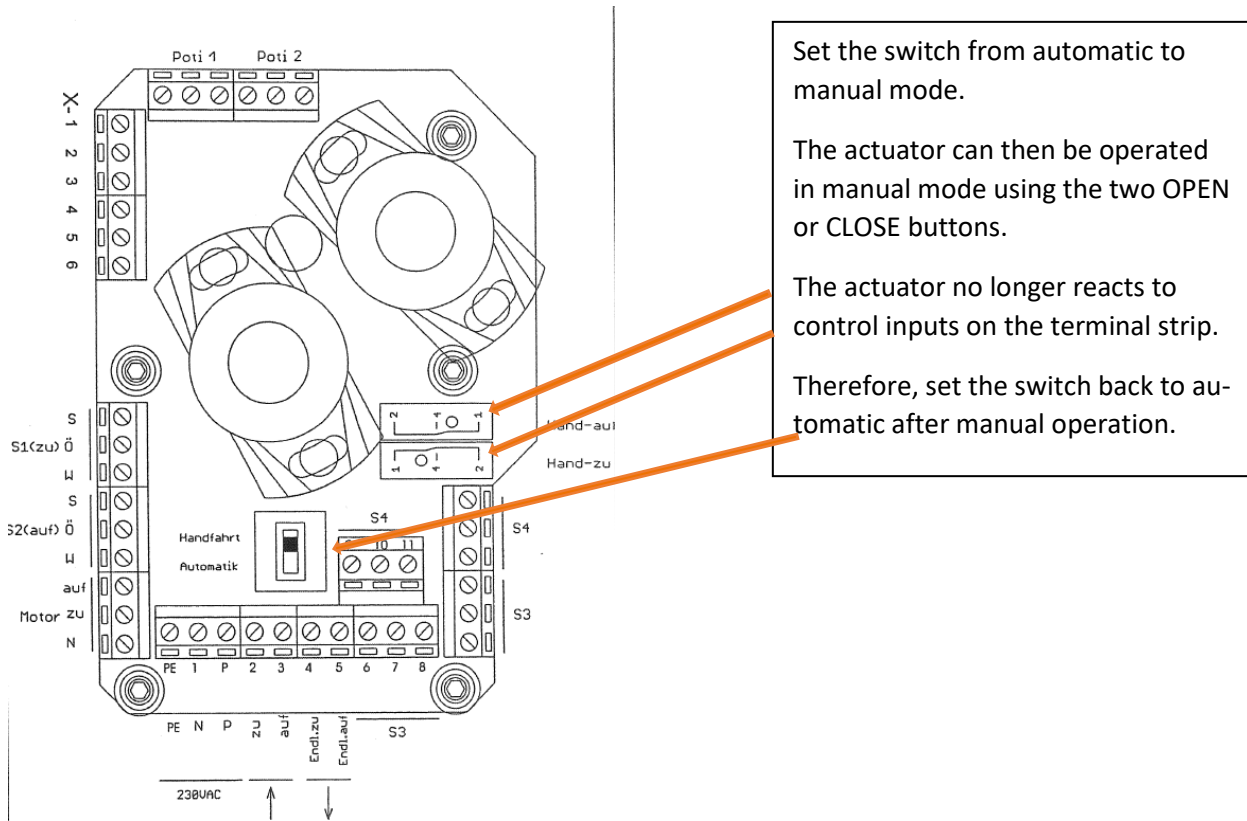


Figure 19: Circuit board actuator, may vary

Hand mode actuator TEC10/20:

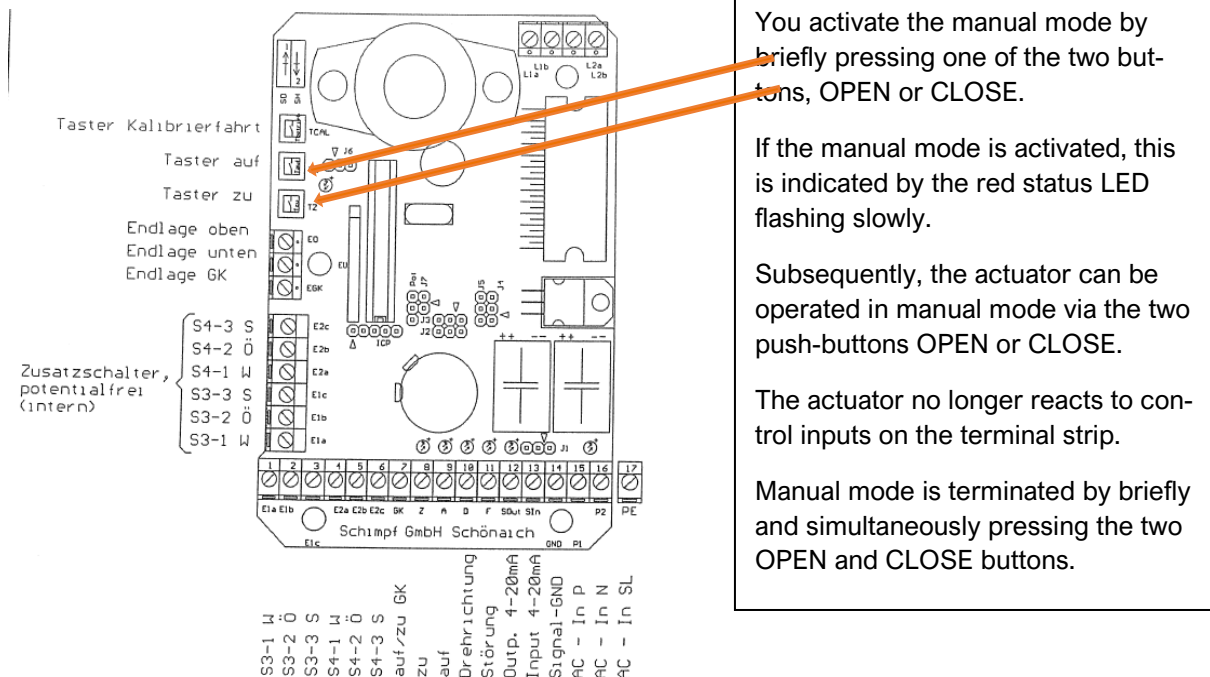


Figure 20: Circuit board actuator, may vary

8 Maintenance

During maintenance, the burner should be cleaned inside and out and all safety devices should be checked for functionality. We recommend removing and cleaning the flame cone and cleaning the combustion fan. After the burner has been put back into operation, the burner settings are recorded. For maintenance, proceed as described in the following chapters.

8.1 Maintenance instructions



Explosion hazard due to escaping gas

Improper work can lead to gas leakage and explosion.

- ⊕ Before starting work, close the fuel shut-off devices.
- ⊕ Work carefully when removing and installing gas-carrying system parts.
- ⊕ Close the screws at the measuring points and check for leaks.



Life-threatening danger due to electric shock

Working under voltage can lead to electric shocks.

- ⊕ Disconnect the unit from the power supply before starting work.
- ⊕ Secure against unexpected restarting.



Danger of burns due to hot components

Hot components can cause burns.

- ⊙ Allow the components to cool down sufficiently.



SCHARR TEC GmbH & Co. KG recommends a maintenance contract to ensure regular inspection.

Maintenance must only be carried out by qualified personnel. The gas burner should be serviced once a year. Depending on the system conditions, more frequent inspection may also be necessary. Components that show increased wear or whose design lifetime has been exceeded or will be exceeded before the next maintenance should be replaced as a precaution. The design lifetime of the components is listed in the maintenance schedule (see chapter 8.2).

Before any maintenance

- ⊗ Inform the operator before starting maintenance work.
- ⊗ Switch off the main switch of the system and ensure that it cannot be switched on again unexpectedly.
- ⊗ Close the fuel shut-off device (ball valve).

After each maintenance

- ⊕ Check gas-carrying components for leaks.
- ⊕ Check the function of the burner.
- ⊕ Record settings of the burner.

8.2 Maintenance plan

Burner component	Criterion / design life	Maintenance measures
Combustion fan	Pollution / damage	⊗ Clean / Replace
Air flow	Pollution	⊗ Clean
Air flap	Pollution / Mobility	⊗ Clean / Oil
Air pressure switch	Switching point / 10 years	⊗ Check / Replace
Ignition cable	Damage	⊗ Replace
Ignition electrode	Pollution / damage	⊗ Clean / Replace
Fire manager	Defective / 10 years	⊗ Replace
Ionisation conduction	Damage	⊗ Replace
Ionisation electrode	Pollution / damage	⊗ Replace
UV-Scanner	Pollution / 10.000 Hours of operation	⊗ Clean / Replace
Shutter	1 Million of circuits / 20 years	⊗ Replace
Flame pipe	Pollution / Damage	⊗ Clean / Replace
Gas multi-block with VPS	Detected error	⊗ Replace
Gas multi-block without VPS	Damage / 10 years	⊗ Replace
Gas pressure switch	Switching point / 10 years	⊗ Check / Replace

The specified design lifespan applies to typical use in a thermoprocessing plant according to EN746.

8.3 Removing the maintenance cone

The maintenance cone must be removed to open the burner casing and to change the ignition electrode / ionisation electrode.

- ⊗ If necessary, remove the UV scanner from the connection of the burner.
- ⊗ Remove the ignition cable or ionisation cable.
- ⊗ Loosen the 4 Allen screws with which the maintenance cone is screwed to the casing.
- ⊗ Remove the maintenance cone including the ignition electrode / ionisation electrode.
- ⊗ You now have a clear view of the gas flap and the gas nozzles of the burner.
- ⊗ Clean the maintenance cone, especially all holes and sight glasses.

Reverse the sequence when reassembling the maintenance cone. Make sure the seal is intact. Replace it if the seal is damaged.

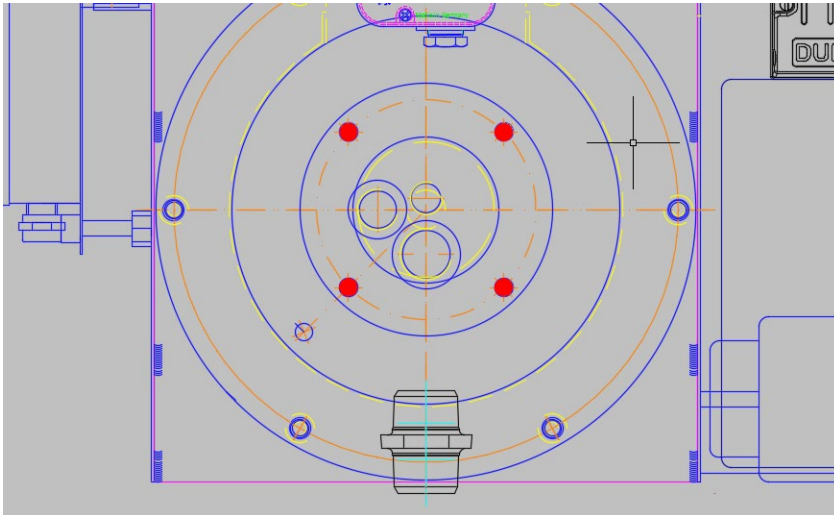


Figure 24: Maintenance cone

The corresponding screws of the maintenance cone are marked in colour.

8.3.1 Cleaning / replacing the ignition electrode

- ⊗ Open the ignition electrode holder using spanners.
- ✓ You can pull the ignition electrode out of the holder towards the back.
- ⊗ Clean the ignition electrode with a brass brush or replace it completely.
- ⊗ Put the ignition electrode back into the ignition electrode holder and tighten it.
- ⊗ Make sure to keep the correct distance to the maintenance flange. (2mm to the casing) (bend into position if necessary).

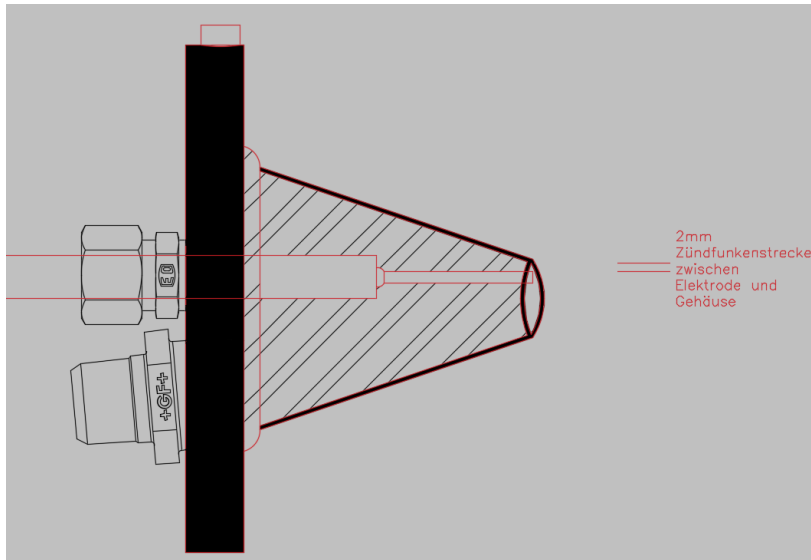


Figure 25: Distance between electrode and casing

8.3.2 Cleaning / replacing the flame monitor

UV-Scanner

Clean the UV tube and any glass panes of the UV scanner with a damp cloth. The UV scanner has a plug-in connection under the connection cover, which makes replacement very easy. (See documentation Dungs MPA41xx)

Shutter

The shutter is maintenance-free. If necessary, it must be replaced according to the documentation. (See documentation Dungs MPA41xx)

Ionisation electrode

- ⊗ Open the ionisation electrode holder using spanners.
- ⊗ You can pull the ionisation electrode out of the holder towards the back.
- ⊗ Clean the ionisation electrode with a brass brush or replace it completely.
- ⊗ Put the ionisation electrode back into the ignition electrode holder and tighten it.
- ⊗ Make sure that the ionisation electrode does not touch the casing.

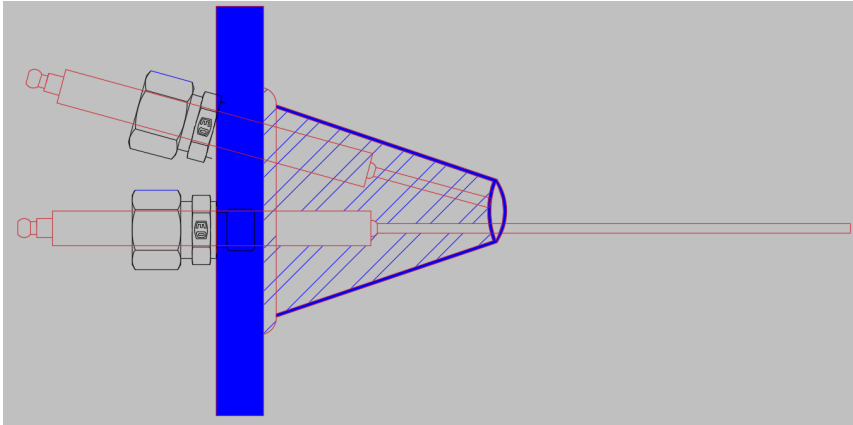


Figure 26: Insertion of ionisation electrode into maintenance cone

If an ionisation electrode is used, it is inserted straight into the maintenance cone via the spark plug connection. The spark plug is inserted into the side of the UV scanner connection via a separate holder. In this case, too, a distance of approx. 2 mm from the casing must be maintained.

8.4 Removing and installing the actuator air damper

- ⊙ EnRemove the combustion fan from the casing.

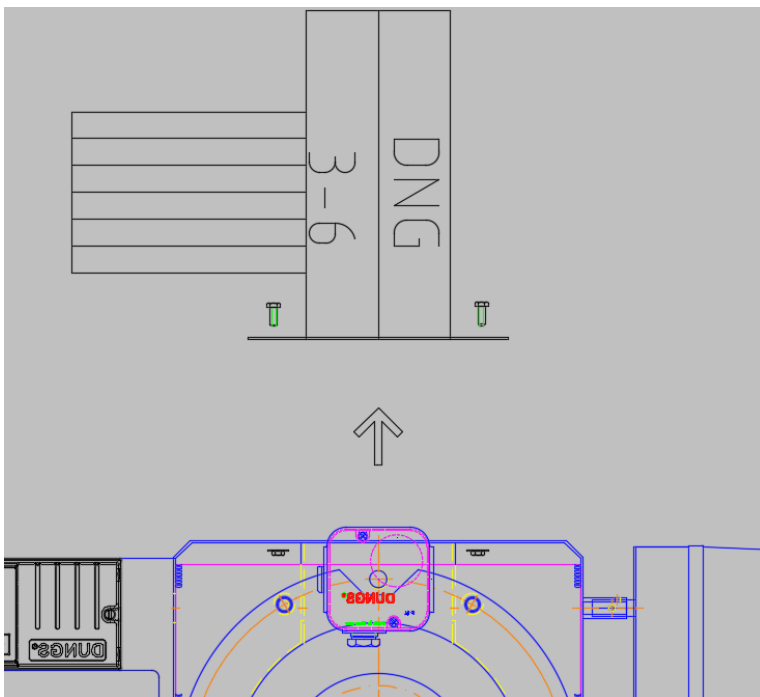


Figure 27: Example picture of the fan during dismantling of the burner casing

- ⊙ Loosen the two screws connecting the air flap to the air shaft.

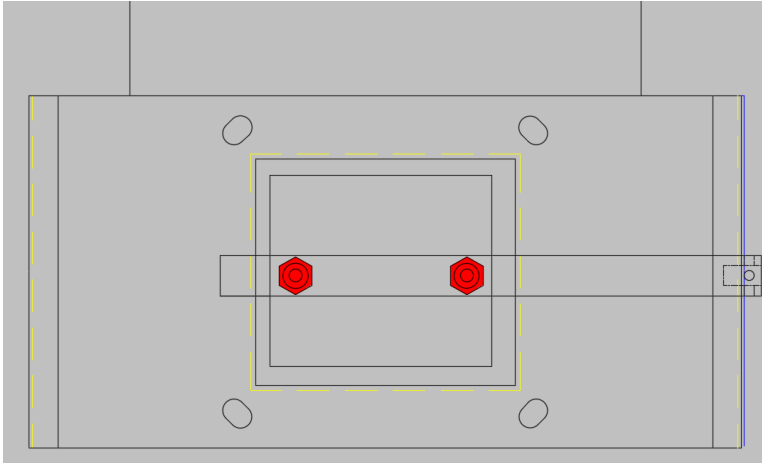


Figure 28: Top view of the burner casing without combustion fan, with view of air damper and air shaft

- Remove the stop screw of the actuator and then pull the actuator incl. air shaft sideways out of the burner.

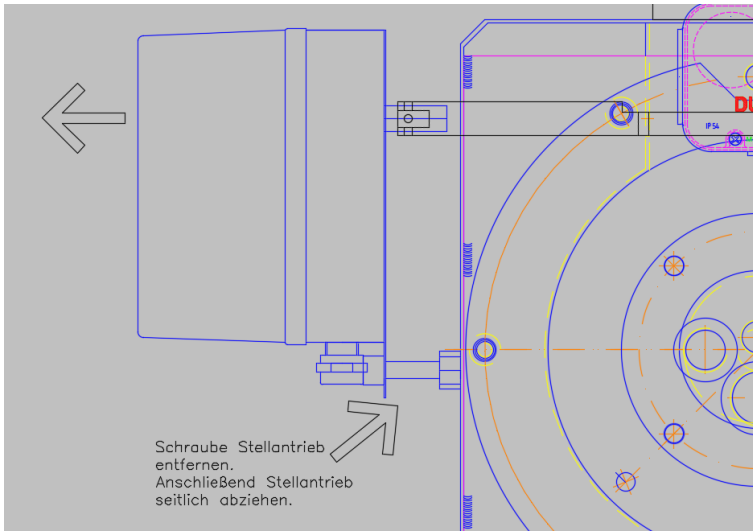


Figure 29: Front view on casing with view on actuator

8.5 Removing and installing the flame cone incl. gas block

After removing the maintenance cone, the housing cover can be removed.

- ⊗ Loosen the 6 or 8 Allen screws with which the casing cover is screwed to the casing.
- ⊗ Remove the housing cover from the burner casing.
- ⊗ You now have a clear view of the gas block and the air mixing cone.



The Phoenix TE1 and TE2 have 6 screws.

The Phoenix TE3 has 8 screws.

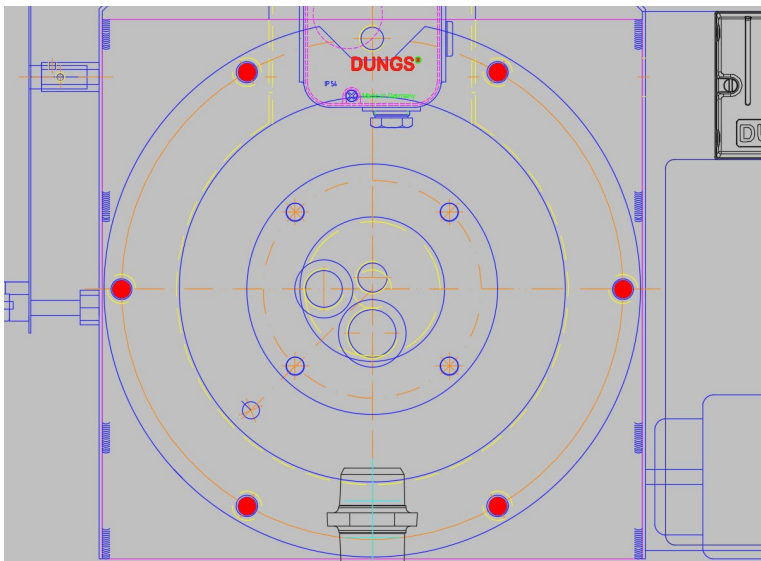


Figure 30: Phoenix TE1 housing cover with Allen screws (marked red)

- ⊗ Remove the 4 screws from the gas block on the underside of the burner, directly next to the gas connection.

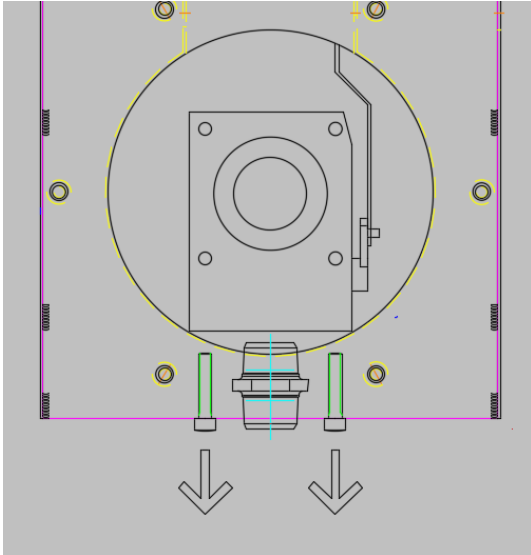


Figure 31: Burner without housing cover

(The gas pipeline is not shown for the sake of clarity.)

- Remove the gas block incl. air flap and attached flame cone from the burner casing.

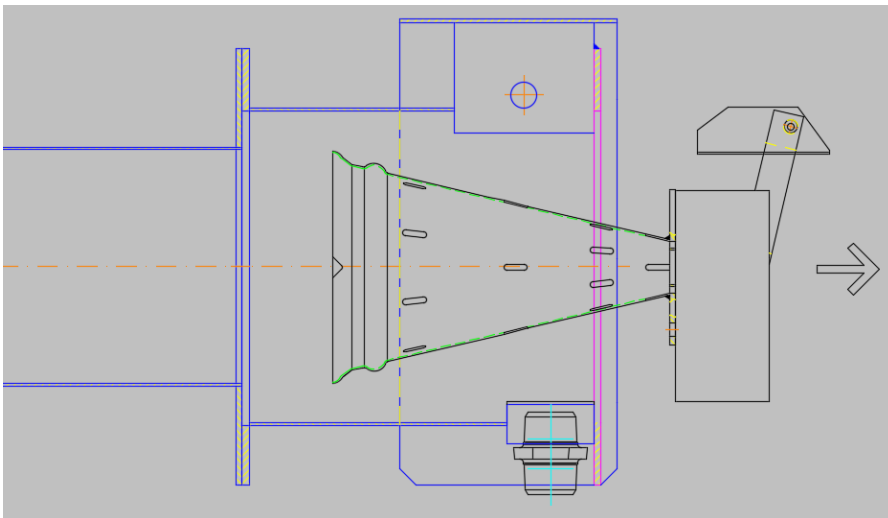


Figure 32: Side view of the burner during removal of the gas block. incl. flame cone and air flap

8.6 Pressure switch / VPS

During the annual maintenance, all safety devices must be checked for function and switching point.

Proceed as follows:

8.6.1 Checking / replacing the air pressure switch

Checking the air pressure switch

- ⊗ Briefly mask the intake side of the combustion fan with a cloth.
- ⊗ The burner goes into fault mode and a clear error message is generated at the burner control unit.
- ⊗ Remove the cloth and acknowledge the fault.
- ⊗ The burner starts and goes into operation again.
- ⊗ Make a note of the switching value of the air pressure switch in the test report.

Replacing the air pressure switch

- ⊗ Switch the burner off and disconnect it from the power supply.
- ⊗ Open the cover of the air pressure switch.
- ⊗ Disconnect the electrical wiring of the pressure switch.
- ⊗ Detach the air pressure switch from the burner casing at the brass screw connection on the back.
- ⊗ If necessary, remove the screw connection from the defective air pressure switch.
- ⊗ Install the screw connection on the new air pressure switch and proceed in reverse order for reassembly.



Additional information can be found in the documentation of the air pressure switch.

8.6.2 Checking / replacing the min. gas pressure monitor

Checking the min. gas pressure monitor

- ⊗ Close the gas ball valve on the inlet side slowly.
- ✓ The gas pressure switch detects the lack of gas and issues a fault signal.
- ⊗ Open the gas ball valve again and acknowledge the fault message.
- ⊗ The burner starts and goes into operation again.
- ⊗ Make a note of the switching value of the gas pressure switch in the test report.

Replacing the min. gas pressure monitor

- ⊗ Switch off the power supply to the burner.
- ⊗ Close the gas ball valve on the inlet side.
- ⊗ Remove the plug connection of the pressure switch.
- ⊗ Unscrew the pressure switch from the multi-block using the two Allen screws.
- ⊗ Install the new pressure switch on the multi-block in reverse order.
- ⊗ Then check for leaks.



Additional information can be found in the documentation of the gas pressure switch.

8.6.3 Checking / replacing the max. gas pressure monitor

Checking the max. gas pressure monitor

- ⊗ Reduce the set value of the max. gas pressure switch until it causes the burner to switch off.
- ✓ The gas pressure switch goes into fault as soon as the pressure is higher than the set value.
- ⊗ Change the setting of the max. gas pressure switch to the original value.
- ⊗ Acknowledge the fault message on the fire manager.
- ✓ The burner starts and goes into operation again.
- ⊗ Make a note of the switching value of the max. gas pressure switch in the test report.

Replacing the max. gas pressure monitor

- ⊗ Switch off the power supply to the burner.
- ⊗ Close the gas ball valve on the inlet side.
- ⊗ Remove the plug connection of the pressure switch.
- ⊗ Detach the pressure switch from the connection flange of the multi-block using an Allen key.
- ⊗ Remove the adapter plate from the defective pressure switch.
- ⊗ Install the adapter plate on the new pressure switch.
- ⊗ Install the new pressure switch in reverse order on the connecting flange of the multi-block.
- ⊗ Then check for leaks while the burner is in operation.



Additional information can be found in the documentation of the gas pressure switch.

8.6.4 Checking / replacing the valve proofing system

Checking the valve proofing system

- ⊗ Before starting the burner, open the "Pa" opening on the valve test system.
- ⊗ Start the burner.
- ⊗ The valve test system cannot build up pressure between the valves and goes into fault mode after 26 seconds at the latest.
- ⊗ Close the opening "Pa" on the valve test system.
- ⊗ Acknowledge the fault on the valve test system.
- ⊗ The cycle starts again and the burner goes into operation.

Replacing the valve proofing system

- ⊗ Switch off the power supply to the burner.
- ⊗ Close the gas ball valve on the inlet side.
- ⊗ Disconnect the plug of the valve test system.
- ⊗ Remove the defective valve test system from the gas multi-block by opening the 4 Allen screws.
- ⊗ Install the new valve test system in reverse order. It is imperative that you use the new screws supplied with the new valve test system.
- ⊗ Then check for leaks.

8.7 Checking / replacing the gas multi-block

The inspection of the gas multi-block is limited to a general visual inspection and the inspection of the gas strainer or gas filter.

8.7.1 Testing gas multi-block

- ⊗ Check all plug connections of the gas multi-block for tightness.
- ⊗ Check all cables for external damage.
- ⊗ Look for obvious damage to the gas multi-block.
- ⊗ Check the gas multi-block for leaks using leak detection spray or gas measuring equipment.

8.7.2 Check gas strainer / gas filter

Check gas strainer on multi-block MB 407 / 410 / 412

The gas strainer is inserted between the gas multi-block and the inlet flange.

To replace or check the strainer, the gas multi-block must be detached from the flange.

To do this, proceed as follows:

- ⊗ Close the gas ball valve.
Remove the two screws on the inlet flange of the gas multi-block.
- ⊗ If necessary, remove the two screws on the outlet flange of the gas multi-block.
- ⊗ Pull the gas multi-block out from between the flanges.
- ⊗ Check the strainer in the inlet of the gas multi-block.
- ⊗ If necessary, clean the strainer with compressed air.
- ⊗ Re-assemble the gas multi-block in reverse order.
- ⊗ When reassembling, make sure that the O-ring seals are intact.
- ⊗ Check the tightness of the gas multi-block using leak detection spray or gas measuring equipment.

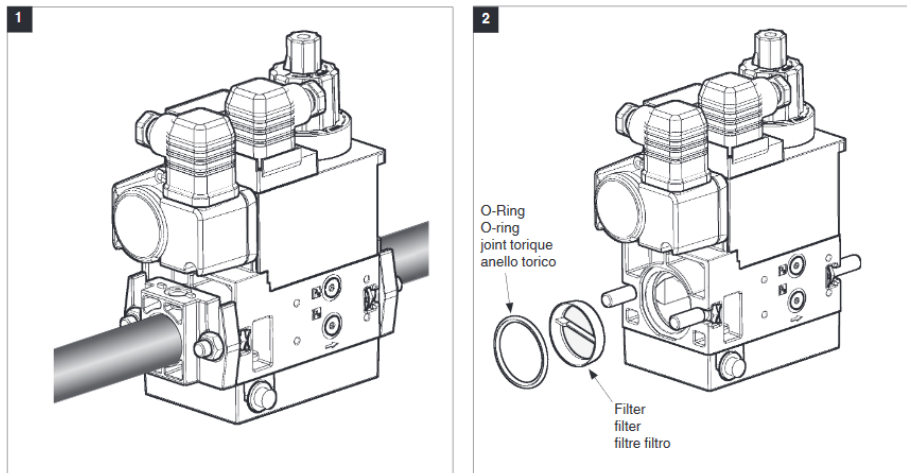


Figure 33: Position of gas strainer in multi-block MB 407 / 410 / 412

Checking the gas filter on multi-block MB 415 / 420

The gas filter is inserted on the underside of the gas multi-block. It can be checked or replaced via a mounting opening.

To do this, proceed as follows:

- ⊗ Close the gas ball valve.
- ⊗ Remove the 6 screws from the mounting hole.
- ⊗ Pull the filter downwards out of the gas multi-block.
- ⊗ Check the filter.
- ⊗ If necessary, clean or replace the filter.
- ⊗ Reverse the procedure to install the gas filter.
- ⊗ Make sure the seal is intact when reinstalling it.
- ⊗ Check the tightness of the gas multi-block using leak detection spray or gas measuring equipment.



Figure 34: Position gas filter gas multi-block MB 415 / 420

8.7.3 Replacing the gas multi-block

- ⊗ Close the gas ball valve.
- ⊗ Remove all plug connections to the gas multi-block and its attachments.
- ⊗ If necessary, remove the attachments of the gas multi-block as described in the respective chapters.
- ⊗ Remove the screws connecting the gas multi-block to the flanges.
- ⊗ Remove the gas multi-block from the pipeline.
- ⊗ Proceed in reverse order to reassemble the gas multi-block.
- ⊗ If necessary, we recommend fitting the attachments first.
- ⊗ Check the gas multi-block for leaks using leak detection spray or gas measuring equipment.

8.8 Replacing the fire manager

The fire manager can be replaced in just a few steps. As a rule, it is not necessary to replace the base of the fire manager. Before replacing the fire manager, make sure that the type is suitable and that the fire manager has been correctly programmed.



Incorrectly programmed fire managers can lead to non-calculated conditions on the burner, which can result in a considerable risk during operation.

Proceed as follows to exchange:

- ⊗ Switch off the power supply to the fire manager/burner.
- ⊗ Open the two screws that secure the fire manager to the base.
- ⊗ Pull the fire manager off towards the front.
- ⊗ Proceed in reverse order to reinstall the burner control unit.

8 Malfunctions

All faults are recognised by the fire manager and are displayed as error messages.

The following list is intended to assist you in rectifying faults.



Additional information can be found in the manufacturer's documentation for the fire manager and can be obtained from the burner manufacturer.

Problem	Indication on the display MPA41xx	Possible cause of the malfunction	Elimination of the possible causes
Fire manager / burner without function	none	<ul style="list-style-type: none"> ⊕ Power supply interrupted ⊕ External fuse blown ⊕ Fire manager fuse blown ⊕ Fire manager defective 	<ul style="list-style-type: none"> ⊕ Check power supply and restore if necessary ⊕ Check fuses ⊕ Replace fire manager
Burner will not start	0	<ul style="list-style-type: none"> ⊕ Heat requirement missing ⊕ Burner not in low load ⊕ Cam 3 in actuator defective 	<ul style="list-style-type: none"> ⊕ Check the voltage of the heat demand (terminal 2). ⊕ Check the actuator, if necessary, run in low load. ⊕ Check cam 3 in the actuator, replace with cam 4 if necessary.
Safety chain malfunction	0xA2	<ul style="list-style-type: none"> ⊕ The safety chain of the fire manager is interrupted ⊕ Min. gas pressure switch triggered/defective ⊕ Max. gas pressure switch triggered/defective 	<ul style="list-style-type: none"> ⊕ Check the gas pressure ⊕ Replace min. gas pressure switch ⊕ Replace max. gas pressure switch ⊕ Open gas ball valve
Flameout during safety period	0xA7	<ul style="list-style-type: none"> ⊕ No flame formation after ignition ⊕ Wrong gas-air mixture ⊕ No ignition spark ⊕ Defective UV scanner ⊕ UV scanner dirty ⊕ Ignition position too low ⊕ Gas multi-block does not open 	<ul style="list-style-type: none"> ⊕ Check ignition spark ⊕ Check the distance between the ignition electrodes ⊕ Replace defective ignition transformer ⊕ Select higher ignition position ⊕ Clean UV scanner ⊕ Replace defective UV scanner ⊕ Adjust gas-air mixture ⊕ Renew gas multi-block
Flame rupture during operation	0xA8	<ul style="list-style-type: none"> ⊕ Gas pressure after multi-block too low ⊕ UV scanner defective ⊕ UV scanner dirty ⊕ Back pressure in combustion chamber is too high 	<ul style="list-style-type: none"> ⊕ Adjust gas pressure after multi-block ⊕ Replace defective UV scanner ⊕ Clean UV scanner ⊕ Reduce back pressure in combustion chamber, consult burner manufacturer if necessary.
Retirement control LDW	0xAA	<ul style="list-style-type: none"> ⊕ Air pressure switch defective ⊕ 2/3 way valve defective 	<ul style="list-style-type: none"> ⊕ Renew air pressure switch ⊕ Renew 2/3 way valve

No air pressure	0xAb	<ul style="list-style-type: none"> ⊕ No air pressure ⊕ Back pressure in combustion chamber is too high 	<ul style="list-style-type: none"> ⊕ Switch on fan ⊕ Replace fan ⊕ Clean fan ⊕ Check combustion chamber pressure
External light	0xA6	<ul style="list-style-type: none"> ⊕ UV scanner detects flame outside burner operating hours ⊕ UV scanner defective 	<ul style="list-style-type: none"> ⊕ Renew UV scanner ⊕ Check for external light, take countermeasures if necessary
Gas pressure too high Gas pressure too low	0x13	<ul style="list-style-type: none"> ⊕ The safety chain of the fire manager is interrupted ⊕ Min. gas pressure switch triggered/defective ⊕ Max. gas pressure switch triggered/defective 	<ul style="list-style-type: none"> ⊕ Check the gas pressure ⊕ Replace min. gas pressure switch ⊕ Replace max. gas pressure switch ⊕ Open gas ball valve
Temperature does not rise / temperature is too high	3	<ul style="list-style-type: none"> ⊕ Control signal interrupted ⊕ Actuator defective 	<ul style="list-style-type: none"> ⊕ Check the control of the actuator ⊕ Check actuator for function with manual operation
Shutter test error	0x61	<ul style="list-style-type: none"> ⊕ Shutter defective ⊕ Extension module defective ⊕ Incorrect programming 	<ul style="list-style-type: none"> ⊕ Renew shutter ⊕ Renew extension module ⊕ Check MPA programming

10 Shutdown

In the event of operational interruptions

- ⊗ switch off burner
- ⊗ close fuel shut-off devices

11 Warranty and liability

Warranty and liability claims in the event of personal injury and property damage are excluded if they are attributable to one or more of the following causes are:

- ⊕ improper use
- ⊕ non-observance of the instructions
- ⊕ operation with non-functional safety or protective devices
- ⊕ continued use despite the occurrence of a defect
- ⊕ improper installation, commissioning, operation and maintenance
- ⊕ improperly carried out repairs
- ⊕ non-use of original SCHARR TEC parts
- ⊕ external forces beyond one's control
- ⊕ unauthorised modifications to the unit
- ⊕ installation of additional components that have not been tested together with the appliance without the manufacturer's consent
- ⊕ installation of combustion chamber inserts which prevent the formation of the flame
- ⊕ unsuitable fuels
- ⊕ Defects in the supply lines
- ⊕ too high connection pressures in the supply line

12 Spare parts / expendable parts

We will be happy to assist you in finding the right wear and spare parts. Please have the corresponding burner ID number ready. For assistance, please contact +49 711 / 7868-463.

The following list shows the most common spare parts incl. SCHARR TEC order number:

12.1 Expendable parts Phoenix TE 1 / 2 / 2.1

Description	Technical Information	SCHARR TEC Order number
Ignition electrode	D 11/100	tt20005
Ignition cable	PVC	tt20006
Spark plug connector	Angled	tt20008
Gas block seal	Dimensions: 100x60x2	tt25180
Maintenance flange seal	Dimensions: DN65 127x77x2	tt20112
Flame tube seal	Dimensions: DN200 273x220x2	tt20099
Sealing tape Phoenix	Self-adhesive	tt20003

12.2 Expendable parts Phoenix TE3 / 3.1

Description	Technical Information	SCHARR TEC Order number
Ignition electrode	D 11/100	tt20005
Ignition cable	PVC	tt20006
Spark plug connector	Angled	tt20008
Gas block seal	Dimensions: 120x80x2	tt25181
Maintenance flange seal	Dimensions: 158x90x2	tt25182
Flame tube seal	Dimensions: 398x305x2	tt20104
Sealing tape Phoenix	Self-adhesive	tt20003

12.3 Spare parts for Phoenix TE 1 / 2 / 2.1 / 3 / 3.1

Find the type of the necessary component on the type plate attached to it. If in doubt, contact the burner manufacturer.

12.3.1 Ball valves

Description	Technical Information	SCHARR TEC Order number
Ball valve 1/2"	Gas ball valve 1/2"	tt20126
Ball valve 3/4"	Gas ball valve 3/4"	tt20125
Ball valve 1"	Gas ball valve 1"	tt20044
Ball valve 1 1/4"	Gas ball valve 1 1/4"	tt20124
Ball valve 1 1/2"	Gas ball valve 1 1/2"	tt20123
Ball valve 2"	Gas ball valve 2"	tt20122

12.3.2 Gas multi-blocks

Description	Technical Information	SCHARR TEC Order number
Gas multi-block MB 407	MB-DLE 407 B01 S20	tt20038
Gas multi-block MB 410	MB-DLE 410 B01 S20	tt20039
Gas multi-block MB 412	MB-DLE 412 B01 S20	tt20040
Gas multi-block MB 415	MB-DLE 415 B01 S20	tt20041
Gas multi-block MB 420	MB-DLE 420 B01 S20	tt20042
Gas multi-block MB 412 (Performance enhanced)	MB-DLE 412 B01 S50	tt251955
Gas multi-block MB 415 (Performance enhanced)	MB-DLE 415 B01 S50	tt25188
Gas multi-block MB 420 (Performance enhanced)	MB-DLE 420 B01 S50	tt200092
Replacement filter element MB415/420	incl. Seal	tt20036

12.3.3 Pressure switch

Description	Technical Information	SCHARR TEC Order number
Min. gas pressure switch	GW 150 A5	tt20031
Max. gas pressure switch	GW 50 A5	tt20032
Air pressure switch	LGW 10 A4	tt20027
Air pressure switch (Performance enhanced)	LGW 50 A4	tt20026
Air pressure switch (Performance enhanced)	LGW150 A4	tt20028

12.3.4 Actuator

Description	Technical Information	SCHARR TEC Order number
Actuator 232	232 D3-230-06-011	tt20024
Actuator 232 with Poti.	232 D3-230-06-059	tt20025
Actuator TEC 3 rotating anticlockwise	3-Pt-Step, direction of rotation: anticlockwise	tt25068
Actuator TEC 3P rotating anticlockwise	3-Pt-Step, direction of rotation: anticlockwise, 1000Ohm potentiometer	tt25310
Actuator TEC 3 rotating clockwise	3-Pt-Step, direction of rotation: clockwise	tt25065
Actuator TEC 3P rotating clockwise	3-Pt-Step, direction of rotation: clockwise, 1000Ohm potentiometer	tt25066
Actuator TEC10 rotating anticlockwise	0-10V Signal, direction of rotation: anticlockwise	tt25070
Actuator TEC10 rotating clockwise	0-10V Signal, direction of rotation: clockwise	tt25071
Actuator TEC20 rotating anticlockwise	4-20mA Signal, direction of rotation: anticlockwise	tt25069
Actuator TEC20 rotating clockwise	4-20mA Signal, direction of rotation: clockwise	tt25067

12.3.5 Combustion fan

Description	Technical Information	SCHARR TEC Order number
DNG 3-6	90 W, 0,3A, 400V	tt25333
DNG 4-14	180W, 0,6A, 400V	tt25185
DNG 6-22,5	370W, 1,2A, 400V	tt20063
DNG 6-25	550W, 1,4A, 400V	tt20062
DNG 6-28	370W, 0,95A, 400V	tt20066
DNG 6-40	750W, 1,9A, 400V	tt20135
DNG 7-60	1500W, 3,4A, 400V	tt20061
DNG 8-80	2200W, 4,6A, 400V	tt20065
DMV 250	120W, 0,41A, 400V	tt25094
DMV 280	250W, 0,8A, 400V	tt25075
DMV 300	550W, 1,33A, 400V	tt20206
DMV 330	750W, 1,73A, 400V	tt20208
DMV 350	1100W, 2,8A, 400V	tt25190
DMV 370/1	1500W, 3,5A, 400V	tt25244
DMV 370/2	2200W, 4,8A, 400V	tt25203

12.3.6 Fire managers / UV-Scanners / Shutters

Description	Technical Information	SCHARR TEC Order number
MPA4112	MPA 4112 intermittent	tt25265
MPA 4112 incl. EM2/4	MPA 4112 continuous operation	tt25314
IFD 258	IFD 258 intermittent	tt20010
UV41 Scanner	UV41 Scanner without adapter	tt25263
UVS 10D0G1 (counter pressure)	incl. counter-pressure adapter 1/2"	tt20130
UVS 10D4G1 (negative pressure)	incl. negative pressure adapter	tt20093
UV-Shutter	UV4x-EM1/1 Shutter	tt25313
UV4x-EM 1/3	Adapter UV41 for negative pressure	tt25266
UV4x-EM 1/7	Adapter UV41 for counter-pressure	tt25267

12.3.7 Valve proofing system/ Ignition transformer / 3/2-way valve

Description	Technical Information	SCHARR TEC Order number
Valve proofing system	VPS 504 S02	tt25024
Ignition transformer	G823 PC with cable	tt20020
3/2- Way valve	directly controlled solenoid valve	tt25072

12.3.8 Components Phoenix Burner

Description	Technical Information	SCHARR TEC Order number
Gas block TE1	incl. Gas wave	tt25234
Gas block TE2 / 2.1	incl. Gas wave	tt25256
Gas block TE3 / 3.1	incl. Gas wave	tt25307
Gas-air mixing cone TE1		tt20047
Gas-air mixing cone TE2 / 2.1		tt20046
Gas-air mixing cone TE3 / 3.1		tt20045
Flame tube Phoenix TE1	250mm length, 159mm diameter	tt20074
Flame tube Phoenix TE2	250mm length, 209mm diameter	tt20073
Flame tube Phoenix TE3	300mm length, 309 mm diameter	tt20072
Air control damper TE1		tt25057
Air control damper TE2		tt25058
Air control damper TE3		tt25059

12.3.9 Diverse components

Description	Technical Information	SCHARR TEC Order number
Pressure gauge 0/25 mbar	KP 80, 1/2" Connection	tt25159
Pressure gauge 0/40 mbar	KP 80, 1/2" Connection	tt25160
Pressure gauge 0/60 mbar	KP 80, 1/2" Connection	tt20015
Pressure gauge 0/100 mbar	KP 80, 1/2" Connection	tt20013
Warning light junction box		tt20107
Gauge glass for Phoenix	Gauge glass 1/2"	tt25014

13 Appendices

13.1 Checklist test report Phoenix burner

Inspections and maintenance work on Phoenix gas burners

Type: _____ Rated power: _____ KW
 Construction number: _____ Year of construction: _____
 Gas pressure before multi-block _____ mbar

	Yes	No
<input type="checkbox"/> Check that the shut-off valves move freely	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Checked for mechanical damage to the burner	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Functional test of the leakage control checked	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Leakage check carried out on screw connections	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Checked for damage to cable / connector connections	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Checking and, if necessary, cleaning the combustion air fan	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Checking and, if necessary, cleaning the connection line to the air pressure switch	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Functionality check / condition check ignition electrode	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Solenoid valve functionality check	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Functionality check: Flame monitoring UV-probe cleaned	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> Functionality check: air pressure switch Setting value: _____ mbar	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Functionality check : min. gas pressure switch Setting value: _____ mbar	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Functionality check: max. gas pressure switch Setting value: _____ mbar	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Functionality check: safety temperature limiter Setting value: _____ °C	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Functionality check: actuator / reset to auto Limit value min.: _____ ° Limit value max.: _____ °	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Gas flow pressure behind multi-block / pressure regulator Min. power: _____ mbar Max. power: _____ mbar	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Other:		

Questions?
We would like to help you.

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