

600 Series - 11S / 19S / 24S / 24C

For trade use

Please read thoroughly
before attempting to
diagnose fault

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Preface

Important general instructions for use

This device should only be operated in accordance with its designated use and the indications given in the servicing instructions. All maintenance and repair operations must be carried out by a qualified service technician.

Always operate in conjunction with original accessories, and use only genuine spare parts. Other combinations of units, accessories and consumables are only to be used if they completely fulfil the specifications involved, and if system performance and safety are not affected in any way.

Note that all the servicing tasks described here must be carried out by a qualified maintenance firm. Work on gas pipes and fittings must only be carried out by a Gas Safe registered engineer.

Subject to technical modifications

As a result of our policy of constant development, there may be small differences between illustrations, functional steps and technical data.



The boiler meets the basic requirements of the appropriate standards and directives.

Conformity has been substantiated by the proper documents which - together with the declaration of conformity - are filed with the manufacturer.



BENCHMARK' Log Book

All Boulter Buderus gas boilers now include an Installation, Commissioning and Service record log book. The details of the log book will be required in the event of any warranty work being requested.

Please complete the appropriate section at each service visit.

1 Messages – Universal Automatic Burner (UBA)

1.1 UBA status display

Operational condition and error messages appear on the display of the Universal Automatic Burner (UBA).
 The message consists of two characters.
 The first character is displayed automatically.

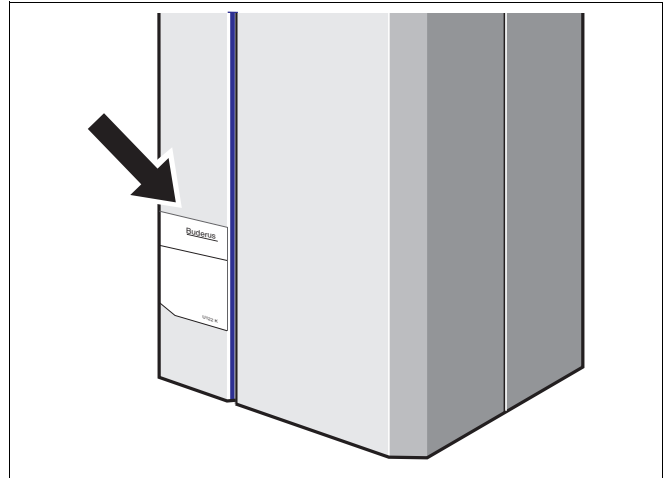


Fig. 1 600 Series 11S / 19S / 24S / 24C: Display

To display the second character:

- Hinge the control panel cover to the left to open.

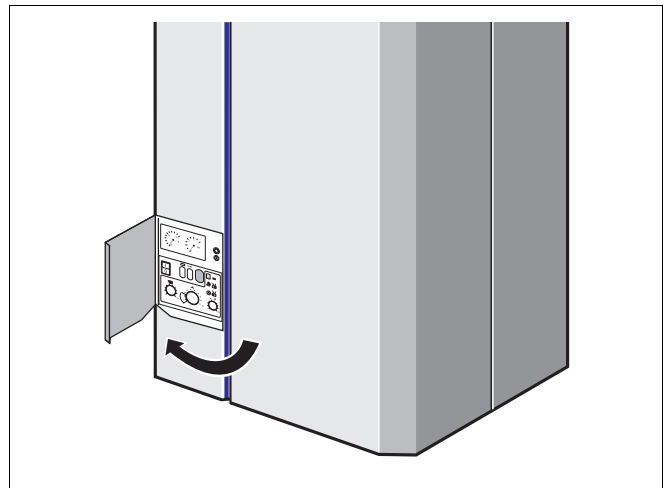


Fig. 2 600 Series 11S / 19S / 24S / 24C:
Open the control panel cover

- Press the "Service" button.

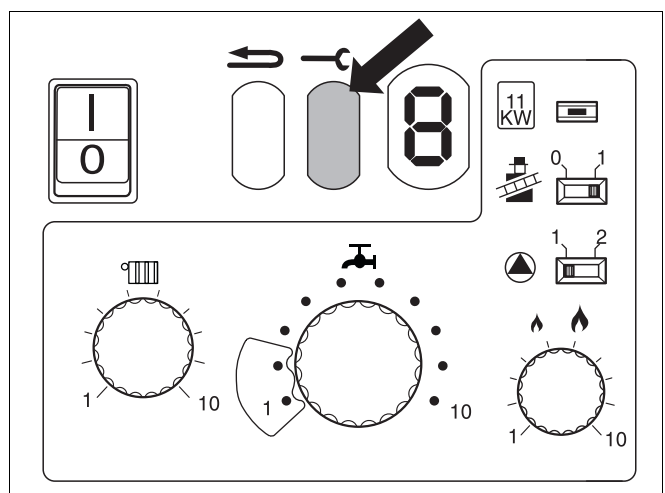


Fig. 3 "Service" button

1.2 UBA operating level 1.5

UBA operating level 1.5 (fig. 4).

Key:

- Item 1: Display
- Item 2: Service button
- Item 3: Reset button
- Item 4: Boiler flow temperature
- Item 5: Hot-water temperature
- Item 6: Power adjustment
- Item 7: Pump overrun switch
- Item 8: Chimney-sweep switch
- Item 9: 11 kW jumper

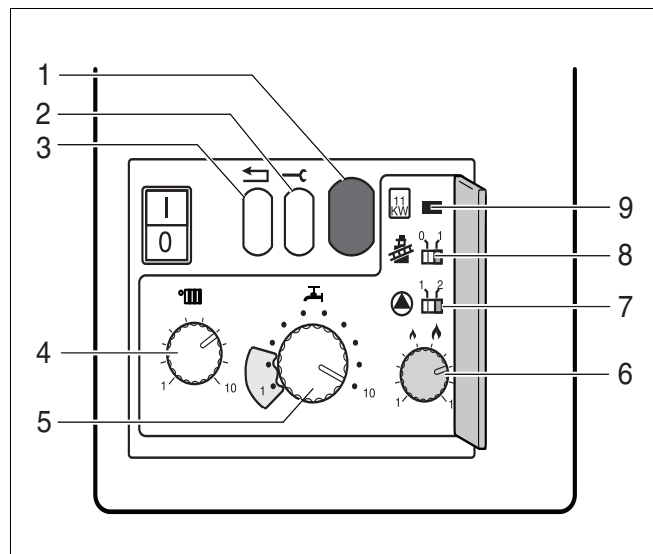


Fig. 4 UBA operating level 1.5

1.3 Service tool

The service tool allows you to determine the operating status of the boiler, check components and carry out fast fault diagnosis.

- Open the cover at the front of the boiler unit and insert the twin plug connector of the service tool into the sockets provided (fig. 5, item 1).

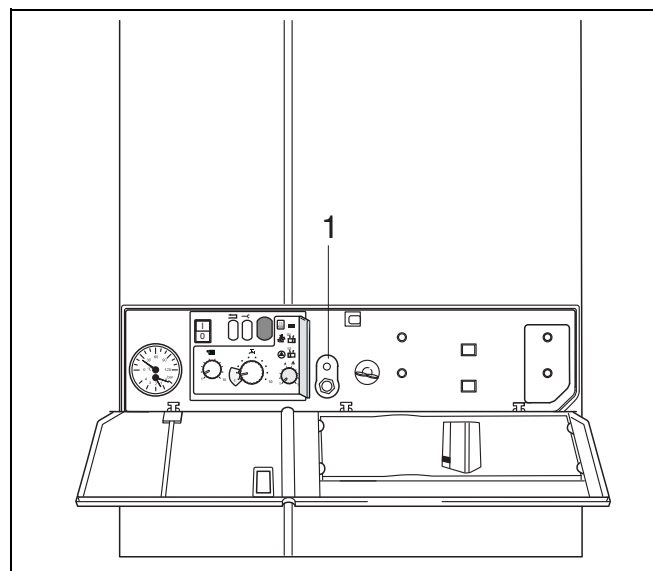


Fig. 5 Service tool connection

1.4 Operating messages

Display	Display after pressing the service button	Meaning
□		600 Series 11S / 19S / 24S / 24C is ready for operation
	R	Burner interval circuit, 10 min from burner start-up
	⌈	Waiting for the three-way valve and/or pump to switch
	H	Standby activated, 600 Series 11S / 19S / 24S / 24C ready to provide heat or hot water
	L	Initial safety period: self-testing of UBA during burner start-up
	U	Post- or pre-flushing period of fan unit
	∩	Flow temperature at adjustment setting
–.		600 Series 11S / 19S / 24S / 24C running in heating mode
	R	“Chimney-sweep” mode, flow-temperature controller bypassed, 600 Series 11S / 19S / 24S / 24C heating to previously-entered flow temperature
	H	Normal heating mode
	∩	Service mode
=.		600 Series 11S / 19S / 24S / 24C running in hot-water mode
	H	Normal hot water mode
r		Reset

Table 1 Displayed UBA operating messages

1.5 Fault messages

Display	Display after pressing the service button	Meaning	Trouble-shooting flow diagram
2		Water flow	
	⌈	Safety sensor exceeds 100 °C	page 11
	P	Excessive temperature increase at safety sensor	page 12
3		Air volume flow	
	⌈	Bad plug-in connection at cable loom, or damaged wiring	page 13
4		Temperatures	
	R	Feed sensor above 100 °C	page 14
	⌈	F2 fuse malfunction, or exhaust-gas sensor tripped	page 16
	F	Safety sensor exceeds 100 °C	page 18
	H	Dripping tap	page 19
	L	Short circuit in safety sensor	page 20
	P	Safety sensor, loose contact or defective	page 21
	U	Short circuit in feed sensor	page 22
	y	Feed sensor, loose contact or defective	page 23
5		Communication	
	⌈	600 series has switched off after disconnection of diagnosis plug	page 24
6		Flame monitoring	
	R	F1 fuse defective, or no ionisation message after ignition	page 25
	⌈	Ionisation message, but no flame	page 29
	H	Flame dies out after gas valve is opened	page 30
	L	Flame goes out during warm-up phase	page 31

Display	Display after pressing the service button	Meaning	Trouble-shooting flow diagram
7		Mains voltage	
	R	Voltage in UBA too low or too high	page 32
	[Mains voltage interrupted following a fault warning message	page 33
	F	F3 fuse defect, or UBA system error	page 34
	H	Voltage peaks in UBA	page 35
	L	UBA timer error	page 36
8		General fault/gas-pressure	
	⚡	External switching contact, e.g. temperature monitor for floor heating, has been tripped	page 37
9		System error	
	R	System error	page 38
	[Incorrect cable connection at KIM, or KIM defective	page 39
	F, H, P	System error (UBA defective)	page 40
	L	Wiring to gas-burner assembly incorrect, or loose wiring connections in UBA	page 41
	U	KIM defective	page 42
E		UBA system fault	
	Any indication, except P	UBA system fault	
	P	Non-compatible UBA fitted	page 43

Table 2 Displayed UBA fault warning messages

2 Faults that the UBA does not display

Hot-water mode

Although the UBA is apparently ready for use, situations may arise where a hot-water tap is opened and no hot water flows out, or flows out for only a short period.

Troubleshooting flow diagram:
page 44/45.

Heating mode

Although the UBA is apparently ready for use, and the room temperature has not yet reached the preset level, the 600 Series 11S / 19S / 24S / 24C wall-mounted condensing gas boiler fails to go into heating mode.

Troubleshooting flow diagram:
page 46.

3 Troubleshooting


The following flow diagrams are provided for the purpose of systematic troubleshooting.

Take the opportunity, while carrying out fault diagnosis, to check that all that plugs and wiring terminals on the UBA are connected correctly.



WARNING

Switch off the 600 Series 11S / 19S / 24S / 24C BEFORE checking the connections.

Each time a fault has been rectified, push the "reset" button "" to unblock the UBA and return it to standby mode.



NOTE

The system **cannot** be reset by disconnecting at the master switch.

Certain troubleshooting tasks must be carried out with the 600 Series 11S / 19S / 24S / 24C in heating mode. When doing so, the chimney-sweep switch should be set to "1" (fig. 6).

Remember to return the chimney-sweep switch to "0" once work is complete.

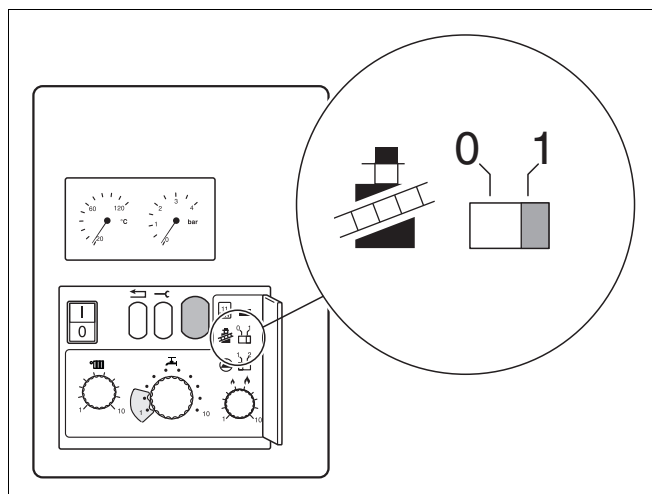


Fig. 6 Chimney sweep switch on UBA

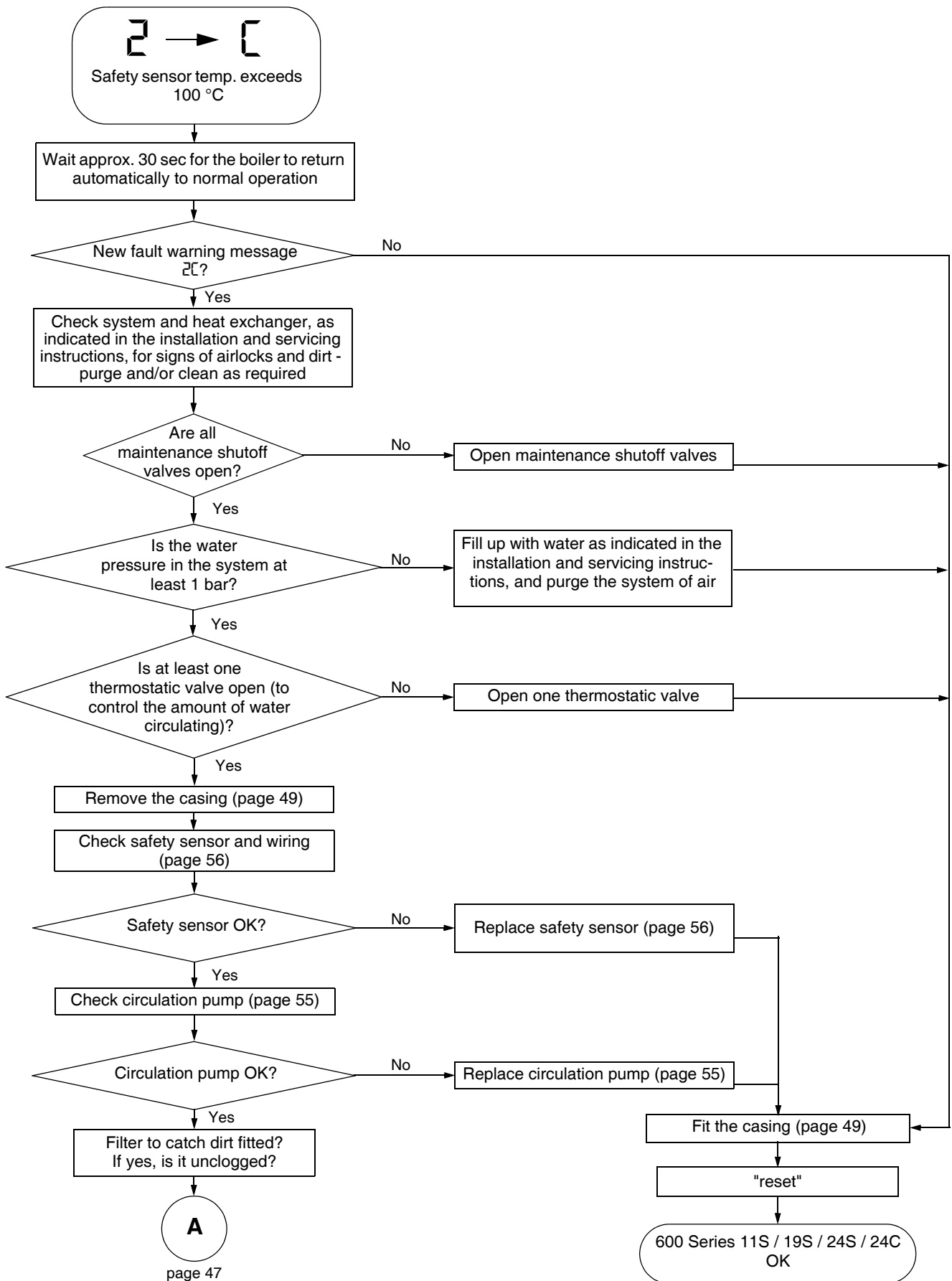


Fig. 7 Fault warning message 2C: Safety sensor temp. exceeds 100 °C

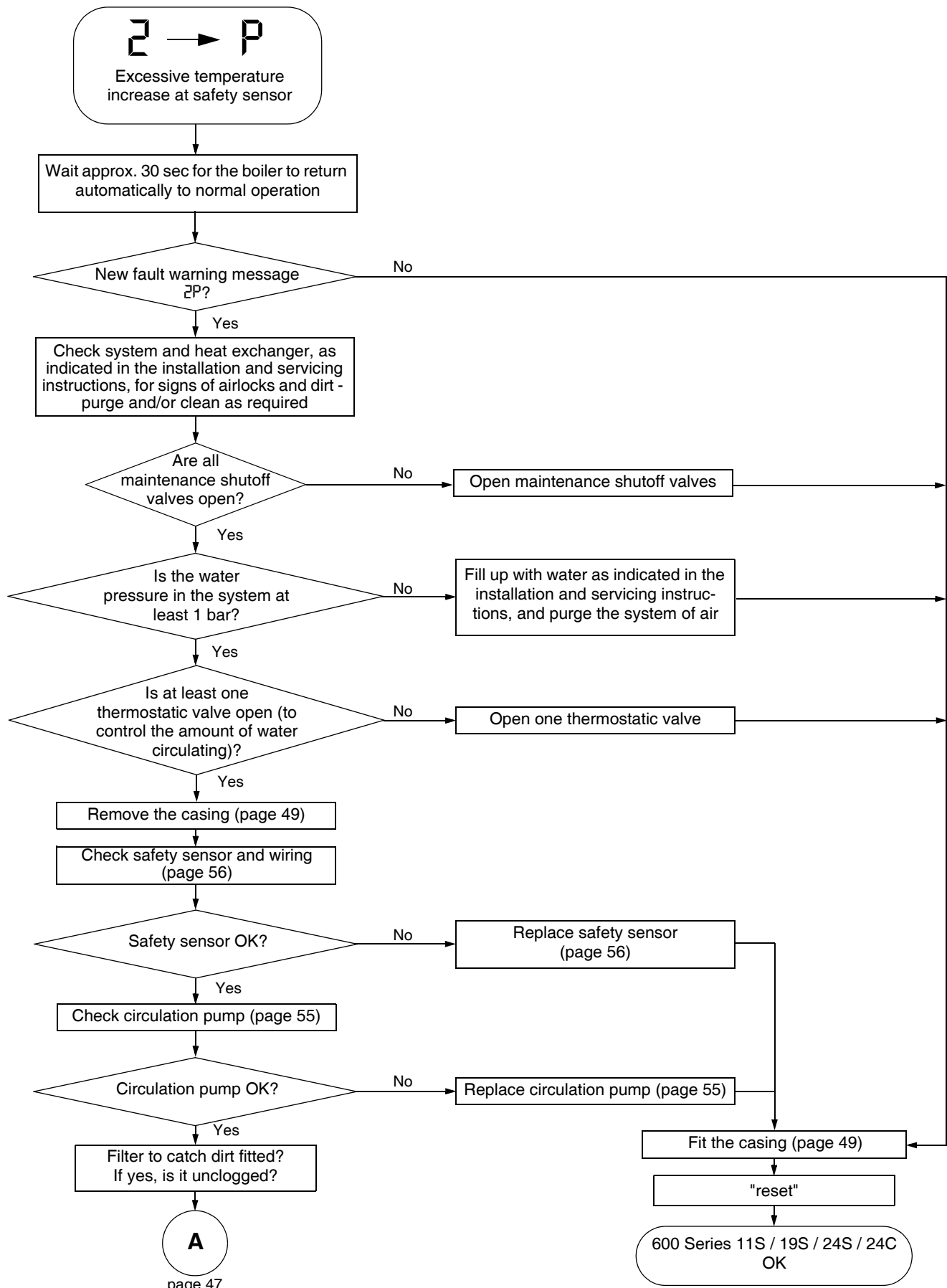


Fig. 8 Fault warning message 2P: Excessive temperature increase at safety sensor

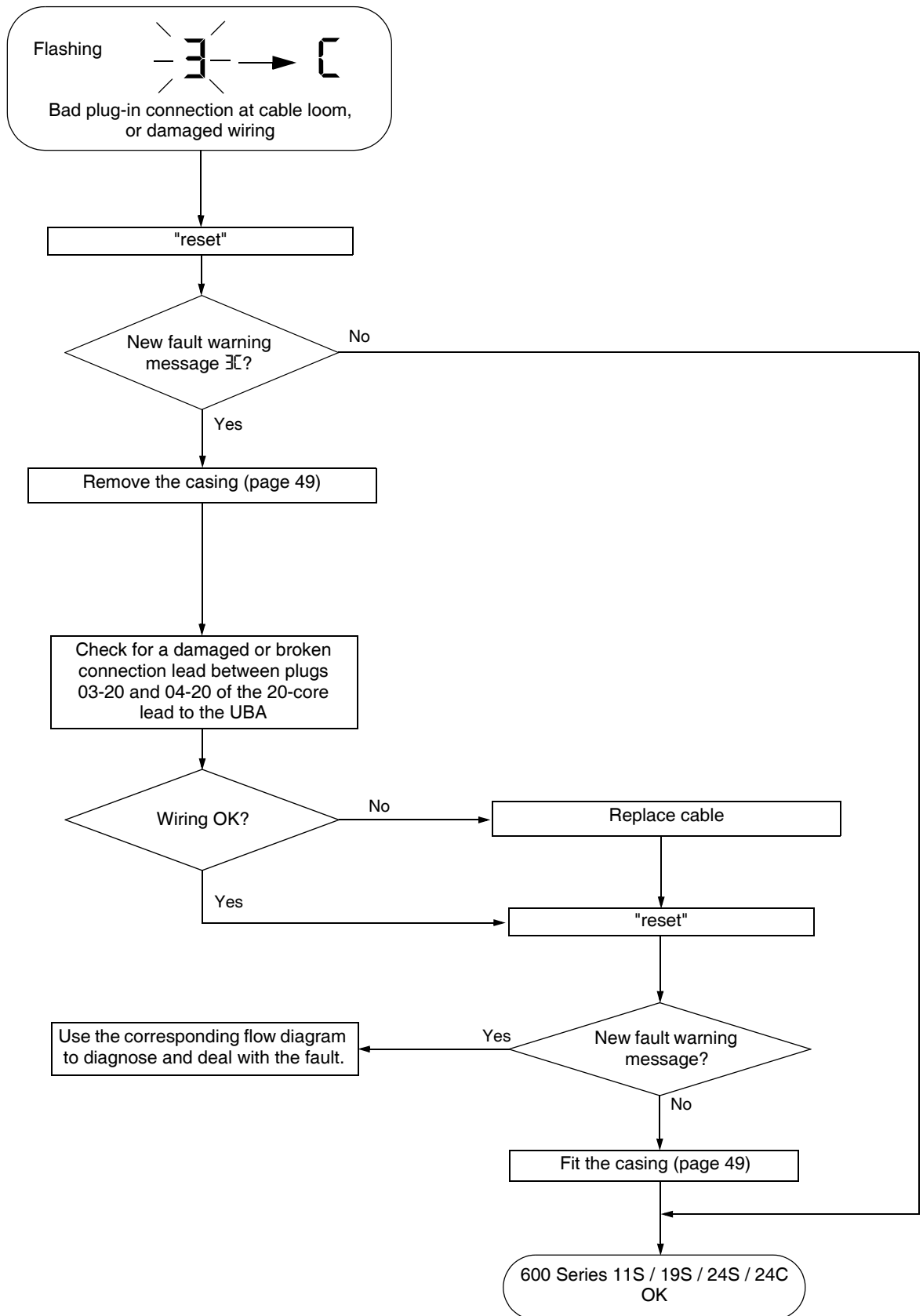


Fig. 9 Fault warning message 3C: Bad plug-in connection at cable loom, or damaged wiring

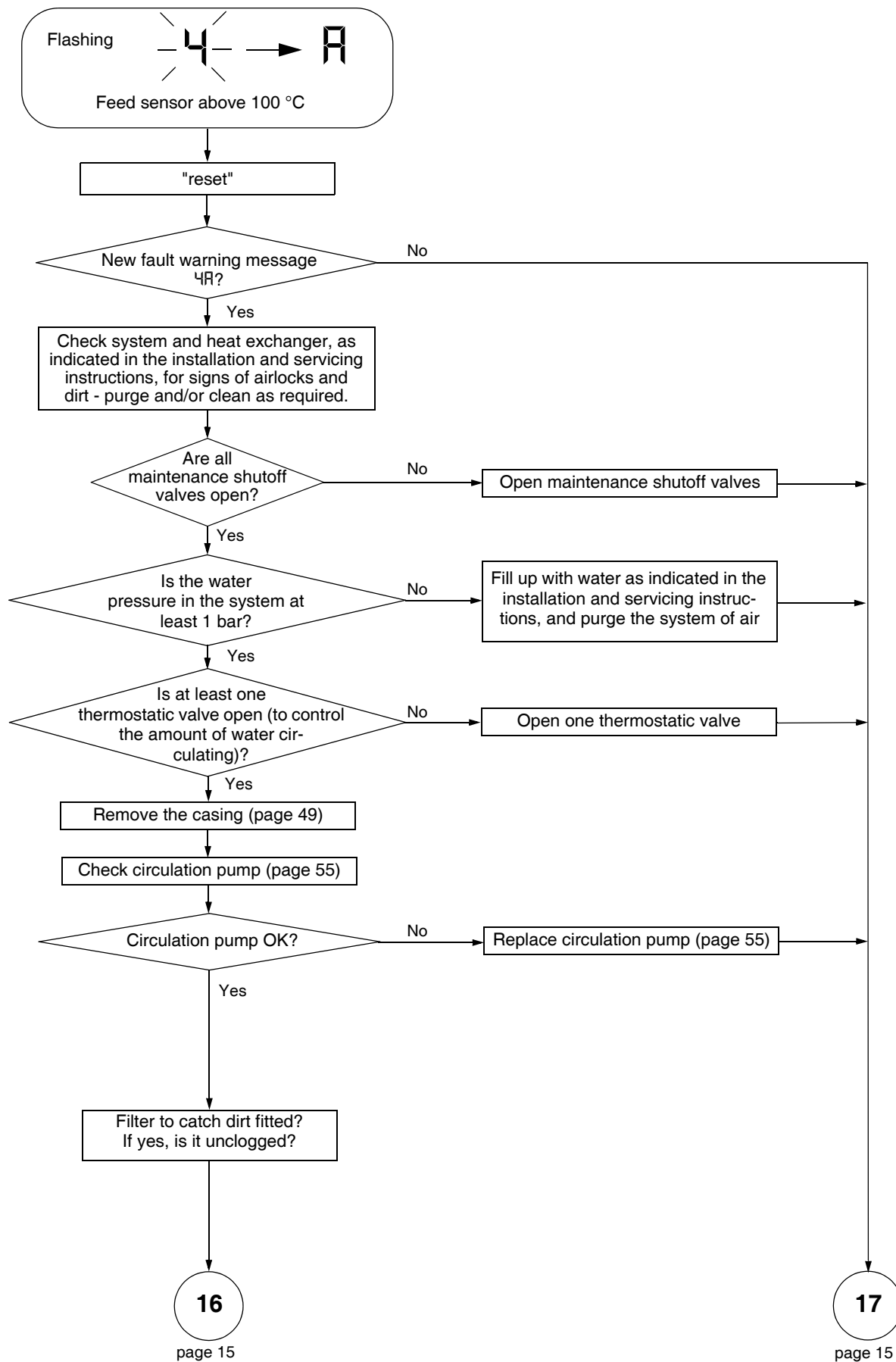


Fig. 10 Fault warning message 4A: Feed sensor above 100 °C

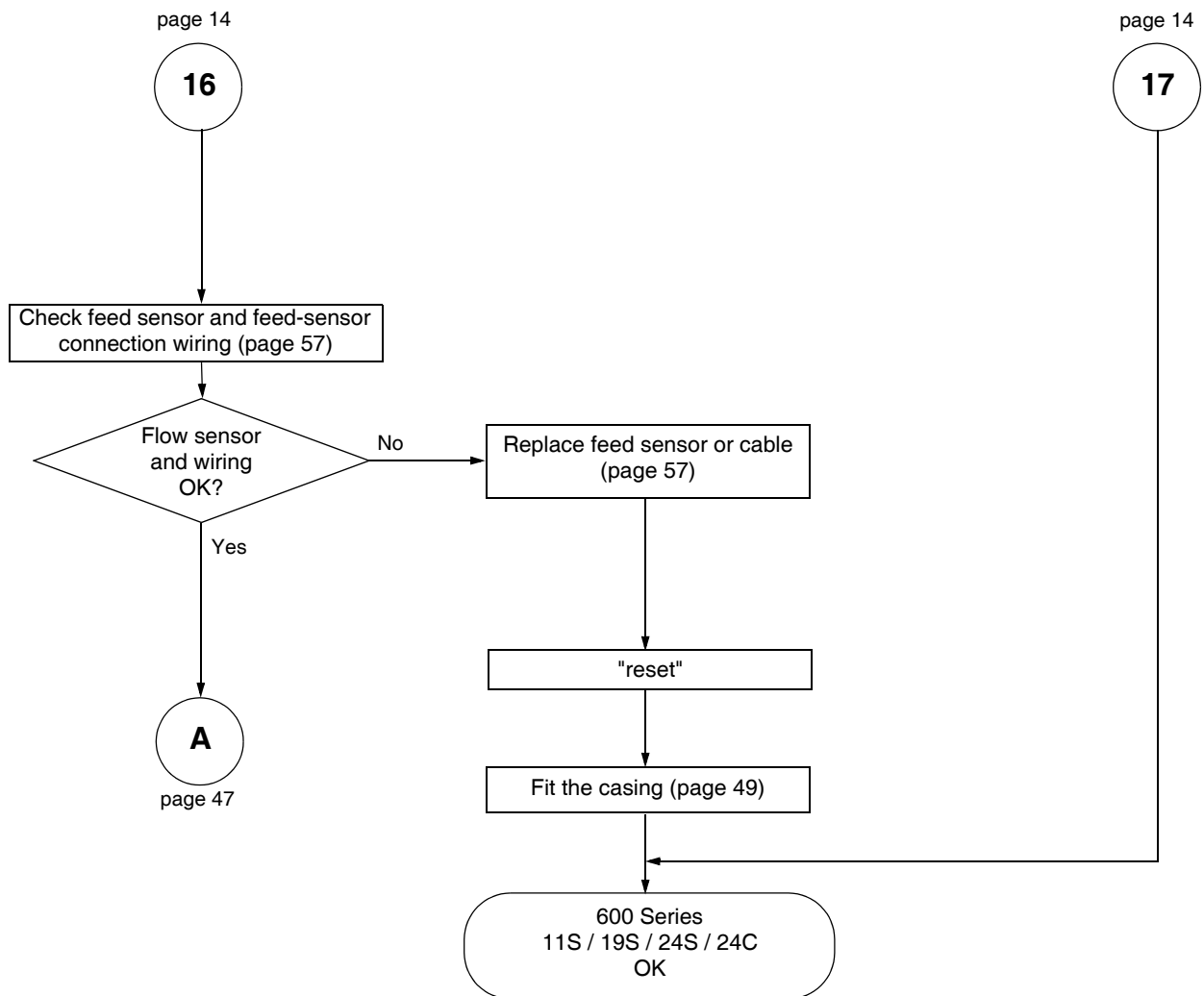


Fig. 11 Continuation of fault warning message 4A: Feed sensor above 100 °C

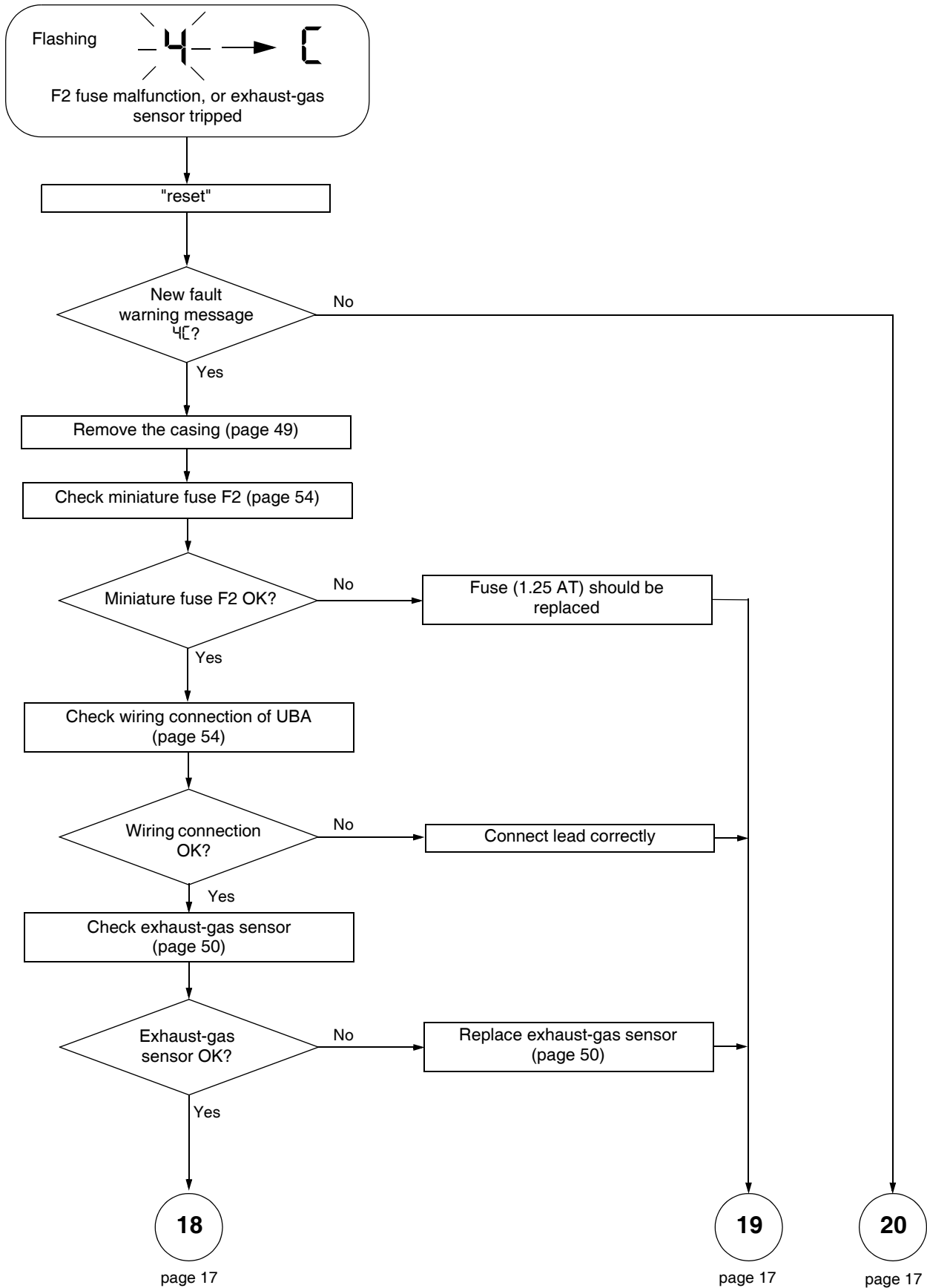


Fig. 12 Fault warning message 4C: F2 fuse malfunction, or exhaust-gas sensor tripped

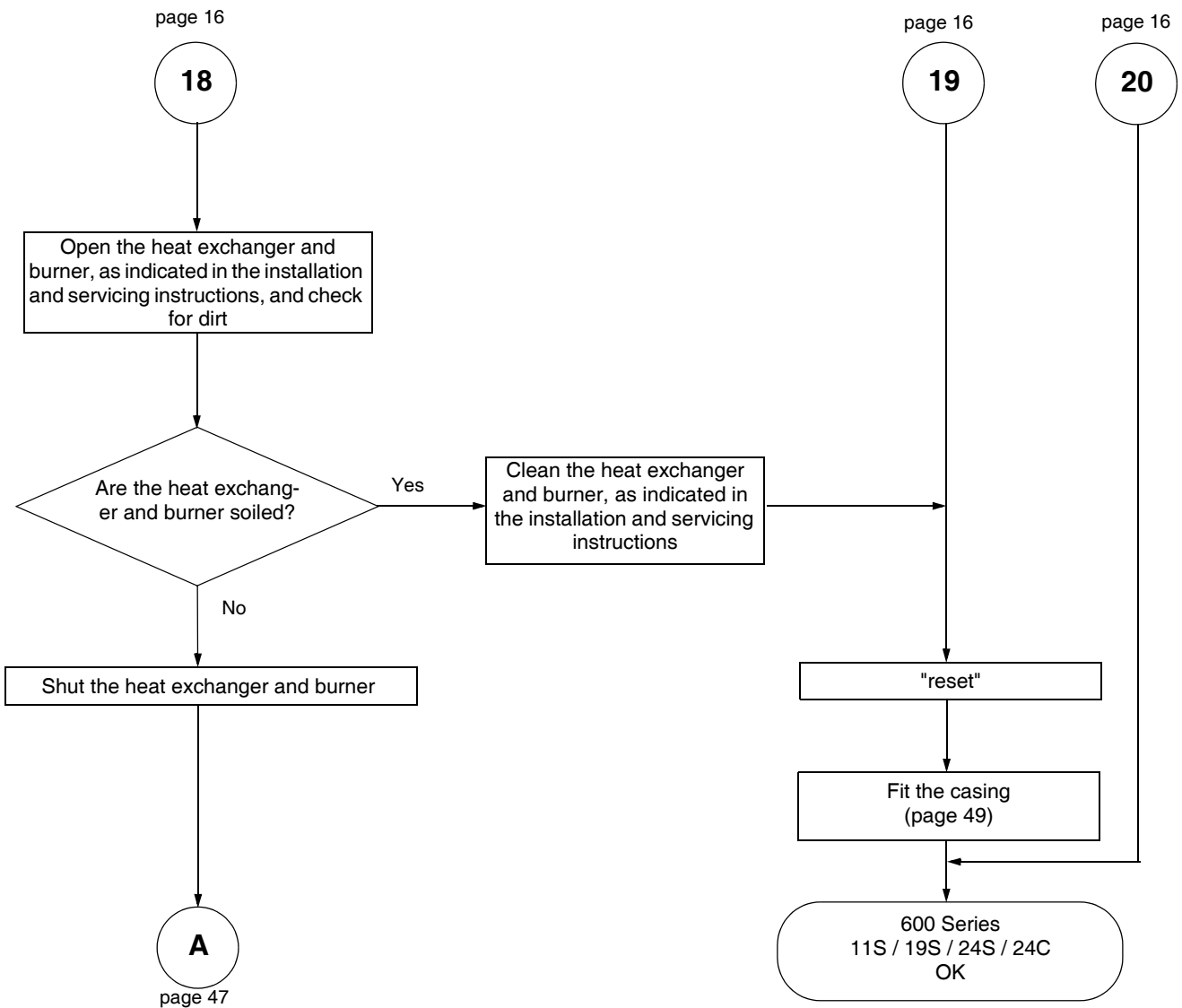


Fig. 13 Continuation of fault warning message 4C: F2 fuse malfunction, or exhaust-gas sensor tripped

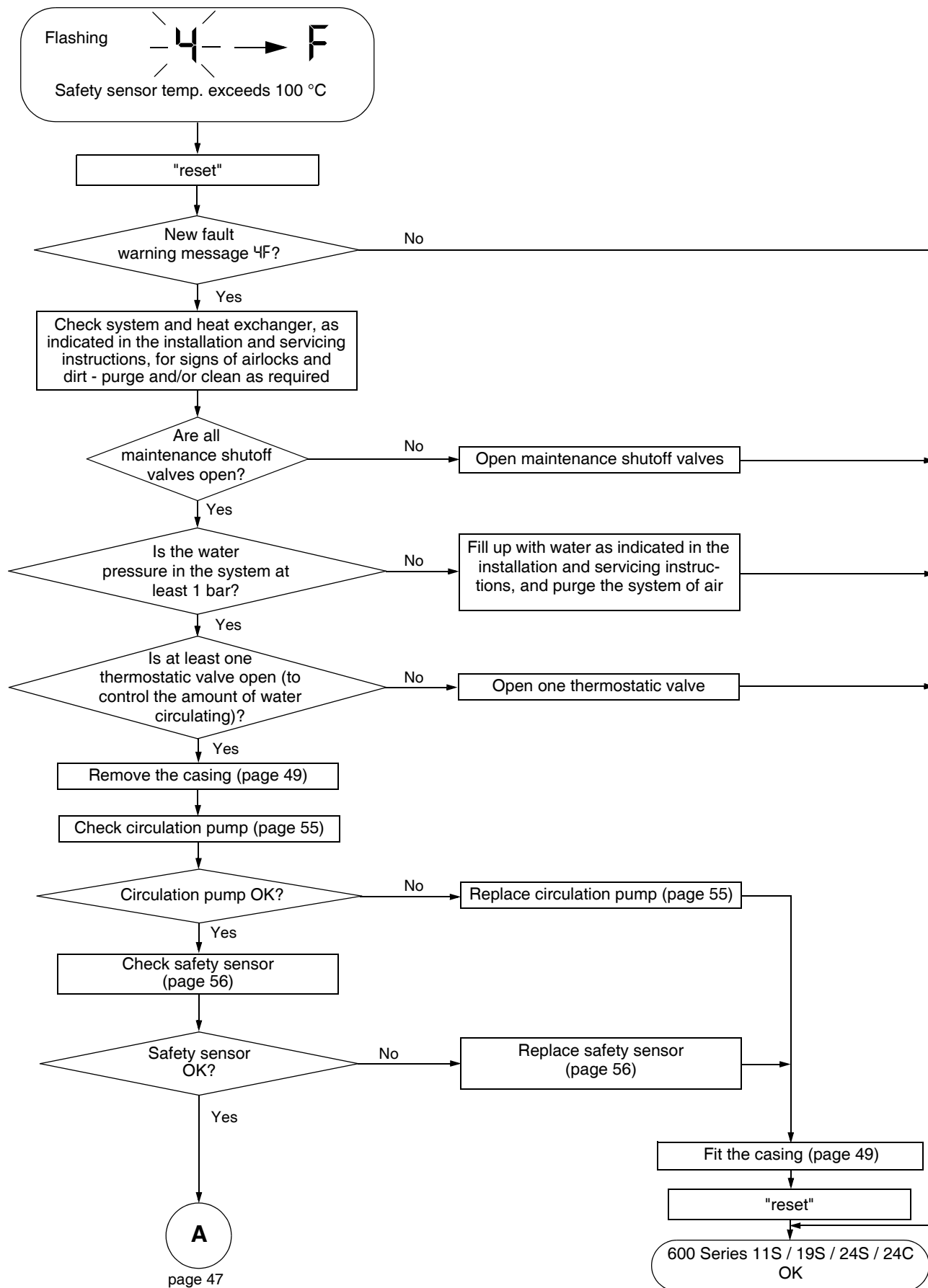


Fig. 14 Fault warning message 4F: Safety sensor temp. exceeds 100 °C

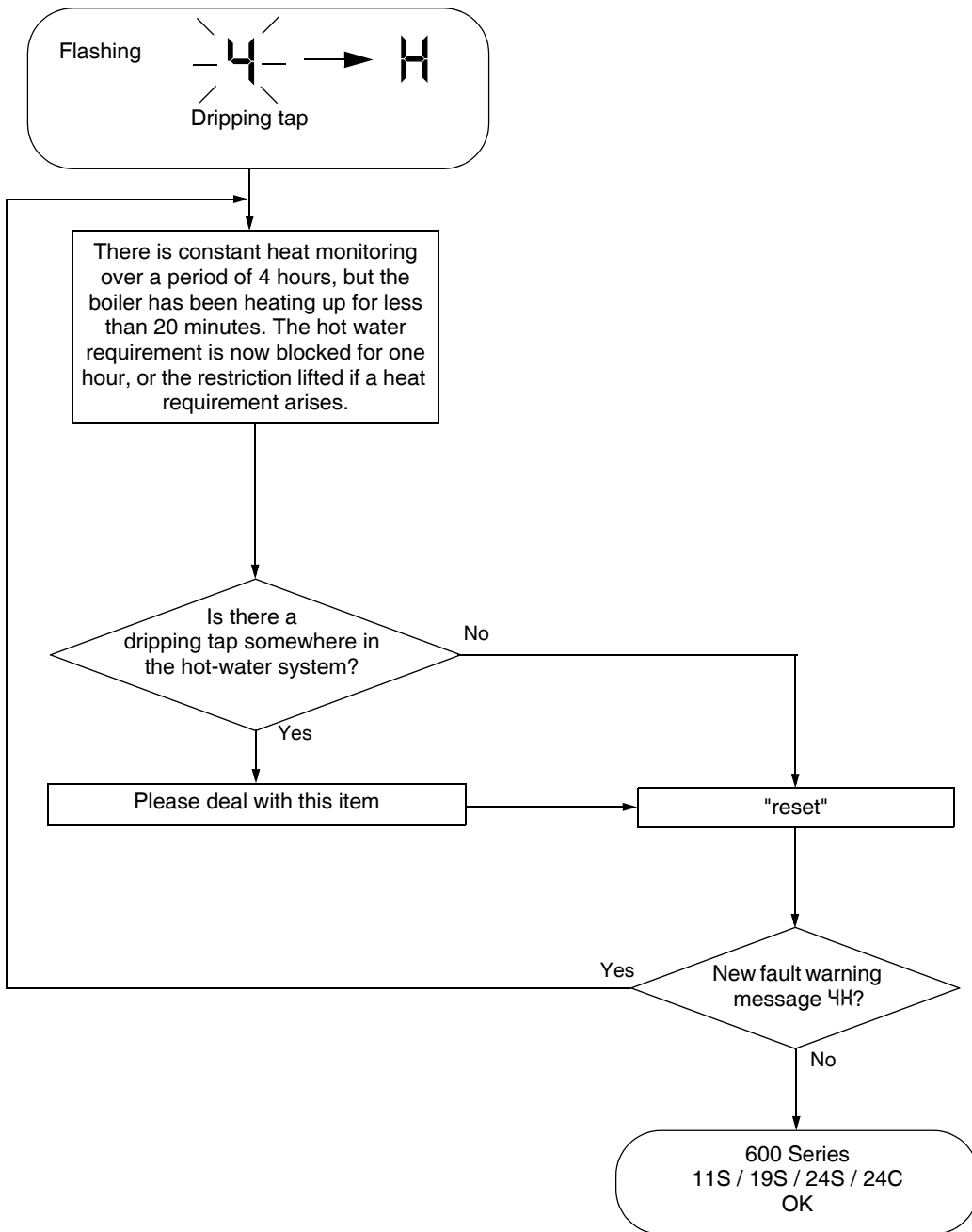


Fig. 15 Fault warning message 4H: Dripping tap

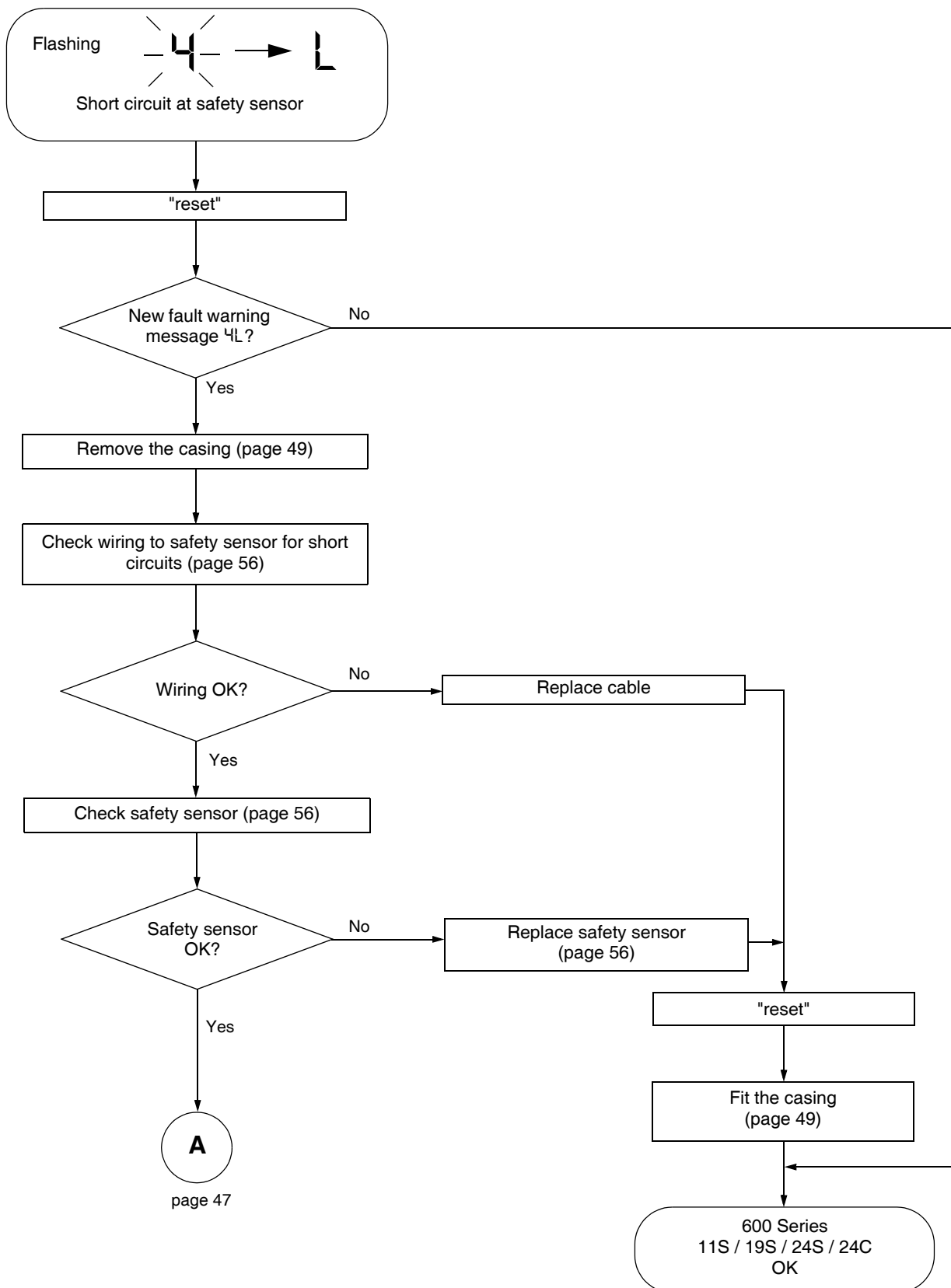


Fig. 16 Fault warning message 4L: Short circuit in safety sensor

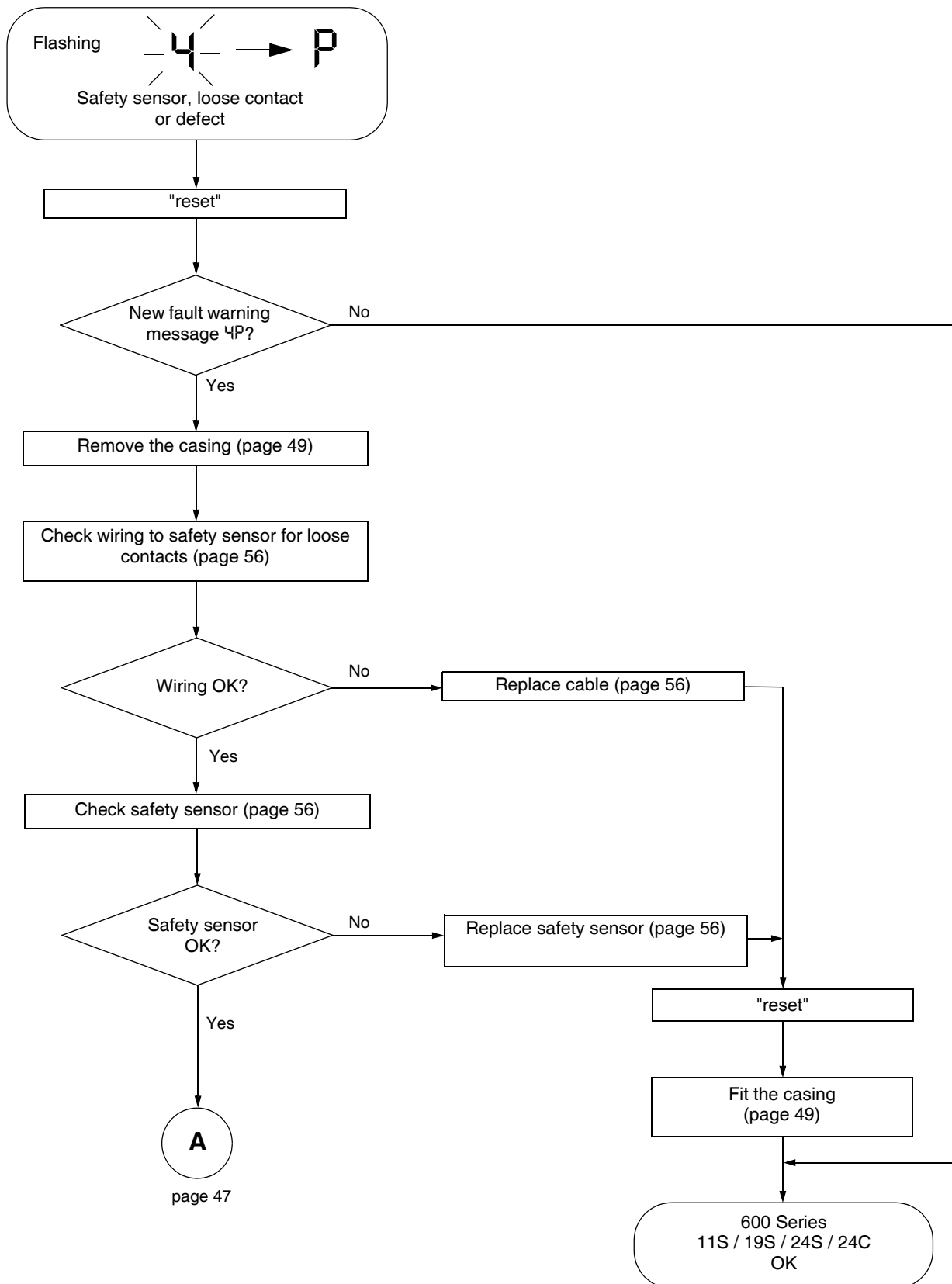


Fig. 17 Fault warning message 4P: Safety sensor, loose contact or defect

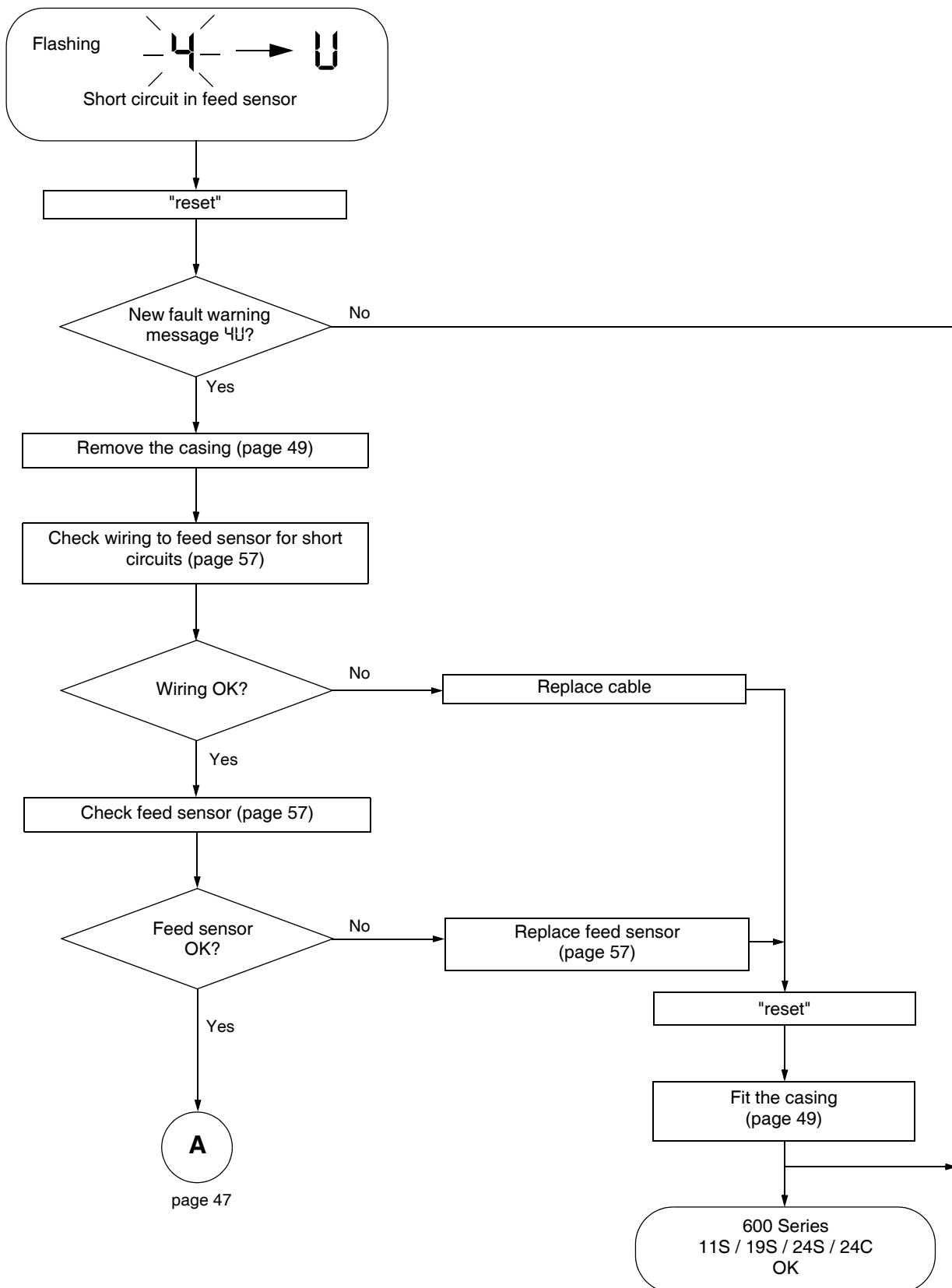


Fig. 18 Fault warning message 4U: Short circuit in feed sensor

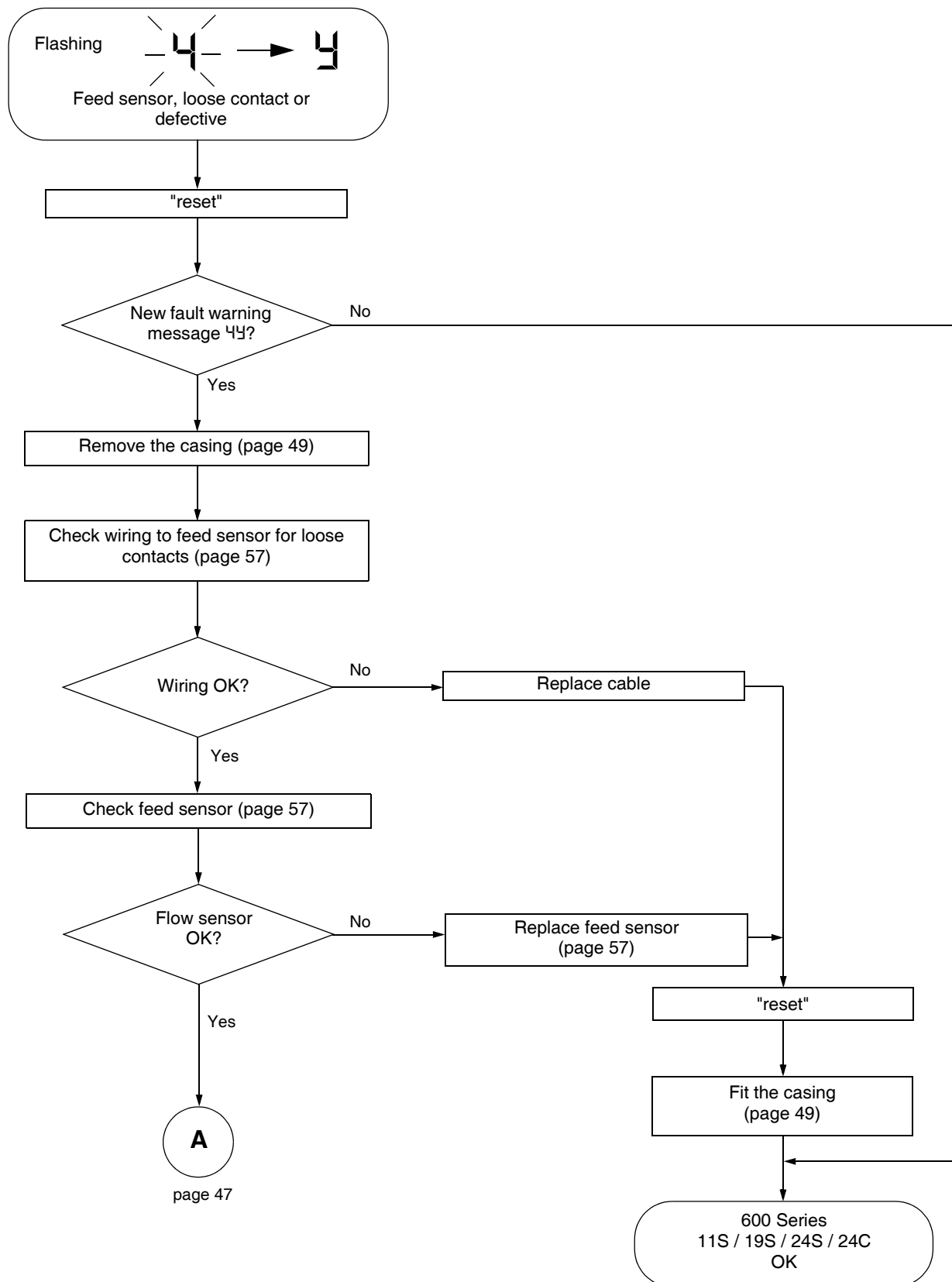


Fig. 19 Fault warning message 4Y: Feed sensor, loose contact or defective

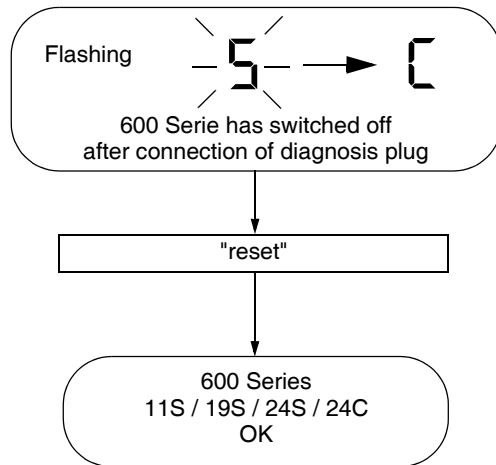


Fig. 20 Fault warning message 5C: 600 Series has switched off after disconnection of diagnosis plug

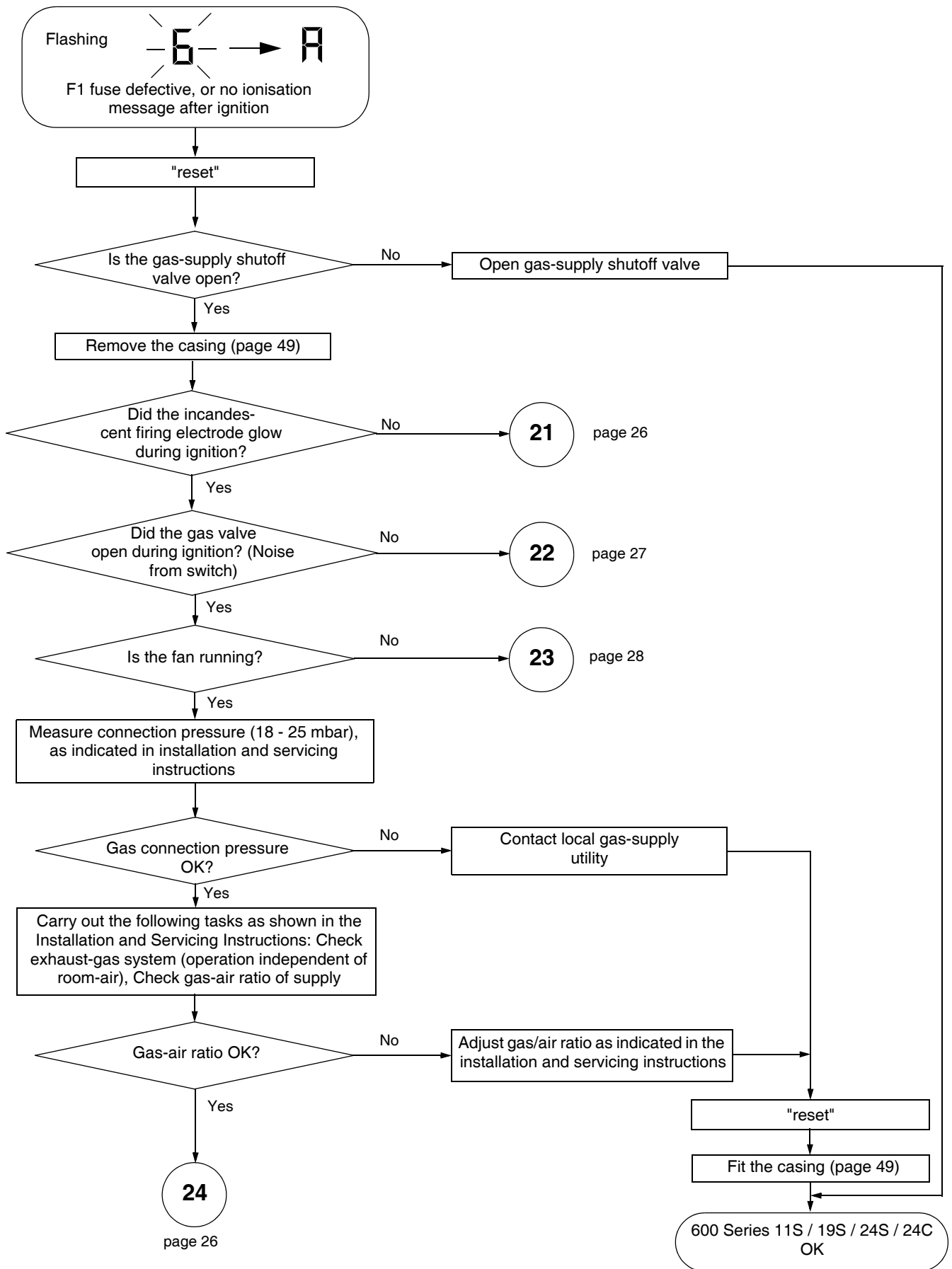


Fig. 21 Fault warning message 6A: F1 fuse defective, or no ionisation message after ignition

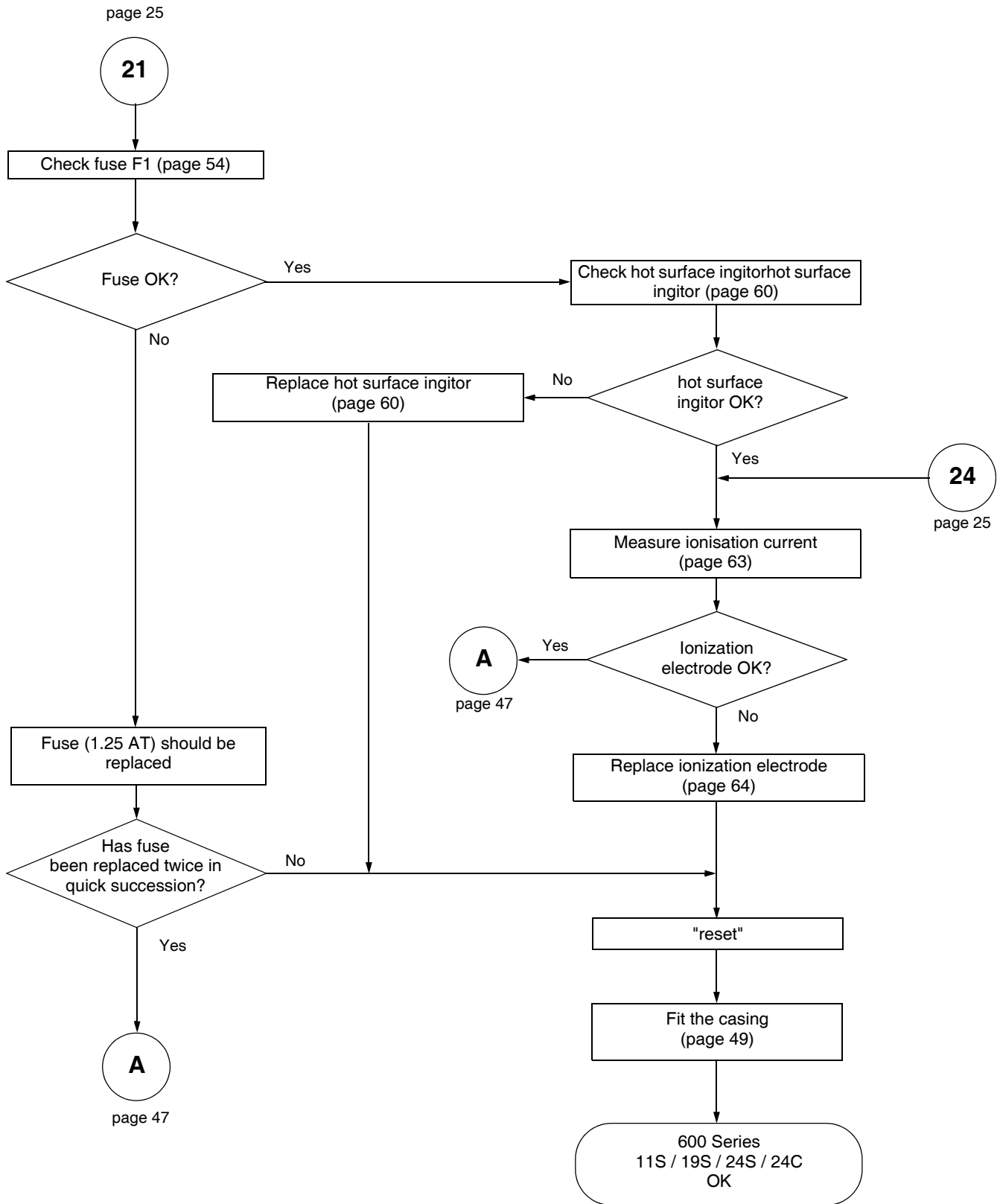


Fig. 22 Continuation of fault warning message 6A: F1 fuse defective, or no ionisation message after ignition

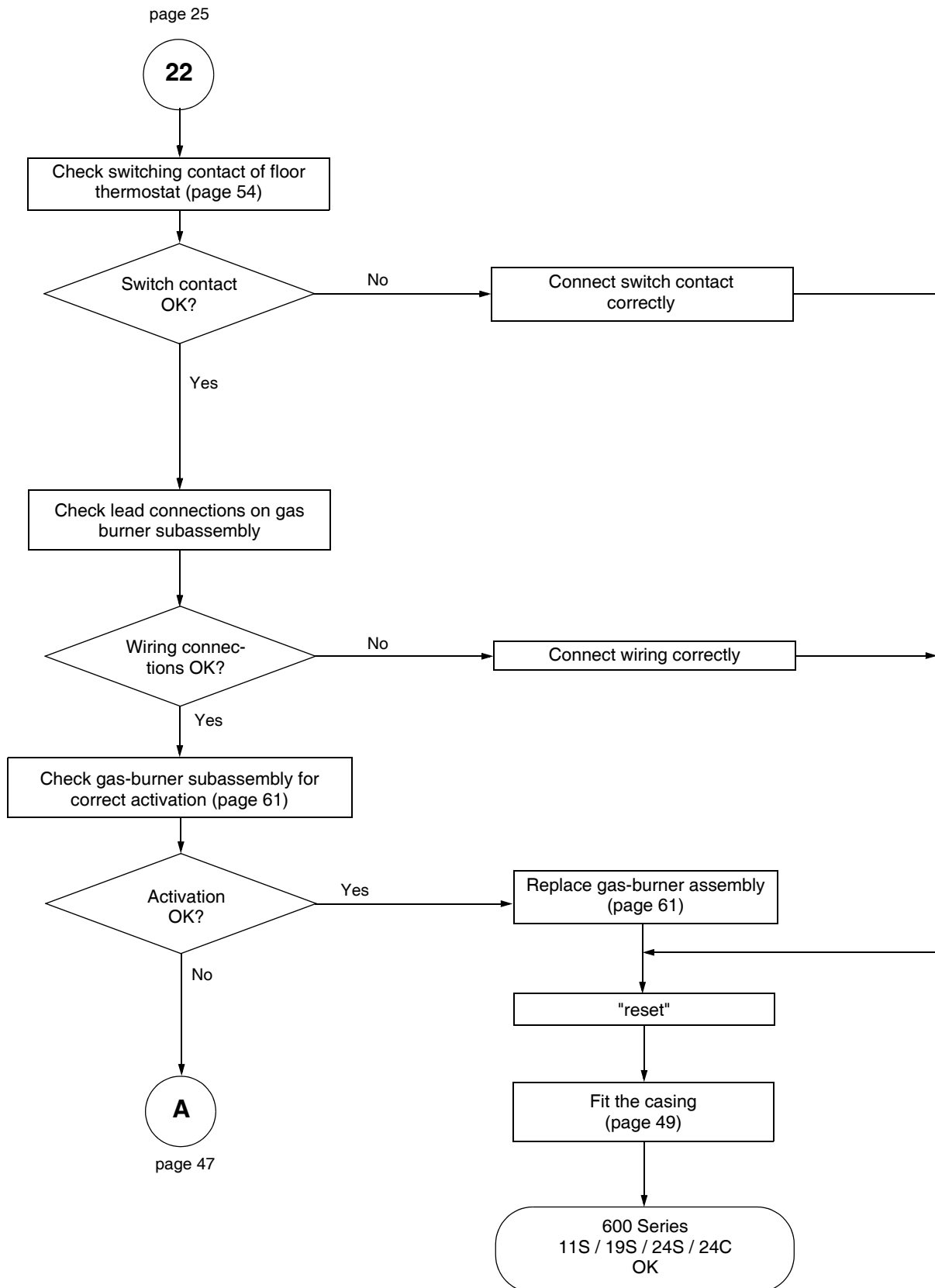


Fig. 23 Continuation of fault warning message 6A: F1 fuse defective, or no ionisation message after ignition

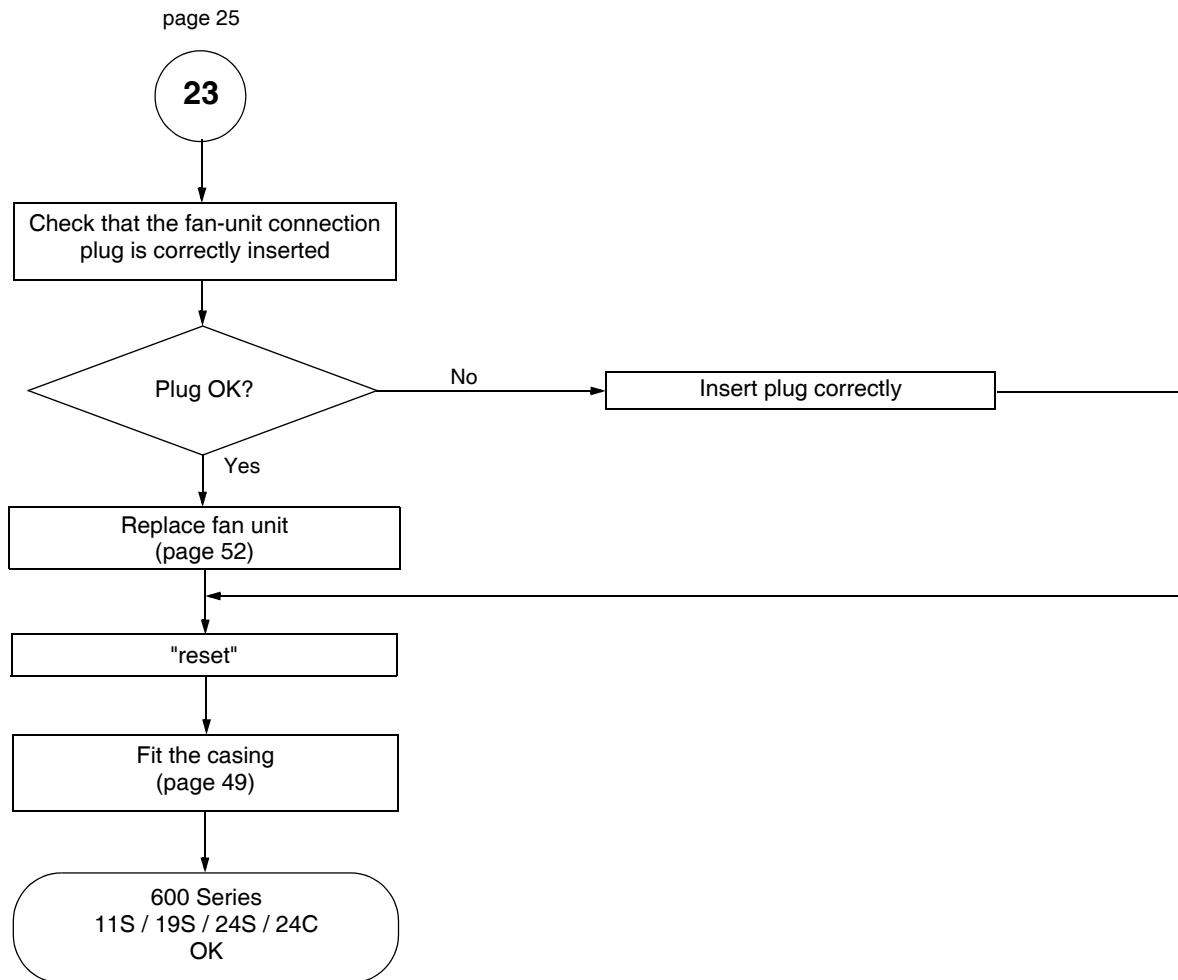


Fig. 24 Continuation of fault warning message 6A: F1 fuse defective, or no ionisation message after ignition

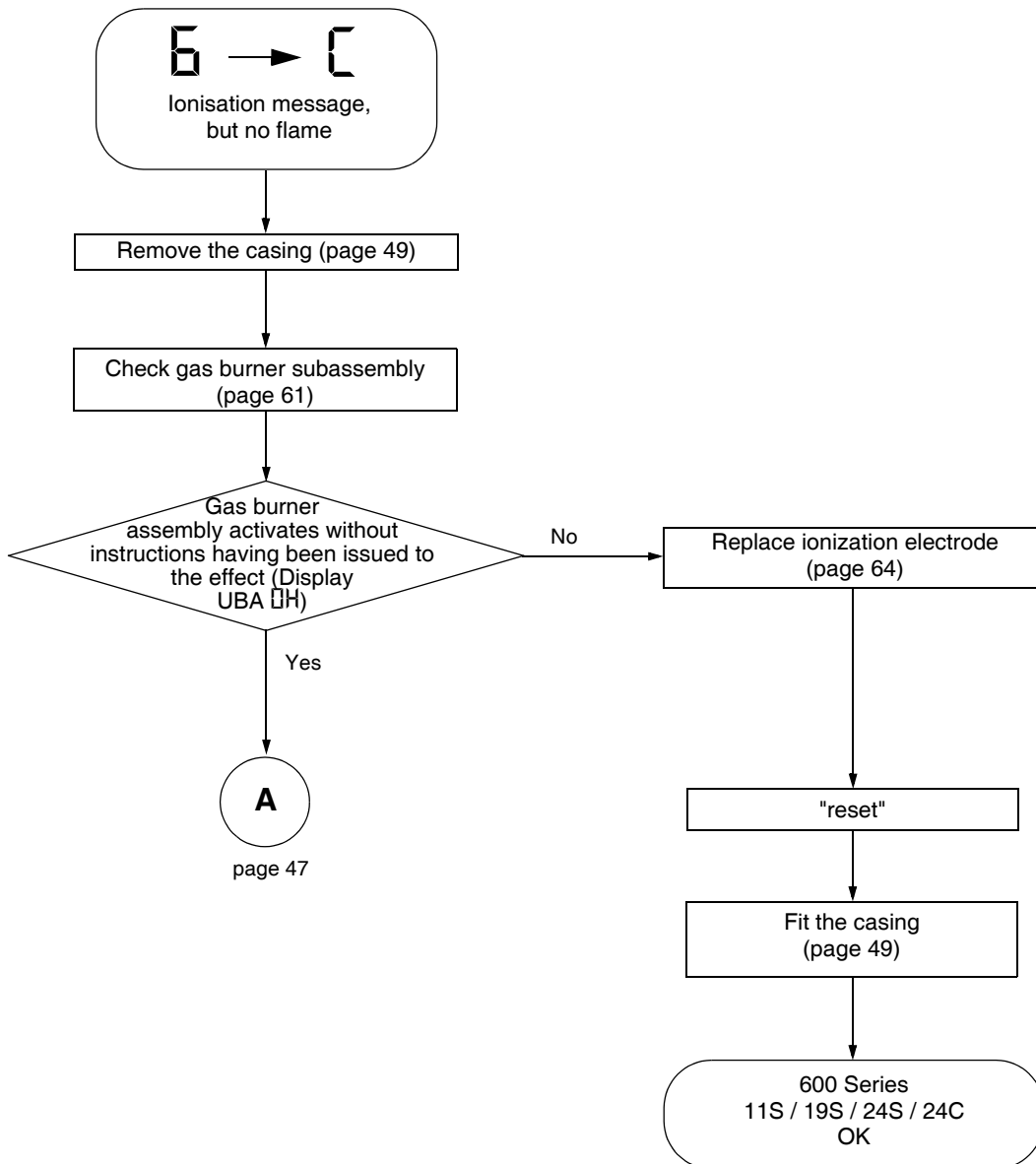


Fig. 25 Fault warning message 6C: Ionisation message, but no flame

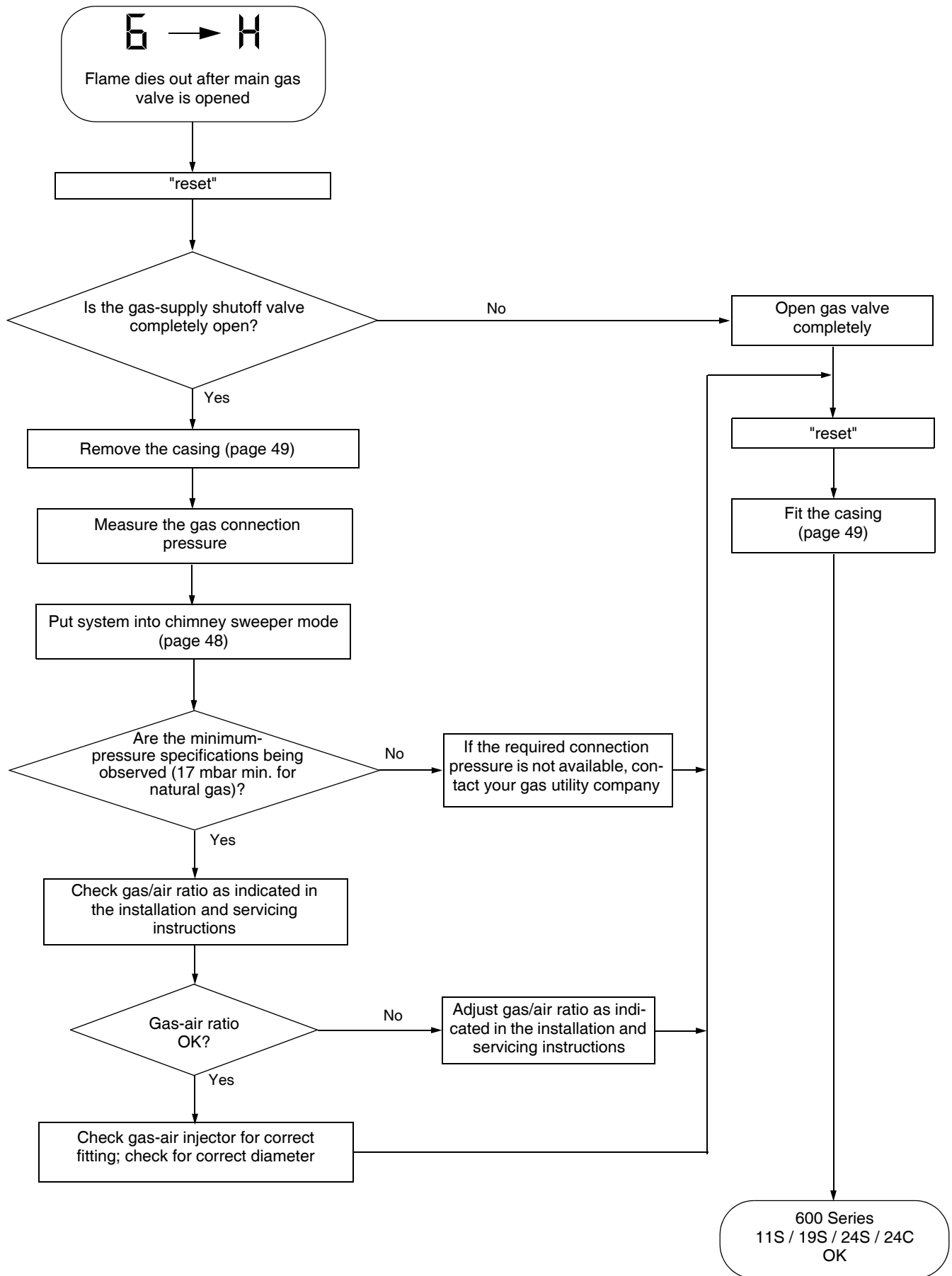


Fig. 26 Fault warning message 6H: Flame dies out after main gas valve is opened

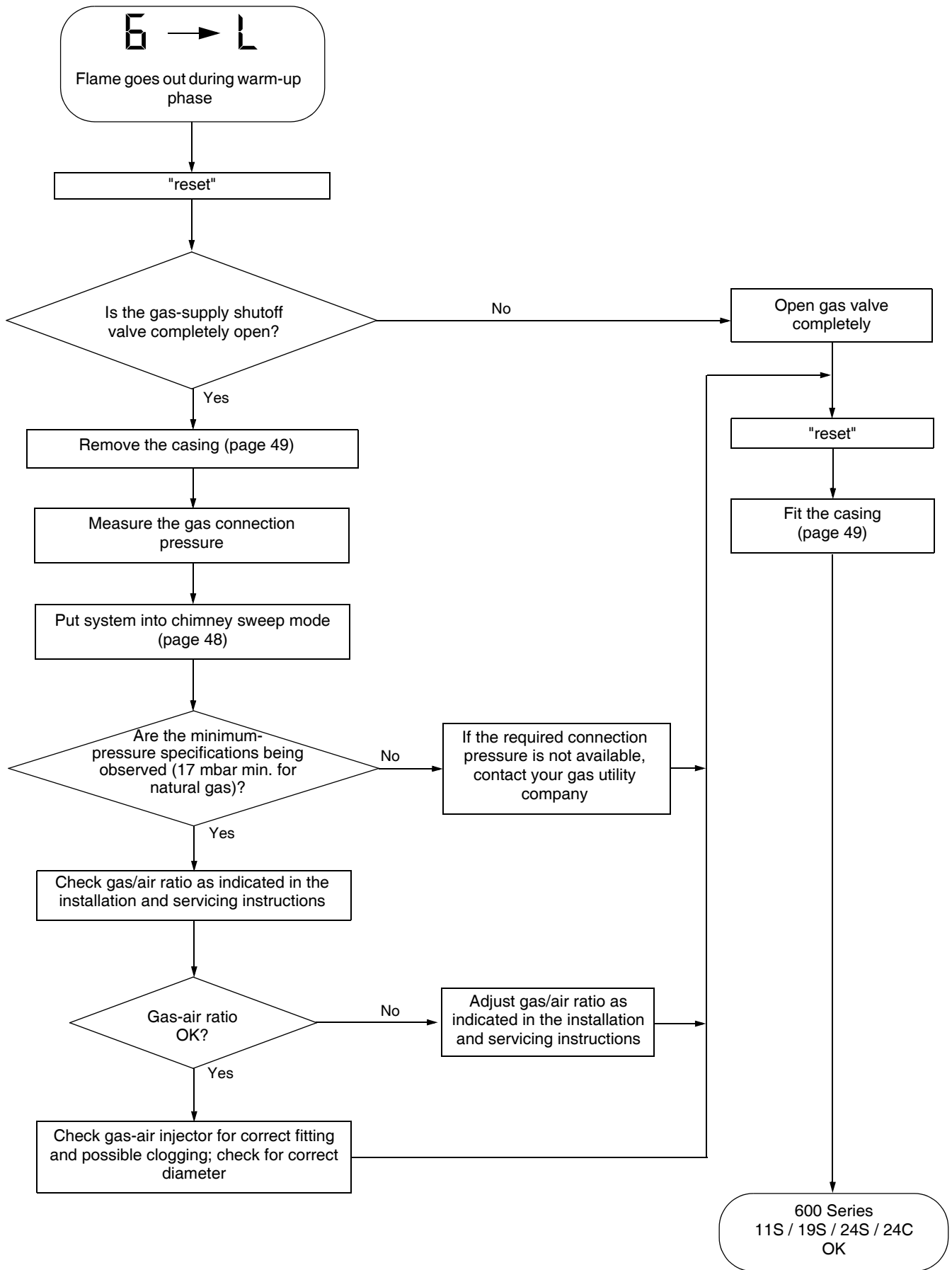


Fig. 27 Fault warning message 6L: Flame goes out during warm-up phase

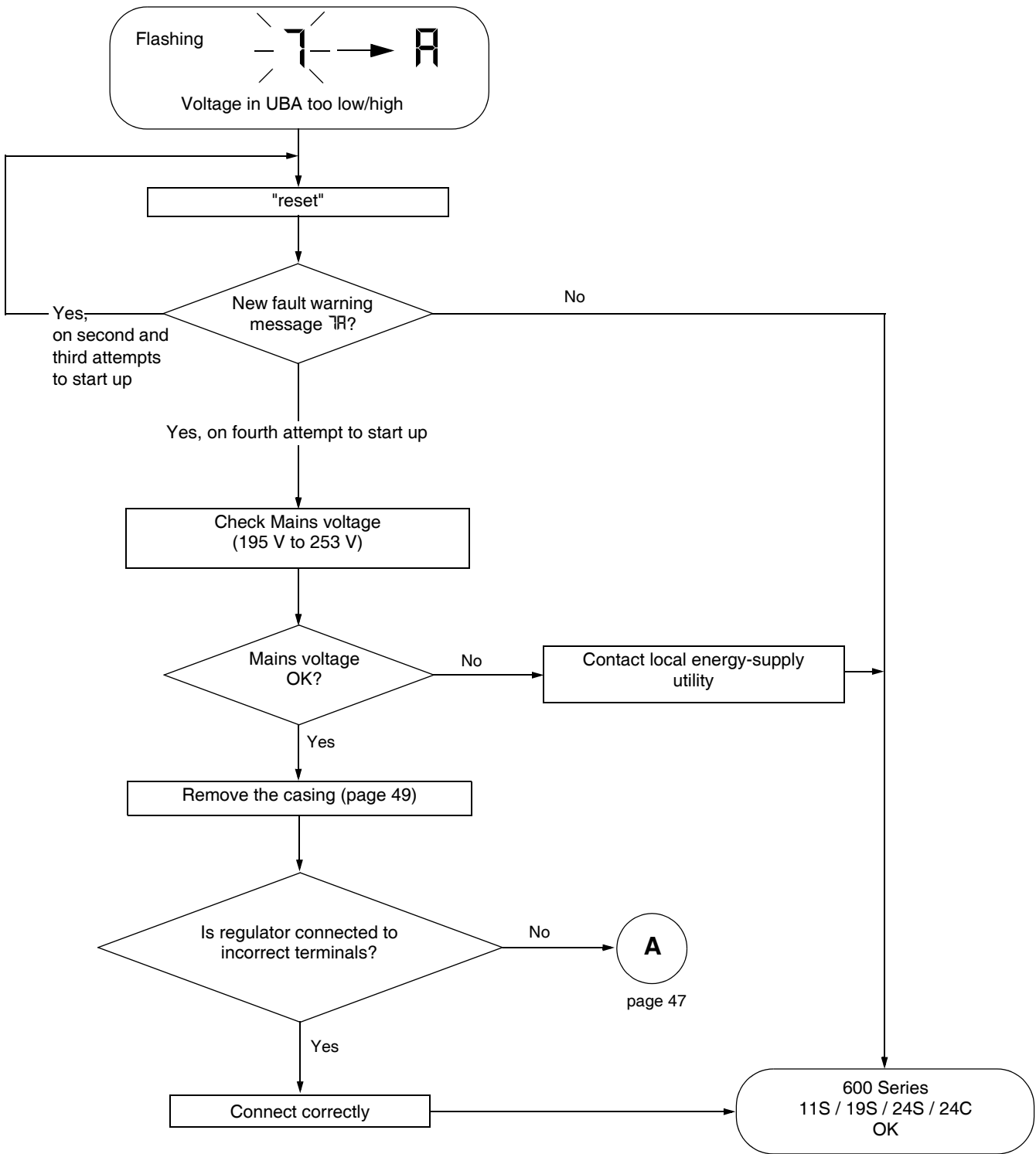


Fig. 28 Fault warning message 7A: Voltage in UBA too low or too high

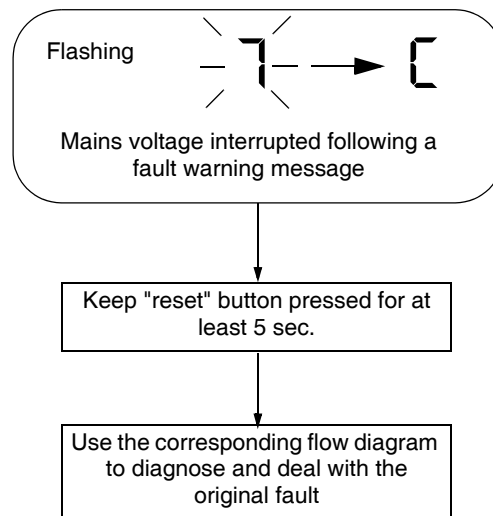


Fig. 29 Fault warning message 7C: Mains voltage interrupted following a fault warning message

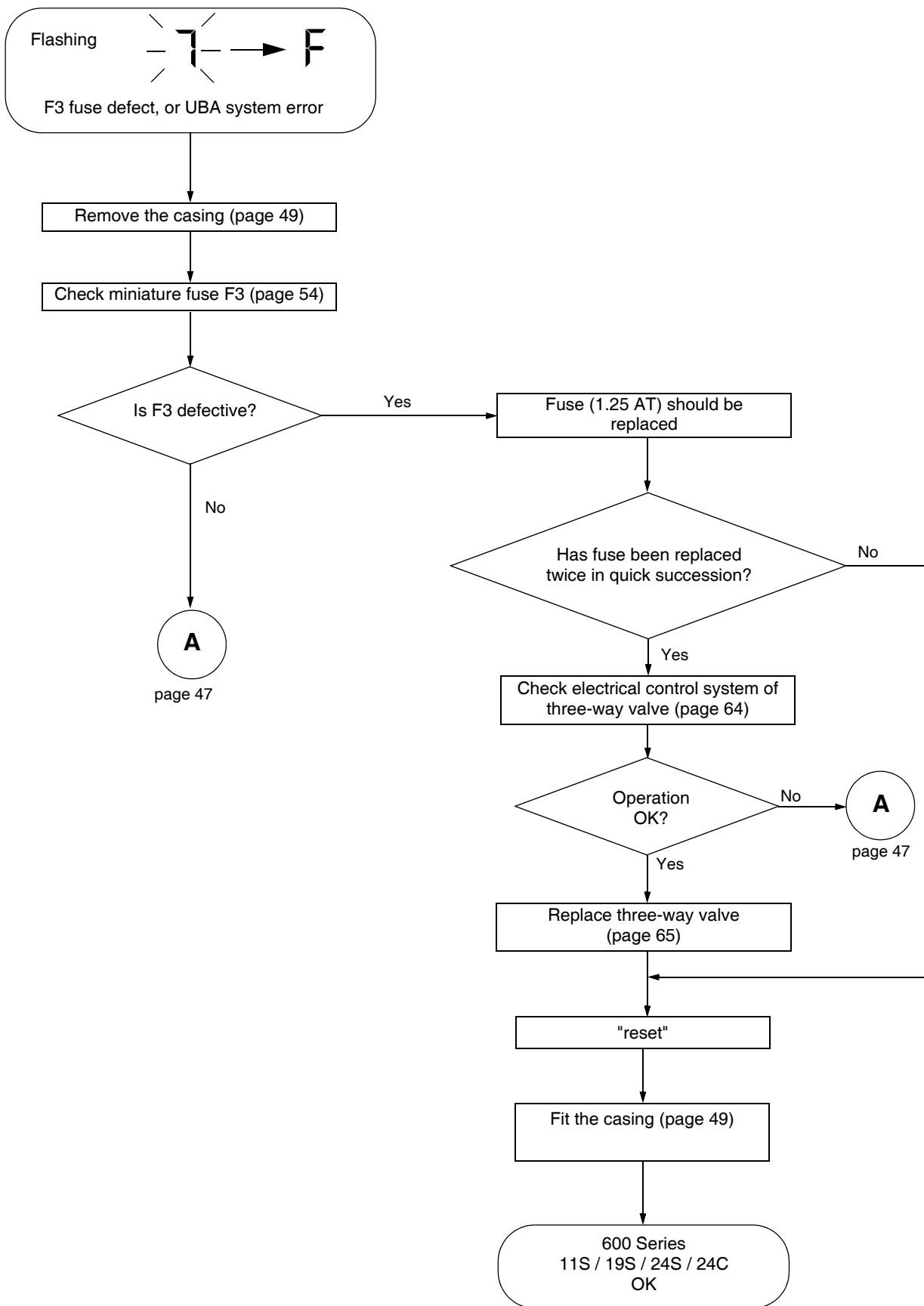


Fig. 30 Fault warning message: 7F: F3 fuse defect, or UBA system error

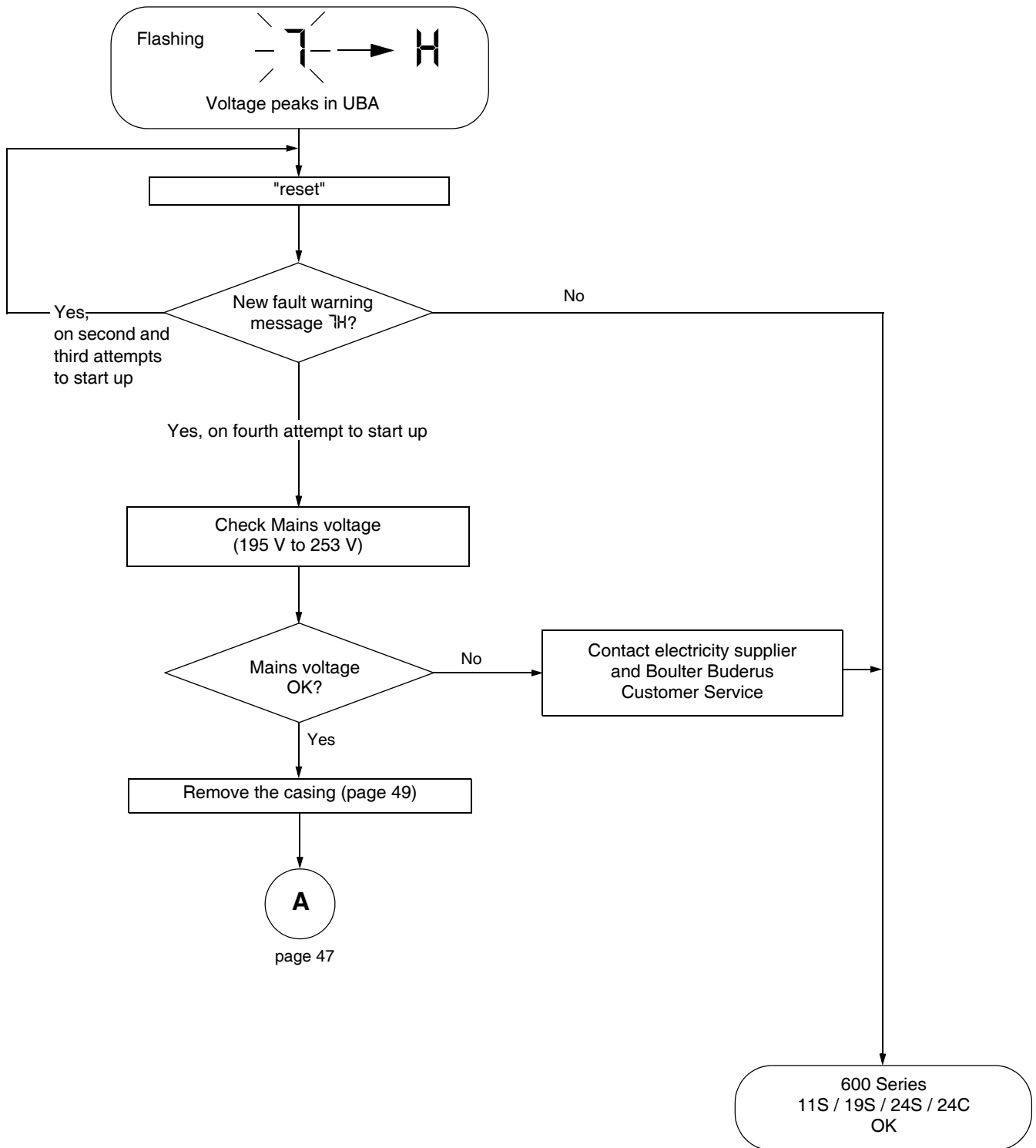


Fig. 31 Fault warning message 7H: Voltage peaks in UBA

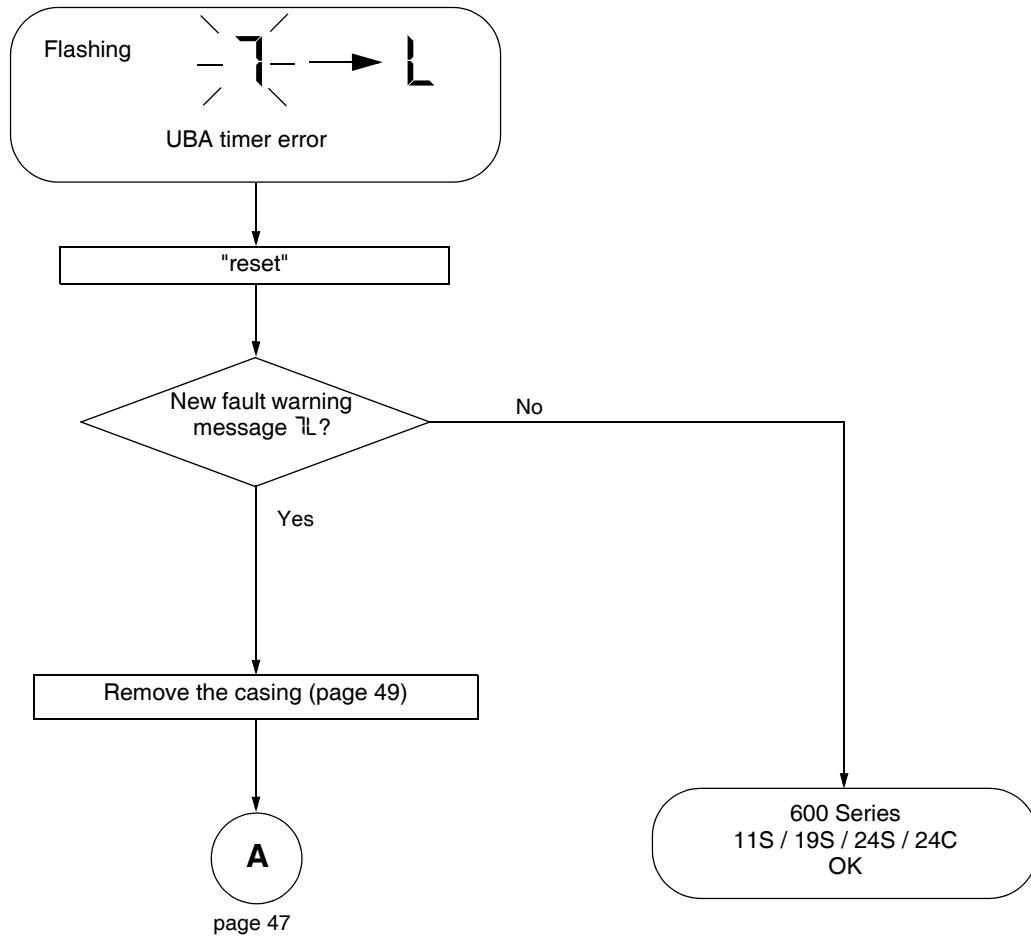


Fig. 32 Fault warning message 7L: UBA timer error

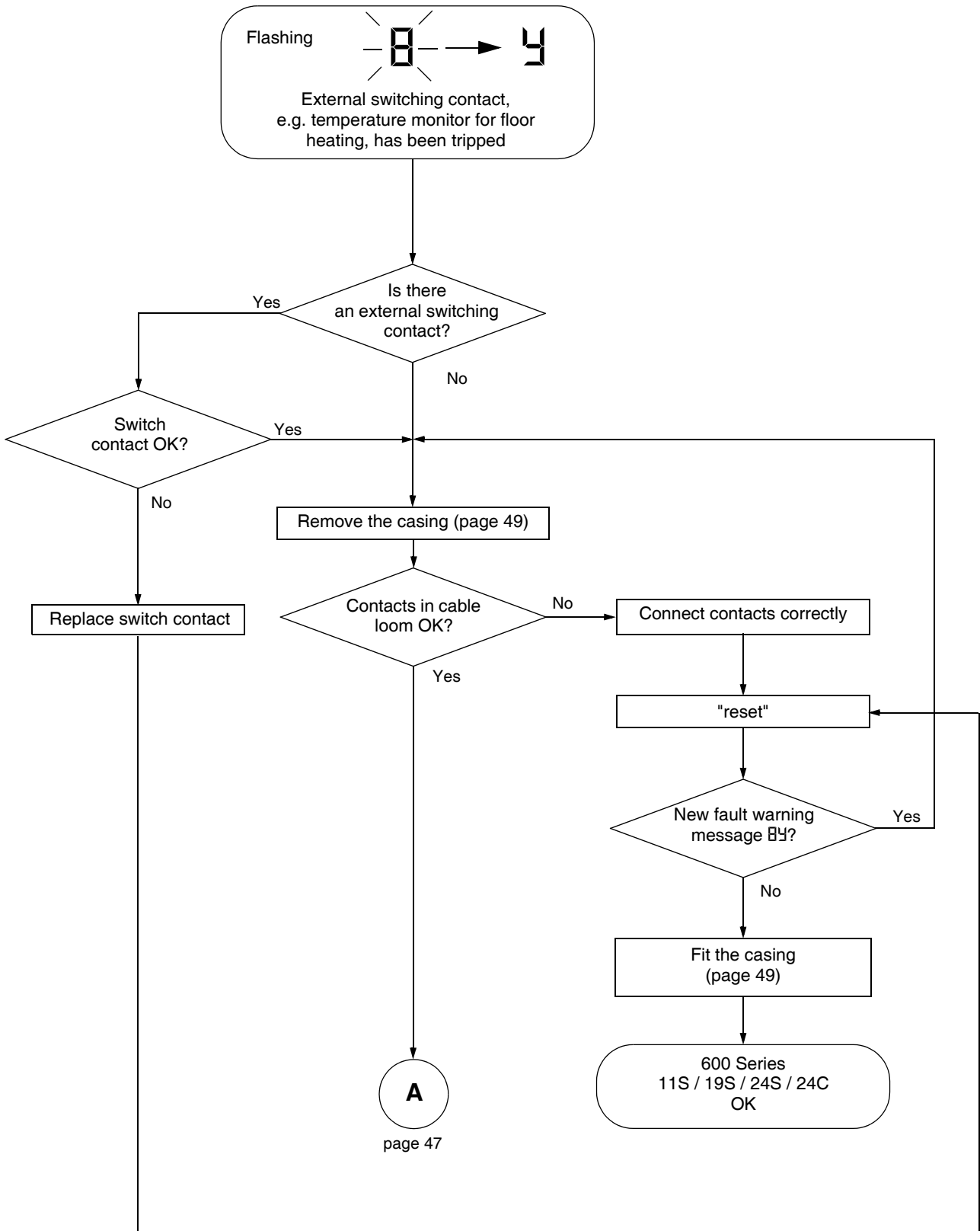


Fig. 33 Fault warning message 8Y: External switching contact, e.g. temperature monitor for floor heating, has been tripped

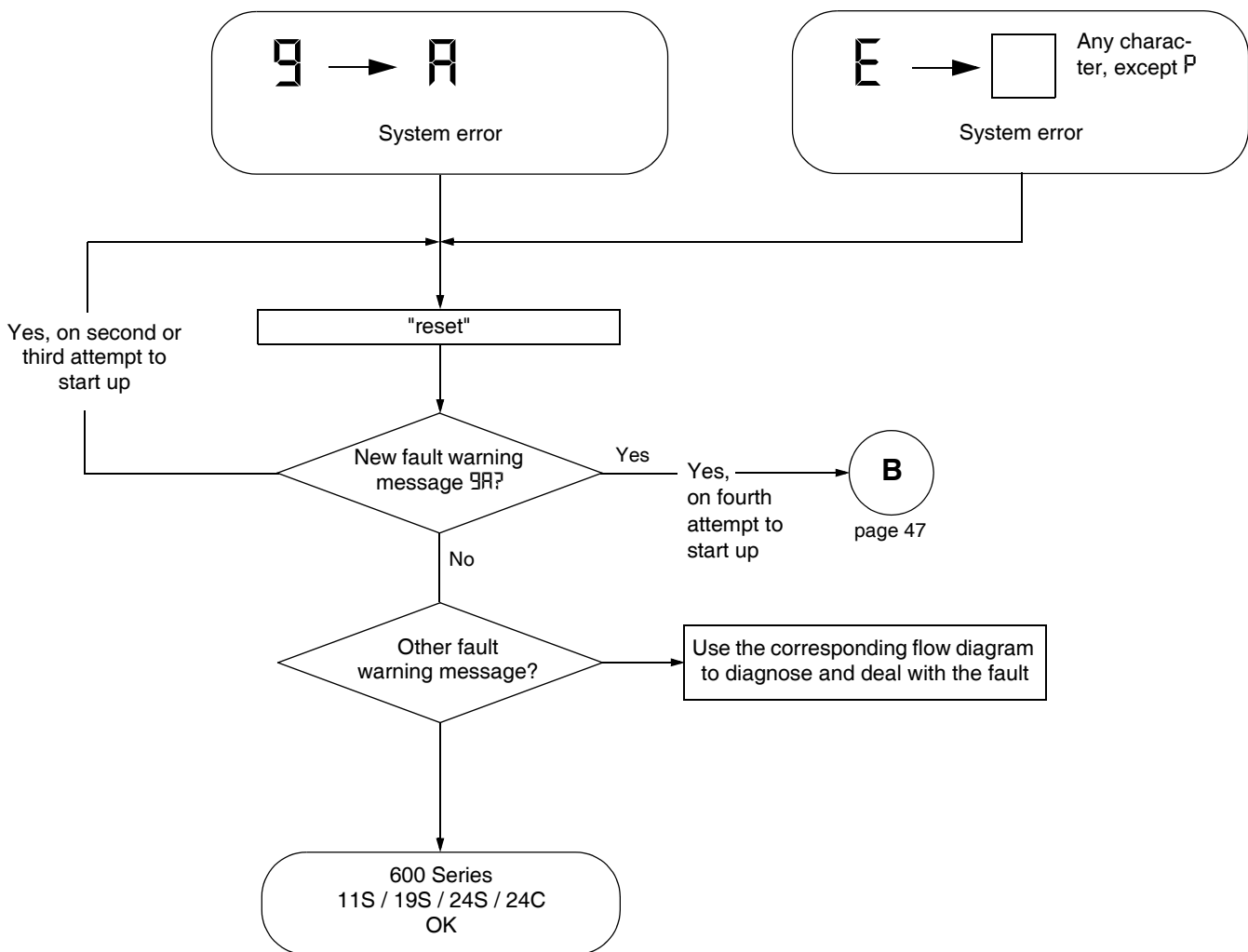


Fig. 34 Fault warning message 9A (with any character except P): System error

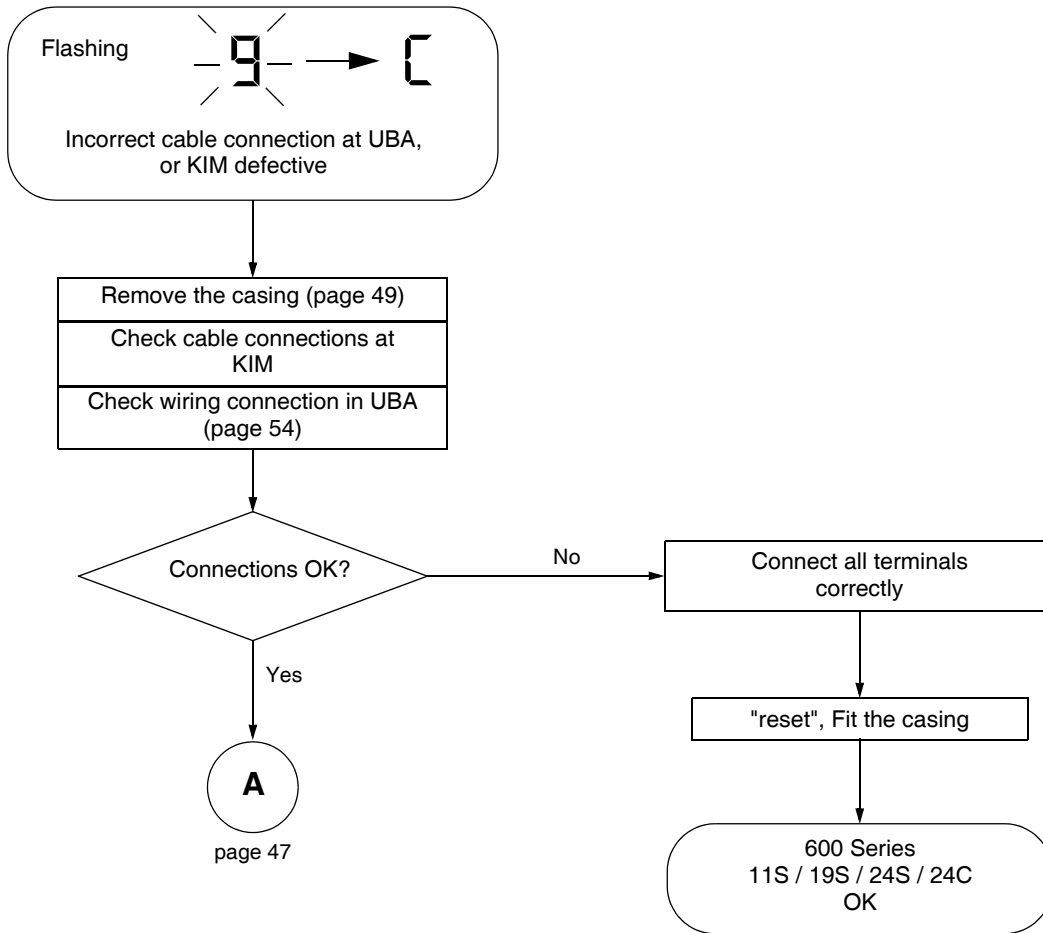


Fig. 35 Fault warning message 9C: Wiring to KIM connected incorrectly

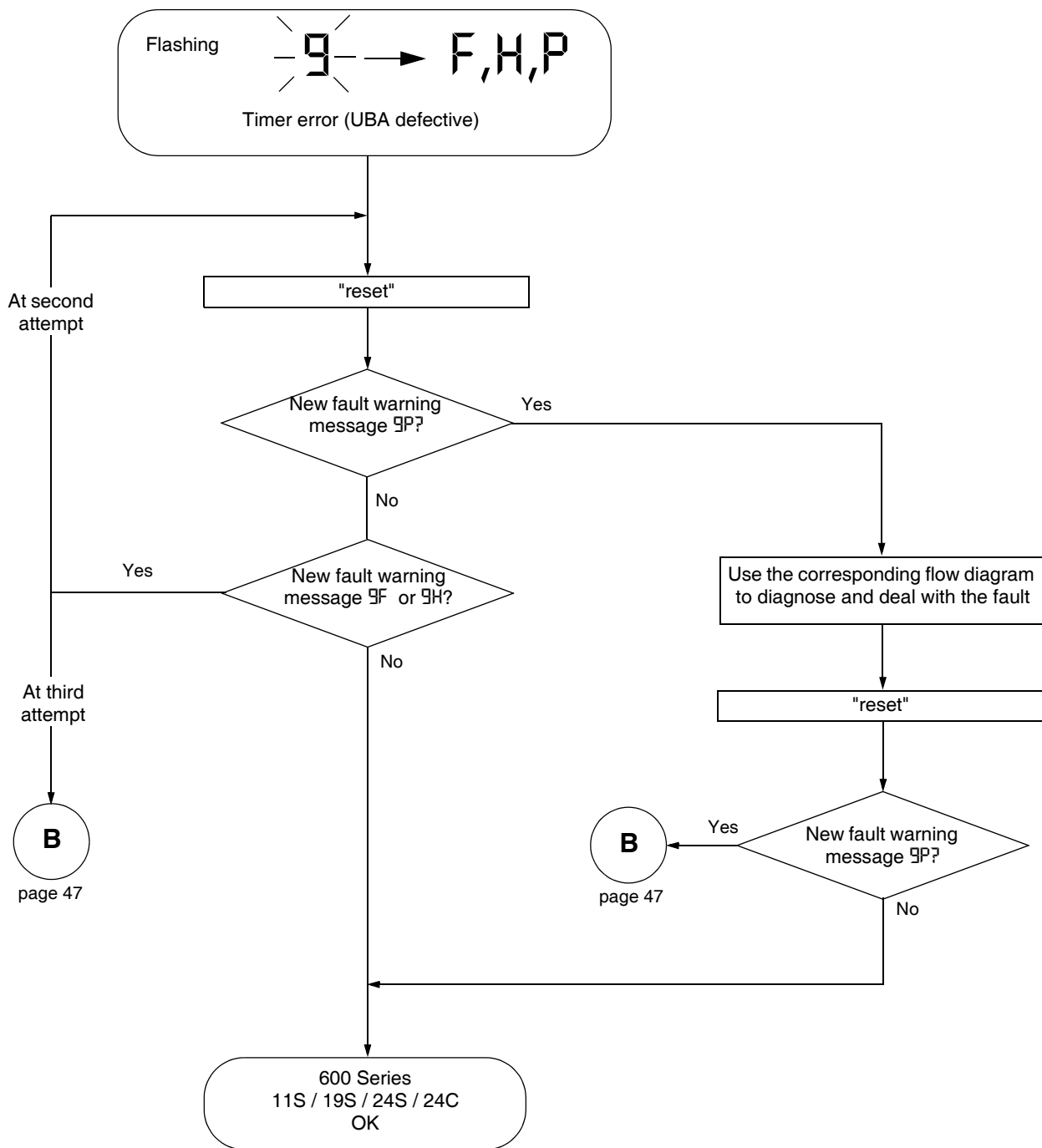


Fig. 36 Fault warning message 9F,H,P: System error (UBA defective), or KIM defective

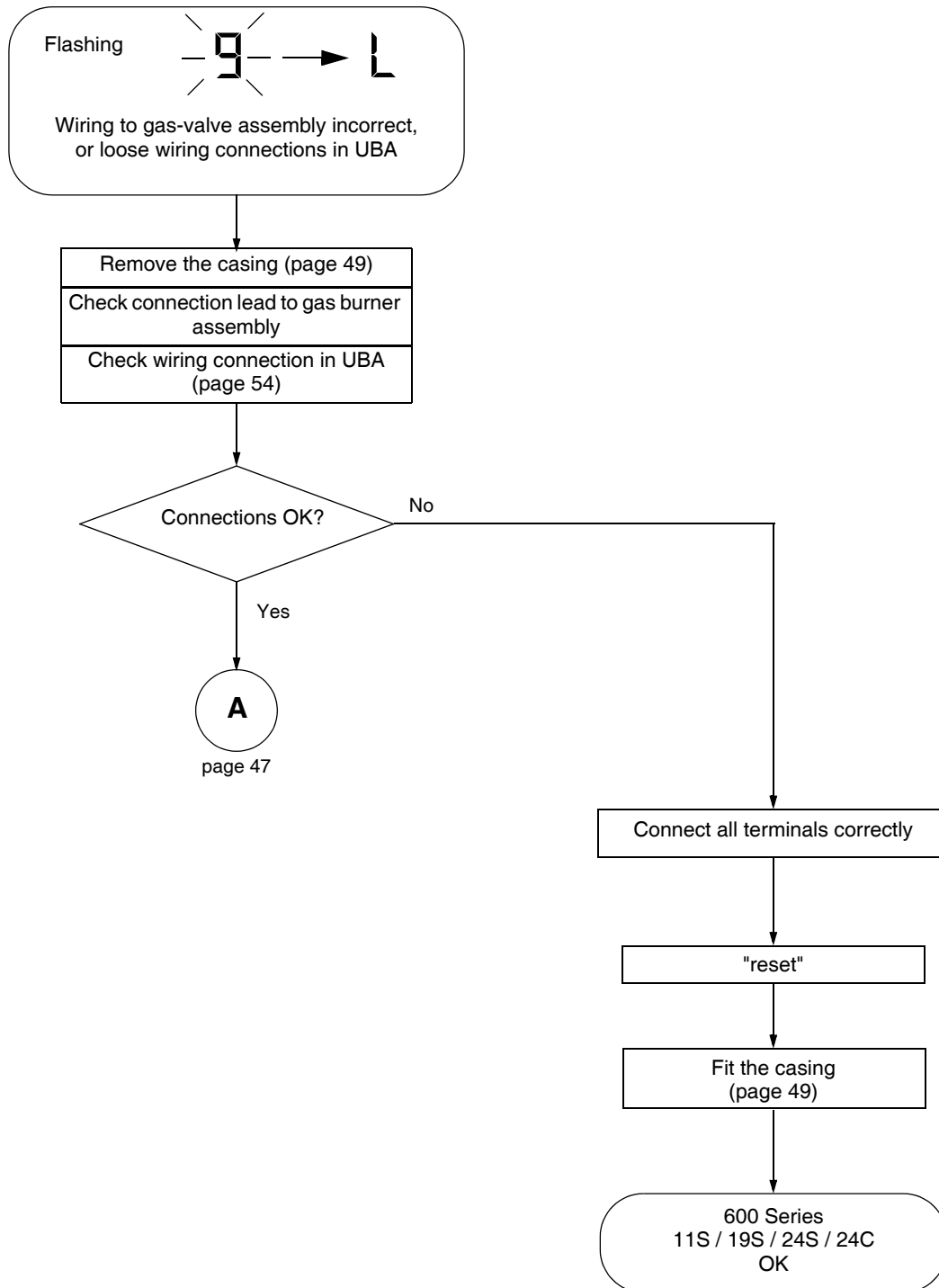


Fig. 37 Fault warning message 9L: Wiring to gas-valve assembly incorrect, or loose wiring connections in UBA.

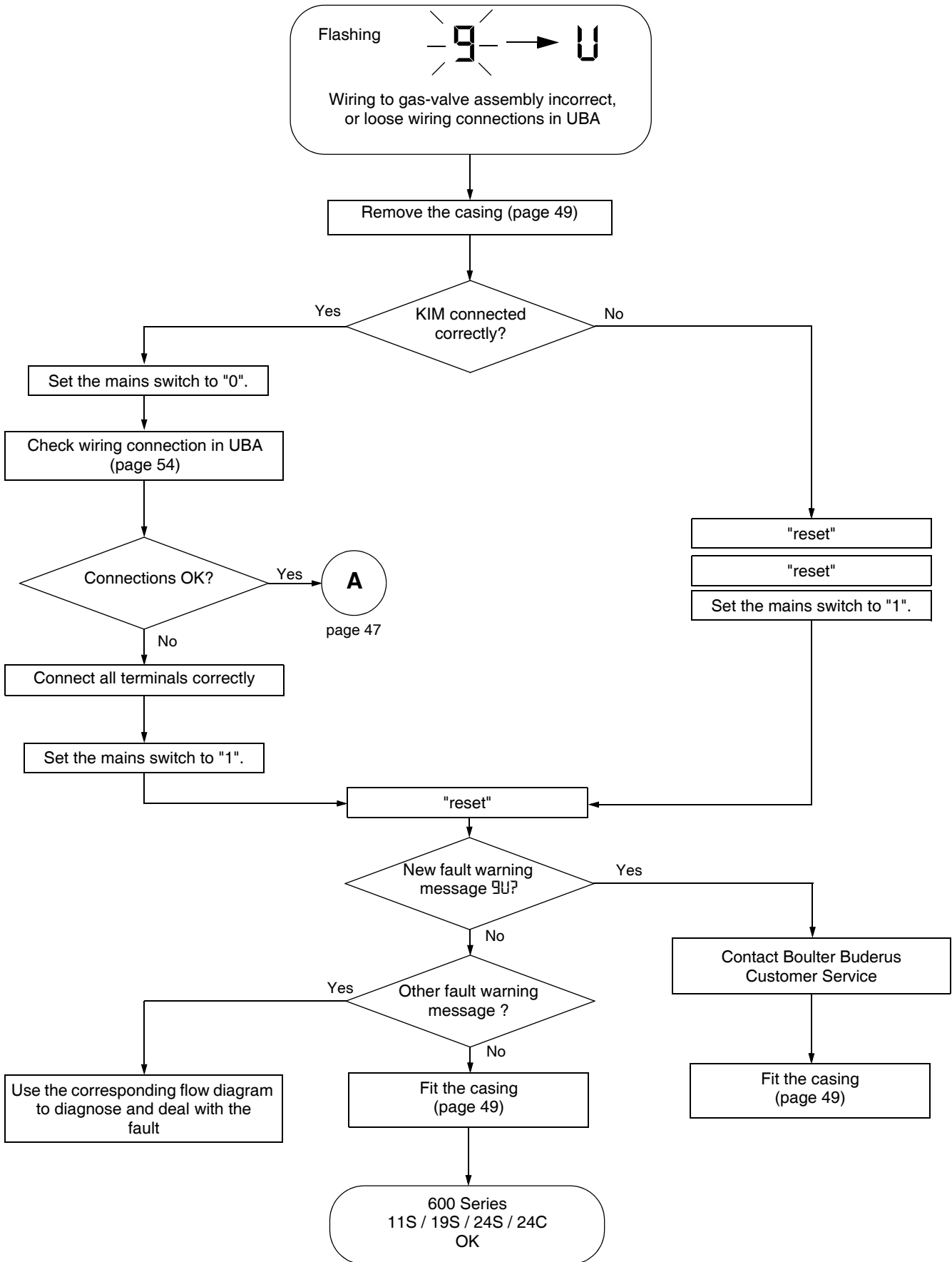


Fig. 38 Fault warning message 9U: Incorrect cable connection at UBA (KIM defective)

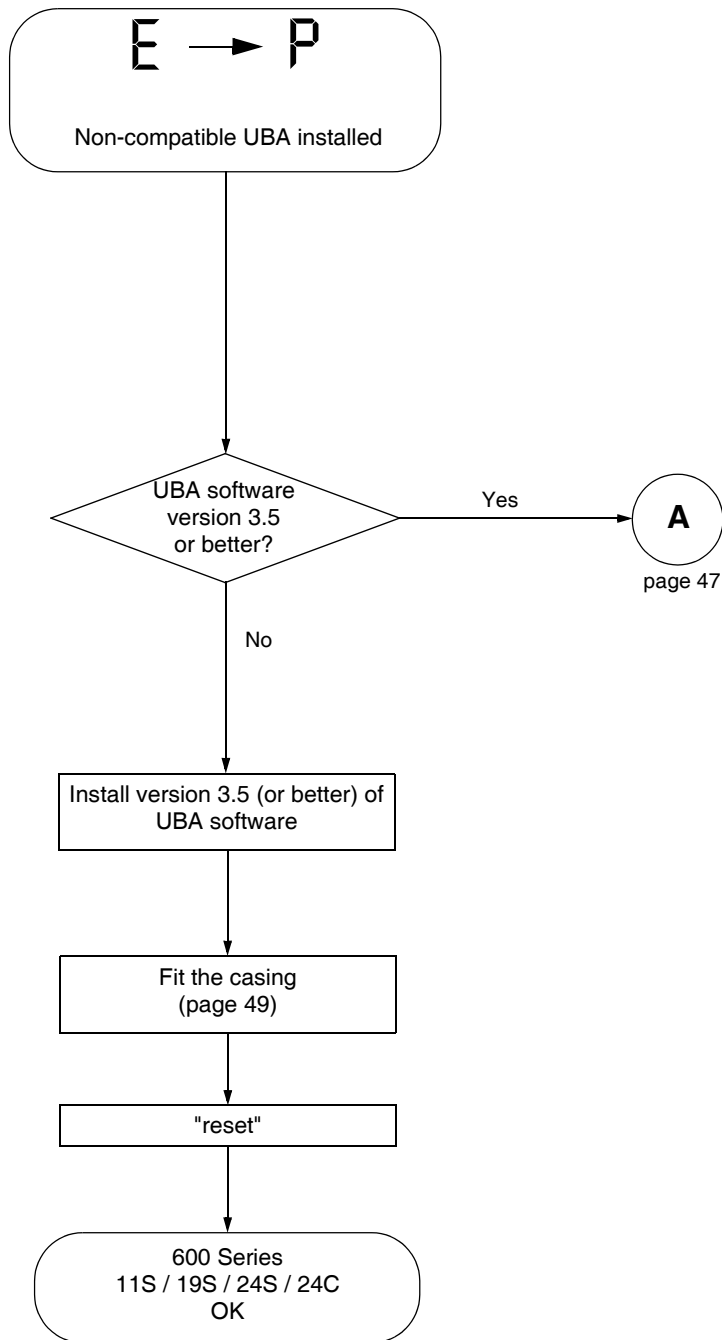


Fig. 39 Fault warning message EP: Non-compatible UBA installed

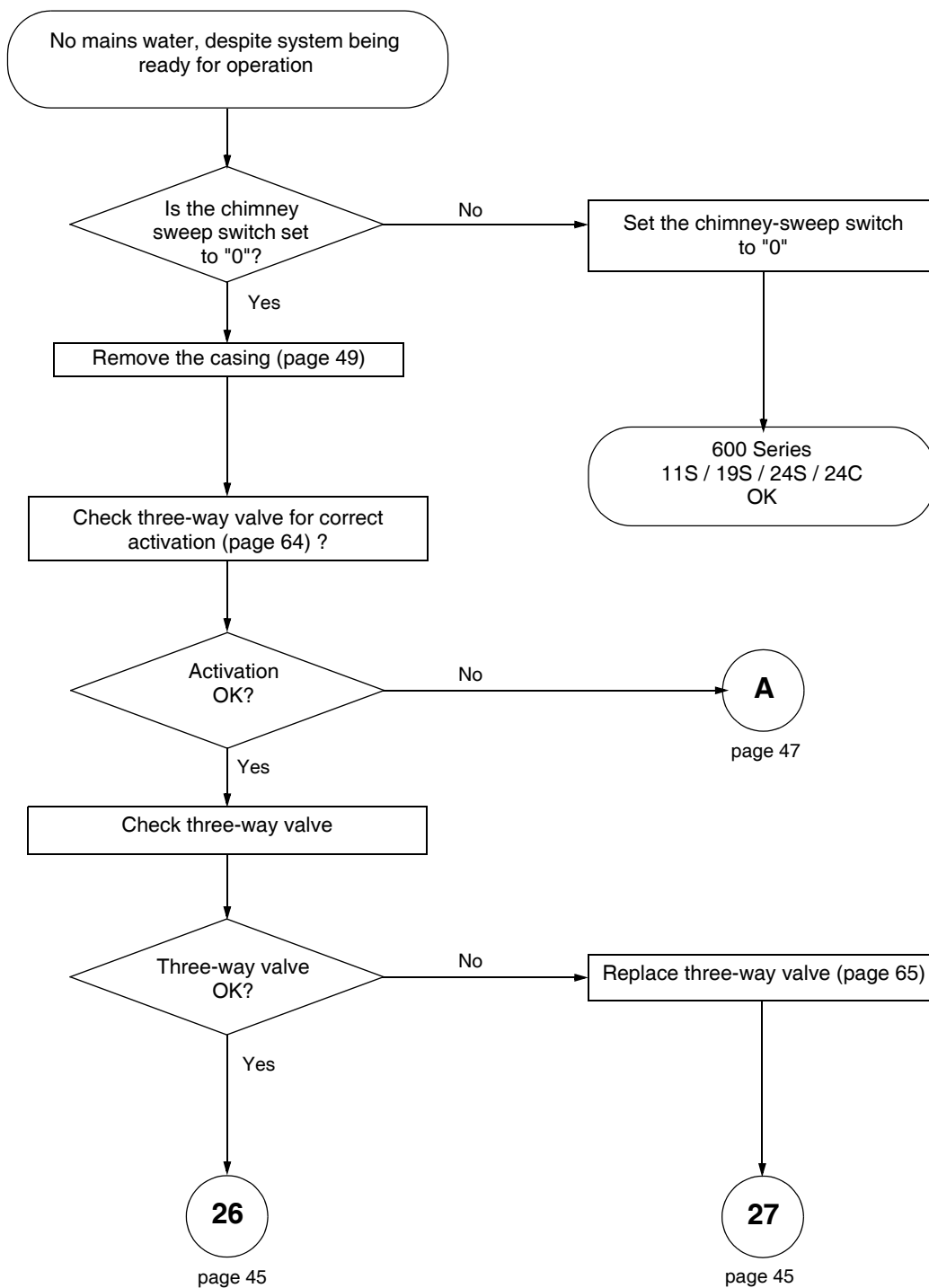


Fig. 40 Malfunction: No mains water, despite system being ready for operation

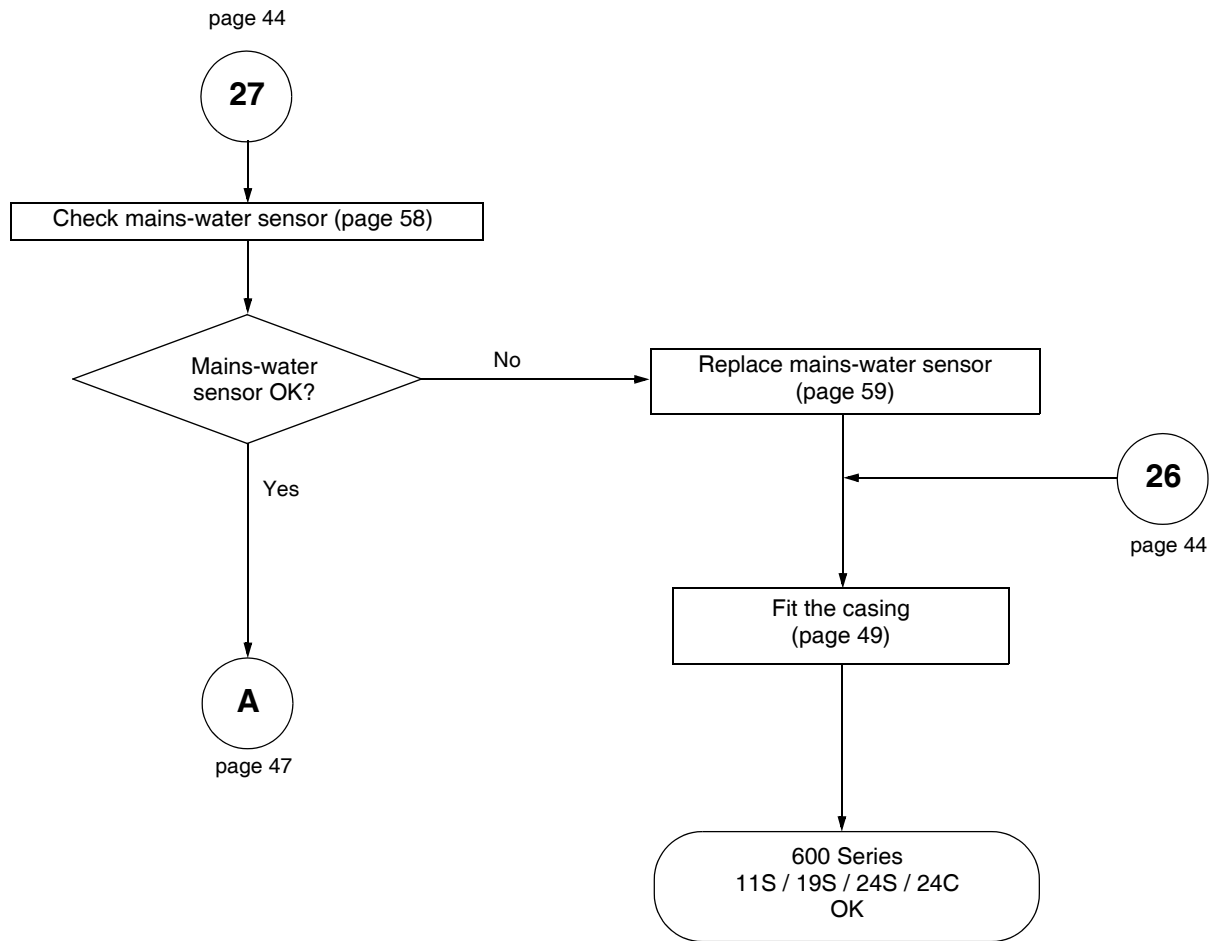


Fig. 41 Continued malfunction: No mains water, despite system being ready for operation

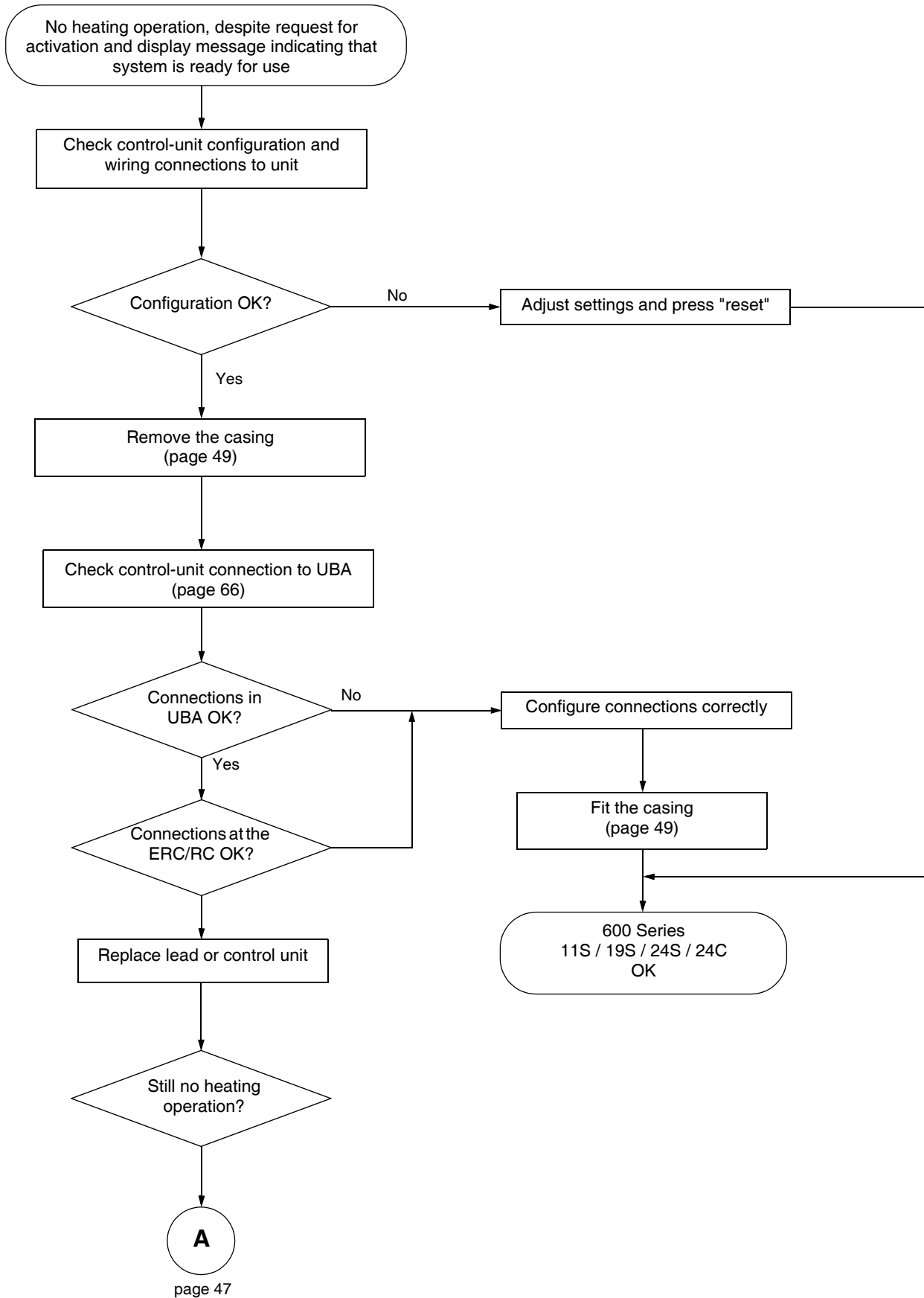


Fig. 42 Malfunction: No heating operation, despite request for activation and display message indicating that system is ready for use

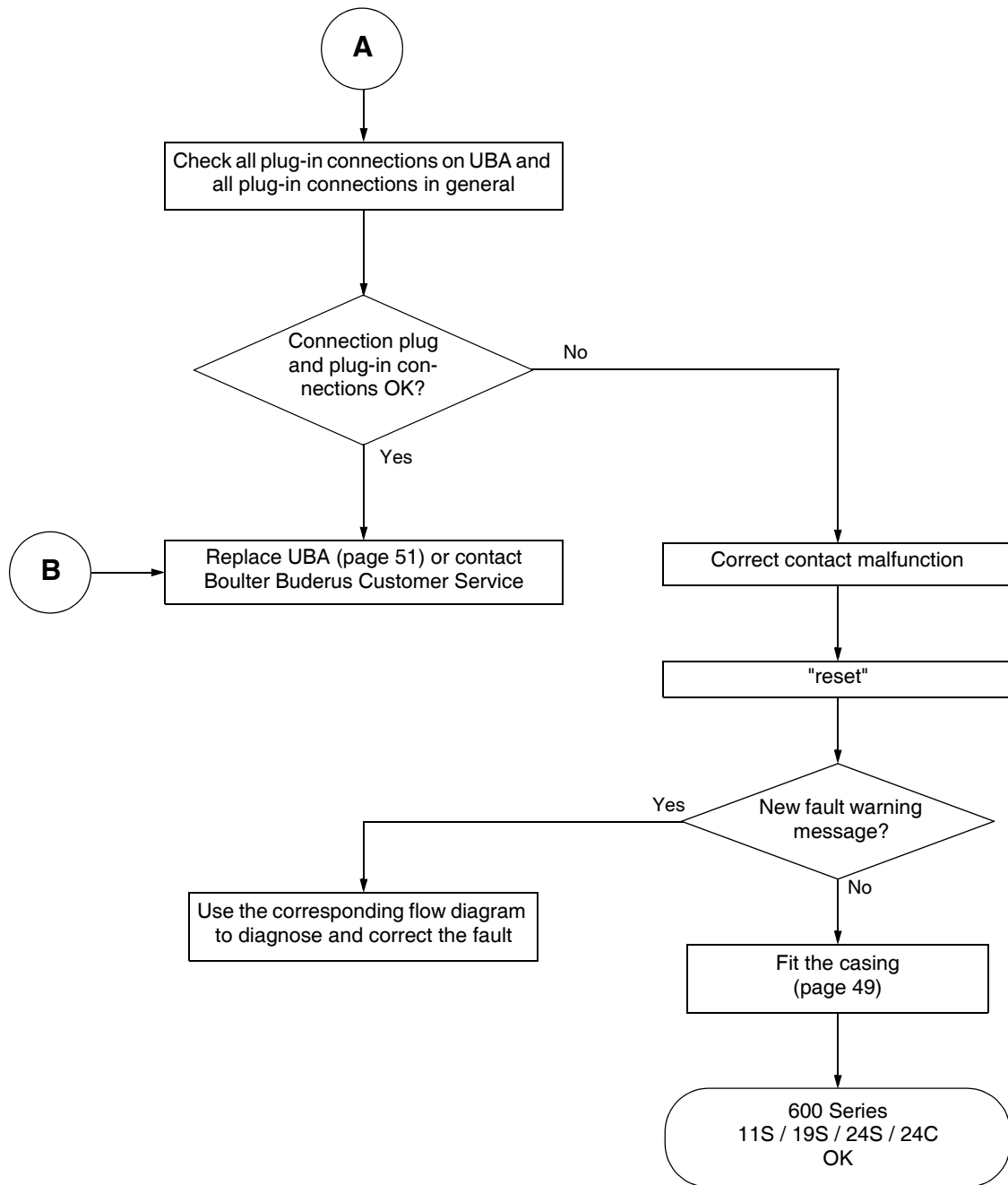


Fig. 43 Continued malfunction: No heating operation, despite request for activation and display message indicating that system is ready for use

3.1 Troubleshooting tasks



CAUTION

All work on the gas supply must be carried out by a Gas Safe registered engineer.
All work on water and electrical supplies must be carried out by a competent person.

3.1.1 Unblocking the 600 Series 11S / 19S / 24S / 24C

Press the "reset" button (fig. 44) after rectifying each fault.
A letter "r" will appear on the display.
This unblocks the UBA and returns it to standby mode.



NOTE

The system cannot be unblocked by disconnecting at the master switch.

If the "reset" button is not kept pressed for long enough, the display will first show a "7" and, after the Service button is pressed, a "C".
Unblock by pressing the "reset" button once more and keeping it pressed for the required time.

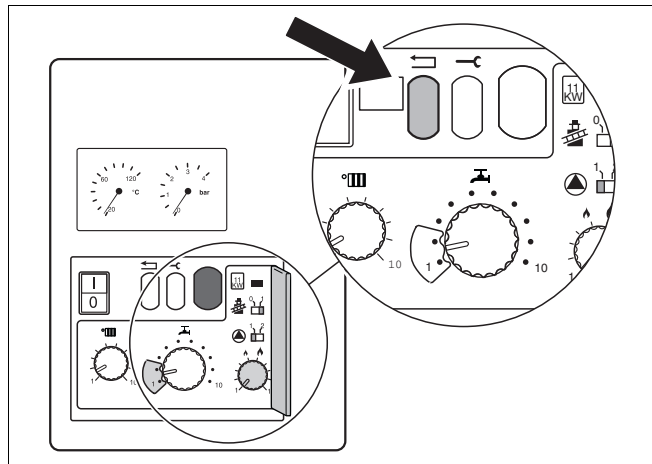


Fig. 44 "Reset" button

3.1.2 Chimney-sweep mode

Certain troubleshooting tasks must be carried out with the 600 Series 11S / 19S / 24S / 24C in heating mode.

- Before proceeding, open the cover of the second operating level on the UBA (fig. 45).
- Set the chimney-sweep switch to "1".
- Remember to return the chimney-sweep switch to "0" once work is complete.
- Close the cover of the second operating level on the UBA.



NOTE

The system cannot be used to supply hot water while it is in chimney-sweep mode. With chimney sweep mode activated, the boiler heats up to its preset feed temperature.

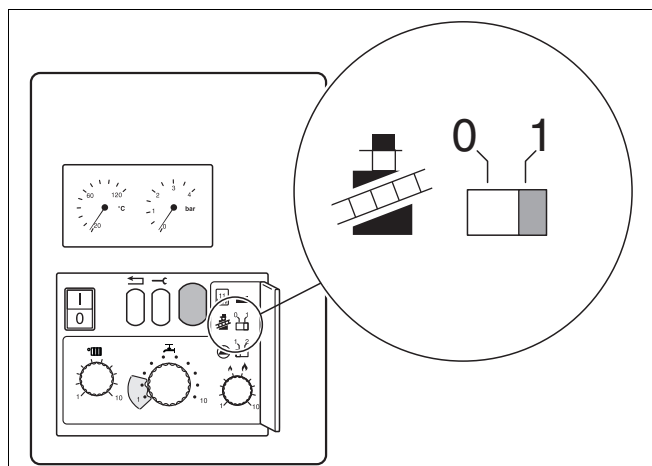


Fig. 45 Chimney-sweep switch

3.1.3 Removing and refitting the outer casing

- Note current display.
- Set the mains switch to "0".
- Loosen the fixing screw (fig. 46, item 1).
- Detach the outer casing.
- To refit the casing, follow the above procedure in reverse order. Then return the mains switch to "1".

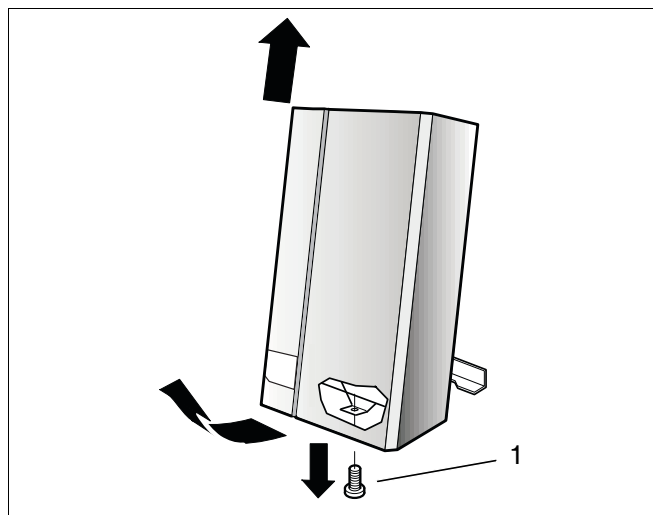


Fig. 46 Remove outer casing

3.1.4 Removing and refitting the combustion-chamber cover

- Open the clip fastenings (fig. 47, item 1).
- Remove combustion-chamber cover.
- To refit the cover, follow the above procedure in reverse order.

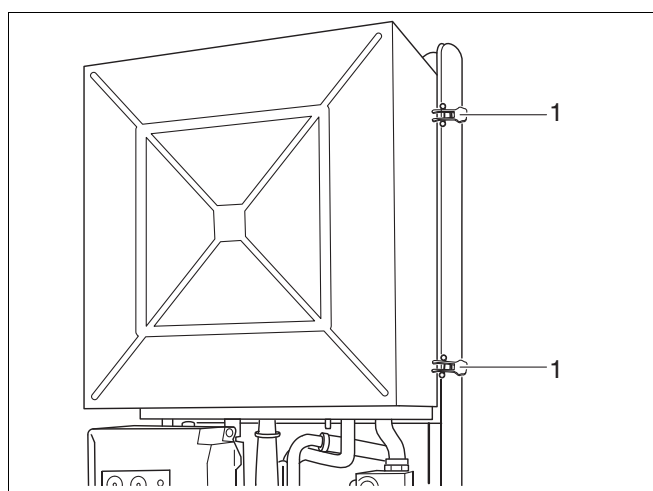


Fig. 47 600 Series 11S / 19S / 24S / 24C:
Remove combustion-chamber cover

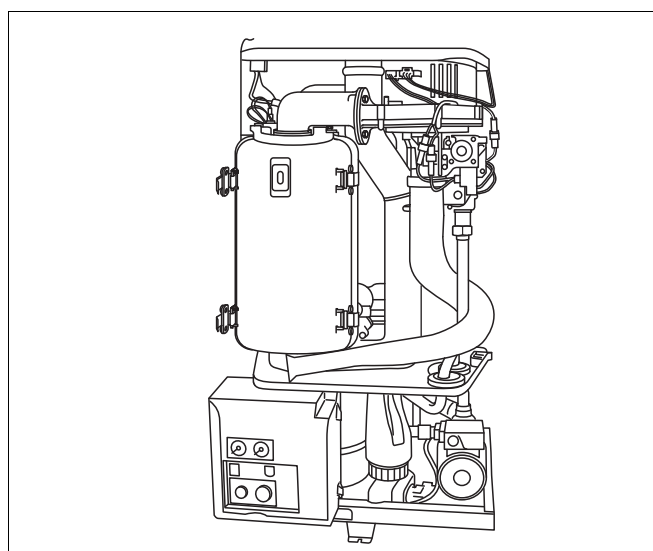
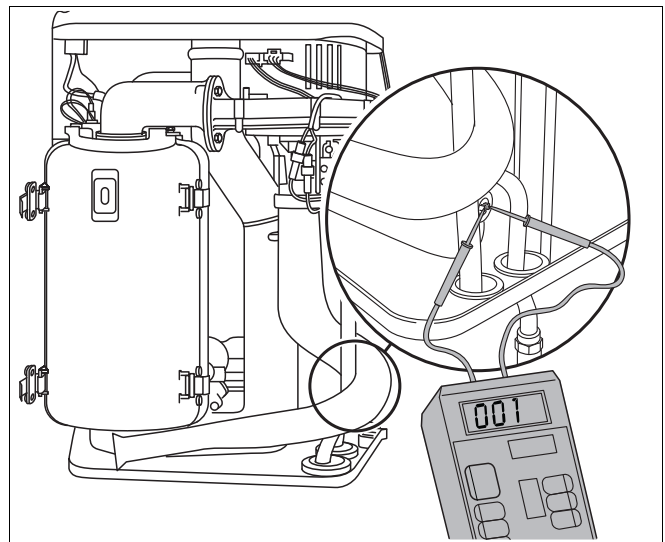


Fig. 48 600 Series 24C: Combi-unit

3.1.5 Checking the exhaust-gas sensor

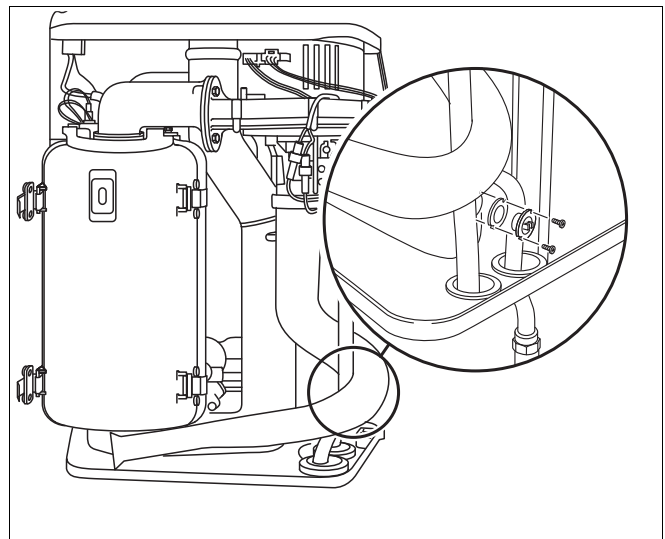
- Detach plug-and-socket connection on cable to exhaust-gas sensor. Ensure that no cable is earthed (grounded) at any point.
- Allow the exhaust-gas sensor to cool down.
Activation temperature:
600 Series 11S / 19S / 24S / 24C: 105 °C
- Check exhaust-gas sensor for free throughput. If throughput is not free, the exhaust-gas sensor is defective.
- Replace any exhaust-gas sensor found to be defective. Ensure you use only genuine Buderus spare parts.
- If the exhaust-gas sensor is working correctly, plug it in once more.



*Fig. 49 600 Series 11S / 19S / 24S / 24C:
Checking the exhaust-gas sensor*

3.1.6 Replacing the exhaust-gas sensor

- Unscrew the flow-backup mounting.
- Detach the cable plug at the exhaust-gas sensor.
- Loosen both retaining screws on the exhaust-gas sensor.
- Remove the exhaust-gas sensor and replace with a new unit (fig. 50).
- Retighten the retaining screws.
- Reconnect the cable plug.
- Screw the mounting into place.



*Fig. 50 600 Series 11S / 19S / 24S / 24C:
Replacing the exhaust-gas sensor*

3.1.7 Checking the air intake and outlet openings

- Check to ensure that the air intake and outlet openings are of sufficient size, and that they are not obstructed or clogged.

3.1.8 Replacing the UBA

- Disconnect the system from the power supply.
- Loosen crosshead screw (fig. 51, item 1) on UBA housing.
- Swivel UBA housing downwards.

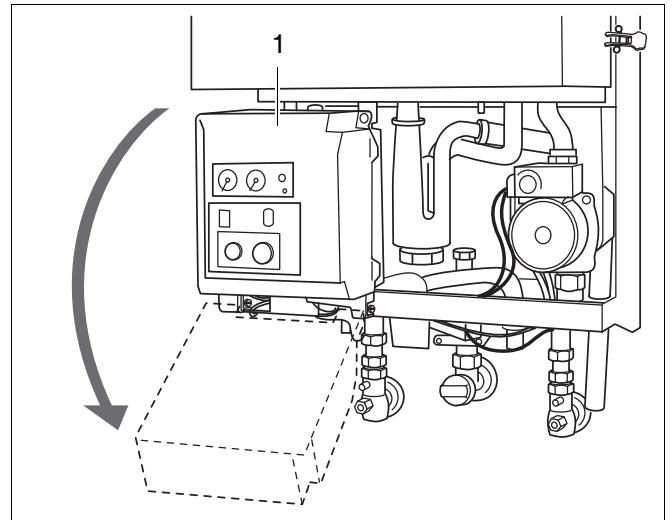


Fig. 51 Swivel UBA housing downwards

- Open the UBA housing (fig. 52).
- Note the position of the cable plugs, disconnect all cable plugs.
- Open the mains connection box by loosening the screw.
- Loosen the four screws and remove the strain-relief clamp.

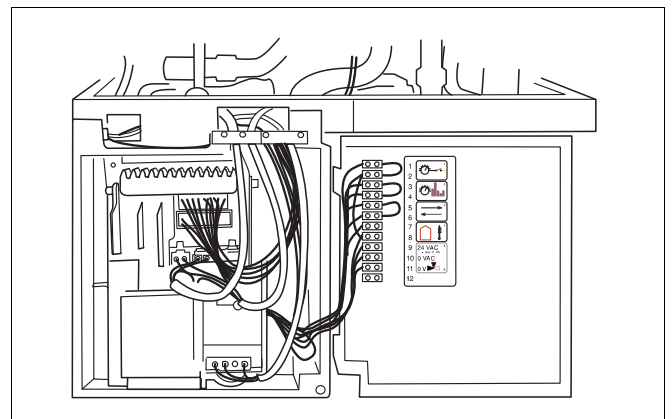


Fig. 52 Opening the UBA housing

- Carefully lift the UBA and remove by pulling forwards (snap lock) (fig. 53).
- Fit new UBA.
- Reconnect all plug-in cables to their correct sockets.
- Feed the mains lead in through the strain-relief clamp in the connection box and connect to the terminals as per the wiring diagram.
- Retighten the strain-relief clamp and shut the connection box.
- Shut the mains connection box.
- Shut the UBA housing.
- Swivel the UBA housing upwards and screw into place.
- Fit the casing.
- Connect system to mains power supply.

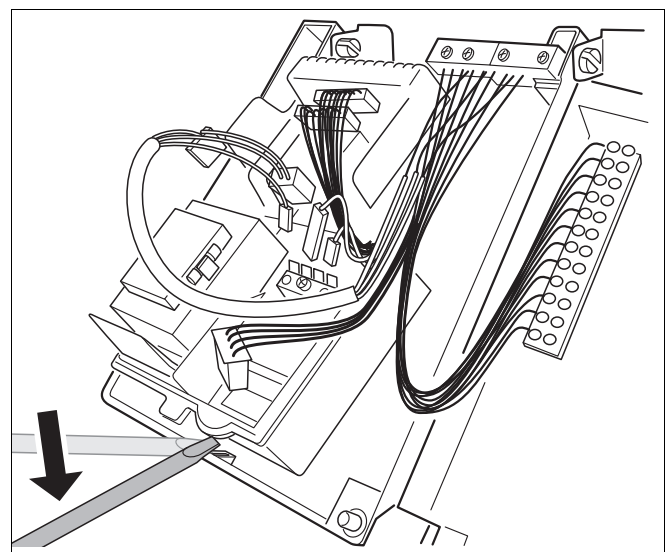


Fig. 53 Carefully lift the UBA to remove

3.1.9 Checking the fan

- Set the mains switch to “0”.
- Disconnect the fan's plug and socket connection.
- Connect a multimeter (230 V AC).
- Turn the mains power switch to “1”.
- Take voltage reading at measuring device.
If the voltage reading is 230 V, the power supply is in order.
- Set the mains switch to “0”.
- If the power supply is in order, plug the unit in once more.
- Turn the mains power switch to “1”.
- If the fan now fails to run, it must be replaced.
- If the fan runs at only partial load (i.e. effective operation of the boiler is not possible), troubleshooting should start at the connection cable to the UBA or UBA.

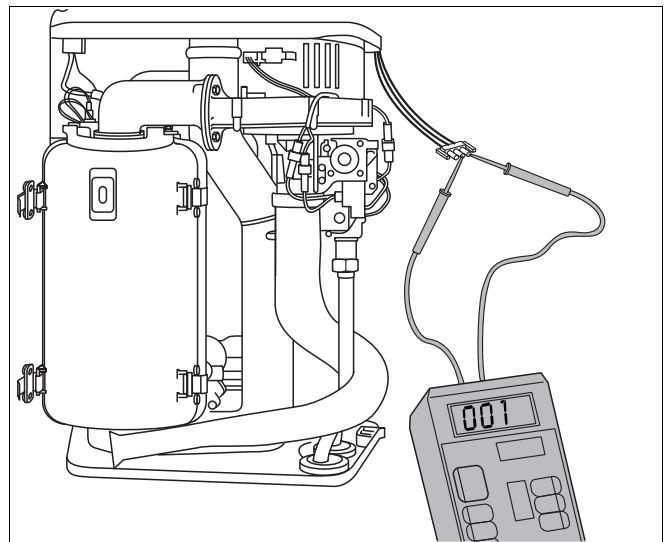


Fig. 54 Checking the fan

3.1.10 Replacing the fan

- Shut the gas cock.
- Disconnect the system from the power supply.
- Disconnect the fan, using the plug and socket from the power supply (fig. 55, item 1), loosen the UBA control line at the fan (fig. 55, item 2) and the gas burner fitting (fig. 55, item 3).
- Loosen the union nut (fig. 55, item 4) on the gas burner fitting.

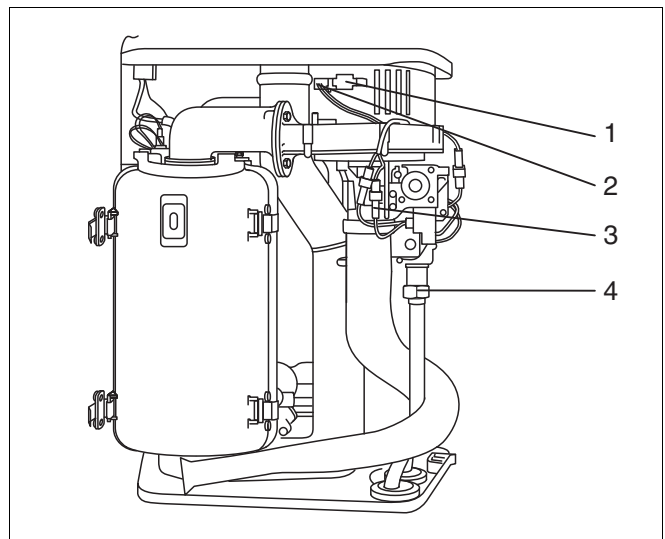


Fig. 55 Replacing the fan on the 600 Series:
Loosen plug and union nut

- Push the safety plate out of the way (fig. 56, item 1).
- Turn air suction tube and pull off from below.

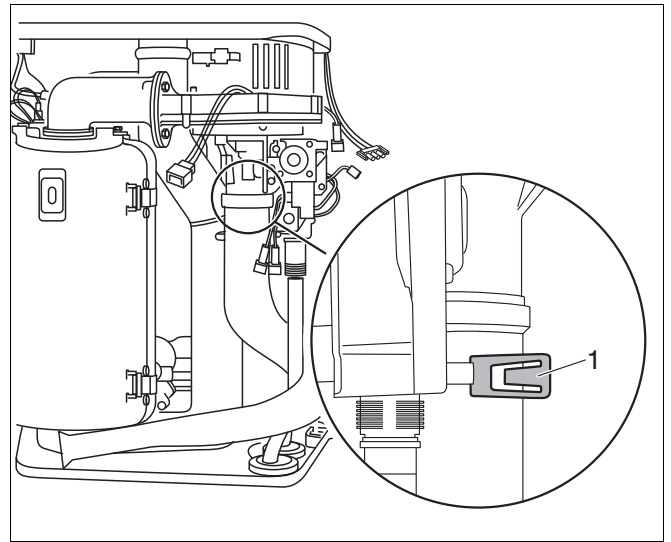


Fig. 56 Replacing the fan on the 600 Series:
Remove the air suction tube

- Swivel the "CombiVENT" gas combination unit forward (fig. 57, item 1)
- Remove the "CombiVENT" gas combination unit from its bayonet connector and pull upwards to detach (fig. 57, item 2).

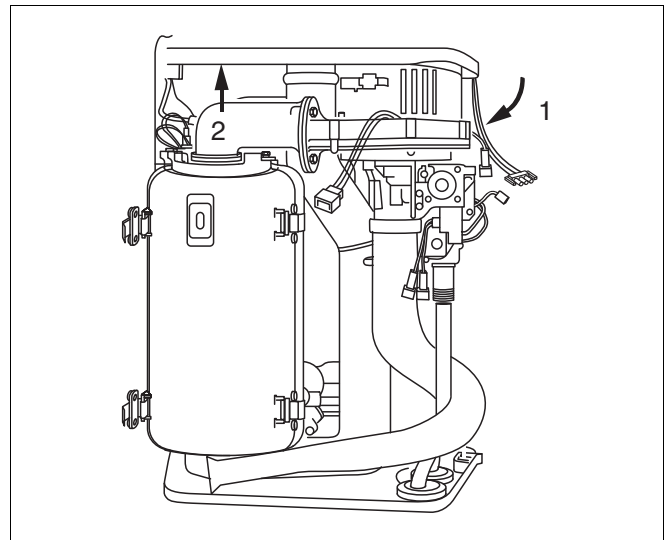


Fig. 57 Replacing the fan on the 600 Series:
Remove the gas connection unit

- Detach the fan by loosening the 2 x 2 screws on the connection unit.
- Replace the fan.
- Refit by following the above procedure in reverse.



NOTE

Once installation has been completed successfully, carry out leak testing as per "Installation and Servicing Instructions" supplied with 600 Series 11S / 19S / 24S / 24C.

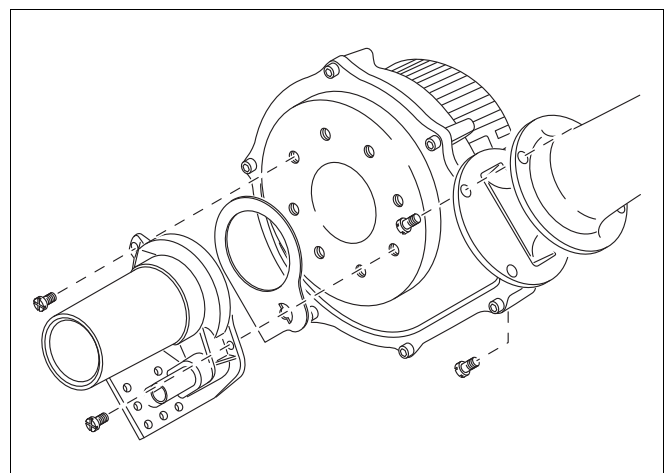


Fig. 58 Replacing the fan on the 600 Series:
Replace the fan

3.1.11 Checking the wiring connections of the UBA

- Disconnect the system from the power supply.
- Loosen crosshead screw on UBA housing.
- Swivel UBA housing downwards.
- Open the UBA housing.
- Check all cable terminals for tightness and resecure/retighten as required.
- Shut the UBA housing.
- Swivel the UBA housing upwards and screw into place.
- Connect system to mains power supply.

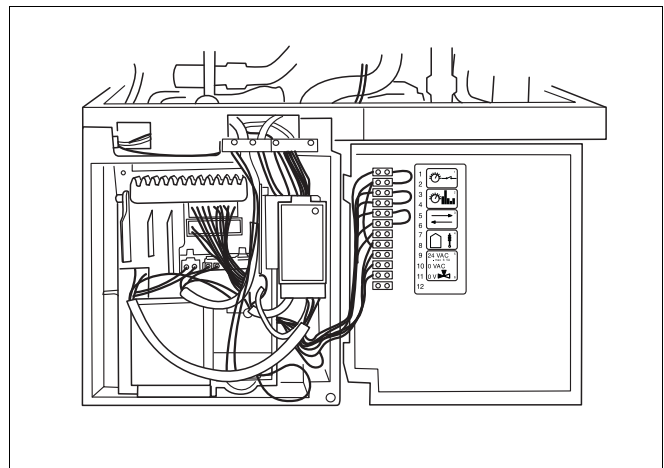


Fig. 59 Checking the wiring connections of the UBA

3.1.12 Checking the miniature fuses

- Disconnect the system from the power supply.
- Loosen crosshead screw on UBA housing.
- Swivel UBA housing downwards.
- Open the UBA housing.
- Check miniature fuses (fig. 60) for correct functioning, or carry out visual inspection. If defective, fit new fuse (1.25 AT).

Fuse	Function
1	Hot surface ingitor
2	UBA, sensors, thermostat valve
3	UBA, three-way valve

- Shut the UBA housing.
- Swivel the UBA housing upwards and screw into place.
- Connect system to mains power supply.

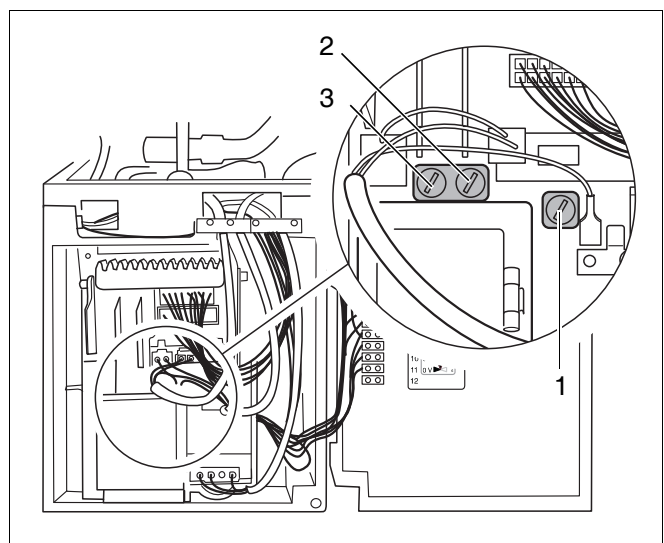


Fig. 60 Checking the miniature fuse

3.1.13 Checking the connections for the second solenoid valve, modulating pump and floor thermostat switching contact

- Pull on mains connection box to detach.
- Check connections of second solenoid valve (fig. 61, item 1), modulating pump (fig. 61, item 2) and floor thermostat switching contact (fig. 61, item 3).

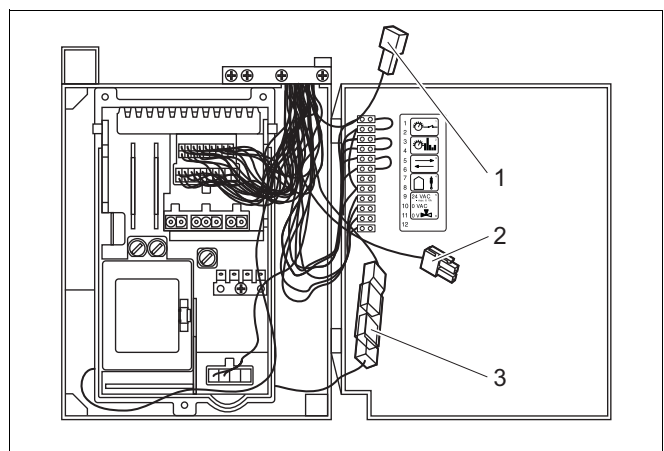


Fig. 61 Connections for the second solenoid valve, modulating pump and external switching contact

3.1.14 Checking the circulation pump

- Remove screw plug on circulation pump (fig. 62).
- Turn the UBA mains power switch to "I".
- Check to ensure that the circulation pump is running. The circulation pump's running mechanism may become blocked if the heating system has been out of use for an extended period. Use a screwdriver to rotate the circulation pump in its normal running direction and release the blockage in question. If this procedure does not work, replace the circulating pump.
- If the circulation pump is working correctly, screw the plug back in.

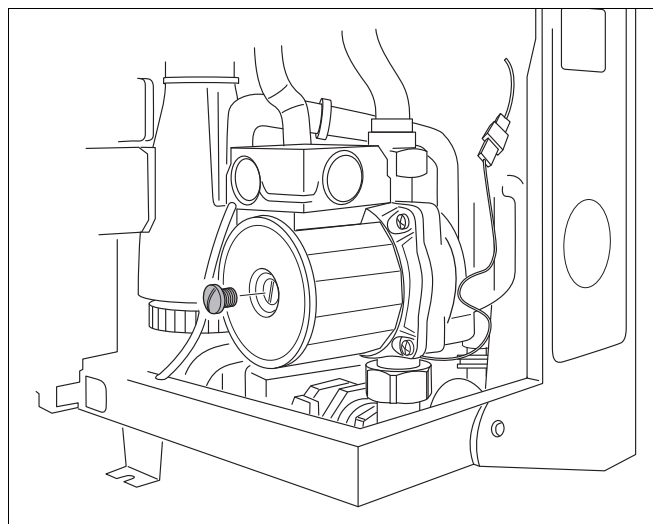


Fig. 62 600 Series 11S / 19S / 24S / 24C:
Checking the circulation pump

3.1.15 Replacing the circulation pump

- Disconnect the system from the power supply.
- Shut the servicing cock.
- Drain the 600 Series 11S / 19S / 24S / 24C as per the "Installation and Servicing Instructions".
- Loosen the screw on the terminal box (fig. 63, item 2) of the circulation pump and open the terminal box. Note the wiring layout, and loosen the cables (fig. 63, item 1).
- Loosen the screw-in connections on the circulation pump (fig. 63, item 3) and remove the pump.
- Fit new pump and connect to system.
- Connect cables in previously-noted order inside terminal box, close terminal box and screw shut.
- Connect system to mains power supply.
- Open servicing cocks.

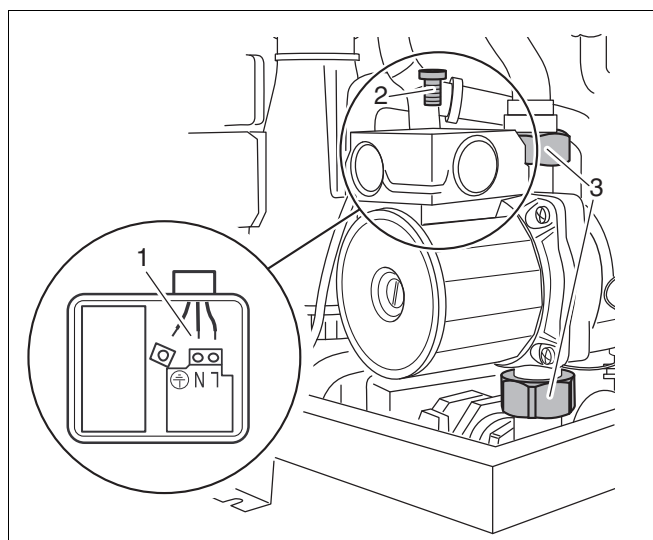


Fig. 63 600 Series 11S / 19S / 24S / 24C:
Replacing the circulation pump



NOTE

Fill the 600 Series 11S / 19S / 24S / 24C and purge the system of air as indicated in the installation and servicing instructions.

3.1.16 Checking the safety sensor

- Unplug cable connection from sensor.
- Measure resistance of sensor (fig. 64, item 1).
- Use a second-reading thermometer to measure the temperature around the sensor.
- Compare readings with values shown in table 3 on page 58. If there is any mismatch (i.e. > 5%), the sensor is defective.
- If the sensor is working correctly, plug it in once more.

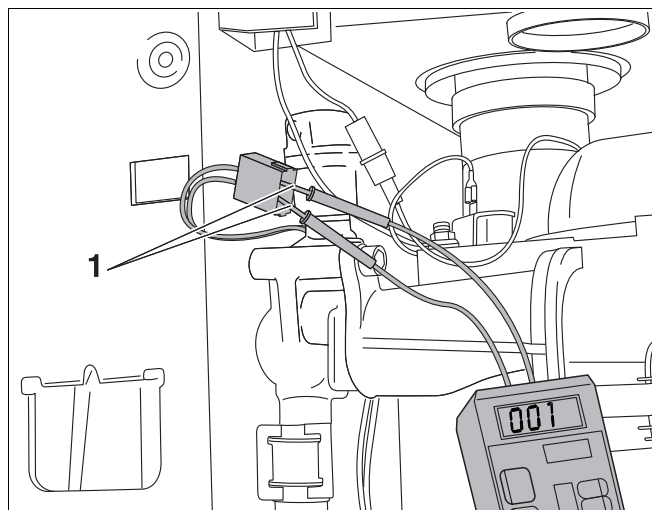


Fig. 64 600 Series 11S / 19S / 24S / 24C:
Checking the safety sensor

3.1.17 Replacing the safety sensor

- Shut the servicing cock.
- Drain the 600 Series 11S / 19S / 24S / 24C as per the "Installation and Servicing Instructions".
- Loosen the plug-in connection (fig. 65, item 1).
- Unscrew the sensor (fig. 65, item 2) and replace with a new unit.
- Plug in cable connection.
- Open servicing cocks.

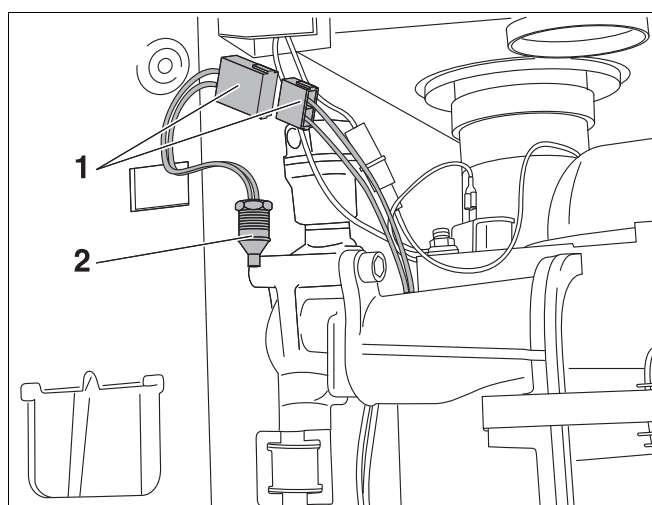


Fig. 65 600 Series 11S / 19S / 24S / 24C:
Replacing the safety sensor



NOTE

Fill the 600 Series 11S / 19S / 24S / 24C and purge the system of air as indicated in the installation and servicing instructions.

3.1.18 Checking the safety sensor connection lead

Check to ensure that all plug-in connections on the sensor and UBA are in order. Note that an incorrectly-inserted plug can lead to the generation of error messages. Start up the boiler by pressing the "reset" button.

- Set the mains switch to "0".
- Disconnect the system from the power supply.
- Unplug cable connection from feed sensor.
- Disconnect 18-pin plug from UBA.
- Use a continuity tester to check the cable between the plug-in connection and the 18-pin plug in the UBA. The test should be carried out on connections 06-18 and 08-18 (fig. 66).
- If the cables are in order, plug them in.
- Connect system to mains power supply.
- Turn the mains power switch to "I".

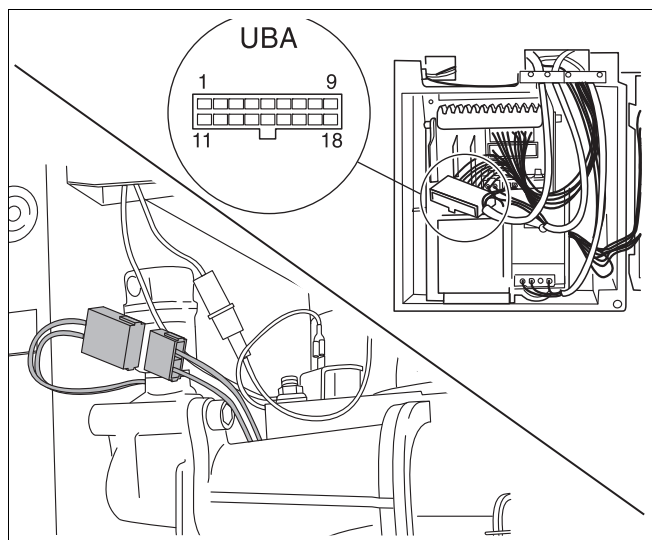


Fig. 66 600 Series 11S / 19S / 24S / 24C:
Checking the safety sensor connection lead

3.1.19 Checking the feed sensor

- Unplug cable connection from sensor.
- Measure resistance of sensor (fig. 67, item 1).
- Use a second-reading thermometer to measure the temperature around the sensor.
- Compare readings with values shown in table 3 on page 58. If there is any mismatch (i.e. > 5%), the sensor is defective.
- If the sensor is working correctly, plug it in once more.

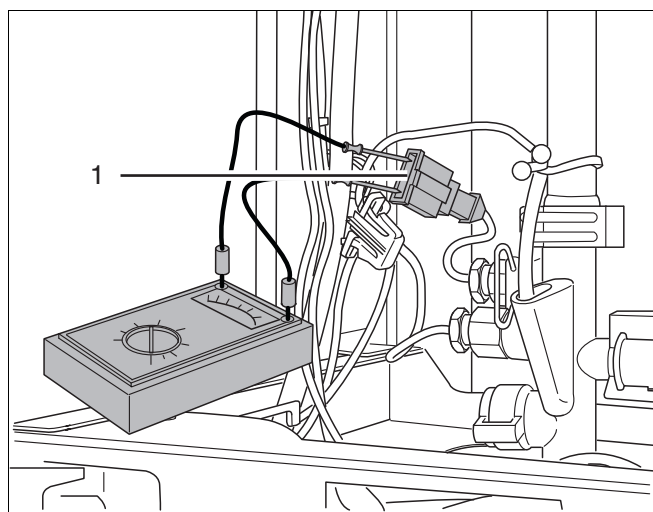


Fig. 67 600 Series 11S / 19S / 24S / 24C:
Checking the feed sensor

3.1.20 Replacing the feed sensor

- Shut the servicing cock.
- Drain the 600 Series 11S / 19S / 24S / 24C as per the "Installation and Servicing Instructions".
- Loosen the plug-in connection (fig. 68, item 1).
- Unscrew the sensor (fig. 68, item 2) and replace with a new unit.
- Plug in cable connection.
- Open servicing cocks.



NOTE

Fill the 600 Series 11S / 19S / 24S / 24C and purge the system of air as indicated in the installation and servicing instructions.

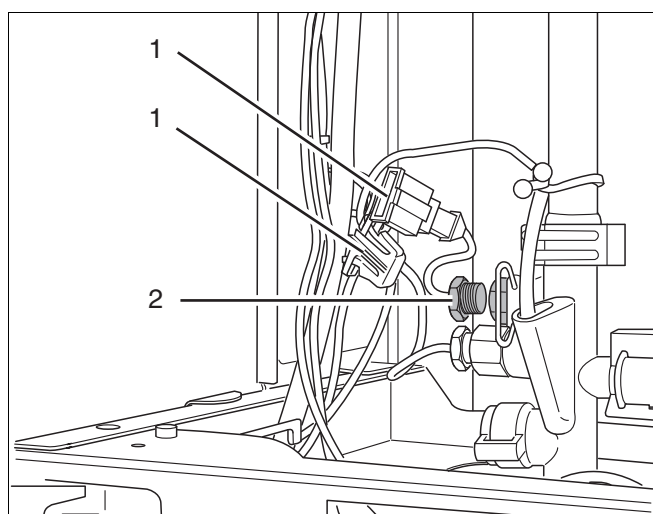


Fig. 68 600 Series 11S / 19S / 24S / 24C:
Replacing the feed sensor

3.1.21 Checking the feed sensor connection lead

Check to ensure that all plug-in connections on the sensor and UBA are in order. Note that an incorrectly-inserted plug can lead to the generation of error messages. Start up the boiler by pressing the "reset" button.

- Set the mains switch to "0".
- Disconnect the system from the power supply.
- Unplug cable connection from feed sensor.
- Disconnect 20-pin plug from UBA.
- Use a continuity tester to check the cable between the plug-in connection and the 20-pin plug in the UBA. The test should be carried out on connections 05-20 and 18-20 (fig. 69).
- If the cables are in order, plug them in.
- Connect system to mains power supply.
- Turn the mains power switch to "I".

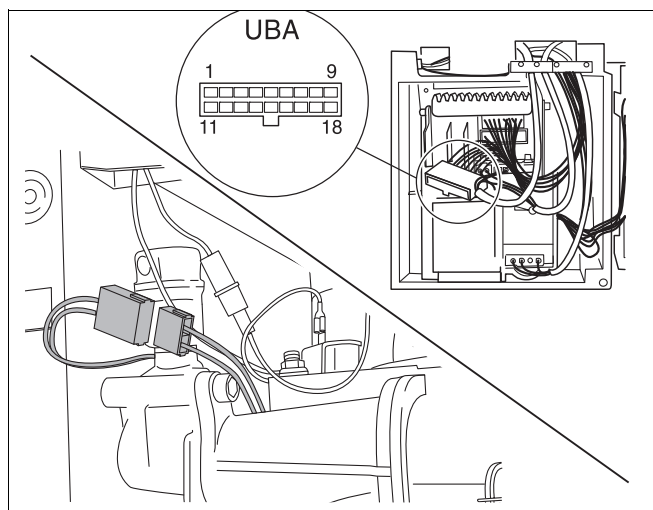


Fig. 69 600 Series 11S / 19S / 24S / 24C:
Checking the feed sensor connection lead

3.1.22 Checking the domestic hot water / mains water supply

- Disconnect the plug-and-socket connection on the hot-water sensor cable (fig. 70, item 1) and/or the mains-water sensor (fig. 70, item 2).
- Measure resistance, take a temperature reading at the thermal pressure gauge (tolerance ± 5 K) and compare with the values listed in table 3. If there is any marked mismatch, the hot-water sensor is defective.
- If the hot-water/mains-water sensor is in order, plug it back in.

Temperature [°C]	Resistance [Ω]
0	29490
5	23462
10	18787
15	15136
20	12268
25	10000
30	8197
35	6754
40	5594
45	4656
50	3893
55	3271
60	2760
65	2339
70	1990
75	1700
80	1458
85	1255
90	1084
95	939,6
100	817,2

Table 3 Resistance values for hot-water/mains-water sensor (approximate values)

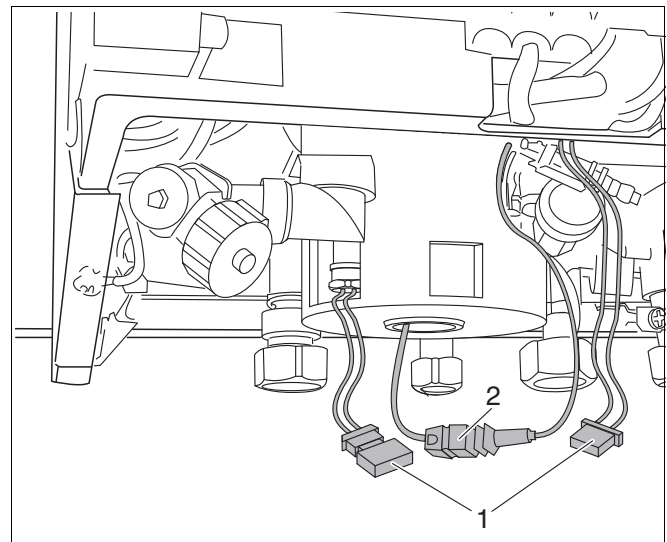


Fig. 70 Checking the domestic hot water / mains water supply

3.1.23 Changing the domestic hot water / mains water supply

- Shut the servicing cock.
- Drain the 600 Series 11S / 19S / 24S / 24C as per the "Installation and Servicing Instructions".
- Disconnection plug-and-socket connection on cable to hot-water/mains-water sensor.
- Remove insulation mounting (fig. 71, item 1) and detach insulation.

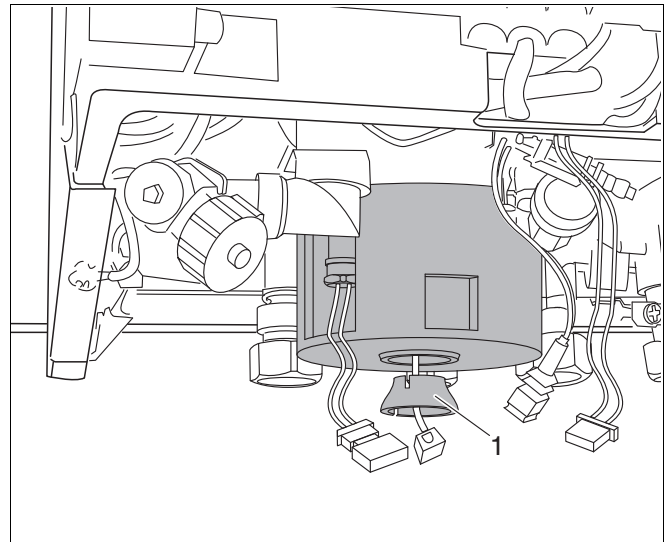


Fig. 71 Changing the domestic hot water / mains water supply

- Pull out the sensor fuses (fig. 72).
- Unscrew hot-water/mains-water sensor and replace with new unit.
- Refit insulation and corresponding mounting elements.
- Plug cable connection in once more.
- Open servicing cocks.
- Fill the 600 Series 11S / 19S / 24S / 24C and purge the system of air as indicated in the installation and servicing instructions.

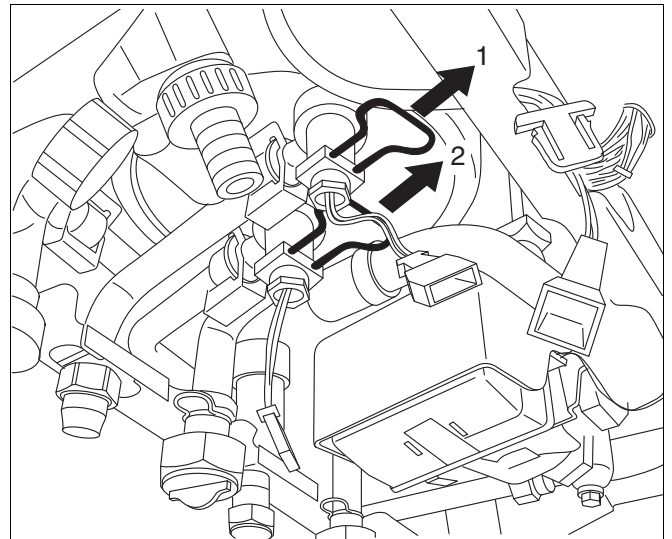


Fig. 72 Changing the domestic hot water / mains water supply

3.1.24 Checking the hot surface ingitor

- Disconnect the system from the power supply.
- Loosen crosshead screw on UBA housing.
- Swivel UBA housing downwards.
- Open the UBA housing.
- Unplug and remove hot surface ingitor from UBA housing (fig. 73).
- Check hot surface ingitor for free throughput. If throughput is free, the hot surface ingitor is in order.
- If the hot surface ingitor is in order, plug the cable into the UBA housing.
- Shut the UBA housing.
- Swivel the UBA housing upwards and screw into place.
- Connect system to mains power supply.

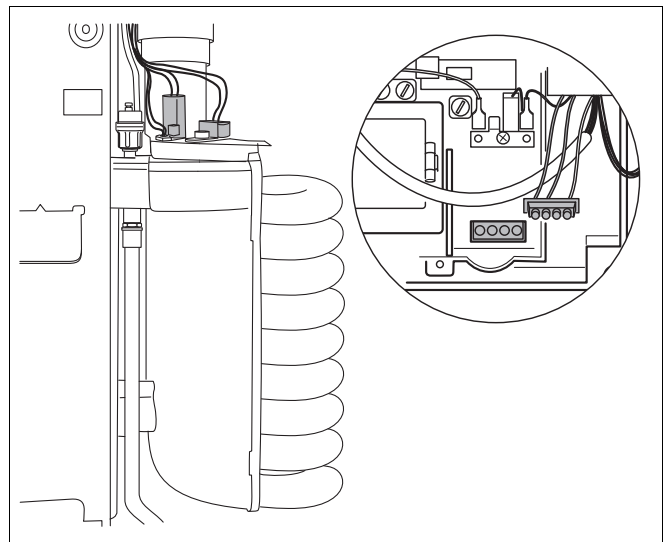


Fig. 73 Checking the hot surface ingitor

3.1.25 Replacing the hot surface ingitor

- Disconnect the system from the power supply.
- Remove combustion-chamber cover.
- Remove the earth (ground) lead from the hot surface ingitor (fig. 74, item 1).

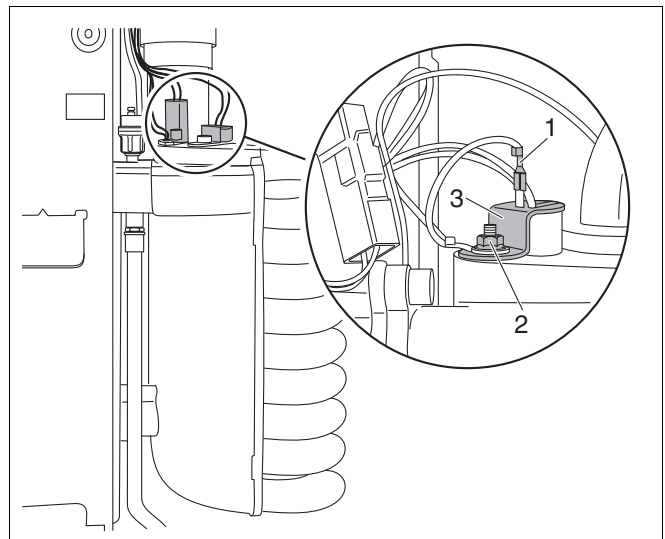


Fig. 74 Replacing the hot surface ingitor

- Loosen crosshead screw on UBA housing.
- Swivel UBA housing downwards.
- Open the UBA housing.
- Unplug hot surface ingitor connection cable from UBA housing (fig. 75).
- Loosen nut on clamp used to secure earth (ground) lead (fig. 74, item 2).
- Detach retaining plate of hot surface ingitor (fig. 74, item 3) and remove hot surface ingitor.

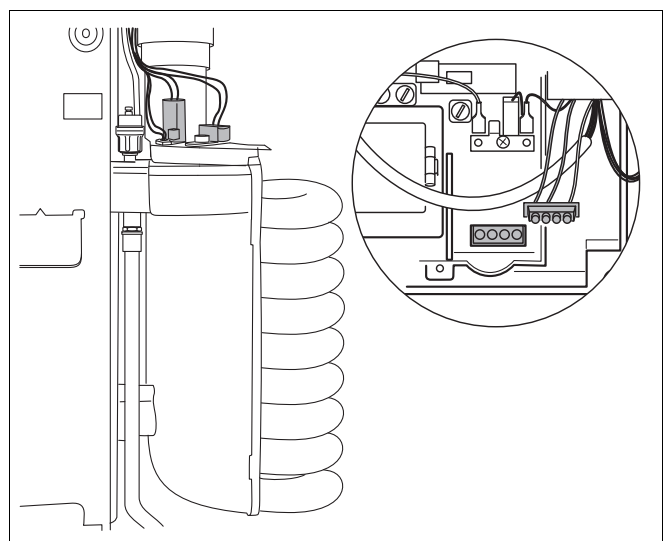


Fig. 75 Disconnect the plug-in cable from the UBA housing

3.1.26 Checking the gas-burner control system for correct activation

- Set the mains switch to “0”.
- Connect the multimeter (AC) to the plug-and-socket power-supply connection to the gas burner fitting.
- Turn the mains power switch to “I”.
- Set the chimney-sweep switch to “I”.
- Start up the device. Take a reading after about 30 seconds of running time.
- If the voltage reading is 24 V, the control system of the gas burner fitting is in order.
- When the test is complete, set the mains switch to “0”.

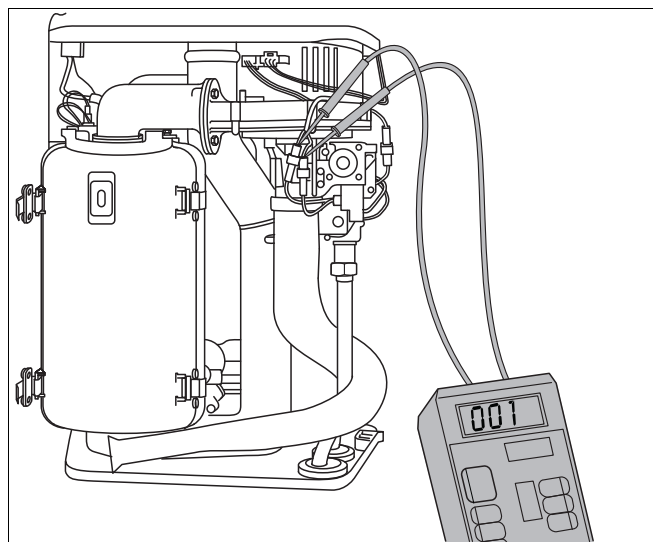


Fig. 76 600 Series 11S / 19S / 24S / 24C:
Checking the gas-burner assembly for correct activation

3.1.27 Replacing the gas burner fitting



DANGER !

All work on the gas supply must be carried out by a Gas Safe registered engineer.

- Shut the gas cock.
- Disconnect the system from the power supply.
- Disconnect the fan using the plug and socket (fig. 77, item 1), loosen the UBA control line at the fan (fig. 77, item 2) and the gas burner fitting (fig. 77, item 3).
- Loosen the union nut (fig. 77, item 4) on the gas burner fitting.

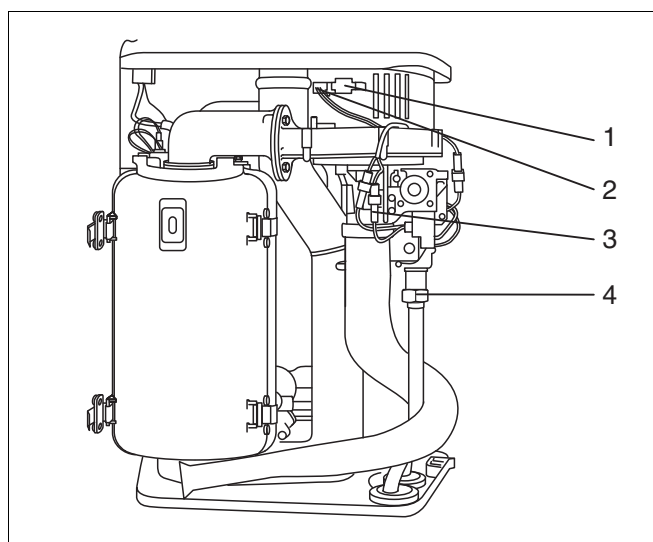


Fig. 77 Replacing the gas burner fitting on the 600 Series:
Loosen plug and union nut

- Push the safety plate out of the way (fig. 78, item 1).
- Turn air suction tube and pull off from below.

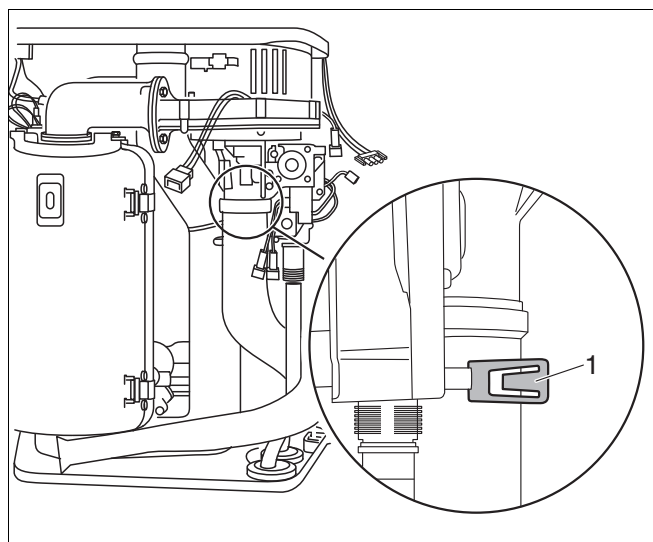


Fig. 78 Replacing the gas burner fitting on the 600 Series:
Remove the air suction tube

- Swivel the "CombiVENT" gas combination unit forward (fig. 79, item 1)
- Remove the "CombiVENT" gas combination unit from its bayonet connector and pull upwards to detach (fig. 79, item 2).

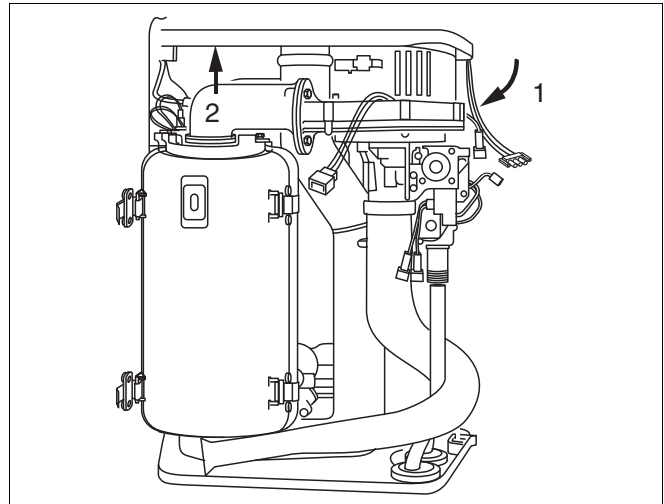


Fig. 79 Replacing the gas burner fitting on the 600 Series: Remove the gas connection unit

- Loosen the three screws (fig. 80).
- Screw the air suction tube safety plate into place (not supplied with new gas burner fitting).

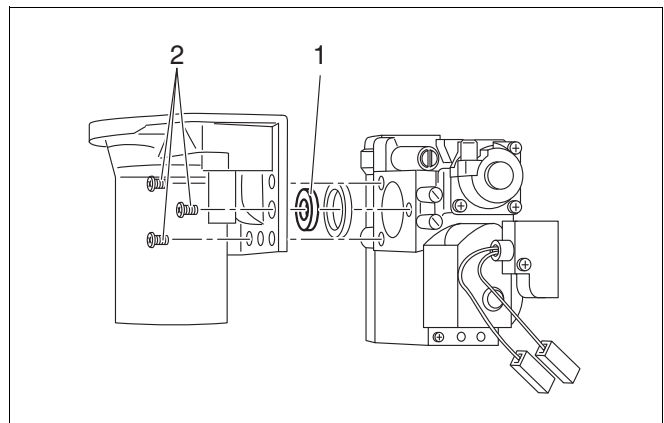


Fig. 80 Replacing the gas burner fitting on the 600 Series: Replace the gas burner fitting

3.1.28 Checking and adjusting the gas-to-air ratio

- Set mains switch (fig. 82, item 1) and chimney-sweep switch (fig. 82, item 3) to "0".
- Unscrew the sealing closure of the burner-pressure testing nipple by one turn (fig. 81).
- Set pressure gauge to zero.
- Connect the positive terminal of the pressure gauge with a hose to the burner pressure measuring nipple (fig. 81).



NOTE

The negative terminal of the pressure gauge MUST NOT be connected.

- Turn the mains power switch to "I" and the chimney-sweep switch to "1".
- When the burner has fired (after approx. 30 seconds), push the service button (fig. 82, item 2) and keep it pressed until "Y" is shown on the display.

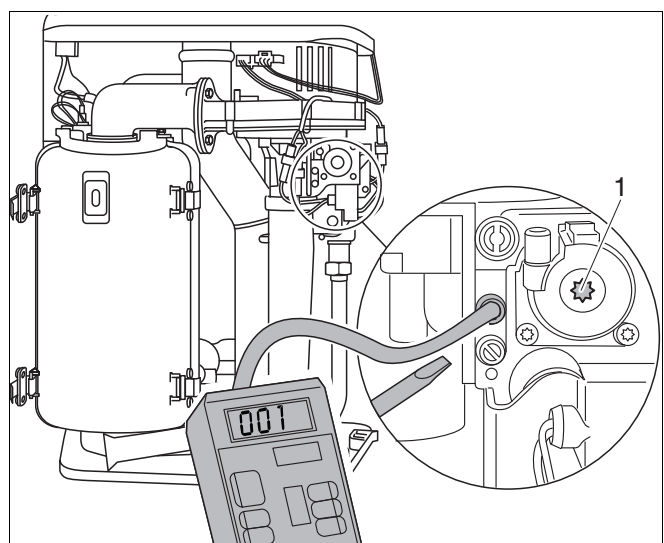


Fig. 81 Check the gas-air ratio

- Set the heating-capacity controller (fig. 82, item 4) to "1".
- Read the differential pressure. The differential pressure ($p_{\text{gas}} - p_{\text{air}}$) must be -5 Pa (± 5 Pa) (display on meter: -10 PA to 0 PA).
- In the event of any anomaly in the gas-to-air ratio, readjust at the setscrew (fig. 81, item 1).


NOTE

Remove the cover fixing screw before readjusting. The cover fixing screw must be secured before readings can be taken.

- Turn mains power switch and chimney-sweep switch to "0".
- Remove the measuring equipment and retighten the screw in the burner-pressure measuring nipple.
- Readjust the heating capacity controller to its original (factory default) setting.
- Turn the mains power switch to "1".

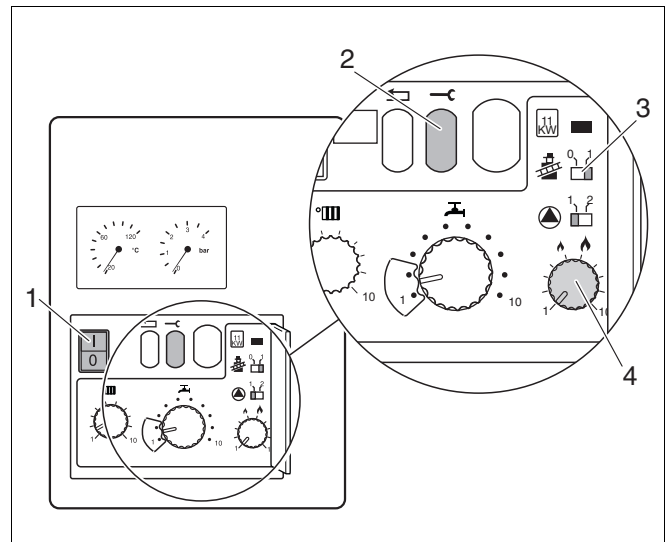


Fig. 82 Check the default gas-air ratio settings

3.1.29 Measuring the ionisation current

- Disconnect the system from the power supply.
- Loosen the plug-and-socket connector of the monitoring cable and connect the measuring device in series. Select the μA direct current range on the multimeter. The multimeter must have a resolution of at least $1 \mu\text{A}$.
- Reconnect the system to the power supply and turn the chimney-sweep switch to "1".
- Measure the ionisation current. The ionisation current must be $> 2 \mu\text{A DC}$.
- Enter the reading on the report form.
- Disconnect the system from the power supply.
- Remove the measuring device and restore the plug-and-socket connection to its original state.
- Turn the chimney-sweep switch to position "0".
- Refit the cover for 2nd control level.
- Reconnect the system to the power supply. When the display shows "7", press the service button to display "c". Press the "reset" button. The display shows "r".

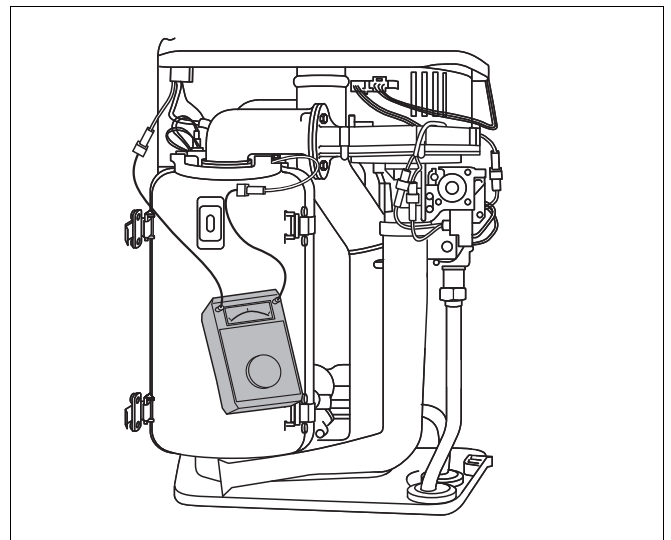


Fig. 83 Measuring the ionisation current

3.1.30 Replacing the ionisation electrode

- Remove the CombiVENT air combination unit as described in "Replacing the gas burner fitting" on page 61.
- Loosen the plug-and-socket connection of the ionization electrode.
- Loosen screw (fig. 84, item 1) by a half-turn and slide bar to remove.
- Pull electrode to remove, and fit new unit.
- Reassemble by following the above procedure in reverse.

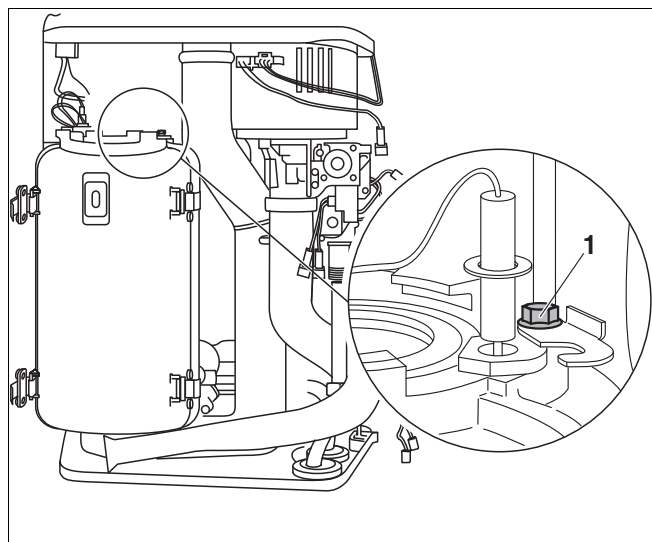


Fig. 84 Replacing the ionisation electrode

3.1.31 Checking the three-way motorised valve for correct operation

- Disconnect the system from the power supply, set mains switch to "0".
- Dismantle condensate trap.
- Remove protective cap from three-way valve.
- Remove bottom insulation from internal hot-water reservoir (applies to GB122-24K only).
- Push in catch on regulating motor and
- remove bayonet connector by twisting anticlockwise.
- Remove regulating motor.
- Set the mains switch to "I" and press the "reset" button.
- Once the 600 Series 11S / 19S / 24S / 24C is in operation, open one of the hot-water taps. The UBA displays " = ." for hot water. If the regulating motor starts up (check for movement of adjusting lever), the motorised head is working.
- Shut the hot-water tap.
- Set the mains switch to "0".
- If the motorised head is working, attach the regulating motor and lock into place by twisting the bayonet connector.
- Connect the system to the power supply, set the mains switch to "I" and press the "reset" button.

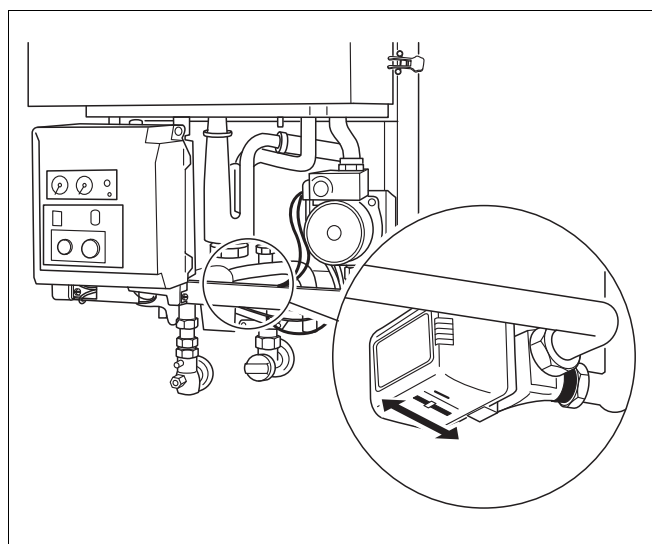


Fig. 85 600 Series 11S / 19S / 24S / 24C:
Checking the motorised head for correct operation

3.1.32 Replacing the motorised valve body control valve

- Shut the servicing cock and drain the 600 Series 11S / 19S / 24S / 24C as per the "Installation and Servicing Instructions".
- Dismantle condensate trap.
- Remove protective cap from three-way valve.
- Remove bottom insulation from internal hot-water reservoir (applies to 600 Serie 24 C only).
- Push in catch on regulating motor and remove bayonet connector by twisting anticlockwise.
- Remove regulating motor.
- Remove the control valve with a spanner and fit a new unit (fig. 86).
- Fit regulating motor and lock into place by twisting the bayonet connector.
- Reconnect the cable plug.



NOTE

Open servicing cocks, fill the 600 Series 11S / 19S / 24S / 24C and purge the system of air as indicated in the installation and servicing instructions.

- Set the mains switch to "I" and press the "reset" button.

3.1.33 Replacing the three-way valve



NOTE

Replace the three-way valve only if leaking occurs on the screw-in pipe connectors.
A: Mains water, **B:** Heating,
AB: Boiler feed line

- Shut the servicing cock and drain the 600 Series 11S / 19S / 24S / 24C as per the "Installation and Servicing Instructions".
- Dismantle condensate trap.
- Remove protective cap from three-way valve.
- Remove bottom insulation from internal hot-water reservoir (applies to 600 serie 24 C only).
- Push in catch on motorised valve head and remove bayonet connector by twisting anticlockwise.
- Remove motorised head.
- Loosen the 3 compression nuts (fig. 87).
- Remove three-way valve and fit new unit.
- Tighten the 3 compression nuts.
- Fit motorised valve head and lock into place by twisting the bayonet connector.
- Reconnect the cable plug.



NOTE

Open servicing cocks, fill the 600 Series 11S / 19S / 24S / 24C and purge the system of air as indicated in the installation and servicing instructions.

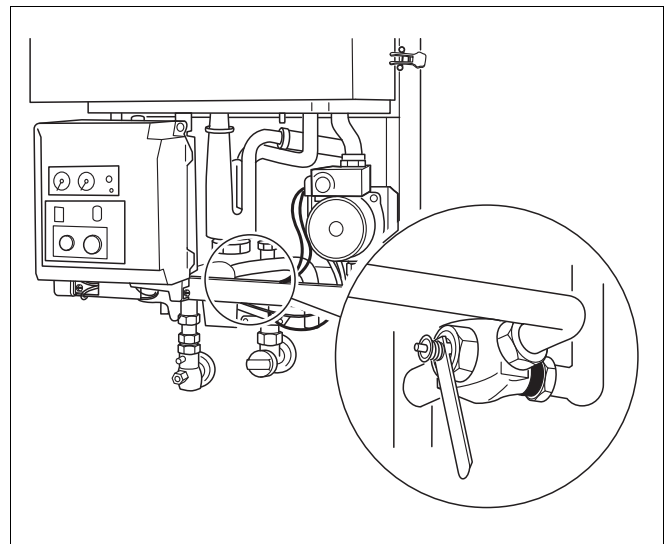


Fig. 86 600 Series 11S / 19S / 24S / 24C:
 Replacing the control valve

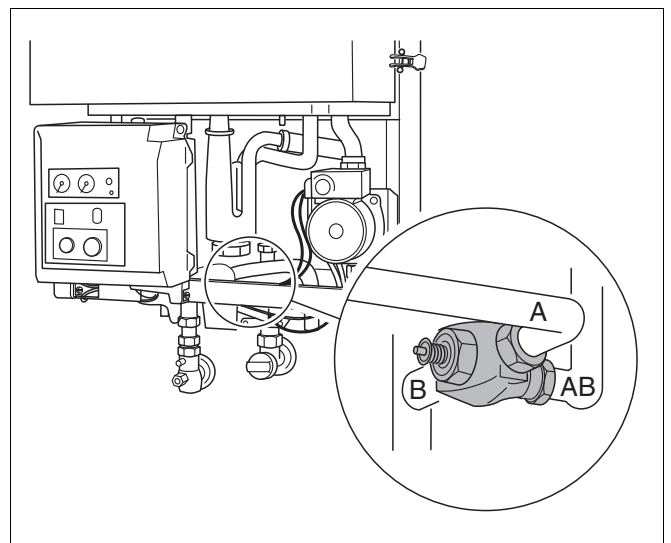


Fig. 87 600 Series 11S / 19S / 24S / 24C:
 Replacing the three-way valve

- Connect the system to the power supply, set the mains switch to “I” and press the “reset” button.

3.1.34 Checking the ERC/RC connections to the UBA

- Disconnect the system from the power supply.
- Loosen crosshead screw on UBA housing.
- Swivel the UBA housing downwards (fig. 88).
- Push in UBA housing on left-hand side and open to the right (fig. 89).
- Check to ensure that ERC or RC are correctly connected to 3 and 4.
- Terminals 1 and 2 should not be wired in any way. The unit is supplied with a dummy connector between terminals 1 and 2 (fig. 90). The DC voltage at terminals 3 and 4 should be approx. 11.5 V. If this is not so, the UBA or the cable harness is defective.

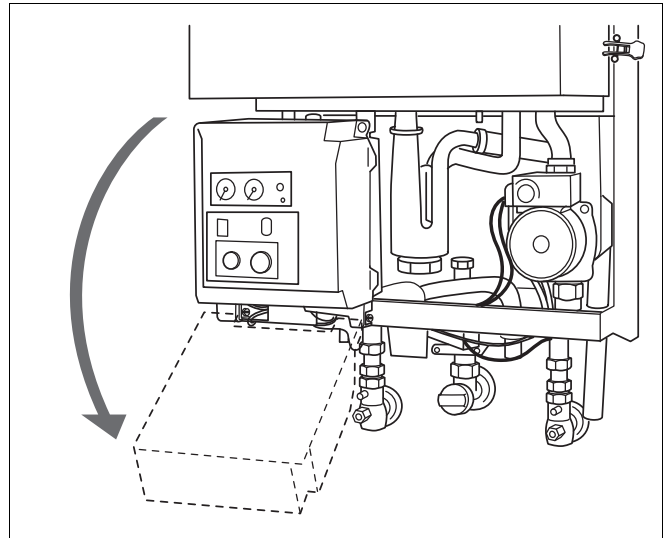


Fig. 88 Swivel UBA housing downwards

- Shut the UBA housing once more.
- Swivel the UBA housing upwards and screw into place.
- Connect system to mains power supply.
- Set the mains switch to “I” and press the “reset” button.

3.1.35 Replacing the terminal strip

- Note order of cable terminals. Loosen all cables.
- Connect the cables, in the right order, to the new terminal strip.

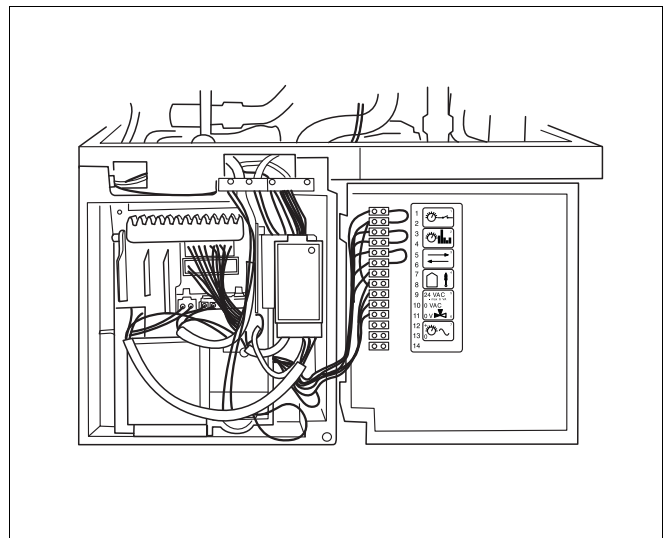


Fig. 89 Opening the UBA housing

3.1.36 Checking connections at the ERC or RC

- Check contact link between cable and ERC or RC.
- There should be a DC voltage of approx. 11.5 V at the ERC or RC.



NOTE

It is possible, in order to limit the source of errors, to disconnect the ERC or RC from the boiler (bridge required at 3 and 4) and to install a conductor bridge at 1 and 2 (fig. 90). The heating and hot-water requirement is then passed via the potentiometer setting of the UBA.

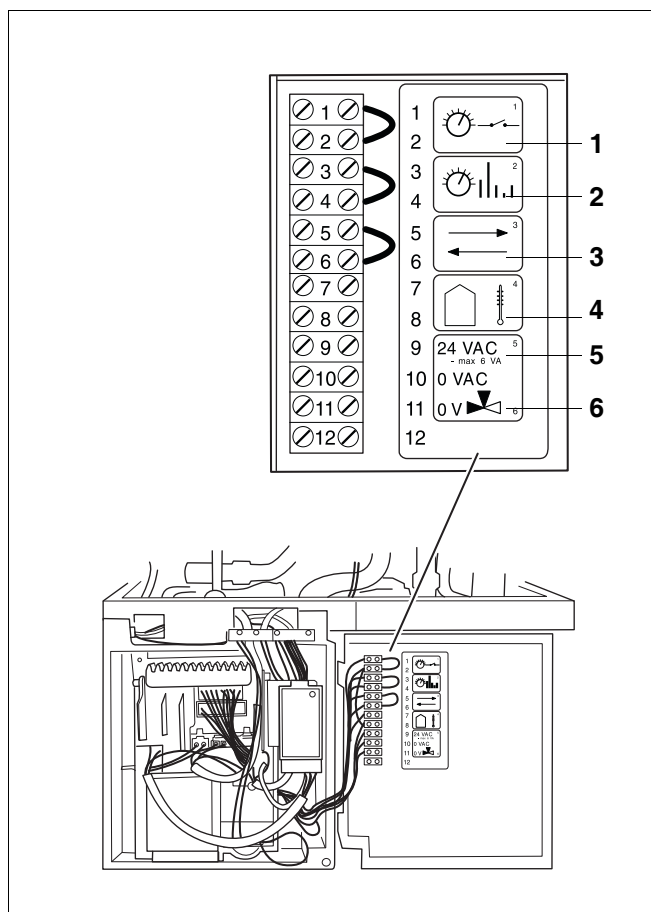


Fig. 90 Checking the controller-device connections at the boiler

Key to control-device connections:

- Item 1: ON/OFF temperature controller
- Item 2: Mod. room temperature controller (digital) ERC / RC
- Item 3: I/O port / communication port
- Item 4: Outdoor-temperature sensor
- Item 5: Power supply 24 VAC/max. 6 VA
- Item 6: Turn-on voltage for three-way valve (9+11)

3.1.37 Replacing the room-temperature control device

- Note order of cable terminals. Loosen all cables.
- Attach cables, in the right order, to the new room-temperature control device.
- Carry out the corresponding adjustment settings on the room-temperature control device.

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