EA02025

TEXAS INSTRUMENTS, INC.'S

9/10/03 ATTACHMENT TO ODI

BOX 4, PARTS A - N

PART I

BRUSH WELLMAN
ENGINEERED MATERIALS

BRUSH WELLMAN INC. 5 JUST ROAD FAIRFIELD NJ 07006 201-227-2558

CERTIFICATE OF MATERIAL QUALITY

TEXAS INSTRUMENT
34 FOREST STREET
BUILDING 11 DOOR 16
ATTLEBORO MA 02703

OUR ORDER NO: FA4484 CUSTOMER NO: 897852
OUR ITEM NO: 01 SHIPMENT NO: 001
YOUR P.O. NO: 300015520 05/01/92
YOUR SPEC NO:
YOUR PART NO: 87716-1

PRODUCT DESCRIPTION	ALLOY	TEMPER	HEAT NO.	DIMENSIONS			
ALLOY STRIP	190	HM TM04	24737	0.005 0.183	+0.0002 +0.002	-0.0002 -0.002	" TH: " WI CO

SHIPMENT NBR 001 = 102.0 LBS
HEAT NUMBER 24737

***** CHEMICAL COMPOSITION (PERCENT) *****

1.94 BE	.23 CO	.06 NI	.09 FE	.12 SI	.07 AL
.006 SN	.01 ZN	.007 CR	.003 PB		

REMAINDER CU

***** AS SHIPPED PROPERTIES *****

TENSILE	(KSI)	142.6	- 144.6
YIELD	(KSI)	122.8	- 122.9
ELONGATION	% IN 2"	14.0	- 14.0
HARDNESS-1	DPH	308.0	
CONDUCTIVITY	% IACS	18.8	
GRAIN SIZE	(MM)	.015	- .015

******* PC / LOT OR COIL NUMBER *****

80- B- 1

Paul J. Freund
QUALITY ASSURANCE MANAGER

5/1
DATE

[redacted]

05/01/92 11:01

1-May-92

77PS QUIET SWITCH COST ADDERS

TOOLING:	k$
DISC DEPARTMENT TOOLING	15.00
BASE AMI SOFTWARE	5.00
BASE AMI HARDWARE	3.00
FINAL AMI HARDWARE/SOFTWARE	15.00
BASE MOLD MODIFICATIONS	3.00
FUNCTION TESTER SOFTWARE	2.20
TOTAL QUIET SWITCH TOOLING COST (K$):	43.20

COST ADDER ELEMENT	77PSL2-1 77PSL2-3 ORIGINAL	77PSL3-1 77PSL3-3 NO SUBBER	77PSL3-2 9HO TAURUS W/SNUBBER
COMPONENTS			
DISC		15.00	15.00
SNUBBER HEXPORT			800.00
NORYL BASE		26.40	26.40
STANDARD BASE	2.14		
SUB-TOTAL COMPONENT ADDERS:	2.14	41.4	841.4
LABOR/YIELDS			
ELEVATED TEMP TESTING		0.35	0.35
HYPOT TESTING		1.25	1.25
FINAL AMI LABOR		5.00	5.00
PILOTING LABOR		1.25	1.25
FINAL AMI YIELDS		14.85	14.85
FUNCTION TESTER YIELDS		49.13	49.13
SUB-TOTAL LABOR/YIELDS ADDERS:	0.00	71.83	71.83
TOTAL COMPONENT/LABOR/ YIELD ADDERS:	2.14	113.23	913.23

5/1/92

77PSC3-1 Quiet Switch 5/19/92
Process Modifications / Stats

- Final Assembly

Snap Switch	Quiet Switch
• Single base gage window	• Dual base gage window - High gage - low gage
• Single pin Selection	• Pin Selection for High gage pin Selection for Low gage
• Sensor Assembly dimension minor Concern.	• Sensor Assembly dimension major Concern.
• Low pin probe. Go - No Go window.	• New SPC - Base dimension - Pin dimension - Sensor dimension
• Low pin Yield loss ~2% → <1%	• Low pin probe: Now: Go - No Go window Need: 100% program LVDT. ($15K).
	• Low pin Yield loss ~2% → 5-25%

Attachments :- Lot Summary Snap vs. Quiet
- Procedural Instructions

FINAL ASSEMBLY MACHINE MANUFACTURING PROCEDURES

STANDARD SINGLE GAGE (77PSL2-1,2-3)

WHEN PROCESSING 77PSL2-1'S AND 77PSL2-3'S THROUGH THE FINAL ASSEMBLY MACHINE THE BASE ASSEMBLIES USED WILL ALL BE OF A SINGLE GAGE SIZE. NO HIGH AND LOW GAGE SEPARATION WILL HAVE BEEN DONE BY THE BASE ASSEMBLY OPERATION.

PIN SELECTION FOR THESE PARTICULAR LOTS WILL BE PER MANUFACTURING ENGINEERING INSTRUCTIONS.

BASE CHECK GAGE DIMENSION USED FOR THESE PARTICULAR LOTS WILL ALSO BE PER MANUFACTURING ENGINEERING INSTRUCTIONS.

HIGH AND LOW GAGE (77PSL3-1,5-2)

WHEN PROCESSING 77PSL3-1'S AND 77PSL5-2'S THE BASE ASSY'S PROVIDED BY THE BASE ASSEMBLY OPERATION. WILL BE DIVIDED INTO TWO CATEGORIES, 'HIGH GAGE' AND 'LOW GAGE'. A DIFFERENT PIN SELECTION WILL BE REQUIRED FOR EACH. IT IS CRITICAL THAT THE HIGH AND LOW GAGE BASE ASSY'S BE KEPT SEPARATED. TOTES USED FOR EACH MUST BE CLEARLY DISTINGUISHABLE FROM ONE ANOTHER AND MUST HAVE PAPERWORK INSIDE THAT FULLY DESCRIBES IT;S CONTENTS, (B.A.M. OPERATOR WILL PERFORM THIS FOR EACH TOTE).

THE PIN SIZE USED FOR EACH GAGE, (HIGH OR LOW), MUST BE PER THE PILOT COMMUNICATION LOG DATA FOE THE PARTICULAR LOT NUMBER THAT IS BEING PROCESSED.

THE CHECK DIMENSION OF THE BASE ASSY'S MUST ALSO BE PER THE PILOT COMMUNICATION LOG. PAY PARTICULAR ATTENTION TO COMPREHEND THE DIFFERENCE BETWEEN HIGH GAGE AND LOW GAGE WHEN SELECTING THE PROPER PIN.

ANYTIME A NEW LOT IS INITIALLY SET-UP TO RUN, OR, WHENEVER ANY MATERIAL IS RE-STOCKED INTO THE MACHINE, (SENSORS, PINS, BASE ASSY'S), SPC VERIFICATION MUST TAKE PLACE. P CHARTS HAVE BEEN SET UP FOR USE EACH TIME VERIFICATION OCCURS. IF ALL CHECKS OUT O.K. DURING THE VERIFICATION ENTER A '1' INTO THE SPC COMPUTER. A '0' MUST BE ENTERED IF A PROBLEM IS FOUND, AND CORRECTIVE ACTION MUST TAKE PLACE PRIOR TO RUNNING PROCESS.

77PSC 3-1 Quiet Switch 5/19/92

- Process modifications

o Function Testing

Snap Switch			Quiet Switch		
•Spec:	90-160 PSI	Act.	•spec	110-150 PSI	Act
	20 min PSI	Rel.		20 min PSI	Rel
	none specified	Diff		15-45 PSI	Diff
	150ms	Creep Rel		200ms min	Creep Rel
	25ms	Creep Act.		200ms min	Creep Act
•Yield loss → (77PSL2-3)	< 1% Creep Release		•Yield loss → (77PSL3-1)	5% to 40% * High Diff Low Release * Low Actuation	
•Yield loss → (77PSL2-1)	5% to 10% creep Release				

• Additional testing implemented.
① Hypot → 10 devices per lot
No failures to date
② Elevated temp → 20 devices per day
No failures to date.

Attachment I : - Procedural Instructions
- High temp SPC
- FTM results.

FUNCTION TESTER
PROCESS SPECIFICATION SUPPLEMENTAL INFORMATION
SUBJECT TO CHANGE, NOTE REVISION
REVISION:A 4/24/92

77PSL3-1

TO FUNCTION TEST THESE DEVICES YOU MUST USE THE SELECT PART NUMBER 77PSL2-1 TO PULL UP DEFAULT SPECIFICATIONS. THEN PROGRAM MANUALLY THE SPECIFICATIONS BELOW:

MAX. ACTUATION	150 PSI	PRECYCLE COUNT	2
MIN. ACTUATION	110 PSI	PREC PRESSURE	600
MAX. RELEASE	140 PSI	RAMP RATE	50
MIN. RELEASE	80 PSI	LEAK RATE	10
MAX. DIFFERENTIAL	45 PSI		
MIN. DIFFERENTIAL	15 PSI		
CREEP CHECK	OFF		
ACTUATION CREEP MIN	200 MSEC.		
RELEASE CREEP MIN	200 MSEC.		

THESE TEST SPECIFICATIONS ARE NOT AUTOMATICALLY SET IN ANY DEFAULTS. YOU MUST CALL UP A 77PSL2-1 AND MANUALLY CHANGE TO THE SPECIFICATIONS LISTED ABOVE.

PLEASE ENSURE THAT THE CREEP CHECK IS TURNED OFF TO RUN THESE DEVICES. WHEN FUNCTION TESTING DEVICES YOU MUST MONITOR THE PRINT OUT FOR EACH DEVICE. IF A DEVICE SHOWS A CREEP ACTUATION OR CREEP RELEASE VALUE LESS THAN 200 MSEC. YOU MUST REMOVE THAT DEVICE FROM THE UNLOAD CONVEYOR AND PLACE IN THE PROPER BIN FOR THESE DEVICES. THEY MUST NOT BE SHIPPED AS GOOD PRODUCT. THIS IS A TEMPORARY SET-UP PENDING SOFTWARE UPDATES.

FUNCTION TESTER
PROCESS SPECIFICATION SUPPLEMENTAL INFORMATION
SUBJECT TO CHANGE, NOTE REVISION
REVISION:A 4/24/92

TESTING PROCEDURE INFORMATION
BY DEVICE TYPE:

77PSL2-1

TO FUNCTION TEST THESE DEVICES YOU MUST USE THE SELECT PART NUMBER SCREEN TO PULL UP DEFAULT SPECIFICATIONS. THE SPECIFICATIONS THAT YOU SHOULD TEST THESE DEVICES TO ARE:

MAX. ACTUATION	160 PSI	PRECYCLE COUNT	2
MIN. ACTUATION	90 PSI	PREC. PRESSURE	800
MAX. RELEASE	120 PSI	RAMP RATE	50
MIN RELEASE	20 PSI	LEAK RATE	10
MAX. DIFFERENTIAL			
MIN. DIFFERENTIAL			
CREEP CHECK	ON		
ACTUATION CREEP MAX	150 MSEC.		
RELEASE CREEP MAX	25 MSEC		

THESE TEST SPECIFICATIONS SHOULD AUTOMATICALLY BE SET WHEN YOU PROPERLY SELECT THIS PART NUMBER. IF NOT CONTACT YOUR ENGINEER.

77PSL2-3

TO FUNCTION TEST THESE DEVICES YOU MUST USE THE SELECT PART NUMBER SCREEN TO PULL UP DEFAULT SPECIFICATIONS. THE SPECIFICATIONS THAT YOU SHOULD TEST THESE DEVICES TO ARE:

MAX. ACTUATION	300 PSI	PRECYCLE COUNT	2
MIN. ACTUATION	200 PSI	PREC. PRESSURE	800
MAX. RELEASE	160 PSI	RAMP RATE	50
MIN. RELEASE	40 PSI	LEAK RATE	10
MAX. DIFFERENTIAL			
MIN. DIFFERENTIAL			
CREEP CHECK	ON		
ACTUATION CREEP MAX	150 MSEC.		
RELEASE CREEP MAX	25 MSEC		

THESE TEST SPECIFICATIONS SHOULD AUTOMATICALLY BE SET WHEN YOU PROPERLY SELECT THIS PART NUMBER. IF NOT CONTACT YOUR ENGINEER.

'17 PS Weekly Yields

PRESSURE TEST DEVICE: L3-1 ONE DEVICE TYPE PER SHEET LOT # ↓	DATE	SHIFT	CLOCK #	TESTED	GOOD	BAD		LEAK	CONT	CREEP ACT	LOW ACT	HIGH ACT	HIGH REL	LOW REL	LOW DIFF	CREEP REL	HIGH DIFF	07-Feb
								B	C	D	E	F	G	H	K	L	M	
W/P 4/19	4-22	1	722871	5090	5004	86			35		1		14			25		11
W/E 4/26	4-27	1	750022	4878	4201	77			24	9	9	1		9		29	1	
W/E 5/3	5-9	1	774211	11896	9675	1926			301		491	1	-2	819	3	41	452	
Remark or Right	5-4	1	724731	20964	18880	2084			263	9	444	2	16	828	3	55	453	11
W/E 5/10	5-11	1	722971	11471	9962	2509			193	70	28	2		1581	12	195	431	
W/E 5/17	5-18	1	750022	6666	5743	923			9		176	61					607	

TI-NHTSA 000061

TMPS Weekly Yields

	PRESSURE TEST DEVICE: L2-1 ONE DEVICE TYPE PER SHEET LOT # ▽	DATE	SHIFT	CLOCK #	TESTED	GOOD	BAD		LEAK	CONT	CAP CEEP	LACK	HAIGH	NIEL N	LEEL	LIFF	CEEL P	IISH	IIFF	
					B	C	D	E	F	G	H	K	L	N						
97.8%	w/e 2/2	2/18		806841	14861	14531	330			21	85		5	4			309	*		
9.0%	w/e 2/9	2/18		"	9345	9250	95			34	13	4	1		26		12			
1.2%	w/e 2/16	2/19		"	13409	13302	107		1	36	2	1					4		63	
1.7%	w/e 2/23	2/26		"	11632	11583	249			15	185	16	19				10		34	Shift Starts Reverse
99.2%	w/e 3/1	2/29		806841	20487	20326	161			52	10	2	2		3		19		73	
98.9%	Month of Feb Total			724731	54873	54261	612		1	142	180	23	22	0	29	0	45		170	
95.5%	w/e 3/8	3/9	1	722971	16,994	16,120	874		1	15	1	2					761		34	
95.4%	w/e 3/15	3/17		"	8347	7965	382			11			1	1			363		7	
90%	w/e 3/22	3/23	1	750022	4059	3629	430			22	1			2			373		12	
84%	w/e 3/29	3/29	1	750022	4017	3601	416			1	2	1					388		24	
93.9%	Month of March Total	4/10		750022	33393	31375	2018		1	49	4	3	1	3			1884		77	
97.7%	w/e 4/19	4/22	1	722971	3957	3789	168			15	13						50			
97.7	w/e 4/26	4/27	1	750022	5144	5027	117			41	14		10				52			
97.9%	w/e 5/3	5/3	1	724731	4500	4407	93			39	3		10				81			
97.7%	[redacted]	5/4		724731	12601	12323	278			85	30		20				145			
97.2%	w/e 5/10	5/11	1	722971	6122	5954	168			35	13		14	1			105			
90.0%	w/e 5/17	5/17	1	750022	20	18	2										2			

TI-NHTSA 000002

MP's WEEKLY YIELDS

	PRESSURE TEST DEVICE: L2-3 ONE DEVICE TYPE PER SHEET LOT # ▽	DATE	SHIFT	CLOCK #	TESTED	GOOD	BAD		LEAK B	COUNT C	CAPACITOR D	LACK E	MAGNET F	MISSING G	LOW H	LOW K	CHIP L	MISSING M	
99.8%	W/E 2/2	2/19	1	806811	1793	1790	3			1							3		
99.6%	W/E 2/9	2/26	1	"	1608	1602	6			2							4		
99.1%	W/E 2/23	3/05	1	"	3620	3596	24			8	9		6						1
99.8%	W/E 3/1	3/28	1	724731	3611	3603	8			4	2		2						
99.5%	Month of Feb			724731	7839	7801	38			14	11		8				4		1
99.8%	W/E 3/8	3/9	1	722971	2137	2132	5			1				1			3		
99.5%	W/E 3/15	3/17	1	722971	4371	4353	18			3	7	1	1						6
99.5%	W/E 3/22	3/23	1	750022	8,332	8239	93			72	3		1				17		5
99.1%	Month of March	4/1	1	750022	14,746	14639	122			86	10	1	2	1			21		11
99.5%	W/E 4/5	4/4	1	724731	7378	9340	38			16	1	3					18		
99.5%	W/E 4/19	4/22	1	722971	1488	1481	7			2				2			5		
99.1%	Month of April	5/5	1	724731	8966	9021	45			18	1	3		2			21		
98.3%	W/E 5/10	5/11	1	722971	1444	1420	24			13		1					10		
97.9%	W/E 5/17	5/18	1	750022	3440	3400	40			19	3	6	1				10	1	

TI-NHTBA 006083

77PSL3-1 Quiet Switch 5/19/92
Process Modifications / Status

o Sensor Assembly

Issue : Loose disc After Crimping. Yield loss At F.A.M. between 5% and 25%.

Actions : Short term Action was increase in crimp pressure (SPSI) to tighten package.

Long term Action is investigation of possible design mod's. to increase disc pre-deflection.

Issue : Differential widening up to 30 PSI. Downward shift of Actuation / Release. Yield loss For High Diff between 5% And 40%.

Actions : Compensation with disc Calibration.

Experimentation to determine if design or process issue. Continuing today.

Notes : No Additional SPC At Sensor Assembly. However pressure has been defined At 60PSI.

Attachments : - Test matrix - Copy of pilot - Prod report
- Process spec.

77PSL3-1 ENGINEERING EVAL'S
ACTUATION/RELEASE PRESSURE DRIFT
5/14/92

PURPOSE IS TO DETERMINE THE IMPACT THAT VARIOUS MANUFACTURING VARIABLES MAY BE HAVING ON THE STABILITY OF ACTUATION/RELEASE PRESSURES FOR THE 77PSL3-1 QUIET SWITCH RECENTLY INTRODUCED INTO PRODUCTION. ADDITIONALLY, INCREASING THE PRE-DEFLECTION OF THE DISC AFTER CRIMPING WILL ALSO BE EVALUATED TO DETERMINE IT'S IMPACT ON THE SAME. DESIGN ENG. HAS NOTED THAT THE REDUCTION OF APPX. .0025" OF PRE-DEFLECTION FOR THE QUIET DISC MAY BE A CONTRIBUTOR TO THE SHIFT PROBLEM WE ARE EXPERIENCING.

TEST LOT DESCRIPTIONS

LOT "A" (48 DEVICES)
- STD PRODUCTION COMPONENTS.
- HAND BUILT, AMI CRIMPED AS FOLLOWS:
  - LOT A1, WITH PRE-CRIMP AND LOW PIN PROBE.
  - LOT A2, NO PRE-CRIMP OR LOW PIN PROBE.
- 77PS DIES, 950PSI O.P.
- 45 STATION @ 60PSI, 90 STATION @ 60PSI.

LOT "B" (24 DEVICES)
- STD PRODUCTION COMPONENTS, (LOT "A").
- TWO SPACERS IN CONVERTOR.
- HAND BUILT, AMI CRIMPED.
- 77PS DIES, 950PSI O.P.
- 45 STATION @ 60PSI, 90 STATION @ 60PSI.

LOT "C" (24 DEVICES)
- STD PRODUCTION COMPONENTS, (LOT "A").
- HAND BUILT, AMI CRIMPED.
- 52/57PS DIES, 950PSI O.P.
- 45 STATION @ 60PSI, 90 STATION @ 60PSI.

LOT "D" (24 DEVICES)
- STD PRODUCTION COMPONENTS, (LOT "A").
- HAND BUILT, HAND-LINE CRIMPED.
- 77PS DIES, STD. O.P. NOTE WHAT IT IS.
- 45 STATION @ STD PSI, 90 STATION @ STD PSI, NOTE WHAT THEY ARE.

LOT "E" (36 DEVICES)

- STD PRODUCTION COMPONENTS, (LOT "A").
- HAND BUILT, AMI CRIMPED.
- 77PS DIES, O.P. AS FOLLOWS:
    - LOT E1, 950PSI
    - LOT E2, 1200PSI
    - LOT E3, 1400PSI
- 45 STATION @ 60PSI, 90 STATION @ 60PSI.

LOT "F" (36 DEVICES)

- STD PRODUCTION COMPONENTS, (LOT "A").
- HAND BUILT, AMI CRIMPED.
- 77PS DIES, 950PSI O.P.
- 45 STATION @ 60PSI
- 90 STATION AS FOLLOWS:
    - LOT F1, 55PSI (12 DEVICES)
    - LOT F2, 60PSI (12 DEVICES)
    - LOT F3, 65PSI (12 DEVICES)

LOT "G" (36 DEVICES)

- STD PRODUCTION COMPONENTS, (LOT "A"), BUT WITH DALE'S STEPPED WASHERS, (PROBABLY 2 OR 3 GROUPS).
- HAND BUILT, AMI CRIMPED.
- 77PS DIES, 950PSI O.P.
- 45 STATION @ 60PSI, 90 STATION @ 60PSI.

LOT "H" (24 DEVICES)

- STD PRODUCTION COMPONENTS, (LOT "A").
- HAND BUILT, DESIGN LAB CRIMPED.

252 TOTAL DEVICES NEEDED FOR TEST.

X-Y RECORDER SHOULD BE USED TO MONITOR CRIMP HEAD PRESSURES DURING EACH TEST RUN.

PRIORITY BY LOT AS FOLLOWS: A, B, G, H, C, D, E, F.

'2 PRODUCTION ROUTING

WHITE, CANARY } Route to Finished Stores
PINK } Route to Dept. Supervisor

:E NUMBER

77 PSL3-1

SPECIAL REQUIREMENT	TOTAL QUANTITY
	9

MANU. ORDER NUMBER	NO SUBTOTALS
1.	
2.	LOT # 5-1
3.	
4.	

QUALITY CONTROL APPROVAL

IN PROCESS	IN PROCESS	FINAL

Form 19962

DATE [redacted] 5-5-92

DEPARTMENT 294

Calib. base 900

K A N - B A N

PILOT ROUTE CARD 77PSL3-1 46515-2 BROWN BASE

PASS CAR

PRESSURE TEST LIMITS

ACT HI 100 CREEP TIME 10 MS
ACT LO 90 PRE-CYCLE PRESS. 600 PSI
MIN REL 20

COMPONENTS

27406-1 CONVERTER LOT#: 238
27630-1 WASHER LOT#: 94
27713-1 CUP LOT#: 11
30656-27 DISC LOT #: S-1
DISC LOT DATE: 5-2-92
DISC ACT. 39.5 DISC REL. 43.6

CUSTOMER PART #: F2VC-9F924-AB ~~F2VC-9F924-AB~~

OPERATION	DATE	TIME	CLOCK #	SHIFT	QTY GOOD	QTY BAD
ASSEMBLE SENSOR	5-4	2:35	722980	1	32	
ASSEMBLE BASE	5-4	2:35	722980	1	32	
FINAL ASSEMBLY	5-4	2:35	722980	1	32	
PRESSURE TEST	5-4	2:36	824641	1	32	
Q.C. CYCLE						

FORM 23911

SER 1; FIX 1; C= 0000000; BIN=0000 ; MRRU=42.7; MRRD=46.7; LEAK RATE= 1.2
ACT= 138.8; REL= 113.7; DIF= 25.1 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 2; FIX 2; C= 0000000; BIN=0000 ; MRRU=42.7; MRRD=46.7; LEAK RATE= 1.2
ACT= 137.8; REL= 110.0; DIF= 27.8 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 3; FIX 3; C= 0000000; BIN=0000 ; MRRU=42.7; MRRD=46.7; LEAK RATE= 1.2
ACT= 137.8; REL= 108.3; DIF= 29.5 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 4; FIX 4; C= 0000000; BIN=0000 ; MRRU=42.7; MRRD=46.7; LEAK RATE= 1.2
ACT= 138.2; REL= 109.3; DIF= 28.9 PSI; ACTCR= 200.0ms; RELCR= 200.0

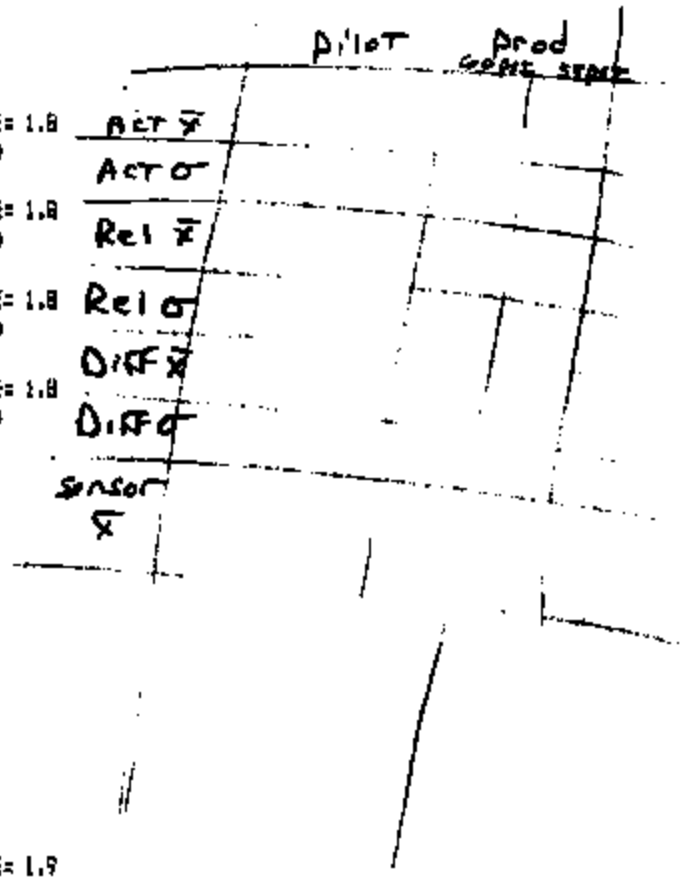
4-MAY-1992 14:57:20.34 OPER DOOR DID NOT OPEN 1

SER 5; FIX 1; C= 0000000; BIN=0000 ; MRRU=49.2; MRRD=45.9; LEAK RATE= 1.8
ACT= 140.7; REL= 114.6; DIF= 26.2 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 6; FIX 2; C= 0000000; BIN=0000 ; MRRU=49.2; MRRD=45.9; LEAK RATE= 1.8
ACT= 137.4; REL= 114.6; DIF= 22.8 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 7; FIX 3; C= 0000000; BIN=0000 ; MRRU=49.2; MRRD=45.9; LEAK RATE= 1.8
ACT= 131.1; REL= 109.6; DIF= 21.5 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 8; FIX 4; C= 0000000; BIN=0000 ; MRRU=49.2; MRRD=45.9; LEAK RATE= 1.8
ACT= 135.6; REL= 105.6; DIF= 30.0 PSI; ACTCR= 200.0ms; RELCR= 200.0



4-MAY-1992 15:01:45.06 OPER DOOR DID NOT CLOSE 1

SER 9; FIX 1; C= 0000000; BIN=0000 ; MRRU=46.5; MRRD=46.2; LEAK RATE= 1.9
ACT= 129.3; REL= 104.1; DIF= 25.2 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 10; FIX 2; C= 0000000; BIN=0000 ; MRRU=46.5; MRRD=46.2; LEAK RATE= 1.9
ACT= 133.3; REL= 111.4; DIF= 21.9 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 11; FIX 3; C= 0000000; BIN=0000 ; MRRU=46.3; MRRD=46.2; LEAK RATE= 1.9
ACT= 138.2; REL= 107.6; DIF= 30.4 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 12; FIX 4; C= 0000000; BIN=0000 ; MRRU=46.3; MRRD=46.2; LEAK RATE= 1.9
ACT= 128.2; REL= 106.8; DIF= 21.4 PSI; ACTCR= 200.0ms; RELCR= 200.0

4-MAY-1992 15:02:14.23 OPER DOOR DID NOT CLOSE 1

SER 13; FIX 1; C= 0000000; BIN=0000 ; MRRU=44.8; MRRD=46.3; LEAK RATE= 1.8
ACT= 142.2; REL= 112.6; DIF= 29.6 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 14; FIX 2; C= 0000000; BIN=0000 ; MRRU=44.8; MRRD=46.3; LEAK RATE= 1.8
ACT= 142.0; REL= 114.0; DIF= 28.0 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 15; FIX 3; C= 0000000; BIN=0000 ; MRRU=44.8; MRRD=46.3; LEAK RATE= 1.8
ACT= 136.7; REL= 104.5; DIF= 32.2 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 16; FIX 4; C= 0000000; BIN=0000 ; MRRU=44.8; MRRD=46.3; LEAK RATE= 1.8
ACT= 139.1; REL= 116.4; DIF= 22.6 PSI; ACTCR= 200.0ms; RELCR= 200.0

4-MAY-1992 15:02:37.80 OPER DOOR DID NOT CLOSE 1

SER 17; FIX 1; C= 0000000; BIN=0000 ; MRRU=46.9; MRRD=46.1; LEAK RATE= 1.8
ACT= 134.9; REL= 109.1; DIF= 25.7 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 18; FIX 2; C= 0000000; BIN=0000 ; MRRU=46.9; MRRD=46.1; LEAK RATE= 1.8
ACT= 133.9; REL= 106.2; DIF= 27.7 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 19; FIX 3; C= 0000000; BIN=0000 ; MRRU=46.9; MRRD=46.1; LEAK RATE= 1.8
ACT= 136.4; REL= 102.8; DIF= 33.6 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 20; FIX 4; C= 0000000; BIN=0000 ; MRRU=46.9; MRRD=46.1; LEAK RATE= 1.8
ACT= 139.1; REL= 113.9; DIF= 25.1 PSI; ACTCR= 200.0ms; RELCR= 200.0

4-MAY-1992 15:03:04.54 DRER DOOR DID NOT CLOSE 1

SER 21; FIX 1; C= 0000000; BIN=GOOD ; MRRU=45.6; MRRD=46.1; LEAK RATE= 1.5
ACT= 139.1; REL= 107.6; DIF= 31.4 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 22; FIX 2; C= 0000000; BIN=GOOD ; MRRU=45.6; MRRD=46.1; LEAK RATE= 1.5
ACT= 126.5; REL= 107.6; DIF= 18.9 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 23; FIX 3; C= 0000000; BIN=GOOD ; MRRU=45.6; MRRD=46.1; LEAK RATE= 1.5
ACT= 135.2; REL= 104.0; DIF= 31.2 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 24; FIX 4; C= 0000000; BIN=GOOD ; MRRU=45.6; MRRD=46.1; LEAK RATE= 1.5
ACT= 136.7; REL= 102.3; DIF= 34.4 PSI; ACTCR= 200.0ms; RELCR= 200.0

4-MAY-1992 15:03:30.06 OPEN DOOR DID NOT CLOSE 1

SER 25; FIX 1; C= 0000000; BIN=GOOD ; MRRU=44.6; MRRD=45.6; LEAK RATE= 2.0
ACT= 140.8; REL= 118.0; DIF= 22.9 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 26; FIX 2; C= 0000000; BIN=GOOD ; MRRU=44.6; MRRD=45.6; LEAK RATE= 2.0
ACT= 133.0; REL= 103.2; DIF= 29.8 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 27; FIX 3; C= 0000000; BIN=GOOD ; MRRU=44.6; MRRD=45.6; LEAK RATE= 2.0
ACT= 144.4; REL= 102.9; DIF= 41.5 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 28; FIX 4; C= 0000000; BIN=GOOD ; MRRU=44.6; MRRD=45.6; LEAK RATE= 2.0
ACT= 137.8; REL= 117.7; DIF= 20.1 PSI; ACTCR= 200.0ms; RELCR= 200.0

4-MAY-1992 15:03:55.96 OPEN DOOR DID NOT CLOSE 1

SER 29; FIX 1; C= 0000000; BIN=GOOD ; MRRU=44.6; MRRD=46.8; LEAK RATE= 1.7
ACT= 132.1; REL= 111.5; DIF= 20.6 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 30; FIX 2; C= 0000000; BIN=GOOD ; MRRU=44.6; MRRD=46.8; LEAK RATE= 1.7
ACT= 140.3; REL= 112.0; DIF= 28.3 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 31; FIX 3; C= 0000000; BIN=GOOD ; MRRU=44.6; MRRD=46.8; LEAK RATE= 1.7
ACT= 136.9; REL= 109.1; DIF= 27.8 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 32; FIX 4; C= 0000000; BIN=GOOD ; MRRU=44.6; MRRD=46.8; LEAK RATE= 1.7
ACT= 137.2; REL= 110.6; DIF= 26.6 PSI; ACTCR= 200.0ms; RELCR= 200.0

4-MAY-1992 15:04:19.42 OPEN DOOR DID NOT OPEN 1

77-S PRESSURE TESTER LOT REPORT

RATING:77PSL2-1
LOT ID:L3-1-5-1-2120-91LOT
LOT STARTED: 4-MAY-1992 14:57:00.35
LOT FINISHED: 4-MAY-1992 15:05:50.40

SETUP DATA:
DISC LOT ID: 0.00
DISC MEAN ACT: 0.0 MEAN REL: 0.0
LIMIT (PSI)
ACTUATION: 110.0 TO 150.0 PSI
RELEASE: 80.0 TO 140.0 PSI
DIFFERENTIAL: 15.0 TO 45.0 PSI
MAX MILLIVOLT: 200.0 PSI
ACT CREEP TIME: 25.0 PSI
REL CREEP TIME: 150.0 PSI
PRECYCLE PRESS: 600.0 PSI
PRECYCLE COUNT: 2

NUMBER OF PIECES TESTED: 32
NUMBER OF PIECES GOOD: 32
YIELD: 100.00 %

REJECT COUNTS

BIN	COUNT	% OF REJECTS
LEAK	0	0.00 %
CONT	0	0.00 %
ACCR	0	0.00 %
ACLO	0	0.00 %
ACHI	0	0.00 %
RLHI	0	0.00 %
RLLO	0	0.00 %
DFLO	0	0.00 %
RLCR	0	0.00 %
DFHI	0	0.00 %

STATISTICS	MEAN	SIGMA	CPK
ACTUATION:	136.7	4.13	1.07
RELEASE:	109.5	4.62	2.13
MILLIVOLT:	0.0	0.00	0.00
DIFFERENTIAL:	27.2	4.95	0.82

HISTOGRAM OF ACTUATION PRESSURE

```
                 0   5   10  15  20  25  30  35  40  45  50
                 +---+---+---+---+---+---+---+---+---+---+
   UNDER    0|  |
   127.5    2|  |**
   130.0    2|  |**
   132.5    3|  |***
```

TI-NHTSA 006073

```
 135.0    4|  |****
 137.5   10|  |**********
 140.0    8|  |********
 142.5    2|  |**
 145.0    1|  |*
  OVER    0|  |
```

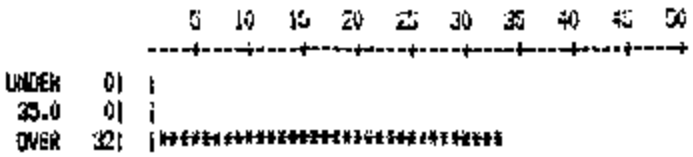
HISTOGRAM OF RELEASE PRESSURE

```
                5   10   15   20   25   30   35   40   45   50
               ----+----+----+----+----+----+----+----+----+----+
UNDER    0|  |
102.5    4|  |****
105.0    5|  |*****
107.5    3|  |*****
110.0    6|  |******
112.5    5|  |*****
115.0    4|  |****
117.5    2|  |**
120.0    1|  |*
 OVER    0|  |
```

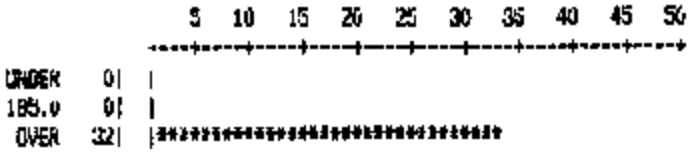
HISTOGRAM OF DIFFERENTIAL PRESSURE

```
                5   10   15   20   25   30   35   40   45   50
               ----+----+----+----+----+----+----+----+----+----+
UNDER    0|  |
 19.0    1|  |*
 20.0    1|  |*
 21.0    2|  |**
 22.0    2|  |**
 23.0    3|  |***
 24.0    0|  |
 25.0    3|  |***
 26.0    2|  |**
 27.0    1|  |*
 28.0    5|  |*****
 29.0    1|  |*
 30.0    5|  |*****
 31.0    2|  |**
 32.0    1|  |*
 33.0    0|  |
 34.0    1|  |*
 35.0    0|  |
 36.0    1|  |*
 37.0    0|  |
 38.0    0|  |
 39.0    0|  |
 40.0    0|  |
 41.0    1|  |*
 OVER    0|  |
```


HISTOGRAM OF ACTUATION CREEP



HISTOGRAM OF RELEASE CREEP



ACTUAL FINAL X(ACT) =	136.7
ACTUATION SIGMA =	4.13
ACTUAL FINAL X(REL) =	109.5
RELEASE SIGMA =	4.62
ACTUATION + 3SIGMA =	149.09
ACTUATION - 3SIGMA =	124.31
RELEASE + 3SIGMA =	123.36
RELEASE - 3SIGMA =	95.64

ACTUAL FINAL X(ACT) =	136.7
ACTUATION SIGMA =	4.13
ACTUAL FINAL X(REL) =	109.5
RELEASE SIGMA =	4.62
ACTUATION + 3SIGMA =	149.09
ACTUATION - 3SIGMA =	124.31
RELEASE + 3SIGMA =	123.36
RELEASE - 3SIGMA =	95.64

7748 PRESSURE TESTER LOT REPORT

RATING:7748L3-1
LOT ID:5-1
LOT STARTED: 8-MAY-1992 10:23:43.27
LOT FINISHED: 8-MAY-1992 10:34:22.77

60 psi Crimp

SETUP DATA:
DISC LOT ID: 0.00
DISC MEAN ACT: 20.6 MEAN REL: 9.8
LIMIT (NC)
ACTUATION: 110.0 TO 150.0 PSI
RELEASE: 80.0 TO 140.0 PSI
DIFFERENTIAL: 15.0 TO 45.0 PSI
MAX MILLIVOLT: 200.0 PSI
ACT CREEP TIME: 25.0 PSI
REL CREEP TIME: 150.0 PSI
PRECYCLE PRESS: 600.0 PSI
PRECYCLE COUNT: 2

NUMBER OF PIECES TESTED: 96
NUMBER OF PIECES GOOD: 54
YIELD: 56.25 %

REJECT COUNTS

TYPE	COUNT	% OF REJECTS
LEAK	0	0.00 %
CONT	2	4.76 %
ACCR	0	0.00 %
RLCR	0	0.00 %
HCHI	0	0.00 %
RLHI	0	0.00 %
DFLO	10	23.81 %
DFLO	0	0.00 %
RLCR	0	0.00 %
DFHI	30	71.43 %

STATISTICS	MEAN	SIGMA	CPK
ACTUATION:	129.6	4.98	1.31
RELEASE:	88.0	4.84	0.41
MILLIVOLT:	0.0	0.00	0.00
DIFFERENTIAL:	43.7	4.66	0.09

HISTOGRAM OF ACTUATION PRESSURE

```
                  0   10   15   20   25   30   35   40   45   50
                 +----+----+----+----+----+----+----+----+----+----+
    UNDER    0:  |
    115.0    1:  |*
    117.5    0:  |
    120.0    3:  |***
    122.5   12:  |************
    125.0    7:  |*******
    127.5   15:  |***************
    130.0   27:  |***************************
    132.5   21:  |*********************
    135.0    0:  |
```

SER 91; FIX 3; C= 0000044; BIN=RELS ; MRRU=43.3; MRRD=43.7; LEAK RATE= 1.6
ACT= 130.1; REL= 79.6; DIF= 50.5 PSI; ACTDR= 200.0ms; RELDR= 200.0

SER 92; FIX 4; C= 0000040; BIN=DFHI ; MRRU=43.3; MRRD=43.9; LEAK RATE= 1.6
ACT= 133.0; REL= 87.4; DIF= 45.6 PSI; ACTDR= 200.0ms; RELDR= 200.0

SER 93; FIX 1; C= 0000000; BIN=BOOD ; MRRU=47.7; MRRD=43.6; LEAK RATE= 2.0
ACT= 126.9; REL= 66.4; DIF= 60.6 PSI; ACTDR= 200.0ms; RELDR= 200.0

SER 94; FIX 2; C= 0000040; BIN=DFHI ; MRRU=47.7; MRRD=43.6; LEAK RATE= 2.0
ACT= 133.5; REL= 86.5; DIF= 47.0 PSI; ACTDR= 200.0ms; RELDR= 200.0

SER 45; FIX 3; C= 0020005; BIN=CONT ; MRRU=47.7; MRRD=43.6; LEAK RATE= 2.0
ACT= 91.2; REL= 70.7; DIF= 20.5 PSI; ACTDR= 200.0ms; RELDR= 200.0

SER 96; FIX 4; C= 0020005; BIN=CONT ; MRRU=47.7; MRRD=43.6; LEAK RATE= 2.0
ACT= 91.2; REL= 70.7; DIF= 20.5 PSI; ACTDR= 200.0ms; RELDR= 200.0

8-MAY-1992 10:34:01.94 OPER DOOR DID NOT CLOSE 1

SER 70; FIX 3; C= 0000000; BIN=0000 ; MRRU=44.3; MRRD=44.5; LEAK RATE= 2.2
ACT= 121.8; REL= 84.3; DIF= 37.5 PSI; ACTDR= 200.0ms; RELDR= 200.0

SER 7e; FIX 4; C= 0000000; BIN=0000 ; MRRU=44.3; MRRD=44.5; LEAK RATE= 2.2
ACT= 121.8; REL= 84.3; DIF= 37.5 PSI; ACTDR= 200.0ms; RELDR= 200.0

8-MAY-1992 10:32:10.32 OPER DOOR DID NOT CLOSE   1

SER 7; FIX 1; C= 0000040; BIN=OPHI ; MRRU=45.8; MRRD=43.9; LEAK RATE= 1.9
ACT= 137.2; REL= 90.7; DIF= 46.5 PSI; ACTDR= 200.0ms; RELDR= 200.0

SER 78; FIX 2; C= 0000040; BIN=OPHI ; MRRU=45.8; MRRD=43.9; LEAK RATE= 1.9
ACT= 129.2; REL= 82.2; DIF= 47.0 PSI; ACTDR= 200.0ms; RELDR= 200.0

SER 79; FIX 3; C= 0000000; BIN=0000 ; MRRU=45.8; MRRD=43.7; LEAK RATE= 1.9
ACT= 123.3; REL= 80.9; DIF= 42.4 PSI; ACTDR= 200.0ms; RELDR= 200.0

SER a0; FIX 4; C= 0000040; BIN=OPHI ; MRRU=45.8; MRRD=43.9; LEAK RATE= 1.9
ACT= 133.1; REL= 83.9; DIF= 49.1 PSI; ACTDR= 200.0ms; RELDR= 200.0

SER 81; FIX 1; C= 0000000; BIN=0000 ; MRRU=44.7; MRRD=44.2; LEAK RATE= 1.5
ACT= 122.7; REL= 81.5; DIF= 41.2 PSI; ACTDR= 200.0ms; RELDR= 200.0

SER 82; FIX 2; C= 0000040; BIN=OPHI ; MRRU=44.7; MRRD=44.2; LEAK RATE= 1.5
ACT= 128.5; REL= 81.7; DIF= 46.7 PSI; ACTDR= 200.0ms; RELDR= 200.0

SER 83; FIX 3; C= 0000000; BIN=0000 ; MRRU=44.7; MRRD=44.2; LEAK RATE= 1.5
ACT= 123.5; REL= 94.0; DIF= 29.5 PSI; ACTDR= 200.0ms; RELDR= 200.0

SER 84; FIX 4; C= 0000000; BIN=0000 ; MRRU=44.7; MRRD=44.2; LEAK RATE= 1.5
ACT= 134.0; REL= 89.5; DIF= 44.5 PSI; ACTDR= 200.0ms; RELDR= 200.0

8-MAY-1992 10:32:55.71 OPER DOOR DID NOT CLOSE   1

SER 85; FIX 1; C= 0000004; BIN=ALLO ; MRRU=44.6; MRRD=44.2; LEAK RATE= 2.0
ACT= 121.7; REL= 78.4; DIF= 43.3 PSI; ACTDR= 200.0ms; RELDR= 200.0

SER 86; FIX 2; C= 0000040; BIN=OPHI ; MRRU=44.6; MRRD=44.2; LEAK RATE= 2.0
ACT= 134.6; REL= 83.2; DIF= 51.3 PSI; ACTDR= 200.0ms; RELDR= 200.0

SER 87; FIX 3; C= 0000000; BIN=0000 ; MRRU=44.6; MRRD=44.2; LEAK RATE= 2.0
ACT= 127.6; REL= 97.2; DIF= 42.4 PSI; ACTDR= 200.0ms; RELDR= 200.0

SER 88; FIX 4; C= 0000000; BIN=0000 ; MRRU=44.6; MRRD=44.2; LEAK RATE= 2.0
ACT= 127.9; REL= 83.7; DIF= 44.2 PSI; ACTDR= 200.0ms; RELDR= 200.0

SER 89; FIX 1; C= 0000000; BIN=0000 ; MRRU=43.8; MRRD=43.7; LEAK RATE= 1.6
ACT= 134.6; REL= 90.6; DIF= 44.0 PSI; ACTDR= 200.0ms; RELDR= 200.0

SER 90; FIX 2; C= 0000000; BIN=0000 ; MRRU=43.8; MRRD=43.7; LEAK RATE= 1.6
ACT= 141.9; REL= 98.0; DIF= 43.9 PSI; ACTDR= 200.0ms; RELDR= 200.0

ACT= 126.2; REL= 80.3; DIF= 45.9 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 59; FIX 3; C= 0000000; BIN=0000 ; MAXU=46.7; MAXD=44.0; LEAK RATE= 1.7
ACT= 130.2; REL= 94.4; DIF= 35.8 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 60; FIX 4; C= 0000000; BIN=0000 ; MAXU=46.7; MAXD=44.0; LEAK RATE= 1.7
ACT= 129.5; REL= 91.5; DIF= 38.0 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 61; FIX 1; C= 0000044; BIN=0LLO ; MAXU=45.3; MAXD=44.3; LEAK RATE= 2.1
ACT= 122.6; REL= 76.4; DIF= 46.3 PSI; ACTCR= 200.0ms; RELCR= 120.2

SER 62; FIX 2; C= 0000000; BIN=0000 ; MAXU=45.3; MAXD=44.3; LEAK RATE= 2.1
ACT= 125.7; REL= 86.6; DIF= 39.1 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 63; FIX 3; C= 0000000; BIN=0000 ; MAXU=45.3; MAXD=44.3; LEAK RATE= 2.1
ACT= 134.5; REL= 92.0; DIF= 42.5 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 64; FIX 4; C= 0000000; BIN=0000 ; MAXU=45.3; MAXD=44.3; LEAK RATE= 2.1
ACT= 132.7; REL= 87.6; DIF= 45.0 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 65; FIX 1; C= 0000040; BIN=0FHI ; MAXU=44.7; MAXD=44.3; LEAK RATE= 2.0
ACT= 132.0; REL= 81.9; DIF= 50.1 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 66; FIX 2; C= 0000000; BIN=0000 ; MAXU=44.7; MAXD=44.3; LEAK RATE= 2.0
ACT= 132.0; REL= 90.9; DIF= 41.1 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 67; FIX 3; C= 0000040; BIN=0FHI ; MAXU=44.7; MAXD=44.3; LEAK RATE= 2.0
ACT= 132.7; REL= 85.8; DIF= 46.9 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 68; FIX 4; C= 0000000; BIN=0000 ; MAXU=44.7; MAXD=44.3; LEAK RATE= 2.0
ACT= 127.5; REL= 86.7; DIF= 40.8 PSI; ACTCR= 200.0ms; RELCR= 200.0

6-MAY-1992 10:31:03.19 DPER DOOR DID NOT CLOSE 1

SER 69; FIX 1; C= 0000044; BIN=0LLO ; MAXU=42.9; MAXD=44.1; LEAK RATE= 1.6
ACT= 121.2; REL= 76.4; DIF= 42.9 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 70; FIX 2; C= 0000044; BIN=0LLO ; MAXU=42.9; MAXD=44.1; LEAK RATE= 1.6
ACT= 125.8; REL= 77.3; DIF= 48.3 PSI; ACTCR= 200.0ms; RELCR= 157.5

SER 71; FIX 3; C= 0000000; BIN=0000 ; MAXU=42.9; MAXD=44.1; LEAK RATE= 1.6
ACT= 132.7; REL= 89.2; DIF= 43.5 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 72; FIX 4; C= 0000000; BIN=0000 ; MAXU=42.9; MAXD=44.1; LEAK RATE= 1.6
ACT= 129.9; REL= 90.7; DIF= 39.1 PSI; ACTCR= 200.0ms; RELCR= 200.0

6-MAY-1992 10:31:41.56 DPER DOOR DID NOT CLOSE 1

SER 73; FIX 1; C= 0000000; BIN=0000 ; MAXU=44.3; MAXD=44.5; LEAK RATE= 2.2
ACT= 122.8; REL= 80.3; DIF= 38.6 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 74; FIX 2; C= 0000040; BIN=0FHI ; MAXU=44.7; MAXD=44.6; LEAK RATE= 2.2
ACT= 128.4; REL= 86.2; DIF= 42.2 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 44; FIX 4; C= [illegible] BIN=[illegible]; MRRU=[illegible]; MRRD=[illegible]; LEAK RATE= [illegible]
ACT= 133.0; REL= 87.4; DIF= 45.6 PSI; ACTCR= [illegible]; RELCR= [illegible]

SER 45; FIX 1; C= 0000040; BIN=DFHI ; MRRU=44.8; MRRD=44.3; LEAK RATE= 1.9
ACT= 132.9; REL= 86.5; DIF= 46.5 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 46; FIX 2; C= 0000000; BIN=GOOD ; MRRU=43.8; MRRD=44.3; LEAK RATE= 1.9
ACT= 129.0; REL= 87.7; DIF= 41.3 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 47; FIX 3; C= 0000000; BIN=GOOD ; MRRU=43.8; MRRD=44.3; LEAK RATE= 1.9
ACT= 126.9; REL= 86.4; DIF= 40.5 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 48; FIX 4; C= 0000000; BIN=GOOD ; MRRU=43.8; MRRD=44.3; LEAK RATE= 1.9
ACT= 121.9; REL= 82.4; DIF= 39.5 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 49; FIX 1; C= 0000000; BIN=GOOD ; MRRU=44.3; MRRD=44.4; LEAK RATE= 2.0
ACT= 130.1; REL= 86.5; DIF= 43.6 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 50; FIX 2; C= 0000000; BIN=GOOD ; MRRU=44.3; MRRD=44.4; LEAK RATE= 2.0
ACT= 128.3; REL= 88.2; DIF= 40.1 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 51; FIX 3; C= 0000000; BIN=GOOD ; MRRU=44.3; MRRD=44.4; LEAK RATE= 2.0
ACT= 126.9; REL= 92.1; DIF= 34.7 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 52; FIX 4; C= 0000000; BIN=GOOD ; MRRU=44.3; MRRD=44.4; LEAK RATE= 2.0
ACT= 130.1; REL= 86.5; DIF= 43.6 PSI; ACTCR= 200.0ms; RELCR= 200.0

6-MAY-1992 10:29:24.58 DRIVER DOOR DID NOT CLOSE 1

SER 53; FIX 1; C= 0000040; BIN=DFHI ; MRRU=47.0; MRRD=44.1; LEAK RATE= 2.3
ACT= 132.3; REL= 87.8; DIF= 45.0 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 54; FIX 2; C= 0000040; BIN=DFHI ; MRRU=47.0; MRRD=44.1; LEAK RATE= 2.3
ACT= 133.3; REL= 82.2; DIF= 51.2 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 55; FIX 3; C= 0000000; BIN=GOOD ; MRRU=47.0; MRRD=44.1; LEAK RATE= 2.3
ACT= 126.2; REL= 82.2; DIF= 44.0 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 56; FIX 4; C= 0000000; BIN=GOOD ; MRRU=47.0; MRRD=44.1; LEAK RATE= 2.3
ACT= 123.2; REL= 85.2; DIF= 38.0 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 57; FIX 1; C= [illegible] BIN=DFHI ; MRRU=[illegible]; MRRD=44.0; LEAK RATE= 1.7
ACT= 133.4; REL= 87.1; DIF= 46.2 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 58; FIX 2; C= [illegible] BIN=[illegible]; MRRU=[illegible]; MRRD=44.0; LEAK RATE= 1.7

SER [illegible] FIX 2; C= [illegible] BIN=6000 ; MRRU=44.3; MRRD=45.3; LEAK RATE= 2.3
ACT= 123.2; REL= [illegible] DIF= 41.4 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 27; FIX 3; C= 0000000; BIN=6000 ; MRRU=44.3; MRRD=45.3; LEAK RATE= 2.3
ACT= 121.6; REL= 87.2; DIF= 34.0 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 28; FIX 4; C= 0000000; BIN=6000 ; MRRU=44.3; MRRD=45.3; LEAK RATE= 2.3
ACT= 142.2; REL= 98.3; DIF= 44.0 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 29; FIX 1; C= 0000000; BIN=6000 ; MRRU=46.9; MRRD=47.1; LEAK RATE= 1.6
ACT= 135.4; REL= 95.4; DIF= 40.0 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 30; FIX 2; C= 0000044; BIN=6LLO ; MRRU=46.9; MRRD=47.1; LEAK RATE= 1.6
ACT= 129.6; REL= 79.9; DIF= 49.7 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 31; FIX 3; C= 0000000; BIN=6000 ; MRRU=46.9; MRRD=47.1; LEAK RATE= 1.6
ACT= 135.6; REL= 92.5; DIF= 43.1 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 32; FIX 4; C= 0000040; BIN=0FHI ; MRRU=46.9; MRRD=47.1; LEAK RATE= 1.6
ACT= 129.6; REL= 82.8; DIF= 46.8 PSI; ACTCR= 200.0ms; RELCR= 200.0

8-MAY-1992 10:27:42.02 GPER DOOR DID NOT CLOSE 1

SER 33; FIX 1; C= 0000000; BIN=6000 ; MRRU=44.3; MRRD=46.1; LEAK RATE= 2.3
ACT= 123.2; REL= 84.6; DIF= 38.6 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 34; FIX 2; C= 0000000; BIN=6000 ; MRRU=44.3; MRRD=46.1; LEAK RATE= 2.3
ACT= 126.4; REL= 87.8; DIF= 38.3 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 35; FIX 3; C= 0000000; BIN=6000 ; MRRU=44.3; MRRD=46.1; LEAK RATE= 2.3
ACT= 128.2; REL= 83.4; DIF= 44.8 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 36; FIX 4; C= 0000040; BIN=6LLO ; MRRU=44.3; MRRD=46.1; LEAK RATE= 2.3
ACT= 120.4; REL= 78.2; DIF= 42.2 PSI; ACTCR= 200.0ms; RELCR= 154.6

SER 37; FIX 1; C= 0000000; BIN=6000 ; MRRU=41.9; MRRD=45.1; LEAK RATE= 1.7
ACT= 134.7; REL= 96.8; DIF= 37.9 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 38; FIX 2; C= 0000000; BIN=6000 ; MRRU=41.9; MRRD=45.1; LEAK RATE= 1.7
ACT= 124.3; REL= 80.5; DIF= 43.8 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 39; FIX 3; C= 0000044; BIN=6LLO ; MRRU=41.9; MRRD=45.1; LEAK RATE= 1.7
ACT= 118.8; REL= 74.2; DIF= 44.6 PSI; ACTCR= 200.0ms; RELCR= 63.1

SER 40; FIX 4; C= 0000040; BIN=0FHI ; MRRU=41.9; MRRD=45.1; LEAK RATE= 1.7
ACT= 135.3; REL= 84.7; DIF= 50.7 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 41; FIX 1; C= 0000000; BIN=6000 ; MRRU=43.8; MRRD=44.8; LEAK RATE= 2.1
ACT= 130.8; REL= 86.1; DIF= 44.7 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 42; FIX 2; C= 0000000; BIN=0FHI ; MRRU=43.8; MRRD=44.8; LEAK RATE= 2.1
ACT= 132.8; REL= 85.0; DIF= 46.7 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER [illegible] FIX [illegible] C= [illegible] BIN=[illegible] ; MRRU=[illegible]; MRRD=45.8; LEAK RATE= 2.1
ACT= [illegible] REL= [illegible] DIF= [illegible] PSI; ACTCR= [illegible] RELCR= 200.0

8-MAY-1992 10:25:37.23 OPER DOOR DID NOT CLOSE 1

SER 13; FIX 1; C= 0000000; BIN=0000 ; MRRU=46.5; MRRD=43.5; LEAK RATE= 2.0
ACT= 125.2; REL= 91.8; DIF= 33.4 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 14; FIX 2; C= 0000040; BIN=0FH1 ; MRRU=46.5; MRRD=43.5; LEAK RATE= 2.0
ACT= 134.2; REL= 83.9; DIF= 50.3 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 15; FIX 3; C= 0000040; BIN=0FH2 ; MRRU=46.5; MRRD=43.5; LEAK RATE= 2.0
ACT= 131.3; REL= 82.3; DIF= 49.0 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 16; FIX 4; C= 0000000; BIN=0000 ; MRRU=46.5; MRRD=43.5; LEAK RATE= 2.0
ACT= 131.5; REL= 87.5; DIF= 44.0 PSI; ACTCR= 200.0ms; RELCR= 200.0

8-MAY-1992 10:26:01.24 OPER DOOR DID NOT CLOSE 1

SER 17; FIX 1; C= 0000000; BIN=0000 ; MRRU=44.8; MRRD=44.0; LEAK RATE= 2.3
ACT= 133.0; REL= 88.5; DIF= 44.5 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 18; FIX 2; C= 0000000; BIN=0000 ; MRRU=44.8; MRRD=44.0; LEAK RATE= 2.3
ACT= 129.9; REL= 89.1; DIF= 40.8 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 19; FIX 3; C= 0000040; BIN=0FH1 ; MRRU=44.8; MRRD=44.0; LEAK RATE= 2.3
ACT= 127.7; REL= 82.7; DIF= 45.0 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 20; FIX 4; C= 0000000; BIN=0000 ; MRRU=44.8; MRRD=44.0; LEAK RATE= 2.3
ACT= 132.4; REL= 91.7; DIF= 40.7 PSI; ACTCR= 200.0ms; RELCR= 200.0

[illegible]

SER 21; FIX 1; C= 0000000; BIN=0000 ; MRRU=45.3; MRRD=44.1; LEAK RATE= 2.2
ACT= 128.9; REL= 84.1; DIF= 44.7 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 22; FIX 2; C= 0000000; BIN=0000 ; MRRU=45.3; MRRD=44.1; LEAK RATE= 2.2
ACT= 127.3; REL= 85.7; DIF= 41.6 PSI; ACTCR= 200.0ms; RELCR= 200.0

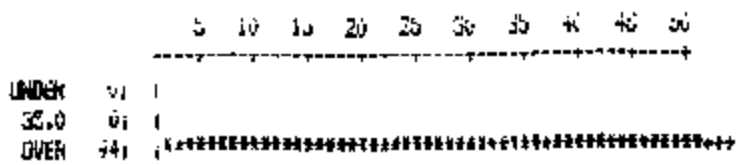
SER 23; FIX 3; C= 0000000; BIN=0000 ; MRRU=45.3; MRRD=44.1; LEAK RATE= 2.2
ACT= 132.1; REL= 93.5; DIF= 38.6 PSI; ACTCR= 200.0ms; RELCR= 200.0

SER 24; FIX 4; C= 0000040; BIN=0FH1 ; MRRU=45.3; MRRD=44.1; LEAK RATE= 2.2
ACT= 126.7; REL= 81.3; DIF= 45.4 PSI; ACTCR= 200.0ms; RELCR= 200.0

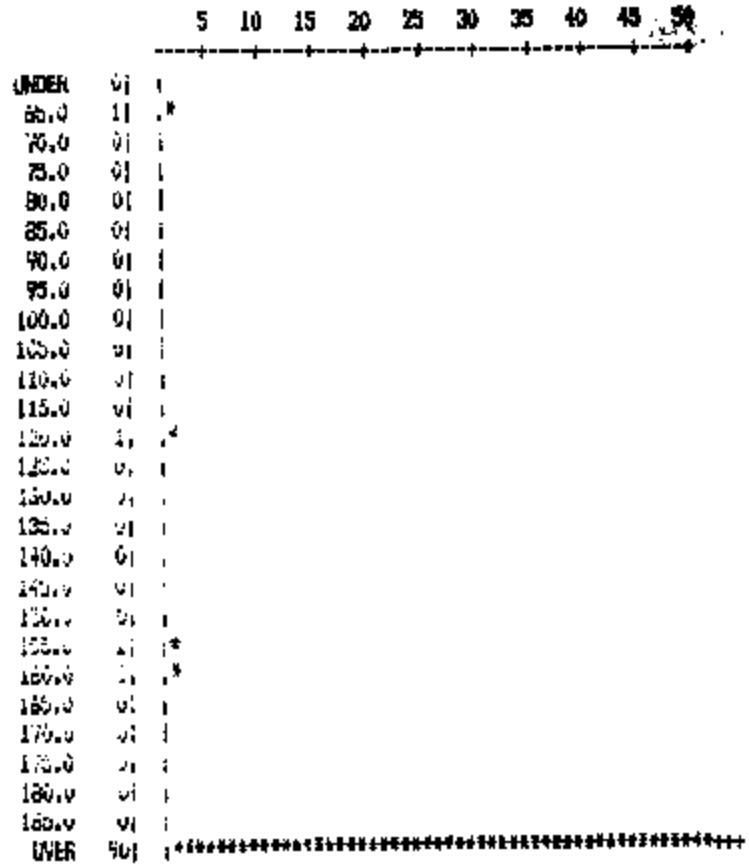
8-MAY-1992 10:26:59.27 OPER DOOR DID NOT CLOSE 1

SER 25; FIX 1; C= 0000000; BIN=0000 ; MRRU=44.5; MRRD=43.3; LEAK RATE= 2.3
ACT= 127.1; REL= 86.1; DIF= 41.0 PSI; ACTCR= 200.0ms; RELCR= 200.0

```
SER    1; FIX 1;  C= 0000040;  BIN=DFHI ;  MRRU=45.0;  MRRD=44.2;  LEAK RATE= 1.6
ACT=  127.3;  REL=   82.1;  DIF=  45.2 PSI;  ACTCR=  200.0ms;  RELCR=  200.0

SER    2; FIX 2;  C= 0000004;  BIN=ALLO ;  MRRU=45.0;  MRRD=44.2;  LEAK RATE= 1.6
ACT=  115.8;  REL=   79.3;  DIF=  36.4 PSI;  ACTCR=  200.0ms;  RELCR=  200.0

SER    3; FIX 3;  C= 0000000;  BIN=GOOD ;  MRRU=45.0;  MRRD=44.2;  LEAK RATE= 1.6
ACT=  130.0;  REL=   89.3;  DIF=  40.6 PSI;  ACTCR=  200.0ms;  RELCR=  200.0

SER    4; FIX 4;  C= 0000000;  BIN=GOOD ;  MRRU=45.0;  MRRD=44.2;  LEAK RATE= 1.6
ACT=  126.0;  REL=   85.3;  DIF=  40.7 PSI;  ACTCR=  200.0ms;  RELCR=  200.0


 6-MAY-1992 10:24:03.57  OPEN DOOR BIN NOT CLOSE         1


 6-MAY-1992 10:24:23.57  OPEN DOOR STILL BIN NOT CLOSE         1


 6-MAY-1992 10:24:43.26  TOTAL CYCLE TIMEOUT         1


SER    5; FIX 1;  C= 0000040;  BIN=DFHI ;  MRRU=45.3;  MRRD=44.0;  LEAK RATE= 1.7
ACT=  128.3;  REL=   82.0;  DIF=  46.2 PSI;  ACTCR=  200.0ms;  RELCR=  200.0

SER    6; FIX 2;  C= 0000040;  BIN=DFHI ;  MRRU=45.3;  MRRD=44.0;  LEAK RATE= 1.7
ACT=  126.8;  REL=   80.8;  DIF=  46.0 PSI;  ACTCR=  200.0ms;  RELCR=  200.0

SER    7; FIX 3;  C= 0000040;  BIN=DFHI ;  MRRU=45.3;  MRRD=44.0;  LEAK RATE= 1.7
ACT=  140.2;  REL=   89.8;  DIF=  50.5 PSI;  ACTCR=  200.0ms;  RELCR=  200.0

SER    8; FIX 4;  C= 0000040;  BIN=DFHI ;  MRRU=45.3;  MRRD=44.0;  LEAK RATE= 1.7
ACT=  137.1;  REL=   81.7;  DIF=  55.4 PSI;  ACTCR=  200.0ms;  RELCR=  200.0


SER    9; FIX 1;  C= 0000000;  BIN=GOOD ;  MRRU=48.7;  MRRD=44.0;  LEAK RATE= 1.6
ACT=  134.8;  REL=   92.8;  DIF=  42.0 PSI;  ACTCR=  200.0ms;  RELCR=  200.0

SER   10; FIX 2;  C= 0000040;  BIN=DFHI ;  MRRU=48.7;  MRRD=44.0;  LEAK RATE= 1.6
ACT=  133.4;  REL=   85.7;  DIF=  47.6 PSI;  ACTCR=  200.0ms;  RELCR=  200.0

SER   11; FIX 3;  C= 0000040;  BIN=DFHI ;  MRRU=48.7;  MRRD=44.0;  LEAK RATE= 1.6
ACT=  142.1;  REL=   91.1;  DIF=  50.9 PSI;  ACTCR=  200.0ms;  RELCR=  200.0

SER   12; FIX 4;  C= 0000004;  BIN=ALLO ;  MRRU=48.7;  MRRD=44.0;  LEAK RATE= 1.6
ACT=  130.0;  REL=   79.0;  DIF=  51.3 PSI;  ACTCR=  200.0ms;  RELCR=  200.0
```



HISTOGRAM OF RELEASE CREEP



140.0	3	
142.5	1	
OVER	0	

HISTOGRAM OF RELEASE PRESSURE

		5 10 15 20 25 30 35 40 45 50
UNDER	0	
13.0	1	
77.5	5	
80.0	8	
82.5	19	
85.0	14	
87.5	21	
90.0	12	
92.5	8	
95.0	3	
97.5	3	
OVER	0	

HISTOGRAM OF DIFFERENTIAL PRESSURE

		5 10 15 20 25 30 35 40 45 50
UNDER	0	
30.0	1	
31.0	0	
32.0	0	
33.0	1	
34.0	1	
35.0	1	
36.0	2	
37.0	1	
38.0	5	
39.0	6	
40.0	3	
41.0	11	
42.0	5	
43.0	5	
44.0	10	
45.0	11	
46.0	8	
47.0	5	
48.0	1	
49.0	3	
50.0	8	
51.0	5	
52.0	0	
OVER	1	

HISTOGRAM OF MOTOR SPEED

77PSC3-1 Quiet Switch 5/19/92
Process Modifications / Status

o Piloting / Pin window

Soap Switch	Quiet Switch
• Calib. target per creep window Analysis.	• Calib target to provide pre-determined spring pre-load.
• Creep window ±.009	Given Sensor $\bar{x}$ + Pin ht. the base calib. target is adjusted Accordingly.
• Stack-up (Base, Sensor, Pin) 3σ : ±.002 (.0015 sensor/pin, .0005 Base)	• Available window : .006
• 100% base gaging	• Stack-up (Base, Sensor, Pin) 3σ : ±.0025 (.0015 sensor/pin, .001 Base)
• Selective pinning	• Each lot is custom calibrated to provide required spring pre-load
• Spec 90-160 Act 20 min Rel None Diff	

Notes: The quiet switch has it's own set of procedural requirements for the pilot maker

Also different Acceptance criteria : 110-150 Act
20 min Rel
15-45 Diff

Attachments : - Pilot procedures.
- Comm Chart Photo
- Base photo

PILOT MAKER
PROCESS PROCEDURES 77PSL3-1,5-2
REVISION A: 4/28/92

GENERAL INFORMATION

EACH DISC LOT MUST BE WEIGHED OUT TO DETERMINE THE EXACT QUANTITY OF DISC IN EACH LOT. THIS WILL PREVENT EXCESSIVE COMPONENTS OR SUB-ASSEMBLIES FROM BEING GENERATED, AND ALSO WILL PREVENT COMPONENT OR SUB-ASSEMBLY DEFICIENCIES.

THE PILOT COMMUNICATION BOARD SET UP IN THE MANUFACTURING AREA IS AN IMPORTANT INFORMATION PIECE. IT WILL ALLOW THE TEAM TO DETERMINE THE STATUS OF ALL CURRENTLY APPROVED PILOTS AT A MOMENTS GLANCE. IT ALSO SERVES TO REDUCE THE POSSIBILITY OF MIS-CALIBRATING THE NEW QUITE SWITCHES, 77PSL3-1 AND 77PSL5-2. THE PIN SELECTION, AS WELL AS THE BASE CHECK TARGET USED ARE IMPORTANT IN ANY PRESSURE SWITCH. THE QUIET SWITCH MAKES THE SELECTION ACCURACY MUCH MORE CRITICAL. THEREFORE, THE ACCURACY OF THE PILOT COMMUNICATION BOARD INFORMATION, AS WELL AS IT'S AVAILABILITY TO ALL INVOLVED IN THE PROCESS IS KEY.

PILOT PROCEDURAL OUTLINE

1.) THE PILOT MAKER WILL BUILD A 32 PIECE PILOT AS WITH STANDARD 77PS PROCEDURES.

2.) THE PILOTS MUST BE CRIMPED ON THE AMI ROTARY CRIMPER USING THE CRIMP DIES MARKED '77PS'. WORK WITH THE AMI OPERATOR TO ENSURE THIS IS ADHERED TO.

3.) WHEN THE PILOT SENSORS ARE AVAILABLE, THE PILOT MAKER WILL NEED TO MEASURE THE SENSOR DEPTH ON 10 SENSORS OUT OF THE PILOT. THE PILOT MAKER MUST THEN CALCULATE THE BASE CHECK DIMENSION REQUIRED TO PROCESS THE PILOT FURTHER. IT IS CRITICAL THAT THE BASE DIMENSION BE SPECIFICALLY TAILORED FOR EACH PILOT. THE FORMULA FOR CALCULATING IS AS FOLLOWS:

PIN SIZE - OFFSET - SENSOR AVERAGE = BASE CHECK NEEDED

4.) FINAL ASSEMBLE THE 32 PIECE PILOT WITH THE PROPER PIN, SENSORS, AND BASE CHECK USING STANDARD 77PS PROCEDURES.

5.) FUNCTION TEST THE PILOT USING STANDARD 77PS FUNCTION TEST PROCEDURES FOR THE 77PSL3-1 OR 77PSL5-2. SPECIFICATIONS AS REQUIRED.

6.) REVIEW THE PILOT RESULTS AND ACCEPT OR REJECT PER STANDARD ACCEPTANCE CRITERIA. NOTE THAT ACTUATION AND RELEASE CREEP MUST BE MAX'D OUT 200MSEC. AR ABOVE. ANYTHING BELOW 200MSEC IS CONSIDERED BAD.

7.) ONCE THE PILOT CAN BE ACCEPTED, THE PILOT MAKER MUST FILL OUT THE INFORMATION ON THE PILOT COMMUNICATION CHART. HOWEVER, DO NOT FILL IN THE SENSOR AVERAGE OR THE BASE CALIBRATION UNTIL 10 SENSORS FROM THE 'PRODUCTION' RUN ARE MEASURED. THE SENSORS FROM THE PRODUCTION RUN CAN BE FROM THE 25 PIECE SAMPLE THAT IS PROCESSED DURING THE PRODUCTION BUILD. WHEN 10 SENSORS FROM THE PRODUCTION RUN AVAILABLE, MEASURE THE DEPTH DIMENSION, CALCULATE THE AVERAGE, THEN CALCULATE THE BASE CHECK TARGET WITH THE FORMULA USED PREVIOUSLY.

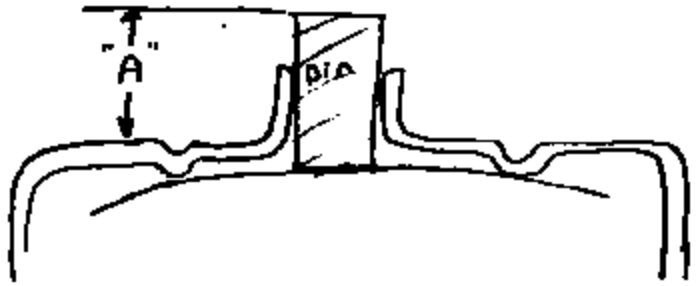
8.) WITH THE SENSOR AVERAGE DIMENSION FROM THE PRODUCTION RUN IN HAND, THE PILOT MAKER SHOULD FILL IN THE REMAINING PORTIONS OF THE CHART. ADDITIONALLY, THE LOW GAGE LINE INFORMATION SHOULD BE FILLED IN AT THIS TIME. THE ONLY DIFFERENCE IS THAT THE PIN SIZE IS .002" SMALLER FOR THE LOW GAGE. THUS, THE RESULTING BASE CHECK TARGET WILL BE .002" SMALLER.

Pilot Communication Chart

Date	Qty	Device P/N	Lot #	pin	offset	Sensor $\bar{X}$	Base clear	Status
4/23	2000	L3-1	6 High	.142	.0065	.0459	89.6	
			6 Low	.140	.0065	.0459	87.6	

77PSC3-1

- Spring offset Calculations
  Base Calib. determination



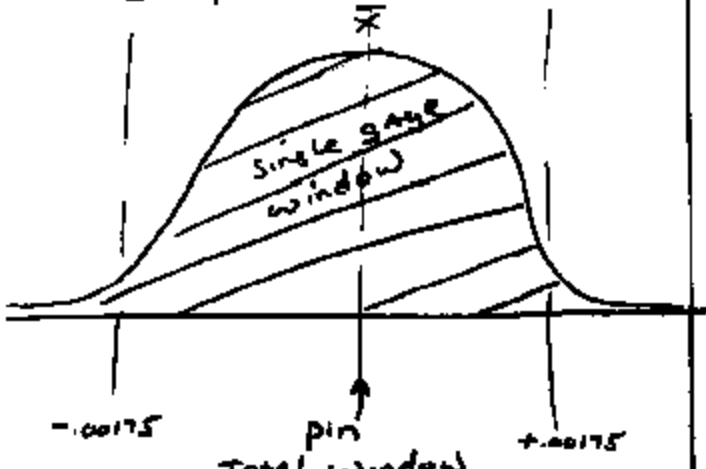
"A" - "B" = .0065 (Spring pre-load)

77PSL3-1 Quiet Switch 5/19/92
Process Modifications / Status

○ Base Assembly

Snap Switch

- Celenex 4300 base
- Single Calib. window At +/- .00175. Single pin selection.

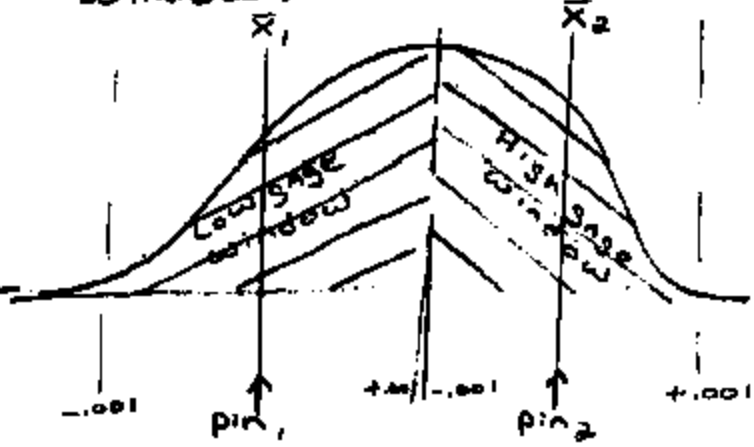


Total window Seat to F.A.M is .0035

- Typical B.A.M. Yields →

Quiet Switch

- Nor-Vl GTX 830 base.
- Dual Calib window. Each At +/- .001. Dual pin selection; one for each window.



Total window Seat to F.A.M is .002

- Typical B.A.M. Yield → However, manual load for 1/2 distribution will be required

NOTES: Hardware / software upgrades to simplify dual window process. Software mods to improve Calib. performance

Heightened emphasis on check SPC. Additional procedure instructions.

ATTACHMENTS: - Lot Summary printout
- Tote I.D. example.

BASE ASSEMBLY MACHINE
MANUFACTURING PROCEDURE
CALIBRATOR-CHECK SET-UPS

TEST LIMIT SCREEN USE:
STANDARD SINGLE GAGE (77PSL2-1,2-3)

ENTER LIMITS

CALIB TARGET XX.X MILS	CALIB TOL XX.X MILS	CAL/CHECK DIFF XX.X MILS
CHECK TARGET XX.X MILS	CHECK TOL XX.X MILS	HIGH/LOW LIMIT XX.X MILS
EST SPRINGBACK XX.X MILS	AUTO-CALIBRATE XXXX	

THE 'HIGH/LOW LIMIT' BUTTON MUST BE SET TO "0". THIS WILL TURN OFF THE HIGH/LOW GAGE SPLIT FEATURE, AND WILL SEND ALL GOOD BASE ASSY'S DOWN THE F.A.M. UNLOAD CONVEYOR.

THE 'CAL/CHECK DIFF' BUTTON SHOULD BE SET TO "0" ALSO. THIS WILL ALLOW THE CHECK STATION TO OVER RIDE THE CALIBRATOR IN THE EVENT THAT THE CALIBRATOR CALLS AN ASSY BAD AND THE CHECK STATION CALLS THE ASSY GOOD. THE ABILITY TO DO THIS WILL ALLOW YOU TO FORCE THE CALIBRATOR TO WORK HARDER WITHOUT REDUCING YIELDS - THUS IMPROVING THE PERFORMANCE OF THE MACHINE. IT MUST BE NOTED, HOWEVER, THAT THIS ALSO MAKES IT IMPERATIVE THAT PROPER CHECK STATION SPC PROCEDURES ARE FOLLOWED.

THE 'CHECK TARGET' AND 'CHECK TOL' VALUES MUST BE SET PER MANUFACTURING ENGINEERING INSTRUCTIONS.

THE 'CALIB TARGET' AND 'CALIB TOL' VALUES MUST BE SET TO ALLOW PROPER CENTERING OF THE DISTRIBUTION ON THE CHECK STATION WINDOW OF ACCEPTANCE.

TEST LIMIT SCREEN USE CONT:
HIGH AND LOW GAGE (77PSL3-1.5-2)

THE 'CHECK TARGET' AND 'HIGH/LOW LIMIT' VALUES MUST BE SET TO THE MID-POINT OF THE PILOT COMMUNICATION LOG HIGH AND LOW BASE CHECK X BAR VALUES. THE 'CHECK TOL' VALUE MUST BE SET PER MANUFACTURING ENGINEERING INSTRUCTIONS.

EXAMPLE:

	25 PIECE SAMPLE DATA		
LOT#	SENSOR XBAR	BASE CHECK XBAR	YOUR RESULTING B.A.M. CHECK TARGET IS
2 HIGH	.045	.0905	.0885
2 LOW	.045	.0865	

NOTE THAT BY PLACING A VALUE OTHER THAN "0" IN THE HIGH/LOW LIMIT BUTTON YOU HAVE ENABLED THE HIGH/LOW GAGE SPLIT PROGRAM. A "0" IN THIS BUTTON WILL TURN OFF THIS PROGRAM DEFAULTING TO THE STANDARD SINGLE WINDOW.

THE 'CALIB TARGET' AND 'CALIB TOL' VALUES MUST NOW BE SET TO ALLOW PROPER CENTERING OF THE DISTRIBUTION ON THE ENTIRE CHECK STATION WINDOW OF ACCEPTANCE.

OPERATING IN THE HIGH/LOW GAGE MODE EFFECTIVELY DIVIDES THE ENTIRE CHECK WINDOW INTO TWO SUB-WINDOWS. THE LOWER HALF OF THE CHECK WINDOW IS DESIGNATED AS "LOW GAGE" WITH THE UPPER HALF DESIGNATED AS "HIGH GAGE". ALL BASE ASSY'S IN THE LOW GAGE HALF WILL BE UNLOADED AT FIRST UNLOAD STATION IMMEDIATELY BEFORE THE F.A.M. CONVEYOR UNLOAD. THESE WILL BE COLLECTED IN A TOTE AND WILL REQUIRE A CHANGE IN PIN SIZE AT THE F.A.M. PER THE PILOT COMMUNICATION LOG. ALL BASE ASSY'S IN THE HIGH GAGE HALF WILL BE UNLOADED DIRECTLY ON THE F.A.M. CONVEYOR AND MUST RECEIVE A PIN SELECTION AS REQUIRED BY THE PILOT COMMUNICATION LOG.

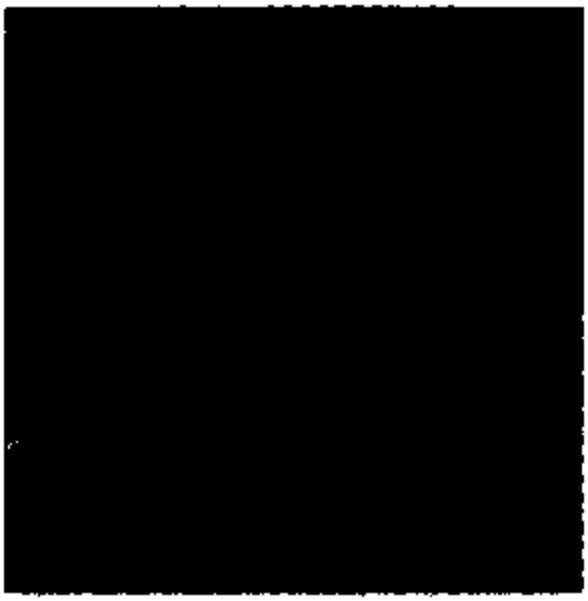
TEST LIMIT SCREEN USE CONT:
HIGH AND LOW GAGE (77PSL3-1.5-2) CONT.

IT IS CRITICAL THAT THE HIGH AND LOW GAGE BASE ASSY'S BE KEPT SEPARATED. TOTES FOR EACH MUST BE CLEARLY DISTINGUISHABLE FROM ON ANOTHER AND EACH MUST HAVE I.D. PAPERWORK INSIDE WHICH DETAILS:

1.) SENSOR LOT NUMBER ASSY'S ARE MADE FOR.
2.) HIGH OR LOW GAGE ASSY'S, (WHICH ONE?)
3.) BASE CHECK WINDOW SORTED TO.
4.) DATE ASSEMBLED AND BY WHICH OPERATOR.
5.) DEVICE PART NUMBER

THE FINAL ASSEMBLY OPERATOR WILL SELECT THE PROPER PIN SIZE, PER THE PILOT COMMUNICATION LOG, TO USE DURING FINAL ASSEMBLY. THE PIN SIZE WILL BE ADJUSTED TO SUIT EITHER HIGH GAGE OR LOW GAGE BASE ASSY'S.

IT IS IMPORTANT THAT THE COMBINED NUMBER OF HIGH AND LOW GAGE'D BASE ASSY'S PROCESSED FOR EACH LOT SHOULD EQUAL THE TOTAL NUMBER OF SENSORS IN THAT LOT. THIS WILL AVOID UNNECESSARY RE-WORK OF UNUSED BASE ASSY'S LATER.



MSG 050 134 PCMB MDES-2 MFPC CPPC ZARN

TO: HILL SWEET PCMB
DAVE CZARN ZARN
STEVE OFFILER SBO1
DALE SOGGE FTUN
CLAIRE BALTHAZAR PCME

FR: MATT SELLERS MJ62

SJ: 77PSL3-1 CALIBRATION SHIFT STUDY

ATTACHED ARE TEST RESULTS FROM A STUDY TO DETERMINE THE CAUSE OF CALIBRATION SHIFTING THE LINE HAS BEEN EXPERIENCING ON THE NEW 77PSL3-1 QUIET SWITCH.

IN ALL, 15 TEST LOTS WERE SET UP, EACH WERE MADE FROM THE SAME COMPONENT LOTS. MANUFACTURING VARIABLES ARE OUTLINED ON THE ATTACHED SHEETS.

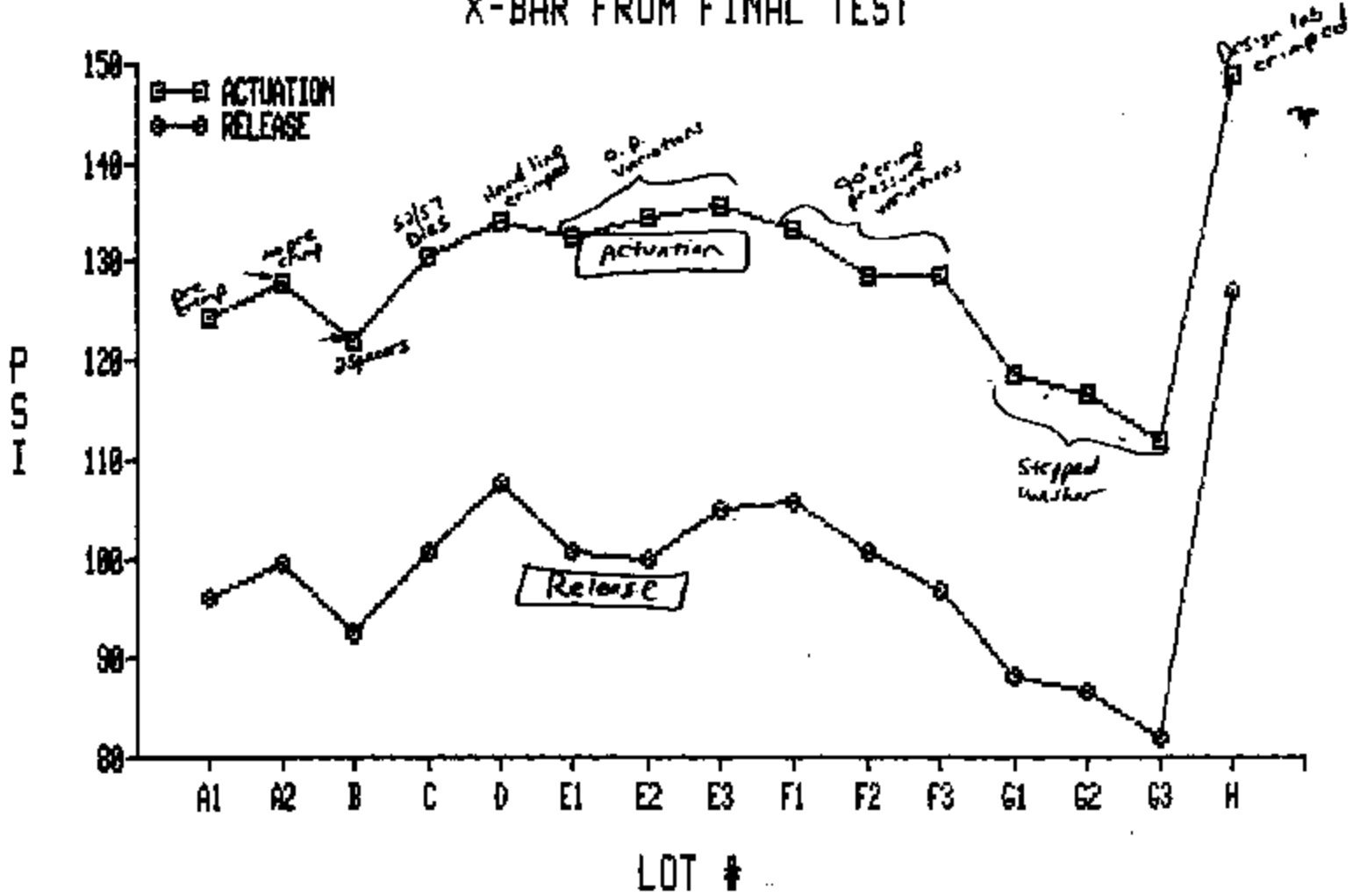
WE HAD EXPECTED THAT AN INCREASE IN DISC PRE-DEFLECTION WOULD POTENTIALLY INCREASE ACTUATION AND RELEASE VALUES. ACTUALLY WE SAW THE OPPOSITE. LOTS 'B' AND 'G' REPRESENT TWO ATTEMPTS TO INCREASE DISC PRE-DEFLECTION. 'B' HAD 2 SPACERS WHILE 'G1', 'G2', AND 'G3' HAD THE STEPPED DOWN WASHERS AT INCREASING LEVELS. IN ALL CASES ACTUATION AND RELEASE VALUES DROPPED FOR LOTS 'B' AND 'G'. DOES THE PROBLEM LIE IN PLACING EXCESSIVE PRE-DEFLECTION ON THE DISC? IF SO THERE SEEMS TO BE A VERY NARROW WINDOW BETWEEN LOOSE (RATTLING DISC) AND EXCESSIVE PRE-DEFLECTION. THE DESIGN LAB CRIMPED PARTS AS EXPECTED WERE SUBSTANTIALLY HIGHER IN ACTUATION AND RELEASE VALUES.

PLEASE REVIEW AND ADD YOUR COMMENTS.

REGARDS . . . MATT
X1245

77PS CRIMP MATRIX STUDY

X-BAR FROM FINAL TEST



crimp matrix Study

MAY 1992

DESIGN OF EXPERIMENTS
MAP

SET LOT	SENSOR MEASUREMENTS CRMP LOW	CRMP HIGH	RANGE	DIAM LOW	DIAM HIGH	RANGE	SENSOR	FINISHED DEVICE ACT	REL	DIF
A1	0.2793	0.2829	0.0047	1.1585	1.1624	0.0039	0.0469	124.4	95.9	28.
A2	0.2789	0.2847	0.0058	1.1610	1.1644	0.0034	0.0471	127.7	99.5	29.
B	0.2810	0.2849	0.0039	1.1592	1.1614	0.0022	0.0472	121.9	92.6	29.
C	0.2775	0.2814	0.0039	1.1602	1.1651	0.0049	0.0474	120.4	100.5	25.
D	0.2816	0.2851	0.0035	1.1590	1.1628	0.0038	0.0473	136.9	107.8	26.
E1	0.2812	0.2857	0.0045	1.1572	1.1615	0.0043	0.0476	132.4	100.6	31.
E2	0.2785	0.2840	0.0055	1.1585	1.1628	0.0043	0.0473	134.3	99.7	34.
E3	0.2795	0.2862	0.0067	1.1587	1.1615	0.0028	0.0474	135.3	104.8	30.
F1	0.2806	0.2858	0.0050	1.1610	1.1630	0.0020	0.0474	138.2	105.5	27.
F2	0.2798	0.2843	0.0045	1.1612	1.1642	0.0030	0.0472	128.6	100.5	28.
F3	0.2790	0.2845	0.0055	1.1610	1.1645	0.0035	0.0475	128.8	96.8	32.
G1	0.2790	0.2838	0.0045	1.1607	1.1722	0.0115	0.0472	118.5	88.2	30.
G2	0.2750	0.2797	0.0047	1.1612	1.1675	0.0063	0.0473	116.7	86.8	29.
G3	0.2760	0.2815	0.0055	1.1617	1.1722	0.0105	0.0477	112.0	82.0	30.
H	0.2864	0.2891	0.0026	1.1598	1.1653	0.0055	0.0472	148.9	127.0	21.
DBL BAR	0.2795	0.2842	0.0047	1.1599	1.1959	0.0048	0.0473			

A_1 AMI w/pre-crimp

A_2 AMI No/pre-crimp

B Two Spacers

TPELS-1 MAY 1992

DESIGN OF EXPERIMENTS

DEV #	CRMP LOW	CRMP HIGH	RANGE	DIAM LOW	DIAM HIGH	RANGE	SENSOR	ACT	REL	DIFF	
A1	0.2795	0.2820	0.0035	1.1560	1.1600	0.0040	0.0468	121.5	93.5	27.9	
2	0.2765	0.2805	0.0040	1.1600	1.1620	0.0020	0.0469	132.1	100.1	31.9	
3	0.2805	0.2850	0.0045	1.1565	1.1650	0.0085	0.0470	121.5	96.1	25.3	
4	0.2750	0.2805	0.0055	1.1560	1.1565	0.0005	0.0467				DUMMY
5	0.2805	0.2865	0.0060	1.1640	1.1685	0.0045	0.0471	121.9	94.4	27.5	
6								120.5	93.4	27.0	
7								130.2	95.7	34.5	
8								122.7	93.7	29.0	
9								130.5	85.0	45.5	DFHI ZPLF
10											
11								128.4	107.1	21.3	
12								119.2	92.4	26.8	
13								117.2	94.4	22.8	
14								128.6	102.0	26.6	
15								119.9	86.9	33.0	
16								125.9	82.0	43.8	
17								122.3	101.2	21.1	
18								127.5	94.2	33.4	
19								124.4	101.8	22.6	
20								131.4	107.7	23.7	
21								124.2	98.2	26.0	
22								119.9	98.2	21.8	
23								126.2	93.1	33.1	
24								119.9	96.4	23.5	
BAR	0.2782	0.2829	0.0047	1.1585	1.1624	0.0039	0.0469	124.4	95.8	28.6	
SIGMA	0.0022	0.0024	0.0009	0.0031	0.0041	0.0027	0.0001	4.3332	6.1439	6.3578	
A25	0.2750	0.2840	0.0090	1.1615	1.1670	0.0055	0.0474	127.3	100.0	27.3	
26	0.2800	0.2850	0.0050	1.1625	1.1650	0.0025	0.0472	129.1	100.3	28.8	
27	0.2810	0.2835	0.0025	1.1620	1.1645	0.0025	0.0471	126.2	99.2	27.0	
28	0.2785	0.2850	0.0065	1.1590	1.1600	0.0010	0.0470	133.3	87.9	45.5	DFHI
29	0.2800	0.2860	0.0060	1.1600	1.1655	0.0055	0.0469	137.6	111.4	26.2	
30								125.3	92.6	32.6	
31								125.3	103.1	22.1	
32								130.1	93.6	36.6	
33								126.6	104.4	22.1	
34								130.1	100.2	29.8	
35								130.7	99.7	31.0	
36								124.4	106.1	18.3	
37								128.9	100.1	28.8	
38								131.7	106.0	25.7	
39								124.6	129.7		DFLO(5.1)
40								127.5	99.7	27.8	
41								119.3	95.7	23.6	
42								132.3	90.0	52.3	DFHI-CA
43								131.9	94.7	37.2	
44								129.4	104.3	25.1	
45								119.1	93.7	25.3	
46								125.5	95.3	30.2	
47								126.9	96.3	30.6	
48								122.4	92.8	29.7	
BAR	0.2789	0.2847	0.0058	1.1610	1.1644	0.0034	0.0471	127.7	99.5	29.7	
SIGMA	0.0021	0.0009	0.0021	0.0013	0.0024	0.0018	0.0002	4.2068	8.9964	7.3578	

Lot A1.
- AMI pre-crimp
- AMI Low pin probe

Lot A3
- AMI crimped
(No pre-crimp)
(No Low pin probe)

DEV #	CRMP LOW	CRMP HIGH	RANGE	DIAM LOW	DIAM HIGH	RANGE	SENSOR	ACT	REL	DIFF	
51	0.2780	0.2820	0.0040	1.5950	1.1620	0.0025	0.0474	114.1	92.6	21.5	
2	0.2805	0.2850	0.0045	1.1595	1.1600	0.0005	0.0471	124.2	86.3	37.9	
3	0.2820	0.2845	0.0025	1.1585	1.1600	0.0015	0.0473	115.0	88.4	26.6	
4	0.2820	0.2875	0.0055	1.1585	1.1605	0.0020	0.0471	115.0	92.9	22.1	
5	0.2825	0.2855	0.0030	1.1600	1.1645	.0.0045	0.0469	127.9	102.8	25.8	
6								125.9	97.4	28.5	
7								127.9	86.1	41.9	
8								124.4	87.5	36.9	
9								122.4	94.2	28.2	
10								116.5	99.2	17.2	
11								129.6	103.1	26.5	
12								119.0	93.2	25.8	
13								118.6	94.9	23.7	
14								122.5	94.9	27.6	
15								124.7	95.3	29.4	
16								124.0	101.4	22.6	
17								128.3	98.6	29.7	
18								125.4	78.8	46.6	DFHI-CR
19								112.0	89.4	22.5	
20								124.0	94.9	29.1	
21								116.7	85.4	31.4	
22								124.2	94.8	29.4	
23								127.6	81.0	46.5	DFHI
24								115.1	89.9	25.2	
BAR	0.2342	0.2374	0.0039	1.0386	0.9678	0.0022	0.0472	121.9	92.6	29.3	
OMA	0.1047	0.1062	0.0011	0.4910	0.4328	0.0013	0.0002	5.1756	6.2559	7.4587	

Lot B
- Lot A, with 3 spacers
- AMI crimped

DEV #	CRMP LOW	CRMP HIGH	RANGE	DIAM LOW	DIAM HIGH	RANGE	SENSOR	ACT	REL	DIFF	
1	0.2775	0.2790	0.0015	1.1620	1.1675	0.0055	0.0471	141.6	94.6	47.0	DFHI
2	0.2785	0.2825	0.0040	1.1605	1.1660	0.0055	0.0476	133.8	102.3	31.5	
3	0.2775	0.2800	0.0025	1.1600	1.1650	0.0050	0.0474	135.1	105.4	29.7	
4	0.2775	0.2835	0.0060	1.1590	1.1655	0.0065	0.0471	132.5	103.9	28.6	
5	0.2765	0.2820	0.0055	1.1595	1.1615	0.0020	0.0479	115.1	89.0	26.1	
6								132.7	100.8	31.9	
7								127.2	100.8	26.4	
8								134.2	97.7	36.5	
9								125.0	97.3	27.7	
10								128.5	99.2	29.3	
11								131.2	85.1	46.1	DFHI
12								140.3	110.1	30.2	
13								128.7	102.7	26.0	
14								141.4	110.4	31.0	
15								130.1	104.4	25.7	
16								126.7	100.7	26.0	
17								130.3	106.9	23.4	
18								126.9	92.7	34.2	
19								126.0	96.1	29.9	
20								124.6	106.9	17.7	
21								133.9	96.6	37.3	
22								123.8	104.8	19.0	
23								128.1	104.3	23.8	
24								132.5	100.1	32.4	
XBAR	0.2775	0.2814	0.0039	1.1602	1.1651	0.0049	0.0474	130.4	100.5	29.9	
XSMA	0.0006	0.0017	0.0017	0.0010	0.0020	0.0015	0.0003	5.8716	6.0679	6.8147	

Lot C
- Lot A2
- AMI crimped with 50/57PS dies vs. 77PS dies.

DEV #	CRMP LOW	CRMP HIGH	RANGE	DIAM LOW	DIAM HIGH	RANGE	SENSOR	ACT	REL	DIFF	
01	0.2820	0.2875	0.0055	1.1590	1.1630	0.0040	0.0473	162.7	141.2	21.5	ACHI-CA
2	0.2810	0.2825	0.0015	1.1590	1.1620	0.0030	0.0478	125.1	97.0	28.1	
3	0.2805	0.2845	0.0040	1.1580	1.1635	0.0055	0.0470	136.0	116.5	19.5	
4	0.2840	0.2885	0.0045	1.1590	1.1635	0.0045	0.0476	135.5	110.1	25.4	
5	0.2905	0.2925	0.0020	1.1600	1.1620	0.0020	0.0470	139.3	106.9	32.4	
6								133.5	105.2	28.3	
7								131.6	109.6	22.0	
8								128.2	74.7	53.5	DFHI
9								129.9	109.3	20.6	
10								147.2	124.1	23.1	
11											ACLO=0
12								142.0	118.1	23.9	
13								119.7	98.3	21.4	
14								134.9	107.7	27.2	
15								134.2	106.6	27.6	
16								133.5	109.9	23.6	
17								134.0	110.5	23.5	
18								120.4	94.0	26.4	
19								134.0	102.0	32.0	
20								133.2	110.5	22.7	
21								130.6	108.6	22.2	
22								126.0	105.8	20.2	
23								134.4	106.3	28.1	
24								133.2	105.8	27.4	
AVR	0.2816	0.2851	0.0035	1.1590	1.1628	0.0036	0.0473	133.9	107.8	26.1	
SMA	0.0013	0.0025	0.0015	0.0006	0.0007	0.0012	0.0003	8.5918	11.7	6.8083	

Lot D

- Lot A2
- Hand line crimped with TMPS dies.

IEV #	CRMP LOW	CRMP HIGH	RANGE	DIAM LOW	DIAM HIGH	RANGE	SENSOR	ACT	REL	DIFF
E1	0.2785	0.2845	0.0060	1.1580	1.1625	0.0045	0.0472	135.9	102.2	33.7
	0.2840	0.2875	0.0035	1.1570	1.1600	0.0030	0.0476	130.7	102.4	28.3
	0.2810	0.2850	0.0040	1.1565	1.1620	0.0055	0.0481	119.3	99.6	19.7
								127.1	104.6	22.5
								136.2	98.1	38.1
								134.4	103.8	30.6
								133.4	101.3	32.1
								131.2	103.0	28.2
								127.5	89.8	37.7
								136.6	101.6	35.0
								143.0	105.8	37.2
								133.2	95.5	37.7
-BAR	0.2812	0.2857	0.0045	1.1572	1.1615	0.0043	0.0476	132.4	100.6	31.7
IGMA	0.0022	0.0013	0.0011	0.0006	0.0011	0.0010	0.0004	5.7035	4.2447	5.8589
E13	0.2790	0.2805	0.0015	1.1575	1.1600	0.0025	0.0477	134.5	96.8	37.7
14	0.2760	0.2875	0.0115	1.1575	1.1625	0.0050	0.0471	134.5	99.3	35.2
15	0.2805	0.2840	0.0035	1.1605	1.1660	0.0055	0.0471	133.1	101.5	33.6
								130.6	101.5	29.1
								139.7	107.9	31.8
								133.4	102.2	31.2
								132.1	107.6	24.5
								140.5	101.7	38.8
								139.0	100.9	38.1
								129.4	96.2	33.2
								142.4	100.9	41.5
24								120.3	80.3	40.0
-BAR	0.2785	0.2840	0.0055	1.1585	1.1628	0.0043	0.0473	134.3	99.7	34.6
IGMA	0.0019	0.0029	0.0043	0.0014	0.0025	0.0013	0.0003	5.7400	6.7480	4.7542
E25	0.2795	0.2840	0.0045	1.1590	1.1625	0.0035	0.0477	122.9	97.8	25.1
26	0.2790	0.2875	0.0085	1.1575	1.1610	0.0035	0.0472	137.8	109.8	28.0
27	0.2800	0.2870	0.0070	1.1595	1.1610	0.0015	0.0473	138.8	107.1	31.7
								135.8	107.1	28.7
								138.5	109.4	29.1 CR
								137.3	103.9	33.4
								123.7	94.9	28.8
								142.3	106.1	36.2
								138.1	100.4	37.7
								130.7	99.4	31.3
36								140.7	109.0	31.7
								139.1	112.4	26.7
-BAR	0.2795	0.2862	0.0067	1.1587	1.1615	0.0028	0.0474	135.5	104.8	30.7
IGMA	0.0004	0.0015	0.0016	0.0008	0.0007	0.0009	0.0002	6.0728	5.2458	3.5791

Lot E1 - Lot A, 950 psi o. pressure

Lot E2 - Lot A, 1200 psi o. pressure

Lot E3 - Lot A, 1400 psi o. pressure

DEV #	CRMP LOW	CRMP HIGH	RANGE	DIAM LOW	DIAM HIGH	RANGE	SENSOR	ACT	REL	DIFF
F1	0.2800	0.2850	0.0050	1.1620	1.1645	0.0025	0.0470	132.5	101.0	31.5
2	0.2815	0.2855	0.0040	1.1620	1.1645	0.0025	0.0476			
3	0.2810	0.2870	0.0060	1.1590	1.1600	0.0010	0.0476	126.9	99.0	27.9
4								137.5	110.6	26.9
5								136.1	112.3	23.8
6								127.9	102.6	25.3
7								139.5	108.4	31.1
8								130.1	105.8	27.3
9								130.1	100.5	29.6
10								138.8	102.3	36.5
11								133.3	109.4	23.9
12								129.4	108.6	20.8
BAR	0.2808	0.2858	0.0050	1.1610	1.1630	0.0020	0.0474	133.2	105.5	27.7
SMA	0.0006	0.0008	0.0008	0.0014	0.0021	0.0007	0.0003	4.1592	4.3872	4.1660
F13	0.2800	0.2860	0.0060	1.1580	1.1620	0.0040	0.0472	128.5	95.4	33.1
14	0.2795	0.2840	0.0045	1.1625	1.1655	0.0030	0.0472	127.7	99.6	28.1
15	0.2800	0.2830	0.0030	1.1630	1.1650	0.0020	0.0472	129.7	107.4	22.3
16								137.4	105.2	32.2
17								128.3	103.4	24.9
18								133.5	110.2	23.3
19								121.1	95.3	25.8
20								117.0	95.7	21.3
21								126.4	92.8	33.6
22								130.1	95.9	34.2
23								130.8	102.3	28.5
24								132.1	102.8	29.3
BAR	0.2798	0.2843	0.0045	1.1612	1.1642	0.0030	0.0472	128.6	100.5	28.1
SMA	0.0002	0.0012	0.0012	0.0022	0.0015	0.0008	0.0000	5.1521	5.3079	4.3712
F25	0.2790	0.2840	0.0050	1.1605	1.1620	0.0015	0.0474	125.2	95.8	29.4
26	0.2820	0.2855	0.0035	1.1605	1.1660	0.0055	0.0478	133.5	100.9	32.6
27	0.2760	0.2840	0.0080	1.1620	1.1655	0.0035	0.0474	133.8	96.3	37.5
28								131.1	99.8	31.3
29								126.8	100.1	26.7
30								125.3	95.6	29.7
31								135.4	99.7	35.7
32								124.7	93.3	31.4
33								125.0	91.8	33.2
34								134.8	108.4	26.4
35								130.0	89.8	40.2
36								120.3	89.8	30.5
BAR	0.2790	0.2845	0.0055	1.1610	1.1645	0.0035	0.0475	128.8	96.8	32.1
SMA	0.0024	0.0007	0.0019	0.0007	0.0018	0.0016	0.0002	4.7089	5.1446	3.9534

CONT

Lot F1 – Lot A2 – 55psi 90° crimp

Lot F2 – Lot A2 – 60 psi 90° crimp

Lot F3 – Lot A2 – 65psi 90° crimp

DEV #	CRMP LOW	CRMP HIGH	RANGE	DIAM LOW	DIAM HIGH	RANGE	SENSOR	ACT	REL	DIFF	
01	0.2795	0.2830	0.0035	1.1610	1.1730	0.0120	0.0472	112.2	85.6	26.6	
02	0.2805	0.2840	0.0035	1.1610	1.1750	0.0140	0.0471	130.0	96.8	33.2	
03	0.2770	0.2835	0.0065	1.1600	1.1685	0.0085	0.0473	120.5	82.1	38.4	
04								112.2	91.8	20.4	
05								124.6	90.8	33.8	
06								121.5	84.2	37.3	
07								118.7	90.6	28.1	
08								114.9	85.3	29.6	
09								115.2	90.5	24.7	
10								120.6	82.2	38.4	
11								118.8	91.0	27.8	
12								112.3	87.9	24.4	
-BAR	0.2790	0.2835	0.0045	1.1607	1.1722	0.0115	0.0472	118.5	88.2	30.2	
IGMA	0.0015	0.0004	0.0014	0.0005	0.0027	0.0023	0.0001	5.2333	4.2527	5.7028	
13	0.2760	0.2810	0.0050	1.1600	1.1655	0.0055	0.0472	112.0	86.9	25.1	
14	0.2740	0.2765	0.0025	1.1615	1.1690	0.0075	0.0473	109.1	82.5	26.6	ACLD
15	0.2750	0.2815	0.0065	1.1620	1.1680	0.0060	0.0473	115.9	85.5	30.4	
16								113.0	82.1	30.9	
17								107.4	82.1	25.3	ACLD
18								120.7	89.3	31.4	
19								120.7	86.2	34.5	
20								118.8	76.7	42.1	
21								120.5	89.4	31.1	
22								115.4	88.6	26.9	
23								129.0	100.6	28.4	
24								117.4	91.3	26.1	
-BAR	0.2750	0.2797	0.0047	1.1612	1.1675	0.0063	0.0473	116.7	86.8	29.9	
IGMA	0.0008	0.0022	0.0016	0.0008	0.0015	0.0008	0.0000	5.6640	5.7276	4.6218	
025	0.2765	0.2820	0.0035	1.1595	1.1730	0.0135	0.0473	114.7	87.4	27.3	
26	0.2730	0.2800	0.0070	1.1635	1.1710	0.0075	0.0483	111.7	87.5	24.2	
27	0.2765	0.2825	0.0060	1.1620	1.1725	0.0105	0.0476	107.5	74.8	32.7	ACLD
28								107.5	75.3	32.2	ACLD
29								113.6	83.4	30.2	
30								122.2	86.2	36.0	
31								122.9	91.4	31.5	
32								118.1	81.1	37.0	
33								99.7	75.8	23.9	ACLD
34								104.7	77.0	27.7	ACLD
35								111.3	84.2	27.1	
36								109.9	79.4	30.5	ACLD
-BAR	0.2760	0.2815	0.0055	1.1617	1.1722	0.0105	0.0477	112.0	82.0	30.0	
IGMA	0.0023	0.0011	0.0015	0.0016	0.0009	0.0024	0.0004	6.5827	5.3224	3.9948	

Lot G1
- Lot A2
- Step washer

Lot G2
- lot A2
- Step washer

Lot G3
- lot A3
- Step washer

DEV #	CRMP LOW	CRMP HIGH	RANGE	DIAM LOW	DIAM HIGH	RANGE	SENSOR	ACT	REL	DIFF	
1	0.2870	0.2895	0.0025	1.1590	1.1665	0.0075	0.0472	148.1	126.2	21.9	
2	0.2875	0.2890	0.0015	1.1610	1.1650	0.0040	0.0472	142.4	123.1	19.3	
3	0.2900	0.2925	0.0025	1.1620	1.1675	0.0055	0.0475	148.5	126.2	22.3	
4	0.2860	0.2885	0.0025	1.1630	1.1660	0.0030	0.0472	156.4	134.5	21.9	ACHI
5	0.2960	0.2985	0.0025	1.1615	1.1630	0.0015	0.0471	153.7	133.0	20.7	ACHI
6	0.2895	0.2910	0.0015	1.1575	1.1625	0.0050	0.0472	149.1	127.9	21.2	
7	0.2855	0.2895	0.0040	1.1560	1.1620	0.0060	0.0472	136.7	119.7	17.0	
8	0.2850	0.2870	0.0020	1.1600	1.1670	0.0070	0.0473	148.6	124.7	23.9	
9	0.2830	0.2865	0.0035	1.1570	1.1655	0.0085	0.0472	152.7	128.5	24.2	ACHI
10	0.2865	0.2895	0.0030	1.1610	1.1675	0.0065	0.0471	153.7	134.8	18.9	ACHI
11								146.8	128.0	18.8	
12								152.4	128.3	24.1	ACHI
13								143.7	123.4	20.3	
14								134.1	110.2	23.9	
15								148.0	127.1	20.9	
16								150.9	129.1	21.8	ACHI
17								154.1	132.5	21.6	ACHI
18								150.0	130.6	19.4	ACHI
19								148.3	127.2	21.1	
20								149.2	125.9	23.3	
21								150.3	126.6	23.7	ACHI
22								153.1	129.3	23.8	ACHI
23								152.5	133.8	18.7	ACHI
24								151.2	129.3	21.9	ACHI
MEAN	0.2866	0.2891	0.0026	1.1598	1.1653	0.0055	0.0472	148.9	127.0	21.9	
SIGMA	0.0020	0.0017	0.0008	0.0022	0.0020	0.0020	0.0001	5.1993	5.7551	1.7897	

Y/

LOT H
- LOT A2
- Design lab crimped

FINAL INSPECTION 77PSL2-1

DATE:5-2-92

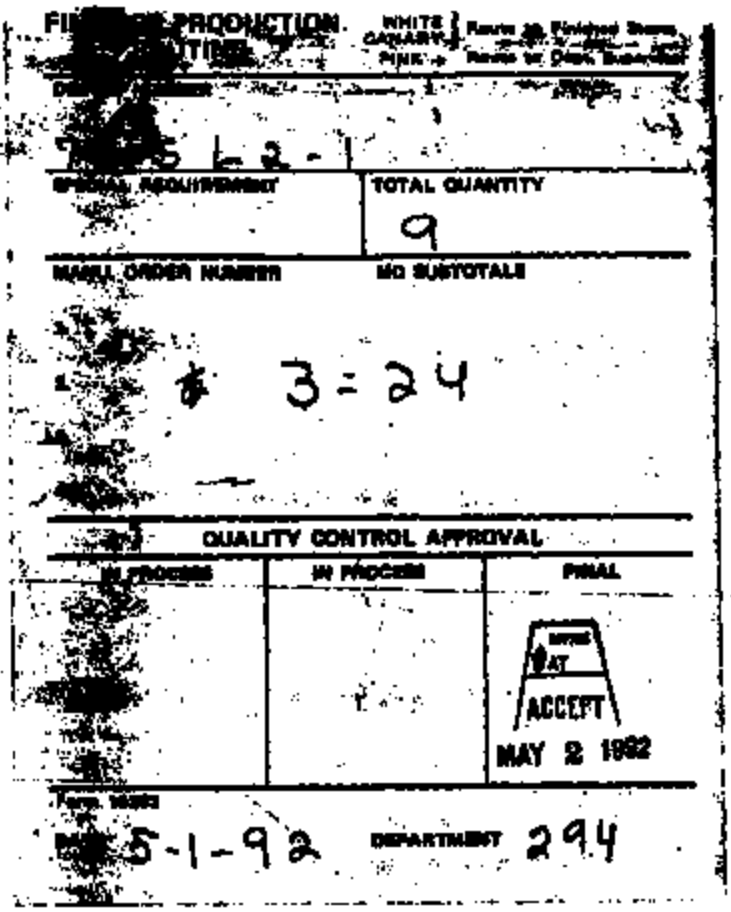
CUSTOMER P/N: F2VC-9F924-AB

DISC LOT 3-24

REEL #1
LOT #3
WASHER LOT 140 1-CUT

MAT.I.D.74868-AC-7-3	DISC LOT	MAT.I.D.
CUP LOT #11	REEL 3	CUP LOT 8
CONV.LOT 756	LOT 4	CONV. LOT
QTY.2000	WASHER LOT	QTY.

TEST	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
1A ACTUATION	136	137	123	136	138	134	139	136	125									
RELEASE	52	54	48	56	52	53	53	53	48									
2 VISUAL	88	82	75	80	86	81	86	82	76									
3 DIMENSION	—	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—				
4B VOLT DROP	—	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—				
5C CUR.LEAK	—	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—				
6D PROOF	—	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—				
7 IMPULSE	✓	✓	✓	✓	✓	—	—	—	—						—	—	—	—
A ACTUATION	140	146	120	145	146	145	133	145	135									
RELEASE	50	55	50	50	50	55	60	60	50									
B VOLT DROP	✓	✓	✓	✓	✓	—	—	—	—						—	—	—	—
C CUR.LEAK	✓	✓	✓	✓	✓	—	—	—	—						—	—	—	—
D PROOF	✓	✓	✓	✓	✓	—	—	—	—						—	—	—	—
8A TERM. STR	—	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—				
A ACTUATION	—	—	—	—	—	145	133	140	135	—	—	—	—	—				
RELEASE	—	—	—	—	—	55	60	60	50	—	—	—	—	—				
B VOLT DROP	—	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—				
C CUR.LEAK	—	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—				
D PROOF	—	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—				
9 BURST	—	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—				



FI[illegible] PRODUCTION ORDER

WHITE - CANARY - PINK - Route to Finished Stores / Route to Order Supervisor

[illegible] 5 L 2 - 1

SPECIAL REQUIREMENT

TOTAL QUANTITY: 9

MAIL ORDER NUMBER

MO SUBTOTALS

3=24

QUALITY CONTROL APPROVAL

IN PROCESS	IN PROCESS	FINAL
		REJECT / ACCEPT
		MAY 2 1992

Form [illegible]

[illegible] 5-1-92 DEPARTMENT 294

ACCEPT

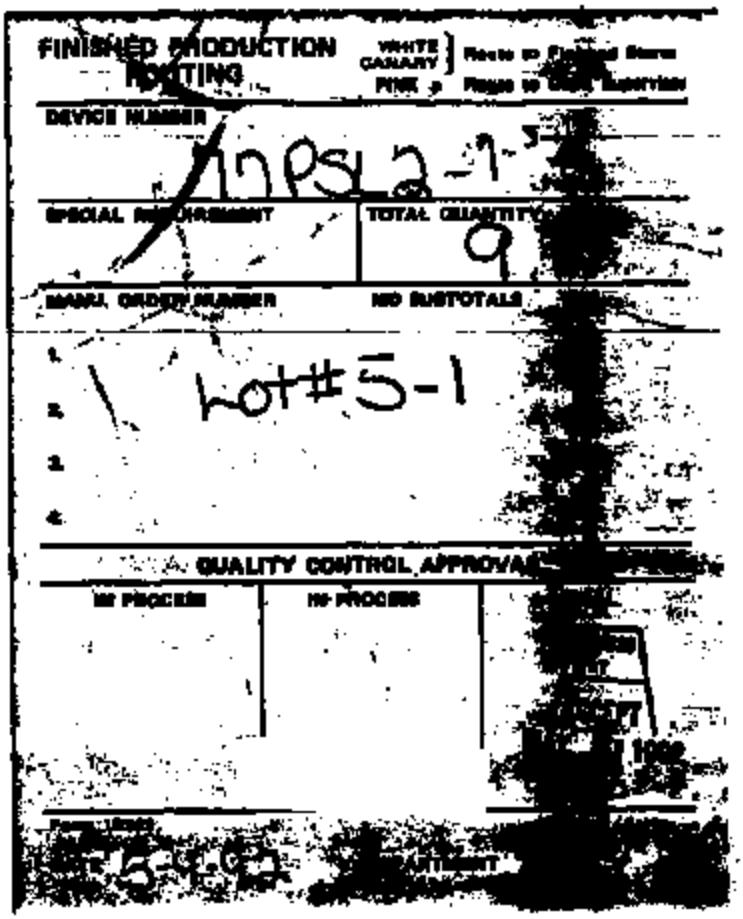
FINAL INSPECTION 77PSL2-1

DATE: 5-5-92

CUSTOMER P/N F2VC-9F924-AB

DISC LOT 5-1	MAT. I.D. 74869-AC1-6	DISC LOT	MAT. I.D.
REEL #4	CUP LOT 811	REEL #	CUP LOT #
LOT #4 92	CONV. LOT 229	LOT #	CONV. LOT
WASHER LOT 118	QTY. 2000	WASHER LOT	QTY.

TEST	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
1A ACTUATION	137	135	128	133	144	132	124	138	133									
RELEASE	60	59	54	55	59	56	56	59	60									
2 VISUAL	✓	✓	✓	✓	✓	✓	✓	✓	✓									
3 DIMENSION	—	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—				
4 VOLT DROP	—	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—				
5 CUR. LEAK	—	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—				
6 PROOF	✓	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—				
7 IMPULSE	✓	✓	✓	✓	✓	—	—	—	—						—	—	—	—
A ACTUATION	130	130	120	127	140	140	145	140	135									
RELEASE	70	69	63	65	69	65	60	60	65									
B VOLT DROP						—	—	—	—						—	—	—	—
C CUR. LEAK						—	—	—	—						—	—	—	—
D PROOF						—	—	—	—						—	—	—	—
E ACTUATION	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—					
A ACTUATION	—	—	—	—	140	145	135	135	—	—	—	—	—					
RELEASE	—	—	—	—	65	60	60	65	—	—	—	—	—					
B VOLT DROP	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—					
C CUR. LEAK	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—					
D PROOF	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—					
F BURST	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—					



FINISHED PRODUCTION ROUTING

WHITE
CANARY
PINK

DEVICE NUMBER

17PSL2-1

SPECIAL REQUIREMENT

TOTAL QUANTITY

9

MANU. ORDER NUMBER

NO SUBTOTALS

1 Lot#5-1

2

3

4

QUALITY CONTROL APPROVAL

W/ PROCESS

W/O PROCESS

5-4-92

MECHANIZATION WORK ORDER

SHT. 1 OF 1

FORM 20222

TI-NHT3A 006113

Date Entered

By MECHANIZATION

Project No. 2513.04-021B

Product Code 060

CC 253

	Date Requested	Requested By (Print)	Date	Mail Sta.	Tel. Ext.
☒ Proposal		Mary Sellers	5/6/92	12-28	1247
☐ Design		Approved By:			
☐ Build		B Sweet	5/5/92		
		DEPARTMENT	Prec		

RECTO. PRODUCT PRINT NOS. SUPPLIED LIST

1	27445
2	27290
3	36917
4	87PSC2-2
5	77PSC3-1
6	FX3465-2 Micron
7	46612
8	46615
9	
10	
11	
12	
13	
14	

PROJECT DESCRIPTION

Propose modification to the S7PS tester and 77PS tester to allow testing of multiple device types As outlined on attached 2-page document.

MECH. TITLE

MECHANICAL	EST. HRS.	ELECTRICAL	EST. HRS.
PROJ. MGR.		PROJ. MGR.	
ENG.		ENG.	
DES.		TECH/DRAFT	
BUILD EST. HRS.		BUILD EST. HRS.	
BUILD CC	DATE	BUILD CC	DATE
DESIGN REVIEW ☐	DATE		
DWG SIGN OFF ☐	DATE		
DESIGN CLOSED TO BUILD	DATE BY		
ORDER CLOSED	DATE BY		
GEN. ASSY. DWG. NO. ASSIGNED			
BUILD CLOSED	DATE		

ADDITIONAL REMARKS, INFORMATION, SKETCH

See attached 2 page document.

WHITE – MECHANIZATION COPY YELLOW – ORIGINATOR'S COPY

Tasks 10-27-92

* Replaceable inserts in place of test Station
* Modify rack vertical to accommodate
* Test all 52's on Tester F26
* Test samples to Ed K.
* Proposal eq [52 and 52B Sequence]
* Minimize black wiring & mark bundles Changeover
* Set Cost date
* Start 52B immediately
* Change over time work

-MSG M#= 395254 FR=VAGS TO=COPY SENT=10/28/92 08:32 AM
ST=C DIV=0050 CC=00134 BY=VAGS AT=10/28/92 08:32 AM

TO: ED KADISEVSKIS MDES

CC:				
BILL SWEET	PCME	JOHN KOURTESIS	MDES
LOU ROCHA	MAYR	ANDRE CHARPENTIER	ACHR
DICK GARIEPY	MFPC	DENNIS NATALE	PCME
BOB BASILIERE	ELTL	TOM BURKE	MFPC
JOHN GORMLEY	JGOR	DAVE CZARN	ZARN
STEVE OFFILER	SB01	CHRIS WAGNER	CDW3

FR: MATT [redacted] PCME

RE: 57/52PS PRESSURE TESTER MODIFICATIONS

ED,

THE FOLLOWING ARE GENERAL NOTES FROM THE MEETING HELD 10/27/92 TO BRAINSTORM UPGRADE APPROACHES FOR THE 57PS AND 52PS PRESSURE TESTERS. THESE NOTES SHOULD BE REFERENCED WHEN YOU ESTIMATE THE REQUESTED MODIFICATIONS TO THESE TESTERS.

GENERAL MEETING NOTES:

THE 57PS TESTER MODIFICATIONS YOU ARE ESTIMATING ARE NECESSARY TO SUPPORT SOME NEW MODEL YEAR 1994 PRODUCTS, AND TO PROVIDE ADDED PRESSURE TESTING CAPACITY WHEN THE 87PS PRODUCT STARTS UP IN DECEMBER 1992. THE MY94 PRODUCTS ARE THE HONDA PSPS AND NISSAN VX54 PSPS.

WE CURRENTLY HAVE THE CAPABILITY OF TESTING 57PS BASED PRODUCTS ON THE 77PS TESTER. THIS BECAME POSSIBLE AFTER SEAL TRAVEL ADJUSTMENTS WERE MADE BY KENNY THIS WEEK. THIS CAPABILITY WILL ALLOW FOR THE REQUIRED DOWNTIME TO MODIFY THE 57PS TESTER WHICH PRELIMINARILY IS ESTIMATED AT 3 OR 4 WEEKS.

THE NEED HERE IS TO DEVELOP THE 57PS TESTER INTO A UNIVERSAL TESTER CAPABLE OF TESTING THE CURRENT 57PS, 52PS, 77PS, 87PS, NISSAN VX54, HONDA PSPS, CHRYSLER LH/JA, AND JUST ABOUT ANY OTHER REASONABLY SIMILAR NEW PRODUCT WITH AN ENVELOPE THAT IS WITHIN SOME MUTUALLY AGREED UPON MAX LIMITS. WE WOULD NEED TO ESTABLISH WHAT THESE LIMITS ARE PRIOR TO INITIATING ANY WORK. WE WILL ALSO WANT TO DEVELOP THE CAPABILITY OF TESTING THIS WIDE VARIETY OF PRODUCTS ON THE 52PS TESTER AS WELL. THIS SHOULD BE ESTIMATED SEPARATELY.

WE DISCUSSED USING SMED FIXTURING SIMILAR TO THOSE USED ON THE APT TESTER THAT WOULD PROVIDE THE OPERATOR THE ABILITY TO CONVERT FROM ONE PRODUCT TYPE TO ANOTHER WITH MINIMAL TIME AND EFFORT EXPENDED. THIS WILL BE NEEDED BECAUSE WE EXPECT TO HAVE DEVICES WITH VARYING TERMINAL POSITIONS AND HEIGHTS. YOU BRIEFLY MENTIONED THE POSSIBILITY OF GANGING THE FOUR FIXTURES TOGETHER TO MAKE CHANGEOVER EVEN FASTER.

WE WILL ALSO BE TAKING THIS TIME TO UPGRADE THE COMPUTER SYSTEM TO TODAY'S STANDARDS. PLEASE INCLUDE THIS IN YOUR ESTIMATE.

AS DISCUSSED AT THE MEETING, YOUR PROPOSAL SHOULD CONSIDER THE RETENTION AND USE OF AS MUCH EXISTING WIRING AND/OR MECHANICAL FEATURES FROM THE CURRENT SYSTEM AS POSSIBLE IN AN EFFORT TO HOLD COST DOWN.

THE NEST THAT THE OPERATOR INSERTS EACH DEVICE INTO MUST BE TOLERANT OF VARIOUS BASE AND HEXPORT DIMENSIONS. SOME PRODUCTS HAVE WIDER BASES AND HEXPORTS THAN OTHERS, SOME HAVE BASES AND HEXPORTS THAT ARE TALLER THAN OTHERS. WE WILL NEED TO AGREE ON A TOLERANCE WINDOW OF ACCEPTABLE DIMENSIONS FOR ALL THESE FEATURES. TRADITIONALLY THE FIXTURES HAVE CLOSELY MATCHED THE DIMENSIONS OF THE BASE TO FORCE ALIGNMENT OF THE TERMINALS WITH THE POGO PINS. BECAUSE THESE TIGHT NEST FEATURES WILL NO LONGER EXIST, WE WILL NEED TO HAVE THE OPERATOR VISUALLY ALIGN EACH DEVICE INTO THE PROPER ORIENTATION DURING TESTER LOADING. WE WOULD EXPECT THAT THE OPERATOR WOULD BE CAPABLE OF ALIGNING EACH DEVICE WITHIN A +/- 10 DEGREE ROTATION?

WE WOULD LIKE TO SEE AS AN OPTION WHAT IT WOULD COST TO CONVERT THE UNLOAD STATION TO ONE LIKE THE 77PS UNLOADER. A STELRON UNIT WOULD UNLOAD ONTO A CONVEYOR. THE CONVEYOR SHOULD BE LONG ENOUGH TO ALLOW THE FUTURE ADDITIONS OF A CODER, LEAK TEST STATION, THREAD PROTECTOR INSTALLER, ETC.

IMMEDIATELY AFTER COMPLETION OF THESE MODIFICATIONS TO THE 57PS TESTER, WE WOULD LIKE TO CONSIDER PERFORMING THE SAME UPGRADE WORK TO THE 52PS TESTER. PLEASE SHOW AS AN OPTION THE COST TO PERFORM THESE IDENTICAL UPGRADES TO THE 52PS TESTER. THE PREMISE HERE IS THAT THE MODIFICATIONS PERFORMED ON THE 57PS TESTER WILL ALLOW US TO TEST 52PS PRODUCTS ON THE 57PS TESTER - PERMITTING THE REQUIRED DOWNTIME WITHOUT SHUTTING THE 52PS LINE DOWN.

TO SUMMARIZE, PLEASE ESTIMATE THE FOLLOWING:

1.0 COMPUTER UPGRADE ON THE 57PS PRESSURE TESTER.

2.0 MECHANICAL UPGRADES TO THE 57PS TESTER NECESSARY TO TEST PRODUCTS OUTLINED ABOVE.

3.0 OPTIONALLY, THE CONVERSION OF THE 57PS TESTER UNLOAD STATION TO EQUAL THE 77PS TESTER.

4.0 COMPUTER UPGRADE ON THE 52PS PRESSURE TESTER.

5.0 MECHANICAL UPGRADES TO THE 52PS TESTER NECESSARY TO TEST PRODUCTS OUTLINED ABOVE.

WE WOULD APPRECIATE AS RAPID A RESPONSE AS POSSIBLE. IF THERE IS ANY MISSING INFORMATION, OR IF YOU DEEM NECESSARY ANOTHER REVIEW, PLEASE CALL.

REGARDS...MATT
X1245

FINAL INSPECTION 77P9L2-1

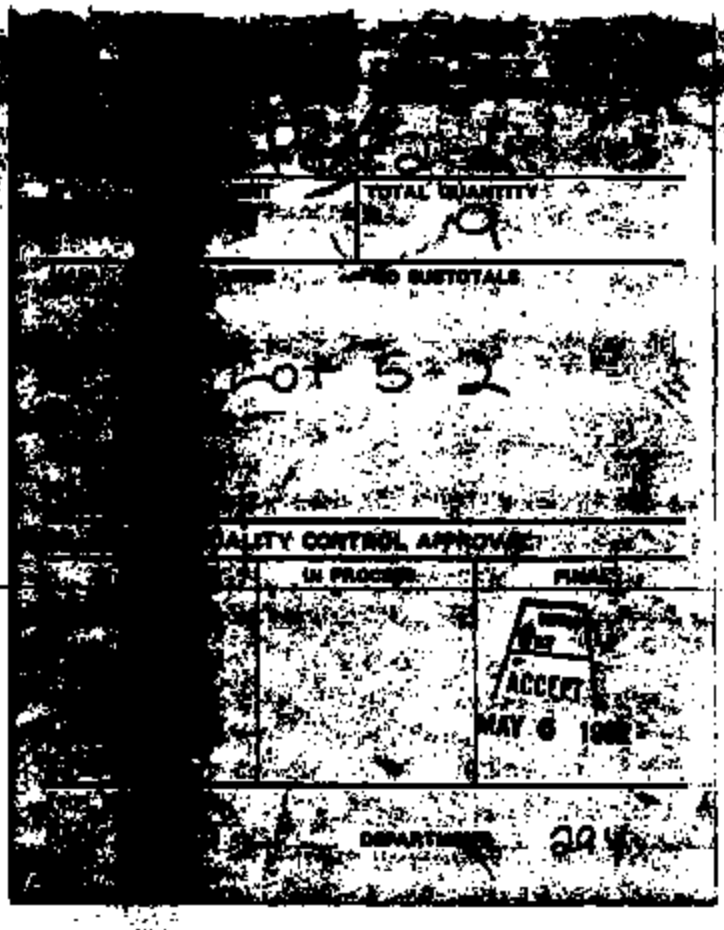
DATE: 5-4-92

CUSTOMER P/N F2VC-9P924-AB

DISC LOT [redacted]	MAT.I.D.74868-AC3-B	DISC LOT	MAT.I.D.
REEL #1	CUP LOT #11	REEL #	CUP LOT #
LOT #4	CONV.LOT 230	LOT #	CONV. LOT
WASHER LOT 145 2-OUT	QTY.1480	WASHER LOT	QTY.

TEST	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
1 [illegible]	121	126	140	129	131	136	142	138										
RELEASE	40	52	42	48	47	56	55	50										
4 [illegible]	OK	OK	OK	OK	OK	OK	OK	OK										
3 [illegible]	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—					
40 VOLT [illegible]	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—					
SC [illegible]	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—					
60 PROOF	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—					
7 [illegible]	OK	OK	OK	OK	—	—	—	—						—	—	—	—	
A FACTOR	130	130	130	125	135	140	140	135										
[illegible]	60	55	65	50	50	70	65	55										
B [illegible]	✓	✓	✓	✓	—	—	—	—						—	—	—	—	
C [illegible]	✓	✓	✓	✓	—	—	—	—						—	—	—	—	
[illegible]	✓	✓	✓	✓	—	—	—	—						—	—	—	—	
[illegible]	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—					
W FACTOR	—	—	—	—	135	140	145	135	—	—	—	—	—					
[illegible]	—	—	—	—	55	70	60	55	—	—	—	—	—					
B [illegible]	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—					
C [illegible]	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—					
D PROOF	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—					
9 [illegible]	—	—	—	—	✓	✓	✓	✓	—	—	—	—	—					

TI-NHTSA 000117


TOTAL QUANTITY
20 52
QUALITY CONTROL APPROVED
IN PROCESS
FINAL
ACCEPT
MAY 6

HIGHLIGHTS

Stephen B. Offiler

Week Ending 92-05-08

87PS VALIDATION ISSUES:

During validation of 87PSL2-2, L8-1, and L11-3, we have discovered an issue with wear of the movable contact. This is mechanical wear not related to electrical erosion. The effect is to increase the base calibration by 3.5 mils (on average, for L2-2, others not analyzed yet). This causes a shift towards creep-actuation after Impulse cycling. We are presently working at "A" priority level to correct the issue. Parallel efforts include:

- Rebuild and test of switches which are purposely pinned towards creep release
- Use of the 50418-5 (high current 55/56/58/61PS contact), which should be a drop-in replacement
- Use of a contact similar to 50418-5, but with much less silver, which should provide a more robust mechanical interface with the stationary contact
- Look into a harder version of the present contact, i.e. harder copper or possible use of brass base material instead

We will have all of the above items underway by mid-next week; with results by Mon. 5/18.

OTHER VALIDATION ISSUES

We will be delivering Fluid Resistance parts to the Chem Lab on Monday 5/11 for 77PSL5-2 and L3-1 combined validation. This represents a two-week slip from the original schedule: pushing completion from 7/2 to 7/16.

Problems which surfaced during the final characterizations of 57PSF3-3 and 57PSL11-3 need to be dealt with, which is preventing completion of these ISR packages originally due 4/15.

PRODUCTION ISSUES

We are analyzing samples from the 40% fallout that is occurring on 77PSL3-1. Dale has noted the "bad" devices make noise, and correlate poorly between production and lab readings: whereas "good" devices are just the opposite. It is hoped that Jeff and I will be able to shed light on these observations and help reduce the unacceptably high fallout.

MISCELLANEOUS

The team is working diligently to produce updated D and P FMEA's for the 87PS. Twice-weekly meetings are progressing.

Jeff is working on an extensive test for Dale to characterize the hydraulic disturbance equated to noise versus disc and device differential. This uses many different test lots of devices. The highest priority item, due 5/13, is an R&R between production snap devices and quiet devices. The rest of the testing will lead to a noise test in the ES, as well as control plans, etc.

PRESSURE SWITCH DATA Form 21605 TEST NO. 251-15-18

DEVICE	DATE REQUESTED	REQUESTED BY	REQUESTED COMPL. DATE
CCPS	9/05/11	Steve Officer	
PERFORMED BY	**DATE STARTED**	**DATE COMPLETED**	**APPROVED BY**
Jeffrey O'Donnell	9/05/11		

PROJECT TITLE: Cruise Control

CUSTOMER:

PURPOSE OF TEST: High temp impulse test

PROCEDURE: Steel disc
Black acryl base
Light Touch switch
Run impulse test at 120°C
* Run impulse test per validation flow chart
- Test aborted due to impulse leak

Initial

Device #	Act Rel	ΔV Drop	I load	Proof	Act Rel			
251-15-01	205 209	1.6	✓	✓	208 209	20K cyc	No actuation	
-02	220 205	2.2	✓	✓	207 205	2234 cyc	No Actuation	
-03	279 199	5.1	✓	✓	276 207	2444 cyc	No Actuation	
-04	228 209	2.1	✓	✓	210 209	2278 cyc	No Act	
-05	296 216	3.1	✓	✓	218 209	2456 cyc	NO ACT	
-06	226 228	2.9	✓	✓	224 209	2444 cyc	NO Act	
-07	229 214	2.6	✓	✓	232 218	2228 cyc	Switch will not actuate/leak	
-08	228 216	2.2	✓	✓	232 213	2228 cyc	NO Act	
-09	226 228	2.2	✓	+	226 205	2228 cyc	NO Actuation	
-10	268 217	4.9	✓	✓	223 218	2228 cyc	Switch will not actuate/leak	
-11	231 212	3.5	✓	✓	226 218	2228 cyc	Leak	
-12	221 212	2.7	✓	✓	220 218	2228 cyc	No actuation, leak	

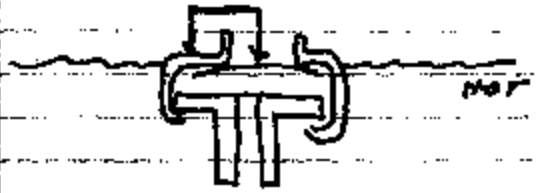
Impulse all remaining parts at normal Temp to complete Seal life

	Act Rel	Proof	Cycle to failure
251-15-13	262 207	✓	
-14	209 205	✓	
-15	295 220	✓	
-16	229 211	✓	
-17	222 207	✓	
-18	225 203	✓	

TI-NHTSA 006120

(OVER)

TEST 315-15-10 TIPS MAGNON RELOCATION



DISTANCE FROM ECM REF TO WIRE MEASURED

		DELTA	
25°C	.1535		
120°C	.278	> 125 mils	
150°C	.334	> 99 mils	> 182 mils
25°C	.184	30 mils	

CONCLUSION: THERE IS A VERY SIGNIFICANT CHANGE ON THE ORDER OF 100'S OF MILS. THE MAGNITUDE IS TOTALLY UNEXPECTED. EXPECTED WAS 5-12 mils WITH 182 mils THE CALCULATED MISSING YOKE.

BECAUSE OF THE MAGNITUDE THE NUMBERS SHOULD BE RECHECKED AND POSSIBLY THE TEST RERUN.

Ford Motor Company of Australia Limited
A.C.N. 004 116 889

Rapifax Transmission

cc Blaine R.

OUR REF. AG.140592/1
PAGE 1 OF 2
FROM TONY EAGLE.
DEPT.: LGE CAR ENGINEERING
RAPIFAX No.: 615.278.648
B/O: 0113 DATE: 14MAY.

TO: PETER BURGER
TEXAS INSTRUMENTS - ADEL
FAX: 618-255-2809.

DELIVERY: ☐ NORMAL ☐ RUSH-CALL FOR PICKUP

c.c. GLENN CROOK. SUPPLY M/e.
c.c. BOB TAYLOR S.Q.I. B/M.
c.c. CHARLIE DOUGLAS. T.I. ATTLEBORO: Ha. 508.699.1598.

Re. CRUISE CONTROL DE-ACTIVATION SWITCH.

WITH REGARD TO YOUR FAX OF 13MAY. THE FOLLOWING INFORMATION MAY BE OF HELP TO YOU.

① PRESENT ASSUMPTION IS THAT SWITCH WILL BE SUPPLIED AS AN END ITEM INTO BROADMEADOWS ASS'Y PLANT #1.

② SUPPLIER QUALITY IMPROVEMENT MANAGER IS BOB TAYLOR, WHO IS BASED AT BROADMEADOWS ASS'Y PLANT #1. RECEIVING INSPECTION CONTACT AT BROADMEADOWS ASS'Y PLANT #1 IS SIMON CHING. THERE IS AN SQI. ENGINEER BASED AT OUR CENTRAL REGION OFFICE IN ADELAIDE. JOANNA RZETELSKI - Ph 366-2446.

③. M.R.D.'s FOR THE ON-GOING BUILD PHASES ARE: E.P. 26 SEP 1992. FOR TRIM & FINAL.
V.P. 23 JULY 1993 - FOR TRIM & FINAL
BUILD TIMING PLANS ATTACHED.
QUANTITIES. 50 PARTS E.P. 50 PARTS V.P.
REPRESENTITIVE PROTOTYPES REQ'D FOR E.P.
OFF-TOOL PARTS REQUIRED FOR V.P.

④ ELECTRICAL CONNECTOR IS F2AB-14A464 ADA PLUG. THREAD IS M10 - 1.0. SAMPLE OF PLUG IN MAIL. I AWAIT DETAIL DRAWING FROM U.S.

REGARDS.

TI-NHTSA 006125

Form AGO 178

05/20/91

Thermal Cycling for Product Verification Specification

Speed Control Switch:

Lab Test:

Total Elapsed Time: 600 Hours

Procedure:

Temperature (Skin) - of plastic	Time
100°F	0.5 hr.
325°F (162)	2.0 hr.
160°F (71°C)	0.25 hr.
100°F	0.5 hr
Total	3.25 hrs.

3.25 hr. X 2/shift = 6.5 hrs./shift

2 shift/day X 6.5 hrs./shift = 13 hrs./day

600 hrs./13 hrs./day = 46.15 days

1) Test every 25 hrs. Implae ...

2) 12 pcs, 5 connectors

Aug 3 - F.Shin Jobs

→ need new print ; red Nowyl.

Will use the both of the two connectors

- Will use sleeve, made of Shrink Tube from either

- keep connectors on the panels

ISK to L3-1 (Mic).

PRESSURE SWITCH DATA Form 21605 TEST NO. 275-03-12

DEVICE	DATE REQUESTED	REQUESTED BY	REQUESTED COMPL. DATE
77PS	970520	Steve Officer	
PERFORMED BY	**DATE STARTED**	**DATE COMPLETED**	**APPROVED BY**
Jeffrey D. Dorrough	9/01/05		

PROJECT TITLE: Speed Control PS

CUSTOMER:

PURPOSE OF TEST: Thermal Cycling for Product Verification Specifications

PROCEDURE: Cycle 500K ingokes while running Temp profile in following page. Fluid temp remain at 115°C, Ambient 38°C.

	init.								
Device #	Act R.I								
275-03-03	339 98								
-04	337 97								
-07	336 97								
-08	332 93	Leak @	240A, 1130K cyc						
-09	342 110								
-10	341 109								
-11	343 112								
-12	337 102								
-14	343 101								
-15	336 107								
-17	343 96	Leak @	239A, 945K cyc						
-19	337 107								
	↓								
	Resume Testing								

03/20/92

Thermal Cycling for Product Verification Specification

Speed Control Switch:

Lab Test:

Total Elapsed Time: 600 Hours

Procedure:

Temperature (Skin)	Time
100°F	0.5 hr.
325°F (162)	2.0 hr.
160°F (182)	0.25 hr.
100°F (38)	0.5 hr
Total	3.25 hrs.

Fluid Temp 113°C

Ambient any this

Ramp ~ 5°C/M.

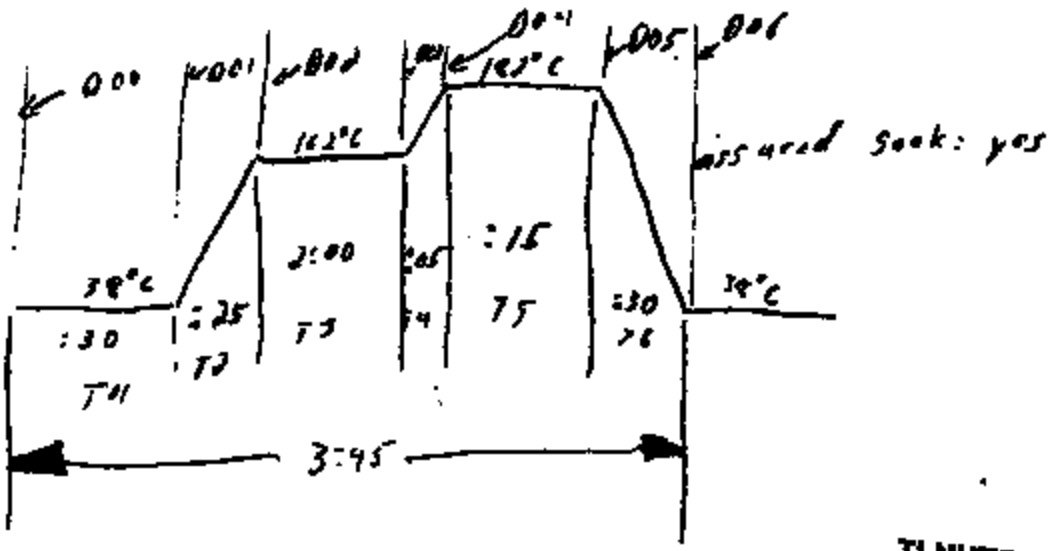
3.25 hr. X 2/shift = 6.5 hrs./shift

2 shift/day X 6.5 hrs./shift = 13 hrs./day

600 hrs./13 hrs./day = 46.15 days

1) Test every 25 hrs. Impact ...

2) 12 pcs, 5 connectors



[illegible]

[illegible]

[illegible]

DICK,

THIS INFO IS BEING RE SUPPLIED TO YOU FOR USE DURING SORTING OF [illegible] RETURNED FROM DANA, [illegible] THE PLAYING WINDOW, IE. [illegible].

[illegible] WITH THE FOLLOWING GENERAL INFORMATION REGARDING PRODUCTION CALIBRATION SUBMARIES SINCE PRODUCT START-UP.

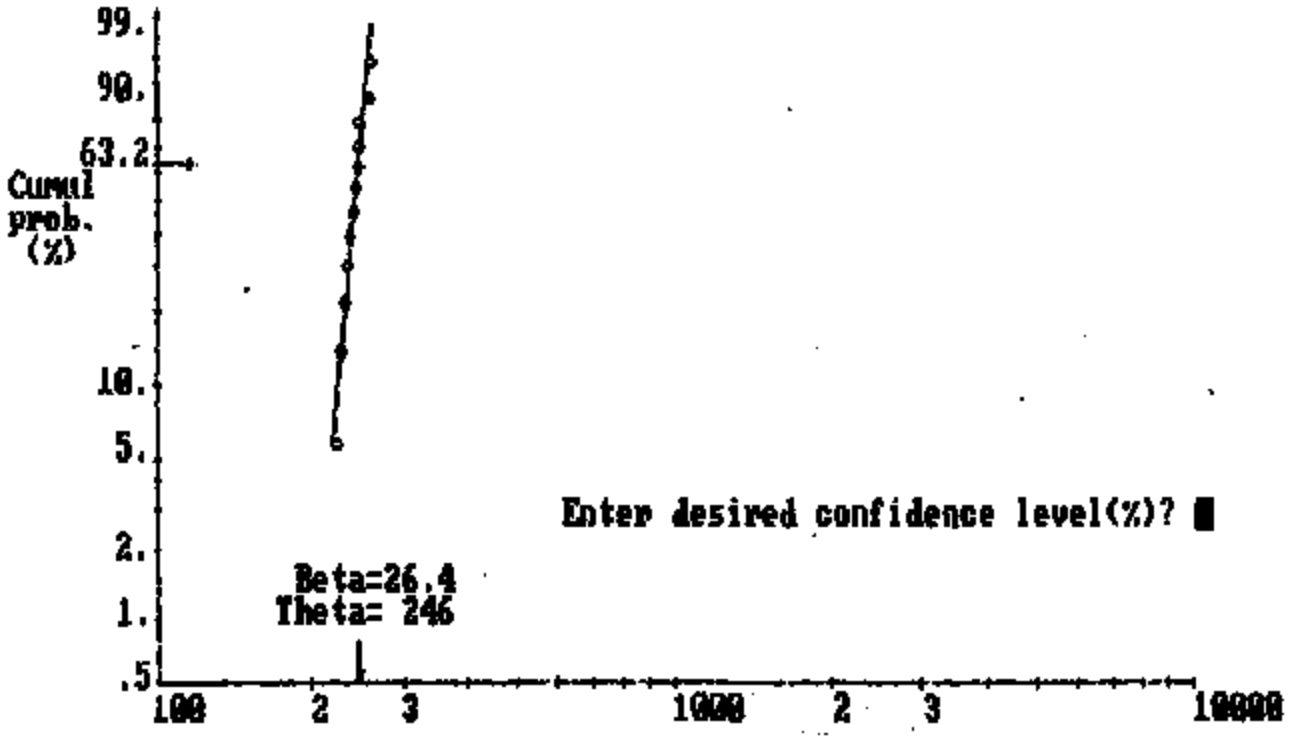
DATE	CALIBRATION [illegible]
[illegible] - 6/25/92	CALIBRATION TARGET IS CENTERED ON PINNING WINDOW RESULTS. AT INDEX 2055 AND BEYOND
6/25/92 - 6/9/92	CALIBRATION TARGET IS SHIFTED .002" TOWARD THE "LONG PIN" SIDE, BASE CHECK = .087", PIN SELECTION = .143".
6/10/92 - [illegible]	CALIBRATION TARGET IS SHIFTED AN ADDITIONAL .001" TOWARD "LONG PIN" SIDE. BASE CHECK = .087", PIN SELECTION = .143".

REGARDS...MATT
x1243

FAILURE OF 170°C TRUCK
IMPULSE TEST #252

920520

NOTE: FIRST FAILURE OF THESE PARTS USING NORMAL TEST PROCEDURE @ 757 K (6 DEVICES TESTED)



TI-NHTSA 006130

CRUISE CONTROL PRESSURE SWITCH
SOUND PULSE LEVEL TEST

Background

The 77PSL2-1 cruise control pressure switch for Ford Motor Co. has been noted to cause a sound in the passenger compartment of some vehicles. The sound is heard during the switch actuation and release when the switch is mounted on the master cylinder. Testing has shown that the sound intensity decreased with decreasing switch differentials. It was theorized that the sound was caused by the sudden increase in the hydraulic volume of the system when the switch actuates. On actuation the pressure disc snaps and travels a small distance (<.020") causing an increase in the fluid volume.

A "noisy" switch can be heard in the lab by applying air pressure and listening for the sound with a common microphone. Nearly "quiet" switches could not be heard with this method. They could be heard when mounted on the brake system. Therefore a more sensitive method of listening for & quantifying the sound level was needed. A new method was developed which actuates a switch hydraulically and listens for the sound with a hydrophone.

System description

The prototype system consist of a hydraulic hand pump which is used to supply pressure to a "t"- fitting. The switch is mounted on the fitting along with a sensitive pressure transducer. The pressure transducer is a quartz dynamic pressure transducer capable of resolving to .001psi. The quartz transducer can measure to 15Khz frequencies. A system overview is shown in figure 1.

The pressure is increased rapidly from 0- 200psi or greater while the switch and the pressure transducer output is monitored with an oscilloscope. With the scope it is possible to observe any sudden change in pressure (including turbulence) which is equivalent to sound in an air system.

Results

Tests were run on both 77PSL2-1 "noisy" switches and 77PSL3-1 low differential "quiet" switch. The results are shown in figures 2 & 3.

The pressure trace shows that the "noisy" switch does have a significant sudden change in pressure associated with a sudden increase in volume. The pressure drop is an average of 55psi, sigma = 4psi for ten pieces. The plot shows that the sudden drop excites the system to resonate.

The low differential switch shows little corresponding pressure drop. A slight leveling of the pressure curve can be see in figure 3. The volume change is reduced with the lower differential disc and there is less energy in the disc to excite the system. Because of manufacturing variability the quiet switch sometimes shows a small pressure drop (Figure 4) and sometimes shows a zero to slightly positive pressure increase (Figure 5). A positive resonant spike was never observed. This indicates that any volume change is immediately dampened out. For a ten piece sample the average pulse level was a positive plus 2.2psi, with a sigma 0.30psi.

TEST LOT NO.	TEST	DEVICE 77P>
TESTED BY		
APPROVED BY D. Scott	TEXAS INSTRUMENTS — MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02703	DOC. 0592-46
DATE 5-20-92		PAGE 1 of 13

FORM 4286

It was noted during repeatability & reproducibility testing that sound levels on noisy switches changed during the test. This is shown by the difference between column one and column two under operator Howard in figure 6. This data is consistently below the other three sets of readings on the same part. It was discovered that the low readings were taken two days before all other readings. This increasing sound level with time has been noted by Ford on test vehicles. An investigation is planned to understand the cause. The investigation may indicate that preconditioning of the parts is required before auditing sound levels.

The time shift effect was not noted on the quiet parts because they were all tested within hours of each other. The R&R for the quiet switches is shown in figure 7.

Conclusion

The test clearly shows a significant difference between noisy and quiet switches. The test achieved it purpose of being able to measure the level of noise in a quiet switch. Based on these results the test will be used on a quarterly basis to audit the production quiet switches. It will also be used check the impact of any design changes that may be required in the future.

Further testing is planned to develop a correlation between the pressure pulse and the device differential for devices that are between noisy and quiet. This correlation will then be used to establish a more precise cut-off point for differential on the production line.

A proposed spec limit for the quiet switch is minus 10psi until a limit can be developed with Ford based on actual vehicle tests.

The test has been run on a production lot date coded 2127 for May 6th, 1992. The test will be rerun in August 1992 as the first quarterly audit.

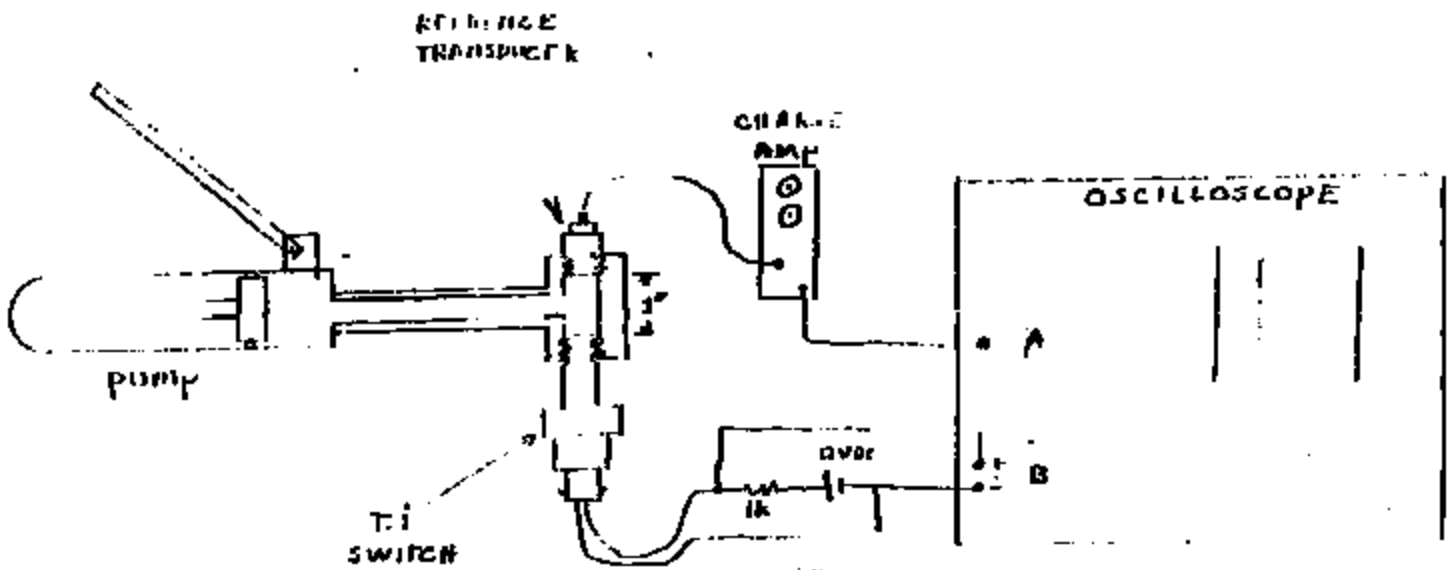
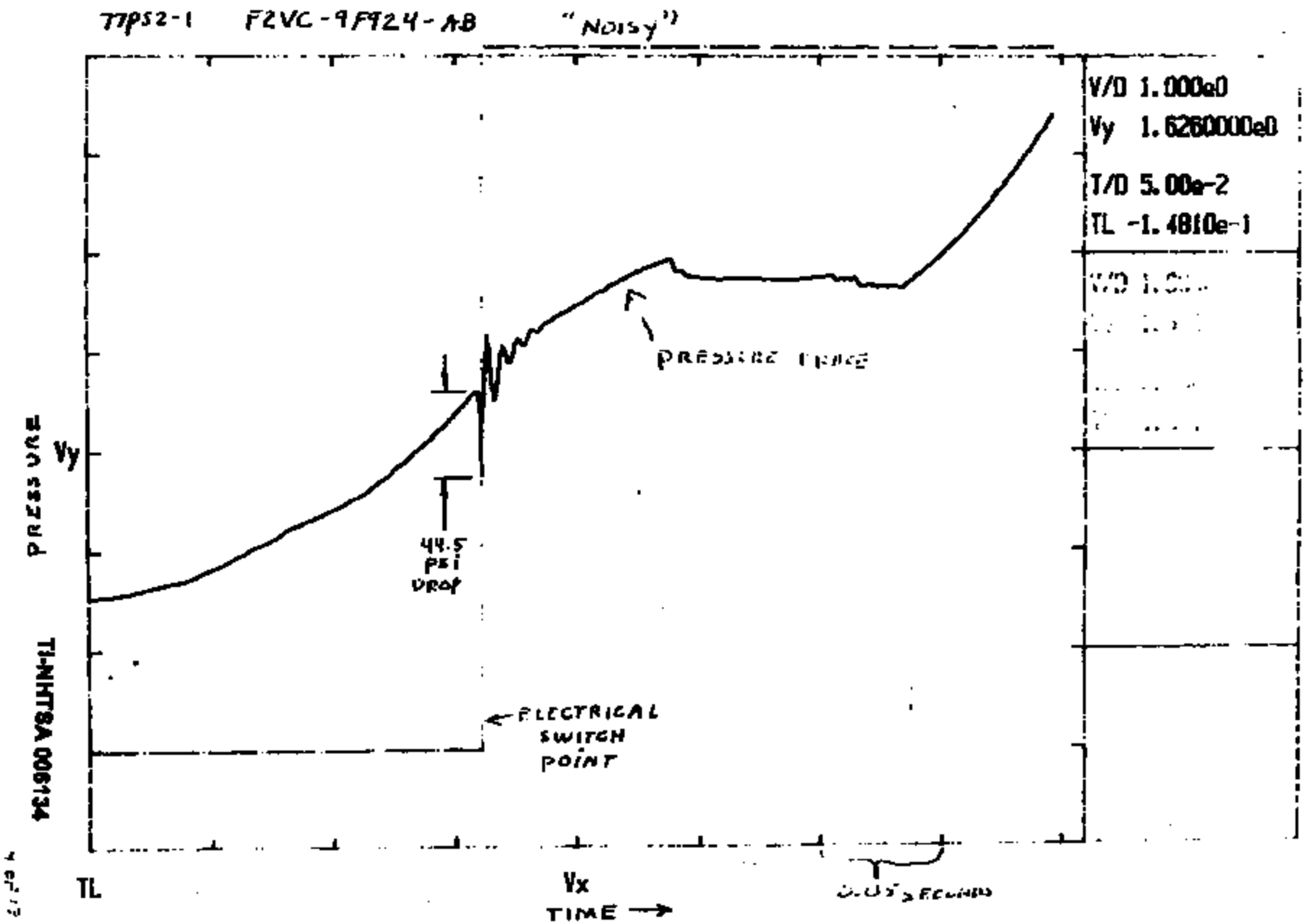


FIGURE 1.


TTPS2-1 F2VC-9F924-AB "Noisy"
V/D 1.000e0
Vy 1.6260000e0
T/D 5.00e-2
TL -1.4810e-1
PRESSURE RISE
Vy
PRESSURE
44.5 PSI PROF
ELECTRICAL SWITCH POINT
TL
Vx
TIME →

FIGURE

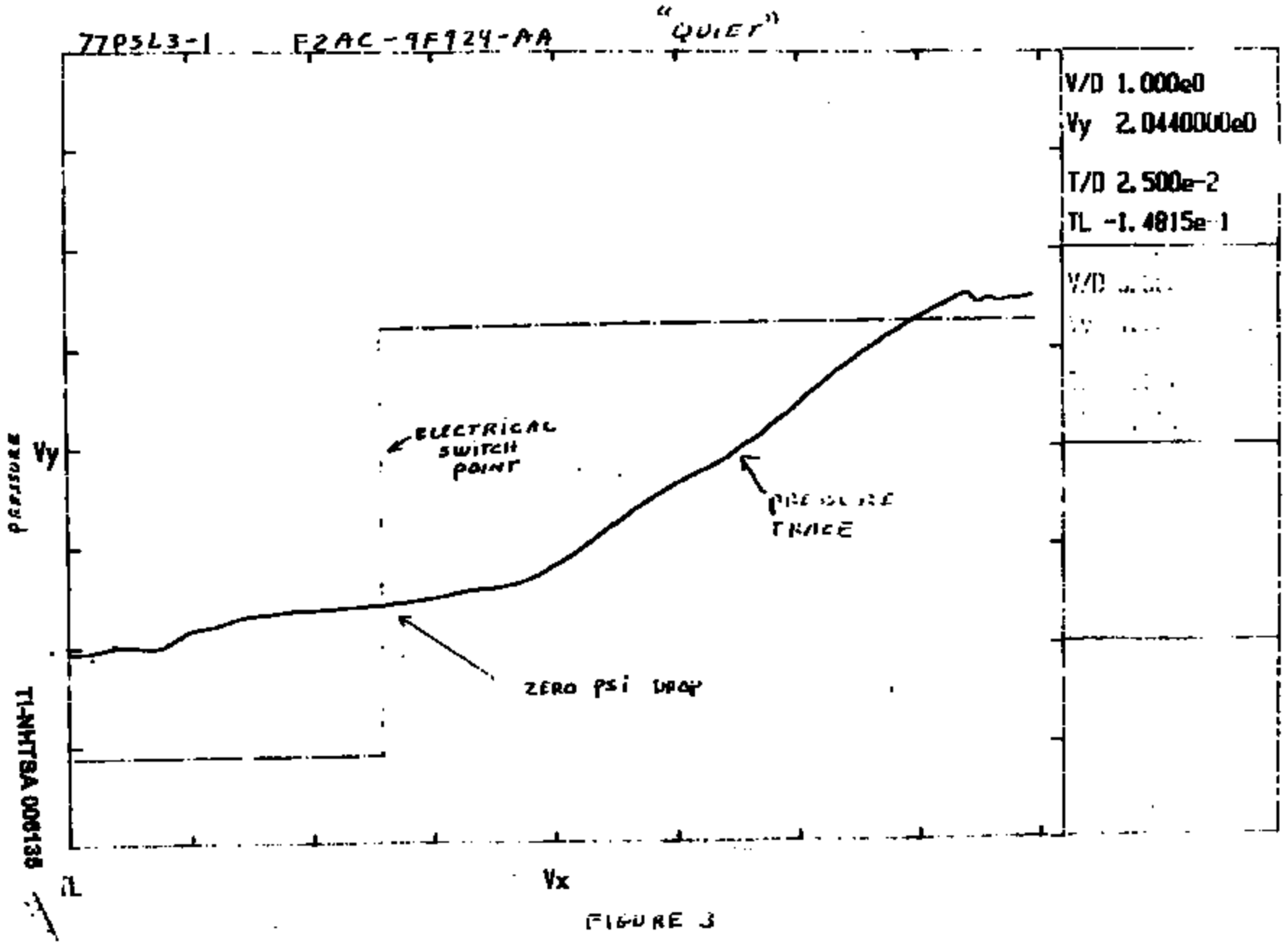
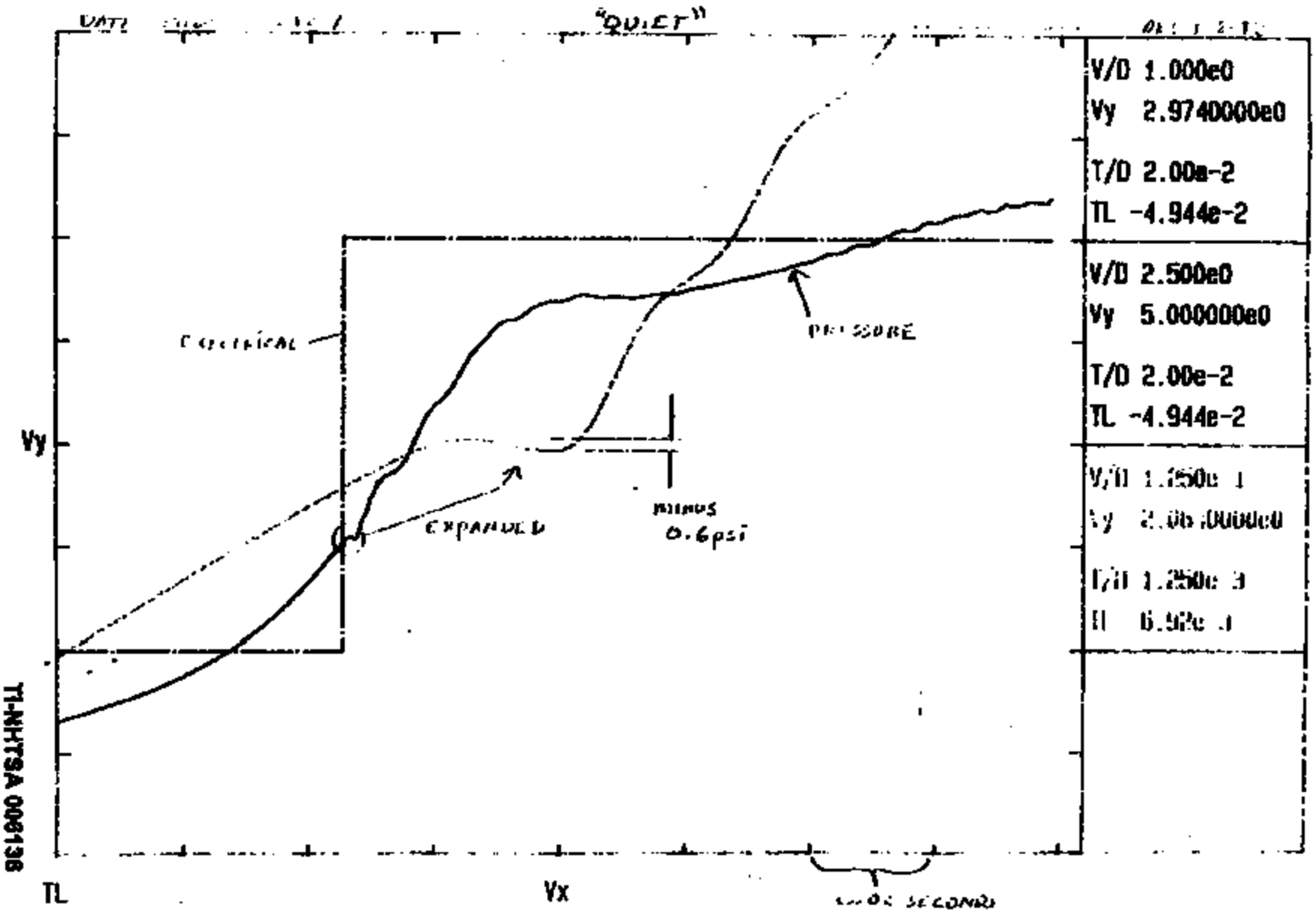

7Z9SL3-1
F2AC-9F924-AA
"QUIET"
V/D 1.000e0
Vy 2.0440000e0
T/D 2.500e-2
TL -1.4815e-1
Vy
PRESSURE
ELECTRICAL SWITCH POINT
PRESSURE TRACE
ZERO psi DROP
TL
Vx
TI-NHTSA 000138

FIGURE 3


"QUIET"
V/D 1.000e0
Vy 2.9740000e0
T/D 2.00e-2
TL -4.944e-2
V/D 2.500e0
Vy 5.000000e0
T/D 2.00e-2
TL -4.944e-2
Vy
TL
Vx
minus
0.6psi
TI-NHTSA 006138

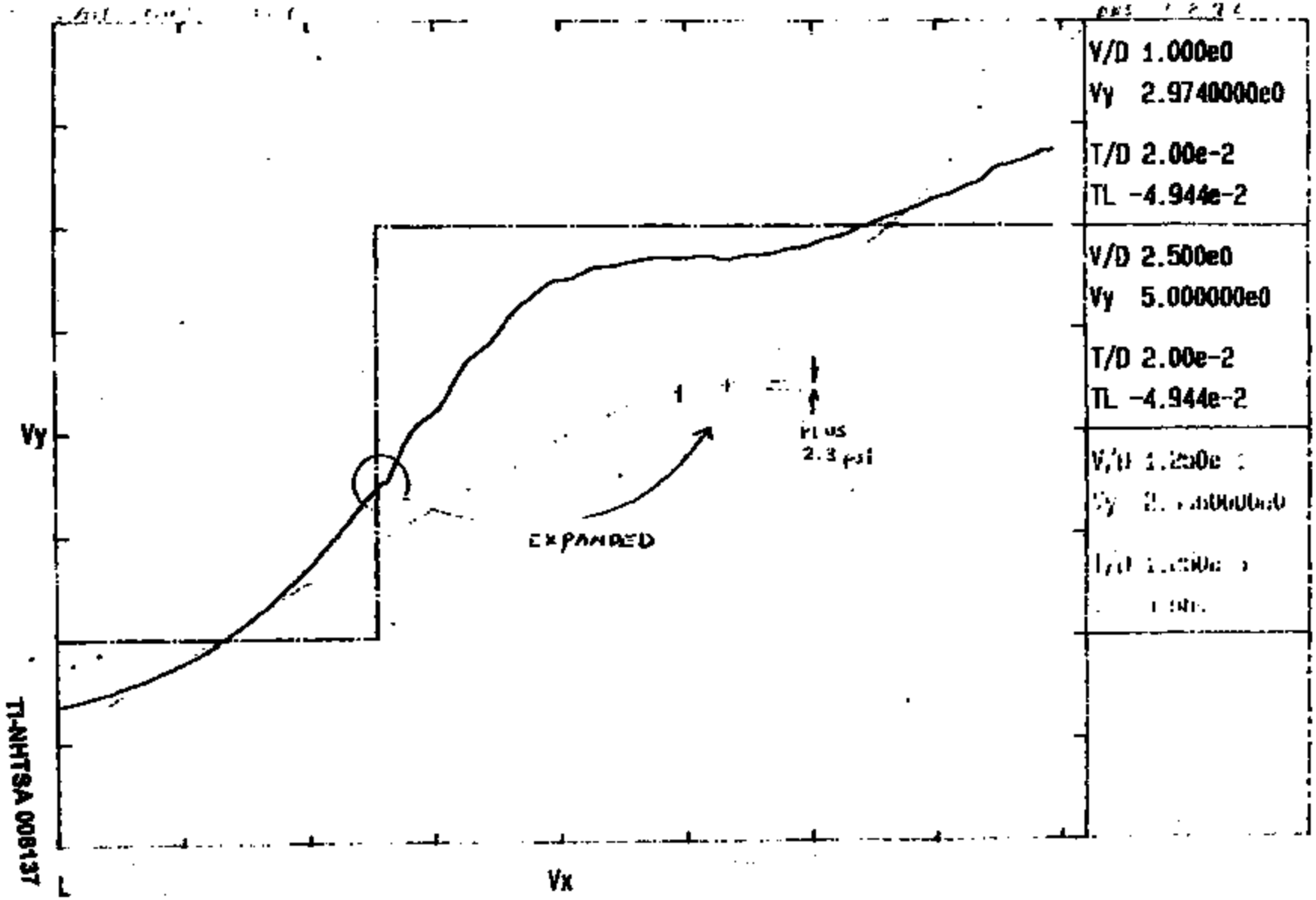
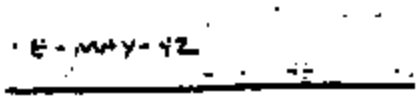
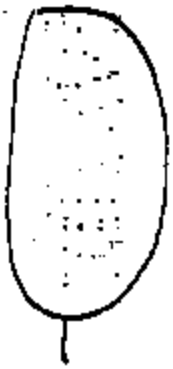

V/D 1.000e0
Vy 2.9740000e0
T/D 2.00e-2
TL -4.944e-2
V/D 2.500e0
Vy 5.000000e0
T/D 2.00e-2
TL -4.944e-2
Vy
Vx
EXPANDED
2.3 psi
TI-NHTSA 008137

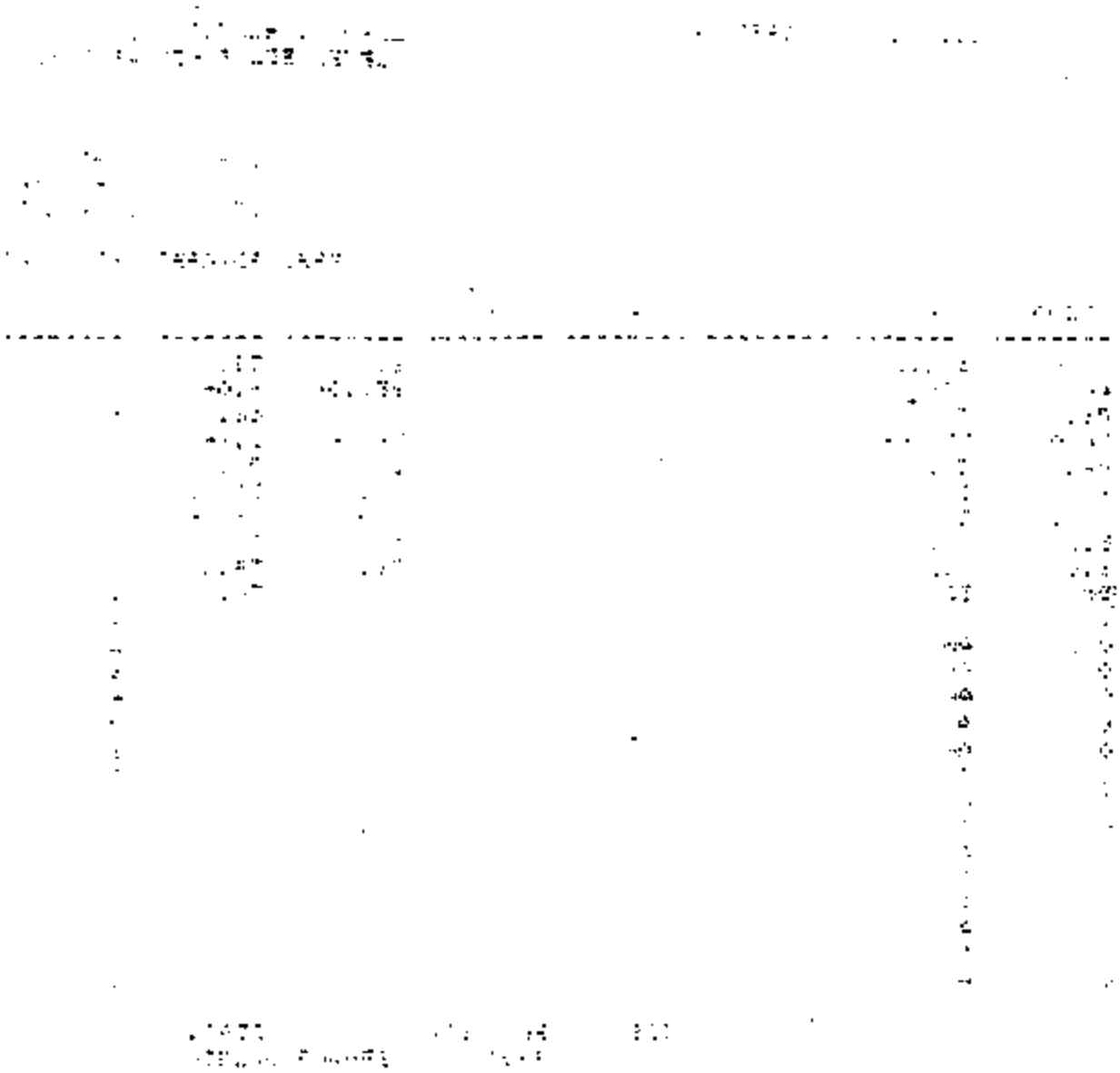
FIGURE 6





SIGNIFICANTLY
LOWER
THAN
OTHER
THREE TRIALS

FIGURE 7



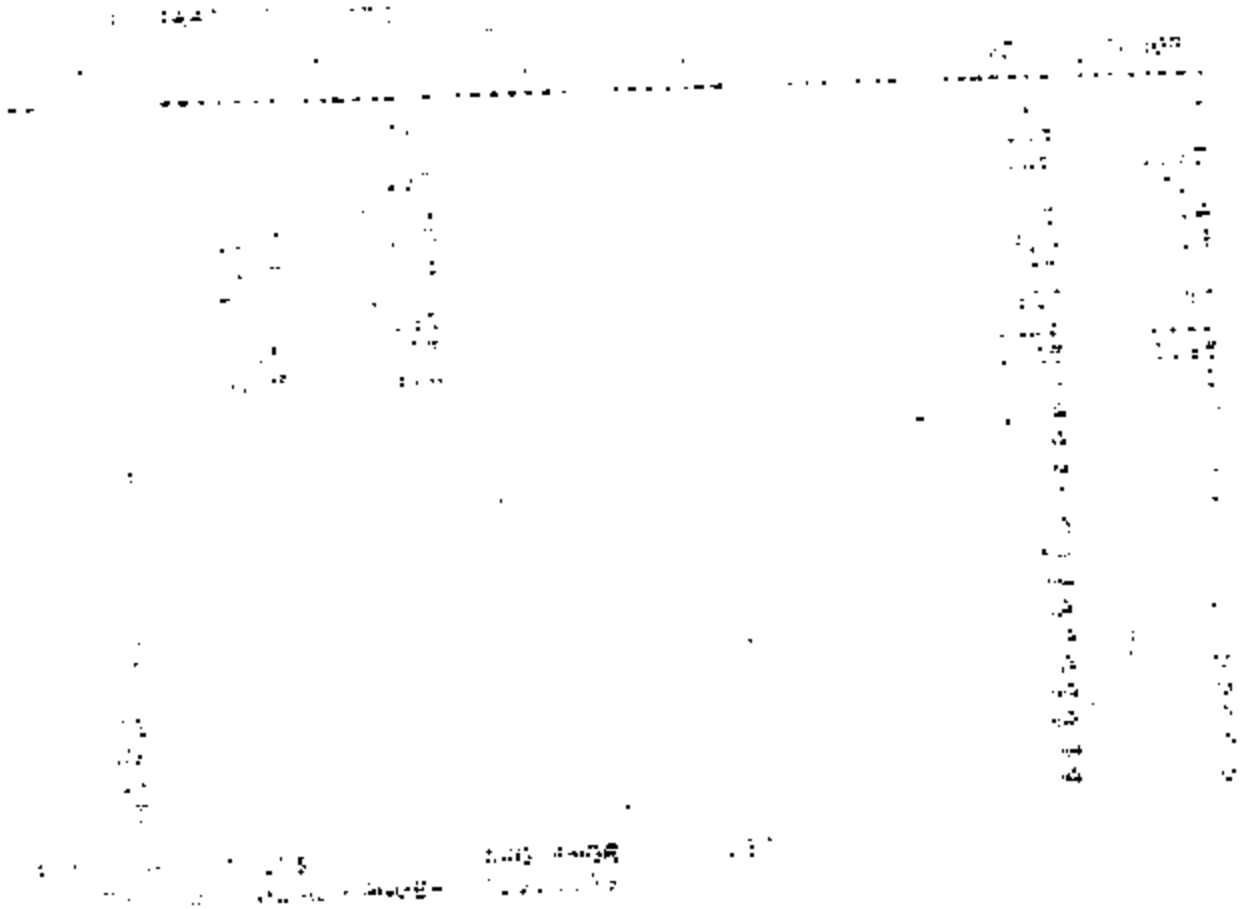
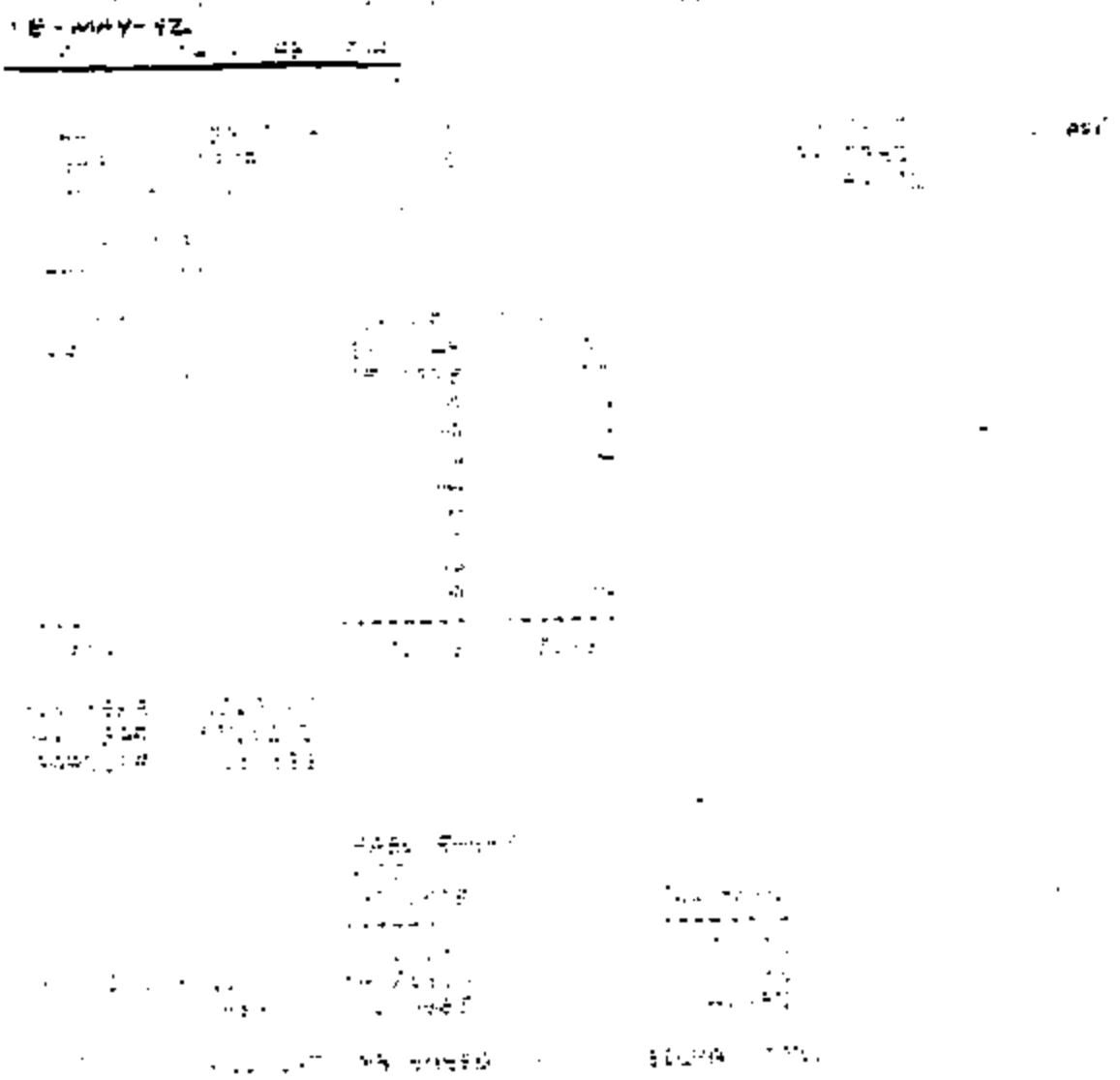
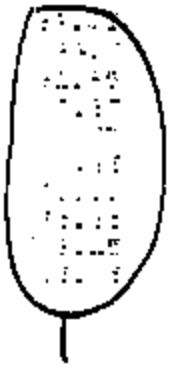


FIGURE 6





SIGNIFICANTLY
LOWER
THAN
OTHER
THREE TRIALS

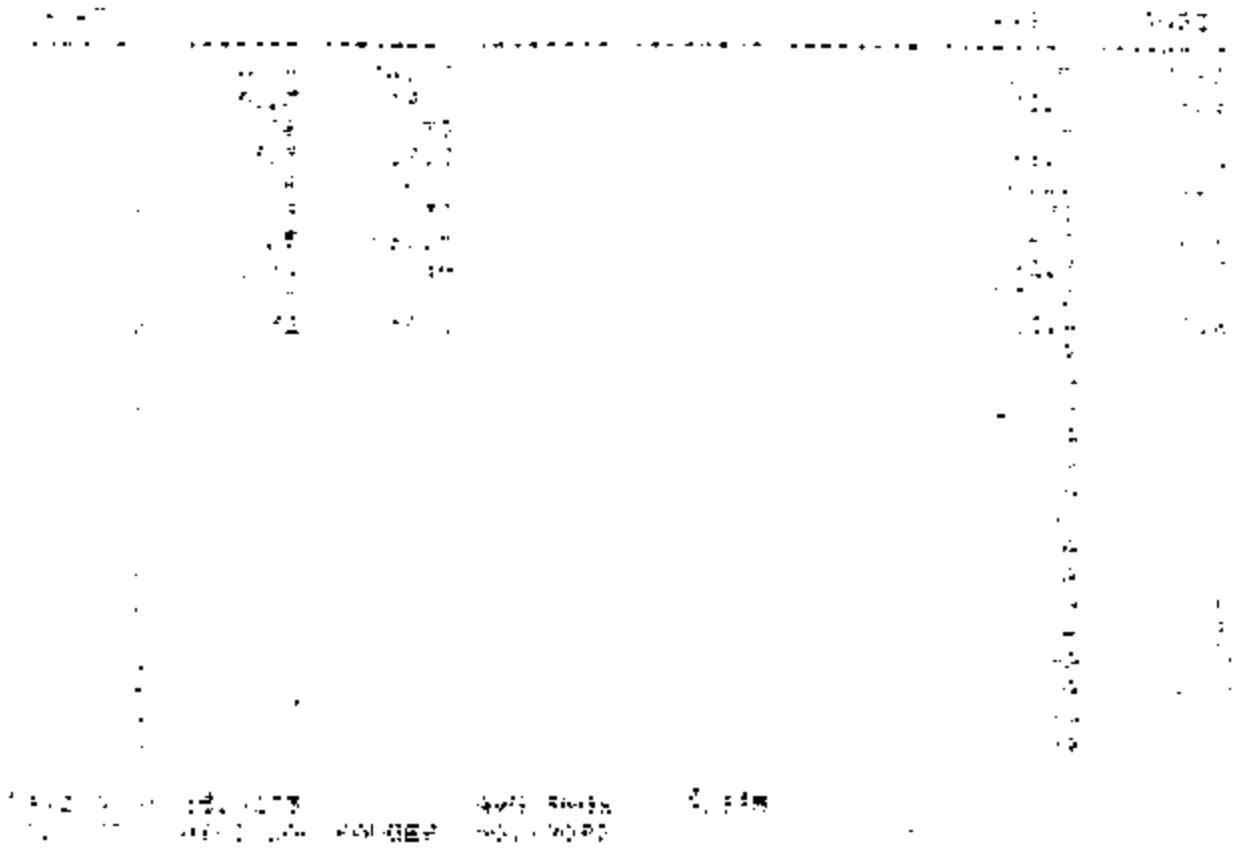
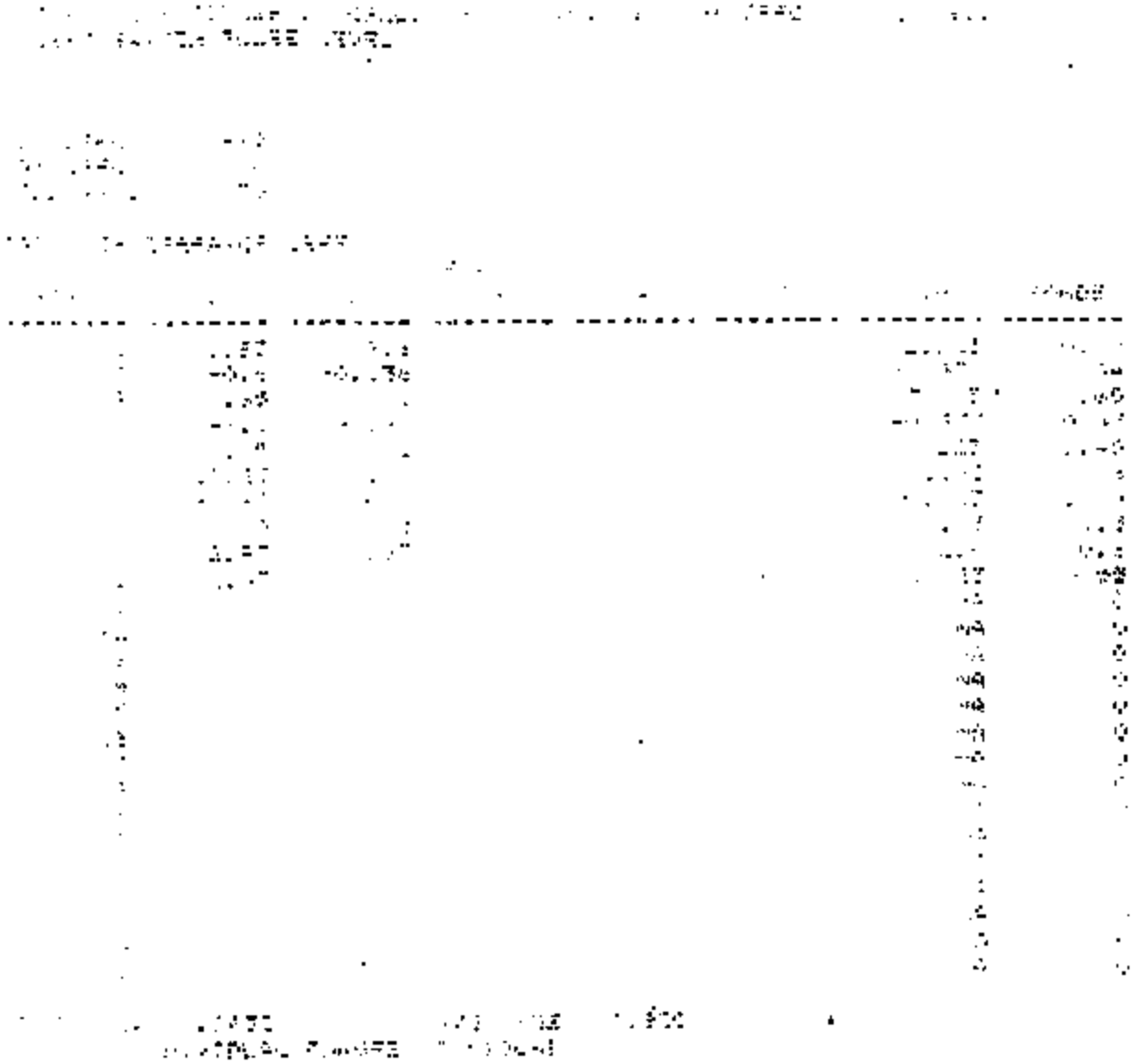
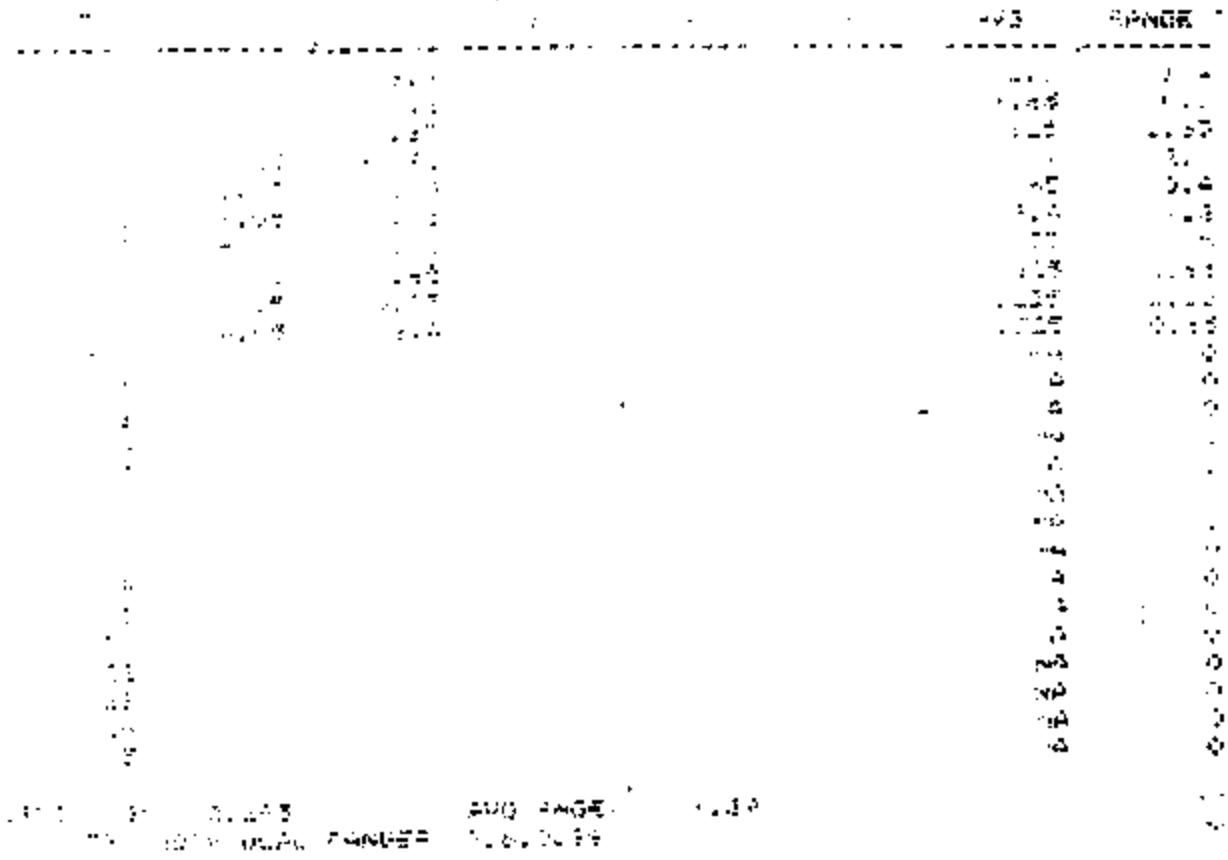


FIGURE 7





HIGHLIGHTS

Stephen B. Offiler
Week Ending 92-05-22

ELECTRONIC SPEED CONTROL DEACTIVATE PS

CONTACT WEAR (87PS VALIDATION ISSUE):
The test of contact wear using 50418-5, 74079, standard 74408 with pin target skewed high, and a control lot will finish cycling today. A total of 48 devices are running, 12 per lot in four test lots. We will characterize the devices, looking for the wear problem to manifest itself as creep-actuations. Next, we will disassemble the devices and individually measure base dimensions to get a positive indication of the amount of pin-length change due to wear. The test should point out the best short- and/or long-term correction to this problem, and allow a reaction plan to be formulated for the failed 87PS validations.

HIGH-TEMPERATURE IMPULSE TESTING FOR LIGHT TRUCK:
We have completed a first-pass Impulse test running devices at 170 C (ambient and fluid temp) with dismal results. All 12 devices failed between 222K and 262K cycles, with a Weibull beta of 26.4 (!) and theta of 246K. Upon opening the devices, we discovered the Kapton was disintegrating, while leaving the thin Teflon skins basically intact. This is shedding light on the old diaphragm life issue, with chemical attack now a primary suspect. We are finishing up a "control" test, using devices from the exact same build lot as the above, run at the normal Impulse temperature parameters.

Light Truck brake engineering, without knowledge of the above failure, has asked us to run a complex 600 hour test with the "skin" temperature of the devices controlled on a ramp they are dictating. We will have a conference call with them to hammer out details, most important being the brake fluid temperature and how we'll control the skin temp. independently and at a higher level than the fluid temp. This will probably require heat lamps, various heat shields, and possibly some means of cooling the fluid. The heat lamps must be controlled by a programmable controller to-be-determined. The TI315 cannot handle thermocouple inputs.

57PSL11-3 VALIDATION FAILURE UPDATE:
Six of 24 devices failed during the Impulse test (not to be confused with the large percentage of Impulse failures in the 87PS tests, which are due to contact wear). One device is inoperative, with X-rays suggesting the disc is preassapped, although it worked normally in initial char. Two devices are gross creep on actuation, with one showing a misplaced environmental seal leading to sensor / switch misalignment causing a chipped (thus shortened) transfer pin; the other shows no apparent cause for CA. Three devices are gross creep release,; no cause assigned. Also, two of 12 devices failed during the Terminal Strength test. One is a creep actuation at 59 msec, the other is creep release at 72 msec. I need to look into the ES to determine if any relief on the creep spec. is allowed post-test.

57PSF3-3 VALIDATION FAILURE UPDATE:
Many of the Impulse parts have been highlighted as failures, due to a reduced actuation and release characteristics post-Impulse. However, we need to scrutinize these values again, since we have learned that the ES allows some relief after Impulse (drift downward of 12 psi on actuation spec's).

PRODUCTION DRIFT ISSUE:
We are working on developing effective area curves, which initially are showing a significant difference between lab-crimped and production-crimped sensors. Fixuring for the PSM pressure-deflection setup is being created to allow P-d curves, which combined with F-d curves from Pete Sampson's setup will give Area versus deflection.

NOISE / HYDRAULIC DISTURBANCE TESTING:
Jeff has completed initial characterization of a total of 50 parts, representing 10 different disc lots of 5 each, both truck and car. At this point, no snubber effects are being included. The R&R of 10 silent and 10 snap discs was completed and results forwarded to Ford by Dale.

AUSTRALIA SAMPLES:
The 24 parts for Capri, using the 3/8-24 thread p/n 36917 hexport, were shipped on 5/20. We are expediting the 10 parts for Falcon, which use an M10x1.0 custom hexport. These should ship on or about 5/27.

-MSG M#= 252966 FR=SBD1 TO=PCME SENT=05/22/92 10:36 AM
R#=384 ST=C DIV=0050 CC=00101 BY=SBD1 AT=05/22/92 10:36 AM

TO:	Ted Ballard	ETB	Paul Katch	PRK1
	Tom Burke	MFPC	Steve Major	SMFH
	Rick Conlin	RAC1	Dale Sagga	FFUN
	Jeff DiDomenico	ELB	Matt Sellers	PCME
	Charlie Douglas	CMP1	Rusty Struble	RCS2
	Norm Freda	WHLZ	Jim Watt	PCQA
	Dick Gariepy	MFPC		
CC:	Tom Charboneau	(delivered separately)		
	Dave Czarn			
FR:	Steve Offiler	SBD1		

SJ: Weekly Highlights

ELECTRONIC SPEED CONTROL DEACTIVATE PS

CONTACT WEAR (87PS VALIDATION ISSUE):
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57PSL11-3 VALIDATION FAILURE UPDATE:
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S/P&P3-3 VALIDATION FAILURE UPDATE:
Many of the Impulse parts have been highlighted as failures, due to a reduced actuation and release characteristics post-Impulse. However, we need to scrutinize these values again, since we have learned that the ES allows some relief after Impulse (drift downward of 12 psi on actuation spec's).

PRODUCTION DRIFT ISSUE:
We are working on developing effective area curves, which initially are showing a significant difference between lab-crimped and production-crimped sensors. Fixuring for the P&M pressure-deflection setup is being created to allow P-d curves, which combined with F-d curves from Pete Sampson's setup will give Area versus deflection.

NOISE / HYDRAULIC DISTURBANCE TESTING:
Jeff has completed initial characterization of a total of 50 parts, representing 10 different disc lots of 5 each, both truck and car. At this point, no snubber effects are being included. The R&R of 10 silent and 10 snap discs was completed and results forwarded to Ford by Dale.

AUSTRALIA SAMPLES:
The 24 parts for Capri, using the 3/8-24 thread p/n 36917 hexport, were shipped on 5/20. We are expediting the 10 parts for Falcon, which use an M10x1.0 custom hexport. These should ship on or about 5/27.

Regards,
Steve O.

FORD NEXT GENERATION SPEED CONTROL (77PS)
MANUFACTURING CONTROL PLAN

PROCESS STEP DESCRIPTION	PRODUCT CHARACTERISTICS	EVALUATION METHOD	CONTROL METHOD	FREQUENCY OF TEST	REACTION PLAN
BASE ASSEMBLY (AMI AUTOMATION)	TERMINAL HEIGHT	DIAL INDICATOR	X/R	5pc/Hr.	SORT SINCE LAST CHECK
	TERMINAL PUSHOUT	FORCE GAGE/ DIAL INDICATOR	X/R	5pc/Hr.	SORT SINCE LAST CHECK
	TERMINAL SEPERATION/ ALIGNMENT	PLUG GAGE	X/R	5pc/Hr.	SORT SINCE LAST CHECK
	SPRING ANGLE	COMPARATOR	X/R	5pc/Hr.	SORT SINCE LAST CHECK
	SPRING CONTACT WIDTH	CALIPERS	X/R	5pc/Hr.	SORT SINCE LAST CHECK
	SPRING TORQUE	FORCE GAGE	X/R	5pc/Hr.	SORT SINCE LAST CHECK
	SPRING BUMP HEIGHT	CALIPERS	X/R	5pc/Hr.	SORT SINCE LAST CHECK
	RIVET HEIGHT	DIAL INDICATOR	X/R	5Pc/Hr.	SORT SINCE LAST CHECK
	CALIBRATION DEFORMATION	CUSTOM CONTINUITY SYSTEM	X/R	5pc/Hr.	SORT SINCE LAST CHECK
	VISUAL QUALITY	VISUAL	X/R	5pc/Hr.	SORT SINCE LAST CHECK
SENSOR ASSEMBL	CRIMP DIAMETER	CALIPERS	X/R	5pc/Hr.	SORT SINCE LAST CHECK
	CRIMP HEIGHT	CALIPERS	X/R	5pc/Hr.	SORT SINCE LAST CHECK
	VISUAL QUALITY	VISUAL	P	5pc/Hr.	SORT SINCE LAST CHECK

CONFIDENTIAL

Revision: D

FORD NEXT GENERATION SPEED CONTROL (77PS)
MANUFACTURING CONTROL PLAN

PROCESS STEP DESCRIPTION	PRODUCT CHARACTERISTICS	EVALUATION METHOD	CONTROL METHOD	FREQUENCY OF TEST	REACTION PLAN
FINAL ASSEMBLY (AMI AUTOMATION)	CRIMP DIAMETER	CALIPER	X/R	5pc/ Hr.	SORT SINCE LAST CHECK
	CRIMP HEIGHT	CALIPER	X/R	5pc/ Hr.	SORT SINCE LAST CHECK
	BASE TORQUE	TORQUE GAGE	X/R	5pc/ Hr.	SORT SINCE LAST CHECK
	CODE CRIMP RING/ DIAMETER-LEGIBILITY	PLUG-VISUAL	P	5pc/ Hr.	SORT SINCE LAST CHECK
FUNCTION TESTER (CUSTOM)	ACTUATION/ RELEASE POINTS (Ford Significant Char.)	MASTERS	X/R	EACH SHIFT	TOOL ROOM/ ENGINEERING EVALUATIONS
	ACTUATION/ RELEASE POINTS	RAMP THROUGH PRESSURE RANGE	X/R	100%	YIELD TRACKING/ SCRAP CONTROL
Q.C. AUDITS	OUTLINED IN DETAIL IN TEXAS INSTRUMENTS (QAS 208), FMC (THREADS / Ford Significant Char.)				

CONFIDENTIAL

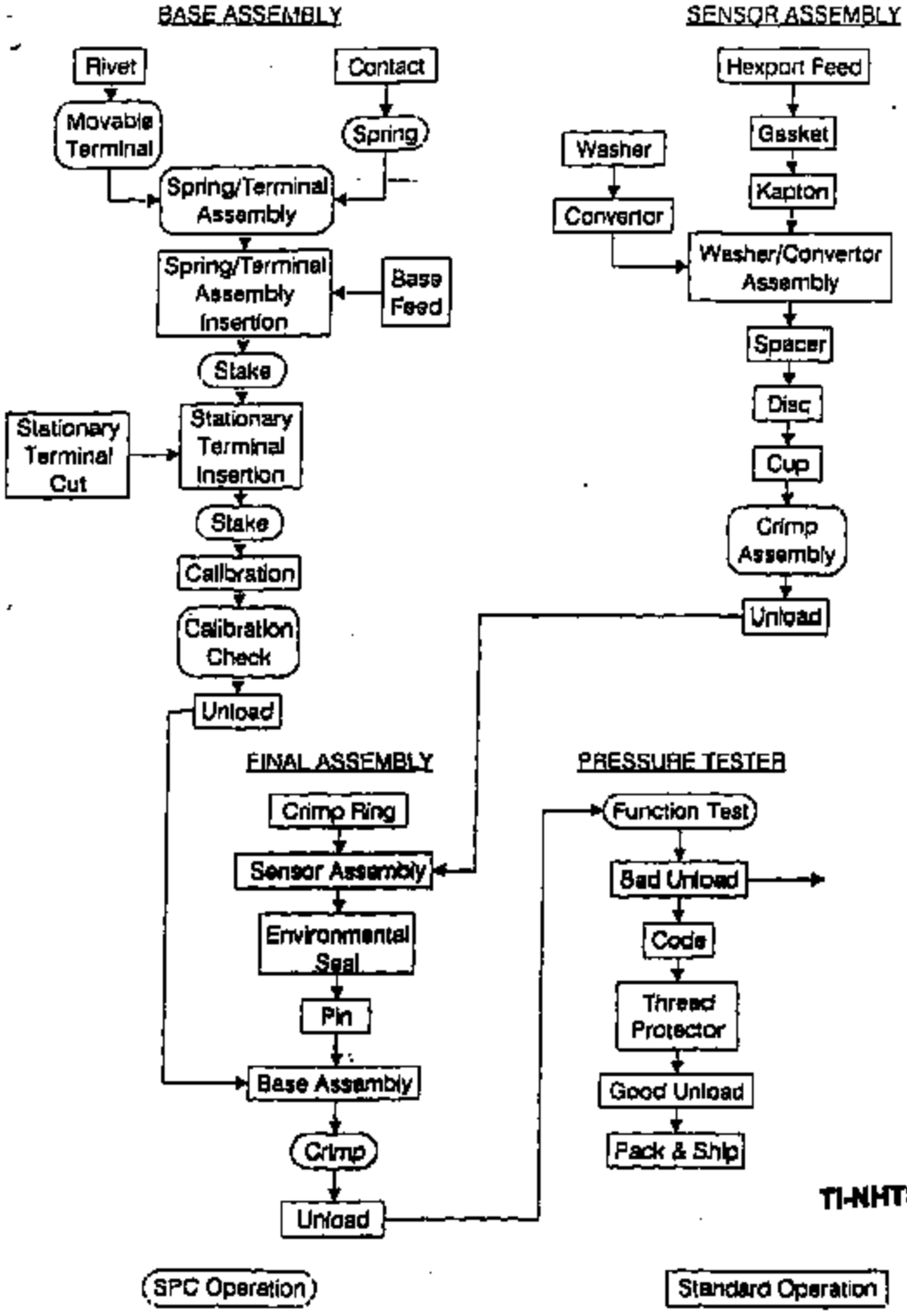
TI-NHTSA 006155

Revision: D

27 May 1992 MJS/cnr 858-6194

FORD NEXT GENERATION SPEED CONTROL

PROCESS FLOW CHART 77PSL2-1/2-3



FORD NEXT GENERATION SPEED CONTROL (7TPS)
MANUFACTURING CONTROL PLAN

PROCESS STEP DESCRIPTION	PRODUCT CHARACTERISTICS	EVALUATION METHOD	CONTROL METHOD	FREQUENCY OF TEST	REACTION PLAN
BASE ASSEMBLY (AMI AUTOMATION)	TERMINAL HEIGHT	DIAL INDICATOR	X/ R	5pc/ Hr.	SORT SINCE LAST CHECK
	TERMINAL PUSHOUT	FORCE GAGE/ DIAL INDICATOR	X/ R	5pc/ Hr.	SORT SINCE LAST CHECK
	TERMINAL SEPERATION/ ALIGNMENT	PLUG GAGE	X/ R	5pc/ Hr.	SORT SINCE LAST CHECK
	SPRING ANGLE	COMPARATOR	X/ R	5pc/ Hr.	SORT SINCE LAST CHECK
	SPRING CONTACT WIDTH	CALIPERS	X/ R	5pc/ Hr.	SORT SINCE LAST CHECK
	SPRING TORQUE	FORCE GAGE	X/ R	5pc/ Hr.	SORT SINCE LAST CHECK
	SPRING BUMP HEIGHT	CALIPERS	X/ R	5pc/ Hr.	SORT SINCE LAST CHECK
	RIVET HEIGHT	DIAL INDICATOR	X/ R	5Pc/ Hr.	SORT SINCE LAST CHECK
	CALIBRATION DEFORMATION	CUSTOM CONTINUITY SYSTEM	X/ R	5pc/ Hr.	SORT SINCE LAST CHECK
	VISUAL QUALITY	VISUAL	X/ R	5pc/ Hr.	SORT SINCE LAST CHECK
SENSOR ASSEMBL	CRIMP DIAMETER	CALIPERS	X/ R	5pc/ Hr.	SORT SINCE LAST CHECK
	CRIMP HEIGHT	CALIPERS	X/ R	5pc/ Hr.	SORT SINCE LAST CHECK
	VISUAL QUALITY	VISUAL	P	5pc/ Hr.	SORT SINCE LAST CHECK

Revision: D

27 May 1992 MJS/cnr 050-0134

FORD NEXT GENERATION SPEED CONTROL (77PS)
MANUFACTURING CONTROL PLAN

PROCESS STEP DESCRIPTION	PRODUCT CHARACTERISTICS	EVALUATION METHOD	CONTROL METHOD	FREQUENCY OF TEST	REACTION PLAN
FINAL ASSEMBLY (AMI AUTOMATION)	CRIMP DIAMETER	CALIPER	X/R	5pc/ Hr.	SORT SINCE LAST CHECK
	CRIMP HEIGHT	CALIPER	X/R	5pc/ Hr.	SORT SINCE LAST CHECK
	BASE TORQUE	TORQUE GAGE	X/R	5pc/ Hr.	SORT SINCE LAST CHECK
	CODE CRIMP RING/ DIAMETER-LEGIBILITY	PLUG-VISUAL	P	5pc/ Hr.	SORT SINCE LAST CHECK
FUNCTION TESTER (CUSTOM)	ACTUATION/ RELEASE POINTS (Ford Significant Char.)	MASTERS	X/R	EACH SHIFT	TOOL ROOM / ENGINEERING EVALUATIONS
	ACTUATION/ RELEASE POINTS	RAMP THROUGH PRESSURE RANGE	X/R	100%	YIELD TRACKING/ SCRAP CONTROL
Q.C. AUDITS	OUTLINED IN DETAIL IN TEXAS INSTRUMENTS (QAS 206), FMC (THREADS / Ford Significant Char.)				

TI-NHTSA 006158

Revision: D

27 May 1992 MJS/cnr 050-6134

[illegible]

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

PARKER HANNIFIN CORPORATION
O-RING DIVISION
2360 CHERRY CIRCLE
SPARTANBURG, S.C. 29303
TELEPHONE (803) 573-7532

J.R.D. Division of Parker Seal certifies that the material used to produce the product in this shipment, namely EPDM/EP104. Conforms to TI drawing and TI purchase order requirements.

PART TITLE... GASKET

CUST P/N... 74353-2	REV H	DATE SHIPPED	P/O... 5000029018
J.R.D. P/N.. 2021SE		3-28-02	S/O... 10761
SILICONE COMPOUND... EP104			QUANTITY... 10,000

Very Truly Yours,
J.R.D. Division

Dennis T. Johnson

DENNIS T. JOHNSON
Quality Control Manager

DTJ/ml

KD 4/4/02

Bob
V3785
2pgs.

TI-NHTSA 006159

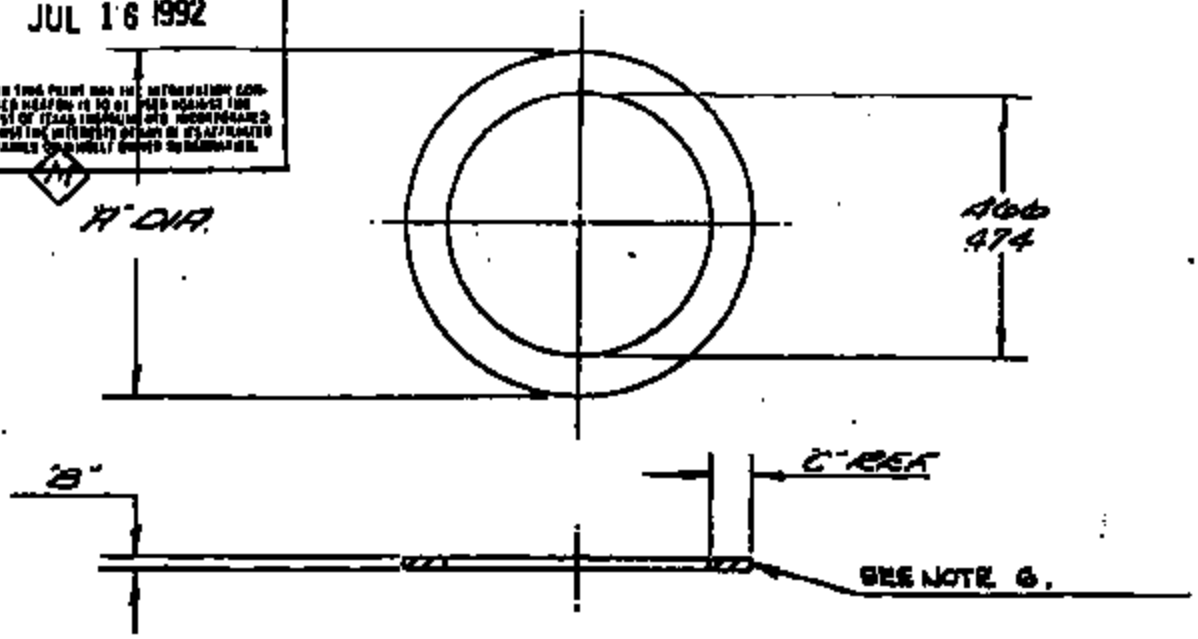
/

TITLE GASKET

REV. H

74353

CERTIFIED PRINT
Parts Made To This Print Must Conform To
ENG. STD. E9898 REV. E
Date JUL 16 1992



NOTES:
1. PARTS MUST BE PURCHASED FROM T.I. ENGINEERING APPROVED VENDORS, LISTED BELOW.
2. MATERIAL CERTIFICATION REQUIRED WITH EACH SHIPMENT.
3. MATERIAL TO BE COMPATIBLE WITH FREON-12 & REFRIGERANT OIL.
4. PARTS TO BE SHIPPED, ISSUED, AND STORED ON 4 FOOT +/- 6 INCH MANDRELS, SEALED IN PLASTIC BAGS AND SHIPPED IN CARDBOARD TUBES.
5. ALL CONTAINERS OF PARTS MUST BE MARKED TO REFLECT ANY MATERIAL LOT, TOOL OR PROCESS CHANGE.
6. DASH 1 (-1) AND DASH 4 (-4) GASKET MUST HAVE FOUR (4) WHITE STRIPING INK MARKS, EQUALLY SPACED AROUND THE CIRCUMFERENCE, AND NOT LESS THAN 1/8 INCH WIDE. NO INK IS ALLOWED ON ANY OTHER SURFACE.

TI-NHTSA 006160

PART NO.	MATERIAL	DURO/HARDNESS	COLOR	A	B	C
74353-4	ETYLENE PROPYLENE T&L COMPOUND E-7104-70 T&L PART NO. 61978	70	BLACK	.670-.662	.030-.036	.063
74353-3	ETHYLENE PROPYLENE T&L COMPOUND E-7054	70	WHITE	.670-.662	.030-.036	.063
74353-2	ETHYLENE PROPYLENE T&L COMPOUND E-7054	70	WHITE	.599-.591	.030-.036	.063
74353-1	ETHYLENE PROPYLENE T&L COMPOUND E-7104-70 T&L PART NO. 61978	70	BLACK	.599-.591	.030-.036	.063

ISS. A | ADDED -3 | ADDED -4 | ADDED -2 | ADDED -1 | ORIGINAL

ISS. | DATE | CH. | ENG.
A | 3-10-86 | | |

TEXAS INSTRUMENTS INCORPORATED
ATTLEBORO, MASS., U.S.A.

KIDDON CONTROL PRODUCTS DIVISION

SIZE A

PARTS LIST 74353

VALENTINE [illegible]

[illegible]

MATERIAL CERTIFICATION

DATE : FRIDAY MAY 27, 1982

CUSTOMER : TEXAS INSTRUMENTS INC

CUSTOMER P.O. NO : 9051118971 SUPPLIER INVOICE NO.: 81761

PART DESCRIPTION : 2713-1 CUP REV.5

SUPPLIER PJO NO. : 19053

QUANTITY SHIPPED : 63,603

SHIPMENT DATE : 05/25/82

WE CERTIFY THAT THE MATERIAL USED
TO PRODUCE THE PRODUCT [illegible]
[illegible]
[illegible]
CONFORMS TO ALL SPECIFICATIONS AND
ALL PURCHASE ORDER REQUIREMENTS

SIGNED [signature]
(Supplier Representative)

Joanne Lorraine Quality Assurance Manager

TI-NHTSA 006181

VALENTINE [illegible]

[illegible]

MATERIAL CERTIFICATION

DATE : FRIDAY MAY 29, 1992

CUSTOMER : TEXAS INSTRUMENTS INC

CUSTOMER P.O. NO : 5351118897 SUPPLIER INVOICE NO.: 81761

PART DESCRIPTION : 2773-1 CUP REV.B

SUPPLIER PJO NO. : 19053

QUANTITY SHIPPED : 63,800

SHIPMENT DATE : 05/29/92

WE CERTIFY THAT THE MATERIAL USED
TO PRODUCE THE PRODUCT [illegible]
SHIPMENT VALLEY
[illegible]
CONFORMS TO ALL DRAWING AND
ALL PURCHASE ORDER REQUIREMENTS

SIGNED Jeanne LaFlamme
(Supplier Representative)

Jeanne LaFlamme Quality Assurance Manager

[illegible] FR=SCC TO=SBO1 SENT=06/01/9[illegible] [illegible]

Memorandum
June [illegible], 1994

TO: Rick Conlin SAG1

CC: KSteve Offiler SBO1 Matt Sellers PGME
Elaine Rose SAMY Bill Sweet TGME
Tom Cheroneau TC Gary Snyder GJGC
Dave Czarn ZARN Dick Gariepy MFFC
Norm Freda WALZ Martha Sullivan JFPC
Jim Watt

FM: Jim Watt JW02

RE: Update On ISIR Submission To Kelsey-Hayes 57PGJ11-3/57PGR-3

Rick, as presented earlier at last week Wednesday's update meeting, the validation test failures have been significant issues relating to completing the ISIR submission to Kelsey-Hayes. Specifically, the test failures encountered during impulse testing were presented by design engineering at the meeting, along with a re-test plan.

Subsequent test failures encountered, if any, will present an [illegible] meeting the 06/03/94 submission target date.

For the 57PGR3-3, three dimensions will be noted as out of current print specification:

1.) 11.63/11.83 Base Mold inside dimension; AFCC welding has been requested to correct the mold.

2.) 18-19 degree (2pl) Terminal tip dimension; Supplier (AJ Knott) has been requested to correct the terminal dimension.

3.) .66-.86 (2pl) Terminal tip dimension; Supplier (AJ Knott) has been requested to correct the terminal dimension.

Regards,

Jim [illegible]msg! JW02 ext. 1719

-msg Mem (0479482 FR=SOZ TO=SBO) [illegible]

Memorandum

June 01, 1992

TO:	James Frenzow	JPF			
CC:	Ed Smith	FCQA	Elaine Rose	DAMY	
	Steve Oeffler	SBO1	Matt Cellers	PDM2	
	Bill Sweet	TCMC	Norm Jay	MLLG	
	Dave Grant	ZF3%	Andy McGuirk	FCQA	
	Dwight Douglas	CMT1	Stan Yonel	E-1	
FM:	Jim Watt	JW02			

Subj: 46412 Base Main Dimensional Discrepancies

James, your earlier message on the 46412 base main shows the .461 in. to .465 in. width dimension measurement exceeding the minimum tolerance with measurements up to .489 in. noted in cavity "D".

Now, the .701 in. to .545 in. width dimension measurement is below the minimum tolerance with measurements down to .5255 in. in cavity "D".

Please provide your corrective action plan to bring the 46412 milled dimensions back into specification noting when Precision Turning can expect to have conforming parts. Provide your response to Matt Cellers and myself.

Regards,

Jim ext. 1719 msg: JW02

DUPONT

CIRCLEVILLE PLANT
P.O. Box 89
Circleville, OH 43113

NO: KC-11
Effective Date: 3/06/92
Expiration Date: 3/06/93

MATERIAL CERTIFICATION

DATE: 6-2-92

CUSTOMER: TEXAS INSTRUMENTS, ATTLEBORO

CUSTOMER ORDER NO. 500011911

CUSTOMER PART NO. & REV. 27225-1 (REV. N)

QUANTITY THIS SHIPMENT 6710

SHIPMENT DATE 6-2-92

We certify that the material used to produce the product in this shipment, namely 500FN131 Kapton*, 3/4" wide, conforms to TI drawing and TI purchase order requirements on file with the HPF Group of the Dupont Company.

SUPPLIER REPRESENTATIVE
ENGINEER - QUALITY CONTROL - TITLE

:dkh/smart no. 387

-MSG Mem 01403221 FR=WELZ TO=GrGi [illegible] 02:06 PM
R#=111 DT=D [illegible]

June 9, 1992

To: Charlie Douglas

Cc: Dave Ctarn
Steve Offiler

Fm: Norm Freda

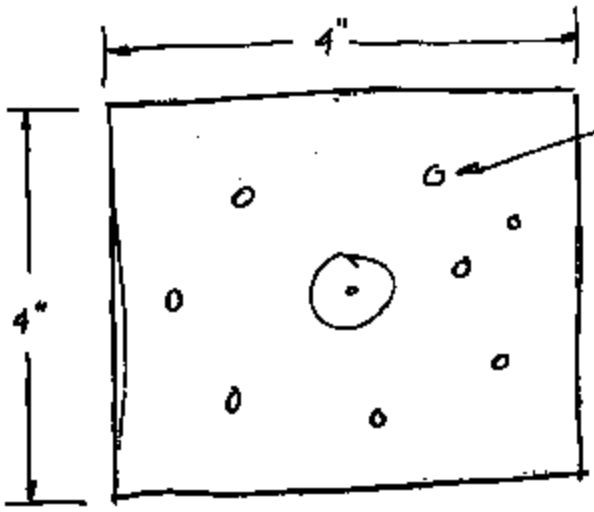
Rg: CCPR FOR BENDIX

Tony Kosarski, Bendix Engineer working on Ford Truck Programs, has requested the following information for the Light Truck CCPS:

1) Installation torque? Torque to fail?
2) Part listing of current and projected CCPS indicating actuation pressure, disc, snubber, color and case material.
3) How do we/will we keep these separate in manufacturing process?
4) Past problems with similar parts -- PSPS & RHC switch?
5) Would like 12 ASTM Noryl test bars & Noryl brochure.

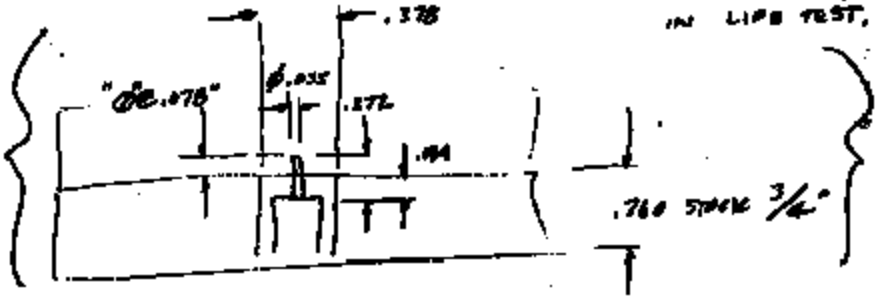
Ford is pushing Bendix to take design responsibility for the CCPS which is the reason for such detailed information. At some point, they may want to visit TIA.

Regards,
Norm

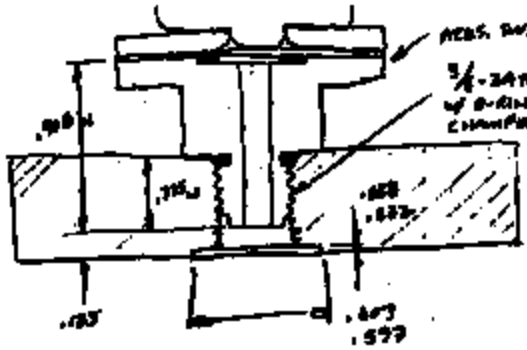


EXISTING FIXTURE BASE, TO WHICH "ADAPTER PLATE" WILL ATTACH, HAS RANDOM PATTERN OF M6X1.0 THD HOLES. INSTRUMENT S-6 SHALL BE TRANSFERRED TO "ADAPTER PLATE" AND DRILL CLEARANCE HOLES FOR M6X1.0. FIXTURE BASE IS FCM PROPERTY, LOCATED IN LIPS TEST.

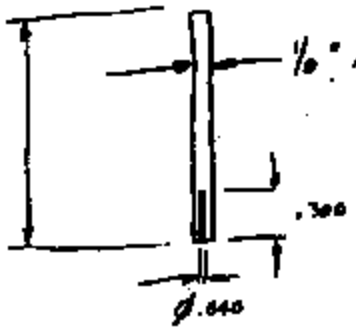
THIS SKETCH FOR DIMENSIONAL CALCULATIONS - MODEL SHOP DISREGARD



ADAPTER PLATE →



LVDT PROBE →



TI-NHTSA 006167

920603

EFFICIENCY LINE# 22,205

	LAB				IROD.				DIFF.	
	1 ACT	2 REL	3 DIFF	4	5 ACT	6 REL	7 DIFF	8	9 ACT	REL
L4	149	137	26		136.4	118.5	17.9		12.6	9.5
L9	151	121	30		140.3	116.7	23.6		10.7	4.3
P5	130	105	25		117.4	99.4	18.0		12.6	5.6
P6	128	103	25		116.1	96.6	19.5		11.9	6.4

THESE #'S TAKEN AT VERY SLOW RAMP RATES, WITH RELEASE TAKEN AFTER ATTAINING A PRESSURE =20K AFTER ATTAINING

CALCULATED AREAS (IN^2)

	ACT	REL
L4	.0629	.0647
L9	.0623	.0656
P5	.0707	.0745
P6	.0715	.0729

LAB - BUILT (DALE)

IROD BUILT

CRIMP AND KAPTON TEST 5-11-92

LAB CRIMP VS PRODUCTION CRIMP
PRODUCTION KAPTON VS ENGINEERING KAPTON

ACTUATION	LAB	PROD	KAPTON
DEVICE #			
1	148.0	121.2	108.7
2	136.6	111.5	106.0
3	133.4	113.8	115.7
4	137.8	111.5	117.5
5	135.0	115.3	117.4
6	139.2	114.6	117.4
7	136.3	106.8	117.4
8	142.7	116.5	122.6
9	130.8	118.6	115.8
10	139.0	126.1	116.9
X-BAR	138.7	115.6	115.5
SIGMA	2.9	3.9	5.2

RELEASE	LAB	PROD	KAPTON
DEVICE #			
1	126.7	99.1	85.7
2	116.1	93.6	71.9
3	114.7	95.8	87.2
4	120.1	93.1	92.7
5	117.0	97.5	87.8
6	119.9	95.9	92.4
7	118.0	85.1	87.3
8	121.7	93.5	91.9
9	116.4	95.8	90.4
10	117.7	104.9	88.0
X-BAR	118.0	95.0	87.7
SIGMA	2.6	2.1	4.9

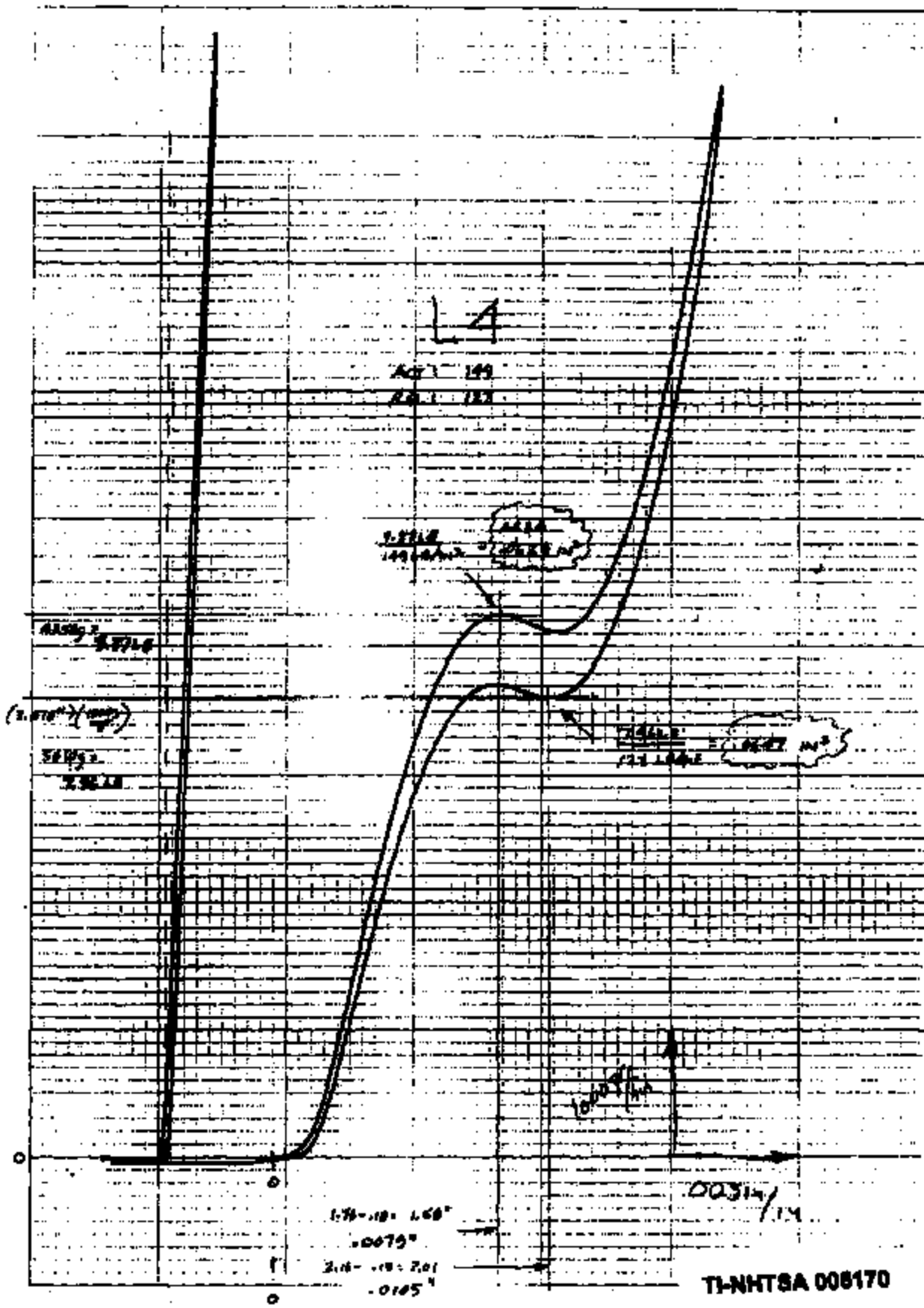
DIFFER.	LAB	PROD	KAPTON
DEVICE #			
1	21.3	22.0	29.0
2	20.5	17.9	34.1
3	18.7	17.9	28.5
4	17.7	18.4	24.9
5	18.0	17.8	29.6
6	19.3	18.7	25.0
7	18.2	21.6	30.1
8	21.0	23.0	30.8
9	22.4	22.8	25.5
10	21.3	21.2	29.0
X-BAR	19.7	19.9	28.6
SIGMA	2.6	1.6	2.1

REPEAT AFTER 950 OVP ON LAB PIECES

ACTUATION	LAB	PROD	KAPTON
DEVICE #			
1	148.2	123.4	109.6
2	136.4	112.5	113.9
3	132.8	116.3	116.9
4	136.4	111.4	117.9
5	139.0	117.4	119.4
6	134.3	116.1	119.4
7	135.5	108.1	119.4
8	143.0	118.2	125.1
9	140.3	120.9	118.1
10	138.4	127.7	117.5
X-BAR	138.4	117.2	117.7
SIGMA	2.9	4.3	5.5

RELEASE	LAB	PROD	KAPTON
DEVICE #			
1	125.6	100.9	86.1
2	115.0	94.9	80.3
3	113.7	98.1	88.3
4	118.5	90.5	93.5
5	118.4	99.4	88.8
6	116.0	96.6	94.4
7	117.2	84.1	88.8
8	121.1	95.0	94.4
9	116.7	96.3	94.0
10	116.7	106.4	89.3
X-BAR	117.0	95.9	90.2
SIGMA	2.6	2.0	5.8

DIFFER.	LAB	PROD	KAPTON
DEVICE #			
1	22.6	22.5	23.6
2	21.4	17.6	33.6
3	19.1	18.2	28.6
4	17.9	20.9	24.4
5	20.6	18.0	30.6
6	18.3	19.5	25.0
7	18.3	23.9	30.6
8	21.8	23.2	30.9
9	23.5	22.6	24.1
10	21.7	21.3	28.3
X-BAR	20.3	20.6	28.4
SIGMA	2.6	1.9	2.2


L4
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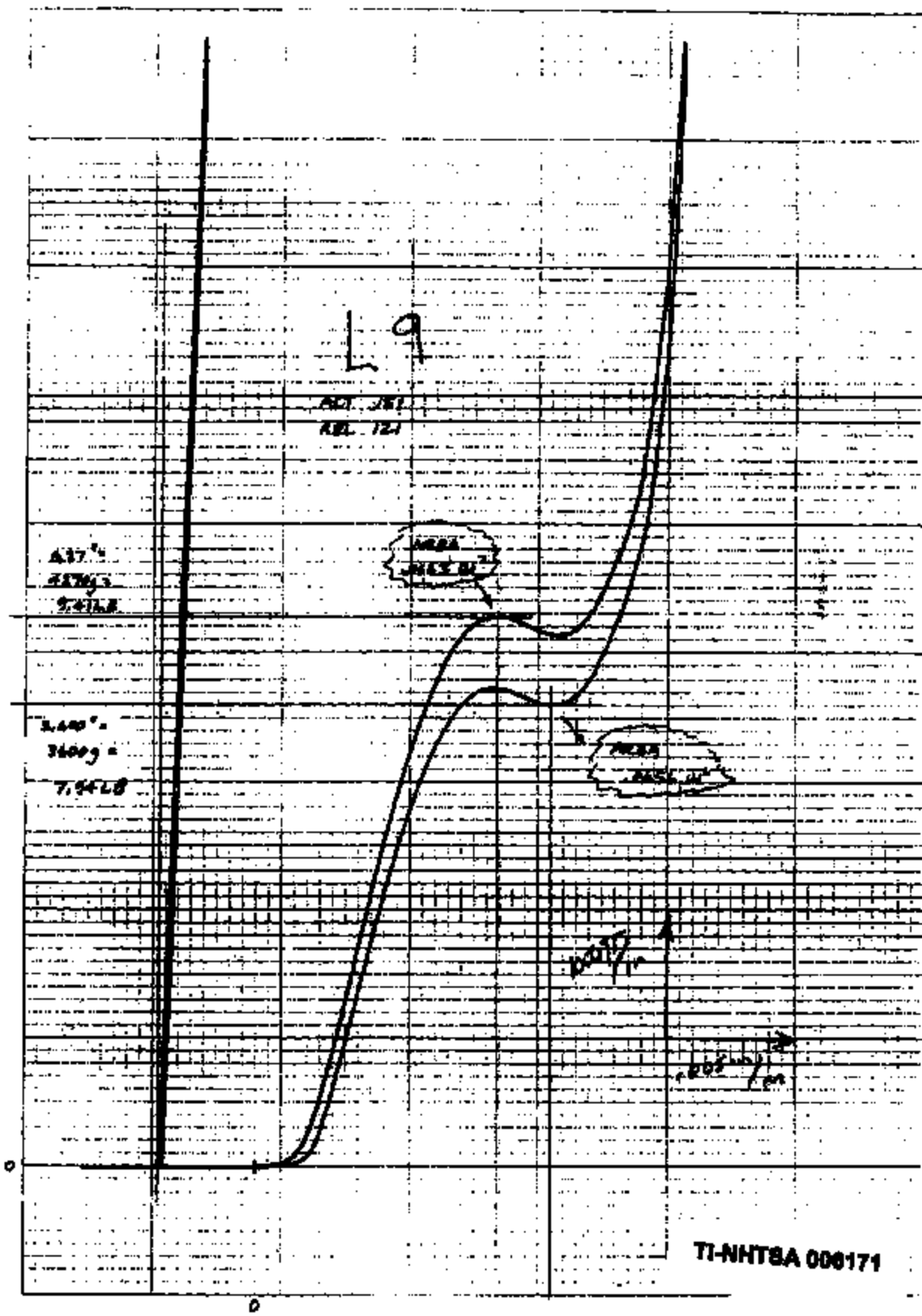
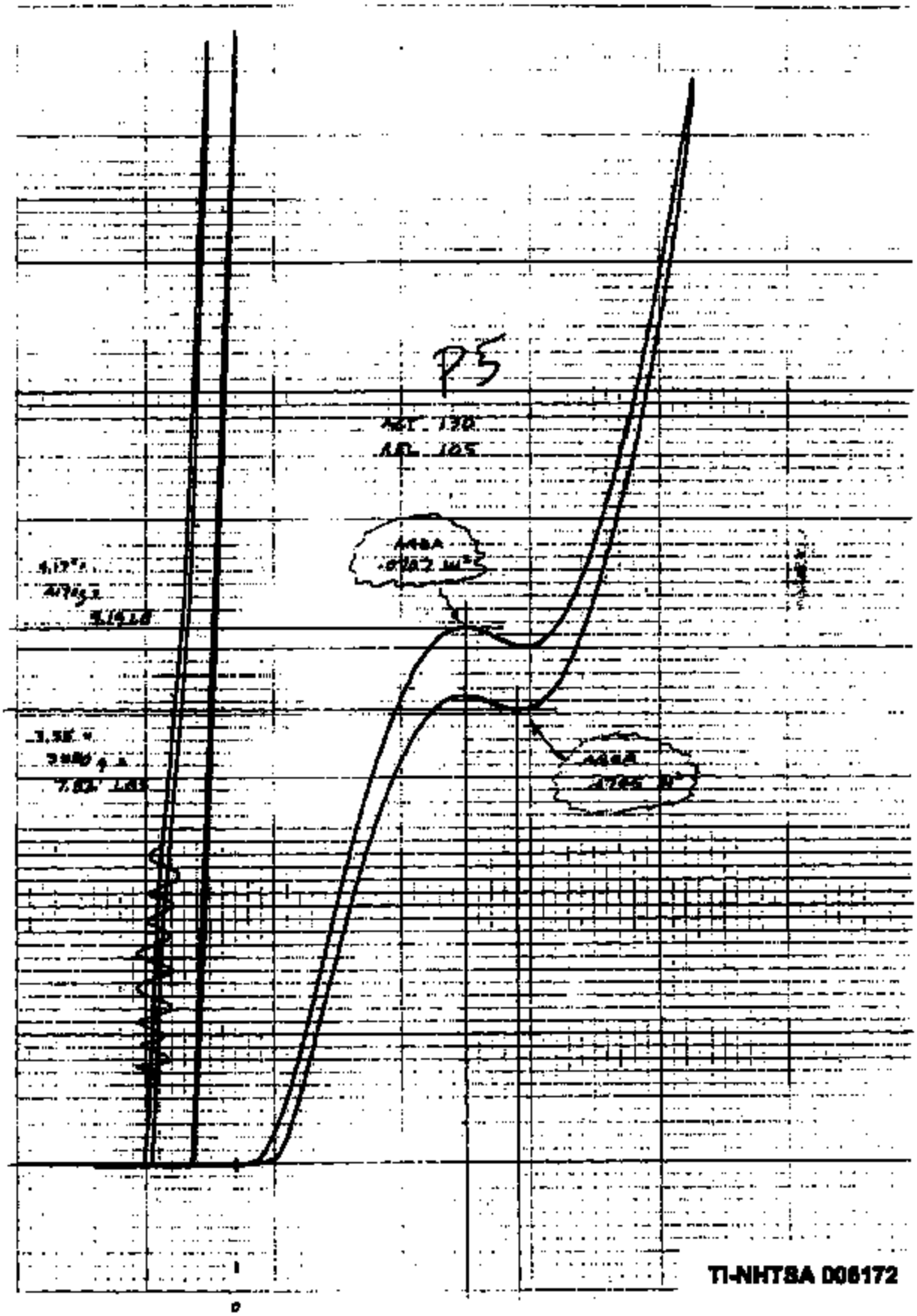
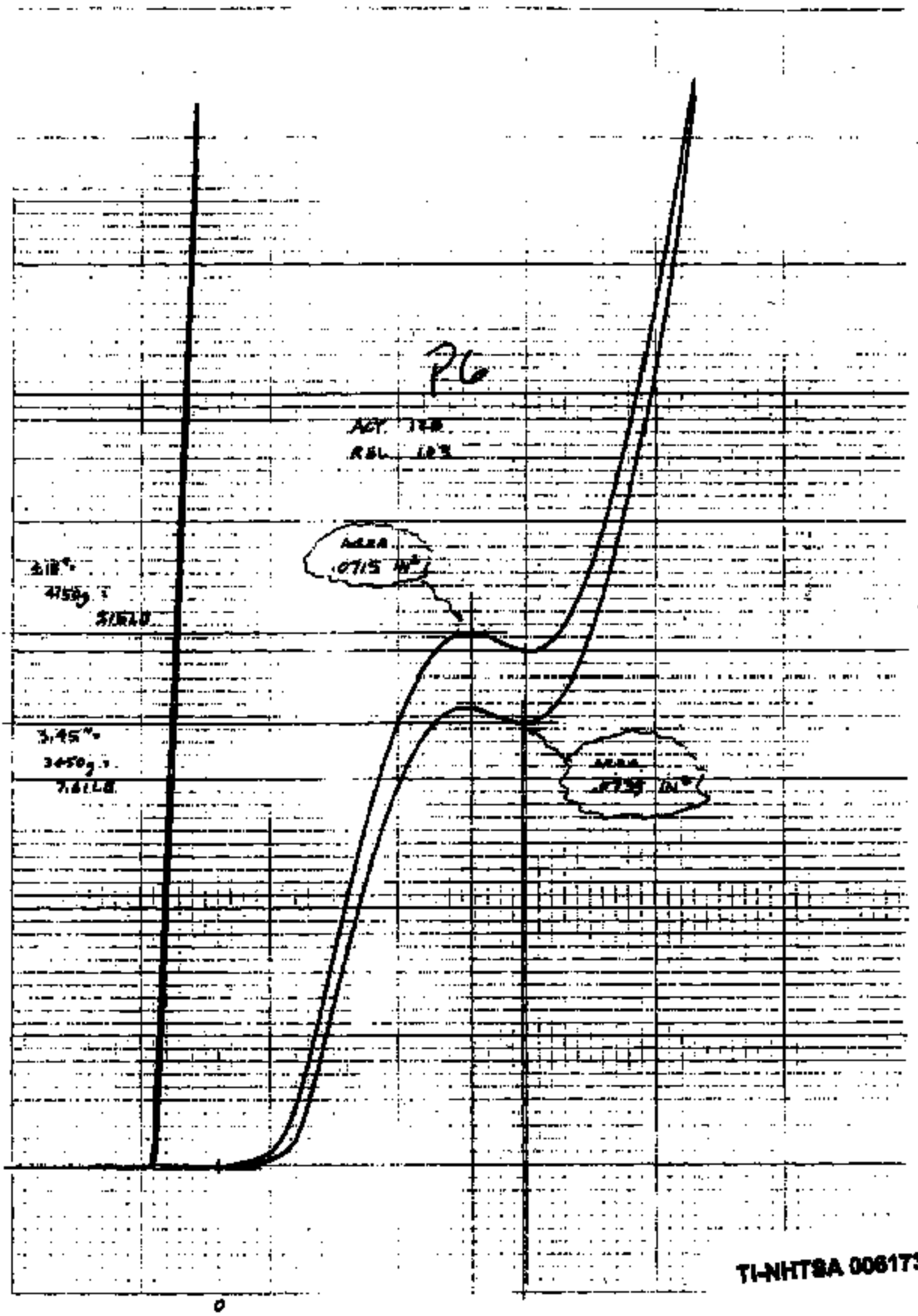
0
.0079"
.0105"
TI-NHTSA 006170



47 0702



47 0702



47 0702

K·E 10 X 10 TO THE INCH 46 X 10 INCHES

CERTIFICATION

June 3, 1992 PAGE 1 OF 6

TEXAS INSTRUMENTS
ACCTS PAYABLE DEPT
P.O. BOX 655
ATTLEBORO, MA 02703

This is to certify the parts furnished on your purchase order have been produced in accordance with specifications listed on your purchase order and/or blueprint. This certification and accompanying documents may not be reproduced, except in full, without written approval of Elco Industries, Inc.

INSPECTION SHEET, MILL SHEET AND SAMPLES ATTACHED

REV.: A

SAMPLES FOR S.O. # 20778 SENT WITH PREVIOUS SHIPMENTS

Records covering material used and the tests and inspection conducted are on file, subject to examination. This is an original certification and has not been amended unless stated below.

Purchase Order No.	505106998
Register No.	50347
Part No.	36900-1
Description	3/8-24 X .81
Quality Control No.	AS341-6
Mfg. Lot No.(s)	20778
Quantity	6,915

Authorized Signature
Quality Coordinator

CERTIFICATION

ELCO INDUSTRIES, INC.
PRECISION AUTOMOTIVE DIVISION
1111 Samuelson Road • P.O. Box 7008
Rockford, Illinois 61125-7008

A.J. OSTER CO.

Brass Mill Products • Steel • Powder • Casting Alloys

1982-1

ORIGINATOR HRA

A J OSTER - WARWICK
445 INDUSTRIAL DRIVE
WARWICK, RI 02886

*** CERTIFICATE OF COMPLIANCE ***

AJO ORD#:	CUST ORD#:	QUANTITY:	DATE SHIPPED:
0181203	15404	TOTAL 2608	6-4-92

CUSTOMER NAME:
K. F. BASSLER CO.

CUST PART#:
260-025-112-2

DESCRIPTION:	GAUGE:	TEMPER:	WIDTH:
CDA 260 COIL	.02500	2#	1.1200

CHEMICAL ANALYSIS

#36887

TNO.....	0107936
HEAT#.....	163053
COIL#.....	S 44291 A
CU.....	69.40000
ZN.....	30.56000
PB.....	.00700
FE.....	.01400
SB.....	.00100
BI.....	.00100

PHYSICAL TEST RESULTS

ROCKWELL.....	R30T 63.6-
TENSILE.....	62.4-
YIELD.....	51.7-
ELONGATION.....	27.5

WE HEREBY CERTIFY THAT THE MATERIAL DESCRIBED HERE IN HAS BEEN MADE TO CONFORM TO SPECIFICATION/ OR REQUIREMENTS OF YOUR ORDER.

June 3 1992
DATE

A. Arroyo
QA SUPERVISOR

TI-NHTSA 006175

[illegible]

TO: DALE A. [illegible]

CC: CHARLIE GOLLING
NORM GARDA
STEVE SPEILER
GARY PALLETT
DAVE CZARN

FM: DAVE CZARN

SU: QUIET SPECIFICATION FOR CCPS (REF: NORM'S MSG #1396475)

DALE,

IT LOOKS LIKE WE'VE GOTTEN SOME POSITIVE FEEDBACK FROM FORD
REGARDING THE SOUND PULSE DATA. I [illegible] IMPORTANT TO ACT ON
DALCO MACROFF'S WILLINGNESS TO RUN [illegible] EVALUATIONS TO CLOSE THE
[illegible] SPEED/VOLUME NOISE AND FEEL QUANTIFICATION. THIS IS OUR
OPPORTUNITY TO DETERMINE THE TRUE [illegible] OF DISC/DEVICE CALIBRATIONS
APLCS THAT WORK IN THE VEHICLE.

I'D LIKE TO SEE A PLAN PUT TOGETHER [illegible] ADDRESSES WHAT [illegible] OF
DISC/DEVICE CALIBRATIONS WE'LL BE DOING, AND [illegible] TO SHIP
FORD.

[illegible]

VIVA, I'M ACQUIRED [illegible] PCI ENGD, [illegible] OF DAVID [illegible] ALSO WILLING
TO [illegible] CALIBRATIONS ON TAURUS SHO, AS [illegible] PLAN TO PROVIDE ENGINEER
[illegible] AS WELL.

REGARDS,
DAVE CZARN
PCI

DUPONT

CIRCLEVILLE PLANT
P.O. Box 89
Circleville, OH 43113

NO: KC-11
Effective Date: 3/06/92
Expiration Date: 3/06/93
Page 1 of 1

MATERIAL CERTIFICATION

DATE: 6-9-82

CUSTOMER: TEXAS INSTRUMENTS, ATTLEBORO

CUSTOMER ORDER NO. 5000 11911

CUSTOMER PART NO. & REV. 27225-1 (REV. N)

QUANTITY THIS SHIPMENT 66.70

SHIPMENT DATE 6-9-92

We certify that the material used to produce the product in this shipment, namely 500FN131 Kapton*, 3/4" wide, conforms to TI drawing and TI purchase order requirements on file with the HPF Group of the Dupont Company.

SUPPLIER REPRESENTATIVE
ENGINEER - QUALITY CONTROL - TITLE

:dkh/smart no. 387

TI-NHTSA 006178

TO: Dave Czarn
Doug Strott
Gregg Noelte
Steve Offiliar
Matt Sellers

FR: SOGEM: HIGHLIGHTS June 5, 1992

Vacation: 6/9-6/17, return on 6/18.

I will be in for the CD-rom standards demo on friday, 6/9 at 9:30.

Customer visit: 6/18, Kalsy-Hayes audit and discussion of first cycle shift.

PRESSURE SWITCH
Problems: We have determined that all quiet switches shipped from day one have had a negative disc preload of 4mils, because of the reduced crown height. The missing preload was not detected because the Kapton was holding the converter up. Fortunately All devices were pinned properly and will switch at the correct actuation values. The only know risk is that the kapton could relax causing the preload to shift to lower values. This could result in devices opening at zero pressure at high temps. High temp continuity has been performed on every lot without failure. In addition 10 random pieces were checked from actuation and release values at 150C. The actuation values dropped from 130 to 100 psi, but they stayed above the 90psi customer spec. CONCLUSION: There probability of failure in the filed appears to be low. We can continue to ship product in this configuration until the preload is adjusted.

GENERAL: Met with the cup supplier this week. To adjust the preload we will shorten the cup. We have requested the supplier to prototype several hundred pieces quickly. Waiting on a delivery date.

The preload change is expected to eliminate the 4-6% fallout for low disc readings on the final assembly machine. It may also improve the act/rel distributions.

A capacitance vs preload correlation has been completed. The correlation is excellent r=.95. The sensitivity is low so it is unlikely to be usable on the production line other than to check extremely gross miss pins, without throwing away good parts. It does look like a valuable tool for failure analysis in the lab.

I have assumed responsibility for the first cycle shift from Steve.

The customer was pleased with our sound pulse test. They are committed to helping us evaluate pieces so we an open up the differential spec to improve yields.

CPS
Another round of sample building yielded 3/5 good front ends. Completion of these sensors is on hold until I return from vacation.

Bob Luminalo is working with Stan to complete 100pills within two weeks. Sample build will recommence when pills are complete.

Howard is working on foolproofing several of the assembly fixtures.

PROBLEM: Delayed delivery of pills will cause an additional delay to our commitment date of mid june. Now expect 20 pieces end of June.

PRESSURE SWITCH DATA Form 21605 TEST NO. 286-15-20

DEVICE	DATE REQUESTED	REQUESTED BY	REQUESTED COMPL. DATE
77PSL3-1		DALE SOGGE	6/18/92
PERFORMED BY	**DATE STARTED**	**DATE COMPLETED**	**APPROVED BY**
DAVID O TOOLE	6/12/92	6/16/92	

PROJECT TITLE:

CUSTOMER:

PURPOSE OF TEST: By Measuring Capacitance of Parts we can Calculate the Preload. Then See acceptable Limits for Production of Exhaust on the High Low Range of what is good Parts & what is NOT.

PROCEDURE: Test Capacitance of 20 Parts in Life Test. Purge each Part up To 200 PSI once & Wait 3 Secs & Took Capacitance Reading. Step 2 Was Exactly the Same as Step 1 Except that We Did the Test on the Production Line. The Main Reason for Step 2 Was To See Not accurate we Could Test on Run Line Production, Good Electrical Relays. Test + see other Possible Sources of Electrical & Magnetic Interference. Step 3 Same as Step 1. No interference Was Picked up.

	Test 1		Test 2		Test 3				
Test #	@ 200 PSI Capacitance	Preload	@ 200 PSI Capacitance	Preload	@ 200 PSI Capacitance	Preload			
#1	1.786	[illegible]	1.779	8.5015	1.761				
#2	1.768	[illegible]	1.767	7.4677	1.758				
#3	1.762	[illegible]	1.761	7.2274	1.757				
#4	1.77	[illegible]	1.765	7.5276	1.765				
#5	1.77	[illegible]	1.765	7.5276	1.766				
#6	1.786	[illegible]	1.776	8.9781	1.778				
#7	1.767	[illegible]	1.766	7.1426	1.762				
#8	1.762	[illegible]	1.75	6.4767	1.739				
#9	1.778	[illegible]	1.771	7.918	1.762				
#10	1.769	[illegible]	1.765	7.617	1.75				
#11	1.761	[illegible]	1.754	6.7969	1.743				
#12	1.748	[illegible]	1.75	6.4769	1.734				
#13	1.778	[illegible]	1.781	8.4614	1.744				
#14	1.765	[illegible]	1.734	5.3557	1.727				
#15	1.770	[illegible]	1.761	7.4193	1.71				
#16	1.764	[illegible]	1.757	6.9671	1.742				
#17	1.776	[illegible]	1.761	7.3474	1.754				
#18	1.765	[illegible]	1.776	8.2285	1.742				
#19	1.7685	[illegible]	1.768	7.7378	1.760				
#20	1.786	[illegible]	1.771	8.0584	1.774				

(OVER)

TI-NHTSA 006180

PRESSURE SWITCH DATA Form 21605 TEST NO. 286-15-20

DEVICE	DATE REQUESTED	REQUESTED BY	REQUESTED COMPL. DATE
77PSL3-1		DALE SOPPE	6/18/92
PERFORMED BY	**DATE STARTED**	**DATE COMPLETED**	**APPROVED BY**
DAVID O TOOLE	6/12/92	6/16/92	

ROJECT TITLE:

CUSTOMER:

PURPOSE OF TEST: By Measuring Capacitance of Parts we can Calculate the Preload. Then See acceptable Limits for Production & Expand on the High Low Range of what is good Parts & what is NOT.

PROCEDURE: Test Capacitance of 20 Parts in Life Test. Brought each Part up To 200PSI once & waited 3 Secs & Took Capacitance Reading. Step 2 was Exactly the Same as Step 1 Except that we Did the Test on the Production Line. The Main Reason for Step 2 was To See How Accurate an Outside Test on Down Line Production, Such Electrical Relays Air & Misc other Possible Sources of Electrical & Magnetic Interference. Step 3 Same as Step 1. No interference was Picked up.

	TEST 1		Test 2		Test 3				
Item #	@ 200 PSI Capacitance	Preload	@ 200 PSI Capacitance	Preload	@ 200PSI Capacitance	Preload			
#1	1.786	[illegible]	1.779	8.5095	1.761				
#2	1.768	[illegible]	1.767	7.4477	1.758				
#3	1.768	[illegible]	1.761	7.2274	1.761				
#4	1.77	[illegible]	1.765	7.5276	1.768				
#5	1.77	[illegible]	1.765	7.5276	1.765				
#6	1.776	[illegible]	1.776	6.1987	1.778				
#7	1.767	[illegible]	1.764	7.6026	1.752				
#8	1.762	[illegible]	1.75	8.4767	1.739				
#9	1.778	[illegible]	1.771	7.968	1.762				
#10	1.768	[illegible]	1.766	6.827	1.75				
#11	1.761	[illegible]	1.758	6.7589	1.760				
#12	1.768	[illegible]	1.75	8.6749	1.734				
#13	1.778	[illegible]	1.781	8.4486	1.764				
#14	1.765	[illegible]	1.734	5.3557	1.727				
#15	1.790	[illegible]	1.783	9.1693	1.78				
#16	1.764	[illegible]	1.757	6.9674	1.762				
#17	1.776	[illegible]	1.761	7.3474	1.752				
#18	1.785	[illegible]	1.775	8.2182	1.766				
#19	1.765	[illegible]	1.761	7.7776	1.766				
#20	1.786	[illegible]	1.778	8.6364	1.774				

(OVER)

DEVICES FOR CAPACITANCE TEST BY DES.ENG.

Capacitance distribution, 20 pieces from production

6-19-92, quiet switches, 77psL3-1

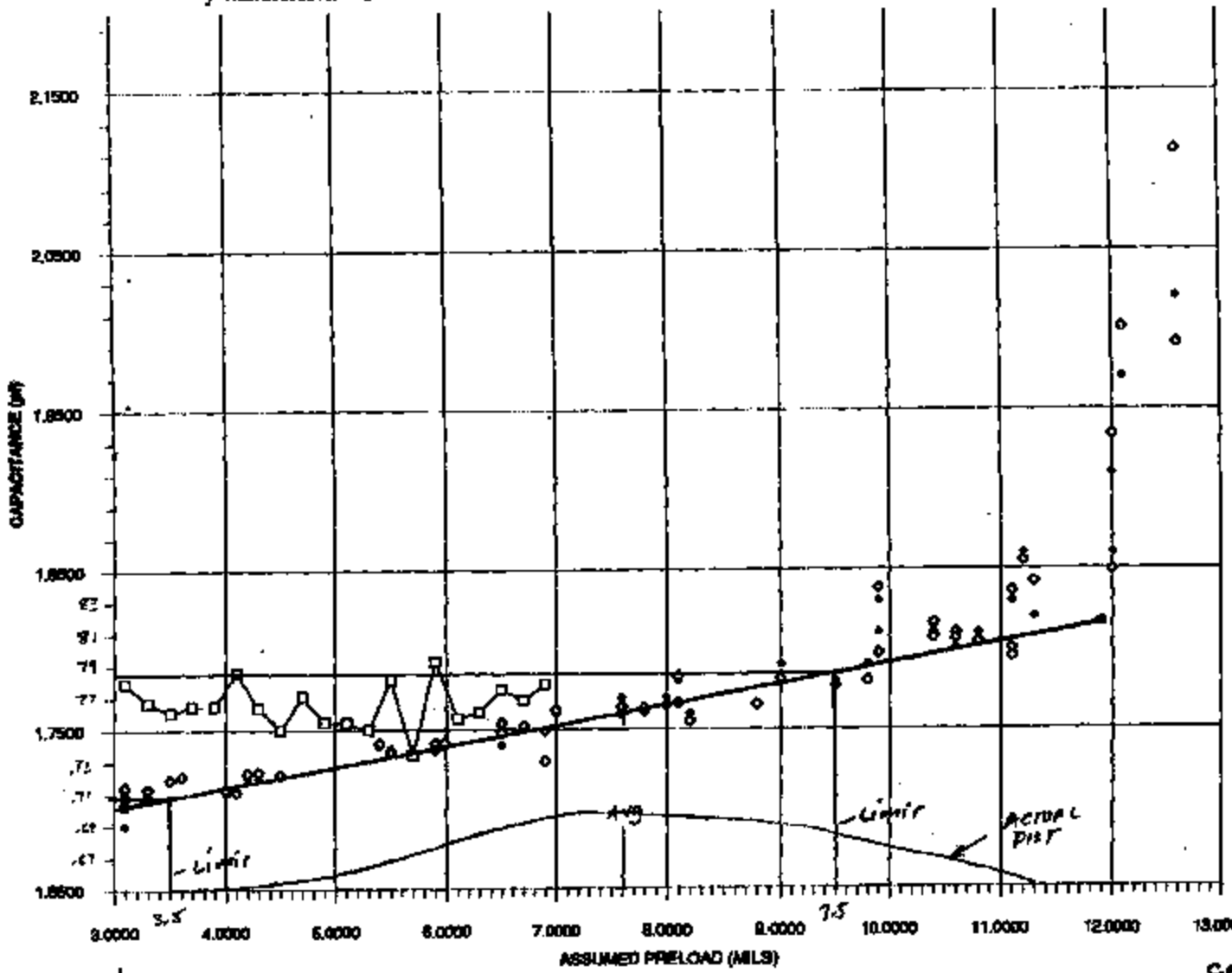
Device #	lab capacitance	line Capacitance	Calculated Preload*	Histogram
1.0000	1.7860	1.7790	8.5085	
2.0000	1.7680	1.7670	7.6678	
3.0000	1.7620	1.7610	7.2474	
4.0000	1.7700	1.7650	7.5277	
5.0000	1.7700	1.7650	7.5277	
6.0000	1.7860	1.7860	8.9990	
7.0000	1.7670	1.7640	7.4576	
8.0000	1.7620	1.7500	6.4767	
9.0000	1.7780	1.7710	7.9480	
10.0000	1.7680	1.7550	6.8270	
11.0000	1.7600	1.7540	6.7570	
12.0000	1.7480	1.7500	6.4767	
13.0000	1.7780	1.7810	8.6486	
14.0000	1.7450	1.7340	5.3558	
15.0000	1.7900	1.7930	9.4894	
16.0000	1.7640	1.7570	6.9672	
17.0000	1.7760	1.7610	7.2474	
18.0000	1.7815	1.7750	8.2283	
19.0000	1.7685	1.7680	7.7378	
20.0000	1.7860	1.7780	8.4385	
Average	1.7707	1.7657	7.5767	
Stnd (n-1	0.0119	0.0136	0.9548	
eight-sid	0.0954	0.1090	7.6381	

*from regression formula

Column 1	
Mean	1.7657
Standard Error	0.003126
Median	1.765
Mode	1.761
Standard Deviation	0.013982
Variance	0.000195
Kurtosis	0.265061
Skewness	-0.1245
Range	0.059
Minimum	1.734
Maximum	1.793
Sum	35.314
Count	20
Largest (1)	1.793
Smallest (1)	1.734
Confidence Level (95%)	0.006128

CAPACITANCE VS PRELOAD 77PSL3-1

y=1.6579668+0.014278174*X R=0.9614 N=80



DRS, 9/19/02, CAPREG.XLS

avg=1.7697pF (7.57mils)

stndp=0.0136 (.155)

$\hat{\sigma}_E = 0.10$ (7.23 mils)

$\hat{\sigma}_G = .0814$ (5.72 mils)

$C_{pk} = \frac{\bar{x} - LSL \text{ or } USL - \bar{x}}{3\hat{\sigma}_{GAGE}}$

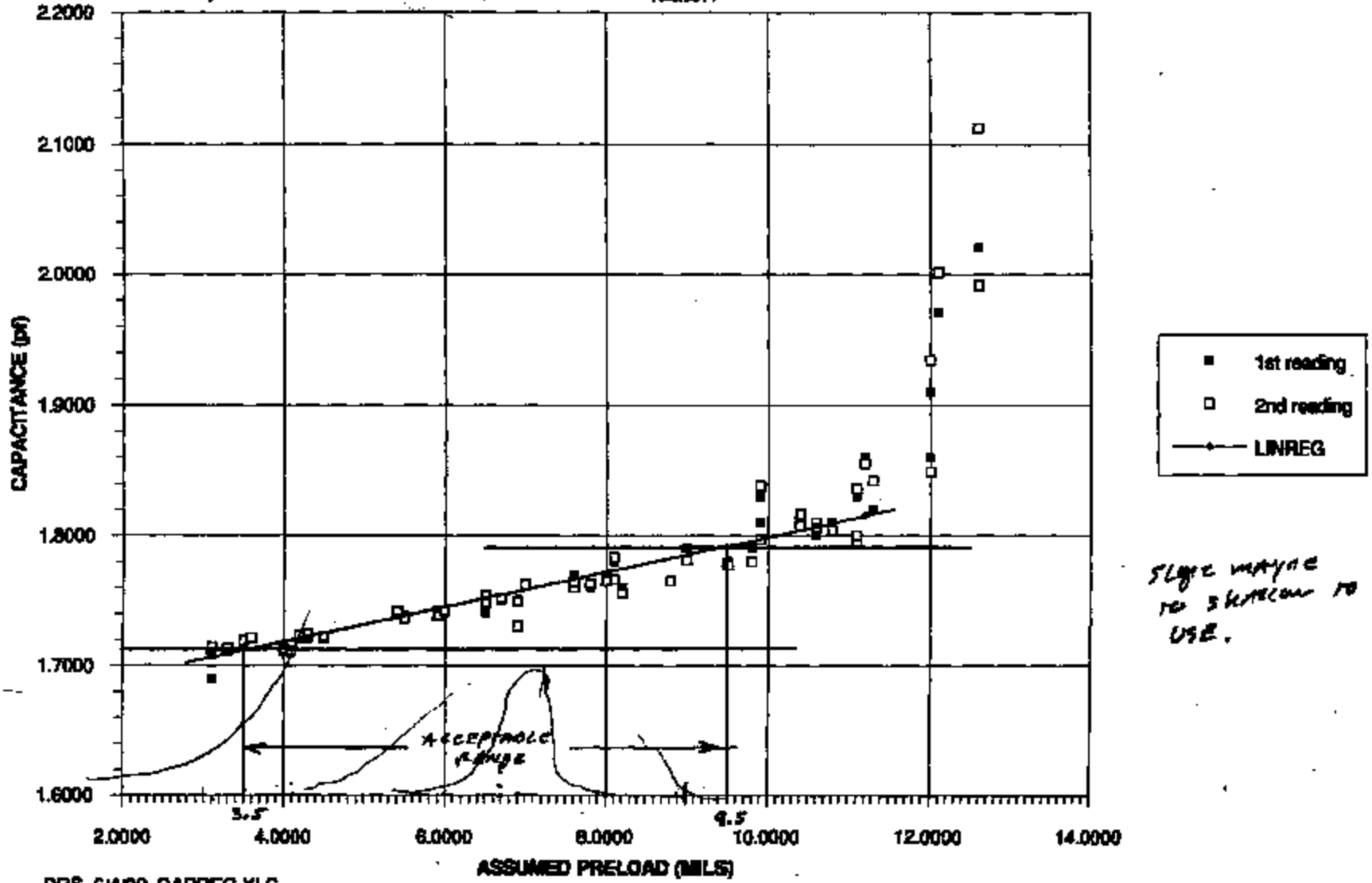
$\frac{7.5 - 3.57}{3(2)} = 0.67$

$$x = \frac{y - 1.657}{0.014}$$

CAPACITANCE VS PRELOAD 77PSL3-1

y = cap x = preload

y=1.657666369+0.014278174*X R=0.9514 N=80



Slope maybe no shorter to use.

DRS, 6/4/92, CAPREG.XLC

TI-NHTSA 006184

77PSL3-1		MAY 20, 1992							
DEVICES FOR CAPACITANCE TEST BY DES.ENG.									
						Capaticance (pF)			
DEVICE #	PIN	SENSOR	BASE	PRELOAD	1st read	2nd read	3 reading	average	PREDICTED
									y=1.65755639+0.014273174*x
3-1	0.1400	0.0443	0.0926	3.1000	1.6900	1.7080		1.6990	1.7018
3-2	0.1396	0.0441	0.0920	3.5000	1.7200	1.7190		1.7195	1.7075
3-3	0.1397	0.0450	0.0914	3.3000	1.7100	1.7130		1.7115	
3-4	0.1400	0.0443	0.0926	3.1000	1.7100	1.7140		1.7120	
3-5	0.1400	0.0447	0.0917	3.6000	1.7200	1.7210		1.7205	
4-1	0.1401	0.0441	0.0917	4.3000	1.7200	1.7240		1.7220	
4-2	0.1401	0.0442	0.0914	4.5000	1.7200	1.7220		1.7210	
4-3	0.1398	0.0443	0.0915	4.0000	1.7100	1.7120		1.7110	
4-4	0.1399	0.0442	0.0916	4.1000	1.7100	1.7110		1.7105	
4-5	0.1400	0.0442	0.0916	4.2000	1.7200	1.7230		1.7215	
5-1	0.1402	0.0445	0.0902	5.5000	1.7350	1.7370		1.7360	
5-2	0.1399	0.0444	0.0900	5.5000	1.7350	1.7360		1.7355	
5-3	0.1401	0.0446	0.0896	5.9000	1.7400	1.7420		1.7410	
5-4	0.1400	0.0443	0.0903	5.4000	1.7400	1.7420		1.7410	
5-5	0.1403	0.0443	0.0901	5.9000	1.7400	1.7380		1.7390	
6-1	0.1412	0.0444	0.0908	5.9800	1.7400	1.7420		1.7410	
6-2	0.1417	0.0440	0.0912	6.5000	1.7400	1.7480		1.7440	
6-3	0.1419	0.0443	0.0907	6.9000	1.7300	1.7300		1.7300	
6-4	0.1417	0.0448	0.0902	6.7000	1.7500	1.7520		1.7510	
6-5	0.1410	0.0443	0.0902	6.5000	1.7500	1.7540		1.7520	
7-1	0.1418	0.0447	0.0902	6.9000	1.7500	1.7490		1.7495	
7-2	0.1418	0.0448	0.0900	7.0000	1.7600	1.7620		1.7610	
7-3	0.1419	0.0445	0.0898	7.6000	1.7600	1.7600		1.7600	
7-4	0.1420	0.0444	0.0900	7.6000	1.7700	1.7640		1.7670	
7-5	0.1417	0.0442	0.0897	7.8000	1.7600	1.7630		1.7615	
8-1	0.1418	0.0445	0.0885	8.8000	1.7650	1.7650		1.7650	
8-2	0.1420	0.0447	0.0892	8.1000	1.7800	1.7830		1.7815	
8-3	0.1418	0.0446	0.0892	8.0000	1.7700	1.7650		1.7675	
8-4	0.1420	0.0443	0.0895	8.2000	1.7600	1.7550		1.7575	
8-5	0.1419	0.0443	0.0895	8.1000	1.7800	1.7660		1.7730	
9-1	0.1417	0.0445	0.0882	9.0000	1.7900	1.7810		1.7855	
9-2	0.1422	0.0445	0.0878	9.9000	1.8300	1.8380		1.8340	
9-3	0.1420	0.0445	0.0877	9.8000	1.7900	1.7800		1.7850	
9-4	0.1416	0.0445	0.0872	9.9000	1.8100	1.7970		1.8035	
9-5	0.1420	0.0447	0.0878	9.5000	1.7800	1.7770		1.7785	
10-1	0.1418	0.0446	0.0866	10.6000	1.8000	1.8100		1.8050	
10-2	0.1420	0.0444	0.0870	10.6000	1.8050	1.8060		1.8055	
10-3	0.1415	0.0446	0.0865	10.4000	1.8100	1.8070		1.8085	
10-4	0.1420	0.0444	0.0872	10.4000	1.8100	1.8160		1.8130	
10-5	0.1421	0.0445	0.0868	10.8000	1.8100	1.8040		1.8070	
11-1	0.1422	0.0444	0.0865	11.3000	1.8200	1.8420		1.8310	
11-2	0.1421	0.0445	0.0865	11.1000	1.8300	1.8360		1.8330	
11-3	0.1423	0.0444	0.0868	11.1000	1.8000	1.7950		1.7975	

77PSL3-1		MAY 28, 1992							
DEVICES FOR CAPACITANCE TEST BY DES.ENG.									
						Capaticance (pF)			
DEVICE #	PIN	SENSOR	BASE	PRELOAD	1st read	2nd read	3 reading	average	PREDICTED
									y=1.65755639+0.014273174*x
11-4	0.1421	0.0443	0.0866	11.2000	1.8600	1.8550		1.8575	
11-5	0.1416	0.0445	0.0860	11.1000	1.8000	1.8000		1.8000	1.8160
12-1	0.1431	0.0449	0.0861	12.1000	1.9700	2.0010		1.9855	
12-2	0.1432	0.0442	0.0864	12.6000	2.0200	1.9910		2.0055	
12-3	0.1420	0.0444	0.0856	12.0000	1.9100	1.9340		1.9220	
12-4	0.1430	0.0446	0.0858	12.6000	#N/A	2.1120		#N/A	
12-5	0.1420	0.0445	0.0855	12.0000	1.8600	1.8490		1.8545	
					y=1.65755639+0.014273174*x				
					r=0.951				
					n=45				

	TEST 1			TEST 2.	
	Capacitance [illegible]	Product.	Product.	Capacitance [illegible]	Product
# 1	1·786.	8·9989536315	8·99	1·779	8·5085
# 2	1·768.	7·737866065	7·73	1·767	7·6677
# 3	1·762.	7·21747769782	7·31	1·761	7·2474.
# 4	1·77	7·8779,96093	7·87	1·765	7·5276
# 5	1·77	7·8779696093.	7·87	1·765	7·5276
# 6	1·786.	8·9989536315	8·99	1·786.	8·9987
# 7	1·767.	7·667785051	7·66	1·764	7·6574
# 8	1·762.	7·21747759782	7·31	1·75	6·4767
# 9	1·778.	8·438466204	8·63	1·771	7·968
# 10	1·768.	7·737864660 65	7·73	1·755	6827
# 11	1·761	7·24774160968.	7·24	1·754	67069
# 12	1·748.	6·3366165788.	6·33	1·75	6·4769
# 13	1·778.	8·438466162804	8·63	1·781.	8·6486
# 14	1·745	6·12643207446	6·12	1·734	5·3657
# 15	1·790.	9·279199637.	9·29	1·793.	9·4893
# 16	1·764	7·457600601	7·65	1·757	6·9671
# 17	1·776.	8·2983864176.	8·29	1·761	7·2474
# 18	1·7815	8·6836748752	8·68	1·775	8·2282
# 19	1·76[illegible]	[illegible]773572	7·77	1·768.	7·7378
# 20	1·78[illegible]	8·9989536315	8·99	1·778	8·4384.

TEST 3.

	Cap.	Preload.
1	1.761	
2	1.753	
3	1.751	
4	1.748	
5	1.745	
6	1.778	
7	1.752	
8	1.739	
9	1.762	
10	1.75	
11	1.743	
12	1.734	
13	1.764	
14	1.727	
15	1.78	
16	1.742	
17	1.754	
18	1.766	
19	1.75[illegible]	
20	1.7[illegible]	

For Dale TEST 1 in Workshop.

Results 1.

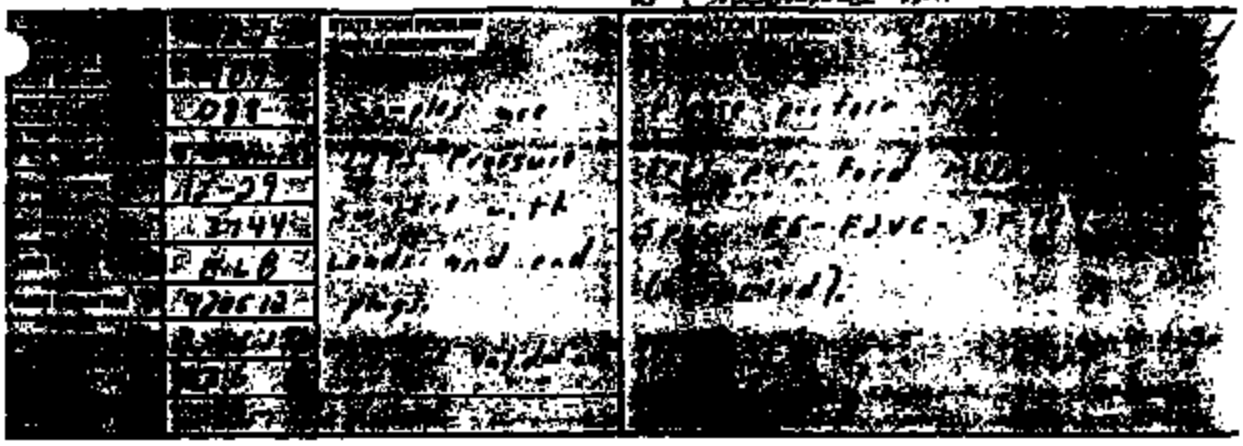
	CAPACITANCE	PRELOAD
1	1.784	8.9989536315
2	1.768	7.7378466065
3	1.762	7.3174775982
4	1.77	7.8779696093
5	1.77	7.8779696093
6	1.786	8.9989536315
7	1.767	7.6677851051
8	1.762	7.3174775982
9	1.778	8.4384616204
10	1.768	7.7378466065
11	1.761	7.2474160988
12	1.748	6.3366165788
13	1.778	8.4384616204
14	1.745	6.1264320746
15	1.79	9.279199637
16	1.764	7.457600601
17	1.776	8.2983386176
18	1.7815	8.4836768752
19	1.7685	7.7728773572
20	1.786	8.9989536315

Live on Production.

Results 2

DEVICE #	CAPACITANCE	PRELOAD	
1	1.779	8.5085	
2	1.767	7.6677	
3	1.761	7.2474	
4	1.765	7.5276	
5	1.765	7.5276	
6	1.786	8.9989	
7	1.764	7.4576	
8	1.75	6.4767	
9	1.771	7.9480	
10	1.755	6.8270	
11	1.754	6.7569	
12	1.75	6.4767	
13	1.781	8.4486	
14	1.734	5.3557	
15	1.793	9.4893	ANALYSIC
16	1.757	6.9671	
17	1.761	7.2474	
18	1.775	8.2282	
19	1.768	7.7378	
20	1.778	8.4384	

TEST NO. 111714 **TECHNICAL SERVICE LABS** TEST NO. 111714



REPORT OF RESULTS:

DATE RECEIVED 5/17/12 DATE OUT 6-12-12 EK/TB

TECHNICIAN			
HOURS WORKED			
PROCEDURE USED			

*PCC I.D.

MC=325	TM=431	JOCY=128	FACIL=514
PC=127	WIRE=432	CLKE=122	FACIL=521
VERS=168	SPD=521	CAN=664	FACIL=581
APCC=443	PEP=522	AD DEV=296	STAFF=856
IMD=430	OSD=535	EMOD=877	

DISTRIBUTION: White and Yellow - Lab Pink - Requestor

PRESSURE SWITCH DATA Form 21605 **TEST NO.** 302-15-24

DEVICE	DATE REQUESTED	REQUESTED BY	REQUESTED COMPL. DATE
7795 Bases (Noryl)		Steve Officer	
PERFORMED BY	**DATE STARTED**	**DATE COMPLETED**	**APPROVED BY**
Jeffrey DiBenedetto	920713	920809	

PROJECT TITLE:

CUSTOMER:

PURPOSE OF TEST: To insure that Noryl pigmented with different colors have similar thermal expansion properties

PROCEDURE: Crimp bases to dummy sensors measure from cap bump to base floor at room temp and 150°C.

group 1

Base #	Color	Room Temp	150°C	Δ	To				
302-15-01	Tan	.4755	.4791	.0036					
-02	↓	.4751	.4784	.0033	.00163				
-03	↓	.4752	.4792	.0040					
302-15-04	Black	.4750	.4775	.0025					
-05	↓	.4753	.4785	.0032	.00313				
-06	↓	.4747	.4784	.0037					
302-15-07	Red	.4751	.4785	.0034					
-08	↓	.4751	.4779	.0028	.00533				
-09	↓	.4750	.4788	.0038					
302-15-10	Grey	.4760	.4799	.0039					
-11	↓	.4765	.4805	.0040	.00377				
-12	↓	.4760	.4797	.0035					

(OVER)

TITLE: Noryl Base Thermal Shift Characterization

PURPOSE: To characterize the amount of shift observed between RT and 150 C for each of the four Noryl colors, to determine if any significant differences exist.

SCOPE: Bases (no terminals) are crimped to "dummy" sensors, which are cut away to expose the cup bump as a reference surface. The measurement from this bump to the floor of the base is recorded. Four Noryl colors (tan, black, red, and gray) are being compared. Only 12 dummy sensors are available, giving 3 test parts per color. Since a greater quantity is desired, two separate lots are run for a total of six data points per base color.

DATA: (average and standard deviation is given below each column of numbers)

Group I

Tan			Black			Red			Gray		
RT	150 C	Delta	RT	150 C	Delta	RT	150 C	Delta	RT	150 C	Delta
0.4755	0.4791	0.0036	0.4750	0.4775	0.0025	0.4751	0.4785	0.0034	0.4760	0.4798	0.0038
0.4751	0.4784	0.0033	0.4753	0.4785	0.0032	0.4751	0.4779	0.0028	0.4765	0.4805	0.0040
0.4752	0.4792	0.0040	0.4747	0.4784	0.0037	0.4750	0.4788	0.0038	0.4762	0.4797	0.0035
0.4753	0.4789	**0.0036**	0.4750	0.4781	**0.0031**	0.4751	0.4784	**0.0033**	0.4762	0.4800	**0.0038**
0.0002	0.0004	0.0003	0.0002	0.0004	0.0005	5E-005	0.0004	0.0004	0.0002	0.0004	0.0002

Group II

Tan			Black			Red			Gray		
RT	150 C	Delta	RT	150 C	Delta	RT	150 C	Delta	RT	150 C	Delta
0.4755	0.4780	0.0025	0.4744	0.4770	0.0026	0.4753	0.4777	0.0024	0.4764	0.4789	0.0025
0.4756	0.4785	0.0029	0.4747	0.4773	0.0026	0.4747	0.4775	0.0028	0.4762	0.4791	0.0029
0.4754	0.4780	0.0026	0.4750	0.4776	0.0026	0.4751	0.4780	0.0029	0.4760	0.4787	0.0027
0.4755	0.4782	**0.0027**	0.4747	0.4773	**0.0026**	0.4750	0.4777	**0.0027**	0.4762	0.4789	**0.0027**
8E-005	0.0002	0.0002	0.0002	0.0002	0	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002

Combined

Tan			Black			Red			Gray		
RT	150 C	Delta	RT	150 C	Delta	RT	150 C	Delta	RT	150 C	Delta
0.4755	0.4791	0.0036	0.4750	0.4775	0.0025	0.4751	0.4785	0.0034	0.4760	0.4798	0.0038
0.4751	0.4784	0.0033	0.4753	0.4785	0.0032	0.4751	0.4779	0.0028	0.4765	0.4805	0.0040
0.4752	0.4792	0.0040	0.4747	0.4784	0.0037	0.4750	0.4788	0.0038	0.4762	0.4797	0.0035
0.4755	0.4780	0.0025	0.4744	0.4770	0.0026	0.4753	0.4777	0.0024	0.4764	0.4789	0.0025
0.4756	0.4785	0.0029	0.4747	0.4773	0.0026	0.4747	0.4775	0.0028	0.4762	0.4791	0.0029
0.4754	0.4780	0.0026	0.4750	0.4776	0.0026	0.4751	0.4780	0.0029	0.4760	0.4787	0.0027
0.4754	0.4785	**0.0031**	0.4749	0.4777	**0.0029**	0.4751	0.4781	**0.0030**	0.4762	0.4795	**0.0032**
0.0002	0.0005	0.0005	0.0003	0.0006	0.0004	0.0002	0.0004	0.0005	0.0002	0.0006	0.0006

RESULTS: It can be noted that Group II seemed to shift less than Group I overall. No hypothesis has been generated yet to explain this. Note the increase in the st dev when the two groups are combined, relative to either group alone. Comparisons of the different colors within each group show no significant difference attributable to color. The maximum observed shift was .0040", which occurred twice (1-tan and 1-gray), while the overall average shift was .0030".

SBO/920807/FILE: NORYL

SBO 720807

cc: JEFF

TITLE: Noryl Base Thermal Shift Characterization to 182 C

PURPOSE: To characterize the amount of shift observed between RT and 182 C to determine if the Light Truck F-series high-temp limit poses potential problems.

SCOPE: The twelve devices from "Group II" of the previous 150 C characterization are used. Since this previous test showed no differences in thermal shift due to color, the data for all four colors has been grouped together. Measurement technique is the same as the previous test.

DATA:

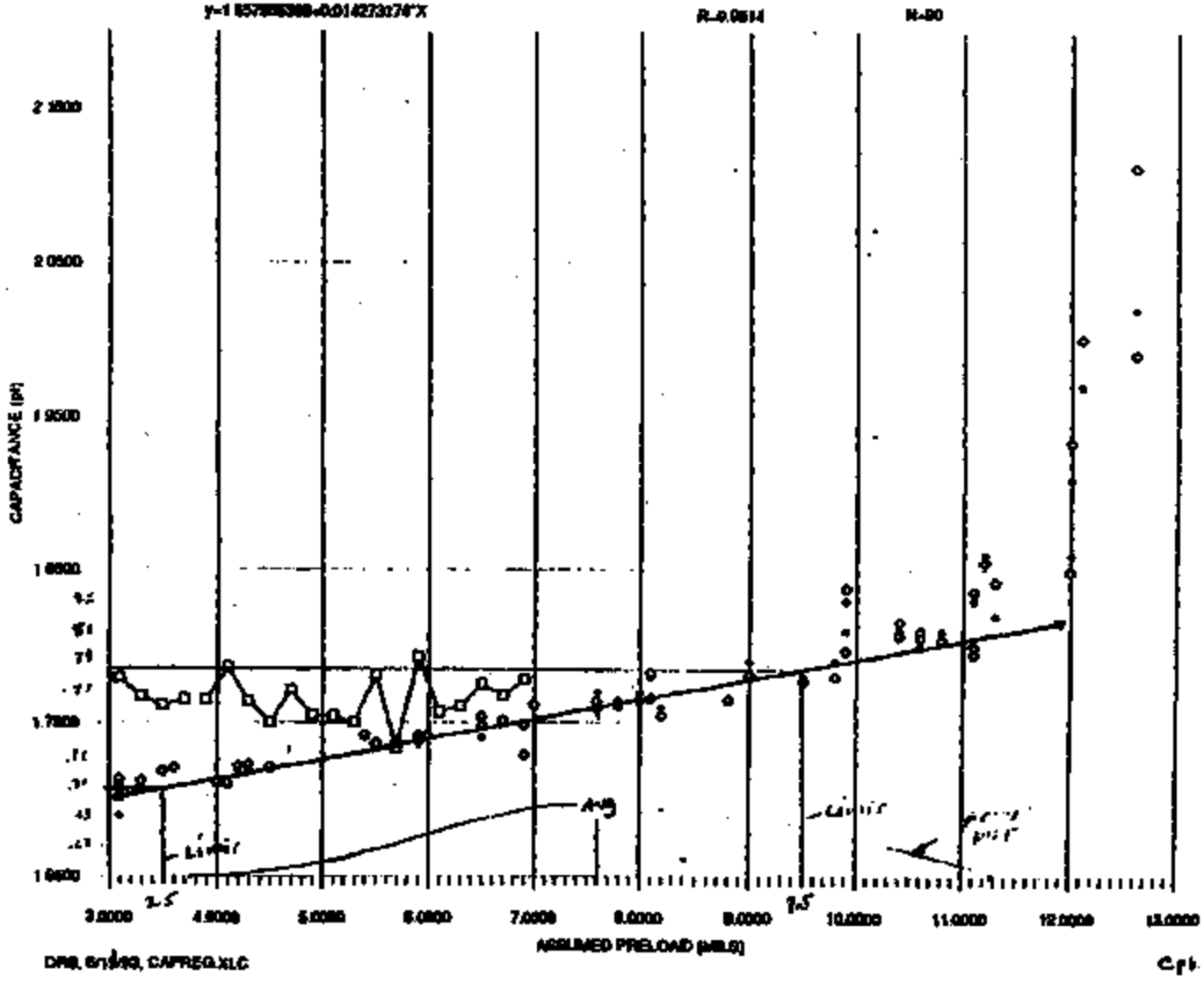
	RT	182 C	Delta
	0.4749	0.4797	0.0048
Tan	0.4750	0.4808	0.0058
	0.4749	0.4804	0.0055
	0.4738	0.4784	0.0046
Black	0.4740	0.4789	0.0049
	0.4744	0.4793	0.0049
	0.4745	0.4793	0.0048
Red	0.4741	0.4800	0.0059
	0.4742	0.4798	0.0056
	0.4758	0.4804	0.0046
Grey	0.4758	0.4815	0.0057
	0.4754	0.4803	0.0049
	avg	-->	0.0052
	std	-->	0.0005
	max	-->	0.0059

RESULTS: Temp shift at 182 C has increased by an additional 2 mils (approx) versus the 150 C characterization. The average of 0.0052 at 182 C compares with the average of .0030 at 150 C; and the max observed (12 data points) of 0.0059 at 182 C compares with 0.0040 (24 data points) at 150 C.

SBO/920808/FILE: NORYL182

SO 920909

CAPACITANCE VS PRELOAD TRIAL 1



DR6, 6/15/99, CAPREG.XLC

avg=1.7857pF (7.57 mils)

slop=0.0135 (135)

Y1 = 0.10 (7.65 mils

Y2 = .0814 (5.72 mils)

T = 0.67

HIGHLIGHTS

Stephen B. Offiler
Week Ending 92-06-19

FORD MY'92 ELECTRONIC SPEED CONTROL DEACTIVATE PS

57PSF3-3 and L11-3 VALIDATIONS: Stan Homol and I have discovered that retesting of F3-3 creep-release "failures" (non-Impulse) generally shows the devices to be good if tested at the ES maximum ramp rate of 10 psi/sec. However, some will show erratic behavior if subject to low-level shock (hitting them on a table). Stan suspects these may have an issue with spacer breakdown and/or wear particles hindering disc motion. We are rather confident that the bulk of the F3-3 issue is basically ramp-rate dependency, (ignoring the erratic ones) however, in my opinion the L11-3 still has pertinent problems. For example, we know that we had one cracked disc out of 33 devices undergoing the Impulse retest, and several more confirmed creepers and/or shock-sensitive erratic parts, and the pin windows are very narrow and shrinking over life.

This information (gilding the L11-3 issue somewhat) was presented to Tom Dann during his visit on Thursday, 6/18, and was well-received. He has asked that we present these findings in writing, including initial char, final slow-ramp char, and final fast-ramp char. He will include these documents, supplementing ISR test reports, with a request for deviation. Additionally, the outstanding areas of the L11-3 ES were discussed. He has also requested that we present this information in writing, along with an action plan for resolution with Ford.

We are making good progress on the F3-3 action items generated by our call to Gary Berlino and Jim Jensen at Ford. The four Impulse parts with creep-release between 10-30 msec were overnighted to Norm Freda for hand-delivery early this week. We have completed production-cycling 20 devices from the original lot, looking for this test to produce creepers to prove correlation of production testing with lab testing. Characterizations by Gail and Jeff should be complete Monday 6/22. Stan has shipped most of the devices purposely built as creepers, which Ford has committed to testing in their system to determine detrimental effects if any.

Norm is working to set up the meetings and conference calls required to complete the ES negotiations with Kuppel and Strauss. I have summarized our position in a lengthy memo to Norm, who is now well-prepared for face-to-face discussions - of course, I will stay closely involved in the negotiations.

AUSTRALIA: An issue has arisen with Ford of Australia, regarding the vacuum spec. They are asking us to go more than an order of magnitude lower than Ford USA. Our equipment can barely attain this level, and we have not had time yet to actually run devices. Field Sales in Australia is indicating a high priority is desired on this, as well as the delinquent prints.

F-SERIES: We are hosting John Pelkey and Nehru (sp?) Modi this Tuesday 6/23. Unfortunately, we are having problems with their 600 hour thermal-ramp Impulse test. We have had two ruptured diaphragms, one at 230 hr (=192K cycles) and one at 294 hr (=245K cycles). Also, the infrared heater is located above the vertically-mounted devices, and the controlling thermocouple is mounted high, quite close to the heater; thus temperatures of the devices below the thermocouple are quite a bit cooler. It has been proposed that we revamp the setup to mount devices at 45 degrees to vertical, to expose more of their length to the infrared rays. It is not clear if we'll be able to accomplish this by Tuesday. Finally, we are getting into a cycler conflict, because we also need to begin thermal cycles and Impulse testing on the EN53 and SHO quiet device validation. On a positive note, Pelkey has asked that the ISW needed ASAP include only a dimension check and reference to EN53/SHO fluid resistance tests. Based on this, it looks like we should abort the 600 hour test for now.

TEXAS INSTRUMENTS INCORPORATED
FORD MOTOR COMPANY VISIT
JUNE 23, 1992

MGSC DEACTIVATION SWITCH MATRIX

FORD P/N	MY92 APPLICATION(S)	MY93 APPLICATION(S)	MY94 APPLICATION(S)
F2VC-9F924-AB	FN36 EN53 (ABS)	FN36 EN53 (ABS) FN10	FN36 EN53 (ABS) MUSTANG CDW27
F2AC-9F924-AA	EN53 (NON ABS)	EN53 (NON ABS)	EN53 (NON ABS)
F2DC-9F924-AA		SHO	SHO
F3TA-9F924-AA	VN58	VN58	VN58
F3TA-9F924-BA		F-SERIES BRONCO	
F58A-9F924-AA			VIN88
940A-9F924-AA			FALCON
94JA-9F924-AB			CAPRI
TBD			F-SERIES BRONCO

[illegible] FR=ZARN TO=SBD1 SENT=03/25/92 03:40 PM
[illegible] ST=C DIV=0050 DC=03101 BY=ZARN AT=03/25/92 03:40 PM

[illegible]

[illegible]	STEVE SPENCER	SBD1
	BILL SWEET	WS4
	MATT WELLERS	MJS2
	[illegible]	PCDM
	C. [illegible] BARIBEAU	MFPC
[illegible]	TOM CHARBONEAU	TC
	RAY TOURANGEAU	RGT2
	ANDY McGUIRK	PCQA
	BILL CONDON	MFPC
	CHARLIE DOUGLAS	CMP1
	JOHN KOURTESIS	MDES
	PAUL LEDSER	PL
	STEVE WALTERS	MLDB
	JEFF DIDOMENICO	ELB
	RICH TURNER	ELB
[illegible]	DAVE CZARN	ZARN

[illegible] CCP9 HIGH TEMP ISSUE - MINUTES OF 3/25 MTG

[illegible]eetings will be held daily at 3:30 in the cafeteria until the issue is [illegible]esolved.

****
[illegible]XT MEETING:
****

DATE: THURSDAY 3/26
TIME: 3:30
PLACE: CAFETERIA CUBE

[illegible]SUE: Devices calibrated to the "short pin" (actually high calibration [illegible]mit) side of the pin window exhibit loss of continuity at elevated [illegible]emperature. Problem is primarily due to thermal expansion/warpage of [illegible]e case reducing the effective pin length.

[illegible]SCUSSION:

[illegible]gh temp viburation test completed w/52 mil offset (shortest effective pin [illegible]length). Spec = 5 - 50 - 5 hz @ 1.5mm displacement; 100 [illegible]icroseconds max chatter chosen for monitoring purposes. Results:

T = 121C all switches passed
on ramp up to 150C, one switch lost continuity at ~130C
T = 150C all remaining switches passed

[illegible]ORT TERM ACTIONS

= NEW ITEM OR COMPLETED ITEM
= PRIORITY ITEM

[illegible] FOR ALL SWITCHES = .050"
[illegible] OFFSET = .25 mm MAXIMUM ACTUATION
[illegible]

[illegible]

[illegible] revised 6/3
A.M. " "

VIBRATION TEST W/52 MIL OFFSET — OFFILER

MEASURE OFFSET OF SWITCH THAT LOST CONT'Y DURING VIBE TEST — comp. OFFILER ← (3 HAVE PARTS)

SAMPLE P/C BASE IN MAT'L ULTEM 2200 IN PROTO MOLD MODIFIED TO INCLUDE HEATERS — SELLERS/ WALTERS comp.

. SAMPLE FORTRON IN HEATED PROTO MOLD — SELLERS

PROD'N PRICING FOR FORTRON AND NORYL — SELLERS

TEST FORTRON AND NORYL ON PROD'N CRIMPER — SELLERS

RETEST "CONTINUITY" FALLOUT @ HIGHER UPPER PRESSURE LIMIT — SWEET

ADD CONTINUITY CHK AT 0 PSIG TO P-TESTER — SELLERS

MEASURE OFFSET ON SWITCHES FROM 45 TO 54 MIL OFFSET LOT... *remove spacers...* — OFFILER ← (MUST >.052 2.05; 15 HAVE PARTS)

CSOK CYCLE IMPULSE TEST 45 TO 54 MIL OFFSET LOT — OFFILER comp.

REPEAT THERMAL CHARACT. AFTER IMPULSE ON ABOVE LOT (on Saturday, 3/28) — OFFILER ← ONLY TO SAVE

45 TO 65 MIL OFFSET MATRIX - NORYL, FORTRON, ULTEM, PBT (control) - by 4/0 *Low cold, hot - BAKE* — SELLERS

UNDERSTANDING THE PROBLEM CAUSE

REPEAT THERMAL EXPANSION TEST W/ — OFFILER → SAME TO MIS (NO)
1. CYLINDRICAL PORTION OF BASE ONLY
2. ENTIRE BASE - NOT CRIMPED TO SENSOR
3. BASE MODIFIED WITH LARGER SENSOR NESTING DIAMETER, CRIMPED TO DUMMY SENSOR WITHOUT THE ENVIRON. SEAL

REPEAT THERMAL EXPANSION W/ALT. BASE MAT'LS (Noryl, Fortron completed; waiting for Ultem bases) — OFFILER

GARDE,
VE EZARN
[illegible]temp

[illegible]

→ CYCLER WINDOW FOR THERM EVAL? — MAYBE WED 8TH

→ (VAL), ED; IS THERE ENVIR. CONSTRAINTS; NEED CONTINGENCY PLAN!

→ 175°C DEVICE RTN'ED BY DELKEY, NEEDS REPORT, SPEAK W/ DELKEY.... THERM EXPERT'S FIN'S; MOVE TO NEW MAT'L — CAL INIT

29 June, 1992 (Monday)

✓ Riveter evaluations. See Friday Actions

- Capacitance test. Dave P.
- Claire. Downtime/Yields on Floor.
  - Throughput logs
- Honda
  - ✓ Call this afternoon to Elco on (Hexport)
  - ✓ Visit George Holman on (terminal) quotes.
  - ✓ Paul Westerlind on (Gasket) quotes.
  - Cup print marked-up with holes. (Steve B.)

✓ 77PS Terminal position capability. (Claire)

- Copy of document for 77/57 tester mods to Ed K.

Follow-up

- Model Shop on rebump Cup.
- Ed on Sound enclosure with conv.
- Steve Meeney. Wednesday do Term Strike tool print?

26 June, 1992 (Friday)

✓ EAM Riveter w/ G.

- 20 cut-out springs for test
- Samples off current riveter with altered springs
- samples off new riveter with altered spring and un-altered spring.
- Samples off new riveter with steel rivets.

✓ Capacitance test.
- Borrow tester. Try-out in design lab. (Dave)
- Build another shielded connector. (Dave)
- write procedure. (Matt)

✓ Model shop rework of 27713-1 cups reduce bump depth by .0045. (Dave)

✓ Downtime + Yield logs out to Floor. (Claire)

✓ under $5K capital review.

✓ Labor updates.

✓ Steve Butler. Print to quote holes on cup.

✓ Terminal position capability. (Claire)

follow-ups:

- Charlie, quiet Switch money.
- Steve Mccooey. Document staking tool prints.
- Ed K. Send enclosure for with-carr auto.

25 June, 1992 (Thursday)

- Honda

17 JUNE, 1992 (wed)

✓ 77PSC3-3 PFMEA

✓ 87PS Cost estimation

✓ 77PS Process Flow update
- Line layout for Similar to PSPS foil

✓ 77PS MEET minutes

Follow-up's

- under $5K Capital

16 JUNE, 1992 (TUESDAY)

✓ 4:00pm manufacturing Meeting.

Follow-up's

- ✓ under ASK Capital review
- ✓ Steve walters. Honda proto mule. Status. need schedule
- ✓ Steve McCooey MWO, LVDT, FAM.
- ✓ Ed MWO Press tester mods 8785.
- •

15 JUNE, 1992 (Monday)

- P.+ L Team meeting 3:00pm
  - ✓ R+m labor breakdown
  - ✓ link #'s breakdown.
  - ✓ write-up on design issue status
    - ✓ Data cracking
    - ✓ loose disc
    - ✓ capacitance testing
    - ✓ C1-1 spec. relief
    - ✓ Function tester defaults
    - ✓ Die set
    - ✓ Riveter
    - ✓ FAM LVDT
    - ✓ Suck/Blow station
  - ✓ Sorting operations - pareto
  - ✓ FTM Fallout - Analysis - pareto

✓ Re-bump tool trends (Dale Soggs)

✓ Honda print package

✓ 87PS Introduction. Pressure tester proposal status (Ed K.)

✓ Quote prototype o-ring mold for Honda to Rick Cali

✓ Quote Adding holes to cp w/ valentine.

- Follow-ups

✓ Charlie Quiet Swivel money.

✓ Honda EX 3477-2 quote. need MEAP

12 June (Friday)

✓ Assembly labor updates.
Here or at home this week.

✓ Rebecca Honda Design review today.

✓ Release FAM LVDT u/c

Follow-up

✓ Sensor gage Bond weight.

11 JUNE (Thursday)

- ✓ George Holman (CPK discussion)
- ✓ Charlie on Quiet Switch money. need to release CVOT.
- ✓ Bill Sweet on quiet Switch CVOT. BOK.
- ✓ Re-bump vs. Production measurements.
- ✓ Honda prints. Get package
- ✓ Review riveter U/C document w/ John K.
- ✓ Honda base mold quote today
- ✓ Honda Customer Funded Accounts
- ✓ Rusty on C3-3 500 pc. production build.
- ✓ Bldg. 11 Downtime Screen review.
- ✓ Set up calibrator DOE.

Follows-ups

- ✓ Paul Kotek FK3477-2 quote (Honda)
- ✓ Dave Varney F-D Fixturing Status

10 June (wed)

✓ Riviera upgrade - John K. on Bruce M. visit
Send to Norm Frodh 1 page write-up on what the change.

✓ Handle prints
- Toring
- Gasket
- Terminals
- Spring
- Base mold. (meeting w/ suitors)

✓ memo on Curve sensors (Rattlers)

Follow-up

✓ George Hetman Bassler Valentine car alarm
✓ Dave Varney on F-D Fixturing.
✓ Paul Koch EX3477-2 quote.

9 JUNE (Tuesday)

✓ AMF #2 upgrade plans.
- organize cap. #'s

✓ TAM Riveter: make status an official Subject

✓ Re-bump vs. Current production. Dave P.
- Familiarize Dave P. with re-bump tooling
Need samples for test ASAP.

✓ Complete G.M. Sealed Switch 2nd proposal

✓ FAM LVDT probe weights. 200 - 300 gms

✓ Dave P. on Sensor gage dead weight

✓ Need to release Honda Base Mold

✓ Capital under #5K.

✓ Set-up Honda Cust Funded ACCT.
Base mold
Terminal Tools
Spring Tools

Follow-up

TI-NHTSA 006211

8 JUNE, 1992 (Monday)

✓ TAM Riveter. Flo Steve McCooey

✓ 27713-1 Filler. Steve O.

✓ 27713-1 modification. Need quote

✓ G.M. Sealed Switch

✓ FAM L.V.D.T. quote / Proposal

✓ Honda Base mold
- Steve to review cup w/ Valentine

(FAX) 3647

✓ order 10,000 EX3423-64-1[3]
- set-up charges ?

Follow-up

✓ Elco quote EX3477-2 (Honda)

June 5, 1992 (Friday)

✓ Highlights

✓ Bob Bartosh line tour. Issue review.
- BTPS start-up
- Quiet Switch
- long range forecast
- line yields
- Honda / Nissan overview
- over-all Cost's. MLO
- PAC meeting

Follow-ups

✓ Bassler / Valentine MES dam George / Avoie.
✓ Elco EK3477-2 quote.

June 4, 1992 (Thursday)

- ✓ Disc lot size meeting 2:30pm mcR
- ✓ Riveter tryout today. MCS information for Norm Freda.
- ✓ George Holmes B512
- ✓ memo to Steve O. on 27713 Filler .002
- ✓ Sim / cPk George Holmes
- ✓ Dale. Nord vs. Celanex Charlie Black Celanex Future
- ✓ Honda response to Sally on why's
- ✓ C.M response on Alternate Sealed Switch proposal.

Follow-up

- ✓ Dave P. 5285 Alum Crimping.
- ✓ Fam pin check LVDT proposal

June 3, 1992 (Wed)

- ✓ Riveter due today. try-outs Commence.
- ✓ Honda Hexport print to mech (proposal for mod's) EX3477-2
- ✓ Honda prints out for quote today.
- ✓ Bassler / A.J.K. meeting Honda terminals - quote request.
- ✓ Andre C. Additional definitions } 77PS60-3 77PS65-2
- ✓ Cadillac Sealed Switch proposal - discuss with walter during Honda mtg. 1/20 letter 235 K tooling 20¢ adder.
- ✓ STAT term ECN
- ✓ Norm Freda @ 313-553-1557
- ✓ Springs / terminals for riveter try-outs tomorrow.
- ✓ Priorities 57/77 tester o/c's with Bill Sweet

Follow-up

- ✓ more Q quiet switch Flow plan
- ✓ Suck/Blow Station
- ✓ Smart response to two memos.
- ✓ Dave Varney P.O test Fixtures
- ✓ Paul Kotch EX 3477-2 proposal

June 2, 1992 (Tue)

✓ AMI U16 for metric Hex to Charlie O.

✓ Chirp rework of JS12 Snubbers

✓ Cadillac Sealed Switch proposal update
- steve emailed on base

✓ Stat. Term ECN

✓ Norm Feeds Call @ 313-553-1557
rivet spec on Torque / HT.

✓ Set-up MTG. with A.J. Knorr / Bassler
for 6/2 Technical review
Design review / quote.
waiters on Base mold.

✓ FAM mods / FTM mods for metric Hexport

Follow-up

✓ Dale Sogge High Diff & Loose die.
✓ Ed R. follow-ups 57/278S tester U16's.
✓ micro oiling process.
✓ Dave Varney P.O fixturing
✓ Pat Korch Elco quote EX3477-2

June 1, 1992 (Monday)

- ✓ Quiet Switch Flow plan.
- ✓ Dave P. on Suck/Blow Station.
- ✓ Cadillac Sealed Switch Design (Stan H.)
- ✓ 77 tester default 87PSC 0-2 77PSC2-1
- ✓ Stat. term. ECN
- ✓ tech list Bill

Follow-ups

- ✓ Dave Handy on Dirc A-D Fixturing
- ✓ Paul Kosch on Elco quotes EX 2477-2

May 29, 1992 (Friday)

- ✓ Highlights
- ✓ DC088 labor report. Response memo Dick Garcia.
- ✓ 77tester defaults. -87PSL3-2 → -77PSL3-1
- ✓ Guide P&L mailing list
- ✓ Stationary terminal ECN (splices) →
- ✓ Tech list. Review w/ Bill / Techs.
- ✓ High diff categorization: 45-50psi; 50-55psi
- ✓ Build 20 devices with loose disc Base check @ +.001.
- ✓ Cadillac Sealed Switch.

Follow-ups

- ✓ Steve McCooey rivetor schedule (Feed back to Norm F.)
- ✓ Ed K. proposal for 57/72 tester w/6's.
- ✓ mwo for Automatic oiling process.

May 26, 1992

- Honda proposal - Leak check
  - Cleaning

  Due May 27, 1992

- Labor report PC 088 - (Tech for Summerston)
- Crimp results - (Determine Actions, Send memo)
- Memos: Steve M. Rivera school
  Andre C. Defaults of 77 FTM
- Tech list update. Sit w/R:11 Sweet.

✓ LVDT probe proposal

18 June (Thursday)

- AMI #9 upgrade plan

19 June (Friday)

22 June (Monday)

- Capacitance test vs Hypot
  - Fixturing
  - Borrow tester (Roland Morin)
  - test in IAL to see if tester is O.K.

- Cups. Model Shop to +.0045 higher bump.

23 June (Tuesday)

24 June (wednesday)

- N.O.K. visit 1:30 Cafe

1 July, 1992 (Wednesday)

CERTIF ..T

RIVERDALE PLATING & HEAT TREATING, INC.

[illegible]

OTERASTERS MANUFACTURING, INC.
767 INDUSTRIAL DR
ELMHURST IL [illegible]

27619-1 WASHER TT-LOT (A)

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

155147	110792	[illegible] TO R/C 47645	12,369	269	6/29/92
155147	110792	THK .0005 - .0006	12,369	269	6/29/92

Subscribed and sworn to before me

THIS 29 DAY OF JUNE [illegible]

Notary Public

OFFICIAL SEAL
[illegible]

RIVERDALE PLATING & HEATING TREATING, INC.
- QUALITY CONTROL

[illegible] Vice President

[illegible] 1992

TI-NHTSA 006228

#37639

Paratech, Inc.

MINIATURE TECHNICAL CERAMICS

15840 Minnesota Avenue • P.O. Box 718 • Paramount, California 90723
Telephone (213) 633-2048 • Fax (213) 633-4907

MATERIAL CERTIFICATION

DATE: 6-30-92

TEXAS INSTRUMENTS, INC.

ORDER NO.: 505108677

PART NO : 74078-148 REV. NO.: G

QUANTITY THIS SHIPMENT: 80,000

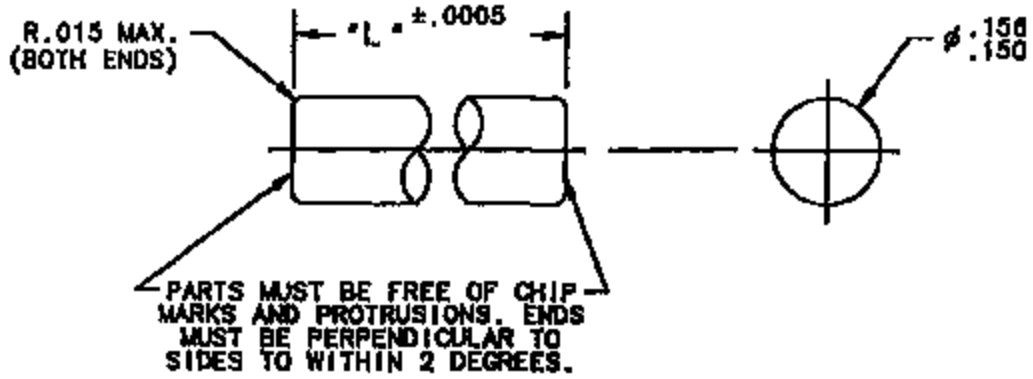
SHIPMENT DATE: 6-30-92

PART DESCRIPTION: PIN

WE CERTIFY THAT THE MATERIAL USED TO PRODUCE THE PRODUCT IN THIS SHIPMENT, NAMELY PIN / STEATITE - L3 , CONFORMS TO T.I. DRAWING AND T.I. PURCHASE ORDER REQUIREMENTS.

PRODUCTION MANAGER

TITLE	REV.	
TRANSFER PIN	G	74078



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

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

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

NOTES:

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

MATERIAL: L-3 GRADE STEATITE (DC-16E6) OR
L-3 GRADE STEATITE (DC-144E)

CURE PER SPEC.----- 50502-2

SHRINKAGE SPEC.---- 50501-1

CERTIFIED PRINT
Parts Made To This Print Must Conform To
ENG. STD. E9898 REV. E
Date JUL 16 1992

THIS DWG. SUPERSEDES 74078 REV. "E" DATED 6-1-88

BY	TEXAS INSTRUMENTS	KILTON	DWG. SIZE	DWG. NO.
TOM DAIL 10-17-88			A	74078

7.1

Insulfab PLASTICS, INC.

PLASTIC FABRICATORS DIVISION
155 NO. MAIN STREET, FRANKLIN, N.H. 03235
603-934-2770

CERTIFICATE OF CONFORMANCE

TO: TEXAS INSTRUMENTS DATE: JUN 30 1992

ATT: QUALITY CONTROL SUP.

THIS CERTIFIES THAT:

SHIPMENT # 164098

PART # 73958-1 REVISION C

QUANTITY 300,000

MAT'L DESC KAPTON HN

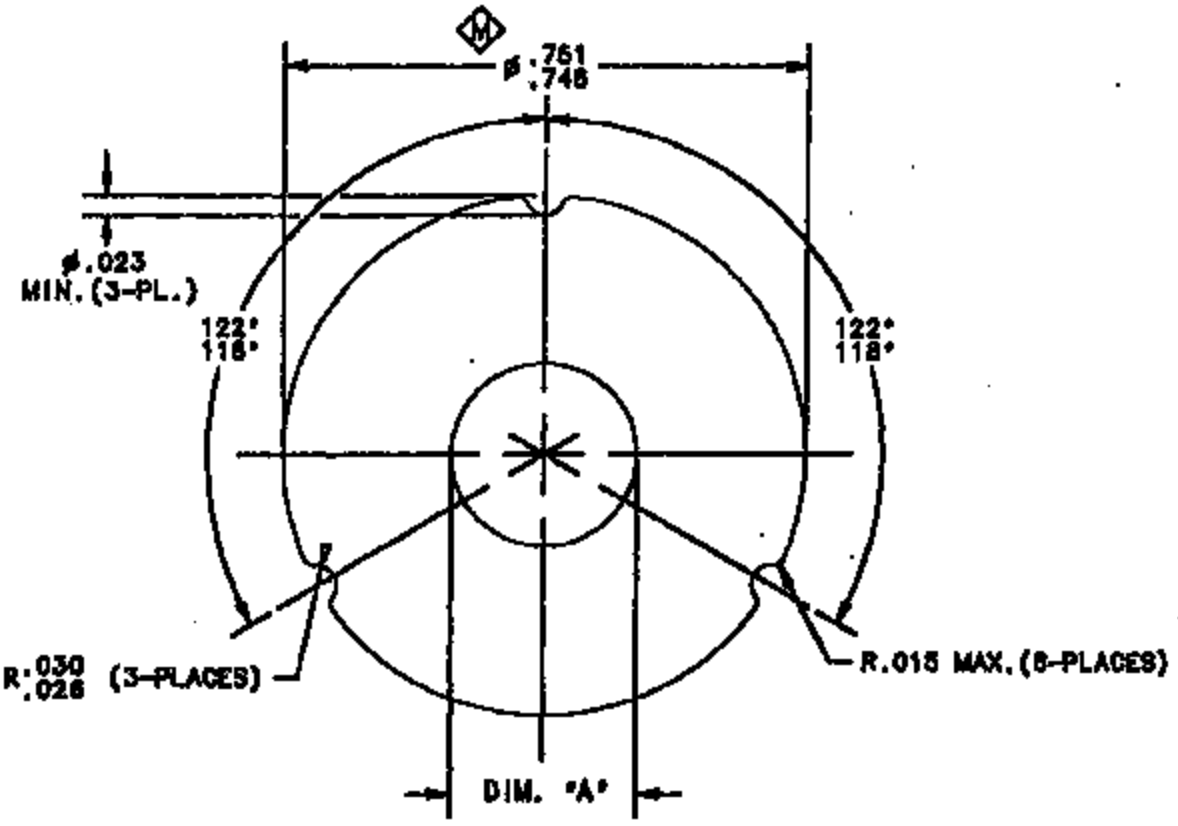
IS IN CONFORMANCE WITH THE REQUIREMENTS, SPECIFICATIONS, AND DRAWINGS

OF YOUR ORDER # 5051093S7-9

BY: INSULFAB PLASTICS
FRANKLIN, NH 03235

Fred Vuyosy
QUALITY CONTROL MANAGER

	TITLE	REV.	
	SPACER	G	73958



NOTES:

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

CERTIFIED PRINT
Parts Made to This Print Must Conform To
ENG. STD. E9898 REV. E
Date JUL 16 1992

PART NO.	MATERIAL	DIM "A"
73958-3	MADE FROM 74224-1 (KAPTON TAPE)	NO HOLE
73958-2	DUPONTS, KAPTON 200H, .0017 - .0023 THICK	
73958-1	KAPTON .0017 - .0023 THICK	.260/.270

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

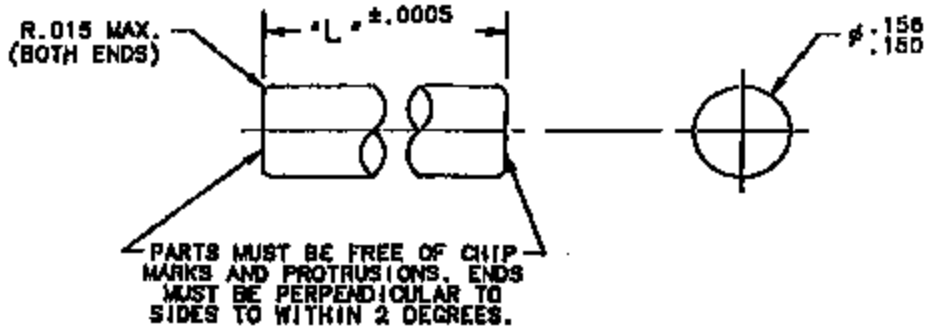
REV.																
													ESB	QA	MAT	PRG

BY TOM DAIL 10-10-88
CHK

TEXAS INSTRUMENTS | KILDON | SIZE A | DWG. NO. 73958

TI-NHTSA 006230

	TRANSFER PIN	REV. G	74078



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

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

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

NOTES:

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

MATERIAL: L-3 GRADE STEATITE (DC-188B) OR L-3 GRADE STEATITE (DC-144E)

CURE PER SPEC.----- 50502-2

SHRINKAGE SPEC.---- 50501-1

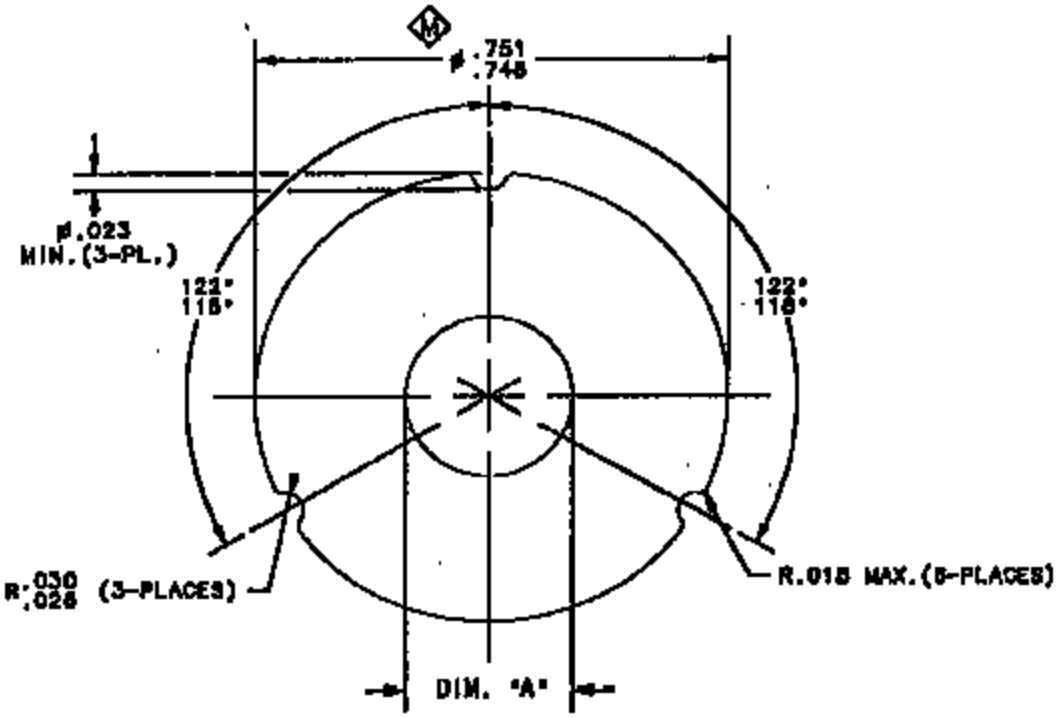
CERTIFIED PRINT
Parts Made To This Print Must Conform To
ENG. STD. E9898 REV. E
Date JUL 16 1992

THIS DWG. SUPERSEDES 74078 REV. "E" DATED 6-4-88

BY	CH.	ENG.	TEXAS INSTRUMENTS ATTLEBORO, MASSACHUSETTS 02703	KLIXON CONTROL PRODUCTS DIVISION	SIZE A	DWG. NO. 74078

TI-NHTSA 006231

	SPACER	G	73958



NOTES:

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

CERTIFIED PRINT
Parts Made To This Print Must Conform To
ENG. STD. E9898 REV. E
Date JUL 16 1992

PART NO.	MATERIAL	DIM "A"
73958-3	MADE FROM 74224-1 (KAPTON TAPE)	
73958-2	DUPONTS, KAPTON 200H, .0017 - .0023 THICK	NO DIM
73958-1	KAPTON .0017 - .0023 THICK	.260/.270

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

BY TOM DAIS 10-16-89
CH.
ENG. [signature] 10/16/89

TEXAS INSTRUMENTS
ATTLEBORO, MASSACHUSETTS 02703

KLIXON
CONTROL PRODUCTS DIVISION

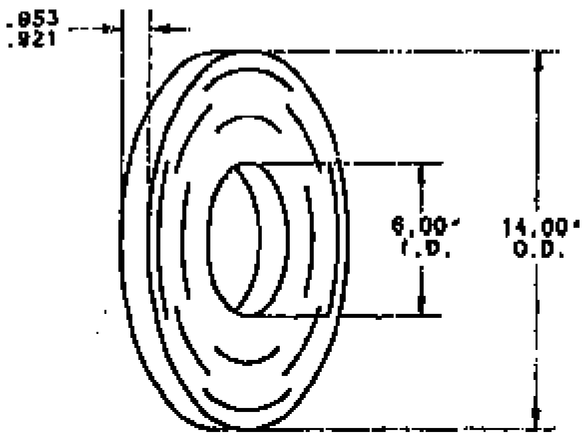
DWG. SIZE A

73958

	TITLE KAPTON TAPE	REV. F	74224

NOTES:

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



CERTIFIED PRINT
Parts Made To This Print Must Conform To
ENG. STD. E9898 REV. E
Date JUL 1 6 1992

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

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

BY TOM DALL 10-14-88 CH. ENG. 10-16-90	TEXAS INSTRUMENTS ATTLEBORO, MASSACHUSETTS 02703	KLIXON CONTROL PRODUCTS DIVISION	DWG. SIZE A	DWG. NO. 74224

TI-NHTBA 008235

7-1

INSULFAB PLASTICS, INC.

PLASTIC FABRICATORS DIVISION
155 NO. MAIN STREET, FRANKLIN, N.H. 03235
603-934-3770

CERTIFICATE OF CONFORMANCE

TO: TEXAS INSTRUMENTS DATE: JUN 30 1992

ATT: QUALITY CONTROL SUP.

THIS CERTIFIES THAT:

SHIPMENT # 164096

PART # 73958-1 REVISION C2

QUANTITY 300,000

MAT'L DESC KAPTON HN

IS IN CONFORMANCE WITH THE REQUIREMENTS, SPECIFICATIONS, AND DRAWINGS

ON YOUR ORDER # 5105092327-4

BY: INSULFAB PLASTICS
FRANKLIN, NH 03235

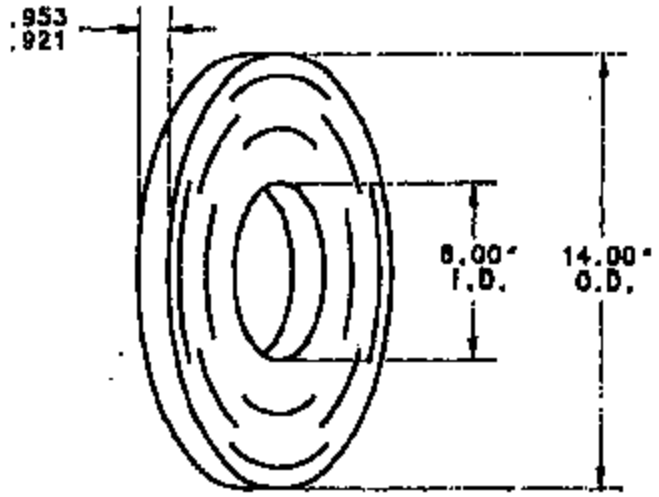
Fred Hussey
QUALITY CONTROL MANAGER

TI 0004699

TITLE	REV.	
KAPTON TAPE	F	74224

NOTES:

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



CERTIFIED PRINT
Parts Made To This Print Must Conform To
ENG. STD. E9898 REV. E
Date JUL 16 1992

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

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

BY TOM DAIL 10-14-88
CH.

TEXAS INSTRUMENTS | KILDON | SIZE A | DWG. NO. 74224

E. I. DU PONT DE NEMOURS & COMPANY
CIRCLEVILLE, OHIO 43113

NO: KC-13
Effective Date: 4/3/91
Expiration Date: 4/3/92

MATERIAL CERTIFICATION

DATE: 6-30-92

CUSTOMER: TEXAS INSTRUMENTS, ATTLEBORO

CUSTOMER ORDER NO. 5000 11913

CUSTOMER PART NO. & REV. 74224-1 (REV. F)

QUANTITY THIS SHIPMENT 31.90

SHIPMENT DATE 6-30-92

We certify that the material used to produce the product in this shipment, namely 200EN Kapton®, 15/16" wide, conforms to TI drawing and TI purchase order requirements on file with the KPF Group of the Dupont Company.

SUPPLIER REPRESENTATIVE
ENGINEER - QUALITY CONTROL - TITLE

:dkh/smart no. 389

6/26/92

TO: Matt Sellers
Dave Czarn
Steve Offiler
Dick Garlepy

FR: Dale Sogge

s|: Quiet switch preload

I have completed the preliminary capacitance vs preload study. As you may recall we proposed that capacitance could be used to check each device from possible mis-pining prior to shipping. It was felt that it would be a more useful test than Hypot. Hypot only checks for long pinned devices where as capacitance checks for both long and short pins.

There is an excellent correlation between capacitance and preload as shown in the attached figure (r=.95). The correlation includes two sets of readings taken one day apart, so repeatability seems to have little effect.

Twenty devices from production were measured to get a feel for our production capability. These are shown on the attached graph. Unfortunately we are not capable to the limits of 3.5 and 9.5. Cpk is 0.67. The data also shows that we are not centered at the 6.5 mil target.

In spite of this lack of capability I strongly recommend that we add a capacitance test to the final tester. If we don't have it in place then we can't figure out what we have to do to improve. Matt has agreed to coordinate mechanization to get this built.

I also strongly suggest that we add this on a sample basis immediately to set if some bad parts are getting out the door. No one currently has this as an action item.

We temporarily installed the cap tester inside the final tester and found that we got identical readings to hose taken in the lab. This means that we don't have to worry about electrical noise if cabled properly.

Regards,
Dale

TEST NO. 111745

TECHNICAL SERVICE LABS

TEST NO. 111745

*POD I.D.	127
REQUESTOR COST CENTER	101
PRODUCT CODE	088
REQUESTOR	S. OF FILE
MAIL STATION	12-29
EXTENSION	1382
LOG ID	5801
DATE SUBMITTED	920630
DATE REQUIRED	920708
NO. OF SAMPLES	1
DESCRIPTION	MIXED - SEE ABOVE

STATE YOUR PROBLEM
SAMPLE DESCRIPTION

SAMPLES CONTAINED IN 3 FOIL PACKETS. # 1 IS A JEWELRY REMOVER SUBSTANCE FOUND WITHIN SWITCH CAVITY. #2 CONTAINS GLASS TERMINALS AND BETA SPRING OF SILVER PLATED CONTACTS. # 3 IS THE "CUP", ZINC - PLATED IRON ALLOY. ALL FROM A CUSTOMER - RETURNED 7FP5 BRAKE MASSAGE SWITCH.

INFORMATION DESIRED: 2249

1) WHAT IS THE JEWELRY REMOVER SUBSTANCE?
2) WHY IS THE BETA SPRING MARRED TO TERMINAL?

REPORT OF RESULTS:

DATE RECEIVED 7/1/92 DATE OUT 7/14

TECHNICIAN			
HOURS WORKED			
PROCEDURE USED			

*PCC I.D.

MC=325	TM=431	JOCY=126	FACIL=514
PC=127	WIRE=432	CLKE=122	FACIL=521
VERS=168	EPD=621	CAN=954	FACIL=531
AFCC=483	PEP=622	AD DEV=286	STAFF=855
IMD=430	CSD=636	EMCD=877	

DISTRIBUTION: White and Yellow - Lab Pink - Requestor

Product Quality Documentation

CERTIFICATE OF COMPLIANCE

Customer Order Number	Customer Part Number	GE Resolution Number	Material, Grade and Color
9000[illegible]455	[illegible]43[illegible]	[illegible]	NORYL 01[illegible] 1790

Lot Number	Qty. Shipped	U.M.	Shipped From	Date Shipped	Shipper's Number
N70[illegible]	[illegible]	LB	MASS SERVICE INC	[illegible]/92	[illegible]

It is hereby certified that the material referenced above conforms to our standard material specifications for the designated material. This certification is subject to our standard conditions of sale applying to products sold to the General Electric Company.

Specification

Specification-Originator

Specification-Constancy

TEST	METHOD	REQUIREMENT	RESULTS	(METRIC)
LOT DATA:				
HDT @264 PSI - 1/4	[illegible]	[illegible] DEG F MINIMUM	[illegible] DEG F	[illegible] DEG C
NOTCHED IZOD IMPACT	[illegible]	[illegible] FT-LB/IN MINIMUM	[illegible].5 FT-LB/IN	[illegible].3 J/M
% ELONGATION	[illegible]	[illegible]5 MINIMUM	3 %	
TENSILE YIELD	[illegible]	[illegible]0,000 PSI MINIMUM	[illegible]5,070 PSI	[illegible]
FLEXURAL MODULUS	[illegible]	[illegible],000,000 PSI MINIMUM	[illegible],[illegible],000 PSI	[illegible]
FLEXURAL STR @ YIELD	[illegible]	[illegible],000 PSI MINIMUM	[illegible],[illegible]00 PSI	[illegible]
SPECIFIC GRAVITY	[illegible]	[illegible].31-[illegible].35 G/CC	[illegible].[illegible]8	[illegible].32 G/CC
% MOISTURE CONTENT	[illegible]	[illegible].50 % MAXIMUM	[illegible].[illegible]8 %	
PRODUCT DATA:			DATE OF LAST AUDIT: 01/92	
FLAMMABILITY, [illegible]	[illegible]	4.00 IN/MIN MAXIMUM	[illegible]	[illegible]

69

[illegible]
Quality Technology Manager

THOMAS [illegible]
Manufacturing Quality Manager

...have any questions concerning this, please contact:

[illegible]

[illegible]

REN [illegible]
TEXAS INSTRUMENTS
34 FOREST ST. MS 14-04
ATTLEBORO MA 02703

1/7-1

K. F. BASSLER COMPANY, INC.
PRECISION TOOLING & METAL STAMPINGS
45 John Wiliam St. • Attleboro, MA 02703 • (508) 222-1061 • Fax: (508) 226-1606
EST. 1946

MATERIAL CERTIFICATION

CUSTOMER: TEXAS INSTRUMENTS, INC. -- ATTLEBORO

CUSTOMER ORDER NO.: 5051118095

CUSTOMER PART NO.: 27406-1

REVISION: F

QUANTITY THIS SHIPMENT: 10,500

LOT NO. THIS SHIPMENT: 166

SHIPMENT DATE: 7.1.92

WE CERTIFY THAT THE MATERIAL USED TO PRODUCE THE PRODUCT IN THIS SHIPMENT, NAMELY, AK 1009 CRS, CONFORMS TO TI'S DRAWING AND PURCHASE ORDER REQUIREMENTS.

AUTHORIZED SIGNATURE: Kathleen A. Penkala

Kathleen A. Penkala
Inside Sales Specialist

PMA PRECISION METALFORMING ASSOCIATION

COMPLIANCE #1

TELEX 881314
FAX 315-336-5510
PHONE 315-336-3800
DUNS 282-3136

ROME STRIP STEEL COMPANY, INC.

530 HENRY ST. BOX 189
ROME, NEW YORK 13440

DATE	INVOICE NO
03/02/92	14240

0 1 0 0 0 0 0 0

SALES CODE
08072016

INVOICE TO: K. F. BASSLER CO., INC.
45 JOHN WILLIAM ST.
ATTLEBORO, MA 02703

SHIP TO: K. F. BASSLER CO., INC.
45 JOHN WILLIAM ST.
ATTLEBORO, MA

QUANTITY (LBS)	NO CLS.	NO SLNS OR ROLL	PARTIAL COMPLETE	SHIPPED BY
11,366	072	08	PART	R S S

ST NO	C	MR	P	S	SI	MI	CR NO
F40019	05	29	011	012	01	01	03

AL	SH	CU	CA

KEES REQUIREMENTS OF:
FIRST ORDER NO 14474

SIZE .7MM X 25.40MM

.04600 X 1.0000

TOLERANCE
+00050-00050+005 -005

+013 -013MM +127 -127MM

TEMPER
8 50 MAX

EDGE
NO3 SLIT

MILL NO.
66012

COILS OR CUT
COIL

LENGTH SPEC
200 PIW 16 34

CLASS
ALUM-KOLD

ASTM NO.
C-1008

COLOR CODE

PREPAID COLLECT
PREPAID

STRAPPING	PAPER WRAP	RAILS	CHAFFS	BOX
BAGS	SKID SIZE	PKG. HT	WASHERS	COVER
200 LBS 1600		21 MI MAX		
ROUTERS	SPACERS	SHROUD	BOARDS	CAPS
INNER	CARRIER	FLATNESS	OIL	T-PCS
	500/096'			

(5,156 KG) 11,366

TEST REPORT

Certificate of Compliance

ATTEST:
052 00280 33-030742
Notary Public, Oneida County
My commission expires

DATE

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

ROME STRIP STEEL CO., INC.

TI-NHTSA 008245

#27900

COMPLIANCE #1

ROME STRIP STEEL COMPANY, INC.
530 HENRY ST. BOX 169
ROME, NEW YORK 13440

TELEX 861214
FAX 315-336-8310
PHONE 315-336-9600
DAL-NET 223-3130

DATE	INVOICE NO.
03/04/92	14343

0 1 0 0 0 0 0 0

SALES CODE
0807 2016

INVOICE TO: K. F. BASSLER CO., INC.
45 JOHN WILLIAM ST
ATTLEBORO, MA 02703

SHIP TO: K. F. BASSLER CO., INC.
45 JOHN WILLIAM ST
ATTLEBORO, MA

QUANTITY (LBS)	NO. CLS.	NO. SKDS OR BDLS	MATERIAL COMPLETE	SHIPPED BY	MT. NO.	C	RE	T	S	SI	NI	CR	NO
9,562	060	07	COMP	CAN MEX	F40019	05	29	011	012	01	01	03	
									AL	VR	CS	CA	

CUST. ORDER NO 14474

COLOR CODE

SIZE	TEMPER	COILS OR CUT	MILL NO.	PREPAID COLLECT	STRAPPING	PAPER WRAP	REELS	CRATES	BOX
L7MM X 25.40MM			06012	PKEPA10					
.04600 X 1.0000	@ 50 MAX	COIL		200 LBS	BANDS 1600	BILLS SIZE	PKG. WT 21 MI MAX	WASTERS	CORES
					NUMBERS	SPACERS	SHIELDS	BOARDS	CAPS
TOLERANCE +00050-00050+005 -005	EDGE NO3 SLIT	LENGTH SPEC 200 PIW 16 34			BURR	CARBON 500/096"	FLATNESS	OIL	T-PCS

+013 -013MM +127 -127MM

CLASS: LOT: ALUMINUM

1 4,337-KGS 9,562

TEST REPORT

Certificate of Compliance

ATTEST:
052 06290 33 030742
Notary Public, Oneida County
My commission expires 5/1/92
DATE 5/5/92

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

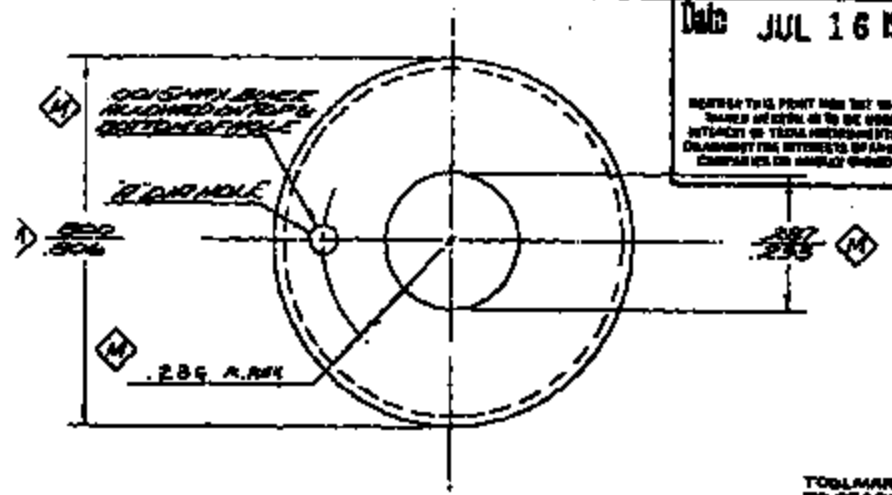
ROME STRIP STEEL CO., INC.

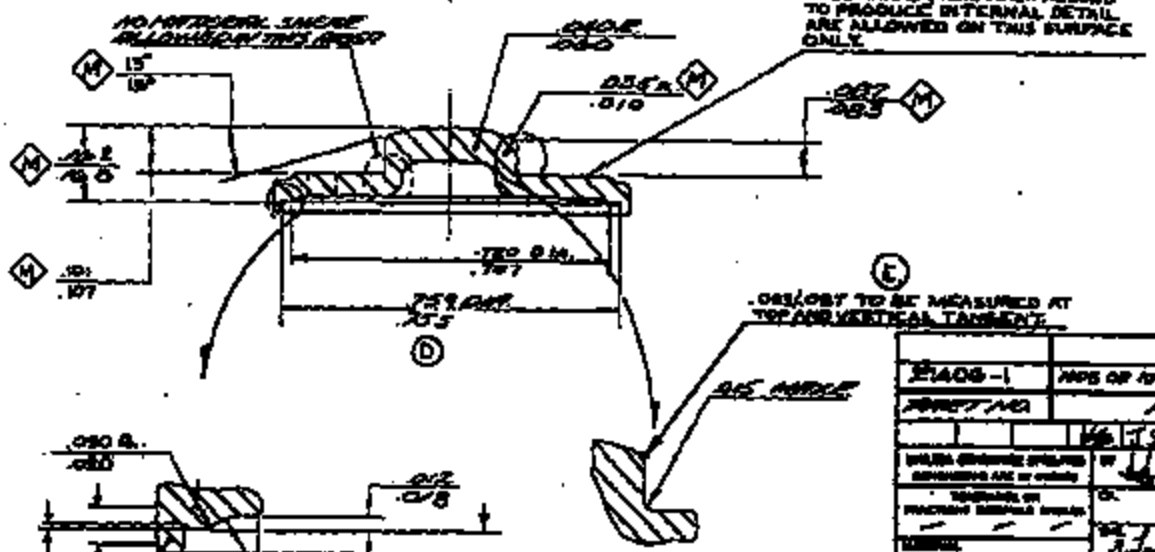
3 of 131 (02)

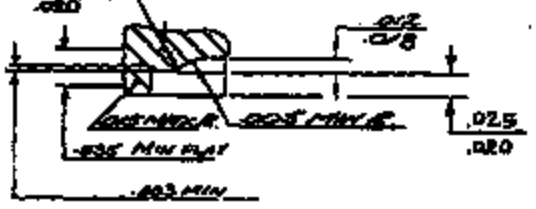
TI-NHTSA 006248

4 2746

CERTIFIED TRUE COPY
Parts Made To This ... Met ... ion To
ENG. STD. E9898 REV. E
Date JUL 16 1992







ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A			
	B			
	C			
	D			
	E			
	F	SEE CN		

NOTE:
1. DIMENSIONS MUST BE CONCENTRIC TO .XXX TOLERANCE TO WITHIN .005 T.I.R.
2. PARTS TO BE SHIPPED ASSEMBLED AND STORED IN SEALED ACRYLIC BAGS AFTER PLATING.
3. DUPLICATE DIMENSIONS THRU REV. B SEE DWG. 27327.
4. THIS PART IS LOT CONTROLLED. ANY CHANGE TO THE FORMING RING PUNCH OR DIE WILL SIGNIFY THE START OF A NEW LOT. A MINIMUM LOT SIZE OF 5000 PIECES WILL BE THE ONLY EXCEPTION. ANY LOT SIZES UNDER 5000 PIECES WILL BE MIXED AND RECODED ALONG WITH THE DATE ON EACH BOX. EACH LOT WILL HAVE ITS OWN PACKING SLIP WITH LOT IDENTIFICATION.
5. STAINS ON PRODUCT DUE TO RUST-INHIBITOR ARE ACCEPTABLE. PARTS MUST BE ABLE TO BE PLATED PER TI'S CURRENT PROCESS.

21A06-1	WIRE OR ROD C.R. STEEL	.065 REF.	ZINC PLATING .0002-.0004 THK
DIRECT MFG.	ANNEALED	9 DIA.	PLATING

DRAWN		1-3-94	TEXAS INSTRUMENTS (ATTLEBORO, MASSACHUSETTS), U.S.A.
CK.			
ENG.	3-9-94	11/94	TITLE: CONNECTER
APPROVED			SIZE B · SCALE 4/1 · DRAWING NO. 82647 · SHEET 27406 · SHEET 1 OF 1

TI-NHTBA 008247

HIGHLIGHTS

Stephen B. Offiler

Week Ending 92-07-02

VALIDATION ISSUES:

Writeup of the 57PSL2-2 validation report, including an Impulse test plus similarity to 57PSL11-3 for all others, is planned for completion today. We have decided the "cleanest" way to proceed is to produce a standalone document for 57PSL2-2, rather than simply producing an addendum to L11-3. This is because the significant issues which arose with L11-3 Impulse tend to make that document awkward. Results of the L2-2 Impulse test showed issues with a several devices: a few became creep-actuation, and a couple had no continuity below approx. 50 psi, then acted normal above this. Extra devices were purposely tested to provide a contingency. We have the needed 24 good parts to report on.

The priority to complete 87PSL2-2 validation has been raised recently. Based on the original val. attempt, we strongly suspect that issues remain with contact wear, which leads to effective pin-shift, manifested as creep-actuation. However, during a subsequent experiment to characterize this phenomenon, it magically disappeared. Thus, another validation attempt will be made, with devices pinned towards the CR side to compensate for expected shifts toward CA. This test will be run in Stan Hornof's Zua cycler, converted back to run per the Impulse specifications.

Validation of 77PSL3-1/L5-2 is progressing. A significant conflict with cycler scheduling forced us to pursue options, and it was determined that the completion date could be pushed out to 08/14. This allows completion of the ongoing Light Truck 600 hour test, with L3-1/L5-2 Impulse and Thermal Cycle following. Backup plans, if failures on the 600 hour test extend the completion date, include conversion of the PAG oil cycler to brake fluid. This will force more schedule juggling which is being comprehended by the PS group as a whole.

LIGHT TRUCK ISSUES:

The Light Truck F-series 600 hour thermal ramp and Impulse test continues to progress. It has reached 200 hours, with a project completion (no additional failures) on Sunday 920719 at 1:00am. In anticipation of failures, we plan to run a standard Impulse test as a backup. This is intended to show Ford that the devices are able to meet the ES, to help downplay these anticipated failures. One device has failed at 49K cycles, with autopsy revealing a misplaced gasket. This presents a significant problem, since this device, built in regular production, was run through the automatic pressure tester (twice) and wasn't flagged as bad. We will definitely need to prepare an explanation of how this happened, also to include specifics on why Ford need not worry about it happening.

Also on F-series, John Pelkey is expecting a supplemental report to the ISW which shows good results on Noryl devices run through Fluid Resistance. We have received L3-1/L5-2 devices from ETL which have Fl Res, Humidity, and Salt Spray testing. John has agreed that we can use similarity with these.

We've received an RMR from Pelkey. The device is a 77PSL2-3, date code 2056 (Feb 25), and comes off of a production E150 Club Wagon. The reported problem was no continuity. Autopsy revealed a badly corroded spring arm, with significant quantities of corrosion byproducts covering the contacts and jamming the transfer pin. TSL is analyzing the device.

POWER STEERING SPECIFICATION:
A high priority remains to complete the spec. negotiations with Strauss and Kaippel. Tom Dan of Kelsey-Hayes is trying to write a deviation to clear the way for 57PSL11-3, and claims to need resolution of the spec. issues to obtain sign-off of the deviation. Norm Freda continues to work diligently to set up the needed meeting and conference call.

AUSTRALIA:
We have completed a mark-up parts list for Capri 77PSL6-1 for production control to work off of, and will place the ECN to get this officially into the system. In parallel we're working on the delinquent envelope print, promised to go out today. This should be ready very soon.

An issue remains with the F of A vacuum spec. Info from TI Australia indicates they want a much harder vacuum than F of USA. We have attempted to run our devices to this vacuum level, and while we couldn't quite attain the desired value, we still noted a potential problem with the diaphragm being sucked out of place which will surely impact life. This issue needs some testing to characterize the magnitude of the problem, which requires cycling capacity, which is in very short supply.

-MSG M#= 171479 FR=SB01 TO=PCME SENT=07/02/92 09:33 AM
R#=299 ST=C DIV=0050 CC=00101 BY=SB01 AT=07/02/92 09:33 AM

TO:	Ted Ballard	ETB	Paul Kotch	PRK1
	Tom Burke	MFPC	Steve Major	SMFH
	Rick Conlin	RAC1	Danny O'Driscoll	DOD
	Jeff DiDomenico	DIDO	Dale Sogge	FFUN
	Charlie Douglas	CMP1	[redacted]	PCME
	Norm Freda	WHLZ	Rusty Struble	RCB2
	Dick Gariepy	MFPC	Jim Watt	PCQA
CC:	Tom Charbonneau	(delivered separately)		
	Dave Czarn			
FR:	Steve Offiler	SB01		

SJ: BiWeekly Highlights

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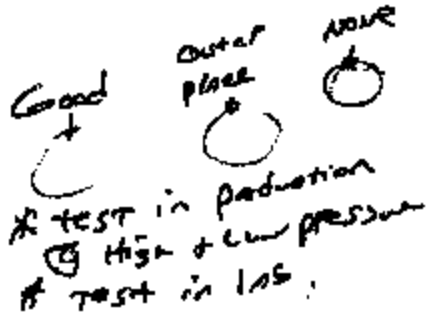
Regards,
Steve G.



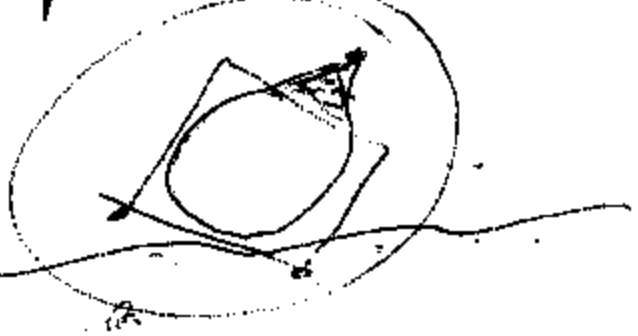
7/2/92 MTG.

(1.) TEST AMI probe. Determine level of forgiveness.

(2.) #' Stripes. 4 or 2. Failed Switch.

(3.) Purposely build out of place & test.

(4.) Long Term.
. Hexport grooves.



Ex #10

VALENTINE TOOL & STAMPING, INC.

111 WEST MAIN ST. NORTON, MASS. 02766
(508) 285-6811 226-2240

CERTIFICATE OF CONFORMANCE

DATE : MONDAY JULY 6, 1992

CUSTOMER : TEXAS INSTRUMENTS INC

CUSTOMER P.O. NO : 8050895438 SUPPLIER INVOICE NO. : 82086

PART DESCRIPTION : 7419/-1 CRIMP RING Rev.B

SUPPLIER PJO NO. : 18629

QUANTITY SHIPPED : 50,000

SHIPMENT DATE : 07/07/92

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

SIGNED Jeanne LaFlamme
Jeanne LaFlamme
Quality Assurance Manager

Job #10

VALENTINE TOOL & STAMPING, INC.

171 WEST MAIN ST., NORTON, MASS. 02766
(508) 285-8021 285-2234

CERTIFICATE OF CONFORMANCE

DATE : MONDAY JULY 6, 1992

CUSTOMER : TEXAS INSTRUMENTS INC

CUSTOMER P.O. NO : 5052854J8 SUPPLIED INVOICE NO.: 52065

PART DESCRIPTION : 7479[illegible]-1 CHIP RING Rev.B

SUPPLIER PJO NO. : 18829

QUANTITY SHIPPED : 60.860

SHIPMENT DATE : 07/07/92

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

SIGNED Jeanne Lafleur
Jeanne Lafleur
Quality Assurance Manager

UNITED ALUMINUM CORPORATION
100 UNITED DRIVE • P.O. BOX 218 • NORTH HAVEN, CONNECTICUT 06473

UA CUSTOM ROLLED™ ALUMINUM SHEET

#94997

0821

SOLD TO: VA003
ATTN: DICK WHITNEY

VALENTINE TOOL & STAMPING INC.
171 WEST MAIN STREET
NORTON, MA 02766-0469

DATE March 27, 1992
CUST. PO# 14726
ORDER SPEC# 5052-O .03200 x 2.312
UA ORDER# 1857120
SPECIFICATIONS ASTM B209,QQ-A-250/8

CHEMICAL COMPOSITION LIMITS

This is to certify the following chemical composition limits, based on an individual or blanket certification of analysis supplied to United Aluminum by its vendor(s):

	VENDOR CERTIFICATION MIN	MAX
SILICON		0.25
IRON		0.40
COPPER		0.10
MANGANESE		0.10
MAGNESIUM	2.2	2.8
CHROMIUM	0.15	0.35
ZINC		0.10
OTHER ELEMENTS (EACH)		0.05
OTHER ELEMENTS (TOTAL)		0.15
ALUMINUM	REMAINDER	

MECHANICAL PROPERTY RESULTS

This is to certify that the following are the results of the mechanical property test(s) performed by United Aluminum, based on a minimum of one sample for the order:

TENSILE STRENGTH (KSI)	28.2
ELONGATION (%)	24

Any test results reported above are subject to the limitations of the testing process. All sales are subject to United Aluminum's Terms and Conditions contained on the reverse of its Sales Order Acknowledgement.

03/27/1992 14:23:15
00124-00002 05254
SHIP SHIP 2

VALENTINE TOOL & STAMPING, INC.

131 WEST MAIN ST. NORTON, MASS. 02766
(508) 285-5911

MATERIAL CERTIFICATION

DATE : MONDAY JULY 6, 1992

CUSTOMER : TEXAS INSTRUMENTS INC

CUSTOMER P.O. NO : 505095438 SUPPLIER INVOICE NO.: 82066

PART DESCRIPTION : 74797-1 CRIMP RING REV.B

SUPPLIER FJO NO. : 18829

QUANTITY SHIPPED : 60,800

SHIPMENT DATE : 07/01/92

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

SIGNED Jeanne Laflamme
(Supplier Representative)

Jeanne Laflamme Quality Assurance Manager

UNITED ALUMINUM CORPORATION

100 UNITED DRIVE • P.O. BOX 218 • NORTH HAVEN, CONNECTICUT 06473

UA UNITED ALUMINUM — CUSTOM ROLLED™ ALUMINUM SHEET

#74797

0021

SOLD TO: VA003
ATTN: DICK WHITNEY

VALENTINE TOOL & STAMPING INC.
171 WEST MAIN STREET
NORTON, MA 02766-0469

DATE March 27, 1992
CUST. PO# 14726
ORDER SPECS 5052-O .03200 x 2.312
UA ORDER# 166712D
SPECIFICATIONS ASTM B209,QQ-A-250/8

CHEMICAL COMPOSITION LIMITS

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SILICON		0.25
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OTHER ELEMENTS (TOTAL)		0.15
ALUMINUM	REMAINDER	

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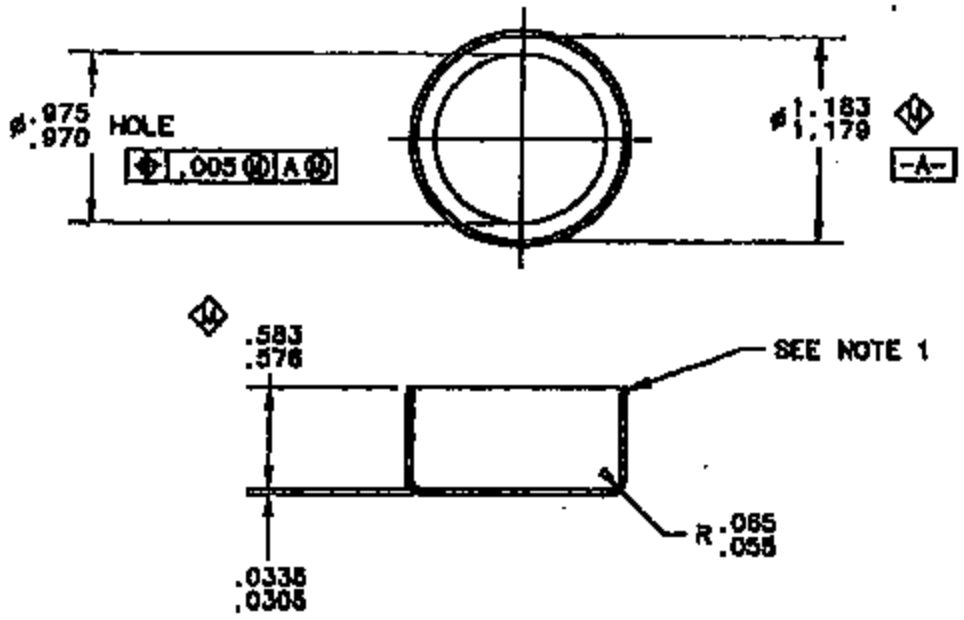
03/27/1992 14:22:15
VS SHIP SHIP 2
00124-00002 05254

TITLE

CRIMP RING

REV. B

74797



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

CERTIFIED PRINT
Parts Made To This Print Must Conform To
ENG. STD. E9898 REV. E
Date JUL 16 1992

RETAIN THIS PRINT AND THE INFORMATION CONTAINED HEREIN AS TO BE KEPT AGAINST THE INTEREST OF TEXAS INSTRUMENTS INCORPORATED OR AGAINST THE INTERESTS OF ANY OF ITS AFFILIATED COMPANIES OR WHOLLY OWNED SUBSIDIARIES.

SUPERSEDES DWG. 74797 REV. A DATED 11-2-90

PART NO.	MATERIAL	FINISH
74797-1	ALUMINUM 5052	

BY GUS PLEASANT 11-2-90
CH.

TEXAS INSTRUMENTS
ATTLEBORO MASSACHUSETTS 02703

KLIXON
CONTROL PRODUCTS

DWG. SIZE A

74797

TI-NHTSA 006257

THE MILFORD GROUP
637 BRIDGEPORT AVE.
MILFORD, CONNECTICUT 06460

TEL: 203-878-4671 • FAX: 203-878-5871 1-800-878-1346

TO: TEXAS INSTRUMENTS

CERTIFICATE OF COMPLIANCE

ACME MILFORD CERTIFIES THAT:

P.O. NUMBER: 500086022
ACME/MILFORD CONTROL NUMBER: 021679
ACME/MILFORD P/N: 6051-AX.062
QUANTITY: 191630

WAS PROCESSED TO CONFORM TO THE FOLLOWING

PART NUMBER: 7417.-1
PART REVISION: M/FC
MATERIAL: BRASS C26130

HEAT NUMBER:
TENSILE AFTER LIGHT DRAW:
FINISH: BRITE FREE OF OIL

SIGNED: James DeMarais JR DATE: 07-06-92

JAMES DEMARAIS
TITLE: QUALITY ASSURANCE DIRECTOR

SWORN TO AND SUBSCRIBED BEFORE ME THIS/_____DAY_____MONTH_____19__

NOTARY PUBLIC_____

77PSL3-1 JULY 7-1992

TEST TO DETERMINE EFFECTS OF 1500 PSI OVERPRESSURE ON RATTLING SE

MEASURE SENSOR HEIGHT ON 25 PCS. REMEASURE AFTER OVERPRESSURE.

REMEASURE SENSORS DAILY

SENSOR #	PRE OVP.	POST OVP.	DELTA	7-8-92	DELTA
1.0	47.9	DIAMETER OVERSIZE			
2.0	50.1	45.6	4.5	45.6	0.0
3.0	49.5	45.6	3.9	45.5	0.1
4.0	50.5	45.8	4.7	45.6	0.2
5.0	47.7	45.3	2.4	45.3	0.0
6.0	49.2	46.4	2.8	46.2	0.2
7.0	49.7	45.2	4.5	45.2	0.0
8.0	49.6	45.7	3.9	45.6	0.1
9.0	50.4	45.5	4.9	45.5	0.0
10.0	50.3	45.5	4.8	45.4	0.1
11.0	50.7	45.8	4.9	45.7	0.1
12.0	50.1	45.6	4.5	45.6	0.0
13.0	50.6	46.1	4.5	45.9	0.2
14.0	49.3	DIAMETER OVERSIZE			0.0
15.0	49.4	46.5	2.9	46.4	0.1
16.0	49.4	DIAMETER OVERSIZE			0.0
17.0	49.4	45.6	3.8	45.5	0.1
18.0	48.2	45.4	2.8	45.3	0.1
19.0	49.8	46.5	3.3	46.5	0.0
20.0	48.5	47.4	1.1	47.3	0.1
21.0	49.3	46.3	3.0	46.3	0.0
22.0	49.8	45.5	4.3	45.4	0.1
23.0	46.8	45.5	1.3	45.5	0.0
24.0	49.1	46.0	3.1	45.9	0.1
25.0	48.7	46.3	2.4	46.3	0.0

DUPONT

NO: KC-11
Effective Date: 3/06/92
Expiration Date: 3/06/93
Page 1 of 1

CIRCLEVILLE PLANT
P.O. Box 89
Circleville, OH 43113

MATERIAL CERTIFICATION

DATE: 7-9-92

CUSTOMER: TEXAS INSTRUMENTS, ATTLEBORO

CUSTOMER ORDER NO. 5000 11911

CUSTOMER PART NO. & REV. 27225-1 (REV. N)

QUANTITY THIS SHIPMENT 66.40*

SHIPMENT DATE 7-9-92

We certify that the material used to produce the product in this shipment, namely 500FN131 Kapton*, 3/4" wide, conforms to TI drawing and TI purchase order requirements on file with the HPF Group of the Dupont Company.

SUPPLIER REPRESENTATIVE
ENGINEER - QUALITY CONTROL - TITLE

:dkh/smart no. 387

PRESSURE SWITCH DATA Form 21605 TEST NO. 296-03-30

DEVICE	DATE REQUESTED	REQUESTED BY	REQUESTED COMPL. DATE
7705		Steve Offiler	
PERFORMED BY	**DATE STARTED**	**DATE COMPLETED**	**APPROVED BY**
J. DiGennaro	9/07/10		

PROJECT TITLE: Cruise Control PS

CUSTOMER:

PURPOSE OF TEST: Develope a special brake fluid seal

PROCEDURE: Build devices in a matrix of diaphragm configurations. cycle to failure per ES. All pass-car parts 7715L2-1 Test run in converted PS/IMS cycler; fluid - DOT 3 Brake Fluid no manifold heaters; ambient @ 135°C Fluid measured @ cycle rate @ 2.5 Hz

Test aborted: Rubber Diaphragms shrinking

Device #	Description	1st Cyc		4th Cyc		Stabilized		Cyc To Failure		Remarks	
296-03-01	control	129	40	121	42	119	42				
-02		130	47	116	50	113	47				
-03		120	44	110	45	111	46			—	
-04		125	47	121	50	119	48				
-05		112	47	110	47	108	45				
-06		126	52	118	53	116	52				
296-03-07	Rubber	125	58	124	57	121	55				
-08	diaphragm	132	54	130	54	125	52				
-09	3 Kaptons	121	51	120	49	116	49				
-10		123	58	119	59	115	56	150K			
-11		127	56	122	54	120	52				
-12		125	58	120	58	119	57				
296-03-13	Rubber	118	58	114	57	109	47	212K			
-14	diaphragm	130	62	117	60	125	58	247K			
-15	2 Kaptons	129	58	120	58	117	55	136K			
-16		139	63	126	63	120	60				
-17		122	59	119	58	115	55	256K			
-18		136	62	123	63	122	61				

(OVER)

394-87-36									
-24									
-27									
-25									
-29									
-28									

DEVICE 296-15

NEW: T ≅ .032-.033 ϕ_1 .597 ϕ_2 .596

OLD: T ≅ .025 ϕ_1 .520 ϕ_2 .524

$V_{NEW} = \pi/4\, D^2 T = \pi/4 (.596^2)(.033) = .0092$

$V_{OLD} = \pi/4 (.522^2)(.025) = .0054$

$\%$ SHRINK $= \frac{V_{OLD} - V_{NEW}}{V_{NEW}} \times 100\% = \frac{.0054 - .0092}{.0092} \times 100 = -40\%$

FLUID-LAYER KAPTON: SIGNIFICANT DELAM. OF TEFLON; TEFLON RIDGE FORMED ON OD OF RUBBER DIA; TRACK IN NORMAL LOCATION BUT BRITTLE & JAGGED

WASHER-LAYER KAPTON: SIDE AGAINST WASHER COVERED W/ SIGNIFICANT BLACK PARTICULATE; TEFLON LAYER ON THIS SIDE IS VERY THIN, SEEMS "CRUSHED" IN REGION OF WASHER BEVEL. KAPTON TEAR SAME AS ABOVE.

(NO INTERMEDIATE LAYER)

PRESSURE SWITCH DATA Form 21605 TEST NO. 297-15-2

DEVICE	DATE REQUESTED	REQUESTED BY	REQUESTED COMPL. DATE
7.7 PSh 31	7/10/92	DALE SOOPE	
PERFORMED BY	**DATE STARTED**	**DATE COMPLETED**	**APPROVED BY**
DAVID O TOOLE	7/10/92		

PROJECT TITLE: EVALUATION OF Cup Bump INCREASE

CUSTOMER:

PURPOSE OF TEST: The Purpose of this test is to check the effect of changing the Cup to increase the preload. Previous Tests have suggested the Gap be decreased by 4-5 mils. This test is to Confirm the Numbers before releasing it to production. (K standard Cups 9 Cups With Hooper Bumps.)

PROCEDURE: 1st Picked up 16 Modified Cups from Mold Shop 2nd Collected 20 Discs "Customers" from Production 3rd Plot Curves of All Discs ↑ Normal VS: → Deflection. 4th Measured Crown Grind with Depth Gauge & Special Fixture. (5th) Built 20 Service Assemblies with 16 Modified Cups 1-10. Standard 11-20 other Pressure Switch Set to 150 PSI (6th) Measured Depth of Disc (7th) Listened for Rattles None (8th Step #1,2 11-12 Sent To Add 10 Total Cross Sectioned. (9th Step Pull Vacuum on 10 Both for Life Cycle & See if Rattle; No Rattle (10) 2,6,3,9,6,13 Life Total 500K Test Held 7 hrs (11th) Step #6 14,15,16 Measure Cross Deflection. DTO

	Act	Rel	Stamping Part		Δ P Pump Assembly	Drill To Disc	Stamping Drill Thru Hole Diameter	Cross Dept	P to C Rel
297-15-01	29.2	19.5	#1 Red	#1	.00181	495	—		
2	22.8	19.5	#2 Turquoise		.0019	485	—		
3	23	19.2	#3 Clear		.0018	485	485		
4	21.1	19	#4 Light		.0018	488	—	486	
5	22.9	19.6	#5 Black	#2	.0018	505	—	506	
6	24.1	20	#6 Red		.00181	492	484		
7	23.5	20	#7 Red		.0018	484	486		
8	23.3	19.6	#8 Green		.00182	491	483		
9	25.4	20	#9 Purple		.00178	492	492		
10	22.2	19	#10 Turquoise	#3	.00178	481	483		
11	22.6	19	#11 Black		.00179	462	—		
12	23.4	19.2	#12 Red		.0018	460	—		
13	24.5	22.3	#13 Blue		.001796	465	457		
14	22.6	20.6	#14 Green	#4	.00183	458	—	459	
15	23.5	19.1	#15 Purple		.00178	460	—	460	
16	23.2	19.5	#16 Turquoise		.0018	454	454		
17	26.6	22.1	#17 Black		.00188	466	456		
18	23.3	19.7	#18 Red	#5	.0018	460	460		
19	24.2	19.7	#19 Blue		.0019	467	457		
20	24.3	20	#20 Green		.00181	458	459		

7-10-9

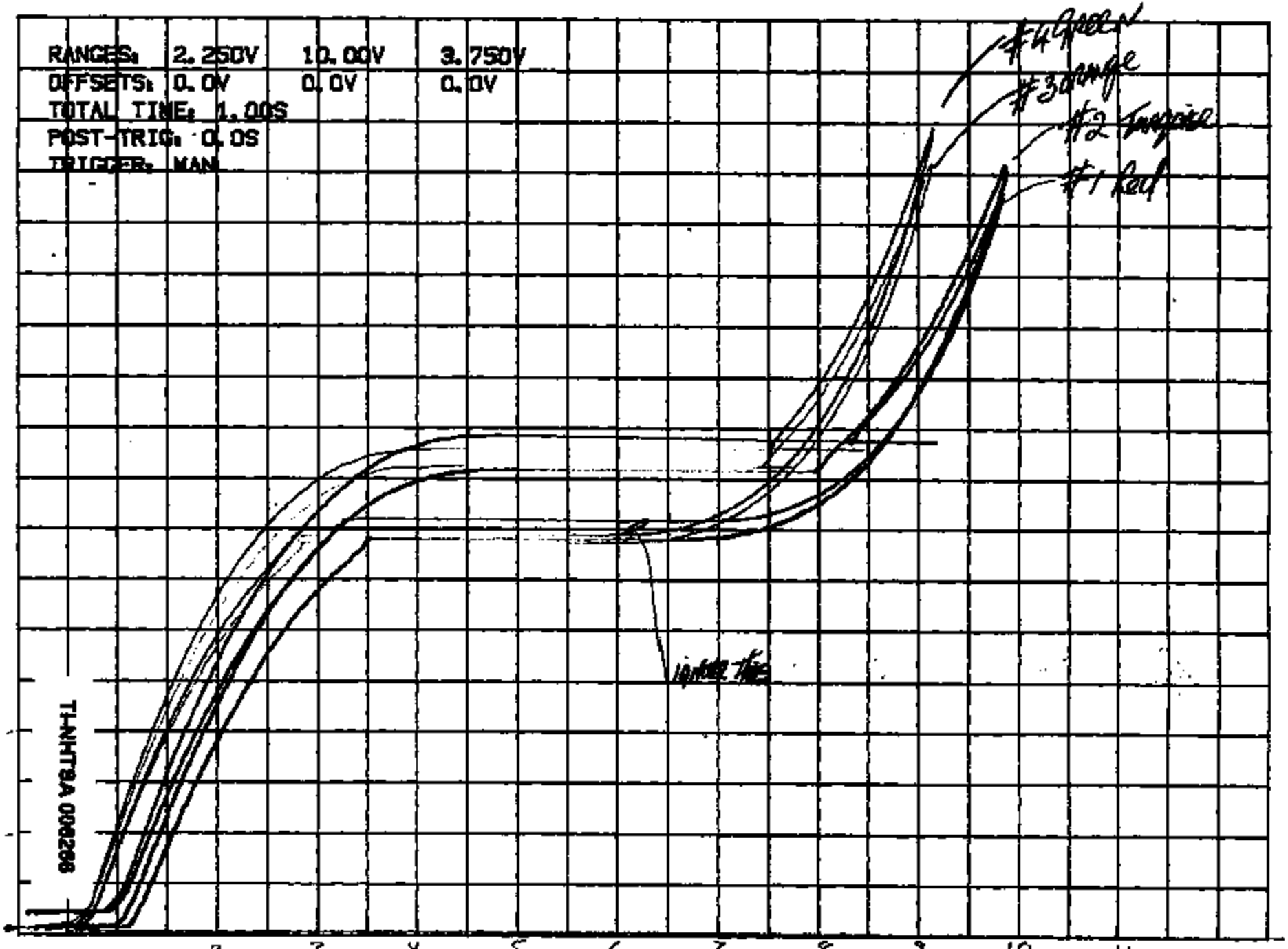
EVALUATION OF CUP BUMP INCREASE

PURPOSE: THE 77PSL3-1 USES A QUIET DISC WITH A CRANK HEIGHT THAT IS ABOUT 0.002" LOWER THAN THE NOISY DISC. WHEN PRODUCTION WAS CHANGED OVER TO THE QUIET DISC THE HEIGHT OF THE BUMP ON THE CUP WAS NOT CHANGED TO MAINTAIN THE PRELOAD. THIS MEANS THAT PRODUCTION IS RUNNING WITHOUT ANY PRELOAD ON THE DISC. THIS CAUSES THE ASSEMBLY MACHINE TO INCORRECTLY READ THE HEIGHT OF THE DISC RESULTING IN A LOW PIN SELECTION. LOW PINNED PISTONS HAVE THE POTENTIAL TO NOT OPEN AT LOW TEMPERATURES

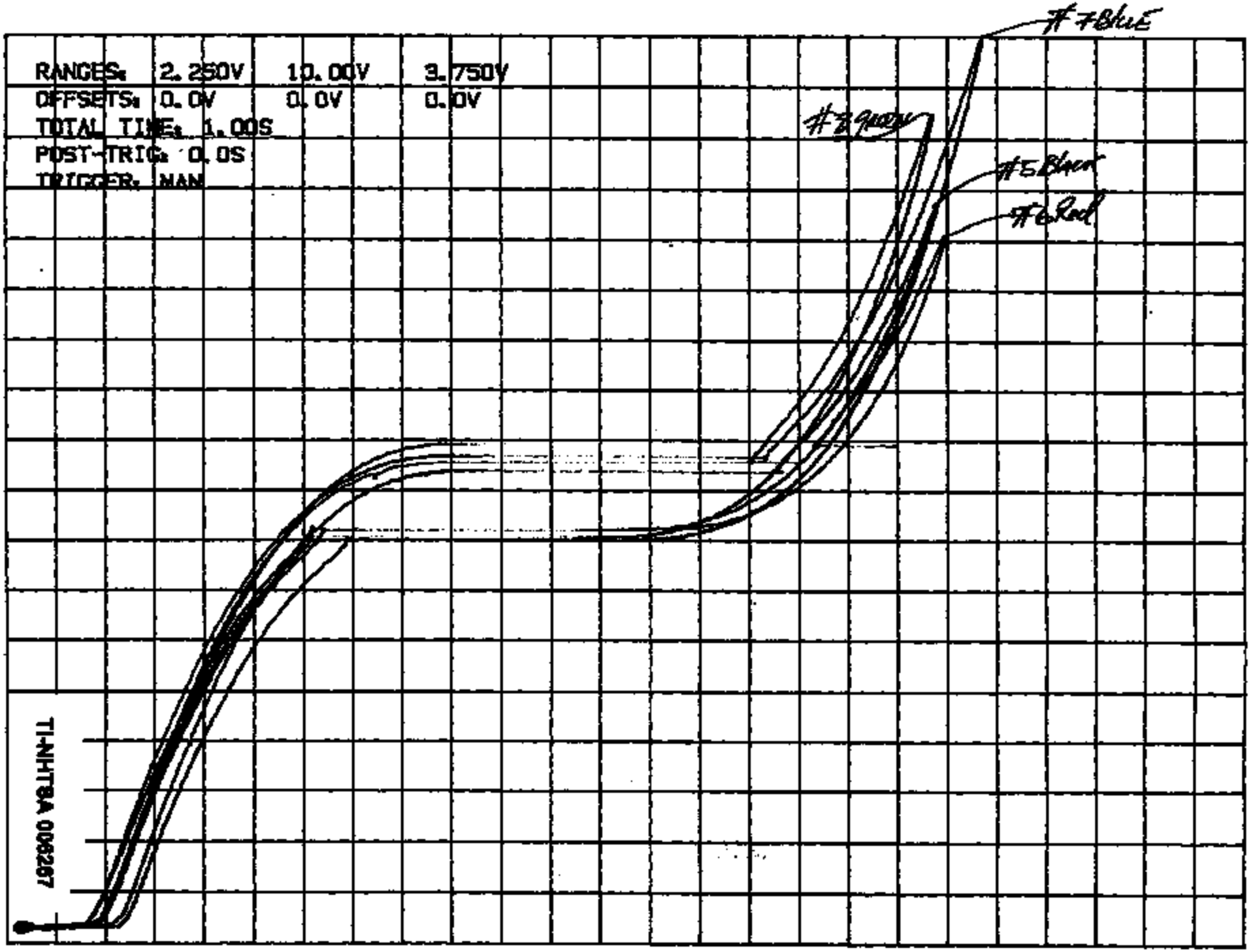
THE PURPOSE OF THIS TEST IS TO EVALUATE THE EFFECT OF CHANGING THE CUP TO INCREASE THE PRELOAD. THE PREVIOUS TESTS HAVE SUGGESTED THE GAP BE DECREASED BY 4.5 MILS. THIS TEST IS TO CONFIRM THE NUMBER BEFORE RELEASING IT TO PRODUCTION.

TEST PLAN:
TEST THE PARTS PER THE ATTACHED FLOW CHART.

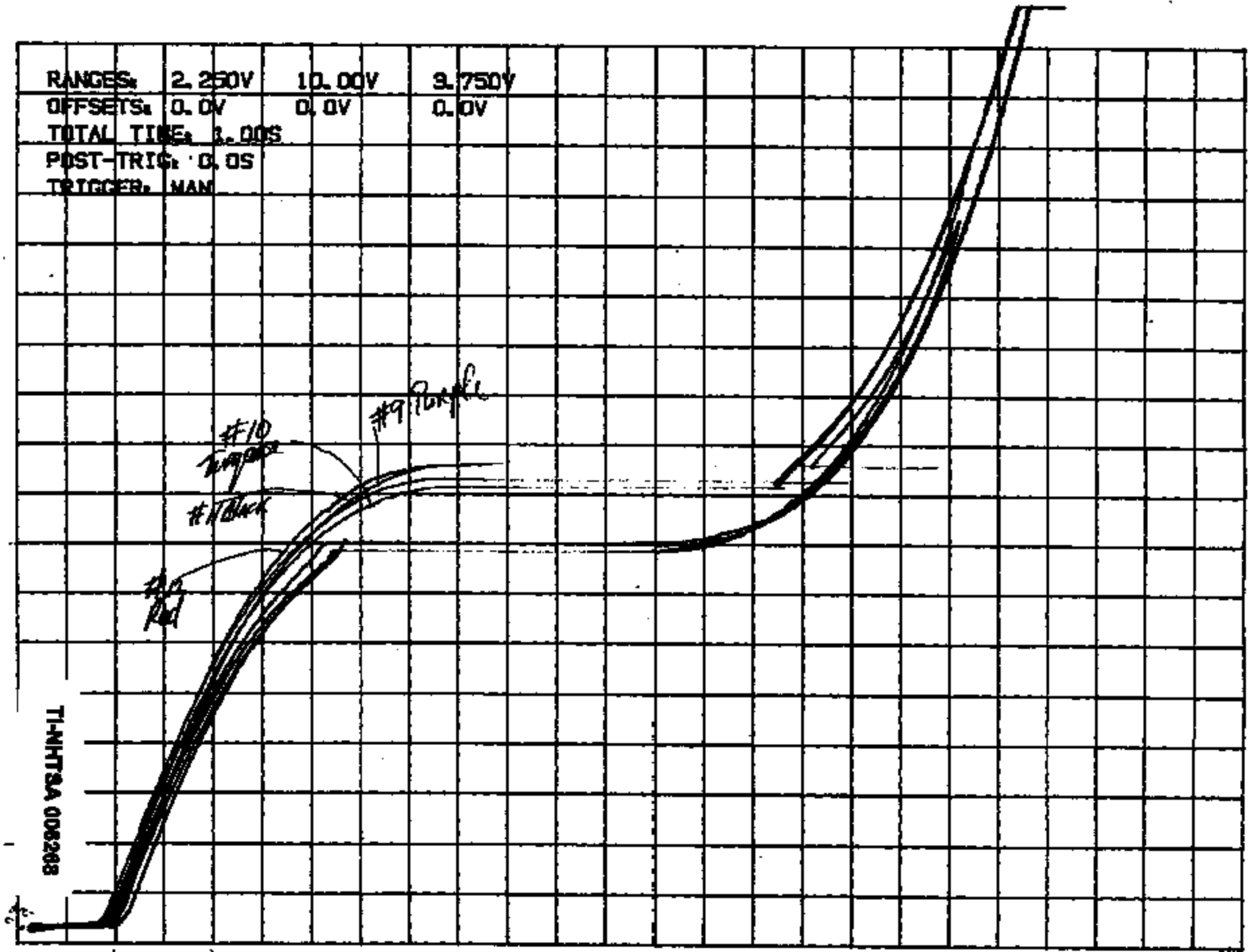
DISC EVENTS PRIOR TO BUILDING (1 shot)

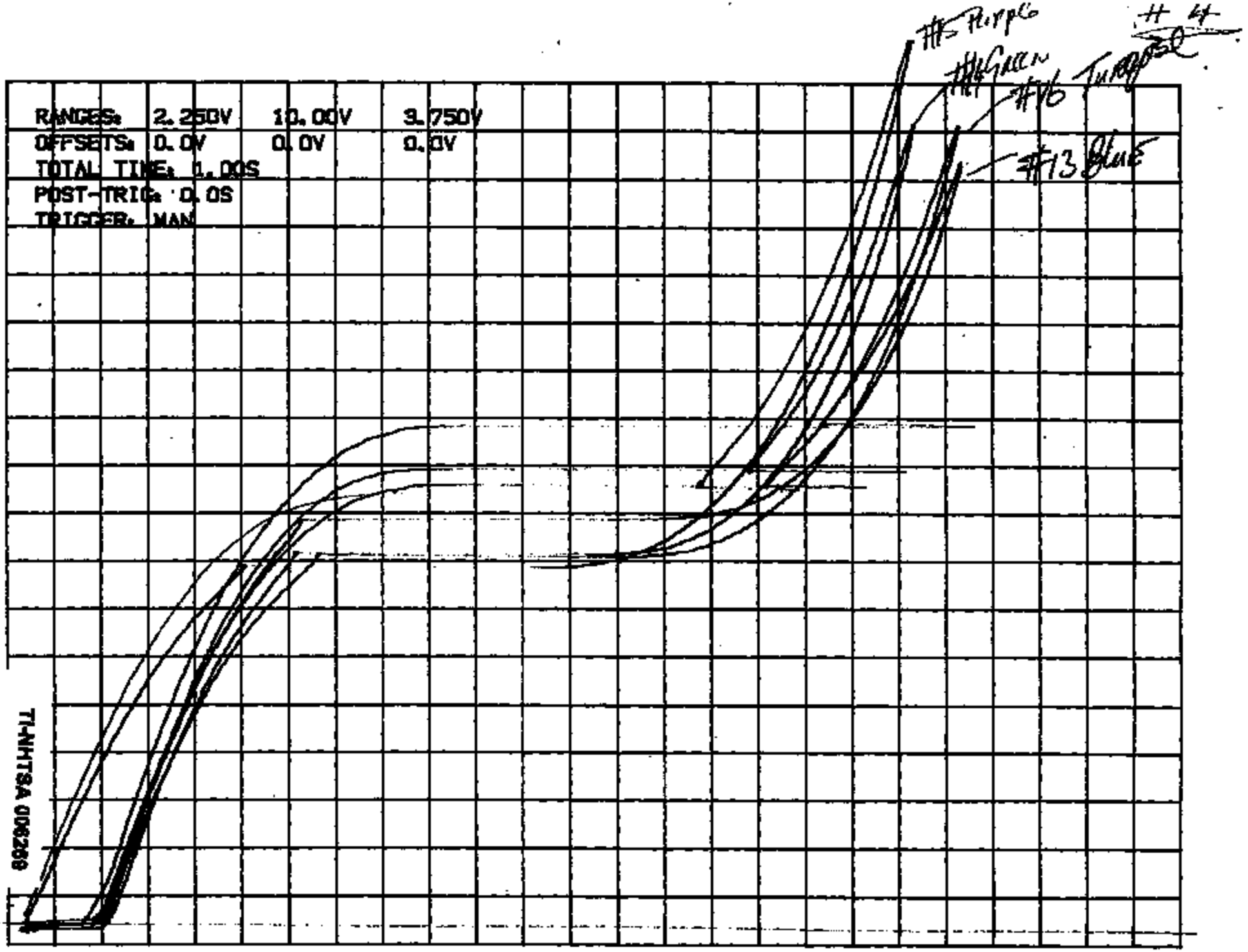


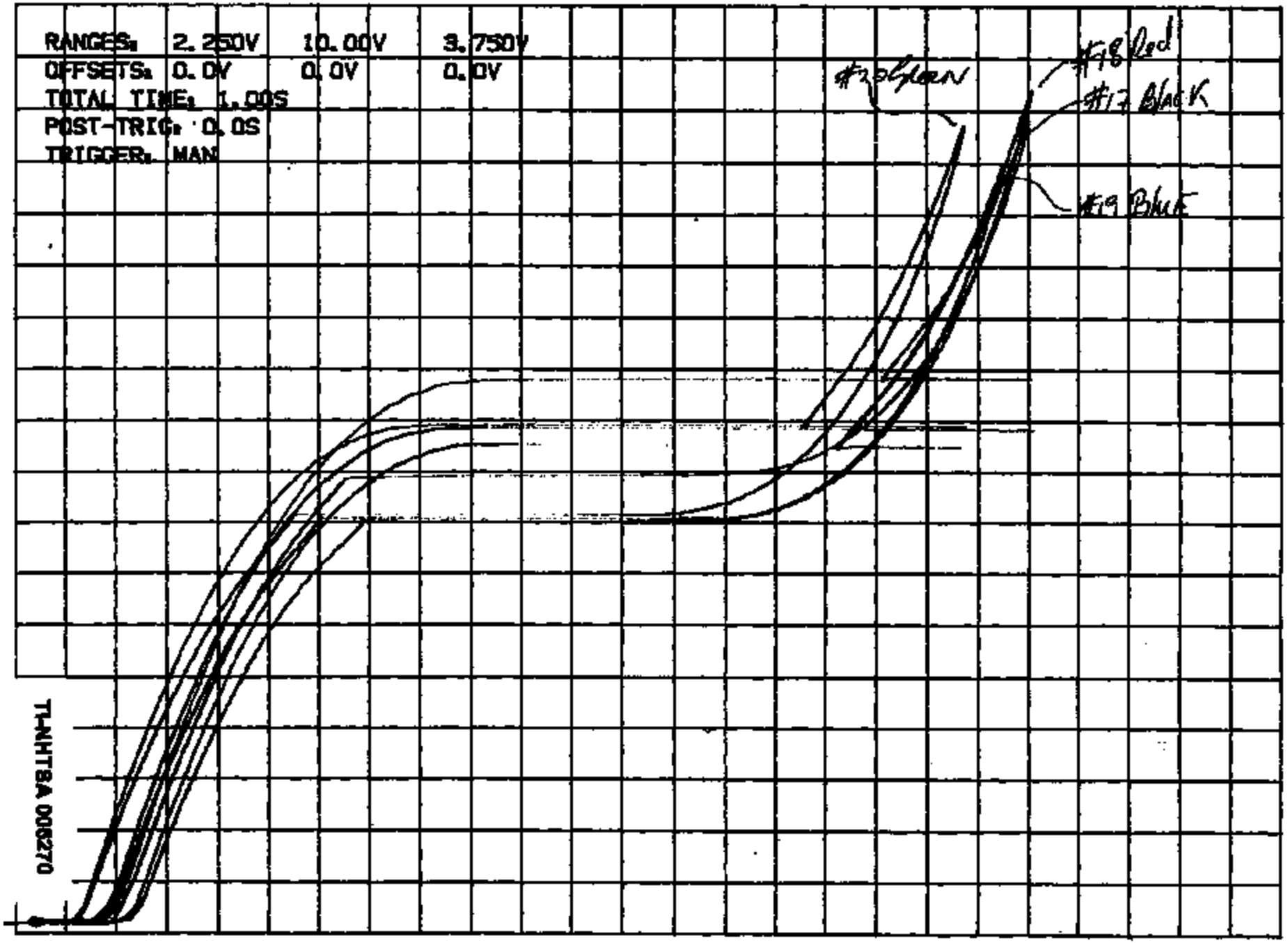
+ 4.7 mph.


#7 Blue
#2 Green
#5 Black
#6 Red
RANGES: 2.250V 10.00V 3.750V
OFFSETS: 0.0V 0.0V 0.0V
TOTAL TIME: 1.00S
POST-TRIG: 0.0S
TRIGGER: MAN
TI-NHTSA 009297

Sta 2 #3


RANGES: 2.250V 10.00V 3.750V
OFFSETS: 0.0V 0.0V 0.0V
TOTAL TIME: 3.00S
POST-TRIG: 0.0S
TRIGGER: MAN
#10 Purple
#9 Purple
#1 Black
#2 Red
TI-NHTSA 006268

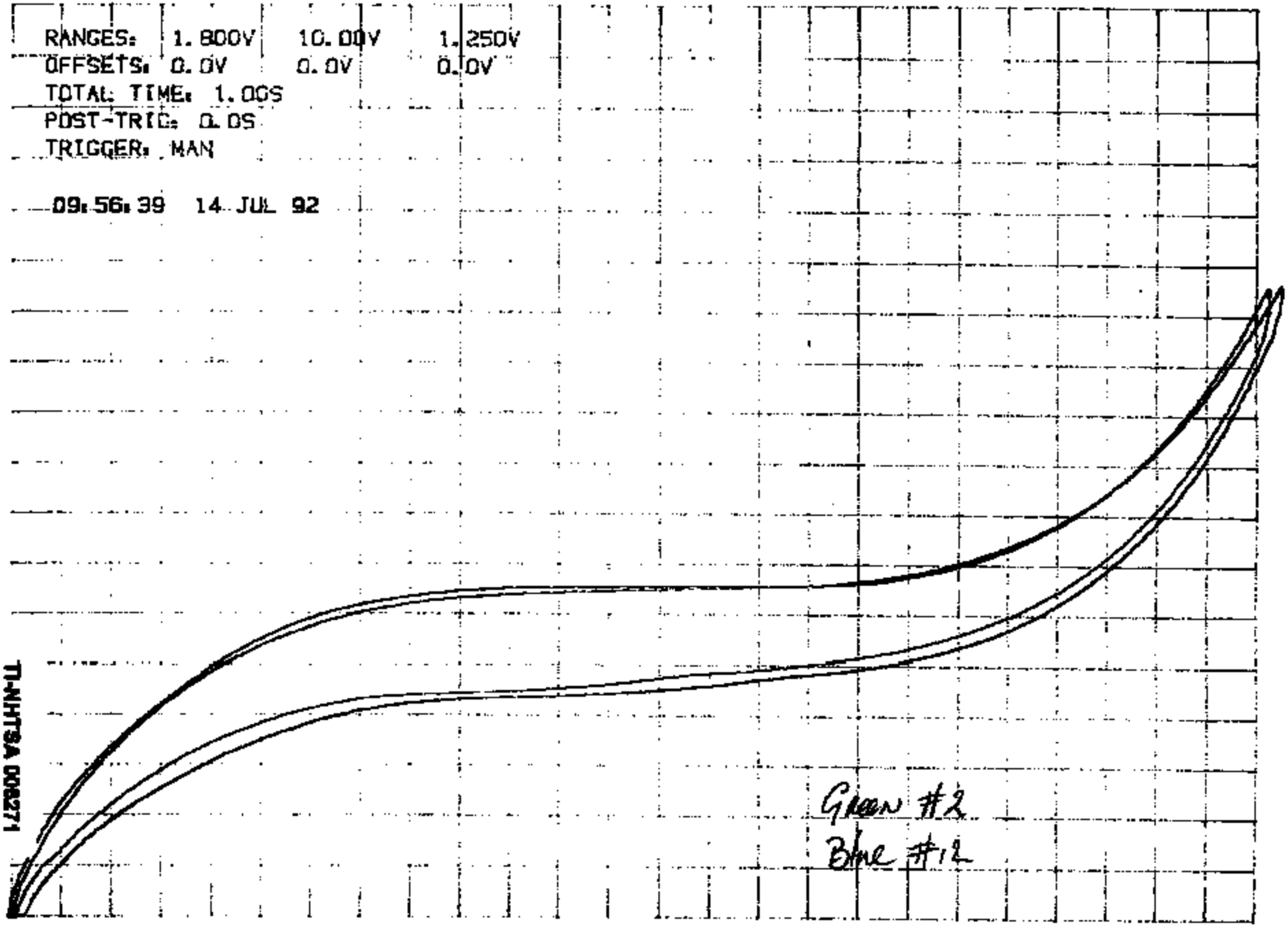

RANGES: 2.250V 10.00V 3.750V
OFFSETS: 0.0V 0.0V 0.0V
TOTAL TIME: 1.00S
POST-TRIG: 0.0S
TRIGGER: MAN
#5 Purple
#4 Green
#6 Turquoise
#13 Blue
#4
TI-NHTSA 006269


RANGES: 2.250V 10.00V 3.750V
OFFSETS: 0.0V 0.0V 0.0V
TOTAL TIME: 1.00S
POST-TRIG: 0.0S
TRIGGER: MAN
#20 Green
#18 Red
#17 Black
#19 Blue
TH-NHTSA 000270

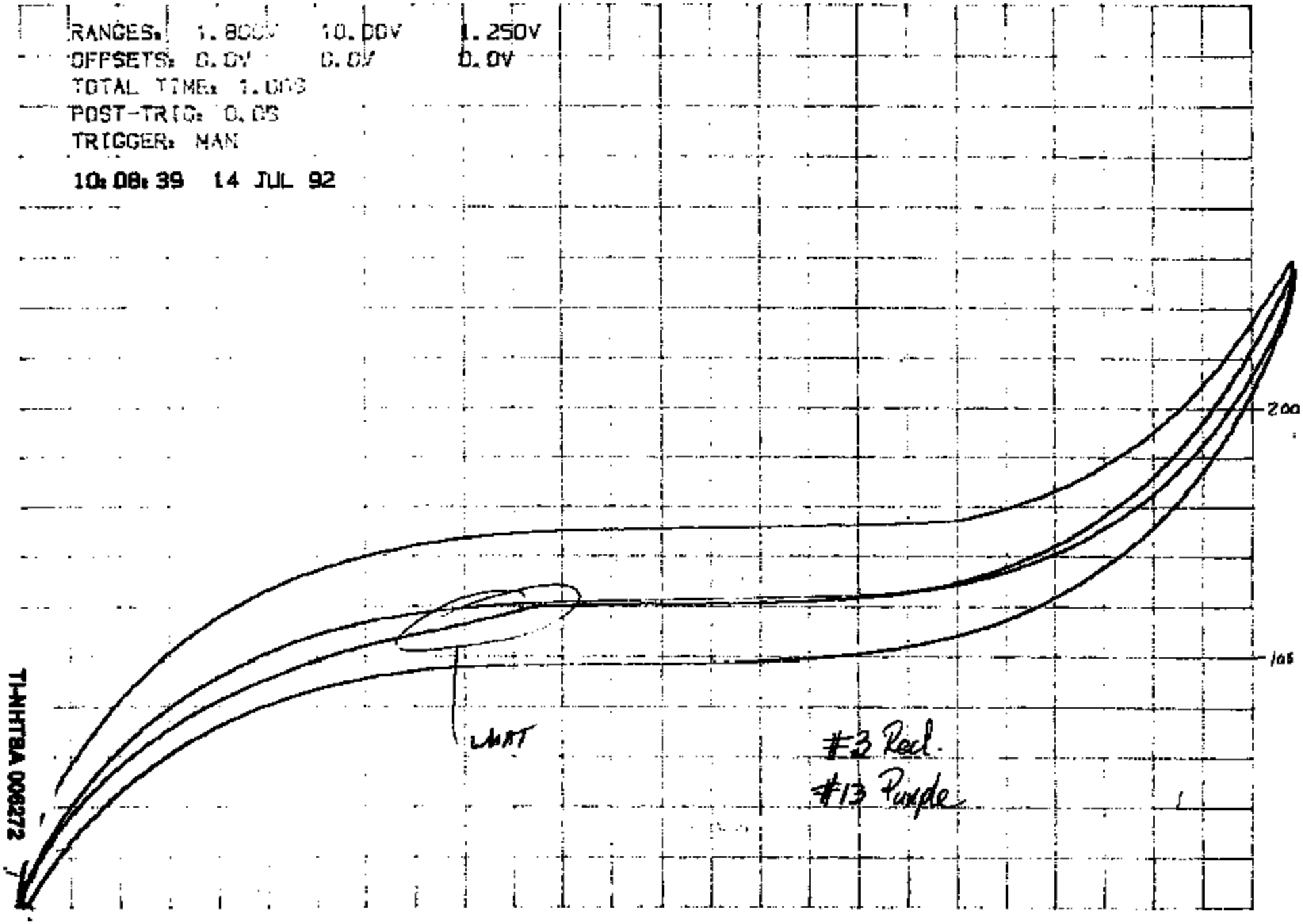
Cross Section

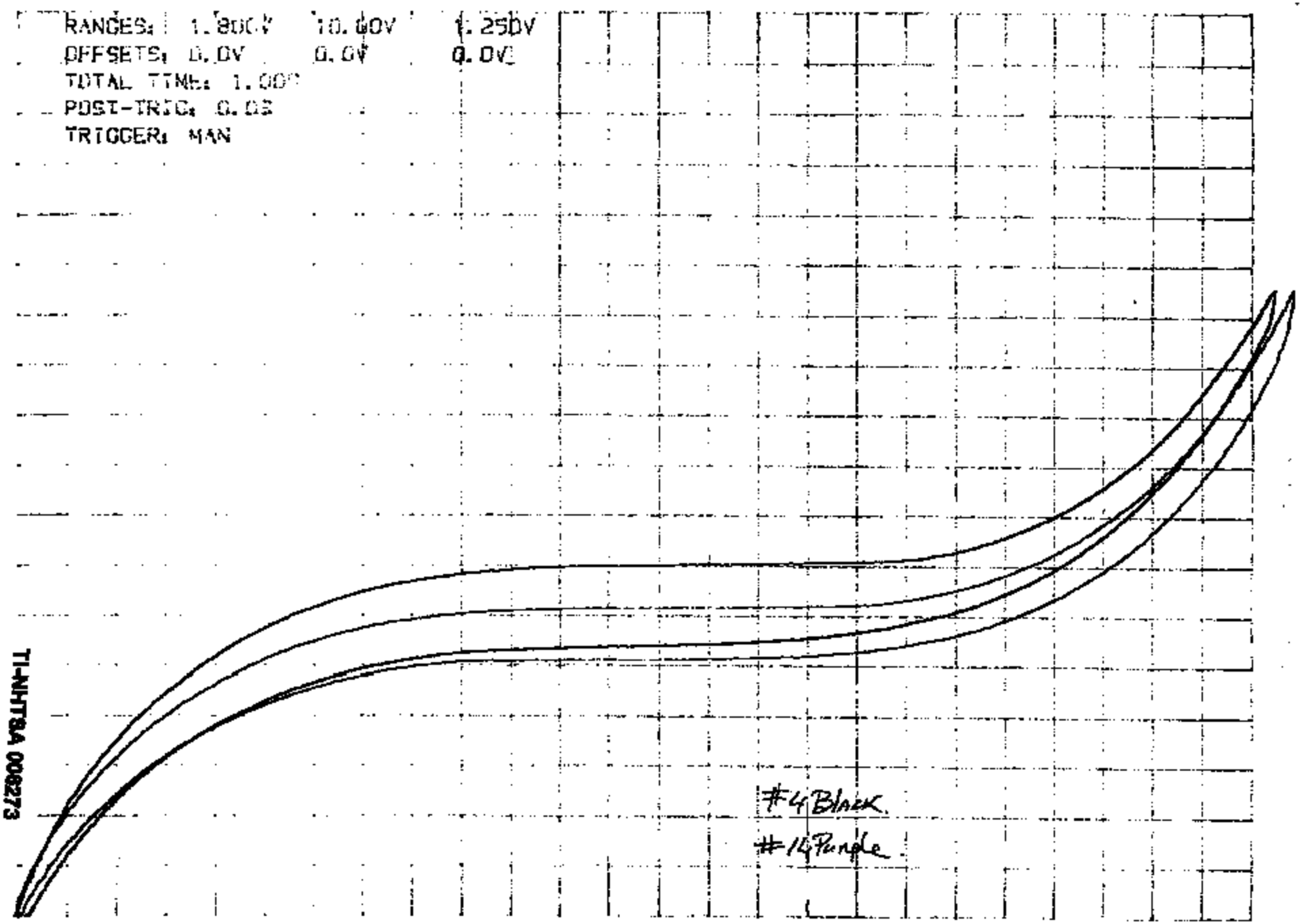
RANGES: 1.800V 10.00V 1.250V
OFFSETS: 0.0V 0.0V 0.0V
TOTAL TIME: 1.00S
POST-TRIG: 0.0S
TRIGGER: MAN

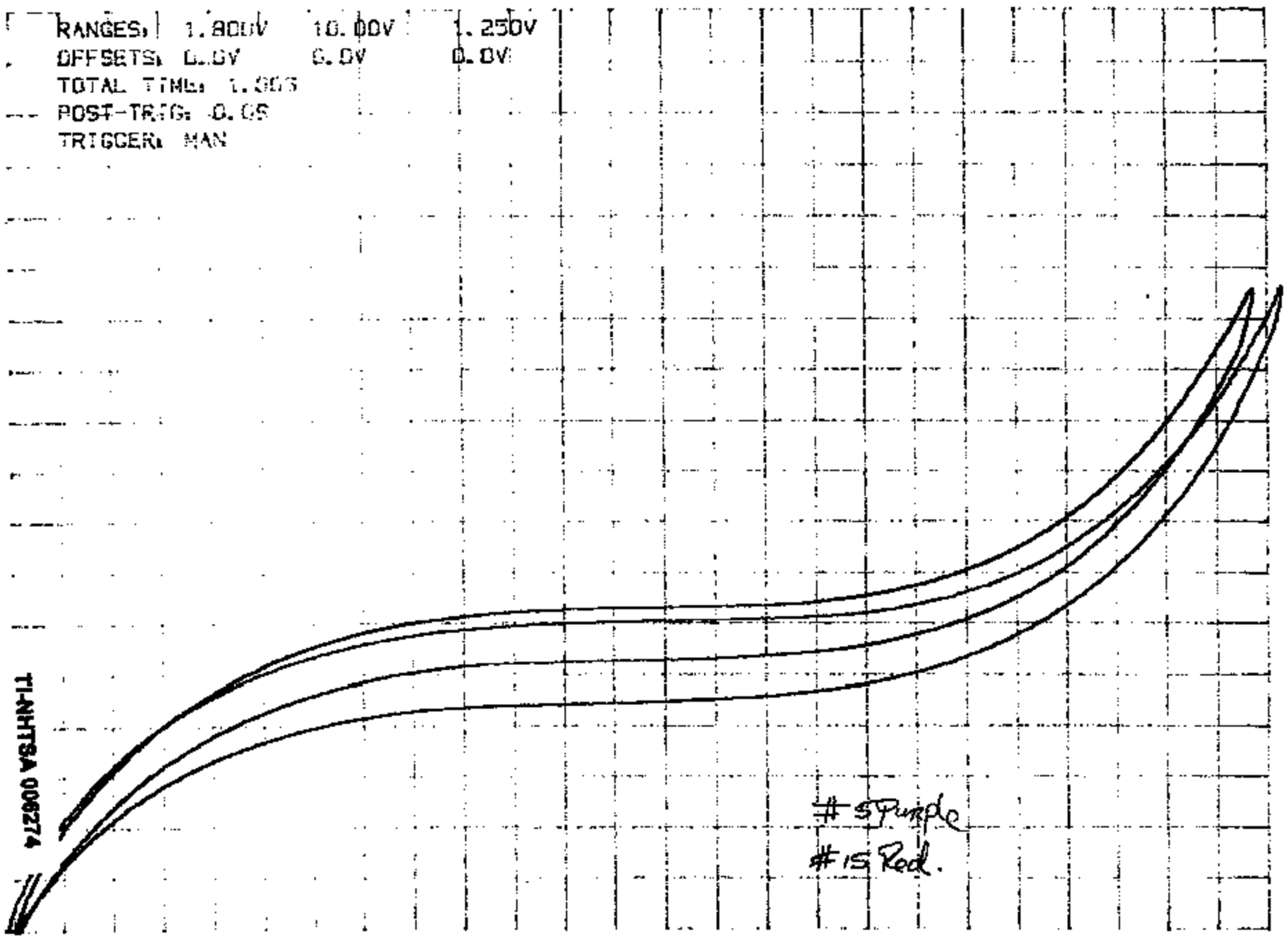
09:56:39 14 JUL 92

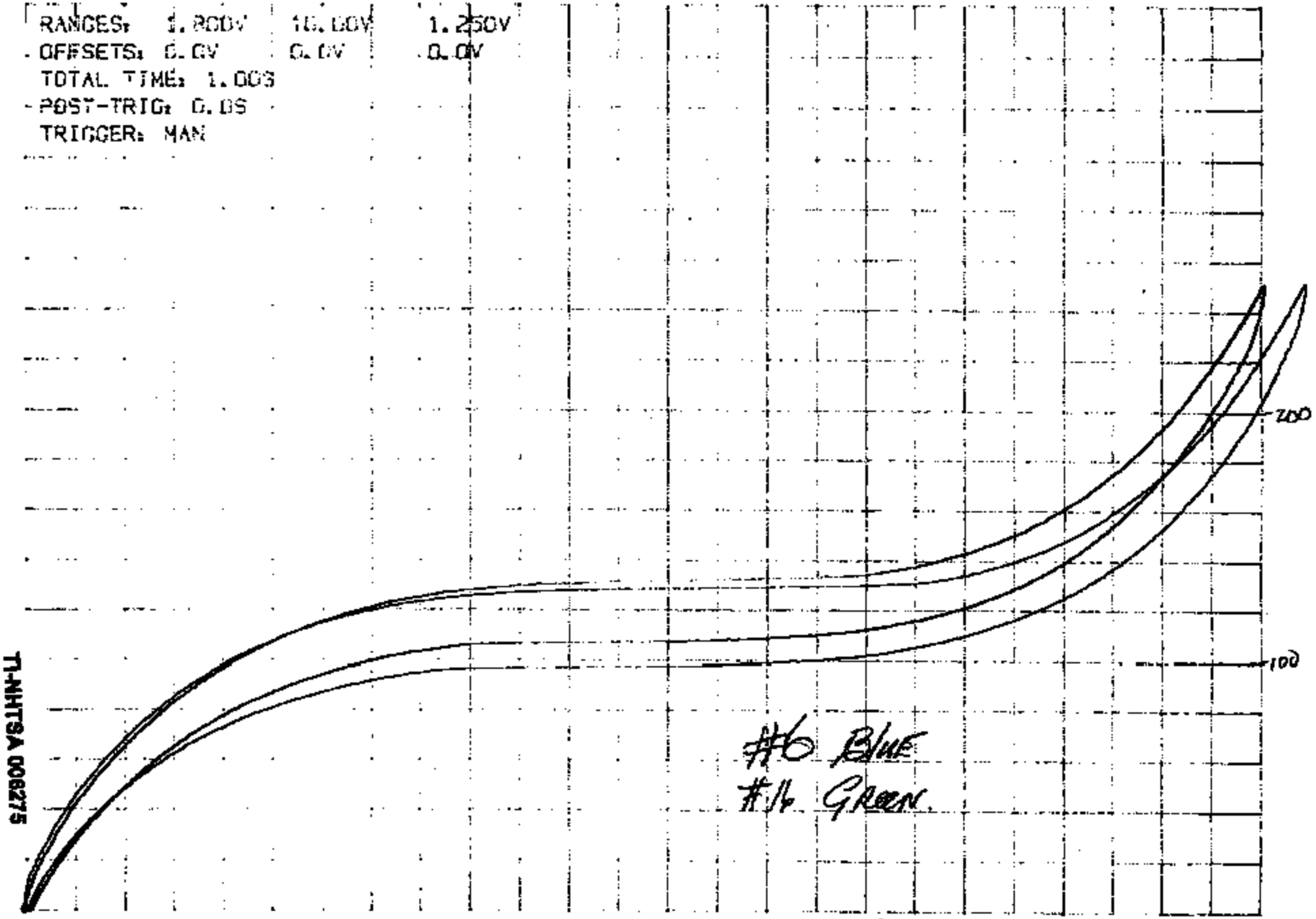


TI-NHTSA 008271

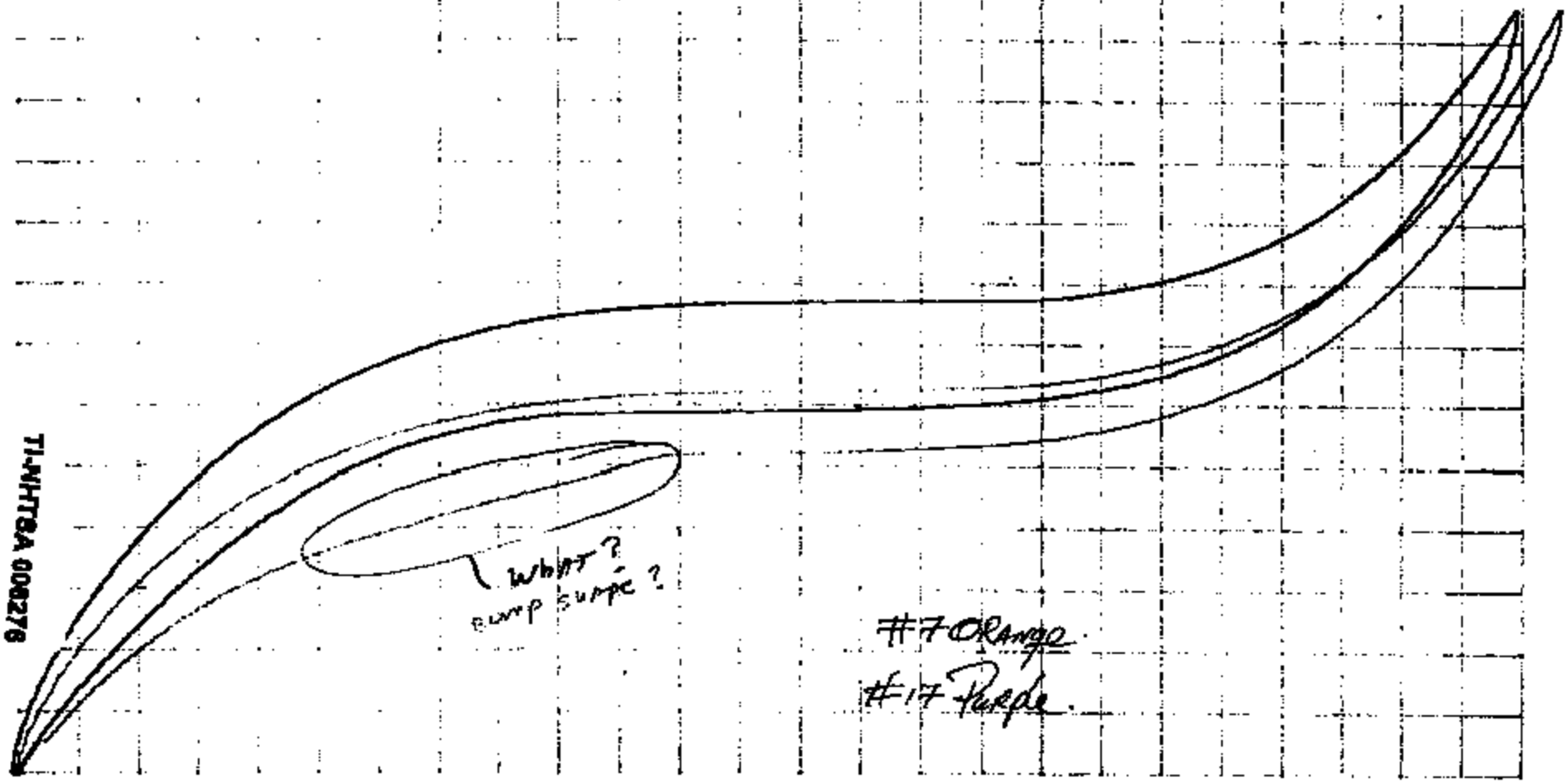

RANGES: 1.800V 10.00V 1.250V
OFFSETS: 0.0V 0.0V 0.0V
TOTAL TIME: 1.000S
POST-TRIG: 0.0S
TRIGGER: MAN
10:08:39 14 JUL 92
200
100
SHUT
#3 Red.
#13 Purple
THHTBA 009272


RANGES: 1.800V 10.00V 1.250V
OFFSETS: 0.0V 0.0V 0.0V
TOTAL TIME: 1.00S
POST-TRIG: 0.0S
TRIGGER: MAN
TI-NHTSA 00273
#4 Black
#14 Purple



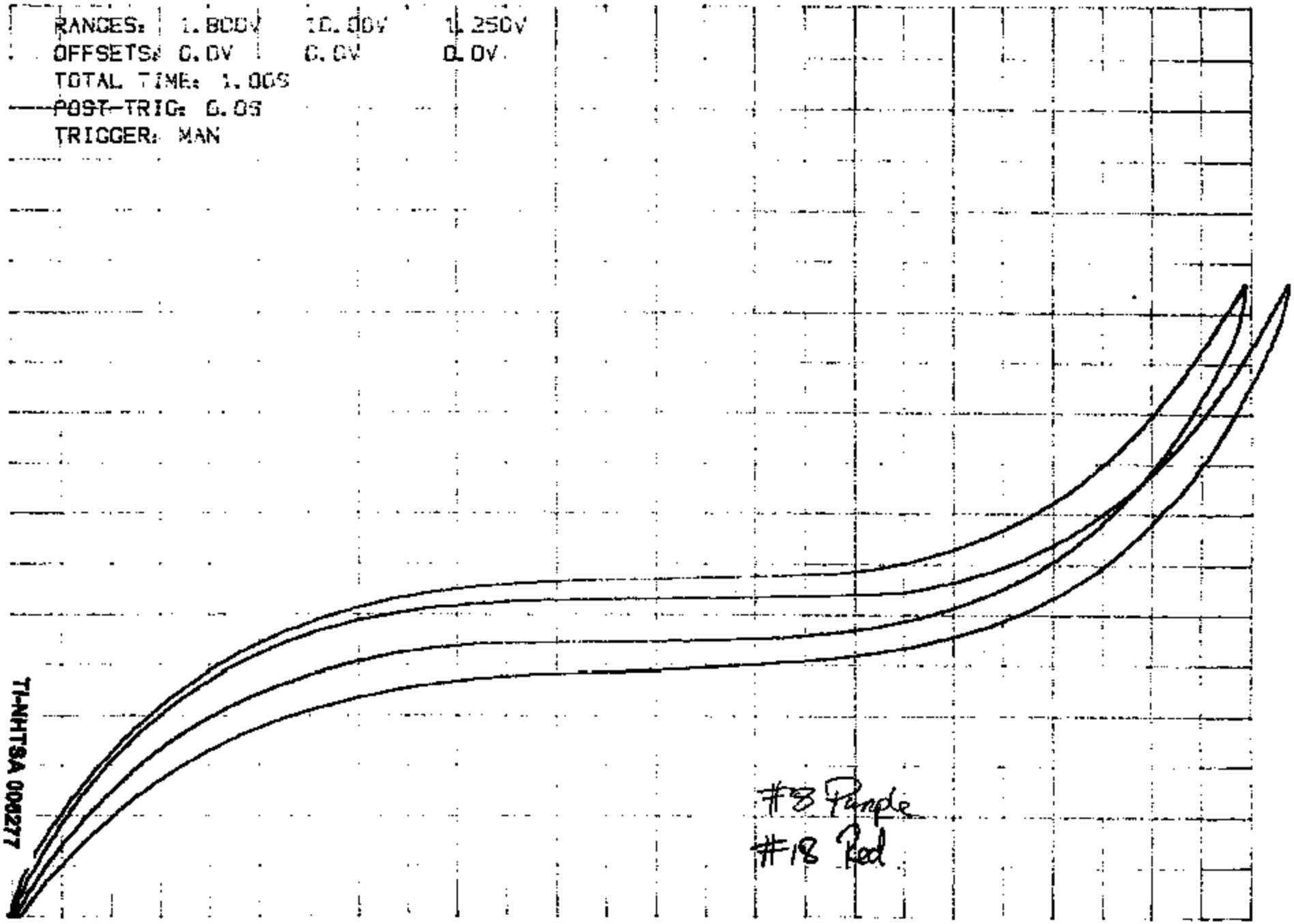


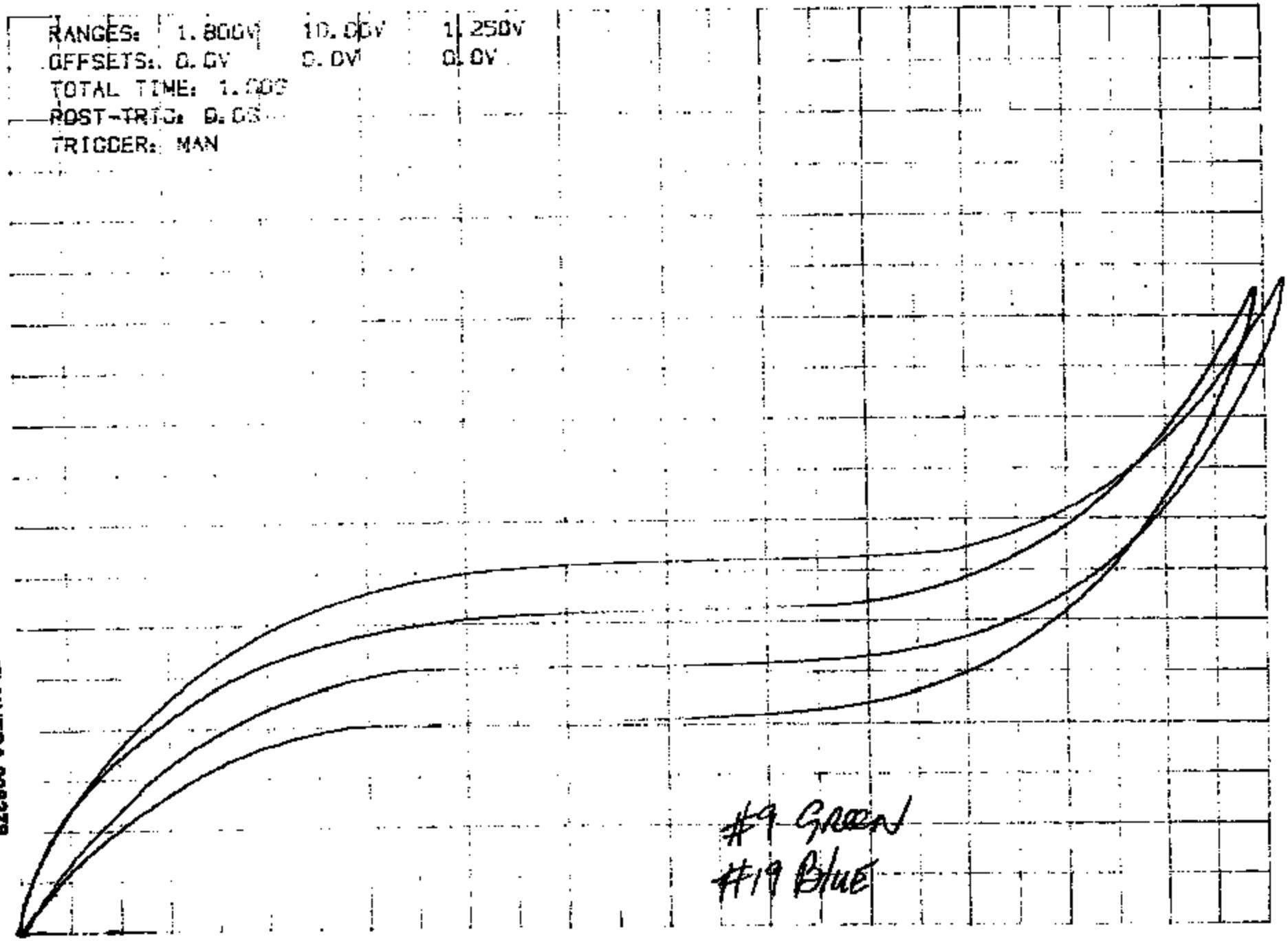
RANGES: 1.800V 10.00V 1.250V
OFFSETS: 0.0V 0.0V 0.0V
TOTAL TIME: 1.000
POST-TRIG: 0.0S
TRIGGER: MAN
10:47:17 14 JUL 93

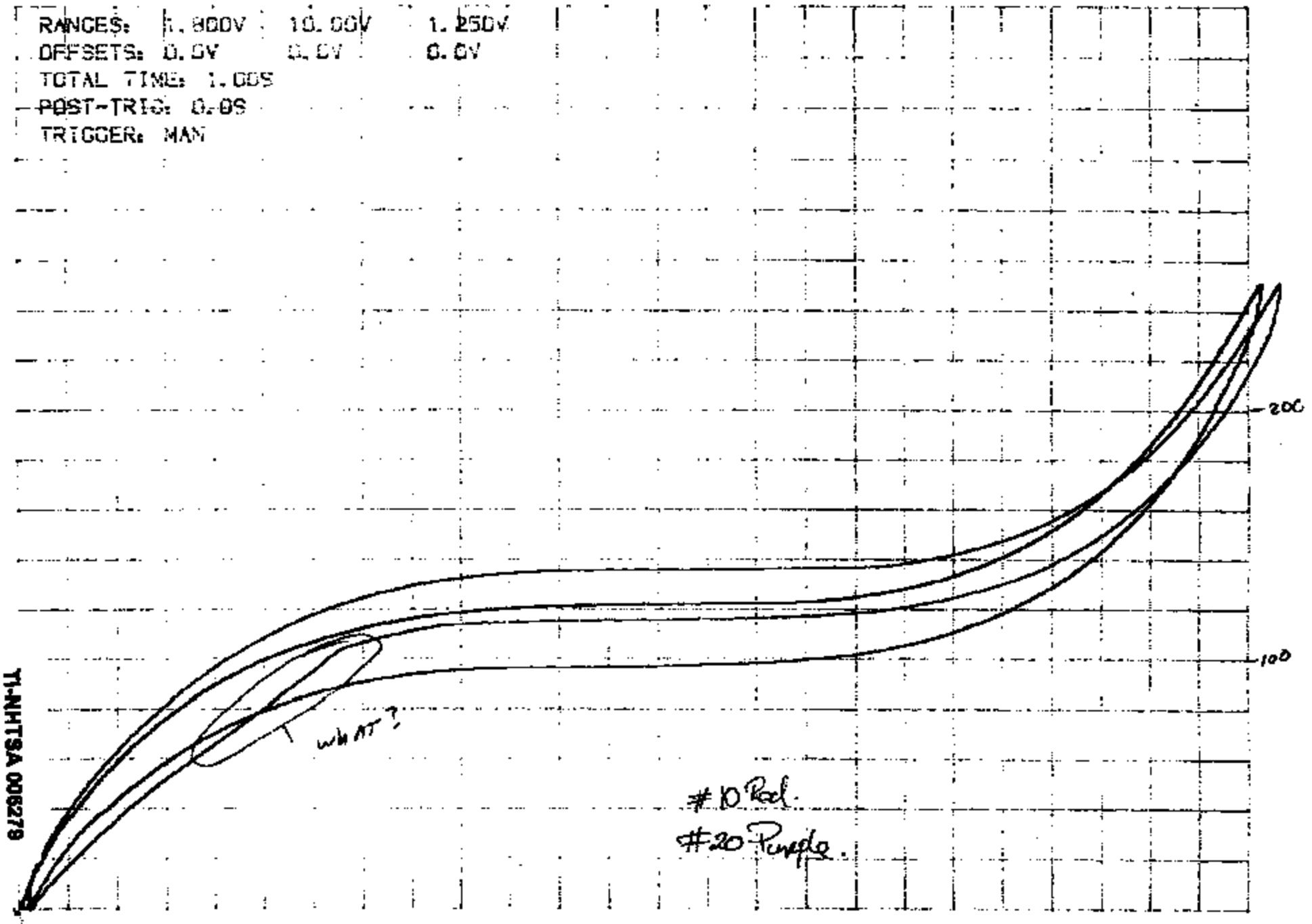


#7 Orange
#17 Purple

TI-WHTBA 000278



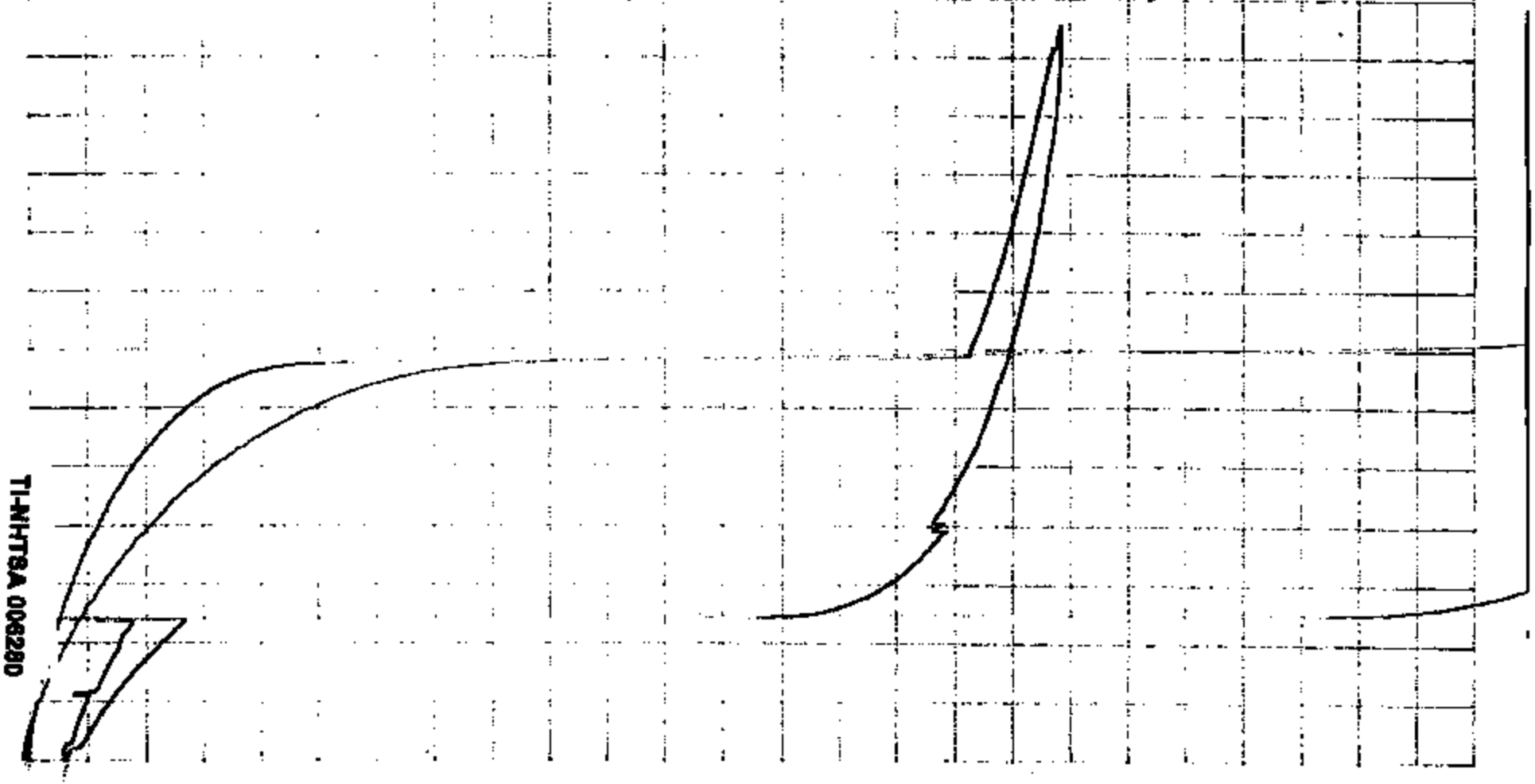




RANGES: 1.800V 10.00V 1.250V
OFFSETS: 0.0V 0.0V 0.0V
TOTAL TIME: 1.00S
POST-TRIG: 0.0S
TRIGGER: MAN
12:48:55 14 JUL 92

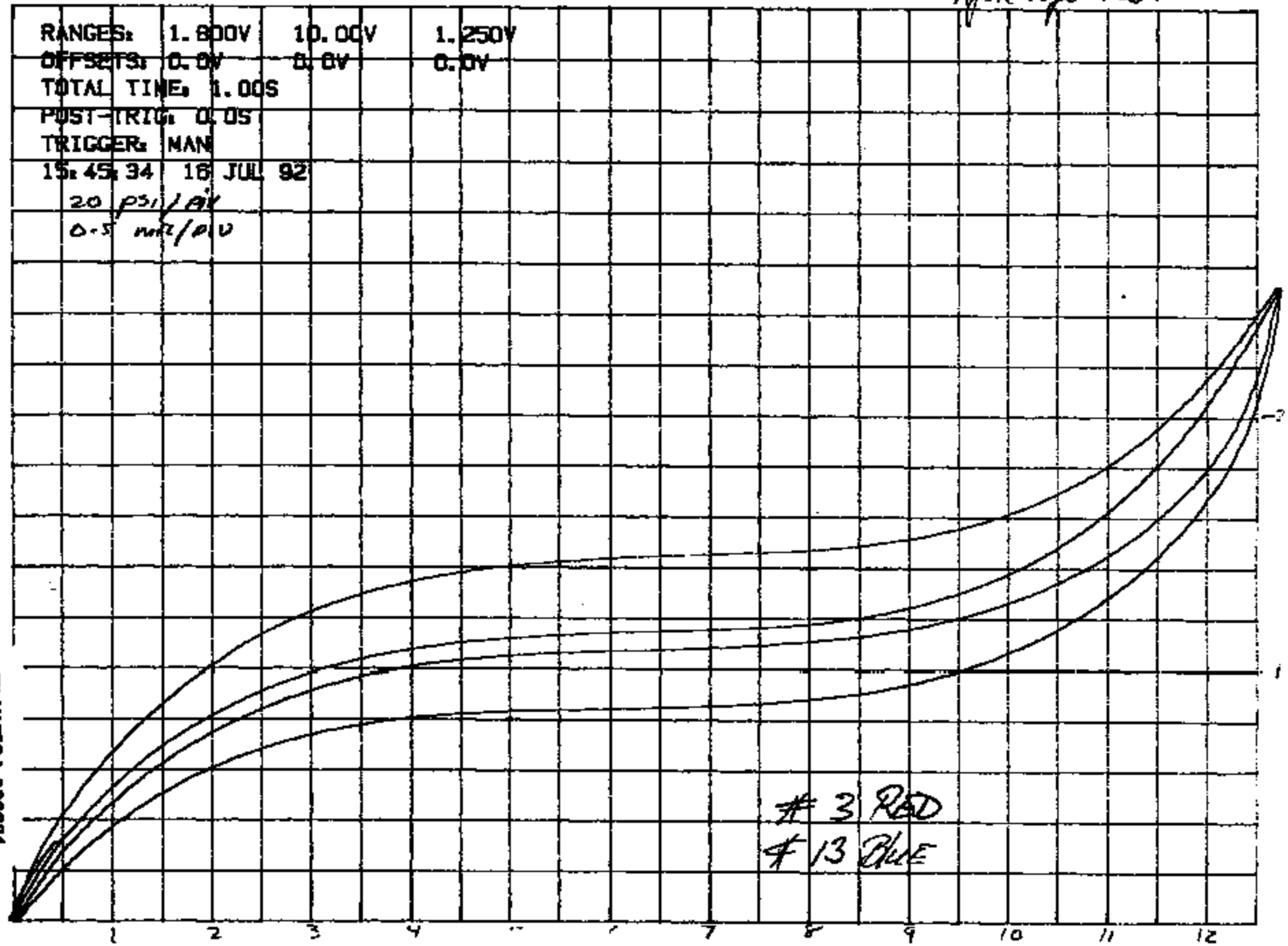
quiet disc in truck cup

RANGES: 1.800V 10.00V 2.250V
OFFSETS: 0.0V 0.0V 0.0V
TOTAL TIME: 1.00S
POST-TRIG: 0.0S
TRIGGER: MAN
12:53:19 14 JUL 92

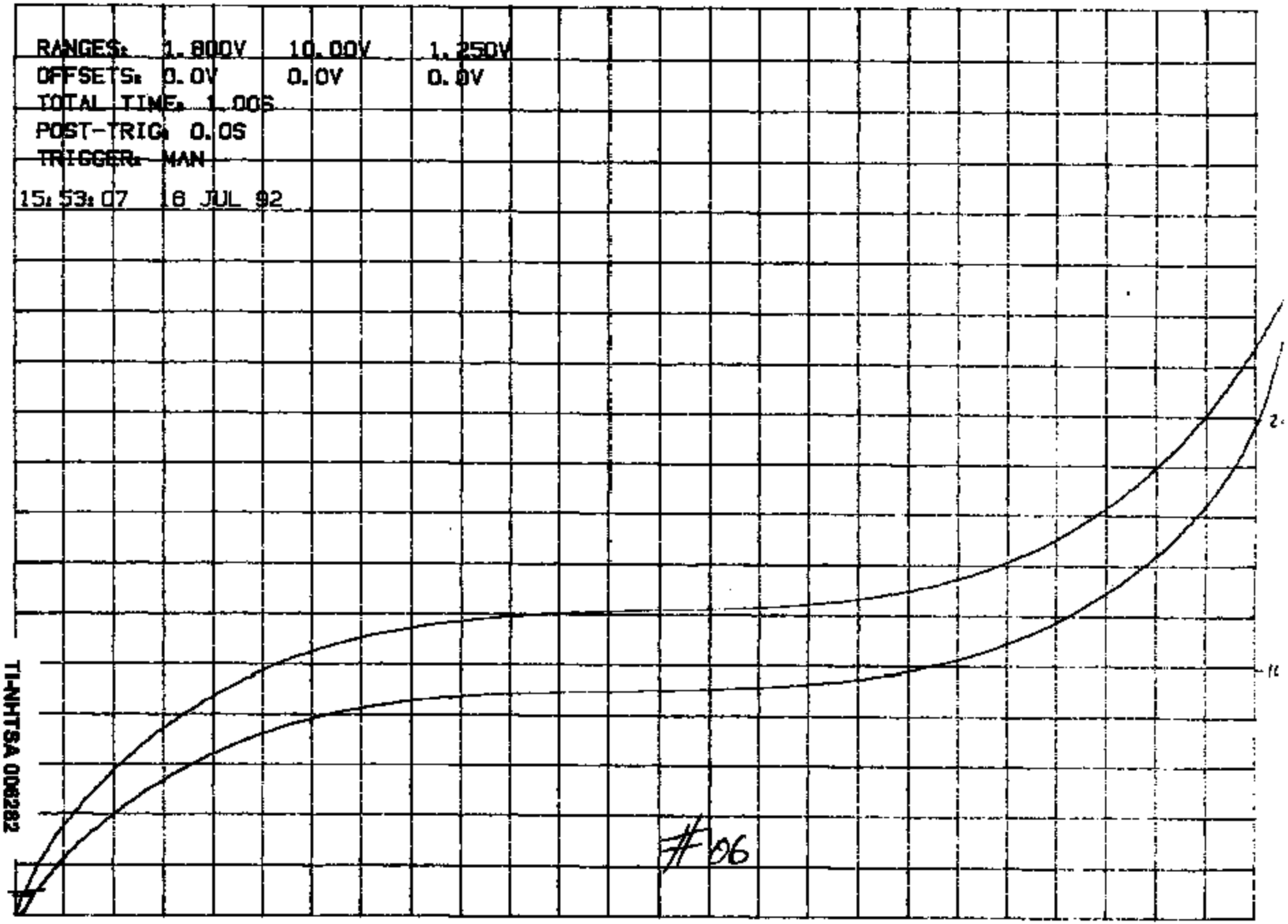


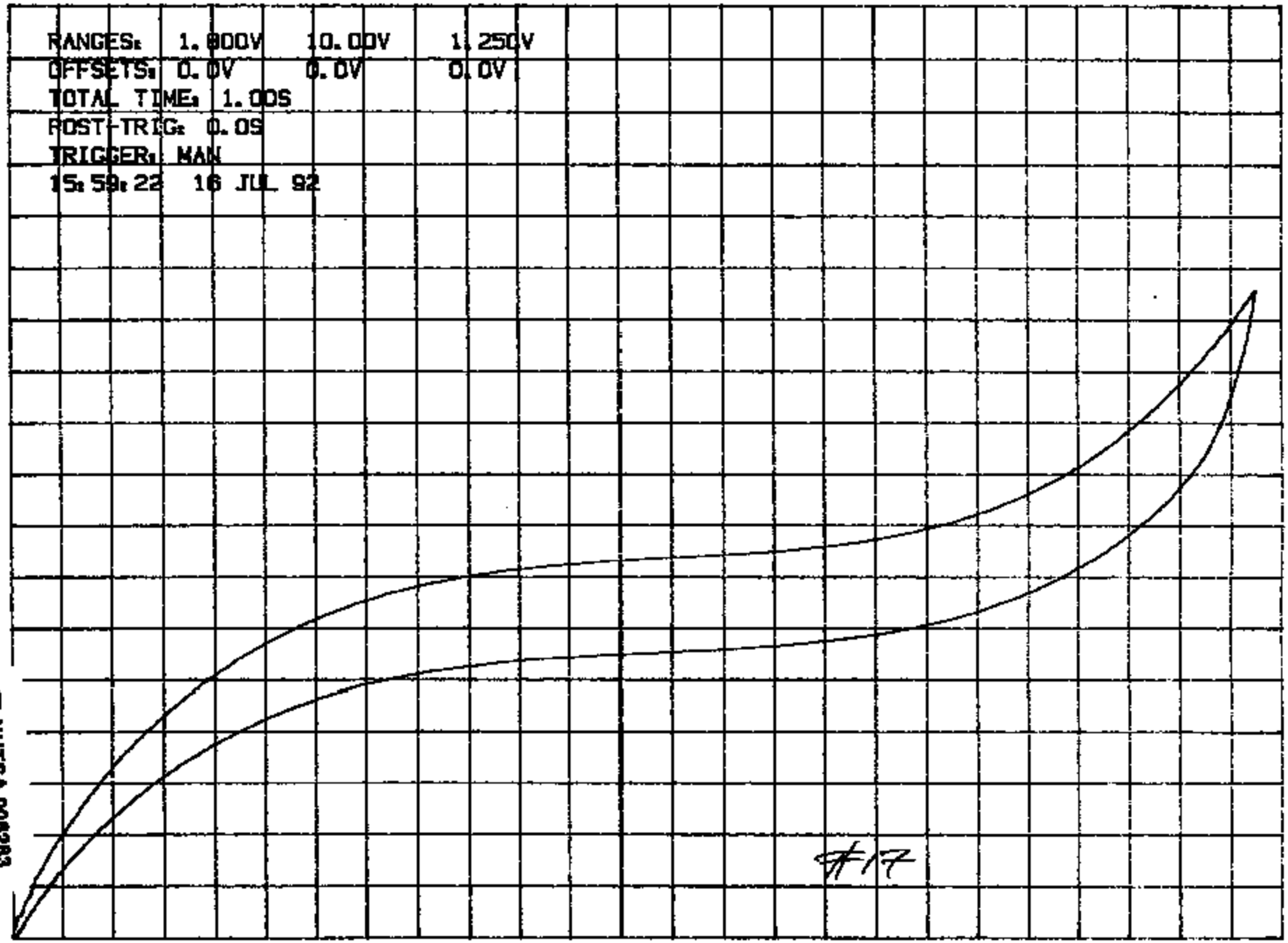
TI-NHTSA 006280

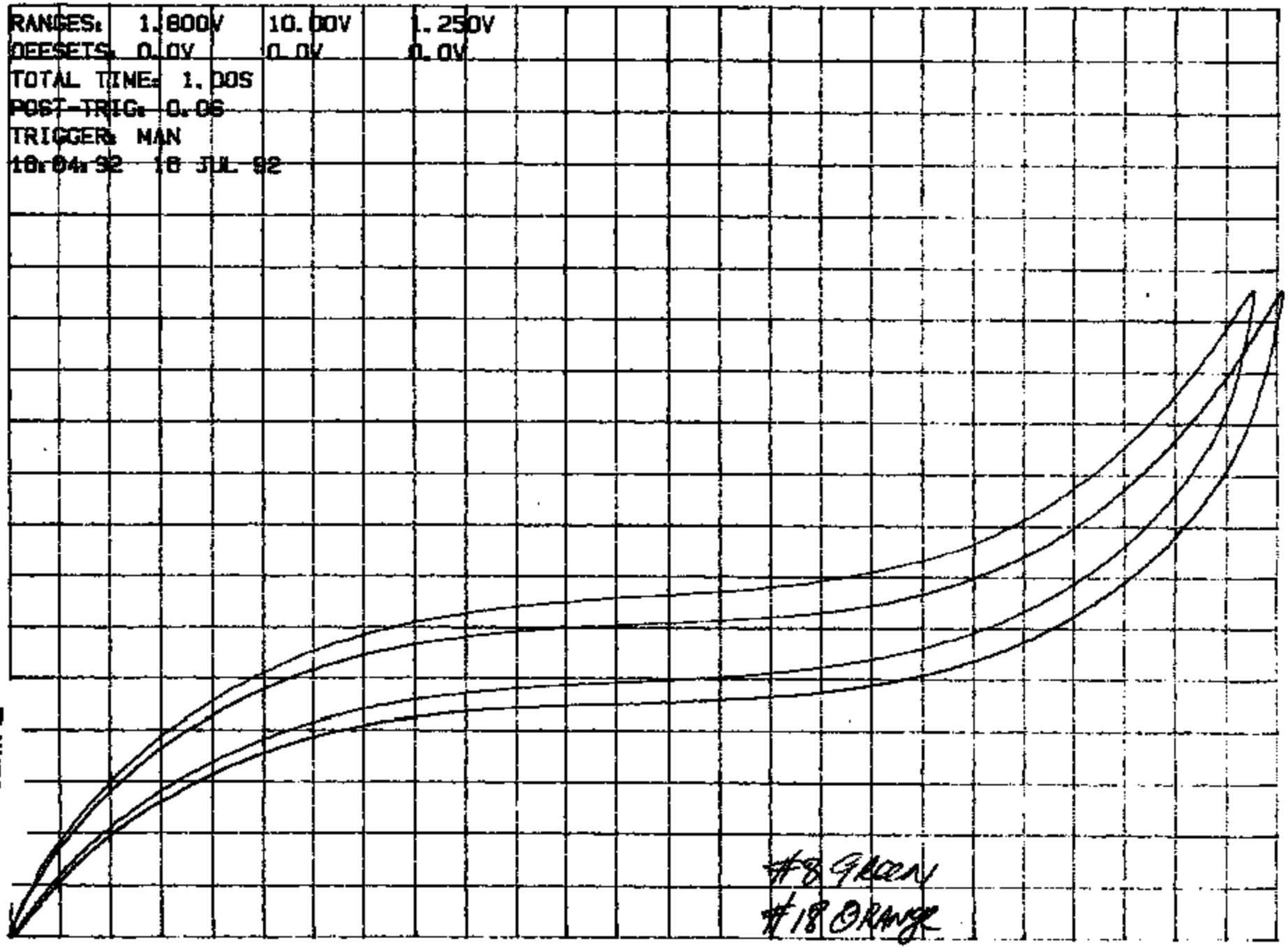
After Life Test



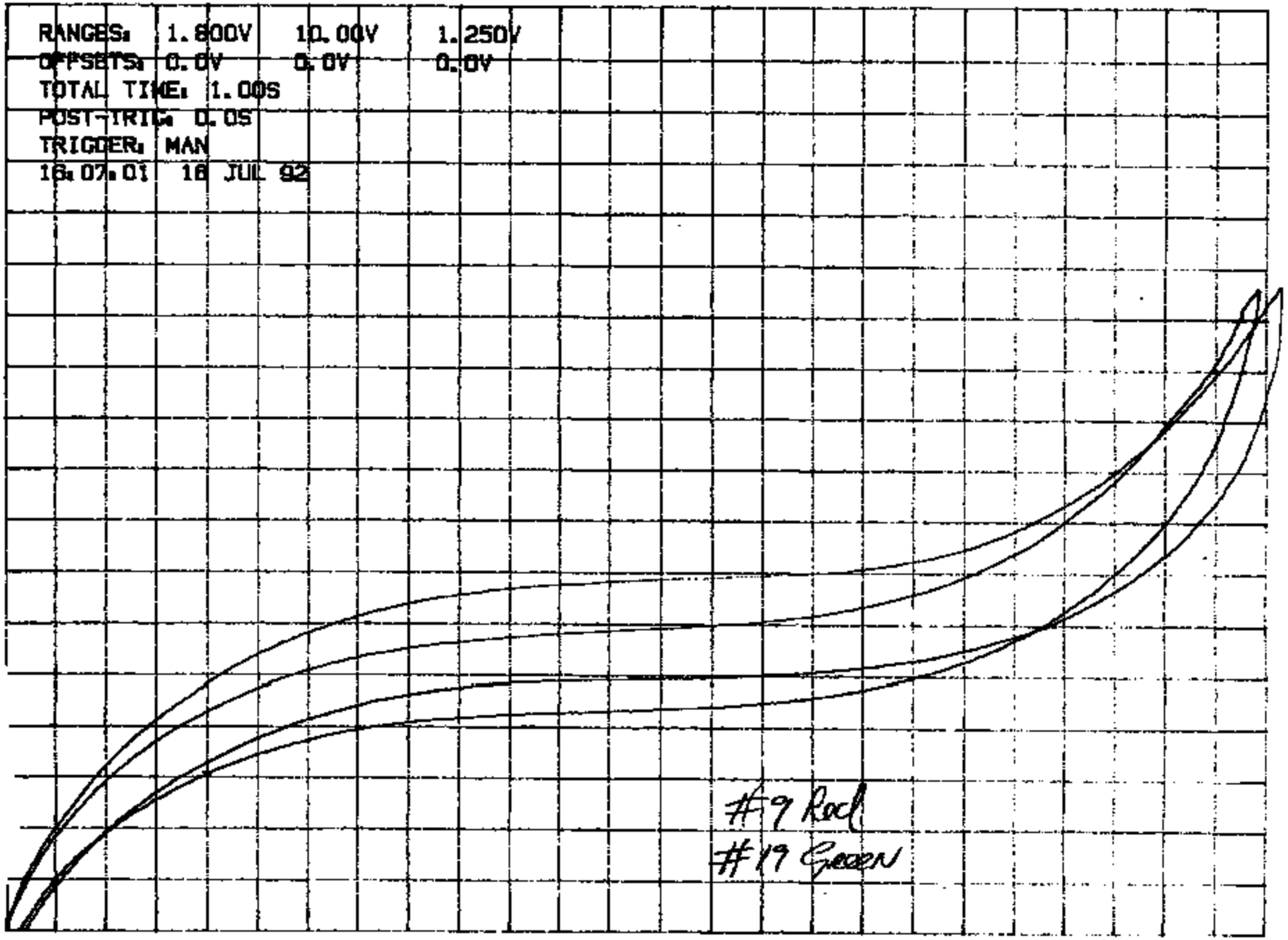
TI-NHTSA 006281



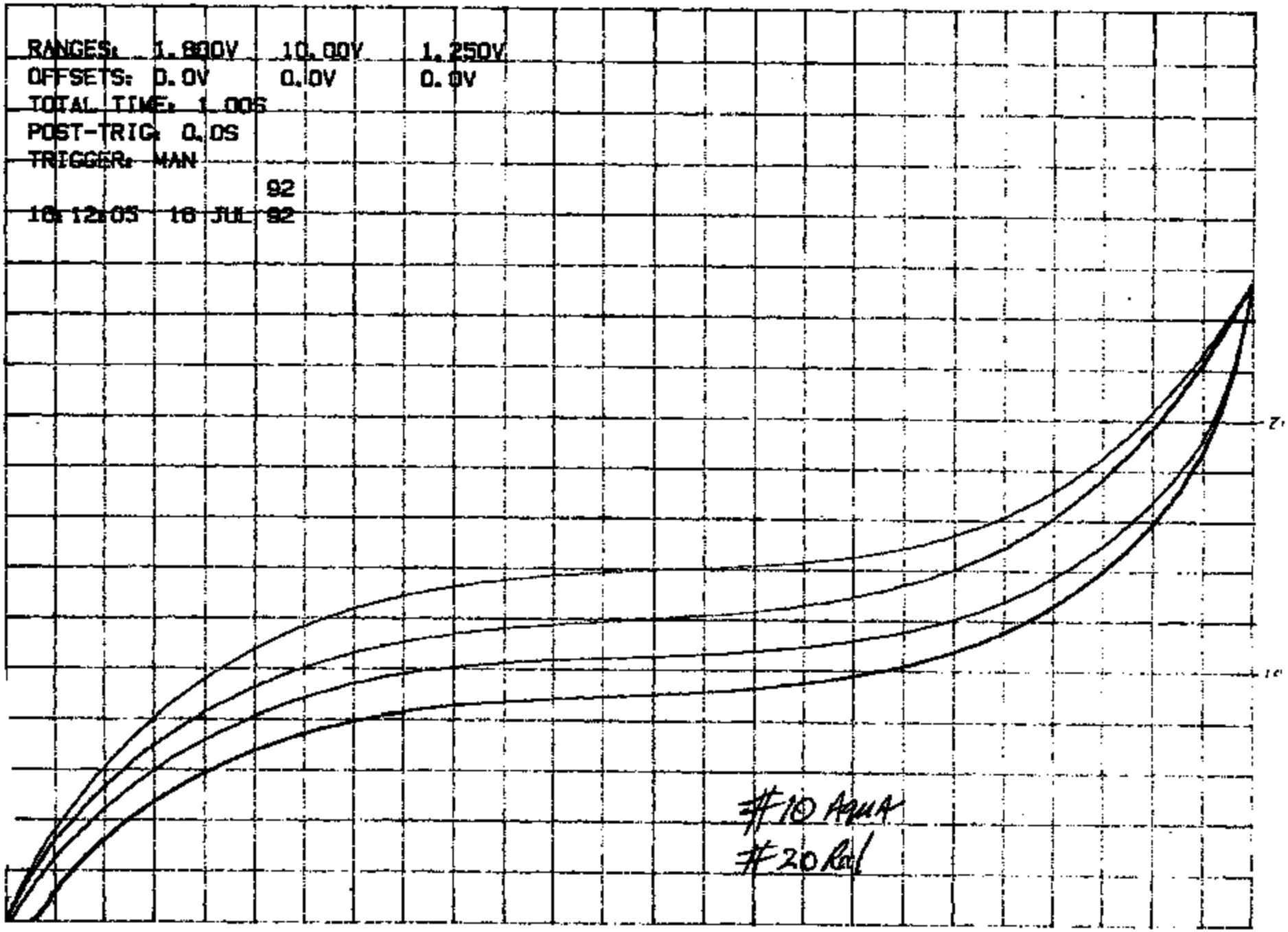




TI-NHT8A 006284



TI-NHTSA 006285



OBSERVATION FROM 297-15-70 TEST DATA.

1) THERE IS A FAIRLY WIDE SCATTER IN THE RISE RATE EVEN THOUGH THEY DO USE WHEELS FROM ONE PRODUCTION LOT.

2) THERE IS NO EVIDENCE OF WHEEL DE-PRELOAD AS THE GAP IS INCREASED BY 4.5 MILS. IN FACT THE CROSS SECTION SUGGESTS THAT THE PRELOAD CAN BE INCREASED BY ADDITIONAL SHIMS BECAUSE THERE IS STILL A GAP BETWEEN THE CONVEXION & WASHER OF 3 MILS.

THE RISE IS FAIRLY HELD CONSTANT AS THE CURVES ON THE [illegible] SHOW - BUT THE RISE IS NOT CONSTANT AS SHIMS ARE ADDED

3) THE SUDDEN CHANGE IN THE RISE RATE AT [illegible] IS ODD. WE DON'T HAVE [illegible] IT COULD BE EXPLAINED ON THE INCREASED GAP BECAUSE THE BUMP HAS PLENTY SO THE RISE COULD BE SWITCHING FROM ONE SIDE OF THE BUMP TO ANOTHER. I DON'T KNOW HOW TO EXPLAIN IT ON AN UNLOADED CUP.

4) THE FLAT ON THE CURVES IS THE FREE PLAY [illegible] LINE. AND THE OVERPRESSURE PORTION OF THE CURVE [illegible]

5) THE FORCE DEFLECTION CURVES SHOW NO EVIDENCE OF TOO MUCH PRELOAD. IF THERE WAS A LARGE PRELOAD THE CURVES WOULD HAVE HAD A SIGNIFICANT VERTICAL SECTION STARTING AT ZERO.

6) pulling a vacuum did not pull the keyton far enough away to unload the disc and cause a locking device on the unmodified cup.

7) spread of retention values was reduced with increased preload

CONCLUSION: ACTUAL change was 4.0 mils. there is no sign of a positive preload. cross section shows that the keyton is still holding the connector up. we should go ahead with the change listed at 4.5 mils.

the connector is the most likely candidate to change rather than the cup itself. it needs to be [illegible]

Test 297-15-20							
Investigation of increased preload to adjust for quet disc on 77psl3-1							
Preloaded							
Part No.		Act		REL		Disc Height	Depth to Disc
	1	24		19.5		18.1	495
	2	23		19.5		18	485
	3	23		19.2		18	485
preloaded	4	24		19.2		18	488
	5	23		19.6		18	505
	6	24		20		18.1	482
	7	24		20		18	484
	8	23		19.6		18.2	481
	9	23		20		17.6	492
	10	22		19		17.8	481
Column 1			*Column 1*			#N/A *Column 1*	
						#N/A	
Mean		23	Mean	19.6		#N/A Mean	487.8
Standard Error		0.2	Standard Error	0.11		#N/A Standard Error	2.407396011
Median		23	Median	19.6		#N/A Median	485
Mode		###	Mode	20		#N/A Mode	485
Standard Deviation		0.6	Standard Deviation	0.36		#N/A Standard Deviation	7.612854826
Variance		0.3	Variance	0.13		#N/A Variance	57.95555556
Kurtosis		0	Kurtosis	-1.2		#N/A Kurtosis	1.915528213
Skewness		0	Skewness	0		#N/A Skewness	1.452152123
Range		1.9	Range	1		#N/A Range	24
Minimum		22	Minimum	19		#N/A Minimum	481
Maximum		24	Maximum	20		#N/A Maximum	505
Sum		233	Sum	196		#N/A Sum	4878
Count		10	Count	10		#N/A Count	10

						#N/A		
						#N/A		
						#N/A		
no preload						#N/A		
	11	23		19		17.9		462
	12	23		19.2		18		460
	13	27		22.3		18.6		455
	14	24		20.6		18.3		458
	15	29		19		17.8		460
	16	23		19.5		18		454
	17	27		22.1		18.8		456
	18	23		19.7		18		460
	19	24		19.7		18		457
	20	24		20		18.1		458
Column 1			*Column 1*		*Column 1*		*Column 1*	
					FOR BOTH COMBINED			
Mean		24	Mean	20.1	Mean	18.075	Mean	458
Standard Error		0.4	Standard Error	0.38	Standard Error	#N/A	Standard Error	0.802772972
Median		24	Median	19.7	Median	18	Median	458
Mode		23	Mode	19	Mode	18	Mode	460
Standard Deviation		1.4	Standard Deviation	1.2	Standard Deviation	0.24894514	Standard Deviation	2.536591035
Variance		1.9	Variance	1.45	Variance	0.06197368	Variance	6.444444444
Kurtosis		0.1	Kurtosis	0.12	Kurtosis	3.48470142	Kurtosis	-0.881346734
Skewness		1.1	Skewness	1.17	Skewness	1.77251794	Skewness	-0.101875681
Range		4	Range	3.3	Range	1	Range	8
Minimum		23	Minimum	19	Minimum	17.8	Minimum	454
Maximum		27	Maximum	22.3	Maximum	18.8	Maximum	462
Sum		242	Sum	201	Sum	361.5	Sum	4580
Count		10	Count	10	Count	20	Count	10

TI-NHTSA 006280

7-21-92

THE FOLLOWING CURVES SHOW THAT THE P-D TEST SET-UP IS CAPABLE OF DETECTING EXCESSIVE PRELOAD. IT SHOWS UP AS A LENCE IN THE CURVE

THIS

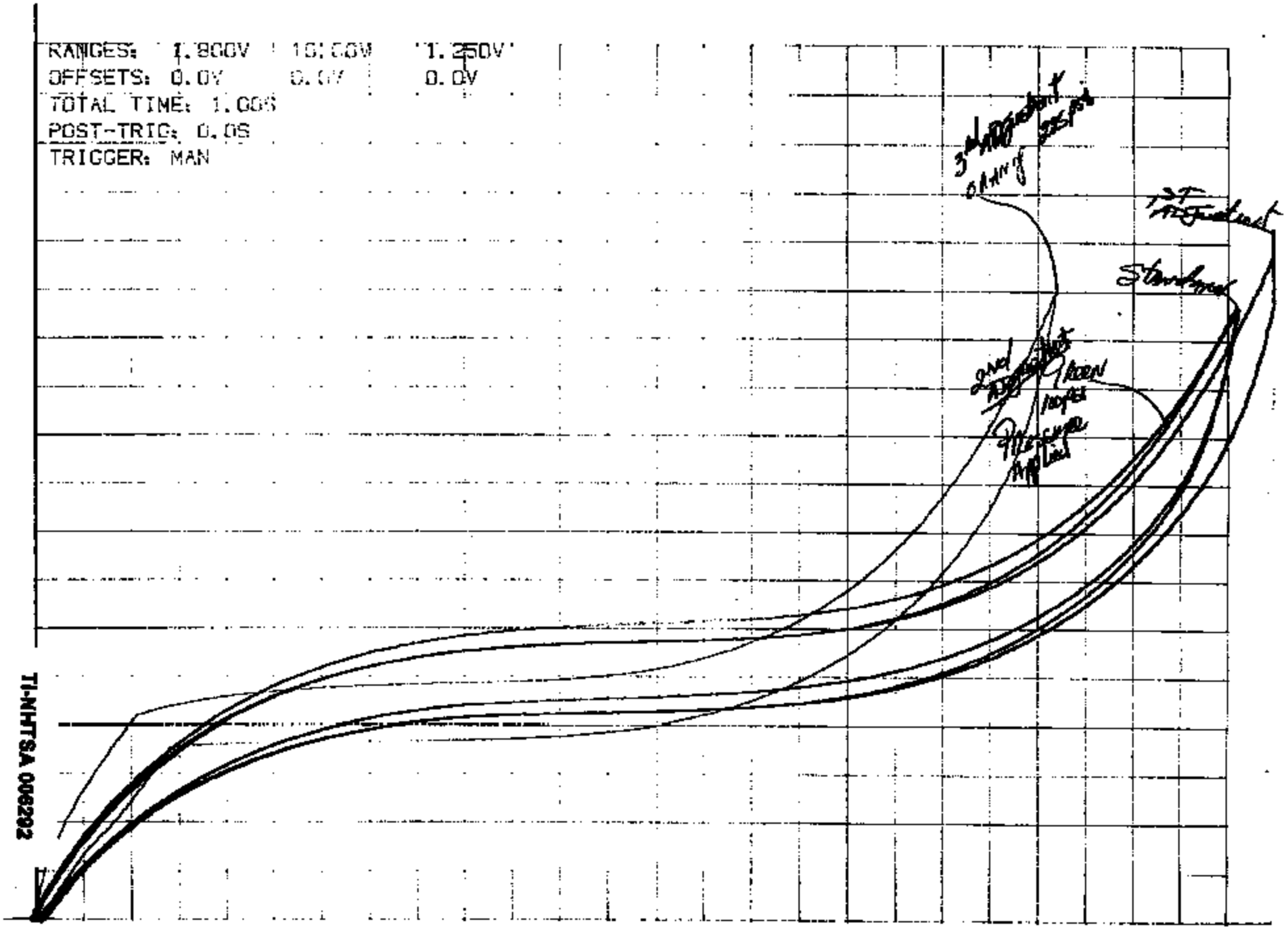
INSTEAD OF THIS

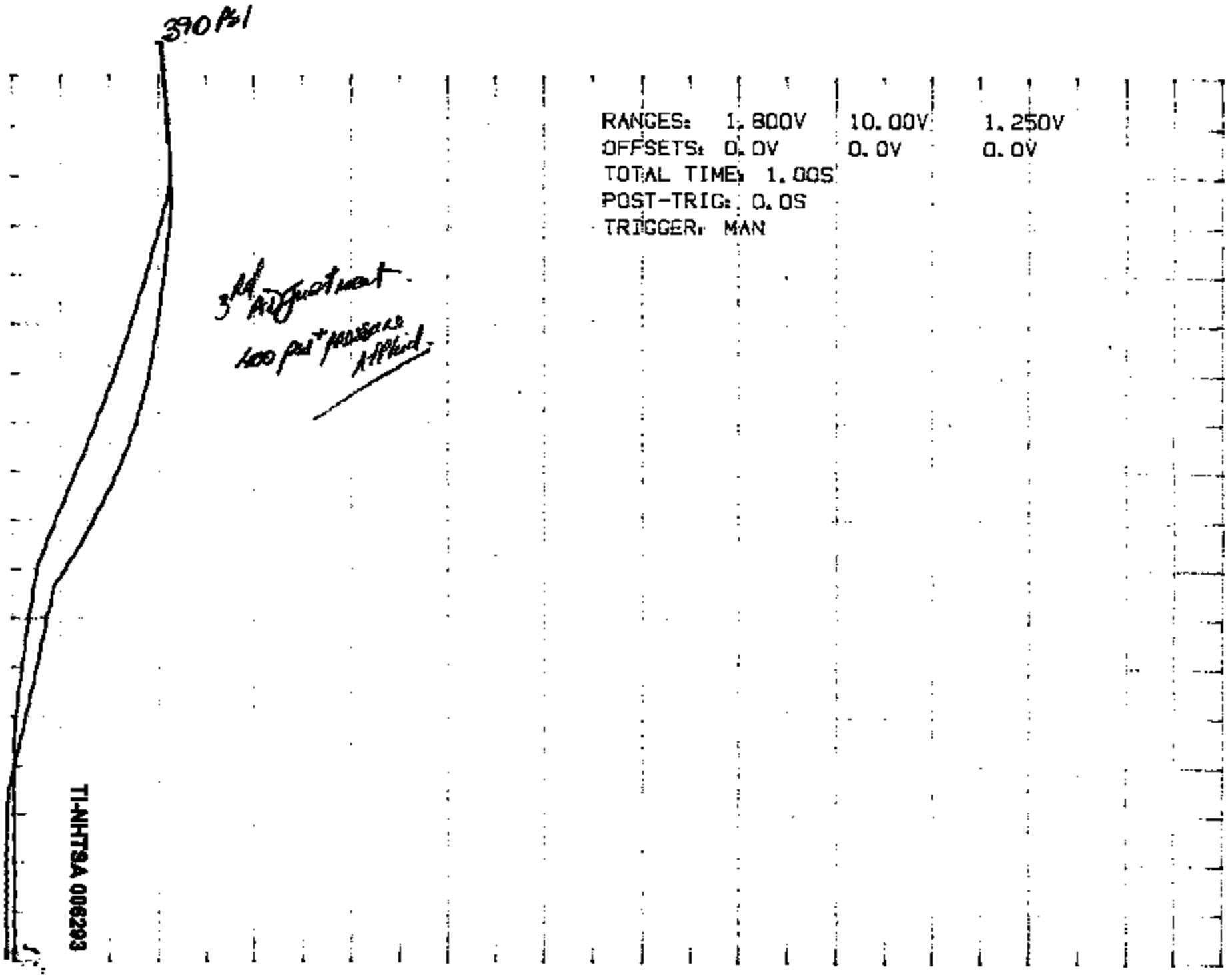
AS THE PRELOAD INCREASES THE ARROW SHORTENS & THE LENCE BECOMES SHARPER AS SHOWN.

EXCESSIVE PRELOAD

CONCLUSION: THE MACHINE CAN DETECT CHANGES IN PRELOAD

PAGE 2 OF 2
X-1739
7-21-92




390 PSI
3rd Adjustment
400 psi pressure applied
RANGES: 1.800V 10.00V 1.250V
OFFSETS: 0.0V 0.0V 0.0V
TOTAL TIME: 1.00S
POST-TRIG: 0.0S
TRIGGER: MAN
TI-NHTSA 006293