meteo control
Energy & Weather Services

Spicherer Straße 48
D-86157 Augsburg
phone: +49 821 / 34666-0
http://www.meteocontrol.com

Calibration Certificate Silicon Irradiance Sensor

Sensor Type: **Si-V-010-T**
Serial No.: **10-10815-17-19420506**
Comment:

Please notice

Datalogger gradient and offset settings		
	Gradient	Offset
Irradiance:	150	0
Temperature:	13	-40

Irradiance Calibration with Artificial Light in Comparison to a Reference Cell

Calibrated by: **Huhnstock-Breuer**
Date / Time: **16.10.2019** **10:17**

	Type	Calibration µV/W/m²	Temperature Coefficient 1/°C	Output mV	Temperature °C	**Irradiance[1)] W/m²**
Reference Cell	Si-Ref mono PTB-1	56,51	0,00067	53,383	26,34	**943,8**

	Type	Gain W/m²/V	Offset V	Correction Factor [3)]	Output V	Temperature °C	**Irradiance [2)] W/m²**
Test Object	Si-V-010-T	150	0	0,999357	6,292	28,79	**943,1**

Calibration of Temperature Measurement Transducer

Calibrated by: **Palamut**
Date / Time: **19.09.2019** **13:59**

Test Resistant Ohm	**Target Temperature [4)] °C**	Output Signal V	**Output Temperature [5)] °C**
850,04	**-38,16**	0,1429	**-38,14**
970,04	**-7,66**	2,4878	**-7,66**
1100,03	**25,69**	5,0563	**25,73**
1200,00	**51,57**	7,0484	**51,63**
1300,00	**77,65**	9,0548	**77,71**

Test Equipment Irradiance Calibration

Manufacturer	Type	Serial No.	Calibration Certificate	Trace
Ingenieurbüro Mencke & Tegtmeyer GmbH	Si-Ref mono PTB-1	02-20002-05-15309999	47109-PTB-18	PTB
Gantner Instruments	IDL100	191667	098220-02 D-K-15019-01-00	DKD
	ISM111	078743	098221-02 D-K-15019-01-00	DKD
OMEGA Engineering	IN510	9894	./.	./.

Test Equipment Temperature Measurement Transducer Calibration

Manufacturer	Type	Serial No.	Calibration Certificate	Trace
Gantner Instruments	ISM111	987654		
burster präzisionsmesstechnik GmbH & Co KG	1142-5100	./.	./.	./.
	1142-5500	./.	./.	./.
	1156-5050	./.	./.	./.
	1156-5010	./.	./.	./.

[1)] $Irradiance = \frac{Output * 1000}{Calibration * (1 + Temperature\ Coefficient * (Temperature - 25))}$

[2)] $Irradiance = (Output - Offset) * Gain * Correction\ Factor$

[3)] Individual calculated for each Calibration Process, must not be used for Outdoor Application.
[4)] Calculated by Test Resistance as Pt1000 Simulator
[5)] Calculated by Output Signal scaled as per Sensor Type

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Calibration Certificate Silicon Irradiance Sensor

Sensor Type: **Si-V-010-T**
Serial No.: **10-10815-17-19420510**
Comment:

Please notice

Datalogger gradient and offset settings		
	Gradient	Offset
Irradiance:	150	0
Temperature:	13	-40

Irradiance Calibration with Artificial Light in Comparison to a Reference Cell

Calibrated by: **Huhnstock-Breuer**
Date / Time: **16.10.2019** **10:20**

	Type	Calibration µV/W/m²		Temperature Coefficient 1/°C	Output mV	Temperature °C	**Irradiance[1)] W/m²**
Reference Cell	Si-Ref mono PTB-1	56,51		0,00067	53,383	26,34	**943,8**
	Type	**Gain W/m²/V**	**Offset V**	**Correction Factor [3)]**	**Output V**	**Temperature °C**	**Irradiance [2)] W/m²**
Test Object	Si-V-010-T	150	0	0,999518	6,295	27,84	**943,8**

Calibration of Temperature Measurement Transducer

Calibrated by: **Palamut**
Date / Time: **19.09.2019** **14:00**

Test Resistant Ohm	**Target Temperature [4)] °C**	Output Signal V	**Output Temperature [5)] °C**
850,04	**-38,16**	0,1366	**-38,22**
970,04	**-7,66**	2,4812	**-7,74**
1100,03	**25,69**	5,0480	**25,62**
1200,00	**51,57**	7,0388	**51,50**
1300,00	**77,65**	9,0445	**77,58**

Test Equipment Irradiance Calibration

Manufacturer	Type	Serial No.	Calibration Certificate	Trace
Ingenieurbüro Mencke & Tegtmeyer GmbH	Si-Ref mono PTB-1	02-20002-05-15309999	47109-PTB-18	PTB
Gantner Instruments	IDL100	191667	098220-02 D-K-15019-01-00	DKD
	ISM111	078743	098221-02 D-K-15019-01-00	DKD
OMEGA Engineering	IN510	9894	./.	./.

Test Equipment Temperature Measurement Transducer Calibration

Manufacturer	Type	Serial No.	Calibration Certificate	Trace
Gantner Instruments	ISM111	987654		
burster präzisionsmesstechnik GmbH & Co KG	1142-5100	./.	./.	./.
	1142-5500	./.	./.	./.
	1156-5050	./.	./.	./.
	1156-5010	./.	./.	./.

[1)] $Irradiance = \frac{Output * 1000}{Calibration * (1 + Temperature\ Coefficient * (Temperature - 25))}$

[2)] $Irradiance = (Output - Offset) * Gain * Correction\ Factor$

[3)] Individual calculated for each Calibration Process, must not be used for Outdoor Application.
[4)] Calculated by Test Resistance as Pt1000 Simulator
[5)] Calculated by Output Signal scaled as per Sensor Type

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Calibration Certificate Silicon Irradiance Sensor

Sensor Type: **Si-V-010-T**
Serial No.: **10-10815-17-19420504**
Comment:

Please notice

Datalogger gradient and offset settings		
	Gradient	Offset
Irradiance:	150	0
Temperature:	13	-40

Irradiance Calibration with Artificial Light in Comparison to a Reference Cell

Calibrated by: **Huhnstock-Breuer**
Date / Time: **16.10.2019** **10:34**

	Type	Calibration µV/W/m²	Temperature Coefficient 1/°C	Output mV	Temperature °C	**Irradiance[1)] W/m²**
Reference Cell	Si-Ref mono PTB-1	56,51	0,00067	53,383	26,34	**943,8**

	Type	Gain W/m²/V	Offset V	Correction Factor [3)]	Output V	Temperature °C	**Irradiance [2)] W/m²**
Test Object	Si-V-010-T	150	0	0,999112	6,297	30,24	**943,7**

Calibration of Temperature Measurement Transducer

Calibrated by: **Palamut**
Date / Time: **19.09.2019** **14:00**

Test Resistant Ohm	**Target Temperature [4)] °C**	Output Signal V	**Output Temperature [5)] °C**
850,04	**-38,16**	0,1221	**-38,41**
970,04	**-7,66**	2,4606	**-8,01**
1100,03	**25,69**	5,0291	**25,38**
1200,00	**51,57**	7,0209	**51,27**
1300,00	**77,65**	9,0280	**77,36**

Test Equipment Irradiance Calibration

Manufacturer	Type	Serial No.	Calibration Certificate	Trace
Ingenieurbüro Mencke & Tegtmeyer GmbH	Si-Ref mono PTB-1	02-20002-05-15309999	47109-PTB-18	PTB
Gantner Instruments	IDL100	191667	098220-02 D-K-15019-01-00	DKD
	ISM111	078743	098221-02 D-K-15019-01-00	DKD
OMEGA Engineering	IN510	9894	./.	./.

Test Equipment Temperature Measurement Transducer Calibration

Manufacturer	Type	Serial No.	Calibration Certificate	Trace
Gantner Instruments	ISM111	987654		
burster präzisionsmesstechnik GmbH & Co KG	1142-5100	./.	./.	./.
	1142-5500	./.	./.	./.
	1156-5050	./.	./.	./.
	1156-5010	./.	./.	./.

[1)] $$Irradiance = \frac{Output * 1000}{Calibration * (1 + Temperature\ Coefficient * (Temperature - 25))}$$

[2)] $$Irradiance = (Output - Offset) * Gain * Correction\ Factor$$

[3)] Individual calculated for each Calibration Process, must not be used for Outdoor Application.
[4)] Calculated by Test Resistance as Pt1000 Simulator
[5)] Calculated by Output Signal scaled as per Sensor Type

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Calibration Certificate Silicon Irradiance Sensor

Sensor Type: **Si-V-010-T**
Serial No.: **10-10815-17-19420505**
Comment:

Please notice

Datalogger gradient and offset settings		
	Gradient	Offset
Irradiance:	150	0
Temperature:	13	-40

Irradiance Calibration with Artificial Light in Comparison to a Reference Cell

Calibrated by: **Huhnstock-Breuer**
Date / Time: **16.10.2019** **10:17**

	Type	Calibration µV/W/m²	Temperature Coefficient 1/°C	Output mV	Temperature °C	**Irradiance[1]** **W/m²**
Reference Cell	Si-Ref mono PTB-1	56,51	0,00067	53,383	26,34	**943,8**

	Type	Gain W/m²/V	Offset V	Correction Factor [3]	Output V	Temperature °C	**Irradiance [2]** **W/m²**
Test Object	Si-V-010-T	150	0	0,999150	6,296	30,02	**943,6**

Calibration of Temperature Measurement Transducer

Calibrated by: **Palamut**
Date / Time: **19.09.2019** **14:00**

Test Resistant Ohm	**Target Temperature [4]** **°C**	Output Signal V	**Output Temperature [5]** **°C**
850,04	**-38,16**	0,1674	**-37,82**
970,04	**-7,66**	2,5262	**-7,16**
1100,03	**25,69**	5,0943	**26,23**
1200,00	**51,57**	7,0861	**52,12**
1300,00	**77,65**	9,0922	**78,20**

Test Equipment Irradiance Calibration

Manufacturer	Type	Serial No.	Calibration Certificate	Trace
Ingenieurbüro Mencke & Tegtmeyer GmbH	Si-Ref mono PTB-1	02-20002-05-15309999	47109-PTB-18	PTB
Gantner Instruments	IDL100	191667	098220-02 D-K-15019-01-00	DKD
	ISM111	078743	098221-02 D-K-15019-01-00	DKD
OMEGA Engineering	IN510	9894	./.	./.

Test Equipment Temperature Measurement Transducer Calibration

Manufacturer	Type	Serial No.	Calibration Certificate	Trace
Gantner Instruments	ISM111	987654		
burster präzisionsmesstechnik GmbH & Co KG	1142-5100	./.	./.	./.
	1142-5500	./.	./.	./.
	1156-5050	./.	./.	./.
	1156-5010	./.	./.	./.

[1] $$Irradiance = \frac{Output * 1000}{Calibration * (1 + Temperature\ Coefficient * (Temperature - 25))}$$

[2] $$Irradiance = (Output - Offset) * Gain * Correction\ Factor$$

[3] Individual calculated for each Calibration Process, must not be used for Outdoor Application.
[4] Calculated by Test Resistance as Pt1000 Simulator
[5] Calculated by Output Signal scaled as per Sensor Type

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Calibration Certificate Silicon Irradiance Sensor

Sensor Type: **Si-V-010-T**
Serial No.: **10-10815-17-19420507**
Comment:

Please notice

Datalogger gradient and offset settings		
	Gradient	Offset
Irradiance:	150	0
Temperature:	13	-40

Irradiance Calibration with Artificial Light in Comparison to a Reference Cell

Calibrated by: **Huhnstock-Breuer**
Date / Time: **16.10.2019** **10:16**

	Type	Calibration µV/W/m²	Temperature Coefficient 1/°C	Output mV	Temperature °C	**Irradiance[1)] W/m²**
Reference Cell	Si-Ref mono PTB-1	56,51	0,00067	53,383	26,34	**943,8**

	Type	Gain W/m²/V	Offset V	Correction Factor [3)]	Output V	Temperature °C	**Irradiance [2)] W/m²**
Test Object	Si-V-010-T	150	0	0,998957	6,294	31,16	**943,1**

Calibration of Temperature Measurement Transducer

Calibrated by: **Palamut**
Date / Time: **19.09.2019** **14:00**

Test Resistant Ohm	**Target Temperature [4)] °C**	Output Signal V	**Output Temperature [5)] °C**
850,04	**-38,16**	0,1264	**-38,36**
970,04	**-7,66**	2,4659	**-7,94**
1100,03	**25,69**	5,0338	**25,44**
1200,00	**51,57**	7,0252	**51,33**
1300,00	**77,65**	9,0316	**77,41**

Test Equipment Irradiance Calibration

Manufacturer	Type	Serial No.	Calibration Certificate	Trace
Ingenieurbüro Mencke & Tegtmeyer GmbH	Si-Ref mono PTB-1	02-20002-05-15309999	47109-PTB-18	PTB
Gantner Instruments	IDL100	191667	098220-02 D-K-15019-01-00	DKD
	ISM111	078743	098221-02 D-K-15019-01-00	DKD
OMEGA Engineering	IN510	9894	./.	./.

Test Equipment Temperature Measurement Transducer Calibration

Manufacturer	Type	Serial No.	Calibration Certificate	Trace
Gantner Instruments	ISM111	987654		
burster präzisionsmesstechnik GmbH & Co KG	1142-5100	./.	./.	./.
	1142-5500	./.	./.	./.
	1156-5050	./.	./.	./.
	1156-5010	./.	./.	./.

[1)] $Irradiance = \frac{Output * 1000}{Calibration * (1 + Temperature\ Coefficient * (Temperature - 25))}$

[2)] $Irradiance = (Output - Offset) * Gain * Correction\ Factor$

[3)] Individual calculated for each Calibration Process, must not be used for Outdoor Application.
[4)] Calculated by Test Resistance as Pt1000 Simulator
[5)] Calculated by Output Signal scaled as per Sensor Type

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Calibration Certificate Silicon Irradiance Sensor

Sensor Type: **Si-V-010-T**
Serial No.: **10-10815-17-19420509**
Comment:

Please notice

Datalogger gradient and offset settings

	Gradient	Offset
Irradiance:	150	0
Temperature:	13	-40

Irradiance Calibration with Artificial Light in Comparison to a Reference Cell

Calibrated by: **Huhnstock-Breuer**
Date / Time: **16.10.2019** **10:19**

	Type	Calibration µV/W/m²	Temperature Coefficient 1/°C	Output mV	Temperature °C	**Irradiance[1] W/m²**
Reference Cell	Si-Ref mono PTB-1	56,51	0,00067	53,383	26,34	**943,8**

	Type	Gain W/m²/V	Offset V	Correction Factor [3]	Output V	Temperature °C	**Irradiance [2] W/m²**
Test Object	Si-V-010-T	150	0	0,999459	6,293	28,19	**943,4**

Calibration of Temperature Measurement Transducer

Calibrated by: **Palamut**
Date / Time: **19.09.2019** **14:02**

Test Resistant Ohm	**Target Temperature [4] °C**	Output Signal V	**Output Temperature [5] °C**
850,04	**-38,16**	0,1568	**-37,96**
970,04	**-7,66**	2,5129	**-7,33**
1100,03	**25,69**	5,0808	**26,05**
1200,00	**51,57**	7,0729	**51,95**
1300,00	**77,65**	9,0802	**78,04**

Test Equipment Irradiance Calibration

Manufacturer	Type	Serial No.	Calibration Certificate	Trace
Ingenieurbüro Mencke & Tegtmeyer GmbH	Si-Ref mono PTB-1	02-20002-05-15309999	47109-PTB-18	PTB
Gantner Instruments	IDL100	191667	098220-02 D-K-15019-01-00	DKD
	ISM111	078743	098221-02 D-K-15019-01-00	DKD
OMEGA Engineering	IN510	9894	./.	./.

Test Equipment Temperature Measurement Transducer Calibration

Manufacturer	Type	Serial No.	Calibration Certificate	Trace
Gantner Instruments	ISM111	987654		
burster präzisionsmesstechnik GmbH & Co KG	1142-5100	./.	./.	./.
	1142-5500	./.	./.	./.
	1156-5050	./.	./.	./.
	1156-5010	./.	./.	./.

[1] $$Irradiance = \frac{Output * 1000}{Calibration * (1 + Temperature\ Coefficient * (Temperature - 25))}$$

[2] $$Irradiance = (Output - Offset) * Gain * Correction\ Factor$$

[3] Individual calculated for each Calibration Process, must not be used for Outdoor Application.
[4] Calculated by Test Resistance as Pt1000 Simulator
[5] Calculated by Output Signal scaled as per Sensor Type