

SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

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



Work Order 444041434

Arrived 11/16/00

Asset No. 008433 Manufacturer DURO-SENSE

Model TYPE K

Instrument Type/Class THERMOCOUPLE

Serial No. 329

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 60 F

Hum. 41 %

Tech MTW

Totals Cal Hours 1

Repair Hours _____

Parts Cost _____

Standards Used 0219

1505

2868

Date Picked Up 12/14/2002

Picked Up By Dunn

Southwest Research Institute
Calibration Laboratory

Work Order 444041434	Mfg. Dur0-Sense	Tech C. M. Wood
Asset No. 8433	Model	Procedure Customer
Serial No. 329	Type k	Cal Date 12-6-00

Calibration As Found/As Released Data

[illegible]




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

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

MEMORANDUM

Date: November 16, 2000

From: Darrell S. Dunn 

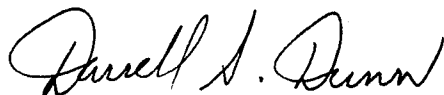
To: SwRI Calibration Laboratory

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: 329
Asset Number: 008433

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 # 444041434

m:\a2la.rpt Rev date 22 May 00

Measurements performed by:

Mack Wood, Technician

SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

Processed by RCRUZ at 2:49:32PM on 6/8/01



Work Order 444043986

Arrived 6/8/01

Asset No. 008433 Manufacturer DURO-SENSE

Model TYPE K

Instrument Type/Class THERMOCOUPLE

Serial No. 329

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

IN4CAL

Special Instructions

WORK NOTES

Date	Hours	Remarks/Notes
6.12	1	Cal
6.13	.5	Cal

SwRI Cal-Lab By: cmw
CAL: Dec 06, 00 DUE: Jun 06, 01
AN: 008433 SN: 329

REPAIR PARTS

Date	Hours	Part Name	Part Number	Failure Description	Cost
4/16					

WORK SUMMARY

Failure Description 11/1A

Repair Action 11/1A

Calibration Procedure Custom Temp 76 F Hum. 54 %

Tech R Dykstra Totals Cal Hours 1.5 Repair Hours Parts Cost

Standards Used 5212, 7001, 4528, 0219

Date Picked Up 6/15/01

Picked Up By [Signature]

43986

Southwest Research Institute
Calibration Laboratory
Calibration Data Sheet

[illegible]



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

Certificate of Calibration

13 June 2001

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: DURO-SENSE TYPE K
Description: THERMOCOUPLE
Serial Number: 329
Asset Number: 008433
Work Order Number: 444043986

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: 76.0 Degrees Fahrenheit Humidity: 54 % RH

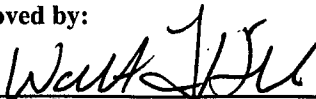
Calibration Date: 13 Jun 01 **Calibration Procedure:** CUSTOMER

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 **444046675**

Asset No. 008433 Manufacturer DURO-SENSE

Model TYPE K

Equipment Type THERMOCOUPLE

Serial No. 329

Accessory No.

Interval 6 M

Calibration Procedure CUSTOMER

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 Type _____

Charge/Project No. 00751.006 1.20

Requester / Telephone DARRELL DUNN/ X6090

This information is correct for the work requested. *Darrell Dunn*

WORK NOTES

Date	Hours	Remarks/Notes
1/11/02	1.0	Cal

SwRI Cal-Lab By: rjk
CAL: Jun 13, 01 DUE: Dec 13, 01
AN: 008433 SN: 329

Date	Hours	Part Name	Part Number	Failure Description	Cost
n/a	→				

WORK SUMMARY

Failure Description n/a

Repair Action n/a

Tech RD/kstra Cal Hrs. 1.0 Repair Hrs Parts Cost Temp 77 F Hum. 26 %

Standards Used 7001, 0219

Date Picked Up 1/21/02

Picked Up By *Darrell Dunn*

Southwest Research Institute

Calibration Laboratory

Calibration Data Sheet Z 540

Workorder	444046675	Mfr.	DURO-SENSE	Technician	R Dykstra
Asset #.	008433	Model	Type K	Procedure	Customer
Serial #.	329	Type	Thermocouple	Cal Date	1/11/02

Remarks: Customer wants readings per letter dated Nov 16, 2001

The reported uncertainty is based upon a standard uncertainty multiplied by a coverage factor of $k=2$

which provides a level of confidence of approximately 95%.

[illegible]



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: 329
Asset Number: 008433
Work Order Number: 444046675

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: 26 % RH


Calibration Date: 11 Jan 02 Calibration Procedure: CUSTOMER

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