



Sintering Furnace Introduction, Installation, Operation, Troubleshooting

Besmile Biotechnology Co. , Ltd.

26/6/2025



Introduction



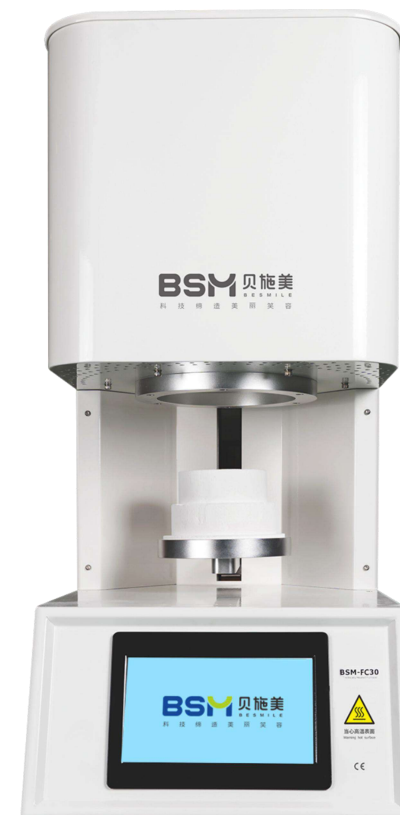
BSM-S30



BSM-FC40

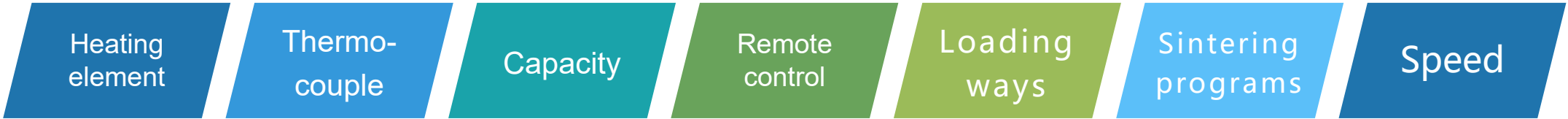


BSM-FM30



BSM-FC30

BSM Sintering Solution



BSM-S30

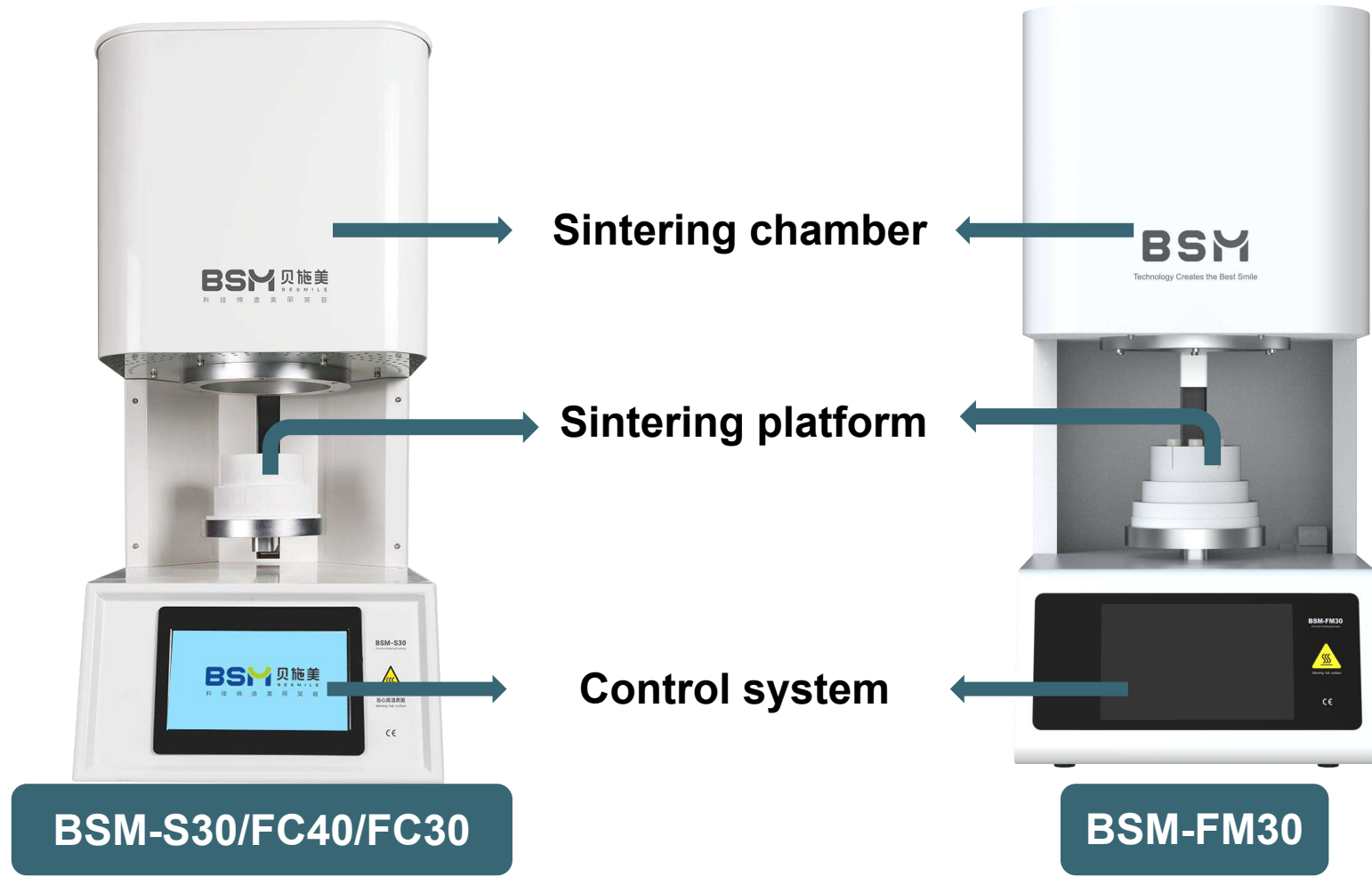
BSM-FC30

BSM-FC40

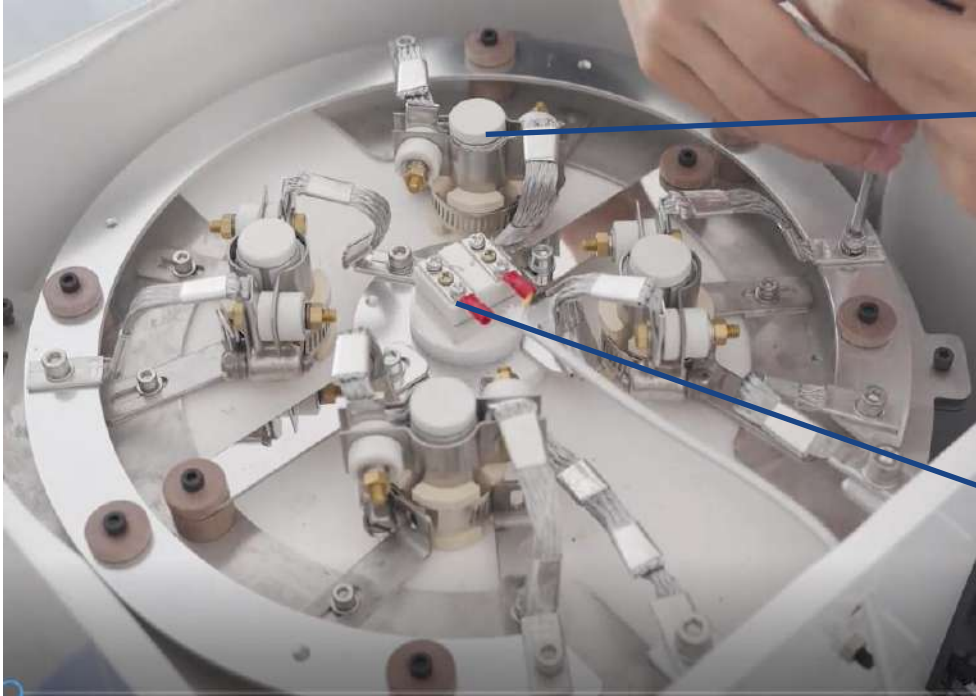
BSM-FM30

MoSi ₂	Type-B	60-80 units	Support	Bottom loading	100	10°C/min
SiC	Type-B	25 units	Support	Bottom loading	100	100°C/min
SiC	Type-B	60-80 units	Support	Bottom loading	100	100°C/min
MoSi ₂	Type-B	60-80 units	Support	Bottom loading	100	25°C/min

➤ Structure



Sintering chamber



BSM-FC40/FC30

Heating rods

Thermocouple

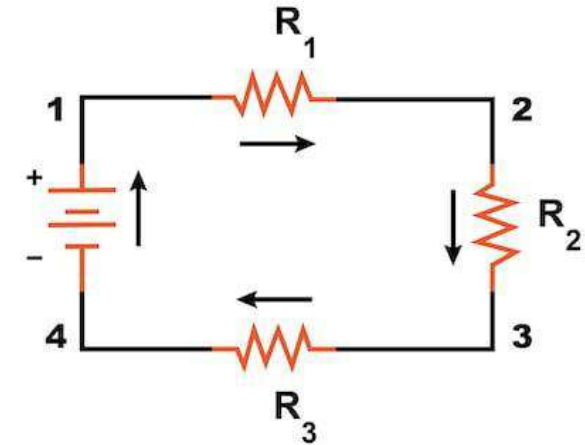


BSM-S30/FM30

(Top view)

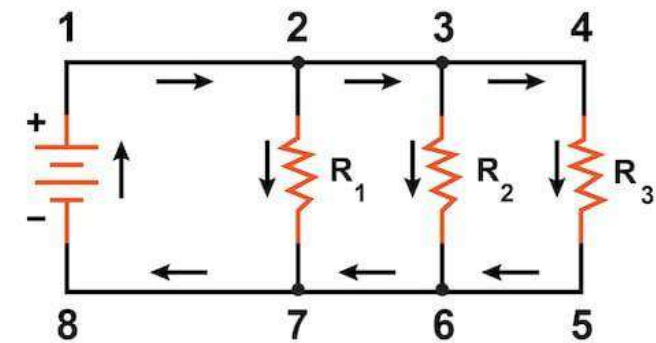
➤ Two common used rods

Molybdenum disilicide rods (For BSM-S30/FM30)



Series connection

Silicon carbide rods (For BSM-FC40/FC30)



Parallel connection



Molybdenum Disilicide Rod (MoSi_2)

BSM-S30/FM30



Advantages

- T_{max} 1800°C
- Long service life, 2-3 years
- Hardly age, electric resistance stays almost same, mixed use of new rods and old rods



Disadvantages

- Lower heating/cooling rate, $\leq 10^\circ\text{C}/\text{min}$



Silicon Carbide Rod (SiC)

BSM-FC30/FC40



Advantages

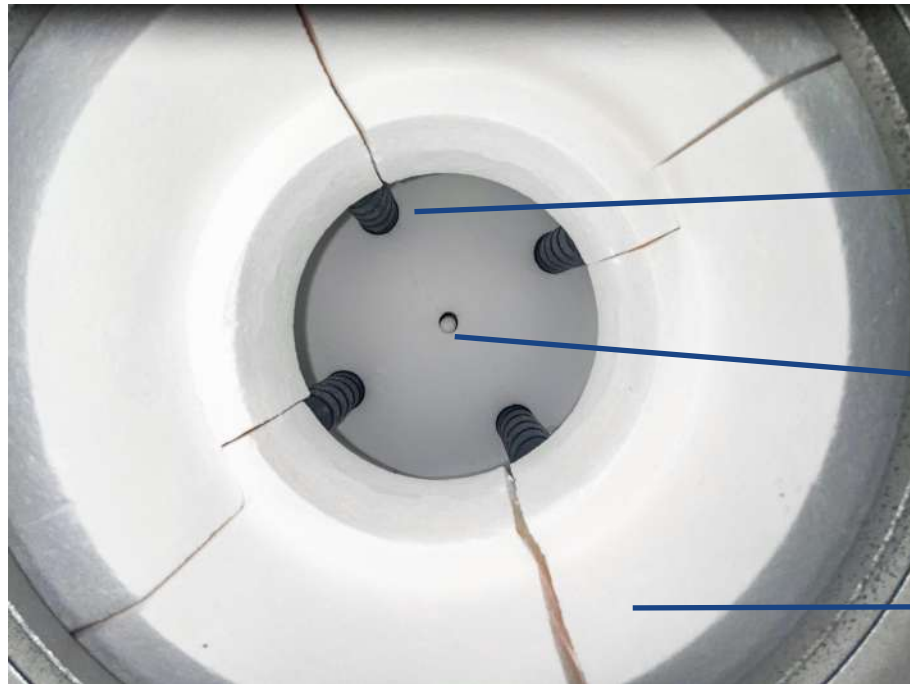
- No pollution
- Faster heating/cooling rate, $\leq 50^{\circ}\text{C}/\text{min}$



Disadvantages

- $T_{\text{max}} 1600^{\circ}\text{C}$
- Shorter service life, half a year
- Easier age, electrical resistance will increase
- Difficult to reach the set temperature after aging
- No mixed use of new rods and old rods

Sintering chamber

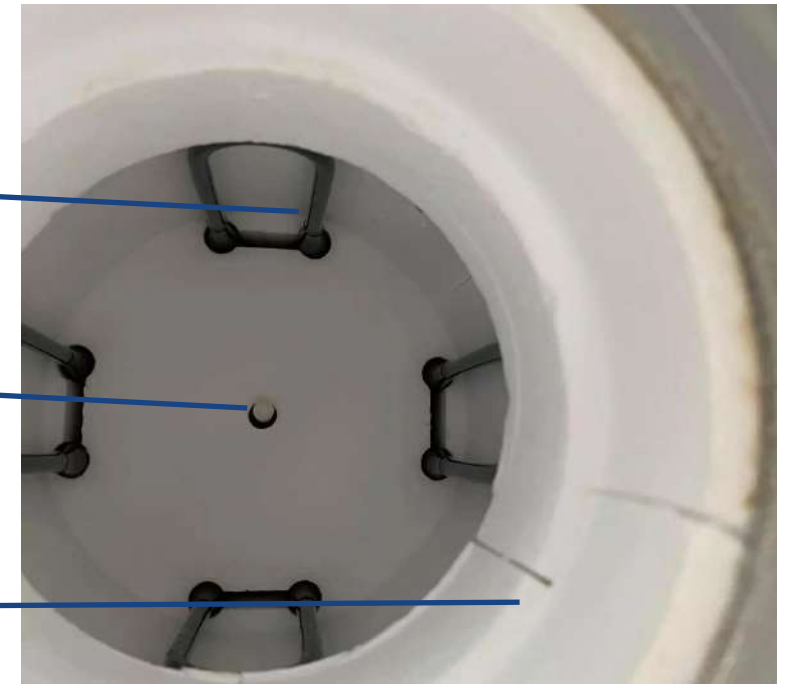


BSM-FC30/FC40

Heating elements

Thermocouple

Fiber refractories



BSM-S30/FM30

(Bottom-up view)

Introduction



7-inch true color touch screen

Your Pocket-Sized Sintering Solution !

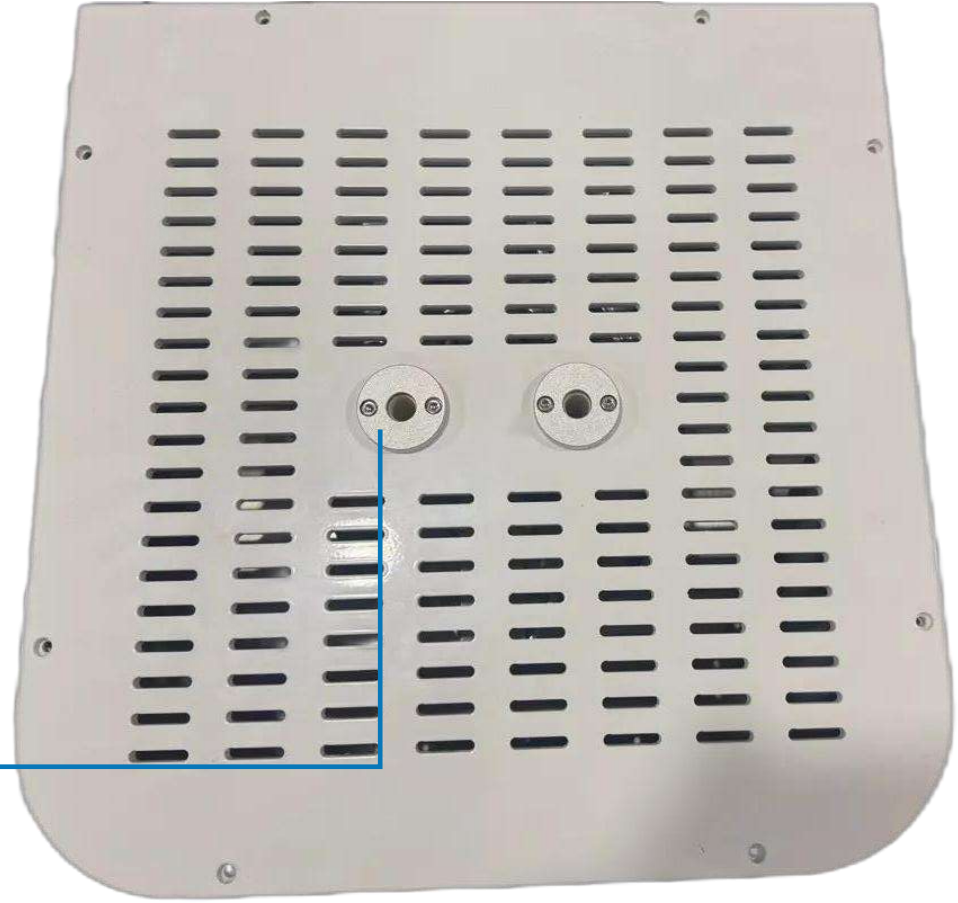


Support WIFI
and hotspot

Exhaust pipes



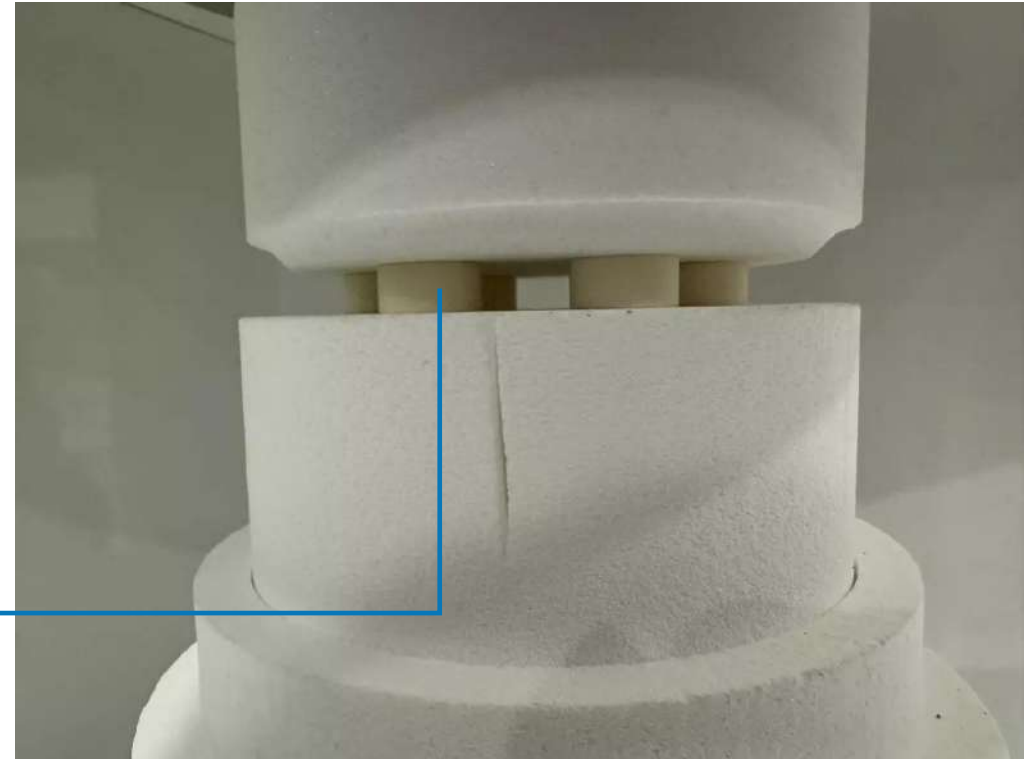
BSM-FC40



BSM-S30 / FM30

Discharge the exhaust gases of the coloring liquid

Even heating



Zirconia rings are designed to support the trays to be heated more evenly.

Large capacity



Two trays: 60~80units
Tray size:105mm*40mm

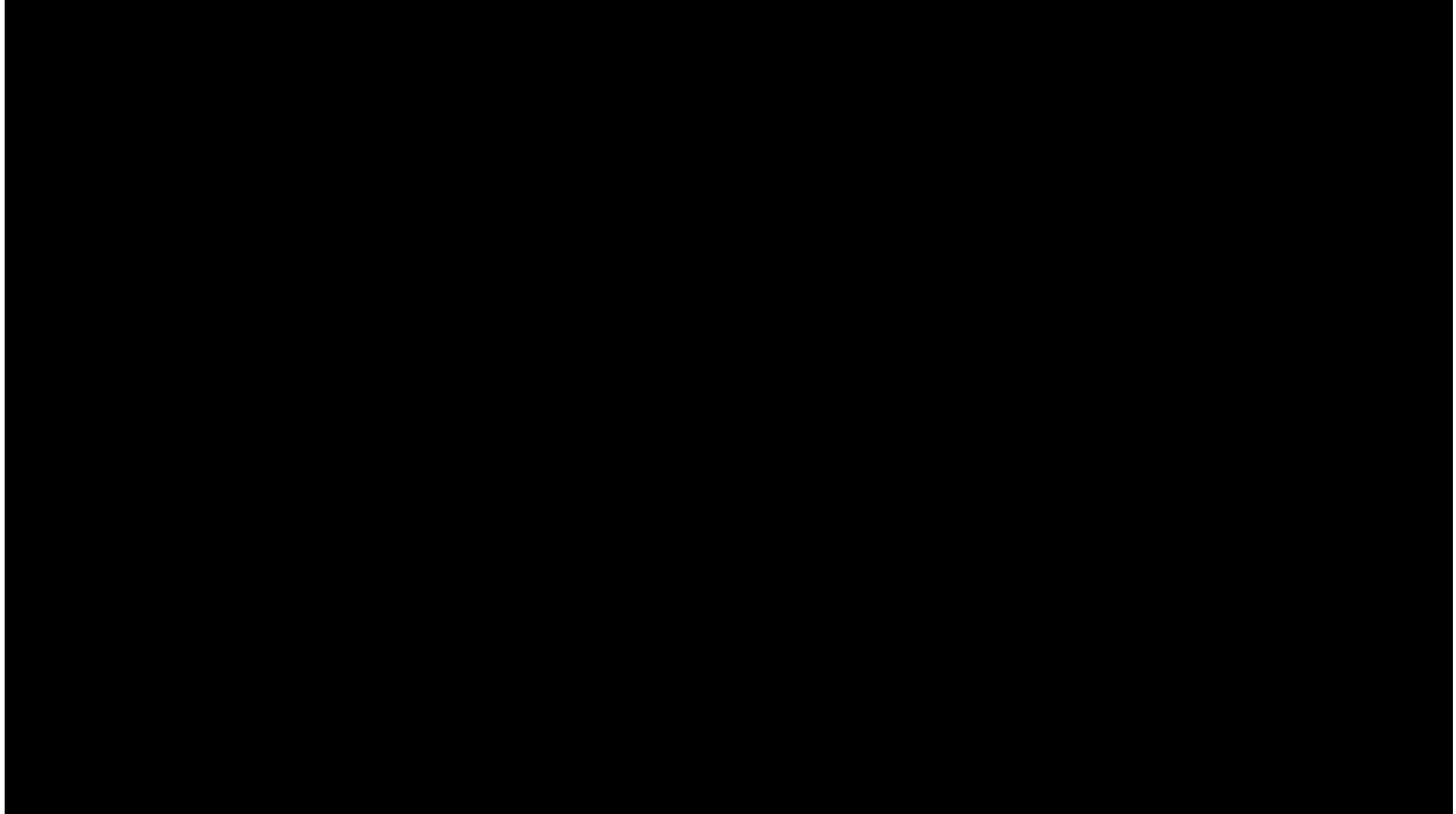
BSM-S30/FC40/FM30

02

Installation

➤ New furnace installation

What should you do
when you get the
package?



➤ New furnace installation



Standard package



Shocksensor

03

Operation



- Initial interface
- Daily workflow
- Program setting
- Temperature accuracy calibration



- *Initial interface*
- Daily workflow
- Program setting
- Temperature accuracy calibration

Initial interface Introduction

Date Time Version Status Chamber temperature

2025/06/18

15:37

V1.08

BSM



278.3 °C

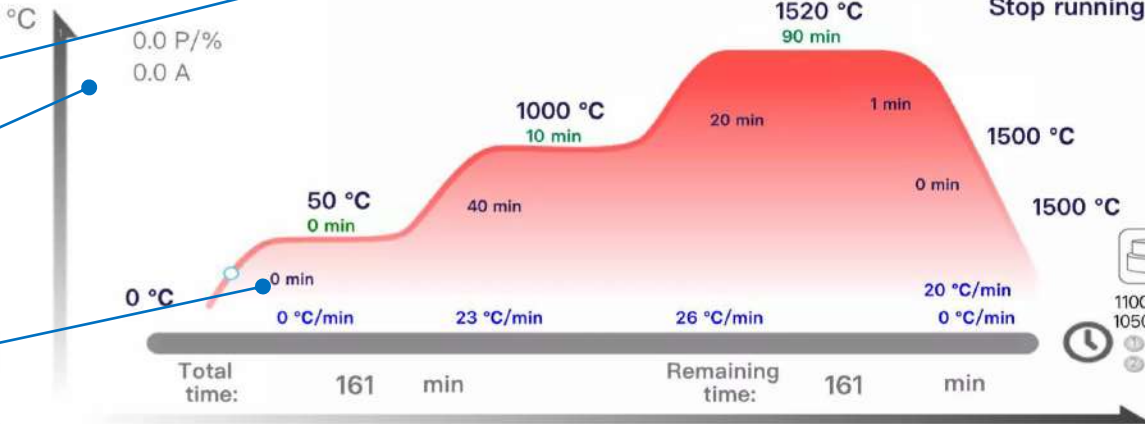
Program number

Program name

Power

Sintering curve

Program 7 BSM-A13



Stop running



Program



Set Up

Program selection

Program setting



Operating buttons

Automatical cooling



Curve



Data



Function



Language



Diagnostic

History curve

Sintering data

Additional function

Choose language

Alarm analysis



- Initial interface
- *Daily workflow*
- Program setting
- Temperature accuracy calibration

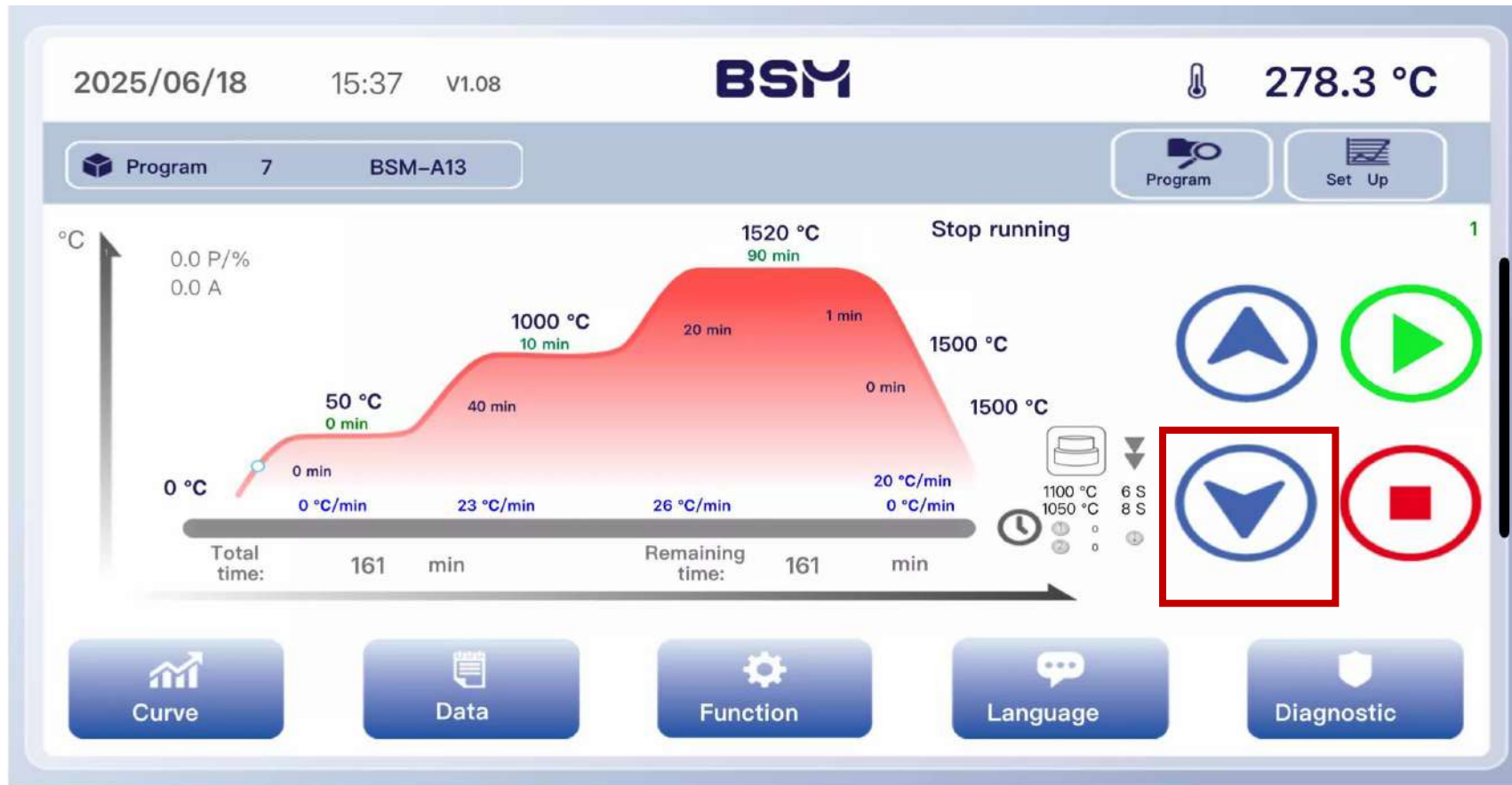
① Power on.

power supply

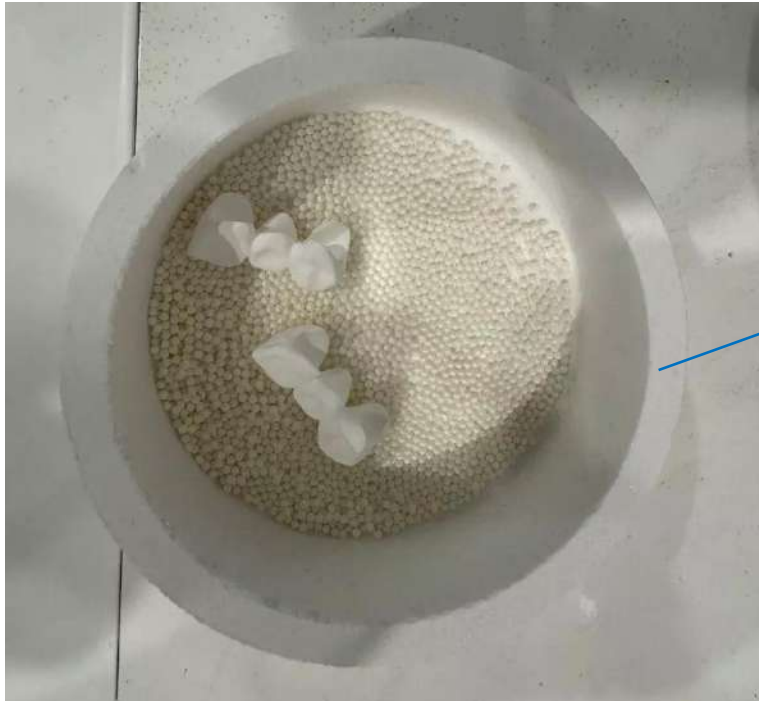
USB port



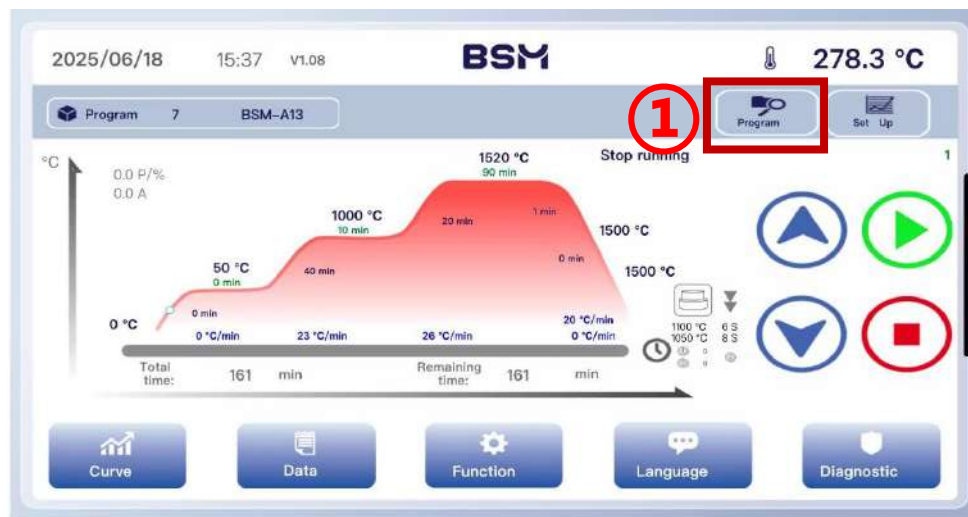
② Click “down” button to lower down the platform.



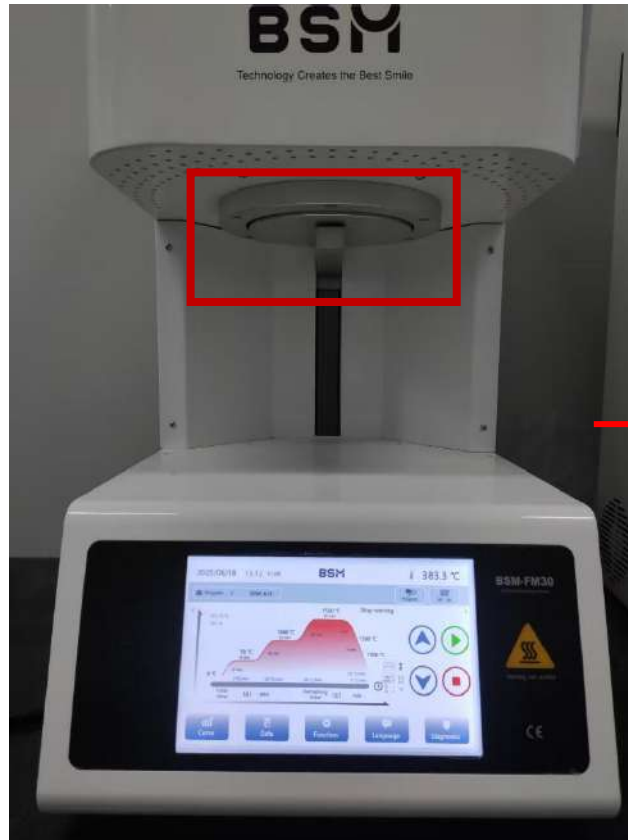
- ③ Put restorations in the sintering tray and put the tray on the platform.



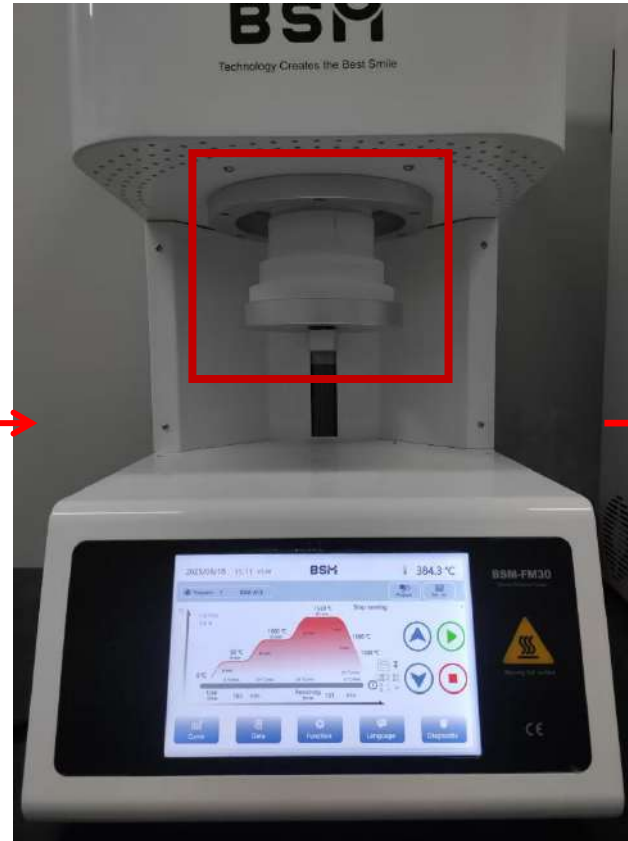
- ④ Choose the program you need and click “start” button. (The program is loaded automatically when you select it, so please do not select the program when the furnace is working!)



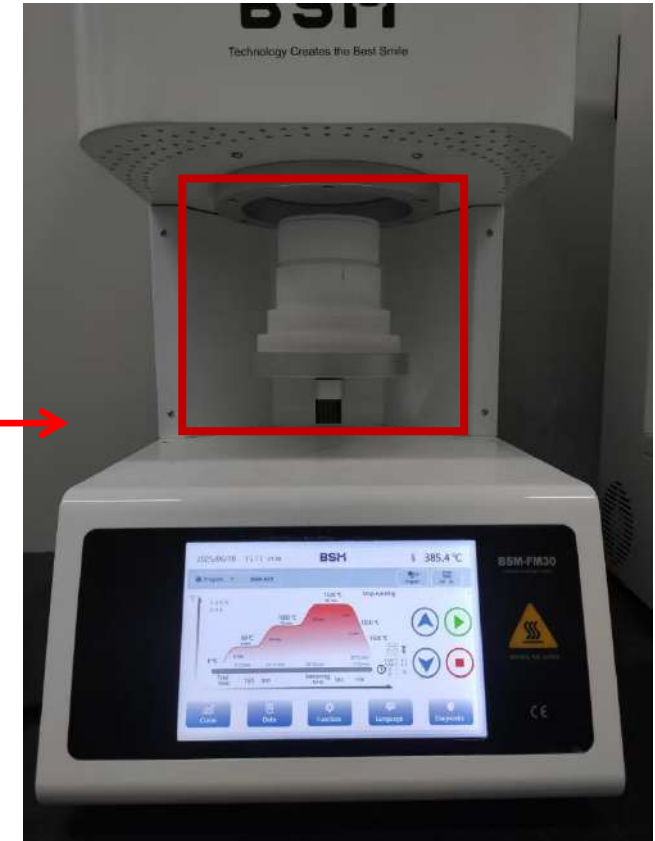
⑤ After cooling, the platform will go down automatically. Take out restorations and have a check.



Closed



Half-open



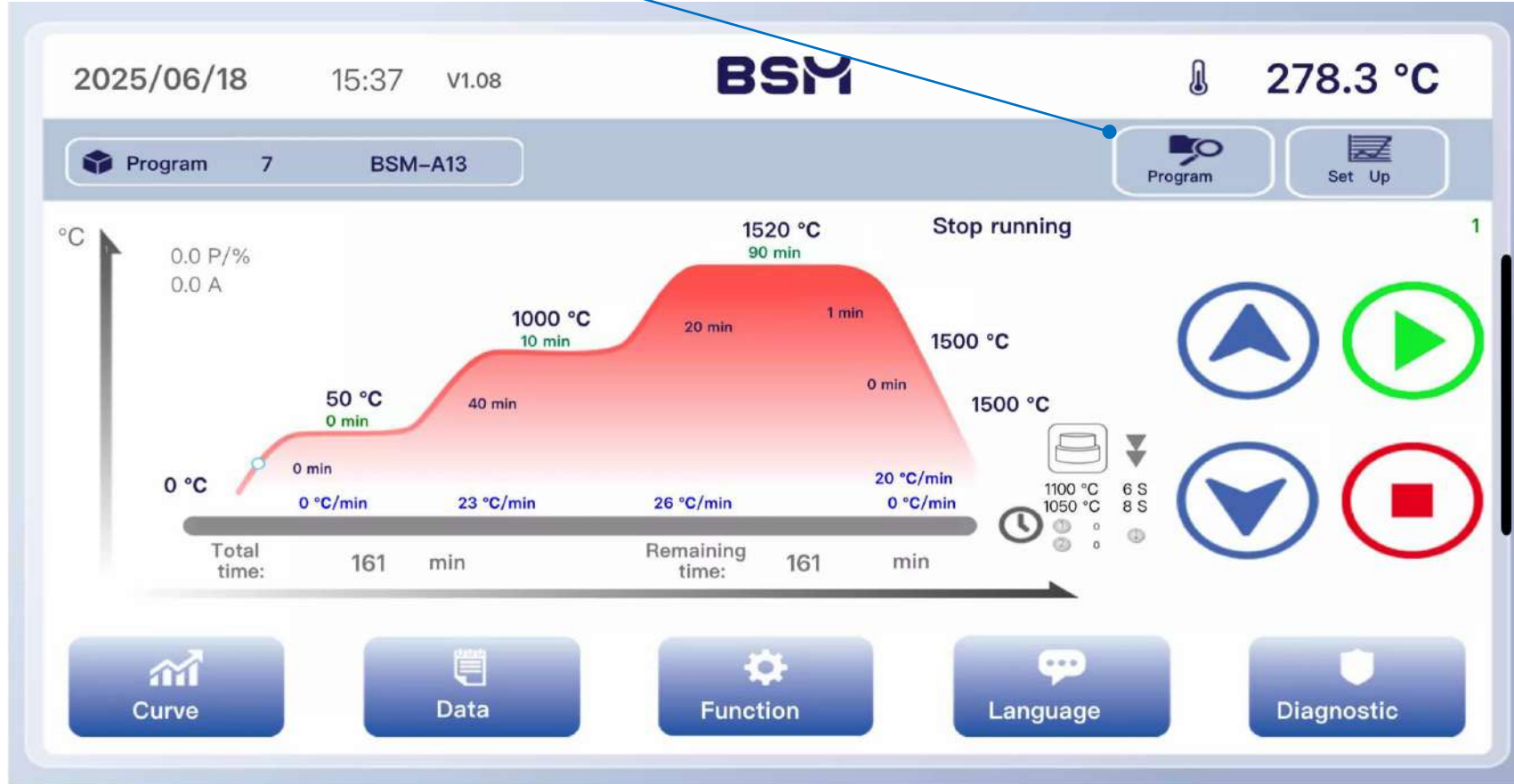
Open



- Initial interface
- Daily workflow
- *Program setting*
- Temperature accuracy calibration

Program setting

① Choose “program”.



Program setting

- ② Choose the one that you want to edit, then click “set up”.
(The yellow ones are built-in programs and cannot be changed)



Program setting

③ Set the parameters as recommended.

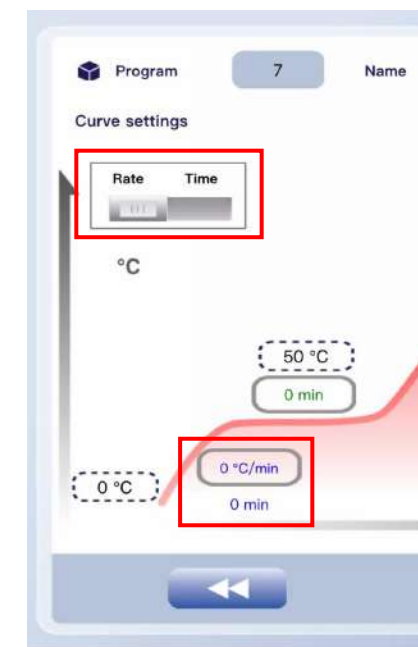
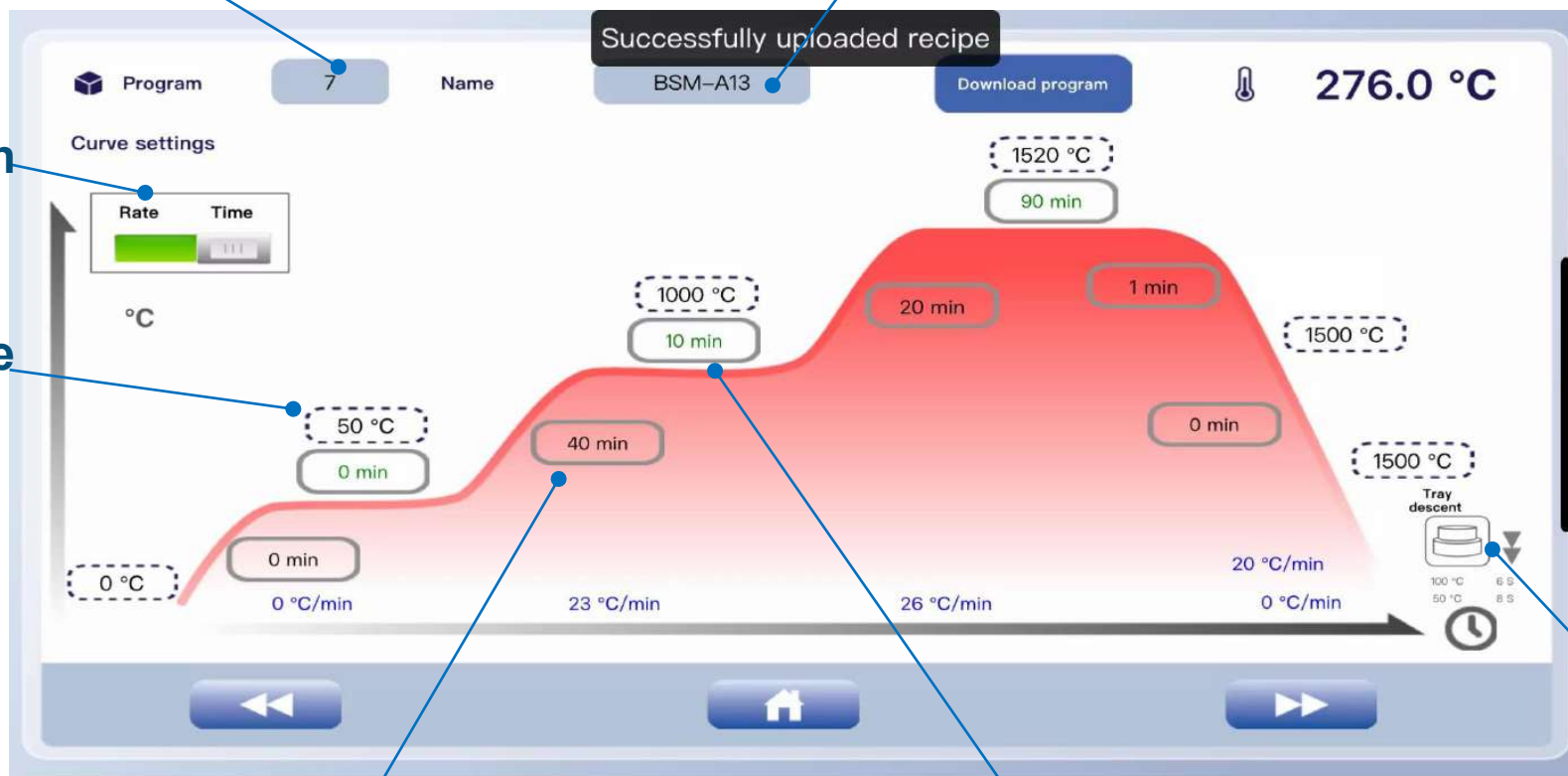
Step	Initial temperature(°C)	Final temperature(°C)	Time(min)	Heating rate(°C/min)
1	50	1000	40	23.75
2	1000	1000	10	Holding
3	1000	1520	20	26
4	1520	1520	90	Holding
5	1520	1500	1	-20
6	1500	Natural cooling		

Change the program you want to edit

Change the program name

Mode switch

Temperature



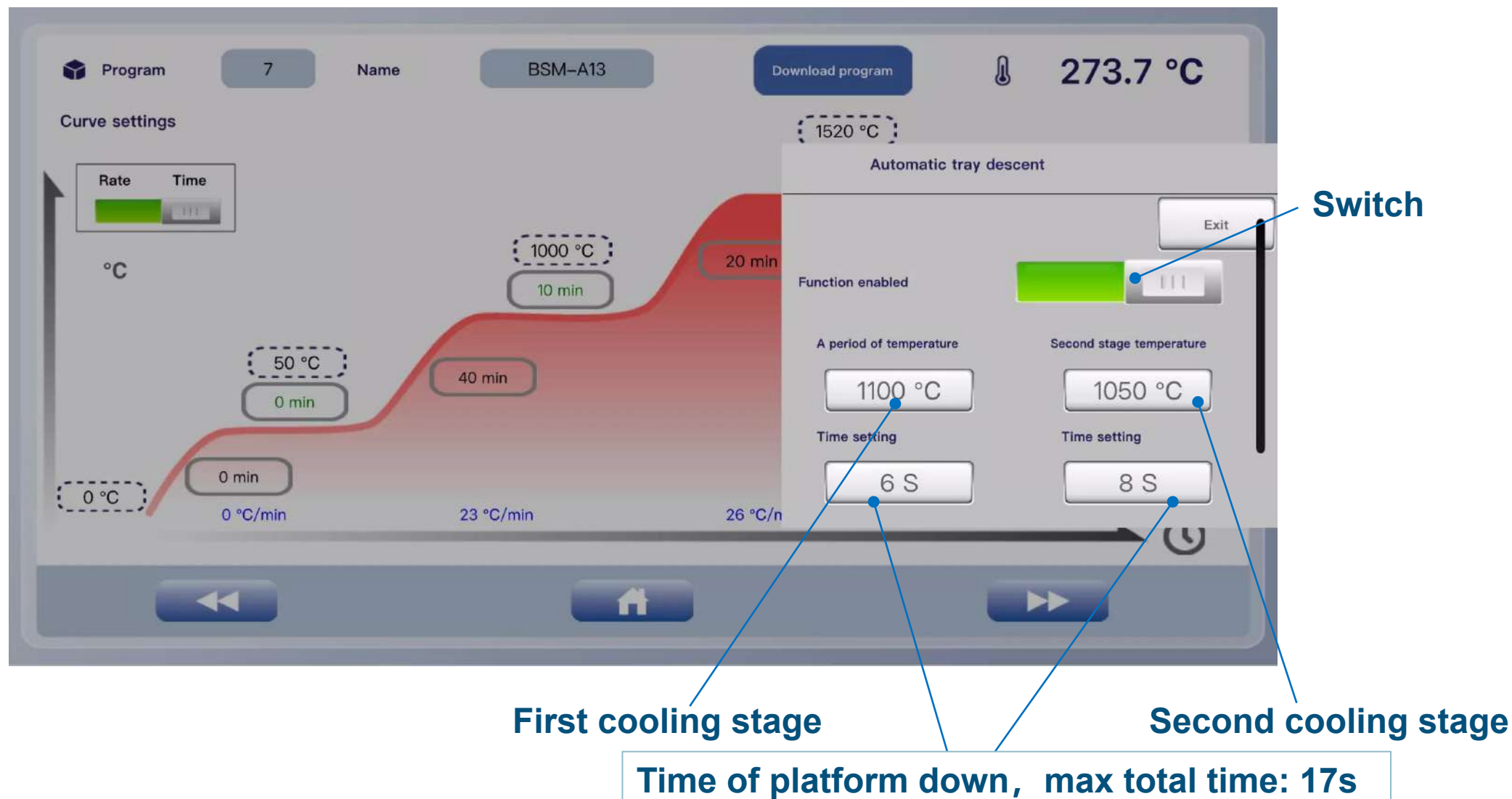
Automatic cooling setting

Time between every two temperature points

Holding time

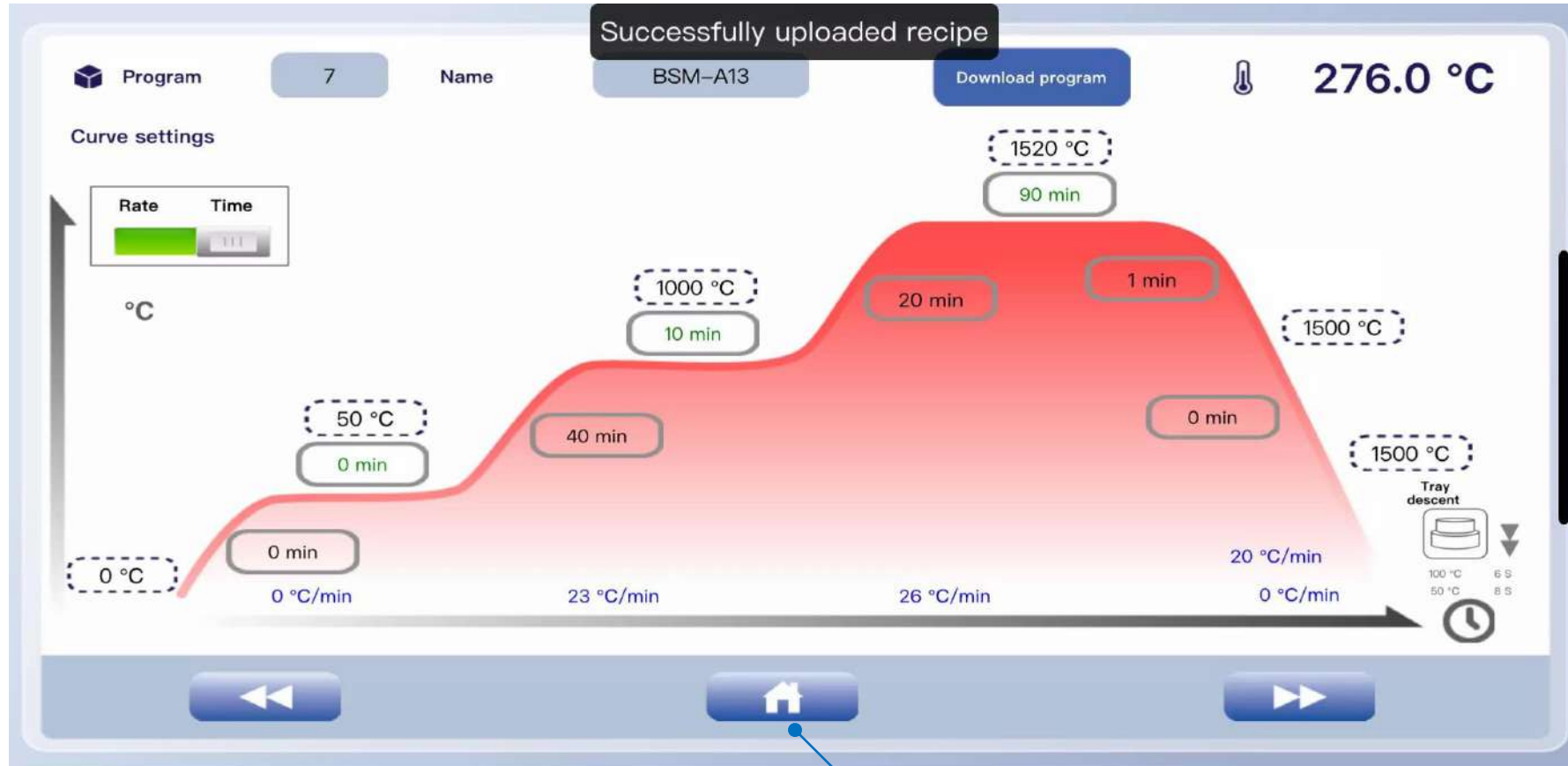
Program setting

- ④ Set the automatic cooling procedure. Fast sintering: First stage 800, second stage 500.
Standard sintering: First stage 300, second stage 200.



Prpgram setting

⑤ Save and exit.



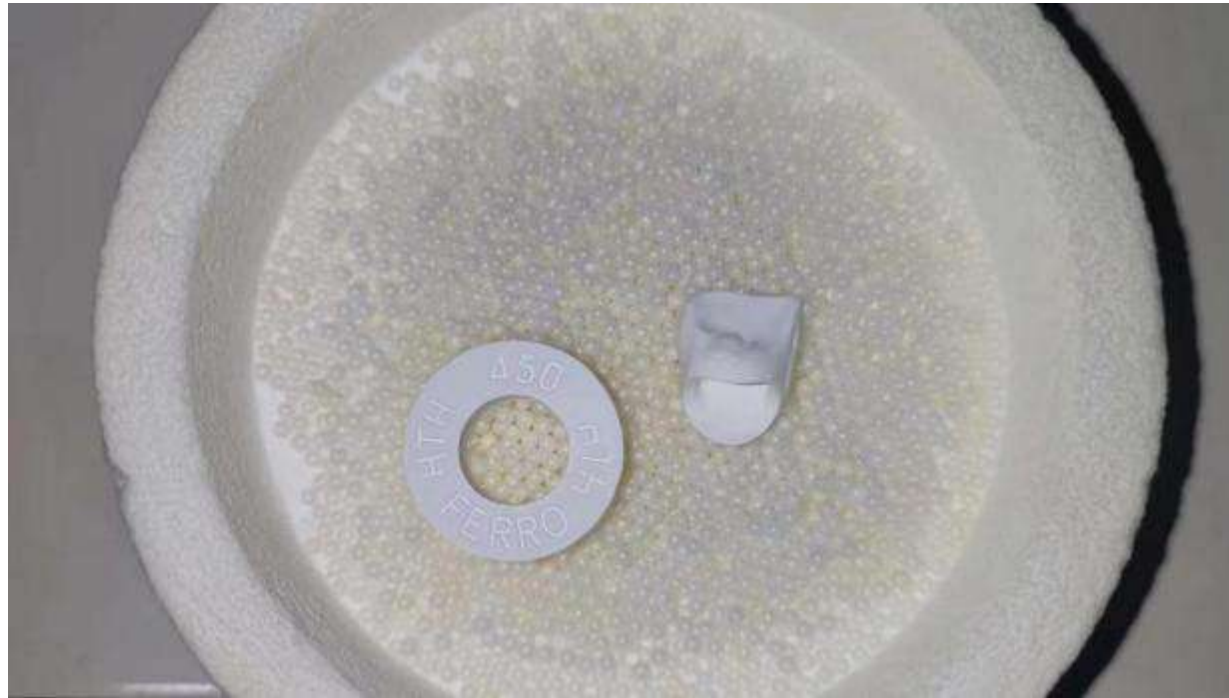
Home



- Initial interface
- Daily workflow
- Program setting
- *Temperature accuracy calibration*

First use

After the installation, We suggest you to sinter one crown and one calibration ring.



After the sintering, if the crown is good, you can try to sinter more teeth. If not, you need to calibrate the temperature.

Temperature accuracy calibration

Step 1

Run the standard sintering program(1520) to sinter the test ring.
(The fast sintering program can not get the accurate result.)



Calibration rings (accessory)



In the center of the sintering bowl

Temperature accuracy calibration

Step 2

Measure the diameter of the ring after sintering with a digital caliper as the picture shows. It's more accurate if you measure several times and average them.



Digital caliper

Temperature accuracy calibration

Step 3

Read the ring temperature according to the ring diameter in the reference table.

For example, if the ring diameter is 19.35mm, you can read the ring temperature is 1540°C.

Real temperature 1540°C is 20 degrees higher than the setting 1520°C

19,30	1550 °
19,31	1548 °
19,32	1546 °
19,33	1544 °
19,34	1542 °
19,35	1540 °
19,36	1538 °
19,37	1536 °
19,38	1533 °
19,39	1531 °

TEMPERATURE-TABLE for PTCR

Higher quality products and lower costs through improved, reliable firing control

Type PTCR - HTH

Ferro no.

1400610

Temperature Range °C

1450 - 1750°C

Ring Colour

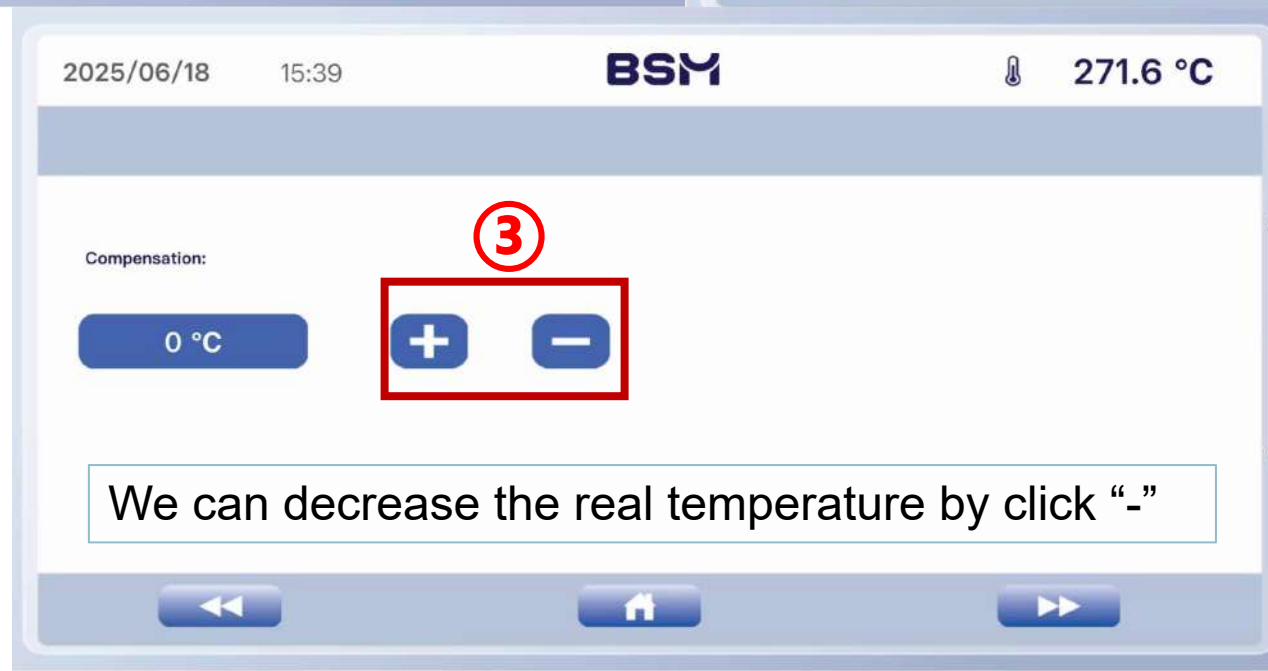
White

Dimensions

± 20 x 10 x 7,0 mm

Ring dia- meter mm	Ring tempe- rature °C	Ring dia- meter mm	Ring tempe- rature °C	Ring dia- meter mm	Ring tempe- rature °C	Ring dia- meter mm	Ring tempe- rature °C	Ring dia- meter mm	Ring tempe- rature °C
				17,95	1709 *	18,45	1666 *	18,95	1609 *
				17,96	1708 *	18,46	1665 *	18,96	1608 *
				17,97	1707 *	18,47	1664 *	18,97	1606 *
				17,98	1707 *	18,48	1663 *	18,98	1605 *
				17,99	1706 *	18,49	1662 *	18,99	1603 *
	17,48	1750 *		18,00	1705 *	18,50	1661 *	19,00	1602 *
	17,49	1749 *		18,01	1704 *	18,51	1660 *	19,01	1600 *
	17,50	1748 *		18,02	1703 *	18,52	1659 *	19,02	1599 *
	17,51	1747 *		18,03	1703 *	18,53	1658 *	19,03	1597 *
	17,52	1746 *		18,04	1702 *	18,54	1657 *	19,04	1596 *
	17,53	1745 *		18,05	1701 *	18,55	1656 *	19,05	1594 *
	17,54	1744 *		18,06	1700 *	18,56	1655 *	19,06	1593 *
	17,55	1743 *		18,07	1699 *	18,57	1654 *	19,07	1591 *
	17,56	1742 *		18,08	1698 *	18,58	1653 *	19,08	1589 *
	17,57	1741 *		18,09	1698 *	18,59	1652 *	19,09	1588 *
	17,58	1740 *		18,10	1697 *	18,60	1651 *	19,10	1586 *
	17,59	1740 *		18,11	1696 *	18,61	1650 *	19,11	1584 *
	17,60	1739 *		18,12	1695 *	18,62	1649 *	19,12	1583 *
	17,61	1738 *		18,13	1694 *	18,63	1648 *	19,13	1581 *
	17,62	1737 *		18,14	1693 *	18,64	1647 *	19,14	1579 *
	17,63	1736 *		18,15	1693 *	18,65	1646 *	19,15	1578 *
	17,64	1735 *		18,16	1692 *	18,66	1645 *	19,16	1576 *
	17,65	1734 *		18,17	1691 *	18,67	1644 *	19,17	1574 *
	17,66	1733 *		18,18	1690 *	18,68	1643 *	19,18	1573 *
	17,67	1732 *		18,19	1689 *	18,69	1642 *	19,19	1571 *
	17,68	1732 *		18,20	1688 *	18,70	1640 *	19,20	1569 *
	17,69	1731 *		18,21	1688 *	18,71	1639 *	19,21	1567 *
	17,70	1730 *		18,22	1687 *	18,72	1638 *	19,22	1565 *
	17,71	1729 *		18,23	1686 *	18,73	1637 *	19,23	1563 *
	17,72	1728 *		18,24	1685 *	18,74	1636 *	19,24	1562 *
	17,73	1727 *		18,25	1684 *	18,75	1635 *	19,25	1560 *
	17,74	1726 *		18,26	1683 *	18,76	1634 *	19,26	1558 *
	17,75	1726 *		18,27	1682 *	18,77	1632 *	19,27	1556 *
	17,76	1725 *		18,28	1682 *	18,78	1631 *	19,28	1554 *
	17,77	1724 *		18,29	1681 *	18,79	1630 *	19,29	1552 *
	17,78	1723 *		18,30	1680 *	18,80	1629 *	19,30	1550 *
	17,79	1722 *		18,31	1679 *	18,81	1627 *	19,31	1548 *
	17,80	1721 *		18,32	1678 *	18,82	1626 *	19,32	1546 *
	17,81	1721 *		18,33	1677 *	18,83	1625 *	19,33	1544 *
	17,82	1720 *		18,34	1676 *	18,84	1624 *	19,34	1542 *
	17,83	1719 *		18,35	1675 *	18,85	1622 *	19,35	1540 *
	17,84	1718 *		18,36	1674 *	18,86	1621 *	19,36	1538 *
	17,85	1717 *		18,37	1674 *	18,87	1620 *	19,37	1536 *
	17,86	1716 *		18,38	1673 *	18,88	1618 *	19,38	1533 *
	17,87	1716 *		18,39	1672 *	18,89	1617 *	19,39	1531 *
	17,88	1715 *		18,40	1671 *	18,90	1616 *	19,40	1529 *
	17,89	1714 *		18,41	1670 *	18,91	1614 *	19,41	1527 *
	17,90	1713 *		18,42	1669 *	18,92	1613 *	19,42	1525 *
	17,91	1712 *		18,43	1668 *	18,93	1612 *	19,43	1522 *
	17,92	1712 *		18,44	1667 *	18,94	1610 *	19,44	1520 *

Temperature accuracy calibration



➤ Purify the sintering chamber

We suggest you to sinter the leftover material to absorb the pollution **Every Month**.
You can do this more often if you sinter colored restorationss.

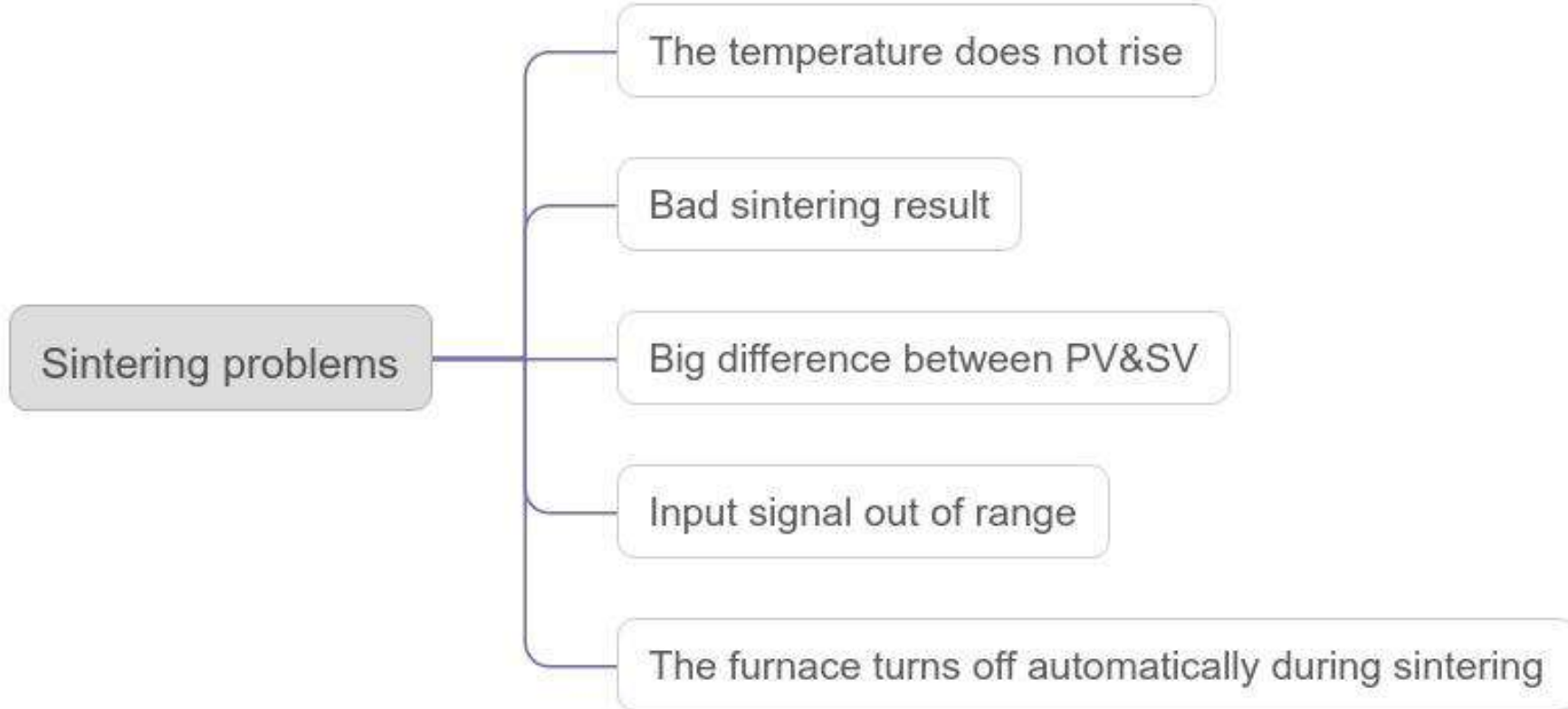


Zirconia beads

Leftover material

04

Common problems



1. The temperature does not rise

① After clicking start, the temperature on screen won't rise immediately. It will take some time before the temperature rises up to the Chamber Temp.

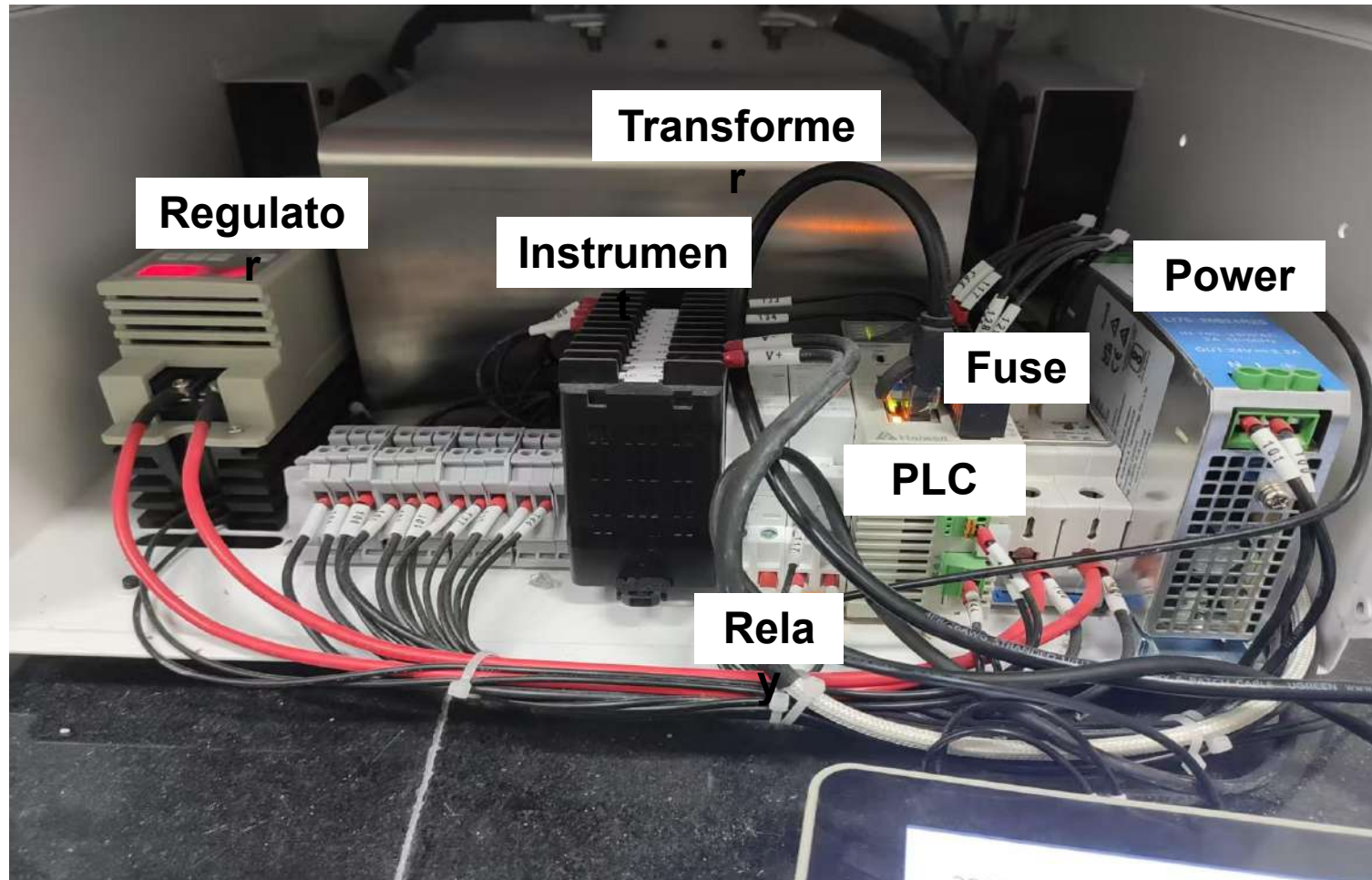
点击运行后，烧结炉不会立刻升温，运行程序一段时间之后才开始升温。有可能已经在升温，只是没有显示出来



1. The temperature does not rise

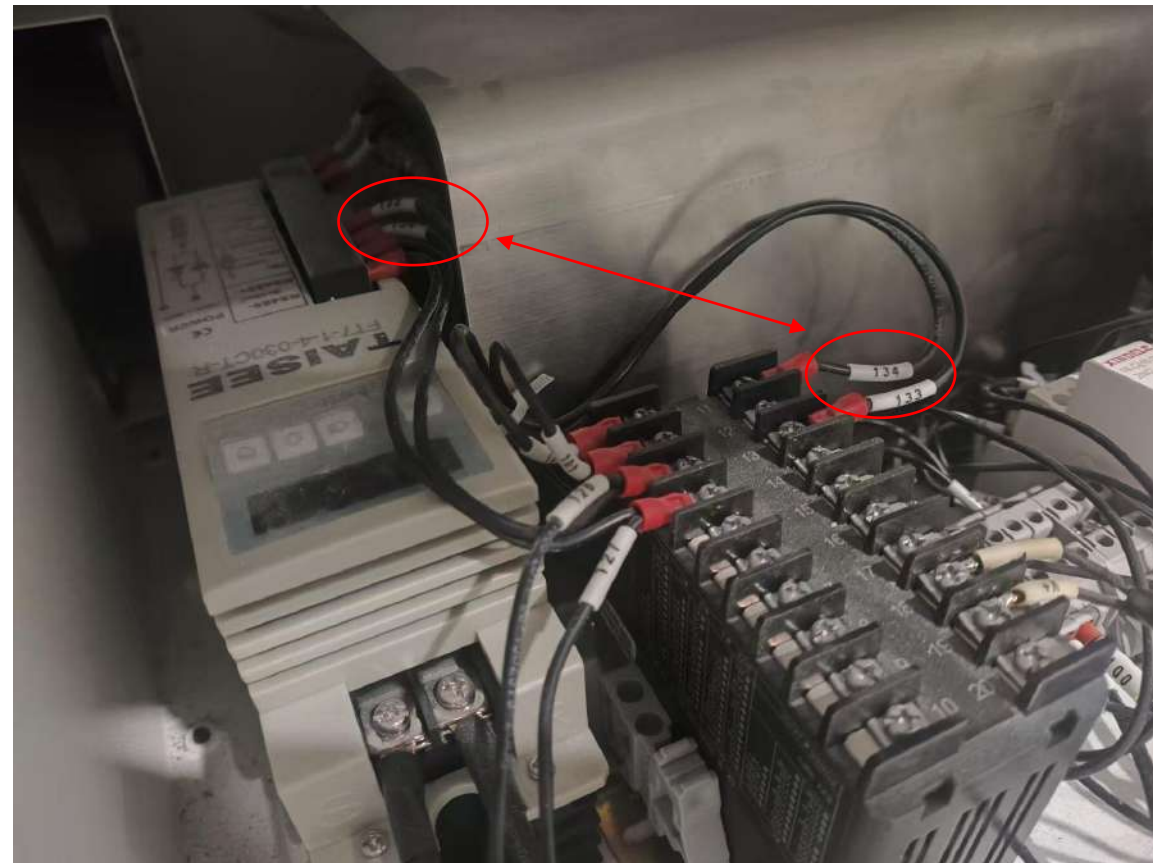
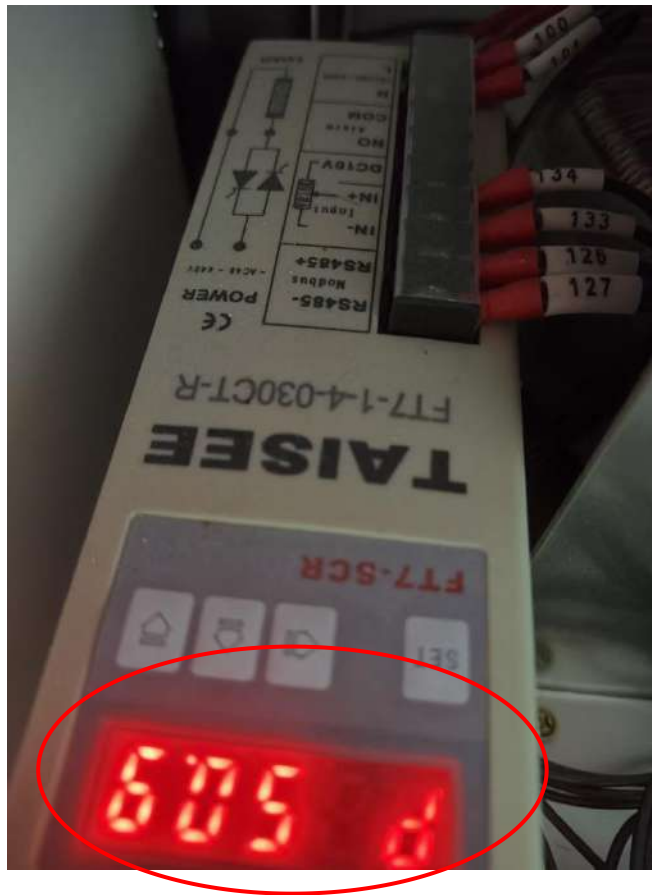
② If the temperature does not rise all the time, we should open the front cover and check if all the parts are working normally.

若一直不升温，则需要打开前盖检查，检查各个元件工作是否正常。



1. The temperature does not rise

- ③ Start a program, remove the front cover and check the number on regulator.
Normally it will change when the furnace is working.
If no, check the connection between the controller and the regulator.
If it is changing, check the heating cycle.



1. The temperature does not rise

④ If all the parts are working normally, check if the heating elements are broken
检查加热棒是否损坏

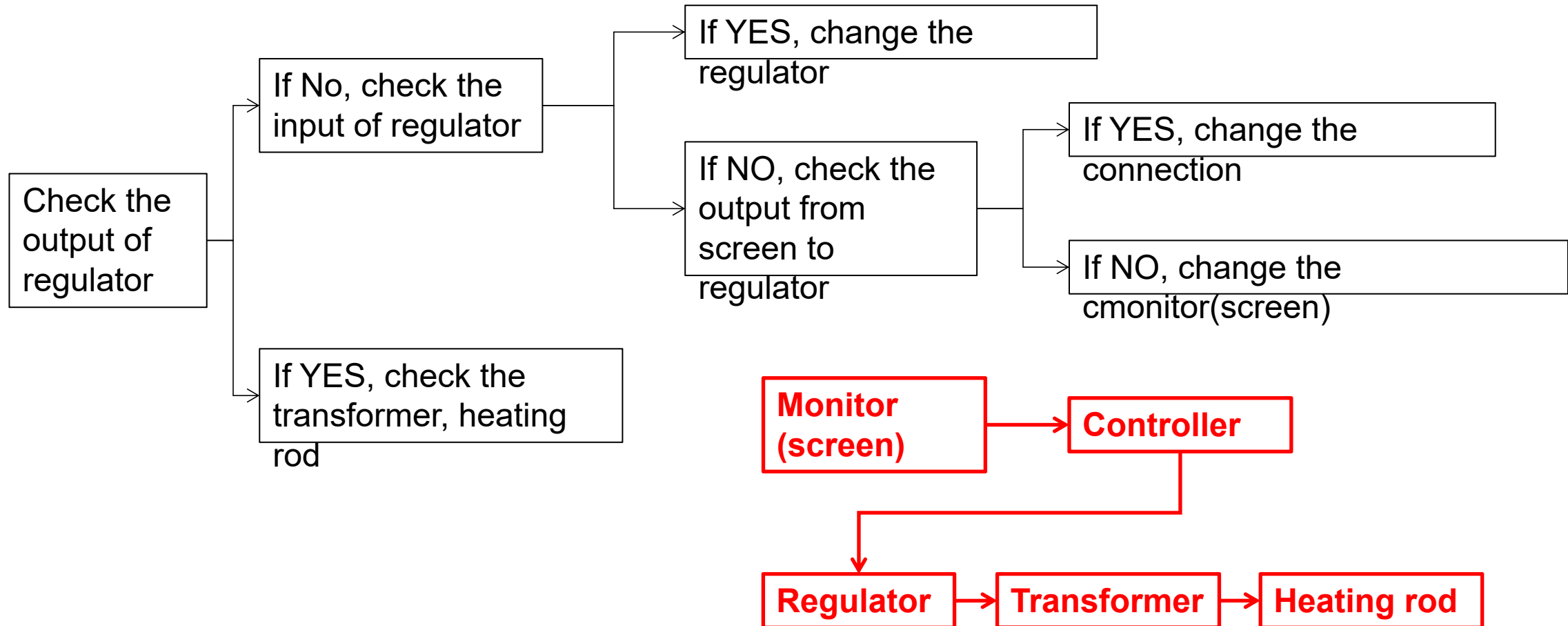
Choose the
“ Ω ” option

Multimeter



- Power off and remove the top cover
- Connect each pen to the two ends of heating rod.
- If the number is around 0.2-10, it is normal.
- If it's very big , the heating element is broken.

1. The temperature does not rise



2. Bad sintering result (Darker or lighter shade)

- **Reason:** Improper temperature (Aging of heating elements or incorrect program).
- **Solution:** Sinter the calibration ring to calibrate the temperature.
- If the T is much lower(1300°C), the teeth will have bad translucency and white
- If the T is a little bit lower(1450°C), the teeth will have bad translucency and dark shade.
- If the T is a little bit higher(1550°C), the teeth will have higher translucency and lighter shade.



3. Big difference between PV&SV

Reason: The actual heating rate is much lower than setted in program.

Solution: we should do the PID calibration for furnace.

实际升温速率比程序设定速率低，我们需要进行PID自整定



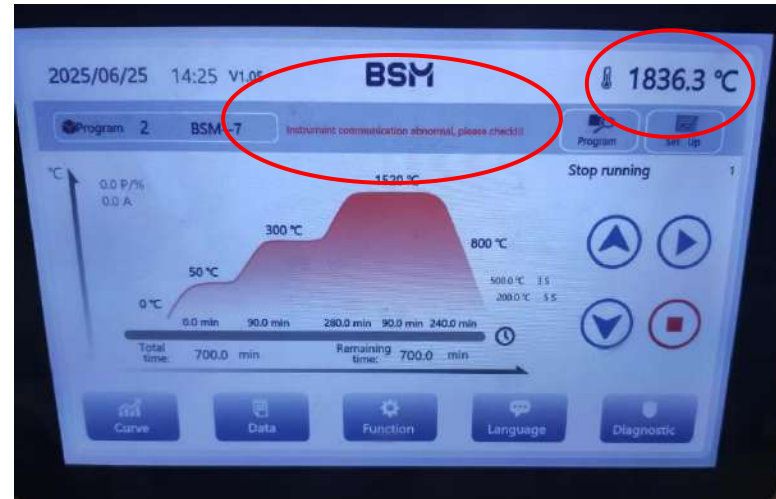
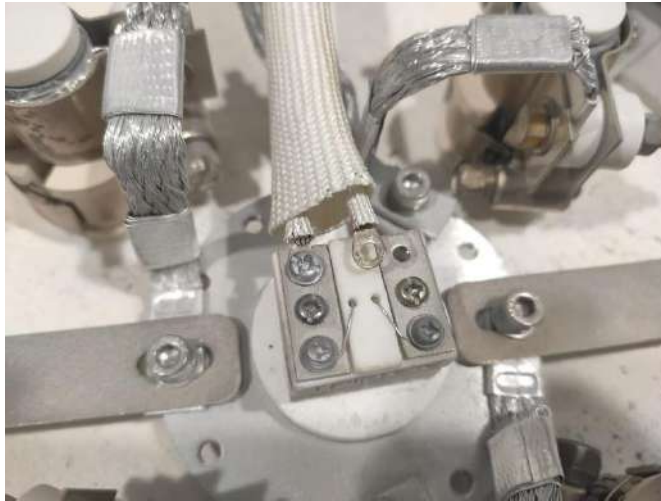
PV: Process Variable (real temperature)

SV: Setpoint (program temperature)

If the difference are big, It means the system has some problem

4. Input signal out of range

- ① If it shows the chamber temp is 1836.3, and gives warning, check the connection for thermocouple, if it's good, change the thermocouple
检查热电偶连接，如果连接正常，更换热电偶



4. Input signal out of range

- ② If it shows the chamber temp is lower than 50, check the connection for thermocouple, exchange the connection
热电偶正负极接反



Standing by



Wrong connection



Right connection



**Thanks for your
watching**

www.bsmdental.com

