

DaimlerChrysler



Parts Submission Warrant

Part Name: Terminal Cust. Part Number: F77B-14474-AA
Shown on Drawing No.: 1S7T-14474-HA Org. Part Number: 7116-4025
Engineering Change Level: G2/AELE-E-11784007-167 Dated: 4/4/2011
Additional Engineering Changes: N/A Dated: N/A
Safety and/or Government Regulation: ☐ Yes ☒ No Purchase Order No. N/A Weight (kg): 0.0003
Checking Aid No.: N/A Checking Aid Engineering Change Level: N/A Dated: N/A

ORGANIZATION MANUFACTURING INFORMATION

Circuit Controls Corporation 22728430
Supplier Name & Supplier/Vendor Code
2277 M-119 Highway
Street Address
Petoskey Michigan 49770 USA
City Region Postal Code Country

CUSTOMER SUBMITTAL INFORMATION

Yazaki/Component
Customer Name/Division
N/A
Buyer/Buyer Code
Ford
Application

MATERIALS REPORTING

Has customer-required Substances of Concern information been reported? ☒ Yes ☐ No ☐ n/a

Submitted by IMDS or other customer format: IMDS #: 87078254

Are polymeric parts identified with appropriate ISO marking codes? ☐ Yes ☐ No ☒ n/a

REASON FOR SUBMISSION (Check at least one)

- | | |
|---|--|
| ☐ Initial Submission | ☐ Change to Optional Construction or Material |
| ☐ Engineering Change(s) | ☐ Supplier or Material Source Change |
| ☐ Tooling: Transfer, Replacement, Refurbishment, or Additional | ☐ Change in Part Process |
| ☐ Correction of Discrepancy | ☐ Parts Produced at Additional location |
| ☐ Tooling Inactive > than 1 year | ☒ Other - please specify |

Document update

REQUESTED SUBMISSION LEVEL (Check one)

- ☐ Level 1 - Warrant only (and for designated appearance items, an Appearance Approval Report) submitted to customer.
☐ Level 2 - Warrant with product samples and limited supporting data submitted to customer.
☒ Level 3 - Warrant with product samples and complete supporting data submitted to customer.
☐ Level 4 - Warrant and other requirements as defined by customer.
☐ Level 5 - Warrant with product samples and complete supporting data reviewed at organization's manufacturing location.

SUBMISSION RESULTS

The results for ☒ dimensional measurements ☒ material and functional tests ☐ appearance criteria ☒ statistical process package
These results meet all design record requirements: ☒ Yes ☐ No (If "NO" - Explanation Required)
Mold / Cavity / Production Process 2D4025

DECLARATION

I affirm that the samples represented by this warrant are representative of our parts, which were made by a process that meets all Production Part Approval Process Manual 4th Edition Requirements. I further affirm that these samples were produced at the production rate of 172,800 /8 hours.
I also certify that documented evidence of such compliance is on file and available for review. I have noted any deviations from this declaration below.

EXPLANATION/COMMENTS:

Is each Customer Tool properly tagged and numbered? ☐ Yes ☐ No ☒ n/a

Organization Authorized Signature Yumi Barden Date 6/3/2011
Print Name: Yumi Barden Phone Number: (231)347-0760 Fax Number: (231) 347-9051
Title: QA Asst. E-mail: ybarden@us.yazaki.com

FOR CUSTOMER USE ONLY (IF APPLICABLE)

PPAP Warrant Disposition: ☒ Approved ☐ Rejected ☐ Other
Customer Signature: [Signature] Date: 06 JUNE 2011
Print Name: YAZAKI EUROPE Limited Customer Tracking Number (optional)

CERTIFICATION REPORT

11A642
LUVATA

SOLD TO CIRCUIT CONTROLS CORP. 2277 M-119 HIGHWAY PETOSKEY, MI 49770		SHIP TO CIRCUIT CONTROLS CORP. 2277 M-119 HIGHWAY PETOSKEY, MI 49770		ENTRY - BOL 54639-360859
				ALLOY KLF5
PRODUCT DESCRIPTION 6.1250 .00980 H04 PHOS BRONZE KLF-5 STRIP *BET* P/N 2804-2500-2820 DATED 7/09/07 (1.1102)		QUANTITY ORDERED PCS. LBS. 999000	PCS. 2 LBS. 4172 DATE 1/5/2011 TIME 1:55:30 PM	CUSTOMER ORDER NO. OUTO-3/PULL GOV'T CONTRACT NO.

COIL NUMBER	703085	703086				
COMPOSITION - %						
Copper	97.68	97.68				
Iron	.102	.102				
Phosphorous	.034	.034				
Tin	2.04	2.04				
PROPERTIES						
Tensile Str. (N/mm ²)	579.1	579.1				
Yield Str. (N/mm ²) .2 OFFSET	555.0	555.0				
Elongation (%) in 2 inches	11.3	11.3				
Grain Size (RTF) in mm	.010	.010				
Vickers	177	177				
Bend Test (L)	OK	OK				
Bend Test (T)	OK	OK				
Elec. Cond. (%) IACS	34.1	34.1				
RA Side-A (µin)	3	3				
RA Side-B (µin)	4	4				
Coating Thickness (µin)	51.00	49.00				
Spring Limit (N/mm ²)	479.5	479.5				

WE HEREBY CERTIFY that these test results were obtained from samples taken from coil(s), which were produced for the purchase order stated. These samples have been subjected to the tests called for by the customer and /or ASTM specification(s).

This product was manufactured in compliance with all applicable government and safety constraints on restricted, toxic, and hazardous materials and complies to the Restriction of Hazardous Substances Directive (RoHS) 2002/95/EC and the Consumer Product Safety Improvement Act of 2008. Luvata Buffalo, Inc. product Material Safety Data Sheets (MSDS) provides component information for all hazardous materials in conformance with the OSHA Hazard Communication Standard (29 CFR 1910.1200).



Technical Department

11A042

CERTIFICATION REPORT

LUVATA

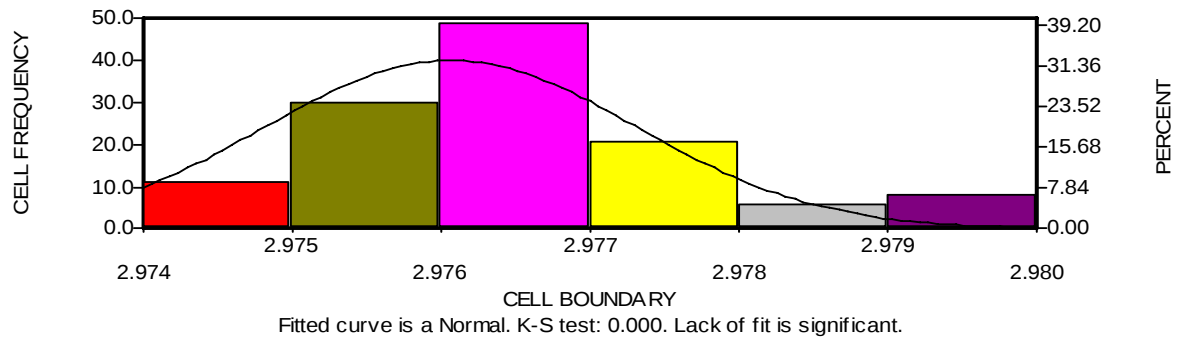
SOLD TO CIRCUIT CONTROLS CORP. 2277 M-119 HIGHWAY PETOSKEY, MI 49770	SHIP TO CIRCUIT CONTROLS CORP. 2277 M-119 HIGHWAY PETOSKEY, MI 49770	ENTRY - BOL 54639-360859	
		ALLOY KLF5	
PRODUCT DESCRIPTION 6.1250 .00980 H04 PHOS BRONZE KLF-5 STRIP *BET* P/N 2804-2500-2820 DATED 7/09/07 (1.1102)	QUANTITY ORDERED PCS. LBS. 999000	PCS. 2 LBS. 4172 DATE 1/5/2011 TIME 1:55:27 PM	CUSTOMER ORDER NO. OUTO-3/PULL
	GOVT CONTRACT NO.		

COIL NUMBER	743639AAC	743639AAD	703084	743639AAB	743402AD	
COMPOSITION - %						
Copper	97.69	97.69	97.69	97.69	97.73	
Iron	.107	.107	.107	.107	.109	
Phosphorous	.031	.031	.031	.031	.031	
Tin	2.04	2.04	2.04	2.04	2.02	
PROPERTIES						
Tensile Str. (N/mm²)	586.0	586.0	586.0	586.0	590.1	
Yield Str. (N/mm²) .2 OFFSET	563.9	563.9	563.9	563.9	572.9	
Elongation (%) in 2 inches	8.5	8.5	8.5	8.5	11.2	
Grain Size (RTF) in mm	.005	.005	.005	.005	.010	
Vickers	182	182	182	182	181	
Bend Test (L)	OK	OK	OK	OK	OK	
Bend Test (T)	OK	OK	OK	OK	OK	
Elec. Cond. (%) IACS	34.9	34.9	34.9	34.9	34.6	
RA Side-A (µin)	4	4	4	4	4	
RA Side-B (µin)	4	4	4	4	4	
Coating Thickness (µin)	47.00	48.00	51.00	54.00	50.00	
Spring Limit (N/mm²)	444.0	444.0	444.0	444.0	490.3	

Certification Report continues on the next page.

7116-4025 2D4025

Box Width 6/29/10



Total number analyzed = 125
 Group Range : 1-125
 Smallest value = 2.974
 Largest value = 2.979
 Average = 2.976
 Process sigma = 0.001
 Population sigma = 0.001
 Sample sigma = 0.001
 Standard error of mean = 0.000
 Skewness = 0.619
 Kurtosis = 0.308

Total number analyzed = 125
 Group Range : 1-125
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 Process sigma = 0.001
 Population sigma = 0.001
 Sample sigma = 0.001
 Standard error of mean = 0.000
 Skewness = 0.619
 Kurtosis = 0.308

Cell	Count	Cell Boundaries
1	11	2.974 to 2.975
2	30	2.975 to 2.976
3	49	2.976 to 2.977
4	21	2.977 to 2.978
5	6	2.978 to 2.979
6	8	2.979 to 2.980

Cell	Count	Cell Boundaries
1	11	2.974 to 2.975
2	30	2.975 to 2.976
3	49	2.976 to 2.977
4	21	2.977 to 2.978
5	6	2.978 to 2.979
6	8	2.979 to 2.980

Capability Analysis ($\pm 3.00s$)

Low Spec : 2.700 0 values below 2.700
 High Spec : 3.300 0 values above 3.300
 0 values out of spec

NORMAL

Cp 77.73
 Cr 1%
 Cpm 4.17
 Zl(Cpl) 214.58(71.53)
 Zu(Cpu) 251.83(83.94)
 Cpk 71.53

Performance Analysis ($\pm 3.00s$)

Low Spec : 2.700 0 values below 2.700
 High Spec : 3.300 0 values above 3.300
 0 values out of spec

NORMAL

Pp 80.62
 Pr 1%
 Ppm 4.17
 Zl(Ppl) 222.53(74.18)
 Zu(Ppu) 261.16(87.05)
 Ppk 74.18

Circuit Controls Corporation
 Process Flow Category: A
 Revision Level: F
 Prepared By: Meridith Porath

Process Flow Diagram

Page 01 of 02

Approval/Date: Dan Mullen 9-15-05

Date Issued: 9-14-05

Step	Process				Operation Description / Number of Operators Required	Special Characteristics	Input Characteristics	Output Characteristics
	Move	Store	Inspect	Rework/Sort				
1					Receiving - Raw Material / 1		Receiving Instructions	
2					Receiving - Inspection / 1 (If accept, go to step 3 If reject, move material to hold area)		Raw material certification; Raw material specification	
3					Move raw material to storage area / 1		Process Instructions	
4					Store until needed for production / 0			
5					Move material to press / 1		Process Instructions	
6					Payoff material to press / 0		Process Instructions	
7					Setup Die / 1	*	Process Standard; Setup instructions; Equipment instructions	
8					1st Piece Inspection / 1 (If accept, go to step 9 If reject, go back to step 7)		Inspection instructions; Gages; Visual Aids	Inspection records
9					Stamping / 1		Process Instructions	
10					Takeup / 0		Process Instructions	

ME-F034

Effective Date: 6-12-00

Revision Level: Initial Issue

* Refer to Appropriate PFMEA, Control Plan, or Inspection Instruction for Special Characteristic Information

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Circuit Controls Corporation
 Process Flow Category: A
 Revision Level: F
 Prepared By: Meridith Porath

Process Flow Diagram

Page 02 of 02

Step	Process				Operation Description / Number of Operators Required	Special Characteristics	Input Characteristics	Output Characteristics
		Move	Store	Rework/Sort				
11				Inspect	Operator/In-Process Inspection / 1		Gages; Inspection Instructions; Visual aids	Inspection records
12					Move to Final Inspection area / 1			
13				Inspect	Final Inspection / 1		Gages; Inspection Instructions; Visual aids	Inspection records
14					Move to packaging area / 1			
15					Packaging / 1		Process Standards; Packaging Handling Manual; Packaging Instructions	
16					Move finished product to storage / 1			
17				Inspect	Dock Audit / 1		Dock Inspection form; Inspection Instructions	Inspection records
18					Store until receive order / 0		Storage Instructions	
19					Move to staging area / 1			
20					Shipping / 1		ASN; Pick List; Shipping Instructions	

ME-F034

Effective Date: 6-12-00

Revision Level: Initial Issue

* Refer to Appropriate PFMEA, Control Plan, or Inspection Instruction for Special Characteristic Information

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CONTROL PLAN

PAGE 1 OF 6

☐ Prototype		☐ Pre-launch		☒ Production		Key Contact/Phone Rod Sydow / 231-347-0760		Date (Orig.) 1/25/1993		Date (Rev.) 4/13/2011	
Control Plan Number 7116-4025 7116-4026						Core Team Gary T. Mason, Meridith Porath / 231-347-0760		Customer Engineering Approval/Date (if Req'd)			
						Supplier/Plant Approval/Date <i>Gary T. Mason 4/13/11</i>					
Supplier/Plant Circuit Controls Corp.			Supplier Code 022728430			Other Approval/Date (if Req'd)		Customer Quality Approval/Date (if Req'd)			
						Other Approval/Date (if Req'd)					

Part Number		Print Number	Revision Level	Part Name/Description	
7116-4025	7116-4026	7116-4025:R	C05-ZF20	2.3 II Sealed Terminal Female	
7116-4025	7116-4026	7116-4025:GP	C09-A316	090-II Female Sealed Terminal	
7116-4025	7116-4026	7116-4025:CR	C00-A286	090-II Female Sealed Terminal	
	7116-4026	7116-4026:RU	C99-P198	090-II Female Sealed Terminal	
F77B-14474-AA	1S7T-14474-HA	1S7T-14474-HA	AELE-E-11784007-167	TRMNL WIR SNAP ON FMLE	
A 017 545 71 26 kZ		A 240 982 00 26	Y09-0461	2.3II (090II) WP + NWP System Female Terminal	
7116-4025	7116-4026	09162110	002	090 II Sealed Terminal Female	

			Characteristics			Special Char. Class	Methods					Reaction Plan
Part/ Process Number	Process Name/ Operation Description	Machine, Device, Jig, Tools For Mfg.	No.	Product	Process		Product/Process Specification/ Tolerance	Evaluation Measurement Technique	Sample		Control Method	
									Size	Freq.		
1	Receiving Raw Material	forklift			received		# of skids no damage	visual	100%	per receipt	bill of lading	shipping forklift operator follows I-QA1-Q Control of Non-conforming Product/GQRS
2	Receiving Inspection				material - plating material - dimensional material appearance		Material certification/ Receiving Inspection WI K-QA012-Q	visual, mic, caliper	1 sample	each skid / TWR	Receiving Inspection database	receiving inspector follows I-QA1-Q Control of Non-conforming Product/GQRS
3	Move raw material to storage	forklift			material movement		TWR - rack / Pancake - Shelf	scan raw material ticket visual	1 skid	each skid / TWR	Trans4M database	mfg. material handler follows I-QA1-Q Control of Non-conforming Product
4	Storage				material storage		material fits in roller rack or on shelf no double stacking	visual	100%	each skid / TWR	none	mfg. material handler follows I-QA1-Q Control of Non-conforming Product

CONTROL PLAN

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☐	Prototype	☐	Pre-launch	☒	Production	Key Contact/Phone Rod Sydow / 231-347-0760		Date (Orig.) 1/25/1993	Date (Rev.) 4/13/2011
Control Plan Number 7116-4025 7116-4026						Core Team Gary T. Mason, Meridith Porath / 231-347-0760		Customer Engineering Approval/Date (if Req'd)	
						Supplier/Plant Approval/Date <i>Gary T. Mason 4/13/11</i>			
Supplier/Plant Circuit Controls Corp.			Supplier Code 022728430			Other Approval/Date (if Req'd)		Customer Quality Approval/Date (if Req'd)	
								Other Approval/Date (if Req'd)	

Part Number		Print Number	Revision Level	Part Name/Description
7116-4025	7116-4026	7116-4025:R	C05-ZF20	2.3 II Sealed Terminal Female
7116-4025	7116-4026	7116-4025:GP	C09-A316	090-II Female Sealed Terminal
7116-4025	7116-4026	7116-4025:CR	C00-A286	090-II Female Sealed Terminal
	7116-4026	7116-4026:RU	C99-P198	090-II Female Sealed Terminal
F77B-14474-AA	1S7T-14474-HA	1S7T-14474-HA	AELE-E-11784007-167	TRMNL WIR SNAP ON FMLE
A 017 545 71 26 kZ		A 240 982 00 26	Y09-0461	2.3II (090II) WP + NWP System Female Terminal
7116-4025	7116-4026	09162110	002	090 II Sealed Terminal Female

			Characteristics			Special Char. Class	Methods					Reaction Plan
Part/ Process Number	Process Name/ Operation Description	Machine, Device, Jig, Tools For Mfg.	No.	Product	Process		Product/Process Specification/ Tolerance	Evaluation Measurement Technique	Sample		Control Method	
									Size	Freq.		
5	Move material to press	forklift			material movement		raw material ticket reel count sheet	scan raw material ticket to reel count sheet	100%	each skid / TWR	Trans4M database	mfg. material handler follows I-QA1-Q Control of Non- conforming Product
6	Payoff material	payoff			payoff		process standard (database)	visual	100%	each setup	Production Schedule Set-up Execution Log	die set-up person adjusts set-up
7	Setup	die, stamping machine			die/ stamping		process standard (database) Setup WI C-MF007-Q	visual	100%	each setup	Production Schedule Set-up Execution Log	die set-up person adjusts set-up/ follows I-QA1-Q Control of Non- conforming Product
				box width		*	:DC 3.35 ~ 2.65	IM & TE specified	1/125	each FP annual layout	1st Piece Inspection record 1st Piece Inspection form QA-FI002 Control Chart SPC Database	die set-up person adjusts set-up/ follows I-QA1-Q Control of Non- conforming Product

CONTROL PLAN

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☐ Prototype	☐ Pre-launch	☒ Production	Key Contact/Phone		Rod Sydow / 231-347-0760		Date (Orig.)	1/25/1993		Date (Rev.)	4/13/2011	
Control Plan Number			7116-4025		7116-4026		Core Team		Gary T. Mason, Meridith Porath / 231-347-0760			
			Supplier/Plant		Supplier Code		Supplier/Plant Approval/Date		Customer Engineering Approval/Date (if Req'd)			
Circuit Controls Corp.			022728430				Gary T. Mason 4/13/11		Customer Quality Approval/Date (if Req'd)			
							Other Approval/Date (if Req'd)		Other Approval/Date (if Req'd)			

Part Number		Print Number	Revision Level	Part Name/Description
7116-4025	7116-4026	7116-4025:R	C05-ZF20	2.3 II Sealed Terminal Female
7116-4025	7116-4026	7116-4025:GP	C09-A316	090-II Female Sealed Terminal
7116-4025	7116-4026	7116-4025:CR	C00-A286	090-II Female Sealed Terminal
	7116-4026	7116-4026:RU	C99-P198	090-II Female Sealed Terminal
F77B-14474-AA	1S7T-14474-HA	1S7T-14474-HA	AELE-E-11784007-167	TRMNL WIR SNAP ON FMLE
A 017 545 71 26 kZ		A 240 982 00 26	Y09-0461	2.3II (090II) WP + NWP System Female Terminal
7116-4025	7116-4026	09162110	002	090 II Sealed Terminal Female

			Characteristics			Special Char. Class	Methods				Reaction Plan	
Part/ Process Number	Process Name/ Operation Description	Machine, Device, Jig, Tools For Mfg.	No.	Product	Process		Product/Process Specification/ Tolerance	Evaluation Measurement Technique	Sample			Control Method
									Size	Freq.		
8	1st Piece Inspection			dimension appearance		1st Piece Inspection form QA-FI002 First Piece Inspection W/ K-QA021-Q	visual, gages per 1st Piece Inspection form QA-FI002	1 pc	each setup	1st Piece Inspection criteria 1st Piece Inspection Form QA-FI002	die set-up person adjusts set-up/ follows I-QA1-Q Control of Non-conforming Product	
9	Stamping	press			stamping	process standard spm (database)	visual	100%	each setup	Production Schedule Set-up Execution Log	die set-up person adjusts set-up/ follows I-QA1-Q Control of Non-conforming Product	
10	Take up parts	winder			winding	process standard quantity, reel size (database)	visual	100%	each reel	Production Schedule Set-up Execution Log	die set-up person adjusts set-up/ follows I-QA1-Q Control of Non-conforming Product	

CONTROL PLAN

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☐ Prototype		☐ Pre-launch		☒ Production		Key Contact/Phone Rod Sydow / 231-347-0760		Date (Orig.) 1/25/1993		Date (Rev.) 4/13/2011	
Control Plan Number 7116-40257116-4026						Core Team Gary T. Mason, Meridith Porath / 231-347-0760		Customer Engineering Approval/Date (if Req'd)			
						Supplier/Plant Approval/Date <i>Gary T. Mason 4/13/11</i>					
Supplier/Plant Circuit Controls Corp.			Supplier Code 022728430			Other Approval/Date (if Req'd)		Customer Quality Approval/Date (if Req'd)			
						Other Approval/Date (if Req'd)					

Part Number		Print Number	Revision Level	Part Name/Description	
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7116-4025	7116-4026	7116-4025:GP	C09-A316	090-II Female Sealed Terminal	
7116-4025	7116-4026	7116-4025:CR	C00-A286	090-II Female Sealed Terminal	
	7116-4026	7116-4026:RU	C99-P198	090-II Female Sealed Terminal	
F77B-14474-AA	1S7T-14474-HA	1S7T-14474-HA	AELE-E-11784007-167	TRMNL WIR SNAP ON FMLE	
A 017 545 71 26 kZ		A 240 982 00 26	Y09-0461	2.3II (090II) WP + NWP System Female Terminal	
7116-4025	7116-4026	09162110	002	090 II Sealed Terminal Female	

			Characteristics			Special Char. Class	Methods					Reaction Plan
Part/ Process Number	Process Name/ Operation Description	Machine, Device, Jig, Tools For Mfg.	No.	Product	Process		Product/Process Specification/ Tolerance	Evaluation Measurement Technique	Sample		Control Method	
									Size	Freq.		
11	Operator / In-Process Inspection			dimension appearance			Operator Inspection Record QA-FI005	gages per Operator Inspection Record QA-FI005 visual (checks performed by operator)	1 pc	see Reel Count Retention record MF-F151 & Operator Inspection Sample Results QA-FI060	Reel Count Retention record Reel Count Retention form MF-F151 Operator Inspection Sample Results record Operator Inspection Sample Results form QA-FI060	operator shuts down process/follows I-QA1-Q Control of Non-conforming Product
				dimension appearance			In-Process Inspection form QA-FI003 In-Process Inspection WI K-MF022-Q	gages per In-Process Inspection form QA-FI003 visual, (all checks performed by floor inspector)	1 pc	per Operator Inspection Record QA-FI005	In-Process Inspection record In-Process Inspection form QA-FI003	floor inspector shuts down process/follows I-QA1-Q Control of Non-conforming Product
12	Move to Final Inspection	product cart			material movement		no damage	visual	100%	each skid	none	operator follows I-QA1-Q Control of Non-conforming Product

CONTROL PLAN

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☐ Prototype	☐ Pre-launch	☒ Production	Key Contact/Phone		Rod Sydow / 231-347-0760		Date (Orig.)	1/25/1993		Date (Rev.)	4/13/2011	
Control Plan Number			7116-4025		7116-4026		Core Team		Gary T. Mason, Meridith Porath / 231-347-0760			
			Supplier/Plant		Supplier Code		Supplier/Plant Approval/Date		Customer Engineering Approval/Date (if Req'd)			
Circuit Controls Corp.			022728430				Other Approval/Date (if Req'd)		Customer Quality Approval/Date (if Req'd)			
							Other Approval/Date (if Req'd)		Other Approval/Date (if Req'd)			

Part Number		Print Number	Revision Level	Part Name/Description	
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7116-4025	7116-4026	7116-4025:CR	C00-A286	090-II Female Sealed Terminal	
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F77B-14474-AA	1S7T-14474-HA	1S7T-14474-HA	AELE-E-11784007-167	TRMNL WIR SNAP ON FMLE	
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			Characteristics			Special Char. Class	Methods					Reaction Plan
Part/ Process Number	Process Name/ Operation Description	Machine, Device, Jig, Tools For Mfg.	No.	Product	Process		Product/Process Specification/ Tolerance	Evaluation Measurement Technique	Sample		Control Method	
									Size	Freq.		
13	Final Inspection			dimension appearance			In-Process Inspection form QA-FI003 Final Inspection WI K-QA004-Q	gages per In-Process Inspection form QA-FI003, visual	1 pc	each skid	In-Process Inspection record In-Process Inspection form QA-FI003	Final Inspector shuts down process/follows I-QA1-Q Control of Non-conforming Product
14	Move to Packaging Area	product cart			material movement		no damage	visual	100%	each skid	none	Final Inspector follows I-QA1-Q Control of Non-conforming Product
15	Packaging				packaging		Box Handling WI F-MF004-Q	visual, scan into inventory	100%	each box	Trans4M database	Box Handler follows I-QA1-Q Control of Non-conforming Product
16	Move Finished Product to Storage Area	forklift			material movement		Storage of Finished Goods WI F-PC003-Q no damage	visual	100%	each skid	Trans4M database	Shipping forklift operator follows I-QA1-Q Control of Non-conforming Product

CONTROL PLAN

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☐ Prototype	☐ Pre-launch	☒ Production	Key Contact/Phone		Rod Sydow / 231-347-0760		Date (Orig.)	1/25/1993		Date (Rev.)	4/13/2011	
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			Supplier/Plant		Supplier Code		Supplier/Plant Approval/Date		Customer Engineering Approval/Date (if Req'd)			
Circuit Controls Corp.			022728430				Other Approval/Date (if Req'd)		Customer Quality Approval/Date (if Req'd)			
							Other Approval/Date (if Req'd)		Other Approval/Date (if Req'd)			

Part Number		Print Number	Revision Level	Part Name/Description	
7116-4025	7116-4026	7116-4025:R	C05-ZF20	2.3 II Sealed Terminal Female	
7116-4025	7116-4026	7116-4025:GP	C09-A316	090-II Female Sealed Terminal	
7116-4025	7116-4026	7116-4025:CR	C00-A286	090-II Female Sealed Terminal	
	7116-4026	7116-4026:RU	C99-P198	090-II Female Sealed Terminal	
F77B-14474-AA	1S7T-14474-HA	1S7T-14474-HA	AELE-E-11784007-167	TRMNL WIR SNAP ON FMLE	
A 017 545 71 26 kZ		A 240 982 00 26	Y09-0461	2.3II (090II) WP + NWP System Female Terminal	
7116-4025	7116-4026	09162110	002	090 II Sealed Terminal Female	

			Characteristics			Special Char. Class	Methods					Reaction Plan
Part/ Process Number	Process Name/ Operation Description	Machine, Device, Jig, Tools For Mfg.	No.	Product	Process		Product/Process Specification/ Tolerance	Evaluation Measurement Technique	Sample		Control Method	
									Size	Freq.		
17	Dock Audit			appearance		Dock Audit Inspection form QA-F1058 Dock Audit Inspection WI K-QA016-Q	visual	100%	per WI K-QA016-Q Dock Audit Inspection	Dock Audit Inspection form QA-F1058	Receiving inspector follows I-QA1-Q Control of Non-conforming Product	
18	Storage				material storage	material fits on shelf stack height no double stacking	visual	100%	each skid	none	Shipping forklift operator follows I-QA1-Q Control of Non-conforming Product	
19	Move to Staging Area	forklift, pallet jack			material movement	Pulling Product for Shipping WI F-PC013-Q	visual	100%	each skid	picklist	Shipping forklift operator follows I-QA1-Q Control of Non-conforming Product	
20	Shipping	forklift			shipped	Pulling Product for Shipping WI F-PC013-Q	visual	100%	each skid	picklist	Shipping forklift operator follows I-QA1-Q Control of Non-conforming Product	

Potential
Failure Mode and Effects Analysis
PFMEA

Core Team Gary Mason - OA, Ron Nuttall - DT, Meridith Porath - ME, Tom Bosch - DE, Dan Muller - MFG DIRECTOR, Jim Hodison - PURCH, Chad Cranney - MFG MNGR

Part Name Terminal
Part Number Refer to Part Matrix

Process Function/ Requirements	Potential Failure Mode	Potential Effect(s) of Failure	SEV	CL	Potential Cause(s) of Failure	OCC	Current Process Controls - Prevention	Current Process Controls - Detection	DET RPN	Recommended Action	Responsibility & Target Completion Date	Action Taken	SEV	OCC	DET	RPN
Receiving Raw Material (1) • To move material from truck to dock	Handling Damage	Material Cannot Be Used	2		Material was Dropped By Hi-Lo	1	Material Certification Hi-Lo Training		2	4	None					
Receiving Inspection (2) • Inspect raw material to verify material specs	Material Does Not Meet Specification	Rejected Material	2		Plating is No Good	2	Material Certification	Receiving Inspection WI QA4.10-1023 Set up Verification at Supplier 100% Gage Inspection on Finished Rolling at Supplier	4	16	None					
					Dimensional Defects	2	Material Certification	Receiving Inspection WI QA4.10-1023 Set up Verification at Supplier 100% Gage Inspection on Finished Rolling at Supplier	4	16	None					
					Visual Defects	2		Receiving Inspection WI QA4.10-1023	8	32	None					
					Procedures Not Followed	4	Red Stickers to Identify WI QA4.13-1016	Visually Look for Red Sticker	7	168	QA 3/1/2005 Make Red Stickers More Readily Available	Stickers Placed at Each Press 2/21/2005	6	2	7	84
	No Good Material Gets Mixed in With Good Material	Defective Material Gets Used in Production	6		Material Not Identified Rejected Material is Set Next to Press to Get Written Up & Gets Used Again	4			7		QA 3/18/2005 Add More Information to Red Sticker Verify Current Procedure	Stickers Updated 2/21/2005 Verified Procedure 2/28/2007	6	2	7	84

Process Function/Requirements	Potential Failure Mode	Potential Effect(s) of Failure	SEV	CL	Potential Cause(s) of Failure	OCC	Current Process Controls - Prevention	Current Process Controls - Detection	DET	RPN	Recommended Action	Responsibility & Target Completion Date	Action Taken	SEV	OCC	DET	RPN
Move Material to Storage (3)	Absence of Receiving Inspection	Good Material Gets Put on Hold	6		Procedures Not Followed	4	Red Stickers to Identify WI QA4.13-1016	Visually Look for Red Sticker	7	168	Make Red Stickers More Readily Available	QA 3/1/2005	Stickers Placed at Each Press 2/21/2005	6	2	7	84
					Material Not Identified	4					Add More Information to Red Sticker	QA 3/18/2005	Stickers Updated 2/21/2005	6	2	7	84
					Urgent Raw Material System Failed	4	Urgent Raw Material Request WI MF4.10-1106	Raw Material Tag	2	40	Revise Urgent Raw Material Request Work Instruction & Form	Manufacturing 9/30/2005	Added a notification flag to urgent material Jan-07	5	2	2	20
					Material Not Aligned When Placed in Roller Racks	2	Material Handler Training		2	24	Add Guides To Material Roller Racks	Manufacturing 9/30/2005	Added Guides Jun-06	6	1	2	12
Place material in storage location	Material is Damaged		6		Forks Not Wide Enough To Pick Up TWR Through Center Hole	1	Material Handler Training		2	12	None						
					Forks Not Lowered Enough and Go Through Pancake Material	1	Material Handler Training		2	12	None						
					Material Removed From Pallet & Rolls Away	1	Stop Blocks		1	6	None						
					Marks Left On Material After Banding Is Removed	2	Bigger Spacers Placed Under Banding		2	24	Order Different Kind of Scissors To Cut Banding	Manufacturing 3/4/2005	Ordered Strapping Cutters 2/15/2005	6	1	2	12

Process Function/ Requirements	Potential Failure Mode	Potential Effect(s) of Failure	SEV	CL	Potential Cause(s) of Failure	OCC	Current Process Controls - Prevention	Current Process Controls - Detection	DET RPN	Recommended Action	Responsibility & Target Completion Date	Action Results			
												Action Taken	SEV	OCC	RPN
	Inventory Error	Material Shortage Leading to Loss of Production & Missed Shipments	7		Too Many Steps to Scan	4	Scanners Updated	Cycle Counts	3	Simplify Process	Manufacturing 7/22/2005	Reduce Number of Steps	7	2	42
					Re-Weights	2			3						
					Material Removed from Hold not Scanned Correctly	2			3	Verify Material Before Setup	Manufacturing 9/30/2005	Material scanned at setup and at lot number change 3/18/2006	7	2	42
					Bad Database/ Software System	2			3						
					Scanner Failure	2			3						
Storage (4) * Store material until needed for production	Discoloration	Material Cannot be Used High Resistance Corrosion	6		Material Sits Too Long In Storage	1	FIFO Annual Inventory	Visual at Setup	3	None					
						2	Spacers	Visual at Setup	3	None					
	Damage to Material	Material Has to be Reworked	6		Double Stacking	2									

Potential
Failure Mode and Effects Analysis
PFMEA

Core Team Gary Mason - QA, Ron Nuttal - DT, Meridith Porath - ME, Tom Bosch - DE, Dan Muller - MFG DIRECTOR, Jim Hodson - PURCH, Chad Cranney - MFG MNGR

Part Name Terminal
Part Number Refer to Part Matrix

Process Function/ Requirements	Potential Failure Mode	Potential Effect(s) of Failure	SEV	CL	Potential Cause(s) of Failure	OCC	Current Process Controls - Prevention	Current Process Controls - Detection	DET RPN	Recommended Action	Responsibility & Target Completion Date	Action Taken	SEV	OCC	DET	RPN
Move Material to Press (5) * Move material from storage to production location * Execute inventory transaction in inventory control system	Handling Damage	Material is Damaged	6		Forks Not Wide Enough To Pick Up TWR Through Center Hole	1	Material Handler Training		2	12	None					
					Forks Not Lowered Enough and Go Through Pancake Material	1	Material Handler Training		2	12	None					
	Inventory Transaction Error	Material Shortage Leading to Loss of Production & Missed Shipments	7		Too Many Steps to Scan Material Removed from Storage not Scanned Correctly	4	Scanners Updated	Cycle Counts	3	84	Simplify Process 7/22/2005	Reduce Number of Steps scanned at setup and at lot number change 3/18/2006	7	2	3	42
Payoff Material (6) * Feed material from coil using dancer arm control & roller driven uncoiler	Improper Payoff Tension	Die Misfeeds	5		Improper Weight Adjustment	2	Preventive Maintenance	Operator Instructions/ Training	3	30	None					
					Slow Payoff Speed	2	Dancer Arm High Limit Switch	Verify at Each Setup	3							
					Payoff Stops	1			3							
	Burrs on Material	Die Misfeeds	7		Banding on Raw Material	3	Supplier Eliminate Banding & Use Tape to Secure Material		2	42	None					
					Cardboard Separators Between Layers				2							

Part Name Terminal
Part Number Refer to Part Matrix

Potential
Failure Mode and Effects Analysis
PFMEA

FMEA Number
Page 5 of 10
Prepared By Meridith Porath - ME
FMEA Date (Orig) 11-16-00 (Rev) 04-14-09
Category A

Core Team Gary Mason - QA, Ron Nuttal - DT, Meridith Porath - ME, Tom Bosch - DE, Dan Muller - MFG DIRECTOR, Jim Hodson - PURCH, Chad Cranney - MFG MNGR

Process Function/ Requirements	Potential Failure Mode/ Visual/ Defects	Potential Effect(s) of Failure	SEV	CL	Potential Cause(s) of Failure	OCC	Current Process Controls - Prevention	Current Process Controls - Detection	DET RPN	Recommended Action	Responsibility & Target Completion Date	Action Taken	SEV	OCC	DET	RPN
Setup (7) * Install die to press * Stock up die * Run parts out of press * Setup/calibrate auxiliary equipment * Bring gages & paperwork to press	Dimensional Defects	Parts cannot be crimped	8	*	Slugs in die	1	Preventative Maintenance	Progression sensor	2	1st piece checks	Die Maint Dec-99	Implemented 1st piece checks	8	1	1	8
		High Insertion Force					Die cleaning at every stock up & misfeed									
		Low Insertion Force														
		No Contact														
		Short Circuit														
		Intermittent Gap														
		Spring Parallelism														
		Incorrect Box Form			Broken tooling	3	Die prep		3	72	None					
					Worn tooling	3	Die prep		3	72	Die Maint Dec-99	Implemented 1st piece checks	8	3	2	48
					No lubrication	2		Operator instructions/ training Float sensor to detect level of lubrication	2	32	None					
					*** Incorrect settings for top stop on press	2		Operator instructions/ training	2	32	MFG 4/29/2008	Updated camera settings	8	1	2	16
Missing Contact Spring **		Low Insertion Force	8		Die Stock Up	9		On-line monitoring equipment	2	144	QA 12/9/2004	Work Instruction QA4.10-1024	8	9	1	72
		No Contact														

ME-F003
Effective Date: 9-24-04
Revision Level: D

Process Function/ Requirements	Potential Failure Mode	Potential Effect(s) of Failure	SEV	CL	Potential Cause(s) of Failure	OCC	Current Process Controls - Prevention	Current Process Controls - Detection	DET RPN	Recommended Action	Responsibility & Target Completion Date	Action Taken	SEV	OCC	DET	RPN
	Missing Weld	Short Circuit No Contact	8		Weld detector not working Supplier coil map incorrect Weld not identified by supplier	2	Raw Material Specification & End of Strip Identification (ME-RF059)	Weld Sensor	2	32	Verify raw material weight to coil map Implement weld sensor checks	Shift Supervisor compares raw material weight to coil map Weld sensors checked at beginning of each shift	8	2	1	16
1st Piece Inspection (8) * Inspect product characteristics according to dimensional tolerances defined on inspection paperwork using specified inspection equipment	Measurement Error	Customer cannot use terminals	5		Lack of training	1		Operator instructions/ training	3	15	None					
Stamping (9) * Form part to print specifications using progressive die & lubrication system	Visual/ Dimensional Defect	Parts cannot be crimped High Insertion Force Low Insertion Force No Contact Short Circuit Intermittent Gap Spring Parallelism Incorrect Box Form	8		Wrong Equipment was used Slugs in die	1	Equipment ID'd on Inspection Paperwork Preventative Maintenance Die cleaning at every stock up & misfeed	Secondary Inspection Process Progression sensor	7	35	None					
					Broken tooling	3	Die prep		2	16	1st piece checks	Implemented 1st piece checks	8	1	1	8
									3	72	None					

Process Function/ Requirements	Potential Failure Mode	Potential Effect(s) of Failure	SEV	CL	Potential Cause(s) of Failure	OCC	Current Process Controls - Prevention	Current Process Controls - Detection	DET	RPN	Recommended Action	Responsibility & Target Completion Date	Action Results				
													Action Taken	SEV	OCC	DET	RPN
					Worn tooling	3	Die prep		3	72	1st piece checks	Die Maint Dec-99	Implemented 1st piece checks	8	3	2	48
					No lubrication	2		Operator instructions/ training Float sensor to detect level of lubrication	2	32	None						
					*** Incorrect settings for top stop on press	2		Operator instructions/ training	2	32	Update camera parameters	MFG 4/29/2008	Updated camera settings	8	1	2	16
	Missing Contact Spring **	Low Insertion Force No Contact	8		Die Stock Up	9		On-line monitoring equipment	2	144	Create work instruction to isolate and remove missing spring section	QA 12/9/2004	Work Instruction QA4.10-1024	8	9	1	72
	Missing Weld	Short Circuit No Contact	8		Weld detector not working Supplier coil map incorrect Weld not identified by supplier	2	Raw Material Specification & End of Strip Identification (ME-RF059)	Weld Sensor	2	32	Verify raw material weight to coil map Implement weld sensor checks	Mfg 1/31/2008	Shift Supervisor compares raw material weight to coil map Weld sensors checked at beginning of each shift	8	2	1	16
	Loose winding Tight winding Flipped winding Kinked winding Stacked winding Bent terminals	Customer has difficulty paying off terminals	4		Wrong fixturing used	3		Visual operator inspections	8	96	None						
Take up Parts (10) * Wind product onto reels according to process standard, using proper feed arm																	

Process Function/ Requirements	Potential Failure Mode	Potential Effect(s) of Failure	SEV	CL	Potential Cause(s) of Failure	OCC	Current Process Controls - Prevention	Current Process Controls - Detection	Recommended Action	Responsibility & Target Completion Date	Action Taken	SEV	OCC	DET	RPN
Operator/ In-Process Inspection (11) * Inspect product characteristics according to dimensional tolerances defined on inspection paperwork using specified inspection equipment	Measurement Error	Customer cannot use terminals	5		Lack of training	1		Operator instructions/ training	None						
Move to Final Inspection (12) * Move reel cart to final inspection area with inspection paperwork & sample	Damaged Terminals	Customer cannot use terminals	2		Wrong Equipment was used	1	Equipment ID'd on Inspection Paperwork	Secondary Inspection Process	None						
Final Inspection (13) * Inspect product characteristics according to dimensional tolerances defined on inspection paperwork using specified inspection equipment	Measurement Error	Customer cannot use terminals	5		Lack of training	1		Operator instructions/ training	None						
Move to Packaging Area (14) * Move reel cart to packaging area	Damaged Terminals	Customer cannot use terminals	2		Terminal Reels fell off of Cart	1		Instructions/ Training	None						

Process Function/ Requirements	Potential Failure Mode	Potential Effect(s) of Failure	SEV	CL	Potential Cause(s) of Failure	OCC	Current Process Controls - Prevention	Current Process Controls - Detection	DET RPN	Recommended Action	Responsibility & Target Completion Date	Action Taken	SEV	OCC	DET RPN
Packaging (15) * Scan reel labels * Print carton labels * Package product according to packaging standard * Apply carton labels	Customer Receives Wrong Terminals	Customer cannot use terminals	4		Wrong label was used	4		Visual operator inspections	7	Action Barcode Scanning	Production Control 07-01-02	Scanners Implemented 06-03-02	4	3	36
Move to Storage Area (16) * Move pallet with hi-lo to storage area	Damaged Terminals	Customer cannot use terminals	2		Terminals were dropped by hi-lo	1		Instructions/ Training	3	None					
Dock Audit (17) * Verify reel & carton labels match	Label Verification Error	Customer receives wrong parts	2		Wrong Paperwork was used	1		Instructions/ Training	3	None					
Storage (18) * Store product until receive order	Discoloration	Increased resistivity	2		Terminals were stored too long	1	FIFO	Instructions/ Training	2	None					
Move to Staging Area (19) * Move pallet to staging area with hi-lo	Damaged Terminals	Customer cannot use terminals	2		Terminals were dropped by hi-lo	1		Instructions/ Training	3	None					
Shipping (20) * Load pallets into trailer or overseas container	Damaged Terminals Wrong Terminals Shipped	Customer cannot use terminals Customer cannot use terminals	2 2		Terminals were dropped by hi-lo while loading onto truck Reel & Carton Label Do Not Match	1 2	 Dock Audit	Instructions/ Training Instructions/ Training	3 2	None None					

Potential
Failure Mode and Effects Analysis
PFMEA

REVISION HISTORY:

DATE	CHANGE MADE	INITIATOR
9/24/2004	Added "Current Process Controls - Prevention" & "Current Process Controls - Detection" columns. Added Revision History.	Meridith Porath
12/8/2004	Added Steps to Match Process Flow Diagram & Control Plan	Meridith Porath
12/9/2004	Updated Recommended Action for Stamping & Set Up Potential Failure Mode of Missing Contact Spring	Rod Sydown
1/6/2005	Added Footnote: ** This Potential Failure Mode only applies to marriage terminals	Jack George
3/17/2006	Updated Severity Rankings for Setup and Stamping	Meridith Porath
4/4/2006	Added Process Function/Requirements	Meridith Porath
2/28/2007	Updated Action Results for Process 2 & Process 3	Meridith Porath/Dan Muller
9/17/2007	Updated Setup and Stamping processes to reflect Failure Modes for CimCool oil system failure. Related to Ford Issue.	Meridith Porath/Dan Muller
9/27/2007	Added "Verify Aeration" under Current Process Controls - Detection & Updated Action Taken for Setup Process	Meridith Porath/Rod Sydown
1/31/2008	Added Missing Welds to Process 7 & 9; Updated Core Team	Meridith Porath/Chad Cranney
3/10/2008	Removed Failure Mode of Loss of Continuity due to wrong oil concentration in Steps 7 & 9; CCC no longer uses oil that requires the Dosatron Oil Dispensing System; See SREA dated 3-3-08	Meridith Porath/Rod Sydown
5/6/2008	Added "Incorrect box form" to Potential Effects of Failure and "Incorrect settings for top stop on press" to Potential Causes of Failure to steps 7 & 9; Also added footnote: ***This Potential Cause of Failure only applies to parts that run in a B-Control Press	Meridith Porath/Jason Jones
3/25/2009	Corrected RPN's in steps 7 & 9 due to calculation error (were 81 should have been 72)	Meridith Porath
4/14/2009	Revised Severity Rankings in steps 4, 7 & 9; Corrected RPN's in steps 7 & 9 due to calculation error (were 36 should have been 32)	Meridith Porath

* Refer to Appropriate Process Flow Chart, Control Plan or Inspection Standard for Special Character Information
 ** This Potential Failure Mode only applies to marriage terminals
 *** This Potential Cause of Failure only applies to parts that run in a B-Control Press

EnGagePlus! R&R Results

MARSHAL OAKLEY
TAMI IDALASKI
GERRY PATERSON

Gage Information

Company:	CIRCUIT CONTROLS	Serial Number:	7150666
Gage I.D.:	Q.A. LAB	Gage Type:	DIGITAL MICROMETER(MI)
Size:	0-25MM	Unit of Measure:	METRIC
Gage Description:	DIGITAL MICROMETER		

Part Information

Company: CIRCUIT CONTROLS
Part Number: ALL
Part Description:
Characteristic: BLADE WIDTH
Master Measurement: 2.25590000
Specification: 2.20000000 - 2.30000000
Tolerance: 0.10000000
Process Variation: 0.01000000

Study Environment Information

R&R Date: 9/10/2010
Time: 7:49:56 AM
Relative Humidity: 0.00 %
Temperature:
Cost: \$0.00
Number of Parts: 10
Number of Trials: 3
R&R Performed By: jhoffma

Results Information:

	Measurement Unit Analysis		Percent of Tolerance		Percent of Process Var.		% of Total Var.	
Repeatability:	0.00001969	0.00	0.11816000	0.12	0.19693333	0.20	6.23844013	6.24
Reproducibility:	0.00001706	0.00	0.10237156	0.10	0.17061927	0.17	5.40486502	5.40
Gage R&R:	0.00002606	0.00	0.15633849	0.16	0.26056414	0.26	8.25413237	8.25
Part Variation:	0.00031460	0.00	1.88760000	1.89	3.14600000	3.15	99.65876429	99.66

X Difference:	0.00003333	Est. Replication Sd:	0.00001969
Total Variation:	0.00031568	Est. Appraiser Sd:	0.00001749
R Bar:	0.00003333	Est. Meas. Error Sd:	0.00002633
Rp:	0.00100000	Sample to Sample Sd:	0.00031466
Upper Control Limit:	0.00008583	Signal To Noise Ratio:	11.94871239
Lower Control Limit:	0.00000000	# of Dist. Categories:	16
Passes Below:	10.00 %	Acceptance Based On:	% R&R
Fails Above:	30.00 %	PASS/FAIL:	PASS
% TV of Tolerance:	%		

Trial Three Report

MARSHAL OAKLEY
TAMI IDALASKI
GERRY PATERSON

Gage Information

Company:	CIRCUIT CONTROLS	Serial Number:	7150666
Gage I.D.:	Q.A. LAB	Gage Type:	DIGITAL MICROMETER(MI)
Size:	0-25MM	Unit of Measure:	METRIC
Gage Description:	DIGITAL MICROMETER		

Part Information

Company:	CIRCUIT CONTROLS		
Part Number:	ALL		
Part Description:			
Characteristic:	BLADE WIDTH		
Master Measurement:	2.25590000		
Specification:	2.20000000 - 2.30000000		
Tolerance:	0.10000000		
Process Variation:	0.01000000		

Study Environment Information

R&R Date:	9/10/2010	
Time:	7:49:56 AM	
Relative Humidity:	0.00	%
Temperature:		
Cost:	\$0.00	
Number of Parts:	10	
Number of Trials:	3	

Trial Three Measurements

	Operator One MARSHAL OAKLEY	Operator Two TAMI IDALASKI	Operator Three GERRY PATERSON	Part Ranges	Part Averages
1	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
2	2.25800000	2.25800000	2.25800000	0.00000000	2.25800000
3	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
4	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
5	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
6	2.25800000	2.25800000	2.25800000	0.00000000	2.25800000
7	2.25700000	2.25700000	2.25800000	0.00100000	2.25733333
8	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
9	2.25800000	2.25800000	2.25800000	0.00000000	2.25800000
10	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
Grand Averages	2.25730000	2.25730000	2.25740000	0.00010000	2.25733333

Trial Two Report

MARSHAL OAKLEY
TAMI IDALASKI
GERRY PATERSON

Gage Information

Company: CIRCUIT CONTROLS
Gage I.D.: Q.A. LAB
Size: 0-25MM
Gage Description: DIGITAL MICROMETER

Serial Number: 7150666
Gage Type: DIGITAL MICROMETER(MI)
Unit of Measure: METRIC

Part Information

Company: CIRCUIT CONTROLS
Part Number: ALL
Part Description:
Characteristic: BLADE WIDTH
Master Measurement: 2.25590000
Specification: 2.20000000 - 2.30000000
Tolerance: 0.10000000
Process Variation: 0.01000000

Study Environment Information

R&R Date: 9/10/2010
Time: 7:49:56 AM
Relative Humidity: 0.00 %
Temperature:
Cost: \$0.00
Number of Parts: 10
Number of Trials: 3

Trial Two Measurements

	Operator One MARSHAL OAKLEY	Operator Two TAMI IDALASKI	Operator Three GERRY PATERSON	Part Ranges	Part Averages
1	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
2	2.25800000	2.25800000	2.25800000	0.00000000	2.25800000
3	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
4	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
5	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
6	2.25800000	2.25800000	2.25800000	0.00000000	2.25800000
7	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
8	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
9	2.25800000	2.25800000	2.25800000	0.00000000	2.25800000
10	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
Grand Averages	2.25730000	2.25730000	2.25730000	0.00000000	2.25730000

Trial One Report

MARSHAL OAKLEY
TAMI IDALASKI
GERRY PATERSON

Gage Information

Company: CIRCUIT CONTROLS
Gage I.D.: Q.A. LAB
Size: 0-25MM
Gage Description: DIGITAL MICROMETER

Serial Number: 7150666
Gage Type: DIGITAL MICROMETER(MI)
Unit of Measure: METRIC

Part Information

Company: CIRCUIT CONTROLS
Part Number: ALL
Part Description:
Characteristic: BLADE WIDTH
Master Measurement: 2.25590000
Specification: 2.20000000 - 2.30000000
Tolerance: 0.10000000
Process Variation: 0.01000000

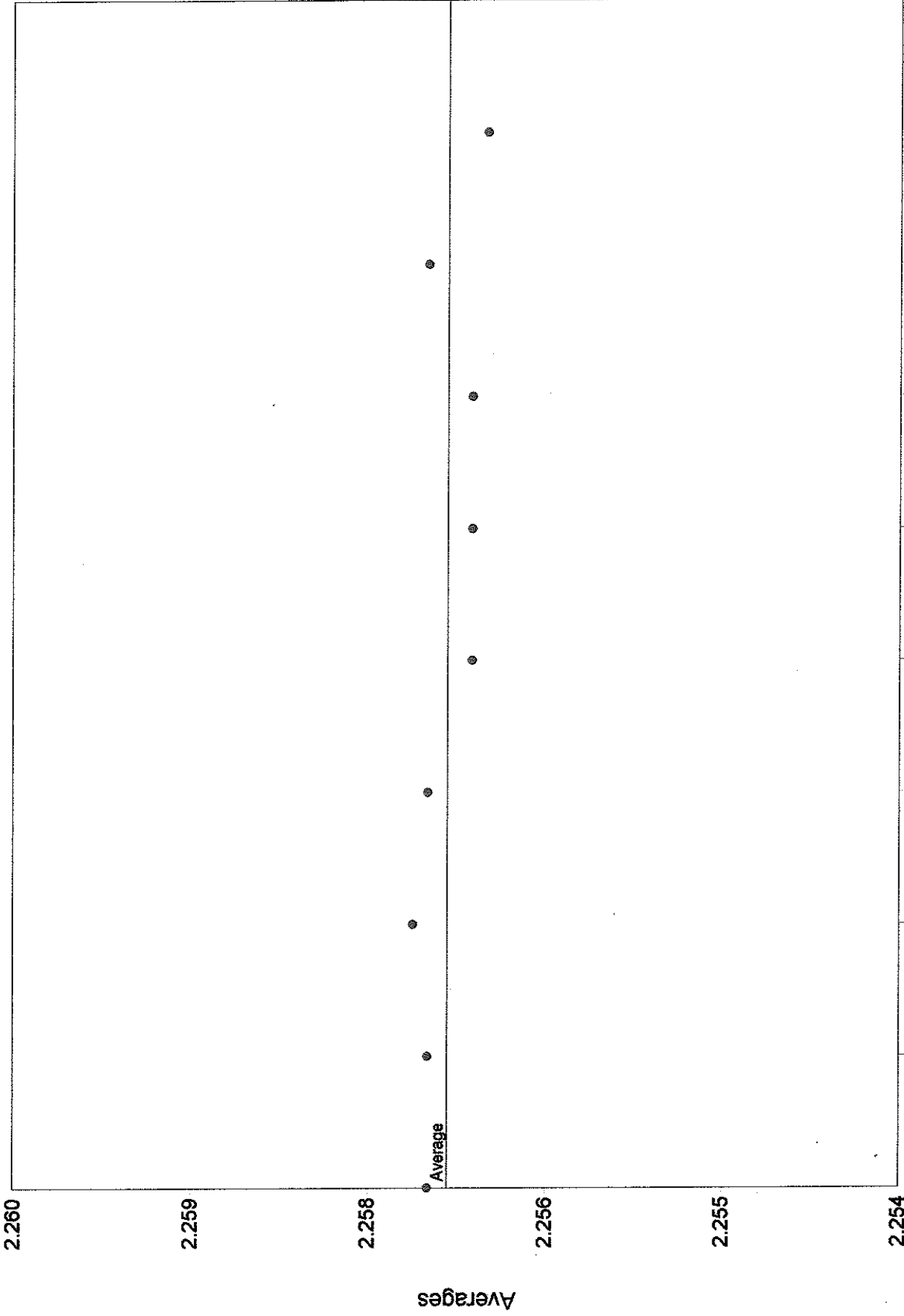
Study Environment Information

R&R Date: 9/10/2010
Time: 7:49:56 AM
Relative Humidity: 0.00 %
Temperature:
Cost: \$0.00
Number of Parts: 10
Number of Trials: 3

Trial One Measurements

	Operator One MARSHAL OAKLEY	Operator Two TAMI IDALASKI	Operator Three GERRY PATERSON	Part Ranges	Part Averages
1	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
2	2.25800000	2.25800000	2.25800000	0.00000000	2.25800000
3	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
4	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
5	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
6	2.25800000	2.25800000	2.25800000	0.00000000	2.25800000
7	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
8	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
9	2.25800000	2.25800000	2.25800000	0.00000000	2.25800000
10	2.25700000	2.25700000	2.25700000	0.00000000	2.25700000
Grand Averages	2.25730000	2.25730000	2.25730000	0.00000000	2.25730000

Stability Chart for blade width with micrometer\ 7150666 \ 9/10/2010



Linearity Study Report

Study Information:

Company:	CIRCUIT CONTROLS	Temperature:	
Serial Number:	7150666	Humidity:	
Study Date:	9/10/2010	Cost:	
Study Time:	11:14:18 AM	Number of Trials:	5
Performed By:	GERRY PATERSON	Passes Below:	10.00 %
Status:	COMPLETE	Fails Above:	30.00 %
Process Variation:	0.01000000		

Comment:

This is a study for blade width using the digital micrometer. (Mi.)

Study Measurements

Reference Value	Trial	Measurement
2.25500000	1	2.25500000
2.25500000	2	2.25500000
2.25500000	3	2.25500000
2.25500000	4	2.25600000
2.25500000	5	2.25500000

Reference Value	Trial	Measurement
2.25600000	1	2.25600000
2.25600000	2	2.25600000
2.25600000	3	2.25600000
2.25600000	4	2.25600000
2.25600000	5	2.25600000

Reference Value	Trial	Measurement
2.25700000	1	2.25700000
2.25700000	2	2.25700000
2.25700000	3	2.25800000
2.25700000	4	2.25700000
2.25700000	5	2.25700000

Reference Value	Trial	Measurement
2.25800000	1	2.25800000
2.25800000	2	2.25800000
2.25800000	3	2.25800000
2.25800000	4	2.25800000
2.25800000	5	2.25800000

Reference Value	Trial	Measurement
2.25900000	1	2.25900000
2.25900000	2	2.25900000
2.25900000	3	2.25800000
2.25900000	4	2.25900000
2.25900000	5	2.25900000

Results

Study Results	PASSED	Linearity:	0.00080000
Goodness of Fit:	0.57142857	Percent Linearity:	8.00000000

Bias Study Report

Study Information:

Company:	CIRCUIT CONTROLS	Temperature:	
Serial Number:	7150666	Humidity:	
Study Date:	09/10/2010	Cost:	
Study Time:	8:13:07 AM	Number of Trials:	10
Part Company:	CIRCUIT CONTROLS	Reference Value:	2.25700000
Part Number:		Process Variation:	0.01000000
Characteristic:		Passes Below:	10.00 %
Performed By:	GERRY PATERSON	Fails Above:	30.00 %
Status:	COMPLETE		

Comment:

This is also being used for a stability study
for digital micrometer.

Study Measurements

<u>Trial</u>	<u>Measurement</u>
1	2.25700000
2	2.25600000
3	2.25600000
4	2.25700000
5	2.25700000
6	2.25700000
7	2.25800000
8	2.25700000
9	2.25700000
10	2.25600000

Results

Study Result:	PASSED Bias:	-0.00020000
Observed Average:	2.25680000 Percent Bias:	2.00000000

EnGagePlus! R&R Results

TAMI IDALASKI
JERRY PATTERSON
PHIL WHITTAKER

Gage Information

Company: CIRCUIT CONTROLS
Gage I.D.: JOE HOFFMAN
Size: 0/150MM
Gage Description: DIGITAL CALIPERS

Serial Number: 04527175
Gage Type: DIGITAL CALIPER (CA)
Unit of Measure: METRIC

Part Information

Company: CIRCUIT CONTROLS
Part Number: ALL
Part Description:
Characteristic: BODY WIDTH
Master Measurement: 9.04020000
Specification: 8.90000000 - 9.10000000
Tolerance: 0.20000000
Process Variation: 0.04000000

Study Environment Information

R&R Date: 10/13/2010
Time: 2:52:25 PM
Relative Humidity: 0.00 %
Temperature:
Cost: \$0.00
Number of Parts: 10
Number of Trials: 3
R&R Performed By: jhoffma

Results Information:

	Measurement Unit Analysis		Percent of Tolerance		Percent of Process Var.		% of Total Var.	
Repeatability:	0.00019693	0.00	0.59080000	0.59	0.49233333	0.49	6.23844012	6.24
Reproducibility:	0.00017062	0.00	0.51185817	0.51	0.42654848	0.43	5.40486891	5.40
Gage R&R:	0.00026056	0.00	0.78169267	0.78	0.65141056	0.65	8.25413490	8.25
Part Variation:	0.00314600	0.00	9.43800000	9.44	7.86500000	7.87	99.65876408	99.66

X Difference:	0.00033333	Est. Replication Sd:	0.00019689
Total Variation:	0.00315677	Est. Appraiser Sd:	0.00017489
R Bar:	0.00033333	Est. Meas. Error Sd:	0.00026334
Rp:	0.01000000	Sample to Sample Sd:	0.00314663
Upper Control Limit:	0.00085833	Signal To Noise Ratio:	11.94871239
Lower Control Limit:	0.00000000	# of Dist. Categories:	16
Passes Below:	10.00 %	Acceptance Based On:	% R&R
Fails Above:	30.00 %	PASS/FAIL:	PASS
% TV of Tolerance:	%		

Trial One Report

TAMI IDALASKI
JERRY PATTERSON
PHIL WHITTAKER

Gage Information

Company: CIRCUIT CONTROLS
Gage I.D.: JOE HOFFMAN
Size: 0/150MM
Gage Description: DIGITAL CALIPERS

Serial Number: 04527175
Gage Type: DIGITAL CALIPER (CA)
Unit of Measure: METRIC

Part Information

Company: CIRCUIT CONTROLS
Part Number: ALL
Part Description: BODY WIDTH
Characteristic: 9.04020000
Master Measurement: 8.90000000 - 9.10000000
Specification: 0.20000000
Tolerance: 0.04000000
Process Variation: 0.04000000

Study Environment Information

R&R Date: 10/13/2010
Time: 2:52:25 PM
Relative Humidity: 0.00 %
Temperature:
Cost: \$0.00
Number of Parts: 10
Number of Trials: 3

Trial One Measurements

	Operator One TAMI IDALASKI	Operator Two JERRY PATTERSON	Operator Three PHIL WHITTAKER	Part Ranges	Part Averages
1	9.03000000	9.04000000	9.04000000	0.01000000	9.03666667
2	9.03000000	9.03000000	9.03000000	0.00000000	9.03000000
3	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
4	9.03000000	9.03000000	9.03000000	0.00000000	9.03000000
5	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
6	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
7	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
8	9.03000000	9.03000000	9.03000000	0.00000000	9.03000000
9	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
10	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
Grand Averages	9.03600000	9.03700000	9.03700000	0.00100000	9.03666667

Trial Two Report

TAMI IDALASKI
JERRY PATTERSON
PHIL WHITTAKER

Gage Information

Company: CIRCUIT CONTROLS
Gage I.D.: JOE HOFFMAN
Size: 0/150MM
Gage Description: DIGITAL CALIPERS

Serial Number: 04527175
Gage Type: DIGITAL CALIPER (CA)
Unit of Measure: METRIC

Part Information

Company: CIRCUIT CONTROLS
Part Number: ALL
Part Description:
Characteristic: BODY WIDTH
Master Measurement: 9.04020000
Specification: 8.90000000 - 9.10000000
Tolerance: 0.20000000
Process Variation: 0.04000000

Study Environment Information

R&R Date: 10/13/2010
Time: 2:52:25 PM
Relative Humidity: 0.00 %
Temperature:
Cost: \$0.00
Number of Parts: 10
Number of Trials: 3

Trial Two Measurements

	Operator One TAMI IDALASKI	Operator Two JERRY PATTERSON	Operator Three PHIL WHITTAKER	Part Ranges	Part Averages
1	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
2	9.03000000	9.03000000	9.03000000	0.00000000	9.03000000
3	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
4	9.03000000	9.03000000	9.03000000	0.00000000	9.03000000
5	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
6	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
7	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
8	9.03000000	9.03000000	9.03000000	0.00000000	9.03000000
9	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
10	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
Grand Averages	9.03700000	9.03700000	9.03700000	0.00000000	9.03700000

Trial Three Report

TAMI IDALASKI
JERRY PATTERSON
PHIL WHITTAKER

Gage Information

Company: CIRCUIT CONTROLS
Gage I.D.: JOE HOFFMAN
Size: 0/150MM
Gage Description: DIGITAL CALIPERS

Serial Number: 04527175
Gage Type: DIGITAL CALIPER (CA)
Unit of Measure: METRIC

Part Information

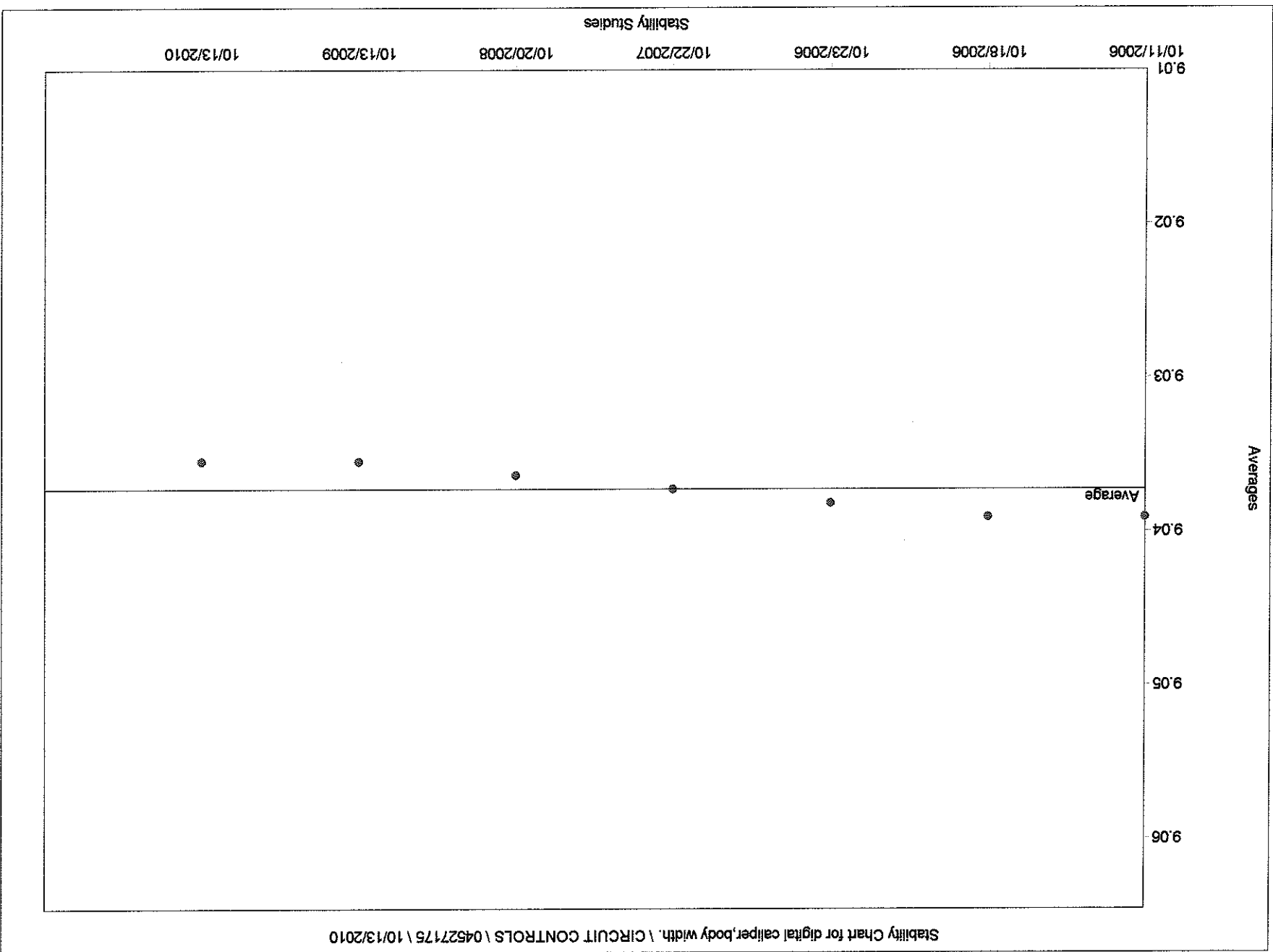
Company: CIRCUIT CONTROLS
Part Number: ALL
Part Description: BODY WIDTH
Characteristic: 9.04020000
Master Measurement: - 9.10000000
Specification: 8.90000000
Tolerance: 0.20000000
Process Variation: 0.04000000

Study Environment Information

R&R Date: 10/13/2010
Time: 2:52:25 PM
Relative Humidity: 0.00 %
Temperature:
Cost: \$0.00
Number of Parts: 10
Number of Trials: 3

Trial Three Measurements

	Operator One TAMI IDALASKI	Operator Two JERRY PATTERSON	Operator Three PHIL WHITTAKER	Part Ranges	Part Averages
1	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
2	9.03000000	9.03000000	9.03000000	0.00000000	9.03000000
3	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
4	9.03000000	9.03000000	9.03000000	0.00000000	9.03000000
5	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
6	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
7	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
8	9.03000000	9.03000000	9.03000000	0.00000000	9.03000000
9	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
10	9.04000000	9.04000000	9.04000000	0.00000000	9.04000000
Grand Averages	9.03700000	9.03700000	9.03700000	0.00000000	9.03700000



Linearity Study Report

Study Information:

Company:	CIRCUIT CONTROLS	Temperature:	
Serial Number:	04527175	Humidity:	
Study Date:	10/13/2010	Cost:	
Study Time:	9:27:43 AM	Number of Trials:	5
Performed By:	TAMI IDALASKI	Passes Below:	10.00 %
Status:	COMPLETE	Fails Above:	30.00 %
Process Variation:	0.04000000		

Comment:

This is a linearity study for a caliper measuring the body width of terminal. The terminal used was the 7116-3191.

Study Measurements

<u>Reference Value</u>	<u>Trial</u>	<u>Measurement</u>
8.93000000	1	8.93000000
8.93000000	2	8.94000000
8.93000000	3	8.95000000
8.93000000	4	8.93000000
8.93000000	5	8.94000000

<u>Reference Value</u>	<u>Trial</u>	<u>Measurement</u>
8.97000000	1	8.97000000
8.97000000	2	8.96000000
8.97000000	3	8.96000000
8.97000000	4	8.97000000
8.97000000	5	8.97000000

<u>Reference Value</u>	<u>Trial</u>	<u>Measurement</u>
9.02000000	1	9.02000000
9.02000000	2	9.03000000
9.02000000	3	9.03000000
9.02000000	4	9.04000000
9.02000000	5	9.03000000

<u>Reference Value</u>	<u>Trial</u>	<u>Measurement</u>
9.04000000	1	9.04000000
9.04000000	2	9.03000000
9.04000000	3	9.05000000
9.04000000	4	9.04000000
9.04000000	5	9.04000000

<u>Reference Value</u>	<u>Trial</u>	<u>Measurement</u>
9.09000000	1	9.09000000
9.09000000	2	9.07000000
9.09000000	3	9.07000000
9.09000000	4	9.08000000
9.09000000	5	9.08000000

Results

Study Results	PASSED	Linearity:	0.00348052
Goodness of Fit:	0.36075929	Percent Linearity:	8.70129870

Bias Study Report

Study Information:

Company:	CIRCUIT CONTROLS	Temperature:	
Serial Number:	04527175	Humidity:	
Study Date:	10/13/2010	Cost:	10
Study Time:	8:38:00 AM	Number of Trials:	9.04000000
Part Company:	CIRCUIT CONTROLS	Reference Value:	0.04000000
Part Number:	ALL	Process Variation:	10.00 %
Characteristic:	BODY WIDTH	Passes Below:	30.00 %
Performed By:	TAMI IDALASKI	Fails Above:	
Status:	COMPLETE		

Comment:

This is a bias study that is also being used as a stability study. The measurements were taken on terminal 7116-3191 for body width.

Study Measurements

<u>Trial</u>	<u>Measurement</u>
1	9.04000000
2	9.04000000
3	9.04000000
4	9.04000000
5	9.04000000
6	9.04000000
7	9.03000000
8	9.03000000
9	9.04000000
10	9.04000000

Results

Study Result:	PASSED	Bias:	-0.00200000
Observed Average:	9.03800000	Percent Bias:	5.00000000

EnGagePlus! R&R Results

BURR SIEBOLD
TAMMI IDALASKI
PHIL WHITTKER

Gage Information

Company:	CIRCUIT CONTROLS	Serial Number:	T005203
Gage I.D.:	Q.A. DEPT.	Gage Type:	COMPARATOR(CO)
Size:	30 INCH	Unit of Measure:	
Gage Description:	SHERR TUMICO		

Part Information

Company: CIRCUIT CONTROLS
Part Number: ALL
Part Description:
Characteristic: DETENT CUT F-4 DIE
Master Measurement: 3.21630000
Specification: 3.20000000 - 3.40000000
Tolerance: 0.20000000
Process Variation: 0.00600000

Study Environment Information

R&R Date: 12/3/2010
Time: 9:52:40 AM
Relative Humidity: 0.00 %
Temperature:
Cost: \$0.00
Number of Parts: 10
Number of Trials: 3
R&R Performed By: jhoffma

Results Information:

	Measurement Unit Analysis		Percent of Tolerance		Percent of Process Var.		% of Total Var.	
Repeatability:	0.00001969	0.00	0.05908000	0.06	0.32822222	0.33	6.23844013	6.24
Reproducibility:	0.00001706	0.00	0.05118578	0.05	0.28436545	0.28	5.40486502	5.40
Gage R&R:	0.00002606	0.00	0.07816924	0.08	0.43427357	0.43	8.25413237	8.25
Part Variation:	0.00031460	0.00	0.94380000	0.94	5.24333333	5.24	99.65876429	99.66

X Difference:	0.00003333	Est. Replication Sd:	0.00001969
Total Variation:	0.00031568	Est. Appraiser Sd:	0.00001749
R Bar:	0.00003333	Est. Meas. Error Sd:	0.00002633
Rp:	0.00100000	Sample to Sample Sd:	0.00031466
Upper Control Limit:	0.00008583	Signal To Noise Ratio:	11.94871239
Lower Control Limit:	0.00000000	# of Dist. Categories:	16
Passes Below:	10.00 %	Acceptance Based On:	% R&R
Fails Above:	30.00 %	PASS/FAIL:	PASS
% TV of Tolerance:	%		

Trial One Report

BURR SIEBOLD
TAMMI IDALASKI
PHIL WHITTKER

Gage Information

Company: CIRCUIT CONTROLS
Gage I.D.: Q.A. DEPT.
Size: 30 INCH
Gage Description: SHERR TUMICO

Serial Number: T005203
Gage Type: COMPARATOR(CO)
Unit of Measure:

Part Information

Company: CIRCUIT CONTROLS
Part Number: ALL
Part Description:
Characteristic: DETENT CUT F-4 DIE
Master Measurement: 3.21630000
Specification: 3.20000000 - 3.40000000
Tolerance: 0.20000000
Process Variation: 0.00600000

Study Environment Information

R&R Date: 12/3/2010
Time: 9:52:40 AM
Relative Humidity: 0.00 %
Temperature:
Cost: \$0.00
Number of Parts: 10
Number of Trials: 3

Trial One Measurements

	Operator One BURR SIEBOLD	Operator Two TAMMI IDALASKI	Operator Three PHIL WHITTKER	Part Ranges	Part Averages
1	3.21600000	3.21600000	3.21600000	0.00000000	3.21600000
2	3.21700000	3.21700000	3.21700000	0.00000000	3.21700000
3	3.21600000	3.21600000	3.21600000	0.00000000	3.21600000
4	3.21700000	3.21700000	3.21700000	0.00000000	3.21700000
5	3.21600000	3.21600000	3.21600000	0.00000000	3.21600000
6	3.21600000	3.21600000	3.21600000	0.00000000	3.21600000
7	3.21600000	3.21600000	3.21600000	0.00000000	3.21600000
8	3.21600000	3.21600000	3.21600000	0.00000000	3.21600000
9	3.21700000	3.21700000	3.21700000	0.00000000	3.21700000
10	3.21600000	3.21700000	3.21700000	0.00100000	3.21666667
Grand Averages	3.21630000	3.21640000	3.21640000	0.00010000	3.21636667

Trial Two Report

BURR SIEBOLD
TAMMI IDALASKI
PHIL WHITTKER

Gage Information

Company: CIRCUIT CONTROLS
Gage I.D.: Q.A. DEPT.
Size: 30 INCH
Gage Description: SHERR TUMICO

Serial Number: T005203
Gage Type: COMPARATOR(CO)
Unit of Measure:

Part Information

Company: CIRCUIT CONTROLS
Part Number: ALL
Part Description:
Characteristic: DETENT CUT F-4 DIE
Master Measurement: 3.21630000
Specification: 3.20000000 - 3.40000000
Tolerance: 0.20000000
Process Variation: 0.00600000

Study Environment Information

R&R Date: 12/3/2010
Time: 9:52:40 AM
Relative Humidity: 0.00 %
Temperature:
Cost: \$0.00
Number of Parts: 10
Number of Trials: 3

Trial Two Measurements

	Operator One BURR SIEBOLD	Operator Two TAMMI IDALASKI	Operator Three PHIL WHITTKER	Part Ranges	Part Averages
1	3.21600000	3.21600000	3.21600000	0.00000000	3.21600000
2	3.21700000	3.21700000	3.21700000	0.00000000	3.21700000
3	3.21600000	3.21600000	3.21600000	0.00000000	3.21600000
4	3.21700000	3.21700000	3.21700000	0.00000000	3.21700000
5	3.21600000	3.21600000	3.21600000	0.00000000	3.21600000
6	3.21600000	3.21600000	3.21600000	0.00000000	3.21600000
7	3.21600000	3.21600000	3.21600000	0.00000000	3.21600000
8	3.21600000	3.21600000	3.21600000	0.00000000	3.21600000
9	3.21700000	3.21700000	3.21700000	0.00000000	3.21700000
10	3.21700000	3.21700000	3.21700000	0.00000000	3.21700000
Grand Averages	3.21640000	3.21640000	3.21640000	0.00000000	3.21640000

Trial Three Report

BURR SIEBOLD
TAMMI IDALASKI
PHIL WHITTKER

Gage Information

Company: CIRCUIT CONTROLS
Gage I.D.: Q.A. DEPT.
Size: 30 INCH
Gage Description: SHERR TUMICO

Serial Number: T005203
Gage Type: COMPARATOR(CO)
Unit of Measure:

Part Information

Company: CIRCUIT CONTROLS
Part Number: ALL
Part Description:
Characteristic: DETENT CUT F-4 DIE
Master Measurement: 3.21630000
Specification: 3.20000000 - 3.40000000
Tolerance: 0.20000000
Process Variation: 0.00600000

Study Environment Information

R&R Date: 12/3/2010
Time: 9:52:40 AM
Relative Humidity: 0.00 %
Temperature:
Cost: \$0.00
Number of Parts: 10
Number of Trials: 3

Trial Three Measurements

	Operator One BURR SIEBOLD	Operator Two TAMMI IDALASKI	Operator Three PHIL WHITTKER	Part Ranges	Part Averages
1	3.21600000	3.21600000	3.21600000	0.00000000	3.21600000
2	3.21700000	3.21700000	3.21700000	0.00000000	3.21700000
3	3.21600000	3.21600000	3.21600000	0.00000000	3.21600000
4	3.21700000	3.21700000	3.21700000	0.00000000	3.21700000
5	3.21600000	3.21600000	3.21600000	0.00000000	3.21600000
6	3.21600000	3.21600000	3.21600000	0.00000000	3.21600000
7	3.21600000	3.21600000	3.21600000	0.00000000	3.21600000
8	3.21600000	3.21600000	3.21600000	0.00000000	3.21600000
9	3.21700000	3.21700000	3.21700000	0.00000000	3.21700000
10	3.21700000	3.21700000	3.21700000	0.00000000	3.21700000
Grand Averages	3.21640000	3.21640000	3.21640000	0.00000000	3.21640000

Bias Study Report

Study Information:

Company:	CIRCUIT CONTROLS	Temperature:	
Serial Number:	T005203	Humidity:	
Study Date:	12/03/2010	Cost:	
Study Time:	7:32:35 AM	Number of Trials:	10
Part Company:	CIRCUIT CONTROLS	Reference Value:	3.21700000
Part Number:	ALL	Process Variation:	0.00600000
Characteristic:	DETENT CUT F-4 DIE	Passes Below:	10.00 %
Performed By:	BURR SIEBOLD	Fails Above:	30.00 %
Status:	COMPLETE		

Comment:

This is a bias study that is also being used as a stability study. This is for the comparator with detent cut f-4.

Study Measurements

<u>Trial</u>	<u>Measurement</u>
1	3.21700000
2	3.21700000
3	3.21700000
4	3.21700000
5	3.21600000
6	3.21700000
7	3.21600000
8	3.21600000
9	3.21700000
10	3.21700000

Results

Study Result:	PASSED	Bias:	-0.00030000
Observed Average:	3.21670000	Percent Bias:	5.00000000

Linearity Study Report

Study Information:

Company:	CIRCUIT CONTROLS	Temperature:	
Serial Number:	T005203	Humidity:	
Study Date:	12/03/2010	Cost:	
Study Time:	2:44:05 PM	Number of Trials:	5
Performed By:	BURR SIEBOLD	Passes Below:	10.00 %
Status:	COMPLETE	Fails Above:	30.00 %
Process Variation:	0.00600000		

Comment:

This is a linearity study for comparartor measuring the Detent cut on the F-4 die.

Study Measurements

Reference Value	Trial	Measurement
3.27000000	1	3.27000000
3.27000000	2	3.28000000
3.27000000	3	3.27000000
3.27000000	4	3.27000000
3.27000000	5	3.27000000

Reference Value	Trial	Measurement
3.28000000	1	3.28000000
3.28000000	2	3.28000000
3.28000000	3	3.28000000
3.28000000	4	3.28000000
3.28000000	5	3.28000000

Reference Value	Trial	Measurement
3.29000000	1	3.29000000
3.29000000	2	3.29000000
3.29000000	3	3.29000000
3.29000000	4	3.29000000
3.29000000	5	3.29000000

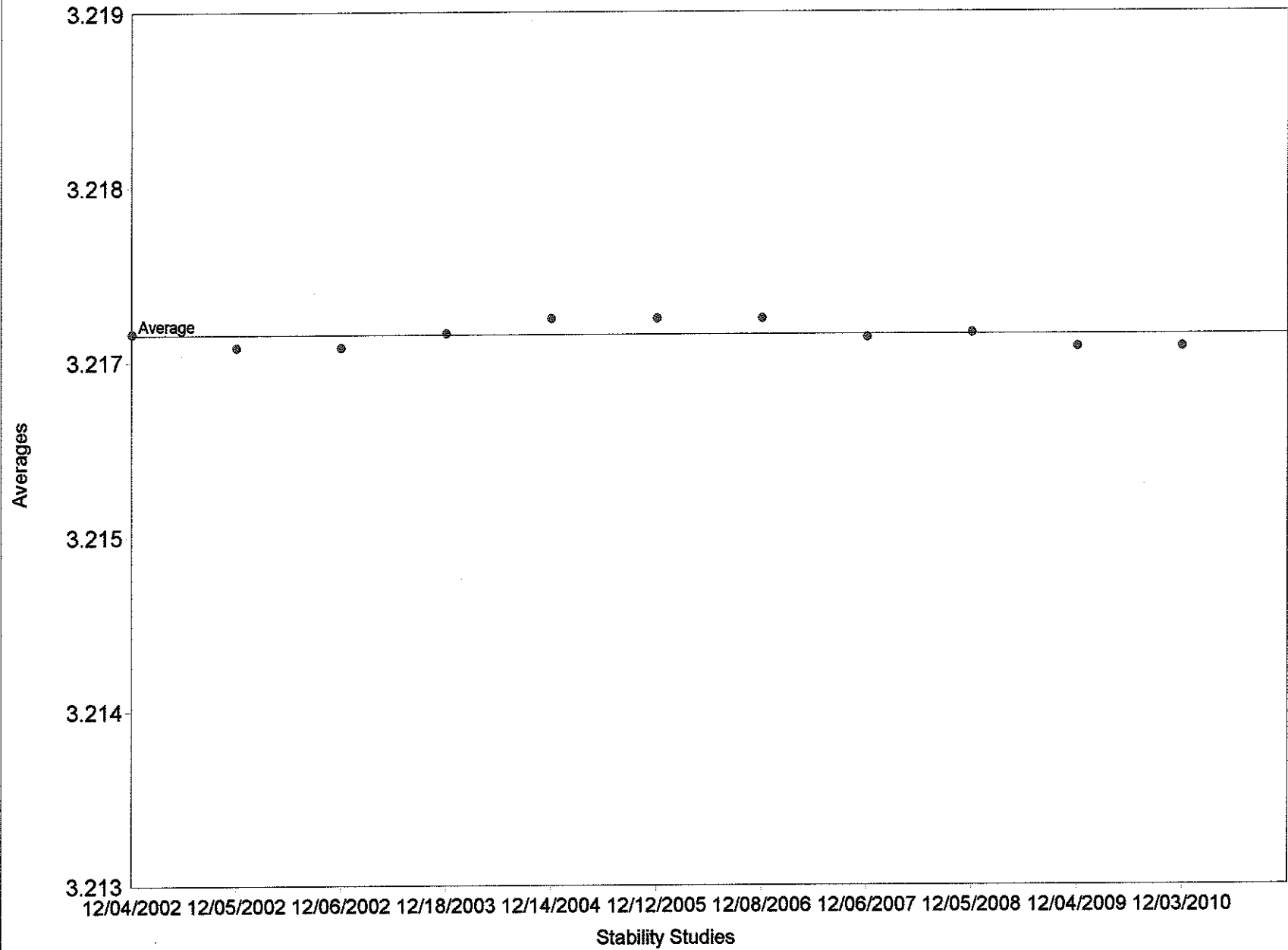
Reference Value	Trial	Measurement
3.30000000	1	3.30000000
3.30000000	2	3.31000000
3.30000000	3	3.30000000
3.30000000	4	3.30000000
3.30000000	5	3.30000000

Reference Value	Trial	Measurement
3.32000000	1	3.32000000
3.32000000	2	3.31000000
3.32000000	3	3.32000000
3.32000000	4	3.32000000
3.32000000	5	3.32000000

Results

Study Results	PASSED	Linearity:	0.00034054
Goodness of Fit:	0.42567568	Percent Linearity:	5.67567568

Stability Chart, Comparator detent cut f-4 \ CIRCUIT CONTROLS \ T005203 \ 12/03/2010





IN-HOUSE LABORATORY SCOPE

QA Lab:

Section I: Specific Tests, Evaluations, and Calibration Verification

1. *Specific Tests* : Dimensional, visual, element analysis and functional tests of raw material and finished goods. Element analysis of materials.

Work instructions : K-QA01, QA02, QA03, QA05, QA08, QA012, QA15, QA17, QA024, QA025, QA029

Findings : See Quality Records Retention Index.

2. *Evaluations* : Dimensional, visual, and functional test results, capability indices, and MSA studies.

Work instructions : A-QA007, L-QA010, L-QA011

Findings : See Quality Records Retention Index.

3. *Calibration Verifications* : Micrometers (all types), calipers, pin gages, thickness gages, indicators, attribute gages, TEW Japanese force gages, stereo microscope.

Work instructions : L-QA001-QA009, L-QA012, L-QA015

Findings : See Quality Records Retention Index.

Section II: Equipment and Program Listings

1. *Equipment* : Micrometers, calipers, video measuring microscope, optical comparator, pin gages, force gages, stereo microscope, thickness gages, indicators, profilometer, attribute gages, hardness testers, gram weights, surface plates, tensile tester, extensometer, gage blocks, kalmaster block, torque wrench, TEW Japanese force gages, scales and plug gage masters for ring gages, SEA 1000 A X-Ray machine, scale and stereo microscope.
2. *Programs* : Engage 4.2, Applied Statistics, Microsoft Excel & Word.

Section III: Methods and Standards

1. *Methods* : See stated work instructions in Section I.
2. *Standards* : Manufacturing blue-prints, customer requirements, ISO/TS16949 requirements, manufactures' requirements and gage prints.

Plating Lab:

Section I: Specific Tests, Evaluations, and Calibration Verification

1. *Specific Tests* : Dimensional, visual, Chemical analysis of plating solutions, Terminal plating thickness, Chemical weight measurement.

Work instructions :

<u>Instruction No.</u>	<u>Solution Process</u>	<u>Test</u>
D-PL003-Q	Electroclean	Surclean 201/Sodium hydrox
D-PL001-Q	Acid dip	Sulfuric acid
D-PL006-Q	Nickel	Nickel chloride
D-PL007-Q	Nickel	Nickel metal
D-PL058-Q	Nickel	Nickel pH
D-PL002-Q	Nickel	Boric acid
D-PL058-Q	Gold	Gold pH
D-PL004-Q	Gold	Gold/ cobalt metal
D-PL005-Q	Gold strip	Free cyanide
D-PL010-Q	Tin	Solderon acid
D-PL011-Q	Tin	Tin metal
D-PL012-Q	Electroclean	Bath make up
D-PL013-Q	Acid dip	Bath make up
D-PL014-Q	Nickel	Bath make up
D-PL015-Q	Gold	Bath make up
D-PL016-Q	Gold strip	Bath make up
D-PL017-Q	Tin	Bath make up
D-PL059-064	Gold	Gold metal by X-ray
D-PL020-Q	Neutralizer	Bath make up
D-PL019-Q	Neutralizer	Neutra rinse 80

Findings : See Quality Records Retention Index.

- Evaluations :* Dimensional, visual, capability indices, plating thickness and plating solutions.
- Calibration verifications :* Refer to QA section above.

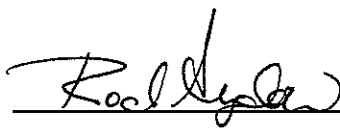
Section II: Equipment and Program Listings

- Equipment :* Scales, Atomic absorption spectrophotometer, Titration analysis, Spectrophotometer, X-ray measurement system, Ph meter, Conductivity meter, Caliper, Hull cell testing-Solution testing (small plating bath)
- Programs: X-ray machine-Applied statistics, Microsoft Excel and Word

Section III: Methods and Standards

Refer to QA section above.

Approved By: _____



Date: _____

2-25-10

C2	APPLICABLE COMPONENTS INFORMATION				APPLICABLE WIRE TYPE AND SIZE					ES
	ITEM DESCRIPTION	COLOR/ PLATING	FORD COMP. PART #	YAZAKI COMP. PART #	MATERIAL	ESB-MTL123-A AWG	WSS-MTL135-A AWG	WSR-MTL126-A mm ²	ES-AUST-11348-AA CODE	
	090-2 WIRE SEAL (RED/PTIN)	BLUE	1X4T-14603-AA		SILICONE RUBBER	22, 20	20, 18	0.5, 0.75	N/A	
	090-2 WIRE SEAL (RED/PTIN)	GREY	T.B.D.	7158-3004-10	SILICONE RUBBER	18, 16	16	1.0	N/A	
	090-2 WIRE SEAL (RED/PTIN)	BROWN	T.B.D.	7158-3005-80	SILICONE RUBBER	16	N/A	1.5	N/A	
	090-2 WIRE SEAL	BLUE	1X4T-14603-B*	7158-3006-90	SILICONE RUBBER	22, 20	20, 18	0.5, 0.75	N/A	
	090-2 WIRE SEAL	GREY	1X4T-14603-C*	7158-3007-10	SILICONE RUBBER	22, 20	16	1.0	N/A	
	090-2 WIRE SEAL	BROWN	1X4T-14603-D*	7158-3008-80	SILICONE RUBBER	16	N/A	1.5	N/A	
	090-2 SEALED (F) TERMINAL	TIN	F77B-14474-AA	7116-4025	COPPER ALLOY	N/A	22, 20	0.35, 0.5	N/A	
	090-2 SEALED (F) TERMINAL	TIN	F77B-14474-HA	7116-4026	COPPER ALLOY	18, 16	N/A	0.75, 1.0	N/A	
	090-2 SEALED (F) TERMINAL	TIN	XW4T-14474-FA	7116-4027	COPPER ALLOY	14	N/A	1.5	N/A	
	090-2 SEALED (F) TERMINAL	GOLD	XW4T-14474-KA	7116-4028-08	COPPER ALLOY	N/A	N/A	0.35, 0.5	N/A	
	090-2 SEALED (F) TERMINAL	GOLD	456T-14474-BA	7116-4029-08	COPPER ALLOY	N/A	N/A	0.50, 1.25	N/A	
	090-2 SEALED (F) TERMINAL	GOLD	714T-14474-AA	7116-4025-08	COPPER ALLOY	22, 20	20	0.50	N/A	
	090-2 SEALED (F) TERMINAL	SILVER	D05T-14474-SA	7116-7188-06	COPPER ALLOY	N/A	N/A	N/A	314D	

ISOMETRIC VIEW
SCALE 1:1

ORIGINATOR

CHECKER

ENGR APP

WTL APP

RELEASED 1571-14474-HA

EE00-I-11048034-000 ()

991220

CAD: Y

YAZAKI

GNOETHEN

FSENYUE2

YAZAKI

A1 CORRECTED PART NUMBER

A2 CORRECTED WIRE SIZE

EDS-YAZAKI

GNOETHEN

FSENYUE2

EDS-YAZAKI

RELEASED 1X4T-14474-KA

B1 UPDATED APPLICABLE COMPONENTS TABLE

UEE1-I-11186229-000 ()

010129

CAD: Y

YAZAKI

GNOETHEN

JSMUEL2

YAZAKI

RELEASED 156T-14474-BA

C1 UPDATED APPLICABLE COMPONENTS TABLE

C2 DRAWING CORRECTION

EE00-E-11579791-000

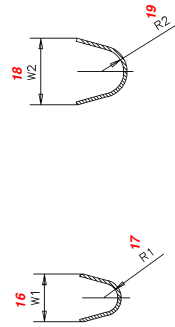
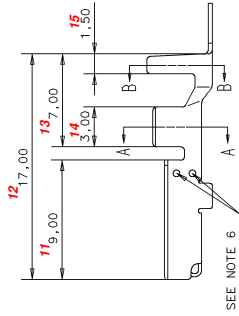
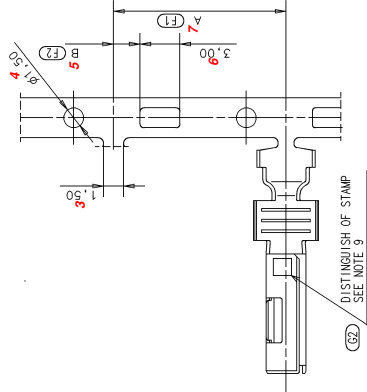
031120

YAZAKI

FORTMANN

UWULF

MATSENG



	PART #	W1	W2	R1	R2	A	B
(C2)	7116-4025	2.30	5.20	0.60	1.60	12.50	3.00
	7116-4026	3.00	5.30	0.80	1.90	12.50	3.00
(C2)	7116-4027	4.20	6.00	1.20	2.00	13.00	2.00
	7116-4028-08	2.30	5.20	0.60	1.60	12.50	3.00
(C1)	7116-4029-08	3.00	5.30	0.80	1.90	12.50	3.00
(D)	7116-4025-08	2.30	5.20	0.60	1.60	12.50	3.00
(G1)	7116-7188-06	2.30	5.20	0.60	1.60	12.50	3.00

YAZAKI NORTH AMERICA, INC.			
APPROVED	CHECKED	CHECKED	DRAWN
 Lee Kim 11/11/08 00111408		Density signed by Rick Wong Date: 2011/04/04 1318.34 -0.007'	Density signed by Anthony Reimer 04/04/11 1312.32 -0.007'

DIVISION		T563		
PLANT				

Ford Motor Company

Ford Motor Company

1000