SOUTHWEST RESEARCH INSTITUTE
Department of Quality Assurance
Calibration Laboratory • 522-5215

WORK ORDER

CERTIFICATE # 22375 ASSET # 1443 DATE 14 Aug 96

ITEM DATA:

Manufacturer Pioto Model 6103

Description Torque Screwdriver Serial # #2

Accessories

ACTION REQUESTED Cal

CUSTODIAN Darrell Dunn Div 20

Turned in by: Phone

CHARGE # 20-5708-573 Date Required

INSTRUMENT USED ON: ☐ NUCLEAR ☐ DOD ☐ NASA ☐ GLP ☐ SPPE
☒ OTHER

COPY OF CALIBRATION CERTIFICATE ☒ Yes ☐ No

CONDITION RECEIVED:

- ____ Out of tolerance, repaired to specifications
- ____ In tolerance, minor adjustments/repairs made
- ____ In tolerance, no adjustments/repairs
- ____ Out of tolerance, adjusted to specifications
- ____ Received into system, introduced or reactivated
- ____ Calibration internal
- ____ Realibility code

ACTION TAKEN: (Calibration/Repair/Parts) S+H 288004

CAL ENVIRONMENT:

Temperature 70 °F Humidity %RH

CALIBRATED/REPAIRED:

By Gulf Coast, Houston, Tx Cal Procedure GGG-W-686D

Date 8-19-96 Accuracy +/-4 % FS.

Cal Interval 6 mos. Time to complete:

Next Cal due 2-19-97 Cal Repair

Standards used (Asset#) Vendor

DATE COMPLETED

DATE PICKED UP 8/27/96 PICKED UP BY

SwRI Form QA-169-2

2575

GULF COAST CALIBRATION

7999 Hansen, Suite 321
Houston, TX 77061
(713) 944-3139

Certificate Of Calibration

REPORT # 96-05351/1

Customer SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO, TEXAS

Date 08-19-1996

Expires 02-19-1997

Customer P.O. 02120 SHIPPING #288004

Type and Size of Gauge PROTO 0-100 IN. OZ. TORQUE WRENCH

Serial No. 2 Tolerance 4%

WRENCH SET	AS RECEIVED	FINAL READING
20	20	20
40	40	40
60	60	60
80	80	80
100	102	102

DONE IN ACCORDANCE WITH Q.A. MANUAL, REV-3; DATED: 12/01/1995. 10CFR21 APPLIES.

Test Equipment	Date of Cal.	Expires
GCC-174	12/01/1995	12/01/1996

This is to certify that the calibration above meets the requirement for accuracy of applicable Federal Specification GGG-W-686D. Our Test Equipment use for calibration is traceable to the NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY. Maintained in accordance with conditions as noted by ANSI Z540-1. Temperature during calibration 70°F.

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
No. 40093

Technician Michael Ha

SOUTHWEST RESEARCH INSTITUTE
Department of Quality Assurance
Calibration Laboratory • 522-5215

WORK ORDER

CERTIFICATE # 25194 ASSET # 001443 DATE 17 Apr 97

ITEM DATA:

Manufacturer Pole Model 610-3

Description 10-910 Screwdriver Serial # 2

Accessories

ACTION REQUESTED Cal

CUSTODIAN Div. 20, Darrell Dunn

Turned in by: Phone 6490

CHARGE # 20-5708-561 Date Required RUSH

INSTRUMENT USED ON: ☐ DOD/NASA ☑ NUCLEAR ☐ GLP ☐ SPPE ☐ ISO
☐ OTHER

COPY OF CALIBRATION CERTIFICATE ☑ Yes ☐ No

NEW WORK ☐ Yes ☑ No If yes, an evaluation shall be made to verify capabilities.
By Date

CONDITION RECEIVED:
_____ (F) Out of tolerance, repaired to specifications
_____ (G) In tolerance, minor adjustments/repairs made
__J__ (J) In tolerance, no adjustments/repairs
_____ (K) Out of tolerance, adjusted to specifications
_____ (S) Received into system, introduced or reactivated

ACTION TAKEN: (Calibration/Repair/Parts) Gulf Coast 04/17/97 ST# 304517

CAL ENVIRONMENT:
Temperature 68 °F Humidity %RH

CALIBRATED/REPAIRED:
By Gulf Coast Cal Procedure GGG-W-086D
Date 04-23-97 Accuracy +/-4%
Cal Interval 1 YRS Reliability Code:
Next Cal due 04-23-97 Cal Time Repair Time
Standards used (Asset#) Under

DATE COMPLETED 25 Apr 97
DATE PICKED UP 5/8/97 PICKED UP BY

SwRI Form QA-174-0

GULF COAST CALIBRATION

7999 Hansen, Suite 321
Houston, TX 77061
(713) 944-3139

Certificate Of Calibration

REPORT #97-246895

Customer SOUTHWEST RESEARCH INSTITUTE Date 04/23/1997
SAN ANTONIO, TEXAS Expires 10/23/1997

Customer P.O. 02120 SHIPPING #304517

Type and Size of Gauge PROTO 0-100 IN. OZ. TORQUE WRENCH

Serial No. 2 Tolerance 4%

WRENCH SET	AS RECEIVED	FINAL READING
20	20	20
40	40	40
60	60	60
80	80	80
100	98	98

DONE IN ACCORDANCE WITH Q.A. MANUAL, REV-3; DATED: 12/01/1995.
10CFR21 APPLIES.

Test Equipment	Date of Cal.	Expires
GCC-174	11/22/1996	11/22/1997

This is to certify that the calibration above meets the requirement for accuracy of applicable Federal Specification GGG-W-686D. Our Test Equipment use for calibration is traceable to the NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY. Maintained in accordance with conditions as noted by ANSI Z540-1. Temperature during calibration 68°F.

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
No. 39569-179355-40093/241548/1

Technician Michael Ha

SOUTHWEST RESEARCH INSTITUTE
Department of Quality Assurance
Calibration Laboratory • 522-5215

WORK ORDER

CERTIFICATE # 29637 ASSET # 001413 DATE 07 May 98

ITEM DATA:

Manufacturer Proto Model 6103

Description Torque Screwdriver Serial # 2

Accessories

ACTION REQUESTED Cal

CUSTODIAN 01-9-0 Daniel Dunn

Turned in by: Rich [illegible] Phone 6310

CHARGE # 20-1418-571 Date Required

INSTRUMENT USED ON: ☐ (DOD/NASA) ☑ (NUCLEAR) ☐ (GLP) ☐ (SPPE) ☐ (ISO)
☐ OTHER

COPY OF CALIBRATION CERTIFICATE ☑ (Yes) ☐ (No)

NEW WORK ☐ Yes ☑ No If yes, an evaluation shall be made to verify capabilities.

By [illegible] Date 05-07-98

Work involves proprietary/confidential information or equipment ☐ (Yes) ☑ (No)

29637

CONDITION RECEIVED:
____ (F) Out of tolerance, repaired to specifications
____ (G) In tolerance, minor adjustments/repairs made
__✓__ (J) In tolerance, no adjustments/repairs
____ (K) Out of tolerance, adjusted to specifications
____ (S) Received into system, introduced or reactivated

ACTION TAKEN: (Calibration/Repair/Parts) Gulf Coast S# 326070 [illegible]

CAL ENVIRONMENT:
Temperature 69 °F Humidity 50 %RH

CALIBRATED/REPAIRED:
By Gulf Coast Houston, Tx Cal Procedure M190-1579
Date 05/11/98 Accuracy +/-4% F.S.
Cal Interval 6mos. Reliability Code: 7
Next Cal due 11/11/98 Cal Time____ Repair Time____
Standards used (Asset#) Vendor

DATE COMPLETED 14 May 98
DATE PICKED UP 5/18/98 PICKED UP BY [signature]

SwRI Form QA-174-0

GULF COAST CALIBRATION

7999 Hansen, Suite 321
Houston, TX 77061
(713) 944-3139

Certificate Of Calibration

REPORT # 98-16349/1

Customer SOUTHWEST RESEARCH INSTITUTE Date 05/14/1998

SAN ANTONIO, TEXAS Expires 11/14/1998

Customer P.O. 02120 SHIPPING #326070

Type and Size of Gauge PROTO 0-100 IN. OZ. TORQUE WRENCH

Serial No. #2 Tolerance ±4%

WRENCH SET	AS RECEIVED	FINAL READING
20	20	20
40	40	40
60	60	60
80	80	80
100	102	102

DONE IN ACCORDANCE WITH Q.A. MANUAL, REV-3; DATED: 12/01/1995.
10CFR21 APPLIES.

PER PROCEDURE: #M190-1379

Test Equipment	Date of Cal.	Expires
GCC-174	11/20/1997	11/20/1998

This is to certify that the calibration above meets the requirement for accuracy of applicable Federal Specification GGG-W-686D. Our Test Equipment use for calibration is traceable to the NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY. Maintained in accordance with conditions as noted by ANSI Z540-1. Temperature during calibration 69°F.HUMIDITY: 50%

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
No. 40093

Technician Michael Ha

SOUTHWEST RESEARCH INSTITUTE
Department of Quality Assurance
Calibration Laboratory • 522-5215

WORK ORDER

CERTIFICATE # 34565 ASSET # 001413 DATE 21 May 99

ITEM DATA:

Manufacturer Proto Model 6109

Description Torque Screwdriver Serial # 2

Accessories _____

ACTION REQUESTED Cal

CUSTODIAN Div. 20. David Dunn

Turned in by: _____ Phone 6090

CHARGE # 20.04 Date Required RUSH

INSTRUMENT USED ON: ☐ (DOD/NASA) ☑ (NUCLEAR) ☐ (GLP) ☐ (SPPE) ☐ (ISO)
☐ OTHER _____

COPY OF CALIBRATION CERTIFICATE ☑ (Yes) ☐ (No)

NEW WORK ☐ Yes ☑ No If yes, an evaluation shall be made to verify capabilities.

By MAD Date 05-21-99

Work involves proprietary/confidential information or equipment ☐ (Yes) ☑ (No)

CONDITION RECEIVED:
_____ (F) Out of tolerance, repaired to specifications
_____ (G) In tolerance, minor adjustments/repairs made
✓ (J) In tolerance, no adjustments/repairs
_____ (K) Out of tolerance, adjusted to specifications
_____ (S) Received into system, introduced or reactivated

ACTION TAKEN: (Calibration/Repair/Parts) 05/25 Gulf Coast SI# 349349

CAL ENVIRONMENT:
Temperature 71 °F Humidity 51 %RH

CALIBRATED/REPAIRED:
By Gulf Coast Calibration Cal Procedure M190-1379
Date J.I.I. 06/01/99 Accuracy ±4% F.S.
Cal Interval 12 months Reliability Code: 8
Next Cal due J.I.I. 12/01/99 Cal Time _____ Repair Time _____
Standards used (Asset#) Vendor

DATE COMPLETED 06/07/99
DATE PICKED UP 6/7/99 PICKED UP BY _____

SwRI Form QA-174-0

34565

GULF COAST CALIBRATION

7999 Hansen, Suite 321
Houston, TX 77061
(713) 944-3139

Certificate Of Calibration

REPORT # 99-68892 PAGE 1 OF 1

Customer SOUTHWEST RESEARCH INSTITUTE Date 06/01/1999

SAN ANTONIO, TEXAS Expires 12/01/1999

Customer P.O. 02120 SHIPPING #349347

Type and Size of Gauge PROTO 0-100 IN. LB. TORQUE WRENCH

Serial No. #2 Tolerance ±4%

WRENCH SET	AS RECEIVED	FINAL READING
20	20	20
40	40	40
60	61	61
80	81	81
100	102	102

DONE IN ACCORDANCE WITH Q.A. MANUAL, REV-3; DATED: 12/01/1995.
10CFR21 APPLIES.

PER PROCEDURE: #M190-1379

Test Equipment	Date of Cal.	Expires
GCC-174	11/12/1998	11/12/1999

This is to certify that the calibration above meets the requirement for accuracy of applicable Federal Specification GGG-W-686D. Our Test Equipment use for calibration is traceable to the NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY. Maintained in accordance with conditions as noted by ANSI Z540-1. Temperature during calibration 71°F. HUMIDITY: 51%.

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
No. 39569-179355-40093/241548/1

Technician Michael Ha

SOUTHWEST RESEARCH INSTITUTE
Department of Quality Assurance
Calibration Laboratory • 522-5215

WORK ORDER

WORK ORDER # 37058 ASSET # 001443 DATE 08 Dec. 99

ITEM DATA:

Manufacturer Pinto Model 6103

Description Torque Screwdriver Serial # #2

Accessories

ACTION REQUESTED Cal

CUSTODIAN Dr. 20 Darrell Dunn

Turned in by: Phone 6096

CHARGE # 20.04 Date Required 12 Dec. 99

INSTRUMENT USED ON: ☐ (DOD/NASA) ☑ (NUCLEAR) ☐ (GLP) ☐ (SPPE) ☐ (ISO)
☐ OTHER

COPY OF CALIBRATION CERTIFICATE ☑ (Yes) ☐ (No)

NEW WORK ☐ Yes ☑ No If yes, an evaluation shall be made to verify capabilities.

By MMcl Date 12.08.99

Work involves proprietary/confidential information or equipment ☐ (Yes) ☑ (No)

CONDITION RECEIVED:
- ✓ Out of tolerance
- ✓ In tolerance
- ____ Damaged (Contact customer)
- ____ Contact ____ Date ____
- ____ Received into system, introduced or reactivated

ACTION TAKEN: (Calibration/Repair/Parts) 12/09 Gulf Coast S/# 558616

CAL ENVIRONMENT:

Temperature 70 °F Humidity %RH

CALIBRATED/REPAIRED:

By Gulf Coast Houston, TX Cal Procedure GGG-W-686D

Date 12.15.99 Accuracy +/- 4% F.S.

Cal Interval 1 yrs Reliability Code 9

Next Cal Due Dec. 2000 Cal Time ____ Repair Time ____

Standards used (Asset #) Vendor

DATE COMPLETED 22 Dec. 99

DATE PICKED UP 12/31/99 PICKED UP BY

SwRI Form QA-174-0

37058

GULF COAST CALIBRATION

7999 Hansen, Suite 321
Houston, TX 77061
(713) 944-3139

Certificate Of Calibration

REPORT # 99-56950/1 PAGE 1 OF 1

Customer SOUTHWEST RESEARCH INSTITUTE Date 12-15-1999

SAN ANTONIO, TX Expires 12-15-2000

Customer P.O. 01533R/358612

Type and Size of Gauge PROTO 0-100 INOZ. TORQUE WRENCH

Serial No. #2 Tolerance ±4%

WRENCH SET	AS RECEIVED	FINAL READING
20 INOZ.	20	20
40 INOZ.	40	40
60 INOZ.	61	61
80 INOZ.	82	82
100 INOZ.	102	102

DONE IN ACCORDANCE WITH Q.A. MANUAL REV. 3 DATED 12/1/1995.
10CFR21 APPLIES.

Test Equipment	Date of Cal.	Expires
GCC-174	11-2-1999	11-2-2000

This is to certify that the calibration above meets the requirement for accuracy of applicable Federal Specification GGG-W-686D. Our Test Equipment use for calibration is traceable to the NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY. Maintained in accordance with conditions as noted by ANSI Z540-1. Temperature during calibration 70°F.

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
No. 40093

Technician *Michael Ha*

RUSH

SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

Processed by RCRUZ at 9:05:38AM on 10/24/00

I4213

Work Order No 444041098 Arrived 10/24/00

Asset No. 001443 Manufacturer PROTO Model 6103

Instrument Type/Class TORQUE SCREWDRIVER Serial No. #2

Accessory No. Calibration Procedure CL-15, 5/99 Location B57

Div/Client DIV20 Custodian DARRELL DUNN Mail Stop B57 Tel. 6090

Charge/Project No. 20.00751.006 Delivered By / Telephone

RUSH 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 CL-15 ASME B107.14M, 94 Temp 70 F Hum. 58 %

Tech SAG Totals Cal Hours 2 Repair Hours _____ Parts Cost _____

Standards Used 6407, 7018

Date Picked Up 10/26/2000 Picked Up By _____

M:\TRAVELER10.RPT Rev 10 Oct 2000

4098

CALIBRATION CHECK FORM

Date Calibrated 25 04 00 Work Order 41098 Cal By SJH

Procedure No./Date CL-15, May99 Unit Under Test Torque Screwdriver

Mfg. PROTO Model 6103 SN 2 AN 1443

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE		MEASURED VALUES		P/F
			MIN - MAX		AS FOUND	RELEASED	
	FS 100 in/oz.		+/- 6% TG.				
	CW (25%FS)	26.00	24.44	27.56	25.72		P
	(50%FS)	50.00	47.00	53.00	50.76		P
	(75%FS)	76.00	71.44	80.56	77.06		P
	(100%FS)	100.0	94.00	106.0	103.3		P
			+/- 6% TG.				
	CCW (25%FS)	26.00	24.44	27.56	26.73		P
	(50%FS)	50.00	47.00	53.00	52.15		P
	(75%FS)	76.00	71.44	80.56	74.78		P
	(100%FS)	100.00	94.00	106.0	103.9		P

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

25 October 2000

Issued to:	DARRELL DUNN DIV20 B57
Manufacturer/Model:	PROTO 6103
Description:	TORQUE SCREWDRIVER
Serial Number:	#2
Asset Number:	001443

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: 70.0 Degrees Fahrenheit Humidity: 58 % RH

Calibration Date: 25 Oct 00 **Calibration Procedure:** ASME B107.14M, 94

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Remarks:

Approved by:

Jim Patterson, Supervisor, or Walt Hill, Metrologist

Measurements performed by:

Ken Harp, Technician

Certificate # 444041098

SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

Processed by RCRUZ at 2:38:38PM on 4/26/01

Work Order 444043360 Arrived 4/26/01

Asset No. 001443 **Manufacturer** PROTO **Model** 6103

Instrument Type/Class TORQUE SCREWDRIVER **Serial No.** #2

Accessory No. **Calibration Procedure** ASME B107.14M, 94 **Location** B57

Div/Client DIV20 **Custodian** DARRELL DUNN **Mail Stop** B57 **Tel.** 6090

Charge/Project No. 20.00751.006 **Delivered By / Telephone** DARRELL DUNN

IN4CAL **Special Instructions** 20.00751.006

WORK NOTES

Date	Hours	Remarks/Notes
5-4-01		Gulf Coast Cal'd 28.00 T.A.T. 1 W.D.
		S.T. # 380592 Shipped

REPAIR PARTS

Date	Hours	Part Name	Part Number	Failure Description	Cost

WORK SUMMARY

Failure Description N/A

Repair Action

Calibration Procedure MFG. **Temp** 70F **Hum.** — %

Tech Gulf Coast **Totals** **Cal Hours** _____ **Repair Hours** _____ **Parts Cost** _____

Standards Used Vendor

Date Picked Up 5/18/2001 **Picked Up By** [signature]

4396

GULF COAST CALIBRATION

7999 Hansen, Suite 321
Houston, TX 77061
(713) 944-3139

Certificate Of Calibration

REPORT # 105-7591 PAGE 1 OF 1

Customer SOUTHWEST RESEARCH INSTITUTE Date 5-11-2001

SAN ANTONIO, TX Expires 5-11-2002

Customer P.O. _____

Type and Size of Gauge PROTO 0-100 INOZ. TORQUE WRENCH

Serial No. #2 Tolerance ±4%

WRENCH SET	AS RECEIVED	FINAL READING
20 INOZ.	20	20
40 INOZ.	41	41
60 INOZ.	62	62
80 INOZ.	82	82
100 INOZ.	102	102

Test Equipment	Date of Cal.	Expires
GCC-174	11-1-2000	11-1-2001

This is to certify that the calibration above meets the requirement for accuracy of applicable Federal Specification GGG-W-686D. Our Test Equipment use for calibration is traceable to the NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY. Maintained in accordance with conditions as noted by ANSI Z540-1. Temperature during calibration 70°F.

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
No. 40093

Technician Michael Ho

SOUTHWEST RESEARCH INSTITUTE
CALIBRATION LABORATORY
MEMORANDUM

May 18, 2001

To: DARRELL DUNN DIV20 B57

From: Walt Hill, Supervisor
Institute Calibration Laboratory

Subject: Calibration by an approved supplier

Manufacturer/Model: PROTO 6103
Description: TORQUE SCREWDRIVER
Serial Number: #2
Asset Number: 001443
Work Order Number: 444043360
Date Calibrated: May 11, 2001
Remarks: GULF COAST CERT #105-7591

Supplier: GULF COAST CALIBRATION INC., HOUSTON, TX

The above item was sent to an approved supplier who is listed on the SwRI Approved Suppliers List (ASL). This supplier is qualified to supply a product or service in support of project activities that require the use of approved suppliers. Please notify the Institute Calibration Laboratory, extension 5215, of any discrepancies with the item or calibration documentation.

Attachment(s) 1

SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

RUSH

Received by RCRUZ,12/6/01 2:25:38PM

Arrived 12/6/01 **Work Order** 444046376

Asset No. 001443 **Manufacturer** PROTO **Model** 6103

Equipment Type TORQUE SCREWDRIVER **Serial No.** #2 **Accessory No.**

Interval 6 M **Calibration Procedure** ASME B107.14M, 94 **Location** B57

Div/Client DIV20 **Custodian** DARRELL DUNN **Mail Stop** B57 **Tel** 6090

IN4CAL **Special Instructions** 20.00751.006

Notify before adjustments or repairs. ( ) **Provide data with certificate (✓)** **Certificate Typ**

Charge/Project No. 00751.006 1.20 **Requester / Telephone**

This information is correct for the work requested.

WORK NOTES

Date	Hours	Remarks/Notes
12/7/01		Torque wrench setting was at 100 in-oz.
		reduced to lowest setting

Date	Hours	Part Name	Part Number	Failure Description	Cost

WORK SUMMARY

Failure Description

Repair Action

Tech **Cal Hrs.** **Repair Hrs** **Parts Cost** **Temp** F **Hum.** %

Standards Used

Date Picked Up 12/12/01 **Picked Up By**

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

Certificate of Calibration

10 December 2001

Issued to:	DARRELL DUNN DIV20 B57
Manufacturer/Model:	PROTO 6103
Description:	TORQUE SCREWDRIVER
Serial Number:	#2
Asset Number:	001443
Work Order Number:	444046376

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: 68.0 Degrees Fahrenheit Humidity: 32 % RH

Calibration Date: 10 Dec 01 **Calibration Procedure:** HAND TORQUE TOOLS, NOV 2000

Condition as Received: IN TOLERANCE

Condition as Returned: IN TOLERANCE

Remarks:

Approved by:

Walt Hill, Supervisor
Institute Calibration Laboratory

Measurements performed by:

Vince Morales, Technician

Calibration Results

SwRI Calibration Laboratory

UUT: PROTO 6103
TORQUE SCREWDRIVER
Serial No: #2
Asset No. 001443

Result: **PASS**
Performed on: 12/10/01 at 10:48:25
Performed by: Vince Morales
Environment: Temp. 68.0°F Humid. 32 %
Condition F/L: FOUND-LEFT
Procedure Completed:

Notes:

Standards Used

Asset	Mfg	Model	Description	Cal. Date	Due Date
006407	CDI	950-DT	DIGITAL READOUT	27-Jun-01	27-Dec-01
006408	CDI	TTPM-41	TORQUE TRANSDUCER	5-Sep-01	5-Mar-02

Test Data

TEST#	STD PARAMETER	TRUE VALUE	UNIT UNDER TEST READING	UNIT UNDER TEST TOLERANCE	UNIT UNDER TEST UUT ERROR	ERROR in (% of Tol)	TUR	NOTIFY USER
CLOCKWISE								
20% F.S.								
44	20.000in/oz		19.970	1.2in/oz	-0.03in/oz	3		
45	20.000in/oz		20.190	1.2in/oz	0.19in/oz	16		
46	20.000in/oz		20.130	1.2in/oz	0.13in/oz	11		
60%F.S.								
47	60.000in/oz		61.580	3.6in/oz	1.58in/oz	44		
48	60.000in/oz		61.330	3.6in/oz	1.33in/oz	37		
49	60.000in/oz		60.430	3.6in/oz	0.43in/oz	12		
100%F.S.								
50	100.000in/oz		100.400	6in/oz	0.4in/oz	7		
51	100.000in/oz		101.600	6in/oz	1.6in/oz	27		
52	100.000in/oz		99.860	6in/oz	-0.14in/oz	2		
COUNTER CLOCKWISE								
20%F.S. CCW								
105	20.000in/oz		19.980	1.2in/oz	-0.02in/oz	2		
106	20.000in/oz		19.520	1.2in/oz	-0.48in/oz	40		
107	20.000in/oz		19.790	1.2in/oz	-0.21in/oz	18		
60%F.S. CCW								
108	60.000in/oz		57.320	3.6in/oz	-2.68in/oz	74		M
109	60.000in/oz		60.570	3.6in/oz	0.57in/oz	16		
110	60.000in/oz		57.420	3.6in/oz	-2.58in/oz	72		M
100%F.S. CCW								
111	100.000in/oz		99.670	6in/oz	-0.33in/oz	5		
112	100.000in/oz		100.500	6in/oz	0.5in/oz	8		
113	100.000in/oz		99.960	6in/oz	-0.04in/oz	1		

End of Test Data

A/N 1443 W/O# 444046376, Cal. Date 10 Dec. 01

Torque Wrench (TI)	Units	Range	Acc. +/-	Resolution
	in/oz	0-100	1.2	0.01
Source of Uncertainty	**Value ft/lb**	**Distribution**	**Divisor**	**Std. Uncert. Ft/lb**
Standard @ 20 in/oz	0.05	Normal	2	0.025
*Reproducibility	0.066	Normal	1	0.066
Resolution (STD)	0.01	Rectangular	Sqrt 3	0.0058
Combined Uncertainty			RSS	0.071
Expanded Uncertainty			*k*=2	0.14
Test Accuracy Ratio (TAR)	**TI Acc./STD Acc.**		Clockwise.	
	24	to 1		
Test Uncertainty Ratio (TUR)	**TI Acc./Muk=2**			
	8.5	to 1		

Torque Wrench (TI)	Units	Range	Acc. +/-	Resolution
	in/oz	0-100	3.6	0.01
Source of Uncertainty	**Value ft/lb**	**Distribution**	**Divisor**	**Std. Uncert. Ft/lb**
Standard @ 60 in/oz	0.15	Normal	2	0.075
*Reproducibility	0.349	Normal	1	0.349
Resolution (STD)	0.01	Rectangular	sqrt 3	0.003
Combined Uncertainty			RSS	0.357
Expanded Uncertainty			*k*=2	0.71
Test Accuracy Ratio (TAR)	**TI Acc./STD Acc.**		Clockwise.	
	24	to 1		
Test Uncertainty Ratio (TUR)	**TI Acc./Muk=2**			
	5.1	to 1		

Torque Wrench (TI)	Units	Range	Acc. +/-	Resolution
	in/oz	0-100	6	0.01
Source of Uncertainty	**Value ft/lb**	**Distribution**	**Divisor**	**Std. Uncert. Ft/lb**
Standard @ 100 in/oz	0.25	Normal	2	0.13
*Reproducibility	0.514	Normal	1	0.51
Resolution (STD)	0.01	Rectangular	Sqrt 3	0.003
Combined Uncertainty			RSS	0.53
Expanded Uncertainty			*k*=2	1.1
Test Accuracy Ratio (TAR)	**TI Acc./STD Acc.**		Clockwise.	
	24	to 1		
Test Uncertainty Ratio (TUR)	**TI Acc./Muk=2**			
	5.5	to 1		

*Reproducibility provided was divided by sqrt of 3

A/N 1443 W/O# 444046376, Cal. Date 10 Dec. 01

Torque Wrench (TI)	Units	Range	Acc. +/-	Resolution
	in/oz	0-100	1.2	0.01
Source of Uncertainty	**Value ft/lb**	**Distribution**	**Divisor**	**Std. Uncert. Ft/lb**
Standard @ 20 in/oz	0.05	Normal	2	0.025
*Reproducibility	0.133	Normal	1	0.133
Resolution (STD)	0.01	Rectangular	Sqrt 3	0.0058
Combined Uncertainty			RSS	0.135
Expanded Uncertainty			*k*=2	0.27
Test Accuracy Ratio (TAR)	**TI Acc./STD Acc.**		Counter Clockwise.	
	24	to 1		
Test Uncertainty Ratio (TUR)	**TI Acc./Muk=2**			
	4.4	to 1		

Torque Wrench (TI)	Units	Range	Acc. +/-	Resolution
	in/oz	0-100	3.6	0.01
Source of Uncertainty	**Value ft/lb**	**Distribution**	**Divisor**	**Std. Uncert. Ft/lb**
Standard @ 60 in/oz	0.15	Normal	2	0.075
*Reproducibility	1.067	Normal	1	1.067
Resolution (STD)	0.01	Rectangular	sqrt 3	0.003
Combined Uncertainty			RSS	1.070
Expanded Uncertainty			*k*=2	2.14
Test Accuracy Ratio (TAR)	**TI Acc./STD Acc.**		Counter Clockwise.	
	24	to 1		
Test Uncertainty Ratio (TUR)	**TI Acc./Muk=2**			
	1.7	to 1		

Torque Wrench (TI)	Units	Range	Acc. +/-	Resolution
	in/oz	0-100	6	0.01
Source of Uncertainty	**Value ft/lb**	**Distribution**	**Divisor**	**Std. Uncert. Ft/lb**
Standard @ 100 in/oz	0.25	Normal	2	0.13
*Reproducibility	0.243	Normal	1	0.24
Resolution (STD)	0.01	Rectangular	Sqrt 3	0.003
Combined Uncertainty			RSS	0.27
Expanded Uncertainty			*k*=2	0.5
Test Accuracy Ratio (TAR)	**TI Acc./STD Acc.**		Counter Clockwise.	
	24	to 1		
Test Uncertainty Ratio (TUR)	**TI Acc./Muk=2**			
	12	to 1		

*Reproducibility provided was divided by sqrt of 3

SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

Received by AANDERSON,7/3/02 10:42:34AM

Arrived 7/3/02 Work Order **444049290**

Asset No. 001443 Manufacturer PROTO Model 6103

Equipment Type TORQUE SCREWDRIVER Serial No. #2 Accessory No.

Interval 6 M Calibration Procedure ASME B107.14M, 94 Location B57

Div/Client DIV20 Custodian DARRELL DUNN Mail Stop B57 Tel 6090

IN LINE Special Instructions 20.00751.006

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

Charge/Project No. 00751.006 1.20 Requester / Telephone

This information is correct for the work requested.

WORK NOTES

Date	Hours	Remarks/Notes
July 5, 2002		Cal. done

Date	Hours	Part Name	Part Number	Failure Description	Cost

444049290

WORK SUMMARY

Failure Description

Repair Action

Tech Cal Hrs. 1.0 Repair Hrs Parts Cost Temp 68 F Hum. 36 %

Standards Used 7010

Date Picked Up 7/10/2002 Picked Up By

Calibration Results

SwRI Calibration Laboratory

TI: PROTO 6103
TORQUE SCREWDRIVER
Serial No: #2
Asset No. 001443

Note: All TAR's are greater than 4:1 unless noted on TAR column.

Result: **PASS**
Performed on: 7/5/02 at 10:45:30
Performed by: Thomas Hannon
Environment: Temp. 68.0°F Humid. 36 %
Condition F/L: FOUND-LEFT
Procedure Completed:
Work Order #: 444049290

Calibration Procedur HAND TORQUE TOOLS, NOV 2000 (0-100in.oz.)
Notes:

Standards Used

Asset	Mfg	Model	Description	Cal. Date	Due Date
007010	CDI	1001-0-TTTP	TORQUE TRANSDUCER	7-Feb-02	7-Aug-02

Test Data

TEST#	STD PARAMETER	TRUE VALUE	TEST INSTRUMENT READING	TEST INSTRUMENT TOLERANCE	TEST INSTRUMENT TI ERROR	ERROR in (% of Tol)	TAR	NOTIFY USER
CLOCKWISE								
20% F.S.								
43	20.000in/oz		20.150	1.2in/oz	0.15in/oz	12		
44	20.000in/oz		20.460	1.2in/oz	0.46in/oz	38		
45	20.000in/oz		19.490	1.2in/oz	-0.51in/oz	43		
60%F.S.								
46	60.000in/oz		58.890	3.6in/oz	-1.11in/oz	31		
47	60.000in/oz		60.680	3.6in/oz	0.68in/oz	19		
48	60.000in/oz		60.180	3.6in/oz	0.18in/oz	5		
100%F.S.								
49	100.000in/oz		97.800	6in/oz	-2.2in/oz	37		
50	100.000in/oz		99.760	6in/oz	-0.24in/oz	4		
51	100.000in/oz		101.200	6in/oz	1.2in/oz	20		
COUNTER CLOCKWISE								
20%F.S. CCW								
100	20.000in/oz		19.650	1.2in/oz	-0.35in/oz	29		
101	20.000in/oz		19.970	1.2in/oz	-0.03in/oz	3		
102	20.000in/oz		20.450	1.2in/oz	0.45in/oz	37		
60%F.S. CCW								
103	60.000in/oz		61.270	3.6in/oz	1.27in/oz	35		
104	60.000in/oz		60.640	3.6in/oz	0.64in/oz	18		
105	60.000in/oz		58.370	3.6in/oz	-1.63in/oz	45		
100%F.S. CCW								
106	100.000in/oz		99.270	6in/oz	-0.73in/oz	12		
107	100.000in/oz		98.030	6in/oz	-1.97in/oz	33		
108	100.000in/oz		100.200	6in/oz	0.2in/oz	3		

End of Test Data

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

Certificate of Calibration

5 July 2002

Issued to:	DARRELL DUNN DIV20 B57
Manufacturer/Model:	PROTO 6103
Description:	TORQUE SCREWDRIVER
Serial Number:	#2
Asset Number:	001443
Work Order Number:	444049290

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: 68.0 Degrees Fahrenheit Humidity: 36 % RH

Calibration Date: 5 Jul 02 **Calibration Procedure:** HAND TORQUE TOOLS, NOV 2000 (0-100in.oz.)

Condition as Received: IN TOLERANCE

Condition as Returned: IN TOLERANCE

Remarks:

Approved by:

Walt Hill, Metrology Group Leader
Institute Calibration Laboratory

Measurements performed by:

Tom Hannon, Technician