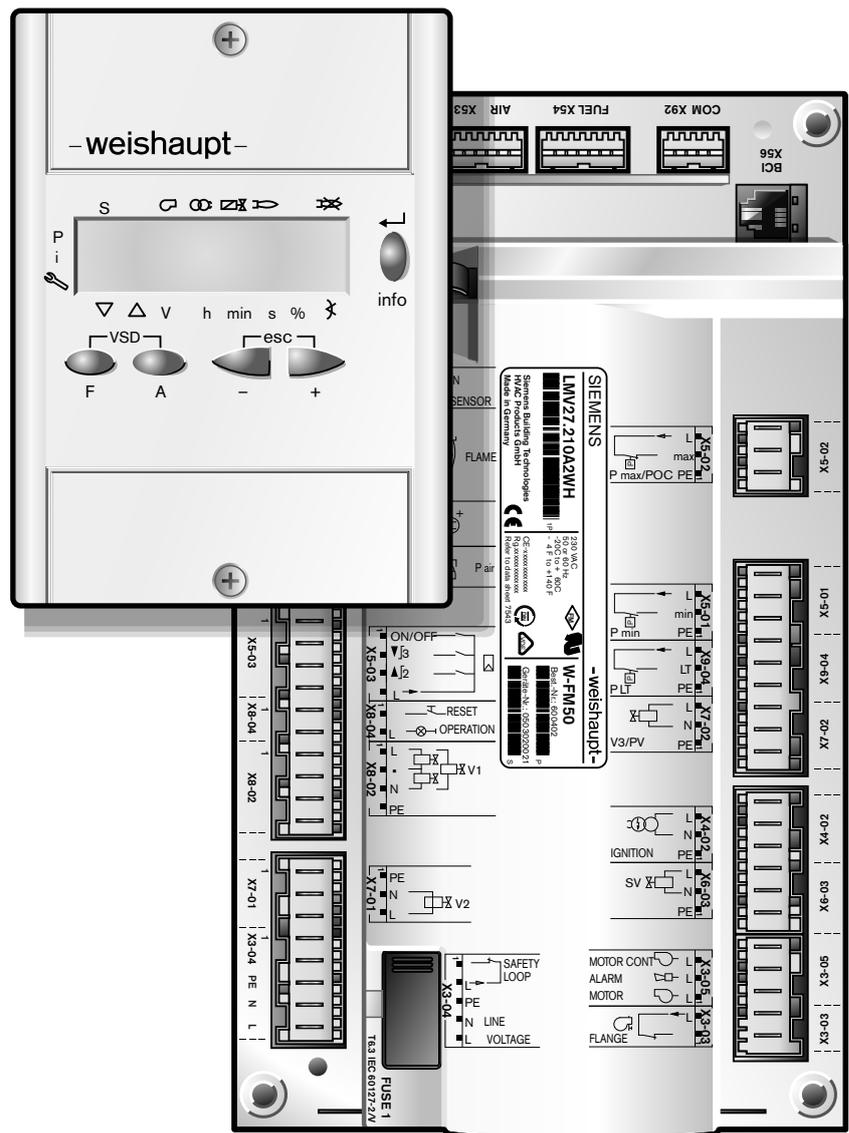


-weishaupt-

# manual

Installation and operating instruction



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**1 User instructions**

**1 User instructions**

Translation of original  
operating instructions

These operating instructions form part of the equipment and must be kept on site at all times.

**1.1 User guide**

**1.1.1 Symbols**

 <b>DANGER</b>	<p>Immediate danger with high risk. Non observance can lead to serious injury or death.</p>
 <b>WARNING</b>	<p>Danger with medium risk. Non observance can lead to environmental damage, serious injury or death.</p>
 <b>CAUTION</b>	<p>Danger with low risk. Non observance can cause damage to the equipment and injury to personnel.</p>
	<p>Important information.</p>
	<p>Requires direct action.</p>
	<p>Result after an action.</p>
	<p>Itemisation.</p>
	<p>Range.</p>

**1.1.2 Target group**

These installation and operating instructions are intended for the operator and qualified personnel. They should be observed by all personnel working on the unit.

Work on the unit must only be carried out by personnel who have the relevant training and instruction.

## 1 User instructions

### 1.2 Guarantee and Liability

Guarantee and liability claims for personal and equipment damage are excluded, if they can be attributed to one or more of the following causes:

- Non approved application of the unit,
- non-observance of the installation and operating instruction,
- operating the unit with faulty safety equipment,
- continual operation despite a fault,
- improper installation, commissioning, operation and service of the unit,
- alterations to the unit,
- the installation of additional components, which have not been tested with the unit,
- the installation of combustion chamber inserts, which impede full flame formation,
- repairs, which have been carried out incorrectly,
- the use of non original Weishaupt parts,
- unsuitable fuels,
- defects in the supply lines,
- acts of God.

## 2 Safety

## 2 Safety

### 2.1 Permissible application

The combustion manager W-FM 50 is suitable for use with single fuel burners.

Improper use could:

- endanger the health and safety of the user or third parties,
- cause damage to the unit or other material assets.

### 2.2 When gas can be smelled

Avoid open flames and spark generation. For example:

- do not operate light switches,
- do not operate electronic equipment,
- do not use mobile telephones.
- ▶ Open doors and windows.
- ▶ Close gas isolating valve.
- ▶ Warn the inhabitants (do not ring door bells).
- ▶ Leave the building.
- ▶ Inform the heating company or gas supplier from outside of the building.

### 2.3 Safety measures

- Rectify safety-relevant defects immediately,
- Replace safety-relevant components according to their specified service life (see Ch. 8.1).

#### 2.3.1 Normal operation

- All labels on the unit must be kept in a legible condition,
- the unit should only be operated with its cover in the closed position,
- do not touch moving parts during operation,
- stipulated settings, service and inspection work should be carried out at regular intervals.

#### 2.3.2 Electrical connection

For all work carried out on live parts:

- Observe the accident prevention instructions BGV A3 and adhere to local directives,
- tools in accordance with EN 60900 should be used.

## 2 Safety

### 2.3.3 Gas supply

- Installation, alteration and maintenance work on gas appliances in buildings and properties must only be carried out by the gas authority or their approved agent,
- the pipe work must be subject to a pre and main test and a combined load test and valve proving test relative to the pressure range intended (e.g. DVGW-TRGI, work sheet G 600),
- inform the gas authority about the type and size of plant prior to installation,
- local regulations and guidelines must be observed during installation (e.g. DVGW-TRGI, work sheet G 600; TRF Band 1 and Band 2),
- the gas supply pipe work should be suitable for the type and quality of gas and should be designed in such a way that it is not possible for liquids to escape (e. g. condensate), observe the vaporisation temperature of liquid petroleum gas,
- use only approved sealing materials. Observe all process information,
- re-commission the unit when changing to a different type of gas,
- carry out soundness test after each service and fault rectification.

### 2.4 Alterations to the construction of the equipment

All conversions require written approval from Max Weishaupt GmbH.

- No additional components may be fitted, which have not been tested for use with the equipment,
- use only original Weishaupt replacement parts.

### 2.5 Noise emission

The noise emissions of a combustion system are determined by the acoustic behaviour of all components fitted.

High noise levels can lead to loss of hearing. Provide operating personnel with protective equipment.

A sound attenuator can be installed to further reduce noise emissions.

### 2.6 Disposal

Dispose of all materials used in a safe and environmentally friendly way. Observe local regulations.

### 3 Product description

### 3 Product description

#### 3.1 Function

##### 3.1.1 Valve proving

The valve proving gas pressure switch checks the soundness of the valves. It signals the combustion manager if the pressure increases or decreases to an impermissible level during valve proving.

Valve proving is carried out automatically by the combustion manager:

- after every controlled shutdown,
- prior to burner start following lockout or power outage.

1. Test phase (function sequence for valve proving valve 1):

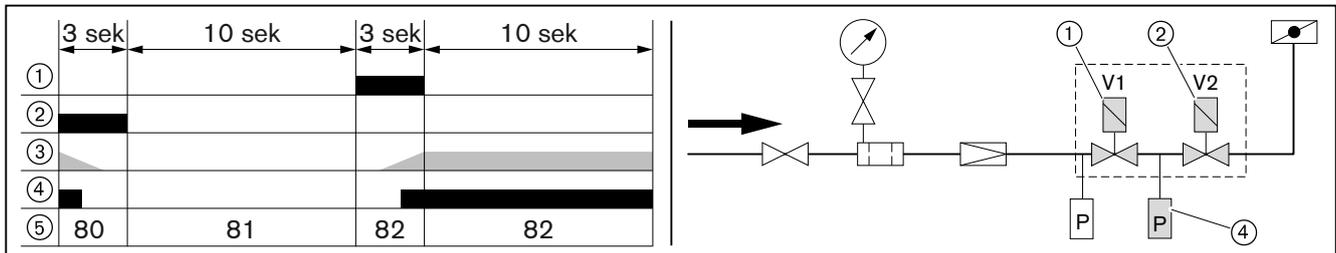
- valve 1 closes,
- valve 2 closes after a delay,
- the gas escapes and the pressure between valve 1 and valve 2 reduces,
- both valves remain closed for 10 seconds.

If the gas pressure increases to above the set value during these 10 seconds, valve 1 is leaking. The combustion manager initiates a controlled shutdown.

2. Test phase (function sequence for valve proving valve 2):

- valve 1 opens, valve 2 remains closed,
- the gas pressure between valve 1 and valve 2 increases,
- valve 1 closes again,
- both valves remain closed for 10 seconds.

If the gas pressure decreases to below the set value during these 10 seconds, valve 2 is leaking. The combustion manager initiates a controlled shutdown.



- ① Valve 1
- ② Valve 2
- ③ Pressure between valve 1 and valve 2
- ④ Valve proving gas pressure switch
- ⑤ Operating phases

##### 3.1.2 Low gas programme

The low gas pressure switch checks the gas connection pressure from phase 22. If the preset gas pressure is not achieved, a low gas programme is initiated.

In the low gas programme the combustion manager carries out a safety shutdown and initiates a restart after the low gas waiting time (10 seconds). This low gas waiting time doubles after every unsuccessful start attempt. If the start attempts exceed the repetition limit value (parameter 223) the combustion manager goes to lockout. If the burner starts, the repetition counter is reset automatically.

**3 Product description**

**3.1.3 Manual load**

If a signal is applied to input X5-03:1 (burner ON), each load setting within the load limit can be selected manually. When manual load is activated, the current load flashes in the operating display. Manual load can be activated either by key combination or via parameter 121. Manual load via parameter 121 offers additional functions.

Load default	Function	
	Parameter 121	Key combination
----	Manual load deactivated	not possible
0.0 ... 19.9	Manual OFF, remains active even after fuel changeover.	not possible
P0	Initiate ignition position (only multi stage operation)	not possible
20.0 ... 100.0 P1 ... P3	Initiate load setting within the load limits. Values outside of the load limits can be adjusted, but not initiated. If the load limits are extended during active manual load, the burner reacts accordingly.	Initiate load setting within the load limits. Only values within the load limits can be adjusted.

For the duration of commissioning (400 Set), manual load is ignored. With the exception of Manual OFF, manual load is deactivated during fuel changeover.

**Manual load via key combination**

Activate manual load:

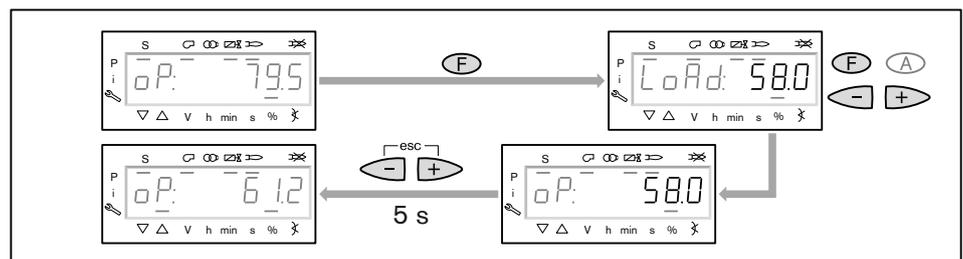
- ▶ Press and hold [F] key.
- ✓ The display shows **LoAd**.
- ▶ Set manual load using [+] or [-] key.
- ✓ The manual load set flashes in the operating display.

Manual load burner OFF:

- ▶ Drive to minimum load position and release [F] and [-] keys.
- ▶ Press [F] and [-] keys again.

Deactivate manual load:

- ▶ Press and hold [esc] key for 5 seconds.



**Manual load via parameter 121**

- ▶ Enter password (see Ch. 5.2.1).
- ▶ Select parameter 121
- ▶ Press [ENTER] key.
- ▶ Set manual load using [+] or [-] key.
- ▶ Press [ENTER] key.
- ✓ Manual load is initiated.

### 3 Product description

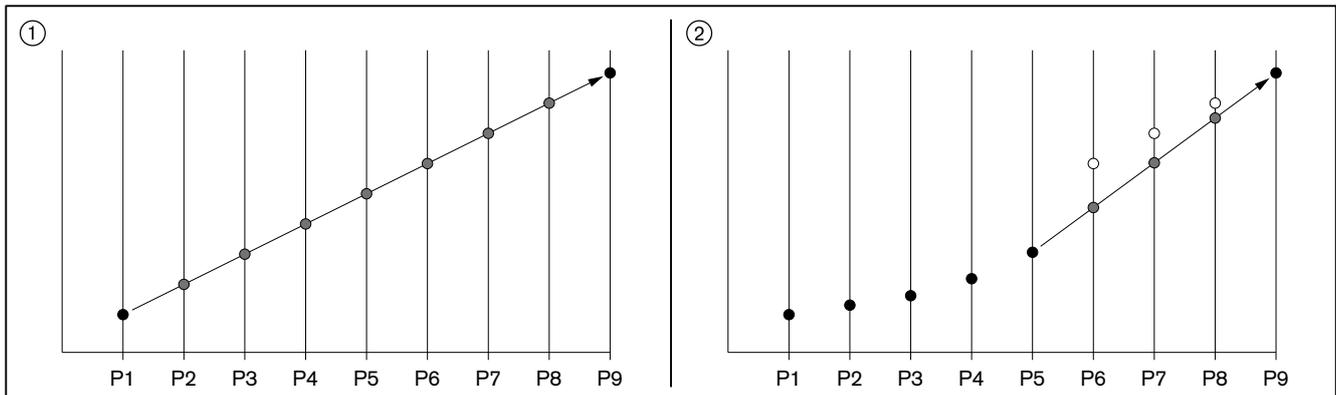
#### 3.1.4 Calculation

A calculation can be initiated in modulating commissioning if P1 and P9 are programmed. During calculation, a straight line is formed from the operating point shown from P1 or from P9. The values on the straight line form new operating points.

Initiating a calculation from P9: Press [+] key for 3 to 5 seconds.

Initiate a calculation from P1: Press [-] key for 3 to 5 seconds.

If during commissioning only P1 and P9 are programmed, the combustion manager initiates an automatic calculation when exiting P1 and calculates P2 to P8.



- ① Automatic calculation
- ② Calculation from P5 to P9

#### 3.1.5 Data backup

In the ABE, the settings of the combustion manager can be saved (Backup) via parameter 050 (see Ch. 5.3.1). If the unit needs to be replaced, or if the parameters have unintentionally been altered, the data can be transferred back to the combustion manager.

As a protection against unintentional data transfer from the ABE to the combustion manager, the burner data of both units is compared; data will only be transferred (Restore), if the data matches.



#### Soot or CO formation because no combustion analysis has been carried out.

At heat demand, the burner starts automatically approx. 30 seconds after the data transfer (Restore).

Directly following the data transfer (Restore):

- ▶ Check sequence of operation
- ▶ Carry out a combustion analysis at each load point.



#### Only in conjunction with frequency converter

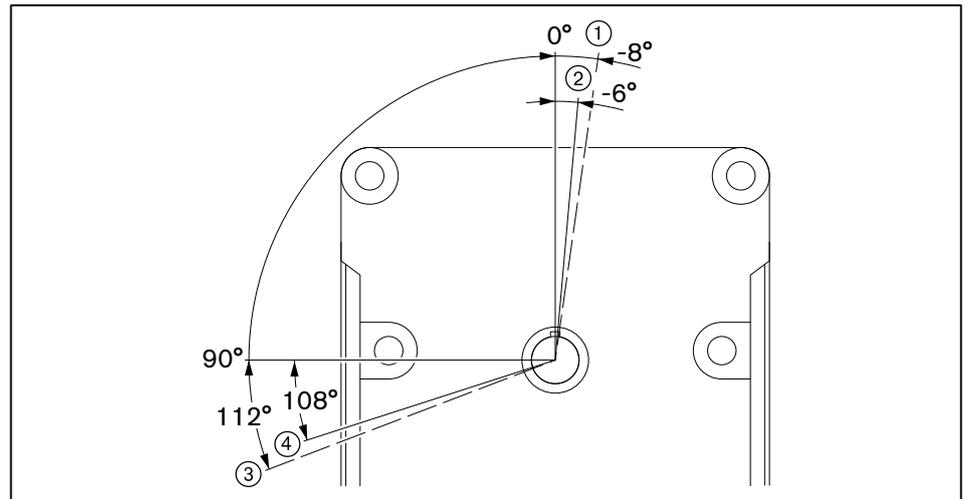
Following data transfer (Restore) a speed standardisation with subsequent adjustment must be carried out.

### 3 Product description

#### 3.1.6 Referencing the actuator

In operating phase 10 (home run) the combustion manager references the actuators, whereby the actuator drives over a reference marker. The actuator then drives back and locates the inner edge of the reference marker. All settings are referenced to this position.

The combustion manager references the fuel actuators to the reference marker OPEN and the air actuator to the reference marker CLOSED. The setting range of the air damper shaft is limited mechanically, therefore the air actuator cannot drive to reference marker OPEN. If the actuators have been mixed up, a reference fault is identified (fault 85).



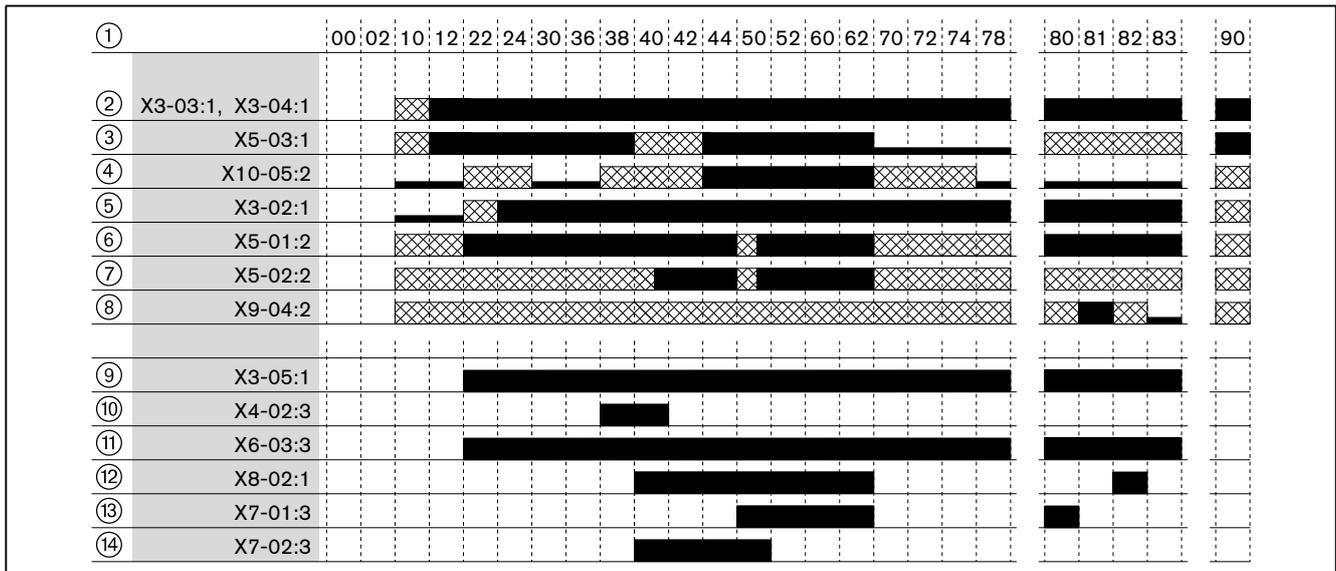
- ① Reference range CLOSED
- ② Reference marker CLOSED (air actuator)
- ③ Reference range OPEN
- ④ Reference marker OPEN (fuel actuators)

**3 Product description****3.1.7 Program sequence****Operating phases**

00	Lockout phase
02	Safety phase
10	Home run
12	Standby
22	Fan / safety valve ON
24	Pre-purge position
30	Pre-purge
36	Ignition position
38	Pre-ignition
40	Fuel release
42	Ignition OFF
44	Flame signal
50	Flame stabilisation (only with Gas with pilot ignition)
52	Ignition pilot valve OFF (only with Gas with pilot ignition)
60	Operating setting 1
62	Operating setting 2
70	Post burn time
72	Post purge position
74	Post-purge
78	Post-purge
80	Venting valve train (only during valve proving)
81	Test without pressure (only during valve proving)
82	Fill valve train (only during valve proving)
83	Test with system pressure (only during valve proving)
90	Low gas waiting time

3 Product description

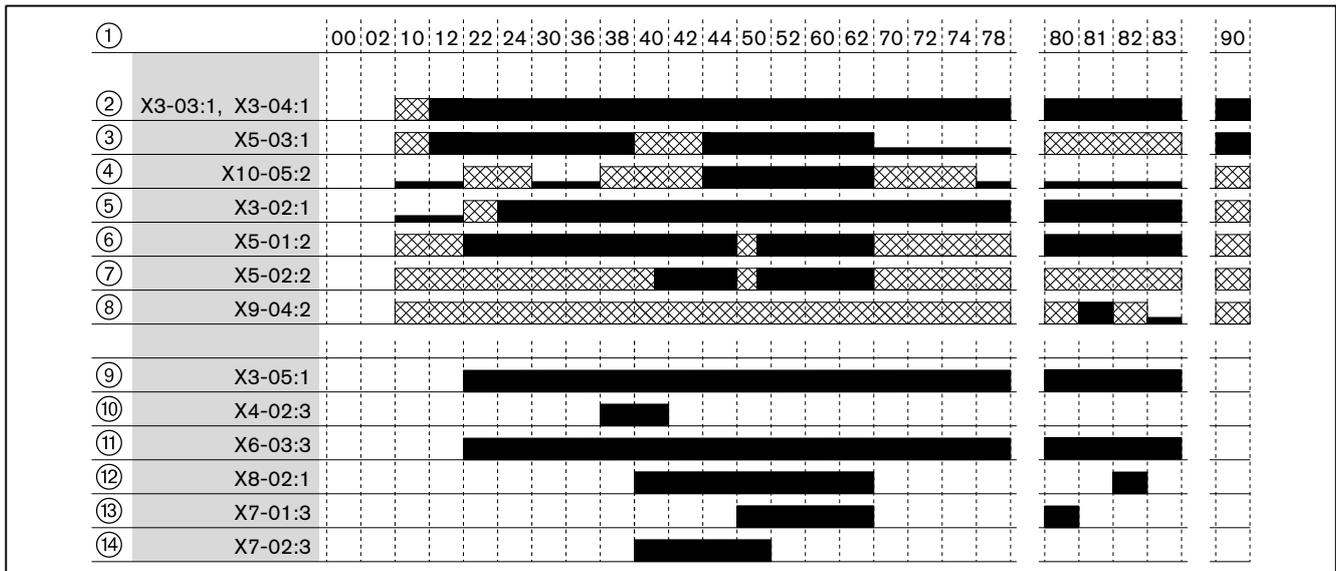
Gas with ignition pilot valve



- Signal on input / output activated
- No signal on input
- Input without influence
- ① Operating phases
- ② Safety circuit
- ③ Heat demand from controller
- ④ Flame signal
- ⑤ Air pressure switch
- ⑥ Low pressure switch
- ⑦ High pressure pressure switch
- ⑧ Valve proving pressure switch
- ⑨ Fan motor
- ⑩ Ignition unit
- ⑪ Safety valve
- ⑫ Fuel valve 1
- ⑬ Fuel valve 2
- ⑭ Ignition pilot valve

3 Product description

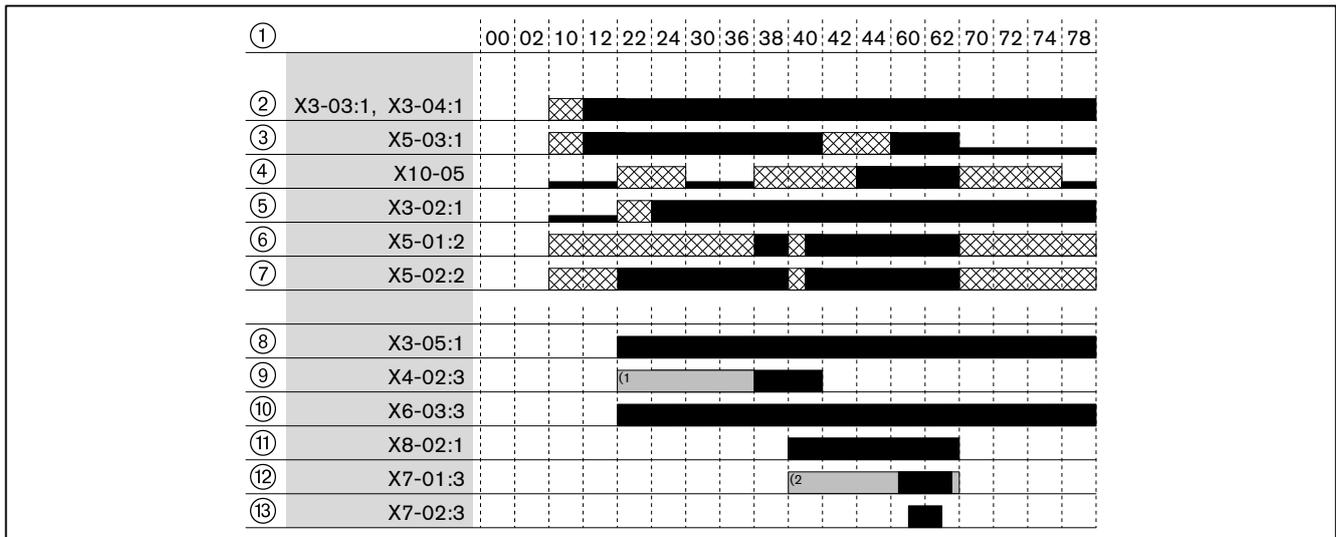
Gas direct ignition



- Signal on input / output activated
- No signal on input
- Input without influence
- ① Operating phases
- ② Safety circuit
- ③ Heat demand from controller
- ④ Flame signal
- ⑤ Air pressure switch
- ⑥ Low pressure switch
- ⑦ High pressure pressure switch
- ⑧ Valve proving pressure switch
- ⑨ Fan motor
- ⑩ Ignition unit
- ⑪ Safety valve
- ⑫ Fuel valve 1
- ⑬ Fuel valve 2

3 Product description

Oil modulating or multi-stage



(1) Only for longer pre-ignition time (parameter 281)

(2) Only with type of operation 12 (oil modulating)

■ Signal on input / output activated

□ No signal on input

▨ Input without influence

① Operating phases

② Safety circuit

③ Heat demand from controller

④ Flame signal

⑤ Air pressure switch

⑥ Low pressure switch

⑦ High pressure pressure switch

⑧ Fan motor

⑨ Ignition unit

⑩ Safety valve

⑪ Fuel valve 1

⑫ Fuel valve 2

⑬ Fuel valve 3

### 3 Product description

### 3.2 Inputs

#### 3.2.1 Voltage supply

The voltage supply is connected to inputs X3-04:3-5 of the W-FM50.

The mains frequency is set in parameter 125.



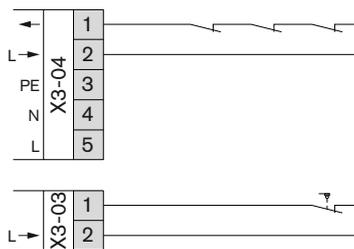
#### 3.2.2 Safety circuit

In the diagnostic code, the inputs X3-03:1/2 and X3-04:1/2 are combined as safety circuit. If one of the inputs is open, at least one safety shutdown is triggered. If the repetition value is exceeded an open input leads to lockout. The repetition value can be set in parameter 215.

At input X3-04:1/2 all external components of the safety circuit are switched in sequence, these include:

- Emergency-Off switch
- Safety temperature limiter (STL)
- Low water safety interlock, etc.

The burner flange limit switch is connected to input X3-03:1/2.



#### 3.2.3 Reset

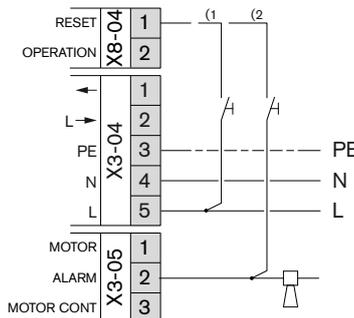
A reset button can be connected to input X8-04:1. If lockout occurs, the combustion manager can be reset by pressing the push button for 1 to 6 seconds. Longer or shorter operation of the push button is ignored by the combustion manager and does not lead to a reaction.

##### With lockout function <sup>(1)</sup>

If the push button is also required for manual lockout, it must be connected to mains input X3-04:5 (L). If the combustion manager is in an operating phase, pressing the push button for 1 to 6 seconds will initiate a manual lockout.

##### Without lockout function <sup>(2)</sup>

If the push button is not required to carry out manual lockout it must be connected to alarm output X3-05:2.

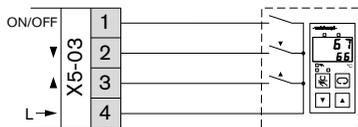


**3 Product description**

**3.2.4 Load controller via contacts**

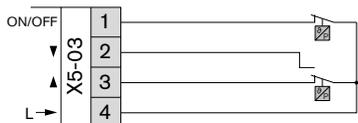
The contact for the heat demand is connected to input X5-03:1 (burner ON).

The load control distinguishes between multi-stage and modulating operation. The type of operation is set in parameter 201.



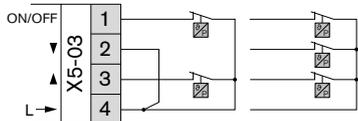
**Modulating operation with load controller**

If input X5-03:2 (CLOSED) is activated, the burner rating reduces. If input X5-03:3 (OPEN) is activated, the burner rating increases. If none of the two inputs is activated, the burner rating remains unchanged.



**Modulating operation with thermostat**

If thermostats or pressure regulators are connected to inputs X5-03, the modulating fuel can only be operated in sliding two stage operation. At heat demand input X5-03:2 (CLOSED) is activated and the burner drives to partial load. If the temperature drops below the value set, input X5-03:3 (OPEN) is activated and the burner drives to full load. If a signal is applied to input X5-03:3, input X5-03:2 is ignored.

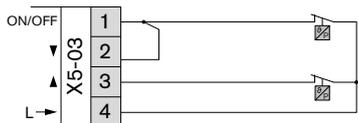


**Multi-stage operation (fuel oil only)**

Two and three stage:

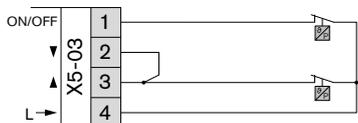
Input	Type of operation	
	two stage	three stage
X5-03:1	stage 1	stage 1
X5-03:2	stage 1	stage 2
X5-03:3	stage 2	stage 3

If input X5-03:3 is activated during 3 stage operation, the burner drives to stage 3, the signal from stage 2 is no longer relevant.



**Low impact start:**

At heat demand and with a bridge between terminal 1 and 2 the burner ignites in stage 1 and then automatically drives to stage 2. If input X5-03:2 is also activated the burner drives to stage 3.

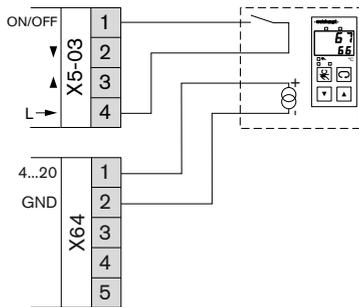


**Change-over release:**

A bridge connects terminals 2 and 3. At heat demand the burner drives to stage 1. If inputs X5-03:2/3 are then activated simultaneously the burner drives via stage 2 to stage 3.

### 3 Product description

#### 3.2.5 Load controller analogue input



The contact for the heat demand is connected to input X5-03:1 (burner ON).

The analogue load signal is connected to terminals X64:1 (4 ... 20 mA) and X64:2 (GND). A signal of less than 3 mA deactivates the analogue input and the load presetting at input X5-03:2/3 has priority (parameter 942). If no load controller is connected to input X5-03:2/3, the combustion manager remains at the current rating until heat demand is interrupted.

#### Modulating operation

In modulating operation, parameter 123 (see Ch. 5.3.1) determines the minimum setting point.

Signal on X64:1/2	Load W-FM
3 ... 4 mA	20 %
20 mA	100 %

#### Multi-stage operation

In multi-stage operation a hysteresis of 1 mA exists between the operating points, which eliminates unnecessary load changes.

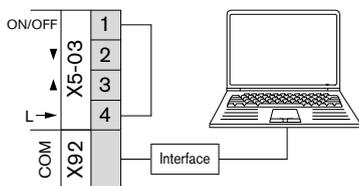
Two stage:

Signal on X64:1/2	Load W-FM
3 ... 5 ... 12 mA	Stage 1
13 ... 15 ... 20 mA	Stage 2

Three stage:

Signal on X64:1/2	Load W-FM
3 ... 5 ... 7 mA	Stage 1
8 ... 10 ... 12 mA	Stage 2
13 ... 15 ... 20 mA	Stage 3

#### 3.2.6 Load controller building management



A Bus interface for building management can be connected to input COM X92.

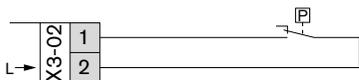
- Modbus: Bus-Interface Modbus OCI412.10 (Order No.: 660 285)
- eBus: Adapter MPA eBUS (Order No.: 743 090)

For burner start, input X5-03:1 (burner ON) must be connected to voltage output X5-03:4. Load presetting is then carried out by the building management system.

The settings required for Bus communication are set in parameters 141 to 148.

**3 Product description**

**3.2.7 Air pressure switch**



The closing contact of the air pressure switch should be connected to input X3-02. If no signal is present once the fan has started, the combustion manager initiates a lockout.

**3.2.8 Minimum pressure switches**



The closing contact of the low pressure switch should be connected to input X5-01.

On burners without low oil pressure switch a bridge must be connected to terminal 2 and terminal 3.

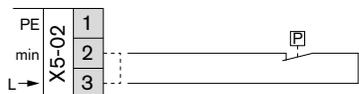
**Low gas pressure switch**

In gas operation, the combustion manager expects a signal at input X5-01:2 from phase 22. If the value set at the low pressure switch is not achieved, the pressure switch contact opens and the combustion manager starts the low gas program (see Ch. 3.1.2).

**Low oil pressure switch**

In oil operation, the combustion manager expects a signal at input X5-01:2 from phase 38 or phase 40 (depending on parameter 276). If the value set at the low pressure switch is not achieved, the pressure switch contact opens and the combustion manager initiates a lockout. In phase 38 (pre-ignition) lockout occurs after a waiting time of 30 seconds, in the phases following 38 lockout occurs immediately.

**3.2.9 High pressure switches**



The opening contact of the high pressure switch must be connected to input X5-02.

On burners without high pressure switch a bridge must be connected to terminal 2 and terminal 3.

**High gas pressure switch**

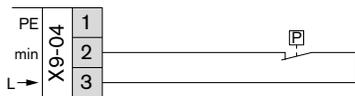
In gas operation the combustion manager expects a signal at input X5-02:2 from phase 40. If the value set at the pressure regulator is exceeded, the pressure switch contact opens and the combustion manager initiates a lockout.

**Max. oil pressure switch**

In oil operation the combustion manager expects a signal at input X5-02:2 from phase 22. If the value set at the pressure switch is exceeded, the pressure switch contact opens and the combustion manager initiates a lockout. In phase 22 (fan ON) lockout occurs after a waiting time of 30 seconds, in the phases following 22, lockout is immediate.

**3 Product description**

**3.2.10 Valve proving gas pressure switch**



The opening contact of the valve proving gas pressure switch must be connected to input X9-04. Input X9-04 is only active during valve proving (see Ch. 3.1.1). The time of the valve proving can be set in parameter 241.

If the pressure set is not achieved in phase 81 (test without pressure), the contact closes.  
If the pressure set is exceeded in phase 83 (test with system pressure), the contact opens.

**3.2.11 Flame sensor**

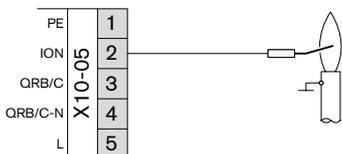
If the flame signal in phase 44 does not equate to the value required, the combustion manager initiates a lockout.  
If the flame signal during operation does not maintain the required value, the combustion manager initiates a controlled shutdown with restart. Two controlled shutdowns in sequence lead to lockout.  
A flame signal at heat demand (phase 12) leads to start prevention.  
A flame signal during pre-purge (phase 30 to 36) or post-purge (phase 78) leads to lockout after one repetition and repeated occurrence.  
Parameter 954 shows the current flame signal as a percentage value.



**QRA...**

The flame sensor QRA... (UV cell) is connected to input X10-06.

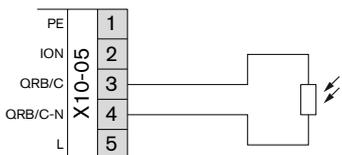
	Flame signal Parameter 954
Response limit extraneous light	greater than 18 %
Operation	min 24 %



**Ionisation electrode**

The ionisation electrode is connected to input X10-05:2.

	Flame signal Parameter 954
Sensor current min.: 4 µA	approx. 30 %
Sensor current max.: 16 ... 40 µA	100 %



**ORB...**

The flame sensor QRB... (photo resistor) is connected to input X10-05:3/4.

	Flame signal Parameter 954
Response limit extraneous light (resistance less than 400 kΩ)	approx. 10 %
Operation (resistance less than 230 kΩ)	approx. 16 %
Short circuit identification (resistance less than 0.5 kΩ)	-

### 3 Product description

#### 3.2.12 Fuel meter

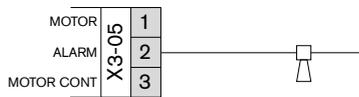


A fuel meter with Reed contact can be connected to input X75. However, a prerequisite is that there is no frequency converter connected and activated. The meter impulses per volume unit must be set in parameter 128. The impulse frequency must not exceed 300 Hz.

### 3 Product description

### 3.3 Outputs

#### 3.3.1 Alarm

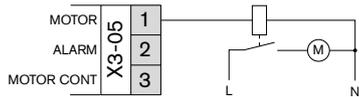


In lockout position (phase 00) a mains voltage signal is emitted at alarm output X3-05:2.

Additionally, it is also possible to signal a start prevention. To do this parameter 210 should be set to 1.

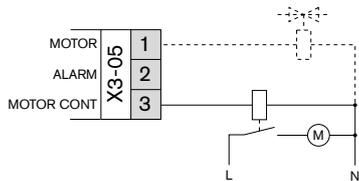
#### 3.3.2 Motor

##### Normal operation



The contactor and the star delta switching of the burner motor are fitted to output X3-05:1 as standard.

##### Continuous operation

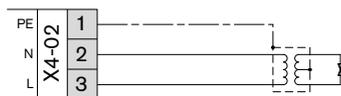


For continuous running fan the contactor or star delta switching of the burner motor is fitted to output X3-05:3.

If an air pressure switch is fitted, an additional vent valve should be fitted and connected to output X3-05:1.

#### 3.3.3 Ignition unit

The ignition unit is connected to output X4-02.



##### Ignition behaviour Gas

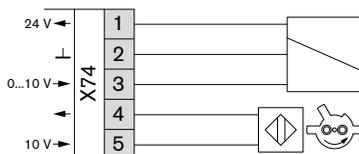
The duration of the pre-ignition time (phase 38) can be altered in parameter 226.

##### Ignition behaviour Oil

In parameter 281 it can be defined whether the ignition should begin in phase 22 or phase 38. The duration of the pre-ignition time (phase 38) can be altered in parameter 266.

#### 3.3.4 Frequency converter

A frequency converter and speed sensor can be connect to plug slot X74.



##### Frequency converter

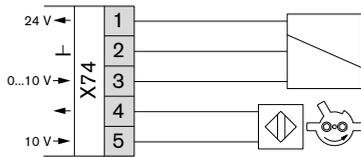
Terminal X74:1	24 V input; supplied by frequency converter
Terminal X74:2	Signal acquisition
Terminal X74:3	Speed setpoint signal (parameter 645)

##### Speed measurement

Terminal X74:4	Speed return signal (input actual speed)
Terminal X74:5	10 V; supplied by combustion manager

**3 Product description**

**3.3.5 Load signal**



Instead of the frequency converter, a load dependent analogue signal can be emitted at output X74:1/2.

The values given relate to an analogue signal of 0 ... 10 V, if a signal of 2 to 10 V or 0/2 to 10 V is set in parameter 645, the voltages listed will change.  
Conversion: (original value x 0.8)+2 = new value

**Modulating operation**

Rating	Curve point	Analogue signal
Off	-	0 V
Ignition load	P0	1 V
Partial load (20 %)	P1	2 V
Full load (100 %)	P9	10 V

**Two stage operation**

Rating	Curve point	Analogue signal
Off	-	0 V
Stage 1	P1	5 V
Stage 2	P2	10 V

**Three stage operation**

Rating	Curve point	Analogue signal
Off	-	0 V
Stage 1	P1	3 V
Stage 2	P2	5 V
Stage 3	P3P3	10 V

### 3 Product description

### 3.4 Technical data

#### 3.4.1 Electrical data

##### Combustion Manager

	W-FM 50
Mains voltage/frequency	230 V/50 ... 60 Hz
Max. consumption	30 W
Max. prefusing	16 A slow
Internal unit fuse	6.3 A slow
Type of protection	IP 00

##### Actuator

	STE 50 1.2 Nm	STE 50 3 Nm
Mains voltage/frequency	DC/AC 24 V/ 50 ... 60 Hz	DC/AC24 V/ 50 ... 60 Hz
Max. consumption	7.5 W	10 W
Torque	1.2 Nm	3 Nm
Setting time	5 s/90°	4 s/90°
Type of protection	IP 54	IP 54
Class of protection	II	II

##### ABE

Mains voltage	DC 5 V
Max. consumption	50 mW
Type of protection (front)	IP54 to ICE 529
Type of protection (rear)	IP40 to ICE 529
Class of protection	II to DIN EN 60 730-1

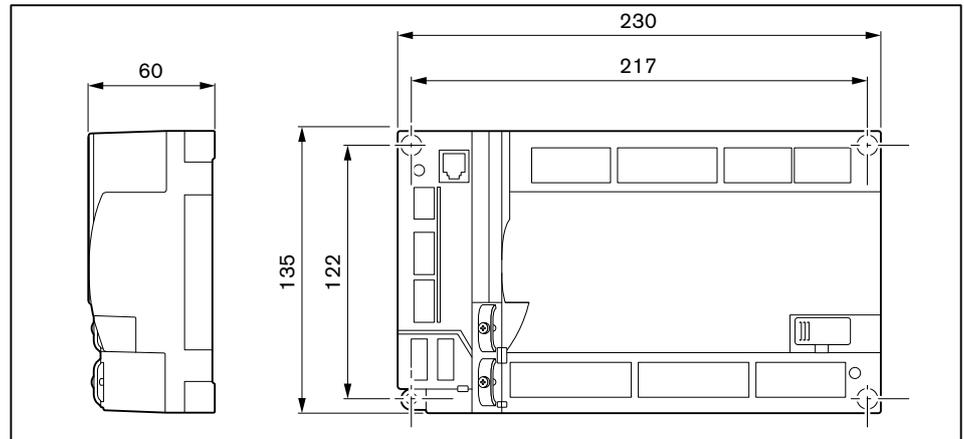
#### 3.4.2 Ambient conditions

Temperature in operation	-20 ... +60 °C
Temperature during transport / storage	-20 ... +60 °C
relative humidity	max 95 %, no dew point

### 3 Product description

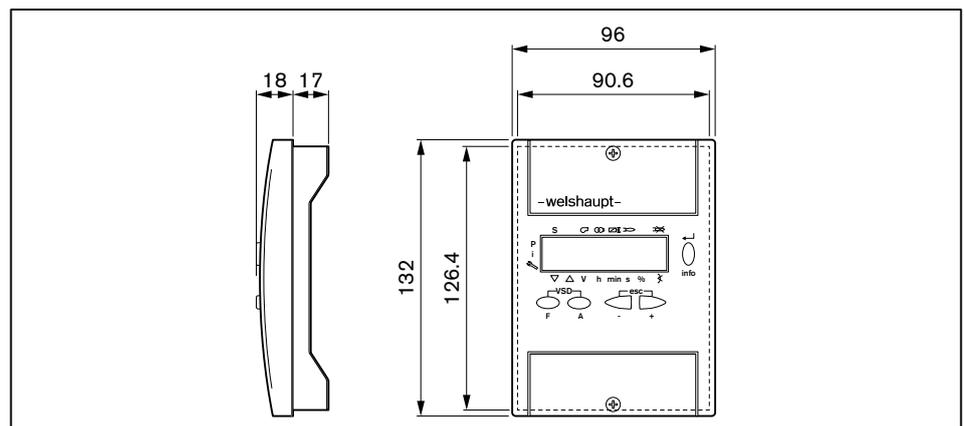
#### 3.4.3 Dimensions

##### Combustion manager



##### Display and operating unit

Recess dimension: 127 x 91 mm ±5 mm



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## 4 Electrical installation

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### 4 Electrical installation



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#### Electric shock when working with voltage applied

The consequence is serious injury or death.

- ▶ Isolate unit prior to carrying out work and protect against accidental reconnection to the mains.



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#### Electric shock despite disconnection from mains

It is possible that electrical components on burners with frequency converters continue to carry voltage and cause electric shock even after the mains have been disconnected.

- ▶ A waiting time of approx. 5 minutes should therefore be observed until all electric voltage has dissipated.

---

The electrical installation must only be carried out by qualified electricians, local regulations must be observed.

Carry out electrical installation in such a way that the burner can still be hinged open.

#### Connect combustion manager W-FM

- ▶ Use cable entry grommets on the housing.
- ▶ Connect wiring in accordance with the enclosed wiring diagram.

Control circuits, which are taken directly via a 16 AT pre-fuse from a 3 phase or single phase alternating current supply, must only be connected between a phase conductor and earth potential neutral conductor.

On mains supply, which does not have a neutral, the control voltage must be supplied via an isolating transformer.

The pole of the transformer, which is to be used as the neutral conductor, must be earthed.

Phase L must not be mixed up with the neutral conductor N. Contact protection will otherwise no longer be given. Malfunctions, which endanger operational safety could occur.

The cable cross section of the voltage supply must be suitable for the nominal current of the pre-fusing (maximum 16 AT).

All other cable connections must be suitable for the relevant internal unit fuse (6.3 AT).

Earthing and neutral conductor must conform to local regulations.

The following applies for cable length:

- Display and operating unit, load controller, safety interlock circuit, burner flange, reset key - maximum 20 m (100 pF/m).
- BCI interface - maximum 20 m (100 pF/m).

#### Connecting the burner motor

The motor must be protected against thermal overload and short circuit. The use of a motor protection switch is recommended.

- ▶ Open terminal box on motor.
- ▶ Carry out voltage supply in accordance to the wiring diagram enclosed, observing motor rotation.

## 4 Electrical installation

### Connect gas valve train

The connection should be made to the wiring diagram supplied with the burner.

- ▶ Connect double gas valve (plug Y2):
  - Solenoid coil on W-FM or DMV
  - Actuator on VGD
- ▶ Connect low gas pressure switch (plug F11)
- ▶ Install valve proving gas pressure switch (plug F12).
- ▶ If required, fit high gas pressure switch (plug F33)

### Speed control

The supply line to the frequency converter is not screened, if the frequency converter is fitted to the motor.

If the frequency converter is separate, the control cable and the mains connection cable between motor and frequency converter are screened.

- ▶ Connect screen to the designated screen clamp on frequency converter.
- ▶ Use screen cable glands (metal) on the burner.

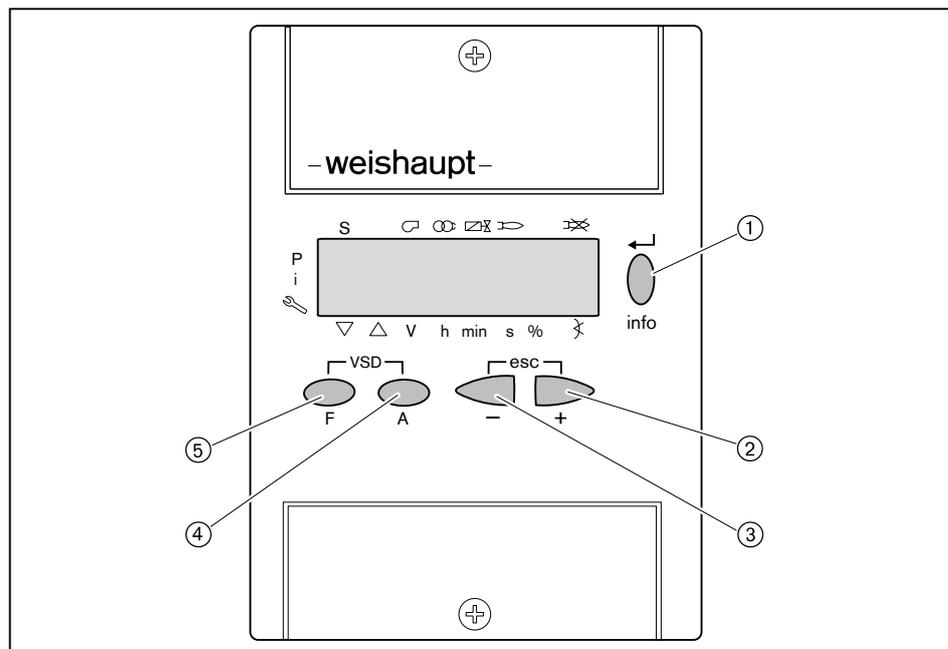
5 Operation

5 Operation

5.1 Operating interface

5.1.1 Operating panel

Display and operating unit (ABE)



No.	Key	Function
①	[ENTER]	back-up of value changes; entry to parameter and values
	[info]	press approx. 3 seconds = Info level; press approx. 5 seconds = Service level
②	[+]	navigation through parameter structure; changing the setting values
③	[-]	
② and ③	[+] and [-] simultaneous (esc) <sup>(1)</sup>	cancel/return
④	[A] (Air)	selects the actuator of the the air dampers
⑤	[F] (Fuel)	selects the fuel supply
④ and ⑤	[A] and [F] simultaneously (VSD) <sup>(2)</sup>	selects the frequency converter (optional)

<sup>(1)</sup> Escape

<sup>(2)</sup> Variable Speed Drive

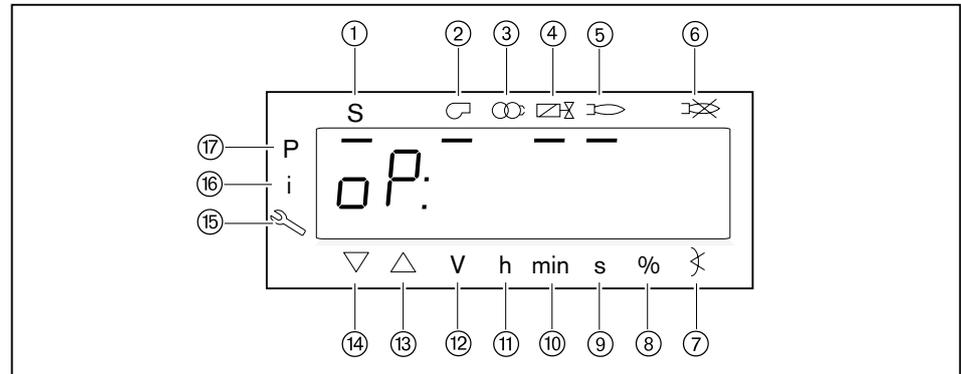
OFF function

- ▶ Press [ENTER] key and any other key simultaneously.
- ✓ Immediate lockout.

## 5 Operation

### 5.1.2 Display

The black cursor in the display shows the status of the inputs and outputs, the unit of values and the active level.



- ① Heat demand by the boiler control (start)
- ② Burner motor
- ③ Ignition
- ④ Fuel valves
- ⑤ Flame signal on
- ⑥ Flame failure or lockout
- ⑦ Degree of angle setting
- ⑧ Percentage value
- ⑨ Second
- ⑩ Minute
- ⑪ Hour (together with volume = V/h)
- ⑫ Volume (m<sup>3</sup>, l, ft<sup>3</sup>, gal)
- ⑬ Actuator OPEN
- ⑭ Actuator CLOSED
- ⑮ Service level
- ⑯ Info level
- ⑰ Parameter level (heating engineer level)

**5 Operation**

**Display OFF**

OFF UPr

The parameter setting is missing, incomplete or has been deleted.

OFF

No heat demand from controller (input X5-03:1).

OFF 5

Safety circuit not closed at heat demand (inputs X3-03:1/2 and X3-04:1/2).

**Display Ph**

Ph22

The combustion manager is in an operating phase and waits for signals or activates outputs depending on the program sequence.

Ph30 15

The combustion manager is in an operating phase and shows the remaining run time programmed (example: pre-purge).

**Display Op**

oP: 67.2

The combustion manager is in modulating operation and shows the current load in percent.

oP: P2

The combustion manager is in multi-stage operation and shows the current fuel stage. When the fuel stage is changed, the additional display on or off indicates the switching of the relevant fuel valve.

oP: P2oF

**Display flashes**

oP: 67.2  
OFF

Manual load is activated. The combustion manager is in manual load default.

Deactivate manual load:

► Press and hold [esc] key for 5 seconds.

**Display Error**

During a fault condition, the display alternately shows the error code C and diagnostic code D (see Ch. 9.2).

Loc:c 2

The combustion manager is in lockout.

Loc:d 1

Once the fault has been rectified the combustion manager has to be reset (see Ch. 9.1).

Err:c 22

The combustion manager initiates a safety shutdown.

Err:d 0

The burner starts automatically, as soon as the cause of the fault has been eliminated.

InF:c 111

The combustion manager shows an occurrence, which does not lead to a shutdown.

InF:d 0

5 Operation

5.2 Displaying and adjusting parameters

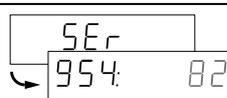
Password level (heating engineer)

Info/Service level

Call up level



▶ Press [F] and [A] keys simultaneously and then enter the password (see Ch. 5.2.1).



The Info or Service level can only be called up from the standard display.

- ▶ Press [ENTER] key.
- For Info level 1 ... 3 s
- For Service level 3 ... 5 s

Next parameter



▶ Press [+] key.



▶ Press [+] key.  
-or-  
Briefly press [ENTER].

Previous parameter



▶ Press [-] key.



▶ Press [-] key.

One level lower



▶ Press [ENTER] key.



▶ Press [ENTER] key for 1 ... 3 s.

One level higher



▶ Press [esc] key.



▶ Press [ENTER] key for 3 ... 5 s.  
-or-  
Press [esc] key.

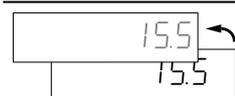
Change value



▶ Press [+] or [-] key.

not possible

Save value



▶ Press [ENTER] key.

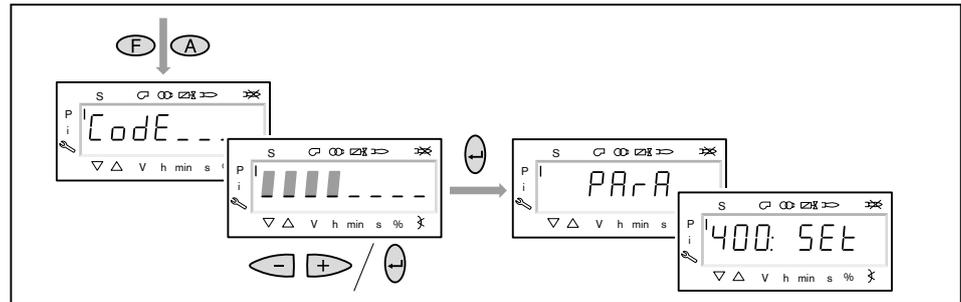
not possible

**5 Operation**

**5.2.1 Password**

**Enter password**

- ▶ Press keys [F] and [A] simultaneously.
- ✓ The display shows `Code`.
- ▶ Enter the first digit using [+] or [-] and confirm with [ENTER].
- ▶ Repeat procedure until the password has been entered.
- ▶ Exit password entry using [ENTER].
- ✓ The display shows `PARA` (parameter level) for a short time and then changes over to `400: SEt` (Setup).

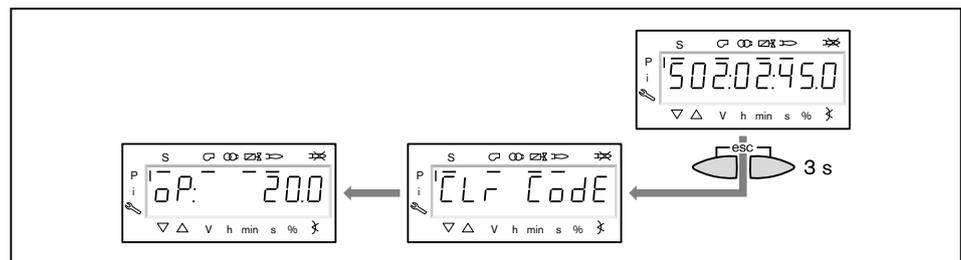


**Deactivating password**

If no key is activated for 30 minutes, the combustion manager automatically deactivates the password and blocks the level.

In the password level, the password can be aborted early:

- ▶ Press [esc] key until the display shows `CLr Code`.
- ▶ Let go of the [esc] key.
- ✓ The combustion manager blocks the password level and changes to the operating display.



## 5 Operation

### 5.3 Parameters

#### 5.3.1 Password level

##### Internal parameters (000: Int)

No.	Function
050	<p>Data backup (see Ch. 3.1.5)</p> <p>Overriding the data set between W-FM and ABE with identical burner identification (P113). If the backup or restore is incorrect, a negative value is displayed. The cause of the fault is described in error message 137 (see Ch. 9.2).</p> <p>Save from W-FM to ABE (Backup):</p> <ul style="list-style-type: none"> <li>▶ Press [ENTER] key.</li> <li>✓ The display shows <code>bAC_up</code>.</li> <li>▶ Press [ENTER] key.</li> <li>▶ Set 1 using [+] key and confirm with [ENTER].</li> <li>✓ Following successful execution the display is reset to 0.</li> </ul> <p>Save from ABE to W-FM (Restore):</p> <ul style="list-style-type: none"> <li>▶ Press [ENTER] key.</li> <li>✓ The display shows <code>bAC_up</code>.</li> <li>▶ Press [+] key.</li> <li>✓ The display shows <code>rESTorE</code>.</li> <li>▶ Set 1 using [+] key and confirm with [ENTER].</li> <li>✓ Following successful execution the display is reset to 0.</li> </ul>
055	Burner identification of data backup (read only).
056	ASN excerpts of data backup (read only).
057	Software version when creating backup (read only).

##### General parameters (100: PARa)

No.	Function
102	Date of manufacture DD.MM.YY
103	Production number
104	Parameter default setting: Customer code
105	Parameter default setting: Version
107	Software version
108	Software variation
111	ASN excerpt for comparison with data backup (P056).
113	<p>Burner identification: Identical to the burner serial No. (name plate). The burner identification has to be reset if the combustion manager has been replaced.</p>
121	Manual load (see Ch. 3.1.3)
123	<p>Minimum setting step in percent</p> <p>Only load changes, which exceed the value set are initiated, this avoids unnecessary setting movements in modulating operation.</p> <p>123.00 = Load default from building management 123.01 = Analogue load controller on X64 123.02 = Load controller contact on X5-03</p>

**5 Operation**

No.	Function
124	<p>Flame failure test (TÜV test)</p> <p>The flame failure test can only be carried out in operating setting 1 (Phase 60).</p> <p>The flame failure test closes the fuel valves and calculates the time up to flame failure. The calculated time is displayed in the diagnostic code in multiples of 0.2 seconds (Example: <code>Loc.D: 8</code> = 1.6 seconds).</p> <p>For the flame failure test the burner drives to the load defined under parameter 133. If no load is defined in parameter 133, the flame failure test is carried out at the current load.</p> <ul style="list-style-type: none"> <li>▶ Press [ENTER] key.</li> <li>▶ Set value 1 using [+] key and confirm with [ENTER].</li> </ul> <p>✓ Following successful execution, the display alternately shows the error code <code>Loc.c: 7</code> and diagnostic code <code>Loc.d: x</code>.</p>
125	<p>Mains frequency</p> <p>0 = 50 Hz 1 = 60 Hz</p>
126	Display illumination
128	<p>Fuel meter</p> <p>The value must correspond to the number of impulses per m<sup>3</sup> of the fuel meter. If the value is set to 0, the fuel meter stops.</p>
130	Delete error history (see Ch. 9.1)
133	Load for flame failure test
141	<p>Operating mode building management</p> <p>0 = OFF 1 = Modbus, the combustion manager operates as Slave, the RTU transfer mode is used (Remote Terminal Unit) 2 = eBus</p>
142	<p>Recurrence time if communication is interrupted (range: 0...7200 secs.)</p> <p>If communication to the building management system fails, the next load controller according to priority will be activated once this time has elapsed. If no other load controller is connected, the burner remains at the current load or it drives to the load defined in parameter 148.</p> <p>Priority 1: Load controller building management Priority 2: Load controller on analogue input X64 Priority 3: Load controller on input X5-03</p>
143	<p>Unit address of combustion manager as eBus participant</p> <p>1 = Address 03 2 = Address 13 3 = Address 33 4 = Address 73 5 = Address F3 6 = Address 1F 7 = Address 3F 8 = Address 7F</p>
144	Send cycle in seconds for the eBus services 05 and 09
145	Unit address of combustion manager as Modbus participant
146	<p>Baud rate Modbus</p> <p>The Baud rate of the combustion manager and the building management system must be identical.</p> <p>0 = 9600 1 = 19200</p>
147	<p>Parity Modbus</p> <p>The Parity of the combustion manager and the building management system must be identical.</p> <p>0 = no Parity bit 1 = odd Parity bit 2 = even Parity bit</p>

**5 Operation**

No.	Function
148	Replacement load (range: 0 ... 100 %) Load default for communication failure with building management system. - - - - = no replacement load 0 ... 19.9 = burner OFF
161	Number of lockouts
162	Operating hours since last reset  Reset: ▶ Press [ENTER] key. ▶ Press [-] key. ✓ The display shows 0, operating hours have been reset.
163	Total operating hours (voltage applied to combustion manager)
164	Start-ups since last reset  Reset: ▶ Press [ENTER] key. ▶ Press [-] key. ✓ The display shows 0, start-ups have been reset.
166	Total start-ups
167	Fuel volume since last reset.  Reset: ▶ Press [ENTER] key. ▶ Press [-] key. ✓ The display shows 0, the fuel volume has been reset.

**Burner control (200: PAr0)**

No.	Function
201	Type of operation - - = not defined (delete curves) 1 = Gas direct ignition 2 = Gas pilot ignition 3, 4 = not used 5 = Oil two stage 6 = Oil three stage 7 ... 11 = not used 12 = Oil modulating 13 ... 22 = not used
208	Program stop 0 = deactivated 1 = pre-purge position (phase 24) 2 = ignition position (phase 36) 3 = interval time 1 (phase 44) 4 = interval time 2 (phase 52)
210	Alarm at start prevention Determines whether a signal is given at output X3-05/2 during start prevention 0 = no alarm (no signal at output X3-05/2) 1 = alarm (signal at output X3-05/2)
211	Fan run-up time (range: 2.0 ... 60 s) Time from fan start to start of actuators.
212	Switch off behaviour / max. time to partial load (range: 0.2 ... 45 s.) If heat demand is no longer present, the burner drives as far as possible to partial load in a predetermined time and then switches off. The burner takes approx. 32 seconds to drive from 100% load to 20% (partial load).

**5 Operation**

No.	Function
215	Repetition counter Safety circuit (range: 1 ... 16) Number of safety shutdowns by the safety circuit before lockout occurs (see Ch. 3.2.2).
221	Flame sensor Gas 0 = QRC 1 = Ionisation electrode/QRA
222	Pre-purge Gas When using a valve proving system and two Class A fuel valves pre-purge following a controlled shutdown can be omitted (to EN 676). 0 = OFF 1 = ON (pre-purge time parameter 225)
223	Repetition counter low gas pressure switch (range: 1 ... 16) Number of safety shutdowns by the low gas pressure switch before lockout occurs (see Ch. 3.1.2).
225	Pre-purge time Gas in operating phase 30 (range: 20 ... 3600 s) Once the pre-purge positions have been reached, the combustion manager remains in phase 30 for the duration of the time set.
226	Pre-ignition time Gas (range: 0.2 ... 3600 s) Duration of pre-ignition time in phase 38.
230	Interval time 1 Gas The interval time 1 in phase 44 acts as stabilisation time after flame formation.
232	Interval time 2 Gas The interval time 2 in phase 52 acts as stabilisation time after flame formation.
233	Post burn time Gas (range: 0.2 ... 60 s) The combustion manager remains in phase 70 for the duration of the time set, the flame sensor is ignored during this time.
234	Post-purge time Gas (range: 0.2 ... 6480 s) Once the post-purge position has been reached, the combustion manager remains in phase 74 for the duration of the time set, the flame sensor is ignored during this time.
236	Low gas pressure switch input / installation position 0 = OFF 1 = Low gas pressure switch fitted in front of valve 1 (factory setting) 2 = Low gas pressure switch fitted between valve 1 and valve 2, valve proving carried out by low gas pressure switch
237	High gas pressure switch If a high gas pressure switch is fitted, set parameter to 1. 0 = OFF 1 = High gas pressure switch 2 = Valve closing contact
241	Valve proving In accordance with DIN EN 676 valve proving is not necessary if pre-purge is activated and the burner rating is less than 1200 kW. 0 = Valve proving OFF (only for ratings < 1200 kW, parameter 222 must be set to 1 = ON) 1 = Valve proving at start-up 2 = Valve proving at shutdown (factory setting) 3 = Valve proving at start-up and shutdown
248	Post-purge time 3 Gas (range: 0.2 ... 6480 s) The combustion manager remains in phase 78 for the duration of the time set except if a new heat demand interrupts the post-purge time 3 in phase 78.

**5 Operation**

<b>No.</b>	<b>Function</b>
261	Flame sensor Oil 0 = QRB 1 = QRA
265	Pre-purge time Oil in operating phase 30 (range: 15 ... 3600 s) Once the pre-purge positions have been reached, the combustion manager remains in phase 30 for the duration of the time set.
266	Pre-ignition time Oil (range: 0.6 ... 3600 s) Once ignition position has been reached, the combustion manager remains in phase 38 for the duration of the time set.
270	Interval time 1 Oil The interval time 1 in phase 44 acts as stabilisation time following flame formation.
272	not used
273	Post burn time Oil (range: 0.2 ... 60 s) The combustion manager remains in phase 70 for the duration of the time set, the flame sensor is ignored during this time.
274	Post-purge time Oil (range: 0.2 ... 6480 s) Once the post-purge position has been reached, the combustion manager remains in phase 74 for the duration of the time set, the flame sensor is ignored during this time.
276	Min. oil pressure switch 0 = OFF 1 = active from phase 38 2 = active from phase 40 with solenoid valve before pressure switch (e.g. pump with valve)
277	Maximum oil pressure switch If a max. oil pressure switch is fitted set parameter to 1. 0 = OFF 1 = Max. oil pressure switch 2 = Valve closing contact
281	Point of ignition Oil 0 = Ignition on in phase 38 (short pre-ignition) 1 = Ignition on in phase 22 (long pre-ignition at fan start)
284	Post-purge time 3 Oil (range: 0.2 ... 6480 s) The combustion manager remains in phase 78 for the duration of the time set except if a new heat demand interrupts the post-purge time 3 in phase 78.

**5 Operation**

**Commissioning parameters (400: SEt)**

Parameter set 400 is used to adjust the fuel air compound regulation (see Ch. 6).

**Compound (500: PArA)**

No.	Function
501	Special positions fuel actuator 501.00 = Standby (is activated in phase 10, 12 and 00) 501.01 = Pre-purge position (is activated in phase 24) 501.02 = Post-purge position (is activated in phase 72)
502	Special positions air actuator 502.00 = Standby (is activated in phase 10, 12 and 00) 502.01 = Pre-purge position (is activated in phase 24) 502.02 = Post-purge position (is activated in phase 72)
503	Special positions frequency converter 503.00 = Standby (is activated in phase 10, 12 and 00) 503.01 = Pre-purge position (is activated in phase 24) 503.02 = Post-purge position (is activated in phase 72)
522	Drive up ramp (range: 5 ... 20 s) The ramp should be at least 20% slower than that of the frequency converter.
523	Drive down ramp (range: 5 ... 20 s) The ramp should be at least 20% slower than that of the frequency converter.
542	Activating Frequency converter 0 = not activated 1 = activated
545	Lower load limit (range: 20.0 ... 100 %) Defines the lower modulating limit (partial load). If no limit has been defined, the lower load limit in operation is automatically set to 20 %. - - - - = no load limit defined (20 %)
546	Upper load limit (range: 20.0 ... 100 %) Defines the upper modulating limit (full load). If no limit has been defined, the upper load limit in operation is automatically set to 100 %. - - - - = no load limit defined (100 %)

**5 Operation****Actuators (600: ACtr)**

<b>No.</b>	<b>Function</b>
606	<p>Range of tolerance of actuator position monitoring with fuel 0 (read only)</p> <p>The value displayed (1.4° factory setting) minus 0.6° results in the range of tolerance. Example.: 1.4°-0.6° = 0.8° Deviation of 0.8° = possible indication of position fault. Deviation of 1.4° = definite indication of position fault.</p> <p>606.00 = Fuel actuator 606.01 = Air actuator</p>
641	<p>Speed standardisation</p> <p>During speed standardisation, a setpoint signal of 95% (9.5 V) is sent to the frequency converter. The speed achieved is saved as 100% value, which means that a reserve of 5% is available during operation. The maximum frequency at the frequency converter must therefore be 52.6 Hz. If the frequency converter is fitted to the burner, the maximum frequency has been factory preset. If the frequency converter is external, the maximum frequency has to be set to this value.</p> <p>Starting standardisation:</p> <ul style="list-style-type: none"> <li>▶ Press [ENTER] key.</li> <li>▶ Set value 1 using [+] key and confirm with [ENTER].</li> </ul> <p>✓ The fan motor starts with air damper open. Following successful execution, the display is reset to 0, if standardisation fails, a negative value is displayed (-x).</p> <p>The combustion values must be checked after every speed standardisation.</p>
642	<p>Standardised speed</p> <p>During speed standardisation a 95% signal is signalled to the frequency converter and the speed achieved is saved as the standard speed.</p> <p>642.00 = Standard speed saved from micro controller 1. 642.01 = Standard speed saved from micro controller 2.</p> <p>The speeds of the two micro controllers may vary by up to 1.5 %.</p>
645	<p>Analogue output X74</p> <p>This output can be used to signal a load dependent analogue signal (see Ch. 3.3.5) or to activate a frequency converter (see Ch. 3.3.4). If it is used to activate a frequency converter, the voltage at output X74 and at setpoint input of the frequency converter must be set identically.</p> <p>0 = DC 0 ... 10 V 1 = DC 2 ... 10 V 2 = DC 0/2 ... 10 V</p>

**Fault history (700: HlSt)**

Parameter set 700 is used to localise and correct faults (see Ch. 9.1).

**5 Operation**

**Process data (900: dAtA)**

No.	Function
903	Current rating 903.00 = Fuel 903.01 = Air
922	Step position actuator 922.00 = Fuel actuator 922.01 = Air actuator
935	Absolute speed Current actual speed (recorded by transmitter disc on motor)
936	Standardised speed Current speed signal in percent.
942	Active load source (load controller) The parameter shows the load source currently active. If more than one load source is available, the combustion manager prioritises to the sequence listed below. The priority cannot be altered. 1 = Load by curve setting 2 = Manual load 3 = Load controller via building management system 4 = External load controller via analogue input X64 terminal 1 / terminal 2 5 = External load controller via contactors X5-03 terminal 2 / terminal 3
947	Contact interrogation W-FM (bit coded output) 947.00 = Inputs 1 = Min. pressure switch 2 = Max. pressure switch 4 = Internal fuel selection 8 = Air pressure switch 16 = Load controller OPEN 32 = Load controller ON 64 = Load controller CLOSED 128 = Safety circuit 947.01 = Outputs 1 = Safety valve 2 = Ignition 4 = Fuel valve 1 8 = Fuel valve 2 16 = Fuel valve 3 / Pilot valve 32 = Internal fuel selection 1
950	Relay nominal condition (Bit coded output) 1 = Alarm 2 = Safety valve 4 = Ignition 8 = Fuel valve 1 16 = Fuel valve 2 32 = Fuel valve 3 / Pilot valve
954	Current flame signal in percent (see Ch. 3.2.11)
960	Current fuel throughput
961	Current operating phase (see Ch. 3.1.7)
981	Fault history: Fault codes (see Ch. 9.2)
982	Fault history: Diagnostic codes (see Ch. 9.2)
992	Fault flags

## 5 Operation

### 5.3.2 Info level

In the info level, parameter values can be displayed but not altered.

To show parameter values:

- ▶ Select parameter using [+] or [-] key.
- ▶ Press [ENTER] key for 1 ... 3 s.
- ✓ Parameter value appears.

No.	Function
167	Fuel volume since last reset
162	Operating hours since last reset
164	Start-ups since last reset
163	Total operating hours (voltage applied to combustion manager)
166	Total start-ups
113	Burner identification: Identical to the burner serial number (name plate)
107	Software version
108	Software variation
102	Date of manufacture DD.MM.YY
103	Production number
104	Parameter default setting: Customer code
105	Parameter default setting: Version
143	Unit address of combustion manager as eBus participant

### 5.3.3 Service level

In the service level, parameter values can be displayed but not altered.

To show parameter values:

- ▶ Select parameter using [+] or [-] key.
- ▶ Press [ENTER] key for 1 ... 3 s.
- ✓ Parameter value appears.

No.	Function
954	Current flame signal in percent (see Ch. 3.2.11)
960	Current fuel throughput
121	Manual load (see Ch. 3.1.3)
922	Step position actuator 922.00 = Fuel actuator 922.01 = Air actuator
936	Standardised speed Current speed signal in percent.
161	Number of lockouts
701	Error history (see Ch. 9.1)
...	
725	

## 6 Commissioning

### 6 Commissioning

The installation and operating manual of the burner should be observed in addition to this chapter. This document contains detailed information about:

- Prerequisites for commissioning
- Setting values and actuator positions
- Combustion tests
- Gas throughput calculation
- Concluding work

## 6 Commissioning

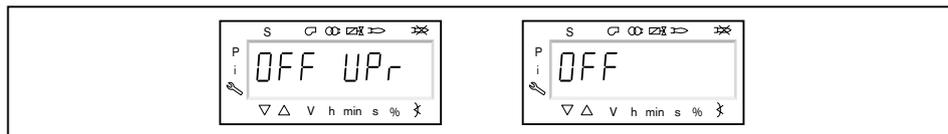
### 6.1 Adjust gas side

#### Prerequisite

- ▶ Open gas isolating valve.
- ✓ Gas pressure in gas valve train increases.
- ▶ Close isolating valve.
- ▶ Switch on voltage supply.
- ✓ The display shows either OFF UPr or OFF.

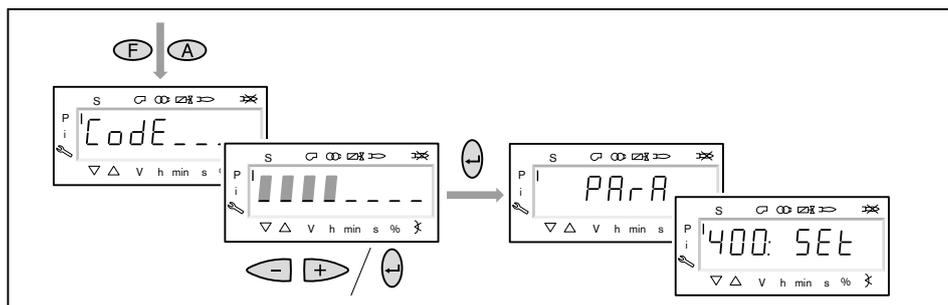
OFF UPr    Burner off and not programmed

OFF        Burner off



#### 1. Enter password

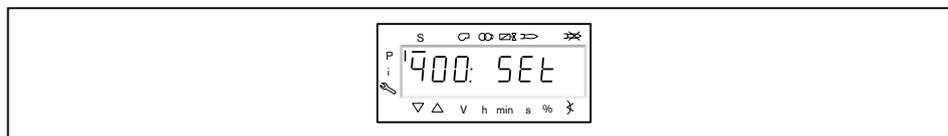
- ▶ Press keys [F] and [A] simultaneously.
- ✓ The display shows Code.
- ▶ Enter the first digit using [+] or [-] and confirm with [ENTER].
- ▶ Repeat procedure until the password has been entered.
- ▶ Exit password entry using [ENTER].
- ✓ The display shows PARA (parameter level) for a short time and then changes over to 400: SEt (Setup).



#### 2. Switch on burner

- ▶ Ensure there is a demand for heat.
- ✓ A black dash appears below the S symbol (start).

For the duration of the commissioning a heat demand is required from the appliance controller, that means signal on input X5-03/1.



## 6 Commissioning

### 3. Start setup

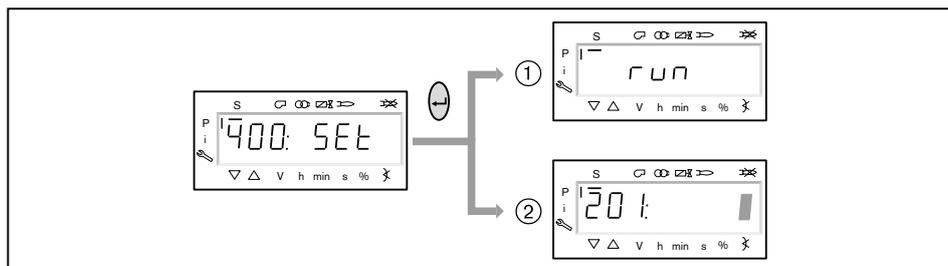
- ▶ Press [ENTER] key.

If the combustion manager has been pre-programmed, the display shows `run` ①.

- ▶ Select type of setting (from step 8).

If the combustion manager has not been programmed, the display shows parameter `201` ②.

- ▶ Define parameter `201`, `542` and `641` and set `P0` (from step 4).
  - `201` = Type of operation
  - `542` = Activation frequency converter
  - `641` = Speed standardisation

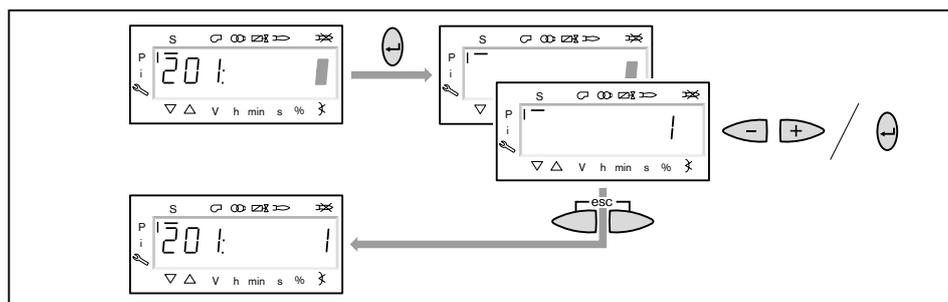


### 4. Set type of operation



The following steps must only be carried out if the combustion manager is not programmed. If the combustion manager has been pre-programmed, proceed with step 8.

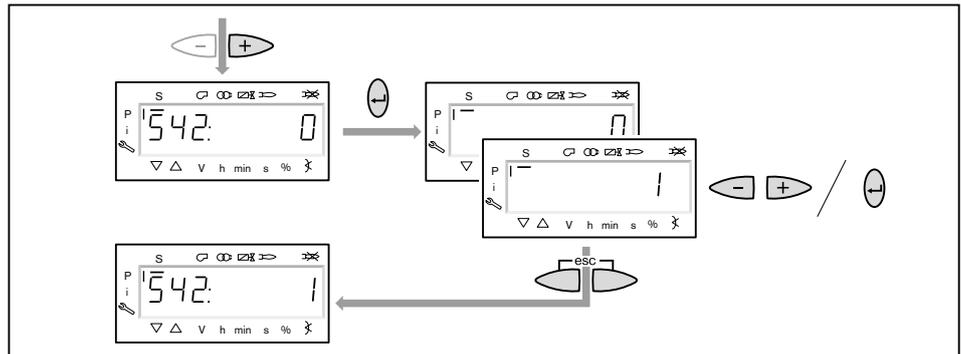
- ▶ Press [ENTER] key.
- ✓ The display shows only the parameter value.
- ▶ Using [+] or [-] set type of operation and confirm with [ENTER].
  - `1` = Direct ignition
  - `2` = Pilot ignition
- ▶ Exit entry using [esc].
- ✓ The display shows parameter `201` with the current type of operation.



## 6 Commissioning

### 5. Activate/deactivate frequency converter

- ▶ Press [+] key.
- ✓ The display shows parameter 542.
- ▶ Press [ENTER] key.
- ✓ The display shows only the parameter value.
- ▶ Activate or deactivate the frequency converter using [+] or [-] and confirm with [ENTER].
  - 0 = without frequency converter
  - 1 = with frequency converter
- ▶ Exit entry using [esc].
- ✓ The display shows parameter 542 with the current setting.

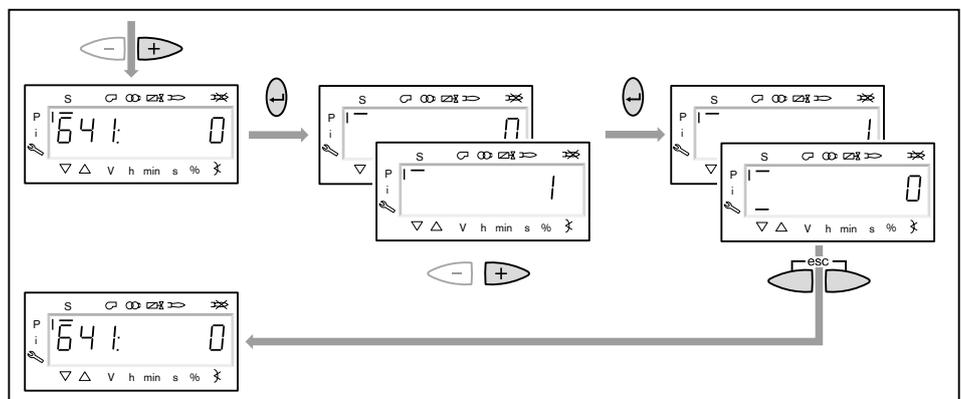


### 6. Carry out speed standardisation



If no frequency converter is available or if standardisation has been carried out with the other fuel, skip speed standardisation 641 using [+] key and continue with step 7.

- ▶ Press [+] key.
- ✓ The display shows parameter 641.
- ▶ Press [ENTER] key.
- ▶ Set value to 1 using the [+] key and start speed standardisation by pressing [ENTER].
- ▶ Check rotation direction of burner motor.
- ✓ The fan motor starts with the air dampers open. Once standardisation is complete, the display changes from 1 to 0.
- ▶ Exit speed standardisation using [esc].
- ✓ The standardised speed can be selected in parameter 642.



## 6 Commissioning

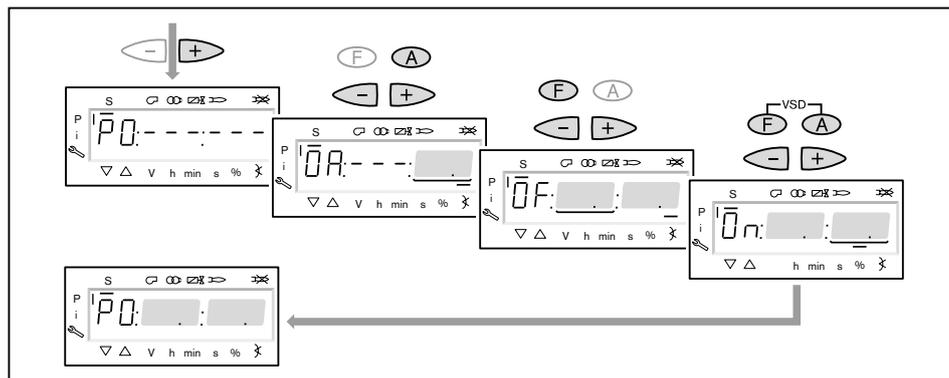
### 7. Preset ignition and full load points

- ▶ Press [+] key.
- ✓ The display shows the ignition load point P0.
- ▶ Press and hold [A] key and using [+]/[-] enter air damper setting 0.0 ... 7.0°.
- ▶ Press and hold [F] key and using [+]/[-] enter gas butterfly position of 8.0 ... 14.0°.



#### Only in conjunction with frequency converter

- ▶ Press and hold [A] and [F] (VSD) keys simultaneously and enter speed using [+]/[-] keys.
- ✓ The ignition speed should not be less than 70 %.



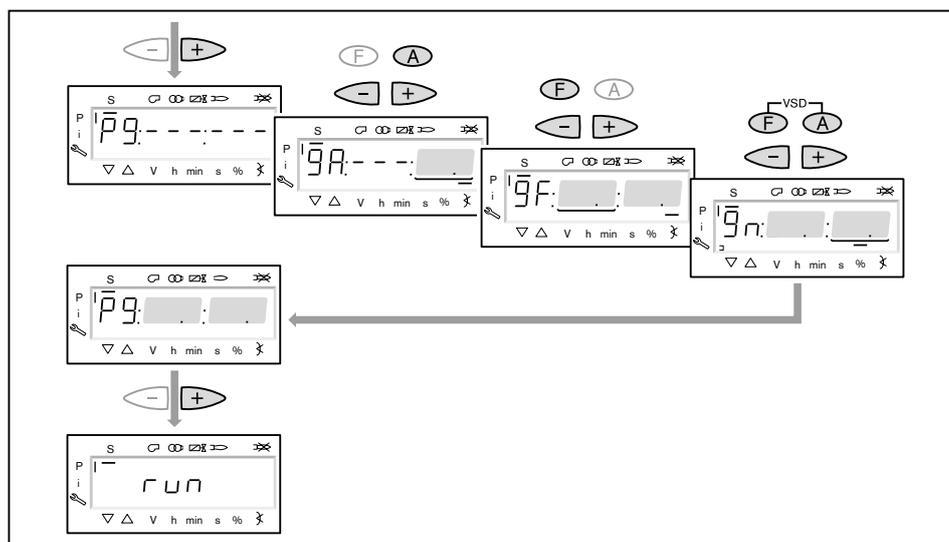
- ▶ Press [+] key.
- ✓ The display shows the full load point P9.
- ▶ Press and hold [A] key and using [+]/[-] enter air damper setting from setting diagram.
- ▶ Press and hold [F] key and using [+]/[-] enter gas butterfly position of 45.0 ... 65.0°.



#### Only in conjunction with frequency converter

- ▶ Press and hold [A] and [F] (VSD) keys simultaneously and set speed to 100 % using [+]/[-] keys.

- ▶ Press [+] key.
- ✓ Exit pre-setting.  
The display changes to run.



## 6 Commissioning

### 8. Select type of setting

The following can be selected as type of setting:

- Adjustment with flame,
- Pre-setting without flame.

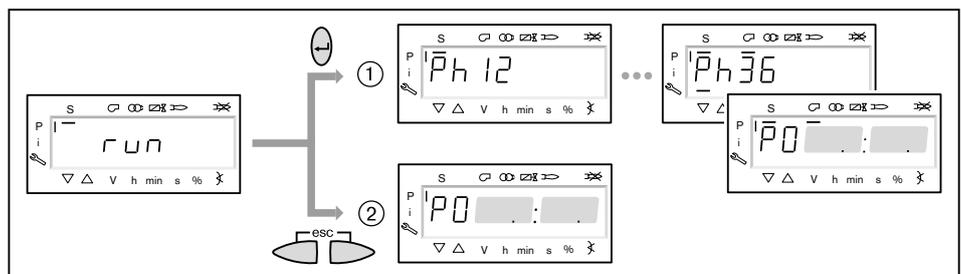
Pre-setting without flame is only used, if the operating points are already known (for example if the combustion manager is exchanged).

#### Adjustment with flame ①

- ▶ Press [ENTER] key.
- ▶ Check rotation direction of burner motor.
- ✓ The burner starts pre-purge Ph12 and stops in ignition position Ph36 without igniting.  
The display shows the ignition load point P0.
- ▶ Set mixing pressure in ignition position (from step 10).

#### Pre-setting without flame ②

- ▶ Briefly press [esc] key.
- ✓ The display shows the operating point P0.  
The black dash below the S symbol disappears.
- ▶ Pre-set operating points without flame (from step 9).



### 9. Pre-set points without flame

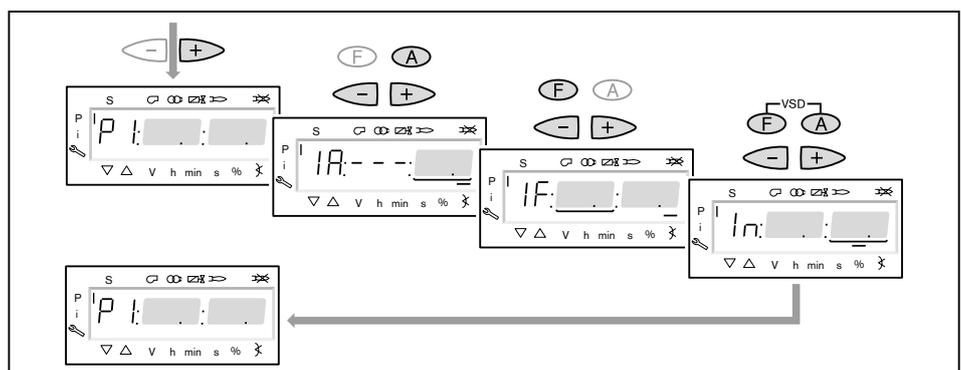
This step must only be carried out, if the type of setting without flame has been selected previously. The adjustment with flame (from step 10) is not replaced by this process.

- ▶ Press [+] key.
- ✓ The display shows the operating point P1.
- ▶ Press and hold the [A] key and preset air damper setting using [+] / [-] keys.
- ▶ Press and hold [F] key and using [+] / [-] pre-set gas butterfly valve position.



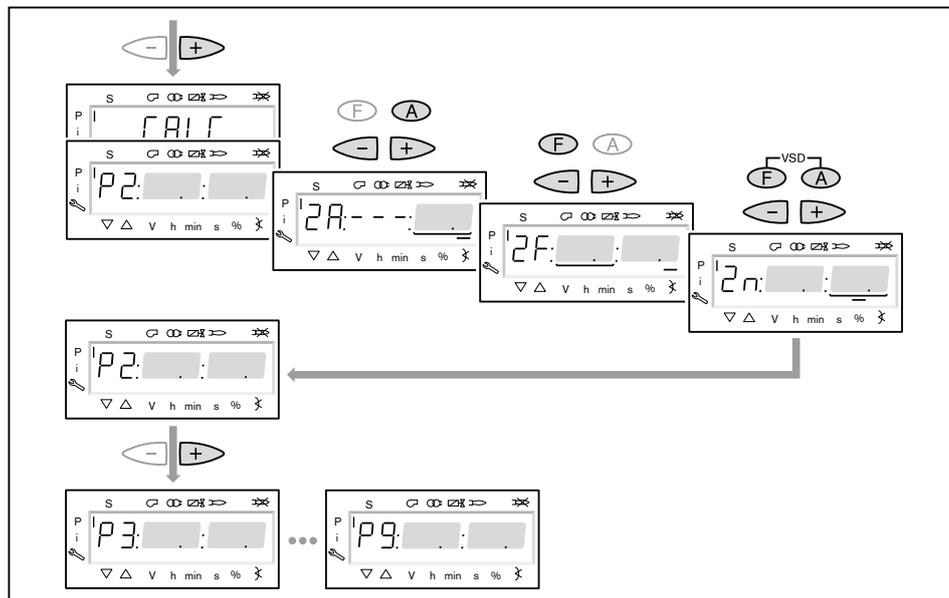
#### Only in conjunction with frequency converter

- ▶ Press and hold [A] and [F] (VSD) keys simultaneously and pre-set speed using [+] / [-] keys.

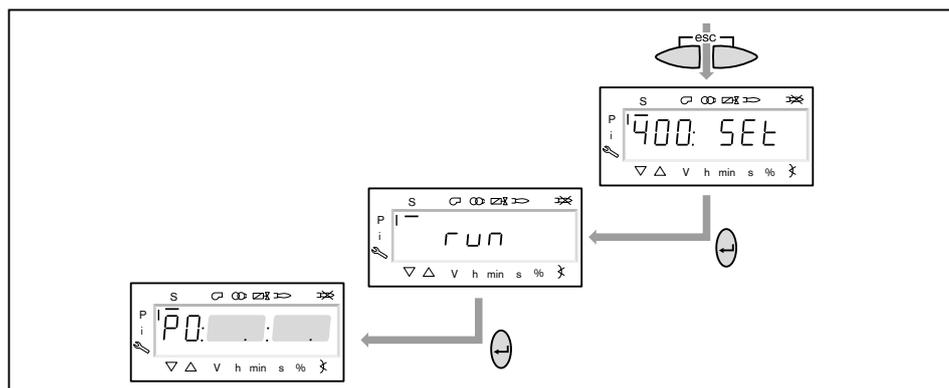


**6 Commissioning**

- ▶ Press [+] key.
- ✓ The display shows CALC.
- The combustion manager starts the calculation.
- The display then shows the operating point P2.
- ▶ Set position air dampers [A] and gas butterfly valve [F] or speed [A] and [F] (VSD).
- ▶ Using [+] key select and pre-set points P3 to P9 in sequence.



- ▶ Exit pre-setting using [esc].
- ✓ The display shows 400 SET.
- ▶ Press [ENTER] key.
- ✓ The display shows run.
- ▶ Press [ENTER] key.
- ▶ Check rotation direction of burner motor.
- ✓ The burner starts pre-purge and stops in ignition position without igniting.
- The display shows the ignition load point P0.



## 6 Commissioning

### 10. Check mixing pressure in ignition position

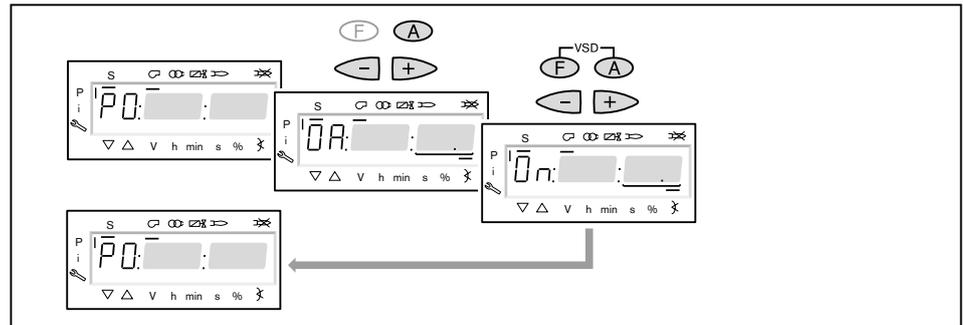
The mixing pressure in ignition position must be between 0.5 and 2.0 mbar.

- ▶ If necessary, adjust mixing pressure via air damper setting.



#### Only in conjunction with frequency converter

- ▶ Press and hold [A] and [F] (VSD) keys simultaneously and enter speed using [+]/[-] keys.
- ✓ The ignition speed should not be less than 70 %.



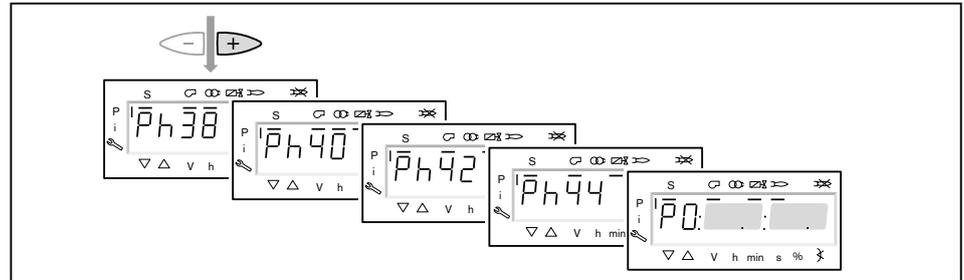
### 11. Check gas valves

- ▶ Press [+] key and check if valves open and close correctly.
- ✓ The burner tries to ignite.  
The low gas pressure switch is activated.  
The display then shows OFF UP<sub>r</sub>.
- ▶ Open gas isolating valve.
- ▶ Press [ENTER] key, until the burner starts again.
- ✓ The display shows P<sub>0</sub> again with the values already set for mixing pressure in ignition position.

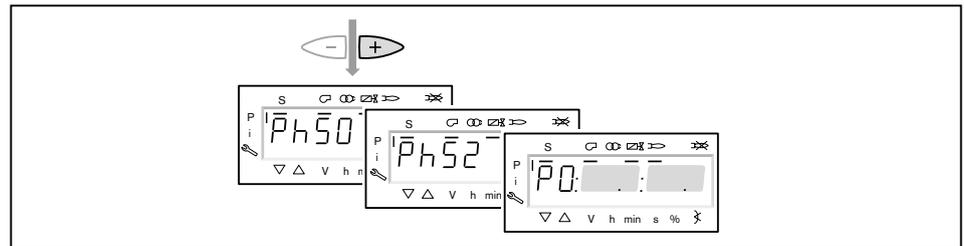
## 6 Commissioning

### 12. Igniting the burner

- ▶ Press [+] key.
- ✓ The burner ignites and the actuators stop in the ignition position.  
 The display shows the following operating phases.
  - Ph 38 = Ignition ON
  - Ph 40 = Fuel valve
  - Ph 42 = Ignition OFF
  - Ph 44 = Flame in ignition position



- ▶ Press [+] key (only for burners with ignition pilot valve).
- ✓ The ignition pilot valve closes.  
 The display shows the following operating phases.
  - Ph 50 = flame stabilisation
  - Ph 52 = ignition pilot OFF



### 13. Adjust setting pressure on pressure regulator

Check the setting pressure at the pressure regulator and if necessary adjust.

### 14. Check combustion

- ▶ Determine combustion values at ignition position.
- ▶ Set O<sub>2</sub> content of approx. 4 ... 5 % via gas butterfly valve position.

## 6 Commissioning

### 15. Pre-set operating point P1

- ▶ Press [+] key.
- ✓ The display shows the operating point P1.
- ▶ Pre-set gas throughput [F] and air quantity [A] whilst observing combustion values.
- ✓ The operating point P1 must lie below the partial load required and within the capacity graph.

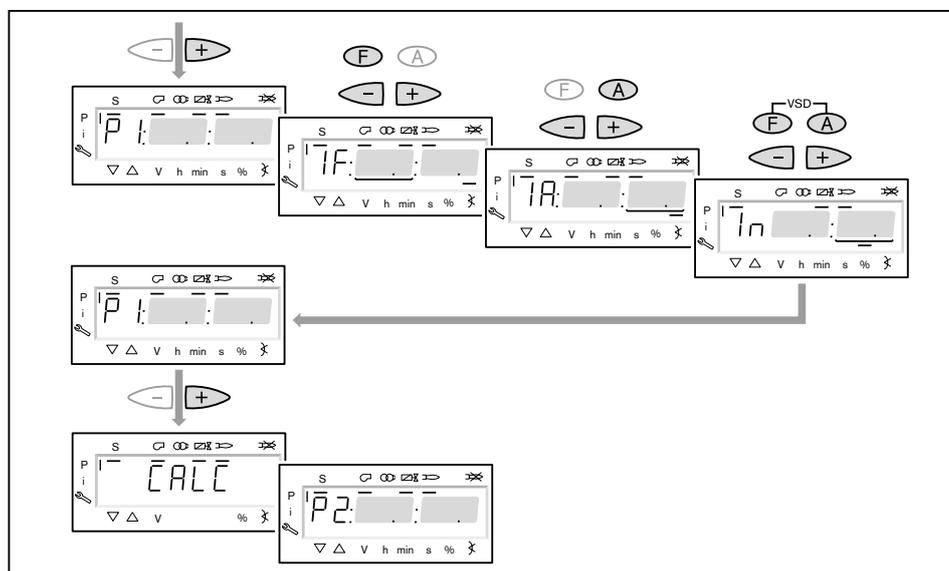


#### Only in conjunction with frequency converter

A minimum speed of 50% should be aimed for in operating point P1.

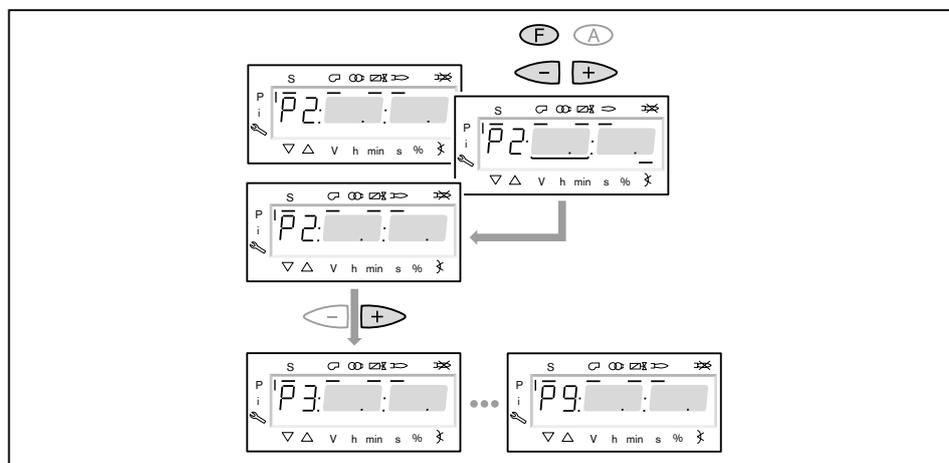
- ▶ Slowly reduce speed using [F] and [A] (VSD) keys, whilst opening air dampers alternately using the [A] key.

- ▶ Press [+] key.
  - ✓ The display shows the operating point P2.
- If no other points have been defined, the combustion manager carries out a calculation and calculates all missing points up to P9, the display briefly shows CALC.



### 16. Drive to full load

- ▶ Using the [+] key, drive to the points in sequence up to P9.
- ▶ Check combustion values at each point and if necessary correct via the gas butterfly valve position [F].



## 6 Commissioning

### 17. Adjust full load

When adjusting full load, the ratings data given by the boiler manufacturer and the capacity graph of the burner must be observed.

- ▶ Calculate gas throughput (operating volume  $V_B$ ) to be set.
- ▶ Set the gas butterfly position [F] in full load to approx. 60 ... 70°.



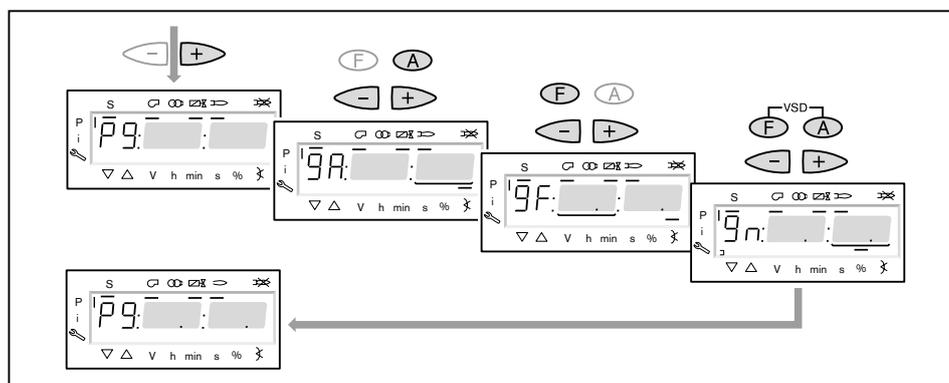
#### Only in conjunction with frequency converter

Select fan speed as low as possible, but not less than 80 %, whilst observing the NO<sub>x</sub> value and flame stability.

- ▶ Adjust setting pressure at pressure regulator until gas throughput ( $V_B$ ) is achieved.
- ▶ Determine combustion limit and using the air supply [A] and/or the fan speed [VSD] set excess air of 15 to 20 %.
- ▶ Re-determine gas throughput.
- ▶ If necessary adjust setting pressure at pressure regulator and reset excess air.



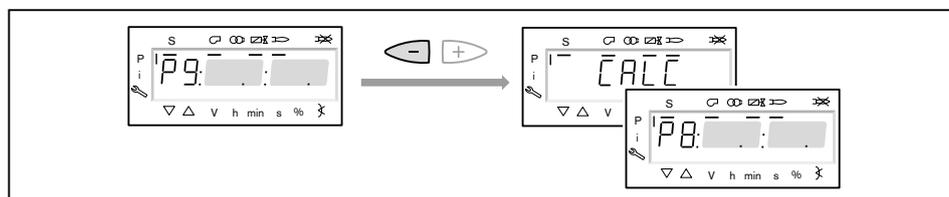
The setting pressure must not be altered once this work has been completed.



### 18. Initiate a calculation

To achieve a constant operating behaviour, it is necessary to initiate a calculation from P9 to P1.

- ▶ Press [-] key for approx. 4 seconds.
- ✓ The display shows CALC.
- ▶ Release [-] key.
- ✓ The combustion manager starts the calculation.
- The display then shows the operating point P8.



6 Commissioning

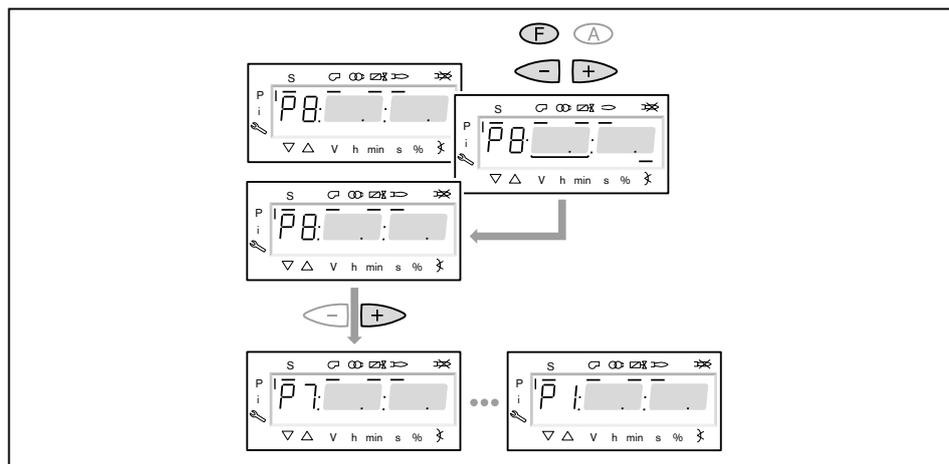
19. Adjusting the operating points



If the [-] key is pressed again for more than 4 seconds, a calculation is started from the point shown to P1.  
 ▶ Briefly press [-] key, if points already calculated or set are not to be overwritten.

The operating points should only be adjusted via the fuel supply [F]. Changes to the air quantity influence the linearity, which has a negative effect on the load control and/or speed control.

- ▶ Check combustion values
- ▶ Press and hold [F] key and using [+] / [-] optimise combustion values.
- ▶ Optimise combustion values at each operating point, until P1 has been reached.



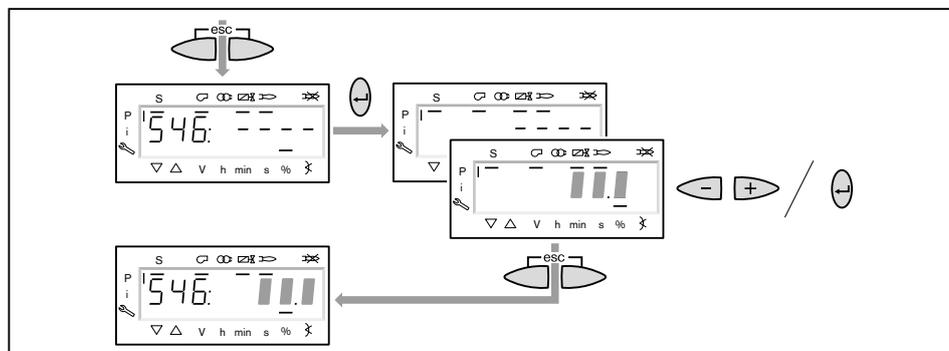
20. Define upper load limit (full load)

Full load can be limited via parameter 546.

- ▶ Exit setting mode using [esc].
- ✓ The display shows 546 - - - -.
- No upper rating range has been defined, that means full load  $\triangleq$  P9 (100 % load assignment).

Continue with step 21, if the full load is not to be limited.

- ▶ Press [ENTER] key.
- ✓ The display shows only the parameter value.
- ▶ Set load limit using [+] or [-] and confirm with [ENTER].
- ✓ Burner drives to value set.
- ▶ Exit entry using [esc].
- ✓ The display shows 546 with the current upper load limit.

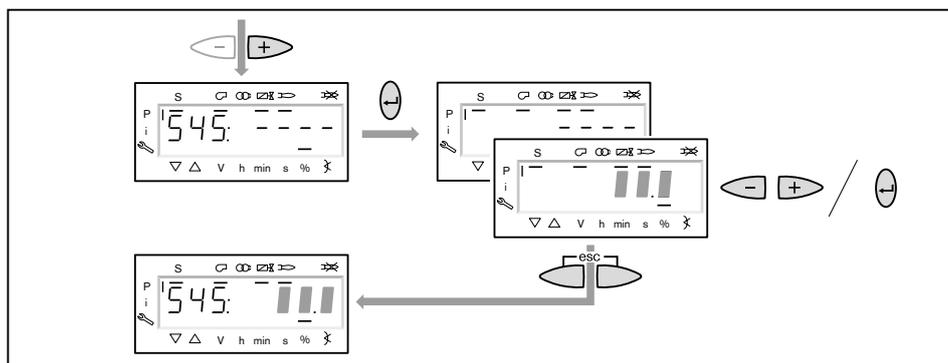


## 6 Commissioning

### 21. Define lower load limit (partial load)

Partial load can be limited via parameter 545.  
When adjusting partial load, the ratings data given by the boiler manufacturer and the capacity graph of the burner must be observed.

- ▶ Press [+] key.
- ✓ The display shows 545 - - - -.
- No lower ratings limit defined, that means partial load  $\triangleq$  P1.
- ▶ Press [ENTER] key.
- ✓ The display shows only the parameter value.
- ▶ Set load limit using [+] or [-] and confirm with [ENTER].
- ✓ Burner drives to value set.
- ▶ Determine fuel throughput and if necessary adjust load limit.
- ▶ Exit entry using [esc].
- ✓ The display shows 545 with the current lower load limit.



### 22. Save points

- ▶ Exit entry using [esc].
- ✓ The display shows 400 SET.
- ▶ Exit entry using [esc].
- ✓ The display shows OP (Operate) with the current rating.



### 23. Check start behaviour

- ▶ Switch off and restart burner.
- ▶ Check start behaviour and if necessary correct ignition load setting.

If the ignition load setting has been changed:

- ▶ Re-check start behaviour.

## 6 Commissioning

### 24. Data backup

- ▶ Press keys [F] and [A] simultaneously.
- ▶ Select 000: Int using [-] key and confirm with [ENTER].
- ✓ The display shows parameter 050.00: 0
- ▶ Press [ENTER] key.
- ✓ The display shows bAC\_up.
- ▶ Press [ENTER] key.
- ▶ Set 1 using [+] key and confirm with [ENTER].
- ✓ Following successful data backup, the display is reset to 0.  
The values have been backed up from the combustion manager to the ABE.
- ▶ Exit level using [esc].

### 25. Set pressure switch and carry out concluding work

For further information see installation and operating manual of burner.

## 6 Commissioning

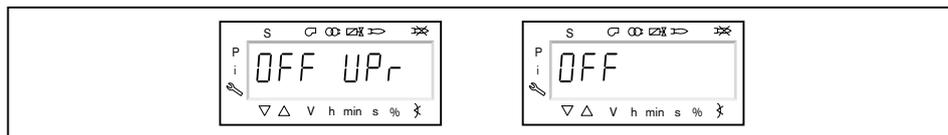
### 6.2 Adjust modulation oil side

#### Prerequisite

- ▶ Open oil shut off devices.
- ▶ Switch on voltage supply.
- ✓ The display shows either OFF UP<sub>r</sub> or OFF.

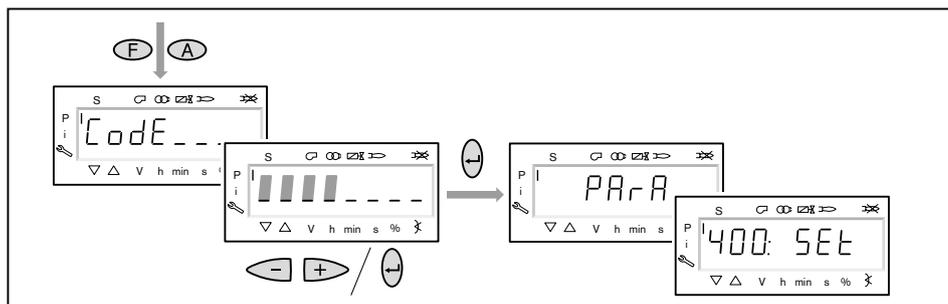
OFF UP<sub>r</sub> Burner off and not programmed

OFF Burner off



#### 1. Enter password

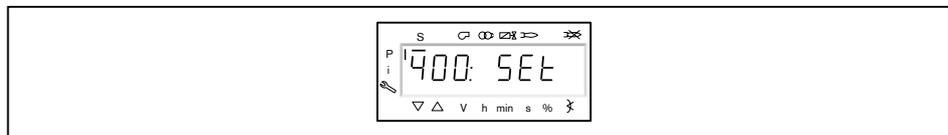
- ▶ Press keys [F] and [A] simultaneously.
- ✓ The display shows Code.
- ▶ Enter the first digit using [+] or [-] and confirm with [ENTER].
- ▶ Repeat procedure until the password has been entered.
- ▶ Exit password entry using [ENTER].
- ✓ The display shows PAR<sub>A</sub> (parameter level) for a short time and then changes over to 400: SEt (Setup).



#### 2. Switch on burner

- ▶ Ensure there is a demand for heat.
- ✓ A black dash appears below the S symbol (start).

For the duration of the commissioning a heat demand is required from the appliance controller, that means signal on input X5-03/1.



## 6 Commissioning

### 3. Start setup

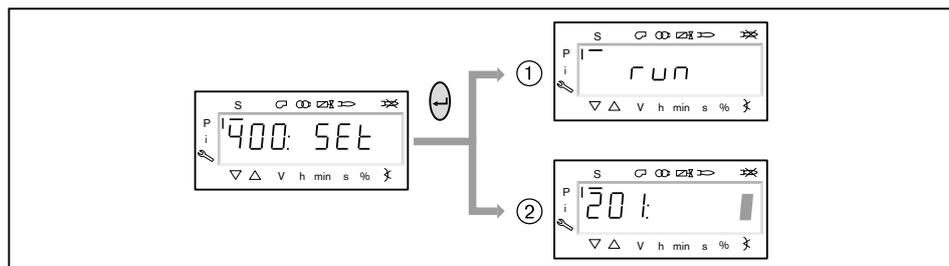
- ▶ Press [ENTER] key.

If the combustion manager has been pre-programmed, the display shows *run* ①.

- ▶ Select type of setting (from step 9).

If the combustion manager has not been programmed, the display shows parameter 201 ②.

- ▶ define parameter 201, 542 and 641 and set P0 (from step 4).
  - 201 = Type of operation
  - 542 = Activation frequency converter
  - 641 = Speed standardisation

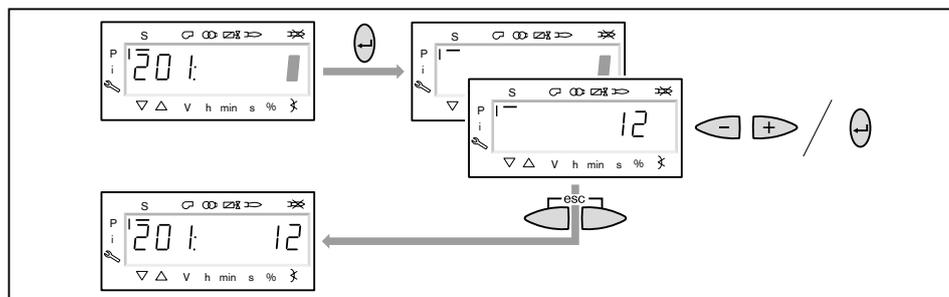


### 4. Set type of operation



The following steps must only be carried out if the combustion manager is not programmed. If the combustion manager has been pre-programmed, proceed with step 9.

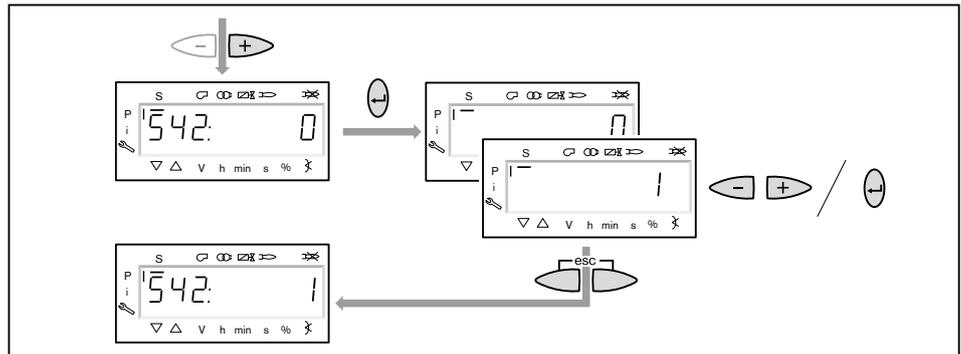
- ▶ Press [ENTER] key.
- ✓ The display shows only the parameter value.
- ▶ Using [+] or [-] set type of operation 12 (oil modulating) and confirm with [ENTER].
- ▶ Exit entry using [esc].
- ✓ The display shows parameter 201 with the current type of operation.



## 6 Commissioning

### 5. Activate/deactivate frequency converter

- ▶ Press [+] key.
- ✓ The display shows parameter 542.
- ▶ Press [ENTER] key.
- ✓ The display shows only the parameter value.
- ▶ Activate or deactivate the frequency converter using [+] or [-] and confirm with [ENTER].
  - 0 = without frequency converter
  - 1 = with frequency converter
- ▶ Exit entry using [esc].
- ✓ The display shows parameter 542 with the current setting.

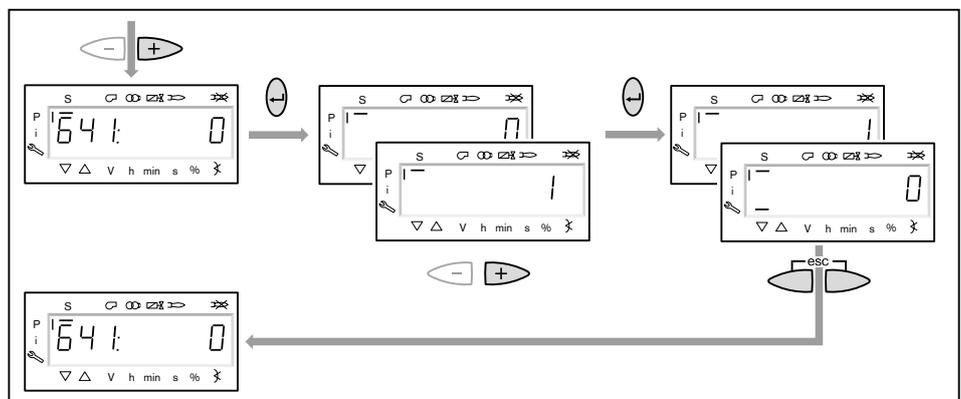


### 6. Carry out speed standardisation



If no frequency converter is available or if standardisation has been carried out with the other fuel, skip speed standardisation 641 using [+] key and continue with step 7.

- ▶ Press [+] key.
- ✓ The display shows parameter 641.
- ▶ Press [ENTER] key.
- ▶ Set value to 1 using the [+] key and start speed standardisation by pressing [ENTER].
- ▶ Check rotation direction of burner motor.
- ✓ The fan motor starts with the air dampers open. Once standardisation is complete, the display changes from 1 to 0.
- ▶ Exit speed standardisation using [esc].
- ✓ The standardised speed can be selected in parameter 642.



**6 Commissioning**

**7. Take over or preset ignition load point**

- ▶ Press [+] key.
- ✓ The display shows the ignition load point P0.

The ignition load point P0 is factory preset (see burner data sheet). If values are available continue with step 8. If the combustion manager has not been programmed (e. g. if the unit has been replaced) the air damper setting and the position of the oil quantity regulator have to be entered.

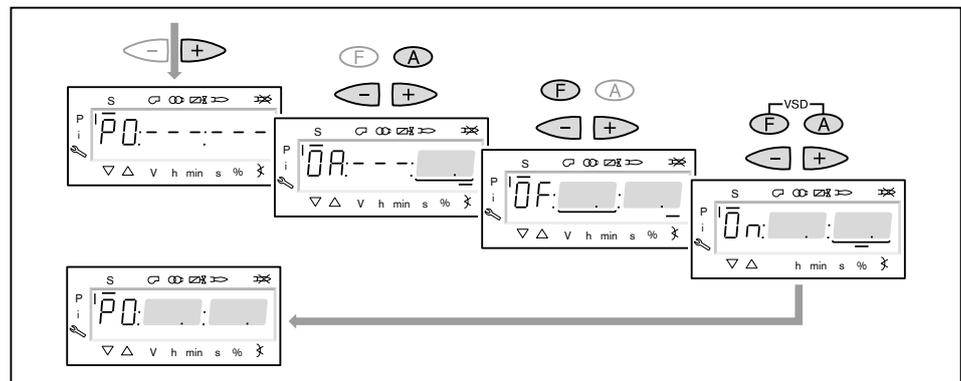
- ▶ Press and hold [A] key and using [+]/[-] enter air damper setting .
- ▶ Press and hold [F] key and using [+]/[-] key enter position of oil quantity regulator .



**Only in conjunction with frequency converter**

The ignition speed should be 100 %.

- ▶ Press and hold [A] and [F] (VSD) keys simultaneously and set speed to 100 % using [+]/[-] keys.



## 6 Commissioning

### 8. Preset full load point

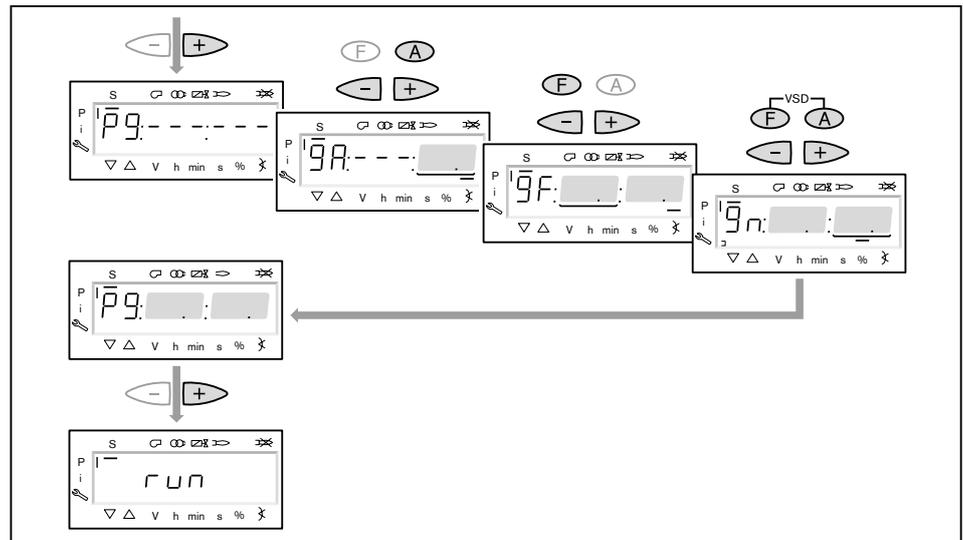
- ▶ Press [+] key.
- ✓ The display shows the full load point P9.
- ▶ Press and hold [A] key and using [+] / [-] enter air damper setting of 70° to 90°.
- ▶ Determine the position of the oil quantity regulator from the burner data sheet.
- ▶ Press and hold [F] key and enter the value using [+] / [-] key.



#### Only in conjunction with frequency converter

- ▶ Press and hold [A] and [F] (VSD) keys simultaneously and set speed to 100 % using [+] / [-] keys.

- ▶ Press [+] key.
- ✓ Exit pre-setting.  
The display changes to run.



## 6 Commissioning

### 9. Select type of setting

The following can be selected as type of setting:

- Adjustment with flame,
- Pre-setting without flame.

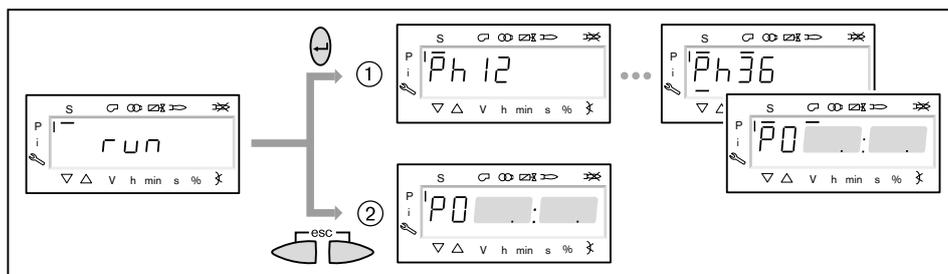
Pre-setting without flame is only used, if the operating points are already known (for example if the combustion manager is exchanged).

#### Adjustment with flame ①

- ▶ Press [ENTER] key.
- ▶ Check rotation direction of burner motor.
- ✓ The burner starts pre-purge  $\bar{P}h12$  and stops in ignition position  $\bar{P}h36$  without igniting.  
The display shows the ignition load point  $\bar{P}0$ .
- ▶ Set mixing pressure in ignition position (from step 11).

#### Pre-setting without flame ②

- ▶ Briefly press [esc] key.
- ✓ The display shows the operating point  $\bar{P}0$ .  
The black dash below the S symbol disappears.
- ▶ Pre-set operating points without flame (from step 10).



### 10. Pre-set points without flame

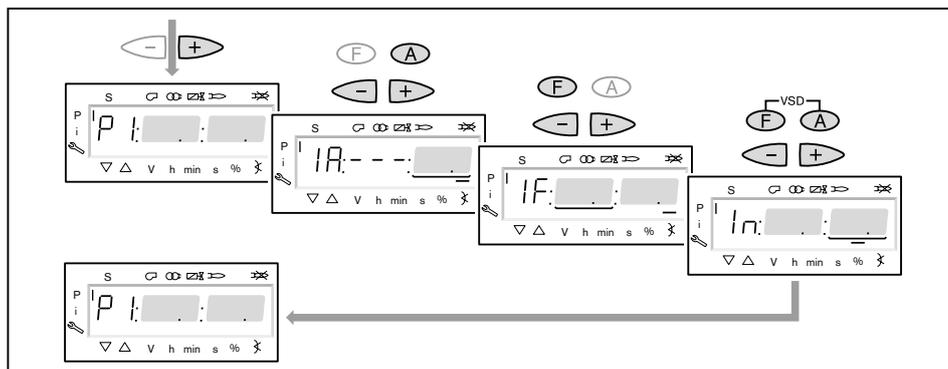
This step must only be carried out, if the type of setting without flame has been selected previously. The adjustment with flame (from step 11) is not replaced by this process.

- ▶ Press [+] key.
- ✓ The display shows the operating point  $\bar{P}1$ .
- ▶ Press and hold the [A] key and preset air damper setting using [+] / [-] keys.
- ▶ Press and hold [F] key and using [+] / [-] key preset position of oil quantity regulator.



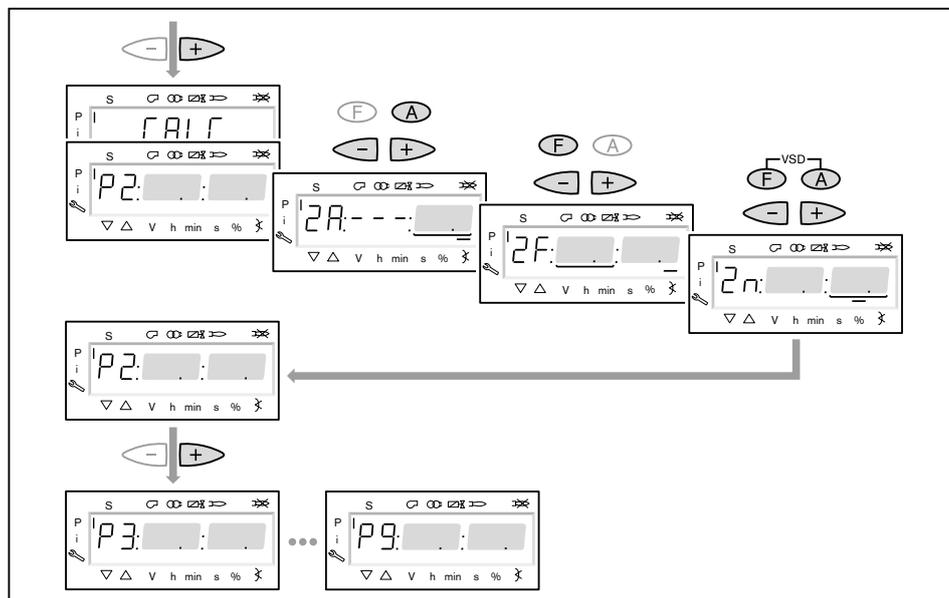
#### Only in conjunction with frequency converter

- ▶ Press and hold [A] and [F] (VSD) keys simultaneously and pre-set speed using [+] / [-] keys.

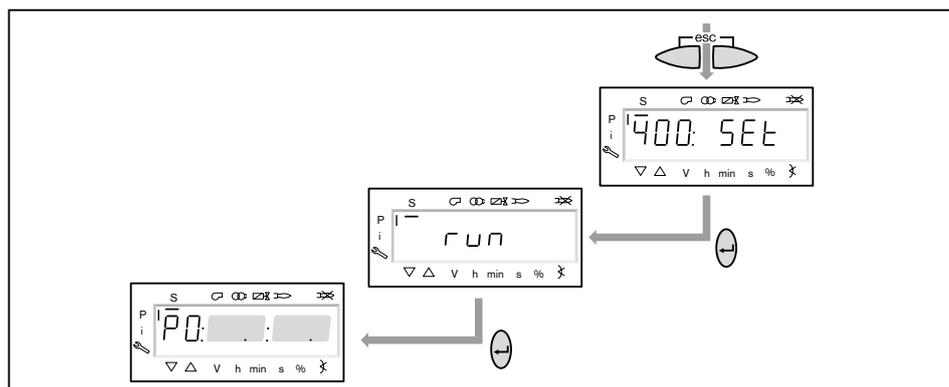


### 6 Commissioning

- ▶ Press [+] key.
- ✓ The display shows CALC.
- The combustion manager starts the calculation.
- The display then shows the operating point P2.
- ▶ Set position air dampers [A] and oil quantity regulator [F] or speed control [A] and [F] (VSD).
- ▶ Using [+] key select and pre-set points P3 to P9 in sequence.



- ▶ Exit pre-setting using [esc].
- ✓ The display shows 400 SET.
- ▶ Press [ENTER] key.
- ✓ The display shows run.
- ▶ Press [ENTER] key.
- ▶ Check rotation direction of burner motor.
- ✓ The burner starts pre-purge and stops in ignition position without igniting.
- The display shows the ignition load point P0.



## 6 Commissioning

### 11. Check mixing pressure in ignition position

The mixing pressure in ignition position must be between 2 ... 5 mbar.

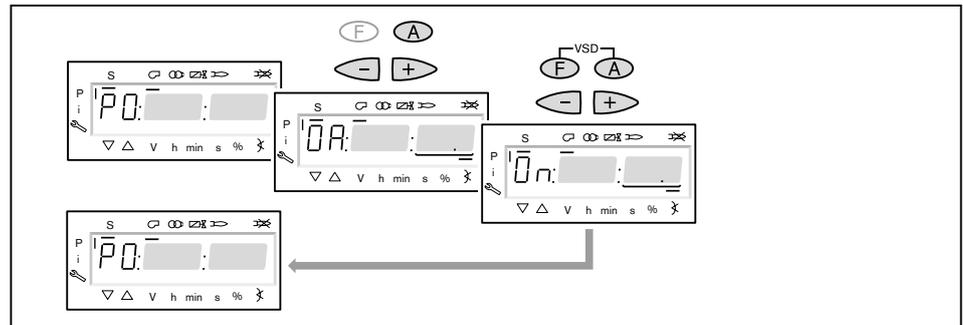
- ▶ If necessary, adjust mixing pressure via air damper setting.



#### Only in conjunction with frequency converter

In oil operation, the ignition speed should be 100 %.

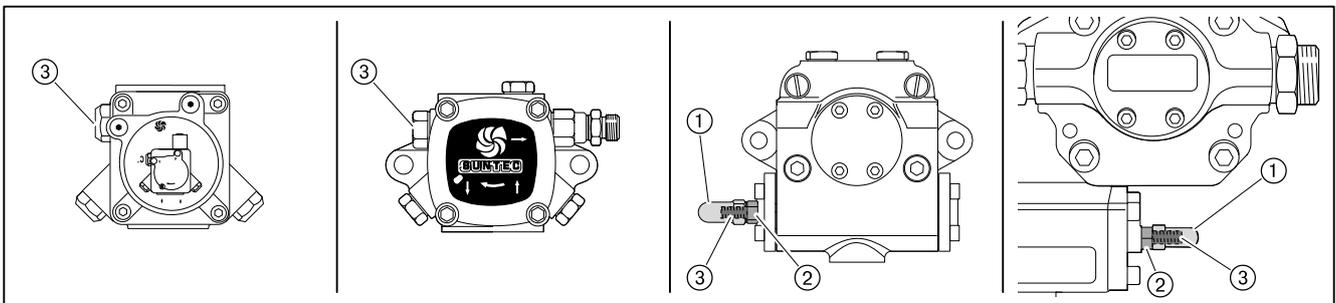
- ▶ Press and hold [A] and [F] (VSD) keys simultaneously and set speed to 100 % using [+]/[-] keys.



### 12. Check pump pressure

The pump pressure in ignition position must be approx. 1 to 2 bar less than that of the full load pressure listed in the burner data sheet.

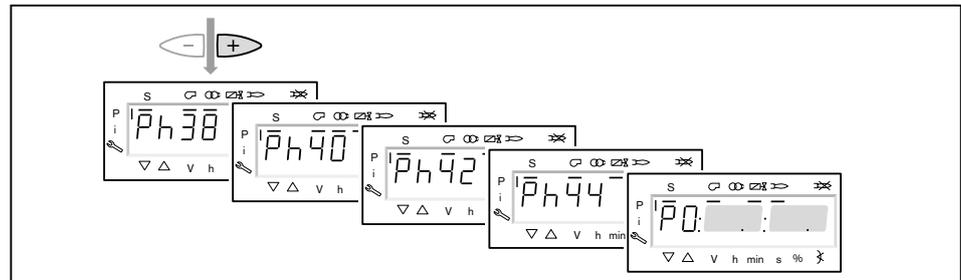
- ▶ Check pump pressure at the pressure gauge and adjust if necessary.
- ▶ Remove closing cap ① (types T and TA only).
- ▶ Undo locknut ② (types T and TA only).
- ▶ Set pump pressure using pressure regulating screw ③.
  - Clockwise rotation = increase pressure
  - Anticlockwise rotation = decrease pressure



6 Commissioning

13. Igniting the burner

- ▶ Press [+] key.
  - ✓ The burner ignites and the actuators stop in the ignition position.
- The display shows the following operating phases.
- Ph 38 = Ignition ON
  - Ph 40 = Fuel valve
  - Ph 42 = Ignition OFF
  - Ph 44 = Flame in ignition position



14. Check combustion

- ▶ Determine combustion values at ignition position P0.
- ▶ Set O<sub>2</sub> content of approx. 4 ... 5 % by positioning the oil quantity regulator [F], whilst observing the return pressure and maintaining 6 ... 8 bar (depending on burner).

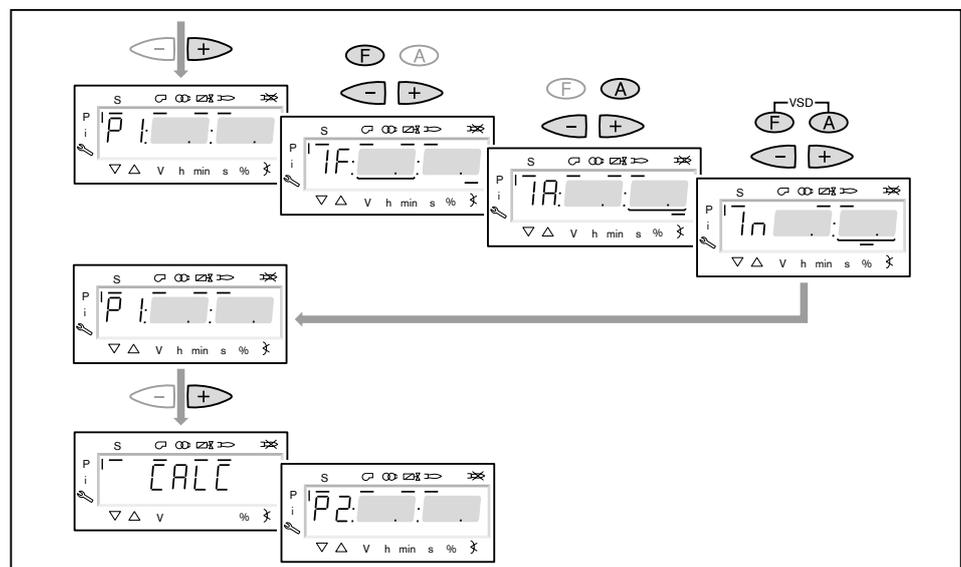
15. Pre-set operating point P1



**Only in conjunction with frequency converter**

In oil operation, the speed should only be reduced so far, that the pump pressure set at full load does not fall by more than 15 %.

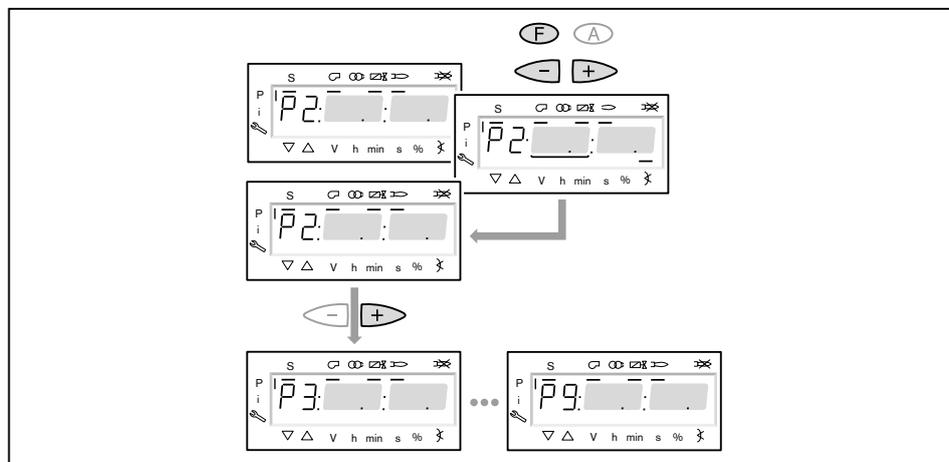
- ▶ Press [+] key.
  - ✓ The display shows the operating point P1.
  - ▶ Check combustion values and correct if necessary.
  - ▶ Press [+] key.
  - ✓ The display shows the operating point P2.
- If no other points have been defined, the combustion manager carries out a calculation and calculates all missing points up to P9, the display briefly shows CALC.



## 6 Commissioning

### 16. Drive to full load

- ▶ Using the [+] key, drive to points P2 to P9 in sequence.
- ▶ Check combustion values at each point and correct via the position of the oil quantity regulator [F].



### 17. Adjust full load

When adjusting full load, the ratings data given by the boiler manufacturer and the capacity graph of the burner must be observed.



#### Only in conjunction with frequency converter

The full load point speed must be 100 %.

- ▶ Press and hold [A] and [F] (VSD) keys simultaneously and set speed to 100 % using [+] / [-] keys.

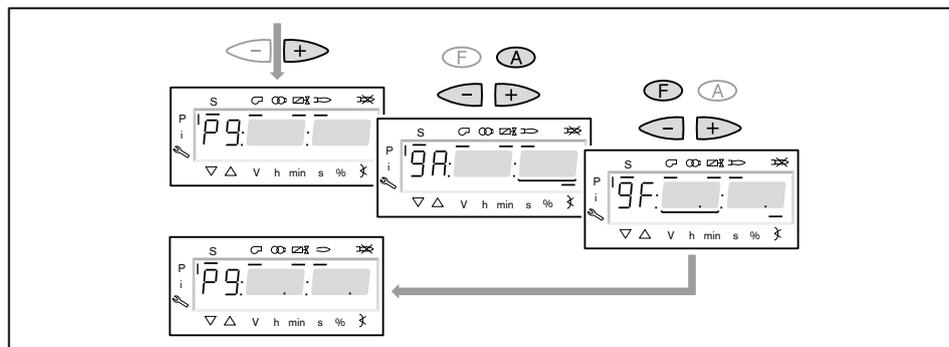
The burner has been factory pre-sized for a specific oil throughput (see burner data sheet).

- ▶ Set pump pressure and oil quantity regulator position to the data given on the burner data sheet.



The pump pressure must not be altered once this work has been completed.

- ▶ Determine oil throughput, if necessary adjust position of oil quantity regulator [F] until the oil throughput required is achieved.
- ▶ Determine combustion limit and set excess air of 15 ... 20 % via the air supply [A].

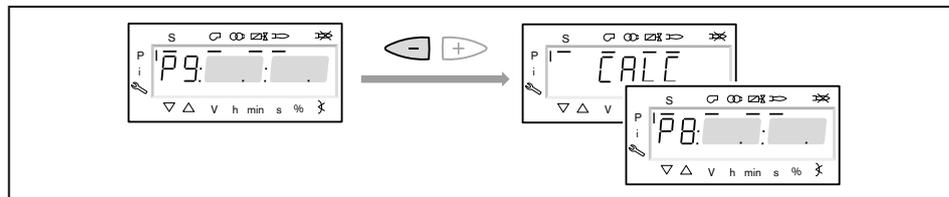


**6 Commissioning**

**18. Initiate a calculation**

To achieve a constant operating behaviour, it is necessary to initiate a calculation from P9 to P1.

- ▶ Press [-] key for approx. 4 seconds.
  - ✓ The display shows CALC.
  - ▶ Release [-] key.
  - ✓ The combustion manager starts the calculation.
- The display then shows the operating point P8.



**19. Adjusting the operating points**

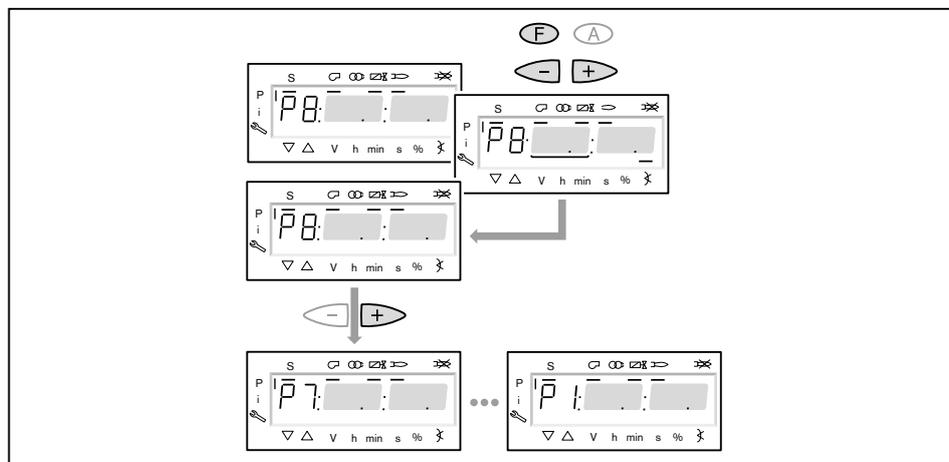


If the [-] key is pressed again for more than 4 seconds, a calculation is started from the point shown to P1.

- ▶ Briefly press [-] key, if points already calculated or set are not to be overwritten.

The operating points should only be adjusted via the fuel supply [F]. Changes to the air quantity influence the linearity, which has a negative effect on the load control.

- ▶ Check combustion
- ▶ Press and hold [F] key and using +/[-] optimise combustion values.
- ▶ Optimise combustion values at each operating point, until P1 has been reached.



**6 Commissioning**

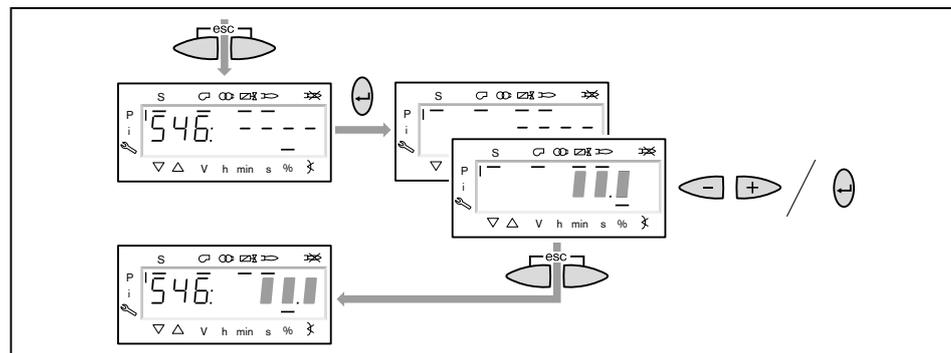
**20. Define upper load limit (full load)**

Full load can be limited via parameter 546.

- ▶ Exit setting mode using [esc].
- ✓ The display shows 546 - - - - .  
 No upper rating range has been defined, that means full load  $\triangleq$  P9 (100 % load assignment).

Continue with step 21, if the full load is not to be limited.

- ▶ Press [ENTER] key.
- ✓ The display shows only the parameter value.
- ▶ Set load limit using [+] or [-] and confirm with [ENTER].
- ✓ Burner drives to value set.
- ▶ Exit entry using [esc].
- ✓ The display shows 546 with the current upper load limit.

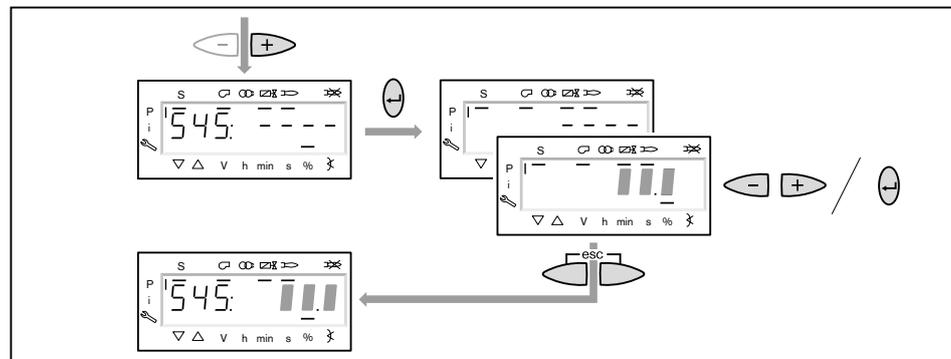


**21. Define lower load limit (partial load)**

Partial load can be limited via parameter 545.

When adjusting partial load, the ratings data given by the boiler manufacturer and the capacity graph of the burner must be observed.

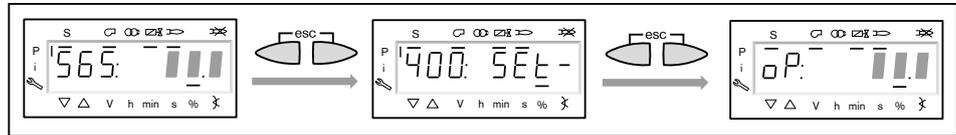
- ▶ Press [+] key.
- ✓ The display shows 545 - - - - .  
 No lower ratings limit defined, that means partial load  $\triangleq$  P1.
- ▶ Press [ENTER] key.
- ✓ The display shows only the parameter value.
- ▶ Set load limit using [+] or [-] and confirm with [ENTER].
- ✓ Burner drives to value set.
- ▶ Determine oil throughput and adjust load limit if required.
- ▶ Exit entry using [esc].
- ✓ The display shows 545 with the current lower load limit.



## 6 Commissioning

### 22. Save points

- ▶ Exit entry using [esc].
- ✓ The display shows 400 SET.
- ▶ Exit entry using [esc].
- ✓ The display shows OP (Operate) with the current rating.



### 23. Check start behaviour

- ▶ Switch off and restart burner.
- ▶ Check start behaviour and if necessary correct ignition load setting.

If the ignition load setting has been changed:

- ▶ Re-check start behaviour.

### 24. Data backup

- ▶ Press keys [F] and [A] simultaneously.
- ▶ Select 000: Int using [-] key and confirm with [ENTER].
- ✓ The display shows parameter 050.00: 0
- ▶ Press [ENTER] key.
- ✓ The display shows bAC\_up.
- ▶ Press [ENTER] key.
- ▶ Set 1 using [+] key and confirm with [ENTER].
- ✓ Following successful data backup, the display is reset to 0.  
The values have been backed up from the combustion manager to the ABE.
- ▶ Exit level using [esc].

### 25. Set pressure switch and carry out concluding work

For further information see installation and operating manual of burner.

## 6 Commissioning

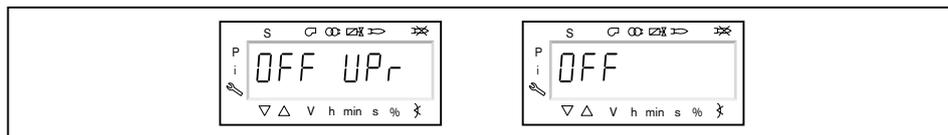
### 6.3 Adjust multi-stage oil side

#### Prerequisite

- ▶ Open oil shut off devices.
- ▶ Switch on voltage supply.
- ✓ The display shows either OFF UP<sub>r</sub> or OFF.

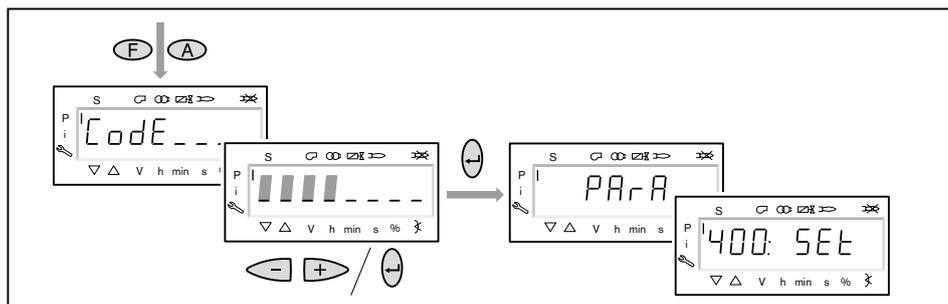
OFF UP<sub>r</sub> Burner off and not programmed

OFF Burner off



#### 1. Enter password

- ▶ Press keys [F] and [A] simultaneously.
- ✓ The display shows Code.
- ▶ Enter the first digit using [+] or [-] and confirm with [ENTER].
- ▶ Repeat procedure until the password has been entered.
- ▶ Exit password entry using [ENTER].
- ✓ The display shows PAR<sub>A</sub> (parameter level) for a short time and then changes over to 400: SEt (Setup).



#### 2. Switch on burner

- ▶ Ensure there is a demand for heat.
- ✓ A black dash appears below the S symbol (start).

For the duration of the commissioning a heat demand is required from the appliance controller, that means signal on input X5-03/1.



## 6 Commissioning

### 3. Start setup

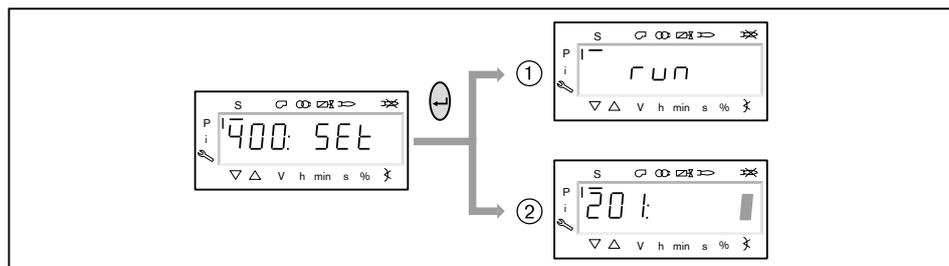
- ▶ Press [ENTER] key.

If the combustion manager has been pre-programmed, the display shows `run` ①.

- ▶ Select type of setting (from step 8).

If the combustion manager has not been programmed, the display shows parameter `201` ②.

- ▶ Define parameter 201, 542 and 641 and set P0 (from step 4).
  - 201 = Type of operation
  - 542 = Activation frequency converter
  - 641 = Speed standardisation

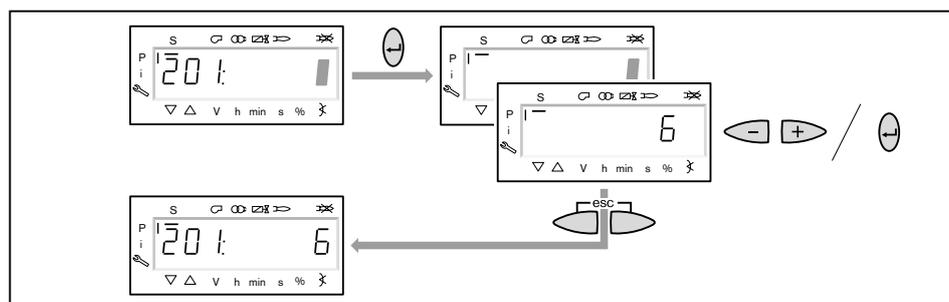


### 4. Set type of operation



The following steps must only be carried out if the combustion manager is not programmed. If the combustion manager has been pre-programmed, proceed with step 8.

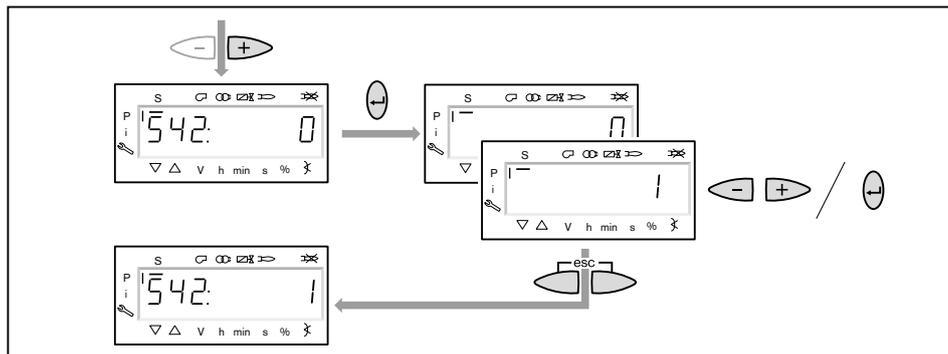
- ▶ Press [ENTER] key.
- ✓ The display shows only the parameter value.
- ▶ Using [+] or [-] set type of operation and confirm with [ENTER].
  - 5 = two stage
  - 6 = three stage
- ▶ Exit entry using [esc].
- ✓ The display shows parameter 201 with the current type of operation.



## 6 Commissioning

### 5. Activate/deactivate frequency converter

- ▶ Press [+] key.
- ✓ The display shows parameter 542.
- ▶ Press [ENTER] key.
- ✓ The display shows only the parameter value.
- ▶ Activate or deactivate the frequency converter using [+] or [-] and confirm with [ENTER].
  - 0 = without frequency converter
  - 1 = with frequency converter
- ▶ Exit entry using [esc].
- ✓ The display shows parameter 542 with the current setting.

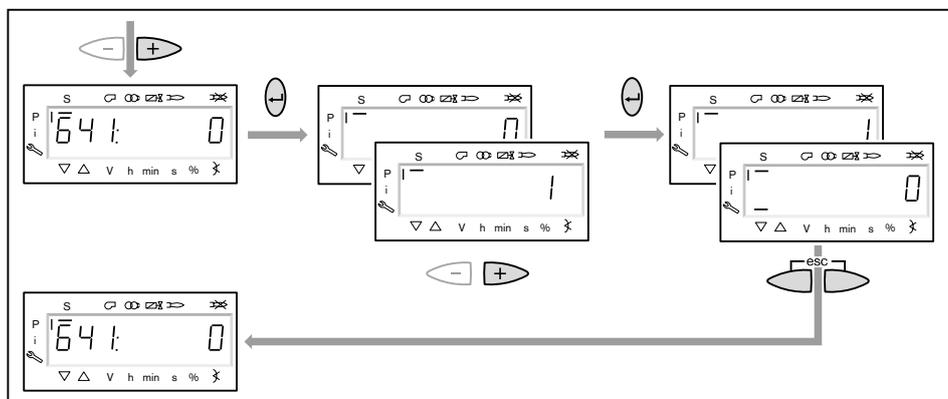


### 6. Carry out speed standardisation



If no frequency converter is available or if standardisation has been carried out with the other fuel, skip speed standardisation 641 using [+] key and continue with step 7.

- ▶ Press [+] key.
- ✓ The display shows parameter 641.
- ▶ Press [ENTER] key.
- ▶ Set value to 1 using the [+] key and start speed standardisation by pressing [ENTER].
- ▶ Check rotation direction of burner motor.
- ✓ The fan motor starts with the air dampers open. Once standardisation is complete, the display changes from 1 to 0.
- ▶ Exit speed standardisation using [esc].
- ✓ The standardised speed can be selected in parameter 642.



## 6 Commissioning

### 7. Preset ignition position

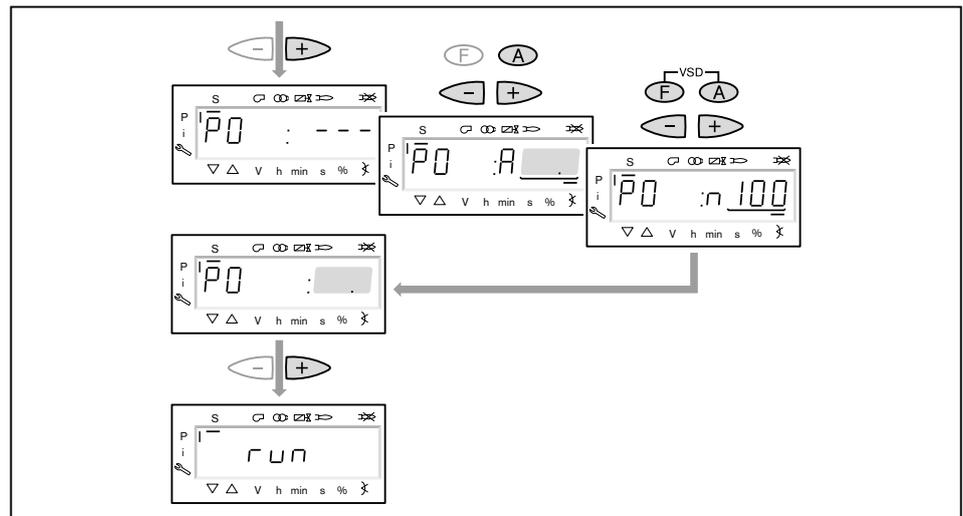
- ▶ Press [+] key.
- ✓ The display shows the ignition load point P0.
- ▶ Press and hold [A] key and using [+]/[-] enter air damper setting .



#### Only in conjunction with frequency converter

In oil operation, the speed in all operating points should be 100 %. If the speed is reduced operating problems could occur.

- ▶ Press [+] key.
- ✓ Exit pre-setting.  
The display changes to run.



## 6 Commissioning

### 8. Select type of setting

The following can be selected as type of setting:

- Adjustment with flame,
- Pre-setting without flame.

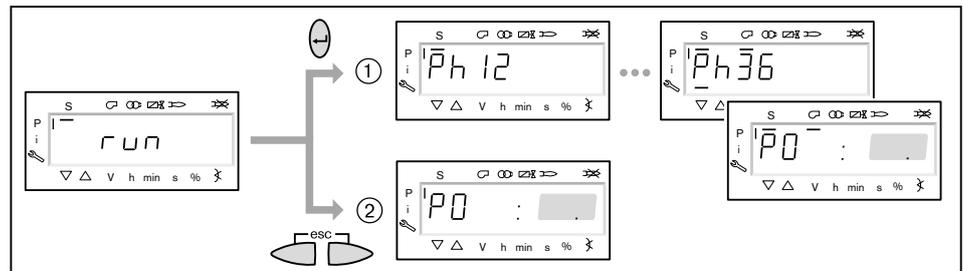
Pre-setting without flame is only used, if the operating points are already known (for example if the combustion manager is exchanged).

#### Adjustment with flame ①

- ▶ Press [ENTER] key.
- ▶ Check rotation direction of burner motor.
- ✓ The burner starts pre-purge Ph12 and stops in ignition position Ph36 without igniting.  
The display shows the ignition load point P0.
- ▶ Set mixing pressure in ignition position (from step 10).

#### Pre-setting without flame ②

- ▶ Briefly press [esc] key.
- ✓ The display shows the operating point P0.  
The black dash below the S symbol disappears.
- ▶ Pre-set operating points without flame (from step 9).



## 6 Commissioning

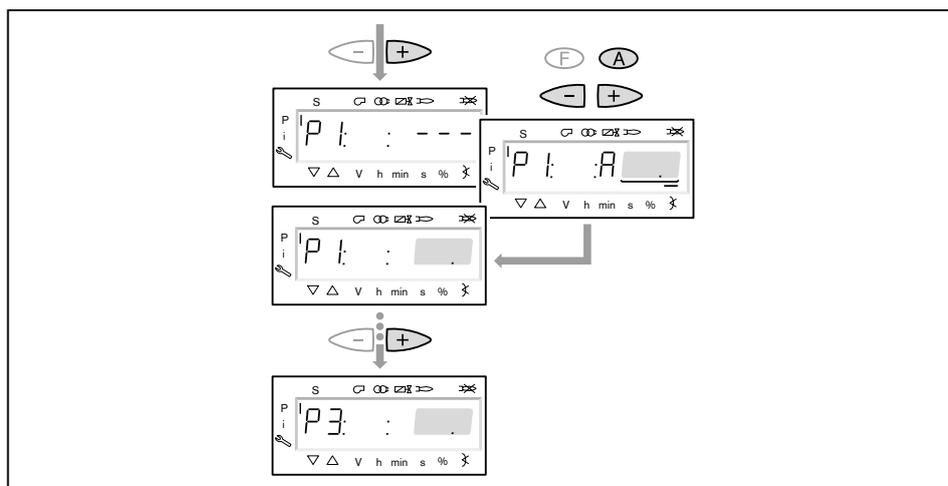
### 9. Pre-set points without flame

This step must only be carried out, if the type of setting without flame has been selected previously. The adjustment with flame (from step 10) is not replaced by this process.

- ▶ Using the [+] key, select and preset the following points in sequence.

- P1      Operating point 1
- P2on    Switch point of P1 after P2
- P2      Operating point 2
- P3on    Switch point from P2 after P3 (only with three stage operation)
- P3P3    Operating point 3 only with three stage operation)

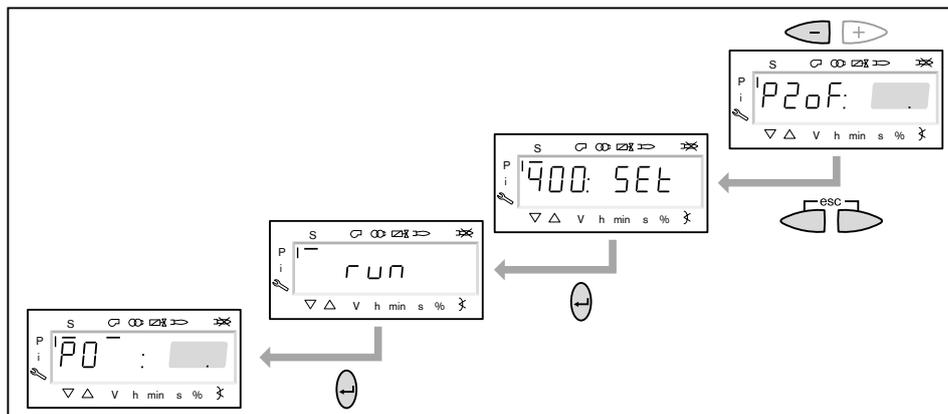
- ▶ Press and hold the [A] key at each point and preset air damper setting using [+] / [-] keys.



- ▶ Using the [-] key, select and preset the following points in sequence.

- P3oF    Switch off point from P3 to P2 (only with three stage operation)
- P2oF    Switch off point P2 after P1

- ▶ Press and hold the [A] key at each point and preset air damper setting using [+] / [-] keys.
- ▶ Exit pre-setting using [esc].
- ✓ The display shows 400 SET.
- ▶ Press [ENTER] key.
- ✓ The display shows run.
- ▶ Press [ENTER] key.
- ✓ The burner starts pre-purge and stops in ignition position without igniting. The display shows the ignition load point P0.



**6 Commissioning**

**10. Check mixing pressure in ignition position**

The mixing pressure in ignition position must be between 2 ... 5 mbar.

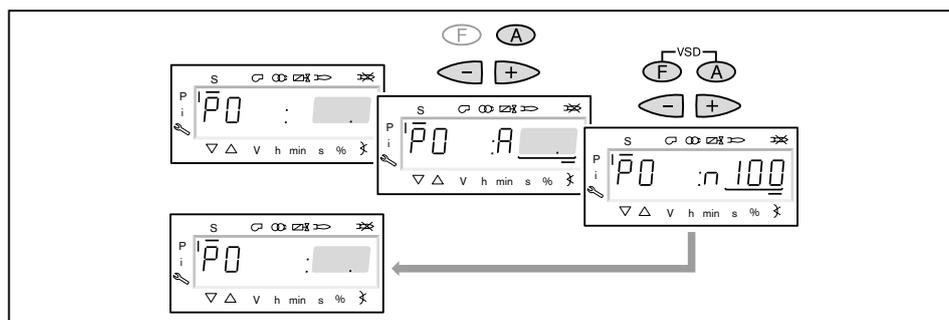
- ▶ If necessary, adjust mixing pressure via air damper setting.



**Only in conjunction with frequency converter**

In multi stage oil operation, the speed in all operating points should be 100 %. If the speed is reduced operating problems could occur.

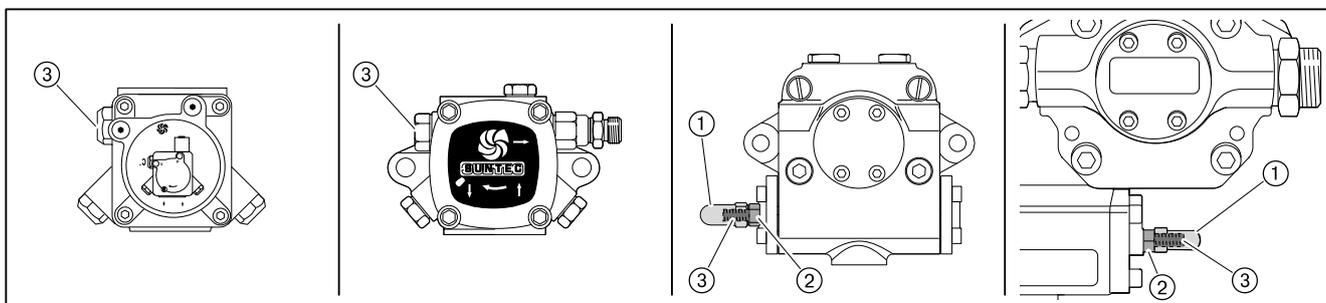
- ▶ Press and hold [A] and [F] (VSD) keys simultaneously and set speed to 100 % using [+]/[-] keys.



**11. Check pump pressure**

The pump pressure must be set according to the full load previously selected.

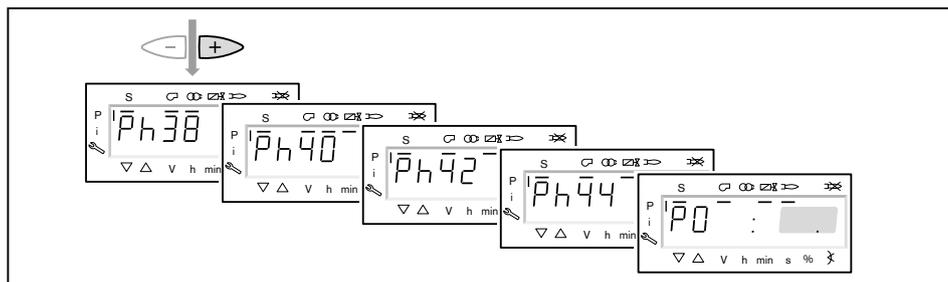
- ▶ Check pump pressure at the pressure gauge and adjust if necessary.
- ▶ Remove closing cap ① (types T and TA only).
- ▶ Undo locknut ② (types T and TA only).
- ▶ Set pump pressure using pressure regulating screw ③.
  - Clockwise rotation = increase pressure
  - Anticlockwise rotation = decrease pressure



## 6 Commissioning

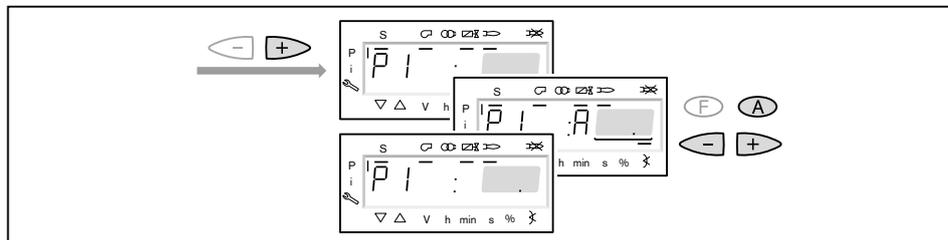
### 12. Igniting the burner

- ▶ Press [+] key.
- ✓ The burner ignites and the actuators stop in the ignition position.  
The display shows the following operating phases.
  - Ph 38 = Ignition ON
  - Ph 40 = Fuel valve
  - Ph 42 = Ignition OFF
  - Ph 44 = Flame in ignition position
- ▶ Check pump pressure.
- ▶ Check combustion values
- ✓ The O<sub>2</sub> content should be approx. 5%.
- ▶ If necessary adjust air damper setting.



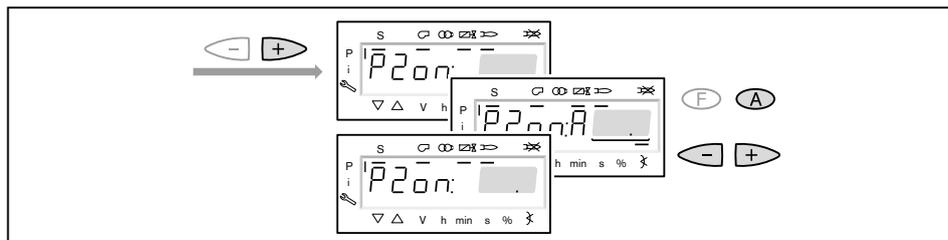
### 13. Adjusting operating point P1

- ▶ Press [+] key.
- ✓ The display shows the operating point P1.  
If P1 has not been preset, the values from P0 are taken over for P1.
- ▶ Preset air damper setting [A] whilst observing combustion values.



### 14. Determine switch on point P2on

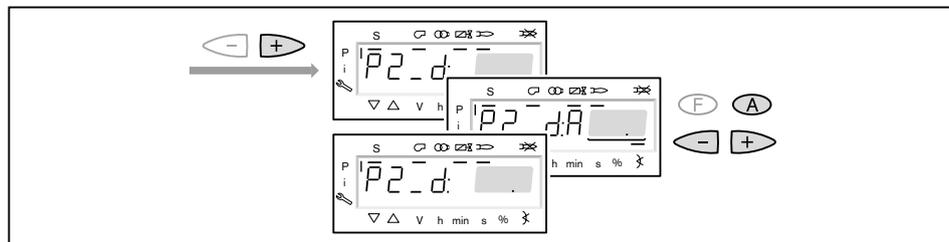
- ▶ Press [+] key.
- ✓ The display shows P2on.  
Stage 2 fuel valve remains closed.
- If P2on has not been preset, the values from P1 are taken over for P2on.
- ▶ Set excess air (O<sub>2</sub> content approx. 8.1 %) via air damper setting [A] whilst observing flame stability.



**6 Commissioning**

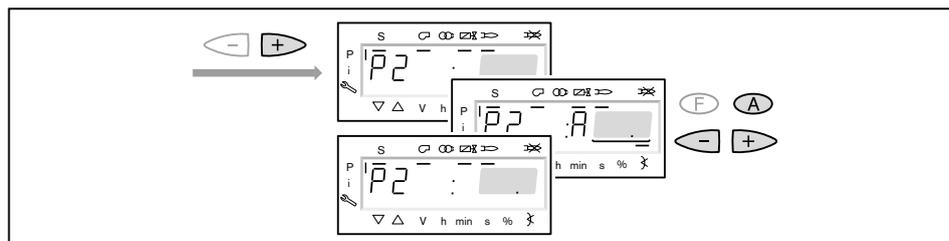
**15. Set preset point P2\_d**

- ▶ Press [+] key.
- ✓ The display shows the preset point P2\_d.  
 Stage 2 fuel valve remains closed.
- ▶ Preset air damper setting [A] expected for the operating point P2.
- ✓ The value is not yet activated.  
 The preset point reduces the insufficient air at activation of P2.



**16. Activate operating point P2**

- ▶ Press [+] key.
- ✓ The display shows P2.  
 Stage 2 fuel valve opens.  
 The preset air damper setting from P2\_d is activated.
- ▶ Preset air damper setting [A] whilst observing combustion values.



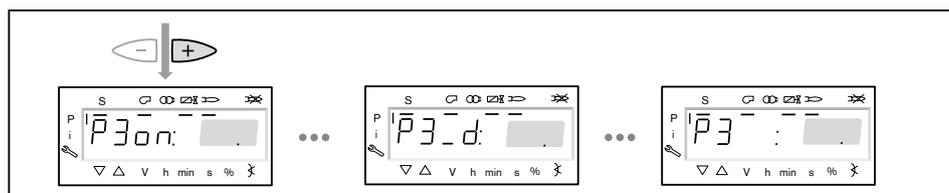
**17. Adjust full load**

When adjusting full load, the ratings data given by the boiler manufacturer and the capacity graph of the burner must be observed.

- ▶ With three stage operation, repeat procedure of step 14, 15 and 16 for switch point P3\_on, preset point P3\_d and operating point P3.
- ▶ Determine fuel throughput and if necessary adjust pump pressure.
- ▶ Check combustion values
- ▶ Set excess air.



The pump pressure must not be altered once this work has been completed.



## 6 Commissioning

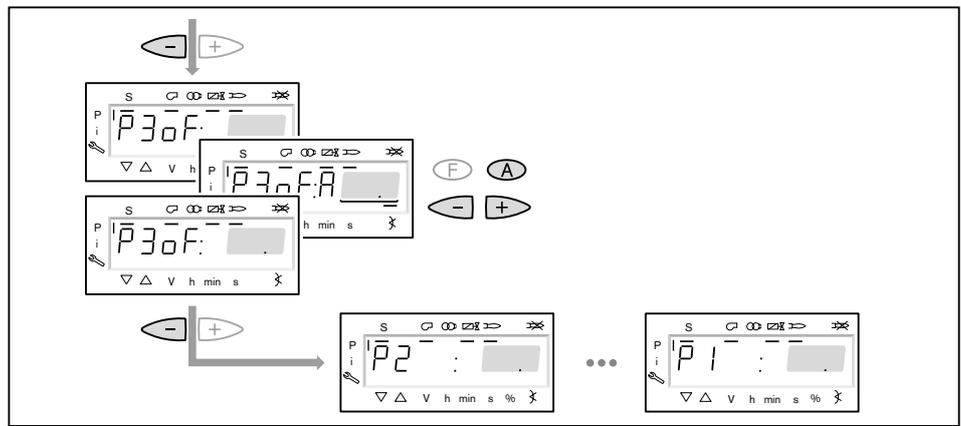
### 18. Initiate partial load

- ▶ Press [-] key.
- ✓ The display shows the switch off point P3oF.



The switch off point stipulates at which air damper setting the fuel valve of the stage above closes. The point itself cannot be activated.

- ▶ Adapt air damper setting [A].
- ✓ The switch off point usually lies 0 ... 5° above the switch point of the individual stage. It must not lie below the switch point.
- ▶ Press [-] key and observe switch off behaviour.
- ▶ Check combustion values in operating point P2.
- ▶ Set excess air via air damper setting [A], do not alter fuel pressure in the process.
- ▶ Repeat procedure for operating point P1.



### 19. Check operating behaviour

- ▶ Using [+] or [-] key, activate operating points several times and observe switch over behaviour.

If the flame is unstable:

- ▶ Decrease air damper setting [A] in the changeover point.

If soot is formed:

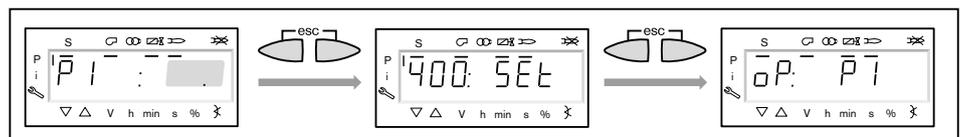
- ▶ Increase air damper setting [A] in the changeover point.

### 20. Save points



The operating point P1 must be activated once, otherwise the display shows OFF UPr when exiting commissioning and the combustion manager remains unprogrammed.

- ▶ Activate operating point P1.
- ▶ Press [esc] twice.
- ✓ The display shows oP (Operate) and an operating point.



## 6 Commissioning

### 21. Check start behaviour

- ▶ Switch off and restart burner.
- ▶ Check start behaviour and if necessary correct ignition load setting.

If the ignition load setting has been changed:

- ▶ Re-check start behaviour.

### 22. Data backup

- ▶ Press keys [F] and [A] simultaneously.
- ▶ Select 000: Int using [-] key and confirm with [ENTER].
- ✓ The display shows parameter 050.00: 0
- ▶ Press [ENTER] key.
- ✓ The display shows bAC\_up.
- ▶ Press [ENTER] key.
- ▶ Set 1 using [+] key and confirm with [ENTER].
- ✓ Following successful data backup, the display is reset to 0.  
The values have been backed up from the combustion manager to the ABE.
- ▶ Exit level using [esc].

### 23. Set pressure switch and carry out concluding work

For further information see installation and operating manual of burner.

## **7 Shutdown**

### **7 Shutdown**

- ▶ For short breaks in operation, e. g. chimney cleaning, switch off the burner.
- ▶ For longer breaks in operation, switch off the burner and close fuel shut off devices.

## 8 Servicing

## 8 Servicing

### 8.1 Safety components

#### Safety components

Vital safety components must be replaced as soon as they reach their predefined lifetime.

The predefined lifetime is not the warranty time specified in the terms and conditions of delivery and payment.

<b>Safety component</b>	<b>Lifetime according to construction</b>	<b>CEN-Standard</b>
ABE / Combustion Manager	10 years or 250 000 operating cycles	EN 230 / 298
Actuators	10 years or 2 000 000 operating cycles	EN 12067-2

9 Troubleshooting

9 Troubleshooting

9.1 Procedures for fault conditions

Fault memory

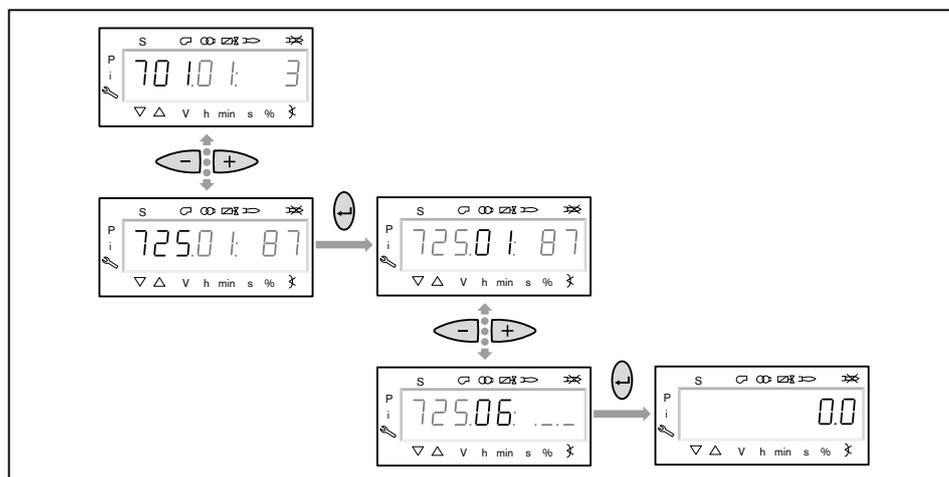
The combustion manager stores the last 25 faults and lockouts in the fault history (parameter 700), 701 is the fault, which occurred last. The fault history can be called up in the service level or password level.

Display fault history

- ▶ call up service level or password level (see Ch. 5.2).
- ▶ Select faults in sequence using [+] or [-] key.
- ▶ Press [ENTER] key (in service level 1 to 3 s).
- ✓ Fault level flashes.
- ▶ Select fault level in sequence using [+] key.

If . . . appears in the display in fault level 05 and 06:

- ▶ Press [ENTER] key (in service level 1 to 3 s).
- ✓ Value is displayed.



No.	Level	Meaning
701	.01 =	Error codes (see Ch. 9.2)
...	.02 =	Diagnostic code (see Ch. 9.2)
725	.03 =	Fault class (arranges faults by priority) 0 = Lockout, highest priority 1 = Safety shut down with software reset 2 = Low voltage 3 = Safety shut down in safety phase 4 = Safety shutdown start prevention 5 = Safety shutdown shutdown 6 = Signal without switch off reaction
	.04 =	Operating phase Operating phase at time of fault (see Ch. 3.1.7.1).
	.05 =	Start-up counter Number of start-ups at time of fault. Press [ENTER] key to display.
	.06 =	Rating Load at time of fault. Press [ENTER] key to display.

## 9 Troubleshooting

### Carry out reset



#### Damage resulting from incorrect servicing

The combustion plant could be damaged.

- ▶ Do not carry out more than 2 lockout resets successively.
- ▶ Faults must be rectified by qualified personnel.

- ▶ Press [ENTER] key for approx. 2 seconds.
- ✓ rESEt appears.
- ▶ Release the key.
- ✓ The burner has been reset.

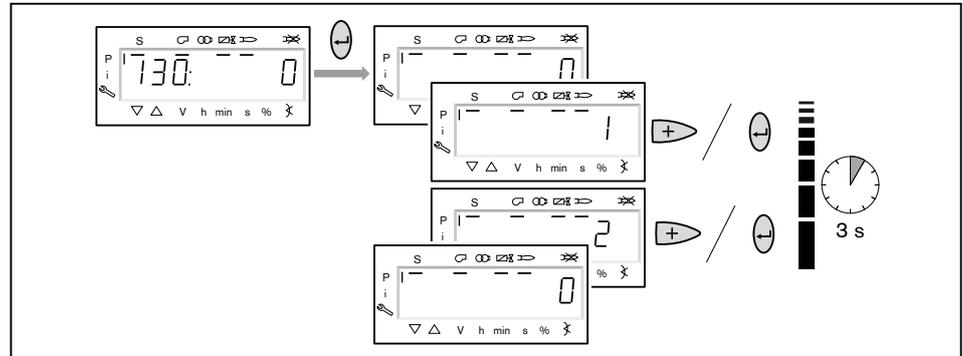
#### Exchanging the unit

- ▶ Select and check fault history and lockout history before replacing the combustion manager or ABE and include when returning the unit for exchange.

#### Delete fault history

Only the fault history in the service level can be deleted. The fault history in the password level is not affected by the deleting process.

- ▶ Enter password (see Ch. 5.2.1).
- ▶ Select parameter 130
- ▶ Press [ENTER] key.
- ✓ The display shows value 0.
- ▶ Set value to 1 within 3 seconds using [+] key, confirm with [ENTER] key, then set value to 2 and confirm again with [ENTER] key.
- ✓ When the display changes to 0 the delete process has been completed.  
If the display shows -1 the duration of 3 seconds was exceeded and the delete process was aborted.



**9 Troubleshooting**

**9.2 Error codes**

Error code	Diagnostic code	Cause	Rectification
2	1	No flame signal in operating phase 44	<ul style="list-style-type: none"> <li>▶ Check flame sensor (soiled, defective, signal strength...)</li> <li>▶ Correct ignition load point</li> </ul>
	2	No flame signal in operating phase 52	
3	0	No air pressure switch signal from operating phase 24	<ul style="list-style-type: none"> <li>▶ Check air pressure switch (setting, connection)</li> <li>▶ Clean fan wheel and air guide</li> <li>▶ Check pressure and negative pressure hoses</li> </ul>
	1	Air pressure switch signal prior to operating phase 22	
	4	Air pressure switch signal prior to start-up	
4	0	Flame signal during pre-purge	▶ Check flame sensor
	1	Flame signal during shutdown	
	2	Flame signal during start-up	
7	0	Flame failure	<ul style="list-style-type: none"> <li>▶ Check flame sensor (soiled, defective, signal strength...)</li> <li>▶ Check fuel supply</li> <li>▶ Check combustion</li> </ul>
	3 ... 255	Flame failure due to TÜV test	
12	0	Valve proving V1 leaking	<ul style="list-style-type: none"> <li>▶ Check valve proving pressure switch (see Ch. 3.1.1)</li> <li>▶ Check solenoid valve</li> </ul>
	1	Valve proving V2 leaking	
14	0	POC open	▶ Check valve closing contact (function, connection)
	1	POC closed	
	64	POC open prior to start-up	
20	0	Low pressure switch has reacted	<ul style="list-style-type: none"> <li>▶ Check low pressure switch</li> <li>▶ Check fuel supply</li> </ul>
	1	Low gas program (see Ch. 3.1.2)	
21	0	High pressure switch has reacted	<ul style="list-style-type: none"> <li>▶ Check high pressure switch</li> <li>▶ Check fuel supply</li> </ul>
22	0	Safety circuit / burner flange open	▶ Check safety devices
	1	Safety circuit / burner flange open during start-up	
50 ... 67	#	Internal fault	▶ Replace combustion manager if fault reoccurs

**9 Troubleshooting**

Error code	Diagnostic code	Cause	Rectification
70	23	Load invalid	
	26	Modulating curve point undefined.	Set curve points for all actuators
71	0	Standby undefined.	Set special positions for all actuators
	1	Pre-purge position undefined	
	2	Post-purge position undefined	
	3	Ignition position undefined	
72	#	Internal fault	► Replace combustion manager if fault reoccurs
73	23	Load invalid	
	26	Multi-stage curve points undefined	Set curve points for all actuators
75	1	Current load incorrect	
	2	Target load incorrect	
	4	Target position incorrect	
	16	Different positions reached	► Repeat standardisation.
76	#	Internal fault	► Replace combustion manager if fault reoccurs
80	1	Combustion manager was unable to correct speed deviations and has reached the lower regulating limit. Frequency converter speed too high	<p>Combustion manager has not been standardised for this motor: ► Repeat standardisation.</p> <p>The ramp times of the frequency converter are longer than those of the combustion manager: ► Check ramp times (parameter 522, 523).</p> <p>The reference line of the frequency converter is not linear: ► Adjust combustion manager/frequency converter control signal (parameter 645).</p> <p>Frequency converter reacts too slowly: ► Check frequency converter settings (inlet filter, slip compensation, fade-out of different speeds).</p>
	2	Combustion manager was unable to correct speed deviations and has reached the upper regulating limit. Frequency converter speed too low	
81	1	Interference impulses on sensor line speed input	► Improve EMC measures.

**9 Troubleshooting**

Error code	Diagnostic code	Cause	Rectification
82	1	Ramp time during run down during standardisation too short	▶ Increase ramp time (parameter 523).
	2	Standardised speed not saved	▶ Repeat standardisation.
	3	No speed signal	▶ Check the connection ▶ Check distance speed sensor / transmitter disc.
	4	Motor did not achieve stable speed during start-up. Frequency converter run-up time too long. Speed below minimum limit for standardisation.	The ramp times of the frequency converter are longer than those of the combustion manager: ▶ Check ramp times (parameter 522, 523).  The reference line of the frequency converter is not linear: ▶ Adjust combustion manager/frequency converter control signal (parameter 645).  Frequency converter reacts too slowly: ▶ Check frequency converter settings (inlet filter, slip compensation, fade-out of different speeds).  Speed of frequency converter is below the minimum standardised speed (650 rpm) ▶ Increase speed of frequency converter.
	5	Incorrect rotation direction	▶ Check rotation direction. ▶ Check installation of transmitter disc.
	6	Impulse pattern (60°, 120°, 180°) incorrect, interference impulses on the sensor line	▶ Check the connection ▶ Check distance speed sensor / transmitter disc. ▶ Improve EMC measures.
	7	Standardised speed is not within the permitted range	
	15	Speed deviation between micro controller 1 und micro controller 2	▶ Repeat standardisation.
	20	Standardisation in incorrect operating phase	▶ Switch off heat demand and repeat standardisation.
	21	Safety circuit / burner flange open during standardisation.	▶ Repeat standardisation.
	22	Air actuator not referenced	▶ Check actuator.
	23	Frequency converter deactivated	▶ Activate frequency converter and repeat standardisation.
	24	Standardisation started without valid type of operation	▶ Check type of operation (parameter 201, 301) and repeat standardisation.
	128	Frequency converter is activated, but is not standardised.	▶ Carry out standardisation.
255	Motor is rotating, but is not standardised	▶ Carry out standardisation.	

**9 Troubleshooting**

Error code	Diagnostic code	Cause	Rectification
83	1	Speed not achieved, lower control limit was activated	Rectification see error code 80.
	2 ... 3	Speed not achieved, upper control limit was activated	Rectification see error code 80.
	4 ... 7	Aborted due to interference impulses on sensor line	► Improve EMC measures.
	8 ... 15	Modulating operation: Curve gradient frequency converter too steep (speed not achieved)  Depending on the ramp time (parameter 522, 523), the speed alteration between two operating points must not exceed a specific percentage.  10 % at 20 s 20 % at 10 s 40 % at 5 s	► Check ramp times (parameter 522, 523).
	16 ... 31	No speed signal	► Check the connection ► Check distance speed sensor / transmitter disc.
	32 ... 63	Speed deviation too high	► Check ramp times (parameter 522, 523).
84	1	Modulating operation: Curve gradient frequency converter too steep  Depending on the ramp time (parameter 522, 523), the speed alteration between two operating points must not exceed a specific percentage.  10 % at 20 s 20 % at 10 s 40 % at 5 s	► Check ramp times (parameter 522, 523).
	2 ... 3	Modulating operation: Curve gradient fuel actuator too steep	The position change between two operating points must not exceed maximum 31°: ► Adjust operating points.
	4 ... 7	Modulating operation: Curve gradient air actuator too steep	
85	1	Fuel actuator referencing error	► Check, if actuators have been mixed up. ► Check, if actuator is blocked.
	2 ... 3	Air actuator referencing error	
	128 ... 255	Parameter settings of one actuator have been changed.	
86	0	Fuel actuator position error	► Check, if actuator is blocked.
	1	Fuel actuator line break	min 0.5 V between Pin 5 and 2 or 6 and 2 : ► Check wiring.
	8	Modulating operation: Curve gradient fuel actuator too steep	The position change between two operating points must not exceed maximum 31°: ► Adjust operating points.
	16 ... 255	Fuel actuator overloaded or mechanically twisted	► Check, if actuator is blocked.

**9 Troubleshooting**

Error code	Diagnostic code	Cause	Rectification
87	0	Air actuator position error	▶ Check, if actuator is blocked.
	1	Air actuator line break	min 0.5 V between Pin 5 and 2 or 6 and 2 : ▶ Check wiring.
	8	Modulating operation: Curve gradient air actuator too steep	The position change between two operating points must not exceed maximum 31°: ▶ Adjust operating points.
	16 ... 255	Air actuator overloaded or mechanically twisted	▶ Check, if actuator is blocked.
90 ... 91	#	Internal fault	▶ Replace combustion manager if fault reoccurs
93	3	Flame sensor short circuit	▶ Check flame sensor ▶ Check wiring.
95	#	External voltage relay contact (internal)	▶ Check flame sensor ▶ Check wiring.
	3	Ignition unit	
	4	Fuel valve 1	
	5	Fuel valve 2	
	6	Fuel valve 3	
96	#	Relay contact fused (internal)	Check relay contact: ▶ Apply voltage. ✓ Output X3-05:1 must be de-energised. ▶ Switch off voltage and unplug plug X3-05. ✓ No ohmic connection must exist between output X3-05:1 and input X3-04:4 (N).  If a criteria is not met: ▶ Replace combustion manager.
	3	Ignition unit	
	4	Fuel valve 1	
	5	Fuel valve 2	
	6	Fuel valve 3	
97	0	Safety relay fused (internal) or external voltage applied to safety relay	Rectification see error code 96.
98	#	Relay does not activate (internal)	▶ Replace combustion manager if fault reoccurs
	2	Safety valve	
	3	Ignition unit	
	4	Fuel valve 1	
	5	Fuel valve 2	
	6	Fuel valve 3	
99 ... 100	#	Internal fault relay activation	▶ Replace combustion manager if fault reoccurs

**9 Troubleshooting**

Error code	Diagnostic code	Cause	Rectification
105	#	Internal fault contact interrogation	Can be caused by capacitive loads or direct current feed. The input, at which the fault occurred is displayed with error code.
	0	Minimum pressure switch	
	1	High pressure switch	
	2	Valve proving pressure switch	
	3	Air pressure switch	
	4	Load controller OPEN	
	5	Load controller ON / OFF	
	6	Load controller CLOSED	
	7	Safety circuit / burner flange	
	8	Safety valve	
	9	Ignition unit	
	10	Fuel valve 1	
	11	Fuel valve 2	
	12	Fuel valve 3	
13	Reset		
106 ... 110	#	Internal fault	► Replace combustion manager if fault reoccurs
111	#	Mains frequency too low	
112	#	Voltage return	No fault
113 ... 115	#	Internal fault	► Replace combustion manager if fault reoccurs
116	#	Operating cycle lifespan exceeded	► Combustion manager should be replaced
117	#	Lifespan exceeded	► Replace combustion manager.
120	0	Interference impulses on fuel meter input	► Improve EMC measures.
121 ... 124	#	Internal fault	► Reset parameters or reset data using Restore. ► Replace combustion manager if fault reoccurs
125 ... 126	#	Internal fault	► Reset parameters. ► Replace combustion manager if fault reoccurs
127	#	Internal fault	► Reset parameters or reset data using Restore. ► Replace combustion manager if fault reoccurs
128	0	Internal fault	► Replace combustion manager if fault reoccurs
129 ... 131	#	Internal fault	► Reset parameters. ► Replace combustion manager if fault reoccurs
132	#	Internal fault	► Replace combustion manager if fault reoccurs
133 ... 135	#	Internal fault	► Reset parameters. ► Replace combustion manager if fault reoccurs
136	1	Restore started	No fault

**9 Troubleshooting**

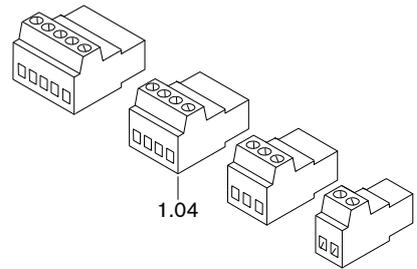
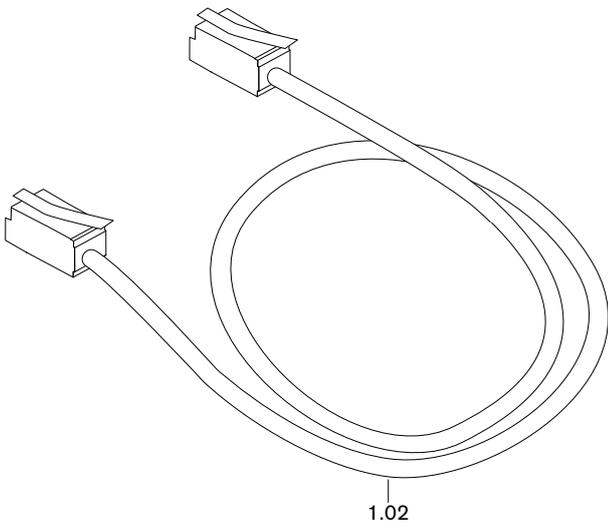
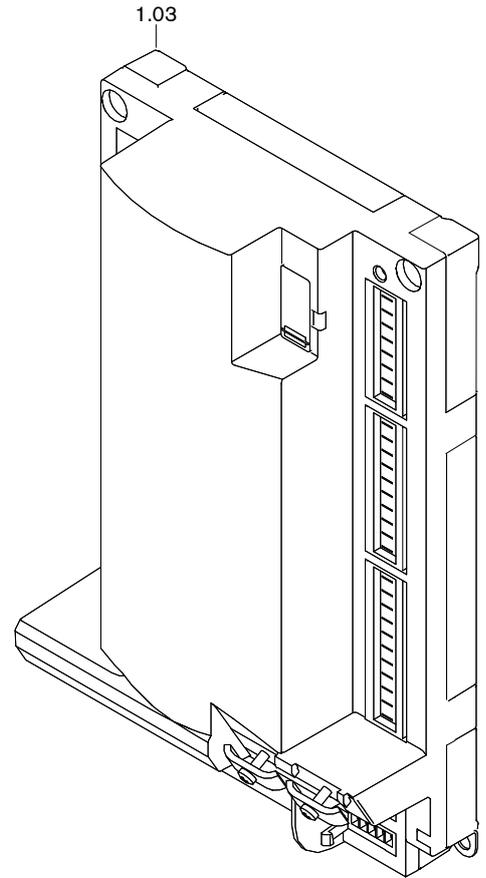
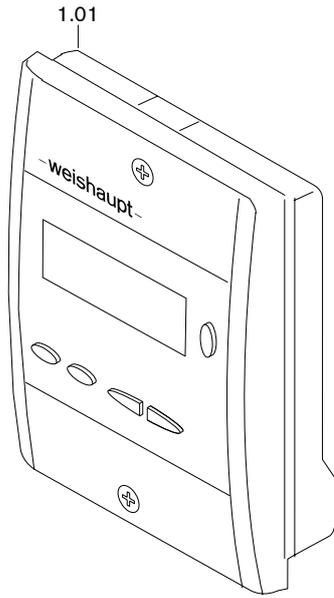
<b>Error code</b>	<b>Diagnostic code</b>	<b>Cause</b>	<b>Rectification</b>
137	255 (-1)	Aborted due to Time-out during Backup / Restore or ABE does not have this function.	<ul style="list-style-type: none"> <li>▶ Check the connection</li> <li>▶ Repeat Backup / Restore.</li> <li>▶ Replace ABE.</li> </ul>
	254 (-2)	Aborted due to transfers error	▶ Repeat Backup / Restore.
	253 (-3)	Restore cannot be carried out at present	
	252 (-4)	Restore incomplete	
	251 (-5)	No burner identification	▶ Define burner identification (parameter 113).
	250 (-6)	Backup data set invalid, Restore not possible	
	249 (-7)	Backup has unsuitable burner identification and must not be uploaded.	
	248 (-8)	Restore cannot be carried out at present	▶ Repeat Backup / Restore.
	247 (-9)	Backup data set invalid, Restore not possible	
	246 (-10)	Aborted due to Time-out during Restore	▶ Repeat Backup / Restore.
	245 (-11)	Access error Restore	
	244 (-12)	Software version and Backup data set incompatible, Restore not possible	
	243 (-13)	Backup data comparison between the micro controllers incorrect	▶ Repeat Backup / Restore.
	242 (-14)	Backup is incorrect and cannot not re-loaded	
	241 (-15)	Backup contains unsuitable ASN and must not be uploaded	
	240 (-16)	No Backup in ABE	
239 (-17)	Backup memory in ABE faulty	▶ Repeat Backup / Restore.	
157 (-99)	Restore successful, however Backup data less than in current system		
146	1	Modbus Time-out	
	2	eBus Time-out	
150	1 (-1)	TÜV Test in invalid operating phase	▶ Start TÜV Test in phase 60
	2 (-2)	Load during TÜV Test less than lower load limit (parameter 545)	▶ Adjust load and repeat TÜV Test.
	3 (-3)	Load during TÜV Test higher then upper load limit (parameter 546)	
	4 (-4)	Manual abort TÜV Test	No fault
	5 (-5)	No flame failure after fuel valves have shut down	<ul style="list-style-type: none"> <li>▶ Check for extraneous light.</li> <li>▶ Check wiring.</li> <li>▶ Check soundness of valves.</li> </ul>
165 ... 166	#	Internal fault	

**9 Troubleshooting**

Error code	Diagnostic code	Cause	Rectification
167	1	Manual lockout by contact	No fault
	2	Manual lockout by ABE	
	3	Manual lockout by PC-Tool	
	8	Communication between W-FM and ABE was interrupted during curve setting	
	9	Communication between W-FM and PC-Tool was interrupted during curve setting	
	33	Reset attempt by PC-Tool	
168 ... 171	#	Internal fault	► Replace combustion manager if fault reoccurs
200	#	System fault free	
201	1	No type of operation selected	
	2 ... 3	No fuel supply defined	
	4 ... 7	No curves defined	
	8 ... 15	Standardised speed undefined	
	16 ... 31	Backup / Restore was not possible	
202	#	Internal fault type of operation setting	► Redefine type of operation (parameter 201).
203	#	Internal fault type of operation setting	► Redefine type of operation (parameter 201). ► Replace combustion manager if fault reoccurs
204	24 ... 52	Program stop is activated. Operating phase is shown in diagnostic code.	► Deactivate program stop (parameter 208).
205	#	Internal fault	► Replace combustion manager if fault reoccurs
206	0	Impermissible unit combination (combustion manager - ABE)	
207	0	Combustion manager version too old	
	1	ABE version too old	
208 ... 209	#	Internal fault	► Replace combustion manager if fault reoccurs
210	0	Impermissible type of operation	► Redefine type of operation (parameter 201).
240 ... 250	#	Internal fault	► Replace combustion manager if fault reoccurs

10 Spares

10 Spares



**10 Spares**

<b>Pos.</b>	<b>Description</b>	<b>Order No.</b>
1.01	ABE for W-FM 50/54	600 408
1.02	Plug cable ABE-W-FM	
	– 2 m	600 406
	– 10 m	600 407
1.03	Combustion manager W-FM50 230 V 50/60 Hz	600 402
1.04	W-FM plug	
	– X3-02 Air pressure switch	716 301
	– X3-03 Limit switch burner flange	716 302
	– X3-04 Mains and safety circuit	716 303
	– X3-05 Fan, alarm	716 410
	– X4-02 Ignition unit	716 305
	– X5-01 Min. oil pressure switch	716 307
	– X5-02 Max. oil pressure switch	716 308
	– X5-03 Control circuit	716 309
	– X6-03 Safety valve	716 312
	– X7-01 Oil valve stage 2	716 313
	– X7-02 Oil valve stage 3	716 314
	– X8-02 Oil valve stage 1	716 317
	– X8-04 Operation + LO Reset 50	716 411
	– X9-04 Valve proving gas pressure switch	716 418
	– X10-05 Flame sensor QRB,QRC, ionisation	716 413
	– X10-06 Flame sensor QRA	716 414
	– X64 Reserve 4-20mA	716 416
	– X74 Connection frequency converter	716 417
	– X75 Fuel meter	716 415

11 Technical documentation

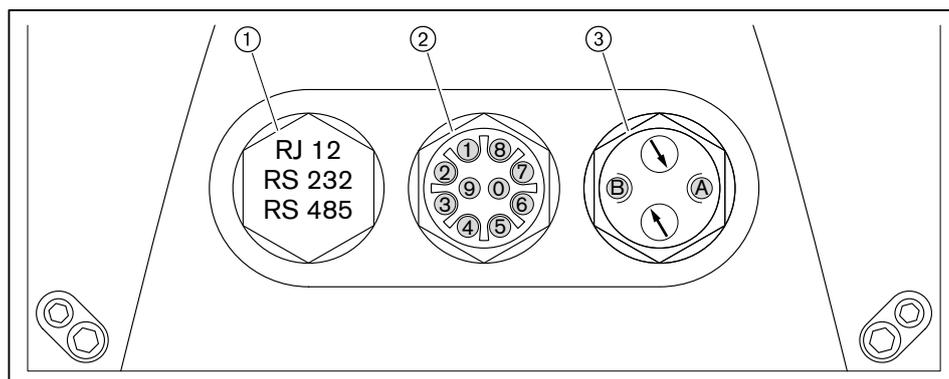
11 Technical documentation

11.1 Frequency converter



Detailed information can be found in the handbook on the CD of the frequency converter.

- The frequency converter fitted to the burner motor when using speed control offers:
- an interface ① for data transfer,
  - a diagnostic window ② with 10 LED's for signal status of inputs and outputs,
  - a status window ③ with 2 red-green LED's to display the operating status.



**Interfaces**

The interface is used to access the frequency converter via a PC. The Software required is available as a free Download ([http://elcat.nord.com/software/nordcon/download/nordcon\\_127.zip](http://elcat.nord.com/software/nordcon/download/nordcon_127.zip)). A connection cable RJ12 to Sub-D9 is required.

**Diagnostic window**

LED	Input/Output	Meaning	
1 (yellow)	Digital output	Alarm from frequency converter	
2 (yellow)	Digital input 1	Start release frequency converter	
3 (yellow)	Digital input 2	Mains adapter 24V DC operation	
4 (yellow)	Digital input 3		
5 (yellow)	Digital input 4		
6 (yellow)	PTC thermistor motor	Excess temperature at motor	
7 (yellow)	Brake Chopper	Brake Chopper active	
8 (yellow)	Mech. brake	Mechanical brake active	
9 (green)	BUS Status 1	off	no communication
		flashes	Bus warning
		on	Communication
0 (red)	BUS Status 2	off	no fault
		flashes	Monitoring fault / Time-out
		on	no system bus

11 Technical documentation

Status window

LED	Display	Meaning	
A (green/red)	AS Interface Status	-	
B (green/red)	Operating condition FC	off	No mains voltage / control voltage
		green on	Ready for operation
		green flashing	2Hz = ready to switch on
			0.5Hz = switch on blocked
		green on red flashing	Not ready for operation (control voltage applied but no mains voltage)
		green flashing red flashing	Warning
red flashing	Fault (fault code see handbook frequency converter)		

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Product		Description	Performance
	<b>W-Burners</b>	The compact series, proven millions of times over: Economical, reliable, fully automatic. Gas, oil and dual fuel burners for domestic and commercial applications. The purflam burner gives almost soot-free combustion of oil with greatly reduced NO <sub>x</sub> emissions.	Up to 570 kW
	<b>Monarch and industrial burners</b>	The legendary industrial burner: Tried and tested, long lived, clear construction. Gas, oil and dual fuel burners for district heat provision.	Up to 11,700 kW
	<b>multiflam® burners</b>	Innovative Weishaupt technology for large burners: Minimal emission values particularly at ratings over one megawatt. Oil, gas and dual fuel burners with patented fuel distribution system.	Up to 17,000 kW
	<b>WK industrial burners</b>	Modular powerhouses: Adaptable, robust, powerful. Oil, gas and dual fuel burners for industrial plant.	Up to 22,000 kW
	<b>Thermo Unit</b>	The Thermo Unit heating systems from cast iron or steel: Modern, economic, reliable. For environmentally friendly heating. Fuel: Gas or oil as desired.	Up to 55 kW
	<b>Thermo Condens</b>	The innovative condensing boilers with the SCOT system: Efficient, low in emissions, versatile. Ideal for domestic heating. Floor standing gas condensing boiler with ratings of up to 1200 kW (cascade), for higher heat demands.	Up to 1,200 kW
	<b>Heat pumps</b>	The heat pump programme offers solutions for utilisation of heat from air, soil and ground water. The systems are suitable for refurbishment or new builds. It is possible to use several heat pumps in cascade operation.	Up to 130 kW
	<b>Solar systems</b>	Free energy from the sun: Perfectly coordinated components, innovative, proven. Pleasantly shaped flat roof collectors to support heating and of domestic water	
	<b>Water heater / energy reservoir</b>	The attractive domestic water heating range includes classic water heaters which are supplied through a heating system and energy reservoirs which can be fed through solar systems.	
	<b>Control technology / building management</b>	From control panels to complete building management systems – at Weishaupt you can find the entire spectrum of modern control technology. Future oriented, economical and flexible.	