

# SOUTHWEST RESEARCH INSTITUTE

## Calibration Laboratory

### WORK ORDER

Processed by RCRUZ at 2:49:57PM on 11/16/00

||||| ||||| ||||| ||||| ||||| ||||| ||||| |||||

**Work Order 444041440**

Arrived 11/16/00

Asset No. 008427 Manufacturer DURO-SENSE

Model TYPE K

Instrument Type/Class THERMOCOUPLE

Serial No. 333

Accessory No. \_\_\_\_\_ Calibration Procedure \_\_\_\_\_

Location B57

Div/Client DIV20

Custodian DARRELL DUNN

Mail Stop B57

Tel. 6090

Charge/Project No. 20.00751.006

Delivered By / Telephone \_\_\_\_\_

**IN4CAL**

Special Instructions \_\_\_\_\_

### WORK NOTES

Date	Hours	Remarks/Notes
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

### REPAIR PARTS

Date	Hours	Part Name	Part Number	Failure Description	Cost
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

### WORK SUMMARY

Failure Description \_\_\_\_\_

Repair Action \_\_\_\_\_

Calibration Procedure Custom Temp 68 F Hum. 41 %

Tech MLW Totals Cal Hours 1 Repair Hours \_\_\_\_\_ Parts Cost \_\_\_\_\_

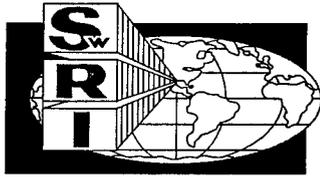
Standards Used 000219, 1505, 2868

Date Picked Up 12/14/2000

Picked Up By [Signature]

4440





**CNIWRA** *A center of excellence in earth  
sciences and engineering*

6220 Culebra Road · San Antonio · Texas, U.S.A. 78228-5166

## MEMORANDUM

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Date: November 16, 2000

From: Darrell S. Dunn *DD*

To: SwRI Calibration Laboratory

Subject: Calibration of Thermocouples and RTDs

I would like to check the calibration of the Duro-Sense Corporation thermocouples (serial numbers 326 to 335) and RTDs (serial numbers 322 to 325) using temperatures of 0 and 150 °C. The calibration check for the thermocouples should be conducted with 12 inches of the thermocouple exposed to controlled temperature bath. The output of the thermocouples in mV should be recorded at these temperatures. Similarly, the entire length of the RTDs should be exposed to the controlled temperature bath and the resistance of the RTDs should be recorded at these temperatures.

Following calibration at 0 and 150 °C, the thermocouples and RTDs need to be appropriately marked. A 6 month interval for checking the calibration of the thermocouples and RTDs is suggested. The vendor documentation is attached for your reference. Please call me at extension 6090 if you have any questions.

Sincerely,

Darrell S. Dunn



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



Certificate #  
0972-01

## Certificate of Calibration

6 December 2000

**Issued to:** DARRELL DUNN DIV20 B57  
**Manufacturer/Model:** DURO-SENSE TYPE K  
**Description:** THERMOCOUPLE  
**Serial Number:** 333  
**Asset Number:** 008427

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NCSL Z540-1-1994. The results of this calibration relate only to the individual item as described above. 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 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.

This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results of this calibration certificate were determined in accordance with the terms of accreditation unless stated otherwise below.

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: 68.0 Degrees Fahrenheit Humidity: 41 % RH

**Calibration Date:** 6 Dec 00 **Calibration Procedure:** CUSTOMER

**Condition as Received:** SEE REMARKS

**Condition as Released:** SEE REMARKS

**Remarks:** CALIBRATION DATA ATTACHED

**Approved by:**

Jim Patterson, Supervisor, or Walt Hill, Metrologist

Certificate # 444041440

m:\a2la.rpt Rev date 22 May 00

**Measurements performed by:**

Mack Wood, Technician

# SOUTHWEST RESEARCH INSTITUTE

## Calibration Laboratory

### WORK ORDER

Processed by JIBARRA at 10:09:04AM on 6/1/01



**Work Order 444043883**

Arrived 6/1/01

Asset No. 008427 Manufacturer DURO-SENSE

Model TYPE K

Instrument Type/Class THERMOCOUPLE

Serial No. 333

Accessory No. Calibration Procedure CUSTOMER

Location B57

Div/Client DIV20

Custodian DARRELL DUNN

Mail Stop B57

Tel. 6090

Charge/Project No. 00751.006 1.20

Delivered By / Telephone DARRELL DUNN/ X6090

**IN4CAL**

Special Instructions \_\_\_\_\_

### WORK NOTES

Date	Hours	Remarks/Notes
<u>6.7.01</u>	<u>1</u>	<u>Calibration</u>

SwRI Cal-Lab By: cmw  
CAL: Dec 06, 00 DUE: Jun 06, 01  
AN: 008427 SN: 333



### REPAIR PARTS

Date	Hours	Part Name	Part Number	Failure Description	Cost
<u>N/A</u>					

### WORK SUMMARY

Failure Description N/A

Repair Action N/A

Calibration Procedure Customer Temp 78F Hum. 45%

Tech R Dykstra Totals Cal Hours 1.0 Repair Hours \_\_\_\_\_ Parts Cost \_\_\_\_\_

Standards Used 004528, 000219, 007001, 5242

Date Picked Up 6/8/01

Picked Up By [Signature]

43883





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

## Certificate of Calibration

7 June 2001

**Issued to:** DARRELL DUNN DIV20 B57  
**Manufacturer/Model:** DURO-SENSE TYPE K  
**Description:** THERMOCOUPLE  
**Serial Number:** 333  
**Asset Number:** 008427  
**Work Order Number:** 444043883

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: 78.0 Degrees Fahrenheit Humidity: 45 % RH

**Calibration Date:** 7 Jun 01      **Calibration Procedure:** CUSTOMER LETTER DATED NOV 16, 2001

**Condition as Received:** SEE REMARKS

**Condition as Received:** SEE REMARKS

**Remarks:** CALIBRATION DATA SHEET ATTACHED

**Approved by:**

Walt Hill, Supervisor  
Institute Calibration Laboratory

**Measurements performed by:**

Roger Dykstra, Technician

# SOUTHWEST RESEARCH INSTITUTE

## Calibration Laboratory

### WORK ORDER

Received by JIBARRA, 1/8/02 11:36:03AM



Arrived 1/8/02

Work Order **444046674**

Asset No. 008427 Manufacturer DURO-SENSE

Model TYPE K

Equipment Type THERMOCOUPLE

Serial No. 333

Accessory No.

Interval 6 M

Calibration Procedure CUSTOMER LETTER DATED NOV 16, 2001 Location B57

Div/Client DIV20

Custodian DARRELL DUNN

Mail Stop B57

Tel 6090

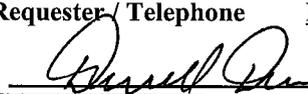
**IN4CAL**

Special Instructions \_\_\_\_\_

Notify before adjustments or repairs. (  ) Provide data with certificate (  ) Certificate Typ \_\_\_\_\_

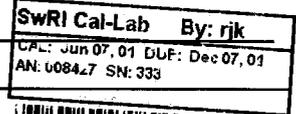
Charge/Project No. 00751.006 1.20

Requester / Telephone DARRELL DUNN/ X6090

This information is correct for the work requested. 

### WORK NOTES

Date	Hours	Remarks/Notes
<u>1/14/02</u>	<u>.5</u>	<u>cal</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____



Date	Hours	Part Name	Part Number	Failure Description	Cost
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

### WORK SUMMARY

Failure Description n/a

Repair Action n/a

Tech R. Dyer Cal Hrs. .5 Repair Hrs \_\_\_\_\_ Parts Cost \_\_\_\_\_ Temp 77 F Hum. 26 %

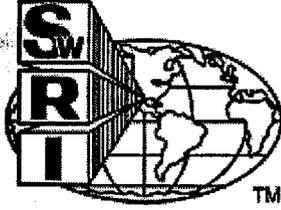
Standards Used 7001, 219

Date Picked Up 1/21/02

Picked Up By 

444046674





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

## Certificate of Calibration

14 January 2002

**Issued to:** DARRELL DUNN DIV20 B57  
**Manufacturer/Model:** DURO-SENSE TYPE K  
**Description:** THERMOCOUPLE  
**Serial Number:** 333  
**Asset Number:** 008427  
**Work Order Number:** 444046674

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: 77.0 Degrees Fahrenheit Humidity: 27 % RH

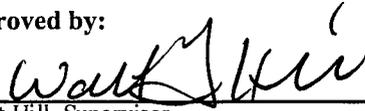
**Calibration Date:** 14 Jan 02 **Calibration Procedure:** CUSTOMER LETTER DATED NOV 16, 2001

**Condition as Received:** SEE ATTACHED DATA

**Condition as Returned:** SEE ATTACHED DATA

**Remarks:** PROVIDED CUSTOMER WITH READINGS.

**Approved by:**

  
\_\_\_\_\_  
Walt Hill, Supervisor  
Institute Calibration Laboratory

**Measurements performed by:**

  
\_\_\_\_\_  
Roger Dykstra, Technician