

Southwest Research Institute
6220 Culebra Road
San Antonio, TX 78238
(210) 522-5215
Department of Quality Assurance
Calibration Laboratory

Certificate of Calibration

25 March 2002

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: DURO-SENSE J-00
Description: RTD
Serial Number: 323
Asset Number: 008423
Work Order Number: 444047709

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NCSL Z540-1-1994. Standards used in this calibration, described in the referenced calibration procedure with associated uncertainties or tolerances, are traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and is available for examination upon request. This certificate is not to be reproduced, except in full, without the written approval of the Southwest Research Institute Department of Quality Assurance Calibration Laboratory.

The uncertainty of the calibration was sufficient to determine that the item met the manufacturer's published specifications unless stated otherwise below.

Ambient Conditions: Temperature: 75.0 Degrees Fahrenheit Humidity: 25 % RH

Calibration Date: 22 Mar 02 **Calibration Procedure:** CUSTOMER

Condition as Received: SEE REMARKS

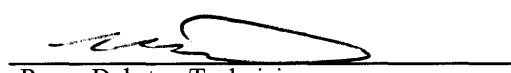
Condition as Returned: SEE REMARKS

Remarks: SEE ATTACHED DATA SHEET.

Approved by:


Walt Hill, Metrology Group Leader
Institute Calibration Laboratory

Measurements performed by:


Roger Dykstra, Technician

Southwest Research Institute
Calibration Laboratory
Calibration Data Sheet

[illegible]



SOUTHWEST RESEARCH INSTITUTE™

6220 Culebra Road, P.O. Drawer 28510
Institute Quality Systems
Institute Calibration Laboratory
Phone: 210-522-5215 Fax 210-522-3692

Certificate of Calibration

Submitted By: DIV20

Address: B57

Contact: DARRELL DUNN

Manufacturer Model: DURO-SENSE J-00

Description: RTD

Serial No: 323

Asset No: 008423

Procedure: CUSTOMER PROCEDURE DATED 11/16/01

Work Order: 444050660

Date Issued: Oct 24, 2002

Calibration Date: Oct 23, 2002

****Calibration Due:** Oct 23, 2003

Calibration Location: N/A

Environment: Temp. 75.0°F Hum. 51 %RH

***As Found:** SEE ATTACHED DATA

***As Left:** SEE ATTACHED DATA

This certificate documents traceability to the National Institute of Standards and Technology (NIST) and the International System of Units (SI). The Laboratory quality system conforms to ISO/IEC 17025, 1999 and ANSI/NCCL Z540-1-1994 which are equivalent to relevant requirements of the ISO 9000-1994 series of standards. This certificate may not be reproduced, except in full, without the written approval of the Southwest Research Institute Calibration Laboratory. The results of this calibration relate only to the individual instrument described above. This certificate shall not be used to claim product endorsement by the American Association for Laboratory Accreditation (A2LA) or any agency of the U. S. Government.

Uncertainty evaluation includes the item under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor of $k=2$ to approximate a 95% confidence level. The calibration process provides a Test Uncertainty Ratio (TUR) of less than or equal to 25% (4:1) of the test limit unless otherwise stated in remarks or an attachment.

*The client has sole responsibility for determination of in/out of tolerance or compliance/noncompliance. An in/out of tolerance opinion is provided for your convenience based only on the Test Instrument (TI) reading(s) and limits as reported. The reported uncertainty relates only to the results at the time of calibration and does not imply any short or long term stability of the TI.

**Calibration interval is determined by the client and does not assure the instrument will remain within tolerance until this date. Any number of factors may cause the instrument to be out of tolerance before the next calibration date.

Remarks: SEE ATTACHED DATA

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
009137	HART SCIENTIFIC, INC	1575	THERMOMETER	Dec 10, 02
008920	HART SCIENTIFIC, INC	17660-A-120-6-W	PLATINUM RTD	Dec 07, 02

Approved by: Walt Hill

Metrology Group Leader

m:\Nona21a1.rpt Rev date 15, August 02

Measurements by: Vince Morales

Metrology Technician

Southwest Research Institute
Calibration laboratory
Calibration Sheet.

Work Order: 444050660	Mfr. Duro-Sense	Technician V Morales
Asset No. 8423	Model J-00	Procedure Customer
Serial No. 323	Type. RTD (385)	Cal Date. October 23, 2002

Remarks:

Customer wants reading per letter dated Nov. 16, 2001

Readings are provided without regard to "Pass" or "Fail". It is up to the user to determine if the readings meet their requirements.

Function/Range	Test Point	TI Reading	Uncertainty
Temperature	Deg. C	Ohms	Deg. C
0.00	0.01	100.25	0.29
150.00	149.99	157.59	0.29



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Phone: 210-522-5215 Fax 210-522-3692

Certificate of Calibration

Submitted By: DIV20

Address: B57

Contact: DARRELL DUNN

Manufacturer Model: DURO-SENSE TYPE K

Description: THERMOCOUPLE

Serial No: 333

Asset No: 008427

Procedure: CUSTOMER LETTER DATED NOV 16, 2000

Work Order: 444053022

Date Issued: Apr 2, 2003

Calibration Date: Apr 1, 2003

****Calibration Due:** Oct 1, 2003

Calibration Location: Bldg. 64

Environment: Temp. 75.0°F Hum. 45 %RH

***As Found:** IN TOLERANCE

***As Left:** IN TOLERANCE

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**Calibration interval is determined by the client and does not assure the instrument will remain within tolerance until this date. Any number of factors may cause the instrument to be out of tolerance before the next calibration date.

Remarks: None

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
009137	HART SCIENTIFIC, INC	1575	THERMOMETER	Jul 06, 03
005325	XITRON TECHNOLOGIES	2000M	V/A/T CALIBRATOR	Oct 30, 03
008920	HART SCIENTIFIC, INC	17660-A-120-6-W	PLATINUM RTD	Jul 06, 03



Approved by: Walt Hill

Metrology Group Leader

m:\Nona21a1.rpt Rev date 15, August 02



Measurements by: Mark Romero

Metrology Technician

Southwest Research Institute
Calibration Laboratory
Calibration Data Sheet

Work Order	444053022	Mfr.	Duro-Sense	Technician	Mark A. Romero
Asset #.	008427	Model	Type K		
Serial #.	333	Type	Thermocouple	Cal Date	1-Apr-03
Remarks:	Test points and procedure comply with custodian memo dated Nov. 16, 2000.				
Accuracy comply with IEC 584-2 (1982)					

Function/Range	Test Point	TI Read	Difference	Test Limits +/-	Uncertainty	Found/Left
mV	Deg C	Deg C	Deg C	Deg C	Deg C	
0.00	0.10	0.03	0.07	1.50	0.26	Pass
6.17	150.04	150.79	-0.75	1.50	0.27	Pass
END OF REPORT						



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Institute Calibration Laboratory
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Certificate #

0972-01

Certificate of Calibration

Submitted By: DIV20

Address: B57

Contact: DARRELL DUNN

Manufacturer Model: DURO-SENSE J-00

Description: RTD

Serial No: 323

Asset No: 008423

Procedure: CL-468, APR/00

Work Order: 444056081

Date Issued: Oct 31, 2003

Calibration Date: Oct 30, 2003

****Calibration Due:** Oct 30, 2004

Calibration Location: Bldg. 64

Environment: Temp. 74.0°F Hum. 53 %RH

***As Found:** SEE ATTACHED DATA

***As Left:** SEE ATTACHED DATA

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**Calibration interval is determined by the client and does not assure the instrument will remain within tolerance until this date. Any number of factors may cause the instrument to be out of tolerance before the next calibration date.

Remarks: None

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
008920	HART SCIENTIFIC, INC	17660-A-120-6-W	PLATINUM RTD	Feb 07, 04
009137	HART SCIENTIFIC, INC	1575	THERMOMETER	Feb 05, 04
005243	HEWLETT-PACKARD	34420A	MULTIMETER	Dec 11, 03

Approved by: Walt Hill

Metrology Group Leader

m:\a2la1.rpt Rev date 15, August 02

Measurements by: Vince Morales

Metrology Technician

Southwest Research Institute
Calibration laboratory
Calibration Report

Work Order:	444056081	Mfr.	Duro-Sense	Technician	Vmorales
Asset No.	8423	Model	J-00		
Serial No.	323	Type.	RTD (385)	Cal Date.	31-Oct-03
Remarks: Data points provided per custodian Memo dated Nov. 16, 2000. Readings are provided without regard to "Pass" or "Fail". It is up to the custodian to determine if the readings meet their requirements.					

Function/Range	Test Point	TI Reading	Difference	+/-Uncertainty
Temp	Deg. C	Deg. C	Deg. C	Deg. C
	0.09	0.93	0.84	0.27
	149.90	150.70	0.80	0.27
Ohms	Ohms	Ohms	Ohms	Ohms
	100.0352	100.3640	0.3288	0.0032
	157.2878	157.5880	0.3002	0.0032
END OF REPORT				