SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

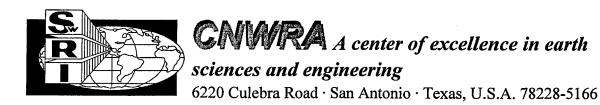
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Asset No.			Work Order 44	4041434	Model <u>TYPE</u>		rived <u>1</u>	11/16/00
Instrumen	t Type/Cl	ass THERMOCO	<u>DUPLE</u>	Se	erial No. <u>329</u>			
Accessory	No.	Calibrati	on Procedure			Lo	cation	<u>B57</u>
Div/Client	DIV20	Cu	stodian <u>DARRELL</u> 1	<u>DUNN</u>	Mail Stop	<u>B57</u>	Г еl. <u>609</u>	<u>90</u>
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Date Picke	d Up/	2/4/2002		Picked Up	By Jan	uf D		

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

Parameter	Standard Reading	UUT As Found	Uncertainty	UUT As Released		
Temperature	Standard Reading Degrees C	MV	Uncertainty +/-mV*	Same		
	0	-0.00569	0.002			
	146.977	6.02692	0.003			
			*Measurement			
			Uncertainty. K =1.65			
			For a confidence level			
			Uncertainty. K =1.65 For a confidence level Of approximately 95%			
				72 8		
				*		
						
· · · · · · · · · · · · · · · · · · ·						



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

Daviell S. Dunn



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



Certificate of Calibration

6 December 2000

Issued to:

DARRELL DUNN DIV20 B57

Manufacturer/Model:

DURO-SENSE TYPE K

Description:

THERMOCOUPLE

Serial Number: **Asset Number:**

329 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

Page lof 1

SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

Processed	by RCRUZ	Z at 2:49:32PM o	n 6/8/01							
Asset No.					44404398		TYPE K	Arrived	<u>6/8/01</u>	
Instrumer	ıt Type/Cl	lass THERMOC	OUPLE			Serial No.	<u>329</u>			
Accessory	No.	Calibrati	ion Proced	dure <u>CUST</u>	<u>'OMER</u>			Location	<u>B57</u>	
Div/Client	<u>DIV20</u>	Cı	ıstodian	DARREL	L DUNN	Ma	il Stop <u>B57</u>	Tel. <u>60</u>	<u>190</u>	
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6.12		Carl								
(<u>.·/3</u>	.5	_CoQ					SwRI Cal-Lab CAL: Dec 06, 00 I AN: 008433 SN: 33	DUE: Jun 06, 01		·
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Failure D	escrintion	N/B		WORF	K SUMMAR	Y				
Repair Ac	- •	4/13		-						_
Calibratio	n Procedi	ire Custo	me				Тетр :	76 F Hur	n. 54 %	6
Tech((1	5242, 700	Tot	als Cal I	Hours <u>/, 5</u>	Repair H	ours	Parts Cost		<u>-</u> ·
Date Picke	ed Up	1/15/01			Picked	Up Ву	Eners !	2		<u> </u>

Southwest Research Institute

Calibration Laboratory Calibration Data Sheet

Work Order 444043986	Mfr. Duro-Sense	· · · · · · · · · · · · · · · · · · ·	Technician R Dykstra					
Asset No. 008433	Model Type K	Procedure Customer						
Serial No. 329	Type Thermocouple		Cal Date	Cal Date 6/13/01				
Remarks:								
Parameter	Applied Value 0.0 Degree C 149.788 Degree C	Found/Left	Instrument Error	Test Uncertainty	Result			
Temperature	0.0 Degree C	-0.00903 mV		+/-0.002 mV				
	149.788 Degree C	6.13161 mV		+/-0.003 mV				
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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:

Measurements performed by:

Institute Calibration Laboratory

Roger Dykstra, Technician

SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

	ENJ INDIA NIKAN III	RA,1/8/02 11:3		Arrived NSE	1/8/02		Work Order odel <u>TYPE F</u>		4046	675
		THERMOCOU			Serial No.				ccessory No	•
Interval	<u>6 M</u>	Calibr	ation Proce	dure <u>CUSTON</u>	MER				Location	<u>B57</u>
Div/Clie	nı <u>DIV20</u>		Custodian	DARRELL D	<u>UNN</u>		Mail Stop	<u>B57</u>	Tel 609	<u>90</u>
IN4C	CAL	Special Inst	ructions							
Charge/	Project N	ustments or repair.	20	Reque	ith certific		Certificate DARREL		J/ X6090	
			1		NOTES	447-1				
Date	Hours	Remarks/Not	es							
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								AN: 008433	SN: 329	
Date	Hours	Part Name →		art Number		Failure	Description			Cost
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Date Pick	xed Up _≠	1/21/02			Picked U		Quell	1 (1	em	

Southwest Research Institute Calibration Laboratory Calibration Data Sheet Z 540

Workorder 444046675	the Section of gall finds	45 M2 -	Mfr.	DURO-	SENSE	PROFESSION OF THE PERSON	Technici	an ***	R Dykstra	· · · · · · · · · · · · · · · · · · ·
Asset #. 008433	Additional Control		Model	Туре К	and splets	"你说话,你你你	Procedu	re 😘	Custome	· The Training
Serial #. 329		-	Туре	Thermo	couple	PARCETUS . LOAD	Cal Date	186	1/11/02	

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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%.

Parameter	Degree C	mV		Constitution of the second	WWW THE	第二次的编码等的现在分词的编码
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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: **Asset Number:**

329

Work Order Number:

008433 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

PROVIDED CUSTOMER WITH READINGS.

Approved by:

Institute Calibration Laboratory

Measurements performed by:

Roger Dykstra, Technician