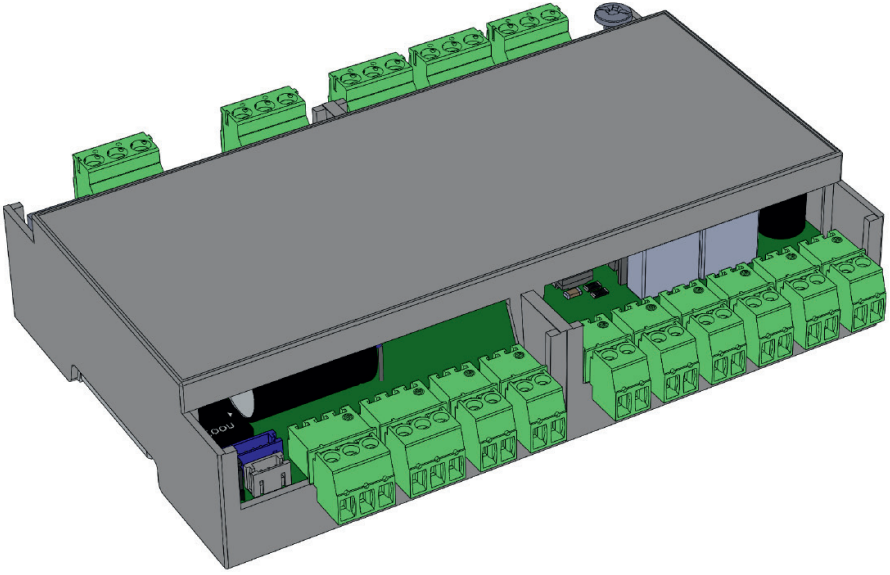


Installation and service instructions

S-Thermatik NEO

SPARTHERM®
THE FIRE COMPANY

CONTENTS

1. GENERAL INFORMATION

You have decided in favour of a Spartherm fireplace accessory - thank you for your confidence in our company.

These installation and service instructions provide details on the installation and start-up of the combustion control system.

Details on operation of the combustion control can be found in the **S-Thermatik NEO operating manual**.

Important information is printed in bold. Safety instructions are underlined and printed in bold - always comply with these points. Before using the appliance, please read the entire operating manual.

The combustion control system is pre-set to the nominal heat output of the fireplace. Information concerning the nominal heat output and the wood feed quantity can be found in the operating manual of the fireplace.

1.1 INFORMATION ON INSTALLATION

Please consult your district master chimney sweep before assembling and installing your fireplace. He will advise you on building regulations, will check the suitability of your chimney, will commission your fireplace insert and will issue the operating licence for your fire area.

When installing and operating the fireplace and connecting it to the chimney, comply with the national and European standards, the country-specific and local directives and regulations as well as the fire regulations for your state (in Germany only) and the Technical Rules of the Stove and Hot Air Heating System Trade (TROL).

All work on the electrical installation may only be performed by an authorised specialist company. All equipment must be switched off at the main switch before performing work on it.

1.2 SCOPE OF DELIVERY AND ACCESSORIES

Scope of delivery:

- 1 x Control system with plug connectors
- 1 x Power cable for the control system
- 1 x Display unit in black or white **(not with stoves)**
- 1 x Display cable, 5 metres **(not with stoves)**
- 1 x Wall socket for the display **(not with stoves)**
- 1 x Motor cable, 2 metres with connectors **(not with stoves)**
- 1 x exhaust gas temperature sensor, 3 or 5 metres(thermocouple Type K)
- 1 x Room temperature sensor, 2 metres
- 1 x Door contact switch for every fire door
- 1 x Actuator motor to control the combustion air
- 1 x Function-monitoring LED **(only with stoves)**
- 1 x Cover plate for the control system **(only with stoves)**
- 1 x Connector housing for the cable from the fireplace insert to the accumulator charge pump. This cable must be provided and connected by the customer.
- S-Thermatik NEO operating manual (for the customer)
- S-Thermatik NEO service manual (for the stove fitter)

With fireplaces, the actuator motor and the door contact are factory-fitted prior to delivery. The other components are supplied separately in the surrounding packaging. In contrast, stoves are pre-assembled completely and are supplied in a turnkey condition.

1.3 SYSTEM COMPONENTS FOR THE S-THERMATIK NEO

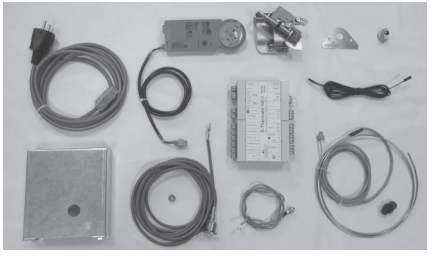
Depending upon the fire area in which the NEO is to be installed, different actuator motors are required for the combustion air control. For this reason, always state when ordering the control system which fire area the NEO is intended for.

The following components are variable and differ depending on the type of fire area:

- Version of actuator motor for the combustion air
- Number of door contact switches
- Version of motor holder for stoves

Here in this image, the S-Thermatik NEO in the version with an external, motor-driven throttle valve for combustion air. This variant is used for fireplaces that, for design reasons, do not have an installed rotary slide valve for the combustion air.

Above, you can see the typical version for fireplaces with a rotary slide valve.



Here is the version for stove applications.

1.4 ACCESSORIES

If needed, all conduits can be extended using normal copper cable, **but this does apply to the cable on the flue gas temperature sensor. Here, a special compensating line MUST be used.**

- 5m extension cable for flue gas sensor (Item no. 1013221)
- 10m extension cable for flue gas sensor (Item no. 1013222)

If the display cable is too short, special lengths up to 20 metres are available on request.

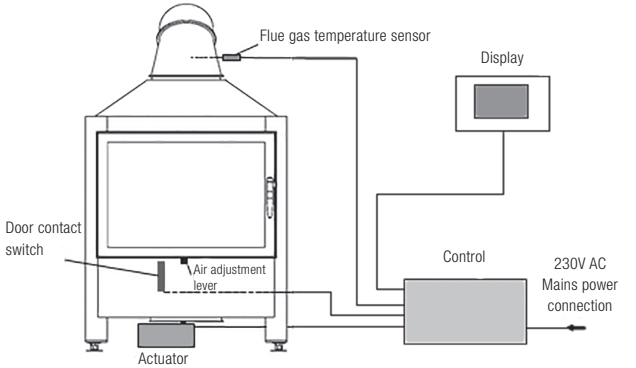
With appliances that circulate water, if the recirculating pump is to be controlled by the S-Thermatik NEO, at least 2, preferably 3 PT 1000 sensors should be ordered at the same time. This is the only way of ensuring that the "differential thermostat" function can be implemented together with the S-Thermatik NEO.

- Temperature sensor PT1000 (Item no. 1013765)
  Length 3 metres, incl. immersion sleeve with a G1/2" external thread

If the control system housing of the NEO is to be protected in a special manner, a dust protection box measuring 210 x 160 x 80 mm can be obtained in which the control system can be installed. **ATTENTION:** The cable housings (see 3.4) must be removed, otherwise the control system will not fit inside.

- Dust protection box for S-Thermatik NEO (part no. 1013792)

1.5 FUNCTIONAL DESCRIPTION OF S-THERMATIK NEO



The basic configuration of the **S-Thermatik NEO** combustion control system consists of the control unit, the display, a flue gas temperature sensor, an actuator motor and a door contact switch. It is only suitable for fire areas that burn split logs.

The combustion control system is activated when the firebox door is opened and is awakened from Standby mode. Depending on the prevailing flue gas temperature, the control system adjusts the motor using the air slider until the correct quantity of combustion air is directed into the appliance.

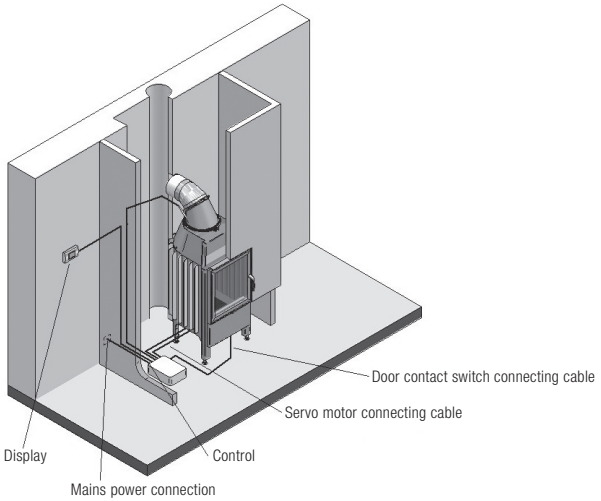
The control system remains active until the flue gas temperature has dropped to about 50°C and then it returns to Standby mode.

In the event of a power failure, the air slider automatically moves into a position in which the fire area can continue to be operated. Until power is restored, or until the fire is extinguished, no further interventions or measures are required.

2. SAFETY NOTES

- The S-Thermatik NEO combustion control may only be used in combination with a wood-fired fireplace.
- Only fire areas which are ordered with this combustion control system and that are appropriately prepared from the factory can be combined with the S-Thermatik NEO.
- The combustion control system cannot be retrofitted!
- The maximum ambient temperature for the electrical components is 50°C. Measures must be taken **by the customer** to ensure that this temperature is not exceeded.
- The total electrical installation of the individual components may only be conducted by an authorised specialist company.
- All equipment must be switched off at the main switch before performing work on it.
- The cables must be laid so as to allow maintenance work to be performed and the individual components of the S-Thermatik NEO to be replaced without any problems.
- Building moisture and condensation are to be avoided as these can result in corrosion and failure of the electrical components.
- The connecting cable of the flue gas temperature sensor can only be extended with a special compensation cable!
- **If the message “Air slider error” appears after opening the door, contact your stove fitter. It is NOT permissible to start up the fireplace in this state!**
- The function of the combustion control system may be checked at any time with the air control lever. **When the firebox door is opened, the air control lever must move to the right every time to the "combustion air fully open" position!**
- The specified factory settings which are required for the safe operation of the combustion control may not be changed.
- Avoid pulling the wires installed on the fireplace. Outside the fireplace, these must be installed so that no tensile forces and no compression, chafing or shearing points are created.

3. DESIGN AND INSTALLATION



The design of the cladding must be such so as to enable access to all the installed components at all times. This concerns the flue gas temperature sensor, the connections, the motor and sensor wires and the control system.

The control system should ideally be positioned behind an air grille in the stove's cold area.

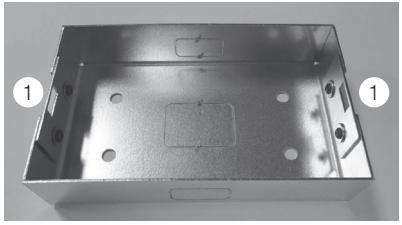
It is recommended to secure the socket to the S Thermatik NEO separately or with a switch (on site). As a result, the system can be easily switched off in the summer or for maintenance purposes.

The maximum ambient temperature at the installation location of the control system must not exceed 50°C!

3.1 INSTALLATION AND CONNECTION OF THE DISPLAY

The installation site must be selected so that the maximum permissible ambient temperature of 50°C is not exceeded and that this component is not exposed to direct heat radiation while the stove is in operation.

For the display cable, preferably use an empty tube with an internal diameter of at least 20 mm, long enough to reach into the provided wall socket. Breakthroughs are laser-cut into the top, bottom and back of the wall socket.



1	Retaining lugs

The minimum dimension for the break-through in the wall is (W x H x D): 139 x 82 x 31 mm.

The wall socket must be installed absolutely horizontally in the wall so that the front edge of the socket is at the same level as the wall coating that is installed subsequently. Only then will the installed display be flush with the wall, without any gaps.

If the socket is not embedded completely horizontally or was embedded too deeply, it is possible to adjust the position and installation depth of the display. There are adjustable retaining tabs to the left and right of the wall socket. Where necessary, the tabs can also be backed with M4 washers so that they protrude further inwards.

Once the socket has been plastered in, the cable is inserted into the display from the back. Ensure that the stop hooks on the connector click into place, locking the connector in position. The cable must be routed without any tensile forces, protected against shearing, crushing and chafing points.

To unfasten the plug connection, press down on the stop hook and pull the connector out of its bushing backwards.

1	Spring clip
2	Stop hook

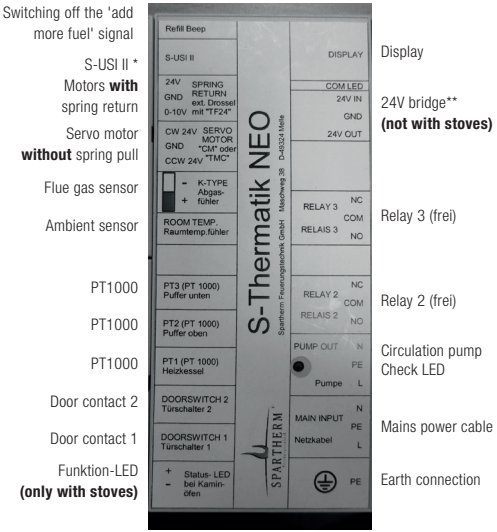
The display is then pushed into the wall socket from the front. There are 2 spring clips on the side of the display that engage in the recesses in the adjustable retaining tabs.

Tip: If the display is too loose, the crosspieces of the fastening clips can be pushed slightly inwards with a screwdriver.

Note: Humidity can adversely affect the display. Therefore, the display must not be mounted until the installation wall has dried.

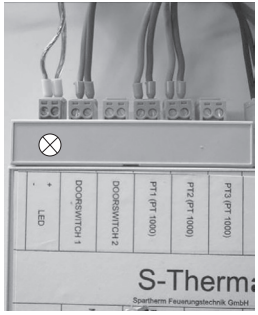
3.2 INSTALLATION AND CONNECTION OF THE CONTROL SYSTEM

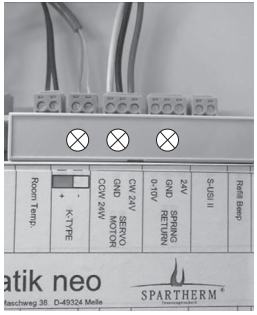
All connections are identified with text on the control system housing.



* To the S-USI II interface, see 3.6

** To the 24V bridge, see 3.8.5





The external components are connected directly to the control system connectors. A separate motor cable must be used for the motors. Also for coupling to a Spartherm S-USI II differential pressure control system, a separate cable must be used.

Pay attention to the polarity of the following connectors: ⊗

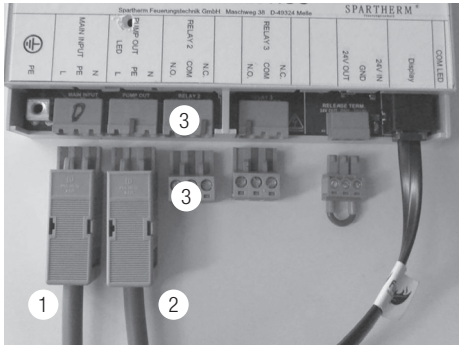
LED, K-Type (flue gas sensor), "Servo motor" and "Spring Return". These are marked on the images with crosses. These terminals are also marked separately. With the flue gas sensor, e.g. the wire colours (green and white) are also printed on the terminal designation.

With all other components, the polarity is irrelevant, i.e. the wires can be connected up in any desired order. If the wires get swapped over, this has no adverse effects. For the connection and installation of PT 1000 sensors on water applications, we advise orienting yourself on the following assignment:

PT1 = boiler sensor, in the heat exchanger of the fire area
PT2 = Heat storage function, top
PT3 = Heat storage function, bottom

The assignment of sensors can also be modified (retrospectively) on the control system.

3.3 CONNECTOR CODING



1	Mains power cable
2	Pump cable
3	Coding pins

Whenever the control system is installed in an electrically conductive housing, e.g. a stove, the cabinet of the appliance must be connected to the earth connection (PE) of the control system. On stoves, a corresponding earth cable is supplied with the appliance and is already connected up.

The mains power cable on fireplaces is fitted with a cable housing. On stoves, this housing is not present because they have a cover plate for the cables and connectors.

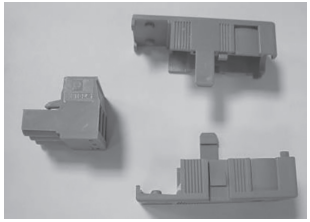
These 4 plug connections (power cable, pump, relay 2 and relay 3) are larger than all the other plug connections. This is to prevent confusion. **Furthermore, they are coded with red plug-in bridges, i.e. each connector only fits into its intended bushing. Never try to plug one of these 4 connectors into a bushing for which it is not intended. The control system could get damaged irreparably.**

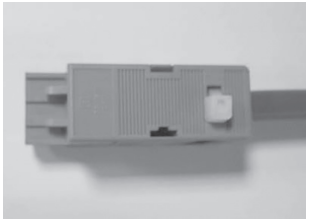
3.4 INSTALLATION OF THE CABLE HOUSING

With stoves, the control system and its connections are located under a cover. Here, the cable housings are not required.

With fireplace inserts, the control system is usually open, inside the stove masonry. Here, the cable housings must be installed.

The power cable is equipped with a cable housing as standard. The pump connection can also run on line voltage if the corresponding relay function has been activated. For this, a separate cable housing and a cable tie are supplied with the unit. **This cable housing MUST be installed on the pump cable (provided by customer) to protect against direct contact.** With stoves, the cable housing is not needed. A cover plate protects against direct contact.





First connect the wires to the connector. Then install the connectors in the lower half dish of the cable housing. Then guide a cable tie through the pre-drilled half dish and guide it around the cable. Tighten down the cable tie and then clip it to the upper half dish.

CAUTION: If the relay outputs 2 and 3 are connected to line voltage, cable housings **must** also be fitted to them. These can be ordered quoting **Product Number 1047657**. For further instructions, please refer to chapter 9.

3.5 CONNECTION OF THE MOTOR

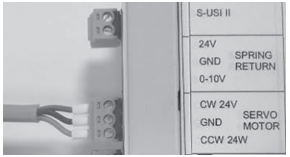
Depending on the type and version of the fire area, different motors are installed. These must be connected to different bushings on the control system. **If they are connected to the wrong bushing, they will not work correctly and there is a risk of explosion. The fire area must neither be commissioned nor operated.**

Rule of thumb: Connect motors without an installed spring return to SERVO MOTOR. Connect motors with spring return to SPRING RETURN.

The control system detects defective motors and displays them as a clear text error message on the display. On stoves without a display, the function LED then flashes rapidly, about 2x per second. This must not be confused with the slow flashing (1x per second) that indicates the need to add fuel.

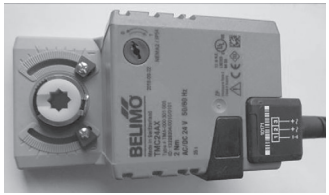
3.5.1 STOVES

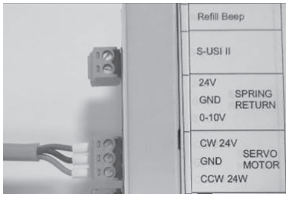
Here, a very flat and space-saving motor is installed. It is connected to the bushing: SERVO MOTOR.



3.5.2 FIREPLACE INSERTS WITH INTEGRATED ROTARY SLIDE VALVE

The great majority of fireplace inserts is equipped with a rotary slide valve for the combustion air control system. The motor is usually located underneath in the SVS support of the appliance, and it must be connected to the **SERVO MOTOR** bushing.

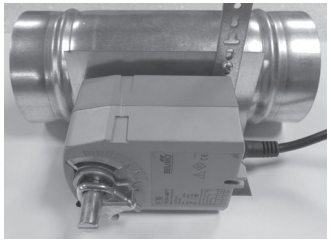


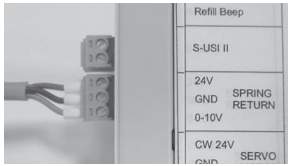


The connecting cable of the actuator should be routed out of the unit as follows. Then a separate combustion air supply can be mounted on the SVS connection socket. The cable outlet has to be sealed with silicone.

3.5.3 FIREPLACE INSERTS WITH AN EXTERNAL RESTRICTOR

Some fireplace inserts are equipped with an external throttle valve outside the appliance. This can be identified by the absence of an air control lever on these fireplace inserts that could be operated manually or with the Cold Hand. The electrical motor connection is on the **SPRING RETURN** bushing. These external throttle flaps have an integrated spring return that releases the entire cross section in the event of a power failure.

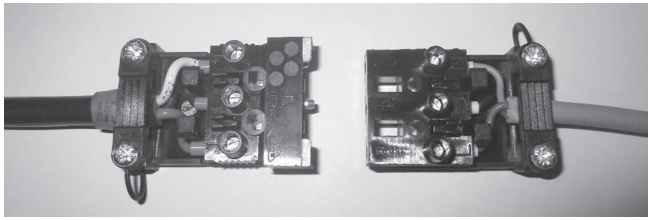




3.5.4 MOTOR CABLE

On stoves, the motor is connected directly to the control system by a short cable. On fireplace inserts, an extension motor cable is used between control system and motor. The polarity of this cable cannot be reversed, i.e. it can only be connected up in one position.

Motor cables are always assigned in the same way:



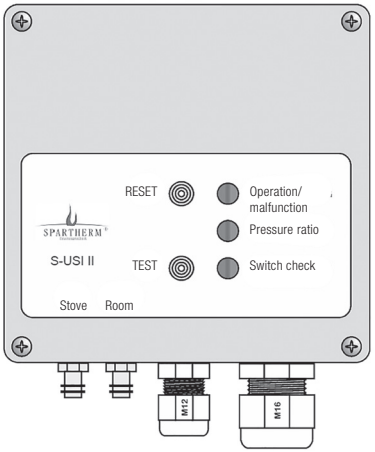
Motor cable	Extension cable	Terminal name in plug connector	Terminal name for the SERVO MOTOR	Terminal name for the SPRING RETURN
white	**grey**	N	CCW 24V	0-10V
Black	**Black**	PE	GND	GND
red	**Brown**	L	CW 24V	24V

If the motor cable is too short, it can be extended with a copper wire measuring 3 x 0.75 mm² to a length of about 10 metres. For other lengths, please consult Spartherm. Ensure that the wires are connected up correctly.

3.6 CONNECTION OF AN S-USI II CONTROL SYSTEM

The S-Thermatik NEO offers the option of connecting to the Spartherm S-USI II vacuum sensor.

The S-USI II is a differential pressure sensor that compares the negative pressure (i.e. vacuum) levels in the flue gas pipe and the installation room. If the negative pressure in the installation room is greater than the draught in the chimney, flue gases could be drawn into the installation room. The S-USI II identifies this condition and switches off the appliance that is creating a vacuum in the installation room (ventilation system, extractor fan or similar).



Switch box on an S-USI II

The user is informed of the prevailing operating status of the system by two-coloured LEDs.

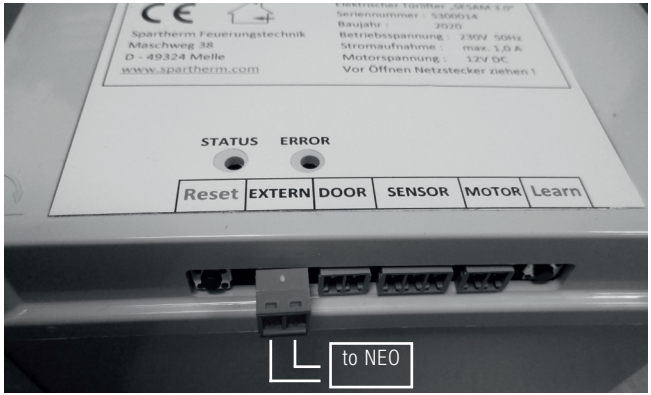
It is possible to connect the S-USI II to the S-Thermatik NEO using a special connecting cable. In the NEO user Menu, you can call up an S-USI screen that shows the prevailing operating statuses and the differential pressure in Pascal. The NEO automatically detects a connected S-USI II.

The standard connecting cable between NEO and S-USI II is 10 metres long and can be ordered by quoting SAP number 1056300. Other cable lengths are available on request.

3.7 CONNECTION OF S-ESAM 3.0 CONTROL SYSTEM

If the S-Thermatik NEO is installed together with a S-ESAM 3.0 door lifter control system, the two systems can be connected. This makes it possible to control the S-ESAM via the NEO display and via smartphone using the S-Thermatik NEO app.

Connect connection “EXT” of S-ESAM 3.0 with contacts COM and NO of the RELAY3 output of NEO using a two-core cable. For more details, refer to chapter 9.4.



The polarity of the cores is irrelevant.

3.8 OTHER CONNECTIONS AND DISPLAYS

3.8.1 REFILL BEEP

As well as connections for the S-USI II, there is a jumper (bridge connector) on the board. This connects 2 contact pins together. If the jumper is removed, the acoustic signal sensor of the control system is disabled permanently. We urgently advise leaving the jumper connected. All sound settings (including muting) can be initiated in the user Menu by display or by app.

3.8.2 ROOM TEMP

For this, the room temperature sensor is connected. The connection cable is about 2 metres long. We recommend rolling out the sensor wire completely and positioning the sensor outside the stove masonry. The actual measured point is the small thick section at the end of the wire.

If the sensor is not connected or is defective, no measured value is displayed. Instead, all that appears are three horizontal dashes (- - -).

3.8.3 LED

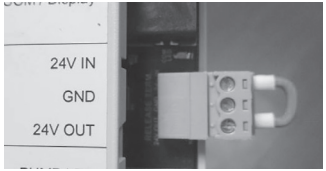
Stoves are supplied without a display The user obtains information about the status of the control system from a function monitoring LED. This is connected to the "LED" bushing on the control system (pay attention to the polarity). The LED works in the following manner:

OFF:	Control system is in standby mode, fire area is off
ON:	Control system working in feedback control mode OR is currently open, performing a self-test in the direction of 100%
SLOW FLASHING:	The time for adding fuel has been reached
FAST FLASHING:	The door is open, the appliance has overheated or an external component is malfunctioning

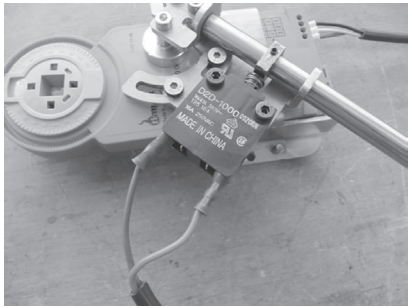
3.8.4 COM LED

A small red LED is mounted directly on the control unit board, beside the display bushing. While it is lit or flashing, operating voltage is supplied and the processor is operational.

3.8.5 24V BRIDGE



On fireplace inserts, a wire bridge is mounted here. If this bridge is missing, the control system cannot work.



On stoves, the Manual / Automatic actuating shaft switch is connected to the 24V bushing. The polarity of the connection line is not a matter for concern.

Whenever the stove control knob is in its Auto position, the contact is closed and the control system can operate.

If the control knob is in the Manual position, the 24V operating voltage to the control system is switched off. Automatic controlled operation is then no longer possible, although the air control lever can still be adjusted manually, where necessary with the Cold Hand.

The control system resumes controlled operation once the switch is moved back into the Auto position.

4. COMMISSIONING

At the factory, the “S-Thermatik NEO” combustion control system is pre-set to the respective fireplace if ordered at the same time. Failing this, the control system must be adapted to suit the fireplace, which involves it being configured appropriately.

The following tasks must be completed before the S-Thermatik NEO can enter service:

1. Fire area must be installed properly and connected to the chimney. Inlet airways must not be angled or sealed.
2. On appliances with circulating water: Appliance must be filled, bled and properly connected to the water supply. Accumulator charge pump installed. The thermal drainage safety device must also be connected up.
3. Flue gas sensor, door contact(s) and actuator motor connected to the control system.
4. If the accumulator charge pump is to be activated by the S-Thermatik NEO, a PT1000 sensor must be placed in the fireplace (PT1) and another PT1000 sensor must be placed in the buffer storage unit (PT2), both connected to the control system. In addition, relay 1 must be set to the "Differential thermostat" function. The cable to the pump must be fitted with a cable housing, and must be connected to the "Pump out" bushing. **Details of this can be found in the chapter "Relay functions / Pump connection"**

Now the self test can be carried out.

4.1 SELF-TEST

To check the control system and its function, it can help to run a self-test. This provides an indication as to whether all components in the control system are OK.

We advise running the self-test once a year at the start of the heating season.

The self-test is carried out every time that the control system becomes disconnected from mains power, once mains power has been restored. To conduct this self-test, the fire area must be cold (flue gas temperature below 50°C) and all fire doors must be closed.

1. Switch the combustion control off (pull out plug)
2. Switch the combustion control on again (insert the plug)
3. The air control lever moves to the right, up to its 100% open limit stop. With stoves, the function monitoring LED remains lit all the time.
4. Then the air control lever moves to the left towards 0%. The function LED on stoves goes out at this point in time. The air control lever remains fully left, against its limit stop.
5. "Standby" must appear on the display and realistic values must be displayed for room and flue gas temperature.
6. Any errors on the flue gas sensor or motor are displayed in clear text. On stoves, the function LEDs then flash rapidly.

If the test has been successful up to this point, without failures or error messages, then the control system and its external components are OK.

Note: The self-test can also be activated by a reset on the display, via Service Menu / Test / Control system.

4.2 AIR SLIDER TEST

If the door is opened while the fireplace is cold, the control system will first perform an air slider test. This ensures that the air slider can move freely along its entire travel path and that there are no points of sluggishness or blockages.

First the air slider moves in the CLOSED (!) direction until it has reached its mechanical limit stop. This is intended for referencing in order to establish a defined starting point. Then it moves in the OPEN direction up to the stop. This travel time is measured and compared with the engine runtime stored in the parameter set. If the measured travel time is too short due to a blockage, an error message is displayed visually and acoustically and will not disappear.

It is NOT permitted to start up the fireplace while an error is active. Contact your stove fitter to inspect the system.

If the travel time is correct, a message “Air slider OK” will appear for 5 seconds, then the main screen will be displayed again.

Note: For technical reasons, the air slider test can only be performed with motors of type I (servo motor), but not with motors of type II (spring return). If an obstacle blocks the travel path of the damper slat, the damper slat will become deformed. A sufficiently large air cross section remains.

4.3 SECOND AIR SLIDER TEST (MECHANICAL TEST)

The second part of the air slider test is performed for certain (not all) fireplaces. This is related to conformity with DIN 18843.

A few minutes after lighting a cold fireplace, a second test of the air slider mechanism is performed. This is intended to ensure that the air adjustment element (slider or throttle valve) actually follows the rotary movement of the engine.

When the exhaust gas temperature has reached ¾ of parameter t-1, the engine starts and sets the air adjustment unit to 0%. The air slider is held in this position for a maximum of 3 minutes, no later than at this point the engine returns to the OPEN direction and the combustion control continues.

If the air adjustment mechanism is intact, the reduction of the air volume will lead to a drop in temperature. As soon as the maximum temperature has dropped by 3°C during this test phase, the test is complete and the engine returns immediately. Once the engine has arrived, the image “Air slider OK” is displayed.

If no temperature drop has occurred by the end of the 3 minute stopping time, the test is terminated and the engine returns. Once the engine has arrived, the image “Air slider fault” is displayed. Do not operate the fireplace in this condition. Let the fire burn down and contact your stove fitter.

It is NOT permitted to start up the fireplace while an error is active. Contact your stove fitter to inspect the system.

If 75 % of t-1 is not reached when starting a fire, the image “No combustion” is displayed after approximately 20 minutes and the air slider remains at 100 %. Add more wood when next starting a fire in the cold fireplace.

The image “No combustion” also appears if an exhaust gas temperature of 50°C has not been reached 20 minutes after the door is opened, e.g. if the combustion chamber was only cleaned. In this case the air slider closes to 0 % and the control system returns to standby.

5. MENU STRUCTURE AND DISPLAY

5.1 MENU STRUCTURE

To keep things simple, the menu is divided into just three sections:

- Statistics of the last 700 burnups
- User Menu
- Service Menu (password-protected)

Regardless of where you happen to be in the menu, using the Menu button at the bottom right, you can always return straight to the Menu selection. In the same way, pressing the Home key at the bottom left returns you immediately to the main Menu.

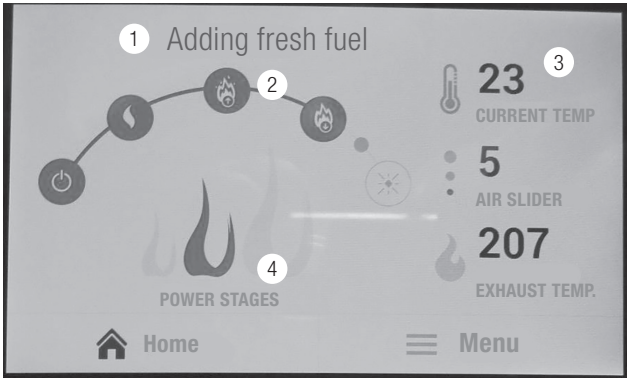
Layout of the menu:

Home (main Menu)		
Statistics	**User Menu**	**Service Menu**
Overview of the last 99 burnups	S-ESAM * System set-up S-USI II ** Display Sound Auto / Manual Language Deactivating the door System information	Selecting the fireplace insert Parameters Relay Menu Doorswitch Menu Motor Menu Overview Test Factory setting Saving user data Loading user data System settings

* only appears if the corresponding function was selected in the Relay Menu

** Coupling option for an S-USI II differential pressure monitor; This menu item appears automatically when an S-USI II is connected.

5.2 MAIN MENU



1	Current status and error messages
2	Progress bar
3	Room temperature, air slider setting and flue gas temperature
4	Heating capacity levels (small / normal / big combustion)

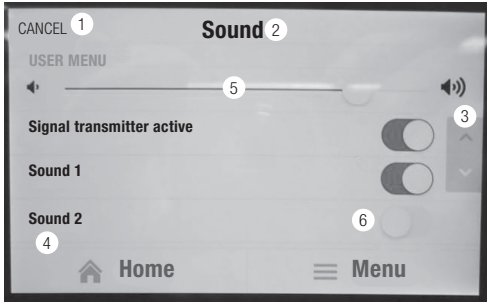
The main Menu provides information at a glance of the prevailing operating mode of the control system. At this level, you can only click the heating capacity levels via the flame icon and the Menu button.

The progress bar indicates the prevailing point in the combustion process. Here is a key to the 6 points:

Standby / ignition / rising temperature / falling temperature / time to add fuel (the small dot) / glowing phase

6. USER MENU

The menu layout is broadly self-explanatory. Here is a sample image for general operation:



1	BACK button
2	Name of the menu
3	Scroll keys
4	Function
5	Setting controller
6	Operating knobs

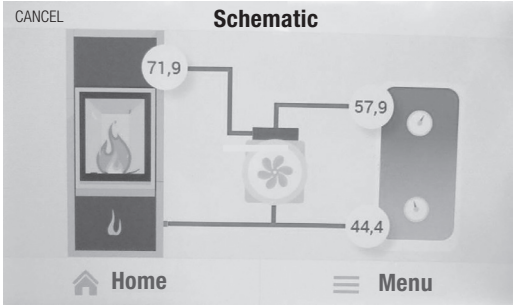
Sliders can be adjusted by fingertip control, or by holding and sliding the round knob. The control knobs can be adjusted by tapping them, or by sliding them gently to the left or right. If the knob is backlit in red, the selected function is enabled.

The active surface of the scroll keys is larger than shown on the display. Scrolling is then also activated by touching beside the grey surface.

If settings have been changed, SAVE appears in red letters at the top right. This pushbutton must be pressed otherwise the changes will not be made.

S-ESAM: Whenever this function is assigned to a relay in the Service Menu, this field appears at the top of the User Menu. By touching this box, the relay is activated for 3 seconds. This enables the Spartherm S-ESAM control system to be activated, an electrical opening mechanism for fire doors. For more details see Chapter 5.4.

Diagram: Here, the hydraulic schematic and the switch status of the accumulator charge pump on water-circulating fireplace inserts can be illustrated. Whenever the pump relay on the NEO has engaged, the pump vane wheel rotates on the display panel.



If the PT1000 sensors are not connected, e.g. on air-circulating fireplace inserts, no temperature values appear. Instead, dashes (- - -) appear on the screen.

By touching the temperature boxes, you can select which sensor should be displayed here. Also see Chapter 3.2.

S-USI II: If a Spartherm S-USI II differential pressure monitor is used, it can be connected to the S-Thermatik NEO with a cable. The displays on the housing of the S-USI II can be shown on the display unit of the NEO.

Display: Here, among other things, is the Screen Saver sub-menu. Here you can choose the brightness level you wish to have for the screen saver. If you choose several temperatures, these will be displayed at 7-second intervals. If you pull the brightness controller all the way to the left, the display will go dark. The screen saver switches on automatically about 2 minutes after the most recent keystroke. The screen image reappears whenever you touch the display unit.

Note: With water applications, it is advisable to display the temperature at the top in the buffer (PT2). This means that you can see immediately the level of progress of the loading of the buffer.

In addition, there is a "Cleaning the display" sub-menu. This switches off the display for 2 minutes. During this time, it accepts no commands. This means you can clean without altering any of the settings. For checking purposes, a timer runs backwards and shows the remaining time.

Sound: Here the button acknowledgement sounds and the alarm sounds can be selected. Also, the volume level can be adjusted. All sound events can also be switched off here.

Operation auto/manual: Here you can switch form Automatic to Manual mode. To do this, move the "auto/man" control knob to the right. Now a position can be selected for the air slider and it can be sent off using the SAVE button at the top right.

To return to Automatic mode, slide the control knob to the left again and save it.

After 3 minutes in manual mode, the control system automatically returns to automatic mode.

CAUTION: Operation of the fire area in Manual mode is at the user's own risk! During a burnup, the air control lever must never be closed to the point where an explosion might occur.

We urgently advise that you ONLY operate the control system IN AUTOMATIC MODE.

Language: Here, you can select the menu language of your choice.

Available at the present time: GB - DE - NL - FR - IT - PL

Deactivating the door: Exactly as in the display (see above), the door switch can be deactivated for 2 minutes. This can scale down the glow without the control system initiating a new burnup when the door is next opened.

Info: Here you will find details about the software versions in use.

7. SERVICE MENU

Access to the Service Menu should not be made too easy. Making changes to the settings without the relevant professional knowledge can cause serious damage. For that reason, the Service Menu is password-protected. The standard password is 1234 and this can be keyed in using the decimal keypad at the bottom of the screen. The password can also be changed, see 7.11.

Note: Whenever the service password is entered, the Service Menu remains open for 30 minutes without needing the password to be keyed in again.

7.1 FIREPLACE

Here, the appropriate set for the fire area to be operated can be selected from the pre-configured sets of parameters.

7.2 PARAMETERS

Here, every individual parameter from the previously selected set of parameters can be changed. Chapter 10 contains a description of the parameters.

It is not advisable to make changes to these settings if you do not have the relevant professional knowledge! This can cause very serious damage to equipment as well as personal injury.

This menu is also password-protected. Each time, a 4-digit random number appears Create the checksum from this and add +1. That is then the access code.

Example: The random number may be 3804. So you add 3+8+0+4 = 15 plus 1 = code 16.

7.3 RELAY MENU

Here, the corresponding functions are selected for each of the 3 relays. Relay 1 is there for the accumulator charge pump (outlet PUMP OUT) but can also have different function assigned to it. **The PUMP OUT output is NOT potential-free and it always issues line voltage. If no pump is connected, for technical reasons associated with insulation, the connector and cable housing should always be plugged in.**

Relays 2 and 3 are potential-free and can be programmed freely.

CAUTION: The selected relay functions are active even if the control system is in Standby mode. This means that the relays switch as soon as their engagement conditions are met, regardless of whether the fire area is operating or not.

Note: The switching power of the relays is 5 Amps. This means that consumers can only be switched directly by the NEO up to about 1100 Watts. A contactor must be used for higher load levels.

The following functions can be selected from the relay menu:

Relay OFF: The relay is deactivated and never switches.

Combustion: While the control system is active, i.e. NOT in Standby mode, this relay is active. This could enable you to block an appliance such as an extractor fan while the fire area is operating. Or switch on a smoke extractor.

Thermostat hot: If the set temperature is exceeded, the relay engages then disengages again once the set temperature drops below the hysteresis value.

Thermostat cold: Below the set temperature, the relay is switched on. The relay switches off again whenever the set temperature exceeds the hysteresis value. It switches back on once the temperature drops below the set threshold value.

Differential temperature: This function compares 2 temperatures and only switches on the relay if temperature A is above the "temperature threshold" AND is higher than temperature B by at least as much as the "Hysteresis Delta T" value. In addition, the relay is also always switched on whenever temperature A is higher than the "Alarm threshold" value. The prime example of this relay function is activation of the accumulator charge pump. This also prevents the buffer being cooled down via the boiler. After saving the "Differential temperature" function, another image appears on screen with the setting values:

Number of the boiler sensor: Indicates which sensor is located in the boiler.

Number of the buffer sensor: Indicates which sensor is in the buffer (at the top).

Temperature threshold: This indicates the switching threshold of the return riser.

Hysteresis: Associated with the return riser. Pump switches off whenever the boiler temperature is lower than the temperature threshold minus hysteresis. Engagement occurs once the threshold is exceeded.

Hysteresis Delta-T: Value showing how much hotter the boiler sensor must be than the buffer sensor, otherwise the pump shuts down.

Alarm threshold: If the boiler temperature rises above this value, the pump is always switched on, regardless of the temperature in the buffer. If the boiler temperature drops 2°C below the alarm threshold, forced engagement is cancelled. This 2°C alarm hysteresis level cannot be adjusted.

Timer: This function relates to the door contact switch. As soon as the fire door has been opened, the relay engages and remains engaged for a definable period of time (1 - 9999 seconds) after the door has been closed.

S-ESAM: The word "S-ESAM" only appears on the top row of the User Menu if this function is selected. Pressing this box activates the corresponding relay for 3 seconds. The time is not adjustable. After that, the relay disengages. This enables the Spartherm S-ESAM control system to be operated remotely. By pressing the S-ESAM row, the fire door then moves upwards electrically, or lowers back down again.

If the S-ESAM function was not assigned to a relay, no entry appears in the User Menu.

After selecting and saving a relay function, a window always appears in which the individual parameters of the selected function and associated sensor must be entered.

Note: Many functions require a hysteresis level to be indicated. This is displayed with a resolution of 0.1°C, e.g. in the overview. The hysteresis value is keyed in without a decimal point, i.e. at a desired hysteresis level of, for example, 5.0°C, a value of 50 must be entered. All settings can be checked in the "Overview", see 7.5.

Circuitry examples and programming options for various applications can be found in Chapter 9.

7.4 DOORSWITCH MENU

This menu is used to set the number of door switches on the fire area and the type of switch they have, i.e. NO or NC. Any door switches not present are deactivated here.

The "Auto" function is intended for operation without a door switch. This function may be activated only after consultation with Spartherm.

7.5 MOTOR MENU

In the Motor Menu, you must select the type of motor that is installed to adjust combustion air levels. There is a choice between motor type I (actuator motors) and motor type II (throttle valve motors with spring return). The connection terminals for type II motors are designated on the control system as "Spring return".

Once you have chosen the right type of motor, the run time must be indicated in seconds, from 0% to 100%. Incorrect values cause malfunctions!

Nearly all internally fitted servo motors have an operating time of 23 seconds, except for the Moro, Sino City, ambiente a6 H_20 fireplaces and all Premium fireplace inserts. These appliances have an operating time of 40 or 34 seconds. External throttle valves (spring return) always have an operating time of 75 seconds. From the controller software version 1.6.0 onwards, the motor run time is set automatically when the set of parameters is selected. **Nevertheless, the motor run time must be checked once before start-up, particularly when using sets 1, 4, 9 and 16.**

7.6 OVERVIEW

Here, all input and output values are listed, including the temperature of the control board. Here too, a temperature sensor is installed. This menu provides only an overview, i.e. operation or adjustment of components is not possible here, only in the Test Menu.

7.7 TEST

Each of the 3 relays can be activated individually in this menu. In addition, the actuator motor can be moved and a self-text can be initiated using the "Reset control system" function. This saves a trip to the fuse box.

7.8 FACTORY SETTING

This button resets the control system to a factory setting that does not have to match that of the fireplace in use at the present time. A selection is made by pressing the button for 3 seconds to confirm. The factory setting includes the following values:

1 door switch normally open NO, motor type I (servo motor) with 23 seconds run-time, pump relay and relays 2 and 3 OFF. In addition, parameter set 0053 is set, 1234 as a service password and 000000 as a Bluetooth password. Screen brightness at 75% for operation and for screen saver, sounds switched to 50%, volume, sound 1 and alarm 1 selected as a melody.

We recommend **NOT** using this function as then all fire insert-specific settings will be deleted

7.9 SAVING USER DATA

All settings for the User Menu and Service Menu can be saved here. We advise using this function once the fire area has been configured and set completely. This means that a functioning setting can always be loaded.

7.10 LOADING USER DATA

Here, the saved user data can be loaded again.

7.11 SYSTEM

Here, the service password (normally 1234) can be changed. If you have forgotten the service password, the S-Thermatik NEO control system must be returned to the factory to get it unlocked.

In addition, the Bluetooth password on the NEO can be defined here. Also see Chapter 8. The factory setting is 000000.

8. APP

For the S-Thermatik NEO there is an app for devices with an Android or an IOS operating system. This app goes by the name of S-Thermatik NEO and it can be downloaded from the Play Store or from iTunes.

To install this app you need to enable Bluetooth on your device.

Installation on an iPhone:

If you have an older version of the app, please delete this.

Open "Settings/Bluetooth" and ignore all known S-Thermatik NEO devices.

Search for "Thermatik" in the app store. Download the app again. Then open the app.

You will see this start-up screen (left image). Click on "Menu" on the bottom right. In the next screen (centre image) click on "Devices" at the top. In the next image (on the right) click on "Connect". If no device is shown, click on "Search" at the top right.

Enter 000000 for the pairing request and click on "Pair"

This screen appears, followed by the data

Installation on an Android smartphone:
The app is installed the same way as with IOS but with some minor deviations. First, uninstall the old app if you have it. Reboot your smartphone.

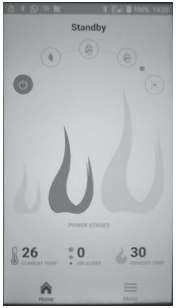
Now download the app. Pairing works just as with IOS.

Allow installation from unknown sources (Settings/ security)

Select Approve.
No data is collected!

The start-up screen initially appears in English.

To change the display to German, click on "Menu / User settings / Language / Deutsch" and press "Save" on the top right to store these settings.



NEO is operated by this app on your mobile device in the same way as via the NEO display: the menus are identical.

The data link only functions using Bluetooth. The module is integrated in the control system. At any one time, it is only possible to connect one mobile device to NEO. You cannot select a different device until Bluetooth is switched off to the connected device or until the device leaves the Bluetooth reception range.

A password for your S-Thermatik NEO can be defined in the Service Menu / System / Bluetooth. This can prevent unauthorised accesses or overlaps. The factory setting is 000000.

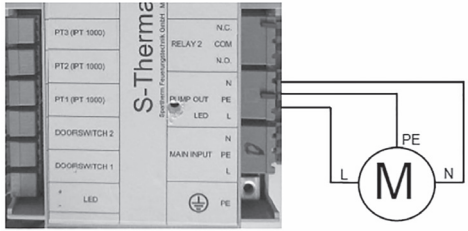
9. SAMPLE CIRCUITS

The switching power of the relays on the NEO is 5 amperes. This means that if consumers with a power rating in excess of 1100 Watts are to be connected, a contactor should be used, otherwise the relays could be destroyed.

A dotted box may be illustrated in the circuitry. This is a branch box. The power line enters this branch box from above, while the line to the consumers exits from below it. From the side, another line goes to NEO to retrieve the relay contact.

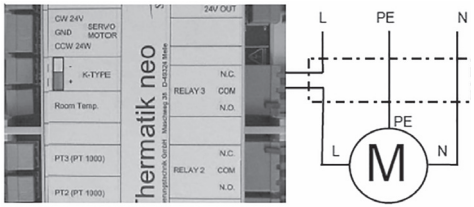
9.1 CONTROLLING THE ACCUMULATOR CHANGE PUMP

The accumulator charge pump is connected directly to the "PUMP OUT" output. The connector and the cable housing are provided. Two further PT1000 sensors are required. One must be installed in the fire area and be connected to PT1 while the other (top) must be connected to the buffer storage unit as PT2. Relay 1 must be assigned the "Differential temperature" function. Everything else is already pre-set. **Use of cable housings, see chapter 3.4.!**



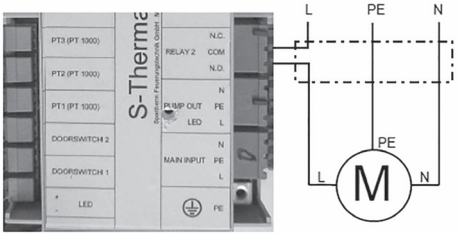
9.2 BLOCKING THE EXTRACTOR FAN

While the control system is active, i.e. is NOT in Standby, relay 3 blocks the extractor fan. The "Combustion" function must be assigned to relay 3. **Use of cable housings, see chapter 3.4.**



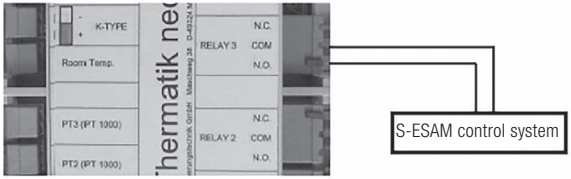
9.3 SWITCHING ON THE SMOKE EXTRACTOR

Whenever the door is opened, a smoke extractor is switched on that continues to run for a predefined length of time after the door has been closed again. Relay 2 is assigned the "Timer" function and the desired run-on time must be set (recommendation: 10 - 20 seconds). **Use of cable housings, see chapter 3.4.**



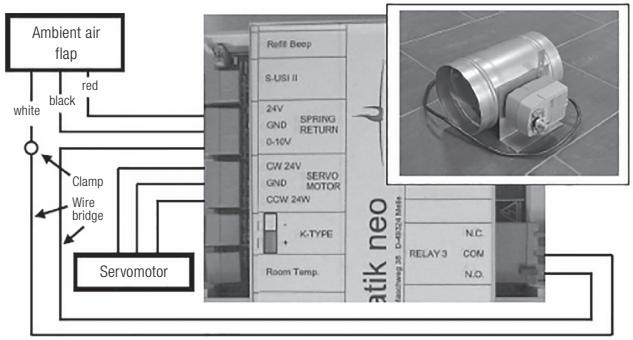
9.4 SWITCHING THE S-ESAM DOOR LIFTER

Relay 3 is assigned the "S-ESAM" function. The NO contact on relay 3 must be connected to the corresponding input terminals on S-ESAM that are provided for an external pushbutton.



9.5 ACTIVATING THE EXTERNAL AIR FLAP

This circuit only suits Spartherm throttle valve motors. Whenever the control system is activated, the throttle valve opens to 100% and remains there until the control system drops back into Standby. Then the flap closes to 0%. When a power failure occurs, the flap opens automatically to 100%. The "Combustion" function must be assigned to relay 3.



10. CLOSED-LOOP CONTROL CHARACTERISTICS

This chapter explains a few of the closed-loop algorithms that govern operation of the control system.

- In the event of a power failure or failure of the flue gas sensor, the air slider moves automatically into a safe position (approx. 50 - 60%). The fire area can continue to be operated manually.
- On cold starts (exhaust temperature below 50°C), the first burnup always takes place during the "high heating power" stage. During this time, the big flame symbol is NOT displayed. With the ensuing burnup, the system then switches to the preselected stage.
- The acoustic signal to add more fuel only sounds once, when the time to add more fuel is reached for the first time. After that, this signal is not repeated.
- In Manual mode, there is no progress bar, and no selectable heating capacity. Whenever the door is opened, the air control lever moves to 100%, stays there in accordance with the definition of parameters CD1 and CS2, then returns to its manually set position. **We urgently recommend that you only operate the fire area in Automatic mode.**
- If wood is not added at the time for adding more fuel, the glowing phase process commences a short while later. Here, by alternating the air slider positions, it is possible to change the declining combustion curve several times. The air slider is not fully closed until the flue gas temperature has dropped below 50°C and the control system has dropped back into Standby mode. Up until that point, the air slider is never fully closed.
- Regardless of the flue gas temperature, whenever the door is opened, the air slider first moves to its 100% position. After a stabilisation time, it then moves to a position that suits the prevailing flue gas temperature, as defined in the parameter settings.
- Following a cold start, if a temperature of at least 50°C is not reached within 20 minutes of the door being opened, the air slider is closed and the control system reports "No ignition".
- Whenever the fireplace is at risk of overheating this is displayed and the air slider is restricted in order to reduce the temperature. Once the temperature has dropped far enough, the burnup is then continued with the declining closed-loop control curve.
- If the temperature t-1 is not reached during burning, the air slider stays at 100 % and NO refuelling signal is transmitted.

11. PARAMETERS

It is not advisable to make changes to these settings if you do not have the relevant professional knowledge! This can cause very serious damage to equipment as well as personal injury.

11.1 DESCRIPTION OF PARAMETERS

- **t-1** - Starting temperature for the feedback control system, until t-1 is reached, the air slider remains in position k-0
- **t-10** - Calculated maximum temperature for burnup, at the same time the end of the rising control curve. t-10 is NOT the actually achieved maximum temperature. During operation, t-10 can and should be exceeded slightly in the process. The wood feed quantity should be adapted accordingly. When t-10 is reached, the air slider is set to the position k-10 and initially remains there. For further details, please refer to "td1".
- **tE 1** - Temperature until end of glowing phase
- **tE 2** - Temperature at start of glowing phase. Within the temperature range defined by tE1 and tE2, the signal for refuelling is generated. Whenever t-10 is reached, the signal to add more fuel is generated when tE2 is reached. If t-10 is not achieved, the signal is generated later, but at the latest when tE1 is reached. Regardless of this content, the air control ever always moves automatically into position k-18 once tE2 is reached.
- **kk** - "Additional constant" for the declining feedback control curve. If t-10 is not reached during the burnup (e.g. due to wet, heavy or excessively large wood) then the value of kk is added to the combustion air settings k-11 to k-18, but depending on the highest temperature level reached. Example: kk is 45%. If only t-1 was reached, then 45% is added to settings k-11 to k-18. If t-5 was reached, only 25%. If t-9 was reached, only 5%. Therefore, if k-11 is 30% and t-7 was reached, the slider is set to 30+15 = 45% to assure the most complete burnup possible, even with this quality of wood.
- **Fm-1** - Firing mode 1, i.e. a weak burn-up. This weakening can be adjusted between 0 and 25%. **ATTENTION: Never set more than 15%. The factory setting is 10%**.
- **Fm-3** - Firing mode 3, i.e. powerful burn-up. The increase can be adjusted from 0 to 100%. **ATTENTION: Never set more than 10%. The factory setting is 10%.**
- **ncs** - Number of cold start combustions with increased air supply
- **kcs** - Air slider setting during the cold start combustions
- **ts 1** - Temperature value when more fuel is added. At the point in time when the fire door is opened, the control system measures the flue gas temperature. If this is above ts 1, the control system leaves the air slider open to 100% for the time CS2, then returns to feedback control mode. If the temperature measures is below ts 1 the air slide is held at 100% for the time CS1. **Attention:** ts1 has another function. When venting the combustion chamber, the system checks whether the temperature reached is above or below ts 1. See E-0.
- **CS1** - 100%- Opening holding time of the air slider at temperatures below ts 1 at the time the door is opened
- **CS2** - 100%- opening time for the air slider at temperatures above ts 1 at the time the door is opened
- **td2** - Limit value from the time when overheating is counteracted. If the temperature t-10 is exceeded by the amount of td2, the air slider is moved into position ktd. td2 is set as a function of t-10. If t-10 is up to 303°C, then td2 = 80°C. If t-10 304°C is up to 423°C, then td2 = 120°C. If t-10 is greater than 423°C, then td2 = 140°C
- **ktd** - Air slider setting when overheating. Standard value: ktd should always be set 10 percentage points lower than k-11 but never less than 5%.
- **k-0** - Air slider setting until temperature is reached t-1
- **k-1** - Air slider setting from point where temperature is exceeded t- 1
- **k-2** - Air slider setting from point where temperature is exceed t- 2
- **k-3** - Air slider setting from point where temperature is exceeded t- 3
- **k-4** - Air slider setting from point where temperature is exceeded t- 4
- **k-5** - Air slider setting from point where temperature is exceeded t- 5

- **k-6** - Air slider setting from point where temperature is exceeded t- 6
- **k-7** - Air slider setting from point where temperature is exceeded t- 7
- **k-8** - Air slider setting from point where temperature is exceeded t- 8
- **k-9** - Air slider setting from point where temperature is exceeded t- 9
- **k-10** - Air slider setting from point where temperature is exceeded t- 10 Settings k-0 up to and including k-10 are calculated for a rising combustion curve.
- **td 1** - Temperature difference to which the actual maximum temperature of a burnup must fall before the control system switches to a declining curve. If "tmax minus td 1" is reached, any "overheated" message that occurs disappears and the air slider is set to k-11.
- **k-11** - Air slider setting from the point where the temperature drops below tmax minus td1"
- **k-12** - Air slider setting from the point where the temperature drops below t- 12
- **k-13** - Air slider setting from the point where the temperature drops below t- 13
- **k-14** - Air slider setting from the point where the temperature drops below t- 14
- **k-15** - Air slider setting from the point where the temperature drops below t- 15
- **k-16** - Air slider setting from the point where the temperature drops below t- 16
- **k-17** - Air slider setting from the point where the temperature drops below t- 17
- **k-18** - Air slider setting from the point where the temperature drops below tE2.
- The settings k-11 up to and including k-18 are calculated for the declining combustion curve.
- **E-C** - During the E-C time, the air slider remains in k-18. The message "Add more fuel" appears on the display. With stoves, the LED starts to flash slowly.
- **k-E** - After timer E-C has run out, the air slider moves into position k-E if no fuel was added during time period E-C.
- **EEC** - The air slider remains in position k-E for time period EEC.
- **E-0** - After the EEC timer runs out, the E-0 timer is started. While it is running, the air slider is set to 100% to ventilate the combustion chamber. The 100% value cannot be adjusted. Only the time on timer E-0 can be adjusted. The status message "Purge the combustion chamber" appears on screen.
- **t-s** - t-s defines the cold-start temperature. If the flue gas temperature drops below t-s during a burnup, the air slider is always closed immediately. The value for t-s is normally 50°C. If the burnup is started at temperatures of below t-s, a cold start is taking place. refer to tss and kss.
- **E-s** - If during ignition and after timer E-s has run out (normally 20 minutes) temperature t-s is not reached, the air slider returns to the 0% position. The message "No combustion" appears and the control system drops back into Standby.
- **kbf** - That is the air slider position after the last ventilation process (see E-0), shortly before the control system closes and drops back into Standby. kbf must NOT be set to zero.
- **ksb** - Is the air slider position if the control system for the fire area is in Standby, i.e. the fire area is Off.
- **kbo** - This air slider position is set automatically whenever there is a power failure or the flue gas sensor fails during a burnup. This enables the fire area to continue being operated until mains power is restored and/or until the sensor is replaced.
- **Edi** - This timer sets the length of dead time during which the display does NOT response to physical contacts. This function is used to clean the display during operation.
- **Edo** - Similar to Edo, the door switch can also be disabled for an adjustable length of time. This makes it possible to restrict the glow without moving the air control lever into 100% when the door is opened.
- **tdr** - Temperature range, only active with operation without a door switch (Auto)
- **Edr** - Respective time window. If the exhaust gas temperature falls by tdr within Edr, this is assessed as door opening.
- **Xdr** - Additional timer for operation without a door switch. Following the first increase in temperature after door opening, the air slider is kept at 100% for the duration of Xdr.

12. APPLIANCE LIST

In this list, the appropriate NEO parameter set is quoted for Spartherm fireplace inserts. This list is updated on a regular basis. There is no set of parameters for any appliances not listed here.

Arte U90 SA GLOBAL; Arte 3RLh 60 Mod. 2016	1
Speedy Ph	2
Arte 1V / F / FD(h) with NSHF	3
Arte BR(h), Arte 3RL100(h) only until October 2009	4
GLOBAL Arte 3RLh 60 wall-mounted	5
GLOBAL Magic	6
GLOBAL Arte U70 SA one-off item	7
GLOBAL Varia 1V(h) 100; Varia M80GET one-off item	8
Mini R1V GLOBAL; Arte U50 GLOBAL; Mini Z1 with 7 kW	9
Mini 2L/2R(h), Arte 2L/R 66 (h)	10
Varia Ch / 3RL / 3RLh; Varia 2L/R80h with Helix or Aquabox	11
Speedy MDRh	12
Varia 1V(h) with Aquabox or NSHF	13
Varia 2Lh 100, 2Rh 100	14
Speedy K(h), R(h), 1V(h)	15
Varia 1V(h), also Varia 1V(h) GLOBAL	16
Varia 1V(h) with 7 kW	17
Arte 3RL(h)100, Arte BR(h) 80	18
GLOBAL basic kit for Varia 1V(h) with Helix	19
GLOBAL Varia S(h), SR(h), Varia Eh, GT and Varia 2L/2R(h) 55 basic kit	20
GLOBAL Varia B(h), BFD(h), GLOBAL Varia B(h) 120	21
GLOBAL Arte X, Xh, XFDh	22
Varia 1V(h) with Helix or Thermobox	23
Speedy M(h), MR(h), both with Aquabox or NSHF	24
Arte W(h)	25
Mini Z1 $H_2$0, Rokossa RG1, both with 7kW	26
Speedy M(h), MR(h) GLOBAL Speedy MR	27
Mini Z1 $H_2$0 XL Rokossa RG1 with 14kW	28
Arte W(h) with Thermobox or Helix	29
Arte BR(h) with Thermobox or Helix	30
Arte BR(h) with Aquabox	31
Mini Z1 with 7 kW and Helix or Thermobox	32
Mini Z1 with 10 kW and NSHF	33
Mini 2L/2R(h) with Thermobox or Helix	34
Mini 2L/2R(h) with Aquabox	35
Speedy MDRh with Helix or Thermobox	36
Speedy MDRh with Aquabox or NSHF	37
Speedy M(h), MR(h) with Helix or Thermobox	38
Speedy K(h), R(h), 1V(h) with Helix or Thermobox	39
Speedy K(h), R(h), 1V(h) with NSHF or Aquabox	40
Varia FD(h)	41
Varia 2L/R(h), 2LR(h), 2RR(h), FD(h), all with Aquabox; Mini SFDh with Helix	42
Mini SFDh, Varia AFD(h) all also with Helix, Varia 2LR(h) 100 with Helix or Thermobox	43
Varia 2L / 2R (h) 80	44
Varia 2L/2R(h), M60(h) GET, Varia 2L/2R(h) 55 GET	45
Varia 2L/2R(h) 55	46
Varia 1V M80 PREMIUM	47
Varia AS(h), AS2L(h), AS2R(h)	48
Varia AS(h), ASFD (h)	49
Varia A(h), Varia M80(h)	50
Varia 2L(h), 2R(h), 2LR(h), 2RR(h), FD(h) with Helix or Thermobox	51
Renova A $H_2$0	52

Varia 2L(h), 2R(h), 2LR(h), 2RR(h)	53
Varia 2L/2R(h) H_20, Rokossa RG 3	54
Speedy E(h)	55
Nova E H_20, also with NSHF	56
Varia 1V(h) H_20, Varia 2L/2R(h) 55 H_20	57
Varia 1V(h)H_20 XL; RG2 to 2015, Varia A(h) H_20, also as GLOBAL, All Varia 1V(h) H_20 X/X/L from 2015 with bypass flap	58
Varia AFD(h) H_20, also Varia AFD(h) H_20 GLOBAL	59
Varia 1V(H) H_20 XXL	60
GLOBAL basic stove door, basic kit	61
Arte 3 RLh 80	62
GLOBAL Mini S(h)	63
Arte 3RLh 60 to 2015	64
Varia C45h	65
Mini R1 V(h)	66
Mini R1 FD(h) SA GLOBAL	67
Renova B Air GLOBAL, Renova B Air, Nova F Air	68
ambiente a4 H_20 sharper, Rokossa IG2 sharper	69
Senso M H_20, Rokossa IG1	70
Senso L and Senso S	71
Passo S and L up until 2014	72
ambiente a1, a2, a3 and a4	73
Stovo all versions	74
Ambiente a4 H_20, Rokossa IG2	75
Piko H_20, Rokossa IG 3	76
Flamenco	77
Sino L	78
Piko L + M, IG3 Air, IG2 Air, Piko S model 2014, Cubo S	79
Duas	80

Moro	81
Sino City	82
ambiente a6 H_20	83
Passo S, M, L model 2015	84
Premium Arte 3RL80 (Throttle with 2 flap leaves)	85
Premium Varia 2LRh80 (Throttle with 2 flap leaves)	86
SEO 1V, SEO L stove	87
BRULA FP1 stove	88
BRULA FP2 Basic stove	89
Premium Arte 3RL60 h	90
Premium Arte U70 h	91
Basic stove 5kg	92
Basic stove 10kg	93
Basic stove 15kg	94
Varia 2LRh55 4S model 2018	95
Premium Arte U50	96
Arte U50, from model 2018	97
Special basic stove (only use following consultation)	98
Premium Varia 2LR 68h	99
Premium Varia 1V 87h	100
Premium Varia FD 87h	101
Varia 2LR 100h 4S	102
Passo XS Modell 2020	103
Schiedel Kingfire Grande S	104
Premium Varia 2LR 55h	105
Varia 2LR 62 (h)	106
Quattro SA 800 top (secondary air)	107
Quattro SA 800 bottom (primary air)	108

Varia Sh	109
Varia 2LR57h 4S	110
Sento	111
Schiedel Kanto	112
Trico	113
Varia 2LR80h 4S	114
Senso L, Sino City, 2022	115

The motor run time is automatically adjusted upon selecting a parameter set. **With the sets marked (1, 4, 9, 16), which are intended for both motor designs, the motor run time MUST be entered by hand (23 sec. with rotary slide control, 75 sec with an external throttle valve)**.

13. REPAIRS

13.1 REPLACING THE MOTOR

The actuator can be removed through the combustion chamber, if necessary. With stoves, additional maintenance apertures may exist under the combustion chamber to facilitate access to the motor. Various different motors can be installed, see 3.5.

General procedure:

1. Take the grate and ash pan out of the fire chamber
2. Remove the entire fire chamber lining
3. Loosen the 6 screws of the primary air recess and remove it from the combustion chamber.
4. Pull central driver pin (the "star") upwards and remove it.
5. Remove the hub, unscrewing the adjusting ring of the lever joint if necessary
6. Remove the VA cover disc
7. With stoves, now loosen the 2 hexagonal socket screws for the mounting support (see Figure). Remove the motor upwards through the large segment.

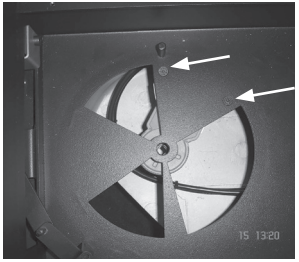
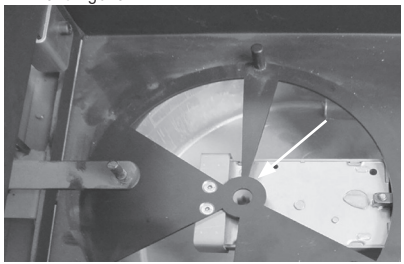


Figure: Bottom plate with air inlet openings, disks have already been removed.

When installing the motor, always make sure that the square or octagon aperture on the engine rests precisely centred below the centre hole in the cabinet floor. Only secure the motor then.

8. With fireplace inserts: Remove the driver star and the hubs, then loosen the clamping screw on the rear motor mount, push the engine about 2 cm forwards and release it from the rear attachment, then lower it and loosen it by pulling it backward out of the front motor mount. See the next figure.

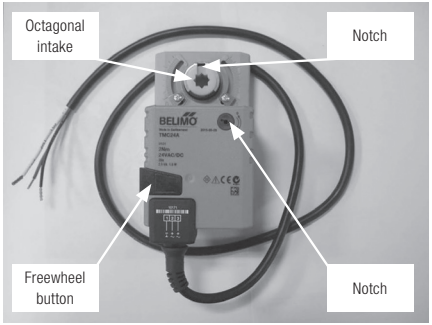


9. Disconnect the cable connector to the actuator motor With stoves, disconnect directly at the motor. With fireplace inserts, disconnect at the cable connector.
10. Remove actuator motor through the large air inlet opening

The assembly is carried out in the reverse order.

When installing the engine, always make sure that the square or octagon aperture on the engine rests precisely centred below the centre hole in the cabinet floor. Then secure the motor, referring to the above Fig.

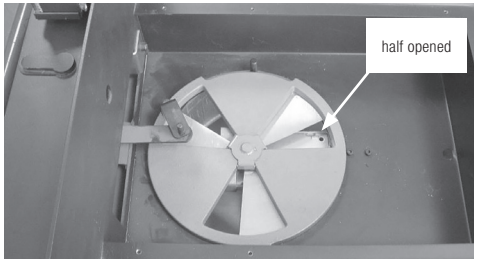
ATTENTION: When replacing the motor shown here (fireplaces), first examine whether the new motor has been suitably prepared.



- First, on the motor, press the freewheel button, hold it and twist the octagon so that it lies exactly in the middle between the two end positions of the motor.
- **CAUTION:** Take the notch in the octagon aperture as a reference point, NOT the steel spring clip, as the clip can be turned against the octagon aperture!
- If the setting is correct, the notch points up as shown in the figure.
- **The rotational direction switch must be set to "0".**

The motor has an operating range of 0 to about 95°; then, it reaches its end stop. It has to be ensured that the rotary disc operates within this range, i.e. that the end stops of the hub are achieved BEFORE the stops of the engine are achieved.

First, install the motor as described above. Lead the cable out of the SVS and reconnect it again.

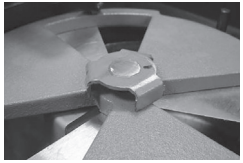


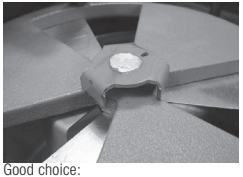
Then insert the thin stainless steel disk. Then install the thick rotary disk so that the air inlets are open halfway, see image.

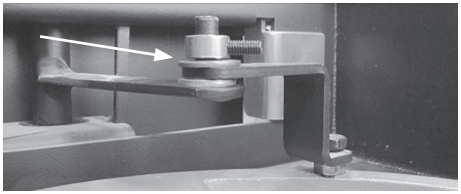
Install the driver stars

Now insert the driver stars from above into the octagon aperture so that the rotary disk has to be turned as little as possible to make the star fit. There are three positions in which the star can fit, as it has three driver vanes.

If necessary, push the freewheel in again and turn the octagon a little.


Poor choice:
The disk must be turned a long way


Good choice:
The disk only needs to be turned a little

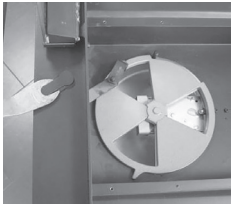


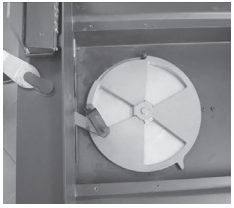
The two lever arms of the air control mechanism should be aligned parallel to each other. Install washers for this purpose, if necessary. Push the adjusting ring onto the mandrel and secure M4 with a DIN 913 grub screw (flat, without tip). Be sure that about 1 mm of air remains up to the washer.

Now, it is necessary to check whether the engine reaches the stops of the hub.

To do this, place the Cold Hand on the air control lever and turn the engine **SLOWLY and evenly (!)** against the drive and check that the segments in the hub are fully opened once and completely closed once. If a position (fully open or closed) is not reached, pull out the star, press and hold the freewheel, turn the octagon slightly and insert the star in a different position. Then repeat the test.

The end positions of the hub have to be reached BEFORE the end stops of the motor have been reached!


End stop position "OPEN"

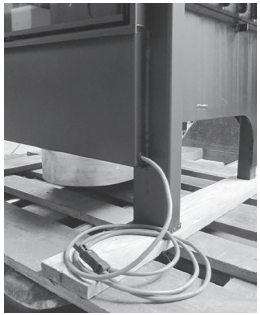

End stop position "CLOSED"

13.2 ENGINE CHANGE ON THE DOUBLE AIR FLAP

When changing the engine on throttle valves, ensure that the valve blade executes the full stroke from 0 % to 100 %. To do so, press and hold the idling button of the new engine and turn the white output ring as on the old engine. After installing the new engine, press and hold the idling button again and manually check that the valve blade executes the full stroke.

13.3 REPLACING THE DOOR CONTACT

At the factory, the door contact switch(es) is/are pre-installed. Different versions can be installed. In all cases, the existing door switch can only ever be replaced by versions of the same type. If there is any deviation from this, please first contact Spartherm for advice.



With fireplace inserts, the door contact protrudes from the carcass. It is connected directly to the S-Thermatik NEO. On stoves, the door contact is already connected.

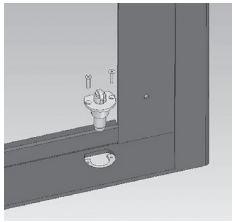
The door switch cable must never be mounted such that it is under tension; if necessary, an extension must be interposed!

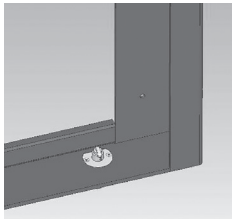
CAUTION: Depending on the version of door switch, the right type (NO normally open or NC normally closed) must be set in the Doorswitch Menu of the control system.

If the control system is ordered together with the fireplace, everything is supplied pre-configured. The factory setting is 1 door contact as an NO.

13.3.1 MECHANICAL DOOR SWITCHES

On a few models a mechanically actuated door switch is fitted for design reasons.

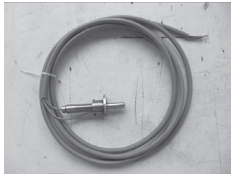




If necessary, in the case of mechanically operated switches, the switching distance can be set by undoing the grub screw under the holder and by turning the switch housing.

Mechanical switches have a roller plunger or a long domed plunger on top of the switch.

Roller plunger



Domed plunger

Function of the mechanical door switches

When the firebox door is closed, the contact is open; When the firebox door is open, the contact is closed.

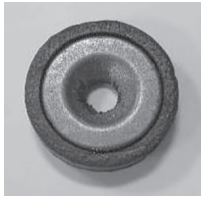
Mechanical door switches always have an NC contact.

13.3.2 MAGNETIC DOOR SWITCHES

Most models are equipped with a contactless magnetic door switch. This cannot be adjusted. It switches from about 10 - 25 mm close to the permanent magnet, which is fastened to the door.

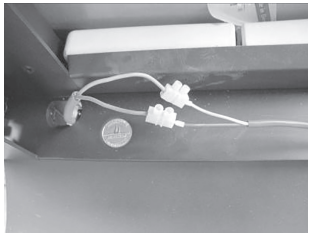
The magnetic door contact is always a normally open (NO) contact.

Please be careful when handling the permanent magnet. It is extremely strong and brittle (risk of breakage). Therefore, never tighten down the central M3 fastening screw.



ONLY PUSH-UP CORNER APPLIANCES (2Lh/2Rh) have a steel guard ring that is placed around the magnet. This provides stop protection. On other appliances, the guard ring must **not** be used because it greatly weakens the magnet.

No door switch holder is installed on newer versions from 2020. A piece of silicone tube is pulled over the door switch. The switch is inserted directly into the hole in the panel and clamped in place by means of the silicone tube (not shown).



To replace the door switch, unscrew it and pull it upwards. Then unfasten or cut through the cables. Connect the new door switch to the existing wires using individual luster terminals.

To check the magnetic door contacts, connect them up to an ohmmeter and move a magnet up close to them. The resistance when interconnected should not exceed max. 2.00 Ohms.

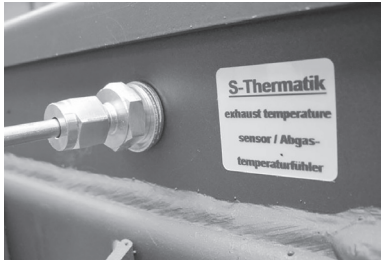
Whenever the magnet is removed, "Overflow" must be displayed.

13.4 REPLACING THE FLUE GAS SENSOR

The flue gas temperature sensor is supplied separately for the fireplace insert and is to be screwed into the threaded hole which is marked with a sticker (M10).

Installation at any other site is not permitted, since this could otherwise have a negative effect on measurement of the flue gas temperature and thus have adverse effects on the functioning of the combustion control.

CAUTION: If the flue gas sensor is supplied with washers, these must be fitted before it is screwed into place. Failing this, the thread will not grip and the sensor will not be sealed properly.



The connection line is routed to the control system where it is connected to the corresponding connection terminal. Pay attention to polarity.

On stoves, it may be necessary to remove the top plate as well as the upper cladding components to gain access to the flue gas sensor.

Note: After installation, the flue gas sensor can be bent once by up to 100 degrees of angle if it collides with walls or similar parts. Only bend this rigid sensor cable by hand, i.e. do not use tools.

14. GUIDE

The S-Thermatik NEO burnup controller detects the most significant errors automatically and displays these in the form of clear text messages.

Motor errors are detected whenever the motor fails to move in response to a movement command. Errors on the exhaust gas sensor are detected by an algorithm in the software. **In both cases, the fire area must not be put into operation until the error has been remedied.**

First check if an error message appears on the display. Consult this advice guide to assist you with this. If the problem cannot be resolved in this way, please contact your dealer or stove fitter.

Problem description	Possible cause / solution
Error message Motor circuit open or motor error	• Check that the motor cable is plugged into the correct bushing. • Check the motor cable. **NOTE:** To reset the error, isolate the control unit from its mains power supply briefly OR, in the User Menu, first select and save Manual mode then select and save Automatic mode.
Error message TC open or short to ground	• Check that the motor cable is plugged into the correct bushing. • Check the motor cable. **NOTE:** The error reset is automatic whenever an intact sensor is connected up
Door open message: The "Door open" message does not disappear after the fire door has been closed	• Check door contact • Check that the permanent magnet is still positioned above the door switch. • Check the magnet for breakages • Check settings in the Doorswitch Menu (NO / NC).
Overheated message During the burnup, the message "Overheated" appears	• Reduce the wood feed quantity. • Check that the appliance setting has the correct set of parameters. The reset process is automatic as the combustion chamber cools down.
Self-test: The air control lever only moves to the right and stays there.	• No power between actuator motor and actuating lever, driver pin (star) has wandered out of position. • Link lever clamps the primary air flap are dragging on the ground and getting caught • Check door contact and its setting.
Self-test: Air control lever first moves to the left, then to the right, where it then stops moving.	• On the motor connector on the control system, swap over the red and white core leads (stoves) or the brown and grey core leads (fire place inserts).
In operation: The air lever moves too quickly back to the left in the closed position.	• Does the current parameter set match the appliance? • Check the flue gas temperature display: are the values displayed plausible? • Check wiring of flue gas sensor for impermissible extension with copper cable or similar. • Clean the water heat exchanger if fitted. • Check draught conditions • Check leak tightness of the appliance (viewing panes, door, ash pan etc.).
In operation: Air control lever does not move to the right in the 100% closed position after the firebox door has been opened.	• Check that the "Door open" message appears. • Air control lever: Mechanism movement is impaired. Loosen it up. Clean and degrease the rotary slide disks • Door contact switch: • Check function of door contact switch • Check wiring from the door contact switch to the control • Check to ensure that the permanent magnet approaches < 10 mm at the switch.
In operation: The air control lever does not close all the way.	• Make the mechanics tight but functional • Clean and degrease the rotary vane discs • Check the parameter setting: does the current parameter set match the device? • Check the air control lever mechanics for looseness

15. DISASSEMBLY

15.1 SAFETY INFORMATION FOR DISASSEMBLY

⚠ **WARNING! Danger due to non-adherence to disassembly instructions!**

Incorrect disassembly of the unit may lead to severe injuries. this chapter contains important information for safe disassembly of the unit.

- Carefully read this chapter prior to disassembly.
- Adhere to the safety information.
- perform the disassembly work as described.

Only qualified personnel may disassemble the unit. electrical work may only be performed by qualified electricians.

To prevent danger, always adhere to the following requirements:

- The unit and other parts that you may come in contact with have cooled down for a sufficient period (e.g. several days).
- No heat or glowing embers remain in the firebox.
- The surroundings of the stove system are protected, e.g. by means of covers for the floor and furniture.

Prior to disassembly, clean the unit and the stove system. For cleaning work, remove the baffle plate from the firebox.

15.2 DISMANTLING THE UNIT

The drive unit is accessible through inspection flaps on the fireplace insert/ stove.

- Remove all cables and connections between the control unit and the motor.
- Remove the control unit.
- Remove the motor

16. DISPOSAL

16.1 DISPOSING OF THE PACKAGING

⚠ **ATTENTION! Risk of environmental damage caused by improper disposal of the packaging!**

- Do not dispose of the packaging with the normal household waste.
- Ensure that the packaging is recycled in a proper, environment-friendly manner.

The packaging is intended to protect the unit from transport damage. the packaging materials have been selected based on their environment-friendly characteristics and are made of recyclable materials. the packaging materials can be returned to the raw material cycle after use.

16.2 DISPOSING OF THE UNIT

⚠ **ATTENTION! Risk of environmental damage caused by improper disposal of the unit!**

- Do not dispose of the unit with the normal household waste.
- Ensure that the unit is recycled in a proper, environment-friendly manner

Dispose of the unit according to the legal regulations through a specialised disposal company or your local disposal facilities.

17. FINAL COMMENTS

Your specialist dealer/contract partner will be glad to support and advise you.

We strongly recommend having fireplaces and stoves checked regularly by a stove fitter.

If required and for additional information (e.g. brochures, spare parts, price lists): Please contact the manufacturer or a specialist shop.

Warranty conditions can be found at www.spartherm.com.

18. EU DECLARATION OF CONFORMITY

EC Declaration of Conformity as defined by EC directives

Low Voltage Directive 2014/35/EU - (LVD)
Electromagnetic Compatibility 2014/30/EU - (EMC)
Wireless systems directive 2014/53/EU - (RED)

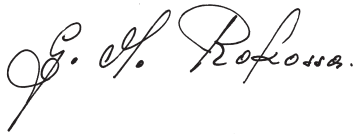
We,

Spartherm Feuerungstechnik GmbH
Maschweg 38 / 49324 Melle, Germany

hereby declare that the products listed below comply with the above EU Directives:

Product type:	Combustion control
Model:	S-Thermatik NEO

Melle, 11.01.2017



We reserve the right to make alterations to the technical data contained herein and accept no liability in respect of any errors made.

SPARTHERM

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SPARTHERM®
THE FIRE COMPANY

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GB / 09-2022