EA02-025

FORD 10/27/03

APPENDIX N

BOOK 17 OF 61

PART 3 OF 4

[redacted]

• Action • Comment History • Process Details • Process Status
• Back to Agenda

OASIS Technical Message Request

Instructions

Top

1. Fields marked with * are required.

OASIS Message Request

Top

Title:	1992-93 Town Car - Brake Pressure Switch
Activity Code:	00 Miscellaneous
QSF/Non-QSF Status:	non-QSF_Item_generated
Tracking Number:	97-0255
Does this request supersede an active SSM?	No
SSM to supersede:	
Are Parts required?	No
Message Type:	Final
Model Year(s):	1992, 1993
Vehicle Line(s):	Town Car
Build Dates:	from: 01-Nov-1991 to: 01-Nov-1993
Engine(s):	
Calibration(s):	
Transmission(s):	
Broadcast Message:	Yes
SSM Distribution:	NA: United States
OASIS Service Codes:	203000 301000 607600
Repair Verification:	

none

Original Text: *(Author: scrimmy)*

***

OASIS Modified Text: *(Author: idejilume)*

***

ASO Modified Text: *(Author: dxu)*

***

OGC Modified Text: *(Author:)*

PSL Modified Text: *(Author: skinkert)*

***

VEE Modified Text: *(Author: mschlot)*

3713 2102

***

Final Version of Text *(Author: mmuhall)*

When replacing a Speed Control Deactivation switch on a 1992-93 Town Car (-97924- Brake Pressure Switch on the Brake Proportioning valve) or the switch electrical harness, tag the removed part and return to Ford Motor Company for analysis. Please include VIN #, mileage, dealer code, and reason removed on the tag. Ship to:
Ford Motor Company
Central Laboratory
15000 Century Drive
Commerce Park North
Dearborn, MI 48120
Attn: DEPT. T118

SSM Number: 12492

Transaction Information

Top

Comments:

*Action:

— Select Action — Submit

Comment History

Top

mvanhall on 24-Feb-1999 10:18:55:
Workflow Name: SSM OASIS2 IMS, Action Taken: Final/Complete (summary sent to: techisc@ford.com, sreimers@ford.com, ldallape@ford.com):
THIS SSM IS NOW ACTIVE.
mvanhall on 24-Feb-1999 09:27:35:
Workflow Name: SSM OASIS2 Review, Action Taken: Final/Enter into Global Oasis:
(no comment)
dyu on 23-Feb-1999 15:38:31:
Workflow Name: SSM Approval ASO, Action Taken: Approve and submit to OASIS:
last line: no names; use dept no.;
mschlott on 23-Feb-1999 14:26:55:
Workflow Name: SSM Approval VEE, Action Taken: Approve and submit to OASIS:
(no comment)
dpinkert on 23-Feb-1999 13:27:26:
Workflow Name: SSM Approval PSL, Action Taken: Approve and submit to OASIS:
Ok to publish - parts not required
ldallape on 23-Feb-1999 13:22:07:
Workflow Name: SSM OASIS1 Review, Action Taken: Accept/Submit to Approving Activities (summary sent to: sreimers@ford.com, mvanhall@ford.com, mtaylor3@ford.com, ldallape@ford.com):
Please expidite.
sreimers on 23-Feb-1999 12:50:40:
Workflow Name: SSM Preparation, Action Taken: Submit to OASIS (summary sent to: fporter@ford.com, jmezie@ford.com, rnevi@ford.com, jbradley@ford.com, tmasters@ford.com, sreimers@ford.com, fporter@ford.com, nkpoint@ford.com, skrooch@ford.com, wsiramcz@ford.com, lbrown@ford.com, dgoel@ford.com, lweifer3@ford.com, jlogal@ford.com):
(no comment)
sreimers on 23-Feb-1999 12:12:30:
Workflow Name: FCSD Oasis SSM, Action Taken: Save for later:
The text was approved by Ray Nevi (ASO), Jay Logal (OGC), Joe Bradley (FCSD), Tom Masters (AVT).

Process Details

Top

Instance Name:	97-0255 1992-93 Town Car - Brake Pressure Switch	**Current User:**	sreimers
Business Process:		**Customer:**	sreimers
Tracking Number:	97-0255	**Performer:**	ldallape
Title:	1992-93 Town Car - Brake Pressure Switch	**Author:**	sreimers
Activity Code:	00 Miscellaneous	**Author Supervisor:**	fporter
Workflow:	SSM OASIS1 Review	**Respond By:**	No time
Status:	Closed/satisfied	**Complete By:**	No time

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3713 2104

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 overheat?

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 we would like 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, solenoids, module, service switch,

Other suspect parts

Ign Switch

3713 2105

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

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 overheat?

Were the underhood fuse links blown?

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

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?

Is there any evidence of aftermarket component installation? (specifically car alarm or remote start)

Parts that we would like 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

3713 2106

Which vehicles to look at

Any new incident of 1992-1995 Towncar, Crown Victoria, or Grand Marquis alleged to have an underhood fire

Specific prior incidents... vins will be provided by ASO forwarded

Prevent corrosion (etch paths from starting a fire

3/11/99

Objects

St. Terminal

Sp. "

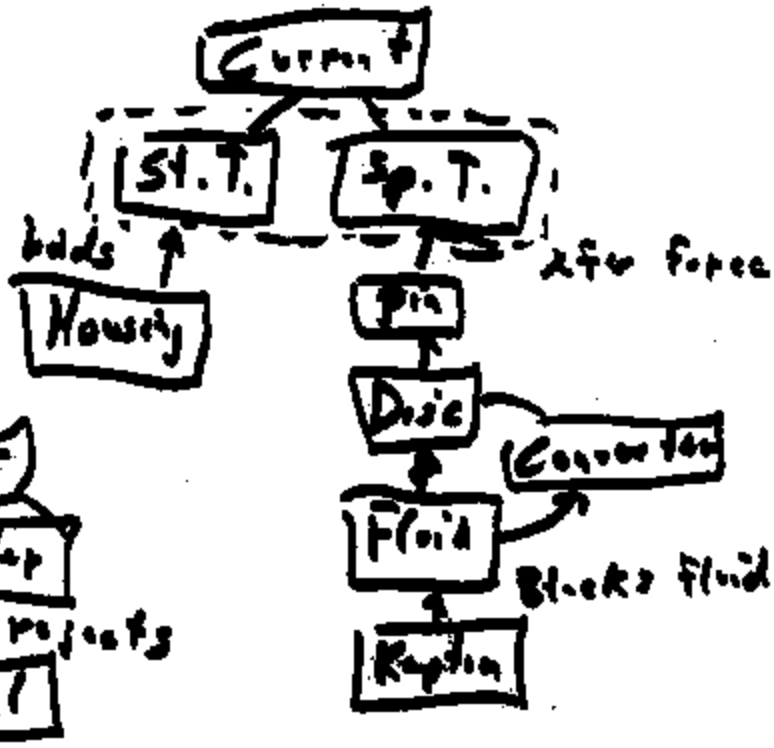
Cup

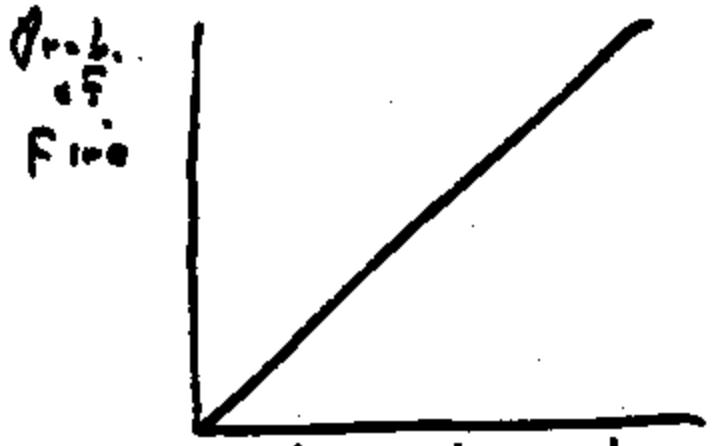
Pin

Disc

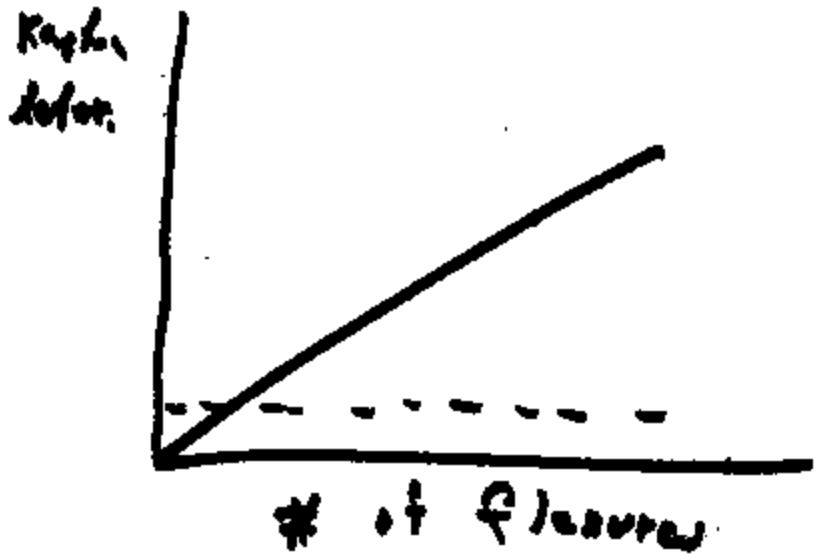
Fluid

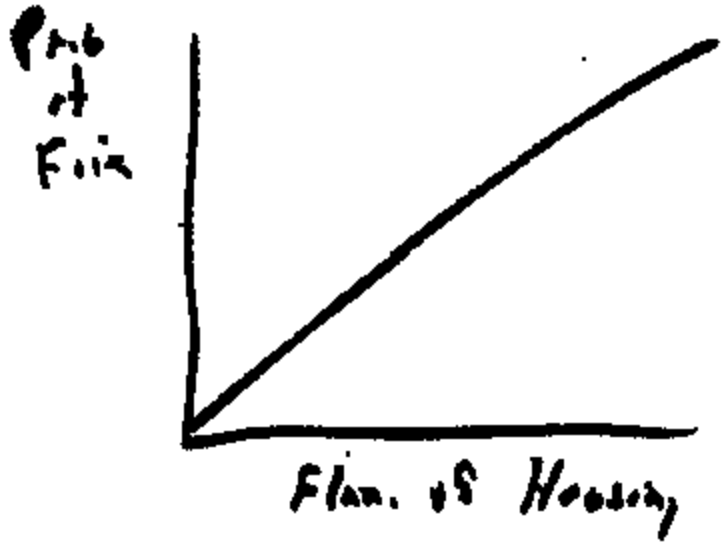
Kapton

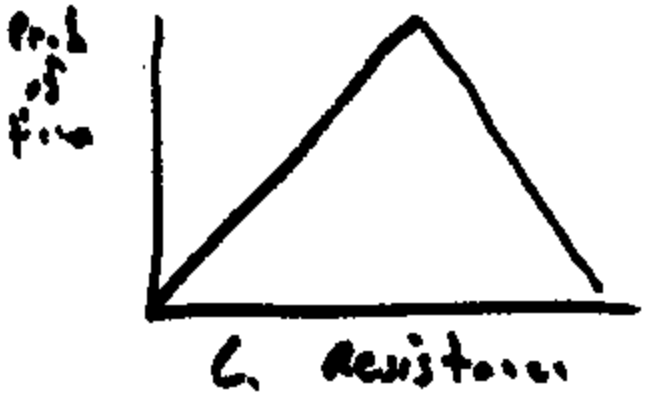




Seal determination, Kapton determination
Amount of current
Length of path from term. to ground


Rayleigh deform.
# of flavors


Prob of Fail
Flav. vs Hadron


Prob of Fail
L resistance

Uniqueness

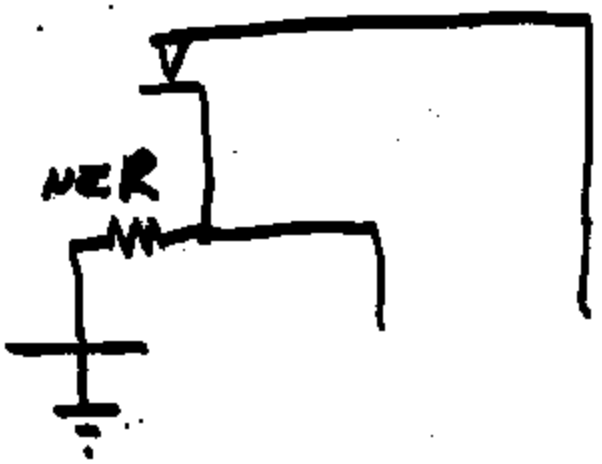
There is always V on terminal
Small or very large current is OK
Major prob. is with system off
Brake fluid borne

Plus.

Drains

Digital

1.)



2.) Ground fault interrupter

3) Reverse polarity of terminals

4) Turn upside down so fluids ~~come~~ run from ground & objects fall away from ground.

5) Plastic diaphragm btw. pin & spring arm (close off switch cavity)

6) Coat all of terminals with plastic except for contacts

7) Put switch after coil

8) O-ring sliding seal

9) Thermal fuse in circuit that melts below ign. temp. of plastic

10) Fill lower half of cavity with gel

.7 DOW non-corrosive to brake tubing 3/11/99

GFI type device/

Rocking
Leak fix 2ND
Deac 3RD
Fire Starter 1ST

- Fill Switch Cavity below rivet
- Prevent Corrosion leak paths from Starting a fire
- Fuse integrated in terminals (a circuit interrupter)
- Cup of non-conducting Mat'l
- Cup coated with Non-conducting
- Non-Flexing Seal
- Sudden change from Hi Insulation Resistance to low to force fuses to blow before fire can start. Neg. (TC Device)
- Thermal Breaker (?)
- Plastic Insulator/Seal btwn Spring arm and transfer pin
- Coat electrical parts with plastic
- Put switch between coil & ground
- Change surface of flexing area to distribute stress (?).

3713 2113

National Semiconductor

LM1851 Ground Fault Interrupter

General Description

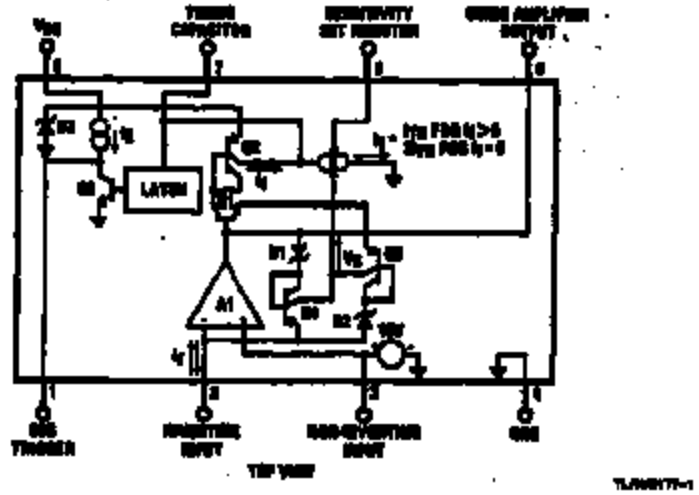
The LM1851 is designed to provide ground fault protection for AC power outlets in consumer and industrial environments. Ground fault currents greater than a preselected threshold value will trigger an external SCR-driven circuit breaker to interrupt the AC line and remove the fault condition. In addition to detection of conventional hot wire to ground faults, the neutral fault condition is also detected.

Full advantage of the [illegible] is taken to provide maximum immunity to false triggering due to line noise. Special features include circuitry that rapidly re-sets the fixing inputter in the event that noise pulses introduced [illegible] and a memory circuit that allows firing of even a sluggish breaker on either half-cycle of the line voltage when external full-wave rectification is used.

Features

- Internal power supply shunt regulator
- Externally programmable fault current threshold
- Externally programmable fault current integration time
- Direct interface to SCR
- Operates under line reversal; both load vs line and hot vs neutral
- [illegible]

Block and Connection Diagram



TOP VIEW

TL/H/5177–1

Order Number LM1851M or LM1851N
See NS Package Number M08A or N08E

Absolute Maximum Ratings

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Current	15 mA
Power Dissipation (Note 1)	1360 mW
Operating Temperature Range	−40°C to +70°C
Storage Temperature Range	−65°C to +150°C

Soldering Information

Dual-In-Line Package (10 sec.)	260°C
Small Outline Package	
Vapor Phase (60 sec.)	215°C
Infrared (15 sec.)	220°C

See AN-450 "Surface Mounting and Their Effects on Product Reliability" for other methods of soldering surface mount devices.

DC Electrical Characteristics $T_A = 25°C$, $I_{SD} = 5$ mA

Parameter	Conditions	Min	Typ	Max	Units
Power Supply Shunt Regulator Voltage	Pin 8, Average Value	28			V
Latch Trigger Voltage	Pin 7	16	17.5	19	V
Sensitivity Set Voltage	Pin 5 to Pin 6	6	7	8.5	V
Output Drive Current	Pin 1, With Fault	0.8	1	5.4	mA
Output Saturation Voltage	Pin 1, Without Fault		160	240	mV
Output Saturation Resistance	Pin 1, Without Fault		160		Ω
Output External Current Sinking Capability	Pin 1, Without Fault, $V_{Pin\ 1}$ Held to 0.8V (Note 4)	5.0	6		mA
Noise Integration Sink Current Ratio	Pin 7, Ratio of Discharge Currents Between No Fault and Fault Conditions	5.0	5.9	6.8	μA/μA

AC Electrical Characteristics $T_A = 25°C$, $I_{SD} = 5$ mA

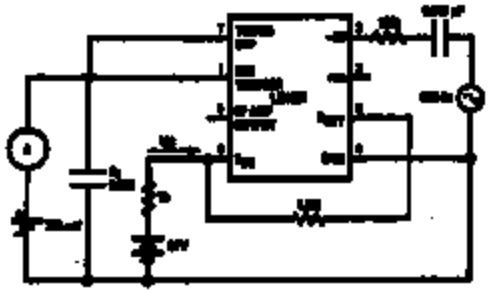
Parameter	Conditions	Min	Typ	Max	Units
Normal Fault Current Sensitivity	Figure 1 (Note 3)	5	6	7	mA
Normal Fault Trip Time	300Ω Fault, Figure 2 (Note 3)		15		ms
Normal Fault with Grounded Neutral Fault Trip Time	300Ω Normal Fault, 3Ω Neutral, Figure 2 (Note 3)		15		ms

Note 1: For operation in ambient temperatures above 25°C, the device must be derated based on a 150°C maximum junction temperature and a thermal resistance of 90°C/W junction to ambient for the DIP and 160°C/W for the SO Package.

Note 2: Average of 10 trips.

Note 3: Required LA sensitivity tolerance to assure that external shunting of LM1851 sensitivity will be necessary.

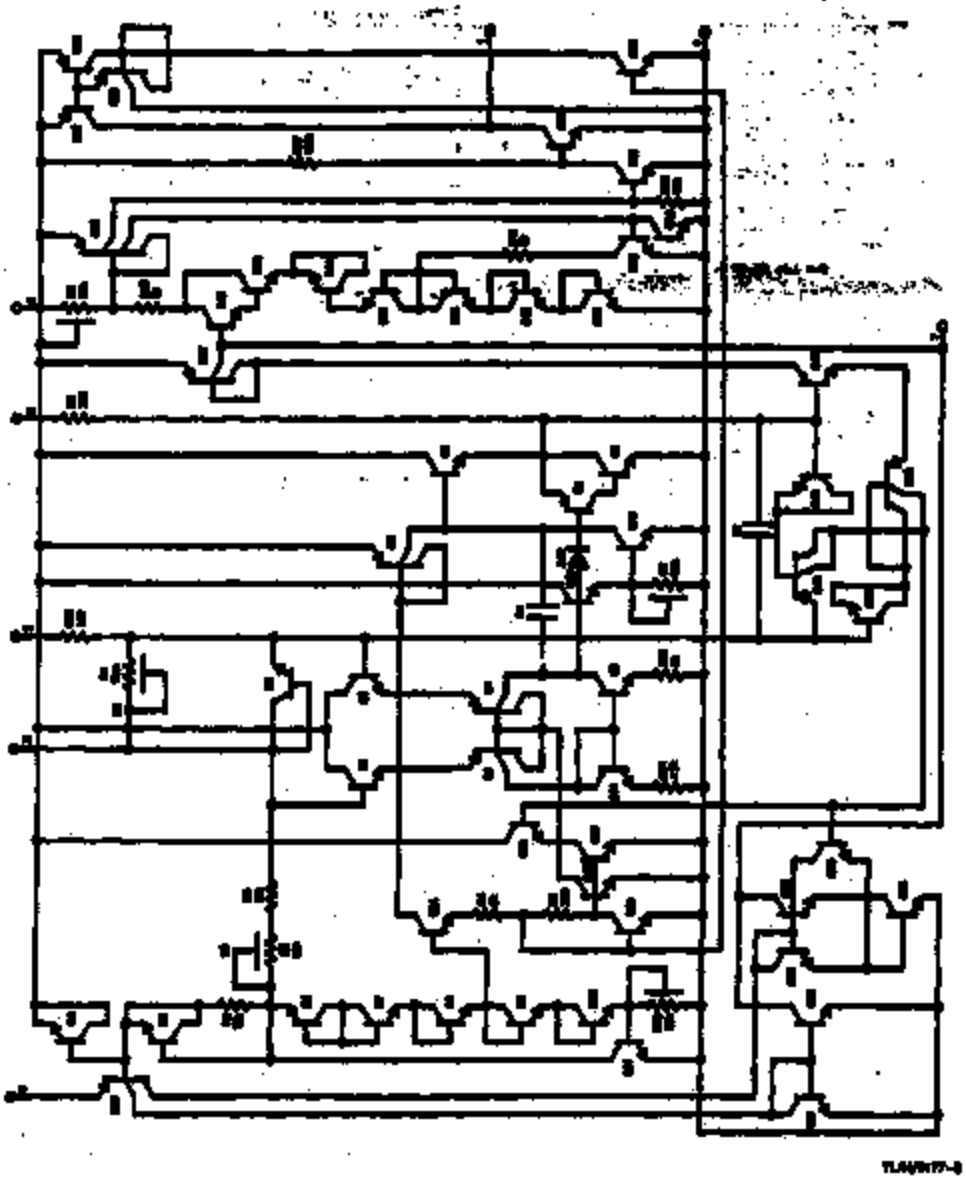
Note 4: This externally applied current is in addition to the internal "output drive current" shown.



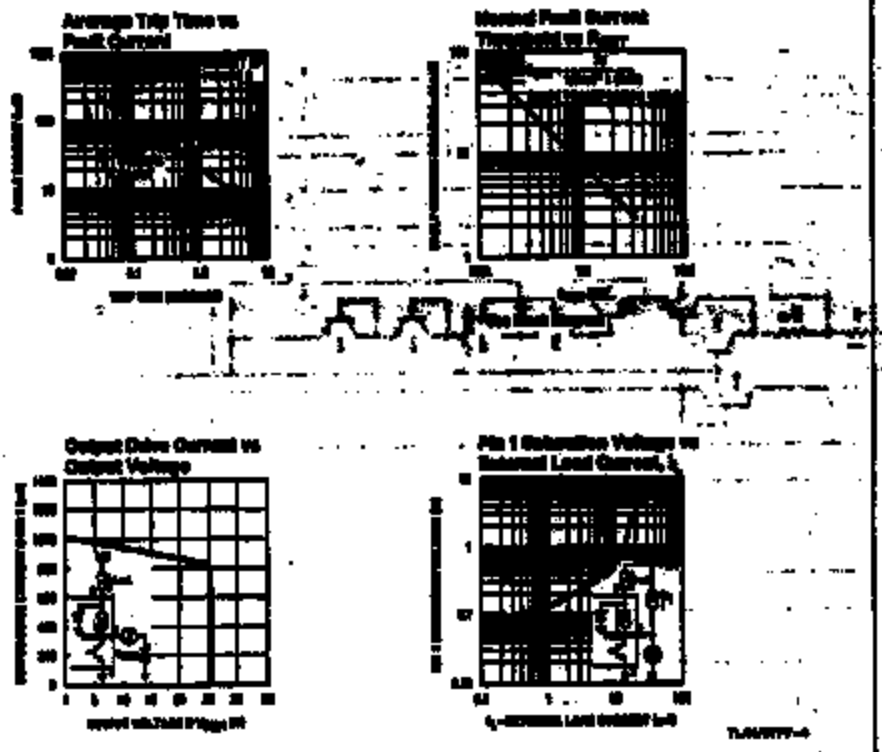
TL/H/5971–6

FIGURE 1. Normal Fault Sensitivity Test Circuit

Internal Schematic Diagram



Typical Performance Characteristics



Circuit Description

(Refer to Block and Connection Diagram)

The LM3401 operates from 85V as set by an internal shunt regulator, D3. In the absence of a fault ($I_P = 0$) the feedback path states signal (V_S) is correspondingly zero. Under these conditions the capacitor discharge current, I_1, sits quiescently at some times its threshold value, I_{TH}, so that notes induced charge on the timing capacitor will be rapidly removed. When a fault current, I_P, is detected in the secondary of the external sense transformer, the operational amplifier, A1, uses feedback to force a virtual ground at the input as it extracts I_1. The presence of I_1 during either half-cycle will cause V_S to go high, which in turn changes I_1 from II_{TH} to I_{TH}. Although I_{TH} discharges the timing capacitor during both half-cycles of the line, I_1 only charges the capacitor during the half-cycle in which I_1 exits pin 2. Thus during one half-cycle (I_{TH}) charges the timing capacitor, while during the other half-cycle I_{TH} discharges it. When the capacitor voltage reaches 17.6V, the latch engages and turns off Q9 permitting I_G to drive the gate of an SCR.

Application Circuits

A typical ground fault interrupter circuit is shown in Figure 8. It is designed to operate on 120 V_{AC} line voltage with 6 mA normal fault sensitivity.

A full-wave rectifier bridge and a 10k/2W resistor are used to supply the DC power required by the IC. A 1 µF capacitor at pin 8 used to filter the ripple of the supply voltage and is also connected across the SCR to allow firing of the SCR on either half-cycle. When a fault causes the SCR to trigger, the circuit breaker is energized and line voltage is removed from the load. At this time no fault current flows and the IC discharge current increases from I_{TH} to I_{TH} (see Circuit Description and Block Diagram). This quickly resets both the timing capacitor and the output latch. At this time the circuit-breaker can be reset and the line voltage again supplied to the load, assuming the fault has been removed. A 1000:1 sense transformer is used to detect the normal fault. The fault current, which is basically the difference current between the hot and neutral lines, is stepped down by 1000 and fed into the input pins of the operational amplifier through a 10 µF capacitor. The 0.0033 µF capacitor between pin 6 and pin 5 and the 330 pF between pins 6 and 4 are added to obtain better noise immunity. The normal fault sensitivity is determined by the timing capacitor discharging current, I_{TH}. I_{TH} can be calculated by:

$$I_{TH}=\frac{7V}{R_{SET}}+8 \qquad (1)$$

At the decision point, the average fault current just equals the threshold current, I_{TH}.

$$I_{TH}=\frac{I_{(peak)}}{2}\times 0.91 \qquad (2)$$

where $I_{(peak)}$ is the one input fault current to the operational amp and the factor of 2 is due to the fact that I_F charges the timing capacitor only during one half-cycle, while I_{TH} discharges the capacitor continuously. The factor 0.91 converts the rms value to an average value. Combining equations (1) and (2) we have

$$R_{SET}=\frac{7V}{I_{(peak)}\times 0.91} \qquad (3)$$

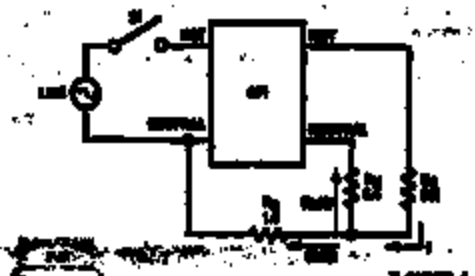
For example, to obtain 6 mA(rms) sensitivity for the circuit in Figure 8 we have:

$$R_{SET}=\frac{7V}{\frac{6\,mA\times 0.91}{1000}}=1.3M\,\Omega \qquad (4)$$

The correct value for R_{SET} can also be determined from the characteristic curve that plots equation (3). Note that this is an approximate calculation, the exact value of R_{SET} depends on the specific sense transformer used and LM1851 tolerances. Inasmuch as UL943 specifies a sensitivity "window" of 4 mA–6 mA, provision should be made to adjust R_{SET} on a per-product basis.

Independent of setting sensitivity, the desired integration time can be obtained through proper selection of the timing capacitor, C_t. Due to the large number of variables involved, proper selection of C_t is best done empirically. The following design example, then should only be used as a guideline.

Assume the goal is to meet UL943 timing requirements. Also assume that worst case timing occurs during GFI start-up (S1 closed) with both a heavy normal fault and a 6Ω ground-to-neutral fault present. This situation is reasonably likely.



TL/H/5770–4

UL943 specifies <30 ms average trip time under these conditions. Calculation of C_t based upon charging currents due to normal fault only is as follows:

<30 ms specification

−5 ms GFI turn-on time (10k and 1 µF)

−3 ms Potential loss of one half-cycle due to fault current sense of half-cycle only

−4 ms Time required to open a stagger circuit breaker

18 ms Maximum integration time that could be allowed

8 ms Value of integration time that accommodates component tolerances and other variables

$$C_t=\frac{I\times T}{V} \qquad (5)$$

where T = integration time

V = threshold voltage

I = average fault current into C_t

$$I=\underbrace{\left(\frac{120\,V_{(rms)}}{R_S}\right)}_{\text{heavy fault current generated (average } I_{FH})}\times\underbrace{\left(\frac{R_N}{R_S+R_N}\right)}_{\text{portion of fault current shunted around GFI}}$$

$$\times\underbrace{\left(\frac{1\,turn}{1000\,turns}\right)}_{\text{current division of input sense transformer}}\times\underbrace{\left(\frac{1}{\pi}\right)}_{C_t\text{ charging on half-cycles only}}\times\underbrace{(0.91)}_{\text{rms to average conversion}} \qquad (6)$$

therefore:

$$C_t=\frac{\left[\left(\frac{120}{R_S}\right)\times\left(\frac{R_N}{R_S+R_N}\right)\times\left(\frac{1}{1000}\right)\times\left(\frac{1}{\pi}\right)\times(0.91)\right]\times 0.008}{7V} \qquad (7)$$

C_t = 0.01 µF

Application Circuits (Continued)

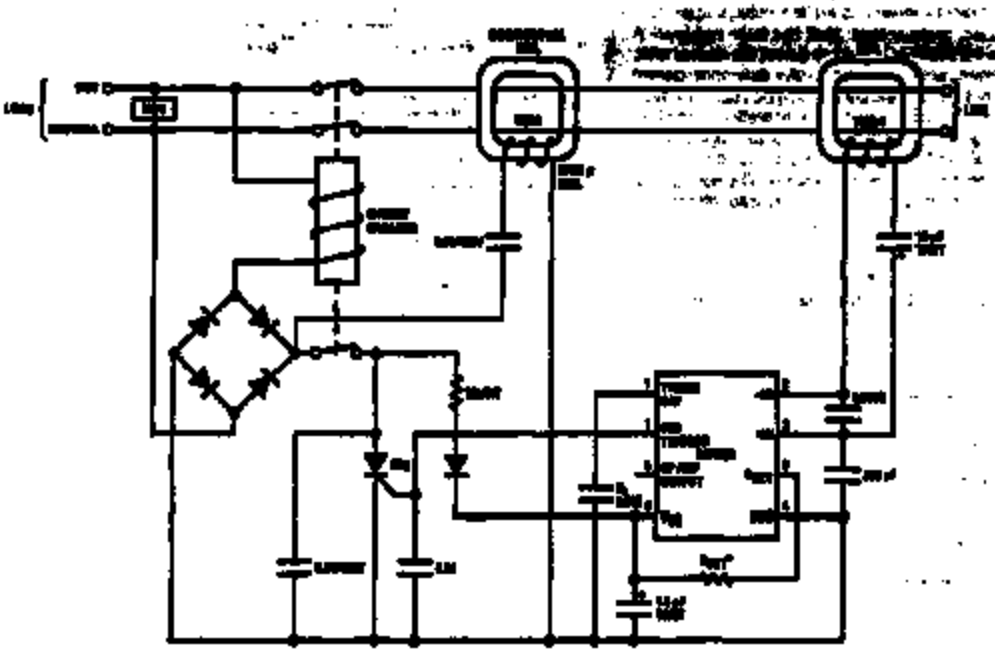
In practice, the actual value of C1 will have to be modified to include the effects of the neutral loop upon the net charging current. The effect of neutral loop induced currents is difficult to quantize, but typically they rise with neutral fault currents, thus allowing a larger value of C1.

For UL943 requirements, 0.018 µF has been found to be the best compromise between tripping and noise.

For those GFI standards not requiring grounded neutral detection, a still larger value capacitor can be used and better noise immunity obtained. The larger capacitor can be interconnected between R_{T1} and R_{T2} are not present, allowing the full fault current, I_f to enter the GFI.

In *Figure 2*, grounded neutral detection is accomplished by loading the neutral coil with 120 Hz energy continuously and allowing none of the energy to couple into the sense transformer during conditions of neutral fault.

Typical Application



*Adjust R_{SET} for desired sensitivity

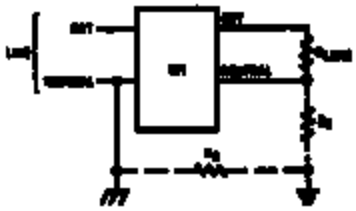
TL/H/5977–6

FIGURE 2. 120 Hz Neutral Transformer Approach

Definition of Terms

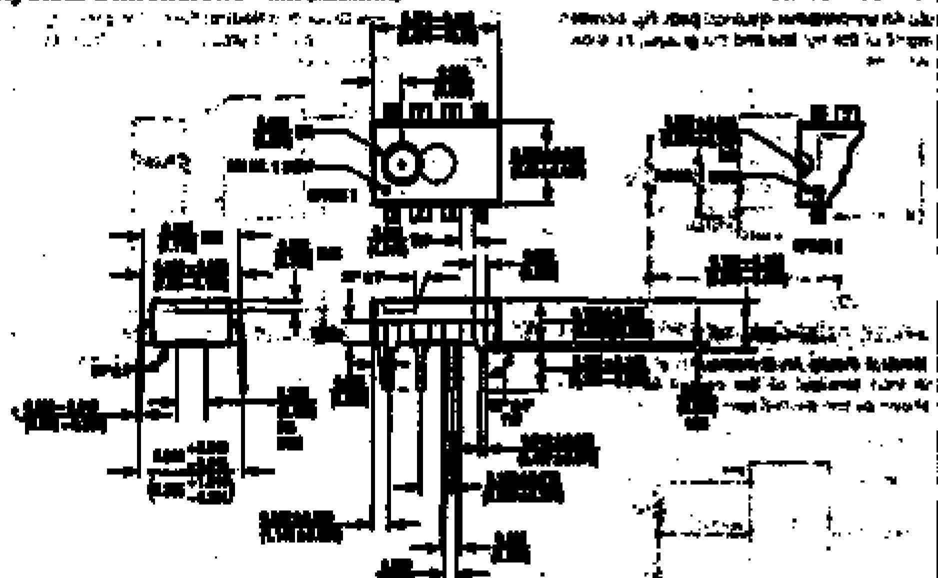
Normal Fault: An unintentional electrical path, R_N, between the load terminal of the hot line and the ground, as shown by the dashed lines.

Grounded Neutral Fault: An unintentional electrical path between the load terminal of the neutral line and the ground, as shown by the dashed lines.



Normal Fault plus Grounded Neutral Fault: The combination of the normal fault and the grounded neutral fault, as shown by the dashed lines.

Physical Dimensions inches (millimeters)



Molded Dual-In-Line Package (N)
Order Number LM1851N
NS Package Number [illegible]

LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

National Semiconductor Corporation [illegible]

National Semiconductor Europe [illegible]

National Semiconductor Hong Kong Ltd. [illegible]

National Semiconductor Japan Ltd. [illegible]

[illegible]

3713 2121

ODI RESUME

INVESTIGATION: EA99-006 DATE OPENED:11-MAR-99
SUBJECT: Under Hood Fires
PROMPTED BY: PE98-055
PRINCIPAL INVESTIGATOR. John Abbott

MANUFACTURER. Ford Motor Co. (Ford)
MODELS: Lincoln Town Car
MODEL YEARS:1992 and 1993
POPULATION: 222,500

PROBLEM DESCRIPTION: Engine compartment fires on the driver's side in the area of the left front wheel well and the brake master cylinder.

FAILURE REPORT SUMMARY

	ODI	MANUFACTURER	TOTAL
COMPLAINTS:	47	64	111
CRASHES:	0	0	0
INJ CRASHES.	0	0	0
# INJURIES:	0	0	0
FAT CRASHES:	0	0	0
# FATALS:	0	0	0
OTHER:	7	13	20

DESCRIPTION OF OTHER: 20 of the reports indicate some level of fire damage to the vehicle owner's carport, garage or home.

ACTION: Open Engineering Analysis

INVESTIGATOR: _____ DIV CHF: _____ OFC DIR: _____

3/6/99 3/11/99 3/11/99
DATE DATE DATE

SUMMARY: The Office of Defects Investigation has received 47 reports indicating the vehicles caught on fire while parked and the engines not running. The reports that contain specific information generally indicate the area of fire origin to be on the driver's side in an area between the left front wheel and the brake master cylinder (see photograph on page 2). In the PE response, Ford provided 64 additional reports that could be relevant to this investigation.

This investigation has been upgraded for further study

(CONTINUED)

3/15/99

3713 2123

Ford Motor Company
Environmental and
Safety Engineering

330 Town Center Drive
Dearborn, Michigan 48126

3M EMT™ 9165 TRANSMISSION
TELEPHONE: (313) 594-2266

AUTOMOTIVE SAFETY OFFICE
PRODUCTION VEHICLE SAFETY
AND COMPLIANCE
FAIRLANE PLAZA SOUTH, Suite 600
DEARBORN, MI 48126

DATE: 99-MAR-15

TIME: 945 AM

Please deliver to: JOE NEME
FRED PORTER

Name: TOM MASTERS

Organization:

Room # and Building:

Telephone:

FAX: 06902
04145
77158

Number of Sheets being Transmitted (including this one): 1

Special instructions/Notes:

PE 98-055 HAS BEEN UPGRADED TO AN
ENGINEERING ANALYSIS EA99-006

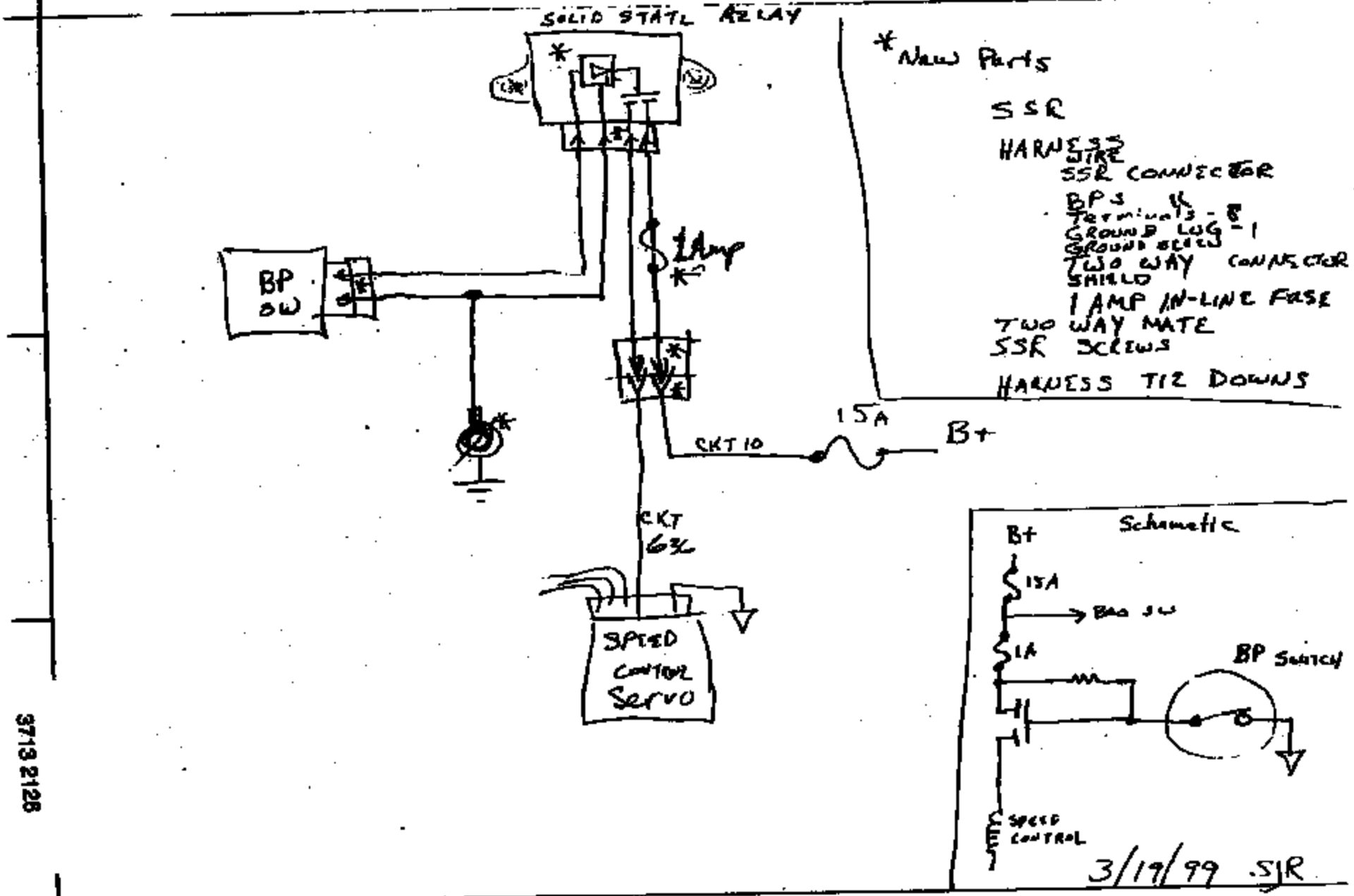
Transmission sent by (Name/Telephone):

WILLIAM M. ABRAMCZYK
x 23284

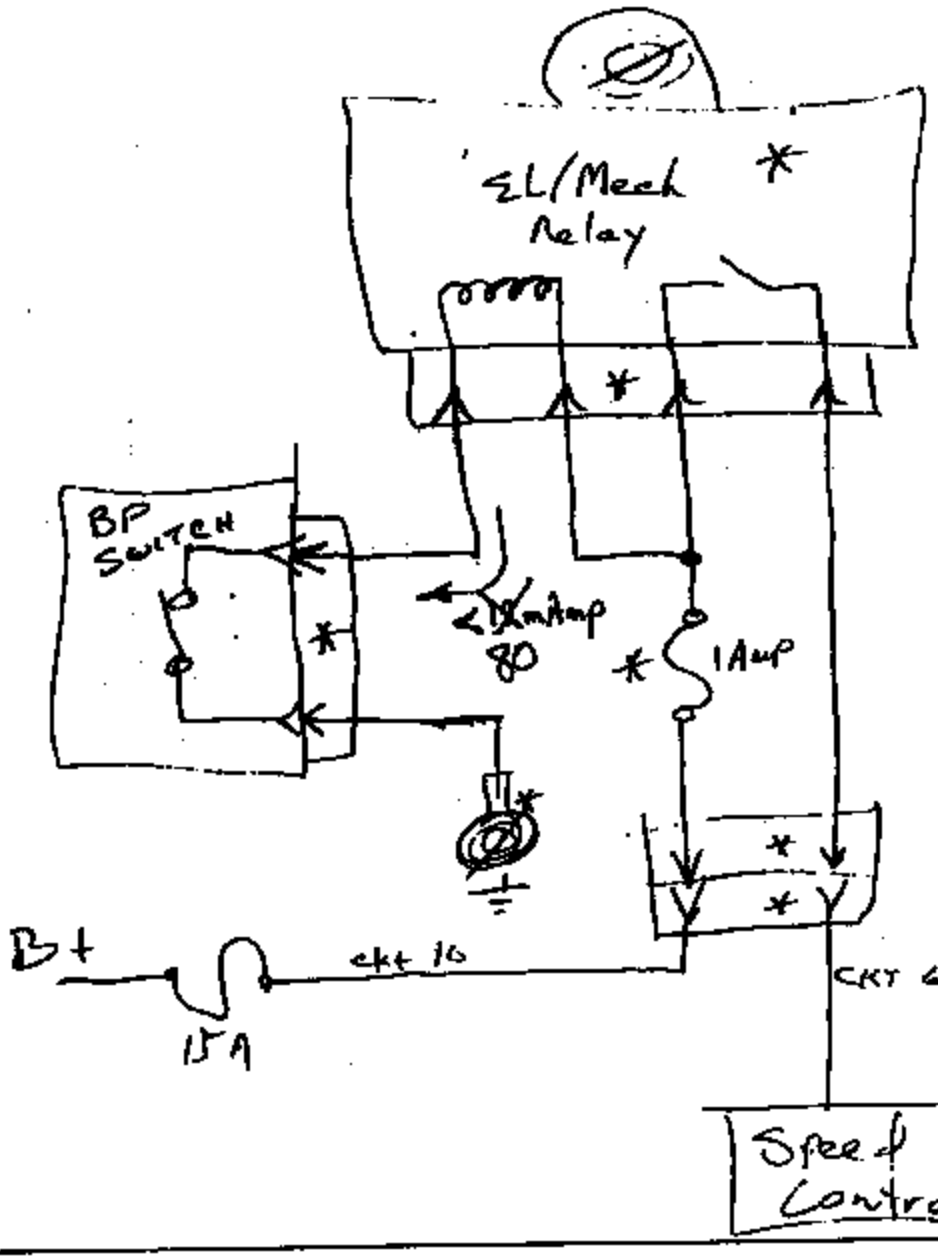
3713 2124

[redacted]

3713 2125


SOLID STATE RELAY
BP SW
1 Amp
CKT 10
15A
B+
CKT 63
SPEED CONTROL SERVO
*New Parts
SSR
HARNESS WIRE
SSR CONNECTOR
BPS Terminals - 8
GROUND LUG - 1
GROUND SCREW
TWO WAY CONNECTOR SHIELD
1 AMP IN-LINE FUSE
TWO WAY MATE
SSR SCREWS
HARNESS TIE DOWNS
Schematic
B+
15A
BRK SW
1A
BP SWITCH
SPEED CONTROL
3/19/99 SJR

3713 2128



*New Parts

EL/Mech Relay

HARNESS

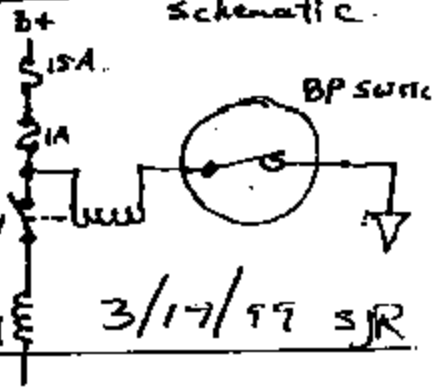
- RELAY CONNECTOR
- BF CONNECTOR
- [illegible] LUG
- IN-LINE FUSE
- Two WAY
- Terminals X 8
- Wire
- Shield

Two Way mate

SCREWS x 2

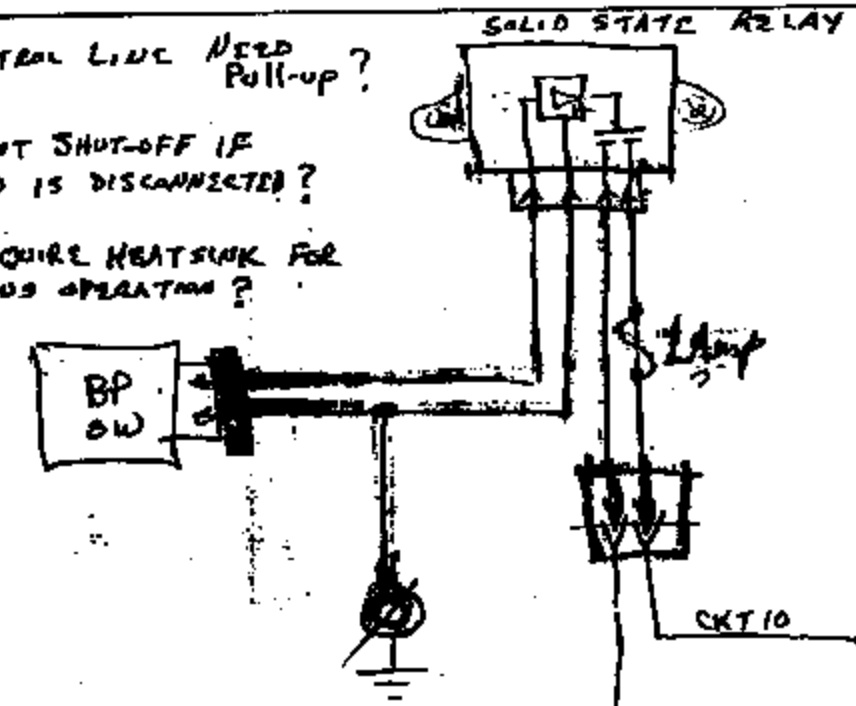
TIE DOWNS

Schematic



3/17/99 SJR

3719 2127



DOES CONTROL LINE NEED Pull-up?

DOES OUTPUT SHUT-OFF IF GROUND IS DISCONNECTED?

DOES IT REQUIRE HEATSINK FOR CONTINUOUS OPERATION?

DOES NOT DETECT GROUND SHORT, MALFUNCTIONS FOR LEAKAGE > ____ Ω

FUNCTIONS FOR LEAKAGE ACROSS TERMINALS > ____ Ω

FUNCTIONS WITH CONTACT RESISTANCE < ____ Ω

LIMITS BP SWITCH CURRENT TO ____ MA

New Parts:

SSR

HARNESS
- WIRE
- SSR CONNECTOR
- BPS Terminals - 8
- GROUND LUG - 1
- GROUND SCREW
- TWO WAY CONNECTOR SHIELD
- 1 AMP IN-LINE FUSE
- TWO WAY MATE
- SSR SCREWS
- HARNESS TIE DOWNS

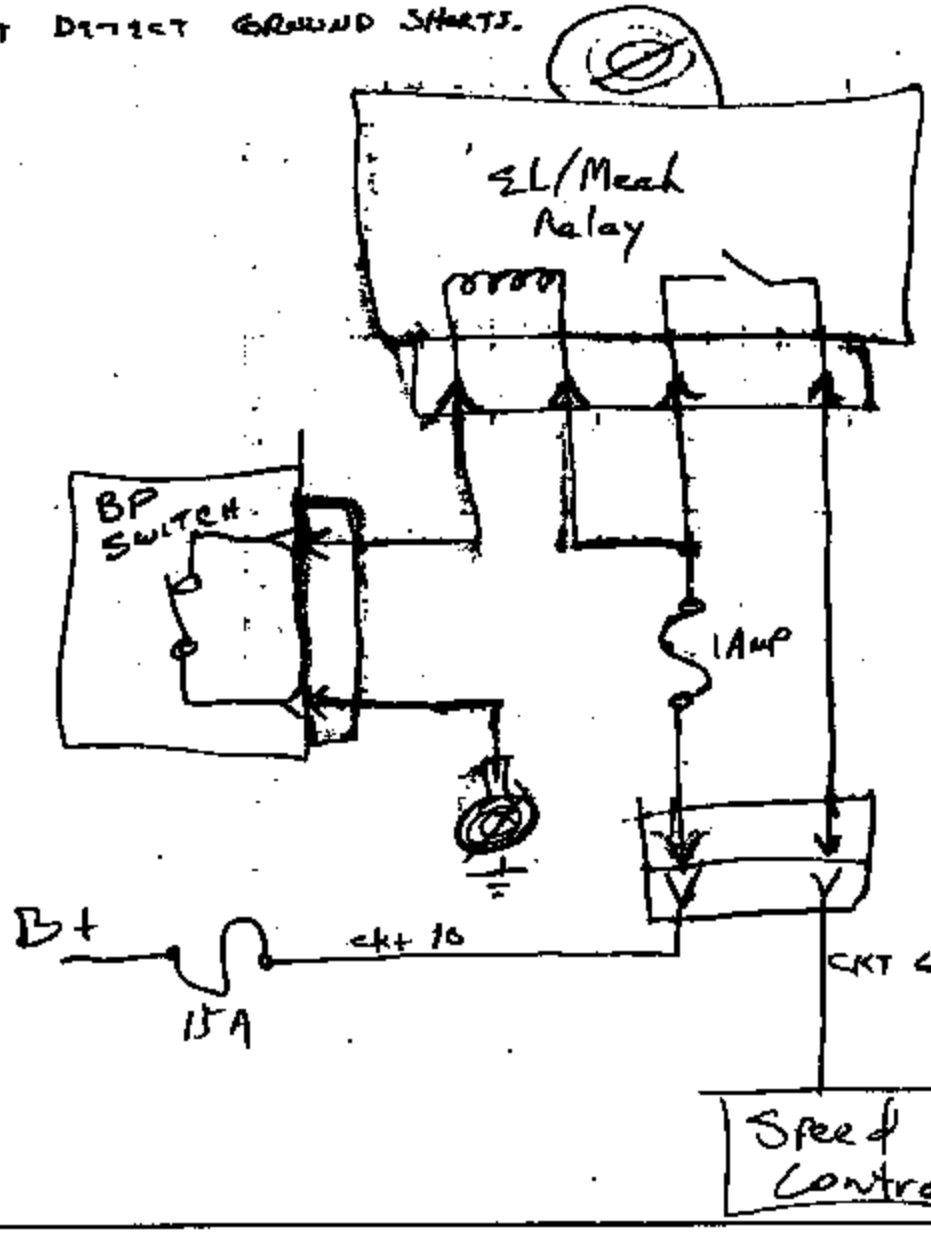
John Hayden 29577 Iso Relays

Tawanda Allen 51680

SSR Bill Gardener 25876 2 G023

3713 2128

DOES NOT DETECT GROUND SHORTS.



New Parts

EL/Mech Relay

HARNESS

- RELAY CONNECTOR
- BP CONNECTOR
- GROUND LUG
- IN-LINE FUSE
- TWO WAY
- Terminals X 8
- Wire
- Shield

TWO Way mate

SCREWS x 2

TIE DOWNS

3/19/99

3/19/99

RELAY SWITCH - Requirements

MUST

- Operate in underhood environment
- Operate continuous (Normally energized when battery is connected, turns off when brake is applied.)
- Low control current draw (< 10 mA?)
- Operate on Battery voltage
- ONE Normal-Open Circuit
- Switch Battery Voltage to Inductive load.
  typ: 0.5 amps 0.8 amps @ -40°
  inductance 53-112 mH
  flyback clamped thru 82 ohms

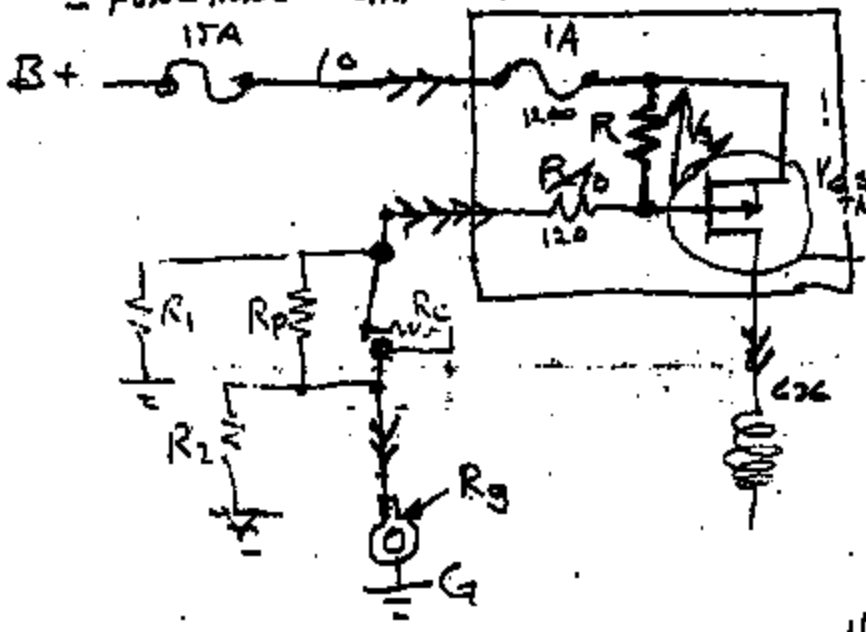
WANT

- Opens circuit when ≥ 1 amp.
- ~~Control current < 5 mA~~
- FORD QUALIFIED part
- Stand-alone mount
- AVAILABLE IN LARGE QUANTITIES (500K in 30 days)

3713 2130

= MEASUREMENTS FOR LEAKAGE < 6000Ω 1/5

- NO GROUND SHORT DETECTION
- FUNCTIONS WITH LEAKAGE ACROSS CONTACTS > 60
- FUNCTIONS WITH CONTACT RESISTANCE < 600Ω



$$\text{Current Limit} = B+ \Big/ \left(R + \frac{R}{10} + \frac{R_1 \| (R_c \| R_p + R_g)}{R_c + R_g}\right)$$

$$\text{MAX} = B+ \Big/ R + \frac{R}{10}$$

SW ON: $A < V_s = B_{+G} - B_{+G} \dfrac{\left(\frac{R}{10} + R_c \| R_p \| R_1\right)}{R + \frac{R}{10} + R_p \| R_c \| R_1}$

$$\frac{A}{B} < \frac{V_s}{B} = 1 - \frac{\frac{R}{10} + R_c \| R_p \| R_1}{R + \frac{R}{10} + R_c \| R_p \| R_1}$$

$$\frac{A}{B_+} < \frac{R}{R + \frac{R}{10} + (R_c \| R_p + R_2 \| R_g) \| R_1}$$

$\epsilon = R_c \| R_p \|$

$$\frac{A}{B} < \frac{R}{R + \frac{R}{10}} = \frac{1}{1.1} = 0.91$$

$$\frac{R}{R + \frac{R}{10} + \epsilon} = \frac{1}{1.1 + \frac{\epsilon}{R}} > \frac{A}{B}$$

$\frac{\epsilon}{R} < \frac{B}{A}$

$\epsilon < \left(\frac{B}{A}\right.$

$1.1 + \frac{\epsilon}{R} < \frac{B}{A}$

3/20/99 SK

$$\epsilon < \left[\frac{B}{A} - \left(1 + \frac{1}{K}\right)\right] R$$

$R_L = 120\Omega$
$R_{.10} = 120$

$k = 10$ for $\frac{R}{\frac{R}{10}}$

V_t	R_C	R_p	R_1	R_g	V_g	B_t
4	3.3mA 2.8Ω	OPEN	OPEN	0	0	14
4	"	OPEN	28Ω	"	0	0
4	"	OPEN	OPEN	28Ω	0	0
4	3.3mA	OPEN	57Ω	57Ω	0	0
4	3.3mA	0	OPEN	OPEN	28Ω	0
4	3.3mA	0	"	"	1	9.6V
#12.7	10.5	.01	10M	10M	.1	0
4	3.3					4.4
2	1.7mA	7100				14
2		.01	7100			
2		.01	14100	14100		
2			10M	10M	1	11.8V

3/20/94

3713 2132

Conclusions

$R_L = 1200$ $R_{10} = 120$

When the contacts are closed
The switch will appear open when

V_T	B	V_g	Ret R_g
4	14	0	> 2882
4	14	2	> 2280
4	14	-2	> 3481
4	16	0	> 3481
4	12	0	> 2280
@ $V_T = 2$	12	0	> 5886
@ $V_T = 6$	12	0	> 1079
6	12	2	> 679
2	16	-2	> 9497
2	14	2	> 5886
2	14	0	> 7089
2	16	0	> 8293

$R_c + R_a$ will exceed these when an ~~open~~ switch contact opens or an open circuit fault occurs or contact corrosion becomes severe.

3/20/99

3713 2133

Conclusion (cont'd) $R_L = 1200$ $R_{10} = 120$

Switch will appear closed when switch contacts are open and $R_1 = 1200$ $R_{10} = 120$

V_T	B	V_g	$R_1 // (R_p + R_2 // R_g)$	i_{leak}
4	14	0	< 2882	> 3.3 mA
4	14	2	< 2280	
4	14	−2	< 3480	
4	16	0	< 3480	
4	12	0	< 2280	
2	12	0	< 5886	> 1.7 mA
6	12	0	< 1079	> 5 mA
6	12	2	< 679	"
2	14	2	< 5886	> 1.7 mA

$R_1 // (R_p + R_2 // R_g)$ will go less than these values when a short to ground occurs at R_1 or corrosion/contaminents inside the switch cause R_p to decrease.

3/20/99

3713 2194

~~- To decrease sensitivity to~~

Desire switch to function for as long as possible & not burn.

When malfunctioning, should cause an obvious symptom (not smoke). (ie. Speed control inop.)
= switch open

If leak path is occuring switch function will be ok down to 6000Ω ~~but may be ok down to 600Ω~~ Below 6000 switch may not open when desired without warning.

If corrosion : increases the R_c to above 600Ω the speed Control may not function. Above 9500Ω SC will not function.

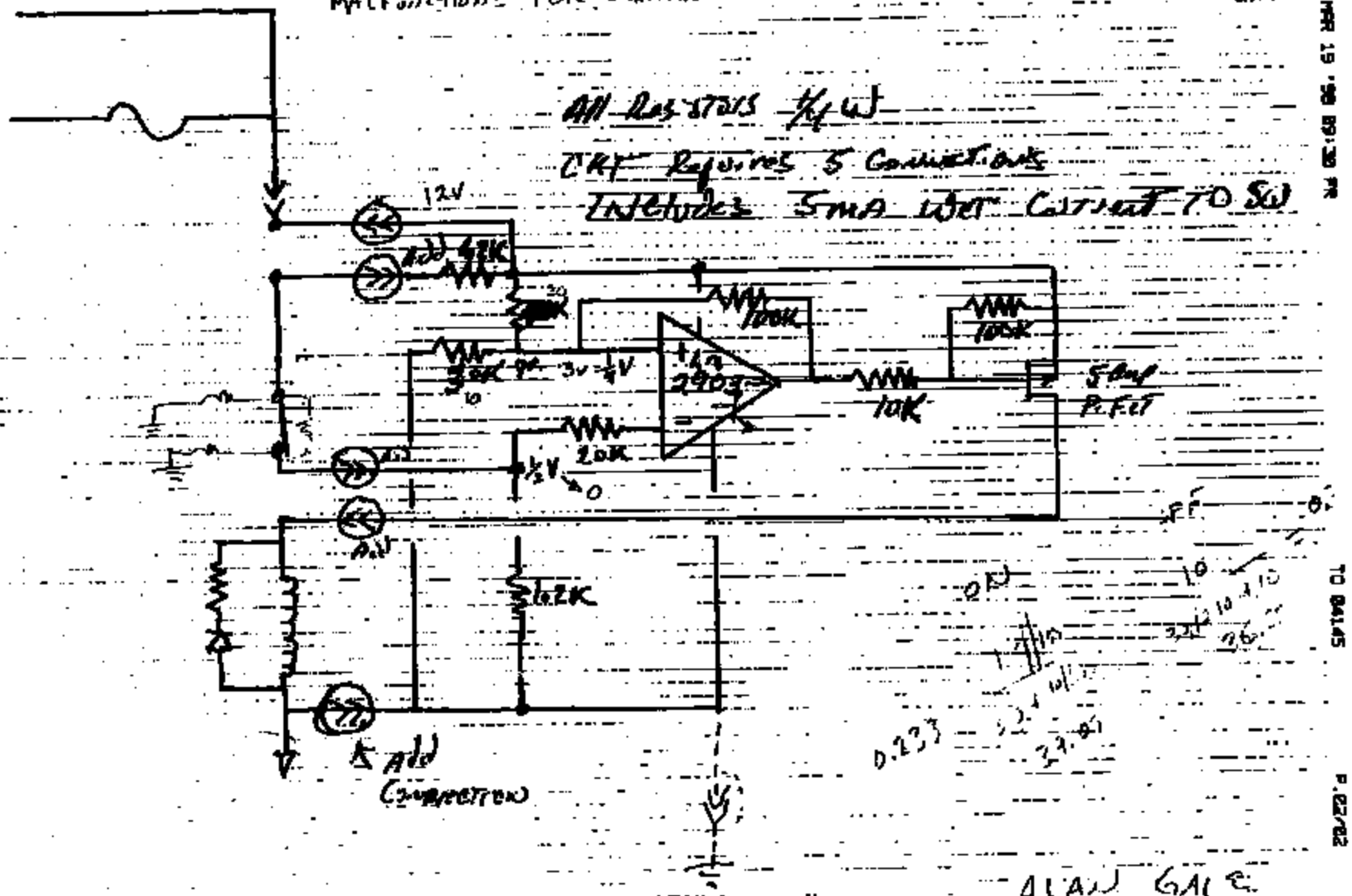
3/20/99

3713 2135

Functions with leakage across contacts >2800Ω

Functions with contact resistance < 1900Ω

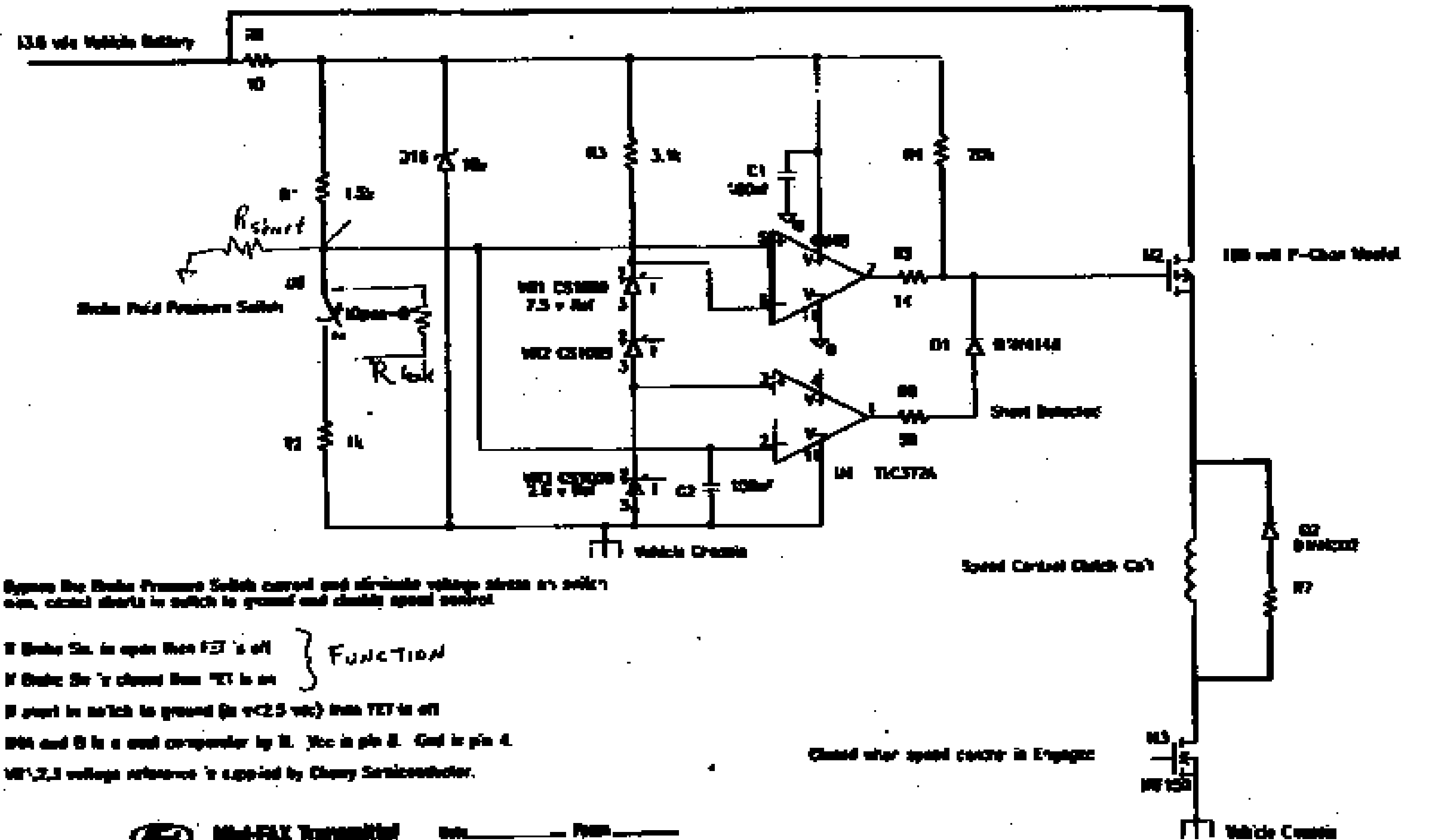
MALFUNCTIONS FOR LEAKAGE ACROSS CONTACTS — < 1900Ω



ALAN GALE

MAR 19 '98 09:38 PM
TO 84145
P.02/02
TOTAL PAGE.02

(A,B,C) {
FUNCTIONS WITH LEAKAGE ACROSS CONTACTS > 900Ω
FUNCTIONS WITH CONTACT RESISTANCE < 900Ω
MALFUNCTIONS WITH LEAKAGE ACROSS CONTACTS < 900Ω



Bypass the Brake Pressure Switch current and eliminate voltage stress on switch open, detect shorts in switch to ground and disable speed control.

If Brake Sw. is open then FET is off
If Brake Sw is closed then FET is on } FUNCTION

If short in switch to ground (ie v<2.5 vdc) then FET is off

U1A and B is a dual comparator by TI. Vcc is pin 8. Gnd is pin 4.

VR1,2,3 voltage reference is supplied by Cherry Semiconductor.

Mini-FAX Transmittal Date ______ Pages ______

To FRED PORTER	From G Flohr
Dept. 5	Dept.
Telephone 53722	Telephone 51022
Fax no. 24145	Fax no.

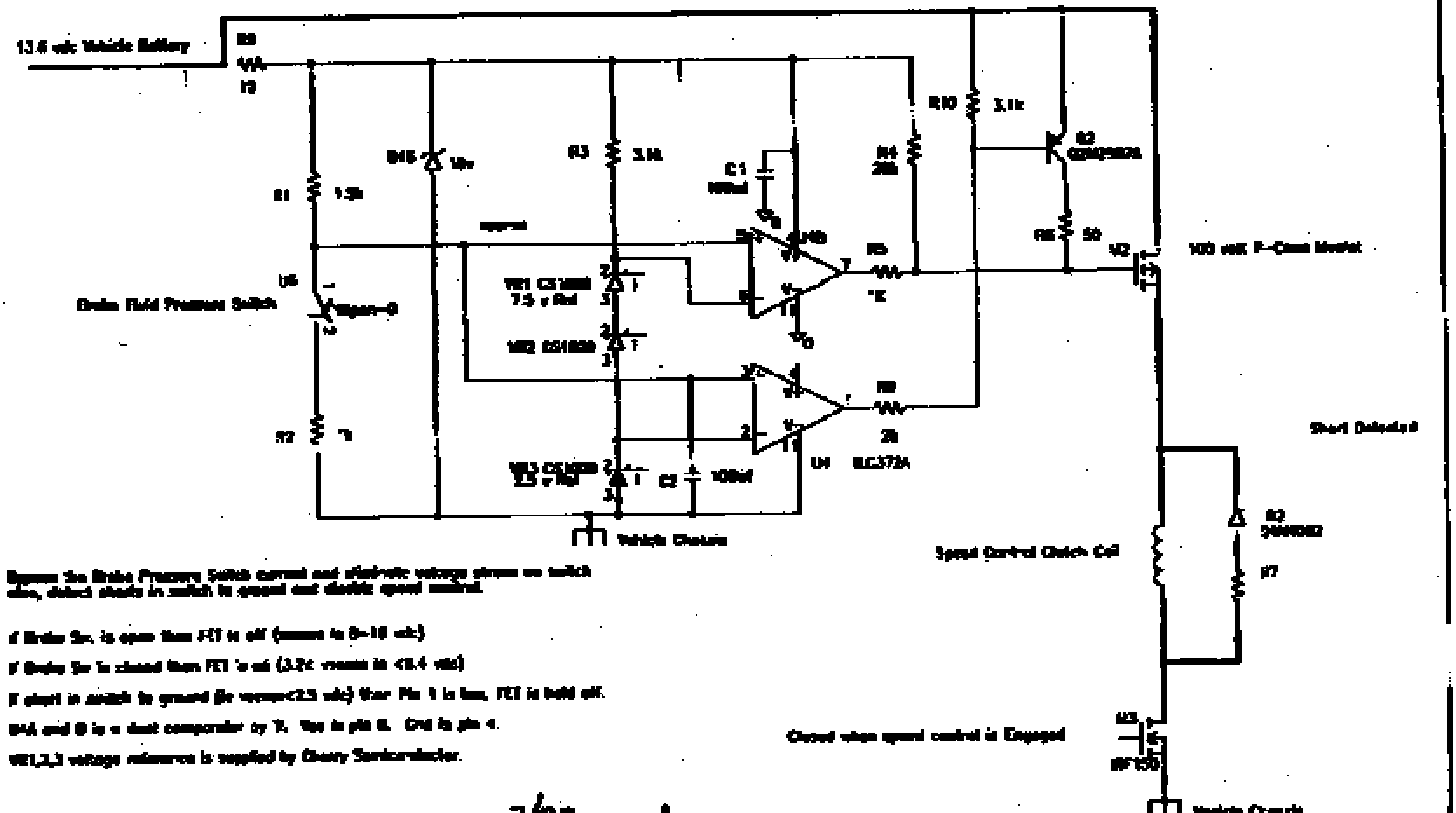
MicroSim Corporation
20 Fairbanks
Irvine, CA 92718
714-770-3022

Page Size: A

Brake Switch Bypass Control
File [illegible]
by Cory R. Flohr

Revision: — March 18, 1999 Page 1 of 1

... < 900Ω
NOR SHORT TO GROUND > 350Ω



Bypass the Brake Pressure Switch current and [illegible] voltage stress on switch [illegible], detect shorts in switch to ground and disable speed control.

If Brake Sw. is open then FET is off (sense is 8-10 vdc)

If Brake Sw is closed then FET is on (3.2< sense is <8.4 vdc)

If short in switch to ground (ie sense<2.5 vdc) then Pin 1 is low, FET is held off.

U1A and B is a dual comparator by TI. Vcc is pin 8. Gnd is pin 4.

VR1,2,3 voltage reference is supplied by Cherry Semiconductor.

Mini-FAX Transmittal — Date 3/22 — Pages 1

To: FRED PORTER — From: G. Flohr
5 — 5R1 — 1625
Telephone: 53722 — Telephone: 51082
04145

[illegible] Corporation
[illegible] Fairbanks
Irvine, CA 92718
714-770-3022

Page Size A

Brake Switch Bypass Control
File [illegible] SCH
by Gary R. [illegible]

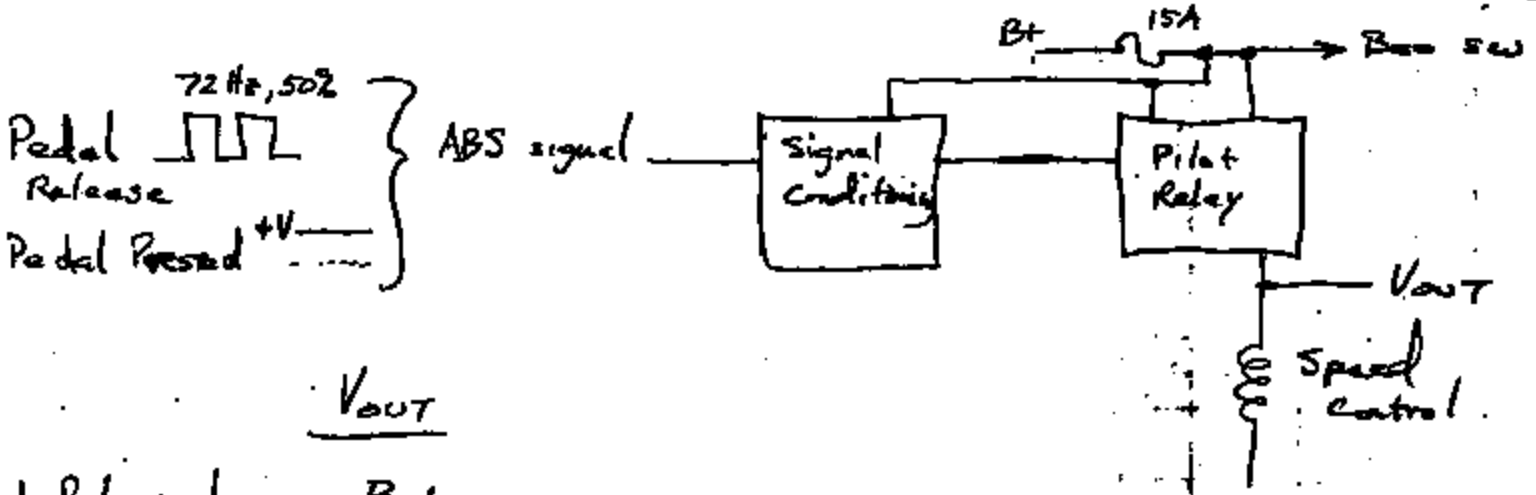
Revision - March 22, 1990 Page 1 of 1

3713 2138

3713 2139

Speed Control 2nd Dedc

USING ABS Pedal Position Switch Signal

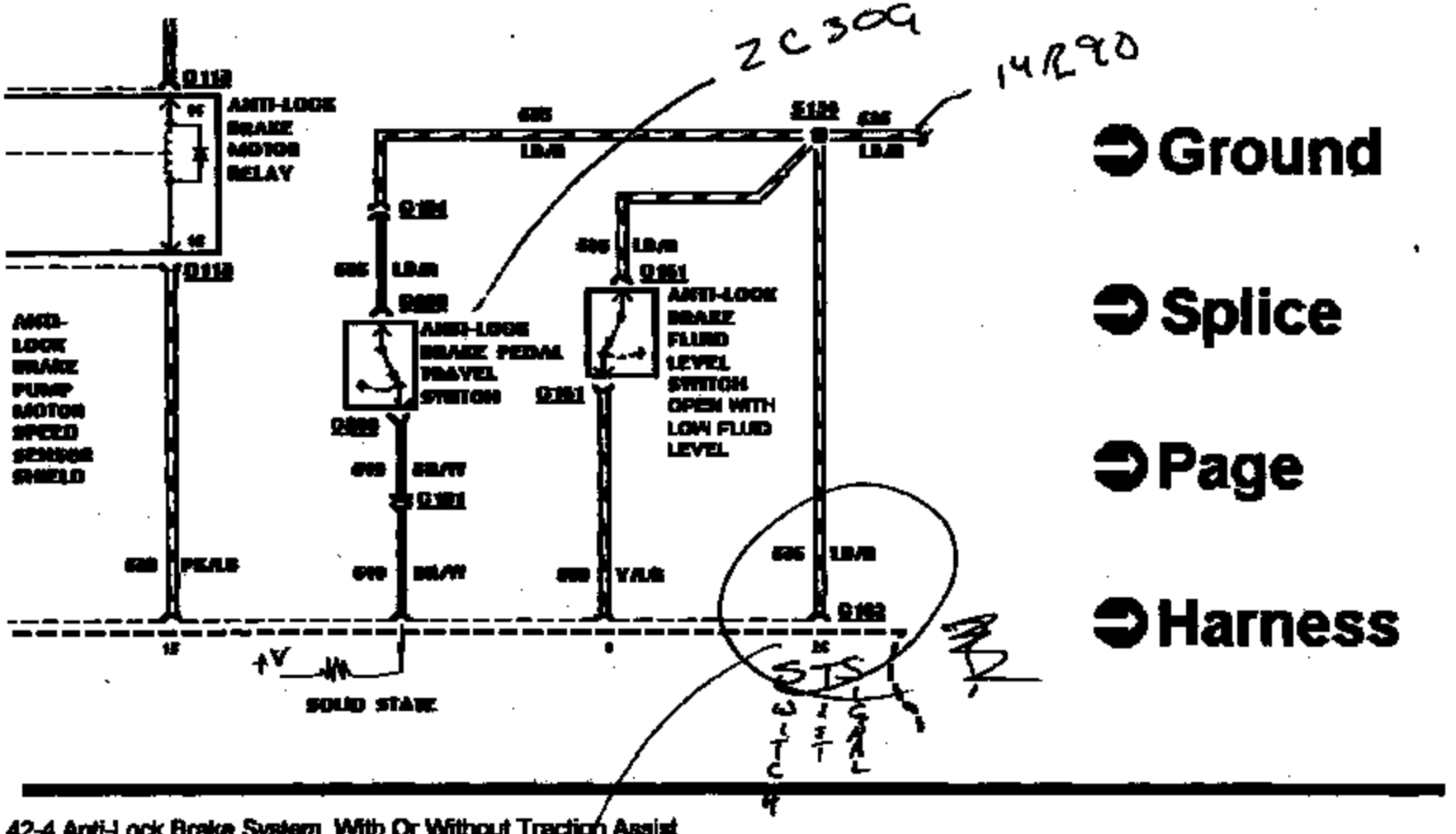


	V_{OUT}
Pedal Released	B+
PEDAL PRESSED	OPEN CKT
15 AMP OPEN	OPEN

3/24/99

3713 2140

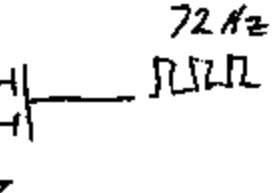
ABS



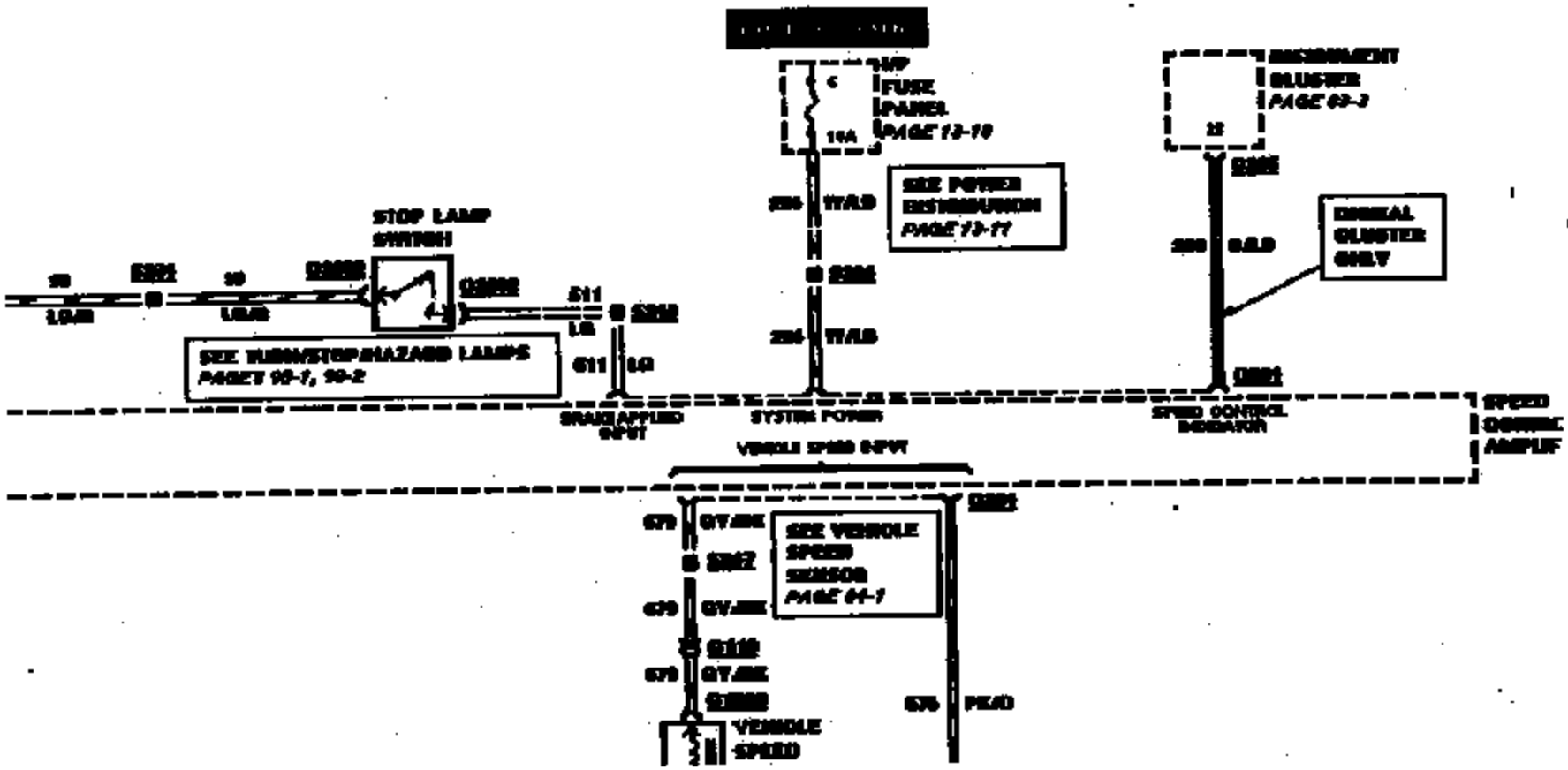
42-4 Anti-Lock Brake System, With Or Without Traction Assist

3713 2141

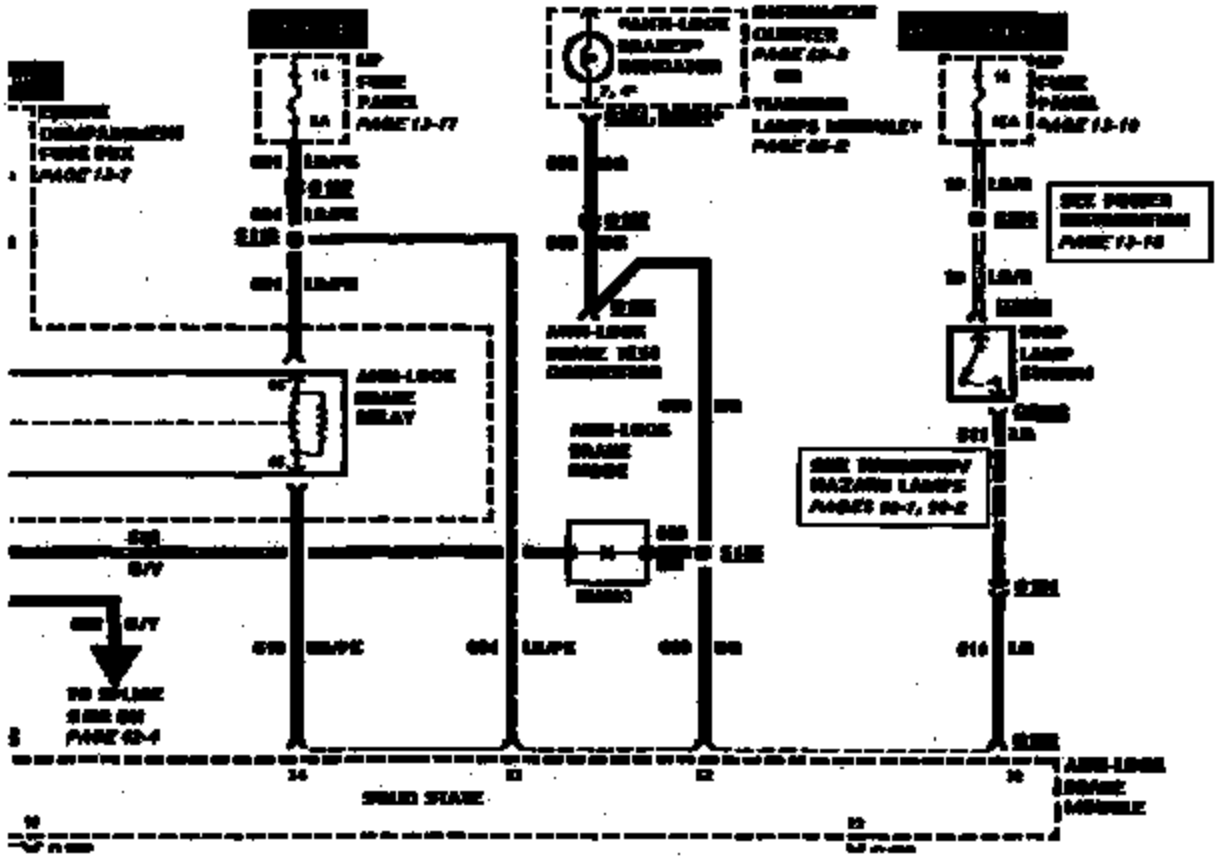
ABS pedal position signal is ~~pulsed~~ square wave at 72 Hz.



CANNOT ROUTE CLUTCH CURRENT THRU THIS SW.



* How The Circuit Works



- Component
- Connector
- Ground
- Splice
- Page

9713 2143

II. PRODUCTION VALIDATION AND IN-PROCESS TESTS (continued)

3. Component Performance Characterization and Functional Requirements

The following requirements shall be met by a random sample of 12 switches at a temperature of 27 ± 3° C (80 ± 10° F) and a square wave input voltage with a peak of 11.5 ± 0.3 volts and a frequency of 75 Hz. unless otherwise specified.

1. Electrical Requirements

a. Current: The switch contacts must accommodate a resistive load of 5.0 milliamperes at 6.2 volts D.C.

C (2) b. Millivolt Drop: The voltage drop across the closed contacts shall not exceed 100 millivolts at a rated load of 5.0 milliamperes at 11.5 volts D.C. initially, during and after durability tests. (This measurement to be taken at the wire harness connector terminals).

(3) c. Open Circuit Resistance: The switch contacts when open shall provide a minimum open circuit resistance of 1.0 megohms.

d. Calibration: The switch shall change status from closed circuit to open circuit and from open circuit to closed circuit within the print specified range before, during and after durability.

2. Mechanical Requirements

a. Operating Force: The force required to operate the switch actuating rod through its complete stroke (as defined on the released drawing) shall not exceed 350 grams at any point during the stroke.

b. Wire Retention: The switch wire harness (two wires) shall withstand a pull force of 110 Newtons (24.2 lbs.) in a direction parallel to the harness exit from the switch housing without wire movement with respect to the housing. Each terminal shall also withstand an axial pull test relative to the wire of 110 Newton (24.2 lbs.) without terminal movement on the wire.

(4) LOCKOUT c. Adjustment: The breakaway force required to adjust the hook on the plunger shall be between 17.8 and 66.7 Newtons (4.0 and 15.0 lbs.). The adjusted hook shall retain its initial setting throughout the entire durability cycle test. The adjustment lockout shall withstand 72.0 Newtons (16.2 lbs.) axial pull force without releasing or breaking and must be capable of relocking with the application of 17.8 to 72.0 Newtons (4.0 to 16.0 lbs.) axial push force.

d. Hook Mounting: The switch hook shall require no more than 44.0 Newtons (9.9 lbs.) force to engage a 6.43/6.38 mm (.254/.249 inch) diameter shaft. The hook shall require a minimum of 11.5 Newtons (2.59 lbs.) force (applied to the hook, not the lift tab) to disengage the hook from the shaft.

(C2) CHARACTERISTICS MARKED ○ ARE FOR INSPECTION AND THE REPORTING DATA. SEE THE CONTROL PLAN

ENGINEERING SPECIFICATION

PART NAME: SPECIFICATION - SW.ASSY-BRAKE ANTI/LK PEDAL POSITION SENSOR

PART NUMBER: ES-F0VB-2C309-AB

LET.	B1	B1	C1	B1	B1	B1	C2	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1
FR.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
LET.	B1	B1	B1	B1	B1	B1	B1	B1	B2									
FR.	19	20	21	22	23	24	25	26	27									

DATE	LET.	FR.	REVISIONS	DR.	CK.
		All	Released ES-F0VB-2C308-AA		[illegible]
881107			Concern: —/N800-N008824-001	[illegible]	[illegible]
		[illegible]	Released ES-F0VB-2C308-AA	[illegible]	[illegible]
			Released ES-F0VB-2C309-AB	[illegible]	[illegible]
	A	24	REVISED FRAME 24	[illegible]	[illegible]
890220			—/N800-E-80367670-000 [illegible]	[illegible]	[illegible]
	B1	[illegible]	REVISED FRAMES 1,4,7,14 THRU [illegible]	[illegible]	[illegible]
	B2	27	REMOVED FRAME 27	[illegible]	[illegible]
890520			—/N800-E-1008[illegible] -000 [illegible]	[illegible]	[illegible]
	C1	3	ADDED NOTE	[illegible]	[illegible]
	C2	9	ADDED NOTE & [illegible]	[illegible]	[illegible]
900126			—/N800-E-10003[illegible] [illegible]	[illegible]	[illegible]

REFERENCE

PREPARED/APPROVED BY: [illegible signature]

CHECKED BY | DETAILED BY

CONCURRENCE/APPROVAL SIGNATURES

PRINCIPAL DESIGN ENGINEER: [illegible signature]

DESIGN ENGINEERING MGT.

PRO MATERIAL ENGINEERING

PRODUCT RELIABILITY ENGRG.: [illegible signature]

MANUFACTURING ENGRG.: [illegible signature]

QUALITY CONTROL ENGRG.: [illegible signature]

PURCHASING: [illegible signature]

NUMBER ES-F0VB-2C309-AB

REV B1

FRAME 1 OF 26

Anti-Lock Brake System (With Or Without Traction Assist)

How The Circuit Works

Anti-lock Brake System
With the Ignition Switch in RUN, current flows through Fuse 18 to the Anti-lock Brake Module and the Anti-lock Brake Relay coil. The Anti-lock Brake Module grounds the relay coil, the coil energizes and the relay contacts change position. Current now flows through Fusible Link Cartridge S and the Anti-lock Brake Relay to the Anti-lock Brake Module, the Anti-lock Brake Motor Relay and the ABS Hydraulic Control Unit.

The Anti-lock Brake Module grounds pin 52 to illuminate the ANTI-LOCK BRAKES indicator until a self-check of the entire Anti-lock System has been completed.

If brake pedal travel reaches approximately 2 inches during an Anti-lock stop, the Anti-lock Brake Pedal Travel Switch contacts open. The Anti-lock Brake Module then grounds pin 15 to energize the Anti-lock Brake Motor Relay coil and close the Relay contacts. Current flows through Fusible Link Cartridge E and the Anti-lock Brake Motor Relay to the pump motor on the ABS Hydraulic Control Unit. The pump motor runs to build up pressure in the brake master cylinder, forcing the brake pedal back up. When the pedal returns enough to close the Anti-lock Brake Pedal Travel Switch contacts, the Anti-lock Brake Module removes ground from pin 15 and the pump motor stops.

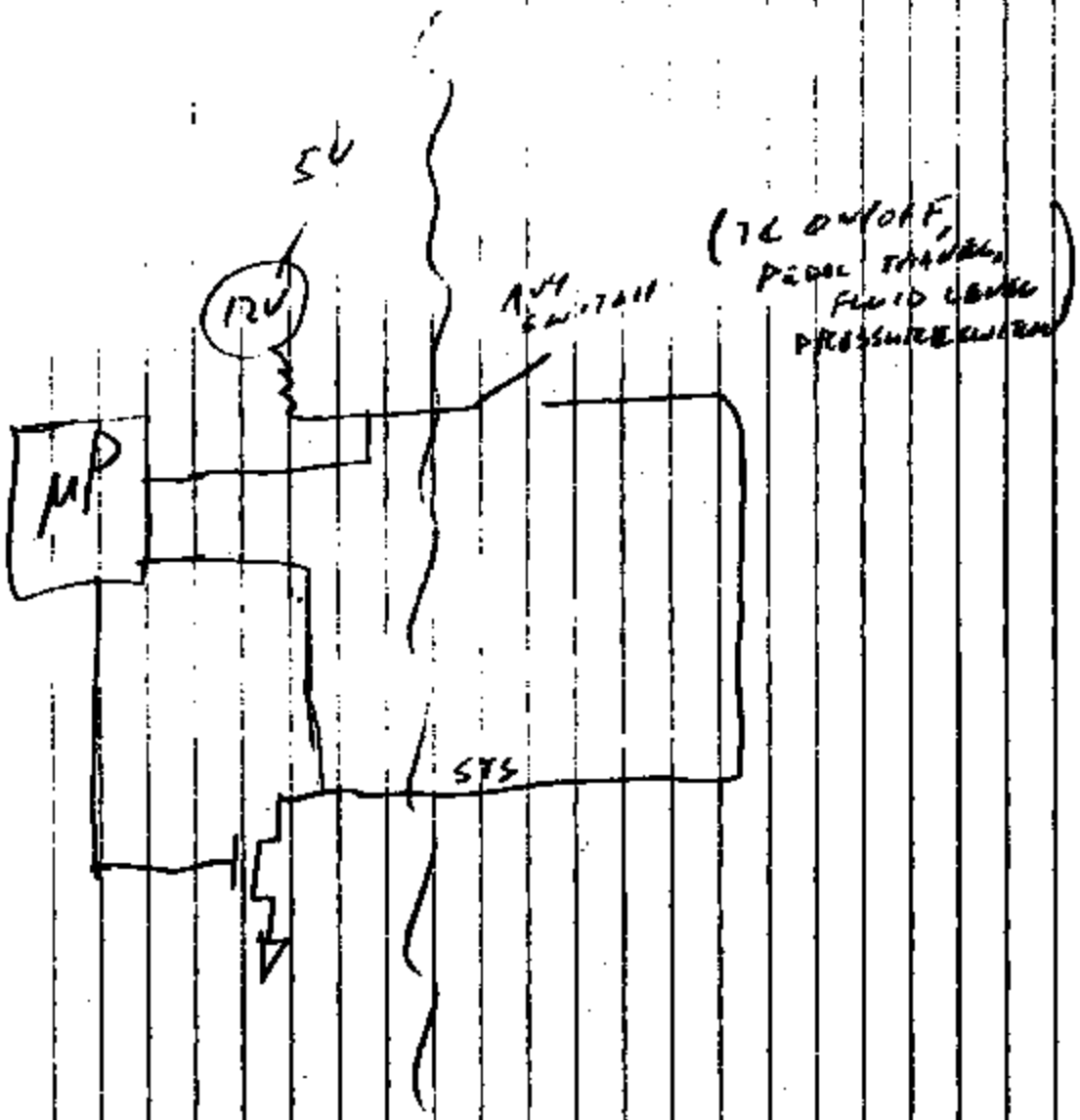
The brake master cylinder fluid reservoir contains a fluid level switch, which opens with fluid level above a predetermined level. If brake fluid level drops too low, the switch contacts close, turning on the red BRAKE warning indicator in the Instrument Cluster. The Anti-lock Brake System is not affected by this condition.

The ABS Hydraulic Control Unit fluid reservoir also contains a fluid level switch, which is closed with fluid level above a predetermined level. If brake fluid level in the reservoir drops too low, the switch contacts open. The Anti-lock Brake Module responds to this input by turning on the amber ANTI-LOCK warning indicator and disabling the anti-lock functions of the brake system.

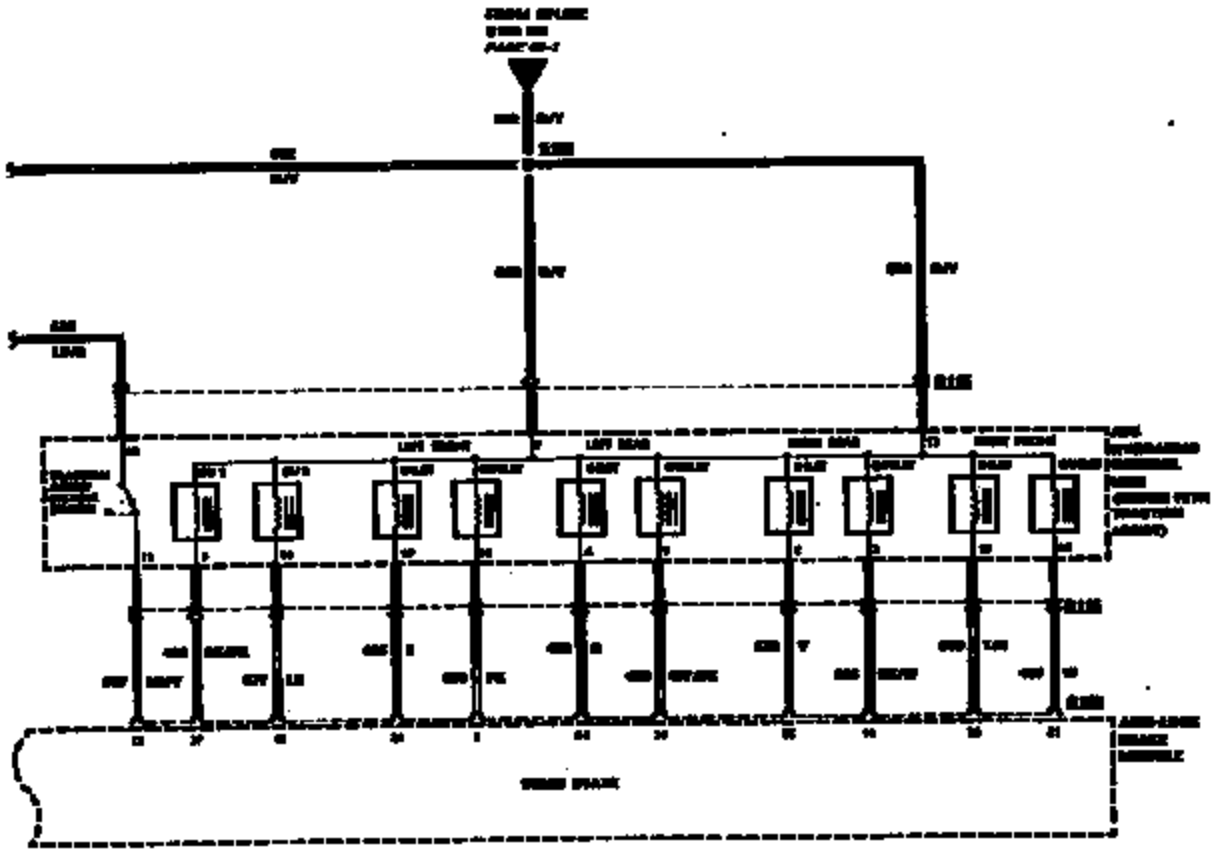
Four individual wheel sensors and toothed sensor rings indicate to the Anti-lock Brake Module the speed of each wheel. Each wheel has a sensor and toothed sensor ring. As the wheel rotates, the teeth on the sensor ring make and break the magnetic field in the wheel sensor, generating a pulsating voltage. The Anti-lock Brake Module monitors these signals and senses impending wheel lockups.

Traction Assist
Vehicles equipped with the Anti-lock Brake System may also be equipped with the Traction Assist System. With this system, the Anti-lock Brake Module detects rear wheel spin and pulses the spinning wheel's brake until traction is reestablished.

REFERENCE : For further diagnostic information, refer to «Section 06-09 » of the Service Manual.


5V
12V
ANY SWITCH
(IL ON/OFF,
PEDAL TRAVEL,
FLUID LEVEL
PRESSURE SWITCH)
μP
STS

8713 2147



- Component
- Connector
- Splice
- Page
- Harness

² How The Circuit Works

[redacted]

Ford Concept	Relocate to Pedal 21	Jumper Switch Out 27	ABS Switch (DeVY) 28	Pilot Relay 14a	Move to NBSC load ground 11a	Break NBSC ground 11b	Insulate from Prop Valve 24	Pins Down 17	On Master Cyl 20	RUN Circuit Power 23	GFI circuit 14b	Negative TC Device 18	In-Line Fuse 22	Boot 25	Drip Loop 26
Effectiveness Rank	1000	1000	1000	270	210	180	32	25	20	12	6	5	6	4	4
Prevents Corrosion	10	10	10	3	3	3	4	5	5	3	1	1	1	4	4
Increases Path from B+ to Ground	10	10	10	10	10	10	8	5	4	1	1	1	1	1	1
Reduces Power in Switch	10	10	10	9	7	6	1	1	1	4	6	5	6	1	1
Factors															
Connector Seal	X	X	X					X	X						
Ingress of corrosion causes ground path															
Kapton Seal	X	X	X												
Ingress of corrosion causes ground path															
Continuous Power															
To ground circuit	X	X	X	X	X	X	X			X	X	X	X		
To Load circuit	X	X	X	X	X	X				X	X	X	X		
Switch Orientation															
Internal path to ground	X	X	X	X			X	X							
Susceptibility to fluid ingress	X	X	X					X						X	X
Terminals have seal to ground	X	X	X	X			X	X							
Current Capability	X	X	X	X	X	X	X				X		X		
Grounded Hexport	X	X	X	X			X								
Plastic Pressure															
Hot Wire Ignition	X	X	X												
Cyclic Acid	X	X	X												

3713 2150

Texas Inst Concept	Thermal ... 8	Coat Arm 11	Coat Cup 1	Non-Conductive cup 2	Diaphragm btwn cup & arm 3	Insulator btwn Cup & arm 4	Thermal Link 9	Potting 13	Teflon Diaph 5	Sliding Seal 6	Connector Topology 7	4th Layer kapton 15	Gold Plate arm 12	Polarity 10	Nitrogen 14
Effectiveness Rank	64	24	24	24	24	8	8	7	6	6	6	5	4	3	1
Prevents Corrosion	8	4	3	3	3	1	1	7	6	6	6	5	4	1	1
Increase Path from B+ to Ground	8	6	8	8	8	8	1	1	1	1	1	1	1	3	1
Reduce Power to Switch	1	1	1	1	1	1	8	1	1	1	1	1	1	1	1
Factors															
Connector Seal		X						X					X		
Ingress of corrosives causes ground path															
Kapton Seal	X	X			X				X	X	X	X	X		
Ingress of corrosives causes ground path															
Continuous Power															
To ground circuit	X	X	X	X	X	X	X							X	
To Load circuit	X						X								
Switch Orientation															
Adjacent path to ground		X	X	X	X	X									
Susceptibility to field ingress		X													
Terminals from cell to ground			X	X	X										
Current Capability							X								
Grounded Header		X	X	X	X	X								X	
Plastic Failures															
Hot Wire Ignition							X								X
Oxalic Acid															X

[illegible]

3713 2151

Ford
Concept

Concept	21 Relocate to Pedal (1a)	27 [illegible] (struck through; "NC / FAIL / SAFE")	26 ABS Switch (DPDT) (1b)	18a Pilot Relay (2) + DRIP LOOP + [illegible] + [illegible]	16a Move to MGSC load ground	16b Break MGSC ground (struck through)	24 Insulate from Prop Valve (3) + DRIP LOOP + IN-LINE FUSE	17 Pins Down	29 On Master Cyl	25 RUN Circuit Power	18b Off circuit	19 Negative TID Device	22 In-Line Fuse	35 Seal	36 Drip Loop (4) NORYL
Effectiveness Rank	1000	1000	1000	270	210	180	32	35	25	12	8	8	5	4	4
Prevents Corrosion	10	10	10	3	3	3	4	5	5	3	1	1	1	4	4
Increase Path from B+ to Ground	10	10	10	10	10	10	8	5	5	1	1	1	1	1	1
Reduce Power to Switch	10	10	10	9	7	6	1	1	1	4	8	8	5	1	1
Factors															
Connector Seal Ingress of corrosives causes ground path	X	X	X					X	X						
Kapton Seal Ingress of corrosives causes ground path	X	X	X												
Continuous Power															
To ground circuit	X	X	X	X	X	X	X			X	X	X	X		
To Load circuit	X	X	X	X	X	X				X	X	X	X		
Switch Orientation															
Internal path to ground	X	X	X	X			X	X							
Susceptibility to fluid ingress	X	X	X					X						X	X
Terminals from wall to ground	X	X	X	X			X	X							
Current Capability	X	X	X	X	X	X	X				X		X		
Grounded Hexport	X	X	X	X			X								
Plastic Failures															
Hot Wire Ignition	X	X	X												
Glycol Acid	X	X	X												

WITH ANY FIX THAT LEAVES BRAKE PRESSURE SWITCH CONNECTED ALSO ADD POLARITY CHANGE + DRIP LOOP + NORYL.

ADD Col. - New failure modes introduced
Ease of implementation
Speed of implementation

FMEA of Re-work Process

MMARDE

3713 2152

Texas Inst Concept	a Transistor	11 Gate Arm	1 Gate Cup	2 Non-Conductive cup	3 Diaphragm bonn cup & arm	4 Insulator bonn Cup & arm	9 Thermal Link	13 Potting	5 Teflon Diaph	6 Mating Seal	7 Connector Topology	15 4th Layer Isolon	12 Gold Plate arm	10 Polarity	14 Navy
Effectiveness Rank	84	24	84	84	84	8	6	7	6	5	5	5	4	3	1
Prevents Corrosion	0	4	3	3	3	1	1	7	5	5	5	5	4	1	1
Increase Path from B+ to Ground	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
Reduces Power in Switch	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1
Design															
Connector Seal Ingress of corrosive causes ground path		X						X					X		
Kapton Seal Ingress of corrosive causes ground path	X	X			X				X	X	X	X	X		
Continuous Power To ground circuit To load circuit	X X	X	X	X	X	X	X X							X	
Switch Orientation Direct path to ground Susceptibility to fluid ingress Terminals face coil to ground		X X	X	X	X	X									
Current Capability							X								
Grounded Heatport		X	X	X	X	X								X	
Plastic Pervious Hot Wire Ignition Oxylic Acid							X								X X

[redacted]

3713 2154

CONCERN DETAIL

PRINT DATE/TIME: 99/05/10 10:01
PAGE: 1

CONCERN NUMBER: C10971850

ORIGIN ACTIVITY: AE00 AVT CORE (ELECTRICAL
ORIGINATOR: KAFATI, JOE W.
DATE: 99/05/06
PHONE: 313-39-05389

P NGT AUTH: I
STATUS: A

CONCERN DESC: 92/93 MODEL YEAR SERVICE ACTION ON TOWN CAR AND CROWN VIC/
GRAND MARQUIS. THIS CONCERN IS FOR A SERVICE KIT THAT WILL
DESCRIPTION: INCLUDE A BPS (F2VC-9F924-AB) AND CONNECTOR (F5VB-14A464-AA)
SOLUTION:
PRODUCTS AFFECTED: WIRE HARNESSES AND BRAKE PRESSURE SWITCH.
MODEL CODES: ORIG
MCC:
ECC:

LOCAL: N
LOCATION: BLDG#2, 23C38
FIX FOR: N

MODEL YEAR: 99
MCC MODEL YEAR: 99
MCC:
ECC: HV01

PLANTS AFFECTED: HA22 HQ17
PRIMARY ENG ACTY: HB00
BUILD EVENT:
CPSC:
PSO:
REQUIRED BY:
SUPPORTING DOCUMENTS:
AUTHORIZED DATE: 00/00/00

OTHER ENG ACTY: AE00 HB00 HC00
CONDITION CODES:
PACK:
PRIORITY CODES: 3
CONCURRED DATE: 00/00/00

CONCUR:
CAUSAL FACTORS:
%:
NOTICE NO:
OVERALL AGE DATE:
REJECTED DATE: 00/00/00

ORIGINATOR'S ESTIMATES:

VEHICLE COST:
WARRANTY COST:
TOW:
TOOLING COST:
VEH WGT:
ASSEMBLY MIN:
ASSEMBLY LABOR:
UNIT OF MEASURE:
FACILITY COST:
E/1000:

AFFECTED PARTS

ASY PART NO:
CPSC:
SUPPLY/LOCAL:
ASY PART DESC:
NOTICE:
DAMAGE AVAIL:

FURTHER DESCRIPTION/CONCERN RESOLUTION/REASON FOR REJECTION ETC.

DESCRIPTION: 92/93 MODEL YEAR SERVICE ACTION ON TOWN CAR AND CROWN VIC/
GRAND MARQUIS. THIS CONCERN IS FOR A SERVICE KIT THAT WILL
INCLUDE A BPS (F2VC-9F924-AB) AND CONNECTOR (F5VB-14A464-AA)
OTA, CAN YOU PLEASE PROVIDE TIMING OF THIS CONNECTOR. WE ARE LOOKING FOR
ROUGHLY ABOUT 150,000 OF THE F5VB 14A464 AA. THIS HAS URGENCY. CHARLES,
LET ME KNOW IF THIS CONNECTOR HAS THE NEW SILICONE FACE SEAL. ALSO, I
THINK THAT THE OUTER SILICONE SEAL IS FOR THIN WAL, NOT SURE BUT, COULD
THIS APPLICATION BE USED FOR STANDARD WAL THICKNESS.
KAFATI, JOE W. 313-39-05389 H AVTH JHK0063 AE00 99/05/06
THIS IS FOR TOWN CARS BUILT FROM 11/4/91 THRU 11/30/92 (123,318 VEHICLES)
AND CROWN VIC / GRAND MARQUIS BUILT FROM 2/5/92 THRU 11/30/92
(155,335 VEHICLES).
HEINERS, STEVE 313-390-3286 H AVTH SJH0292 AE00 99/05/06
TO MIKE PETTIGREW FOR FEL45 REVIEW.
PACINSKI, SHERR 810-344-5150 H X6700 SPACINSR HV1A 99/05/07

(CONTINUED)

-MORE-

9718 2155

CONCERN DETAIL

PRINT DATE/TIME: 99/05/10 10:01
PAGE: 2

CONCERN NUMBER
C10971850

ORIGIN ACTIVITY: AE80 AVT CORE (ELECTRICAL
ORIGINATOR: KAPATI, JOE W.
DATE: 99/05/06
PHONE: 313-39-05389
P MGT AUTH: I
STATUS: A

----------FURTHER DESCRIPTION/CONCERN RESOLUTION/REASON FOR REJECTION ETC.----------

DESCRIPTION: WITH ORDERING CONNECTOR F5VB-14A464-AA WE ALSO NEED TO INCLUDE THE WEDGE
THAT LOCKS IN THE TERMINALS. THE WEDGE PART NUMBER IS E9EB-14A468-DA.
I SPOKE WITH BILL TUTTLE FROM UTA AND HE SAID THAT AT UTA CAN PRODUCE
25,000 CONNECTORS PER DAY. RIGHT NOW THEY HAVE 26,000 PARTS AVAILABLE
WITH AN ADDITIONAL 9000 ON SHELF READY TO SHIP. THEY CAN PRODUCE 25K PER
DAY AND IN ROUGHLY TEN DAYS THEY WILL HAVE 380,000 CONNECTORS.
KAPATI, JOE W. 313-39-05389 M AVTE JWK0453 AE80 99/05/07
SHERRY PACZESKI, APPROVED 99-07 SERVICE, -0- COSTS/WT, FOR 91/93 SERVICE PARTS.
PETERSON,MIKE- 248-34-45040 M EE840 MLP0421 EE00 99/05/08
FN145 APPROVED FOR 99-07 SERVICE ONLY, -0- COSTS/WT FOR 91/93 SERVICE PARTS.
PACZESKI, SHERR 810-344-5150 M E6700 SPACZESK NV1A 99/05/10
JOE KAPATI, NEED WORKSHEET AND PARTS SCREEN COMPLETED BEFORE I CAN TAKE THIS
CONCERN TO APPROVED STATUS.
PACZESKI, SHERR 810-344-5150 M E6700 SPACZESK NV1A 99/05/10
JACK NOELANDR, FN145 HAS APPROVED, WHAT IS EE114'S STATUS?
PACZESKI, SHERR 810-344-5150 M E6700 SPACZESK NV1A 99/05/10

----------RESOLUTION OF CONCERN----------

ACTIVITY: AE00
AGE DATE: 99/05/10
REMARKS:
MODEL CODES:
NOTICE:
EFFECTIVE IN:
RESPONSE CODE:
MODULE LEADER NAME: ELECTRICAL PMT LEADER

SCHEDULED DATES- APPROVED:
COMPLETE:
DISTRIBUTED:
INCORPORATED:

ACTUAL DATES- APPROVED:
COMPLETE:
DISTRIBUTED:
INCORPORATED:
REJECTED:

LISTING OF CALIBRATION NUMBER:

LISTING OF EFFECTIVE TYPE/POINT:

LISTING OF PROGRAM ID/SEGMENT:

----------MANUFACTURING ACTIVITIES AFFECTED----------
MFG ACTY: REQUEST: PRAS: LEAD:
ASSEMBLY COST: FAC COST:
VEH COST:
VEH WGT:
TOOLING COST:
UNIT OF MEASURE:

ACTIVITY: EE00
AGE DATE: 99/05/10
REMARKS:
RESPONSE CODE:
MODULE LEADER NAME: BODY PMO

-MORE-

3713 2158

CONCERN DETAIL

PRINT DATE/TIME: 99/05/10 10:01
PAGE: 3

CONCERN NUMBER
C10971850

ORIGIN ACTIVITY: AE00 AVT CORE (ELECTRICAL
ORIGINATOR: KAPATI, JOE W.
DATE: 99/05/06
PHONE: 313-59-05389
P NOT NOTE: I
STATUS: A

RESOLUTION OF CONCERN

ACTIVITY: XE00
RESPONSE CODE:
MODEL CODES:
NOTICE:
EFFECTIVE IN:

SCHEDULED DATES- APPROVED:
COMPLETE:
DISTRIBUTED:
INCORPORATED:

ACTUAL DATES- APPROVED:
COMPLETE:
DISTRIBUTED:
INCORPORATED:
REJECTED:

LISTING OF CALIBRATION NUMBER:

LISTING OF EFFECTIVE TYPE/POINT:

LISTING OF PROGRAM ID/SEGMENT:

**********MANUFACTURING ACTIVITIES AFFECTED**********
MFG ACTY: REQUEST: FREQ: LEAD: VEH COST: TOOLING COST:
ASSEMBLY COST: FAC COST: VEH WGT: UNIT OF MEASURE:

****

ACTIVITY: MC00
RESPONSE CODE:
AGE DATE: 99/05/10
MODULE LEADER NAME: CHASSIS PRO
REMARKS:
MODEL CODES:
NOTICE:
EFFECTIVE IN:

SCHEDULED DATES- APPROVED:
COMPLETE:
DISTRIBUTED:
INCORPORATED:

ACTUAL DATES- APPROVED:
COMPLETE:
DISTRIBUTED:
INCORPORATED:
REJECTED:

LISTING OF CALIBRATION NUMBER:

LISTING OF EFFECTIVE TYPE/POINT:

LISTING OF PROGRAM ID/SEGMENT:

**********MANUFACTURING ACTIVITIES AFFECTED**********
MFG ACTY: REQUEST: FREQ: LEAD: VEH COST: TOOLING COST:
ASSEMBLY COST: FAC COST: VEH WGT: UNIT OF MEASURE:

3713 2157

-MORE-

CONCERN DETAIL

PRINT DATE/TIME: 99/05/10 10:01
PAGE: 4

CONCERN NUMBER: C10971050

ORIGIN ACTIVITY: AE00 AVT CORE (ELECTRICAL
ORIGINATOR: KAFATI, JON W.
DATE: 99/05/06
PHONE: 313-39-05389
P MGT AUTH: I
STATUS: A

PROPOSED RESOLUTION

ACTIVITY	DATE	RESOLUTION

APPROVALS

REGION	DEPARTMENT	USERID	ACTIVITY	APPROVER'S NAME	DATE APPROVED	APPROVAL	STATUS
N	AVTE	JWK0053	AE00	KAFATI, JON W.	99/05/06		N
N	AVTE	SJR8293	AE00	REIMERS, STEVE	99/05/06	R	
N	AVTE	FJP9196	AE00	PORTER, FRED	99/05/07	R	
C	7039	UTAFN74	G039	UTA WIRING (FN74) DE	00/00/00		
N	KB654	JSN9001	EC00	[illegible], J.S.	00/00/00		
N	SP971	JCS6647	[illegible]	[illegible], JOHN	00/00/00		
N	AVTE	TMASTERS	AE00	MASTERS, TOM	00/00/00		
N	AVTE	JWK0053	AE00	KAFATI, JON W.	99/05/06		A
N	K5840	MLP0621	[illegible]	PETTERSEN, MIKE-VC RE	99/05/08	Y	
N	K6700	DJA4500	NV1A	[illegible], DONALD J.	00/00/00		
N	K645	GAT1062	EC00	THORNTON, GEORGE	00/00/00		
N	5330	CVC2000	EA63	BAA LINCOLN PROGRAM	00/00/00		
N	VC[illegible]	PKLIMEK	KE00	KLIMEK, PATTY P.	00/00/00		
N	K6700	MLB6471	NV1J	[illegible], MIKE L.	00/00/00		
N	K5840	APT0980	[illegible]	[illegible], [illegible] WIX	00/00/00		
N	K6700	SPACYNSK	NV1A	PACYNSKI, SHERRY	99/05/10	Y	

3713 2168

WERS HARDCOPY PARAMETER RECAP

c.

BASIC PARAMETERS

REQUESTOR: MALHOTRA, ANITA

REQUEST DATE/TIME: 99/06/10 10:01:15

REPORTS REQUESTED FOR: MALHOTRA, ANITA

DESTINATION DEVICE: R0204301

PRINT DATE/TIME: 99/06/10 10:01:15

DATA EXTRACT DATE/TIME: 99/06/10 10:01:14

REPORT OPTIONS

HARD-COPY REQUEST-TYPE: ON-LINE REQUEST(LATEST DATA)

LANGUAGES: ENGLISH

PART DATA RESTRICTIONS:
NONE

SELECTION CRITERIA

NOTICE NUMBER:

PART NUMBER:

PART FUNCTION:

CONCERN NUMBER: C10971850

REPORTS REQUESTED

RELEASE / CONCERN COVER		DESIGN TRANSLATION SHEET	
RELEASE SUMMARY		CONCERN OF ASSEMBLY	SAR ONLY:
RELEASE CHANGE SUMMARY	X	CONCERN DETAIL	
PART FUNCTION RELEASE		ALERT DETAIL	
MULTI-FUNCTION RELEASE			

3713 2159

Service Recall Bulletin

May, 1999

TO: All Ford and Lincoln Mercury Dealers

SUBJECT: Safety Recall 99S15: Certain 1992 and 1993 Crown Victoria, Grand Marquis, and Lincoln Town Cars with Speed Control - Speed Control Deactivation Switch

AFFECTED VEHICLES

Certain 1992 and 1993 Crown Victoria and Grand Marquis with Speed Control built at the St. Thomas assembly plant from February 5, 1992 through November 30, 1992. Also, certain 1992 and 1993 Town Cars built at the Wixom Assembly plant from November 4, 1991 through November 30, 1992.

REASON FOR RECALL

Some Speed Control Deactivation Switches on the affected vehicles may develop a resistive short in the electrical circuit that may potentially result in an underhood fire. A fire is possible both when the vehicle is running and when the vehicle engine is off. Also, the short may disable the speed control system or cause a fuse to open.

SERVICE ACTION

Repair parts will not be available until mid-June, 1999. Until parts are available, the interim repair described in Attachment III should be used. When parts are available the permanent repair must be completed to close this recall.

Interim Repair: This repair should be performed immediately to eliminate the possibility of a fire. This interim repair involves disconnecting the electrical connector from the Speed Control Deactivation Switch, taping the connector end to protect it from contamination and securing the connector with a tie-strap. The speed control system will be inoperative until the permanent repair is performed.

Permanent Repair: The parts for this repair are expected to become available the middle of June, 1999. This repair will involve the replacement of the Speed Control Deactivation Switch with a new switch. In addition, the switch hard-shell connector will be replaced to eliminate the possibility of undetected heat damage to the connector.

Concur: Steve Reimers 5/17/99

To: V

For your approval.

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 10

To Steve Reimers	From Gary Balint
Co.	Co.
Dept.	Phone # 72790
Fax #	Fax # 51024

3713 2150

ATTACHMENTS

Attachment I: Administrative Information
Attachment II: Labor Allowances, Parts Ordering Information, Disposition of Removed Parts
Attachment III: Technical Information

QUESTIONS?

Claims Information: 1-800-423-8651
Other Recall Questions: 1-800-325-5821

Sincerely,

A. R. O'Neill
Director
Vehicle Service and Programs

Safety Recall 96S16
Certain 1992 and 1993 Crown Victoria, Grand Marquis, and Lincoln Town Cars with Speed Control - Speed Control Deactivation Switch

OASIS

You must use OASIS to determine if a vehicle is eligible for this recall.

Please note that the Interim Repair will not remove the VIN from OASIS.

PLEASE NOTE

Correct all vehicles in stock before delivery. Federal law requires dealers to complete any outstanding safety recall service before a new vehicle is delivered to the buyer or lessee. Violation of this requirement by a dealer could result in a civil penalty of up to $1,100 per vehicle.

PROMPTLY CORRECT

Promptly correct affected vehicles on the enclosed list and other eligible vehicles which are brought to your dealership.

DEALER-OWNER CONTACT

Immediately contact any affected owner whose name is not on the list. Give the owner a copy of the Owner Letter and schedule a service date.

REGIONAL CONTACT

Advise regional office if an owner:

- cannot be contacted.
- does not make a service date.

CLAIMS PREPARATION AND SUBMISSION

- Enter claims using DWE.
- Refer to ACES II Manual for claims preparation and submission information.
- After performing the Permanent Repair, the replaced parts must be returned to the Warranty Parts Return Center for inspection (See Attachment II page 2). FCS 700 tags will be sent as soon as the claim is submitted.

OWNER REFUNDS

Ford Motor will only refund for owner-paid repairs made before the date of the Owner Letter (or after the date of the Owner Letter if an emergency repair was made away from the servicing dealer.) Refer to ACES II Manual for Refund information.

Safety Recall 99S15
Certain 1992 and 1993 Crown Victoria, Grand Marquis, and Lincoln Town Cars with Speed Control - Speed Control Deactivation Switch

LABOR ALLOWANCES

Interim Repair

Description	Labor Operation	Labor Time
Remove, Tape and Secure the Speed Control Deactivation Switch *	99S15E*	0.3 Hour
Administrative Allowance	Misc. Expense Code "ADMIN"	0.1 Hour

* Labor Operation 99S15E will NOT close the Recall.

Permanent Repair

Description	Labor Operation	Labor Time
Replace Speed Control Deactivation Switch and Hard-shell Connector	99S15B	0.5 Hour
Administrative Allowance	Misc. Expense Code "ADMIN"	0.1 Hour

PARTS REQUIREMENTS

Parts Ordering Information

Parts will not be direct shipped for this recall. Order your parts requirement through normal order processing channels as noted below:

Stock Orders	Effective immediately	Normal order process
Interim Orders	Effective immediately	Normal order process
Emergency Orders	31 days after launch	Normal order process
Emergency Orders	First 30 days after launch	Call 1-800-325-6621

Part Number	Description	Quantity
XW7Z-9G652-AA	Speed Control Deactivation Switch Kit	1

Safety Recall 99S18
Certain 1992 and 1993 Crown Victoria, Grand Marquis, and Lincoln Town Cars with Speed Control - Speed Control Deactivation Switch

DEALER PRICE

For latest prices, check or call your:

- Order Processing Center
- DOES II
- Updated Price Book

EXCESS STOCK RETURN

Excess stock returned for credit must have been purchased from Ford Customer Service Division in accordance with Policy Procedure Bulletin 4000.

DISPOSITION OF REMOVED PARTS

Parts Return Requested (after completion of Permanent Repair):

We are requesting that the removed parts be returned to Ford Motor Company:

- Speed Control Deactivation Switch
- Switch Hardshell Connector

Packaging and Shipping:

- Speed Control Deactivation Switch
  - Do not drain the brake fluid from inside the Speed Control Deactivation Switch.
  - Use the plastic cap from the new switch to trap and seal as much oil inside the switch as possible.
- Switch Hardshell Connector
  - Connect the hardshell connector to the Speed Control Deactivation Switch.
  - Attach the FCS 700 tag to the part
- Shipping Instructions
  - Follow direction on FCS 700 tag
  - See Section 3 of the ACES II manual for more details

INTERIM REPAIR

DISABLE SPEED CONTROL DEACTIVATION SWITCH

SERVICE PROCEDURE

1. Disconnect the electrical connector from the speed control deactivation switch. See Figure 1.

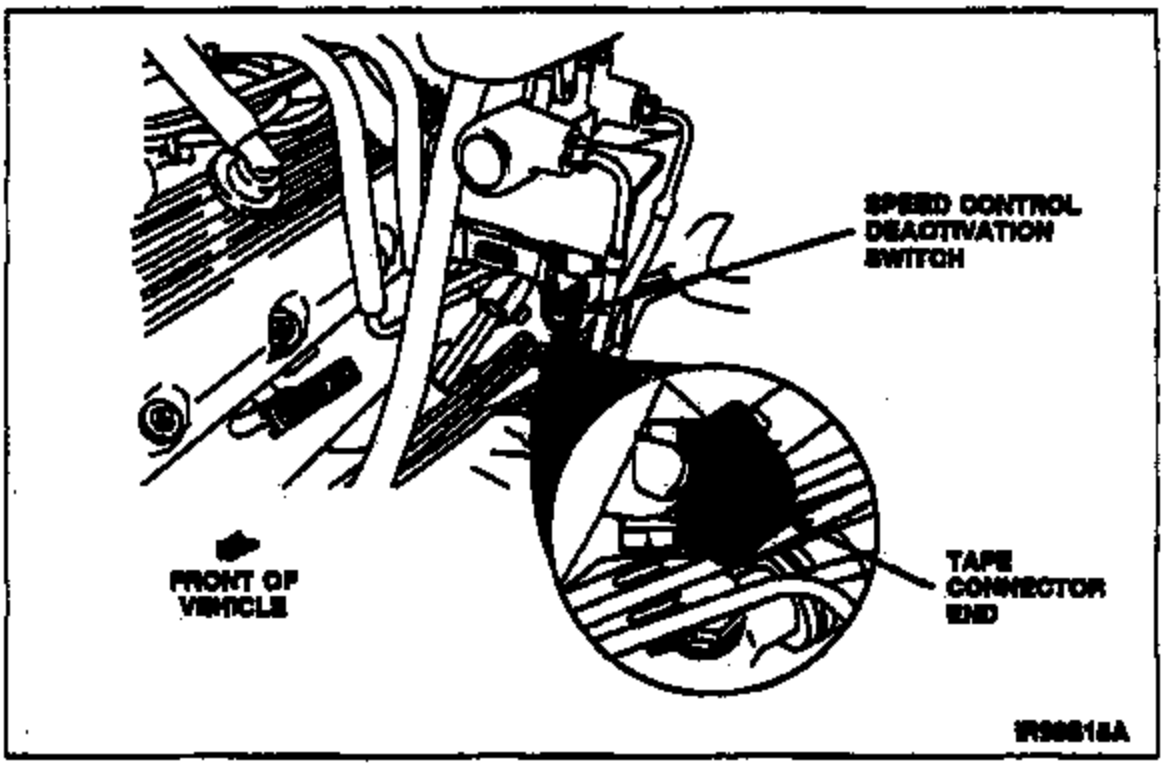


FIGURE 1

2. Tape the end of the connector to prevent contamination from entering the end of the connector.
3. Tie strap the connector to the wiring harness located on the left splash shield.

Concur:
Steve Reimers
5/17/99

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DEARBORN, MICHIGAN 48121
5/98

PERMANENT REPAIR

SPEED CONTROL DEACTIVATION SWITCH AND CONNECTOR REPLACEMENT

AFFECTED VEHICLES: CERTAIN 1992 AND 1999 CROWN VICTORIA, GRAND MARQUIS AND TOWN CAR WITH SPEED CONTROL

OVERVIEW

This repair involves replacement of the speed control deactivation switch and the hard shell of the switch electrical connector. The connector terminals will be removed from the old connector hard shell and inserted into the *new* connector hard shell.

PROCEDURE

1. Install a memory saver and disconnect the negative battery terminal.
2. Disconnect the electrical connector from the speed control deactivation switch. See Figure 2.

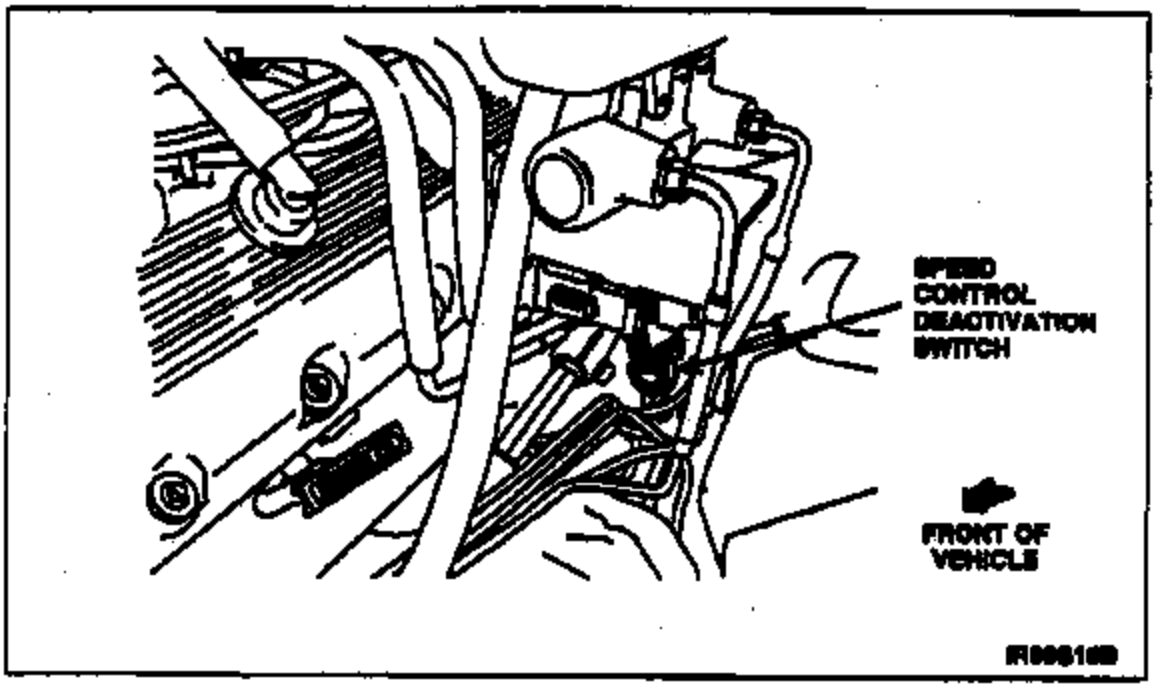


FIGURE 2

Concur: Steve Reimers 5/17/99

CPR © 1999 FORD MOTOR COMPANY
DEARBORN, MICHIGAN 48121

3. Remove the locking wedge from the end of the connector. Then, disengage the locking tabs and remove the wire terminals from the connector. See Figure 3.

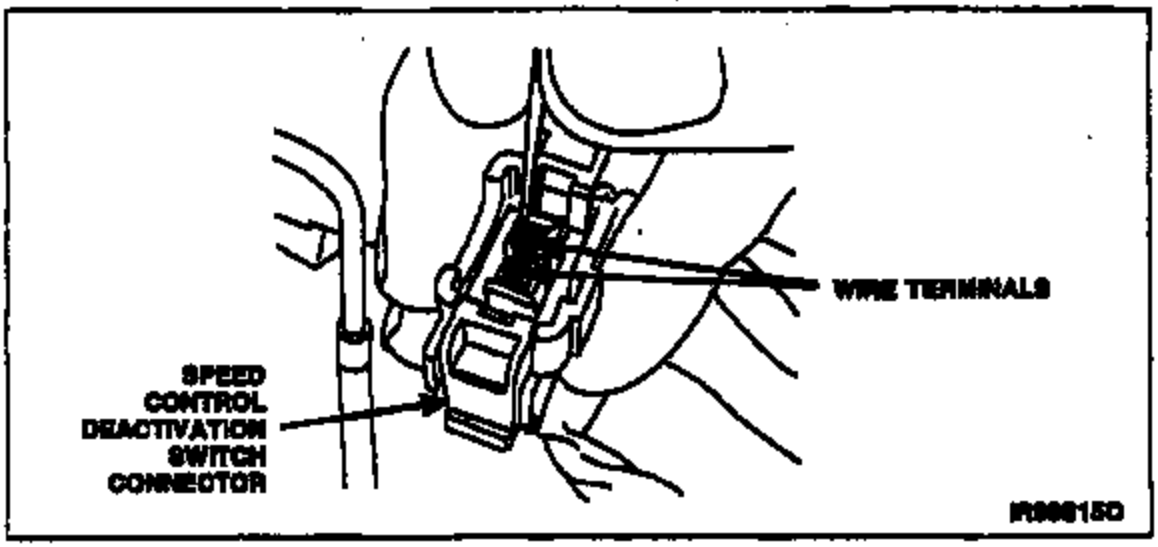


FIGURE 3

4. Obtain the *new* connector from the kit. Insert both wire terminal ends through the connector seal and into the connector hard shell. (The wire terminal ends may be installed into either of the connector cavities).
5. Check the connector to make sure the locking tabs have engaged both terminal ends. Also, make sure the seal is fully seated in the back of the connector. Then, install the red locking wedge to secure the terminals in the connector.
6. Obtain the speed control deactivation switch from the parts kit.
7. Remove the old speed control deactivation switch.
8. Fill the *new* speed control deactivation switch with High Performance DOT 3 Brake Fluid and install the speed control deactivation switch. Tighten the switch to 18 Nm (13 lb-ft).
9. Attach the electrical connector to the speed control deactivation switch.
10. Connect the battery negative cable and remove the memory saver.
11. Raise the vehicle on a hoist.
12. Connect a clear drain tube to the RH rear bleeder screw and the other end in a container partially filled with the recommended brake fluid.
13. Have an assistant pump the brake pedal and then hold firm pressure on the brake pedal.
14. Loosen the RH rear bleeder screw until a stream of brake fluid comes out. While the assistant maintains pressure on the brake pedal, tighten the bleeder screw.
    - Repeat until clear, bubble-free fluid comes out.
    - Refill the brake master cylinder reservoir as necessary.
15. Repeat Steps 12-14 for the LH rear bleeder screw.
16. Lower the vehicle.

Concur: Steve Reimers
5/17/99

[redacted]
OPR © 1999 FORD MOTOR COMPANY
DEARBORN, MICHIGAN 48121
999

RTB

A. R. O'Neill
Director
Vehicle Service and Programs
Ford Customer Service Division

Ford Motor Company
P. O. Box 1904
Dearborn, Michigan 48121

May, 1999

Safety Recall 99S15

Mr. John Sample
123 Main Street
Anywhere, USA 12345

Your Vehicle Identification Number: 12345678901234567

This notice is sent to you in accordance with the requirements of the National Traffic and Motor Vehicle Safety Act.

Ford Motor Company has decided that a defect which relates to motor vehicle safety exists in certain 1992 and 1993 Crown Victoria, Grand Marquis, and Lincoln Town Cars with Speed Control.

SAFETY DEFECT

Some Speed Control Deactivation Switches on the affected vehicles may develop a resistive short in the electrical circuit that may potentially result in an underhood fire. A fire is possible both when the vehicle is running and when the vehicle engine is off. Also, the short may disable the speed control system or cause the brake light fuse to open.

REPAIRS

Repair parts may not be available until mid-June, 1999,. If your dealer is not able to obtain the parts needed for this recall, an Interim Repair can be performed at no charge to you. However a second visit to your dealer will be required at a later date to have the permanent repair performed. We regret this inconvenience, but your safety is our primary concern.

Interim Repair: If parts are not available, the Interim Repair should be performed immediately. This repair involves disconnecting the electrical connector from the Speed Control Deactivation Switch and protecting the connector end from contamination. The Speed Control system will be inoperative until the Permanent Repair is performed.

Permanent Repair: Parts for this repair are expected to become available the middle of June, 1999. This repair will involve the replacement of the Speed Control Deactivation Switch with a new switch. In addition, the switch hard-shell connector will be replaced to eliminate the possibility of undetected heat damage to the connector.

HOW LONG WILL IT TAKE?

The time needed for either of the repairs is less than one-half day. However, due to service scheduling issues, your dealer may need your vehicle for a longer period of time. Please call your dealer for a service date.

Call your dealer without delay. Ask for a service date and whether parts are in stock for Safety Recall 95S15.

If your dealer does not have the parts in stock, they can be ordered before scheduling your service date. If available, parts would be expected to arrive within a week after ordering. If parts are not available, your dealer can perform the Interim Repair free of charge. When parts are available, your dealer will perform the Permanent Repair free of charge.

When you bring your vehicle in, show the dealer this letter. If you misplace this letter, your dealer will still do the work, free of charge.

REFUNDS

If you paid to have this service done before the date of this letter, Ford is offering a full refund. For the refund, please give your paid original receipt to your Ford or Lincoln Mercury dealer. To avoid delays, do not send receipts to Ford Motor Company.

CHANGED ADDRESS OR SOLD THE VEHICLE?

Please fill out the enclosed prepaid postcard and mail it to us if you have changed your address or sold the vehicle.

If the dealer doesn't make the repair promptly and without charge, you may contact the Ford Customer Assistance Center, P. O. Box 6248, Dearborn, Michigan 48121. You also may send a complaint to the Administrator, National Highway Traffic Safety Administration, 400 Seventh Street, S. W., Washington, D. C. 20590 or call the toll free Auto Safety Hotline 1-800-424-9393 (Washington, D. C. area residents may call 366-0123).

We regret the inconvenience this service may cause you, but we want you to have the work done for your safety and satisfaction with your Ford or Lincoln-built vehicle.

Sincerely,

A. R. O'Neill
Director
Vehicle Service and Programs

3713 2170

3713 2171

Percentage of Fires Based On Production Volumes with Engine off/Unknown

	1992 Model Year		
	Production volumes	Number of fires	% fire
Town car	109,120	40	0.04
CV/GM	283,393	*20	0.01
Econoline	155,460	N/A	N/A
F-series	507,105	N/A	N/A

	1993 Model Year		
	Production volumes	Number of fires	% fire
Town car	113,554	7	0.01
CV/GM	183,146	2	0.001
Econoline	188,452	32	0.02
F-series	542,480	55	0.01

	1994 Model Year		
	Production volumes	Number of fires	% fire
Town car	113,028	3	0.003
CV/GM	196,072	15	0.01
Econoline	199,726	34	0.02
F-series	606,672	47	0.01

	1995 Model Year		
	Production volumes	Number of fires	% fire
Town car	107,696	7	0.01
CV/GM	192,591	4	0.002
Econoline	206,696	15	0.01
F-series	686,117	46	0.01

	1996 Model Year		
	Production volumes	Number of fires	% fires
Town car	90,784	5	0.01
CV/GM	203,307	12	0.01
Econoline	155,336	N/A	N/A
F-series	493,543	N/A	N/A

	1997 Model Year		
	Production volumes	Number of fires	% fire
Town car	104,977	1	0.001
CV/GM	251,796	7	0.003
Econoline	195,185	N/A	N/A
F-series	341,930	N/A	N/A

*** Note:**
Of the 20 1992 CV/GM, there are 6 vehicles equipped with ABS. Of the 1992 CV/GM without ABS there are 3 that are identified as the brake pressure switch as the probable cause.

Originator: JKafati
File: volumes2
Date issued: 4/12/99
Date revised: 4/9/99

THIS PAGE ACCOUNTS FOR PAGE(S) REMOVED FOR CONFIDENTIAL FILE.
DOCUMENTS CONTAINED IN FILE ROOM.

BOX 3713 PAGE(S) 2173-2175 DATE 10-20-99.

Note printed by WABRAMCZ on 5 Jan 1999 at 13:01:21

From: FPORTER --DRBN007
To: WABRAMCZ--DRBN005
RENGLISH--DRBN005
DGOEL --DRBN005
KGRIBBLE--DRBN005
SLAROUCH--FORDNAI
JNEME --DRBN005
GSTEVEN1--DRBN006
EWELFER3--DRBN006

Date and time 12/18/98 17:04:06
BEGEN --DRBN007
JEVANS8 --DRBN005
JGREGOIR--DRBN005
NLAPOINT--DRBN005
JMCINERN--DRBN005
RMEVI --DRBN005
CTHOMAS5--DRBN005

FROM: F. J. Porter USAST(UTC -05:00)
Subject: 97924 Update (19981218)

1992-1993 Town Car F2VC-97924-A Brake Pressure Switch Investigation

TEAM:

AVT EESE Chassis Electronics:	Fred Porter	x84-53722	fporter
AVT Chassis Engineering:	Joe Evans	x32-23832	jevans8
	Barry Egen	x32-39512	begen
AVT EESE EOS:	Rob English	x33-72225	renglish
AVT Design Analysis:	Norm LaPointe	x89-42686	nlapoint
AVT EESE OPE:	Jim Gregoire	x33-79962	jgregoir
EESE Prod. Veh. Safety:	William Abramczyk	x32-22284	wabramcz
	Ray Mevi	x59-47688	rmevi
Large Luxury VC Safety:	John McInerney	x32-20276	jmcinern
	Joe Neme	x39-08133	jneme
AVT Materials Engineering:	Greg Stevens	x32-36486	gsteven1
	Ken Gribble	x32-28618	kgribble
	Clark Thomas	x59-41313	cthomas5
Central Lab Services:	Steve LaRouche	x84-54876	slarouch

INFORMATION:

NHTSA letter: PE98-058

Vehicles identified: 21 initially identified.
20 additional vehicles reported since publication of the investigation.

Warranty: A total of 89 warranty claims are identified in AWS on the F2VY-97924-A for 1992 and 1993 Town Cars.

Two CQIS reports (WJIAA133 & VUUAA122) mention underhood fire in connection with the brake pressure switch.
WJIAA133 occurred at 51,500 miles.
VUUAA122 occurred at 56,602 miles.

Supplier: The pressure switch was manufactured by Texas Instruments. The switch was purchased in assembly with the brake proportioning valve bought from Surfaces.

Contacts: Surfaces - Mike Thomas (248)543-6520 [KELTEK Industries]
TI - Rob Sharp (248)305-5729

TI - Russ Baumann (508)236-3314
TI - Charlie Douglas (508)236-3687

Function: The brake pressure switch is a redundant switch for turning off the speed control function.

X-Rays: Taken by Steve LaRoucha, Norm LaPointe & Clark Thomas on 12/17/1998. Original photographs and part are in Steve LaRoucha's possession.

ON-GOING ACTIVITY:

2 service parts have been ordered from Fairlane Ford for X-ray and other testing by Central Lab Services.

Meeting with representatives of TI is planned for 12/22/1998 to discuss intended operation of the switch. The meeting will be at the Central Laboratory Conference room off of the lobby.

QUESTIONS: (in no particular order)

1) What is the normal current in the brake pressure switch?

2) Was cruise control standard on Town Car in 1992 and 1993?

3) Under what circumstances is brake fluid flammable?

According to Clark Thomas & Mary Kaga, brake fluid is flammable approximately 300 degrees F.

4) What is the repair history for vehicles that have exhibited a probl
Repair history for the two CQIS vehicles are being gathered by F
Porter.

5) What other vehicles use this brake pressure switch? What are their electrical configurations?

MODEL YEAR	92	93	94	95	96	97	98
Town Car	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	
Crown Vic	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	
Grand Marquis	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	
Econoline	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Club Wagon	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
F-Series		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Bronco		XXXX	XXXX	XXXX	XXXX		
Taurus SHO		XXXX	XXXX	----			
Capri			XXXX	XXXX	----		
Windstar			XXXX	XXXX	XXXX	XXXX	XXXX
Falcon				XXXX	XXXX	XXXX	XXXX
Explorer					----	XXXX	XXXX
Ranger					----	XXXX	XXXX
Expedition						XXXX	XXXX
Navigator							XXXX

XXXX = used in model year
---- = may have been used in model year

6) Is this switch still in use? If not, why not? If so, what design cha[illegible] have been implemented since 1992/1993?

Charlie Douglas of TI is investigating the design changes that may have been implemented on the brake pressure switch beginning in 1993.

7) What fault codes are stored if the brake pressure switch fails?

Regards,

Fred Porter OV - fporter fporter@ford.com
Chassis E/E Systems Applications (313)845-3722
Bldg 6 - Mail Drop 5030 - Cubicle 3E004 fax: 390-4145

Note printed by WABRAMCZ on 5 Jun 1998 at 13:03:21

From: FPORTER --DRBN007
To: WABRAMCZ--DRBN005
RENGLISH--DRBN005
DGOEL --DRBN005
KGRIBBLE--DRBN005
SLAROUCH--FORDHA1
JNEME --DRBN005
GSTEVEN1--DRBN005
MWELFER3--DRBN006

Date and time 12/16/98 17:04:06
BEGEN --DRBN007
JEVANS8 --DRBN005
JGREGOIR--DRBN005
NLAPOINT--DRBN005
JMCINERN--DRBN005
RNEVI --DRBN005
CTHOMAS5--DRBN005

FROM: F. J. Porter
Subject: 9F924 Update (199812181

UHART(UTC -05:00)

1992-1993 Town Car F2VC-9F924-A Brake Pressure Switch Investigation

TEAM:

AVT EESE Chassis Electronics:	Fred Porter	x84-53722	fporter
AVT Chassis Engineering:	Joe Evans	x32-23832	jevans8
	Barry Egen	x32-39812	begen
AVT EESE EOS:	Rob English	x33-73225	renglish
AVT Design Analysis:	Norm LaPointe	x59-42686	nlapoint
AVT EESE OPE:	Jim Gregoire	x21-79962	jgregoir
EESE Prod. Veh. Safety:	William Abramczyk	x32-23284	wabramcz
	Ray Nevi	x59-47588	rnevi
Large Luxury VC Safety:	John McInerney	x32-30276	jmcinern
	Joe Neme	x19-08133	jneme
AVT Materials Engineering:	Greg Stevens	x32-36686	gsteven1
	Ken Gribble	x32-38638	kgribble
	Clark Thomas	x59-41313	cthomas5
Central Lab Services:	Steve LaRouche	x84-54876	slarouch

INFORMATION:

NHTSA letter: PE98-055

Vehicles identified: 21 initially identified.
20 additional vehicles reported since publication of the investigation.

Warranty: A total of 85 warranty claims are identified in ANS on the F2VY-9F924-A for 1992 and 1993 Town Cars.

Two CQIS reports (WJIAA135 & VDUAA332) mention underhood fire in connection with the brake pressure switch.
WJIAA135 occurred at 51,500 miles.
VDUAA332 occurred at 56,802 miles.

Supplier: The pressure switch was manufactured by Texas Instruments. The switch was purchased in assembly with the brake proportioning valve bought from Surfaces.

Contacts: Surfaces - Mike Thomas (248)543-6520 (HILITE Industries)
TI - Rob Sharp (248)305-5729

TI - Russ Baumann (508)236-3314
TI - Charlie Douglas (508)236-3687

Function: The brake pressure switch is a redundant switch for turning off the speed control function.

X-Rays: Taken by Steve LaRoucha, Norm LaPointe & Clark Thomas on 12/17/1998. Original photographs and part are in Steve LaRouche's possession.

ON-GOING ACTIVITY:

2 service parts have been ordered from Fairlane Ford for X-ray and other testing by Central Lab Services.

Meeting with representatives of TI is planned for 12/22/1998 to discuss intended operation of the switch. The meeting will be at the Central Laboratory Conference room off of the lobby.

QUESTIONS: (in no particular order)

1) What is the normal current in the brake pressure switch?

2) Was cruise control standard on Town Car in 1992 and 1993?

3) Under what circumstances is brake fluid flammable?

According to Clark Thomas & Mary Haga, brake fluid is flammable approximately 100 degrees F.

4) What is the repair history for vehicles that have exhibited a probl Repair history for the two CQIS vehicles are being gathered by Fi Porter.

5) What other vehicles use this brake pressure switch? What are their electrical configurations?

MODEL YEAR	92	93	94	95	96	97	98
Town Car	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	
Crown Vic	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	
Grand Marquis	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	
Econoline	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Club Wagon	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
F-Series		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Bronco		XXXX	XXXX	XXXX	XXXX		
Taurus SHO		XXXX	XXXX	----			
Capri			XXXX	XXXX	----		
Windstar			XXXX	XXXX	XXXX	XXXX	XXXX
Falcon				XXXX	XXXX	XXXX	XXXX
Explorer					----	XXXX	XXXX
Ranger					----	XXXX	XXXX
Expedition						XXXX	XXXX
Navigator							XXXX

XXXX = used in model year
---- = may have been used in model year

6) Is this switch still in use? If not, why not? If so, what design [redacted] have been implemented since 1992/1993?

Charlie Douglas of TI is investigating the design changes that may [redacted] been implemented on the brake pressure switch beginning in 1992.

7) What fault codes are stored if the brake pressure switch fails?

Regards.

Fred Porter OV - fporter fporter3ford.com
Chassis E/E Systems Applications (313)845-3722
Bldg 5 - Mail Drop 5030 - Cubicle 3E004 fax: 390-4145

SUMMARY

Reviewed 93-96 Econoline reports which included:
Owner Reports (MORS)
Field Reports (CQIS)

There were 81 reports categorized engine off/unknown and underhood based on the information available.

28 out of 81 are reported engine off.
53 out of 81 are reported unknown.

Of the 28 vehicles reported with the engine off:
14 are reported to be unknown probable cause.
5 are reported to be electrical as a probable cause.
2 are reported as having after market conversions.
1 is reported as having started in the left front wheel area.
1 is reported as the brake pressure switch as the probable cause.
1 is reported to be a gas leak.
1 is reported to be the battery.
1 is reported to be the A/C unit.
1 is reported to be transmission.
1 is reported to be the catalytic converter.

Of the 53 vehicles reported with the engine unknown:
24 are reported to be unknown probable cause.
6 are reported to be electrical as a probable cause.
5 are reported to be the ingintion switch.
3 are reported to be the left side of vehicle.
3 are reported to be the battery.
2 are reported to be at the front end of the vehicle.
2 are reported to be the fuel pump.
1 is reported to be the A/C relay.
1 is reported as part of a conversion with the heater A/C area.
1 is reported as the vacuum hose.
1 is reported to be the computer module.
1 is reported to be a ground wire melted.
1 is reported to be the transmission.
1 is reported to be the alternator.
1 is reported to be the power distribution fuse panel burnt.

Originator: JKafati
File: summary3.xls
Date issued: 2/15/99
Date revised: 2/12/99

3713 2182

SUMMARY

Reviewed 65 92/93 Crown Vic/Grand Marquis reports of which 46 were categorized engine unknown, engine off and underhood.

Of the 46 reports:
30 out of 46 are reported engine unknown.
16 out of 46 are reported engine off.

Of the 30 vehicles reported with the engine unknown:
9 are reported to be unknown probable cause.
4 are reported to be the alternator as a probable cause.
3 are reported to have started in the front of the car.
2 are reported to have started in the left front of the vehicle.
2 are reported to be the brake booster as a probable cause
1 is reported as brake light wiring touching brake fluid.
1 electrical short.
1 heating system
1 cowl area
1 master cylinder
1 would not shift out of park.
1 rupture hose.
1 starting system.
1 delta PFE hose burned.
1 air compressor

Of the 16 vehicles reported with the engine off:
7 are reported to be unknown probable cause.
2 are reported to have started in the left front of the vehicle.
2 are reported electrical as a probable cause.
2 are reported fuel lines as a probable cause.
1 is reported as the fuel pump relay.
1 is reported as the starter.
1 is reported as the brake pressure switch.

FIELD REVIEW COMMITTEE

To: (North America)
Secretary, FRC
Suite 785
Diagnostic Service Center II
Ford Customer Service Division — North America

To: (Europe)
Secretary, FRC
Room GB-1/329,
Ford Customer Service Division — Europe

The attached Evaluation Paper is being forwarded for review by the Field Review Committee. Copies have been submitted for review to:

Office of the General Counsel:	YES ☐	NO ☐
Vehicle Environmental Engineering:	YES ☐	NO ☐
Automotive Safety Office:	YES ☐	NO ☐
VC Purchasing Director	YES ☐	NO ☐

Subject: 1992 & 1993 Town Car Underhood Fires

Vehicle Line Director	*Vehicle Center Engineering Director*
Date	Date

Note: Both signatures are required prior to Review by the Field Review Committee

1. PROBLEM DESCRIPTION (what/when/extent)

A. NHTSA opened PE 98-055, dated November 24,1998, into "... 21 reports of engine compartment fires in 1992 and 1993 Lincoln Town Cars." Our investigation into these reports indicates the brake pressure switch may be involved in some of the reports.

The brake pressure switch was introduced on the 1992 Town Car in November 1991, as part of the Electronic Speed Control system. The same brake pressure switch was introduced on the 1992 Crown Victoria and Grand Marquis in February 1992. The switch wiring and packaging location are similar on all three vehicles .

Internal brake fluid leakage is one of the reasons service technicians remove brake pressure switches. Internal corrosion of the electrical switch components is observed in brake pressure switches with brake fluid leakage. Chlorine is not evident in these switches.

B. The brake pressure switch, F2VC-9F924-AB (service part F2VY-9F924-A) is the redundant speed control deactivation switch (CPSC 060605) for the Electronic Speed Control that is standard on all Town Cars built between November 1991 and Job #1 MY1998 and is an option on Crown Victoria and Grand Marquis.

C. Vehicles Affected —

Model Year (s)	Vehicle Lines	Vehicle Volume	Variants	Other Limiting Factors
1992, 1993	Town Car	123,310	all	none
1992, 1993	CV/GM	155,335	all	With Electronic Speed Control

D. Markets Affected: All markets.

E. Corporate Product Systems Classification (CPSC) code(s): 06.06.05

2. DEFINE ROOT CAUSE

A. Though we have not definitively identified the root cause, the brake pressure switch appears to be susceptible to brake fluid leaks and corrosion that may create a conductive path in the switch resulting in overheating. Analysis performed on field samples of the brake pressure switches involved in underhood fires has not allowed us to conclude that the brake pressure switch was the cause of the fires. Analysis performed on brake pressure switch field samples not involved in fires suggests brake fluid enters some of the switch cavities through cracks in localized brittle portions of the internal Kapton diaphragm or other contaminants through the electrical connector seals. This contamination in the presence of a continuous electrical potential is favorable to causing corrosion. Corrosion products inside the brake pressure switch cavity could create a conductive path between the uninterrupted battery power and ground. During lab testing, intended to create internal corrosion, it was observed that a conductive path to ground carried an increasing leakage current of 1 to 2 amps average at 14 volts, with transients of 10 amps at 14 volts. These lab conditions were capable of melting or igniting the brake pressure switch plastic bases in a 3 hour controlled environment (see chart #1).

In normal operation, the switch leakage current is expected not to exceed 0.0001 amps. The switch contacts normally conduct up to 0.75 amps to the speed control clutch when speed control is engaged and 0.005 amps when not engaged. The current into the switch is limited by a 15 amp fuse and is supplied by a circuit that is always energized.

B. The Ford process intended to prevent the diaphragm leakage and connector seal contamination is the engineering specification (ES-F2VC-9F924-AA) which requires:

- electrical current leakage to the housing (ground) not to exceed 0.0001 amps;
- proof test... no evidence of fluid leakage, seepage, or drop in test pressure greater than 62 psi (in 30 seconds) is permitted;
- 500,000 Impulse cycles at 224° F ambient using 275° F brake fluid;
- 80 hours of humidity cycling;
- 72 hours of Salt spray; and
- in-process testing to control the quality of the component.

C. The design process did not prevent this issue because DV testing did not evidence any leaking diaphragm or connector seal leakage or internal switch corrosion. The potential effect of creating a conductive path caused by contaminants on the internal switch metallic components was not anticipated in the brake pressure switch design FMEA. ES durability testing did not evidence a leaking diaphragm nor connector seal leakage nor internal switch corrosion.

D. Please check the applicable item(s) in each category:

- Type: ☐ Design ☐ Manufacturing ☐ Vehicle Assembly
  ☐ Other (If other, specify ___)
- System: ☐ Body ☒ Chassis ☐ Cooling ☐ Fuel ☒ Electrical ☐ Engine
  ☐ Glass ☐ Restraints ☐ Transmission/Axle
  ☐ Vehicle Label/Publications ☐ Emissions Control
  ☐ OBD ☐ Other (If other, specify ___)
- Symptom: ☐ Brake Control ☐ Emission Compliance
  ☐ Other Regulatory Compliance ☐ Driveability/No Start
  ☐ Engine Speed Control/Unexpected Movement ☒ Fire
  ☐ Steering Control ☐ Occupant Restraint ☐ Personal Injury
  ☐ Visibility ☐ Warranty Avoidance/Customer Satisfaction
  ☒ Other (If other, specify Speed Control Inoperative)

3. PROBLEM INVESTIGATION/VERIFICATION DATA

A. Lab Test

Lab experiments were performed to reproduce ignition or melting as suggested by analysis of field returns and data. (see Attachment 4) These tests were done with a variation of brake fluid concentrations, water and salt to develop a model to understand the factors contributing to thermal events. These tests did not result in a melting or ignition with brake fluid or water. A salt water solution procedure reliably produced melted switches and some ignited plastic switch bases. This is shown in attachment 4 test 6b.

The test parameters used to create melting or ignition in an accelerated lab environment are:

Voltage: 14 volts dc
Current Limit: 15 amps
Solution: 5% NaCl and tap water
Orientation: connector 45° from vertical (in-vehicle orientation)

Procedure: Apply voltage between the switch contact components and the switch metallic base (normal operating condition). Inject salt water solution into the pressure switch cavity through the connector body. Repeat injection as water is boiled away. In 2 to 3 hours, the plastic switch bases will begin to melt and some will ignite drawing 1 to 10 amps of switch leakage current to ground.

This model was used to verify that the proposed relay and wire harness overlay is a robust modification for this concern.

Attachment 4 below lists tests that shows test details.

Include a summary of all of the paths we have investigated. Include the chart.

Include a discussion of change history—looked and found no pattern?

B. Vehicle tests: Vehicle tests were performed on a 1992 Town Car to determine the pressure applied to the brake pressure switch. Maximum pressure seen in these tests did not exceed the maximum test pressure of the engineering specification for the part. No fire or smoke was observed.

C. Plant/Supplier Reports: The Town Car, Crown Victoria and Grand Marquis assembly plants no longer used this part after mm/dd/ 1997. There were no plant or supplier reports..

D. Quality Indicators: 13 of 47 engine off-or-unknown fire incidents reported in MORS and CQIS on 1992 and 1993 Town Cars mention the brake pressure switch or a symptom related to a brake pressure switch failure. (See attachment 1)

Fire allegations on Town Car, Crown Victoria and Grand Marquis declined for vehicles built after November 1992. (see attachments 1& 2) Based on a review of fire allegations potentially related to the brake pressure switch, the trend demonstrates that the affected vehicle population was built between November 1991 and November 1992.

The mileage at the time of the fire, of the vehicles involved, is 60,000 to 100,000 miles and the average time-in-service is 48 to 72 months (see attachment 3). Vehicles built after the affected population, predictably have reached this mileage and time-in-service for build dates up to BBBBBBB and do not show a similar fire incident rate.

E. Field Reports: Two separate incidents of observed flames on the brake pressure switch were reported by mechanics servicing Town Cars.

Additionally, 48 switches from U.S. vehicles have been collected.

The results of examining these follow:

- 30 functioned correctly with no fluid leakage evident.
- 10 are alleged to be involved in fires.

- 6 leaked brake fluid through the Kapton diaphragm. These had black or dark green residue (containing Brake Fluid, Zinc, Copper, Sulfur) on the terminals and/or cup. 4 due to brittle cracks.
- 3 would not open the switch contact
- 1 had high switch contact resistance
- 8 showed transfer of brass contact material to cup (4 fire / 4 leakers)
- 2 missing movable contacts appear corroded away (2 leakers)
- 1 separated movable contact (leaker)

F. Part Sales: The service part is used for multiple model years and 4 vehicle lines. Sales for the affected vehicles cannot be segregated for comparison to other vehicle usage.

G. .... *List number of accidents... attributed to this condition.*

4. ACTIONS TAKEN IN PRODUCTION; INTERIM (CONTAINMENT) AND/OR PERMANENT

The affected production material were built in the 1992 and 1993 model years. No action is required to be taken in production as these parts are no longer used on Town Car and Crown Victoria and Grand Marquis built after the 1997 model year.

5. VERIFY EFFECTIVENESS OF CORRECTIVE ACTIONS

No corrective action has been implemented in production as this part is no longer used on the Town Car, Crown Victoria or Grand Marquis built after the 1997 model year.

6. ESTIMATED PRODUCTION AND PROBLEM STATISTICS (MAGNITUDE OF CONCERN)

A.

VEHICLES AFFECTED (BY MODEL AND MODEL YEAR)	ASSEMBLY PLANTS (INCLUDING KNOCK DOWN OPERATIONS)	VEHICLE PRODUCTION DATES		POTENTIALLY AFFECTED UNITS	
		FROM	UP TO AND INCLUDING	NUMBER OF UNITS	ESTIMATED PERCENTAGE OF VEHICLES THAT CONTAIN THE CONDITION
Town Car	Wixom AP	11/4/1991	11/30/1992	123,310	unknown
CV/GM	St Thomas AP	2/5/1992	11/30/1992	155,335	unknown

B. The source of the data is a NAVIS report.

7. AFTERMARKET PARTS

A. The brake pressure switch is released as an individual service part and as part of assembly F2VY-2B091-B.

B. The affected service stock is usable with the proposed field service action below.

8. ASSESSMENT OF EFFECT ON VEHICLE OPERATION

Customers may experience inoperative speed control, difficulty shifting out of park (fuse #12 blown), dead battery, brake warning lamp ON, excessive brake pedal travel and/or smoke or fire on the left hand side of engine compartment.

9. DESCRIPTION OF CONCERN SOLUTION AND PARTS REQUIREMENTS (FIELD SERVICE ACTIONS)

A. Field Modification: The modification will be accomplished in two visits to the dealership. The first visit will cut the two wires at the brake pressure switch connector to remove power from the switch and prevent potential heating of the switch. The connector and wire stubs will be wrapped with tape to protect the switch until the next visit. The harness wires will be individually wrapped in tape and tied back to the harness to prevent a short to ground. This will disable speed control.

Return vehicles to dealerships a second time for installation of a wire harness overlay rework kit which includes a relay that limits power to the brake pressure switch to 200 milliamps. No power is applied to the brake pressure switch when the ignition is off in contrast to with the unmodified circuit which is always energized.

B. Assessment of procedure

- This modification procedure has been installed on a 1992 Town Car and a 1993 Crown Victoria. The speed control system functioned normally.
- The 200 milliamp current limit successfully prevented melting and ignition as demonstrated in lab testing (see attachment 4 test 16).
- The modification effects the electrical distribution system by adding a 200 milliamp load to the vehicle electrical system when the key is in the RUN or ACC position. There is no additional load and there is no power applied to the brake pressure switch when the key is in the OFF position.
- This modification changes the effect of a short to ground on the brake pressure switch. The unmodified effect disabled speed control. The modified effect disables the secondary deactivation function of the brake pressure switch. The speed control has 3 additional redundant deactivation functions. . No corrective action is necessary as this is a redundant function.
- Validation by FMEA process for other vehicles is not applicable.
- The modification procedure was evaluated by FCSD using appropriate tools, equipment, and a representative vehicle.

C.

- Kit name Relay Jumper.
- 150,000 rework kits will be ready for service by 6/25/99 (8 weeks). WERS concern C10965448 will be released with the completion of the rework kit design and procedure scheduled for TBD.
- production part number is not applicable
- service kit part number is F3VB-9A839-AA
- 1 kit is required per vehicle.

D. ... *Other parts?????*

E. Driveability and Emissions not affected.

10. PROGRAM PARTS SIGN OFF/AVAILABILITY

EESE OPD is working with FCSD and wiring harness supplier to complete the design of the service kit.

30,000 kits will be available 5 weeks after supplier is started.

30,000 kits per week will be available thereafter.

(150,000 kits can be supplied in 8 weeks.)

11. SUPPLIER INVOLVEMENT

A. TBD

B.

C.

D.

E.

F.

12. FINANCIAL IMPLICATIONS

		Vehicle Volume	Cost Per Unit	Total Cost (000)
A	Program Administration Costs	278,645	$1.20	$334
B	Inspection Costs (Units to be Inspected but Not Modified)	0		0
C	Part I Modification Costs(Units to be Inspected and Modified) • Parts (priced at dealer price plus ___%) ($1.00 (e)) Labor (0.3 hours x $58.34 labor rate)	278,645	$18.50	5,155
C	Part II Modification Costs(Units to be Inspected and Modified) • Parts (priced at dealer price plus 40 %) ($11.75 (e)) • Labor (0.9 hours x $58.34 labor rate) $52.50	278,645	$64.25	17,900
D	Dealer Administration Allowance (for safety and emissions recalls only) [0.1 hours x $58.34 labor rate – N.A.]	278,645	$5.83	1,625
E	Total Cost (total A through D)			25,014
F	Percentage of Recommended Supplier Recovery (if applicable or TBD if unknown)			0%
G	Supplier Impact (E * F, if applicable)			0
H	Net FORD Exposure (E-G)			0
I	Potential Warranty Offset			0

13. PREVENT ACTIONS

A. Review SDS,WCR Brake System Durability and Bench Testing (DVP&R) to examine the effect of contaminated, or aged, or incorrect brake fluid. Update FMEAs and FTAs.

B. *.....generic items or processes impacted.....*

C. *... corporate memory updates ...*

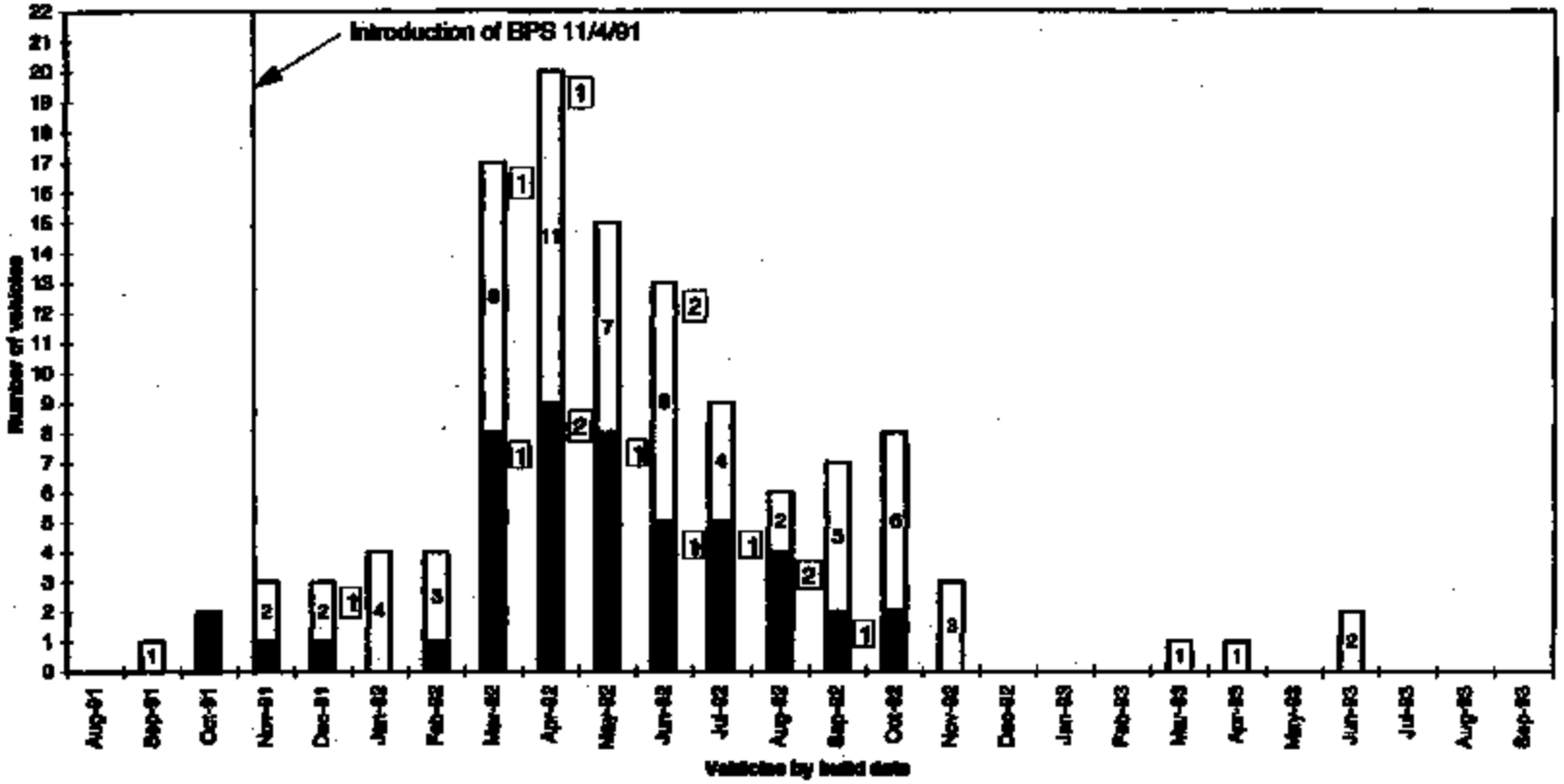
14. REFERENCE DATA

A. Attachments

1 Pareto of 92/93 Town Car Underhood Fire Allegations With Engine On/Off/Unknown.
2 Pareto of 92/93 Crown Vic/Grand Marquis Underhood Fire Allegations With Engine On/Off/Unknown.
3 92 Lincoln Town Car Reported Incidents Of 40 Vehicles with Engine Off/Unknown
4 9F924 De-activation Switch Test Synopsis
5 Hexport Current vs. Time , Fluid Ingress Experiment
6 Hydraulic Pressure Switch Cross Section

B. T. F. Donovan, Manager
Phone: (313)390-7420
E/E Systems, LVC/TVC OPD & Core Quality
Building 5, 1A043

Pareto of 92/93 Town Car Underhood Fire Allegations With Engine On/Off/Unknown



Note:

- The shaded region represents vehicles with engine off/unknown.
- The unshaded region represents vehicles with engine on.
- [1] Represents BPS symptoms

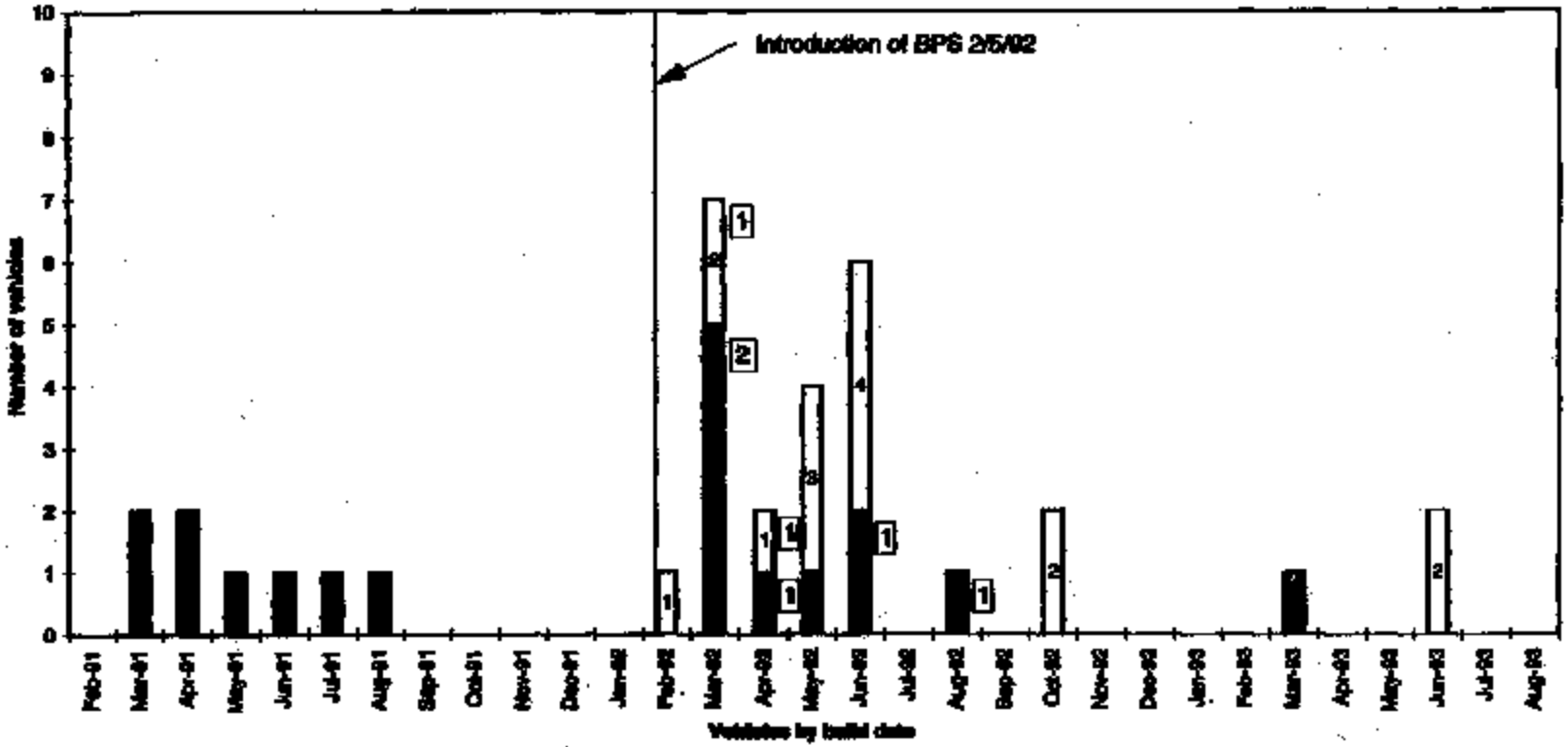
There were 11 vehicles in the unknown category.
3 engine off/unknown, [1] relates to a BPS symptom. 8 engine on.

Originator: JKalail
File: Bulkhd.xls
Date issued: 4/19/99
Date revised: 4/16/99

3713 2186

Attachment 1

Pareto of 92/93 CV/GM Underhood Fire Allegations With Engine On/Off/Unknown



Note:

- The shaded region represents vehicles with engine off/unknown.
- The unshaded region represents vehicles with engine on.
- [1] Represents BPS symptoms

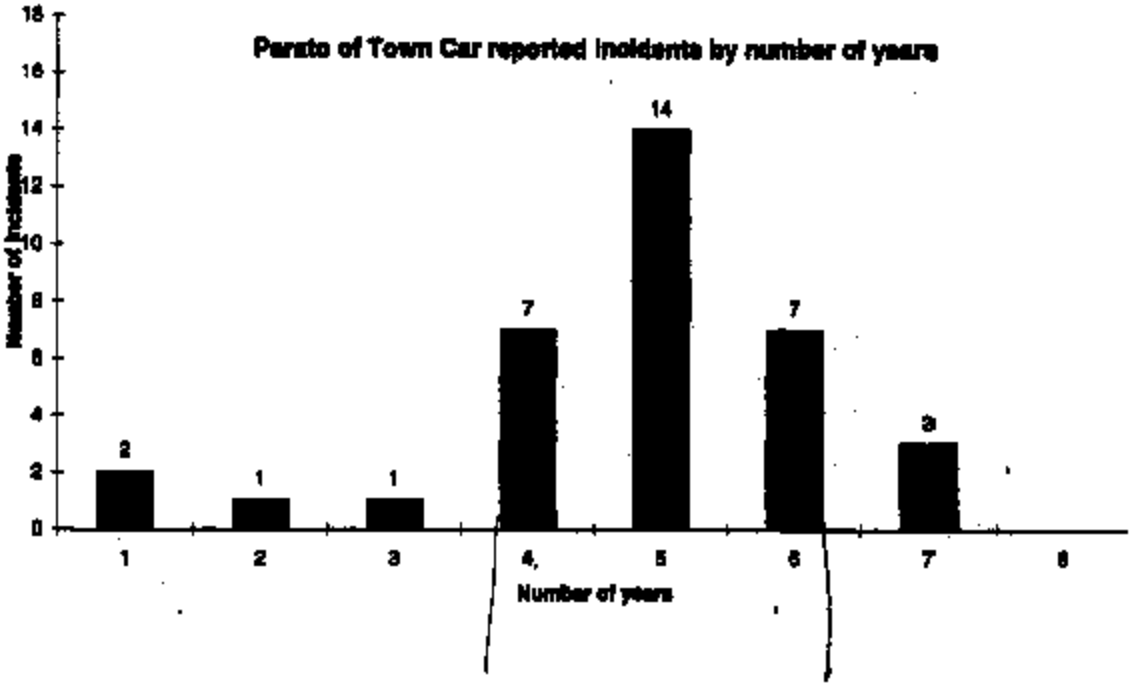
There were 4 vehicles in the unknown category.
3 engine off/unknown, [2] relate to BPS symptoms.
1 engine on, [1] relates to a BPS symptom.

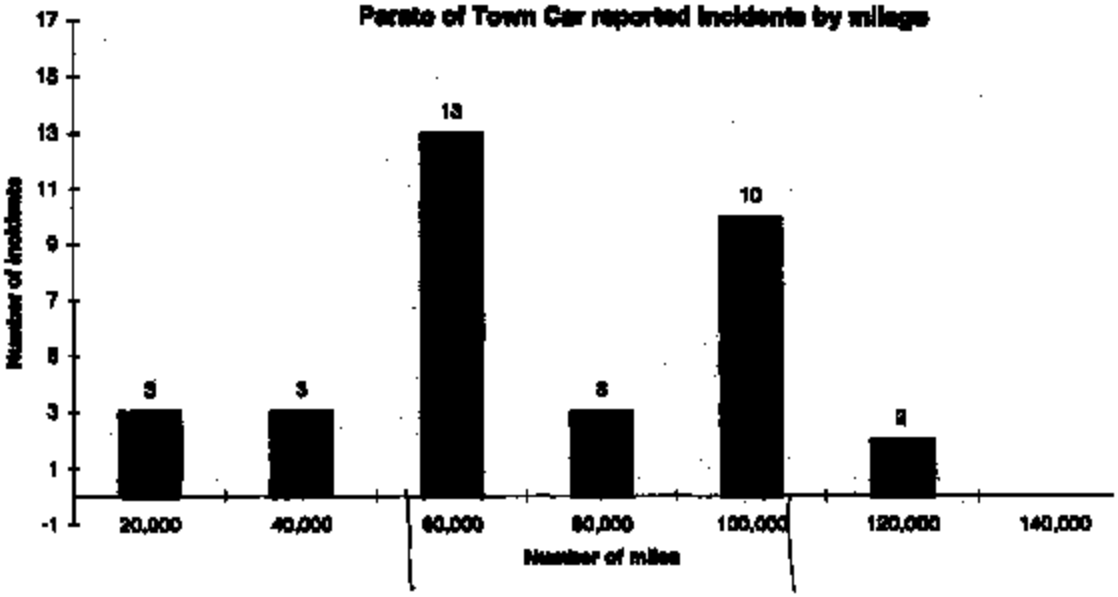
Originator: JKabat
File: 6vbdcm.xls
Date issued: 4/19/99
Date revised: 4/16/99

3713 2196

Attachment 2

92 Lincoln Town Car Reported Incidents Of 40 Vehicles with Engine Off/Unknown





Note:
There were 5 vehicles with unknown vins, therefore, years in service were undetermined.
There were 8 vehicles with unknown miles.

Attachment 3

Attachment 4

9F924 De-activation Switch Test Synopsis

This document is a synopsis of tests conducted during the investigation of the 9F924 brake pressure switch manufactured by Texas Instruments (P/N 77PS). These tests attempt to reconcile the parameters of the system with alleged field events. The following are the system parameters around the application of the brake pressure switch.

1. The switch components are exposed to battery potential continuously after the vehicle is manufactured.
   A. The hexport of the switch is screwed into the brake proportioning valve that is mounted to the vehicle frame. The vehicle frame is a ground potential.
   B. Battery voltage is continuously connected to moveable contact. The ignition switch does not modify battery voltage to the brake pressure switch.

The intent of this document is to highlight test findings.

Test 1

Objective: Determine if switch ignition can occur under the following conditions:

- Switch contact flooded with brake fluid mixed with varying amounts of % tap water.
- 14 volts applied to one terminal, second terminal electrically floating. (No electrical load across switch terminals).
- Switch hexport electrically grounded.

Test eight samples with the following mixtures:

2 with 4% tap water in brake fluid
2 with 6% tap water in brake fluid
2 with 10% tap water in brake fluid
2 with 75% tap water in brake fluid

Results: No ignition occurred. No significant temperature rise observed. Leakage current to ground ranged from 0.5 mAmps to 5 mAmps over the 250-hour test duration.

Conclusion: While degradation in performance is observed, brake fluid does not develop corrosion or a leakage current path quickly enough to use for laboratory validation testing.

Test 2

Objective: Determine if switch ignition can occur under the following conditions:

- Switch contact flooded with brake fluid mixed with varying amounts of % tap water.
- 14 volts applied to one terminal, second terminal connected to a 14-ohm resistor tied to ground. (1 Amp load across switch terminals).
- Switch hexport electrically grounded.

Results: No ignition occurred. The temperature rise was less than 10°F over the 250-hour duration of the test.

Conclusion: Heat generated by the switch contacts is not sufficient to ignite the plastic base or brake fluid.

Attachment 4

Test 6

Objective: Determine if switch ignition can occur under the following conditions:

- A heater element installed in contact cavity of the switch.
- Apply power to the heating element until plastic base ignites.
- Apply an external spark to the fumes from the plastic.
- Brake fluid present in the contact cavity (wet device) and not present in the contact cavity (dry device).

Results: Ignition occurred in both wet and dry devices.
Wet device: The internal temperature of a wet device reached 660°F. A hole melted through the base of the switch (close to the heating element). The externally applied spark ignited the fumes and flames engulfed the switch.
Dry device: The internal temperature of a dry switch reached over 1000°F. The switch base flopped over. The externally applied spark ignited the fumes and flames engulfed the switch.

Conclusion: The plastic base with brake fluid can be ignited when 5 Watts of electrical power are dissipated as heat in the switch for 15 minutes, followed by a spark.

Test A

Objective: Identify the interactions of the materials found in the switch returned from the Reddick report by placing a brass and copper electrode in a pool of brake fluid with a 12 volt potential between them.

Results: After 24 hours, a black residue formed on both electrodes. The brake fluid did not ignite.

Conclusion: The material found in the switch returned from the Reddick report was a result of an interaction between brake fluid, the internal switch components and the continuous electrical field present in the vehicle.

Test B

Objective: Show that the brake pressure switch is capable of supporting the maximum design current load by applying 15 Amps through the switch contacts until they reach a stable temperature.

Results: The temperature rise stabilized at 36°F after 10 minutes. Vehicle test results show a maximum temperature of 250°F at the left-hand engine mount. This mount is near the brake pressure switch. With the temperature rise observed, the maximum temperature the brake pressure switch is exposed to is 286°F. This is less than the 433°F melting point of the plastics used in the switch base.

Conclusion: The brake pressure switch will not ignite under extreme vehicle environmental conditions. Heat to cause an ignition must come from a source outside of the normal design of the switch. To ignite a switch, either an external source, or an internal short to ground must provide heat.

Test 6a

Attachment 4

Objective: Determine if corrosive degradation of switch electrical components can cause a decrease in electrical isolation (and thus a source of heat) in the switch that may lead to an ignition. Subject the switch to the following conditions:

- 5% NaCl in tap water solution is injected into contact cavity of a switch.
- 14 Volts is applied to the switch.
- Hexport is grounded.
- Current is limited at 15 Amps.

Results: Of 4 samples tested, over a 2 - 3 hour period, the switch leakage current averaged 1 Amp while reaching peaks of 10 Amps. Near the end of the experiment with leakage current greater than 2 Amps, the switch bases started to melt. 2 of the switches continued to heat until the plastic ignited. The other 2 continued to melt until electrical connection was broken.

Conclusion: Corrosion materials can create a conductive path that may lead to ignition. In this experiment, NaCl was used to accelerate the corrosion in the switch. Other corrosive processes may yield the same results.

Test 7

Objective: Determine if switches meet cycle life specification by running the life cycle test beyond specification until the switch performance is degraded.

Results: The first sample developed a leak in the kapton seal after 728,000 cycles. The mean time to developing leaks was determined to be 1,200,000 cycles.

Conclusion: The kapton seal exceeds design specification of 500,000 cycles.

Test 15a

Objective: Determine if long time switch exposure to brake fluid can lead to an ignition.

Results: Test is ongoing. Results to date show no increase in conductivity of both new and used brake fluid. At 350 hours of testing, current draw on each device is less than 20 mAmps.

Conclusion: 350 hours of brake fluid exposure is not sufficient to cause ignition. At 350 hours of testing, current draw remains below the levels needed to create ignition as simulated in laboratory experiments.

Attachment 4

Test 6b

Objective: Understand the ignition process, determine the current path and establish a repeatable ignition method.

Results: Multiple attempts at ignition, via injection of a 5% NaCl in tap water into the contact cavity of switches, has resulted in a repeatability rate of approximately 50%. Plots of hexport current vs. time show an increase in leakage current until the point of ignition in 2 to 3 hours.

Conclusion: A repeatable laboratory method for switch ignition has been established. Based on hexport current measurements, the current path is from switch terminals to hexport body. When a NaCl in tap water solution is repeatedly injected into the contact cavity of powered switches, electrolytic corrosion of the switch terminals results in an increase in terminal resistance and a conductive path to the sensor housing. When sufficient power is drawn through the terminal and conductive path, the materials inside the switch heat. These materials may begin to glow red hot. A hole melts through the switch base and ignition occurs. There is arcing visible throughout the corrosion process that may provide the spark necessary for ignition.

Test 13a

Objective: Compare various fluids in the established ignition method.

Results: A switch filled with 5% NaCl in tap water resulted in an ignition when average hexport leakage current exceeded 2.5 Amps during a 3 hour test. Switches that were filled with tap water and rainwater drew less than 10 mAmps during a 3-hour test and showed little signs of corrosion. Switches filled with new and used brake fluids, with water and without water, all had less than 3 mAmps leakage current and showed no signs of accelerated corrosion.

Conclusion: NaCl in tap water is the most effective method for creating a short-term corrosion to produce heat in the switch. While brake fluid is not as effective in producing corrosion for a lab test, it does produce corrosion when introduced into the switch cavity.

Test 15

Objective: Compare the burn characteristics of various plastics that have the potential to be used as switch base materials. Plastics tested have melting and flowing characteristics compatible with the molding process of the switch base.

Results: When 5% NaCl in tap water was injected into switches with different base materials, the following results were obtained: Cellanex 4300 ignited 3 out of 5 attempts. Noryl ignited 2 out of 5 attempts. Zytel ignited 1 out of 5 attempts.

Conclusion: Different plastics exhibit different ignition characteristics. None of the plastics tested guaranteed protection against ignition.

Attachment 4

Test 15b

Objective: Compare: 1) the probability of switch ignition in the vertical position (connector up) verses a 45° orientation and 2) the probability of switch ignition as a function of rotational angle (about the switches length axis) in the 45° orientation.

Results: Switch ignitions in the lab occurred with the switches mounted both vertically and 45° from vertical. In addition, switch ignitions in the lab occurred at various rotational angles.

Conclusion: Switch ignition does not appear to be sensitive to vertical orientation vs. 45° orientation nor to rotational angle in the 45° orientation.

Test 16

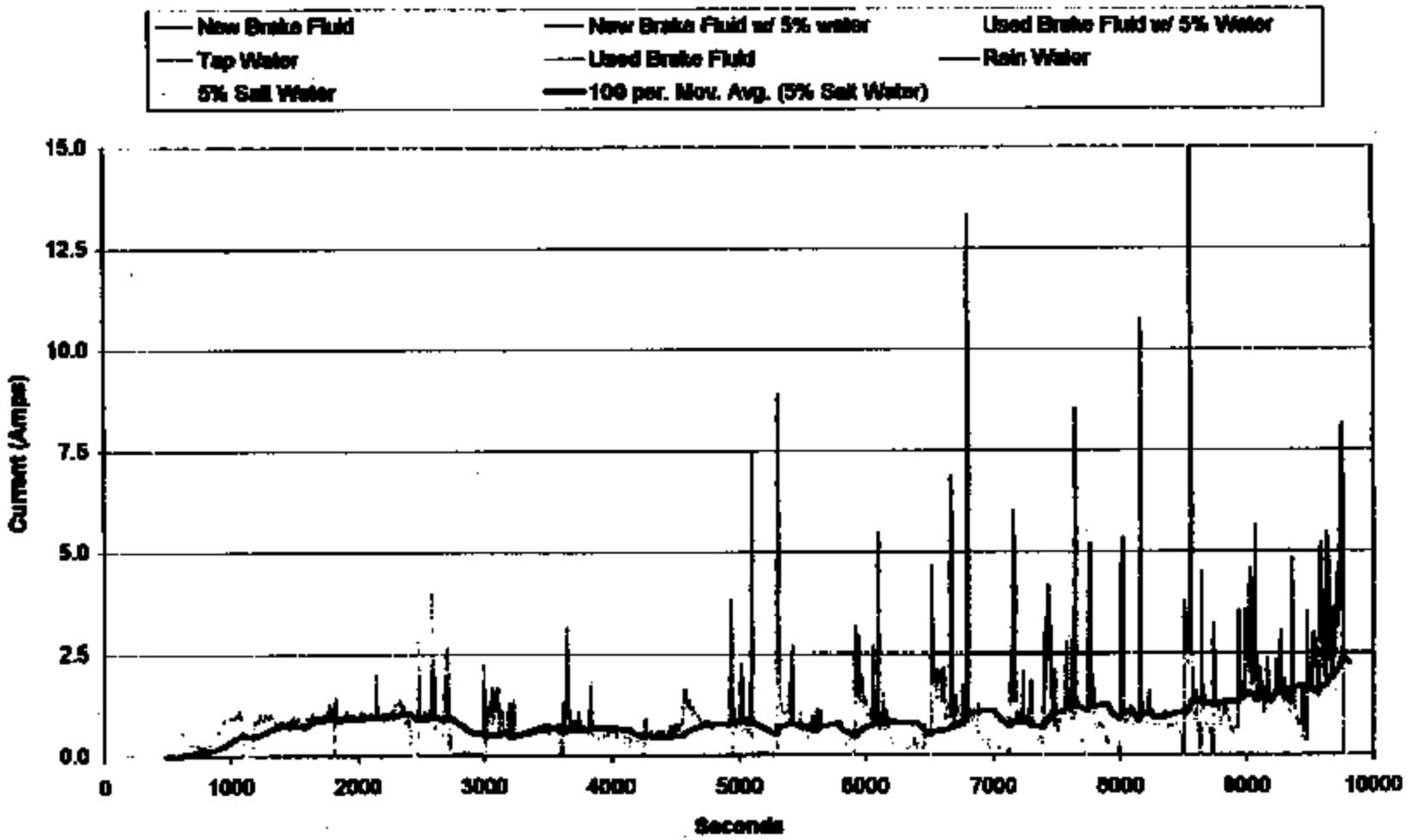
Objective: To test proposed relay circuit.

Results: A switch was injected with 5% NaCl in tap water solution and placed in a proposed current limiting circuit for 48 hours. The current draw remained constant at 180 mAmps throughout the test. There was no thermal activity observed and the contact arm remained intact.

A switch was brought to a high leakage current condition using the established ignition method. An impending burn is a condition where a corrosive resistance has built up in the switch and an ignition is imminent as determined by observing leakage current. The switch was placed in the proposed relay circuit for 18 hours where it drew 180 mAmps, showed no visible thermal activity and did not result in a burn. Because the proposed relay circuit acts as a resistor that limits current to the switch, the maximum power to the switch is limited to 0.75 Watts. A resistive wire was wrapped around the base of the switch and 0.75 Watts of power was applied to the wire. The wire became warm to the touch but had no effect on the switch.

Conclusion: 0.75 Watts, the maximum power in the proposed circuit design, is not enough power to cause switch terminal heating sufficient for ignition. In previous tests, using a resistor as the heating element, approximately 5 Watts of power was necessary to create an ignition. There is not enough power in the proposed circuit to create ignition.

Hexport Current vs. Time
Fluid Ingress Experiment



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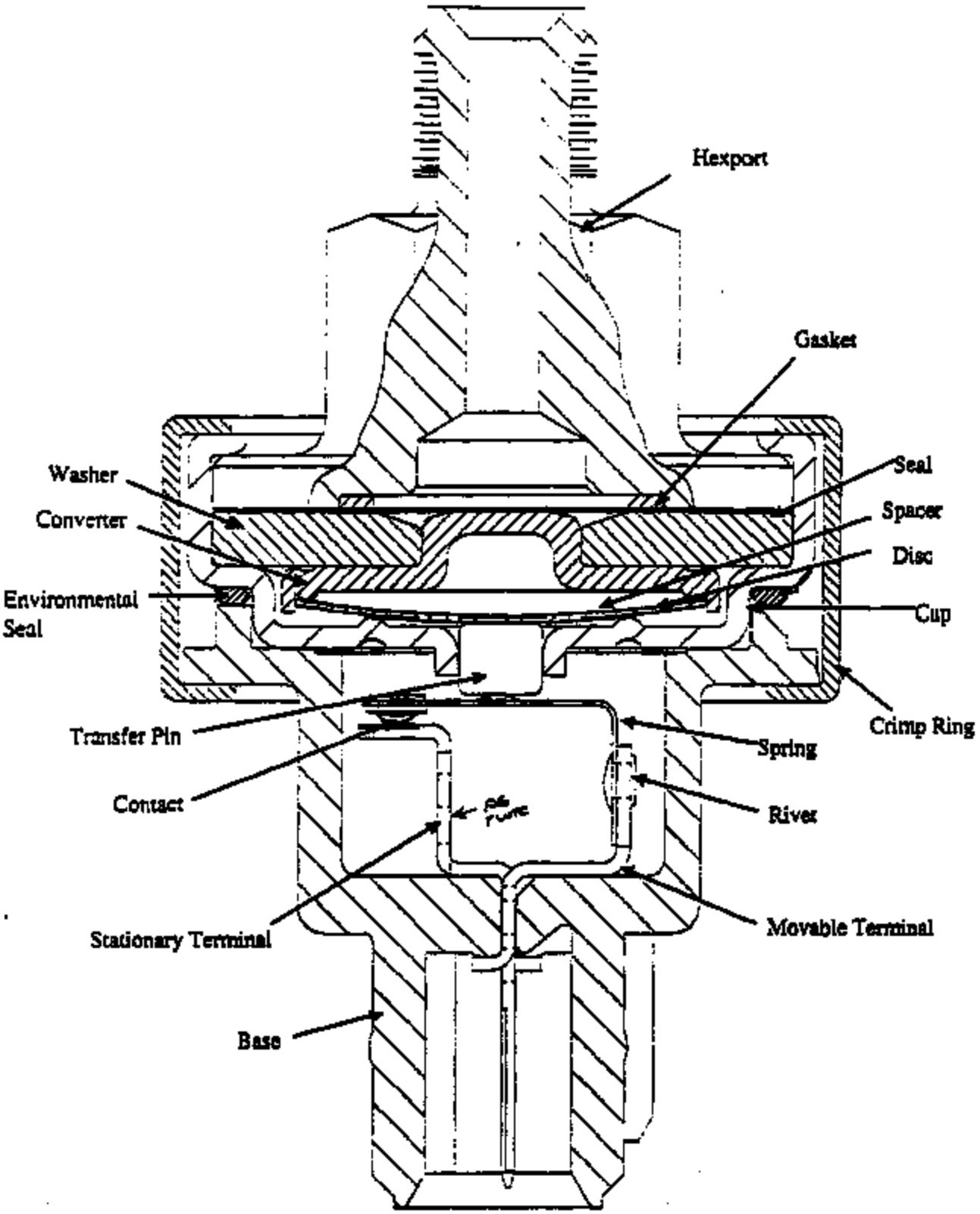
Hydraulic Pressure Switch Cross Section



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FAX COVER SHEET

DRAFT REVIEW OF SAFETY RECALL 99S15

5/13/99

		FAX #
TO:	R. Wheelock - ESE (Legal/OGC)	42268
	A. Martin - PS&L	61166
	R. Wooten - Claims/Adj	54336
	T. Day - CLOIS	06727
	J. Kafati - AVT	81266 ✓ — 03817
	N. Vert - Owner Relations	86269 ✓
	D. Waxer WDMO	83817 ✓
	T. Lusardi - Tech Hotline	54601 ✓

FROM: Al Lease - FCSD/Recall PH 39-08877 FAX 84-81024

Please respond to this review promptly by phone or FAX.

Approved : _____

Approved With Changes: _____

Not Approved: _____

Name and Date of Reviewer: _____

Date: _____

3713 2205

DRAFT

To: All FCSD Regional Managers

cc: All Regional Sales Managers
Ford Division
All PDC Managers

Subject: Safety Recall 99S15: Certain 1992 and 1993 Crown Victoria, Grand Marquis, and Lincoln Town Cars with Speed Control - Brake Pressure Switch

See the Dealer Bulletin for program details.

REGIONAL/DEALER ACTION

Federal law requires that dealer stock vehicles must be corrected before delivery.

Advise FCSD, using Form 7256, if a dealer reports that an affected vehicle is not at the location shown in our records.

Make sure regional personnel understand the service procedures before assisting dealers or customers.

QUESTIONS?

Claims Information	1-800-423-5851
Other Recall Questions	1-800-325-5821

A. R. O'Neill
Director
Vehicle Service and Programs

DRAFT

Service Recall Bulletin

May, 1999

TO: All Ford and Lincoln Mercury Dealers

SUBJECT: Safety Recall 99S15: Certain 1992 and 1993 Crown Victoria, Grand Marquis, and Lincoln Town Cars with Speed Control - Brake Pressure Switch

AFFECTED VEHICLES

Certain 1992 and 1993 Crown Victoria and Grand Marquis with Speed Control built at the St. Thomas assembly plant from February 5, 1992 through November 30, 1992. Also, certain 1992 and 1993 Town Cars built at the Wixom Assembly plant from November 4, 1991 through November 30, 1992.

REASON FOR RECALL

Some brake pressure switches that were installed on the affected vehicles may have been improperly crimped. Over time, these switches may develop a resistive short in the electrical circuit. This short may cause the fuse to open and disable the cruise control circuit. It is also possible for the switch to short without opening the fuse. This could cause the switch to generate sufficient heat to cause a fire, even while the vehicle is not running.

SERVICE ACTION

The dealer will replace the brake pressure switch with a current production switch. In addition, the switch hard-shell connector will be replaced to eliminate the possibility of undetected heat damage to the connector.

ATTACHMENTS

Attachment I: Administrative Information
Attachment II: Labor Allowances and Parts Ordering Information
Attachment III: Technical Information

QUESTIONS?

Claims Information: 1-800-423-5651
Other Recall Questions: 1-800-325-5621

Sincerely,

A. R. O'Neill
Director
Vehicle Service and Programs

3713 2207

DRAFT

Safety Recall 99S16
Certain 1992 and 1993 Crown Victoria, Grand Marquis, and Lincoln Town Cars with Speed Control - Brake Pressure Switch

OASIS

You must use OASIS to determine if a vehicle is eligible for this recall.

PLEASE NOTE

Correct all vehicles in stock before delivery. Federal law requires dealers to complete any outstanding safety recall service before a new vehicle is delivered to the buyer or lessee. Violation of this requirement by a dealer could result in a civil penalty of up to $1,100 per vehicle.

PROMPTLY CORRECT

Promptly correct affected vehicles on the enclosed list and other eligible vehicles which are brought to your dealership.

DEALER-OWNER CONTACT

Immediately contact any affected owner whose name is not on the list. Give the owner a copy of the Owner Letter and schedule a service date.

REGIONAL CONTACT

Advise regional office if an owner:

- cannot be contacted.
- does not make a service date.

CLAIMS PREPARATION AND SUBMISSION

- Enter claims using DWE.
- Refer to ACES II Manual for claims preparation and submission information.

OWNER REFUNDS

Ford Motor will only refund for owner-paid repairs made before the date of the Owner Letter (or after the date of the Owner Letter if an emergency repair was made away from the servicing dealer.) Refer to ACES II Manual for Refund information.

Safety Recall 99S16
Certain 1992 and 1993 Crown Victoria, Grand Marquis, and Lincoln Town Cars with Speed Control - Brake Pressure Switch

LABOR ALLOWANCES

DESCRIPTION	LABOR OPERATION	LABOR TIME
Replace Brake Pressure Switch and Hard-shell Connector	99S16B	0.5 Hour
Administrative Allowance	Misc. Expense Code "ADMIN"	0.1 Hour

PARTS REQUIREMENTS

Parts Ordering Information

Parts will not be direct shipped for this recall. Order your parts requirement through normal order processing channels as noted below:

Stock Orders	Effective immediately	Normal order process
Interim Orders	Effective immediately	Normal order process
Emergency Orders	31 days after launch	Normal order process
Emergency Orders	First 30 days after launch	Call 1-800-325-6021

Part Number	Description	Quantity
TBD	Brake Pressure Switch Kit	1

DEALER PRICE

For latest prices, check or call your:

- Order Processing Center
- DOES II
- Updated Price Book

EXCESS STOCK RETURN

Excess stock returned for credit must have been purchased from Ford Customer Service Division in accordance with Policy Procedure Bulletin 4000.

BRAKE PRESSURE SWITCH AND CONNECTOR REPLACEMENT

AFFECTED VEHICLES: CERTAIN 1998 AND 1999 CROWN VICTORIA, GRAND MARQUIS AND TOWN CAR WITH SPEED CONTROL

OVERVIEW

This repair involves replacement of the brake pressure switch and the hard shell of the switch electrical connector. The connector terminals will be removed from the old connector hard shell and inserted into the new connector hard shell.

PROCEDURE

1. Install a memory saver and disconnect the negative battery terminal.
2. Disconnect the electrical connector from the brake pressure switch. See Figure 1

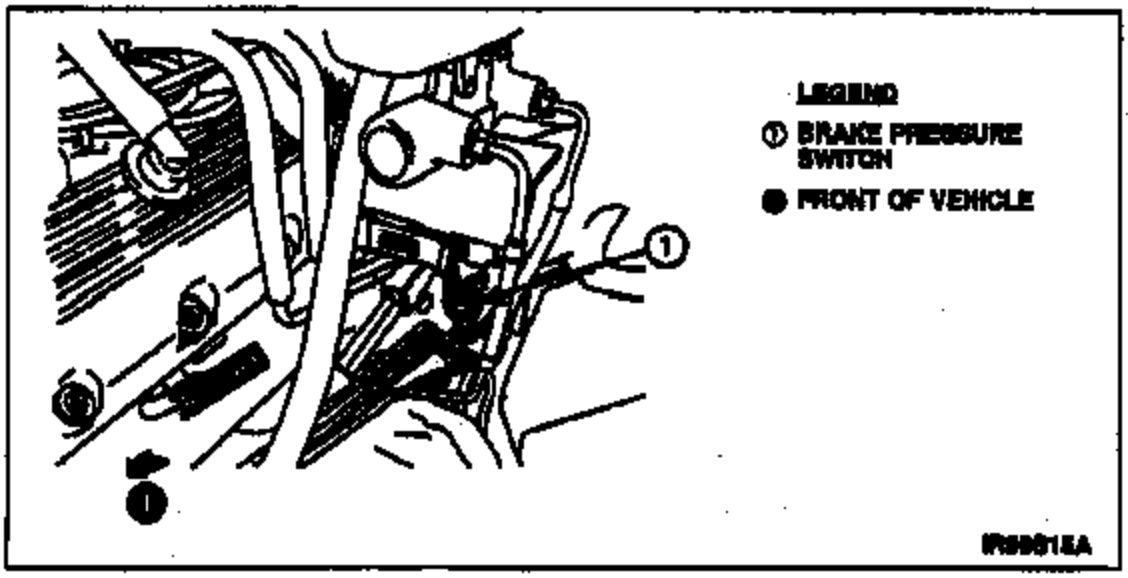

FIGURE 1

BRAKE PRESSURE SWITCH AND CONNECTOR REPLACEMENT

CPR © 1998 FORD MOTOR COMPANY
DEARBORN, MICHIGAN 48121

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3. Remove the locking wedge from the end of the connector. Then, disengage the locking tabs and remove the wire terminals from the connector. See Figure 2.

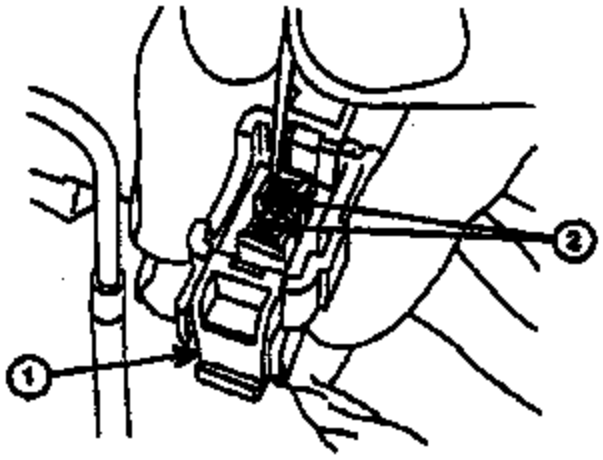

FIGURE 2

4. Obtain the *new* connector from the kit. Insert both wire terminal ends through the connector seal and into the connector hard shell. (The wire terminal ends may be installed into either of the connector cavities).
5. Check the connector to make sure the locking tabs have engaged both terminal ends. Also, make sure the seal is fully seated in the back of the connector. Then, install the red locking wedge to secure the terminals in the connector.
6. Obtain the brake pressure switch from the parts kit.
7. Remove the old brake pressure switch.
8. Fill the *new* brake pressure switch with High Performance DOT 3 Brake Fluid and install the brake pressure switch. Tighten the switch to 18 Nm (13 lb-ft).
9. Attach the electrical connector to the brake pressure switch.
10. Connect the battery negative cable and remove the memory saver.
11. Raise the vehicle on a hoist.
12. Connect a clear drain tube to the RH rear bleeder screw and the other end in a container partially filled with the recommended brake fluid.
13. Have an assistant pump the brake pedal and then hold firm pressure on the brake pedal.
14. Loosen the RH rear bleeder screw until a stream of brake fluid comes out. While the assistant maintains pressure on the brake pedal, tighten the bleeder screw.
    - Repeat until clear, bubble-free fluid comes out.
    - Refill the brake master cylinder reservoir as necessary.
15. Repeat Steps 12-14 for the LH rear bleeder screw.
16. Lower the vehicle.

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DEARBORN, MICHIGAN 48121
ALL RIGHTS RESERVED

I.S. XXXX	SHEET 2 OF 2
BRAKE PRESSURE SWITCH AND CONNECTOR REPLACEMENT	

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DRAFT

A. R. O'Neill
Director
Vehicle Service and Programs
Ford Customer Service Division

Ford Motor Company
P. O. Box 1904
Dearborn, Michigan 48121

May, 1999

Safety Recall 99S15

Mr. John Sample
123 Main Street
Anywhere, USA 12345

Your Vehicle Identification Number: 12345678901234567

This notice is sent to you in accordance with the requirements of the National Traffic and Motor Vehicle Safety Act.

Ford Motor Company has decided that a defect which relates to motor vehicle safety exists in certain 1992 and 1993 Crown Victoria, Grand Marquis, and Lincoln Town Cars with Speed Control.

SAFETY DEFECT

Some brake pressure switches that were installed on the affected vehicles may have been improperly crimped. Over time, these switches may develop a resistive short in the electrical circuit. This short may cause the fuse to open and disable the cruise control circuit. It is also possible for the switch to short without opening the fuse. This could cause the switch to generate sufficient heat to cause a fire, even while the vehicle is not running.

REPAIRS

The dealer will replace the brake pressure switch with a current production switch. In addition, the switch hard-shell connector will be replaced to eliminate the possibility of undetected heat damage to the connector.

Dealers currently have instructions and parts ordering information.

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HOW LONG WILL IT TAKE?

The time needed for this repair is less than 1/2 day. However, due to service scheduling issues, your dealer may need your vehicle for a longer period of time. Please call your dealer for a service date.

Call your dealer without delay. Ask for a service date and whether parts are in stock for Safety Recall 99S15.

If your dealer does not have the parts in stock, they can be ordered before scheduling your service date. Parts would be expected to arrive within a week after ordering.

When you bring your vehicle in, show the dealer this letter. If you misplace this letter, your dealer will still do the work, free of charge.

REFUNDS

If you paid to have this service done before the date of this letter, Ford is offering a full refund. For the refund, please give your paid original receipt to your Ford or Lincoln Mercury dealer. To avoid delays, do not send receipts to Ford Motor Company.

CHANGED ADDRESS OR SOLD THE VEHICLE?

Please fill out the enclosed prepaid postcard and mail it to us if you have changed your address or sold the vehicle.

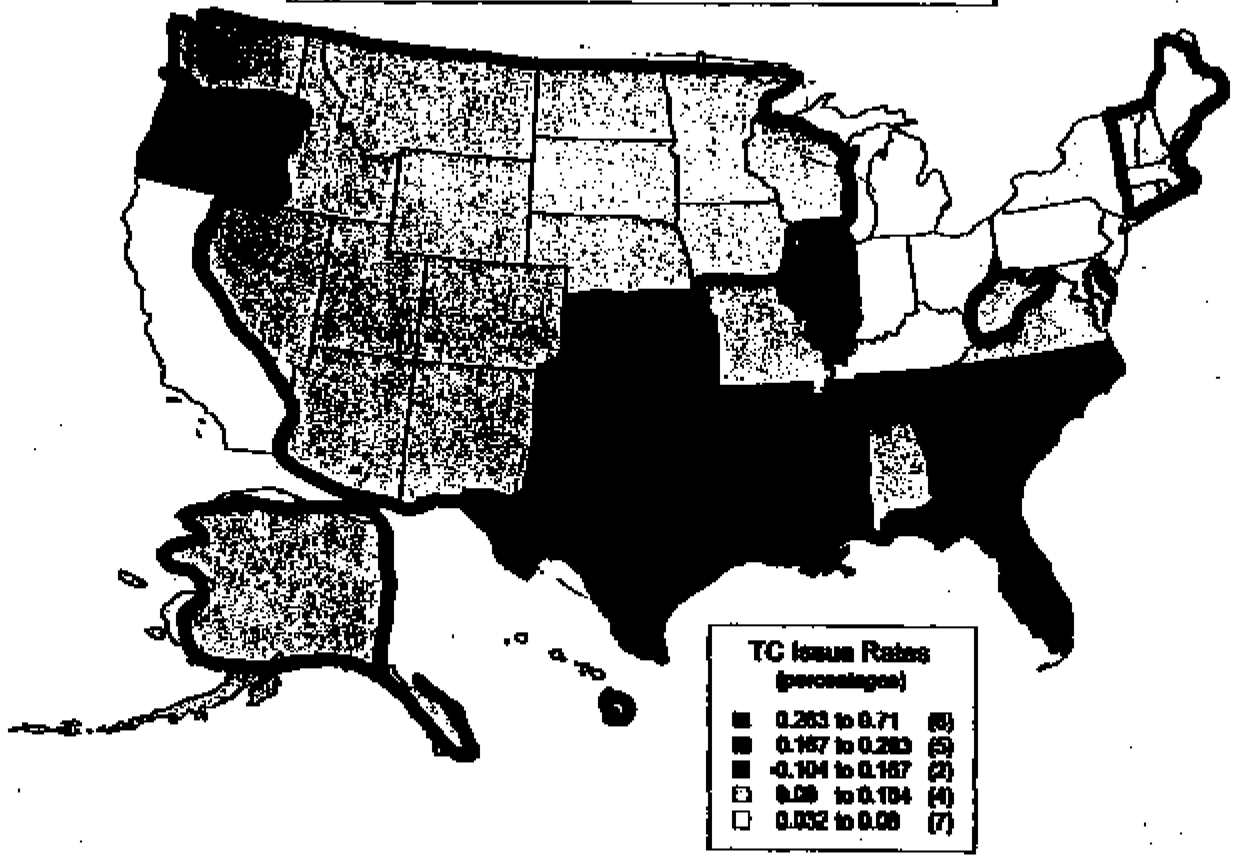
If the dealer doesn't make the repair promptly and without charge, you may contact the Ford Customer Assistance Center, P. O. Box 6248, Dearborn, Michigan 48121. You also may send a complaint to the Administrator, National Highway Traffic Safety Administration, 400 Seventh Street, S. W., Washington, D. C. 20590 or call the toll free Auto Safety Hotline 1-800-424-9393 (Washington, D. C. area residents may call 366-0123).

We regret the inconvenience this service may cause you, but we want you to have the work done for your safety and satisfaction with your Ford or Lincoln-built vehicle.

Sincerely,

A. R. O'Neill
Director
Vehicle Service and Programs

Town Car Issue Rates



9LC04

3713 2214

92 sales per state
Worst Louisiana
South east States

5300

Originator: mhardie

BUILDCHT, KLS

Page 1 of 1

Date Issued: 16 March 1999
Date Revised: 3/16/99

code for what the customer comment is

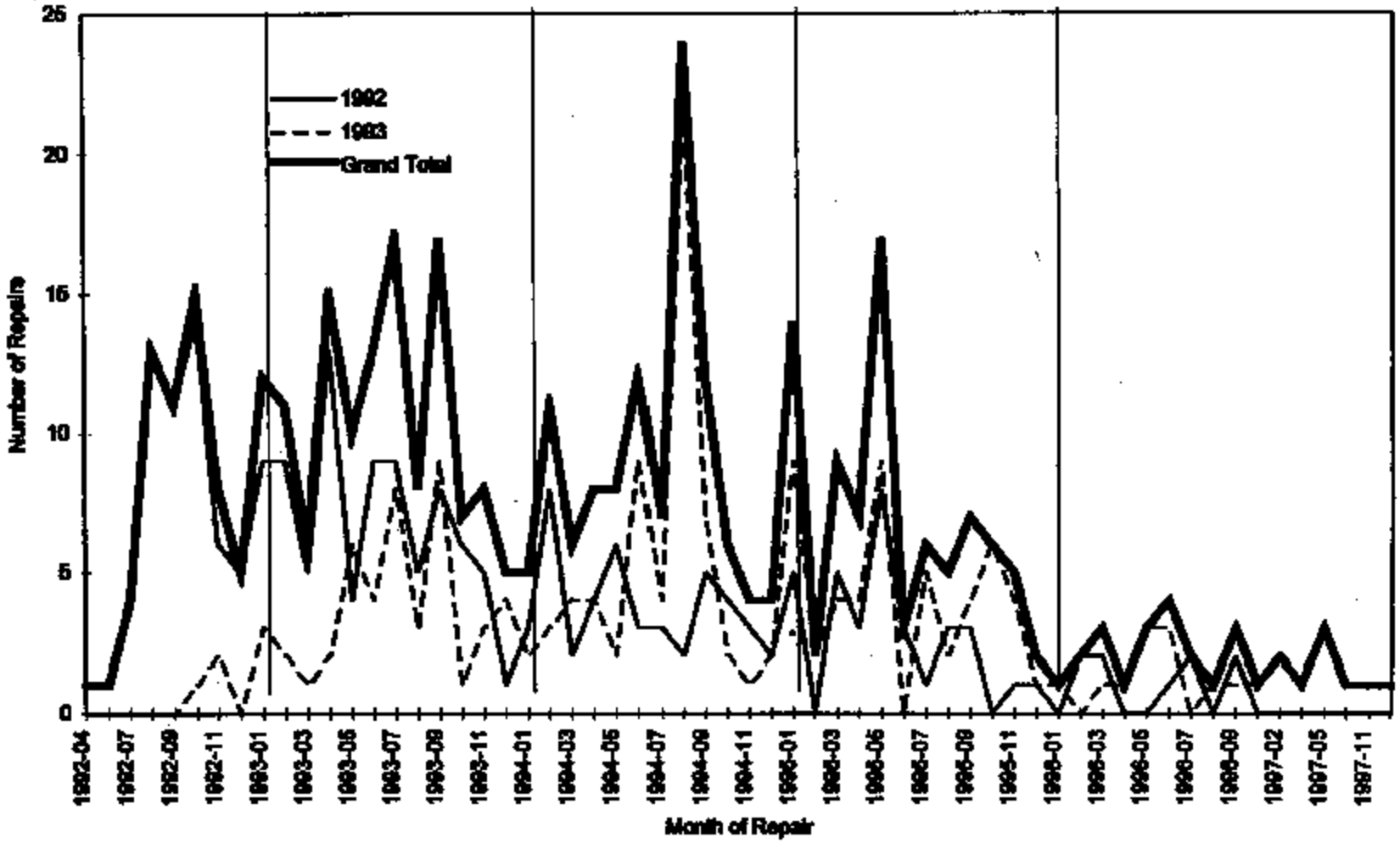
All Brake Pressure Switch Replacements on Panther Vehicles 92/93 by Concern

MDL_YR	(All)

	Data	
Customer Concern Code	Sum of COSTS	Sum of REPAIRS
A25 - ENGAGEMENT TROUBLES (SPEED CONTROL)	$20,925	149
N17 - BRAKES NOISY	$5,852	60
A26 - DISENGAGEMENT TROUBLES (SPEED CONTROL)	$6,409	44
A99 - ADMINISTRATIVE (PARTS RETURN/ETC.)	$2,076	27
A27 - DOES NOT MAINTAIN A CONSISTENT SPEED	$3,191	22
A85 - OTHER ELECTRICAL ACCESSORY TROUBLES	$4,867	22
N11 - UNUSUAL ENGINE NOISE AT IDLE	$1,274	18
N59 - OTHER SQUEAK/RATTLE (EXCLUDING WIND NOISE)	$2,121	15
H05 - EXCESSIVE "BRAKE PEDAL EFFORT" REQUIRED	$1,026	12
H19 - BRAKE-ABS WARNING LIGHT TROUBLES	$547	7
L83 - BRAKE FLUID LEAK	$245	6
N27 - VIBRATION OR SHUDDER WHILE BRAKING	$866	4
H02 - BRAKES GRAB OR LOCK-UP	$474	3
C05 - A/C DOES NOT WORK	$336	2
N22 - VEHICLE VIBRATES WHEN DRIVING BELOW 45 MPH	$126	2
S25 - SEAT BELT COIL/UNCOIL TROUBLES	$123	2
P59 - OTHER AUTOMATIC TRANSMISSION TROUBLES	$423	2
P67 - SHIFTS OCCUR TOO EARLY, TOO LATE, TOO OFTEN	$1,120	2
P61 - DIFFICULT TO OPERATE SHIFT LEVER	$150	1
H04 - PARKING BRAKE TROUBLES	$64	1
N18 - UNUSUAL TRANSMISSION NOISE	$64	1
C60 - OTHER STEERING/HANDLING AND RIDE TROUBLES	$55	1
L25 - LIGHTS NOT WORKING-INTERIOR	$25	1
B05 - BODY PANELS HARD TO OPEN	$23	1
A88 - WIRING TROUBLES	$75	1
L68 - POWER STEERING FLUID LEAK	$52	1
P82 - AUTOMATIC - 4-WHEEL/ALL -WHEEL DRIVE TROUBLES	$190	1
Grand Total	$52,485	407

3713 2215

Total Repairs by Month for Pressure Switch on 1992/1993MY Panther Vehicles



3713 2218

Brake Pressure Switch

TIS	35

Sum of R1000	Vehicle Line AWS		
State Code	Crown Victoria	Grand Marquis	Town Car
AK	0	0	0
AL	1.06	0	0.94
AR	0	0	0
AZ	0.75	1.41	1.29
CA	0.24	0	0.26
CO	2.2	0	0
CT	0.64	1.02	0
DE	3.11	1.98	0
FL	0.73	1.06	0.29
GA	0.4	0.81	0.8
HI	0	0	0
IA	0	0.87	0
ID	0	0	0
IL	0.83	0.88	0
IN	0.66	0.31	0
KS	0.82	0	1.63
KY	0.37	0.8	0
LA	0	0.41	0
MA	0.49	1.5	0.72
MD	0.46	0.61	0
ME	0	0	0
MI	0.62	0.32	0.67
MN	0	0	0
MO	0.31	0.69	0
MS	0	0	0
MT	0	0	0
NC	0.26	0.76	0
ND	0	0	0
NE	0	0	0
NH	0	0	0
NJ	0	1.21	0.41
NM	0	0	1.17
NV	0	0	0
NY	0.14	0.24	0.14
OH	0.65	0.69	0.44
OK	0.66	0	0
ON	0	0	0
OR	0	0	0
PA	1.06	0.77	0.33
RI	0	0	0
SC	0	1.24	0
SD	0	0	0
TN	0	0.41	1.67
TX	0.61	0.72	0.37
UT	0	0	0
VA	0.19	1.03	0.96
VT	0	0	0
WA	1.09	0	0.59
WI	0.46	0.85	1.34
WV	0	0	0
WY	0	0	0

SUM TOTAL
SWITCH
REPAIRS

TIS	36

Sum of REPAIRS	Vehicle Line AWS		
State Code	Crown Victoria	Grand Marquis	Town Car
AK	0	0	0
AL	3	0	1
AR	0	0	0
AZ	1	2	1
CA	3	0	2
CO	2	0	0
CT	2	1	0
DE	1	1	0
FL	7	23	7
GA	2	3	1
HI	0	0	0
IA	0	1	0
ID	0	0	0
IL	5	5	0
IN	3	1	0
KS	1	0	1
KY	1	1	0
LA	0	1	0
MA	1	5	2
MD	1	1	0
ME	0	0	0
MI	3	3	2
MN	0	0	0
MO	1	2	0
MS	0	0	0
MT	0	0	0
NC	1	2	0
ND	0	0	0
NE	0	0	0
NH	0	0	0
NJ	0	10	2
NM	0	0	1
NV	0	0	0
NY	1	2	1
OH	4	5	2
OK	1	0	0
ON	0	0	0
OR	0	0	0
PA	5	5	1
RI	0	0	0
SC	0	2	0
SD	0	0	0
TN	0	1	2
TX	5	7	3
UT	0	0	0
VA	1	3	2
VT	0	0	0
WA	1	0	1
WI	1	5	2
WV	0	0	0
WY	0	0	0

Volumes
1992 MY

TIS	38

Sum of VEHICLES	Vehicle Line AWS		
State Code	Crown Victoria	Grand Marquis	Town Car
AK	129	0	0
AL	2829	1972	1089
AR	1774	1250	689
AZ	1330	1422	777
CA	12468	5282	7784
CO	906	683	206
CT	3110	961	709
DE	322	606	285
FL	9530	21290	24517
GA	4968	3699	1997
HI	159	0	0
IA	1603	1758	307
ID	210	293	0
IL	6090	9101	3282
IN	4688	3196	1484
KS	1226	1338	616
KY	2690	1677	1254
LA	3585	2429	1632
MA	2066	6346	2787
MD	2200	1996	1200
ME	1642	491	0
MI	4875	9462	2997
MN	1806	1696	333
MO	3268	3417	1928
MS	1573	1021	620
MT	224	161	0
NC	3961	2537	1409
ND	386	358	0
NE	678	736	197
NH	520	666	177
NJ	2906	6291	4941
NM	661	729	868
NV	661	362	288
NY	7267	8371	7308
OH	7234	7226	4682
OK	1799	1639	1103
ON	374	0	0
OR	868	644	153
PA	5664	6479	3051
RI	357	0	0
SC	3229	1606	844
SD	390	275	0
TN	1830	2464	1195
TX	9863	9662	8122
UT	212	292	0
VA	5145	2899	2078
VT	212	121	0
WA	917	881	1508
WI	2083	3540	1492
WV	716	668	195
WY	427	148	0

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* Notes printed by TMASTERS on 9 Apr 1999 at 07:27:59 *
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From: JNEME --DRBN005 Date and time 04/08/99 15:13:23
To: TMASTERS--DRBN005 TDONOVAN--DRBN005
FPORTER --DRBN007
cc: SCOLE1 --DRBN005

FROM: Joseph S. Neme USART(UTC -04:00)
SUBJECT: Town Car Underhood Fires
See notes below... please let me know when we can have a 14D to review with Jack Paskus and Bill Bohan...thanks

Joseph S. Neme
LVC - Safety
Phone: 39-08133, Fax:62-18147, E-Mail:jneme@ford.com
Location: MD1255/Cube 2M37, Building #2 Textpager:313-795-7003
*** Forwarding note from JMCINERN--DRBN005 04/08/99 15:10 ***
To: JNEME --DRBN005

FROM: John McInerney USART(UTC -04:00)
Subject: Town Car Underhood Fires

Regards,
John McInerney:Tech Specialist-Safety,LVC-OPD Safety and Police Engineering. 313-322-0276, Pager:313-795-9243 or TEXTPAGE "Cel" phone:734-765-7534,"FORD-Building the Safest Cars in the World"
*** Forwarding note from JPASKUS --DRBN005 04/08/99 13:17 ***
To: JMCINERN--DRBN005
cc: JPASKUS --DRBN005

FROM: Jack Paskus USART(UTC -04:00)
Subject: Town Car Underhood Fires

I agree with Bill. Please organize a session to make it happen. Thanks

Regards,
Jack Paskus, Engineering Director, LVC
Room 13G112, MD 1131, Building 1
32-22530 FAX: 84-50078
*** Forwarding note from WBOHAN --DRBN005 04/08/99 09:02 ***
To: JPASKUS --DRBN005
cc: LCAMP --DRBN005 WBOHAN --DRBN005

FROM: Bill Bohan USART(UTC -04:00)
Subject: Town Car Underhood Fires
This note is in reference to the message I left asking you to give me a call.

You'll recall that back in February, I mentioned that we had about 2 months to investigate the alleged Town Car underhood fires and come to some kind of decision. Next week will be April 15 and the two months will be up. I recommend that LVC schedule a Tech Review next week with the possibility of turning it in to an FRC.

For the meeting, I recommend that the subjects of potential short term field action, potential permanent field action, potential involvement of other vehicle lines and all information that can help us determine if we have a defect be reviewed (in other words, an updated 14d white paper).

Your continuing efforts on this subject are really appreciated.

Regards,
Bill Bohan, Production Vehicle Safety & Compliance Manager
Automotive Safety Office, EGE, Suite 500, Fairlane Plaza South
Phone (313)322-9115:Fax(313)594-2268:email wbohan@ford.com

BRONCO

92	93	94	95	96	97	98	99
F3TB-12A581-AC	F4TB-12A581-AN	F5TB-12A581-AZ	F6TB-12A581-AJ	F7TB-12A581-BJ			
E9EB-14A464-AA	F4ZB-14A464-MA	F4ZB-14A464-MA	F4ZB-14A464-MA	F4ZB-14A464-MA			
18Ga . AZ	18Ga . AZ	SHORTING BAR	SHORTING BAR	[illegible]	[illegible]		

CAPRI

92	93	94	95	96	97	98	99

CROWN VICTORIA/ GRAND MARQUIS

92	93	94	95	96	97	98	99
F3AB-14401-AS	F4AB-14401-AE	F5AB-14401-AZ	F8AB-14401-AL	F7AB-14401-AL		XW3T-14401-	
F2AB-14A464-ADA	F2AB-14A464-ADA	[illegible]	[illegible]	[illegible]	F6OB-14A464-AA	F8OB-14A464-AA	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	18Ga . AZ	18Ga . AZ	

ECONOLINE

92	93	94	95	96	97	98	99
F3UB-12A581-CB	F4UB-12A581-GZ	F5UB-12A581-BZ	F6UB-12A581-CZ	F7UB-12A581-LY			
E9EB-14A464-AA	F4ZB-14A464-MA	F4ZB-14A464-MA	F4ZB-14A464-MA	F4ZB-14A464-MA			
SHORTING BAR	SHORTING BAR	SHORTING BAR	SHORTING BAR	SHORTING BAR			

EXPEDITION

92	93	94	95	96	97	98	99
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	XL14-12A581-AT	
						F4ZB-14A464-MA	
						16Ga . AZ	

3718 2222

Date Printed 4/7/99