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**1 Product Description**

The EXHAUSTO control system EBC 11 (Fig. 1) is used in connection with installation of EXHAUSTO chimney fans to heating appliances. EBC 11 has been developed for use with 1 or 2-step boilers and water heaters. The control system can be used with both atmospheric gas appliances as well as forced draught appliances for oil and gas.

The control system supervises the fail-safe function. In case of insufficient chimney draught, the EBC 11 will shut down the boiler. The control system is developed to meet BS 5440: Part 1 1990 and BS 6644: 1991 and other relevant European standards.

**Functions**

When the boiler thermostat calls for heat, the chimney fan will immediately start up on full speed. When the fail-safe supervision confirms sufficient chimney draught, the boiler burner will be released and the fan speed will adjust to the pre-set value corresponding to the appliance running at step 1. (Fig. 1-D).

If the appliance has a 2-step operation, the EBC 11 will automatically adjust the fan speed to the pre-set value when the 2nd step on the burner comes in. (Fig. 1-E).

The control has a 12-second built-in delay function to avoid nuisance cut-outs.

When the boiler stops, the chimney fan stops too. It is however possible to pre-set a post-purge period of 3 minutes. (Fig. 1-F).

All connections in the control box are connected to amber light diodes which make supervision and fault finding easy. (Fig. 1-G).

**Extra functions.**

The control system consists of 2 extra fail-safe functions which can be selected by dipswitch (Fig. 1-F) according to local laws and standards.

- MANUAL RESET after fail-safe lock-out.
- PDS-CHECK controls the fail-safe function (pressure differential switch)

Fig. 1-A: Fuse (T5A)

Fig. 1-B: Alarm diode (red)

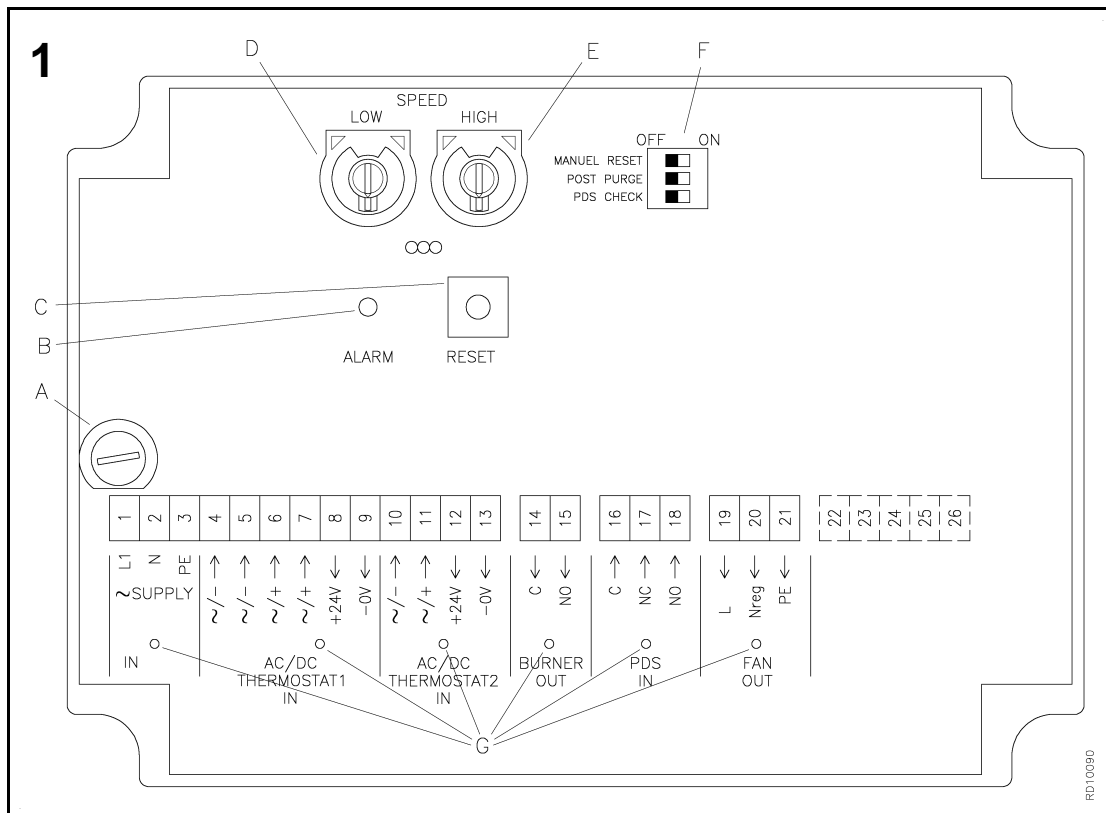
Fig. 1-C: Reset button

Fig. 1-D: Potentiometer step 1 (low speed)

Fig. 1-E: Potentiometer step 2 (high speed)

Fig. 1-F: Dipswitch options

Fig. 1-G: Diodes (green) for indication of position ON/OFF



## 2 Installation

### 2.1 Operation

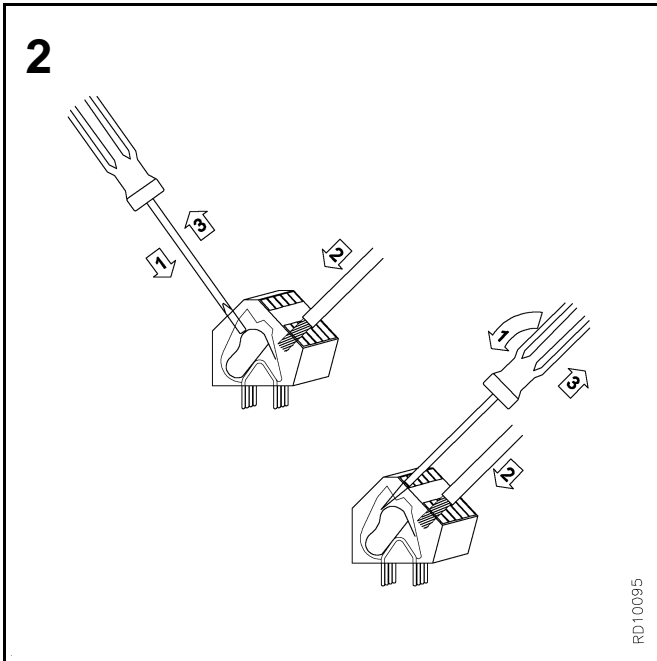
The control system is installed in the boiler room.

### 2.2 Electric connection



EBC 11 is connected to a supply voltage of 230V.

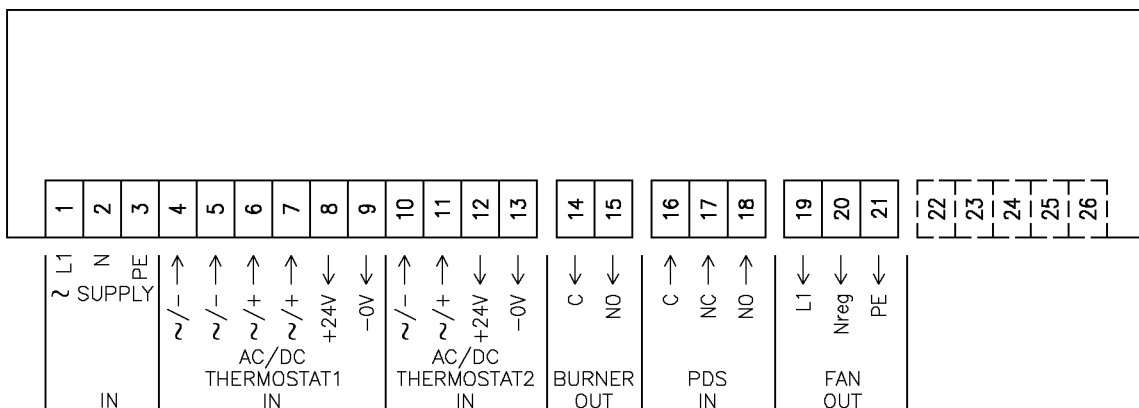
The terminals of the control system are spring-loaded. For installing of the conductors it is necessary to use a suitable screwdriver. Fig. 2 shows how the conductors are installed.



### Terminals (Fig. 3)

- 1 Supply L1 (230V)
- 2 Supply N
- 3 Supply PE
- 4-5 Boiler thermostat 1. Opto coupler (~/-10-230V)
- 6-7 Boiler thermostat 1. Opto coupler (~/+10-230V)
- 8 24V DC supply for voltage free contact
- 9 LK0V DC supply for voltage free contact
- 10 Boiler thermostat 2. Opto coupler (~/-10-230V)
- 11 Boiler thermostat 2. Opto coupler (~/+10-230V)
- 12 24V DC supply for voltage free contact
- 13 0V DC supply for voltage free contact
- 14 Boiler relay switch Common (max 230V AC 8A)
- 15 Boiler relay switch Normally Open (max 230V AC 8A)
- 16 PDS - C (Common) pressure differential switch
- 17 PDS - NC (Normally Closed) pressure differential switch
- 18 PDS - NO (Normally Open) pressure differential switch
- 19 Chimney fan L1 (max. 3A)
- 20 Chimney fan Nreg
- 21 Chimney fan PE

## 3



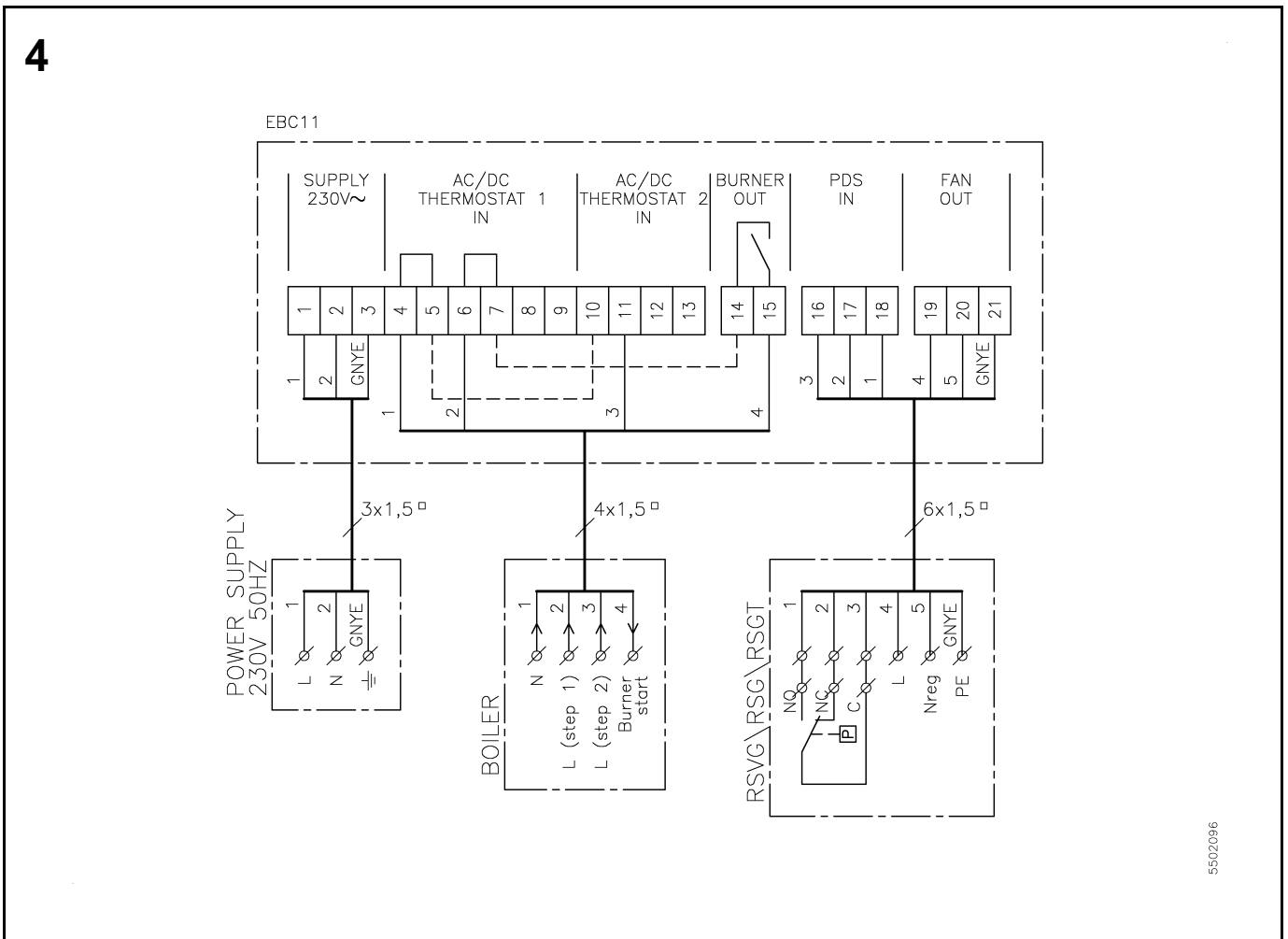
**2.2.1 Example of connection**

The control system can be connected to a supply voltage as well as a voltage free contact. If in any doubt regarding the correct connection to the boiler controls, please contact the boiler manufacturer for advice.

**2.2.2 Example 1 - Voltage start signal from boiler thermostat (Fig. 4)**

The example shows how a voltage signal (10-230V AC/DC) from the boiler control is connected to the EBC 11.

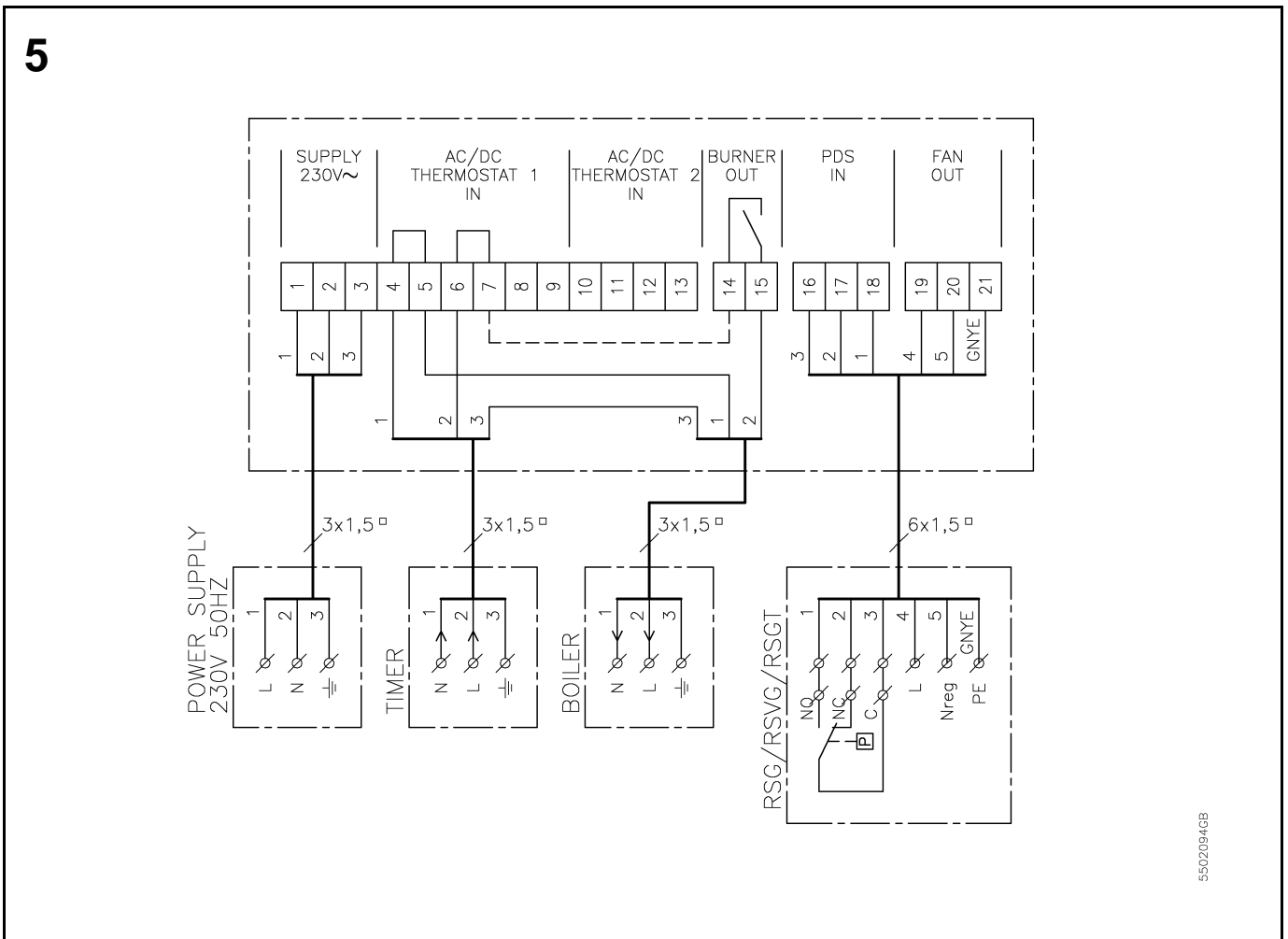
- Power supply to the control is connected over terminals 1-3
- Connection to the boiler control:
  - Step 1: The normal start signal for the burner (phase) is connected to terminal 6.
  - Loop terminals 7 and 14.
  - The start signal for the boiler comes on from terminal 15.
  - Connect neutral to terminal 4.
  - Step 2: The start signal step 2 for the burner is connected over terminal 11 and neutral over terminal 10; neutral can also be a loop between 5 and 10.
- Chimney fan with built-in fail-safe supervision is connected over terminals 16-21 according to the installation instructions enclosed with the chimney fan. If an extern pressure switch (PDS) is used connect the PDS over terminals 16-18 and the chimney fan over terminals 19-21.



**2.2.3 Example 2 – Voltage start signal from timer (Fig. 5)**

The example shows how voltage start signal from the timer is connected to the EBC 11.

- Power supply to the control is connected over terminals 1-3.
- Connection to the timer and the boiler control.
  - Start signal from the timer (phase) is connected over to terminal 6.
  - Loop terminals 7 and 14.
  - The start signal for the boiler comes on from terminal 15.
  - Connect neutral from the timer to terminal 4.
  - Neutral for the boiler can be taken from terminal 5.
  - Loop earth between timer and boiler control.
- Chimney fan with built-in fail-safe supervision is connected over terminals 16-21 according to the installation instructions enclosed with the chimney fan. If an extern pressure switch (PDS) is used connect the PDS over terminals 16-18 and the chimney fan over terminals 19-21.



**2.3 Installation**

Item 2.3.1. must be read before starting installation.

**2.3.1 Dipswitch-setting**

The dipswitch-setting (Fig. 6-C), requirements must be made before starting installation.

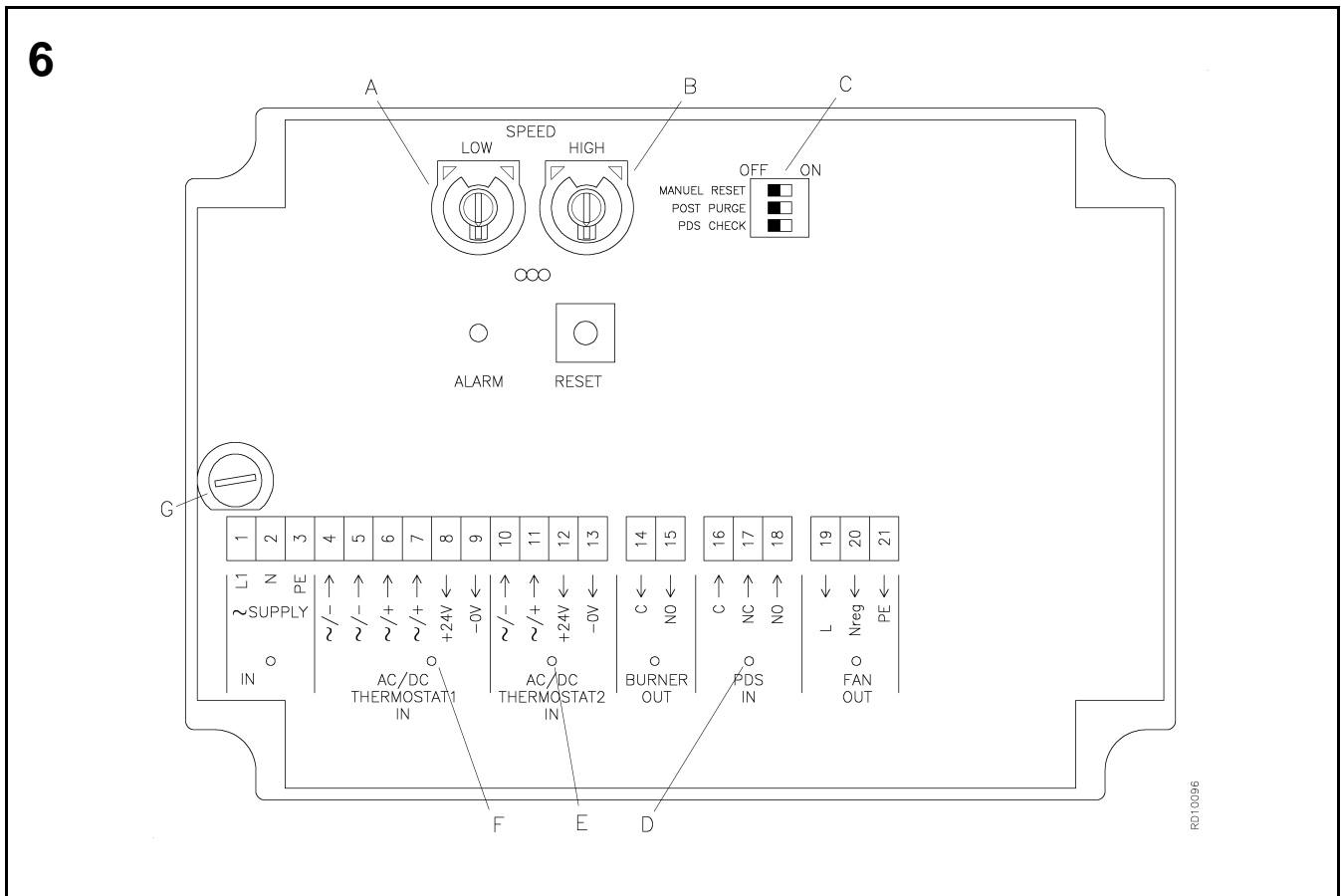
Dipswitch	Name	OFF	ON
1	MANUAL RESET	Automatic reset after power failure and draught failure	Manual reset after power failure and draught failure
2	POST PURGE	No post-purge	Post-purge period of 3 minutes
3	PDS CHECK	No control, indicating that the pressure differential switch has been in position NC before starting up	The pressure differential switch had to be in position NC before starting up

1. Set the potentiometer 1 and 2 to its maximum setting. (Fig. 6-A and 6-B).
2. Set the pressure differential switch (PDS) at minimum. The PDS is typically placed inside the chimney fan.
3. Start the system on step 1, boiler thermostat 1 (Fig. 6-F lights up).
4. Wait until the PDS is connected (Fig 6-D lights up).
5. Adjust potentiometer 1 (Fig. 6-A) slowly down to the correct draught. If the fail-safe system indicates failure, increase the fan speed at the potentiometer 1.
6. Increase slowly the PDS-setting until disengagement of the PDS can be registered (click sound) or the light (Fig. 6-D) goes out. Register the PDS-value of disengagement. Set the PDS to 25 Pa below the registered value of disengagement.
7. 2-step systems. Start step 2 on the system and adjust potentiometer 2 (Fig. 6-B) slowly down to the correct draught. Boiler thermostat 1 and 2 must be connected (Fig. 6-E and Fig. 6-F lights up).
8. Check that the fail-safe system disconnects the boiler. Failure can be simulated by disassembling the minus tube on the pressure differential switch or disconnect 18 during operation.
9. Check the start-up function after commissioning is finished.

Factory setting: All OFF.

**2.4 Commissioning**

EBC 11 must be commissioned in order to obtain the correct chimney draught.  
Please ensure following:

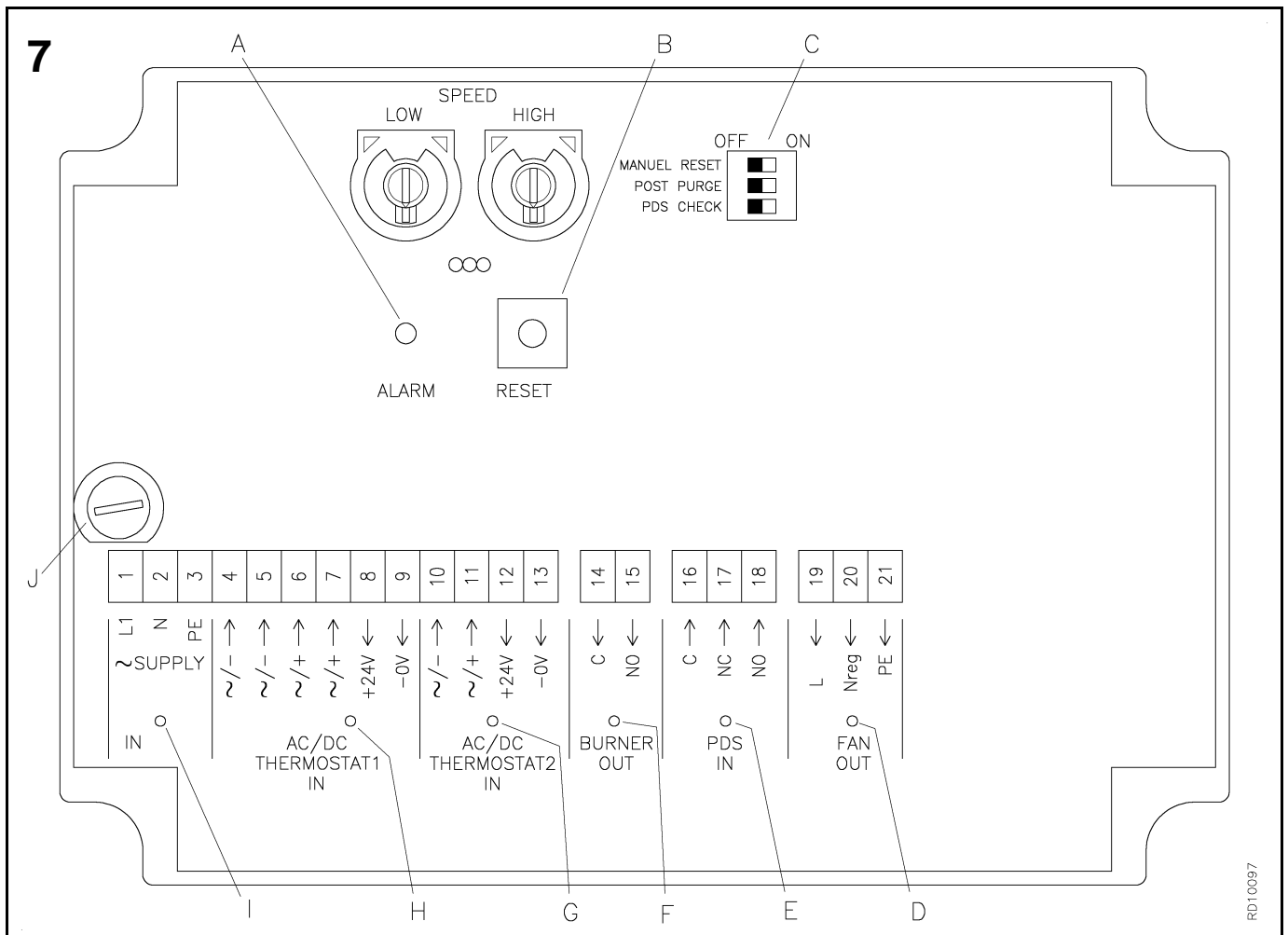


### 3 Fault finding

Observation	Type of fault	Solution
<b>No light in SUPPLY (Fig. 7-I)</b>	A blown fuse or a failing power supply	1) Check the fuse (Fig. 7-J) and the chimney fan supply 2) Check the wiring
<b>Permanent light in ALARM diode (Fig. 7-A)</b> - The chimney fan light is off (FAN Fig. 7-D) - (It is only possible when MANUAL RESET is ON Fig. 7-C)	Grid failure (Power failure)	Press the RESET button for one second (Fig. 7-B) - PLEASE SEE THE WARNING.
<b>Permanent light in ALARM diode (Fig. 7-A)</b> - The chimney fan light is on (FAN Fig. 7-D)	Failing chimney draught	1) If PDS light is on (Fig. 7-E), press the RESET button for one second (Fig. 7-B) - PLEASE SEE THE WARNING. 2) If PDS light is off (Fig. 7-E), check the repair switch to the chimney fan 3) Check the flue, chimney and chimney fan for blocking 4) Check the commissioning according to item 2.4.
<b>Flashing ALARM diode (Fig. 7-A)</b> - (It is only possible when PDS CHECK is ON Fig. 7-C)	Failure in fail-safe supervision (PDS CHECK)	1) Check the setting of the fail-safe system. The natural draught can prevent disconnection. Alternatively deselect PDS-CHECK on dipswitch Fig. 7-C 2) Check the connection to the fail-safe system 3) Check the change function of the fail-safe system



Some systems call for a special starting procedure after fail-safe disconnection. Follow this before pressing the RESET button (Fig. 7-B).



#### 4 Technical data

Height x width x depth	: 125 mm x 175 mm x 75 mm
Degree of protection/material	: IP54/ABS
Supply voltage	: 230V +/-10%
Fuse	: T5A
Ambient temperature	: -20°C - +50°C
Boiler thermostat input	: 10-230V AC/DC
Boiler output relay	: max. 8A/230V
Chimney fan output (AC3)	: max. 3A/230V

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