GIERSCH

Technical Information • Installation Instructions

M2.2-LN

Issued April 2024

In the interests of continuous product improvement, technical specifications are subject to change without prior notice!

Oil

CE

GB

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1 General information

An oil-fired system must be installed in compliance with a number of regulations and requirements. It is therefore the duty of the installer to be familiar with all applicable regulations and requirements. Installation, start-up and maintenance must be performed with utmost care. Heating oil EL in accordance with DIN 51603 must be used.
The burner must not be operated in rooms with high levels of air humidity (laundry rooms), dust or corrosive vapours.

Manually operated shut-off valve

Before the burner or typically means a manually operated shut-off valve for separating the burner must be installed. It must be easily accessible.

Filter and venting device

Upstream of the burner, a filter must be installed to prevent the ingress of foreign matter. To vent the fuel feed line proper facilities shall be provided.

2 Scope of delivery

Before installing the oil burner of the M2.2-LN series, please check the scope of delivery. Scope of delivery: Burner, recirculation attachment, fastening screws, separate operating instructions, technical information, flange seal, one 7-pin and one 4-pin connector (Wieland plug).

Oil nozzles are not included in the scope of delivery.

3 Maintenance and customer service

The complete system should be checked once a year for correct functioning and leaks in accordance with DIN 4755 by a representative of the manufacturer or other suitably qualified person.
According to DIN EN 267 it is not permissible to perform repairs on components with a safety function. On the other hand, the replacement of parts with genuine parts or approved equivalent parts is permitted.
We accept no liability for consequential damage in cases of incorrect installation or repair, the fitting of non-genuine parts or where the equipment has been used for purposes for which it was not intended.

4 Operating instructions

The operating instructions together with this technical information leaflet must be displayed in a clearly visible position in the boiler room. It is essential to write the address of the nearest customer service centre on the rear of the operating instructions.

5 Instruction of operating personnel

Failures are often caused by operator error. The operating personnel must be properly instructed in how the burner works. In the event of recurring faults, Customer Service should be notified.

6 Key for code designation

M2.2-Z-L-LN

- LN — LowNox
- Z — air damper
- L — 2 stage
- 2 — type extended mixer
- 2 — burner type
- M — burner series

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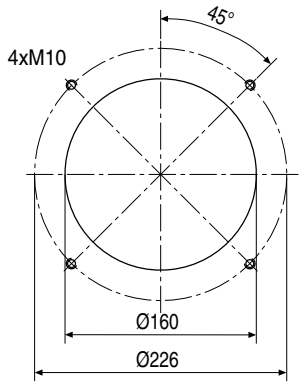
7 Technical specifications

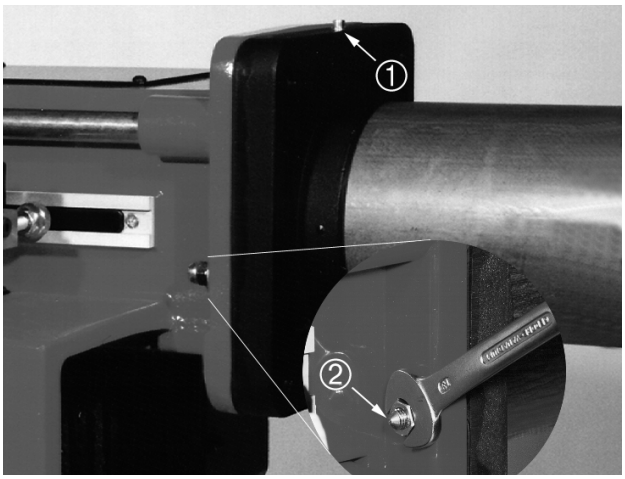
	Burner type
Technical specifications	**M2.2-Z-L-LN**
Burner output in kW	171 - 534
Fuel oil	EL, DIN 51603
Mode of operation	2-stage
Voltage	400 V - 50 Hz
Current consumption (max.)	6.5 A
Electric motor power (at 2800 rpm) in kW	1.1
Oil pump (type)	Suntec AP2 75
Flame failure controller	Flame detector IRD 1010
Control box	LMO 24
Weight in kg	41
Noise emission in db(A)	≤ 78
Emission class	3
NO_x limit value	< 110 mg/kWh

8 Boiler connection dimensions

All dimensions in mm.



9 Flange installation



The boiler connection plate must be prepared according to the dimensions specified for the “boiler connection dimensions”. A flange seal can be used as a marking template. First release the nuts (2) SW13 and cap nuts of the guide rods. Then, the burner flange including the burner pipe can be pulled over the guide rod to the front.

If the door opening of the boiler is smaller than the burner pipe diameter, the burner pipe can be removed after releasing the locking screw (1). The thread of the fastening screws must be coated with graphite before fastening. Align the flange (including the burner pipe) and flange seal and fasten the screws.

Boiler designs that have a very low front plate or door and/or U-fired boiler require a corresponding extension to the mixing unit. This is already installed when the oil burner is ordered with an extended mixing unit.

Otherwise, the short burner pipe and the nozzle rod must be replaced with a longer design. The standard extension is 100 mm.

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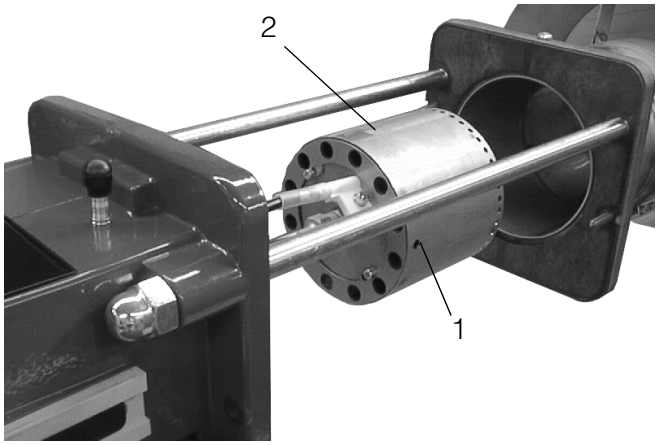
10 Inserting the nozzle

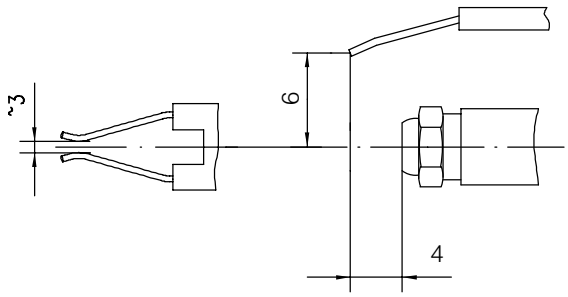


After releasing both nuts M8 (SW13), the burner can be retracted on the guide rods. It is now in the service position. Release the screw (1. 4 mm hexagon socket) and pull the mixing head (2) off to the front.

Remove the plastic sealing screw from the nozzle holder. Do make sure that sealing surface is not damaged.

Screw in the selected nozzle using a hexagon key (SW16). Use an open-ended spanner to hold it. Then re-attach the baffle plate and secure it.

11 Setting the ignition electrodes

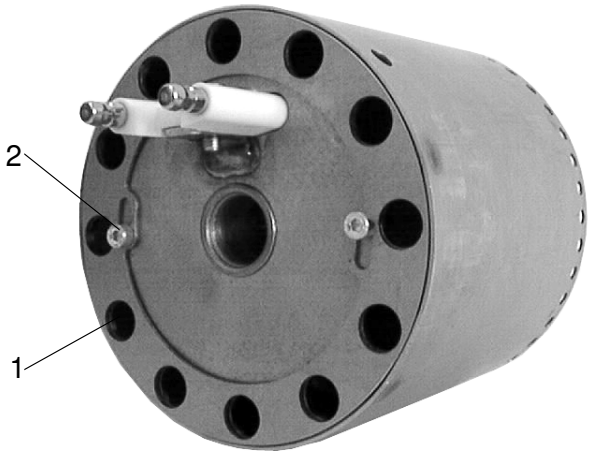


The ignition electrodes are preset at the factory. The following clearances must be observed between the nozzle and the ignition electrode.

Dimensions are specified for checking purposes after replacing a nozzle or electrode.

The distance from the nozzle to the front edge of the baffle plate is 50 mm.

12 Information about the mixing unit M-LowNox



The design and mode of operation of the mixing unit used takes account of the basic connections between flow, combustion and the generation of pollutants.
In addition to the setting of the dimension "A" described at 13, the mixing unit also provides a way to adjust the primary air opening (1) to adapt the emission values in critical cases.
To do this:
Release the 2 screws (2). Then turn the perforated disc to continuously reduce the openings. Then retighten the screws.

A minimum primary opening of 6 mm must be maintained!

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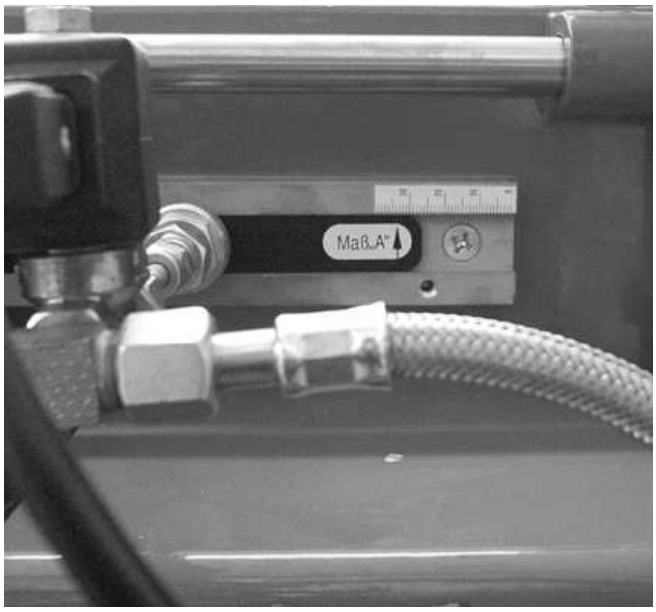
13 Setting the nozzle rod (dimension “A”)



The dimension "A” describes the position of the nozzle stem with baffle plate in the burner pipe cone. The setting table can be used to preset the burner to the appropriate performance.

The setting for the nozzle carrier should selected so that the pressure in front of the baffle plate is approx. 6-9 mbar in the first stage and/or 13-18 mbar in the second stage.

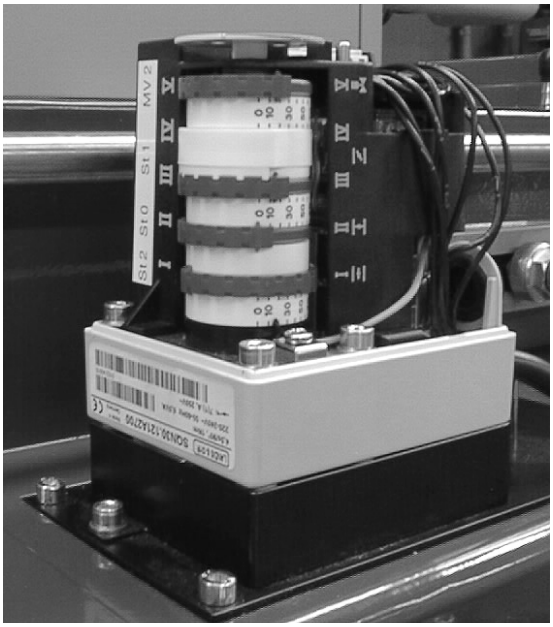
For boilers with higher combustion chamber pressure, it is necessary to increase dimension “A” slightly, or reduce it if the combustion chamber pressure is low.

Similarly, it is necessary to adjust the cam position at the air flap motor.

Higher resistance ➔ smaller number
Lower resistance ➔ larger number

A precise calibration is absolutely necessary!

14 Setting the air flow rate



The air flap positioning motor adjusts the position of the air flap or trips the solenoid valve on two-stage burners with air shutoff. Make the adjustment using the limit switch cams on the positioning drive roller.
The cam positions for adjusting the burner to the required boiler capacity can be taken from the setting table.

For this purpose, remove the hood from the air flap positioning motor. Use the adjustment key to change the cam positions. The adjustment key is located at the side of the air flap positioning motor.

The switching cams can be readjusted when calibrating the burner if necessary.

Higher number ➔ more air, compression increases
Lower number ➔ less air, compression decreases

Colour codes of the switching cams:

Please note the following when adjusting the switch cams:

- Do not set cam position ST1 via ST 2.
- Set the cam position MV2 to approx. 1/3 of the positioning distance between stage 1 and stage 2.
- Check cam position MV2 after correcting cam position ST1.
- After adjusting ST1 and ST2, toggle to the next stage in order to activate the adjustment.
- After you have finished calibrating the burner, reattach the servomotor hood and set switch stages 1-2 to stage 2.

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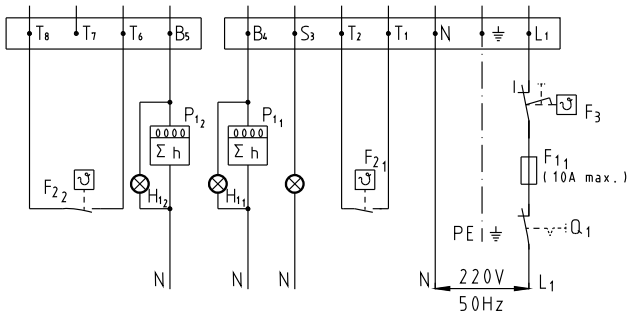
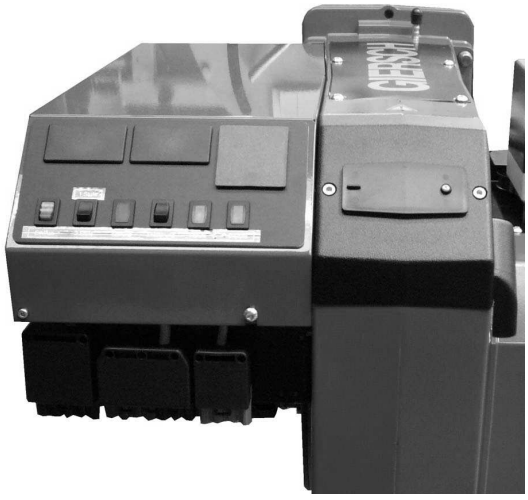
15 Electrical connection



The electrical connection of the burner must be made in the connector included according to the circuit diagram, taking account of the local regulations.

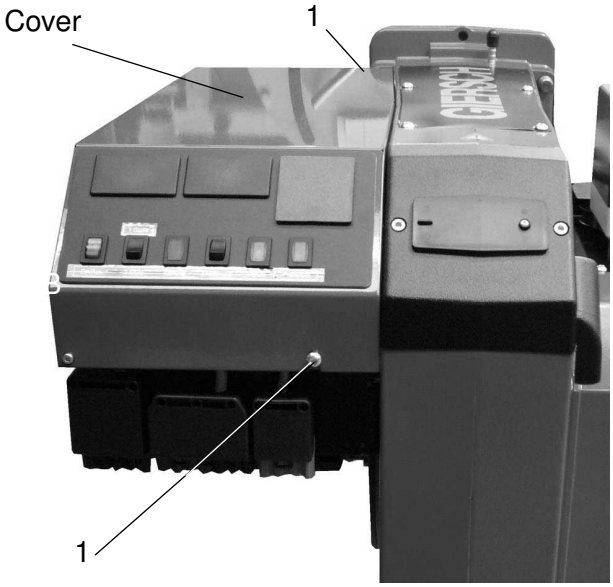
The supply cable must be fused with a 10 A quick blow or 6.3 A slow blow and routed expediently as a flexible cable.

For explanation of switching symbols, see page 15



Always set the main switch to "Off" and remove the fuse before connecting the cables or removing electrical components.

The electrical connection of the burner must comply with the circuit diagram. This work must be performed by trained, qualified electricians. The supply cable to the burner must be of the flexible type.



See 21. Circuit diagram

The cover has to be removed and set to the service position in order to permit access to the control unit. To do this, release the 2 retaining screw (1) and fold the hood to the left.

16 Oil connection

Oil lines must be routed to the burner as far as necessary to allow the oil hoses to be connected without tension. It must be ensured that the burner can easily be brought to the service position.

Important: an oil filter must be installed before the oil pump.

The tables for dual and single feed line installation show the maximum possible piping lengths dependent on 3 factors relative to fuel oil EL 4.8 cST.

- Height difference between pump and tank,
- Nozzle throughput and/or pump type,
- Pipe diameter.

4 brackets, 1 valve and 1 non-return valve were included for the resistance with the suction line length. Due to possible oil gas emissions, the dimension "X" should not exceed a length of 4 m.

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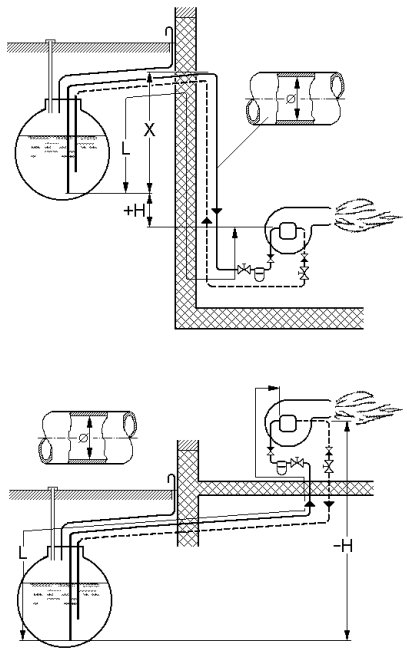
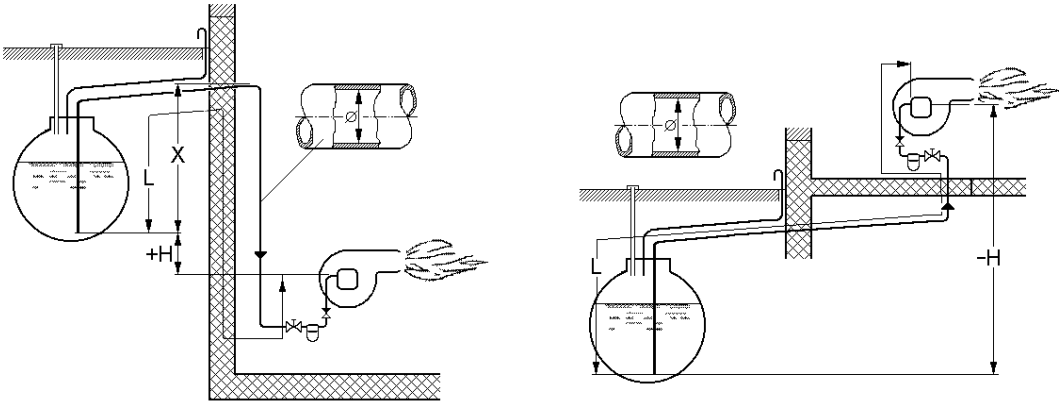
Twin-pipe system



H (m)	Suntec AP2 75 L (m)		
	∅ 6 mm	∅ 8 mm	∅ 10 mm
4.0	22	75	150
3.0	19	66	150
2.0	16	56	141
1.0	13	47	118
0.5	12	42	107
0	11	38	96
-0.5	9	33	84
-1.0	8	29	73
-2.0	5	19	51
-3.0	2	10	28
-4.0	0	0	5

Single-pipe system



Nozzle	Suntec AP2 75						
	12 kg/h		19 kg/h		30 kg/h		
Cable. ∅	∅4mm	∅6mm	∅6mm	∅8mm	∅6mm	∅8mm	∅10mm
H (m)	L (m)	L (m)	L (m)	L (m)	L (m)	L (m)	L (m)
4.0	21	109	72	150	45	144	150
3.0	18	96	63	150	39	127	150
2.0	16	82	55	150	34	109	150
1.0	13	69	46	146	28	92	150
0.5	12	63	41	133	26	83	150
0	11	56	37	119	23	74	150
-0.5	9	50	33	105	20	66	150
-1.0	8	43	28	91	17	57	141
-2.0	6	30	20	64	12	40	98
-3.0	3	17	11	36	6	22	56
-4.0	0	4	2	9	0	5	13

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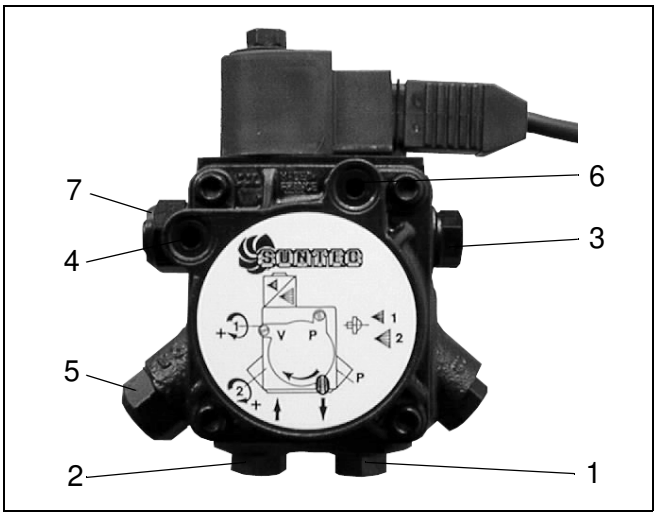
17 Oil pump

The pumps are intended for installation in the dual feed line system (factory setting). The M2.2-LN oil burner starts at low pump pressure and then switches to a higher pump pressure and full power.
The pump pressure must be set for the appropriate output (see setting table).
The specified pump pressures are only guide values and may deviate depending on plant conditions.
For this:

- Release pressure measuring connection,
- Screw in the pressure gauge,
- Set the pump pressure with pressure setting 5 (2nd stage) and 4 (1st stage) according to table.

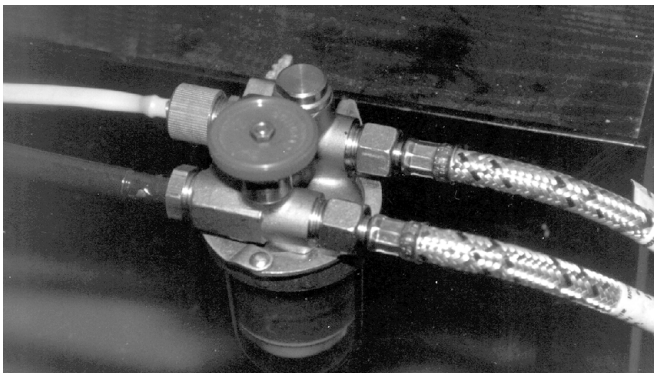
If the pump is to be switched to a single feed line system, the following must be observed:



Suntec:

Remove the return line and connection nipple. Release the bypass plug from the return hole and use a sealing plug to it seal off securely. The pump suction flow will then be identical to the flow rate through the nozzle.

1 = Return line
2 = Supply line
3 = Nozzle output
4 = Pressure setting 1st stage
5 = Pressure setting 2nd stage
6 = Pressure measuring connection
7 = Vacuum measuring connection



We recommend that you use a heating oil filter with return inlet when changing over to a single-pipe system. This leaves the pump operating in twin-pipe mode. Install the feed and return burner hoses to the filter. Open the oil tap on the filter. Start up the system.

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18 Start-up

- Screw in the oil pressure gauge for pump pressure measurement.
- Preset the burner to the appropriate boiler capacity according to the nozzle selection table and setting table.

  – Nozzle size
  – Dimension “A”
  – Air flap setting ST 1 / ST 2
- Connect the boiler to the burner interface.
- Switch on the burner.
- After opening the air flap, switch on the ignition and the blower.
- After completion of pre-aeration, solenoid valve 1 opens.
- The burner ignites in stage 1.
- Set the burner to the 2nd stage with the switch and check the pump pressure (set again if necessary).
- Measure the CO_2 content, the exhaust gas temperature and the soot formation.
- Correct the blower air at the air flap motor and/or correct dimension "A" (refer to page 6).
- After calibrating, the 2nd stage, set the switch to the 1st stage and set the pump pressure.
- Measure the CO_2 content, the exhaust gas temperature and the soot formation.
- Correct the blower air at the air flap motor (refer to page 6).
- After you have finished calibrating the burner, reattach the hood of the air flap motor.
- Switch off the burner and remove the oil pressure gauge.

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19 Information about the control unit

Testing the control unit for proper functioning

Danger of fatal injury from electric shocks!

Disconnect electrical cable from power supply before carrying out any work on live parts! Troubleshooting may only be carried out by authorised and trained personnel! Unlocking may only be carried out by an authorised specialist.

When commissioning the plant or when doing maintenance work, make the following safety checks:

Burner startup with flame detector darkened:

- Lockout at the end of «TSA»

Burner startup with flame detector exposed to extraneous light:

- Lockout after no more than 40 seconds.

Burner operation with simulated loss of flame:

- For that purpose, darken the flame detector during operation and maintain that state

Repetition followed by lockout at the end of «TSA»

Safety and switching functions

If a flame failure occurs during operation, the fuel feed shuts off immediately and the system tries a restart, with pre-aeration and retarded ignition. If no flame results, the control box shows a fault after the safety time. The system restarts automatically after an interruption in the power supply. The control box shows a fault if the photo-electric cell detects a light source during the pre-aeration time, after the safety time.

Display during commissioning

Color code table of the multi-colored signal light		
State	**Color code**	**Color**
Waiting time (tw), other waiting states	○.....	OUT
The oil preheater is heating	●.....	yellow
Ignition phase, ignition activated	○●○●○●○●○●	flashing yellow
Operation, flame OK	□.....	green
Operation, flame bad	○□○□○□○□○□	flashing green
Extraneous light when the burner starts	□▲□▲□▲□▲□▲	green-red
undervoltage	●▲●▲●▲●▲●	yellow-red
Fault, alarm	▲.....	red
Error code output, see error code table	○▲○▲○▲○▲○▲○	flashing red
Interface diagnosis	▲▲▲▲▲▲▲▲▲▲▲▲	red flickerinmg light

Legend:
..... Permanent ○ OUT ▲ red ● yellow □ green

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Diagnostics of the cause of fault
After lockout, the red fault signal lamp remains steady on. In that condition, the visual diagnostics of the cause of fault according to the error code table can be activated by pressing the lockout reset button for more than 3 seconds. Pressing the reset button again for at least 3 seconds, the interface diagnostics will be activated. Interface diagnostics works only if the AGK20… lockout reset button extension is not fitted. If, by accident, interface diagnostics has been activated, in which case the slightly red light of the signal lamp flickers, it can be deactivated by pressing again the lockout reset button for at least 3 seconds. The instant of switching over is indicated by a yellow light pulse.

Error code table

Red blink code of signal lamp (LED)	„AL“ at term. 10	Possible cause
2 x blinks	ON	No establishment of flame at the end of «TSA» - Faulty or soiled fuel valves - Faulty or soiled flame detector - Poor adjustment of burner, no fuel - Faulty ignition equipment
3 x blinks	ON	Free
4 x blinks	ON	Extraneous light on burner startup
5 x blinks	ON	Free
6 x blinks	ON	Free
7 x blinks	ON	Too many losses of flame during operation (limitation of the number of repetitions) - Faulty or soiled fuel valves - Faulty or soiled flame detector - Poor adjustment of burner
8 x blinks	ON	Time supervision oil preheater
9 x blinks	ON	Free
10 x blinks	OFF	Wiring fault or internal fault, output contacts, other faults

During the time the cause of fault is diagnosed, the control outputs are deactivated burner remains shut down. The diagnostics of the cause of fault is quit and the burner switched on again by resetting the burner control. Press the lockout reset button for about 1 second (<3 seconds).

Flame control using IRD

The infra-red flicker detector IRD 1010 is used to monitor the blue burning flame reliably.The IRD1010 reacts only to flickering infra-red light. The IRD1010 is a safety device and must not be opened. The IRD1010 function indicator should monitored periodically. When a low intensity is displayed this means that the burner setting has changed or the incidence of light on the sensor has been reduced by dirt and dust.

Operability check:

A safety check of the flame failure system must be carried out when the appliance is first commissioned and after any inspections or long periods of inactivity.

Start-up test with flame detector covered:
After expiry of the safety period, the burner should perform a safety cut-out.

Start-up test with flame detector illuminated:
After approx. 20 s of pre-aeration the burner must go over to fault.

Standard. Startup; if burner in operation, darken the flame detector:
Attempt startup again, at the end of the safety time the burner must go over to fault.

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20 Troubleshooting

Observation	Cause	Remedy
Burner motor is not running	Fuse defective Safety thermostat locked out Controller set temperature exceeded Control unit defective Motor defective Air flap positioning motor does not open and/or does not switch through Motor–pump coupling defective	Replace Unlock Try to restart i.a.w. temperature decrease Replace Replace Replace Replace
Burner starts and goes into failure mode after the safety time elapses	a) with flame formation: Flame detector dirty, faulty, not properly connected Control unit defective b) without flame formation: No ignition Burner receives no oil: :valves, oil line closed Oil tank empty Filter dirty Oil line leaky Pump faulty Foot valve leaky Nozzle dirty or defective Solenoid valve defective Filter in pump blocked External light Motor–pump coupling defective	 Clean, replace, connect correctly Replace Check ignition electrode and setting, ignition transformer and cable Open Add oil Clean Seal Replace Seal Replace nozzle Replace Clean and/or replace filter See item 19 Replace
Flame extinguishes during operation	Oil tank empty Nozzle dirty or defective Oil filter or oil supply lines dirty Entrapped air Solenoid valve defective	Add oil Replace nozzle Clean filter and cables Check suction line and fittings Replace
Mixing unit is heavily fouled by oil or is heavily coked	Incorrect setting Incorrect nozzle size Combustion air flow incorrect Central heating room insufficiently ventilated	Correct setting dimensions Replace Readjust burner Ensure aeration inlets are sufficiently large

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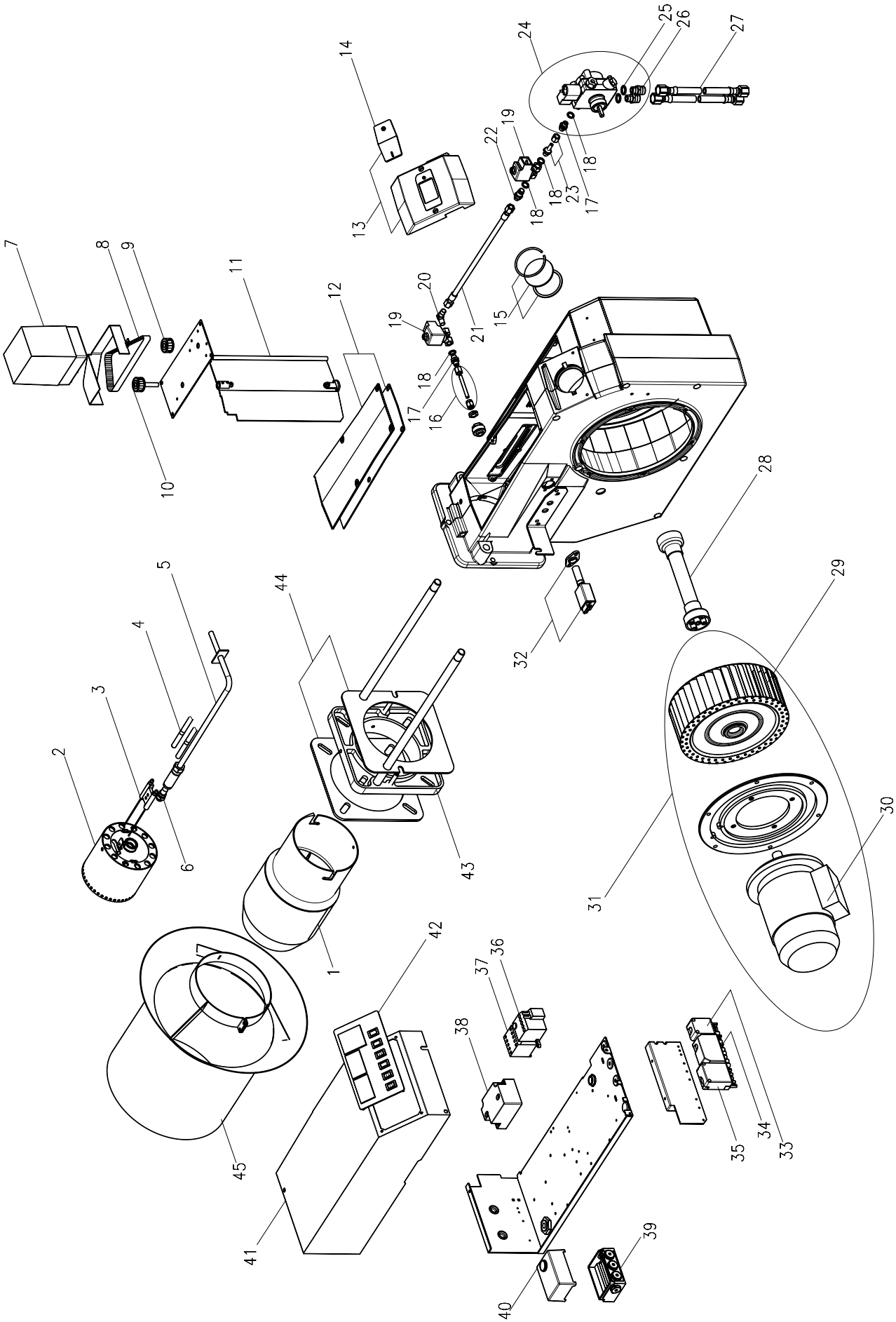
The values specified in the tables are only reference inputs for start-up. The system settings required in each case must be redefined if values such as boiler output, calorific value and altitude deviate.
Adjustment is required in any case (due to the system design).

Burner output		Boiler capacity at ηk = 93%	Nozzle Delavan	Oil pump pressure		Oil throughput		Dimension “A”	Pos. Air flap			Baffle plate pressure	
ST2	ST1			ST2	ST1	ST2	ST1		ST2	ST1	MV2	ST2	ST1
[kW]	[kW]	[kW]	[gph]	[bar]	[bar]	[kg/h]	[kg/h]	[mm]	[°]	[°]	[°]	[mbar]	[mbar]
M2.2-LN													
240	171	223	3.50/60°A	24	13.0	20.3	14.5	5 - 6	60	10	30	15.5	9.0
312	230	290	5.00/60°A	20	11.5	26.4	19.5	7 - 10	60	20	35	19.0	12.0
456	330	424	7.00/45°A	24	11.5	38.6	27.9	38 - 43	70	39	45	12.0	5.0

* We recommend Delavan nozzles.

Let the recirculation pipe terminate flush with the edge of burner pipe!

22 Exploded-view drawing M2.2-Z-L-LN



23 Spare parts list M2.2-Z-L-LN

Position	Designation	Order no.:
1	Burner pipe M2.2-LN ø160 / 140 x 274	47-90-22999
2	Mixing unit compl. with ignition electrode	47-90-24075
3	Set of ignition electrodes	47-90-24070
4	Ignition cable 440 mm long	47-50-26739
5	Nozzle assembly compl.	47-90-24090
6	Oil nozzle	on request
7	Positioning drive compl. SQN 30	36-90-20501
8	Toothed belt	46-50-21028
9	Toothed washer 14 x L037	46-90-21027
10	Toothed washer 26 x L037 with pin	46-90-21026
11	Air flap	47-90-27030
12	Cover with seal	47-90-10698
13	Hood	47-90-24857
14	Sight glass cover	47-90-12106
15	Inspection glass with seal	36-90-11544
16	Serto connection solenoid valve to nozzle stem for M2-LN	47-90-29286
17	Pressure pipe nipple GES 6LL	47-50-20127
18	Seal 14 x 10 x 2	37-50-10788
19	Solenoid valve R 1/8“	37-90-10885
20	Elbow male stud coupling S-WEV 8LL	47-90-20139
21	Pressure hose NW4	47-90-25156
22	Connector, straight S-GEV 8LLR	47-50-21319
23	Connection solenoid valve to nozzle stem	47-90-20234
24	Pump AP2 75 compl.	37-90-11607
25	Seal 13 x 18 x 2	37-50-11293
26	Hose nipple R1/4“ x R3/8“	46-50-10554
27	Metal hose NW8 1500 mm long	57-90-10348
28	Coupling M2.2 compl.	47-90-27425
29	Fan wheel 224 x 82	47-90-22498
30	Motor 1.1 kW	36-90-11538
31	Motor (compl.) with fan wheel	47-90-27424
32	Flicker detector IRD 1010.1, red with cable	47-90-12172
33	Socket 4-pin. green	37-90-20744
34	Socket 7-pin. black-brown	37-90-20731
35	Socket 5-pin. black	37-90-20748
36	Thermal overcurrent relay 2.4 - 4.0 A	47-90-25172
37	Small motor protection B7 - 30-10	47-90-25171
38	Ignition unit Mod. 26/48	47-90-26930
39	Control box base	37-90-11310-01
40	Control unit LMO 24	47-90-28928
41	Electronic unit hood	47-90-24852
42	Panel	47-90-25389
43	Mounting flange compl.	36-90-11721
44	Gasket set	47-90-27199
45	Recirculation pipe	47-90-24013
-	Inlet nozzle	36-90-11541
-	Motor connection cable	47-90-25340

E. .02.1999 • G. 05.04.24

24 Declaration of Conformity

GIERSCH
Wärme für die Zukunft.
Giersch GmbH | Adjutantenkamp 18 | 58675 Hemer
0 23 72/965-0 0 23 72/6 1240 info@giersch.de www.giersch.de

Declaration of Conformity for Oil Burners

We, Giersch GmbH, Adjutantenkamp 18 in D-58675 Hemer declare under our responsibility that

oil burner type **M2.2-Z-L-LN**

are conform with the regulations of these directives

MD2006/42/EC
EMC2004/108/EC
BED92/42/EEC
LVD2006/95/EC
ErP2009/125/EG

und are marked with:

CE

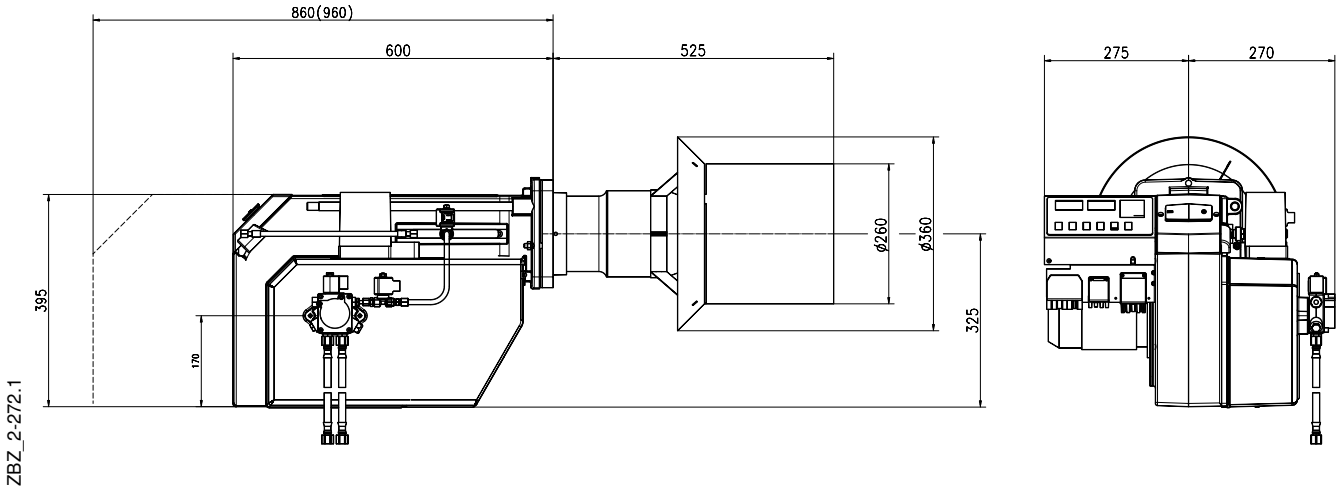
EN 267 report OB 2852016T1 TÜV Rheinland Energy GmbH

Hemer, 12.01.2024

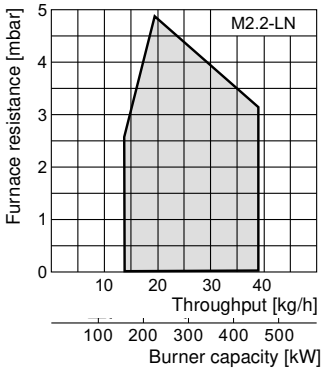
Dr. Josef Becker
Geschäftsführer

25 Dimensions

All dimensions are given in mm



26 Working range



Working range acc. to DIN EN 267.
The working range is relative to a height of approx. 200 m above sea level and a room temperature of 20°C.

Giersch GmbH • Brenner und Heizsysteme
Adjutantenkamp 18 • D-58675 Hemer •
Telephone 02372/965-0 • Telefax 02372/61240
Email: info@giersch.de • Internet: http://www.giersch.de

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