

74176

SEAL

REV. B

74176

M

.232
700

M

.234
766.0055
0045NOTE:
1.00 MAX. BURR ALLOWED

CERTIFIED PRINT
 Parts Made To This Print Must Conform To
 ENG. STD. E9898 REV. E
 Date JUL 1 1991

NEVER USE THIS PRINT FOR THE INFORMATION OF THE
 PARTS MANUFACTURER IS TO BE USED AS A GUIDE TO THE
 PARTS OF THE PARTS MANUFACTURER'S DESIGN
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REVISIONS
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74176-1

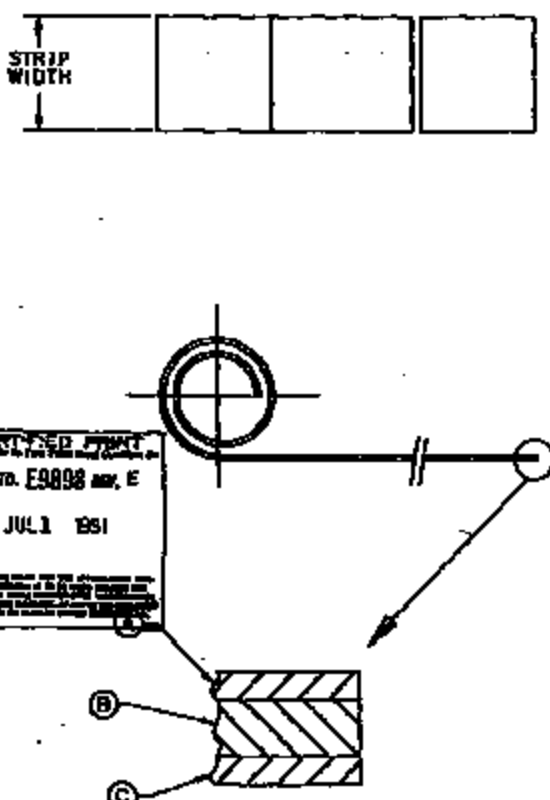
MAKE FROM 27225-1 (STRIP)

PART NO.

MATERIAL

REV. 1	2-1-84	VS	103-101-1	M2H	M2H	P3H	P372	P351	P374
BY	2-1-84	TEXAS INSTRUMENTS INCORPORATED		KILXON		DWS. NO.		74176	
ENR.	2-1-84	ATTLEBORO, MASS., U.S.A.		CONTROL PRODUCTS DIVISION		DWS. NO.		74176	
ENR.	2-1-84								

TI-NHTSA 003615

5		4		3		2		1																																				
<table border="1" style="border-collapse: collapse;"> <tr> <th colspan="4" style="text-align: center;">REVISIONS</th> </tr> <tr> <th style="width: 10%;">ZONE</th> <th style="width: 10%;">LTH</th> <th style="width: 60%;">DESCRIPTION</th> <th style="width: 20%;">DATE</th> <th style="width: 10%;">APPROVED</th> </tr> <tr> <td style="text-align: center;">K</td> <td></td> <td>ADDED "CORE MATERIAL" COLUMN. 27225-1 & -2 "FAS PUT UP" 1.5, 195 "3" CL 154938, CF</td> <td style="text-align: center;">5-8-60</td> <td style="text-align: center;">C. G. 361</td> </tr> </table>										REVISIONS				ZONE	LTH	DESCRIPTION	DATE	APPROVED	K		ADDED "CORE MATERIAL" COLUMN. 27225-1 & -2 "FAS PUT UP" 1.5, 195 "3" CL 154938, CF	5-8-60	C. G. 361																					
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 Diagram showing a cross-section of a Kapton strip roll. The roll is labeled with 'A' for the core material, 'B' for the Kapton strip, and 'C' for the Teflon coating. A dimension line indicates the 'STRIP WIDTH'. A circular detail view shows the cross-section of the roll, with a hatched area representing the core material. NOTES: 1. STRIP TO BE INSPECTED FOR TEFLON COATING, THICKNESS, DEFORMITIES, BUBBLES, AND LAMINATE SEPARATION. 2. EACH KAPTON STRIP ROLL MUST BE LABELED WITH T.I. PART NO. ON INSIDE OF CORE. 3. NO MORE THAN 2 SPLICES PER COIL PERMITTED, SPLICES TO BE CLEARLY MARKED WITH YELLOW MYLAR. 4. MATERIAL CERTIFICATION REQUIRED WITH EACH SHIPMENT. 5. ROLLS SLITTED FROM END OF MASTER COIL NOT ACCEPTABLE. 6. BUCKLING OF THE CORE ALLOWED UP TO 1/4" MEASURED RADially AWAY FROM THE CORE. 7. DENT RIP OR JAGGED EDGES ON MATERIAL NOT ALLOWED. 8. ROLLS ARE TO BE SHIPPED WITH PROTECTIVE INSERT CORES IN THE PACKING BOX. THIS DNG. SUPERSEDES 27225 REV. 44 DATED 12-13-59																																												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>PART NO.</th> <th>MATERIAL</th> <th>THICKNESS (MILS)</th> <th>TEFLON (A) KAPTON (B) TYPE H (C) TYPE H (D) TYPE H</th> <th>CONSTRUCTION (MILS) (SEE NOTE 2)</th> <th>STRIP WIDTH (IN.)</th> <th>FAS PUT UP (1.5, 195, 3) (IN.)</th> <th>CORE MATERIAL</th> </tr> <tr> <td>27225-3</td> <td>ROFONT 300 FINEST</td> <td>3 ± .4 MILS</td> <td>0.5</td> <td>2</td> <td>0.5</td> <td>.902-.904</td> <td>3 x 9 1/2</td> <td>PLASTIC (WHITE)</td> </tr> <tr> <td>27225-2</td> <td>ROFONT 300 FINEST</td> <td>5 ± .5 MILS</td> <td>1</td> <td>3</td> <td>1</td> <td>.902-.904</td> <td>8 x 9 1/2</td> <td>CARDBOARD</td> </tr> <tr> <td>27225-1</td> <td>ROFONT 300 FINEST</td> <td>8 ± .5 MILS</td> <td>1</td> <td>3</td> <td>1</td> <td>.734-.768</td> <td>8 x 9 1/2</td> <td>CARDBOARD</td> </tr> </table>										PART NO.	MATERIAL	THICKNESS (MILS)	TEFLON (A) KAPTON (B) TYPE H (C) TYPE H (D) TYPE H	CONSTRUCTION (MILS) (SEE NOTE 2)	STRIP WIDTH (IN.)	FAS PUT UP (1.5, 195, 3) (IN.)	CORE MATERIAL	27225-3	ROFONT 300 FINEST	3 ± .4 MILS	0.5	2	0.5	.902-.904	3 x 9 1/2	PLASTIC (WHITE)	27225-2	ROFONT 300 FINEST	5 ± .5 MILS	1	3	1	.902-.904	8 x 9 1/2	CARDBOARD	27225-1	ROFONT 300 FINEST	8 ± .5 MILS	1	3	1	.734-.768	8 x 9 1/2	CARDBOARD
PART NO.	MATERIAL	THICKNESS (MILS)	TEFLON (A) KAPTON (B) TYPE H (C) TYPE H (D) TYPE H	CONSTRUCTION (MILS) (SEE NOTE 2)	STRIP WIDTH (IN.)	FAS PUT UP (1.5, 195, 3) (IN.)	CORE MATERIAL																																					
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27225-2	ROFONT 300 FINEST	5 ± .5 MILS	1	3	1	.902-.904	8 x 9 1/2	CARDBOARD																																				
27225-1	ROFONT 300 FINEST	8 ± .5 MILS	1	3	1	.734-.768	8 x 9 1/2	CARDBOARD																																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center;"> TEXAS INSTRUMENTS PHOTODUPLICATIONS DIVISION </td> <td colspan="2" style="text-align: center;"> KODAK CONTROL PRODUCTS DIVISION </td> </tr> <tr> <td colspan="4" style="text-align: center;"> KAPTON STRIP SPECIFICATION </td> </tr> <tr> <td colspan="2" style="text-align: center;"> 82647 </td> <td colspan="2" style="text-align: center;"> 27225 </td> </tr> </table>										TEXAS INSTRUMENTS PHOTODUPLICATIONS DIVISION		KODAK CONTROL PRODUCTS DIVISION		KAPTON STRIP SPECIFICATION				82647		27225																								
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KAPTON STRIP SPECIFICATION																																												
82647		27225																																										

TI-NHTSA 003616

DIEMASTERS

CERTIFICATE OF CONFORMANCE

SHIP TO:

**TEXAS
INSTRUMENTS**



FROM

Diemasters Manufacturing, Inc.

767 Industrial Drive
Elmhurst, Illinois 60126

DATE SHIPPED: 1-12/91

PURCHASE ORDER #: 5000/0089

SHIPPING OR INVOICE NUMBER: 00121

MATERIAL TRACE NUMBER (P.O. # HEAT, LOT, OR ROUTE SHEET NUMBER): 65-7196

QUANTITY SHIPPED: 75,790

PART NUMBER: 27639-1

REVISION: D

PART DESCRIPTION: WASHER

OPERATION PERFORMED: MANUFACTURING

SPECIFICATION: 27639-1

REVISION: D

THE MATERIAL DESCRIBED ABOVE WAS PROCESSED, INSPECTED AND FOUND TO CONFORM
TO THE DRAWING(S) AND SPECIFICATION(S) LISTED.

[Signature]
QUALITY CONTROL

08-14-91
DATE

ENCLOSURES: ☒ CERTIFICATE OF RAW MATERIAL

TRACEABLE LOT# 79

☐ INDEPENDENT LABORATORY TEST REPORT OF RAW MATERIAL

☐ INSPECTION REPORT(S)

☒ SUB ^{HEAT-TREAT} ~~PLATING~~ SUPPLIER'S CERTIFICATION(S) OF CONFORMANCE

☐ FORM _____ NON-CONFORMANCE RELEASED BY: _____

☐ REWORK EXPLANATION

TI-NHTSA 003617

RIVERDALE PLATING & HEAT TREATING, INC.

580 West 134th Street Riverdale, Illinois 60427-1194

TELEPHONES
(708) 849-2050
(312) 568-2400

DIEMASTERS MANUFACTURING, INC.
747 INDUSTRIAL DR
ELMHURST IL 60120-1525

27639-1

JUN - 3 1991

THIS IS TO CERTIFY THAT THE PARTS, FURNISHED AGAINST THE LISTED
PURCHASE ORDER, WERE PROCESSED IN ACCORDANCE TO SPECIFICATION.

PURCHASE NO.	DATE ORDERED	PROCESS DESCRIPTION	QUANTITY SHIPPED	WEIGHT SHIPPED	DATE SHIPPED
133431	I08657	AUSTEMPER TO R/C 40-55	74,515	1,559	5/29/91
133431	I08657	ZINC .0002 - .0006	74,515	1,559	5/29/91

Subscribed and sworn to before me

THIS 27 DAY OF MAY, 1991

Leonard O. Brynteson

Notary Public

"OFFICIAL SEAL"

Leonard O. Brynteson

Notary Public, State of Illinois

My Commission Expires 7/26/92

RIVERDALE PLATING & HEATING TREATING, INC.

Richard K. Nelson

Vice President

TH-NHT8A 003618

that material meets ordered specification

Bally Diagnostics
 TEXAS INSTR.
 27639-1
 QUALITY CONTROL
 APR 30 1991
 L GALLO

Size
1 3/8 x 0.085
PD Number
021540
MIL Number
62276

Heat						AISI			Rockwell		
657196						C-105			B 74/78		
%C	%Mn	%P	%S	%Si	%Ni	%Cr	%Mo	%Al	%Cu	%V	%Co
52	78	015	008	23							
Tensile Strength (psi)				.2% Yield Strength (psi)				% Elongation in 2"			
Surface		Inclusion Rating		Grain Size							
Decarburization				Microstructure							
Cold Bend											
Parallel to the rolling direction over a						Radius Bend					
Perpendicular to the rolling direction over a						Radius Bend					
Hardenability						Miscellaneous					

I certify that the above data is correct

[Signature] Date 4/26/91

Name *[Signature]*

Notary Public, State of New York, County of Onondaga

My commission expires *[Signature]*

ROME STRIP STEEL

530 Henry St.
 Rome, NY 13440

315-338-5500
 FAX 315-338-5510

TI-NHTSA 003819

5	4	3	2	1
NOTES: - PART MUST BE FLAT TO WITHIN .008 T.I.R.. - DIAMETERS MARKED WITH * MUST BE CONCENTRIC TO WITHIN .004 T.I.R.. - PARTS TO BE SHIPPED, ISSUED, AND STORED WITH APPLIED RUST PREVENTIVE BEFORE PLATING. AFTER PLATING, PARTS TO BE SHIPPED, ISSUED, AND STORED IN SEALED PLASTIC BAGS. - NO TOOL MARKS ALLOWED IN THE SHADED AREA OR BEVELED SIDE OF WASHER. - THE PART'S HARDNESS IS MEASURED AFTER A .005-.010 THICK SKIN IS REMOVED. - THIS PART IS LOT CONTROLLED. ANY PRESS CHANGE, NEW SETUP, PUNCH CHANGE, MAJOR TOOL WORK OR MATERIAL LOT CHANGE WILL SIGNIFY START OF A NEW LOT. NO MINIMUM LOT SIZE. EACH BOX WILL HAVE A LOT NUMBER. EACH LOT WILL HAVE IT'S OWN PACKING SLIP WITH LOT IDENTIFICATION. - MATERIAL CERTIFICATION REQUIRED WITH EACH SHIPMENT. - STAMP IDENTIFICATION CODE AS REQUIRED TO IDENTIFY SUPPLIER TOOL. CODE SHALL BE CLEARLY VISIBLE AFTER PLATING. NO BURR OR SWAMP EDGES PERMITTED. (-S ONLY) - DIM. "A" TO BE MEASURED WITH STANDARD WASHER GAUGE. - IDENTIFICATION MARKS ALLOWED BETWEEN .410-.470R.. - THESE SURFACES MUST BE SMOOTH AND FREE OF ANY PLATING ASPERITIES OR INCLUSIONS. (I.E., NO FROSTED EFFECTS OR PARTICULATE CONTAMINATION IN THE PLATING.)				
THIS DWG. SUPERSEDES 27639 REV. "C" DATED 3-30-84				

REVISIONS

ZONE	LTB	DESCRIPTION	DATE	APPROVED
1		1. SEE NOTE 4" WAS "SEE NOTE 5"		
2		2. SEE NOTE 8" WAS "SEE NOTE 9"		
3		3. SEE NOTE 11" WAS "SEE NOTE 12"		
4		4. SEE NOTE 15" WAS "SEE NOTE 16"		

G.F.

CERTIFIED PRINT
 ENG. STD. 23808 REV. E
 JUL 1 1991

TI-NHTSA 003620



K. F. BASSLER COMPANY, INC.
PRECISION TOOLING & METAL STAMPINGS

45 John William St. • Attleboro, MA 02703 • (508) 222-1061 • Fax (508) 225-1505

MATERIAL CERTIFICATION

CUSTOMER: Texas Instruments Inc. - Attleboro
CUSTOMER ORDER NO.: 505097078
CUSTOMER PART NO.: 27406-1
REVISION: F
QUANTITY THIS SHIPMENT: 21,000
LOT NO. THIS SHIPMENT: 143
SHIPMENT DATE: 6.25.91

WE CERTIFY THAT THE MATERIAL USED TO PRODUCE THE PRODUCT IN THIS SHIPMENT, NAMELY, AK-1008 CRS, CONFORMS TO TT's DRAWING AND PURCHASE ORDER REQUIREMENTS.

AUTHORIZED SIGNATURE:

Kathleen A. Penkala
Kathleen A. Penkala
Inside Sales Specialist



TI-NHTSA 003621

TELEX 981214
FAX 975356-8010
PHONE 315-336-5500
DUNN 223-5128

ROME STRIP STEEL COMPANY, INC.
530 HENRY ST. BOX 180
ROME, NEW YORK 13440

COMPLIANCE

27900-1

SALES CODE
08072016

0 1 0 0 0 0 0 0

DATE INVOICE NO.

02/28/91 02706

INVOICE TO: R. F. BASSLER CO., INC.
P. O. BOX 995
ATTLEBORO, MA

02703

SHIP TO: R. F. BASSLER CO., INC.
137H-JOHN WILLIAM STS
ATTLEBORO, MA

QUANTITY (LBS) 19,636
MO. CEN. 135
NO. SABS OR BOLS 13
PARTIAL COMPLETE PART

SHIPPED BY
PAUL H

HT NO 466708
C 07
RN 36
P 014
S 008
SI 01
HT CR NO

MEETS REQUIREMENTS OF
CUST. ORDER NO. 14474

COLOR CODE

17MM X 25.40MM

PULL NO
58100

PREPAID
COLLECT
PREPAID

STRAPPING

PAPER WRAP

ADLS

CRATES

BOX

.04600 X 1.0000

TENNES

B 50 MAX

COIL

200 LBS

SHOS

WEAP SIZE

PRG. RT

WASTERS

CORES

TOLERANCE

+00050-00050+005 -005

EDGE

ND3 SLIT

LENGTH SPEC

200 PIN 16 34

RUNNERS

SPACTRS

SHEDIN

BOARDS

CAPS

+013 -013MM +127 -127MM

ALUM. TAIL 0-1008

BURN

CARBER

FLATNESS

OIL

T-PCB

500/096'

TEST REPORT

(8,907 KG)

19,636

Certificate of Compliance

ATTEST:

087-06280-22-030291

Notary Public, Onondaga County

My commission expires

DATE

3/1/91

I certify that the above figures are a true and correct copy of those contained in the records of this corporation.

A. Zingales
ROME STRIP STEEL CO., INC.

TI-NHTSA 003622

Paratech, Inc.

A SUBSIDIARY OF JONS FARM CO. INC.
MINIATURE TECHNICAL CERAMICS

18840 MINNESOTA AVENUE • P.O. BOX 718 • PARAMOUNT, CALIFORNIA 90723
TELEPHONE (213) 633-2045 • FAX (213) 633-8907

MATERIAL CERTIFICATION

DATE: 4-22-91

TEXAS INSTRUMENTS, INC.

ORDER NO.: 505049981

PART NO : 74078-146 REV. NO.: F

QUANTITY THIS SHIPMENT: 75.000

SHIPMENT DATE: 4-22-91

PART DESCRIPTION: PIN

WE CERTIFY THAT THE MATERIAL USED TO PRODUCE THE PRODUCT IN THIS
SHIPMENT, NAMELY PIN / STEATITE - LJ, CONFORMS TO T.I.
DRAWING AND T.I. PURCHASE ORDER REQUIREMENTS.


PRODUCTION MANAGER

TI-NHTSA 003624

74078

R.015 MAX.
(BOTH ENDS)

L ±.0005

.156
.150

PARTS MUST BE FREE OF CHIP
MARKS AND PROTRUSIONS. ENDS
MUST BE PERPENDICULAR TO
SIDES TO WITHIN 2 DEGREES.

"L" LENGTH IS DETERMINED BY THE SUFFIX OF THE PART NUMBER IN THOUSANDTHS
OF AN INCH. I.E.;

PART NO.	"L"
74078-155	.155
74078-210	.210

VENDOR WILL BE PREPARED TO FURNISH PINS .130 - .250 LONG.

NOTES:

1. FINISHED PARTS TO BE SHIPPED, ISSUED AND STORED IN SEALED PLASTIC BAGS. SEALED PLASTIC BAGS TO CONTAIN 20,000 PINS (OR LESS FOR PARTIAL BAGS). BAGS MUST BE CLEARLY LABELED WITH THE PART NO. AND THE QUANTITY OF PARTS IDENTIFIED ON THE OUTSIDE OF EACH BAG.
2. MATERIAL CERTIFICATION REQUIRED WITH EACH SHIPMENT.

MATERIAL: L-3 GRADE STEATITE (DC-18E5)
L-3 GRADE STEATITE (DC-144E)

CURE PER SPEC.----- 80502-2

SHRINKAGE SPEC.----- 80501-1

OR CERTIFIED PRINT Parts Made To This Print Must Conform To
ENG. STD. E9898 REV. E
Date JUL 1 1991
NEITHER THIS PRINT NOR THE INFORMATION CONTAINED THEREIN IS TO BE USED AS A BASIS FOR THE JUDGMENT OF YOUR MERCHANTABILITY (OR ANY OTHER) OR AS A BASIS FOR THE REJECTION OF ANY OF THE PRODUCTS OR MATERIALS OF ANY OTHER COMPANY OR COMPANY OF ANY OTHER COMPANY.

THIS DWG. SUPERSEDES 74078 REV. "E" DATED 8-4-88

BY TOM DALL 10-17-88	TEXAS INSTRUMENTS ATTLEBORO, MASSACHUSETTS 02703	KILIXON CONTROL PRODUCTS DIVISION	DWG. NO. A	REV. NO. 74078
CHK. [Signature] 05-20-91				
DATE 05-20-91	CODE IDENT NO. 82647			

10220721

TEXAS INSTRUMENTS, INC.
P.O. BOX 666
ATLANTA, GA 30303

PARKER HANIFIN CORPORATION
JUL DIVISION
WEST CROFT CIRCLE
SPARTANBURG, S.C. 29302
TELEPHONE (803) 573-7332

J.S.L. Division of Parker Hannifin certifies that the material used to produce the product in this shipment, namely SILICONE/ 87819. Conforms to TI drawing and TI purchase order requirements.

PART TITLE... ENVIRONMENTAL SEAL

COST P/N... REV D

DATE SHIPPED

P/O... 500023492

J.S.L. P/N... 207218

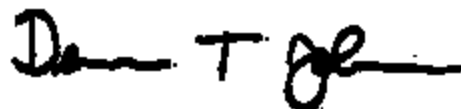
D/N... 91449-1

SILICONE COMPOUND... 87819

10-21-91

QUANTITY... 3,000

Very Truly Yours,
J.S.L. Division



DENNIS T. JOHNSON
Quality Control Manager

872/91



TI-NHTSA 003626

DEVICE # 52/57PS
PROJ. # 3355

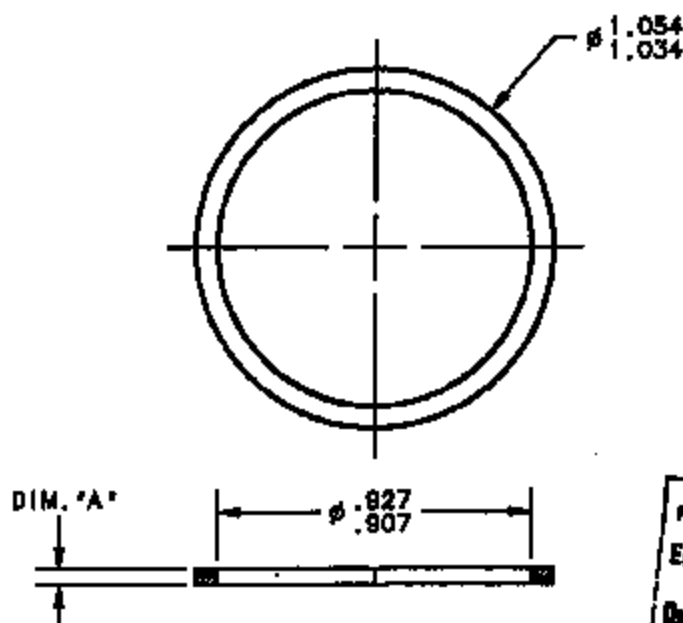
TITLE

ENVIRONMENTAL SEAL

REV
E

74247

74247



NOTES:

1. MATERIAL CERTIFICATION REQUIRED WITH EACH SHIPMENT.
2. 74247-3 IS TO BE RED IN COLOR WITH 3 BLACK MARKS ON THE EXTERNAL CIRCUMFERENCE AT 120° INTERVALS.

THIS DWG. SUPERSEDES 74247 REV. "D" DATED 10-14-88

	SILICONE JBL (T-B-D)	55 - 65	BLUE	.045-.055
74247-3	SILICONE JBL S7424-6	55 - 65	SEE NOTE 2	.045-.055
74247-2	SILICONE JBL S7424-6	65 - 85	RED	.040-.080
74247-1	BUNA N JBL N7D14-50	60 - 60	BLACK	.040-.050
PART NO.	MATERIAL	DUROMETER	COLOR	DIM. "A"

1. ADD -3, -4 AND NOTE 2.
2. DIM. "A" TO TABLE.
3. CR. 10/28/87, 10-1-81 CM

REV

TOM DAIL 8-18-91



TEXAS INSTRUMENTS
ATL BORO, MASSACHUSETTS 02783



REV
A

74247

TI-NHTSA 003627

752-6042

TEXAS INSTRUMENTS, INC.
BUILDING 11-16
34 FOREST STREET
ATTLEBORO, MA 02703

PARKER HANNIFIN CORPORATION
JBL DIVISION
WEST CROFT CIRCLE
SPARTANBURG, S.C. 29302
TELEPHONE (803) 573-7332

J.B.L. Division of Parker Seal certifies that the material used to produce the product in this shipment, namely SILICONE/ S7424. Conforms to TI drawing and TI purchase order requirements.

PART TITLE... ENVIRONMENTAL SEAL

CUST P/N... [REDACTED] REV D

J.B.L. P/N... 05042S

SILICONE COMPOUND... S7424

DATE SHIPPED

8-26-91

P/O... 500023131

B/N... 16374

QUANTITY... 14,700

REPLACED
with
Blue - 4 seal

Very Truly Yours,
J.B.L. Division

Dennis T. Johnson

DENNIS T. JOHNSON
Quality Control Manager

DTJ/MS

DTJ

TI-NHTSA 003628

752-6042

TEXAS INSTRUMENTS, INC.
BUILDING 11-18
34 FORNEY STREET
ATLANTIC, NM 02703

PARKER HANIFIN CORPORATION
JUL DIVISION
WEST CROFT CIRCLE
SPARTANBURG, S.C. 29302
TELEPHONE (803) 573-7332

J.B.L. Division of Parker Seal certifies that the material used to produce the product in this shipment, namely SILICONE/ 57424. Conforms to TI drawing and TI purchase order requirements.

PART TITLE... ENVIRONMENTAL SEAL

COST P/N... 74247 2 REV B

DATE SHIPPED

P/O... 500023131

J.B.L. P/N... 06042S

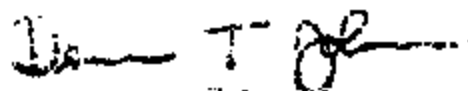
6-26-81

B/N... 17108

SILICONE COMPOUND... 57424

QUANTITY... 23,550

Very Truly Yours,
J.B.L. Division



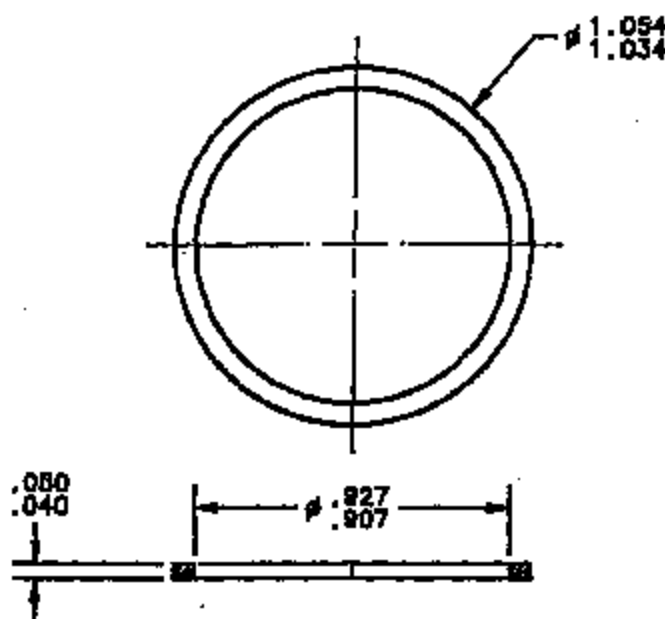
DENNIS T. JOHNSON
Quality Control Manager

DTJ/MS

DTJ

TI-NHTSA 003629

74247



CERTIFIED PRINT
 Parts Made To This Print Must Conform To
 ENG. STD. E9898 REV. E
 Date JUL 1 1991
 NEITHER THIS PRINT NOR THE INFORMATION CONTAINED HEREIN IS TO BE USED AGAINST THE UNITED STATES GOVERNMENT OR ANY OF ITS EMPLOYEES OR CONTRACTORS IN ANY MANNER OR FOR ANY PURPOSES OTHER THAN THAT FOR WHICH IT WAS ORIGINALLY DESIGNED.

NOTES:

1. MATERIAL CERTIFICATION REQUIRED WITH EACH SHIPMENT.

THIS DWG. SUPERSEDES 74247 REV. "C" DATED 9-20-86

PART NO.	MATERIAL	DUROMETER	COLOR
74247-2	SILICONE JBL S7424-6	55 - 65	RED
74247-1	BUNA N JBL N7014-50	50 - 80	BLACK

BY TOM BAIL 10-14-88

CH

ENG. G. Kellerman 11-10-88

MANUFACTURE



TEXAS INSTRUMENTS

ATLANTA, MASSACHUSETTS 02102

KLUXON

CONTROL PRODUCTS DIVISION

ENG. NO.

REV. NO.

A

74247

74247

CONF. INFO. NO. 000000

TI-NHTSA 003630



PLASTIC FABRICATORS DIVISION
155 NO. MAIN STREET, FRANKLIN, N.H. 03235
603-891-2770

CERTIFICATE OF CONFORMANCE

TO: TEXAS INSTRUMENTS

DATE: JUN 3 1991

ATT: QUALITY CONTROL SUP.

THIS CERTIFIES THAT:

SHIPMENT # 159462

PART # 73958-1 REVISION 6

QUANTITY 172,000

MAT'L DESC. KAPTON HD

IS IN CONFORMANCE WITH THE REQUIREMENTS, SPECIFICATIONS, AND DRAWINGS
ON YOUR ORDER # 00416920446

BY: INSULFAB PLASTICS
FRANKLIN, NH 03235

Fred Vignone
QUALITY CONTROL MANAGER

3
HARLITE
MELAMINE
SILICONES
EPOXIES

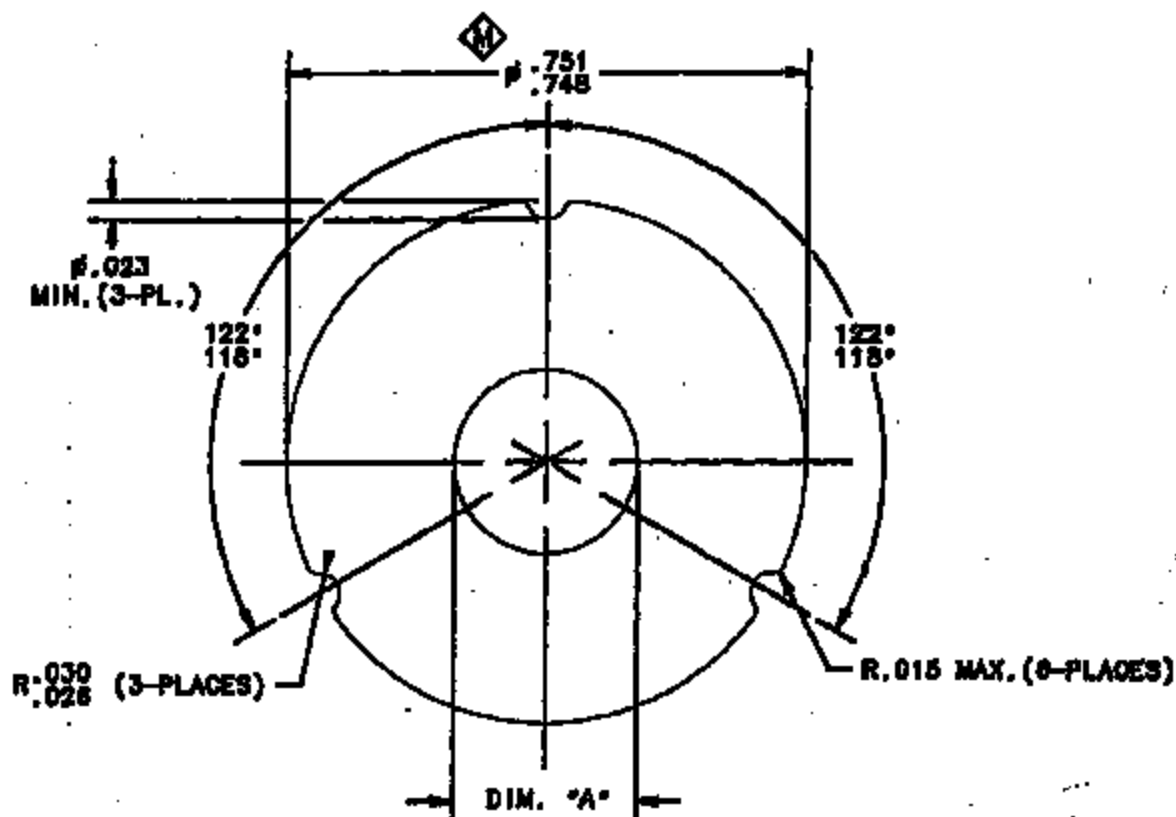
DISTRIBUTORS AND FABRICATORS OF
TEFLON • FELS • FOME • PLEXGLAS • POLYSTYRENE • CLIP
NYLON • EXPLO-PAPER • MELDITE • POLYETHYLENE
UL-100

TI-NHTSA 003631

SPACER

G

73958



NOTES:

1. .001 MAX. BURR ALLOWABLE.
2. PARTS TO BE SHIPPED, ISSUED, AND STORED IN SEALED PLASTIC BAGS.
3. ALL CONTAINERS OF PARTS MUST BE DATE CODED. DATE CODE IS TO REFLECT ANY MATERIAL LOT, TOOL OR PROCESS CHANGE. CERTIFIED PRINT
3. MATERIAL CERTIFICATION REQUIRED WITH EACH LOT.

ENG. STD. E9898 REV. E

Date JUL 1 1991

DEFINITION: THIS PRINT AND THE INFORMATION CONTAINED THEREIN IS TO BE USED AS A GUIDE ONLY. IT IS NOT TO BE USED AS A BASIS FOR THE DESIGN OR CONSTRUCTION OF ANY PART OR ASSEMBLY. THE USER MUST CONSULT THE APPROPRIATE STANDARDS OR SPECIFICATIONS FOR THE PART OR ASSEMBLY.

73958-3	MADE FROM 74224-1 (KAPTON TAPE)	NO HOLE
73958-2	DUPONTS, KAPTON 200H. .0017 - .0023 THICK	NO HOLE
73958-1	KAPTON .0017 - .0023 THICK	.280/.270
PART NO.	MATERIAL	DIM "A"

THIS DWG. SUPERSEDES 73958 REV. "F" DATED 10-14-88

TOM BAIL 10-10-88

CH.

ENG. H. H. H. 10/16/90

MANUFACTURE



TEXAS INSTRUMENTS

ATTLEBORO, MASSACHUSETTS 01701

KIDON

SPECIAL PRODUCTS
DIVISION

REV.

SIZE

A

DWG. NO.

73958

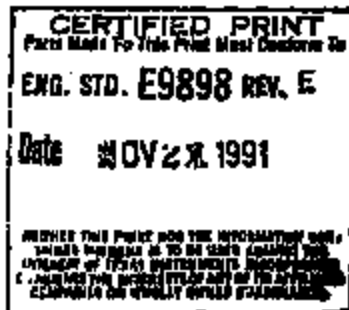
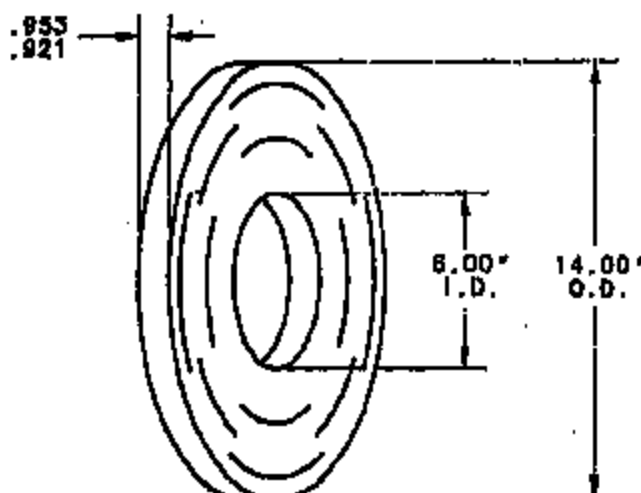
CODE IDENT No. A9647

TI-NHTSA 003632

74224

NOTES:

1. ROLLS SLITTED FROM ENDS OF MASTER COIL NOT ACCEPTABLE.
2. BUCKLING OF THE CORE ALLOWED UP TO 1/4" MEASURED RADIALLY AWAY FROM THE CORE.
3. DENTS, RIPS, OR JAGGED EDGES ON MATERIAL NOT ALLOWED.
4. ROLLS ARE TO BE SHIPPED WITH PROTECTIVE INSERT CORES IN THE PACKING BOX.



74224-1	DUPONTS, KAPTON 200H	.0017/.0023	
PART NUMBER	MATERIAL	THICKNESS	

THIS DWG. SUPERSEDES 74224 REV. "E" DATED 10-14-88

BY: TEM DALL 10-14-88	TEXAS INSTRUMENTS AUSTIN, TEXAS 78701	KILKON CONTROL PRODUCTS DIVISION	DWG. NO. 74224
CHK: <i>Stanford</i> 10-16-90			

COPY RIGHT NO. 92847

VALENTINE TOOL & STAMPING, INC.

111 WEST MAIN ST. NORTON, MASS. 02766
(508) 285-6011

MATERIAL CERTIFICATION

DATE : TUESDAY APRIL 30, 1991

CUSTOMER : TEXAS INSTRUMENTS INC

CUSTOMER P.O. NO : 5050637-6

SUPPLIER INVOICE NO.: 79319

PART DESCRIPTION : 74787-1 CRIMP RING REV.8

SUPPLIER PJO NO. : 18573

QUANTITY SHIPPED : 20,449

SHIPMENT DATE : 04/30/91

WE CERTIFY THAT THE MATERIAL USED
TO PRODUCE THE PRODUCT IN THIS
SHIPMENT, NAMELY
5052 AL
CONFORMS TO T.I. DRAWINGS AND
T.I. PURCHASE ORDER REQUIREMENTS.

SIGNED

Jaime Lofgren
(Supplier Representative)

Jaime Lofgren Quality Control Manager

TI-NHTSA 003834

VALENTINE TOOL & STAMPING, INC.

101 WEST MAIN ST. NORTON, MASS. 02766
(508) 285-6911 226-0940

CERTIFICATE OF CONFORMANCE

DATE : TUESDAY APRIL 30, 1991

CUSTOMER : TEXAS INSTRUMENTS INC

CUSTOMER P.O. NO : 505063716

SUPPLIER INVOICE NO.: 79319

PART DESCRIPTION : 74797-1 CRIMP RING REV.B

SUPPLIER PJO NO. : 18573

QUANTITY SHIPPED : 20,449

SHIPMENT DATE : 04/30/91

WE CERTIFY THAT ALL ITEMS SHIPPED ON THIS ORDER MEET THE REQUIREMENTS
OF THE PURCHASE ORDER AND APPLICABLE DRAWINGS/SPECIFICATIONS. RESULTS
OF REQUIRED MECHANICAL, VISUAL, FUNCTIONAL AND CHEMICAL TESTS ARE ON
FILE IN OUR QUALITY CONTROL DEPARTMENT.

SIGNED

Jeanne Lafontaine
Jeanne Lafontaine
Quality Control Manager

TI-NHT9A 003635

UNITED ALUMINUM CORPORATION

100 UNITED DRIVE • NORTH HAVEN, CONNECTICUT 06473 • (203) 239-0881



9281

VALENTINE TOOL & STAMPING, INC.
171 WEST MAIN STREET
NORTON, MA 02756-0469
ATTN: DICK WHITNEY

DATE 4/18/91
P.O. # 13876
SHIPPED 4/19/91
UA ORDER # 161499

THIS IS TO CERTIFY THAT THE MATERIAL LISTED BELOW CONFORMS WITH THE CHEMICAL COMPOSITION LIMITS OF OQA-250/8F AND THE FOLLOWING ARE THE LIMITS:

AA 5052

CHEMICAL COMPOSITION

	MIN.	MAX.
SILICON		0.25
IRON		0.40
COPPER		0.1
MANGANESE		0.1
MAGNESIUM	2.2	2.8
CHROMIUM	0.15	0.35
ZINC		0.1
TITANIUM		
OTHER ELEMENTS (EACH)		.05
OTHER ELEMENTS (TOTAL)		.15
ALUMINUM	REMAINDER	

MECHANICAL PROPERTIES

TENSILE STRENGTH	28.3 KSI
ELONGATION IN 2"	20%

..032

2.312

5052-0

UNITED ALUMINUM CORPORATION

54797-1

NOTES

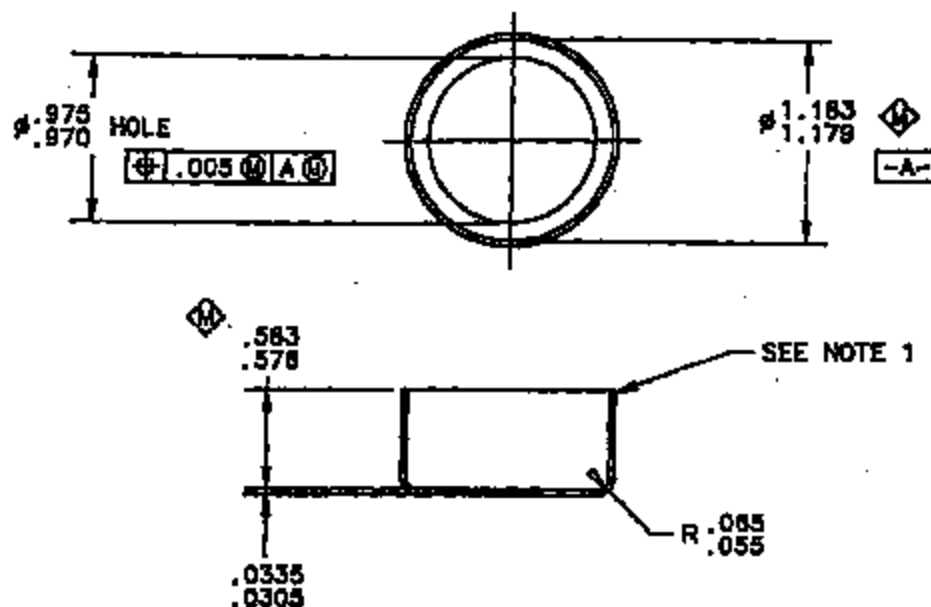
TI-NHTSA 003636

CRIMP RING

REV.
B

74797

74797



NOTES:

1. PINCH OFF RADIUS ALLOWED.
2. .002 MAX. BURR ALLOWED.
3. PARTS TO BE SHIPPED, ISSUED, AND STORED IN SEALED PLASTIC BAGS.
4. MATERIAL CERTIFICATION REQUIRED WITH EACH SHIPMENT.

CERTIFIED PRINT	
Parts Made To This Print Must Conform To	
ENG. STD. E9898 REV. E	
Date	JUL 1 1991
REVIEWER THIS PRINT FOR THE INFORMATION CONTAINED HEREIN IS TO BE USED AS A GUIDE ONLY. THE USER OF THIS PRINT SHALL BE RESPONSIBLE FOR THE PROPER INTERPRETATION OF THE PRINT AND FOR THE PROPER USE OF THE PRINT.	

SUPERSEDES DWG. 74797 REV. A DATED 11-2-80

74797-1	ALUMINUM 5052	
PART NO.	MATERIAL	FINISH

BY: [Signature]
 CH: [Signature]
 ENG: [Signature]
 DATE: 7/1/91
 MAKEPEACE



TEXAS INSTRUMENTS
 ATTLEBORO, MASSACHUSETTS 01903

KLIXON
 CONTROL PRODUCTS
 DIVISION

DWG. NO.
 A

REV. NO.

74797

TI-NHTSA 003637

Cap

CERTIFICATE OF CONFORMANCE

TO: TEXAS INSTRUMENTS
ATTLEBORO, MASSACHUSETTS

PURCHASE ORDER NUMBER: 500023184

CUSTOMER PART NUMBER: 74179-2

PART DESCRIPTION: 342 - 3/8" THICK RPD

OUR JOB NUMBER: 163505-1

The supplier hereby certifies that adequate data is on file showing that all components and materials used in the article furnished comply with the physical and chemical properties required by our firm.

Roger J. Binkus 5 31-91
Roger J. Binkus
Quality Assurance Manager

SINCLAIR & RUSH COMPANY

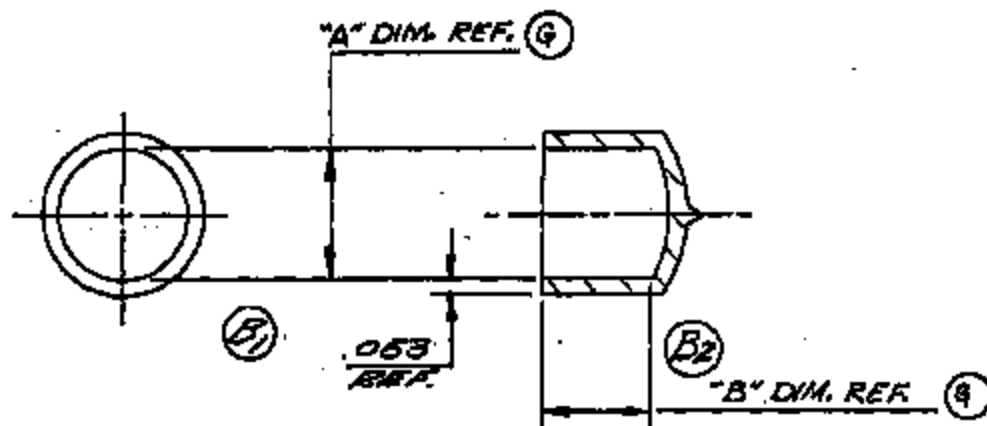
16 SOUTH BROADWAY, ST. LOUIS, MO 63111-3187 • PHONE: (800) 527-CAPS • TELEX: 442584 SINCLARUSH STL • FAX: (314) 481-2701

TI-NHT8A 003638

THREAD CAP

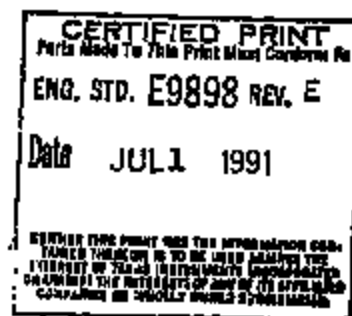
74179

74179



NOTE:
IDENTIFICATION MEMO MUST ACCOMPANY EACH
SHIPMENT STATING THE FOLLOWING:
SINCLAIR RUSH #SC 0.243-4 (1/2" IL) TX 701-1R

(H)



74179-2	VINYL	.333/.343	.313/.438	SINCLAIR & RUSH	RED
74179-1	VINYL	.955/.365	.281/.343	MOCAP	RED
PART NOS.	MATERIAL	DIM."A"	DIM."B"	VENDOR	COLOR
BY <i>Tom Dill</i> 2/2/84	 TEXAS INSTRUMENTS INCORPORATED ATLEBORO, MASS. U.S.A.			 KILKON CERTIFIED PRODUCT DIVISION	ENG. NO. 74179
CH. <i>R.H. Wynn</i> 2/17/84					Dwg. No. A
ENG. <i>D. Smith</i> 2/1/84					

TI-NHTSA 003640

DFMEA

TI-NHTSA 003841

Section 1		Section 2		Section 3		Section 4		Section 5		Section 6		Section 7		Section 8		Section 9		Section 10		Section 11		Section 12		Section 13		Section 14		Section 15		Section 16		Section 17		Section 18		Section 19		Section 20		Section 21		Section 22		Section 23		Section 24		Section 25		Section 26		Section 27		Section 28		Section 29		Section 30		Section 31		Section 32		Section 33		Section 34		Section 35		Section 36		Section 37		Section 38		Section 39		Section 40		Section 41		Section 42		Section 43		Section 44		Section 45		Section 46		Section 47		Section 48		Section 49		Section 50		Section 51		Section 52		Section 53		Section 54		Section 55		Section 56		Section 57		Section 58		Section 59		Section 60		Section 61		Section 62		Section 63		Section 64		Section 65		Section 66		Section 67		Section 68		Section 69		Section 70		Section 71		Section 72		Section 73		Section 74		Section 75		Section 76		Section 77		Section 78		Section 79		Section 80		Section 81		Section 82		Section 83		Section 84		Section 85		Section 86		Section 87		Section 88		Section 89		Section 90		Section 91		Section 92		Section 93		Section 94		Section 95		Section 96		Section 97		Section 98		Section 99		Section 100	
Section 1	Section 2	Section 3	Section 4	Section 5	Section 6	Section 7	Section 8	Section 9	Section 10	Section 11	Section 12	Section 13	Section 14	Section 15	Section 16	Section 17	Section 18	Section 19	Section 20	Section 21	Section 22	Section 23	Section 24	Section 25	Section 26	Section 27	Section 28	Section 29	Section 30	Section 31	Section 32	Section 33	Section 34	Section 35	Section 36	Section 37	Section 38	Section 39	Section 40	Section 41	Section 42	Section 43	Section 44	Section 45	Section 46	Section 47	Section 48	Section 49	Section 50	Section 51	Section 52	Section 53	Section 54	Section 55	Section 56	Section 57	Section 58	Section 59	Section 60	Section 61	Section 62	Section 63	Section 64	Section 65	Section 66	Section 67	Section 68	Section 69	Section 70	Section 71	Section 72	Section 73	Section 74	Section 75	Section 76	Section 77	Section 78	Section 79	Section 80	Section 81	Section 82	Section 83	Section 84	Section 85	Section 86	Section 87	Section 88	Section 89	Section 90	Section 91	Section 92	Section 93	Section 94	Section 95	Section 96	Section 97	Section 98	Section 99	Section 100																																																																																																				

TI-NHTSA 003648

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TI-NHTSA 003849

Part of _____

1991-1992

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77-NHT8A 003650

ТІАМТБА 003057

TI-NHTSA 003852

Training Description/Target		Frequency	Duration	Cost	Responsible	Start Date	End Date	Progress	Notes
Safety Training	Basic Safety Training	Quarterly	2 Days	\$500	John Doe	2023-01-01	2023-01-02	100%	Completed
	Advanced Safety Training	Quarterly	3 Days	\$750	John Doe	2023-01-03	2023-01-05	100%	Completed
	First Aid Training	Quarterly	1 Day	\$250	John Doe	2023-01-06	2023-01-06	100%	Completed
	Fire Safety Training	Quarterly	1 Day	\$250	John Doe	2023-01-07	2023-01-07	100%	Completed
	Emergency Response Training	Quarterly	2 Days	\$500	John Doe	2023-01-08	2023-01-09	100%	Completed
	Defensive Driving Training	Quarterly	2 Days	\$500	John Doe	2023-01-10	2023-01-11	100%	Completed
	Public Speaking Training	Quarterly	1 Day	\$250	John Doe	2023-01-12	2023-01-12	100%	Completed
	Team Building Training	Quarterly	1 Day	\$250	John Doe	2023-01-13	2023-01-13	100%	Completed
	Customer Service Training	Quarterly	1 Day	\$250	John Doe	2023-01-14	2023-01-14	100%	Completed
	Time Management Training	Quarterly	1 Day	\$250	John Doe	2023-01-15	2023-01-15	100%	Completed
Technical Skills	Conflict Resolution Training	Quarterly	1 Day	\$250	John Doe	2023-01-16	2023-01-16	100%	Completed
	Stress Management Training	Quarterly	1 Day	\$250	John Doe	2023-01-17	2023-01-17	100%	Completed
	Leadership Training	Quarterly	2 Days	\$500	John Doe	2023-01-18	2023-01-19	100%	Completed
	Project Management Training	Quarterly	2 Days	\$500	John Doe	2023-01-20	2023-01-21	100%	Completed
	Communication	Quarterly	1 Day	\$250	John Doe	2023-01-22	2023-01-22	100%	Completed
	Decision Making Training	Quarterly	1 Day	\$250	John Doe	2023-01-23	2023-01-23	100%	Completed
	Problem Solving Training	Quarterly	1 Day	\$250	John Doe	2023-01-24	2023-01-24	100%	Completed
	Teamwork Training	Quarterly	1 Day	\$250	John Doe	2023-01-25	2023-01-25	100%	Completed
	Workplace Safety Training	Quarterly	1 Day	\$250	John Doe	2023-01-26	2023-01-26	100%	Completed
	Health and Wellness Training	Quarterly	1 Day	\$250	John Doe	2023-01-27	2023-01-27	100%	Completed
Soft Skills	Financial Literacy Training	Quarterly	1 Day	\$250	John Doe	2023-01-28	2023-01-28	100%	Completed
	Environmental Awareness Training	Quarterly	1 Day	\$250	John Doe	2023-01-29	2023-01-29	100%	Completed
	Community Engagement Training	Quarterly	1 Day	\$250	John Doe	2023-01-30	2023-01-30	100%	Completed
	Global Perspectives Training	Quarterly	1 Day	\$250	John Doe	2023-01-31	2023-01-31	100%	Completed
	Cultural Awareness Training	Quarterly	1 Day	\$250	John Doe	2023-02-01	2023-02-01	100%	Completed
	Language Skills Training	Quarterly	1 Day	\$250	John Doe	2023-02-02	2023-02-02	100%	Completed
	Technical Skills Training	Quarterly	2 Days	\$500	John Doe	2023-02-03	2023-02-04	100%	Completed
	Soft Skills Training	Quarterly	1 Day	\$250	John Doe	2023-02-05	2023-02-05	100%	Completed
	Professionalism Training	Quarterly	1 Day	\$250	John Doe	2023-02-06	2023-02-06	100%	Completed
	Business Writing Training	Quarterly	1 Day	\$250	John Doe	2023-02-07	2023-02-07	100%	Completed
Public Speaking	Public Speaking Training	Quarterly	1 Day	\$250	John Doe	2023-02-08	2023-02-08	100%	Completed
	Team Building Training	Quarterly	1 Day	\$250	John Doe	2023-02-09	2023-02-09	100%	Completed
	Customer Service Training	Quarterly	1 Day	\$250	John Doe	2023-02-10	2023-02-10	100%	Completed
	Time Management Training	Quarterly	1 Day	\$250	John Doe	2023-02-11	2023-02-11	100%	Completed
	Conflict Resolution Training	Quarterly	1 Day	\$250	John Doe	2023-02-12	2023-02-12	100%	Completed
	Stress Management Training	Quarterly	1 Day	\$250	John Doe	2023-02-13	2023-02-13	100%	Completed
	Leadership Training	Quarterly	2 Days	\$500	John Doe	2023-02-14	2023-02-15	100%	Completed
	Project Management Training	Quarterly	2 Days	\$500	John Doe	2023-02-16	2023-02-17	100%	Completed
	Communication	Quarterly	1 Day	\$250	John Doe	2023-02-18	2023-02-18	100%	Completed
	Decision Making Training	Quarterly	1 Day	\$250	John Doe	2023-02-19	2023-02-19	100%	Completed

TI-NHT8A 003053

Personnel Information			Assignment Information			Performance Information			Action Information		
Employee Name	Employee ID	Employee Title	Assignment Title	Assignment ID	Assignment Location	Performance Rating	Performance Comments	Action Type	Action Date	Action Status	
John Doe	1001	Software Engineer	Project X Development	1001	New York	4.5	Excellent performance, completed all tasks on time.	Promotion	2023-10-01	Pending	
Jane Smith	1002	Product Manager	Project Y Planning	1002	San Francisco	3.8	Good performance, some delays in planning.	Reassignment	2023-10-05	Pending	
Mike Johnson	1003	Marketing Specialist	Project Z Launch	1003	Los Angeles	3.2	Needs improvement in communication and teamwork.	Training	2023-10-10	Pending	
Sarah Lee	1004	Quality Assurance	Project W Testing	1004	Chicago	4.0	Consistent performance, thorough testing.	Retention	2023-10-15	Completed	
David Kim	1005	Systems Administrator	Project V Maintenance	1005	Seattle	3.5	Good performance, minor issues with system uptime.	Reassignment	2023-10-20	Pending	
Emily White	1006	Business Development	Project U Sales	1006	Phoenix	3.0	Needs improvement in sales strategy and client relations.	Training	2023-10-25	Pending	
Chris Brown	1007	Finance Analyst	Project T Budgeting	1007	Philadelphia	4.2	Excellent performance, accurate budgeting.	Promotion	2023-10-30	Pending	
Alex Green	1008	Operations Manager	Project S Logistics	1008	San Diego	3.7	Good performance, efficient logistics management.	Retention	2023-11-05	Completed	
Olivia Black	1009	Human Resources	Project R Recruitment	1009	Portland	3.3	Needs improvement in recruitment process and candidate selection.	Training	2023-11-10	Pending	
Noah Gray	1010	IT Support	Project Q Troubleshooting	1010	San Jose	4.1	Excellent performance, quick resolution of issues.	Promotion	2023-11-15	Pending	
Isabella Blue	1011	Project Coordinator	Project P Planning	1011	San Antonio	3.6	Good performance, effective planning and coordination.	Retention	2023-11-20	Completed	
Liam Red	1012	Software Engineer	Project O Development	1012	San Francisco	3.9	Good performance, innovative solutions.	Retention	2023-11-25	Completed	
Mia Yellow	1013	Product Manager	Project N Planning	1013	Los Angeles	3.4	Good performance, clear planning and vision.	Retention	2023-12-01	Completed	
Ben Green	1014	Marketing Specialist	Project M Launch	1014	Chicago	3.1	Needs improvement in marketing strategy and execution.	Training	2023-12-05	Pending	
Charlotte Blue	1015	Quality Assurance	Project L Testing	1015	Seattle	4.3	Excellent performance, thorough testing and attention to detail.	Promotion	2023-12-10	Pending	
Lucas Red	1016	Systems Administrator	Project K Maintenance	1016	Phoenix	3.6	Good performance, reliable system maintenance.	Retention	2023-12-15	Completed	
Amelia Yellow	1017	Business Development	Project J Sales	1017	Philadelphia	3.2	Needs improvement in sales strategy and client relations.	Training	2023-12-20	Pending	
Ethan Green	1018	Finance Analyst	Project I Budgeting	1018	San Diego	4.0	Excellent performance, accurate budgeting and financial analysis.	Promotion	2023-12-25	Pending	
Sophia Blue	1019	Operations Manager	Project H Logistics	1019	Portland	3.7	Good performance, efficient logistics management.	Retention	2024-01-01	Completed	
Oliver Red	1020	Human Resources	Project G Recruitment	1020	San Jose	3.3	Needs improvement in recruitment process and candidate selection.	Training	2024-01-05	Pending	
Isabella Yellow	1021	IT Support	Project F Troubleshooting	1021	San Antonio	4.1	Excellent performance, quick resolution of issues.	Promotion	2024-01-10	Pending	
Benjamin Blue	1022	Project Coordinator	Project E Planning	1022	San Francisco	3.6	Good performance, effective planning and coordination.	Retention	2024-01-15	Completed	
Mia Green	1023	Software Engineer	Project D Development	1023	Los Angeles	3.9	Good performance, innovative solutions.	Retention	2024-01-20	Completed	
Lucas Yellow	1024	Product Manager	Project C Planning	1024	Chicago	3.4	Good performance, clear planning and vision.	Retention	2024-01-25	Completed	
Amelia Red	1025	Marketing Specialist	Project B Launch	1025	Seattle	3.1	Needs improvement in marketing strategy and execution.	Training	2024-02-01	Pending	
Ethan Blue	1026	Quality Assurance	Project A Testing	1026	Phoenix	4.3	Excellent performance, thorough testing and attention to detail.	Promotion	2024-02-05	Pending	

TI-NHTSA 003654

TEST RESULTS

TI-NHTSA 003656

ADDENDUM TO:
REPORT OF ISR TESTING
FORD PASSENGER CAR
ELECTRONIC SPEED CONTROL
DEACTIVATION PRESSURE SWITCH
FS/91/49-A

TEXAS
INSTRUMENTS

ADDENDUM TO:
 REPORT OF ISR TESTING
 FORD PASSENGER CAR
 ELECTRONIC SPEED CONTROL
 DEACTIVATION PRESSURE SWITCH
 PS/91/49-A

TEXAS INSTRUMENTS INCORPORATED
 CONTROL PRODUCTS DIVISION
 PRECISION CONTROLS DEPARTMENT
 34 FOREST STREET
 ATTLEBORO, MA 02703

TEST LOT NO.	TEST	DEVICE
TESTED BY	 TEXAS INSTRUMENTS MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02703	DOC.
APPROVED BY <i>Amc</i>		PAGE
DATE 01-18-12		

FORM 522E

TI-NHTSA 003658

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4.2	Data # 172	15
4.3	Data # 173	18
4.4	Fluid Resistance	21

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY	TEXAS INSTRUMENTS 	MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02703
DATE 01-12-19		DOC. PAGE 2

FORM 6285

TI-NHTSA 003659

1.0 GENERAL

1.1 Customer: Ford Motor Company, Passenger Car Brake Systems Engineering

1.2 TI Part Number: 77PSL2-1

1.3 Customer Part Number: F2VC-9F924-AB

1.4 Specifications: Ford Engineering Specification number
(delta) ES-F2VC-9F924-AA

1.5 Date of Completion : 911218

1.6 Quantity of Units Tested: 48

1.7 Disposition of Tested Units:

1.7.1 All devices are retained under quarantine.

1.8 TI test number: 172-15-24
173-15-24

1.9 TI Pressure Switch test report number: PS/91/49-A

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY		SEC.
DATE 91-12-18	TEXAS INSTRUMENTS 	PAGE 2

FORM 8225

TI-NHTSA 003680

2.0 OBJECTIVE

The original battery of tests reported in TI test report number PS/91/49 dated 910920 was performed to demonstrate the ability of TI P/N 77PSL2-1 to conform to customer specifications given in (delta) ES-F2VC-9F924-AA, in fulfillment of the requirements of the Initial Sample Report. During these original tests, problems were noted with diaphragm life during the Impulse test. It was discovered that these problems were related to the automatic pressure sensor assembly crimper, and furthermore that devices assembled on the manually-loaded crimper had no difficulty with diaphragm life. In the interest of meeting strict ISR deadlines, the Impulse portion of the test was successfully re-run using devices assembled on the manually-loaded crimper. However, these devices did not undergo the Fluid Resistance test due to time constraints. A 90-day Alert, # A10166193, was issued on 911002 (see Appendix 4.1). During this 90-day period, efforts to understand and correct the discrepancies of the automatic equipment have been made. The objective of this addendum is to report on the successful completion of the tests (Fluid Resistance and Impulse) which were compromised in the original ISR, using devices built both on the automatic equipment and the manually-loaded equipment. Crimp dies from the manually-loaded equipment were transferred to the automatic equipment in order to produce the successful test devices. The permanent corrective action will be to produce exact duplicates of these crimp dies for the automatic line.

TEST LOT NO.	TEST	DEVICE
TESTED BY	TEXAS INSTRUMENTS 	DOC.
APPROVED BY		PAGE
DATE 91-11-18		

FORM 8298

TI-NHTSA 003661

3.0 TEST PROCEDURES AND RESULTS

All switches were tested to Ford Engineering Specification (delta) ES-F2VC-9F924-AA, sections III. M. (Fluid Resistance) and E. (Impulse), with initial and final characterizations consisting of III. A. (Calibration), B. (Voltage Drop), C. (Current Leakage), and D. (Proof). Raw data is included in Appendix 4.2 and 4.3.

TEST LOT NO.	TEST	TEXAS INSTRUMENTS 	MATERIALS & CONTROLS GROUP ATTLEBORO, MA 01702	DEVICE
TESTED BY				DOC.
APPROVED BY				PAGE
DATE 01-12-18				3

FORM 5296

TI-NHTSA 003662

3.1 CALIBRATION

3.1.1 Procedure: Calibration is checked at room temperature using ambient air as the pressure medium. Calibration settings, as specified on the part drawing, are actuation (electrical contacts opening) at 90 - 160 psig, and release (contacts reclosing) at 20 psig minimum. For the purpose of stabilization, actuation values are recorded on the sixth cycle, after subjecting the switch to two (2) pressure cycles to 800 psig minimum and back to zero, followed by three (3) cycles to 1.1 times actuation pressure minimum and back to zero. The change in continuity is measured while conducting 750 +/- 50 milliamps at 13.0 +/- 1.0 volts DC.

3.1.2 Equipment: Custom TI designed and built pressure check station, using Heise Model CM96365 pressure gage calibrated on a regular quarterly schedule. Continuity change measured on custom TI designed and built equipment meeting the above electrical parameters.

3.1.3 Initial Results: All 48 devices tested were found to be within specification.

3.1.4 Final Results: All 48 devices tested were found to be within specification.

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY	TEXAS INSTRUMENTS 	DOC.
DATE 11-13-19		PAGE 1

FORM 5200

TI-NHTSA 003583

3.2 VOLTAGE DROP

- 3.2.1 Equipment: Fluke Model 8020B Digital Multimeter, calibrated quarterly, used in conjunction with the continuity equipment in 3.1.2.
- 3.2.2. Initial results: The average voltage drop was 4.5 millivolts, and the standard deviation was 1.5. All values are significantly below the specification of 200 millivolts maximum.
- 3.2.3 Final results: The average voltage drop was 14.3 millivolts, and the standard deviation was 22.7. All values are significantly below the specification of 200 millivolts maximum.

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY	TEXAS INSTRUMENTS 	MATERIALS & CONTROLS GROUP ATLANTIC, MA 02703
DATE 11-12-11		DOC. PAGE 1

FORM 8290

3.3 CURRENT LEAKAGE

- 3.3.1 Equipment: Associated Research HyPot test unit used as power source for 500 VAC, 60 Hz test circuit. Fluke Model 8020B Digital Multimeter, calibrated quarterly, used to measure voltage drop across a series resistance of one megohm (+/- 5%).
- 3.3.2 Initial results: Measuring terminals to case with switch closed; measuring terminals to case with switch open; and measuring between the terminals: the maximum current leakage observed less than 2 microamps. All values are significantly below the specification of 100 microamps.
- 3.3.3. Final results: Same three measurements per device as 3.3.2. All current leakage values were consistent with initial results. The maximum observed was 2.7 microamps. All values are significantly below the specification of 100 microamps.

TEST LOT NO.	TEST	DEVICE
TESTED BY	 TEXAS INSTRUMENTS	DOC.
APPROVED BY		PAGE
DATE 01-12-18		

FORM 8296

TI-NHTSA 003865

3.4 PROOF

- 3.4.1 Procedure: Calibration readings were recorded only after proof testing. Test pressure was 3000 psi per the part drawing.
- 3.4.1 Equipment: Enerpak model P-392 hydraulic hand pump using Enerpak hydraulic fluid as the pressure medium. Hydraulic fluid is removed from the devices using a combination of vacuum and residue-free solvent Sprayon(TM) Hi-Tech 02002 TF Electrical Contact Cleaner. US Gauge #33714 reading to 5000 psig with 100 psi increments, resolvable to 50 psi., calibrated quarterly. Custom TI designed and built safety enclosure.
- 3.4.2 Initial Results: No evidence of fluid leakage and no drop in test pressure was observed on any device.
- 3.4.3 Final Results: No evidence of fluid leakage and no drop in test pressure was observed on any device.

TEST LOT NO.	TEST	DEVICE
TESTED BY	TEXAS INSTRUMENTS 	DOC.
APPROVED BY		PAGE
DATE 01-12-12		

FORM 5286

TI-NHTSA 003668

3.5 FLUID RESISTANCE

3.5.1 Devices tested: 172-15-01 thru -12
173-15-01 thru -12.

3.5.2 Equipment: Fluids as called out in ES table (frame 12 of 18); appropriate beakers and storage apparatus; vented hood.

3.5.3 Results: The 24 devices were subject to the Impulse test following completion of Fluid Resistance.

TEST LOT NO.	TEST	TEXAS INSTRUMENTS 	MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02703	DEVICE
TESTER BY				DOC.
APPROVED BY				PAGE
DATE 61-12-18				10

FORM 6285

TI-NHTSA 003667

3.6 IMPULSE

- 3.6.1 Devices tested: 172-15-01 thru -24
173-15-01 thru -24.
- 3.6.2 Procedure: 172-15-13 thru -24, and 173-15-13 thru -24 were run together on the Impulse test per the ES. Devices 172-15-01 thru -12 and 173-15-01 thru -12 were subject to the Fluid resistance test first, then run together on the Impulse test.
- 3.6.3 Equipment: Thermotron model S-4 Mini-Max environmental chamber capable of -55 C to +200 C, humidity uncontrolled. Custom TI designed and built cyclor, utilizing Enerpak integrated hydraulic pressure source, TI315 Programmable Logic Controller, Moog servovalve and controller, Simpson signal generator, and opposing-piston fluid isolators, to produce a hydraulic-fluid flow-type primary with a brake-fluid dead-end-type secondary terminated with a 24-station manifold equipped with internal heaters. Capability to 5 Hz at 0-1450 psig cycle. Custom TI designed and built 24 station Switch Monitor Circuit which automatically stops the cyclor in the event of abnormal switch action, defined as continuity change which does not track the signal from the signal generator. Thermocouple readouts calibrated quarterly. 12-station inductive load bank, per the schematic found in the ES (frame 18 of 18; figure 4.) used in the last 25K cycles.
- 3.6.4 Results: All devices passed.

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY	TEXAS INSTRUMENTS  MATERIALS & CONTROL GROUP ATTLEBORO, MA 02703	DOQ.
DATE 01-12-12		PAGE 11

FORM 828

TI-NHTSA 003568

Appendix 4.1
Alert

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY	TEXAS INSTRUMENTS 	DOC.
DATE 01-12-10		PAGE 13

FORM 5280

TI-NHTSA 003669

ALERT DETAIL

PRINT DATE/TIME: 91/10/11 09:39
PAGE:

ALERT NUMBER
A78144193

ORIGIN ACTIVITY: 6600 CHAGRIS PED (LUCS) -
ORIGINATOR: PEASE, R. P.
CPSC: 04085

TYPE: (U) USE PPH
DATE: 91/10/02
PHONE: 32-37955
NOTICE NO:

STATUS: 2
LOCATION: RM 3001, BLDG05, 0
RESOLVING NOTICE:

ALERT DESC: PERMIT TEXAS INSTRUMENTS TO SHIP SPEED CONTROL REDUNDANT
DEACTIVATION SWITCH, F2VC-09924-AS, WITH EXCEPTION TO THE
PRODUCTS AFFECTED: 1992 LINCOLN TOWN CAR, CROWN VICTORIA, BRASS
HAWKUS WITH NEW GENERATION SPEED CONTROL.
MODEL CODES: CVFA CVTH CVVB
PLANTS AFFECTED: NA17
RFE CONCERN CTRL:
PROGRAM:

MODEL YEAR: 92

QTY:
EST INCRN VAR COST:
EST INCRN YRD COST:
UNIT MEASURE:
SUPP SOCS:

-0.92

TIME: 900
EST INCRN TOOL COST:
EST INCRN FAC COST:
APPEARANCE:

ENS CONCERN CTRL:
EFFECTIVE IN:
EMISSION CODE: 000

INVALID:
QTY:
DISP: U
EST INCRN LBR COST: 0.00
MT EFFECT: 0.0000

***** AFFECTED PARTS *****

AFF PART NO:
CPSC:
ACT:

04085

INTER:

AFF PART DESC:
NOTICE:
SUPPLY/LOCAL:
SUPPLIER:

AVAIL:

REL IND: N
FUNC RECD:

***** FURTHER DESCRIPTION/ALERT RESOLUTION/REASON FOR REJECTION ETC. *****

USERID: 0992409
ALERT DESC: ACTIVITY: NCR0 ENTRY DATE: 91/10/02
USING A MANUALLY LOADING BENCH CRIMPING MACHINE VERSUS THE
AUTOMATIC IN LINE LOADED CRIMPER. THE AUTOMATIC CRIMPER HAS
BEEN DETERMINED TO HAVE A YET TO BE DEFINED DEFICIENCY THAT
RESULTS IN PART FAILURE TO MEET THE REQUIRED NUMBER OF CYCLE
IN THE IMPULSE TEST. THE SUPPLIER IS GIVEN A 90 DAY PERIOD
TO RESOLVE THE ISSUE. THE MANUALLY CRIMPED PARTS PASS THE
TEST. THIS DEVIATION PERMITS INCORPORATION OF THE -AD
LEVEL SWITCH AND DELETION OF THE INTERIM -AD SWITCH FOR A
COST REDUCTION OF 0.92. THE -AD SWITCH IS FIA TO END ITEM

USERID: 0992409
ALERT DESC: ACTIVITY: NCR0 ENTRY DATE: 91/10/03
PROPORTIONING VALVES F2AC-28091-BA, F2VC-28091-CC, AND
JUNCTION BLOCK F2AC-28320-EM.

USERID: LA20584
ALERT DESC: ACTIVITY: NCR0 ENTRY DATE: 91/10/04
OK. SUPPLY. APPROVAL REQ'D. IF FVSS IS AFFECTED. LA2

USERID: 0405368
ALERT DESC: ACTIVITY: NCR0 ENTRY DATE: 91/10/04

-NOTE-

T-NHTSA 003670

ALERT DETAIL

PRINT DATE/TIME: 91/10/11 09:39
PAGE: 2

ALERT NUMBER
A1016610X

ORIGIN ACTIVITY: NC00 CHASSIS PED (LNCR)
ORIGINATOR: PEASE, B. F.
CPAC: 000005

TYPE: (U) USE PPH
DATE: 91/10/02
PHONE: 32-37955
NOTICE NO:

STATUS: A
LOCATION: RM 3001, BLDG25, D
RESOLVING OFFICE:

***** FURTHER DESCRIPTION/ALERT RESOLUTION/REASON FOR REJECTION ETC. *****

USERID: BJN5368
ALERT DESC:
PHOTO NOT AFFECTED BJK

ACTIVITY: NC00 ENTRY DATE: 91/10/04

USERID: JLN1024
ALERT DESC:
NOTED

ACTIVITY: NC00 ENTRY DATE: 91/10/07
J SIMMONS 32-37976

***** APPROVALS *****

REGION	DEPARTMENT	USERID	ACTIVITY	APPROVER'S NAME	DATE APPROVED	APPROVAL
N	K0667	BFP2409	NC00	PEASE, B. F.	91/10/02	
N	K0667	JLN1024	NC00	SIMMONS, J.L.	91/10/07	
N	K0667	LA20600	NC00	ZIELINSKY, L.A.	91/10/04	Y
N	K0667	BJN5368	NC00	HAEROFF, B.J.	91/10/04	Y
N	K0660	VSD0370	NC00	DEGRAZIA, V.E. (DEPT	91/10/09	Y
N	K0613	AJT6109	NC00	YUNAS, A.J.	91/10/04	Y
N	K0613	MATL	NC00	CHASSIS MATL BATEKES	91/10/04	Y
N	K0611	PPH1017	NC00	PPH BATEKES-CHASS	00/00/00	
N	K0667	BFP2409	NC00	PEASE, B. F.	91/10/02	
N	K0670	JGV4166	NC00	VANDERKOOI, J.G. (C	00/00/00	

TI-NHTSA 003871

Appendix. 4.2
Data # 172

TEST LOT NO.	TEST TEXAS INSTRUMENTS  MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02703	DEVICE
TESTED BY		DOC.
APPROVED BY		PAGE
DATE 41-12-18		38

FORM 8298

TI-NHTSA 003672

PRESSURE SWITCH DATA

Form 31605

TEST NO. 172-11-24

DEVICE 77 PSL 2-1	DATE REQUESTED 11/1/51	REQUESTED BY Steve C. F. Law	REQUESTED COMPL. DATE
PERFORMED BY Jed Roy D. Berman	DATE STARTED 11/1/51	DATE COMPLETED	APPROVED BY
PROJECT TITLE: Ford MF '51 Election Speed Control Diagnostics 15			

CUSTOMER:

PURPOSE OF TEST: Review of Validation testing which caused the first time

PROCEDURE: Impulse and Fluid Res/Impulse test per Ford ES parts Crimped as hand-lid

Pressure	Temp	Altitude	No. Imp	Cur A	Cur B	Cur C	Fluid	
172-11-24	91.12	117/43	5.9	1.50	1.50	1.16	Pos	
1		118/41	5.9	1.51	1.46	1.17		
2		118/41	5.9	1.52	1.44	1.18		
3		118/45	4.6	1.51	1.46	1.19		
4		118/45	4.7	1.52	1.47	1.20		
5		118/48	4.2	1.52	1.51	1.21		
6		118/42	5.4	1.55	1.51	1.20		
7		118/44	3.1	1.57	1.47	1.23		
8		125/41	5.6	1.50	1.45	1.21		
9		126/47	5.7	1.51	1.49	1.26		
10		126/50	4.3	1.51	1.48	1.27		
11		128/47	3.3	1.51	1.47	1.28		
122-16-17	91.06	117/47	3.7	1.58	1.29	1.29	1.25	
13		118/42	4.5	1.61	1.27	1.27		
14		118/45	2.7	1.78	1.23	1.21		
15		118/42	4.4	1.58	1.38	1.23		
16		118/51	2.7	1.58	1.25	1.26		
17		124/47	3.1	1.67	1.40	1.25		
18		118/53	2.7	1.66	1.32	1.22		
19		121/47	3.1	1.67	1.38	1.26		
20		118/47	3.6	1.68	1.40	1.25		
21		124/52	3.2	1.63	1.41	1.29		
22		119/45	4.1	1.72	1.42	1.29		
23		119/47	3.4	1.74	1.45	1.29		

(OVER)

Final Cloy

Proof	Act/Rel	n, Day	A	B	C
172-4-01	Pass	105/54	12.2	1.61	1.35
-02		114/50	2.4	1.63	1.35
-03		116/56	11.6	1.65	1.65
-04		116/56	9.9	1.65	1.37
-05		118/58	1.6	1.65	1.40
-06		118/57	14.0	1.62	1.38
-07		118/55	2.6	1.58	1.30
-08		107/58	1.7	1.60	1.34
-09		111/56	2.8	1.63	1.36
-10		114/58	2.5	1.62	1.39
-11		116/60	1.4	1.57	1.33
-12		114/56	2.3	1.61	1.35
172-4-13	Pass	108/58	4.9	1.60	1.35
-14		110/57	1.1	1.48	1.24
-15		118/62	3.8	1.46	1.25
-16		111/59	4.2	1.52	1.27
-17		112/57	6.1	1.51	1.27
-18		116/60	7.1	1.52	1.28
-19		118/57	3.7	1.64	1.36
-20		111/62	3.2	1.72	1.37
-21		112/59	2.8	1.71	1.38
-22		116/58	5.9	1.59	1.29
-23		111/57	2.4	1.63	1.30
-24		111/58	5.2	1.57	1.32

Appendix 4.3

Data # 173

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY	TEXAS INSTRUMENTS 	DOC.
DATE 02-12-10	MATERIALS & CONTROLS GROUP ATLSEBORD, MA 02702	PAGE 11

FORM 5296

TI-NHTSA 003675

PRESSURE SWITCH DATA

Form 21605

TEST NO. 173-15-24

DEVICE 778SL2-1	DATE REQUESTED 11/18/91	REQUESTED BY Steve Off-lor	REQUESTED COMPL. DATE
PERFORMED BY Jeffrey D. Quaresimo	DATE STARTED 11/18/91	DATE COMPLETED	APPROVED BY
PROJECT TITLE: Ford 1981 Electronic Speed Control Deactivation P?			

CUSTOMER:

PURPOSE OF TEST: Reason of Validation testing which failed the first time

PROCEDURE: Impulse test and Fluid Res/Impulse test on Ford ES. All tests passed on AMD

Dev. #	Gr. Id	Act/Rel	Thdmg	Cur	A	B	C	Pre	
173-15-24	9/11/91	121/57	3.8	1.58	1.56	1.72			
-P1		124/57	6.3	1.92	1.99	1.72			
-11		125/52	5.3	1.84	1.52	1.72			
-12		123/57	4.3	1.86	1.54	1.72			
-13		128/56	3.6	1.86	1.52	1.72			
-14		128/58	4.1	1.82	1.50	1.72			Fluid Res
-15		121/59	4.4	1.93	1.52	1.75			
-16		125/59	4.1	1.72	1.48	1.74			Impulse
-17		127/52	4.3	1.74	1.50	1.75			
-18		123/57	5.0	1.96	1.51	1.75			
-19		121/54	4.8	1.98	1.52	1.73			
-20		128/53	6.2	1.82	1.50	1.72			
173-15-27	9/11/91	121/52	3.3	1.74	1.76	1.79			
-17		122/57	2.9	1.70	1.44	1.76			
-18		118/61	4.3	1.50	1.36	1.81			
-19		125/61	4.0	1.75	1.76	1.84			
-20		122/55	2.1	1.78	1.41	1.69			
-21		115/50	2.5	1.44	1.34	1.83			
-22		128/57	4.5	1.62	1.42	1.82			Impulse
-23		121/52	2.9	1.62	1.48	1.82			
-24		121/53	3.9	1.69	1.38	1.79			
-25		121/51	4.0	1.79	1.42	1.75			
-26		121/60	3.9	1.57	1.29	1.82			
-27		129/52	3.8	1.53	1.33	1.70			

OVER

TI-NHTSA 003676

Final Clor

Proc f	A. 1/2, 1	r/c Avg	C. 1/2, 1/2, 1/2							
			A	B	C					
122-11-01	111/56	6.3	2.0400	1.53	1.67					
01	112/58	2.3	1.55	1.28	1.56					
02	113/57	2.0	1.87	1.91	2.67					
03	114/58	1.8	1.60	1.37	1.67					
04	115/59	5.9	1.71	1.42	1.61					
05	116/55	3.0	1.75	1.45	1.61					
06	117/62	21.5	1.66	1.31	1.65					
07	118/57	1.9	1.53	1.20	1.69					
08	119/57	4.2	1.58	1.27	1.61					
09	120/51	39.2	1.89	1.55	1.71					
10	121/51	9.5	1.60	1.34	1.68					
11	122/52	7.6	1.64	1.35	1.78					
122-45-11	112/57	2.0	1.60	1.37	1.75					
01	113/60	39.2	1.69	1.42	1.59					
02	114/58	1.5	1.61	1.27	1.90					
03	115/54	73.6	1.45	1.25	1.86					
04	116/55	97.9	1.56	1.35	1.71					
05	117/57	2.3	1.55	1.20	1.83					
06	118/59	92.6	1.79	1.28	1.77					
07	119/61	1.9	1.58	1.26	1.79					
08	120/58	21.9	1.73	1.47	1.28					
09	121/55	47.2	1.58	1.24	1.75					
10	122/56	40.2	1.75	1.45	1.70					
11	123/55	35.1	1.61	1.39	1.69					

Appendix 4.4
Fluid Resistance

TEST LOT NO.	TEST	DEVICE
TESTED BY	 TEXAS INSTRUMENTS	DOC.
APPROVED BY		PAGE
DATE 01-12-18		23

FORM 5206

TI-NHTSA 003678

TEST NO. 109832

TECHNICAL SERVICE LABS

TEST NO. 109832

DATE IN	127	SEND YOUR PRELIM SAMPLE DESCRIPTION SAMPLES ARE 77PS PRESSURE SWITCHES WITH LEADS & END PLUGS	INFORMATION DESIRED:	3548
RECEIVED	181		PLEASE PERFORM FLUID RESISTANCE TEST FOR FORD MOTOR CO. SPEC ES-FIVE-9F924-AA (ATTACHED)	
DATE OF	180			
RECEIVED	5. OFFICIAL			
INFORMATION	12-29			
RECEIVED	1382			
RECEIVED	5806			
DATE RECEIVED	91-11-04			
DATE RECEIVED	91-11-12			
NO. OF SAMPLES	24			
COMPOSITION	4-1-62			

REPORT OF RESULTS:

DATE RECEIVED

11/3/91

DATE OUT

12-12

TECHNICIAN			
NO. OF WORKERS			
PROCEDURE USED			

*PCC L.D.

 MC-325
 PC-127
 VES-168
 AFCC-482
 MD-430

 TM-431
 WFE-422
 EPD-821
 PEP-822
 CSD-823

 JOY-128
 CLUE-122
 CAN-864
 AD DIV-225
 BMCD-877

 FACIL-814
 FACIL-821
 FACIL-831
 STAFF-858

DISTRIBUTION: White and Yellow - Lab Pink - Requester

TI-NHTSA 003679

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TI-NHTSA 003680

REPORT OF ISR TESTING
FORD PASSENGER CAR
ELECTRONIC SPEED CONTROL
DEACTIVATION PRESSURE SWITCH
PS/91/49

TEXAS
INSTRUMENTS

TI-NHTSA 003661

REPORT OF I&R TESTING
 FORD PASSENGER CAR
 ELECTRONIC SPEED CONTROL
 DEACTIVATION PRESSURE SWITCH
 PS/91/49

TEXAS INSTRUMENTS INCORPORATED
 CONTROL PRODUCTS DIVISION
 PRECISION CONTROLS DEPARTMENT
 34 FOREST STREET
 ATTLEBORO, MA 02703

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY <i>APR</i>	 TEXAS INSTRUMENTS MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02703	DOC.
DATE 91-08-20		PAGE 1

FORM 5208

TI-NHTSA 003682

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FORM 5286

TI-NHTSA 003683

1.0 GENERAL

1.1 Customer: Ford Motor Company, Passenger Car Brake Systems Engineering

1.2 TI Part Number: 77PSL2-1

1.3 Customer Part Number: F2VC-9F924-AB

1.4 Specifications: Ford Engineering Specification number (delta) ES-F2VC-9F924-AA

1.5 Date of Completion: 910920

1.6 Quantity of Units Tested: 104

1.7 Disposition of Tested Units:

1.7.1 Devices 156-15-37 thru -42 were destroyed in Burst testing (3.5)

1.7.2 All other devices are retained under quarantine.

1.8 TI test series number: 156-15-104

1.9 TI Pressure Switch test report number: PS/91/49

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FORM 528E

TI-NHTSA 003684

2.0 OBJECTIVE

This battery of tests was performed to demonstrate the ability of 77PSL2-1 to conform to customer specifications given in (delta) ES-F2VC-9F924-AA, in fulfillment of the requirements of the Initial Sample Report. Units tested were built using fully qualified production components and production assembly equipment.

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FORM 8298

TI-NHTSA 003885

3.0 TEST PROCEDURES AND RESULTS

All switches were tested to Ford Engineering Specification (delta) ES-F2VC-9F924-AA. A copy of this ES is included in Appendix 4.1. Procedural details are therefore omitted from the presentation of results in most cases. In those instances where the ES procedure methodology is modified, a complete explanation of the actual procedure is presented. For all tests, raw data is included in Appendix 4.2.1.

A flow chart is included in the ES (frame 4 of 18), as follows: All test devices are to be subject to an initial characterization consisting of Calibration, Voltage Drop, Current Leakage, and Proof. Devices are then divided into groups per the flow chart and subject to the indicated tests in the indicated order. Finally, devices are subject to a final characterization. However, it became necessary to deviate from this exact procedure as described below. We believe that this alternate procedure still meets the intent of the ES.

During the first phase of Impulse (3.10) testing (12 virgin devices) it was discovered that the pressure-sensing assemblies were improperly built, resulting in a reduction in life of the diaphragm. During investigation of the root cause of diaphragm problems, it was learned that the final crimp station on the automatic assembly equipment experiences this problem only on this particular part; all other devices built on this equipment are not subject to this. Witness the good results obtained with the Light Truck (F3TA-9F924-AA) version of this test (see data in Appendix 4.2.7), built on the automatic assembly equipment, as supporting evidence.

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FORM 1298

TI-NHTSA 003586

3.0 TEST PROCEDURES AND RESULTS, CONTINUED

While analysis and permanent corrective actions are ongoing, it was also learned that the manual assembly equipment which performs the final crimp produces pressure-sensing assemblies which have acceptable life. This equipment was used 4Q90 during validation of F2VC-9F924-BB (TI P/N 57PSL5-3) which uses exactly the same pressure sensing assembly, as well as to produce the rebuilt Impulse devices (157-15-81 thru -104) and will continue to be used until such time as the permanent corrective actions are in place on the automatic equipment and re-validation is completed.

To expedite completion of the switch validation, 12 of the rebuilt parts were not subjected to the Fluid Resistance test (3.9). However, this will not affect the results of the Impulse test in any way, since the various fluids do not come into contact with the diaphragm. Invoking similarity with the Light Truck (F3TA-9F924-AA) version of this test which was run simultaneously, all devices undergoing Fluid Resistance in this test easily passed their subsequent Impulse test.

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FORM 5226

TI-NHTSA 003687

3.1 CALIBRATION

- 3.1.1 Procedure: Calibration is checked at room temperature using ambient air as the pressure medium. Calibration settings, as specified on the part drawing, are actuation (electrical contacts opening) at 200 - 300 psig, and release (contacts reclosing) at 40 psig minimum. For the purpose of stabilization, actuation values are recorded on the sixth cycle, after subjecting the switch to two (2) pressure cycles to 800 psig minimum and back to zero, followed by three (3) cycles to 1.1 times actuation pressure minimum and back to zero. The change in continuity is measured while conducting 750 +/- 50 milliamps at 13.0 +/- 1.0 volts DC.
- 3.1.2 Equipment: Custom TI designed and built pressure check station, using Heise Model CM96365 pressure gage calibrated on a regular quarterly schedule. Continuity change measured on custom TI designed and built equipment meeting the above electrical parameters.
- 3.1.3 Initial Results: All 72 original devices tested were found to be within specification.
- 3.1.4 Final Results: 42 surviving original devices were found to be within specification. 6 were destroyed in Burst (3.5), 24 were aborted from Impulse (3.10). 24 additional devices which underwent Impulse but had no initial characterization were also found to be within specification at the completion of testing.

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FORM 528E

TI-NHTSA 003685

3.2 VOLTAGE DROP

- 3.2.1 Equipment: Fluke Model 8020B Digital Multimeter, calibrated quarterly, used in conjunction with the continuity equipment in 3.1.2.
- 3.2.2. Initial results: The average voltage drop was 4.9 millivolts, and the standard deviation was 1.9. All values are significantly below the specification of 200 millivolts maximum.
- 3.2.3 Final results: The average voltage drop was 6.4 millivolts, and the standard deviation was 3.5.

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FORM 5296

TI-NHTSA 003669

3.3 CURRENT LEAKAGE

- 3.3.1 Equipment: Associated Research HyPot test unit used as power source for 500 VAC, 60 Hz test circuit. Fluke Model 8020B Digital Multimeter, calibrated quarterly, used to measure voltage drop across a series resistance of one megohm (+/- 5%).
- 3.3.2 Initial results: Measuring terminals to case with switch closed; measuring terminals to case with switch open; and measuring between the terminals: the maximum current leakage observed was 2.3 microamps. All values are significantly below the specification of 100 microamps.
- 3.3.3. Final results: Same three measurements per device as 3.3.2. All current leakage values were consistent with initial results. All values are significantly below the specification of 100 microamps.

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FORM 8204

TI-NHTSA 003690

3.4 PROOF

- 3.4.1 Procedure: Calibration readings were recorded only after proof testing. Test pressure was 3000 psi per the part drawing.
- 3.4.1 Equipment: Enerpak model P-392 hydraulic hand pump using Enerpak hydraulic fluid as the pressure medium. Hydraulic fluid is removed from the devices using a combination of vacuum and residue-free solvent Sprayon(TM) Hi-Tech 02002 TF Electrical Contact Cleaner. US Gauge #33714 reading to 5000 psig with 100 psi increments, resolvable to 50 psi., calibrated quarterly. Custom TI designed and built safety enclosure.
- 3.4.2 Initial Results: No evidence of fluid leakage and no drop in test pressure was observed on any device.
- 3.4.3 Final Results: No evidence of fluid leakage and no drop in test pressure was observed on any device.

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3.5 BURST

3.5.1 Devices tested: 156-15-37 thru -42.

3.5.2 Procedure: A pressure of 7000 psig was applied and held for 30 seconds minimum. Pressure was then increased slowly until failure. Failure is typically signalled by a sudden drop in test pressure of several hundred psi, which corresponds with the first point at which some internal component reaches irreversible plastic deformation and causes an increase in internal volume. The peak pressure attained as this occurs is defined as the bursting point.

3.5.3. Equipment: same as 3.4.1., with the addition of Enerpak gauge reading to 10,000 psig with 100 psi increments, resolvable to 50 psi., calibrated quarterly.

3.5.4. Results: All six devices passed 30 seconds at 7000 psig without evidence of fluid leakage or drop in test pressure. The failure point defined in 3.5.2 was recorded, and a Weibull plot generated. See data section 4.2.2. Using the statistical acceptance criteria from the ES (frame 3 of 18), a minimum Weibull slope (beta) of 31.5 and a minimum Characteristic Life (theta) of 7680.7 psi was calculated at 90% confidence. The 0.72 reliability at 90% confidence is 7414 psi. Thus, the parts exceed the burst specification of 7000 psig by 414 psi at the Ford-specified confidence and reliability levels.

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FORM 5295

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3.6 VIBRATION

3.6.1 Devices tested: 156-15-43 thru -48.

3.6.2 Equipment: Vibration table, Ling, model A395 with Hewlett-Packard model 5427 controls. Air tank with 350 psig minimum pressurized Nitrogen used to actuate devices with at least 1.1 times maximum actuation specification on part drawing; $300 \text{ psig} \times 1.1 = 330 \text{ psi}$ minimum.

3.6.3 Results: All six switches met the acceptance criteria in the ES (frame 9 of 18; section III. I. 2.).

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FORM 0395

TI-NHTSA 003693

3.7 VACUUM

3.7.1 Devices tested: 156-15-49, -50, -52 thru -55.

3.7.2 Equipment: Kinney vacuum pump. Sensotec pressure transducer range 0-25 psia calibrated quarterly, with Fluke model 8020B Digital Multimeter readout, calibrated quarterly.

3.7.3 Results: All six devices met the acceptance criteria in the ES (frame 10 of 18; section III. K. 2.).

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TI-NHTSA 003694

3.8 TEMPERATURE CYCLE

3.8.1 Devices tested: 156-15-56 thru -61.

3.8.2 Equipment: Thermotron model S-4 Mini-Max environmental chamber capable of -55 C to +200 C, humidity uncontrolled. Custom TI designed and built cycler, utilizing Enerpak integrated hydraulic pressure source, TI315 Programmable Logic Controller, Moog servovalve and controller, Simpson signal generator, and opposing-piston fluid isolators, to produce a hydraulic-fluid flow-type primary with a brake-fluid dead-end-type secondary terminated with a 24-station manifold equipped with internal heaters. Capability to 5 Hz at 0-1450 psig cycle. Custom TI designed and built 24 station Switch Monitor Circuit which automatically stops the cycler in the event of abnormal switch action, defined as continuity change which does not track the signal from the signal generator. Thermocouple readouts calibrated quarterly.

3.8.3 Results: All six devices met the acceptance criteria in ES (frame 11 of 18; section III. L. 2.). Data sheet in section 4.2.4 shows actual fluid and ambient temperatures attained at each cycle.

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FORM 128B

TI-NHTSA 003695

3.9 FLUID RESISTANCE

3.9.1 Devices tested: 156-15-01 thru -36.

3.9.2 Equipment: Fluids as called out in ES table (frame 12 of 18); appropriate beakers and storage apparatus; vented hood.

3.9.3 Results: The 36 devices were divided into groups as follows for subsequent testing. Results of these tests are reported below.

3.9.3.1 Impulse (3.10), -01 thru -12

3.9.3.2 Terminal Strength (3.11), -13 thru -24.

3.9.3.3 Humidity (3.12), -25 thru -30.

3.9.3.4 Salt Spray (3.13), -31 thru -36.

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3.10 IMPULSE

- 3.10.1 Devices tested: 156-15-81 thru -104.
- 3.10.2 Procedure: 24 virgin devices were run as opposed to 12 virgins and 12 from Fluid Resistance. This is discussed in detail in section 3.0. The parameters given in the ES (frame 7 of 18, section III. E. 1.) are followed explicitly.
- 3.10.3 Equipment: same as 3.8.2 with the addition of a 12-station inductive load bank, per the schematic found in the ES (frame 18 of 18; figure 4.) used in the last 25K cycles.
- 3.10.4 Results/Discussion: Pre-characterization was not performed. After completion of the 500K cycles, all 24 devices passed the acceptance criteria found in the ES (frame 7 of 18, section III. E. 2).

This test may be regarded as the one of the most rigorous. This test is run at elevated temperature (135 C fluid), elevated pressure (1450 psig, 2 Hz), and total cycles (applying brakes 5 times per mile for 100,000 miles) which exceed conditions typically found in actual motor vehicles.

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3.11 TERMINAL STRENGTH

3.11.1 Devices tested: 156-15-13 thru -24.

3.11.2 Equipment: Custom TI designed and built fixtures for gaging terminal movement after force application and for application of impact via a pendulum. This equipment is regularly used on the 57PS/77PS assembly lines in testing to TI Quality Assurance Specifications.

3.11.3 Results: All twelve devices passed the acceptance criteria found in the ES (frame 10 of 18; section III. J. 2.).

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TI-NHTSA 003698

3.12 HUMIDITY

3.12.1 Devices tested: 156-15-25 thru -30.

3.12.2 Equipment: Humidity chamber RK model 5S.

3.12.3 Results/Discussion: Please note that performing a full characterization per the ES consists of actuation, release, millivolt drop, current leakage, and proof. This battery of tests when performed on six (6) devices takes approximately 2 hours to complete. Therefore "Within 15 minutes..." called out in the ES (frame 8 of 18, section III. G. 2. a.) is an acceptance requirement that is physically impossible to meet. Every effort is made to complete final characterization within the two hour period stated above.

All six devices passed the acceptance criteria found in the ES (frame 8 of 18; section III. G. 2.).

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FORM 5291

TI-NHTSA 003699

3.13 SALT SPRAY

3.13.1 Devices tested: 156-15-31 thru -36.

3.13.2 Equipment: Harshaw salt spray chamber.

3.13.3 Results: All six devices passed the acceptance criteria found in the ES (frame 8 of 18, section III. H. 2.).

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FORM 5295

TI-NHTSA 003700

Appendix 4.1
Ford Engineering Specification
(delta) ES-F2VC-9F924-AA

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FORM 8285

TI-NHTSA 003701

Engineering Specification

PART NAME SWITCH ASSEMBLY - SPEED CONTROL DEACTIVATE										PART NUMBER ▽ ES-32VC-9F924-AA									
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DATE	LET	PR	REVISIONS							OR	CK	REFERENCE							
												PREPARED/APPROVED BY							
												CHECKED BY				DETAILED BY			
												CONCURRENCE/APPROVAL SIGNATURES							
												DESIGN ENGINEERING SUPERV							
												DESIGN ENGINEERING MGT							
												MANUFACTURING ENGRG.							
												QUALITY CONTROL							
												PURCHASING							
												SUPPLIER QUALITY ASSISTAN							
												ELECTRONICS DIVISIO							

FRAME 1 OF 18	REV	▽ ES-32VC-9F924-AA
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MAY PD 3047-01

TI-NHTSA 003702

Engineering Specification

SWITCH ASSEMBLY - SPEED CONTROL DEACTIVATE

I. General

This specification covers the test requirements for the speed control deactivate switch -9F924- used in the electronic speed control system. Design changes on the switch assembly or its components shall not be made without compliance to Section V of this specification and written approval from the releasing Production Engineering Office.

This engineering specification is a supplement to the released drawing on the above part, and all requirements herein must be met in addition to all other requirements of the part drawing. Minimum measures necessary for demonstrating compliance to these requirements are given in each section.

The engineering tests, sample sizes, and test frequencies contained within this engineering specification reflect the minimum requirements established to provide a regular evaluation of conformance to design intent. The engineering test program is intended as a supplement to normal material inspections, dimensional checking and in-process controls, and should in no way adversely influence other inspection operations.

Q1 suppliers may implement different test sample sizes and frequencies providing these changes have been included in an alternate Control Plan approved by the design responsible Product Engineering Office and concurred in by SQA.

II. PRODUCTION VALIDATION AND IN-PROCESS TESTS

- Production Validation (PV) Tests must be completed satisfactorily with parts from production tooling (and processes where possible) before ISIR approval and authorization for shipment of production parts can be effected. Parts must be revalidated completely, or per Section V whenever any change is made which could possibly affect part function or performance.
- In-Process Test Phase 1 (IP-1) - IP-1 tests are used to demonstrate process capability and must be completed using initial production parts from production tooling and processes prior to first production shipment approval. IP-1 tests are to continue in effect until process capability is demonstrated.
- In-Process Tests Phase 2 (IP-2) - IP-2 test program may be implemented only after process capability has been established. Tests must be completed with production parts on a continuing basis. Samples for these tests must be selected on a random basis to represent the entire production population as much as possible. In the event that any of the requirements in these tests is not met, the reaction plan specified in Ford Q101 Section III.2.3, "ES Test Performance Requirements" shall be invoked.

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MAY 1988 PD 3847-82 (Previous editions may NOT be used)

TI-NHTSA 003703

SECTION III. TABLE OF TESTS

Item	Test Name Functional Tests	PRODUCTION VALIDATION		IN-PROCESS IP-1		IN-PROCESS IP-2	
		Minimum Sample Size	Statistical Test Acceptance Criteria	Minimum Sample Size	Statistical Test Acceptance Criteria	Minimum Sample Size	Statistical Test Acceptance Criteria
III.							
△ A	Calibration	72	P90-.96	100%	All Must Pass	100%	All Must Pass
B	Voltage Drop	72	P90-.96	12/Mo.	P90-.84	4/Lot	" " "
C	Current Leakage	72	P90-.96	3/Mo.	P90-.56	4/Lot	" " "
D	Proof Test	72	P90-.96	12/Mo.	P90-.84	4/Lot	" " "
F	Burst	6	P90-.72	3/Mo.	P90-.56	4/Lot	" " "
I	Vibration	6	P90-.72	3/Mo.	P90-.56	6/6 No.	P90-.72
J	Terminal Strength	12	P90-.84	6/Mo.	P90-.72	4/Lot	All Must Pass
K	Vacuum	6	P90-.72	3/Mo.	P90-.56	6/6 No.	P90-.72
L	Temperature Cycle	6	P90-.72	3/Mo.	P90-.56	6/6 No.	P90-.72
M	Fluid Resistance	36	P90-.94	36/12Mo	P90-.94	36/12Mo.	P90-.94
<u>Durability Tests</u>							
III.							
I	Impulse	24	P90-.90	12/Mo.	P90-.84	3/3 No.	P90-.56
J	Humidity	6	P90-.72	3/Mo.	P90-.56	6/6 No.	P90-.72
II	Salt Spray	6	P90-.72	3/Mo.	P90-.56	6/6 No.	P90-.72

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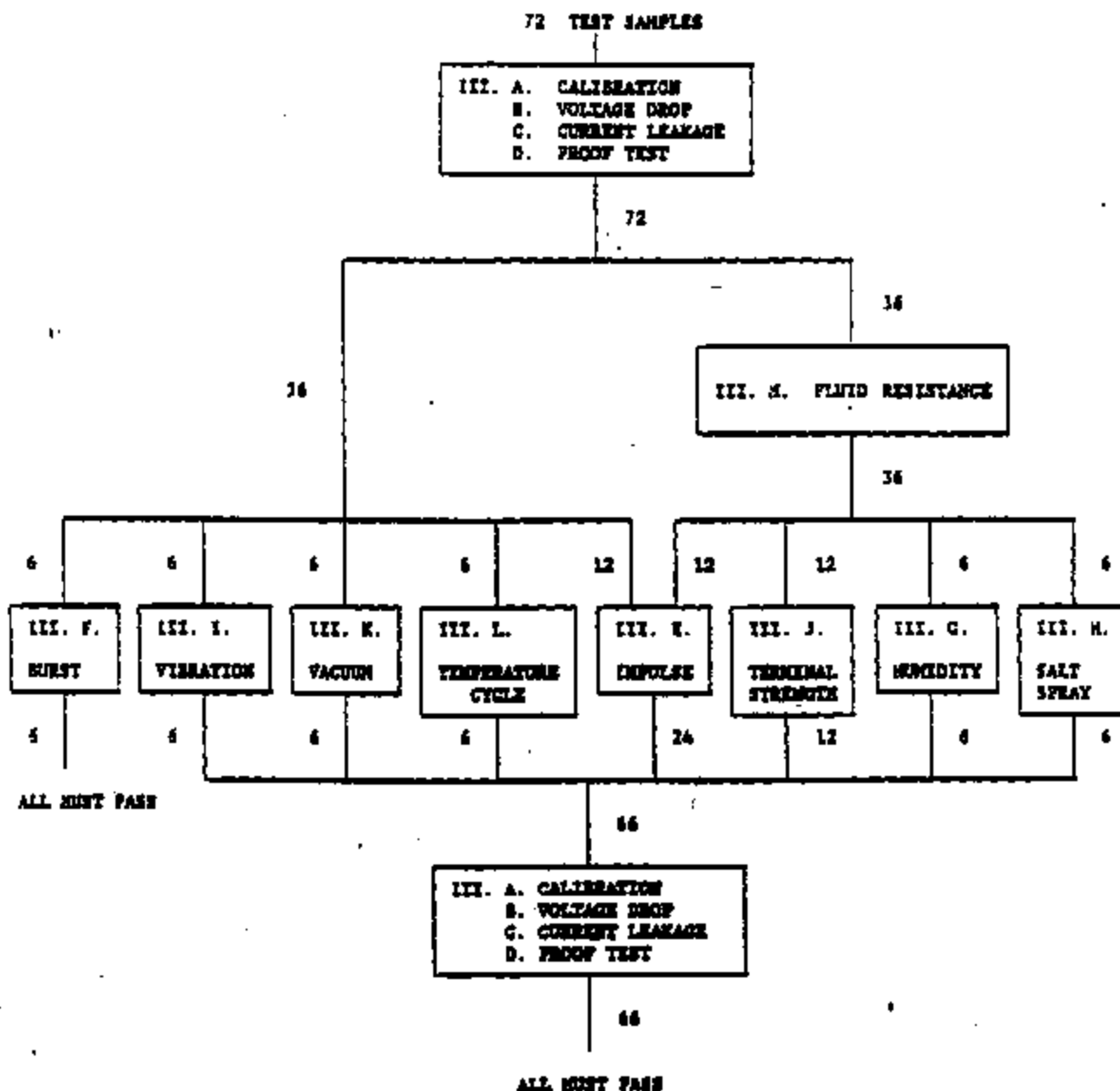
▽ ES-7270-97924-4A

PART PD 3847-82 (Previous sections may refer to units)

TL-NHTSA 003704

Engineering Specification

PRODUCTION VALIDATION FLOW CHART



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101 PD 3947-82 (Previous editions may not be used)

TI-NHTSA 003705

Engineering Specification

III. TEST PROCEDURES AND REQUIREMENTS

▽ A. Calibration

1. Test Requirements

- a. Switch calibration is to be checked at room temperature (16°C - 33°C) using ambient air or equivalent.
- b. Calibration settings shall be specified on the part drawing with the settings checked after 2 or more pressure cycles with ambient air, or equivalent. Pressure cycle range is to be determined by the manufacturer to insure switch calibration stability. The cut-in and differential set points are to be measured while conducting 750 ± 50 milliamperes while 13.0 ± 1.0 volts D.C. is applied. The cut-in point is to be checked with increasing pressure.
- c. The cut-out point is to be checked with decreasing pressure, and the differential set point is to be calculated using the cut-in pressure minus the cut-out pressure.

2. Acceptance Requirements

- a. Nonconformance is defined as any switch point which falls outside the tolerance band specified on the part drawing.

B. Voltage Drop

1. Test Requirements

- a. Voltage drop is to be measured after 2 or more cycles with ambient air or equivalent from 0 to $10,000 \pm 172$ KPa (1450 ± 25 PSI) while conducting 750 ± 50 milliamperes and 13.0 ± 1.0 volts D.C. is applied to the switch. Under these conditions with the switch closed the voltage drop is to be measured. Millivolt connection interface at terminals to be less than 10 millivolts.

2. Acceptance Requirements

- a. Nonconformance is defined as a voltage drop in excess of 200 millivolts.

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Engineering Specification

III. TEST PROCEDURES AND REQUIREMENTS (cont'd)

C. CURRENT Leakage

1. Test Requirements

- a. Current leakage is to be checked with 500 volts, 60 Hz alternating current.
- b. Current leakage is to be checked:
 - (1) Between the switch leads with the contacts open.
 - (2) Between the lead and the switch housing with contacts closed.
 - (3) Between either lead and switch housing with the contacts open.

2. Acceptance Requirements

- a. Nonconformance is defined as any leakage current in excess of one hundred (100) microamperes.

D. Proof Test

1. Test Requirements

- a. Subject sample switches to Section A to establish their initial switching pressures.
- b. Proof test is to be conducted using brake fluid or equivalent as the pressure medium. Test pressure shall be as specified on the part drawing. Test pressure shall be isolated from pressure source and held for not less than 30 seconds.
- c. Recheck the switches to Section A.

2. Acceptance Requirements

- a. No evidence of fluid leakage, seepage, or drop in test pressure greater than 430 KPa. (62 PSI) is permitted.
- b. A change in cut-in and cut-out pressures greater than $\pm 5\%$ from the initial value is not permitted.
- c. The test samples must be destroyed after testing.

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Engineering Specification

III. TEST PROCEDURES AND REQUIREMENTS (cont'd)

E. Impulse

1. Test Requirements

- a. Test the switch for a total of 500,000 cycles.
Cycle pressure between (low) 0-276 KPa (0-40 psi)
and (high) $10,000 \pm 345$ KPa (1430 ± 50 psi).
 - 1) 0 - 475,000 cycles: 13 ± 1 volts, trace current to monitor function.
 - 2) 475,001 - 500,000 cycles: 13 ± 1 volts D.C., 750 ± 50 ma., per figure 4.
- b. Brake fluid temperature to be $135 \pm 14^{\circ}\text{C}$ and ambient temperature to be 107°C min.
- c. Cycle rate is to be 110-130 cycles per minute.
- d. Switch must open and close each cycle.

2. Acceptance Requirements

- a. After impulse test check to sections A, B, C, & D using the procedure established in each section.
- b. Nonconformance is defined as any switch not meeting the criteria in sections A, B, C, & D.
- c. Samples used for this test must be destroyed after all testing is completed.

F. Burst

1. Test Requirement

- a. Burst strength is to be checked using brake fluid or equivalent as the pressure medium.
- b. Pressurize the switch to 48.3 MPa (7000 PSI) minimum and hold for 30 seconds minimum.

2. Acceptance Requirements

- a. Nonconformance is defined as any evidence of fluid leakage or seepage from the switch or threads.
Samples used for this test must be destroyed after testing is completed.

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Engineering Specification

III. TEST PROCEDURES AND REQUIREMENTS (Cont'd)

G. Humidity

1. Test Requirements

- a. Mount the switch in the test port in a humidity chamber. Currently released mating electrical connector must be installed before start of test.
- b. Subject the switch to ten (10) continuous humidity cycles as follows:
 - (1) Raise temperature to $65 \pm 10/-2$ °C over 2.5 hours; at 90-98% relative humidity.
 - (2) Hold 3 hours at $65 \pm 10/-2$ °C at 90-98% relative humidity.
 - (3) Lower temperature to $25 \pm 10/-2$ °C over 2.5 hours; at 80-98% relative humidity.

2. Acceptance Requirements

- a. Within 15 minutes after completion of the tenth humidity cycle check the switch to sections A, B, C, D, using the procedure established in each section.
- b. Nonconformance is defined as any switch not meeting the criteria in sections A, B, C, or D.

H. Salt Spray

1. Test Requirements

- a. Mount the switch in the test port in a salt spray chamber. The currently released mating electrical connector and wiring must be installed prior to start of test.
- b. Expose the switch assembly to 72 hours of salt spray per ASTM B-117.

2. Acceptance Requirements

- a. After exposure, check the switch to sections A, B, C, D, using the procedure established in each section.
- b. Nonconformance is defined as any switch not meeting the criteria in sections A, B, C, or D. Samples used for this test must be destroyed after all testing is completed.

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FRAME	OF	REVISED		NUMBER

Engineering Specification

III. TEST PROCEDURES AND REQUIREMENTS (cont'd)

I. Vibration

1. Test Requirements

- a. Mount the switch in the test port and attach the currently released mating electrical connector before start of test.
- b. Switches are to be vibrated in all 3 planes with electrical continuity being monitored during the entire test. See Figure 1 for switch orientation in the 3 planes. Vibration tests are to be conducted at room temperature using brake fluid, ambient air, or equivalent as the pressure medium.
- c. Internal pressure shall be maintained at 0 KPa G. when the switch is in the closed position and 1.1 times max actuation pressure shown on print when the switch is in the open position.
- d. Vibrate the switch at 1.5 mm displacement (peak-to-peak) while varying the frequency uniformly from 5 to 50 to 5 Hz over a 5 minute period.
- e. Vibrate the switch in alternate one-hour periods in the open and closed positions for a total of 8 hours in each plane. (Total test time is 24 hours).

2. Acceptance Requirements

- a. After the entire vibration sequence check the switches to sections A, B, C, or D using the procedure established in each section.
- b. Nonconformance is defined as any evidence of leakage or any change in electrical continuity/discontinuity during the vibration cycles, or any switch not meeting the criteria in sections A, B, C, or D. Samples used for this test must be destroyed after all testing is completed.

9	18			ES-FZVC-9F924-AA
FRAME	OF	REVISED		NUMBER

MAY 1968 PD 3947-82 (Previous editions may apply to users)

TI-NHTSA 003710

Engineering Specification

III. TEST PROCEDURES AND REQUIREMENTS (cont'd)

J. Terminal Strength

1. Test Requirements

- a. Mount the switch in the test port.

(1) Apply a 89 ± 9 N axial force to each terminal.

(2) With a pendulum apply a 45 ± 5 N impact force to the switch housing at the connector end, perpendicular to the centerline axis of the switch. See Figure 2 for force application point and direction.

2. Acceptance Requirements

- a. Check the switch to sections A, B, C, and D using the procedures established in each section.
- b. Nonconformance is defined as any terminal or housing fracture, or any switch not meeting the criteria in sections A, B, C, or D.

K. Vacuum

1. Test Requirements

- a. Mount the switch in the test port. Vacuum tests are to be conducted at room temperature using ambient air as the pressure medium.
- b. Subject the switch to 5 cycles of vacuum from atmospheric pressure (760 mm Hg) to an absolute pressure of 3-6 mm Hg. Maintain the vacuum for a minimum of 60 seconds.

2. Acceptance Requirements

- a. Check the switch to sections A, B, C, and D using the procedure established in each section.
- b. Nonconformance is defined as any switch not meeting the criteria in sections A, B, C, and D.

$$3 \text{ mm Hg} = 0.050 \text{ psi} = 0.400 \text{ KPa}$$

$$6 \text{ mm Hg} = 0.116 \text{ psi} = 0.800 \text{ KPa}$$

10	18			ES-F2VC-9P924-AA
FRAME	OF	REVISED		NUMBER

MAY PD 3847-82 (Previous editions may NOT be used)

TI-NHTSA 003711

Engineering Specification

III. TEST PROCEDURES AND REQUIREMENTS (cont'd)

L. Temperature Cycle

1. Test Requirements

- a. Mount switches in test ports; test to be run using currently released brake fluid.
- b. Repeat the following procedure 25 times.
 - (1) Lower the switch and fluid temperature to at least -40°C .
 - (2) Cycle the switches ten times at 10 seconds/cycles. One cycle consists of a pressure variation from 0 - 276 KPa.G (0-40 psi) to $10,000 \pm 345$ KPa.G (1430 ± 50 PSI).
Note: Switch must open and close each cycle.
 - (3) Raise switch and fluid temperature to 38°C minimum.
 - (4) Repeat Step 2.
- c. At completion of Step b, check switches per sections A, B, C, and D.

2. Acceptance Requirements

- a. Nonconformance is defined as any evidence of switch fluid leakage, seepage, or not meeting the criteria of sections A, B, C, and D.

M. Fluid Resistance

1. Test Requirements

- a. Mount the switch in the test port and orient as installed in the vehicle.
- b. Install the currently released mating electrical connector (with wire leads) to the switch.
- c. Sequentially, immerse the switch into each of the specified fluids, at a temperature of $23 \pm 2^{\circ}\text{C}$, for 5 ± 1 second. Remove the switch and drain and store the switch for the specified time at room temperature, prior to immersing into the next fluid.

11	15			ES-F2VC-9F924-AA
FRAME	OF	REVISED		NUMBER

Engineering Specification

III. TEST PROCEDURES AND REQUIREMENTS (cont'd)

<u>Fluid</u>	<u>Drain Time</u>	<u>Storage Time</u>
Reference Fuel C ASTM D471	60 $\pm$ 5 min.	none
10W40 Engine Oil	24 $\pm$ 1 hour	14 days
Ethylene Glycol/ Water 50/50 by Volume	24 $\pm$ 1 hour	24 $\pm$ 1 hour
Brake Fluid DOT 3	24 $\pm$ 1 hour	48 $\pm$ 1 hour
Automatic Transmission/ Power Steering Fluid (same) ESP-M2C138-CJ	24 $\pm$ 1 hour	14 days
Isopropyl Alcohol/ Water 50/50 by Volume	24 $\pm$ 1 hour	none
Reference Fuel C, ASTM D471 with Methyl Alcohol 85/15 by Volume	24 $\pm$ 1 hour	none

- d. Per the Flow Chart, subject the prescribed number of immersed switches to the post immersion tests specified below:

- III. E. Impulse
- III. G. Humidity
- III. H. Salt Spray
- III. J. Terminal Strength

Acceptance Requirements

- a. Switches must fully meet the requirements of the specified post immersion test.
- b. Nonconformance is defined as any switch not meeting the criteria in sections A, B, C, or D. Samples used for this test must be destroyed after all testing is completed.

12	18			ES-F2VC-9F924-AA
FRAME	OF	REVISED		NUMBER

MAY 1988 PD 3947-a2 (Previous editions may not be used)

TI-NHTSA 003713

Engineering Specification

IV. STATISTICAL ANALYSIS METHODS

- A. For PV, IP-1 and IP-2 tests, all samples tested must pass. Having all the required sample size pass will provide data to support the conclusion that the switch has a minimum reliability R, at a given confidence of C. The notation Pc-R is interpreted as minimum reliability equal to R, at a confidence C; thus P90-.80 means a minimum reliability of 80% at 90% confidence.
- B. All samples must pass in the statistical test acceptance criteria stated for tests with 100% frequency; or samples from lots, which could have a variable size.

V. REVALIDATION REQUIREMENTS

- A. No change in design, material, process or component supplier shall be made without prior approval from the releasing Product Engineering Office. As part of approving a change, the releasing Product Engineering Office will establish the portion of the Product Validation tests required to be run to revalidate the switch. The following table is to be used as a guide in determining the type of tests required for revalidation requirements.

MINOR CHANGE REVALIDATION

<u>Component</u>	<u>Process or Material Change or New Supplier</u>
1. Terminals, Contacts, or Connector	III, B, C, E, G, H, I, J, L, M.
2. Case or Housing	All Tests
3. Dia or Diaphragm	III, A, D, E, F, I, K, L.
4. Fitting or Fluid Connection	III, D, E, F, H, I, M.
B. Annual revalidation is not required on carryover switches.	

VI. LOT DEFINITION

A lot is defined as no more than eight (8) hours of production up to 4,000 pieces. If shifts extend beyond eight (8) hours, or more than 4,000 pieces are produced in a shift, the product must be separated into at least two lots.

13	18			▽ ES-FZVC-9F924-AA
FRAME	OF	REVISED		NUMBER

Engineering Specification

VII. RECORD RETENTION

- A. Recording and record retention shall conform with Ford Q-101.
- B. Production Validation test results and analysis are to be forwarded to the releasing Product Engineering Office before approval for shipment of production parts can be granted.
- C. In-Process test results shall be available at the supplier's manufacturing facility for the releasing Product Engineering Office and Ford SQA or its representatives to review on request.

VIII. INSTRUCTIONS AND NOTES

All switches are to be identified with the Ford part number, supplier identification, and a data code indicating final assembly.

All test equipment and test procedures for testing to this specification must be approved by the releasing Product Engineering Office and no change in equipment or procedure may be made without their written concurrence.

Test port configuration is shown in Figure 3.

O-rings, if used in the design, shall be free from cuts, nicks, abrasions or any other damage which would result in a fluid leak.

All switches must have a shipping cap installed over the port threads to prevent contamination. All shipping caps must be approved by the releasing Product Engineering Office prior to production incorporation.

All switches that do not pass the calibration test are to either be readjusted and rechecked, or scrapped. (Salvage of component parts permitted with 100% reinspection).

If product nonconformance occurs for test Sections III. B, C, D, E, F, and J, production shall be stopped and the problems corrected. All production lots shall be sorted 100% prior to shipment. Suspected nonconformance of any shipped parts shall be reported immediately to the releasing Product Engineering Office.

If nonconformance of the statistical acceptance criteria occurs for test Sections III. G, H, I, K, L and M, a cause to recall the subject weeks production and to stop production may result.

14	18			▽ ES-F2VC-9F924-AA
FRAME	OF	REVISED		NUMBER

MAY 1988 PD 3947-82 (Previous editions may be used)

TI-NHTSA 003716

Engineering Specification

IX. COMPILATION OF REFERENCE DOCUMENTS

ASTM B-117. Salt Spray Testing

Ford Q-101. Quality System Standard - 1983 Edition

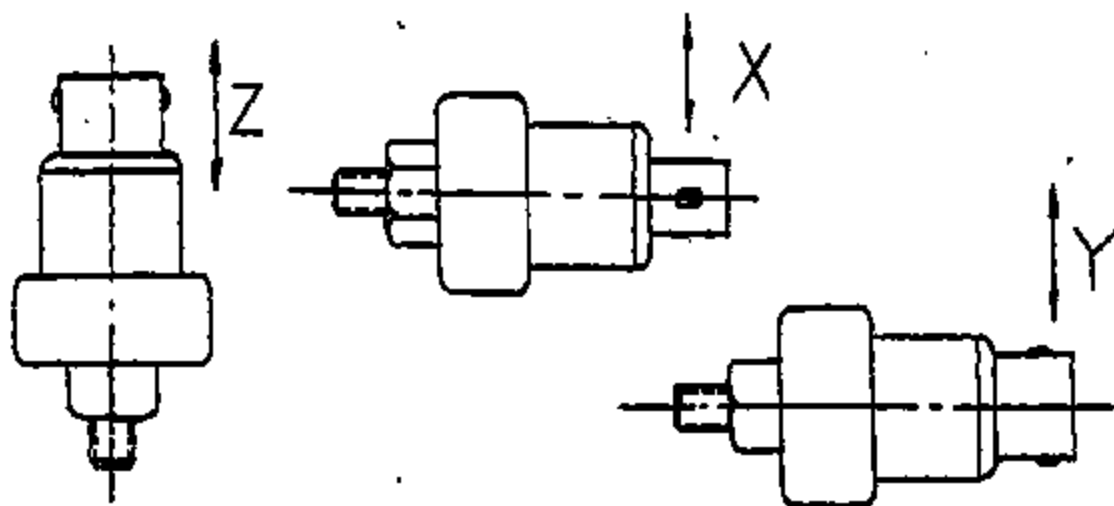
ES-F0ES-14A464-AA. Specification - SLV Assy - Wire Connector

ES-F2VF-9C735-AA. Specification - Servo Assembly Speed Control

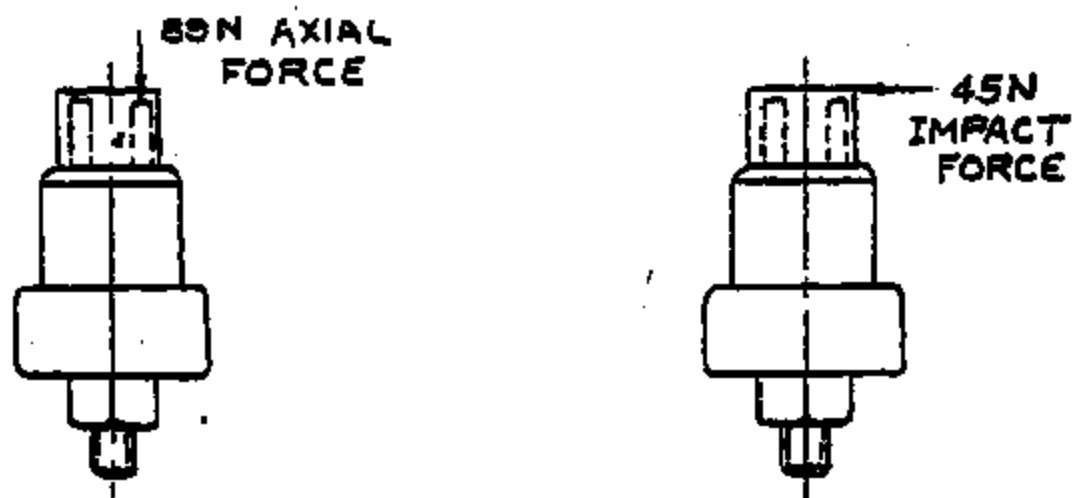
15	18			▽ ES-F2VC-9F924-AA
FRAME	OF	REVISED		NUMBER

MAY 1988 PD 3947-82 (Previous editions may NOT be used)

TI-NHTSA 003716



VIBRATION TEST - SWITCH ORIENTATION
FIGURE 1.

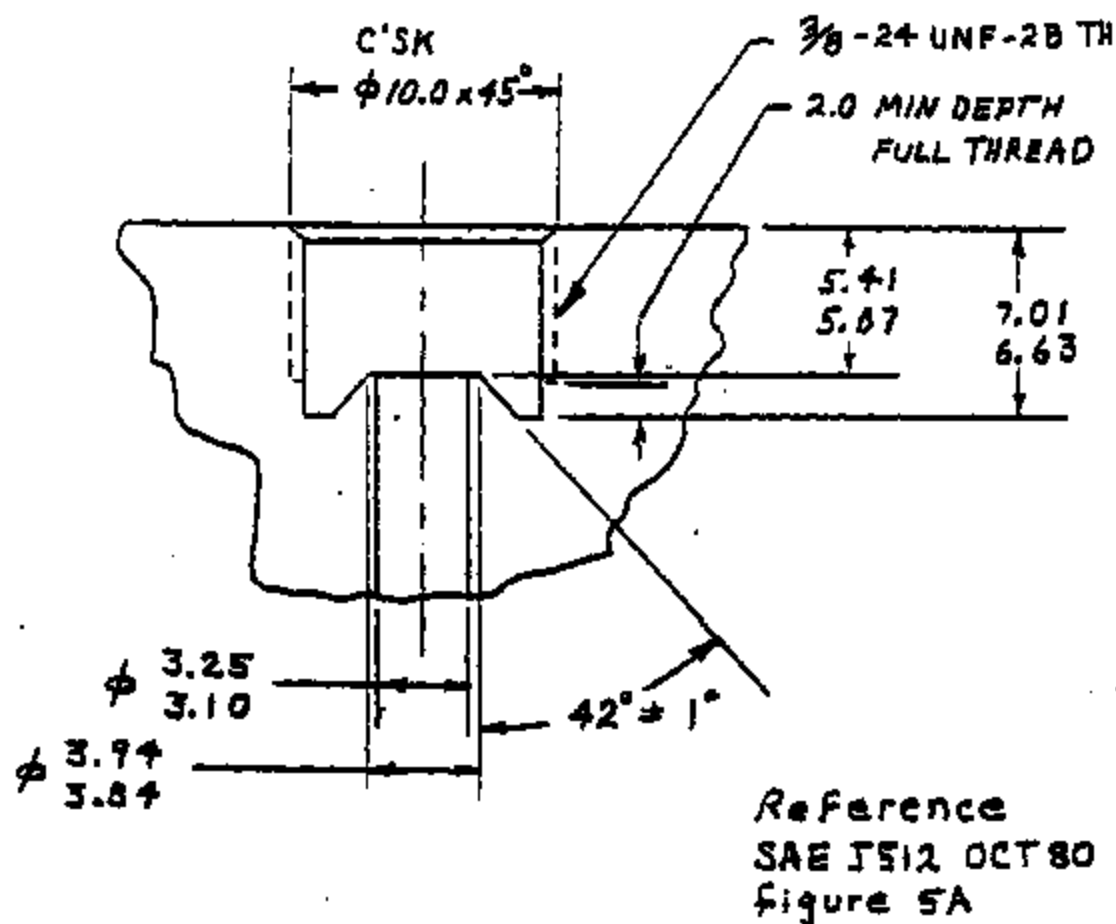


TERMINAL STRENGTH - LOAD ORIENTATION
FIGURE 2.

16	16			▽ ES-F2YC-9F924-AA
FRAME	OF	REVISED		NUMBER

MAY 1982 PD 3947-22 (Previous editions may NOT be used)

TI-NHT8A 003717



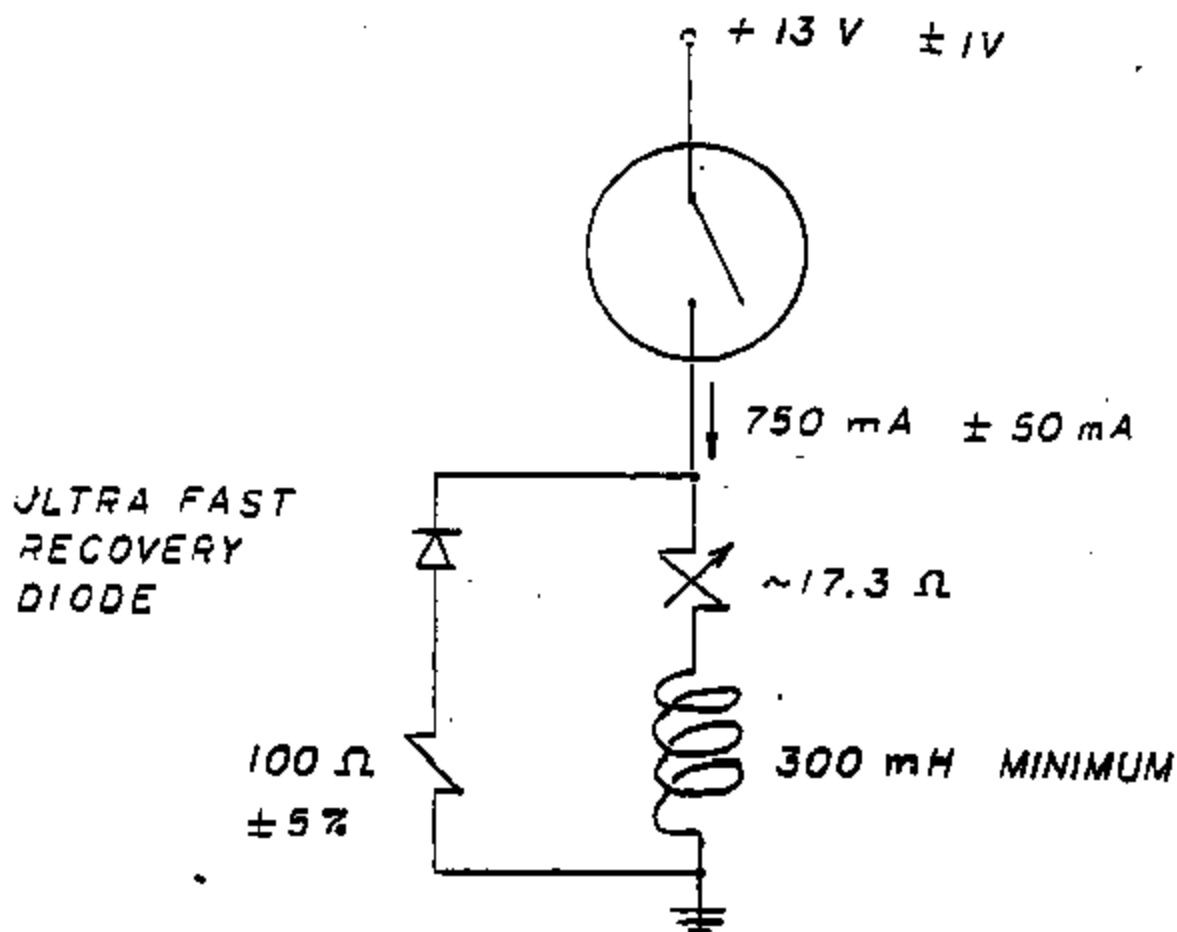
TEST FIXTURE PORT CONFIGURATION

FIGURE 3

17	18			▽ IS-F2VC-9F924-AA
FRAME	OF	REVISED		NUMBER

MAY 1988 PD 3947-82 (Previous editions may not be used)

TI-NHT8A 003718



DEACTIVATE SWITCH
TEST SET UP

FIGURE 4

18	18			ES-P2TC-97924-11
FRAME	OF	REVISED		NUMBER

MAY 1982 PD 3947-82 (Previous editions may NOT be used)

TI-NHTSA 003719

Appendix. 4.2.1
Initial and Final Characterization

TEST LOT NO.	TEST	DEVICE
TESTED BY	TEXAS INSTRUMENTS 	DOC.
APPROVED BY		PAGE
DATE 91-09-30		19

FORM 9298

PRESSURE SWITCH DATA

FORM 21605

TEST NO. 156-15-104

DEVICE 77P5L2-1	DATE REQUESTED	REQUESTED BY	REQUESTED COMPL. DATE
PERFORMED BY Jeffrey D. Denuncio	DATE STARTED 6/12/91	DATE COMPLETED	APPROVED BY
PROJECT TITLE: Ford MY'92 Electronic Speed Control Deactivate PS			

CUSTOMER: P.S.S.-C94

PURPOSE OF TEST:

Refer to Ford ES

PROCEDURE:

Current leakage						Test	
Device #	Act/Rtg	nV Resp	to leakage	to leakage	to leakage		
156-15-01	127/46	4.2	1.58mA	1.43mA	1.52mA	Good	Fluid res & Temp/Sec
01	127/51	4.7	2.16	1.49	1.50		Fluid res & Temp/Sec
02	128/51	4.8	1.78	1.33	1.62		Fluid res & Temp/Sec
04	128/52	4.4	1.67	1.32	1.72		Fluid res & Temp/Sec
05	124/57	3.1	1.71	1.23	1.43		Fluid res & Temp/Sec
07	130/53	3.3	1.70	1.33	1.59		Fluid res & Temp/Sec
07	124/47	3.3	2.23	1.61	1.60		Fluid res & Temp/Sec
08	120/51	3.6	3.00	1.49	1.87		Fluid res & Temp/Sec
09	132/52	3.0	1.98	1.43	1.97		Fluid res & Temp/Sec
10	118/41	5.5	1.97	1.53	1.71		Fluid res & Temp/Sec
10	122/51	2.9	1.80	1.43	1.95		Fluid res & Temp/Sec
10	120/49	4.9	1.85	1.42	1.81		Fluid res & Temp/Sec
11	121/52	4.2	1.82	1.39	1.66		Fluid res & Temp/Sec
14	127/55	4.0	1.76	1.38	1.85		Fluid res & Temp/Sec
15	126/46	4.5	1.82	1.48	1.87		Fluid res & Temp/Sec
16	123/51	4.7	1.82	1.42	1.70		Fluid res & Temp/Sec
17	120/43	3.7	1.80	1.38	1.84		Fluid res & Temp/Sec
18	122/52	3.0	1.56	1.43	1.88		Fluid res & Temp/Sec
19	132/56	3.7	1.87	1.44	1.83		Fluid res & Temp/Sec
20	122/50	5.0	1.76	1.35	1.70		Fluid res & Temp/Sec
21	132/53	4.2	1.78	1.37	1.79		Fluid res & Temp/Sec
22	123/51	4.3	1.74	1.49	1.57		Fluid res & Temp/Sec
23	128/57	3.3	1.79	1.36	1.62		Fluid res & Temp/Sec
24	124/52	4.8	1.82	1.39	1.63		Fluid res & Temp/Sec
25	127/49	4.1	1.67	1.37	1.64		Fluid res & Humidity
26	124/50	5.8	1.70	1.29	1.71	Good	Fluid res & Humidity
27	127/46	4.2	1.60	1.15	1.63		Fluid res & Humidity
28	121/45	4.8	1.69	1.23	1.72		Fluid res & Humidity

TI-NHTSA 003721

Current Leakage

Device #	Ac/Rel	mV Drop	to housing	to housing	to housing	Prof	Tests	
15-11-1	122/47	2.7	1.16 mA	1.22 mA	1.49 mA	Good	Fluores	Humidity
20	122/50	4.5	1.16	1.25	1.46		Fluores	Humidity
21	125/76	4.7	1.15	1.24	1.61		Fluores	Salt Spray
22	129/47	3.3	1.62	1.23	1.18		Fluores	Salt Spray
23	126/53	5.2	1.74	1.34	1.70		Fluores	Salt Spray
24	145/65	2.2	1.78	1.38	1.67		Fluores	Salt Spray
25	121/51	3.4	1.67	1.27	1.77		Fluores	Salt Spray
31	123/44	3.8	1.73	1.33	1.81		Fluores	Salt Spray
37	125/52	3.9	1.70	1.44	1.59		Burst	
39	119/44	3.5	1.92	1.72	1.59		Burst	
79	174/60	3.5	1.66	1.31	1.58		Burst	
79	126/53	4.7	1.79	1.39	1.56		Burst	
41	135/52	9.3	1.69	1.22	1.51		Burst	
42	116/45	3.5	1.67	1.24	1.66		Burst	
43	121/40	3.8	1.63	1.23	1.64		Vibration	
74	127/47	5.7	1.60	1.20	1.65		Vibration	
74	117/43	3.6	1.56	1.23	1.65		Vibration	
46	123/47	3.4	1.59	1.21	1.67		Vibration	
77	135/62	6.3	1.65	1.24	1.62		Vibration	
49	122/45	4.1	1.49	1.20	1.49		Vacuum	
49	124/65	3.5	1.61	1.21	1.43		Vacuum	
50	117/45	3.3	1.58	1.23	1.42		Vacuum	
51	Not used							
51	127/43	14.5	1.64	1.27	1.64	Good	Vacuum	
53	120/43	5.3	1.61	1.25	1.55		Vacuum	
59	122/50	5.0	1.63	1.29	1.62		Vacuum	
59	123/42	9.7	1.62	1.29	1.63		Vacuum	
59	127/47	5.7	1.63	1.28	1.72		Temp Cycle	
59	122/52	6.1	1.70	1.29	1.56		Temp Cycle	
59	121/45	5.2	1.69	1.31	1.55		Temp Cycle	
59	128/48	5.4	1.72	1.28	1.49		Temp Cycle	
61	129/50	6.4	1.72	1.28	1.76		Temp Cycle	
61	126/61	5.1	1.76	1.27	1.46		Temp Cycle	
62	123/56	8.2	1.78	1.24	1.47		Temp Cycle	Stopped @ 100K
62	124/39	4.8	1.66	1.24	1.47		Temp Cycle	Look @ 350K
64	125/53	5.2	1.67	1.25	1.41		Temp Cycle	Look @ 295K
65	122/55	7.7	1.69	1.25	1.44		Temp Cycle	Look @ 155K
66	129/52	9.7	1.72	1.27	1.45		Temp Cycle	Stopped @ 155K
67	125/51	6.0	1.76	1.31	1.46		Temp Cycle	Stopped @ 200K
68	116/41	6.8	1.73	1.30	1.48		Temp Cycle	Look @ 325K
69	124/43	10.0	1.73	1.34	1.45		Temp Cycle	Look @ 300K
70	120/46	7.3	1.74	1.29	1.49		Temp Cycle	Look @ 250K
71	123/45	6.7	1.78	1.26	1.43		Temp Cycle	Look @ 285K
72	129/58	6.1	1.71	1.27	1.47		Temp Cycle	Look @ 280K
73	129/59	3.9	1.69	1.27	1.77		Temp Cycle	Look @ 250K
74	126/42	4.6	1.71	1.27	1.41			
74	128/59	5.3	1.73	1.28	1.50			
74	120/53	7.1	1.71	1.29	1.49			
75	120/52	7.2	1.75	1.30	1.47			
76	129/62	6.6	1.73	1.30	1.47			
79	124/42	5.4	1.78	1.23	1.49			
80	122/55	5.1	1.75	1.31	1.43			

790 K

Rebuild of Impulse ports/Post Cycle

Device #	Proof	Act/Rel	H ₂ O Drop	Current Leakage					
156-5-91	OK	105/53	31	1.81	1.53	1.60			
-92		111/53	101	1.90	1.60	1.77			
-97		113/54	107	2.03	1.64	1.78			
-98		108/55	47	2.14	1.66	1.70			
-93		110/60	91	1.96	1.86	1.69			
-91		120/64	55	1.88	1.56	1.80			
-95		112/56	277	1.89	1.57	1.81			
-96		110/53	114	1.89	1.56	1.80			
-27		110/54	59	1.87	1.57	1.83			
-94		112/55	42	1.93	1.58	1.74			
-90		112/57	40	2.29	1.69	1.77			
-92		116/60	42	2.03	1.58	1.66			
-94		111/58	76	2.01	1.60	1.66			
-99		115/56	43	2.18	1.64	1.68			
-31		118/55	68	1.92	1.67	1.70			
-98		115/57	125	1.86	1.60	1.70			
-97		118/57	111	2.20	1.68	1.78			
-91		112/60	104	1.75	1.52	1.73			
-77		114/58	128	1.96	1.64	1.75			
-10		109/57	86	1.93	1.60	1.84			
-61		115/56	108	1.78	1.47	1.73			
-102		117/58	97	2.05	1.61	1.76			
-103		118/53	48	2.06	1.63	1.78			
-106	✓	112/52	132	2.17	1.65	1.73			

Final Check

Device #	Proof	Act/Rel	H ₂ O Drop	Current Leakage					
156-5-01	Fluid Rec. & Tankage	OK							
02	Fluid Rec. & Tankage	OK							
03	Fluid Rec. & Tankage	OK							
04	Fluid Rec. & Tankage	OK							
05	Fluid Rec. & Tankage	OK							
06	Fluid Rec. & Tankage	OK							
07	Fluid Rec. & Tankage	OK							
08	Fluid Rec. & Tankage	OK							
09	Fluid Rec. & Tankage	OK							
10	Fluid Rec. & Tankage	OK							
11	Fluid Rec. & Tankage	OK							
12	Fluid Rec. & Tankage	OK							
13	Fluid Rec. & Tankage	OK							
14	Fluid Rec. & Tankage	OK							
15	Fluid Rec. & Tankage	OK							
16	Fluid Rec. & Tankage	OK							
17	Fluid Rec. & Tankage	OK							
18	Fluid Rec. & Tankage	OK							
19	Fluid Rec. & Tankage	OK							
20	Fluid Rec. & Tankage	OK							
21	Fluid Rec. & Tankage	OK							
22	Fluid Rec. & Tankage	OK							
23	Fluid Rec. & Tankage	OK							
24	Fluid Rec. & Tankage	OK							
25	Fluid Rec. & Tankage	OK							
26	Fluid Rec. & Tankage	OK							
27	Fluid Rec. & Tankage	OK							
28	Fluid Rec. & Tankage	OK							
29	Fluid Rec. & Tankage	OK							
30	Fluid Rec. & Tankage	OK							

Device	Test	Proof	Act/Rcl	Nv Df	Curr	OP-Holding	OP-Holding	OP-Holding
1545-31	Fluid Res 150t + 500t	OK	124/41	41	1.68	1.47	1.65	
32	Fluid Res 150t + 500t		127/52	40	1.88	1.61	1.85	
33	Fluid Res 150t + 500t		125/59	42	1.71	1.43	1.64	
34	Fluid Res 150t + 500t		140/70	41	3.31	7.40	7.69	
35	Fluid Res 150t + 500t		124/57	41	1.68	1.40	1.66	
36	Fluid Res 150t + 500t		123/53	42	1.68	1.40	1.65	
37	Barst	7600						
38	Barst	7600						
39	Barst	7600						
40	Barst	7600						
41	Barst	7600						
42	Barst	7600						
43	Vibration	OK	121/48	43	2.18	1.75	1.94	
44	Vibration		123/51	41	1.94	1.58	1.83	
45	Vibration		121/50	43	1.89	1.56	1.72	
46	Vibration		123/53	45	1.97	1.61	1.77	
47	Vibration		117/45	43	1.92	1.58	1.71	
48	Vibration		124/50	41	1.92	1.54	1.80	
49	Vibration	OK	124/47	3.3	1.92	1.60	1.83	
50	Vibration	OK	124/47	4.1	1.91	1.60	1.87	
51	Not used							
52	Vibration	OK	124/47	17.0	1.85	1.49	1.89	
53	Vibration	OK	124/44	9.2	1.87	1.31	1.80	
54	Vibration	OK	124/45	6.5	1.83	1.54	2.18	
55	Vibration	OK	124/47	5.3	1.67	1.91	2.01	
56	Temp Cycle	OK	124/53	5.6	1.47	1.27	1.75	
57	Temp Cycle	OK	124/60	1.7	1.56	1.34	1.78	
58	Temp Cycle	OK	124/51	5.2	1.63	1.43	1.91	
59	Temp Cycle	OK	114/52	7.5	1.67	1.32	1.72	
60	Temp Cycle	OK	125/57	6.6	1.78	1.43	1.71	
61	Temp Cycle	OK	125/66	5.6	1.57	1.37	1.92	
62	Temp Cycle	OK						
63	Temp Cycle	OK						
64	Temp Cycle	OK						
65	Temp Cycle	OK						
66	Temp Cycle	OK						
67	Temp Cycle	OK						
68	Temp Cycle	OK						
69	Temp Cycle	OK						
70	Temp Cycle	OK						
71	Temp Cycle	OK						
72	Temp Cycle	OK						
73	Temp Cycle	OK						
74	Temp Cycle	OK						
75	Temp Cycle	OK						
76	Temp Cycle	OK						
77	Temp Cycle	OK						
78	Temp Cycle	OK						
79	Temp Cycle	OK						
80	Temp Cycle	OK						

Appendix 4.2.2
Burst data and Weibull

TEST LOT NO.	TEST	DEVICE
TESTED BY		DOC.
APPROVED BY		PAGE
DATE 21-08-76		44

FORM 5285

ESTIMATE AND TWO SIDED 90 % CONFIDENCE
INTERVALS FOR DISTRIBUTION PARAMETERS

SHAPE(BETA) PARAMETER : 63.735
LOWER LIMIT : 31.505 — LOW EXTREME @ 90%
UPPER LIMIT : 128.9330291748047

SCALE(THETA) PARAMETER: 7768.737
LOWER LIMIT : 7680.740 — LOW EXTREME @ 90%
UPPER LIMIT : 7857.741

ASSUME

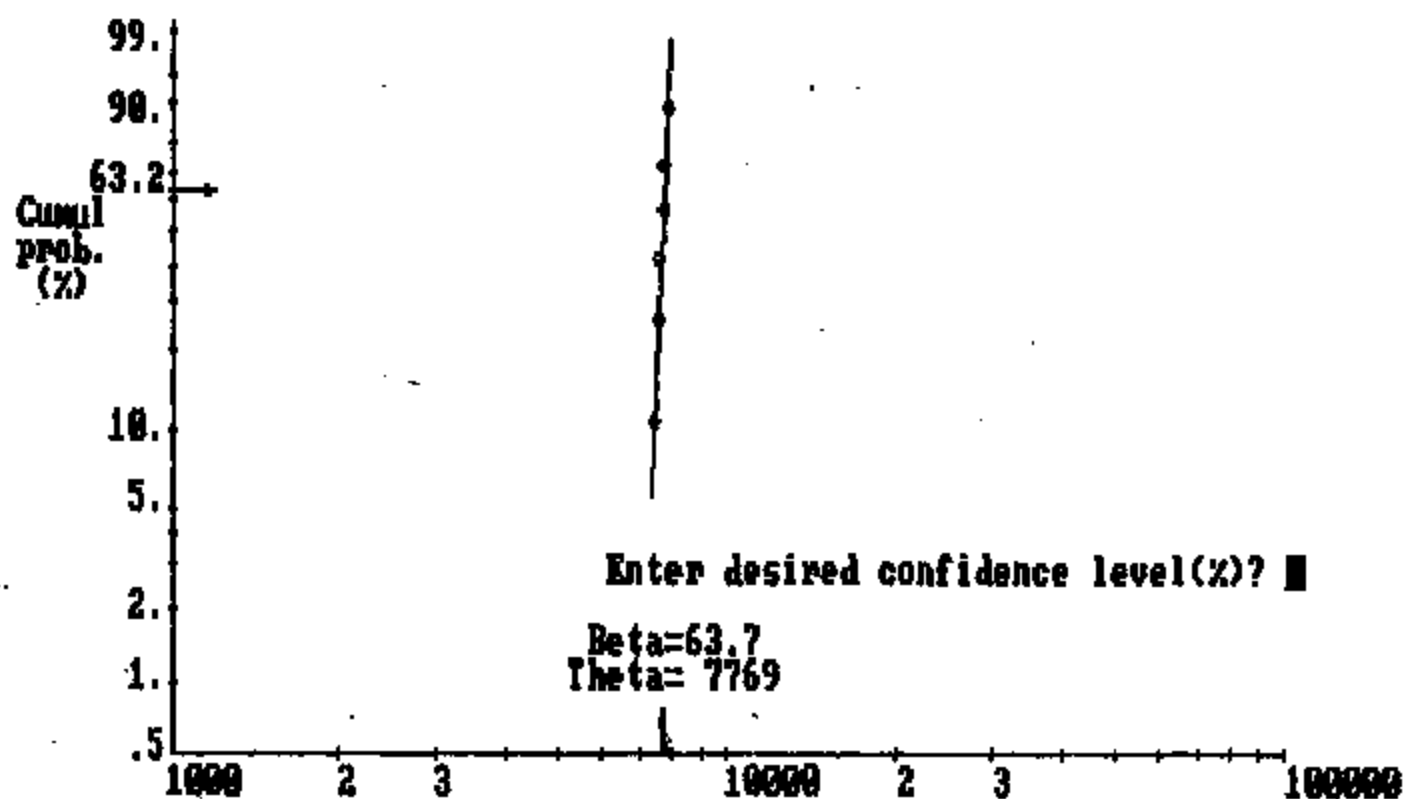
TIME VALUES FOR SPECIFIED LEVELS OF RELIABILITY - USING LOW VALUES
***** FOR β AND θ

* WEIBULL SLOPE : 31.50
* CHARACTERISTIC LIFE : 7680.74

FROM ASSUME

NO.	RELIABILITY(X)	TIME ASSUME
1	72	7414.0854

TI-NHTSA 003727



Appendix 4.2.3
Vibration

TEST LOT NO.	TEST TEXAS INSTRUMENTS  MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02703	DEVICE
TESTED BY		DOC.
APPROVED BY		PAGE
DATE 01-00-00		17

FORM 8206

TI-NHT8A 003728

ENVIRONMENTAL TEST LAB REQUEST FORM
(ONE TEST PER REQUEST)

DATE 8/5/91
REQUIRED COMPLETION DATE 7/19/91 8/17/91
DEVICE 7755204, 72P362-3
CHARGE DEPT. NO. 127 I.O. NO. 101060
REFERENCE SPEC. NO. ES-P2VS-9F924-AA
SOURCE OF TEST SAMPLES Perigo Lab
QUANTITY OF TEST SAMPLES 12

REQUESTED BY Tefrey D. Pomeale
EXTENSION 3144 MS 12-27

REPORT NO. 0887-081
TESTED BY Lab
COMPLETION DATE 9-3-91

TEST REQUIREMENTS: (TO BE FILLED IN BY REQUESTOR)

See attached, Vibration.

TEST PERFORMED:

per attached specification.

TEST RESULTS:

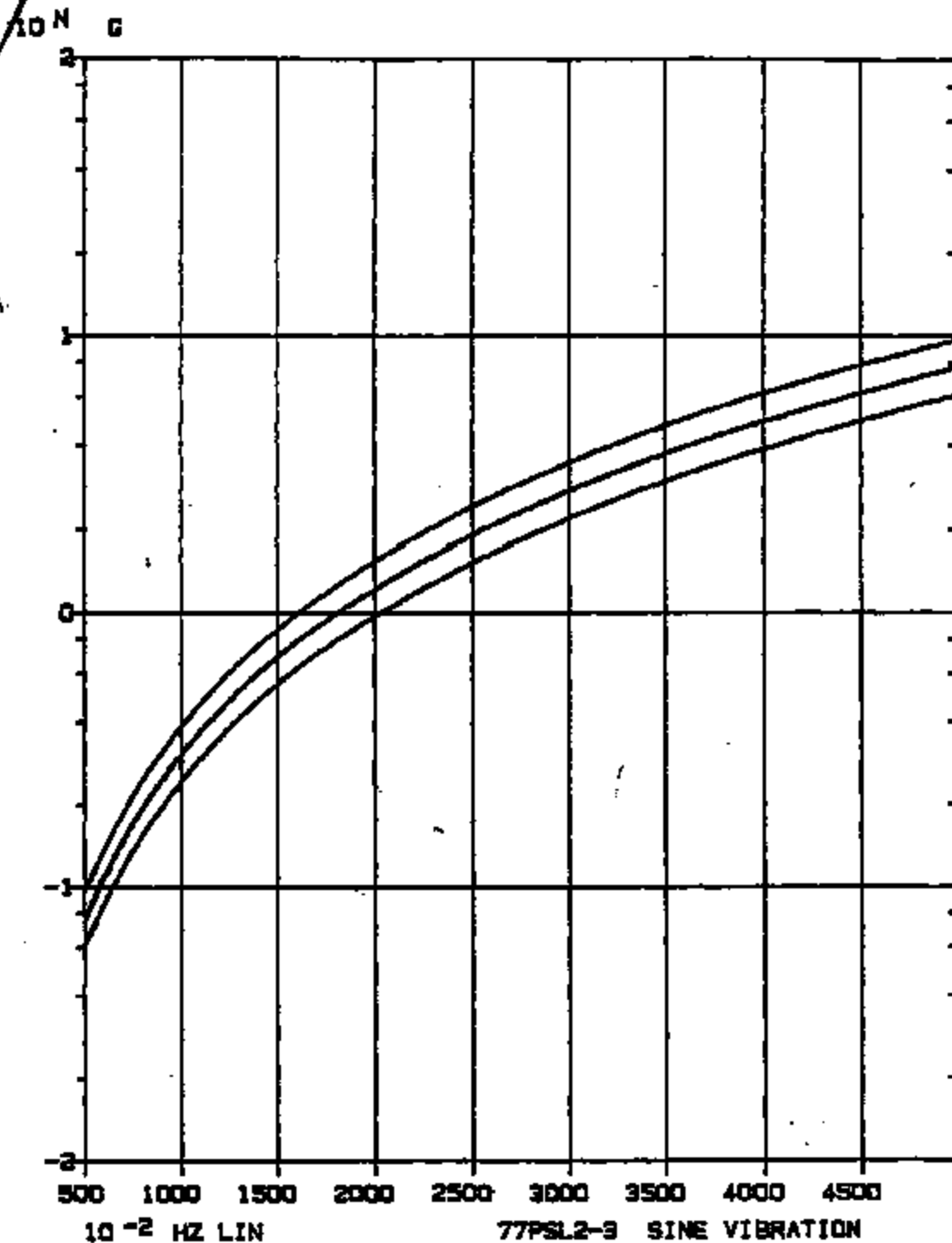
See attached sheets.

EQUIPMENT USED:

CALIBRATION DATE:

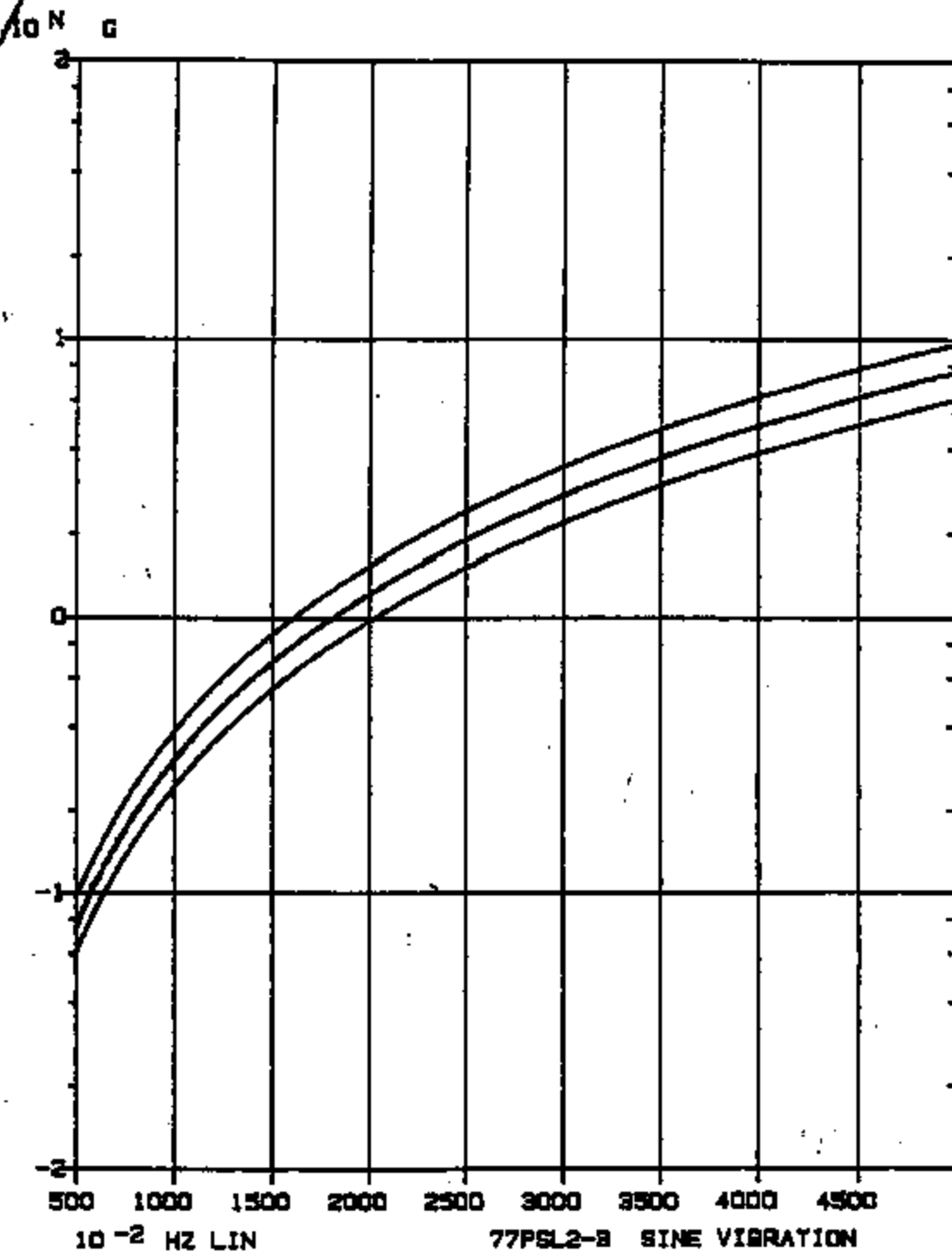
NEXT DUE DATE:

EVT 0887-081 RUN 1 8-29-91 Y AXIS 8-OK 0-REJ LF
POST TEST SWEEP # 182 DOWN



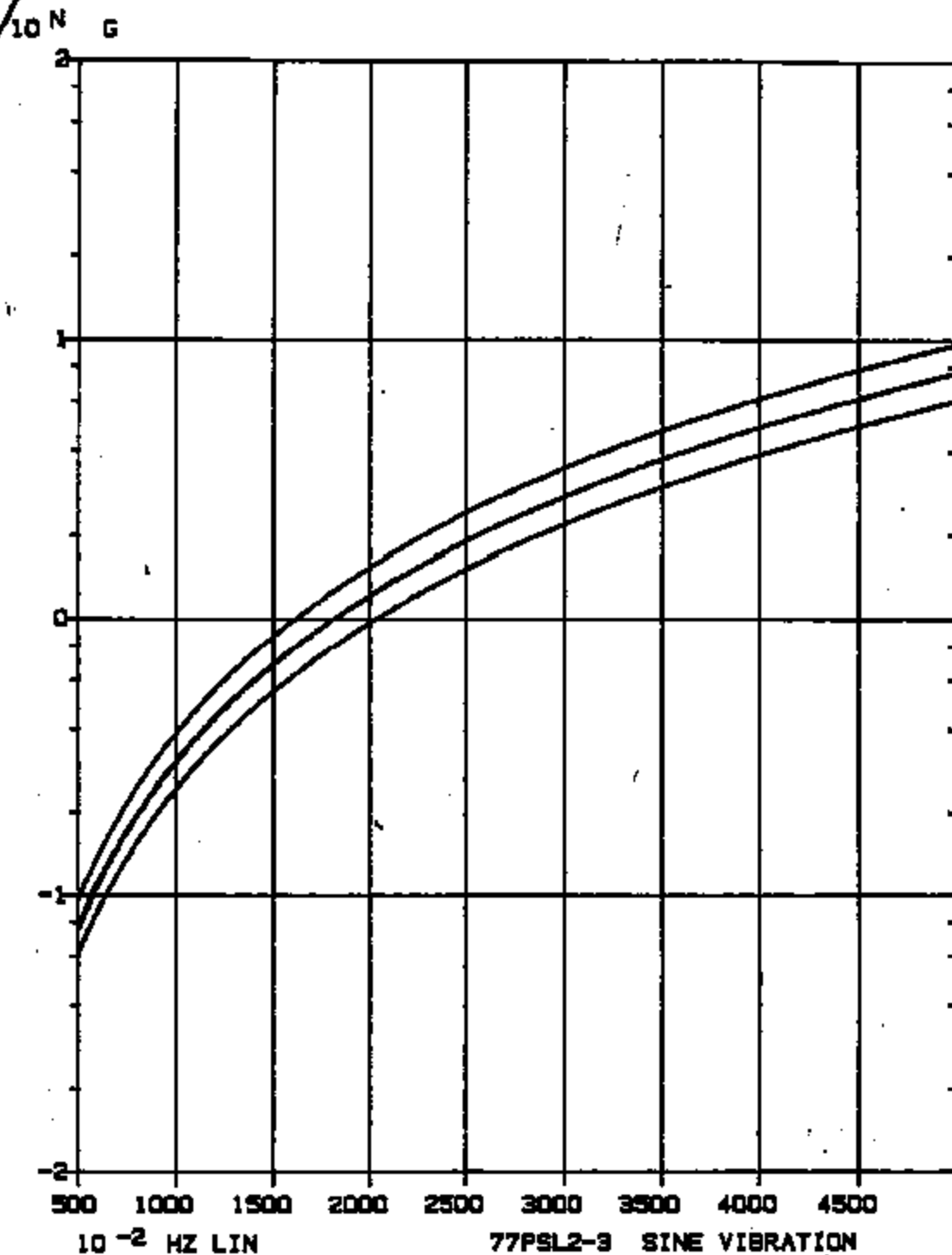
TI-NHTSA 003730

EVT 0887-081 RUN 2 8-30-81 Z AXIS B-OK O-REJ LF
POST TEST SWEEP # 182 DOWN



TI-NHTSA 003731

EVT 0887-081 RUN 3 9-3-81 X AXIS 8-OK 0-REJ LF
POST TEST SWEEP # 182 DOWN



TI-NHTSA 003732

Appendix 4.2.4
Thermal Cycle Day/Time/Temp

TEST LOT NO. TESTED BY APPROVED BY DATE 11-05-70	TEST TEXAS INSTRUMENTS 	MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02703	DEVICE DOC. PAGE 11
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FORM 8296

TI-NHTSA 003733

77 PS Validation Testing

Temp. Cycle Test

(LOW SCRIPT -42°C)

	1	2	3	4	5	6	7	8	9	10	11	12	13
	Temp	Temp	Time	Date		Temp	Temp	Time	Date				
Cycle 1	+40	+43	11:45	8/7/91		-43	-45	11:35	8/7/91				
2	43	43	1:05	"		-40	-46	2:10	"				
3	43	42	2:45	"		-42	-49	4:10	"				
4	40	40	3:35	"		-43	-44	4:15P	"				
5	41	40	7:35A	8/8/91		-41	-47	8:45	8/8/91				
6	39	41	9:20	"		-41	-44	10:35	"				
7	42	43	11:45	"		-42	-44	12:50	"				
8	41	42	1:30	"		-42	-44	3:00P	"				
9	40	43	3:30	"		-40	-45	4:40P	"				
10	42	43	5:05P	"		-42	-44	6:30P	"				
11	42	43	7:35P	"		-43	-44	9:35P	"				
12	40	43	7:50A	8/9/91		-40	-44	9:05	8/9/91				
13	42	42	9:30A	"		-40	-44	10:40	"				
14	42	43	11:15A	"		-42	-44	12:40	"				
15	42	42	1:10P	"		-40	-44	2:25	"				
16	41	43	2:45	"		-40	-44	4:00	"				
17	40	43	4:25	"		-40	-44	5:35	"				
18	41	42	11:40A	8/10/91		-43	-44	2:35P	8/10/91				
19	41	42	3:00P	"		-42	-44	4:35	"				
20	40	42	5:20P	"		-42	-44	7:15P	"				
21	43	42	8:40A	8/11/91		-43	-44	4:50P	8/11/91				
22	43	42	5:15	"		-41	-44	6:45	"				
23	40	42	7:50	8/12/91		-40	-44	9:05	8/12/91				
24	40	43	9:50	"		-40	-45	11:05	"				
25	40	43	11:50	"		-40	-44	1:05	"				
26													
27													
28													
29													
30													
31													

TLNHTSA 003734

Appendix 4.2.5
Fluid Resistance Test

TEST LOT NO.	TEST TEXAS INSTRUMENTS  MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02703	DEVICE
TESTED BY		DOO.
APPROVED BY		PAGE
DATE 01-03-20		54

FORM 8298

TI-NHT8A 003735

TEST NO. 107831

TECHNICAL SERVICE LABS

TEST NO. 107831

LAB NO.		INFORMATION
REQUESTOR		
MAIL STATION		
EXTENSION		
DATE REQUIRED	10/1/91	
NO. OF SAMPLES	22	
COMPOSITION	10/1/91	

REPORT OF RESULTS:

complete

DATE RECEIVED

8/28/91

DATE OUT

9-5

EMPLOYEE NO.									
JOB NO.									
NO. ANALYZED									
HOURS WORKED									

Appendix 4.2.6
Humidity

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY		DOC.
DATE 01-03-20	TEXAS INSTRUMENTS  MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02702	PAGE 56

FORM 5295

TI-NHTSA 003737

ENVIRONMENTAL TEST LAB REQUEST FORM
(ONE TEST PER REQUEST)

DATE 9/6/91
REQUIRED COMPLETION DATE 7/11/91
DEVICE 77P562-1; 77P562-3
CHARGE DEPT. NO. 127 I.D. NO. 101060
REFERENCE SPEC. NO. ES-F2V6-9F92Y-AA
SOURCE OF TEST SAMPLES Resisa Lab
QUANTITY OF TEST SAMPLES 12

REQUESTED BY Jeffrey DiBenedictis
EXTENSION 2144-MS H-22
REPORT NO. 0933-091
TESTED BY LAB
COMPLETION DATE 9-20-91

TEST REQUIREMENTS: (TO BE FILLED IN BY REQUESTOR)

Please run humidity test per attached.

TEST PERFORMED:

START 9-16-91 15:00 CHAMBER MALFUNCTION (SHUT DOWN) ylf
RESTART 9-18-91 0830 HOURS
STOP 9-20-91 1630 HOURS

TEST RESULTS:

EQUIPMENT USED:

CALIBRATION DATE:

NEXT DUE DATE:

Appendix 4.2.7
Salt Spray

TEST LOT NO.	TEST	DEVICE
TESTED BY	 TEXAS INSTRUMENTS	DOC.
APPROVED BY		PAGE
DATE 11-01-20		31

FORM 8298

ENVIRONMENTAL TEST LAB REQUEST FORM
(ONE TEST PER REQUEST)

DATE 9/6/91
REQUIRED COMPLETION DATE 7/11/91
DEVICE 778562-1 ; 778562-3
CHARGE DEPT. NO. 126 I.O. NO. 101060
REFERENCE SPEC. NO. MS-F246-9F124-AA
SOURCE OF TEST SAMPLES Decca Lab
QUANTITY OF TEST SAMPLES 1d

REQUESTED BY Jeffrey P. DamasioEXTENSION 3/48 10-29
11/6/91REPORT NO. 0934-091TESTED BY SalCOMPLETION DATE 9-9-91

TEST REQUIREMENTS: (TO BE FILLED IN BY REQUESTOR)

Please run salt spray Test per attached.

TEST PERFORMED:

IN: 1430 9-6-91
Out: 1430 9-9-91

TEST RESULTS:

to be determined by requestor.

EQUIPMENT USED:

CALIBRATION DATE:

NEXT DUE DATE:

Appendix 4.2.8
Light Truck F3TA-9F924-AA Data

TEST LOT NO.	TEST	DEVICE
TESTED BY	 TEXAS INSTRUMENTS	DOC.
APPROVED BY		PAGE
DATE 91-08-20		80

FORM 8295

TI-NHTSA 003741

Form 21605

TEST NO. 157-15-150

DEVICE	DATE REQUESTED	REQUESTED BY	REQUESTED COMPLETION DATE
728511-3			

PERFORMED BY <i>Ref: A. J. ...</i>	DATE STARTED <i>12/1/81</i>	DATE COMPLETED	APPROVED BY
---------------------------------------	--------------------------------	----------------	-------------

PROJECT TITLE: Ford MY '93 Electronic Speed control deactivate PS

CUSTOMER: LT

PURPOSE OF TEST:

PROCEDURE:

Current History

Designation	Hot Roll	Wt Drop	Wt Loss	Wt Loss	Wt Loss	Proof	Tests	
107-18-01	261/194	4.5	1.65	1.32	1.64	Good	Fluid Res	Impulse
13	262/196	4.9	1.60	1.31	1.63		Fluid Res	Impulse
14	260/196	4.7	1.60	1.23	1.59		Fluid Res	Impulse
15	263/199	4.6	1.68	1.25	1.67		Fluid Res	Impulse
16	260/197	4.3	1.67	1.21	1.63		Fluid Res	Impulse
17	259/191	6.0	1.60	1.23	1.66		Fluid Res	Impulse
18	262/197	4.0	1.57	1.20	1.67		Fluid Res	Impulse
19	263/195	5.0	1.76	1.28	1.70		Fluid Res	Impulse
20	260/196	4.1	1.64	1.28	1.59		Fluid Res	Impulse
21	267/190	4.7	1.92	1.37	1.60		Fluid Res	Impulse
22	256/190	4.5	1.75	1.26	1.60		Fluid Res	Impulse
23	266/195	3.6	1.76	1.27	1.62		Fluid Res	Impulse
24	260/198	4.8	1.95	1.39	1.53	Good	Fluid Res	Taken Spec
25	258/191	2.1	2.00	1.52	1.64		Fluid Res	Taken Spec
26	258/196	4.9	1.90	1.45	1.65		Fluid Res	Taken Spec
27	264/195	5.3	1.73	1.31	1.50		Fluid Res	Taken Spec
28	263/200	4.7	1.61	1.31	1.57		Fluid Res	Taken Spec
29	259/187	5.5	1.76	1.29	1.66		Fluid Res	Taken Spec
30	262/193	5.2	1.83	1.30	1.68		Fluid Res	Taken Spec
31	263/196	4.1	1.77	1.29	1.63		Fluid Res	Taken Spec
32	260/197	3.0	1.93	1.38	1.55		Fluid Res	Taken Spec
33	263/193	3.4	1.91	1.35	1.59		Fluid Res	Taken Spec
34	257/192	4.2	1.62	1.27	1.77		Fluid Res	Taken Spec
35	259/194	4.0	1.65	1.27	1.60		Fluid Res	Taken Spec
36	261/190	6.4	1.99	1.42	1.50	Good	Fluid Res	Humidity
37	258/192	4.6	1.71	1.42	1.57		Fluid Res	Humidity
38	270/195	4.7	1.89	1.29	1.63		Fluid Res	Humidity

TI-NHTSA 003742

Specimen	Age / Rel	u V Dry	to 100%	to 100%	to 100%	Proof	Test
266/197	5.6	1.92	1.36	1.54	Good	Fluid for & Humidity	
263/196	4.5	1.76	1.34	1.58		Fluid for & Humidity	
241/179	6.8	1.74	1.32	1.51		Fluid for & Humidity	
267/199	5.2	1.76	1.36	1.64		Fluid for & Salt Spray	
249/171	4.3	1.65	1.23	1.61		Fluid for & Salt Spray	
267/199	7.1	1.69	1.31	1.64		Fluid for & Salt Spray	
259/185	5.2	1.75	1.34	1.62		Fluid for & Salt Spray	
NOT USED							
266/197	6.1	1.74	1.32	1.73	Good	Fluid for & Salt Spray	
140/111	7.7						
254/193	2.9	1.67	1.27	1.65	Good	Fluid for & Salt Spray	
254/194	4.8	1.95	1.52	1.61		Burst	
259/185	5.6	1.71	1.32	1.65		Burst	
266/197	4.7	1.69	1.29	1.60		Burst	
NOT USED							
253/175	4.7	1.77	1.38	1.66	Good	Burst	
266/195	4.4	1.67	1.27	1.60		Burst	
261/182	5.0	1.75	1.32	1.67		Burst	
252/197	6.1	1.72	1.32	1.62		Vibrating	
264/194	7.5	1.77	1.38	1.63		Vibrating	
257/191	3.5	1.77	1.35	1.62		Vibrating	
253/190	11.0	1.90	1.28	1.79		Vibrating	
NOT USED							
260/184	4.1	1.65	1.29	1.52	Good	Vibrating	
264/181	5.1	1.73	1.31	1.52	Good	Vibrating	
NOT USED							
257/196	5.1	1.77	1.33	1.56	Good	Vacuum	
255/179	5.5	1.77	1.33	1.49		Vacuum	
256/182	9.4	1.78	1.36	1.49		Vacuum	
241/171	7.9	1.80	1.35	1.49		Vacuum	
253/194	5.0	1.94	1.36	1.44		Vacuum	
259/183	9.5	1.82	1.34	1.52		Vacuum	
252/194	3.1	1.72	1.32	1.49		Temp Cycle	
256/170	6.0	1.82	1.36	1.48		Temp Cycle	
263/199	4.7	1.85	1.38	1.50		Temp Cycle	
254/190	5.5	1.88	1.41	1.52		Temp Cycle	
255/199	9.0	1.89	1.37	1.51		Temp Cycle	
257/183	9.3	1.91	1.35	1.45		Temp Cycle	
254/197	2.7	1.80	1.35	1.49		Temp Cycle	
NOT USED							
256/177	5.0	1.82	1.36	1.45	Good	Impulse	
249/186	4.6	1.80	1.33	1.45		Impulse	
250/197	4.0	1.92	1.41	1.50		Impulse	
262/189	8.0	1.83	1.37	1.46		Impulse	
254/182	5.8	1.81	1.36	1.45		Impulse	
201/184	4.3	1.86	1.41	1.51		Impulse	
NOT USED							
211/181	7.7	1.94	1.41	1.51	Good	Impulse	
257/189	5.1	1.76	1.34	1.47		Impulse	
213/182	2.4	1.78	1.35	1.48		Impulse	
256/194	5.1	1.79	1.34	1.48		Impulse	
273/199	4.0	1.78	1.33	1.46		Impulse	

Final Characterizations

Draw =	TESTS	Proof	Ret/Ret	Min Disp	Min Disp	Min Disp	Min Disp
157-15-01	Fluid Ret & Tensile	OK	237/190	3.5	1.91	1.47	1
02	Fluid Ret & Tensile	OK	237/190	4.3	1.61	1.57	1
03	Fluid Ret & Tensile	OK	237/190	4.3	1.64	1.57	1
04	Fluid Ret & Tensile	OK	241/192	4.3	1.59	1.37	1
05	Fluid Ret & Tensile	OK	232/181	2.9	1.79	1.41	1
06	Fluid Ret & Tensile	OK	241/190	6.3	1.78	1.44	1
07	Fluid Ret & Tensile	OK	251/195	2.5	1.78	1.38	1
08	Fluid Ret & Tensile	OK	237/179	2.7	1.48	1.29	1
09	Fluid Ret & Tensile	OK	237/180	2.4	1.59	1.35	1
10	Fluid Ret & Tensile	OK	240/182	3.2	1.53	1.32	1
11	Fluid Ret & Tensile	OK	236/181	2.2	1.49	1.31	1
12	Fluid Ret & Tensile	OK	232/177	3.3	1.49	1.22	1
13	Not Used						
14	Fluid Ret & Tensile	OK	250/180	4.1	1.86	1.27	1
15	Fluid Ret & Tensile		253/186	4.1	1.68	1.23	1
16	Fluid Ret & Tensile		256/190	4.2	1.65	1.21	1
17	Fluid Ret & Tensile		246/186	4.2	1.65	1.21	1
18	Fluid Ret & Tensile		265/202	4.0	1.74	1.23	1
19	Fluid Ret & Tensile		258/192	4.0	1.66	1.22	1
20	Fluid Ret & Tensile		245/190	4.0	1.76	1.37	1
21	Fluid Ret & Tensile		260/181	4.1	1.66	1.38	1
22	Fluid Ret & Tensile		258/185	4.1	1.63	1.39	1
23	Fluid Ret & Tensile		262/198	4.1	1.75	1.40	1
24	Fluid Ret & Tensile		255/187	4.0	1.72	1.35	1
25	Fluid Ret & Tensile		257/188	4.0	1.54	1.31	1
26	Fluid Ret & Tensile	OK	267/191	6.3	2.13	1.50	1
27	Fluid Ret & Tensile		261/191	4.9	2.10	1.70	1
28	Fluid Ret & Tensile		275/190	4.1	2.00	1.61	1
29	Fluid Ret & Tensile		270/189	6.7	1.66	1.45	1
30	Fluid Ret & Tensile		279/190	5.8	2.00	1.65	1
31	Fluid Ret & Tensile		279/191	5.7	2.00	1.65	1
32	Fluid Ret & Tensile		269/194	4.0	306.00	4.39	3
33	Fluid Ret & Tensile		254/193	4.0	2.18	1.54	1
34	Fluid Ret & Tensile		260/193	4.0	310.00	4.40	4
35	Fluid Ret & Tensile		274/205	4.0	310.00	307.00	3
36	NOT USED						
37	Fluid Ret & Tensile	OK	259/193	4.0	39.6	37.4	3
38	NOT USED						
39	Fluid Ret & Tensile	OK	257/192	4.0	307.00	306	3
40	NOT USED						
41	NOT USED						
42	NOT USED						
43	NOT USED						
44	NOT USED						
45	NOT USED						
46	NOT USED						
47	NOT USED						
48	NOT USED						
49	NOT USED						
50	NOT USED						
51	NOT USED						
52	NOT USED						
53	NOT USED						
54	NOT USED						
55	NOT USED						
56	NOT USED						
57	NOT USED						

Specimen	TESTS	Proof	Act/Pol	11-Prop	11-Prop	11-Prop	11-Prop
151-15-58	Vacuum	OK	218/198	8.9	1.67	1.46	1.9
152	Vacuum	OK	213/191	9.5	1.66	1.49	1.91
153	Vacuum	OK	253/170	7.7	1.71	1.77	1.85
154	Temp. Cycle	OK	248/192	5.3	1.59	1.34	1.8
155	Temp. Cycle	OK	234/194	4.2	1.57	1.33	1.7
156	Temp. Cycle	OK	253/197	9.4	1.59	1.37	1.71
157	Temp. Cycle	OK	244/178	6.8	1.66	1.39	1.6
158	Temp. Cycle	OK	245/193	9.8	1.64	1.42	1.7
159	Temp. Cycle	OK	246/182	13.3	1.58	1.39	1.6
160	Temp. Cycle	OK	252/181	1.9	1.74	1.57	1.6
161	NOT USED						
162	Temp. Cycle	OK	235/177	3.1	1.57	1.36	1.5
163	Temp. Cycle	OK	270/181	2.0	1.58	1.39	1.75
164	Temp. Cycle	OK	242/194	1.2	1.77	1.64	1.7
165	Temp. Cycle	OK	250/185	2.0	2.05	1.67	2.1
166	Temp. Cycle	OK	247/186	1.9	2.11	1.72	1.75
167	Temp. Cycle	OK	247/181	1.9	2.10	1.71	2.1
168	NOT USED						
169	Temp. Cycle	OK	254/194	1.9	1.99	1.75	1.95
170	Temp. Cycle	OK	246/188	19.1	1.72	1.36	1.7
171	Temp. Cycle	OK	248/181	5.3	1.74	1.54	1.7
172	Temp. Cycle	OK	251/184	1.9	1.98	1.57	1.5
173	Temp. Cycle	OK	261/114	1.9	57.1-A	76.8	31.2

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TI-NHTSA 003746

TEXAS INSTRUMENTS



November 15, 1991

Kelsey-Hayes Company
9475 Center Road
Fenton, Michigan 48430

Attn: Ms. Rita Gunia
Purchasing Department

Subj: Part Number 12604301 Switch (E7SC-3N824-AA)
Part Number 12590701 Switch (F2VC-9F924-AB)
ISIR Submissions

Dear Rita,

Enclosed, please find the ISIR for the 12604301 and 12590701 switches. Both ISIR submissions were accomplished on Ford forms as we are in the process of transferring data to Kelsey-Hayes forms.

The 12590701 submission has several dimensional issues on the layout that are being addressed.

The 12604301 submission needs dimensional layout, control plan, manufacturing flow diagram, PIST, PIPC, and PV testing that are being addressed.

Please let me know if you have any questions or if I may be of any further assistance.

Regards,


Jim Watt
SRA Engineer
Precision Controls Department
Control Products Division

cc: Dave Czarn, MS 12-29; Gary Snyder, MS 12-33
Charlie Douglas, MS 12-33
Andy McGuirk, MS 12-27
Steve Majors, TI Farmington Hills, Michigan

enc: ISIR submissions

TEXAS INSTRUMENTS INC. ! MATERIALS & CONTROLS GROUP ! SITE

PARTS LIST ! PROJECT ! PART NUMBER: 77PSL2-3 ! REV LTR: A CLS: 650
EXPLOSION ! NUM: 3423 ! DWG PFX: NUM: 77PSL2-3 ! ECN INC. DT: 91/11/05

TITLE: PRESSURE SWITCH

LV!	CNT !	QTY/UM	BITH!	PART/DRAWING NUMBER	RV!	NOMENCLATURE/PARM DATA
01!	1!	REF		36952-1	?	FINAL ASSEMBLY
				36952-1		
01!	2!	1	27!	27739-1		BASE ASSEMBLY
				27759SH1		
02!	3!	1	2!	46515-1		BASE (BLACK)
				46515		
02!	4!	1	3!	36888-1		STATIONARY TERMINAL
				36888		
02!	5!	1	4!	36897-1		MOVABLE TERMINAL ASM
				36897SH1		
03!	6!	1	2!	74408-1		MOVABLE CONTACT
				74408		
03!	7!	1	3!	74171-1		RIVET
				74171		
03!	8!	1	4!	36887-1		MOVABLE TERMINAL
				36887		
03!	9!	1	5!	36889-1		SPRING ARM
				36889		
01!	10!	1	24!	27293-14		SENSOR ASSEMBLY
				27293SH2		
02!	11!	1	2!	36900-1		MOD SAE J512 HEXPORT
				36900		
02!	12!	1	3!	74353-1		GASKET
				74353		
02!	13!	1	4!	27288-1		CUP
				27288		
02!	14!	3	5!	74176-1		SEAL
				74176		
02!	15!	OR	5!	27225-1		KAPTON STRIP SPEC (.175 LBS/K)
				27225		
02!	16!	1	6!	27639-1		WASHER
				27639		
02!	17!	1	7!	27406-1		CONVERTER
				27406		
02!	18!	1	8!	74224-1		KAPTON TAPE (.100 LBS/K)
				74224		
02!	19!	OR	8!	73958-2		SPACER
				73958		
02!	20!	OR	8!	73958-3		SPACER
				73958		
02!	21!	1	9!	36656-28		3/4" FORMED DISC
				36656SH1		
01!	22!	1	14!	74797-1		CRIMP RING
				74797		
01!	23!	1	18!	74078-146		TRANSFER PIN
				74078		
01!	24!	1	21!	74247-2		ENVIRONMENTAL SEAL

TI-NHTSA 003748

01	25	1	22	74179-2	THREAD CAP
				74179	
01	26	AR		27318-1	CARTON ASM.
				27318	
02	27	1	2	74219-1	CARTON
				74219	
02	28	5	3	74218-1	ROW SEPARATOR
				74218	
02	29	4	4	27317-1	DEVICE SEPARATOR
				27317	

! NOTES, REV. DATA, DISTRIBUTION, OPERATING CHARACTERISTICS, SPECIAL REQUIREMENTS !

REV DESC: SET UP ! CCB APPROVAL DATE: 91/08/14

DFTG WORK GROUP: PRECISION CONTROLS ! ECR ORIGINATOR: STEPHEN B OFFILER

NOTES:

1 - ACTUATION PRESSURE ----- 200-300 PSIG

2 - RELEASE PRESSURE ----- 40 PSIG MIN.

99 - CR M06083, ADDED P/L TO EIS, NEW DRAWING IN SYSTEM

5-71

cc = *Handwritten:* Handwritten:
Handwritten: FYD/Comman
Handwritten: Jhr
Handwritten: J

Kelsey-Hayes Company
6475 Center Road
Fenton, Michigan 48430

September 27, 1991 J.

Attn: Mr. Steve Moffett

Subj: Initial ISR Submission
Ford Part Number F2VC-9F924-AB
Pass Car Series

Dear Steve,

Enclosed, please find our initial ISR submission for the
NBSB deactivation switch, Ford part number F2VC-9F924-AB.
The submission includes complete product validation testing
which is enclosed with the documentation.-

We noted one discrepancy during the dimensional analysis.
Dimension 1.85 - 2.06 was inadvertently transferred in error
from the envelope drawing to the component drawing,
resulting in the one out of dimension measurement (2.699).
Sample bases with the corrected dimension will be
forwarded to you within three weeks.

We noted that the pass car print does not indicate any significant
characteristics, and therefore, no PIST/PIPC data is required.
However, we intend to provide PIST/PIPC data on actuation,
release, and thread specifications, and forward the data
to you.

Please let me know if you have any questions or if I may be
of any further assistance.

Regards,

Jim Watt
GRA Engineer
Precision Controls Department
Control Products Division

cc: Dave Czarn, MS 12-27; Charlie Douglas, MS 12-33
Andy McGuirk, MS 12-27
Joe Schuck, TI Farmington Hills, Michigan

encl: ISIR Submission

TI-NHTBA 003761

MN12 Program

KELSEY-HAYES™ GROUP
INITIAL SAMPLE READINESS CHECKLIST

Jan 1991

Charles Douglas
Yogen Chandra

Supplier Texas Inst. Supplier Contact Yogen Chandra
Supplier Address 34 Forest St.
City, State, Zip Attleboro, MA Phone (508) 699-3012 Fax (508) 699-1599
Part or Product pressure switch Date 9-9-91
Kelsey-Hayes Group _____ Kelsey-Hayes Contact _____
PLN 12604301 Released version 8/10 dated 4-9-91

The following items have been prepared and/or approved. Items marked with an asterisk (*) are to be completed prior to ISIR date.

K-H Required	Item	Available by Supplier	K-H Disposition (Note: initial and date each item)
_____	*Manufacturing feasibility signoff	_____	_____
_____	*Design FMEA	_____	_____
☒	*Process flow diagram	_____	_____
☒	*Process FMEA	_____	_____
☒	*Designated characteristics list	_____	_____
_____	*Pre-launch control plan	_____	_____
☒	Gage R&R studies	_____	_____
☒	Short term process capability studies	_____	_____
☒	*Process control plan	_____	_____
_____	Inspection instructions	_____	_____
_____	Sat-up instructions	_____	_____
_____	Operations instructions	_____	_____
☒	ES testing requirements	_____	_____
_____	Packaging and identification approval	_____	_____
☒	Functional testing	_____	_____

P/c				L/T		
F ₁₀	K ₁₄			F ₁₀		

asm. dev. prints

Burst 7K for
Both 4/T & P/C

Proof force
REV. A

P/C = 3K

4/T = 4K

SAMPLE REPORT

REASON FOR REPORT	VENDOR		P.O.	PART NO.	REV.
NEW PART	☒			77PSL2-1	C8
REPLACEMENT TOOL.	☐		REPORT REQ. BY	DATE	INSPECTED BY
CORRECTED TOOL.	☐		2. Rose	10/11/91	ELAINE GRAVEL
REPAIRED TOOL.	☐				10/29/91
REVIEW	☐		THE DIMENSIONS INDICATED BELOW REPRESENT TEXAS INSTRUMENTS' FINDINGS REGARDING THE ACTUAL VALUES FOR ALL CHARACTERISTICS MEASURED. IN CASES WHERE ACTUAL VALUES DEVIATE FROM THE SPECIFIED DIMENSIONS, THE DISPOSITION MUST INDICATE THE REQUIRED ACTION FOR EACH NON-CONFORMANCE IN THE APPROPRIATE COLUMN.		
OTHER <u>DIM. ANALYSIS</u>	☒				

		(CIRCLE ALL OUT OF TOLERANCE DIMENSIONS)					DISPOSITION	
		1B	2C	3C	4D	5D	6D	DISP
1	19.45-19.81	19.55	19.61	19.58	19.56	19.57	19.57	CAL
2	16.36-16.76	16.55	16.62	16.63	16.57	16.57	16.57	CAL
3	12.80-13.21	12.974	13.051	13.035	13.035	13.028	13.046	TM
4	11.40-11.90	11.788	11.808	11.775	11.773	11.758	11.755	TM
5	2.84-3.05	2.93	2.92	2.92	2.92	2.93	2.93	CAL
6	0.15 A	0.241	0.220	0.223	0.231	0.215	0.215	TM
7	1.24-1.45	1.252	1.250	1.280	1.280	1.280	1.285	TM
8	1.24-1.55	1.402	1.397	1.400	1.389	1.397	1.397	TM
9	1.85-2.06	2.004	1.974	1.996	1.984	1.994	1.984	TM
10	13.43-13.85	13.772	13.693	13.800	13.686	13.686	13.588	TM
11	31° ±2°	30° 34'	29° 53'	31°	29° 04'	29° 03'	30° 02'	TM
12	2.79-3.10 AX	2.88	2.88	2.90	2.90	2.89	2.90	CAL
13	0.25-0.75	0.251	0.240	0.231	0.221	0.246	0.227	TM
14	0.05-0.26 2X	0.051	0.074	0.140	0.137	0.133	0.137	TM
15	19.05 MAX.	18.64	18.51	18.62	18.62	18.57	18.67	CAL
16	57.15 MAX.	55.65	55.70	55.71	55.70	55.69	55.68	CAL
17	12.59-13.11	12.755	12.719	12.761	12.761	12.741	12.741	TM
18	11.65-12.17	11.639	11.634	11.721	11.721	11.720	11.732	TM
19	14.23 MAX.	13.61	13.65	13.63	13.61	13.63	13.63	CAL
20	9.37-9.66	9.52	9.52	9.53	9.52	9.52	9.52	TM
21	8.12 Mid.	8.293	8.293	8.175	8.175	8.175	8.175	TM
22	1.52-2.04	1.740	1.732	1.793	1.727	1.781	1.796	TM
23	7.82-8.03	7.94	7.94	7.97	7.97	7.92	7.96	CAL
24	6.60-6.81	6.640	6.690	6.693	6.647	6.665	6.642	TM

REMARKS AND/OR INSTRUCTIONS:

DISPOSITION: TOOL APPROVED FOR PROD.

RESUBMISSION REQ'D

MFG. ENG.:

QRA ENG.:

PURCH. AGENT:



SAMPLE REPORT

REASON FOR REPORT	TEST	NO.	DATE NO	REV.
NEW PART ☒			278542-1	C2
REPLACEMENT TOOL	RECEIVED BY	DATE	INSTRUCTIONS	
CONNECTED	<i>E. Raza</i>	<i>7/1/77</i>	<i>Machine Operator</i>	<i>7/1/77</i>
REPAIRS				
REVIEW				
QT-58				

00015



SAMPLE REPORT

REASON FOR REPORT	VENDOR	P.O.	PART NO.	REV.
NEW PART			7725L2-1	CP
REPLACEMENT TOOL.	REPORT REQ. BY	DATE	INSPECTED BY	DATE
CORRECTED TOOL.				10/29/9
REPAIRED TOOL.	THE DIMENSIONS INDICATED BELOW REPRESENT TEXAS INSTRUMENTS' FINDINGS REGARDING THE ACTUAL VALUES FOR ALL CHARACTERISTICS MEASURED. IN CASES WHERE ACTUAL VALUES DEVIATE FROM THE SPECIFIED DIMENSIONS, THE DISPOSITION MUST INDICATE THE REQUIRED ACTION FOR EACH NON-CONFORMANCE IN THE APPROPRIATE COLUMN.			
REVIEW				
OTHER				

(CIRCLE ALL OUT OF TOLERANCE DIMENSIONS)						DISPOSITION			
		1B	2C	3C	4D	5D	6D		
24A	29 ^{±2} ° 4X	29° 54'							TM
		36° 57'							
		30° 34'							
		28° 46'							
25	1.80-2.21R 2X	1.842	1.842	1.842	1.842	1.842	1.842	1.842	ROUNDED
26	7.23-7.75	7.739	7.521	7.689	7.539	7.554	7.531	TM	
26A	NO Flash OR burrs allowed on surface	OK	OK	Flash	OK	OK	Flash		
27	2.79-3.41	3.145	3.093	3.160	3.150	3.119	3.107	TM	
28	0.68-1.38	1.115	1.162	1.179	1.142	1.161	1.153		
28A	Stamp date code and Ford H/N on surface	V has been omitted.							
29	0.25 MIN. X 40°-50° CHAMFER	Threads have been added							
30	3/8-16-2.5 THD.	OK							3/8-16-2.5 THD. going
31	1.10-1.40	1.316							TM
32	7 0.16 D	0.051	0.048	0.048	0.002	0.030	0.056		Spec Rob DUFFY
33	2.5°	OK							Spec Rob DUFFY
34	41-43°	41° 20'							Spec Rob DUFFY
35	40°-50° CHAMFER	Threads have been added							
36	32.57 MAX.	31.41	31.46	31.45	31.50	31.46	31.53		OK
37	14.02-14.53 MAX.	14.11	14.11	14.11	14.13	14.13	14.13		OK
38	3.30-3.60	3.454	3.434	3.432	3.432	3.432	3.432		OK
39	7.23-7.37	7.27	7.334	7.322	7.324	7.309	7.316		OK
40	5.58-5.85	5.713	5.713	5.713	5.713	5.713	5.713		OK
41	(71.5 ^{±2}) 2X	72° 30'	72° 14'	72° 20'	72° 37'	72° 11'	72° 36'		OK

REMARKS AND/OR INSTRUCTIONS: #38 MAX plug accepted on 40+5D .135. MAX plug accepted on 1B, 2C 30+4D .134. #33 Separate sample of hex part OK, other damaged when doing circular RUNOUT.

DISPOSITION: TOOL APPROVED FOR PROD.	RESUBMISSION REQ'D
MFG. ENG.:	QRA ENG.:
	PURCH. AGENT:

TEXAS INSTRUMENTS

ATTLEBORO, MASSACHUSETTS 01903



PAGE 1

SAMPLE REPORT

REASON FOR REPORT	VENDOR	P.O.	PART NO.
☒ NEW PART ☐ REPLACEMENT TOOL ☐ CORRECTED ☐ REPAIR			772SL

SAMPLE REPORT

REASON FOR REPORT	VENDOR	P.O.	PART NO.	REV.
NEW PART			77P5L2-1	
REPLACEMENT TOOL.	REPORT REQ. BY	DATE	INSPECTED BY	DATE
CORRECTED TOOL.				10/29/91
REPAIRED TOOL.	THE DIMENSIONS INDICATED BELOW REPRESENT TEXAS INSTRUMENTS' FINDINGS REGARDING THE ACTUAL VALUES FOR ALL CHARACTERISTICS MEASURED. IN CASES WHERE ACTUAL VALUES DEVIATE FROM THE SPECIFIED DIMENSIONS, THE DISPOSITION MUST INDICATE THE REQUIRED ACTION FOR EACH NON-CONFORMANCE IN THE APPROPRIATE COLUMN.			
REVIEW				
OTHER				

		(CIRCLE ALL OUT OF TOLERANCE DIMENSIONS)				DISPOSITION			
		1A	2C	3C	4D	5D	6D		
42	1.42-1.63 2X	1.623	1.630	1.622	1.624	1.623	1.599	TM	Revised
		1.623	1.633	1.628	1.585	1.598	1.590		
43	0.35-0.66 4X	0.660	0.573	0.574	0.572	0.574	0.574	TM	
		0.645	0.577	0.602	0.577	0.572	0.577		
		0.574	0.572	0.579	0.587	0.584	0.549		
		0.570	0.557	0.574	0.553	0.558	0.553		
44	2.30-2.72 2X	2.430	2.509	2.487	2.412	2.515	2.520	TM	
		2.460	2.460	2.460	2.460	2.460	2.460		
45	2.15-2.42 2X	2.125	2.177	2.204	2.195	2.164	2.127	TM	
		2.214	2.215	2.126	2.162	2.127	2.161		
46	2.5 ± 2° 2X	2.500	2.491	2.510	2.500	2.500	2.500	TM	
		2.500	2.500	2.500	2.500	2.500	2.500		
47	TRAIL-ROCK BROWN	0.000	0.000	0.000	0.000	0.000	0.000	TM	
48	4.5 ± 2° 4X	4.500	4.500	4.500	4.500	4.500	4.500	TM	
		4.500	4.500	4.500	4.500	4.500	4.500		
49	0.86-1.17 4X	1.170	1.170	1.170	1.170	1.170	1.170	TM	Revised
		0.860	0.860	0.860	0.860	0.860	0.860		
		0.860	0.860	0.860	0.860	0.860	0.860		
50	0.35-0.66 4X	0.660	0.660	0.660	0.660	0.660	0.660	TM	
		0.350	0.350	0.350	0.350	0.350	0.350		
		0.350	0.350	0.350	0.350	0.350	0.350		
51	2.59-2.80 2X	2.705	2.710	2.703	2.713	2.710	2.704		
		2.399	2.499	2.572	2.492	2.407	2.475		
		0.072	0.024	0.113	0.017	0.008	0.050		
		2.695	2.703	2.715	2.703	2.695	2.710		
		2.499	2.522	2.320	2.377	2.427	2.443		
		0.034	0.057	0.085	0.028	0.020	0.022		
52	1.3-1.9 2X	1.900	1.900	1.900	1.900	1.900	1.900		
		1.300	1.300	1.300	1.300	1.300	1.300		
53	0.66-0.87	0.785	0.815						
54	0.10-0.31	0.262	0.274						
		0.100	0.100						

DISPOSITION: TOOL APPROVED FOR PROD.	RESUBMISSION REQ'D
MFG. ENG.:	QRA ENG.:
	PURCH. AGENT:



SAMPLE REPORT

REASON FOR REPORT		VENDOR		P.O. #	PART NO.	REV.
NEW PART					77PSL2-1	
REPLACEMENT TOOL		REPORT REQ. BY	DATE	INSPECTED BY		DATE
CORRECTED TOOL						10/3/77
REPAIRED TOOL		THIS REPORT IS A SUMMARY OF THE TEST RESULTS OF THE SAMPLES SUBMITTED FOR ANALYSIS. IT IS NOT A SUBSTITUTE FOR THE TEST RESULTS REPORT. THE TEST RESULTS REPORT IS THE ONLY AUTHORITY FOR THE DETERMINATION OF THE QUALITY OF THE SAMPLES. THE TEST RESULTS REPORT IS THE ONLY AUTHORITY FOR THE DETERMINATION OF THE QUALITY OF THE SAMPLES.				

10	20	30	40	50	60	70	80	90	100
0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524
0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524
0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524
0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524
0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524
0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524
0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524
0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524
0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524	0.524

**DRAWINGS AVAILABLE UPON
REQUEST**

PROCESS POTENTIAL AND QUALITY INDEXES SUMMARY DATA SHEET

PART #: E3TA-9F924-AA

SUPPLIER: TEXAS Instruments

CODE: T 091K

ADDRESS: 34 Front St.
Arlington, Mass. 02113

VEHICLE BUILD (CIRCLE ONE): EP VP FD

SUPPLIER CONTACT: Jim Watt

CONTACT PHONE: 508-699-1719

PART DESCRIPTION: Next Generation
Speed Controls Deactivate Pressure Switch

SOA CODE:

OTHER (DEFINE)

CHARACTERISTIC TYPE

∇ = FORD CRITICAL
CHARACTERISTICS

S.C. = FORD OR SUPPLIER SIGNIFICANT
CHARACTERISTICS

NUMBER OF CRITICAL AND/OR SIGNIFICANT CHARACTERISTICS:

1: <u>Actuation Pressure</u>	TYPE: <u>SC</u>	Cp = <u>1.8</u>	Cpk = <u>1.2</u>
2: <u>Release Pressure</u>	TYPE: <u>SC</u>	Cp = <u>* 5.2</u>	Cpk = <u>1.8</u>
3: <u>3/8-24 UNE-2A Thread</u>	TYPE: <u>SC</u>	Cp =	Cpk = <u>needs Go</u>
4:	TYPE:	Cp =	Cpk = <u>needs Go</u>
5:	TYPE:	Cp =	Cpk =
6:	TYPE:	Cp =	Cpk =
7:	TYPE:	Cp =	Cpk =
8:	TYPE:	Cp =	Cpk =
9:	TYPE:	Cp =	Cpk =
10:	TYPE:	Cp =	Cpk =
11:	TYPE:	Cp =	Cpk =
12:	TYPE:	Cp =	Cpk =
13:	TYPE:	Cp =	Cpk =
14:	TYPE:	Cp =	Cpk =
15:	TYPE:	Cp =	Cpk =

$$PIST = \frac{534}{536} \times 100 = \underline{99.8} \%$$

$$PIPC_{Cp} = \frac{1/1}{1} \times 100 = \underline{100} \%$$

$$PIPC_{Cpk} = \frac{2/2}{2} \times 100 = \underline{100} \%$$

COMMENTS:

* Cp Index not calculatable on unilateral tolerance

PREPARED BY:

Elaine Poon

DATE: 9-20-91

AVERAGE AND RANGE (R-R) CHART

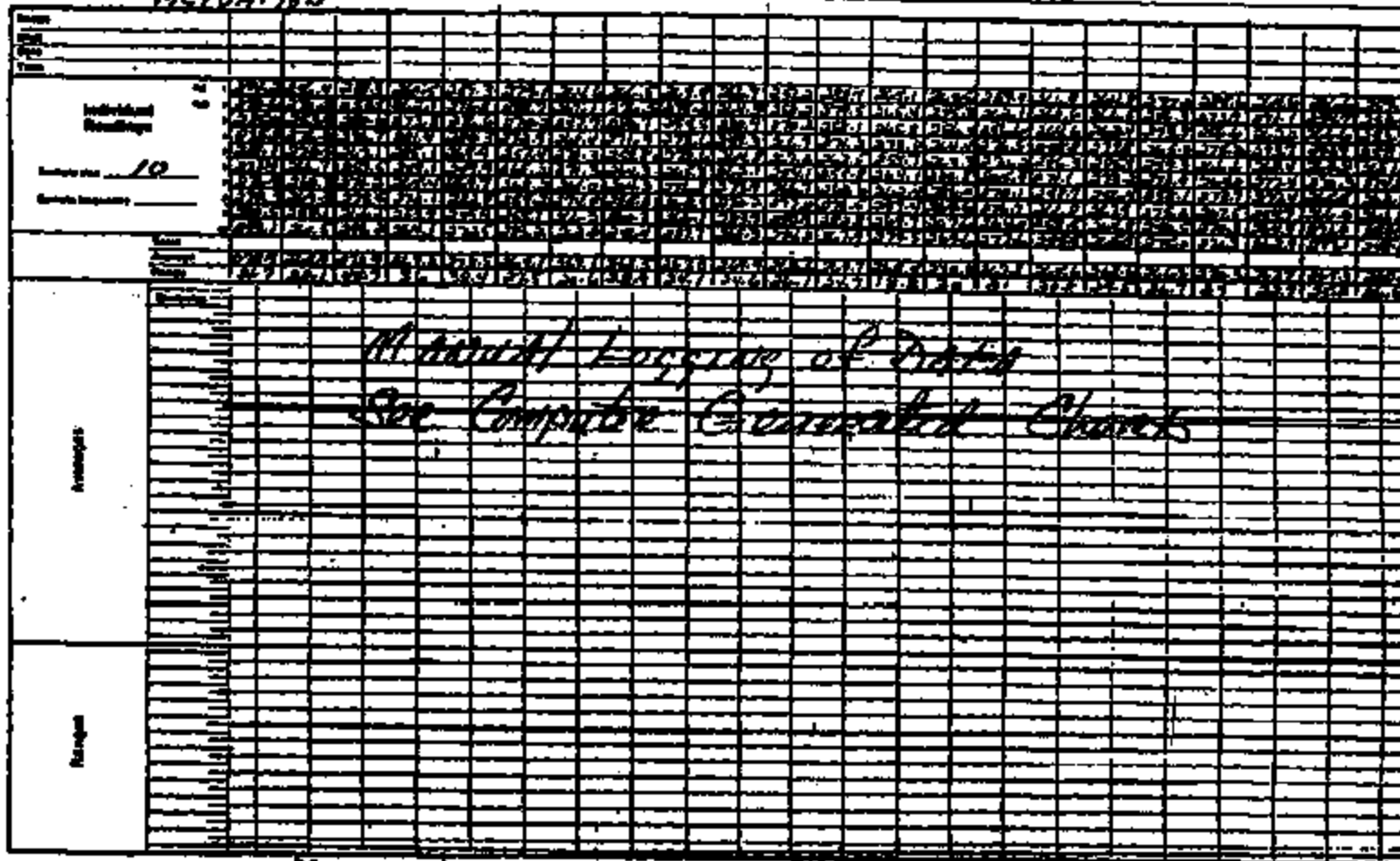
Pressure Switch 77PSL2-3
 300 200
 Actuation

USE CHART 1 - 100% AND 100% CHART

PG. 1 of 2

NET GENERATION SPEED CONTROL

LIGHT TRUCK



AVERAGE AND RANGE (X-R) CHART

USE GRAPH FOR THE FOLLOWING AND CORRELATING AVERAGE

PG. 2 of 2

Part Name PRESSURE SWITCH Part No. 77PS42-3
 Quantity 400 Unit 300 Sample Size 30
Actuation

LIGHT TRUCK

Individual Readings		Averages		Ranges	
1	22.5	22.5	22.5	22.5	22.5
2	22.5	22.5	22.5	22.5	22.5
3	22.5	22.5	22.5	22.5	22.5
4	22.5	22.5	22.5	22.5	22.5
5	22.5	22.5	22.5	22.5	22.5
6	22.5	22.5	22.5	22.5	22.5
7	22.5	22.5	22.5	22.5	22.5
8	22.5	22.5	22.5	22.5	22.5
9	22.5	22.5	22.5	22.5	22.5
10	22.5	22.5	22.5	22.5	22.5
11	22.5	22.5	22.5	22.5	22.5
12	22.5	22.5	22.5	22.5	22.5
13	22.5	22.5	22.5	22.5	22.5
14	22.5	22.5	22.5	22.5	22.5
15	22.5	22.5	22.5	22.5	22.5
16	22.5	22.5	22.5	22.5	22.5
17	22.5	22.5	22.5	22.5	22.5
18	22.5	22.5	22.5	22.5	22.5
19	22.5	22.5	22.5	22.5	22.5
20	22.5	22.5	22.5	22.5	22.5
21	22.5	22.5	22.5	22.5	22.5
22	22.5	22.5	22.5	22.5	22.5
23	22.5	22.5	22.5	22.5	22.5
24	22.5	22.5	22.5	22.5	22.5
25	22.5	22.5	22.5	22.5	22.5
26	22.5	22.5	22.5	22.5	22.5
27	22.5	22.5	22.5	22.5	22.5
28	22.5	22.5	22.5	22.5	22.5
29	22.5	22.5	22.5	22.5	22.5
30	22.5	22.5	22.5	22.5	22.5

AVERAGE AND RANGE (R-M) CHART

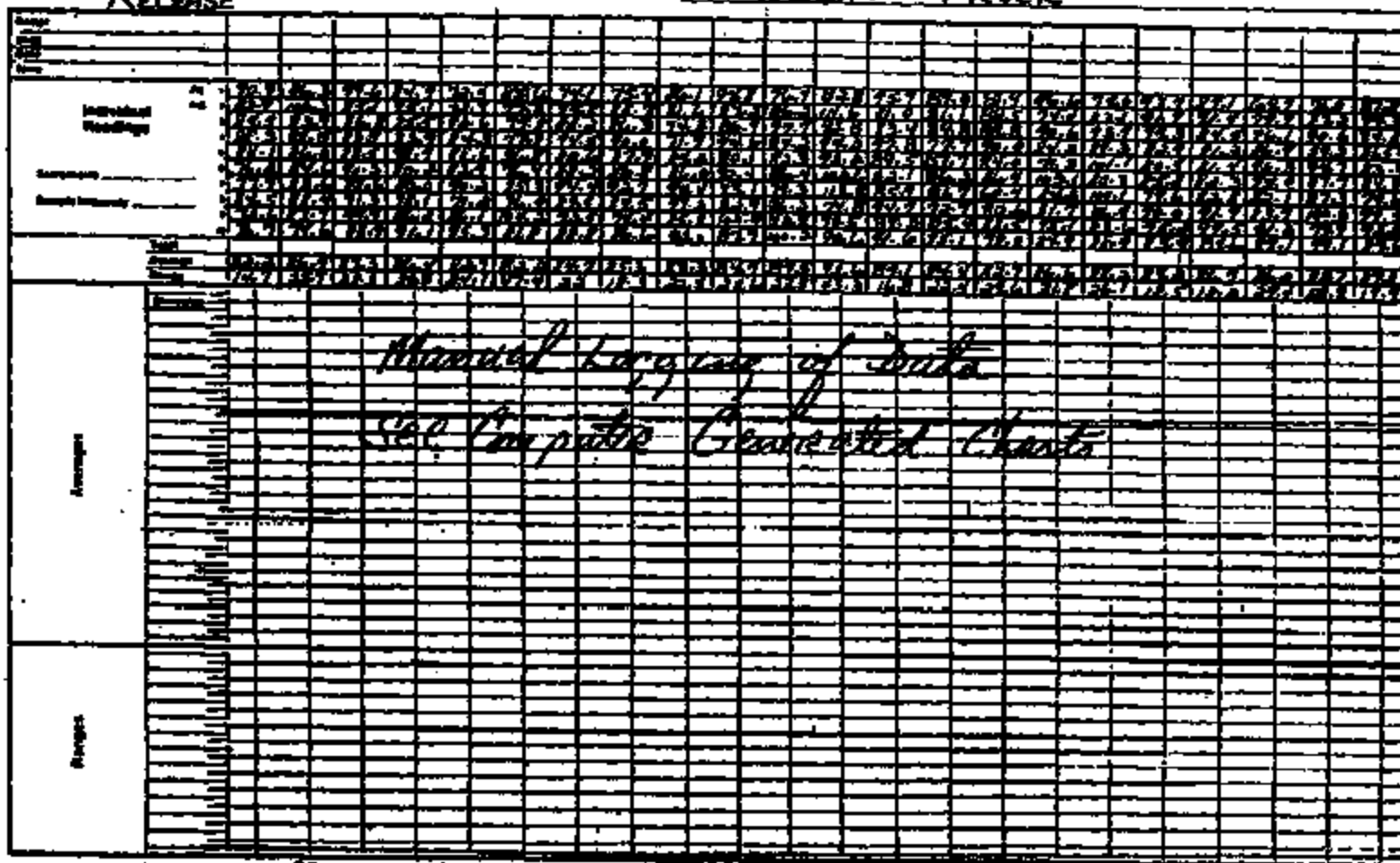
Part Name PRESSURE SWITCH Part No. 77PSL2-3
 Operator No. _____ Machine Code and No. _____
 Rev. - 300 - 40 Inspector _____
RELEASE

USE GRAPHIC, LIST, OR TABLE AND COMPARISON ADVISORY

PG. 1 of 2

NEXT GENERATION SPEED CONTROL

LIGHT TRUCK



TI-NHTSA 003786

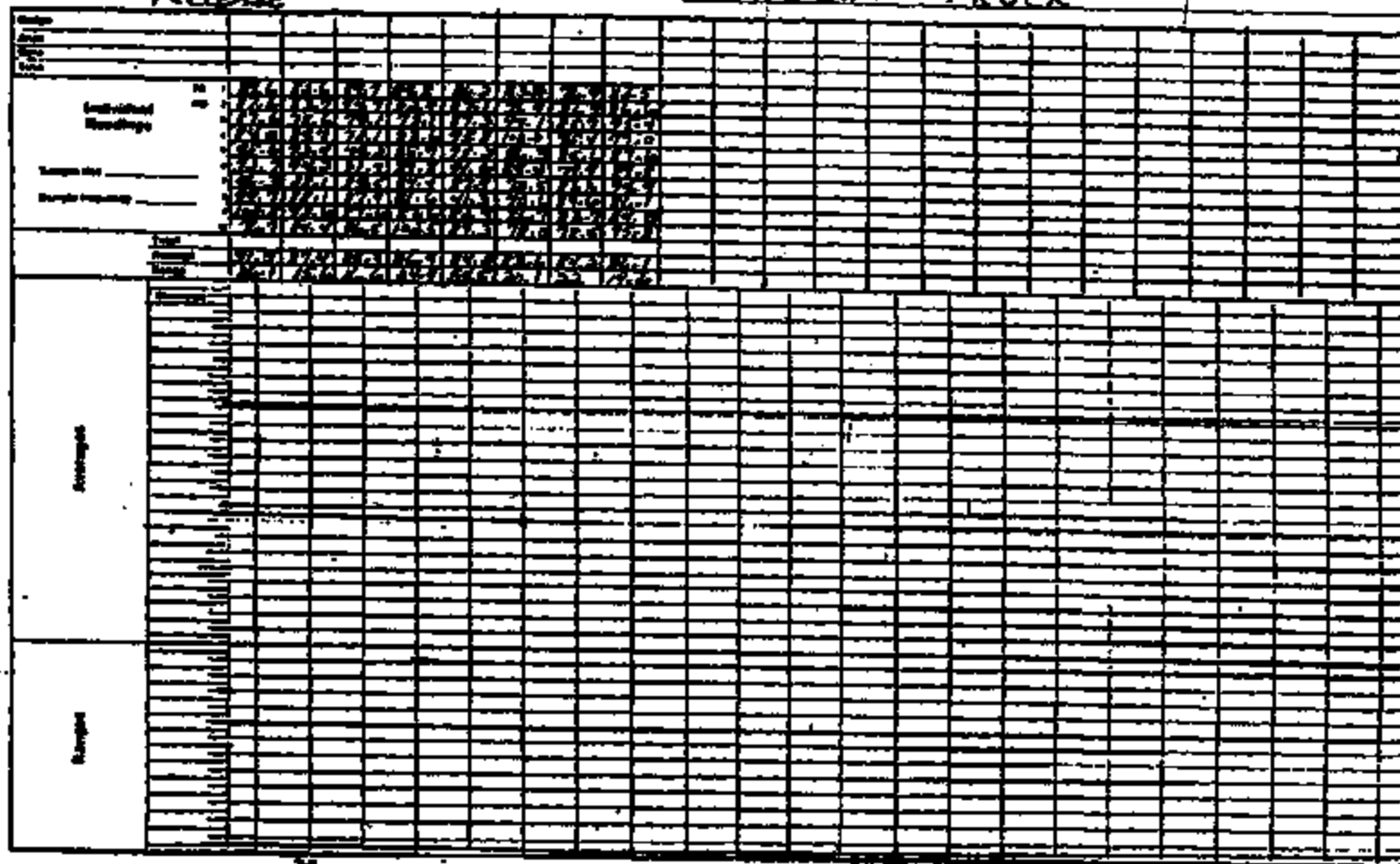
AVERAGE AND RANGE G-18 CHART

USE CURVE, 117-118-119 AND CORRESPONDING ACTIONS

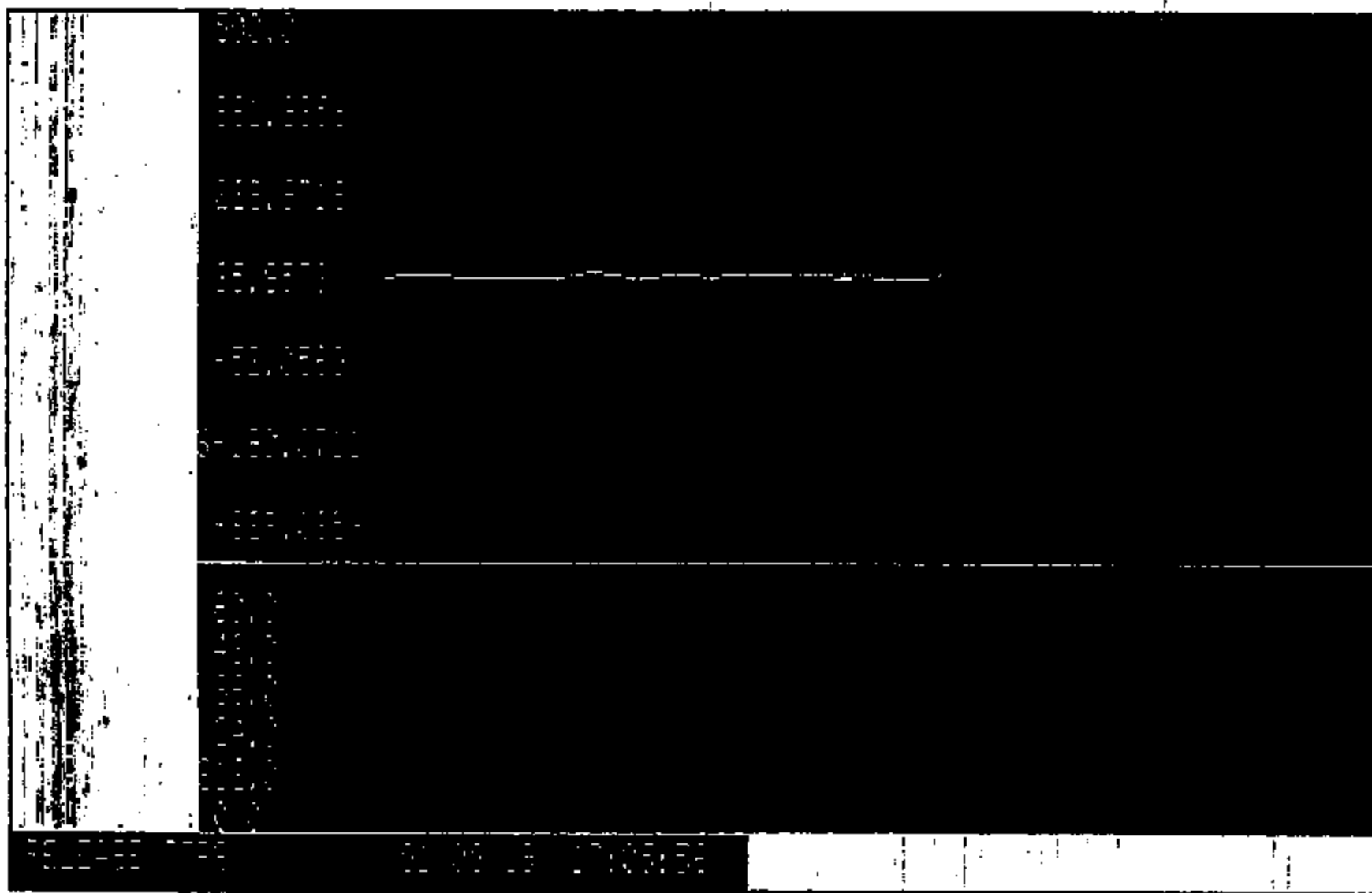
PG. 2 of 2

Part Name Pressure Switch 77PSL2-3
 Sample Size 40 Release
 Size 300 40

LIGHT TRUCK

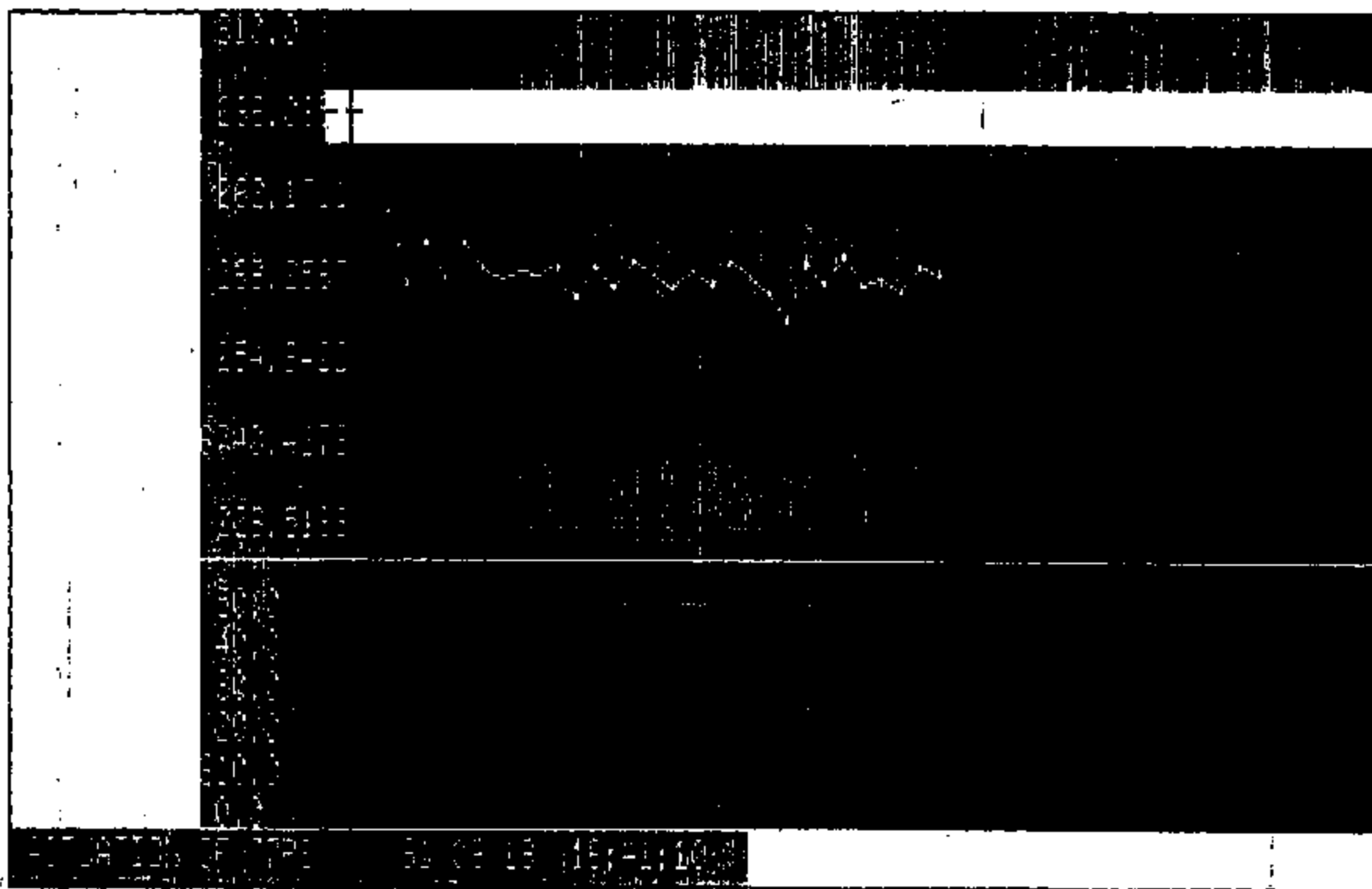


TI-NHTSA 003768



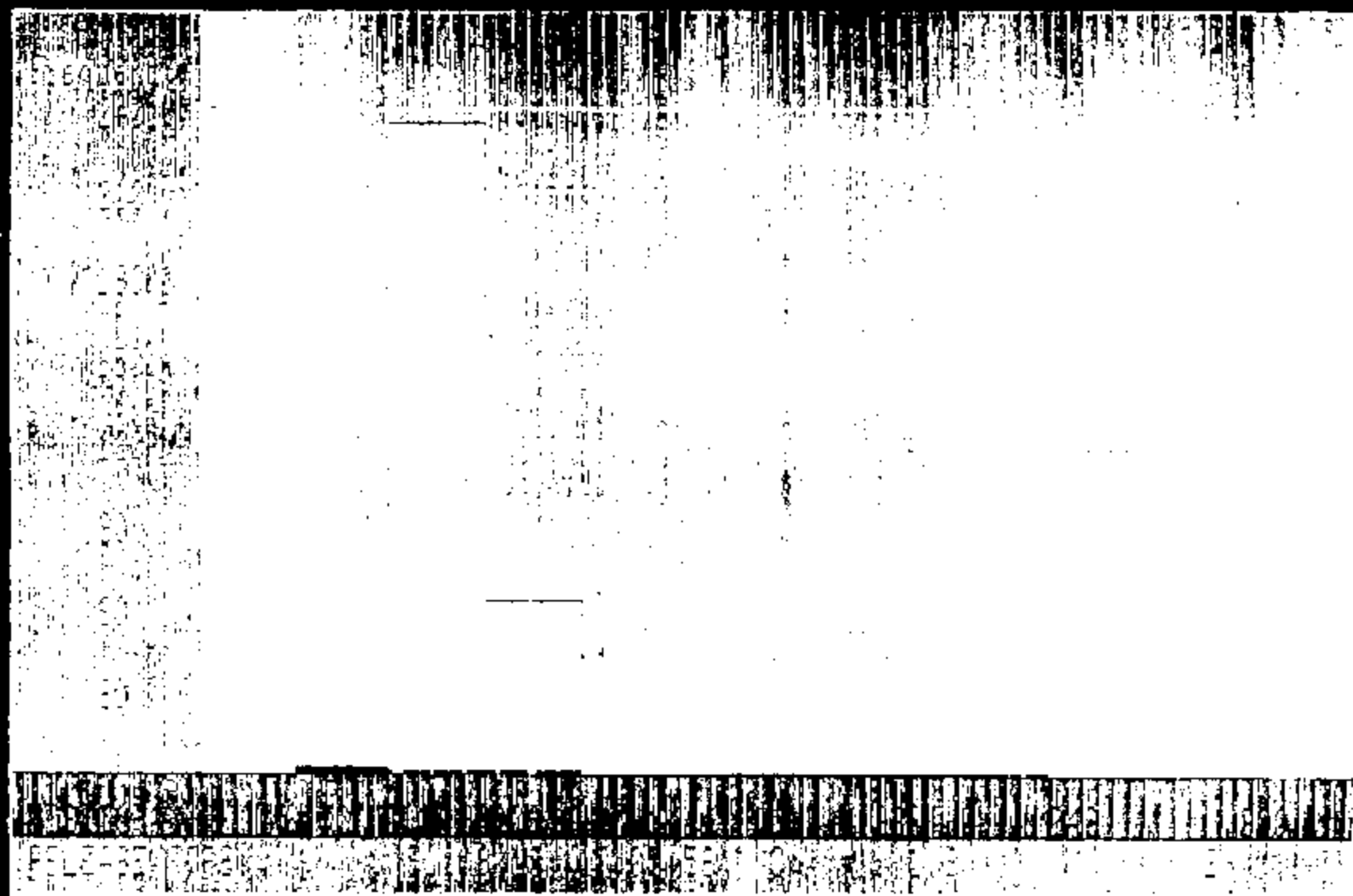
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cale perator lot overlay very n imits

TI-NHTBA 003771



Quit Divisions East of the operator every n

TEXAS INSTRUMENTS



DIMENSIONAL ANALYSIS ON PART NUMBER

F2VC-9F924-AB

NOTE: MARKED PRINT DENOTES CAVITY # 1A

BLUEPRINT SPEC	CAVITY # 3A ACTUAL	CAVITY # 3C ACTUAL	CAVITY # 4C ACTUAL	CAVITY # 5B ACTUAL	CAVITY # 6C ACTUAL	COMMENTS
1 11.92 - 11.60	11.68	11.69	11.69	11.70	11.69	
2 1.45 - 1.24	1.42	1.29	1.33	1.26	1.31	
3 19.91 - 19.45	19.62	19.64	19.64	19.60	19.66	
4 16.75 - 16.56	16.62	16.64	16.64	16.64	16.65	
5 2.05 - 2.84	2.91	2.91	2.91	2.91	2.90	
6 11.90 - 11.40	11.78	11.79	11.78	11.77	11.78	
7 2.10 - 2.79	2.84 2.85	2.83 2.84	2.84 2.85	2.86 2.86	2.89 2.85	
8 8.30 - 8.72	8.43 8.36	8.54 8.57	8.43 8.31	8.31 8.35	8.30 8.34	
9 COLOR : BROWN	OK	OK	OK	OK	OK	
10 2.08 - 1.85	2.699	2.685	2.660	2.705	2.685	TOOL TO BE CORRECTED

THE PASS CAR (F2VC-9F924-AB) AND LIGHT TRUCK (FT3A-9F24-AA) SWITCHES ARE PRODUCED OFF OF THE SAME PRODUCTION TOOLING.

THE (FT3A-9F924-AA) FULL DIMENSIONAL ANALYSIS FOLLOWS. DIMENSIONS # 1-10 LISTED ABOVE PERTAIN TO THE POLARITY KEY FEATURE WHICH IS DIFFERENT ON THE (F2VC-9F924-AB) SWITCH.

TEXAS INSTRUMENTS INCORPORATED - 34 FOREST STREET - ATTLEBORO, MA 02703
608-888-8808 - TELEX 92-7768 TWX 718-845-0888 - CABLE TEXINS

TI-NHTSA 003772

TEXAS INSTRUMENTS



DIMENSIONAL ANALYSIS ON PART NUMBER

F37A-9F924-A6

NOTE: MARKED PRINT DENOTES CAVITY # A1

	BLUEPRINT SPEC	CAVITY # A2 ACTUAL	CAVITY # C3 ACTUAL	CAVITY # C4 ACTUAL	CAVITY # D5 ACTUAL	CAVITY # D6 ACTUAL	COMMENTS
1	13.45-13.85	13.692	13.623	13.602	13.719	13.646	
2	31DEG +/- .200 30DEG 36MIN		31DEG 01MIN	30DEG 49MIN	32DEG 10MIN	32DEG 27MIN	
3	1.85 - 2.04	2.690	2.669	2.667	2.699	2.692	TOOL TO BE CORRECTED
4	19.05 MAX	18.685	18.663	18.691	18.677	18.636	
5	10.05-0.25 2PL	.199 .137	.208 .196	.245 .197	.225 .176	.169 .161	
6	0.50 +/- 0.25	.562 .510	.515 .453	.419 .347	.392 .553	.429 .596	
7	2.75-3.10 2PL	2.900 2.898	2.896 2.896	2.896 2.900	2.902 2.891	2.867 2.899	
8	19.45-19.81	19.60	19.52	19.61	19.57	19.61	
9	16.55-16.76	16.566	16.608	16.585	16.585	16.628	
10	12.80-13.21	13.040	13.036	13.033	12.978	12.956	
11	11.40-11.90	11.770	11.810	11.788	11.790	11.777	
12	2.84 - 3.05	2.925	2.917	2.923	2.920	2.923	
	0.1 A	.094	.013	.019	.004	.002	
13	1.24 - 1.45	1.997	1.294	1.292	1.328	1.326	
14	11.60-11.92	11.742	11.672	11.745	11.688	11.737	

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502-692-8000 • TELEX 92-7708 TWX 710-246-6886 • CABLE TEXINS

TI-NHTSA 003773

TEXAS INSTRUMENTS



DIMENSIONAL ANALYSIS ON PART NUMBER

PSTA-9F924-AA

	BLUEPRINT SPEC	CAVITY # A2 ACTUAL	CAVITY # C3 ACTUAL	CAVITY # C4 ACTUAL	CAVITY # D5 ACTUAL	CAVITY # D6 ACTUAL	COMMENTS
15	1.24 - 1.35	1.346	1.334	1.337	1.334	1.333	
16	6.60 - 6.61	6.670	6.678	6.680	6.665	6.667	
17	NO FLASH/FLARE	OK	OK	OK	OK	OK	
18	7.23 - 7.75	7.549	7.646	7.699	7.454	7.425	
19	2.79 - 3.41	3.10	3.10	3.10	3.07	3.07	
20	0.67 - 1.50	1.096	1.096	1.102	1.112	1.141	
21	DATE & PART#	OK	OK	OK	OK	OK	
22	0.25" IN 40-50 IDED CHAMFER	UNABLE TO	MEASURE	BECAUSE	THREADS ARE	ALREADY IN	
23	3/8-24NF-2A	OK	OK	OK	OK	OK	
24	1.10 - 1.40	1.220	1.213	1.230	1.234	1.320	
25	12.5 C	.20	.20	.20	.20	.20	
26	0.16 D	.020	.036	.008	.023	.025	
27	41DEB - 450EB	MEASURED ON IDROME SECTIONED PIECE					
28	40DEB - 500EB	MEASURED ON IDROME SECTIONED PIECE					
29	7.82 - 8.03	7.90 7.91	7.90 7.89	7.89 7.93	7.89 7.88	7.86 7.90	
30	1.50 - 2.04	1.754	1.857	1.881	1.887	1.887	

TEXAS INSTRUMENTS INCORPORATED • 34 FOREST STREET • AUSTIN, TEXAS 78706
 512-345-6666 • TELETYPE 512-7708 TWX 710-245-6666 • CABLE TEXONE

TI-NHT8A 003774

**TEXAS
INSTRUMENTS**



DIMENSIONAL ANALYSIS ON PART NUMBER

ATB-924-00

	BLUEPRINT SPEC	CAVITY # A2 ACTUAL	CAVITY # C3 ACTUAL	CAVITY # C4 ACTUAL	CAVITY # D5 ACTUAL	CAVITY # D6 ACTUAL	COMMENTS
31	9.35 - 9.66	9.55	9.38	9.50	9.50	9.58	
32	9.12 - 9.14	9.22	9.14	9.19	9.22	9.14	
33	14.22 MAX	13.64	13.62	13.58	13.67	13.68	
34	57.15 MAX	55.60	55.60	55.55	55.58	55.52	
35	12.85-13.11	12.83	12.83	12.88	12.80	12.83	
36	11.65-12.17	11.79	11.84	11.89	11.84	11.89	11.91
37	1.80-2.21R 2PL	1.83	2.02	1.82	1.80	1.80	MEAS. SIDE W/O KEY
38	(2) DEG +/- 2 DEG (401) MEASURED IN SEPARATE BASE - CROSS SECTIONED						
39	32.51 MAX	31.61	31.68	32.59	31.72	31.68	31.73
40	14.02-14.58	14.231	14.221	14.225	14.222	14.221	
41	3.30 - 3.60	3.420	3.413	3.441	3.429	3.435	3.430
42	7.23 - 7.37	7.299	7.281	7.340	7.352	7.294	7.284
43	5.58 - 5.85	5.604	5.585	5.641	5.662	5.594	5.581
44	171.50 DEG +/- 2 DEG (2) 22 MIN	172 DEG 22 MIN	172 DEG 30 MIN	172 DEG 30 MIN	172 DEG 30 MIN	172 DEG 29 MIN	
	(2 PL)	172 DEG 24 MIN	172 DEG 36 MIN	171 DEG 33 MIN	172 DEG 43 MIN	171 DEG 44 MIN	
45	1.42-1.63 2PL	1.595	1.572	1.610	1.561	1.541	1.544
46	0.35 - 0.64	0.571	0.557	0.545	0.575	0.530	0.573
	14 PL	0.582	0.568	0.583	0.553	0.562	0.564

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7-ННТ9А 003775

TEXAS INSTRUMENTS



DIMENSIONAL ANALYSIS ON PART NUMBER

F3TA-9F924-00

	BLUEPRINT SPEC	CAVITY # A2 ACTUAL	CAVITY # C3 ACTUAL	CAVITY # C4 ACTUAL	CAVITY # D5 ACTUAL	CAVITY # D6 ACTUAL	COMMENTS
47	2.59 - 2.60	L 2.681	L 2.705	L 2.687	L 2.697	L 2.709	
	(2 PL)	R 2.702	R 2.696	R 2.705	R 2.721	R 2.684	
	0.2 n A C	L.021 R.015	L.000 R.075	L.076 R.081	L.081 R.030	L.011 R.154	
	2.465	2.444 2.450	2.465 2.390	2.389 2.384	2.384 2.475	2.476 2.311	
48	0.35 - 0.66	.463 .456	.539 .530	.571 .492	.508 .483	.476 .504	
	(4 PL)	.494 .538	.474 .505	.449 .514	.511 .509	.491 .509	
49	0.86 - 1.17	.965 .995	.909 .962	.968 .989	.990 .953	.987 .955	
	(4 PL)	.943 .952	.956 .959	.975 .923	.955 .934	.980 .974	
50	43DEG +/- 2DEG	44DEG 45MIN	43DEG 50MIN	43DEG 39MIN	45DEG 26MIN	43DEG 58MIN	
	(4 PL)	44DEG 47MIN	44DEG 45MIN	44DEG 05MIN	44DEG 39MIN	45DEG 54MIN	
		45DEG 13MIN	44DEG 37MIN	44DEG 11MIN	45DEG 12MIN	45DEG 54MIN	
		45DEG 04MIN	45DEG 20MIN	44DEG 44MIN	44DEG 23MIN	44DEG 24MIN	
51	8.30-8.72 2PL	8.342 8.430	8.302 8.423	8.364 8.499	8.365 8.429	8.509 8.392	
52	12.15-2.42 2PL	2.180 2.220	2.198 2.153	2.169 2.219	2.161 2.170	2.149 2.194	
53	23DEG +/- 2DEG	24DEG 22MIN	24DEG 16MIN	24DEG 47MIN	24DEG 17MIN	23DEG 37MIN	
	(2 PL)	23DEG 30MIN	23DEG 41MIN	23DEG 50MIN	23DEG 04MIN	23DEG 39MIN	
54	COLOR: BLACK	OK	OK	OK	OK	OK	
55	13-19DEG 2PL	ON CROSS	SECTIONED	PART ON	PRINT		
56	8.66 - 0.97	ON CROSS	SECTIONED	PART ON	PRINT		
57	0.10 - 0.31	.252 .278	.287 .251	.276 .260	.287 .260	.288 .257	
58	0.58 - 0.68	.625 .646	.646 .621	.648 .622	.656 .622	.644 .626	

TEXAS INSTRUMENTS INCORPORATED 5414 FORT WORTH STREET DALLAS, TEXAS 75236

800-555-5555 • TELEK 282-7788 TWX 710-346-4888 • CABLE TIDC88

TI-NHT8A 003776

77LIST

A1 .. 658

TEXAS INSTRUMENTS INC. MATERIALS & CONTROLS GROUP SITE

PARTS LIST : PROJECT : PART NUMBER: 77PSL2-1 : REV LTR: A CLS: 650
 EXPLOSION : NUM: 3423 : DWG PFX: NUM: 77PSL2-1 : ECN INC. DT: 91/11/05

TITLE: PRESSURE SWITCH

LV	CNT	QTY/UM	BITH	PART/DRAWING NUMBER	RV	NOMENCLATURE/PARM DATA
01	1	REF		36952-1		FINAL ASSEMBLY
				36952-1		
01	2	1	27	27759-2		BASE ASSEMBLY
				27759SH1		
02	3	1	2	46515-2		✓ BASE (BROWN)
				46515		
02	4	1	3	36888-1		✓ STATIONARY TERMINAL
				36888		
02	5	1	4	36897-1		MOVABLE TERMINAL ASM
				36897SH1		
03	6	1	2	74408-1		✓ MOVABLE CONTACT
				74408		
03	7	1	3	74171-1		✓ RIVET
				74171		
03	8	1	4	36887-1		✓ MOVABLE TERMINAL
				36887		
03	9	1	5	36889-1		✓ SPRING ARM
				36889		
01	10	1	24	27293-13		SENSOR ASSEMBLY
				27293SH2		
02	11	1	2	36900-1		✓ MOD 8AE J512 HEXPORT
				36900		
02	12	1	3	74353-1		✓ GASKET
				74353		
02	13	1	4	27713-1		✓ CUP
				27713		
02	14	3	5	74176-1		✓ SEAL
				74176		
02	15	OR	5	27225-1		✓ KAPTON STRIP SPEC (.175 LBS/K)
				27225		
02	16	1	6	27639-1		✓ WASHER
				27639		
02	17	1	7	27406-1		✓ CONVERTER
				27406		
02	18	1	8	74224-1		✓ KAPTON TAPE (.100 LBS/K)
				74224		
02	19	OR	8	73958-2		✓ SPACER
				73958		
02	20	OR	8	73958-3		✓ SPACER
				73958		
02	21	1	9	36656-27		3/4" FORMED DISC
				36656SH1		
01	22	1	14	74797-1		✓ CRIMP RING
				74797		
01	23	1	18	74078-146		✓ TRANSFER PIN
				74078		
01	24	1	21	74247-2		✓ ENVIRONMENTAL SEAL

TI-NHTSA 003777

01	26	AR		74179	74179	THREND LHP
				27318-1		CARTON ASM.
				27318		
02	27	1	2	74219-1		CARTON
				74219		
02	28	5	3	74218-1		ROW SEPARATOR
				74218		
02	29	4	4	27317-1		DEVICE SEPARATOR
				27317		

! NOTES, REV. DATA, DISTRIBUTION, OPERATING CHARACTERISTICS, SPECIAL REQUIREMENTS !

REV DESC: SET UP

! CCB APPROVAL DATE: 91/08/14

DFTG WORK GROUP: PRECISION CONTROLS

! ECN ORIGINATOR: STEPHEN B OFFILER

NOTES:

1 - ACTUATION PRESSURE ----- 90-160 PSIG

2 - RELEASE PRESSURE ----- 20 PSIG MIN.

99 - CR M06083, ADDED P/L TO EIS, NEW DRAWING IN SYSTEM

F2VC-9F924-AB

MATERIAL ANALYSIS

PARTS LIST

	PART NAME	PART #	CERTIFIED
1	BASE	46515-2	YES
2	STA. TERM.	36888-1	YES
3	MOVE. CONTACT	74408-1	YES
4	RIVET	74171-1	YES
5	MOVE. TERM.	36887-1	YES
6	SPRING ARM	36889-1	YES
7	J512 HEXPORT	36900-1	YES
8	GASKET	74353-1	YES
9	CUP	27713-1	YES
10	SEAL	74176-1	YES
11	KAPTON STRIP	27225-1	YES
12	WASHER	27639-1	YES
13	CONVERTER	27406-1	YES
14	KAPTON TAPE	74224-1	YES
15	SPACER	73958-2/-3	YES
16	CRIMP RING	74797-1	YES
17	TRANSFER PIN	74078-BEL	YES
18	ENVIO. SEAL	74247-2	YES
19	THREAD CAP	74179-2	YES

TI-NHT8A 003770

November 15, 1991

Kelsey-Hayes Company
9475 Center Road
Fenton, Michigan 48430

Attn: Ms. Rita Dunia
Purchasing Department

Subj: Part Number 12604301 Switch (E78C-3N824-AA) ← 57PCF3-3
Part Number 12590701 Switch (F2VC-9F924-AB) ← 77PSL2-1
ISIR Submissions

Dear Rita,

Enclosed, please find the ISIR for the 12604301 and 12590701 switches. Both ISIR submissions were accomplished on Ford forms as we are in the process of transferring data to Kelsey-Hayes forms.

The 12590701 submission has several dimensional issues on the layout that are being addressed.

The 12604301 submission needs dimensional layout, control plan, manufacturing flow diagram, PIST, PIPC, and PV testing that are being addressed.

Please let me know if you have any questions or if I may be of any further assistance.

Regards,

Jim Watt
GRA Engineer
Precision Controls Department
Control Products Division

cc: Dave Czarn, MS 12-29
Charlie Douglas, MS 12-33
Andy McGuirk, MS 12-27
Steve Majors, TI Farmington Hills, Michigan

encl: ISIR submissions

(Rev 0, 11/15/91)

cc = Elaine R.
RJE/
Please have
(2) binders
made for K-4

to send
today -
Thx,
Jim
11/15/91

TI-NHTSA 003780

**KELSEY-HAYES™ GROUP
INITIAL SAMPLE READINESS CHECKLIST**

Supplier Texas Instruments Supplier Contact Jim Watt
 Supplier Address 34 Forest Street
 City, State, Zip Attleboro, MA. 02703 Phone _____ Fax _____
 Part or Product P24C-9F924-013 Date Nov. 15, 1991
 Kelsey-Hayes Group ABS Kelsey-Hayes Contact Rita Gunnig

The following items have been prepared and/or approved. Items marked with an asterisk (*) are to be completed prior to ISIR date.

K-H Required	Item	Available by Supplier (Note: initial and date each item)	K-H Disposition
_____	*Manufacturing feasibility signoff	<u>JW 11/15/91</u>	_____
_____	*Design FMEA	<u>JW 11/15/91</u>	_____
☒	*Process flow diagram	<u>EP 11-15-91</u>	<u>EP</u>
_____	*Process FMEA	<u>JW 11/15/91</u>	_____
_____	*Designated characteristics list	<u>JW 11/15/91</u>	_____
☒	*Pre-launch control plan	<u>EP 11-15-91</u>	_____
☒	Gage R&R studies	<u>EP 11-15-91</u>	_____
_____	Short term process capability studies	_____	_____
☒	*Process control plan	<u>EP 11-15-91</u>	_____
_____	Inspection instructions	_____	_____
_____	Set-up instructions	_____	_____
_____	Operations instructions	_____	_____
_____	ES testing requirements	_____	_____
_____	Packaging and identification approval	_____	_____
_____	Functional testing	_____	_____

DIMENSIONAL ANALYSIS ON PART NUMBER

F2VC-9F924-AB

old
DIMENSIONAL PEST
558 CHECKS

NOTE: MARKED PRINT DENOTES CAVITY # 18

	BLUEPRINT SPEC	CAVITY # 2C ACTUAL	CAVITY # 3C ACTUAL	CAVITY # 4C ACTUAL	CAVITY # 5C ACTUAL	CAVITY # 6C ACTUAL	COMMENTS
1	19.45 - 19.81	19.61	19.56	19.56	19.57	19.57	
2	16.56 - 16.76	16.62/16.64	16.62/16.63	16.58/16.59	16.54/16.56	16.59/16.59	
3	12.80 - 13.21	13.051	13.035	13.043	13.078	12.946	
4	11.40 - 11.90	11.808	11.775	11.773	11.758	11.733	
5	2.94 - 3.05	2.92	2.92	2.92	2.93	2.93	
	⊕ 0.15 ⊕	⊕ 1.920/0.020	⊕ 1.933/0.033	⊕ 1.869/0.031	⊕ 1.885/0.015	⊕ 1.887/0.013	
6	11.60 - 11.92	11.67/11.71	11.72/11.68	11.60/11.63	11.63/11.67	11.65/11.65	
7	1.24 - 1.45	1.250	1.280	1.250	1.290	1.265	
8	1.24 - 1.55	1.397	1.400	1.389	1.397	1.397	
9	1.85 - 2.06	1.974	1.996	1.994	1.994	1.986	
10	13.43 - 13.85	13.693	13.800	13.686	13.686	13.556	
11	31DEG +/- 2DEG	29DEG 53MIN	31DEG	29DEG 04MIN	29DEG 03MIN	30DEG 08MIN	
12	2.79 - 3.10 2X	2.90/2.90	2.90/2.90	2.90/2.90	2.89/2.89	2.90/2.94	
13	0.25 - 0.75	0.480/0.800	0.442/0.673	0.498/0.671	0.490/0.744	0.460/0.757	OUT OF SPEC.
14	0.05 - 0.26 2X	0.074/0.127	0.140/0.076	0.127/0.135	0.133/0.163	0.0711/0.036	
		0.092/0.069	0.086/0.114	0.048/0.081	0.038/0.813	0.137/0.165	
15	19.05 MAX	18.57 18.66	18.54 18.66	18.60 18.77	18.63 18.71	18.61 18.67	

TI-NHTSA 003762

DIMENSIONAL ANALYSIS ON PART NUMBER

F2VC-9F924-AB

	BLUEPRINT SPEC	CAVITY # 2C ACTUAL	CAVITY # 3C ACTUAL	CAVITY # 4D ACTUAL	CAVITY # 5D ACTUAL	CAVITY # 6D ACTUAL	COMMENTS
16	57.15 MAX	55.70	55.71	55.70	55.69	55.69	
17	12.59 - 13.11	12.72/12.84	12.77/12.76	12.76/12.77	12.75/12.81	12.73/12.80	
18	11.65 - 12.17	11.65/11.64	11.73/11.79	11.88/11.84	11.78/11.86	11.73/11.88	
19	14.23 MAX	13.65	13.67	13.65	13.65	13.66	
20	9.39 - 9.64	9.61/9.66	9.57/9.64	9.49/9.62	9.38/9.74	9.55/9.67	OUT OF SPEC.
21	8.12 MIN	9.13/9.54	9.12/9.18	8.98/9.36	9.14/9.22	9.11/9.14	
22	1.52 - 2.04	1.732	1.783	1.727	1.781	1.796	
23	7.82-8.03	7.94	7.97/7.99	7.97	7.98	7.96	
24	6.60 - 6.81	6.698	6.693	6.647	6.663	6.642	
24A	29DEG+/-2DB 4X1 ON CROSS	SECTIONED	PART ON	PRINT			
25	1.80-2.21R 2X1	1.84-1.84	1.84-1.84	1.84-1.84	1.84-1.84	1.84-1.84	
26	7.23-7.75	7.52	7.53	7.54	7.55	7.53	
26A	NO FLASH OR BURRS ALLOWED ON SURFACE	OK	FLASH	OK	OK	FLASH	
27	2.79-3.41	3.099	3.160	3.150	3.119	3.107	
28	0.68-1.30	1.168	1.179	1.148	1.161	1.153	

TI-NHTSA 003783

DIMENSIONAL ANALYSIS ON PART NUMBER

F2VC-9F424-A8

	BLUEPRINT SPEC	CAVITY # 20 ACTUAL	CAVITY # 20 ACTUAL	CAVITY # 40 ACTUAL	CAVITY # 50 ACTUAL	CAVITY # 60 ACTUAL	COMMENTS
28A	STAMP DATE	INVERTED	DELTA	OMITTED.	HAS SINCE	BEEN	
	CODE & PART#	INCLUDED	IN CODING	OPERATION.			
29	10.25MIN ± .40	N/A THREADS	HAVE BEEN	ADDED			
	130DEG CHAMFER						
30	13/8-24UNF-2A	OK	OK	OK	OK	OK	
31	1.10-1.40	ON CROSS	SECTIONED	PART ON	PRINT		
32	0.16 ±	0.046	0.046	0.008	0.030	0.056	
33	2.5	ON CROSS	SECTIONED	PART ON	PRINT		
34	41DEG - 42DEG	ON CROSS	SECTIONED	PART ON	PRINT		
35	140-30DEG CHAMF	N/A THREADS	HAVE BEEN	ADDED			
36	32.51 MAX	31.46-31.48	31.45-31.46	31.50-31.47	31.46-31.48	31.58-31.58	
37	14.02-14.53EX	14.11	14.11/14.13	14.11/14.13	14.12/14.13	14.11/14.12	
38	3.30-3.60	3.48 - 3.43	3.43 - 3.42	3.45 - 3.46	3.44 - 3.47	3.45 - 3.45	
39	7.23-7.37	7.34-7.32	7.33-7.33	7.31-7.37	7.32-7.30	7.37-7.39	OUT OF SPEC.
40	5.58-5.85	5.72-5.68	5.64-5.66	5.67-5.70	5.60-5.66	5.61-5.63	
41	71.5DEG +/-	72DEG 11MIN	72DEG 12MIN	72DEG 26MIN	71DEG 56MIN	72DEG 10MIN	
	2DEG 21	72DEG 14MIN	72DEG 50MIN	72DEG 37MIN	72DEG 11MIN	72DEG 36MIN	

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DIMENSIONAL ANALYSIS ON PART NUMBER

F2VC-9P924-AB

BLUEPRINT SPEC	CAVITY # 20 ACTUAL	CAVITY # 30 ACTUAL	CAVITY # 40 ACTUAL	CAVITY # 50 ACTUAL	CAVITY # 60 ACTUAL	COMMENTS
42 1.42-1.63 2X	1.63-1.63	1.58-1.63	1.64-1.60	1.60-1.59	1.60-1.57	out of Spec.
42 0.35-0.66 4X	0.57-0.59	0.57-0.60	0.58-0.58	0.58-0.57	0.57-0.59	
	0.53-0.55	0.58-0.57	0.59-0.56	0.56-0.55	0.55-0.56	
44 8.30-8.72 2X	8.51-8.44	8.41-8.44	8.42-8.42	8.39-8.43	8.42-8.36	
45 2.15-2.42 2X	2.18-2.22	2.30-2.15	2.20-2.16	2.16-2.19	2.20-2.16	OUT/SPEC ON MARKED PRINT 2.13
46 25DEG +/- 2 2X	24DEG 41MIN	23DEG 14MIN	23DEG 35MIN	23DEG 09MIN	23DEG 34MIN	
	23DEG 45MIN	24DEG 31MIN	23DEG 53MIN	23DEG 59MIN	24DEG 24MIN	
47 HOUSING: BROWN	BROWN	BROWN	BROWN	BROWN	BROWN	
48 45DEG +/- 2 4X	46DEG 47MIN	46DEG 09MIN	45DEG 06MIN	45DEG 37MIN	43DEG	
	43DEG 15MIN	43DEG 20MIN	45DEG 04MIN	44DEG 11MIN	46DEG 03MIN	
	45DEG 46MIN	46DEG 46MIN	45DEG 16MIN	44DEG 07MIN	44DEG 01MIN	
	45DEG 23MIN	45DEG 39MIN	44DEG 46MIN	45DEG 34MIN	44DEG 34MIN	
49 0.86-1.17 4X	0.99-1.03	0.97-1.02	0.98-1.02	0.99-1.03	0.99-1.03	
	0.96-0.97	0.96-1.00	0.93-1.00	0.97-0.97	0.95-0.96	
50 0.35-0.66 4X	0.43-0.44	0.46-0.48	0.46-0.50	0.45-0.54	0.51-0.49	
	0.49-0.52	0.54-0.53	0.52-0.52	0.50-0.54	0.51-0.44	

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FAC-924-AB

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TEXAS INSTRUMENTS

INCORPORATED

MATERIALS AND CONTROLS GROUP

- ☐ ATTLEBORO, MA 01903 ☐ VERMILION, NY 14159
☐ JOHNSON CITY, TN 37601 ☐ CENTRAL LAKE, MI 48826

SHIPPING SLIP

DATE: / / S.O. # **214070**

REF. # DATE SHIPPED / /

SHIPPED VIA:

USE (CHECK ONE)

- ☐ SCRAP SALES
☐ SALE OF ASSETS
☐ OUTSIDE PROCESSING
☐ TRANSFERS BETWEEN TI LOCATIONS
☐ EXPENSE MATERIAL
☒ OTHER, EXPLAIN: Sample

DIV/ACCT. # 050 CC: 149

SHIP TO:

KELSEY-HAYES COMPANY
 9475 Center Road
 Fenton, Michigan 48430

Attn: Ms. Rita Gunia
 Purchasing Dept.

Texas Instruments Inc

CHARGE TO:

QUANTITY	DESCRIPTION/PART #/PC	UNIT PRICE	TOTAL
	One complete package One partial package 6 Samples	N/C	
GROSS WEIGHT	NO. OF CONTAINERS	ORIGINATOR'S NAME (TYPED)	ORIGINATOR'S SIGNATURE
		Elaine Rose MS 12-29	<i>Elaine Rose</i>

9-015148 584

ACQUISITION DECEMBER 1984

TI-NHTSA 003787

**DRAWINGS AVAILABLE UPON
REQUEST**