

# Operating Instructions

## Temperature Controller D2

Max. Temperature 1320 °C

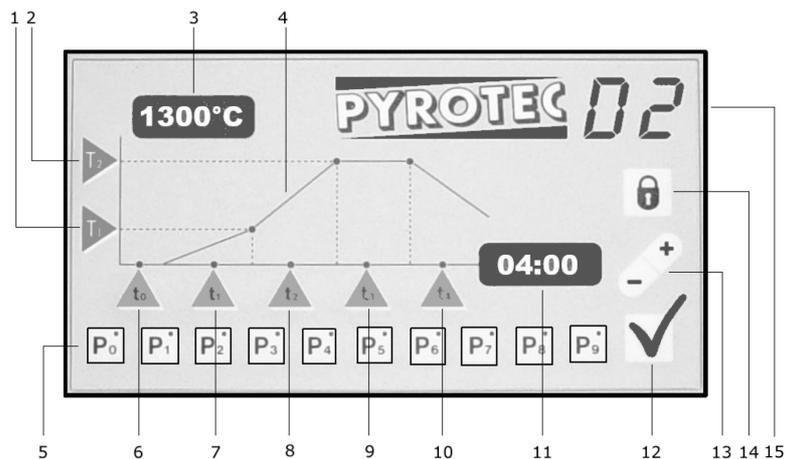


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### Controllers Panel

- 1 read/change 1<sup>st</sup> heat up ramp temperature
- 2 read/change 2<sup>st</sup> heat up ramp temperature
- 3 Display for kiln temperature
- 4 grafical scheme of the firing curve (LEDs pointing to current segment)
- 5 selecting one out of 10 programmes
- 6 read/change delay time
- 7 read/change 1<sup>st</sup> heat up ramp time
- 8 read/change 2<sup>st</sup> heat up ramp time
- 9 read/change dwell time
- 10 read/change cool down time
- 11 display for time
- 12 key to start and stop a firing
- 13 keys to change programme values
- 14 key to lock the controller's key pad
- 15 main switch



## General Information

Your PYROTEC D2 uses the latest technology available concerning firing safety, accuracy and easy handling. Appearing as a handy controller easy to use, it is a highly sophisticated instrument with a totally configurable control design allowing adaption to almost all applications. Reading through this manual quickly familiarizes you with the numerous features of your PYROTEC D2.

Please also refer to the safety advise of your kiln manufacturer!

## Safety advise

Depending on the kiln model the controller is either mounted on the kilns operating panel or on the wall (use mounting bracket coming with the kiln).

**Note: Never place the PYROTEC D2 on the top of your kiln!**

Your PYROTEC kiln and controller has passed extended tests during manufacturing process. However, we recommend never to fire the kiln unattended especially at the end of the firing.

## Setting up the Controller

Mount the PYROTEC D2 controller on the kilns resp. the wall accordingly. The controller is connected to the kiln by a multipole plug (fits only in one orientation). Lock the plug by the lever on the socket. When turning on the controller with the mains switch(15) after 3 seconds display (3) shows the actual kiln temperature. Your PYROTEC D2 is now ready for use.

## Programmes

The **PYROTEC D2** comes with 5 typical firing curves, programme no. 1 (P1) to no. 5(P5) and another 5 programmes that may be set according to one's special needs. The factory set programmes are as follows:

Programme	Time <sub>1</sub> t <sub>1</sub>	Temperature <sub>1</sub> T <sub>1</sub>	Time <sub>2</sub> t <sub>2</sub>	Temperature <sub>2</sub> T <sub>2</sub>	Time <sub>3</sub> t <sub>3</sub>	Time <sub>4</sub> t <sub>4</sub>
P <sub>1</sub> drying	5:00	150	0:00	150	0:00	0:00
P <sub>2</sub> slow biscuit	6:00	600	0:00	900	0:10	0:00
P <sub>3</sub> fast biscuit	4:00	600	0:00	900	0:10	0:00
P <sub>4</sub> glaze 1050°C	2:00	400	0:00	1050	0:20	0:00
P <sub>5</sub> glaze 1180°C	2:00	400	0:00	1180	0:20	0:00

Programmes P<sub>6</sub> – P<sub>0</sub> may be set according to one's needs.

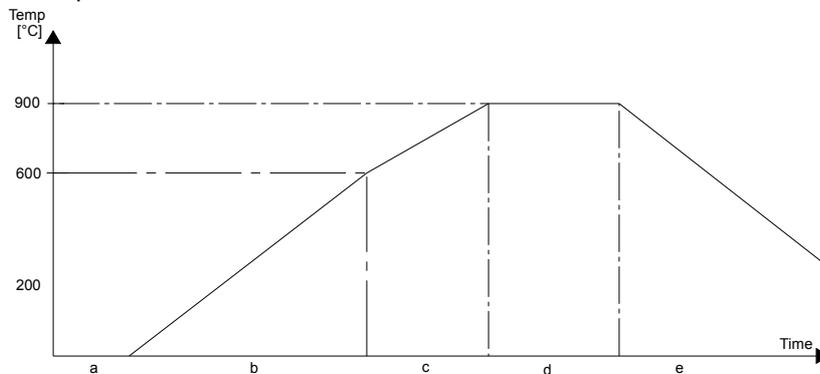
All times shown on display (11) have the format hours:minutes (04:20 means 4 hours and 20 minutes)

All Programmes even the factory set ones may be changed at any time. Delay time cannot be stored and has to be set each time, a new firing will be started. Default is 00:00, i.e. the controller starts immediately after pushing the start key(12).

## Firing Curves

The PYROTEC D2 microprocessor controller allows an exact and reproduceable control of your kiln. A firing curve consists of the segments (a) to (e).

Example:



### (a): delay time

Time display(11) reads the remaining delay time.  
Temperature display(3) reads actual kiln temperature.  
Controller starts the firing when delay time turns to zero.  
LED in segment "a" indicates delay time is running down.

### (b): heating up to 1st temperature

First heating up rate is entered by the time(7) and temperature(1)  
The kiln heats up at the selected rate to the first temperature(600°C in the example above)  
Time display(11) reads the remaining time of first ramp.  
Temperature display(3) reads actual kiln temperature.  
LED in segment "b" indicates that first ramp is run.

### (c): heating up to final (firing) temperature

Second heating up rate is entered by the time(8) and temperature(2)  
Kiln heats up at the selected rate to firing temperature (900°C in the example above)  
Time display(11) reads the remaining of second ramp.  
Temperature display(3) reads actual kiln temperature.  
LED in segment "c" indicates that second ramp is run.

### (d): dwell at final temperature

Dwell time is entered by time(9)  
Kiln is kept at the final temperature for the selected time. This is to ensure all fired goods are entirely heated through.  
Time display(11) reads the remaining dwell time.  
Temperature display(3) reads actual kiln temperature.  
LED in segment "d" indicates dwell time is running down.

### (e): cooling down

Cool down time is entered by time(10)  
Kiln cools down **to 200 °C** at the selected rate  
Time display(11) reads the remaining cool down time.  
Temperature display(3) reads actual kiln temperature.  
LED in segment "e" indicates cooling down time is running down.  
When cool down time is zero, firing is finished. All LEDs of the firing curve are dark, temperature display reads actual kiln temperature, time display shows "EndE".

## Starting a Firing

When turning on the controller with the mains switch(15) after 3 seconds display (3) shows the actual kiln temperature. Your PYROTEC D2 is now ready for use.

Select the programme you want to use by pushing one of 10 programm keys(5), the corresponding light inside the key indicates which programme has been selected. Push start key(12) to run the firing. A flashing decimal point inside the time display(11) indicates a running programme.

During the entire firing the temperature display(3) reads the actual kiln temperature. Every 20 seconds the firing temperature is shown flashing.

Time display (11) reads the remaining time for the actual segment of the firing curve(4).

### Note

**The flashing decimal point on the right hand side of display(11) always indicates a running programme.**

When the firing is completed successfully, the temperature display(3) reads the actual kiln temperature, the time display(11) reads „EndE“.

## Checking Programme Values

All programme values may be checked by pressing the corresponding key (1,2,6, 7, 8, 9, 10). This may be done at anytime even during a firing process without interrupting it.

Temperature display (3) resp. time display (11) reads the programme value for 2 seconds before returning to the actual kiln temperature resp. remaining time. The corresponding indicator of the firing curve (4) keeps flashing while displays show programmed values.

## Changing Programme Values

All values of any programme may be changed according to one's needs.

Select the programme you want to adjust as described in „Starting a Firing“ before. In order to change a value just press the corresponding key(1,2,6, 7, 8, 9, 10). The indicator LED in the firing curve flashes and the display (3 for temperatures, 11 for times) show the actual values. You may now change these values by means of key "+ -" (13) or keys P0-P9 (5) using them as numeric keys.

Values changed by doing so are stored automatically and remain in storage even after switching off the D2(15). You are free to change them as described above at any time once more.

Values may be changed even after starting the firing. You just have to interrupt the firing by pressing key (12), change the value(s) as described above and finally start the firing again by pressing key(12) once more.

## Locking the Controller

To prevent the PYROTEC D1 from unauthorized usage you can lock the keypad by pressing the key (4). A decimal point on the left hand side in display (1) indicates the controllers keypad is locked. If the controller is locked you can check values but not for instance start or interrupt a firing. To unlock the controller press and hold key (4) again for 3 seconds until the decimal point disappears.

## Power Failure

In case of a power breakdown the firing process is interrupted. After power is established again the firing process is continued from that point at which it was interrupted. If the kiln temperature has dropped more than 50°C since the power failure happened the firing is interrupted (error messages F2 comes up).

## Operation Limits

All times are entered as hours : minutes at a maximum of 99 hours 59 minutes. Temperatures are allowed to be entered from 20°C up to 1320°C. Note that when entering 1320°C the maximum dwell is limited to 10 minutes for safety reasons. Also watch the maximum temperature of the PYROTEC kiln. Due to the mains limitations of one phase kilns some kiln models are not capable of reaching the maximum temperature of the controller. Never try to operate the kiln outside its temperature range.

## Results of Previous Firing

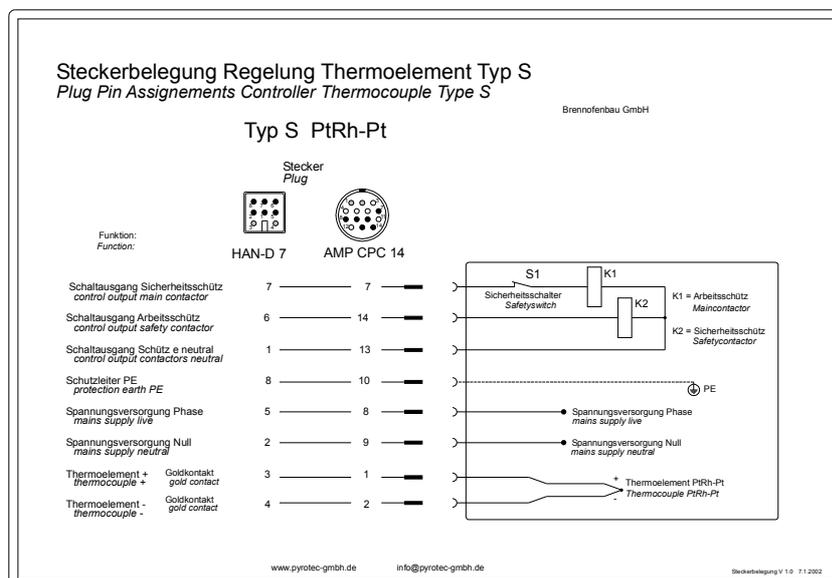
After the firing is completed the following results of the firing can be displayed in (1) by keeping the key (7) pressed:

- operation hours of the heating elements (net time) since starting the firing
- total operation hours of the heating elements (net time) since using the controller
- temperature at the end of the firing resp. when error occurred
- elapsed time since end of firing resp. when error occurred

## Technical Specifications

power supply	180 - 245V AC 50/60 Hz
fuse	0,5 A semi-lag
rated power	5 W
signal input thermocouple	PtRh10%-Pt (S)
resolution	0.1°C
accuracy	0,1% full scale
case dimensions	200 x 110 x 60 mm
weight	1100 g
ambient temperature	-10°C to 55°C

## Pin Assignment of the Plug



## Error Messages

The integrated microprocessor inside your PYROTEC D2 performs continuous checking of the firing process. In case of any malfunction the display read an error message pointing to the problem. Following is a description of the possible error messages:

**F1 :** The kiln doesn't follow the required temperature increase.

This error message **points clearly to a kiln problem**. Possible cause:

- broken fuse, power phase or relay failed
- the door (lid) contact is open
- a heating element is broken
- the heating elements are too old (esp.with high firing temperatures)
- the thermocouple has a short circuit

### **F2 1: Safety Switch Off feature was activated**

The PYROTEC D2 has detected an overtemperature the kiln and switched off the kiln by the 2nd power relay (20°C overshoot vs. T1 or T2 at or above 900°

Check and repair the cause carefully before continue using the kiln again to avoid further damage !

### **F2 2: Firing interrupted due to power breakdown**

In case of a power breakdown the firing process is interrupted. After power is established again the firing process is continued from that point at which it was interrupted. If the kiln temperature has dropped more than 50°C since the power failure happened the firing is finished and the PYROTEC D2 shows error message.

### **F3: Thermocouple or thermocouple circuit defect**

Possible cause:

- thermocouple broken
- thermocouple wiring bad
- bad contacts of the connecting plug

### **F4: Impossible values on data acquisition**

Possible cause:

- thermocouple polarized bad
- thermocouple temperature less than -40°C

### **F8 : Error detected during power-up self check**

On every power-up the controller performs a self check. If an error is detected the controller shows F8. Please contact your local dealer.