V&P SCIENTIFIC, INC.
Innovators in Liquid Handling, Arraying and Mixing

TECHNICAL NOTE 113D

OPERATION MANUAL FOR VP 741 SERIES HEATING BLOCKS

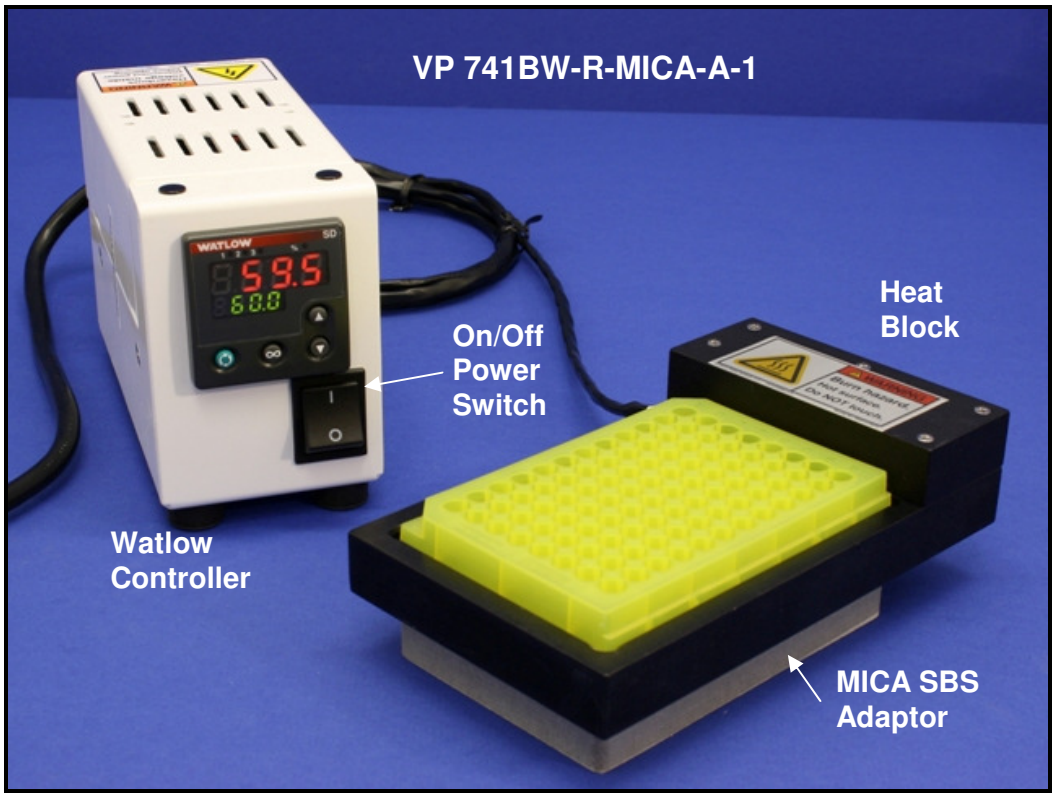

Figure 1. Parts of a VP 741 Series Heating Block, VP 741BW-R-MICA-A-1, shown as an example.

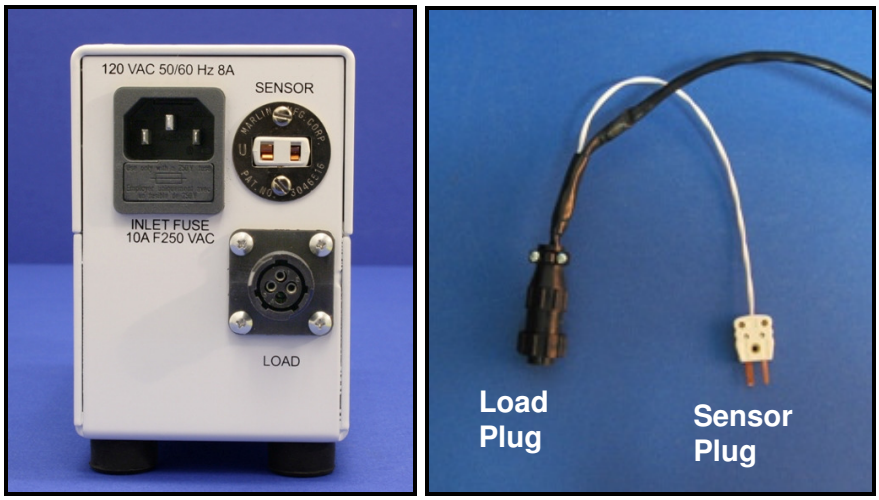

Figure 2. Back of Watlow Controller and Connector Cable for a VP 741 Series Heating Block.

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WARNING!!!!!

VP 741 Series Heating Blocks can be very hot when operating, so exercise caution. Do not handle black aluminum heating portion of the unit while it is HOT!!

Table 1. Models of VP 741 Series Heating Blocks

VP 741A	Aluminum Heating Block, for one deep well microplate, temperature control 25 to 200°C with thermocouple (TC), Watlow Controller, 120 Volt
VP 741A-R	Aluminum Heating Block, for one deep well microplate, temperature control 25 to 200°C with RTD, Watlow Controller, 120 Volt
VP 741A-RCE	Aluminum Heating Block, for one deep well microplate, temperature control 25 to 200°C with RTD, Watlow Controller, 230 Volt, CE compliant, VP 581B-MICA on bottom
VP 741A-RBC	Aluminum Heating Block, for one deep well microplate, low eddy current feature, temperature control 25 to 200°C with RTD, Watlow Controller with computer control, 120 Volt, VP 581B-MICA on bottom
VP 741AW-R-MICA-B-1	Aluminum Heating Block, for one deep well microplate, temperature control 25 to 200°C with RTD, Watlow Controller, 120 Volt, VP 581B-MICA on bottom
VP 741BW-MICA	Aluminum Heating Block, low profile design for robot applications with PCR plates and standard microplates, temperature control 25 to 200°C with thermocouple (TC), Watlow Controller, 120 Volt, VP 581B-MICA on bottom
VP 741BWCE-MICA	Aluminum Heating Block, low profile design for robot applications with PCR plates and standard microplates, temperature control 25 to 200°C with thermocouple (TC), Watlow Controller, 230 Volt, CE compliant, VP 581B-MICA on bottom
VP 741BW-MICA-A	Aluminum Heating Block, low profile design for robot applications with PCR plates and standard microplates, temperature control 25 to 200°C with thermocouple (TC), Watlow Controller, 120 Volt, VP 581A-MICA on bottom
VP 741BW-R-MICA	Aluminum Heating Block, low profile design for robot applications with PCR plates and standard microplates, temperature control 25 to 200°C with RTD, Watlow Controller, 120 Volt, VP 581B-MICA on bottom
VP 741BW-RC-MICA	Aluminum Heating Block, low profile design for robot applications with PCR plates and standard microplates, temperature control 25 to 200°C with RTD, Watlow Controller with computer control, 230 Volt, CE compliant, VP 581B-MICA on bottom
VP 741BW-RCE-MICA	Aluminum Heating Block, low profile design for robot applications with PCR plates and standard microplates, temperature control 25 to 200°C with RTD, Watlow Controller, 120 Volt, CE compliant, VP 581B-MICA on bottom
VP 741BW-R-MICA-A-1	Aluminum Heating Block, low profile design for robot applications with PCR plates and standard microplates, temperature control 25 to 200°C with RTD, Watlow Controller, 120 Volt, VP 581A-MICA on bottom
VP 741BW-RCE-MICA-A-1	Aluminum Heating Block, low profile design for robot applications with PCR plates and standard microplates, temperature control 25 to 200°C with RTD, Watlow Controller, 230 Volt, CE compliant, VP 581A-MICA on bottom
VP 743A-1RM	Aluminum Heating Block for three deep well microplates or racks of glass vials, temperature control 25 to 200° C with RTD, Watlow Controller,120 Volt, Mica insulation on bottom for VP 710E-2HM Magnetic Tumble Stirrer

SET-UP

HEAT BLOCK INSTALLATION

1. Carefully remove Heat Block and Watlow Controller from packaging inside shipping box. Place the Heat Block on a working surface that is clear of heat sensitive items, such as paper or equipment, or heat conducting material. The Watlow Controller can be placed next to the Heat Block or up to 6 feet away with Connector Cable.

2. The Heat Block Connector Cable, which is attached to the block, has two plugs on the free end for connecting to the Watlow Controller (refer to Figure 2). Connect the round 3-pin plug of the Connector Cable into the receptacle marked "load" on the back of the Watlow Controller as shown in Figure 2. Also on the back of the Watlow Controller, connect the 2-prong plug of the Connector Cable into the receptacle marked "sensor". If the Heat Block model is configured with computer communication, please also refer to Technote #134B, "VP 741 Series Heat Block with Computer Control".

3. Connect power cord into the power receptacle on the back of the Watlow Controller. Connect the power cord to a 120 V outlet. In the case of CE compliant models, connect the power cord to a 230 V outlet.

OPERATION

HEAT BLOCK OPERATION USING THE WATLOW CONTROLLER

1. Turn on the Watlow Controller using the on/off power switch. The Controller already has a temperature programmed so the Heat Block will immediately begin to heat. The red number in the upper display is the current temperature of the Heat Block. The green number in the lower display is the set point during operation. See page 20 of the Watlow Controller Operating Instructions (Appendix) for more details on features of the display.

2. To turn off the Heat Block without turning the power switch off, press the down arrow key until green lower display reads "OFF".

Figure 3. Watlow Controller Display for a VP 741 Series Heat Block

3. Although the center of the Heat Block will be at the temperature on the display, the actual temperature of samples in the microplate wells or tubes will be 3℃ to 5℃ below this temperature depending upon the efficiency of heat transfer. It is recommended that the temperature in one or more samples be measured to determine appropriate setting for a particular application.

4. For faster heat transfer use a Heat Block Insert such as one that conforms to the bottom of a plate (for example, VP 741I6B or VP 741I6C) or an insert that holds tubes or vials. Contact V&P Scientific for information on these items.

5. The upper limit temperature on the Watlow Controller is set to 120°C at the factory. Temperatures higher than 120°C should not be used with polypropylene tubes or microwell plates. Polypropylene will melt at temperatures greater than 130°C. To operate at temperatures above 120°C, use of glass or other high temperature-stable containers is recommended.

6. To increase the maximum temperature beyond 120°C, perform the following steps on the Setup Page of the Watlow Controller:

a. To access the Setup Page on the display, press and hold the 2 Arrow Keys for about 3 seconds or until the display reads "SEt" in red in the upper display and "PAgE" in green in the lower display.
b. Press the green circle "Advance" key until the display shows "SP.HI" (See Table 2, below.)
c. Using the up and down arrows to change the maximum temperature to no more than 200°C.
d. The temperature range of the VP 741A & VP 741B Heating Blocks is as follows:
    a. Minimum Temperature (SP.LO) = 25°C
    b. Maximum Temperature (SP.HI) = 200°C
e. Do not change any of the other parameters in the Setup Page (see Table 2 for list of parameters).
f. To exit from the Setup Page, press the Infinity Key.

Table 2. Setup Page Parameters for VP 741series Heat Blocks: Changing Upper Temperature Limit (see page 3)

Thermocouple (TC)

Sen	TC
LIN	J
C-F	C
5.dEC	0.0
15.EN	NO
SP.LO	25.0
SP.HI	120.0
FTRE	OFF
OT	HEAT
CTRL	FTB
FTB1	1.0
PL1	100.0
P5L1	0.0
P5HI	100.0
NLF1	OFF
UNIT	US
I.ERR	NLAT
FAIL	OFF
DSP	NOR
RP	OFF
LOC	3

RTD

Sen	RTD
C-F	C
5.dEC	0.0
15.EN	NO
SP.LO	25.0
SP.HI	120.0
FTRE	OFF
OT1	HEAT
CTRL	FTB
FTB1	1.0
PL1	100.0
P5L1	0.0
P5HI	100.0
NLF1	OFF
UNIT	US
I.ERR	NLAT
FAIL	OFF
DSP	NOR
RP	OFF
LOC	3

7. The Watlow Control is capable of sophisticated control features such as ramping and soaking profiles, as well as configuration and data logging with a standard Windows PC. These functions, however, are additional custom features that are not pre-configured. We suggest the Series SD Users Manual be checked for these advanced features to see if they are useful for your application.

OPERATION WITH A MAGNETIC TUMBLE STIRRER

If using with a V&P Scientific Magnetic Tumble Stirrer, please also follow the instructions of the stirrer. It is recommended that only specific V&P Heating Block models be used for magnetic stirring applications, such as ones with RTD temperature sensors and eddy current modification. Please contact V&P Scientific for more information.

Product Maintenance

GENERAL PRODUCT CARE

When not in use, turn the power switch off.

Do not place the Watlow Controller in chambers with temperatures above 40°C.

Do not submerse Heat Block or Watlow Controller into liquid or allow liquid to come into contact with any openings.

Do not for any reason open the Watlow Controller enclosure or the heating element compartment of the Heat Block. This will void the warranty.

For any other questions regarding the Controller, please refer to the Watlow Control Instructions (Appendix).

If technical assistance is required, contact:

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WARRANTY

V&P Scientific, Inc. warrants this product to be free from defects in material and workmanship when used under normal laboratory conditions for one year. This warranty begins on the date of delivery from V&P Scientific.

In the event this product fails under normal laboratory conditions within the specified period of time because of a defect in material or workmanship, V&P Scientific will, at its option, repair or replace the product. Damage to the product caused by user negligence is not covered.

Please keep the special shipping carton in case the unit needs to be shipped back to V&P Scientific. Please contact V&P Scientific at the above address for return authorization and shipping instructions.

This warranty is made in lieu of other warranties expressed or implied including the warranties of merchantability and fitness for a particular purpose. V&P Scientific shall not be liable for loss or damages arising from the use of these products nor for consequential damages of any kind.

APPENDIX (attached Watlow Controller Operating Instructions)

In the Watlow Operation Instructions, the Watlow Controller provided with a VP741 Series Heat Block is referred to as a static set-point version, with a product code, “SD_C__ “.

Advanced features such as Ramp and Soak (or Profiling) and Modbus, EIA-485 serial communications to interface with PC software applications are available but must be ordered separately.