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Extech Instruments Corporation
EICMEX530-CP
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Revision: 1.1

EX530 CALIBRATION PROCEDURE

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Revision Log

Revision Number	Date Approved	Pages Affected	Description of Revision
Initial	October 2006	All	Initial Release
1.1	May 2007	8-10	Checking procedure accuracy range corrected.

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1.0. INTRODUCTION

1.1. Purpose

The purpose of this procedure is to provide detailed instructions on how to test and/or adjust Extech Instruments Model EX530.

1.2. Policy

This procedure will be used as a guideline for instructions needed to properly calibrate Extech Instruments Model EX530.

1.3. Scope / Field of Application

This procedure will be used by Extech Instruments Calibration Laboratory for detailed instructions on how to test and/or adjust Extech Instruments Model EX530.

1.4. Document Security

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1.5. Document References

- Model EX530 “Auto Ranging Multimeter” Checking Procedure.
- EX530 Data Sheet (EICDS-EX530).

1.6. Special Terms / Definitions

- National Institute of Standards and Technology (NIST) – Is the internationally recognized body in which all calibrations are traceable through.

2.0. REQUIRED EQUIPMENT

The following equipment will be needed to properly calibrate the instrument.

- (1) Calibrated Wavetek Universal Calibrator (Model: 9100) or equivalent.
- (1) Premium Grade Type K Thermocouple wire.
- (2) Banana to Banana test leads.

3.0. EX530 ACCURACY TEST

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- 3.1. Install one (1) 9VDC battery into the instrument.
- 3.2. Connect the banana to banana test leads to the output socket of the EX530.
- 3.3. Connect the other end of the banana to banana test leads to the input of the Wavetek 9100.
- 3.4. Power on and set the EX530 to mVDC.
- 3.5. Set the Wavetek 9100 to DC Voltage.
- 3.6. Input 350.00 mVDC.
- 3.7. Record the EX530 reading on the proper data sheet. (EICDS-EX530)
- 3.8. For the remaining test points refer to the “Model EX530 – Checking Procedure” listed in Appendix A.

NOTE: For instruments coming in under a RMA number, record all of the readings on the proper data sheet, even if they are not within the specified tolerance. If the instrument is new and out of the specified tolerances, proceed to Section: 4. There is no need to record “Out of Tolerance” conditions for new instruments.

- 3.10. If any of the readings were outside of the specified tolerances, proceed to Section: 4.
- 3.11. If all of the readings were within the specified tolerances, the instrument is now complete.

4. EX530 CALIBRATION ADJUSTMENTS

NOTE: To perform the following adjustments, the same equipment is required as in Section: 2.0.

4.1.0 mVDC Adjustment

- 4.1.1 Set the EX530 to mVDC mode.
- 4.1.2 Input 350.0 mVDC to the input sockets of the EX530.

NOTE: The display should indicate “350.00mV.”

- 4.1.3 Adjust VR6 until you have a reading of 350.0mVDC.

4.2.0 VDC Adjustment

- 4.2.1 Input 3.500VDC into the input sockets of the EX530.

NOTE: The display should indicate “3.500VDC”.

- 4.2.2 Adjust VR1 until the UUT displays a reading of 3.500VDC.

4.3.0 VAC Adjustment

- 4.3.1 Input 3.5000VAC into the input sockets of the EX530.

NOTE: The display should indicate “3.5000VAC”.

- 4.3.2 Adjust VR3 until the UUT displays a reading of 3.5000VAC.

4.4.0 ADC Zero Adjustment

- 4.4.1 With no input applied to the EX530.

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NOTE: The display should indicate “0.000ADC”.

4.4.2 Adjust VR2 until the UUT displays a reading of 0.000ADC.

4.5.0 Temperature Adjustment

4.5.1 Using a Type K thermocouple wire input 25.0°C into the input sockets of the EX530.

NOTE: The display should indicate “25.0°C”.

4.5.2 Adjust VR4 until the UUT displays a reading of 25.0°C.

4.5.3 Using banana to banana test leads input 31.124mVDC into the EX530 input sockets.

NOTE: The display should indicate “750°C”.

4.5.4 Adjust VR5 until the display reads 750°C.

4.5.5 Switch the rotation switch of the EX530 to °F.

4.5.6 Put the Wavetek 9100 or equivalent to Temperature °F.

4.5.7 Input 77°F to the input sockets of the UUT.

NOTE: Verify the display indicates “77°F”.

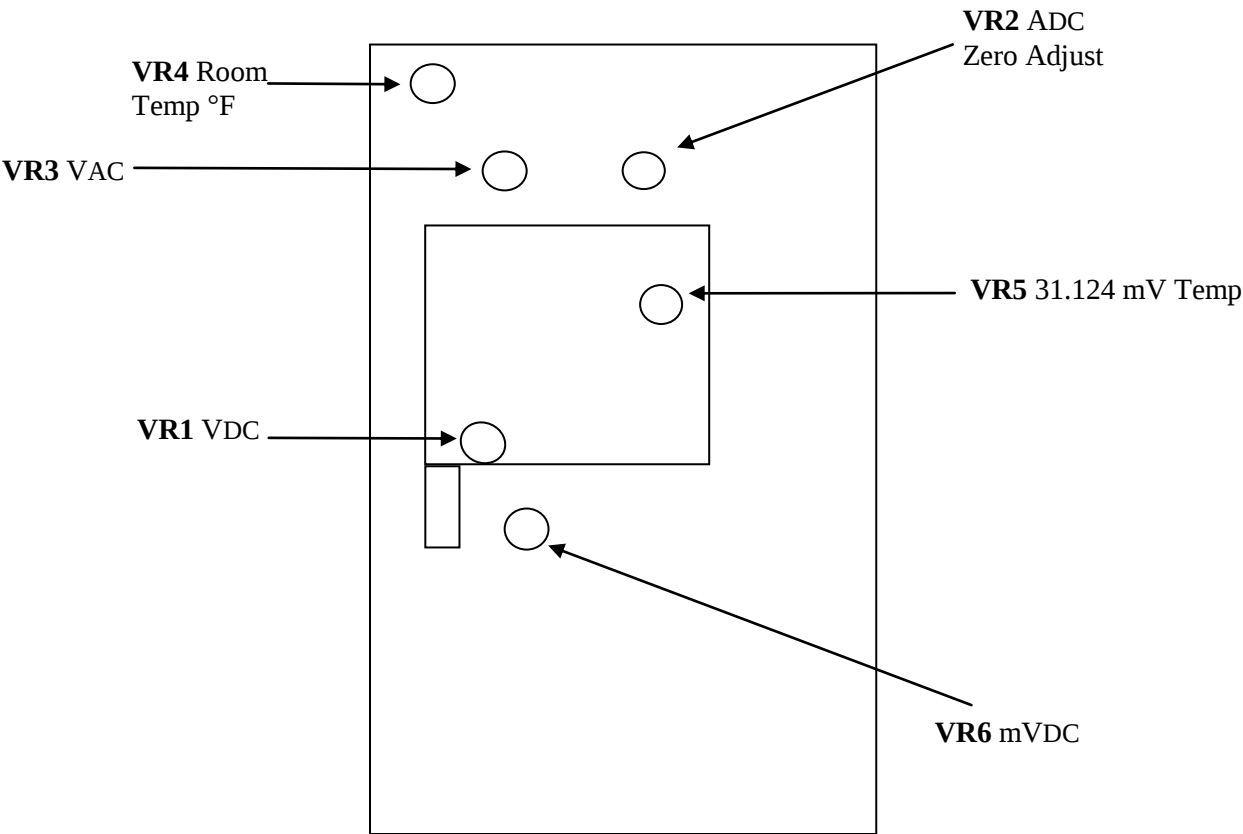
4.5.8 Input 31.124mVDC to the EX530 input sockets.

4.5.9 Verify the UUT reads 1350°F.

NOTE: After all adjustments have been made, proceed to Section: 3 to retest the instrument. Record the data from Section: 3 as the “Final Reading” of the instrument. If the instrument is new, record the data as the “Calibration Data”.

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Figure: 1
Calibration Potentiometers



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Appendix: A

CHECKING PROCEDURE

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Model# EX530

True RMS Industrial Multimeter

1. VISUAL - Check for cosmetic problems, scratches, wrong labels, loose labels, etc.
2. Insert 1 each "9V" battery and observe correct polarity.
3. Power "ON" and check for any missing display segments.
4. Test the following functions:

FUNCTION	RANGE	INPUT	TOLERANCE	READING	NOTES
DC Volts	400 mV	350.0 mV	+/- (0.06%rdg+2d)	349.77 – 350.23	
DC Volts	4.000 V	3.500 V	+/- (0.06%rdg+2d)	3.4977 – 3.5023	
DC Volts	40.00 V	35.00 V	+/- (0.06%rdg+2d)	34.977 – 35.023	
DC Volts	400 V	350.0 V	+/- (0.06%rdg+2d)	349.77 – 350.23	
DC Volts	1000 V	950.0 V	+/- (0.1%rdg+2d)	948.8 – 951.2	
AC Volts	400.0 mV	350.0 mV	+/- (1.0%rdg+4d)	346.46 – 353.54	50Hz to 1000Hz
AC Volts	4.000 V	3.500 V	+/- (1.0%rdg+3d)	3.4646 – 3.5354	
AC Volts	40.00 V	35.00 V	+/- (1.0%rdg+3d)	34.642 – 35.354	
AC Volts	400.0 V	350.0 V	+/- (1.0%rdg+3d)	346.42 – 353.54	
AC Volts	1000 V	950.0 V	+/- (1.0%rdg+3d)	940.2 – 959.8	
DC Amps	400.0 uA	350.0 uA	+/- (1.0%rdg+3d)	346.47 – 353.53	
DC Amps	4000 uA	3.500 mA	+/- (1.0%rdg+3d)	3.462 – 3.538	
DC Amps	40.00 mA	35.00 mA	+/- (1.0%rdg+3d)	34.647 – 35.353	
DC Amps	400.0 mA	350.0 mA	+/- (1.0%rdg+3d)	346.47 – 353.53	
DC Amps	10.00 A	9.50 A	+/- (1.0%rdg+3d)	9.402 – 9.598	
4-20 Ma % (-25 to 125%)	4 to 20 mA	4.00 mA	+/- (50digits)	-00.50 to 00.50	
	4 to 20 mA	12.00 mA	+/- (50digits)	49.50 to 50.50	
	4 to 20 mA	20.00 mA	+/- (50digits)	99.50 to 100.50	
AC Amps	400.0 uA	350.0 uA	+/- (1.5%rdg+3d)	344.72 – 355.28	50Hz to 1000Hz
AC Amps	4000 uA	3.500 mA	+/- (1.5%rdg+3d)	3.444 – 3.556	
AC Amps	40.00 mA	35.00 mA	+/- (1.5%rdg+3d)	34.472 – 35.528	
AC Amps	400.0 mA	350.0 mA	+/- (1.5%rdg+3d)	344.72 – 355.28	
AC Amps	10.00 A	9.50 A	+/- (1.5%rdg+3d)	9.354 – 9.646	
Resistance	400 Ω	350.0Ω	+/- (0.3%rdg+9d)	348.86 – 351.14	
Resistance	4 K Ω	3.500KΩ	+/- (0.3%rdg+4d)	3.4891 – 3.5109	

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Resistance	40 K Ω	35.00K Ω	+/- (0.3%rdg+4d)	34.891 – 35.109
Resistance	400 K Ω	350.0K Ω	+/- (0.3%rdg+4d)	348.91 – 351.09
Resistance	4 M Ω	3.500M Ω	+/- (0.3%rdg+4d)	3.4891 – 3.5109
Resistance	40 M Ω	35.00M Ω	+/- (2.0%rdg+10d)	34.290 – 35.710

CHECKING PROCEDURE

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Model# EX530 (continued)

True RMS Industrial Multimeter

FUNCTION	RANGE	INPUT	TOLERANCE	READING	NOTES
Frequency	40.00 Hz	35.00 Hz	+/- (0.1%rdg+1d)	34.964 – 35.036	
Frequency	400.0 Hz	350.0 Hz	+/- (0.1%rdg+1d)	349.64 – 350.36	
Frequency	4.000 KHz	3.500 KHz	+/- (0.1%rdg+1d)	3.4964 – 3.5036	
Frequency	40.00 KHz	35.00 KHz	+/- (0.1%rdg+1d)	34.964 – 35.036	
Frequency	400.0 KHz	350.0 KHz	+/- (0.1%rdg+1d)	349.64 – 350.36	
Frequency	4.000 MHz	3.500 MHz	+/- (0.1%rdg+1d)	3.4964 – 3.5036	
Frequency	40.00 MHz	35.00 MHz	+/- (0.1%rdg+1d)	34.964 – 35.036	optional
Frequency	100.00 MHz	95.00 MHz	unspecified	N/A	optional
Line Frequency	40.00 to 400 Hz	45.00 Hz	+/- 0.5% reading	44.77-45.23	
Line Frequency	40.00 to 400 Hz	50.00 Hz	+/- 0.5% reading	49.75-50.25	
Line Frequency	40.00 to 400 Hz	60.00 Hz	+/- 0.5% reading	59.60-60.30	
Line Frequency	40.00 to 400 Hz	350.0 Hz	+/- 0.5% reading	348.25-351.75	
Capacitance	40.00 nF	3.500 nF	+/- (3.5%rdg+40d)	3.337 – 3.663	
	40.00 nF	35.00 nF	+/- (3.5%rdg+40d)	33.735 – 36.265	
	400.0 nF	350.0 nF	+/- (3.5%rdg+40d)	337.35 – 362.65	
	4.000 uF	3.500 uF	+/- (3.5%rdg+10d)	3.3765 – 3.6235	
	40.00 uF	35.00 uF	+/- (3.5%rdg+10d)	33.765 – 36.235	
	400.0 uF	350.0 uF	+/- (3.5%rdg+10d)	337.65 – 362.35	
	4000 uF	3500.0 uF	+/- (5.0%rdg+10d)	3.3240 – 3.6760	
	40.00 mF	4700.0 uF	+/- (5.0%rdg+10d)	4.455 – 4.945	
	40.00 mF	22.000 mF	+/- (5.0%rdg+10d)	20.890 – 23.110	
Temperature °F	-58 to 1382 °F	-50.0	+/- (1.0%rdg+4.5F)	-55.0 to -45.0	
	-58 to 1382 °F	32.0	+/- (1.0%rdg+4.5F)	27.2 to 36.8	
	-58 to 1382 °F	212.0	+/- (1.0%rdg+4.5F)	205.4 to 218.6	
	-58 to 1382 °F	500.0	+/- (1.0%rdg+4.5F)	490.5 to 509.5	
	-58 to 1382 °F	750.0	+/- (1.0%rdg+4.5F)	738.0 to 762.0	
	-58 to 1382 °F	1300.0	+/- (1.0%rdg+4.5F)	1282.5 to 1317.5	
Temperature °C	-50 to 750 °C	-40.0	+/- (1.0%rdg+2.5C)	-42.9 to -37.1	
	-50 to 750 °C	0.0	+/- (1.0%rdg+2.5C)	-2.5 to 2.5	
	-50 to 750 °C	100.0	+/- (1.0%rdg+2.5C)	96.5 to 103.5	
	-50 to 750 °C	500.0	+/- (1.0%rdg+2.5C)	492.5 to 507.5	
	-50 to 750 °C	750.0	+/- (1.0%rdg+2.5C)	740.0 to 760.0	
Duty Cycle	0.10 to 99.90%	10%	+/- (1.2%rdg+2d)	9.86 – 10.14	
Duty Cycle	0.10 to 99.90%	50%	+/- (1.2%rdg+2d)	49.38 – 50.62	

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Duty Cycle 0.10 to 99.90% 95% +/- (1.2%rdg+2d) 93.84 – 96.16

CHECKING PROCEDURE

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Model# EX530 (continued)

True RMS Industrial Multimeter

5. Test the "CONTINUITY" function. The unit should "beep" continuously at less than 100 Ω .
6. Test the "DIODE" function with a known good diode and note a typical reading of 0.400 to 0.700V.
7. Test the "HOLD" function. It should freeze the reading in the display.
8. Test the "RELATIVE" function. Refer to manual.
9. Test the "AUTO POWER OFF" function turns the meter OFF in approximately 15 minutes.
10. Turn the meter to "OFF" position.
11. Re package and transfer the meter to warehouse status