178 121 80-3 2018-04-06

Installation- and maintenance instruction

BG 550/650/700/800/950

BMS LMV

Bentone®

Table of contents

GENERAL

1. General Information

This Installation and Maintenance manual:

- is to be regarded as part of the burner and must always be kept near the installation site
- is intended for use by authorised personnel
- must be read prior to installation
- must be observed by all who work with the burner and associated system components
- work with the burner may only be carried out by certified installers/ personnel

Enertech AB is not liable for any typographical errors and reserves the right to make design changes without prior notice.

Safety instructions

- The burner may only be used for its intended purpose in accordance with the product's technical data.
- The burner may only be installed and operated by authorised personnel.
- The product is packaged to prevent damage from occurring during handling. Handle the product with care. Lifting equipment must be used to lift larger packages.
- The products must be transported/stored on a level surface in a dry environment, max. 80% relative humidity, no condensation. Temperature -20 to +60 °C.
- Check that the burner is compatible with the boiler's output range.
- All components must be installed without being bent, twisted or subjected to mechanical or thermal forces which can affect the components.
- The burner must be installed so that it complies with local regulations for fire safety, electrical safety, and fuel distribution.
- The gas outlet from the pressure regulator shall be configured in accordance with applicable regulations and lead to a safe area.
- Make sure when installing the equipment that there is enough space to service the burner.
- Permitted temperature during operation -10 to +60 °C. Max 80% relative humidity, no condensation.
- The installer must ensure that the room has adequate air supply.
- The room must comply with local regulations pertaining to its intended use.
- The installation site must be free of chemicals.
- Burner pipes, fan wheels and air dampers may contain sharp edges.
- The surface temperature of the burner's components can exceed 60 °C.
- Caution: The burner has moving parts, and there is risk of crushing injuries.

- The electrical installation must be professionally carried out in accordance with applicable high voltage regulations, as per Enertech's recommendations.
- Before servicing, shut off the fuel supply and turn off the power to the burner.
- Seal inspections must be performed during installation and servicing to prevent gas leakage.
- Care should be taken by the installer to ensure that no electrical cables or fuel lines are crushed or otherwise damaged during installation or servicing.
- If the boiler is equipped with an access hatch, this must be equipped with a hatch opening switch connected to the burner's safety system.
- When in operation, the burner's noise level can exceed 85 dBA. Use hearing protection.
- The burner must not be put into operation without proper safety and protection devices.
- A Class BE fire extinguisher is recommended.
- It is forbidden to alter thedesign or use accessories which have not been approved by Enertech in writing.
- Prior to operation, the following points must be checked:
- fitting and installation work has been completed and approved
- electrical installation has been correctly performed
- flue gas ducts and combustion air ducts are not blocked
- all actuators and control and safety devices are in working order and correctly set

Actions to take if you smell gas

Turn off the equipment and the boiler. Open windows and doors. Prevent open flames or sparking, e.g. do not turn lights on or off, do not use any electrical appliances, do not use mobile phones. Open windows and doors. Close the gas ball valve. Warn residents; do not use doorbells. Evacuate the building. Notify the installer or gas supplier once the building has been evacuated.

Burner servicing schedule

Servicing must be carried out once a year or after 3000 hours of operation

Burner	1 year	3000 hrs
Inspection of electrical installation	1 year	3000 hrs
Leakage check	1 year	3000 hrs
Filter	1 year replacement at Δp>10 mbar	3000 hrs replacement at Δp>10 mbar
Electrodes	Replacement/Cleaning 1 year	Replacement/Cleaning 3000 hrs
Brake disc	Replacement/Cleaning 1 year	Replacement/Cleaning 3000 hrs
Motor	1 year	3000 hrs
Fan wheel	1 Year Replacement when cleaning needed/ imbalance	3000 h Replacement when cleaning needed/ imbalance

Component replacement intervals

Control system	10 years	250,000 starts
Valve control system	10 years	250,000 starts
Pressure switch	10 years	250,000 starts
Ignition system with flame guard	10 years	250,000 starts
UV flame sensor	10000 hrs	N/A
Gas pressure regulators	15 years	N/A
Gas valve without seal testing	10 years	250,000 starts
Gas valve with seal testing	Replacement upon fault detection	N/A
Gas pressure switch	10 years	250,000 starts
Safety blow-off system	10 years	N/A
Damper motor	N/A	500,000 starts
Contactor	10 years	500,000 starts

The burner and its components must be recycled according to applicable regulations.

Delivery check

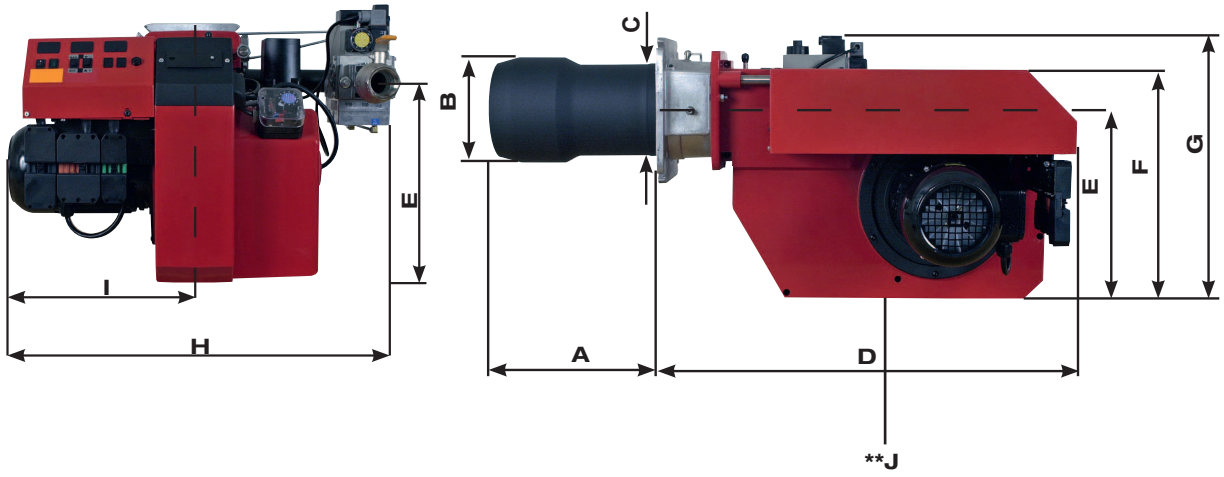
- Make sure everything is delivered and the goods have not been damaged during transit.
- If something is wrong with a delivery, report it to the supplier.
- Transport damage must be reported to the shipping company.

2. Technical data

2.1 Burners are intended for use at:

- Water heating generators
- Steam generators
- Industrial applications
- Hot air generators

2.2 Dimensions



Dimensions stated in mm

Type		Length of burner tube	Flange measure A	Burner tube measure B	Burner tube measure C
BG 550	Standard 1	256	226	162	162
	Standard 2	356	326		
	Standard 3	456	426		
BG 650	Standard 1	316	286	184	162
	Standard 2	416	386		
BG 700	Standard	363	328	220	205
	Långt utförande	663	628		
BG 800	Standard	396	361	261	205
	Långt utförande	696	661		
BG 950	Standard 1	350	310	280	254

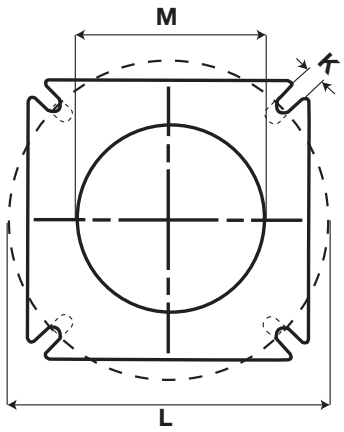
	D	E	F	G	H	I	**J
BG 550	660	320	400	*590	*743	343	200
BG 650	660	320	400	*590	*743	343	200
BG 700	820	410	510	*730	*970	420	200
BG 800	820	410	510	*730	*1022	472	200
BG 950	890	410	510	*730	*1027	472	200

* The above dimensions are max. measurements. Depending on the components used, the measurements may vary.

** Min. recommended distance to floor.

2.2.1 Heat generator connection dimensions

	K	L	M
BG 550	M12	(Ø 210) Ø 255-290	Ø 170
BG 650	M12	(Ø 210) Ø 254-280	Ø 190
BG 700	M14	(Ø 280) Ø320-380	(Ø 210) Ø 230
BG 800	M14	(Ø 280) Ø320-380	(Ø 210) Ø 270
BG 950	M14	(Ø 340) Ø420-490	(Ø 260) Ø 290



2.2.2 Capacity range

Type	Grade of gas	Capacity kW	Gas quantity at min. power Nm³/h [1)]	Gas quantity at max. power Nm³/h [1)]	Max. connection pressure mbar	Min connection pressure mbar
BG 550	**G20**	140–628	15	67	360	see data plate
BG 550	**G25**	140–628	17	73		see data plate
BG 550	**G30**	140–628	4	19		see data plate
BG 550	**G31**	140–628	6	25		see data plate
BG 650	**G20**	200–1125	21	118	360	see data plate
BG 650	**G25**	200–1125	24	137		see data plate
BG 650	**G30**	200–1125	6	35		see data plate
BG 650	**G31**	200–1125	6	35		see data plate
BG 700	**G20**	300–1500	31	157	360	see data plate
BG 700	**G25**	360–1500	37	183		see data plate
BG 700	**G31**	380–1650	15	67		see data plate
BG 800	**G20**	380–2400	40	252	360	see data plate
BG 800	**G25**	380–2400	46	293		see data plate
BG 800	**G30**	380–2400	40	252		see data plate
BG 950	**G20**	500–3200	52	336	360	see data plate
BG 950	**G25**	500–2800	61	342		see data plate
BG 950	**G30**	500–3200	15	98		see data plate
BG 950	**G31**	500–3200	20	130		see data plate

Lower heat value Hu at normal state 15°C and 1013.25 mbar EN676				
Grade of gas		kWh/Nm³	MJ/Nm³	kcal/Nm³
Natural gas	G20	9.5	34.02	8126
Natural gas	G25	8.2	29.25	6986
Propane	G31	24.6	88.00	21019
Butane	G30	32.5	116.09	27728

Gas quantity and capacity vary according to grade of gas and connection pressure.

2.2.3 Appliance categories

Only dry gas is permitted for use

BG 550

Gerätekategorien Appliance categories	Versorgungsdrücke Supply pressures	Bestimmungsländer Countries of destination
$II_{2R/3R}$	30-360mBar	"BG, CZ, DE, EE, ES, FR, GR, HU, IS, IT, LU, LV, NO, PT, SI, All countries"
$II_{2H3B/P}$	30-360mBar	AT, CH, CY, DK, FI, LT, RO, SE, SK
II_{2H3P}	30-360mBar	GB, IE,
$II_{2L3B/P}$	30-360mBar	NL, RO
$II_{2E3B/P}$	30-360mBar	PL
$I_{2E(R)B}$	30-360mBar	BE
I_{3P}	30-360mBar	BE

BG 650

Gerätekategorien Appliance categories	Versorgungsdrücke Supply pressures	Bestimmungsländer Countries of destination
$II_{2R/3R}$	40-360mBar	"BG, CZ, DE, EE, ES, FR, GR, HU, IS, IT, LU, LV, NO, PT, SI, All countries"
$II_{2H3B/P}$	40-360mBar	AT, CH, CY, DK, FI, LT, RO, SE, SK
II_{2H3P}	40-360mBar	GB, IE,
$II_{2L3B/P}$	40-360mBar	NL, RO
$II_{2E3B/P}$	40-360mBar	PL
$I_{2E(R)B}$	40-360mBar	BE
I_{3P}	40-360mBar	BE

BG 800

Gerätekategorien Appliance categories	Versorgungsdrücke Supply pressures	Bestimmungsländer Countries of destination
$II_{2R/3R}$	40-360mBar	”CZ, DE, EE, ES, FR, GR, IT, LT, LU, LV, IT, NO, PT, SI, All countries”
$II_{2H3B/P}$	40-360mBar	”AT, CH, CY, DK, FI, LT, RO, SE, SK”
II_{2H3P}	40-360mBar	GB, IE,
$II_{2L3B/P}$	40-360mBar	NL, RO
$II_{2E3B/P}$	40-360mBar	PL, RO
$I_{2E(R)B}$	40-360mBar	BE
I_{2H}	40-360mBar	HU, LT, LV
$I_{3B/P}$	30-360mBar	BE, HU,LT
I_{3R}	30-360mBar	GB,LT

BG 700

Gerätekategorien Appliance categories	Versorgungsdrücke Supply pressures	Bestimmungslände Countries of destin
$II_{2R/3R}$	40-360mBar	”BG, CZ, DE, EE, ES, HU, IS, IT, LU, LV, NO All countries”
II_{2H3P}	40-360mBar	”AT, CH, CY, DK, FI, LT, SK”
II_{2H3P}	40-360mBar	GB, IE,
II_{2L3P}	40-360mBar	NL, RO
II_{2E3P}	40-360mBar	PL
$I_{2E®}$	40-360mBar	BE
I_{3P}	40-360mBar	BE

BG 950

Gerätekategorien Appliance categories	Versorgungsdrücke Supply pressures	Bestimmungsländer Countries of destination
$II_{2R/3R}$	40-360mBar	”CZ, DE, EE, ES, FR, GR, IT, LT, LU, LV, IT, NO, PT, SI, All countries”
$II_{2H3B/P}$	40-360mBar	”AT, CH, CY, DK, FI, LT, RO, SE, SK”
II_{2H3P}	40-360mBar	GB, IE,
$II_{2L3B/P}$	40-360mBar	NL, RO
$II_{2E3B/P}$	40-360mBar	PL, RO
$I_{2E(R)B}$	40-360mBar	BE
I_{2H}	40-360mBar	HU, LT, LV
$I_{3B/P}$	30-360mBar	BE, HU,LT
I_{3R}	30-360mBar	GB,LT

2.2.4 Electric Specification

Type	BG 550	BG 650
Motor	230/400V, 50Hz, 3,5/2,5A, 0,75kW 2860 Rpm	230/400V, 50Hz, 6,5/4,0A, 1,5kW, 2890 Rpm
The recommended main fuse motor	C10A	
Control power	230V1F~2,5A	
Sound	89 dBA ± 0,5 dBA	91 dBA ± 0,5 dBA

Type	BG 700	BG 800	BG 950
Motor	230/400V, 50Hz, 10,4/5,5A, 3,0kW, 2940 Rpm	230/400V, 50Hz, 20,5/12,0A, 5,5kW, 2950 Rpm	230/400V, 50Hz, 21,5/13,5A, 5,5kW, 2950 Rpm
The recommended main fuse motor	C16A	D20A	D20A
Control power	230V1F~2,5A		
Sound	93 dBA ± 0,5 dBA	96 dBA ± 0,5 dBA	97 dBA ± 0,5 dBA

Measurements according to EN 3746: 2010

Alt.1 The sound level of the burner can be reduced by equipping the burner with silencer. Installation must be done so it does not prevent air supply to the burner.

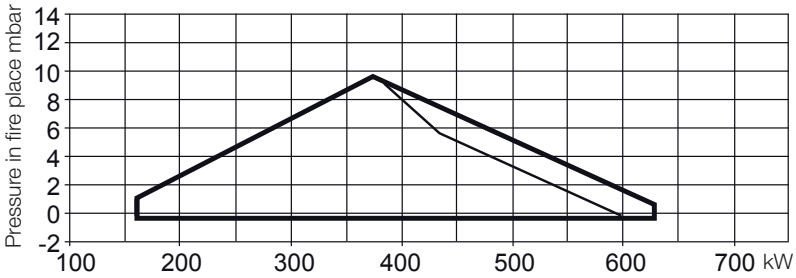
Alt.2 The burner's noise level can be reduced by connecting the burner's air intake to the air duct that opens into an appropriate location. Installation must be done so it does not prevent air supply to the burner.

2.2.5 Working field

BG 550

140-628 kW

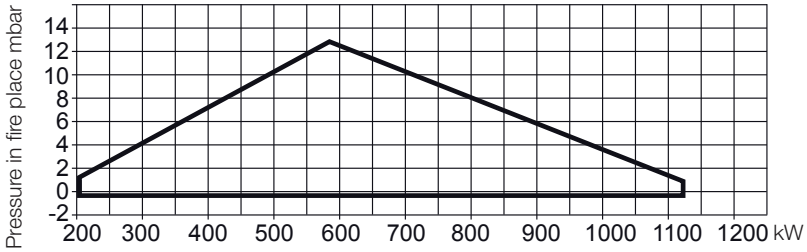
Do not exceed working field



BG 650

200-1125 kW

Do not exceed working field

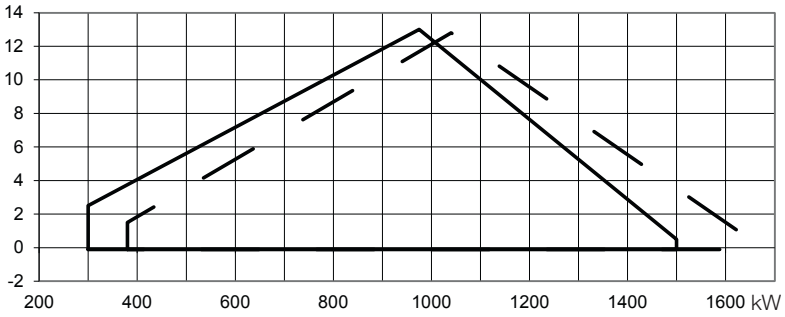


BG 700

G20, G21 300-1500 kW

G31 380-1650

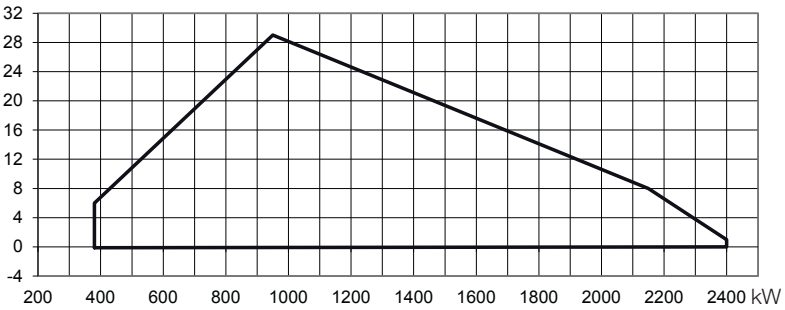
Do not exceed working field



BG 800

380-2400 kW

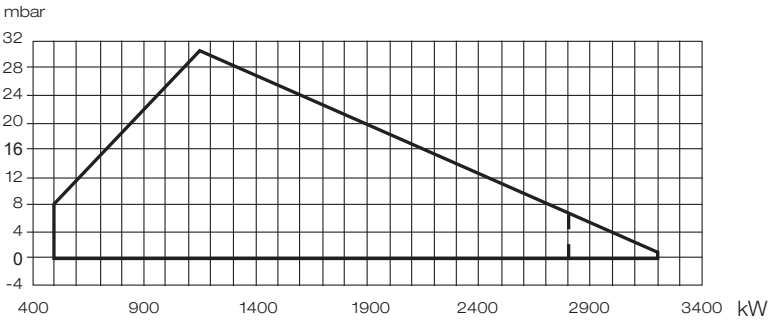
Do not exceed working field



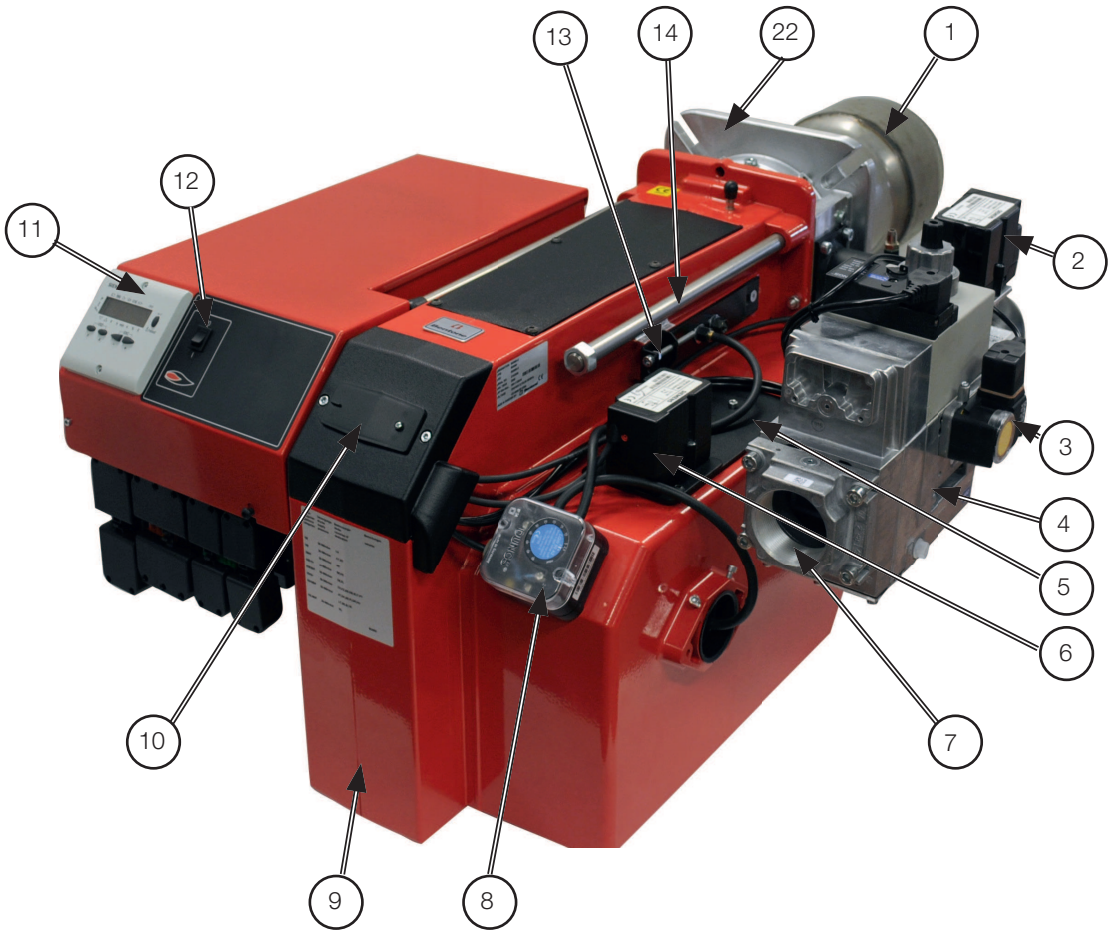
BG 950

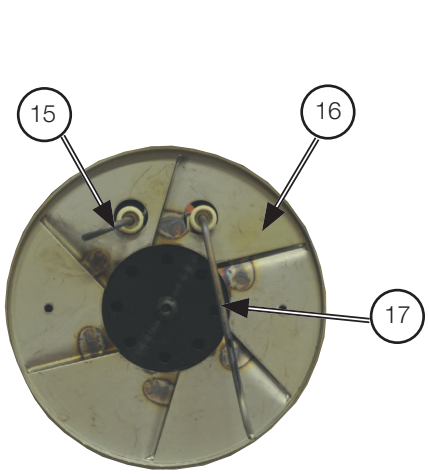
500-3200 kW

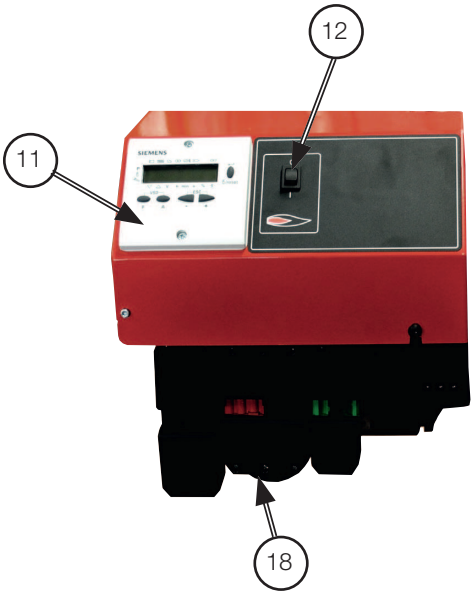
Do not exceed working field

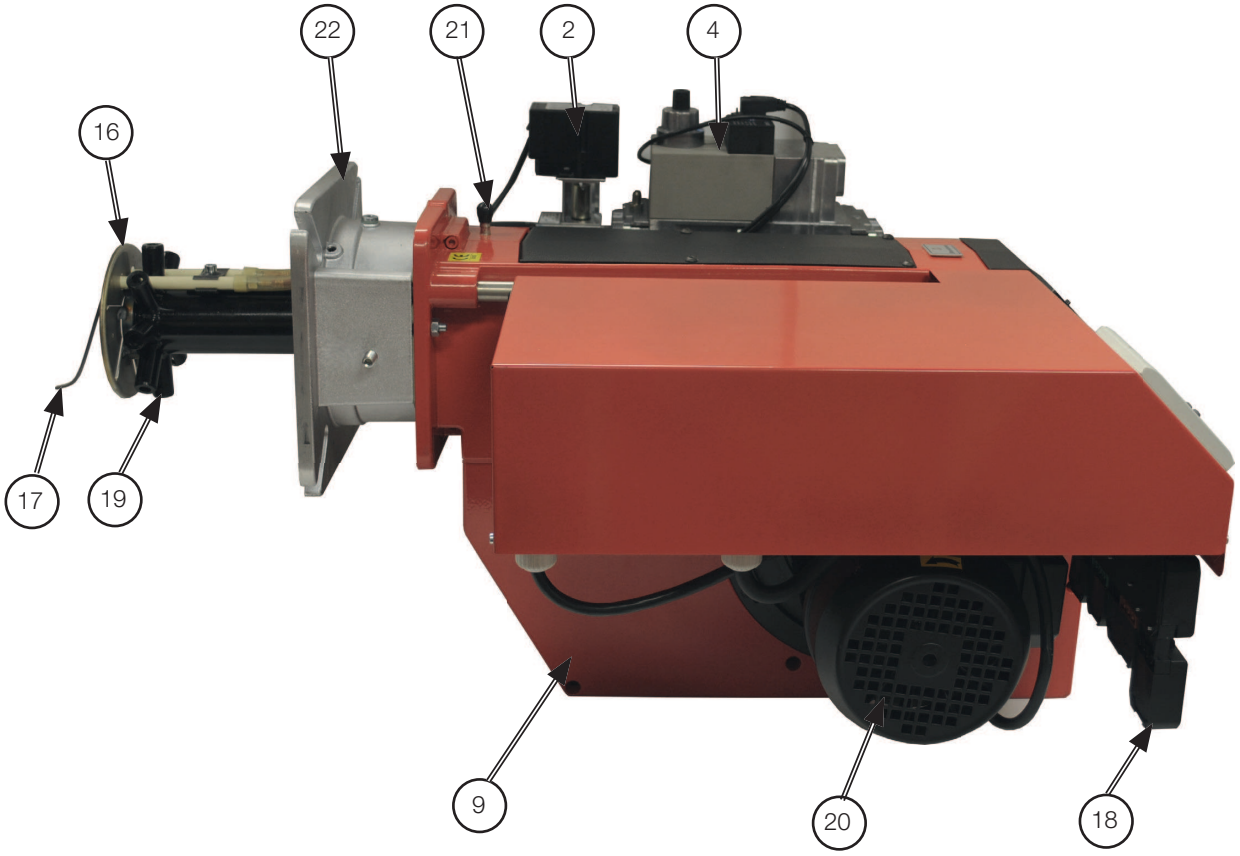


2.3 Description BG 550/650





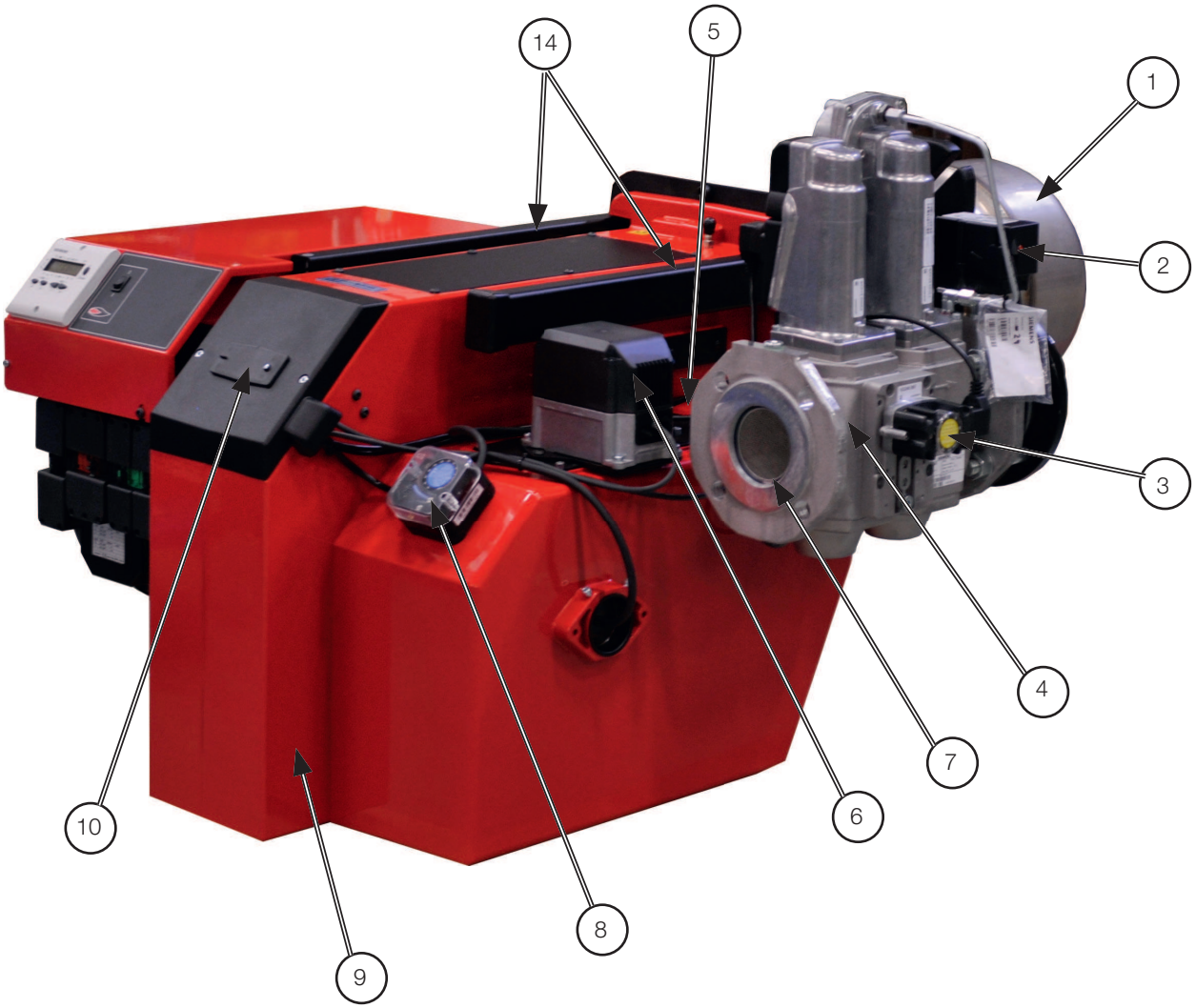


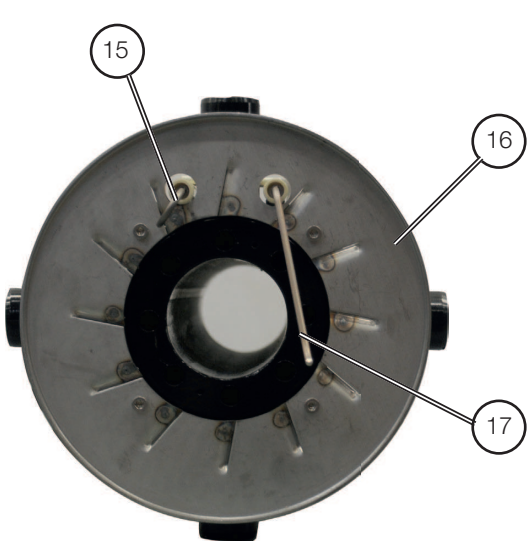


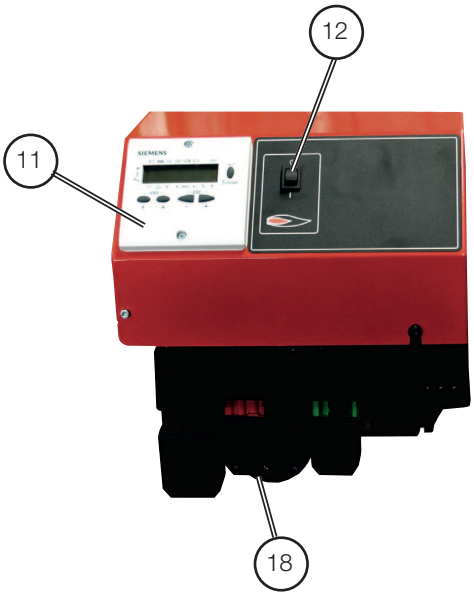
2.3.1 Components BG 550/650

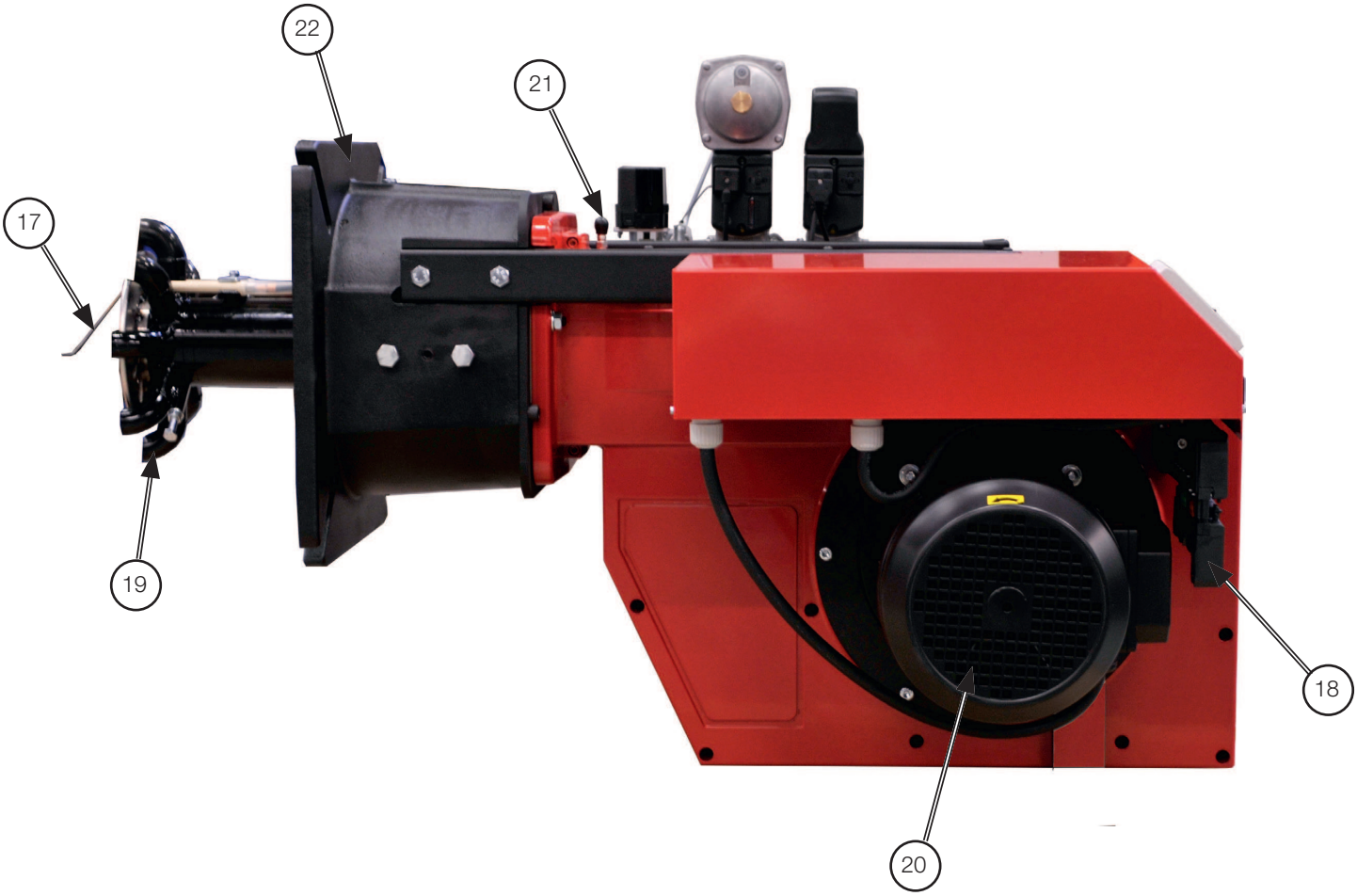
1. Burner tube
2. Damper motor, gas
3. Min. gas pressure switch/tightness check
4. MultiBloc
5. Air damper
6. Damper motor, air
7. Connection gas fittings
8. Air pressure switch
9. Fan house
10. Sight glass
11. AZL display for LMV automatic control unit
12. Switch 0-I
13. Brake plate adjustment
14. Guide bar
15. Ignition electrode
16. Shrouded disc
17. Ionisation electrode
18. Electrical connection
19. Gas nozzle
20. Motor
21. Measuring nipple, fan pressure
22. Connection flange

2.4 Description BG 700/800/950









2.4.1 Components BG 700/800/950

1. Burner tube
2. Damper motor, gas
3. Min. gas pressure switch/tightness check
4. MultiBloc
5. Air damper
6. Damper motor, air
7. Connection gas fittings
8. Air pressure switch
9. Fan house
10. Sight glass
11. AZL display for LMV automatic control unit
12. Switch 0-I
13.
14. Guide bar
15. Ignition electrode
16. Shrouded disc
17. Ionisation electrode
18. Electrical connection
19. Gas nozzle
20. Motor
21. Measuring nipple, fan pressure
22. Connection flange

3. General instruktions

3.1 General instructions

The installation of the gas burner must be carried out in accordance with current regulations and standards. The installers of gas burners should therefore be acquainted with all regulations and ensure that the installation complies with the requirements. The installation, mounting and adjustment should be made with the greatest care and only the correct gas should be used.

3.2 Operating instructions

The operating instructions accompanying the burner should be left in a prominent position in the boiler room.

3.3 Instructions

The user should be thoroughly in-structed in the function of the gas burner and the whole installation. The supplier must instruct the user.

3.4 Inspection and maintenance

Daily inspection is advisable..

3.5 Start up

After the burner has been fitted to the boiler and the electric connection, the leakage control, the venting and the electric function test have been carried out, the burner will be ready for start-up.

Howerer, study the sections dealing with adjustments of multi-bloc, combustion air and combustion head. Open the ball valve and switch on the main switch. If the burner starts the actual adjustment can be made.

3.6 Commissioning of installation

Control of the combustion. The combustion quality is checked by means of a flue gas analysis device. Adjust the burner to appr. 20%

excess air in accordance with the table. Check the flue gas temperature. Calculate the efficiency. Check also the actual gas volume on the gas meter so that the correct input is achieved.

4. Installation

4.1 Delivery check

Check that all has been delivered and that the goods have not been damaged during transport. If that is not the case, please notify the delivery company. Transport damages should be reported to the forwarding agency.

4.2 Preparations for installation

Check that the measurements and capacity range of the burner are compatible with the boiler. The power ratings on the type plate refer to the min. and max. power of the burner.

4.3 Gas supply

For good operating safety, it is important that the gas supply system is installed correctly.
Consider the following:

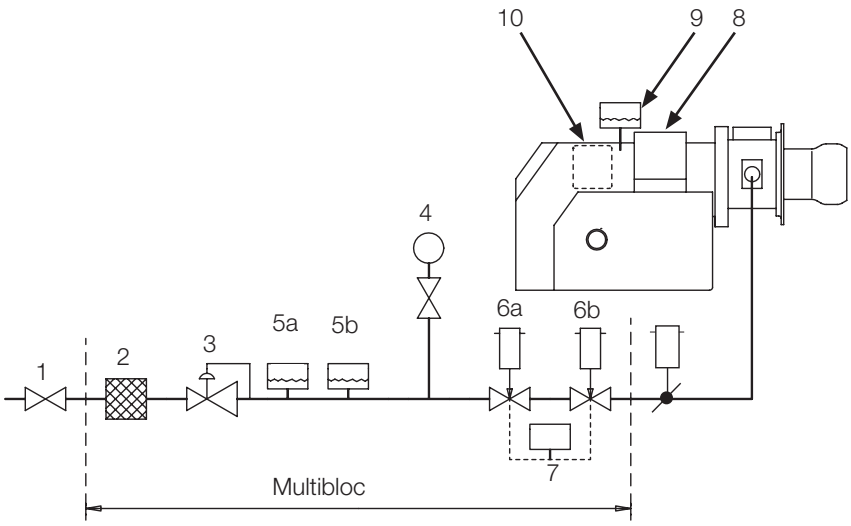
1. Check that the burner is approved for the gas quality of the installation. If not, please contact the supplier.
2. Check that the gas components of the burner are approved for indicated gas pressure.
3. The gas supply system should be installed in accordance with current standards.
4. Pipe lines should be run so that service on boiler and burner is facilitated.
5. Pipe lines should be run so that eventual contaminants cannot come into contact with the gas components.

4.4 Electric connection

Before starting the electric installation, the main switch must be turned off.
If the boiler has a 7-pole and a 4-pole Eurostecker connector, these usually fit directly to the burner. If not, use the connectors included.
(Refer to connection under Electric equipment)

If an electric connection other than the one recommended by Enertech is used, a risk of damage and injury can arise.

4.5 Skeleton diagrams



1. Ball valve
2. Filter
3. Governor
4. Pressure gauge with shut-off cock
5a. Gas pressure switch, mini
5b. Gas pressure switch, maxi
6a. Main valve, 2 -stage
6b. Safety valve
7. 1) Valve proving system
8. Air damper motor
9. Air pressure switch
10. Gas burner control LMV

Pos. 5b, 7: Components not required according to EN 676.

[1] Required over 1200 kW according to EN 676

When Bio gas is used, Enertech shall always be contacted.

4.6 Fitting the burner to the boiler

Use 4 x M12 bolts to fit the burner to the boiler. See technical data for the hole pattern.

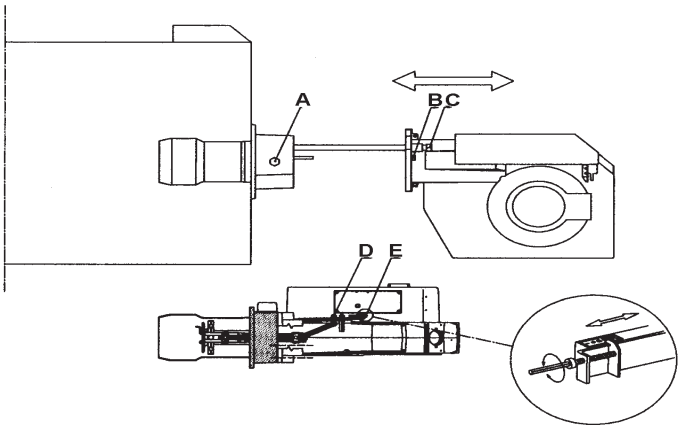
To make the fitting process easier, it is possible to separate the burner body from the gas flange with the combustion head and valve assembly in place.

Proceed as follows:

1. Ensure that no power is going to the burner. Switch off the main power supply and disconnect the Euro plugs from the burner. NOTE! If the burner is directly connected, ensure that all components on the burner are without power.
2. Remove the cover plate from the fan housing.
3. Undo the nut (D) to the nozzle assembly.
   (applies to BG 550 & 650; does not feature on BG 700, 800 & 950)
4. Disconnect the electrical cables to the valve assembly and gas damper motor.
5. Undo the screws (B) on both sides.
6. Undo the end stops (C) on the guides.
7. Disconnect the ignition cable, ionisation cable and control arm (550/650 only) from the gas nozzle.
8. Pull out the burner body from the guides and put it in a suitable place.

After separating the burner body and gas flange it is easier to fit the gas flange with the combustion head and valve assembly to the boiler. Once the gas flange is fitted to the boiler, it is easy to lift the burner body up onto the guides. Assemble the burner in reverse order to its disassembly.

Service position



! Check the gas tightness.

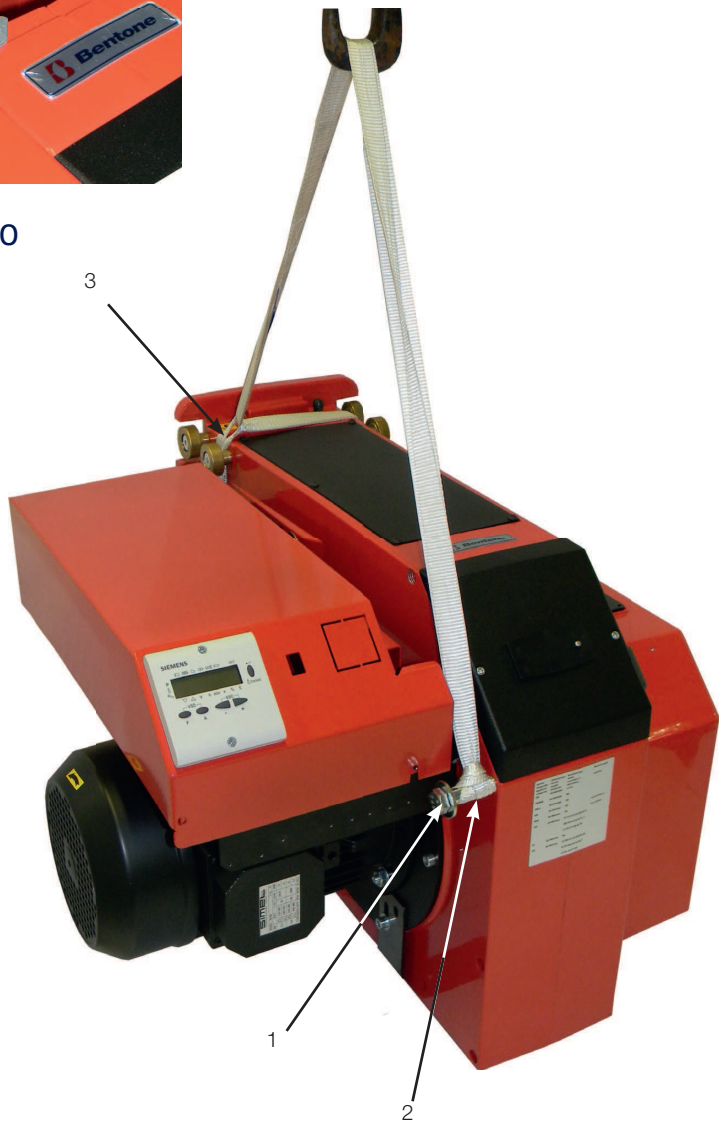
4.7 Handling and lifting instruction

4.7.1 BG 550, BG 650

Option
The lifting aid we used here are available as spare parts, Figure 1

Figure 1

4.7.2 BG 700, BG 800, BG 950



4.8 Inspection of gas nozzle before commissioning

The gas nozzle can easily be inspected by using the guides on the burner.

Proceed as follows:

1. Ensure that no power is going to the burner. Switch off the main power supply and disconnect the Euro plugs from the burner.

> ! If the burner is directly connected, ensure that all components on the burner are without power.

2. Remove the cover plate from the fan housing.
3. Undo the nut (D) to the nozzle assembly. (applies to BG 550 & 650; does not feature on BG 700, 800 & 950)
4. Disconnect the ignition cable and ionisation cable for the gas nozzle.
5. Ensure there is enough slack in the electrical cables to the valve assembly and gas damper motor to pull out the burner body in the rear position on the guides. If there is not enough slack the cables can be disconnected.
6. Undo the screw (B) on both sides.
7. Pull out the burner on the guides.
8. Undo the screw(s) (A) on the gas flange.
9. Take out the gas nozzle.
10. See section 11.7-11-10

Re-assemble the burner in reverse order to that described above. When re-assembling, make sure that the O-ring located between the gas nozzle and the gas flange is in the correct position when the nozzle is re-fitted.

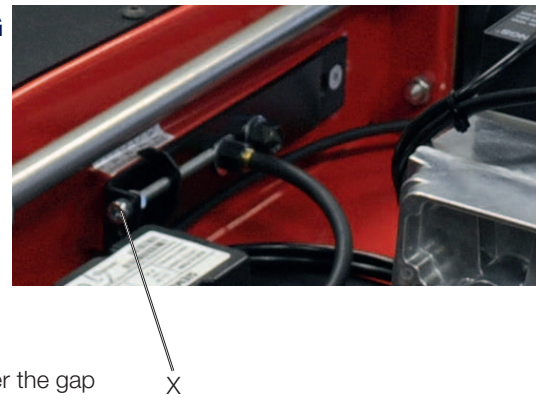
> ! If the burner tube is the long variant, the gas nozzle must be removed from the connection tube and then inserted backwards into the fan housing (from the boiler) to enable maintenance of the brake plate, nozzle, electrodes, etc.

5. Setting the burner

5.1 Setting the combustion assembly

It may sometimes be necessary to adjust the combustion assembly, i.e. the position of the brake plate in the burner tube.

5.1.1 Setting the combustion assembly, BG 550 & 650



The burner is equipped with a lever that changes the position of the brake plate in the combustion head. This is used to set the correct pressure drop across the combustion assembly and thereby obtain good combustion without ripples.

The best position is, among other things, dependent on the input power and overpressure in the boiler.

A general rule of thumb is that the smaller the capacity, the smaller the gap should be between the brake plate and the combustion assembly.

The position of the brake plate also has an impact on the quantity of air supplied for combustion. This means that once the brake plate has been adjusted, the combustion should be checked and, if necessary, the setting of the air damper adjusted to obtain good combustion.
Make the adjustment by turning screw X.

A left turn opens the brake plate, providing a lower pressure drop and more air to the combustion process.

A right turn closes the brake plate, providing a higher pressure drop and less air to the combustion process.

5.1.2 Setting the combustion assembly, BG 700, 800 & 950

The burner is **not** equipped with a lever that changes the position of the brake plate in the combustion head.

On these burners the combustion assembly is designed so that good combustion can be obtained without adjusting the brake plate.

5.2 Setting the air damper

The position of the air damper must be adjusted to achieve a suitable fuel-air mixture in the operational events that are programmed.

See section 13.4 (LMV) for the setting procedure.

5.4 Calculate prepurge time

Parameter 225 is used to set the blowing time

V =	Fire box size	m^3	
Q =	Burner output at prepurge	[kW]	
X =	Prepurge time seconds	Water boilers	
		100% air rate	at least 20s prepurge time
		50 % air rate	at least 40s prepurge time
		33% air rate	at least 60s prepurge time
X =	Prepurge time seconds	Steam generators at last prepurge 5 times firebox volume	
X =	Prepurge time seconds	Industrial heating process at least prepurge at least 5 times firebox and adapted compartments volumes together	
		Local regulations must be followed	

Calculation example:

Example A: V=2m^3 Q=200

Example B: V=9,5m^3 Q=500

Example C: V=25m^3 Q=2200

Example A $X = \frac{V \cdot 5}{((Q \cdot 1{,}2) / 3600)} = \frac{2 \cdot 5}{((200 \cdot 1{,}2)/3600)} =$ 150 seconds

Example B $X = \frac{V \cdot 5}{((Q \cdot 1{,}2) / 3600)} = \frac{9{,}5 \cdot 5}{((500 \cdot 1{,}2)/3600)} =$ 285 seconds

Example C $X = \frac{V \cdot 5}{((Q \cdot 1{,}2) / 3600)} = \frac{25 \cdot 5}{((2200 \cdot 1{,}2)/3600)} =$ 170 seconds

5.3 Setting the gas damper

The position of the gas damper must be adjusted to achieve the desired minimum and maximum input power.
See section 13.4 (LMV) for the setting procedure.

5.4.1 Example of how to calculate the gas quantity (natural gas G20):

V_0 =	Desired quantity of gas	[Nm^3/h]
Q =	Boiler output	[kW]
H_U =	Gas heat value	[kWh/Nm^3] or [MJ/Nm^3] or [kcal/Nm3]
η=	Boiler efficiency	[%]

Calculation example:

Q = 2200 kW

H_U = Example A: 34,020 MJ/Nm^3

Example B: 9.5 kWh/Nm^3

Example C: 8126 $kcal/Nm^3$

η = 90%

$$\text{Example A } V_{0A} = \frac{Q \cdot 3600}{H_u \cdot \eta} = \frac{2200 \cdot 3600}{34{,}200 \cdot 0.90} \approx 258\ Nm^3/h$$

$$\text{Example B } V_{0B} = \frac{Q}{H_u \cdot \eta} \approx \frac{2200}{9.5 \cdot 0.90} \approx 257\ Nm^3/h$$

$$\text{Example C } V_{0C} = \frac{Q}{H_u \cdot 0{,}00116 \cdot \eta} = \frac{2200}{8126 \cdot 0.00116 \cdot 0.90} \approx 259\ Nm^3/h$$

If the barometer reading (altitude), pressure and temperature of the gas deviate significantly from normal values, this must be taken into account as follows:

T =	Temperature of gas at the gas meter	[°C]
B =	Barometer reading	[mbar]
P =	Pressure of gas at the gas meter	[mbar]
f =	Factor calculated for multiplication with flow in Nm^3/h to arrive at actual flow in Nm^3/h.	
V =	Actual flow	[m^3/h]

$$f = \frac{273}{273+T} \cdot \frac{B+P}{1013.25}$$

Calculation example:

T = 15°C

B = 945 mbar

P = 15 mbar

$$f = \frac{273}{273+15} \cdot \frac{945+15}{1013.25} \approx 0.90\ Nm^3/h$$

This means that the quantity of gas read from the gas meter should actually be read off as 1.11 . the calculated flow in a normal state.

$$V = V_0 \cdot f$$
$$V_A = V_{0A} \cdot f = 258 \cdot 0.90 \approx 232\ m^3/h$$
$$V_B = V_{0B} \cdot f = 257 \cdot 0.90 \approx 231\ m^3/h$$
$$V_C = V_{0C} \cdot f = 259 \cdot 0.90 \approx 233\ m^3/h$$

5.5 Calculating the quantity of gas supplied

The quantity of gas supplied can be calculated if the system is equipped with a gas flow meter of some type. The procedure here is usually to measure how long it takes for the burner to consume a certain quantity of gas.

To measure:

t = Time for a certain quantity of gas consumed by the burner. [h]

M = Quantity of gas consumed. [m^3]

V = Actual gas flow [m^3/h]

$$V = \frac{M}{t}\ [m^3/h]$$

Calculation example:

t = 1 min 10 s

M = 4500 dm^3 (litre)

$$M = \frac{4500}{1000} = 4.5\ m^3$$
$$t = \frac{1}{60} + \frac{10}{3600} = 0.0194\ h$$
$$V = \frac{M}{t} = \frac{4.5}{0.0194} \approx 232\ m^3/h$$

6. Service

Whoever carries out service and maintenance on the burner must be authorised to do so. If components need to be replaced, the replacements must be of the same make and type and be approved by the authorities. If the burner is to be used for a different grade of gas, a new adjustment must be carried out. If town gas is to be used, it is also necessary to convert the combustion assembly; in some cases the multi-block or valves and gas train may also need to be changed to a larger type.

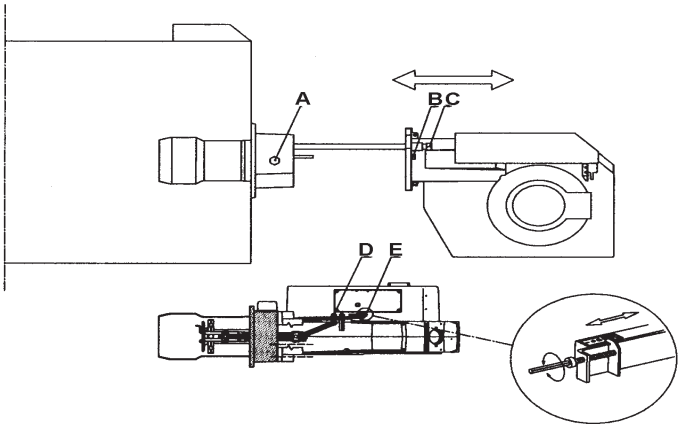
6.1 Servicing the combustion assembly

Removal and installation

1. Switch off the main power supply and disconnect the Euro plugs from the burner.

> **!** If the burner is directly connected, ensure that all components on the burner are without power.

2. Remove the cover and disconnect the ignition cable, ionisation cable and control arm (550/650 only) from the gas nozzle.
3. Loosen the nuts (B) and pull the burner body out of the guides.
4. Loosen the screw (A); this releases the combustion assembly and allows it to be lifted out.
5. Check and clean the brake plate and gas inlet. If necessary, replace the worn parts.
6. Check the ignition electrode (see chapter 11.7–11.10). Replace if necessary.
7. Check the ionisation electrode (see chapter 11.7–11.10). Replace if necessary.
8. Fit the combustion assembly in reverse order.
9. Press the burner together and lock using the nuts (B).
10. Fit the Euro plugs and turn on the main power supply.
11. Check/adjust the combustion.



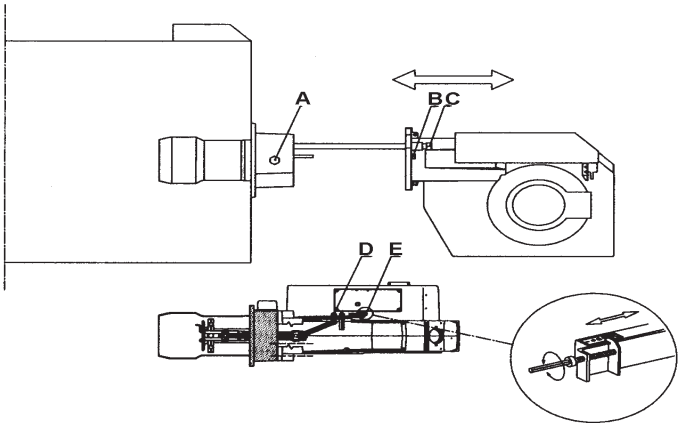
6.2 Servicing air dampers

Removal and installation

1. Switch off the main power supply and disconnect the Euro plugs from the burner.

> **!** If the burner is directly connected, ensure that all components on the burner are without power.

2. Loosen the nuts (B) and pull the burner body out of the guides.
3. Remove the intake grille at the air intake.
4. Remove the screws (G) securing the damper motor mounting plate.
5. Lift up the damper motor.
6. Clean the air damper (F) and the intake. Lubricate any damper shaft.
7. Re-install the damper motor and mounting plate on the air intake. Ensure that the damper shaft and control arm are connected correctly.
8. Adjust the home position of the damper before tightening the screws (I).
9. Push the damper motor forwards and backwards in the adjustment slot.
10. Lock the damper motor in position where the damper is almost engaged but still has a small air gap by the fan housing.
11. Install the intake grille for the air intake.
12. Press the burner together and lock using the nuts (B).
13. Check/adjust the combustion.



6.3 Replacement of damper motor, air

Removal and installation

1. Switch off the main power supply and disconnect the Euro plugs from the burner.

> ! If the burner is directly connected, ensure that all components on the burner are without power.

2. Disconnect the damper motor cable from the automatic control unit.
3. Remove the screws (I) securing the damper motor.
4. Loosen the screws (G) to the damper motor mounting plate.
5. Lift up the damper motor.
6. Remove (H) the control arm from the motor shaft.
7. Remove the damper motor from the mounting plate (I).

> ! SQM must be connected and supplied with power before installation to ensure that the motor shaft and direction of rotation are set correctly.

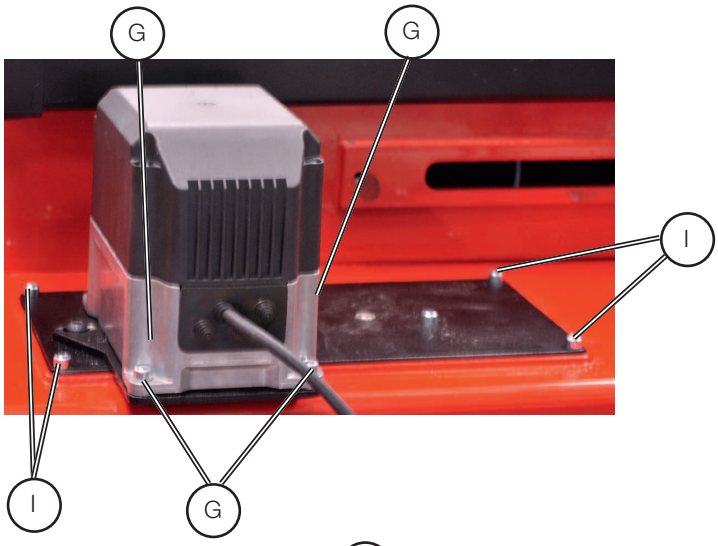
8. Install the new damper motor on the mounting plate.

> ! For BG 550/650, SQN 14 is used for air control.
> For BG700/800/950, SQM 33 is used.
> Parameter 601.00:0
> Parameter 601.01:1
> Parameter 602.00:0
> Parameter 602.01:1

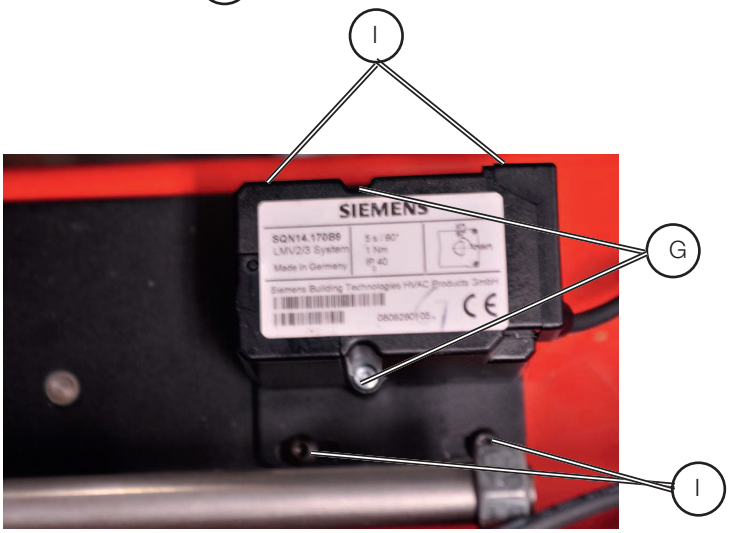
9. Fit the control arm on the damper motor shaft. It is important that the screw is perpendicular to the plane of the shaft.
10. Re-install the damper motor and mounting plate on the air intake. Ensure that the damper shaft and control arm are connected correctly.
11. Connect the damper motor cable to the automatic control unit.
12. Fit the Euro plugs and turn on the main power supply.
13. Adjust the home position of the damper before tightening the screws.
14. Push the damper motor forwards and backwards in the adjustment slot.
15. Lock the damper motor in position where the damper is almost engaged but still has a small air gap by the fan housing.
16. Connect the damper motor cable to the automatic control unit.
17. Fit the Euro plugs and turn on the main power supply.
18. Check/adjust the combustion.

> ! NOTE! When resetting dampers, ensure that they do not engage in the close damper position. If dampers do engage, the automatic control unit will report an error message.

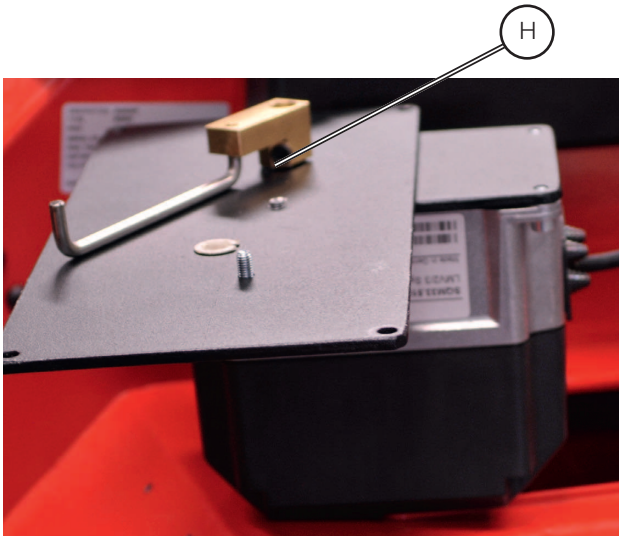
BG700-950



BG550/650



BG550-950



6.4 Replacement of damper motor, gas

Removal and installation

1. Switch off the main power supply and disconnect the Euro plugs from the burner.

> ! If the burner is directly connected, ensure that all components on the burner are without power.

2. Disconnect the damper motor cable from the automatic control unit.
3. Undo the screw (Y) on the connection between the motor and damper.
4. Undo the screws (X) and remove the damper motor from its damper plate.
5. Install the new damper motor, tighten the screws (X).

> ! An SQN 13 damper motor must be used to adjust the gas valve.

6. When tightening screw (Y), ensure that the damper is in the closed position.
7. Connect the damper motor cable to the automatic control unit.
8. Fit the Euro plugs and turn on the mains power.
9. Check / adjust combustion.

6.5 Flame monitoring and ionisation current check

The standard version of the burner is monitored according to the ionisation principle. The ionisation current should be checked on initial start-up and at each service visit.
The reason for low ionisation current can be leakage current, poor connection to earth, fouling or incorrectly positioned ionisation electrode in the combustion head. Sometimes the wrong gas-air mixture can also cause a very poor ionisation current.
The ionisation current is measured with a microampere meter (µA) that is connected in series with the ionisation electrode and the gas burner control. Connect the µA meter according to the figure. The minimum required ionisation current is shown in the table. In practice, this current must be significantly higher, preferably more than 10 µA. The connection of the µA instrument is made easier by the fact that all gas burners are equipped with a divisible ionisation cable.

Technical data

For continuous operation!

No-load voltage at ION terminal (X10–05 terminal 2)	Approx. UMains
! Protect the ionization probe against electric shock hazard!	
Short-circuit current	Max. AC 1 mA
Required detector current	Min. DC 4 µA, flame display approx. 30%
Possible detector current	Max. DC 16…40 µA, flame display approx. 100%
Threshold values when flame is supervised by an ionization probe:	
- Start prevention (extraneous light)	Intensity of flame (parameter 954) ≥18%
- Operation	Intensity of flame (parameter 954) >24%

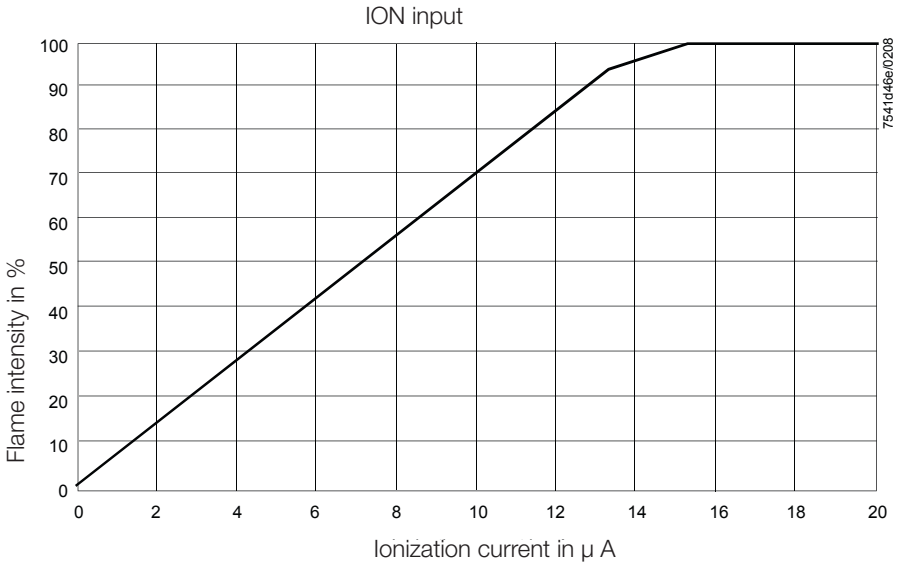
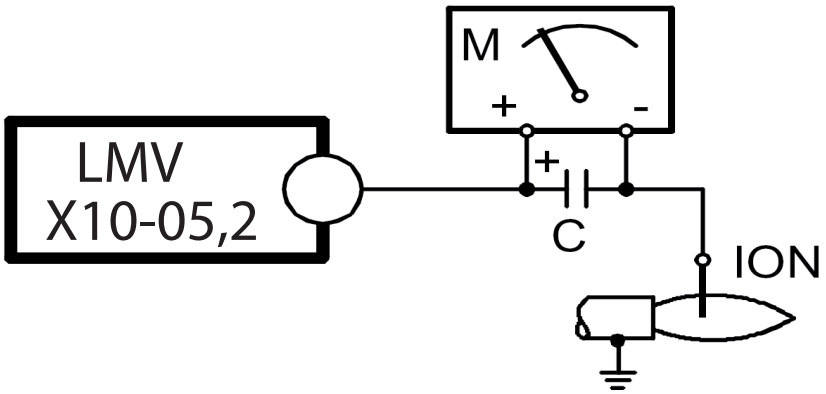
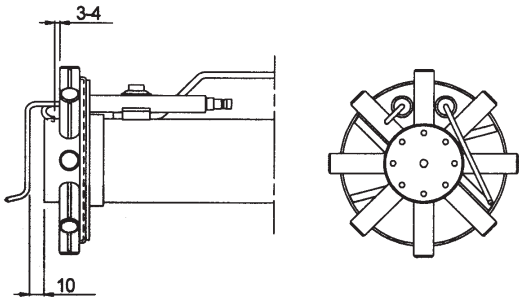


Figure 1: Ionization input at AC 120 V / AC 230 V

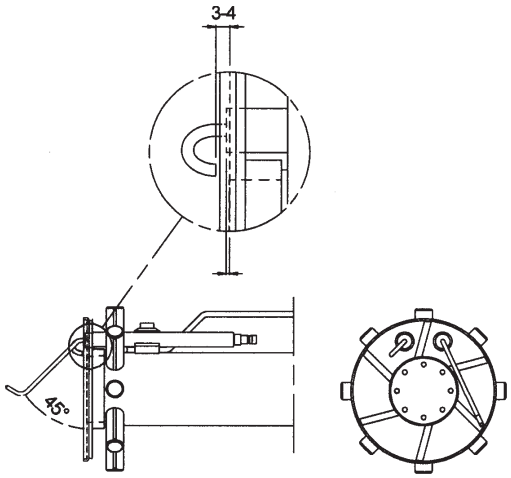


6.6 Gas nozzle BG 550/650

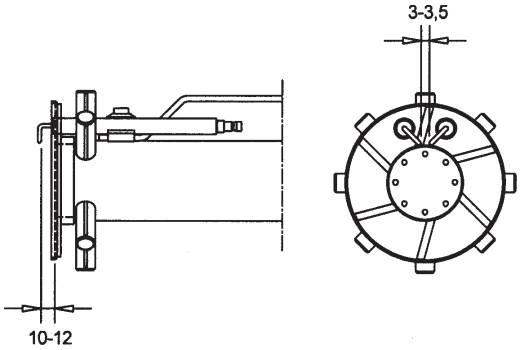
Towngas



Natural gas, Propane

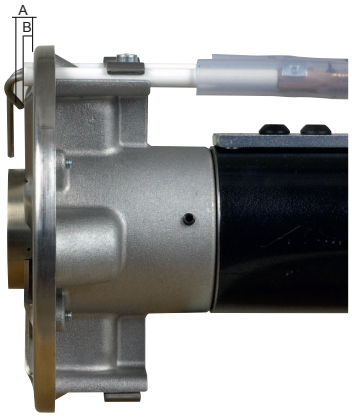


Biogas (UV detector)



6.7 Gas nozzle BG 550LN

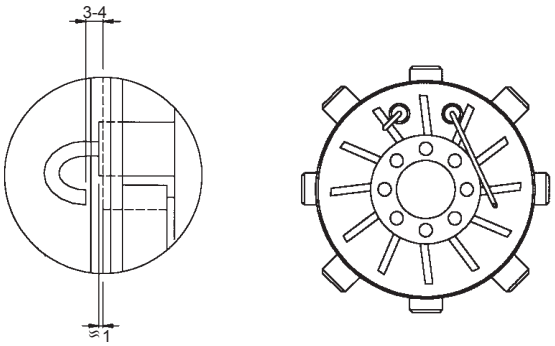
A = 10 mm Front edge of brake plate
B = 3 mm



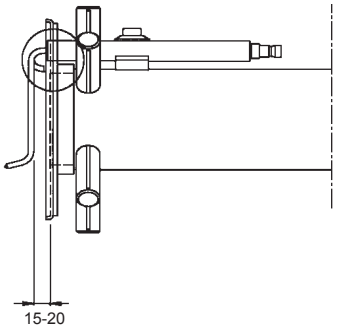
A = Position of ionisation detector
B = Position of ignition electrode

6.8 Gas nozzle BG 700/800

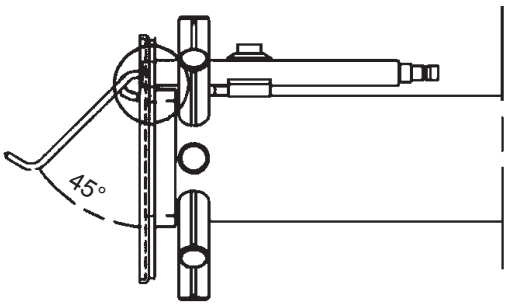
Natural gas, Propane



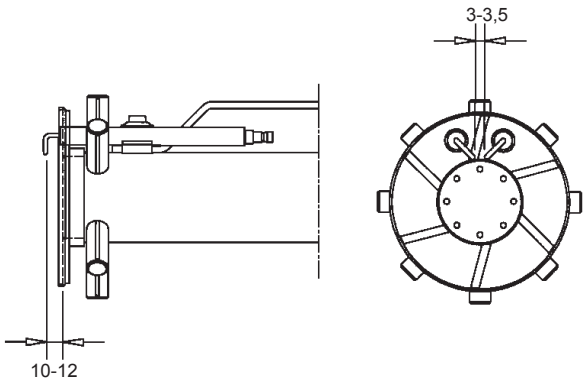
Natural gas



Propane



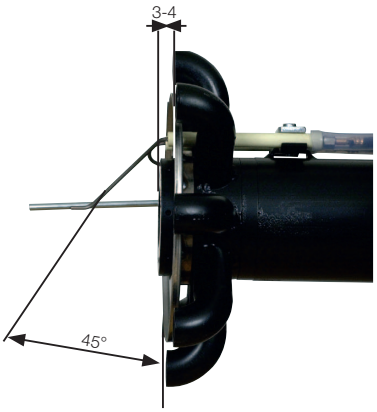
Biogas (UV detector)



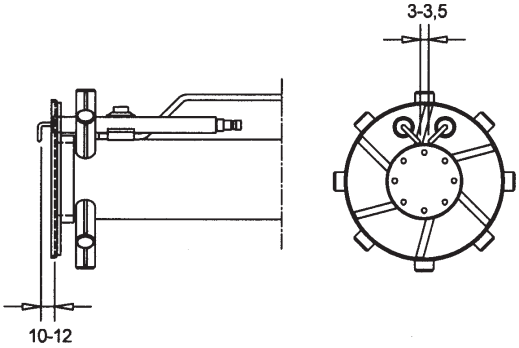
6.9 Gas nozzle BG 950

Natural gas, LPG

Distance electrode - brake plate.



Biogas (UV-sond)



6.10 UV detector

This should not be exposed to temperatures higher than 60°C. The current passing though the UV detector, when it is lit up, should be at least 70 µA for LFL1. This current can be measured using a multimeter, although this is only necessary if a malfunction is suspected.

If flame detectors QRA2… / QRA4.U / QRA10... are used for flame supervision with the LMV37.4..., it must be ensured that the basic unit is permanently connected to power (conforming to EN 230 / EN 298), thus enabling the system to detect flame detector failures during startup and shutdown.

Operating voltage	Max. 350 V peak
Required detector current in operation	Min. 70 µA
Possible detector current in operation	Max. 600 µA
Permissible length of flame detector cable - normal cable (laid separately)	Max. 20 m

Measuring circuit for detector current measurement

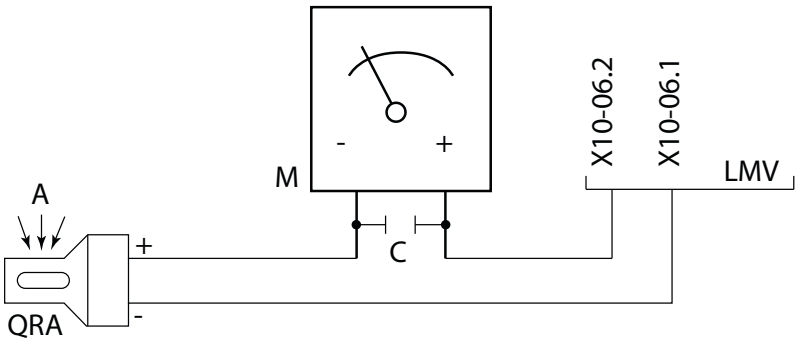
Legend

A Incidence of light

C Electrolytic capacitor 100...470 µF; DC 10...25 V

M Microammeter Ri max. 5000 Ω

UV flame detector QRA...



- Input QRA... is not short-circuit-proof! Short-circuits of X10-06 Pin 2 against earth can destroy the QRA... input
- Simultaneous operation of QRA... and ionization probe is not permitted!

Threshold values when flame is supervised by QRA...:

- Start prevention (extraneous light) Intensity of flame (parameter 954) ≥18%
- Operation Intensity of flame (parameter 954) >24%

6.11 Setting the air pressure switch

The air pressure switch should block the burner if the air quantity supplied for combustion is insufficient. The air pressure switch must be set so that, if there is a defective air supply at the burner's max. or min. capacity, it reacts before the monitored pressure falls so much that it results in poor combustion.

Inställningsområde ca:

LGW 10	1-10	mbar
LGW 50	2,5-50	mbar

Setting for air pressure switch

1. Remove the protective cover, screw (Y).

> **!** Be careful when adjusting the air pressure switch; it contains a live component.

2. Start the burner.
3. Carefully turn the scale on the air pressure switch clockwise until the air pressure switch stops the burner. **Is the tolerance on the scale for the min. air pressure switch approx. ±15%?**
4. Try to find the pressure at which the burner stops for both the minimum and maximum input power by turning the scale. Make a note of the values and then set the air pressure switch on the basis of the highest pressure noted at which the burner stopped.
5. The air pressure switch should be set to a pressure approx. 10–15% lower than the highest noted pressure at which the burner stopped.
6. After setting the air pressure switch, perform repeated starts and run through the burner's set output range several times. This is to ensure the reliable function of the burner. If breakdowns or interruptions occur, the air pressure switch is probably set to a too narrow position.
7. Fit the protective cover, screw (Y).

6.12 Setting the min. gas pressure switch

The min. gas pressure switch should react to a burner connection pressure that is too low and in such cases prevent the burner from starting. If the connection pressure to the burner is too low during operation, the min. gas pressure switch should stop the burner. The burner can start again once the connection pressure has risen above the pressure set for the min. gas pressure switch.

Setting for min. gas pressure switch

1. Remove the protective cover, screw (Y).
2. Open the pressure outlet (X) and connect a manometer to measure the connection pressure.
3. Start the burner.
4. Measure and make a note of the connection pressure to the burner during normal operation at the highest input power.
5. Based on the desired connection pressure set, determine the connection pressure at which the gas pressure switch should stop the burner. Set the connection pressure at which the burner is stopped at a level where the burner is stopped before poor combustion occurs.
6. Set the min. gas pressure switch to this value by turning the scale.
7. Check the setting by carefully closing the ball valve while measuring the connection pressure.
8. When the min. gas pressure switch stops the burner, the value measured should then approximately correspond to the setting on the min. gas pressure switch. The tolerance on the scale for the min. gas pressure switch is approx. ±15%.
9. Open the ball valve.
10. Remove the pressure gauge and close the pressure outlet (X).

> **!** Check the gas tightness.

11. Fit the protective cover, screw (Y).

6.13 Setting the max. gas pressure switch

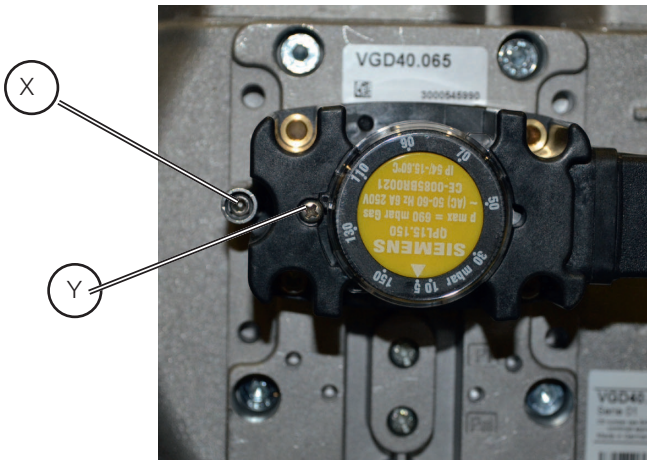
The burner is only equipped with a max. gas pressure switch if the customer makes such a request. It should block the burner if the gas pressure exceeds the set value. Starting can then only take place through a manual reset (gas burner control or overpressure switch).

Setting for min. gas pressure switch

1. Remove the protective cover, screw (Y).
2. Open the pressure outlet (X) and connect a manometer to measure the pressure downstream of the gas valve.
3. Start the burner.
4. Measure and make a note of the highest pressure downstream of the gas valve within the range of the set input power when the burner is operating under normal conditions.
5. Based on the highest pressure measured downstream of the gas valve, the desired pressure at which the burner must be stopped is set downstream of the gas valve.
6. Set the max. gas pressure switch to this value by turning the scale. The tolerance on the scale for the max. gas pressure switch is approx. ±15%.
7. Remove the pressure gauge and close the pressure outlet (X).

> **!** Check the gas tightness.

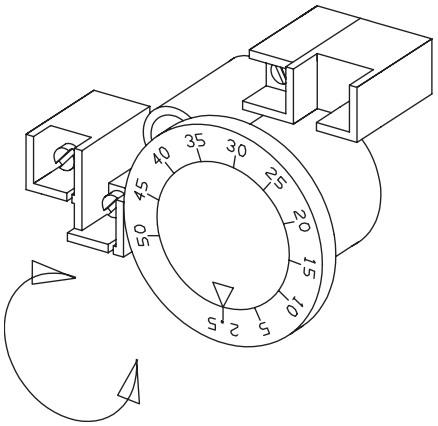
8. Fit the protective cover, screw (Y).



Setting range:

2.5–50	mbar	GW	50
5-150	mbar	GW	150

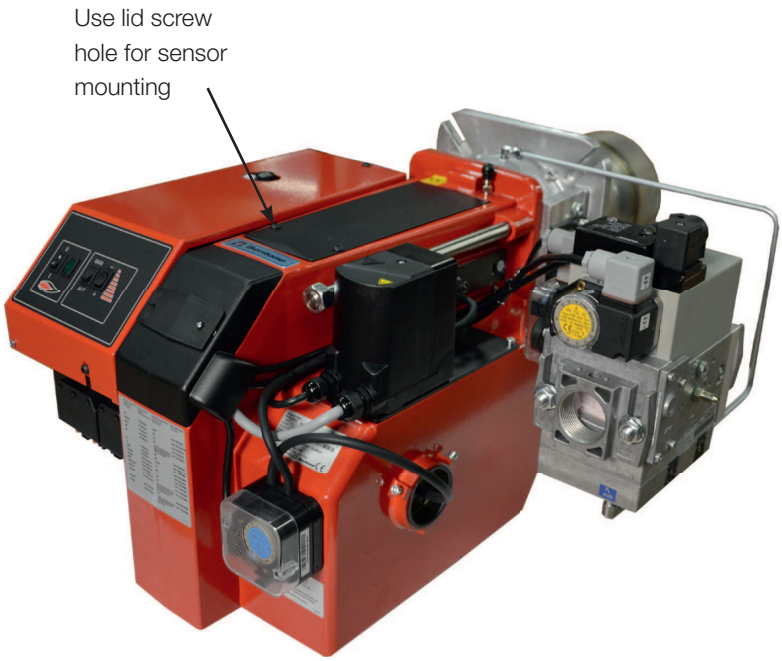
Gas pressure switch, air pressure switch



6.14 Vibration

Maximum vibration level are 5,0 mm/s

- Check all bolts and nuts for correct torque
- Check fan wheel for damage and contamination. Change when dirty/ unbalanced
- Check motor bearings. If worn change motor/bearings



7. Handing over of the installation

- Make repeated start attempts to ensure that the adjustments function.
- Close the ball valve during operation to check that the gas switch switches off at the set value.
- Remove the hose for the air pressure switch to check that the burner locks out.
- Check that all protective covers and measurement nipples are mounted and fastened.
- Fill out necessary test reports.
- Instruct the persons in charge of the operation on the service and maintenance of the installation and what to do should any troubles occur.
- Inspection and service must be carried out by authorized personnel.

! Review and service should be performed by authorised personnel only

8. Fault location, functional troubles

Trouble free operation is dependent on three factors: electricity, gas and air supply. Should there be any changes in the ratio between these three factors there is a risk of break downs. It has been proved that most break downs are caused by simple faults. Before calling the service engineer, the following should therefore be checked:

- Is the gas cock open?
- Are all fuses in order and the current switched on?
- Are the thermostats correctly set?
- Are pressostats, overheating protection etc. in operating position and not locked-out?
- Is the gas pressure sufficient?
- Is the gas burner control in start position?
- Has the gas control or the motor protector locked out? - Reset.
- Is the circulation pump in operation?
- Is there a supply of fresh air to the installation?
- If integral components are of a different make from what is stated in this manual, see the enclosed loose-leaf.

9. Regulators

The burner can be either fitted with a regulator on the burner or connected to an external regulator if this is preferred. The interface with the regulator is a Stecker connector in the electrical cabinet, irrespective of whether the regulator is internal or external. Connection of the preferred type of regulator can be made here easily.

Three variants of regulator for installation directly on the burner are available.

- JUMO dTRON 316 With three position signal: up signal, no signal and down signal.
- RWF50.2 With three position signal: up signal, no signal and down signal.
- RWF50.3 With analogue signal 4–20 mA or 0–10 V. LMV37 uses 4–20 mA.

For information and operation of the different regulators which can be installed directly on the burner, see the enclosed manual.

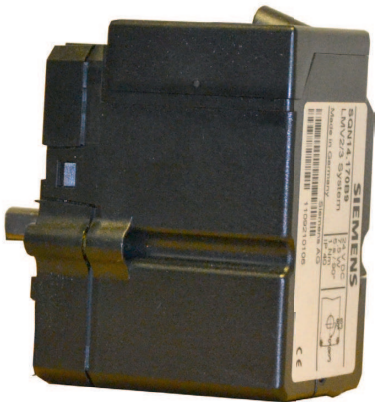
When connecting an external regulator of a type other than those which are installed on burners, see the manufacturer's recommendations and the wiring diagram for burners.

10. Damper motors

The burner is fitted with two damper motors, one for the gas damper and one for the air damper. They can be SQN13, SQN14 or SQM33.4 type motors.

10.1 SQN damper motor

10.1.1 Technical specification



Torque	Up to 1 Nm (rated output torque)
SQN13…	Gas
SQN14…	Air
Running time	Adjustable on the LMV3...
Supply voltage	AC / DC 24 V ±20 % (load on interface)
Power consumption Max.	7.5 W
Perm. on time	Max. 50 %
Perm. running time	Max. 60 s
Angular adjustment	Usable range max. 90°
Degree of protection	IP40
Rated resolution encoder monitoring	0.7°
0-position of actuator drive shaft	As supplied 0 +2° / -2°
Environmental conditions:	
Temperature range	-10...+60 °C
Humidity	<95 % r.h.

10.1.2 Mounting position

Optional

10.1.3 Choice of damper motor variant

An SQN14 damper motor is used on BG 550 and BG 650 burners to control the amount of air. An SQN13 damper motor is used on BG 550, BG 650, BG 700, BG 800 and BG 950 burners to control the amount of gas.

10.1.4 Important to remember

- When servicing/replacing a damper motor, select the correct motor for the desired control as the direction of rotation varies.
- When servicing/replacing a damper motor, clean it and check that the damper is not sluggish to avoid problems with the damper motor not managing to make adjustments.
- The tightening torque of 1.5 Nm for the fixing screws must not be exceeded to prevent damage to the actuator and to ensure that the actuator does not twist on its mounting surface
- When mounting the actuator, ensure that the permissible axial and radial loads on the bearing are no not be exceeded
- When fitting the actuator to the controlling element, the correct mounting order must be observed. It is usually as follows:

1. Screw on the actuator
2. Connect the actuator's drive shaft to the controlling element using the coupling pin screw.

- The actuators are supplied with attached connecting cable and plug
- Single bend when laying the cable: 2 x cable diameter
- Always run the high-voltage ignition cables separate from the unit and other cables while observing the greatest possible distance.
- The holding torque is reduced when the actuator is disconnected from power.

10.2 SQM damper motor

10.2.1 Technical specification

Torque	up to 3 Nm nominal output torque self-holding torque
SQM33.5…	Parameter 601.00:0 Parameter 601.01:1 Parameter 602.00:0 Parameter 602.01:1
Cable length:	
SQM33.510…	1,5 m
SQM33.511…	3,0 m
Running time	Adjustable on the LMV3...
Supply voltage	AC / DC 24 V ±20 % (load on interface)
Power consumption Max.	10 W
Perm. on time	50%, max. 3 min. continuously
Angular adjustment	Usable range max. 90°
Degree of protection	IP40
Rated resolution encoder monitoring	0.7°
0-position of actuator drive shaft	Supply state 0 ±0.6°
Environmental conditions:	
Temperature range	-20...+60 °C
Humidity	<95% r.h.

10.2.2 Mounting position

Optional

10.2.3 Choice of damper motor variant

An SQN13 damper motor with anticlockwise rotation is used on BG 550 and BG 650 burners to control the amount of air. An SQN14 damper motor with clockwise rotation is used on BG 550 BG 650, BG 700, BG 800 and BG 950 burners to control the amount of gas.

10.2.4 Important to remember

- When servicing/replacing a damper motor, select the correct motor for the desired control as the direction of rotation varies.
- When servicing/replacing a damper motor, clean it and check that the damper is not sluggish to avoid problems with the damper motor not managing to make adjustments.
- The tightening torque of 1.5 Nm for the fixing screws must not be exceeded to prevent damage to the actuator and to ensure that the actuator does not twist on its mounting surface
- When mounting the actuator, ensure that the permissible axial and radial loads on the bearing are no not be exceeded
- When fitting the actuator to the controlling element, the correct mounting order must be observed. It is usually as follows:

1. Screw on the actuator
2. Connect the actuator's drive shaft to the controlling element using the coupling pin screw.

- The actuators are supplied with attached connecting cable and plug
- One-time bend when laying the cable: 2 x cable diameter
- Always run the high-voltage ignition cables separate from the unit and other cables while observing the greatest possible distance.
- The holding torque is reduced when the actuator is disconnected from power.

11. Gas train

11.1 DMK gas butterfly damper

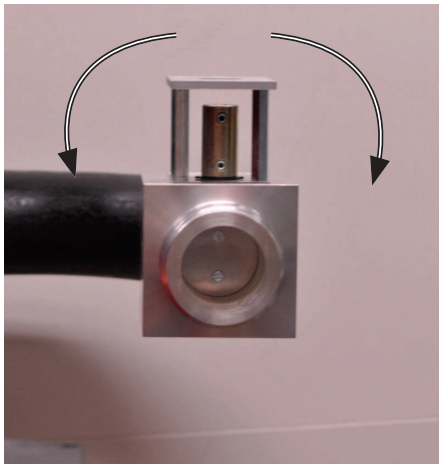
11.1.1 Technical specification

Max. operating pressure	500	mbar
Max. differential pressure over damper	250	mbar
Max. damper setting angle	90°	

Required torque:	
DMK 512, 515 and 520	min. 50 Ncm
DMK 5065 and 5080	min. 150 Ncm

Throat diameter:		
DMK 512	21	mm
DMK 515	32	mm
DMK 520	40	mm
DMK 5065	65	mm
DMK 5080	80	mm
Threaded versions: DMK 512, 515 and 520		
Flanged versions: DMK 5065 and 5080		
DMK 5065 and 5080 Environmental conditions:		
Temperature range	-15...70 °C	
Humidity	<95% r.h.	
Gas qualities	No nonferrous materials. Suited for use with gases up to max. max. 0,1 vol. % H2S, dry	

11.1.2 Installation position



Use with actuator drive any installation position posiable.

11.1.3 Important to remember

- Before replacing a butterfly damper, make sure you order the correct damper size with the correct inlet diameter.
- When performing installation and service, check whether the gas damper is in the closed position when the burner is turned off. See image
- When installing a gas damper, observe the direction of flow shown on the gas damper.
- After working on a gas damper, check the gas tightness

11.2 MULTI-BLOCK VGD40... SKP15/25

11.2.1 Technical specification

> **!** All components must be installed without being bent, twisted or subjected to mechanical or thermal forces which can affect the components.

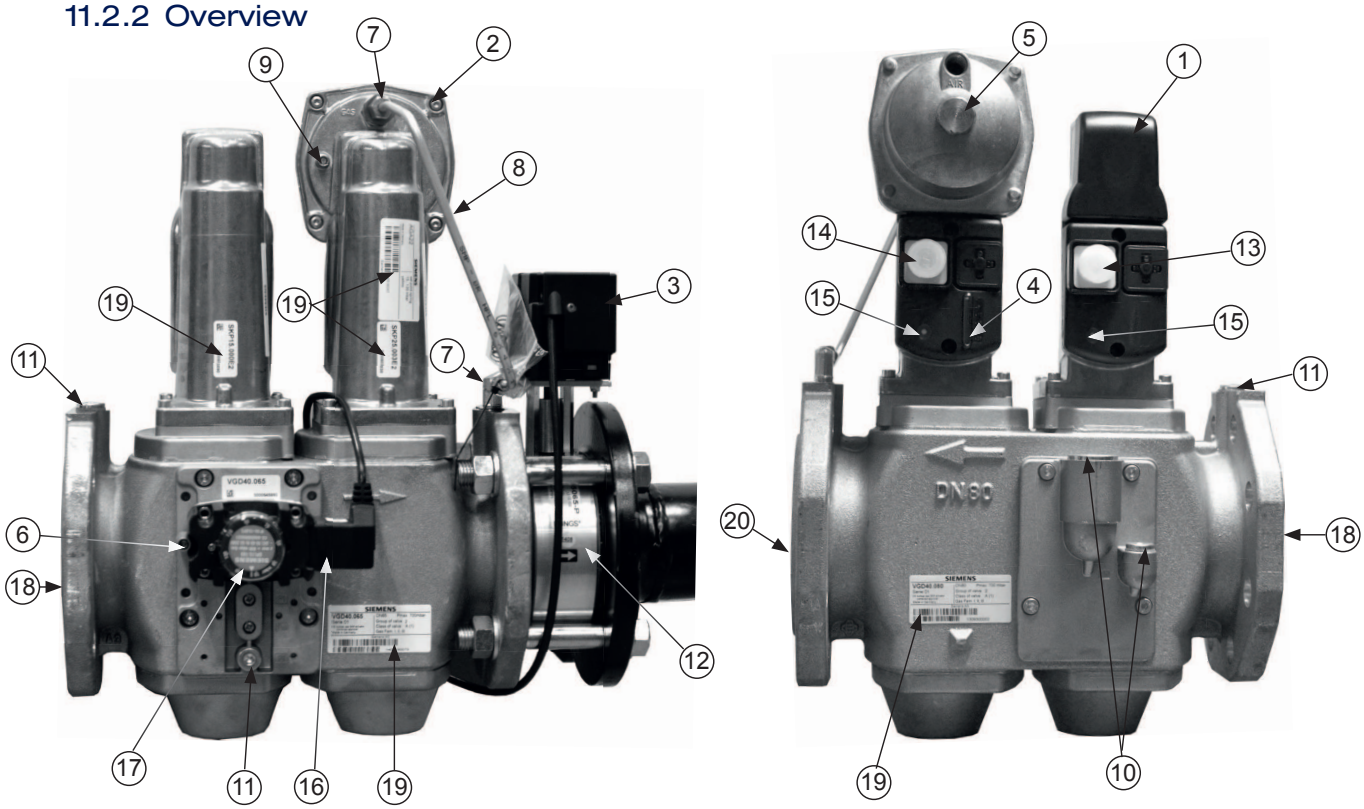
Max. connection pressure:	
VGD40.65/SKP15/25	1500 mbar (static pressure when valves are closed)
VGD40.65/SKP15/25	700 mbar (dynamic pressure when valves are open)
VGD40.80/SKP15/25	1500 mbar (static pressure when valves are closed)
VGD40.80/SKP15/25	700 mbar (dynamic pressure when valves are open)

Adjustable regulator pressure:		
VGD40.65/SKP15/25 with spring AGA 29	≤ 22	mbar
VGD40.65/SKP15/25 with spring AGA 22	15 - 120	mbar
VGD40.80/SKP15/25 with spring AGA 29	≤ 22	mbar
VGD40.80/SKP15/25 with spring AGA 22	15 - 120	mbar

Dirt trap		Built in (mesh size 0.9 mm)
Solenoid valve V1	SKP15	opening time varies with valve size, 14 s for max stroke closing time <0,8 s
Solenoid valve V2	SKP25	opening time varies with valve size, 14 s for max stroke closing time <0,8 s
Voltage / Frequency		50 - 60 Hz 220 - 240 V AC -15 % +10 %
Switch-on duration		100%
Degree of protection		IP54
Multi-block connection flange		
VGD40.65/SKP15/25		DN65
VGD40.80/SKP15/25		DN80

Environmental conditions:	
Temperature range	-10...60 °C
Humidity	<95% r.h.
Gas qualities	No nonferrous materials. Suited for use with gases up to max. max 0,1 vol. % H2S, dry

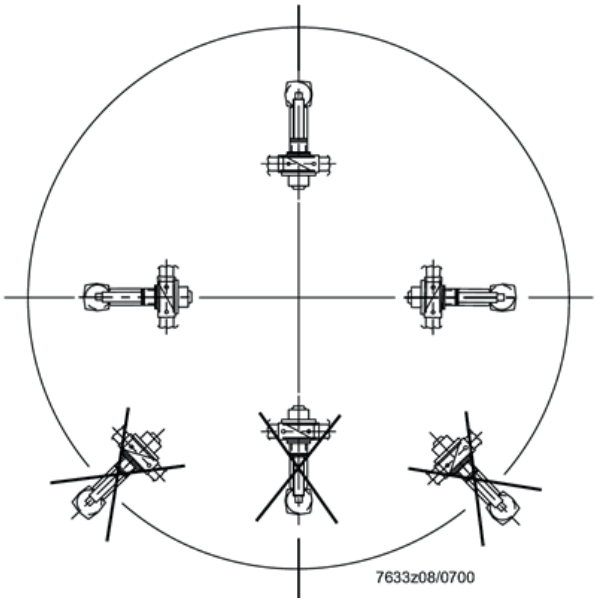
11.2.2 Overview



1. V1 SKP15
2. V2 SKP25
3. Motor gas valve
4. V2 Stroke indication
5. Adjustment pressure regulator
6. **Measuring nipple/ pressure switch**/min/VPS/Pm
7. Connection ¼" pG
8. Impuls tube pG
9. Test nippel pG (measurement of pressure after V2)
10. Connection Pm
11. Connection Pi
12. Butterfly damper
13. Electrical connection gas valve V1
14. Electrical connection gas valve V2
15. Indication of V1 and V2 in operation
16. Electrical connection gas pressure switch min/VPS
17. Pressure switch min/VPS
18. Flange connection inlet
19. Data plate
20. Flange connection, outlet

A gas pressure switch for monitoring that the connection pressure does not get too low is mounted on the multi-block so that it can be used both as a gas pressure switch and to check for tightness. The burner can also be fitted with an additional gas pressure switch to monitor that the nozzle pressure does not get too high.

11.2.3 Installation position



11.2.4 Adjusting the multi-block

When the multi-block is used together with the LMV37 control unit with butterfly valve on the gas pipe, the multi-block acts as a clean valve, which is not used to set the correct gas flow. However, some adjustment of the multi-block may help to achieve robust burner function. The regulator on the multi-block should be set in such a way that the input pressure is reduced using the regulator; this ensures that any variation in the input pressure will not affect the pressure leaving the block.

11.2.5 Actuator SKP15

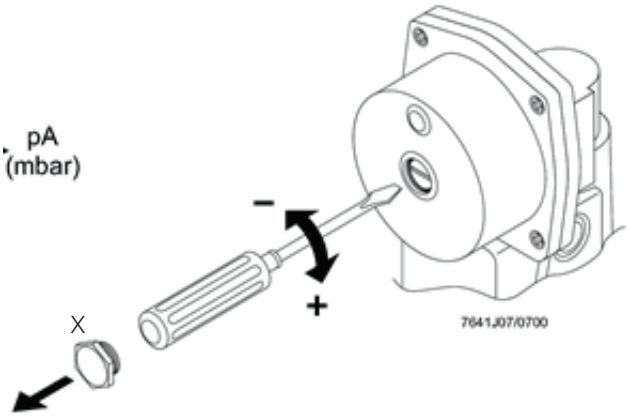
SKP15 is mounted on the first valve of the multi-block in the direction of gas flow. The only function of this actuator is open/close.

11.2.6 Actuator SKP25

SKP25 is mounted on the second valve of the multi-block in the direction of gas flow. This actuator has two functions: open/close and controlling the gas pressure leaving the multi-block.

11.2.6.1 Adjusting the pressure regulator on actuator SKP25

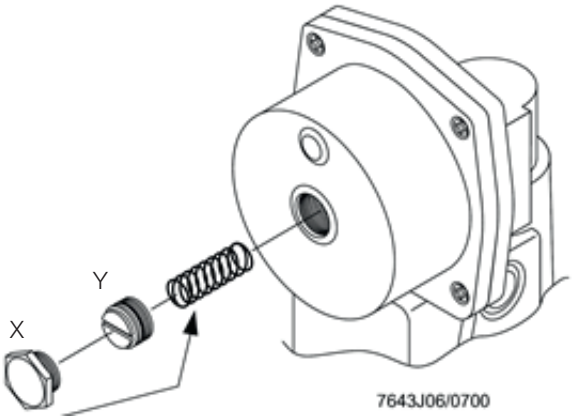
1. Remove protective plug X.
2. Adjust the pressure regulator by turning the adjuster screw with the slotted screwdriver to the desired output pressure in Pa, see image.
   Turning to right = higher regulator pressure
   Turning to left = lower regulator pressure
3. Fit protective plug X.
   Possible output pressure range 15–120 mbar.
   Pressure is measured at the pressure outlet on SKP25. See section 10.2.2.



11.2.6.2 Replacing the spring on the pressure regulator for an SKP25 actuator

The SKP25 actuator is fitted with an AGA29 type spring for the regulator at the factory.

1. Remove protective plug X.
2. Remove pressure regulator screw Y.
3. Take out the spring and replace it.
4. Fit pressure regulator screw Y and set to the desired regulator pressure.
5. Fit protective plug X.



11.2.6.3 Impulse pipe for pressure regulator SKP25

On multi-block VGD40…/SKP15/25 there is an impulse pipe for the nozzle pressure which is necessary for regulator SKP25 to function properly. The impulse pipe has an inside diameter of 4 mm and an outside diameter of 6 mm. The impulse pipe for the nozzle pressure to the regulator is fitted at the factory. When replacing the impulse pipe, a steel pipe must be used with an inside diameter > 4 mm. The impulse pipe must be protected again breakage and damage. If damage should occur, the impulse pipe must be replaced before the burner is put into operation again.

11.3 MULTI-BLOCK, MB-DLE 412-420

11.3.1 Technical specification

Max. connection pressure: 360 mbar

Adjustable regulator pressure:

MB-D 412 B01 S52	4–50 mbar
MB-D 415 B01 S52	20–50 mbar
MB-D 420 B01 S52	20–50 mbar

! All components must be installed without being bent, twisted or subjected to mechanical or thermal forces which can affect the components.

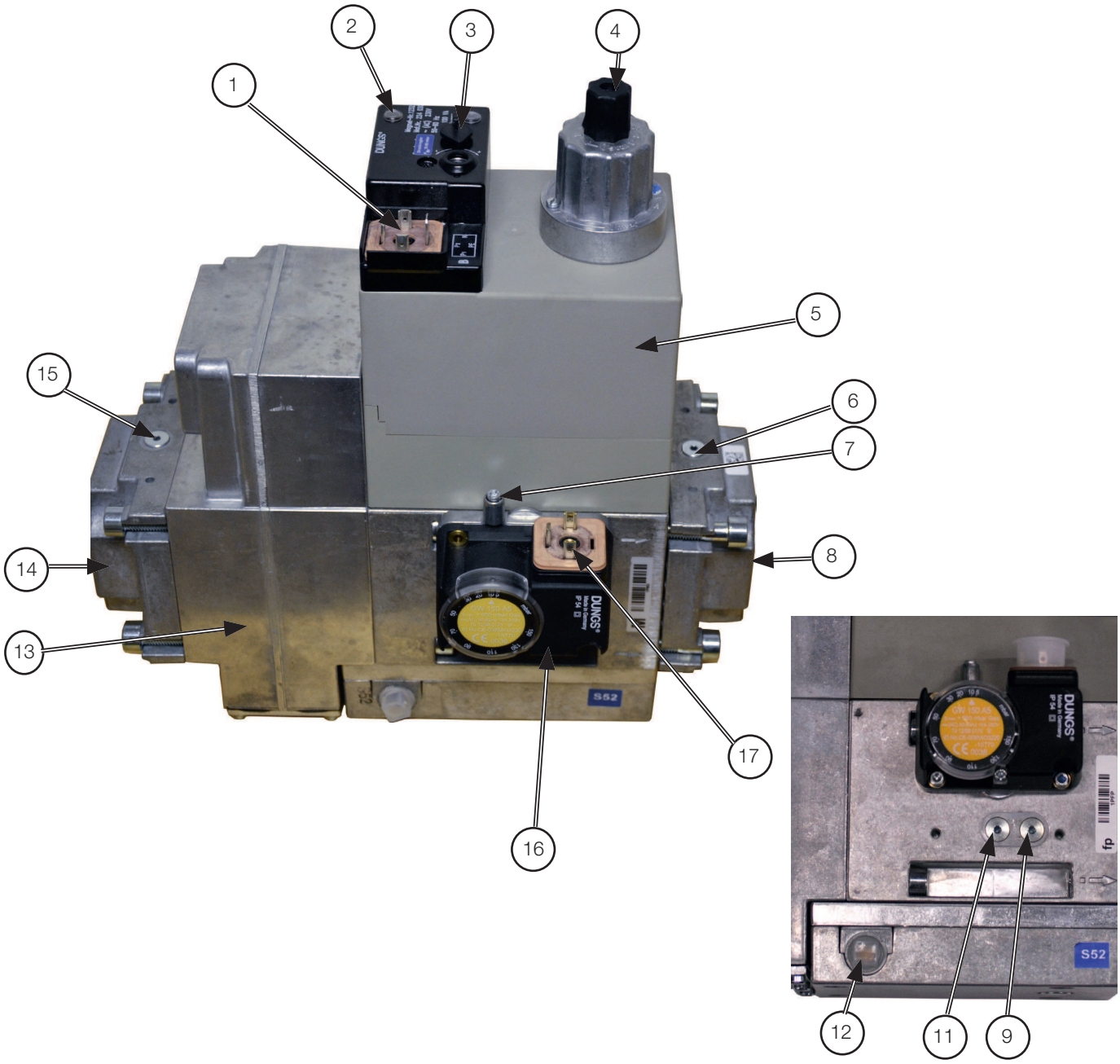
Dirt trap	Sieve, microfilter, changing the filter is possible without removing the valve.
Solenoid valve V1	fast closing, fast opening
Solenoid valve V2	fast closing, fast opening
Voltage / Frequency	50 - 60 Hz 220 - 230 V AC -15 % +10 %
Switch-on duration	100%
Degree of protection	IP54

Multi-block thread flange:

MB-DLE 412 B01 S52	Rp ¾, 1, 1¼
MB-DLE 415 B01 S52	Rp 1, 1¼, 1½, 2
MB-DLE 420 B01 S52	Rp 1, 1¼, 1½, 2
Environmental conditions:	
Temperature range	-15...70 °C
Gas qualities	Suitable for gases of families 1, 2, 3 and other neutral gaseous media.

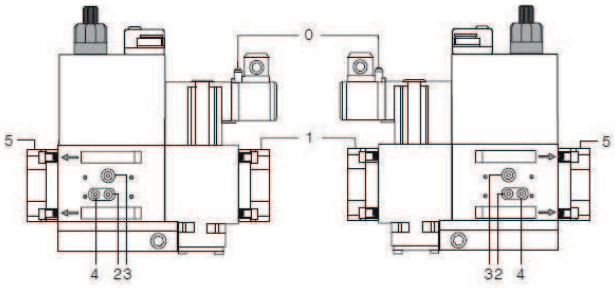
11.3.2 Overview

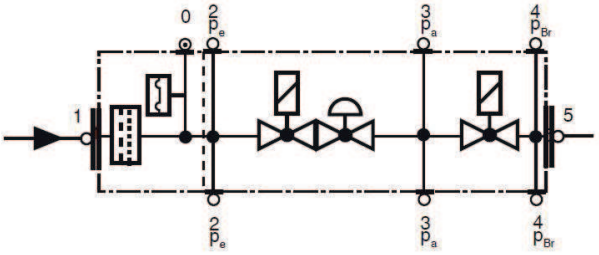
1. Electrical connection for valves (plug DIN EN 175 301-803)
2. Operating LED
3. Adjuster screw, regulator
4. Hydraulic brake and adjustment plate
5. Electromagnet
6. Measuring connection output pressure
7. Measuring connection G 1/8 after valve 1 (possible on both sides)
8. Output flange
9. Measuring connection G 1/8 after valve 2
10.
11. Measuring connection G 1/8 before valve 1 (possible on both sides)
12. Plug with valve water tray, regulator
13. Filter housing
14. Input flange
15. Measuring connection G 1/8 connection pressure
16. Gas pressure switch, min.
17. Electrical connection for pressure switch



11.3.3 Pressure taps

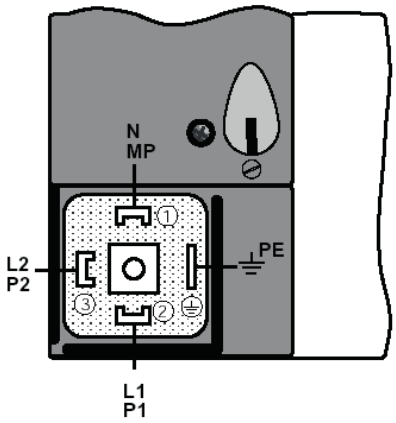
Pressure outlets

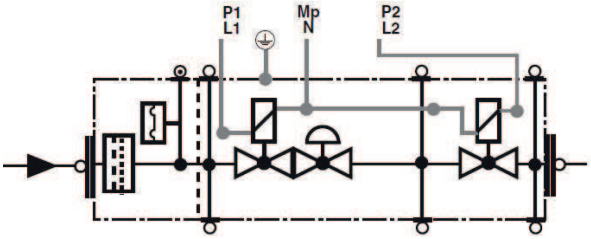




1, 2, 3, 4, 5. Locking screw G 1/8

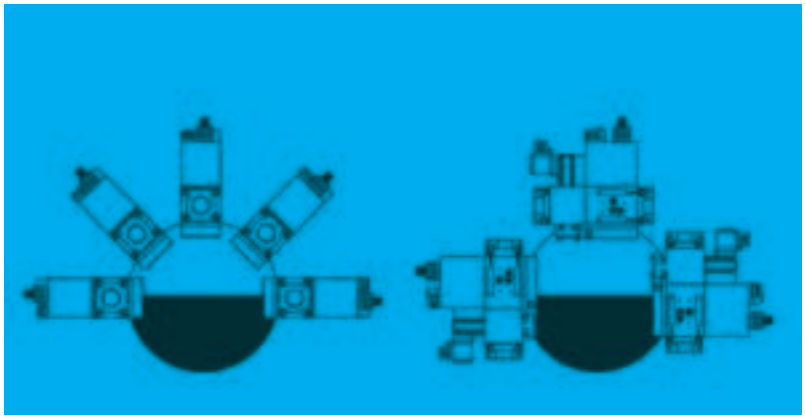
11.3.4 Electrical connection





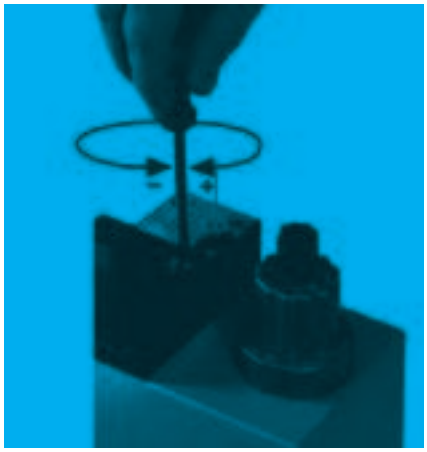
11.3.5 Installation position

Solenoid can be mounted vertically upright or in lying horizontally as well as its intermediate positions.



11.3.6 Adjusting the multi-block

When the multi-block is used together with the LMV37 control unit with butterfly valve on the gas pipe, the multi-block acts as a clean valve, which is not used to set the correct gas flow. However, some adjustment of the multi-block may help to achieve robust burner function. This mainly concerns the regulator on the multi-block. The regulator on the multi-block should be set in such a way that the input pressure is reduced using the regulator; this ensures that any variation in the input pressure will not affect the pressure leaving the block.

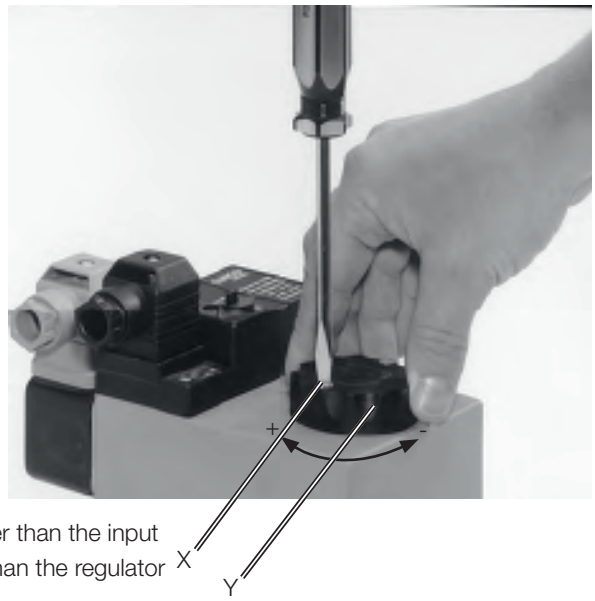


11.3.6.1 Adjusting the pressure regulator

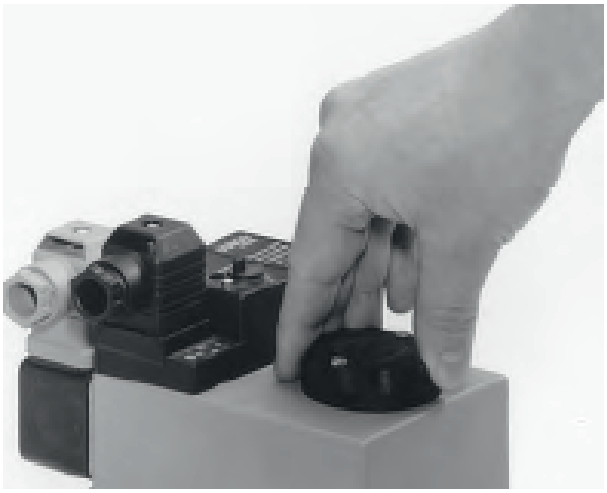
1. Open protective cover X.
2. Adjust the pressure regulator by turning the adjuster screw with screwdriver no. 3 to the desired output pressure in Pa, see image.
   Turning to right = higher regulator pressure
   Turning to left = lower regulator pressure
   Possible output ranges 4–50 mbar for MB-D 412 and 20–50 mbar for MB-D 415 and 420. Pressure is measured at pressure outlet no. 6.
   See section 10.3.3.

11.3.6.2 Adjusting the gas valve on the multi-block

1. Undo locking screw X.
2. Turn the knob for gas valve Y
   Turning to right = smaller amount of gas
   Turning to left = larger amount of gas
3. Do not forget to re-tighten locking screw X.



The amount should be adjusted by means of alternate adjustment of the gas valve and pressure regulator. The adjustment should be performed at maximum load when the flow and pressure drop are at their greatest.
If this procedure is followed, the preferred reduction of pressure in stages can be achieved. To maintain a good, robust supply of gas and robust subsequent combustion, the pressure should be lowered in stages between the adjustments to the pressure regulator and then the gas valve. In other words, the regulator pressure must be lower than the input pressure and the pressure after the valve must be lower than the regulator pressure.



NB This adjustment can be used as a complement on burners with the LMV control system with a butterfly gas valve. The main adjustment of the amount of gas takes place here with the gas butterfly damper.

NB This adjustment is not suitable on burners with the LMV control system with a butterfly gas valve. The adjustment of the amount of ignition gas is made here with the butterfly valve.

12. Electric equipment

12.1 Safety system

Safety systems must be installed in accordance with regulations that are applicable for the appliance. This may differ according to the process burner are installed in to. Se local regulations for information.

Safety system cables must be run in separate cables outgoing signal must not come in same cable as incoming signal. Signals must be in different harnesses for safety reasons.

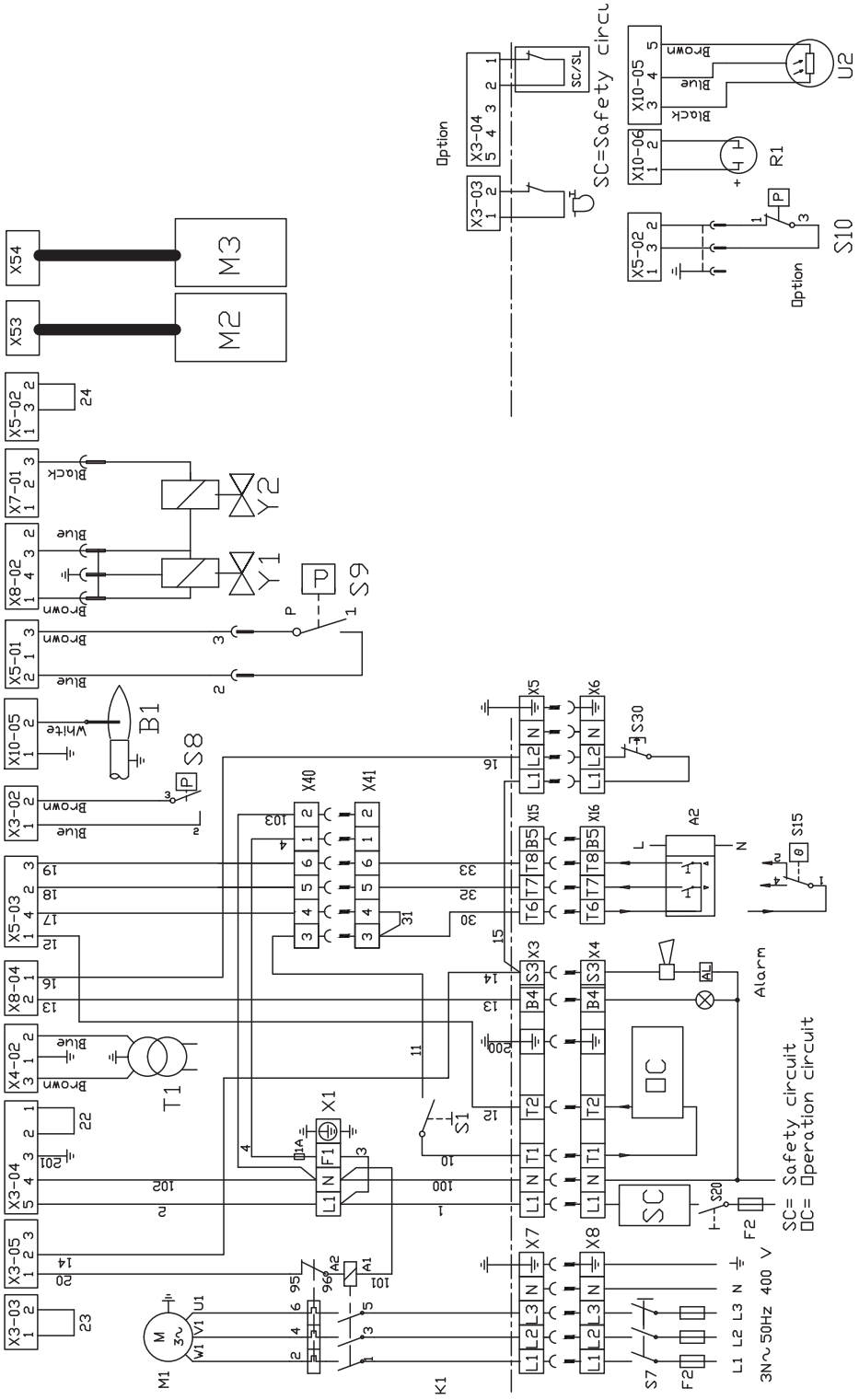
Safety system as door switches, water level, pressure, temperature and other safety limiters must be installed in safety loop according to process.

The switch for high gas pressure can be installed for different uses. Installation must be carried out pursuant to applicable regulations.

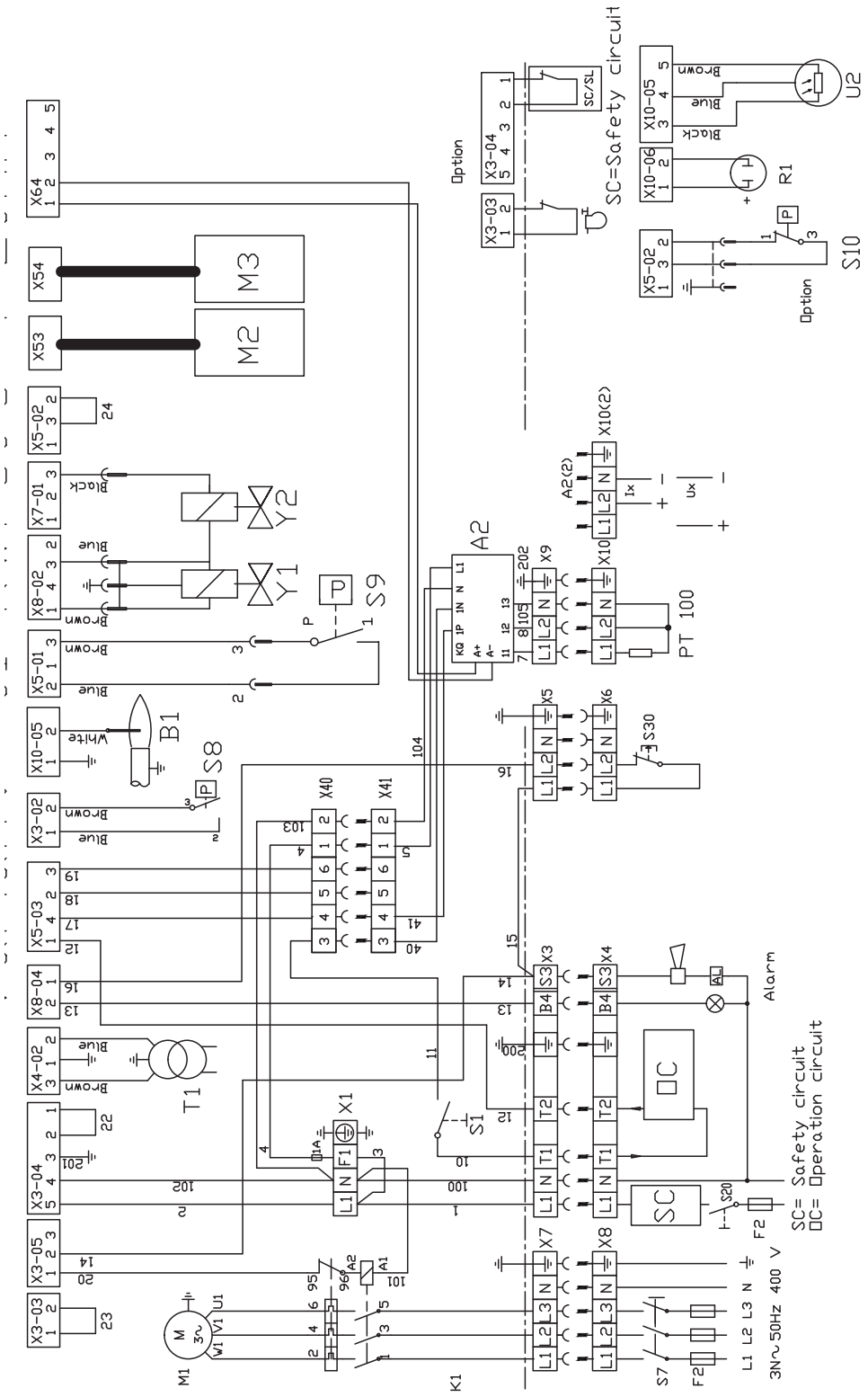
- The switch can be installed so that it reacts either to inlet pressure or pressure according to the multi-block pressure regulator.
- The high gas pressure switch can be installed to the connection pipe between the multi-block and the burner head, and will then function as a power monitor.
- Installation will block burner operation and a manual restart will be required.

Installation must be carried out pursuant to applicable regulations.

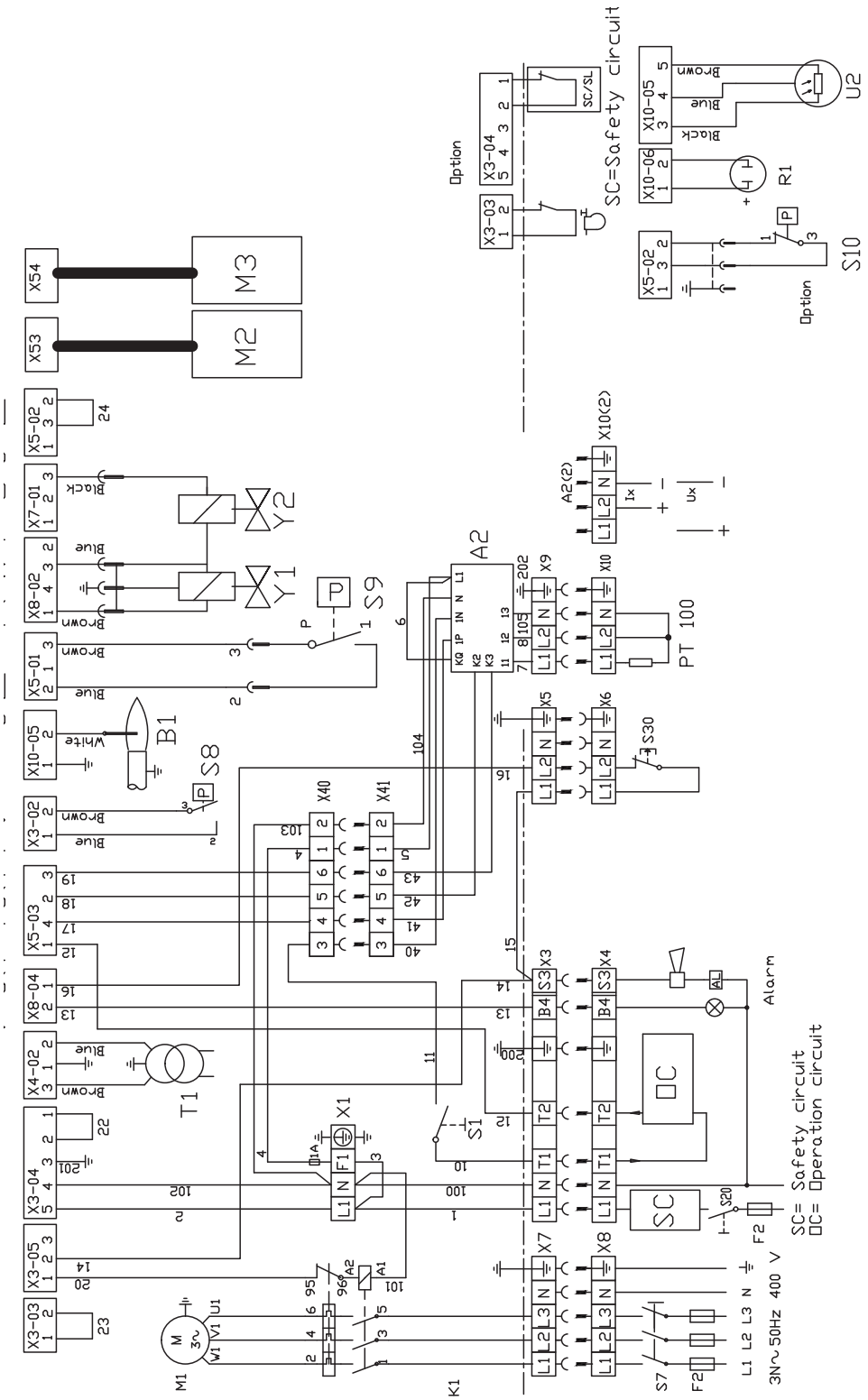
12.2 Wiring diagram



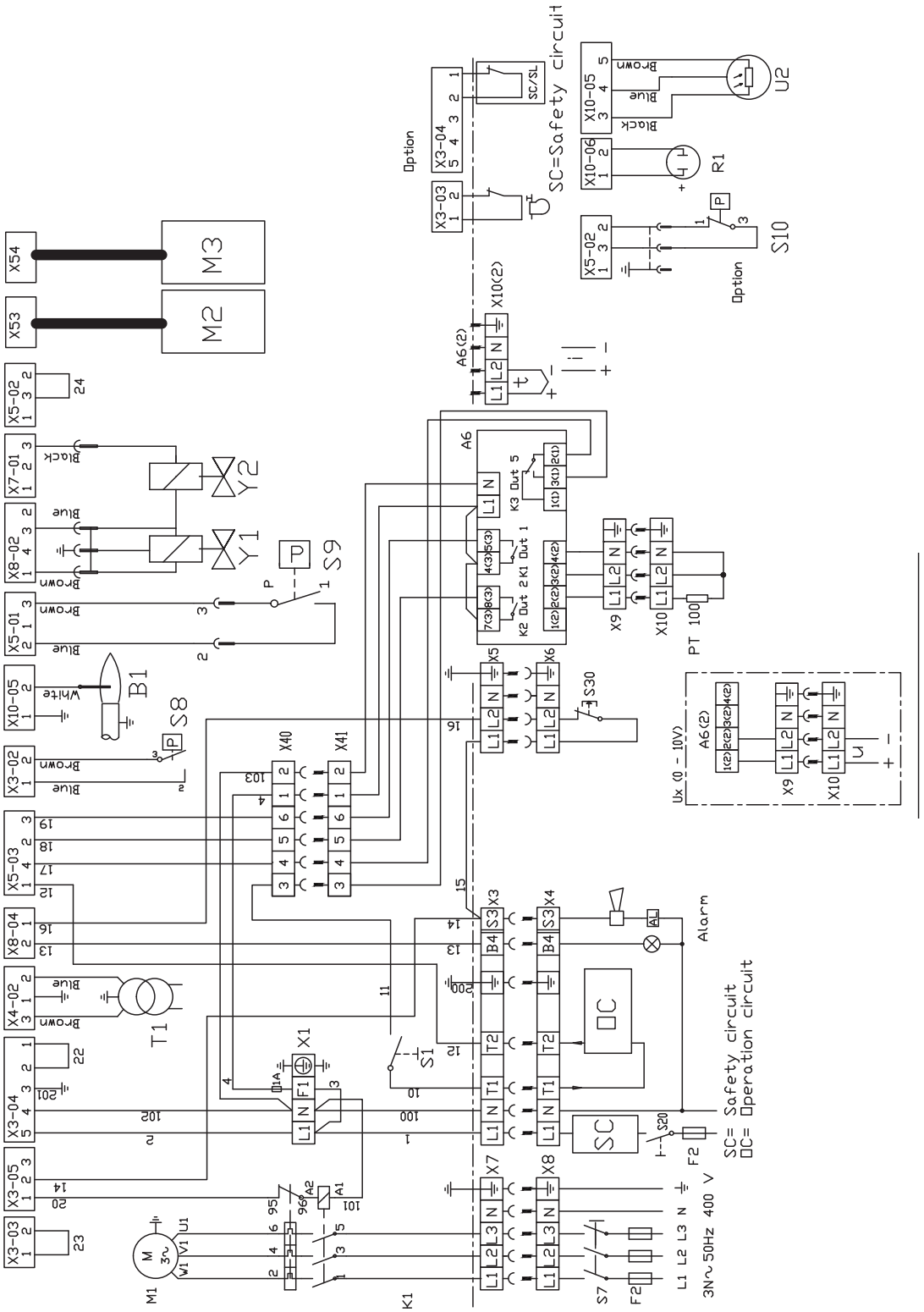
12.3 Wiring diagram RWF 50:3



12.4 Wiring diagram RWF 50:2



12.5 Wiring diagram Jumo 316



12.7 List of components

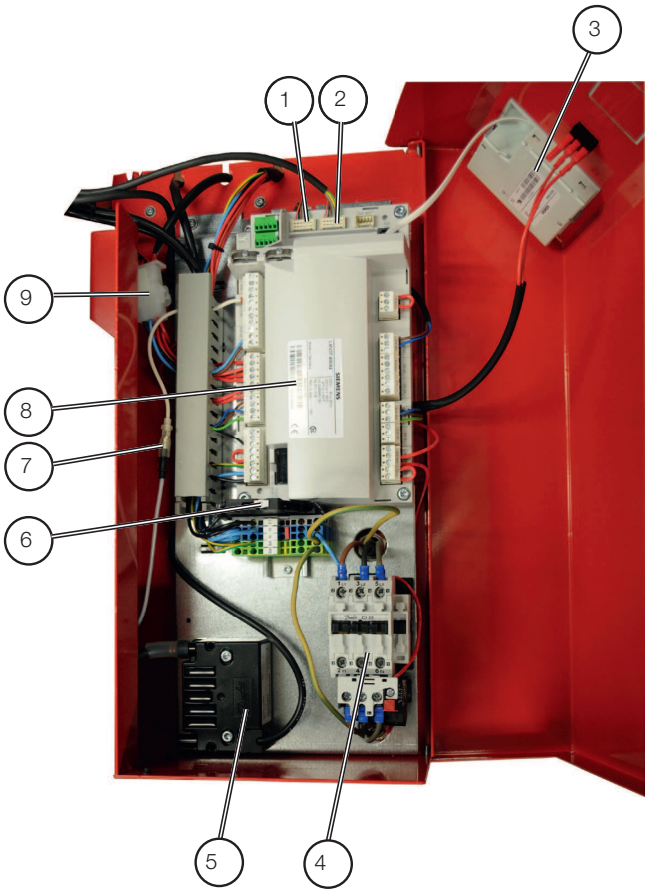
M1	Burner motor
K1	Motor contactor with thermal overload protector
T1	Ignition transformer
S8	Air pressure switch
B1	Ionization electrode
S1	Operating switch
S7	Main switch
S9	Gas pressure switch
S15	Control thermostat, 3-pole
S20	Main switch
S30	External reset
Y1	Gas solenoid valve
Y2	Gas solenoid valve
M2	Damper Motor air
M3	Damper Motor (gas)
A2	Power control
A6	Power control R316
A6(2)	PT 100-sensor, Thermocouple, current/voltage
F2	Operating fuse

Max loading K1
Connection A1,A2 / 95, 96 / 97, 98 Max 0,2A/15W

R1	UV-detector
U2	UV-detector QRC
X1	Connection terminal board
X3	Plug-in contact, burner
X4	Plug-in contact, boiler
X5	Plug-in contact, stage 2, burner
X6	Plug-in contact, stage 2, boiler
X7	Plug-in contact, 3 phase, burner
X8	Plug-in contact, 3 phase, boiler
X9	Plug-in contact, power controller R316, burner
X10	Plug-in contact, power controller R316
X10(2)	Thermocouple, current/voltage
X15	Plug-in contact, power controller, burner
X16	Plug-in contact, power controller
X40	Contact power controller
X41	Contact power controller
SC	Safety circuit
OC	Operation circuit

12.6 Components, electrical cabinet

1. Contact for damper motor, air SQN 14 (BG550/650)
   Contact for damper motor, air SQM 33 (BG700-950)
2. Contact for damper motor, gas SQN 13
3. AZL display for LMV automatic control unit
4. Contactor with surge protection
5. Transformer
6. Fuse holder
7. Branching point/measuring point for ionisation
8. LMV automatic control unit
9. Quick-release switch for regulator



13. LMV37 automatic control unit

The LMV37 automatic control unit is a piece of control equipment that can be used for many different types of burner.
In the following review of how this control equipment works and can be adjusted, the description will focus on the type of burner covered by this

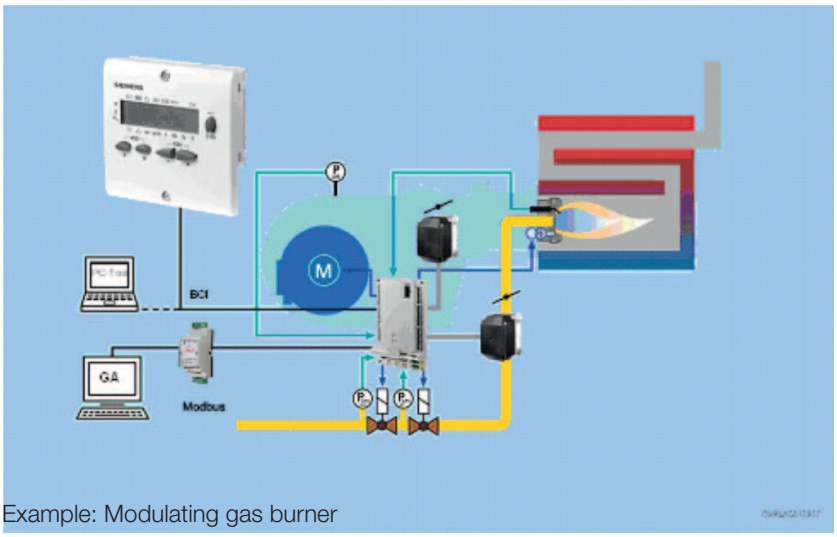
13.1 System structure/function description

The LMV37.4... is a microprocessor-based burner management system with matching system components for the control and supervision of forced draft burners of medium to high capacity.

Integrated in the basic unit of the LMV37.4... are:

- Burner management system complete with valve proving system
- Electronic air-fuel ratio control system for a maximum of 2 SQM3... or SQN1... actuators
- Control of VSD air fan
- Modbus interface

At the time of writing, of the parameters mentioned above, motor frequency control and communication via modbus are not available on the burner models described in this manual.



Example: Modulating gas burner

The system components (display and operating unit, actuators) are connected directly to the LMV37.4... basic unit. All safety-related digital inputs and outputs of the system are monitored by a contact feedback network.

13.2 General information

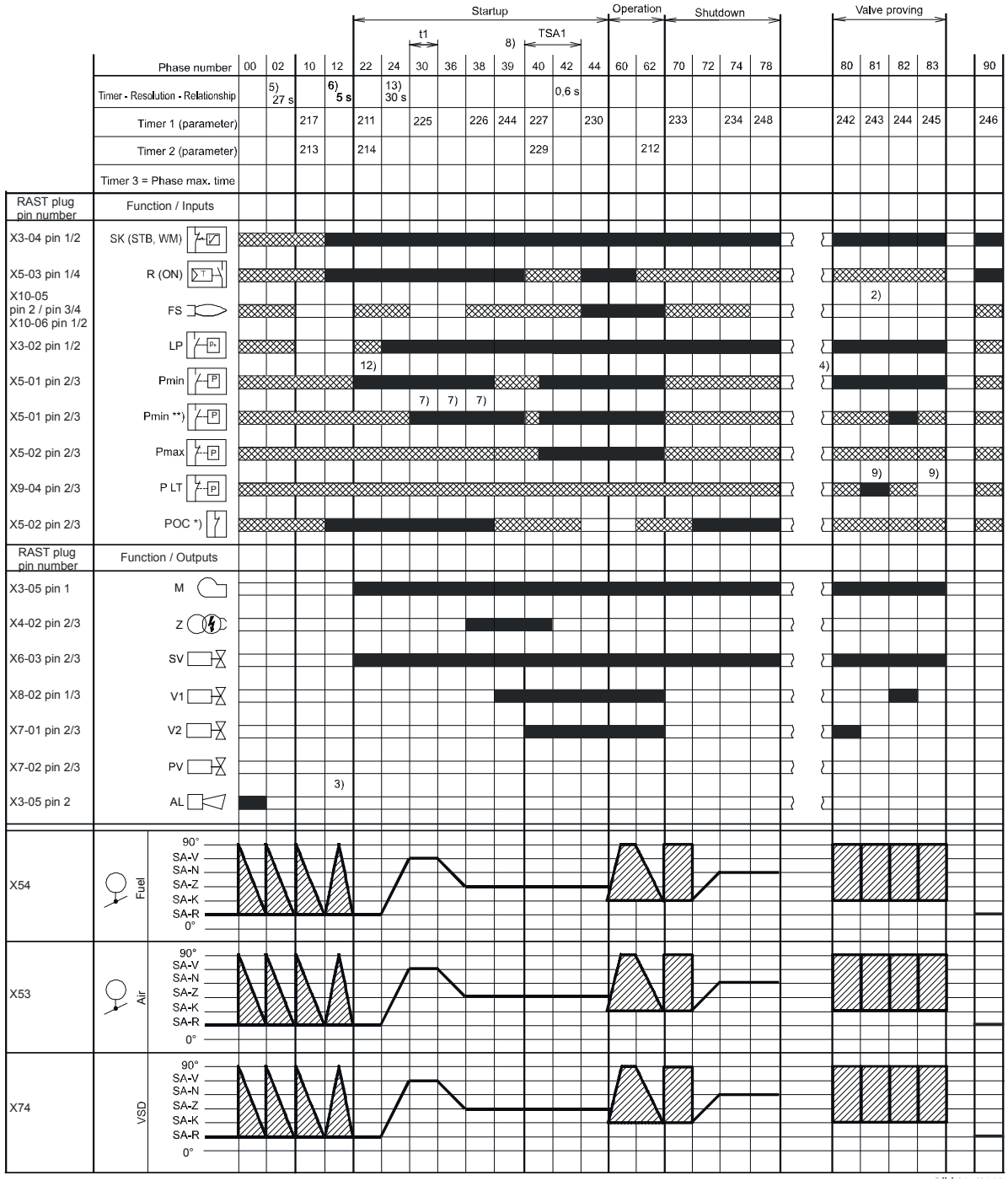
The burner management system is operated and parameterized via the AZL2… display. The AZL2… with LCD and menu-driven operation facilitates straightforward use and targeted diagnostics. When making diagnostics, the display shows the operating states, the type of error and the point in time the error occurred. Passwords protect the different parameter levels of the burner against unauthorized access. It is possible to select from different types of fuel trains and make use of a wide choice of individual parameter settings (program times, configuration of inputs / outputs, etc.), enabling the installer to make optimum adaptations to the relevant application. A change of parameters varies in levels of authorization, this manual will give info on those that might be changed by the installer. The actuators are driven by stepper motors and can be positioned with high resolution. Specific features and actuator settings are defined by the LMV37.4... basic unit.

13.3 Technical Data Basic unit LMV37.4...

Mains voltage	
LMV37.400A2	AC 230 V -15 % / +10 %
Mains frequency	50 / 60 Hz ±6 %
Safety class	I, with parts according to II and III to DIN EN 60730-1
Perm. mains primary fuse (externally)	Max. 16 AT
Unit fuse F1 (internally)	6.3 AT (DIN EN 60127 2 / 5)
Mains supply: Input current depending on the operating state of the unit	

Under voltage	
Safety shutdown from operating position at mains voltage	
LMV37.400A2	Approx. AC 186 V
Restart on rise in mains voltage	
LMV37.400A2	Approx. AC 195 V

Gas direct ignition «G», «G mod», «G mod pneu»



Legend to the sequence diagrams

Not all phases, times, indices, abbreviations and symbols appear in the individual sequence diagrams or are needed there!

Phase numbers

00	Lockout phase
02	Safety phase
10	Home run
12	Standby (stationary)
22	Fan motor (M) = ON, safety valve (SV) = ON
24	Air damper (LK) — fuel valve (V) – position
30	Prepurging
36	Air damper (LK) — ignition (Z) – position
38	Preignition ignition (Z) = ON
39	Test pressure switch-min (Pmin)
40	Fuel valve (V) = ON
42	Ignition (Z) = OFF
44	Interval 1 (t44)
50	Safety time 2 (TSA2)
52	Interval 2 (t52)
60	Operation 1 (stationary)
62	Operation 2 air damper (LK) — low-fire (KL) – position
70	Afterburn time (t13)
72	Air damper (LK) — Rated load (NL) – position
74	Postpurge time (t8)
78	Postpurge time (t3)
80	Evacuation of test space
81	Atmospheric pressure test
82	Filling of test space
83	Gas pressure test
90	Gas shortage waiting time

Valve proving is performed depending on the parameter settings:
Simultaneously with the prepurge time and/or the afterburn time.

Times

TSA1	1st safety time
TSA2	2nd safety time
t1	Prepurge time
t3	Postpurge time
t8	Postpurge time
t13	Afterburn time
t44	Interval 1
t52	Interval 2

Indices

1)	Parameter:	Short/long prepurge time for oil only Short/long on time of oil pump – time
2)	Only with valve proving during startup	
3)	Parameter:	With/without alarm in the event of start prevention
4)	If signal is faulty in the startup phase, phase 10 is next, otherwise phase 70	
5)	Max. time safety phase, then lockout	
6)	Time from occurrence of start prevention to signaling	
7)	Only in case of valve proving during startup (valve proving via pressure switch-min)	
8)	Only in case of startup without valve proving (valve proving via pressure switch -min)	
9)	Inverse logic in case of valve proving via pressure switch-min	
10)	Parameter:	Oil pressure min-input 1 = active from phase 38 2 = active from safety time
11)	Only with fuel train Lo and 2 fuel valves	
12)	Parameter 223:	Repetition limit value gas pressure switch-min in connection with gas shortage program parameter 246 (phase 90)
13)	Max. drop-in/response time for air pressure switch	
14)	Alternative to valve proving	
15)	Alternative to pressure switch-max (Pmax) or POC	

Abbreviations

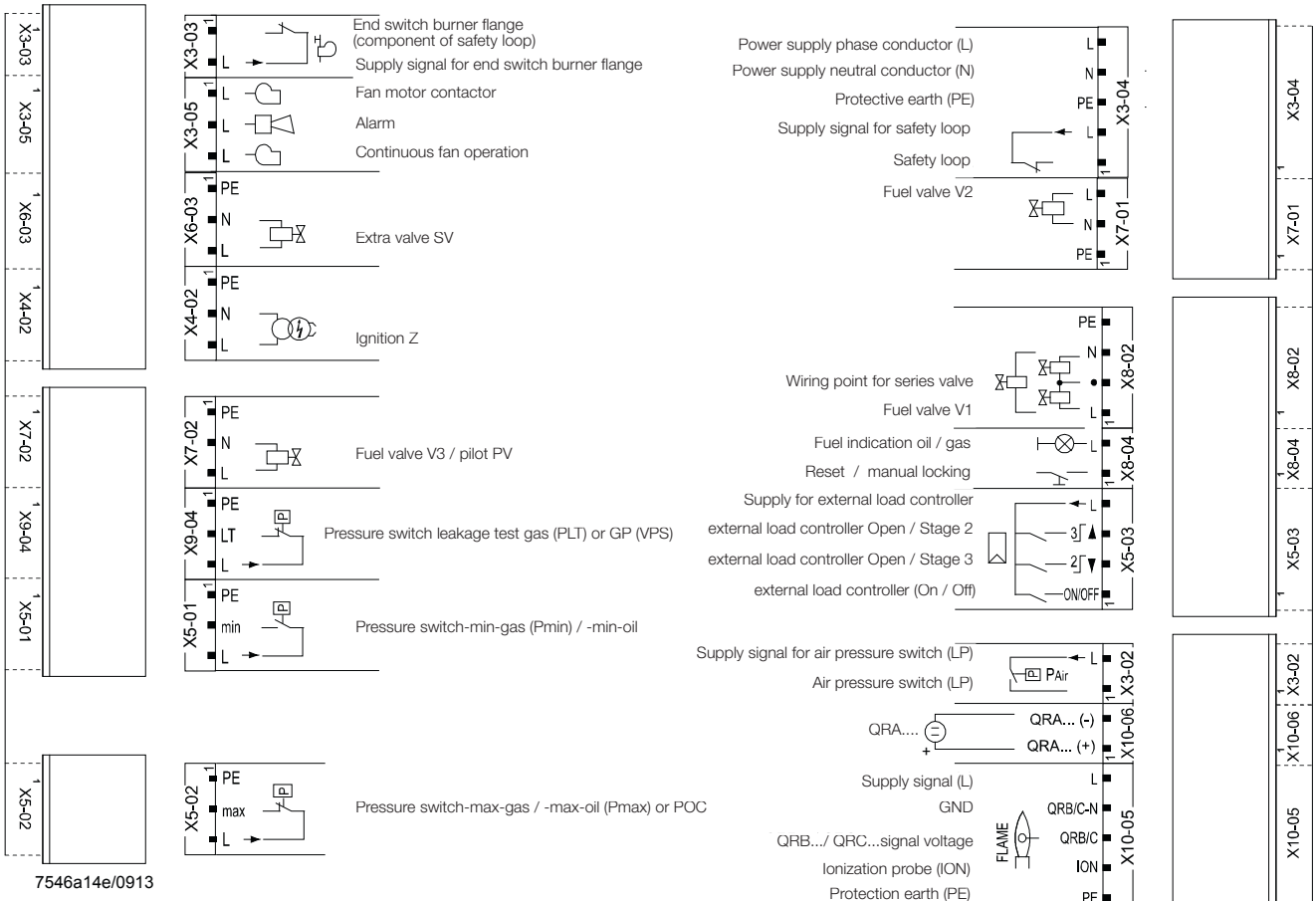
AL	Alarm
FS	Flame signal
GM	Fan motor contactor
LP	Air pressure switch
M	Fan motor
P LT	Pressure switch for valve proving
Pmax	Pressure switch-max
Pmin	Pressure switch-min
POC	Proof of closure
PV	Pilot valve
R	Temperature or pressure controller
SB	Safety limiter
SK	Safety loop
STB	Safety limit thermostat
SV	Safety valve
WM	Water shortage
V1	Fuel valve 1
V2	Fuel valve 2
VP	Combustion pressure switch
Z	Ignition transformer

SA	Actuator
SA-K	Low-fire position of actuator
SA-N	Postpurge position of actuator
SA-R	Home position of actuator
SA-V	Rated load position of actuator
SA-Z	Ignition load position of actuator

Symbols

	Permissible position range
	In Standby mode: Actuator is allowed to travel within the permissible position range, but is always driven to the home position; must be in the home position for phase changes
0°/10% 90°/100%	Position as supplied (0°) Actuator fully open (90°)
	Input/output signal 1 (ON) Input/output signal 0 (OFF) Input permissible signal 1 (ON) or 0 (OFF)

13.4 Connection and internal diagram



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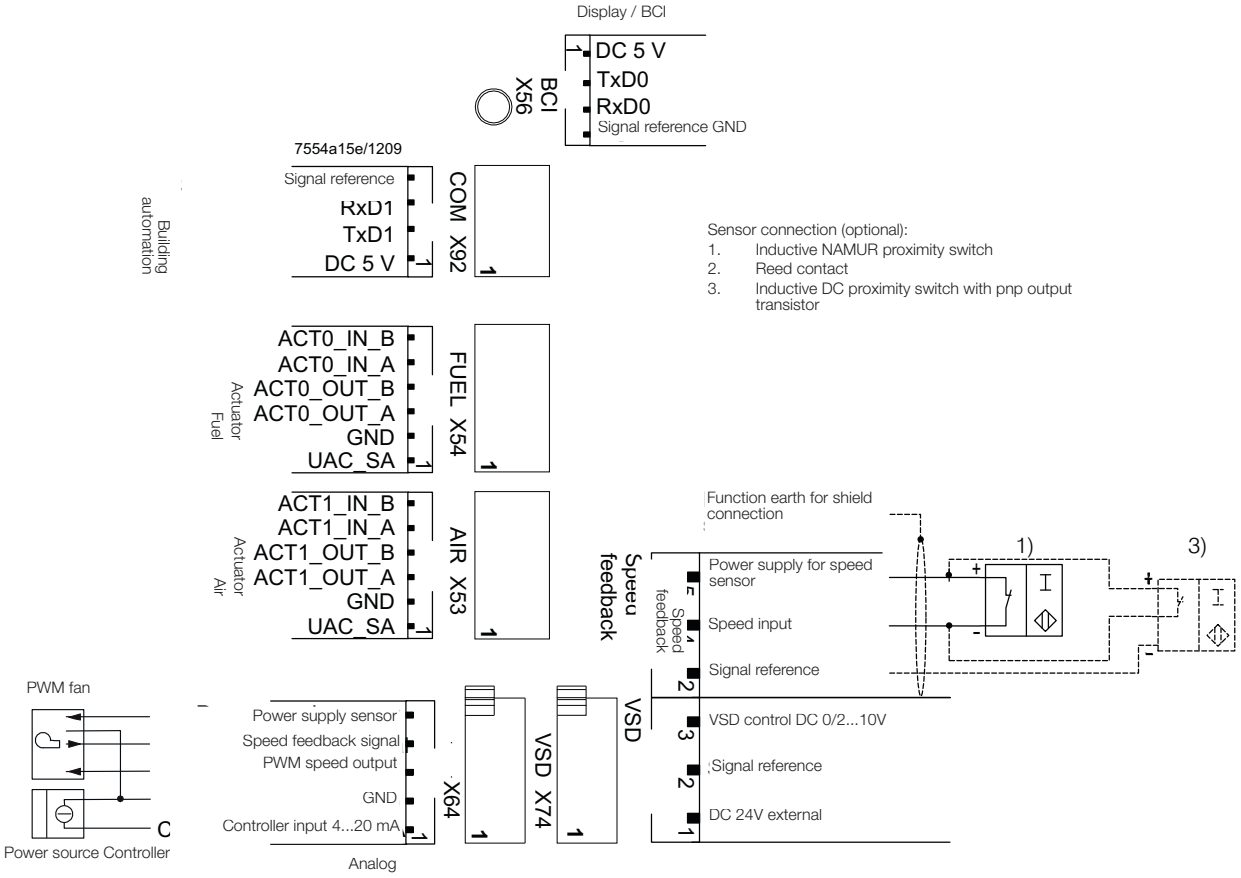
Shielding:

For shielding the cables on the VSD, refer to:

- Siemens SED2 VSD Commissioning Manual (G5192), chapters 4 and 7, or
- Danfoss Operation Manual VLT 6000 (MG60A703), chapter Installation


Display / BCI
DC 5 V
TxD0
RxD0
Signal reference GND
BCI X56
7554a15e/1209
Signal reference
RxD1
TxD1
DC 5 V
COM X92
Building automation
Sensor connection (optional):
1. Inductive NAMUR proximity switch
2. Reed contact
3. Inductive DC proximity switch with pnp output transistor
ACT0_IN_B
ACT0_IN_A
ACT0_OUT_B
ACT0_OUT_A
GND
UAC_SA
FUEL X54
Actuator Fuel
ACT1_IN_B
ACT1_IN_A
ACT1_OUT_B
ACT1_OUT_A
GND
UAC_SA
AIR X53
Actuator Air
Function earth for shield connection
Speed feedback
Power supply for speed sensor
Speed input
Signal reference
1)
3)
PWM fan
Power supply sensor
Speed feedback signal
PWM speed output
GND
Controller input 4...20 mA
X64
VSD X74
VSD
VSD control DC 0/2...10V
Signal reference
DC 24V external
Power source Controller
Analog

14. Operation

14.1 LMV37 automatic control unit

14.1.1 Explanation of display and buttons

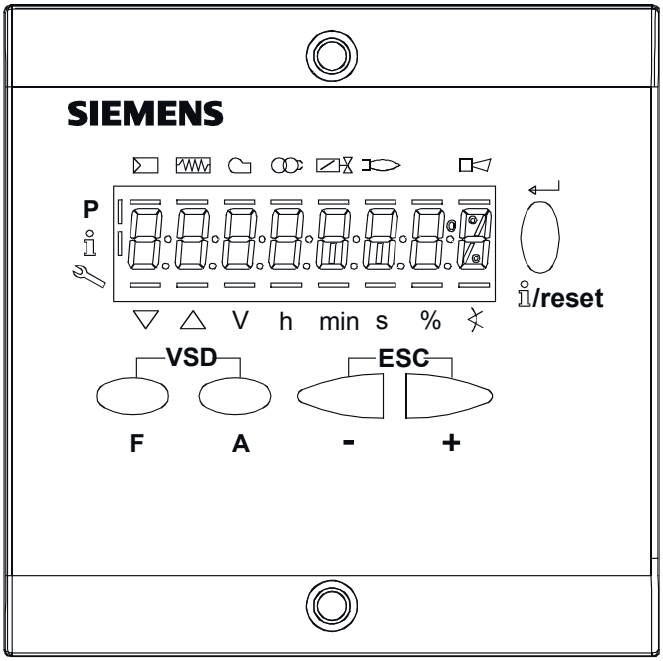


Figure 3: Description of unit/display and buttons

Button	Function
F	**Button F** - For adjusting the fuel actuator (keep F depressed and adjust the value by pressing - or +)
A	**Button A** - For adjusting the air actuator (keep A depressed and adjust the value by pressing - or +)
VSD F A	Buttons A and F: VSD function - For changing to parameter setting mode P (press simultaneously F and A)
i/reset	**Info and Enter button** - For navigating in info or service mode • Selection (symbol flashing) (press button for <1 s) • For changing to a lower menu level (press button for 1…3 s) • For changing to a higher menu level (press button for 3…8 s) • For changing the operating mode (press button for >8 s) - Enter in parameter setting mode - Reset in the event of fault - One menu level down

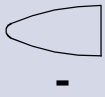
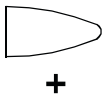
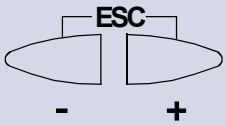
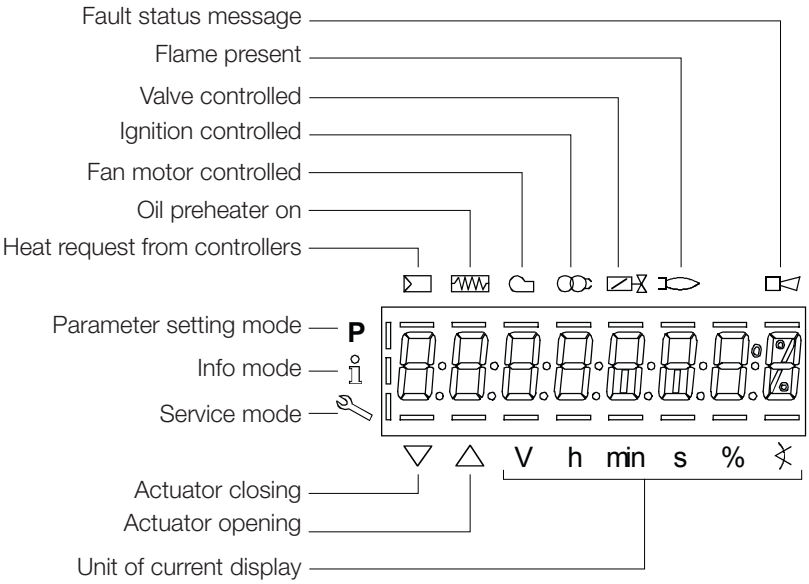
Button	Function
	**- button** - For decreasing the value - For navigating during curve adjustments in info or service mode
	**+ button** - For increasing the value - For navigating during curve adjustments in info or service mode
	**+ and - button: Escape function** (press - and + simultaneously) - No adoption of value - One menu level up

Figure 4: Meaning of display



14.2 List of phase displays

The display shows which phase the burner is in. The table below lists the codes and explains what these mean for the various phases. Not all the phases described in the table are shown or are suitable for the burners described in this manual.

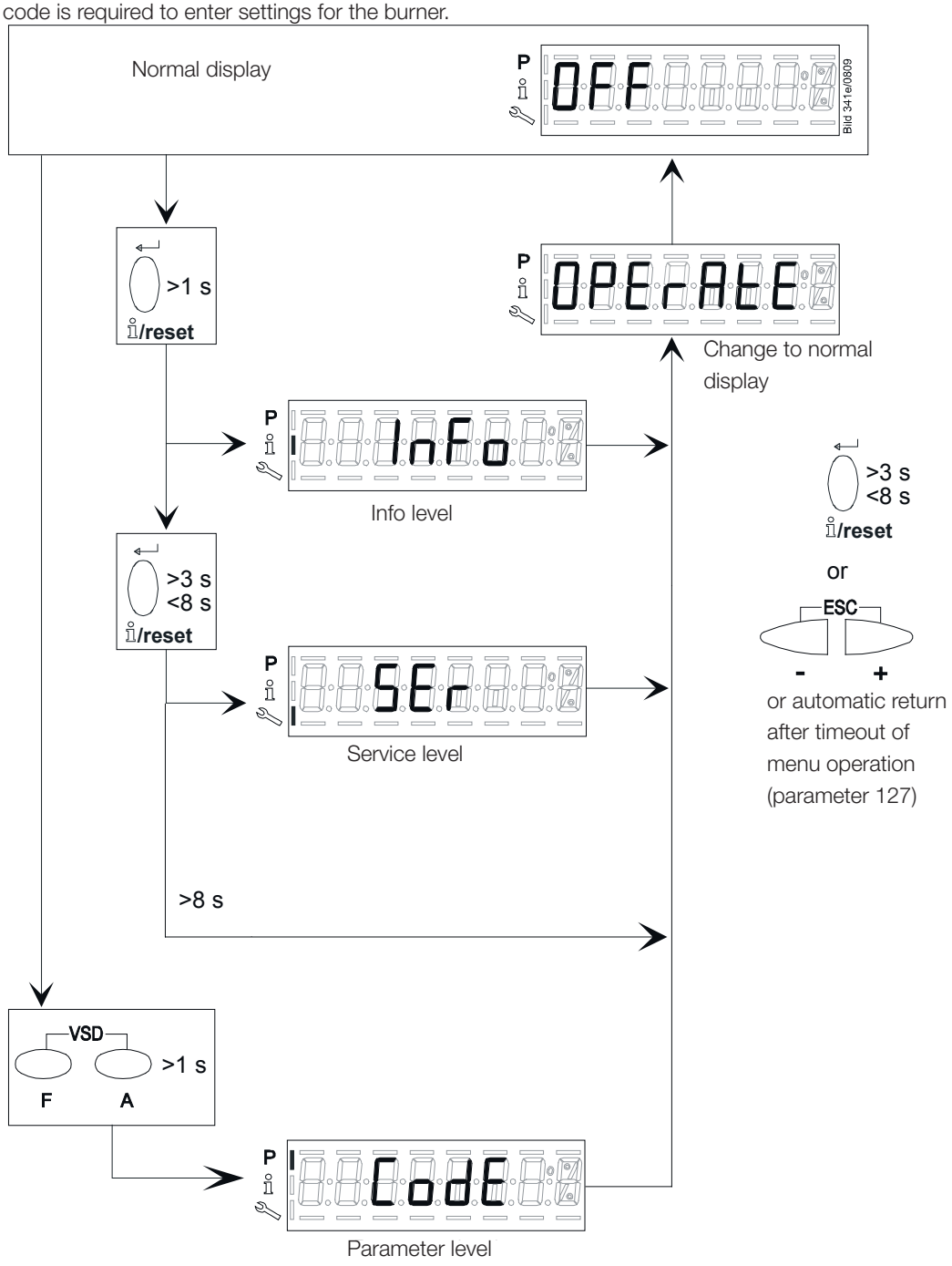
Phase	Function
Ph00	Lockout phase
Ph01	Safety phase
Ph10	Home run
Ph12	Standby (stationary)
Ph22	Fan ramp up time (fan motor = ON, safety valve = ON)
Ph24	Traveling to the prepurge position
Ph30	Prepurge time
Ph36	Traveling to the ignition position
Ph38	Preignition time
Ph39	Valve proving filling time (test of pressure switch-min when fitted between fuel valves V1 and V2)
Ph40	1st safety time (ignition transformer ON)
Ph42	1st safety time (ignition transformer OFF)
Ph44	Interval 1
Ph50	2nd safety time
Ph52	Interval 2
Ph60	Operation 1 (stationary)
Ph62	Max. time low-fire (operation 2, preparing for shutdown, traveling to low-fire)
Ph64	Switching back to pilot: Modulation to ignition load
Ph65	Switching back to pilot: Interval 2 waiting time
Ph66	Switching back to pilot: Reactivation of ignition + pilot
Ph67	Switching back to pilot: Shutdown of main valves
Ph68	Switching back to pilot: Pilot mode waiting phase
Ph69	Switching back to pilot: Pilot mode waiting phase for burner startup
Ph70	Afterburn time
Ph72	Traveling to the postpurge position
Ph74	Postpurge time (no extraneous light test)
Ph78	Postpurge time (t3) (abortion when load controller ON)
Ph80	Valve proving test evacuation time
Ph81	Valve proving test time atmospheric pressure, atmospheric test
Ph82	Valve proving filling test, filling
Ph83	Valve proving time gas pressure, pressure test
Ph90	Gas shortage waiting time

14.3 Automatic control unit levels

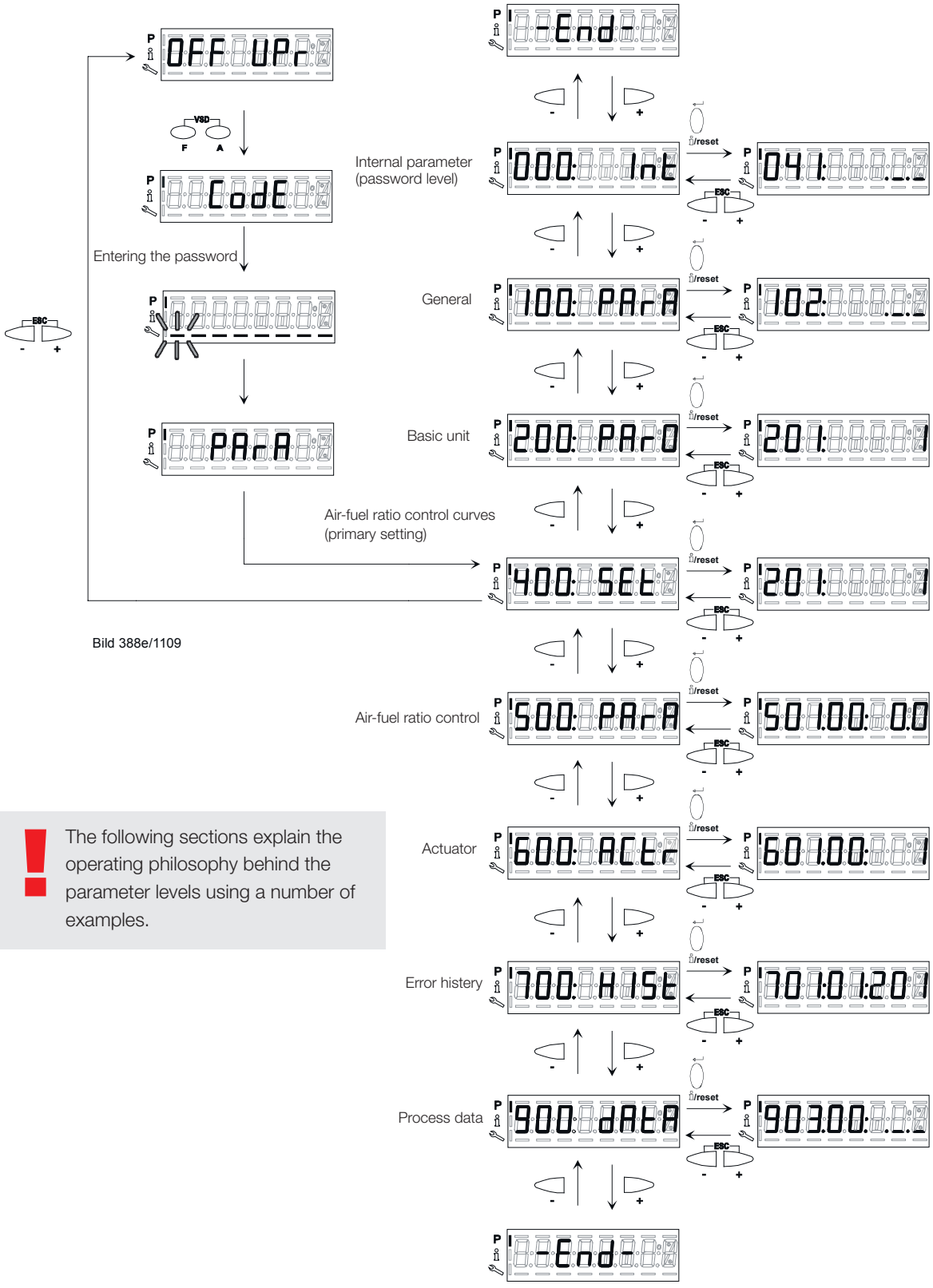
When working on burners there are different levels at which the automatic control unit can be accessed.

The info and service levels can be accessed without a password; error codes, error history and basic information about the burner can be viewed on these levels.

A code is required to enter settings for the burner.



14.3.1 Structure of parameter levels



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The following sections explain the operating philosophy behind the parameter levels using a number of examples.

14.3.2 Parameter of level info

No.	Parameter
167	Fuel volume resettable (m^3, l, ft^3, gal)
162	Operating hours resettable
164	Startups resettable
163	Operating hours when unit is live
166	Total number of startups
113	Burner identification
107	Software version
108	Software variant
102	Identification date
103	Identification number
104	Preselected parameter set: Customer code
105	Preselected parameter set: Version
143	Reserve
End	

14.3.3 Parameter of level service

No.	Parameter
954	Flame intensity
960	Actual flow rate (fuel throughput in m^3/h, l/h, ft^3/h, gal/h)
121	Manual output Undefined = automatic operation
922	Incremental position of actuators Index 0 = fuel Index 1 = air
936	Standardized speed
161	Number of faults
701 . . . 725	Error history: 701-725.01.Code ex. 701. 01. xxx chronological error list index value of index

Indexlista:

01 = error code

02 = diagnostic code

03 = error class

04 = error phase

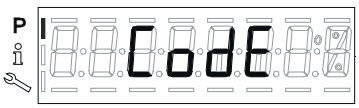
05 = startup counter

06 = output

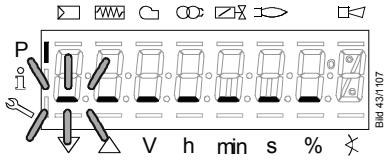
14.3.4 Access code for service engineer level

The code for logging into service level is found on the plate on the inside of the cover for the electrical connections box.

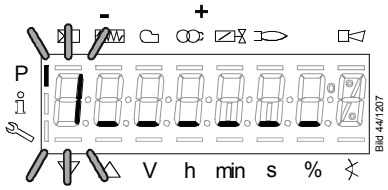
Press button combination VSD F A to display **CodE**



When releasing the buttons, 7 bars appear the first of whishes.

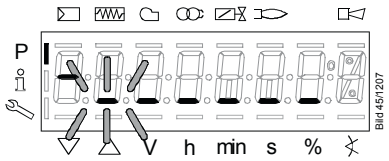


Press or to select a number or letter.



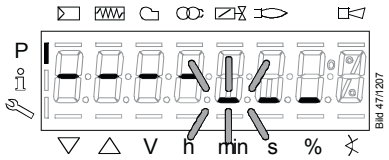
Press to confirm the value

i/reset



The value entered changes to a minus sign (-)
The next bar starts flashing.

Complete the rest of the password according to the principle described.



Example: Password consisting of 4 characters.

After entery of the last character the password must be confirmed by pressing

/reset

14.4 Setting the automatic control unit

To set the correct ratio between air and fuel, it is important to understand how this type of burner is controlled. This chapter will describe the procedure to follow when adjusting a burner with an LMV37 automatic control unit.

Note! When power is turned on for an unadjusted automatic control unit, "**OFF UPr**" is always shown in the display.

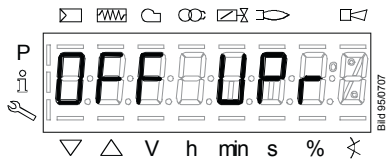
14.3.5 Setting an automatic control unit which has not previously been set or lost its settings

Check that the burner is receiving power and that gas is being supplied to the burner.

Move the switch (X) on the burner to the ON position.

The text "**OFF UPr**" is shown in the display.

Follow the procedure indicated below to set the automatic control unit.

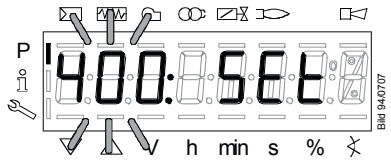


An unprogrammed unit or a unit whose operating mode has been reset or changed displays **OFF UPr.**

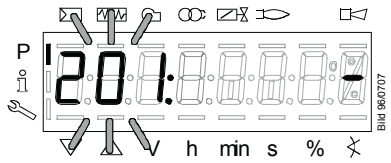
Press VSD (F) (A) > 1 second to access login mode.

To continue with the setting work, you need to log into service engineer level. See 5.3.4.

After login is complete, continue with the setting work as shown below.



Press i/reset to select parameter **400** for initial commissioning and for setting air-fuel controll.



201: appears flashing.

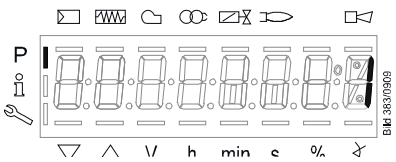
Press i/reset to go to the settings for air-fuel ratio control and parameter **201** for selecting the operating mode.

Ensure that the fuel train is correctly set in compliance with the type of burner used.

No	Parameter	Actuator controlled	
201	Burner operating mode (fuel train, modulating / multistage, actuators, etc.)	Air	Fuel
	-- = undefined (delete curves)	•	•
	1 = gas modulating (G mod)	•	•
	2 = gas modulating with pilot valve (Gp1 mod)	•	•
	3 = gas modulating with pilot valve (Gp2 mod)	•	•
	4 = oil modulating (Lo mod)	•	•
	5 = oil 2-stage (Lo 2 stage)	•	-
	6 = oil 3-stage (Lo 3 stage)	•	-
	7 = gas modulating (G mod pneu)	•	-
	8 = gas modulating (Gp1 mod pneu)	•	-
	9 = gas modulating (Gp2 mod pneu)	•	-
	10 = oil modulating with gas pilot (LoGp mod)	•	•
	11 = oil 2-stage with gas pilot (LoGp 2-stage)	•	-
	12 = oil modulating with 2 fuel valves (Lo mod 2V)	•	•
	13 = oil modulating with gas pilot and 2 fuel valves (LoGp mod 2V)	•	•
	14 = gas modulating (G mod pneu, 0 active)	-	-
	15 = gas modulating with pilot (Gp1 mod pneu, 0 active)	-	-
	16 = gas modulating with pilot (Gp2 mod pneu, 0 active)	-	-
	17 = oil 2-stage (Lo 2-stage, 0 active)	-	-
	18 = oil 3-stage (Lo 3-stage, 0 active)	-	-
	19 = gas modulating only when firing on gas (G mod fuel active)	-	•
	20 = gas modulating with pilot only when firing on gas (Gp1 mod fuel active)	-	•
	21 = gas modulating with pilot only when firing on gas (Gp2 mod fuel active)	-	•
	22 = oil modulating only when firing on oil (Lo mod fuel active)	-	•

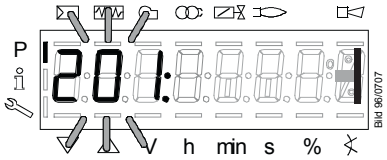
This manual describes “1=gas modulating (Gmod)” type burners.

Press: ESC - + to return to parameter level.

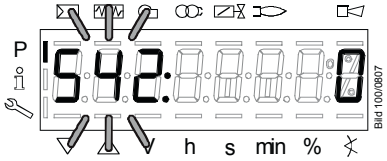


Press i/reset to save selected setting.

Press: ESC - + to return to parameter level.



To the next parameter +



Parameter **542** to activate the VSD / PWM fan.
You can choose:
0 = VSD / PWM fan OFF
1 = VSD / PWM fan ON

If the parameter is set correctly, move directly to the next parameter with +

Press i/reset to adjust parameter **542**.

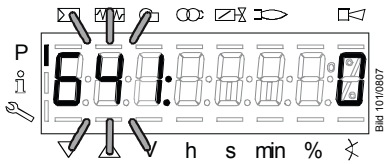
Select your setting by pressing one of the buttons - +

Press i/reset to save the setting for parameter **542:** VSD

Press: ESC - + to return to parameter level.

This manual describes “0=VSD OFF” type burners.

To the next parameter + Back to the previous parameter -



Parameter **641** to control speed standardization of the VSD.

You can choose:

0 = speed standardization of VSD OFF

1 = speed standardization of VSD ON

After setting speed standardization to 1, standardization of the VSD commences. If successful, the parameter is reset to 0. Negative values indicate errors (refer to chapter Automatic speed standardization).

If the parameter is set correctly, move directly to the next parameter with +

Press: to adjust parameter **641**: speed standardization

i/reset

Select your setting by pressing one of the buttons - +

Press: to save the setting for parameter **641:** VSD

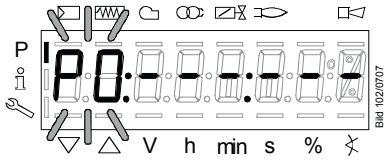
i/reset

Press: ESC to return to parameter level.

- +

> **!** This manual describes "0=speed standardization" type burners.

To the next parameter +

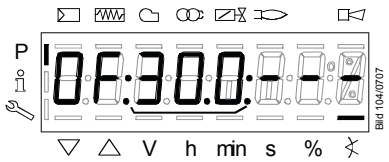


Display **P0** appears flashing.

Curvepoint for ignition load.

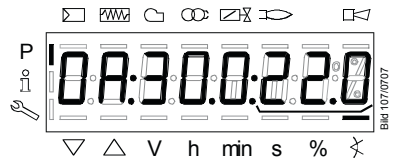
Press simultaneously F and - or + to set ignition position **P0** of the fuel damper.

> **!** Set a suitable fuel-air mixture so that the burner starts.



Example: **30.0**

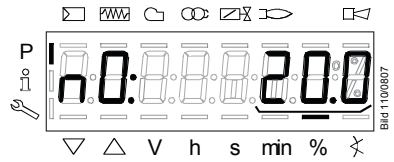
Press simultaneously A and - or + to set ignition position **P0** of the air actuator.



Example: **22.0**

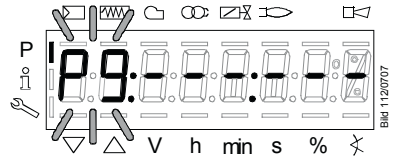
Press simultaneousl F and A and - or + to adjust speed **nO** of the load controller.

This menu option is only shown if parameter 542 has been set to 1, for burners with VSD.
This manual only describes burners without VSD.



Example: **20.0**

To the next curvepoint +

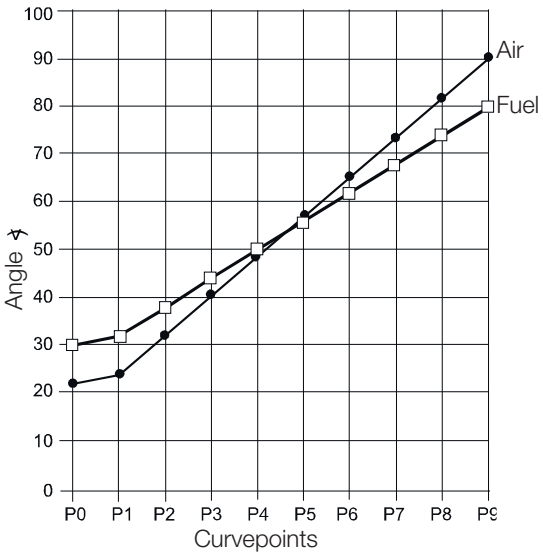


P9 appears flashing.
Curvepoint for high-fire.
Same procedure as with **P0**

Note:
If - is pressed first, the display jumps to 90!

Back to the previous curvepoint -

When curvepoint 9 is set, press + to start the burner.



It is important to set **P0** and **P9** as accurately as possible. These settings are used to calculate the remaining curvepoints once the burner has started.

Curvepoints P2 to P8 are automatically computed as a straight line between P1 and P9.

Example 1 = gas modulating

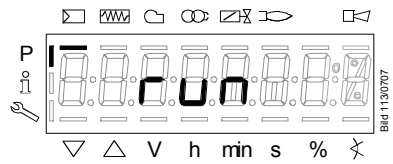
	Curvepoint	Value 1 fuel	Value 2 air
P0, **P1** and **P9** are set as described	**P0**	30.0	22.0
	P1	32.0	24.0
	P9	80.0	90.0

Curvepoint **P1** is automatically set to the same value as **P0** on the first start. This value can, however, be adjusted once the burner has started.

	Curvepoint	Value 1 fuel	Value 2 air
P2 through **P8** have automatically been calculated:	**P2**	38.0	32.3
	P3	44.0	40.5
	P4	50.0	48.8
	P5	56.0	57
	P6	62.0	65.3
	P7	68.0	73.5
	P8	74.0	81.8

To simplify the setting work involved for each curvepoint, do as follows:

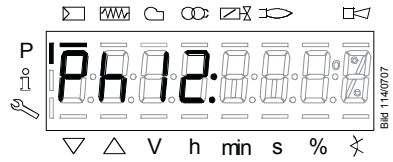
1. Check that good combustion is achieved at **P1**; adjust if necessary.
2. Move along to **P2** and check/adjust for good combustion.
3. Calculate the curvepoints between **P2** and **P9** by pressing > on +.
4. Now move along to **P3** and repeat the process described.
5. Repeat the process until curvepoint **P9** has been reached.
   This method makes the setting work easier and faster to complete. A more “correct” setting is obtained straight away. The process may need to be redone if the wrong input power was set for **P9** initially. For this reason, be extremely careful when entering the first setting of **P9**.



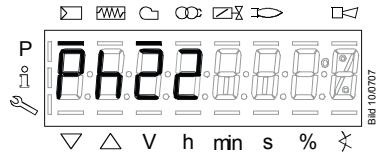
Identification of start for setting the curve parameters.

Press ↵ i/reset to continue.

The burner motor will then start and a number of phases in the automatic control unit are completed. A menu then appears, asking whether further changes to ignition load **P0** need to be made.
If the switch on the burner is in the OFF position, the automatic control unit will not proceed from **Ph12:** Move the switch to the **ON** position to continue.

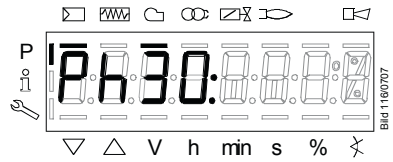


Phase Standby (stationary)

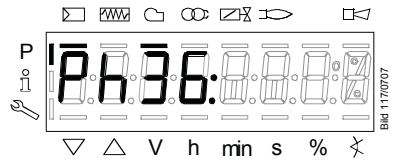


Phase Fan ramp up (fan motor = ON, safety valve = ON)

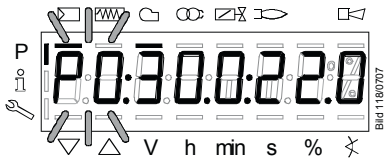
Phase Traveling to prepurge position



Phase Prepurging



Phase Traveling to ignition position



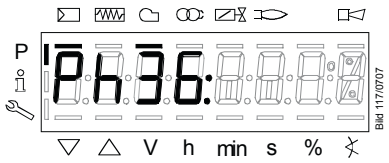
Ignition position **P0** can only be set after symbol △ or ▽ is no longer highlighted.

For fuel, keep (F) depressed, for air (A),

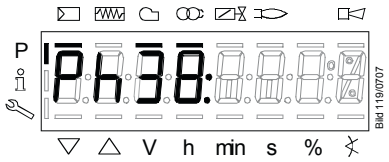
press (-) or (+) to adjust the value.

When the symbol △ or ▽ is no longer highlighted,

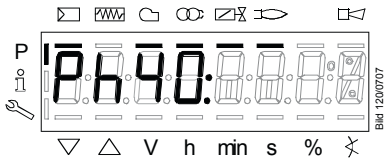
press (+) to continue.



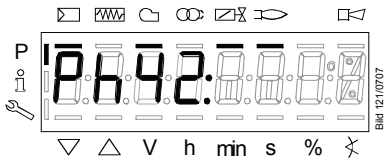
Phase Traveling to ignition position



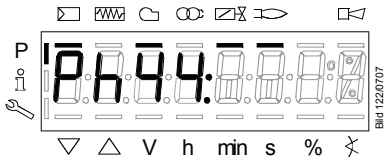
Phase Preignition



Phase for first safety time (ignition transformer ON)



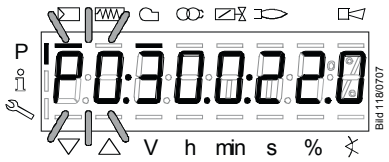
Phase for first safety time (ignition transformer OFF), preignition time OFF



Phase Interval 1

The burner has ignited and is burning. Should the burner not ignite, repeat the above procedure but adjust ignition load **P0** to get the burner to start.

The **P0** menu will appear when the burner starts successfully.
It is now possible to adjust ignition load **P0** while the burner is in operation.



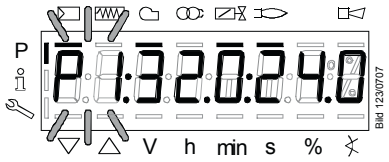
Ignition position **P0** can only be set when symbol △ or ▽ is no longer highlighted.

For fuel, keep F depressed, for air A,

press - or + to adjust the value.

When the symbol △ or ▽ is no longer highlighted,

press + to continue to the next curvepoint.



Low flame position **P1** can only be set when symbol △ or ▽ is no longer highlighted.
The value is adopted from **P0**

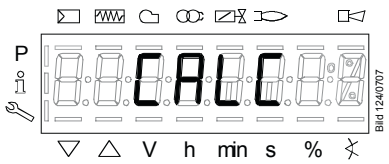
For fuel, keep F depressed, for air A,

press - or + to adjust the value.

When symbol △ or ▽ is no longer highlighted.

Back to the previous curvepoint -
When the symbol △ or ▽ is no longer highlighted,

press + to start calculating curvepoints.



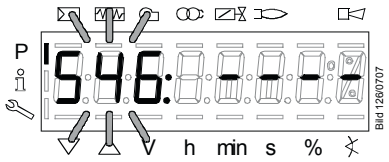
When changing from **P1** to **P2** for the first time, curvepoints **P2**…**P8** automatically calculated and saved.
CALC appears for a short moment.

When reviewing curvepoints after calculating them, check and adjust each curvepoint in order to achieve good combustion.

Move along to curvepoint (high-fire point) **P9**; allow the burner to reach high-fire point **P9**.

When **P9** flashes, press ESC - +

If the burner goes into blocking mode when increasing to full load, restart the setting procedure and adjust the curvepoints in order to avoid the burner entering blocking mode.



The maximum capacity is displayed.
If the display shows - - - -, the maximum capacity has not yet been specified.
The system can be run up to 100%.

You can press i/reset to go to editing mode, enabling you to change the maximum capacity.

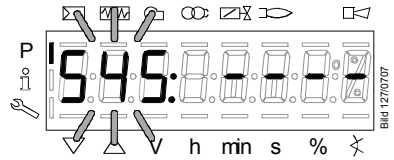
Adjust the setting downwards or upwards using the buttons - +

Press i/reset to save the setting.

Press ESC - + to return to parameter level.

The benefit of setting the maximum input power in this way is that at a later date it is easy to change the input power without having to adjust the amount of air and gas. The setting curve is therefore adjusted to the highest input power that the installation can handle. The desired input power is then set by entering how much of the maximum power is required.

To the next parameter +



The minimum capacity is displayed.
If the display shows - - - -, the minimum capacity has not yet been entered.
The system can be run down to 20%.

You can press i/reset to go to editing mode, enabling you to change the minimum capacity.

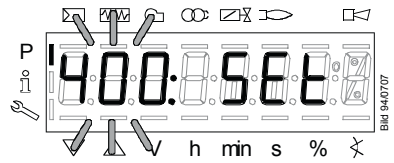
Adjust the setting downwards or upwards using the buttons - +

Press i/reset to save the setting.

Press ESC - + to return to parameter level.

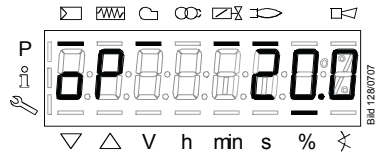
The benefit of setting the minimum input power in this way is that at a later date it is easy to change the input power without having to adjust the amount of air and gas. The setting curve is therefore adjusted to the lowest input power that the installation can handle. The desired input power is then set by entering how much of the minimum power is required.

Completing parameterization of the curve ESC - + Back to the previous parameter -



When symbol ▼ or ▲ is no longer highlighted, you can press **ESC** a second time.

Press ESC - + to exit parameter level.



The settings for air-fuel ratio control by the LMV37.4... are now completed.

14.4.1 The parameters below may need to be set according to the nature of the installation.

To change any of the parameters set out below, go into parameter level and make the required adjustments.

14.4.1.1 Pressure switch-min input

236 Gas: Pressure switch-min input
0 = inactive
1 = pressure switch-min (upstream of fuel valve 1)
2 = **valve proving via pressure switch-min (between fuel valves 1 and 2)**
Factory settings marked with bald text.

> ! This manual describes “2=valve proving via pressure switch-min (between fuel valves 1 and 2)” type burners.

14.4.1.2 Execution valve proving

241 Gas: Execution valve proving
0 = no valve proving
1 = valve proving on startup
2 = valve proving on shutdown
3 = valve proving on startup and shutdown
Factory settings marked with bald text.

> ! Depending on the type of burner, the automatic control unit should be set to either “0=no valve proving” or “1=valve proving on startup”.

At an input power higher than 1,200 kW, a tightness test must be performed.
At an input power lower than 1,200 kW, performing a tightness test is optional. It is essential for all changes to take local standards and regulations into consideration.

> ! The automatic control unit should be set to “Index 0 = no-load position”.

14.4.1.3 No-flame positions fuel actuator

501 No-flame positions fuel actuator
Index 0 = no-load position
Index 1 = pre purge position
Index 2 = post purge position
Factory settings marked with bald text.

> ! The automatic control unit should be set to “Index 0 = no-load position”.

14.4.1.4 No-flame positions air actuator

502 No-flame positions air actuator
Index 0 = no-load position
Index 1 = pre purge position
Index 2 = post purge position
Factory settings marked with bald text.

14.4.1.5 Active detector flame evaluation

221 Gas: Active detector flame evaluation

0 = QRB / QRC
1 = ION / QRA

Factory settings marked with bald text.
When replacing detector flame between ionisation and UV-cell (QRA), no change to the setting parameters is required; simply disconnect and connect ionisation and UV-cell (QRA) respectively..

14.4.1.6 Prepurging

222 Gas: Prepurging

Index 0 = deactivated
Index 1 = activated

Factory settings marked with bald text

When using valve proving and 2 fuel valves of class A, prepurging is not required (conforming to EN 676).

If not activated, it is nevertheless performed if one or several of the following conditions apply:

- Alterable lockout position
- After an off time of >24 hours
- In the event of a power failure (power-on)
- In the event of shutdown due to an interruption of gas supply (safety shutdown)

14.4.1.7 Prepurging time

225 Gas: Prepurging time
20 s – 60 min

14.4.1.8 Postpurge time

234 Gas: Postpurge time (no external light test)
0,2 s – 108 min

14.4.1.9 Postpurging in lockout position

190 Postpurging in lockout position

0 = deactivate (no-load position)
1 = active (postpurge position)

Factory settings marked with bald text.

When the Purging in the lockout position function is used, the fan may only be powered via a contactor and must not be connected directly to LMV37.4 (X3-05 pin 1)!

When active, the Alarm in the event of start prevention function (parameter 210) is only possible to a limited extent!

The LMV37.4 system simply moves the actuators to the postpurge position. A fan release contact cannot be controlled, as the alarm relay of the LMV37.4 system cuts off the power supply to the outputs. With the Alarm in the event of start prevention function, an external circuit that may be present for controlling the fan release contact for purging in the lockout position is activated via start prevention in standby mode.

14.4.1.10 Continuous fan

A burner can be converted into a continuous fan using conversion kit 119 230 01. See the documentation provided with the kit for instructions on how to perform the conversion.

14.4.1.11 Continuous operation

The LMV37 automatic control unit permits continuous operation of the burner, provided that the burner's detector flame is an ionisation detector flame.

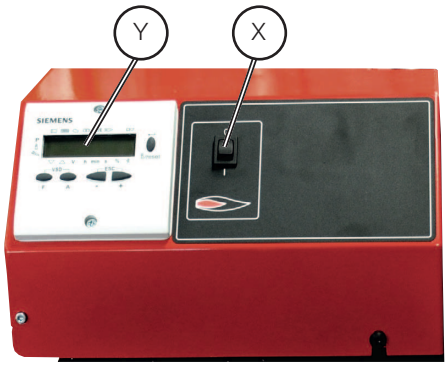
When forced intermittent operation is activated, the unit shuts down for a moment after 23 hours and 45 min of uninterrupted operation, followed by an automatic restart.
When forced intermittent operation is inactivated the burner will run continuously.
Forced intermittent operation is a standard feature.
239 Gas: Forced intermittent operation
0 = inactivate
1 = activated
Factory settings marked with bald text.

14.4.2 Adjusting settings of previously set automatic control unit

With the warm settings, the burner is started up after pressing the Info button. Air-fuel ratio control can now be accurately set while the flame is present. When traveling along the precalculated curve to high-fire point **P9**, all intermediate curvepoints **(P2...P8)** must be set.

Automatic operation is released when – after reaching **P9** – the curve settings are quit by pressing ESC. If the curve settings are aborted earlier (**ESC** or shutdown due to fault), start prevention **OFF UPr** continues to be active until all points are set.

If required, the gas pressure can be set at the high-fire point. In case the gas pressure is changed, all points must be checked by traveling along the curve downward and – if required – must be readjusted. safety shutdown, parameterization of the curve is quit.



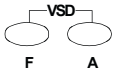
Check that the burner is connected to gas and has gas pressure.

Check that the burner is connected to an electrical supply.

Move the switch X to the ON position.

The display Y on the burner will now be active.

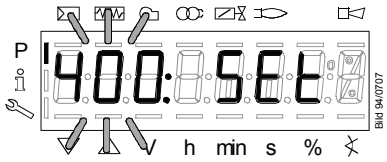
Follow the description below to set the burner.

Press 

> 1 second to access login mode.

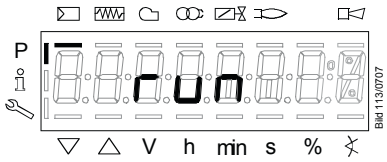
To continue with the setting work, you need to log into service engineer level. See 5.3.4.

After login is complete, continue with the setting work as shown below.



Press  to select parameter **400** for initial commissioning and for setting air-fuel ratio control

i/reset



Identification of start for setting the curve parameters.

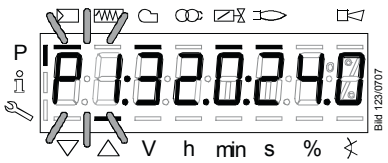
i/reset

When there is a request for heat.

! If, during the time the curve is parameterized, an error occurs which leads to safety shutdown, parameterization of the curve is quit.

The startup process on the automatic control unit now takes place. To see what happens in each phase, go to chapter 3.3.
When the automatic control unit has completed the start procedure and the burner has started, the setting values for curvepoint 1 will appear; settings for the minimum input power will be shown in the display. See display representation below. If you wish to adjust the ignition load,

this can be done by pressing - when curvepoint 1 is shown in the display.



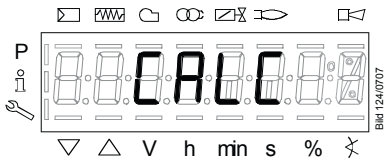
Low-flame position **P1** can only be set when symbol △ or ▽ is no longer highlighted.
The value is adopted from **P0**.

For fuel, keep F depressed, for air A,

Press - and + to adjust the value.

When symbol △ or ▽ is no longer highlighted, the next curvepoint **P2** can be selected with +

To the next curvepoint + back to the previous curvepoint -



This type of calculation can be performed at whichever curvepoint you have reached.

The calculation can be done for either higher or lower curvepoints.

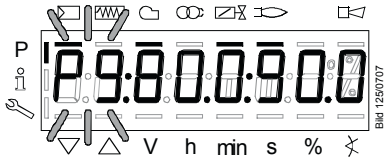
Hold down - for > 3 seconds until calculation begins in order to calculate for a lower curvepoint.

The same method is used to calculate for a higher curvepoint, but with the button +

Once a calculation has been performed, each curvepoint can be set individually following the same procedure as that used when setting curvepoint 1.

The combustion values of each curvepoint must be checked and adjusted if necessary.

Curvepoint 1 should be set to the minimum input power that the installation can handle. Curvepoint 9 should be set to the maximum input power that the installation can handle. Once the curve setting is complete, the desired minimum and maximum input power can be set.



High-fire position **P9** can only be set when symbol △ or ▽ is no longer highlighted.

If required, readjust the gas pressure.

For fuel, keep F depressed, for air A,

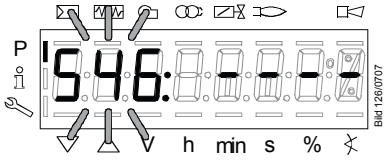
Press - and + to adjust the value.

When symbol △ or ▽ is no longer highlighted, the curve is set and it is possible to go on with the rest of the setting.

After setting the high-fire point (P9), either a change to parameter 546 (automatic operation) can be made (ESC) or all curvepoints can be run through in the reverse order.
If the gas pressure is changed, all curvepoints must be checked and – if required – readjusted.

Press ESC - + when P9 flashes.

If ESC is pressed before **P9** flashes, the burner is turned off and the automatic control unit enters **OFF UPr** mode.



The maximum capacity is displayed.

If the display shows - - - -, the maximum capacity has not yet been specified.The system can be run up to 100%.

You can press i/reset to go to editing mode, enabling you to change the maximum capacity.

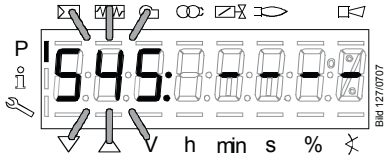
Adjust the setting downwards or upwards using the buttons - +

Press i/reset to save the setting.

Press ESC - + to return to parameter level.

+

To the next parameter.



The minimum capacity is displayed.

If the display shows - - - -, the minimum

capacity has not yet been entered.

The system can be run down to 20%.

You can press to go to editing mode,

i/reset

enabling you to change the minimum capacity.

Adjust the setting downwards or upwards using the buttons

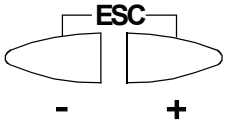
\+ -

Press to save the setting.

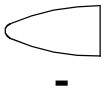
i/reset

Press ESC to return to parameter level.

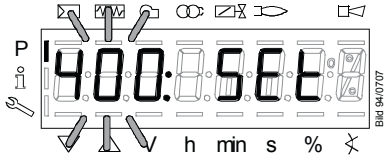
- +



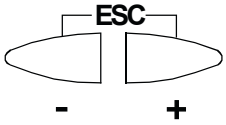
Completing parameterization of the curve

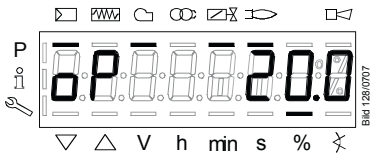


Back to the previous parameter



When symbol △ or ▽ is no longer highlighted, you can press **ESC** a second time.





The warm settings for air-fuel ratio control by the LMV37.4... are now completed.

14.5 Backup and restore

When adjustments to the burner are complete, it is a good idea to make a backup of the settings.

The backup ensures that the adjusted values are also saved in the display memory. This can be useful, e.g. if there are any problems with the LMV. The LMV can then be replaced and previous settings for the burner restored from the display memory to the new LMV.

Backup: Means that the parameters set on the LMV control unit are saved in the display memory.

Restore: Means that the settings saved in the display memory are transferred to the LMV and these overwrite any settings already in the LMV. The transferred parameter settings then act as operating parameters for the burner.

14.5.1 Backup

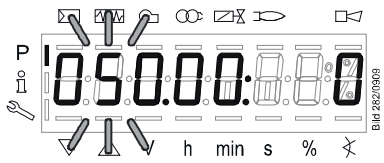
Press VSD (F + A) > 1 second to access login mode.

To continue with the setting work, you need to log into service engineer level. See 5.3.4.
After login is complete, continue with the setting work as shown below.

Press or for parameter level **000**.

(-) (+)

Press **i/reset**

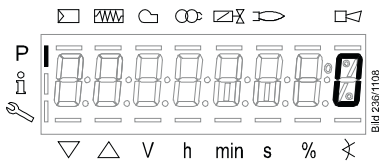


Display: Parameter **050**, flashes, index **00**, and value **0** do not.

i/reset

Display: Parameter **bAC_UP**

i/reset



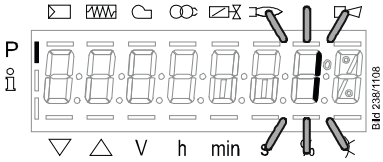
Display: Value **0**

Press to backup process.

i/reset

Press to shift the value in change mode 1 position to the left.

+



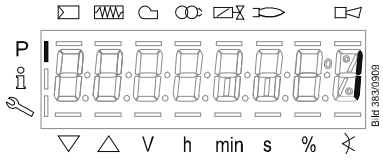
Display: Value **1** flashes

> To detect potential dispalay errors, the value is displayed 1 place shifted to the left

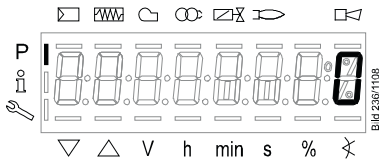
> Note! The value must be set to 1 if a backup is required, and to 0 if a backup is not required.
> The values higher than 1 which can be set must not be used.

Press to activate the backup process.

i/reset



Display**: 1** appears



After about 5 seconds (depending on the duration of the program), **0** appears on the display, indicating the end of the backup process.

Display: **0**

> If an errror occurs during the backup process, a negativ value is displayed. For error diagnostics, the cause of the error can be determined from the diagnostic code of error message 137 (see Error code list)

Press **ESC** four times until the top menu is displayed.

- **+**

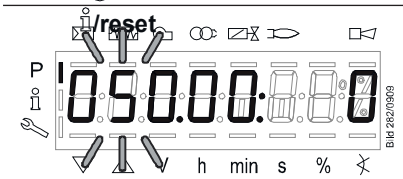
14.5.2 Restore

Press VSD (F) (A) > 1 second to access login mode.

To continue with the setting work, you need to log into service engineer level. See 5.3.4.
After login is complete, continue with the setting work as shown below.

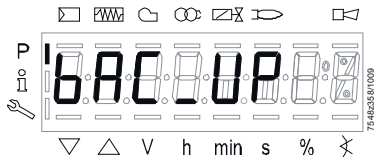
Press - or + for parameter level **000**.

Press i/reset



Display: Parameter **050**, flashes, index **00**, and value **0** do not.

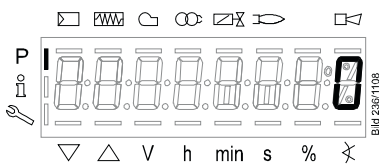
i/reset



Display: Parameter **bAC_UP**

Press + to select parameter **rESstorE**

i/reset



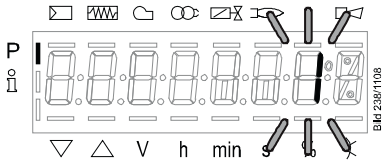
Dispalay: Value **0**

Press to select the restore process.

i/reset

Press to shift the value in change mode 1 position to the left.

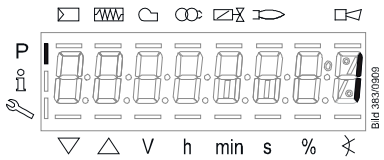
+



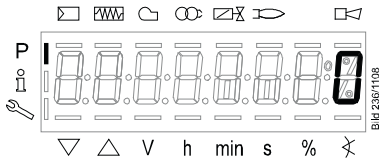
Display: Value **1** flashes

To detect potential dispalay errors, the value is displayed 1 place shifted to the left

Press  to activate the the restore process.

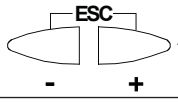


Dispalay**: 1** appears



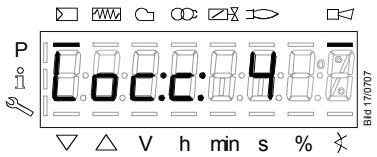
After about 8 seconds (depending on the duration of the program), **0** appears on the display, indicating the end of the backup process.

Display: **0**

Press  four times until the top menu is displayed.

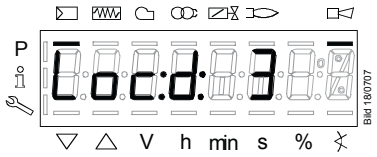
14.6 Fault status message, display of errors and info

14.6.1 Display of errors (faults) with lockout



The display shows Loc:, the bar under the fault status message ⚐ appears.

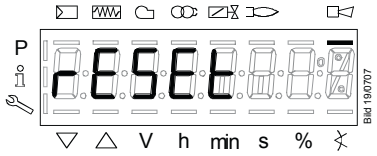
The unit is in the lockout position.



The display shows current error code c: alternating with diagnostic code d: (refer to Flash code list).

Example: Error code 4/diagnostic code 3

When pressing  for 1...3 s, **rESEt** appears on the display.



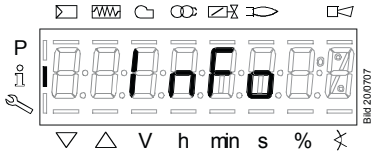
When the button is released, the basic unit is reset.

If the i/reset button is pressed for a time other than the time indicated above, a change to the previous menu is made.

Exception
If an error occurred while setting the curve, a change back to the parameter setting level is made.

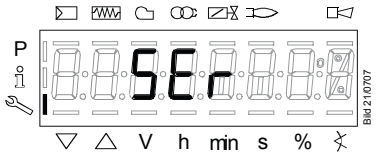
14.6.2 Activating info / service mode from lockout

i/reset >3 s



When pressing i/reset for >3 s, the display shows InFo,

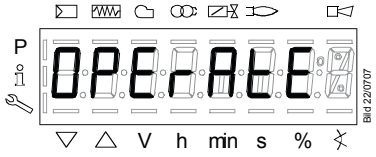
i/reset >5 s



SEr and then **OPErAtE.**

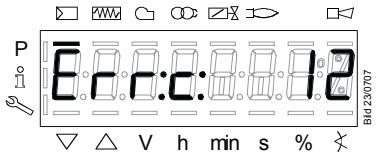
For a list of parameters, see table 5.3.3.

i/reset >8 s

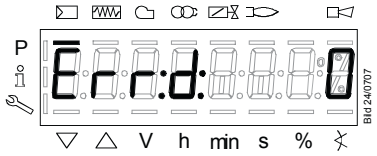


When the button is released, a change to info / service mode is made.

14.6.3 Error with safety shutdown



The display shows **Err:**.
The unit initiates safety shutdown.
The display shows current error code c:
alternating with diagnostic code d:.



Press  1...3 s, to return to the normal display.

i/reset

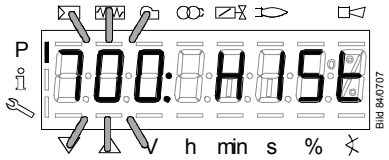
Example: Error code **12** / diagnostic code **0**

14.6.4 Error history

Press VSD (F) (A) > 1 second to access login mode.

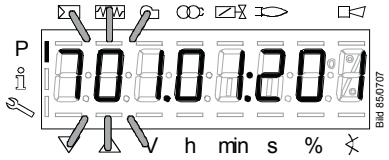
To continue with the setting work, you need to log into service engineer level. See 5.3.4.
After login is complete, continue with the setting work as shown below.

Press - or + for parameter level **700**.



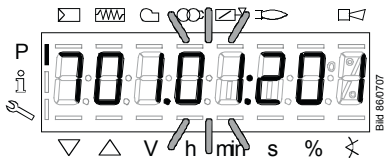
HISt 700: for error history

Press i/reset to go to the parameter level.



Display: Parameter **701**. flashes, index **01**: and example value **201** does not.

Press i/reset to go to index **01:**



Display: Parameter **701**. does not flash, index **01**: flashes, value **201** does not.

To the next index + Back to the previous index. -

Press + to select the index:

.01 = error code

.02 = diagnostic code

.03 = error class

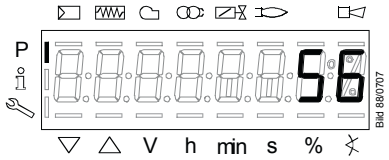
.04 = error phase

.05 = startup counter

.06 = output

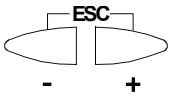
Example:

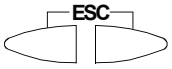
Parameter **701**., index **05**: for startup counter, diagnostic code ._._



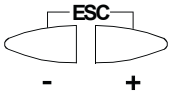
Press  to go to display mode.

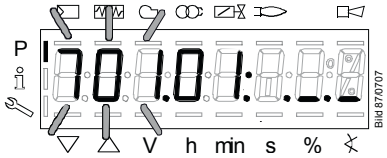
Display: Value **56** (number of startup)



Press  to return to the index.

Display: Parameter **701**. does not flash, index **05**: flashes, characters ._._ do not.





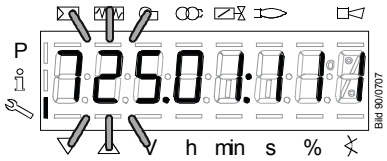
Press ESC - + to return to the parameter level.

Display: Parameter **701**. flashes index **01**: does not,

characters ._._ do not.

To the next old error +

Shows all saved error codes between 701 and 725.

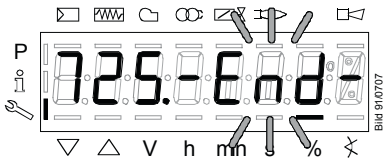


Parameters cover the period of time back to the last error since history was deleted (max. to parameter **725**.)

Example:

Parameter **725**., index **01**:, error code **111**

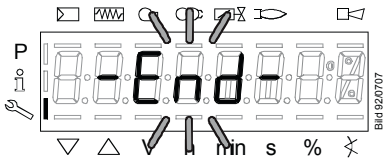
To the next parameter + Back to the previous parameter. -



When this display appears, you have reached the end of the error history index.

Display – **End** – appears flashing.

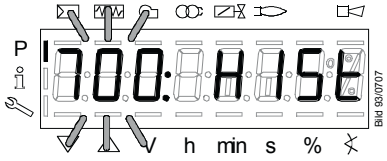
To the next index + Back to the previous index. -



When this display appears, you have reached the end of the error history.

Display – **End** – appears flashing.

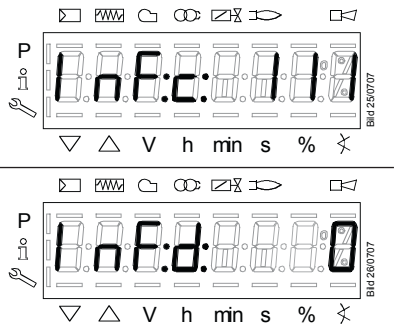
Press ESC - + twice.



HISt 700: for error history

14.7 Dispaly message of info

14.7.1 General information



The unit displays an event which does not lead to shutdown.

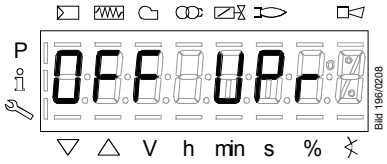
The display shows current error code c: alternating with diagnostic code d:.

Press ⏎ **i/reset** to return to the display of phases.

Example: Error code **111** / diagnostic code **0**

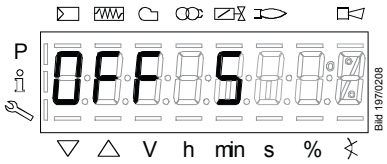
> **Note**
> For meaning of the error and diagnostic codes, refer to chapter Error code list. When an error has been acknowledged, it can still be read out from the error history.

14.7.2 Start prevention



A non-programmed or not completely parameterized unit, or a unit whose operating mode was reset or changed, displays **OFF UPr.**

14.7.3 Safety loop



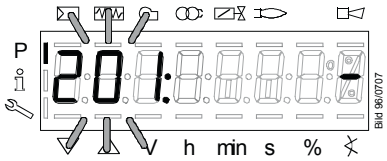
A unit whose safety loop and / or burner flange contact is open, and a controller ON signal is present, displays **OFF S**.

14.8 Resetting the automatic control unit

Press **F** **A** > 1 second to access login mode.
To continue with the setting work, you need to log into service engineer level. See 5.3.4.

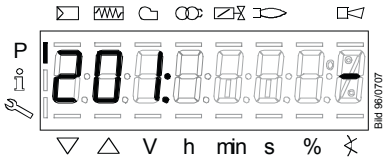
After login is complete, move to parameter level **200** using  or  .
- **+**

Press 
i/reset



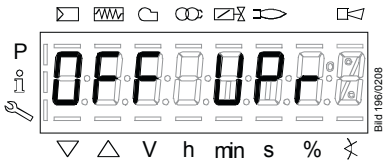
201: appears flashing

Press 
i/reset to go to the settings for air-fuel ratio control and parameter **201** for selecting the operating mode.



Select another burner type than the one already selected by pressing one of the buttons  or  .
- **+**

Confirm this selection with 
i/reset The automatic control unit is now reset.



Restart the setting process for the LMV automatic control unit as specified in 3.2.1.

14.9 Manual output

A manual output can be set with the «Normal display» of the display and operating unit.

14.9.1 Activation of Manually OFF in standby via the display and operating unit

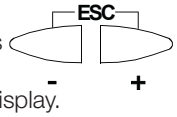
When the burner is in OFF position it can be set to Manually OFF which means that the burner will not start.

Manual OFF can be activated by pressing 

for at least 1 second then **LoAd 0.0** appears flashing.

LoAd 0.0 means Manually OFF.

As long as the Manual OFF is active, **OFF** appears on the normal display flashing.

To deactivate and to change to automatic operation, press 

for 3 seconds. Then OFF appears without flashing in the display.

14.9.2 Activation of Manually OFF in operation and adjustment of output via the display and operating unit

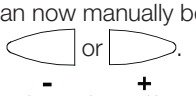
When the burner is in operation position it can be set to Manually OFF which means that the load of the burner can be manually set and will not start if the burner is shut down.

To activate Manually OFF, first run the system to the minimum output limit.

Manual OFF can be activated by pressing 

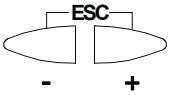
for at least 1 second then **LoAd 0.0** appears flashing.

Adjustment of **LoAd** can now manually be done by pressing 

and simultaneous pressing 

or .

The burner will now stay in set input if none of the safety regulators stops the burner.

To deactivate and to change to automatic operation, press 

for 3 seconds.

If Manually OFF is activated, it is stored via mains OFF.
On power return, the burner assumes the Manually OFF position (OFF flashing).

Please note that the automatic control unit will not exit manual mode by itself. Make sure that the automatic control unit is reset to automatic mode.

The unit can be changed to manual mode without login taking place. If the automatic control unit has been left in manual mode, no automatic burner control will take place, which in turn means that the installation is not operating satisfactorily. For this reason, make sure when servcing/troubleshooting that the automatic control unit is not in manual mode.

Manually OFF must not be used just to put a burner out of operation when doing mounting work, or when the burner is not ready for operation. The safety notes contained in chapter Safety notes must be observed!

15. Parameter list

Par. no.	Parameter	Number of elements	Type	Edit	Value range Min	Value range Max	Resolution	Default setting		Password level
000	Internal parameters									
050	Start backup / restore via AZL2.../ PC software (set parameter to 1) Index 0: Create backup Index 1: Execute restore Error diagnostics via negative values (see error code 137)	2	Std_s8	edit	-99	50	1	0; 0		SO
055	Burner identification of AZL2... backup data set	1	Std_s32	read only	0	99999999	1	0		SO
056	ASN extraction of AZL2... backup data set	8	Std_u8	read only	0	127	1	0		SO
057	Software version when creating the AZL2... backup data set	1	Hex_16	read only	0x100	0xFFF9	1	0		SO
100	General									
102	Identification date	1	Date	read only	0	255	1			Info / Service
103	Identification number	1	Std_u16	read only	0	65535	1			Info / Service
104	Preselected parameter set: Customer code	1	Std_u8	read only	0	255	1	9		Info / Service
105	Preselected parameter set: Version	1	Hex_16	read only	0	0xFFFF	1	LMV37.400...: V 01.05 LMV37.420...: V 01.06		Info / Service
107	Software version	1	Hex_16	read only	0x100	0xFFF9	1	V 03.30		Info / Service
108	Software variant	1	Std_u8	read only	0	255	1	LMV37.400...: 1 LMV37.420...: 2		Info / Service
111	ASN extraction for verification with the AZL2... backup data set	8	Std_u8	read only	0	127	1	0		SO
113	Burner identification	1	Std_s32	edit	0	99999999	1	undefined		SO
121	Manual output Undefined = automatic mode	1	Output	edit / clear	0%	100%	0.1%	undefined		Info / Service
123	Minimum output positioning step Index 0: BACS output Index 1: Output of external load controller, analog Index 2: Output of external load controller contacts	3	Output	edit	0%	100%	0.1%	Index 0 1 2	Value 0% 1% 0%	SO
124	Start loss-of-flame test (TÜV test) (set parameter to 1) (shutdown of fuel valves ⟶ loss of flame) Error diagnostics via negative values (see error code 150)	1	Std_s8	edit	-6	1	1	0		SO

Par. no.	Parameter	Num-ber of ele-ments	Type	Edit	Value range Min	Max	Resolu-tion	Default setting	Password level
125	Mains frequency 0 = 50 Hz 1 = 60 Hz	1	Selection	edit	0	1	1	LMV37.400...: 0 LMV37.420...: 1	SO
126	Display brightness	1	Std_u8	edit	0%	100%	1%	LMV37.400...: 75 % LMV37.420...: 100 %	SO
128	Fuel meter: Pulse valency [pulses / volume unit]	1	Std_u16	edit	0	400	0.01	0	SO
130	Delete display of error history To delete the display: Set parameter to 1, then to 2 Return value 0: Job successfully completed Return value -1: Timeout of 1_2 sequence	1	Std_s8	edit	-5	2	1	0	SO
133	Default output for TÜV test Invalid = TÜV test when output is active 2.000...10.000 = low-fire...high-fire or stage 1 / stage 2 / stage 3	1	Output	edit / clear	20 %	100 %	0.1 %	undefined	SO
141	Operating mode BACS 0 = off 1 = Modbus 2 = reserved	1	Selection	edit	0	2	1	0	SO
142	Setback time in the event of communication breakdown Setting values 0 = inactive 1….7200 s	1	Std_u16	edit	0 s	7200 s	1 s	120 s	SO (BA)
143	Reserved	1	Std_u8	edit	1	8	1	1	Info / Service
144	Reserved	1	Std_u16	edit	10 s	60 s	1 s	30 s	SO
145	Device address for Modbus of basic unit Setting values 1…247	1	Std_u8	edit	1	247	1	1	SO
146	Setting of Baud rate for Modbus communication Setting values 0 = 9600 1 = 19200	1	Selection	edit	0	1	1	1	SO
147	Parity for Modbus 0 = none 1 = odd 2 = even	1	Selection	edit	0	2	1	0	SO

Par. no.	Parameter	Num-ber of ele-ments	Type	Edit	Value range Min	Value range Max	Resolu-tion	Default setting	Password level
148	Default output if communication with building automation is interrupted Setting values: For **modulation operation** the setting range is as follows: 0…19.9 = burner off 20…100 = 20…100% burner rating For **multistage operation** apply to setting range: 0 = burner OFF, P1, P2, P3 Invalid = no default output predefined by building automation Default setting: **Invalid**	1	Output	edit / clear	0%	100%	0.1%	undefined	SO (BA)
161	Number of faults	1	Std_u16	read only	0	65535	1	0	Info / Service
162	Operating hours resettable	1	Std_s32	reset	0 h	9999999 h	1 h	0 h	Info / Service
163	Operating hours when unit is live	1	Std_s32	read only	0 h	9999999 h	1 h	0 h	Info / Service
164	Number of startups resettable	1	Std_s32	reset	0	9999999	1	0	Info / Service
166	Total number of startups	1	Std_s32	read only	0	9999999	1	0	Info / Service
167	Fuel volume resettable [m³, l, ft³, gal]	1	Std_s32	reset	0	99999999	1	0	Info / Service
176	**Switching back to pilot** switching cycles	1	Std_s32	read only	0	9999999	1	0	Info / Service
190	Postpurging in lockout position 0 = deactivate (no-load position) 1 = active (postpurge position) When active, the **Alarm in the event of start prevention** function is only possible to a limited extent!	1	Selection	edit	0	1	1	0	SO
191	Function **Switching back to pilot** 0 = deactivate 1 = active (low active) 2 = active (high active) Load controller contacts X5-03 are deactivated when function is active!	1	Std_u8	edit	0	2	1	0	SO
192	**Switching back to pilot** minimum time	1	Time	edit	5 s	120 s	0,2 s	30 s	SO
193	**Switching back to pilot** maximum time	1	Time	edit	30 s	108 min.	0,2 s	60 min.	SO
195	Repetition limit heavy oil direct start 1 = no repetition 2...15 = 1...14 number of repetitions 16 = constant repetition	1	Std_u8	edit	1	16	1	3	SO
200	**Basic unit**								

Par. no.	Parameter	Num-ber of ele-ments	Type	Edit	Value range Min	Max	Resolu-tion	Default setting	Password level
201	Burner operating mode (fuel train, modulating / multistage, actuators, etc.) -- = undefined (delete curves) 1 = G mod 2 = Gp1 mod 3 = Gp2 mod 4 = Lo mod 5 = Lo 2-stage 6 = Lo 3-stage 7 = G mod pneu 8 = Gp1 mod pneu 9 = Gp2 mod pneu 10 = LoGp mod 11 = LoGp 2-stage 12 = Lo mod 2 fuel valves 13 = LoGp mod 2 fuel valves 14 = G mod pneu without actuator 15 = Gp1 mod pneu without actuator 16 = Gp2 mod pneu without actuator 17 = Lo 2-stage without actuator 18 = Lo 3-stage without actuator 19 = G mod only gas actuator 20 = Gp1 mod only gas actuator 21 = Gp2 mod only gas actuator 22 = Lo mod only oil actuator 23 = Ho mod. sep. circulation 24 = Ho 2-stage sep. circulation 25 = Ho mod. without circulation 26 = Ho 2-stage without circulation 27 = Ho 3-stage without circulation	1	Selection	edit / clear	1	27	1	undefined	SO
204	Analog output invalid (4…20 mA) 0 = default load low-fire 1 = safety shutdown + start prevention	1	Std_u8	edit	0	1	1	1	SO
208	Program stop 0 = inactive 1 = PrePurgP (Ph24) 2 = IgnitPos (Ph36) 3 = interval 1 (Ph44) 4 = interval 2 (Ph52)	1	Selection	edit	0	4	1	0	SO (BA)
210	Alarm in the event of start prevention 0 = deactivated 1 = activated	1	Selection	edit	0	1	1	LMV37.400...: 0 LMV37.420...: 1	SO

Par. no.	Parameter	Num-ber of ele-ments	Type	Edit	Value range Min	Max	Resolu-tion	Default setting	Password level
211	Fan ramp up time	1	Time	edit	2 s	60 s	0.2 s	2 s	SO
212	Max. time down to low-fire	1	Time	edit	0.2 s	10 min	0.2 s	45 s	SO
215	Repetition limit safety loop 1 = no repetition 2...15 = 1...14 number of repetitions 16 = constant repetition	1	Std_u8	edit	1	16	1	LMV37.400...: 16 LMV37.420...: 1	SO
221	Gas: Active detector flame evaluation 0 = QRB / QRC 1 = ION / QRA	1	Selection	edit	0	1	1	1	SO
222	Gas: Prepurging 0 = deactivated 1 = activated	1	Selection	edit	0	1	1	1	SO
223	Repetition limit gas pressure switch-min 1 = no repetition 2...15 = 1...14 number of repetitions 16 = constant repetition	1	Std_u8	edit	1	16	1	LMV37.400...: 16 LMV37.420...: 1	SO
225	Gas: Prepurge time	1	Time	edit	LMV37.400…: 20 s LMV37.420…: 5 s	60 min	0.2 s	LMV37.400...: 20 s LMV37.420...: 30 s	SO
226	Gas: Preignition time	1	Time	edit	0.4 s	60 min	0.2 s	2 s	SO
230	Gas: Interval 1	1	Time	edit	0.4 s	60 s	0.2 s	2 s	SO
232	Gas: Interval 2	1	Time	edit	0.4 s	60 s	0.2 s	2 s	SO
233	Gas: Afterburn time	1	Time	edit	0.2 s	60 s	0.2 s	8 s	SO
234	Gas: Postpurge time (no extraneous light test)	1	Time	edit	0.2 s	108 min	0.2 s	LMV37.400...: 0,2 s LMV37.420...: 15 s	SO
235	Gas: Air pressure switch (LP) 0 = inactive 1 = active 2 = active, except phase 60...66 (pneumatic operation only)	1	Selection	edit	1	2	1	1	SO
236	Gas: Pressure switch-min input 0 = inactive 1 = pressure switch-min (upstream of fuel valve 1 (V1)) 2 = valve proving via pressure switch-min (between fuel valves 1 (V1) and 2 (V2))	1	Selection	edit	1	2	1	1	SO

Par. no.	Parameter	Num-ber of ele-ments	Type	Edit	Value range Min	Value range Max	Resolu-tion	Default setting		Password level
237	Gas: Pressure switch-max / POC input 0 = inactive 1 = pressure switch-max 2 = POC 3 = pressure switch valve proving	1	Selection	edit	1	2	1	LMV37.400...: 1 LMV37.420...: 2		SO
239	Gas: Forced intermittent operation 0 = inactive 1 = activated	1	Selection	edit	0	1	1	1		SO
241	Gas: Execution valve proving 0 = no valve proving 1 = valve proving on startup 2 = valve proving on shutdown 3 = valve proving on startup and shutdown	1	Selection	edit	0	3	1	LMV37.400...: 2 LMV37.420...: 0		SO
248	Gas: Postpurge time (t3) (abortion with load controller (LR)-ON	1	Time	edit	1 s	108 min	0.2 s	1 s		SO
400	**Ratio curves**									
401	Ratio control curve fuel actuator (only curve settings)	13	Std_s16	edit	0°	90°	0.1°	0°; 0°; 15°; undefined		SO
402	Ratio control curve air actuator (only curve settings)	13	Std_s16	edit	0°	90°	0.1°	0°; 90°; 45°; undefined		SO
403	Ratio control curve VSD (only curve settings)	13	Std_s16	edit	15 %	100%	0.1%	0%; 100%; 50%; undefined		SO
500	**Ratio control**									
501	No-flame positions fuel actuator Index 0 = home position Index 1 = prepurge position Index 2 = postpurge position	3	Std_s16	edit	0°	90°	0.1°	Index 0 1 2	Value 0° 0° 15°	SO
502	No-flame positions air actuator Index 0 = home position Index 1 = prepurge position Index 2 = postpurge position	3	Std_s16	edit	0°	90°	0.1°	Index 0 1 2	Value 0° 90° 45°	SO
503	No-flame speeds VSD Index 0 = no-load speed Index 1 = prepurge speed Index 2 = postpurge speed	3	Std_s16	edit	0%	100%	0.1%	Index 0 1 2	Value 0% 100% 50%	SO
522	Ramp up	1	Std_u8	edit	5 s	40 s	1 s	10 s		SO
523	Ramp down	1	Std_u8	edit	5 s	40 s	1 s	10 s		SO
542	Activation of VSD / PWM fan 0 = inactive 1 = active	1	Selection	edit	0	1	1	0		SO

Par. no.	Parameter	Num-ber of ele-ments	Type	Edit	Value range Min	Max	Resolu-tion	Default setting		Password level
544	Ramp modulating	1	Std_u8	edit	32 s	80 s	1 s	32 s		SO
545	Lower output limit undefined = 20 %	1	Output	edit / clear	20%	100%	0.1%	undefined		SO (BA)
546	Upper output limit undefined = 100 %	1	Output	edit / clear	20%	100%	0.1%	undefined		SO (BA)
600	**Actuators**									
601	Selection of reference point Index 0 = fuel Index 1 = air 0 = close (<0°) 1 = open (>90°)	2	Selection	edit	0	1	1	Index 0 1	Value 0 1	SO
602	Actuator's direction of rotation Index 0 = fuel Index 1 = air 0 = counterclockwise 1 = clockwise (exclusively for SQM3...)	2	Selection	edit	0	1	1	Index 0 1	Value 0 1	SO
606	Tolerance limit of position monitoring [0.1°] Index 0 = fuel Index 1 = air Greatest position error where a fault is securely detected ⟶ error detection band: (parameter 606-0.6°) to parameter 606	2	Std_u8	edit	0.5°	4°	0.1°	Index 0 1	Value 1.7° 1.7°	SO
611	Type of referencing Index 0 = fuel Index 1 = air 0 = standard 1 = stop within usable range 2 = internal stop (SQN1...) 3 = both	2	Std_u8	edit	0	3	1	Index 0 1	Value 0 0	SO
613	Type of actuator Index 0 = fuel Index 1 = air 0 = 5 s / 90° (1 Nm, 1,2 Nm, 3 Nm) 1 = 10 s / 90° (6 Nm) 2 = 17 s / 90° (10 Nm)	2	Std_u8	edit	0	2	1	0; 0		SO
641	Control of speed standardization of VSD Error diagnostics of negative values (refer to error code 82) 0 = no speed standardization 1 = speed standardization active	1	Std_s8	edit	-25	1	1	0		SO

Par. no.	Parameter	Num-ber of ele-ments	Type	Edit	Value range Min	Value range Max	Resolu-tion	Default setting	Password level
642	Standardized speed Index 0 = speed 1 Index 1 = speed 2 (internal supervision)	2	Std_u16	read only	650	6500	0.1	undefined	SO
645	Configuration of analog output 0 = DC 0...10 V 1 = DC 2...10 V 2 = DC 0/2...10 V	1	Std_u8	edit	0	2	1	0	SO
652	VSD behavior when safety loop / burner flange is open 0 = no VSD control when safety loop / burner flange is open 1 = VSD control independent of safety loop / burner flange	1	Std_u8	edit	0	1	1	1	HF
653	VSD standstill supervision in standby mode 0 = deactivate 1 = active	1	Std_u8	edit	0	1	1	1	HF
700	**Error history**								
701	Error history: 701-725.01.Code	25	Std_u8	read only	0	255	1	0	Info / Service
•	Error history: 701-725.02.Diagnostic code	25	Std_u8	read only	0	255	1	0	Info / Service
•	Error history: 701-725.03.Error class	25	Std_u8	read only	0	6	1	0	Info / Service
•	Error history: 701-725.04.Phase	25	Std_u8	read only	0	255	1	0	Info / Service
•	Error history: 701-725.05.Startup counter	25	Std_s32	read only	0	99999999	1	0	Info / Service
725	Error history: 701-725.06.Output	25	Output	read only	0%	100 %	0.1%	0%	Info / Service
900	**Process data**								
903	Current output Index 0 = fuel Index 1 = air	2	Output	read only	0%	100%	0.1%	0%	Info / Service
922	Incremental position of actuators Index 0 = fuel Index 1 = air	2	Std_s16	read only	-50°	150°	0.01°	0°	Info / Service
935	Absolute speed	1	Std_u16	read only	0	6553.5	0.1	0	SO
936	Standardized speed	1	Std_s16	read only	-200%	200%	0.1%	0%	Info / Service
942	Active load source 1 = output during curve settings 2 = manual output 3 = default output via building automation 4 = default output via analog input 5 = external load controller via contacts	1	Selection	read only	0	255	1	0	SO

Par. no.	Parameter	Num-ber of ele-ments	Type	Edit	Value range Min	Value range Max	Resolu-tion	Default setting	Password level
947	Result of contact sensing (bit-coded) Bit 0.0 = 1: Pressure switch-min Bit 0.1 = 2: Pressure switch-max Bit 0.2 = 4: Pressure switch valve proving Bit 0.3 = 8: Pressure switch air pressure switch Bit 0.4 = 16: Load controller OPEN Bit 0.5 = 32: Load controller ON Bit 0.6 = 64: Load controller CLOSE Bit 0.7 = 128: Safety loop Bit 1.0 = 1: Safety valve Bit 1.1 = 2: Ignition Bit 1.2 = 4: Fuel valve 1 Bit 1.3 = 8: Fuel valve 2 Bit 1.4 = 16: Fuel valve 3 / pilot valve Bit 1.5 = 32: Reset	2	Std_u8	read only	0	255	1	0	Info / Service
948	Contact feedback network counter register	14	Std_u8	read only	0	255	1	0	SO
950	Required relay state (bit-coded) Bit 0 = 1: Alarm Bit 1 = 2: Safety valve Bit 2 = 4: Ignition Bit 3 = 8: Fuel valve 1 Bit 4 = 16: Fuel valve 2 Bit 5 = 32: Fuel valve 3 / pilot valve	1	Std_u8	read only	0	255	1	0	Info / Service
951	Mains voltage (normalized) AC 230 V: Voltage = value x 1.683 AC 120 V: Voltage = value x 0.843	1	Std_u8	read only	0 V	255 V	1 V	0 V	SO
954	Intensity of flame	1	Std_u8	read only	0%	100%	1%	0%	Info / Service
960	Actual flow rate (m³/h, l/h, ft³/h, gal/h)	1	Std_u16	read only	0	6553.5	0.1	0	Info / Service
961	Phase (state for external modules and display)	1	Std_u8	read only	0	255	1	0	Info / Service
981	Error memory: Code	1	Std_u8	read only	0	255	1	0	Info / Service
982	Error memory: Diagnostic code	1	Std_u8	read only	0	255	1	0	Info / Service
992	Error flags	10	Hex_32	reset	0	0xFFFFFFFF	1	0	SO

Std_**u8** 8 bit integer, **not** signed

Std_**u16** 16 bit integer, **not** signed

Std_**u32** 32 bit integer, **not** signed

Std_**s8** 8 bit integer, signed

Std_**s16** 16 Bit integer, signed

Std_**s32** 32 Bit integer, signed

! Note
This data type is also used to mark an invalid or non-signed value by using the value of -1!

16. Error code list

Error code	Diagnostic code	Meaning for the LMV37.4... system	Remedy
no Comm		**No communication between LMV37.4... basic unit and AZL2...**	Check wiring for line interruption/loose contact
2	**#**	**No flame at the end of the safety time (TSA)**	
	1	No flame at the end of safety time 1 (TSA1)	
	2	No flame at the end of safety time 2 (TSA2)	
	4	No flame at the end of safety time 1 (TSA1) (software version ≤ V02.00)	
3	**#**	**Air pressure failure**	
	0	Air pressure off	
	1	Air pressure on	
	2	Evaluation of air pressure	Correct the setting of parameter 235 or 335 (Deactivation of the air pressure check in operation only allowed in pneumatic operation!)
	4	Air pressure on – start prevention	
	20	Air pressure, combustion pressure – start prevention	
	68	Air pressure, POC – start prevention	
	84	Air pressure, combustion pressure, POC – start prevention	
4	**#**	**Extraneous light**	
	0	Extraneous light during startup	
	1	Extraneous light during shutdown	
	2	Extraneous light during startup – start prevention	
	6	Extraneous light during startup, air pressure – start prevention	
	18	Extraneous light during startup, combustion pressure – start prevention	
	24	Extraneous light during startup, air pressure, combustion pressure – start prevention	
	66	Extraneous light during startup, POC – start prevention	
	70	Extraneous light during startup, air pressure, POC – start prevention	
	82	Extraneous light during startup, combustion pressure, POC – start prevention	
	86	Extraneous light during startup, air pressure, combustion pressure, POC – start prevention	

Error code	Diagnostic code	Meaning for the LMV37.4... system	Remedy
7	#	Loss of flame	
	0	Loss of flame	
	3	Loss of flame (software version ≤ V02.00)	
	3...255	Loss of flame due to TÜV test (loss-of-flame test)	
12	#	Valve proving	
	0	Fuel valve 1 (V1) leaking (fuel valve 2 with valve proving via X5-01)	For valve proving via X5-01 (gas pressure switch-min) - Check to see if the valve on the burner side is leaking - Check to see if the pressure switch for the valve proving is closed when gas pressure is present - Check wiring to see if there is a short-circuit
	1	Fuel valve 2 (V2) leaking (fuel valve 1 with valve proving via X5-01)	For valve proving via X5-01 (gas pressure switch-min) - Check to see if the valve on the gas side is leaking - Check wiring to see if there is a short-circuit
	2	Valve proving not possible	Valve proving activated, but pressure switch-min selected as input function for X9-04 (check parameters 238 and 241)
	3	Valve proving not possible	Valve proving activated, but no input assigned (check parameters 236 and 237)
	4	Valve proving not possible	Valve proving activated, but 2 inputs assigned (set parameter 237 to pressure switch-max or POC)
	5	Valve proving not possible	Valve proving activated, but 2 inputs assigned (check parameters 236 and 237)
	81	V1 leaking	Check to see if the valve on the gas side is leaking Check wiring to see if there is an open-circuit
	83	V2 leaking	Check to see if the valve on the burner side is leaking Check to see if the pressure switch for the leakage test is closed when gas pressure is present Check wiring for short-circuit
14	#	POC	
	0	POC open	Check to see if the valve's closing contact is closed
	1	POC close	Check wiring Check to see if the valve's closing contact opens when valve is controlled
	64	POC open – prevention of startup	Check wiring to see if there is a line interruption. Check to see if the valve's closing contact is closed
19	80	Combustion pressure, POC – start prevention	Check to see if pressure switch has closed with no combustion pressure present Check wiring for short-circuit
20	#	Pressure switch-min (Pmin)	
	0	No minimum gas /oil pressure	Check wiring for line interruption
	1	Gas shortage – start prevention	Check wiring for line interruption

Error code	Diagnostic code	Meaning for the LMV37.4... system	Remedy
21	#	**Pressure switch-max (Pmax) / POC**	
	0	**Pressure switch-max (Pmax):** Max. gas / oil pressure exceeded **POC:** POC open (software version ≤ V02.00)	Check wiring to see if there is a line interruption. POC: Check to see if the valve's closing contact is closed.
	1	POC close (software version ≤ V02.00)	Check wiring. Check to see if the valve's closing contact opens when the valve is controlled
	64	POC open – start prevention (software version ≤ V02.00)	Check wiring. Check whether valve's make contact opens when valve is controlled
22 OFF S	#	**Safety loop / burner flange**	
	0	Safety loop / burner flange open	
	1	Safety loop / burner flange open – start prevention	
	3	Safety loop/burner flange, extraneous light – start prevention	
	5	Safety loop/burner flange, air pressure – start prevention	
	17	Safety loop/burner flange, combustion pressure – start prevention	
	19	Safety loop/burner flange, extraneous light, combustion pressure – start prevention	
	21	Safety loop/burner flange, air pressure, combustion pressure – start prevention	
	23	Safety loop/burner flange, extraneous light, air pressure, combustion pressure – start prevention	
	65	Safety loop/burner flange, POC – start prevention	
	67	Safety loop/burner flange, extraneous light, POC – start prevention	
	69	Safety loop/burner flange, air pressure, POC – start prevention	
	71	Safety loop/burner flange, extraneous light, air pressure, POC – start prevention	
	81	Safety loop/burner flange, combustion pressure, POC – start prevention	
	83	Safety loop/burner flange, extraneous light, combustion pressure, POC – start prevention	
	85	Safety loop/burner flange, air pressure, combustion pressure, POC – start prevention	
	87	Safety loop/burner flange, extraneous light, air pressure, combustion pressure, POC – start prevention	
23	#	**Gas pressure switch-min (Pmin) / heavy oil direct start**	
	0	No minimum gas pressure	Check wiring to see if there is an open-circuit (X5-01)
	1	Gas shortage – start prevention	Check wiring to see if there is an open-circuit (X5-01)
	2	Heavy oil direct start	Check wiring to see if there is an open-circuit (X9-04) Check that the oil is preheated correctly

Error code	Diagnostic code	Meaning for the LMV37.4... system	Remedy
51	#	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
55	#	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
56	#	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
57	#	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
58	#	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
60	0	Internal error: No valid output source	Make a reset; if error occurs repeatedly, replace the unit
65	#	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
66	#	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
67	#	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
70	#	**Error air-fuel ratio control: Position calculation modulating**	
	23	Output invalid	No valid output
	26	Curvepoints undefined	Adjust the curvepoints for all actuators
71	#	**Special position undefined**	
	0	Home position	Parameterize the home position for all actuators used
	1	Prepurge position	Parameterize the prepurge position for all actuators used
	2	Postpurge position	Parameterize the postpurge position for all actuators used
	3	Ignition position	Parameterize the ignition position for all actuators used
72	#	**Internal error air-fuel ratio control**	Make a reset; if error occurs repeatedly, replace the unit
73	#	**Internal error air-fuel control: Position calculation multistep**	
	23	Output invalid	No valid output
	26	Curvepoints undefined	Adjust the curvepoints for all actuators
75	#	**Internal error air-fuel ratio control: Data clocking check**	
	1	Current output different	
	2	Target output different	
	4	Target positions different	
	16	Different positions reached	Can be caused by different standardized speeds (e.g. after restore of data set) when the VSD is activated ⟶ standardize again and check adjustment of the air-fuel ratio control system
76	#	**Internal error air-fuel ratio control**	Make a reset; if error occurs repeatedly, replace the unit

Error code	Diagnostic code	Meaning for the LMV37.4... system	Remedy
80	#	**Control range limitation of VSD**	Basic unit could not correct the difference in speed and reached a control range limit. 1. Basic unit is not standardized for this motor ⟶ repeat standardization. ! Caution! Settings of air-fuel ratio control must be checked! 2. Ramp time settings of the VSD are not shorter than those of the basic unit (parameters 522, 523) or the setting for the modulating operating ramp is incorrect (parameter 544) 3. Characteristic of the VSD is not linear. Configuration of the voltage input at the VSD must accord with that of the basic unit (parameter 645). 4. VSD does not follow quickly enough the changes of the basic unit. Check settings of the VSD (input filter, slippage compensation, hiding different speeds
	1	Control range limitation at the bottom	VSD speed was too high
	2	Control range limitation at the top	VSD speed was too low
81	1	Interrupt limitation speed input	Too much electromagnetic interference on the sensor line ⟶ improve EMC
82	#	**Error during VSD's speed standardization**	
	1	Timeout of standardization (VSD ramp down time too long)	Timeout at the end of standardization during ramp down of the VSD ⟶ ramp time settings of the VSD are not shorter than those of the basic unit (parameter: 523)
	2	Storage of standardized speed not successful	Error during storage of the standardized speed ⟶ lock the basic unit, then reset it and repeat the standardization
	3	Line interruption speed sensor	Basic unit receives no pulses from the speed sensor: 1. Motor does not turn. 2. Speed sensor is not connected. 3. Speed sensor is not activated by the sensor disk (check distance)

Error code	Diagnostic code	Meaning for the LMV37.4... system	Remedy
	4	Speed variation / VSD ramp up time too long / speed below minimum limit for standardization	Motor has not reached a stable speed after ramp up. 1. Ramp time settings of the VSD are not shorter than those of the basic unit (parameters 522, 523). 2. Characteristic of the VSD is not linear. Configuration of the voltage input at the VSD must accord with that of the basic unit (parameter 645). 3. VSD does not follow quickly enough the changes of the basic unit. Check settings of the VSD (input filter, slippage compensation, hiding different speeds) 4. Speed of VSD lies below the minimum for standardization (650 1/min)
	5	Wrong direction of rotation	Motor's direction of rotation is wrong. 1. Motor turns indeed in the wrong direction ⟶ change parameterization of the direction of rotation or interchange 2 live conductors. 2. Sensor disk is fitted the wrong way ⟶ turn the sensor disk.
	6	Unplausible speed sensor signals	The required pulse pattern (60°, 120°, 180°) has not been correctly identified. 1. Speed sensor does not detect all tappets of the sensor disk ⟶ check distance 2. As the motor turns, other metal parts are detected also, in addition to the tappets ⟶ improve mounting. 3. Electromagnetic interference on the sensor lines ⟶ check cable routing, improve EMC
	7	Invalid standardized speed	The standardized speed measured does not lie in the permissible range ⟶ motor turns too slowly or too fast
	15	Speed deviation µC1 + µC2	The speeds of microcomputer 1 and 2 deviated too much. This can be caused by wrong standardized speeds (e.g. after restoring a data set to a new unit) ⟶ repeat standardization and check the air-fuel ratio
	20	Wrong phase of phase manager	Standardization was made in a wrong phase. Permitted are only phases ≤12 ⟶ controller OFF, start standardization again
	21	Safety loop / burner flange open	Safety loop or burner flange is open ⟶ repeat standardization with safety loop closed
	22	Air actuator not referenced	Air actuator has not been referenced or has lost its referencing. 1. Check if the reference position can be approached. 2. Check if actuators have been mixed up. 3. If error only occurs after the start of standardization, the actuator might be overloaded and cannot reach its destination.
	23	VSD deactivated	Standardization was started with VSD deactivated ⟶ activate the VSD and repeat standardization
	24	No valid operating mode	Standardization was started without valid operating mode ⟶ activate valid operating mode and repeat standardization
	25	Pneumatic air-fuel ratio control	Standardization was started with pneumatic air-fuel ratio control ⟶ standardization with pneumatic air-fuel ratio control not possible

Error code	Diagnostic code	Meaning for the LMV37.4... system	Remedy
	128	Running command with no preceding standardization	VSD is controlled but not standardized ⟶ make standardization
	255	No standardized speed available	Motor turns but is not standardized ⟶ make standardization
83	#	**Speed error VSD**	Required speed has not been reached
	Bit 0 Valency 1	Lower control range limitation	Speed has not been reached because control range limitation has become active ⟶ for measures, refer to error code 80
	Bit 1 Valency 2...3	Upper control range limitation	Speed has not been reached because control range limitation has become active ⟶ for measures, refer to error code 80
	Bit 2 Valency 4...7	Interrupt shutdown due to electromagnetic interference	Speed has not been reached due to too much electromagnetic interference on the sensor line ⟶ for measures, refer to error code 81
	Bit 3 Valency ≥ 8	Curve too steep in terms of ramp speed	Check speed differential between the curvepoints and the modulating operating ramp setting (parameter 544). 1. Modulating operating ramp 32 seconds Curve slope max. 10% for LMV37.4 ramp of 20 seconds (20% for 10 seconds or 40% for 5 seconds) 2. Modulating operating ramp 48 seconds Curve slope max. 10% for LMV37.4 ramp of 30 seconds (20% for 15 seconds or 30% for 10 seconds) 3. Modulating operating ramp 64 seconds Curve slope max. 10% for LMV37.4 ramp of 40 seconds (20% for 20 seconds or 40% for 10 seconds) ⟶ Between the ignition point (P0) and the low-fire point (P1), the speed change in modulating mode may be a maximum of 40%, independent of the LMV3… ramp. 2. The setting of the VSD ramp must be about 20% faster than the ramps in the basic unit (parameters 522, 523).
	Bit 4 Valency ≥ 16	Interruption of speed signal	No speed detected in spite of control. 1. Check if the motor turns. 2. Check if the speed sensor delivers a signal (LED / check distance from the sensor disk). 3. Check wiring of the VSD.
	Bit 5 Valency ≥ 32	Quick shutdown due to excessive speed deviation	Speed deviation was for about 1 s >10% outside the anticipated range. 1. Check ramp times of the LMV37.4... and VSD. 2. Check wiring of the VSD.

Error code	Diagnostic code	Meaning for the LMV37.4... system	Remedy
84	Curve slope actuators		
	Bit 0 Valency 1	VSD: Curve too steep in terms of ramp speed	Check speed differential between the curvepoints and the modulating operating ramp setting (parameter 544). 1. Modulating operating ramp 32 seconds Curve slope max. 10% for LMV37.4 ramp of 20 seconds (20% for 10 seconds or 40% for 5 seconds) 2. Modulating operating ramp 48 seconds Curve slope max. 10% for LMV37.4 ramp of 30 seconds (20% for 15 seconds or 30% for 10 seconds) 3. Modulating operating ramp 64 seconds Curve slope max. 10% for LMV37.4 ramp of 40 seconds (20% for 20 seconds or 40% for 10 seconds) ⟶ Between the ignition point (P0) and the low-fire point (P1), the speed change in modulating mode may be a maximum of 40%, independent of the LMV3… ramp. 2. Setting of the VSD ramp must be about 20% shorter than the ramps in the basic unit (parameters 522 and 523)
	Bit 1 Valency 2..3	Fuel actuator: Curve too steep in terms of ramp rate	Check position differential between the curvepoints and the modulating operating ramp setting (parameter 544). 1. Modulating operating ramp 32 seconds The slope of the curve may be a maximum position change of 31° (15° for SQM33.6 and 9° for SQM33.7) between 2 curve points in modulating mode. 2. Modulating operating ramp 64 seconds The slope of the curve may be a maximum position change of 62° (30° for SQM33.6 and 18° for SQM33.7) between 2 curve points in modulating mode.
	Bit 2 Valency 4..7	Air actuator: Curve too steep in terms of ramp rate	Check position differential between the curvepoints and the modulating operating ramp setting (parameter 544). 1. Modulating operating ramp 32 seconds The slope of the curve may be a maximum position change of 31° (15° for SQM33.6 and 9° for SQM33.7) between 2 curve points in modulating mode. 2. Modulating operating ramp 64 seconds The slope of the curve may be a maximum position change of 62° (30° for SQM33.6 and 18° for SQM33.7) between 2 curve points in modulating mode.
85	#	Referencing error ones actuators	
	0	Referencing error of fuel actuator	Referencing of fuel actuator not successful. Reference point could not be reached. 1. Check the setting of the actuator type (parameter 613.0 or 614) 2. Check to see if actuators have been mixed up 3. Check to see if actuator is locked or overloaded
	1	Referencing error of air actuator	Referencing of fuel actuator not successful Reference point could not be reached. 1. Check the setting of the actuator type (parameter 613.1) 2. Check to see if actuators have been mixed up 3. Check to see if actuator is locked or overloaded
	Bit 7 Valency ≥ 128	Referencing error due to parameter change	Parameterization of an actuator (e.g. the reference position) has been changed. To trigger new referencing, this error is set

Error code	Diagnostic code	Meaning for the LMV37.4... system	Remedy
86	#	Error fuel actuator	
	0	Position error	Target position could not be reached within the required tolerance band ⟶ check to see if actuator is locked or overloaded
	Bit 0 Valency 1	Line interruption	Line interruption detected at actuator's terminals ⟶ check wiring (voltage X54 across pin 5 or 6 and pin 2 >0.5 V)
	Bit 3 Valency ≥ 8	Curve too steep in terms of ramp rate	Check position differential between the curvepoints and the modulating operating ramp setting (parameter 544). 1. Modulating operating ramp 32 seconds The slope of the curve may be a maximum position change of 31° (15° for SQM33.6 and 9° for SQM33.7) between 2 curve points in modulating mode. 2. Modulating operating ramp 64 seconds The slope of the curve may be a maximum position change of 62° (30° for SQM33.6 and 18° for SQM33.7) between 2 curve points in modulating mode.
	Bit 4 Valency ≥ 16	Step deviation in comparison with last referencing	Actuator was overloaded or mechanically twisted. 1. Check the setting of the actuator type (parameter 613.0 or 614) 2. Check to see if the actuator is blocked somewhere along its working range. 3. Check to see if the torque is sufficient for the application.
87	#	Error air actuator	
	0	Position error	Target position could not be reached within the required tolerance band ⟶ check to see if actuator is locked or overloaded
	Bit 0 Valency 1	Line interruption	Line interruption detected at actuator's terminals ⟶ check wiring (voltage X53 across pin 5 or 6 and pin 2 >0.5 V)
	Bit 3 Valency ≥ 8	Curve too steep in terms of ramp rate	Check position differential between the curvepoints and the modulating operating ramp setting (parameter 544). 1. Modulating operating ramp 32 seconds The slope of the curve may be a maximum position change of 31° (15° for SQM33.6 and 9° for SQM33.7) between 2 curve points in modulating mode. 2. Modulating operating ramp 64 seconds The slope of the curve may be a maximum position change of 62° (30° for SQM33.6 and 18° for SQM33.7) between 2 curve points in modulating mode.
	Bit 4 Valency ≥ 16	Sectional deviation in comparison with last referencing	Actuator was overloaded or mechanically twisted. 1. Check the setting of the actuator type (parameter 613.1) 2. Check to see if the actuator is blocked somewhere along its working range. 3. Check to see if the torque is sufficient for the application
90	#	Internal error basic unit	
91	#	Internal error basic unit	
93	#	Error flame signal acquisition	

Error code	Diagnostic code	Meaning for the LMV37.4... system	Remedy
	3	Short-circuit of sensor	Short-circuit at QRB... 1. Check wiring. 2. Flame detector possibly fault
95	#	**Error relay supervision**	
	3 Ignition transformer 4 Fuel valve 1 5 Fuel valve 2 6 Fuel valve 3	External power supply active contact	Check wiring
96	#	**Error relay supervision**	
	3 Ignition transformer 4 Fuel valve 1 5 Fuel valve 2 6 Fuel valve 3	Relay contacts have welded	Test the contacts: 1. Unit connected to power: Fan output must be dead. 2. Disconnect power: Disconnect fan. No resistive connection between fan output and neutral conductor allowed. If one of the 2 tests fails, release the unit since contact have definitively welded and safety can no longer be ensured.
97	#	**Error relay supervision**	
	0	Safety relay contacts have welded or external power supply fed to safety relay	Test the contacts: 1. Unit connected to power: Fan output must be dead. 2. Disconnect power: Disconnect fan. No resistive connection between fan output and neutral conductor allowed. If one of the 2 tests fails, release the unit since contacts have definitively welded and safety can no longer be ensured.
98	#	**Error relay supervision**	
	2 Safety valve 3 Ignition transformer 4 Fuel valve 1 5 Fuel valve 2 6 Fuel valve 3	Relay does not pull in	Make a reset; if error occurs repeatedly, replace the unit
99	#	**Internal error relay control**	Make a reset; if error occurs repeatedly, replace the unit

Error code	Diagnostic code	Meaning for the LMV37.4... system	Remedy
	3	Internal error relay control	Make a reset. If error occurs repeatedly, replace the unit Software version V03.10: If error C:99 D:3 occurs during standardization of the VSD, deactivate temporarily function Alarm in case of start prevention (parameter 210 = 0, when using a release contact) or interrupt the controller-ON signal
100	#	**Internal error relay control**	Make a reset; if error occurs repeatedly, replace the unit
105	#	**Internal error contact sampling**	
	0 Pressure switch min 1 Pressure switch max / POC 2 Pressure switch valve proving 3 Air pressure 4 Load controller open 5 Load controller on / off 6 Load controller close 7 Safety loop / Burner flange 8 Safety valve 9 Ignition transformer 10 Fuel valve 1 11 Fuel valve 2 12 Fuel valve 3 13 Reset	Stuck-At failure	Can be caused by capacitive loads or supply of DC voltage to the mains voltage inputs. The diagnostic code indicates the input where the problem occurred
106	#	**Internal error contact request**	Make a reset; if error occurs repeatedly, replace the unit
107	#	**Internal error contact request**	Make a reset; if error occurs repeatedly, replace the unit
108	#	**Internal error contact request**	Make a reset; if error occurs repeatedly, replace the unit
110	#	**Internal error voltage monitor test**	Make a reset; if error occurs repeatedly, replace the unit
111	#	**Mains undervoltage**	Mains voltage to low Conversion factor diagnostic code ⟶ voltage value (AC 230 V: 1,683; AC 120 V: 0,843)
112	0	Mains voltage recovery	Error code for triggering a reset on power restoration (no error)
113	#	**Internal error mains voltage supervision**	Make a reset; if error occurs repeatedly, replace the unit
115	#	**Internal error system counter**	
116	0	Designed lifecycle exceeded (250,000 startups)	Warning threshold has been reached. The unit should be replaced
117	0	Life time exceeded Operation no longer allowed	Switch-off threshold has been reached
120	0	Interrupt limitation fuel counter input	Too many disturbance pulses at the fuel meters input ⟶ Improve EMC
121	#	**Internal error EEPROM access**	Make a reset, repeat last parameterization / check. Restore the parameter set, if error occurs repeatedly, replace the unit

Error code	Diagnostic code	Meaning for the LMV37.4... system	Remedy
122	#	**Internal error EEPROM access**	Make a reset, repeat last parameterization / check. Restore the parameter set, if error occurs repeatedly, replace the unit
123	#	**Internal error EEPROM access**	Make a reset, repeat last parameterization / check. Restore the parameter set, if error occurs repeatedly, replace the unit
124	#	**Internal error EEPROM access**	Make a reset, repeat last parameterization / check. Restore the parameter set, if error occurs repeatedly, replace the unit
125	#	**Internal error EEPROM read access**	Make a reset, repeat last parameterization / check. If error occurs repeatedly, replace the unit
126	#	**Internal error EEPROM write access**	Make a reset, repeat last parameterization / check. If error occurs repeatedly, replace the unit
127	#	**Internal error EEPROM access**	Make a reset, repeat last parameterization / check. Restore the parameter set, if error occurs repeatedly, replace the unit
128	0	Internal error EEPROM access - synchronization during initialization	Make a reset; if error occurs repeatedly, replace the unit
129	#	Internal error EEPROM access – command synchronization	Make a reset, repeat last parameterization / check. If error occurs repeatedly, replace the unit
130	#	Internal error EEPROM access - timeout	Make a reset, repeat last parameterization / check. If error occurs repeatedly, replace the unit
131	#	Internal error EEPROM access - page on abort	Make a reset, repeat last parameterization / check. If error occurs repeatedly, replace the unit
132	#	Internal error EEPROM register initialization	Make a reset; if error occurs repeatedly, replace the unit
133	#	Internal error EEPROM access – Request synchronization	Make a reset, repeat last parameterization / check. If error occurs repeatedly, replace the unit
134	#	Internal error EEPROM access – Request synchronization	Make a reset, repeat last parameterization / check. If error occurs repeatedly, replace the unit
135	#	Internal error EEPROM access – Request synchronization	Make a reset, repeat last parameterization / check. If error occurs repeatedly, replace the unit
136	#	Restore	
	1	Restore started	Restore of a backup has been started (no error) New devices require resetting following restore!
		for further diagnostic codes for error code 136, refer to error code 137	For measures, refer to error code 137
137	#	**Internal error – backup / restore**	
	157 (-99)	Restore – ok, but backup < data set of current system	Restore successful, but backup data set is smaller than in the current system
	239 (-17)	Backup – storage of backup in AZL2... faulty	Make reset and repeat backup
	240 (-16)	Restore – no backup in AZL2...	No backup in AZL2...
	241 (-15)	Restore – interruption concerning unpassable ASN	The Backup has a unpassable ASN and may not restore of the unit

Error code	Diagnostic code	Meaning for the LMV37.4... system	Remedy
	242 (-14)	Backup – backup made is inconsistent	Backup is faulty and cannot be transferred back
	243 (-13)	Backup – data comparison between µCs faulty	Repeat reset and 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	Repeat reset and backup
	246 (-10)	Restore – timeout when storing in EEPROM	Repeat reset and backup
	247 (-9)	Data received are inconsistent	Backup data set invalid, restore not possible
	248 (-8)	Restore cannot at present be made	Repeat reset and backup
	249 (-7)	Restore – abortion due to unsuitable burner identification	Backup has an unsuitable burner identification and must not be transferred to the unit
	250 (-6)	Backup – CRC of one page is not correct	Backup data set 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	Repeat reset and backup
	253 (-3)	Restore cannot at present be made	Repeat reset and backup
	254 (-2)	Abortion due to transmission error	Repeat reset and backup
	255 (-1)	Abortion due to timeout during restore	Make a reset, check the connections and repeat the backup
146	#	**Timeout building automation interface**	Refer to User Documentation Modbus (A7541)
	1	Modbus timeout	
150	#	**TÜV test**	
	1 (-1)	Invalid phase	TÜV test may only be started in phase 60 (operation)
	2 (-2)	TÜV test default output too low	TÜV test default output must be lower than the lower output limit
	3 (-3)	TÜV test default output too high	TÜV test default output must be higher than the upper output limit
	4 (-4)	Manual abortion	No error: Manual abortion of TÜV test by the user
	5 (-5)	TÜV test timeout	No loss of flame after fuel valves have been shut 1. Check for extraneous light 2. Check wiring for short-circuit 3. Check to see if one of the valves is leaking
165	#	**Internal error**	
166	0	Internal error watchdog reset	
167	#	**Manual locking**	Unit has been manually locked (no error)
	1	Manual locking by contact	
	2	Manual locking by AZL2...	
	3	Manual locking by PC software	
	8	Manual locking by the AZL2... Timeout / communication breakdown	During a curve adjustment via the AZL2..., the timeout for menu operation has elapsed (setting via parameter 127), or communication between the LMV37.4... and the AZL2... has broken down

Error code	Diagnostic code	Meaning for the LMV37.4... system	Remedy
	9	Manual locking by the PC software Communication breakdown	During a curve adjustment via the ACS410, communication between the LMV37.4... and the ACS410 was interrupted for more than 30 seconds
	33	Manual locking after PC software reset attempt	PC software made a reset attempt although the system worked correctly
168	#	**Internal error management**	Make a reset; if error occurs repeatedly, replace the unit
169	#	**Internal error management**	Make a reset; if error occurs repeatedly, replace the unit
170	#	**Internal error management**	Make a reset; if error occurs repeatedly, replace the unit
171	#	**Internal error management**	Make a reset; if error occurs repeatedly, replace the unit
200 OFF	#	**System error-free**	No error
201 OFF UPr	#	**Start prevention**	Start prevention due to unparameterized unit Go to error history, entry 702, for initial cause of the error with shutdown in connection with the first curve settings
	Bit 0 Valency 1	No operating mode selected	
	Bit 1 Valency 2..3	No fuel train defined	
	Bit 2 Valency 4..7	No curves defined	
	Bit 3 Valency 8..15	Standardized speed undefined	
	Bit 4 Valency 16..31	Backup / restore was not possible	
202	#	**Internal error operating mode selection**	Redefine the operating mode (parameter 201)
203	#	**Internal error**	Redefine the operating mode (parameter 201). Make a reset; if error occurs repeatedly, replace the unit
204	**Phase number**	**Program stop**	Program stop is active (no error)
205	#	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
206	0	Inadmissible combination of units (basic unit - AZL2...)	
207	#	**Version compatibility basic unit - AZL2...**	
	0	Basic unit version too old	
	1	AZL2... version too old	
208	#	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
209	#	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
210	0	Selected operating mode is not released for the basic unit	
240	#	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
245	#	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit
250	#	**Internal error**	Make a reset; if error occurs repeatedly, replace the unit

EU Declaration of conformity

Bentone Gasburners

CE

Certificate No.	Type	Certificate No.	Type
CE-0123CT1269	BFG 1	CE-0123CT1326	BG 550
CE-0123CT1270	STG 120	CE-0123CT1337	BG 600
CE-0123CT1281	STG 146	CE-0123CT1348	BG 650
CE-0123CT1292	BG 300	CE-0123CT1359	BG 700
CE-0123CT1304	BG 400	CE-0123CT1360	BG 800
CE-0123CT1315	BG 450	CE-0123CT1371	BG 950

This declaration of conformity is issued under the sole responsibility of the manufacturer. The object of the declaration described above is in conformity with:

Gas Appliance Regulation 2016/426/EU

Machinery Directive 2006/42/EC

EMC 2014/30/EU

Restriction of the use of certain hazardous substances (RoHS) Directive 2011/65/EU

References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:

EN 676+A2:2008	(excluded Annex J/K)	Automatic forced draught burners for gaseous fuels

Additional information can be downloaded at:

www.bentone.com

Enertech AB
Box 309
S-341 26 LJUNGBY

Ljungby February 15th, 2018

Håkan Lennartsson
Managing Director
Enertech AB

Bentone®

General instructions for gasburners

Installation

1. Follow standards and instructions applicable to the installation of gas burners
2. Ensure that the electric installation is made in accordance with existing regulations
3. Check that the fresh air intake of the boiler room is sufficiently dimensioned
4. Check by studying the data plate that the efficiency of the burner is adapted to the boiler output
5. Check that the burner is adapted to the gas quality in question
6. Check that the input pressure of the gas is correct
7. Check that the dampers of the boiler are open
8. Check that there is water in the system
9. Check that thermostats etc. are correctly adjusted
10. Read the instructions and follow the directions given for the burner as to starting-up and service

Maintenance

General instructions

1. Keep the boiler room clean
2. Ensure that the fresh air intake of the boiler room is not restricted
3. Switch off the current and shut off the gas supply if the burner must be withdrawn from the boiler
4. Do not use the boiler for burning paper and waste if there is no special arrangement (fire room) for this

If the burner has stopped

1. Press the reset button of the relay
2. Check that the max. thermostat has not cut out
3. Check other thermostats for example room ther mostat, if any
4. Check that the gas pressure to the burner is sufficient
5. Check that the electric fuses have not blown
6. Make a new attempt to start the burner and check the counter of the gas meter to find out whether the solenoid valve opens
7. If the burner does not start in spite of repeated starting attempts call the installer

Normal operation

1. Ensure that the air supply to the burner is not obstructed by dust and dirt
2. Have the installer make a yearly overhaul of the installation so that safety is not jeopardized
3. Have the installer at the yearly overhaul also adjust the burner to ensure optimal combustion economy
4. Check periodically that there is water in the system (fill up if necessary) and that thermostats etc. are normally adjusted
5. Ensure that there is no water or dampness in contact with the burner

Shut-Off

1. Switch off the current with the main switch
2. Shut-off the gas supply with the shut-off cock on the burner

Warning

1. Never keep your face in front of the fire room door when starting up the burner
2. Do not use naked flame when inspecting the fire room

Authorized installer:

_____

Address:_____

Tel:_____

Enertech AB. P.O Box 309, SE-341 26 Ljungby.
www.bentone.se, www.bentone.com

Bentone®