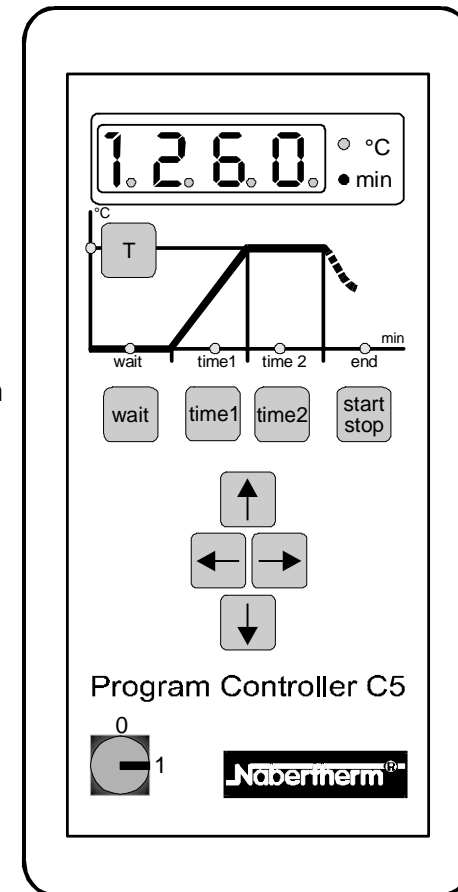


Bedienungsanleitung

Lesen Sie diese Bedienungsanleitung bitte sorgfältig durch, um

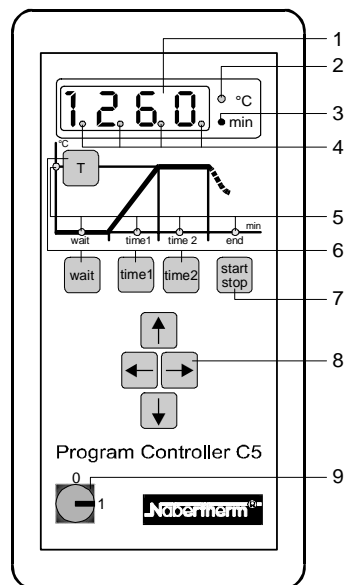
- den vollen Leistungsumfang des Program Controllers kennzulernen
- Fehlbedienungen zu vermeiden
- ein Programm erst einmal „im Kopf“ zu erstellen und abzuarbeiten



Contents

Control panel 2
 Features 3
 Safety 3
Switching on the program controller 3
 Entering start delay time 4
 Entering desired temperature ... 4
 Entering heating-up time 5
 Entering dwell time 5
 Starting a program 6
 Overview of program cycle 6
 Checking program values 6
 Stopping a program 7
 Fault indications 8
 Technical data 10
 Rating data 10
For your notes 11

Control panel



- 1 Display with time and temperature indication
- 2 LED "°C"
- 3 LED "min"
- 4 Display LEDs
- 5 LEDs "Program status"
- 6 Key to retrieve program values
- 7 "start/stop" key
- 8 Cursor keys for entering program values
- 9 Key-operated switch (S5 with rocker switch)

For your notes:



Technical data

Tmax:	Set at works according to type of furnace
Measurement input:	Type S
Overvoltage category:	Class II
Environmental conditions:	Temperature: 5 °C - 40 °C in compliance with EN 60204, part 1 Humidity: 30% - 95%
Cleaning:	Switch unit off load , clean with damp cloth
Protection class:	C5: protection class 2 / totally insulated <input type="checkbox"/> S5: protection class 1 / PE terminal <input checked="" type="checkbox"/>
In the event of a power failure:	During the start delay time (wait) at <4s: <ul style="list-style-type: none"> • remaining time is processed During the start delay time(wait) at > 4s: <ul style="list-style-type: none"> • program is aborted During the program segments time1 and time2 the program is continued.

Rating data

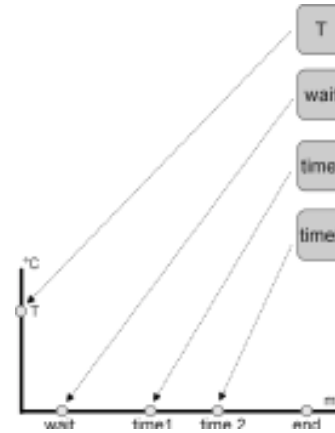
Type:	C5 / S5
Relay outputs:	C5: 230 V - 6A (floating) S5: 230 V - 16A
Supply voltage:	230 V - 50/60 Hz, 3 VA
Fusing:	C5: 32 mA S5: 40 mA

Features

The Program Controller C5 (more than 3.6 kW) or S5 (up to 3.6 kW) is an electronic temperature program controller which permits the precise control of your heat treatment processes.

The controller features:

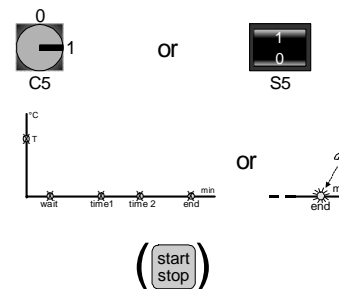
- a variable operating temperature, settable in °C
- a variable start delay time (time till start of set heating-up ramp), settable in **min**.
- a variable heating-up time, (time in which set temperature shall be reached), settable in **min**.
- a variable dwell time at set temperature, settable in **min**.
- a memory chip which saves all values entered
- integrated LEDs which always indicate the actual program status



Safety

The program controller is equipped with a number of electronic safety features. In the event of malfunction, the furnace switches off and a fault indication appears on the display. For more details see "**Fault Indications**".

Switching on the program controller

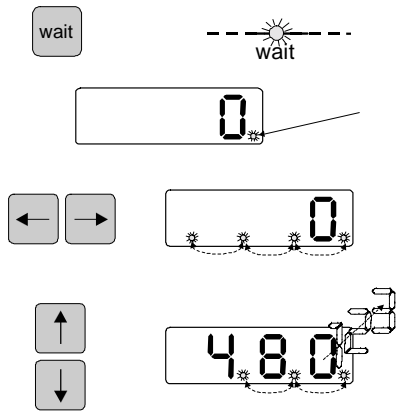


The program controller is ready for operation when the key-operated switch (C5) or the rocker switch (S5) is switched on "1".

To enter program values for temperature or time the LED **end** must be on or all "**program status**" LEDs must be off.

If one of the LEDs **wait**, **time 1**, **time 2** or **T** is on, press the **start/stop** key once.

Entering start delay time



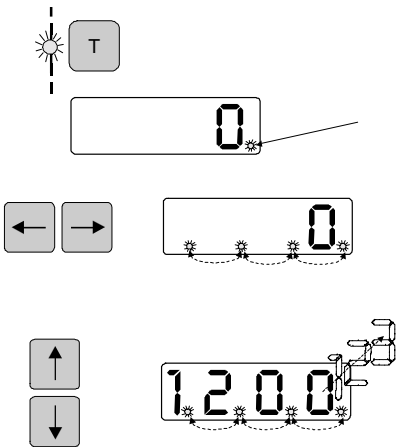
With key **wait** you can define a start delay time which delays the start of the program. Press key **wait**, the corresponding LED flashes. The LED on the display flashes simultaneously.

With keys **←** **→** you can select the desired position on the display; the corresponding LED flashes.

With keys **↑** **↓** you can alter each figure from 0-9. The value entered appears on display (in this case, for instance 480 min.)

Attention:
If no value is entered within 10 seconds, the actual temperature appears on display.

Entering desired temperature



With key **T** you can define the desired operating temperature. Press key **T**, the corresponding LED flashes. The LED on display flashes simultaneously.

With keys **←** **→** you can select the desired position on the display; the corresponding LED flashes.

With keys **↑** **↓** you can alter each figure from 0-9. The value entered appears on display (in this case, for instance 1200°C)

If a value higher than the max. possible is entered, this is automatically corrected (see "Technical Data")

Attention:
If no value is entered within 10 seconds, the actual temperature appears on display.



Fault indication **F6** appears when a system fault in the controller occurs. Possible cause:

- The program controller is defect
- Extreme power system disturbance

Attention:
When this fault indication appears, switch off the controller for a moment and then switch it on again. In most cases this will rectify the fault and the program will continue automatically.



Fault indication **F7** appears when the actual temperature is 30°C higher than the maximum operating temperature (from version 12/97 onwards: 50°C). This fault indication is triggered only when the furnace temperature has exceeded 700°C. Possible cause:

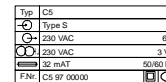
- Contactor defect



If it is not possible to eliminate the fault, please contact your customer service or call Nabertherm direct.



Furnace rating plate



Controller rating plate

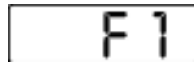
To deal with the problem as fast as possible the following is always required:

- Fault indication shown on display
- Rating plate data (furnace and program controller)

Fault indications

In the event of program controller malfunction, the furnace switches off automatically and a fault indication appears on the display. This fault indication often facilitates the tracing and elimination of the fault.

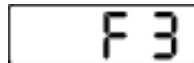
The following fault indications on the display may indicate a malfunction:



Fault indication **F1** (from version 12/97 onwards) appears when the furnace heats up too slowly or not at all (>4°C/h).

Possible cause:

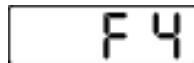
- A fuse is defect
- A heating element is defect
- ELCB has triggered
- Thermocouple is defect



Fault indication **F3** appears when a fault in the temperature measuring circuit occurs.

Possible cause:

- Thermocouple is defect
- Equalizing cable to thermocouple is defect.

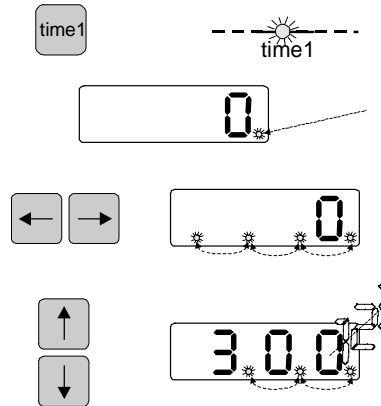


Fault indication **F4** appears when the thermocouple has been wrongly connected.

Possible cause:

- Thermocouple polarity is reversed (+,-)

Entering heating-up time



With key **time1** you can define the heating-up time. Press key **time1**; the corresponding LED flashes.

The LED on display flashes simultaneously.

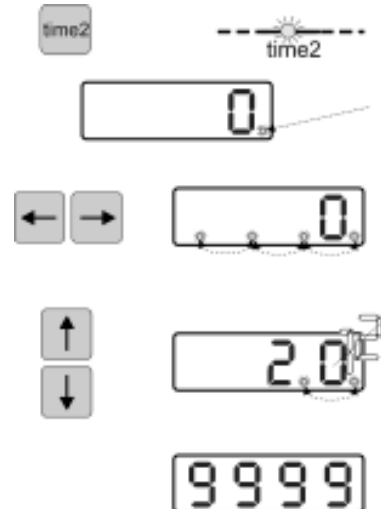
With keys you can select the desired position on the display; the corresponding LED flashes.

With keys you can alter each figure from 0-9. The value entered appears on display (in this case, for instance 300 min.). *The maximum heating-up time is 5000 min.*

Attention:

If no value is entered within 10 seconds, the actual temperature appears on display.

Entering dwell time



With key **time2** you can define the desired dwell time.

Press key **time2**; the corresponding LED flashes. The LED on display flashes simultaneously.

With keys you can select the desired position on the display; the corresponding LED flashes.

With keys you can alter each figure from 0-9. The value entered appears on display (in this case, for instance 20 min.). *For an unlimited dwell time enter "9999".*

Attention:

If no value is entered within 10 seconds, the actual temperature appears on display.

Starting a program

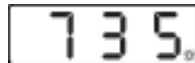


By pressing the **start/stop** key all values entered are saved and the program automatically starts. If a start delay time has been entered the LEDs **wait** and **min** light up.



The start delay time appears on the display and runs backwards to 0. If no start delay time has been set the program starts immediately with **time1**.

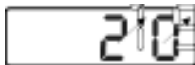
Overview of program cycle



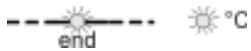
As soon as the start delay time has expired (if entered) the LEDs **time1** and **°C** light up and remain on until the set temperature **T** has been reached.



The display LED remains on whilst the furnace heats up (from version 12/97 onwards).



When the set temperature **T** has been reached, provided a dwell time has been set when programming, the LED **time2** lights up.



The temperature reached appears on display.



As soon as the dwell time has expired the LEDs **end** and **°C** light up. The actual temperature appears on display and the furnace cools down.

Checking program values



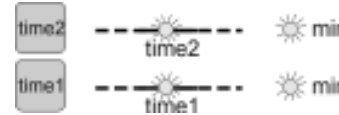
All values entered can be checked at any time even whilst a program cycle is running. However, it is not possible to alter values whilst the program is running.

On pressing key **T** the temperature entered appears on display and the LED **°C** lights up.

Press key **wait**. The start delay time entered appears on display and the LEDs **wait** and **min** light up. If a program with start delay time has already been started, the remaining time appears on display.



Press key **time1** or **time2**. The time entered appears on display, the corresponding LEDs as well as LED **min** light up.

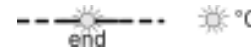


Attention:

Within 10 seconds the actual temperature appears on display.

Stopping a program

A program can be stopped automatically or manually.



When the program stops **automatically**, the program entered has been fully executed, the LEDs **end** and **°C** light up.

Attention:

All values entered remain saved (except start delay time).



To stop a program **manually**, press the **start/stop** key. LEDs **end** and **°C** light up.

Attention:

When a program is stopped manually and restarted, all program values entered are reprocessed. Therefore, before restarting the program, please check the desired values and alter these accordingly.

See previous section for more details.