Enertech Group

Installation & Maintenance Manual

MGN 860 – 1350 M3D DLU

Gas Burner

11/12

Tel: +44 (0) 1905 794331 **Fax:** +44 (0) 1905 794017 **Email:** info@nu-way.co.uk **Web:** www.nu-way.co.uk

Contents

E. 13.11.06 • G. 21.09.11

1 General information

Installation of a gas-fired heating system must be performed in accordance with the applicable regulations and guidelines. It is, therefore, the duty of the installation engineer to ensure that all regulations have been read carefully and understood. 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.

Nu-Way MG860/1350-LN M3D DLU Series gas burners are suitable for combustion of natural gas or liquid gas in accordance with EN 437 and are in compliance with the EN 676 European standard.

2 Checking scope of delivery and electrical data

Before installing the Nu-Way gas burner, please check that all items included in the scope of delivery are present.

Scope of delivery:
burner housing, gas jacket with burner pipe, mounting kit, documentation and gas train.

Gas installation and commissioning are subject to the applicable national regulations. 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 and 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 valves and fittings.

3 Maintenance and customer service

The complete system should be checked once a year for correct functioning and leaks by a representative of the manufacturer or other suitably qualified person.

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.

5 Instruction of operating personnel

Faults 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.

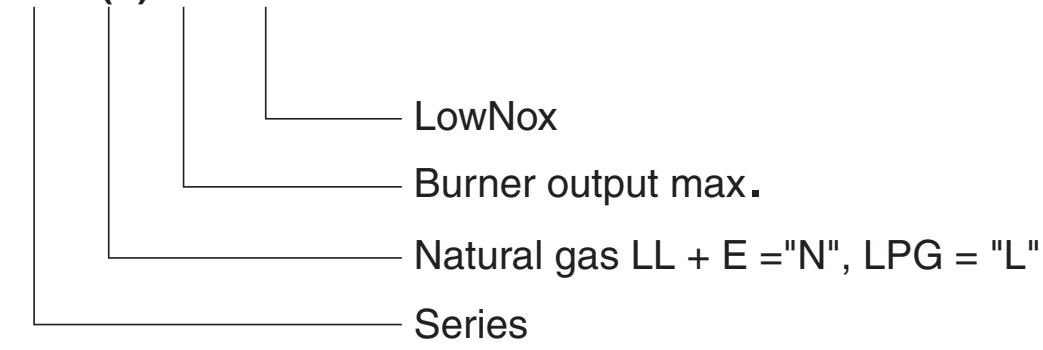
6 Filter/Strainer

According EN676 a filter/strainer shall be fitted at the inlet of the safety shut-off valve to prevent the ingress of foreign elements.

E. 13.11.06 • G. 21.09.11

7 Key for code designation

MGN(L)860-LN

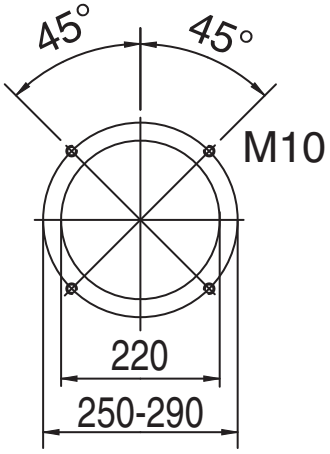


8 Technical specifications

	Burner type	
Technical specifications	**MG860-LN M3D DLU**	**MG1350-LN M3D DLU**
Burner output in kW	225 - 860	225 - 1350
Gas type	Natural gas LL + E = "N", LPG = "L"	
Mode of operation	Progressive two-stage or modulating	
Voltage	3 / PE ~50 Hz 400 V / T16 A	
Max. power consumption at start / during operation	6.5 A max./ 3.6 A eff.	8.0 A max./ 4.6 A eff.
Electric motor power (at 2800 rpm) in kW	1.1	2.2
Flame failure controller	Ionisation	
Control box	MPA 22	
Weight in kg	56	58
Noise emission in db(A)	≤ 78	≤ 78

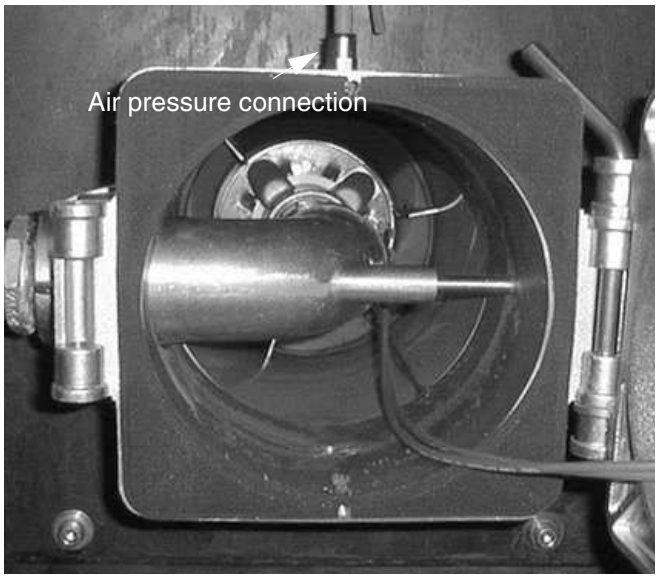
9 Boiler connection dimensions

All dimensions are given in mm



E. 13.11.06 • G. 21.09.11

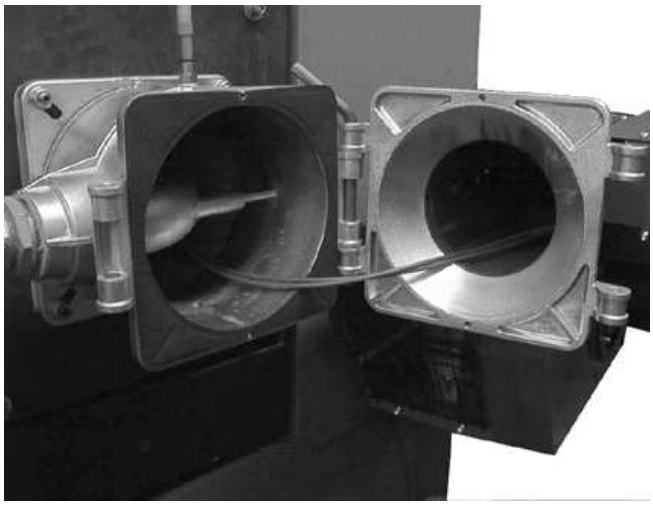
10 Mounting the gas jacket on the boiler



Use adhesive to affix the gas-jacket gasket to the gas jacket.

The boiler connection plate has to be prepared in accordance with the sizes as stated in „9. Boiler connection dimensions“. You can use the gas-jacket gasket as a template.
Using an 8 mm socket-head wrench, secure the gas jacket to the boiler with the 4 M 10 fastening screws and washers. The air pressure connection for the gas train must be positioned at the top.

11 Mounting the burner housing on the gas jacket (service position)



Position the burner housing in the gas-jacket hinge and secure it with a rod. The burner is now in the service position.

Make sure that the gasket is correctly seated between the gas jacket and the burner housing.

Swing the burner closed and insert the second securing rod into the hinge. Tighten the screw at the top to secure the burner in position.

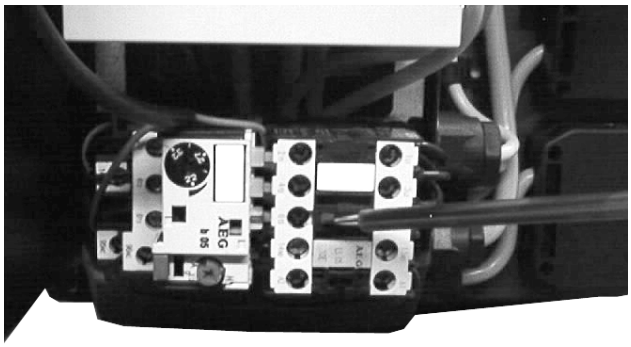
12 Electrical connection

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

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

See 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 securing screws (1) and fold the cover down to the left.



Once the connection to the electricity supply has been established, check the wiring and briefly actuate the motor contactor with an electrician's insulated screwdriver to check the direction of rotation of the burner motor.

The direction of rotation is correct if the fan turns toward the boiler (see the arrow on the motor flange).

IMPORTANT !

The motor protective relay is set ex-works. The set value should not be incorrectly adjusted.

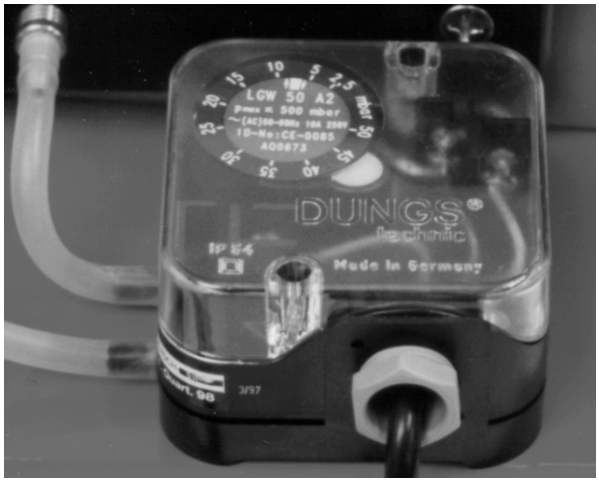
E. 13.11.06 • G. 21.09.11

13 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.

Do not open the air flap positioning motor. The optics can become damaged irreparably. No warranty will be given if the seal is broken.

14 Air pressure switch



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.

15 Gas pressure switch for gas inlet pressure

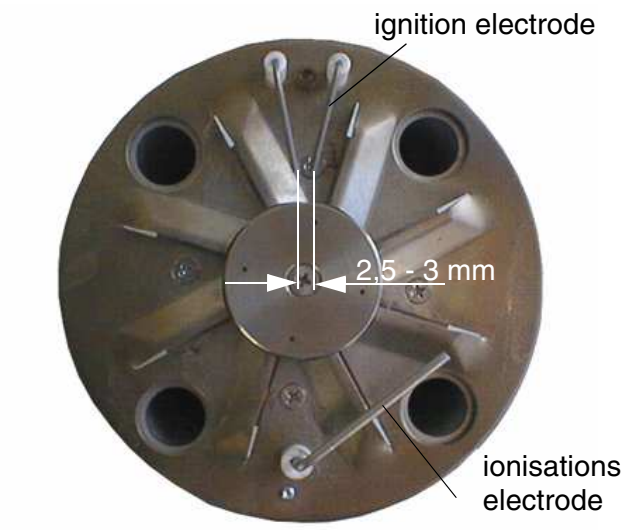
The gas pressure switch on the gas train serves to monitor the gas inlet pressure. The burner is shut down if the gas inlet pressure drops below the set minimum value (preset at factory). The burner starts up automatically again when the minimum pressure is exceeded.

16 Gas pressure switch for VPS

The gas pressure switch for VPS is preset to 10 mbar at the factory.

The operating point of the gas pressure switch for VPS must be set to half the inlet flow pressure.

17 Adjustment of the ignition electrodes



The ignition electrodes are preset at the factory.

18 Flame control with Ionisation monitor

In the presence of an alternating-current voltage between burner and ionisation rod, the rectifying effect of the flame causes a direct current to flow. This ionisation current is the flame signal and is amplified before being output to the control box. A flame cannot be simulated, because the rectifying effect collapses if there is a short-circuit between sensor electrode and burner.

Measuring ionisation current

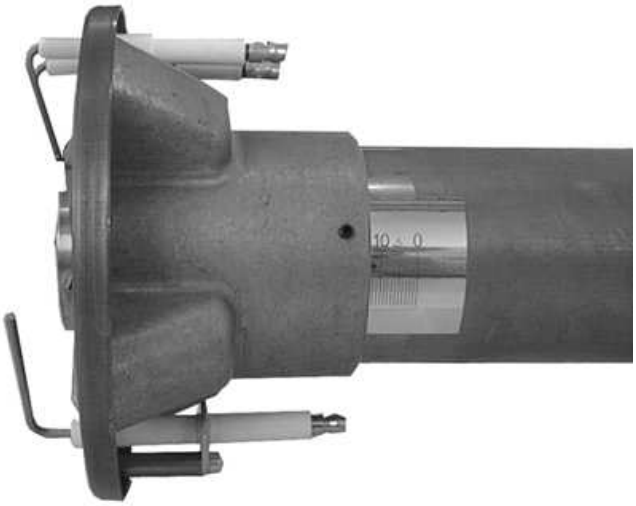
The ionisation current must be measured during burner start-up and maintenance or after a fault indication in the control box. Disconnect the plug of the ionisation cable and connect the ionisation measuring cable.

Perform measurement straight after the post-ignition time during the safety time period !

The ionisation current must be at least 1.5 µA. Currents lower than 1.5 µA cause unstable operation or shut-down. If the current is too low clean the ionisation rod and the inside of the burner tube. It may be necessary to correct the shape of the ionisation rod. If the ionisation rod is defective, replace the electrode. Reverse the polarity of the ignition transformer, if necessary. Check the cables for moisture formation and dry if necessary.

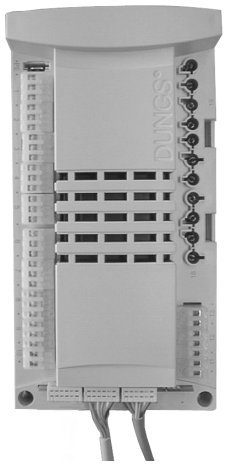
E. 13.11.06 • G. 21.09.11

19 Adjustment of the burner head



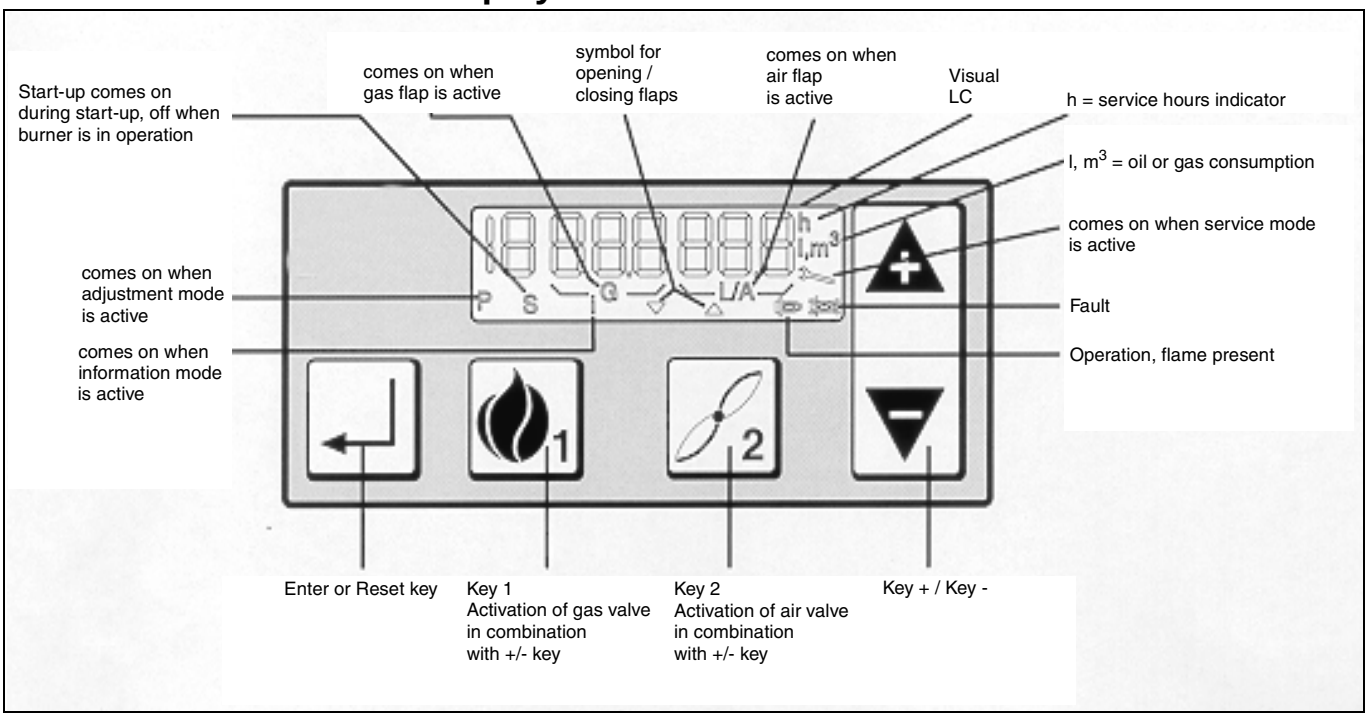
Set the position of the burner head according to burner output in accordance with the table on page 16ff.

20 Control unit MPA 22



The MPA 22 is a microprocessor-controlled intermittent-duty control box for controlling and monitoring pneumatic modulating forced-air burners with an actuator drive. For operation as an automatic gas burner control with integral valve proving system.
The MPA 22 has e-BUS connectivity.

21 MPA 22 control unit display



22 Start-up

The burner can be put into operation once the gas and electrical installation and assembly work has been completed.

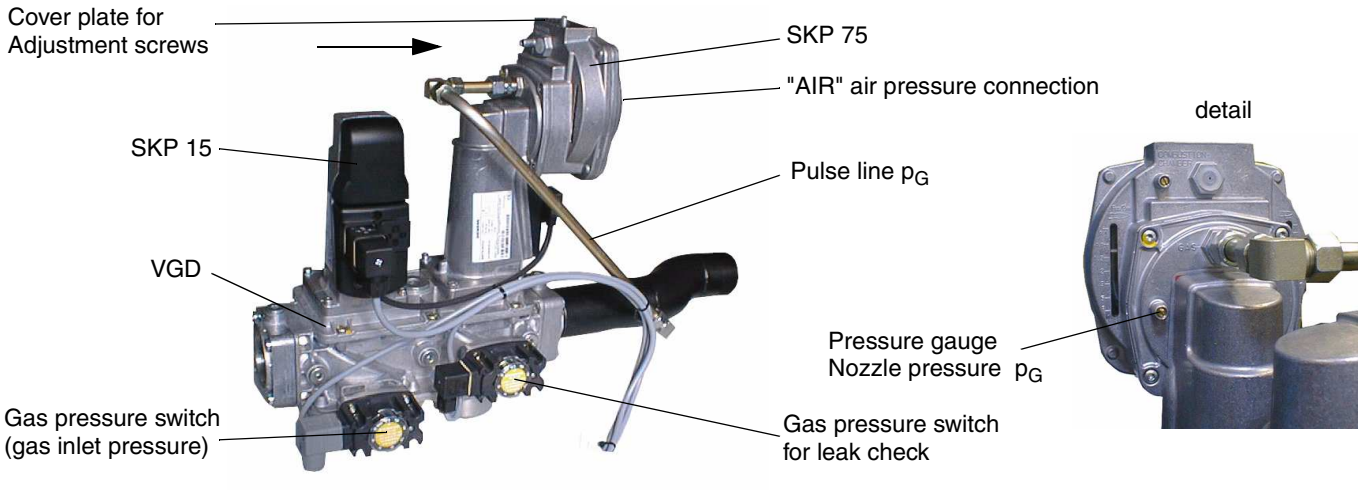
- Check the connections on the gas train.
- Prepare the flue-gas analyser.
- Start the burner.
- Adjustment of air surplus and output. See 23. Gas train KEV_{II} 1 ½" , KEV 2" and KEV DN65 or 23.a Gas train KEV25 1" and KEV30 1 ½ ".
- Record the setting data.
- Check the gas pressure monitor after start-up. To do so, close ball valve slowly. The burner must shut down, but must not go into fault mode. If the burner goes into fault mode, increase the setting on the gas pressure monitor.

E. 13.11.06 • G. 21.09.11

23 Gas train KEV$_{II}$ 1 ½" , KEV 2" and KEV DN65

Installing the gas train	
Installation position	only in horizontal line, not tilted.
Minimum distance to walling	20 mm
Screw the combustion chamber pressure measuring nipple into the gas jacket at the top (see "10 Mounting the gas jacket on the boiler"). Route the connecting hose between the measuring nipple for combustion chamber pressure and the gas train in a loose loop.	

Screw each air pressure measuring nipple into the top of the gas jacket (see 10. Mounting the gas jacket on the boiler).



Connect the blue hose to the "AIR" connection on the gas train and the air pressure connection on the gas jacket. The blue hose serves as a control line for the gas train and must be routed in a loose loop without kinking.

Remove the plate for covering the adjustment screws from the gas pressure regulator.

Start the burner.

1. Setting the air surplus in high and low-load operation

- Set the air flap positions P9 for high-load operation and P1 for low-load operation as specified in 26. Adjustment tables. Follow the setting procedure described in 24. Adjustment mode - pneumatic gas-fired operation with MPA 22 display.
- In high-load operation, set the air surplus with the "large flame" adjustment screw on the gas pressure regulator. The CO_2 level in the flue gas should be 9-10% for natural gas.
- In low-load operation, set the air surplus with the "small flame" adjustment screw on the gas pressure regulator. The CO_2 level in the flue gas should be 9-10% for natural gas. The low-load setting influences the high-load setting.
- In high-load operation, check the air surplus and, if necessary, correct the setting with the "large flame" adjustment screw on the gas pressure regulator.

2. Setting the output in high and low-load operation

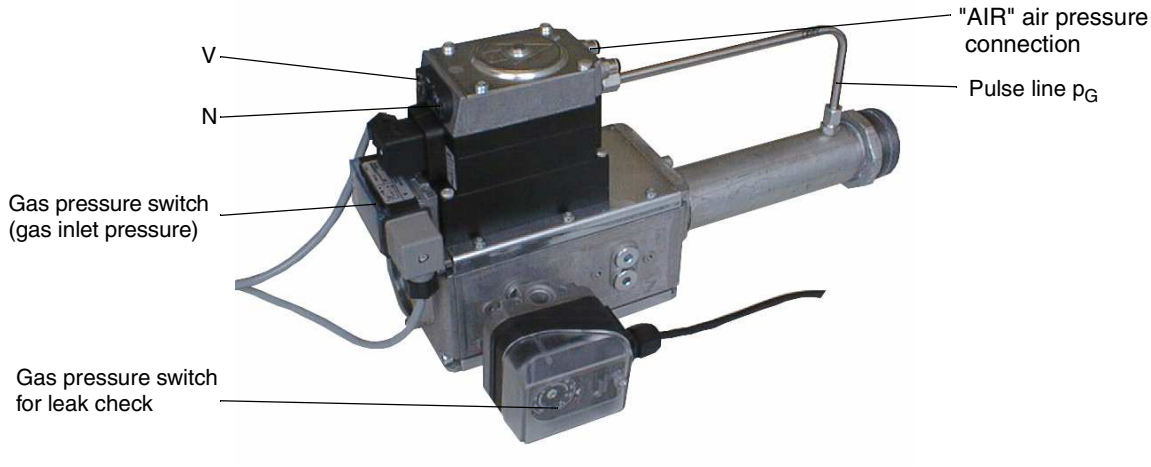
- Check the high-load setting via the gas flow at the gas meter or compare the nozzle pressure with the values stated in 26. Adjustment tables. The output can be increased by opening the air flap (to increase P9) and reduced by closing the air flap (to reduce P9). The air surplus is not affected by this adjustment.
- Check the low-load setting via the gas flow at the gas meter or compare the nozzle pressure with the values stated in 26. Adjustment tables. The output can be increased by opening the air flap (increase P1) and reduced by closing the air flap (reduce P1). The air surplus is not affected by this adjustment.

E. 13.11.06 • G. 21.09.11

23.a Gas train KEV25 1½" and KEV30 1"

Installing the gas train	
Installation position	only in horizontal line, not tilted.
Minimum distance to walling	20 mm
Screw the air pressure measuring nipple into the gas jacket at the top (see "10 Mounting the gas jacket on the boiler"). Route the connecting hose between the measuring nipple for combustion chamber pressure and the gas train in a loose loop.	

Screw each air pressure measuring nipple into the top of the gas jacket (see 10. Mounting the gas jacket on the boiler).



The blue hose serves as a control line for the gas train and must be routed in a loose loop without kinking. Cut the blue hose into two sections. Connect the first sections of blue hose to the "p_L" connection on the gas train and the air pressure connection on the gas jacket, and connect the other section to the "p_F" measuring point on the combustion chamber.

The hose must be routed in such a fashion that any condensate forming inside the combustion chamber flows back, and not into the gas train.

Start the burner.

1. Setting the air surplus in high and low-load operation

- Set the air flap positions P9 for high-load operation and P1 for low-load operation as specified in 26. Adjustment tables. Follow the setting procedure described in 24. Adjustment mode - pneumatic gas-fired operation with MPA 22 display.
- In high-load operation, set the air surplus at the adjustment screw "V" on the gas pressure regulator. The CO2 level in the flue gas should be 9-10% for natural gas.
- In low-load operation, set the air surplus with the adjustment screw "N" on the gas pressure regulator. The CO2 level in the flue gas should be 9-10% for natural gas. The low-load setting influences the high-load setting.
- In high-load operation, check the air surplus and, if necessary, correct the setting using the adjustment screw "V" on the gas pressure regulator.

2. Setting the output in high and low-load operation

- Check the high-load setting via the gas flow at the gas meter or compare the nozzle pressure with the values stated in 26. Adjustment tables. The output can be increased by opening the air flap (to increase P9) and reduced by closing the air flap (to reduce P9). The air surplus is not affected by this adjustment.
- Check the low-load setting via the gas flow at the gas meter or compare the nozzle pressure with the values stated in 26. Adjustment tables. The output can be increased by opening the air flap (increase P1) and reduced by closing the air flap (reduce P1). The air surplus is not affected by this adjustment.

E. 13.11.06 • G. 21.09.11

24 Adjustment mode - pneumatic gas-fired operation

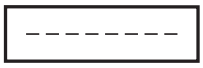
To enter this adjustment mode, the burner must be on standby.
Standby means that the burner is connected to the power supply, but no heating request has been issued. If **OFF** appears on the display on MPA 22, the unit is running in standby mode and has already been configured.

If **OFFUPr** appears on the display, the MPA 22 is also running in standby mode, but the unit is still unprogrammed and all setting parameters still have to be entered by the following procedure.

Important: If the setting operation is interrupted within 30 min. or not completed correctly, **OFFUPr** will also be displayed.

To change new setting parameters or old setting parameters, follow these steps:

Step 1:
Enter the safety code. Press key 1 and key 2 simultaneously



Step 2:
7 horizontal bars are now displayed. Enter the password as follows.
Note:
The intervals between the individual inputs must not be longer than 20 sec., as the MPA 22 will otherwise revert to standby mode. If this is the case, you will have to start the code entry procedure from the beginning again.

- Press the minus key twice.

- Confirm your entry by pressing key 2 once.

- Press the minus key once.

- Confirm your entry by pressing key 2 twice.

- Press the plus key 4 x.

- Confirm your entry by pressing key 2 once.

- Press the plus key twice.

- Confirm your entry by pressing key 2 once.

- Press the plus key 3 x.

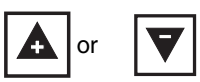
- Confirm your entry by pressing key 2 once.

- Press the minus key 4x.

- Press the enter key once.
  Password entry is now finished.

Step 3:
after the correct password has been entered, **EGAS Pn** appears on the display.

Step 4:
the operating points P9 (max load), **P1 (min load)** and **P0 (starting point)** can now be selected by pressing the **plus or minus key**.

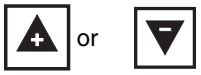


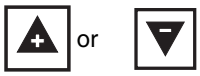
Step 5:
After the operating point **P9** is selected, **9GAS** appears on the display. The max load operating point can be adjusted to values between 0° and 90 ° by holding down **key 2** and optionally pressing the **plus or minus key**.
For basic setting values, please refer to the adjustment table.

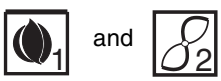
Step 6:
After you have set **P9**, press the **plus key** to set **P1**. **1Gas** appears on the display.
The min load operating point can be adjusted to values between 0° and 90 ° by holding down **key 2** and optionally pressing the **plus or minus key**.
For basic setting values, please refer to the adjustment table.

Step 7:
After you have set **P1**, press the **plus key** to set **P0** (the starting point). **0 Gas** appears on the display.
The operating point (starting point) can now be set to a value between 0° and 90° by holding down **key 2** and optionally pressing the **plus or minus key**. The value of **P1** should preferably be set. If **P1**, (min. load) is set to a very low value, it is recommended to set **P0** to a higher value than **P1** in order to ensure stable starting.
For basic setting values, please refer to the adjustment table.

Step 8:
After you have set **P0**, press the **plus key.**
GAS Pn. appears on the display.
Now close the safety chain and issue a heating request.
The burner should now start up and dwell in the ignition position. If this is not the case, please repeat the procedure for adjustment of ignition point **P0** under **step 7**.
After the burner has started up, the gas train must be set to the nozzle pressure specified in the adjustment table.







Step 9:
The setting values are now adjusted in relation to the boiler and the required burner output. The burner is in operation throughout the adjustment procedure so that all boilers and measured data relevant to the burner can be recorded.
Adjust the operating points in the order **P0**,**P1** and **P9** and make adjustments by simultaneously pressing **key 2** and the **plus or minus key**. To switch the burner to normal operation, press **key 1** and **key 2** simultaneously for approximately 2 sec. The burner switches to min output **P1** and then returns to normal operation.
The setting procedure is now completed.
Note:
If you want to change values after finishing the setting procedure, you will have to start from the beginning again.

E. 13.11.06 • G. 21.09.11

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
LPG gas (propane)	$H_{i,n}$ = 25.89 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:

Altitude above seal 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	220 kW
Efficiency η_K (assumed)	92%
Calorific value $H_{i,n}$	10.4 kWh/m^3

Gas flow in standard state (V_n)

$$V_n = \frac{Q_n}{\eta_k \times H_{i,n}} = \frac{220kW}{0,92 \times 10,4 \frac{kWh}{m^3}} = 23\frac{m^3}{h}$$

Gas flow in operating state (V_B)

$$V_B = \frac{V_n}{f} = \frac{23\frac{m^3}{h}}{0,94} = 24\frac{m^3}{h}$$

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]
η_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]

E. 13.11.06 • G. 21.09.11

The values given in the tables are only setting values for start-up. The necessary system adjustment must be newly determined in the case of deviating data such as boiler output, calorific value and altitude.
A correction is required in any case.

The maximal burner output can only be achieved in mixing head position 0. Due to the variable mixing head position, the operating behaviour of the burner can be optimized for different heat generators.

						MGN860-LN M3D DLU								MGL860-LN M3D DLU			
						Natural gas LL Hi,n = 9.3 [kWh/m³]				Natural gas E $H_{i,n}$ = 10.4 [kWh/m³]				LPG $H_{i,n}$ = 25.89 [kWh/m³]			
Burner output [kW]		Boiler output [kW]	Air flap position [°]		Burner head position [mm]	Gas nozzle pressure [mbar]		Gas flow rate [m³/h]		Gas nozzle pressure [mbar]		Gas flow rate [m³/h]		Gas nozzle pressure [mbar]		Gas flow rate [m³/h]	
St. 2	S. 1		St. 2 P 9	St. 1 P 1		St.2	St. 1	St. 2	St. 1	St. 2	St. 1	St. 2	St. 1	St. 2	St. 1	St. 2	St. 1
450	224	419	26.0	9	**22**	7.3	2.1	49.9	24.8	5.7	1.6	44.6	22.2	7.4	2.0	17.4	8.7
520	260	484	33.0	12	**22**	9.6	2.7	57.6	28.8	7.5	2.1	51.5	25.8	9.5	2.7	20.1	10.0
600	300	558	40.0	14	**22**	12.0	3.5	66.5	33.3	9.4	2.7	59.5	29.7	12.1	3.6	23.2	11.6
740	370	688	90.0	19	**22**	14.7	5.0	82.0	41.0	11.5	3.9	73.4	36.7	17.4	5.2	28.6	14.3
560	280	521	30.5	13	**10**	7.9	2.7	62.1	31.0	6.2	2.1	55.5	27.8	9.4	2.9	21.6	10.8
640	320	595	36.0	17	**10**	10.3	3.5	70.9	35.5	8.1	2.7	63.4	31.7	11.8	3.6	24.7	12.4
760	380	707	51.0	21	**10**	14.5	4.8	84.2	42.1	11.3	3.8	75.3	37.7	16.0	4.8	29.4	14.7
813	410	756	90.0	22.5	**10**	16.2	5.2	90.1	45.4	12.7	4.1	80.6	40.6	18.0	5.5	31.4	15.8
600	300	558	30.0	10	**0**	9.1	2.8	66.5	33.3	7.1	2.2	59.5	29.7	9.0	2.9	23.2	11.6
680	340	632	34.0	13	**0**	11.2	3.5	75.4	37.7	8.8	2.7	67.4	33.7	11.3	3.5	26.3	13.1
780	390	725	44.0	17	**0**	14.3	4.3	86.5	43.2	11.2	3.4	77.3	38.7	14.5	4.3	30.1	15.1
860	430	800	90.0	20	**0**	17.4	5.0	95.3	47.7	13.6	3.9	85.2	42.6	17.4	5.1	33.2	16.6

						MGN1350-LN M3D DLU								MGL1350-LN M3D DLU			
						Natural gas LL Hi,n = 9.3 [kWh/m³]				Natural gas E $H_{i,n}$ = 10.4 [kWh/m³]				LPG $H_{i,n}$ = 25.89 [kWh/m³]			
Burner output [kW]		Boiler output [kW]	Air flap position [°]		Burner head position [mm]	Gas nozzle pressure [mbar]		Gas flow rate [m³/h]		Gas nozzle pressure [mbar]		Gas flow rate [m³/h]		Gas nozzle pressure [mbar]		Gas flow rate [m³/h]	
St. 2	St. 1		St. 2 P 9	St. 1 P 1		St. 2	St. 1	St. 2	St. 1	St. 2	St. 1	St. 2	St. 1	St. 2	St. 1	St. 2	St. 1
440	220	405	22	9	**22**	4.9	1.3	48.8	24.6	3.8	1.0	43.6	22.0	4.3	1.6	17.0	8.5
600	300	552	30	13	**22**	6.9	2.5	66.5	33.3	5.4	2.0	59.5	29.7	7.5	2.4	23.2	11.6
800	400	736	40	20	**22**	12.8	4.2	88.7	44.3	10.0	3.3	79.3	39.7	12.8	3.7	30.9	15.4
1000	500	920	90	25	**22**	19.6	5.2	110.9	55.4	15.3	4.1	99.1	49.6	19.5	5.4	38.6	19.3
500	250	460	25	9	**10**	5.0	1.2	55.4	27.5	3.9	0.9	49.6	24.6	4.5	1.5	19.3	9.7
660	330	607	32	17	**10**	7.0	3.0	73.2	36.6	5.5	2.3	65.4	32.7	7.4	2.2	25.5	12.7
860	430	791	41	22	**10**	13.0	4.2	95.3	47.7	10.2	3.3	85.2	42.6	12.3	3.4	33.2	16.6
1080	540	994	90	27	**10**	20.3	5.3	119.7	59.9	15.9	4.1	107.1	53.5	19.2	5.1	41.7	20.9
600	300	552	21	10	**0**	5.1	1.4	66.5	33.3	4.0	1.1	59.5	29.7	4.9	1.5	23.2	11.6
800	400	736	26	14	**0**	8.6	2.4	88.7	44.3	6.7	1.9	79.3	39.7	8.6	2.4	30.9	15.4
1100	550	1012	43	19	**0**	16.0	4.9	121.9	61.0	12.5	3.8	109.0	54.5	16.2	4.2	42.5	21.2
1350	680	1242	90	24	**0**	24.6	6.3	149.7	75.4	19.2	4.9	133.8	67.4	24.5	6.2	52.1	26.1

27 Troubleshooting

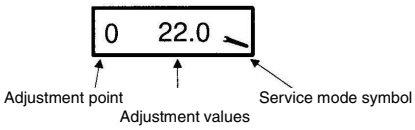
Defect determined:	Cause:	Remedy:	Fault code
Burner motor does not start up	Electric supply lead faulty	Rectify faults in electrical installation	
	Fuse faulty	Replace	
	Safety thermostat locked	Unlock	42 h
	Temperature of controller setting is exceeded	Renewed start attempt after temperature drop	
	MPA 22 faulty	Replace	04 h
	Leak	Rectify leak	44H / 43H
	No gas	Safeguard gas supply	
	Gas pressure monitor faulty	Replace gas train	22 h
	Filter in gas train dirty	Clean or replace	
	Air pressure switch not in idle position	Check air pressure switch (see page 7)	20 h
	Burner motor faulty	Replace	
	No load at terminal 5	Check plug connection and current path of solenoid valve	
	Mains voltage < 187 V	Rectify faults in electrical installation	
Burner starts up and switches to fault mode before or after expiry of safety period	Air pressure monitor does not switch through during pre-ventilation	See Page 7	21 h
	Ignition influencing of ionization monitor	See Page 8	26 h
	Gas solenoid valve does not open	Replace gas train	
	Starting gas quantity set too low	Increase starting gas quantity	
	No ignition	Check ignition electrode and setting, ignition transformer and cable	
	Phase and zero mixed up	Connect connector unit in correct phase sequence	
	Flame control faulty	Check according to Page 8	2BH
	Air pressure switch opens during operation	See Page 7	21 h
	Gas nozzle dirty or faulty	Replace gas nozzle	
Flame extinguishes during operation	No gas	Safeguard gas supply	
	Filter in gas train dirty	Clean or replace	
	Flame blow-off	Incorrect burner setting	27 h
	Air pressure monitor contact opens	Check/replace air pressure switch	21 h
	Flame signal too weak	Measure flame signal, check ionisation electrode	27 h

E. 13.11.06 • G. 21.09.11

Service mode - pneumatic gas-fired operation

The service mode serves to display the set parameters and to read out the fault memory. It can be invoked in any operating state of the burner.
Important:
setting values cannot be changed in service mode. If no key is pressed for longer than 20 sec., the display returns to standby mode.

To access the service mode, press the **enter key** for approx. 2 sec.
The following now appear on the display: point **P0** and the air flap positioning motor setting value at ignition in angular degrees, plus a wrench symbol denoting the service mode.



The following points can be retrieved by repeatedly pressing the enter key:

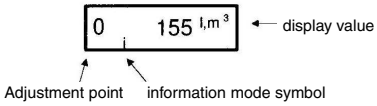
- The characteristic curves for points **P0**, **P1** and **P9**
- The last 6 fault messages **P10** to **P15** (see fault code MPA)
- The testing times of the valve proving system **P16** and **P17**
- The flame quality **P18**
- The eBus address of the MPA **P19**
- The switch setting of the valve proving system **P21**
- The eBus address of the external controller **P24**
- The modulation delay
- The set start points **P26**

To exit the service mode, please press the enter key or wait approx. 20 sec.

Information mode

The information mode is intended for display of consumption figures, operating hours and software data.

To access information mode, press the **enter key** for approx. 0.5 sec.
A **zero** and a **value** appear on the display.



The following values can be queried in information mode under setting points 0 to 8. Retrieve by repeatedly pressing the enter key:

Important:
If no key is pressed for longer than 20 sec., the display returns to normal operating mode.

0 = fuel consumption
1 = total operating hours
2 = for oil only
3 = for oil only
4 = number of successful startups
5 = display of software version
6 = software creation date
7 = hardware number
8 = date of production

E. 13.11.06 • G. 21.09.11

Troubleshooting the MPA

Code	Description
04 h	Internal hardware fault
05 h	Internal hardware fault
06 h	Internal hardware fault
07 h	Internal hardware fault
09 h	Internal hardware fault
10 h	Internal hardware fault
11 h	Internal hardware fault
12 h	Internal hardware fault
13 h	Internal hardware fault
14 h	Internal hardware fault
15 h	Internal hardware fault
20 h	Air pressure switch is not in idle position
21 h	Failure of air pressure switch
22 h	Failure of gas pressure monitor
25 h	No flame after safety period
26 h	Outside light
27 h	Flame failure during operation
29 h	Internal hardware fault
2AH	Internal hardware fault
2BH	Short-circuit in photo resistor or internal fault
2CH	Internal hardware fault
30 h	Internal hardware fault
31 h	Internal hardware fault
32 h	Internal hardware fault
33 h	Internal hardware fault
34 h	Internal hardware fault
42 h	Safety chain interrupted
43 h	Y3 found to be leaking during leak check
44 h	Y3 found to be leaking during leak check
45 h	Internal hardware fault
46 h	Internal hardware fault
47 h	Internal hardware fault
48 h	Internal hardware fault
4AH	Internal hardware fault
5BH	Internal hardware fault
4CH	Internal hardware fault
4DH	Internal hardware fault
4EH	Internal hardware fault
50 h	Internal hardware fault
51 h	Internal hardware fault
52 h	Internal hardware fault
53 h	Internal hardware fault
54 h	Internal hardware fault
55 h	Internal hardware fault
56 h	Internal hardware fault
57 h	Internal hardware fault
58 h	Internal hardware fault
59 h	Internal hardware fault

E. 13.11.06 • G. 21.09.11

Code	Description
5AH	Internal hardware fault
5CH	Internal hardware fault
5DH	Internal hardware fault
5EH	Internal hardware fault
63 h	Internal hardware fault
64 h	Internal hardware fault
65 h	Internal hardware fault
67 h	Internal hardware fault
68 h	Incorrect feedback from air flap positioning drive (check connector and cable, actuator drive mounting and air flap mechanism)
6AH	Air-flap actuator position is out of tolerance (check connector and cable, actuator drive mounting and air flap mechanism)
6CH	Internal hardware fault
6DH	Internal hardware fault
6EH	Actuator drive interchanged or incorrectly connected
6FH	Burner detection error
70 h	Internal hardware fault
71 h	Internal hardware fault
73 h	Internal hardware fault
74 h	Internal hardware fault
75 h	Internal hardware fault
76 h	Internal hardware fault
77 h	Internal hardware fault
78 h	Internal hardware fault
79 h	Internal hardware fault

Process description

Startup tests	Processor and program memory test / move actuator drives to reference position
State 01	Startup decision (heating request present)
State 02	Blower idle state check
State 03	Blower startup
State 04	Preventilation / operation of gas flap actuator over speed range
State 05	Preventilation / activate and test watchdog
State 06	Preventilation / move gas flap actuator to ignition position
State 07	Move air flap actuator to ignition position
State 08	Pre-ignition depending on parameters
State 09	Startup safety period
State 10	Stabilisation period
State 11	Move positioning drive from ignition point to operating characteristic
State 12	Operation
State 13	VPS - evacuate valve cavity / (post-ventilate)
State 14	Test duration Y2 / (remaining post-ventilation time)
State 15	VPS - fill valve cavity / (remaining post-ventilation time)
State 16	Test duration Y3 / (remaining post-ventilation time)
State 17	Remaining post-ventilation time
State 18	Restart disable time / waiting loop for low gas program
State 20	Standby position

E. 13.11.06 • G. 21.09.11

28 Adjustments log

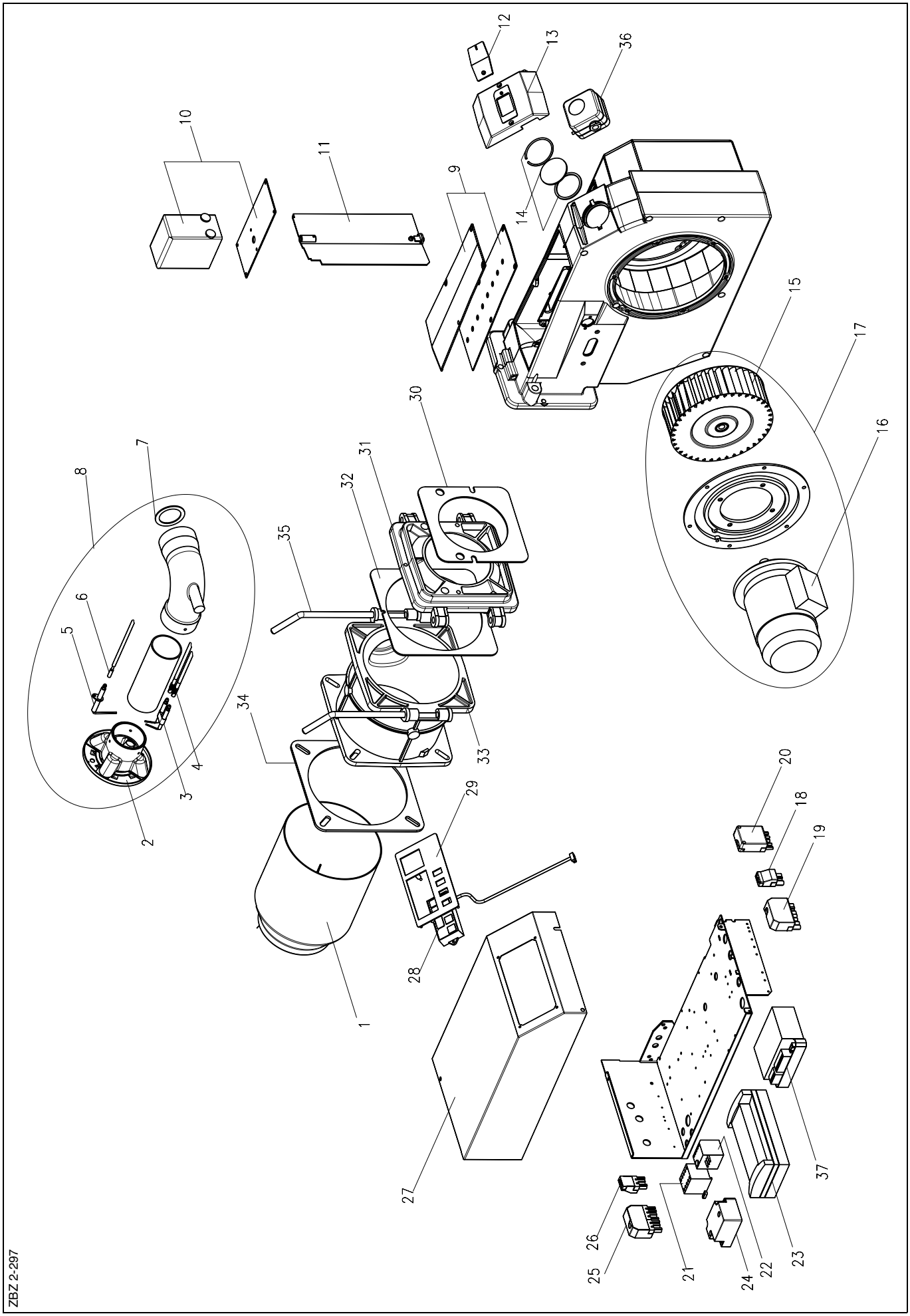
Please enter the measured values into the Adjustments log.

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				

E. 13.11.06 • G. 21.09.11

29 Explosion drawing

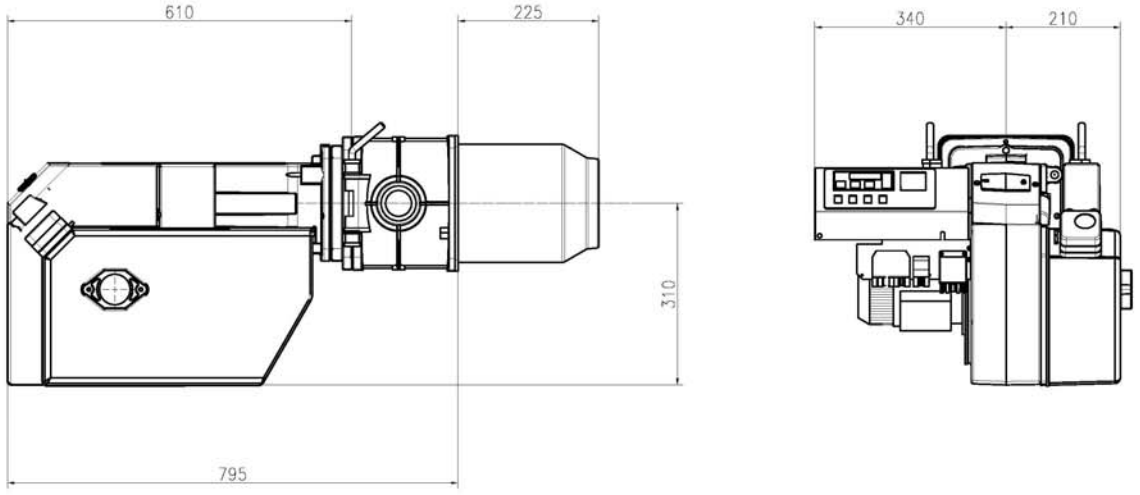


30 Spare parts list

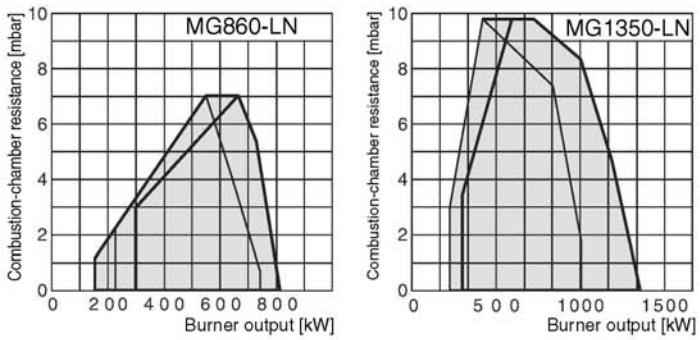
Item	Designation	PU	Art. No.
1	Burner tube MG860	1	47-90-24880
1	Burner tube MG860, extended by 100 mm	1	47-90-25260
1	Burner tube MG860, extended by 200 mm	1	47-90-25261
1	Burner tube MG1350	1	47-90-24878
1	Burner tube MG1350, extended by 100 mm	1	47-90-25258
1	Burner tube MG1350, extended by 200 mm	1	47-90-25559
2	Flow plate complete with ignition electrode	1	47-90-24877
3	Ignition electrode complete with fastening	2	47-90-22421
4	Ignition cable	2	47-50-25134
4	Ignition cable, extended by 100 mm	2	47-50-25004
4	Ignition cable, extended by 200 mm	2	47-50-25005
5	Ionisation electrode complete with fastening	1	47-90-26588
6	Ionisation cable	2	47-90-26718
6	Ionisation cable, extendet by 100 mm	1	47-90-26719
6	Ionisation cable, extendet by 200 mm	1	47-90-26720
7	Gasket for gas nozzle	5	47-50-25500
8	Gas nozzle complete with electrode (Natural gas)	1	47-90-26626
8	Gas nozzle complete with electrode, extended by 100 mm (Natural gas)	1	47-90-26698
8	Gas nozzle complete with electrode, extended by 200 mm (Natural gas)	1	47-90-26699
8	Gas nozzle complete with electrode (LPG)	1	47-90-26709
8	Gas nozzle complete with electrode, extended by 100 mm (LPG)	1	47-90-26710
8	Gas nozzle complete with electrode, extended by 200 mm (LPG)	1	47-90-26711
9	Sealing ring for cover	1	47-50-10698
10	Actuator drive SAD 1.5 complete till 08.08	1	47-90-24763
10	Actuator drive SAD 1.5 complete from 09.08	1	47-90-27032
11	Air flap complete till 08.08	1	47-90-24663
11	Air flap complete from 09.08	1	47-90-27030
12	Cover for sight glass	5	47-50-12106
13	Cover	1	47-90-24857
14	Sight glass	5	36-50-11544
15	Fan wheel ∅218 x 80 for MG860	1	36-90-11540-01
15	Fan wheel ∅224 x 82 for MG1350	1	47-90-24847
16	1.1 kW 400 V / 50 Hz motor for MG860	1	36-90-11538
16	2.2 kW 400 V / 50 Hz motor for MG1350	1	47-90-24846
17	1.1 kW motor complete with fan wheel for MG860	1	47-90-25205
17	2.2 kW motor complete with fan wheel for MG1350	1	47-90-25508
18	3-pole female connector, black	1	37-90-20739
19	7-pole female connector, black / brown	1	37-50-20731
20	5-pole female connector, black	1	37-50-20748
21	Thermal relay T7DU MG860	1	47-90-25172
21	Thermal relay T7DU MG1350	1	47-90-25173
22	Miniature motor contactor B7-30-10	1	47-90-25171
23	Control box MPA 22 V1.21	1	47-90-24166
24	Electronic ignition transformer TRK 2, complete	1	47-90-24469
25	7-pole female connector, green	5	37-50-10831
26	3-pole female connector, black	5	37-50-20739
27	Terminal box cover	1	47-90-24852
28	MPA display AM07	1	47-90-24167
29	Facing panel	1	47-90-24887
30/32/34	Gasket completet	1	47-90-26722
31	Gas jacket part 2, complete	1	44-90-30242
33	Gas jacket part 1, complete	1	44-90-30245
35	Securing rod	2	46-50-21085
36	Differential pressure switch	1	47-90-26723
37	Energy-converter DLU02	1	47-90-24198
-	Fan inlet device	1	36-90-11541
-	Protective screen	1	47-90-10696

E. 13.11.06 • G. 21.09.11

31 Dimensions (all dimensions are given in mm)



32 Working ranges



— Burner head "close"
— Burner head "open"

Working ranges according to EN 676.

Enertech Limited,
P O Box 1,
Vines Lane
Droitwich,
Worcestershire,
WR9 8NA

Tel: +44 (0) 1905 794331 **Fax:** +44 (0) 1905 794017
Email: info@nu-way.co.uk **Web:** www.nu-way.co.uk

NU-WAY®
Enertech Group