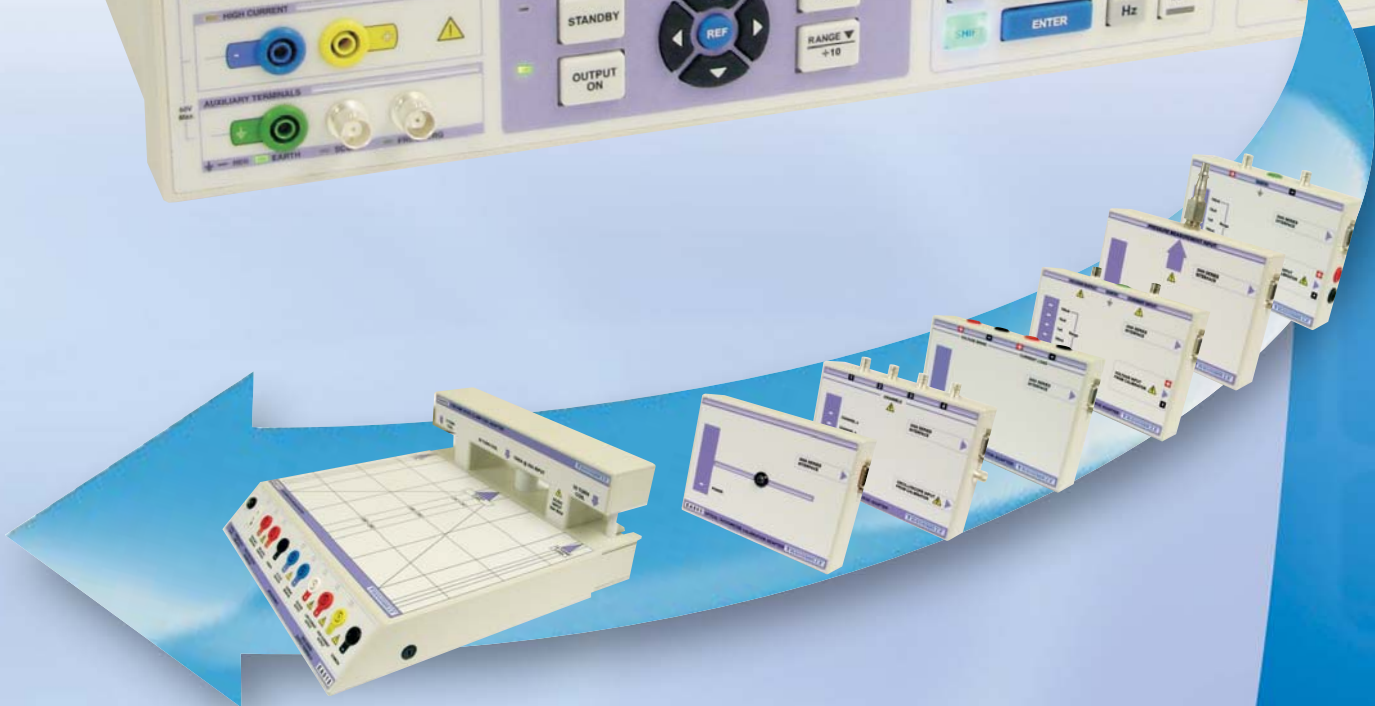
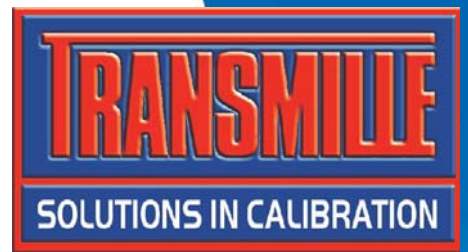


# 3000SERIES

## MULTI PRODUCT CALIBRATORS



**CALIBRATION GUIDE**

To verify the 3000 Series calibrators, it is necessary to measure the outputs from each range and compare them to the published specifications. Linearity checks should also be performed.

A basic verification procedure would be typically as little as 60 tests, although a full procedure may be as many as 400 tests. Please see [www.transmille.com](http://www.transmille.com) for an example 3000 Series certificate. When using Transmille PROCAL calibration software, a fully automated verification & calibration procedure is available for approved service centres.

Adjustment can be made using two methods – either direct front panel adjustment or adjustment using a PC based Virtual Front Panel software package (optional) with the calibrator connected to the PC RS232 interface.



**WARNING : RISK OF SHOCK**

**THIS PROCEDURE SHOULD ONLY BE ATTEMPTED BY QUALIFIED PERSONNEL**

To prevent unauthorised use of the VFP software, a password is required before access is granted. Adjustment can be completed without disassembly of the calibrator.

Each function e.g. DC voltage, AC Current, Resistance etc. has several ranges. Each range has one or more calibration constants. See table below.

3000 Series adjustment allows any calibration constant to be adjusted independently of any other, therefore it is possible to adjust a single range without needing to adjust any other points. Altering the calibration constants directly changes the calibrators output. Adjusting the calibrator simply involves changing the constant until the output reads correctly.

DC Voltage	:	Zero : + Full Scale : - Full Scale
AC Voltage	:	Zero : Full Scale @ 206Hz : Frequency Response
DC Current	:	Zero : + Full Scale : - Full Scale
AC Current	:	Zero : Full Scale @ 206Hz : Frequency Response

Resistance	:	2 Wire & 4 Wire value for each resistance
Capacitance	:	Value for each Capacitor
Inductance	:	Value for each Inductor

Linearity is inherent within the design of the D to A in the calibrator and does not need to be adjusted.

### **ADJUSTMENT : EQUIPMENT REQUIRED**

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Precision 8 ½ Digital Multimeter. E.g. Hewlett Packard HP3458A or Wavetek 1281.

Capacitance / Inductance bridge. E.g. Wayne Kerr B905.

Frequency counter.

Shunt resistors for measurement of 2A and 20A.

Low thermal test leads with 4mm plug terminations.

Shrouded test leads suitable for 1000V AC measurements.

1m BNC to BNC cable with 2off BNC to 4mm adapters.

Computer with RS232 interface running Transmille virtual front panel program.

RS232 cable.

## ADJUSTMENT OVERVIEW – USING 3000 SERIES VIRTUAL FRONT PANEL SOFTWARE

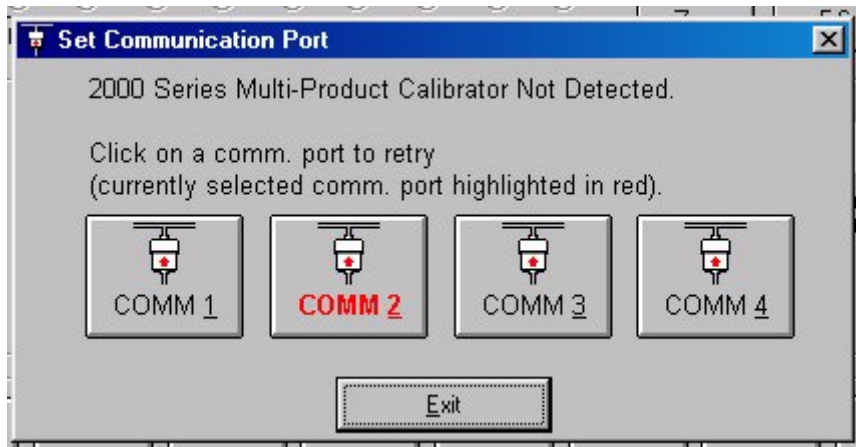
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- 1) Install virtual front panel software.
- 2) Connect 30xx to computer RS232 port
- 3) Allow all equipment to stabilise for at least 4 hours.
- 4) Run virtual front panel program.
- 5) Select range & output to be adjusted using the virtual front panel program.
- 6) Enter calibration control mode. (Password required).
- 7) Press 'Start' to enable adjustment. A 'C' will appear on the calibrator display.
- 8) Adjust calibration constant until the output of the calibrator is correct. **The constants for each range must be adjusted in the correct sequence. See following pages for details.**
- 9) Press the store button to save the constant.  
(Changing range will also store the constant.)  
Press the 'abort' button to abandon calibration of the range being adjusted.
- 10) Select next range to be adjusted.
- 11) Close calibration control panel and exit virtual front panel program

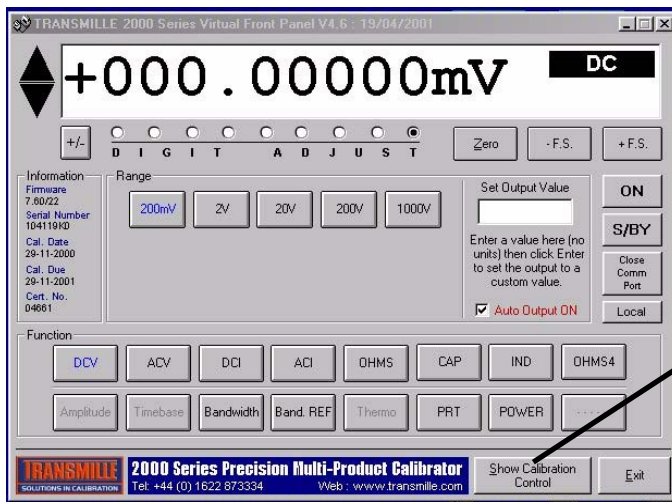
### Starting the virtual control program

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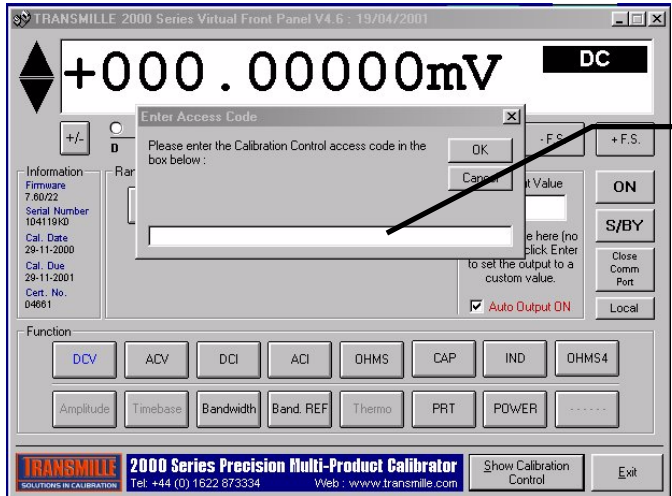
- 1) Install the Virtual front panel program onto computer from CD supplied.  
The CD will auto-run. Select 'utilities' and follow installation instructions.
- 2) Connect RS232 cable between computer and calibrator.
- 3) Run the Virtual front panel program.
- 4) Select Comm port



- 5) Click the 'Show Calibration Control Button'

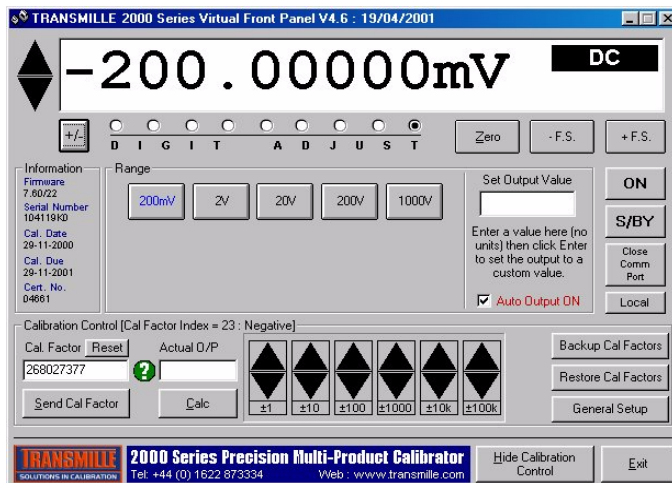


Show Calibration Control



Enter Password

7) The main calibration screen is now displayed



Test Leads	Low Thermal
HP3458 Setting	DCV, NPLC 30, NDIG 6, ARANGE
30xx Terminals	Voltage
Notes	NULL DMM before test and re-check NULL after 200mV range adjustment

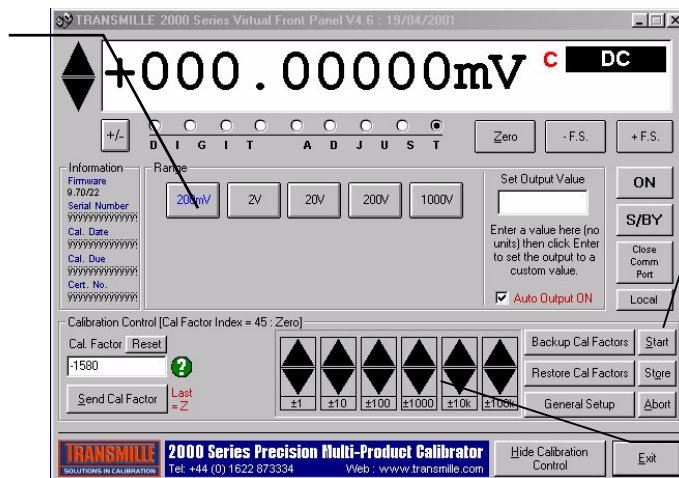
Settings and connections.

Adjustment sequence for DC 200mV to 20V ranges.

- 1) Zero
- 2) + full scale
- 3) - full scale

## ZERO ADJUSTMENT

- 1) Click 200mV range button

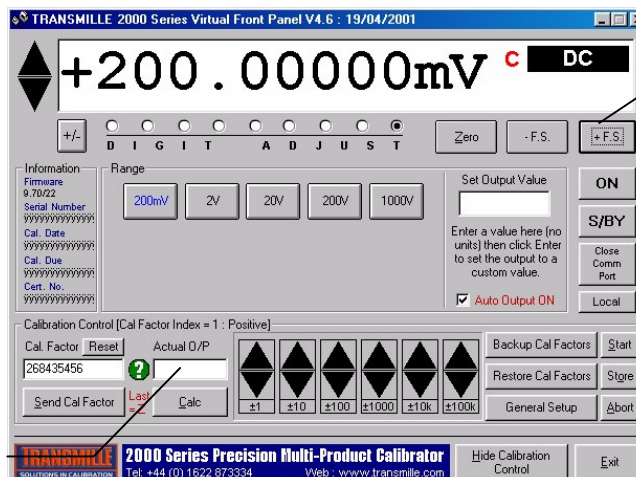


- 2) Click START button

- 3) Click up/down buttons until DMM reads 0.0000mV

## POSITIVE FULL SCALE ADJUSTMENT

- 5) Enter reading on DMM here and click CALC button. DMM should now read 200.0000mV. Fine adjustment may be made using the up/down buttons

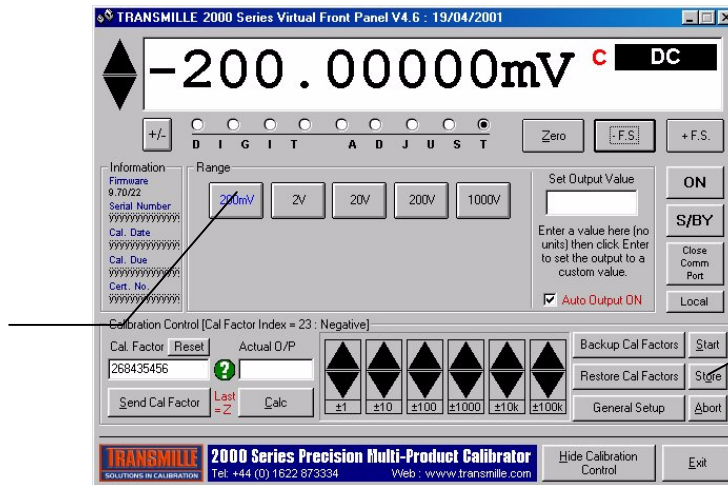


- 4) Click +FS button



## Negative Full Scale Adjustment

7) Enter reading on DMM here and click CALC button. DMM should now read -200.0000mV. Fine adjustment may be made using the up/down buttons



8) Click the STORE button

The 2V and 20V ranges are adjusted using the technique as per the 200mV range.

TEST TITLE	TEST VALUE	RANGE
200mV Range	0mV	200mV
200mV Range	200mV	200mV
200mV Range	-200mV	200mV
2V Range	0V	2V
2V Range	2V	2V
2V Range	-2V	2V
20V Range	0V	20V
20V Range	20V	20V
20V Range	-20V	20V

Adjustment points

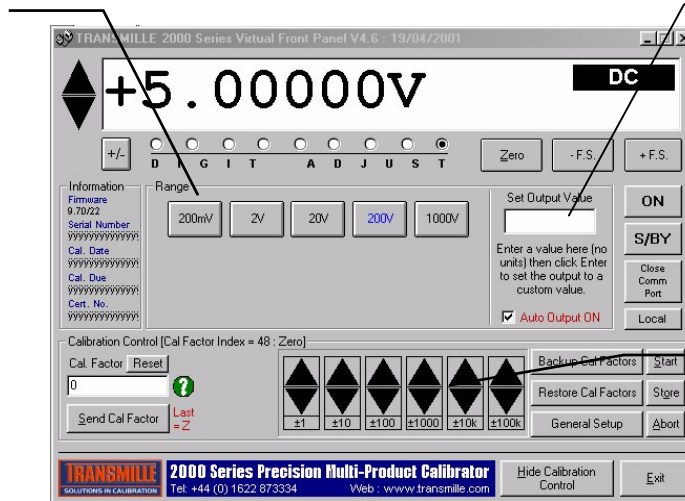
200V Range

- 1) Connect shrouded test leads between 30xx Voltage terminals and DMM Voltage input.
- 2) Set HP3458A to DCV, NDIG 6, NPLC 30, 1000V RANGE
- 3) Click 200V range button on 30xx VFP

ZERO ADJUSTMENT

4) Click 200V range button

5) Enter '5' in this box and press return key



6) Click up/down buttons until DMM reads 0.000V

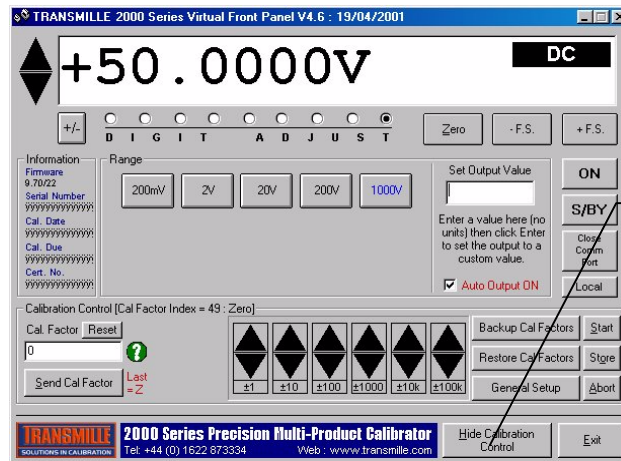
The full scales are calibrated in the same way as low voltage DC

The 1000V range is calibrated using the technique as the 200V range except that the zero is set up at 50V. See table below for adjustment points.

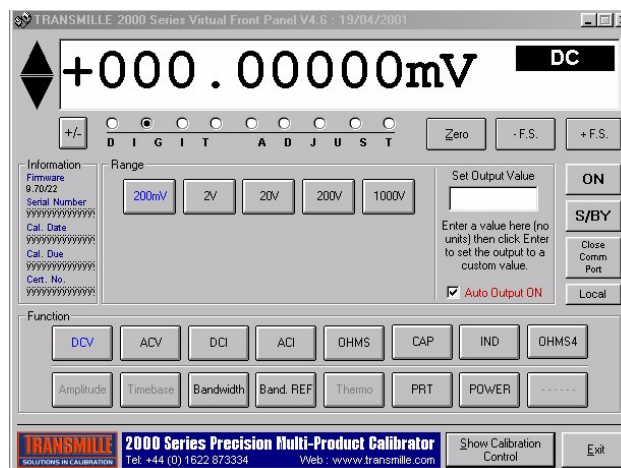
TEST TITLE	TEST VALUE	RANGE
200V Range	5V	200V
200V Range	200V	200V
200V Range	-200V	200V
1kV Range	50V	1kV
1kV Range	1000V	1kV
1kV Range	-1000V	1kV

Adjustment points

After calibrating the DC Voltage ranges, Click the HIDE CALIBRATION CONTROL button to return to the 'function selection screen'.



HIDE CALIBRATION CONTROL



FUNCTION SELECT SCREEN.



- 1) Connect the shrouded test leads between 30xx Current terminals and DMM Current input.
- 2) Set HP3458A to DCI, NPLC 30, NDIG 6, AUTORANGE.
- 3) Open circuit test leads at calibrator end and select MATH NULL on DMM
- 4) Re-connect test leads to 30xx
- 5) Select DCI on FUNCTION SELECTION SCREEN.
- 6) Click Show Calibration Control Button
- 7) Click 200uA Button

The adjustment procedure is the same as DC Voltage, adjust zero, positive full scale and negative full scale as shown in the table below.

For 2A range adjustment, connect a 1 Ohm standard resistor to the 30xx output and measure voltage on the V terminals of the resistor with the DMM on the 2V DC range.

For 20A range adjustment, use a 0.1 Ohm standard resistor.

TEST TITLE	TEST VALUE	RANGE
200uA Range	0uA	200uA
200uA Range	200uA	200uA
200uA Range	-200uA	200uA
2mA Range	0mA	2mA
2mA Range	2mA	2mA
2mA Range	-2mA	2mA
20mA Range	0mA	20mA
20mA Range	20mA	20mA
20mA Range	-20mA	20mA
200mA Range	0mA	200mA
200mA Range	200mA	200mA
200mA Range	-200mA	200mA
2A Range	0A	2A
2A Range	2A	2A
2A Range	-2A	2A
20A Range	0A	20A
20A Range	20A	20A
20A Range	-10A	20A

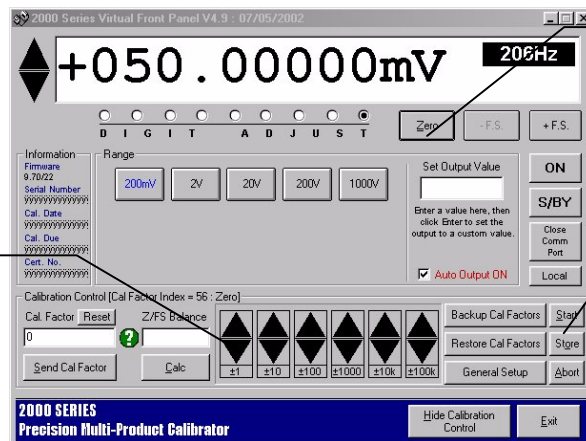
Adjustment points

AC voltage is calibrated by adjusting the output at 206Hz and then adjusting the frequency response at other frequencies found in the drop down box. The 206Hz output must always be set up first.

- 1) Connect screened test leads between 30xx Voltage terminals and DMM Voltage input.
- 2) Set HP3458A to ACV, SETACV SYNC, LFILTER 1, NPLC 30, MANUAL RANGE & LFREQ LINE
- 3) Select MATH OFF on DMM
- 4) Click ACV on FUNCTION SELECT screen.
- 5) Click 200mV range button on 30xx VFP

### ZERO CAL

8) Click up/down buttons until DMM reads 50.00mV

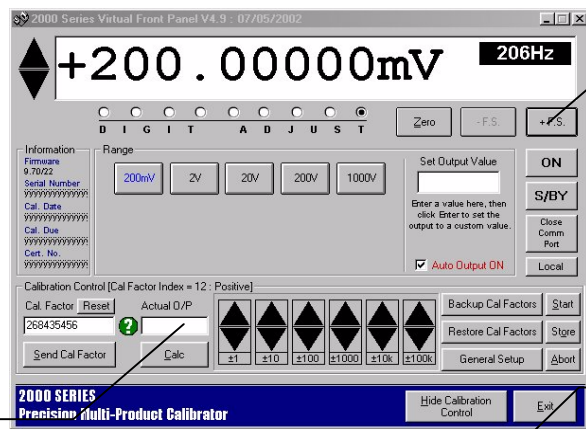


6) Click ZERO button

7) Click START button

### FS CAL

10) Enter reading on DMM here and click CALC button. DMM should now read 200.0000mV. Fine adjustment may be made using the up/down buttons

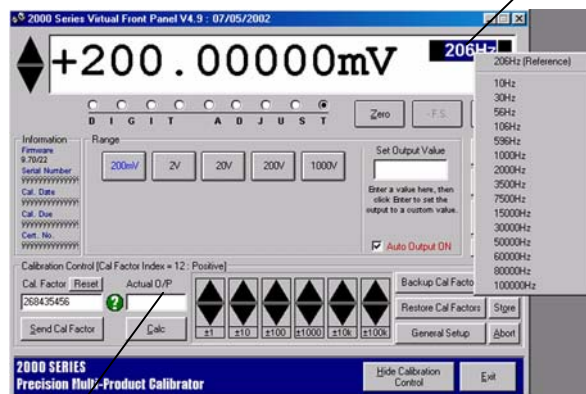


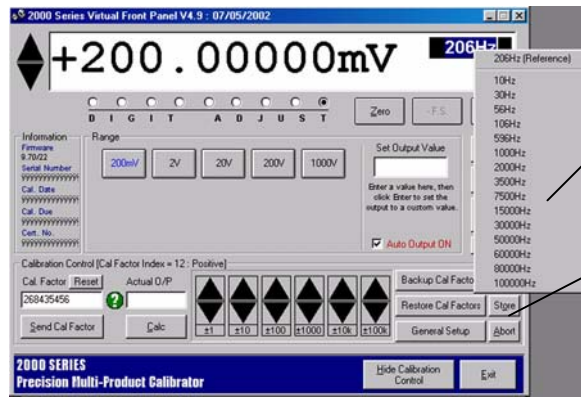
9) Click FS Button

11) Double click frequency selection box and select lowest frequency available for this range. Look at the user manual supplied with the instrument to find the max/min frequencies for this range.

### FREQ SET POINT CAL

12) Enter reading on DMM here and click CALC button. DMM should now read 200.0000mV. Fine adjustment may be made using the up/down buttons





13) Adjust 30xx at all frequencies on this list which are available on the selected range as above

14) Click the STORE button when all the frequency tests are complete.

The adjustment procedure is the same for the other AC Voltage ranges. Note the 1000V range full scale is adjusted at 700V because of the voltage input limit of the DMM. See table below.

## AC Voltage Frequency Response Calibration Test Points For 3050

TEST TITLE	TEST VALUE	RANGE
200mV Range : 206Hz	50mV	200mV
200mV Range : 206Hz	200mV	200mV
200mV Range : 10Hz	200mV	200mV
200mV Range : 40Hz	200mV	200mV
200mV Range : 56Hz	200mV	200mV
200mV Range : 106Hz	200mV	200mV
200mV Range : 596Hz	200mV	200mV
200mV Range : 1000Hz	200mV	200mV
200mV Range : 2000Hz	200mV	200mV
200mV Range : 3500Hz	200mV	200mV
200mV Range : 5000Hz	200mV	200mV
200mV Range : 7500Hz	200mV	200mV
200mV Range : 10000Hz	200mV	200mV
200mV Range : 15000Hz	200mV	200mV
200mV Range : 20000Hz	200mV	200mV
2V Range : 206Hz	0.5V	2V
2V Range : 206Hz	2V	2V
2V Range : 10Hz	2V	2V
2V Range : 40Hz	2V	2V
2V Range : 56Hz	2V	2V
2V Range : 106Hz	2V	2V
2V Range : 596Hz	2V	2V
2V Range : 1000Hz	2V	2V
2V Range : 2000Hz	2V	2V
2V Range : 3500Hz	2V	2V
2V Range : 5000Hz	2V	2V
2V Range : 7500Hz	2V	2V
2V Range : 10000Hz	2V	2V
2V Range : 15000Hz	2V	2V
2V Range : 20000Hz	2V	2V
2V Range : 30000Hz	2V	2V
2V Range : 40000Hz	2V	2V
2V Range : 50000Hz	2V	2V
2V Range : 60000Hz	2V	2V
2V Range : 80000Hz	2V	2V
2V Range : 100000Hz	2V	2V

TEST TITLE	TEST VALUE	RANGE
20V Range : 206Hz	5V	20V
20V Range : 206Hz	20V	20V
20V Range : 10Hz	20V	20V
20V Range : 40Hz	20V	20V
20V Range : 56Hz	20V	20V
20V Range : 106Hz	20V	20V
20V Range : 596Hz	20V	20V
20V Range : 1000Hz	20V	20V
20V Range : 2000Hz	20V	20V
20V Range : 3500Hz	20V	20V
20V Range : 5000Hz	20V	20V
20V Range : 7500Hz	20V	20V
20V Range : 10000Hz	20V	20V
20V Range : 15000Hz	20V	20V
20V Range : 20000Hz	20V	20V
20V Range : 30000Hz	20V	20V
20V Range : 40000Hz	20V	20V
20V Range : 50000Hz	20V	20V
20V Range : 60000Hz	20V	20V
20V Range : 80000Hz	20V	20V
20V Range : 100000Hz	20V	20V
200V Range : 206Hz	50V	200V
200V Range : 206Hz	200V	200V
200V Range : 40Hz	200V	200V
200V Range : 56Hz	200V	200V
200V Range : 106Hz	200V	200V
200V Range : 596Hz	200V	200V
200V Range : 1000Hz	200V	200V
200V Range : 2000Hz	200V	200V
200V Range : 3500Hz	200V	200V
200V Range : 5000Hz	200V	200V
200V Range : 7500Hz	200V	200V
200V Range : 10000Hz	200V	200V
200V Range : 15000Hz	200V	200V
200V Range : 20000Hz	200V	200V
1000V Range : 206Hz	250V	1000V
1000V Range : 206Hz	700V	1000V
1000V Range : 40Hz	700V	1000V
1000V Range : 56Hz	700V	1000V
1000V Range : 106Hz	700V	1000V
1000V Range : 596Hz	700V	1000V
1000V Range : 1000Hz	700V	1000V
1000V Range : 2000Hz	700V	1000V
1000V Range : 3500Hz	700V	1000V
1000V Range : 5000Hz	700V	1000V
1000V Range : 7500Hz	700V	1000V
1000V Range : 10000Hz	700V	1000V

## AC VOLTAGE FREQUENCY RESPONSE CALIBRATION TEST POINTS FOR 3041

TEST TITLE	TEST VALUE	RANGE
200mV Range : 206Hz	50mV	200mV
200mV Range : 206Hz	200mV	200mV
200mV Range : 10Hz	200mV	200mV
200mV Range : 30Hz	200mV	200mV
200mV Range : 56Hz	200mV	200mV
200mV Range: 106Hz	200mV	200mV
200mV Range: 596Hz	200mV	200mV
200mV Range : 1000Hz	200mV	200mV
200mV Range : 2000Hz	200mV	200mV
200mV Range : 3500Hz	200mV	200mV
200mV Range : 5000Hz	200mV	200mV
200mV Range : 7500Hz	200mV	200mV
200mV Range : 10000Hz	200mV	200mV
200mV Range : 20000Hz	200mV	200mV
200mV Range : 30000Hz	200mV	200mV
200mV Range : 40000Hz	200mV	200mV
200mV Range : 50000Hz	200mV	200mV
200mV Range : 60000Hz	200mV	200mV
200mV Range : 80000Hz	200mV	200mV
200mV Range : 100000Hz	200mV	200mV
200mV Range : 200000Hz	200mV	200mV
200mV Range : 400000Hz	200mV	200mV
200mV Range : 500000Hz	200mV	200mV
2V Range : 206Hz	0.5V	2V
2V Range : 206Hz	2V	2V
2V Range : 10Hz	2V	2V
2V Range : 30Hz	2V	2V
2V Range : 56Hz	2V	2V
2V Range: 106Hz	2V	2V
2V Range: 596Hz	2V	2V
2V Range : 1000Hz	2V	2V
2V Range : 2000Hz	2V	2V
2V Range : 3500Hz	2V	2V
2V Range : 5000Hz	2V	2V
2V Range : 7500Hz	2V	2V
2V Range : 10000Hz	2V	2V
2V Range : 15000Hz	2V	2V
2V Range : 20000Hz	2V	2V
2V Range : 30000Hz	2V	2V
2V Range : 40000Hz	2V	2V
2V Range : 50000Hz	2V	2V
2V Range : 60000Hz	2V	2V
2V Range : 80000Hz	2V	2V
2V Range : 100000Hz	2V	2V
2V Range : 200000Hz	2V	2V
2V Range : 400000Hz	2V	2V
2V Range : 500000Hz	2V	2V

20V Range : 10Hz	20V	20V
20V Range : 30Hz	20V	20V
20V Range : 56Hz	20V	20V
20V Range: 106Hz	20V	20V
20V Range: 596Hz	20V	20V
20V Range : 1000Hz	20V	20V
20V Range : 2000Hz	20V	20V
20V Range : 3500Hz	20V	20V
20V Range : 5000Hz	20V	20V
20V Range : 7500Hz	20V	20V
20V Range : 10000Hz	20V	20V
20V Range : 15000Hz	20V	20V
20V Range : 20000Hz	20V	20V
20V Range : 30000Hz	20V	20V
20V Range : 40000Hz	20V	20V
20V Range : 50000Hz	20V	20V
20V Range : 60000Hz	20V	20V
20V Range : 80000Hz	20V	20V
20V Range : 100000Hz	20V	20V
200V Range : 206Hz	50V	200V
200V Range : 206Hz	200V	200V
200V Range : 30Hz	200V	200V
200V Range : 56Hz	200V	200V
200V Range: 106Hz	200V	200V
200V Range: 596Hz	200V	200V
200V Range : 1000Hz	200V	200V
200V Range : 2000Hz	200V	200V
200V Range : 3500Hz	200V	200V
200V Range : 5000Hz	200V	200V
200V Range : 7500Hz	200V	200V
200V Range : 10000Hz	200V	200V
200V Range : 15000Hz	200V	200V
200V Range : 20000Hz	200V	200V
1000V Range : 206Hz	250V	1000V
1000V Range : 206Hz	700V	1000V
1000V Range : 30Hz	700V	1000V
1000V Range : 56Hz	700V	1000V
1000V Range: 106Hz	700V	1000V
1000V Range: 596Hz	700V	1000V
1000V Range : 1000Hz	700V	1000V
1000V Range : 2000Hz	700V	1000V
1000V Range : 3500Hz	700V	1000V
1000V Range : 5000Hz	700V	1000V
1000V Range : 7500Hz	700V	1000V
1000V Range : 10000Hz	700V	1000V

## AC VOLTAGE FREQUENCY RESPONSE CALIBRATION TEST POINTS FOR 3010

TEST TITLE	TEST VALUE	RANGE
200mV Range : 206Hz	50mV	200mV
200mV Range : 206Hz	200mV	200mV
200mV Range : 10Hz	200mV	200mV
200mV Range : 30Hz	200mV	200mV
200mV Range : 56Hz	200mV	200mV
200mV Range: 106Hz	200mV	200mV
200mV Range: 596Hz	200mV	200mV
200mV Range : 1000Hz	200mV	200mV
200mV Range : 2000Hz	200mV	200mV
200mV Range : 3500Hz	200mV	200mV
200mV Range : 5000Hz	200mV	200mV
200mV Range : 7500Hz	200mV	200mV
200mV Range : 10000Hz	200mV	200mV
200mV Range : 20000Hz	200mV	200mV
200mV Range : 30000Hz	200mV	200mV
200mV Range : 40000Hz	200mV	200mV
200mV Range : 50000Hz	200mV	200mV
200mV Range : 60000Hz	200mV	200mV
200mV Range : 80000Hz	200mV	200mV
200mV Range : 100000Hz	200mV	200mV
200mV Range : 200000Hz	200mV	200mV
200mV Range : 400000Hz	200mV	200mV
200mV Range : 500000Hz	200mV	200mV
2V Range : 206Hz	0.5V	2V
2V Range : 206Hz	2V	2V
2V Range : 10Hz	2V	2V
2V Range : 30Hz	2V	2V
2V Range : 56Hz	2V	2V
2V Range: 106Hz	2V	2V
2V Range: 596Hz	2V	2V
2V Range : 1000Hz	2V	2V
2V Range : 2000Hz	2V	2V
2V Range : 3500Hz	2V	2V
2V Range : 5000Hz	2V	2V
2V Range : 7500Hz	2V	2V
2V Range : 10000Hz	2V	2V
2V Range : 15000Hz	2V	2V
2V Range : 20000Hz	2V	2V
2V Range : 30000Hz	2V	2V
2V Range : 40000Hz	2V	2V
2V Range : 50000Hz	2V	2V
2V Range : 60000Hz	2V	2V
2V Range : 80000Hz	2V	2V
2V Range : 100000Hz	2V	2V
2V Range : 200000Hz	2V	2V
2V Range : 400000Hz	2V	2V
2V Range : 500000Hz	2V	2V

20V Range : 10Hz	20V	20V
20V Range : 30Hz	20V	20V
20V Range : 56Hz	20V	20V
20V Range: 106Hz	20V	20V
20V Range: 596Hz	20V	20V
20V Range : 1000Hz	20V	20V
20V Range : 2000Hz	20V	20V
20V Range : 3500Hz	20V	20V
20V Range : 5000Hz	20V	20V
20V Range : 7500Hz	20V	20V
20V Range : 10000Hz	20V	20V
20V Range : 15000Hz	20V	20V
20V Range : 20000Hz	20V	20V
20V Range : 30000Hz	20V	20V
20V Range : 40000Hz	20V	20V
20V Range : 50000Hz	20V	20V
20V Range : 60000Hz	20V	20V
20V Range : 80000Hz	20V	20V
20V Range : 100000Hz	20V	20V
200V Range : 206Hz	50V	200V
200V Range : 206Hz	200V	200V
200V Range : 30Hz	200V	200V
200V Range : 56Hz	200V	200V
200V Range: 106Hz	200V	200V
200V Range: 596Hz	200V	200V
200V Range : 1000Hz	200V	200V
200V Range : 2000Hz	200V	200V
200V Range : 3500Hz	200V	200V
200V Range : 5000Hz	200V	200V
200V Range : 7500Hz	200V	200V
200V Range : 10000Hz	200V	200V
200V Range : 15000Hz	200V	200V
200V Range : 20000Hz	200V	200V
200V Range : 30000Hz	200V	200V
200V Range : 40000Hz	200V	200V
1000V Range : 206Hz	250V	1000V
1000V Range : 206Hz	700V	1000V
1000V Range : 30Hz	700V	1000V
1000V Range : 56Hz	700V	1000V
1000V Range: 106Hz	700V	1000V
1000V Range: 596Hz	700V	1000V
1000V Range : 1000Hz	700V	1000V
1000V Range : 2000Hz	700V	1000V
1000V Range : 3500Hz	700V	1000V
1000V Range : 5000Hz	700V	1000V
1000V Range : 7500Hz	700V	1000V
1000V Range : 10000Hz	700V	1000V



## AC Current Adjustment

---

- 1) Connect the screened test leads between 30xx Current terminals and DMM Current input.
- 2) Set HP3458A to ACI, NPLC 30.SETACV SYNC, LFILTER 1, LFREQ LINE
- 3) Select MATH OFF on DMM
- 4) Select ACI on FUNCTION SELECTION SCREEN.
- 5) Click Show Calibration Control Button
- 6) Click 200uA Button

The adjustment procedure is the same as AC Voltage, calibrate zero, positive full scale and frequency points as shown in the table below.

For 2A range adjustment, connect a 1 Ohm standard resistor to the 30xx output and measure voltage on the V terminals of the resistor with the DMM on the 2V AC range

For 20/30A range adjustment, use a 0.1 Ohm standard resistor.

## AC CURRENT FREQUENCY RESPONSE CALIBRATION POINTS FOR 3050

TEST TITLE	TEST VALUE	RANGE
200uA Range: 206Hz	50uA	200uA
200uA Range: 206Hz	200uA	200uA
200uA Range: 10Hz	200uA	200uA
200uA Range: 40Hz	200uA	200uA
200uA Range: 56Hz	200uA	200uA
200uA Range: 106Hz	200uA	200uA
200uA Range: 596Hz	200uA	200uA
200uA Range: 1000Hz	200uA	200uA
200uA Range: 2000Hz	200uA	200uA
200uA Range: 3500Hz	200uA	200uA
200uA Range: 5000Hz	200uA	200uA
200uA Range: 7500Hz	200uA	200uA
200uA Range: 10000Hz	200uA	200uA
2mA Range: 206Hz	0.5mA	2mA
2mA Range: 206Hz	2mA	2mA
2mA Range: 10Hz	2mA	2mA
2mA Range: 40Hz	2mA	2mA
2mA Range: 56Hz	2mA	2mA
2mA Range: 106Hz	2mA	2mA
2mA Range: 596Hz	2mA	2mA
2mA Range: 1000Hz	2mA	2mA
2mA Range: 2000Hz	2mA	2mA
2mA Range: 3500Hz	2mA	2mA
2mA Range: 5000Hz	2mA	2mA
2mA Range: 7500Hz	2mA	2mA
2mA Range: 10000Hz	2mA	2mA
20mA Range: 206Hz	5mA	20mA
20mA Range: 206Hz	20mA	20mA
20mA Range: 10Hz	20mA	20mA
20mA Range: 40Hz	20mA	20mA
20mA Range: 56Hz	20mA	20mA
20mA Range: 106Hz	20mA	20mA
20mA Range: 596Hz	20mA	20mA
20mA Range: 1000Hz	20mA	20mA
20mA Range: 2000Hz	20mA	20mA
20mA Range: 3500Hz	20mA	20mA
20mA Range: 5000Hz	20mA	20mA
20mA Range: 7500Hz	20mA	20mA
20mA Range: 10000Hz	20mA	20mA

TEST TITLE	TEST VALUE	RANGE
200mA Range: 206Hz	50mA	200mA
200mA Range: 206Hz	200mA	200mA
200mA Range: 10Hz	200mA	200mA
200mA Range: 40Hz	200mA	200mA
200mA Range: 56Hz	200mA	200mA
200mA Range: 106Hz	200mA	200mA
200mA Range: 596Hz	200mA	200mA
200mA Range: 1000Hz	200mA	200mA
200mA Range: 2000Hz	200mA	200mA
200mA Range: 3500Hz	200mA	200mA
200mA Range: 5000Hz	200mA	200mA
200mA Range: 7500Hz	200mA	200mA
200mA Range: 10000Hz	200mA	200mA
2A Range: 206Hz	500mA	2A
2A Range: 206Hz	2A	2A
2A Range: 10Hz	2A	2A
2A Range: 40Hz	2A	2A
2A Range: 56Hz	2A	2A
2A Range: 106Hz	2A	2A
2A Range: 596Hz	2A	2A
2A Range: 1000Hz	2A	2A
2A Range: 2000Hz	2A	2A
20A Range: 206Hz	3A	20A
20A Range: 206Hz	12A	20A
20A Range: 10Hz	12A	20A
20A Range: 40Hz	12A	20A
20A Range: 56Hz	12A	20A
20A Range: 106Hz	12A	20A
20A Range: 596Hz	12A	20A
20A Range: 1000Hz	12A	20A
20A Range: 2000Hz	12A	20A

## AC CURRENT FREQUENCY RESPONSE CALIBRATION POINTS FOR 3041

TEST TITLE	TEST VALUE	RANGE
200uA Range: 206Hz	50uA	200uA
200uA Range: 206Hz	200uA	200uA
200uA Range: 10Hz	200uA	200uA
200uA Range: 30Hz	200uA	200uA
200uA Range: 56Hz	200uA	200uA
200uA Range: 106Hz	200uA	200uA
200uA Range: 596Hz	200uA	200uA
200uA Range: 1000Hz	200uA	200uA
200uA Range: 2000Hz	200uA	200uA
200uA Range: 3500Hz	200uA	200uA
200uA Range: 5000Hz	200uA	200uA
200uA Range: 7500Hz	200uA	200uA
200uA Range: 10000Hz	200uA	200uA
2mA Range: 206Hz	0.5mA	2mA
2mA Range: 206Hz	2mA	2mA
2mA Range: 10Hz	2mA	2mA
2mA Range: 30Hz	2mA	2mA
2mA Range: 56Hz	2mA	2mA
2mA Range: 106Hz	2mA	2mA
2mA Range: 596Hz	2mA	2mA
2mA Range: 1000Hz	2mA	2mA
2mA Range: 2000Hz	2mA	2mA
2mA Range: 3500Hz	2mA	2mA
2mA Range: 5000Hz	2mA	2mA
2mA Range: 7500Hz	2mA	2mA
2mA Range: 10000Hz	2mA	2mA
20mA Range: 206Hz	5mA	20mA
20mA Range: 206Hz	20mA	20mA
20mA Range: 10Hz	20mA	20mA
20mA Range: 30Hz	20mA	20mA
20mA Range: 56Hz	20mA	20mA
20mA Range: 106Hz	20mA	20mA
20mA Range: 596Hz	20mA	20mA
20mA Range: 1000Hz	20mA	20mA
20mA Range: 2000Hz	20mA	20mA
20mA Range: 3500Hz	20mA	20mA
20mA Range: 5000Hz	20mA	20mA
20mA Range: 7500Hz	20mA	20mA
20mA Range: 10000Hz	20mA	20mA

TEST TITLE	TEST VALUE	RANGE
200mA Range: 206Hz	50mA	200mA
200mA Range: 206Hz	200mA	200mA
200mA Range: 10Hz	200mA	200mA
200mA Range: 30Hz	200mA	200mA
200mA Range: 56Hz	200mA	200mA
200mA Range: 106Hz	200mA	200mA
200mA Range: 596Hz	200mA	200mA
200mA Range: 1000Hz	200mA	200mA
200mA Range: 2000Hz	200mA	200mA
200mA Range: 3500Hz	200mA	200mA
200mA Range: 5000Hz	200mA	200mA
200mA Range: 7500Hz	200mA	200mA
200mA Range: 10000Hz	200mA	200mA
2A Range: 206Hz	500mA	2A
2A Range: 206Hz	2A	2A
2A Range: 10Hz	2A	2A
2A Range: 30Hz	2A	2A
2A Range: 56Hz	2A	2A
2A Range: 106Hz	2A	2A
2A Range: 596Hz	2A	2A
2A Range: 1000Hz	2A	2A
2A Range: 2000Hz	2A	2A
2A Range: 3500Hz	2A	2A
2A Range: 5000Hz	2A	2A
30A Range: 206Hz	3A	30A
30A Range: 206Hz	20A	30A
30A Range: 10Hz	20A	30A
30A Range: 30Hz	20A	30A
30A Range: 56Hz	20A	30A
30A Range: 106Hz	20A	30A
30A Range: 596Hz	20A	30A
30A Range: 1000Hz	20A	30A

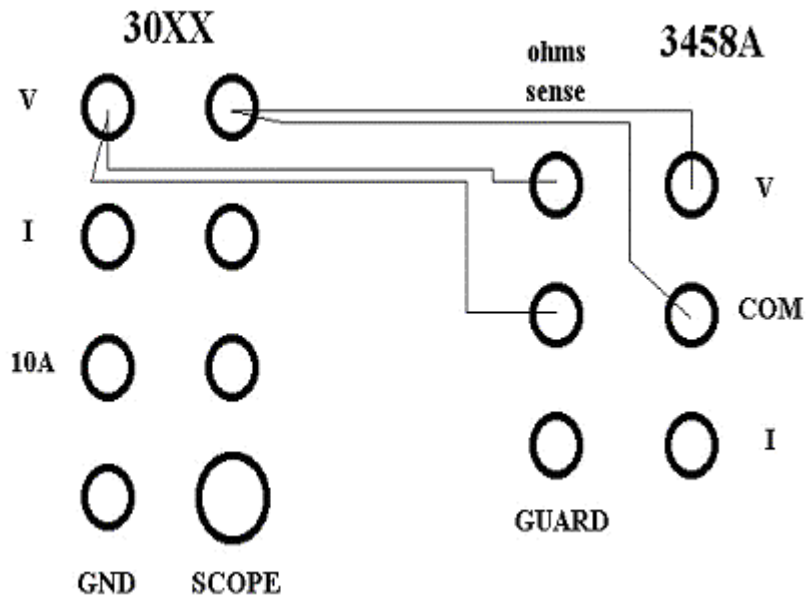
## AC CURRENT FREQUENCY RESPONSE CALIBRATION POINTS FOR 3010

TEST TITLE	TEST VALUE	RANGE
200uA Range: 206Hz	50uA	200uA
200uA Range: 206Hz	200uA	200uA
200uA Range: 10Hz	200uA	200uA
200uA Range: 30Hz	200uA	200uA
200uA Range: 56Hz	200uA	200uA
200uA Range: 106Hz	200uA	200uA
200uA Range: 596Hz	200uA	200uA
200uA Range: 1000Hz	200uA	200uA
200uA Range: 2000Hz	200uA	200uA
200uA Range: 3500Hz	200uA	200uA
200uA Range: 5000Hz	200uA	200uA
200uA Range: 7500Hz	200uA	200uA
200uA Range: 10000Hz	200uA	200uA
2mA Range: 206Hz	0.5mA	2mA
2mA Range: 206Hz	2mA	2mA
2mA Range: 10Hz	2mA	2mA
2mA Range: 30Hz	2mA	2mA
2mA Range: 56Hz	2mA	2mA
2mA Range: 106Hz	2mA	2mA
2mA Range: 596Hz	2mA	2mA
2mA Range: 1000Hz	2mA	2mA
2mA Range: 2000Hz	2mA	2mA
2mA Range: 3500Hz	2mA	2mA
2mA Range: 5000Hz	2mA	2mA
2mA Range: 7500Hz	2mA	2mA
2mA Range: 10000Hz	2mA	2mA
20mA Range: 206Hz	5mA	20mA
20mA Range: 206Hz	20mA	20mA
20mA Range: 10Hz	20mA	20mA
20mA Range: 30Hz	20mA	20mA
20mA Range: 56Hz	20mA	20mA
20mA Range: 106Hz	20mA	20mA
20mA Range: 596Hz	20mA	20mA
20mA Range: 1000Hz	20mA	20mA
20mA Range: 2000Hz	20mA	20mA
20mA Range: 3500Hz	20mA	20mA
20mA Range: 5000Hz	20mA	20mA
20mA Range: 7500Hz	20mA	20mA
20mA Range: 10000Hz	20mA	20mA

TEST TITLE	TEST VALUE	RANGE
200mA Range: 206Hz	50mA	200mA
200mA Range: 206Hz	200mA	200mA
200mA Range: 10Hz	200mA	200mA
200mA Range: 30Hz	200mA	200mA
200mA Range: 56Hz	200mA	200mA
200mA Range: 106Hz	200mA	200mA
200mA Range: 596Hz	200mA	200mA
200mA Range: 1000Hz	200mA	200mA
200mA Range: 2000Hz	200mA	200mA
200mA Range: 3500Hz	200mA	200mA
200mA Range: 5000Hz	200mA	200mA
200mA Range: 7500Hz	200mA	200mA
200mA Range: 10000Hz	200mA	200mA
2A Range: 206Hz	500mA	2A
2A Range: 206Hz	2A	2A
2A Range: 10Hz	2A	2A
2A Range: 30Hz	2A	2A
2A Range: 56Hz	2A	2A
2A Range: 106Hz	2A	2A
2A Range: 596Hz	2A	2A
2A Range: 1000Hz	2A	2A
2A Range: 2000Hz	2A	2A
2A Range: 3500Hz	2A	2A
2A Range: 5000Hz	2A	2A
30A Range: 206Hz	3A	30A
30A Range: 206Hz	20A	30A
30A Range: 10Hz	20A	30A
30A Range: 30Hz	20A	30A
30A Range: 56Hz	20A	30A
30A Range: 106Hz	20A	30A
30A Range: 596Hz	20A	30A
30A Range: 1000Hz	20A	30A

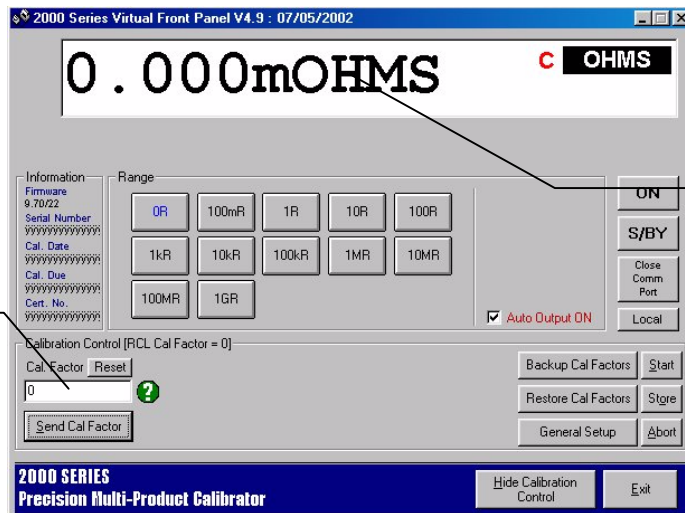
0 Ohms to 10 kOhm ranges

- 1) Select 2 wire Ohms function on 'function selection screen'. Click 'show calibration control'..
- 2) Set HP3458A to OHMS4, NPLC 30, AUTO RANGE



- 3) Use 2 sets of shrouded test leads connected as shown above
- 4) Select 0 Ohms and note reading on DMM

6) Type the DMM reading in this box and click the 'send cal factor' button.

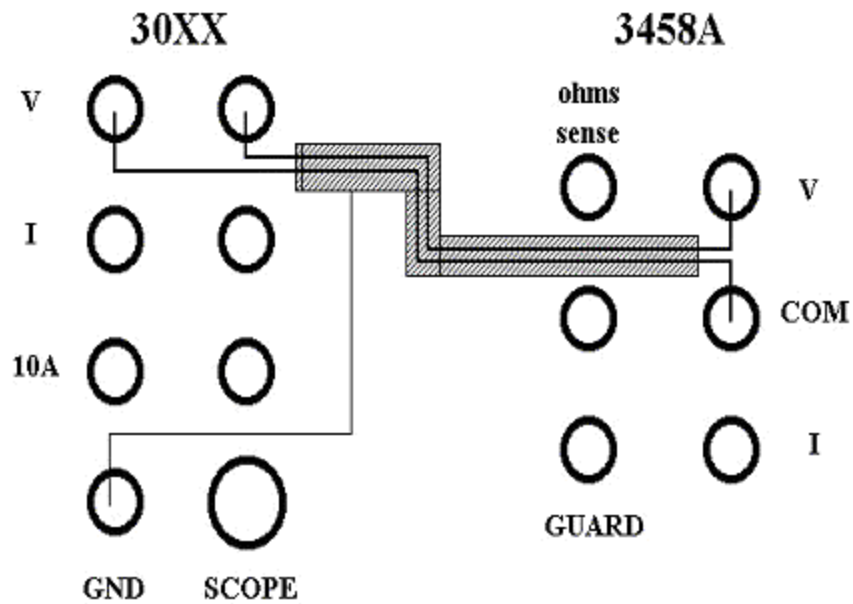


7) The reading here & on the 30xx should now be the same as the reading on the DMM. If not, enter the DMM reading again as in step 6

Repeat this procedure for resistance ranges from 100mOhms to 10kOhms.

## 100kOhms to 1GOhm ranges

- 1) Connect screened test leads between 30xx Voltage terminals and DMM Voltage input.
- 2) Set HP3458A to OHMS2, NPLC 30, AUTO RANGE



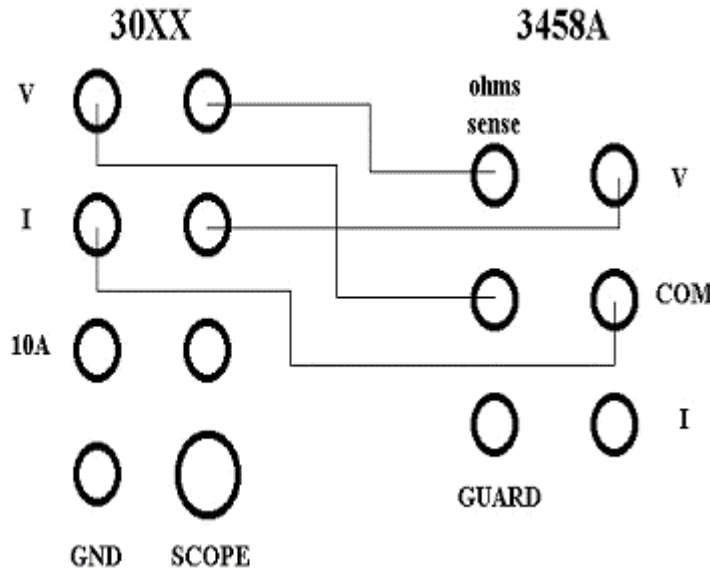
- 3) Select 2 wire Ohms from FUNCTION SELECTION SCREEN
  - 4) Select 100k Ohms and note reading on DMM
- Adjust value as in steps 6 & 7 on previous page.  
Repeat for 1MOhm, 10MOhm, 100MOhm and 1GOhm. (Note that 2040/2005 calibrators do not have a 1GOhm range)



**100mOhms to 100kom ranges**

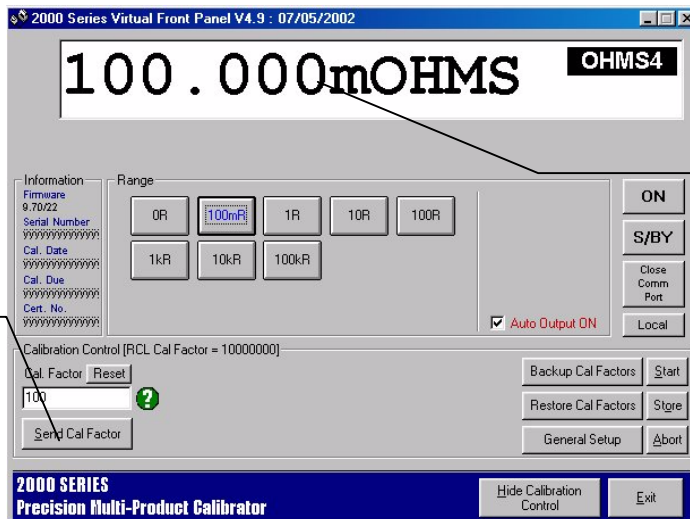
1) Connect test leads as shown below..

Set HP3458A to OHMS4, NPLC 30, NDIG 7 , AUTO RANGE, OCOMP ON



- 2) Select 4 wire Ohms from FUNCTION SELECTION SCREEN
- 3) Select 0 Ohms and select MATH NULL on DMM. The calibration constant is always 0 for this range as this is the zero reference for all other 4 wire Ohms readings.
- 4) Select 100mOhms and note reading on DMM

5) Type the DMM reading in this box and click the 'send cal factor' button.



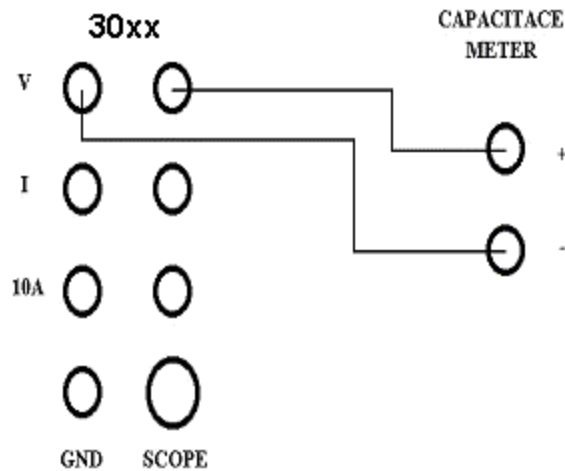
6) The reading here & on the 30xx should now be the same as the reading on the DMM. If not, enter the DMM reading again as in step 5

Repeat this procedure for resistance ranges from 100mOhms to 100kOhms.

TEST TITLE	TEST VALUE
0 Ohms 2 Wire	0.0 ohms
0.1 Ohms 2 Wire	0.1 ohms
1 Ohms 2 Wire	1.0 ohms
10 Ohms 2 Wire	10.0 ohms
100 Ohms 2 Wire	100 ohms
1k Ohms 2 Wire	1.0k ohms
10k Ohms 2 Wire	10.00k ohms
100 kOhms 2 Wire	100k ohms
1MOhms 2 Wire	1M ohms
10MOhms 2 Wire	10.0M ohms
100MOhms 2 Wire	100M ohms
1000MOhms 2 Wire	1000M ohms
30 Ohms 2 Wire	30.0 ohms
300 Ohms 2 Wire	300 ohms
3 kOhms 2 Wire	3k ohms
30 kOhms 2 Wire	30k ohms
300 kOhms 2 Wire	300k ohms
3 MOhms 2 Wire	3M ohms
100 mOhms 4 Wire	100m ohms
1 Ohms 4 Wire	1 ohms
10 Ohms 4 Wire	10 ohms
100 Ohms 4 Wire	100 ohms
1 kOhms 4 Wire	1k ohms
10 kOhms 4 Wire	10k ohms
100 mOhms 4 Wire	100k ohms
1 MOhms 4 Wire	1M ohms
10 MOhms 4 Wire	10M ohms
100 MOhms 4 Wire	100M ohms

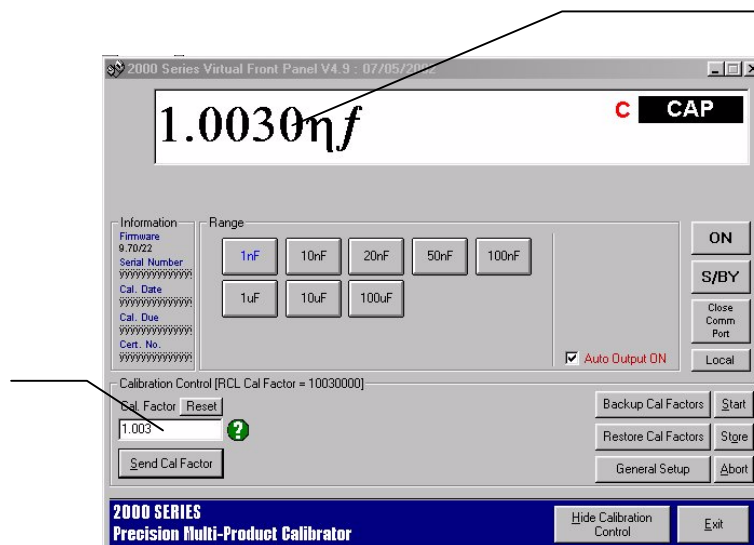
### Resistance Adjustment points

- 1) Select capacitance on function selection screen'. Click 'show calibration control'
- 2) Connect screened test leads between 30xx Voltage terminals and capacitance bridge



- 3) Null capacitance bridge as described in user manual.
- 4) Select 1nF of 30xx
- 5) Select autorange and note reading on bridge

6) Type the reading in this box and click the 'send cal factor' button.



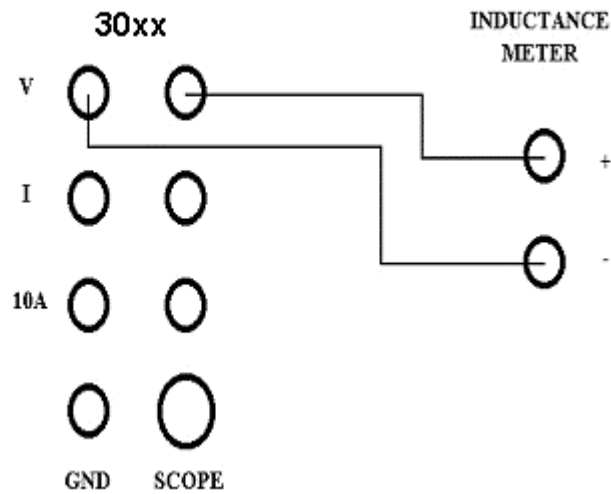
7) The reading here & on the 30xx should now be the same as the reading on the bridge. If not, enter the bridge reading again as in step 6

Repeat this procedure for capacitance ranges from 10nF to 100uF.

TEST TITLE	TEST VALUE
1nF	1nF
10nF	10.0nF
20nF	20nF
50nF	50nF
100nF	100nF
1uF	1uF
10uF	10uF
100uF	100uF

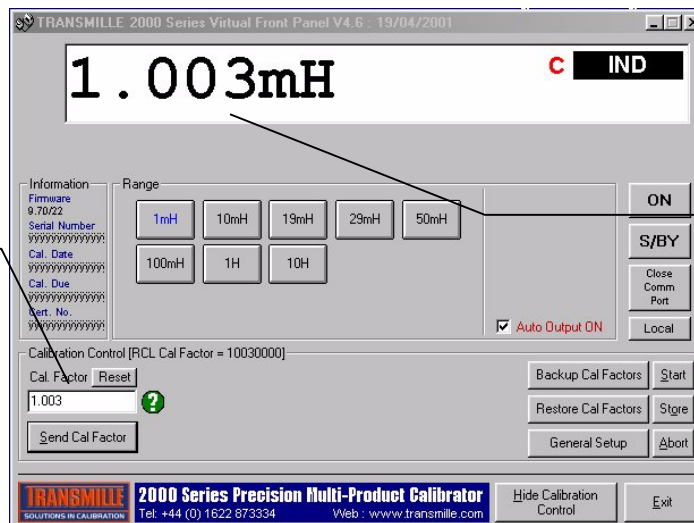
Capacitance Adjustment Points

- 1). Select inductance on function selection screen'. Click 'show calibration control'..
- 2) Connect screened test leads between 30xx Voltage terminals and inductance bridge



- 3) Null inductance bridge as described in user manual.
- 4) Select autorange and note reading on bridge and select 1mH on the 30xx

5) Type the reading in this box and click the 'send cal factor' button.



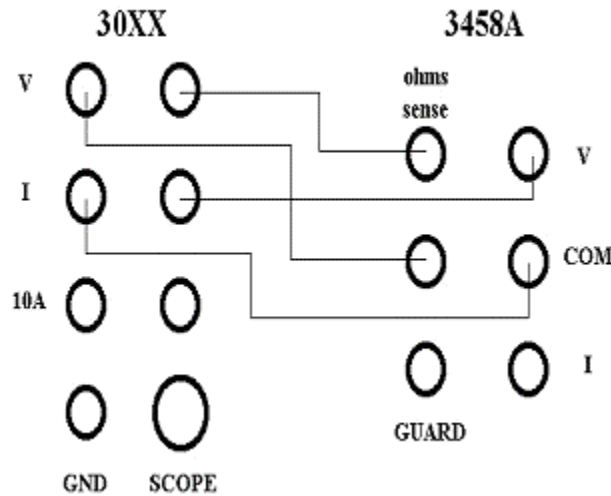
6) The reading here & on the 30xx should now be the same as the reading on the bridge. If not, enter the bridge reading again as in step 5

Repeat this procedure for inductance ranges from 10mH to 10H.

TEST TITLE	TEST VALUE
1mH	1mH
10mH	10mH
19mH	19mH
29mH	29mH
50mH	50mH
100mH	100mH
1H	1H
10H	10H

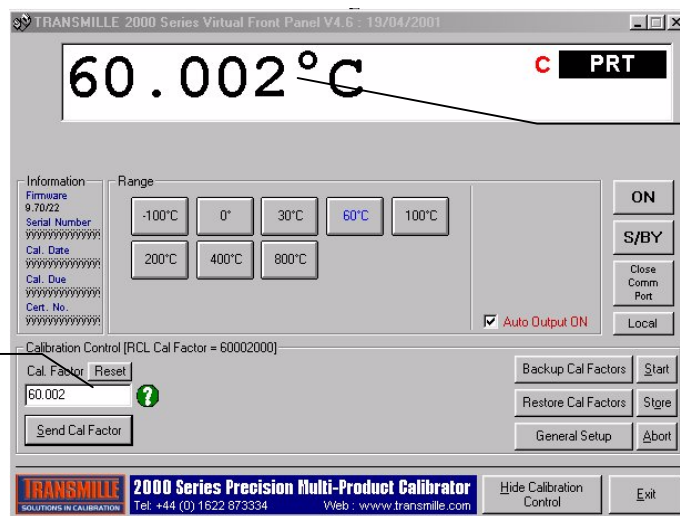
Inductance Adjustment Points

- 1). Select inductance on function selection screen'. Click 'show calibration control'.
- 2) Connect test leads for 4 wire resistance measurement as shown below.
- 3) Select PRT from the 'function selection screen'.



- 4) If an HP3458A DMM is used, select 4 wire Ohms and MATH CTRD85. This causes the DMM to read directly in deg C. Other types of meter may require the resistance reading to be converted into deg C using PRT tables.
- 5) Select -100 deg C and note reading on meter

6) Type the reading in this box and click the 'send cal factor' button. Leave the minus sign off for -100 deg C.



7) The reading here & on the 30xx should now be the same as the reading on the meter. If not, enter the bridge reading again as in step 6.

Repeat this procedure for PRT ranges from 0 deg C to 800 deg C.

TEST TITLE	TEST VALUE
-100.0°C PRT	-100.0°C
0.0°C PRT Temperature	0.0°C
30.0°C PRT Temperature	30.0°C
60.0°C PRT Temperature	60.0°C
100.0°C PRT	100.0°C
200.0°C PRT	200.0°C
400.0°C PRT	400.0°C
800.0°C PRT	800.0°C

PRT Adjustment points

### Amplitude Adjustment

Only 2 points need to be set up to adjust all of the amplitude ranges.  
Ensure that DC Voltage is adjusted correctly before starting this procedure.

- 1) Connect test leads between 30xx scope terminals and DMM Voltage input.
- 2) Set HP3458A to DCV, NPLC 30, .AUTO RANGE.
- 3) Click 'Amplitude' on the 'function selection' screen.

4) Select 10mV/div

5) Click 'Start'

6) Adjust output for a reading of 60.00mV on DMM

7) Select 100mV/div

8) Adjust output for a reading of 600.00mV on DMM

9) Click Store

### Timebase Adjustment

The timebase function is crystal controlled and does not require adjustment.



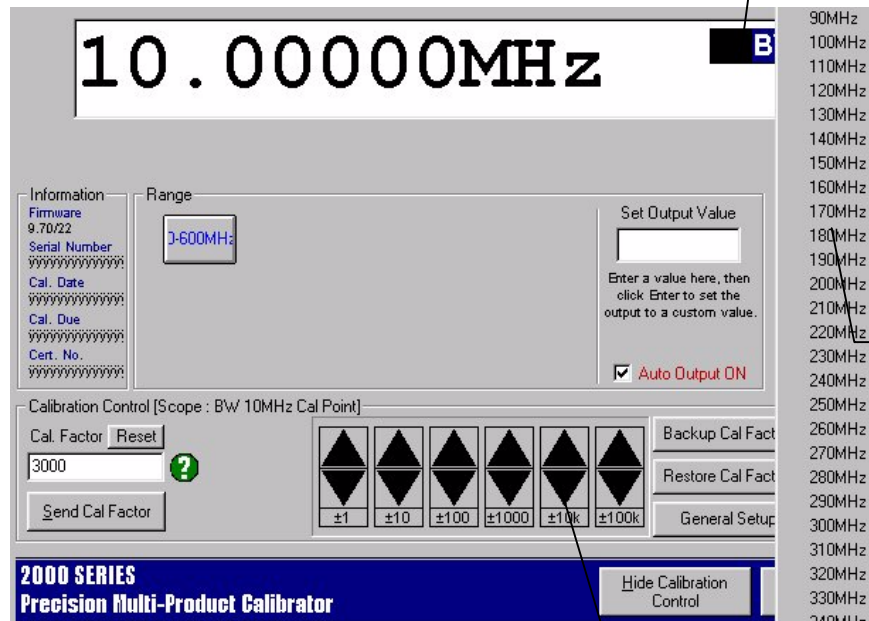
## Levelled sweep Adjustment

Connect 30xx oscilloscope output to a calibrated oscilloscope with a bandwidth of greater than 700MHz.

Use a good quality BNC lead terminated with 50 Ohms.

- 1) Click 'Bandwidth' on 'function selection' screen.
- 2) Click 'start'

3) Double click BW button to display all calibration points.



4) Click frequency to be calibrated, starting with the lowest frequency.

5) Adjust until waveform on oscilloscope is 600mV pk-pk.

- 6) Calibrate all frequencies from 5MHz to 610 MHz
- 7) Click 'Store' Button.

The frequency of the levelled sweep is crystal controlled and cannot be adjusted.

## ADJUSTMENT OVERVIEW – USING 3000 SERIES FRONT PANEL

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The 3000 Series calibrator includes the facility to adjust outputs using the front panel controls.

Calibration constants stored within the calibrator can then be adjusted



**WARNING : RISK OF SHOCK**

**THIS PROCEDURE SHOULD ONLY BE ATTEMPTED BY QUALIFIED PERSONNEL**

Each function e.g. DC voltage, AC Current, Resistance etc. has several ranges.

Each range has one or more calibration constants. See table below.







The 3000 Series Font Panel allows any calibration constant to be adjusted independently of any other, therefore it is possible to adjust a single range without needing to adjust any other points. Altering the calibration constants directly changes the calibrator output. Adjusting the calibrator simply involves changing the constant until the output reads correctly.

<b>DC Voltage</b>	:	<b>Zero : + Full Scale : - Full Scale</b>
<b>AC Voltage</b>	:	<b>Zero : Full Scale @ 206Hz : Frequency Response</b>
<b>DC Current</b>	:	<b>Zero : + Full Scale : - Full Scale</b>
<b>AC Current</b>	:	<b>Zero : Full Scale @ 206Hz : Frequency Response</b>
<b>Resistance</b>	:	<b>2 Wire &amp; 4 Wire value for each resistance</b>
<b>Capacitance</b>	:	<b>Value for each Capacitor</b>
<b>Inductance</b>	:	<b>Value for each Inductor</b>

### Setting The Calibrator For Manual Adjustment

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1) To select front panel calibration mode on the calibrator


Enter      

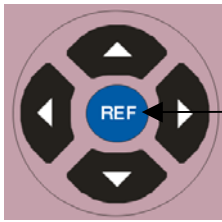
Then press 

Enter  


The calibrator will produce a 2 second beep to confirm front panel calibration mode is selected

2) Select range & output to be adjusted

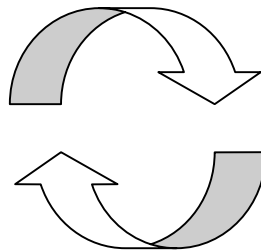
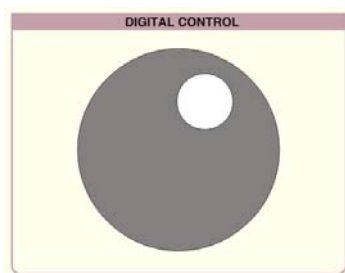
3) With the required function, range and output set, press the  button



Press to enter calibration mode


 The shift button will illuminate when in calibration mode

4) Use the digital control knob to change the measured output  
(or the displayed resistance / capacitance value) as required.



INCREASE OUTPUT

DECREASE OUTPUT

5) Press  again and the SHIFT button illumination will turn off to indicate the adjustment has been saved.

**ONCE CALIBRATION IS COMPLETED TURN THE CALIBRATOR OFF, THEN ON AGAIN**

## FULL SCALE SETUP POINTS

<b>DC VOLTAGE</b>			
Range	Zero	+ Full Scale	-Full Scale
200mV	21mV	200mV	-200mV
2V	0.21V	2V	-2V
20V	2.1V	20V	-20V
200V	21V	200V	-200V
1000V	210	1000V	-1000V

<b>DC CURRENT</b>			
Range	Zero	+ Full Scale	- Full Scale
200uA	21uA	200uA	-200uA
2mA	0.21mA	2mA	-2mA
20mA	2.1mA	20mA	-20mA
200mA	21mA	200mA	-200mA
2A	210mA	2A	-2A
30A	2.1A	20A	-20A

<b>AC VOLTAGE AT 206Hz</b>		
Range	Zero	Full Scale
200mV	21mV	200mV
2V	0.21V	2V
20V	2.1V	20V
200V	21V	200V
1000V	210	1000V

See frequency points detailed below

<b>AC CURRENT AT 206Hz</b>		
Range	Zero	Full Scale
200uA	21uA	200uA
2mA	0.21mA	2mA
20mA	2.1mA	20mA
200mA	21mA	200mA
2A	210mA	2A
30A	2.1A	20A

See frequency points detailed below

## AC VOLTAGE FREQUENCY RESPONSE CALIBRATION TEST POINTS FOR 3050

TEST TITLE	TEST VALUE	RANGE
200mV Range : 206Hz	50mV	200mV
200mV Range : 206Hz	200mV	200mV
200mV Range : 10Hz	200mV	200mV
200mV Range : 40Hz	200mV	200mV
200mV Range : 56Hz	200mV	200mV
200mV Range: 106Hz	200mV	200mV
200mV Range: 596Hz	200mV	200mV
200mV Range : 1000Hz	200mV	200mV
200mV Range : 2000Hz	200mV	200mV
200mV Range : 3500Hz	200mV	200mV
200mV Range : 5000Hz	200mV	200mV
200mV Range : 7500Hz	200mV	200mV
200mV Range : 10000Hz	200mV	200mV
200mV Range : 15000Hz	200mV	200mV
200mV Range : 20000Hz	200mV	200mV
2V Range : 206Hz	0.5V	2V
2V Range : 206Hz	2V	2V
2V Range : 10Hz	2V	2V
2V Range : 40Hz	2V	2V
2V Range : 56Hz	2V	2V
2V Range: 106Hz	2V	2V
2V Range: 596Hz	2V	2V
2V Range : 1000Hz	2V	2V
2V Range : 2000Hz	2V	2V
2V Range : 3500Hz	2V	2V
2V Range : 5000Hz	2V	2V
2V Range : 7500Hz	2V	2V
2V Range : 10000Hz	2V	2V
2V Range : 15000Hz	2V	2V
2V Range : 20000Hz	2V	2V
2V Range : 30000Hz	2V	2V
2V Range : 40000Hz	2V	2V
2V Range : 50000Hz	2V	2V
2V Range : 60000Hz	2V	2V
2V Range : 80000Hz	2V	2V
2V Range : 100000Hz	2V	2V

TEST TITLE	TEST VALUE	RANGE
20V Range : 206Hz	5V	20V
20V Range : 206Hz	20V	20V
20V Range : 10Hz	20V	20V
20V Range : 40Hz	20V	20V
20V Range : 56Hz	20V	20V
20V Range: 106Hz	20V	20V
20V Range: 596Hz	20V	20V
20V Range : 1000Hz	20V	20V
20V Range : 2000Hz	20V	20V
20V Range : 3500Hz	20V	20V
20V Range : 5000Hz	20V	20V
20V Range : 7500Hz	20V	20V
20V Range : 10000Hz	20V	20V
20V Range : 15000Hz	20V	20V
20V Range : 20000Hz	20V	20V
20V Range : 30000Hz	20V	20V
20V Range : 40000Hz	20V	20V
20V Range : 50000Hz	20V	20V
20V Range : 60000Hz	20V	20V
20V Range : 80000Hz	20V	20V
20V Range : 100000Hz	20V	20V
200V Range : 206Hz	50V	200V
200V Range : 206Hz	200V	200V
200V Range : 40Hz	200V	200V
200V Range : 56Hz	200V	200V
200V Range: 106Hz	200V	200V
200V Range: 596Hz	200V	200V
200V Range : 1000Hz	200V	200V
200V Range : 2000Hz	200V	200V
200V Range : 3500Hz	200V	200V
200V Range : 5000Hz	200V	200V
200V Range : 7500Hz	200V	200V
200V Range : 10000Hz	200V	200V
200V Range : 15000Hz	200V	200V
200V Range : 20000Hz	200V	200V
1000V Range : 206Hz	250V	1000V
1000V Range : 206Hz	700V	1000V
1000V Range : 40Hz	700V	1000V
1000V Range : 56Hz	700V	1000V
1000V Range: 106Hz	700V	1000V
1000V Range: 596Hz	700V	1000V
1000V Range : 1000Hz	700V	1000V
1000V Range : 2000Hz	700V	1000V
1000V Range : 3500Hz	700V	1000V
1000V Range : 5000Hz	700V	1000V
1000V Range : 7500Hz	700V	1000V
1000V Range : 10000Hz	700V	1000V
1000V Range : 15000Hz	700V	1000V
1000V Range : 20000Hz	700V	1000V

## AC VOLTAGE FREQUENCY RESPONSE CALIBRATION TEST POINTS FOR 3041

TEST TITLE	TEST VALUE	RANGE
200mV Range : 206Hz	50mV	200mV
200mV Range : 206Hz	200mV	200mV
200mV Range : 10Hz	200mV	200mV
200mV Range : 30Hz	200mV	200mV
200mV Range : 56Hz	200mV	200mV
200mV Range : 106Hz	200mV	200mV
200mV Range : 596Hz	200mV	200mV
200mV Range : 1000Hz	200mV	200mV
200mV Range : 2000Hz	200mV	200mV
200mV Range : 3500Hz	200mV	200mV
200mV Range : 5000Hz	200mV	200mV
200mV Range : 7500Hz	200mV	200mV
200mV Range : 10000Hz	200mV	200mV
200mV Range : 20000Hz	200mV	200mV
200mV Range : 30000Hz	200mV	200mV
200mV Range : 40000Hz	200mV	200mV
200mV Range : 50000Hz	200mV	200mV
200mV Range : 60000Hz	200mV	200mV
200mV Range : 80000Hz	200mV	200mV
200mV Range : 100000Hz	200mV	200mV
200mV Range : 200000Hz	200mV	200mV
200mV Range : 400000Hz	200mV	200mV
200mV Range : 500000Hz	200mV	200mV
2V Range : 206Hz	0.5V	2V
2V Range : 206Hz	2V	2V
2V Range : 10Hz	2V	2V
2V Range : 30Hz	2V	2V
2V Range : 56Hz	2V	2V
2V Range : 106Hz	2V	2V
2V Range : 596Hz	2V	2V
2V Range : 1000Hz	2V	2V
2V Range : 2000Hz	2V	2V
2V Range : 3500Hz	2V	2V
2V Range : 5000Hz	2V	2V
2V Range : 7500Hz	2V	2V
2V Range : 10000Hz	2V	2V
2V Range : 15000Hz	2V	2V
2V Range : 20000Hz	2V	2V
2V Range : 30000Hz	2V	2V
2V Range : 40000Hz	2V	2V
2V Range : 50000Hz	2V	2V
2V Range : 60000Hz	2V	2V
2V Range : 80000Hz	2V	2V
2V Range : 100000Hz	2V	2V
2V Range : 200000Hz	2V	2V
2V Range : 400000Hz	2V	2V
2V Range : 500000Hz	2V	2V

20V Range : 10Hz	20V	20V
20V Range : 30Hz	20V	20V
20V Range : 56Hz	20V	20V
20V Range : 106Hz	20V	20V
20V Range : 596Hz	20V	20V
20V Range : 1000Hz	20V	20V
20V Range : 2000Hz	20V	20V
20V Range : 3500Hz	20V	20V
20V Range : 5000Hz	20V	20V
20V Range : 7500Hz	20V	20V
20V Range : 10000Hz	20V	20V
20V Range : 15000Hz	20V	20V
20V Range : 20000Hz	20V	20V
20V Range : 30000Hz	20V	20V
20V Range : 40000Hz	20V	20V
20V Range : 50000Hz	20V	20V
20V Range : 60000Hz	20V	20V
20V Range : 80000Hz	20V	20V
20V Range : 100000Hz	20V	20V
200V Range : 206Hz	50V	200V
200V Range : 206Hz	200V	200V
200V Range : 30Hz	200V	200V
200V Range : 56Hz	200V	200V
200V Range : 106Hz	200V	200V
200V Range : 596Hz	200V	200V
200V Range : 1000Hz	200V	200V
200V Range : 2000Hz	200V	200V
200V Range : 3500Hz	200V	200V
200V Range : 5000Hz	200V	200V
200V Range : 7500Hz	200V	200V
200V Range : 10000Hz	200V	200V
200V Range : 15000Hz	200V	200V
200V Range : 20000Hz	200V	200V
1000V Range : 206Hz	250V	1000V
1000V Range : 206Hz	700V	1000V
1000V Range : 30Hz	700V	1000V
1000V Range : 56Hz	700V	1000V
1000V Range : 106Hz	700V	1000V
1000V Range : 596Hz	700V	1000V
1000V Range : 1000Hz	700V	1000V
1000V Range : 2000Hz	700V	1000V
1000V Range : 3500Hz	700V	1000V
1000V Range : 5000Hz	700V	1000V
1000V Range : 7500Hz	700V	1000V
1000V Range : 10000Hz	700V	1000V

## AC VOLTAGE FREQUENCY RESPONSE CALIBRATION TEST POINTS FOR 3010

TEST TITLE	TEST VALUE	RANGE
200mV Range : 206Hz	50mV	200mV
200mV Range : 206Hz	200mV	200mV
200mV Range : 10Hz	200mV	200mV
200mV Range : 30Hz	200mV	200mV
200mV Range : 56Hz	200mV	200mV
200mV Range: 106Hz	200mV	200mV
200mV Range: 596Hz	200mV	200mV
200mV Range : 1000Hz	200mV	200mV
200mV Range : 2000Hz	200mV	200mV
200mV Range : 3500Hz	200mV	200mV
200mV Range : 5000Hz	200mV	200mV
200mV Range : 7500Hz	200mV	200mV
200mV Range : 10000Hz	200mV	200mV
200mV Range : 20000Hz	200mV	200mV
200mV Range : 30000Hz	200mV	200mV
200mV Range : 40000Hz	200mV	200mV
200mV Range : 50000Hz	200mV	200mV
200mV Range : 60000Hz	200mV	200mV
200mV Range : 80000Hz	200mV	200mV
200mV Range : 100000Hz	200mV	200mV
200mV Range : 200000Hz	200mV	200mV
200mV Range : 400000Hz	200mV	200mV
200mV Range : 500000Hz	200mV	200mV
2V Range : 206Hz	0.5V	2V
2V Range : 206Hz	2V	2V
2V Range : 10Hz	2V	2V
2V Range : 30Hz	2V	2V
2V Range : 56Hz	2V	2V
2V Range: 106Hz	2V	2V
2V Range: 596Hz	2V	2V
2V Range : 1000Hz	2V	2V
2V Range : 2000Hz	2V	2V
2V Range : 3500Hz	2V	2V
2V Range : 5000Hz	2V	2V
2V Range : 7500Hz	2V	2V
2V Range : 10000Hz	2V	2V
2V Range : 15000Hz	2V	2V
2V Range : 20000Hz	2V	2V
2V Range : 30000Hz	2V	2V
2V Range : 40000Hz	2V	2V
2V Range : 50000Hz	2V	2V
2V Range : 60000Hz	2V	2V
2V Range : 80000Hz	2V	2V
2V Range : 100000Hz	2V	2V
2V Range : 200000Hz	2V	2V
2V Range : 400000Hz	2V	2V
2V Range : 500000Hz	2V	2V

20V Range : 10Hz	20V	20V
20V Range : 30Hz	20V	20V
20V Range : 56Hz	20V	20V
20V Range: 106Hz	20V	20V
20V Range: 596Hz	20V	20V
20V Range : 1000Hz	20V	20V
20V Range : 2000Hz	20V	20V
20V Range : 3500Hz	20V	20V
20V Range : 5000Hz	20V	20V
20V Range : 7500Hz	20V	20V
20V Range : 10000Hz	20V	20V
20V Range : 15000Hz	20V	20V
20V Range : 20000Hz	20V	20V
20V Range : 30000Hz	20V	20V
20V Range : 40000Hz	20V	20V
20V Range : 50000Hz	20V	20V
20V Range : 60000Hz	20V	20V
20V Range : 80000Hz	20V	20V
20V Range : 100000Hz	20V	20V
200V Range : 206Hz	50V	200V
200V Range : 206Hz	200V	200V
200V Range : 30Hz	200V	200V
200V Range : 56Hz	200V	200V
200V Range: 106Hz	200V	200V
200V Range: 596Hz	200V	200V
200V Range : 1000Hz	200V	200V
200V Range : 2000Hz	200V	200V
200V Range : 3500Hz	200V	200V
200V Range : 5000Hz	200V	200V
200V Range : 7500Hz	200V	200V
200V Range : 10000Hz	200V	200V
200V Range : 15000Hz	200V	200V
200V Range : 20000Hz	200V	200V
200V Range : 30000Hz	200V	200V
200V Range : 40000Hz	200V	200V
1000V Range : 206Hz	250V	1000V
1000V Range : 206Hz	700V	1000V
1000V Range : 30Hz	700V	1000V
1000V Range : 56Hz	700V	1000V
1000V Range: 106Hz	700V	1000V
1000V Range: 596Hz	700V	1000V
1000V Range : 1000Hz	700V	1000V
1000V Range : 2000Hz	700V	1000V
1000V Range : 3500Hz	700V	1000V
1000V Range : 5000Hz	700V	1000V
1000V Range : 7500Hz	700V	1000V
1000V Range : 10000Hz	700V	1000V

## AC CURRENT FREQUENCY RESPONSE CALIBRATION POINTS FOR 3050

TEST TITLE	TEST VALUE	RANGE
200uA Range: 206Hz	50uA	200uA
200uA Range: 206Hz	200uA	200uA
200uA Range: 10Hz	200uA	200uA
200uA Range: 40Hz	200uA	200uA
200uA Range: 56Hz	200uA	200uA
200uA Range: 106Hz	200uA	200uA
200uA Range: 596Hz	200uA	200uA
200uA Range: 1000Hz	200uA	200uA
200uA Range: 2000Hz	200uA	200uA
200uA Range: 3500Hz	200uA	200uA
200uA Range: 5000Hz	200uA	200uA
200uA Range: 7500Hz	200uA	200uA
200uA Range: 10000Hz	200uA	200uA
2mA Range: 206Hz	0.5mA	2mA
2mA Range: 206Hz	2mA	2mA
2mA Range: 10Hz	2mA	2mA
2mA Range: 40Hz	2mA	2mA
2mA Range: 56Hz	2mA	2mA
2mA Range: 106Hz	2mA	2mA
2mA Range: 596Hz	2mA	2mA
2mA Range: 1000Hz	2mA	2mA
2mA Range: 2000Hz	2mA	2mA
2mA Range: 3500Hz	2mA	2mA
2mA Range: 5000Hz	2mA	2mA
2mA Range: 7500Hz	2mA	2mA
2mA Range: 10000Hz	2mA	2mA
20mA Range: 206Hz	5mA	20mA
20mA Range: 206Hz	20mA	20mA
20mA Range: 10Hz	20mA	20mA
20mA Range: 40Hz	20mA	20mA
20mA Range: 56Hz	20mA	20mA
20mA Range: 106Hz	20mA	20mA
20mA Range: 596Hz	20mA	20mA
20mA Range: 1000Hz	20mA	20mA
20mA Range: 2000Hz	20mA	20mA
20mA Range: 3500Hz	20mA	20mA
20mA Range: 5000Hz	20mA	20mA
20mA Range: 7500Hz	20mA	20mA
20mA Range: 10000Hz	20mA	20mA

TEST TITLE	TEST VALUE	RANGE
200mA Range: 206Hz	50mA	200mA
200mA Range: 206Hz	200mA	200mA
200mA Range: 10Hz	200mA	200mA
200mA Range: 40Hz	200mA	200mA
200mA Range: 56Hz	200mA	200mA
200mA Range: 106Hz	200mA	200mA
200mA Range: 596Hz	200mA	200mA
200mA Range: 1000Hz	200mA	200mA
200mA Range: 2000Hz	200mA	200mA
200mA Range: 3500Hz	200mA	200mA
200mA Range: 5000Hz	200mA	200mA
200mA Range: 7500Hz	200mA	200mA
200mA Range: 10000Hz	200mA	200mA
2A Range: 206Hz	500mA	2A
2A Range: 206Hz	2A	2A
2A Range: 10Hz	2A	2A
2A Range: 40Hz	2A	2A
2A Range: 56Hz	2A	2A
2A Range: 106Hz	2A	2A
2A Range: 596Hz	2A	2A
2A Range: 1000Hz	2A	2A
2A Range: 2000Hz	2A	2A
20A Range: 206Hz	3A	20A
20A Range: 206Hz	12A	20A
20A Range: 10Hz	12A	20A
20A Range: 40Hz	12A	20A
20A Range: 56Hz	12A	20A
20A Range: 106Hz	12A	20A
20A Range: 596Hz	12A	20A
20A Range: 1000Hz	12A	20A
20A Range: 2000Hz	12A	20A



## AC CURRENT FREQUENCY RESPONSE CALIBRATION POINTS FOR 3041

TEST TITLE	TEST VALUE	RANGE
200uA Range: 206Hz	50uA	200uA
200uA Range: 206Hz	200uA	200uA
200uA Range: 10Hz	200uA	200uA
200uA Range: 30Hz	200uA	200uA
200uA Range: 56Hz	200uA	200uA
200uA Range: 106Hz	200uA	200uA
200uA Range: 596Hz	200uA	200uA
200uA Range: 1000Hz	200uA	200uA
200uA Range: 2000Hz	200uA	200uA
200uA Range: 3500Hz	200uA	200uA
200uA Range: 5000Hz	200uA	200uA
200uA Range: 7500Hz	200uA	200uA
200uA Range: 10000Hz	200uA	200uA
2mA Range: 206Hz	0.5mA	2mA
2mA Range: 206Hz	2mA	2mA
2mA Range: 10Hz	2mA	2mA
2mA Range: 30Hz	2mA	2mA
2mA Range: 56Hz	2mA	2mA
2mA Range: 106Hz	2mA	2mA
2mA Range: 596Hz	2mA	2mA
2mA Range: 1000Hz	2mA	2mA
2mA Range: 2000Hz	2mA	2mA
2mA Range: 3500Hz	2mA	2mA
2mA Range: 5000Hz	2mA	2mA
2mA Range: 7500Hz	2mA	2mA
2mA Range: 10000Hz	2mA	2mA
20mA Range: 206Hz	5mA	20mA
20mA Range: 206Hz	20mA	20mA
20mA Range: 10Hz	20mA	20mA
20mA Range: 30Hz	20mA	20mA
20mA Range: 56Hz	20mA	20mA
20mA Range: 106Hz	20mA	20mA
20mA Range: 596Hz	20mA	20mA
20mA Range: 1000Hz	20mA	20mA
20mA Range: 2000Hz	20mA	20mA
20mA Range: 3500Hz	20mA	20mA
20mA Range: 5000Hz	20mA	20mA
20mA Range: 7500Hz	20mA	20mA
20mA Range: 10000Hz	20mA	20mA

TEST TITLE	TEST VALUE	RANGE
200mA Range: 206Hz	50mA	200mA
200mA Range: 206Hz	200mA	200mA
200mA Range: 10Hz	200mA	200mA
200mA Range: 30Hz	200mA	200mA
200mA Range: 56Hz	200mA	200mA
200mA Range: 106Hz	200mA	200mA
200mA Range: 596Hz	200mA	200mA
200mA Range: 1000Hz	200mA	200mA
200mA Range: 2000Hz	200mA	200mA
200mA Range: 3500Hz	200mA	200mA
200mA Range: 5000Hz	200mA	200mA
200mA Range: 7500Hz	200mA	200mA
200mA Range: 10000Hz	200mA	200mA
2A Range: 206Hz	500mA	2A
2A Range: 206Hz	2A	2A
2A Range: 10Hz	2A	2A
2A Range: 30Hz	2A	2A
2A Range: 56Hz	2A	2A
2A Range: 106Hz	2A	2A
2A Range: 596Hz	2A	2A
2A Range: 1000Hz	2A	2A
2A Range: 2000Hz	2A	2A
2A Range: 3500Hz	2A	2A
2A Range: 5000Hz	2A	2A
30A Range: 206Hz	3A	30A
30A Range: 206Hz	20A	30A
30A Range: 10Hz	20A	30A
30A Range: 30Hz	20A	30A
30A Range: 56Hz	20A	30A
30A Range: 106Hz	20A	30A
30A Range: 596Hz	20A	30A
30A Range: 1000Hz	20A	30A

## AC CURRENT FREQUENCY RESPONSE CALIBRATION POINTS FOR 3010

TEST TITLE	TEST VALUE	RANGE
200uA Range: 206Hz	50uA	200uA
200uA Range: 206Hz	200uA	200uA
200uA Range: 10Hz	200uA	200uA
200uA Range: 30Hz	200uA	200uA
200uA Range: 56Hz	200uA	200uA
200uA Range: 106Hz	200uA	200uA
200uA Range: 596Hz	200uA	200uA
200uA Range: 1000Hz	200uA	200uA
200uA Range: 2000Hz	200uA	200uA
200uA Range: 3500Hz	200uA	200uA
200uA Range: 5000Hz	200uA	200uA
200uA Range: 7500Hz	200uA	200uA
200uA Range: 10000Hz	200uA	200uA
2mA Range: 206Hz	0.5mA	2mA
2mA Range: 206Hz	2mA	2mA
2mA Range: 10Hz	2mA	2mA
2mA Range: 30Hz	2mA	2mA
2mA Range: 56Hz	2mA	2mA
2mA Range: 106Hz	2mA	2mA
2mA Range: 596Hz	2mA	2mA
2mA Range: 1000Hz	2mA	2mA
2mA Range: 2000Hz	2mA	2mA
2mA Range: 3500Hz	2mA	2mA
2mA Range: 5000Hz	2mA	2mA
2mA Range: 7500Hz	2mA	2mA
2mA Range: 10000Hz	2mA	2mA
20mA Range: 206Hz	5mA	20mA
20mA Range: 206Hz	20mA	20mA
20mA Range: 10Hz	20mA	20mA
20mA Range: 30Hz	20mA	20mA
20mA Range: 56Hz	20mA	20mA
20mA Range: 106Hz	20mA	20mA
20mA Range: 596Hz	20mA	20mA
20mA Range: 1000Hz	20mA	20mA
20mA Range: 2000Hz	20mA	20mA
20mA Range: 3500Hz	20mA	20mA
20mA Range: 5000Hz	20mA	20mA
20mA Range: 7500Hz	20mA	20mA
20mA Range: 10000Hz	20mA	20mA

TEST TITLE	TEST VALUE	RANGE
200mA Range: 206Hz	50mA	200mA
200mA Range: 206Hz	200mA	200mA
200mA Range: 10Hz	200mA	200mA
200mA Range: 30Hz	200mA	200mA
200mA Range: 56Hz	200mA	200mA
200mA Range: 106Hz	200mA	200mA
200mA Range: 596Hz	200mA	200mA
200mA Range: 1000Hz	200mA	200mA
200mA Range: 2000Hz	200mA	200mA
200mA Range: 3500Hz	200mA	200mA
200mA Range: 5000Hz	200mA	200mA
200mA Range: 7500Hz	200mA	200mA
200mA Range: 10000Hz	200mA	200mA
2A Range: 206Hz	500mA	2A
2A Range: 206Hz	2A	2A
2A Range: 10Hz	2A	2A
2A Range: 30Hz	2A	2A
2A Range: 56Hz	2A	2A
2A Range: 106Hz	2A	2A
2A Range: 596Hz	2A	2A
2A Range: 1000Hz	2A	2A
2A Range: 2000Hz	2A	2A
2A Range: 3500Hz	2A	2A
2A Range: 5000Hz	2A	2A
30A Range: 206Hz	3A	30A
30A Range: 206Hz	20A	30A
30A Range: 10Hz	20A	30A
30A Range: 30Hz	20A	30A
30A Range: 56Hz	20A	30A
30A Range: 106Hz	20A	30A
30A Range: 596Hz	20A	30A
30A Range: 1000Hz	20A	30A

## RESISTANCE CALIBRATION TEST POINTS

TEST TITLE	TEST VALUE	NOTE
0 Ohms 2 Wire	0.0 ohms	
0.1 Ohms 2 Wire	0.1 ohms	3041/3010 Only
1 Ohms 2 Wire	1.0 ohms	3041/3010 Only
10 Ohms 2 Wire	10.0 ohms	
100 Ohms 2 Wire	100 ohms	
1k Ohms 2 Wire	1.0k ohms	
10k Ohms 2 Wire	10.00k ohms	
100 kOhms 2 Wire	100k ohms	
1M Ohms 2 Wire	1M ohms	
10M Ohms 2 Wire	10.0M ohms	
100M Ohms 2 Wire	100M ohms	
1000M Ohms 2 Wire	1000M ohms	3041/3010 Only
30 Ohms 2 Wire	30.0 ohms	Simulated Resistance option
300 Ohms 2 Wire	300 ohms	Simulated Resistance option
3 kOhms 2 Wire	3k ohms	Simulated Resistance option
30 kOhms 2 Wire	30k ohms	Simulated Resistance option
300 kOhms 2 Wire	300k ohms	Simulated Resistance option
3 M Ohms 2 Wire	3M ohms	Simulated Resistance option
100 mOhms 4 Wire	100m ohms	3041/3010 Only
1 Ohms 4 Wire	1 ohms	3041/3010 Only
10 Ohms 4 Wire	10 ohms	
100 Ohms 4 Wire	100 ohms	
1 kOhms 4 Wire	1k ohms	
10 kOhms 4 Wire	10k ohms	
100 kOhms 4 Wire	100k ohms	

## CAPACITANCE CALIBRATION TEST POINTS

TEST TITLE	TEST VALUE	NOTE
1nF	1nF	3041/3010 Only
10nF	10.0nF	
20nF	20nF	
50nF	50nF	
100nF	100nF	
1uF	1uF	
10uF	10uF	3041/3010 Only
100uF	100uF	Simulated Res/Cap option
1mF	100uF	Simulated Res/Cap option
10mF	100uF	Simulated Res/Cap option