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DB02 Dry Block Calibrator

CALIBRATION OF TEMPERATURE SENSORS

Practical probe calibration using a Dry Block Calibrator can be a daunting task resulting in the operator collecting a variety of results, all of which only seem to cause confusion.



This discussion is aimed to assist the operator through the learning process and we hope will guide you into developing a reliable, practical calibration procedure for your calibration work.

Field calibration of temperature probes and their associated instruments by the use of dry block calibrators is achieved in one of two ways. These are:

1. Using the Calibrator as a Standard

The calibrator is purchased with a number of selected set points, which the unit has been calibrated to. If a test probes is inserted to the same depth as the calibrations are referenced to the controller indication gives, via the traceable calibration, your reference to provide a comparison.

2. Using an External Calibrated Standard

This is a safer method of calibration where the dry block calibrator is primarily used as a stable heat source. The certified reference thermometer has its probe inserted to the same depth as the probe under test and the comparison is between the certified reference thermometer and the probe.

Whichever method you choose will depend on accuracy, range and quality procedures which you set in place.

PROBE IMMERSION:

The probes which are used in the Dry Block Calibrator must always be inserted sufficiently into the mass of the heat block so as to ensure minimum heat loss through the sensor sheath and/or leads to the outside environment.

Also a heat-conducting medium such as high temperature silicon oil or silicon grease should be used to ensure maximum heat transfer between block and probes.

There are a number of standard inserts available and one should be selected to suit the type of probe or probes under test.

For special or odd probes inserts can be made to order.

CERTIFICATION:

The certification of your equipment is crucial to the ongoing accuracy of your work. We recommend a minimum of 12 month renewals or, if in the case of an external calibrated source, whatever is recommended by the supplier of that standard.

CONCLUSION:

Selection of a calibration method and reliable procedures which you develop with particular reference to your own applications will provide calibrations which are reliable and effective.

SAFETY

Care must always be exercised in the use of this dry block calibrator as the environment and conditions may not suit the safe use of portable electrical equipment.

Remember:

1. You will be dealing with components which may be hot and injury could occur if sufficient care is not taken.
2. Always ensure that the dry block calibrator is operated on a safe, secure working platform.
3. If any possibility of an unsafe electrical environment occurs always use an approved electrical safety protection device.

This product is intended for use by competent personnel. The personnel using this equipment are expected to be fully conversant and able to handle any hazards, which may be encountered.

Note: The calibrator should never be put away hot.

After use, allow the unit to cool down by selecting a low value set point (less than 40°C) and leave on until the set point has been reached.

The DB02 Dry Block Calibrator is designed to operate between ambient temperature and 180°C. Operation outside this range is not recommended and will void the warranty.

ELECTRICAL SUPPLY

The units supply requirements are specified on the Serial Number plate.

The supplied cord may not have a plug connected to it.

The colour code is as follows:

Colour	Function
Brown	Live
Blue	Neutral
Green/Yellow	Earth

Please connect your unit to the electrical supply correctly.

OPERATION:

Calibration using the Controller Indication as a Reference:

1. Locate the DB02 on a suitable working surface and connect to the power supply taking normal safety precautions.
2. Select the set point that is required by pressing the SV key on the controller face until the pre-programmed temperature displays. Now press the ENT key and the SV value will be entered and the controller will heat the block to that temperature.

(For different values and specific controller operation refer to the Shimaden SR253 handbook in the back of this manual)

3. Place the thermometer(s) into the hole of the block to the depth indicated in the calibration certificate and wait for the temperature to stabilise.
4. Once the indicated readings are stable, record three sets of readings over 6 minutes. These readings should be consistent if stabilisation has been achieved. Now the average value can be calculated.
5. Repeat the process for other temperature required.
6. When finished set the controller to the minimum set point and allow the DB02 to cool before switching off and storing.

Calibration using and External Reference:

1. Locate the DB02 on a suitable working surface and connect to the power supply taking normal safety precautions.
2. Select the set point that is required by pressing the SV key on the controller face until the pre-programmed temperature displays. Now press the ENT key and the SV value will be entered and the controller will heat the block to that temperature.

(For different values and specific controller operation refer to the Shimaden SR253 handbook in the back of this manual)

3. Place the thermometer and the reference probe into the hole to the same depth and as physically close together as possible and wait for the temperature to stabilise.

(N.B silicon oil will assist the heat transfer in this process)

4. Once the indicated readings are stable, record three sets of readings over 6 minutes. These readings should be consistent if stabilisation has been achieved. Now the average value can be calculated.
5. Repeat the process for other temperature required.
6. When finished set the controller to the minimum set point and allow the DB02 to cool before switching off and storing.

MAINTENANCE:

Minimal maintenance is required and the better condition it is kept in the longer and more trouble free the equipment will run.

There is no internal maintenance required.

Ensure that the air vents are kept free and clear.

Do not use pointed objects on the keyboard of the controller.

Keep away from moisture.

CONTROLLER PARAMETERS

The Shimaden SR253 Controller has been loaded with the following set points and parameters.

These should only be changed by operators who are aware of the control philosophies associated with these values.

Set Points:

SV1	=	0.0°C
SV2	=	60.0°C
SV3	=	70.0°C
SV4	=	80.0°C
SV5	=	90.0°C
SV6	=	100.0°C
SV7	=	110.0°C
SV8	=	120.0°C
SV9	=	130.0°C
SV10	=	140.0°C

EV1	=	Dev.MD:DH	1.0°C
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Output 1 cycle time	=	5sec
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SVH	=	180.0°C
SVL	=	0.0°C

P Bias	=	
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All PID values set:

P	=	2.4%
I	=	21sec
D	=	5sec