

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

## Certificate of Calibration

12 August 2002

**Issued to:** DARRELL DUNN DIV20 B57  
**Manufacturer/Model:** DURO-SENSE J-00  
**Description:** RTD  
**Serial Number:** 324  
**Asset Number:** 008424  
**Work Order Number:** 444049424

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: 45 % RH

**Calibration Date:** 23 Jul 02 **Calibration Procedure:** CUSTOMER

**Condition as Received:** SEE ATTACHED DATA

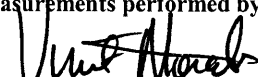
**Condition as Returned:** SEE ATTACHED DATA

**Remarks:**

**Approved by:**

  
Walt Hill, Metrology Group Leader  
Institute Calibration Laboratory

**Measurements performed by:**

  
Vince Morales, Technician

Southwest Research Institute  
Calibration laboratory  
Calibration Sheet.

As Found/Left

<b>Work Order:</b>	<b>444049424</b>	<b>Mfr.</b>	Durosense	<b>Technician</b>	V.Morales
<b>Asset No.</b>	<b>8424</b>	<b>Model</b>	J-00	<b>Procedure</b>	Customer
<b>Serial No.</b>	<b>324</b>	<b>Type.</b>	RTD Temperature Probe	<b>Cal Date.</b>	July 23, 2002

**Remarks:**

(1) If no value is listed the uncertainty is >4/1

The results (TI Reading) are provided, it is up to the end user to determine if results meet their need.

Standard		TI Reading	Uncertainty (1)
Deg.C.		Ohms	Ohms
0.12		100.61	0.014
149.89		157.86	0.014



# 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:** 324

**Asset No:** 008424

**Procedure:** CUSTOMER LETTER DATED NOV 16, 2000

**Work Order:** 444055167

**Date Issued:** Sep 5, 2003

**Calibration Date:** Sep 2, 2003

**\*\*Calibration Due:** Sep 2, 2004

**Calibration Location:** Bldg. 64

**Environment:** Temp. 75.0°F Hum. 48 %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/NCSL 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:** Per memo dated Nov. 16, 2000.

### Standards Used

Asset	Manufacturer	Model	Description	Cal Due
009137	HART SCIENTIFIC, INC	1575	THERMOMETER	Feb 05, 04
008920	HART SCIENTIFIC, INC	17660-A-120-6-W	PLATINUM RTD	Feb 07, 04
007001	HEWLETT-PACKARD	3458A/OPT-002	MULTIMETER	Jan 17, 04

Approved by: Walt Hill

Metrology Group Leader

m:\Nona2\al.rpt Rev date 15, August 02

Measurements by: Mark Romero

Metrology Technician

Southwest Research Institute  
Calibration laboratory  
Calibration Report

Work Order:	444055167	Mfr.	Duro-Sense	Technician	Mark Romero
Asset No.	008424	Model	J-00		
Serial No.	324	Type.	RTD (385)	Cal Date.	02-Sep-03
Remarks: The results (TI Reading) are provided, it is up to the end user to determine if results meet their need.					
Tolerance: Not specified . Verification complies with custodian memo dated Nov. 16, 2000.					
Stability: Not specified					

Function/Range	Test Point	TI Reading	Difference	+/-Uncertainty
Temp	Deg. C	Deg. C	Deg. C	Deg. C
	0.09	0.85	0.76	0.26
	149.92	150.76	0.84	0.27
Ohms	Ohms	Ohms	Ohms	Ohms
	100.0353	100.3327	0.2974	0.0032
	157.2954	157.6091	0.3137	0.0032

END OF REPORT



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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: 324

Asset No: 008424

Procedure: TEMPERATURE, MAY/02

Work Order: 444060612

Date Issued: Sep 13, 2004

Calibration Date: Sep 13, 2004

\*\*Calibration Due: Sep 13, 2005

Calibration Location: Bldg. 64

Environment: Temp. 73.0°F Hum. 40 %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/NC SL 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. See Remarks or attached Calibration Report with the same Work Order number for calibration data.

\*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: Per memo dated Nov. 16, 2000.

### Standards Used

Asset	Manufacturer	Model	Description	Cal Due
009137	HART SCIENTIFIC	1575	THERMOMETER	Sep 25, 04
008920	HART SCIENTIFIC	5614-17660-A-12	PLATINUM RTD	Sep 25, 04
001505	HEWLETT-PACKARD	3458A/OPT-002	MULTIMETER	Mar 19, 05

Approved by: Walt Hill  
Metrology Group Leader  
m:\a2la\l.rpt Rev date 11, May 04

Measurements by: Bob Trollinger  
Metrology Technician

Southwest Research Institute  
Calibration laboratory  
Calibration Report

Work Order:	444060612	Mfr.	DURO-SENSE	Technician	blt
Asset No.	008424	Model	J-00		
Serial No.	324	Type.	RTD (385)	Cal Date.	13-Sep-04
Remarks: The results (TI Reading) are provided, it is up to the end user to determine if results meet their need.					
Tolerance: Not specified					
Stability: Not specified					

Function/Range	Test Point	TI Reading	Difference	+/-Uncertainty
Temp	Deg. C	Deg. C	Deg. C	Deg. C
	0.12	0.89	0.77	0.27
	149.94	150.74	0.80	0.27
Ohms	Ohms	Ohms	Ohms	Ohms
	100.0481	100.3474	0.2993	0.0032
	157.3027	157.6031	0.3004	0.0032

END OF REPORT