MANUAL

MEDIUM TEMPERATURE
DRY BLOCK CALIBRATOR
650-H

BRIEF PROFILE

An ISO 9001-2015 certified Instrumentation company (since 1972) serving Industries in India & Worldwide thro' the Manufacture & Supply of World-Class Calibration Instruments & Systems like Temperature, Pressure & Signal Calibrators, Black Body Calibration Sources, Pneumatic & Hydraulic Hand Pumps, Dead Weight & Comparison Testers, Calibration Test Benches, etc.

Dear User,

Thank you for selecting ***Nagman's Medium Temperature Dry Block Calibrator*** *and becoming a proud owner of this Calibration Instrument.*

We have strived hard to ensure the accuracy of the contents of this manual. We would appreciate any suggestions/feedback to correct any errors noticed and to improve the quality of contents of this Manual

Specifications are subject to change owing to continuous development and we reserve rights to effect Changes / Modifications to this Manual.

Read the Instructions before starting to use the Product.

Wishing you for a long association with us.

For any service related issues, please contact service@nagman.com

VERSION CONTROL

Version No.	Updated on	Updated by
V 1.1	01.09.2022	Nagman

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1. INTRODUCTION

Nagman's Medium Temperature Dry Block Calibrator – Model 650-H is used for calibrating RTD's, Thermocouples, Temperature Switches, Temperature Indicators etc.

Temperature controller Nagman 172 is used in this instrument, having two levels in the temperature profile determined as RAMP and SOAK between Set temperature point (SP) and Set time. At the time of calibration "RUN" indication is active in the controller continuously shows the current "Block" temperature.

Desired temperature is set in the Nagman 172 controller by "P" key for accessing the input parameter and pressing ▲/▼ to increase and decrease the value.

Proper use of the instrument will provide accurate calibration of temperature sensors.

2. SPECIFICATION

Range	50°C to 650°C
Resolution	0.1°C
Accuracy	±1.2°C
Stability	±0.5°C
Stabilisation Time	15 Minutes
Well Diameter	30 mm
Immersion Depth	110 mm
Heating Time (Ambient to max.)	20 Minutes approx.
Cooling Time max. (to 100°C)	60 Minutes
Switch Test facility	Provided
Interchangeable Thermowells	Single hole to suit 1/4" & 1/2" Probes. Other Sizes / Multihole available as optional.
Housing / Mounting	Bench-top
Power Supply	230V AC, 50 Hz
Instrument Dimensions (L x D x H)	160 x 330 x 350 mm
Instrument Weight (approx.)	8.5 Kg.

Operating Temperature Range (Ambient)	15 – 40°C
Storage Temperature Range	10 – 50°C
Humidity Range	40 -75%RH
Protection Class	IP52

3. STANDARD DELIVERIES & OPTIONAL ACCESSORIES

Standard Delivery

- Basic Instrument
- Test Leads
- Mains Cable
- Insertion Tubes (to suit 2x1/4“ & 1x1/2“ probes)
- Tool for Insertion Tubes
- Spare Fuses
- Carrying Case
- Traceable Calibration Certificate
- Instruction Manual

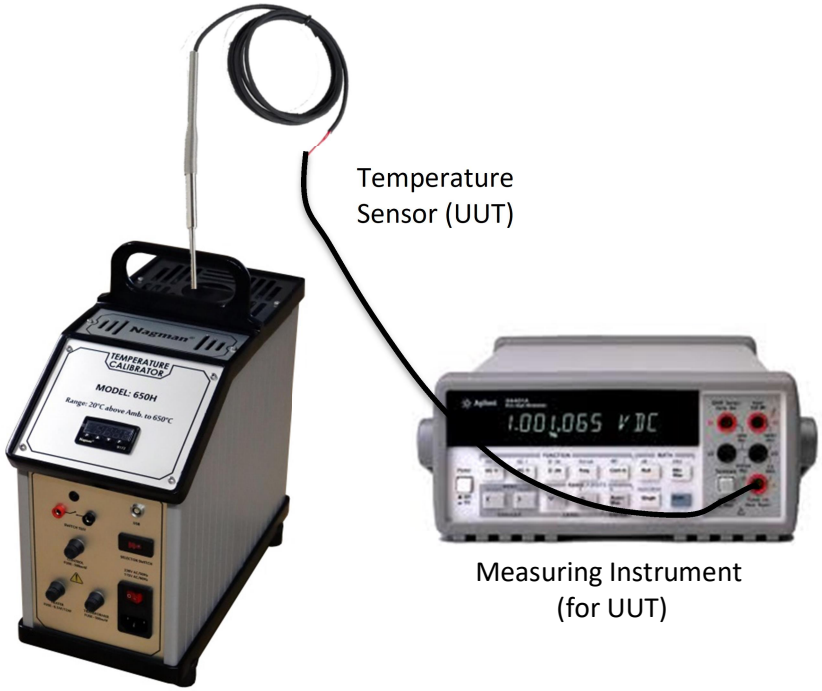
Optional Accessories

- Additional Thermowells / Insertion Tubes (to choose from) :
  Single hole standard sizes to suit 1/8”, 1/4”, 3/8”, 1/2”, 3/4” & 3, 4, 5, 6, 7, 8, 10, 12, 13, 15, 17, 19 & 21 mm probes
  Multihole (Typical) : (1x6 + 1x8) or (3x6) or (1x10 + 1x4) mm
- Computer Interface
- “Caltemp” Calibration Software
- Reference Thermocouple
- Dual Voltage Selection (110V & 230V AC)
- Power Supply 110V AC, 60 Hz
- Calibration Certificates are issued in Accordance with our Scope as granted by NABL per ISO/IEC 17025:2017 Standards

4. PARTS IDENTIFICATION

1. Heater Block
2. PID Controller
3. Computer Interface
4. Switch Test
5. Control Fuse
6. Selector Switch
7. Heater fuse
8. Transformer fuse
9. Main Switch

5. CONNECTION DIAGRAM



650-H - Universal Dry Block
Medium Temperature Calibrator

6. SAFETY INSTRUCTIONS

Symbols Used

S. No.	Symbol	Description
1.		Read the user manual before operating the instrument.
2.		Warning- conditions that may pose hazards to the user.
3.		Caution-conditions that may damage the instrument.
4.		Special Information
5.		Hot surface- areas which are at high temperature
6.		Electric shock- condition that may pose shock to the user.

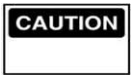
- This calibrator is designed for interior use only.
- Inspect the instrument for damage before each use.
- Do not use the instrument if it appears damaged or operates abnormally.
- If the instrument is used in a manner not in accordance with the equipment design, the instrument may get damaged.
- Do not place the instrument under a cabinet or other structure. Leave enough clearance to allow for safe and easy insertion and removal of probes.
- Do not drop the probe stems into the “well”. This type of action can cause a shock to the Sensor.
- Do not use this instrument for any application other than the calibration work. Any other use of the instrument may cause unknown hazards to the user.
- Do not operate near flammable materials.
- Calibration Equipment should only be used by Trained Personnel.
- Completely unattended operation is not recommended.

- This instrument and the thermometer probes are sensitive instrument that can be damaged. Always handle those devices with care.

- Do not leave the inserts in the instrument for prolonged periods. It may cause damage due to high operating temperature of the instrument.

- Do not slam the probe sheath into the well. It may cause a shock to the sensor and affect the calibration.

- **Do not operate this instrument in an excessively wet, oily, dusty, or dirty environment, or in explosive zones.**



- Always operate this instrument at room temperature between 10˚C and 40˚C. Allow sufficient air circulation for the instrument by leaving at least 20 cm of clearance around the instrument.

- Continuous high temperature operation may lead to shorten the life time of the components.

- Use of this instrument at HIGH TEMPERATURES for extended periods of time requires caution

- The high temperature present in dry-wells designed for operation at more than 650˚C may result in fires and cause severe burns if safety precautions are not observed.

- Do not turn off the instrument at temperature higher than 100˚C. This would create a hazardous situation. Select a set-point less than room temperature and allow the Instrument to cool before it turning OFF.

- Do not use the instrument if the cooling fan built-in at the bottom of the Instrument is out of order.

- Ensure a free supply of air to the fan grill located at the back of the Instrument.

- Check that earth connection for the instrument is available and then plug the Power cord

STORING AND TRANSPORTING THE CALIBRATOR:

The following guidelines should always be observed when storing and transporting the calibrator. This will ensure that the calibrator remain in good working order.

Storing:

- Switch OFF the calibrator (below 100˚C) using the power control switch.

- If you intend to store the calibrator in the packing box after use, you must ensure that the instrument has cooled to a temperature within the storage temperature range (10˚Cto 50 ˚C) – very close to ambient temperature before placing it in the Packing Box

Transporting:

- The Inserts must be removed to avoid damage to the instrument if the calibrator is to be transported for long distances

- Do not touch the well access surface of the instrument.
- The block vent may be very hot due to the fan blowing across the heater block of the instrument.
- Do not touch the well or the Insert while the calibrator is heating up, they may be very hot.
- Do not touch the tip of the sensor (as well as the portion immersed in the well) when it is removed from the Insert / well, it may be very hot.
- The air over the well can reach temperatures greater than 200˚C for high temperature (400˚C and higher) dry-wells. Probes and Inserts may be hot and should only be inserted or removed from the instrument, when the instrument is set at temperatures less than 50˚C. Use extreme care when removing hot inserts.
- Do not touch the handle of the calibrator during use – it may be hot.

- This instrument must be plugged into a 230V AC, 50Hz (Optional 115V AC, 60Hz), electric outlet only.

- The power cord of the instrument is equipped with a three-pin grounding plug for protection against electrical shock hazards. It must be plugged directly into a properly grounded three-pin socket. The receptacle must be installed in accordance with local codes and ordinances. Do not use an extension cord or adapter plug.

- If supplied with user accessible fuses, always replace the fuse with one of the same rating, voltage, and type.
- Always replace the power cord with an approved cord of the correct rating and type.

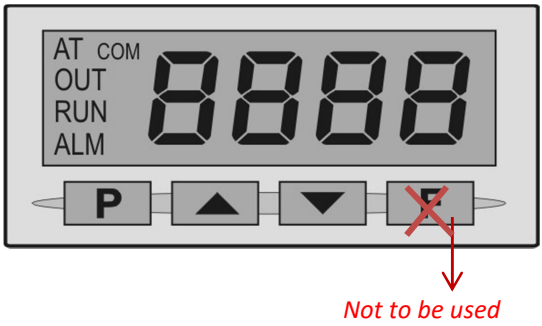
- Turn off the Instrument immediately, during main power fluctuation. Power bumps from brown-outs could damage the instrument. Wait until the power has stabilized.

- Do not remove the fuse box from the socket until the power cord has been disconnected.

- If the fuse blows immediately after you have replaced them, the calibrator should be returned to the manufacturer for service.

7. OPERATING INSTRUCTION

Display Panel:



When configuring a parameter, the display alternates between the parameter prompt and its value (the parameter value is shown with a light blinking to differentiate it from the parameter prompt).

P Key: Used to walk through the menu parameters.
Increment ▲ and Decrement ▼ key: allow altering the values of the parameters.

F Key: accesses special functions: RUN (toggles YES/NO) and the two modes of timer control – **FACTORY CONFIGURED AND NOT TO BE USED DURING CALIBRATION**

The display indicator also the signs **AT**, **OUT**, **RUN ALM** and **COM**:

AT : Stays ON while the controller is in tuning process.

OUT : For relay or pulse control output; it reflects the actual state of the output.

RUN : Indicates that the controller is active, with the control output and alarms enabled. (RUN=YES).

ALM : Signalize the occurrence of alarm condition. It lights when either alarm is active.

COM : Flashes when there is RS485 activity.

The parameters are grouped in levels according to their functionality and operation easiness. The 5 levels of parameters are:

1 – Operation Level

2 – Tuning Level

3 – Alarms Level

4 – Configuration Level

5 – Calibration Level

The "**P"** key is used for accessing the parameters within a level. Keeping the "**P"** key pressed, at every 2 seconds the controller jumps to the next level of parameters, showing the first parameter of each level:

PV >> atvn >> fva1 >> type >> pass >> **PV …**

To enter a particular level, simply release the "**P"** key when the first parameter in that level is displayed.

Factory settings (eg: Temperature Unit in ℃) are made for user friendly operation and not to be altered without a Trained Personnel.

PROCEDURE (SET POINT / UNIT):

- Connect the power cable to the Dry Block Calibrator.
- Switch ON the instrument
- Press the "**P**" key, it preparing to access the input parameter by showing "RUN 0.00"
- Again press "**P**" key, which shows "SP 0.00" to enter the set point of temperature.
- Set the required temperature in the PID Controller as follows.
- Press "▲" key to increase the set temperature (°C).
- Press "▼" key to decrease the set temperature (°C).
- After entering the set point of temperature, Long Press the "**P**" key display moves to next parameter, approximately at every 2 seconds and take your hand from "**P**" key after reaching "PASS" in the controller.
- Then it get started to reach the Set point of temperature.
- Insert the sensors, which are going to be calibrated into the corresponding hole of the insert.
- Allow the bath to stabilize at the set temperature.

- Connect test probe to the indicator and note down the readings of test probe and same steps can be followed for other set of calibration points.

- After calibration is over, set the bath temperature to ambient and allow it to cool.

- After reaching the ambient temperature, switch off the power supply.

- For UNIT change (°C to °F) Keeping the "**P"** key pressed, at every 2 seconds the controller jumps to the next level of parameters, showing the first parameter of each level:

  PV >> atvn >> fva1 >> type >> pass >>

  simply release the **P** key when the "type" parameter in that level is displayed and press "**P**" key till the display reads "unit" i.e. fLtr >>dPPo >> unit >> and simply release "P" key. Display reads with "°C" press ▲ / ▼ key to change the temperature indication unit in "F" and long press the "**P**" key, display moves to next parameter, approximately at every 2 seconds and take your hand from "**P**" key after reaching "PASS" in the controller. Same procedure to be followed for changing the unit in "F" to "C".

Note : "F" key not to be used in this temperature instrument during calibration.

SPECIAL NOTES / INSTRUCTIONS:

Following special notes / Instructions are to be followed strictly, for trouble free & safe operation.

1. All the parameters are factory configured. Though there are 5 levels of controller parameter configuration, users are strictly advised to change “SET point” alone & “UNIT” (if required) functions which is shown in procedure.

2. MEDDLING through other function / parameter may lead to malfunction of the unit, such as improper display indication, over heating and may also lead to physical hazards.

3. If you get struck during configuring any of the user allowed parameters, (“SET point” & “UNIT”) simply come out of the configuration procedure without entering “**P**” key.

Switch Test

- Connect the output of thermostat switch to the switch test sockets using the test probes supplied.

- If the thermostat switch is “Normally Closed”, the LED indication will glow and will stop glowing when the switch changes its state.

- If the thermostat switch is “Normally Open”, the LED indication will not glow initially and will glow when the switch changes its state.

8. TROUBLESHOOTING / MAINTENANCE

Replace the main fuse by following the below instructions:

- Identify the main fuse in the fuse box in the socket.
- Open the lid of the fuse box using a screwdriver.
- Replace the fuse with the main fuse rating 6.3A (12A for 115V).
- Controller is not ON, check the control fuse.
- Fan is not working check the Transformer fuse.

Replace the Heater fuse by following the below instructions:

- Identify the heater fuse in the corresponding fuse holders marked in the enclosure of the equipment.
- Open the fuse holder in anti-clockwise direction.
- Replace the fuse with the main fuse rating as 6.3A (12A for 115V)

Maintenance:

Clean the instrument by following the below instructions.

- Before cleaning the calibrator, you must switch it off, allow it to cool down and remove all cables.

- Users should / must carry out the following cleaning procedures as and when required.

Exterior of the instrument - Clean using water and a soft cloth. The cloth should be wrung out hard to avoid any water penetrating the calibrator and causing damage.

Insert - Must always be clean and should be regularly wiped using a soft lint free, dry cloth. You must ensure that there are no textile fibers on the Insert when it is inserted in the well. The fibers may adhere to the well and damage it.

Adjusting and calibrating the instrument

You are advised to return the calibrator to Nagman, Chennai - INDIA or to an accredited laboratory at least once a year for calibration.

Returning the calibrator for Service

When returning the calibrator to the manufacturer for service, please provide complete information about the problems faced for clear analysis of the problem. The calibrator should be returned in the original packing.

Nagman‘s liability ceases if :

- Parts are replaced / repaired using spare parts which are not identical to those recommended by the manufacturer.

Nagman‘s liability is restricted to errors that originated from the factory.

For more details, write to :

NAGMAN INSTRUMENTS AND ELECTRONICS PRIVATE LIMITED

170/1a2, Chennai Bangalore Highway Road,
Sembarambakkam, Chennai - 600 123. INDIA.
Phone: +91-44-66777000, 011, 022, 033
Email: support@nagman.com
Website : www.nagman.com