

EA02-025

FORD 10/27/03

APPENDIX N

BOOK 24 OF 61

PART 2 OF 5

1992 & 1993 Town Car Underhood Fires

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 76% 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.

1992 & 1993 Town Car Underhood Fires

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 680°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

1992 & 1993 Town Car Underhood Fires

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 mAmpa.

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.

1992 & 1993 Town Car Underhood Fires

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.

1992 & 1993 Town Car Underhood Fires

Attachment 4

Test 15b

Objective: Compare: 1) the probability of switch ignition in the vertical position (connector up) versus 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.

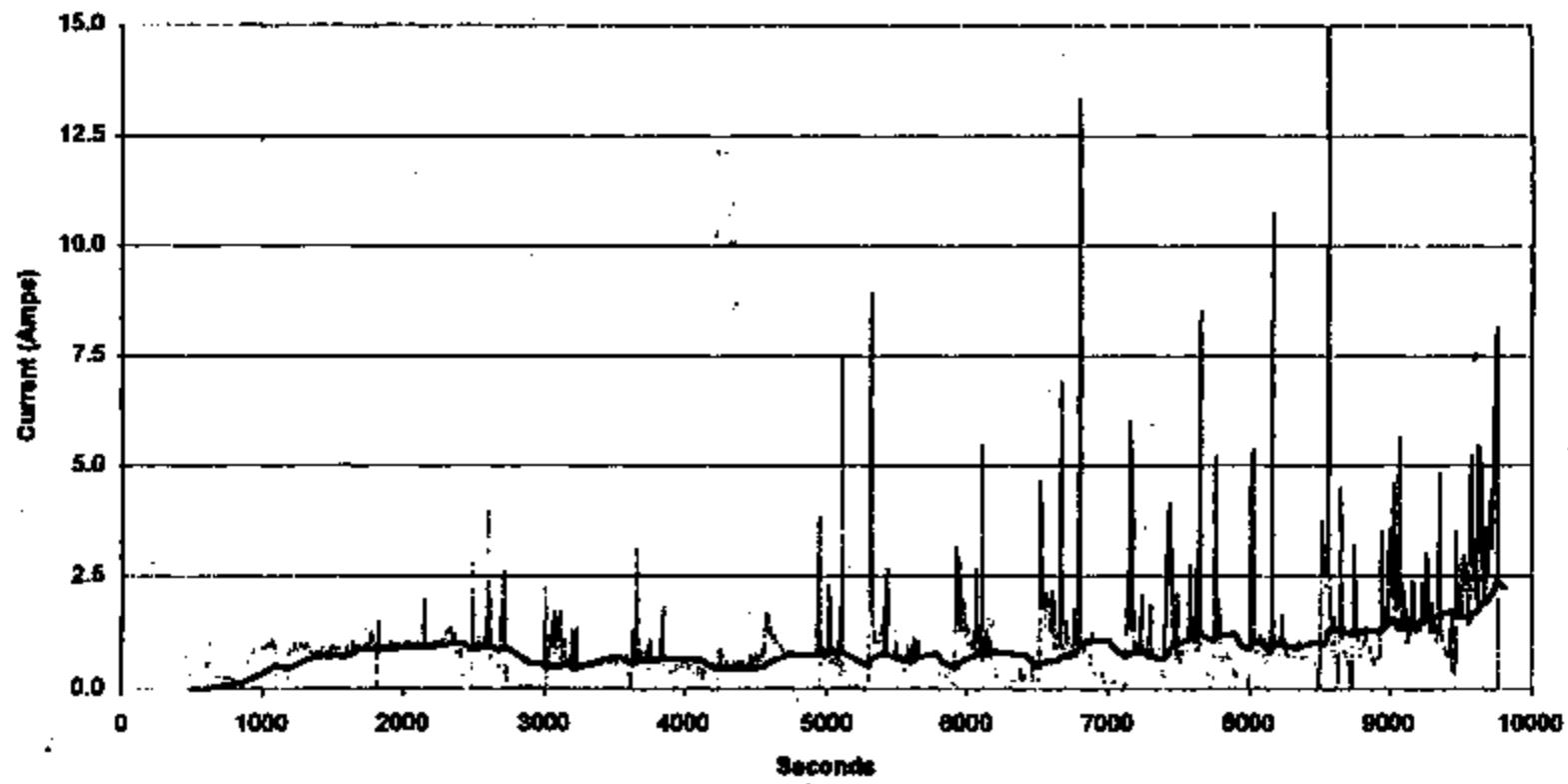
Results: A switch was injected with 5% NaCl in tap water solution and placed in a proposed current limiting circuit for 48 hours. The current draw remained constant at 180 mAmps throughout the test. There was no thermal activity observed and the contact arm remained intact.

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.

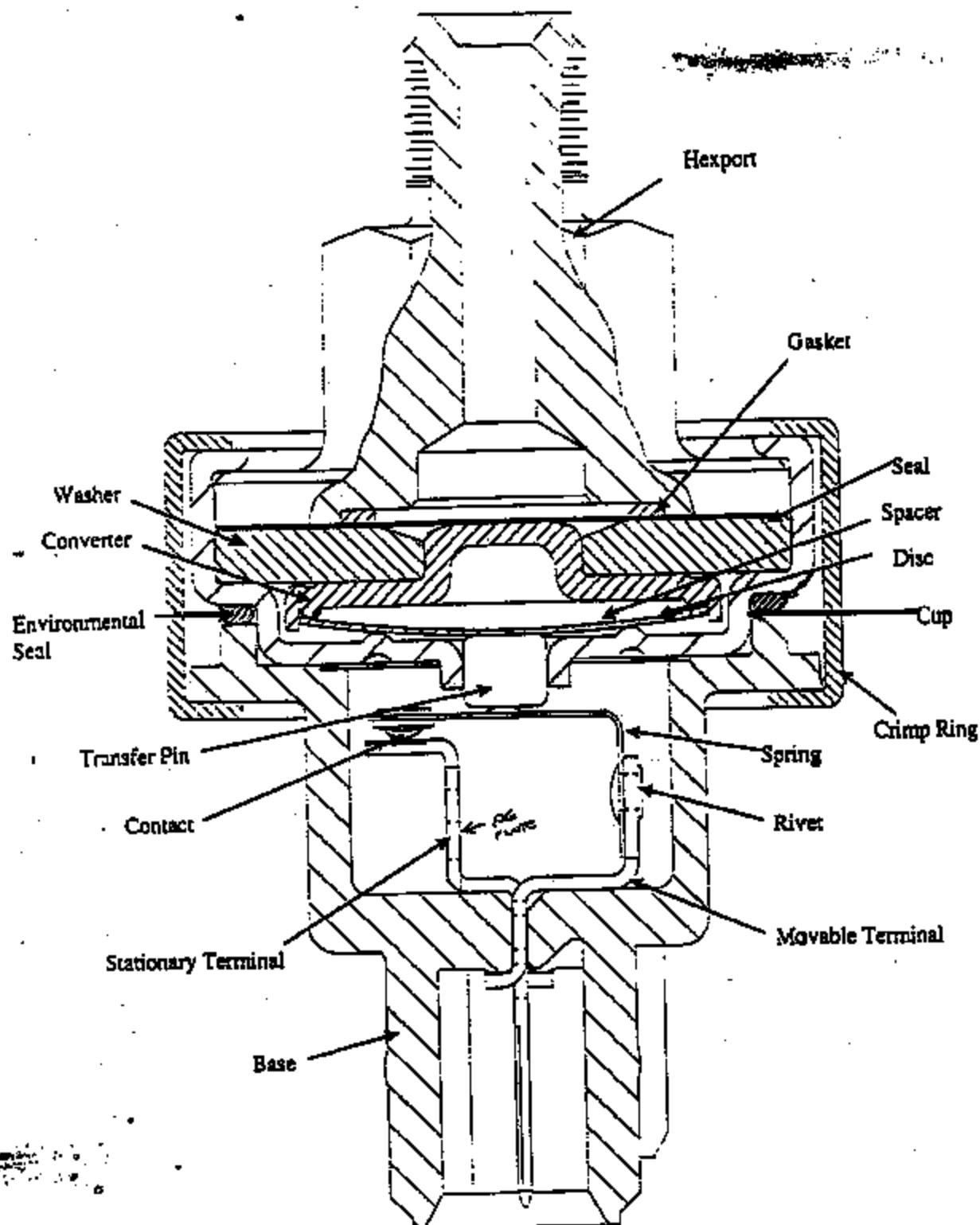
Hexport Current vs. Time
Fluid Ingress Experiment

New Brake Fluid	New Brake Fluid w/ 5% water	Used Brake Fluid w/ 5% Water
Tap Water	Used Brake Fluid	Rain Water
5% Salt Water	100 per. Mov. Avg. (5% Salt Water)	



37135784

Hydraulic Pressure Switch Cross Section



19:30 APR 29, 1999
PRODUCTION DATE: APR 29, 1999
CSD11101 VER. 14:50 02/19/99

FORD CUSTOMER SERVICE DIVISION
SERVICE, WARRANTY, AND FINANCIAL SYSTEMS DEPARTMENT
CAMPAIGN NOTIFICATION AND ADMINISTRATION CONTROL SYSTEM

PAGE 1
JOB 38878-01
SECTION 40.40.001

CSD11101 6 CSETEP05

APPLY MAVIS EXTRACT AUDIT/CONTROL REPORT

CAMPAIGN	EXTRACT RECORDS		
	IN	PROCESSED	REJECTED
99815	278,645	278,645	0
TOTALS:	278,645	278,645	0

CAMPAIGN	PLANT	PLANT RECORDS	
		BEGIN DATE	END DATE
99815	X	19920205	19921130
99815	Y	19911103	19921130

RESPONSIBLE DEALER USED	:	278,645
SHIP TO DEALER WITHIN 100 MILES	:	0
FACING DEALER WITHIN 100 MILES	:	0
PROXIMIZED FORD DEALER USED	:	0
PROXIMIZED MVR DEALER USED	:	0
SHIP TO DEALER (NO NAME) USED	:	0
FACING DEALER (NO NAME) USED	:	0
SCRIPTO BODY BUILDER DEALER USED	:	0
FACING BODY BUILDER DEALER USED	:	0
DEFAULT '181080' DEALER USED	:	0
DEFAULT '481569' DEALER USED	:	0
DEFAULT '59X440' DEALER USED	:	0
NEW VEHICLE PROCESSED	:	0
EXISTING VEHICLE PROCESSED	:	278,645

3713 6786

* Note printed by KZUBIETA on 29 Apr 1999 at 12:18:15 *

From: MMCCOMB --DRBN006 Date and time 04/29/99 12:09:39
To: KZUBIETA--DRBN006
cc: MMCCOMB --DRBN006 SHORNER --FORDMA2
EVILUSH --FORDMA2 MHABIAN --DRBN006
DROSSETT--DRBN006 RUDEBROC--DRBN006
LUKEAROC--DRBN006 BESCHE --DRBN006
LIGNE3 --DRBN006

FROM: Mark McComb USAST (UTC -04:00)
Subject: 99815-1 release

AUTHORIZATION FOR COMPANY RELEASE DATE: 99/04/29
CAMPAIGN NUMBER: 99815-1
MODEL YEAR(S): 1992-93
DESCRIPTION: SPEED CONTROL/FIRE UNDER HOOD
CAMPAIGN TYPE: SAFETY/EMISSIONS NOTIFICATIONS OTHER
EXTRACT TYPE: NEW CAMPAIGN SUPPLEMENT
DATASET NAME: CS.CB0110NV.NAVIS.EXTRACT.G1361V00
TO LOAD USE NUMBER: NAVISNEW
RECORD COUNT: 278,649
RMDS INFORMATION: CSW CS0110NV PRINT RPT DATE: 99/04/29 TIME: 11:06:06
TRANSMITTAL PREPARED BY: MMCCOMB

PRESS F11 FOR TOP OF FORM

Sincerely,
Mark McComb
Cube 602
CQIS CNACS

* The light at the end of the
* tunnel has been turned off
* due to budget cuts

3713 5767

* Note printed by KZUBIETA on 29 Apr 1999 at 10:44:04 *

From: KZUBIETA--DRBN006
To: LGHEE3 --DRBN006
MACCONE --DRBN006
JLYNCH --DRBN006
ABERROD --DRBN006
SHORMER --FORDNA2
BESCHI --DRBN006

Date and time 04/29/99 10:42:36
DROSSETT--DRBN006
LUDDEBROC--DRBN006
HODDEBROC--DRBN006
KWLUSH --FORDNA2
MEABIAN --DRBN006

FROM: Kelly Subietta
*** Resending note of 04/27/99 15:10
To: MACCONE --DRBN006
KZUBIETA--DRBN006
JLYNCH --DRBN006
BESCHI --DRBN006
SHORMER --FORDNA2
OC: LGHEE3 --DRBN006

UNAFT (UTC -04:00)

MEABIAN --DRBN006
DROSSETT--DRBN006
LUDDEBROC--DRBN006
KWLUSH --FORDNA2

FROM: Larry Gee
Subject: Extract Request 99815

UNAFT (UTC -04:00)

BOT!!!!

This extract is being resent to select only speed control vehicles in kit codes BB and CC (all AAs automatically have speed control) - VO52=5,7.

The revised extract is listed below.

FORD CUSTOMER SERVICE DIVISION
REQUEST FOR SERVICE RECALL/OWNER NOTIFICATION EXTRACT

CAMPAIGN NUMBER: 99815 Reqd DATE: 04/29/99 PRIOR REQUEST: 4/27/99

MODEL YEAR	VEHICLE LINE(S)	MODEL YEAR	VEHICLE LINE(S)
1992-1993	Town Car		
1992-1993	Cr. Vio/Gr. Marq.		

DESCRIPTION: 1992/93 Town Car/Crown Vio/Grand Marq. w/ speed control - under hood (Fred Porter {FPORTR} 313-845-3722)

DIVISIONS INVOLVED: ALL FCSD CANADA FIES MEXICO OTHER

REQUEST TYPE: NEW CAMP CAMP SUPPLEMENT VENDOR SPECIAL

ESTIMATED NUMBER OF UNITS: 256,000

CAMPAIGN SPECIFICATIONS:

EXCLUDE WARRANTY CANCELLATION CODES T1, T2, T3, T4

ADD VINS METHOD OF TRANSMISSION? _____

DELETE VINS METHOD OF TRANSMISSION? _____

PLANT CODE	DATES*	VEHICLE LINE CODES
FROM	THRU	

***** SEE KIT CODES *****

*IF NOT PRODUCTION DATES, SPECIFY WHICH DATES TO USE: _____

ADDITIONAL PARAMETERS: Please provide cross tabs by State/Province breakdown. Also provide Generation Number with XTABS Report Name (Date/Time).

SPECIAL HANDLING INSTRUCTIONS: BOTH Need today!

CAMPAIGN SPECIFICATIONS CONTINUED:

KIT CODE SPECIFICATIONS:

PRESS PF1 FOR TOP OF FORM

Received.

3713 5770

* Note printed by KZUBIETA on 29 Apr 1999 at 11:34:07 *

From: MMCCOMB --DRBN006
To: KZUBIETA--DRBN006
Cc: MNICOMB --DRBN006
LUDERROC--DRBN006

Date and time 04/29/99 11:20:49
JLVNCH --DRBN006
LGEEB3 --DRBN006

FROM: Mark McComb
Subject: 99815-1

USAET (UTC -04:00)

The report is under 99/04/29 11:06:06. Extract is G1361V00.

Sincerely,
Mark McComb
Cube 602
CGIS CMACS

* The light at the end of the
* tunnel has been turned off
* due to budget cuts

3713 6771

11:00 APR 29, 1999
PRODUCTION DATE: APR 29, 1999
CS011961 VER. 10:56 06/29/99

FORD CUSTOMER SERVICE DIVISION
SERVICE, WARRANTY, AND FINANCIAL SYSTEMS DEPARTMENT
CAMPAIGN NOTIFICATION AND ADMINISTRATIVE CONTROL SYSTEM

PAGE 1
JOB 36874-01
SECTION 40-40.001

CNT-NAVIS-15 NAVIS-EXT

NAVIS EXTRACT AUDIT/CONTROL REPORT

SUMMARY COUNTS FOR CAMPAIGN 99915

TOTAL CAMPAIGN RECORDS -----	278,645
CNT01: KIT CODE AA -----	123,310
CNT02: KIT CODE BB -----	64,021
CNT03: KIT CODE CC -----	91,314
CNT04: -----	0
CNT05: -----	0
CNT06: -----	0
CNT07: -----	0
CNT08: 6000 PARA -----	745,666
CNT09: 6997 PARA (ADD VIN6) -----	0
CNT10: PLANT = Y -----	231,496
CNT11: V/L = Y -----	231,496
CNT12: PROD 11/4/91 - 11/30/92 -----> AA	125,310
CNT13: PLANT = X -----	514,170
CNT14: PROD 2/5/92 - 11/30/92 -----	181,575
CNT15: V052 = 5,7 -----	155,333
CNT16: V/L = A -----> BB	64,021
CNT17: V/L = N -----> CC	91,314
CNT18: -----	0
CNT19: -----	0
CNT20: -----	0
CNT21: -----	0
CNT22: -----	0
CNT23: -----	0
CNT24: -----	0
CNT25: -----	0
CNT26: -----	0
CNT27: -----	0
CNT28: -----	0
CNT29: -----	0
CNT30: -----	0
EDIT COUNT 01 -----	0
EDIT COUNT 02 -----	0
EDIT COUNT 03 -----	0
EDIT COUNT 04 -----	0
DEALER CHANGE COUNT -----	287
PO BOX COUNT -----	0
SOLD DATE CHG COUNT -----	0
NA REC DATE CHG COUNT-----	4,741
NA EFF DATE CHG COUNT-----	4,639
EDIT COUNT 10 -----	0
EDIT COUNT 11 -----	0
EDIT COUNT 12 -----	0
DIVISION CHARGE COUNT -----	18
MINI I/P COUNT -----	0
NAVIS I/P COUNT -----	745,710
CARD I/P COUNT -----	0
SUP & ERROR CARD -----	0
CARD ADD COUNT -----	0
CARD DROP COUNT -----	0
CARD MATCH COUNT -----	0
FILE MIGR PRO DATE -----	15
CAMP MIGR PRO DATE -----	0
CNT-NAV-PASS-STATUS-EQ-00 -----	0
CNT-NAV-PASS-STATUS-NE-00 -----	0

11:00 AM 29, 1999
PRODUCTION DATE: APR 29, 1999
CSDT1001 VER. 10:56 04/29/99
CEREM615 NAVISEXT

FORD CUSTOMER SERVICE DIVISION
SERVICE, WARRANTY, AND FINANCIAL SYSTEMS DEPARTMENT
CAMPAIGN IDENTIFICATION AND ADMINISTRATIVE CONTROL SYSTEM
NAVIS EXTRACT AUDIT/CONTROL REPORT

PAGE 2
JOB 38876-01
SECTION 40.40.001

SUMMARY COUNTS FOR CAMPAIGN 99815

PLANT	---- BUILT DATE ----	
	BEGINNING	ENDING
X	19920205	19921130
Y	19911105	19921130

U.S. based

CAMPAIGN DATA SUMMARY								
CAMPAIGN NUMBER - 99815								
DIVISION BY MODEL YEAR								
	TOTAL	FPMO	FPMO FD	FPMO LM	F/CD	APFL	FEDF	TEOM
ALL	278645	262651	588341	2038151	110571	8491	2171	36711 RAM
92	174601	1648361	335851	1312511	76221	7341	691	13461 RAM
93	1040461	978191	252511	723641	34391	1151	1681	23311 RAM

*U.S.-L-M
CANADA
AFFILIATE
FEDERATED
NON-FED*

Mini-FAX Transmittal *5/11*

TO: BILL ABRAHAMSKY	FROM: KELLY ZUBER
BLDG. TELEPHONE FAX NO.	BLDG. TELEPHONE FAX NO.
<i>11780 1284</i>	

CAMPAIGN DATA SUMMARY

MODEL YEAR = 92

CAMPAIGN NUMBER = P9215

PLANT BY VEHICLE LINE

	ALL	X	Y	
ALL	174601	034761	811251	BAW
A	363051	363031		BAW
H	569711	569711		BAW
V	811251		811251	BAW

CAMPAIGN DATA SUMMARY

MODEL YEAR = 93

CAMPAIGN NUMBER = 99815

PLANT BY VEHICLE LINE

	ALL	X	Y	
ALL	1048641	618591	421851	RAW
A	275161	275161		RAW
R	343431	343431		RAW
V	421851		421851	RAW

CAMPAIGN DATA SUMMARY

MODEL YEAR = 92

CAMPAIGN NUMBER = 99615

DIVISION BY KIT CODE

	TOTAL	FPSD	FPSD RD	FPSD LH	F/C	APPL	FEDF	FEDM
ALL	174601	164838	335852	131251	76221	7341	691	13401 RAN
AA	81125	782611	1	782611	21281	1761	91	5511 RAN
BB	36589	335851	335851	1	26161	11	371	2641 RAN
CC	56971	529901	1	529901	28761	5571	231	5251 RAN

CAMPAIGN DATA SUMMARY

MODEL YEAR = 93

CAMPAIGN NUMBER = 99S15

DIVISION BY KIT CODE

	TOTAL	FPMO	FPMO FO	FPMO LM	F/C	AFFL	FEDF	FEDM	
ALL	104044	97815	25251	72584	3435	115	148	2531	RAM
AA	42165	40807		40807	866	73	16	423	RAM
JR	27516	25251	25251		1114	1	50	1101	RAM
CC	34343	31757		31757	1455	42	82	1007	RAM

CAMPAIGN DATA SUMMARY

MODEL YEAR = 92

CAMPAIGN NUMBER = 99815

DIVISION BY ENGINE CODE

	TOTAL	FPSD	FPSD FD	FPSD LM	F/C	AFFL	FEDF	FEDW
ALL	174601I	164836I	33585I	131251I	7622I	734I	69I	1340I RAV
W	174601T	164836I	33585I	131251I	7622I	734I	69I	1340I RAV

CAMPAIGN DATA SUMMARY

MODEL YEAR = 93

CAMPAIGN NUMBER = 99515

DIVISION BY ENGINE CODE

	TOTAL	FPSD	FPSD PR	FPSD LH	FAC	AFFL	FEDF	FEDM
ALL	104044	97815	25291	72564	34351	1151	1481	25311 RAM
U	104044	97815	25291	72564	34351	1151	1481	25311 RAM

CAMPAIGN DATA SUMMARY

MODEL YEAR = 92

CAMPAIGN NUMBER = 99815

DIVISION BY BODY STYLE

	TOTAL	FPMB	FPMB FD	FPMB LN	F/C	AFFL	FEDF	FEDW	
ALL	174601	1646361	33585	1312911	76221	7361	691	13601	RAM
M74	130121	125301		123301	6231	21	11	561	RAM
M75	439991	406601		404601	22531	5551	221	4691	RAM
M81	456681	448921		448921	7431	21	1	311	RAM
M82	292541	275171		275171	11821	1741	71	4541	RAM
M83	62031	58521		58521	2831		21	661	RAM
P72	53961	52801	52801		1071		91		RAM
P73	61091	46481	46481		13221		1	1391	RAM
P74	234441	221741	221741		11191	11	271	1231	RAM
P75	13561	14831	14831		701	11	11	21	RAM

CAMPAIGN DATA SUMMARY

MODEL YEAR = 93

CAMPAIGN NUMBER = 99915

DIVISION BY BODY STYLE

	TOTAL	FPSB	FPSB FD	FPSB LN	A/C	AFBL	FEDF	FEDN	
ALL	1040441	979151	252511	725611	34351	1151	1681	25311	RAV
M74	83991	79751		79751	3321		21	901	RAV
M75	259441	237821		237821	11251	421	891	9171	RAV
M81	209571	206851		206851	1731	51		941	RAV
M82	165811	157111		157111	5281	681	121	2621	RAV
M83	46471	44111		44111	1651		41	471	RAV
P71	10951	10951	10951		21				RAV
P72	9891	6281	6281		351		1	3261	RAV
P73	47361	37561	37561		6601		31	3171	RAV
P74	206961	197741	197741		4171		471	4581	RAV

CAMPAIGN DATA SUMMARY

MODEL YEAR = 92

CAMPAIGN NUMBER = 99315

DIVISION BY ENGINE TAG CODE

	TOTAL	FPSD	FPSD PD	FPSD LM	F/C	APFL	FEDF	FEDR	
ALL	174601	164336	33585	131251	76221	734	69	1340	RAM
2G800BA	3360	3253	3253		102			51	RAM
2G802BA	7439	7011	824	6187	287	1	61	134	RAM
2G804AA	19538	17838	17838		14511		271	222	RAM
2G804BA	4773	4198	4198		5491		51	211	RAM
2G806AA	43741	40757	2571	38188	22111	350	171	4061	RAM
2G806BA	10284	9186	569	8617	8891	207	11	11	RAM
2G808AA	3569	3580	3580		51		41		RAM
2G808BA	752	752	752		1		1		RAM
2G812AA	24394	23569		23569	6391	57	4	3251	RAM
2G812AB	19	19		19	1		1		RAM
2G812BA	47934	46324		46324	12801	99	51	2261	RAM
2G812CA	8294	8078		8078	1961	20	1		RAM
2G816AA	951	851		851	101				RAM
2G816BA	1891	1861		1861	31				RAM

CAMPAIGN DATA SUMMARY

MODEL YEAR = 93

CAMPAIGN NUMBER = 99815

DIVISION BY ENGINE TAG CODE

	TOTAL	FPMO	FPSD FB	FPSD LM	F/C	AFPL	FEDF	FERN	
ALL	104044	97815	252511	72564	3435	115	148	2531	RAV
3G806AA	22554	20516	20516	1	893	1	461	1099	RAV
3G806AA	38210	35399	3642	31757	1676	42	86	1009	RAV
3G806AA	1095	1093	1093	1	21	1	1	1	RAV
3G812AA	40791	39489		39489	857	6	161	423	RAV
3G816AA	1394	1318		1318	9	67	1	1	RAV

CAMPAIGN DATA SUMMARY

MODEL YEAR = 92

CAMPAIGN NUMBER = 99815

DIVISION BY STATUS

	TOTAL	FPSD	TPSD FD	FPSD LN	F/C	AFFL	FEDF	FEDM	
ALL	1746601	1648361	335831	1312511	76221	734	691	13401	RAW
880	361	271	31	241	111				RAW
608	51	51	21	31					RAW
750	9861	1	1	1		7341	561	2361	RAW
800	1676471	1593911	316971	1276941	70991		531	11041	RAW
801	33971	29921	911	20811	4051				RAW
802	25281	24211	972	14491	1071				RAW

CAMPAIGN DATA SUMMARY

MODEL YEAR = 93

CAMPAIGN NUMBER = 99815

DIVISION BY STATUS

	TOTAL	FPSD	FPSD FD	FPSD LN	F/C	AFFL	FEDF	FEMI	
ALL	104044	978151	252511	725641	34351	1151	1481	25311	RAW
600	371	361	161	181	31	1	1	1	RAW
604	241	231	111	121	11	1	1	1	RAW
750	4201	11	1	11	115	221	2021	RAW	
770	3401	3001	1	3801	1	1	1	1	RAW
800	958431	902671	290461	672211	31611	1241	22491	RAW	
801	47821	44761	10361	26341	2321	1	1	1	RAW
802	27581	27201	3421	25781	381	1	1	1	RAW

CAMPAIGN DATA SUMMARY

MODEL YEAR = 92

CAMPAIGN NUMBER = 99615

DIVISION BY ENGINE CALIBRATION

	TOTAL	FPMO	FPMO FD	FPMO LH	F/C	APFL	FEBF	FEDM	
ALL	174601	164836	33985	131251	7622	734	691	1340	RAM
	20791	11	1	11		734	41	1340	RAM
218AR10AI	92261	89181	3314	56041	306		21		RAM
218BR10AI	7541	7141	391	323	40				RAM
218CR10AI	3041	2561	144	1141	43		31		RAM
218DR05AI	399681	367071		367071	1256		71		RAM
218ER05AI	10831	10521		10521	31		1		RAM
218FR05AI	642651	600061	196401	40368	4235		421		RAM
218QR05AI	19251	19251	5471	1378					RAM
218WR05AI	69001	60301	31221	29081	865		51		RAM
218YR05AI	43411	43321	43321	1	51		41		RAM
218JR05AI	308501	300051		300051	843		21		RAM
218MR05AI	30111	30111	13921	16191			1		RAM
218MR05AI	10041	10041	475	5291			1		RAM
218PR10AI	3191	3191	1091	1381					RAM
218RD05AI	22191	22191		22191					RAM
218RR05AI	56531	56531		56531					RAM
218SR05AI	6251	6251		6251					RAM
218TR10AI	551	551	391	161					RAM

CAMPAIGN DATA SUMMARY

MODEL YEAR = 93

CAMPAIGN NUMBER = 99815

DIVISION BY ENGINE CALIBRATION

	TOTAL	FPG8	FPG8 TO	FPG8 LM	F/C	AFFL	FEDF	FEDB	
ALL	1040461	978151	25251	725641	34351	1151	1481	25311	RAW
	63401	3621	11	3011	34351	751		25281	RAW
318DR00AI	20741	20741		20741			21		RAW
318DR10AI	108641	108601		108601			31		RAW
318DR11AI	26111	26111		26111					RAW
318ER00AI	1731	1731		1731					RAW
318ER10AI	3981	3981		3981					RAW
318ER11AI	184811	184901	7792	106581			311		RAW
318FR10AI	295771	295061	123471	171191			691	21	RAW
318GR00AI	6061	6061	2761	3381					RAW
318GR10AI	2991	2991	1251	1741					RAW
318GR11AI	1411	1411	611	801					RAW
318HR00AI	21951	21911	10881	11031			11		RAW
318HR10AI	14361	14291	7021	7271			21	51	RAW
318HR11AI	6071	5801	2531	3271			11	281	RAW
318IR00AI	4561	4561	4561						RAW
318IR10AI	431	431	431						RAW
318IR11AI	5931	5931	5931						RAW
318JR00AI	43401	43401		43401					RAW
318JR10AI	134051	133971		133971			81		RAW
318JR11AI	23351	23321		23321			31		RAW
318MR00AI	7241	6901	3761	3211			281		RAW
318MR10AI	9221	9121	5211	3811			101		RAW
318MR11AI	3191	3091	1361	1751			11		RAW

CAMPAIGN DATA SUMMARY

MODEL YEAR = 93

CAMPAIGN NUMBER = 99215

DIVISION BY ENGINE CALIBRATION

	TOTAL	F/P/S/D	F/P/S/D FG	F/P/S/D LN	F/C	AFPL	FEDF	FEDM	
318MR0DA	413I	413I	226I	187I	I	I	I	I	RAV
318MR10A	287I	287I	164I	123I	I	I	I	I	RAV
318MR11A	93I	93I	39I	54I	I	I	I	I	RAV
318MR0DA	472I	472I	I	472I	I	I	I	I	RAV
318MR1DA	1002I	1002I	I	1002I	I	I	I	I	RAV
318RR0DA	20I	20I	I	20I	I	I	I	I	RAV
318RR10A	626I	626I	I	626I	I	I	I	I	RAV
318RR11A	981I	981I	I	981I	I	I	I	I	RAV
318SR0DA	243I	243I	I	243I	I	I	I	I	RAV
318SR1DA	148I	148I	I	148I	I	I	I	I	RAV
OTHER	448I	448I	I	448I	I	I	I	I	RAV

CAMPAIGN DATA SUMMARY

CAMPAIGN NUMBER = 99315

MODEL YEAR BY EMISSION CODE

	ALL	92	93	
TOTAL	278643	17461	104044	RAW
	227978	139847	881111	RAW
E	104	61	43	RAW
G	1683	1227	456	RAW
H	81	81	1	RAW
2	19643	12887	6736	RAW
3	11344	8842	2482	RAW
4	1344	1114	230	RAW
7	9374	6395	2979	RAW
5	65411	3775	2766	RAW
9	553	332	221	RAW

CAMPAIGN DATA SUMMARY

CAMPAIGN NUMBER = 99515

MODEL YEAR BY UNI

	ALL	92	93	
TOTAL	278643	174601	104044	RAM
1LE	123310	81123	42185	RAM
2PA	44021	34805	27516	RAM
2NE	91314	56971	34343	RAM

CAMPAIGN DATA SUMMARY

CAMPAIGN NUMBER = 99815

MODEL YEAR BY COUNTRY

	ALL	92	93	
TOTAL	2706451	174401	1040441	RAW
U.S.A.	2626511	1648361	978151	RAW
CANADA	110571	76221	34351	RAW
FEDF	2171	691	1481	RAW
FEDM	38711	13401	25311	RAW
VENEZUELA	6691	6691		RAW
JAPAN	1681	611	1071	RAW
NETHERLANDS	101	21	81	RAW
MEXICO	21	21		RAW

CAMPAIGN DATA SUMMARY

DIVISION = 1

CAMPAIGN NUMBER = 99015

MODEL YEAR BY STATE

	ALL	92	93	
	6961	3451	331	RAU
C	11	11	1	RAU
D	71	71	1	RAU
I	31	31	1	RAU
X	11	11	1	RAU
M	21	21	1	RAU
N	11	11	1	RAU
O	11	11	1	RAU
V	22	22	1	RAU
AK	701	561	121	RAU
AL	13321	7061	6261	RAU
AR	6901	3911	2991	RAU
AZ	7851	4581	3271	RAU
CA	34151	19801	14351	RAU
CO	4371	3291	1161	RAU
CT	5701	2971	2731	RAU
DC	2921	2271	251	RAU
DE	1711	731	981	RAU
FL	59681	31721	27961	RAU
GA	23021	13251	9771	RAU
KI	731	361	371	RAU
IA	6561	4271	2271	RAU
ID	1241	801	441	RAU

CAMPAIGN DATA SUMMARY

DIVISION = 1

CAMPAIGN NUMBER = 99215

MODEL YEAR BY STATE

	ALL	92	93	
IL	I 2512I	1333I	1177I	RAW
IN	I 980I	518I	442I	RAW
KS	I 731I	403I	318I	RAW
KY	I 631I	399I	432I	RAW
LA	I 1174I	604I	570I	RAW
MA	I 1281I	798I	483I	RAW
MD	I 1368I	796I	572I	RAW
ME	I 176I	91I	85I	RAW
MJ	I 2576I	1522I	1056I	RAW
MN	I 1400I	943I	465I	RAW
MO	I 1810I	1239I	571I	RAW
MS	I 634I	315I	319I	RAW
MT	I 78I	55I	23I	RAW
NC	I 1896I	868I	1028I	RAW
ND	I 164I	105I	59I	RAW
NE	I 265I	152I	113I	RAW
NH	I 220I	95I	125I	RAW
NJ	I 1777I	974I	809I	RAW
NM	I 345I	200I	145I	RAW
NV	I 229I	121I	108I	RAW
NY	I 2003I	1042I	961I	RAW
OH	I 2388I	1295I	1093I	RAW
OK	I 2643I	2105I	538I	RAW
OR	I 357I	199I	158I	RAW

CAMPAIGN DATA SUMMARY

DIVISION = 1

CAMPAIGN NUMBER = 99215

MODEL YEAR BY STATE

	ALL	92	93	
PA	2105	1853	1052	RAW
RI	210	113	97	RAW
SC	1247	684	973	RAW
SD	160	112	68	RAW
TR	1120	547	573	RAW
TX	4384	2369	2015	RAW
UT	269	168	101	RAW
VA	1983	1277	706	RAW
VT	81	46	35	RAW
WA	422	224	198	RAW
WI	999	632	367	RAW
WV	348	190	158	RAW
WY	92	31	61	RAW

CAMPAIGN DATA SUMMARY

MISSION = 3

CAMPAIGN NUMBER = 99615

MODEL YEAR BY STATE

	ALL	92	93
--	-----	----	----

	40681	14271	26411	RAW
--	91	41	51	RAW
AK	441	251	191	RAW
AL	25591	15491	10101	RAW
AR	17121	10391	6731	RAW
AZ	19211	9641	9571	RAW
CA	110791	48891	41861	RAW
CO	12901	8771	4131	RAW
CT	15221	9241	5981	RAW
DC	3221	2151	1071	RAW
DE	5981	3451	2531	RAW
FL	314731	204581	110151	RAW
GA	55011	34821	16191	RAW
GU	11	11	11	RAW
HI	7531	4601	2651	RAW
IA	12331	6841	5491	RAW
ID	2371	1361	1011	RAW
IL	114471	79111	44361	RAW
IN	30921	18981	11041	RAW
JN	11	11	11	RAW
KS	13351	7751	5601	RAW
KY	21151	13551	7601	RAW
LA	34671	23381	11291	RAW

CAMPAIGN DATA SUMMARY

DIVISION = 3

CAMPAIGN NUMBER = 99815

MODEL YEAR BY STATE

	ALL	92	93	
IA	I 5260	3358	1902	RAM
ID	I 2920	1850	1078	RAM
ME	I 400	249	153	RAM
MI	I 10082	6455	3627	RAM
MM	I 2291	1554	737	RAM
MO	I 40061	2548	1423	RAM
MS	I 12961	764	332	RAM
MT	I 1701	167	63	RAM
NC	I 33031	2094	1209	RAM
ND	I 2331	129	104	RAM
NE	I 5701	315	257	RAM
NH	I 6661	487	259	RAM
NJ	I 95451	5771	3774	RAM
NM	I 8481	628	226	RAM
NV	I 10411	547	494	RAM
NY	I 11103	5783	4329	RAM
OK	I 7853	4747	3106	RAM
OK	I 19488	15790	3696	RAM
OR	I 762	551	211	RAM
PA	I 6124	3725	2399	RAM
PB	I 1	1	1	RAM
PE	I 4	1	3	RAM
RI	I 5281	284	244	RAM
SA	I 2	1	2	RAM

CAMPAIGN DATA SUMMARY

DIVISION = 3

CAMPAIGN NUMBER = 99515

MODEL YEAR BY STATE

	ALL	92	93	
SC	28421	1983	8591	RAW
SD	2121	105	109	RAW
TM	35931	22051	13661	RAW
TX	135441	91051	43731	RAW
UT	5031	3131	1961	RAW
VA	47881	31011	16791	RAW
VI	21	27	1	RAW
VT	1641	901	741	RAW
WA	11581	8451	3131	RAW
WI	19641	12181	7461	RAW
WV	6007	3487	2521	RAW
WY	1571	771	601	RAW

CAMPAIGN DATA SUMMARY

DIVISION = 4

CAMPAIGN NUMBER = P9615

MODEL YEAR BY STATE

	ALL	92	93	
	192	135	57	RAV
AB	1084	783	301	RAV
BC	713	527	186	RAV
IL	2	1	1	RAV
IN	11	11	1	RAV
MB	340	228	412	RAV
NT	1	1	1	RAV
NS	294	192	102	RAV
NB	11	11	1	RAV
NF	54	32	22	RAV
NR	302	218	84	RAV
NT	9	5	4	RAV
ON	5966	3963	1941	RAV
PE	61	36	25	RAV
PQ	1673	1205	468	RAV
RJ	11	11	1	RAV
SK	422	291	131	RAV
YT	11	11	1	RAV

CAMPAIGN DATA SUMMARY

DIVISION = 5

CAMPAIGN NUMBER = 99815

MODEL YEAR BY STATE

	ALL	92	93	
	4568	1933	2635	RAW
--	21		21	RAW
AF	11		11	RAW
CA	21	21	1	RAW
CO	11		11	RAW
GU	191	121	71	RAW
IL	11		11	RAW
JH	41	41	1	RAW
MI	1471	1371	101	RAW
MO	31	31	1	RAW
NJ	51	51	1	RAW
PR	1781	441	1341	RAW
RD	11	11	1	RAW
SA	31	11	21	RAW
SP	11		11	RAW
TX	21	21	1	RAW
VI	11	11	1	RAW

TABLE 13. PLANE A, PART 1-1

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CAMPAGN DATA SUMMARY

CAMPAIGN NUMBER = 99615

STATE BY ORDER DEALER

3713 5801

CAMPAIGN DATA SUMMARY

CAMPAIGN NUMBER = 99515

STATE BY ORDER DEALER

	AF	AK	AL	AR	AZ	BC	CA	CH	CD	CT	DC	DE	
B1 3421													RAV
B4 5051													RAV
1104171													RAV
1323571													RAV
1604551													RAV
2117421													RAV
21182241													RAV
2103221													RAV
25F3071													RAV
2480081													RAV
2465121													RAV
27F0601													RAV
4113691													RAV
41V2111													RAV
41V5441													RAV
4417161													RAV
5683001				13									RAV
71BD161								351					RAV
B4 10K1													RAV
B4 B9J1													RAV
OTHER	11	114	3890	2402	27061	7131	144591	11	17271	20921	5741	7691	RAV

CAMPAIGN DATA SUMMARY

CAMPAIGN NUMBER = 99615

STATE BY ORDER DEALER

	FL	GA	GU	HI	IA	ID	IL	IN	JH	KS	KY	LA	MA	MD	ME	MI	MO	MS	NC	ND	NE	NH	NI	OK	PA	PR	RI	SD	VA	WA	WI	WV	WY
B1 342																														RAV			
B4 9031																														RAV			
11M6171																														RAV			
1323571																														RAV			
16C4551																														RAV			
2117621																														RAV			
21N2241																														RAV			
2109221																														RAV			
23F3D71		11	11																											RAV			
24B0081		63																												RAV			
24E5121		76																	11											RAV			
27FB001																														RAV			
4113691																														RAV			
41V2111																														RAV			
41V5441																														RAV			
44I1161																														RAV			
5603001																			11											RAV			
71B0181																														RAV			
B4 10H1																														RAV			
B4 691																														RAV			
OTHER	37501	78021	201	8261	16871	3611	13960	40531	51	20561	29461	46411																			RAV		

CAMPAIGN DATA SUMMARY

CAMPAIGN NUMBER = 99515

STATE BY ORDER DEALER

	VA	MD	RD	DE	MI	NH	ND	RS	NY	WB	NC	ID
81 342												RAM
84 563	I											RAM
13U617	I				I							RAM
132557	I				I							RAM
16C455	I				I							RAM
21L742	I				I						41	RAM
21W224	I				I			I			231	RAM
21U322	I				I			I				RAM
23J307	I				I		I		861			RAM
24W065	I				I			I				RAM
24E312	I				I			I				RAM
27F080		I										RAM
411369		I										RAM
41W211		I										RAM
41W544		I										RAM
44I116		I			I			I				RAM
560300		I			I			I				RAM
71B018	I				I			I				RAM
84 16H	I				I			I				RAM
84 89J	I				I			I				RAM
OTHER	6540	340	4288	574	128031	36981	58191	18441	2491	294	91721	398

CAMPAIGN DATA SUMMARY

CAMPAIGN NUMBER = 99B15

STATE BY ORDER DEALER

	NE	NP	IN	IJ	IL	MS	MT	NV	NY	OH	OK	OR	PA	SD	WA
B1 3421							1					181	RAW		
B4 5031							1						RAW		
11U8171							1						RAW		
1323571							1					114	RAW		
1604551				20									RAW		
21L7421							1						RAW		
21M2241							1						RAW		
21U3221							1						RAW		
23F3071							1						RAW		
2480081									11				RAW		
24E5121							1					11	RAW		
27P0601									1				RAW		
4113691									1				RAW		
41W2111							1						RAW		
41V5441							1						RAW		
4411161							1					29	RAW		
5603001					481		1						RAW		
71BD181							1						RAW		
B4 10H1							1						RAW		
B4 89J1							1						RAW		
OTHER	6351	561	0061	113071	11451	3021	91	12701	131061	102101	220171	58881	RAW		

CAMPAIGN DATA SUMMARY

CAMPAIGN NUMBER = 99213

STATE BY ORDER DEALER

	OR	PA	PE	PO	PR	RD	RI	SA	SC	SD	SK	SP	
	B1 3421												I RAW
	B4 5031												I RAW
	1												
	1104171		I										I RAW
	1323571		I										I RAW
	1604551		I										I RAW
	21L742		I										I RAW
	21M224		I										I RAW
	21U322		I										I RAW
	23F3071		I										I RAW
	24B0061		I										I RAW
	24E5121		I										I RAW
	27F0801		I										I RAW
	4113691		I										I RAW
	41V211		I										I RAW
	4TV5441		I										I RAW
	4611161		I										I RAW
	5603001		I										I RAW
	71B0181		I										I RAW
	B4 1041		I										I RAW
	B4 8941		I										I RAW
OTHER	11191	82281	61	16741	182	1	7391	51	41041	3721	4191	11	I RAW

CAMPAIGN DATA SUMMARY

CAMPAIGN NUMBER = 99615

STATE BY ORDER DEALER

	TM	TX	UT	VA	WI	VT	MA	MI	NY	VY	YT	
81 5421												RAV
84 5031												RAV
1106171												RAV
1323571												RAV
16C4551												RAV
21L7421	1			1	51							RAV
21N2241												RAV
21U3221												RAV
23F3071		1										RAV
2480081												RAV
2485121												RAV
27F0801					1311							RAV
41134P1								101				RAV
41V2111									1			RAV
41V5441									9			RAV
4411161										1		RAV
5603001										1		RAV
71B4181											1	RAV
84 10M1											1	RAV
84 89J1											1	RAV
OTHER 1	47131	179511	7721	6631	31	2451	19801	29431	9481	2491	11	RAV

CAMPAIGN DATA SUMMARY

CAMPAIGN NUMBER = 99E15

EMISSION LABELS BY MODEL YEAR

ALL	2704451	RAW
92	174401	RAW
93	104044	RAW

UNIT=UCA VOL=RER=BUCKOL DEN=3 TETCH=0 LRECL=00250 BLKSIZE=27730 RECFM=FB RATE=09110 TIME=11.05 OEMNAME=CS.CSD110MV.MAVIS
0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....0
.3881RDRMVECTRACT 9202 990429

0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....0
... REC 0001 LENGTH 00250
.2FACPT4W8MX1783 01337A42880088B 50215d0300 920213920617920416920618991518880016J ENOMA.
.ID 5601 N W EXPRESSW GALLUP NM973.
.05 Y0000 3Y V PJ218FR00A 0000 ... SEC 0002 LENGTH 00250
*
0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....0
.2FACPT4W8MX184 4933PA420804LA 84 89J0921049202109262209202209202209991518880020
3131516 10MTEST 89 89J
Y0000 3Y V PJ218FR00A 0000 ... SEC 0003 LENGTH 00250
*
0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....0
.2FACPT76W7MX184 0433PA428804AA 1323578880519202119203129203129203129991518880019HERT2-R.
.ENT-A-CAR 5601 N W EXPRESSW OKLAHOMA CITY OK731.
.26 Y0000 3Y V PJ218FR00A 0000 ... SEC 0004 LENGTH 00250
*
D.....1.....2.....3.....4.....5.....6.....7.....8.....9.....0
.2FACPT76W7MX184 0433PA428804AA 1323578880519202119203129203129203129991518880019HERT2-R.
.ENT-A-CAR 5601 N W EXPRESSW OKLAHOMA CITY OK731.
.26 Y0000 3Y V PJ218FR00A 0000 ... SEC 0005 LENGTH 00250
*
0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....0
.2FACPT74W9MX184 0433PA428804AA 1323578880519202129203129203129203129991518880019HERT2-R.
.ENT-A-CAR 5601 N W EXPRESSW OKLAHOMA CITY OK731.
.26 Y0000 3Y V PJ218FR00A 0000 ... SEC 0006 LENGTH 00250
*
0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....0
.2FACPT74W4MX184 0433PA428804AA 1323578880519202139203129203129203129991518880019HERT2-R.
.ENT-A-CAR 5601 N W EXPRESSW OKLAHOMA CITY OK731.
.26 Y0000 3Y V PJ218FR00A 0000 ... SEC 0007 LENGTH 00250
*
D.....1.....2.....3.....4.....5.....6.....7.....8.....9.....0
.2FALP75U3MX187 2133644288008B 248008 92020692111921112921112999151888001118 CLAT.
.ID 5300 N FED HWY FT LAUD FL333.
.08 Y0000 30 3V T/2188R10A 0000 ... SEC 0008 LENGTH 00250

* Note printed by FECHL on 7 May 1999 at 10:07:38 *

From: KEUBIETA--DRBN006
To: TBASIL --DRBN005
PVEGH --DRBN005
DFINLEY --FORDNA1
REHGLIS1--DRBN005
TDOMOVAN--DRBN005
SRIMERS--DRBN007
TMASTERS--DRBN005
WABRANCZ--DRBN005

Date and time 05/06/99 19:08:15
JAAMIOKA--DRBN006
FECHL --DRBN007
RHEVI --DRBN005
JPAEKUS --DRBN005
FPORTER --DRBN007
JKAFATI --DRBN004
CTESKE --DRBN005

FROM: Kelly Subieta USAET(UTC -04:00)
Subject: New Number '99815' Assigned on May 6, 1999

Regards,
Kelly Subieta
FCSD, Recall/Service Programs, Recall/CNV Coordinator
313-248-6817 Fax: 313-845-1024 Internet: KEUBIETA@Ford.com
*** Forwarding note from KEUBIETA--DRBN006 05/06/99 19:04 ***
To: Recall Number Assignment Distribution

FROM: Kelly Subieta USAET(UTC -04:00)
Subject: New Number '99815' Assigned on May 6, 1999

Safety Recall 99815 has been assigned to 1992-93 Town Car, Crown Victoria and Grand Marquis Vehicles Equipped with Speed Control - Brake Pressure Switch (99X32).

14-D Author: Tim Donovan

The 14-D Team/Author will be responsible for reviewing Prevent Action closure with the Engineering Directors on July 30, 1999, at the Engineering Directors' Campaign Prevent Meeting.

This review will focus on implementation of Prevent Action (step 13) requiring evidence of incorporation and overall quality of event including systemic root cause and appropriate prevent action selection to capture lessons learned.

Please contact Dave Craig (DCRAIG) upon receipt of this notice for further information and direction.

Regards,
Kelly Subieta
FCSD, Recall/Service Programs, Recall/CNV Coordinator
313-248-6817 Fax: 313-845-1024 Internet: KEUBIETA@Ford.com

Speed Control Deactivation Switch Rationale

- 1) WCR - Automatic Vehicle Speed Control 10.03-D01-1
DEACTIVATION REDUNDANCY:
Backup system for deactivation shall be provided.
- 2) SDS Requirement SC-0005 REDUNDANT BRAKE DEACTIVATION REQUIRED
A redundant method for sensing brake application independent of the primary system deactivation mode must be provided to the speed control system.
One Interpretation of this requirement: Brake Pedal cancellation of speed control operation shall be done using dual brake detection systems; speed control operation shall be canceled if a malfunction occurs at the microcomputer or at the brake switch.
- 3) Primary Redundant Safety Feature
(Most important the Deactivation Switch is INDEPENDENT of Servo electronics)
- 4) All major speed control system has a similar switch
- 5) Used to avoid liability
- 6) Introduction with the vacuum system; estimate 1979

Being INDEPENDENT of Servo electronics, Deactivation Switch provides system cancellation for:

- Stuck motor phase after engagement
- Shorted motor phase after engagement
- Normal brake (stop Lamp) malfunction
- Seized motor
- Software malfunction

Brake Pressure Switch Questions

Competitive Vehicles

How is switch packaged?

Is it always Powered (HOT_ALL_TIME) ?

Are the contacts opened when pressure applied?

What is fuse limit?

What is being switched?

Is it a redundant switch?

Stewart Salter by 2/16/99

What are descriptions from AWS and CQIS?

Joe Neme/ Bill Abramczyk by 2/16/99

Are the switch materials compatible with brake fluid?

Greg Stevens by 2/16/99

Are the switch materials compatible with brake fluid in an electric field?

Greg Stevens by 2/16/99

Are the switch materials compatible with brake fluid and contaminants?

Greg Stevens by 2/16/99

Are the switch materials compatible with contaminated brake fluid in an electric field?

Greg Stevens by 2/16/99

What are we seeing in returned Speed control modules (FRACAS)?

Fred Kohl/ Dan Budzynski by 2/12/99

What does TI DFEMA say about this failure mode?

Rob Sharpe by 2/10/99

What are TI in-process test failures?

Rob Sharpe by 2/10/99

What does Speed control FMEA say about Brake Switch ?

Fred Kohl by 2/9/99

Brake Pressure Switch Questions

The Brake Pressure Switch (Deactivation Switch) coupled with the Stop Lamp switch are categorized as "Automatic Deactivation". The FMEA lists Automatic Deactivation" as current design control for 66 different potential cause/ mechanical failures.

Brake Pressure Switch (Deactivator Switch) is one of the most important safety features.

When was non-Pressure actuated switched introduced?

Steve Reimers by 2/9/99

Is the Circuit drive hi-side or low-side?

Circuit is low side driven.

Results of Central Lab analysis

Steve LaRouch by 2/12/99

Analysis of harness pig-tails

Joe Kafati by 2/16/99

If a switch is contaminated can it start the event?

Fred Porter by 2/16/99

Flash points for all materials?

Greg Stevens by 2/16/99

What heat is conducted internally?

Don't understand this question!!!!!!

Provide color photos of Econoline?

Rob Sharpe by 2/8/99

What is the difference in the base materials that look different?

Rob Sharpe by 2/16/99

TI analysis results of the Memphis parts (crease marks in diaphragm, etc) ?

Rob Sharpe by 2/9/99

What are the material call-outs for 1992 and 1993?

Rob Sharpe by 2/9/99

Results of testing with corrosion simulation?

Fred Porter by 2/16/99

What does it take to start an event?

Fred Porter by 2/16/99

Brake Pressure Switch Questions

How does speed control use this switch? Fred Kohl by 2/11/99

1. Brake Pressure Switch provides electrical power to the speed control servo clutch circuit. The clutch circuit needs to be energized for the servo motor to pull the cable.
2. Switch provides a redundant method of sensing brake application independent of the primary system deactivation mode; this is a SDS (SC-0005) requirement.

- Signal from the stop lamp switch is primary deactivation mode for brake application.
- Under "hard" braking condition: Brake Pressure Switch provides redundant brake signal to the speed control logic (similar to stop lamp switch signal) and disconnects power to the clutch circuit; causing the speed control servo pulley to immediately return to the idle position. Note: Under normal braking conditions, only the stop lamp switch signal cancels speed control operation.

Do all Ford applications use switch between fuse and load? YES
Fred Kohl by complete

Do all Ford applications have switch connected to HOT-ALL-TIMES?
Joe Kafati by 2/16/99

Why is this switch connected to HOT-ALL-TIMES?
Fred Kohl by Complete
Because the SDS requires it to be connected to the same fuse as the stop lamp.

What is SDS requirement number? Fred Kohl by 2/16/99
SDS (SC-0068) states: The stop lamp switch and redundant deactivator switch must be on the same fused circuit.

Can the switch act as a fuse? Team by complete
No.

Could a fuse (e.g. 2 amp) be added in series between the stop lamp fuse and the brake pressure switch? Failure parameters would have to be known.

Brake Pressure Switch Questions

Is it feasible to disconnect the switch as immediate containment?

Yes. The customer will not have use of the speed control.

Is it acceptable to Jumper out the switch as immediate containment?

Fred Kohl by 2/16/99

NO... Would eliminate an important safety feature of the speed control system. The Brake Pressure Switch provides the redundant method for sensing brake application independent of the primary system deactivation mode. This is an SDS (SC-0005) requirement.

Elimination of this feature requires the concurrence of the OGC.

Other recommendations for immediate containment?

All by on-going

Add fuse between the stop lamp fuse and the brake pressure switch?

Can Brake Pressure Switch function be removed from power feed circuit and placed in ground return circuit? Fred Kohl by tbd

1. *Would require redesign of the speed control electronics.*
2. *Additional isolated ground circuit is required.*
3. *From FMEA position switching the ground circuit is not as good as switching the B+ feed.*
 - *With a ground return circuit; short to ground (fault) it would override the deactivation switch.*
 - *With the current power feed circuit; short to ground make the speed control system inoperative. A short to power is required to override the deactivation switch; much lower potential to occur.*

+ Note printed by FKOHL on 26 Feb 1999 at 10:29:11 +

From: SREIMERS--DRBN007
To: WBOYER1 --VISTRON
cc: FKOHL --DRBN007
GDYGERT --VISTRON
PPORTER --DRBN007 Porter, F.J.

Date and time 02/25/99 16:15:03

TSCHRODY--VISTRON
GHUBERTS--VISTRON

FROM: Steve Reimers USAET (UTC -05:00)
Subject: RE: Speed control servo
Thanks for the technical info. Did the bad R44 WGSC batch include any MY92 or
MY 93 Town cars built after 11/1/91? If so, was there any corrective action
for the vehicles already delivered? Also, are there other failure modes internal
to the WGSC which result in the clutch coil being energized when it should be
off?

Steve Reimers building 3 3C043
AVT Chassis E/E System Applications mail drop 5011
39-03246 SREIMERS sreimers@ford.com fax 39-03286
*** Forwarding note from WBOYER1 --VISTRON 02/25/99 15:51 ***
To: SREIMERS--FOURMAIL Reimers, Steve (S.
cc: FKOHL --FOURMAIL Kohl, Fred (F.H.) TSCHRODY--VISTRON Schrödy, Thomas (T.
GDYGERT --VISTRON Dygert, Greg (G.J. DRUDZINS--VISTRON Budzynski, Dan (D.
GHUBERTS--VISTRON Huberts, Garlan (G

From: Boyer, Wes (W.D.)
Subject: RE: Speed control servo

Steve,

Greg Dygert helped me with this. He ran a dynamic transient response
analysis on the flyback voltage appearing at the BPS - Dead node (our J1-9
terminal) when the clutch is engaged and switched off by the external BPS.
With the flyback clamping resistor in place, the transient is limited to a
relatively clean, exponentially decaying impulse peaking at about -50 volts,
with or without the 22 nF capacitor in our module, confirming my description
of 2/22/1999.

Without the 82 ohm resistor and diode across the clutch winding, the voltage
is an underdamped oscillation that theoretically peaks at +/- 1000 volts
and whose envelope decays exponentially. It is very likely that the switch
and/or capacitor (rated at 100 volts dc, 200 v pk) would break down at a
much lower voltage. The energy stored in the clutch winding could cause the
switch to arc. For this to occur the ignition must be ON and speed control
must have been "SET" (or #1 fault = shorted MOSFET driver) AND the flyback
resistor, R44, is open (fault #2) AND the brake pressure builds up to open
the switch. If fault #1 occurs without the switch opening, a continuous
current of about 0.5 amp drains the battery rather rapidly (overnight) and
the driver will be aware that something is wrong. Fault #2 is known to have
caused fault #1 and the drained battery on a small population of vehicles
built with Thin F44 (non-ceramic) circuits and a bad batch of R44 resistors
from the supplier. I do not believe these are in the same generation of
WGSC modules as the present concern.

Please copy Huberts, Garlan (G.J.) and/or Dygert, Greg (G.J.) with any reply
or response to this message.

Regards,

Wes (W. D.) Boyer
Visteon Automotive Systems
Precision Speed Control - Electronic Design
(Usually at work, Wednesday + Thursday, only;
w.d.boyar@visteon.org)

Phone: (313) 248-9417
Fax: (313) 322-3529
E-mail: wboyer1@visteon.com
Personal e-mail:

> -----Original Message-----
> From: Steve Reimers SMTP:sreimers@gw.ford.com
> Sent: Monday, February 22, 1999 12:18 PM
> To: wboyer1@visteon.com
> Cc: fkohl@gw.ford.com
> Subject: RE: Speed control servo
>
> Can you model this with the flyback resistor disconnected?
>
> Steve Reimers building 5 3C043
> AVT Chassis E/E System Applications mail drop 5011
> 39-03286 SRIMMERS sreimers@ford.com fax 39-03286 ;>
> *** Forwarding note from SRIMMERS--FORDMAIL 02/22/99 10:00 ***
> To: SRIMMERS--FORDMAIL Reimers, Steve (S. WBOYER1 --VISTEON Boyer, Wes
> (W.D.)
> cc: FKOHL --FORDMAIL Kohl, Fred (F.H.) TSCHRODY--VISTEON Schrodty,
> Thomas (T
>
> From: Boyer, Wes (W.D.)
> Subject: RE: Speed control servo
>
> The transient pulse will be an identical mirror image of the one shown in
> the previous traces. That is, instead of floating at the Vbatt level,
> "charging" the inductance at zero the Vds(on) of the MOSFET and flying
> back to a positive voltage, the pulse on the SPS side (referenced to
> ground)
> will fly back to a negative voltage limited by the I*R drop across the
> clamping resistor. There will be a small difference in the dynamics due
> to
> a capacitor at the SPS-Dead node that doesn't enter the picture when the
> FET
> is switched. I will look into that on Wednesday.
>
> Wes
> w.d.boyar@visteon.org
>
> -----Original Message-----
> From: Steve Reimers
> To: wboyer1@visteon.com
> Cc: fkohl@gw.ford.com; tschrody@visteon.com
> Sent: 2/18/99 3:46 PM
> Subject: RE: Speed control servo
>
> Please re-run this model with the following condition: No Fly-back and
> FET alwa
> ys on and use the Brake Pressure switch to create the switching
> transient.
> What is the voltage at the brake pressure switch?
>
> Steve Reimers building 5 3C043
> AVT Chassis E/E System Applications mail drop 5011
> 39-03286 SRIMMERS sreimers@ford.com fax 39-03286 ;>
> *** Forwarding note from WBOYER1 --VISTEON 02/17/99 10:56 ***
> To: DPORTR1--VISTEON Porter, David (D.L SRIMMERS--FORDMAIL Reimers,

> Steve (S.
> cc: FKohl --FORDMAIL Kohl, Fred (F.H.) TSCHRODY--VISTECOM Schrödy,
> Thomas (T
> DBUDZYN--VISTECOM Budzynski, Dan (D.
>
> From: Boyer, Wes (W.D.)
> Subject: RE: Speed control servo
>
> Attached is an analysis of the idealized flyback pulse of the turn-off
> transient on the clutch winding:
> <<CL_82r44.pdf>>
>
> Regards,
> Wes (W.D.) Boyer Phone: (313) 248-9417
> Visteon Automotive Systems Fax: (313)
> 322-3529
> Precision Speed Control - Electronic Design E-mail:
> WBoyer1@vistecom.com
> (Usually at work, Wednesday + Thursday, only; Personal e-mail:
> w.d.boyer@iesee.org)
>
> -----Original Message-----
> > From: Porter, David (D.L.)
> > Sent: Wednesday, February 17, 1999 10:29 AM
> > To: Steve Reimers
> > Cc: Fred Kohl (E-mail); Tom Schrödy (E-mail); Wes Boyer (E-mail)
> > Subject: RE: Speed control servo
>
> > Steve, the inductance of the clutch was at one time called out as
> 53-112
> > NH. This is measured at 1 KHz and in parallel.
>
> > Dave Porter dporter1@Vistaconet.com Phone: 313-990-8674
> > Fax
> > 313-322-3529
>
> > -----Original Message-----
> > From: Steve Reimers SMTF:sreimers@gw.ford.com
> > Sent: Wednesday, February 17, 1999 9:53 AM
> > To: dporter1@vistecom.com; fkohl@gw.ford.com
> > Subject: FW: Speed control servo
>
> > Fred Kohl will bring the parts to Visteon. These were retrieved
> from junkyards
> as part of a sampling process related to Brake Pressure switch
> function. The
> > Brake Pressure switch E8 spec defines 300 milli-Henry as the
> minimum
> > test induc
> > tance for life testing. Is this a good number? Can you measure
> the
> > inductance
> > to establish a minimum and maximum?
>
> > Steve Reimers building 5 3C043
> > AVT Chassis E/E System Applications mail drop 5011
> > 39-03286 SREIMERS sreimers@ford.com fax 39-03286 ;>
> > *** Forwarding note from DPORTER1-VISTECOM 02/17/99 08:18 ***
> > To: SREIMERS--FORDMAIL Reimers, Steve (S.
> > cc: FKohl --FORDMAIL Kohl (E-mail) WBOYER1 --VISTECOM Wes

>> Boyer (E-mail)
>>
>> From: Porter, David (D.L.)
>> Subject: FW: Speed control servo
>>
>> Steve, the clutch resistance should be in the neighborhood of 24
>> Ohms. If
>> the clutch winding is intact, and nothing is mechanically
>> damaged,
>> etc. I
>> would assume the parts are functional. There is no specified
>> inductance on
>> the clutch, because it varies with gear position (open or
>> closed).
>> If it
>> is important to check functionality of these parts, bring them
>> to
>> our lab,
>> and I can bench test them for you. Are these parts off vehicles,
>> or
>> just
>> unused parts that have been lying in a corner for a few years?
> You
> did not
> mention motor phase inductance or resistance. Generally, the
> motors
> are OK
> if they rotate freely, and the three phases all have a
> resistance of
> about
> 2.5 Ohms.
>>
>> Dave Porter dporter1@visteon.com Phone:
>> 313-390-8674
>> FAX 313-322-3529
>>
>> -----Original Message-----
>> From: Boyer, Wes (W.D.)
>> Sent: Wednesday, February 17, 1999 8:05 AM
>> To: Porter, David (D.L.)
>> Subject: FW: Speed control servo
>>
>>
>> f.y.i.
>> Regards,
>> Wes (W. D.) Boyer Phone: (313)
>> 248-9417
>> Visteon Automotive Systems FAX: (313)
>> 322-3529
>> Precision Speed Control - Electronic Design E-mail:
>> WBoyer1@visteon.com
>> (Usually at work, Wednesday + Thursday, only; Personal e-mail:
>> w.d.boyer@iana.org)
>>
>> -----Original Message-----
>> From: Fred Kohl SWTP:fckohl@gw.ford.com
>> Sent: Tuesday, February 16, 1999 3:48 PM
>> To: whoyer1@visteon.com; tschrody@visteon.com
>> Subject: RE: Speed control servo

> >
> >
> >
> > Regards, Fred Kohl, Precision Speed Control (Panther)
> > PROPS ID: FKohl Phone TDD Pager (888) 377-6280
> > IBM Mail(USPMCDJS)
> > Mailing Address: ETC C375
> > *** Forwarding note from REINERS--DRBN007 02/16/99 12:38 ***
> > To: FKohl --DRBN007
>
> > FROM: Steve Reimers USART(UTC
> -05:00)
> > Subject: RE: Speed control servo
> > These are from MY92 and 93. No known failures. Just want to
know
> > if
> > there
> > clutch control function has degraded.
>
> > Steve Reimers building 5 3C043
> > AVT Chassis E/E System Applications mail drop 8011
> > 39-03285 REINERS reimers@ford.com fax 39-03285 ;>
> > *** Forwarding note from FKohl --FORDMAIL 02/16/99 10:33 ***
> > To: TSCHRODY--VISTEON Schrod, Thomas (T
> > cc: DBUDZYNS--VISTEON Budzynski, Dan (D. FKohl, --FORDMAIL
> Kohl,
> > Fred
> > (W.H.)
> > REINERS--FORDMAIL Reimers, Steve (S.
>
> > From: Boyer, Wes (W.D.)
> > Subject: RE: Speed control servo
>
> > I'll send a copy of the complete clutch-dump analysis when I
get
> > in on
> > Wednesday.
>
> > What model year clutches are we talking about? And, Why from
the
> > "junkyard?"
>
> > Wes
> > w.d.boyer@msn.com
> > -----Original Message-----
> > From: Schrod, Thomas (T.P.)
> > To: Boyer, Wes (W.D.)
> > Sent: 2/16/99 10:13 AM
> > Subject: FW: Speed control servo
>
> > Wes,
>
> > I don't think you're in today, but if you are... Could you
respond
> > to
> > Steve Reimers? I'm busy at MEHF and will return tomorrow.
> >
> > -----Original Message-----
> > From: Fred Kohl
> > To: tschrody@visteon.com

> > > Cc: dbudzyns@visteon.com; fkohl@gw.ford.com;
> > > sreimers@gw.ford.com
> > > Sent: 2/16/99 7:59 AM
> > > Subject: Speed control servo
> > >
> > > Can you answer Steve questions?
> > >
> > > Regards, Fred Kohl, Precision Speed Control (Panther)
> > > PROPS ID: FKOHLL Phone TBD Pager (886) 377-6280
> > > IBM Mail(USFMCCBJS)
> > > Mailing Address: WTC C375
> > > *** Forwarding note from SREIMERS--DRBN007 02/15/99 18:14 ***
> > > To: FKOHLL --DRBN007
> > >
> > > FROM: Steve Reimers USAST(UTC
> -05:00)
> > > Subject: Speed control servo
> > > What is the inductance and resistance of the clutch? What is
> used
> > to
> > > clamp the
> > > flyback voltage? What is the magnitude of the flyback
> voltage?
> > > I have collected at least ten speed servos from junk yards.
> Can
> > you test
> > > than f
> > > or function?
> > >
> > > Steve Reimers building 5 3C643
> > > AVT Chassis H/H System Applications mail drop 3011
> > > 39-03286 SREIMERS sreimers@ford.com fax 39-03286 ;>
>
>
> Attachments sent separately:
>
> Data Type File Name
> -----
> BINARY CL_82R44.PDF_PC

Brake Pressure Switch Questions:

Can BRAKE PRESSURE SWITCH function be removed from power feed circuit and placed in ground return circuit of the servo clutch?

At a minimum the following would be required:

SPEED CONTROL SERVO

Redesign the speed control electronic
1. New board layout

2. New ROM

3. New software strategy for deactivation switch function

4. Additional isolated ground circuit

Manufacturing plant equipment effected

1. Process equipment for new board layout

2. Test equipment for new deact switch strategy

Estimate 12 months minimum to develop and prove-out.

WIRING HARNESS(S)

Additional wiring circuit for ground circuit through deact switch.
More than one harness maybe be effected. BESE would need to reply.

SERVICE TEST EQUIPMENT:

Field/service equipment would not work properly for the deactivation switch function.

PMSA CONSIDERATIONS:

With switching the power circuit, a wiring harness short to ground would make the speed control system inoperative.

With switching the ground circuit, a wiring harness short to ground would override the function of the deactivation switch.

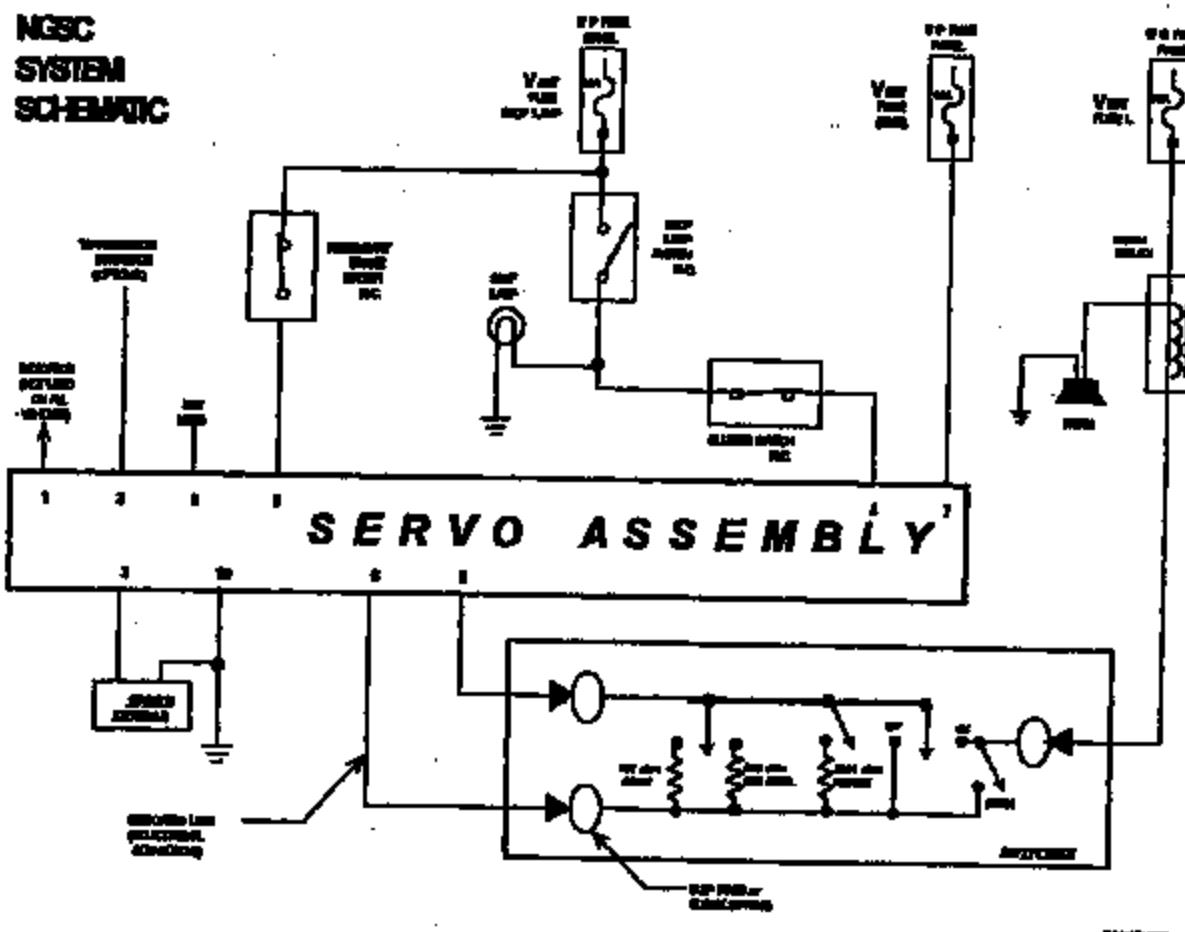
Based on a minimum of 12 months to design and prove out required changes to the servo; this is not compatible with a near term implementation.

Can BRAKE PRESSURE SWITCH function be moved to the ground circuit of the speed control servo without any changes?

NO; Every time the deactivation switch is cycled, the speed control system would reset itself. The vehicle set speed memory would be lost. RESUME function would not work. Driver would have to press "ON" and "SET" to re-engage the speed control system instead of just pressing the "RESUME" or "SET".

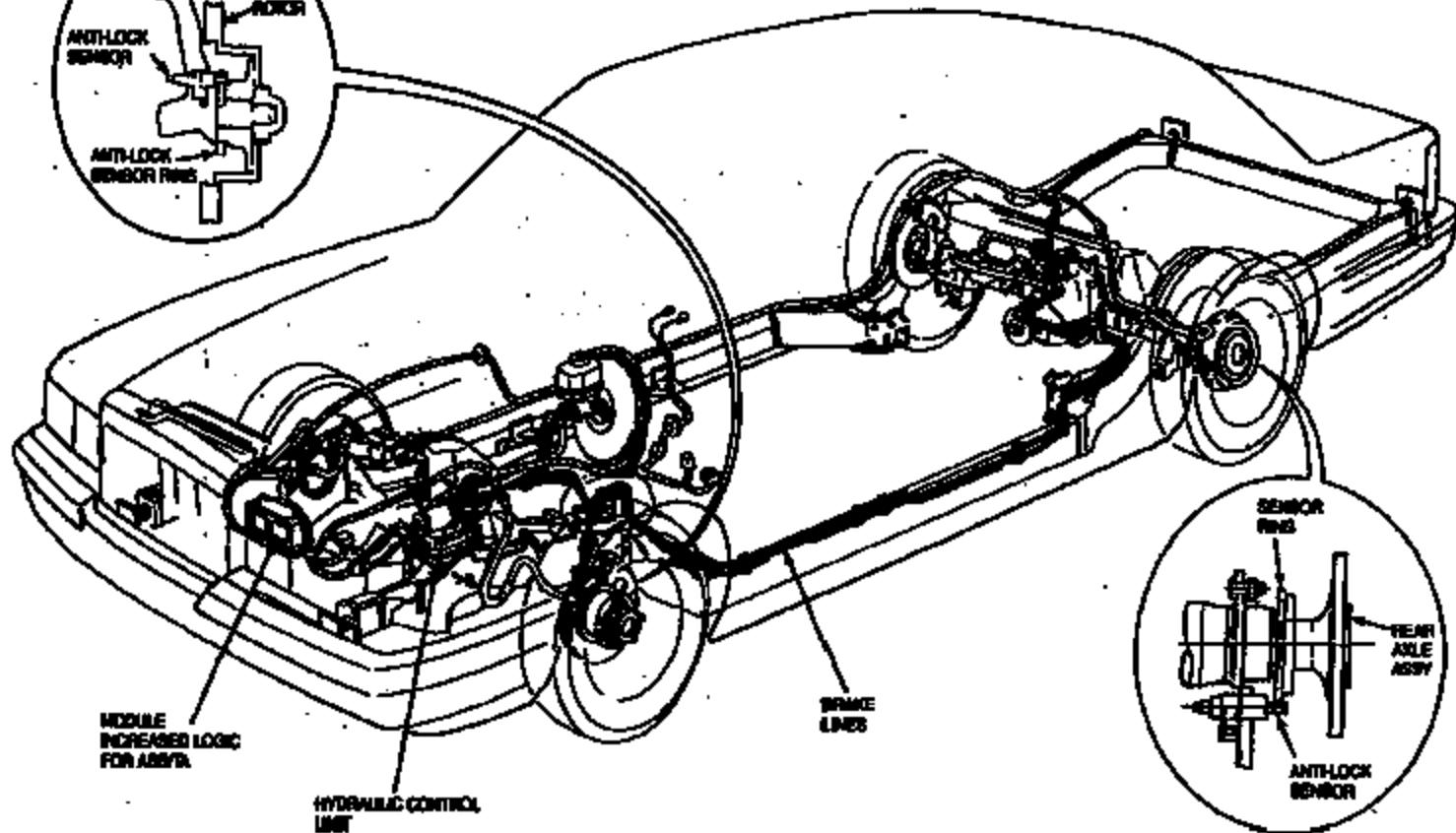
1.2 System Schematic (continued)

SCHEMATIC TITLE2

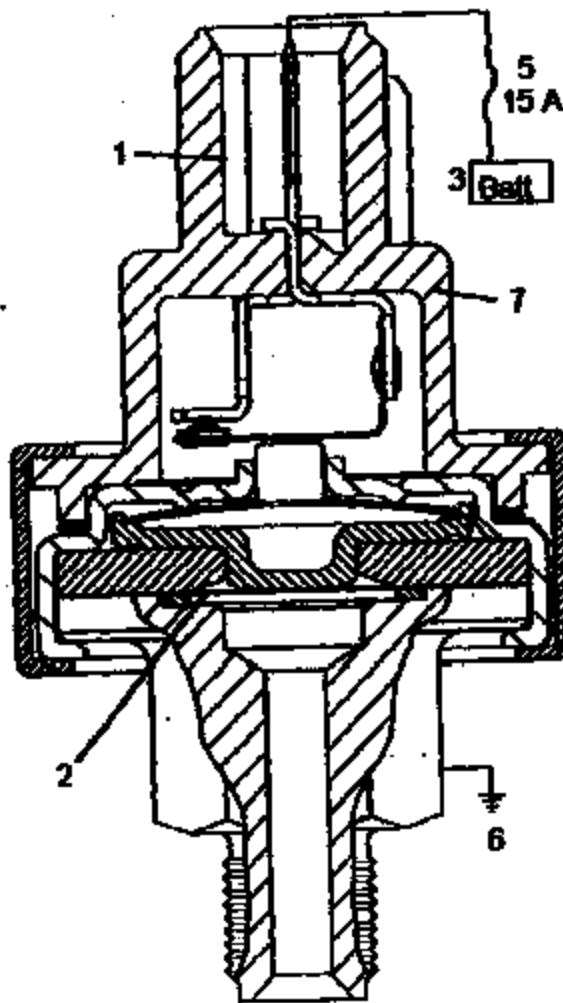


DESCRIPTION (Continued)

The Traction Assist system monitors brake usage to prevent brake鎖死 (brake lockup). It operates at vehicle speeds up to approximately 40 km/h (25 mph).



Contributing Factors



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

Brake Pressure Switch Questions:

Can BRAKE PRESSURE SWITCH function be removed from power feed circuit and placed in ground return circuit of the servo clutch?

At a minimum the following would be required:

SPEED CONTROL SERVO

Redesign the speed control electronic

1. New board layout
2. New EEPROM
3. New software strategy for deactivation switch function
4. Additional isolated ground circuit

Manufacturing plant equipment affected

1. Process equipment for new board layout
2. Test equipment for new deact switch strategy

Estimate 12 months minimum to develop and prove-out.

WIRING HARNESS(S)

Additional wiring circuit for ground circuit through deact switch. More than one harness maybe be effected. SAGE would need to reply.

SERVICE TEST EQUIPMENT

Field/service equipment would not work properly for the deactivation switch function.

FMEA CONSIDERATIONS:

With switching the power circuit, a wiring harness short to ground would make the speed control system inoperative.

With switching the ground circuit, a wiring harness short to ground would override the function of the deactivation switch.

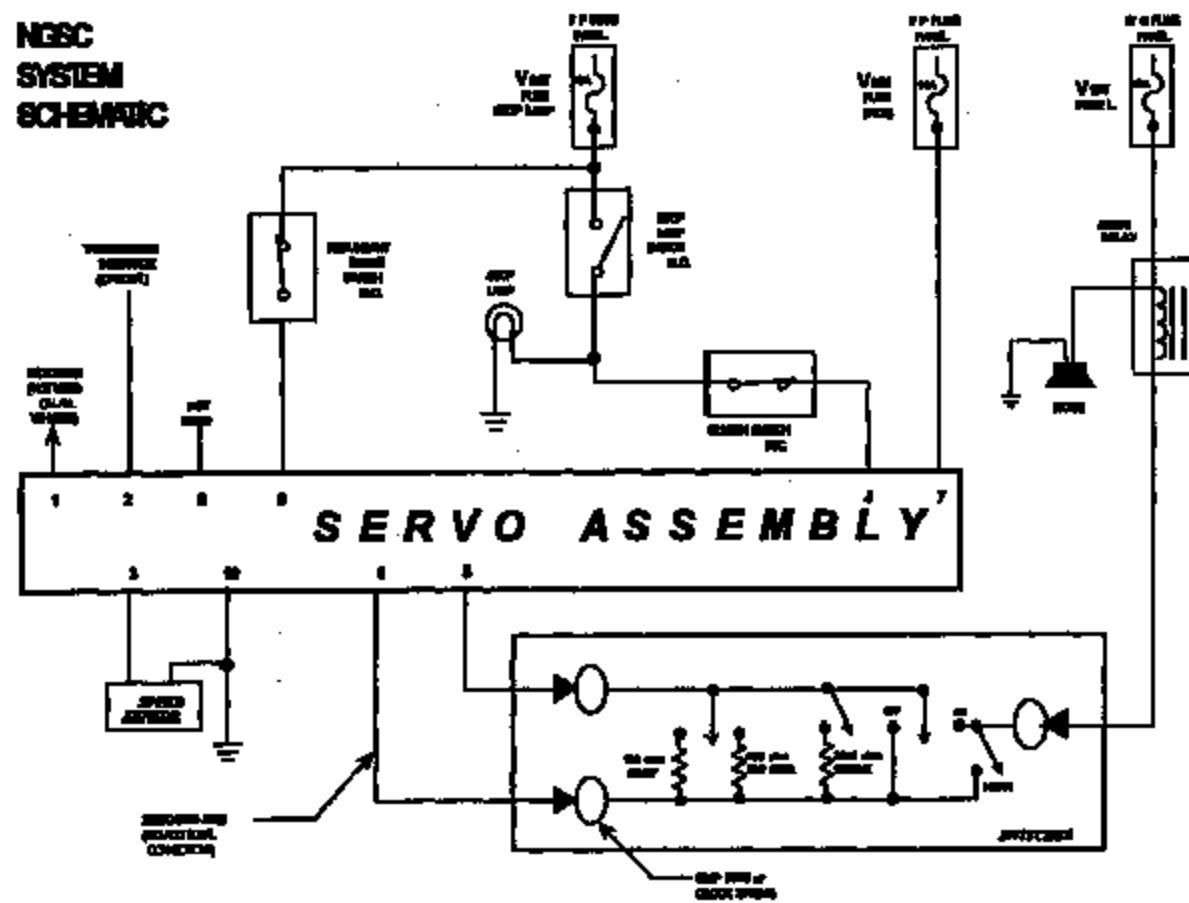
Based on a minimum of 12 months to design and prove out required changes to the servo; this is not compatible with a near term implementation.

Can BRAKE PRESSURE SWITCH function be moved to the ground circuit of the speed control servo without any changes?

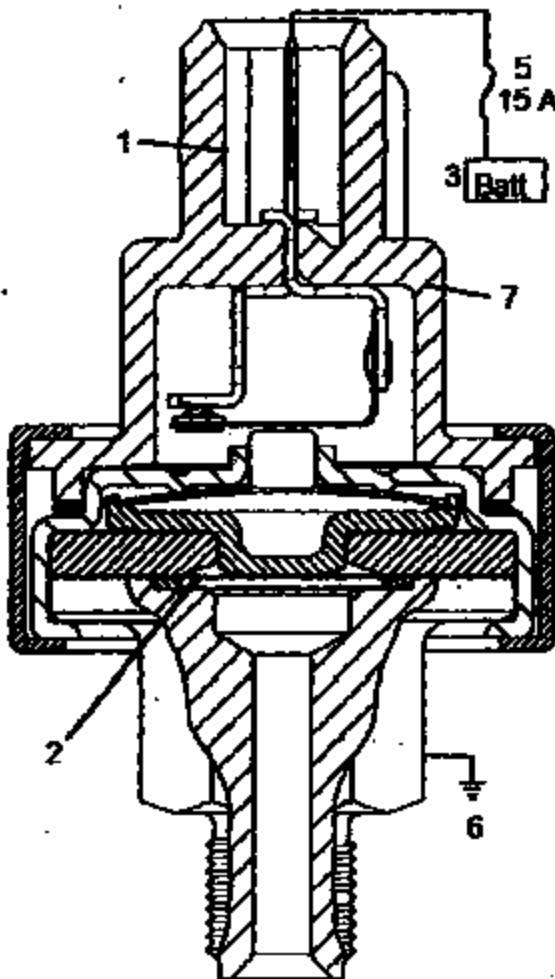
NO: Every time the deactivation switch is cycled, the speed control system would reset itself. The vehicle set speed memory would be lost. RESUME function would not work. Driver would have to press "OFF" and "SET" to re-engage the speed control system instead of just pressing the "RESUME" or "SET".

1.2 System Schematic (continued)

SCHEMATICTITLE2



Contributing Factors



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

* Note printed by FKOHL on 9 Mar 1999 at 15:13:34 *

From: JKAFATI --DRBN004
To: DSYLVEIS1--DRBN005
cc: FKOHL --DRBN007
TMASTER --DRBN005

Date and time 03/09/99 15:09:14
JKAFATI --DRBN004

FROM: Joseph Kafati USAST(UTC -04:00)
Subject: Brake Deac Switch Re-location
Del, we are contacting the AVT switch group which have responsibility
for the deac. switch. Fred Kohl and myself have spoken to Mike Salanta
who is the release engineer for FW74 and he will speak to his supervisor
so that we could get someone to review the packaging. I am also contacting
Mark Schulte from Pollak who makes these switches to review packaging.
I am shooting for setting up a review for tomorrow morning. Thanks

Regards,
Joseph Kafati

Advanced Vehicle Technology, EMEC-ODD
PH: 313-350-5389, Text Page: (313) 795-0702, FAX: 313-248-1268
*** Forwarding note from FKOHL --DRBN007 03/09/99 14:41 ***
To: SREIMERS--DRBN007 MREKSE --DRBN005
JKAFATI --DRBN004
cc: FPORTER --DRBN007 TBAZIL --DRBN005
JEVANSS --DRBN005 DSYLVEIS1--DRBN005
DBUDEYNS--VISTECN SPEASE --DRBN005
TSCHRODY--VISTECN FKOHL --DRBN007

FROM: Fred Kohl USAST(UTC -05:00)

Subject: Brake Deac Switch Re-location
Want to clarify who has D&E for electrical deactivation switch, it is AVT.
The current electrical deact switch is released by AVT, believe Mike Salanta
is the engineer, MBALANTA 1-313-8454007

Speed Control Group released a vacuum switch for the old vacuum system. Also,
this switch was packaged by the Brake Group on the brake pedal support brkt.

Regards, Fred Kohl, Precision Speed Control (Panther)
PROPS ID: FKOHL Phone TAD Pager (888) 377-6280
IBM Mail(UAFTMCJZ)
Mailing Address: HTC C375
*** Forwarding note from SREIMERS--DRBN007 03/09/99 15:06 ***
To: FKOHL --DRBN007 TSCHRODY--VISTECN

FROM: Steve Reimers USAST(UTC -05:00)

Subject: Brake Deac Switch Re-location
The D&E is from Vistecn. Who do you recommend to do the package review of Mar
y's switch relocation design?

Steve Reimers building 5 38008
AVT Chassis E/E System Applications mail drop 5011
39-03286 SREIMERS sreimers@ford.com fax 39-03286 13
*** Forwarding note from MREKSE --DRBN005 03/09/99 15:48 ***
To: SREIMERS--DRBN007 DSYLVEIS1--DRBN005
cc: TBAZIL --DRBN005 SPEASE --DRBN005
JEVANSS --DRBN005 FPORTER --DRBN007
AZAPARAC--DRBN005

FROM: M. P. REESE
Subject: Brake Decac Switch Re-location

USAEST (UTC -05:00)

STEVE, I HAVE NO PROBLEM WITH JOE, BRUCE, OR AL LOOKING AT THE DESIGNER'S TIME TO SEE THE PACKAGE AVAILABLE AROUND THE 1992/3/4 TOWN CAR BRAKE PEDAL AND BRACKET ASSEMBLY (-2450-), BUT THEY ARE NOT THE RELEASE ACTIVITY THAT WOULD TRY TO RELEASE AN ELECTRICAL SWITCH INTO THAT ENVIRONMENT. SPEED CONTROL IS THAT RELEASE ACTIVITY.

I WILL BE OUT FOR A FEW DAYS. I WILL ASK A CORE DESIGNER TO COORDINATE WITH JOE, BRUCE, AND AL. PACKAGE REVIEW BY SPEED CONTROL DESIGN AND RELEASE?

NEWS ABOUT 1992 MODEL TOWN CAR. THE 1992 SERVICE MANUAL SHOWS THIS FOR THE SPEED CONTROL SYSTEM:

- * EARLY PRODUCTION VEHICLES USED A VACUUM DUMP VALVE, ON THE BRAKE PEDAL AND BRACKET ASSEMBLY. PAGE 10-03B-1.
- * LATE PRODUCTION VEHICLES, LIKE 1993 AND 1994 MODEL TOWN CAR, "THE SYSTEM OPERATES INDEPENDENT OF ENGINE VACUUM, THEREFORE NO VACUUM LINES ARE REQUIRED."

THIS WAS NOT A JOB #1 CHANGE. THAT HISTORY I DO NOT HAVE.
THIS IS ANOTHER PLACE WHERE THE SPEED CONTROL RELEASE ENGINEER COULD HELP; THAT IS, EXACTLY WHEN EARLY PRODUCTION STOPPED AND LATE PRODUCTION STARTED (VIN, DATE, ETC.).

Regards,

M. P. Reese 313-317-7142 (313-621-6675 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from REIMERS--DRBN007 03/08/99 15:11 ***
To: REIMERS --DRBN005
cc: JEVANS --DRBN005 SPEASE --DRBN005
ABAPARAC --DRBN005 TRAKIL --DRBN005
FPORTER --DRBN007 Porter, F.J. JGRAYTT --DRBN004

FROM: Steve Reimers

USAEST (UTC -05:00)

Subject: Brake Decac Switch Re-location
Please contact Joe Evans, Bruce Pease, and A. Kaprakas when you are ready for the check. These guys should be able to provide a good sanity check.

Steve Reimers building 5 3E008
AVT Chassis E/E System Applications mail drop 5011
39-03286 REIMERS reimers@ford.com fax 39-03286 ;>
*** Forwarding note from REIMERS --DRBN005 03/06/99 17:33 ***
To: REIMERS--DRBN007
cc: TRAKIL --DRBN005 LSMTBS --DRBN005
DSYLVEST--DRBN006

FROM: M. P. REESE

USAEST (UTC -05:00)

Subject: Brake Decac Switch Re-location, 1992/1993/1994 TOWN CAR

STEVE, PANTHER SERVICE MANUALS PROVIDE A LITTLE MORE LIGHT:

- * 1993 MODEL (ON PAGE 10-03-1, SPEED CONTROL SYSTEM) AND 1994 MODEL (ON PAGE 10-03-1, SPEED CONTROL SYSTEM - ELECTRONIC) MANUALS CONTAIN THIS SENTENCE, "THE SYSTEM OPERATES INDEPENDENT OF ENGINE VACUUM, THEREFORE NO VACUUM LINES ARE REQUIRED."
- * I WILL FIND AND CHECK A 1992 MODEL MANUAL.
THIS SOMEWHAT SUPPORTS A SPACE BEING AVAILABLE ON THE TOWN CAR BRAKE PEDAL AND BRACKET ASSEMBLY. I WILL TRY TO BE READY, WHEN SOMEONE COMES TO CHECK.

Regards,

M. P. Reese 313-317-7142 (313-621-6675 FAX)

OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from SREIMERS--DRBN007 03/05/99 17:24 ***
To: JKAJATI --DRBN004
cc: FPORTER --DRBN007 Porter, F.J. MREESSE --DRBN005
KEYHOL --DRBN007

FROM: Steve Reimers USART(UTC -05:00)
Subject: Brake Deac Switch Re-location
Joe, Can you do the checking that Marty is requesting? Do you know who the design and release engineer(s) is for the brake pedal mounted switch and the harness?

Steve Reimers building 5 3M009
AVT Chassis E/E System Applications mail drop 5011
39-03286 SREIMERS sreimers@ford.com fax 39-03286
*** Forwarding note from MREESSE --DRBN005 03/05/99 14:27 ***
To: SREIMERS--DRBN007
cc: TRASIL --DRBN005 LEMITR9 --DRBN005
DAYLVEST--DRBN006 WLIVINGS--DRBN005

FROM: M. P. REESE USART(UTC -05:00)
Subject: Brake Deac Switch Re-location - DESIGN ORDER RESULTS

STEVE, THERE IS A PLACE FOR A SWITCH TO BE LOCATED ON THE 1992/1993/1994 TOWN CAR BRAKE PEDAL ASSEMBLY. IT IS THE "KEYHOLE" IN THE PEDAL ASSEMBLY'S BRACKET, WORKING WITH THE FLAT SURFACE ON THE PLASTIC ADAPTER (ON THE PEDAL ASSEMBLY'S ARM). THESE FEATURES WERE USED TO MOUNT THE VALVE ASSEMBLY - SPEED CONTROL (-9C727-) AND THE CLIP - SPEED CONTROL VACUUM VALVE (-9C966-) ON OTHER MODEL YEAR/CARLINE PANTHER CARS. SWITCH AND WIRING CLEARANCE TO STEERING COLUMN CRUSH ZONE WILL DEPEND ON DIMENSIONS OF SWITCH TO BE USED, AND WIRING ROUTING. (THE 1999 MODEL SWITCH, AT THIS LOCATION, DOES INTERFERE WITH THE CRUSH ZONE.) A DIFFERENT/NEW SWITCH WILL BE NEEDED.

IT IS TIME FOR THE CHECK TO VERIFY THESE RESULTS, THAT I REQUESTED DURING THE 1999 MAR 03 MEETING. THE CHECK IS NEEDED, BECAUSE REFERENCES (DESIGN LAYOUTS, WERS, DOCHAN, ETC.) THAT WE HAVE AVAILABLE (AND RECOVERED FROM ARCHIVES) ARE NOT PERFECT. I REQUEST REVIEW BY THE APPROPRIATE DESIGN AND RELEASE (SWITCH AND WIRING) ENGINEER. PLEASE RELAY THIS REQUEST.

IF THIS SOLUTION DOES NOT HOLD UP TO THE CHECK, THEN WE WILL NOT BE ABLE TO ADD A SWITCH ON THE BRAKE PEDAL AND BRACKET ASSEMBLY.

Regards,
M. P. Reese 313-317-7142 (313-621-6875 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from MREESSE --DRBN005 03/01/99 12:24 ***
To: SREIMERS--DRBN007 FPORTER --DRBN007
cc: TRASIL --DRBN005 JHEMM --DRBN005

FROM: M. P. REESE USART(UTC -05:00)
Subject: Brake Deac Switch Re-location - DESIGN ORDER

STEVE, THE RESULT OF THE MEETING THIS MORNING IS THAT WE WILL HAVE A FEASIBLE CLEAR SOLUTION (FOR SWITCH MOUNTED TO BRAKE PEDAL ASSEMBLY, ON 1992/1993/1994 TOWN CAR) BY NOON FRIDAY 1999 MAR 05.
IN MAKING THIS SOLUTION, WE ARE BEING VERY CAREFUL SO THAT WE DO NOT MAKE SOMETHING ELSE WORSE. THE HISTORY IS VAGUE.
ANY GOOD NEWS, ABOUT OTHER SOLUTIONS?

Regards,

M. P. Reese 313-317-7142 (313-621-6675 FAX)
OPG LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from BREIMERS--DRBN007 02/27/99 16:19 ***
To: MREESB --DRBN005
cc: FPORTER --DRBN007 Porter, F.J.

FROM: Steve Reimers USAST(UTC -05:00)
Subject: Brake Decac Switch Re-location
Marty, Please call Fred Porter with the update from your meeting. I will be at
MPG most of the day.

Steve Reimers building 5 3E008
AVT Chassis E/E System Applications mail drop 5011
39-03286 BREIMERS reimers@ford.com fax 39-03286 ;>
*** Forwarding note from MREESB --DRBN007 02/27/99 16:13 ***
To: BREIMERS--DRBN007
cc: TRASIL --DRBN005 LEMITHY --DRBN005

FROM: M. P. REESB USAST(UTC -05:00)
Subject: Brake Decac Switch Re-location

I AM OPTIMISTIC ABOUT ABILITY TO PACKAGE THE CURRENT PRODUCTION SWITCH ON
THE BRAKE PEDAL AND BRACKET ASSEMBLY IN 1992/1993/1994 TOWN CARS. I WILL
KNOW MORE (BUT NOT EVERYTHING) ABOUT TIMING AT THE CONCLUSION OF A 9:00 AM
MEETING WITH CHASSIS DESIGNERS. GENERAL OPTIMISM COMES FROM THE BRAKE
PEDAL AND BRACKET ASSEMBLY DRAWINGS; THEY (SO FAR) SHOW EVOLUTION OVER THE
MODEL YEARS, AND INVOLVE ONLY ONE SUPPLIER.

WEERS AND DOCHMAN ARE NOT IN GOOD SHAPE FOR THIS 1992/1993/1994 MODEL TASK.
THAT SLOWS THE ADVANCE. FACILITATES AMBUSH.

ALWAYS, I MUST CONSIDER EFFECTS ON FWDSS 105. VEHICLE TEST, BRAKE SYSTEM.
I INTEND TO CALL YOU, ABOUT NOON ON MONDAY 1999 MAR 01.

Regards,
M. P. Reese 313-317-7142 (313-621-6675 FAX)
OPG LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from BREIMERS--DRBN007 02/25/99 15:39 ***
To: MREESB --DRBN005

FROM: Steve Reimers USAST(UTC -05:00)
Subject: Brake Decac Switch Re-location
Marty, I was asked what the status of this design work. Have you got any good
words I can pass on to my manager? I would like to give Jack Paskus a sense of
where we are on this task, what the next step(s) are and when they are targeted
to complete. My meeting with Paskus is monday at 3:30.
thanks,

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
39-03286 BREIMERS reimers@ford.com fax 39-03286 ;>

* Note printed by PEONHL on 9 Mar 1999 at 08:44:07 *

From: MREESKE --DRBN005
To: JKAFATI --DRBN004 ~~cc: 3105387~~
Cc: TBASIL --DRBN005
JEROME --DRBN003
WLIVINGST --DRBN005

Date and time 03/09/99 06:46:56
PEONHL --DRBN007
SREIMERS--DRBN007
DSYLVES1--DRBN005

FROM: M. P. REESE USAET(UTC -05:00)
Subject: Brake Dead Switch Re-location - 1992/1993/1994 TOWN CAR

JOE AND FRED, I ASK THAT YOU BOTH REVIEW AVAILABLE PACKAGE ON THE BRAKE PEDAL AND BRACKET ASSEMBLY (-2450-), TO SEE SPACE AVAILABLE AND TO HELP YOU CHOOSE A SPEED CONTROL DEACTIVATE SWITCH THAT WILL FUNCTION IN THAT SPACE ON 1992/1993/1994 TOWN CAR. THIS IS THE CHECK THAT I HAVE ASKED FOR. HELP, PLEASE.

CONTACT DEL SYLVESTER X16540, PLEASE, TO REVIEW THIS SOONEST, PLEASE.
(I WILL BE ABSENT FOR A FEW DAYS, AND DO NOT WANT THAT TO DELAY THIS REVIEW.)
THANK YOU... (AND THANKS, DEL).

Regards,

M. P. Reese 313-317-7142 (313-621-6675 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from MREESKE --DRBN005 03/08/99 15:48 ***
To: SREIMERS--DRBN007
Cc: TBASIL --DRBN005
JEVANS --DRBN005
AZAPARAC--DRBN005
DSYLVES1--DRBN008
BPEASE --DRBN005
FPORTER --DRBN007

FROM: M. P. REESE USAET(UTC -05:00)
Subject: Brake Dead Switch Re-location

STEVE, I HAVE NO PROBLEM WITH JOE, BRUCE, OR AL LOOKING AT THE DESIGNER'S TUBE TO SEE THE PACKAGE AVAILABLE AROUND THE 1992/3/4 TOWN CAR BRAKE PEDAL AND BRACKET ASSEMBLY (-2450-), BUT THEY ARE NOT THE RELEASE ACTIVITY THAT WOULD TRY TO RELEASE AN ELECTRICAL SWITCH INTO THAT ENVIRONMENT. SPEED CONTROL IS THAT RELEASE ACTIVITY.

I WILL BE OUT FOR A FEW DAYS. I WILL ASK A CORE DESIGNER TO COORDINATE WITH JOE, BRUCE, AND AL. PACKAGE REVIEW BY SPEED CONTROL DESIGN AND RELEASE?

NEWS ABOUT 1992 MODEL TOWN CAR. THE 1992 SERVICE MANUAL SHOWS THIS FOR THE SPEED CONTROL SYSTEM:

- * EARLY PRODUCTION VEHICLES USED A VACUUM DUMP VALVE, ON THE BRAKE PEDAL AND BRACKET ASSEMBLY. PAGE 10-03B-1.
- * LATER PRODUCTION VEHICLES, LIKE 1993 AND 1994 MODEL TOWN CAR,
"THE SYSTEM OPERATES INDEPENDENT OF ENGINE VACUUM, THEREFORE NO VACUUM LINES ARE REQUIRED."

THIS WAS NOT A JOB #1 CHANGE. THAT HISTORY I DO NOT HAVE.

THIS IS ANOTHER PLACE WHERE THE SPEED CONTROL RELEASE ENGINEER COULD HELP; THAT IS, EXACTLY WHEN EARLY PRODUCTION STOPPED AND LATE PRODUCTION STARTED (VIN, DATE, ETC.).

Regards,

M. P. Reese 313-317-7142 (313-621-6675 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from SREIMERS--DRBN007 03/08/99 15:11 ***

Joe

3713 5883

To: MREESB --DRBN008
cc: JEVANSB --DRBN005
ABAPARAC--DRBN005
FPORTER --DRBN007 Porter, F.J.

SPEASH --DRBN005
TEAZIL --DRBN005
JEAFAWI --DRBN004

FROM: Steve Reimers
Subject: Brake Dead Switch Re-location
Please contact Joe Evans, Bruce Faase, and A. Zapackas when you are ready for the check. These guys should be able to provide a good sanity check.

Steve Reimers building 5 3E008
AVT Chassis E/E System Applications mail drop 5011
39-03286 SPEASH speimers@ford.com fax 39-03286 />
*** Forwarding note from MREESB --DRBN008 03/06/99 17:33 ***
To: SPEASH --DRBN007
cc: TEAZIL --DRBN005
DSTLVEST--DRBN006 LSHMITR9 --DRBN005

FROM: M. P. REESE USAET(UTC -05:00)
Subject: Brake Dead Switch Re-location, 1992/1993/1994 TOWN CAR

STEVE, PARTNER SERVICE MANUALS PROVIDE A LITTLE MORE LIGHT:
* 1993 MODEL (ON PAGE 10-03-1, SPEED CONTROL SYSTEM) AND 1994 MODEL (ON PAGE 10-03-1, SPEED CONTROL SYSTEM - ELECTRONIC) MANUALS CONTAIN THIS SENTENCE, "THE SYSTEM OPERATES INDEPENDENT OF ENGINE VACUUM, THEREFORE NO VACUUM LINES ARE REQUIRED."
* I WILL FIND AND CHECK A 1992 MODEL MANUAL.

THIS SOMEWHAT SUPPORTS A SPACE BEING AVAILABLE ON THE TOWN CAR BRAKE PEDAL AND BRACKET ASSEMBLY. I WILL TRY TO BE READY, WHEN SOMEONE COMES TO CHECK.

Regards,
M. P. Reese 313-317-7142 (313-621-6673 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24N31
*** Forwarding note from SPEASH--DRBN007 03/06/99 17:24 ***
To: JEAFAWI --DRBN004
cc: FPORTER --DRBN007 Porter, F.J. MREESB --DRBN005
PEKHL --DRBN007

FROM: Steve Reimers USAET(UTC -05:00)
Subject: Brake Dead Switch Re-location
Joe, Can you do the checking that Marty is requesting? Do you know who the design and release engineer(s) is for the brake pedal mounted switch and the harness?

Steve Reimers building 5 3E008
AVT Chassis E/E System Applications mail drop 5011
39-03286 SPEASH speimers@ford.com fax 39-03286 />
*** Forwarding note from MREESB --DRBN008 03/06/99 14:27 ***
To: SPEASH --DRBN007
cc: TEAZIL --DRBN005
DSTLVEST--DRBN006 LSHMITR9 --DRBN005
WLIVINGB --DRBN005

FROM: M. P. REESE USAET(UTC -05:00)
Subject: Brake Dead Switch Re-location - DESIGN OWNER RESULTS

STEVE, THERE IS A PLACE FOR A SWITCH TO BE LOCATED ON THE 1992/1993/1994 TOWN CAR BRAKE PEDAL ASSEMBLY. IT IS THE "KEYHOLE" IN THE PEDAL ASSEMBLY'S BRACKET, WORKING WITH THE FLAT SURFACE ON THE PLASTIC ADAPTER (ON THE PEDAL ASSEMBLY'S ARM). THESE FEATURES WERE USED TO MOUNT THE VALVE ASSEMBLY - SPEED CONTROL (-9C727-) AND THE CLIP - SPEED CONTROL VACUUM VALVE (-9C966-)

ON OTHER MODEL YEAR/CARLINE PANTHER CARS. SWITCH AND WIRING CLEARANCE TO STEERING COLUMN CRUSH ZONE WILL DEPEND ON DIMENSIONS OF SWITCH TO BE USED, AND WIRING ROUTING. (THE 1999 MODEL SWITCH, AT THIS LOCATION, DOES INTERFERE WITH THE CRUSH ZONE.) A DIFFERENT/NEW SWITCH WILL BE NEEDED.

IT IS TIME FOR THE CHECK TO VERIFY THESE RESULTS, THAT I REQUESTED DURING THE 1999 MAR 03 MEETING. THE CHECK IS NEEDED, BECAUSE REFERENCES (DESIGN LAYOUTS, WORKS, DOCMAN, ETC.) THAT WE HAVE AVAILABLE (AND RECOVERED FROM ARCHIVES) ARE NOT PERFECT. I REQUEST REVIEW BY THE APPROPRIATE DESIGN AND RELEASE (SWITCH AND WIRING) ENGINEER. PLEASE RELAY THIS REQUEST.

IF THIS SOLUTION DOES NOT HOLD UP TO THE CHECK, THEN WE WILL NOT BE ABLE TO ADD A SWITCH ON THE BRAKE PEDAL AND BRACKET ASSEMBLY.

Regards,

M. P. Reese 313-317-7142 (313-621-6675 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from MREESB --DRBN005 03/01/99 12:24 ***
To: SREIMERS--DRBN007 FPORTER --DRBN007
cc: TBASIL --DRBN005 JHENK --DRBN005

FROM: M. P. REESE USAET(UTC -05:00)
Subject: Brake Deac Switch Re-location - DESIGN ORDER

STEVE, THE RESULT OF THE MEETING THIS MORNING IS THAT WE WILL HAVE A FEASIBLE, CLEAR SOLUTION (FOR SWITCH MOUNTED TO BRAKE PEDAL ASSEMBLY, ON 1992/1993/1994 TOWN CAR) BY NOON FRIDAY 1999 MAR 05.

IN MAKING THIS SOLUTION, WE ARE BEING VERY CAREFUL SO THAT WE DO NOT MAKE SOMETHING ELSE WORSE. THE HISTORY IS VAGUE.

ANY GOOD NEWS, ABOUT OTHER SOLUTIONS?

Regards,

M. P. Reese 313-317-7142 (313-621-6675 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from SREIMERS--DRBN007 02/27/99 15:19 ***
To: MREESB --DRBN005
cc: FPORTER --DRBN007 Porter, F.J.

FROM: Steve Reimers USAET(UTC -05:00)
Subject: Brake Deac Switch Re-location
Marty, Please call Fred Porter with the update from your meeting. I will be at MPG most of the day.

Steve Reimers building 5 3E008
AVT Chassis E/E System Applications mail drop 5011
39-03286 SREIMERS sreimers@ford.com fax 39-03286 />
*** Forwarding note from MREESB --DRBN005 02/27/99 15:13 ***
To: SREIMERS--DRBN007 LEMITH9 --DRBN005
cc: TBASIL --DRBN005

FROM: M. P. REESE USAET(UTC -05:00)
Subject: Brake Deac Switch Re-location

I AM OPTIMISTIC ABOUT ABILITY TO PACKAGE THE CURRENT PRODUCTION SWITCH ON THE BRAKE PEDAL AND BRACKET ASSEMBLY IN 1992/1993/1994 TOWN CARS. I WILL KNOW MORE (BUT NOT EVERYTHING) ABOUT TIMING AT THE CONCLUSION OF A 9:00 AM MEETING WITH CHASSIS DESIGNERS. GENERAL OPTIMISM COMES FROM THE BRAKE PEDAL AND BRACKET ASSEMBLY DRAWINGS; THEY (SO FAR) SHOW EVOLUTION OVER THE MODEL YEARS, AND INVOLVE ONLY ONE SUPPLIER.

WERS AND DOGMAN ARE NOT IN GOOD SHAPE FOR THIS 1992/1993/1994 MODEL TASK.
THAT SLOWS THE ADVANCE. FACILITATES AMBUSH.

ALWAYS, I MUST CONSIDER EFFECTS ON FWDSS 105. VEHICLE TEST, BRAKE SYSTEM.
I INTEND TO CALL YOU, ABOUT NOON ON MONDAY 1993 MAR 01.

Regards,

M. P. Reese 313-317-7142 (313-621-6675 FAX)
OPD LVC - Brakas Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from SREINERS--DRBN007 02/28/99 15:39 ***
To: MREESSE --DRBN005

FROM: Steve Reimers

USANT (UTC -05:00)

Subject: Brake Dead Switch Re-location

Marty, I was asked what the status of this design work. Have you got any good words I can pass on to my manager? I would like to give Jack Paskus a sense of where we are on this task, what the next step(s) are and when they are targeted to complete. My meeting with Paskus is monday at 3:30. thanks,

Steve Reimers
AVT Chassis E/E System Applications
39-03286 SREINERS sreimers@ford.com

building 5 3C043
mail drop 5011
fax 39-03286 >>

* Note printed by FEKHL on 22 Feb 1999 at 15:34:10 *

From: DPORTER1--VISTEON
To: BREIMERS--FORDMAIL Steve Reimers
cc: FEKHL --FORDMAIL Fred Kohl (E-mail)

Date and time 02/22/99 13:45:46

From: Porter, David (D.L.)
Subject: RE: Speed Control Report

The failure of part #316 was a functional failure, that is, speed control would not function. The clutch function was OK, but pulley and clutch rotation was locked at the zero throttle position by the (melted) pulley cover. Once the melted pulley cover was removed, the actuator function was normal, although the motor was almost rusted enough to fail to function, due to water entry. Presumably fire extinguisher entered through the partially melted amplifier. Part #316 failed due to water entry, but the clutch was not engaged, and clutch coil resistance was normal. Note that coil resistance is the same whether the clutch is engaged or not.

Dave Porter dporter1@Visteon.com Phone: 313-390-8674 Fax 313-322-3529

> -----Original Message-----
> From: Steve Reimers SMTF:sreimers@w.ford.com
> Sent: Monday, February 22, 1999 12:42 PM
> To: dporter1@visteon.com
> Subject: Speed Control Report
>
> Thanks for the quick response. Did any of the FAILED units have a clutch
> stuck
> in the energized state? What does FAIL mean for this test?
> thanks,
>
> Steve Reimers building 5 3C043
> AVT Chassis E/I System Applications mail drop 5011
> 39-03286 BREIMERS sreimers@ford.com fax 39-03286 ;>

----- Part 2

MIME-version: 1.0
Content-Type: application/ms-tnef
Content-Transfer-Encoding: base64

eJ4+Iic8AQAeQCAAAAABAAEAAQeQ8gAIAAAA5AQAAAADoAAStgAcAGRAAAEALQTSSWwHbY
b3NVzN0gTWTpibC50b3E1ADE1AQNAWAAOAAMAAwCABYADQAnACQAAQBBHQgqgAMADgAAAM6HgqAN
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* Note printed by FKohl on 22 Feb 1999 at 11:07:21 *

From: BREINERS--FORDMAIL Date and time 02/12/99 10:00:58
To: BREINERS--FORDMAIL Reimers, Steve (S. WBOYER1 --VISTECOM Boyer, Wes (W.D.)
Cc: FKohl --FORDMAIL Kohl, Fred (F.H.) TSCHRODY--VISTECOM Schrody, Thomas (T

From: Boyer, Wes (W.D.)
Subject: RE: Speed control servo

The transient pulse will be an identical mirror image of the one shown in the previous traces. That is, instead of floating at the Vbatt level, "charging" the inductance at zero the Vds(on) of the MOSFET and flying back to a positive voltage, the pulse on the BPG side (referenced to ground) will fly back to a negative voltage limited by the I*R drop across the clamping resistor. There will be a small difference in the dynamics due to a capacitor at the BPG-Dmoc node that doesn't enter the picture when the FET is switched. I will look into that on Wednesday.

Wes
w.d.boyer@imca.org

-----Original Message-----

From: Steve Reimers
To: wboyer1@vistecom.com
Cc: fkohl@gw.ford.com; tschrody@vistecom.com
Sent: 2/13/99 5:46 PM
Subject: RE: Speed control servo

Please re-run this model with the following condition: No Fly-back and FET always on and use the Brake Pressure switch to create the switching transient.
What is the voltage at the brake pressure switch?

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
39-03286 BREINERS reimers@ford.com fax 39-03286 />
*** Forwarding note from WBOYER1 --VISTECOM 02/17/99 10:56 ***
To: DPORTER1--VISTECOM Porter, David (D.L BREINERS--FORDMAIL Reimers,
Steve (S.
Cc: FKohl --FORDMAIL Kohl, Fred (F.H.) TSCHRODY--VISTECOM Schrody,
Thomas (T
DBUDZYNS--VISTECOM Budzynski, Dan (D.

From: Boyer, Wes (W.D.)
Subject: RE: Speed control servo

Attached is an analysis of the idealized flyback pulse of the turn-off transient on the clutch winding:
<<Cl_82x44.pdf>>

Regards,
Wes (W. D.) Boyer Phone: (313) 248-9417
Visteon Automotive Systems Fax: (313)
322-3529
Precision Speed Control - Electronic Design E-mail:
WBoyer1@vistecom.com
(Usually at work, Wednesday + Thursday, only; Personal e-mail:



Laboratory Test Data
Visteon Product Engineering Office

Page 1 of 1

Draft 2-19-99 B

Dawn Porter

Name Tested: PSC Activator from TownCare & Crown Misters

Traffic: Parts from Some Vehicle Transitions

"Mechanical actuator still functional, but amplifier partially melted, baseplate loose, some parts' solder reflowed, and unbonds broken.

To Fred Kohl

Test/ Veh matrix

* Note printed by FKOHL on 19 Feb 1999 at 10:32:30 *

From: SREIMERS--DRBN007
To: WBOYER1 --VISTEON
cc: FKOHL --DRBN007

Date and time 02/18/99 17:45:55
TSCHEODY--VISTEON

FROM: Steve Rainers USANET(UTC -05:00)
Subject: RE: Speed control servo
Please re-run this modal with the following condition: No Fly-back and VFT always on and use the Brake Pressure switch to create the switching transient.
What is the voltage at the brake pressure switch?

Steve Rainers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
39-03286 SREIMERS sreimers@ford.com fax 39-03286 />
*** Forwarding note from WBOYER1 --VISTEON 02/17/99 10:56 ***
To: DPORTER1--VISTEON Porter, David (D.L.SREIMERS--FORDMAIL Rainers, Steve (S.
cc: FKOHL --FORDMAIL Kohl, Fred (F.H.) TSCHEODY--VISTEON Schrody, Thomas (T.
DHODZINS--VISTEON Hudzynski, Dan (D.

From: Boyer, Wes (W.D.)
Subject: RE: Speed control servo

Attached is an analysis of the idealized flyback pulse of the turn-off transient on the clutch winding:

<<Cl_82r44.pdf>>

Regards,
Wes (W. D.) Boyer Phone: (313) 248-9417
Visteon Automotive Systems Fax: (313) 322-3529
Precision Speed Control - Electronic Design E-mail: WBoyer1@visteon.com
(Usually at work, Wednesday + Thursday, only, Personal e-mail:
w.d.boyer@visteon.org)

> -----Original Message-----
> From: Porter, David (D.L.)
> Sent: Wednesday, February 17, 1999 10:29 AM
> To: Steve Rainers
> Cc: Fred Kohl (E-mail); Tom Schrodny (E-mail); Wes Boyer (E-mail)
> Subject: RE: Speed control servo
>
> Steve, the inductance of the clutch was at one time called out as 53-112
> MH. This is measured at 1 KHz and in parallel.
>
> Dave Porter dporter1@visteon.net Phone: 313-390-8674 FAX
> 313-322-3529
>
> -----Original Message-----
> From: Steve Rainers SMTP:sreimers@gw.ford.com
> Sent: Wednesday, February 17, 1999 9:53 AM
> To: dporter1@visteon.com; fkohl@gw.ford.com
> Subject: FW: Speed control servo
>
> Fred Kohl will bring the parts to Visteon. These were retrieved
> from junkyards
> as part of a sampling process related to Brake Pressure switch
> function. The
> Brake Pressure switch HS spec defines 300 milli-Henry as the minimum

POWER ANALYSIS of 82 OHM IN CLUTCH FLYBACK CIRCUIT (R44)

RECTANGULAR FLAT CHIP RESISTOR POWER DISSIPATION (generic)

$\theta = 0, 5, \dots, 75$

$$Pd_{2512}(\theta) := [8 < 70, 1000, 1000 - 0.0125 \cdot 1000 \cdot (\theta - 70)]$$

$$Pd_{2010}(\theta) := [8 < 70, 900, 900 - 0.0125 \cdot 900 \cdot (\theta - 70)]$$

$$Pd_{1210}(\theta) := [8 < 70, 250, 250 - 0.00952 \cdot 250 \cdot (\theta - 70)]$$

$$Pd_{1206}(\theta) := [8 < 70, 125, 125 - 0.00952 \cdot 125 \cdot (\theta - 70)]$$

$$Pd_{0805}(\theta) := [8 < 70, 100, 100 - 0.00952 \cdot 100 \cdot (\theta - 70)]$$

$$Pd_{0603}(\theta) := [8 < 70, 63, 63 - 0.0125 \cdot 63 \cdot (\theta - 70)]$$

$$Pd_{0402}(\theta) := [8 < 70, 63, 63 - 0.01612 \cdot 63 \cdot (\theta - 70)]$$

POWER

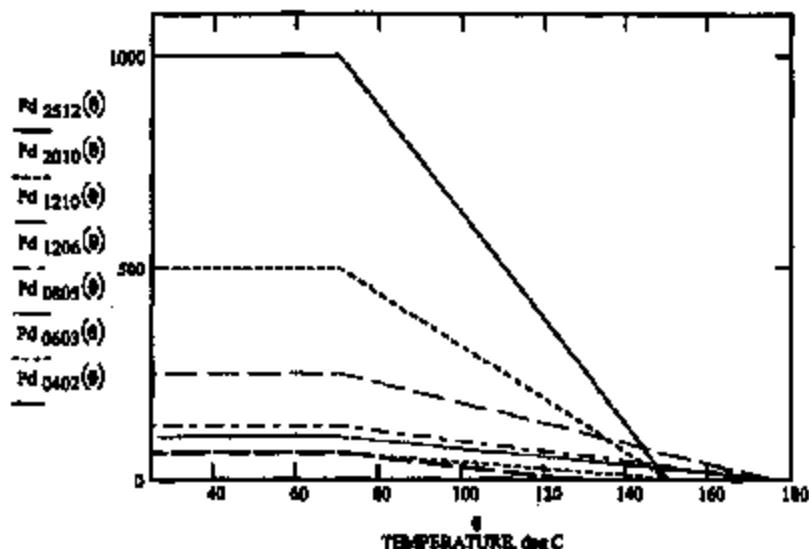


Figure 1.a:

Power derating curves for rectangular flat chip resistors.

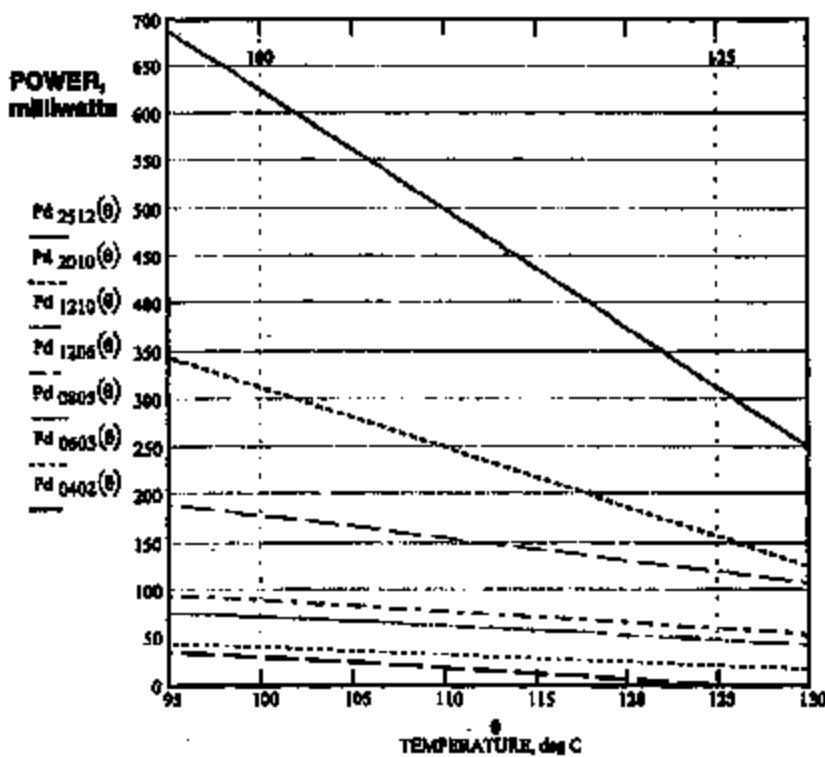


Figure 1.b:

Power derating curves for rectangular flat chip resistors at elevated temperatures.

$k = 1.7$

Power Capability,
 $S_{max}^{1/2}$ mW @ 125 °C

2512	$Pd_{2512}(125) = 312.5$
2010	$Pd_{2010}(125) = 136.25$
1210	$Pd_{1210}(125) = 119.1$
1206	$Pd_{1206}(125) = 59.55$
0805	$Pd_{0805}(125) = 47.64$
0603	$Pd_{0603}(125) = 19.6875$
0402	$Pd_{0402}(125) = 6.1 \cdot 10^{-3}$

POWER ANALYSIS of 82 OHM in CLUTCH FLYBACK CIRCUIT (P44)

**PULSE LIMIT POWER (SINGLE PULSE) for
RECTANGULAR FLAT CHIP RESISTORS (generic)**

$x := 0.02, 0.04, \sqrt{1100}$

$$t_p(x) := x^2$$

$S_{82\Omega_k} :=$	$Y_{0.04_k} :=$	$Y_{10_k} :=$	$\alpha_k := \frac{\ln(Y_{10_k}) - \ln(Y_{0.04_k})}{\ln(10) - \ln(0.04)}$	$t_p :=$	$Y_{0.04_k(25)} :=$
2912	150	30			38.69606
2010	76	20			14.299954
1210	40	12.5			20.399457
1206	22	8			12.190501
3604	10.5	4.4			4.3218
6003	6	2.8			3.847604
4402	3	1.6			2.079545

$$\ln(P_0) = \frac{\ln(Y_{10_k}) - \ln(Y_{0.04_k})}{\ln(10) - \ln(0.04)} \cdot (\ln(t_p(x)) - \ln(0.04)) + \ln(Y_{0.04_k}) \cdot \alpha_k \cdot (\ln(t_p(x)) - \ln(0.04)) + \ln(Y_{0.04_k})$$

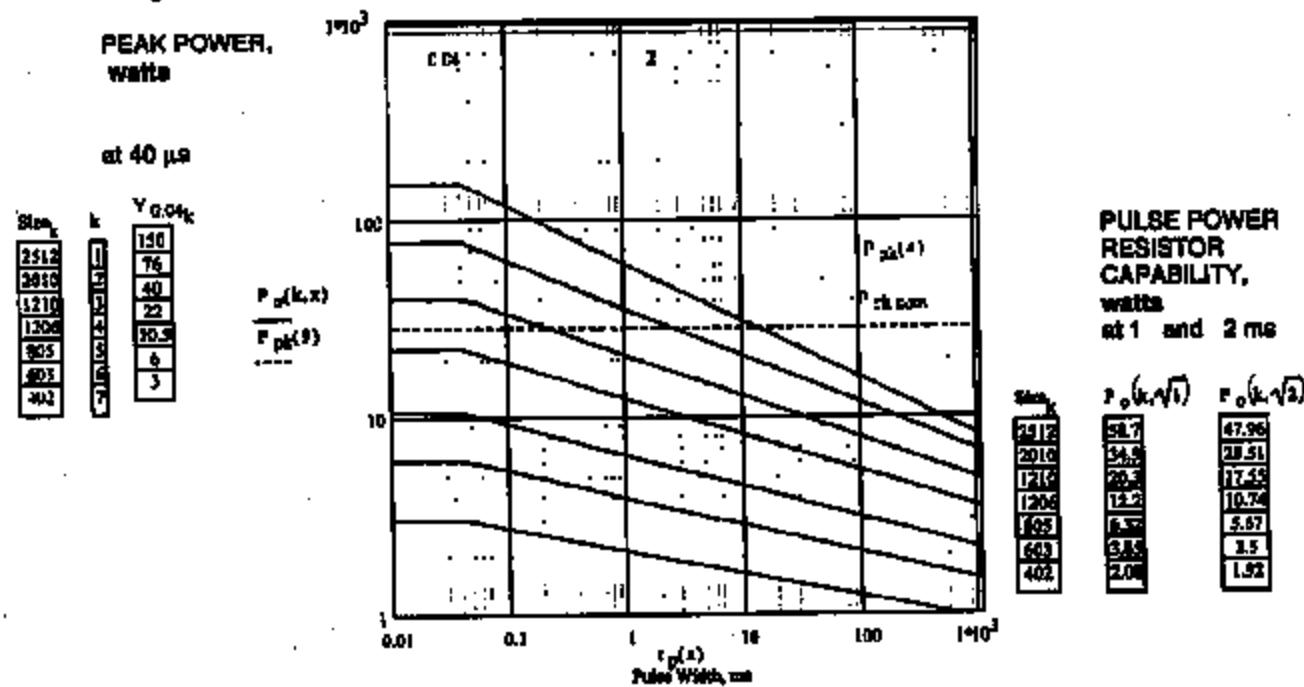
$$\ln(P_0) = \alpha_k \cdot (\ln(t_p(x)) - \ln(0.04)) + \ln(Y_{0.04_k}) = \ln\left(\left(\frac{t_p(x)}{0.04}\right)^{\alpha_k}\right) + \ln(Y_{0.04_k}) = \ln\left[Y_{0.04_k} \left(\frac{t_p(x)}{0.04}\right)^{\alpha_k}\right]$$

$$P_0 = Y_{0.04_k} (25 + t_p(x))^{\alpha_k}$$

$$P_0(k,x) := 0 \leq t_p(x) \leq 0.04, Y_{0.04_k(25)} \leq (Y_{0.04_k})^{t_p(x)}$$

$$P_0(k,x) := P(t_p(x) \leq 0.04, P_0(k,x), 10^{-10})$$

Figure 2. SINGLE PULSE PEAK POWER, watts vs. PULSE DURATION, ms



POWER ANALYSIS of 82 OHM in CLUTCH FLYBACK CIRCUIT (R44)

IDEALIZED TRANSIENT CURRENT PULSE IN SINGLE 82Ω resistor CLUTCH FLYBACK CIRCUIT:

$$L_{clutch} = 0.078 \quad R_{ext} = 82 \quad \text{ohms @ room temp.}$$

$$t_{clutch}(J) := \frac{L_{clutch}}{R_{ext}(J)} \cdot 1000$$

$$v_g(J,t) := v_g(J,t) - 8. \text{mV}$$

$$\begin{aligned} & \text{Plotting} \\ & \text{Limits: } k(J,t) := \min(v<5.5, 1, v_g(J,t), 5000) \\ & I_{max}(t) := P(v<5.5, k(J,t), 5000) \\ & v_{nom}(t) := P(v<5.5, k(J,t), 5000) \end{aligned}$$

Fig. 3.a.
Transient
clutch
current

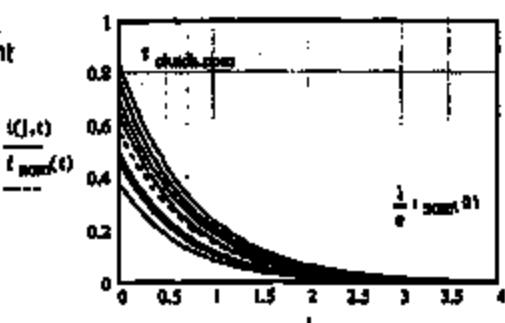
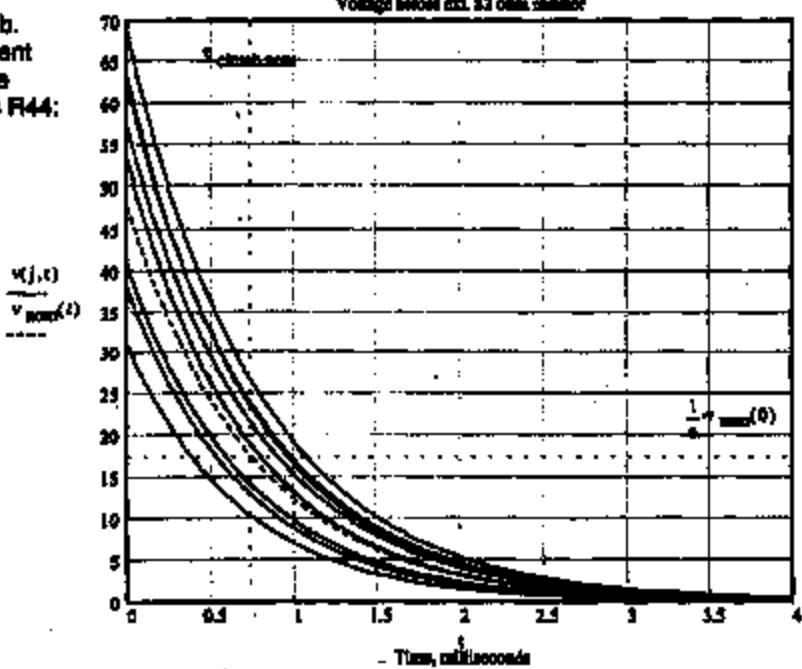


Fig. 3.b.
Transient
voltage
across R44:



$$P_{pk,J}(J,t) := (J(t))^2 R_{ext}$$

$$P_{pk,J}(J,t) := P(v<5.5, P_{pk,J}(J,t), 5000)$$

$$P_{pk,nom,J}(t) := \frac{I_{max}(t)^2}{R_{ext}}$$

$$P_{pk,nom,J}(t) := P(v<5.5, P_{pk,nom,J}(t), 5000)$$

$$\cos\left[\frac{\pi t}{T}\cdot(23.9+R_{ext})\right] = 1$$

whose solution for t_x is

and the real part of the solution for the time constant of the power transient is

$$\tau_p := \frac{3000}{.306410 + 0.0128205 \cdot R_{ext}}$$

$$\tau_p = 0.368272 \quad R_{ext} = 82$$

$$t_{clutch,nom} := \frac{L_{clutch}}{23.9+R_{ext}} \cdot 1000$$

ohms @ various temp.

$$t_{clutch,nom} = 0.736544$$

$$I_{max}(t) := \frac{14}{23.9} \cos\left(\frac{\pi t}{t_{clutch,nom}}\right)$$

$$v_{nom}(t) := P(v<5.5, R_{ext}, t_{clutch,nom}, 5000)$$

J	R _{ext} (J)
0	99.5
-1	101.4
-2	103.3
-3	105.1
-4	106.9
-5	108.7
-6	110.5
-7	112.3
-8	114.1
-9	115.9

J	V _{de} (mV)	R _{ext}	I _{pk,J} (J,0)	v(J,0)
0	50	99.5	0.309	58.798
-1	52	101.4	0.273	61.366
-2	54	103.3	0.231	57.442
-3	56	105.1	0.196	61.532
-4	58	106.9	0.163	53.546
-5	60	108.7	0.139	40.910
-6	62	110.5	0.114	34.312
-7	64	112.3	0.081	31.242

Shown for worst case cell
resistance and feed voltage.

TEMP: PEAK
VOLTAGE

J	G _J	v(J,0)	V _{de} (mV)
0	40	50.721	58
-1	39	53.556	54
-2	38	57.442	51
-3	37	61.532	48
-4	36	53.546	45
-5	35	40.910	42
-6	34	34.312	39
-7	33	31.242	36

Nominal Peak Voltage:

$$v_{nom}(0) = 48.03473 \quad \text{volts}$$

$$t_{clutch,nom} = 0.736544 \quad \text{milliseconds.}$$

$$t_{clutch}(4) = 0.742897 \quad \text{milliseconds.}$$

$$P_{pk,J}(J,t) = \frac{14}{23.9} \cos\left[\frac{\pi t}{T} \cdot (23.9+R_{ext})\right]^2$$

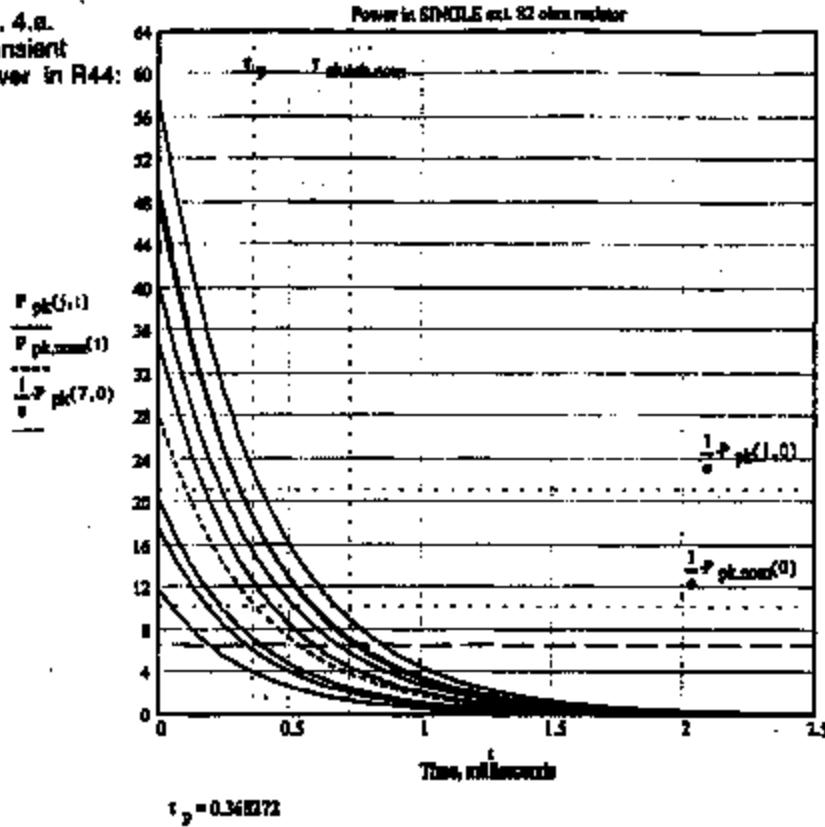
$$\frac{P}{R_{ext}} = \frac{1}{\left(\frac{14}{23.9}\right)^2} \cos^2\left[\frac{\pi t}{T} \cdot (23.9+R_{ext})\right]$$

$$\left[\frac{\frac{3000}{(.306410 + 0.0128205 \cdot R_{ext})}}{\frac{.3000}{(.306410 + 0.0128205 \cdot R_{ext})} - 3.1415926535897932385 \cdot \frac{1}{(.306410 + 0.0128205 \cdot R_{ext})}} \right]$$

POWER ANALYSIS of 82 OHM in CLUTCH FLYBACK CIRCUIT (R44)

IDEALIZED TRANSIENT POWER PULSE IN SINGLE 82 OHM RESISTOR IN CLUTCH FLYBACK CIRCUIT:

Fig. 4.a.
Transient
power in R44:



$$t_p = 0.34872$$

Shown for worst case coil
resistance and best voltage.

Vdc (v)	Ppk(1,0)	TOTAL PEAK	
		VOLTS	WATTS
18	57.72	57.72	57.72
19	57.53	57.53	57.53
20	57.40	57.40	57.40
21	57.33	57.33	57.33
22	57.30	57.30	57.30
23	57.26	57.26	57.26
24	57.22	57.22	57.22
25	57.18	57.18	57.18
26	57.14	57.14	57.14
27	57.10	57.10	57.10
28	57.06	57.06	57.06
29	57.02	57.02	57.02
30	56.98	56.98	56.98
31	56.93	56.93	56.93
32	56.88	56.88	56.88
33	56.83	56.83	56.83
34	56.78	56.78	56.78
35	56.73	56.73	56.73
36	56.68	56.68	56.68
37	56.63	56.63	56.63
38	56.58	56.58	56.58
39	56.53	56.53	56.53
40	56.48	56.48	56.48
41	56.43	56.43	56.43
42	56.38	56.38	56.38
43	56.33	56.33	56.33
44	56.28	56.28	56.28
45	56.23	56.23	56.23
46	56.18	56.18	56.18
47	56.13	56.13	56.13
48	56.08	56.08	56.08
49	56.03	56.03	56.03
50	55.98	55.98	55.98
51	55.93	55.93	55.93
52	55.88	55.88	55.88
53	55.83	55.83	55.83
54	55.78	55.78	55.78
55	55.73	55.73	55.73
56	55.68	55.68	55.68
57	55.63	55.63	55.63
58	55.58	55.58	55.58
59	55.53	55.53	55.53
60	55.48	55.48	55.48
61	55.43	55.43	55.43
62	55.38	55.38	55.38
63	55.33	55.33	55.33
64	55.28	55.28	55.28

Total in resistor:

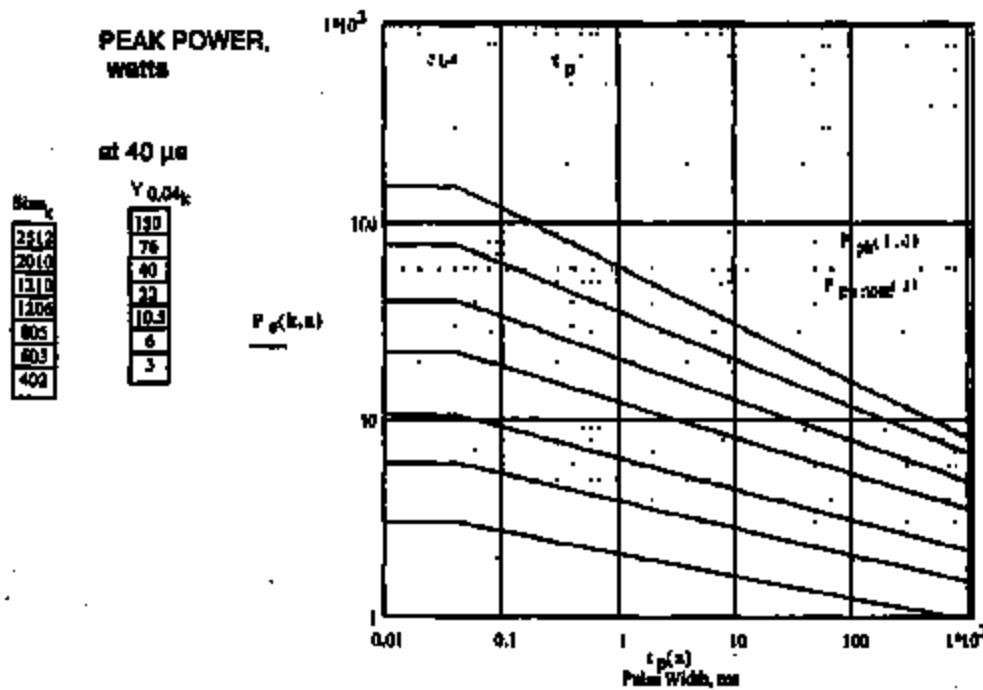
$$P_{pk}(1,0) = 57.72 \text{ mW}$$

worst Case 18 Vdc @ -40 deg C

$$P_{pkmax}(0) = 28.136762$$

$$\bullet Vdc,in = 14 \text{ volts}$$

Figure 5: SINGLE PULSE PEAK POWER, watts vs. PULSE DURATION, ms



$$P_{pk,p}(1,x) := f(t_p(x) < 1050, P_{pk}(1,0), 10^{-10})$$

(limits for plotting, only)

SINGLE 82Ω resistor

Peak power at time zero

& worst case clutch resistance:

$$P_{pk}(1,0) = 57.72 \text{ mW}$$

Peak power at time zero
& nominal clutch resistance:

$$P_{pkmax}(0) = 28.136762$$

PULSE POWER RESISTOR CAPABILITY, watts

at t_p

Size	$P_{pk}(t_p, t_p)$
2512	78.54
2010	44.44
1510	25.00
1200	14.44
845	7.4
603	4.43
402	2.43

POWER ANALYSIS of 82 OHM In CLUTCH FLYBACK CIRCUIT (R44)

Figure 8.a: SINGLE PULSE PEAK POWER, watts vs. PULSE DURATION, ms

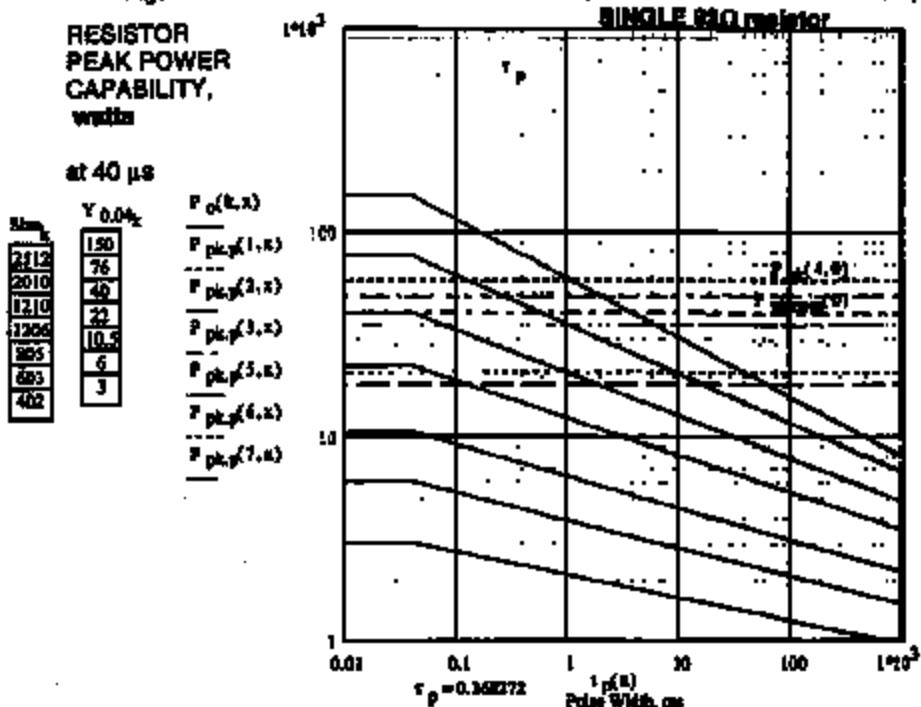
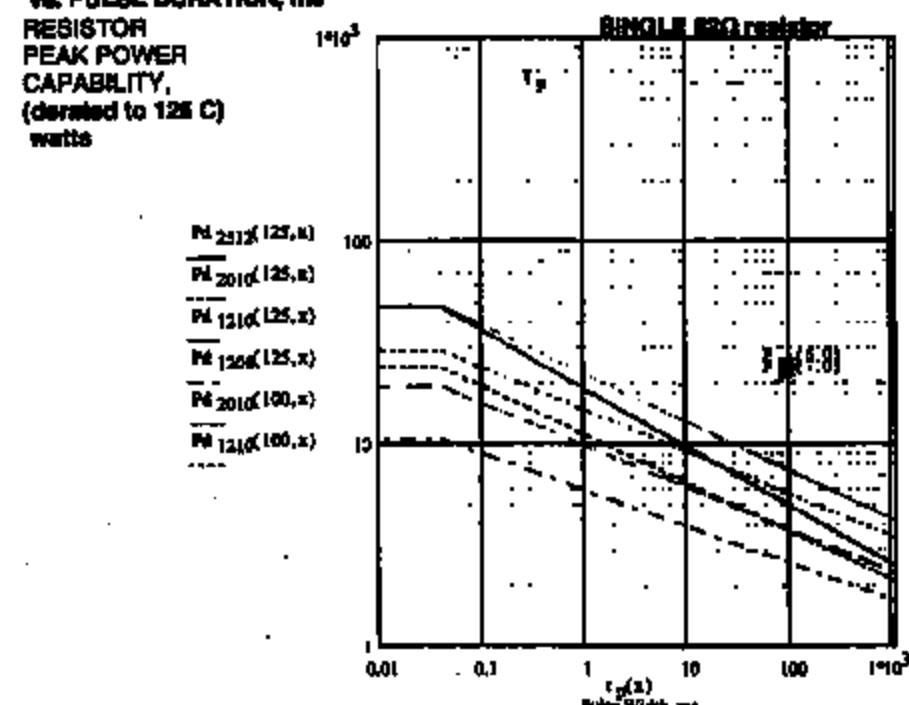


Figure 6.b. SINGLE PULSE PEAK POWER, watts (dotted to 120°C)



WORST CASE OVER TEMP. & VOLTAGE: TEMP & VOLT. TOTAL		
	V _D (V)	Worst P _{pk} (t,0)
-40	16	57.722
-20	16	47.7
0	16	40.282
20	16	39.371
70	16	34.664
100	16	22.411
125	16	17.007
150	16	11.503
20	14	20.156

**SINGLE 82Ω resistor
PULSE POWER
RESISTOR
CAPABILITY,
written
at $t_0 = 0.36622$**

Size	P ₀ (k ₀ , k ₁)
2312	78.34
2310	44.63
2316	35.05
2306	14.65
1005	7.4
603	4.43
402	2.33

WORST CASE OVER
TEMP. & VOLTAGE:
TEMP & VOLT. TOTAL

	Veto by	waives
j	P _j (j,0)	P _j (j,1)
1	16	27.772
2	16	47.738
3	16	40.295
4	16	55.571
5	16	54.946
6	16	20.411
7	16	17.107
8	16	11.903
9	16	21.152

SINGLE E2Q resistor

**PULSE POWER
RESISTOR
CAPABILITY,
watts**

* Note printed by FKOHL on 17 Feb 1999 at 11:19:23 *

From: DPORTER1--VISTECOM Date and time 02/17/99 10:29:10
To: SREIMERS--FORDMAIL Steve Reimers
cc: FKOHL --FORDMAIL Fred Kohl (E-mail) TSCHEODY--VISTECOM Tom Schedy (E-mail)
WBOYER1 --VISTECOM Wes Boyer (E-mail)

From: Porter, David (D.L.)
Subject: RE: Speed control servo

Steve, the inductance of the clutch was at one time called out as 53-112 MH.
This is measured at 1 KHz and in parallel.

Dave Porter dporter1@Vistecnet.com Phone: 313-390-8674 Fax
313-322-3529

> -----Original Message-----
> From: Steve Reimers SMTP:sreimers@w.ford.com
> Sent: Wednesday, February 17, 1999 9:53 AM
> To: dporter1@vistecn.com, fkohl@gw.ford.com
> Subject: FW: Speed control servo
>
> Fred Kohl will bring the parts to Vistecn. These were retrieved from
> junkyards
> as part of a sampling process related to Brake Pressure switch function.
> The
> Brake Pressure switch ES spec defines 300 milli-Henry as the minimum test
> induc
> tance for life testing. Is this a good number? Can you measure the
> inductance
> to establish a minimum and maximum?
>
> Steve Reimers building 5 3C043
> AVT Chassis E/E System Applications mail drop 5011
> 39-03286 SREIMERS sreimers@ford.com fax 39-03286 ;>
> *** Forwarding note from DPORTER1--VISTECOM 02/17/99 08:18 ***
> To: SREIMERS--FORDMAIL Reimers, Steve (S.
> cc: FKOHL --FORDMAIL Fred Kohl (E-mail) WBOYER1 --VISTECOM Wes Boyer
> (E-mail)
>
> From: Porter, David (D.L.)
> Subject: FW: Speed control servo
>
> Steve, the clutch resistance should be in the neighborhood of 24 Ohms. If
> the clutch winding is intact, and nothing is mechanically damaged, etc. I
> would assume the parts are functional. There is no specified inductance on
> the clutch, because it varies with gear position (open or closed). If it
> is important to check functionality of these parts, bring them to our lab,
> and I can bench test them for you. Are these parts off vehicles, or just
> unused parts that have been lying in a corner for a few years? You did not
> mention motor phase inductance or resistance. Generally, the motors are OK
> if they rotate freely, and the three phases all have a resistance of about
> 2.5 Ohms.
>
> Dave Porter dporter1@Vistecnet.com Phone: 313-390-8674 Fax
> 313-322-3529
>
> -----Original Message-----

>> From: Boyer, Wes (W.D.)
>> Sent: Wednesday, February 17, 1999 8:05 AM
>> To: Porter, David (D.L.)
>> Subject: FW: Speed control servo

>
>
>> f.y.i.
>> Regards,
>> Wes (W.D.) Boyer Phone: (313) 248-9417
>> Visteon Automotive Systems Fax: (313) 322-3329
>> Precision Speed Control - Electronic Design E-mail:
>> WBoyer1@visteon.com
>> (Usually at work, Wednesday + Thursday, only; Personal e-mail:
>> w.d.boyer@msn.org)

>
>> -----Original Message-----
>> From: Fred Kohl SMTP:fkohl@gw.ford.com
>> Sent: Tuesday, February 16, 1999 3:48 PM
>> To: wboyer1@visteon.com; tschrody@visteon.com
>> Subject: RE: Speed control servo

>
>> fyi
>
>> Regards, Fred Kohl, Precision Speed Control (Panther)
>> PROWS ID: FKohl Phone TBD Pager (868) 377-6280
>> IBM Mail (USFMCEJ2)
>> Mailing Address: FFC C375
>> *** Forwarding note from GREIMERS--DRBN007 02/16/99 11:38 ***
>> To: FKohl --DRBN007

>
>> FROM: Steve Reimers USANT(UTC -05:00)
>> Subject: RE: Speed control servo
>> These are from MY92 and 93. No known failures. Just want to know if
>> there
>> clutch control function has degraded.

>
>> Steve Reimers building 5 3C043
>> AVE Chassis E/E System Applications mail drop 5011
>> 39-03286 GREIMERS sreimers@ford.com fax 39-03286 ;>
>> *** Forwarding note from FKohl --FORDMAIL 02/16/99 10:33 ***
>> To: TSCHRODY--VISTECH Schrody, Thomas (T
>> cc: DRUDSYNS--VISTECH Budzynski, Dan (D. FKohl --FORDMAIL Kohl, Fred
>> (F.H.)
>> GREIMERS--FORDMAIL Reimers, Steve (S.

>
>> From: Boyer, Wes (W.D.)
>> Subject: RE: Speed control servo
>
>> I'll send a copy of the complete clutch-dump analysis when I get in on
>> Wednesday.
>
>> What model year clutches are we talking about? And, Why from the
>> "junkyard?"
>
>> Wes
>> w.d.boyer@msn.org
>> -----Original Message-----
>> From: Schrody, Thomas (T.P.)
>> To: Boyer, Wes (W.D.)
>> Sent: 2/16/99 10:13 AM

>> Subject: RE: Speed control servo
>>
>> Was,
>>
>> I don't think you're in today, but if you are... Could you respond to
>> Steve Reimers? I'm busy at NPEF and will return tomorrow.
>>
>> -----Original Message-----
>> From: Fred Kohl
>> To: tschrody@vistecn.com
>> Cc: dbudzyna@vistecn.com; fkohl@gw.ford.com; sreimers@gw.ford.com
>> Sent: 2/15/99 7:59 AM
>> Subject: Speed control servo
>>
>> Can you answer Steve questions?
>>
>> Regards, __ Fred Kohl, Precision Speed Control (Panther)
>> PROFS ID: FKohl Phone TBD Pager (888) 377-6280
>> IBM Mail(USFMCEJX)
>> Mailing Address: ETC C375
>> *** Forwarding note from SREIMERS--DRBN007 02/15/99 18:14 ***
>> To: FKohl --DRBN007
>>
>> FROM: Steve Reimers USAMT(UTC -05:00)
>> Subject: Speed control servo
>> What is the inductance and resistance of the clutch? What is used to
>> clamp the
>> flyback voltage? What is the magnitude of the flyback voltage?
>> I have collected at least ten speed servos from junk yards. Can you test
>> them &
>> or function?
>>
>> Steve Reimers building 5 3C043
>> AVT Chassis E/E System Applications mail drop 5011
>> 39-03286 SREIMERS sreimers@ford.com fax 39-03286 ;>

----- Part 2

MIME-Version: 1.0
Content-Type: application/ms-tnef
Content-Transfer-Encoding: base64

* Note printed by FKOHL on 17 Feb 1999 at 09:58:18 *

From: SREIMERS--DRBN007
To: DPORTER1--VISTRON

Date and time 02/17/99 09:52:37
FKOHL --DRBN007

FROM: Steve Reimers
Subject: FW: Speed control servo
Fred Kohl will bring the parts to Visteon. These were retrieved from junkyards as part of a sampling process related to Brake Pressure switch function. The Brake Pressure switch EE spec defines 300 milli-Henry as the minimum test inductance for life testing. Is this a good number? Can you measure the inductance to establish a minimum and maximum?

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
39-03286 SREIMERS sreimers@ford.com fax 39-03286 ;>
*** Forwarding note from DPORTER1--VISTRON 02/17/99 08:16 ***
To: SREIMERS--FORDMAIL Reimers, Steve (S.
cc: FKOHL --FORDMAIL Fred Kohl (E-mail) WBOYER1 --VISTRON Wes Boyer (E-mail)

From: Porter, David (D.L.)
Subject: FW: Speed control servo

Steve, the clutch resistance should be in the neighborhood of 24 Ohms. If the clutch winding is intact, and nothing is mechanically damaged, etc. I would assume the parts are functional. There is no specified inductance on the clutch, because it varies with gear position (open or closed). If it is important to check functionality of these parts, bring them to our lab, and I can bench test them for you. Are these parts off vehicles, or just unused parts that have been lying in a corner for a few years? You did not mention motor phase inductance or resistance. Generally, the motors are OK if they rotate freely, and the three phases all have a resistance of about 2.5 Ohms.

Dave Porter dporter1@Vistacom.net.com Phone: 313-390-8674 Fax
313-322-3529

> -----Original Message-----

> From: Boyer, Wes (W.D.)
> Sent: Wednesday, February 17, 1999 8:05 AM
> To: Porter, David (D.L.)
> Subject: FW: Speed control servo

>

>

> f.y.i.

> Regards,

> Wes (W.D.) Boyer Phone: (313) 248-9417
> Visteon Automotive Systems Fax: (313) 322-3529
> Precision Speed Control - Electronic Design E-mail: WBOYER1@vistacom.com
> (Usually at work, Wednesday + Thursday, only, Personal e-mail:
> w.d.boyer@iese.org)

> -----Original Message-----

> From: Fred Kohl SMTP:fkohl@gw.ford.com
> Sent: Tuesday, February 16, 1999 3:48 PM
> To: wboyer1@vistacom.com; tschrody@vistacom.com
> Subject: RE: Speed control servo

>

> fyi
>
> Regards, __ Fred Kohl, Precision Speed Control (Panther)
> PROPS ID: FKohl Phone TDD Pager (888) 377-6280
> IBM Mail(USFMCBJS)
> Mailing Address: ETC C375
> *** Forwarding note from SREIMERS--DRBN007 02/16/99 12:38 ***
> To: FKohl --DRBN007
>
> FROM: Steve Reimers USAET(UTC -05:00)
> Subject: RE: Speed control servo
> These are from MY92 and 93. No known failures. Just want to know if
> there
> clutch control function has degraded.
>
> Steve Reimers building 5 3C043
> AVT Chassis E/E System Applications mail drop 5011
> 39-03286 SREIMERS sreimers@ford.com fax 39-03286 ;>
> *** Forwarding note from FKohl --FORMAIL 02/16/99 10:33 ***
> To: TSCHRODY--VISTEON Schrodny, Thomas (T
> cc: DBUDZYN--VISTEON Budzynski, Dan (D. FKohl --FORMAIL Kohl, Fred
> (F.H.)
> SREIMERS--FORMAIL Reimers, Steve (S.
>
> From: Boyer, Wes (W.D.)
> Subject: RE: Speed control servo
>
> I'll send a copy of the complete clutch-dump analysis when I get in on
> Wednesday.
>
> What model year clutches are we talking about? And, Why from the
> "junkyard?"
>
> Wes
> w.d.boyer@seca.org
> -----Original Message-----
> From: Schrodny, Thomas (T.P.)
> To: Boyer, Wes (W.D.)
> Sent: 2/16/99 10:13 AM
> Subject: FW: Speed control servo
>
> Wes,
>
> I don't think you're in today, but if you are... Could you respond to
> Steve Reimers? I'm busy at NPEF and will return tomorrow.
>
> -----Original Message-----
> From: Fred Kohl
> To: tschrody@visteon.com
> Cc: dbudzyn@visteon.com; fkohl@gw.ford.com; sreimers@gw.ford.com
> Sent: 2/16/99 7:59 AM
> Subject: Speed control servo
>
> Can you answer Steve questions?
>
> Regards, __ Fred Kohl, Precision Speed Control (Panther)
> PROPS ID: FKohl Phone TDD Pager (888) 377-6280
> IBM Mail(USFMCBJS)
> Mailing Address: ETC C375
> *** Forwarding note from SREIMERS--DRBN007 02/16/99 10:14 ***

> To: FKOHL --DRRN007
>
> FROM: Steve Rainiers USAET(UTC -05:00)
> Subject: Speed control servo
> What is the inductance and resistance of the clutch? What is used to
> clamp the
> flyback voltage? What is the magnitude of the flyback voltage?
> I have collected at least ten speed servos from junk yards. Can you test
> them f
> or function?
>
> Steve Rainiers
> AVE Chassis E/E System Applications building 5 3C043
> 1000 3RD AVENUE mail drop 5G11
> SAN JOSE, CALIFORNIA 95112-5011
> (408) 272-6500
> FAX: (408) 272-6505

USAET (UTC -05:00)

building 5 3C043

mail drop 5011

fax 39-03286

* Note printed by FKOHL on 17 Feb 1999 at 09:58:39 *

From: FKOHL --DRBN007
To: DPORTER1--VISTECN
cc: FKOHL --DRBN007
TSCHRODY--VISTECN
REIMERS--DRBN007

Date and time 02/17/99 09:55:41

DSUDZYNS--VISTECN
WBOYER1 --VISTECN

FROM: Fred Kohl
Subject: FW: Speed control servo
I will pick up the 10 servos from Steve Reimers late today (2/17). I will put them on your desk for analysis. Steve needs your analysis by vehicle number. Each servo is in a bag with vehicle ID.

*Record
data cards*

/

If I get a chance I will put the vehicle number on the part...

Regards, Fred Kohl, Precision Speed Control (Panther)
PROFS ID: FKOHL Phone TBD Pager (888) 377-6280
IBM Mail(USFWCBJZ)
Mailing Address: WTC C375
*** Forwarding note from DPORTER1--VISTECN 02/17/99 08:18 ***
To: REIMERS--FORDMAIL Reimers, Steve (S.
cc: FKOHL --FORDMAIL Fred Kohl (E-mail) WBOYER1 --VISTECN Wes Boyer (E-mail)

*Need
Matrix
analysis*

From: Porter, David (D.L.)
Subject: FW: Speed control servo

Steve, the clutch resistance should be in the neighborhood of 24 Ohms. If the clutch winding is intact, and nothing is mechanically damaged, etc. I would assume the parts are functional. There is no specified inductance on the clutch, because it varies with gear position (open or closed). If it is important to check functionality of these parts, bring them to our lab, and I can bench test them for you. Are these parts off vehicles, or just unused parts that have been lying in a corner for a few years? You did not mention motor phase inductance or resistance. Generally, the motors are OK if they rotate freely, and the three phases all have a resistance of about 2.5 Ohms.

Dave Porter dporter1@Vistecnet.com Phone: 313-390-8674 Fax
313-322-3529

> -----Original Message-----

> From: Boyer, Wes (W.D.)
> Sent: Wednesday, February 17, 1999 8:05 AM
> To: Porter, David (D.L.)
> Subject: FW: Speed control servo

>

>

> f.y.i.

> Regards,

> Wes (W. D.) Boyer Phone: (313) 248-9417
> Vistecn Automotive Systems Fax: (313) 322-3529
> Precision Speed Control - Electronic Design E-mail: WBoyer1@vistecn.com
> (Usually at work, Wednesday + Thursday, only; Personal e-mail:
> w.d.boyer@ieee.org)

>

> -----Original Message-----
> From: Fred Kohl SMTF:fkohl@gw.ford.com
> Sent: Tuesday, February 16, 1999 3:48 PM
> To: whoyer@vistacon.com; tschrody@vistacon.com
> Subject: RE: Speed control servo
>
> tyi
>
> Regards, Fred Kohl, Precision Speed Control (Panther)
> PROPS ID: FKOHL Phone TBD Pager (888) 377-6280
> IBM Mail(UFWMCBJS)
> Mailing Address: HTC C375
> *** Forwarding note from BREIMERS--DREBN007 02/16/99 12:38 ***
> To: FKOHL --DREBN007
>
> FROM: Steve Reimers URAEST(UTC -05:00)
> Subject: RE: Speed control servo
> These are from MY#2 and 93. No known failures. Just want to know if
> there
> clutch control function has degraded.
>
> Steve Reimers building 5 3C043
> AVT Chassis E/E System Applications mail drop 5011
> 39-03286 BREIMERS sreimers@ford.com fax 39-03286 ;>
> *** Forwarding note from FKOHL --FORDMAIL 02/16/99 10:33 ***
> To: TSCHRODY--VISTACOM Schrody, Thomas (T
> cc: DBUDZYNS--VISTACOM Budzynski, Dan (D. FKOHL --FORDMAIL Kohl, Fred
> (F.B.)
> BREIMERS--FORDMAIL Reimers, Steve (S.
>
> From: Boyar, Wes (W.D.)
> Subject: RE: Speed control servo
>
> I'll send a copy of the complete clutch-dump analysis when I get in on
> Wednesday.
>
> What model year clutches are we talking about? And, Why from the
> "junkyard?"
>
> Wes
> w.d.boyar@iesaa.org
> -----Original Message-----
> From: Schrody, Thomas (T.B.)
> To: Boyar, Wes (W.D.)
> Sent: 2/16/99 10:13 AM
> Subject: FW: Speed control servo
>
> Wes,
>
> I don't think you're in today, but if you are... Could you respond to
> Steve Reimers? I'm busy at HDMF and will return tomorrow.
>
> -----Original Message-----
> From: Fred Kohl
> To: tschrody@vistacon.com
> Cc: dbudzyns@vistacon.com; fkohl@gw.ford.com; sreimers@gw.ford.com
> Sent: 2/16/99 7:59 AM
> Subject: Speed control servo
>
> Can you answer Steve questions?

* Note printed by FKOML on 17 Feb 1999 at 09:46:48 *

From: FKOML --DRBN007
To: TSCHIRDT--VISTEON
cc: FKOML --DRBN007

Date and time 02/12/99 15:38:42

FROM: Fred Kohl

USAET(UTC -05:00)

Subject: More Questions

Answers to the questions:

Do not understand first question as stated. If he means brake pressure switch stuck closed all of the time, customer would not know as long as there not any other failures.

A relay between the fuse and the switch is OK.

Tom; need your help with the time between BCU signal and when software turns off (de-energize) the clutch circuit. What does the software say?

Also, is the timing different if we get a De-act switch signal?

Regards, Fred Kohl, Precision Speed Control (Panther)
PROPS ID: FKOML Phone TBD Pager (628) 377-6280
IBM Mail(UARWCRJS)
Mailing Address: HTC C375
*** Forwarding note from BREINERS--DRBN007 02/09/99 18:08 ***
To: FKOML --DRBN007

FROM: Steve Reimers

USAET(UTC -05:00)

Subject: More Questions

Would a customer know if the speed control clutch drive output was stuck on?
Is a relay between the the Brake P switch and fuse an feasible fix?
What kind of timing is expected between when the BCU turns off the clutch drive output and when the Brake P switch opens?
thanks,

Steve Reimers
AVT Chassis E/Z System Applications
39-03286 BREINERS sreimers@ford.com

building 5 3C063
mail drop 5011
fax 39-03286 ;>

MSG FROM: FKOHL -DRBN007 TO: SREIMERS-DRBN007 02/15/99 04:12:37

To: SREIMERS-DRBN007

cc: DBUDZYNS-VISTEON

TSCHRODY-VISTEON

FKOHL -DRBN007

FROM: Fred Kohl USAET(UTC -05:00)

Subject: Alternate Disc Switch

Yes, the pedal mounted switch currently used is compatible electrically with the 92 and 93 Town Car.

I do not know if mounting in the vehicle and wiring harness requirements can easily be met. Chassis would have to answer the mounting / packaging questions and ESE would have to address the wiring harness issues.

The current Town Car disc switch engineer is Mike Salanta (MSALANTA) 84-54007.

Regards, Fred Kohl, Precision Speed Control (Panther)

PROFS ID: FKOHL Phone TBD Pager (888) 377-6280

IBM Mail(USPMCBJ2)

Mailing Address: ETC C375

*** Forwarding note from SREIMERS-DRBN007 02/13/99 16:43 ***

To: FKOHL -DRBN007

FROM: Steve Reimers USAET(UTC -05:00)

Subject: Alternate Disc Switch

Is the brake pedal mounted switch a viable replacement for the Pressure switch as far as the speed control electronics is concerned? Is this switch input compatible with the speed controls in 92 and 93 town cars?

Steve Reimers building 5 3C043

AVT Chassis E/E System Applications mail drop 5011

39-03286 SREIMERS sreimers@ford.com fax 39-03286 >

MSG FROM: FKOHL -DRBN007 TO: SREIMERS-DRBN007 02/15/99 08:21:01

To: SREIMERS-DRBN007

FROM: Fred Kohl

USAET(UTC -05:00)

Subject: RE: More Questions

See Tom's note about clutch release time. Typical time for normal cruise conditions (1/4) throttle opening is about 0.5 seconds.

Regards, Fred Kohl, Precision Speed Control (Panther)

PROFS ID: FKOHL Phone TBD Pager (888) 377-6280

IBM Mail(USPMCBJ2)

Mailing Address: ETC C375

*** Forwarding note from TSCHRODY-VISTEON 02/15/99 06:41 ***

To: FKOHL -FORDMAIL Kohl, Fred (F.H.)

From: Schrödy, Thomas (T.P.)

Subject: RE: More Questions

The time required to open the clutch via the Speed Control Amplifier varies. When the ECO input is activated, the motor is spooled to the idle position before releasing the clutch. Timing will depend on how far the throttle is open at the time. This is done to provide a "gentle" release of the accelerator. If the brakes are applied hard, the Brake Pressure Switch will open. Since this switch removes power from our clutch, the clutch opens immediately.

Regards,

Thomas Schrödy

Product Design Engineer ETC, C-393

Precision Speed Control Tel: (313) 323-9695
Visteon Automotive Systems Fax: (313) 322-3529

> -----Original Message-----
> From: Fred Kohl [SMTP:fkohl@gw.ford.com]
> Sent: Friday, February 12, 1999 3:39 PM
> To: tschrody@visteon.com
> Cc: fkohl@gw.ford.com
> Subject: More Questions
>
> Answers to the questions:
> Do not understand first question as stated. If the means brake pressure
> switch stuck closed all of the time, customer would not know as long as
> there not any other failures.
>
> A relay between the fuse and the switch is OK.
>
> Tom; need your help with the time between BOO signal and when software
> turns off (de-energize) the clutch circuit. What does the software say?
> Also, is the timing different if we get a Do-out switch signal?
>
> Regards, Fred Kohl, Precision Speed Control (Panther)
> PROPS ID: FKOHL Phone TDD Pager (888) 377-6280
> IBM Mail(USFMCRJZ)
> Mailing Address: ETC C375
> *** Forwarding note from SREIMERS--DRBN007 02/09/99 18:08 ***
> To: FKOHL --DRBN007
>
> FROM: Steve Reimers USAET(UTC -05:00)
> Subject: More Questions
> Would a customer know if the speed control clutch drive output was stuck
> on?
> Is a relay between the the Brake P switch and fuse a feasible fix?
> What kind of timing is expected between when the BOO turns off the clutch
> drive
> output and when the Brake P switch opens?
> thanks,
>
> Steve Reimers building 5 3C043
> AVT Chassis E/B System Applications mail drop 5011
> 39-03286 SREIMERS sreimers@ford.com fax 39-03286 >

=
MSG FROM: FKOHL --DRBN007 TO: TSCHRODY--VISTEON 02/15/99 09:27:39

To: TSCHRODY--VISTEON

cc: FKOHL --DRBN007

FROM: Fred Kohl USAET(UTC -05:00)

Subject: RE: More Questions

Tom, I told Steve that the customer would not know if an internal driver
for the clutch output was stuck on. The BOO signal would cause the motor
to be driven back to idle. Also, the brake pressure switch when
activated would open the feed to the clutch circuit.

I told him that there is NO warning light for faults.

Another question Steve had: does the speed control module check to see if
the driver circuit for the clutch is turned on when it should not be.

Does it set an internal code or make the system inop?
Steve; mentioned that ABS units check the output state and sets codes if there are faults detected.

Regards, Fred Kohl, Precision Speed Control (Panther)
PROFS ID: FKOHL Phone TBD Pager (888) 377-6280
IBM Mail(USFMCRJZ)

Mailing Address: BTIC C375

*** Forwarding note from SREIMERS-DRBN007 02/15/99 08:57 ***

To: FKOHL -DRBN007

*** Reply to note of 02/15/99 08:21

FROM: Steve Reimers USAET(UTC -05:00)

Subject: RE: More Questions

If the clutch output driver gets stuck "ON" would the customer be aware of it?
Would the speed control detect this fault? ...light a warning lamp? ...log a fault code? Any action on FRACAS?

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
39-03286 SREIMERS reimers@ford.com fax 39-03286 >

MSG FROM: FKOHL -DRBN007 TO: FKOHL -DRBN007 02/15/99 08:12:37

To: SREIMERS-DRBN007

cc: DBUDZYNS-VISTBON TSCHRODY-VISTBON
FKOHL -DRBN007

FROM: Fred Kohl USAET(UTC -05:00)

Subject: Alternate Dese Switch

Yes, the pedal mounted switch currently used is compatible electrically with the 92 and 93 Town Car.

I do not know if mounting in the vehicle and wiring harness requirements can easily be met. Chassis would have to answer the mounting / packaging questions and BESE would have to address the wiring harness issues.

The current Town Car dash switch engineer is Mike Salminia (MSALANTA) 24-54007.

Regards, Fred Kohl, Precision Speed Control (Panther)

PROFS ID: FKOHL Phone TBD Pager (888) 377-6280
IBM Mail(USFMCRJZ)

Mailing Address: BTIC C375

*** Forwarding note from SREIMERS-DRBN007 02/13/99 16:43 ***

To: FKOHL -DRBN007

FROM: Steve Reimers USAET(UTC -05:00)

Subject: Alternate Dese Switch

Is the brake pedal mounted switch a viable replacement for the Pressure switch as far as the speed control electronics is concerned? Is this switch input compatible with the speed controls in 92 and 93 town cars?

Steve Reimers building 5 3C043

AVT Chassis E/E System Applications mail drop 5011

39-03286 SREIMERS reimers@ford.com fax 39-03286 >

MSG FROM: FKOHL -DRBN007 TO: SREIMERS-DRBN007 02/15/99 10:51:04

To: SREIMERS-DRBN007

FROM: Fred Kohl USAET(UTC -05:00)

Subject: RE: More Questions

Steve; we do not monitor the state of the clutch driver..

Regards, Fred Kohl, Precision Speed Control (Panther)

PROPS ID: PKOHL Phone TBD Pager (888) 377-6280
IBM Mail(USFMCBJZ)
Mailing Address: ETC C375
*** Forwarding note from TSCHRODY-VISTEON 02/15/99 10:11 ***
To: PKOHL --FORMAIL.Kohl, Fred (F.H.)
From: Schrodny, Thomas (T.P.)
Subject: RE: More Questions
We do not monitor the state of the clutch driver.
Regards,
Thomas Schrodny
Product Design Engineer ETC, C-395
Precision Speed Control Tel: (313) 323-9695
Visteon Automotive Systems Fax: (313) 322-3529
> -----Original Message-----
> From: Fred Kohl [SMTP:fkohl@gw.ford.com]
> Sent: Monday, February 15, 1999 9:29 AM
> To: tschrody@visteon.com
> Cc: fkohl@gw.ford.com
> Subject: RE: More Questions
>
> Tom, I told Steve that the customer would not know if or internal driver
> for the clutch output was stuck on. The BOO signal would cause the motor
> to be driven back to idle. Also, the brake pressure switch when
> activated would open the feed to the clutch circuit.
>
> I told him that there is NO warning light for faults.
>
> Another question Steve had: does the speed control module check to see if
> the driver circuit for the clutch is turned on when it should not be.
> Does it set an internal code or make the system inop?
>
> Steve, mentioned that ABS units check the output state and sets codes if
> there are faults detected.
>
> Regards, Fred Kohl, Precision Speed Control (Panther)
> PROPS ID: PKOHL Phone TBD Pager (888) 377-6280
> IBM Mail(USFMCBJZ)
> Mailing Address: ETC C375
> *** Forwarding note from SREIMERS-DREHN007 02/15/99 08:57 ***
> To: PKOHL --DREHN007
>
> ++++ Reply to note of 02/15/99 08:21
> FROM: Steve Reimers USAET(UTC -05:00)
> Subject: RE: More Questions
> If the clutch output driver gets stuck "ON" would the customer be aware of
> it?
> Would the speed control detect this fault? ...light a warning lamp? ...log
> a fa
> nlt code? Any action on FRACAS?
>
> Steve Reimers building 5 3C043
> AVT Chassis E/B Systems Applications mail drop 3011
> 39-03286 SREIMERS sreimers@ford.com fax 39-03286 ;>

MSG:FROM: FKOHL -FORDMAIL TO: FKOHL -DRBN007 02/16/99 10:26:29
To: FKOHL -FORDMAIL Kohl, Fred (F.H.) TSCHRODY-VISTEON Schrod, Thomas (T
cc: DBUDZYNS-VISTEON Budzynski, Dan (D. SREIMERS-FORDMAIL Reimers, Steve (S.
From: Schrod, Thomas (T.P.)
Subject: RE: Speed control servo

Goodlemen,

I am at North Penn today supporting PV builds. I can answer some of the questions today, but more specific details will have to wait until tomorrow. I do not recall the specific electrical parameters of the clutch. The flyback is clamped in the amplifier with a diode in series with an 82ohm resistor.

We can bench test any of the servos you have collected. Did these units come from vehicles with a specific failure, or are they just a random sample of units?

—Original Message—

From: Fred Kohl
To: tschrody@visteon.com
Cc: dbudzyna@visteon.com; fkohl@gw.ford.com; sreimers@gw.ford.com
Sent: 2/16/99 7:59 AM
Subject: Speed control servo

Can you answer Steve questions?

Regards, Fred Kohl, Precision Speed Control (Panther)
PROFS ID: FKOHL Phone TBD Pager (888) 377-6280

IBM Mail(USFMCRBZ)

Mailing Address: ETC C375

*** Forwarding note from SREIMERS-DRBN007 02/15/99 16:14 ***

To: FKOHL -DRBN007

FROM: Steve Reimers USAET(UTC -05:00)

Subject: Speed control servo

What is the inductance and resistance of the clutch? What is used to clamp the

flyback voltage? What is the magnitude of the flyback voltage?

I have collected at least ten speed servos from junk yards. Can you test them?

or function?

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
39-03286 SREIMERS sreimers@ford.com fax 39-03286 >

MSG FROM: FKOHL -DRBN007 TO: FKOHL -DRBN007 02/12/99 15:38:42

To: TSCHRODY-VISTEON

cc: FKOHL -DRBN007

FROM: Fred Kohl USAET(UTC -05:00)

Subject: More Questions

Answers to the questions:

Do not understand first question as stated. If he means brake pressure switch stuck closed all of the time, customer would not know as long as there not any other failures.

A relay between the fuse and the switch is OK.

Tom; need your help with the time between BOO signal and when software turns off (de-energize) the clutch circuit. What does the software say?

Also, is the timing different if we get a Do-act switch signal?
Regards, Fred Kohl, Precision Speed Control (Panther)
PROFS ID: FKOHL Phone TEL Pager (988) 377-6280
IBM Mail(USFMCRHZ)

Mailing Address: ETC C375

*** Forwarding note from SREIMERS--DRBN007 02/09/99 18:08 ***

To: FKOHL --DRBN007
FROM: Steve Reimers USAET(UTC -05:00)
Subject: More Questions

Would a customer know if the speed control clutch drive output was stuck on?
Is a relay between the the Brake P switch and fuse an feasible fix?
What kind of timing is expected between when the BOO turns off the clutch drive
output and when the Brake P switch opens?

thanks,

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
39-03286 SREIMERS sreimers@ford.com fax 39-03286 >

MSG-FROM: DPORTER1-VISTEON TO: FKOHL --DRBN007 02/17/99 08:18:43
To: SREIMERS-FORDMAIL Reimers, Steve (S.
cc: FKOHL --FORDMAIL Fred Kohl (E-mail) WBOYER1-VISTEON Wes Boyer (E-mail)
From: Porter, David (D.L.)
Subject: FW: Speed control servo

Steve, the clutch resistance should be in the neighborhood of 24 Ohms. If
the clutch winding is intact, and nothing is mechanically damaged, etc, I
would assume the parts are functional. There is no specified inductance on
the clutch, because it varies with gear position (open or closed). If it
is important to check functionality of these parts, bring them to our lab,
and I can bench test them for you. Are these parts off vehicles, or just
unused parts that have been lying in a corner for a few years? You did not
mention motor phase inductances or resistance. Generally, the motors are OK
if they rotate freely, and the three phases all have a resistance of about
2.5 Ohms.

Dave Porter dporter1@Visteon.net Phone: 313-390-8674 Fax
313-322-3529

>—Original Message—

> From: Boyer, Wes (W.D.)
> Sent: Wednesday, February 17, 1999 8:05 AM
> To: Porter, David (D.L.)
> Subject: FW: Speed control servo

>

>

> f.y.i.

> Regards,

> Wes (W. D.) Boyer Phone: (313) 248-9417
> Visteon Automotive Systems Fax: (313) 322-3529
> Precision Speed Control - Electronic Design E-mail: WBoyer1@visteon.com
> (Usually at work, Wednesday + Thursday, only; Personal e-mail:
> w.d.boyer@isae.org)

>

>—Original Message—

> From: Fred Kohl (SMTP:fkohl@gw.ford.com)
> Sent: Tuesday, February 16, 1999 3:48 PM

> To: wboyer1@visteon.com; tschrody@visteon.com
> Subject: RE: Speed control servo
>
> fyi
>
> Regards, __ Fred Kohl, Precision Speed Control (Panther)
> PROPS ID: FKOHL Phone TDD Pager (388) 377-6280
> IBM Mail(USFMCRBZ)
> Mailing Address: ETC C375
> *** Forwarding note from SREIMERS--DRBN007 02/16/99 12:38 ***
> To: FKOHL --DRBN007
>
> From: Steve Reimers USAET(UTC -05:00)
> Subject: RE: Speed control servo
> These are from MY92 and 93. No known failures. Just want to know if
> there
> clutch control function has degraded.
>
> Steve Reimers building 5 3C043
> AVT Chassis E/E System Applications mail drop 5011
> 39-03286 SREIMERS sreimers@ford.com fax 39-03286 >
> *** Forwarding note from FKOHL --FORDMAIL 02/16/99 10:33 ***
> To: TSCHRODY-VISTEON Schrody, Thomas (T
> cc: DBUDZYNS-VISTEON Bedzynski, Dan (D. FKOHL --FORDMAIL Kohl, Fred
> (F.H.)
> SREIMERS--FORDMAIL Reimers, Steve (S.
>
> From: Boyer, Wes (W.D.)
> Subject: RE: Speed control servo
>
> I'll send a copy of the complete clutch-damp analysis when I get in on
> Wednesday.
>
> What model year clutches are we talking about? And, Why from the
> "junkyard?"
>
> Wes
> w.d.boyer@jees.org
> ---Original Message---
> From: Schrody, Thomas (T.P.)
> To: Boyer, Wes (W.D.)
> Sent: 2/16/99 10:13 AM
> Subject: FW: Speed control servo
>
> Wes,
>
> I don't think you're in today, but if you are... Could you respond to
> Steve Reimers? I'm busy at NPEP and will return tomorrow.
>
> ---Original Message---
> From: Fred Kohl
> To: tschrody@visteon.com
> Cc: dbudzyns@visteon.com; fkohl@gw.ford.com; sreimers@gw.ford.com
> Sent: 2/16/99 7:59 AM

> Subject: Speed control servo
>
> Can you answer Steve questions?
>
> Regards, Fred Kohl, Precision Speed Control (Panther)
> PROFS ID: FKOHL Phone TBD Pager (888) 377-6280
> IBM Mail(USPMCBJZ)
> Mailing Address: ETC C375
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> To: FKOHL -DRBN007
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> 39-03286 SREIMERS sreimers@ford.com fax 39-03286 >
—— Part 2
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MSG FROM: SREIMERS--DRBN007 TO: FKohl --DRBN007 02/17/99 09:12:37
To: DPORTERI--VISTEON FKohl --DRBN007
FROM: Steve Reimers USAET(UTC -05:00)
Subject: FW: Speed control servo

Fred Kohl will bring the parts to Visteon. These were retrieved from junkyards
as part of a sampling process related to Brake Pressure switch function. The
Brake Pressure switch BS spec defines 300 milli-Hour as the minimum test indec-
ence for life testing. Is this a good number? Can you measure the inunction
to establish a minimum and maximum?
Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
39-03286 SREIMERS reimers@ford.com fax 39-03286 >

*** Forwarding note from DPORTER1-VISTRON 02/17/99 08:18 ***

To: SRHIMERS-FORDMAIL Raimers, Steve (S.
cc: FKOHIL -FORDMAIL Fred Kohl (E-mail) WBOYER1 -VISTRON Wes Boyer (E-mail)
From: Porter, David (D.L.)

Subject: FW: Speed control servo

Steve, the clutch resistance should be in the neighborhood of 24 Ohms. If the clutch winding is intact, and nothing is mechanically damaged, etc. I would assume the parts are functional. There is no specified inductance on the clutch, because it varies with gear position (open or closed). If it is important to check functionality of these parts, bring them to our lab, and I can bench test them for you. Are these parts off vehicles, or just unused parts that have been lying in a corner for a few years? You did not mention motor phase inductance or resistance. Generally, the motors are OK if they rotate freely, and the three phases all have a resistance of about 2.5 Ohms.

Dave Porter dporter1@VistaCoast.com Phone: 313-390-3674 Fax
313-322-3529

> -----Original Message-----

> From: Boyer, Wes (W.D.)
> Sent: Wednesday, February 17, 1999 8:05 AM
> To: Porter, David (D.L.)
> Subject: FW: Speed control servo

>

>

> f.y.i.

> Regards,

> Wes (W. D.) Boyer Phone: (313) 248-9417
> Visteon Automotive Systems Fax: (313) 322-3529
> Precision Speed Control - Electronic Design E-mail: WBoyer1@visteon.com
> (Usually at work, Wednesday + Thursday, only; Personal e-mail:
> w.d.boyer@iccc.org)

>

> -----Original Message-----

> From: Fred Kohl [SMTP:fkohl@gw.ford.com]
> Sent: Tuesday, February 16, 1999 3:48 PM
> To: wboyer1@visteon.com; tachrody@visteon.com
> Subject: RE: Speed control servo

>

> fyi

>

> Regards, Fred Kohl, Precision Speed Control (Pending)

> PROPS ID: FKOHIL Phone TBD Pager (865) 377-6280

> IBM Mail(USPMCBIZ)

> Mailing Address: ETC C375

> *** Forwarding note from SRHIMERS-DREN007 02/16/99 12:38 ***

> To: FKOHIL -DREN007

>

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>

> Steve Raimers building 5 3C043

> AVT Chassis E/E System Applications mail drop 5011
> 39-03286 SREIMERS weimers@ford.com fax 39-03286 >
> *** Forwarding note from FKOHIL -FORDMAIL 02/16/99 10:33 ***
> To: TSCHRODY-VISTEON Schrödy, Thomas (T
> cc: DBUDZYNS-VISTEON Budzynski, Dwa (D. FKOHIL -FORDMAIL Kohl, Fred
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> Mailing Address: ETC C375
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> To: FKOHIL -DREN007
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> Subject: Speed control servo
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MSG:FROM: DPORTER!-VISTBON TO: FKOHL -DEHN007 02/17/99 10:29:10
To: SREIMERS-FORDMAIL Steve Reimers
cc: FKOHL -FORDMAIL Fred Kohl (E-mail) TSCHRODY-VISTBON Tom Schrödy (E-mail)
WBOYERI -VISTEON Wes Boyer (E-mail)

From: Porter, David (D.L.)
Subject: RE: Speed control servo
Steve, the inductance of the clutch was at one time called out as 53-112 MHL.
This is measured at 1 KHz and is parallel.
Dave Porter dporter1@Vistacenet.com Phone: 313-390-8674 Fax:
313-322-3529

> -----Original Message-----
> From: Steve Reimann [SMTP:areimann@gw.ford.com]
> Sent: Wednesday, February 17, 1999 9:13 AM
> To: dporter1@viscon.com; fchob@gw.ford.com
> Subject: FW: Speed control servo

- >
- > Fred Kohl will bring the parts to Vintec. These were retrieved from
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- > as part of a sampling process related to Brake Pressure switch function.
- > The
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> Steve Reimers building 5 3C043
> AVT Chassis E/E System Applications mail drop 5011
> 39-03286 SREIMERS sreimers@ford.com fax 39-03286 ;>
> *** Forwarding note from DPORTER1-VISTEON 02/17/99 08:18 ***
> To: SREIMERS-FORDMAIL Reimers, Steve (S.
> cc: FKOHLL -FORDMAIL Fred Kohl (E-mail) WBOYER1 -VISTEON Wes Boyer
> (E-mail)

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>>
>> f.y.i.
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>> Wes (W. D.) Boyer Phone: (313) 248-9417
>> Visteon Automotive Systems Fax: (313) 322-3529
>> Precision Speed Control - Electronic Design E-mail:
>> WBoyer1@visteon.com
>> (Usually at work, Wednesday + Thursday, only; Personal e-mail:
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>> fyi
>>
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>> PROPS ID: FKOHL Phone THD Pager (368) 377-6280
>> IBM Mail(USFMCRJZ)
>> Mailing Address: ETC C375
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>> SREIMERS-FORDMAIL Reimers, Steve (S.
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>> Cc: dmndzus@visteon.com; fkohl@gw.ford.com; sreimers@gw.ford.com
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>> IBM Mail(USPMCBJZ)
>> Mailing Address: ETC C375
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>> AVT Chassis E/B System Applications mail drop 5011
>> 39-03286 SREIMERS sreimers@ford.com fax 39-03286 >
----- Part 2
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AAAAAIIBCAB
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g4jONIK
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MUZEQjgsOE8mbWMwbjE0MiSkZWFFyYm9ybi5mb3RkLmNvbT4AAAApRg—

MSG;FROM: SREIMERS-FORDMAIL TO: FKOHL -DREN007 02/22/99 10:00:55
To: SREIMERS-FORDMAIL Reimers, Steve (S. WBOYER1 -VISTECN Boyer, Wes (W.D.)
cc: FKOHL -FORDMAIL Kohl, Fred (F.H.) TSCHROODY--VISTECN Schrödy, Thomas (T
From: Boyer, Wes (W.D.)
Subject: RE: Speed control servo

The transient pulse will be an identical mirror image of the one shown in the previous traces. That is, instead of floating at the Vbias level, "charging" the inductance at zero [the Vds(on) of the MOSFET] and flying back to a positive voltage, the pulse on the HPS side (referenced to ground) will fly back to a negative voltage limited by the IR drop across the clamping resistor. There will be a small difference in the dynamics due to a capacitor at the HPS-Deac node that doesn't enter the picture when the FET is switched. I will look into that on Wednesday.

Wes

w.d.boyer@icss.org

—Original Message—

From: Steve Reimers

To: wboyer1@vistecn.com

Cc: fkohl@gw.ford.com; tschroody@vistecn.com

Sent: 2/18/99 5:46 PM

Subject: RE: Speed control servo

Please re-run this model with the following condition: No Fly-back and

FET always

ys on and use the Brake Pressure switch to create the switching
transistor.

What is the voltage at the brake pressure switch?

Steve Reimers building 5 3C043

AVT Chassis E/E System Applications mail drop 5011

39-03286 SREIMERS sreimers@ford.com fax 39-03286 >

*** Forwarding note from WBOYER1 -VISTECN 02/17/99 10:56 ***

To: DPORTER1-VISTECN Porter, David (D.L. SREIMERS-FORDMAIL Reimers,

Steve (S.
cc: FKOHIL -FORDMAIL Kohl, Fred (F.H.) TSCHRODY-VISTEON Schrödy,
Thomas (T

DBUDZYNS-VISTEON Budzynski, Dan (D.

From: Boyer, Wes (W.D.)

Subject: RE: Speed control servo

Attached is an analysis of the idealized flyback pulse of the turn-off
transient on the clutch winding:

<<C1_82r44.pdf>>

Regards,

Wes (W. D.) Boyer Phone: (313) 248-9417

Visteon Automotive Systems Fax: (313)

322-3529

Precision Speed Control - Electronic Design E-mail:

WBoyer1@visteon.com

(Usually at work, Wednesday + Thursday, only; Personal e-mail:
w.d.boyer@ieea.org)

> -----Original Message-----

> From: Porter, David (D.L.)

> Sent: Wednesday, February 17, 1999 10:29 AM

> To: Steve Reimers

> Cc: Fred Kohl (E-mail); Tom Schrödy (E-mail); Wes Boyer (E-mail)

> Subject: RE: Speed control servo

>

> Steve, the inductance of the clutch was at one time called out as
53-112

> MH. This is measured at 1 KHz and in parallel.

>

> Dave Porter dporter1@Visteon.com Phone: 313-390-8674

Fax:

> 313-322-3529

>

> -----Original Message-----

> From: Steve Reimers [SMTP:sreimers@gw.ford.com]

> Sent: Wednesday, February 17, 1999 9:53 AM

> To: dporter1@visteon.com; fkuhl@gw.ford.com

> Subject: FW: Speed control servo

>

> Fred Kohl will bring the parts to Visteon. These were retrieved
from junkyards

> as part of a sampling process related to Brake Pressure switch

> function. The

> Brake Pressure switch ES spec defines 300 milli-Henry as the
minimum

> test induc

> tance for life testing. Is this a good number? Can you measure
the

> inductance

> to establish a minimum and maximum?

>

> Steve Reimers building 5 3CD43

> AVT Classics E/E System Applications mail drop 5011

> 39-03286 SREIMERS sreimers@ford.com fax 39-03286 >

> *** Forwarding note from DPORTER1-VISTEON 02/17/99 08:18 ***

> To: BREIMERS-FORDMAIL Reimers, Steve (S.
> cc: FKOHLL -FORDMAIL Fred Kohl (E-mail) WBOYER1 -VISTEON Wes
> Boyer (E-mail)
>
> From: Porter, David (D.L.)
> Subject: FW: Speed control servo
>
> Steve, the clutch resistance should be in the neighborhood of 24
> Ohms. If
> the clutch winding is intact, and nothing is mechanically
damaged,
> etc. I
> would assume the parts are functional. There is no specified
> inductance on
> the clutch, because it varies with gear position (open or
closed).
> If it
> is important to check functionality of these parts, bring them
to
> our lab,
> and I can bench test them for you. Are these parts off vehicles,
or
> just
> unused parts that have been lying in a corner for a few years?
You
> did not
> mention motor phase inductance or resistance. Generally, the
motors
> are OK
> if they rotate freely, and the three phases all have a
resistance of
> about
> 2.5 Ohms.
>
> Dave Porter dporter1@Vistixnet.com Phone:
313-390-8674
> Fax
313-322-3529
>
> >Original Message-----
> > From: Boyer, Wes (W.D.)
> > Sent: Wednesday, February 17, 1999 8:05 AM
> > To: Porter, David (D.L.)
> > Subject: FW: Speed control servo
>
>
> > f.y.i.
> > Regards,
> > Wes (W. D.) Boyer Phone: (313)
> 248-9417
> > Visteon Automotive Systems Fax: (313)
> 322-3529
> > Precision Speed Control - Electronic Design E-mail:
> WBoyer1@visteon.com

> > (Usually at work, Wednesday + Thursday, only; Personal e-mail:
> > w.d.boyer@iccc.org)
> >
> > -----Original Message-----
> > From: Fred Kohl [SMTP:fkohl@gw.ford.com]
> > Sent: Tuesday, February 16, 1999 3:48 PM
> > To: wboyer1@visteon.com; tschrody@visteon.com
> > Subject: RE: Speed control servo
> >
> > fyi
> >
> > Regards, Fred Kohl, Precision Speed Control (Panther)
> > PROPS ID: FKOHL Phone TRD Pager (888) 377-6280
> > IBM Mail(USFMCBIZ)
> > Mailing Address: ETC C375
> > *** Forwarding note from SREIMERS--DRBN007 02/16/99 12:38 ***
> > To: FKOHL --DRBN007
> >
> > FROM: Steve Reimers USART(UTC
-05:00)
> > Subject: RE: Speed control servo
> > These are from MY92 and 93. No known failures. Just want to
know
> if
> > there
> > clutch control function has degraded.
> >
> > Steve Reimers building 5 3C043
> > AVT Chassis E/E System Applications mail drop 5011
> > 39-03286 SREIMERS sreimers@ford.com fax 39-03286 >
> > *** Forwarding note from FKOHL --FORDMAIL 02/16/99 10:33 ***
> > To: TSCHRODY--VISTEON Schrödy, Thomas (T
> > cc: DBUDZYNS--VISTEON Budzynski, Dan (D. FKOHL --FORDMAIL
Kohl,
> Fred
> > (F.H.)
> > SREIMERS--FORDMAIL Reimers, Steve (S.
> >
> > From: Boyer, Wes (W.D.)
> > Subject: RE: Speed control servo
> >
> > I'll send a copy of the complete clutch-dump analysis when I
get
> in on
> > Wednesday.
> >
> > What model year clutches are we talking about? And, Why from
the
> > "junkyard"?
> >
> > Wes
> > w.d.boyer@iccc.org
> > -----Original Message-----
> > From: Schrödy, Thomas (T.P.)

> > To: Boyer, Wes (W.D.)
> > Sent: 2/16/99 10:13 AM
> > Subject: FW: Speed control servo
>
> > Wes,
> >
> > I don't think you're in today, but if you are... Could you
respond
> to
> > Steve Reimers? I'm busy at NPEF and will return tomorrow.
>
> > -----Original Message-----
> > From: Fred Kohl
> > To: technody@vistron.com
> > Cc: dbutayns@vistron.com; fkohl@gw.ford.com;
reimers@gw.ford.com
> > Sent: 2/16/99 7:59 AM
> > Subject: Speed control servo
>
> > Can you answer Steve questions?
>
> > Regards, Fred Kohl, Precision Speed Control (Panther)
> > PROPS ID: FKOHL Phone TBD Paper (888) 377-6260
> > IBM Mail(USFMCHHZ)
> > Mailing Address: ETC C375
> > *** Forwarding note from SREIMERS--DRBN007 02/15/99 13:14 ***
> > To: FKOHL --DRBN007
>
> > FROM: Steve Reimers USAET(UTC
-05:00)
> > Subject: Speed control servo
> > What is the inductance and resistance of the clutch? What is
used
> to
> > clamp the
> > flyback voltage? What is the magnitude of the flyback
voltage?
> > I have collected at least ten speed servos from junk yards.
Can
> you test
> > them f
> > or function?
>
> > Steve Reimers building 5 3C043
> > AVT Chassis E/E System Applications mail drop 5011
> > 39-03286 SREIMERS reimers@ford.com fax 39-03286 ?
Attachments sent separately:

Data Type	File Name
BINARY	CL_52R44.PDF_PC

MSG:FROM: DPORTER1-VISTRON TO: FKOHL --DRBN007 02/22/99 13:45:46
To: SREIMERS--FORDMAIL Steve Reimers

cc: FKOHIL -PORDM(AIL Fred Kohl (E-mail)

From: Porter, David (D.L.)

Subject: RE: Speed Control Report

The failure of part #316 was a functional failure, that is, speed control would not function. The clutch function was OK, but pulley end clutch rotation was locked at the zero throttle position by the (melted) pulley cover. Once the melted pulley cover was removed, the actuator function was normal, although the motor was almost rusted enough to fail to function, due to water entry. Presumably fire extinguisher entered through the partially melted amplifier. Part #316 failed due to water entry, but the clutch was not engaged, and clutch coil resistance was nominal. Note that coil resistance is the same whether the clutch is engaged or not.

Dave Porter dporter1@Vistacom.com Phone: 313-390-3674 Fax 313-322-3329

> -----Original Message-----

> From: Steve Reimers [SMTP:sreimers@gw.ford.com]

> Sent: Monday, February 22, 1999 12:42 PM

> To: dporter1@vistacom.com

> Subject: Speed Control Report

>

> Thanks for the quick response. Did any of the FAILED units have a clutch

> stuck

> in the energized state? What does FAIL mean for this test?

> thanks,

>

> Steve Reimers building 5 3C043

> AVT Chassis E/E System Applications mail drop 5011

> 39-03286 SREIMERS sreimers@ford.com fax 39-03286 >

----- Part 2

MIME-version: 1.0

Content-Type: application/ms-tnef

Content-Transfer-Encoding: base64

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CQBjXmhkSDzINA4wHoEhg/tbMEmoXQmB6AbwCQJHMmYiXQKHIoIAaAbHRdIZhpJKYFoHYEc
CNg
T/85h3AKEIqVSvqHyMZ8ARgnStwZCCyHsAA0HR1IPDXBbElOxzQsgDABCCwB0D7INAiYGckEC
vT
IrAFsRHzyawBYHMFQHJ1MjAHkXAJDDEKIAm4M3H6UgsGR/CIAzIMh8wKoAFwAwwfB55SNgUB
nw
c3UAwAJgJdHkZmkwMWV4H9AcQHx/BAAdDVD8JAhkSHMNvEkocHMTZRKIVhbQnQByAlkbels
R61
Nh3T1ZE0a3kUB4t8PPFL8QPQAnwZ2Pn/y4JHkFoAMRNnREAAAGQk9L7L8gjYB4icCvyiPE/rqQA
/SgDewwQIEdsCgRBcA9Od9DATSiHIAFwCKhLgqfCoTDG8ITwTEgRGEraDXAjwlRBjAb0QvCMTc
8
SImGZCkwR7lxQFZAiWXXHOFF8AWgbURBwMwHPAEoIAzIDMM4kwICMNjcostINGYbJ4SyQy
MNg
DkASRlwETM7BEYsOjAPMQngJqEFkNUFQC1QBsAFBqoLgCAR/k0HkENwPqBQ80YWT6RPcQcLE
0+k
AgBpLTBNHcBQDqgHwAwAUAM0FOsYqIMMANbOgyDYhFAUyqAGUDmUmUHsREAIFCYE1U
UDpxzHbW
U0C4Z3caHALIEpSXUYVL1TgBmACMFVHTQ1gZGhLPMFQZWIyYAxAJBM08kgDRjWyBbAD
MNMIkU
kPHNWGdUbIVBISTeOdknUSIUYsHVib/R/IVIXOMIUCHkVJBjQIG/Uw/TsQM0AHB09EVURVSDA
PG
I7sdoABwwwQgV9EoA3E3MG&nkD/KTAAgGUJYEcwaRdwW410BshKBjGQQuawTEVERB+gKWAII
BDg
30daH3AjxTtwG1BdrhQhEP8DoCgSCFARhPCQkFAhoEAxIsqAPoIAVydIZG8HkT9iwipBASIREM
C
B5B6P/dGPCDRZQgRhgKgFXccB+XSIgIQAMQZDcHIDVIgDAzQsA0FVBG10FWHlRgQEDgHBBd
AUUv
RU0GAHlygUqAQXA6EWoJNwNQDAAxFkA2Bw8IC4NTAxG3MKgEtwLRxwAxlQOyBTUKVJT
UX+UgXw
SIBXF1fWSII4Exhs3dsJIM7PKYUfTEa8AAAAB4AQsABAAAAAXgAAADwIWlQLTc5MDiyMjEy
NDIw
NDs5OTAyMjIxMjQyMDQ6MUUqL2M9VVMvYWRsZD0gL3BybWQ9Rm9yZC9vPW92dm0vZGQub
322bT1m
b3JkLINSRUINRVJTLyIATUhtPgAAAAAA4AIIAYAAAAAAAAMAAAAAAAABGAAAAAAOFAAA
AAAAAAwAF
zAggBgAAAAAAwAAAAAAABYAAAAAEIuAAAAAAAADAACACCAGAAAAAADAAAAAA
AArAAABsQAA
PRIAAB4AAyAIIAYAAAAAAwAAAAAAABGAAAAAPSAABAAAABQAAADgMDMAAAA
AAwACgAggBgAA
AAAAwAAAAAAABYAAAAAAAYUAAAAAAAALAAACCCAGAAAAADAAAAAAARgAAA
AACbQAAAAAAAAMA
BoAIIAYAAAAAAwAAAAAAABGAAAAABGFAAAAAAAABwAHgAggBgAAAAAAwAAAAA
AAAByAAAAAQIUA
AAAAAAAAsAiACCAGAAAAADAAAAAAARgAAAAA2hQAAAQAAAAEAAAAAAAAlg
AJgAggBgAAAAAA
wAAAAAAAABYAAAAAN4UAAAABAAAAAAAB4ACnAIIAYAAAAAAwAAAAAA
BGAAAAADIFAAAB
AAAAAQAAAAAAAADAPe/CQQAAAMA/T/EBAAAAbAmAAAAAAADADYAAAAAAAGB
D///AgPfABA
AAAwAAAAYz1VUzthPSA7eD1mb3lk02w9VmTVEVYMDe0TikwMjlyMTgxOTM2W50xNjY0OTU
AHgA4
QAEAAAIAAAAARFBPUlFUjeAAAAAAhgA3QAEAAAIAAAAARFBPUlFUjeAAAAAAQAAHMC
YE7KSXnB

QAAIMOoirrKSXs4BHgA9AAAFAAAAukU6IAAAAAB00AQAAABUAAABTcGVIZCB
D6250cm9s
IFJLc09yIAAAAAAnADUQAQAAAeyAAAASM0Q4MDkUNjkwMDg0RDIxMTI4RKQwMEEwQzID
Q0VGIMjMw
MUZBQjelMUBmbWMwbjE0Mj5kZWPyYm9yb15mb3JkLwNvbT4AAAALACKAAAAAAAlwAAA
AAAawAG
BMLFXDgDAAcQswMAAAMAEBAAAAAAwAREAAAAAAsAAgQAQAAAGUAAABUSEVGQUI
MVVJFT02QQVJU
LmrQfdBLRFGVUSDVEIPTlFMRkfJTFVSRsLSEPUSYMqULFRURDT05U19MV09VTEROT1
RGV1SD
VEPTIRIRUNMVRDSEZTlNLSU9OV0FTT0mAAAAAAIBfwABAAAARgAAADwzRDgszOTU2
OTAwODRE
MjExOTbGRDAwQTBDOUNDRUYyMxAxRHCOTgxQGZfYzBuMTQyLmRlYXlb3JuLmZvemQuY2
9PgAA
ALI+

=
MSG:FROM: WBOYER1 -VISTEON TO: FKOHL -DREIN007 02/25/99 15:51:53
To: SREIMERS-FORDMAIL Reitman, Steve (S.)
cc: FKOHL -FORDMAIL Kohl, Fred (F.H.) TSCHRODY-VISTEON Schrody, Thomas (T.
GDYGERT-VISTEON Dygert, Greg (G.J.) DBUDZYNE-VISTEON Bedzynski, Dan (D.)
GHUBERTS-VISTEON Huberts, Garlan (G)
From: Boyer, Wes (W.D.)
Subject: RE: Spend control servo
Steve,

Greg Dygert helped me with this. He ran a dynamic transient response analysis on the flyback voltage appearing at the HPS - Diac node (our J1-9 terminal) when the clutch is engaged and switched off by the external HPS. With the flyback clamping resistor in place, the transient is limited to a relatively clean, exponentially decaying impulse peaking at about -30 volts, with or without the 22 nF capacitor in our module, confirming my description of 2/22/1999.

Without the 82 ohm resistor and diode across the clutch winding, the voltage is an underdamped oscillation that theoretically peaks at +/- 1000 volts and whose envelope decays exponentially. It is very likely that the switch and/or capacitor (rated at 100 volts dc, 200 v pk) would break down at a much lower voltage. The energy stored in the clutch winding could cause the switch to arc. For this to occur the ignition must be ON and speed control must have been "SET" (or #1 fault - shorted MOSFET driver) AND the flyback resistor, R44, is open (fault #2) AND the brake pressure builds up to open the switch. If fault #1 occurs without the switch opening, a continuous current of about 0.5 amp drains the battery rather rapidly (overnight) and the driver will be aware that something is wrong. Fault #2 is known to have caused fault #1 and the drained battery on a small population of vehicles built with Thin FR4 (non-ceramic) circuits and a bad batch of R44 resistors from the supplier! I do not believe these are in the same generation of NGSC modules as the protest concern.

Please copy Huberts, Garlan (G.J.) and/or Dygert, Greg (G.J.) with my reply or response to this message.

Regards,

Wes (W. D.) Boyer Phone: (313) 248-9417
Visteon Automotive Systems Fax: (313) 322-3529
Precision Spend Control - Electronic Design E-mail: WBoyer1@visteon.com
(Usually at work, Wednesday + Thursday, only; Personal e-mail:

w.d.boyer@leco.org)
> —Original Message—
> From: Steve Reimers [SMTP:sreimers@gw.ford.com]
> Sent: Monday, February 22, 1999 12:18 PM
> To: wboyer1@visteon.com
> Cc: fkohli@gw.ford.com
> Subject: RE: Speed control servo
>
> Can you model this with the flyback resistor disconnected?
>
> Steve Reimers building 5 3CD43
> AVT Chassis E/E System Applications mail drop 5011
> 39-03286 SREIMERS sreimers@ford.com fax 39-03286 >
> *** Forwarding note from SREIMERS-FORDMAIL 02/22/99 10:00 ***
> To: SREIMERS-FORDMAIL Reimers, Steve (S. WBOYER1 - VISTEON Boyer, Wes
> (W.D.)
> cc: FKOHLL -FORDMAIL Kohl, Fred (F.H.) TSCHRODY-VISTEON Schrödy,
> Thomas (T
>
> From: Boyer, Wes (W.D.)
> Subject: RE: Speed control servo
>
> The transient pulse will be an identical mirror image of the one shown in
> the previous traces. That is, instead of floating at the Vbatt level,
> "charging" the inductance at zero [the Vds(on) of the MOSFET] and flying
> back to a positive voltage, the pulse on the BPS side (referenced to
> ground)
> will fly back to a negative voltage limited by the I^R drop across the
> clamping resistor. There will be a small difference in the dynamics due
> to
> a capacitor at the BPS-Deac node that doesn't enter the picture when the
> FET
> is switched. I will look into that on Wednesday.
>
> Wes
> w.d.boyer@leco.org
>
> —Original Message—
> From: Steve Reimers
> To: wboyer1@visteon.com
> Cc: fkohli@gw.ford.com; tschrody@visteon.com
> Sent: 2/18/99 5:46 PM
> Subject: RE: Speed control servo
>
> Please re-run this model with the following condition: No Fly-back and
> FET alwa
> ys on and use the Brake Pressure switch to create the switching
> transient.
> What is the voltage at the brake pressure switch?
>
> Steve Reimers building 5 3CD43
> AVT Chassis E/E System Applications mail drop 5011
> 39-03286 SREIMERS sreimers@ford.com fax 39-03286 >
> *** Forwarding note from WBOYER1 - VISTEON 02/17/99 10:56 ***

> To: DPORTER1--VISTRON Porter, David (D.L.SREIMERS--FORDMAIL Reimers,
> Steve (S.
> cc: FKOHL --FORDMAIL Kahl, Fred (F.H.) TSCHRODY--VISTRON Schrod, Thomas (T
> DBUDZYNS--VISTRON Budzynski, Dan (D.
>
> From: Boyer, Wes (W.D.)
> Subject: RE: Speed control servo
>
> Attached is an analysis of the idealized flyback pulse of the turn-off
> transient on the clutch winding:
> <<C1_82x44.pdf>>
>
> Regards,
> Wes (W. D.) Boyer Phone: (313) 248-9417
> Visteon Automotive Systems Fax: (313)
> 322-3329
> Precision Speed Control - Electronic Design E-mail:
> WBoyer1@visteon.com
> (Usually at work, Wednesday + Thursday, only; Personal e-mail:
> w.d.boyer@icsee.org)
>
>> -----Original Message-----
>> From: Porter, David (D.L.)
>> Sent: Wednesday, February 17, 1999 10:29 AM
>> To: Steve Reimers
>> Cc: Fred Kahl (E-mail); Tom Schrod, Wes Boyer (E-mail)
>> Subject: RE: Speed control servo
>>
>> Steve, the inductance of the clutch was at one time called out as
>> 53-112
>> MH. This is measured at 1 KHz and is parallel.
>>
>> Dave Porter dporter1@Vistecost.com Phone: 313-390-8674
>> Fax
>> 313-322-3329
>>
>> -----Original Message-----
>> From: Steve Reimers [SMTP:sreimers@gw.ford.com]
>> Sent: Wednesday, February 17, 1999 9:53 AM
>> To: dporter1@visteon.com; fkohl1@gw.ford.com
>> Subject: FW: Speed control servo
>>
>> Fred Kahl will bring the parts to Visteon. These were retrieved
>> from junkyards
>> as part of a sampling process related to Brake Pressure switch
>> function. The
>> Brake Pressure switch ES spec defines 300 milli-Henry as the
>> minimum
>> test induc
>> tance for life testing. Is this a good number? Can you measure
>> the
>> inductance
>> to establish a minimum and maximum?

>>
>> Steve Reimers building 5 3C043
>> AVT Chassis/EV System Applications mail drop 5011
>> 39-03286 SREIMERS.sreimers@ford.com fax 39-03286 >
>> *** Forwarding note from DPORTER1-VISTEON 02/17/99 08:18 ***
>> To: SREIMERS-FORDMAIL Reimers, Steve (S.
>> cc: FKOH1 -FORDMAIL Fred Kohl (E-mail) WBOYER1 -VISTEON Wes
>> Boyer (E-mail)
>>
>> From: Porter, David (D.L.)
>> Subject: FW: Speed control servo
>>
>> Steve, the clutch resistance should be in the neighborhood of 24
>> Ohms. If
>> the clutch winding is intact, and nothing is mechanically
> damaged,
>> e.g. I
>> would assume the parts are functional. There is no specified
>> inductance on
>> the clutch, because it varies with gear position (open or
> closed).
>> If it
>> is important to check functionality of these parts, bring them
> to
>> our lab,
>> and I can bench test them for you. Are these parts off vehicles,
> or
>> just
>> unused parts that have been lying in a corner for a few years?
> You
>> did not
>> mention motor phase inductance or resistance. Generally, the
> motors
>> are OK
>> if they rotate freely, and the three phases all have a
> resistance of
>> about
>> 2.5 Ohms.
>>
>> Dave Porter dporter1@Vistecnet.com Phone:
> 313-390-8674
>> Fax
>> 313-322-3529
>>
>> > -----Original Message-----
>> > From: Boyer, Wes (W.D.)
>> > Sent: Wednesday, February 17, 1999 8:05 AM
>> > To: Porter, David (D.L.)
>> > Subject: FW: Speed control servo
>> >
>> >
>> > f.y.i.
>> > Regards,
>> > Wes (W. D.) Boyer

Phone: (313)

>> 248-9417
>> > Visteon Automotive Systems FAX: (313)
>> 322-3529
>> > Precision Speed Control - Electronic Design E-mail:
>> WBoyer1@visteon.com
>> > (Usually at work, Wednesday + Thursday, only; Personal e-mail:
>> > w.d.boyer@lees.org)
>> >
>> > —Original Message—
>> > From: Fred Kohl (SMTP:kohl@gw.ford.com)
>> > Sent: Tuesday, February 16, 1999 3:48 PM
>> > To: wboyer1@visteon.com; tschrody@visteon.com
>> > Subject: RE: Speed control servo
>> >
>> > fyi
>> >
>> > Regards, Fred Kohl, Precision Speed Control (Panther)
>> > PROFS ID: FKOHLL Phone TDD Pager (888) 377-6280
>> > IBM Mail(USFMCBJZ)
>> > Mailing Address: ETC C375
>> > *** Forwarding note from SREIMERS--DRBN007 02/16/99 12:38 ***
>> > To: FKOHLL --DRBN007
>> >
>> > FROM: Steve Reimers USAET(UTC
>-05:00)
>> > Subject: RE: Speed control servo
>> > These are from MY92 and 93. No known failures. Just want to
> know
>> if
>> > there
>> > clutch control function has degraded.
>> >
>> > Steve Reimers building 5 3C043
>> > AVT Chassis E/E System Applications mail drop 5011
>> > 39-03286 SREIMERS sreimers@ford.com fax 39-03286 >
>> > *** Forwarding note from FKOHLL --FORDMAIL 02/16/99 10:33 ***
>> > To: TSCHRODY--VISTEON Schrody, Thomas (T
>> > cc: DBUDZYNS--VISTEON Budzynski, Dwa (D. FKOHLL --FORDMAIL
> Kohl,
>> > Fred
>> > (F.H.)
>> > SREIMERS--FORDMAIL Reimers, Steve (S.
>> >
>> > From: Boyer, Wes (W.D.)
>> > Subject: RE: Speed control servo
>> >
>> > I'll send a copy of the complete clutch-dump analysis when I
> get
>> in on
>> > Wednesday.
>> >
>> > What model year clutches are we talking about? And, Why from
> the
>> > "junkyard?"

>> >
>> > Wes
>> > w.d.boyer@isca.org
>> > -----Original Message-----
>> > From: Schrod, Thomas (T.P.)
>> > To: Boyer, Wes (W.D.)
>> > Sent: 2/16/99 10:13 AM
>> > Subject: FW: Speed control servo
>> >
>> > Wes,
>> >
>> > I don't think you're in today, but if you are... Could you
> respond
>> to
>> > Steve Reimers? I'm busy at NPEF and will return tomorrow.
>> >
>> > -----Original Message-----
>> > From: Fred Kohl
>> > To: tschrody@viscon.com
>> > Cc: dbradyna@viscon.com; fkohl@gw.ford.com;
> reimers@gw.ford.com
>> > Sent: 2/16/99 7:39 AM
>> > Subject: Speed control servo
>> >
>> > Can you answer Steve questions?
>> >
>> > Regards, Fred Kohl, Precision Speed Control (Panther)
>> > PROFS ID: FKOHLL Phone TBD Pager (BS) 377-6280
>> > IBM Mail(USPMCBJZ)
>> > Mailing Address: ETC C375
>> > *** Forwarding note from SREIMERS-DRBN007 02/15/99 16:14 ***
>> > To: FKOHLL -DRBN007
>> >
>> > FROM: Steve Reimers USAET(UTC
>-05:00)
>> > Subject: Speed control servo
>> > What is the inductance and resistance of the clutch? What is
> used
>> to
>> > clamp the
>> > flyback voltage? What is the magnitude of the flyback
> voltage?
>> > I have collected at least ten speed servos from junk yards.
> Can
>> you test
>> > them f
>> > or function?
>> >
>> > Steve Reimers building 5 3C043
>> > AVT Chassis E/E System Applications mail drop 5011
>> > 39-03286 SREIMERS reimers@ford.com fax 39-03286 >
>
>
> Attachments sent separately:

> From: Steve Reimers [SMTP:sreimers@gw.ford.com]
> Sent: Tuesday, February 23, 1999 5:25 PM
> To: fkohl@gw.ford.com
> Cc: tschrody@visteon.com
> Subject: Speed Control Output
>
> Does your FMEA include a condition where the clutch is continuously
> energized b
> because the FET output driver is latched in the ON-state? Is this a
> failure mode
> or for the output FET circuit? When the Brake pressure switch disconnects
> the p
> over to the clutch would that cause the FET to unlatch? When the
> Brake pressure switch re-applies power to the clutch would the FET
> re-latch or
> stay OFF?
>
> Steve Reimers building 5 3C043
> AVT Chassis E/B System Applications mail drop 5011
> 39-03286 SREIMERS sreimers@ford.com fax 39-03286 >

MSG FROM: FKOHL --DRBN007 TO: FKOHL --DRBN007 03/08/99 08:29:14
To: SREIMERS--DRBN007
cc: TSCHRODY--VISTEON DBUDZYNS--VISTEON
FKOHL --DRBN007 MRESE --DRBN005
FROM: Fred Kohl USAET(UTC -05:00)
Subject: Brake Dose Switch Re-location
The Speed Control Group did release the old vacuum dump valve but the packaging
of the valve on the brake pedal support was handled by the brake group.
I am available to review packaging of a electrical switch in this area, but the
normal responsibility is with Brake group and AVT.
Regards, Fred Kohl, Precision Speed Control (Panther)
PROPS ID: FKOHL Phone TBD Pager (888) 377-6280
IBM Mail(USFMCBIZ)
Mailing Address: ETC C375
*** Forwarding note from SREIMERS--DRBN007 03/08/99 18:06 ***
To: FKOHL --DRBN007 TSCHRODY--VISTEON
FROM: Steve Reimers USAET(UTC -05:00)
Subject: Brake Dose Switch Re-location
The D&R is from Visteon. Who do you recommend to do the package review of Mart
y's switch relocation design?
Steve Reimers building 5 3E008
AVT Chassis E/B System Applications mail drop 5011
39-03286 SREIMERS sreimers@ford.com fax 39-03286 >
*** Forwarding note from MRESE --DRBN005 03/08/99 15:48 ***
To: SREIMERS--DRBN007
cc: TBrazil --DRBN005 DSYLVES1--DRBN005
JEVANS8 --DRBN005 SPEASE --DRBN005
AZAPARAC--DRBN005 FPORTER --DRBN007
FROM: M. P. REESER USAET(UTC -05:00)
Subject: Brake Dose Switch Re-location
STEVE, I HAVE NO PROBLEM WITH JOE, BRUCE, OR AL LOOKING AT THE DESIGNER'S
TUBE TO SEE THE PACKAGE AVAILABLE AROUND THE 1992/3/4 TOWN CAR BRAKE PEDAL

AND BRACKET ASSEMBLY (-2450-), BUT THEY ARE NOT THE RELEASE ACTIVITY THAT WOULD TRY TO RELEASE AN ELECTRICAL SWITCH INTO THAT ENVIRONMENT. SPEED CONTROL IS THAT RELEASE ACTIVITY.
I WILL BE OUT FOR A FEW DAYS. I WILL ASK A CORE DESIGNER TO COORDINATE WITH JOE, BRUCE, AND AL. PACKAGE REVIEW BY SPEED CONTROL DESIGN AND RELEASE? NEWS ABOUT 1992 MODEL TOWN CAR. THE 1992 SERVICE MANUAL SHOWS THIS FOR THE SPEED CONTROL SYSTEM:

- * EARLY PRODUCTION VEHICLES USED A VACUUM DUMP VALVE, ON THE BRAKE PEDAL AND
- BRACKET ASSEMBLY. PAGE 10-03B-1.
- * LATE PRODUCTION VEHICLES, LIKE 1993 AND 1994 MODEL TOWN CAR,
"THE SYSTEM OPERATES INDEPENDENT OF ENGINE VACUUM, THEREFORE NO VACUUM LINES ARE REQUIRED."

THIS WAS NOT A JOB #1 CHANGE. THAT HISTORY I DO NOT HAVE.
THIS IS ANOTHER PLACE WHERE THE SPEED CONTROL RELEASE ENGINEER COULD HELP;
THAT IS, EXACTLY WHEN EARLY PRODUCTION STOPPED AND LATE PRODUCTION STARTED

(VIN, DATE, ETC.).

Regards,

M. P. Reese 313-317-7142 (313-621-6675 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31

*** Forwarding note from SREIMERS--DRBN007 03/08/99 15:11 ***

To: MREESB --DRBN005
cc: JEVANSB --DRBN005 BPEASE --DRBN015
AZAPARAC --DRBN005 TRAZIL --DRBN005
FPORTER --DRBN007 Porter, F.J. JKAFATTI --DRBN004
FROM: Steve Reimers USAET(UTC -05:00)

Subject: Brake Deac Switch Re-location

Please contact Joe Evans, Bruce Pease, and A. Zaparac when you are ready for the check. These guys should be able to provide a good sanity check.

Steve Reimers building 5 3B008
AVT Chassis E/B System Applications mail drop 5011
39-03286 SREIMERS sreimers@ford.com fax 39-03286 >

*** Forwarding note from MREESB --DRBN005 03/06/99 17:33 ***

To: SREIMERS--DRBN007
cc: TRAZIL --DRBN005 LSMITH9 --DRBN006
DSYLVEST --DRBN006

FROM: M. P. REESE USAET(UTC -05:00)

Subject: Brake Deac Switch Re-location, 1992/1993/1994 TOWN CAR

STEVE, PANTHER SERVICE MANUALS PROVIDE A LITTLE MORE LIGHT:

- * 1993 MODEL (ON PAGE 10-03-1, SPEED CONTROL SYSTEM) AND 1994 MODEL (ON PAGE 10-03-1, SPEED CONTROL SYSTEM - ELECTRONIC) MANUALS CONTAIN THIS SENTENCE, "THE SYSTEM OPERATES INDEPENDENT OF ENGINE VACUUM, THEREFORE NO VACUUM LINES ARE REQUIRED."
- * I WILL FIND AND CHECK A 1992 MODEL MANUAL.

THIS SOMEWHAT SUPPORTS A SPACE BEING AVAILABLE ON THE TOWN CAR BRAKE PEDAL

AND BRACKET ASSEMBLY. I WILL TRY TO BE READY, WHEN SOMEONE COMES TO CHECK.

Regards,

M. P. Reese 313-317-7142 (313-621-6675 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from SREIMERS--DRBN007 03/05/99 17:24 ***

To: JKAFATTI --DRBN004

cc: FPORTER -DRBN007 Porter, F.J. MREESB -DRBN005
FKOHL -DRBN007
FROM: Steve Reimers USAET(UTC -05:00)
Subject: Brake Decs Switch Re-location
Joe, Can you do the checking that Marty is requesting? Do you know who the deal
in and release engineer(s) is for the brake pedal mounted switch and the harness
#?
Steve Reimers building 5 3E008
AVT Chassis E/B System Applications mail drop 5011
39-03286 SREIMERS reimers@ford.com fax 39-03286 >
*** Forwarding note from MREESB -DRBN005 03/05/99 14:27 ***
To: SREIMERS -DRBN007
cc: TBAZIL -DRBN005 LEMITH9 -DRBN005
DSYLVEST -DRBN006 WLIVING8 -DRBN005
FROM: M. P. REESE USAET(UTC -05:00)
Subject: Brake Decs Switch Re-location - DESIGN ORDER RESULTS
STEVE, THERE IS A PLACE FOR A SWITCH TO BE LOCATED ON THE 1992/1993/1994
TOWN CAR BRAKE PEDAL ASSEMBLY. IT IS THE "KEYHOLE" IN THE PEDAL ASSEMBLY'S
BRACKET, WORKING WITH THE FLAT SURFACE ON THE PLASTIC ADAPTER (ON THE
PEDAL
ASSEMBLY'S ARM). THESE FEATURES WERE USED TO MOUNT THE VALVE ASSEMBLY -
SPEED CONTROL (-9CT27-) AND THE CLIP - SPEED CONTROL VACUUM VALVE (-9C966-)
ON OTHER MODEL YEAR/CARLINE PANTHER CARS. SWITCH AND WIRING CLEARANCE TO
STEERING COLUMN CRUSH ZONE WILL DEPEND ON DIMENSIONS OF SWITCH TO BE USED,
AND WIRING ROUTING. (THE 1999 MODEL SWITCH, AT THIS LOCATION, DOES INTERFERE
WITH THE CRUSH ZONE.) A DIFFERENT/NEW SWITCH WILL BE NEEDED.
IT IS TIME FOR THE CHECK TO VERIFY THESE RESULTS, THAT I REQUESTED DURING THE
1999 MAR 03 MEETING. THE CHECK IS NEEDED, BECAUSE REFERENCES (DESIGN
LAYOUTS,
WBBS, DOCMAN, ETC.) THAT WE HAVE AVAILABLE (AND RECOVERED FROM ARCHIVES)
ARE
NOT PERFECT. I REQUEST REVIEW BY THE APPROPRIATE DESIGN AND RELEASE (SWITCH
AND WIRING) ENGINEER. PLEASE RELAY THIS REQUEST.
IF THIS SOLUTION DOES NOT HOLD UP TO THE CHECK, THEN WE WILL NOT BE ABLE TO
ADD A SWITCH ON THE BRAKE PEDAL AND BRACKET ASSEMBLY.
Regards,
M. P. Reese 313-317-7142 (313-621-6675 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from MREESB -DRBN005 03/01/99 12:24 ***
To: SREIMERS -DRBN007 FPORTER -DRBN007
cc: TBAZIL -DRBN005 JNBMB -DRBN005
FROM: M. P. REESE USAET(UTC -05:00)
Subject: Brake Decs Switch Re-location - DESIGN ORDER
STEVE, THE RESULT OF THE MEETING THIS MORNING IS THAT WE WILL HAVE A
FEASIBLE,
CLEAR SOLUTION (FOR SWITCH MOUNTED TO BRAKE PEDAL ASSEMBLY, ON
1992/1993/1994
TOWN CAR) BY NOON FRIDAY 1999 MAR 05.
IN MAKING THIS SOLUTION, WE ARE BEING VERY CAREFUL SO THAT WE DO NOT MAKE
SOMETHING ELSE WORSE. THE HISTORY IS VAGUE.
ANY GOOD NEWS, ABOUT OTHER SOLUTIONS?
Regards,
M. P. Reese 313-317-7142 (313-621-6675 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31

*** Forwarding note from SREIMERS--DRBN007 02/27/99 16:19 ***

To: MREESE --DRBN005

cc: FPORTER --DRBN007 Porter, F.J.

FROM: Steve Reimers USAET(UTC -05:00)

Subject: Brake Disc Switch Re-location

Marty, Please call Fred Porter with the update from your meeting. I will be at MPG most of the day.

Steve Reimers building 5 3E008

AVT Chassis E/E System Applications mail drop 5011

39-03286 SREIMERS sreimers@ford.com fax 39-03286 >

*** Forwarding note from MREESE --DRBN005 02/27/99 16:13 ***

To: SREIMERS--DRBN007

cc: TBAZIL --DRBN003 LSMITH9 --DRBN005

FROM: M. P. REESE USAET(UTC -05:00)

Subject: Brake Disc Switch Re-location

I AM OPTIMISTIC ABOUT ABILITY TO PACKAGE THE CURRENT PRODUCTION SWITCH ON THE BRAKE PEDAL AND BRACKET ASSEMBLY IN 1992/1993/1994 TOWN CARS. I WILL KNOW MORE (BUT NOT EVERYTHING) ABOUT TIMING AT THE CONCLUSION OF A 9:00 AM MEETING WITH CHASSIS DESIGNERS. GENERAL OPTIMISM COMES FROM THE BRAKE PEDAL AND BRACKET ASSEMBLY DRAWINGS; THEY (SO FAR) SHOW EVOLUTION OVER THE

MODEL YEARS, AND INVOLVE ONLY ONE SUPPLIER.

WERS AND DOCMAN ARE NOT IN GOOD SHAPE FOR THIS 1992/1993/1994 MODEL TASK. THAT SLOWS THE ADVANCE. FACILITATES AMBUSH.

ALWAYS, I MUST CONSIDER EFFECTS ON FMVSS 105. VEHICLE TEST, BRAKE SYSTEM. I INTEND TO CALL YOU, ABOUT NOON ON MONDAY 1999 MAR 01.

Regards,

M. P. Reese 313-317-7142 (313-621-6675 FAX)

OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31

*** Forwarding note from SREIMERS--DRBN007 02/25/99 15:39 ***

To: MREESE --DRBN005

FROM: Steve Reimers USAET(UTC -05:00)

Subject: Brake Disc Switch Re-location

Marty, I was asked what the status of this design work. Have you got any good words I can pass on to my manager? I would like to give Jack Perkins a sense of where we are on this task, what the next step(s) are and when they are targeted to complete. My meeting with Perkins is Monday at 3:30.

thanks,

Steve Reimers building 5 3C043

AVT Chassis E/E System Applications mail drop 5011

39-03286 SREIMERS sreimers@ford.com fax 39-03286 >

MSG FROM: SREIMERS--DRBN007 TO: FKOHL --DRBN007 03/09/99 09:13:04

To: FKOHL --DRBN007

FROM: Steve Reimers USAET(UTC -05:00)

Subject: Brake Disc Switch Re-location

You should review the choices of switch.

Steve Reimers building 5 3E008

AVT Chassis E/E System Applications mail drop 5011

39-03286 SREIMERS sreimers@ford.com fax 39-03286 >

*** Forwarding note from FKOHL --DRBN007 03/09/99 08:29 ***

To: SREIMERS--DRBN007

cc: TSCHRODY-VISTEON DBUDZYNE-VISTEON

FKOHL -DRBN007..

MREESSE -DRBN005

FROM: Fred Kahl

USAET(UTC -05:00)

Subject: Brake Dose Switch Re-location

The Speed Control Group did release the old vacuum dump valve but the packaging of the valve on the brake pedal support was handled by the brakes group.

I am available to review packaging of a electrical switch in this area, but the normal responsibility is with Brake group and AVT.

Regards, Fred Kahl, Precision Speed Control (Panther)

PROPS ID: FKOHL Phone TBD Pager (868) 377-6280

IBM Mail/USFMCR/Z

Mailing Address: ETC C375

*** Forwarding note from SREIMERS -DRBN007 03/08/99 18:06 ***

To: FKOHL -DRBN007 TSCHRODY-VISTBON

FROM: Steve Reimers USAET(UTC -05:00)

Subject: Brake Dose Switch Re-location

The D&R is from Visteon. Who do you recommend to do the package review of Mart y's switch relocation design?

Steve Reimers building 5 3E008

AVT Chassis E/E System Applications mail drop 5011

39-03286 SREIMERS reimers@ford.com fax 39-03286 >

*** Forwarding note from MREESSE -DRBN005 03/08/99 15:48 ***

To: SREIMERS -DRBN007

cc: TBAZIL -DRBN005 DSYLVES1 -DRBN005

JEVANSS -DRBN005 EPHASE -DRBN005

AZAPARAC -DRBN005 FPORTER -DRBN007

FROM: M. P. REESE USAET(UTC -05:00)

Subject: Brake Dose Switch Re-location

STEVE, I HAVE NO PROBLEM WITH JOE, BRUCE, OR AL LOOKING AT THE DESIGNER'S TUBE TO SEE THE PACKAGE AVAILABLE AROUND THE 1992/3/4 TOWN CAR BRAKE PEDAL AND BRACKET ASSEMBLY (J490-), BUT THEY ARE NOT THE RELEASE ACTIVITY THAT WOULD TRY TO RELEASE AN ELECTRICAL SWITCH INTO THAT ENVIRONMENT. SPEED CONTROL IS THAT RELEASE ACTIVITY.

I WILL BE OUT FOR A FEW DAYS. I WILL ASK A CORE DESIGNER TO COORDINATE WITH JOE, BRUCE, AND AL. PACKAGE REVIEW BY SPEED CONTROL DESIGN AND RELEASE? NEWS ABOUT 1992 MODEL TOWN CAR. THE 1992 SERVICE MANUAL SHOWS THIS FOR THE SPEED CONTROL SYSTEM:

* EARLY PRODUCTION VEHICLES USED A VACUUM DUMP VALVE, ON THE BRAKE PEDAL AND

BRACKET ASSEMBLY. PAGE 10-03B-1.

* LATE PRODUCTION VEHICLES, LIKE 1993 AND 1994 MODEL TOWN CAR, "THE SYSTEM OPERATES INDEPENDENT OF ENGINE VACUUM, THEREFORE NO VACUUM LINES ARE REQUIRED."

THIS WAS NOT A JOB #1 CHANGE. THAT HISTORY I DO NOT HAVE.

THIS IS ANOTHER PLACE WHERE THE SPEED CONTROL RELEASE ENGINEER COULD HELP; THAT IS, EXACTLY WHEN EARLY PRODUCTION STOPPED AND LATE PRODUCTION STARTED (VIN, DATE, ETC.).

Regards,

M. P. Reese 313-317-7142 (313-621-6675 FAX)

OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31

*** Forwarding note from SREIMERS -DRBN007 03/08/99 15:11 ***

To: MREESSE -DRBN005

cc: JEVANSS -DRBN005 EPHASE -DRBN005

AZAPARAC -DRBN005 TBAZIL -DRBN005

FFPORTER -DRBN007 Porter, F.I. JKAFATI -DRBN004
FROM: Steve Reimers USAET(UTC -05:00)
Subject: Brake Deca Switch Re-location
Please contact Joe Evans, Bruce Poole, and A. Zaprocki when you are ready for the check. These guys should be able to provide a good safety check.
Steve Reimers building 5 3B008
AVT Chassis E/E System Applications mail drop 5011
39-03286 SREIMERS reimers@ford.com fax 39-03286 >
*** Forwarding note from MREHSE -DRBN005 03/06/99 17:33 ***
To: SREIMERS-DRBN007
cc: TBAZIL -DRBN005 LSMITH9 -DRBN005
DSYLVEST-DRBN006
FROM: M. P. REESE USAET(UTC -05:00)
Subject: Brake Deca Switch Re-location, 1992/1993/1994 TOWN CAR
STEVE, PANTHER SERVICE MANUALS PROVIDE A LITTLE MORE LIGHT:
* 1993 MODEL (ON PAGE 10-03-1, SPEED CONTROL SYSTEM) AND 1994 MODEL (ON PAGE 10-03-1, SPEED CONTROL SYSTEM - ELECTRONIC) MANUALS CONTAIN THIS SENTENCE, "THE SYSTEM OPERATES INDEPENDENT OF ENGINE VACUUM, THEREFORE NO VACUUM LINES ARE REQUIRED."
* I WILL FIND AND CHECK A 1992 MODEL MANUAL.
THIS SOMEWHAT SUPPORTS A SPACE BEING AVAILABLE ON THE TOWN CAR BRAKE PEDAL
AND BRACKET ASSEMBLY. I WILL TRY TO BE READY, WHEN SOMEONE COMES TO CHECK.
Regards,
M. P. Reese 313-317-7142 (313-621-6675 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from SREIMERS-DRBN007 03/05/99 17:24 ***
To: JKAFATI -DRBN004
cc: FFPORTER -DRBN007 Porter, F.I. MREHSE -DRBN005
PKOHL -DRBN007
FROM: Steve Reimers USAET(UTC -05:00)
Subject: Brake Deca Switch Re-location
Joe, Can you do the checking that Marty is requesting? Do you know who the design and release engineer(s) is for the brake pedal mounted switch and the harness?
if
Steve Reimers building 5 3B008
AVT Chassis E/E System Applications mail drop 5011
39-03286 SREIMERS reimers@ford.com fax 39-03286 >
*** Forwarding note from MREHSE -DRBN005 03/05/99 14:27 ***
To: SREIMERS-DRBN007
cc: TBAZIL -DRBN005 LSMITH9 -DRBN005
DSYLVEST-DRBN006 WLIVINGS-DRBN005
FROM: M. P. REESE USAET(UTC -05:00)
Subject: Brake Deca Switch Re-location - DESIGN ORDER RESULTS
STEVE, THERE IS A PLACE FOR A SWITCH TO BE LOCATED ON THE 1992/1993/1994 TOWN CAR BRAKE PEDAL ASSEMBLY. IT IS THE "KEYHOLE" IN THE PEDAL ASSEMBLY'S BRACKET, WORKING WITH THE FLAT SURFACE ON THE PLASTIC ADAPTER (ON THE PEDAL ASSEMBLY'S ARM). THESE FEATURES WERE USED TO MOUNT THE VALVE ASSEMBLY - SPEED CONTROL (-9C727-) AND THE CLIP - SPEED CONTROL VACUUM VALVE (-9C966-) ON OTHER MODEL YEAR/CARLINE PANTHER CARS. SWITCH AND WIRING CLEARANCE TO STEERING COLUMN CRUSH ZONE WILL DEPEND ON DIMENSIONS OF SWITCH TO BE USED, AND WIRING ROUTING. (THE 1999 MODEL SWITCH, AT THIS LOCATION, DOES INTERFERE)

WITH THE CRUSH ZONE.) A DIFFERENT/NEW SWITCH WILL BE NEEDED.
IT IS TIME FOR THE CHECK TO VERIFY THESE RESULTS, THAT I REQUESTED DURING THE
1999 MAR 03 MEETING. THE CHECK IS NEEDED, BECAUSE REFERENCES (DESIGN
LAYOUTS,
WERS, DOCMAN, ETC.) THAT WE HAVE AVAILABLE (AND RECOVERED FROM ARCHIVES)
ARE
NOT PERFECT. I REQUEST REVIEW BY THE APPROPRIATE DESIGN AND RELEASE (SWITCH
AND WIRING) ENGINEER. PLEASE RELAY THIS REQUEST.
IF THIS SOLUTION DOES NOT HOLD UP TO THE CHECK, THEN WE WILL NOT BE ABLE TO
ADD A SWITCH ON THE BRAKE PEDAL AND BRACKET ASSEMBLY.

Regards,

M. P. Reese 313-317-7142 (313-621-6675 FAX)

OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31

*** Forwarding note from MREESIE -DRBN005 03/01/99 12:24 ***

To: SREIMERS--DRBN007 FPORTER--DRBN007

cc: TBAZIL --DRBN005 JNEMB --DRBN005

FROM: M. P. REESE USAET(UTC -05:00)

Subject: Brake Deca Switch Re-location - DESIGN ORDER

STEVE, THE RESULT OF THE MEETING THIS MORNING IS THAT WE WILL HAVE A

FEASIBLE,

CLEAR SOLUTION (FOR SWITCH MOUNTED TO BRAKE PEDAL ASSEMBLY, ON
1992/1993/1994

TOWN CAR) BY NOON FRIDAY 1999 MAR 05.

IN MAKING THIS SOLUTION, WE ARE BEING VERY CAREFUL SO THAT WE DO NOT MAKE

SOMETHING ELSE WORSE. THE HISTORY IS VAGUE.

ANY GOOD NEWS, ABOUT OTHER SOLUTIONS?

Regards,

M. P. Reese 313-317-7142 (313-621-6675 FAX)

OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31

*** Forwarding note from SREIMERS--DRBN007 02/27/99 16:19 ***

To: MREESIE --DRBN005

cc: FPORTER --DRBN007 Porter, P.J.

FROM: Steve Reimers USAET(UTC -05:00)

Subject: Brake Deca Switch Re-location

Marty, Please call Fred Porter with the update from your meeting. I will be at
MPG most of the day.

Steve Reimers building 5 3E008

AVT Chassis E/B System Applications mail drop 5011

39-03286 SREIMERS reimers@fod.com fax 39-03286 >

*** Forwarding note from MREESIE --DRBN005 02/27/99 16:13 ***

To: SREIMERS--DRBN007

cc: TBAZIL --DRBN005 LSMITES--DRBN005

FROM: M. P. REESE USAET(UTC -05:00)

Subject: Brake Deca Switch Re-location

I AM OPTIMISTIC ABOUT ABILITY TO PACKAGE THE CURRENT PRODUCTION SWITCH ON
THE BRAKE PEDAL AND BRACKET ASSEMBLY IN 1992/1993/1994 TOWN CARS. I WILL
KNOW MORE (BUT NOT EVERYTHING) ABOUT TIMING AT THE CONCLUSION OF A 9:00 AM
MEETING WITH CHASSIS DESIGNERS. GENERAL OPTIMISM COMES FROM THE BRAKE
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THE

MODEL YEARS, AND INVOLVE ONLY ONE SUPPLIER.

WERS AND DOCMAN ARE NOT IN GOOD SHAPE FOR THIS 1993/1993/1994 MODEL TASK.
THAT SLOWS THE ADVANCE. FACILITATES AMBUSH.
ALWAYS, I MUST CONSIDER EFFECTS ON FMVSS 105. VEHICLE TEST, BRAKE SYSTEM.

I INTEND TO CALL YOU ABOUT NOON ON MONDAY 1999 MAR 01.

Regards,

M. P. Reese 313-317-7142 (313-621-6675 FAX)

OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31

*** Forwarding note from SREIMERS-DRBN007 02/25/99 15:39 ***

To: MREESB -DRBN005

FROM: Steve Reimers USAET(UTC -05:00)

Subject: Brake Dec Switch Re-location

Marty, I was asked what the status of this design work. Have you got any good words I can pass on to my manager? I would like to give Jack Perkins a sense of where we are on this task, what the next step(s) are and when they are targeted to complete. My meeting with Perkins is tomorrow at 3:30.

thanks,

Steve Reimers building 5 3C043

AVT Chassis E/E System Applications mail drop 5011

39-03286 SREIMERS reimers@ford.com fax 39-03286 >

*

MSG FROM: FKOHIL -DRBN007 TO: FKOHIL -DRBN007 03/09/99 14:41:38

To: SREIMERS-DRBN007 MREESB -DRBN005

JKAFATI -DRBN004

cc: FPORTER -DRBN007 TBrazil -DRBN005

JEVANS8 -DRBN005 DSYLVES1 -DRBN005

DBUDZYNS -VISTRON BPEASE -DRBN005

TSCHRODY -VISTRON FKOHIL -DRBN007

FROM: Fred Kohl USAET(UTC -05:00)

Subject: Brake Dec Switch Re-location

Want to clarify who has D&R for electrical deactivation switch, it is AVT.

The current electrical deact switch is released by AVT, believe Mike Salanta
is the engineer, MSALANTA 1-313-8434007

Speed Control Group released a vacuum switch for the old vacuum system. Also,
this switch was packaged by the Brakes Group on the brake pedal support bracket.

Regards, Fred Kohl, Precision Speed Control (Panther)

PROPS ID: FKOHIL Phone TBD Pager (888) 377-6280

IBM Mail(USFMCRJZ)

Mailing Address: ETC C375

*** Forwarding note from SREIMERS-DRBN007 03/08/99 18:06 ***

To: FKOHIL -DRBN007 TSCHRODY -VISTRON

FROM: Steve Reimers USAET(UTC -05:00)

Subject: Brake Dec Switch Re-location

The D&R is from Vistron. Who do you recommend to do the package review of Marty's switch relocation design?

Steve Reimers building 5 3E008

AVT Chassis E/E System Applications mail drop 5011

39-03286 SREIMERS reimers@ford.com fax 39-03286 >

*** Forwarding note from MREESB -DRBN005 03/08/99 15:45 ***

To: SREIMERS-DRBN007

cc: TBrazil -DRBN004 DSYLVES1 -DRBN005

JEVANS8 -DRBN005 BPEASE -DRBN005

AZAPARAC -DRBN005 FPORTER -DRBN007

FROM: M. P. REESB USAET(UTC -05:00)

Subject: Brake Dec Switch Re-location

STEVE, I HAVE NO PROBLEM WITH JOE, BRUCE, OR AL LOOKING AT THE DESIGNER'S
TUBE TO SEE THE PACKAGE AVAILABLE AROUND THE 1992/3/4 TOWN CAR BRAKE PEDAL

AND BRACKET ASSEMBLY (-2450-), BUT THEY ARE NOT THE RELEASE ACTIVITY THAT WOULD TRY TO RELEASE AN ELECTRICAL SWITCH INTO THAT ENVIRONMENT. SPEED CONTROL IS THAT RELEASE ACTIVITY.

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(VIN, DATE, ETC.).

Regards,

M. P. Reese 313-317-7142 (313-621-6675 FAX)

OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31

*** Forwarding note from SREIMERS--DRBN007 03/08/99 15:11 ***

To: MRREESE --DRBN005

cc: JEVANS8 --DRBN005 RPEASE --DRBN003

AZAPARAC --DRBN003 TBAZIL --DRBN005

FPORTER --DRBN007 Porter, F.I. IKAFATI --DRBN004

FROM: Steve Reimer USAET(UTC -05:00)

Subject: Brake Disc Switch Re-location

Please contact Joe Evans, Bruce Pease, and A. Zapachas when you are ready for the check. These guys should be able to provide a good sanity check.

Steve Reimer building 5 3B004

AVT Chassis E/E System Applications mail drop 5011

39-03286 SREIMERS weimer@ford.com fax 39-03286 >

*** Forwarding note from MRREESE --DRBN005 03/06/99 17:33 ***

To: SREIMERS--DRBN007

cc: TBAZIL --DRBN005 LSMITH9 --DRBN003

DSYLVEST --DRBN006

FROM: M. P. REESE USAET(UTC -05:00)

Subject: Brake Disc Switch Re-location, 1992/1993/1994 TOWN CAR.

STEVE, PANTHER SERVICE MANUALS PROVIDE A LITTLE MORE LIGHT:

* 1993 MODEL (ON PAGE 10-03-1, SPEED CONTROL SYSTEM) AND 1994 MODEL (ON PAGE 10-03-1, SPEED CONTROL SYSTEM - ELECTRONIC) MANUALS CONTAIN THIS SENTENCE, "THE SYSTEM OPERATES INDEPENDENT OF ENGINE VACUUM, THEREFORE NO VACUUM LINES ARE REQUIRED."

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M. P. Reese 313-317-7142 (313-621-6675 FAX)

OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31

*** Forwarding note from SREIMERS--DRBN007 03/06/99 17:24 ***

To: IKAFATI --DRBN004

cc: FPORTER -DRBN007 Porter, F.J. MREHSE -DRBN005
PKOHL -DRBN007

FROM: Steve Reimers USAET(UTC -05:00)
Subject: Brake Deca Switch Re-location

Joe, Can you do the checking that Marty is requesting? Do you know who the deal
gn and release engineer(s) is for the brake pedal mounted switch and the harness
s?

Steve Reimers building 5 3B008
AVT Chassis E/E System Applications mail drop 5011
39-03286 SREIMERS sreimers@ford.com fax 39-03286 >
*** Forwarding note from MREHSE -DRBN005 03/05/99 14:27 ***

To: SREIMERS -DRBN007
cc: TBAZIL -DRBN005 LSMITH9 -DRBN005
DSYLVVEST -DRBN006 WLIVING8 -DRBN005
FROM: M. P. REESE USAET(UTC -05:00)
Subject: Brake Deca Switch Re-location - DESIGN ORDER RESULTS

STEVE, THERE IS A PLACE FOR A SWITCH TO BE LOCATED ON THE 1992/1993/1994
TOWN CAR BRAKE PEDAL ASSEMBLY. IT IS THE "KEYHOLE" IN THE PEDAL ASSEMBLY'S
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SPEED CONTROL (-9C727-) AND THE CLIP - SPEED CONTROL VACUUM VALVE (-9C966-)
ON OTHER MODEL YEAR/CARLINE PANTHER CARS. SWITCH AND WIRING CLEARANCE TO
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AND WIRING ROUTING. (THE 1999 MODEL SWITCH, AT THIS LOCATION, DOES INTERFERE
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Regards,
M. P. Reese 313-317-7142 (313-621-6675 FAJQ)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from MREHSE -DRBN005 03/01/99 12:24 ***

To: SREIMERS -DRBN007 FPORTER -DRBN007
cc: TBAZIL -DRBN005 JNEME -DRBN005
FROM: M. P. REESE USAET(UTC -05:00)
Subject: Brake Deca Switch Re-location - DESIGN ORDER

STEVE, THE RESULT OF THE MEETING THIS MORNING IS THAT WE WILL HAVE A
FEASIBLE,
CLEAR SOLUTION (FOR SWITCH MOUNTED TO BRAKE PEDAL ASSEMBLY, ON
1992/1993/1994
TOWN CAR) BY NOON FRIDAY 1999 MAR 03.
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ANY GOOD NEWS, ABOUT OTHER SOLUTIONS?

Regards,
M. P. Reese 313-317-7142 (313-621-6675 FAJQ)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31

*** Forwarding note from SREIMERS -DRBN007 02/27/99 16:19 ***

To: MREESIE -DRBN003
cc: FPORTER -DRBN007 Porter, F.J.
FROM: Steve Reimers USAET(UTC -05:00)

Subject: Brake Deco Switch Re-location

Marty, Please call Fred Porter with the update from your meeting. I will be at MPG most of the day.

Steve Reimers building 5 3B008
AVT Chassis E/E System Applications mail drop 5011
39-03286 SREIMERS sreimers@ford.com fax 39-03286 >
*** Forwarding note from MREESIE -DRBN003 02/27/99 16:13 ***

To: SREIMERS -DRBN007
cc: TBRAZIL -DRBN005 LSMITH9 -DRBN003
FROM: M. P. REESE USAET(UTC -05:00)
Subject: Brake Deco Switch Re-location

I AM OPTIMISTIC ABOUT ABILITY TO PACKAGE THE CURRENT PRODUCTION SWITCH ON THE BRAKE PEDAL AND BRACKET ASSEMBLY IN 1992/1993/1994 TOWN CARS. I WILL KNOW MORE (BUT NOT EVERYTHING) ABOUT TIMING AT THE CONCLUSION OF A 9:00 AM MEETING WITH CHASSIS DESIGNERS. GENERAL OPTIMISM COMES FROM THE BRAKE PEDAL AND BRACKET ASSEMBLY DRAWINGS; THEY (SO FAR) SHOW EVOLUTION OVER THE

MODEL YEARS, AND INVOLVE ONLY ONE SUPPLIER.

WERS AND DOCMAN ARE NOT IN GOOD SHAPE FOR THIS 1992/1993/1994 MODEL TASK. THAT SLOWS THE ADVANCE. FACILITATES AMBUSH.

ALWAYS, I MUST CONSIDER EFFECTS ON FMVSS 105. VEHICLE TEST, BRAKE SYSTEM. I INTEND TO CALL YOU, ABOUT NOON ON MONDAY 1999 MAR 01.

Regards,

M. P. Reese 313-317-7142 (313-621-6675 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31

*** Forwarding note from SREIMERS -DRBN007 02/25/99 15:39 ***

To: MREESIE -DRBN003
FROM: Steve Reimers USAET(UTC -05:00)

Subject: Brake Deco Switch Re-location

Marty, I was asked what the status of this design work. Have you got any good words I can pass on to my manager? I would like to give Jack Peikus a sense of where we are on this task, what the next step(s) are and when they are targeted to complete. My meeting with Peikus is monday at 3:30.

thanks,

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
39-03286 SREIMERS sreimers@ford.com fax 39-03286 >

MSG FROM: FKOHL -DRBN007 TO: FKOHL -DRBN007 03/18/99 11:23:16

To: DBUDZYNE-VISTEON FPORTER -DRBN007

GHUBERTS-VISTEON SREIMERS -DRBN007

SSIMPS03-VISTEON TSCHROEDY-VISTEON

cc: FKOHL -DRBN007

FROM: Fred Kohl USAET(UTC -05:00)

Subject: Brake Pressure Switch in Ground Return Circuit

Fred Porter and Steve Reimers:

Attached file (GridReturn.doc) details what it would take at a minimum to place the brake pressure switch (deactivation switch) in the ground return circuit.

Please note a complete design analysis would be needed to determine if other changes are required.

Visteon does not feel this change is a viable solution for fixing the issue. We will continue to support you and the teams efforts to resolve the issue. A reply on Visteon letterhead will come next week.

Regards, Fred Kahl, Precision Speed Control (Panther)
PROPS ID: FKOHL Phone (313) 32-21801 Pager (888) 377-6280
IBM Mail(UEFMCHBZ)
Mailing Address: EVB, 1WE05

MSG:FROM: KZUBIETA-DRBN006 TO: FKOHL -DRBN007 05/06/99 19:08:15
To: TBAZIL -DRBN003 JSAKIOKA-DRBN006
PVEGH -DRBN005 FKOHL -DRBN007
DFINLEY -FORDNA1 JNEVI -DRBN005
RENGLIS1-DRBN005 JPASKUS -DRBN005
TDONOVAN-DRBN005 FPORTER -DRBN007
SHREIMERS-DRBN007 JEAFATI -DRBN004
TMASTERS-DRBN005 CTEKKE -DRBN005
WAHRAMCZ-DRBN005

FROM: Kelly Zubietta USAET(UTC -04:00)
Subject: New Number "99S15" Assigned on May 6, 1999

Regards,
Kelly Zubietta

PCSD, Recall/Service Programs, Recall/CNP Coordinator
313-248-8817 Fax: 313-845-1024 Internet: KZUBIETA@Ford.com

*** Forwarding note from KZUBIETA-DRBN006 05/06/99 19:04 ***

To: Recall Number Assignment Distribution

FROM: Kelly Zubietta USAET(UTC -04:00)

Subject: New Number "99S15" Assigned on May 6, 1999
Safety Recall 99S15 has been assigned to 1992-93 Town Car, Crown Victoria and Grand Marquis Vehicles Equipped with Speed Control - Brake Pressure Switch (99X32).

14-D Author: Tim Donovan

The 14-D Team/Author will be responsible for reviewing Prevent Action closure with the Engineering Directors on July 30, 1999, at the Engineering Directors' Campaigns Prevent Meeting.

This review will focus on implementation of Prevent Action (step 13) requiring evidence of incorporation and overall quality of event including systematic root cause and appropriate prevent action selection to capture lessons learned. Please contact Dave Craig (DCRAIG) upon receipt of this notice for further information and direction.

Regards,
Kelly Zubietta

PCSD, Recall/Service Programs, Recall/CNP Coordinator
313-248-8817 Fax: 313-845-1024 Internet: KZUBIETA@Ford.com

MSG FROM: FKOHL -DRBN007 TO: FKOHL -DRBN007 05/06/99 07:50:56
To: RSMIT195-DRBN005 TMASTERS-DRBN005
cc: FPORTER -DRBN007 LCORNEY -DRBN007
MSALANTA-DRBN005 DBUDZYNS-VISTBON
FKOHL -DRBN007
FROM: Fred Kahl USAET(UTC -04:00)

Subject: MCR Idea: Delete Cruise Control De-Activate Switch
First of all, we CAN NOT delete the function of the Deactivation Switch for the Speed Control system. It is a WCR and SDS safety requirement. All known speed control systems have a dual brake cancellation system. The deact switch function must be independent of the normal brake switch (stop lamp) and independent of the speed control electronics.

Regards, Fred Kahl, Precision Speed Control (Panther)
PROFS ID: FKOHL Phone (313) 32-21801 Pager (868) 377-6280
IBM Mail(USFMCRB/Z)

Mailing Address: EVB, 1WB03

*** Forwarding note from FPORTER -DRBN007 05/05/99 12:36 ***

To: RSMIT195-DRBN005

cc: FKOHL -DRBN007 TMASTERS-DRBN005
SREDMERS-DRBN007

FROM: F. J. Porter USAET(UTC -04:00)

Subject: MCR Idea: Delete Cruise Control De-Activate Switch

Ron,

Fred Kahl (kahl) at Vistron would be a good person to talk to about this.

Regards,

Fred Porter OV - fporter@ford.com
Chassis E/E Systems Applications (313)845-3722
Bldg 5 - Mail Drop 503G - Cubicle 3E004 fax: 390-4145

*** Forwarding note from RSMIT195-DRBN005 05/05/99 14:19 ***

To: FPORTER -DRBN007

cc: TMASTERS-DRBN005

FROM: Ron J. Smith USAET(UTC -04:00)

Subject: MCR Idea: Delete Cruise Control De-Activate Switch

Good Afternoon Fred,

I am pursuing the cost reduction idea mentioned in the attached prof note. Who can I talk to about this idea? Thanks for your anticipated cooperation.

Regards,

Ron J. Smith

AVT/EESE/OPD

(313) 322-3288 (RSMIT195)

*** Forwarding note from MHALANTA-DRBN005 05/05/99 14:23 ***

To: LCORNEY -DRBN007

cc: RSMIT195-DRBN003 DLAL -DRBN003
BALVEY -DRBN005 D5TOLLST-DRBN004

From: Michael Salente USAET(UTC -04:00)

Subject: MCR Idea: Delete Cruise Control De-Activate Switch

I do not believe we can eliminate it, but perhaps use other means to either detect brake pedal depression, or intent to slow down or stop vehicle.

You must have a REDUNDANT means of deactivation, cannot rely on breakaway switch only per FMVSS requirements.

The switch itself is (actual) \$1.16

wiring save (guess \$0.10 or \$0.15)

mounting pad deletion (guess \$0.10 or \$0.15)

brake pedal flag deletion (guess \$0.05).

Please advise how you wish to accomplish this.

Personally, I would not cry if the #P924 went away.

Thanks,

Regards,
Michael Salente

Phone: (313) 84-54007, msalanta@ford.com
Fax Pg: (313) 795-9159, FAX: (313) 323-2923
*** Forwarding note from LCORNEY -DRBN007 05/03/99 13:51 ***
To: MSALANTA-DRBN003 Salanta, Michael
cc: BSMTT195-DRBN003
FROM: Lee Corney, Vistron USAET(UTC-04:00)
Subject: MCR Idea: Delete Cruise Control De-Activate Switch
Mike,
CRID # 150762 DELETE AC SWITCH XF1T-9F924-AB(Vistron Bedford)
is currently an idea in the cost reduction system. (Current CrownVic/Grand
Marquis).
Apparently, there is a cost reduction out there to delete a "redundant"
brake cut out switch for the cruise control system.
1) Is this a valid idea?
2) What would this be worth (ball park guess)...??
3) Any other comments you might have?
thanks,
Lee Corney
Vistron - Large/Luxury Car Vehicle Center
Phone: 313-33-72787 Internet ID: lcorney.ford@e-mail.com
Page: Text Page or 313-792-9181

Brake Pressure Switch Questions:

Can BRAKE PRESSURE SWITCH function be removed from power feed circuit and placed in ground return circuit of the servo clutch?

At a minimum the following would be required:

SPEED CONTROL SERVO

Redesign the speed control electronic

1. New board layout
2. New MROM
3. New software strategy for deactivation switch function
4. Additional isolated ground circuit

Manufacturing plant equipment affected

1. Process equipment for new board layout
2. Test equipment for new deact switch strategy

Estimate 12 months minimum to develop and prove-out.

WIRING HARNESS(S)

Additional wiring circuit for ground circuit through deact switch.
More than one harness maybe be effected. EME would need to reply.

SERVICE TEST EQUIPMENT:

Field/service equipment would not work properly for the deactivation switch function.

POWER CONSIDERATIONS:

With switching the power circuit, a wiring harness short to ground would make the speed control system inoperative.

With switching the ground circuit, a wiring harness short to ground would override the function of the deactivation switch.

Based on a minimum of 12 months to design and prove out required changes to the servo; this is not compatible with a near term implementation.

Can BRAKE PROGRAM SWITCH function be moved to the ground circuit of the speed control servo without any changes?

NO; Every time the deactivation switch is cycled, the speed control system would reset itself. The vehicle set speed memory would be lost. RESUME function would not work. Driver would have to press "OFF" and "SRT" to re-engage the speed control system instead of just pressing the "RESUME" or "SRT".

Speed Control Deactivation Switch Rationale

- 1) WCR - Automatic Vehicle Speed Control 10.03-D01-1
DEACTIVATION REDUNDANCY:
Backup system for deactivation shall be provided.
- 2) SDS Requirement SC-0005 REDUNDANT BRAKE DEACTIVATION REQUIRED
A redundant method for sensing brake application independent of the primary system deactivation mode must be provided to the speed control system.
One Interpretation of this requirement: Brake Pedal cancellation of speed control operation shall be done using dual brake detection systems; speed control operation shall be canceled if a malfunction occurs at the microcomputer or at the brake switch.
- 3) Primary Redundant Safety Feature
(Most important the Deactivation Switch is INDEPENDENT of Servo electronics)
- 4) All major speed control system has a similar switch
- 5) Used to avoid liability
- 6) Introduction with the vacuum system; estimate 1979

Being INDEPENDENT of Servo electronics, Deactivation Switch provides system cancellation for:

- Stuck motor phase after engagement
- Shorted motor phase after engagement
- Normal brake (stop Lamp) malfunction
- Seized motor
- Software malfunction