GIERSCH

Technical Information • Installation Instructions

MK3-LMV-AGM

Oil / gas

March 2024 edition

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

CE

GB

Contents

E. 06.09.18 • G. 11.03.24

1. General information

Installation of a combined gas/oil burner must be performed in accordance with extensive regulations and guidelines. 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.
The burner must not be operated in rooms with high levels of air humidity (laundry rooms), dust or corrosive vapours. The boiler room must be ventilated accordingly with ventilation air.
Heating oil EL in accordance with DIN 51603 must be used.
The duel-fuel burners are ideal for the combustion of natural gas or liquid gas in accordance with EN 437 and fuel oil EL and complies with European Standards EN 676 and EN 267.

Manually operable shut-off valve

A manually operable shut-off valve for disconnecting the burner must be installed upstream of the burner and/or control equipment. It must be easy to access.

Filter and venting device

A filter must be installed upstream of the burner to prevent entry of foreign matter. Suitable equipment must be provided to vent the fuel supply line.

2. Scope of delivery

Before installing the combined gas/oil burner, please check that all the items included in the scope of delivery are present.
Scope of delivery:
burner, mounting kit, separate operating instructions, technical information, separate circuit diagram, flange seal, one 7- pin connector and one 4- pin plug connector (Wieland connector).

Caution !
Oil nozzles are not included in the scope of delivery.

For gas:

Gas fitting

Gas installation and commissioning are subject to the applicable Technical Regulations of the DVGW (DVGW-TRGI).
The gas pipe must be designed to conform to the flow rate and the available gas flow pressure and routed with the lowest pressure loss over the shortest distance to the burner.
The loss of gas pressure via the gas train and the burner as well as the resistance on the fuel gas side of the heat generator must be less than the connection flow pressure.

Caution !
Observe sequence and throughflow direction of fittings

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. The address of the nearest customer service centre must be displayed on the back of the operating instructions.

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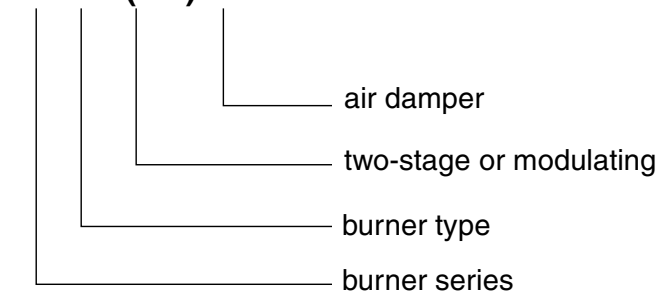
5. Instruction of operating personnel

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

MK 3-Z(-M)-L

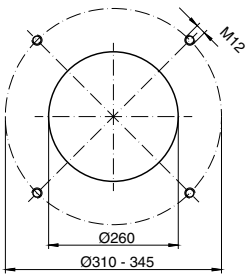


7. Technical specifications

	Burner type			
Technical specifications	**MK3.1**	**MK3.2**	**MK3.3**	**MK3.4**
Burner output in kW (in gas-fired operation)	441 - 1510	738 - 1883	620 - 2505	887 - 2705
Burner output (in oil-fired operation) in kg/h (in kW)	46.2 - 127.3 (548 - 1510)	62.2 - 158.5 (738 - 1880)	64.0 - 211.2 (759 - 2505)	74.8 - 228.0 (887 - 2705)
Fuel	Light oil, natural gas LL + E, liquid gas			
Mode of operation	Optionally oil/gas two-stage or gas modulating, oil two-stage			
Voltage	3 / N / PE ~ 50 Hz / 400 V			
Power consumption at start / during operation *	10.5 / 6.5	15.0 / 9.0	15.5 / 9.3	16.3 / 11.3
Electric motor power (at 2800 rpm) in kW	3.0	4.0	4.4	5.5
Flame failure controller	KLC1000			
Control box	LMV26			
Directive MPC 2015/2193/EU	≤ 50 MW			
NOx limit value for gas	≤ 100 mg/Nm^3			
NOx limit value for oil	≤ 200 mg/Nm^3			

* The power consumption of the version with external oil pump is 2.7 A higher.

8. Boiler connecting dimensions (All dimensions are given in mm)



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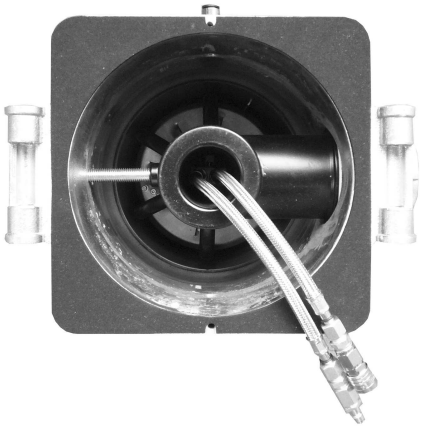
9. Mounting the gas jacket on the boiler



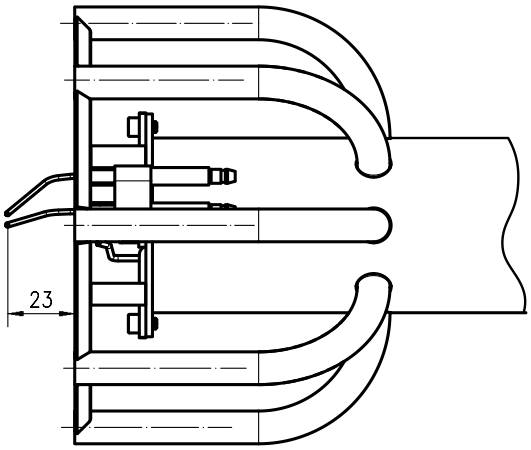
The boiler connection plate must be prepared according to the dimensions specified for the boiler connection dimensions. You can use the gas-jacket gasket as a template. Screw the gas jacket to the boiler using the four M10 fastening screws with washers and a size Allen key.

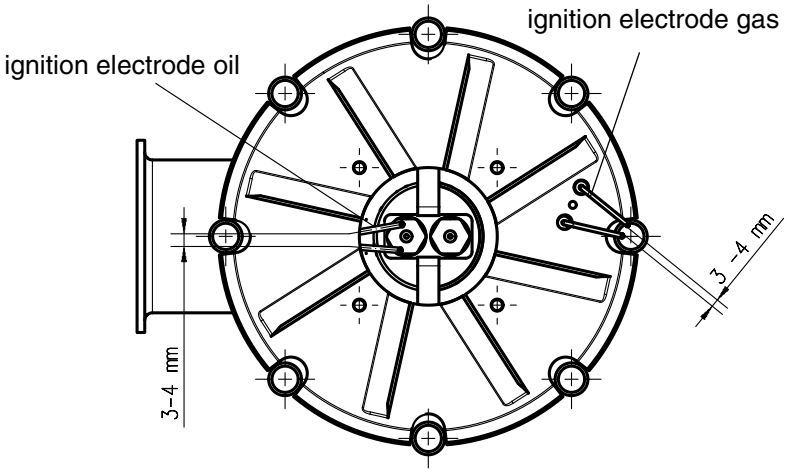
The air pressure switch for the gas train must beat the top.

10. Ignition electrode

The following clearances between the nozzle and ignition electrode should be observed:

The given dimensions are intended for checking purposes after making necessary corrective adjustments or replacing an electrode.





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11. Flame detector KLC 1000

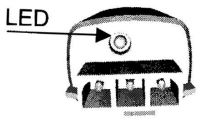
A safety inspection of the flame detector must be performed after commissioning and after any maintenance that is carried out.

When doing so:

- The flame detector must be covered up for the start-up attempt - after completion on the safety time, the control box must go into a fault condition!
- Illuminate the flame detector with an ext. UV light during the start-up attempt, e.g. cigarette lighter or lamp (existing room lighting is not sufficient) - the control box must go into fault condition during the pre-ventilation phase!
- Cover up the flame detector in burner operation - depending on the control box design, the control box must go into fault condition either at the end of the safety time or directly after covering up control box.

Status indication of LED flame detector

The status of the KLC 1000 flame detector is indicated by the built-in LED.

No burner operation	LED OFF	No heating request	
Pre-ventilation	LED OFF	No flame present	
Burner operation	LED flashes continuously	Flame present	

For maintenance, the inspection glass of the KLC 1000 should be cleaned regularly using a clean, lint-free cloth. Never use burner cleaning sprays. As internal checks are made of the KLC 1000. no further tests are necessary. The KLC is a safety component and must not be opened.

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12. 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.

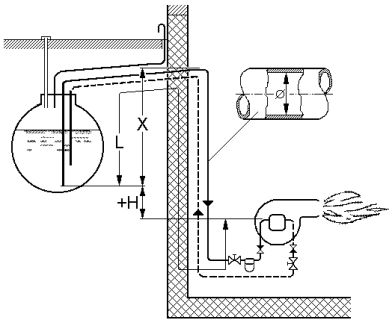
Important: an oil filter must be installed before the oil pump.

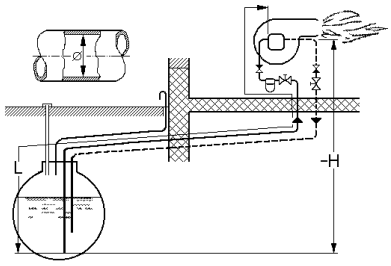
The tables for dual and single feed line installation show the maximum possible piping lengths dependent on 3 factors relative to fuel oil EL 4.8 cST.

- 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.

Twin-pipe system





H (m)	Suntec AJ6 L (m)				Suntec J7 L (m)				
∅ mm	10	12	14	16	10	12	14	16	20
4.0	13	28	54	93	7	17	34	60	-
3.0	11	25	47	82	6	15	29	52	-
2.0	9	21	40	70	5	12	25	45	-
1.0	8	17	34	59	3	10	21	37	-
0.5	7	16	30	53	3	9	19	34	-
0	6	14	27	48	2	8	16	30	77
-0.5	5	12	24	42	-	6	14	26	67
-1.0	4	10	20	36	-	5	12	22	58
-2.0	2	7	14	25	-	3	8	15	40
-3.0	0	3	7	13	-	-	3	7	22
-4.0	-	-	-	-	-	-	-	-	4

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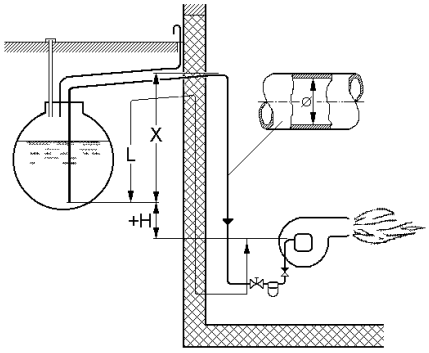
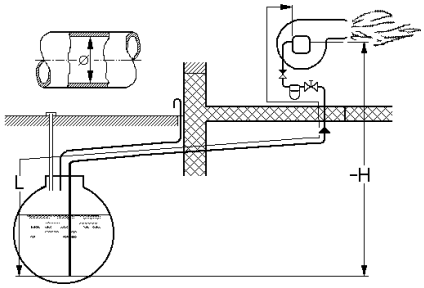
Single-line system





Nozzle	14 (gph)			20 (gph)				30 (gph)				45 (gph)			
.∅ mm	8	10	12	8	10	12	14	10	12	14	16	10	12	14	16
H (m)	L (m)	L (m)	L (m)	L (m)	L (m)	L (m)	L (m)	L (m)	L (m)	L (m)	L (m)	L (m)	L (m)	L (m)	L (m)
4.0	21	52	100	14	36	75	100	23	49	92	-	15	32	61	100
3.0	18	45	95	12	31	66	100	20	43	81	-	13	28	53	92
2.0	16	39	82	11	27	57	100	17	37	70	-	11	24	46	79
1.0	13	33	69	9	23	48	89	15	31	59	-	9	20	38	66
0.5	12	30	62	8	20	43	81	13	28	53	-	8	18	35	60
0	11	27	56	7	18	39	72	12	25	48	82	7	16	31	54
-0.5	9	23	49	6	16	34	64	10	22	42	72	-	14	27	47
-1.0	8	20	43	5	14	30	55	9	19	36	63	-	12	23	41
-2.0	5	14	30	3	10	21	39	6	13	25	44	-	8	16	28
-3.0	3	8	17	-	5	11	22	3	7	14	25	-	4	8	15
-4.0	-	-	4	-	-	-	5	-	-	-	5	-	-	-	-

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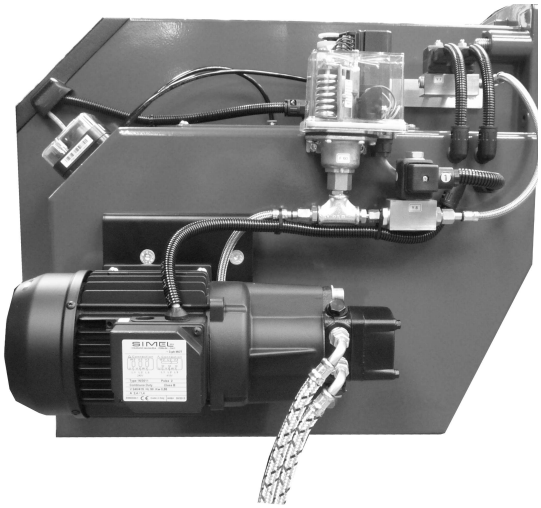
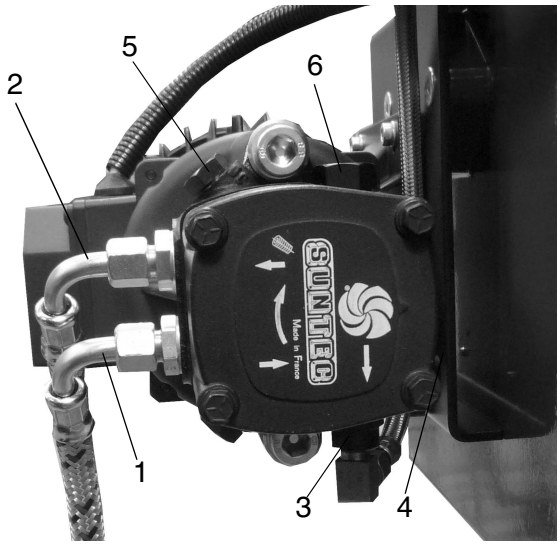
13. Pump unit

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.



Pump unit for MK3.1 / MK3.2



Oil pump for MK3.3 / MK3.4

1 Flow
2 Return
3 Nozzle connection
4 Transducer connection
5 Vacuum measuring connection
6 Pressure setting

To convert the pump for operation on a single line system, the following points must be observed: remove the return line and the connection nipple. Unscrew the bypass plug in the return line port and tightly seal the port with a sealing plug. The pump suction flow will then be identical to the flow rate through the nozzle.

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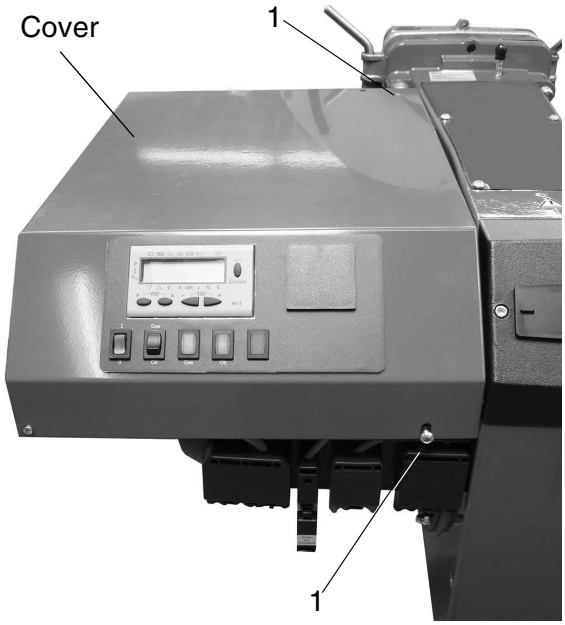
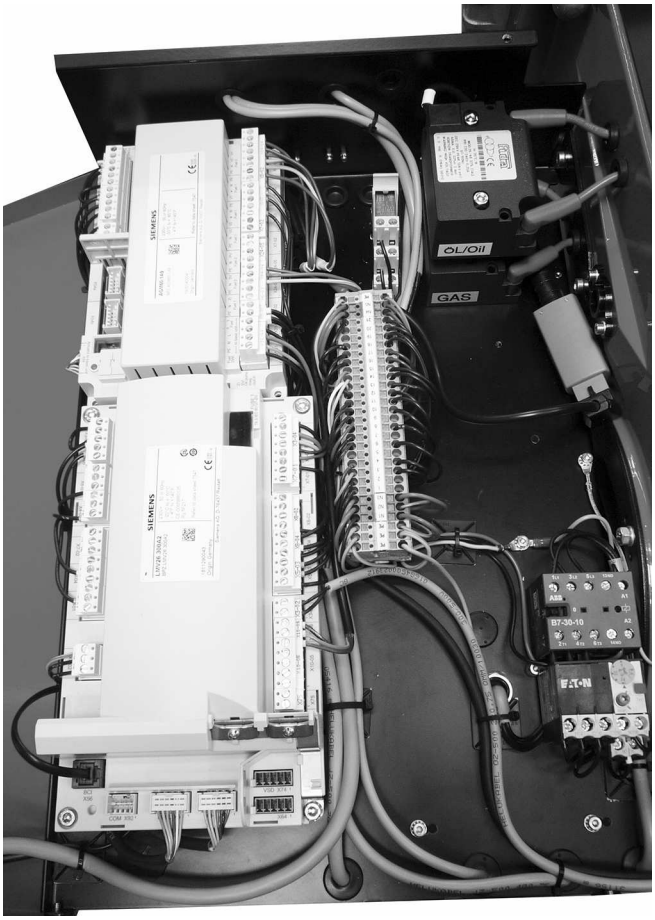
14. Electrical connection



De-energise the burner when carrying out connection work and removing electrical parts!

The burner must be connected to the electricity supply in accordance with the wiring diagram. This work must be performed by trained, qualified electricians. The supply cable to the burner must be of the flexible type.



See separate circuit diagram

The cover has to be removed and set to the service position in order to permit access to the control unit. Remove the 2 securing screws (1) and fold the cover down to the left.

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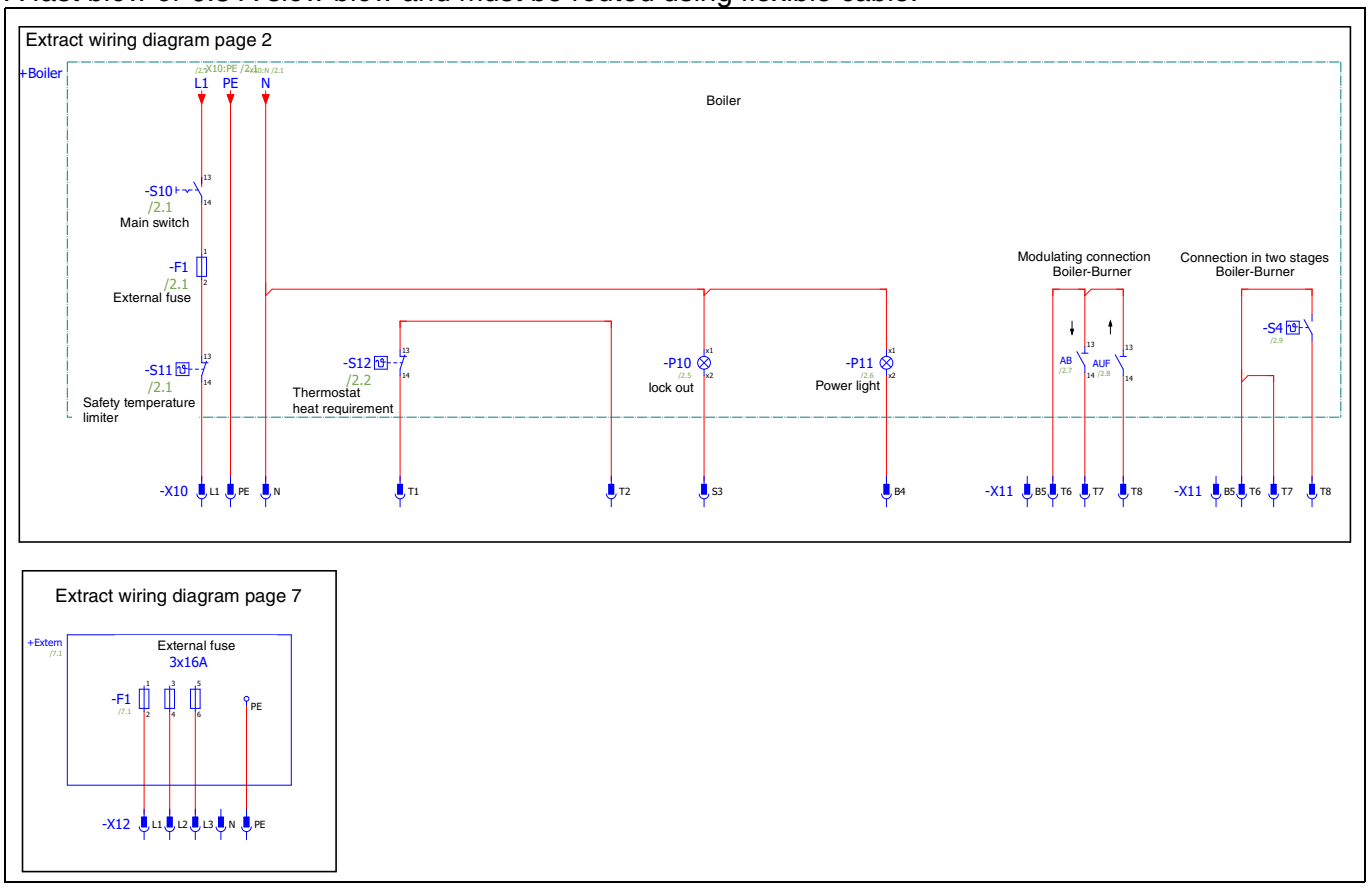
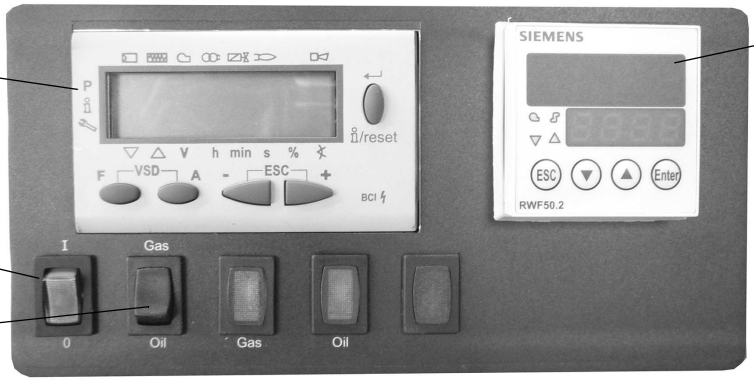
15. Terminal diagram - connector pin assignments

If the male connector has already been wired:
check the connections according to the connection diagram!

The electrical connection of the burner must be made in the male connector included according to the connection diagram, taking account of the local regulations. The supply cable must be fused with max. 10 A fast blow or 6.3 A slow blow and must be routed using flexible cable.



16. Front panel



Maintenance switch:
- Position 0 = maintenance
- Position I = operation

When set to 0, the control unit can still be operated, but all burner functions are deactivated.

Caution:
If the maintenance switch is in position 0 when the heat request is present, the fault lamp lights red and the display shows the message OFF S.
The burner is not in fault condition.
The LMV can still be operated; OFF S = safety chain switched of

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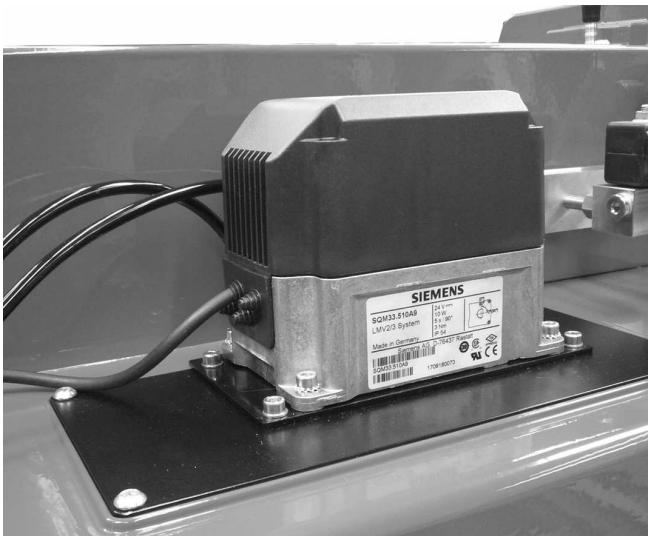
17. Air flap positioning motor

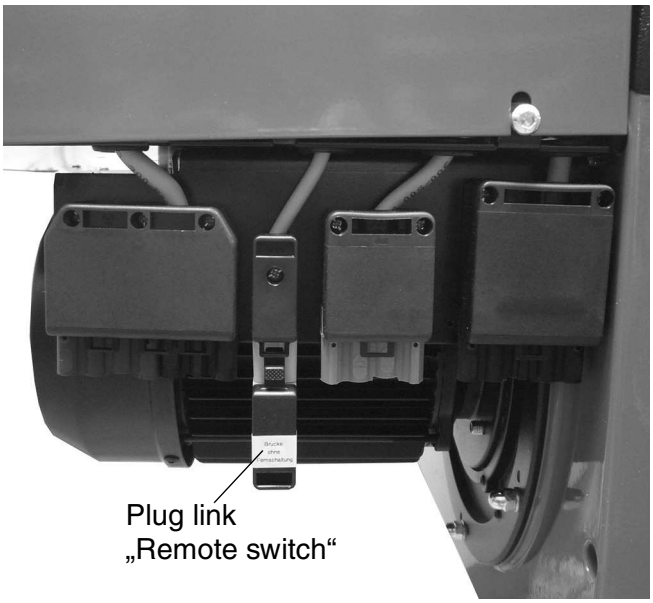


The air flap positioning motor is designed for air flap adjustment on progressive two-stage burners or modulating burners. The motor is activated electronically via the microprocessor-controlled control box.

Caution

The housing must not be opened under voltage, as the light that enters could destroy the drive.

18. Remote switching



Caution:

When operating without remote switching, do not remove the "Remote switching" jumper.

When operating with remote switching, the "Remote switching" jumper must be replaced with the remote switching connection and the selector switch must be in the **Gas** position.

If the selector switch is set to oil position with the remote switch connected, remote switching is not possible.

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19. Air pressure monitor

The air pressure switch is a differential pressure switch and monitors pressure at the forced-air burner. The air pressure switch is preset at the factory to 8 mbar.

Note

Check that the burner does not produce CO above the stipulated value when the air pressure is too low before the cut-off point.

Causes:

- Incorrect setting
- Motor does not run
- Motor runs in the wrong direction.

20. Gas train

20.1 Installation of the gas train

Installation of the gas train	
Installation position	only in horizontal line, not tilted.
Minimum distance to walling:	20 mm
Screw the measuring nipple for combustion chamber pressure into the gas jacket at the top. Route the connecting hose between the measuring nipple for combustion chamber pressure and the gas train in a loose loop.	

The air pressure connection nipple must be screwed into the gas jacket at the top.

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20.2 Gas pressure switch min. and gas pressure switch as leak control

The **gas pressure switch MIN** at the gas fitting serves to monitor the gas inlet pressure. If the minimum gas inlet pressure is not reached (factory setting), the burner is switched off. The burner automatically starts again when the minimum pressure is exceeded. The gas pressure monitor as **density control DK** generally serves to check the valves and must be set to 50% of the static gas inlet pressure.

The monitoring of the gas inlet pressure and the tightness control are either carried out only with the gas pressure monitor DK **(the jumper GDW MIN must not be removed)** or with the gas pressure switch MIN and the gas pressure switch DK **(the GDW MIN jumper has to be replaced with the connection of the gas pressure switch MIN)**.

Additional parameterization of the LMV is not required here.

21. Function test

A safety inspection must be carried out on the flame detector directly after start-up as well as after a service or lengthy shut-down.

Start-up with covered flame sensor:
When the safety interval elapses, the burner must switch to lockout mode.

Start-up with exposed flame sensor:
The burner must go into lockout mode after approx. 20 s of pre-ventilation.

to ISO standards. Start-up; if burner in operation, cover up the flame sensor:
New start-up attempt; the burner must go into fault condition after the safety time.

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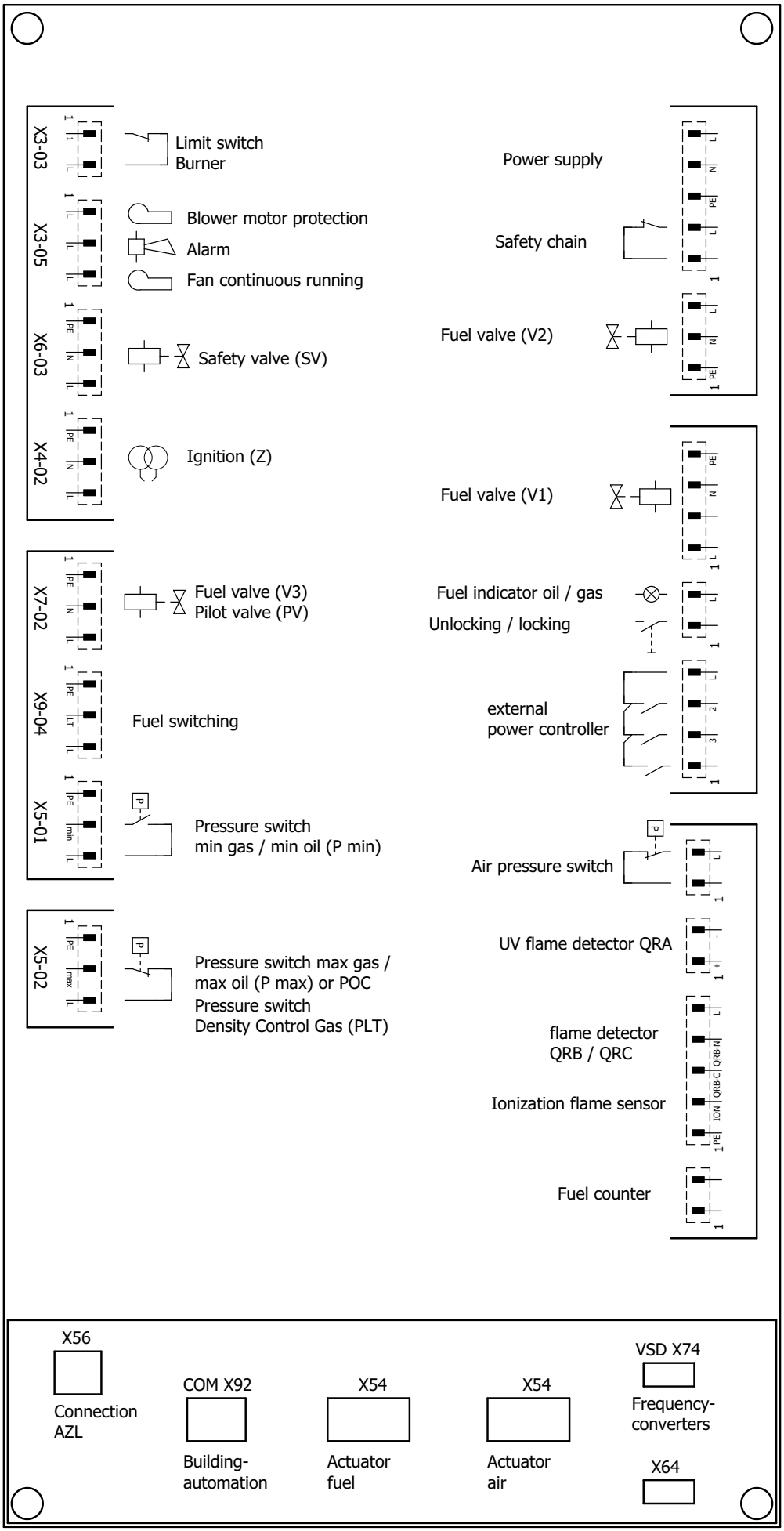
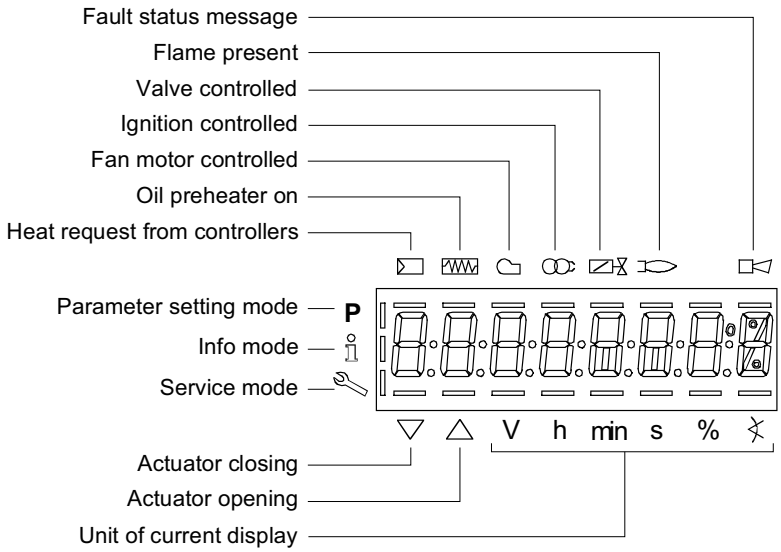
22. Connection diagram LMV



23. Operating instructions and equipment description LMV



Button	Function
F	**F button** - To adjust the fuel drive (Hold down the **F button** and set the value with the **- or + button**)
A	A button - To adjust the air drive (Hold down the **A button** and set the value with the **- or + button**)
VSD F A	**F and A button** - To shift to parametrisation mode **P** (**F and A button** press simultaneously with **- or + button**) - To adjust the speed for frequency converter operation (FC) (**F and A button** press simultaneously with **- or + button**)
i/reset	**Information and enter button** - To navigate in information and service mode * Selection (flashing symbol) increment (press button < 1 s) * To switch to a lower menu level (press button < 1 ... 3 s) * To switch to a lower menu level (press button < 3 ... 8 s) * To switch the operating mode (press button > 8 s) - **Enter** in parametrisation mode - **Unlock** in case of fault - One menu level down
-	**- Button** - Reduce value - For navigating in curve setting, information and service mode
+	**+ Button** - Increase value - For navigating in curve setting, information and service mode
ESC - +	**- and + button: Escape function** (Press **- and + button** simultaneously) - Do not accept the value - One menu level higher

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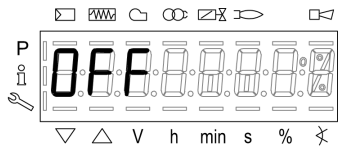
24. Start-up and calibration

Determine burner output according to table page 43 ff. P0 = start level, P1 = 1st step / min. Power, P9 = 2nd stage / max. Power.

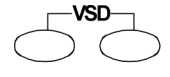
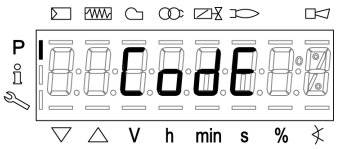
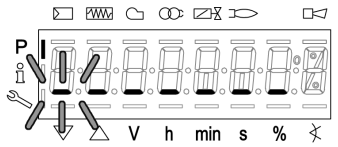
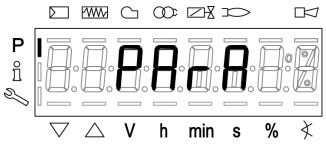
Normally P0 = P1. For condensing boilers, P0 must be set higher than P1. The setting depends on the boiler.

To enter the setting mode, the burner must be in standby mode.Standby means that the burner is supplied with power, gas pressure is built up and none Heat request is present (maintenance switch to position 0).

The combustion managers are configured in the factory and preset to low power.

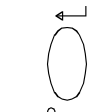
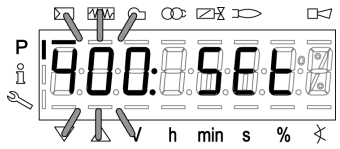
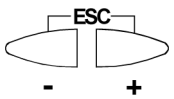
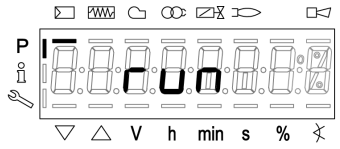
Action button	Display	Description
		**OFF** means burner off and programmed. **OFF UPr** means burner off and non-programmed.

Enter password

Action button	Display	Description
		Press **F and A button** simultaneously. The display **CodE** appears
  **i/reset**		After releasing the buttons, 7 bars appear and the first one flashes. Use the **- or + button** to select a number or letter. Confirm each value with **i/reset**.
 **i/reset**		Confirm the password **1234** with **i/reset** after the last input.
		After correct input, the following appears for a max. of two seconds

Set the operating mode for gas as burner fuel

The selector switch must be in position GAS

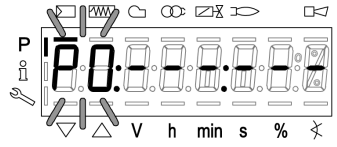
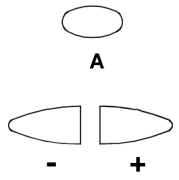
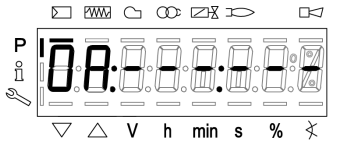
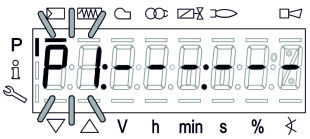
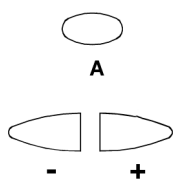
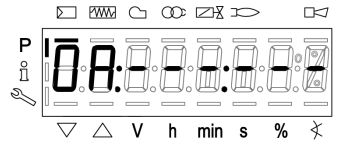
Action button	Display	Description
		Initial commissioning and compound setting
		If the burner control is programmed, run will be displayed. (Starter voltage for curve parameterization)

You have the option of pressing the hot setting (page 20) directly by pressing i / Reset. continue.

Adjustment without flame

Cold-setting

Use the values from the settings table for the default setting.
When presetting, the maintenance switch should be in position 0

Action button	Display	Description
		Set the start position air flap.
		Hold down **key - A** and use the **- or + key** to set the value. Normally P0 = P1. For condensing boilers, P0 must be set higher than P1. The setting depends on the boiler.
		Move to the next curve point.
		Set curve point P1
		Hold down **key - A** and use the **- or + key** to set the value.

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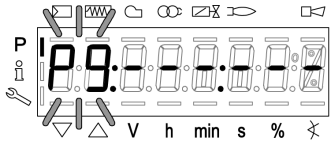
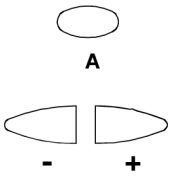
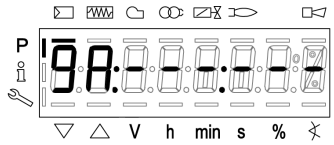
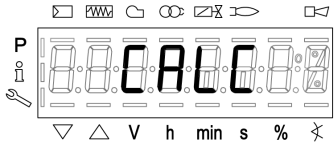
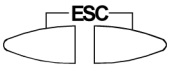
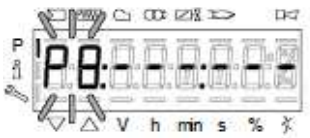
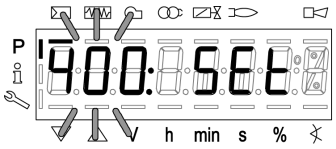
Action button	Display	Description
		**Press +** to confirm all the curve points until the curve point P9 is reached.

High load preset

Action button	Display	Description
		Set the high load air flap.
		Hold down **button A** and set the value with the **- or + button**.
		The **- key** is longer than 3 sec. hold down to trigger the calculation **(CALC)**. The points p8 to P1 are automatically calculated and set to a straight line.
		Pressing the **ESC key** returns to the parameter level.
		Pressing **i/Reset key**

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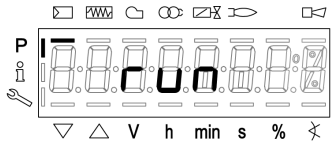
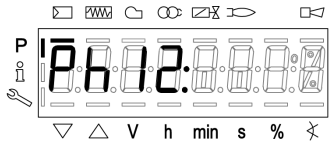
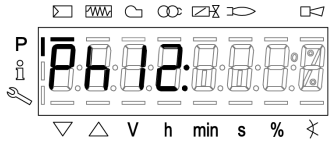
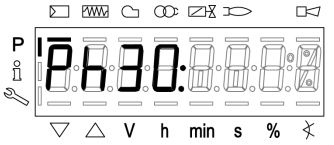
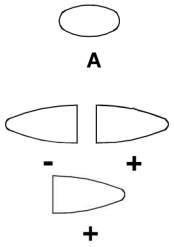
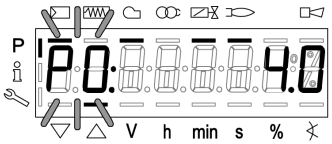
Hot setting, adjustment with flame

Start identifier for curve programming

Action button	Display	Description
 **i/reset**		It will show **run gas.** Press the **i** / **reset key** to start the burner
		Burner start with pre-ventilation.
Maintenance switch 0/1		Heat request **ON** Burner starts with the pre-purge
		Blower start-up and safety valve ON
		Run in pre-ventilation position
		Pre-ventilation
If the leakage check is activated, Ph80, Ph81, Ph82 and Ph83 are displayed first.		
		Run in ignition position
 **+**		If the phase sequence stops at **Ph36, + press the key**
 **A** **- +** **+**		This display appears only if the LMV was originally unprogrammed. Otherwise, he jumps directly from Ph36 to Ph38. The **ignition position P0** can only be extinguished the symbols ▼ ▲ are corrected. Hold down **button A** and set the value with the **- or + button.** Press **+ key** to confirm.

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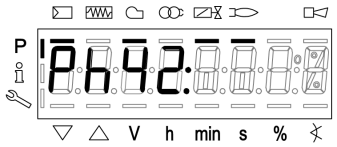
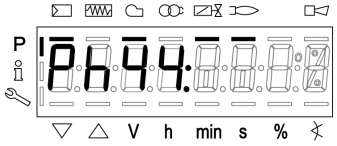
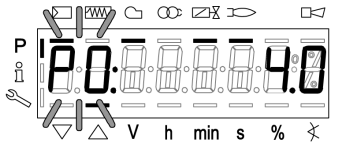
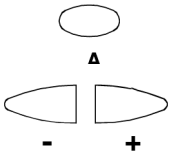
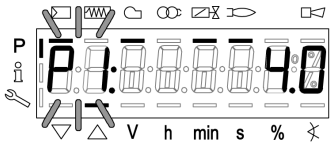
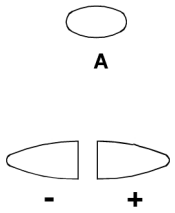
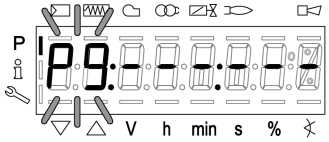
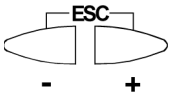
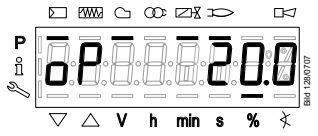
Action button	Display	Description
		Ignition ON
		Valves ON
		Ignition OFF
		Flame in start position
 +		Skip **P0 with + key**
 +		Move to the next curve point, P1 low load
 - +		Hold down **button A** and set the value for the low load with **the - or + button**.
 +		
 +		Use **+ button** to confirm all curve points up to curve point P9. In curve point **P9**, set the excess air for the high load at the gas ramp using the adjusting screw **"V" or "large flame"** . The CO_2 value should be 9-10% for natural gas.
 -		Use the **- button** to select curve point **P1**. In curve point **P1**, set the excess air for the low load at the gas ramp using the adjusting screw **"N" or "small flame"** . The CO2 value should be 9-10% for natural gas.
 +		Use the **+ button** to select curve point **P9** again. In curve point **P9**, check the excess air for the high load at the gas ramp and correct using the adjusting screw **"V" or "large flame"** .

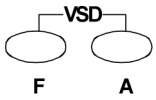
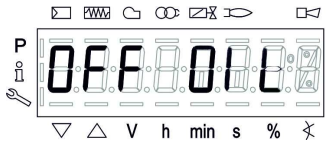
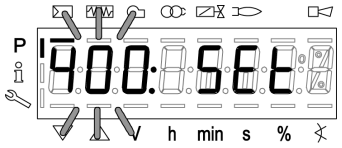
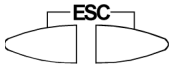
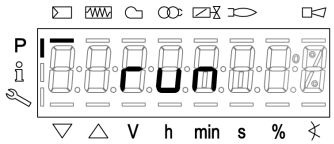
Setting the output in high and low-load operation

Action button	Display	Description
		Check the high-load setting via the gas flow at the gas meter or compare the nozzle pressure with the values stated in the adjustment tables. Hold down **A button** and use the **- or + button** to set the output for curve point **P9**. The air surplus is not affected by this adjustment.
		Use the **- button** to select curve point P1. Check the low-load setting via the gas flow at the gas meter or compare the nozzle pressure with the values stated in the adjustment tables.
		Back to curve point **P9**
		After setting all curve points, the burner is ready for operation. Press the **ESC button briefly 3x** to save all curve points and access automatic mode
		OP 20 … 100 Burner output stage (automatic mode)

The warm setting of the burner is completed.

Set the operating mode for oil as burner fuel

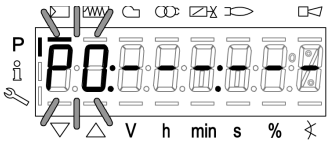
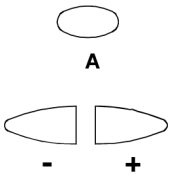
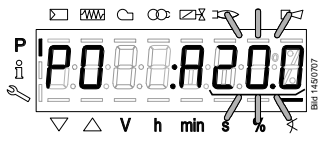
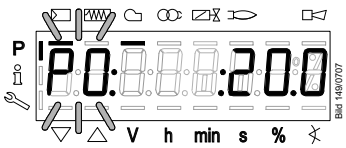
The selector switch must be set to OIL**.**

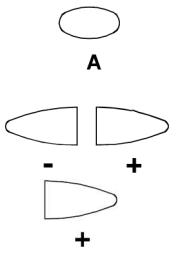
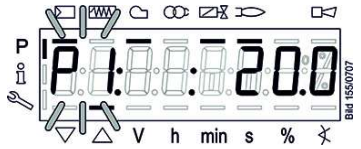
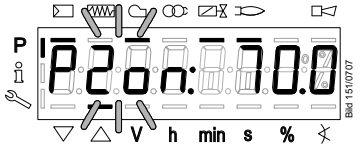
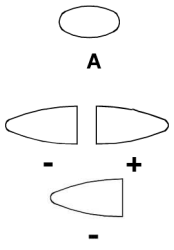
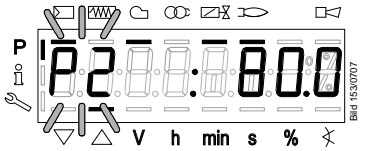
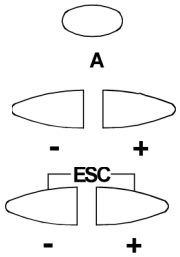
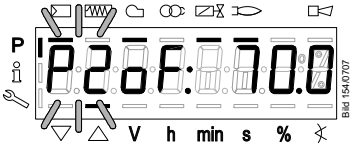
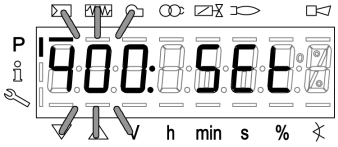
Action button	Display	Description
		After pressing the key combination, the following display appears
		
		If the burner control is programmed, run will be displayed. **ESC button** cold setting

You have the possibility to continue directly with the warm setting by pressing the button **i** / **reset.**

Start load preset

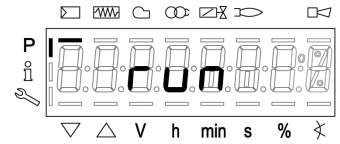
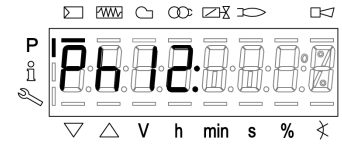
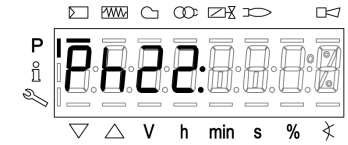
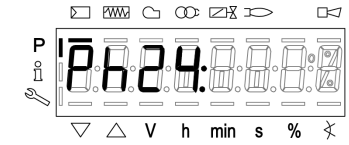
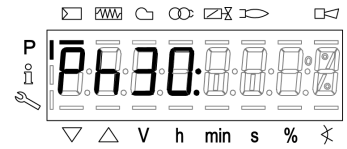
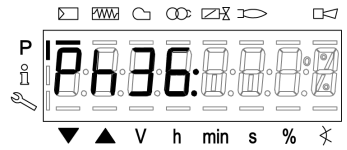
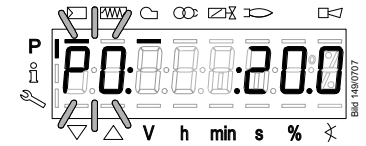
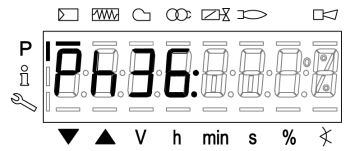
Use the values from the adjustment tables for the default setting.
The maintenance switch should first be in position 0.

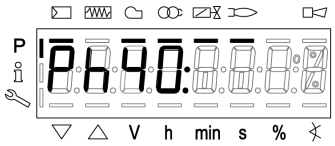
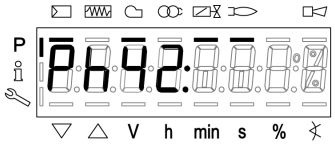
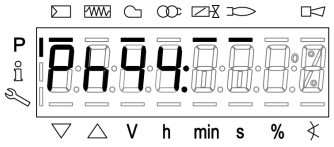
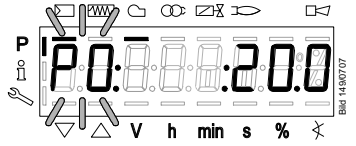
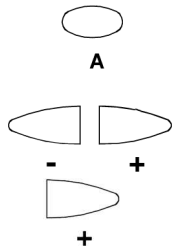
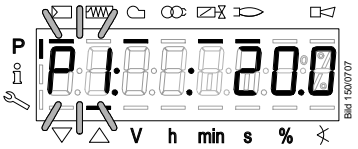
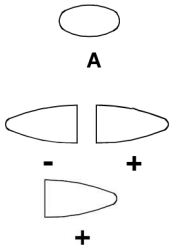
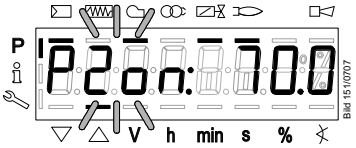
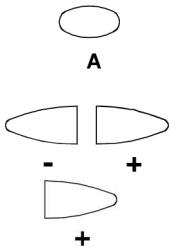
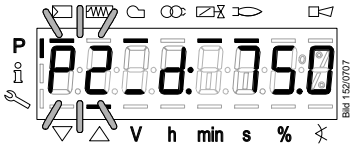
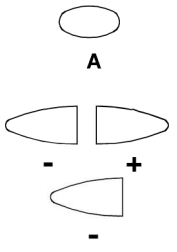
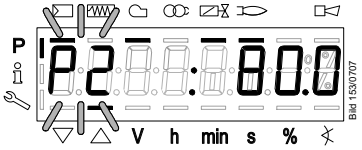
Action button	Display	Description
		
		Hold down **button A** and set the value with the **- or + button**.
		Set the start position air flap. Release the **A button**
		Press the **+ button** to continue

Action button	Display	Description
		
		Set switch-on point MV2 with **A and + or - button**. Continue with **+ button**
		Set operating point P2 with **A and + or - key.** Continue with **- button** Adjust CO2 values to approx. 12.5%
		Set cut-off point MV2 with **A and + or - key.** Use the **- key** to select curve point P1 **P2-oF** should be about 5-10 ° lower than P2 With **key ECSC** to 400 warm setting
		

The cold setting of the burner is completed.

Warmsetting

Action button	Display	Description
i/reset		It will display run OIL Activate the fuel oil with existing ones Heat request. Press **i** / **reset** to start the burner.
Maintenance switch 0/I		Maintenance switch ON The burner starts with pre-ventilation
		The burner starts with pre-ventilation
		Blower run and safety valve ON
		Driving in pre-ventilation position
		Pre-ventilation
		Driving in ignition position
+		If the LMV was originally unprogrammed, the commissioning stops in phase 36. The air damper position can be adjusted cold again. Continue with **+ button**
		Driving in ignition position
		Ignition ON

Action button	Display	Description
		Valves ON
		Ignition OFF
		Flame in start position
		Skip with **+ key**
		Set operating point P1 with **A and + or - key**. The damper position can be adjusted again. Continue with **+ button** Adjust CO2 values to approx. 12.5%.
		Set switch-on point MV2 with **A and + or - button**. The damper position can be adjusted again. Continue with **+ button**
		Set presetting point P2 with **A and + or - key.** Continue with **+ button** **P2_d** should be about 5 ° lower than P2 or P2.
		Set operating point P2 with **A and + or - key**. The damper position can be adjusted again. Continue with **- button** Adjust CO2 values to approx. 12.5%.

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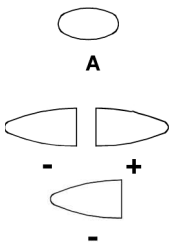
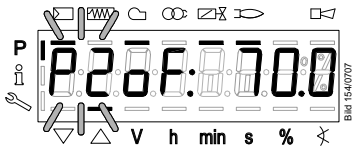
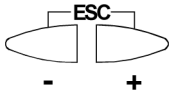
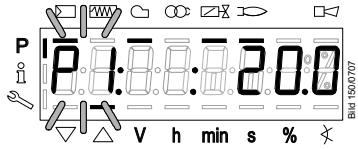
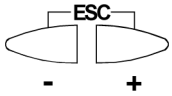
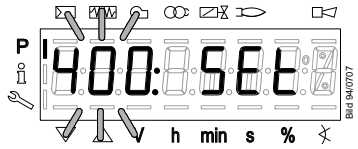
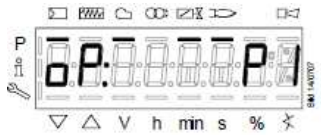
Action button	Display	Description
		Set cut point MV2 with **A and + or - key**. The damper position can be adjusted again. Use the **- key** to select curve point P1 **P2-oF** should be about 5-10 ° lower than P2
		Briefly press the **ESC key**
		Release automatic mode with **ESC key**, press briefly
		Burner power levels OP P1 ... P2 (automatic mode)

LMV phase display

Phase	Function
Ph00	Fault phase
Ph02	Safety phase
Ph10	Go home
PH12	Standby (stationary)
Ph22	Blower start-up time (122) (blower motor = ON, auxiliary valve = ON)
Ph24	Run in pre-air position
Ph30	Pre-air time
Ph36	Run in ignition position
Ph38	Pre-ignition phase
Ph39	Leakage check filling time (test pressure switch min for installation between fuel valve V1 and fuel valve V2)
Ph40	First safety time (ignition transformer ON)
Ph42	First safety time (ignition transformer OFF)
Ph44	Interval 1
Ph50	Second safety time
Ph52	Interval 2
Ph60	Operation 1 (stationary)
Ph62	Max. time, low load (operation 2, preparation for decommissioning, run at low load)
Ph70	After-burn time
Ph72	Run in post-ventilation position
Ph74	Post-ventilation time (no foreign light check)
Ph78	Post-ventilation time 3 (abort when power controller ON)
Ph80	Leakage check idle time
Ph81	Leakage check test time atmospheric pressure, atmosphere test
Ph28	Leakage check filling test, filling
Ph83	Leakage check test time gas pressure, pressure test
Ph90	Gas shortage waiting time

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Fault code list LMV

Press i/reset button for two seconds to acknowledge fault.

loc.C:	loc.d:	Description	Measure
		No communication between basic device AZL2…	Check wiring for interruptions/loose contacts
2	1 - 2	No flame at the end of the safety time	
3	0 - 84	Compressed air fault	No compressed air
4	0 - 86	External light	
7	0 - 255	Flame cut-off	
12	0	Fuel valve 1 leaking (fuel valve 2 for leakage check)	For leakage check via X5-01 (gas pressure switch min) - Check whether valve on burner side is leaking - Check whether pressure switch for leakage check is closed when gas pressure is applied - Check wiring for short-circuit
	1	Fuel valve 2 leaking (fuel valve 1 for leakage check via X5-01)	For leakage check via X5-01 (gas pressure switch min) - Check whether valve on gas side is leaking - Check wiring for short-circuit
	2- 5	Leakage check not possible	Leakage check activated but no input assigned
	81	V1 leaking	Check whether valve on gas side is leaking Check the wiring for interruptions
	83	V2 leaking	Check whether the valve on the burner side is leaking Check whether the pressure switch for the leak test is closed when gas pressure is applied Check wiring for short-circuit
14	0	POC open	Check whether valve NC contact is closed
	1	POC closed	Check wiring Check whether valve NC contact opens when he valve is activated
	64	POC open start prevention	Check wiring for interruptions Check whether valve NC contact is closed
19	80	Combustion pressure, POC start prevention	Check whether the pressure switch is closed without combustion pressure being present Check wiring for short-circuit
20	0 - 1	Pressure switch min no minimum gas pressure/oil pressure	Check wiring for interruption
21	0	Pressure switch max (Pmin) / heavy fuel - immediate start	Check wiring for interruption. POC: Check whether valve NC contact is closed
22 OFF S	0 - 87	Safety chain	
23	0 - 2	Gas pressure switch min (Pmin) / heavy fuel - immediate start	Check wiring for interruption (X5-01) and (X9-04)
50 - 67	#	Internal error	
70	26 - 26	Error group	Set all curve points for gas and air actuators, and for the FC
71	0 - 3	Special position undefined	Parametrise actuators
75 - 76		Internal fault group	
80	1 - 2	Control range restriction of the frequency converter	1. Basic device is not standardized for this motor > Repeat standardization 2. The group setting must be checked
81	1	Frequency converter fault	Too many interference pulses on the probe line > Improve EMC measures
82	1 - 2	Frequency converter fault	Internal error

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loc.C:	loc.d:	Description	Measure
82	3	Sensor interrupt	The basic device does not receive pulses from the speed sensor: 1. Motor does not turn 2. Speed sensor not connected 3. Speed sensor is not actuated by the encoder disk (check distance)
82	4	Frequency converter fault	Internal error
82	5	Incorrect direction of rotation	The direction of rotation of the motor is incorrect 1. Motor does actually rotate in the wrong direction > Re-parameterize the direction of rotation or exchange 2 phases 2. Encode disk is fitted reversed > Turn the encoder disk
82	6	Frequency converter fault	The required pulse pattern (60°, 120°, 180°) has not been recognized correctly 1. Speed sensor does not detect all cams of the encoder disk > Check the distance 2. When turning the motors, other mechanical parts are detected in addition to the cams > Correct the installation 3. Faults on the sensor lines > Check the routing, improve EMC
82	7	Invalid standardization speed	The measured standardization speed does not lie in the permitted range > Motor turns to slowly or too fast.
82	15	Speed deviation	Carry out standardization again and check the group setting
82	20	Incorrect phase of the phase manager	Standardization performed in a wrong phase. Only phases <12 are permissible > Controller off, re-start standardization
82	21	Safety chain / burner flange opened	Repeat standardization with safety chain closed
82	22	Air drive not referenced	The air drive is not referenced or has lost its reference 1. Check whether the reference position can be approached 2. Check whether the drives have been exchanged 3. If the fault does not occur until after referencing, the drive is overloaded and cannot reach its target
82	23	Frequency converter deactivated	Standardization was started with frequency converter deactivated > Activate frequency converter and repeat standardization
82	24 - 255	Frequency converter fault	Perform standardization
83	0 - 1	Control range restriction of the frequency converter	1. Basic device is not standardized for this motor > Repeat standardization
83	2	Frequency converter fault	Too many interference pulses on the probe line > Improve EMC measures
83	3	Frequency converter fault	Internal error
83	4	Speed signal interrupted	No speed detected despite actuation. 1. Check that the motor is turning 2. Check whether the speed encoder is supplying a signal (check LED / distance from encoder disk) 3. Check wiring of the frequency converter
83	5	Frequency converter fault	Internal error
84	0 - 2	Frequency converter fault	Internal error

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loc.C:	loc.d:	Description	Measure
85	0	Error group fuel drive	Referencing of fuel drive not successful. Unable to reach reference point. 1. Check whether the drives have been exchanged 2. Check whether the drive is blocked or overloaded
85	1	Error group air drive	Referencing of fuel drive not successful. Unable to reach reference point. 1. Check whether the drives have been exchanged 2. Check whether the drive is blocked or overloaded
86	0 - 1	Error group fuel drive	Unable to achieve the target position within the required tolerance. -> Check whether the drive is blocked or overloaded. A line break was detected at the drive connections. -> Check wiring (voltage X54 between Pin 5 or 6 and Pin 2 >0.5 V).
86	3	Error group fuel drive	Internal error
86	4	Step deviation compared to last referencing	The drive was overloaded and/or mechanically distorted. 1. Check the setting of the drive type 2. Check whether the drive is blocked on one side in the drive area 3. Check whether the torque is sufficient for the application
87	0 - 1	Error air drive	Unable to achieve the target position within the required tolerance. -> Check whether the drive is blocked or overloaded. A line break was detected at the drive connections. -> Check wiring (voltage X53 between Pin 5 or 6 and Pin 2 >0.5 V).
87	3	Error group air drive	Internal error
87	4	Step deviation compared to last referencing	The drive was overloaded and/or mechanically distorted. 1. Check the setting of the drive type 2. Check whether the drive is blocked on one side in the drive area 3. Check whether the torque is sufficient for the application
90 - 92	#	Internal fault group	
93	3	Short-circuit of probe	Short-circuit at QRB... 1. Check wiring 2. Flame probe possible defective
95	3 Ignition transformer 4 Fuel valve 1 5 Fuel valve 2 6 Fuel valve 3	External supply NOC	Check wiring
96	3 Ignition transformer 4 Fuel valve 1 5 Fuel valve 2 6 Fuel valve 3	Relay welded	Measure the contacts: 1. Device at voltage: Blower output must be de-energised 2. Deactivated voltage: Disconnect blower. There must be no ohmic connection between blower output and N. If one of the two tests fails, replace the unit, since the contacts are definitely welded and safety can no longer be guaranteed.

loc.C:	loc.d:	Description	Measure
97	0	Safety relay welded or external voltage at safety contact	Measure the contacts: 1. Device at voltage: Blower output must be de-energised 2. Deactivated voltage: Disconnect blower. There must be no ohmic connection between blower output and N. If one of the two tests fails, replace the unit, since the contacts are definitely welded and safety can no longer be guaranteed.
98	2 Safety valve 3 Ignition trans-former 4 Fuel valve 1 5 Fuel valve 2 6 Fuel valve 3	Replay does not pick up	Unlock; if it recurs, replace the unit
99 - 250	#	Internal error	
137	#	Interner Fehler – Backup / Restore	
	157 (-99)	Restore – ok, but backup < data set of current	Restore successful, but backup data record is smaller than in the current
	239 (-17)	Backup – storage of backup in AZL2 faulty	Reset and repeat backup
	240 (-16)	Restore – no backup in AZL2	No backup stored in AZL2
	241 (-15)	Restore – abortion due to unsuitable product no. (ASN)	Backup has an unsuitable product no. (ASN) and must not be loaded on the LMV26
	242 (-14)	Backup – backup made is inconsistent	Backup is faulty and cannot be transferred back
	243 (-13)	Backup – data comparison between µCs faulty	Reset and repeat backup
	244 (-12)	Backup data are incompatible	Backup data are incompatible with the current software version, restore not possible
	245 (-11)	Access error to parameter Restore_Complete	Reset and repeat backup
	246 (-10)	Restore – timeout when storing in EEPROM	Reset and repeat backup
	247 (-9)	Data received are inconsistent	Backup data record invalid, restore not possible
	248 (-8)	Restore cannot at present be made	Reset and repeat backup
	249 (-7)	Restore – abortion due to unsuitable burner identification	Backup has an unsuitable burner identification and must not be transferred to the LMV26
	250 (-6)	Backup – CRC of one page is not correct	Backup data record invalid, restore not possible
	251 (-5)	Backup – burner identification is not defined	Define burner identification and repeat backup
	252 (-4)	After restore, pages still on ABORT	Reset and repeat backup
	253 (-3)	Restore cannot at present be made	Reset and repeat backup
	254 (-2)	Abortion due to transmission error	Reset and repeat backup
	255 (-1)	Abortion due to timeout during backup / restore	Make a reset, check the connections and repeat backup / restore In case of repeated backup timeout, the AZL2 does not yet support backup functionality

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25. Calculation principles for gas burner adjustment

The values given in the tables are setting values for start-up.
The necessary system adjustment must be newly determined in each case.

General:
The calorific value ($H_{i,n}$) of fuel gases is generally specified for the normal state (0°C, 1013 mbar).

Natural gas type E $H_{i,n}$ = 10.4 kWh/m^3
Natural gas type LL $H_{i,n}$ = 9.3 kWh/m^3
Gas counters measure the volume of gas in the operational state.

Gas flow determination:
To allow the heat generator load to be adjusted correctly, the gas flow rate must be determined in advance.

Example:

Height above sea level	230 m
Barometric air pressure B (acc. to. table)	989 mbar
Gas pressure P_G at counter	20 mbar
Gas temperature ϑ_G	16°C
Boiler output Q_n	430 kW
Efficiency h_K (assumed)	90%
Calorific value $H_{i,n}$	10.4 kWh/m^3

Gas flow in standard state (V_n)

$$V_n = \frac{Q_n}{\eta_k \times H_{i,n}} = \frac{430kW}{0,90 \times 10,4 \frac{kWh}{m^3}} = 46 \frac{m^3}{h}$$

Gas flow in operating state (V_B)

$$V_B = \frac{V_n}{f} = \frac{46 \frac{m^3}{h}}{0,94} = 49 \frac{m^3}{h}$$

Conversion factor (f)

$$f = \frac{B + P_G}{1013} \times \frac{273}{273 + \vartheta_G}$$

Annual average air pressure

Average geodetic altitude of the supply region above sea level [m]	from		1	51	101	151	201	251	301	351	401	451	501	551	601	651	701
	to	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750
Annual average of air pressure	(mbar)	1016	1013	1007	1001	995	989	983	977	971	965	959	953	947	942	936	930

Legend:
Q_n = Boiler output [kW]
h_K = Efficiency [%]
$H_{i,n}$ = Lower standard calorific value [kWh/m^3]
f = Conversion factor
B = Barometric air pressure [mbar]
p_G = Gas pressure at gas meter [mbar]
ϑ_G = Gas temperature at gas meter [°C]

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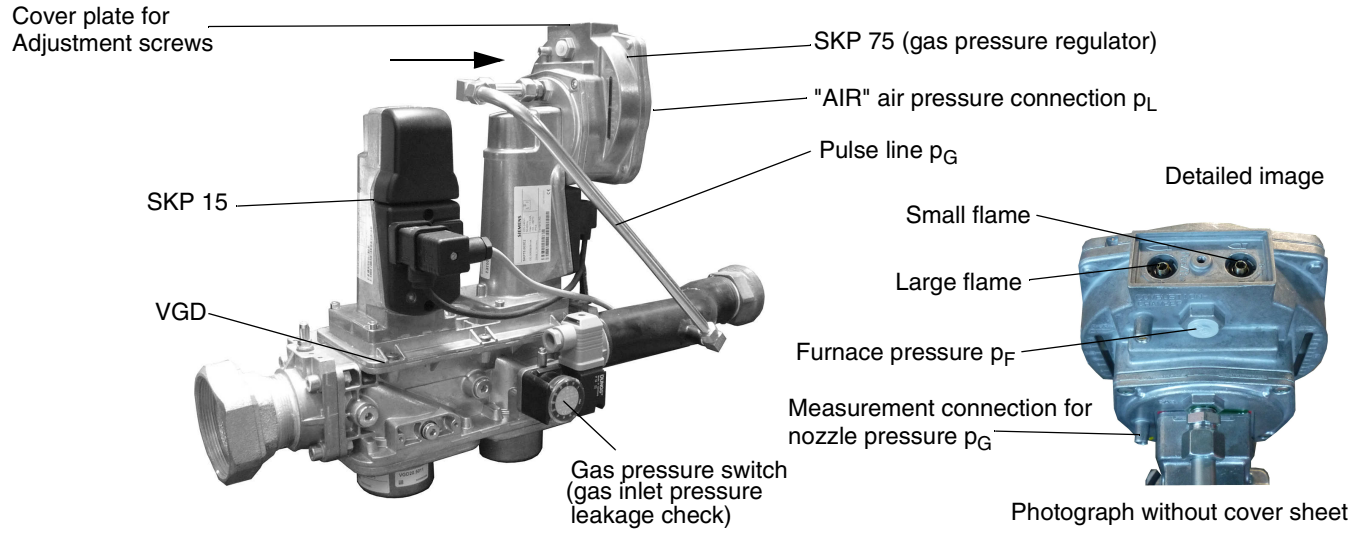
26. Gas burner with gas train

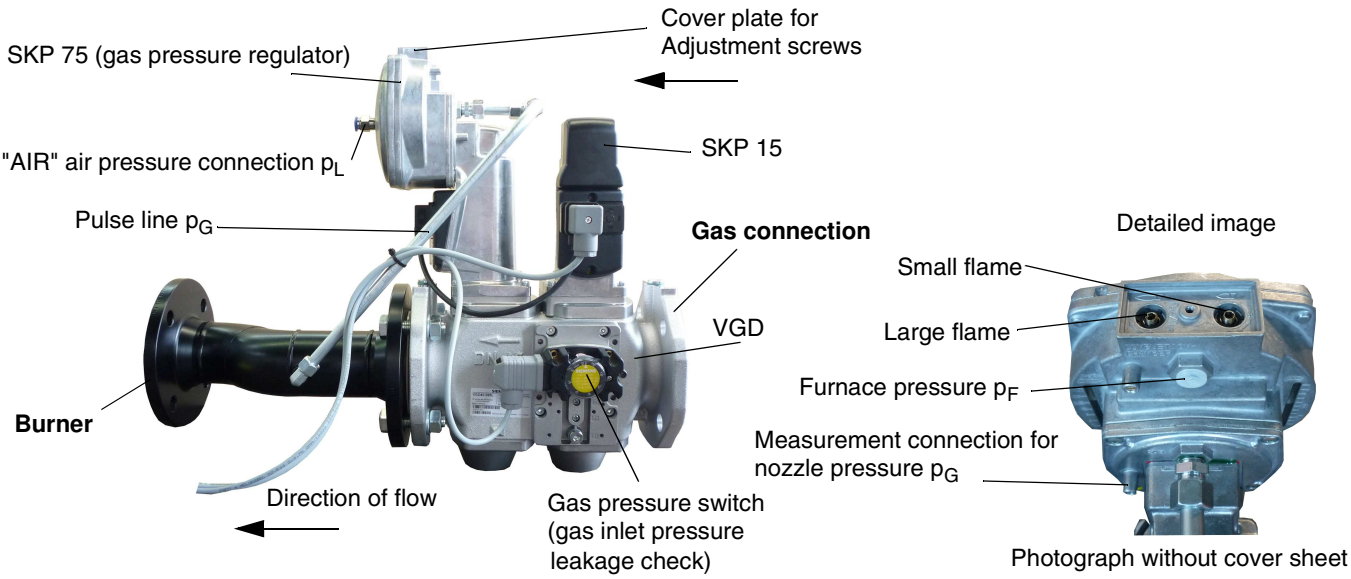
Installation of the gas train	
Installation position	only in horizontal line, not tilted.
Minimum distance to walling:	20 mm
Screw the measuring nipple for combustion chamber pressure into the gas jacket at the top. Route the connecting hose between the measuring nipple for combustion chamber pressure and the gas train in a loose loop.	

The air pressure connection nipple must be screwed into the gas jacket at the top.

KEV 1 ½", KEV2", KEV DN65 (VGD20.40, VGD20.50, VGD40.65 all SKP15/75).



KEV DN65, KEV DN80 (VGD40.65, VGD40.80 all SKP15/75)



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Large flame / "V" setting	Exhaust gas analysis values	
Change in "+" direction if:	CO_2 too low	O_2 too high
Change in "-" direction if:	CO_2 too high	O_2 too low

Small flame /"N" setting	Exhaust gas analysis values	
Change in "+" direction if:	CO_2 too low	O_2 too high
Change in "-" direction if:	CO_2 too high	O_2 too low

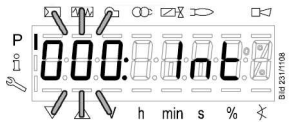
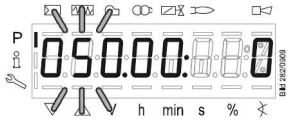
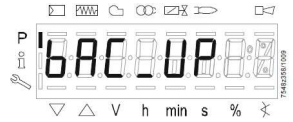
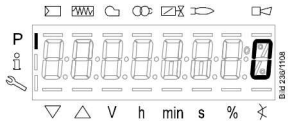
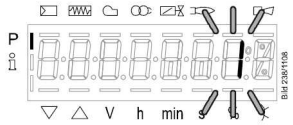
Caution !
Difference between baffle plate pressure p_L - furnace pressure p_F must be at least 0.3 mbar.

27. Backup / Restore

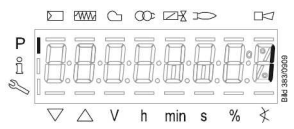
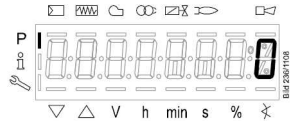
With the help of the AZL2, settings of the LMV26 can be saved (backup) and restored to the LMV27 at a later time.

Caution!
We recommend to perform a backup after a parameter change!

Backup

Action button	Display	Description
		Parameter **000**: flashes. Display: Parameter 000: flashing, display **Int** not
i/reset		
+		Press **+ key** to select parameter **050**. Display: Parameter 050. flashing, index 00: and value 0 not
i/reset		
		With **i** / **reset** select parameter **bAC_UP**. Display: Parameter bAC_UP
i/reset		
		Press **i** / **reset** to select the backup operation. Display: Value = 0
+		With the **+ key,** the value in change mode is shifted one position to the left. Display: Value 1 flashes **Note** To detect display errors, the value is displayed offset to the left

E. 06.09.18 • G. 11.03.24

Action button	Display	Description
i/reset		With **i** / **reset** activate the backup process. Display: 1 appears
ca. 5 seconds		After approx. 5 seconds (depending on the duration of the program), the display shows 0 and signals the end of the backup process. Display: 0

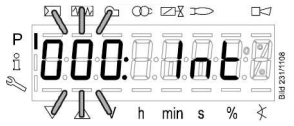
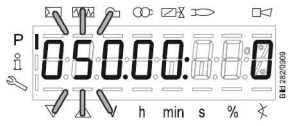
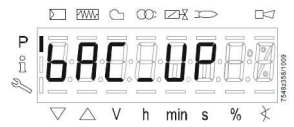
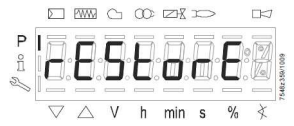
Note!

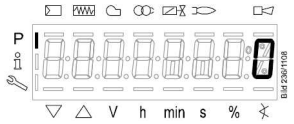
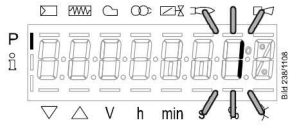
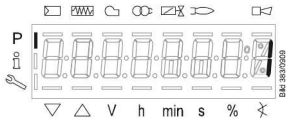
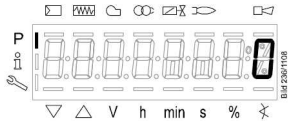
If an error occurs during the backup, a negative value is displayed. For error diagnostics, the cause of the error can be read from the diagnostic code of error message 137 (see error code list).

Restore a backup record (Restore)

To restore a backup data set, the parameter must be set to the value 1.

Restore

Action button	Display	Description
		Parameter **000**: flashes. Display: Parameter 000: flashes, **Int** does not.
i/reset		
+		Press **+ key** to select parameter **050**. Display: Parameter 050. flashing, index 00: and value 0 not
i/reset		
		With **i** / **reset** select parameter **bAC_UP.** Display: Parameter bAC_UP
+		Press **+ key** to select the parameter **rESTorE.** Display: **rESTorE**

Action button	Display	Description
i/reset		
		Press **i** / **reset** to select the restore operation. Display: value 0
+		With the **+ key**, the value in change mode is shifted one position to the left. Display: Value 1 flashes **Note** To detect display errors, the value is displayed offset to the left.
i/reset		With **i** / **reset** activate the backup process. Display: 1 appears
ca. 8 seconds		After approx. 8 seconds (depending on the duration of the program), the display shows 0 and signals the end of the backup process. Display: 0

Note:

- Before restoring the backup data on the LMV26, the latter compares the burner identification and product no. (ASN) with the burner identification and product no. (ASN) of the backup data set. If the data accord, they are restored. If not, the restore process is aborted. In case of abortion, or if an error occurs during the restore process, the display shows a negative value. For error diagnostics, the cause of the error can be determined from the diagnostic code of error message 137 (see Error code list). When the restore process is successfully completed, value 0 appears on the display. The LMV26 is supplied with undefined burner identification. In that case, the restore process from the AZL2 is possible without having to enter the burner identification in the LMV26.
- Information Err C: 136 D: 1 (restore started) is displayed for a short moment

Caution
On completion of the restore process, the sequence of functions and the parameter settings must be checked.

28. Service level

The service level is used to display information about errors including the error history and information about the LMV26.

Note!

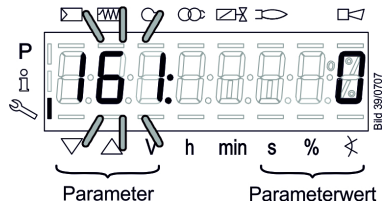
When on the service level, you can press **- or+** to display the next or the previous parameter.

Instead of pressing **+ key** yozu can also press **i/reset** for <1 sec..

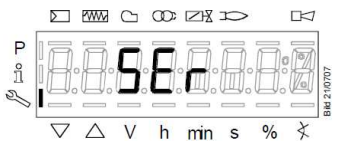
Note!

Press **ESC-Taste** or **i/reset** for > 3 s to return to the normal display.

Note! No change of values on the service level.

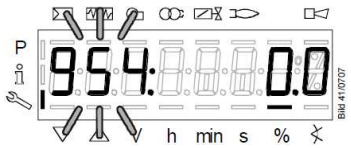
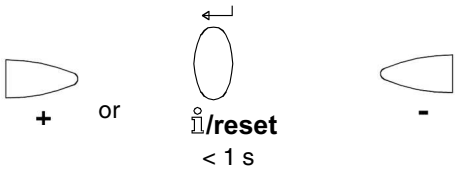
	If characters ._._ are displayed by the parameter, the value may consist of more than 5 digits. Press **i/reset** for >1 s and <3 s to display the value. Press **i/reset for** >3 s or **ESC** to return to the selection of the parameter number (parameter number flashes).

Display of the service level

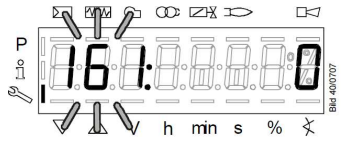
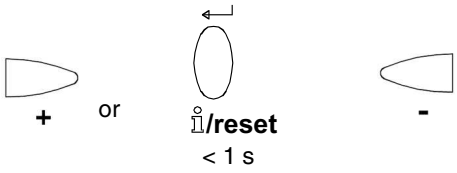
Action button	Display	Description
		Press **i/reset** for >3 s until **SEr** appears When releasing you are on the service level.

Nr.	Parameter
Service level	
954	Intensity of flame
960	Actual flow rate (fuel throughput in m³/h, l/h, ft³/h, gal/h)
121	Manual output Undefined = automatic operation
922	Incremental position of actuators Index 0 = fuel Index 1 = air
161	Number of faults
701 ● ● ● ● ●	Error history: 701-725.01.Code Error history: 701-725.02.Diagnostic code Error history: 701-725.03.Error class Error history: 701-725.04.Phase Error history: 701-725.05.Startup counter Error history: 701-725.06.Output Error history: 701-725.07.Fuel
725	Error history: Oldest error in the history

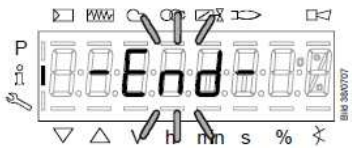
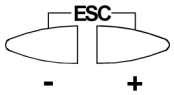
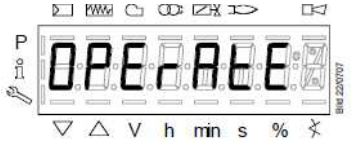
Intensity of flame

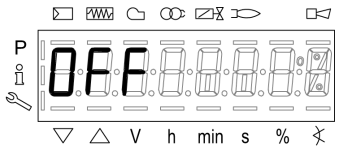
Action button	Display	Description
		The display shows **parameter 954**: flashing on the left. On the right, the flame's intensity is displayed as a percentage. Example: **954: 0.0**
To the next parameter		Back to the previous parameter

Numbers of fauls

Action button	Display	Description
		The display shows **parameter 161**: flashing on the left, the number of faults that occurred thus far on the right **0**. Example: Parameter **161: 0**
To the next parameter		Back to the previous parameter

End of service level

Action button	Display	Description
		When this display appears, you have reached the end of the service level. Display – **End** – appears flashing.
To the start of the service level		To the end of the service level
		Press **ESC** to return to the normal display. **OPErAtE** appears for a short moment.

Action button	Display	Description
		When this display appears, you are back on the normal display and you can change to the next level mode.

Note!

Press **ESC** or **i** / **reset** > 3 seconds to return to the normal display.

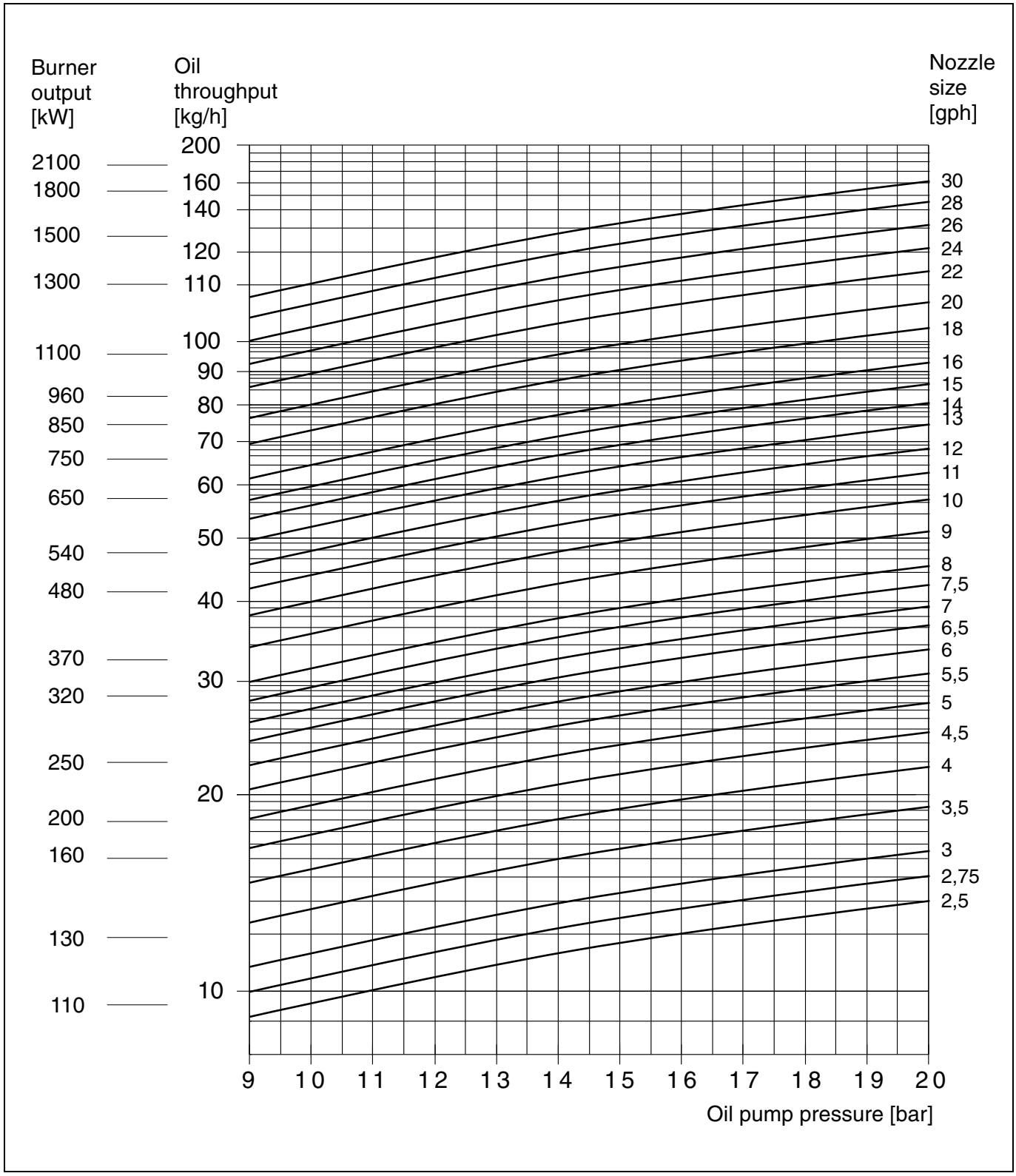
Error classes

The errors are divided into different error classes depending on the type of shutdown reaction. The current error displays all classes. Only the mistakes of the most important classes are included in the history.

Error classes	Priority	Description	History
0	highest	lock	●
1		Safety shutdown with software reset	●
2		undervoltage	
3		Safety shutdown: safety phase	●
4		Safety shutdown: Start prevention	
5		Safety features: Decommissioning	●
6	lowest	Message without switch-off reaction	

29. Nozzle selection diagram

If the desired output deviates from the values specified in the tables, the nozzle size and the pump pressure can be determined on the basis of the following diagram.



MK3.1-ZM-L					MK3.1-ZM-L-N								MK3.1-ZM-L-F			
					Natural gas L $H_{i,n}$ = 9,3 [kWh/m³]				Natural gas H $H_{i,n}$ = 10,4 [kWh/m³]				LPG $H_{i,n}$ = 25,89 [kWh/m³]			
Burner output [kW]		Boiler output η= 93% [kW]	Air flap position [°]		Gas nozzle pressure p_G [mbar]		Gas flow rate [m³/h]		Gas nozzle pressure p_G [mbar]		Gas flow rate [m³/h]		Gas nozzle pressure p_G [mbar]		Gas flow rate [m³/h]	
2. St.	1. St.	2. St.	2. St. P 9	1. St. P 1	2. St.	1. St.	2. St.	1. St.	2. St.	1. St.	2. St.	1. St.	2. St.	1. St.	2. St.	1. St.
1000	550	930	15	10	13,6	4,0	110,9	61,0	10,1	2,4	99,1	54,5	12,1	3,6	39,8	21,9
1100	550	1023	20	11	16,0	4,0	121,9	61,0	12,0	2,4	109,0	54,4	14,6	3,6	43,8	21,9
1200	600	1116	20	11	18,6	4,9	133,0	66,5	14,0	3,2	119,0	59,5	17,4	4,3	47,8	23,9
1300	650	1209	38	12	21,2	5,9	144,1	72,1	16,1	4,0	128,9	64,4	20,4	5,1	51,8	25,9
1400	700	1302	80	13	23,9	7,0	155,2	77,6	18,2	4,8	138,8	69,4	23,6	5,9	55,7	27,9
1500	750	1395	90	14	26,8	8,0	166,3	83,1	20,4	5,6	148,7	74,3	27,1	6,8	59,7	29,9

MK3.1-ZM-L													
									Light oil H_i = 11,86 [kWh/kg]				
Burner output [kW]		Boiler output η= 93% [kW]	Air flap position [°]						Pump pressure [bar]	Oil nozzle Steinen		Oil flow rate [kg/h]	
2. St.	1. St.	2. St.	P0	P1	P2 on	P2 d	P2	P2 off		2. St. SS/60°	1. St. SS/60°	2. St.	1. St.
1000	550	930	10	11	15	12	15	15	21	7/60°S	8,5/60°S	84,3	46,4
1100	550	1023	11	12	15	17	20	17	21	8,5/60°S	8,5/60°S	92,7	46,4
1200	600	1116	11	12	15	17	20	17	21	9/60°S	9/60°S	101,2	50,6
1300	650	1209	12	13	15	35	38	33	21	10/60°S	10/60°S	109,6	54,8
1400	700	1302	13	14	18	77	80	70	20	11/60°S	11/60°S	118,0	59,0
1500	750	1395	14	15	18	86,9	89,9	75	20	12/60°S	12/60°S	126,5	63,2

MK3.2-ZM-L					MK3.2-ZM-L-N								MK3.2-ZM-L-F			
					Natural gas L $H_{i,n}$ = 9,3 [kWh/m^3]				Natural gas H $H_{i,n}$ = 10,4 [kWh/m^3]				LPG $H_{i,n}$ = 25,89 [kWh/m^3]			
Burner output [kW]		Boiler output η= 93% [kW]	Air flap position [°]		Gas nozzle pressure p_G [mbar]		Gas flow rate [m^3/h]		Gas nozzle pressure p_G [mbar]		Gas flow rate [m^3/h]		Gas nozzle pressure p_G [mbar]		Gas flow rate [m^3/h]	
2. St.	1. St.	2. St.	2. St. P 9	1. St. P 1	2. St.	1. St.	2. St.	1. St.	2. St.	1. St.	2. St.	1. St.	2. St.	1. St.	2. St.	1. St.
1400	750	1302	35	12	26,5	6,5	155,2	83,1	22,3	6,3	138,8	74,3	20,0	5,7	55,7	29,9
1500	750	1395	37	12	29,4	8,5	166,3	83,1	24,8	6,3	148,7	74,3	22,9	5,7	59,7	29,9
1600	800	1488	42	13	32,3	9,8	177,4	88,7	27,4	7,5	158,6	79,3	26,1	6,5	63,7	31,9
1700	850	1581	50	14	35,2	11,2	188,4	94,2	29,9	8,7	168,5	84,3	29,4	7,4	67,7	33,8
1800	900	1674	68	15	38,1	12,5	199,5	99,8	32,5	9,9	178,4	89,2	33,0	8,3	71,7	35,8

MK3.2-ZM-L														
									Light oil H_i = 11,86 [kWh/kg]					
Burner output [kW]		Boiler output η= 93% [kW]	Air flap position [°]						Pump pressure [bar]	Oil nozzle Steinen		Oil flow rate [kg/h]		
2. St.	1. St.	2. St.	P0	P1	P2 on	P2 d	P2	P2 off		2. St. SS/60°	1. St. SS/60°	2. St.	1. St.	
1400	750	1302	12	13	15	32	35	30	20	10/60°S	12/60°S	118,0	63,2	
1500	750	1395	12	12	15	34	37	32	20	12/60°S	12/60°S	126,5	63,2	
1600	800	1488	13	14	16	39	42	36	20	12/60°S	12/60°S	134,9	67,5	
1700	850	1581	14	15	17	47	50	42	21	13/60°S	13/60°S	143,3	71,7	
1800	900	1674	15	16	18	65	68	60	20	14/60°S	14/60°S	151,8	75,9	

MK3.3-ZM-L					MK3.3-ZM-L-N								MK3.3-ZM-L-F			
					Natural gas L $H_{i,n}$ = 9,3 [kWh/m³]				Natural gas H $H_{i,n}$ = 10,4 [kWh/m³]				LPG $H_{i,n}$ = 25,89 [kWh/m³]			
Burner output [kW]		Boiler output η= 93% [kW]	Air flap position [°]		Gas nozzle pressure p_G [mbar]		Gas flow rate [m³/h]		Gas nozzle pressure p_G [mbar]		Gas flow rate [m³/h]		Gas nozzle pressure p_G [mbar]		Gas flow rate [m³/h]	
2. St.	1. St.	2. St.	2. St. P 9	1. St. P 1	2. St.	1. St.	2. St.	1. St.	2. St.	1. St.	2. St.	1. St.	2. St.	1. St.	2. St.	1. St.
1700	850	1581	32	12	18,3	4,2	188,4	94,2	14,8	3,0	168,5	84,3	14,8	3,7	67,7	33,8
1900	950	1767	39	15	22,4	5,5	210,6	105,3	18,3	4,2	188,3	94,2	18,5	4,6	75,7	37,8
2100	1050	1953	42	17	26,9	7,0	232,8	116,4	22,0	5,4	208,2	104,1	22,6	5,6	83,6	41,8
2300	1150	2139	68	19	31,6	8,5	255,0	127,5	25,9	6,7	228,0	114,0	27,1	6,8	91,6	45,8
2500	1250	2325	90	21	36,7	10,1	277,1	138,6	30,1	8,0	247,8	123,9	32,0	8,0	99,5	49,8

MK3.3-ZM-L														
									Light oil EL H_i = 11,86 [kWh/kg]					
Burner output [kW]		Boiler output η= 93% [kW]	Air flap position [°]						Pump pressure [bar]	Oil nozzle Steinen		Oil flow rate [kg/h]	
2. St.	1. St.	2. St.	P0	P1	P2 on	P2 d	P2	P2 off		2. St. SS/60°	1. St. SS/60°	2. St.	1. St.
1700	850	1581	13	14	16	29	32	28	21	13/60°S	13/60°S	143,3	71,7
1900	950	1767	15	16	18	36	39	35	20	15/60°S	15/60°S	160,2	80,1
2100	1050	1953	17	18	20	39	42	38	21	16/60°S	16/60°S	177,1	88,5
2300	1150	2139	19	20	22	65	68	60	20	18/60°S	18/60°S	193,9	97,0
2500	1250	2325	21	22	24	86,9	89,9	80	21	19/60°S	19/60°S	210,8	105,4

MK3.4-ZM-L					MK3.4-ZM-L-N								MK3.4-ZM-L-F			
					Natural gas L $H_{i,n}$ = 9,3 [kWh/m³]				**Natural gas H** $H_{i,n}$ = 10,4 [kWh/m³]				**LPG** $H_{i,n}$ = 25,89 [kWh/m³]			
Burner output [kW]		Boiler output η= 93% [kW]	Air flap position [°]		Gas nozzle pressure p_G [mbar]		Gas flow rate [m³/h]		Gas nozzle pressure p_G [mbar]		Gas flow rate [m³/h]		Gas nozzle pressure p_G [mbar]		Gas flow rate [m³/h]	
2. St.	1. St.	2. St.	2. St. P 9	1. St. P 1	2. St.	1. St.	2. St.	1. St.	2. St.	1. St.	2. St.	1. St.	2. St.	1. St.	2. St.	1. St.
1800	900	1674	30	12	20,0	4,0	199,5	99,8	15,9	2,8	178,4	89,2	16,5	4,1	71,7	35,8
2000	1000	1860	33	14	24,7	5,4	221,7	110,9	19,8	3,9	198,3	99,1	20,4	5,1	79,6	39,8
2200	1100	2046	41	16	29,9	6,8	243,9	121,9	23,9	5,1	218,1	109,0	24,7	6,2	87,6	43,8
2400	1200	2232	50	18	35,4	8,4	266,0	133,0	28,4	6,4	237,9	119,0	29,4	7,4	95,6	47,8
2600	1300	2418	80	20	41,3	10,1	288,2	144,1	33,3	7,8	257,7	128,9	34,5	8,6	103,5	51,8

MK3.4-ZM-L														
									Light oil EL H_i = 11,86 [kWh/kg]					
Burner output [kW]		Boiler output η= 93% [kW]	Air flap position [°]						Pump pressure [bar]	Oil nozzle Steinen		Oil flow rate [kg/h]		
2. St.	1. St.	2. St.	P0	P1	P2 on	P2 d	P2	P2 off		2. St. SS/60°	1. St. SS/60°	2. St.	1. St.	
1800	900	1674	12	13	16	27	30	26	21	14/60°S	14/60°S	151,8	75,9	
2000	1000	1860	14	15	18	30	33	29	22	15/60°S	15/60°S	168,6	84,3	
2200	1100	2046	16	17	20	38	41	37	21	17/60°S	17/60°S	185,5	92,7	
2400	1200	2232	18	19	22	47	50	45	20	19/60°S	19/60°S	202,4	101,2	
2600	1300	2418	20	21	24	77	80	70	21	20/60°S	20/60°S	219,2	109,6	

31. Adjustments log

Please enter the measured values into the Adjustments log.

Boiler type	Gas fitting

Measured values		min.	max.	Date
P0 (start point)				
P1 (min load)				
P9 (max load)				
Flue gas temperature	°C			
Carbon dioxide (CO_2 level)	%			
O_2 content	%			
CO level	%			
Flue	mbar			
Nozzle pressure	mbar			
Boiler pressure	mbar			
Room temperature	°C			
Gas type				
Setting value **V** at the fitting				
Setting value **N** at the fitting				

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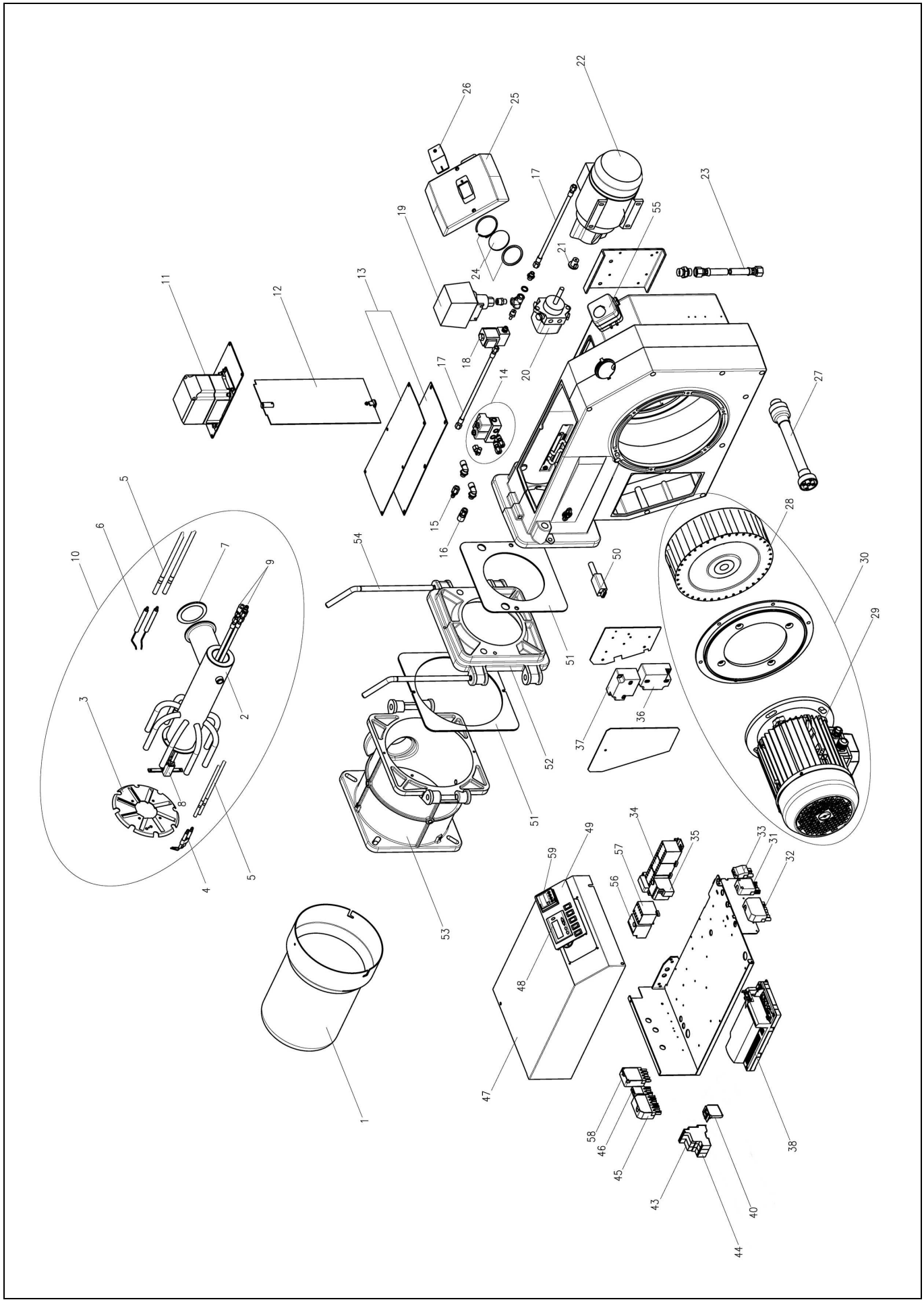
32. Explosion drawings / spare parts lists

MK3.1 / MK3.2



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Pos.	Benennung	VE	Art.-Nr.
1	Burner pipe MK3.1/MK3.2		47-90-25392
1	Burner pipe MK3.1/MK3.2, extended 200 mm		47-90-25442
2	Mixing head MK3.1/MK3.2 welded		47-90-27091
2	Mixing head MK3.1/MK3.2 welded, extended 200 mm		47-90-27092
3	Baffle plate MK3.1/MK3.2		47-90-25088
4	Oil ignition electrodes compl.		47-90-26213
5	Oil/gas ignition cable set	2	47-50-25003
5	Oil/gas ignition cable set, extended 200 mm	2	47-50-25482
6	Gas ignition electrodes compl.		47-90-24921
7	Seal for gas nozzle	5	47-50-12791
8	Nozzle holder MK compl. pre-assembled		47-90-25086
8	Nozzle holder MK compl. pre-assembled, extended 200 mm		47-90-25423
9	Hydraulic set		47-90-27087
10	Mixing head MK compl. pre-assembled, excl. ignition cable		47-90-25036
10	Mixing head MK compl. pre-assembled, extended 200 mm, excl. ignition cable		47-90-24993
11	Positioning drive SQN 33 kpl.		47-90-29332
12	Air damper compl.		47-90-29331
13	Cover with seal		47-90-12982
14	Conversion kit double solenoid valve M+MK		47-90-30413
15	Hydraulic coupling compl.		47-90-25464
16	Hydraulic sealing nipple T2320V, compl.		47-90-25465
17	Pressure pipe NW4 compl.320 mm long		47-90-24995
18	Solenoid valve R 1/4“		36-90-11583
19	Oil pressure switch 0-40 bar compl. with cable		47-90-28330
20	Oil pump AJ6, kpl.		47-90-26064
21	Coupling pump-motor		47-90-28851
22	Motor 0.55 kW		47-90-28787
23	Metal hose NW10, 1500 mm long	2	47-50-12818
24	Inspection glass with seal		36-90-11544
25	Hood MK		47-90-24999
26	Sight glass cover	5	47-50-12106
27	Coupling compl.		47-90-27096
28	Fan wheel TLR Ø 280 x 80 for MK3.1		47-90-27093
28	Fan wheel TLR Ø 280 x 100 for MK3.2		47-90-27099
29	Motor 3 kW for MK3.1		47-90-29348
29	Motor 4 kW for MK3.2		47-90-29349
30	Motor 3 kW with fan wheel for MK3.1		47-90-27094
30	Motor 4 kW with fan wheel for MK3.2		47-90-27100
31	4-pin socket green		37-90-20744
32	7-pin socket black/brown		37-90-20731
33	3-pin fermale connector black		37-90-20742
34	Star delta combination with thermorelais ZE4 for MK3.1		47-90-25176-01
34	Star delta combination with thermorelais ZE6 for MK3.2		47-90-25176
35	Thermal overload relay 2,4 - 4,0 A MK3.1		47-90-25172-01
35	Thermal overload relay 4,0 - 6,0 A		47-90-25173-01
36	Ignition transformator 26/35 incl. ignition cable 200 mm lg.		47-90-26790
37	Ignition transformator 26/48 incl. ignition cable 200 mm lg.		47-90-27095
38	Control box LMV 26		47-90-29094-02

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Pos.	Benennung	VE	Art.-Nr.
40	Remote manual-switch		47-90-25040
43	Relay CR-P230AC2		47-90-25199
44	Base CR-PLSx		47-90-26713
45	Buchsenteil		47-90-25186
46	Buchsenteil 3-pol. schwarz		37-90-20739
47	Electronic unit hood		47-90-25206
48	Display unit AZL		47-90-29098
49	Panel MK		47-90-29721
49	Cover with controller		47-90-29420
50	Flame detector KLC 1000		47-90-27184
51	Gasket set		47-90-26792
52	Gas jacket part 2		47-90-12771
53	Gas jacket part 1		47-90-12770
54	Mounting roud	2	46-90-12809
55	Differential pressure switch LGW 50		44-90-20793
56	Thermal overcurrent relay for pump unit 2.4 - 4 A		47-90-25172-01
57	Small motor contactor B7-30-10 for pump unit		47-90-25171
58	5-pole connector part, black for pump unit		37-90-20753
59	Digital controller RWF 50, temperature (optional)		47-90-28819-1
-	Inlet nozzle		47-90-12875
-	Motor connection cable		47-90-25410
-	Fuel switchover unit AGM60		47-90-29099
-	Plug bridge Gas pressure switch max.		47-90-27382
-	Female part 3-pol. brown		47-90-27203
-	Plug bridge remote switching		47-90-11002
-	Socket 2-pol. gray		47-90-11003
-	Plug bridge gas pressure switch min.		47-90-27399

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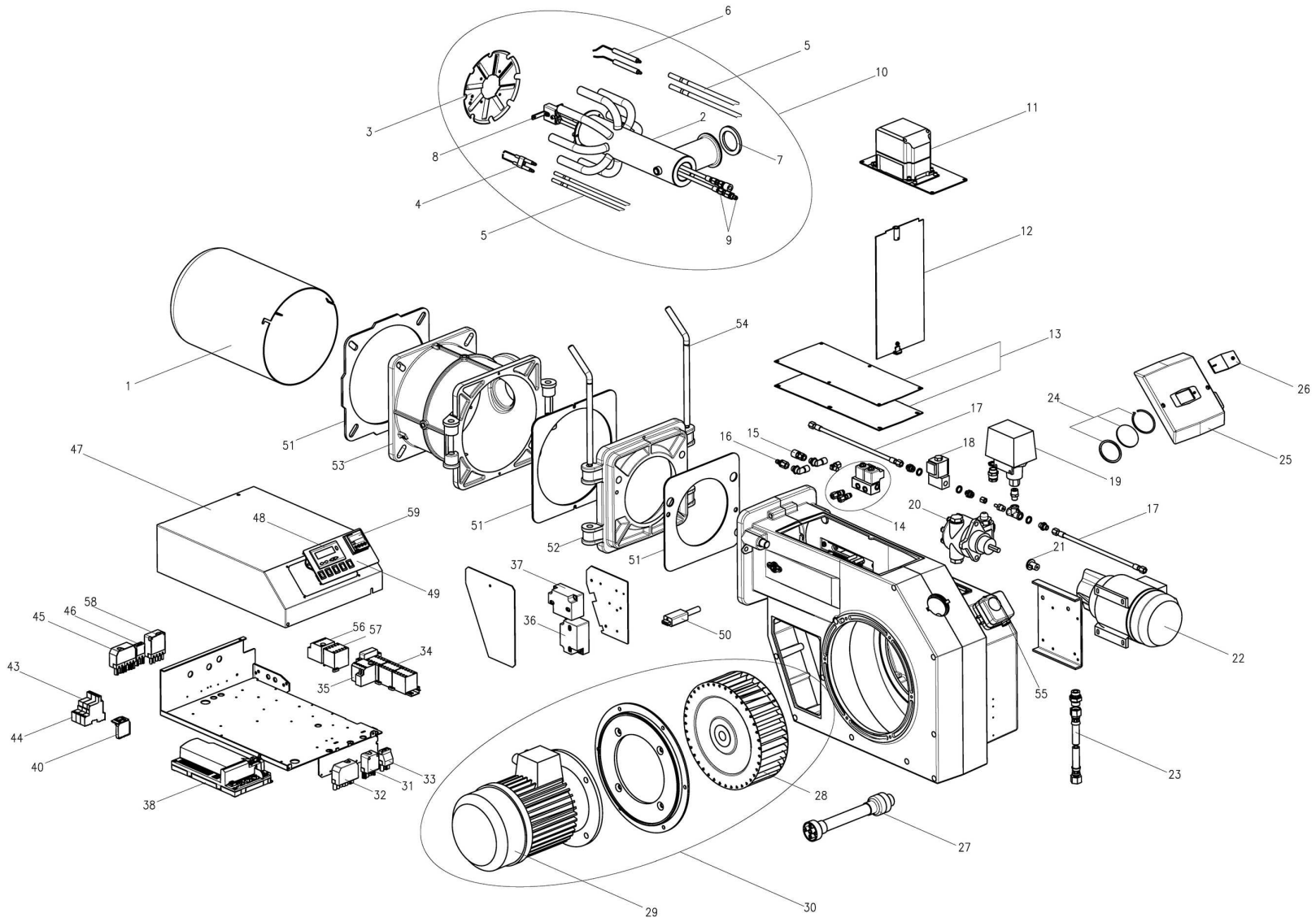
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Pos.	Benennung	VE	Art.-Nr.
1	Burner pipe MK3.3 / MK3.4		47-90-25393
1	Burner pipe MK3.3 / MK3.4, extended 200 mm		47-90-25443
2	Mixing head MK3.3 / MK3.4, welded		47-90-27097
2	Mixing head MK3.3 / MK3.4, welded, extended 200 mm		47-90-27098
3	Baffle plate MK3.3 / MK3.4		47-90-25238
4	ignition electrodes oil cpl.		47-90-26213
5	Ignition cable set oil /gas	2	47-50-25003
5	Ignition cable set oil /gas, extended 200 mm	2	47-50-25482
6	Ignition electrodes gas cpl.		47-90-24921
7	Seal for gas nozzle	5	47-50-12791
8	Nozzle holder MK cpl. pre-assembled		47-90-25086
8	Nozzle holder MK cpl. pre-assembled, extended 200 mm		47-90-25423
9	Hydraulic set		47-90-27087
10	Mixing head MKcpl., pre-assembled, without ignition cable		47-90-25272
10	Mixing head MK cpl., pre-assembled, without ignition cable, extended 200 mm		47-90-25425
11	Positioning drive SQM 33 cpl.		47-90-29332
12	Air damper cpl.		47-90-29331
13	Cover with seal		47-90-12982
14	Conversion kit double solenoid valve M+MK		47-90-30413
15	Hydraulic coupling cpl.		47-90-25464
16	Hydraulic plug T2320V, cpl.		47-90-25465
17	Pressure hose NW4 kpl. 320 mm lg		47-90-24995
18	Solenoid valve R 1/4“ kpl. for MK3.3 / MK3.4		47-90-27107
19	Oil pressure switch 0- 40 bar with cable		47-90-28330
20	Oil pumpJ7CCC, cpl.		47-90-27110
21	Coupling pump-motor		47-90-28851
22	Motor 0.55 kW		47-90-28787
23	Metal hose NW10 1500 mm lg.		47-90-12818
24	Sight glass with seal		36-90-11544
25	Hood MK		47-90-24999
26	Cover for sight glass	5	47-50-12106
27	Coupling cpl. for MK3.3		47-90-27101
27	Coupling cpl. for MK3.4		47-90-27102
28	Fan wheel TLR Ø 280 x 100 for MK3.3		47-90-27099
28	Fan wheel TS Ø 290 x 114 for MK3.4		47-90-29349
29	Motor 4 kW for MK3.3		47-90-12803
29	Motor 5,5 kW for MK3.4		47-90-22876
30	Motor 4 kW with fan wheel for MK3.3		47-90-27100
30	Motor 5,5 kW with fan wheel MK3.4		47-90-26801
31	Socket 4-pin. green		37-90-20744
32	Socket 7-pin. black/brown		37-90-20731
34	Star-delta combination with thermorelay ZE6 for MK3.3		47-90-25176
34	Star-delta combination with thermorelay ZE9 for MK3.4		47-90-25176-02
35	Thermal overloar relay 4,0 - 6,0 A for MK3.3		47-90-25173-01
35	Thermal overloar relay 6,0 - 9,0 A for MK3.4		47-90-25174
36	Ignition transformator Mod. 26/35 incl. ignition cable 200 mm lg. for MK3.3		47-90-26790
37	Ignition transformator 26/48 incl. ignition cable 200 mm lg. for MK3.4		47-90-27095

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Pos.	Benennung	VE	Art.-Nr.
38	Control boxLMV26		47-90-29094-02
40	Remote-manual switch		47-90-25040
43	Relay CR-M230AC4		47-90-25181
44	Base CR-M4LS		47-90-26731
45	Socket 7-pin. green		37-90-10831
46	3-pole female connector, black		37-90-20739
45	Female connector		47-90-25186
47	Electronic unit hood		47-90-25206
48	Display unit AZL		47-90-29098
49	Panel		47-90-29421
49	Cover with controller		47-90-29420
50	Flame detector KLC 1000		47-90-27184
51	Gasket set		47-90-26792
52	Gas jacket Part 2		47-90-12771
53	Gas jacket Part 1		47-90-12770
54	Mounting rod	2	46-90-12809
55	Differential pressure switch 2,5 - 50 mbar		47-90-26723
56	Thermal overcurrent relay for pump unit 2.4 - 4 A		47-90-25172-01
57	Small motor contactor B7-30-10 for pump unit		47-90-25171
58	5-pole connector part, black for pump unit		37-90-20753
59	Digital controller RWF50, temperature (optional)		47-90-28819-1
-	Inlet nozzle		47-90-12875
-	Motor connecting cable		47-90-25410
-	Fuel switchover unit AGM60		47-90-29099
-	Plug bridge Gas pressure switch max.		47-90-27382
-	Female part 3-pol. brown		47-90-27203
-	Plug bridge remote switching		47-90-11002
-	Socket 2-pol. gray		47-90-11003
-	Plug bridge gas pressure switch min.		47-90-27399

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33. 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 Gas Burners

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

gas burner type **MK3/…**

is conform with the regulations of these directives

MD2006/42/EG
EMV2014/30/EG
GAD 2016/426/EG
MCP2015/2193/EU
RoHS 2011/65/EU
DIN EN 676

and is marked with:

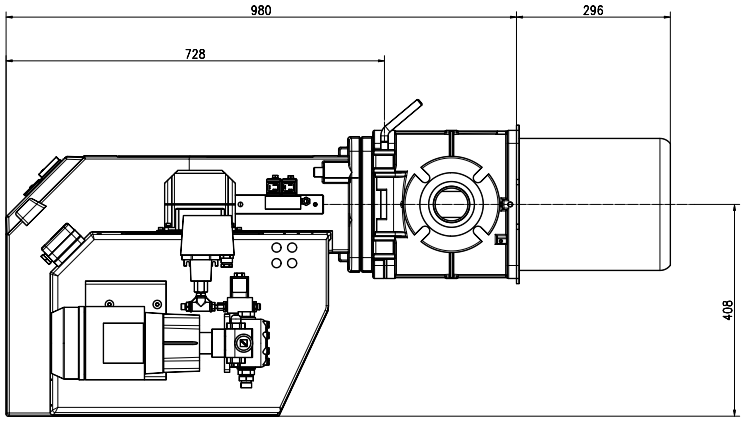
CE

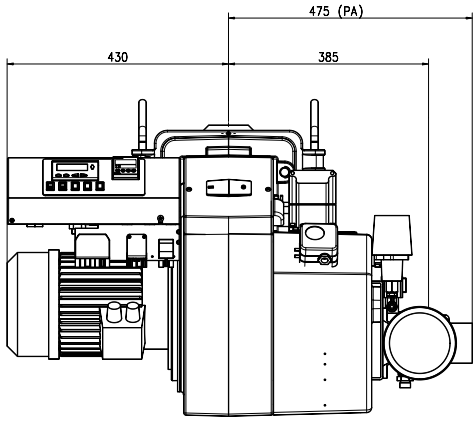
CE-0085

Hemer, 12.01.2024

Dr. Josef Becker
Managing Director

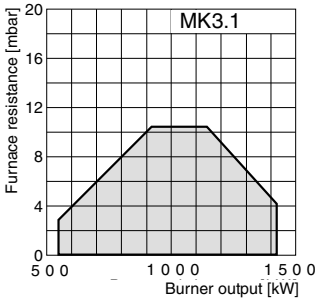
34. Dimensions (All dimensions are given in mm)

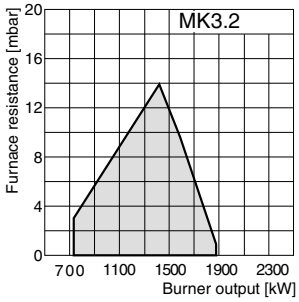


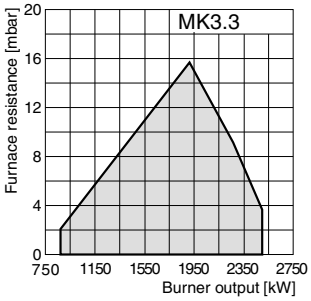


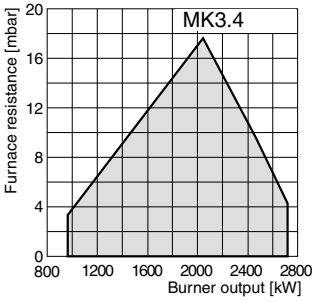
35. Working ranges

Gas / oil









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