

ELECTRICAL INSTRUMENTATION CALIBRATION REPORT

DUE DATE: 26-May-11

This document states that the instrument described below meets or exceeds all manufacturer specifications and has been compared to standards which are directly traceable to the National Institute of Standards and Technology and whose procedures are in accordance with the requirements of ANSI/NCSL Z540-1-1994, ISO 10012-1:1992(E) and ISO/IEC 17025:2005.

26-May-10 Date: Certificate #: 1005260905E SO#: 133326 Temp: 20 degrees C Humidity: 47 % Procedure: TP-0080-REVB Rendered To: Instrumatic Espanola, S.A. InstrumentModel-S/N: IL1700 #330 Calibration/Repair Remarks: None Parts (If Needed): None

As Found Tolerance In Out		As Found Readings	As Found Permissible Error	Applied Current	As Left Readings	As Left Tolerance
V		9.980E-4	+/- 0.5%	1.000E-3	1,000E-3	+/- 0.2%
V		1.000E-4	+/-0.5%	1.000E-4	1.002E-4	+/- 0.2%
V		9.990E-6	+/-0.7%	1.000E-5	1.000E-5	+/- 0.2%
	~	9.790E-7	+/-1.0%	1.000E-6	1.000E-6	+/- 0.2%
	~	9.760E-8	+/-1.0%	1.000E-7	9.970E-8	+/- 0.5%
	~	9.790E-9	+/-1.0%	1.000E-08	1.000E-8	+/- 0.5%
	~	9.790E-10	+/-1.0%	1.000E-09	1.001E-9	+/- 0.5%
	~	9.700E-11	+/-1.5%	1.000E-10	1.000E-10	+/- 1.0%

Tolerance after repair and/or calibration:

Out:

In: X

COMBINED NIST AND KEITHLEY TRANSFER UNCERTAINTY IS AS FOLLOWS: 1mA=+/-0.025%, 100uA=+/-0.025%, 10uA=+/-0.025%, 10uA=+/-0.025%, 10uA=+/-0.035%, 10nA=+/-0.065%, 1nA=+/-0.065%, 100pA=+/-0.25%

The above Instrument was compared to the Keithley Current Calibrator/Source Model 263 S/N 0730631 as of 23-Mar-10 whigh is traceable to NIST and whose calibration is due: 23-Mar-11

Calibrated By:

"For authorized copies of this certificate please contact International Light, Inc."

Form F-094 Rev A

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263 S/N 0730631





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DUE DATE: 26-May-11

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Date: 26-May-10 Certificate #: 1005260904E SO#: 133326

Temp: 20 degrees C Humidity: 47 % Procedure: TP-0080-REVB

Rendered To: Instrumatic Espanola, S.A.

InstrumentModel-S/N: IL1700 #2338

Calibration/Repair Remarks: None

Parts (If Needed): None

As Foun Tolerand In	As Found Readings	As Found Permissible Error	Applied Current	As Left Readings	As Left Tolerance
V	9.990E-4	+/- 0.5%	1.000E-3	1.000E-3	+/- 0.2%
V	1.000E-4	+/-0.5%	1.000E-4	1.001E-4	+/- 0.2%
V	1.000E-5	+/-0.7%	1.000E-5	1.000E-5	+/- 0.2%
V	9.940E-7	+/-1.0%	1.000E-6	1.000E-6	+/- 0.2%
V	9.910E-8	+/-1.0%	1.000E-7	9.970E-8	+/- 0.5%
V	9.960E-9	+/-1.0%	1.000E-08	1,000E-8	+/- 0.5%
V	9.990E-10	+/-1.0%	1.000E-09	1.003E-9	+/- 0.5%
~	9.920E-11	+/-1.5%	1.000E-10	1.000E-10	+/- 1.0%

Tolerance after repair and/or calibration:

Out

In: X

COMBINED NIST AND KEITHLEY TRANSFER UNCERTAINTY IS AS FOLLOWS: 1mA=+/-0.025%, 100uA=+/-0.025%, 10uA=+/-0.025%, 1

The above Instrument was compared to the Keithley Current Calibrator/Source Model 263 S/N 0730631 as of 23-Mar-10 windh is traceptole 16 NIST and whose calibration is due: 23-Mar-11

Calibrated By:

"For authorized copies of this certificate please contact International Light, Inc."

Form F-094 Rev A

263 S/N 0730631

national Light Technologies, Inc. chnology Drive, Peabody, MA 01960 USA 818-6180 / 978-818-6181 fax





International Light Technologies certifies that the instrument described below has been compared with the laboratory working standards whose calibrations are traceable to the U.S. National Institute of Standards and Technology and whose procedures are in accordance with the requirements of ANSI/NCSL Z540-1-1994, ISO 10012-1:1992(E).

Rendered-to: INSTRUMATIC ESPANOLA S.A.		
Detector: SED038 #1386	Input Optic	: R #172
Filter: Y #5485	Misc.:	N/A
Spectral Response (half power points):		
(YLS) PHOTOPIC LUMINANCE RESPONSE SENSITIVI	TY FACTOR AS	CALIBRATED ON: 27-May-2010
6.06E-10 (A)(fL-1) assuming 3215 K Color	Temperature	
1.769E-10 (A)(m2)(cd-1) assuming 3215 K Color		
4.5% *Change In Sensitivity From Previous	Calibration Dated	1: 07-Mar-2008
Tolerance As Found: In ✓ Out	Tolerance	As Left: In Out
Unit will read directly in foot-Lamberts when used with an II	.1700 Calibrated	with IL1700 #330.
CALIBRATED WITH ILT1700 +5V BIAS: ON REFERENCE PLANE: Average Field of Vision +/-0.75 Deg *difference includes intrinsic detector change, NIST recertificadjustments. PRIMARY STANDARD: U.S. National Institute of Standard SED033#4528/Y#16218/R#204 - December 14, 2005 - N.LS.T. Uncertainty: 1.3%	cation updates, la	Detector Response
ILT Transfer Uncertainty to Customer = +/- 4.3 % plus N	VIST uncertainty :	above.
JGHT SOURCE: 1S 1000W QTH/Reflectance Tablet	LAMP OUT	TPUT: 205 fL
NSTRUMENTATION; #6400/Y	PROCEDU	RE: YLSIS 6
EMPERATURE: 23 degrees C	HUMIDITY	: 46 %
Calibration Technician	CHECKED	BY:QA Manager, Calibrations
OR AUTHORIZED COPIES OF THIS CERTIFICATE OR OTHER INFO E REPRODUCED EXCEPT IN FULL, WITHOUT THE WRITTEN APPR	RMATION PLEASE ROVAL OF INTERNA	REFER TO THESE NUMBERS. THIS CERTIFICATE SHALL NO TIONAL LIGHT TECHNOLOGIES
Calibration Date: 27-May-10 Certificate No.: 0052		FO/Sales Order #: 133326
ILT RECOMMENDS AN ANNUAL CALIBRATION CONFIRMATION INT DEPENDING ON RESULTS OF PRECEDING CALIBRATIONS.	ERVAL INTERVAL	

International Light Technologies, Inc. 10 Technology Drive, Peabody, MA 01960 USA 978-818-6180 / 978-818-6181 fax

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Detector: SEI	NSTRUMATIC ESPANOLA	O. 1.	
	D038#1386	Input Optic:	W #3728
Filter: Y #5485		Misc.:	N/A
Spectral Response	e (half power points):		
(YIS) PHOTOPIC ILLU	MINANCE RESPONSE SEN	SITIVITY FACTOR AS	S CALIBRATED ON: 27-May-2010
3.69E-8 (A)(ft2)(lm-1) assuming 3215	5 K Color Temperature	ė
3.428E-09 (A)(lux-1) assuming 3215 K Col	lor Temperature	
1.1%*C	hange In Sensitivity From Pre	vious Calibration Dated	: 07-Mar-2008
Tolerance As Fou	ind: In VOut	20.1	NV 2 V
	Marie City - Auto- 1944		As Left: In \(\) Out \(\)
Unit will read directly in	lumens per square foot (footer	andles) or lux when used	with an IL1700 Calibrated with IL1700 #330.
CALIBRATED WITH IL	T1700 +5V BIAS: ON	OFF ✓	
REFERENCE PLANE: (Groove ONE formed by filter	or diffuser elements and	next element, counted from front surface of assembly
*difference includes intri	Groove ONE formed by filter insic detector change, NIST re	or diffuser elements and certification updates, lab	next element, counted from front surface of assembly, o experimental error or modifications to the hardware
*difference includes intri adjustments. PRIMARY STANDARD:	insic detector change, NIST re : U.S. National Institute of Stz	certification updates, lab	experimental error or modifications to the hardware
*difference includes intri adjustments. PRIMARY STANDARD:	insic detector change, NIST re	certification updates, lab	experimental error or modifications to the hardware
*difference includes intri adjustments. PRIMARY STANDARD: SED033 #4528 / Y #16	insic detector change, NIST re U.S. National Institute of Sta 5218 - December 8, 2005 -	certification updates, lab	experimental error or modifications to the hardware
*difference includes intri adjustments. PRIMARY STANDARD: SED033 #4528 / Y #16 N.I.S.T. Uncertainty:	insic detector change, NIST re U.S. National Institute of Sta 5218 - December 8, 2005 - 0.50%	mdards and Technology NIST Test No.: 844/2	Detector Response 72571-05/1
*difference includes intri adjustments. PRIMARY STANDARD: SED033 #4528 / Y #16 N.I.S.T. Uncertainty:	insic detector change, NIST re U.S. National Institute of Sta 5218 - December 8, 2005 - 0.50%	mdards and Technology NIST Test No.: 844/2	Detector Response 72571-05/1
*difference includes intri adjustments. PRIMARY STANDARD: SED033 #4528 / Y #16 N.I.S.T. Uncertainty: LT Transfer Uncertainty	insic detector change, NIST re U.S. National Institute of Sta 5218 - December 8, 2005 - 0.50% to Customer = +/- 4.3 %	undards and Technology NIST Test No.: 844/2	Detector Response 72571-05/1
*difference includes intri adjustments. PRIMARY STANDARD: SED033 #4528 / Y #16 N.I.S.T. Uncertainty: LT Transfer Uncertainty JGHT SOURCE: 1S 10 NSTRUMENTATION:	insic detector change, NIST re U.S. National Institute of Sta 218 - December 8, 2005 - 0.50% to Customer = +/- 4.3 % 00W QTH #6400/Y	undards and Technology NIST Test No.: 844/2	Detector Response 72571-05/1 bove. PUT: 205 lm/ft2
*difference includes intri adjustments. PRIMARY STANDARD: SED033 #4528 / Y #16 N.I.S.T. Uncertainty: LT Transfer Uncertainty JIGHT SOURCE: 1S 10 NSTRUMENTATION: EMPERATURE: 23	insic detector change, NIST re U.S. National Institute of Sta 218 - December 8, 2005 - 0.50% to Customer = +/- 4.3 % 00W QTH #6400/Y	undards and Technology NIST Test No.: 844/2 plus NIST uncertainty at	Detector Response 72571-05/1 bove. PUT: 205 lm/ft2 RE: _YISIS
*difference includes intri adjustments. PRIMARY STANDARD: SED033 #4528 / Y #16 N.I.S.T. Uncertainty: LT Transfer Uncertainty JGHT SOURCE: 1S 10 NSTRUMENTATION: EMPERATURE: 23 ALIBRATED BY:	insic detector change, NIST re U.S. National Institute of Sta 218 - December 8, 2005 - 0.50% to Customer = +/- 4.3 % 00W QTH #6400/Y degrees	plus NIST uncertainty at LAMP OUT_	Detector Response 72571-05/1 bove, PUT: 205 lm/ft2 RE:YIS1S
*difference includes intri adjustments. PRIMARY STANDARD: SED033 #4528 / Y #16 N.I.S.T. Uncertainty: LT Transfer Uncertainty IGHT SOURCE: 18 10 NSTRUMENTATION: EMPERATURE: 23 ALIBRATED BY: Ca	insic detector change, NIST re U.S. National Institute of Sta 218 - December 8, 2005 - 0.50% to Customer = +/- 4.3 % 00W QTH #6400/Y degrees	plus NIST uncertainty at LAMP OUT PROCEDUR HUMIDITY CHECKED B	Detector Response 72571-05/1 bove. PUT: 205 lm/ft2 RE: YISIS : 46 % RY: QA Manager, Calibrations
*difference includes intri adjustments. PRIMARY STANDARD: SED033 #4528 / Y #16 N.I.S.T. Uncertainty: LT Transfer Uncertainty LIGHT SOURCE: 1S 10 NSTRUMENTATION: TEMPERATURE: 23 CALIBRATED BY: Ca OR AUTHORIZED COPIES CIE REPRODUCED EXCEPT I	insic detector change, NIST re U.S. National Institute of Sta 218 - December 8, 2005 - 0.50% to Customer = +/- 4.3 % 00W QTH #6400/Y degrees	plus NIST uncertainty at LAMP OUT PROCEDUR HUMIDITY CHECKED B	Detector Response 72571-05/1 bove, PUT: 205 lm/ft2 RE: _YIS1S : _ 46 % BY:QA Manager, Calibrations

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10 Technology Drive, Peabody, MA 01960 USA 378-818-6180 / 978-818-6181 fax ntl-lighttech.com





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Rendered-to: INSTRUMATIC ESPANOLA S	\$.A.
Detector: SED033 #4776	Input Optic: W #5599
Filter: F#16702	Misc.: N/A
Spectral Response (half power points):	
(PIR) PEAK IRRADIANCE RESPONSE SENSITIVIT	TY FACTOR AS CALIBRATED ON: 26-May-2010
1.137E-2 (A)(cm2)(W-1) assuming more	nochromatic irradiance at 600nm
0.7% *Change In Sensitivity From Pre	vious Calibration Dated: 07-Mar-2008
Tolerance As Found: In Out	WAS CONTRACTED AND ADDRESS OF THE PARTY OF T
Tolerance As Found: In Out	Tolerance As Left: In Out
Unit will read directly in watts per square centimeter when	hen used with an II.1700 Calibrated with II.1700 #2338.
CALIBRATED WITH ILT1700 +5V BIAS: ON	OFF J
REFERENCE PLANE: Groove ONE formed by filter of	or diffuser elements and next element, counted from front surface of assembly.
	certification updates, lab experimental error or modifications to the hardware
PRIMARY STANDARD: U.S. National Institute of Sta 1219 - November 2005 - NIST Test No. 844/272521- January 1997 - NIST Test No. 844/257423-96/1	andards and Technology Detector Response 05: U1023 - January 1997 - NIST Test No. 844/257423-96/2: D204 -
N.I.S.T. Uncertainty: 200-250nm=5%;250-400nm	=1.0%;400-900nm=0.31%;900-1000nm=0.58%;1000-1100nm=2.93%
INTERNATIONAL LIGHT TECHNOLOGIES PRIMA	
II#01,#02,#3275,#139,#1490,U522,H627	JAN 2008 - JAN 2018
ILT Transfer Uncertainty to Customer = +/- 3.0 %	plus NIST uncertainty above.
LIGHT SOURCE: IS 1000W QTH	LAMP OUTPUT: 2,85E-5 W/cm2
INSTRUMENTATION: #6400	PROCEDURE: PIR1S
TEMPERATURE: 23 degrees C	HUMIDITY: 46 % (1)
CALIBRATED BY:	CHECKED BY:
Calibration Technician	QA Manager, Calibrations
FOR AUTHORIZED COPIES OF THIS CERTIFICATE OR OTHE BE REPRODUCED EXCEPT IN FULL, WITHOUT THE WRITTE	R INFORMATION PLEASE REFER TO THESE NUMBERS. THIS CERTIFICATE SHALL NOT N APPROVAL OF INTERNATIONAL LIGHT TECHNOLOGIES
Calibration Date: 26-May-10 Certificate No.:	
ILT RECOMMENDS AN ANNUAL CALIBRATION CONFIRMATI DEPENDING ON RESULTS OF PRECEDING CALIBRATIONS.	ON INTERVAL INTERVALS OF CONFIRMATION MAY NEED TO BE ADJUSTED

rnational Light Technologies, Inc.

echnology Drive, Peabody, MA 01960 USA 818-6180 / 978-818-6181 *fax* ighttech.com





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Rendered-to: INSTRUMATIC ESPANOLA S.A.	
Detector: SED033 #4776	Input Optic: R #415
Filter: F#16702	Misc.: N/A
Spectral Response (half power points):	
(PRR) PEAK RADIANCE RESPONSE SENSITIVITY FAC	TOR AS CALIBRATED ON: 26-May-2010
8.86E-4 (A)(cm2)(sr)(W-1) assuming monor	chromatic radiance at 600nm
-3.7% *Change In Sensitivity From Previous 6	Calibration Dated: 07-Mar-2008
Tolerance As Found: In J Out	Tolerance As Left: In √ Out
Unit will read directly in watts per square centimeter per stera	dian when used with an IL1700 Calibrated with IL1700 #2338.
CALIBRATED WITH ILT1700 +5V BIAS: ON	OFF
REFERENCE PLANE: Average Field of Vision +/-0.75 Deg	grees
*difference includes intrinsic detector change, NIST recertifi- adjustments.	cation updates, lab experimental error or modifications to the hardware
PRIMARY STANDARD; U.S. National Institute of Standard 1219 - November 2005 - NIST Test No. 844/272521-05 : U January 1997 - NIST Test No. 844/257423-96/1	s and Technology Detector Response 1023 - January 1997 - NIST Test No. 844/257423-96/2: D204 -
N.L.S.T. Uncertainty: 200-250nm=5%;250-400nm=1.0%	s;400-900nm=0.31%;900-1000nm=0.58%;1000-1100nm=2.93%
INTERNATIONAL LIGHT TECHNOLOGIES PRIMARY 1 IL.#01,#02,#3275,#139,#1490,U522,H627	TRANSFER STANDARDS; JAN 2008 - JAN 2018
ILT Transfer Uncertainty to Customer = +/- 3.0 % plus N	NIST uncertainty above.
LIGHT SOURCE: 1S 1000W QTH/Reflectance Tablet	LAMP OUTPUT: 8.80E-6 W/cm2/sr
INSTRUMENTATION: #6400	PROCEDURE: PRRIS
TEMPERATURE: 23 degrees 🖓 🚶	HUMIDITY: 46 % A.O.
CALIBRATED BY: Calibration Technician	CHECKED BY: QA Manager, Calibrations
FOR AUTHORIZED COPIES OF THIS CERTIFICATE OR OTHER INFO BE REPRODUCED EXCEPT IN FULL, WITHOUT THE WRITTEN APP	DRMATION PLEASE REFER TO THESE NUMBERS. THIS CERTIFICATE SHALL NOT ROVAL OF INTERNATIONAL LIGHT TECHNOLOGIES
Calibration Date: 26-May-10 Certificate No.: 005	270101 FO/Sales Order #: 133326
ILT RECOMMENDS AN ANNUAL CALIBRATION CONFIRMATION IN DEPENDING ON RESULTS OF PRECEDING CALIBRATIONS.	TERVAL INTERVALS OF CONFIRMATION MAY NEED TO BE ADJUSTED

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