

EA02025

TEXAS INSTRUMENTS, INC.'S

09/10/03 LETTER TO ODI

REQUEST 9

BOX 12

PART A – 0

PART 0



Global Chassis Commodity Management

17101 Rutledge Dr. M0807
PO Box 1687
Dearborn, MI 48124

December 4, 2001

Ms. Martha Sullivan
Vice President
Texas Instruments Inc.
Sensors & Controls
84 Forest Street
P.O. Box 8954
Attleboro, MA 02703-9800

REDACTED

Dear Martha,

It was a pleasure talking with you last Thursday during our phone conference regarding the brake cruise control deactivation switch. Here are minutes from our meeting to ensure we are aligned with the agreements reached and next steps:

Attendees:

Jeff Engel, Ford Executive Director, Global Purchasing
Scott Shepherd, Ford Director, Global Chassis Commodity Management
Drew Sheffield, Supervisor, Brake Systems, Global Chassis Commodity Management
Martha Sullivan, TI Vice President
Steve Major, TI Sensor Products USA Manager
Dave Czarn, TI Marketing Manager

Agreements:

1. Ford agreed to share brake switch field/safety data with Texas Instruments; this involves the vehicle history data that led Ford to the conclusion that the current application is safe for all vehicle applications.
2. Texas Instruments agreed to continue shipping the switch in 2002 QY based on Ford's current plan to accelerate re-sourcing of this product to another supplier. Texas Instruments agreed to assist Ford with this move and to allow Ford and another switch supplier to visit the Texas Instruments plant to review the product.

We should be able to have the technical data review meeting later this week if Texas Instruments is available. I will coordinate this and additional supply questions with Dave Czarn.

Sincerely,

Drew Sheffield
Purchasing Supervisor, Brake Systems

cc: Jeff Engel
Scott Shepherd
Steve Major
Dave Czarn

VIA FACSIMILE (313) 390-2353

December 5, 2001

Mr. Drew Sheffield
Purchasing Supervisor, Brake Systems
Ford Motor Company
CMP, MD 607
17101 Rotunda Drive
Dearborn, MI 48124-4084

RE: Your December 4, 2001 letter to Martha Sullivan

Dear Drew:

We received your December 4 fax and while we concur with the first point, we will offer here our interpretation of the agreement made on the second point.

2. Texas Instruments agreed to continue shipping beyond December 31, 2001 based on:

- a. Ford's current plan to accelerate resourcing of this product to another supplier and,
- b. Ford granting TI indemnity for switches manufactured from January 1, 2002 forward, in line with the wording of TI's November 8, 2001 letter

Texas Instruments agreed to assist Ford with this move and to allow Ford and another switch supplier to visit the Texas Instruments' plant to review the product line.

In the event that Texas Instruments' interpretation of the field/safety data is not consistent with Ford's conclusion that the switch application is safe for all applications, we will need to revisit the backward looking indemnity requested in our November 8, 2001 letter and forward looking supply of the switch.

By return letter, please confirm Ford's concurrence of the above.

Sincerely,

David Chern
Sensor Products Marketing Manager
PH: (508) 236-1104
FX: (508) 236-3745
d-chern@ti.com

TI-NHTSA 017244



Global Chassis Commodity Management

17101 Rokusa Dr. M0807
PO Box 10897
Dearborn, MI 48124

December 21, 2001

Mr. David Ozari
Senior Product Marketing Manager
Texas Instruments Inc.
Sensors & Controls
34 Forest Street
P.O. Box 2964
Attleboro, MA 01703-0964

Dear David,

I received your December 19, 2001 letter. As you know, during our December 8 phone conference, Kris Christerson shared with Texas Instruments the kind of switch performance data (customer, dealer, government) readily available for a detailed review by Texas Instruments. This included VOQ data involving the same data reviewed by NHTBA, detailed data from Ford's customer hotline and dealer technicians, and the results of the Belton Rouge investigations. We again extended the invitation to Texas Instruments to meet with Ford to review the data in person and ask any questions related to it.

Texas Instruments asked Kris many questions and requested additional data, which Kris agreed to pursue. Kris has switch sales figures for part sales to dealers outside warranty, and out by switch part number and model year. I believe he is prepared to share this data with Texas Instruments at your convenience.

I want to make sure that Ford addresses Texas Instruments' specific questions about switch performance. Since the December 19 letter is very general regarding the exact nature of data requested, please contact Kris 518-823-8467 to get specific answers regarding what kind of reports Ford can and cannot generate and to discuss what conclusions can be drawn. As we discussed, there are many causes for thermal events in vehicles (e.g., bad aftermarket installation/repair of equipment), and we need to be careful how we interpret the information.

Thank you.

Sincerely,

Drew Sheffield
Purchasing Supervisor, Brake Systems

cc: Kris Christerson

Ford Motor Company

Global Chevrolet Commodity Management

17101 Rotunda Dr. MD007
PCI Box 1567
Dearborn, MI 48124

February 21, 2002

Mr. David Czarn
Sensor Products Marketing Manager
Texas Instruments Inc.
Sensors & Controls
34 Forest Street
P.O. Box 2984
Attleboro, MA 02703-0984

Dear David,

As we discussed recently, Ford is still in the process of finalizing phase-out timing for the Texas Instruments' cruise control deactivation switch. All production programs have now committed to phase-out the switch by the end of the 2002 calendar year, and engineers and master cylinder suppliers are working toward the following schedule:

- Windstar - Job1 03MY (7/29/02)
- E-Series - Running change Job1 03MY+30 days or Job 1+60 days (8/06/02 or 10/05/02)
- Motorhome - R/O to follow E-Series timing (8/06/02 or 10/05/02)
- Ranger/E-Series - R/C Job2 03MY (12/01/02)
- F150/Blackwood - R/C Job1 03MY + 60 days (10/07/02)
- SuperDuty/Excursion - Job1 03MY (11/4/02)
- Explorer/Mountaineer/Explorer Sport/SportTrac - Job1 03MY (6/02)
- Aviator - R/C Job 1 03MY + 60 days to follow Explorer
- Expedition/Navigator - balances out with introduction of new Expedition/Navigator (3/02)
- F850/750 - master cylinder switch no longer required for vehicle (10-11/02)
- Falcon - master cylinder switch no longer required for vehicle with introduction of 03MY

This preliminary schedule should assist Texas Instruments with supply and manufacturing planning. It is my understanding that FORD and Texas Instruments are working out a mutually agreeable supply plan.

Regarding the technical discussions, I spoke with Kris Christensen a few days ago and I believe he will be contacting you to finalize a meeting date (tentatively next week) for Ford and Texas Instruments to sit down and review the data requested by Texas Instruments.

We expect Texas Instruments to support Ford's supply needs until each program phases-out this product, and will assist as required to ensure a smooth transition.

Sincerely,

*Drew Sheffield*Drew Sheffield
Purchasing Supervisor, Brake Systemscc: Scott Shepherd Steve Major Dave Czarn
Fred Porter Mike Renwood Kris Christensen

originator: dms:amr/esa

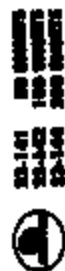
Page 1 of 1

REDACTED

TI-NHTSA 017246

77PS DOCUMENTS

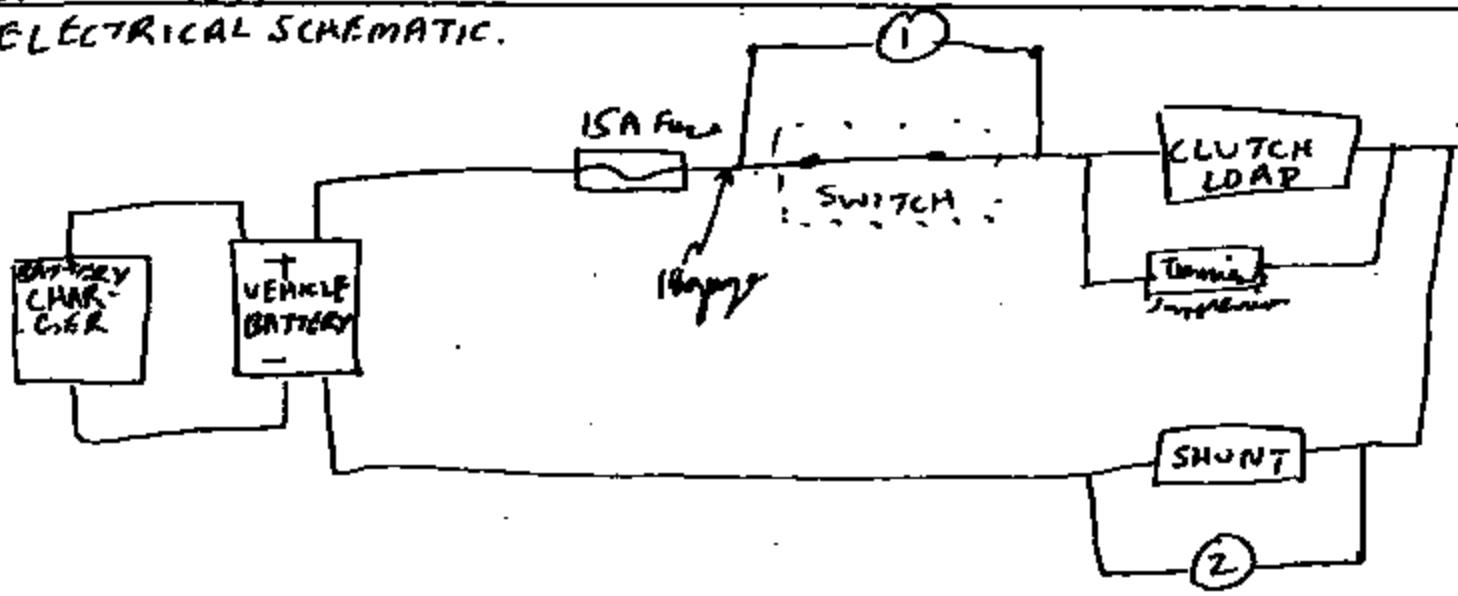
FROM AZIZ RAHMAN



TI-NHTSA 017247

SPARK STUDY TEST
 ELECTRICAL SCHEMATIC.

AR



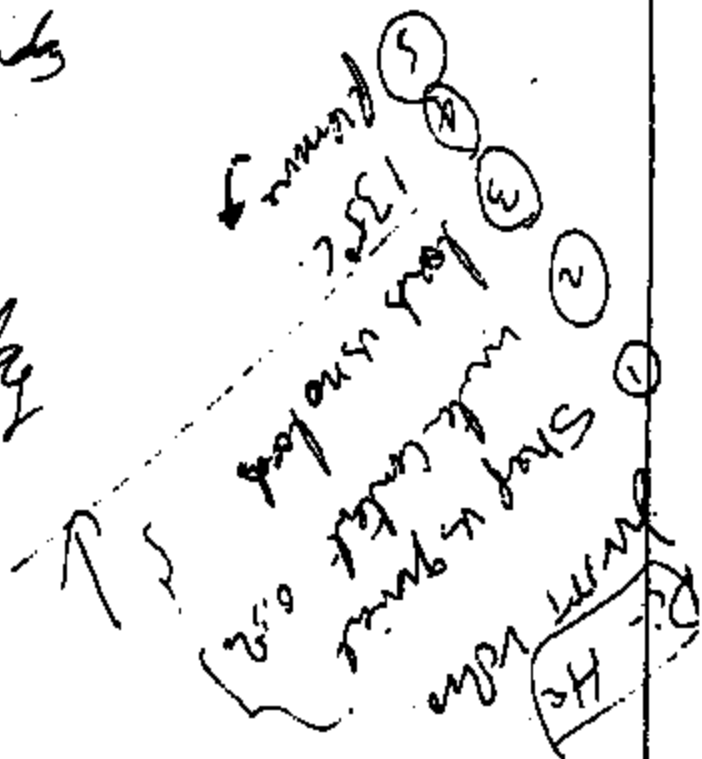
- Channel ① = Voltage drop across switch
- ② = Current through switch
- ③ = Pressure transducer on manifold

Cycling supply.

6 yds / 700 4 wds
5 day.

5 day } 10 day
5 day }

16 turns/mile.



WERS

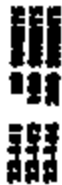
Part # / changes in B.A. Changek.
Prac

PK.

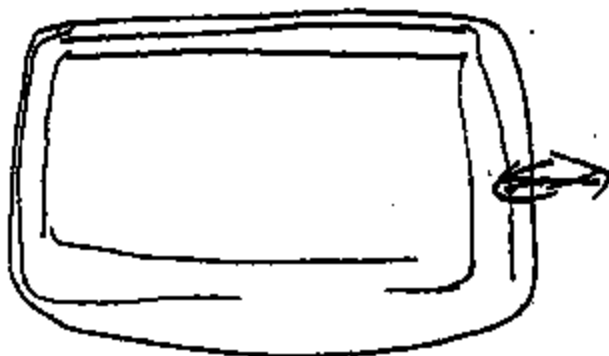
↑
Kontrolliert mit Ge. verortet.

Video optical evidence of spark.

Lesen Kerylincom Shutan around in Buchst. hind.



① Keep on cycling to maintain other
pulse mode.



② Look at delta from the waveform data
for 2 pulse modes.

Memory is needed
and.

③ D-reaction: first ramped out to store L.

Master CGIS Data

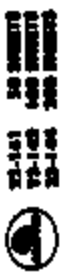
IN/IS NOT
Vehicle Town Car

① DOW MTG.

② WED

③ FRI/MON

517
352
9980
3745



① VEHICLE TEST - AVT

② PUMPING CURRENT THROUGH
* MANIFOLD - AVT

③ CONTINUE TAKE PART
ANALYSIS - CL

④ why?? - CL

⑤ T.I test parts analysis - CL

⑥ SPARK Test - hook T.I
Board.

⑦ PSE DWG TO MP, SK.

⑧ Jams checked.

⑨ Got 2 more. NADA again with head
w/ L. look 1/2.

Review 50h
Xerox memo
on body. 9 pages
into Veh. Test plan..

⑩ Contaminant - not mentioned directly
w/ body. phony's starting... FP

Azic printed into
date sheet

⑪ Heater switches
samples

steps worried
 ① FAX ~~to~~ core team | e-mail

② 2 paper on known themes - PSE - (S) / (rad)

(S) home
 517
 512
 9090

③ taking text
 - copy

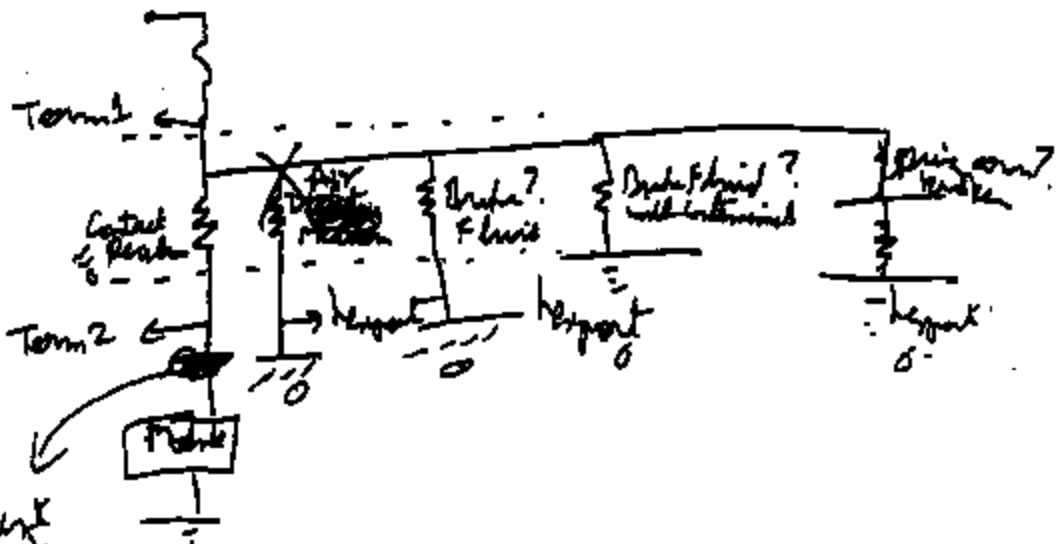
④ Don't letter - fixed
 ① 1/2 days. Call with 1719

728
 1075x
 1095x
 1200x
 1200x

X return of p with may ① thru ⑤ core team. 1/2 hr
 ~ paper in words in detail - share

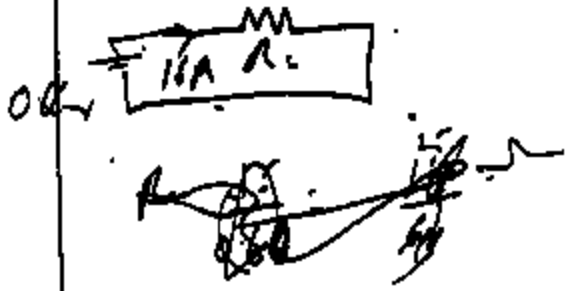
FK1
 ↑ 1213x2 ↑

Wiring Diagram



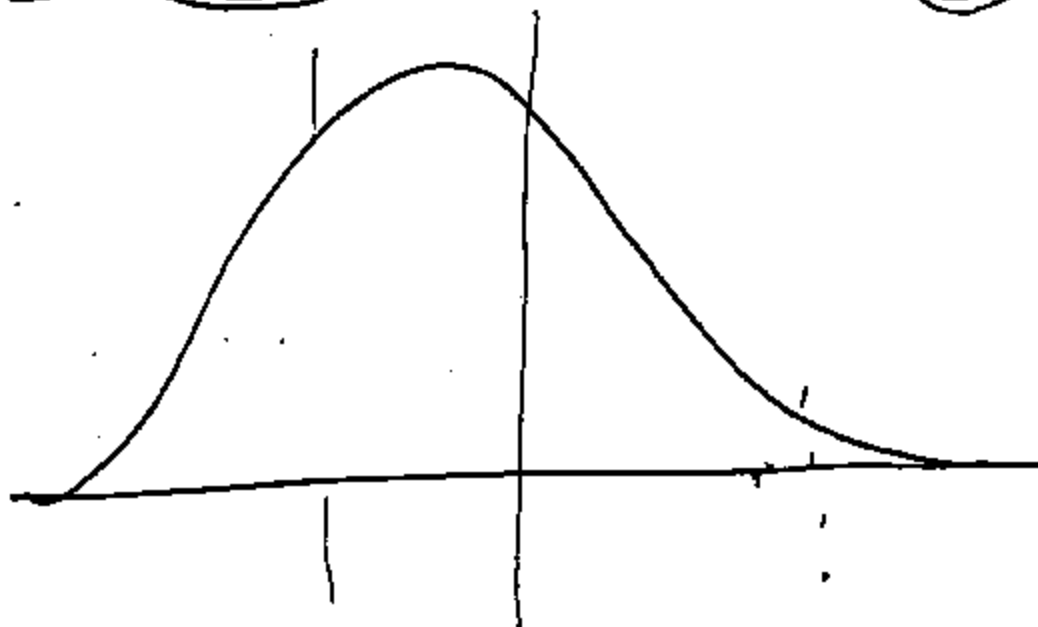
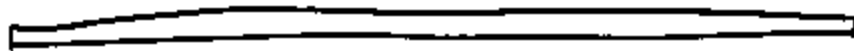
Current limited by Pulse Generator

1.1
I_{max}



Need to ^{to} provide
300 feet/min²

What can create a fire
90% of fire char in car
Get DOW in time



TI-NHTSA 017265

Alameda County 2:30
Cabrillo Health Center

Temp test BLDG 5 NW Lab Amb. - 100% Humid. - 2.				
Date	Time	Indoor	Outdoor	
2/11	2:45 P	76	1	
	4:30	70	1	9th crystal

NO SMOKING
NO DRINKING
NO EATING
NO ALCOHOL
NO GAMING
NO FIREARMS

garment - report + ~~test~~ + inspect
path.

garment resp. virus?
... aerosol virus?

End of trip → end day life

Include animal to rest conversion
rest. | G. registers Material Group.

Mail stop | Pch Lane Tower,
Nanny | Room 604 West
Landscape.

A212.

WHEN CAN WE GET SOME OF THE
EARLY FAILURES FROM THE TI TEST.
WANT TO GET THEM? STONE LABOURS,

mit - DOE = just come identify
corrective action in place
→ 2 weeks for fire definition.

DOE

TI + Dupont

Dreams

Increase life dramatically

Transducer ??

Not concerned with strength, wear-out

How - acoustic vibration

List of tests - buy them

to increase
New to 1w. life

97 Gown V. 1
2 year old

majorly 5/6 year
old old

① Quantity wear
change criteria
② F. 3. 1/2
improvement

③ DOE
④ P. T. 9 M
⑤ Full. 80W

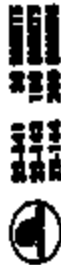
ABS 300,000

① Contain y. 1/2, 1/2
too much wear

Re-sale. Merine Wash June 1971

Re-test Cole
V. 1/2

W. 1/2



① CDW has to come in to explain yin/yang
- ~~long~~ / ~~short~~ / ~~term~~ / ~~long~~

② Need experiments to accelerate Kraton breakdown. NHTSA. Test Drive
- Dupont causing embrittlement

DOE
① - noise vs quiet

② - term
③ - moisture
④ - layer of Kraton
⑤ - salt - noise

term based
work life vs
water content

Need 2-3x life: Hard for others
Nothing has
mechanical loss
work

③ W. is also from system reliability

Task Review meeting every 2 weeks.

① Need a target skill to have
rotation in place in 2 months max time
with 2A review next week
2C review regular.

- maybe relay.

Same use - orange box ✓
7 chapters in A books -
what
rethink line.

Tom Johnson how to get this to
know.



Melina

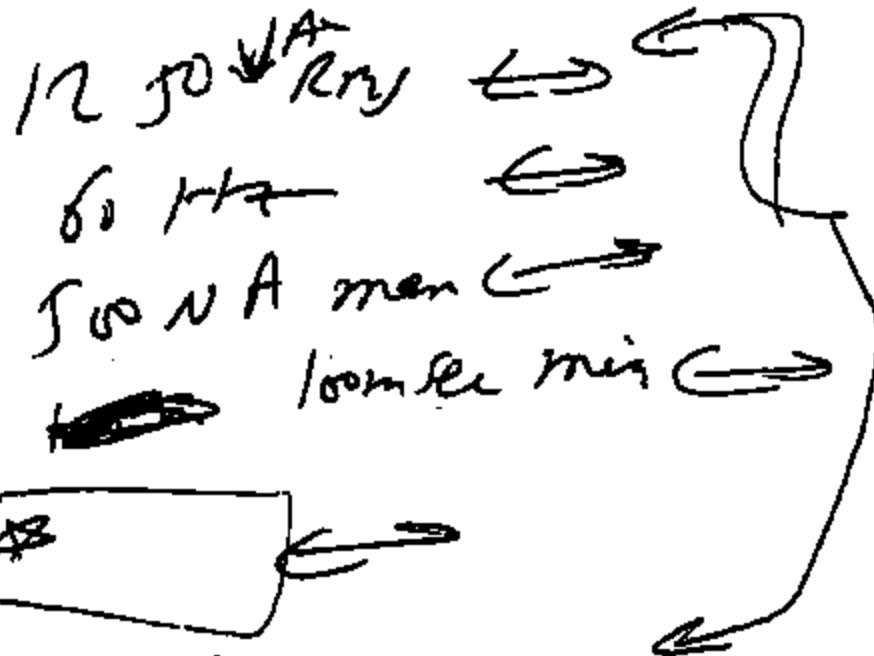
Norm Laporte

over view
M. W. ...
E/Mon Drop off D/H/A
Speakers Blk. P/L/A

DOW.

Wed 2 PM 3A Ø39

11-11-11
11-11-11
11-11-11
11-11-11



living links in person, planned - Steve

Wednesday meeting with Joe Alami

Mr. Jack Casper ↔ Chay Ezzina trans VC
Chuck Teske ↔ Phyllis Ezzina. Towla
Ann Orville ↔ Prudith Direct LVC
(UTA)

Wed Joe Alami
B.M. Brangid Anti lobby office
Steve - F. officers

Got to do
more

Joe with chattering at schools/breakdown

Tues, Pete Jones 248-340-3239

Andy Fan # 3745

~~Case~~

Cory Rm 2247

Attention: no problem.
As attraction while being X-ray.

John Joyce → IT.
Antina -

Siccd

Internet & car.

80322



HV

8 .196
1K

04 / 6042094
417
3700

Steve Reeves, name, number, etc.
Pay - 1 -
credit.

on vehicle rent plan.

Linda Joy

~~Language D. Mitchell~~
~~...~~

Act
of Unreadable

ALL T.C.s
ATU

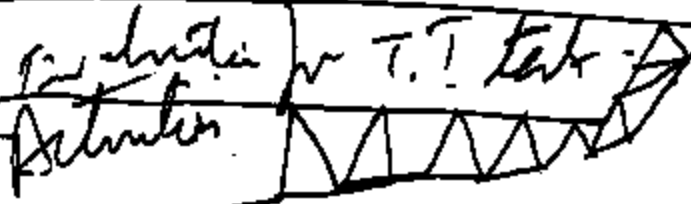
Need to know TC
is in there as



AB / Non-AB/

6, 3,

pp 7501, 8 ^{tech.} ^{contracts}
Work plan



Brake Fluid replacing inhibitors
SAE paper Improved Brake Fluid

Mineral Filled Nylon \rightarrow melts conductive.

Chloride to Contamination list of DF
contaminant



B; K Drangyk

2809

See jobs all the time

26300 \rightarrow fracture
down of DF
conductance

Styrene is a white noise of conductance
problem with water stud - styrene

DBNCH₃

acetic acid pre-wash - clean wash

92/53 F-7000

chem phosphate red of cell
in hyp.

AC 00E 10206181.000

4/30/52

Release of

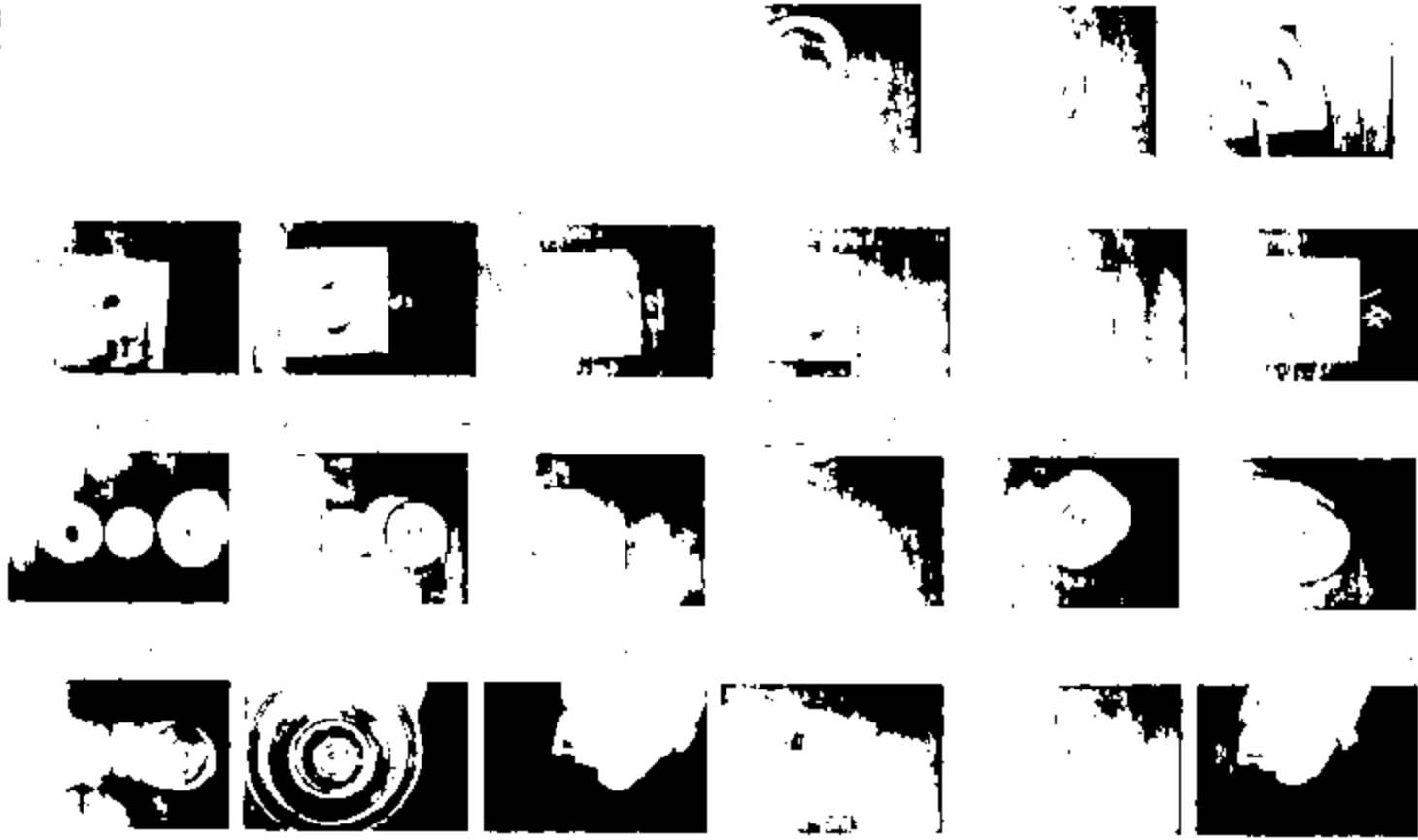
L3.1
F2 AC to
EN53 CV/Km.

24/2/52
Ampr 24/2/52





TI-NHTSA 017267



TI-NHTSA 017268

FORD SWITCH COMMODITY TEAM VISIT
CRUISE CONTROL PRESSURE SWITCH

OVERVIEW

THE CCPS IS A REDUNDANT SAFETY DEVICE IN A NEW, VACUUM-LESS ELECTRONIC CRUISE CONTROL DESIGNED BY FORD.

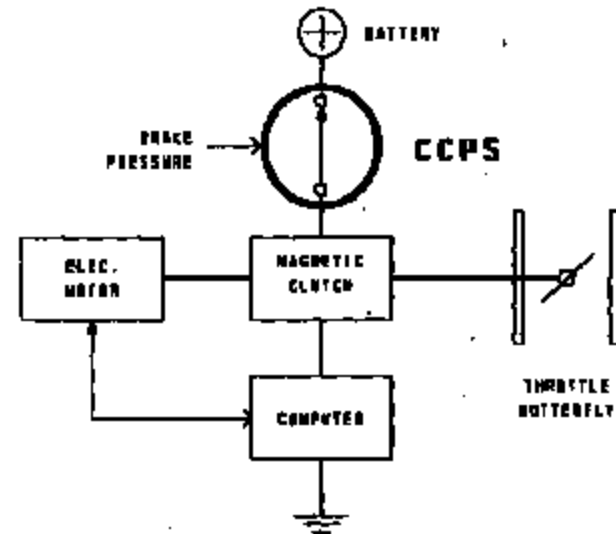
FUNCTIONALLY, IT REPLACES THE PRESENT VACUUM DUMP VALVE BY DE-ENERGIZING A CLUTCH WHICH CONNECTS THE THROTTLE TO AN ELECTRIC ACTUATOR.

IT IS PLUMBED INTO THE BRAKE LINE. WHEN THE DRIVER APPLIES PRESSURE TO THE BRAKE PEDAL, THE NORMALLY-CLOSED SWITCH OPENS, DISCONNECTING THE ACTUATOR FROM THE THROTTLE BUTTERFLY.

SPECIFICATIONS:

ACTUATION: 150 PSI +/- 50
RELEASE: 100 PSI MIN.
BURST: 7000 PSI
CYCLES: 500K, 0 - 1450 PSI, 2 Hz
VOLTAGE: BATTERY
CURRENT: 0.75 AMP

CLD/daa



FORD SWITCH COMMODITY TEAM VISIT
CRUISE CONTROL PRESSURE SWITCH

TI-NHTSA 017270

BACKGROUND/HISTORY

- o FORD ENGINEERING CONTACTED TEXAS INSTRUMENTS IN 4Q87 TO DEVELOP BRAKE PRESSURE SWITCH FOR FUTURE ELECTRONIC SPEED CONTROL SYSTEM.
- o FIRST QUARTER 1988, TEXAS INSTRUMENTS DEDICATED A DESIGN ENGINEER TO THE DEVELOPMENT OF CCPS.
 - ENGINEER DEDICATED 3+ YEARS PRIOR TO START OF PRODUCTION.
- o TEXAS INSTRUMENTS HAS CONTINUALLY SUPPLIED PROTOTYPES TO FORD SPECIFICATIONS AND TIMING REQUIREMENTS.
 - INCLUDES DELIVERY ON AS LITTLE AS 24 HOURS' NOTICE.
- o TEXAS INSTRUMENTS HAS CONTINUED TO MEET PROGRAM GUIDELINES AS SET FORTH BY FORD.

CLD/DAA

FORD SWITCH COMMODITY TEAM VISIT
CRUISE CONTROL PRESSURE SWITCH.

TI-NHTSA 017271

INITIAL PROGRAM GOALS (AS HANDED TO TI BY FORD ENGINEERING)

DEVICE PRICE - \$1.75 - \$1.90
TOOLING - \$700K - \$950K

ORIGINAL PREMISES

- o USE OF CURRENT PRODUCTION BASE ASSEMBLY WITH METRI-PACK CONNECTOR.
- o ACTUATION PRESSURE IN 150 PSI RANGE, TOLERANCE UNDEFINED.
- o NORMALLY CLOSED LOGIC.
- o NO CREEP REQUIREMENT.
- o PROOF PRESSURE 2K PSI.
- o BURST PRESSURE 5K PSI.
- o NO PIN GAUGING NECESSARY.

CLD/DAA

FORD SWITCH COMMODITY TEAM VISIT
 CRUISE CONTROL PRESSURE SWITCH

CHANGES/IMPACT OF CHANGES TO PROGRAM FOUNDATION

CHANGE	APPROXIMATE	
	<u>TOOLING IMPACT</u>	<u>DEVICE IMPACT</u>
USE OF BASE ASSEMBLY WITH METRI-PACK CONNECTOR NOT ACCEPTABLE TO FORD.		
o MANUAL BASE ASSEMBLY WITH FORD DESIRED TERMINAL ORIENTATION	\$50K	\$.30
OR		
o AUTOMATED BASE ASSEMBLY WITH FORD DESIRED TERMINAL ORIENTATION	\$250K	
o ELIMINATE CONVERTER		(\$.06)
o CRIMP RING FROM .025" TO .050"	\$10K	\$.08
o RE-DESIGN OF TERMINALS TO PROVIDE FORD DESIRED TERMINAL ORIENTATION.	\$50K	\$.04

CLD/DAA

FORD SWITCH COMMODITY TEAM VISIT
CRUISE CONTROL PRESSURE SWITCH

T-NHT6A 017273

CHANGES/IMPACT OF CHANGES TO PROGRAM FOUNDATION

<u>CHANGE</u>	<u>APPROXIMATE</u>	
	<u>TOOLING IMPACT</u>	<u>DEVICE IMPACT</u>
PROOF PRESSURE REQUIREMENT MOVED FROM 2K TO 5K PSI.		
BURST PRESSURE REQUIREMENT MOVED FROM 5K TO 7K PSI.		
o ADDITIONAL PIECE OF KAPTON ADDED TO HANDLE BURST REQUIREMENT.	\$10K	\$.02
o DISC SEAT 40% THICKER TO HANDLE BURST REQUIREMENT.		\$.06
o HEXPORT 40% THICKER TO HANDLE BURST REQUIREMENT.		\$.06

CLD/DAA

FORD SWITCH COMMODITY TEAM VISIT
CRUISE CONTROL PRESSURE SWITCH

TI-NHTSA 017274

CHANGES/IMPACT OF CHANGES TO PROGRAM FOUNDATION

<u>CHANGE</u>	<u>APPROXIMATE</u>	
	<u>TOOLING IMPACT</u>	<u>DEVICE IMPACT</u>
THREAD CAP REQUIRED	\$10K	\$.02
TOLERANCE DEFINED AS +/-50 PSI		
o PIN GAUGING NECESSARY (ALSO TIED TO CHANGE IN BASE ASSEMBLY)	\$100K	
	-----	-----
TOTAL IMPACT	\$230K	\$.52
OR		
TOTAL IMPACT	\$430K	\$.22

CLD/DAA

FORD SWITCH COMMODITY TEAM VISIT
CRUISE CONTROL PRESSURE SWITCH

TI-NHTSA 017276

CURRENT STATE OF PROGRAM

UTILIZING BASE WITH MANUAL TERMINAL ASSEMBLY:

- o DEVICE PRICE \$2.27 - \$2.42
- o TOOLING \$930K - \$1180K

UTILIZING BASE WITH AUTOMATED TERMINAL ASSEMBLY:

- o DEVICE PRICE \$1.97 - \$2.12
- o TOOLING \$1130K - \$1380K

CLD/DAA

FORD SWITCH COMMODITY TEAM VISIT
CRUISE CONTROL PRESSURE SWITCH

ENGINEERING INNOVATION/EXPERTISE

o TRADITIONAL PRESSURE SWITCH MATERIAL/LABOR BREAK-OUT AS FOLLOWS:

- MATERIAL: 55% - 60% OF TOTAL COST
- LABOR/OVERHEAD: 40% - 45% OF TOTAL COST

o CRUISE CONTROL PRESSURE SWITCH MATERIAL/LABOR BREAK-OUT AS FOLLOWS: (GIVEN CURRENT SPECIFICATION)

- MATERIAL: 72% OF TOTAL COST
- LABOR/OVERHEAD: 28% OF TOTAL COST

o TEXAS INSTRUMENTS PRODUCES IN EXCESS OF 10KK DISCS/YEAR FOR SNAP ACTING PRESSURE SWITCHES.

- 20+ YEARS OF DISC MANUFACTURING EXPERIENCE

o CRUISE CONTROL PRESSURE SWITCH REPRESENTS BREAKTHROUGH IN AUTOMATED NESTING OF TERMINALS.

- CCPS REPRESENTS STATE OF THE ART IN SNAP ACTING PRESSURE SWITCH DESIGN AND MANUFACTURE.

CLD/DAA

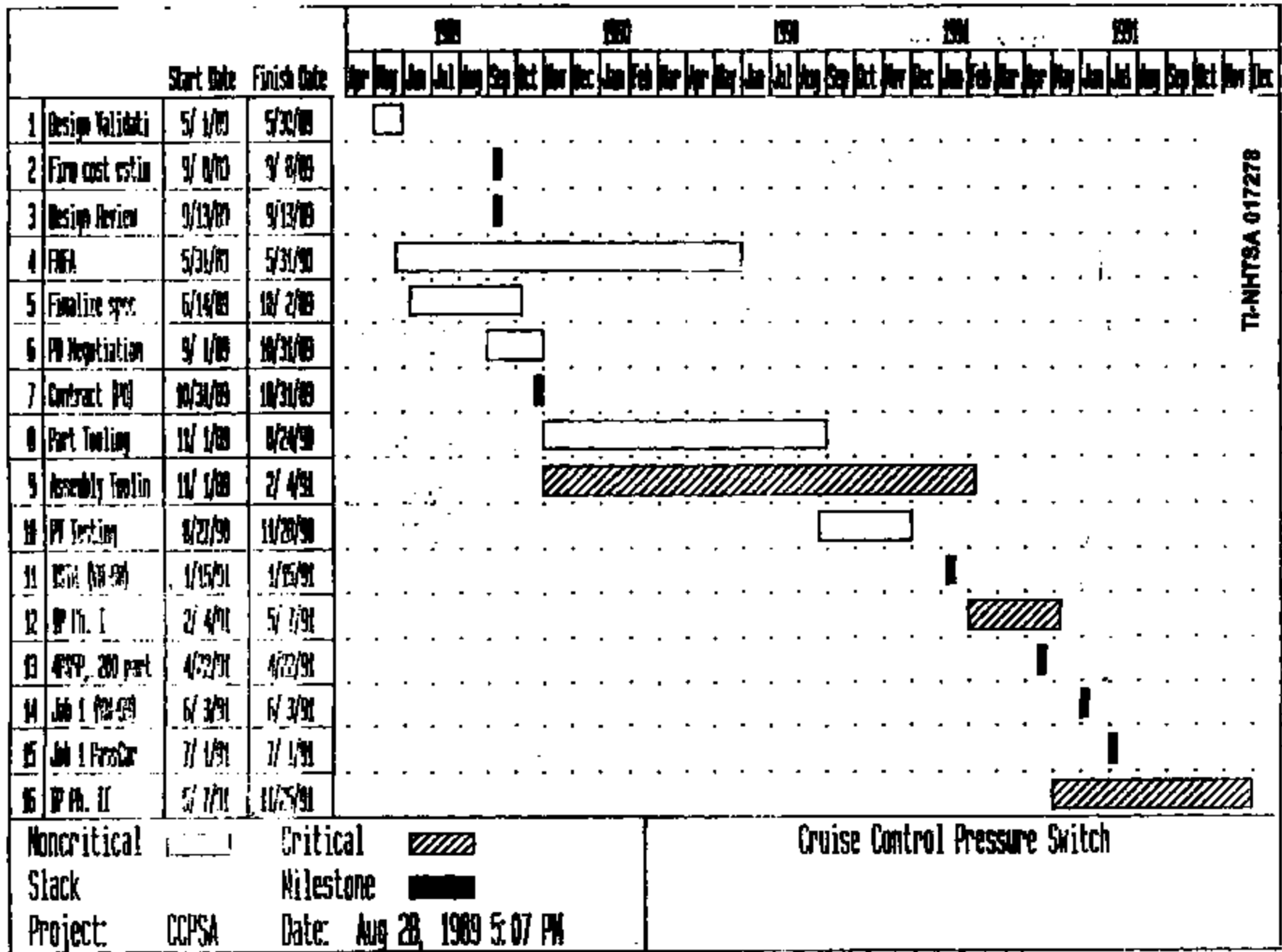
FORD SWITCH COMMODITY TEAM VISIT
CRUISE CONTROL PRESSURE SWITCH

TI-NHTSA 017277

TIMING ISSUES

- o IN ORDER TO MEET MY92 PRODUCTION START-UP, IT IS NECESSARY TO ORDER PRODUCTION ASSEMBLY TOOLING NO LATER THAN NOVEMBER.
 - NEED FORD RELEASE TO BEGIN ORDER OF TOOLING.
- o TOOLING NEEDS TO BE IN PLACE 3-6 MONTHS PRIOR TO JOB 1.
 - NECESSARY TO HIT IN-PROCESS PHASE I REQUIREMENTS.
 - AN 11/89 TOOLING RELEASE WILL RESULT IN TOOLING BEING IN PLACE 2/91.
 - ASSURES ANY NECESSARY DE-BUGGING WILL BE COMPLETE PRIOR TO JOB 1.

CLD/DAA

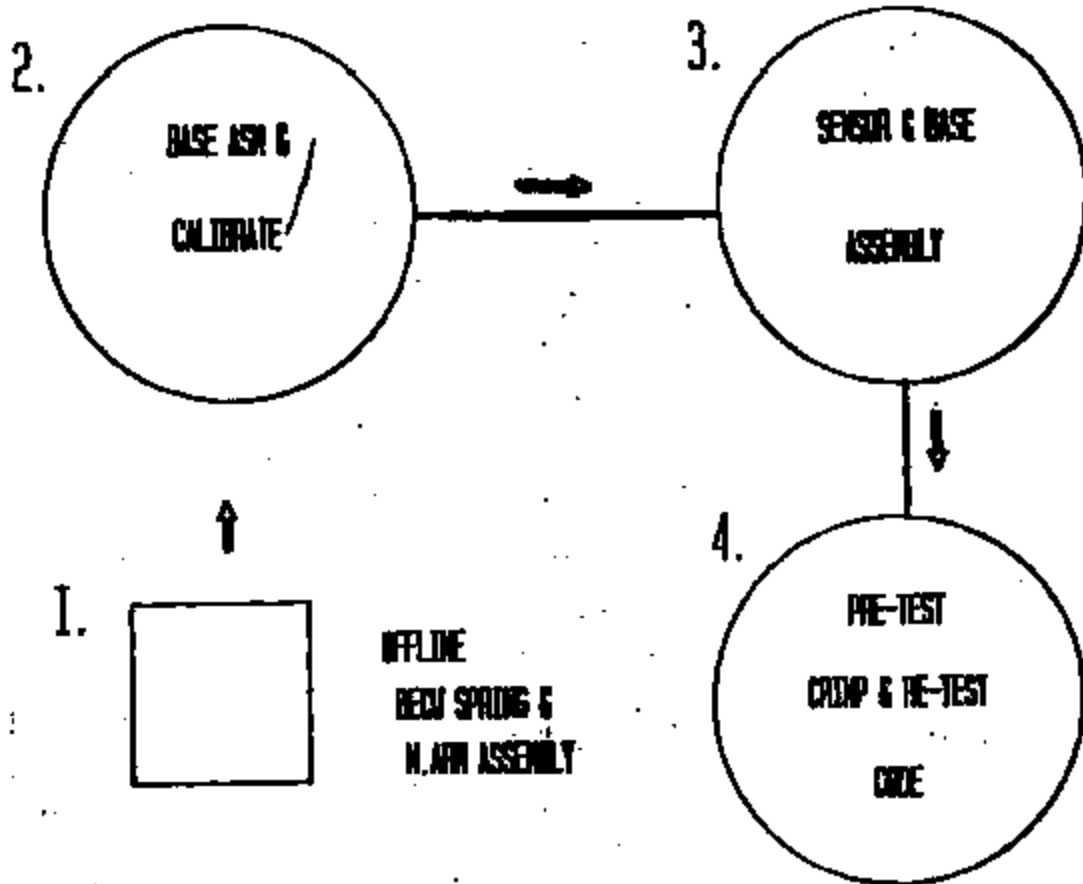


TI-NHTSA 017278

Noncritical Critical
 Slack Milestone
 Project: CCPSA Date: Aug 28, 1989 5:07 PM

Cruise Control Pressure Switch

CCPS MACHINE LAYOUT



TI-NHTSA 017279

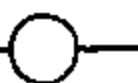
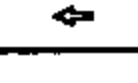
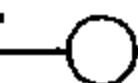
MACHINE 1. SPRING ARM TO TERMINAL

PAYOFF REELED
FORMED
TERMINALS



TAKEUP
TERMINALS W/
UNBENT SPRINGS

RIVET COMPONENTS



BECU REELED
FLAT STOCK

INSTALL CONTACT

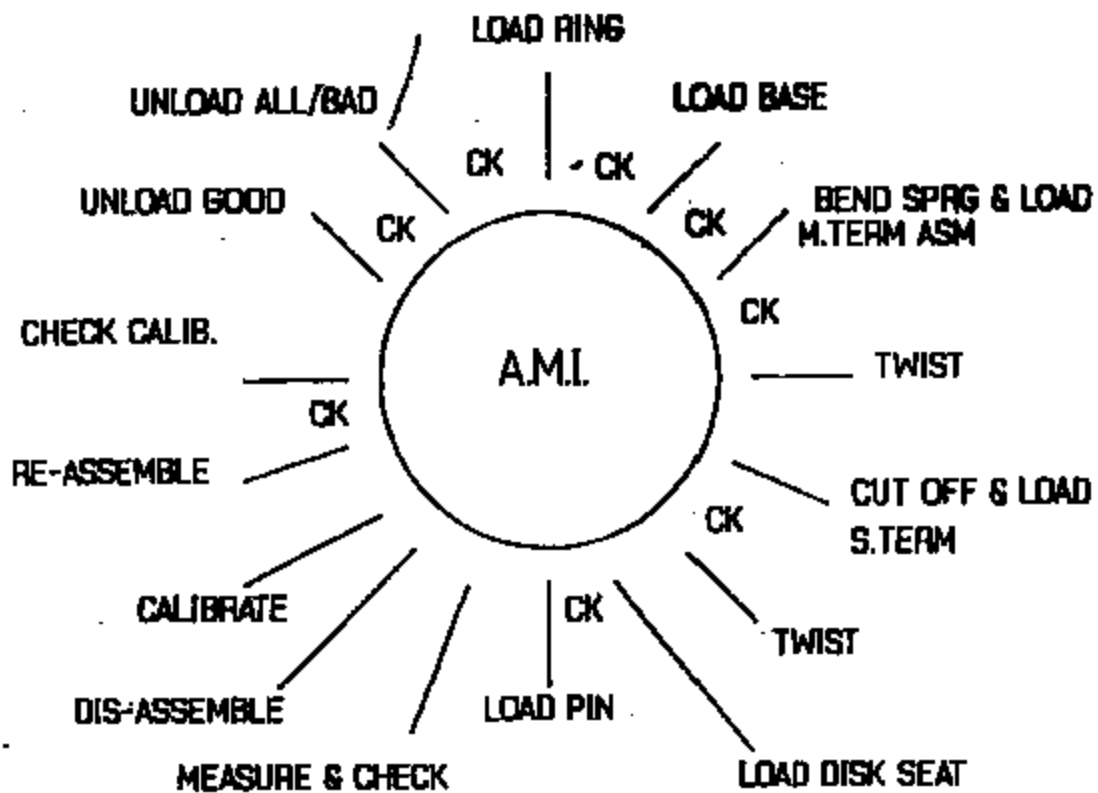


FORM DIMPLE &
HOLE



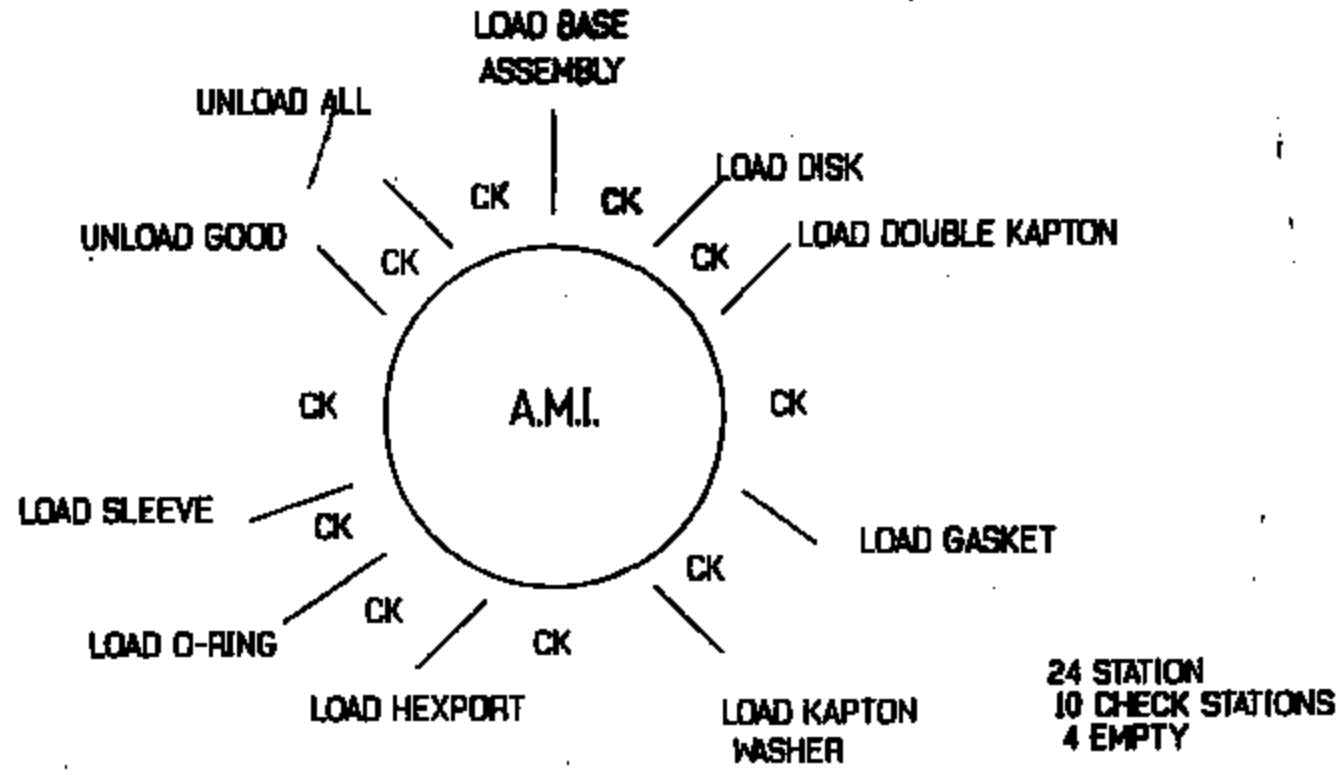
WIN 000-0124 00/00/00

MACHINE 2. BASE ASM & CALIBRATE

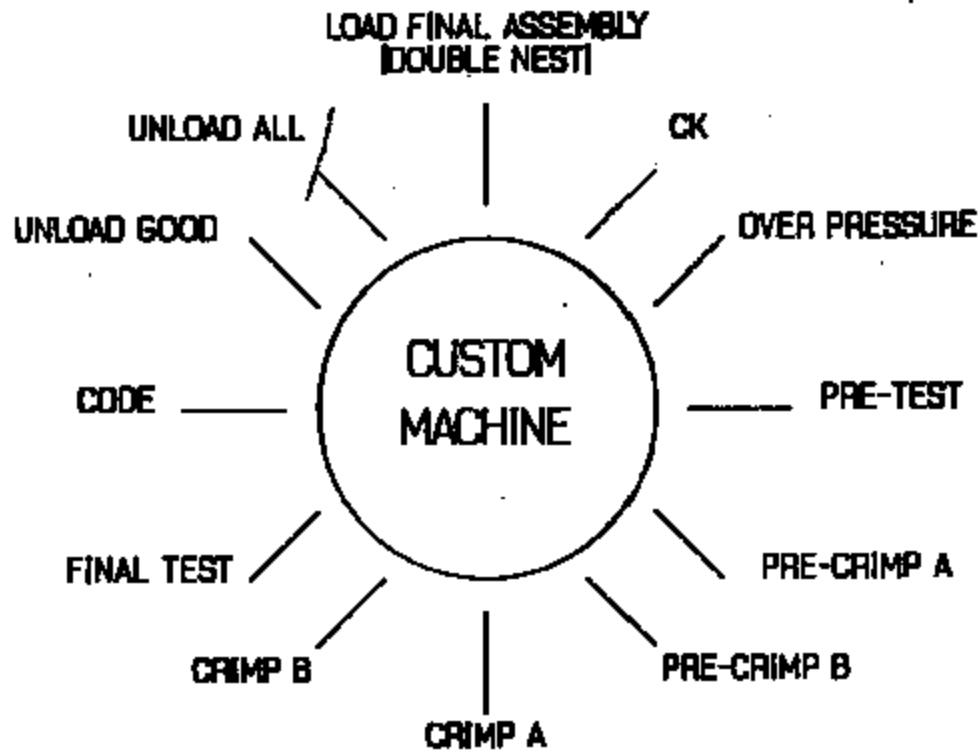


24 STATION
10 CHECK
1 EMPTY

MACHINE 3. FINAL ASSEMBLY



MACHINE 4. P.TEST, CRIMP, & CODE



KAN 080-0134 00/01/00

TI-NHTSA 017283

FORD SWITCH COMMODITY TEAM VISIT
CRUISE CONTROL PRESSURE SWITCH

TI-NHTSA 017284

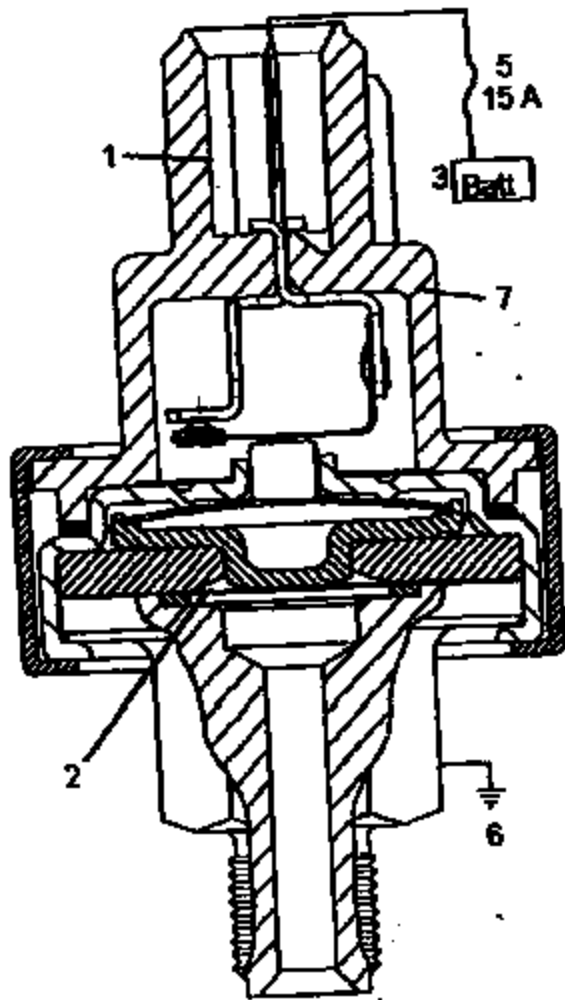
SUMMARY

- o TEXAS INSTRUMENTS HAS BEEN ENGAGED WITH FORD ENGINEERING FOR 2+ YEARS AS SOLE DEVELOPER OF PRESSURE SWITCH FOR MY92 ELECTRONIC CRUISE CONTROL SYSTEM.
- o TEXAS INSTRUMENTS HAS OPERATED WITHIN AND CONTINUES TO OPERATE WITHIN EXPECTATION RANGE/GUIDELINES PUT FORTH BY FORD.
- o CCPS REPRESENTS STATE OF THE ART IN PRESSURE SWITCH DESIGN.
- o RELEASE OF TOOLING FUNDS IS CRITICAL TO INSURE JOB 1 IS MET IN MY92.

CLD/DAA

Discovered by Andy Ford
on 3/11/99 by Ford

Contributing Factors



1. Connector Seal
2. Kapton Life
3. Continuous Power
4. Switch Orientation
5. Current Capability
6. Grounded Hex-Port
7. Plastic Parameters

Delivered to
Andy on 3/11/99
by Fred.

Potential Actions

	Improve connector seal	Re-orient connector	Re-locate switch to brake pedal	Improve kapton diaphragm	Insert in-line fuse with switch	Add power off switch	Re-locate switch to ground side	Re-locate switch to RUN circuit	Insulate switch from prop valve	Use flame retardant plastic
Connector Seal	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>							
Kapton Life			<input checked="" type="checkbox"/>	<input type="checkbox"/>						
Continuous Power					<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Switch Orientation		<input type="checkbox"/>	<input checked="" type="checkbox"/>						<input type="checkbox"/>	
Current Capability					<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Grounded Hex-port			<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Plastic Parameters										<input type="checkbox"/>

= fixed
 = improved

TI-NHTSA 017286

Fuel

Free Packer - Researching Super. in classes - suspension

Steel ~~assembly~~ ~~control~~ for lab

Abim Lepoint - engineer - DE * - visited TI

(... Interv) - col...
Bill Bunker - Sol...?

1/20/00

Fred.

I believe that your list includes some service part numbers, older rev levels, as well as pre-production or prototype part numbers. Overall, including Ford Australia, there are eight different production parts. Differences from part to part are fairly minor and include, actuation calibration, release pressure, hexport style, position tab, color of connector base, thread style, and trap noise associated with the pressure disc. The following matrix, helps summarize this information:

<u>Part Number</u>	<u>Actuation</u>	<u>Release</u>	<u>Base</u>	<u>Hexports</u>	<u>Thread</u>	<u>S or Q</u>
F2VC 9F924 AB 90-160 (1)	20 min	Brown	pos 2	J512	3/8-24M	Snap
F6LC 9F924 AA 200-300 (2)	40 min	Black	pos 1	J512	3/8-24M	Snap
F2AC 9F924 AA 90-200 (3)	20 min	Natural	pos 2	J512	3/8-24M	Quiet
F58A 9F924 AA 90-160 (4)	20 min	Grey	pos 1	J512	3/8-24M	Quiet
F3TA 9F924 CA 200-300 (5)	40 min	Red	pos 1	J512	3/8-24M	Snap
94DA 9F924 AA 90-160 (6)	20 min	Natural	pos 2	o-ring	M10x1.0M	Quiet
F3DC 9F924 AA 90-160 (7)	20 min	Natural	pos 2	Scrubber	3/8-24M	Quiet
94JA 9F924 AB 90-160 (8)	20 min	Grey	pos 1	o-ring	3/8-24M	Quiet

Vehicle - Part Number Correlation

- (1) Crown Vic, Grand Marquis, Mark, Town Car
- (2) Econoline, Club Wagon
- (3) Crown Vic, Grand Marquis, Mark, Town Car
- (4) Winstar
- (5) Bronco, F-Series, Ranger, Explorer, Navigator, Expedition, Econoline, Club Wagon
- (6) Falcon
- (7) SHO Taurus
- (8) Capri

TI P/N Correlation to Above

- (1) 77PSL2-1
- (2) 77PSL2-3
- (3) 77PSL3-1
- (4) 77PSL3-2
- (5) 77PSL3-3
- (6) 77PSL4-1
- (7) 77PSL5-2
- (8) 77PSL6-1

TI-NHTSA 017288

Fred,

I believe that your list includes some service part numbers, older rev levels, as well as pre-production or prototype part numbers. Overall, including Ford Australia, there are eight different production parts. Differences from part to part are fairly minor and include: actuation calibration, release pressure, bumpout style, position tab / color of connector base, thread style, and soap noise associated with the pressure disc. The following matrix, helps summarize this information:

<u>Part Number</u>	<u>Actuation</u>	<u>Release Beam</u>	<u>Mount</u>	<u>Thread</u>	<u>S or Q</u>
F2VC 9F924 AB 90-160 (1)	20 min	Brown / pos 2	F512	3/8-24M	Soap
F5LC 9F924 AA 200-300 (2)	40 min	Black / pos 1	F512	3/8-24M	Soap
F2AC 9F924 AA 90-200 (3)	20 min	Natural / pos 2	F512	3/8-24M	Quiet
F58A 9F924 AA 90-160 (4)	20 min	Grey / pos 1	F512	3/8-24M	Quiet
F3TA 9F924 CA 200-300 (5)	40 min	Red / pos 1	F512	3/8-24M	Soap
94DA 9F924 AA 90-160 (6)	20 min	Natural / pos 2	o-ring	M10x1.0M	Quiet
F1DC 9F924 AA 90-160 (7)	20 min	Natural / pos 2	Scrubber	3/8-24M	Quiet
94JA 9F924 AB 90-160 (8)	20 min	Grey / pos 1	o-ring	3/8-24M	Quiet

Vehicle - Part Number Correlation

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- (6) Falcon
- (7) SHO Trans
- (8) Capri

TI-NHTSA 017289

WELL AS KAPTON (C/O AZIZ FROM FORD). no results

UNDERSTAND BRAKE SWITCH AND KAPTON WEAROUT WITH ANOTHER FORD PLATFORM STEVE DID WE COLLECT ANY SAMPLES FROM SIMILAR AGE VEHICLES? no results

collect 24 samples

WE SHOULD ALSO DISCUSS THE POTENTIAL BRAKE PEDAL POSITION 'SOLUTION' TO HELP FORD UNDERSTAND THEIR RISKS IN THAT PATH

- ELECTRONIC SYSTEMS

↳ Sensors from
Ford... Any??

1/2 @ amps

100 milli amp Load

- FURTHER BY ITSELF IS NOT
ENOUGH TO LINE UP...

- SEEMS TO USE A SPARK.....

3 amps inductive / 15 amps
INDUCTIVE WITH BRAKE FLUID

TI-NHTSA 017290

The following are a list of drawings that I found. At first glance they appear to be the same part. Is there an easy explanation of the differences:

F2AC-9F924-AA
F2YC-9F924-AB
F2YC-9F924-AB
F3DC-9F924-AA
F3TA-9F924-AA
F3TA-9F924-AA
F3TA-9F924-AA
F50B-9F924-AA
F59A-9F924-AA
F50B-9F924-AA
F4DB-9F924-AB
F6LC-9F924-AA
F6SB-9F924-AA
F6SB-9F924-AA
F6SB-9F924-AA
F62B-9F924-AA
F9AB-9F924-AA
F8DB-9F924-AA
XF1T-9F924-AC
XF1T-9F924-AB
XF1T-9F924-AA
XR13-9F924-AA

Thanks for your help.

Regards,

Fred Porter

OV - fporter

fporter@ford.com

Chassis E/E Systems Applications

(313)845-3722

Bldg 5 - Mail Drop 5030 - Cubicle 3E004

fax: 390-6145

Vehicle/Customer Information

Model Year: Make: VIN#: Mileage:
Build Date: Present Vehicle Location: Who owns vehicle now:
Customer Name: Phone: Is it ok for engineering to contact customer:

Incident Info/Vehicle History

Where did fire originate? (engine compartment, quadrant, suspect location, or suspect component(s))

What was the vehicle circumstances when the fire was noticed? Was the vehicle running, parked, engine on/off... if off, how long?

Did customer notice anything unusual prior to fire? (specifically... difficulty getting the vehicle out of park, speed control not working, brake warning lamp illuminated, stop lamp inoperative)

Do any underhood relays show evidence of overheating?

Were the underhood fuse links blown?

Were there any fuses that were blown or show evidence of other damage?

Is the correct fuse for the stop lamp switch in the fuse box?

Was there any damage to any wiring in the area where the fire was suspected to start?

Does the air suspension pump show evidence of overheating?

Was there any aftermarket modifications to the vehicle? (specifically car alarm, trailer tow, or remote start)

Was the vehicle involved in a natural disaster/accident that required significant vehicle clean up? If so where was cleanup performed?

What was vehicle repair history?

Parts that are wanted from vehicle if possible to acquire

Brake pressure switch (preferably with wire pigtail/connector attached and still attached to prop valve)

Sample of brake fluid at prop valve (in sealed glass container)

Relay pack located on LH fender apron (with as much wiring as possible)

EDIS 8 module located on LH fender

Speed control module located on LH fender

Air suspension compressor located under air filter

Air suspension relay

Other suspect parts

TI-NHTSA 017292

Discussion w/ Bill Abianczyk

Fire in - Fred Porter

Diaphragms purchased on both leakers

Leakage → almost fire

Brake lights - oxidation? assumption

Fire adapts - limited to switches

→ State Farm has the switches

Warranty part sales → 370 parts / month

May - 161 parts / month

205 - 295

F2 - VY (2/2000)

Galvanic corrosion → terminal to cup

Crash JZ / Grand Marquis - other issues

Function of temp of location
orientation not on issues

- leak failure on master cylinder

connector switch - got cool
→ Pressure in brake system
11:00 AM 21 1998

about 30 mins before switch was on - could be something else

NHTSA 55
- Brake repair
last year

Need root cause to
Safety recall
quick

- Tax done ASAP
Dell: meeting
tax solution

TI-NHTSA 017293

Fred Polter

Tavis SHO
- meeting / 1/5!

- Heating up
- Concern NHTSA may issue a finding (letter live yesterday, focused on switch)
 - > solution is to disconnect the sensor
 - How do you know?
 - electricity involved in starting ignition
- > Not able to recreate a thermal event
 - > sensor w/ hole in switch housing
 - 24V on connector - 2 days -
 - Grid on ~~board~~
 - 1/2 amp - current draw
- > clutch coil limits current - FET to ground.
- Designed engineer - Daily mtg's
 - > TI to participate - a few weeks?
 - How does switch work?
 - Automated process?
 - TI organization knowledge
- copper content in green/black stuff
 - zinc ALDF, samples
 - collision of contacts - common thread.
- Down the tubes
 - thinks there will be a recall
 - F2V part? - across whole fleet?
 - How collision / recall via -
 - application - pressures? - medium

THANK YOU FOR YOUR TIME TO
 MEET WITH ME ON WEDS MON 17.

FOR SOME FOUR MONTHS
 THE AUTOMATED SERVICES & CUSTOMERS

RECENTLY TEAM HAS BEEN SUPPLYING THE
 THE FUNDING WITH FACTS, DATA

AND ANALYSIS REGARDING OUR BRACE WITH TELLING
 WE HAVE RESIDENT

PUSHING FORWARD WITH
 THE LAST 6 CONSECUTIVE CONF JOURNALS
 INCLUDING 3 WEEKS OF THE RECENT PAST
 (AND INTEND TO CONTINUE IN THIS AREA ??)

AS THERE WAS A RECAP OF THE ACTIVITIES &
 CONTRIBUTED TO TOTAL EVENTS
 DURING THE MONTH

BOTH TE & FUND ATTEMPT TO RECREATE THOSE
 EVENTS WITH BRACE FUND IN THE CITY

DURING THE NEXT

TWO WEEKS TE WILL EXPERIMENT
 WITH "OLD" ALSO BRACE FUND USING
 OUR MOST CURRENT RECORDS

ALTERNATE SIMILAR
"LIFE TYPING"

EP WE ALSO INVESTIGATED SWITZER CAPABILITY
AND ^{USIA SPECIALLY TRAINED TECHNIQUES} DEMONSTRATION THE ABILITY OF
THE 92-8-94 TOWN CAR BRAKE FLUID
TO CONSISTENTLY EXHIBIT "SPECIFICITY".
PRELIMINARY ~~FIELD~~ ^{LABORATORY} RETURNS ~~INDICATE~~ AND
~~FIELD~~ - ~~RESULTS~~ ^{RESULTS} SUGGEST THAT
SAMPLES HAVE ^{SHOWN} RESPONSE IN SOLVENT
EXTRACTIVE

PRELIMINARY RETURNS WITH BRAKE FLUID
LETTERS. ~~RESULTS~~ ^{HOWEVER,} LAB TESTING

AND WAS RECENTLY TAKEN FROM
WITH "NEW" BRAKE FLUID LETTERS & "OLD"
BRAKE FLUID IS BEING RETURNED TO

SOME OF THESE PARTS EXHIBITED
EVIDENCE OF BEING WORN OUT THROUGH
EXPOSURE TO ^{BRAKE} INDICATING VEHICLES
THAT APPEAR TO BE APPLICATION CYCLE QUANTITY
A "TYPICAL" ISSUE...

313-390-4145
Fred Porter



TEXAS
INSTRUMENTS

FACSIMILE TRANSMITTAL

TO:

Name:

Fred Porter

Location:

Mail Station:

Phone Number:

FAX Number:

FROM:

Bryan Dague

TEXAS INSTRUMENTS MS

Phone Number:

508-236-3234

FAX Number:

Total number of pages (including header page):

2 pgs.

COMMENTS:

Please call Lorraine Orano
at 508-236-1405, if there is
a problem with the fax. Thank you



PX163920

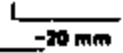


Figure 1: PX163920.

PX163920

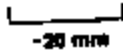


Figure 2: PX163920.

TI-NHTSA 017298

Note: Nominal magnification given for photomicrographs.



PX163920



~10 mm

Figure 3: PX163920.

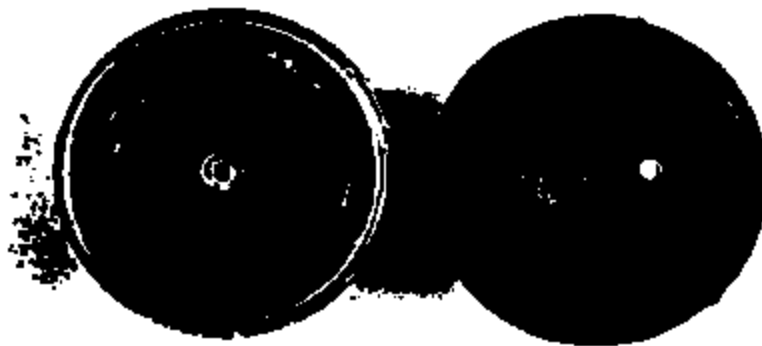


Figure 4: PX163920.

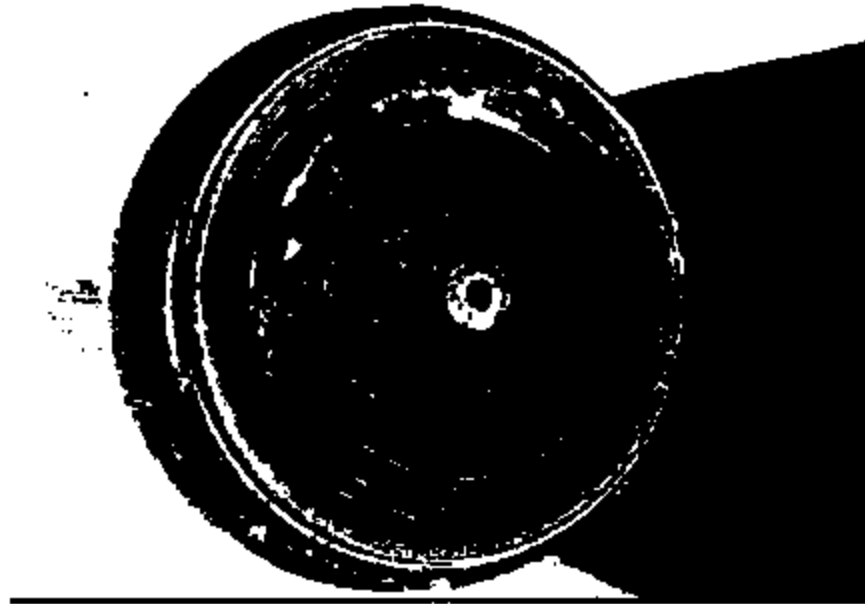


Figure 5: PX163920.



Figure 6: PX163920.

TI-NHTSA 017300

Note: Nominal magnifications given for photomicrographs.

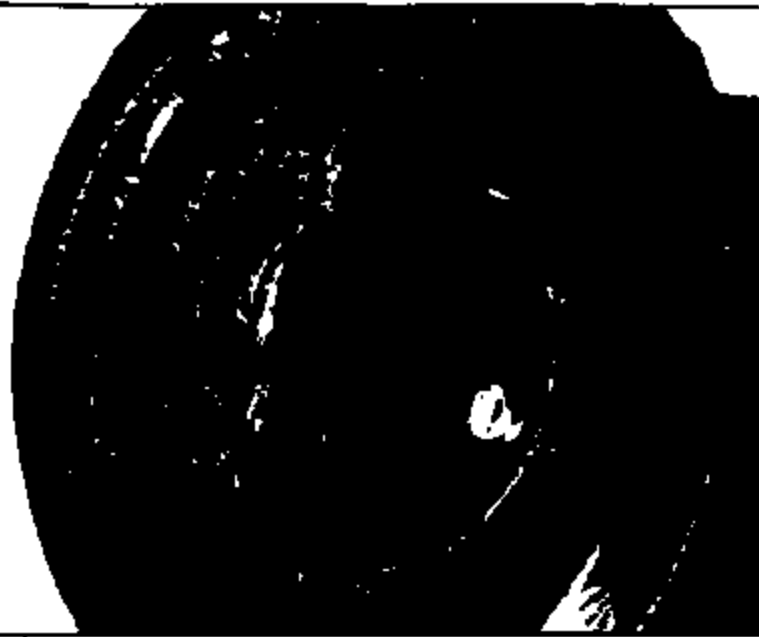


Figure 7: PX163920.

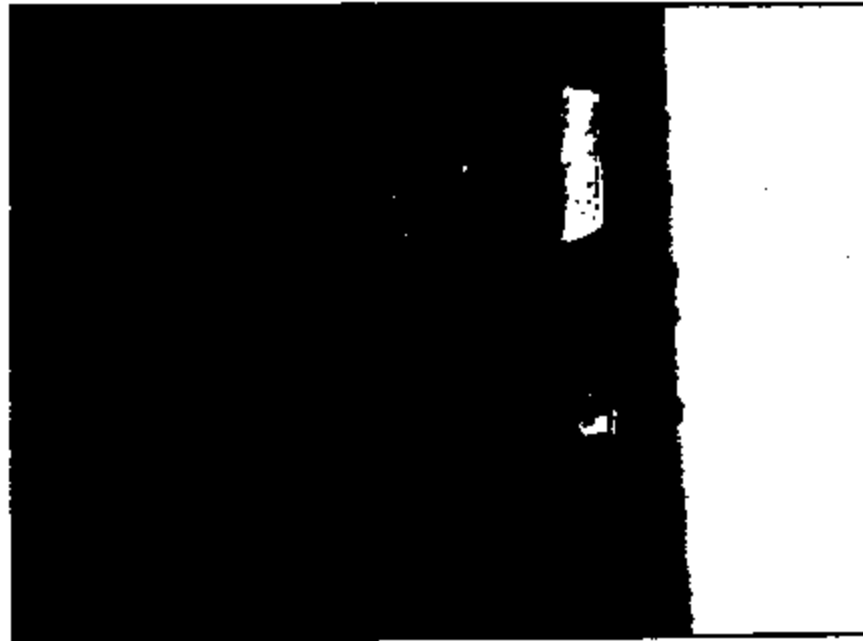


Figure 8: PX163820.

TI-NHTSA 017301

Note: Nominal magnifications given for photomicrographs.

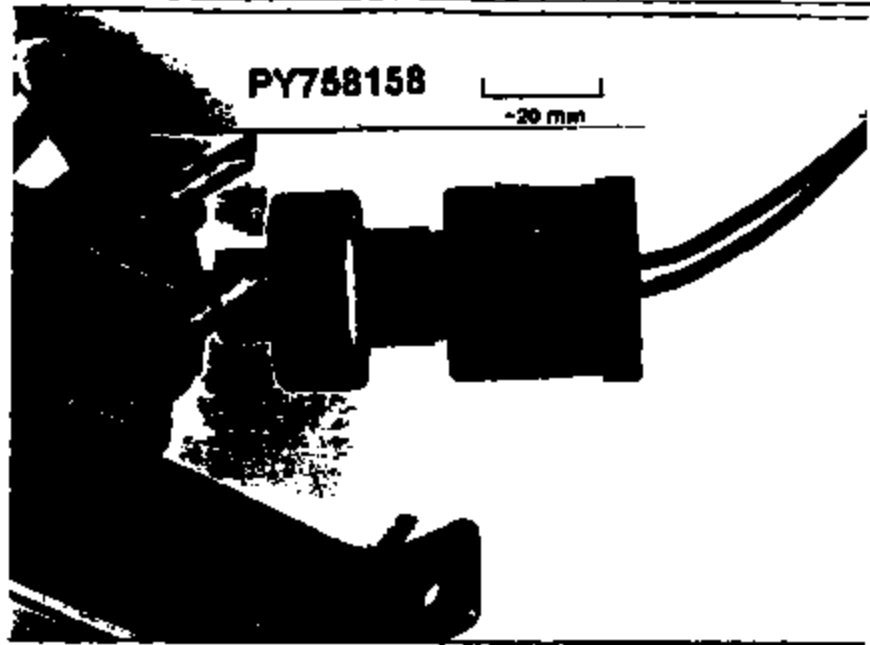


Figure 9: PY758158.

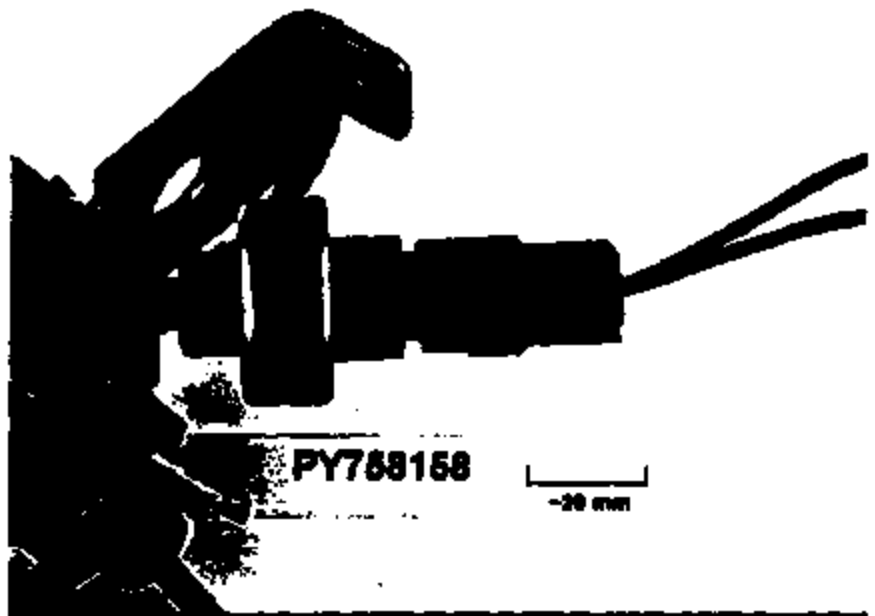


Figure 10: PY758158.

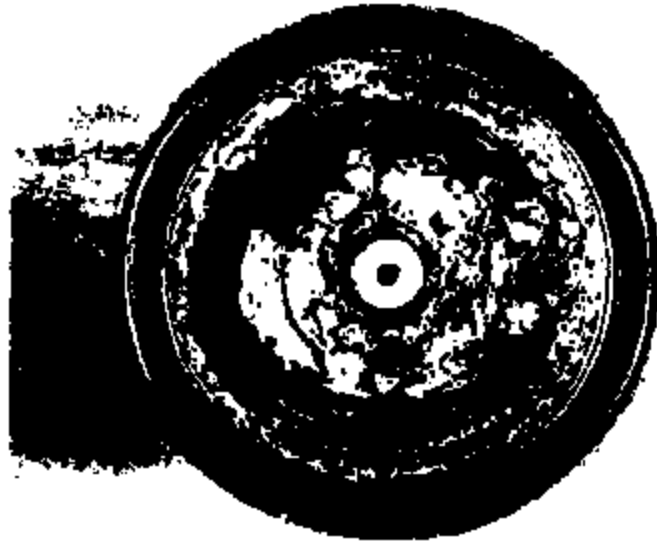


Figure 11: PY758158.

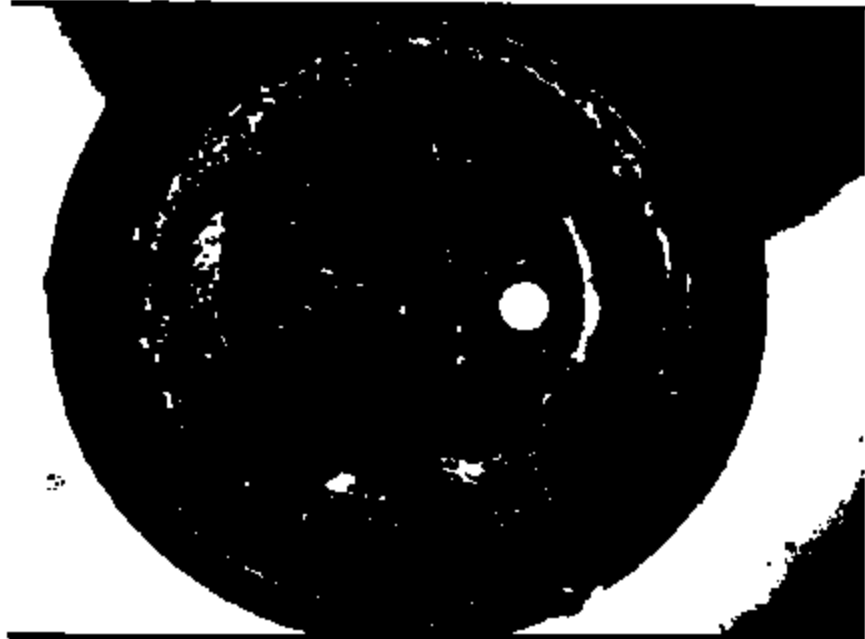


Figure 12: PY758156.

TI-NHTSA 017303

Note: Nominal magnifications given for photomicrographs.

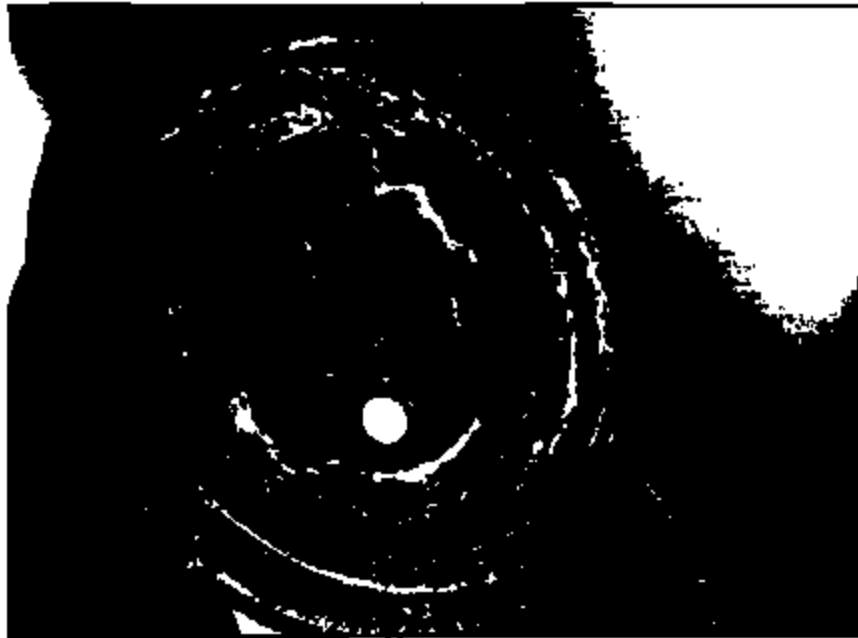


Figure 13: PY758158.



Figure 14: PY758158.

TI-NHTSA 017304

Note: Nominal magnification given for photomicrographs.



Figure 15: PX163820, seal 1 fluid side.



Figure 16: PX163820, seal 1 fluid side.

TI-NHTSA 017305

Note: Nominal magnifications given for photomicrographs.

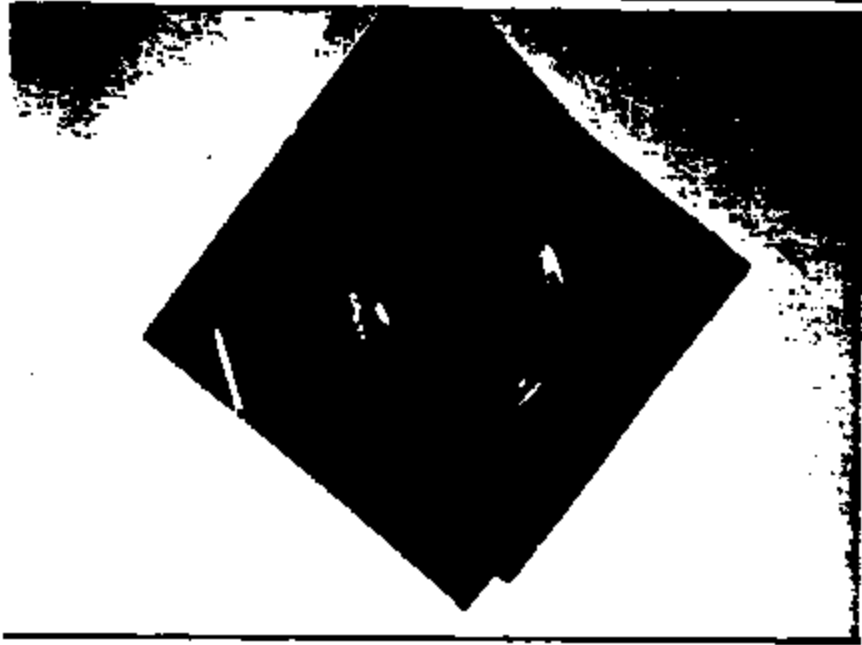


Figure 17: PX163920, seal 2.

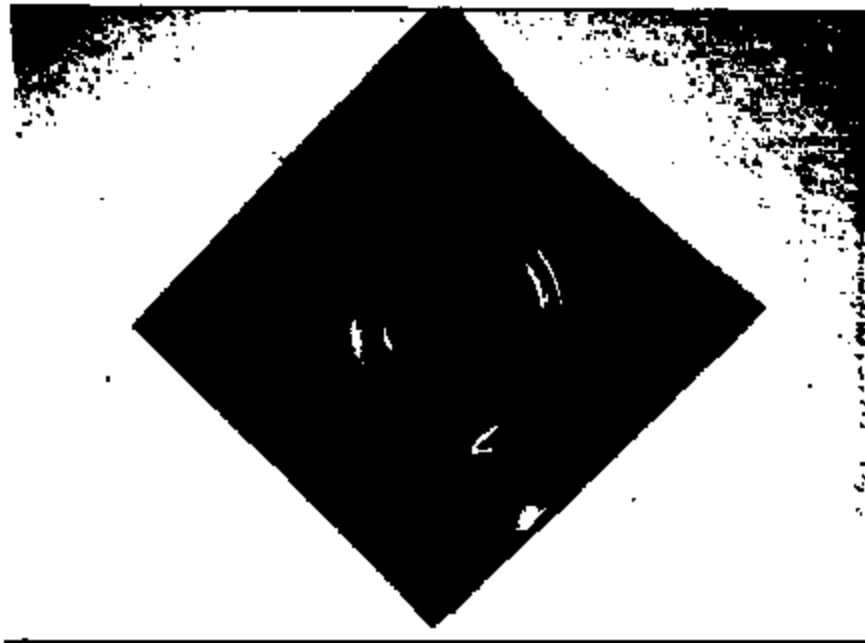


Figure 18: PX163920, seal 3.

TI-NHTSA 017306

Note: Nominal magnifications given for photomicrographs.

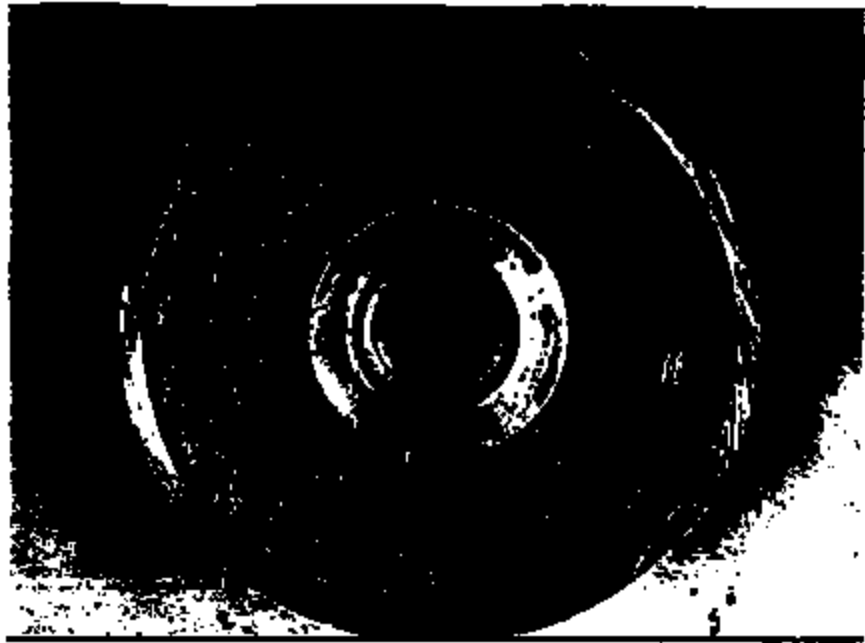


Figure 19: PX163920, cup washer, converter, disc.

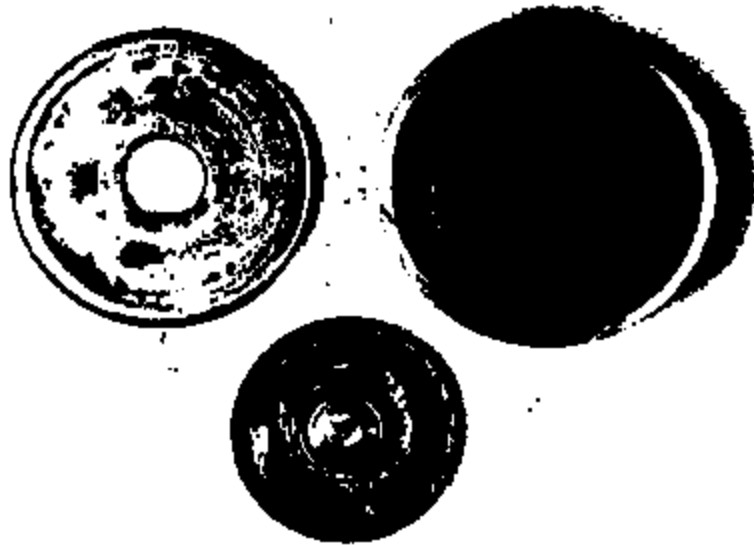


Figure 20: PX163920, cup washer, converter, disc.

TI-NHTSA 017307

Note: Nominal magnifications given for photomicrographs.

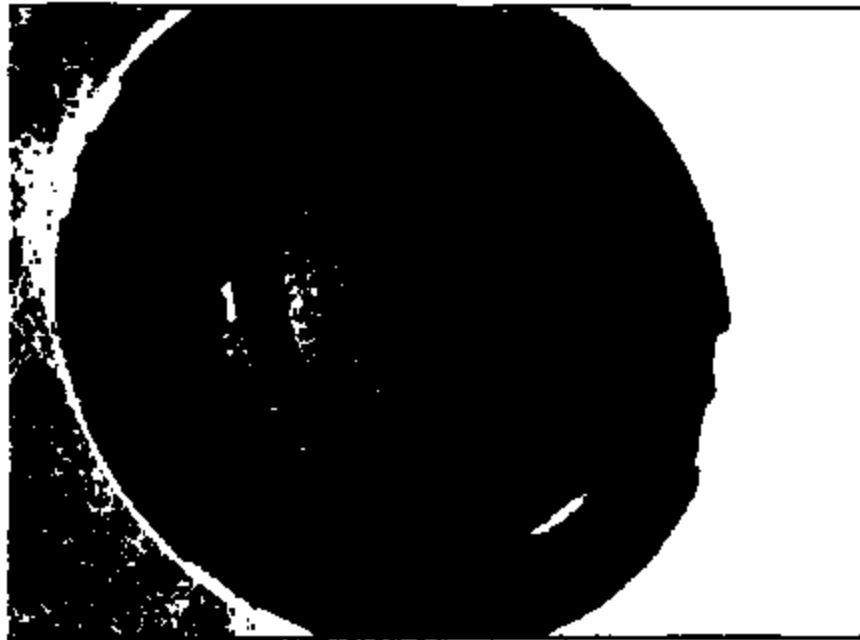


Figure 21: PX163920, hexaport cavity.

TI-NHTSA 017308

Note: Nominal magnifications given for photomicrographs.

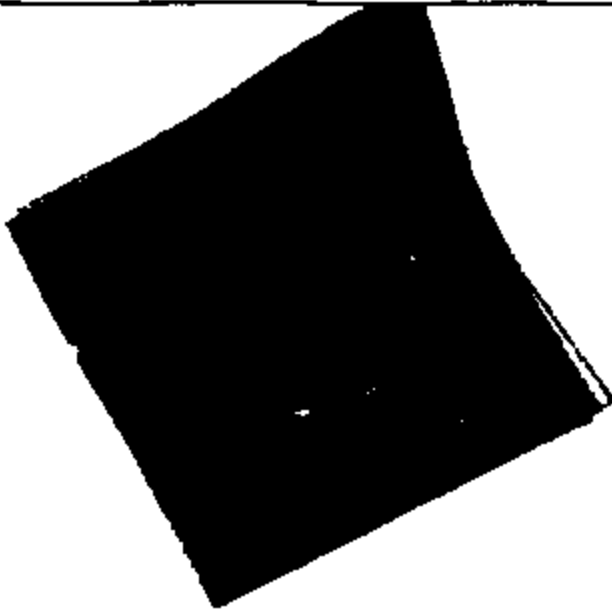


Figure 22: PY758158, seal 1 fluid side.

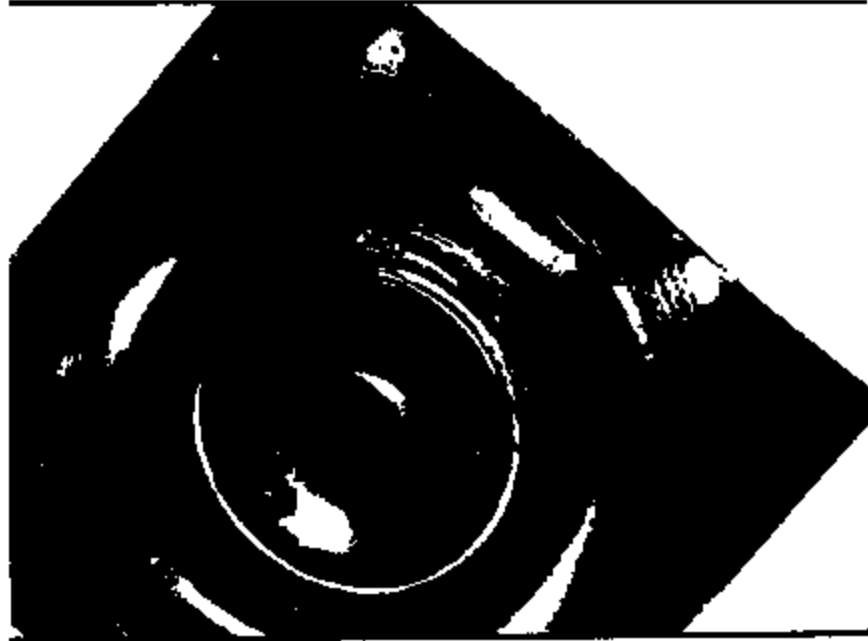


Figure 23: PY758158, seal 1 fluid side.

TI-NHTSA 017309

Note: Nominal magnifications given for photomicrographs.

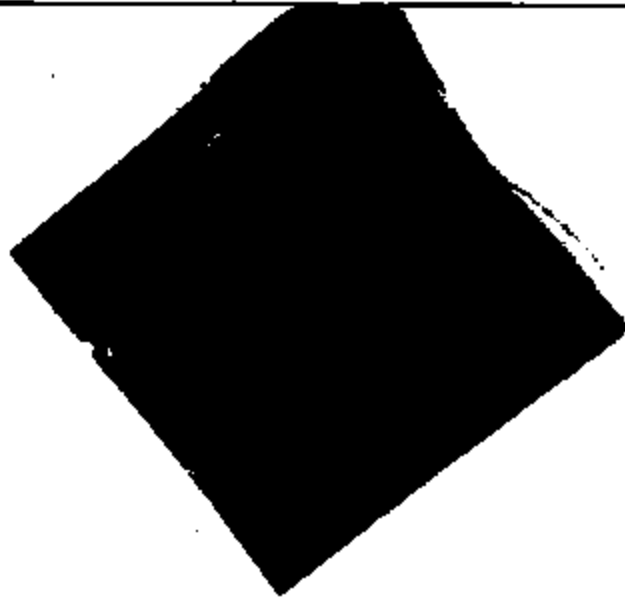


Figure 24: PY758158, seal 2.

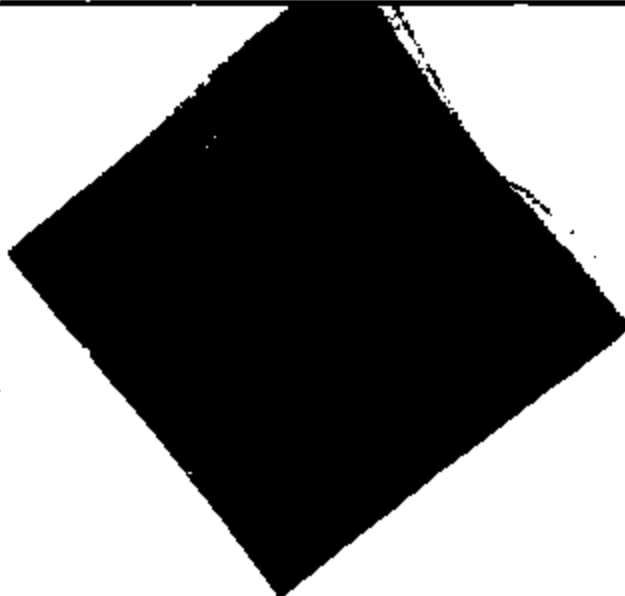


Figure 25: PY758158, seal 3.

TI-NHTSA 017310

Note: Nominal magnifications given for photomicrographs.

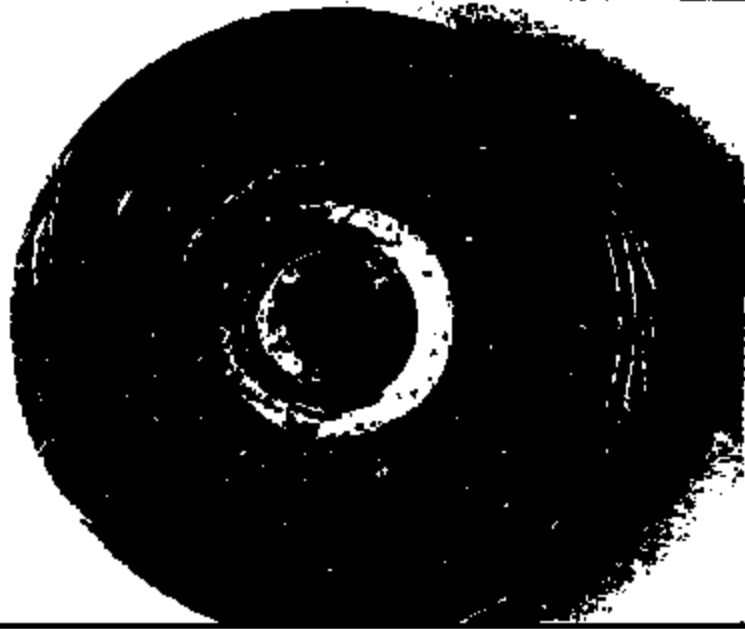


Figure 26: PY758158, cup, washer, converter, disc.

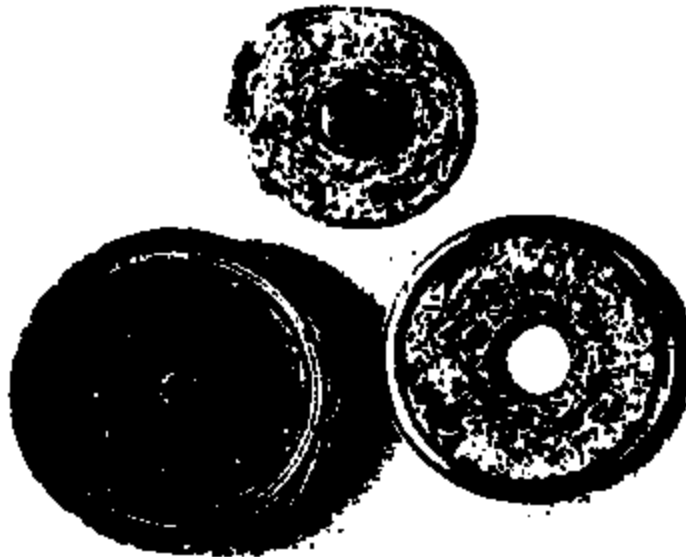


Figure 27: PY758158, cup, washer, converter, disc.

TI-NHTSA 017311

Note: Nominal magnifications given for photomicrographs.

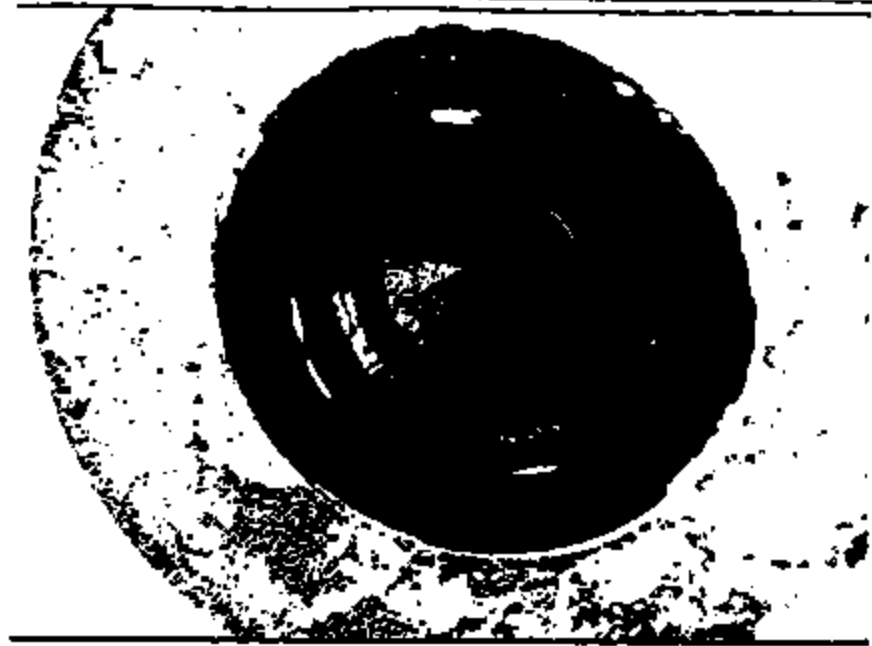


Figure 26: PY758158, hexaport cavity.

TI-NHTSA 017312

Note: Nominal magnifications given for photomicrographs.

Douglas, Charles

To: Porter, Fred (Ford)
Subject: RE: (U)

Fred,

I believe that your list includes some service part numbers as well as pre-production or prototype part numbers. Overall, including Ford Australia, there are eight different production parts. Major differences from part to part are actuation calibration, release pressure, hexport style, position tab / color of connector base, thread style, and snap noise associated with the pressure disc. The following matrix, helps summarize this information:

Part Number	Actuation	Release	Base	Hexport	Thread	Snap /
Quiet						
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F2AC 9F924 AA 24M Snap	(3) 90-200	20 min	Natural / pos 2	J512	3/8-	
F58A 9F924 AA(4) 24M Snap	90-160	20 min	Grey / pos 1	J512	3/8-	
F3TA 9F924 CA 24M Snap	(5) 200-300	40 min	Red / pos 1	J512	3/8-	3/8-
94DA 9F924 AA(6) F3DC 9F924 AA 24M Quiet	90-160 (7) 90-160	20 min 20 min	Natural / pos2 Natural / pos2	o-ring Snubber	M10x1.0M 3/8-	Quiet
94JA 9F924 AB(8) 24M Quiet	90-160	20 min	Grey / pos 1	o-ring	3/8-	

- (1) Crown Vic, Grand Marquis, Mark, Town Car
- (2) Econoline, Club Wagon
- (3) Crown Vic, Grand Marquis
- (4) Winstar
- (5) Bronco, F-Series, Ranger, Explorer, Navigator, Expedition, Econoline, Club Wagon
- (6) Falcon
- (7) SHO Taurus
- (8) Capri

Charlie

Charlie Douglas
(508) 236-3657 (P)
(508) 236-1586 (F)
c-dougla2@fi.com

From: Frederick J. Porter(SMTP:porter@ford.com)
Sent: Friday, December 18, 1998 8:16 PM
To: c-dougla2@fi.com
Subject: (U)

to: c-dougla2@fi.com

Charlie,



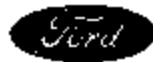
Steve LaRouche

Materials Engineer
Metallurgy Section
Advanced Vehicle Technology

Central Laboratory
15000 Century Drive
Dearborn, MI 48120
Telephone: 313/845-4578
Fax: 313/825-7814



TI-NHTSA 017314



Ford

Jolanta J. Lott
AVT Materials, Fasteners &
Corrosion Protection Engineering
Chassis Materials

2000 Robins Drive
P.O. Box 2053
Bldg #5 MD 5008 Cuba 20088
Dearborn, MI 48121-2053 USA

Tel: 313 348-3847
Fax: 313 390-7224

 
jlott@ford.com 

TI-NHTSA 017315



Ford Motor Company

TI-OS 006225

Zandra R. Deering
Product Design Engineer
Large & Luxury Car Vehicle Center
CPD Safety/Police Engineering

Vehicle Center 2 - West
Mail Drop 1124/Cube 1GB058
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Tel: 313 994-1000
Fax: 313 990-6002
Pager: 800 769-7243
Pvt: 352-1334

TI-NHTSA 017316

BRAKE PRESSURE SWITCH
REVIEW

12/22/98

NAME	ORGANIZATION	PHONE
FRED PORTER	FORD AVT EESC	(313) 84-5372
JOLA LOTT	AVT HILLS ENGINEERING	(313) 24-8364
ZANDRA DEERING	LVC - SAFETY ENGR	(313) 99-4166
Jim Gregoire	AVT EESC - OPD	(313) 33-7996
STEVE LAPOINTE	FORD CENTRAL LABS	313 8454876
NOEMIAN LAPOINTE	AVT - DES. LAB.	313 99/42686
	248 926-9896	313 337-8256 (fax)

John Injaaney
 Tom M...
 ↳ Lux Veh Center
 Dealings w/ACE Labs 10

Mac...
 313 3700
 480 8530

Bryan Dague (Dsgn Overview)

3 Kapton used for redundancy (water in Brake Fluid attack Kapton)
Bryan stated that seal (Kapton) is very good

Steve → can water/moisture come thru cap?
we have seal internally + seal cap (seals) → used thru thickness

Bryan → water films in peak of AC applications (contacts)

Steve → Any Solder or McFing (Solder on 2 types of metal materials)
Zinc Plate, silver Plate

Norm → Does Brake Fluid attack terminals/contacts (corrosion)
Bryan → Brake Fluid itself drying but carries water

Buss #360
uniform
coated w/silver on contacts

→ Corrosion → Oxides on internal term's
there elements
offer Tech Service Lab

Norm → has seen corrosion (many questions re.)
What does corrosion do?
High Ω in contacts
Break term arms
Eventually could travel to Diaphragm (break down)
to would fill w/ Brake Fluid

Bryan referenced High current loads (AC) blow out term
Brake plate $\frac{new}{pl}$ (Also had plastic) melt

This term designed to handle 3-5 AMP load

CKT fused @ 15 Amps (Norm)
(Bryan could test in lab)
Metal dissipate heat
Plastic would slow

Norm → How to detect corrosion
Voltage Drop ($\approx 200\text{mV}$ is spec)
Prod $< 1\mu\text{V}$
w/corrosion low to open CKT



Steve What is Base Material
Noryl 30% glass (cont)

Norm - Set up Protocol for analysis (failure)
(1 day) lab @ TX
Mid to late January

Ford Show what they have:
(from actual event.) Memphis?

"Pictures"

Wires + Conn Seal



Several items

think inside-out

Always Babb food

worried about ground path

Send pict + copy of schematic

"X Rays"

Show several fractures + possible corrosion

Color Copies → forward to Boyer

Fred → Report to Ford legal 1/8/90

F2V69F924-AB

"2056"

Al Hopkins

Protocol to Fred 1/4/98

5, 6th Test Anhydrous Cu @ YI-A

2-3 people

draw a sample

get back to Norm tomorrow AM.

Johns - Material Specs

for components on Bridwa

Fred Fax # 313 390 4145

538 Wed

Debbie LiTex

Set up a Nitp

on phone

or face to face

1st of year

Call on 4+1

Norm Labiate

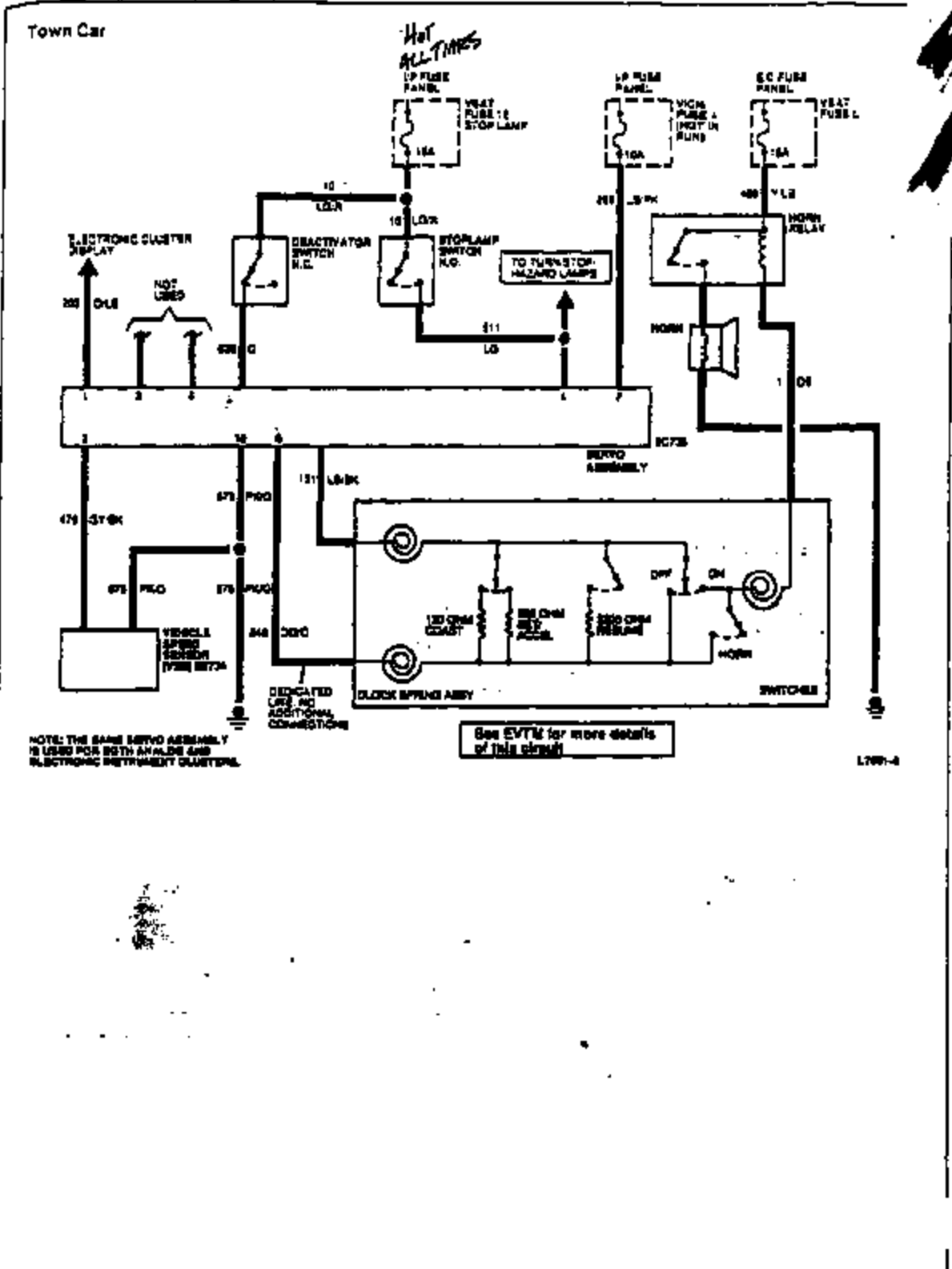
Thur 1/7 1440 out

9:50 Back

only Norm, still

working

DIAGNOSIS AND TESTING (Continued)



Food Central Labs - Steel Laborte
 2-samples - A, B, C - 92 Over Hub
 - 93 Over Hub
 - 92 Over Hub
 - 92 Over Hub

B - can not analyze - on hold - third party involvement
 → all samples from Dallas or Houston vehicles
 (same crack on air blade on edge of hole) - Sample B

Samples C + A - no connector remaining
 sensor ASM + comp

Sample B - part of connector removed

Sample C

- crimp ring - looks like residual glass fibers from base - otherwise relatively clean.
- All components inside, major damage from fire

Sample A

- crimp ring - may have started to melt - lots of inside corrosion?
- all components inside, major damage from fire

D-97 leaker - U.S. Motor from terminal to cage
 - 1992 vehicle

12 from Fla } non-terminal
 12 from Texas } - Event
 - Turn Cars
 - Grand Mag.

'92 Tour Car leaker
 - broke thru in connector
 - replaced switch - cruise valve

- several dealer reports of fire at the switch

(2)

- Christian Litigation vehicle in Fla -
Is TI visiting? - Fire

(D) Leaker from 1997 ~~vehicle~~
pole vehicle

- outside fully covered with liquid - brake fluid?

→ 250k to 5MSE resistance case to pin

→ 1.452's across the switch terminals,

- Fluid all through connector top of CP
Black Sludge on one area of the cup
+ moisture contact



- Environmental seal looks good - empty clean
- the mark on ~~door~~ - same location as black distribution on ^{display}

~~base~~ D1 - Black lines - Delam?

D2 - Black wear

D3 - Some Black wear - Delam?

connector

lots of brown goop under master, on connector side

(1.2 (2 parts)) (E) Random sample from 92 or 93 Tur car - looked clean

- normal pin wear

- Kapton looks good - no ^{real} wear. 350° bump.

- no leak

- similar line on seal

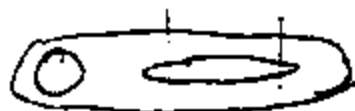
TI-NHTSA 017323

Line terminal natural. Stayed the same since '92?

- ⑤ Datecode 2126 - FIVE #AB
92 Town Car 117K miles
= Part covered with dirt & liquid - Inside connector

~ 2MS from pin to case
~ 4MS across the switch - for bright on
for cruise stop.

- Spring arm corroded through - two places



- large amount black/green stuff on top of inside connector
- Black stuff in post - not down hole
- hole is clean

TO: ~~Fred Kohl~~ ^{Tom Swaddy} (x 21801)

3 pages

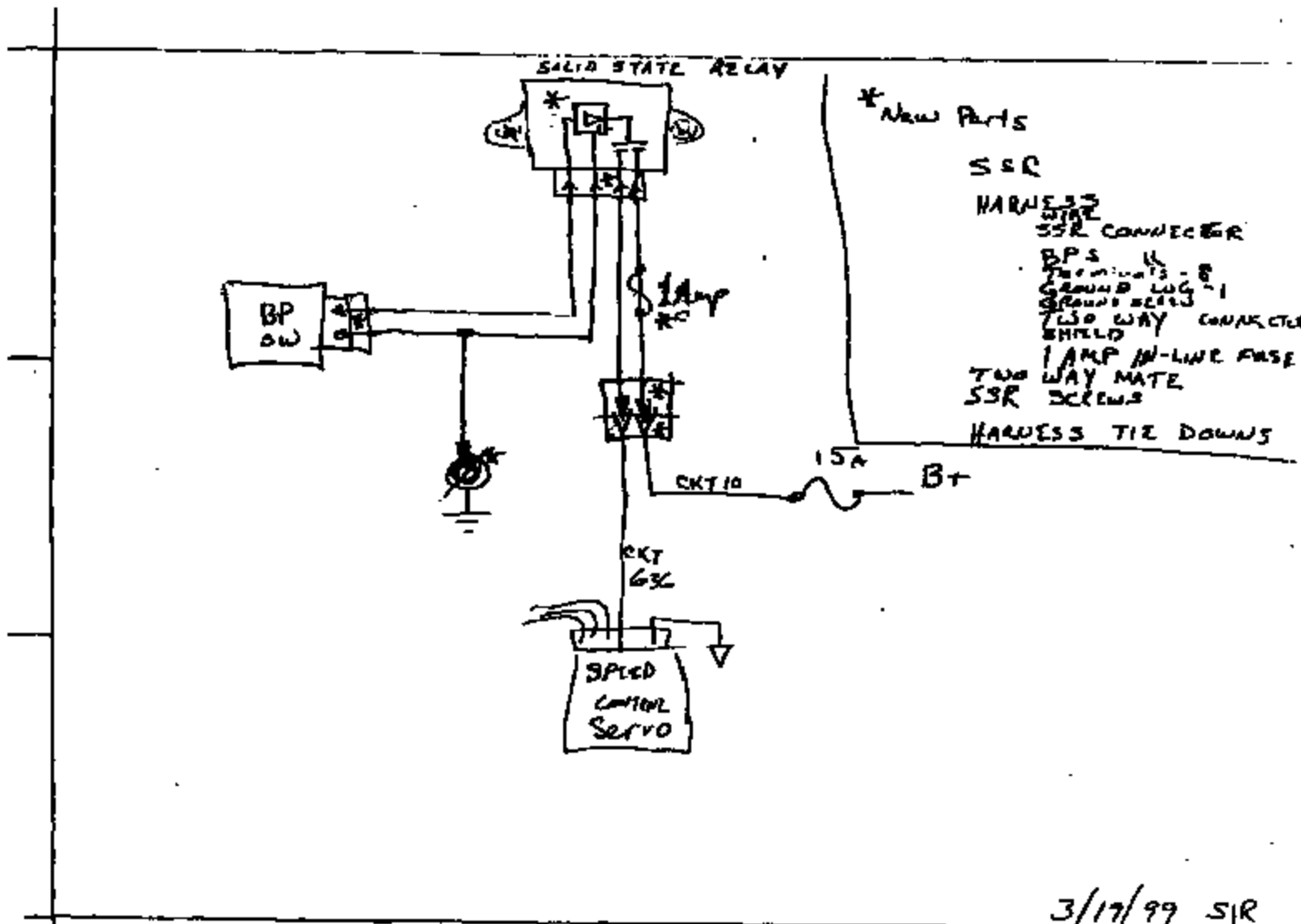
FROM: Steve Reimers (x 03286)

RE: Brake Pressure Switch Circuits

PAGE 2 & 3 show proposed circuits for moving the BP switch to a ground circuit & limiting its operating current to $< 12\text{mA}$.

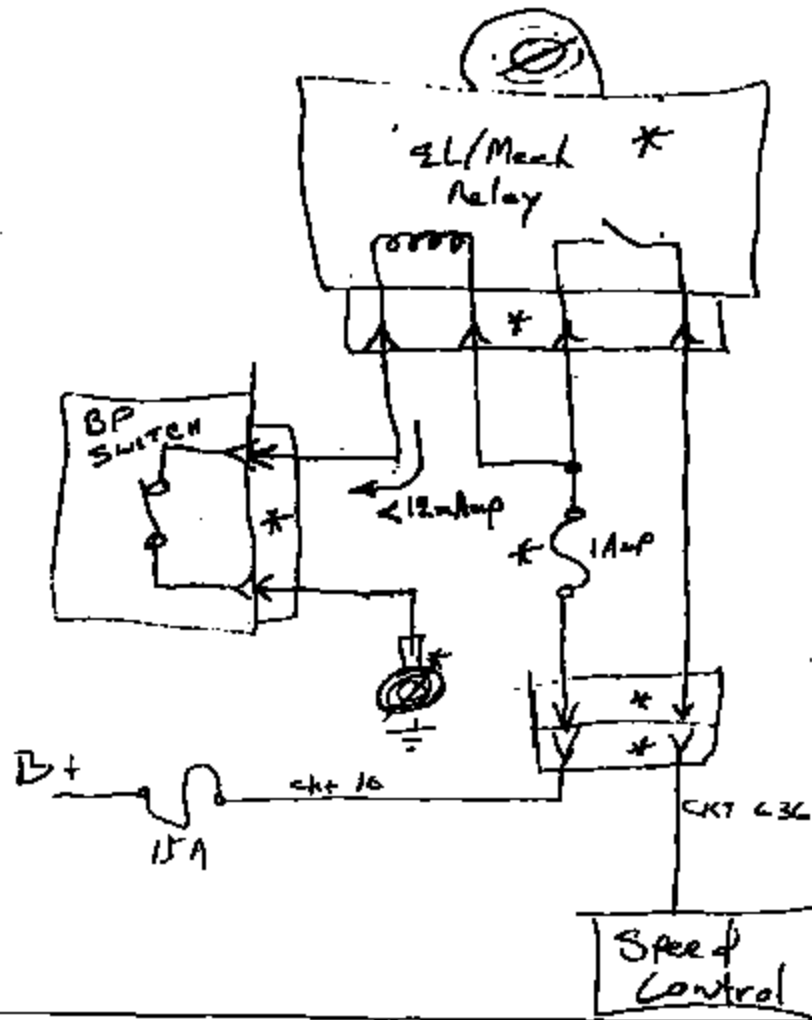
The Speed Control Clutch current is supplied by a switch that is not effected by Brake Fluid. Please comment on the feasibility and suggest parts that would be useable for the relay or solid state relay.

Thanks, Steve



TI-NHTSA 017328





* New Parts
 EL/Mech Relay
 HARNESS
 RELAY CONNECTOR
 BF CONNECTOR
 CENTER LOG
 IN-LINE FUSE
 TWO WAY
 TERMINALS X B
 WIRE
 SHIELD
 TWO WAY mate
 SCREWS & 2
 TIE DOWNS

3/17/99 3R

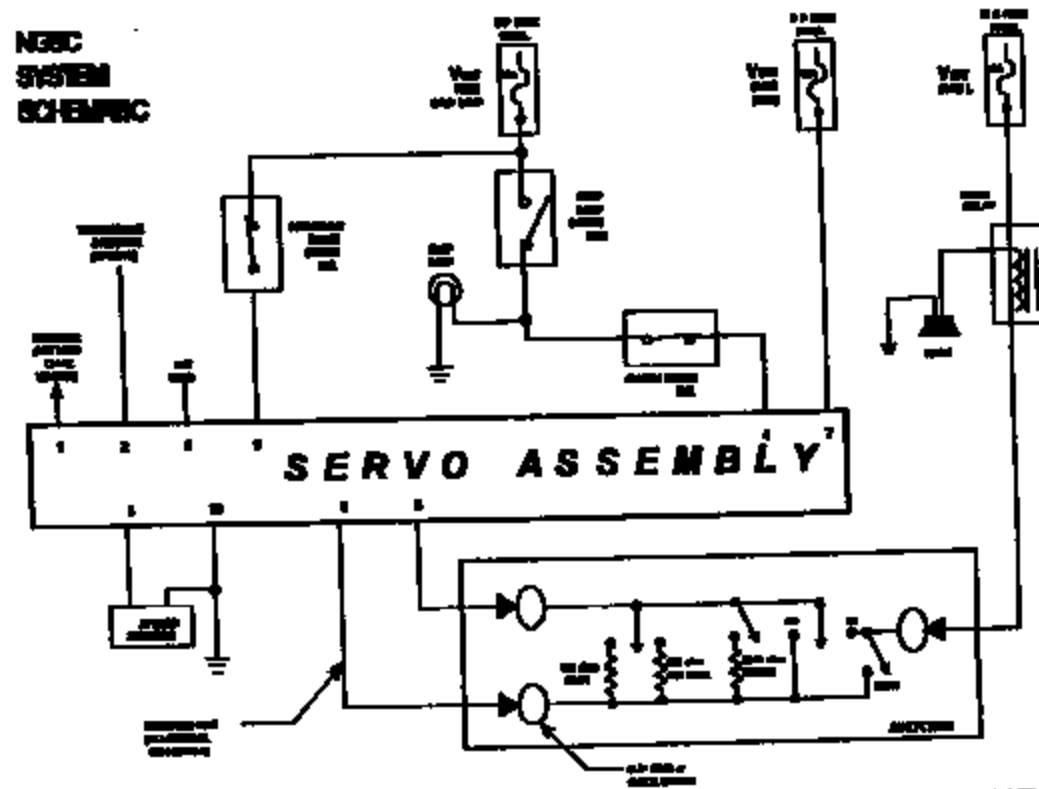
TL-NHTSA 017327

CLASSIFIED BY: 801-26
 DECLASSIFY ON: 801-26
 CLASSIFIED BY: 101-26
 DECLASSIFY ON: 101-26



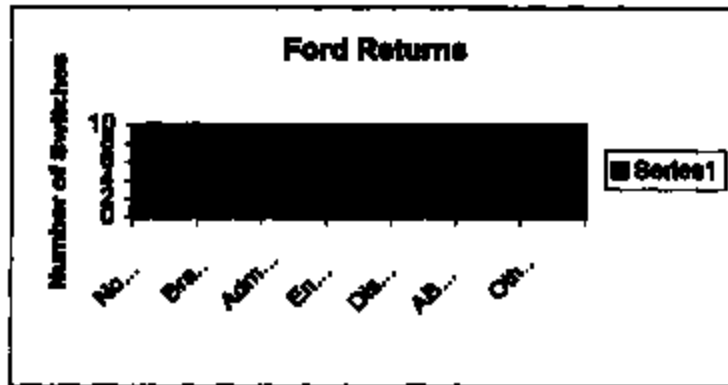
1.2 System Schematic (continued)

SCHEMATIC TITLE 2



TI-NHTSA 017328

No Description	9
Brake Fluid Leak	6
Administrative Parts Return	4
Engagement Troubles	2
Disengagement Troubles	2
ABS Warning Light	1
Other Electrical Accessory Trouble	1



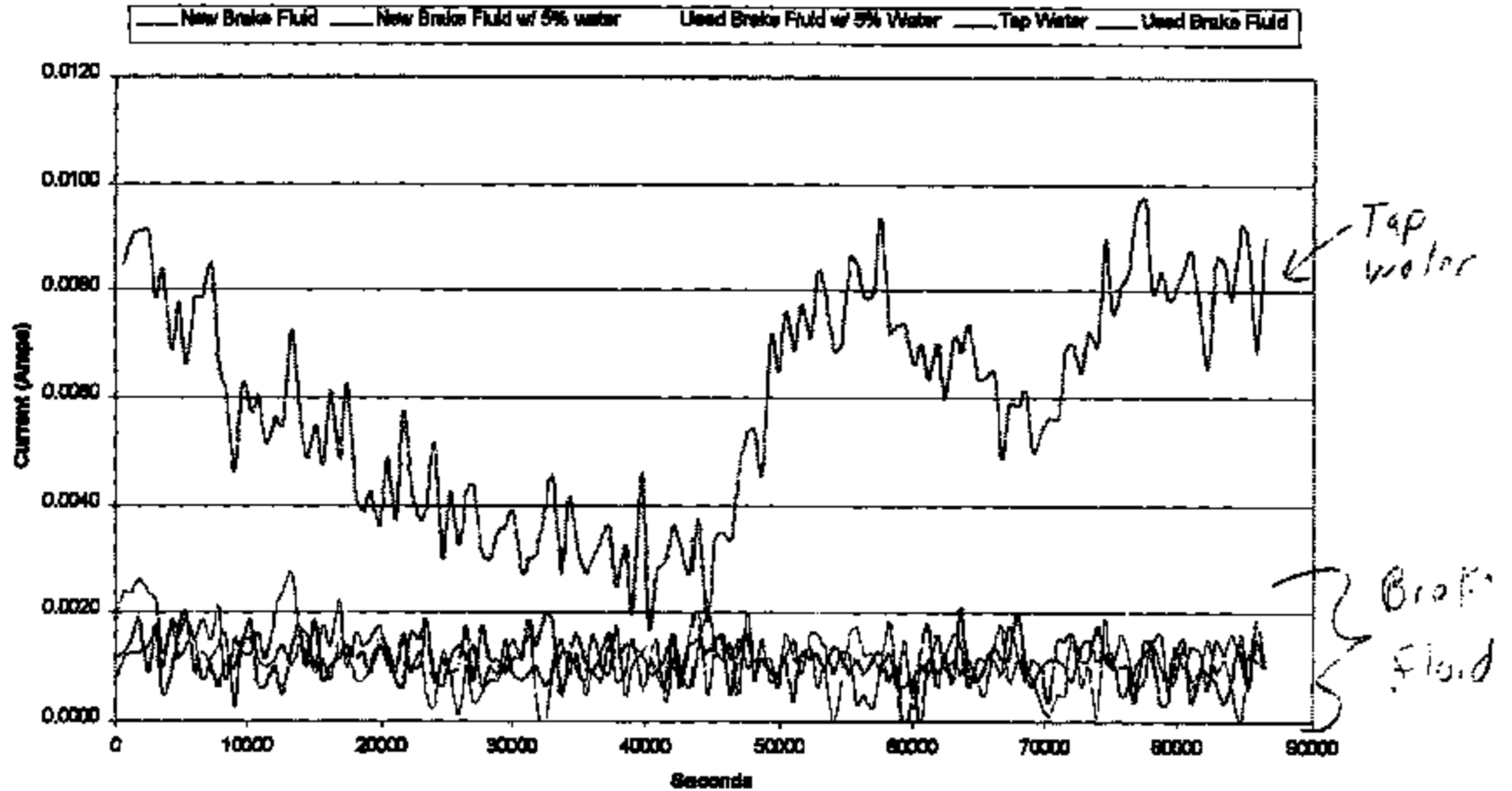
Post-It™ brand fax transmittal memo 7671 # of pages > 3

To Andy McGuirk	From SEAN
Co. Fred Porter	Co. TI
Dept.	Phone #
Fax # 313 390-4145	Fax #

- | -

(24) Hour Fluid Ingress Test

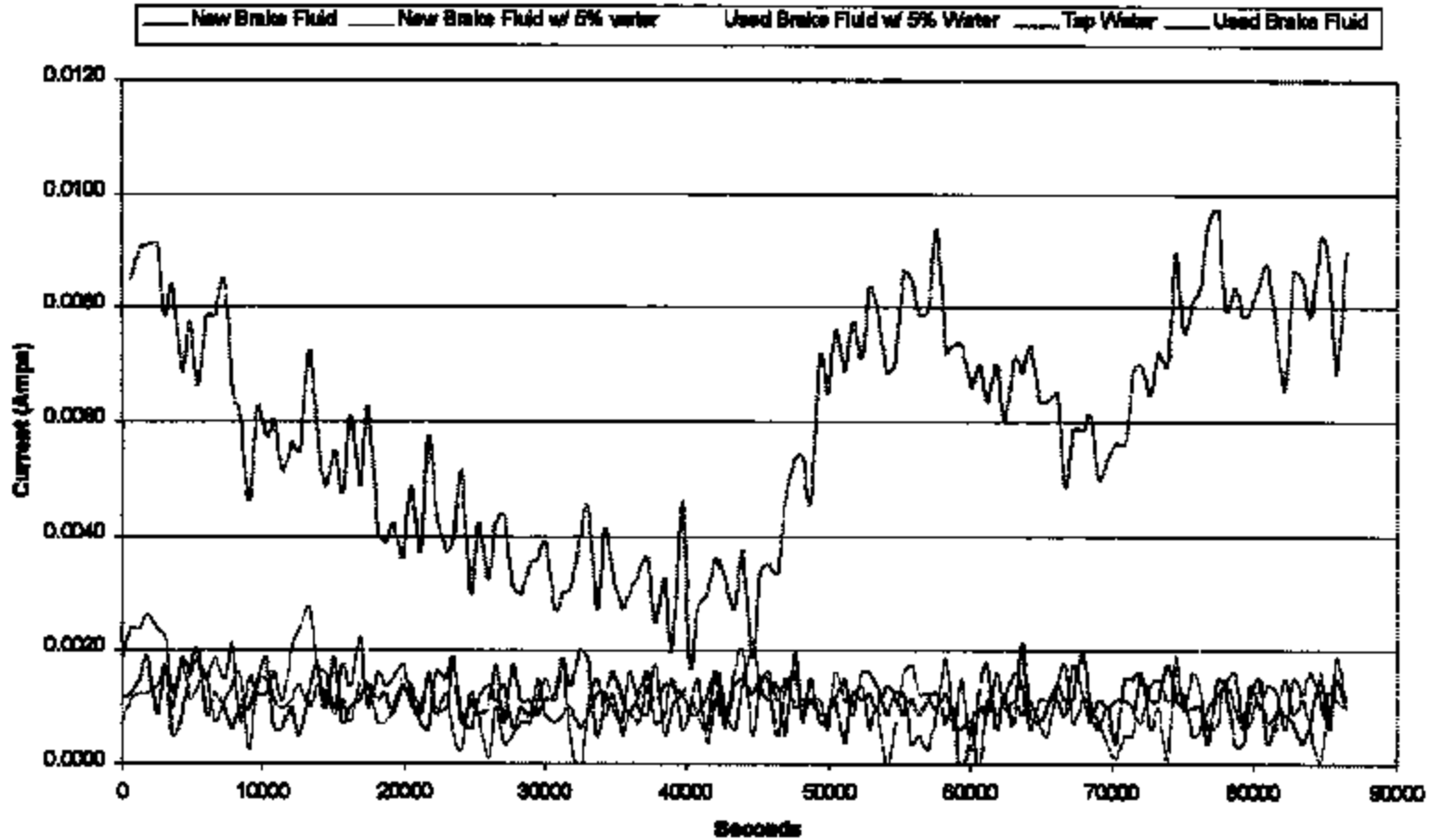
Hexport Current vs. Time
Fluid Ingress Experiment



TI-NHTSA 017331

(24) Hour Fluid Ingress Test

Hexport Current vs. Time
Fluid Ingress Experiment



TI-NHTSA 017332

~~1/18/92~~
~~1/19/92~~
- Lunch date
~~1/20/92~~

Ford

Dec/Jan 4/1 month
Feb 6
March 21
April 22
May 20
June 20

↑ alt ↑
Nov 1991 - STPS manual compex
↓ Panel Feb 1992 - Automated compex

- Part net spec - impulse - Feb '92
- 4/6/92
- 7/10/92
- Daily Impulse test data? (Ruhup)
- SPK - crimp height
- Continuous improvement by Dec.?
- 80? - teardrop?

Dec 6

Norm LePante
Rene Stables
Sue Rivers
Fred Parker

→ What were Crimp Pressures de-batched

- create tear drop - send

ANSA - Melony W. Jensen or Fisher (25K vehicles)
- Recall on Nov '91 → Nov '92 vehicles
- replace suspect connector shell - a strong seal on front seal
- letters go out when 150K switches received

25000/vehicle

All re-strapping costs? - Norm LePante
"Not part of W's discussion" - Fred P



Team ...
Part of ...
2000 ...

- Report ...
- ...
- ...
- ...
- ...
- ...

What about ...

FOSS ...

Next need for report from ...

If we see ... correlation how to relate it to fires?

Memphis had fire out of switch (Don't know) car in car other ...

Containment

- Put speed control
- New circuit for CCS (not hot all the time)
- Contain what?

134-5A
Even without resistor
Must contain

DOE to characterize?

Ford to understand other applications

CCS is a Critical Concern Review Group

Must Diagnose Switch! which unit? Guilty until innocent

Joe Nemi - has Dealer reports

Connector
Why cut?

Don't start 140, start work plan

Key questions to FOSS regarding area (San, Junnie Grove, etc)

Need need for Tech Adv or Follow up Mtg.

Switch is (1) of several causes for Team Car Case

Need TI feedback for questions @ TI w/ Memphis incident.

Updated Memphis ...
Black residue looks like
black fluoride ...
concentrate on ...



Ford Motor Company

Thomas E. Masters
Supervisor Large/Lux Car & Truck
Systems & Wiring OPO
AUT EISEE - CPO

2000 Roland Drive MD 8017
Rm. 2A254, Bldg. 85
Dearborn, MI 48121-2052 USA

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48121-2052

Steve Palmers

Product Design Engineer 3000 Ricardo Drive
Development/Manufacturing Dearborn, MI 48121
Chassis Electronic Systems Reg. #L 38989-48988888
Advanced Vehicle Technology Telephone: 313780-3228
PROFE: SRELMERS Fax: 313680-4148
Email: spalmers@ford.com

313/780-3228 @ Ford.com

1) Flash points
ABS has material spec
2 base materials Calorex (30/1 ... 4)
Kaptan and Teflon
Seal - seal (locking)

2) 2nd material PVC
material at "G" 7795LB-1 → 7795LB-1 base material of hoses

3) SPC - 1. PFA/PTFE ...
We identify looks for potential problems, none related to ...
7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

4) Thermal partition = SPC
Measure input (Temperature) height
Input position (Type and
separation (Type and Size and
Alignment (Type and Size and

5) IP Testing
Research nothing no problems

6)

- 7) Externally Testing
- 1) Conductivity of Brake fluid with diff water levels
Energy test
 - 2) Understand conductivity of switch to ground
with contaminated fluid
 - 3) Brake fluid across in switch w/ 12V saw failure on test arm
Done

8) Outside Ford
Lead [redacted] (within ABS) not only on ignition checks voltage
[redacted] rear brake court
1 year

PRESENT

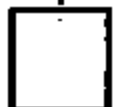
BRAKE
LAMP
CIRCUIT
(VBAT)



N/C
BRAKE SWITCH



E M
CLUTCH



CRUISE
CONTROLLER

PROPOSED

BRAKE (VBAT)
LAMP
CIRCUIT

N/O
RELAY



CRUISE
CONTROL
INPUT



N/C
BRAKE SWITCH



E M
CLUTCH



CRUISE
CONTROLLER

CONFIDENTIAL

71-NHTSA 017340



~~...~~
~~...~~
 - Lurch date
~~...~~

Ford

Dec/Jan 4/month
 Feb 6
 March 24
 April 22
 May 20
 June 20

↑
 Nov 1991 - 57PS manual comp
 Feb 1992 - Automated comp

- Part not spec - impulse - Feb 92
- 4/6/92
- 7/12/92
- Daily Impulse test data? (Runup)
- SPL - crimp height
- Continuous improvement by Dec.?
- 80? - tear drop?

Dec 6

Norm LaPointe
 Rick Stevens
 Steve Rivers
 Fred Parker

→ What were Crimp Pressures de-batched

- create tear drop - send

AVTSA - Meeting with tomorrow or Friday (25K vehicles)
 - Recall on Nov 91 → Nov 92 vehicles
 - replace switch connector shell - silicone seal to form seal
 - letters go out with 150K switches received

100/vehicle

Are we showing costs? - Norm LaPointe
 "Not part of H's discussion" - Fred P



~~10/1/92~~
~~10/1/92~~
 - Lanchette
~~10/1/92~~

To do
 Dec/Jan 4/none
 Feb 6
 March 21
 April 22
 May 20
 June 20

Nov 1991 - STPS manual crimper
 Feb 1992 - Automated crimper

- Post net spec - impulse - Feb '92
- 4/6/92
- 7/12/92
- Daily Impulse test data? (Rump)
- SPL - crimp height
- Continuous improvement by Dec.?
- 80? - tear drop?

Dec 6

Norm LePante → What were Crimp Pressures de-lanchated
 Rick Stevens
 Steve Rivers
 Fred Parker
 - create tear drop - send

NOTE - Reeling Wire transfer or Fixing (25K cables)
 - recall on Nov 91 → Nov 92 vehicles
 - ~~reel~~ switch connector shell - 25000 seal of factory seal
 - letters go out when ISO cables received

mpuo/vehicle
 All re-throwing the costs? - Norm LePante
 "Not part of this discussion" - Fred P



Tech in field Panther CrownVic, Marquee, Town Car
Relay packs
EMS module (all four NHTSA)

Expertise to look @ parts

Norm focused on switch (didn't know about others)

Buy back vehicles and study system

71, 72, 73, 74 design analysis @ Dealership

71: different

72, 73, 74 similar

↳ had a splash shield to protect 42w conn from brake overflow

What about other competitors - Do they use? How wired?

FORD (currently Relians), FRM CAS could highlight town car this for getting field warranties

* Next week for report from Analysis

If we see leakage, corrosion how to relate it to fires?

Memphis had fire out of switch (Dealer saw) car in for other plms.

Containment

Pull speed control

New circuit for CCS (not hot all the time)

Contain what?

NHTSA

Even without Resolution,

must contain

DOE to characterize?

Ford to understand other applications

CCR's → Critical Concern Review Group

Must Disprove switch! Which hunt!

Guilty until innocent

Joe Nemi → has Dealer reports

① connector
② relay pack

Don't start IAD, start work plan

Many questions to A.I.D regarding fires (Town, CrownVic, Grand Marquis)

Next week for Tech Review or follow up Mtg.

Switch is (1) of several reasons for Town Car fires

* Need TI feedback for questions @ TI w/ Memphis incident.

TI-NHTSA 017343

↳ updated Memphis report
Black residue looks like
Brake fluid & Oxidate of
metal
concentrate on 196
switch

FORD SPEED CONTROL DEACTIVATE
PRESSURE SWITCH MILG STONES

- 89-02-17 TRIP TO FORD; ENG. DISCUSSIONS KICKED OFF
INCL. DESIGN VAL. REQUIREMENTS, SAMPLE NEEDS,
LONG. SPEC. MET W/ PASS-CAR RELEASE UNIT
DIANA KOENIG & NESC SUBV. GARY KLINGBER
- 89-03-XX DESIGN VALIDATION OF DIRECT-DISC DESIGN BASED
ON APPROXIMATED PV FROM IS
- 89-04-XX 57PS-STYLE CONNECTOR W/ ACTUATED PRIORITY
KEY IS PROPOSED TO US BY FORD
- 89-04-28 116 CUSTOMER SAMPLES (57PS-STYLE) SHIPPED TO
GARY K. FIRST SAMPLES.
- 89-05-25 50 77-SWITCH STYLE SAMPLES SHIPPED.
- 89-06-XX FIRST INFO FROM FORD THAT THE ORIGINAL
150 PSI ACT. ASSUMPTION MAY CHANGE, AND
MAY BE DIFF. FOR CAR & TRUCK (THIS
LATER PROVES TO BE TRUE) TEST DEVICES
IN SEVERAL DIFFERENT RANGES CONSTRUCTED
TO SUPPORT FORD TESTING.
- 89-06-23 FIRST MET'S W/ NHTSB MOD1; JET FLARE
SEAL IS PROPOSED
- 89-07-XX OUR INTERNAL MECHANIZATION PEOPLE ARE
BECOMING INVOLVED - CALIBRATION OF ASSEMBLY
VS. PIN SOLUTION IS PROPOSED AS HIGHER-QUALITY,
LOWER COST, AND MORE AUTOMATABLE
- 89-08-XX P.I.S.T. & A.I.R.C.A. ^{SAMPLES} FOR LIGHT TRUCK
- 89-11-XX FIRST WORD THAT TRUCK SPEC WILL BE
250 ± 50; DESIGN DIRECTION CHANGES
FUNDAMENTALLY FROM "DIRECT-DISC" TO 57PS
CONNECTOR-STYLE SENSOR

4-11-1982

89-12-XX ES NEGOTIATIONS BEGIN; WE PROVIDE FORD W/ A MARKED-W 57PS 302L TO PERM BASIS FOR DISCUSSING

90-01-XX LIGHT TRUCK DECIDES TO USE A 57PS VARIANT FOR INITIAL PRODUCTION 78

" MAJOR MTS' HELD WITHIN FORD, TI ATTENDING, IN ORDER TO RECONCILE PROGRAM ISSUES BETWEEN PASS CAR BRANCH, LT BRANCH, AND NASC ENG.

90-02-XX PASS-CAR SPEC WILL BE 125±35; INTERNAL CHANGES TO OUR DEVICE TO HIT THIS RANGE ARE BEGUN

90-02-00 FIRST WORD OF TORCO M/C FOR LT; ISSUE RAISED IS OVERALL LENGTH (NO DIA. MENTIONED) THEY'D LIKE 1.75"

90-02-XX DURING ES NEGOTIATIONS, WE SUPPORT FORD IN SEVERAL WAYS BY SUGGESTING MORE COST-EFFECTIVE / MORE REALISTIC TEST PROCEDURES (X1 POWERD IMPULSE TEST, HUNNIBY MIL-SPEC TEST

90-03-XX ES FINALIZED IN CONTENT; ~~WORK~~ WORK IS CHANGING TO ROBUST SENSOR IN A COST-EFFECTIVE MANNER FOR THE P/C 125±35 SPEC.

90-05-XX ALL FORD PRINTS CONVERTED TO CONFORM TO ANSI Y14.5M-1982 & METRICATED

90-06-XX PASS-CAR DECIDES UPON ISIL SEAL ALSO; FIRST SAMPLES SHIPPED

90-07-XX WE ARE IN CONTACT W/ SEA SCOTT KUSCH. DETAILS OF ISIL SUBMISSION FOR TRUCK & CAR MR. BEING ADDRESSED.

11/11/88

- 90-08-17 FORD ADDS A FLUID-RESISTANCE TEST REQUIREMENT TO IES @ 11% HOUR (IN TERMS OF ISE EFFORTS) WE ACCEPT IT. ALSO, WE REDESIGN INTERNAL COMPONENTS TO MINIMIZE INTERNAL VOLUME & REDUCE TRAPPED AIR POTENTIAL. INL FORD.
- 90-09-XX THE COST-EFFECTIVENESS OF ACHIEVING A J512 CHAMPETE W/ STANDARD ±.002 TOLERANCE BECOMES A MAJOR ISSUE, EVENTUALLY LEADING TO A COMPREHENSIVE PAPER STUDY FOLLOWED BY A VALIDATION TEST AND VERBAL BLESSING FROM THE SAE J512 COMMITTEE.
- 90-09-18 FORD VISITS TIA ; IRASE, RANGLI, KLINGLUB.
- 90-11-XX LIGHT TRUCK PRODUCTION VALIDATION (STPS) IS COMPLETED; ISE PACKAGE SUBMITTED
- 90-12-XX PASS-CAR ENG OKAYS THE MODIFIED J512
PASS-CAR PRODUCTION VALIDATION / ISE IS COMPLETED
WE INVENT A METHOD TO RAGE THE J512 CHAMPETE
- 91-02-XX LIGHT TRUCK OKAYS THE MODIFIED J512
TORQUE / TTS CORRESPONDENCE BEGINS
TI MECHANIZATION IS NEARLY COMPLETE OF AUTOMATION TOOLING; INSTANT CALIBRATION DRIFT IS VERY SUCCESSFUL
- 91-07-XX NICKEL-PLATE TORQ SAMPLES, SHIPPED.
WE ARE SUPPORTING TIER-1'S IN THEIR MOD-J512 VALIDATION TESTING
- 91-08-XX AUDIBLE NOISE ON WINDUP ALERTS FORD, ENG. OF POSSIBLE PROBS; WE IMMEDIATELY BEGIN DIVULGMENT OF CRIST DEVICE & SHIP SAMPLES.

protect the lead-in thread, which Elco agreed to produce without any cost penalty.

Also, again due to air entrapment concerns, FC wants the large opening on the backside of the hexport to be filled. We are looking into either building the hexport without the large opening, or filling it.

HUMIDITY TESTS: I presented the results of our three-way humidity comparison test. All devices passed all tests functionally. Based on operations, Ford's favored 10-cycle MIL-STD test was obviously the most severe by far, the original Ford spec. was most lenient, and my favored test, the standard 10-cycle MIL-STD fell between the two. Bruce agreed to step back to my test.

RELEASE SPEED: We explained a rationale, based on estimated Cpi numbers, for a reduction in release from 40 to 20. They really don't have a problem with this, as long as they are guaranteed that release will in fact take place. We explained about the speed-control logic whereby, after a brake-lite failure, if our switch disengages the system then a key-off cycle must take place which indirectly means the brake pressure falls to zero and our device is guaranteed to reset.

ES SPEC ISSUES: The specific wording of several miscellaneous items in the "Notes and Instructions" section is being updated to reflect the real world, based on our internal Quality Assurance Specification document QAS 29a (57PS ... previously approved by Ford 5GA). I left a copy of this which Bruce will use to update those areas I highlighted.

VELOPE PRINTS / SAMPLES: Bruce has asked that we submit a revised envelope print showing the new flare within about 2 weeks. Furthermore, he needs 2 ride-height switch samples (57PSFI-3) with the new flare and filled hexport in about a week.

*** Meeting II - ELD NGSC ***
TI Personnel: Steve Offiler, Joe Schuck
Ford Personnel: Gary Klingler

This was an informal program status/update meeting. Joe obtained the most recent schedule dates for the lead platforms... ISIR's, 4S and IF MSD's, etc. He'll get a copy of these to me for use in updating our overall program schedule.

We delivered test devices at 90 psi and 160 psi for system testing to take place to confirm the FC spec. Also, Gary would like a couple devices which represent roughly the min release for both car and truck. I have 125 psi devices with releases in the 30's and a 201 psi device with a 2 psi release ... these will suffice.

Gary is pursuing business at Ford Australia, roughly 40K units per year. He has beat out GM Holden's electronic speed control based on both cost and performance. They want a fully-engineered package which will be a drop-in. No idea how the brake pressure switch will fit into the system, in terms of fluid fitting, etc.

*** Meeting III - Light Truck Speed Control ***
TI Personnel: Steve Offiler, Joe Schuck
Ford Personnel: George Randall

George dropped a couple of bombshells "off the record":

TI-NHTSA 017347

George estimates that electrical system is 10% better performance but 15% more money; this value ratio must improve before F-series will sign up. '9- is a possibility if Flangler can reduce cost. Ranger-series is a question for the same reason. Expadline is definitely signed up for the new system, and MINSP will run into packaging issues which will force use of the LV system as well.

LT has no plans at present to move to the CCPS. That is, they plan to continue to pay \$2.97 for a modified 57PS indefinitely beyond the 30-day cutoff. This does not mean they will never move to the \$2.05 switch, but it will be done "in the future" as a cost reduction action. This is definitely being done to avoid paying a part of the 1.25K tooling. Heading between the lines, I think LT will move to the CCPS immediately after FC picks up the whole tab for tooling.

George will need an updated envelope soon. He'll accept metric or inch, although he's not under the metrication gun like FC. He doesn't care for "soft" metric (converted inch), preferring true inch or "hard" metric (conceived from scratch as metric, with most dia's in integer mm).

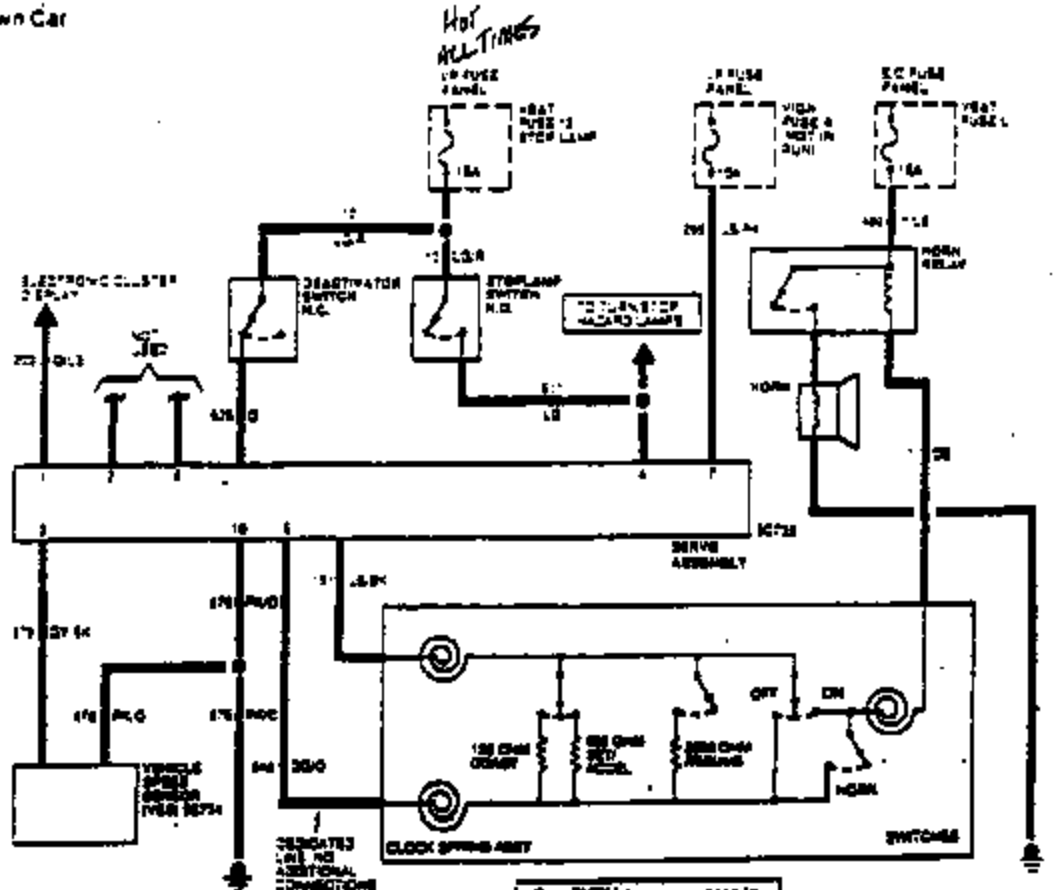
George insists that we stay with 4K proof, but this is no problem. It was his idea to move the proof spec. to the print to keep the ES exactly the same for truck and car. Someone in LT Brake Eng. is playing around with changing the angles on the JS12 spec., but George will fight this. He's a real strong believer in established standards. This is also why he didn't bat an eyelash at the latest change from 15 humidity cycles back to 10.

Regards,
Steve O.

TI-NHTSA 017348

DIAGNOSIS AND TESTING (Continued)

Town Car



NOTE THE SAME DRIVE ASSEMBLY IS USED FOR BOTH ANALOG AND ELECTRONIC INSTRUMENT CLUSTERS.

See EVTM for more details of this system

17001-1

10-03-5