

F2VC-9F924-AB

MATERIAL ANALYSIS

PARTS LIST

	PART NAME	PART #	CERTIFIED
1	BASE	44515-2	YES
2	STA. TERM.	36886-1	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-SEL	YES
18	ENVID. SEAL	74247-2	YES
19	THREAD CAP	74179-2 74888-1	YES

submitted - 4 CERT.
JAN. '92

TI-NHTSA 004313

FINAL INSPECTION RESULTS

DATE: 1-2-92

CUSTOMER: P. J. FORD-434-43

TEST LOT: 12-16
 TEST #1
 TEST #2
 TESTER: LIT 112 2-17

TEST LOT: 12-16
 TEST #1
 TEST #2
 TESTER: LIT 112 2-17

TEST LOT: 12-16
 TEST #1
 TEST #2
 TESTER: LIT 112 2-17

TEST LOT: 12-16
 TEST #1
 TEST #2
 TESTER: LIT 112 2-17

TEST	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
ACTUATION	115	117	111	128	101	117	128	101	101	101	101	101	101	101	101	101	101	101	101	101
RELEASE	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
DIFF.	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
2 VOLT DROP	---	---	---	---	---	✓	✓	---	---	---	---	---	---	---	---	---	✓	✓	---	---
3 CUR. LEAK	---	---	---	---	---	✓	✓	---	---	---	---	---	---	---	---	---	✓	✓	---	---
4 PROOF	---	---	---	---	---	✓	✓	---	---	---	---	---	---	---	---	---	✓	✓	---	---
5 IMPULSE	OK	OK	OK	OK	OK	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ACTUATION	110	115	115	120	110	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
RELEASE	45	40	45	40	40	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
VOLT DROP	✓	✓	✓	✓	✓	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CUR. LEAK	✓	✓	✓	✓	✓	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PROOF	✓	✓	✓	✓	✓	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CREEP	✓	✓	✓	✓	✓	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7 BURST	✓	✓	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8 DINSTONAL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
VISUAL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	---	---	---	---	---	---	---	---	---	---
9 CREEP	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10 TERM. STR	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ACTUATION	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
RELEASE	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
VOLT DROP	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CUR. LEAK	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PROOF	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
CREEP	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TI-NHTSA 004314

IN JED PRODUCTION ROUTE

DEVICE NUMBER

77PSL3

SPECIAL REQUIREMENT

TOTAL QUANTITY

MANU. ORDER NUMBER

NO SUBTOTALS

1.

2.

3.

4.

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

ACCEPT
JAN 2 1992

Form 1000

DATE

11/31/91

DEPARTMENT

294

FINISHED PRODUCTION ROUTE

DEVICE NUMBER

77PSL2-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

1.

2.

3.

4.

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

ACCEPT
JAN 2 1992

Form 1000

DATE

11/31/91

DEPARTMENT

294

QUAL INSPECTION REPORT

DATE: 1-2-92

CUSTOMER: FORD MOTOR CO.

TEST: 1-1

TEST: 1-1

TEST: 1-1

TEST: 1-1

TEST: 1-1

TEST: 1-1

TEST: 1-1

TEST: 1-1

TEST: 1-1

TEST: 1-1

TEST: 1-1

TEST: 1-1

TEST: 1-1

TEST: 1-1

TEST: 1-1

TEST: 1-1

TEST	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
ACTUATION	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
RELEASE	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
LEAK	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
VOLT DROP						✓	✓									✓	✓	
CUR. LEAK						✓	✓									✓	✓	
PROOF						✓	✓									✓	✓	
IMPULSE	OK	OK	OK	OK	OK					OK	OK	OK	OK	OK				
ACTUATION	100	100	100	105	100					100	110	110	100	115				
RELEASE	40	40	40	35	20					40	40	35	40	40				
VOLT DROP	✓	✓	✓	✓	✓					✓	✓	✓	✓	✓				
CUR. LEAK	✓	✓	✓	✓	✓					✓	✓	✓	✓	✓				
PROOF	✓	✓	✓	✓	✓					✓	✓	✓	✓	✓				
CREEP	✓	✓	✓	✓	✓					✓	✓	✓	✓	✓				
BURST										✓	✓							
6 DIMENSIONAL																		
VISUAL	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
9 CREEP								✓	✓								✓	✓
10 TERM. SYN								✓	✓								✓	✓
ACTUATION								110	105								115	110
RELEASE								35	20								40	40
VOLT DROP								✓	✓								✓	✓
CUR. LEAK								✓	✓								✓	✓
PROOF								✓	✓								✓	✓
CREEP								✓	✓								✓	✓

TI-NHTSA 004316

FINISHED PRODUCTION ROUTING

WHITE CANARY
PINK → Route to Dept. Supervisor

DEVICE NUMBER

77 PSL 2-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

- 1.
- 2.
- 3.
- 4.

1-2

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL
ACCEPT
JAN 31 1992

Form 10388

DATE 1-2-92

DEPARTMENT

294

FINISHED PRODUCTION ROUTING

WHITE CANARY
PINK → Route to Dept. Supervisor

DEVICE NUMBER

77 PSL 2-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

- 1.
- 2.
- 3.
- 4.

1-1

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

ACCEPT
JAN 31 1992

Form 10388

DATE 1/3/92

DEPARTMENT

294

-MSG #= 342427 PR=EARN TO=PCQA SENT-01/02/92 12:37 PM
R#-151 ST=C DIV-0050 CC-00101 BY=EARN AT-01/02/92 12:37 PM

JANUARY 2, 1992

TO: RUSTY STRUBLE	RCS2	CC: TOM CHARBONEAU	TC
NIKE DeMATTIA	PCQA	JOHN KOURTESIS	MDES
CHARLIE DOUGLAS	CPPC	STEVE MAJOR	WHLE
DICK GARIEPY	MFPC	ANDY McGUIRK	PCQA
PAUL KOTCH	PRK1	ED O'NEILL	EJON
JOE LAZARE	JNL8		
STEVE OFFILER	SBO1	GARY SNYDER	CPPC
MATT SELLERS	PCNE	MARTHA SULLIVAN	CPPC
BILL SWEET	PCNE	RAY TOURANGEAU	PCNE
JIM WATT	PCQA	BILL CONGDON	MFPC
CLAIRE BALTHAZAR	PSWT	STEVE MCCOKEY	MDES
TERRY RODRIGUEZ	MFPC	ELAINE ROSE	PCQA

FR: DAVE CZARN ZARN

SJ: FORD CRUISE CONTROL PRESSURE SWITCH START-UP MEETING:
01/02/92 MEETING MINUTES

MEETING

THE NEXT MEETING IS SCHEDULED FOR:

DATE: 1/9/92 (THURSDAY)
TIME: 10:00 - 11:30 AM
PLACE: MARKETING CONFERENCE ROOM

*To ed to change
57 P.S. fluid for 1/1/92*

77PS

Hexport:

10B21 material looks promising so we plan to proceed with getting approval for the change on the 36900 hexport. Charlie will draft a letter to L/T and P/C notifying them that we plan to change, and tie this into the 2A/3A gaging as an overall plan for improving thread quality.

Quote: due 1/14/92

. REPORT ON ELCO ISSUES FROM 7/22 VISIT	KOTCH	ONGOING
- 10B21 STEEL/.00015" MIN. PLATE/J512		
. CORRECT ELCO'S J512 GAGE R&R ISSUE	SELLERS	01/23
* NOTIFY FORD OF CHANGE TO 10B21	DOUGLAS	02/14
* QUOTE FOR 10B21 W/.00015" MIN. PLATE	KOTCH	01/16
AND NO RE-ROLL		

Environmental Seal:

. REMOVE -3 AS ALTERNATE FROM P/L	OFFILER	01/30
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Production Issues:

A meeting was held this week to discuss ramp-up to 7.5K/day (from present 3K/day). This capacity will be required as the 57PSL-to-77PSL conversion takes place; tentatively beginning early 2Q92. Dave Peripoli reported that spring-to-terminal riveting has not caused significant downtime recently; however, downtime in general is not yet well documented. Plan is to ramp-up to 5K/day for approx. 2 weeks beginning 1/6; John K. will have a technician assigned to monitor the line to identify and resolve problems as they occur, and to document where the bigger problems lie.

. MAINTAIN RUNNING TOTAL OF L/T (L2-3)	STRUBLE	ONGOING	TI-NHTSA 004318
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SWITCHES LEADING TO 100K FOR AMORTISATION
 Status Date Total Shipped
 Jan 2 8092

- . UPDATE PRODUCTION PLANS FOR ALL SWITCHES DOUGLAS ONGOING
- . UPDATE PRODUCTION COMPONENT AND ASM. OFFILER 02/13 > 60K
- . DRAWINGS TO CURRENT DESIGN LEVEL
- . CHANGE FREQUENCY OF RING GAGE CALIB. GARIEPY 01/09
- . FROM ONCE/6 WEEKS TO ONCE/QTR; KEEP LOG
- . TO DETERMINE IF GAGES ARE OUT OF CAL.

Jim pointed out that the revision level of the customer release drawing must be on the shipping label, and that QC needs to have a way of knowing if it's correct. The team agreed that the Ford release print rev. level (presently = A for L2-3 and B for L2-1) would be used. Terry noted that the L2-3 currently notes no revision level, and the L2-1 is G instead of B.

- * MARKED LABELS W/CORRECT INFO TO DICK RODRIGUEZ 01/02
- * CORRECT LABELS: L2-3 rev A; L2-1 rev B GARIEPY 01/16

Sensor Assembly Machine:

- . UPGRADE KAPTON PICK AND PLACE SELLERS 01/23
- . INSTALL WASHER/CONV. STATION ON AMI SELLERS 01/30
- . PRIORITIZE REMAINING UPGRADE ITEMS SELLERS ONGOING

Base Assembly Machine:

- * UPDATE PROGRESS OF ULTRASONICALLY SELLERS/ ONGOING
- . WELDED SPRING ARM/TERMINAL ASSEMBLY OFFILER

Final Assembly Machine:

PV Testing/ISR:

We submitted the P/C addendum on schedule, and believe this will lead to full production approval. Need to follow up to make this happen.

- * SUBMIT ADDENDUM TO PC ISR W/CORRECTED BASE DIMENSION & PIST/PIPC DATA WATT 10/18 ORIG. ~~COMP.~~
12/20 REV.
12/20 COMP.
- * STATUS OF L/T APPROVAL ? DOUGLAS/ 11/28 ORIG.
- * COMPLETE PV TESTING & REPORT MAJOR 01/09 REV.
- * SEND SECOND ISR SUBMISSION TO FORD OFFILER 12/20 ORIG.
- . AND TIER 1'S 12/20 COMP.
- * CLEAN UP ISSUES ON K-H PACKAGE WATT 12/20 ORIG.
- * F/U WITH FORD REGARDING P/C APPROVAL WATT 01/23 COMP.
WATT 01/09

Diaphragm Life:

- . IMPLEMENT SOLUTION TO DIAPHRAGM LIFE OFFILER/ ONGOING
- . SET UP MTG TO REVIEW RESULTS OF CRIMP/ SELLERS
- . DIAPHRAGM LIFE STUDIES OFFILER 01/09

TI-NHTSA 004319

Low Differential Switch for MY94

Ford intends to release \$6k in January, so we can make the software changes needed for piloting low diff'l (quiet) sensors. The team's goal is to be prepared to ship switches by the end of 2Q92.

. ESTABLISH LIST OF ACTIONS REQ'D TO START-UP LOW DIFF'L SWITCH	SELLERS	1/30
. DETERMINE IF ANY QUALIFICATION IS REQ'D	DOUGLAS	1/30

Miscellaneous:

. COMPLETE DESIGN FMEA	OFFILER	04/18	ORIG.
		02/14	REV.
. SEND LETTERS TO FORD/GM AND TIER 1'S; 3A THREAD GAGING	WATT/ CEARN	1/30	
. PUT SYSTEM IN PLACE TO REPORT CPK TO FORD QUARTERLY; DETERMINE WHAT TO REPORT	WATT	12/19	(?)

PRODUCTION PLAN BY MONTH (THOUSANDS)

	P/C 77PSL2-1	L/T 77PSL2-3
NOV	6.4	13.6
DEC	35	9
JAN	37	6.6
FEB	54	10.0

MILESTONES	PLANNED	ACTUAL
77PS ISIR	09/01/91 ORIG.	
	09/20/91 REV.	09/27 - INITIAL
	12/20/91	12/20 - FINAL
77PS SOP (TI)	10/91	10/91

REGARDS,
DAVE CEARN | 47-FORD

ROUND KAPTON TEST TEST 178-03-30 JAD 1/2/92

DEVICE #	HEXPORT	KAPTON	INITIAL ACT / REL	454K CYC. ACT / REL	CYC. TO FAILURE
178-03-01	STANDARD	SQUARE	136 / 60		1424K
178-03-02	STANDARD	SQUARE	145 / 61		970K
178-03-03	STANDARD	SQUARE	134 / 62		1113K
178-03-04	STANDARD	SQUARE	133 / 59		1860K
178-03-05	STANDARD	SQUARE	136 / 60		1056K
178-03-06	STANDARD	SQUARE	137 / 57		1131K
178-03-07	STANDARD	ROUND	154 / 88		2601K
178-03-08	STANDARD	ROUND	154 / 87		2316K
178-03-09	STANDARD	ROUND	160 / 84		2591K
178-03-10	STANDARD	ROUND	162 / 85		1933K
178-03-11	STANDARD	ROUND	151 / 84	137 / 72	2247K
178-03-12	STANDARD	ROUND	155 / 84		2245K
178-03-13	.003" STEP	ROUND	149 / 87		1672K
178-03-14	.003" STEP	ROUND	159 / 83	140 / 73	2096K
178-03-15	.003" STEP	ROUND	157 / 86		2577K
178-03-16	.003" STEP	ROUND	146 / 84		1860K
178-03-17	.003" STEP	ROUND	147 / 78		2015K
178-03-18	.003" STEP	ROUND	154 / 75		2083K
178-03-19	.005" STEP	ROUND	151 / 85		254K
178-03-20	.005" STEP	ROUND	150 / 83		454K
178-03-21	.005" STEP	ROUND	147 / 75		2631K
178-03-22	.005" STEP	ROUND	156 / 78		2661K
178-03-23	.005" STEP	ROUND	142 / 83	137 / 75	2267K
178-03-24	.005" STEP	ROUND	147 / 76		2544K
178-03-25	.007" STEP	ROUND	149 / 81		294K
178-03-26	.007" STEP	ROUND	157 / 85	139 / 75	2441K
178-03-27	.007" STEP	ROUND	154 / 83		105K
178-03-28	.007" STEP	ROUND	155 / 88		1693K
178-03-29	.007" STEP	ROUND	157 / 80		2222K
178-03-30	.007" STEP	ROUND	151 / 83		2225K

TI-NHTSA 004321

FINAL INSPECTOR: TTPSL2-1

DATE: 1-6-92

CUSTOMER: FV-9924-AR

DISC LOT 1-5
REEL #1
LOT #2
WASHER LOT 112 2007

MAT. L.D. 74941-AR4-1
DISC LOT #1
REEL #1
LOT #2
WASHER LOT 112 2007

MAT. L.D. 74941-AR4-1
DISC LOT #1
REEL #1
LOT #2
WASHER LOT 112 2007

TEST	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. ACTUATION	120	135	130	137	135	135	140	125	135	130	130	135	130	135	145	127	137	137	
2. RELEASE	35	40	40	40	40	35	40	40	45	35	40	45	45	45	40	45	45	45	
3. DIFF.	85	95	90	95	95	100	100	85	90	95	90	90	95	90	105	80	85	95	
4. VOLT DROP	---	---	---	---	---	L	L	---	---	---	---	---	---	---	---	L	L	---	---
5. CUR. LEAK	---	---	---	---	---	L	L	---	---	---	---	---	---	---	---	L	L	---	---
6. PROOF	---	---	---	---	---	L	L	---	---	---	---	---	---	---	---	L	L	---	---
7. IMPULSE	L	L	L	L	✓	---	---	---	---	---	L	L	L	L	---	---	---	---	---
8. ACTUATION	125	125	120	120	120	---	---	---	---	---	120	120	125	120	120	---	---	---	---
9. RELEASE	30	40	40	40	40	---	---	---	---	---	30	40	45	40	45	---	---	---	---
10. VOLT DROP	L	L	L	L	✓	---	---	---	---	---	✓	✓	L	L	---	---	---	---	---
11. CUR. LEAK	L	L	L	L	L	---	---	---	---	---	L	L	L	L	---	---	---	---	---
12. PROOF	L	L	L	L	✓	---	---	---	---	---	✓	✓	✓	---	---	---	---	---	---
13. CREEP	✓	✓	✓	✓	✓	---	---	---	---	---	L	L	L	L	---	---	---	---	---
14. BURST	L	L	---	---	---	---	---	---	---	---	L	✓	---	---	---	---	---	---	---
15. DIMENSIONAL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16. VISUAL	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
17. CREEP	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
18. TEMP. STR	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
19. ACTUATION	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
20. RELEASE	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
21. VOLT DROP	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
22. CUR. LEAK	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
23. PROOF	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
24. CREEP	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TI-NHTSA 004322

FINISHED PRODUCTION ROUTING

WHITE } Route to Finished Store
CANARY }
PINK } Route to Dept. Supervisor

DEVICE NUMBER

77PSL2-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

1.

2.

1-5

3.

4.

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

JAN 7 1992

Form 10283

DATE 1-3-92

DEPARTMENT 294

FINISHED PRODUCTION ROUTING

WHITE } Route to Finished Store
CANARY }
PINK } Route to Dept. Supervisor

DEVICE NUMBER

77PSL2-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

1.

2.

1-6

3.

4.

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

JAN 7 1992

Form 10283

DATE 1-3-91

DEPARTMENT 294

FINAL INSPECTION 7798 1

DATE: 1-7-92

CUSTOMER P/N F24C-9F924-8B

DISC LOT 1-3

MAT. I.D. 74868-8B4-6

DISC LOT

MAT. I.D.

REEL #1

CUP LOT #4

REEL #

CUP LOT #

LOT #1

CONV. LOT 151

LOT #

CONV. LOT

WASHER LOT 121 1-CUT

QTY. 2000

WASHER LOT

QTY.

TEST	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
1 ACTUATION	115	110	110	110	110	115	115	120	100									
RELEASE	30	40	40	40	40	30	35	45	35									
DIFF.	85	70	72	71	72	85	80	75	65									
2 VOLT DROP	---	---	---	---	---	L	L	---	---									
3 CUR. LEAK	---	---	---	---	---	L	L	---	---									
4 PROOF	---	---	---	---	---	L	L	---	---									
5 IMPULSE	L	L	L	L	L	---	---	---	---									
ACTUATION	75	75	75	100	100	---	---	---	---									
RELEASE	40	40	40	40	45	---	---	---	---									
VOLT DROP	L	L	L	L	L	---	---	---	---									
CUR. LEAK	L	L	L	L	L	---	---	---	---									
PROOF	L	L	L	L	L	---	---	---	---									
CREEP	L	L	L	L	L	---	---	---	---									
7 BURST	L	L	---	---	---	---	---	---	---									
8 DISTORTION	---	---	---	---	---	---	---	L	L									
VISUAL	OK	OK	OK	OK	OK	OK	OK	OK	OK									
9 CREEP	---	---	---	---	---	---	---	L	L									
10 TERM. STR	---	---	---	---	---	---	---	L	L									
ACTUATION	---	---	---	---	---	---	---	120	100									
RELEASE	---	---	---	---	---	---	---	40	35									
VOLT DROP	---	---	---	---	---	---	---	L	L									
CUR. LEAK	---	---	---	---	---	---	---	L	L									
PROOF	---	---	---	---	---	---	---	L	L									
CREEP	---	---	---	---	---	---	---	L	L									

TI-NHTSA 004324

FINISHED PRODUCTION ROUTING

WHITE
CANARY

Route to Finished Goods
Route to Dept. Supervisor

DEVICE NUMBER

7P5L2-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

1.

2.

1-3

3.

4.

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

JAN 17 1992

Form 18982

DATE

1/6/92

DEPARTMENT

294

TI-NHT8A 004325

FINAL INSPECTION: 77932-1

DATE: 1-08-92

CUSTOMER P/N: F27C-9592A-NE

3130 LOT 1-9
REEL # 2
LOT # 3
WASHER LOT 112 2 CUT

PART. I.D. 74666-AC4-4
CUP LOT # 1
CONV. LOT# 151
QTY. 2000

3130 LOT 1-10
REEL # 3
LOT # 1
WASHER LOT 112 2-25

PART. I.D. 74666-AC4-4
CUP LOT # 4
CONV. LOT# 151
QTY. 2000

TEST	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
1 ACTUATION	135	145	150	150	135	140	150	150	150	120	145	135	145	140	145	135	145	140
RELEASE	45	45	50	40	45	50	45	50	50	50	40	40	45	45	45	40	50	50
DIFF.	90	100	100	110	95	90	105	100	100	80	105	95	100	95	100	95	95	90
2 VOLT DROP	—	—	—	—	—	L	L	—	—	—	—	—	—	—	—	L	L	—
3 CUR. LEAK	—	—	—	—	—	L	L	—	—	—	—	—	—	—	—	L	L	—
4 PROOF	—	—	—	—	—	L	L	—	—	—	—	—	—	—	—	L	L	—
5 IMPULSE	L	L	L	L	L	—	—	—	—	L	L	L	L	L	—	—	—	—
ACTUATION	135	135	140	135	140	—	—	—	—	130	130	130	135	135	—	—	—	—
RELEASE	45	45	55	45	45	—	—	—	—	55	50	45	55	45	—	—	—	—
VOLT DROP	L	L	L	L	L	—	—	—	—	L	L	L	L	L	—	—	—	—
CUR. LEAK	L	L	L	L	L	—	—	—	—	L	L	L	L	L	—	—	—	—
PROOF	L	L	L	L	L	—	—	—	—	L	L	L	L	L	—	—	—	—
CREEP	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
7 BURST	✓	✓	—	—	—	—	—	—	—	L	L	—	—	—	—	—	—	—
8 DIRECTIONAL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VISUAL	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
9 CREEP	—	—	—	—	—	—	—	—	—	L	L	—	—	—	—	—	—	—
10 TERM. STR.	—	—	—	—	—	—	—	—	—	L	✓	—	—	—	—	—	—	—
ACTUATION	—	—	—	—	—	—	—	—	—	145	145	—	—	—	—	—	—	—
RELEASE	—	—	—	—	—	—	—	—	—	50	50	—	—	—	—	—	—	—
VOLT DROP	—	—	—	—	—	—	—	—	—	L	L	—	—	—	—	—	—	—
CUR. LEAK	—	—	—	—	—	—	—	—	—	L	L	—	—	—	—	—	—	—
PROOF	—	—	—	—	—	—	—	—	—	L	✓	—	—	—	—	—	—	—
CREEP	—	—	—	—	—	—	—	—	—	L	✓	—	—	—	—	—	—	—

TI-NHT8A 004326

FINISHED PRODUCTION ROUTING

WHITE } Route to Finished Store
CANARY }
PINK } Route to Dept. Supervisor

DEVICE NUMBER

77PS L24

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

- 1.
2. 1-10
- 3.
- 4.

QUALITY CONTROL APPROVAL

IN PROCESS	IN PROCESS	FINAL
		JAN 19 1992

Form 18282

DATE 1-8-92 DEPARTMENT 29

FINISHED PRODUCTION ROUTING

WHITE } Route to Finished Store
CANARY }
PINK } Route to Dept. Supervisor

DEVICE NUMBER

77PS L21

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

- 1.
2. 1-9
- 3.
- 4.

QUALITY CONTROL APPROVAL

IN PROCESS	IN PROCESS	FINAL
		JAN 9 1992

Form 18282

DATE 1-8-92 DEPARTMENT 294

FINAL INSPECTION 77P92-1

DATE: 1-8-92

CUSTOMER P/N: F29C-99924-46

2150 LOT 1-7

REEL #1

LOT #2

WASHER LOT 112 2-037

MAT. I.D. 74868-904-1

CUP LOT #6

CONV. LOT 131

STY. 2006

2150 LOT 1-8

REEL #2

LOT #2

WASHER LOT 112 2-037

MAT. I.D. 74868-904-1

CUP LOT #6

CONV. LOT 131

STY. 2006

TEST	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
ACTUATION	140	140	141	140	150	140	140	145	140	140	135	140	140	140	140	130	140	145
RELEASE	60	57	57	58	65	62	60	60	55	45	50	40	45	45	45	50	57	45
DIFF.	80	83	84	82	85	78	80	85	85	95	95	100	95	95	95	80	93	100
2 VOLT DROP	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	—	✓	✓	—
3 CUR. LEAK	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	—	✓	✓	—
4 PROOF	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	—	✓	✓	—
5 IMPULSE	OK	OK	OK	OK	OK	—	—	—	—	OK	OK	OK	OK	OK	—	—	—	—
ACTUATION	130	140	135	130	130	—	—	—	—	130	130	130	140	140	—	—	—	—
RELEASE	60	55	60	60	65	—	—	—	—	50	50	45	45	45	—	—	—	—
VOLT DROP	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
CUR. LEAK	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
PROOF	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
CREEP	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
7 BURST	✓	✓	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—
8 INSTANTAN.	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
VISUAL	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
9 CREEP	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
10 TERM. STR.	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
ACTUATION	—	—	—	—	—	—	—	145	140	—	—	—	—	—	—	—	140	145
RELEASE	—	—	—	—	—	—	—	80	55	—	—	—	—	—	—	—	50	40
VOLT DROP	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
CUR. LEAK	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
PROOF	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
CREEP	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓

TI-NHTSA 004328

FINISHED PRODUCTION ROUTING

WHITE CANARY PINK → Route to Finished Goods
Route to Dept. Supervisor

DEVICE NUMBER

77PSL2-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

- 1.
- 2.
- 3.
- 4.

1-8

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

NOTED
SAT
ACCEPT
JAN 18 1992

Form 19282

DATE 1-7-92

DEPARTMENT 294

FINISHED PRODUCTION ROUTING

WHITE CANARY PINK → Route to Finished Goods
Route to Dept. Supervisor

DEVICE NUMBER

77PSL2-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

- 1.
- 2.
- 3.
- 4.

1-7

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

NOTED
SAT
ACCEPT
JAN 18 1992

Form 19282

DATE 1-7-92

DEPARTMENT 294

TI-NHTSA 004329

-MSG M#- 22100 FR-ZARN TO-PCQA SENT=01/08/92 09:58 AM
R#-126 ST-C DIV=0050 CC=00101 BY-ZARN AT=01/08/92 09:58 AM

JANUARY 8, 1992

TO: RUSTY STRUBLE	RCS2	CC: TOM CHARBONEAU	TC
MIKE DeMATTIA	PCQA	JOHN KOURTESIS	NDES
CHARLIE DOUGLAS	CPPC	STEVE MAJOR	WHLZ
DICK GARIEPY	MFPC	ANDY McGUIRK	PCQA
PAUL KOTCH	PRK1	ED O'NEILL	EJON
JOE LAZARZ	JML8		
STEVE OFFILER	SBO1	GARY SNYDER	CPPC
MATT SELLERS	PCME	MARTHA SULLIVAN	CPPC
BILL SWEET	PCME	RAY TOURANGEAU	PCME
JIM WAIT	PCQA	BILL CONGDON	MFPC
CLAIRE BALTHAZAR	PSWT	STEVE MCGOOFY	NDES
TERRY RODRIGUEZ	MFPC	ELAINE ROSE	PCQA

FR: DAVE CZARN ZARN

SJ: FORD CRUISE CONTROL PRESSURE SWITCH START-UP MEETING:
01/09/92 MEETING RESCHEDULE

DUE TO SCHEDULING CONFLICTS, THE START-UP MEETING HAS BEEN CHANGED
TO LATER IN THE DAY:

DATE: 1/9/92 (THURSDAY)
TIME: 2:30 - 3:30 PM
PLACE: CAFETERIA CUBE

I APOLOGIZE FOR ANY INCONVENIENCE THIS MAY CAUSE.

REGARDS,
DAVE CZARN \47A-FORD

TI-NHTSA 004330

TEXAS INSTRUMENTS



Kelsey-Hayes Company
9475 Center Road
Fenton, Michigan 48430

January 09, 1992

Attn: Mr. Thomas G. Dan
Supplier Quality Assurance

Subj: Part Number 12590701 Pressure Switch (F2VC-9F924-AB)
IBIR Addendum

Ref: Your 12/20/91 Letter

Dear Tom,

Enclosed, please find the dimensional layout for the pressure switch, Kelsey-Hayes part number 12590701. Please refer to the SMCR that was submitted on 12/19/91 to correct the 12590701 release drawing.

We have also included copies of the design FMEA, process FMEA, and designated key characteristics list. We believe this completes the IBIR submission requirements for part number 12590701.

After reviewing the IBIR addendum, please let us know if you have any questions or if I can be of any further assistance.

Regards,

Jim Watt
QRA Engineer
Precision Controls Department
Control Products Division

cc: Dave Cearn, MS 12-29; Charlie Douglas, MS 12-33
Rita Gunia, Kelsey-Hayes Purchasing Dept., Fenton, Mi.
Andy McGuirk, MS 12-27
Steve Majors, TI Farmington Hills, Michigan

encl: IBIR Addendum For 12590701

1-9-72

RECOMMENDED TO C-2

① FBI DASH RE-SEARCH
to K. H. P. 17, 17-1-72
PRINT

② Copy of Form P-57/120
PPGZ Summary Data-
Sheet with sign. - 17-1-72
234424000000. 17-1-72

③ DFINCA & P-1004

④ New Cert form - 4
21010. 2-1-72

*fine - 2
to, in 2
photo - 1000000000*

INITIAL SAMPLE WARRANT

No. 112384

PART INFORMATION

Part Name Next Generation Speed Control Part Number F2VC-9F924-AB
Control Item ☐ Yes ☐ No Engineering Change Level _____ Date _____
Engineering Change Authorization Bruce Pease Date _____
Shown on Drawing No. F2VC-9F924-AB Part Weight .062 kg
Reason for Initial Sample:
☐ Initial Submission ☒ Change in Optional Construction or Material ☐ Process Change
☐ Engineering Change(s) ☐ Additional, Replacement, or Refurbished Tooling ☐ Change in Subcontractor or Source
☐ Tooling Transfer ☐ Correction of Discrepancy (Resubmission No. _____) ☐ Parts Produced at Additional Location
☐ Other - Please Specify _____

SUPPLIER INFORMATION (Manufacturing Location)

Supplier Name Texas Instruments Inc. Street Address 34 Forest Street
City Attleboro State Ma Postal Code 02703 Country USA
Supplier Mfg. Location Code - DUNS T097K Customer Assigned Ford Motor Co - EED

CUSTOMER INFORMATION

Customer Name Ford Motor Co. - EED Buyer Fred Hendershot Buyer Code 165
Purchase Order Number _____ Sample Acceptance Level _____
Application Next Generation Speed Control

RESULTS

The results for dimensional measurements ☐, material tests ☐, and functional (ES) tests ☐ meet all drawing and specification requirements ☐ Yes ☐ No

Submission Checklist

☐ Checked Print	☒ Material Test Results	☐ Control Plan
☐ Auxiliary Drawings/Sketches	☐ Certifications	☐ Process Capability Results
☐ Correct Number of Samples	☐ Functional (ES) Test Results	☐ Process Flow Diagram
☐ Dimensional Results	☐ Product Engineering Approval	☐ Gage (Measurement) Studies

Supporting data for all requirements are available upon request.

COMMENTS:

Submission due to change of environmental seal material composition
and copy of area is attached.

DECLARATION

I affirm that the samples represented by this warrant are representative of our parts and have been made to the applicable customer drawings and specifications from specified materials, on regular production tooling with no operations other than the regular production process.

Authorized Signature Jim Watt Date 9 JAN 92
Print Name Jim Watt Title QA Engineer Phone No. 508-699-1719

APPROVAL (when required by customer procedure) ☐ Approved ☐ Rejected

Signature _____ Date _____

Realty
Dec 88 292c

TI-NHTSA 004333

1-9-92

Ford PKG. FAT:

- * Full L/T Dim's and 10 P/C Dim's pertaining to Base

K-H PKG. FAT:

- * Initially sent full P/C Dim's with Ford Print with out of spec. condition's -
- * Followed up with Dim's matched up to K-H print (16 comparat's)

Pitts / ~~Print~~

- * Need to resolve out of spec. condition's.

dim. # 13, 20, 45, 52

→ Submitted Ford Copy 8-24-92

MSO M#=#0701 FR=SB01 TO=PCME SENT=01/10/92 07:56 AM
R#=#261 ST=C DIV=0050 CC=00101 BY=SB01 AT=01/10/92 07:56 AM

TO:	Tom Burke	MFPC	Steve Major	WHLZ
	Jeff DiDomenico	ELB	Mark Sellers	PCME
	Charlie Douglas	CPFC	Rusty Struble	RCS2
	Paul Kotch	PRK1	Jim Watt	PCRA

CC: Tom Charboneau (delivered separately)
Dave Czarn

FM: Steve Dffiler SB01

SJ: Weekly Highlights

=====

FORD MY'92 ELECTRONIC SPEED CONTROL DEACTIVATE PS

57-to-77 CONVERSION: I have officially reserved the number 87PS (project #3472) for the new devices. For the sake of continuity and mfg simplicity, we plan to retain the same suffix, for example 57PSL11-2 becomes 87PSL11-2. It is important that we agree upon a strategy soon, since we are beginning to fall behind the aggressive schedule drafted in December and there remains some question whether we work exclusively on L2-2 or simultaneously work on all candidates, i.e. L2-2, L8-1, L11-2, and L11-3 as well as 57PS devices which need validation of A1 crimp ring and line-move.

SILENT DEVICE FOR MY93 BHD TAURUS: We have received a M/C, with our silent 77PS switch installed, from Tim Andresen at Ford. They claim that the supposedly silent switch makes audible noise in the passenger compartment, and request an evaluation and test report. We plan to fixture the M/C on benchtop, confirm that the switch is the culprit, and next obtain an ABS Taurus to install this M/C and quantify the audible noise. Other experimentation, such as use of a snubber, can be executed at the same time.

DIAPHRAGM LIFE: We are presently running a test which is comparing square and round Kapton which is taken from the exact same material lot. This is because the exemplary life performance of the round Kapton witnessed previously was compared to production square Kapton from a different lot and different mfg. process. We've included a control group using standard production parts, and another test group using Ube polyimide material obtained from Gary Baker.

We have completed all testing designed to expose the formation process of the teardrop. Results will be presented and discussed at a meeting with Mfg. Eng. early next week.

DFMEA: Significant efforts are being expended in order to remain on track for completion in early February. While this is requiring more time commitment than originally planned, the team is very pleased thus far with the results. This should become a benchmark document for future DFMEA's.

Regards,
Steve D.

TI-NHTSA 004335

HIGHLIGHTS
Stephen B. Offiler
Week Ending 92-01-10

Stephen B. Offiler
92-01-10



FORD MY92 ELECTRONIC SPEED CONTROL DEACTIVATE PS

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SILENT DEVICE FOR MY93 SHO TAURUS: We have received a M/C, with our silent 77PS switch installed, from Tim Andresen at Ford. They claim that the supposedly silent switch makes audible noise in the passenger compartment, and request an evaluation and test report. We plan to fixture the M/C on benchtop, confirm that the switch is the culprit, and next obtain an ABS Taurus to install this M/C and quantify the audible noise. Other experimentation, such as use of a snubber, can be executed at the same time.

→ STD. SILENT SWIT; SNUBBER SILENT; SNUBBER-ALA?

DIAPHRAGM LIFE: We are presently running a test which is comparing square and round Kapton which is taken from the exact same material lot. This is because the exemplary life performance of the round Kapton witnessed previously was compared to production square Kapton from a different lot and different mfg. process. We've included a control group using standard production parts, and another test group using Ube polyimide material obtained from Gary Baker.

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-MSG N# 90701 FR=SB01 TO=PCQA SENT=01/10/92 07:56 AM
R#003 ST=C DIV=0050 CC=00101 BY=SB01 AT=01/10/92 07:56 AM

TO: Tom Burke MFPC Steve Major WHLZ
Jeff DiDomenico ELB Matt Sellers PCME
Charlie Douglas CPPC Rusty Struble RCS2
Paul Kotch PRK1 Jim Watt PCQA

CC: Tom Charboneau (delivered separately)
Dave Czarn

FR: Steve Offiler SB01

SJ: Weekly Highlights

*cc = Clair & R.
Kyi/RW
01/10/92*

FORD MY'92 ELECTRONIC SPEED CONTROL DEACTIVATE PS

57-to-77 CONVERSION: I have officially reserved the number 87PS (project #3472) for the new devices. For the sake of continuity and mfg simplicity, we plan to retain the same suffix, for example 57PSL11-2 becomes 87PSL11-2. It is important that we agree upon a strategy soon, since we are beginning to fall behind the aggressive schedule drafted in December and there remains some question whether we work exclusively on L2-2 or simultaneously work on all candidates, i.e. L2-2, L8-1, L11-2, and L11-3 as well as 57PS devices which need validation of Al crimp ring and line-move.

SILENT DEVICE FOR MY93 SHO TAURUS: We have received a M/C, with our silent 77PS switch installed, from Tim Andresen at Ford. They claim that the supposedly silent switch makes audible noise in the passenger compartment, and request an evaluation and test report. We plan to fixture the M/C on benchtop, confirm that the switch is the culprit, and next obtain an ABS Taurus to install this M/C and quantify the audible noise. Other experimentation, such as use of a snubber, can be executed at the same time.

DIAPHRAGM LIFE: We are presently running a test which is comparing square and round Kapton which is taken from the exact same material lot. This is because the exemplary life performance of the round Kapton witnessed previously was compared to production square Kapton from a different lot and different mfg. process. We've included a control group using standard production parts, and another test group using Ube polyimide material obtained from Gary Baker.

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DFMEA: Significant efforts are being expended in order to remain on track for completion in early February. While this is requiring more time commitment than originally planned, the team is very pleased thus far with the results. This should become a benchmark document for future DFMEA's.

Regards,
Steve O.

TI-NHTSA 004337

TEXAS INSTRUMENTS



Ford Motor Company
17000 Oakwood Blvd.
P.O. Box 1586-D-2015
Dearborn, Michigan 48121

January 19, 1991

Attn: Mr. Mark Scholler

Subj: ISIR Submission (Component Material Change)
Ford Part Number F2VC-9F924-AB
Pass Car Series

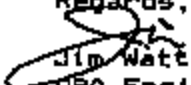
Ref: SREA No. 147671

Dear Mark,

Enclosed, please find our ISIR submission to document the environmental seal material change for the NGSC deactivation switch, Ford part number F2VC-9F924-AB. The submission includes a copy of the approved Supplier Request For Engineering Approval (SREA) no. 147671.

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

Regards,


Jim Watt
URA 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 submission

-MSG M#- 22100 FR=ZARN TO=PCQA SENT=01/08/92 09:58 AM
R#126 ST=C DIV=0050 CC=00101 BY=ZARN AT=01/08/92 09:58 AM

JANUARY 8, 1992

TO: RUSTY STRUBLE	RCS2	CC: TOM CHARBONEAU	TC
MIKE DeMATTIA	PCQA	JOHN KOURTESIS	MDES
CHARLIE DOUGLAS	CPPC	STEVE MAJOR	WHLZ
DICK GARIEPY	MFPC	ANDY McGUIRK	PCQA
PAUL KOTCH	PRK1	ED O'NEILL	EJON
JOE LAZARZ	JNL8		
STEVE OFFILER	SB01	GARY SNYDER	CPPC
MATT SELLERS	PCME	MARTHA SULLIVAN	CPPC
BILL SWEET	PCME	RAY TOURANGEAU	PCME
JIM WATT	PCQA	BILL CONGDON	MFPC
CLAIRE BALTHAZAR	PSWT	STEVE McGOOEY	MDES
TERRY RODRIGUES	MFPC	ELAINE ROSE	PCQA

FR: DAVE CZARN ZARN

SJ: FORD CRUISE CONTROL PRESSURE SWITCH START-UP MEETING:
01/09/92 MEETING RESCHEDULE
=====

DUE TO SCHEDULING CONFLICTS, THE START-UP MEETING HAS BEEN CHANGED
TO LATER IN THE DAY:

DATE: 1/9/92 (THURSDAY)
TIME: 2:30 - 3:30 PM
PLACE: CAFETERIA CUBE

I APOLOGIZE FOR ANY INCONVENIENCE THIS MAY CAUSE.

REGARDS,
DAVE CZARN | 47A-FORD

TI-NHTSA 004338

-MSG M#- 90701 FR-SBO1 TO-CPPC SENT=01/10/92 07:56 AM
R#-387 ST=C DIV=0050 CC=00101 BY-SBO1 AT=01/10/92 07:56 AM

TO:	Tom Burke	MFPC	Steve Major	WHLZ
	Jeff DiDomenico	ELB	Matt Sellers	PCME
	Charlie Douglas	CPPC	Rusty Struble	RCS2
	Paul Kotch	PRK1	Jim Watt	PCQA

CC: Tom Charboneau (delivered separately)
Dave Czarn

FR: Steve Offiler SBO1

SJ: Weekly Highlights
=====

FORD MY'92 ELECTRONIC SPEED CONTROL DEACTIVATE PS

57-to-77 CONVERSION: I have officially reserved the number 87PS (project #3472) for the new devices. For the sake of continuity and mfg simplicity, we plan to retain the same suffix, for example 57PSL11-2 becomes 87PSL11-2. It is important that we agree upon a strategy soon, since we are beginning to fall behind the aggressive schedule drafted in December and there remains some question whether we work exclusively on L2-2 or simultaneously work on all candidates, i.e. L2-2, L8-1, L11-2, and L11-3 as well as 57PS devices which need validation of Al crimp ring and line-move.

SILENT DEVICE FOR MY93 SHO TAURUS: We have received a M/C, with our silent 77PS switch installed, from Tim Andresen at Ford. They claim that the supposedly silent switch makes audible noise in the passenger compartment, and request an evaluation and test report. We plan to fixture the M/C on benchtop, confirm that the switch is the culprit, and next obtain an ABS Taurus to install this M/C and quantify the audible noise. Other experimentation, such as use of a snubber, can be executed at the same time.

DIAPHRAGM LIFE: We are presently running a test which is comparing square and round Kapton which is taken from the exact same material lot. This is because the exemplary life performance of the round Kapton witnessed previously was compared to production square Kapton from a different lot and different mfg. process. We've included a control group using standard production parts, and another test group using Ube polyimide material obtained from Gary Baker.

We have completed all testing designed to expose the formation process of the teardrop. Results will be presented and discussed at a meeting with Mfg. Eng. early next week.

DFMEA: Significant efforts are being expended in order to remain on track for completion in early February. While this is requiring more time commitment than originally planned, the team is very pleased thus far with the results. This should become a benchmark document for future DFMEA's.

Regards,
Steve O.

TI-NHTSA 004340

TO: DAVID CZARN

01/13/92

Re: Ford 77PS ISIR (Passcar) cc: Matt Sellers
(HiLite Industries,
DANA Corp.,
Kelsey Hayes) - N/A
Etienne Rose

- | <u>ACTION</u> | <u>who</u> | <u>when</u> |
|--|-------------------------------|-------------|
| 1.) Terminal Position dimension is out of spec; Need corrective action on line | Matt Sellers | 01/16/92 |
| 2.) Rerun 77PS Passcar samples for terminal position; | Matt Sellers | 01/16/92 |
| 3.) Remeasure terminal position; QC to assist if required | Matt Sellers/
Etienne Rose | 01/17/92 |
| 4.) Resubmit 77PS Passcar ISIR ? to who? | Jim Watt | 01/20/92 |
- Thx,
Jim Watt

FINAL INSPECTION TTPS-1

DATE: 1-14-92

DISPOSER P/N: 2300-2222-42

TEST LOT: 1-12

TEST LOT: 1-12

TEST LOT: 1-12

TEST LOT: 1-12

TEST #1

TEST #1

TEST #1

TEST #1

TEST #1

TEST #1

TEST #1

TEST #1

TEST LOT 110 1 01

TEST LOT 110 1 01

TEST LOT 110 1 01

TEST LOT 110 1 01

TEST	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
ACTUATION	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300
RELEASE	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230
DIFF.	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240
VOLT DROP																		
CUR. LEAK																		
PROOF																		
IMPULSE	OK	OK	OK	OK	OK					OK	OK	OK	OK	OK				
ACTUATION	120	120	120	126	125					125	120	125	120	125				
RELEASE	55	55	50	60	60					60	60	60	60	65				
VOLT DROP	✓	✓	✓	✓	✓					✓	✓	✓	✓	✓				
CUR. LEAK	✓	✓	✓	✓	✓					✓	✓	✓	✓	✓				
PROOF	✓	✓	✓	✓	✓					✓	✓	✓	✓	✓				
CREEP	✓	✓	✓	✓	✓					✓	✓	✓	✓	✓				
BURST	✓	✓								✓	✓							
DIMENSIONAL								✓	✓								✓	✓
VISUAL	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
CREEP								✓	✓								✓	✓
TERM. STR.								✓	✓								✓	✓
ACTUATION								130	130								130	125
RELEASE								60	55								60	60
VOLT DROP								✓	✓								✓	✓
CUR. LEAK								✓	✓								✓	✓
PROOF								✓	✓								✓	✓
CREEP								✓	✓								✓	✓

TI-NHTSA 004342

FINISHED PRODUCTION ROUTING WHITE CANARY } Route to Finished Store PINK } Route to Dept. Supervisor

DEVICE NUMBER

77PSL2-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

1.

2.

1-16

3.

4.

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL
 00772
 GAT
 ACCEPT
 JAN 15 1992

Form 10262

DATE 1/14/92

DEPARTMENT 294

FINISHED PRODUCTION ROUTING

WHITE CANARY } Route to Finished Store
 PINK } Route to Dept. Supervisor

DEVICE NUMBER

77PSL2-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

1.

2.

1-15

3.

4.

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL
 00772
 GAT
 ACCEPT
 JAN 15 1992

Form 10262

DATE 1/14/92

DEPARTMENT 294

MSG# 206257 FR=SB01 TO=PCME SENT=01/14/92 03:58 PM
R#333 ST=C DIV=0050 CC=00101 BY=SB01 AT=01/14/92 03:58 PM

TO: Dave Czarn ZARN Matt Sellers PCME
Jeff DiDomenico ELB ~~Billy Gault~~ PCME
Dick Gariepy MFPC

CC: Tom Charbonnet TC Ray Tourangeau PCME

FR: Steve Offiler SB01

SJ: 77PS Diaphragm Life Review
=====

*
* PLEASE NOTE CHANGE TO ROOM AND TIME *
*

Please plan to attend a meeting to review the latest results of the ongoing Kapton diaphragm life testing, and to finalize plans to implement permanent corrective actions which used to successfully complete the recent ISR validation.

WHERE: CPD Conference Room
WHEN: Wednesday, 92-01-15 from 11:00 to 12:00

Contact me as soon as possible if conflicts exist.

Regards,
Steve O.

Minutes

- ① Teardrop → Reduced Kapton life (original failures did not exhibit drop effects, so correlation is suspect)
- ② Causes of teardrops
- ③ AMI vs. Handline tests, which is better.
- ④ Proximity ~~sensor~~ to determine Kapton thickness rather than Continuity method.
- ⑤ Build sensors using Kapton only. No Teflon coating.



TI-NHTSA 004344

- ⑥ Quantify Hand-line dies test vs. AMI die test

FINAL INSPECTION 77PGL2-1

DATE: 1-14-92

CUSTOMER P/N P240-9P924-AB

DISC LOT 1-11
REEL # 2
LOT # 3
WASHER LOT 112 2-CUT

MAT. I.D. 74863-AB3-1
CUP LOT # 6
CONV. LOT 151
QTY. 2000

DISC LOT 1-12
REEL # 2
LOT # 4
WASHER LOT 112 2-CUT

MAT. I.D. 74862-AB3-1
CUP LOT # 6
CONV. LOT 151
QTY. 2000

TEST	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
1 ACTUATION	135	130	135	140	135	135	135	135	135	135	130	135	140	130	135	135	135	135
RELEASE	50	60	60	45	70	65	65	55	65	60	65	70	60	65	45	70	70	70
DIFF.	85	70	75	95	65	70	70	80	70	75	65	65	80	65	70	65	65	65
2 VOLT DROP	---	---	---	---	---	L	L	---	---	---	---	---	---	---	L	L	---	---
3 CUR. LEAK	---	---	---	---	---	L	L	---	---	---	---	---	---	---	L	L	---	---
4 PROOF	---	---	---	---	---	L	L	---	---	---	---	---	---	---	L	L	---	---
5 IMPULSE	L	L	L	L	L	---	---	---	---	L	L	L	L	L	---	---	---	---
ACTUATION	120	125	125	130	130	---	---	---	---	120	125	125	130	130	---	---	---	---
RELEASE	60	60	65	65	70	---	---	---	---	60	60	65	60	60	---	---	---	---
VOLT DROP	L	L	L	L	L	---	---	---	---	L	L	L	L	L	---	---	---	---
CUR. LEAK	L	L	L	L	L	---	---	---	---	L	L	L	L	L	---	---	---	---
PROOF	L	L	L	L	L	---	---	---	---	L	L	L	L	L	---	---	---	---
CREEP	L	L	L	L	L	---	---	---	---	L	L	L	L	L	---	---	---	---
7 BURST	L	L	---	---	---	---	---	---	---	L	L	---	---	---	---	---	---	---
8 DISSECTION	---	---	---	---	---	---	---	L	L	---	---	---	---	---	---	---	L	L
VISUAL	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
9 CREEP	---	---	---	---	---	---	---	L	L	---	---	---	---	---	---	---	L	L
10 TERM. STRE	---	---	---	---	---	---	---	L	L	---	---	---	---	---	---	---	L	L
ACTUATION	---	---	---	---	---	---	---	135	70	---	---	---	---	---	---	---	135	70
RELEASE	---	---	---	---	---	---	---	130	65	---	---	---	---	---	---	---	135	65
VOLT DROP	---	---	---	---	---	---	---	L	L	---	---	---	---	---	---	---	L	L
CUR. LEAK	---	---	---	---	---	---	---	L	L	---	---	---	---	---	---	---	L	L
PROOF	---	---	---	---	---	---	---	L	L	---	---	---	---	---	---	---	L	L
CREEP	---	---	---	---	---	---	---	L	L	---	---	---	---	---	---	---	L	L

TI-NHTSA 004345

FINISHED PRODUCTION ROUTING

WHITE } Route to Finished Goods
CANARY }
PINK } Route to Dept. Supervisor

DEVICE NUMBER

77P562-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

1.

2.

1-12

3.

4.

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

JAN 15 1992

Form 10200

DATE 1-14-92

DEPARTMENT 294

FINISHED PRODUCTION ROUTING

WHITE } Route to Finished Goods
CANARY }
PINK } Route to Dept. Supervisor

DEVICE NUMBER

77P562-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

1.

2.

1-11

3.

4.

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

JAN 15 1992

Form 10200

DATE 1/14/92

DEPARTMENT 294

-MSG #= 193553 FR=ZARN TO=PCQA SENT=01/14/92 11:25 AM
R#086 ST=C DIV=0050 CC=00101 BY=ZARN AT=01/14/92 11:25 AM

JANUARY 14, 1992

TO: RUSTY STRUBLE	RCS2	CC: TOM CHARBONEAU	TC
MIKE DeMATTIA	PCQA	JOHN KOURTESIS	MDES
CHARLIE DOUGLAS	CPFC	STEVE MAJOR	WHLB
DICK GARIEPY	MFPC	ANDY McGUIRK	PCQA
PAUL KOTCH	PRK1	ED O'NEILL	RJON
JOE LAHARS	JML8		
STEVE OFFILER	SBO1	GARY SNYDER	CPFC
MATT SELLERS	PCME	MARTHA SULLIVAN	CPFC
BILL SWEET	PCME	RAY TOURANGEAU	PCME
JIM WATT	PCQA	BILL CONGDON	MFPC
CLAIRE BALTHAZAR	PSWT	STEVE MCCOBBY	MDES
TERRY RODRIGUEZ	MFPC	ELAINE ROSE	PCQA

FR: DAVE CZARN EARN

SJ: FORD CRUISE CONTROL PRESSURE SWITCH START-UP MEETING:
01/09/92 MEETING MINUTES

MEETING

THE NEXT MEETING IS SCHEDULED FOR:

DATE: 1/16/92 (THURSDAY)
TIME: 10:00 - 11:30 AM
PLACE: MARKETING CONFERENCE ROOM

77PS

Export:

. REPORT ON ELCO ISSUES FROM 7/22 VISIT	KOTCH	ONGOING
- 10B21 STEEL/.00015" MIN. PLATE/J512 \$		
. CORRECT ELCO'S J512 GAGE R&R ISSUE	SELLERS	01/23
. NOTIFY FORD OF CHANGE TO 10B21	DOUGLAS	02/14
. QUOTE FOR 10B21 W/.0015" min. PLATE	KOTCH	01/16
AND NO RE-ROLL		

Environmental Seal:

. REMOVE -3 AS ALTERNATE FROM P/L OFFILER 01/30

Production Issues:

. MAINTAIN RUNNING TOTAL OF L/T (L2-3)	STRUBLE	ONGOING
SWITCHES LEADING TO 100K FOR AMORTIZATION		
Status Date	Total Shipped	
Jan 14	2045 11,424	
. UPDATE PRODUCTION PLANS FOR ALL SWITCHES	DOUGLAS	ONGOING
. UPDATE PRODUCTION COMPONENT AND ASM.	OFFILER	02/13
DRAWINGS TO CURRENT DESIGN LEVEL		
* CHANGE FREQUENCY OF RING GAGE CALIB.	GARIEPY	01/09 ORIG.
FROM ONCE/6 WEEKS TO ONCE/QTR; KEEP LOG		STATUS ???
TO DETERMINE IF GAGES ARE OUT OF CAL.		

*Elco to visit 2/4/92 AM
2-4 people*

*Str. s to write summary letter
up
30.2 ea.*

TI-NHTSA 004347

* MARKED LABELS W/CORRECT INFO TO DICK	RODRIGUEZ	01/02	ORIG.
		01/02	COMP.
* CORRECT LABELS: L2-3 rev A; L2-1 rev B (Packing will order correct labels)	GARIEPY	01/16	ORIG.
		01/09	COMP.

Sensor Assembly Machine:

. UPGRADE KAPTON PICK AND PLACE	SELLERS	01/23
. INSTALL WASHER/CONV. STATION ON AMI	SELLERS	01/30
. PRIORITIZE REMAINING UPGRADE ITEMS	SELLERS	ONGOING

Base Assembly Machine:

. UPDATE PROGRESS OF ULTRASONICALLY WELDED SPRING ARM/TERMINAL ASSEMBLY	SELLERS/ OFFILER	ONGOING
--	---------------------	---------

Final Assembly Machine:

PV Testing/ISR:

The P/C addendum has been reviewed and approved by Ford SQA. Mark Scholler will issue a letter giving us full approval status, within two weeks. Scholler asked TI to review the 77PS mfg. control plan for Cpk quart early reporting; e.g., crimp height, crimp pressure, etc. He asked that we consider reporting more than calib. pressure and thread dimensions, and pay particular attention to the crimp process since it was implicated in the alert.

* F/U WITH FORD REGARDING P/C APPROVAL	WATT	01/09	ORIG.
		01/09	COMP.
* F/U WITH FORD TO ENSURE APPROVAL LETTER IS RECEIVED BY 1/24.	WATT	ONGOING	
* PROVIDE LIST OF MFG. OPERATIONS FOR Cpk REVIEW TO JIM WATT	SMITH	01/15	need copy
* SELECT MFG. OPERATIONS FOR Cpk REPORTING	SELLERS	01/23	
* PROVIDE QUARTERLY REPORTING OF ABOVE	WATT	start 03/31	
* STATUS OF L/T APPROVAL	DOUGLAS/ MAJOR	11/28 01/16	ORIG. REV.

A number of issues remain on the K-H package. K-H has their own envelope drawing that has only a limited number of dimensions; unfortunately, terminal position is one of them. Jim has identified what needs to be done prior to submittal; see below.

* CORRECT TERMINAL POSITION	SELLERS	01/16
* RE-RUN P/C SAMPLES SO TERM'L POS'N DATA CAN BE COLLECTED	SELLERS	01/16
* MEASURE SAMPLES	SELLERS/ ROSE	01/17
* CLEAN UP ISSUES ON K-H PACKAGE AND RESUBMIT	WATT	01/23
		only 57F3-3 due 4/15/92
* DO PITTS/DANA HAVE THEIR OWN ENV. DWGS?	DOUGLAS	01/23

Diaphragm Life:

. IMPLEMENT SOLUTION TO DIAPHRAGM LIFE	OFFILER/ SELLERS	ONGOING
* SET UP MTG TO REVIEW RESULTS OF CRIMP/	OFFILER	01/09
		ORIG.

TI-NHTSA 004348

ORIG. = BLACK STRIPES
ADD. = BLUE
WAS PK PV TESTING done / black striped E. Seal:

for Pitts/Dana
or. copy

DIAPHRAGM LIFE STUDIES

01/15 REV.

Low Differential Switch for MY94 *MASTER*

MY93 SHO Taurus is using a M/C mounted P/C switch; M/C is supplied by Teves. Ford and Teves believe our "silent" switch can be heard in the passenger compartment on brake application; they believe the noise is intermittent. Steve O. is investigating.

* ESTABLISH LIST OF ACTIONS REQ'D TO START-UP LOW DIFF'L SWITCH	SELLERS	1/30
* DETERMINE IF ANY QUALIFICATION IS REQ'D	DOUGLAS	1/30
* EVALUATE TEVES M/C FOR NOISE	OFFILER	ONGOING
* REPORT RESULTS TO FORD/TEVES	OFFILER	TBD
* ENV. DWG. FOR LOW DIFF'L SWITCH	OFFILER	1/23
- REVIEW PROPOSED ENV. DWG WITH REDUCED # OF DIMENSIONS W/D. CZARN		

Miscellaneous:

* COMPLETE DESIGN FMEA	OFFILER	04/18	ORIG.
		02/14	REV.
* SEND LETTERS TO FORD/GM AND TIER 1'S;	WATT/	1/30	
3A THREAD GAGING	CZARN		

PRODUCTION PLAN BY MONTH (THOUSANDS)

	P/C 77PSL2-1	L/T 77PSL2-3
NOV	6.4	13.6
DEC	35	9
JAN	37	7
FEB	60	12

REGARDS,
DAVE CZARN \48-FORD

T1-NHTSA 004349

-MSD MM= 206257 FR=SB01 TO=PCME SENT=01/14/92 03:58 PM
R#-333 BT=C DIV=0050 CC=00101 BY=SB01 AT=01/14/92 03:58 PM

TO: Dave Czern ZARN Matt Sellers PCME
Jeff DiDomenico ELB ~~Bill Swartz~~ PCME
Dick Garlepy MFPC

CC: Tom Charbonneau TC Ray Tourangeau PCME

FR: Steve Offiler SB01

SUB: 77PB Diaphragm Life Review
=====

*
* PLEASE NOTE CHANGE TO ROOM AND TIME *
*

Please plan to attend a meeting to review the latest results of the ongoing Kapton diaphragm life testing, and to finalize plans to implement permanent corrective actions which used to successfully complete the recent ISR validation.

WHERE: CPD Conference Room
WHEN: Wednesday, 92-01-15 from 11:00 to 12:00

Contact me as soon as possible if conflicts exist.

Regards,
Steve O.

Minutes

- ① Teardrop → Reduced Kapton life (original failures did not exhibit teardrop effects. So correlation is suspect)
- ② Causes of teardrops
- ③ AMS vs. Handline tests. which is better.
- ④ Proximity Sensor to determine Kapton thickness rather than Continuity method.
- ⑤ Build Sensor using Kapton only. No Teflon coating.



- ⑥ Quantity Hand-line dies AMS vs. AMS die AMS.

DATE: 1-15-92

CUSTOMER P/N: F29C-9F324-AB

DISC LOT 1-17

MAT. I.D. 74983-AB2-1

DISC LOT 1-18

MAT. I.D. 74983-AB2-1

REEL #2

CUP LOT #7

REEL #2

CUP LOT #7

LOT #5

CONV. LOT 149

LOT #4

CONV. LOT 149

WASHER LOT 110 1-07

QTY. 2795

WASHER LOT 110 1-07

QTY. 2006

TEST	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. ACTUATION	120	120	120	120	120	125	120	120	120	120	125	120	125	120	120	125	120	125	120
2. RELEASE	50	60	55	50	55	55	50	60	60	50	55	50	55	55	55	45	50	40	
3. DIFF.	70	60	75	80	65	70	70	60	60	70	70	70	70	65	65	80	70	70	
4. VOLT DROP	---	---	---	---	---	L	L	---	---	---	---	---	---	---	---	L	L	---	
5. CUR. LEAK	---	---	---	---	---	L	L	---	---	---	---	---	---	---	---	L	L	---	
6. PROOF	---	---	---	---	---	L	L	---	---	---	---	---	---	---	---	L	L	---	
7. IMPULSE	L	---	L	L	L	---	---	---	---	L	L	L	L	L	L	---	---	---	
8. ACTUATION	110	110	115	115	110	---	---	---	---	---	---	120	120	120	115	110	---	---	
9. RELEASE	45	55	50	50	50	---	---	---	---	---	---	50	50	50	50	50	---	---	
10. VOLT DROP	L	L	---	L	L	---	---	---	---	---	---	L	L	L	L	L	---	---	
11. CUR. LEAK	L	L	---	L	L	---	---	---	---	---	---	L	L	L	L	L	---	---	
12. PROOF	L	L	L	L	L	---	---	---	---	---	---	L	L	L	L	L	---	---	
13. CREEP	L	L	L	L	L	---	---	---	---	---	---	L	L	L	L	L	---	---	
14. BURST	L	L	---	---	---	---	---	---	---	---	---	L	L	---	---	---	---	---	
15. DIMENSIONAL	---	---	---	---	---	---	---	L	L	---	---	---	---	---	---	---	---	L	L
16. VISUAL	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
17. CREEP	---	---	---	---	---	---	---	L	L	---	---	---	---	---	---	---	---	L	L
18. TERM. STR.	---	---	---	---	---	---	---	L	L	---	---	---	---	---	---	---	---	L	L
19. ACTUATION	---	---	---	---	---	---	---	---	---	120	120	---	---	---	---	---	---	120	120
20. RELEASE	---	---	---	---	---	---	---	---	---	55	55	---	---	---	---	---	---	50	60
21. VOLT DROP	---	---	---	---	---	---	---	---	---	L	L	---	---	---	---	---	---	L	L
22. CUR. LEAK	---	---	---	---	---	---	---	---	---	L	L	---	---	---	---	---	---	L	L
23. PROOF	---	---	---	---	---	---	---	---	---	L	L	---	---	---	---	---	---	L	L
24. CREEP	---	---	---	---	---	---	---	---	---	L	L	---	---	---	---	---	---	L	L

TI-NHTSA 004351

FINISHED PRODUCTION ROUTING
 WHITE CANARY PINK
 Route to Finished Store
 Route to Dept. Supervisor

DEVICE NUMBER

77P5L221

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

1.

2.

1-18

3.

4.

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

JAN 16 1992

Form 19282

DATE

1/14/92

DEPARTMENT

294

FINISHED PRODUCTION ROUTING

WHITE CANARY PINK
 Route to Finished Store
 Route to Dept. Supervisor

DEVICE NUMBER

77P5L221

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

1.

2.

1-17

3.

4.

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

JAN 16 1992

Form 19282

DATE

1/14/92

DEPARTMENT

294

TEXAS
INSTRUMENTS



Kelsey-Hayes Company
101 Oak Street
Milford, Michigan 48381

January 15, 1992

Attn: Mr. John Shorkey
Quality Engineer

Subj: Part Number E7SC-3N824-AA Pressure Switch
Part Number F3TA-9F924-AA Pressure Switch

Re: Your 01/14/92 Telephone Call

Dear John,

We have confirmed the actuation pressures for
Kelsey-Hayes part number numbers as follows:

<u>Part number</u>	<u>Actuation Pressure</u>
E7SC-3N824-AA	350-450 psi
F3TA-9F924-AA	200-300 psi

I have also enclosed a copy of Mr. Thomas Dan's 12/20/91
letter as you requested.

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

Regards,


Jim Watt
QRA Engineer
Precision Controls Department
Control Products Division

cc: Dave Czern, MS 12-29; Charlie Douglas, MS 12-33
Thomas Dan, Kelsey-Hayes Supplier Quality, Fenton, Mi.
Rita Gunia, Kelsey-Hayes Purchasing Dept., Fenton, Mi.
Andy McGuirk, MS 12-27
Steve Majors, TI Farmington Hills, Michigan

**PRECISION CONTROLS DESIGN ENGINEERING
KAPTON DIAPHRAGM LIFE REVIEW - 15 January 1992
MY92 FORD CRUISE CONTROL PRESSURE SWITCH**

- PURPOSE:**
- 1) TO REVIEW EVIDENCE SUPPORTING THE THEORY THAT TEARDROP FORMATION IS RELATED TO SHORTENED DIAPHRAGM LIFE**
 - 2) TO REVIEW PROCESS-RELATED PARAMETERS WHICH CONTRIBUTE TO TEARDROP FORMATION**
 - 3) TO REVIEW EVIDENCE SUGGESTING THAT THE HAND-LINE CRIMP TOOLS ARE SUPERIOR TO AMI TOOLS; AND THAT THE AMI CRIMPER IS SUPERIOR TO THE HAND-LINE CRIMPER**
 - 4) TO DISCUSS PERMANENT IMPLEMENTATION OF HAND-LINE TOOLS (OR DUPLICATES) ON THE AMI**

TI-NHTSA 004384

**PRECISION CONTROLS DESIGN ENGINEERING
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MY92 FORD CRUISE CONTROL PRESSURE SWITCH**

**EVIDENCE SUPPORTING THE THEORY THAT TEARDROP FORMATION IS RELATED TO
SHORTENED DIAPHRAGM LIFE:**

- o DURING DIAPHRAGM LIFE TESTING IN OCT. '91, ONE PARTICULAR SET OF TEST DEVICES SHOWED A PARTICULARLY POOR WEIBULL BETA (SLOPE); I.E. SOME DEVICES DIED RATHER QUICKLY WHILE OTHERS WERE MUCH MORE ROBUST.
- o SAMPLES OF THE LOW-LIFE AND HIGH-LIFE PARTS WERE OPENED TO OBSERVE THE CONDITION OF THE DIAPHRAGM.
- o LOW-LIFE PARTS SHOWED A VERY LOCALIZED RUPTURE, WHILE HIGH-LIFE PARTS SHOWED A MORE DISTRIBUTED WEAR PATTERN CIRCUMFERENTIALLY AT THE CONVERTER BUTTON. IT IS THOUGHT THAT THE LOCALIZED RUPTURE OCCURS DUE TO HIGH STRESSES AT THE APEX OF THE TEARDROP; ABSENCE OF TEARDROP MEANS NO ABNORMAL / ASYMMETRIC STRESSES AND THEREFORE HIGHER LIFE.
- o THIS FACT, COMBINED WITH THE FACT THAT ORIGINAL VALIDATION PARTS (SUMMER '91) SHOWED VERY POOR LIFE PLUS VERY OBVIOUS TEARDROPS, GAVE RISE TO THE HYPOTHESIS THAT PRESENCE OF THE TEARDROP IS CORRELATABLE TO SHORTENED DIAPHRAGM LIFE.

TI-NHTSA 004365

15 Jan 92 SBO 50-101

**PRECISION CONTROLS DESIGN ENGINEERING
KAPTON DIAPHRAGM LIFE REVIEW - 15 January 1992
MY92 FORD CRUISE CONTROL PRESSURE SWITCH**

PROCESS-RELATED PARAMETERS WHICH CONTRIBUTE TO TEARDROP FORMATION:

- o A TEST WAS PLANNED AND EXECUTED TO DETERMINE AT WHAT POINT IN THE MANUFACTURING PROCESS THE TEARDROP IS FORMED.
- o DEVICES WERE BUILT WITH AND WITHOUT GASKETS IN ORDER TO DETERMINE IF SOME FRICTION PHENOMENON DURING GASKET COMPRESSION WAS A CONTRIBUTOR.
- o DEVICES WERE REMOVED FROM THE AMI CRIMPER AT VARIOUS STAGES OF COMPLETION AS FOLLOWS:
 - BEFORE THE AIR-BLAST STATION
 - BEFORE THE SECOND (FINAL) STAGE OF CRIMP
 - BEFORE THE FIRST STAGE OF CRIMP I.E. AFTER PRECRIMP
- o RESULTS SHOW THAT THE ABSENCE OF GASKET CREATES A MUCH LOOSER DIAPHRAGM, WITH NO REAL IDENTIFIABLE TEARDROP OR OTHER GEOMETRY
- o PRIOR TO AIR-BLAST, A TWIN-APEX TEARDROP IS COMMONLY FOUND (GASKET PARTS)
- o PRIOR TO FINAL CRIMP, THE TWIN-APEX IS APPARENT BUT NOT AS WELL DEFINED
- o AFTER PRE-CRIMP, THE DIAPHRAGM IS PERFECTLY FLAT - THE SHAPES SEEM TO COME DIRECTLY FROM THE CRIMPING OPERATIONS

TI-NHT8A 004358

15 Jan 92 SBO 50-101

**PRECISION CONTROLS DESIGN ENGINEERING
KAPTON DIAPHRAGM LIFE REVIEW - 15 January 1992
MY92 FORD CRUISE CONTROL PRESSURE SWITCH**

EVIDENCE SUGGESTING THAT THE HAND-LINE CRIMP TOOLS ARE SUPERIOR TO AMI TOOLS; AND THAT THE AMI CRIMPER IS SUPERIOR TO THE HAND-LINE CRIMPER:

o **A TWO-BY-TWO MATRIX OF TEST PARTS WAS BUILT, USING:**

- HL TOOLS ON HL CRIMPER
- HL TOOLS ON AMI CRIMPER
- AMI TOOLS ON HL CRIMPER
- AMI TOOLS ON AMI CRIMPER

o **AFTER CYCLING ALL DEVICES TO FAILURE, WEIBULL PLOTS PRODUCED THE FOLLOWING RESULTS (RANKED BY CALCULATED RELIABILITY AT 500k CYCLES):**

- | | | | | |
|----|------------------|-----------|------------|-----------|
| 1) | HL TOOLS ON AMI | BETA=10.4 | THETA=709k | REL=97.4% |
| 2) | AMI TOOLS ON AMI | BETA=8.8 | THETA=668k | REL=86.3% |
| 3) | HL TOOLS ON HL | BETA=5.3 | THETA=670 | REL=80.9% |
| 4) | AMI TOOLS ON HL | BETA=7.9 | THETA=540 | REL=58.0% |

TI-NHTSA 004357

**PRECISION CONTROLS DESIGN ENGINEERING
KAPTON DIAPHRAGM LIFE REVIEW - 15 January 1992
MY92 FORD CRUISE CONTROL PRESSURE SWITCH**

PERMANENT IMPLEMENTATION OF HAND-LINE TOOLS (OR DUPLICATES) ON THE AMI:

- o FORD REQUIRED THAT WE COMPLETE A REVALIDATION AFTER "FIXING" OUR DIAPHRAGM LIFE PROBLEMS.
- o AT THE DROP-DEAD DATE EARLY IN NOV '91, WE WERE FORCED TO PUT OUR BEST FOOT FORWARD, THIS WAS HL TOOLS ON AMI.
- o WHILE WE ACTUALLY DID PASS VALIDATION, IT NOW MEANS THAT OUR VALIDATED PROCESS IS USING HL TOOLS ON AMI CRIMPER.
- o WE MUST UNDERSTAND THE EFFORTS INVOLVED IN IMPLEMENTING THIS AS A PERMANENT CORRECTIVE ACTION, SINCE THIS IS THE CUSTOMER'S PERCEPTION.

TI-NHTSA 004358

15 Jan 92 SBO 50-101

SG HQ= 271908 FR=SARN TO=PCQA SENT=01/16/92 11:22 AM
 R#-004 ST=C DIV=0050 CC=00101 ST=SARN AT=01/16/92 11:22 AM

HUARY 16, 1992

1: RUSTY STRUBLE	RCS2	CC: TOM CHARBONNEAU	TC
MIKE DeMATTIA	PCQA	JOHN KOURTESIS	NDES
CHARLIE DOUGLAS	CPFC	STEVE MAJOR	WELS
DICK GARIEPY	MFPC	ANDY NGQUIRK	PCQA
PAUL KOTCH	PRK1	ED O'NEILL	BJON
JOE LEMARS	JNL8		
STEVE OFFILER	SBO1	GARY SNYDER	CPFC
MATT SELLERS	PCNE	MARTHA SULLIVAN	CPFC
BILL SWEET	PCNE	RAY TOURANGEAU	PCNE
JIM WATT	PCQA	BILL CONGDON	MFPC
CLAIRE BALTHASAR	PNWT	STEVE MCCOONEY	NDES
TERRY RODRIGUEZ	MFPC	ELAINE ROSE	PCQA

FR: DAVE CEARN SARN

SJ: FORD CRUISE CONTROL PRESSURE SWITCH START-UP MEETING:
 01/16/92 MEETING MINUTES

Interd. FAS MTG. 1-30-92 9:25 PM
 ITT TEVES visit 2/4/92
 George CRANE 2-2

MEETING

THE NEXT MEETING IS SCHEDULED FOR:

DATE: 1/23/92 (THURSDAY)
 TIME: 10:00 - 11:30 AM
 PLACE: MARKETING CONFERENCE ROOM

77PS

Hexport:

Elco quoted 10B21/.00015" min. plate/no re-roll @ \$302.64/K (1992 economics). Current 36900 hex price is \$310.50/K, including re-roll at \$19.37/K. Our expectation is that the 10B21 price should be lower, considering the thinner plate and no re-roll. Paul noted this to Elco when he rec'd the quote and has asked for explanation. Elco's quality team visit to TIA is scheduled tentatively for Tuesday, 2/4.

. REPORT ON ELCO ISSUES FROM 7/22 VISIT KOTCH ONGOING
 - 10B21 STEEL/.00015" MIN. PLATE/J512 \$
 . J512 GAGE R&R STUDY → MATT + Dave P. SELLERS 01/23 GAGE @ Eng. Insp.
 Need to give this item a priority so it's completed prior to Elco's Feb. 4 visit.

. NOTIFY FORD OF CHANGE TO 10B21	DOUGLAS	02/14	
. QUOTE FOR 10B21 W/.0015" min. PLATE	KOTCH	01/16	ORIG.
AND NO RE-ROLL		01/16	COMP.
. ASK ELCO TO EXPLAIN 10B21 COST PRIOR TO 2/4 MTG.	KOTCH	01/23	

Environmental Seal:

. REMOVE -3 AS ALTERNATE FROM P/L OFFILER 01/30
 (ECN entered)

TI-NHTSA 004359

Production Issues:

MAINTAIN RUNNING TOTAL OF L/T (12-3)	STRUBLE	ONGOING
SWITCHES LEADING TO LOOK FOR AMORTISATION		
Status Date	Total Shipped	
Jan 18	11,424	
UPDATE PRODUCTION PLANS FOR ALL SWITCHES	DOUGLAS	ONGOING
UPDATE PRODUCTION COMPONENT AND ASN.	OFFILER	02/13
DRAWINGS TO CURRENT DESIGN LEVEL		
CHANGE FREQUENCY OF RING GAGE CALIB.	GARIEPY	01/09 ORIG.
FROM ONCE/6 WEEKS TO ONCE/QTR; KEEP LOG		STATUS ???
TO DETERMINE IF GAGES ARE OUT OF CAL.		

Sensor Assembly Machine:

UPGRADE KAPTON PICK AND PLACE	SELLERS	01/23
INSTALL WASHER/CONV. STATION ON AMI	SELLERS	01/30
PRIORITIZE REMAINING UPGRADE ITEMS	SELLERS	ONGOING

Base Assembly Machine:

EA machine is down due to spring blanking die; poor tool design by EA makes this a big effort. Machining is extensive, and may require equipment to be down until Monday 1/20 - Bill and Matt are expediting.

UPDATE PROGRESS OF ULTRASONICALLY	SELLERS/	ONGOING
WELDED SPRING ARM/TERMINAL ASSEMBLY	OFFILER	

Final Assembly Machine:

PV Testing/ISR:

F/U WITH FORD TO ENSURE APPROVAL LETTER	WATT	ONGOING	
IS RECEIVED BY 1/24.			
PROVIDE LIST OF MFG. OPERATIONS FOR	SMITH	01/15	ORIG.
Cpk REVIEW TO JIM WATT		01/15	COMP.
(Rec'd - needs to be modified to include 77PS P.C.)			
SELECT MFG. OPERATIONS FOR Cpk REPORTING	SELLERS	01/23	
PROVIDE QUARTERLY REPORTING OF ABOVE	WATT	start 03/31	
STATUS OF L/T APPROVAL ?	DOUGLAS/	11/28	ORIG.
	MAJOR	01/23	REV.

No issues remain on the K-E package. Terminal position needs to be resolved before submitting Dana/Pitts pkgs.

CORRECT TERMINAL POSITION	SELLERS	01/16	ORIG.
		01/20	REV.
RE-RUN P/C SAMPLES SO TERM'L POS'N	SELLERS	01/16	ORIG.
DATA CAN BE COLLECTED		01/20	REV.
MEASURE SAMPLES	SELLERS/	01/17	ORIG.
	ROSE	01/21	REV.
SUBMIT DANA/PITTS PKGS	WATT	01/23	ORIG.
DO PITTS/DANA HAVE THEIR OWN ENV. DNCS?	DOUGLAS	01/20	
(CHANGED DATE, SO WE CAN HAVE INFO BEFORE SHIPPING PKGS.)			

Diaphragm Life:

TI-NHTSA 004380

Mtg. held 1/15 to review diaphragm life issue. Several concepts to make design more robust were discussed. In the meantime, H-L dies will be replicated for use on AMI; full AMI sensor crimp can begin when this is complete and when we receive written approval (letter expected by 1/24). On-line impulse test will be used to monitor crimp process with new dies.

. IMPLEMENT SOLUTION TO DIAPHRAGM LIFE	OFFILER/ SELLERS	ONGOING	
* SET UP MTG TO REVIEW RESULTS OF CRIMP/ DIAPHRAGM LIFE STUDIES	OFFILER	01/09	ORIG.
		01/15	REV.
		01/15	COMP.
* ACTION PLAN FOR FULL AMI CRIMP	SELLERS	01/23	
* ACTION PLAN TO EVAL. DESIGN MODE.	OFFILER	01/23	

Low Differential Switch for NY94

. ESTABLISH LIST OF ACTIONS REQ'D TO START-UP LOW DIFF'L SWITCH	SELLERS	1/30
. DETERMINE IF ANY QUALIFICATION IS REQ'D	DOUGLAS	1/30
. EVALUATE TEVES M/C FOR NOISE	OFFILER	ONGOING
. REPORT RESULTS TO FORD/TEVES	OFFILER	TBD
. ENV. DWG. FOR LOW DIFF'L SWITCH	OFFILER	1/23
- REVIEW PROPOSED ENV. DWG WITH REDUCED # OF DIMENSIONS N/D. CEARN		
* TEVES VISIT TO TIA ?? - UPDATE	WATT	ONGOING

Miscellaneous:

. COMPLETE DESIGN FMEA	OFFILER	04/18	ORIG.
		02/14	REV.
. SEND LETTERS TO FORD/GM AND TIER 1'S; 3A THREAD GAGING	WATT/ CEARN	1/30	GM - won't accept 3A Gaging

Steve will set up new env. dwgs. with reference to gaging per ANSI B1.1.

PRODUCTION PLAN BY MONTH (THOUSANDS)

	F3V6 P/C 77PSL2-1	F3T4 L/T 77PSL2-1
NOV	6.4	13.6
DEC	35	9
JAN	75	7 (error on last wks' minutes)
FEB	60	12

REGARDS,
DAVE CEARN \49-FORD

TI-NHTSA 004361

-MSG N#- 299145 FR-SBO1 TO-CPPC SENT-01/17/92 08:23 AM
R#-087 ST-C DIV-0050 CC-00101 BY-SBO1 AT-01/17/92 08:23 AM

TO:	Tom Burke	MFPC	Dale Sogge	FFUN
	Jeff DiDomenico	ELB	Matt Sellers	PCME
	Charlie Douglas	CPPC	Rusty Struble	RCS2
	Paul Kotch	PRK1	Jim Watt	PCQA
	Steve Major	WHLZ		

CC: Tom Charboneau (delivered separately)
Dave Czarn

FR: Steve Offiler SBO1

SJ: Weekly Highlights

FORD MY'92 ELECTRONIC SPEED CONTROL DEACTIVATE PS

87PS: Charlie Douglas has begun to hold startup meetings, and we are proceeding with required planning to co-ordinate internal design validation plus customer production validation of 87PSL2-2, L8-1, and L11-3. Also included are revalidation of 57PSF3-5, and 57PSF9-1 which are running in parallel with 87PS testing. Certain devices already have ISR dates promised to Ford (92-04-15), which will serve to direct priorities. We are working on several items to streamline this process, including approval from Ford to consolidate specifications.

Since a fairly large number of devices will ultimately need to undergo Impulse and Thermal Cycle (using similarity as much as possible for all other tests) we are beginning to plan for cycler capacity. Jeff has devised a scheme to set up the new cycler to run the complex TC test unattended. He will place an order for an Omega dual-setpoint temperature controller needed to accomplish this, as well as a spare brake-fluid-compatible hydraulic cylinder.

SILENT DEVICE FOR MY93 SHO TAURUS: Benchtop testing of the M/C with our silent 77 installed showed extremely little audible noise, requiring amplification to hear at all. This suggests that the noise problem is emanating from elsewhere in the system, but of course it could still be stimulated by our switch. Ford has requested we perform an evaluation and respond with a formal test report. This will require that we obtain an ABS-equipped vehicle in order to isolate the source of noise. Any ABS Taurus, or any Continental (ABS standard) will fit this Teves M/C. We prefer a Taurus if possible, since Ford reports the problem manifests itself here, but we are having significant trouble locating a rental ABS Taurus. We may have to try the Continental, which is based on the Taurus platform but probably includes more sound-deadening materials which will make the audible noise situation different.

DIAPHRAGM LIFE: The ongoing square vs. round Kapton test has begun to produce interesting results. (Recall that round Kapton from a previous test, from an 8.5 x 11 sample sheet, produced exemplary results.) This test compares round and square cut from the same sample sheet. The test also includes a Japanese polyimide film from Ube, square, and a control lot. As the test nears 1KK cycles, 3 of 6 Ube parts are dead beginning at 414K; 4 of 6 controls are dead beginning at 545K; and NO failures from either square or round lot from sample sheet material. It seems obvious that the sample

material has much greater resistance to rupture, and it remains to be seen whether round vs. square makes a significant difference in these parts. Upon completion of this test, we should involve Dupont to explain the material differences (production vs. sample sheet) and possibly upgrade the production material.

A synopsis of developments in diaphragm life testing was presented this week. As a result, several good ideas were generated. The general attitude is that a more robust design is required, which is not sensitive to production line variables such as crimp tool geometries, crimp forces, etc. We will proceed with testing and development work, including the following experimentation: reduce/limit Kapton clamping by machining a step on the outer portion of the hexport flange to provide metal-to-metal contact to washer and using a small-diameter round diaphragm; try full-round diaphragms with only 2 layers; try Kapton without Teflon; addition of a "bump" male feature on the hexport with corresponding female in the washer in order to stretch the Kapton during assembly; and use of pre-bent, concave hexports (salvage parts, for example) to see if this eliminates the tendency of the diaphragm to move radially inward which is thought to happen as the hexport and washer bend at crimp.

TOKICO: Info coming from Charlie in Dearborn via Dave indicates we've laid our hands on a Tokico M/C with Hy-Stat switch installed. Apparently the switch mounts at an angle in order to clear the reservoir. We plan to completely characterize the switch, take photos and X-rays, then cross-section it.

Regards,
Steve O.

-MSG MH= 299145 FR=SB01 TO=PCME SENT=01/17/92 08:23 AM
R#=387 ST=C DIV=0050 CC=00101 BY=SB01 AT=01/17/92 08:23 AM

TO:	Tom Burke	MFPC	Dale Bogge	FFUN
	Jeff DiDomenico	ELB	Mat	PCME
	Charlie Douglas	CPPC	Rusty Struble	RCS2
	Paul Katch	PRK1	Jim Watt	PCQA
	Steve Major	WHLZ		

CC: Tom Charbonneau (delivered separately)
Dave Czarn

FR: Steve Offiler SB01

SJ: Weekly Highlights

=====

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TI-NHTSA 004364

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Regards,
Steve G.

HIGHLIGHTS
Stephen B. Offler
Week Ending 92-01-17

John
2017



FORD MY92 ELECTRONIC SPEED CONTROL DEACTIVATE PS

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SILENT DEVICE FOR MY93 SHO TAURUS: Benchtop testing of the MAC with our silent T7 installed showed extremely little audible noise, requiring amplification to hear at all. This suggests that the noise problem is emanating from elsewhere in the system, but of course it could still be stimulated by our switch. Ford has requested we perform an evaluation and respond with a formal test report. This will require that we obtain an ABS-equipped vehicle in order to isolate the source of noise. Any ABS Taurus, or any Continental (ABS standard) will fit this Taurus MAC. We prefer a Taurus if possible, since Ford reports the problem manifests itself here, but we are having significant trouble locating a rental ABS Taurus. We may have to try the Continental, which is based on the Taurus platform but probably includes more sound-deadening materials which will make the audible noise situation different.

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↳ SHARP DING, CRIMP QUALITY OFF SCALE
289/144

TI-NHTSA 004366

-MSG N#- 299145 FR-SBO1 TO-PCQA SENT-01/17/92 08:23 AM
R#-031 ST-C DIV-0050 CC-00101 BY-SBO1 AT-01/17/92 08:23 AM

cc Elaine R.
FyI

TO:	Tom Burke	MFPC	Dale Sogge	FFUN
	Jeff DiDomenico	ELB	Natt Sellers	PCNE
	Charlie Douglas	CFPC	Misty Struble	RCB2
	Paul Ketch	PRK1	Jim Wats	PCQA
	Steve Major	WHL3		

CC: Tom Charboneau (delivered separately)
Dave Czarn

FR: Steve Offiler SBO1

SJ: Weekly Highlights

FORD MY'92 ELECTRONIC SPEED CONTROL DEACTIVATION PS

87PS

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April 17, 1992

Since a fairly large number of devices will ultimately need to undergo Impulse and Thermal Cycle (using similarity as much as possible for all other tests) we are beginning to plan for cycler capacity. Jeff has devised a scheme to set up the new cycler to run the complex TC test unattended. He will place an order for an Omega dual-setpoint temperature controller needed to accomplish this, as well as a spare brake-fluid-compatible hydraulic cylinder.

SILENT DEVICE FOR MY93 SBO TAURUS: Benchtop testing of the M/C with our silent 77 installed showed extremely little audible noise, requiring amplification to hear at all. This suggests that the noise problem is emanating from elsewhere in the system, but of course it could still be stimulated by our switch. Ford has requested we perform an evaluation and respond with a formal test report. This will require that we obtain an ABS-equipped vehicle in order to isolate the source of noise. Any ABS Taurus, or any Continental (ABS standard) will fit this Taurus M/C. We prefer a Taurus if possible, since Ford reports the problem manifests itself here, but we are having significant trouble locating a rental ABS Taurus. We may have to try the Continental, which is based on the Taurus platform but probably includes more sound-deadening materials which will make the audible noise situation different.

also
Taurus

DIAPHRAGM LIFE: The ongoing square vs. round Kapton test has begun to produce interesting results. (Recall that round Kapton from a previous test, from an 8.5 x 11 sample sheet, produced exemplary results.) This test compares round and square cut from the same sample sheet. The test also includes a Japanese polyimide film from Ube, square, and a control lot. As the test nears 1KK cycles, 3 of 6 Ube parts are dead beginning at 414K; 4 of 6 controls are dead beginning at 545K; and NO failures from either square or round lot from sample sheet material. It seems obvious that the sample material has much greater resistance to rupture, and it remains to be seen whether round vs. square makes a significant difference in these parts. Upon completion of this test, we should involve Dupont to explain the material differences (production vs. sample sheet) and possibly upgrade the production material.

TI-NHTSA 004367

A synopsis of developments in diaphragm life testing was presented this week. As a result, several good ideas were generated. The general attitude is that a more robust design is required, which is not sensitive to production line variables such as crimp tool geometries, crimp forces, etc. We will proceed with testing and development work, including the following experimentation: reduce/limit Kapton clamping by machining a step on the outer portion of the hexport flange to provide metal-to-metal contact to washer and using a small-diameter round diaphragm; try full-round diaphragms with only 3 layers; try Kapton without Teflon; addition of a "bump" male feature on the hexport with corresponding female in the washer in order to stretch the Kapton during assembly; and use of pre-bent, concave hexports (salvage parts, for example) to see if this eliminates the tendency of the diaphragm to move radially inward which is thought to happen as the hexport and washer bend at crimp.

TOKICO: Info coming from Charlie in Dearborn via Dave indicates we've laid our hands on a Tokico M/C with Hy-Stat switch installed. Apparently the switch mounts at an angle in order to clear the reservoir. We plan to completely characterize the switch, take photos and X-rays, then cross-section it.

Regards,
Steve O.

PRESSURE SWITCH DATA

Form 21605

TEST NO. 191-15-03

DEVICE CCPS	DATE REQUESTED 1/17/92	REQUESTED BY Steve OLF 1st	REQUESTED COMPL. DATE
PERFORMED BY Jeffrey D. Parnes 60	DATE STARTED 2/12/92	DATE COMPLETED	APPROVED BY
PROJECT TITLE: Ford MY '91 Electron Speed Control Port into PS			

CUSTOMER

PURPOSE OF TEST: Stopped hexport, using a small-diameter, tall-round
drillings which is constrained primarily by the gasket.

PROCEDURE:

Build into sensors using an AMI.

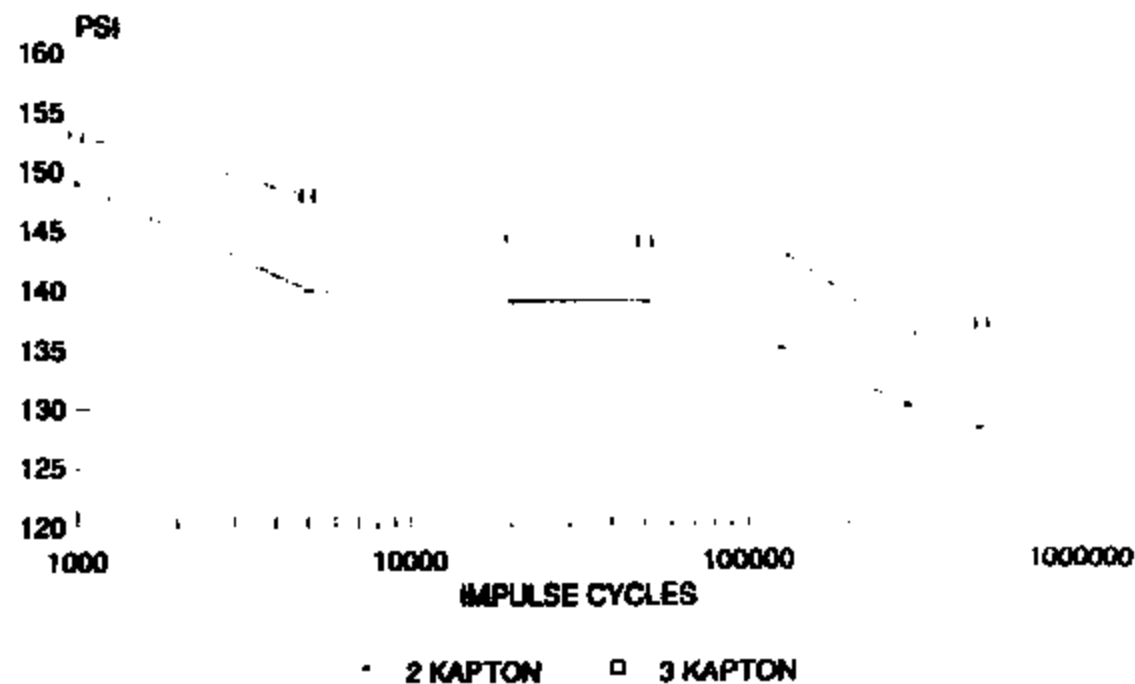
Get off hexports.

Build date 9/10/13

Cancelled

TI-NHTSA 004369

2 vs. 3 ROUND KAPTON CALIBRATION SHIFT (ACT)



TI-NHTSA 004371

JAD 920229

1. *Staphylococcus aureus* (ATCC 12228) and *Staphylococcus epidermidis* (ATCC 12228) were grown in TSB medium.

Date		Time		Location		Weather		Remarks	
1971	10/10	10:00	10:15	10:30	10:45	11:00	11:15	11:30	11:45
10:00 - 10:15: Arrived at the site. The weather was clear and the water was calm. The tide was low. 10:15 - 10:30: The first group of birds was observed. They were feeding on the ground near the water's edge. 10:30 - 10:45: The second group of birds was observed. They were feeding on the ground near the water's edge. 10:45 - 11:00: The third group of birds was observed. They were feeding on the ground near the water's edge. 11:00 - 11:15: The fourth group of birds was observed. They were feeding on the ground near the water's edge. 11:15 - 11:30: The fifth group of birds was observed. They were feeding on the ground near the water's edge. 11:30 - 11:45: The sixth group of birds was observed. They were feeding on the ground near the water's edge.									

1970-1971	420,000	1	148	76	145	72	142	70	144	71	140	69	135	68	138	67	136
1971-1972	420,000	1	155	77	152	73	149	71	144	71	143	69	135	68	131	67	129
1972-1973	420,000	1	156	77	153	72	145	70	142	69	144	71	139	68	137	67	135
1973-1974	420,000	1	160	78	157	73	150	71	146	72	145	70	136	69	137	68	134
1974-1975	420,000	1	161	78	158	73	151	71	147	72	146	70	137	69	138	68	135
1975-1976	420,000	1	162	78	159	73	152	71	148	72	147	70	138	69	139	68	136
1976-1977	420,000	1	163	78	160	73	153	71	149	72	148	70	139	69	140	68	137
1977-1978	420,000	1	164	78	161	73	154	71	150	72	149	70	140	69	141	68	138
1978-1979	420,000	1	165	78	162	73	155	71	151	72	150	70	141	69	142	68	139
1979-1980	420,000	1	166	78	163	73	156	71	152	72	151	70	142	69	143	68	140
1980-1981	420,000	1	167	78	164	73	157	71	153	72	152	70	143	69	144	68	141
1981-1982	420,000	1	168	78	165	73	158	71	154	72	153	70	144	69	145	68	142
1982-1983	420,000	1	169	78	166	73	159	71	155	72	154	70	145	69	146	68	143
1983-1984	420,000	1	170	78	167	73	160	71	156	72	155	70	146	69	147	68	144
1984-1985	420,000	1	171	78	168	73	161	71	157	72	156	70	147	69	148	68	145
1985-1986	420,000	1	172	78	169	73	162	71	158	72	157	70	148	69	149	68	146
1986-1987	420,000	1	173	78	170	73	163	71	159	72	158	70	149	69	150	68	147
1987-1988	420,000	1	174	78	171	73	164	71	160	72	159	70	150	69	151	68	148
1988-1989	420,000	1	175	78	172	73	165	71	161	72	160	70	151	69	152	68	149
1989-1990	420,000	1	176	78	173	73	166	71	162	72	161	70	152	69	153	68	150
1990-1991	420,000	1	177	78	174	73	167	71	163	72	162	70	153	69	154	68	151
1991-1992	420,000	1	178	78	175	73	168	71	164	72	163	70	154	69	155	68	152
1992-1993	420,000	1	179	78	176	73	169	71	165	72	164	70	155	69	156	68	153
1993-1994	420,000	1	180	78	177	73	170	71	166	72	165	70	156	69	157	68	154
1994-																	

TI-NHTSA 004372

TEXAS
INSTRUMENTS



cc: E/In+R.

Kelsey-Hayes Company
101 Oak Street
Milford, Michigan 48361

January 20, 1992

Attn: Mr. Clay Bailey
Manufacturing Engineer

Subj: Part Number E7BC-3N824-AA Pressure Switch
Part Number F3TA-9F924-AA Pressure Switch

Ref: Your 01/20/92 Telephone Call

Dear Clay,

The purpose of this letter is to substantiate our discussion concerning the above referenced pressure switches. The switches are to be assembled with the threaded metal hexport onto the application. Installation torque is to be applied only to the metal hexport part of the switch.

There is to be no torque applied to the plastic connector part of the switch. Any torque applied to the plastic connector may cause abnormal operation, damage, or destruction of the switch function.

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

Regards,


Jim Watt
DRA Engineer
Precision Controls Department
Control Products Division

cc: Dave Czarn, MS 12-29; Charlie Douglas, MS 12-33
Thomas Dan, Kelsey-Hayes Supplier Quality, Fenton, Mi.
Rita Gunia, Kelsey-Hayes Purchasing Dept., Fenton, Mi.
Andy McGuirk, MS 12-27
Steve Majors, TI Farmington Hills, Michigan

-MSG N#- 408207 FR=ZARN TO=PCQA SENT=01/21/92 02:49 PM
R#-140 ST=C DIV=0050 CC=00101 BY=ZARN AT=01/21/92 02:49 PM

JANUARY 21, 1992

TO:	RUSTY STRUBLE	RCS2	CC:	TOM CHARBONEAU	TC
	MIKE DeMATTIA	PCQA		JOHN KOURTESIS	MDES
	CHARLIE DOUGLAS	CPPC		STEVE MAJOR	WHLE
	DICK GARIEPY	MFPC		ANDY MCGUIRK	PCQA
	PAUL KOTCH	PRK1		ED O'NEILL	EJON
	JOE LAZARZ	JML8			
	STEVE OFFILER	SBO1		GARY SNYDER	CPPC
	MATT SELLERS	PCME		MARTHA SULLIVAN	CPPC
	BILL SWEET	PCME		RAY TOURANGEAU	PCME
	JIM WATT	PCQA		BILL CONGDON	MFPC
	CLAIRE BALTHASAR	PSWT		STEVE MCGOONEY	MDES
	TERRY RODRIGUEZ	MFPC		ELAINE ROSE	PCQA

FR: DAVE CZARN ZARN

SJ: FORD CRUISE CONTROL PRESSURE SWITCH START-UP MEETING:
01/16/92 MEETING MINUTES

MEETING

THE NEXT MEETING HAS BEEN CHANGED TO:

DATE: 1/23/92 (THURSDAY)
TIME: 10:00 - 11:30 AM
PLACE: ***** CAFETERIA CUBE *****

REGARDS,
DAVE CZARN

TI-NHTSA 004374

-MSG #4= 271908 FR=EARN TO=PCQA SENT=01/16/92 11:22 AM
R#-004 ST=C DIV=0050 CC=00101 BY=EARN AT=01/16/92 11:22 AM

JANUARY 16, 1992

TO: RUSTY STRUBLE	RCS2	CC: TOM CHARBONEAU	TC
MIKE DeMATTIA	PCQA	JOHN KOURTESIS	MDES
CHARLIE DOUGLAS	CPPC	STEVE MAJOR	WHLZ
DICK GARIEPY	MFPC	ANDY McGUIRK	PCQA
PAUL KOTCH	PRK1	ED O'NEILL	BJON
JOE LAHARZ	JML8		
STEVE OFFILER	SB01	GARY SNYDER	CPPC
MATT SELLERS	PCNE	MARTHA SULLIVAN	CPPC
BILL SWEET	PCNE	RAY TOURANGEAU	PCNE
JIM WATT	PCQA	BILL CONGDON	MFPC
CLAIRE BALTHASAR	PSWT	STEVE MCCOKEY	MDES
TERRY RODRIGUEZ	MFPC	ELAINE ROSE	PCQA

FR: DAVE CHARN EARN

SJ: FORD CRUISE CONTROL PRESSURE SWITCH START-UP MEETING:
01/16/92 MEETING MINUTES

INTERNAL-PCQ MTG. 1-30-92 9AM PCQ
ITT TEVES visit 2/4/92
George CRANE 2-21
+

MEETING

THE NEXT MEETING IS SCHEDULED FOR:

DATE: 1/23/92 (THURSDAY)
TIME: 10:00 - 11:30 AM
PLACE: MARKETING CONFERENCE ROOM

77PS

Hexport:

Elco quoted 10B21/.00015" min. plate/no re-roll @ \$302.64/K (1992 economics). Current 36900 hex price is \$310.50/K, including re-roll at \$18.37/K. Our expectation is that the 10B21 price should be lower, considering the thinner plate and no re-roll. Paul noted this to Elco when he rec'd the quote and has asked for explanation. Elco's quality team visit to TIA is scheduled tentatively for Tuesday, 2/4.

. REPORT ON ELCO ISSUES FROM 7/22 VISIT KOTCH ONGOING
- 10B21 STEEL/.00015" MIN. PLATE/J512 \$
. J512 GAGE R&R SHOT -> MATT + Dave P. SELLERS 01/23 Gage @ Brg Insp.
Need to give this item a priority so it's completed prior to Elco's Feb. 4 visit.

. NOTIFY FORD OF CHANGE TO 10B21	DOUGLAS	02/14	
. QUOTE FOR 10B21 W/.00015" min. PLATE	KOTCH	01/16	ORIG.
AND NO RE-ROLL		01/16	COMP.
* ASK ELCO TO EXPLAIN 10B21 COST PRIOR	KOTCH	01/23	
TO 2/4 MTG.			

Environmental Seal:

. REMOVE -3 AS ALTERNATE FROM P/L OFFILER 01/30
(ECN entered)

TI-NHTSA 004375

Production Issues:

- MAINTAIN RUNNING TOTAL OF L/T (L2-3) STRUBLE ONGOING
SWITCHES LEADING TO 100K FOR AMORTIZATION
Status Date Total Shipped
Jan 16 11,424
- UPDATE PRODUCTION PLANS FOR ALL SWITCHES DOUGLAS ONGOING
- UPDATE PRODUCTION COMPONENT AND ASN. OFFILER 02/13
DRAWINGS TO CURRENT DESIGN LEVEL
- * CHANGE FREQUENCY OF RING GAGE CALIB. GARIEPY 01/09 ORIG.
FROM ONCE/6 WEEKS TO ONCE/QTR; KEEP LOG STATUS ???
TO DETERMINE IF GAGES ARE OUT OF CAL.

Sensor Assembly Machine:

- UPGRADE KAPTON PICK AND PLACE SELLERS 01/23
- INSTALL WASHER/CONV. STATION ON AMI SELLERS 01/30
- PRIORITIZE REMAINING UPGRADE ITEMS SELLERS ONGOING

Base Assembly Machine:

BA machine is down due to spring blanking die; poor tool design by EA makes this a big effort. Machining is extensive, and may require equipment to be down until Monday 1/20 - Bill and Matt are expediting.

- UPDATE PROGRESS OF ULTRASONICALLY WELDED SPRING ARM/TERMINAL ASSEMBLY SELLERS/ OFFILER ONGOING

Final Assembly Machine:

FV Testing/ISR:

- F/U WITH FORD TO ENSURE APPROVAL LETTER WATT ONGOING
IS RECEIVED BY 1/24.
- * PROVIDE LIST OF MFG. OPERATIONS FOR SMITH 01/15 ORIG.
Cpk REVIEW TO JIN WATT 01/15 COMP.
(Rec'd - needs to be modified to include 77PS P.C.)
- * SELECT MFG. OPERATIONS FOR Cpk REPORTING SELLERS 01/23
- * PROVIDE QUARTERLY REPORTING OF ABOVE WATT start 03/31
- * STATUS OF L/T APPROVAL ? DOUGLAS/ 11/28 ORIG.
MAJOR 01/23 REV.

No issues remain on the K-E package. Terminal position needs to be resolved before submitting Dana/Pitts pkgs.

- * CORRECT TERMINAL POSITION SELLERS 01/16 ORIG.
01/20 REV.
- * RE-RUN P/C SAMPLES SO TERM'L POS'N SELLERS 01/16 ORIG.
DATA CAN BE COLLECTED 01/20 REV.
- * MEASURE SAMPLES SELLERS/ 01/17 ORIG.
ROSE 01/21 REV.
- * SUBMIT DANA/PITTS PKGS WATT 01/23 ORIG.
- * DO PITTS/DANA HAVE THEIR OWN ENV. DNGS? DOUGLAS 01/20
- (CHANGED DATE, SO WE CAN HAVE INFO BEFORE SHIPPING PKGS.)

Diaphragm Life:

TI-NHTSA 004376

Mtg. held 1/15 to review diaphragm life issue. Several concepts to make design more robust were discussed. In the meantime, H-L dies will be replicated for use on ANI; full ANI sensor crimp can begin when this is complete and when we receive written approval (letter expected by 1/24). On-line impulse test will be used to monitor crimp process with new dies.

. IMPLEMENT SOLUTION TO DIAPHRAGM LIFE	OFFILER/SELLERS	ONGOING	
* SET UP MTG TO REVIEW RESULTS OF CRIMP/DIAPHRAGM LIFE STUDIES	OFFILER	01/09 01/15 01/15	ORIG. REV. COMP.
* ACTION PLAN FOR FULL ANI CRIMP	SELLERS	01/23	
* ACTION PLAN TO EVAL. DESIGN MODS.	OFFILER	01/23	

Low Differential Switch for MY94

. ESTABLISH LIST OF ACTIONS REQ'D TO START-UP LOW DIFF'L SWITCH	SELLERS	1/30
. DETERMINE IF ANY QUALIFICATION IS REQ'D	DOUGLAS	1/30
. EVALUATE TEVES M/C FOR NOISE	OFFILER	ONGOING
. REPORT RESULTS TO FORD/TEVES	OFFILER	TBD
. ENV. DWG. FOR LOW DIFF'L SWITCH	OFFILER	1/23
- REVIEW PROPOSED ENV. DWG WITH REDUCED # OF DIMENSIONS W/D. CERN		
* TEVES VISIT TO TIA ?? - UPDATE	WATT	ONGOING

Miscellaneous:

. COMPLETE DESIGN FMEA	OFFILER	04/19 02/14	ORIG. REV.
. SEND LETTERS TO FORD/GM AND TIER 1'S; 3A THREAD GAGING	WATT/ CERN	1/30	GM - won't accept 3A gaging!

Steve will set up new env. dwgs. with reference to gaging per ANSI B1.1.

PRODUCTION PLAN BY MONTH (THOUSANDS)

	F2V6 P/C 77PSL2-1	F3T4 L/T 77PSL2-3
NOV	6.4	13.6
DEC	35	9
JAN	75	7 (error on last wks' minutes)
FEB	60	12

REGARDS,
DAVE CERN \49-FORD

TI-NHT8A 004377

-MSG #4- 424533 FR-DT1 TO-PCQA SENT-01/22/92 07:37 AM
R#-152 ST-C DIV-0050 CC-00101 BY-DT1 AT-01/22/92 07:37 AM

JANUARY 22, 1992

TO: CHARLIE DOUGLAS CPPC
DICK GARIEPY NFPC
HARRY NIJENHUIS HUIS
MATT SELLERS PCME
GARY SNYDER CPPC
RUSTY STRUBLE RCS2
BILL SWEET PCME
JIM WATT PCQA

CC: TOM CHARBONEAU TC
STEVE OFFILER SBO1

FR: DAVE CEARN EARN

SJ: P/S RESPONSIBILITIES

EFFECTIVE IMMEDIATELY, STEVE OFFILER WILL HAVE FULL DESIGN
ENGINEERING RESPONSIBILITY FOR THE FORD-EUROPE SWITCHES. STEVE'S
PROJECTS WILL INCLUDE ALL OF THE 87PS/57PS VALIDATION TESTING
TARGETED FOR COMPLETION IN EARLY 2Q92.

REGARDS,
DAVE CEARN
/dt

CC - Elaine R. ✓

DENNA M.

Bob Duffin

tyI/Smith
1/22/92

TI-NHTSA 004378

-MSG M#- 29480 FR=ZARN TO=GAMY SENT=01/23/92 12:41 PM
R#-027 ST=C DIV=0050 CC=00101 BY=ZARN AT=01/23/92 12:41 PM

JANUARY 23, 1992

TO: RUSTY STRUBLE	RC82	CC: TOM CHARBONEAU	TC
MIKE DeMATTIA	MD3	JOHN KOURTESIS	MDES
CHARLIE DOUGLAS	CNP1	STEVE MAJOR	WHLZ
DICK GARIEPY	MFPC	ANDY McGUIRK	PCQA
PAUL KOTCH	PRK1	ED O'NEILL	EJON
JOE LAZARZ	JML8		
STEVE OFFILER	SBO1	GARY SNYDER	CPFC
MATT SELLERS	PCME	MARTHA SULLIVAN	CPFC
BILL SWEET	PCME	RAY TOURANGEAU	PCME
JIM WATT	PCQA	BILL CONGDON	MFPC
CLAIRE BALTHAZAR	PSWT	STEVE MCCOGEY	MDES
TERRY RODRIGUEZ	MFPC	ELAINE ROSE	GAMY

FR: DAVE CZARN ZARN

SJ: FORD CRUISE CONTROL PRESSURE SWITCH START-UP MEETING:
01/23/92 MEETING MINUTES

MEETING

THE NEXT MEETING IS SCHEDULED FOR:

DATE: 1/30/92 (THURSDAY)
TIME: 10:00 - 11:30 AM
PLACE: MARKETING CONFERENCE ROOM

77PS

Export:

Elco still needs to provide input on the 10B21 quote, which the team believes is unjustifiably high. Charlie proposes 10B21 as a PBC to Ford, provided we can negotiate the price to where it probably should be.

. REPORT ON ELCO ISSUES FROM 7/22 VISIT	KOTCH	ONGOING	
- 10B21 STEEL/.00015" MIN. PLATE/J512 \$			
* J512 GAGE R&R STUDY	SELLERS	01/23	ORIG.
		02/07	
. NOTIFY FORD OF CHANGE TO 10B21	DOUGLAS	02/14	
* ELCO EXPLANATION OF 10B21 COST	KOTCH	01/23	ORIG.
		01/30	REV.

ISW?
MAT. ANAL.

Environmental Seal:

. REMOVE -3 AS ALTERNATE FROM P/L OFFILER 01/30
(ECN entered)

Production Issues:

Matt proposed we consider calibrating all base assemblies to the same dimension, then select pins when needed. The original intent of the design and process was to calibrate the base as needed so a single pin is always used. Matt's concern is mostly for

TI-NHT8A 004379

calibrating at the extremes; too little contact height adjustment may result in a large sigma, too much may cause early life failures for broken contacts. Also, the pin-selecting process is already planned as a way to rework process for base asms. that do not meet calibration targets. Not all team members believe we should change the mfg. approach of calibrating base asms. Matt will study the issue further.

* PLAN FOR DETERMINING IF CALIBRATING AT THE EXTREMES IS A YLD. OR LIFE PROB.	SELLERS	02/07	
* DETERMINE WHICH MFG. APPROACH IS BEST	TEAM	ONGOING	
. UPDATE PRODUCTION COMPONENT AND ASM. DRAWINGS TO CURRENT DESIGN LEVEL	OFFILER	02/13	
* CHANGE FREQUENCY OF RING GAGE CALIB. FROM ONCE/6 MONTHS TO ONCE/QTR; KEEP LOG TO DETERMINE IF GAGES ARE OUT OF CAL.	GARIEPY	01/09	ORIG.
		01/23	COMP.

Sensor Assembly Machine:

* UPGRADE KAPTON PICK AND PLACE	SELLERS	01/23	ORIG.
		01/31	REV.
* INSTALL WASHER/CONV. STATION ON AMI	SELLERS	01/31	
. PRIORITIZE REMAINING UPGRADE ITEMS	SELLERS	ONGOING	

Base Assembly Machine:

EA machine was down last week due to the spring blanking die; poor tool design by EA made this a big effort. After modifications, there are still problems; build schedule impacted by 1 week. 57PS is not an optional backup since Ford has obsoleted the P/N. Work on tooling should be completed today, so production can resume; work is scheduled for Saturday, provided equipment is operational.

* ORDER NEW BLANKING TOOL	GARIEPY/	01/27	
. UPDATE PROGRESS OF ULTRASONICALLY WELDED SPRING ARM/TERMINAL ASSEMBLY	SELLERS/	ONGOING	
	OFFILER		

Matt and Steve McCooey visited Stapla 1/22 and returned w/parts for testing.

Final Assembly Machine:

* MODIFY UNLOAD TO MINIMIZE DAMAGE TO SEALING SURFACE	GARIEPY	01/30	
* ESTAB. PLAN W/STEVE, AL AND STAN TO DETMN. EFFECT OF DAMAGE ON SEALING SURF.	CZARN	01/30	

PV Testing/ISR:

We've received written P/C approval!!!

* F/U WITH FORD TO ENSURE APPROVAL LETTER IS RECEIVED BY 1/24.	WATT	COMP.	
. SELECT MFG. OPERATIONS FOR Cpk REPORTING	SELLERS	01/23	ORIG.
		01/30	COMP.

Initially, the reported op's will be calibration and thread check. Ford SQA asked that we report Cpk on a diaphragm life-related characteristic. If such a characteristic is identified, we'll consider adding it to the quarterly Cpk report.

TI-NHTSA 004380

. PROVIDE QUARTERLY REPORTING OF ABOVE	WATT start	03/31	
* STATUS OF L/T APPROVAL	DOUGLAS/	11/28	ORIG.
	MAJOR	01/30	REV.
* CORRECT TERMINAL POSITION	SELLERS	01/16	ORIG.
(get commitment from mechanization)		01/30	REV.
* RE-RUN P/C SAMPLES SO TERM'L POS'N	SELLERS	01/16	ORIG.
DATA CAN BE COLLECTED		?????	
* MEASURE SAMPLES	SELLERS/	01/17	ORIG.
	ROSE	?????	REV.
. SUBMIT DANA/PITTS PKGS	WATT	01/23	ORIG.
* DO PITTS/DANA HAVE THEIR OWN ENV. DWGS?	DOUGLAS	01/20	ORIG.
No, they don't.		01/20	COMP.

Diaphragm Life:

* UPDATE TEAM ON IMPLEMENTING FULL AMI CRIMP AND TESTING OF MODIFIED DESIGNS	OFFILER/	ONGOING	
	SELLERS		
* SET UP MTG TO REVIEW RESULTS OF CRIMP/DIAPHRAGM LIFE STUDIES	OFFILER	01/09	ORIG.
		01/15	REV.
		01/15	COMP.
* ACTION PLAN FOR FULL AMI CRIMP	SELLERS	01/23	ORIG.
		01/23	COMP.
* ACTION PLAN TO EVAL. DESIGN MODS.	OFFILER	01/23	ORIG.
		01/23	COMP.
* BEGIN BUILDING P/C WITH FULL AMI CRIMP	SELLERS/	PROVIDE DATE	
	GARIEFY	@ NEXT MTG	

Low Differential Switch for NY94

. ESTABLISH LIST OF ACTIONS REQ'D TO START-UP LOW DIFF'L SWITCH	SELLERS	1/30	
. DETERMINE IF ANY QUALIFICATION IS REQ'D	DOUGLAS	1/30	
. EVALUATE TEVES M/C FOR NOISE	OFFILER	ONGOING	
. REPORT RESULTS TO FORD/TEVES	OFFILER	TBD	
* ENV. DWG. FOR LOW DIFF'L SWITCH	OFFILER	1/23	ORIG.
- REVIEW PROPOSED ENV. DWG WITH REDUCED # OF DIMENSIONS W/D. CZARN		1/30	REV.
* TEVES VISIT TO TIA SCHEDULED FOR FEB 11	WATT	COMP.	

Miscellaneous:

. COMPLETE DESIGN FMEA	OFFILER	04/18	ORIG.
		02/14	REV.
. SEND LETTERS TO FORD/GM AND TIER 1'S; 3A THREAD GAGING	WATT/	1/30	
	CZARN		

Production Plan:

. MAINTAIN RUNNING TOTAL OF L/T (L2-3) SWITCHES LEADING TO 100K FOR AMORTIZATION	STRUBLE	ONGOING
Status Date	Total Shipped	
Jan 23	12,376	
. UPDATE PRODUCTION PLANS	STRUBLE	ONGOING

P/C

L/T

TI-NHTSA 004381

	<u>77PSL2-1</u>	<u>77PSL2-3</u>
NOV	6.4	13.6
DEC	35	9
JAN	75	7
FEB	60	12
MAR	50	10

REGARDS,
DAVE CZARN \50-FORD

TI-NHTSA 004382

-MSG N# 30865 FR-VAGS TO-PCQA SENT-01/23/92 01:05 PM
R#-017 ST-C DIV-0050 CC-00134 BY-VAGS DT-01/23/92 01:05 PM

TO: RUSTY STRUBLE PCS2
JOE LAEAR JNL8
PAUL WESTERLIND BS11
STEVE OFFILER EBO1
STAN HONOL SE2
ED RADISEVSKIS NDMS

CC: BILL SWEET PCNE
CHARLIE DOUGLAS CPFC
DAVE CLEARN SARN
DICK GARIEPY NFPC
TOM-BURKE NFPC
JIM WATT PCQA

FR: MATT SELLERS PCNE

SJ: 74179-2 THREAD CAP CHANGE

A MEETING WAS HELD 1/21/92 WITH RUSTY, JOE, PAUL, AND MYSELF IN ATTENDANCE. WE OUTLINED PLANS TO CONVERT 77PS AND SUBSEQUENTLY 57/87PS PARTS LIST TO CALL OUT AN ALTERNATE THREAD CAP. THIS CHANGE, AS YOU KNOW, IS REQUIRED TO ALLOW FULL AUTOMATION OF THE CAP INSTALLATION. THE CURRENT VINYL DIPPED PART NUMBER IS 74179-2; SINCLAIR AND ROSE ARE THE SUPPLIER. THE NEW THREAD CAP, (WHICH IS A STANDARD EC-6 CAP), HAS A PART NUMBER RESERVED AS 74888-1; THE CAPLOGS DIVISION OF PROTECTIVE CLOSURES CO., INC. WILL SUPPLY.

IN SUMMARY, THE SCHEME WILL BE ~~WOM~~ TO CONVERT ALL 77PS PRODUCTS TO THE NEW CAP IMMEDIATELY. ALL 57PS AND SOON TO BE 87PS PRODUCTS WILL BE CONVERTED AS SOON AS INVENTORY CHANGEOVER IS COMPLETE. JOE AND PAUL PREDICT THIS WILL HAPPEN AROUND 5/1/92.

HENDRICK'S, THE BOWL SUPPLIER FOR THIS PROJECT, IS CURRENTLY DRAWING UP PLANS TO MODIFY THE CURRENT FEEDER TO ASSEMBLE THE 74888-1 THREAD CAP.

BELOW I WILL LIST ACTIONS IN NEED OF DOING. PLEASE PLAN TO UPDATE ME ON EACH OF THESE ITEMS STATUS AS PROGRESS IS MADE.

ACTIONS:

CHANGE ALL 77PS PARTS LIST AND AFFECTED PRINTS TO REFLECT 74888-1 AS THE THREAD CAP FOR USE.

STEVE O.

ADD 74888-1 THREAD CAP TO ALL 87PS PARTS LIST AND PRINTS AS THEY ARE DRAFTED.

STEVE O.

ADD 74888-1 THREAD CAP AS THE "PRIMARY" ON ALL 57PS PARTS LIST AND PRINTS. LEAVING 74179-2 AS AN ALTERNATE.

STAN H.

RECEIVE FORMAL PROPOSED MODIFICATION PLAN FROM HENDRICKS. NEED LEAD TIME, ETC.

ED K.

RECEIVE MODIFIED FEEDER FROM HENDRICKS AND INSTALL ON THE FUCTION TESTER.

ED K.

*cc = clainer,
Fgt/mt
01/23/92*

TI-NHTSA 004383

PLACE PRODUCTION ORDERS FOR 74888-1 THREAD CAPS
COMMENSURATE WITH IMMEDIATE 77PS REQUIREMENTS, AND
ALSO 57/87PS REQUIREMENTS BEGINNING 8/1/92. DELETE
THE 74179-2 FROM FUTURE ORDERING PLANS.

JOE L.

VERIFY NO ADDITIONAL ORDERS ARE PLACED FOR 74179-2,
AND THAT SUFFICIENT RELEASES ARE SCHEDULED WITH
CAPLING TO SUPPORT JOE'S REQUIREMENTS.

PAUL W.

VERIFY THAT THE P.O. PRICE DOES NOT EXCEED THE
QUOTED \$5.40/K.

PAUL W.

DETERMINE THROUGH ANCHOR ENGINEERING IF AN
ALTERNATE COLOR SUCH AS NATURAL OR GREEN WILL
RESULT IN PRICE REDUCTIONS.

PAUL W.

THANKS & REGARDS...NATT
K1245

TI-NHTSA 004384

HEXPORT MATERIAL EVALUATION 10L10 VS. 10B21

In order to determine if 10B21 steel is a suitable replacement/substitute for the present production 10L10 steel hexport material, three different types of tests were run. One involved cross-sectioning one hexport of each material and performing Diamond Pyramid Hardness readings in various areas, specifically at the roots and crests of the threads. The second test involved affixing the threaded portion in a vise and applying a measured torque to the hex until failure occurred. The third involved a burst test of actual pressure switches built with hexports of each material.

The results of the DPH test, using a 200-gram indenter, showed the average reading in the threaded area to be 244 for the 10B21 vs. 194 for the 10L10. A higher reading means greater hardness.

The torque test was run on ten hexports of each material. During this test, shear failure occurred at the thread undercut (similar geometry to the O-ring gland on hexports so intended) in all cases. 3/8-24 nuts were affixed to the male hexport thread with Loctite and held firmly in a vice to ensure that hexport failure would occur. (Preliminary testing showed the female thread would strip otherwise.) Torque was increased in 1 ft-lb increments with a limit-release type torque wrench, and the sequence of test parts was randomized to remove any potential effects of calibration drift. The average torque to reach shear failure was 51.8 ft-lb for 10B21 vs. 41.3 ft-lb for 10L10.

The burst test was run on 12 pressure switches total, using 6 hexports of each material. The procedure involves slowly increasing hydraulic pressure while observing a gage, and recording the peak value attained at the point of yield. This is signalled by a sudden drop in test pressure of several hundred psi, and is due to plastic deformation of some internal component(s) which results in a larger fluid volume, hence the pressure drop. The hexport is generally involved in the failure mode, showing some deformation in the flange area. Results show the average burst strength of devices built with 10B21 hexports was 7983 psi vs. 7650 for 10L10.

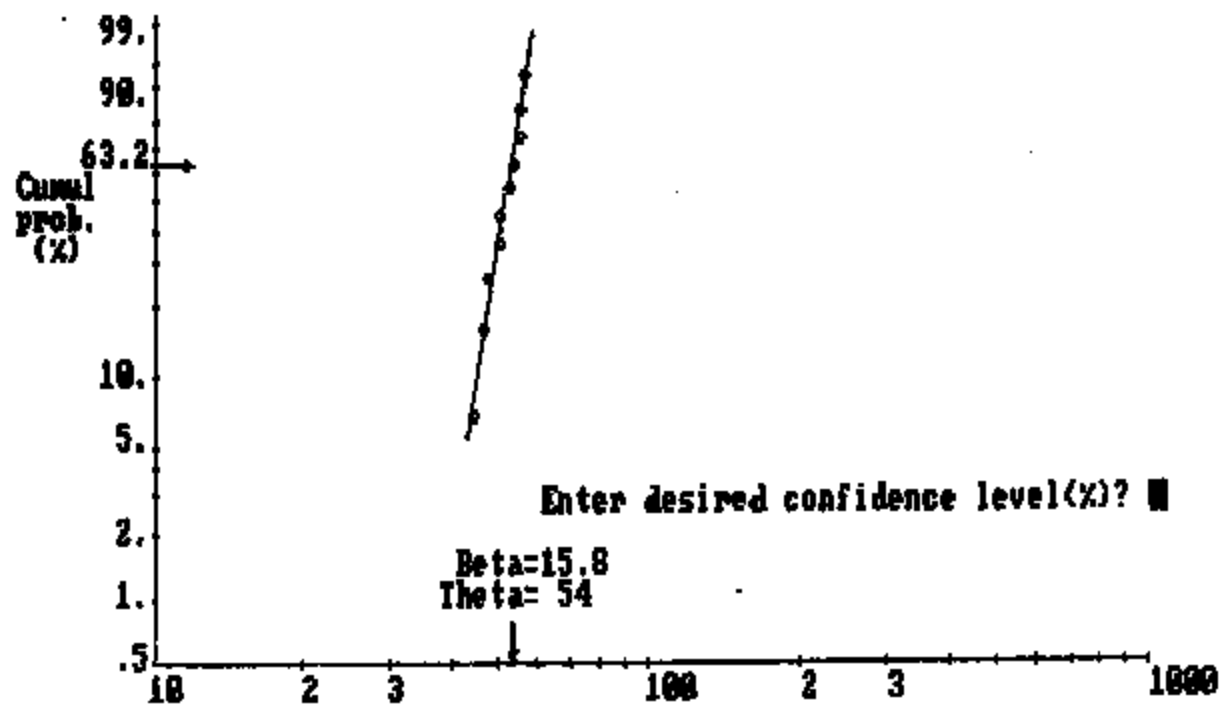
As can be seen above, in each of the three functional tests the 10B21 was shown to be superior. The magnitude of the improvement in physical properties is not extremely large, but significant nonetheless. The 10B21 material has higher carbon content, and contains boron to improve heat-treatability. Even without a heat-treat, this material will cold-work to a greater hardness than the 10L10 which accounts for the observed differences. There is no reason to expect any difference whatsoever in other properties, such as the level of corrosion protection offered by zinc and chromate plating.


Stephen B. Offler, Design Engineer
Texas Instruments Inc.

920123

TI-NHTSA 004385

Torque to failure of 10B21 Hex parts



TI-NHT8A 004386

-MSG M#- 52551 FR=SB01 TO=CPPC SENT=01/24/92 07:45 AM
R#-384 ST=C DIV=0050 CC=00101 SY=SB01 AT=01/24/92 07:45 AM

TO:	Tom Burke	MFPC	Dale Sogge	FFUN
	Jeff DiDomenico	ELB	Matt Sellers	PCME
	Charlie Douglas	CPPC	Rusty Struble	RCS2
	Paul Kotch	PRK1	Jim Watt	PCQA
	Steve Major	WHLZ		

CC: Tom Charboneau (delivered separately)
Dave Czarn

FR: Steve Offiler SBO1

SJ: Weekly Highlights

FORD MV'92 ELECTRONIC SPEED CONTROL DEACTIVATE PS

87PS: Planning for the various validations and all attendant documentation continues. We are presently working with Tom Strauss (PC Steering) and John Kaippel (LT Steering) to consolidate the two separate ES's (E53C for most applications, and E57A for LT). We've been able to steer LT away from the temperature characterizations required during their Thermal Cycle test. The Impulse test, previously 225K to 1450 psi and 775K to 600 psi was tentatively changed to 250K at 1450 psi, but John dug up a hose assembly ES which calls out 400K to 1600 psi. Before we settle on anything, I've requested that John forward a copy of that spec. It is possible that other parameters (such as temperature) are also different. Regardless, any changes apply to Validation testing, not to In-Process testing which will remain the same.

CUSTOMER ISSUES: Marketing has come up with a plan to borrow a car from Tasca Lincoln-Mercury in order to install the Teves M/C and conduct experiments on switch noise. We will visit Tasca today to finalize details. I have roughed out a test plan which will be presented to Tasca management. We have five switches that we'd like to experiment with: 1) the low-differential "silent" switch returned with the M/C; 2) a snubber device with snap disc; 3) a snubber device with low-diff disc; 4) a device using a custom diaphragm composed of layers of Kapton and EPDM rubber; 5) the Hi-Stat switch. We hope to be able to determine where the noise is coming from, and under what conditions, so that we may recommend possible solutions to Ford.

We've learned that our delay in producing an envelope drawing for WIN88 has upset a certain individual on that program, who has now threatened to go ahead with Hi-Stat. In order to placate this individual, we will place high priority on producing this print, although his reaction is somewhat childish and underscores a seemingly fundamental problem with the TI/Ford working relationship.

DIAPHRAGM LIFE: The present test of round vs. square diaphragms is nearing completion. The round test parts are again showing the best life, with only 3 of 6 dead and no Weibull stat's calculated yet. The square test parts (same sample-sheet material as round) have 5 of 6 dead, with a rel. at 500K = 99.91%. The controls (production material) have all 6 dead, with rel. at 500K = 95.76%.

TI-NHTSA 004387

Finally, the Japanese polyimide material shows the worst life with all 6 dead and a rel. at 500K = 83.29%.

We have an outline, but still need to finalize plans to continue with diaphragm life experiments as discussed at last week's meeting. This is complicated somewhat by the need for cyclical resources to conduct the battery of validation tests for 57PS and 87PS.

PRODUCTION ISSUES: Mfg. Eng. is interested in redefining the 77PS switch calibration scheme, by running the calibrator/check station at a fixed value and selecting pins as appropriate for different sensor lots. A meeting will need to be organized in the near future to explore ramifications of this.

Regards,
Steve O.

HIGHLIGHTS
Stephen B. Offler
Week Ending 92-01-24

Handwritten signature and date 1/20/92



FORD MY'92 ELECTRONIC SPEED CONTROL DEACTIVATE PS

87PS: Planning for the various validations and all attendant documentation continues. We are presently working with Tom Strauss (PC Steering) and John Kaippel (LT Steering) to consolidate the two separate ES's (E53C for most applications, and E57A for LT). We've been able to steer LT away from the temperature characterizations required during their Thermal Cycle test. The impulse test, previously 225K to 1450 psi and 775K to 600 psi was tentatively changed to 250K at 1450 psi, but John dug up a hose assembly ES which calls out 400K to 1600 psi. Before we settle on anything, I've requested that John forward a copy of that spec. It is possible that other parameters (such as temperature) are also different. Regardless, any changes apply to Validation testing, not to In-Process testing which will remain the same.

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TI-NHTSA 004389

-MSG N#- 107279 FR-SBO1 TO-PCDA SENT-01/27/92 09:23 AM
R#-108 ST-C DIV-0050 CC-00101 BT-SBO1 AT-01/27/92 09:23 AM

TO: Charlie Douglas CPPC Matt Sellers PCNF
CC: Tom Burke MYPC Rusty Struble ACS2
Dave Csarn EARN Bill Sweet PCNF
Dick Gariepy MYPC Jim Watt PCDA
Joe Lazars JMLB Paul Westerlind B511
FR: Steve Offiler SBO1 Stan Hosol SH2
SI: 57/77/87PS Thread Cap Changeover

Charlie/Matt - We've noticed an important item seems to have been inadvertently omitted from the action plan outlined on MSG # 30565. We need to inform the customers! Specifically, we should notify all Ford release engineers (Power Steering & Brake at Truck & Car) as well as every Tier-1 involved.

Regards,
Steve / Stan

cc = Elaine R.
FYE / J. Watt
01/27/92

FINAL INSPECTION 779644-1

CUSTOMER P/N: F315-WF324-AE

DATE: 1-28-92
 DISC LOT 1-14
 REEL # 1
 LOT # 6
 WASHER LOT 116 & CUP

RECEIVED: 779644-23-1
 DISC LOT # 7
 CONVEYER LOT
 QTY: 1215
 DISC LOT
 REEL #
 LOT #
 WASHER LOT
 QTY:

RECEIVED:
 DISC LOT #
 CONVEYER
 QTY:

TEST	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1 ACTUATION	145	145	145	145	145	145	145	145	145	145										
2 RELEASE	50	50	50	50	50	50	50	50	50	50										
3 DIFF.	95	95	95	100	95	110	95	90	95	95										
4 VOLT DROP	---	---	---	---	---	---	---	---	---	---										
5 CUR. LEAK	---	---	---	---	---	---	---	---	---	---										
6 PROOF	---	---	---	---	---	---	---	---	---	---										
7 IMPULSE	✓	✓	✓	✓	✓	---	---	---	---	---										
8 ACTUATION	130	130	125	130	135	---	---	---	---	---										
9 RELEASE	45	50	50	55	55	---	---	---	---	---										
10 VOLT DROP	✓	✓	✓	✓	✓	---	---	---	---	---										
11 CUR. LEAK	✓	✓	✓	✓	✓	---	---	---	---	---										
12 PROOF	✓	✓	✓	✓	✓	---	---	---	---	---										
13 CREEP	✓	✓	✓	✓	✓	---	---	---	---	---										
14 THERM. STRE	✓	✓	---	---	---	---	---	---	---	---										
15 DISINTEGR.	---	---	---	---	---	---	---	---	---	---										
16 VISUAL	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK										
17 CREEP	---	---	---	---	---	---	---	---	✓	✓										
18 THERM. STRE	---	---	---	---	---	---	---	---	✓	✓										
19 ACTUATION	---	---	---	---	---	---	---	---	140	145										
20 RELEASE	---	---	---	---	---	---	---	---	82	85										
21 VOLT DROP	---	---	---	---	---	---	---	---	✓	✓										
22 CUR. LEAK	---	---	---	---	---	---	---	---	✓	✓										
23 PROOF	---	---	---	---	---	---	---	---	✓	✓										
24 CREEP	---	---	---	---	---	---	---	---	✓	✓										

FINISHED PRODUCT
ROLL

WHITE CANARY
PINK

WHITE CANARY
PINK

DEVICE NUMBER

77PSLA-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

1.

1-14

2.

3.

4.

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

ACCEPT
JAN 28 1992

Form 1988

DATE

1/28/92

DEPARTMENT

294

TI-NHTSA 004392

MECHWIN CORPORATION
460 NEPPERMAN AVENUE
YONKERS, N.Y. 10701

#74171-1

*** CERTIFICATE OF ANALYSIS AND COMPLIANCE ***

CT: 33500 FEB 3 1992

ACME MILFORD
857 BRIDGEPORT AVENUE
MILFORD, CT. 06460

MWC # 7761
P.O.: 1288
OUR INVOICE: 8332
DELIVERY DATE: 01/29/92

SIZE: .0570

R.I.A.: %

ALLOY: 260

ELONGATION:

ASTM: B 134

ROCKWELL HARDNESS:

FINISH: B

GRAIN SIZE AT FINAL ANNEAL:

TENSILE STRENGTH: 41.4 KSI

ELECTRICAL CONDUCTIVITY: %

TEMPER DESIGNATION: H00

CHEMICAL ANALYSIS:

CU	ZN	PB	FE	SN
47.580	0.01	0.003	0.017	
AL	MN	NI	SI	P

OTHER:

WE CERTIFY THAT THIS SHIPMENT CONFORMS TO THE CHEMICAL AND PHYSICAL
PROPERTIES SHOWN ABOVE, AND IS IN COMPLIANCE WITH THE SPECIFICATIONS
OF THIS ORDER

MECHWIN CORPORATION

Dated: 01/30/92

By: *E.E. V. S. L.*

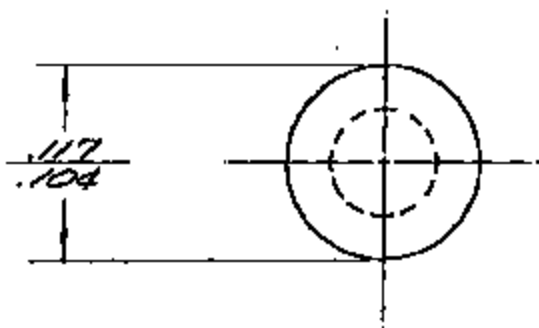
TI-NHTSA 004393

R/VET

KEY
B

74171

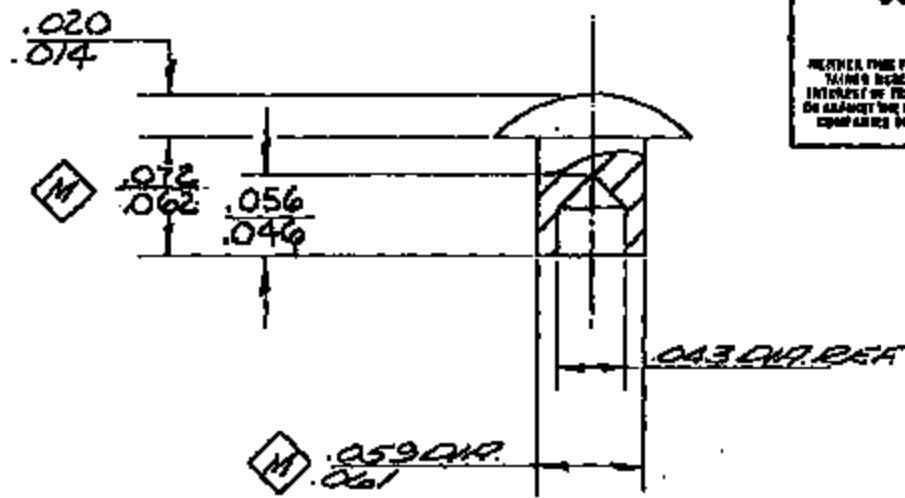
1172



CERTIFIED PRINT
Print Made To This Print Must Conform To
ENG. STD. E9898 REV. E

Date JUL 16 1992

NEITHER THIS FIRM NOR THE INFORMATION CONTAINED HEREIN IS TO BE USED FOR ANY INTEREST OF TEXAS INDEPENDENTS INCORPORATED OR AGAINST THE INTERESTS OF ANY OF ITS AFFILIATE COMPANIES OR INDIVIDUAL OWNERS OR STOCKHOLDERS.



NOTES:
1. PARTS MUST BE STORED IN PLASTIC BAGS THRU ALL SHIPPING AND HANDLING PROCESSES

NOV 1964 57 DEL 11
78778 Z-1-44
6 OCT 54
28-66-1212-29-84

74171-1

CD# 2608455

TI-NHTSA 004384

A	Q	PART NO.	MATERIAL
---	---	----------	----------

VS	GB-107	M21	P38	P37A	P35	P9
----	--------	-----	-----	------	-----	----

BY SA 2-1-84 CH. K.H. Warner 2-1-84 TEXAS INSTRUMENTS
INCORPORATED

KIDSON

OWN. 74171
BYE

HIGHLIGHTS
Stephen B. Offler
Week Ending 92-01-31

John Kaippel
12-2-91



FORD MY'92 ELECTRONIC SPEED CONTROL DEACTIVATE PS

87PS: We've received information from John Kaippel (LT Steering) which shows the requirement for the hoses used in PS assemblies is 400K cycles at 150 C fluid / 135 C ambient to 1600 psi. John has asked us to increase our requirement (for Validation only) to this, with the exception that he hasn't asked for any change in our present test temperature, which is 135 C fluid / 107 C ambient. We are generally in agreement that we can meet the higher number of cycles and higher pressure without any problem, and furthermore it appears to be a large negotiation concession on our part. We now owe John a marked-up spec. for finalization, and concurrence with other PS engineers (Pass Car, Europe, etc.).

SHO TAURUS NOISE ISSUE: We have obtained a brand-new '92 Mercury Sable as a test vehicle from Tasca Lincoln-Mercury in Seekonk, MA. Their co-operation in this matter has been exemplary. The car is to be returned the morning of Feb. 6. We have installed the master cylinder that was sent to us by Tim Andresen, along with the prototype "silent" 77PS device which they found to make noise on a '93 SHO Taurus evaluation prototype. We have installed this M/C, and discovered a very minor noise in the system, and tactile feel in the pedal. With engine off or on, the noise is not as noticeable as the sound made by the brake light switch. Subjectively, the noise/feel are generally not considered annoying in any way by several individuals who have experienced it. We have noted at least three points in the pedal travel which produce some noise and/or tactile feel: the BLS, our switch, and the third is suspected to be the ABS pedal-travel sensor. The Ford memo from Tim Andresen which accompanied the M/C states: "Based on the number of cars we have built with the switch, I don't think this is a 100% problem. However, some of the switches make significant noise which may be intermittent." This seems to suggest that the noise we are experiencing is not necessarily as acute as it might be under different conditions. We plan to continue evaluations, including: installation of a normal snap device for comparison sake; isolation of the "silent" switch with rubber hose; a custom device with rubber diaphragm; and we are considering the logistics required in order to use the prototype snubber devices we've prepared with silent and snap discs.

DIAPHRAGM LIFE: The most recent test of square vs. round Kapton has been completed. The round Kapton from the sample sheet fared best, with rel. at 500K = 99.71%; next is square Kapton from the same sample sheet at 99.53%; then production square Kapton at 95.76%; finally the Japanese polyimide at 83.29%. (all values at 50% confidence).

-MSG N#- 256020 FR=SB01 TO=CPPC SENT=01/31/92 07:11 AM
R#-128 ST=C DIV=0050 CC=00101 BY=SB01 AT=01/31/92 07:11 AM

TO: Ted Ballard	AVME	Steve Major	WHL2
Tom Burke	MFPC	Dale Sogge	FFUN
Jeff DiDomenico	ELB	Matt Sellers	PCHE
Charlie Douglas	CPPC	Rusty Struble	RCS2
Paul Kotch	PRK1	Jim Watt	PCQA

CC: Tom Charbonneau (delivered separately)
Dave Czarn

Baris

FR: Steve Offiler SBO1

SJ: Weekly Highlights

SERVICE

E7DP 76370 AB TEMPERATURE
E8D2 76370 A SWITCH SENSORS
(517) 263-8937

FORD MY'92 ELECTRONIC SPEED CONTROL DEACTIVATE PS EXT 110

87PS: We've received information from John Kaippel (LT Steering) which shows the requirement for the hoses used in PS assemblies is 400K cycles at 150 C fluid / 135 C ambient to 1600 psi. John has asked us to increase our requirement (for Validation only) to this, with the exception that he hasn't asked for any change in our present test temperature, which is 135 C fluid / 107 C ambient. We are generally in agreement that we can meet the higher number of cycles and higher pressure without any problem, and furthermore it appears to be a large negotiation concession on our part. We now owe John a marked-up spec. for finalization, and concurrence with other PS engineers (Pass Car, Europe, etc.).

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TI-NHTSA 004396

Regards,
Steve O.

TI-NHTSA 004396A

TO: Dave Czarn
Keith Kawate

Charlie Douglas
Matt Sellers

FR: SOGGE: HIGHLIGHTS Jan 31 1992

CPS

The entire V8 development team have a strong conviction that the CPS is needed. The head of GM powertrain is also very interested. Unfortunately they have not done a cost benefit analysis. They believe they need to install the TI cps on the V8 and take measurements before they can do the analysis sometime in the fall. Steve major has the details of what we need to put together for a business proposal. CPC is looking for a revised Bailpark sensor price plus our proposed funding required within approx three weeks. Assessing the technical design risk and developing an accurate manufacturing cost in three weeks will require considerable effort. I am waiting for Martha and Steve to provide direction before working on this.

An indication of CPC's seriousness is that they have already asked for cast heads from the foundry with CPS ports. They should be available in three weeks.

Based on testing in their lab our sensor is really a 1-2% total error device, not 8-10% as we thought. A sensor with 50,000 miles of TI durability also showed this level of error, which shows that we can hit their target specs. See attached plot.

Target customer milestones:

10 samples for engine testing	2/1/92
64 samples for engines and vehicles	may 92
build three vehicles with full control hardware & software	may 92
algorithm & software dev	to 7/1/92
dyno testing of sensor & system	to 12/1/92
Vehicle driveability & emissions	6/92-1/94
production intent samples	1/93
component validation complete, concept approval granted	2/94

No samples will be provided until we make a program proposal and it's accepted by CPC. CPC understands this and will wait for the 2/1 samples.

PRESSURE SWITCH

Dave Czarn is still trying to find out from Ford if we have clearance for a hex crimp ring. The model shop is making a hex crimp ring for a demo. It will be ready to show to the customer by 2/7.

I am pursuing three designs for a 32mm hex crimp ring.

1) Thin wall drawn part	est cost \$0.09-0.13
2) Thin wall Zn die casting	est cost \$0.13
3) Aluminum Impact extrusion	est cost ?

TI-NHTSA 004397

Based on quote for item 8 below I expect the impact part to be expensive. Waiting for input from Impact houses. The die cast part can probably be rolled without cracking. Only question on Zn is creep causing a calibration change. Calculation shows we should have 100% factor of safety at 100c operation for 10 years, using a limit of .0001" change in crimp height. We will evaluate rolling and creep with model shop prototypes in Zamak-8. My strongest emphasis will be on the drawn part because of the low technical risk and potential for lowest cost.

A second set of alternatives is a 33mm hex crimp ring (Ex3355-89 & 90)

- | | |
|---|-------------------------|
| 4) Thick wall drawn part | quoted cost \$0.09-0.16 |
| 5) Thick wall Zn die casting, same as 2 above | est cost \$0.13 |
| 6) Aluminum impact extrusion | quoted cost \$1.42 |
| 7) Thick wall cold headed | quoted cost \$0.60 |
| 8) Thick wall brass screw machine | quoted cost \$0.31 |

All these prices compare to the current cost of \$0.04 for the Aluminum part without wax.

We should be able to pull all information together for a customer presentation on 2/7.

TO: Dave Czarn
Keith Kawata

Charlie Douglas
Matt Sellers

FR: SOGGE: HIGHLIGHTS Jan 31 1992

CPS

The entire V8 development team have a strong conviction that the CPS is needed. The head of GM powertrain is also very interested. Unfortunately they have not done a cost benefit analysis. They believe they need to install the TI cps on the V8 and take measurements before they can do the analysis sometime in the fall. Steve major has the details of what we need to put together for a business proposal. CPC is looking for a revised Ballpark sensor price plus our proposed funding required within approx three weeks. Assessing the technical design risk and developing an accurate manufacturing cost in three weeks will require considerable effort. I am waiting for Martha and Steve to provide direction before working on this.

An indication of CPC's seriousness is that they have already asked for cast heads from the foundry with CPS ports. They should be available in three weeks.

Based on testing in their lab our sensor is really a 1-2% total error device, not 8-10% as we thought. A sensor with 50,000 miles of TI durability also showed this level of error, which shows that we can hit their target specs. See attached plot.

Target customer milestones:

10 samples for engine testing	2/1/92
64 samples for engines and vehicles	may 92
build three vehicles with full control hardware & software	may 92
algorithm & software dev	to 7/1/92
dyno testing of sensor & system	to 12/1/92
Vehicle driveability & emissions	8/92-1/94
production intent samples	1/93
component validation complete, concept approval granted	2/94

No samples will be provided until we make a program proposal and it's accepted by CPC. CPC understands this and will wait for the 2/1 samples.

PRESSURE SWITCH

Dave Czarn is still trying to find out from Ford if we have clearance for a hex crimp ring. The model shop is making a hex crimp ring for a demo. It will be ready to show to the customer by 2/7.

I am pursuing three designs for a 32mm hex crimp ring.

1) Thin wall drawn part	est cost \$0.09-0.13
2) Thin wall Zn die casting	est cost \$0.13
3) Aluminum impact extrusion	est cost ?

TI-NHTSA 004399

For the quote for Item 8 below I expect the impact part to be expensive. Waiting for information from impact houses. The die cast part can probably be rolled without cracking. The question on Zn is creep causing a calibration change. Calculation shows we should have 100% factor of safety at 100c operation for 10 years, using a limit of 0.001 change in crimp height. We will evaluate rolling and creep with model shop techniques in Zamak-8. My strongest emphasis will be on the drawn part because of low technical risk and potential for lowest cost.

Second set of alternatives is a 33mm hex crimp ring (Ex3355-88 & 90)

4) Thick wall drawn part	quoted cost \$0.09-0.16
5) Thick wall Zn die casting, same as 2 above	est cost \$0.13
6) Aluminum Impact extrusion	quoted cost \$1.42
7) Thick wall cold headed	quoted cost \$0.60
8) Thick wall brass screw machine	quoted cost \$0.31

These prices compare to the current cost of \$0.04 for the Aluminum part without

We should be able to pull all information together for a customer presentation on 2/7.

FINAL INSPECTION 779512-1

DATE: 1-31-92

CUSTOMER: PAV CON-40014-92

DISC LOT 1-22

MT. 111.74855-AL-11

DISC LOT 1-22

MT. 111.74855-AL-11

REV. #1

DISC LOT 1-22

REV. #1

DISC LOT 1-22

LOT #4

CONV. LOT 151

LOT #1

CONV. LOT 151

DISC LOT 1-22

CONV. LOT 151

DISC LOT 1-22

CONV. LOT 151

TEST	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
ACTUATION	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125
RELEASE	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55
WLT	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
VOLT DROP																			
CUR. LEAK																			
PROOF																			
IMPULSE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ACTUATION	120	110	120	120	120							120	120	120	120	120			
RELEASE	60	45	45	50	50							45	30	60	45	60			
VOLT DROP												✓	✓	✓	✓	✓			
CUR. LEAK	✓	✓	✓	✓	✓							✓	✓	✓	✓	✓			
PROOF	✓	✓	✓	✓	✓							✓	✓	✓	✓	✓			
CREEP	✓	✓	✓	✓	✓							✓	✓	✓	✓	✓			
BURST	✓	✓										✓	✓						
ADDITIONAL																		✓	✓
VISUAL	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
CREEP									✓	✓								✓	✓
HYD. STR.									✓	✓								✓	✓
ACTUATION									125	125								120	120
RELEASE									55	50								45	30
VOLT DROP									✓	✓								✓	✓
CUR. LEAK									✓	✓								✓	✓
PROOF									✓	✓								✓	✓
CREEP									✓	✓								✓	✓

TI-NHTSA 004401

FINISHED PRODUCTION ROUTING

WHITE CANARY PAGE 1
 Route to Finished State
 Route to Dept. Supervisor

DEVICE NUMBER
 77PSI 2-1

SPECIAL REQUIREMENT TOTAL QUANTITY
 9

MANU. ORDER NUMBER NO SUBTOTALS
 1-23

QUALITY CONTROL APPROVAL

IN PROCESS	IN PROCESS	FINAL

Form 10202
 DATE 1/30/92 DEPARTMENT 294

FINISHED PRODUCTION ROUTING

WHITE CANARY PAGE 1
 Route to Finished State
 Route to Dept. Supervisor

DEVICE NUMBER
 77PSI 2-1

SPECIAL REQUIREMENT TOTAL QUANTITY
 9

MANU. ORDER NUMBER NO SUBTOTALS
 1-22

QUALITY CONTROL APPROVAL

IN PROCESS	IN PROCESS	FINAL

Form 10202
 DATE 1/30/92 DEPARTMENT 294

-MSG M# 256020 FR=SBD1 TO=PCME SENT=01/31/92 07:11 AM
R#033 ST=C DIV=0050 CC=00101 BY=SBD1 AT=01/31/92 07:11 AM

TO: Ted Ballard	AVME	Steve Major	WHLZ
Tom Burke	MFPC	Dale Sogge	FFUN
Jeff DiDomenico	ELB	Matt Callers	PCME
Charlie Douglas	CPPC	Rusty Struble	RCS2
Paul Kotch	PRK1	Jim Watt	PCQA

CC: Tom Charboneau (delivered separately)
Dave Czarn

FR: Steve Offiler SBD1

SU: Weekly Highlights
=====

FORD MY'92 ELECTRONIC SPEED CONTROL DEACTIVATE PB

87PB: We've received information from John Kaippel (LT Steering) which shows the requirement for the hoses used in PB assemblies is 400K cycles at 150 C fluid / 135 C ambient to 1600 psi. John has asked us to increase our requirement (for Validation only) to this, with the exception that he hasn't asked for any change in our present test temperature, which is 135 C fluid / 107 C ambient. We are generally in agreement that we can meet the higher number of cycles and higher pressure without any problem, and furthermore it appears to be a large negotiation concession on our part. We now owe John a marked-up spec. for finalization, and concurrence with other PS engineers (Pass Car, Europe, etc.).

BHO TAURUS NOISE ISSUE: We have obtained a brand-new '92 Mercury Sable as a test vehicle from Tasca Lincoln-Mercury in Seekonk, MA. Their co-operation in this matter has been exemplary. The car is to be returned the morning of Feb. 6. We have installed the master cylinder that was sent to us by Tim Andresen, along with the prototype "silent" 77PB device which they found to make noise on a '93 SHO Taurus evaluation prototype. We have installed this M/C, and discovered a very minor noise in the system, and tactile feel in the pedal. With engine off or on, the noise is not as noticeable as the sound made by the brake light switch. Subjectively, the noise/feel are generally not considered annoying in any way by several individuals who have experienced it. We have noted at least three points in the pedal travel which produce some noise and/or tactile feel: the BLS, our switch, and the third is suspected to be the ABS pedal-travel sensor. The Ford memo from Tim Andresen which accompanied the M/C states: "Based on the number of cars we have built with the switch, I don't think this is a 100% problem. However, some of the switches make significant noise which may be intermittent." This seems to suggest that the noise we are experiencing is not necessarily as acute as it might be under different conditions. We plan to continue evaluations, including: installation of a normal snap device for comparison sake; isolation of the "silent" switch with rubber hose; a custom device with rubber diaphragm; and we are considering the logistics required in order to use the prototype snubber devices we've prepared with silent and snap discs.

DIAPHRAGM LIFE: The most recent test of square vs. round Kapton has been completed. The round Kapton from the sample sheet fared best, with rel. at 500K = 99.71%; next is square Kapton from the same sample sheet at 99.53%; then production square Kapton at 95.76%; finally the Japanese polyimide at 83.29%. (all values at 50% confidence).

Regards,
Steve O.

TL-NHTSA 004403

1 DAYE STUDY FOR REPEATABILITY AND REPRODUCIBILITY (LONG METHOD)
 -F001-92
 7700 PAPERLESS TESTER
 ACTIVATION

NUMBER OF OPERATORS	3	MIN SPEC	90
NUMBER OF PARTS	4	MAX SPEC	160
NUMBER OF TRIALS	2	TOLERANCE	70

DATA SUMMARY

OPERATOR	AVERAGE	RANGE
1	104.325	0.25
2	103.7	0.25
3	104.15	0.5
4	NA	NA
5	NA	NA
6	NA	NA
7	NA	NA
8	NA	NA
9	NA	NA
10	NA	NA

AVERAGE	104.0583	0.366666
---------	----------	----------

1N XBAR	103.7
2 XBAR	104.325
XBAR DIFF	0.625

	MEASUREMENT UNIT ANALYSIS	%TOLERANCE
REPEATABILITY:	1.674054	2.39%
REPRODUCIBILITY:	1.877854	2.25%
RPT & REPR (R&R):	2.300452	3.29%

NOTE: ALL CALCULATIONS BASED ON 5.15 SIGMA (99%)

FOR STUDY FIGURES IN CELLS A8,A9,A10. MIN/MAX SPEC IN B12, B13
 PRESSURE TESTER
 AUTOMATIC

MIN SPEC 90
 MAX SPEC 160
 TOLERANCE 70

DATA FOR OPERATOR 1

PART	1	2	TRIAL 3	4	5	AVG	RANGE
1	107.3	106.8				107.05	0.5
2	106.7	106.8				106.75	0.1
3	102.9	102.5				102.7	0.4
4	100.8	100.9				100.8	0
5						NA	0
6						NA	0
7						NA	0
8						NA	0
9						NA	0
10						NA	0
11						NA	0
12						NA	0
13						NA	0
14						NA	0
15						NA	0
16						NA	0
17						NA	0
18						NA	0
19						NA	0
20						NA	0
21						NA	0
22						NA	0
23						NA	0
24						NA	0
25						NA	0

GRND AVG: 104.325 AVG RNGE: 0.25
 UCL FOR INDIVIDUAL RANGES 1.1979

TI-NHTSA 004405

ATA FOR OPERATOR 2

TRIAL	1	2	3	4	5	AVG	RANGE
1	105.6	105.5				105.55	0.1
2	106.3	106.3				106.3	0
3	102.1	102.1				102.6	1
4	100.5	100.2				100.35	0.3
5						NA	0
6						NA	0
7						NA	0
8						NA	0
9						NA	0
10						NA	0
11						NA	0
12						NA	0
13						NA	0
14						NA	0
15						NA	0
16						NA	0
17						NA	0
18						NA	0
19						NA	0
20						NA	0
21						NA	0
22						NA	0
23						NA	0
24						NA	0
25						NA	0
GRND AVG	103.7		AVG RANGE	0.35			
UCL FOR INDIVIDUAL RANGES			1.1979				

TI-NHTSA 004406

GA FOR OPERATOR 3

PART	1	2	TOTAL	3	4	5	AVG	RANGE
1	104.4	104.4					104.4	0
2	108.4	107.6					108	0.8
3	103	101.8					102.4	1.2
4	101.8	101.8					101.8	0
5							NA	0
6							NA	0
7							NA	0
8							NA	0
9							NA	0
10							NA	0
11							NA	0
12							NA	0
13							NA	0
14							NA	0
15							NA	0
16							NA	0
17							NA	0
18							NA	0
19							NA	0
20							NA	0
21							NA	0
22							NA	0
23							NA	0
24							NA	0
25							NA	0

GRND AVG: 104.15 AVG RANGE: 0.5
 UCL FOR INDIVIDUAL RANGES 1.1979

GAUGE STUDY FOR REPEATABILITY AND REPRODUCIBILITY (LONG METHOD)
 -800-92
 1775 PRESSURE TESTER
 RELEASE

NUMBER OF OPERATORS	3	MIN SPEC	20
NUMBER OF PARTS	4	MAX SPEC	120
NUMBER OF TRIALS	2	TOLERANCE	100

DATA SUMMARY

OPERATOR	AVERAGE	RANGE
1	45.075	0.5
2	45.2625	0.775
3	45.825	0.15
4	NA	NA
5	NA	NA
6	NA	NA
7	NA	NA
8	NA	NA
9	NA	NA
10	NA	NA
VERAGE	45.72083	0.475

N XBAR	45.2625
X XBAR	45.075
XBARDIFF	0.8125

	MEASUREMENT UNIT ANALYSIS	XTOLERANCE
REPEATABILITY:	2.168661	2.17%
REPRODUCIBILITY:	2.052217	2.05%
RPY & REP (RLR):	2.985747	2.99%

NOTE: ALL CALCULATIONS BASED ON 5.15 SIGMA (99%)

FOR STUDY TITLES IN CELLS A9.A9.A10. MIN/MAX SPEC IN B12. B13
 77PS PRESSURE TESTER
 RELEASE

MIN SPEC 20
 MAX SPEC 120
 TOLERANCE 100

DATA FOR OPERATOR 1

PART	1	2	TRIAL 3	4	5	AVG	RANGE
1	44.1	43.8				43.95	0.3
2	50.5	50.1				50.3	0.4
3	48.7	48.4				48.55	0.3
4	42	41				41.5	1
5						NA	0
6						NA	0
7						NA	0
8						NA	0
9						NA	0
10						NA	0
11						NA	0
12						NA	0
13						NA	0
14						NA	0
15						NA	0
16						NA	0
17						NA	0
18						NA	0
19						NA	0
20						NA	0
21						NA	0
22						NA	0
23						NA	0
24						NA	0
25						NA	0

GRND AVG: 46.075 AVG RANGE: 0.5
 UCL FOR INDIVIDUAL RANGES 1.551025

DATA FOR OPERATOR A

TRIAL	1	2	3	4	5	AVG	RANGE
1	43.7	43.2				43.45	0.5
2	42.4	47.4				44.9	1.9
3	44.8	48.2				46.5	0.6
4	40.7	40.5				40.6	0.2
5						NA	0
6						NA	0
7						NA	0
8						NA	0
9						NA	0
10						NA	0
11						NA	0
12						NA	0
13						NA	0
14						NA	0
15						NA	0
16						NA	0
17						NA	0
18						NA	0
19						NA	0
20						NA	0
21						NA	0
22						NA	0
23						NA	0
24						NA	0
25						NA	0

GRND AVG: 45.2625

AVG RANGE: 0.775

UCL FOR INDIVIDUAL RANGES

1.851925

TI-NHTSA 004410

TR FOR OPERATOR 3

TRIAL	1	2	3	4	5	AVG	RANGE
1	42.6	42.5				42.55	0.1
2	50.7	50.6				50.55	0.1
3	49.2	48.7				48.75	0.1
4	41.5	41.4				41.45	0.1
5						NA	0
6						NA	0
7						NA	0
8						NA	0
9						NA	0
10						NA	0
11						NA	0
12						NA	0
13						NA	0
14						NA	0
15						NA	0
16						NA	0
17						NA	0
18						NA	0
19						NA	0
20						NA	0
21						NA	0
22						NA	0
23						NA	0
24						NA	0
25						NA	0

GRND AVG: 45.825 AVG RANGE: 0.18
 UCL FOR INDIVIDUAL RANGES 1.551825

DATA STUDY FOR REPEATABILITY AND REPRODUCIBILITY (LONG METHOD)

DEAL INDICATOR

DATE 4/15/70

TIPS

NUMBER OF OPERATORS 2
NUMBER OF PARTS 10
NUMBER OF TRIALS 2

MIN SPEC 0.499
MAX SPEC 0.479
TOLERANCE 0.02

DATA SUMMARY

OPERATOR	AVERAGE	RANGE
1	0.470705	0.00019
2	0.470625	0.00063
3	NA	NA
4	NA	NA
5	NA	NA
6	NA	NA
7	NA	NA
8	NA	NA
9	NA	NA
10	NA	NA

AVERAGE	0.470665	0.00041

X BAR 0.470625
L1X XBAR 0.470705
XBARDIFF 0.00008

	MEASUREMENT UNIT ANALYSIS	%TOLERANCE
	-----	-----
REPEATABILITY:	0.001871	9.36%
REPRODUCIBILITY:	0	0.00%
RPT & REPR (ALR):	0.001871	9.36%

NOTE: ALL CALCULATIONS BASED ON 3.15 SIGMA (99%)

TRA FIELD TITLES IN CELLS A8,A9,A10. MIN/MAX SPEC IN B12, B13
 DATA INDICATOR
 Q999 4 10070

MIN SPEC 0.459
 MAX SPEC 0.479
 TOLERANCE 0.02

DATA FOR OPERATOR 1

PART	1	2	TRIAL	4	5	AVG	RANGE
			3				
1	0.4693	0.4694				0.46935	0.0001
2	0.4697	0.4696				0.46965	0.0001
3	0.471	0.4715				0.47125	0.0005
4	0.4718	0.4718				0.4718	0
5	0.472	0.472				0.472	0
6	0.4715	0.4716				0.47155	0.0001
7	0.4707	0.471				0.47085	0.0003
8	0.4694	0.4693				0.46935	0.0001
9	0.4718	0.4713				0.47155	0.0005
10	0.4696	0.4698				0.4697	0.0002
11						NA	0
12						NA	0
13						NA	0
14						NA	0
15						NA	0
16						NA	0
17						NA	0
18						NA	0
19						NA	0
20						NA	0
21						NA	0
22						NA	0
23						NA	0
24						NA	0
25						NA	0

GRAND AVG:0.470705 AVG RANGE: 0.00019
 UCL FOR INDIVIDUAL RANGES 0.001239

TI-NHTSA 004413

TA FOR OPERATOR 2

PAGE	1	2	TOTAL	3	4	5	AVG	RANGE
1	0.4695	0.4696					0.46955	0.0001
2	0.4693	0.4698					0.46955	0.0005
3	0.4718	0.4709					0.47135	0.0009
4	0.4719	0.4706					0.47125	0.0013
5	0.4715	0.4718					0.47165	0.0003
6	0.4715	0.4717					0.4716	0.0002
7	0.471	0.4715					0.47125	0.0005
8	0.4705	0.4716					0.47105	0.0011
9	0.4694	0.4702					0.4698	0.0008
10	0.4689	0.4695					0.4692	0.0006
11							NA	0
12							NA	0
13							NA	0
14							NA	0
15							NA	0
16							NA	0
17							NA	0
18							NA	0
19							NA	0
20							NA	0
21							NA	0
22							NA	0
23							NA	0
24							NA	0
25							NA	0

GRAND AVG: 0.470625

AVG RANGE: 0.00063

UCL FOR INDIVIDUAL RANGES 0.001939

TI-NHTSA 004414

**DRAWINGS AVAILABLE UPON
REQUEST**

-MSG N/- 314381 FR-BKD2 TO-COPY SENT-02/03/92 10:48 AM
ST-C DIV-0050 CC-00149 BY-BKD2 AT-02/03/92 10:49 AM

TO: JIM WATT JW01 CC: ANDY MCQUIRK ACM1
MATT SELLERS PCME MIKE DEMATTIA MD3
STEVE OFFILER SBO1 BILL SWEET WS4
CHARLIE DOUGLAS CMP1 DAVE CZARN ZARN

FROM: ELAINE ROSE GAMY

SUBJECT: FORD CP AND CPK

FORD HAS REQUIRED SUPPLIERS TO FURNISH THEM WITH CP AND CPK DATA FOR SIGNIFICANT CHARACTERISTICS ON A QUARTERLY BASIS. THIS INFORMATION IS TO BE INPUT ON A DISKETTE FURNISHED FROM FORD AND IS TO BE RETURNED TO THEM. COULD THE TEAM PLEASE DECIDE THE FOLLOWING:

1. WHICH DEVICES ARE TO BE INCLUDED IN THE REPORTING? 77PS PASS CAR AND LT? 57PS ? ANY OTHERS?
2. WHICH CHARACTERISTICS ARE SIGNIFICANT AND SHOULD BE REPORTED.

THIS IS A CONTINUOUS REPORTING SYSTEM, SO WHAT WE DECIDE NOW WILL BE WHAT WE HAVE TO REPORT FROM NOW ON.

COULD WE PLEASE COME TO A CONSENSUS AS SOON AS IS POSSIBLE. WE WILL BE OVERDUE SHORTLY WITH THIS INFORMATION TO FORD.

REGARDS, ELAINE

X:1907

TI-NHTSA 004417

FINAL INSPECTION TYPE 2-1

DATE: 2-4-92

CUSTOMER P/N: F2K-00024-05

100 LOT 1-24

REEL # 1

LOT # 1

WASHER LOT 117 1-01

100 LOT 1-24

REEL # 1

LOT # 1

WASHER LOT 117 1-01

100 LOT 1-24

REEL # 1

LOT # 1

WASHER LOT 117 1-01

100 LOT 1-24

REEL # 1

LOT # 1

WASHER LOT 117 1-01

TEST	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. ACTUATION	150	177	180	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185	185
2. RELEASE	95	60	60	60	65	55	60	60	70	60	55	60	55	60	55	55	55	55	55
3. DIFF.	95	65	95	95	70	95	65	65	75	65	55	60	60	60	60	90	55	55	55
4. VOLT DROP	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5. CUR. LEAK	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6. PROOF	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7. IMPULSE	OK	OK	OK	OK	OK	---	---	---	---	OK	OK	OK	OK	OK	---	---	---	---	---
8. ACTUATION	132	130	135	140	130	---	---	---	---	135	130	130	130	135	---	---	---	---	---
9. RELEASE	55	60	55	60	60	---	---	---	---	60	55	60	55	55	---	---	---	---	---
10. VOLT DROP	✓	✓	✓	✓	✓	---	---	---	---	✓	✓	✓	✓	✓	---	---	---	---	---
11. CUR. LEAK	✓	✓	✓	✓	✓	---	---	---	---	✓	✓	✓	✓	✓	---	---	---	---	---
12. PROOF	✓	✓	✓	✓	✓	---	---	---	---	✓	✓	✓	✓	✓	---	---	---	---	---
13. CREEP	✓	✓	✓	✓	✓	---	---	---	---	✓	✓	✓	✓	✓	---	---	---	---	---
14. BURST	✓	✓	---	---	---	---	---	---	---	✓	✓	---	---	---	---	---	---	---	---
15. DIMENSIONAL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16. VISUAL	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
17. CREEP	---	---	---	---	---	---	---	---	---	✓	✓	---	---	---	---	---	---	✓	✓
18. TERM. STR.	---	---	---	---	---	---	---	---	---	✓	✓	---	---	---	---	---	---	✓	✓
19. ACTUATION	---	---	---	---	---	---	---	---	---	140	145	---	---	---	---	---	---	145	135
20. RELEASE	---	---	---	---	---	---	---	---	---	60	65	---	---	---	---	---	---	55	50
21. VOLT DROP	---	---	---	---	---	---	---	---	---	✓	✓	---	---	---	---	---	---	✓	✓
22. CUR. LEAK	---	---	---	---	---	---	---	---	---	✓	✓	---	---	---	---	---	---	✓	✓
23. PROOF	---	---	---	---	---	---	---	---	---	✓	✓	---	---	---	---	---	---	✓	✓
24. CREEP	---	---	---	---	---	---	---	---	---	✓	✓	---	---	---	---	---	---	✓	✓

TI-NHTSA 004418

FINISHED PRODUCTION ROUTING

WHITE } Route to Finished Goods
CANARY }
PINK } Route to Dept. Supervisor

DEVICE NUMBER

770SL2-1

SPECIAL REQUIREMENT	TOTAL QUANTITY
	21

MANU. ORDER NUMBER NO SUBTOTALS

1.

2. 1-24

3.

4.

QUALITY CONTROL APPROVAL

IN PROCESS	IN PROCESS	FINAL
		

Form 18362

DATE 2/3/92

DEPARTMENT 294

FINISHED PRODUCTION ROUTING

WHITE } Route to Finished Goods
CANARY }
PINK } Route to Dept. Supervisor

DEVICE NUMBER

770SL2-1

SPECIAL REQUIREMENT	TOTAL QUANTITY
	9

MANU. ORDER NUMBER NO SUBTOTALS

1.

2. 1-25

3.

4.

QUALITY CONTROL APPROVAL

IN PROCESS	IN PROCESS	FINAL
		

Form 18362

DATE 2/19/92

DEPARTMENT 294

TI-NHTSA 004419

-MSG NO- 368449 FR-EARN TO-GANY SENT-02/04/92 04:19 PM
R#-041 ST-C DIV-0050 CC-00101 BY-EARN AT-02/04/92 04:19 PM

FEBRUARY 4, 1992

TO: RUSTY STRUBLE	RCS2	CC: TOM CHARBONNEAU	TC
MIKE DeMATTIA	MD3	JOHN KOURTESIS	NDNS
CHARLIN DOUGLAS	CMF1	STEVE MAJOR	WELS
DICK GARIEPY	MPFC	ANDY McGUIRE	PCQA
PAUL KOTCH	PKK1	ED O'NEILL	EJON
JOE LAZAR	JNL6		
STEVE OFFILER	SBO1	GARY SWYDER	CPFC
MATT SELLERS	PCNE	MARTHA SULLIVAN	CPFC
BILL SWEET	PCNE	RAY TOURANGEAU	PCNE
JIM WATT	PCQA	BILL CONGDON	MPFC
CLAIRE BALTHASAR	PSWT	STEVE MCCOON	NDNS
TERRY RODRIGUEZ	MPFC	ELAINE ROSE	GANY

FR: DAVE CEARN EARN

SJ: FORD CRUISE CONTROL PRESSURE SWITCH START-UP MEETING:
01/30/92 MEETING MINUTES

MEETING

THE NEXT MEETING IS SCHEDULED FOR:

DATE: 2/6/92 (THURSDAY)
TIME: 10:00 - 11:30 AM
PLACE: MARKETING CONFERENCE ROOM

77PB

Report:

Elco will visit 2/12; need 10B21 cost delta info. prior to visit.
Paul reported that conversion to 10B21 would take 6-8 weeks.

Production issue: hexports rec'd with machining chips/stringers in the fluid port. Parts need to be dispositioned - if we sort, Elco's agreed to pay.

- . J512 GAGE R&R STUDY
- . NOTIFY FORD OF CHANGE TO 10B21
- * ELCO EXPLANATION OF 10B21 COST
- * RELEASE ELCO TO SHIP 1 BOX EA. OF 10B21/.0003" PLT AND 10L10 .0015" PLT

SELLERS	01/23	ORIG.
	02/07	
DOUGLAS	02/14	
KOTCH	01/23	ORIG.
	02/06	REV.
KOTCH	02/06	

Environmental Seal:

- . REMOVE -3 AS ALTERNATE FROM P/L (ECN entered)

OFFILER 01/30 STATUS?

Production Issues:

4 boxes of P/C switches returned for flakes & sensor crimp. Jim noted that prod'n parts are being brushed off before packing, but

TI-NHTSA 004420

the flakes may be getting brushed onto the parts in the tote.

* PLAN FOR ADDRESSING FLAKE ISSUE	SELLERS/	02/13	
	WATT		
* PLAN FOR DETERMINING IF CALIBRATING AT THE EXTREMES IS A YLD. OR LIFE PROB.	SELLERS	02/07	
* UPDATE PRODUCTION COMPONENT AND ASM. DRAWINGS TO CURRENT DESIGN LEVEL	OFFILER	02/13	
* CHANGE FREQUENCY OF RING GAGE CALIB. FROM ONCE/6 MONTHS TO ONCE/QTR; KEEP LOG TO DETERMINE IF GAGES ARE OUT OF CAL.	GARIPEY	01/09	ORIG.
		02/06	

Sensor Assembly Machine:

* UPGRADE KAPTON PICK AND PLACE	SELLERS	01/23	ORIG.
		01/31	REV.
* INSTALL WASHER/CONV. STATION ON AMI	SELLERS	01/31	
* PRIORITIZE REMAINING UPGRADE ITEMS	SELLERS	ONGOING	

Base Assembly Machine:

* PROPOSAL FOR NEW DIE SET	MCDOONEY	02/04	
* ORDER NEW BLANKING TOOL	GARIPEY/	02/06	
* UPDATE PROGRESS OF ULTRASONICALLY WELDED SPRING ARM/TERMINAL ASSEMBLY	SELLERS/	ONGOING	
	OFFILER		

Final Assembly Machine:

* MODIFY UNLOAD TO MINIMIZE DAMAGE TO SEALING SURFACE	GARIPEY	01/30	ORIG.
		01/30	COMP.

Interim solution in place; Russ L. is working on a permanent arrangement for reducing velocity of parts before they enter the tote.

* ESTAB. PLAN W/STEVE, AL AND STAN TO DETERM. EFFECT OF DAMAGE ON SEALING SURF.	CHARN	01/30	ORIG.
		02/06	REV.

Initial testing of Volvo minitimer w/damaged surface is scheduled for completion by 2/06.

ISR:

* PROVIDE QUARTERLY REPORTING OF ABOVE	WATT start	03/31	
* STATUS OF L/T APPROVAL	DOUGLAS/	11/28	ORIG.
	MAJOR	02/06	REV.
* CORRECT TERMINAL POSITION	SELLERS	01/16	ORIG.
		02/06	REV.
* RE-RUN P/C SAMPLES SO TERM'L POS'N DATA CAN BE COLLECTED	SELLERS	01/16	ORIG.
		02/06	REV.
* MEASURE SAMPLES	SELLERS/	01/17	ORIG.
	ROSS	02/10	REV.
* SUBMIT DANA/PITTS PKGS	WATT	01/23	ORIG.
		02/13	REV.

Diaphragm Life:

TARGET DATE FOR BUILDING P/C WITH FULL AMI CRIMP	CRIMP	02/24	
* UPDATE TEAM ON IMPLEMENTING FULL AMI CRIMP AND TESTING OF MODIFIED DESIGNS	OFFILER/	ONGOING	
	SELLERS		
* MEASURE AMI CRIMP DIES	SELLERS	01/31	

17 PK
note any
diff. in
pilot exp
results
↓
full PK mini
crimp sta:
today 2-01

TI-NHTSA 004421

Low Differential Switch for MY94

Steve's testing with the Tasca Sabla has shown that the low differential (-3-5 psi) disc creates an audible noise and tactile feel in the brake pedal; a similar diff'l switch with a snubber/export does not. Another solution is an "ultra-low" (-1-3 psi est.) differential, which may present a disc manufacturing problem.

* ESTABLISH LIST OF ACTIONS REQ'D TO START-UP ULTRA LOW DIFF'L SWITCH	SELLERS	2/14	
* FIRM QUOTE FOR ULTRA-LOW DIFF'L SWITCH	SELLERS	3/15	
* DETERMINE IF ANY QUALIFICATION IS REQ'D	DOUGLAS	1/30	ORIG.
		1/30	COMP.

Tim Andersen's first input was that full BS testing is required; Charlie will follow up on 2/04 to renegotiate; Teves needs to be in on the decision as well.

* EVALUATE TEVES M/C FOR NOISE	OFFILER	ONGOING	
* REPORT RESULTS TO FORD/TEVES	OFFILER	TED	
* ENV. DWG. FOR LOW DIFF'L SWITCH	OFFILER	1/23	ORIG.
- REVIEW PROPOSED ENV. DWG WITH REDUCED # OF DIMENSIONS W/D. CEARN		2/04	REV.

Miscellaneous:

* COMPLETE DESIGN FMEA	OFFILER	04/18	ORIG.
		02/24	REV.
* SEND LETTERS TO FORD/GM AND TIER 1'S; 3A THREAD GAGING	WATT/CEARN	1/30	ORIG.
		2/14	REV.

Need 10B21 cost delta info., so we know if the change can be proposed as a PECS to Ford.

Production Plan:

* MAINTAIN RUNNING TOTAL OF L/T (L2-3) SWITCHES LEADING TO LOCK FOR AMORTIZATION	STRUBLE	ONGOING
Status Date	Total Shipped	
Jan 23	12,376	
* UPDATE PRODUCTION PLANS	STRUBLE	ONGOING

	P/C 77PEL2-1	L/T 77PEL2-3
NOV	6.4	13.6
DEC	35	9
JAN	75	7
FEB	60 ?	12 ?
MAR	50 ?	10 ?

REGARDS,
DAVE CEARN \51-FORD

For 77PS Meeting,

Jim 2-5-92

Plan for continuation. RMR# 41572 1-28-92

- also from
- Harman
- problem

Pitts Industries

952 pcs.

loose FLASH on "SENSOR" side

- wing side
- connect side

Found on Both -

No

Elaine



57PS SENSOR → 77PS BASE

#Cycles:	DEVICE	1	2	3	4	5	6	7	8	9	10
50-550	BURST	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
550-750	REBUILT (-1000)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
750-950	OK	OK	OK	BROKEN SPRING	OK	OK	OK	OK	OK	OK	OK
950-1350	OK	OK	OK	OK	OK	OK	OK	OK	BROKEN SPRING	OK	OK
1350-1850	OK	OK	OK	-	OK	OK	BROKEN SPRING	OK	-	OK	OK
1850-2100	OK	OK	OK	-	OK	OK	-	OK	-	OK	OK
2100-2160	OK	OK	OK	-	OK	OK	-	OK	-	BROKEN SPRING	OK
2160-2180	OK	OK	BROKEN SPRING	-	OK	OK	-	OK	-	-	-
2180-2250	BROKEN SPRING	OK	-	-	OK	OK	-	OK	-	-	-
2250-2300	OK	OK	-	-	BROKEN SPRING	OK	-	OK	-	-	-
2300-2400	-	OK	-	-	-	OK	-	OK	-	-	-
2400-2550	-	OK	-	-	-	OK	-	OK	-	-	-
2550-2650	-	OK	-	-	-	OK	-	OK	-	-	-
2650-2750	-	OK	-	-	-	OK	-	OK	-	-	-
2750-2850	-	OK	-	-	-	OK	-	OK	-	-	-
2850-2950	-	OK	-	-	-	OK	-	OK	-	-	-
2950-3050	-	OK	-	-	-	OK	-	OK	-	-	-
3050-3150	-	OK	-	-	-	OK	-	OK	-	-	-
3150-3250	-	OK	-	-	-	OK	-	OK	-	-	-
3250-3350	-	OK	-	-	-	OK	-	OK	-	-	-
3350-3450	-	OK	-	-	-	OK	-	OK	-	-	-
3450-3550	-	OK	-	-	-	OK	-	OK	-	-	-
3550-3650	-	OK	-	-	-	OK	-	OK	-	-	-
3650-3750	-	OK	-	-	-	OK	-	OK	-	-	-
3750-3850	-	OK	-	-	-	OK	-	OK	-	-	-
3850-3950	-	OK	-	-	-	OK	-	OK	-	-	-
3950-4050	-	OK	-	-	-	OK	-	OK	-	-	-
4050-4150	-	OK	-	-	-	OK	-	OK	-	-	-
4150-4250	-	OK	-	-	-	OK	-	OK	-	-	-
4250-4350	-	OK	-	-	-	OK	-	OK	-	-	-
4350-4450	-	OK	-	-	-	OK	-	OK	-	-	-
4450-4550	-	OK	-	-	-	OK	-	OK	-	-	-
4550-4650	-	OK	-	-	-	OK	-	OK	-	-	-
4650-4750	-	OK	-	-	-	OK	-	OK	-	-	-
4750-4850	-	OK	-	-	-	OK	-	OK	-	-	-
4850-4950	-	OK	-	-	-	OK	-	OK	-	-	-
4950-5050	-	OK	-	-	-	OK	-	OK	-	-	-
5050-5150	-	OK	-	-	-	OK	-	OK	-	-	-
5150-5250	-	OK	-	-	-	OK	-	OK	-	-	-
5250-5350	-	OK	-	-	-	OK	-	OK	-	-	-
5350-5450	-	OK	-	-	-	OK	-	OK	-	-	-
5450-5550	-	OK	-	-	-	OK	-	OK	-	-	-
5550-5650	-	OK	-	-	-	OK	-	OK	-	-	-
5650-5750	-	OK	-	-	-	OK	-	OK	-	-	-
5750-5850	-	OK	-	-	-	OK	-	OK	-	-	-
5850-5950	-	OK	-	-	-	OK	-	OK	-	-	-
5950-6050	-	OK	-	-	-	OK	-	OK	-	-	-
6050-6150	-	OK	-	-	-	OK	-	OK	-	-	-
6150-6250	-	OK	-	-	-	OK	-	OK	-	-	-
6250-6350	-	OK	-	-	-	OK	-	OK	-	-	-
6350-6450	-	OK	-	-	-	OK	-	OK	-	-	-
6450-6550	-	OK	-	-	-	OK	-	OK	-	-	-
6550-6650	-	OK	-	-	-	OK	-	OK	-	-	-
6650-6750	-	OK	-	-	-	OK	-	OK	-	-	-
6750-6850	-	OK	-	-	-	OK	-	OK	-	-	-
6850-6950	-	OK	-	-	-	OK	-	OK	-	-	-
6950-7050	-	OK	-	-	-	OK	-	OK	-	-	-
7050-7150	-	OK	-	-	-	OK	-	OK	-	-	-
7150-7250	-	OK	-	-	-	OK	-	OK	-	-	-
7250-7350	-	OK	-	-	-	OK	-	OK	-	-	-
7350-7450	-	OK	-	-	-	OK	-	OK	-	-	-
7450-7550	-	OK	-	-	-	OK	-	OK	-	-	-
7550-7650	-	OK	-	-	-	OK	-	OK	-	-	-
7650-7750	-	OK	-	-	-	OK	-	OK	-	-	-
7750-7850	-	OK	-	-	-	OK	-	OK	-	-	-
7850-7950	-	OK	-	-	-	OK	-	OK	-	-	-
7950-8050	-	OK	-	-	-	OK	-	OK	-	-	-
8050-8150	-	OK	-	-	-	OK	-	OK	-	-	-
8150-8250	-	OK	-	-	-	OK	-	OK	-	-	-
8250-8350	-	OK	-	-	-	OK	-	OK	-	-	-
8350-8450	-	OK	-	-	-	OK	-	OK	-	-	-
8450-8550	-	OK	-	-	-	OK	-	OK	-	-	-
8550-8650	-	OK	-	-	-	OK	-	OK	-	-	-
8650-8750	-	OK	-	-	-	OK	-	OK	-	-	-
8750-8850	-	OK	-	-	-	OK	-	OK	-	-	-
8850-8950	-	OK	-	-	-	OK	-	OK	-	-	-
8950-9050	-	OK	-	-	-	OK	-	OK	-	-	-
9050-9150	-	OK	-	-	-	OK	-	OK	-	-	-
9150-9250	-	OK	-	-	-	OK	-	OK	-	-	-
9250-9350	-	OK	-	-	-	OK	-	OK	-	-	-
9350-9450	-	OK	-	-	-	OK	-	OK	-	-	-
9450-9550	-	OK	-	-	-	OK	-	OK	-	-	-
9550-9650	-	OK	-	-	-	OK	-	OK	-	-	-
9650-9750	-	OK	-	-	-	OK	-	OK	-	-	-
9750-9850	-	OK	-	-	-	OK	-	OK	-	-	-
9850-9950	-	OK	-	-	-	OK	-	OK	-	-	-
9950-10050	-	OK	-	-	-	OK	-	OK	-	-	-

77PS REPORTED TEST

Cost reduction conversion
for 57's to 87's

FINAL INSPECTION REPORT

DATE: 2-5-6

CUSTOMER: [REDACTED]

WASHER LOT 117 1-67

WASHER LOT 117 1-67

WASHER LOT 117 1-67

WASHER LOT 117 1-67

WASHER LOT 117 1-67

WASHER LOT 117 1-67

WASHER LOT 117 1-67

WASHER LOT 117 1-67

WASHER LOT 117 1-67

WASHER LOT 117 1-67

WASHER LOT 117 1-67

WASHER LOT 117 1-67

WASHER LOT 117 1-67

WASHER LOT 117 1-67

WASHER LOT 117 1-67

WASHER LOT 117 1-67

TEST	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
ACTUATION	130	130	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140
RELEASE	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
DIFF.	80	70	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
2 VOLT DROP	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2 CUR. LEAK	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2 PROOF	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2 CREEP	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2 BURST	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2 DIMENSIONAL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2 VISUAL	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
2 CREEP	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2 TERM. STR.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ACTUATION	120	130	130	130	140	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RELEASE	45	45	50	50	50	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VOLT DROP	✓	✓	✓	✓	✓	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CUR. LEAK	✓	✓	✓	✓	✓	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PROOF	✓	✓	✓	✓	✓	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CREEP	✓	✓	✓	✓	✓	—	—	—	—	—	—	—	—	—	—	—	—	—	—
BURST	✓	✓	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
DIMENSIONAL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VISUAL	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
CREEP	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TERM. STR.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ACTUATION	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RELEASE	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VOLT DROP	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CUR. LEAK	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PROOF	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CREEP	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

FINISHED PRODUCTION ROUTING

WHITE } Route to Finished Store
CANARY }
PINK } Route to Dept. Supervisor

DEVICE NUMBER

770562-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

1.

2.

3.

4.

1-27

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

ACCEPT
FEB 15, 1992

Form 10282

DATE 3/3/92

DEPARTMENT 294

FINISHED PRODUCTION ROUTING

WHITE } Route to Finished Store
CANARY }
PINK } Route to Dept. Supervisor

DEVICE NUMBER

770562-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

1.

2.

3.

4.

1-26

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

ACCEPT
FEB 15, 1992

Form 10282

DATE 3/3/92

DEPARTMENT 294

FINAL INSPECTION REPORT

DATE: 1-6-92

CUSTOMER: FORD MOTOR CO.

TEST LOT: 1-28

TEST LOT: 1-28

TEST LOT: 1-28

TEST LOT: 1-28

TEST LOT: 1-28

TEST LOT: 1-28

TEST LOT: 1-28

TEST LOT: 1-28

TEST LOT: 1-28

TEST LOT: 1-28

TEST LOT: 1-28

TEST LOT: 1-28

WASHER LOT: 117

WASHER LOT: 117

WASHER LOT: 117

WASHER LOT: 117

TEST	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
ACTUATION	145	147	149	151	153	155	157	159	161	163	165	167	169	171	173	175	177	179
RELEASE	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102	104
DIFF.	75	77	79	81	83	85	87	89	91	93	95	97	99	101	103	105	107	109
1. VOLT DROP	---	---	---	---	---	✓	✓	---	---	---	---	---	---	---	---	✓	✓	---
2. CUR. LEAK	---	---	---	---	---	✓	✓	---	---	---	---	---	---	---	---	✓	✓	---
3. PROOF	---	---	---	---	---	✓	✓	---	---	---	---	---	---	---	---	✓	✓	---
4. CREEP	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5. BURST	OK	OK	OK	OK	OK	---	---	---	---	OK	OK	OK	OK	OK	---	---	---	---
ACTUATION	135	140	145	150	155	---	---	---	---	155	160	165	170	175	---	---	---	---
RELEASE	40	45	50	55	60	---	---	---	---	45	50	55	60	65	---	---	---	---
1. VOLT DROP	✓	✓	✓	✓	✓	---	---	---	---	✓	✓	✓	✓	✓	---	---	---	---
2. CUR. LEAK	✓	✓	✓	✓	✓	---	---	---	---	✓	✓	✓	✓	✓	---	---	---	---
3. PROOF	✓	✓	✓	✓	✓	---	---	---	---	✓	✓	✓	✓	✓	---	---	---	---
4. CREEP	✓	✓	✓	✓	✓	---	---	---	---	✓	✓	✓	✓	✓	---	---	---	---
5. BURST	✓	✓	---	---	---	---	---	---	---	✓	✓	---	---	---	---	---	---	---
6. DIMENSIONAL	---	---	---	---	---	---	---	✓	✓	---	---	---	---	---	---	---	✓	✓
7. VISUAL	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
8. CREEP	---	---	---	---	---	---	---	✓	✓	---	---	---	---	---	---	---	✓	✓
9. THERM. STR.	---	---	---	---	---	---	---	✓	✓	---	---	---	---	---	---	---	✓	✓
ACTUATION	---	---	---	---	---	---	---	140	145	---	---	---	---	---	---	---	140	145
RELEASE	---	---	---	---	---	---	---	55	60	---	---	---	---	---	---	---	70	75
1. VOLT DROP	---	---	---	---	---	---	---	✓	✓	---	---	---	---	---	---	---	✓	✓
2. CUR. LEAK	---	---	---	---	---	---	---	✓	✓	---	---	---	---	---	---	---	✓	✓
3. PROOF	---	---	---	---	---	---	---	✓	✓	---	---	---	---	---	---	---	✓	✓
4. CREEP	---	---	---	---	---	---	---	✓	✓	---	---	---	---	---	---	---	✓	✓

TI-NHTSA 004427

FINISHED PRODUCTION ROUTING

WHITE CANARY PINK → Route to Dept. Supervisor

DEVICE NUMBER

77 L2-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

3

MANU. ORDER NUMBER

MO SUBTOTALS

- 1.
2. 1-27
- 3.
- 4.

QUALITY CONTROL APPROVAL

IN PROCESS	IN PROCESS	FINAL
		WHITE CANARY PINK ACCEPT

Form 10000

DATE 2-5-72 DEPARTMENT 274

FINISHED PRODUCTION ROUTING

WHITE CANARY PINK → Route to Dept. Supervisor

DEVICE NUMBER

77 L2-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

3

MANU. ORDER NUMBER

MO SUBTOTALS

- 1.
2. 1-28
- 3.
- 4.

QUALITY CONTROL APPROVAL

IN PROCESS	IN PROCESS	FINAL
		WHITE CANARY PINK ACCEPT FEB. 6

Form 10000

DATE 2-5-72 DEPARTMENT 274

HIGHLIGHTS

Stephen B. Offiler
Week Ending 92-02-07

[Handwritten signature]
9/2/92



FORD MY'92 ELECTRONIC SPEED CONTROL DEACTIVATE PS

SWITCH NOISE ISSUE: We have completed testing on the borrowed '92 Sable w/ Texas ABS, and the car has been restored to original equipment condition and returned on schedule to Tasea Lincoln Mercury. We had the opportunity to explore a number of different switch configurations, including: discs at various differentials; snubbers vs. standard J512 ports; remote mounting with rubber hose; and the Hi-Stat device. We confirmed the noise issue reported by Ford, as well as a tactile feel, although the so-named "low-differential" (4 psi) device implicated by Ford was not considered significantly obtrusive. Subsequent testing showed absolutely no noise or feel using discs with "ultra-low differential" up to 2.6 psi, while a 3.6 psi device was marginal. It is generally felt that 3.0 psi max differential would be sufficient to completely eliminate this customer concern. We'll need to explore the disc-processing ramifications of such a spec. Experimentation conducted with snubber hexports showed 4.0 psi diff. was undetectable, while 5.6 psi was marginal, suggesting a spec of about 5.0 max. However, concerns with the snubber include the fact that snubber plus J512 will be quite expensive, standard o-ring snubber may be scallable to Pass Car but won't help this issue when it arises at Light Truck, and finally air entrapment. We found no difference in noise and feel when the switches were remotely mounted with about 12" of 1/4" I.D. hydraulic hose. Finally, running the Hi-Stat switch for information showed that even with its snubber it has significant noise and feel, to a somewhat greater extent than our low-diff device and somewhat less than one of our production snap devices.

PRODUCTION ISSUES: Production impulse testing turned up spring arms cracking at the bump. Analysis by Mfg. Eng. and Mech. showed that the bump was not being formed correctly, with a fairly sharp crease in one area where the bump comes out of the plane of the spring. This corresponded with the location of the crack. The tool was dismantled and it was learned that the die was formed asymmetrically, causing this sharp crease. Since this feature has not been touched since day 1, there is some cause for concern that all product shipped has this potential to crack. However, the production cycle is known to be unrealistically severe. We have had no problems to date with any spring arms run in our cycle. We are presently running a sampling of recent production devices in our cycle to ensure that there truly isn't any cause for concern. The feature in the die which caused this condition was expertly re-worked by hand, and the bumps now look exemplary.

CUSTOMER ISSUES: We were forced to rush to get a print out to WIN88, and as such did not have the opportunity to reduce the number of dimensions as we intend to do on all future envelope prints. This print was turned around by drafting in one day. Our "lateness" perceived by Ford is a black eye for TI, although the real reason the print was "late" is that we don't seem to have a good ability to anticipate the requirements of Ford's system, thus we're caught unprepared and forced to rush which causes negative feelings and greatly increases the chances for error.

TI-NHTSA 004429

FINISHED PRODUCTION ROUTE
 ROUTE TO FINISHED STATE
 ROUTE TO DEPT. SUPERVISOR

DEVICE NUMBER

77PSL2-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

1

2

3

4

1-21

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

Form 1000

DATE

1/31/92

DEPARTMENT

294

-MSG M#- 4743 FR=SB01 TO=CPPC SENT=02/07/92 08:02 AM
R#=396 ST=C DIV=0050 CC=00101 BY=SB01 AT=02/07/92 08:02 AM

TO: Ted Ballard	AVME	Steve Major	WHLZ
Tom Burke	MFPC	Dale Sogge	FFUN
Jeff DiDomenico	ELB	Matt Sellers	PCME
Charlie Douglas	CPPC	Rusty Struble	RCSZ
Paul Kotch	PRK1	Jim Watt	PCQA

CC: Tom Charboneau (delivered separately)
Dave Czarn

FR: Steve Offiler SB01

SJ: Weekly Highlights

FORD MY'92 ELECTRONIC SPEED CONTROL DEACTIVATE PS

SWITCH NOISE ISSUE: We have completed testing on the borrowed '92 Sable w/ Texas ABS, and the car has been restored to original equipment condition and returned on schedule to Tasca Lincoln Mercury. We had the opportunity to explore a number of different switch configurations, including: discs at various differentials; snubbers vs. standard J512 ports; remote mounting with rubber hose; and the Hi-Stat device. We confirmed the noise issue reported by Ford, as well as a tactile feel, although the so-named "low-differential" (4 psi) device implicated by Ford was not considered significantly obtrusive. Subsequent testing showed absolutely no noise or feel using discs with "ultra-low differential" up to 2.6 psi, while a 3.6 psi device was marginal. It is generally felt that 3.0 psi max differential would be sufficient to completely eliminate this customer concern. We'll need to explore the disc-processing ramifications of such a spec. Experimentation conducted with snubber hexports showed 4.0 psi diff. was undetectable, while 5.6 psi was marginal, suggesting a spec of about 5.0 max. However, concerns with the snubber include the fact that snubber plus J512 will be quite expensive, standard o-ring snubber may be sellable to Pass Car but won't help this issue when it arises at Light Truck, and finally air entrapment. We found no difference in noise and feel when the switches were remotely mounted with about 12" of 1/4" I.D. hydraulic hose. Finally, running the Hi-Stat switch for information showed that even with its snubber it has significant noise and feel, to a somewhat greater extent than our low-diff device and somewhat less than one of our production snap devices.

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CUSTOMER ISSUES: We were forced to rush to get a print out to WIN88, and as such did not have the opportunity to reduce the number of dimensions as we intend to do on all future envelope prints. This print was turned around by

TI-NHTSA 004432

drafting in one day. Our "lateness" perceived by Ford is a black eye for TI, although the real reason the print was "late" is that we don't seem to have a good ability to anticipate the requirements of Ford's system, thus we're caught unprepared and forced to rush which causes negative feelings and greatly increases the chances for error.

Regards,
Steve O.

TO: Dave Czarn
Keith Kawate → *scuz*

Charlie Douglas
Matt Sellers

FR: SOGGE: HIGHLIGHTS Feb 7th 1992

CPS

Still waiting for Steve Major & Martha to determine program direction. At the present time we are not doing anything. This could be a problem in that CPC expects us to quote very soon. To do the quote right we may not be able to meet CPC expectations.

Don Hoffecker visited GMF this week to discuss CPS and introduce Elby. GMF likes working with Hoffecker, we may want to occasionally bring him in as a consultant.

CPC has gotten encouraging temp data on a 5.8l dyno engine. The max temp occur at peak rpm of 5,800 at wide open throttle. With the oil at 148C and coolant at 121C the P11 was at 132C, electronics at 126C and the diaphragm at 338C. The low electronics temp is good. Unfortunately the proving ground people believe that it's not worse case because it does not include the effect of the stagnant hot under hood air. The proving ground has measured temps as high as 225C at the spark plug rubber boot at 80Mph with a 38C ambient. CPC will build a vehicle and send to Arizona as soon as the cast heads come in, approximately one month.

PRESSURE SWITCH

A pressure switch was built with an aluminum hex crimp ring. It survived the torque test although at 30ft-lbs there was some slight yielding from contact against the hexport. The part had a .120" thick bottom to handle the contact load. In production this area would be work hardened by the impacting process so the design looks good. I am now pushing suppliers to see if we can hit a target of less than \$0.10 per part.

The latest input from Ford is that some vehicles cannot use this Hex crimp ring because of a space problem. We are waiting for master cylinder prints from Ford. While we are waiting I will work on better methods of attaching the connector hex to the crimp ring and the crimp ring to the hexport.

From my viewpoint I believe we should ask marketing to make a serious QFD/ study of the need for a down sized switch starting from scratch. I think we need to have one to avoid losing Ford business, Gain back Chrysler business, start serving transmissions with discrete switches, and go head to head with our competition on other opportunities. Strategically the space constraints under hood are going to get tighter and tighter every year, sooner or later we will face more size constraints. We may already have the perfect starting point with the Zua switch. Or we can focus effort and resources onto Japan's effort to downsize. Japan status is unknown at this point.

FINAL INSPECTION 77PSL2-1

DATE: 2-10-92

CUSTOMER P/N F2VC-9F924-AB

DISC LOT 2-3
REEL # 2
LOT # 4
WASHER LOT 117

MAT. I.D. 74668-AB2-1
CAP LOT # 9
CONV. LOT 153
QTY. 2000

DISC LOT 2-4
REEL # 2
LOT # 1
WASHER LOT 117
QTY. 2000

TEST	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
1 ACTUATION	123	126	122	130	126	121	123	119	126	123	127	128	129	124	126	124	133	129
RELEASE	45	51	53	49	53	47	46	44	51	48	51	50	53	44	46	49	48	49
DIFF.	78	75	68	80	72	74	82	75	85	75	76	78	75	80	79	75	84	80
2 VOLT DROP	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓	—	—
3 CUR. LEAK	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓	—	—
4 PROOF	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓	—	—
5 IMPULSE	OK	OK	OK	OK	OK	—	—	—	—	OK	OK	OK	OK	OK	—	—	—	—
ACTUATION	125	135	135	135	130	—	—	—	—	125	120	130	135	130	—	—	—	—
RELEASE	55	60	60	60	55	—	—	—	—	55	55	60	55	55	—	—	—	—
VOLT DROP	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
CUR. LEAK	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
PROOF	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
CHOP	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
7 BURST	✓	✓	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—
8 DIMENSIONAL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	✓	✓
VISUAL	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
9 CHOP	—	—	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	✓	✓
10 TERM. STG	—	—	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	✓	✓
ACTUATION	—	—	—	—	—	—	—	—	120	130	—	—	—	—	—	—	130	125
RELEASE	—	—	—	—	—	—	—	—	45	50	—	—	—	—	—	—	50	45
VOLT DROP	—	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	✓	✓
CUR. LEAK	—	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	✓	✓
PROOF	—	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	✓	✓
CHOP	—	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	✓	✓

TI-NHTSA 004435

FINISHED PRODUCTION ROUTING

WHITE } Route to Finished Goods
CANARY }
PINK } Route to Dept. Supervisor

DEVICE NUMBER

77P5L3-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

- 1.
- 2.
- 3.
- 4.

2-4

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

DEFECT
SAT
ACCEP
FEB 11 1992

Form 18282

DATE 2/10/92

DEPARTMENT 2941

FINISHED PRODUCTION ROUTING

WHITE } Route to Finished Goods
CANARY }
PINK } Route to Dept. Supervisor

DEVICE NUMBER

77P5L3-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

- 1.
- 2.
- 3.
- 4.

2-3

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

DEFECT
SAT
ACCEP
FEB 11 1992

Form 18282

DATE 2/10/92

DEPARTMENT 2911

Form 21603

TEST NO.

199-15-61

DEVICE H-1st CCPS		DATE REQUESTED	REQUESTED BY Steve Offley	REQUESTED COMPL. DATE
PERFORMED BY Jeffrey D. Mancuso		DATE STARTED 2/14/92	DATE COMPLETED	APPROVED BY
PROJECT TITLE: Field NY '92 Election - spend critical documents to PS				

CUSTOMER

PURPOSE OF TEST:

Over

PROCEDURE:

Hydrol Switch				77856 2-3			
	Act/Rol	Temp/Fches	Hydrop		Act/Rol	Temp/Fches	Hydrop
In-1:al	229/129	3.5/loop	4.4		280/129	4.0/2.7	2.9
48 Recycle	225/129	2.8/loop	4.4		282/126	4.1/0.5	6.2
Hisbat suited Failed with a hydraulic leak @ 102R impulses							

FULL INSPECTION 77P2-1

DATE: 2-11-92

CUSTOMER P/N F2AC-9724-48

BISC LOT 2-6
REEL 2
LOT 1
WAGNER LOT 129

MAT. I.D. 74868-482-1
CUP LOT 8
CONV. LOT 153
QTY. 2000

BISC LOT 2-6
REEL 2
LOT 2
WAGNER LOT 129

MAT. I.D. 74868-482-1
CUP LOT 8
CONV. LOT 153
QTY. 2000

TEST	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
1 ACTUATION	124	117	124	123	121	122	123	121	114	123	124	119	120	118	115	121	120	127
RELEASE	54	49	55	52	51	45	54	45	51	54	49	45	56	54	43	52	50	51
STIFF.	70	67	69	70	69	77	68	75	65	77	75	73	69	64	70	69	68	76
2 VOLT SWP	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓	—	—
3 CUR. LEAK	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓	—	—
4 PROOF	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓	—	—
5 IMPULSE	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
ACTUATION	120	115	120	120	115	—	—	—	—	120	110	110	110	115	—	—	—	—
RELEASE	55	50	55	55	5	—	—	—	—	55	50	45	50	55	—	—	—	—
VOLT SWP	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
CUR. LEAK	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
PROOF	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
CRIP	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
7 STIFF	✓	✓	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—
8 DUNNOM	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VISUAL	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
9 CRIP	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
10 THER. STG	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
ACTUATION	—	—	—	—	—	—	—	120	115	—	—	—	—	—	—	—	120	125
RELEASE	—	—	—	—	—	—	—	40	50	—	—	—	—	—	—	—	50	50
VOLT SWP	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
CUR. LEAK	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
PROOF	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
CRIP	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓

2/12/92

Elaine
2AUS 3A (609 MG)
2AC 0P10 (S)
2AUS 3A (609 MG)

Re = 27290-2 Hertz (Eles)

u/10001 material (pitch knots)

Please see me on
doing some measurements -

Thurs -

Jim Watt

01/13/92

Fm= Jim Watt

To= Dave Czarn,

cc= Ed Smith
V. H. S. Co.

Re= Ford 77PS ISIR
(Mark Scholler)

- | <u>Action</u> | <u>who</u> | <u>when</u> |
|--|-------------|-------------|
| 1.) ISIR Addendum OK;
Mark Scholler will publish
note as to Alert resolution | Scholler | 2 wks |
| 2.) Scholler asked TI to review
mfg control plan for Cpk
Quarterly reporting, e.g., crimp
height, crimp pressure, etc....
Provide list of mfg operations
for Cpk review | edsmith | 01/15/92 |
| 3.) Select mfg operations for Cpk
management | Matt Sellen | 01/23/92 |
| 4.) Provide Quarterly Cpk reporting
of operations selected above | Jim Watt | 2/21/92 |

TO: DAVE CERN

01/13/92

Re: Ford 77PS ISIR (Passcar) cc: Matt Sellers
(HiLite Industries,
Elaine Rose

DANA Corp.,
Kelsey Hays - N/A

ACTION

- 1.) Terminal Position dimension
is out of spec; Need corrective
action on line

who

when

Matt
Sellers

01/16/92

- 2.) Rerun 77PS Passcar sample
for terminal position;

Matt
Sellers

01/16/92

- 3.) Remeasure terminal position;
QC to assist if required

Matt
Sellers/
Elaine Rose

01/17/92

- 4.) Resubmit 77PS Passcar
ISIR

? to who?

Jim Watt

01/20/92

Thx,
Jim Watt

-MSJ M#- 157392 FR-ZARN TO-GAMY SENT-02/12/92 04:57 PM
R#-049 ST-C DIV-0050 CC-00101 BY-ZARN AT-02/12/92 04:57 PM

FEBRUARY 12, 1992

TO: RUSTY STRUBLE	RC52	CC: TOM CHARBONEAU	TC
MIKE DeMATTIA	MD3	JOHN KOURTESIS	MDES
CHARLIE DOUGLAS	CMP1	STEVE MAJOR	SNFH
DICK GARIOPY	MFPC	ANDY McGUIRE	PCQA
PAUL KOTCH	PRK1	ED O'NEILL	EJON
JOE LAZARZ	JML8	NORM FREDA	WHLZ
STEVE OFFILER	SB01	GARY SNYDER	CPFC
MATT SELLERS	PCME	MARTHA SULLIVAN	CPFC
BILL SWEET	PCME	RAY TOURANGEAU	PCME
JIM WATT	PCQA	BILL CONGDON	MFPC
TERRY RODRIGUEZ	MFPC	STEVE MCCOEVY	MDES
		ELAINE ROSE	GAMY

FR: DAVE CZARN ZARN

SJ: FORD CRUISE CONTROL PRESSURE SWITCH START-UP MEETING:
02/06/92 MEETING MINUTES

MEETING

THE NEXT MEETING IS SCHEDULED FOR:

DATE: 2/13/92 (THURSDAY)
TIME: 10:00 - 11:30 AM
PLACE: MARKETING CONFERENCE ROOM

*6 pc. samples
for P. H. / G. H.*

77PS

Hexport:

Elco will visit 2/12; need 10B21 cost delta info. prior to visit.
Paul reported that conversion to 10B21 would take 6-8 weeks.

Production issue: hexports rec'd with machining chips/stringers in
the fluid port. Parts need to be dispositioned - if we sort,
Elco's agreed to pay.

*Elco -
Sort 100%*

. J512 GAGE R&R STUDY	SELLERS	01/23	ORIG.
		02/07	
. NOTIFY FORD OF CHANGE TO 10B21	DOUGLAS	on hold	
* ELCO EXPLANATION OF 10B21 COST	KOTCH	01/23	ORIG.
		02/13	REV.
* RELEASE ELCO TO SHIP 1 BOX EA. OF	KOTCH	02/06	ORIG.
10B21/.0003" PLT AND 10L10 .0015" PLT		02/06	COMP.

Production Issues:

4 boxes of P/C switches returned for flakes ^{3/11/92} & sensor crimp. Jim
noted that prod'n parts are being brushed off before packing, but
the flakes may be getting brushed onto the parts in the tote.

* PLAN FOR ADDRESSING FLAKE ISSUE	SELLERS/	02/13
	WATT	
. PLAN FOR DETERMINING IF CALIBRATING AT	SELLERS	03/05

TI-NHTSA 004443

TJE EXTREMES IS A YLD. OR LIFE PROB.			
. UPDATE PRODUCTION COMPONENT AND ASM.	OFFILER	02/13	
DRAWINGS TO CURRENT DESIGN LEVEL			
* CHANGE FREQUENCY OF RING GAGE CALIB.	GARIEPY	01/09	ORIG.
FROM ONCE/6 MONTHS TO ONCE/QTR; KEEP LOG		02/06	COMP.
TO DETERMINE IF GAGES ARE OUT OF CAL.			

Sensor Assembly Machine:

* UPGRADE KAPTON PICK AND PLACE	SELLERS	01/23	ORIG.
		01/31	REV.
		01/31	COMP.
* INSTALL WASHER/CONV. STATION ON AMI	SELLERS	01/31	ORIG.
		01/31	COMP.
. PRIORITIZE REMAINING UPGRADE ITEMS	SELLERS	ONGOING	

Base Assembly Machine:

* PROPOSAL FOR NEW DIE SET	MCCOOEY	02/04	ORIG.
		02/04	COMP.
* ORDER NEW BLANKING TOOL	GARIEPY/	02/06	ORIG.
		02/06	COMP.
. UPDATE PROGRESS OF ULTRASONICALLY	SELLERS/	ONGOING	
WELDED SPRING ARM/TERMINAL ASSEMBLY	OFFILER		

Final Assembly Machine:

* ESTAB. PLAN W/STEVE, AL AND STAN TO	CZARN	01/30	ORIG.
DETMN. EFFECT OF DAMAGE ON SEALING SURF.		02/06	REV.
		02/06	COMP.

Initial testing of Volvo minitimer w/damaged surface completed; most severely damaged bases showed signs of ingress after humidity testing. Follow up testing needs to be planned.

ISR:

. PROVIDE QUARTERLY REPORTING OF ABOVE	WATT start	03/31	
* STATUS OF L/T APPROVAL	DOUGLAS/	11/28	ORIG.
	MAJOR	02/06	REV.
		02/06	COMP.
* CORRECT TERMINAL POSITION	SELLERS	01/16	ORIG.
		02/13	REV.
* RE-RUN P/C SAMPLES SO TERM'L POS'N	SELLERS	01/16	ORIG.
DATA CAN BE COLLECTED		02/13	REV.
* MEASURE SAMPLES	SELLERS/	01/17	ORIG.
	ROSE	02/15	REV.
* SUBMIT DANA/PITTS PKGS	WATT	01/23	ORIG.
		02/15	REV.

Diaphragm Life:

TARGET DATE FOR BUILDING P/C WITH FULL AMI CRIMP		02/24	
* UPDATE TEAM ON IMPLEMENTING FULL AMI	OFFILER/	ONGOING	
CRIMP AND TESTING OF MODIFIED DESIGNS	SELLERS		
* MEASURE AMI CRIMP DIES	SELLERS	01/31	ORIG.
		02/06	COMP.

Ultra-Low Differential Switch MY93

* ESTABLISH LIST OF ACTIONS REQ'D TO START-UP ULTRA LOW DIFF'L SWITCH	SELLERS	02/14	
* FIRM QUOTE FOR ULTRA-LOW DIFF'L SWITCH	SELLERS	02/27	changed
* EVALUATE TEVES M/C FOR NOISE	OFFILER	COMP.	
* REPORT RESULTS TO FORD/TEVES	OFFILER	TBD	
* ENV. DWG. FOR LOW DIFF'L SWITCH	OFFILER	01/23	ORIG.
		02/04	REV.
		02/04	COMP.

Miscellaneous:

. COMPLETE DESIGN FMEA	OFFILER	04/18	ORIG.
		02/14	REV.
		02/07	COMP.
. SEND LETTERS TO FORD/GM AND TIER 1'S; 3A THREAD GAGING	WATT/ CZARN	1/30 2/14	ORIG. REV.

Production Plan:

. MAINTAIN RUNNING TOTAL OF L/T (L2-3) SWITCHES LEADING TO 100K FOR AMORTIZATION	STRUBLE	ONGOING
Status Date Total Shipped		
Feb 06 17,850		
		18+K
. UPDATE PRODUCTION PLANS	STRUBLE	ONGOING

	P/C 77PSL2-1	L/T 77PSL2-3
NOV	6.4	13.6
DEC	35	9
JAN	75	7
FEB	76.4	11.4
MAR	47.1	12.6

REGARDS,
DAVE CZARN \52-FORD

FINAL INSPECTION 779L2-1

DATE: 2-12-92

CUSTOMER P/N F20C-9F924-00

WISC LOT 2-9
REEL # 2
LOT # 1
WASHER LOT 129

WAT. I.D. 74040-AC1-6
CSP LOT # 8
CONV. LOT 150
QTY. 2000

WISC LOT 2-10
REEL # 1
LOT # 2
WASHER LOT 129

WAT. I.D. 74040-AC1-6
CSP LOT # 8
CONV. LOT 150
QTY. 2000

TEST	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
1 ACTUATION	122	122	118	112	124	131	126	119	124	121	114	117	124	120	122	103	121	116
RELEASE	49	47	43	41	39	47	30	49	45	47	44	46	38	46	43	43	47	42
DIFF.	72	75	75	71	45	83	76	49	75	73	49	49	85	74	79	62	73	73
2 VOLT DROP	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK	—	—
3 CUR. LEAK	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK	—	—
4 PUMP	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK	—	—
5 IMPULSE	OK	OK	OK	OK	OK	—	—	—	—	OK	OK	OK	OK	OK	—	—	—	—
ACTUATION	110	115	105	120	120	—	—	—	—	110	110	110	110	115	—	—	—	—
RELEASE	50	50	43	45	50	—	—	—	—	45	45	50	50	50	—	—	—	—
VOLT DROP	OK	OK	OK	OK	OK	—	—	—	—	OK	OK	OK	OK	OK	—	—	—	—
CUR. LEAK	OK	OK	OK	OK	OK	—	—	—	—	OK	OK	OK	OK	OK	—	—	—	—
PUMP	OK	OK	OK	OK	OK	—	—	—	—	OK	OK	OK	OK	OK	—	—	—	—
KEEP	OK	OK	OK	OK	OK	—	—	—	—	OK	OK	OK	OK	OK	—	—	—	—
7 PUMP	OK	OK	—	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—
8 DISCHARGE	OK	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK
VERB.	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
9 KEEP	OK	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK
10 VERB. CTR.	OK	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK
ACTUATION	—	—	—	—	—	—	—	120	130	—	—	—	—	—	—	—	130	120
RELEASE	—	—	—	—	—	—	—	35	40	—	—	—	—	—	—	—	45	45
VOLT DROP	—	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK
CUR. LEAK	—	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK
PUMP	—	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK
KEEP	—	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK

TI-NHTSA 004446

FINISHED PRODUCTION

WHITE } Route to Finished Store
CANARY }
PINK } Route to Dept. Supervisor

DEVICE NUMBER

77PSL 2-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

1.

2.

2-10

3.

4.

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

ACCEPT
FEB 18 1992

Form 10002

DATE 2/17/92

DEPARTMENT 294

FINISHED PRODUCTION ROUTING

WHITE } Route to Finished Store
CANARY }
PINK } Route to Dept. Supervisor

DEVICE NUMBER

77PSL 2-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

1.

2.

2-9

3.

4.

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

ACCEPT
FEB 18 1992

Form 10002

DATE 2-11-92

DEPARTMENT 294

TI-NHTSA 004447

FINAL INSPECTION 779L3-1

DATE: 2-12-92

CUSTOMER P/N F24C-9F924-48

DISC LOT 2-7
REEL # 2
LOT # 2
WASHER LOT 129

MAT. I.D. 74848-A02-7
COP LOT # 8
CONV. LOT 153
QTY. 2000

DISC LOT 3-8
REEL # 2
LOT # 4
WASHER LOT 129

MAT. I.D. 74848-A02-8
CUP LOT # 8
CONV. LOT 153
QTY. 2000

TEST	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
1 ACTUATION	115	120	112	121	122	112	119	112	118	126	130	124	128	137	129	124	122	135
RELEASE	40	40	35	42	35	39	40	42	40	54	42	32	30	47	34	33	30	51
PROF.	71	80	77	79	84	73	78	78	78	71	88	82	77	90	88	71	71	82
2 WALT DROP	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK	—	—
3 CHALLENGE	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK	—	—
4 PROF	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK	—	—
5 TAPLINE	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ACTUATION	115	110	110	110	115	—	—	—	—	120	120	125	120	125	—	—	—	—
RELEASE	50	40	40	45	40	—	—	—	—	55	50	60	50	50	—	—	—	—
WALT DROP	OK	OK	OK	OK	OK	—	—	—	—	OK	OK	OK	OK	OK	—	—	—	—
CHALLENGE	OK	OK	OK	OK	OK	—	—	—	—	OK	OK	OK	OK	OK	—	—	—	—
PROF	OK	OK	OK	OK	OK	—	—	—	—	OK	OK	OK	OK	OK	—	—	—	—
CHRP	OK	OK	OK	OK	OK	—	—	—	—	OK	OK	OK	OK	OK	—	—	—	—
7 BURN	OK	OK	—	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—
8 BURNING	—	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK
VIEW	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
9 CHRP	—	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK
10 TERN. STN	—	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK
ACTUATION	—	—	—	—	—	—	—	120	125	—	—	—	—	—	—	—	130	140
RELEASE	—	—	—	—	—	—	—	40	30	—	—	—	—	—	—	—	30	30
WALT DROP	—	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK
CHALLENGE	—	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK
PROF	—	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK
CHRP	—	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK

TI-NHTSA 004448

FINISHED PRODUCTION ROUTING
 WHITE CANARY PINK
 Route to Finished Goods
 Route to Dept. Supervisor

DEVICE NUMBER

77PSU 2-1

SPECIAL REQUIREMENT TOTAL QUANTITY

MANU. ORDER NUMBER NO SUBTOTALS

- 1.
2. 2-8
- 3.
- 4.

QUALITY CONTROL APPROVAL

IN PROCESS	IN PROCESS	FINAL
		8029 SAT ACCEPT FEB 18 1992

Form 18282

DATE 2-12-92 DEPARTMENT 294

FINISHED PRODUCTION ROUTING
 WHITE CANARY PINK
 Route to Finished Goods
 Route to Dept. Supervisor

DEVICE NUMBER

77PSU 2-1

SPECIAL REQUIREMENT TOTAL QUANTITY

9

MANU. ORDER NUMBER NO SUBTOTALS

- 1.
2. 2-7
- 3.
- 4.

QUALITY CONTROL APPROVAL

IN PROCESS	IN PROCESS	FINAL
		8029 SAT ACCEPT FEB 18 1992

Form 18282

DATE 2-12-92 DEPARTMENT 294

KAPTON MATERIAL TEST TEST 188-03-24 JAO 920212

DEVICE #	KAPTON	CYC. TO FAILURE
188-03-01	FROM HAND LINE	1215K
188-03-02		932K
188-03-03		545K
188-03-04		1034K
188-03-05		778K
188-03-06		824K
188-03-07	FROM SAMPLE SHEET	938K
188-03-08	CUT INTO SQUARES	1004K
188-03-09		1186K
188-03-10		1726K
188-03-11		993K
188-03-12		1260K
188-03-13	FROM SAMPLE SHEET	1406K
188-03-14	CUT INTO CIRCLES	1795K
188-03-15		1722K
188-03-16		1232K
188-03-17		970K
188-03-18		1922K
188-03-19	JAPANESE POLYIMIDE	1520K
188-03-20	FILM, SQUARE	414K
188-03-21		1016K
188-03-22		466K
188-03-23		1293K
188-03-24		661K

TI-NHTSA 004450

TO: Dave Czarn
Keith Kawata

Charlie Douglas
Matt Sellers

FR: BOGGE: HIGHLIGHTS Feb 13th 1982

PRESSURE SWITCH

Still waiting on prints from the customer so we can determine if the hex can go on the crimp ring. In the mean time I am working on a design for hex around the connector. I am trying to improve the connection using serrations so no orientation is required. I am also using the castled crimp geometry from the 55ps.

The leading candidate for hex on connector is a single piece hex and crimp ring that is loaded from the top. The crimp is then made at the bottom trapping a steel washer which transmits the torque to the hexpart. The model shop is building different spline configurations for testing.

Three quotes have been received for the aluminum hex crimp ring. They are all at \$0.20-\$0.25 unfinished. A secondary machining operation is required to put the round crimp lip in place. The fundamental problem with this part is that the raw material cost is 5-6 cents, based on Aluminum at \$1.00/lb. This process will not meet my cost target of 10 cent total added to the final product. This is the main reason I have chosen to go with a drawn part. (Tom: note aluminum beverage cans are made by drawing and ironing. They are not made by extrusion. I saw it on TV last week and asked the impact houses.)

TI-NHTSA 004451

CPS

We expect the customer to complete their cost/benefit study today. They have supplied us with a detailed schedule showing actions required assuming the cost/benefit study is positive. This new schedule requires high resource commitment from TI, starting immediately. With full commitment coming 3/15/92.

Prior to committing to their schedule we need to weigh the program risk vs potential payback, against other projects in the pipeline. A significant tech risk exists with our current diaphragm based design approach because of the revised specs required for this engine. Specs like 1200psi instead of 800psi, linearity, temp sensitivity, etc. I recommend that we hold a tech review of the program next week. The tech review should have some non-precision tech experts for objectivity. Resources could then be assigned based on the design direction arising from the review. The resource commitment and estimated risk could then be presented to management for a commitment decision. I believe if we jump on it we can come to a decision within two weeks. This project is a tough call because the risk is high but the payback is also very high.

Customer schedule:

Ti receives engine	3/1/92
Purchasing agreement on technical protection complete	3/15/92
Ship 20 samples	3/20
First vehicle build	4/1
Ship samples with production intent hybrid	11/92

We have used a kistler transducer on loan from CPC. We did achieve some reduction in total error. But the error has shifted from almost exclusively hysteresis to exclusively non-linearity. We need something more than a time available basis if we are to understand how to correctly characterize the sensor.

P/N 36400-1 10B21 W/ .003" ZN NO KEKOLU
207# 10137 3/P-34UNF-2A .3468/.3430 3A - .3479(.3450)

3/P-3468F-29 . 3468/ . 3430

34 - 3479 (3450)

Actual

1	7.001	.3478
---	-------	-------

3 rd	1.001	-3478
-----------------	-------	-------

3	+ .00450	.3513
---	----------	-------

4	* 00075	34750
---	---------	-------

5	+ 00150	3423
---	---------	------

350	1.001	3479
-----	-------	------

7	1.002	3000
---	-------	------

5	1000	244
---	------	-----

9		346P
---	--	------

10	3.235	3.506
----	-------	-------

41	4.001	5/78
----	-------	------

10-24	A	1411.8
-------	---	--------

13	100000	3000
----	--------	------

13	7,003.50	3503
14		11/BC

14	<u>7 - 002</u>	<u>3888</u>
15	<u>1 - 001</u>	<u>1-001</u>

13	7.00250	.3973
14		1.1010

10	7-001	3918
25		4122

45 th	+ 103	1348
10		270

17	4.00050	.3473
18		.3473

19	+ 002	3488
20		

20	7-00150	3483
21		

21	1.001	.3478
----	-------	-------

5042	7.00225	34905
------	---------	-------

23

24

25

24	
----	--

27	
----	--

2a		
----	--	--

PREPARED BY: Flaine Ross

DATE: 2-13-91

UNIVERSAL PLANNING FORM 71-4700

TI-NHTSA 004453

P/N 36900-1 10B21 W/.003"Z.N No Kennell

Lot # 10137

3/P-24 UNF-2A .3468/.3430

3A - .3479/(.3450)

Dial Reading

1	0	.3468
2	+ .00050	.3473
3	+ .00150	.3483
4	+ .00250	.3493
5	+ .00150	.3483
6	+ .00175	.34855
7	+ .001	.3478
8	- .00050	.3473
9	+ .00050	.3473
10	+ .00200	.3488
11	+ .00250	.3493
12	+ .00050	.3473
13	+ .001	.3478
14	+ .002	.3488
15	+ .00150	.3483
16	+ .00275	.34955
17	+ .00175	.34855
18	+ .001	.3478
19	+ .00175	.34855
20	+ .00175	.34855
21	+ .00125	.34805
22	+ .00025	.34705
23	+ .001	.3478
24	+ .001	.3478
25	+ .00275	.34955
26	+ .00175	.34805
27	+ .00050	.3473
28	+ .001	.3478

OPERATING UNIT: TOLSON GAGE 3A-24 UNF-2A

PREPARED BY: ELAINE ROSE

DATE: 2-13-93

0 = .3468

UNIVERSAL PLANNING FORM 1104700

TI-NHTSA 00454

TI-NHTSA 004455

PREPARED BY: ELAINE ROSE DATE: 2-13-92 UNIVERSAL PLANNING FORM 11-5478B

HIGHLIGHTS
Stephen B. Offler
Week Ending 92-02-14

Handwritten signature/initials



FORD MY'92 ELECTRONIC SPEED CONTROL DEACTIVATE PS

SWITCH NOISE ISSUE: We've begun to work with the disc department to arrive upon a production-viable method to produce ultra-low-differential discs. We've returned the original Disc Dept. prototype lot of 1.3 psi diff. to Ted for further analysis, including Force-Deflection work. The goal is to develop a means of producing and checking these discs in production. Additionally, Ted has provided a bit of disturbing news: the disc used in the actual device which caused the customer noise complaint has a differential of 2.5 psi (all quoted measurements using Disc Dept equipment) while our experimentation showed a 3 psi device to be undetectable. Does this mean that diff. is not necessarily correlatable to sound? Mfg. Eng. and Mechanization are becoming involved at this point. A meeting will be held next Monday to discuss how to pilot, build, and test a device which is silent.

HI-STAT DEVICE: We've completed a competitive evaluation of this device. This includes X-rays, characterizations, cycle testing to failure, and disassembly. We discovered quite a bit of drift in characterization, with initial readings of 289/144, 10K readings of 279/129, and 50K readings of 265/134. The mV drop looked okay. The device was a release-creep. The device developed a leak at about 100K cycles. Upon opening, we discovered the internal seal (composed of a round-section O-ring, colored purple) had extruded. Design features include an insert-molded base, with very beefy sections to support the crimp operation which must withstand the entire burst pressure. No transfer pin is used, rather the discs (2 stacked) act directly on the spring arm with a Kapton insulator. Overall the device appears very prototype in nature, with no plating of any kind on any steel internal components. Additionally, the device is quite poor in terms of Design For Assembly, with the diaphragm, the pressure/force converter pin, and the discs poorly located and easy to misplace.

DIAPHRAGM LIFE: We've received test parts from the model shop, and evaluations have begun. Configurations include:

- stepped hexports to accommodate small-diameter round diaphragms which are constrained primarily by the gasket rather than clamped between hex flange and washer
- hexports and washers with features to stretch the diaphragm during assembly
- two vs. three pieces of full-round Kapton to explore drift and life
- concave features cut into washer and hex flange to mimic the "bent" geometry which occurs during crimp

HEXPORT: As a result of the Elco meeting, we are planning to do a combined Impulse and Thermal Cycle test of the 10B21 hexports in order to have this information available if the customers request it when we inform them of the material change. This is likely to be combined with the evaluation of the Stapta ultrasonic welded movable terminals, and one of the higher pressure disc loss for 87PS conversion.

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 date 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 part 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

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

TI-NHTSA 004458

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 $\pm$ 343 KPa (1450 $\pm$ 50 psi).
 - 1) 0 - 475,000 cycles: 13 $\pm$ 1 volts, trace current to monitor function.
 - 2) 475,001 - 500,000 cycles: 13 $\pm$ 1 volts D.C., 750 $\pm$ 50 ma., per figure 4.
- b. Brake fluid temperature to be 135 $\pm$ 14°C and ambient temperature to be 107°C min.
125°F
- 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 Requirements

- 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.

7	18			ES-F2VC-9F924-AA
FRAME	OF	REVISED		NUMBER

WAT PD 3947-B2 (Previous editions may NOT be used)

TI-NHTSA 004460

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/No.	P90-.84	4/Lot	" " "
C	Current Leakage	72	P90-.96	3/No.	P90-.56	4/Lot	" " "
D	Proof Test	72	P90-.96	12/No.	P90-.84	4/Lot	" " "
F	Burst	6	P90-.72	3/No.	P90-.56	4/Lot	" " "
I	Vibration	6	P90-.72	3/No.	P90-.56	6/6 No.	P90-.72
J	Terminal Strength	12	P90-.84	6/No.	P90-.72	4/Lot	All Must Pass
K	Vacuum	6	P90-.72	3/No.	P90-.56	6/6 No.	P90-.72
L	Temperature Cycle	6	P90-.72	3/No.	P90-.56	6/6 No.	P90-.72
M	Fluid Resistance	36	P90-.94	36/12No	P90-.94	36/12No.	P90-.94
Durability Tests							
III.							
E	Impulse	24	P90-.90	12/No.	P90-.84	3/3 No.	P90-.56
G	Humidity	6	P90-.72	3/No.	P90-.56	6/6 No.	P90-.72
H	Salt Spray	6	P90-.72	3/No.	P90-.56	6/6 No.	P90-.72

FORM PD 3947-82 (Previous editions may apply)

PAGE

3

OF

18

REVIEWED

NUMBER

△ ES-F2VC-9F92A-4A

TI-NHTSA 00462

-MSG N#- 211394 FR-SBO1 TO-CMP1 SENT=02/14/92 09:10 AM
R#-161 ST-C DIV-0050 CO-00101 BY-SBO1 AT=02/14/92 09:10 AM

TO: Ted Ballard	ETB	Steve Major	SMFH
Tom Burke	MFPC	Dale Sogge	FFUN
Jeff DiDomenico	ELB	Matt Sellers	PCME
Charlie Douglas	CMP1	Rusty Struble	RCS2
Paul Kotch	PRK1	Jim Watt	PCQA

CC: Tom Charboneau (delivered separately)
Dave Czarn

FR: Steve Offiler SBO1

SJ: Weekly Highlights

FORD MY'92 ELECTRONIC SPEED CONTROL DEACTIVATE PS

SWITCH NOISE ISSUE: We've begun to work with the disc department to arrive upon a production-viable method to produce ultra-low-differential discs. We've returned the original Disc Dept. prototype lot of 1.3 psi diff. to Ted for further analysis, including Force-Deflection work. The goal is to develop a means of producing and checking these discs in production. Additionally, Ted has provided a bit of disturbing news: the disc used in the actual device which caused the customer noise complaint has a differential of 2.5 psi (all quoted measurements using Disc Dept equipment) while our experimentation showed a 3 psi device to be undetectable. Does this mean that diff. is not necessarily correlatable to sound? Mfg. Eng. and Mechanization are becoming involved at this point. A meeting will be held next Monday to discuss how to pilot, build, and test a device which is silent.

HI-STAT DEVICE: We've completed a competitive evaluation of this device. This includes X-rays, characterizations, cycle testing to failure, and disassembly. We discovered quite a bit of drift in characterization, with initial readings of 289/144, 10K readings of 279/129, and 50K readings of 265/134. The mV drop looked okay. The device was a release-crimp. The device developed a leak at about 100K cycles. Upon opening, we discovered the internal seal (composed of a round-section O-ring, colored purple) had extruded. Design features include an insert-molded base, with very beefy sections to support the crimp operation which must withstand the entire burst pressure. No transfer pin is used, rather the discs (2 stacked) act directly on the spring arm with a Kapton insulator. Overall the device appears very prototype in nature, with no plating of any kind on any steel internal components. Additionally, the device is quite poor in terms of Design For Assembly, with the diaphragm, the pressure/force converter pin, and the discs poorly located and easy to misplace.

DIAPHRAGM LIFE: We've received test parts from the model shop, and evaluations have begun. Configurations include:

- stepped hexports to accomodate small-diameter round diaphragms which are constrained primarily by the gasket rather than clamped between hex flange and washer
- hexports and washers with features to stretch the diaphragm during assembly
- two vs. three pieces of full-round Kapton to explore drift and life

- concave features cut into washer and hex flange to mimic the "bent" geometry which occurs during crimp

HEXPORT: As a result of the Elco meeting, we are planning to do a combined Impulse and Thermal Cycle test of the 10B21 hexports in order to have this information available if the customers request it when we inform them of the material change. This is likely to be combined with the evaluation of the Stapla ultrasonic welded movable terminals, and one of the higher pressure disc lots for 87PS conversion.

Regards,
Steve O.

FINAL INSPECTION 77PBL2-1

DATE: 2-14-92

CUSTOMER P/N F24C-9F924-48

DISC LOT 2-11
REEL # 2
LOT # 3
WASHER LOT 129

NAT. I.D. 74868-A02-B : DISC LOT 2-12
CUP LOT # 9 : REEL # 2
CONV. LOT 134 : LOT # 1
QTY. 2000 : WASHER LOT 129

NAT. I.D. 74868-A02-7
CUP LOT # 9
CONV. LOT 134
QTY. 2000

TEST	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
1 ACTUATION	126	125	127	128	128	125	126	128	130	113	119	131	122	115	120	126	126	117
RELEASE	34	32	49	54	43	32	37	31	33	34	32	33	45	35	33	32	34	33
DIFF.	72	73	78	74	73	52	57	31	33	39	67	77	78	60	47	79	72	62
2 VOLT DROP	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK	—	—
3 CUR. LEAK	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK	—	—
4 PROOF	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK	—	—
5 INFLAME	OK	OK	OK	OK	OK	—	—	—	—	OK	OK	OK	OK	OK	—	—	—	—
ACTUATION	125	120	130	130	130	—	—	—	—	120	115	125	125	110	—	—	—	—
RELEASE	50	45	50	50	40	—	—	—	—	50	50	30	40	45	—	—	—	—
VOLT DROP	OK	OK	OK	OK	OK	—	—	—	—	OK	OK	OK	OK	OK	—	—	—	—
CUR. LEAK	OK	OK	OK	OK	OK	—	—	—	—	OK	OK	OK	OK	OK	—	—	—	—
PROOF	OK	OK	OK	OK	OK	—	—	—	—	OK	OK	OK	OK	OK	—	—	—	—
CREEP	OK	OK	OK	OK	OK	—	—	—	—	OK	OK	OK	OK	OK	—	—	—	—
7 BURST	OK	OK	—	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—
8 THERMAL	—	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK
VIBRAL	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
9 CREEP	—	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK
10 THER. STAY	—	—	—	—	—	—	—	OK	OK	—	—	—	—	—	—	—	OK	OK
ACTUATION	—	—	—	—	—	—	—	125	125	—	—	—	—	—	—	—	130	129
RELEASE	—	—	—	—	—	—	—	30	35	—	—	—	—	—	—	—	35	35
VOLT DROP	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
CUR. LEAK	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
PROOF	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
CREEP	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓

TI-NHTSA 004466

FINISHED PRODUCTION ROUTING		WHITE	Route to Finished Store
		CANARY	Route to Dept. Supervisor
DEVICE NUMBER			
77 PSL 2-1			
SPECIAL REQUIREMENT	TOTAL QUANTITY		
	9		
MANU. ORDER NUMBER	NO SUBTOTALS		
1. 2. 3. 2-12 4.			
QUALITY CONTROL APPROVAL			
IN PROCESS	IN PROCESS	FINAL	
			
Form 1898			
DATE 2-13-92		DEPARTMENT 294	

FINISHED PRODUCTION ROUTING		WHITE	Route to Finished Store
		CANARY	Route to Dept. Supervisor
DEVICE NUMBER			
77 PSL 2-1			
SPECIAL REQUIREMENT	TOTAL QUANTITY		
	9		
MANU. ORDER NUMBER	NO SUBTOTALS		
1. 2. 3. 2-11 4.			
QUALITY CONTROL APPROVAL			
IN PROCESS	IN PROCESS	FINAL	
			
Form 1898			
DATE 2-13-92		DEPARTMENT 294	

FINAL INSPECTION 77PR2-1

DATE: 12-14-92

CUSTOMER P/N F24C-WF924-00

DISC LOT 2-13
REEL #1
LOT #3
WASHER LOT 129

MT. I.S. 74060-002-8
CUP LOT 89
CONV. LOT 154
QTY. 2000

DISC LOT 2-14
REEL #1
LOT #4
WASHER LOT 129

MT. I.S. 74060-002-7
CUP LOT 89
CONV. LOT 154
QTY. 2000

TEST	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
1 INJECTION	110	125	130	130	130	125	130	125	130	120	125	120	130	120	125	120	125	130
RELEASE	90	95	95	40	35	60	60	95	60	60	60	60	95	95	60	60	60	45
DIFF.	40	70	80	70	75	75	70	70	70	60	65	60	75	65	75	60	65	70
2 VOLT DROP	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3 CUR. LEAK	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4 PROOF	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5 IMPULSE	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
INJECTION	100	130	125	130	125	—	—	—	—	115	120	110	120	110	—	—	—	—
RELEASE	40	50	60	25	55	—	—	—	—	55	55	50	50	50	—	—	—	—
VOLT DROP	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
CUR. LEAK	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
PROOF	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
SHRIMP	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
7 SHRIMP	✓	✓	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—
8 TENSILE	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VISUAL	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
9 SHRIMP	—	—	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	✓
10 TENS. STRE.	—	—	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	✓
INJECTION	—	—	—	—	—	—	—	—	125	130	—	—	—	—	—	—	125	130
RELEASE	—	—	—	—	—	—	—	—	95	95	—	—	—	—	—	—	60	60
VOLT DROP	—	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	✓	✓
CUR. LEAK	—	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	✓	✓
PROOF	—	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	✓	✓
SHRIMP	—	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	✓	✓

FINISHED PRODUCTION ROUTING

WHITE CANARY
PINK → Route to Dept. Supervisor

DEVICE NUMBER

77 PSL 2-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

1.

2.

3.

4.

2-14

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

ACCEPT
FEB 15 1992

Form 18282

DATE 2-13-92

DEPARTMENT 294

FINISHED PRODUCTION ROUTING

WHITE CANARY
PINK → Route to Dept. Supervisor

DEVICE NUMBER

77 PSL 2-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

1.

2.

3.

4.

2-13

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

ACCEPT
FEB 15 1992

Form 18282

DATE 2-13-92

DEPARTMENT 294

FINAL INSPECTION 77PSL2-1

DATE: 2-14-92

CUSTOMER P/N F2WC-9F924-00

DISC LOT 2-15
REEL # 1
LOT # 3
WASHER LOT # 130

NAT. I.D. 74668-AA2-7
CUP LOT # 9
CONV. LOT 154
QTY. 2000

DISC LOT 2-16
REEL # 1
LOT # 5
WASHER LOT # 130
QTY. 2550

TEST	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
1 ACTUATION	120	122	123	124	113	116	125	123	122	125	123	122	123	121	120	122	116	118
RELEASE	57	57	55	65	52	55	59	62	59	54	50	51	51	53	56	52	46	48
DIFF.	62	64	67	59	61	61	63	40	63	71	73	71	71	68	64	70	69	69
2 VOLT DROP	---	---	---	---	---	OK	OK	---	---	---	---	---	---	---	OK	OK	---	---
3 CUR. LEAK	---	---	---	---	---	OK	OK	---	---	---	---	---	---	---	OK	OK	---	---
4 PROOF	---	---	---	---	---	OK	OK	---	---	---	---	---	---	---	OK	OK	---	---
5 DYPHASE	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ACTUATION	115	120	120	120	110	---	---	---	---	120	120	120	120	120	---	---	---	---
RELEASE	60	60	60	60	55	---	---	---	---	50	50	50	50	55	---	---	---	---
VOLT DROP	OK	OK	OK	OK	OK	---	---	---	---	OK	OK	OK	OK	OK	---	---	---	---
CUR. LEAK	OK	OK	OK	OK	OK	---	---	---	---	OK	OK	OK	OK	OK	---	---	---	---
PROOF	OK	OK	OK	OK	OK	---	---	---	---	OK	OK	OK	OK	OK	---	---	---	---
CREEP	OK	OK	OK	OK	OK	---	---	---	---	OK	OK	OK	OK	OK	---	---	---	---
7 BURN	OK	OK	---	---	---	---	---	---	---	OK	OK	---	---	---	---	---	---	---
8 DIMENSIONAL	---	---	---	---	---	---	---	OK	OK	---	---	---	---	---	---	---	OK	OK
VISUAL	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
9 CREEP	---	---	---	---	---	---	---	OK	OK	---	---	---	---	---	---	---	OK	OK
10 TENS. STR.	---	---	---	---	---	---	---	OK	OK	---	---	---	---	---	---	---	OK	OK
ACTUATION	---	---	---	---	---	---	---	120	120	---	---	---	---	---	---	---	115	115
RELEASE	---	---	---	---	---	---	---	60	55	---	---	---	---	---	---	---	46	40
VOLT DROP	---	---	---	---	---	---	---	OK	OK	---	---	---	---	---	---	---	OK	OK
CUR. LEAK	---	---	---	---	---	---	---	OK	OK	---	---	---	---	---	---	---	OK	OK
PROOF	---	---	---	---	---	---	---	OK	OK	---	---	---	---	---	---	---	OK	OK
CREEP	---	---	---	---	---	---	---	OK	OK	---	---	---	---	---	---	---	OK	OK

TI-NHTSA 004470

FINISHED PRODUCTION ROUTING WHITE } Route to Finished Goods
CANARY }
PINK } Route to Dept. Supervisor

DEVICE NUMBER

77 PS62-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

MO SUBTOTALS

1.

2.

3.

4.

2-15

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

00528
SAT
ACCEPT
FEB 24 1992

Form 19262

DATE 2-14-92

DEPARTMENT 294

FINISHED PRODUCTION ROUTING WHITE } Route to Finished Goods
CANARY }
PINK } Route to Dept. Supervisor

DEVICE NUMBER

77 PS62-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

MO SUBTOTALS

1.

2.

3.

4.

2-16

QUALITY CONTROL APPROVAL

IN PROCESS

IN PROCESS

FINAL

00528
SAT
ACCEPT
FEB 24 1992

Form 19262

DATE 2-14-92

DEPARTMENT 294

TI-NHTSA 004471

FINAL INSPECTION 77962-71

DATE: 2-15-92

CUSTOMER P/N F2VC-9F924-AB

DISC LOT 2-18
REEL #1
LOT #5
WASHER LOT 130

WAT. I.D. 74064-AC1-6
CUP LOT #9
CONV. LOT 154
QTY. 2300

DISC LOT 2-19
REEL #2
LOT #2
WASHER LOT 130

WAT. I.D. 74064-AC1-6
CUP LOT MIXED
CONV. LOT MIXED
QTY. 2000

TEST	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
1 ACTUATION	120	108	110	124	114	116	118	122	122	114	117	115	119	114	119	121	113	111
RELEASE	51	47	39	54	43	51	50	53	56	52	56	53	54	54	56	56	59	50
DIFF.	69	61	71	70	71	65	68	69	66	62	61	62	64	60	63	65	54	61
2 VOLT DROP	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓	—	—
3 CUR. LEAK	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓	—	—
4 PROOF	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓	—	—
5 IMPULSE	✓	✓	✓	✓	—	—	—	—	—	OK	OK	OK	OK	OK	—	—	—	—
ACTUATION	115	110	110	120	110	—	—	—	—	110	120	120	120	120	—	—	—	—
RELEASE	50	50	40	60	45	—	—	—	—	40	50	50	50	45	—	—	—	—
VOLT DROP	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
CUR. LEAK	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
PROOF	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
TEMP	✓	✓	✓	✓	✓	—	—	—	—	✓	✓	✓	✓	✓	—	—	—	—
7 BURN	✓	✓	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—
8 DIMENSIONAL	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
VISUAL	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
9 CREEP	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
10 TERN. STR	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
ACTUATION	—	—	—	—	—	—	—	125	120	—	—	—	—	—	—	—	120	115
RELEASE	—	—	—	—	—	—	—	55	60	—	—	—	—	—	—	—	60	50
VOLT DROP	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
CUR. LEAK	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
PROOF	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓
CREEP	—	—	—	—	—	—	—	✓	✓	—	—	—	—	—	—	—	✓	✓

FINISHED PRODUCTION ROUTING WHITE CANARY PINK } Route to Finished Goods
 PINK } Route to Dept. Supervisor

DEVICE NUMBER 477 PSL 2-1

SPECIAL REQUIREMENT	TOTAL QUANTITY
	9

MANU. ORDER NUMBER NO SUBTOTALS

- 1.
- 2.
- 3.
- 4.

2-19

QUALITY CONTROL APPROVAL

IN PROCESS	IN PROCESS	FINAL
		

Form 19262

DATE 2-14-92 DEPARTMENT 294

FINISHED PRODUCTION ROUTING WHITE CANARY PINK } Route to Finished Goods
 PINK } Route to Dept. Supervisor

DEVICE NUMBER 77 PSL 2-1

SPECIAL REQUIREMENT	TOTAL QUANTITY
	9

MANU. ORDER NUMBER NO SUBTOTALS

- 1.
- 2.
- 3.
- 4.

2-18

QUALITY CONTROL APPROVAL

IN PROCESS	IN PROCESS	FINAL
		

Form 19262

DATE 2-14-92 DEPARTMENT 294

2/17/92

Steve,

Re: Elco 3A vs 2A

(1) Data from Ron Williams (Elco) -

Please check over if any

difference in calculation method

(2) Via 3A - $Q_p = 2.632$
 $Q_{pk} = 1.774$

Thx,

Jim W.

Cpk Index (Bilateral Tolerances)		
Sample Number	Enter Values	Device: 38900-1 3.1 Measurement Type: J. GAGE 2A
1	0.34620	Lower Spec: 0.3430 Upper Spec: 0.3479 Spec Range: 0.0049
2	0.34620	
3	0.34620	
4	0.34620	
5	0.34620	
6	0.34620	Average: 0.3463 Std Dev: 0.0003 Min Reading: 0.3456 Max Reading: 0.3468 Range: 0.0012
7	0.34620	
8	0.34620	
9	0.34620	
10	0.34620	
11	0.34650	Cp: 2.666 Cpl: 3.540 Cpu: 1.792 Cpk: 1.792
12	0.34630	
13	0.34660	
14	0.34660	
15	0.34660	
16	0.34670	
17	0.34670	
18	0.34670	
19	0.34670	
20	0.34670	
21	0.34680	
22	0.34690	
23	0.34600	
24	0.34600	
25	0.34610	
26	0.34610	
27	0.34610	
28	0.34610	
29	0.34610	
30	0.34610	
31		
32		
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48		
49		
50		

ELCO DATA

-MSG N/- 347427 FR=GAMY TO=COPY SENT=02/19/92 12:50 PM
ST-C DIV=0050 CC=00149 BY=GAMY AT=02/19/92 12:50 PM

TO: JIM WATT JW02 CC: ANDY MCGUIRKACH1
MATT SELLERS PCME MIKE DEMATTIA MD3
STEVE OFFILER SBO1 BILL SWEET WS4
CHARLIE DOUGLAS CMP1 DAVE CZARN ZARN

FROM: ELAINE ROSE GAMY

SUBJECT: FORD CP AND CPK (77PS & 57PS)

TEAM DECISION WAS NOT TO USE APT SPC FILES, BECAUSE DATA IS BASED
ON MASTERS.

IN REVIEWING PRINTOUTS FROM PRODUCTION RUN DATA, IT ENDS UP BEING
SORTED PRODUCT, WHICH IS ALSO NOT ACCEPTABLE.

SUGGESTION TO START SEPARATE SPC FILES, USING A 5 (?) PIECE
PRODUCTION SAMPLE, IS THE NEXT IDEA.

PLEASE CONSIDER THIS.

REGARDS,
ELAINE

TI-NHTSA 004476

Ford $C_pK/C_p = (77PS + 57PS)$

Team decision was not to use APT SPC files because data is based on master's.

In reviewing print outs from production run data, it ends up being sorted product, which is also not acceptable.

Suggestion to start separate SPC files, using a 5 (?) pc. prod. sample, is the next idea.

Please consider this.

Thy -
Eline

-MSG M#- 347427 FR=GAMY TO=COPY SENT=02/19/92 12:50 PM
ST=C DIV=0050 CC=00149 BY=GAMY AT=02/19/92 12:50 PM

TO: JIM WATT JW02 CC: ANDY MCGUIRKACM1
MATT SELLERS PCNE MIKE DEMATTIA MD3
STEVE OFFILER SBO1 BILL SWEET WS4
CHARLIE DOUGLAS CMP1 DAVE CZARN ZARN

FROM: ELAINE ROSE GAMY

SUBJECT: FORD CP AND CPK (77PS & 57PS)

TEAM DECISION WAS NOT TO USE APT SPC FILES, BECAUSE DATA IS BASED
ON MASTERS.

IN REVIEWING PRINTOUTS FROM PRODUCTION RUN DATA, IT ENDS UP BEING
SORTED PRODUCT, WHICH IS ALSO NOT ACCEPTABLE.

SUGGESTION TO START SEPARATE SPC FILES, USING A 5 (?) PIECE
PRODUCTION SAMPLE, IS THE NEXT IDEA.

PLEASE CONSIDER THIS.

REGARDS,
ELAINE

TI-NHTSA 004479

TEXAS INSTRUMENTS INC. / MATERIALS & CONTROLS GROUP / SITE

PARTS LIST / PROJECT / PART NUMBER: 77PSL2-1 / REV LTR: E CLS: 650
EXPLOSION / NUM: 3423 / DWG PFX: NUM:77PSL2-1 / IECN INC.DT: 92/02/20

TITLE: PRESSURE SWITCH

LV/CNT	QTY/UM	IBITN	PART/DRAWING NUMBER	RV	NOMENCLATURE/PARM DATA
01	1	REF	36952-1		FINAL ASSEMBLY
			36952-1		
01	2	1	27759-2		BASE ASSEMBLY
			27759SH1		
02	3	1	46515-2		BASE (BROWN)
			46515		
02	4	1	36888-1		STATIONARY TERMINAL
			36888		
02	5	1	36897-1		MOVABLE TERMINAL ASM
			36897SH1		
03	6	1	74408-1		MOVABLE CONTACT
			74408		
03	7	1	74171-1		RIVET
			74171		
03	8	1	36887-1		MOVABLE TERMINAL
			36887		
03	9	1	36889-1		SPRING ARM
			36889		
04	10	AR	27716-1		SPR MAT'L STR SPEC (.216 LBS/K)
			27716SH1		
01	11	1	27293-13		SENSOR ASSEMBLY
			27293SH2		
02	12	1	36900-1		MOD SAN J512 HEXPORT
			36900		
02	13	1	74353-1		GASKET
			74353		
02	14	1	27713-1		CUP
			27713		
02	15	3	74176-1		SEAL
			74176		
03	16	AR	27225-1		KAPTON STRIP SPEC (.175 LBS/K)
			27225		
02	17	1	27639-1		WASHER
			27639		
02	18	1	27406-1		CONVERTER
			27406		
02	19	1	73958-2		SPACER
			73958		
02	20	OR	73958-3		SPACER
			73958		
03	21	AR	74224-1		KAPTON TAPE (.100 LBS/K)
			74224		
02	22	1	36656-27		3/4" FORMED DISC
			36656SH1		
01	23	1	74797-1		CRIMP RING
			74797		
01	24	1	74078-143		TRANSFER PIN
			74078		
01	25	1	74247-4		ENVIRONMENTAL SEAL
			74247		
01	26	1	74888-1		THREAD CAP
			74888		
01	27	AR	27318-1		CARTON ASM.
			27318		
02	28	1	74219-1		CARTON
			74219		
02	29	5	74218-1		ROW SEPARATOR
			74218		
02	30	4	27317-1		DEVICE SEPARATOR

TI-NHTSA 004480

27317

1 NOTES, REV. DATA, DISTRIBUTION, OPERATING CHARACTERISTICS, SPECIAL REQUIREMENTS 1

REV DESC: SET UP

1 CCB APPROVAL DATE: 92/01/30

DFTG WORK GROUP: PRECISION CONTROLS

1 ECH ORIGINATOR: STEPHEN B OFFILER

NOTES:

- 1 - ACTUATION PRESSURE ----- 90-160 PSIG
- 2 - RELEASE PRESSURE ----- 20 PSIG MIN.
- 99 - CR M07857, THREAD CAP 74888-1 WAS 74179-2
STOCK DISPOSITION
FINISHED DEVICES - N/A
PARTS & SUB ASMS - N/A

DETAILED REVISION DESCRIPTION:

NO DATA EXISTS FOR THIS REVISION

-MSG Nf- 411164 FR-RIVA TO-FOSL SENT-08/26/92 07:55 AM
R#-102 ST-C DIV-0050 CC-00149 BY-RIVA AT-08/26/92 07:55 AM

To: Any Andres ANYA

TI-NHTSA 004481

-NEG M#- 371305 FR-ZARN TO-GAMY SENT-02/20/92 06:49 AM
R#-062 ST-C DIV-0050 CC-00101 BY-ZARN AT-02/20/92 06:49 AM

FEBRUARY 20, 1992

TO: RUSTY STRUBLE	RCS2	CC: TOM CHARBONEAU	TC
MIKE DeMATTIA	MD3	JOHN KOURTESIS	MDES
CHARLIE DOUGLAS	CMPI	STEVE MAJOR	SMFH
DICK GARIEPY	MFPC	ANDY McGUIRK	PCQA
PAUL KOTCH	PRK1	ED O'NEILL	EJON
JOE LAZARZ	JML8	NORM FREDI	WHLE
STEVE OFFILER	SBO1	GARY SNYDER	CPPC
MATT SELLERS	PCNE	MARTHA SULLIVAN	CPPC
BILL SWEET	PCNE	RAY TOURANGEAU	PCNE
JIM WATT	PCQA	BILL CONGDON	MFPC
TERRY RODRIGUEZ	MFPC	STEVE MCCOOEY	MDES
		ELAINE ROSE	GAMY

FR: DAVE CZARN ZARN

SJ: FORD CRUISE CONTROL PRESSURE SWITCH START-UP MEETING

PLEASE NOTE THAT TODAY'S MEETING HAS BEEN CANCELLED DUE TO
THE TEVES VISIT. OUR NEXT MEETING WILL BE THURSDAY 2/27
AT 10 AM IN THE MKTG CONF RM.

THANKS, DAVE

TI-NHTSA 004482

HIGHLIGHTS
Stephen B. Offler
Week Ending 92-02-21

[Handwritten signature]
2/20/92



FORD MY'92 ELECTRONIC SPEED CONTROL DEACTIVATE PS

57 AND 87 VALIDATIONS: The decision has been made to significantly elevate the priority on these programs. All six are planned to progress more or less in parallel, but rearrangements can and will be made in order to finish 57PSL11-3 and 57PSF3-3 to avoid jeopardizing the 920415 date promised to Ford. The internal motivation for completing the other four ASAP is to expedite the changeover of 57Lx-x business to 87Lx-x, which improves company profits. We are presently working on the detailed timing, and in parallel Jeff has begun to co-ordinate device builds and equipment requirements. Additional resources required will be determined by the timing charts. The elevated priority of these six programs tends to place everything else on the back burner.

SILENT DEVICE: Initial meetings have been held with Mechanization to begin to explore production techniques for piloting/pinning (calibration) silent devices. Pending test results on the first lots of silent ultra-low-differential discs from the disc dept., we'll begin looking at force- and pressure-deflection curves to determine characteristics that would be correlatable to pinning technique, such as inflection points in the hatchet curves and determination of slope changes that define these points, etc. etc. Additionally, we'll be doing more work with the numerical approach originally proposed, where the ratio's of device differential vs. act. sigma across a range of calibrator settings produce a local peak at the center of the pinning window. Mechanization has taken a first-pass look at an automatic machine to collect hatchet-curve data on sensors to find the center of the pin window. The cost is very roughly \$88K.

DIAPHRAGM LIFE / MISC TESTING: Progress on the current lots of diaphragm-life experiments has been halted by the validations. Some progress has been made: we have discovered that features which stretch the Kapton during crimp leave asymmetric strain patterns in the diaphragm (not teardrops, but actually worse); the lots using small round diaphragms constrained by the gasket (rather than clamped by the hex flange/washer) look quite good, and we plan to eventually cycle a lot of these; and the two-vs-three full round Kaptons running to determine drift performance has produced a leaker in the two-pc lot.

Stan Homol has provided a bagful of miscellaneous 52PS and 57PS devices built in 1986. We plan to choose a few 52's from the bag (built on AM1) and open them up to look for teardrops.

Devices using ultrasonic-welded movable terminal assemblies and 10B21 hexports have been built to undergo a hybrid Impulse and Thermal Cycle test. This is designed to provide data on the life of these components at temperature, pressure, and cycling extremes. The hybrid test was originally conceived to expedite individual Impulse and TC tests and distribute the temperature cycling throughout life cycling. ~~This revision is held.~~

While cycling production devices recently (looking for spring arm cracks at the bump) we had one PC device that went open-circuit at high temperature. It actually displayed continuity very briefly during release, which we attributed to bounce. The switching action seems to suggest the device was pinned very short. We opened the device, and discovered the base was calibrated to .092" (outside the .089" +/- .002 machine settings) and the T-pin was .142". Our calculations show this is at least .003" too short. We need to understand if thermal expansion is causing a pin-shift at high temp, and/or if temperature causes characteristic changes to the hatchet curve. This may lead to revised room-temp pinning to compensate, shooting for the high end of the window instead of the center.

TI-NHTSA 004483