EA02-025

FORD 10/27/03

APPENDIX N

BOOK 17 OF 61

PART 1 OF 4

1993 Town Car)				and a metal oxalate. Indicates presence of brake fluid on fluid and switch sides of seals.	All three Kapton seals are buckled and exhibit brittle cracks which most likely formed leak path. Damage appears to have initiated in seal closest to washer. Damaged Kapton darkened and embrittled by unknown mechanism.	transfer of contact material to cup probably as oxide, sulfide, or corrosion product. Glycol based material (probably brake fluid) also detected in this area.	movable contact missing. Stationary contact exhibits loss of material due to corrosion, evidence of dezincification, stress corrosion cracking. Base of movable contact melted back into bulkhead between switch and terminal cavities. Appears to have occurred in later stages of event. Surfaces of terminals covered with black and green deposits which appear to be sulfur compounds of the terminal materials.
A (1993 Town Car, Houston)	1LNLM82W1PY[redacted]	7777/2281	Burned	Elements from contact material detected at fitting end of hexport. Indicate possible flow of fluid back through seals. Traces of silicone ... detected.	Gasket and environmental seal missing. Charred fragments Kapton seals remain.	Deposits on face of cup contain elements from brass contacts indicating transfer of contact material to cup probably as oxide, sulfide, or corrosion product.	Base, stationary contact, movable contact, and terminals missing.
B (1992 Town Car, Houston)	1LNLM83W5NY[redacted]	F2VC/2114	Burned.	Elements from contact material detected at fitting end of hexport. Indicate possible flow of fluid back through seals.	Not permitted to disassemble switch.	Deposits on face of cup contain elements from brass contacts indicating transfer of contact material to cup probably as oxide, sulfide, or corrosion product.	Transfer pin and movable contact missing. Stationary contact exhibits crack in similar location as that in Reddick sample.
C (1992 Town Car, Houston)	1LNLM81W2NY[redacted]	F2VC/2003	Burned	Elements from contact material detected at fitting end of hexport. Indicate possible flow of fluid back through seals. Black deposit in cavity contains traces of hydrocarbon and silicone.	Gasket appears charred. Environmental seal missing. Damage to Kapton seals currently being evaluated.	Deposits on face of cup contain elements from brass contacts indicating transfer of contact material to cup probably as oxide, sulfide, or corrosion product.	Base, stationary contact, movable contact, and terminals missing.
D (1997 Crown Victoria)	2FALP71W1VX[redacted]	F2AC/????	Apparent leakage.	Black residue containing glycol based material (probably brake fluid) and a metal oxalate. Indicates presence of brake fluid on fluid and switch sides of seals.	Environmental seal and gasket intact and appear to have had good sealing. Kapton seals exhibit damage similar to that found in Reddick sample. All three exhibit brittle cracks which most likely formed a leak path.	Dark green deposits on face of cup contain elements from brass contacts indicating transfer of contact material to cup probably as oxide, sulfide, or corrosion product. Deposits appear to have formed a bridge between movable contact and cup. Liquid in interior and on face of cup is glycol based (probably brake fluid).	Switch cavity and terminal cavity contain glycol based material (probably brake fluid). Contacts appear intact. Dark green deposits on movable and stationary contacts contain elements from brass contact material. Terminals appear clean (no apparent deposits or corrosion).
E (#11 from survey)		F2AC/2137	No leaks or other apparent problems.	Black residue containing glycol based material (probably brake fluid) and a metal oxalate. Indicates presence of brake fluid on fluid and switch sides of seals.	Environmental seal and gasket intact and appear to have had good sealing. Kapton seals exhibit deformation and buckling similar to that found in Reddick sample. Crazing on surfaces suggest incipient damage is occurring.	Face of cup appears clean and dry.	Switch cavity and terminal cavity appear clean and dry. No apparent deposits or corrosion.
F	1LNLM82W1NY[redacted]	F2VC/2128	Apparent leakage	Black residue containing glycol based material (probably brake fluid) and a metal oxalate. Indicates presence of brake fluid on fluid and switch sides of seals.	Environmental seal and gasket intact and appear to have had good sealing. Kapton seals exhibit damage similar to that found in Reddick sample. All three exhibit brittle cracks which most likely formed a leak path.	Dark green deposits on face of cup contain elements from brass contacts indicating transfer of contact material to cup probably as oxide, sulfide, or corrosion product. Liquid in interior and on face of cup is glycol based (probably brake fluid).	Switch cavity and terminal cavity contain glycol based material (probably brake fluid). Stationary contact is intact, but does show stress corrosion cracking in progress in bridge area (same location as in Reddick switch). Movable contact appears to have separated as a result of loss of material (~50% of thickness) due to corrosion. No evidence of heating or arc damage. Dark green deposits on movable and stationary contacts contain elements from brass contact material, as well as sulfur. Terminals exhibit green deposits (currently being analyzed). Deposits extend in from both sides of bulkhead between switch and terminal cavities, but do not meet.

****
* Note printed by SREIMERS on 15 Feb 1999 at 10:01:44 *
****

From: SLAROUCH--FORDMAIL Date and time 02/15/99 08:30:47
To: SREIMERS--FORDMAIL Reimers, Steve (S.

From: LaRoucha, Steve (S.)
Subject: RE: Brake Pressure Switch Sulfur

Steve: We have found sulfur in all the other switches. We haven't identified a source yet. I hope that Dow or DuPont can give us some ideas.

Steve LaRoucha (SLAROUCH)
Metallurgy Section, Central Laboratory, Room M410
(313) 845-4876 (313) 322-1614 FAX

-----Original Message-----
From: Steve Reimers mailto:sreimers@gw.ford.com
Sent: Monday, February 15, 1999 8:15 AM
To: LaRouche, Steve
Subject: Brake Pressure Switch Sulfur

You mentioned sulfur as one of the contaminants found in the Memphis switch. Did you find sulfur in any others? Have you identified the likely source? thanks,

Steve Reimers building S 3C043
AVT Chassis E/E System Applications mail drop 5021
39-03286 SREIMERS sreimers@ford.com fax 39-03286 ;>

2-8-99—

Don Robertson 32-20484 1-800-580-1271
DROBERTG Brk P Sw
Module FIELD Returns
Meeting 8:15 2/9/99 my Desk

LAB EXPERIMENT

Test

2/16/99

~~1.10~~

New switch

Sw w/ Brake fluid 20 M PSI to MANIFOLD

w/ Brake fluid 0.5 M → 1 M PSI to Manifold

& Salt H2O

~~w/ 70 AMPS~~ 22°C → 46°C
10 minutes

Switch Testing

2/16/99

Max Current test

NEW DRY SWITCH 12 AMPS THRU TERMINAL 1 TO 2.

AMBIENT @ 23°C Temp Rises to 34°C in terminal cavity in ~10 minutes

Switch w/Brake Fluid in Terminal Cavity

@ 12 AMPS
Temp Rises to 35°C in ~15 MINUTES

~~Voltage measure on manifold = 0.4 +~~

@ 15-16 AMPS Temp = 45°C in 15 minutes

Voltage on ungrounded manifold to power supply + terminal = 0.4 V

voltage at power supply 0.64 V
Current to Ground >0.00 mAmps

Dry Switch @ 15-16 AMPS

Voltage at manifold = 0.0
to power supply + terminal
voltage at power supply = 0.64

3713 1868

****
* Note printed by SREIMERS on 13 Feb 1999 at 11:18:14 *
****

From: I2060625--EXTERNAL Date and time 02/12/99 09:42:29
To: FPORTER --FORDMAIL 'Fred Porter (For NLAPOINT--FORDMAIL 'Norm LaPointe (F
SLAROUCH--FORDMAI 'Steve Larouche (SREIMERS--FORDMAIL 'Steve Reimers (F

From: Rahman, Axis
Subject: Brake Pressure Switch Temp Test

Allan and I started a temperature test yesterday in AVT BLDG 5 lab. We injected brake fluid into the base area and hooked up one of the switch terminals to 24 vdc, while grounding the switch via the hexport. The ambient was set at 100 C. The initial current draw was 1mA.

After about 3 hours, most of the brake fluid had evaporated and very little was left in the base. We need fo find a way to keep the brake fluid in the base. I think even if we use a connector, there will still be evaporation loss. I was thinking about manually replinishing lost fluid periodically. Any ideas?

Additionally, Norm and I discussed the safety aspect and decided that we will not run the temp test over the weekend or overnight.

In order to increase our sample size for test, I have requested a test manifold from Attleboro. We can use this to test multiple switches at the same time. This manifild should arrive today.

FYI, my e-mail address is axis@ti.com

Regards
Axis.

Brake Pressure Switch Table:

Sensor Id Codes					
FY754575	5-93	42621	0.2 Ohm	167.0 Ohms	Inf. Ohm
NY749208	6-92	53237	0.3 Ohm	0.3 Ohm	Inf. Ohm
FY686795	1-93	NA	0.3 Ohm	4.48 M Ohm	Inf. Ohm
PX639934	11-92	68302	0.2 Ohm	1.5 Ohms	Inf. Ohm
FY650225	10-92	72114	0.2 Ohm	1.7 Ohm	Inf. Ohm
PX638867	12-92	55333	0.3 Ohm	17 K Ohm	Inf. Ohm
PX665270	4-93	66689	0.3 Ohm	2.90 Ohm	Inf. Ohm
PX643515	12-92	43531	0.2 Ohm	0.4 Ohms	Inf. Ohm
PX623672	10-92	94145	0.2 Ohm	24 M Ohm	Inf. Ohm
FY695374	1-93	NA	0.2 Ohm	11.39 M Ohm	Inf. Ohm
NX758774	7-92	97199	0.2 Ohm	6.79 M Ohm	Inf. Ohm
BY639984	9-93	97199	0.2 Ohm	0.2 Ohm	Inf. Ohm
'Lankhe Sensor' VIN 2FALP71W1YX145375			0.4 Ohm	1.1 Ohms	4.80 M Ohms
New sensor #1			0.2 Ohm	0.4 Ohm	Inf. Resistance
New sensor #2			0.2 Ohm	1.1 Ohm	Inf. Resistance

Brake Pressure Switch Table:

DESTINATIONS
Resistance Measurement #1 [illegible]
Resistance Measurement #2 [illegible]
Resistance Measurement #3 [illegible]

[illegible]					
2MEBM75W7NX762858	7-92	79164	0.4 Ohm	11.60 M Ohms	Inf. Ohm
1LNLM83W2PY774256	7-92	67549	0.4 Ohm	1.9 Ohm	Inf. Ohm
1LNLM82W3PY724043	3-93	71337	0.4 Ohm	3.5 Ohm	Inf. Ohm
1LNLM83W8PY628170	9-92	88087	0.4 Ohm	16 M Ohms	Inf. Ohm
1LNLM82W4PY632329	9-92	98349	0.5 Ohm	Inf. Ohm	Inf. Ohm
1LNLM82WOPY729611	3-93	47325	0.4 Ohm	111.9 Ohm	Inf. Ohm
2MEGM74W2NX72[illegible]39	4-92	86922	0.4 Ohm	6.80 Ohm	Inf. Ohm
2FALP74W4PX160223	3-93	65614	0.4 Ohm	3.2 Ohms	Inf. Ohm
2MELM74W4PX637766	12-92	58132	0.6 Ohm	Inf. Ohm	Inf. Ohm
1LNLM81W7PY669375	12-92	82224	0.4 Ohm	Inf. Ohm	Inf. Ohm
1LNLM82W8PY726056	3-93	91358	0.4 Ohm	Inf. Ohm	Inf. Ohm
1LNLM81W2PY727899	3-93	88135	0.4 Ohm	0.6 Ohm	Inf. Ohm

TX. Trip 2-10-98 - 2-12-98

B-D MT

(1) SC 1LNLM82W6PY638990 T.C

(2) SC 2FACP71W2PX163920 C.V 4-93 199929

(3) SC 2MELM75WXRX641595 GM 12-93

(4) 2FACP71W1PX163312 C.V 3-93 40692

(5) 1LNLM81WXPY610384 T.C 8-92 73115

(6) 1LNLM92W3NY724366 T.C Ford

(7) 1LNLM92W6PY750172 T.C 5-93

(8) SC 1LNLM81W4NY733191

(9) SC 1LNLM82W8PY754154

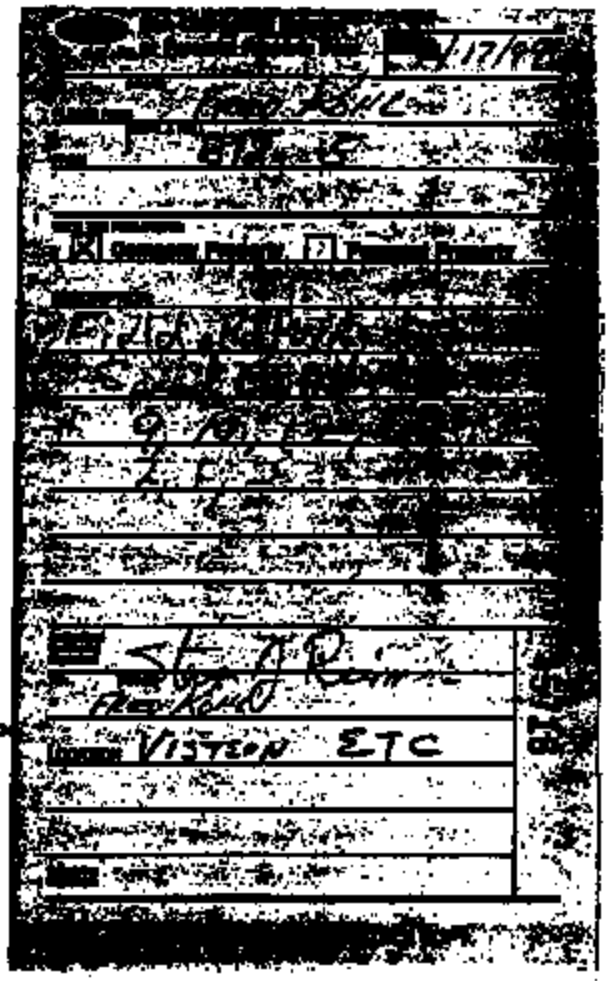
(10) SC 2FACP74WXPX151190

(11) 1LNLM82W4PY754047

(12) SC 1LNLM81W9PY742958

(13) SC 1LNLM81W9PY743413

SC - Speed control for check-



Report Sys... Information

Print Date : May 17, 1999
Print Time : 7:35

Cutoff Date: Apr 30, 1998

Result ID: 3491671
Page Number : 1

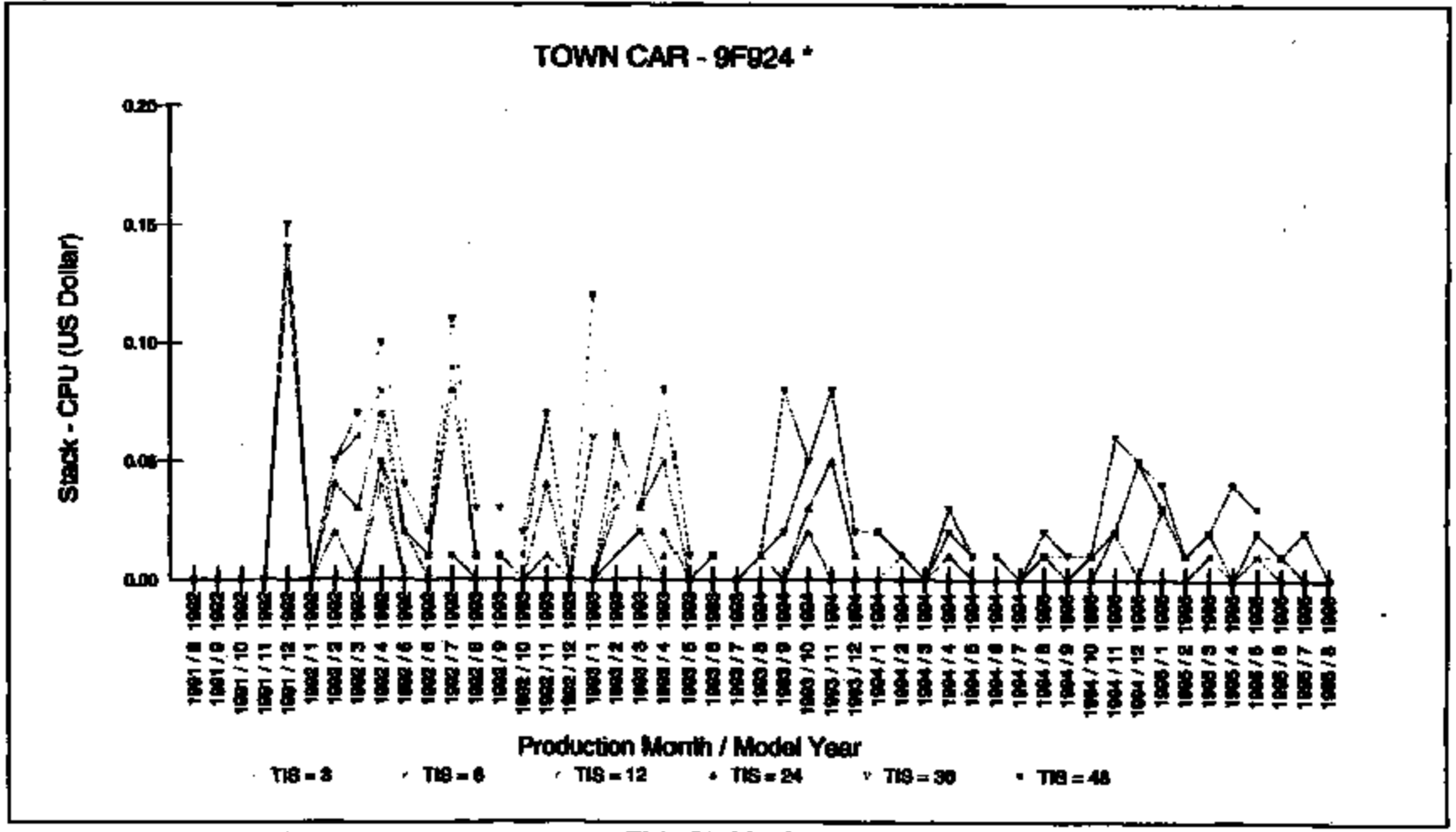
Model Years : 1995, 1994, 1993, 1992
TIS Value(s) : 3,6,12,24,36,48

Logic : Corporate

Min Divisor : 100

Statistic : CPU (US Dollar)
Max TIS : 48

Unique Selections : Vehicle Line AWS='TOWN CAR



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Report Sta[illegible]e Information

Print Date : May 17, 1999
Print Time : 7:37

Cutoff Date: Apr 30, 1999

Result ID: 3491071
Page Number : 1

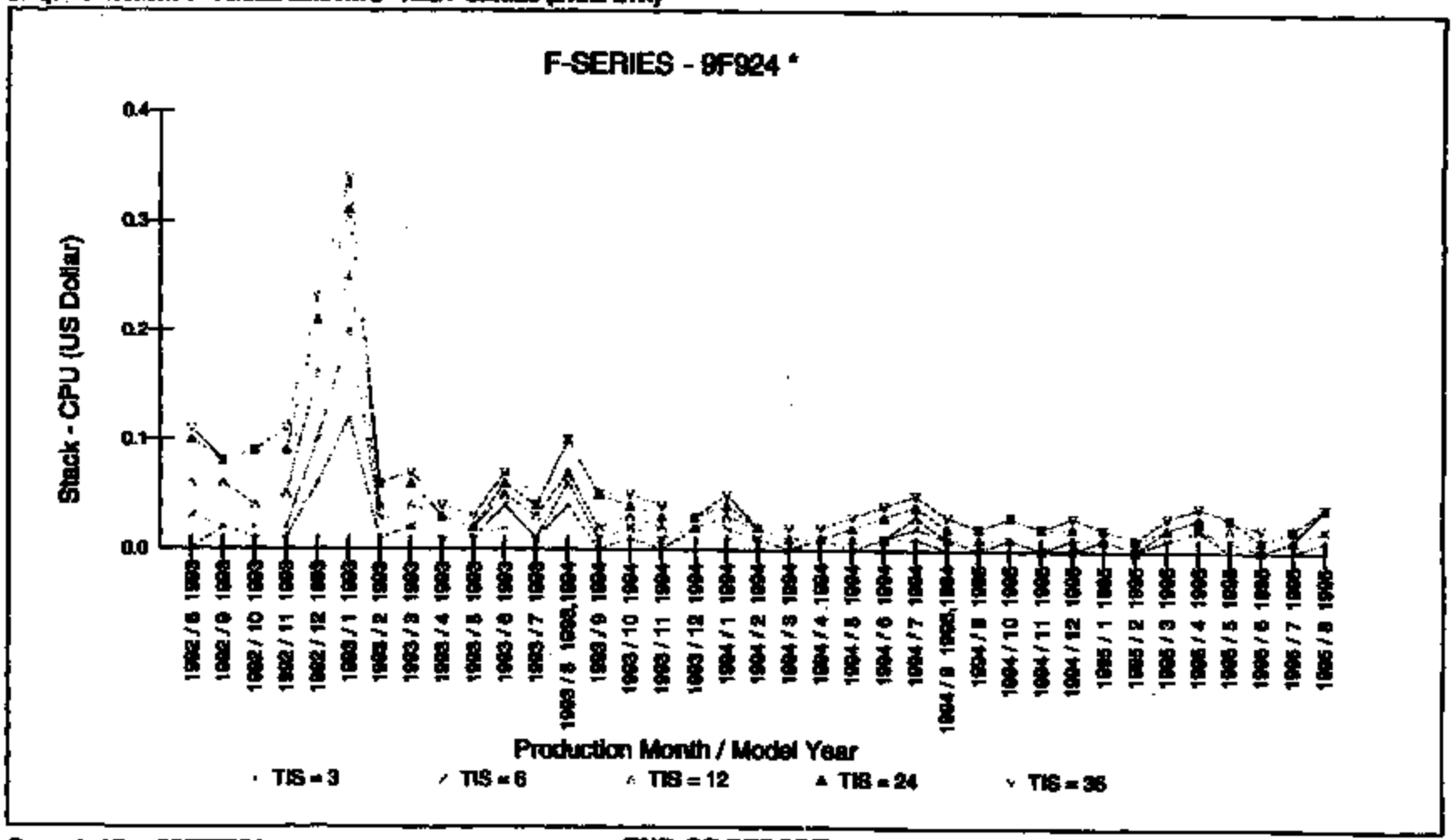
Model Years : 1995, 1994, 1993
TIS Value(s) : 3,6,12,24,36

Logic : Corporate

Min Divisor : 100

Statistic : CPU (US Dollar)
Max TIS : 36

Unique Selections : Vehicle Line AWS='ALL F-SERIES (INCL. STR)



Generated By: SPETERS1

END OF REPORT

*Chart has been modified from original settings

3713 1875

Report Specific Information

Print Date : May 17, 1999
Print Time : 7:31

Cutoff Date: Apr 30, 1999

Result ID: 3491671
Page Number : 1

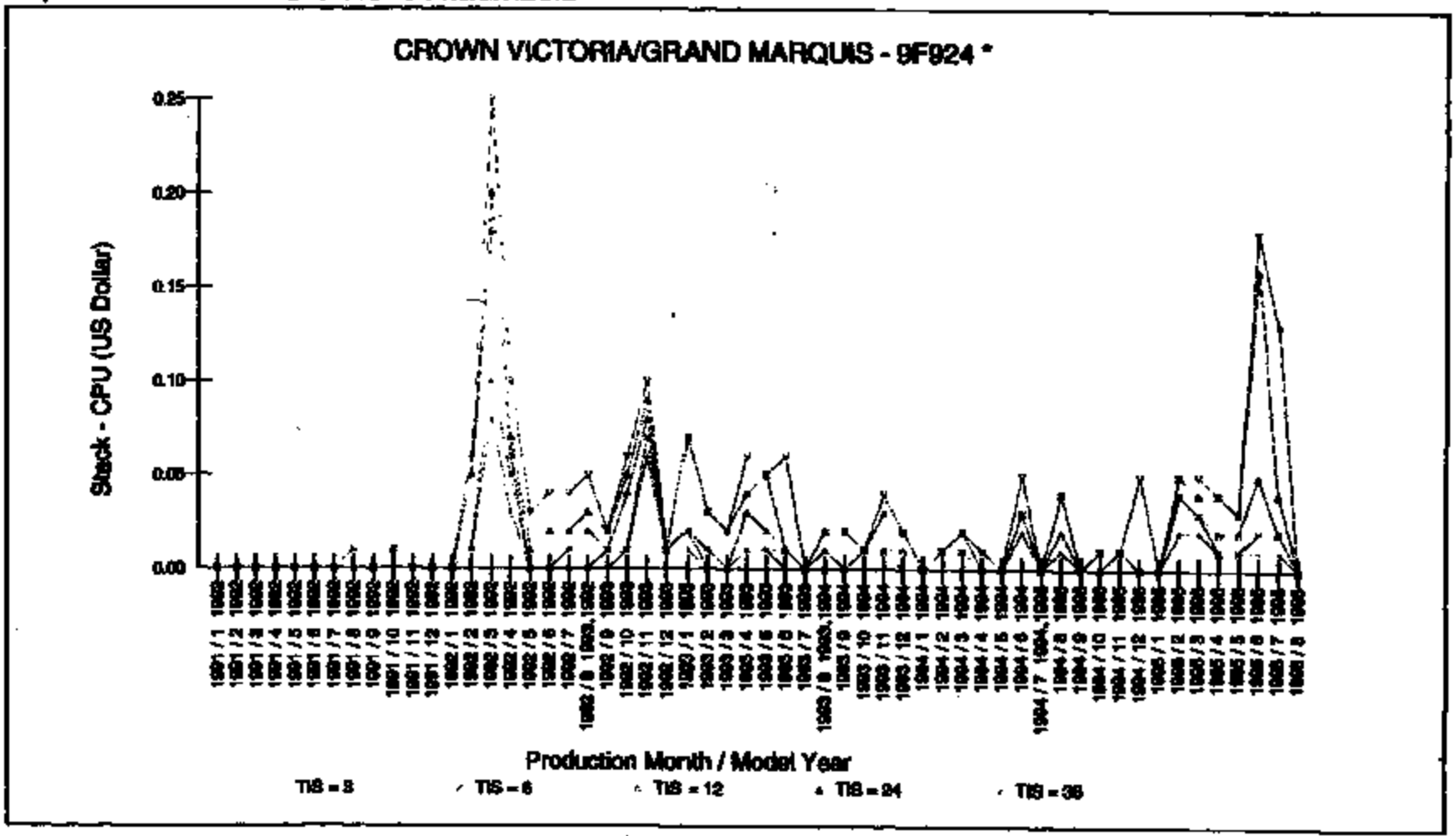
Model Years : 1995, 1994, 1993, 1992
TIS Value(s) : 3,6,12,24,36

Logic : Corporate

Min Divisor : 100

Statistic : CPU (US Dollar)
Max TIS : 36

Unique Selections : Vehicle Line AWS="CR VIC/GR MARQ



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END OF REPORT

*Chart has been modified from original settings

3713 1876

Report Specification Information

Print Date : May 17, 1999
Print Time : 7:33

Cutoff Date: Apr 30, 1999

Result ID: 3401671
Page Number : 1

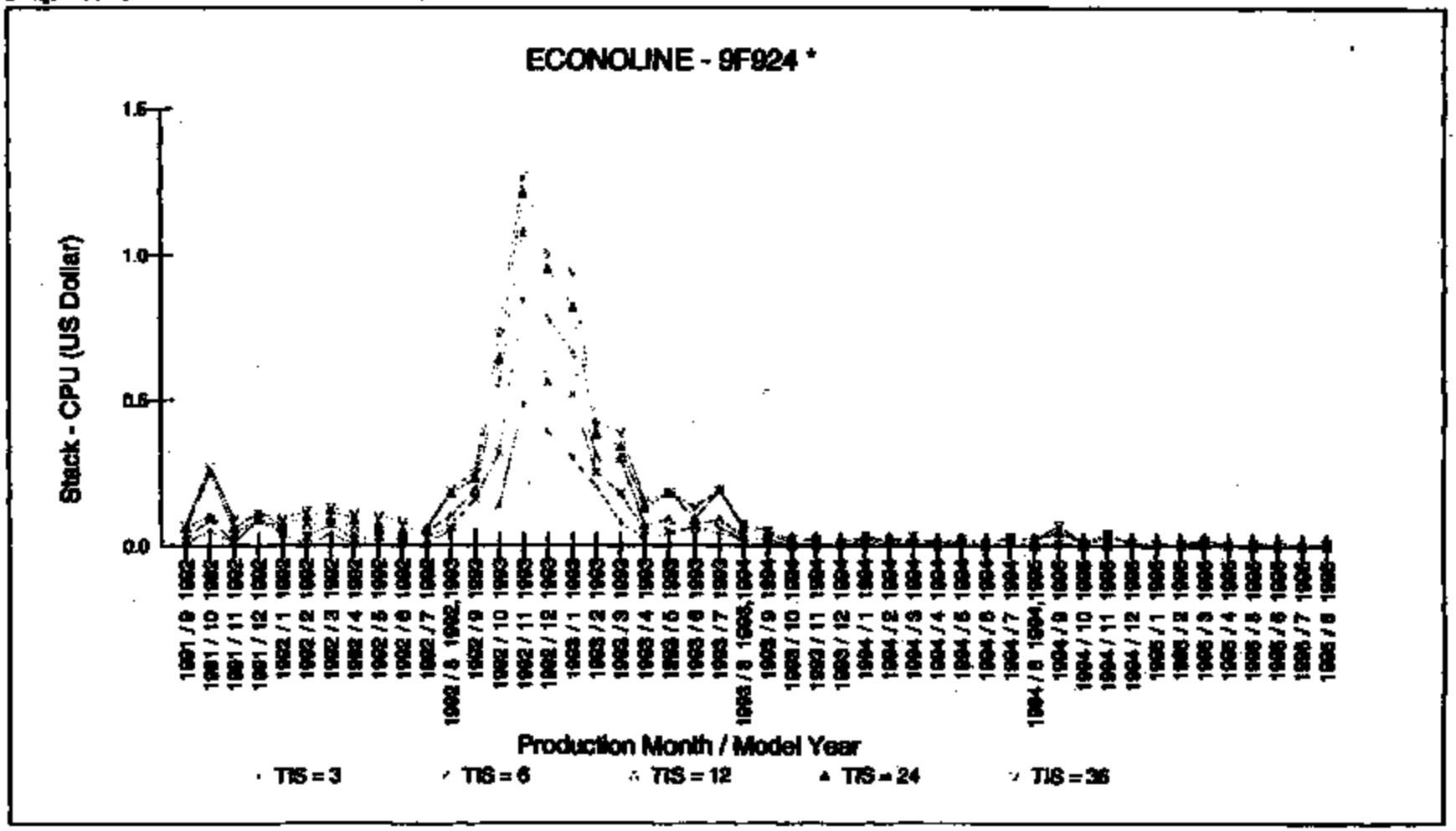
Model Years : 1995, 1994, 1993, 1992
TIS Value(s) : 3,6,12,24,36

Logic : Corporate

Min Divisor : 100

Statistic : CPU (US Dollar)
Max TIS : 36

Unique Selections : Vehicle Line ANS="ECONOLINE



3713 1877

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END OF REPORT

*Chart has been modified from original settings

Report Specification Information

Print Date : May 17, 1999
Print Time : 7:28

Cutoff Date: Apr 30, 1999

Result ID: 3491071
Page Number : 1

Model Years : 1993, 1994, 1995
TIS Value(s) : 3,6,12,24,36,48

Logic : Corporate

Min Divisor : 100

Statistic : CPU (US Dollar)
Max TIS : 48

Unique Selections : Vehicle Line AWS="MARK VIII

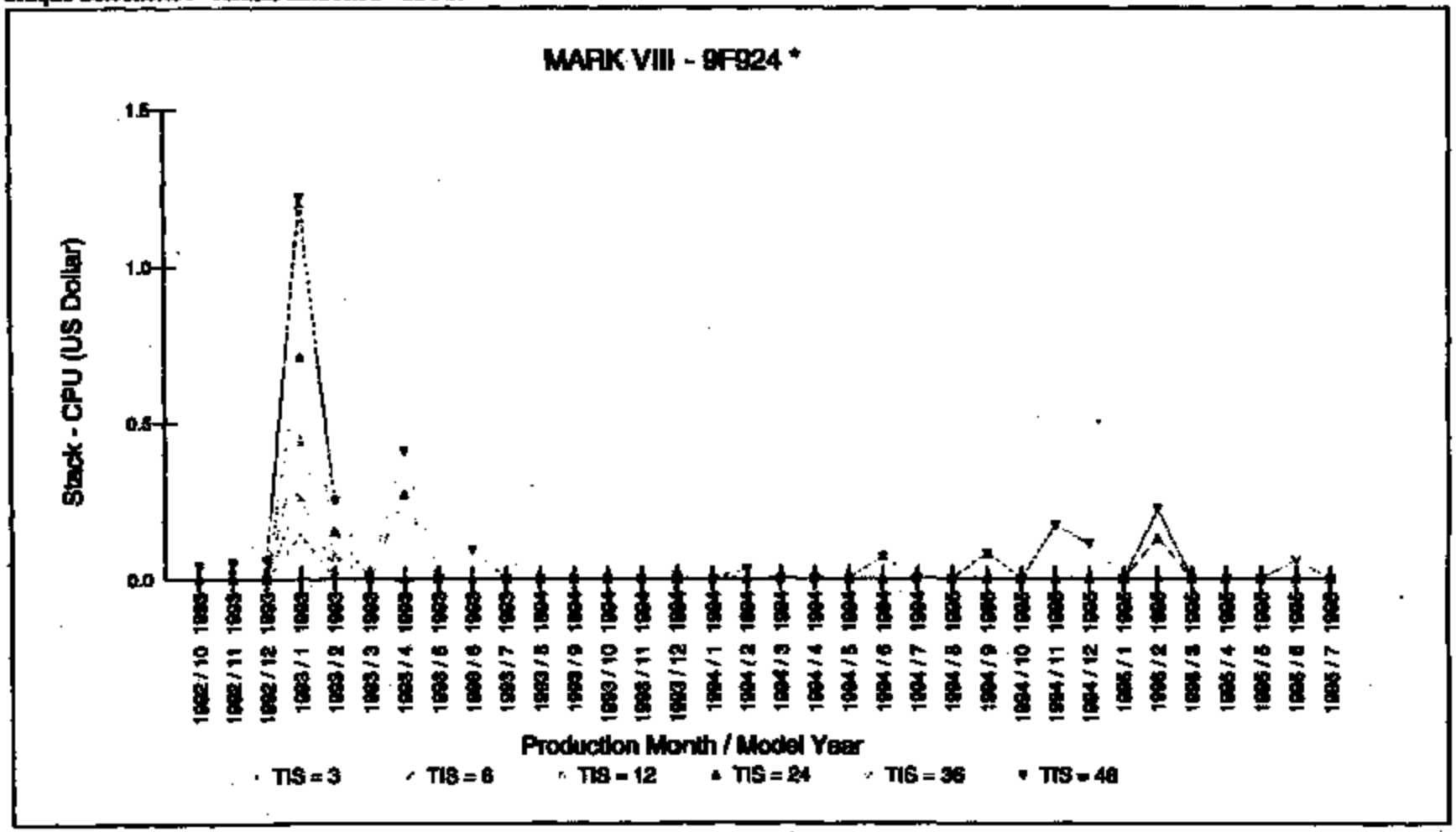

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*Chart has been modified from original settings

5713 1878

Report Specific Information

Print Date : May 17, 1999
Print Time : 7:35

Cutoff Date: Apr 30, 1999

Result ID: 3491072
Page Number : 1

Model Years : 1995, 1994, 1993
TIS Value(s) : 3,6,12,24,36

Logic : Corporate

Min Divisor : 100

Statistic : CPU (US Dollar)
Max TIS : 36

Unique Selections : Vehicle Line AWS=DA - TAURUS

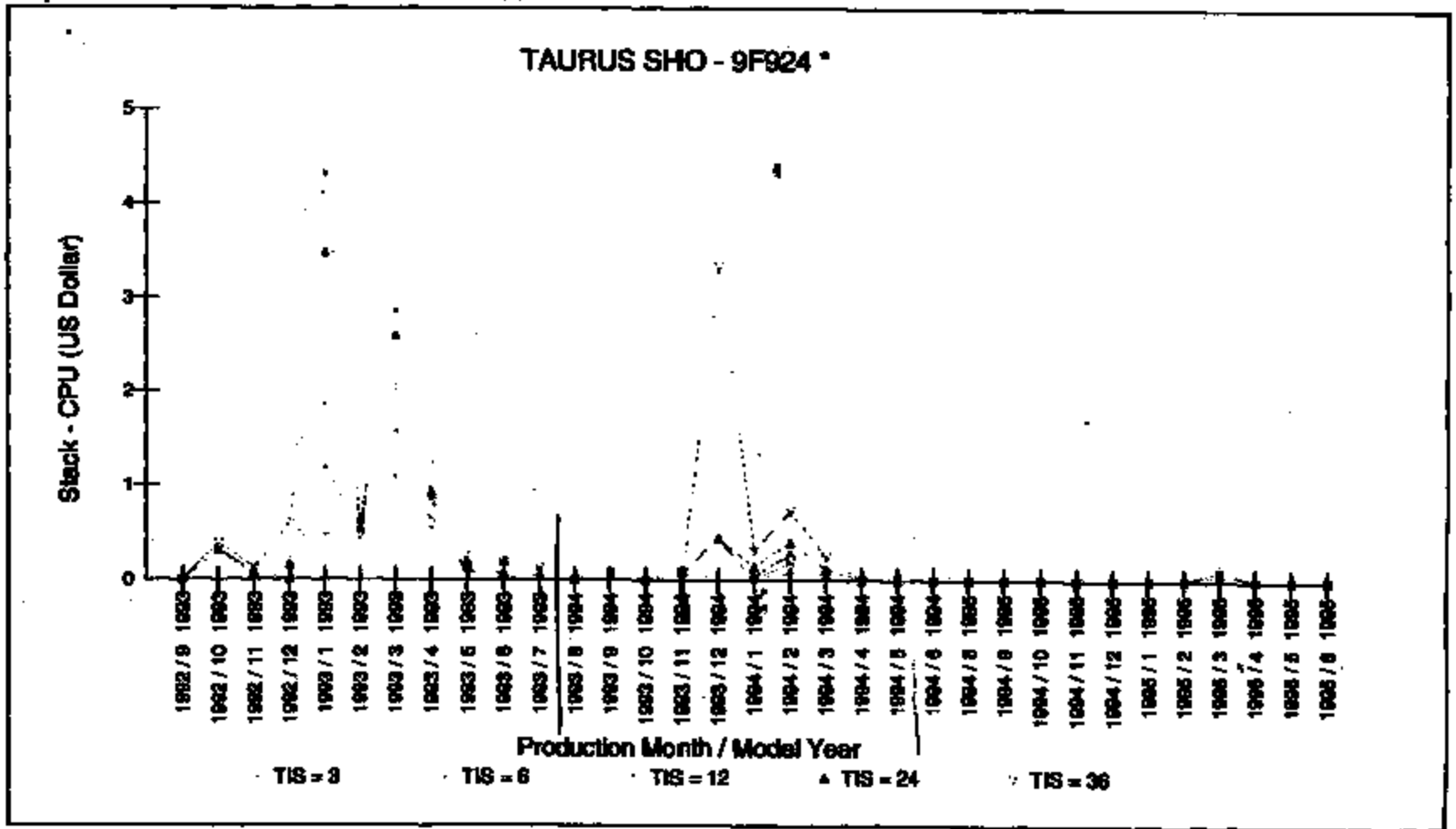

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*Chart has been modified from original settings

3713 1878

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Print Time : 10.46

Cutoff Date: Apr 30, 1999

Result ID: 3401071
Page Number : 1

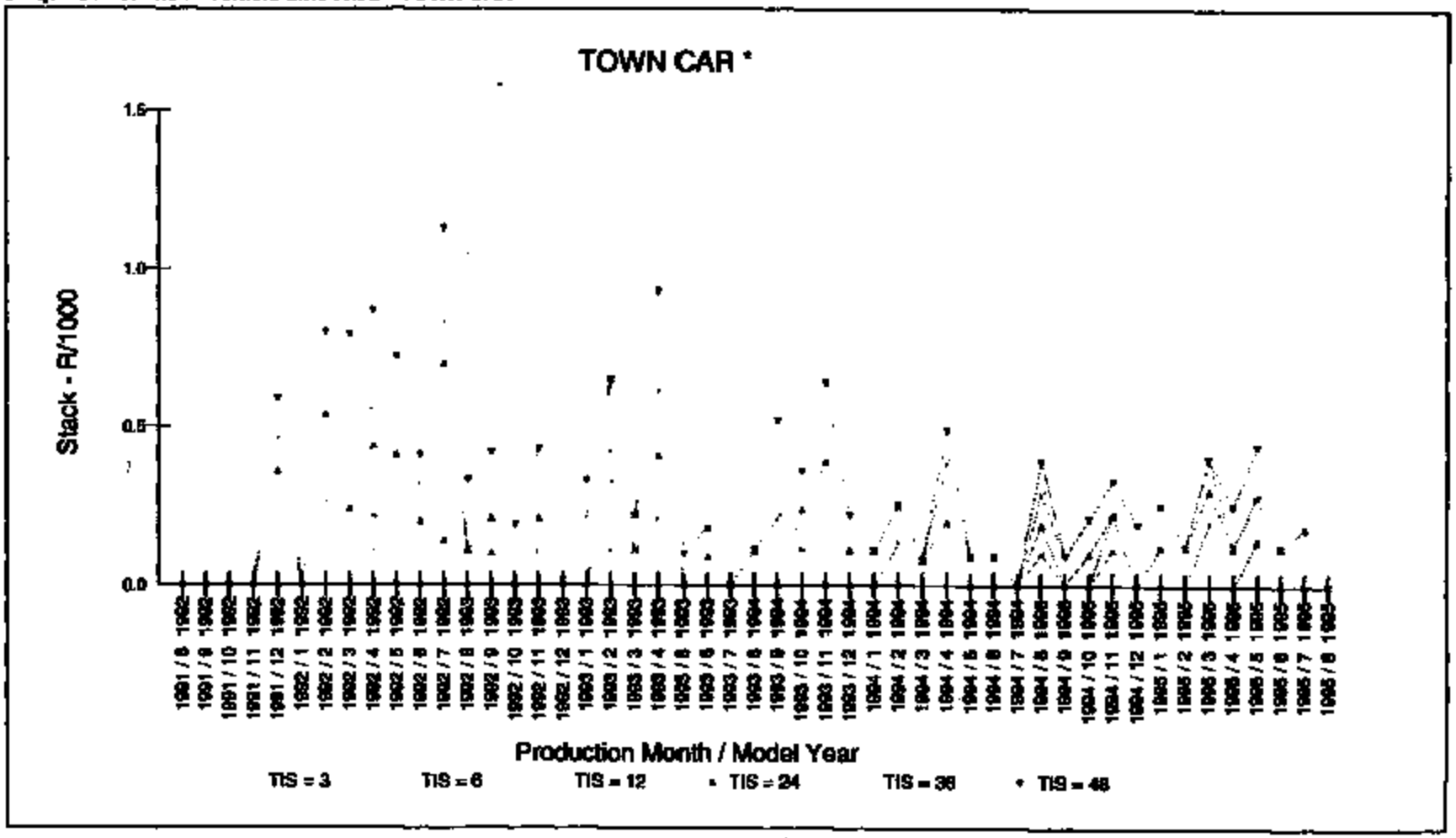
Model Years : 1995, 1994, 1993, 1992
TIS Value(s) : 3,6,12,24,36,48

Logic : Corporate

Min Divisor : 100

Statistic : R/1000
Max TIS : 48

Unique Selections : Vehicle Line AWS='TOWN CAR



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END OF REPORT

*Chart has been modified from original settings

3713 1860

Report Sp. .c Information

Print Date : May 28, 1999
Print Time : 10.40

Cutoff Date: Apr 30, 1999

Result ID: 3401071
Page Number : 1

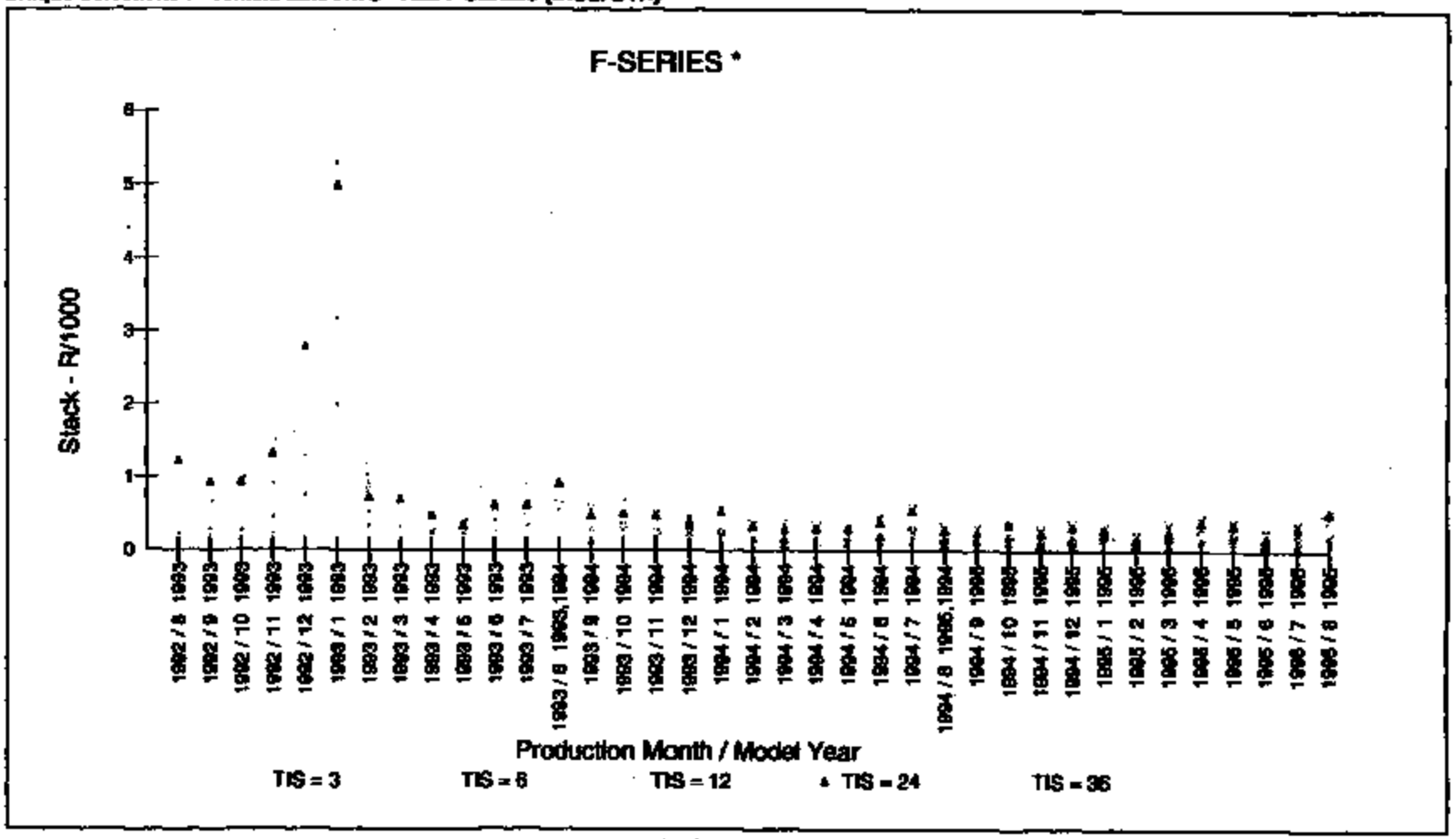
Model Years : 1995, 1994, 1993
TIS Value(s) : 3,6,12,24,36

Logic : Corporate

Min Divisor : 100

Statistic : R/1000
Max TIS : 36

Unique Selections : Vehicle Line AWS='ALL F-SERIES (INCL. STR)



Generated By: SPETERS1

END OF REPORT

*Chart has been modified from original settings

3713 1991

Report Specific Information

Print Date : May 20, 1999
Print Time : 10.38

Cutoff Date: Apr 30, 1999

Result ID: 3401071
Page Number : 1

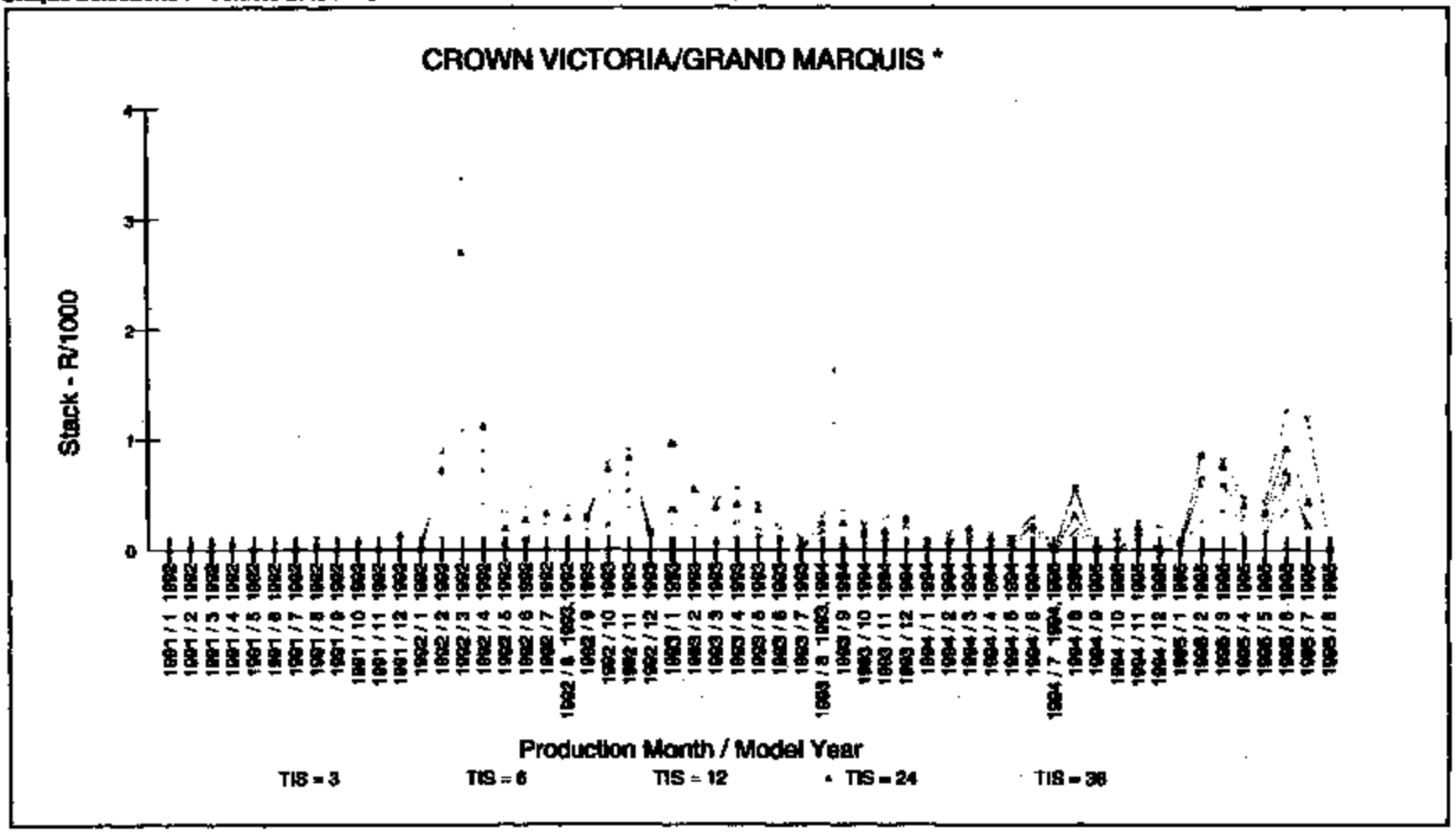
Model Years : 1995, 1994, 1993, 1992
TIS Value(s) : 3,6,12,24,36

Logic : Corporate

Min Divisor : 100

Statistic : R/1000
Max TIS : 36

Unique Selections : Vehicle Line AWS='CR VIC/GR MARQ



3713 1882

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END OF REPORT

*Chart has been modified from original settings

Report Specific Information

Print Date : May 20, 1999
Print Time : 10:38

Cutoff Date: Apr 30, 1999

Result ID: 3401071
Page Number : 1

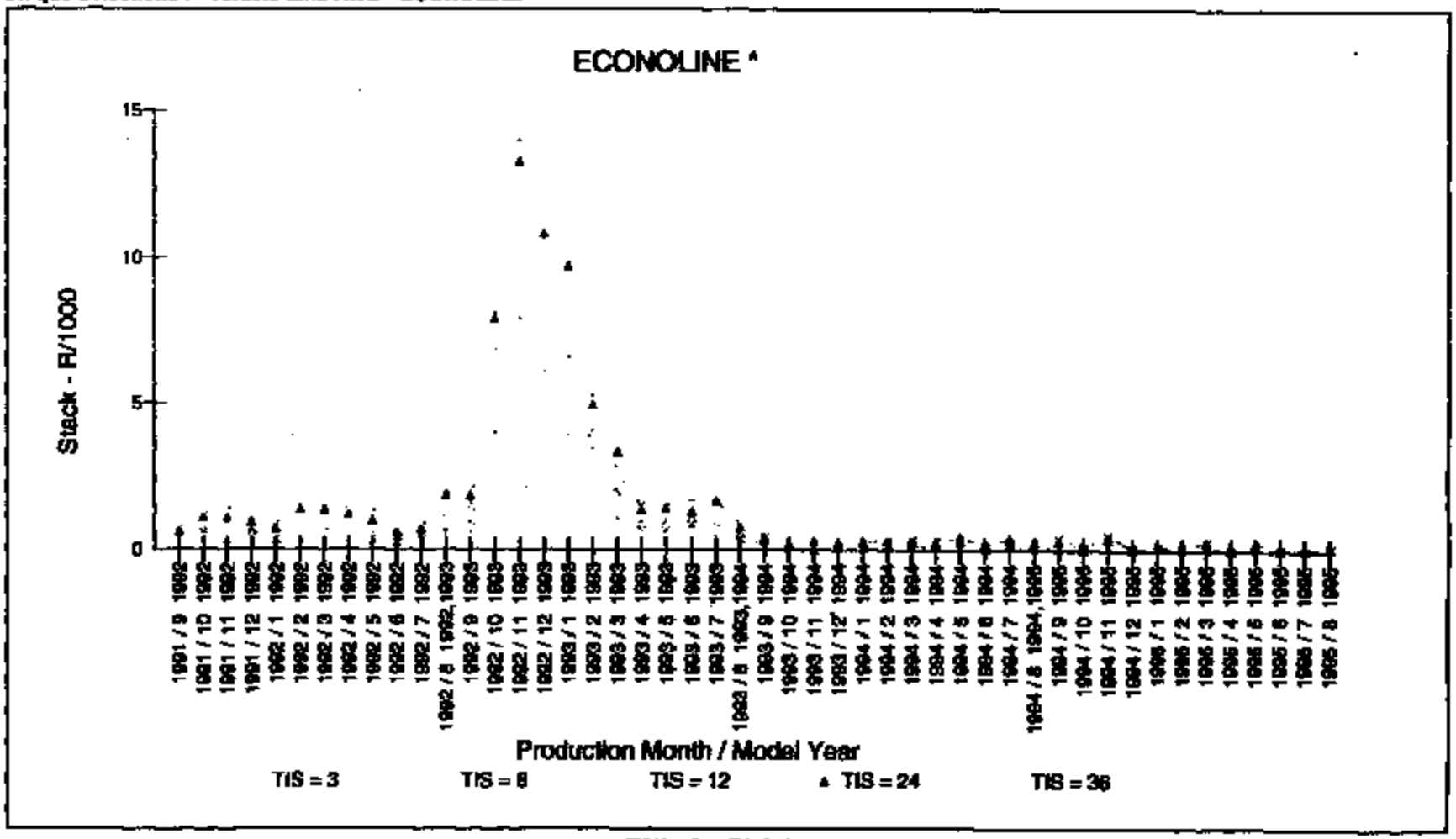
Model Years : 1995, 1994, 1993, 1992
TIS Value(s) : 3,6,12,24,36

Logic : Corporate

Min Divisor : 100

Statistic : R/1000
Max TIS : 36

Unique Selections : Vehicle Line AWS='ECONOLINE



97/3 1993

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END OF REPORT

*Chart has been modified from original settings

Report Specific Information

Print Date : May 20, 1999
Print Time : 10:39

Cutoff Date: Apr 30, 1999

Result ID: 3401671
Page Number : 1

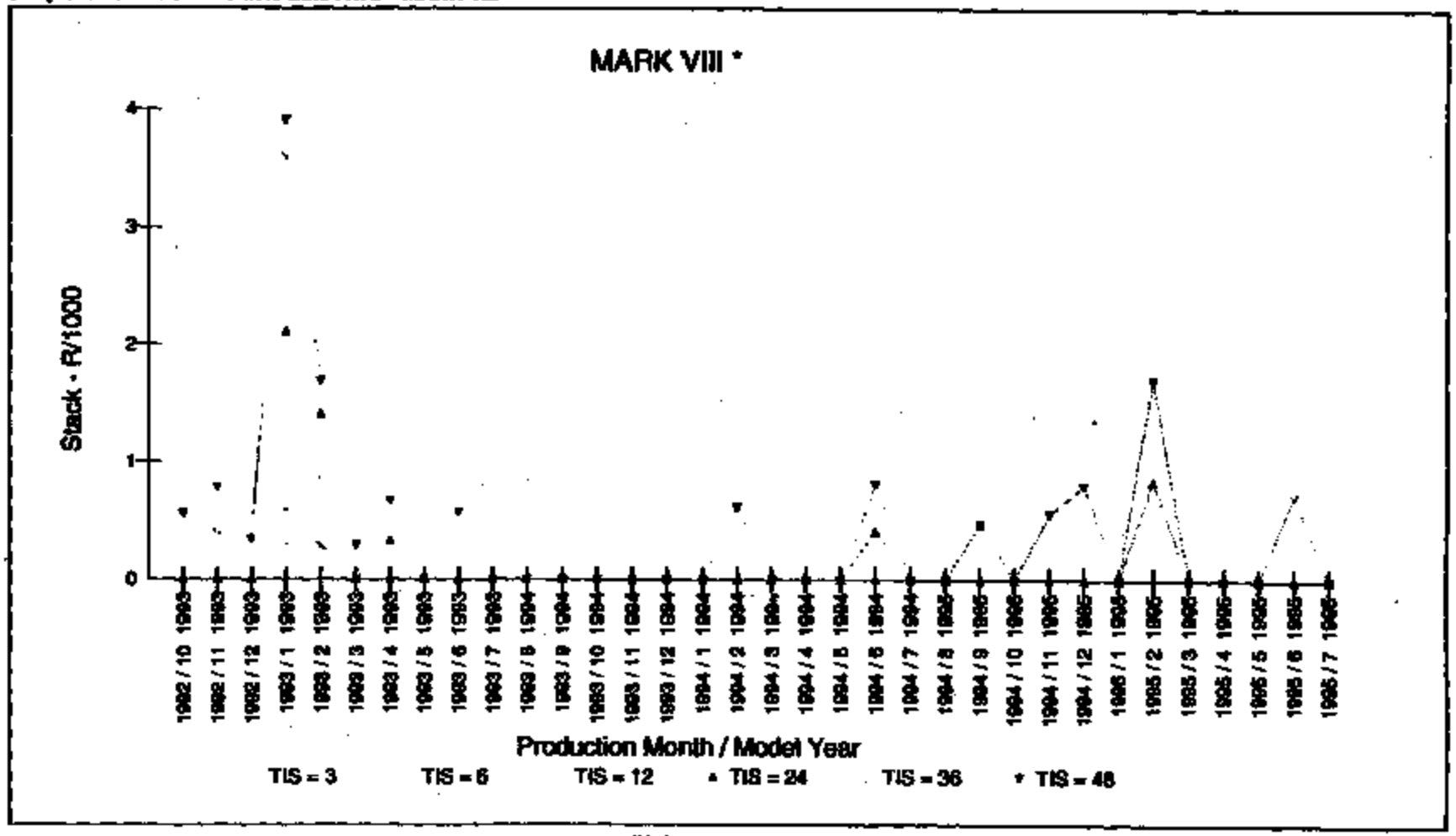
Model Years : 1995, 1994, 1993
TIS Value(s) : 3,6,12,24,36,48

Logic : Corporate

Min Divisor : 100

Statistic : R/1000
Max TIS : 48

Unique Selections : Vehicle Line AWS='MARK VIII



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END OF REPORT

*Chart has been modified from original settings

3713 1994

Report Spe. .e Information

Print Date : May 20, 1999
Print Time : 10.35

Cutoff Date: Apr 30, 1999

Result ID: 3491072
Page Number : 1

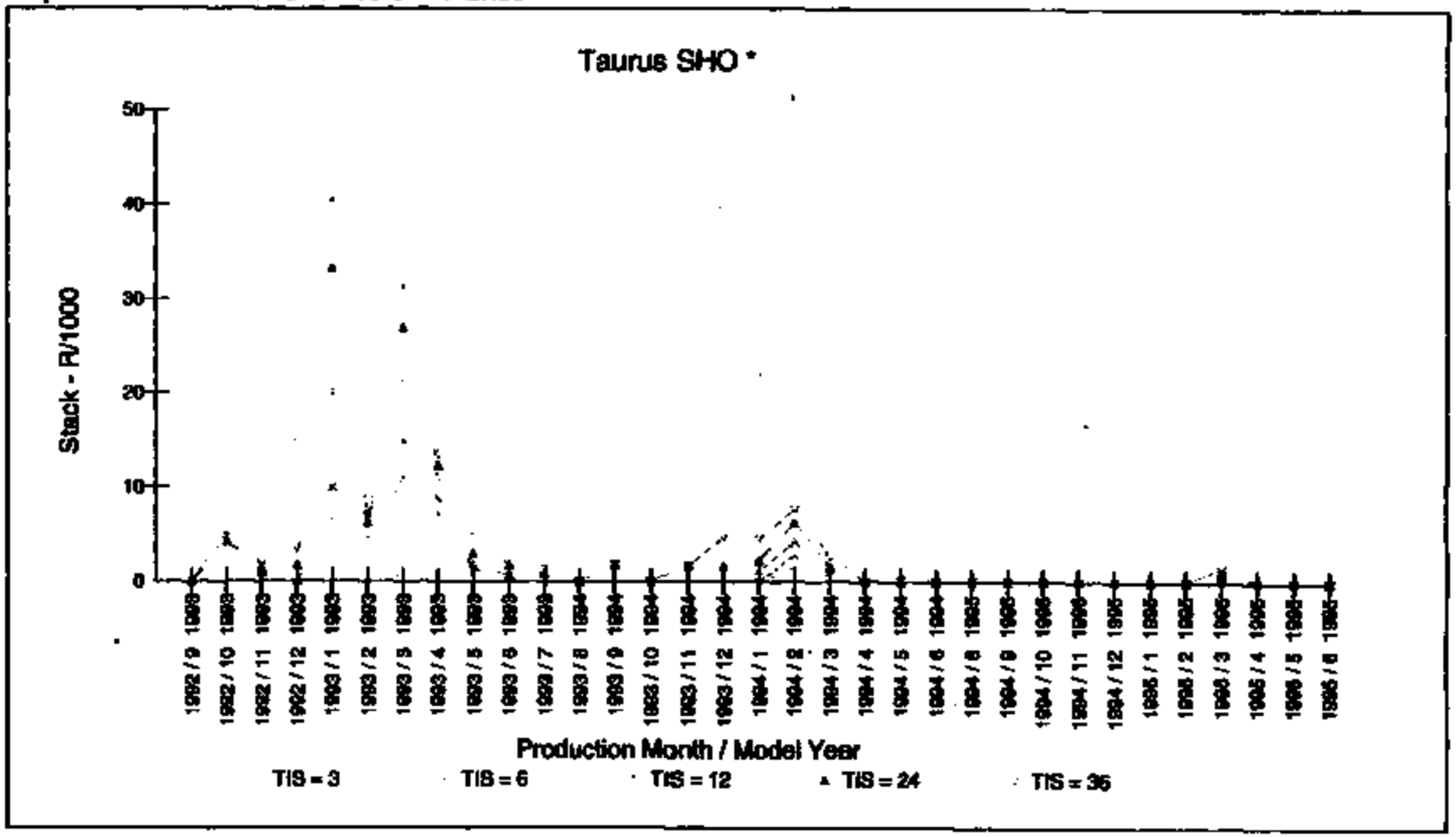
Model Years : 1995, 1994, 1993
TIS Value(s) : 3,6,12,24,36

Logic : Corporate

Min Divisor : 100

Statistic : R/1000
Max TIS : 36

Unique Selections : Vehicle Line AWSeDA - TAURUS



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END OF REPORT

*Chart has been modified from original settings

9713 1995

Percentage of Brake Pressure Switch Symptoms Related to Production Volumes with Engine off/Unknown

	1992 Model Year		
	Production volumes	# of fires by symptom	% fire
Town car	109,120	10	0.01
CV/GM	289,393	8	0.003
Econoline	155,450	0	0
F-series	507,105	0	0

	1993 Model Year		
	Production volumes	# of fires by symptom	% fire
Town car	113,554	3	0.003
CV/GM	183,146	0	0
Econoline	186,462	1	0.001
F-series	542,480	1	0.0002

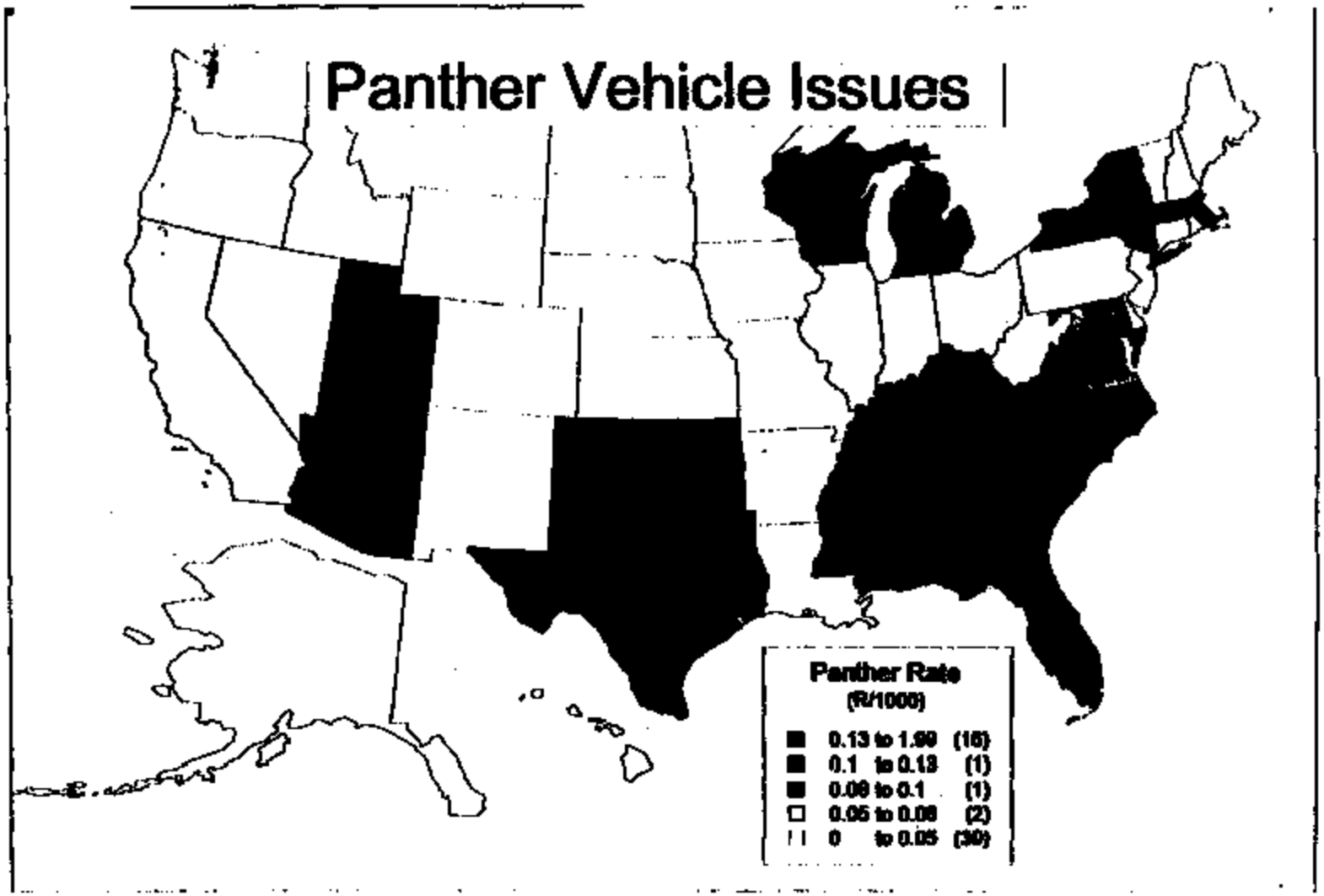
	1994 Model Year		
	Production volumes	# of fires by symptom	% fire
Town car	113,028	0	0
CV/GM	196,072	2	0.001
Econoline	199,728	1	0.001
F-series	606,872	1	0.0002

	1995 Model Year		
	Production volumes	# of fires by symptom	% fire
Town car	107,696	2	0.002
CV/GM	192,591	0	0
Econoline	206,696	2	0.001
F-series	686,117	2	0.0003

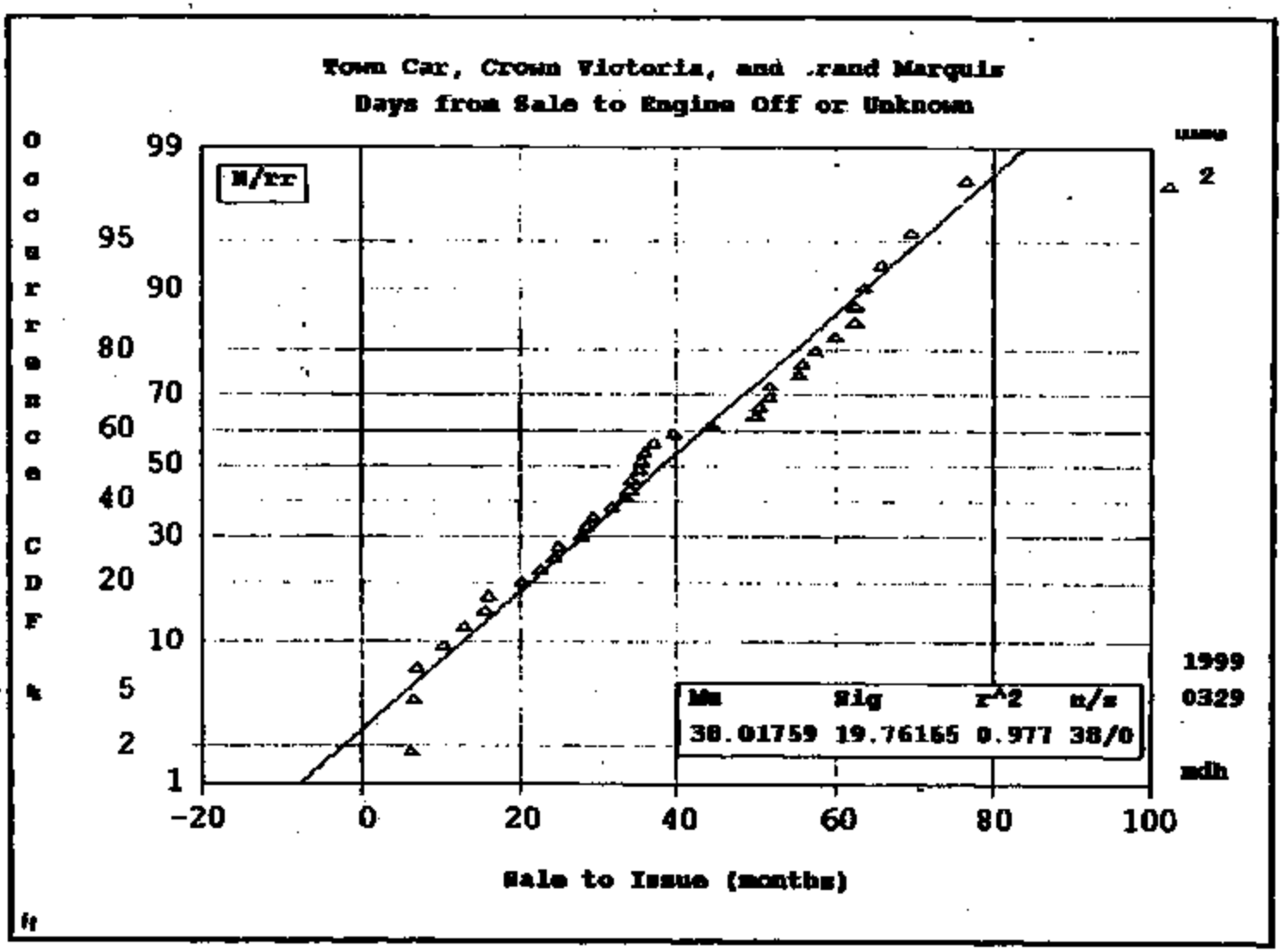
	1996 Model Year		
	Production volumes	# of fires by symptom	% fires
Town car	90,764	1	0.001
CV/GM	203,307	1	0.0005
Econoline	156,336	0	0
F-series	493,543	0	0

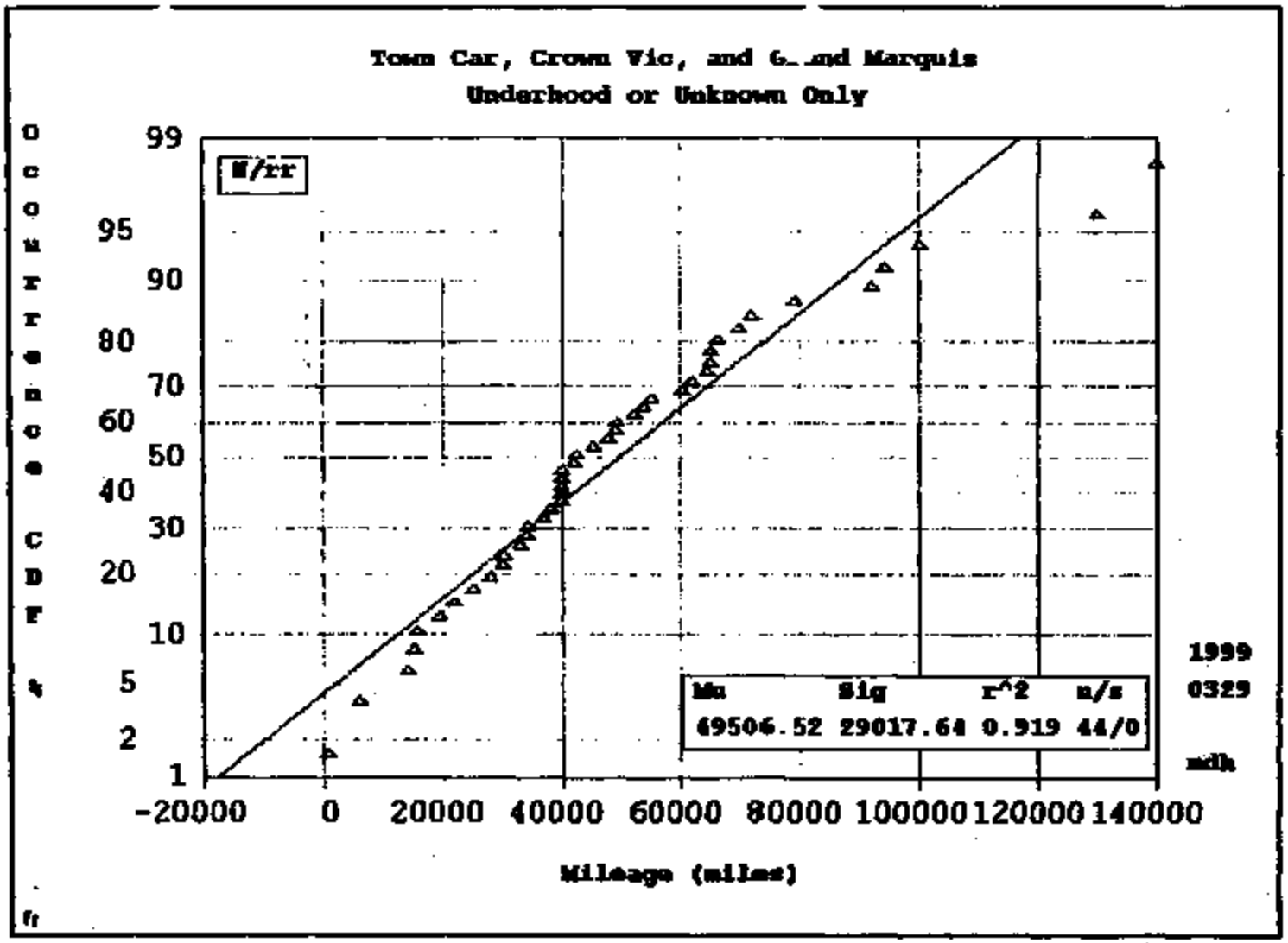
	1997 Model Year		
	Production volumes	# of fires by symptom	% fire
Town car	104,977	0	0
CV/GM	251,796	1	0.0004
Econoline	195,185	0	0
F-series	341,930	0	0

Panther Vehicle Issues



9713 1887


Town Car, Crown Victoria, and Grand Marquis
Days from Sale to Engine Off or Unknown
Occurrence CDF %
99
95
90
80
70
60
50
40
30
20
10
5
2
1
M/Yr
-20
0
20
40
60
80
100
Sale to Issue (months)
Mn Sig r^2 n/s
38.01759 19.76165 0.977 38/0
1999
0329
mdh


Town Car, Crown Vic, and G_nd Marquis
Underhood or Unknown Only
M/rr
Cumulative CDF %
99
95
90
80
70
60
50
40
30
20
10
5
2
1
-20000
0
20000
40000
60000
80000
100000
120000
140000
Mileage (miles)
Mu Sig r^2 n/s
49506.52 29017.64 0.919 44/0
1999
0329
mdh

3713 1999

FINAL 1998

3/24/99

1998 MY EARLY WARRANTY CLAIMS FOR VISTEON FORD[illegible] SPEED CONTROL SYSTEM — FORD CONFIDENTIAL

CURRENT BUILD, 9/19 THRU 10/10/98 — RECORD RETENTION PZT-00-00-01, DISPOSE OF BY 12/2003

MCC	* CSR * PART NUMBER	PART NAME	ESCORT TRACER	TAURUS SABLE	CR VIC GR MQ	F87A CONT.	MARK VIII	CONT. WST.	TOWN CAR	MUST.	WIND STAR	TOTAL CLAIMS
TQ01	XL8Z9	SC CABLE				2				1	4	7
		LABOR ONLY	1	4	2		1	7	4	3	7	29
	* XC735	SERVO SPEED CNTL	14	12	13	3	1	9	6	18	18	93
		LABOR ONLY	8	11	7	2		3	8	10	2	47
	XC8Z	STEERING WHEEL SW	8	10	7	3	5	2	12	4	27	84
		LABOR ONLY	5	11	3			6	2	13	1	41
	XW1Z	SWITCH BRK CNTRL				1		2		3	28	[illegible]
		LABOR ONLY								3	1	4
TQ01/7T04		ALL OTHER PARTS										
		LABOR ONLY	2	0	1			1		0	3	23
		TOTAL	38	64	33	11	7	30	26	62	96	337

CURRENT BUILD THRU 10/10/98

MCC	* CSR * PART NUMBER	PART NAME	ESCORT TRACER	TAURUS SABLE	CR VIC GR MQ	F87A CONT.	MARK VIII	CONT. WST.	TOWN CAR	MUST.	WIND STAR	TOTAL CLAIMS
TQ01	XL8Z9	SC CABLE	5	16	6	7		2	2	17	98	144
		LABOR ONLY	17	64	16	1	3	104	13	27	68	283
	* XC735	SERVO SPEED CNTL	152	221	116	20	12	128	48	150	332	1171
		LABOR ONLY	62	87	38	8	4	89	20	60	68	417
	XC8Z	STEERING WHEEL SW	105	185	103	12	75	91	35	87	461	1136
		LABOR ONLY	24	54	23	6	3	34	12	77	22	255
	XW1Z	SWITCH BRK CNTRL		19	3	3	2	33	3	32	61	153
		LABOR ONLY	2	6				2		20	9	41
TQ01/7T04		ALL OTHER PARTS	24	5				8		13	4	55
		LABOR ONLY	24	21	6	3		29	2	32	24	141
		TOTAL	395	683	380	58	99	512	134	520	1118	3864
		SALES THRU 9/12/98	262284	329120	127303	23899	18058	223911	62212	100114	277515	1414610

* VISTEON MANUFACTURED PART

NOTE: 9F924 IS PRESSURE SWITCH ON BRAKE & PEDAL POSITION ON CLUTCH RELAY [illegible] 3/24/99

8713 1880

FINAL 1998

1998 MY EARLY WARRANTY CLAIMS FOR VISTEON FORD ELECTRONICS SPEED CONTROL SYSTEM — FORD CONFIDENTIAL

RECORD RETENTION 85-4-2, DISPOSE OF BY 12/98

MCC	PART NUMBER	PART NAME	EXPED/ HAVIG	ECONO LINE	P-SER FW96/102	RANGER	EXPL/ AWTHR	TOTAL CLAIMS
7Q01	9B825	SC CABLE	1	1	1		5	8
		LABOR ONLY	4	3	1	6	13	27
	* 9C735	SERVO SPEED CNTL	12	10	12	5	4	43
		LABOR ONLY	8	1	5	4	16	34
	9C960	STEERING WHEEL SW	5	2	9	11	22	49
		LABOR ONLY	3		6	1	9	19
	9F924	SWITCH SPD CNTRL	1		1		1	3
		LABOR ONLY			1			1
7Q01/7T04	ALL OTHER PARTS			2		1	1	4
		LABOR ONLY		1		1	2	4
	TOTAL		34	20	36	28	73	192

MCC	PART NUMBER	PART NAME	EXPED/ HAVIG	ECONO LINE	P-SER FW96/102	RANGER	EXPL/ AWTHR	TOTAL CLAIMS
7Q01	9B825	SC CABLE	7	31	9	7	79	133
		LABOR ONLY	20	32	24	27	143	246
	* 9C735	SERVO SPEED CNTL	117	96	219	85	153	670
		LABOR ONLY	32	14	33	43	109	241
	9C960	STEERING WHEEL SW	92	40	114	109	255	610
		LABOR ONLY	17	5	30	9	41	102
	9F924	SWITCH SPD CNTRL	11	6	28	1	10	57
		LABOR ONLY		3	4	1	3	11
7Q01/7T04	ALL OTHER PARTS		1	6	4	31	22	64
		LABOR ONLY	9	5	21	17	33	85
	TOTAL		306	238	517	330	848	2219
	SALES THRU 9/12/98		223983	128245	298647	203181	324724	1178780

* VISTEON MANUFACTURED PART

3713 1891

1995 MY EARLY WARRANTY CLAIMS FOR VISTEON FORD ELECTRONICS SPEED CONTROL SYSTEM

FORD CONFIDENTIAL

RECORD RETENTION 85-4-2, DISPOSE OF BY 12/98

[redacted], 10/3 THRU 10/15/98

[redacted] MCC	PART NUMBER	PART NAME	EXPED/ MAVIG	ECONO LINE	F-SER P496/102	F-SER P88131	RANGER	EXPL/ MUSTG	TOTAL CLAIMS
7Q81	[redacted]	SC CABLE					1		1
		LABOR ONLY				2		1	3
	9C735	SERVO SPEED CNTL		2	3	2			7
		LABOR ONLY			2	5	1		8
	9C888	STEERING WHEEL SW			2	7			9
		LABOR ONLY				4			4
	[redacted]	SWITCH AND CNTRL							
		LABOR ONLY							
7Q81/7T04	ALL OTHER PARTS					1			1
		LABOR ONLY				2	1		3
	TOTAL			2	7	23	3	1	36

[redacted] THRU 10/15/98

[redacted] MCC	PART NUMBER	PART NAME	EXPED/ MAVIG	ECONO LINE	F-SER P496/102	F-SER P88131	RANGER	EXPL/ MUSTG	TOTAL CLAIMS
7Q81	[redacted]	SC CABLE				3	1		4
		LABOR ONLY	1		3	13		1	18
	9C735	SERVO SPEED CNTL		3	4	31		1	41
		LABOR ONLY			8	31	2	4	45
	9C888	STEERING WHEEL SW	1		2	39		6	48
		LABOR ONLY			1	28	2		31
	[redacted]	SWITCH AND CNTRL				5			5
		LABOR ONLY				3			3
7Q81/7T04	ALL OTHER PARTS					2			2
		LABOR ONLY				26	2	1	29
	TOTAL		2	3	18	183	7	13	226
	SALES THRU 8/31/98					112058			112058

2713 1892

* VISTEON MANUFACTURED PART

1998 MY EARLY WARRANTY CLAIMS FOR VISTEON FORD ELECTRONICS SPEED CONTROL SYSTEM — FORD CONFIDENTIAL

RECORD RETENTION #27-09-05-05, EXPIRES OF MY 12/2003

CURRENT RUNS, 10/3 THRU 10/10/98

MCC	PART NUMBER	PART NAME	ESCORT TRACER	TAURUS SABLE	CR VIC GR MO	F#74 CONT.	CONT. MYST.	TOWN CAR	MUST.	MIND STAR	COUGAR	TOTAL CLAIMS
7Q01	9A825	SC CABLE										
		LABOR ONLY		1								1
	* 9C735	SERVO SPEED CNTL		41	1							42
		LABOR ONLY		11				1				12
	9C888	STEERING WHEEL SW	3	8	1							12
		LABOR ONLY		15							2	17
	9F924	SWITCH BRK CANCL		43								43
		LABOR ONLY		5								5
7Q01/7T04	ALL OTHER PARTS		1	1								2
		LABOR ONLY		5								5
	TOTAL		4	130	2			1			2	139

YEAR-TO-DATE THRU 10/10/98

MCC	PART NUMBER	PART NAME	ESCORT TRACER	TAURUS SABLE	CR VIC GR MO	F#74 CONT.	CONT. MYST.	TOWN CAR	MUST.	MIND STAR	COUGAR	TOTAL CLAIMS
7Q01	9A825	SC CABLE										
		LABOR ONLY		2	1						8	11
	* 9C735	SERVO SPEED CNTL		62	3			1			2	68
		LABOR ONLY		13	2		1	1			10	27
	9C888	STEERING WHEEL SW	4	14	1						4	23
		LABOR ONLY		33	1			1			2	37
	9F924	SWITCH BRK CANCL		77				2			3	82
		LABOR ONLY		8								8
7Q01/7T04	ALL OTHER PARTS		1	1								2
		LABOR ONLY		15			1					16
	TOTAL		5	225	8		2	5			29	274
	SALES THRU 9/31/98										7297	7297

* VISTEON MANUFACTURED PART

3713 1863

Do These All Have Speed Control?

Air Suspension?

SUMMARY

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

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

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

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

[illegible]

No.	[redacted]	City	State	Zip	Telephone	VIN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Mileage	[illegible]	[illegible]	[illegible]
1	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
13	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
14	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
17	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
18	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
19	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
20	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
21	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
22	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
23	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
24	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
25	[redacted]	[illegible]	AZ	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
26	[redacted]	Jefferson City	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
27	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
28	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	Town Car	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
29	[redacted]	[illegible]	[illegible]	[redacted]	[redacted]	[redacted]	[illegible]	[illegible]	Town Car	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

1992-1993 CROWN VICTORIA/GRAND MARQUIS AND
1992, 1994, 1995 LINCOLN TOWN CAR
UNDERHOOD FIRES

No.	Name	Address	City	State	ZIP	Telephone Number	VEHICLE VIN	Engine problem	Model Year	Model	Mileage	Possible problem description	Date	Type
1	[redacted]		Jacksonville Beach	FL				Engine off	1994	Town Car	46,000	Underhood. Vehicle would not start. Blinking fuel pump relay.	6/1/1995	MOR
2			Birmingham	AL				Unknown	1991	Town Car	99,317	Underhood. Starter splicer wire fuel.	8/1/1995	MOR
3			Hamilton	MT				Engine off	1994	Town Car	70,000	Underhood. Unknown	6/1/1995	MOR
4			Anniston	AL				Engine off	1991	Town Car	100,000	Underhood. Unknown	6/1/1995	MOR
5			Hattiesburg	MS				Engine on	1994	Town Car	40,000	Underhood. Unknown, 6 spark plugs, torque converter was replaced.	6/1/1995	MOR
6			Mobile	AL				Unknown	1995	Town Car	34,000	Underhood. Unknown	6/1/1995	MOR
7			Destin	GA				Unknown	1995	Town Car	37,000	Underhood. Unknown	7/1/1995	MOR
8			Fort Walton Beach	FL				Engine on	1994	Town Car	51,000	Underhood. Fuel pump replaced, vehicle locked in reverse or stalled.	7/1/1995	MOR
9			Pensacola	FL				Unknown	1993	Town Car	90,000	Underhood. Unknown	6/1/1995	MOR
10			Mobile	AL				Unknown	1994	Town Car	40,000	Underhood. Starter replaced brake booster and engine misfires.	6/1/1995	MOR
11			Miami	OK				Unknown	1991	Town Car	99,311	Underhood. Unknown, A/C Wipers fail.	6/1/1995	MOR
12			Memphis	AZ				Engine off	1995	Town Car	5,000	Underhood. electrical	6/1/1995	MOR
13			Pompano Beach	FL				Unknown	1995	Town Car	Unknown	Underhood. Front seat of vehicle. Unknown	6/1/1995	MOR
14			St. Louis	MO				Engine off	1994	Town Car	80,000	Underhood. Electrical. Seat heater area looks like starter.	6/1/1995	MOR
15			Arcadia	CA				Engine on	1995	Town Car	30,000	Underhood. Unknown	6/1/1995	MOR
16			Huntsville	AL				Engine off	1995	Town Car	30,000	Underhood. Unknown	6/1/1995	MOR
17			Myrtle Beach	SC				Engine off	1995	Town Car	11,000	Underhood. Left front of vehicle.	6/1/1995	MOR
18			Los Angeles	CA				Unknown	1995	Town Car	40,000	Underhood. Brake booster, fires.	6/1/1995	MOR
19			Biloxi	MS				Engine on	1994	Town Car	34,000	Underhood. Pretty hard fires.	6/1/1995	MOR
20			Southaven	MS				Unknown	1991	Town Car	140,000	Underhood. Alternator	6/1/1995	MOR
21			Destin	GA				Engine on	1994	Town Car	Unknown	Underhood. Trying to jump start another car. Stopped in heavy traffic.	6/1/1995	MOR
22			Tucson	AZ				Unknown	1995	Town Car	30,000	Underhood. Alternator cracked fuse box, brakes go all the way to floor.	6/1/1995	MOR
23			Hamilton	TX				Engine off	1994	Town Car	44,000	Underhood. Electrical, in area of battery.	6/1/1995	MOR
24			Memphis	TN				Unknown	1992	Caliber	24,000	Underhood. Vehicle would not start out of park. Brake fluid leaked from back of master cyl.	10/1/1995	COR
25			Ft. Lauderdale	FL				Engine off	1995	Caliber	16,000	Underhood. Brake pressure sensor.	6/1/1995	COR
26			Destin	GA				Engine on	1995	Caliber	8,000	Underhood. Fluid was leaking from under car.	6/1/1995	COR
27			Jacksonville	GA				Unknown	1995	Caliber	12,000	Underhood. Unknown	11/1/1995	COR

3718 1996

[redacted]

1998-1999 CROWN VICTORIA/GRAND MARQUIS and
1992, 1994, 1998 LINCOLN TOWN CAR
WINDMOOR FIRE

[redacted]																				
[redacted]																				
[redacted]																				
[redacted]																				
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Summary of 130 '92MY Town Car CQIS Verbatims and Electrical Next Steps

& some 93

SUMMARY

1.0 There are 4 main categories that the 130 CQIS verbatims can be binned to:
- (A). 36% or 47 out of 130 are reportedly brake related.
- (B). 27% or 35 out of 130 are reportedly unknown.
- (C). 20% or 26 out of 130 are reportedly electrical related.
- (D). 17% or 22 out of 130 have reported probable causes relating to systems other than brakes or electrical.

2.0 There are 4 main categories of the 130 CQIS verbatims for vehicle locations of the reported fires.
- (A). 51% or 66 out of 130 are reported to be underhood.
- (B). 35% or 46 out of 130 are ~~reported to be unknown~~ not reported
- (C). 10% or 13 out of 130 are reported to be under the car.
- (D). 4% or 5 out of 130 are reported not to be underhood.

3.0 There are 4 main categories of engine status for these 130 CQIS verbatims:
- (A). 38% or 50 out of 130 are reportedly engine unknown - not known whether engine was running or not.
- (B). 35% or 46 out of 130 are reportedly engine running.
- (C). 25% or 32 out of 130 are reportedly engine off.
- (D). 2% or 2 out of 130 are reportedly with engine idling.

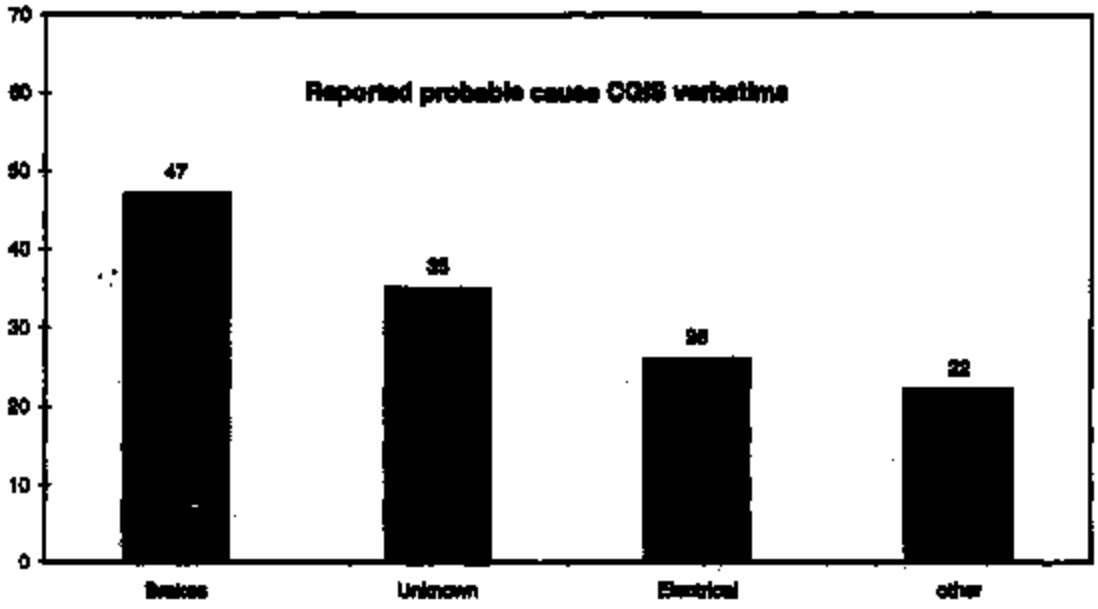
NEXT STEPS:

1.0 Review CV/GM CQIS verbatims for reported fires - target complete date is 2/26/1999.
2.0 Request FCSD to pull feature codes for the 130 related CQIS VIN's.
3.0 Request 12 previously burned vehicles be investigated per the electrical questions forwarded to JNeme.

1LNLM81W1PY[redacted]	1LNLM82W7NY[redacted]
1LNLM82W8NY[redacted]	1LNLM81W6NY[redacted]
1LNLM83W1NY[redacted]	1LNLM83W7NY[redacted]
1LNLM82W9NY[redacted]	1LNLM82W5NY[redacted]
1LNLM82W5NY[redacted]	1LNLM81W9NY[redacted]
1LNLM81W6NY[redacted]	1LNLM82W2NY[redacted]

A:\summary by Jkatell, x05389, created 2/19/1999, revisions, page 1 of 1.

92MY Town Car CQIS Parato Analysis



Notes:

(1) Brakes account for 47 out of 130 92MY Town Car CQIS verbatims.
* Categories include these types of comments: Brake pressure switch, Brakes lock-up, brake booster hangs-up, brake lines, frozen calipers, power brake unit, plastic piston caliper melts, brakes caught fire, undercut rotors, after market parts.

(2) Unknowns account for 35 out of 130 92MY Town Car CQIS verbatims.
* No probable root cause identified.

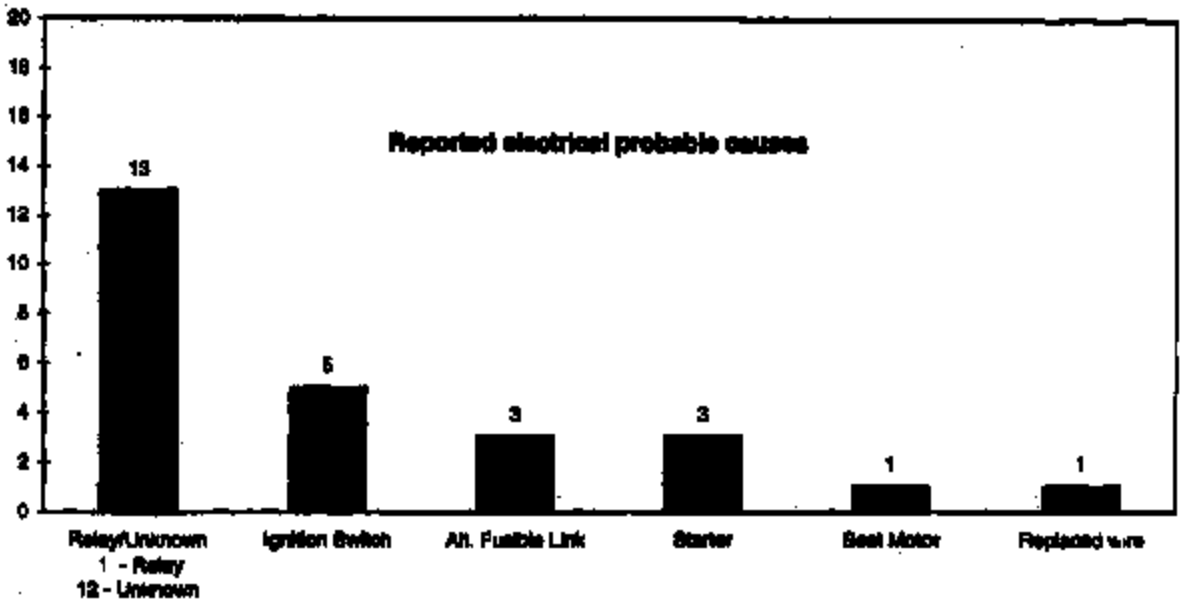
(3) Electrical accounts for 26 out of 130 92MY Town Car CQIS verbatims.
* Categories include these types of comments: 12 are reportedly an electrical issue with comments such as car shorted, possible electrical wire malfunction, electrical problem, electrical short, fire department stated electrical issue.
others include suspension relay, replaced a wire, ignition switch, starter, alternator fusible link, Seat motor.

(4) Other accounts for 22 out of 130 92MY Town Car CQIS verbatims.
* Categories included are battery on top of car hood, left front of vehicle, right rear side, gas lines, engine low or no coolant, catalytic converter, dashboard, spark plug wires, A/C compressor (overheated), liquid fuel equipment.

A:\chart1, by Jkafati x05389, created 2/18/1999, revisions, page 1 of 1

3713 1699

92MY Town Car CQIS Perato Analysis



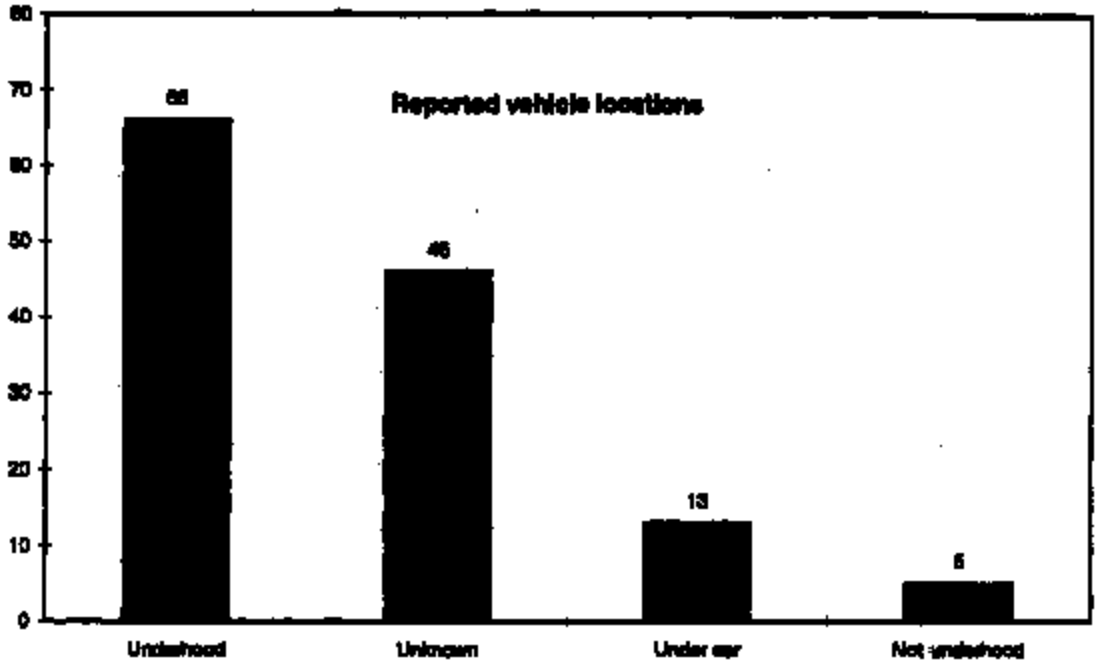
Note:
(1) Of the 13 probable electrical issues on the first bar, 12 are stated as an electrical issue without any other conclusion.

Relay/Unknown
- 1 - Relay
- 12 - Unknown

(2) Ignition Switch
- 2 of the 5 ignition switches were previous recall issues that customers did not bring in for service.
- 3 are identified as possible ignition switch.

A:\chart2, by Jkafati x05389, created 2/15/1999, revisions, page 1 of 1

92MY Town Car CQIS Pareto Analysis

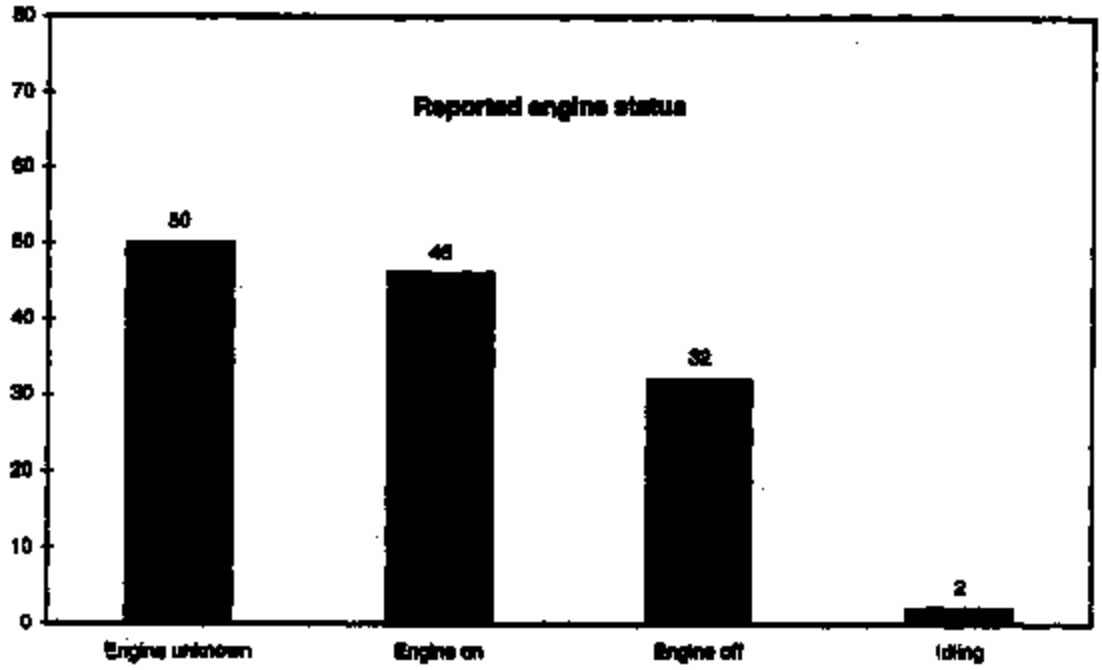


Notes:
* Underhood location is broken down into the following categories as probable causes:

(1) Underhood unknown	19	Out of a total of 35
(2) Brake related	18	Out of a total of 47
(3) Electrical related	13	Out of a total of 26
(4) Left front of vehicle	7	
(5) Engine low/no coolant	3	
(6) Gas lines	1	
(7) Battery on top of hood	1	
(8) Catalytic converter	1	
(9) A/C comp. (overheat)	1	
(10) Spark plug wires	1	
(11) Right rear side	1	

A:\char13, by Jkellett x053569, created 2/18/1999, revisions, page 1 of 1

92MY Town Car CQIS Pareto Analysis

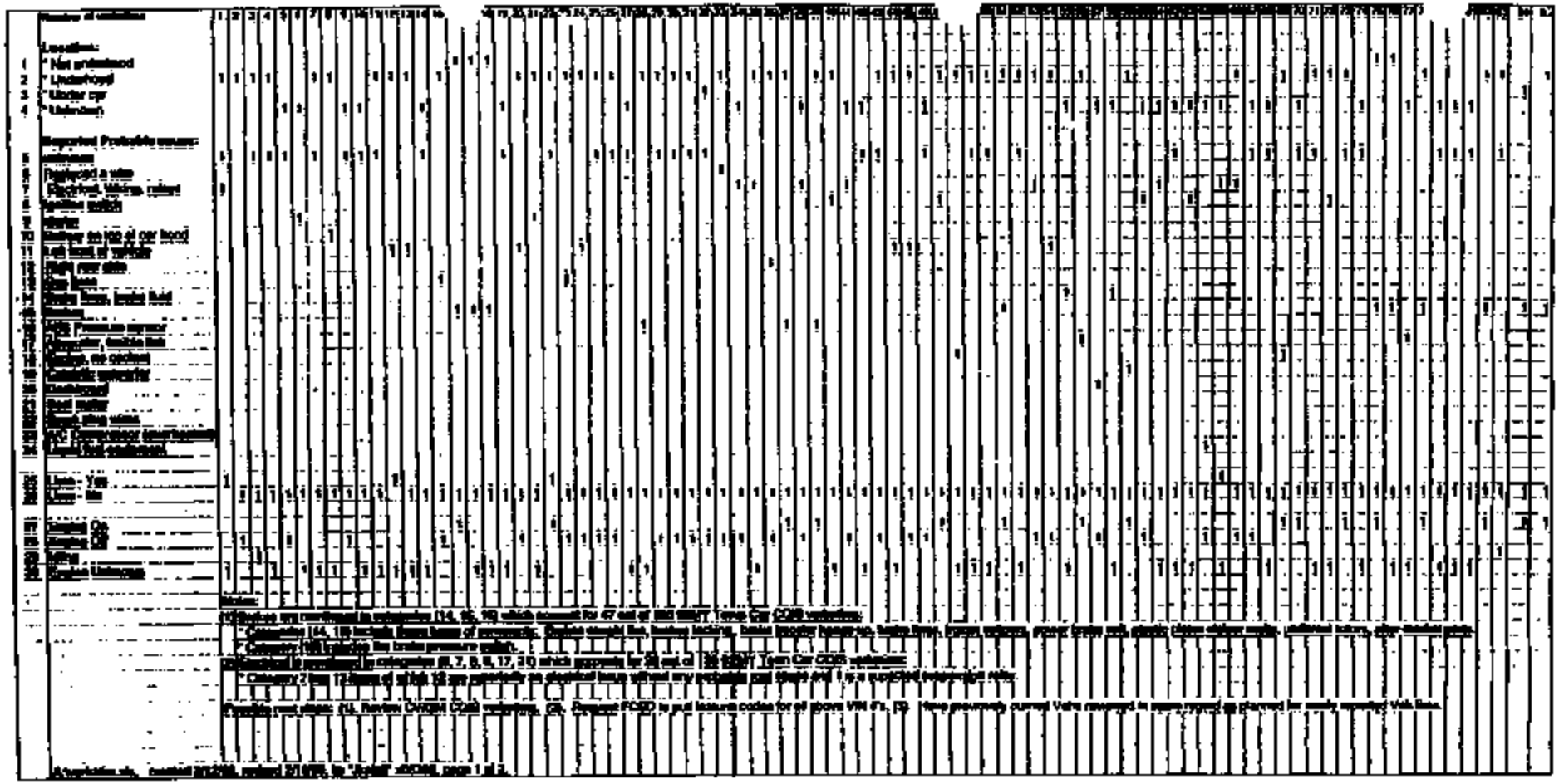


Note:
* Of the reported probable causes with the engine off:

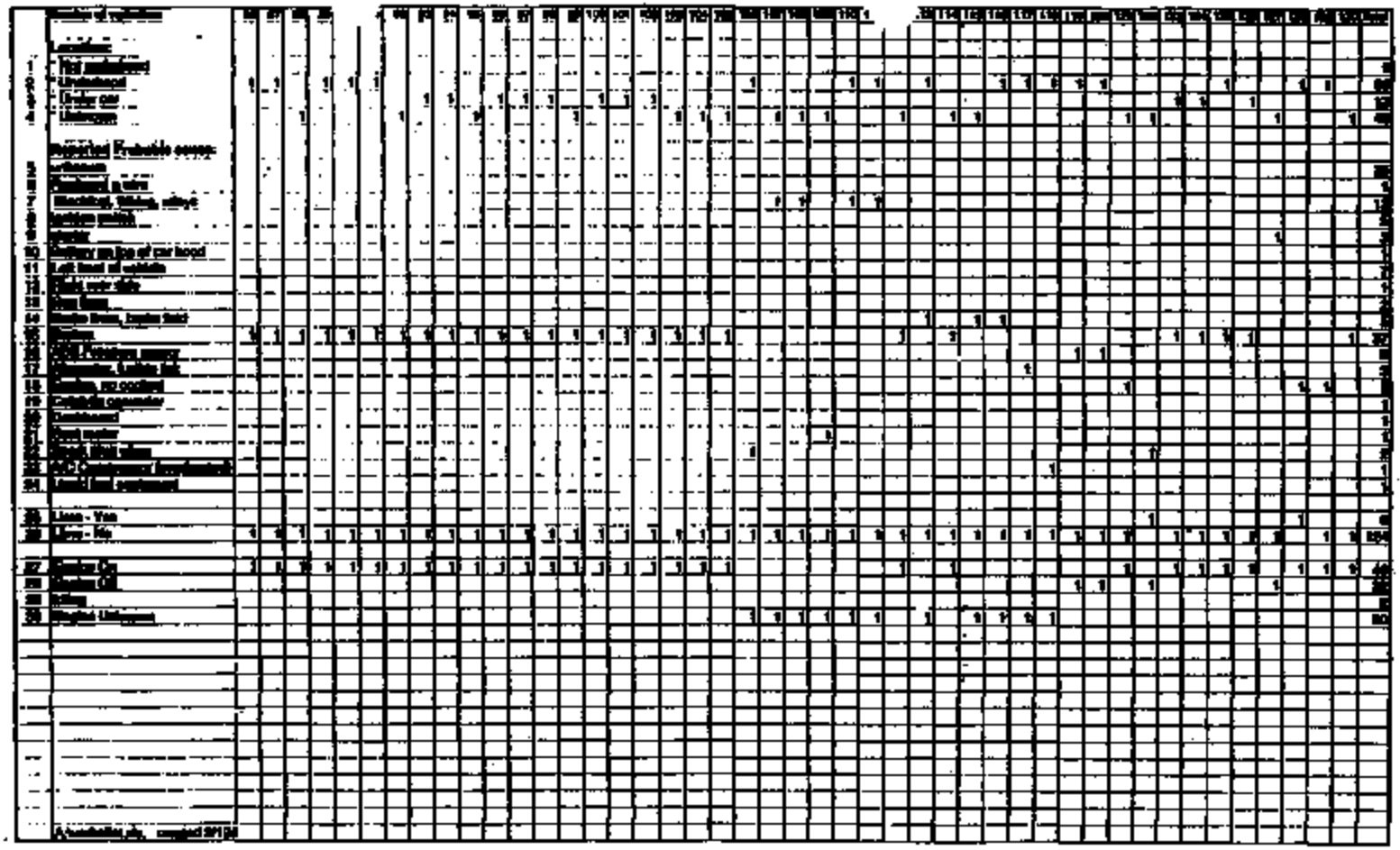
* Unknown (category 5)	12
* Electrical (category 6,7,8,9,17,21)	8
* Left Front of vehicle (category 11)	4
* Brakes (category 14,15,16)	2
* Gas lines (category 13)	2
* Right rear side (category 12)	1
* Dashboard (category 20)	1
* Spark plug wires (category 22)	1
* Liquid equipment (category 24)	1

A:\chart4, by Jkafati x05369, created 2/19/1999, revisions, page 1of 1

88MY Town Car CGEA Vehicle Analysis



MMY Towne Car COPS Vehicular Analysis



Vehicle Information Report

Reddish Veh.

GENERAL VEHICLE INFORMATION:

(Related Claims)

VIN:	1LNLM82W8PY622977	Veh Line:	C/V8 - TOWN CAR (FN36/FN116) [91-97]	Eng Serial No:	W
Model Year:	1993	Market Derived:	C/M - L-M DIVISION DERIVATIVE	Body Shell:	*
Veh Typ:	C	Drive Code:	C/B - 2 WHL L/H REAR DRIVE	Engine:	C/VN - R-M 4.6L SOHC EFI NA CIV8 G-NP
Inv. Dealer:	12PH	Body Cab Style:	C/FC - 4 DOOR SEDAN-6 LITE	Transmission:	C/DK - 4 SPD AUTO TRANS NAAO AODE
		Version/Series:	C/BR - SIGNATURE VERSION		

BUILD INFORMATION:

Region:	NA - [illegible]	Plant:	9A - WIXOM PLANT BUILD
Country:	USA - [illegible]	Prod Date:	10-SEP-1992

SALE INFORMATION:

Region:	NA - [illegible]	Selling Dealer:	32263A - *
Country:	USA - [illegible]	Selling Dlr St/Prov:	MI
		Buyer St/Prov:	TN

Arrival Date:	23-SEP-1992	Red Carpet Lease:	1
Sale Date:	08-FEB-1993	Fleet/Retail/Co. Lease:	R
Warranty Start Date:	08-FEB-1993	Modified Vehicle:	*
Orig Warranty Date:	08-FEB-1993	Recognized Vehicle:	* Vehicle Export Flag: N

VOC/EOC:

```
---------1---------2---------3---------4---------5---------6---------7---------8---------
MB2PY622977 4L J 07J2077 PH D PJY 3PA 4 2 LG P 220663 3 DG DH 9 H M1
NL0 5 D 755A MP
```

3713 1806

INSTALLED OPTION INFORMATION:

Air Conditioning:	CK - ATC AIR CONDITIONER	GVW Code:	-
Alternator Amp Rating:	*	GVW Class Code:	L
Audio Dist:	AC - AUDIO DISC CHANGER PLAYER	Instrumentation:	AC - ELECTRONIC INSTRUMENTATION
Axle Ratio:	EGACC - 3.08 FINAL DRIVE RATIO	Mirror(Driver Side):	* - [N/A]
Axle Type:	EGJAC - LIMITED SLIP REAR AXLE	Mirror(Passgr Side):	* - [N/A]
Battery Amp Rating:	72	Paint:	PNJAC - MED MOCHA C/C
Brake Code:	FEAAB - 4 WHL ANTI-LOCK BRAKES	Power Antenna:	* - [N/A]
Brake Code(Service):	* - [N/A]	Radio:	AQ - ELETR PREMIUM AM/FM STR/CSTE
Calibration Code:	31MR0A	Sound System:	* - [N/A]
Color(Accent):	* - [N/A]	Supp Tandem Axle:	* - [N/A]
Color(Trim):	010S4 -	Tire Brand:	AJ - MICHELIN TIRE VENDOR
Delivery Type:	L	Tire Size:	DXOSF - P215/70R15 WSW
Driveshaft Code:	*	Traction Control:	* - [N/A]
Front Seat:	CK - SEAT-SPLIT BENCH	Wheel Base:	* - [N/A]
Fuel Type:	* - [N/A]		

ESP INFORMATION: EMISSIONS INFORMATION:

ESP Code:	*	Emission Code:	C/H - C/H
ESP Coverage(Miles):	*	Emission Cert Type:	F
ESP Coverage(Time):	*	Emission Decal Suffix:	HY
ESP Plan Year:	*	Engine Family:	FFM46VSFHF2
ESP Signature Date:			

Any comments? You can contact

webmaster@aws-ford.com

8718 1806

Claim Detail Report

Model Year = 1993; Claim Key = 7837232

Vehicle Information

Model Year:	1993
Market Derived:	C/M - L-M DIVISION DERIVATIVE
Body/Cab Type:	C/FC - 4 DOOR SEDAN-6 LITE
Version/Series:	C/BR-SIGNATURE VERSION
Drive Type:	C/B-2 WHL L/H REAR DRIVE
Vehicle Line:	C/VB-TOWN CAR (FN36/FN116) [91-97]
Warranty Start Date:	08-FEB-1993
Production Date:	10-SEP-1992
VIN:	1LNLM82W0PY[redacted]

Claim Information

Document Number:	037982
Repair Date:	08-FEB-1993
Distance:	11
TIS:	0

Dealer Information:

Dealer Name:	SCHILLING LM MENDENHALL/BRAC
Dealer Code:	12098 - *
Address:	2660 SOUTH MENDENHALL
City:	MEMPHIS
State:	AR Zip Code:38115
Country:	USA Region Code: NA
Phone:	(901)400-4000

Expense Information

Customer Paid Amount:	0
Deductible Amount:	0
Dealer Paid Amount:	0
Labor Cost:	31.2
Misc. Expense Amount:	0
Part Markup Amount:	
Material Cost:	106.99
Total Cost Gross:	138.19

Cust. Concern Code:	D02 - ENGINE WOULD NOT START
Condition Code:	08 - OTHER/UNKNOWN(NO APPROPRIATE COND. CODE)
Technician Comment:	D01-CK CHARGING SYSTEM HAVING TO JUMP START
Customer Comment:	

Labor Op Code	Labor Op Description	Labor Op Cost
10654A	BATTERY CHARGE AND TEST	0
10654B	BATTERY REPLACE	0

Causal Flag	Full Part Number PREF	BASE	SUFF	Part Description	CPSC	Part Quality	Extended Amount
Y	*	10654	*	BATTERY	NANANA	0	0
N	BXT	65	850	MOTORCRAFT BATTERY	NANANA	1	0

Any comments? You can contact

webmaster@awa-ford.com

3713 1908

Claim Detail Report

Model Year = 1993; Claim Key = 7837234

Vehicle Information

Model Year:	1993
Market Derived:	C/M - L-M DIVISION DERIVATIVE
Body/Cab Type:	C/FC - 4 DOOR SEDAN-6 LITE
Version/Series:	C/BR-SIGNATURE VERSION
Drive Type:	C/B-2 WHL L/H REAR DRIVE
Vehicle Line:	C/VB-TOWN CAR (FN36/FN116) [91-97]
Warranty Start Date:	08-FEB-1993
Production Date:	10-SEP-1992
VIN:	1LNLM82W0P[redacted]

Claim Information

Document Number:	046402
Repair Date:	06-JUL-1993
Distance:	5544
TIS:	5

Dealer Information:

Dealer Name	SCHILLING LM MENDENHALL/BRAC
Dealer Code:	12098 - *
Address:	2660 SOUTH MENDENHALL
City:	MEMPHIS
State:	AR Zip Code:38115
Country:	USA Region Code: NA
Phone:	(901)400-4000

Expense Information

Customer Paid Amount:	0
Deductible Amount:	0
Dealer Paid Amount:	0
Labor Cost:	0
Misc. Expense Amount:	25
Part Markup Amount:	
Material Cost:	0
Total Cost Gross:	25

Cust. Concern Code: A99 - ADMINISTRATIVE (PARTS RETURN/ETC.)

Condition Code: PP - LOANER CAR

Technician Comment:

Customer Comment:

Labor Op Code	Labor Op Description	Labor Op Cost

8713 1909

Casual Flag	Full Part Number PREF	BASE	SUFF	Part Description	CPSC	Part Quality	Extended Amount
Y	*	2001	*	KIT-BRAKE SHOE LININ	060302	1	0

Any comments? You can contact

webmaster@aws-ford.com

3713 1910

Claim Detail Report

Model Year = 1993; Claim Key = 7837233

Vehicle Information

Model Year:	1993
Market Derived:	C/M - L-M DIVISION DERIVATIVE
Body/Cab Type:	C/FC - 4 DOOR SEDAN-6 LITE
Version/Series:	C/BR-SIGNATURE VERSION
Drive Type:	C/B-2 WHL L/H REAR DRIVE
Vehicle Line:	C/VB-TOWN CAR (FN36/FN116) [91-97]
Warranty Start Date:	08-FEB-1993
Production Date:	10-SEP-1992
VIN:	1LNLM82W0PY[redacted]

Claim Information

Document Number:	046401
Repair Date:	06-JUL-1993
Distance:	5544
TIS:	5

Dealer Information:

Dealer Name	SCHILLING LM MENDENHALL/BRAC
Dealer Code:	12098 - *
Address:	2660 SOUTH MENDENHALL
City:	MEMPHIS
State:	AR Zip Code:38115
Country:	USA Region Code: NA
Phone:	(901)400-4000

Expense Information

Customer Paid Amount:	0
Deductible Amount:	0
Dealer Paid Amount:	0
Labor Cost:	65.24
Misc. Expense Amount:	0
Part Markup Amount:	
Material Cost:	173.6
Total Cost Gross:	238.84

Cust. Concern Code:	N17 - BRAKES NOISY
Condition Code:	30 - CHAFED,EXCESSIVE WEAR,FRAYED
Technician Comment:	BRAKES VERY NOISEY;_____ EXCESSIVE BRAKE DUST
Customer Comment:	

Labor Op Code	Labor Op Description	Labor Op Cost
930103A	REPLACE OR REPACK	0

3713 1911

Causal Flag	Full Part Number PREF	BASE	SUFF	Part Description	CPSC	Part Quality	Extended Amount
Y	F3AZ	2001	A	KIT-BRAKE SHOE LININ	060302	1	0
N	F3VY	1125	A	DISC - FRONT WHEEL BRAKE	060301	2	0

Any comments? You can contact

webmaster@aws-ford.com

3713 1912

Claim Detail Report

Model Year = 1993; Claim Key = 23854485

Vehicle Information

Model Year:	1993
Market Derived:	C/M - L-M DIVISION DERIVATIVE
Body/Cab Type:	C/FC - 4 DOOR SEDAN-6 LITE
Version/Series:	C/BR-SIGNATURE VERSION
Drive Type:	C/B-2 WHL L/H REAR DRIVE
Vehicle Line:	C/VB-TOWN CAR (FN36/FN116) [91-97]
Warranty Start Date:	08-FEB-1993
Production Date:	10-SEP-1992
VIN:	1LNLM82W0PY[redacted]

Claim Information

Document Number:	08275801
Repair Date:	29-DEC-1998
Distance:	54321
TIS:	72

Dealer Information:

Dealer Name	SCHILLING LM MENDENHALL/BRAC
Dealer Code:	12098 - *
Address:	2660 SOUTH MENDENHALL
City:	MEMPHIS
State:	TN Zip Code:38115
Country:	USA Region Code: NA
Phone:	(901)400-4000

Expense Information

Customer Paid Amount:	0
Deductible Amount:	0
Dealer Paid Amount:	0
Labor Cost:	75.64
Misc. Expense Amount:	30
Part Markup Amount:	
Material Cost:	13.1
Total Cost Gross:	118.74

Cust. Concern Code: H19 - BRAKE-ABS WARNING LIGHT TROUBLES

Condition Code: 42 - DOES NOT OPERATE PROPERLY

Technician Comment: ELECTRICAL CIRCUITS TEST.REPLACED BRAKE LIGHT SWITCH AND WIRING.RETEST.

Customer Comment: CUST STATES THAT BRAKE LIGHTS INOP. TECH 7102. SERVICE PART.

Labor Op Code	Labor Op Description	Labor Op Cost
13480A	SWITCH-STOP LAMP REPLACE	18.91
14200A	WIRING ASSEMBLY REPAIR	31.52
12650D	EEC-IV - (QUICK TEST) DIAGNOSIS	25.21

3713 1913

Causal Flag	Full Part Number PREF	BASE	SUFF	Part Description	CPSC	Part Quality	Extended Amount
Y	FOAZ	13480	A	SWITCH ASY-STOPLIGHT	060604	1	6.95
N	EOAZ	14487	B	WIRE CONNECTOR	180103	2	.27
N	*	OSP	*	OUTSIDE PART	060604	1	5.87

Any comments? You can contact

webmaster@ecas-ford.com

3713 1914

[redacted]

3713 1915

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 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. EESE would need to reply.

SERVICE TEST EQUIPMENT:
Field/service equipment would not working 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 "ON" and "SET" to re-engage the speed control system instead of just pressing the "RESUME" or "SET".

****
* Note printed by SREINERS on 26 Feb 1999 at 07:47:14 *
****

From: TSCHRODY--VISTEON Date and time 02/26/99 07:10:19
To: SREINERS--FORDMAIL Reiners, Steve (S.
cc: WBOYER1 --VISTEON Boyer, Wes (W.D.)

From: Schrody, Thomas (T.P.)
Subject: RE: Speed control servo

Steve,

I looked back into our files. The problems with R44 were contained to a design that was in production between August 1995 and April 1996. This would only affect the 1996MY.

Regards,

Thomas Schrody
Product Design Engineer ETC, C-395
Precision Speed Control Tel: (313) 323-9695
Visteon Automotive Systems Fax: (313) 322-3829

> -----Original Message-----
> From: Steve Reiners SMTP:sreiners@gw.ford.com
> Sent: Thursday, February 25, 1999 4:18 PM
> To: wboyer1@visteon.com
> Cc: fkohl@gw.ford.com; tschrody@visteon.com; gdygert@visteon.com;
> ghuberts@visteon.com; Porter, F.J.
> Subject: RE: Speed control servo
>
> Thanks for the technical info. Did the bad R44 PGSC 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
> interna
> l to the PGSC which result in the clutch coil being energized when it
> should be
> off?
>
> Steve Reiners building 5 3C043
> AVT Chassis E/E System Applications mail drop 5011
> 39-03286 SREINERS sreiners@ford.com fax 39-03286 ;>
> *** Forwarding note from WBOYER1 --VISTEON 02/25/99 15:51 ***
> To: SREINERS--FORDMAIL Reiners, Steve (S.
> cc: FKOHL --FORDMAIL Kohl, Fred (F.H.) TSCHRODY--VISTEON Schrody,
> Thomas (T
> GDYGERT --VISTEON Dygert, Greg (G.J. DSUDZYNS--VISTEON Sudzynski,
> Dan (D.
> GHUBERTS--VISTEON 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 - Desc 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 = aborted 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
> HSSC 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 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@ieee.org)
>
> > -----Original Message-----
> > From: Steve Reimers SMTP:sreimers@gw.ford.com
> > Sent: Monday, February 22, 1999 12:10 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 3011
> > 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: FKOHL --FORDMAIL Kohl, Fred (F.K.) TSCHRODY--VISTEON 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 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@ieee.org
> >
> > -----Original Message-----
> > From: Steve Reimers
> > To: wboyer1@visteon.com
> > Cc: fkohl@gv.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 3C043
> > AVT Chassis E/E System Applications mail drop 8011
> > 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 Reimers,
> > Steve (S.
> > cc: FKOHL --FORDMAIL Kohl, Fred (F.H.) TSCHRODY--VISTEON Schrody,
> > 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:
> > <<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@ieee.org)
> >
> > > -----Original Message-----
> > > From: Porter, David (D.L.)

NGSC

****
* Note printed by SREIMERS on 25 Feb 1999 at 16:00:27 *
****

From: WBOYER1 --VISTEON Date and time 02/25/99 15:51:53
To: SREIMERS--FORDMAIL Reimers, Steve (S.
cc: FKOHL --FORDMAIL Kohl, Fred (F.R.) TSCHRODY--VISTEON Schrody, Thomas (T
GDYGERT --VISTEON Dygert, Greg (G.J. DBUDZYNS--VISTEON Budzynski, Dan (D.
GHUBERTS--VISTEON 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 - Dsac 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 d.c. 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 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 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@ieee.org)

> -----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 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: FKOHL --FORDMAIL Kohl, Fred (F.E.) TSCHRODY--VISTEON 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 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@ieee.org
>
> -----Original Message-----
> From: Steve Reimers
> To: wboyer1@visteon.com
> Cc: fkohl@gw.ford.com; tschrody@visteon.com
> Sent: 2/18/99 5:46 PM
> Subject: RE: Speed control servo
>
> Please re-run this modal 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 S 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 Reimers,
> Steve (S.
> cc: FKOHL --FORDMAIL Kohl, Fred (F.E.) TSCHRODY--VISTEON Schrody,
> 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:
> <<Cl_82r44.pdf>>
>
> Regards,
> Wes (W. D.) Boyer Phone: (313) 248-9417
> Visteon Automotive Systems Fax: (313)
> 322-3829
> Precision Speed Control - Electronic Design E-mail:

> WBoyer1@visteon.com
> (Usually at work, Wednesday + Thursday, only; Personal e-mail:
> w.d.boyer@ieee.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 Schrody (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@Visteonet.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; 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 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 S 3C043
> > AVT Chassis E/E System Applications mail drop 5011
> > 39-01286 SREIMERS sreimers@ford.com fax 39-01286 />
> > *** Forwarding note from DPORTER1--VISTEON 02/17/99 08:18 ***.
> > 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

> > > clutch control function has degraded.
> > >
> > > 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 FKOHL --FORDMAIL 02/16/99 10:33 ***
> > > To: TSCHRODY--VISTEON Schrody, Thomas (T
> > > cc: DBUDSYNS--VISTEON Budsynski, Dan (D. FKOHL --FORDMAIL
> Kohl,
> > Fred
> > > (F.K.)
> > > 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@ieee.org
> > > -----Original Message-----
> > > From: Schrody, Thomas (T.F.)
> > > 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: dbudsyns@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(USFMCBJZ)
> > > Mailing Address: RTC C375
> > > *** Forwarding note from SREIMERS--DRBN007 02/15/99 18:14 ***
> > > To: FKOHL --DRBN007
> > >
> > > FROM: Steve Reimers USART(UTC
> -05:00)
> > > Subject: Speed control servo

> > our lab.
> > and I can bench test them for you. Are these parts off vehicles,
> or
> > just
> > unused parts that have been lynig 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@Visteonet.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@ieee.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 TBD Pager (888) 377-6280
> > > > IBM Mail(USFMCBJE)
> > > > Mailing Address: ETC C175
> > > > *** Forwarding note from SREINERS--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

> > > > What is the inductance and resistance of the clutch? What is
> used
> > to
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> voltage?
> > > > I have collected at least ten speed servos from junk yards.
> Can
> > you test
> > > > them f
> > > > or function?
> > > >
> > > > Steve Reimers AVT Chassis E/E System Applications 39-03286 SREIMERS@ford.com
> > > > building 3 3C043 mail drop 5011 fax 39-03286 ;>
>
>
> Attachments sent separately:
>
> | Data Type | File Name |
> | --- | --- |
> | BINARY | CL_32B44.MDF_PC |

NGSC

****
* Note printed by SREIMERS on 18 Feb 1999 at 07:51:44 *
****

From: DPORTER1--VISTEON Date and time 02/17/99 10:28:09
To: SREIMERS--FORDMAIL Steve Reimers
cc: FKOHL --FORDMAIL Fred Kohl (E-mail) TSCHRODY--VISTEON Tom Schrody (E-mai
MBOYER1 --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 MH. This is measured at 1 Khz and in parallel.

Dave Porter dporter1@Visteonet.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; 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 ES spec defines 300 milli-Henry as the minimum test
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> tance for life testing. Is this a good number? Can you measure the
> inductance
> to establish a minimum and maximum?
>
> Steve Reimers building S 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: FKOHL --FORDMAIL Fred Kohl (E-mail) MBOYER1 --VISTEON Wes Boyer
> (E-mail)
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> Subject: FW: Speed control servo
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>
> Dave Porter dporter1@Visteonet.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@ieee.org)
> >
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> > 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)
> > PROFS ID: FKOHL Phone TBD Pager (888) 377-6280
> > IBM Mail(USFMCBJX)
> > Mailing Address: HTC C375
> > *** Forwarding note from SREIMERS--DRBN007 02/16/99 12:38 ***
> > To: FKOHL --DRBN007
> >
> > FROM: Steve Reimers USNET(UTC -05:00)
> > Subject: RE: Speed control servo
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> clutch control function has degraded.
> >
> > Steve Reimers building 5 3C049
> > 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 Budzynski, Dan (D. FKOHL --FORDMAIL Kohl, Fred
> > (F.K.)
> > 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
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> >
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> > w.d.boyer@ieee.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
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> > -----Original Message-----
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> > Cc: dbudzynx@visteon.com; fkohl@gw.ford.com; sreimers@gw.ford.com
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> > Can you answer Steve questions?
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> > Regards,__ Fred Kohl, Precision Speed Control (Panther)
> > PROFS ID: FKOHL Phone TBD Pager (888) 377-6280
> > IBM Mail(USFMCBJZ)
> > Mailing Address: ETC C375
> > *** Forwarding note from SREIMERS--DRBN007 02/15/99 18:14 ***
> > To: FKOHL --DRBN007
> >
> > FROM: Steve Reimers USART(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 S 3C043
> > AVT Chassis E/E System Applications mail drop 5011
> > 39-03286 SREIMERS sreimers@ford.com fax 39-03286 ;>

NGSC

****
* Note printed by SREINERS on 15 Feb 1999 at 15:21:58 *
****

From: FKOHL --DRBN007 Date and time 02/15/99 10:51:04
To: SREINERS--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)
PROFS ID: FKOHL Phone TBD Pager (888) 377-6280
IBM Mail(USFMCBJS)
Mailing Address: ETC C375
*** Forwarding note from TSCHRODY--VISTEON 02/15/99 10:11 ***
To: FKOHL --FORDMAIL Kohl, Fred (F.H.)

From: Schrody, Thomas (T.F.)
Subject: RE: More Questions

We do not monitor the state of the clutch driver.

Regards,

Thomas Schrody
Product Design Engineer ETC, C-395
Precision Speed Control Tel: (313) 323-9695
Vistaon 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@vistaon.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)
> PROFS ID: FKOHL Phone TBD Pager (888) 377-6280
> IBM Mail(USFMCBJS)
> Mailing Address: ETC C375
> *** Forwarding note from SREINERS--DRBN007 02/15/99 08:57 ***
> To: FKOHL --DRBN007
>
> *** Reply to note of 02/15/99 08:21
> FROM: Steve Reiners USAET(UTC -05:00)

3713 1928

> 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
> ult code? Any action on FRACAS?
>
> Steve Reimers building 5 3C043
> AVT Chassis E/E System Applications mail drop 5011
> 39-03286 SREIMERS sreimers@ford.com fax 39-03286 ;>

NGSC

CLUTCH Circuit

Transient voltage and peak power in single 82 ohm resistor in clutch flyback circuit.

$j := 1..9$ R_{wj} := Minimum Winding Resistance $R_{ext} := 82$

I_{pkj} := Envelope of Max Current $L_{clamb} := 0.075$

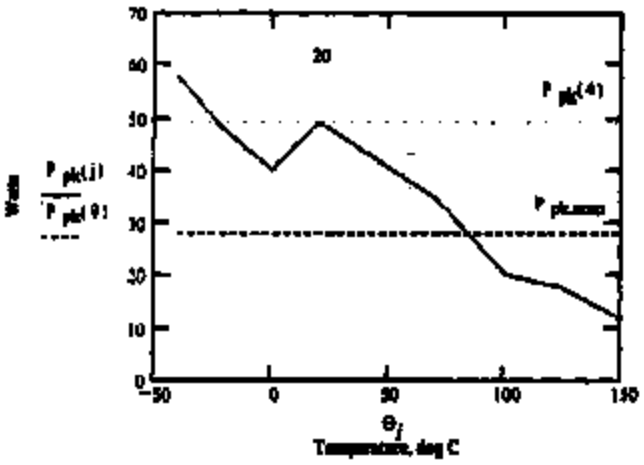
over worst case test voltage

j	Θ_j :=	R_{wj} :=	Vdc_{kj} :=	I_{pkj} :=	$P_{pk}(j) := (I_{pkj})^2 \cdot R_{ext}$	$R_{tot}(j) := R_{wj} + R_{ext}$	Total Peak Power, watts $P_{pk}(j)$	Peak Resistor Power, watts $P_{pk}(j)$	Θ_j
1	-40	17.5	15	0.839	57.721453	99.5	57.721453	57.721453	-40
2	-20	19.4	16	0.763	47.737838	101.4	47.737838	47.737838	-20
3	0	21.4	16	0.781	49.994882	103.4	49.994882	49.994882	0
4	20	23	19	0.776	49.377435	105	49.377435	49.377435	20
5	70	27.6	19	0.653	34.966528	109.6	34.966528	34.966528	70
6	100	30.3	16	0.499	20.418082	112.3	20.418082	20.418082	100
7	125	32.6	15	0.466	17.806792	114.6	17.806792	17.806792	125
8	150	34.8	14	0.391	11.807203	116.8	11.807203	11.807203	150
9	20	23.9	14	0.586	28.136472	105.9	28.136472	28.136472	20

$I_{pk.nom} := \frac{14}{23.9}$ $P_{pk.nom} := (I_{pk.nom})^2 \cdot R_{ext}$ $t_{clamb.nom} := \frac{L_{clamb}}{23.9 + R_{ext}} \cdot 1000$

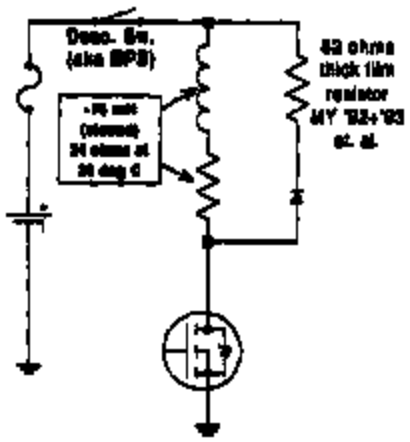
$I_{pk.nom} = 0.585774$ $P_{pk.nom} = 28.136782$ $t_{clamb.nom} = 0.736544$

$j := 1..8$



<—19 Vdc in @ 20 deg C
(min limit clutch resistance)

<—14 Vdc in @ 20 deg C
(nominal clutch resistance)



RECTANGULAR FLAT CHIP RESISTOR POWER DISSIPATION *(generic)*

$\theta := 0.5..175$

$Pd_{2512}(\theta) := \left[\theta < 70, 1000, 1000 - 8.0125 \cdot 1000 \cdot (\theta - 70)\right]$

$Pd_{2010}(\theta) := \left[\theta < 70, 500, 500 - 0.0125 \cdot 500 \cdot (\theta - 70)\right]$

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

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

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

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

$Pd_{0402}(\theta) := \left[\theta < 70, 63, 63 - 0.01818 \cdot 63 \cdot (\theta - 70)\right]$

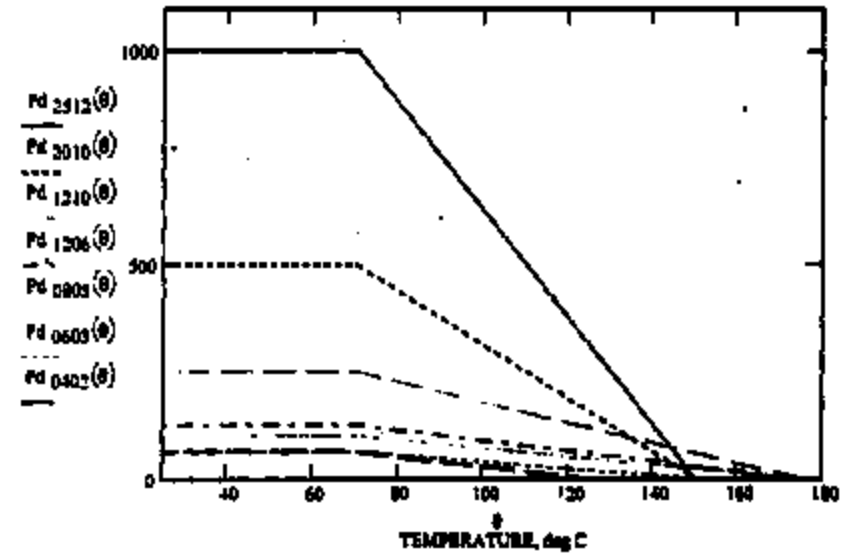


Figure 1.a:

Power derating curves for rectangular flat chip resistors.

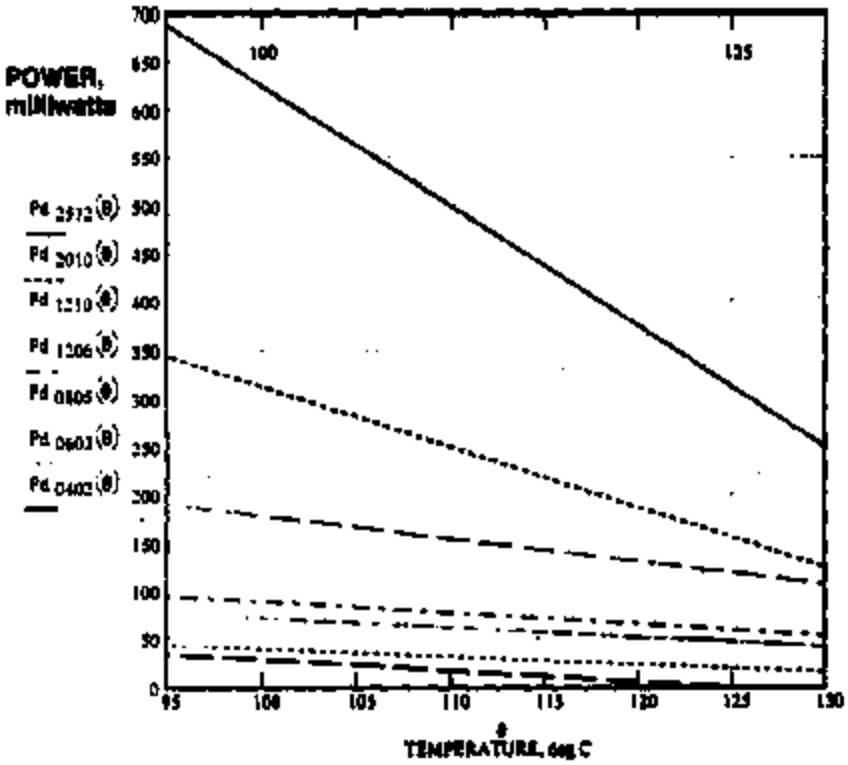


Figure 1.b:

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

$k := 1..7$

$Size_k :=$ **Power Capability, mw @125 C**

2512 $Pd_{2512}(125) = 312.5$

2010 $Pd_{2010}(125) = 156.25$

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 $Pd_{0402}(125) = 4.3 \cdot 10^{-3}$

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

$x := 0.02, 0.04 .. \sqrt{1180}$

$t_p(x) := x^2$

k	$Size_k :=$	$Y_{0.04_k} :=$	$Y_{10_k} :=$
1	2512	150	30
2	2010	75	20
3	1210	40	12.5
4	1206	22	8
5	0805	10.5	5.4
6	0603	6	3.8
7	0402	3	1.4

$m_k := \frac{\ln(Y_{10_k}) - \ln(Y_{0.04_k})}{\ln(10) - \ln(0.04)}$

m_k	$Y_{0.04_k}(25)^{m_k}$
-0.28545	38.69506
-0.34178	24.899084
-0.31066	20.302457
-0.19521	12.198591
-0.14745	8.3238
-0.13902	3.847804
-0.11585	2.879545

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

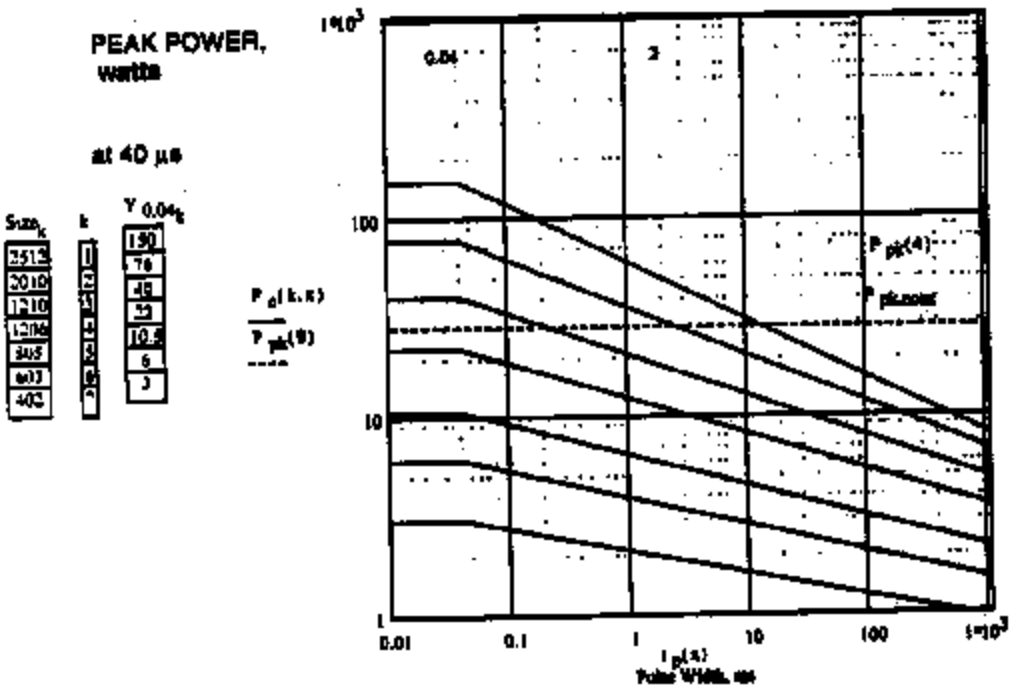
$$\ln(P_0) := m_k \cdot (\ln(t_p(x)) - \ln(0.04)) + \ln(Y_{0.04_k}) \quad m_k \left[\left(\frac{t_p(x)}{0.04} \right)^{m_k} \right] + \ln(Y_{0.04_k}) \quad m_k \left[\left[Y_{0.04_k} \cdot \left(\frac{t_p(x)}{0.04} \right) \right]^{m_k} \right]$$

$P_0 := Y_{0.04_k} \cdot (25 \cdot t_p(x))^{m_k}$

$P_1(k,x) := \left[t_p(x) \le 0.04, Y_{0.04_k} \cdot \left[Y_{0.04_k}(25)^{m_k} \right] \cdot t_p(x)^{m_k} \right]$

$P_0(k,x) := \left[t_p(x) < 1050, P_1(k,x), 10^{-10} \right]$

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



PULSE POWER RESISTOR CAPABILITY, watts at 1 and 2 ms

$Size_k$	$P_0(k,\sqrt{1})$	$P_0(k,\sqrt{2})$
2512	58.7	47.96
2010	34.9	29.51
1210	20.3	12.55
1206	13.3	10.74
805	6.22	5.67
603	3.85	3.5
402	2.08	1.92

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

$L_{clutch} = 0.078$ $R_{ext} = 82$ *ohms @ room temp.*

$\tau_{clutch}(j) := \frac{L_{clutch}}{R_{tot}(j)} \cdot 1000$ $i_{pk}(j,t) := I_{pk_j} \cdot \exp\left(\frac{-t}{\tau_{clutch}(j)}\right)$

$v_{pk}(j,t) := i_{pk}(j,t) \cdot R_{ext}$ *Plotting limits:* $i(j,t) := if(t \le 5.5, i_{pk}(j,t), .5000)$

$i_{nom}(t) := if(t \le 5.5, i_{nom,pk}(t), .5000)$ $v(j,t) := if(t \le 5.5, v_{pk}(j,t), .5000)$

j	$R_{tot}(j)$
0	99.8
1	101.4
2	103.2
3	105
4	109.8
5	112.3
6	114.8
7	116.8

$t := 0.2, 6.15 .. 6$ $\tau_{clutch.nom} := \frac{L_{clutch}}{23.9 + R_{ext}} \cdot 1000$

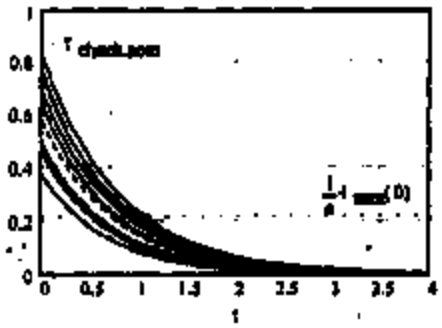
ohms @ various temps.

$\tau_{clutch.nom} = 0.736544$

$I_{nom,pk}(t) := \frac{14}{23.9} \cdot \exp\left(\frac{-t}{\tau_{clutch.nom}}\right)$

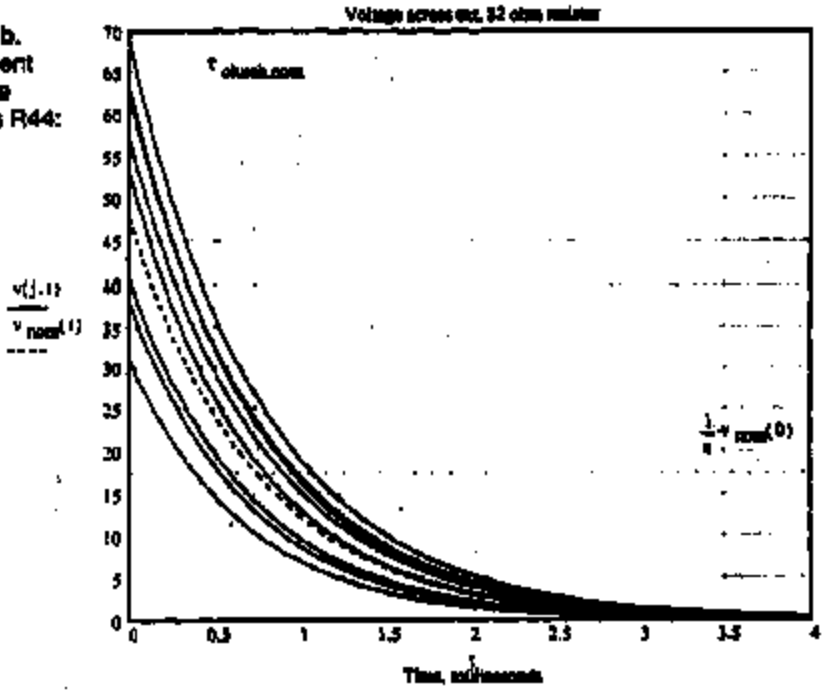
$v_{nom}(t) := if(t \le 5.5, R_{ext} \cdot i_{nom,pk}(t), .5000)$

Fig. 3.a. Transient clutch current



j	V_{dc_j}	Θ_j	R_{tot_j}	$I_{pk_j}(j,0)$	v(j,0)
0	16	-40	17.5	0.839	68.798
1	15	-20	19.4	0.768	63.566
2	14	0	21.3	0.701	57.485
3	13	20	23	0.776	63.615
4	12	70	27.7	0.857	70.348
5	11	100	34.8	0.499	40.918
6	10	120		0.466	38.212
7	9	150		0.381	31.242

Fig. 3.b. Transient voltage across R44:



Shown for worst case coil resistance and test voltage:

TEMP: PEAK VOLTAGE

j	Θ_j	v(j,0)	V_{dc_j}
0	-40	68.798	16
1	-20	63.566	15
2	0	57.485	14
3	20	63.615	13
4	70	70.348	12
5	100	40.918	11
6	120	38.212	10
7	150	31.242	9

Nominal Peak Voltage:

$v_{nom}(0) = 48.033473$ volts

$\tau_{clutch.nom} = 0.736544$ millisec.

$\tau_{clutch}(4) = 0.742857$ millisec.

$P_{pk.pk}(j,t) := i(j,t)^2 \cdot R_{ext}$

$P_{pk}(j,t) := if(t \le 5.5, P_{pk.pk}(j,t), .50000)$

$\frac{P}{R_{ext}\left(\frac{14}{23.9}\right)^2} = \exp\left[\frac{-t}{\tau_p} \cdot (23.9 + R_{ext})\right]^2 = \frac{1}{e}$

$P_{pk.nom}(t) := \frac{v_{nom}(t)^2}{R_{ext}}$ $P_{pk.nom}(t) := if(t \le 5.5, P_{pk.nom}(t), .50000)$

$\exp\left[\frac{-t}{\tau_p} \cdot (23.9 + R_{ext})\right]^2 = \frac{1}{e}$ whose solution for τ_p is

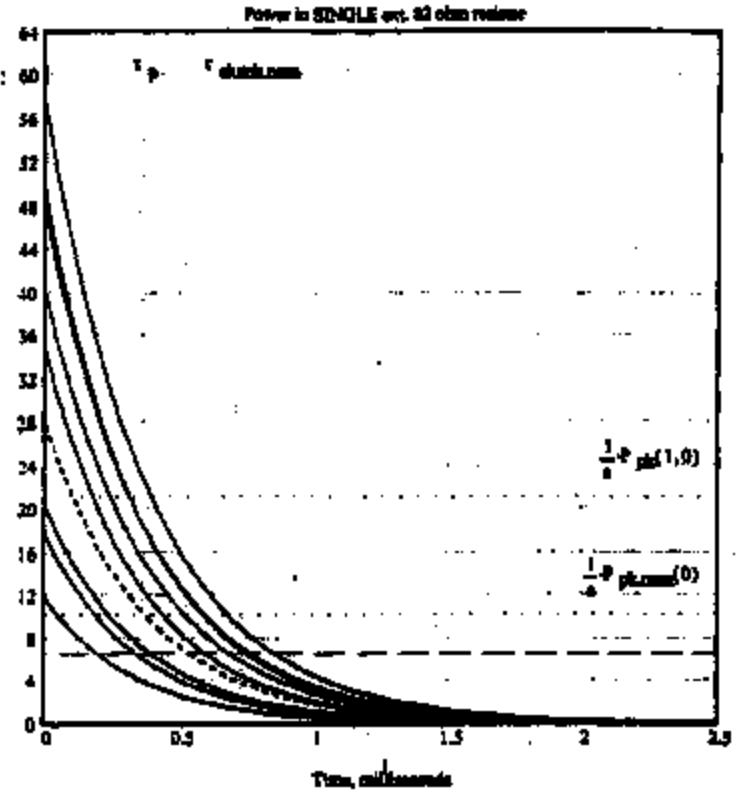
$$\left[\frac{.5000}{(.306410 + 0.0128205 \cdot R_{ext})} - 3.1415926535897932385 \cdot \frac{i}{(.306410 + 0.0128205 \cdot R_{ext})}\right]$$

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

$\tau_p := \frac{.5000}{.306410 + 0.0128205 \cdot R_{ext}}$ $\tau_p = 0.368272$ $R_{ext} = 82$

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

Fig. 4.8. Transient wer in R44:



$\tau_p = 0.365272$

Shown for worst case coil resistance and test voltage:

j	$V_{dc\,in_j}$	Θ_j	TEMP: TOTAL PEAK VOLTS $v(j,0)$	TOTAL PEAK WATTS $P_{pk}(j,0)$
0	16	-40	56.796	57.722
1	15.5	-20	53.566	52.778
2	15	0	50.445	48.109
3	14.5	20	47.431	45.378
4	14	70	44.526	42.968
5	13.5	100	41.729	39.418
6	13	125	39.039	36.207
7	12.5	150	36.457	33.329

Totals in resistor:

$P_{pk}(1,0) = 57.721522$

worst Case 16 Vdc @: -40 deg C

$P_{pk,nom}(0) = 28.136762$

@ Vdc.in = 14 volts

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

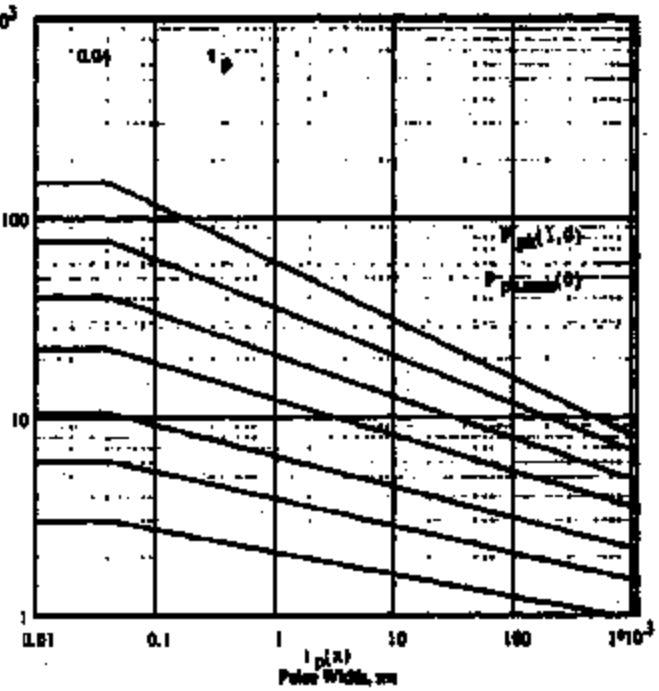
PEAK POWER, watts

at 40 µs

$Size_k$
2512
2010
1210
1206
805
603
402

$Y_{0.04_k}$
150
τ_p
40
20
10.5
$\frac{1}{e}$
7

$P_{pk}(1,x)$



$P_{pk,p}(j,x) := \min\left(t_{pk}(x)\cdot 1050, P_{pk}(j,0), 10^{10}\right)$ (limits for plotting only)

SINGLE 82Ω resistor

Peak power at time zero & worst case clutch resistance

$P_{pk}(1,0) = 57.721522$

Peak power at time zero & nominal clutch resistance

$P_{pk,nom}(0) = 28.136762$

PULSE POWER RESISTOR CAPABILITY, watts

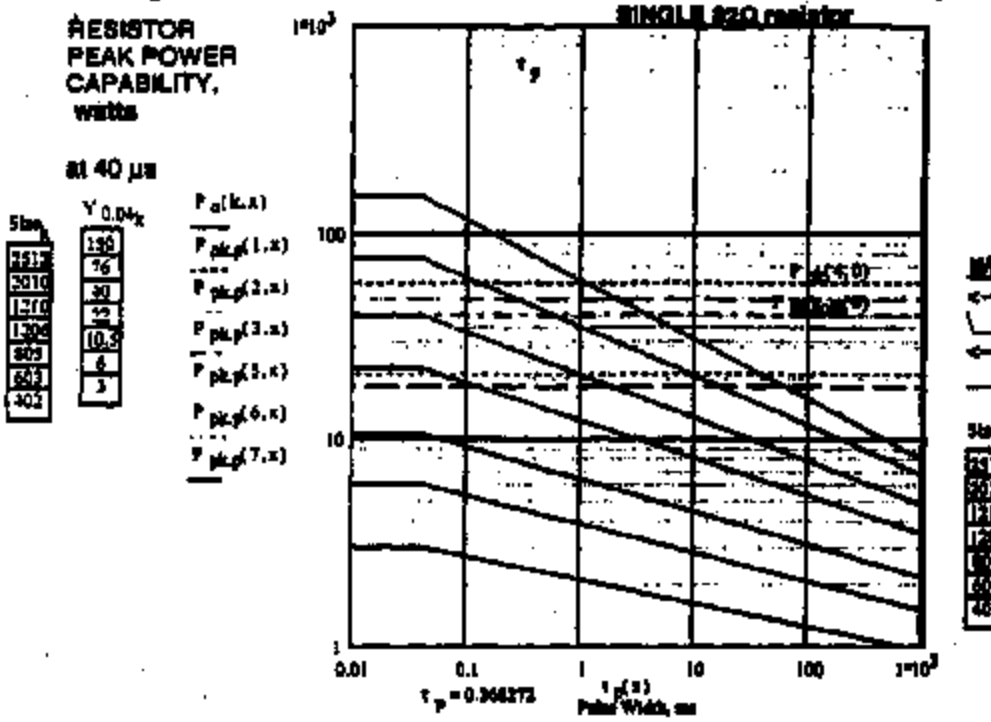
at τ_p

$Size_k$	$P_0\left(k_{sq}\sqrt{\tau_p}\right)$
2512	73.56
2010	44.43
1210	25.06
1206	14.65
805	7.4
603	4.45
402	2.23

Figure 6.a: **SINGLE PULSE PEAK POWER, watts vs. PULSE DURATION, ms**

RESISTOR PEAK POWER CAPABILITY, watts

at 40 µs



WORST CASE OVER TEMP. & VOLTAGE:

TEMP & VOLT. TOTAL watts

WORST CASE

<-15Vdc @ -40C
15Vdc @ 20C
<-14Vdc(nom)
16Vdc @ 125C

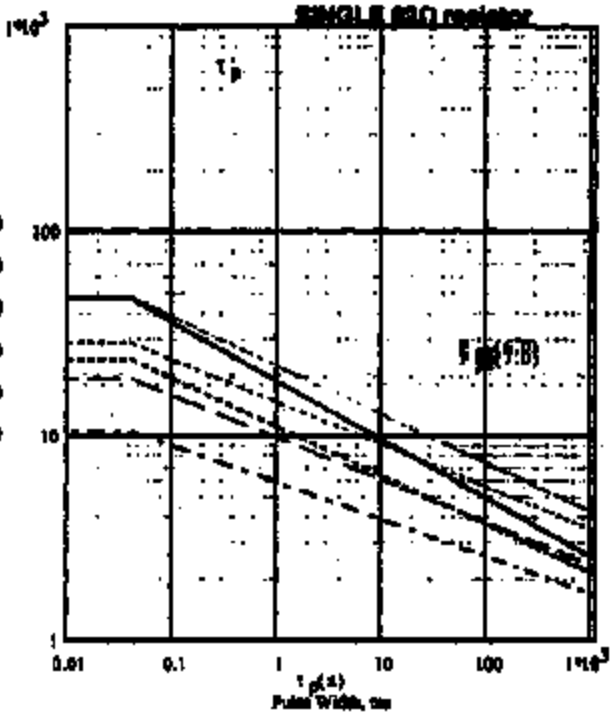
SINGLE 82Ω resistor

PULSE POWER RESISTOR CAPABILITY, watts

at $\tau_p = 0.366272$

Figure 6.b. **SINGLE PULSE PEAK POWER, watts (derated to 125 C) vs. PULSE DURATION, ms**

RESISTOR PEAK POWER CAPABILITY, (derated to 125 C) watts



WORST CASE OVER TEMP. & VOLTAGE:

TEMP & VOLT. TOTAL watts

SINGLE 82Ω resistor

PULSE POWER RESISTOR CAPABILITY, watts

at $\tau_p = 0.366272$

CABLE

Potential Failure Mode and Effects Analysis (Design FMEA)

System
Subsystem
Component: Multiconductor Control Cable

Design Responsibility: Vroom Speed Control Systems Engrg

Key Date

Model Year(s)/ Level: 1999 / All Models

Core Team: Joe Roberts, Tom Rodrigues, Tom Black, Jim Taylor (Detailer), John Brown (Facilitator), Amy Roberts (Asst)

FMEA Number:
Page 1 of 1
Prepared by:
FMEA Date (Orig.): 01.10.99 (Rev.): 08.08.99

Item / Function	Potential Failure Mode	Potential Effects of Failure	S e v	C l a s s	Potential Cause(s)/ Mechanism(s) Failure	O c c	Current Design Controls	D e t	R. P. N.	Recommended Action(s)	Responsibility & Target Completion Date	Actions Taken	S e v	O c c	D e t	R. P. N.
POWERTRAIN ASSY & W																
Transfers force and motion from motor to objects body and back -##-	Wire not transfer force and motion	Inoperative system if speed control not available	9		Inadequate plug/socket connection	3	Field Evaluation Units in use	1	27	No further actions required.						
					Conduit size more -strength -diameter -# of strands -inadequate lubrication	1	Field Evaluation Units in use	1	9	No further actions required.						
	Wire not transfer force/motion adequately	Poor performance if -slow response	5		-Improper wire strand specification -System query/function -improper connector specified type connect -inadequate dimensional clearance between wire size and and inner ## -(unintelligible) -Routing -Improper specified route dimension	1	Field Evaluation Units in use CS-FDVT-94XXX-AA Calibration Development Key Life Tests	1	5	No further actions required.						
	Wire not allow throttle to return to idle	Throttle is held if idle if -Cable wire is -Adjustment	10		Insufficient tension into bracket by design Assembly	1	Field Evaluation Units in use CS-FDVT-94XXX-AA Calibration Development Key Life Tests	1	10	1) Review control plans include on-going checks for insertion and removal forces. 2) Release the Components cable with mapping drawings.	1) Cable suppliers August 1998. 2) Trimline - 8/98 Trimbest - 12/98 Hi-Lux - 3/99					
				10	Over wear exists on items do wheels and driving -insufficient clearance -insufficient tooth runout/wear -insufficient protection against outer body	1	Field Evaluation Units in use CS-FDVT-94XXX-AA Calibration Development Key Life Tests	2	20	1) Update and to include a evaluations for wear over wide range. 2) Implement cable spec CS-FDVT-94XXX-AA	1) Penny Wilson, 6/1/99. 2) All system engineers, on-going					
				7C	Improper wear dimension specified	2	Field Evaluation Units in use CS-spec CS-FDVT-94XXX-AA Calibration Development Key Life Tests	1	28	Based on changes industry standards an assessment ranking of 8 and a reduction of 1 appears to be adequate at this time.						
				7C	Inadequate dimensional between the wire wire and tube -Slack Up)	1	Field Evaluation Units in use spec CS-spec-94XXX-AA Calibration Development Key Life Tests	1	28	Release the Component cable with mapping drawings.	Trimline - 6/98 Trimbest - Jayco Hi-Lux - 3/99					
Harness does moving accelerator control -##-	Does not generate adequate load applied	Impaired acceleration if	9		-Inconsistent Material Strength -Speed Rate -Tube connection -Excessive slack specified -Routing between three and other tube -Electronic	1	Field Evaluation Units in use CS-FDVT-94XXX-AA Calibration Development Key Life Tests	10	140	No further actions required.						

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Potential
Failure Mode and Effects Analysis
(Design FMEA)

System
Subsystem
X Component: [illegible] Flatpack Cable

Design Responsibility: Vickers Speed Control Systems Engrg Dept

FMEA Number:
Page 2 of 9
Prepared by:
FMEA Date (Orig.): 97.10.30 (Rev.): 98.08.08

Model Year/Vehicle(s): 1998 / All Ultima RTV

Core Team: Tom Bakken, Tom Anderegg, Tim Berk, Tim Taylor (Detroit), John Quach (Tradon), Jay Edwards (St-Leo)

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	C l a s s	Potential Cause(s)/ Mechanism(s) of Failure	O c c u r	Current Design Controls	D e t e c	R.P.N.	Recommended Action(s)	Responsibility & Target Completion Date	Actions Taken	S e v	O c c	D e t	R.P.N.
Hold supply pressure level at or just range of electric servomotor	Loss of supply pressure to valve (not flow) to allow full range of electric servomotor movement	Higher than expected offset (10) for Ultima 14x Degraded cable function -Electric motor not able (10)	10	YC	Incorrect tolerance stack-up	1	Field Evaluation Units SS spec ES-FDVC-98025-AA Calibration Development Key Life Tests Stack-up Study	2	20	1) Ensure updated plane symbols on-going change for operation and control focus. 2) Release the Temperate cable with snap-in harness. 3) Add digital chart ????	1) While supplier Report 1998. 2) Validation - 9/98 Prodmat - 10/98 Bi-Lev - 3/99 3) Corey Holder, 8/31/98 ???					
				YC	Inadequately defined part dimension -core wire cross length conductor length -conduit and mold depth -gage dimension	1	Field Evaluation Units SS spec ES-FDVC-98025-AA Calibration Development Key Life Tests	3	30	Update Design Guide	Corey Holder. 8/31/98					
				YC	Inadequately defined package requirements -material specific	1	Field Evaluation Units SS spec ES-FDVC-98025-AA Calibration Development Key Life Tests	2	20	Update Design Guide	Corey Holder. 8/31/98					
Meet pressure and flow accuracy duty fore requirement -see Table	Does not provide adequate seal to valve	System #1 & #2 -Contaminate to servo -Not able hold off pressure -Degrade system function (8)	10	YC	Improper seal material selection -poor resistance -wrong durometer -composition unknown	1	Field Evaluation Units SS spec ES-FDVC-98025-AA Water Spray Test ASTM Durability	4	40	Add salt spray / corrosion test to specific ASTM	Mike Stephanski. 8/30/98					
				YC	Improper compression -tolerance stack-up	1	Field Evaluation Units SS spec ES-FDVC-98025-AA Water Spray Test ASTM Durability	4	40	Add salt spray / corrosion test to specific ASTM	Mike Stephanski. 8/30/98					
				YC	Mating surface -gouging -surface condition -surface size	1	Field Evaluation Units SS spec ES-FDVC-98025-AA Water Spray Test ASTM Durability	4	40	Add salt spray / corrosion test to specific ASTM	Mike Stephanski. 8/30/98					
				YC	Improper retention features -use of pressure seal	1	Field Evaluation Units SS spec ES-FDVC-98025-AA Water Spray Test ASTM Durability	3	30	Based on current industry standards an Occurrence rating of 1 and a detection of 2 appear to be adequate at this time.						
				YC	conditions exists to cause leaking feature -breaks	1	Field Evaluation Units SS spec ES-FDVC-98025-AA Water Spray Test ASTM Durability	2	20	Based on current industry standards an Occurrence rating of 1 and a detection of 2 appear to be adequate at this time.						
Meet pressure valve sensory case cable condition -see Table	Does not provide sensor supply into cable	-System temp (5) -Contaminate to cable -Electric motor not able (10) -Degraded system function (8)	10	YC	Improper cable component for cable orientation	1	Field Evaluation Units SS spec ES-FDVC-98025-AA Water Spray Test ASTM Durability	1	10	Based on current industry standards an Occurrence rating of 1 and a detection of 2 appear to be adequate at this time.						

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Potential
Failure Mode and Effects Analysis
(Design FMEA)

System
Subsystem
Component: [illegible] Speed Control Cable

Design Responsibility: Cruise Speed Control Systems Engr

Key Date:

FMEA Number:
Page 1 of 5
Prepared by:
FMEA Date (Orig.): 07.10.20 (Rev.): 08.06.05

Model Year/Vehicle(s): 1998 - All 8500s, 9's

Core Team: Jim Dobson, Tom Hutchyski, Tim Hock, Tim Tighe (Electrical), John Black (Trident), Guy Roberts (Marion)

Item	Potential Failure Mode	Potential Effect(s) of Failure	S e v	Potential Cause(s)/ Mechanism(s) Failure	O c c	Current Design Controls	D e t	R P N	Recommended Action(s)	Responsibility & Target Completion Date	Action Taken	S e v	O c c	D e t	R P N
				1* Improper clearance between core wire OD and vapor cap ID	1	Field Evaluation Tests ES spec ES-F9HF-9A825-AA Water Spray Test HPR Durability	2	20	Based on current industry standards an occurrence rating of 2 and a detection of 2 appear to be adequate at this time.						
Must last for life of vehicle under normal operating conditions 10 yrs. 150,000 mi	Does not lock in core of vehicle	-Customer dissatisfaction -degraded (6) -Increased warranty costs (6)	6	2- Improper cable material selection	1	Field Evaluation Tests ES spec ES-F9HF-9A825-AA Key Life Tests HPR Durability	1	6	No further actions required.						
				3 Improper lubrication specification Type II (grease (2)	2	Field Evaluation Tests ES spec ES-F9HF-9A825-AA Key Life Tests HPR Durability	2	24	Review information again	Mike Hargreaves 5/31/98					
				3A Liner wear material (1) Load vs Time (5)	1	Field Evaluation Tests ES spec ES-F9HF-9A825-AA Key Life Tests HPR Durability	1	5	No further actions required.						
				4 Improper routing specified	1	Field Evaluation Tests ES spec ES-F9HF-9A825-AA Key Life Tests HPR Durability Design Hot Dock Review	1	6	No further actions required.						
				5 Environmental Corp/ Abrasive material water conditions not stated	1	Field Evaluation Tests ES spec ES-F9HF-9A825-AA Key Life Tests HPR Durability	3	18	No further actions required.						
				6 Insufficient clip/bracket retention	1	Field Evaluation Tests ES spec ES-F9HF-9A825-AA Key Life Tests HPR Durability	1	6	No further actions required.						
				7. Insufficient conduit fitting retention	2	Field Evaluation Tests ES spec ES-F9HF-9A825-AA Key Life Tests HPR Durability	1	6	No further actions required.						
				8. Core wire [illegible] relationship	3	Field Evaluation Tests ES spec ES-F9HF-9A825-AA Key Life Tests HPR Durability	1	6	No further actions required.						
				9. Insufficient pull off of end fitting -into bracket	1	Field Evaluation Tests ES spec ES-F9HF-9A825-AA Key Life Tests HPR Durability	1	5	No further actions required.						
				10 Assembly -bottom up	1	Prototype Builds	3	30	No further actions required.						
Must be easily assembled -no problem load bar -cable -cable load -throttle bracket	Not easy to assemble Interference -excessive force -ergonomics	-Slowed production (5) -Damage during assembly (6) -Quality repair (10) -Rigid/Leftover system (6) -Vehicle fails off rate (10)	10	10 Improper material specification for core or conduit	1	ES spec ES-F9HF-9A825-AA Prototype Builds	2	20	Based on current industry standards an occurrence rating of 1 and a detection of 2 appear to be adequate at this time.						
				Inadequate packaging of system in vehicle	2	ES spec ES-F9HF-9A825-AA Prototype Builds	2	40	Occurrence number reflects the inadequate data to support design change. Verify change effectiveness through warranty.	Mike Hargreaves 5/98	Warranty review indicates a significant reduction in this failure mode.	10	1	8	80

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File name : fmea_sbl.wpg

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8713 1998

Potential
Failure Mode and Effects Analysis
(Design FMEA)

System
Subsystem
X_Component: [illegible]

Design Responsibility: Vacuum Spool Control Systems Engrg

Key Date:

FMEA Number:
Page 1 of 3
Prepared by:
FMEA Date (Orig.): 97.10.30 Rev.): 98.06.05

Model Year/Vehicle(s): 1998 / All Models

Core Team: Bob Feldman, Tom Goldsmith, Tim Jones, Eric Tigue (Facilitator), John Roach (Student), Jay Roberts (Mr.Lee)

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	C l a s s	Potential Cause(s)/ Mechanism(s) of Failure	O c c u r	Current Design Controls	D e t e c t	R.P.N.	Recommended Action(s)	Responsibility & Target Completion Date	Action Taken	S e v	O c c u r	D e t e c t	R.P.N.
	Not easy to assemble electrical connector into receptacle	Allowed production (1) damage during assembly (2) operator injury (3) hydrostatic system (4) inaccurate hold off time (5)	10	IV	Improper selection geometry of snap in feature	2	DS spec XX-YYYY-ZZZZ-AA Prototype Builds	2	40	1) Always control plane analysis on-going checks for insertion and removal forces.	(1) Cable suppliers August 1998.					
										2) Release the connector cable with snap-in feature.	2) Tolerance - 0/05 Tolerance - 10/05 Mr.Lee - 5/05					
					Orientation of locators	2	DS spec XX-YYYY-ZZZZ-AA Prototype Builds	2	40	Interfaces with receptor designers on early in program development to assemble.	Design Systems Eng Application, on-going					
					Inadequate packaging of system on vehicle	3	DS spec XX-YYYY-ZZZZ-AA Prototype Builds	2	24	No further actions required.						
	Can may be assembled into [illegible]	Allowed production (1) damage during assembly (2) system/hydrostatic [illegible]	2		Improper insertion geometry of snap in feature	2	DS spec XX-YYYY-ZZZZ-AA Prototype Builds	2	24	No further actions required.						
					Improper material specification	2	DS spec XX-YYYY-ZZZZ-AA Prototype Builds	2	24	No further actions required.						
					Insufficient thumb pad size	2	DS spec XX-YYYY-ZZZZ-AA Prototype Builds	2	24	Verify with Chamber plant [illegible]	Larry Lorey 08/15/97					
Part cannot change during assembly and function	Damage during shipping and handling	System is [illegible] inaccurate hold off time (10) Expected system function [illegible] cannot assemble	10	IV	Incorrectly specified change	1	DS spec XX-YYYY-ZZZZ-AA Prototype Builds	9	180	Release plastic bags to assure below specs. Need to verify effectiveness & solution after 2 weeks.	Larry Lorey, April 1998					
					Incorrect orientation and quantity of cables in containers	2	DS spec XX-YYYY-ZZZZ-AA Prototype Builds	4	80	Based on current industry standards on connectors sealing of 1 and a tolerance of 2 appears to be adequate at this time.						
					Inadequate case seals to slot retention	2	DS spec XX-YYYY-ZZZZ-AA Prototype Builds	2	40	Modify shipping pkg.	Tolmat, 5/31/98					
					Inadequate leak-resistance	1	DS spec XX-YYYY-ZZZZ-AA Prototype Builds	2	20	Based on current industry standards on connectors sealing of 1 and a tolerance of 2 appears to be adequate at this time.						
					Inadequate crush resistance of components	1	DS spec XX-YYYY-ZZZZ-AA Prototype Builds	2	20	Based on current industry standards on connectors sealing of 1 and a tolerance of 2 appears to be adequate at this time.						
Part is unavailable [illegible]	Not easily serviceable	-Increased service time/cost -Customer irritation -Loss of customer loyalty	4		Improper packaging	2	Prototype Builds Design Val Shock Vacuum Service Trials	2	16	No further actions required.						
					Inadequate assembly/installation instructions defined	1	Prototype Builds Service Trials	2	20	No further actions required.						

Prepared on : 98.07.06 08:15:03

File name : fmea_ch3.mmm

Produced by QUEQuine for Windows Version 3.1

Potential
Failure Mode and Effeccs Analysis
(Dasign FMEA)

System
Subsystem
Component: Altitude/Speed Control Cable

Design Responsibility: Cruise Speed Control Systems Engrg

Model Year/Vehicle(s): 1990 - ALL Vikes Mfr

Key Date:

FMEA Number:
Page 1 of 3
Prepared by:
FMEA Date (Orig.): 97-10-30 (Rev.): 98-06-09

Cable Type, Anti-Rotate, Cam Backgrounds, Tps Back, Tps Trigger Threadform, Idle Attach (Tabbed), Key Reference (Pc-Low)

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	C l a s s	Potential Cause/Mechanism of Failure	O c c u r	Current Design Controls	D e t e c t i o n	R. P. N.	Recommended Action(s)	Responsibility & Target Completion Date	Action Results: Actions Taken	S e v	O c c u r	D e t e c t i o n	R. P. N.
					Removal of cable not intuitive	3	Prototype Builds Design Val Road Reviews Engineer Tribals	3	24	No further actions required.						

Printed on : 97.11.06 08:18:01

File name : fmea_d02.rep

Produced by DFMEApak for Windows Version 2.1

****
* Note printed by SREIMERS on 15 Feb 1999 at 08:57:49 *
****

From: FKOHL --DRBN007 Date and time 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(USFMCBJZ)
Mailing Address: ETC C375
*** Forwarding note from TSCHRODY--VISTEON 02/15/99 06:41 ***
To: FKOHL --FORDMAIL Kohl, Fred (F.H.)

From: Schrody, Thomas (T.P.)
Subject: RE: More Questions

The time required to open the clutch via the Speed Control Amplifier varies. When the BOO 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 Schrody
Product Design Engineer ETC, C-395
Precision Speed Control Tel: (313) 323-9698
Visteon Automotive Systems Fax: (313) 322-2529

> -----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 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 held 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 is we get a De-act switch signal?
>
> Regards,__ Fred Kohl, Precision Speed Control (Panther)
> PROFS ID: FKOHL Phone TBD Pager (888) 377-6280
> IBM Mail(USFMCBJZ)
> Mailing Address: ETC C375
> *** Forwarding note from SREIMERS--DRBN007 02/09/99 18:08 ***

> To: FRONL --DRBN007
>
> FROM: Steve Reimers USART(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 ECC turns off the clutch
> drive
> output and when the Brake P switch opens?
> thanks,
>
> Steve Reimers building S 3C043
> AVT Chassis E/E System Applications mail drop S011
> 39-03286 SREIMERS sreimers@ford.com fax 39-03286 ;>

4/2/97

Potential
Failure Mode and Effects Analysis
(Design FMEA)

3713 1943

Potential
Failure Mode and Effects Analysis
(Design FMEA)

Ford

System
Subsystem
Component: Potential Vehicle Speed control Subsystem (PSCS)

Design Responsibility: Vehicle Speed control System Engineering

Model Year/Vehicle(s): 1997 / Contour/Mystique

Key Date

Core Team: Pat Patel, Jerry Lowry, Sam Palmisa, Dustin Brooks, Mark Friedrich

FMEA Number:
Page 1 of 01
Prepared by:
FMEA Date (Orig.): 1997.02.14 (Rev.): 1997.09.14

Item/Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	Class	Potential Cause(s)/ Mechanism(s) Failure	O c c	Current Design Controls	D e t	R.P.N.	Recommended Action(s)	Responsibility & Target Completion Date	Action Taken	S e v	O c c	D e t	R.P.N.
			8		Valve improper into the servo-transmit -cap loose plate -supplier to selector rod -cable to selector -connection -servo clevis -servo rod seal	3	1 EE-DFF Control 2 EEC/scale control 3 operational Gauge	3	72	Add milestone gat to the sup services.	Chris Thibodeau to verify 9-1-97	Implemented March 1997	8	3	3	72
										Implemen a cost Push tags at both north Dana and Plten.	Chris Thibodeau 9-1-97	Initial Acquisition at South Plten Implemented June 1997	8	3	3	72
										Investigate using shim epoxy in combination with a vacuum system to check gaps.	Chris Thibodeau 8-1-97	Implemented July 1997	8	3	3	72
										Investigate adding bushing to motor arm and sleeve.	Dave Barker 8-1-97	Implemented June 1997	8	3	3	72
										Investigate adding rubber bush to bushing servo assembly.	Sam Kim 8-15-97	Implemented additional sil gel and white epoxy the rubber bush	8	3	3	72
					11 PCV voltages wrong -open -short	4	1 EE-DFF Control 2 EEC/SCCEL Control 3 Operational Gauge	3	36	The assessment of 4 be done only because or incomplete data values. Even data the needed before the assessment making can be forecast.	Sam Palmisa 10-1-97					
Does not maintain the set speed. -accelerates at an abnormal rate -maintains speed the extreme of the switch -decelerates beyond extreme of the switch -it out of control	Customer experiences loss of confidence in system-to -unpredicted safety issue -excessive override required	10		1A Cable disconnected at servo pulley -cracked bracketry	4	1 Automatic Annihilation 12 Demonstration Methodology 20 Combined Durability 24 Production Gauging Design 25 Sub Process Check Device -white inspection strips on cable -assembly fixture Augmentin 26 Automatic cable Assembly to Throttle Lever Bracket/Throttle Body Package, "Push On / Pull Off" Effects	4	128	Conduct DFE for improvement on the failure mode and effect findings.	Sam Palmisa 10-10-97					
										Implement a Design cross-fun assembly cable to improve resistance to fraying.	Sam Palmisa to verify 10-1-97	Implemented June 1997. Sam data still needed to further evaluate results.	10	2	2	40
										Use to discuss Safety issues, at end of line assembly and dyn test can be added to the process sheets.	Application Engineers the work Sam Kim Palmisa 9-15-97	Initial implementation to date. 100% by September 1997	10	2	2	40
				1C Cable disconnected at throttle body	2	1 Automatic Annihilation 12 Demonstration Methodology 20 Combined Durability 24 DFE Process Check Device 25 DFE Process Approval 26 End of Line Test (EOL)	2	80	Based on enough Safety standards be consistent having of 1 and a detection of 8 appear to be dangerous as data line.						
				1C Cable DFE stated on the application bracket	2	1 Automatic Annihilation 12 Verification Methodology 20 Combined Durability 24 DFE Process Check Device 25 DFE Process Approval 26 Assembly Detection and Mis Verification Gauges 27 End of Line Test (EOL)	2	80	Implement the subject cable bracket assem inspection and add to the process sheets.	Application Engineers the work Sam Kim Palmisa 9-15-97	Revised action as it an subject Customer Complaint for implementation starting September 1997.				

3713 1944

Filename:
C:\Program Files\Ford\FMEA 3-0 Pro

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Potential
Failure Mode and Effects Analysis
(Design FMEA)

Ford

Sponsor:
Subsystem:
Component: Automatic Vehicle Speed Control Subsystem (AVC)

Design Responsibility: Vistron Speed Control System Engineering
Key Date:

Model Year/Vehicle(s): 1992 / Programwagon
Core Team: Pat Ryback, Henry Lathrop, Sam Rubadue, Kristen Woodin, Mark Friedrich

Date (Orig.): 1989.03.28 (Rev.): 1997.10.30
Prepared by:
Page 3 of 10
Date Number:

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	Potential Cause(s)/ Mechanism(s) of Failure	O c c	Current Design Controls	D e t	R.P.N.	Recommended Action(s)	Responsibility & Target completion Date	Actions Taken / Resulting Value	S e v	O c c	D e t	R.P.N.
				Stop pedalboard brackets	3	A Automatic Identification C2 Constructive Methodology D0 combined Durability E2 DOE Process Check Review E5 DOE Process Approval G1 End of Line Test (EOL)	4	96	Implement a maximum step on A torque wave value evaluation cable to prevent misinstallation.	Ken Schmidt to verify 10-1-97	Implemented June 1997	10	04	4	160
				Cable pinched in conduit	3	A Automatic Identification C2 Constructive Methodology D0 combined Durability E2 DOE Process Check Review E5 DOE Process Approval G1 End of Line Test (EOL)	3	90	Implement a new cable specification which includes a load test on the conduit.	Ken Kim 7-1-97	Validation testing on going. See completion date 12/31/97				
				Cable crossbracing defects -frayed cross wire -kinked cross wire -kinked conduit wire -excess slack in cable -excess slack in tooth motion design -inadequate cable lubrication	2	A Automatic Identification C2 Constructive Methodology D0 combined Durability E2 DOE Process Check Review E5 DOE Process Approval G1 End of Line Test (EOL)	3	60	Implement a new cable specification for enhanced product validation. Implement a longer wave wire retention cable to improve resistance to pinching.	Ken Kim 7-1-97 Ken Schmidt to verify 10-1-97	Validation testing on going. See completion date 12/31/97 Implemented 2000 1997. Some wire cable needed to further evaluate results.	10	03	3	90
				Cable fingers into wire harness	3	D0 combined Durability E4 Splash Protection E6 Windshield Water Wash - Car Wash Test	3	90	Wave processing with the accelerator controls for the cruise tests 200 and 250 be modified to consist of the wire wave wire wave test.	Engineering engineers who work Ken Kim Schmidt 10-30-97	Process Audit updated to methods and procedures	10	3	3	90
									Implement a cable design standard that ensures that cruise control function into cable. -bending cable attitude.	Engineering engineers that work Ken Kim Schmidt 10-1-97	Check of new cable specification. See completion 12/31/97				
									Implement an accelerated grease wear wash test.	Lenny Lathrop 9-15-97	Check of Accelerometer Electronic test. 12-97	10	3	3	90
				Cable fingers into the cruise harness -top base plate -rubber to retainer seal -cable to retainer connection -water climate -water can wash	3	A Automatic Identification C2 Constructive Methodology D0 combined Durability E4 Splash Protection E6 Windshield Water Wash - Car Wash Test G0 Corrosion Protection	4	96	Implement an accelerated grease wear wash test.	Lenny Lathrop 9-15-97	Check of Accelerometer Electronic test. 12-97	10	3	4	120
									Add silicone and to the cap overtime.	Chris Schneider to testing 9-1-97	Implemented March 1997	10	3	4	120
									Implement a 5000 wash test on both weight Pass and Wilson.	Chris Schneider 9-1-97	Electrical Inspection at North Penn Implemented June 1997	10	3	4	120
									Investigate using white epoxy in combination with a cruise system to absorb gaps.	Angie Schneider 9-1-97	Implemented July 1997	10	3	4	120
									Investigate adding sealable to outer rim and sleeve.	Ken Porter 9-1-97	Implemented June 1997	10	3	4	120
									Investigate using rubber boot to housing cover assembly	Ken Kim 9-15-97	Implemented additional oil gel load white epoxy (in rubber boot	10	3	4	120

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Filename:

Potential
Failure Mode and Effects Analysis
(Design FMEA)

Ford

X Subsystem
__Component: Automatic Vehicle Speed Control Subsystem (VSC)

Model Year/Vehicle(s): 1999 / Contour/Mystique

Core Team: Phil Hudak, Kelvy Kelvey, Jon Kobain, Bruce Brenda, Mark Friedrich

Design Responsibility: Transaxle Speed Control System Engineering

Key Date:

FMEA Number:
Page 4 of 40
Prepared by:
FMEA Date (Orig.): 1999.09.13 (Rev.): 1997.10.10

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	Potential Cause(s)/ Mechanism(s) of Failure	O c c	Current Design Controls	D e t	R. P. N.	Recommended Action(s)	Responsibility & Target Completion Date	Action Taken	A c t i o n R e s u l t s: S e v	O c c	D e t
				VSC non-compatibility	1	21 Vehicle Sim	2	84	Because of the low occurrence and detection ratings, the team has determined that no further actions are required.					
				Customer misapplication of Cruz product	2	No controls for this cause.			This item has been determined to be a cause of concern outside of the control of the speed control design team.					
				"Sticky" steering wheel switch	1	1 SS-SFF Control 10 Attributes, control 16 CAGEP Control 9 Schematic Examination 13 Functional Redundancy	3	252	It has been determined that this cause is outside of the control of the speed control design team. However, we will investigate with the steering wheel design team.					
				Improper levers -binding of mechanical components -bearing stress -inadequate sliding -bearing misalignment -inadequate bearing retainer -pulley not pushed on shaft -incorrect pinion rotation -fatigue	1	9 Schematic Examination 13 Functional Redundancy 20 Combined Durability 54 DES Process Sheet Review 55 DES Process Approval 63 End of Line Test (EOL)	4	84	Because of the low occurrence and detection ratings, the team has determined that no further actions are required.					
				Incorrectly scale the speed sensor input	1	12 Schematic Examination 9 Steady State Control 13 Functional Redundancy 20 Combined Durability 46 Design Compatibility System 54 DES Process Sheet Review 63 End of Line Test (EOL)	2	28	Because of the low occurrence and detection ratings, the team has determined that no further actions are required.					
				Improper speed sensor output	1	12 Schematic Examination 9 Steady State Control 13 Functional Redundancy 20 Combined Durability 46 Design Compatibility System 54 DES Process Sheet Review 63 End of Line Test (EOL)	2	28	Because of the low occurrence and detection ratings, the team has determined that no further actions are required.					
	Does not maintain desired speed the set speed on a level road.	Desired level of speed control performance	8	Speedometer variability -stability -accuracy -hysteresis	1	9 Steady State Control 11 Functional Redundancy 17 Performance Stability 20 Combined Durability	2	16	No further actions required.					
				Improper amplifier calibration	2	9 Steady State Control 11 Functional Redundancy 17 Performance Stability 20 Combined Durability	2	32	No further actions required.					

3713 1946

Filename:
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Registered to: Milligan Bear

Potential
Failure Mode and Effects Analysis
(Design FMEA)

Ford

System
Subsystem
Component: Automatic Vehicle Speed Control Subsystem (VSC)

FMEA Number:
Page 1 of 66
Prepared by:

Design Responsibility: Vehicle Speed Control System Engineering

Model Year/Vehicle(s): 1993 / FUSION/MONDEO

Key Date:

FMEA Date (Orig.): 1987.03.12 (rev.): (1987.10.30

Core Team: Pat Schuh, Kathy Lathrop, Ken Gabriel, Bradley Brooks, Mitch Ortenlight

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	C l a s s	Potential Cause(s)/ Mechanism(s) of Failure	O c c	Current Design Controls	D e t	R.P.N.	Recommended Action(s)	Responsibility & Target Completion Date	Actions Taken	S e v	O c c	D e t	R.P.N.
					Degraded speed signal performance	2	9 Steady State Control 11 Functional Evaluation 12 Performance Stability 20 Combined Capability		3	54 No further actions required.						
					EMC incompatibility	1	9 Steady State Control 11 Functional Evaluation 12 Performance Stability 20 Combined Capability 21 Validate EMC		3	63 No further actions required.						
					Transmission calibration interaction	3	9 Steady State Control 11 Functional Evaluation 12 Performance Stability 20 Combined Capability		6	324 No further actions required.						
					"Sticky" mechanisms -throttle bodies -speed control cables -accelerator cables -linkages	3	9 Steady State Control 11 Functional Evaluation 12 Performance Stability 20 Combined Capability		3	54 No further actions required.						
	Does not maintain "desired" level of speed (do not speed up or control) performance-2 buttons	9	Speedometer variability -scaling -accuracy -hysteresis	3	9 Steady State Control 11 Functional Evaluation 16 Allowable Speed Loss on Grade 17 Performance Stability 20 Combined Capability		3	54 No further actions required.						
					Improper amplifier calibration	3	9 Steady State Control 11 Functional Evaluation 16 Allowable Speed Loss on Grade 17 Performance Stability 20 Combined Capability		3	54 No further actions required.						
					Degraded speed signal performance	2	9 Steady State Control 11 Functional Evaluation 16 Allowable Speed Loss on Grade 17 Performance Stability 20 Combined Capability		3	54 No further actions required.						
					EMC incompatibility	1	9 Steady State Control 11 Functional Evaluation 16 Allowable Speed Loss on Grade 17 Performance Stability 20 Combined Capability 21 Validate EMC		3	63 No further actions required.						
					Powertrain calibration interaction	3	9 Steady State Control 11 Functional Evaluation 16 Allowable Speed Loss on Grade 17 Performance Stability 20 Combined Capability		3	54 No further actions required.						
					"Sticky" mechanisms -throttle bodies -speed control cables -accelerator cables -linkages	3	9 Steady State Control 11 Functional Evaluation 16 Allowable Speed Loss on Grade 17 Performance Stability 20 Combined Capability		7	378 No further actions required.						

Filename:
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3718 1947

Potential
Failure Mode and Effects Analysis
(Design FMEA)

Ford

System
E Subsystem
Component Automatic Vehicle Speed Control Subsystem (PSCS)

Model Year/Vehicle(s) 1998 / ESCORT/ZX2

Core Team Pat Hubbell, Larry Lehmann, Ray Ephraim, Prentis Hyman, Mark Friedrich

Design Responsibility: Vehicle Speed Control System Engineering

Key Date

FMEA Number:
Page 1 of 20
Prepared by:
FMEA Date (Orig.): 1997.02.12 (Rev.): 1997.10.09

Item / Function	Potential Failure Mode	Potential Effects of Failure	S e v	C l a s s	Potential Cause(s)/ Mechanism(s) Failure	O c c u r	Current Design Controls	D e t.	R.P.N.	Recommended Actions	Responsibility & Target Completion Date	Results Actions Taken	S e v	O c c	D e t	R.P.N.
					Incorrect Throttle sensitivity	1	9 Steady State Control 11 Functional Evaluation 16 Allowable Speed Loss vs Grade 17 Performance Stability 20 Control Durability	2	36	No further actions required.					
					Throttle cable slack	3	9 Steady State Control 11 Functional Evaluation 16 Allowable Speed Loss vs Grade 17 Performance Stability 20 Control Durability	4	96	No further actions required.					
	Does not maintain the set speed on a incline	Reduced level of speed control performance-5	5		Speedometer variability -pulsility -accuracy -hysteresis	3	9 Steady State Control 11 Functional Evaluation 17 Performance Stability 20 Control Durability	2	90	No further actions required.					
					Amplifier amplifier calibration	2	9 Steady State Control 11 Functional Evaluation 17 Performance Stability 20 Control Durability	7	70	No further actions required.					
					Degraded speed signal performance	2	9 Steady State Control 11 Functional Evaluation 17 Performance Stability 20 Control Durability	7	70	No further actions required.					
					Vac incompatibility	1	9 Steady State Control 11 Functional Evaluation 17 Performance Stability 20 Control Durability	2	18	No further actions required.					
					Powertrain calibration interaction	1	9 Steady State Control 11 Functional Evaluation 17 Performance Stability 20 Control Durability	2	36	No further actions required.					
					-Binding mechanism -Throttle Cables -Speed control cable -Accelerator cable -Linkages	2	9 Steady State Control 11 Functional Evaluation 17 Performance Stability 20 Control Durability	2	88	No further actions required.					
					Throttle/Linkage cable slack	3	9 Steady State Control 11 Functional Evaluation 17 Performance Stability 20 Control Durability	2	36	No further actions required.					
	Does not control overspeed on decline	Customer intervention required to slow vehicle-6 Customer intervention required to countersteer-6	6		No Causes Identified.		No current controls.			The competition currently has this feature and mechanism is responding this problem. - Compare dimensions with competitors and explicit assessments.					

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3713 1849

Potential

Failure Mode and Effects Analysis
(Design FMEA)

Ford

System / Subsystem / Component: Dynamic Vehicle Speed Control Subsystem (DVC)

Model Year/Vehicle(s): 1998 / P98/N98/D98/F

Core Team: Pat Hahah, Larry Ketzy, Ken Pahlik, Dustin Brooks, Vast Friedrich

Design Responsibility: Electron Speed Control System Engineering

Key Date:

FMEA Number:
Page 7 of 48
Prepared by:
FMEA Date (Orig.): 1997.08.12 (Rev.): 1997.10.18

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	Potential Cause(s)/ Mechanism(s) of Failure	O c c	Current Design Controls	D e t	R. P. N.	Recommended Action(s)	Responsibility & Target Completion Date	Actions Taken / Revised Values	S e v	O c c	D e t	R. P. N.
	Does not maintain the set speed in adverse environmental conditions -temperature -humidity -moisture -dust -chemicals	Loss of speed control function-S Reduced level of speed control performance-S	5	Speedsensor variability -stability -accuracy -dynamics	1	10 Environmental Test 19 Thermal Exposure (Heat Protection) 20 Combined Durability 25 Rear Docking Accelerator Linkage 30 Splash Protection 35 Unhardened Power Wash - Car Wash Test 41 Thermal Management	3	15	No further actions required.						
				Lack of proper scale -not chemically inert	2	20 Combined Durability 25 Rear Docking Accelerator Linkage 30 Splash Protection 35 Unhardened Power Wash - Car Wash Test 44 Component Level EMCAB	3	30	No further actions required.						
				Analogous sensing surface -wear -contamination -parting lines	2	10 Environmental Test 19 Thermal Exposure (Heat Protection) 20 Combined Durability 25 Rear Docking Accelerator Linkage 30 Splash Protection 35 Unhardened Power Wash - Car Wash Test 41 Thermal Management	3	30	No further actions required.						
				Analogous sensing cover -plastic deformation of the amplifier -Inaccurate number of fasteners -Inaccurate location of fasteners -Inaccurate torques specified	4	10 Environmental Test 19 Thermal Exposure (Heat Protection) 20 Combined Durability 25 Rear Docking Accelerator Linkage 30 Splash Protection 35 Unhardened Power Wash - Car Wash Test 41 Thermal Management 44 Component Level EMCAB -Design at component level	3	60	No further actions required.						
				Components not selected for full range of environmental conditions	5	10 Environmental Test 19 Thermal Exposure (Heat Protection) 20 Combined Durability 25 Rear Docking Accelerator Linkage 30 Splash Protection 35 Unhardened Power Wash - Car Wash Test 41 Thermal Management	2	50	No further actions required.						
				Improper fastener selection	3	10 Environmental Test 19 Thermal Exposure (Heat Protection) 20 Combined Durability 25 Rear Docking Accelerator Linkage 30 Splash Protection 35 Unhardened Power Wash - Car Wash Test 41 Thermal Management 44 Component Level EMCAB	3	90	No further actions required.						
Must turn on upon driver command	Does not turn on	Loss of speed control function-S Speed control indicator is not illuminated-S	5	Open circuit -connection -component -switch	1	1 CP-DVC Control 7 Operational Range 20 Diagnostics	3	15	Establish the specifications for this function and enter on the FMEA.	See Section 23-1-07					
				Inoperable switch	3	1 CP-DVC Control 7 Operational Range 20 Diagnostics	3	45	No further actions required.						

Filename:
C:\FMEA\1998\F98N98D98 3-1.FMP

Printed on: 1997.08.08 08:08:08
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Registered to: Ashgate Hour

Potential
Failure Mode and Effects Analysis
(Design FMEA)

Item: Electronic Automatic Vehicle Speed Control Subsystem (VSC)

Model Year/Vehicle(s): 1997 / Premium/Sport

Core Team: Pat Ryhal, Larry Latsay, Dan Schaus, Dennis Brooks, Mark Friedrich

Design Responsibility: Vietnam Speed Control System Engineering

Key Date:

Item Number:

Page 1 of 44

Prepared by:

FMEA Date (Orig.): 1997.08.12 (Rev.): 1997.10.30

Function	Potential Failure Mode	Potential effects of failure	S e v	C l a s s	Potential cause(s) / mechanism(s) of failure	O c c u r	Current Design Controls	D e t e c t	R.P.N.	Recommended Action(s)	Responsibility & Target completion Date	Actions Taken	S e v	O c c	D e t
					Responsible supplier	1	1 ON-OFF Control 2 operational Range 10 Diagnostics	1	1	No further actions required.					
	Deceleration not desired by the operator.	Operator not aware of system status-S Speed control malfunction is not eliminated-S	4		Lack of Testing Test	1	40 Design Responsibility Review	4	80	Formal warranty clause to switch design engineers.	Dan Schaus 12-1-97				
					Open circuit -Both Sensors not working -Sensorless -Sensorless	1	1 ON-OFF Control 7 operational Range 10 Diagnostics	1	1	No further actions required.					
Short responsibly not to driver command. -ECM requirement	Not speed accelerate the desired speed	Consumer dissatisfaction-S	10		Speedometer variability -stability -accuracy -hysteresis	2	5 Steady State Control 10 Performance Accuracy 20 Combined Durability	2	20	Establish the specification per this function and under on this cond.	Dan Schaus 12-1-97				
					Improper amplifier calibration	2	5 Steady State Control 10 Performance Accuracy 20 Combined Durability	2	20	No further actions required.					
					Degraded speed signal performance	1	5 Steady State Control 10 Performance Accuracy 20 Combined Durability	2	10	No further actions required.					
					EMC susceptibility	1	21 Vehicle EMC	6	30	No further actions required.					
					Inaccurate calibration information	2	5 Steady State Control 10 Performance Accuracy 20 Combined Durability	2	20	No further actions required.					
					Analog conversion -Throttle Position -speed control cable -accelerator cable -Linkages	1	5 Steady State Control 10 Performance Accuracy 20 Combined Durability	2	10	No further actions required.					
					Inadequate software logic	2	5 Steady State Control 10 Performance Accuracy 20 Combined Durability	2	20	No further actions required.					
					Excessive cable slack	1	5 Steady State Control 10 Performance Accuracy 20 Combined Durability	2	10	No further actions required.					
					Insufficient cable slack	2	5 Steady State Control 10 Performance Accuracy 20 Combined Durability	2	20	No further actions required.					
	Not speed accelerate the desired speed.	Consumer annoyance-S	4		Speedometer variability -stability -accuracy -hysteresis	2	11 Functional evaluation 15 Performance Accuracy 20 Combined Durability	2	24	No further actions required.					
					Improper amplifier calibration	2	11 Functional evaluation 15 Performance Accuracy 20 Combined Durability	1	14	No further actions required.					
					Degraded speed signal performance	1	11 Functional evaluation 15 Performance Accuracy 20 Combined Durability	2	8	No further actions required.					

Filename:
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Reviewed on: PROMPlus User

Po. .tial
Failure Mode and Effects Analysis
(Design FMEA)

Item Number:
Page 4 of 10
Prepared by:
Model Year(s)/ Vehicle(s): 1993.00.00 (Rev): 1997.10.00

Item: Sunf/Vehicleem 1996 / 0000000000000
Key Date:
Core Team: Don Adams, Lenny Lathrop, Sam Sabella, Cynthia Brophy, Mark Friedrich

Item/ Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	Potential Cause(s)/ Mechanism(s) Failure	O c c	Current Design Controls	D e t	R P N	Recommended Action(s)	Responsibility & Target Completion Date	Action Results: Actions Taken	S e v	O c c	D e t	R P N
				SAP vulnerability	5	11 Functional Evaluation 15 Performance Accuracy 20 Combined Durability 7x Suzuki Test	8	0	No further actions required.						
				Sensitivity calibration determination	2	11 Functional Evaluation 15 Performance Accuracy 20 Combined Durability	8	0	No further actions required.						
				-voltage combinations -throttle valves -speed control cable -transducer cable -linkages	8	11 Functional Evaluation 15 Performance Accuracy 20 Combined Durability	8	0	No further actions required.						
				Analogous software logic	5	11 Functional Evaluation 15 Performance Accuracy 20 Combined Durability	8	0	No further actions required.						
				Excessive cable slack	5	11 Functional Evaluation 15 Performance Accuracy 20 Combined Durability	8	0	No further actions required.						
				Cantilevered cable slack	5	11 Functional Evaluation 15 Performance Accuracy 20 Combined Durability	8	0	No further actions required.						
	Initial modulation Customer dissatisfaction-S prior to specified mileage	5	Speedometer variability- -calibration -accuracy -hysteresis	5	11 Functional Evaluation 15 Performance Accuracy 20 Combined Durability	8	0	No further actions required.						
			Improper amplifier calibration	5	11 Functional Evaluation 15 Performance Accuracy 20 Combined Durability	8	0	No further actions required.						
			Degraded speed signal performance	5	11 Functional Evaluation 15 Performance Accuracy 20 Combined Durability	8	0	No further actions required.						
			EMC incompatibility	5	11 Functional Evaluation 15 Performance Accuracy 20 Combined Durability 7A Vehicle EMC	8	0	No further actions required.						
			Pressure calibration determination	2	11 Functional Evaluation 15 Performance Accuracy 20 Combined Durability	8	0	No further actions required.						
			-voltage combinations -throttle valves -speed control cable -transducer cable -linkages	8	11 Functional Evaluation 15 Performance Accuracy 20 Combined Durability	8	0	No further actions required.						
			Analogous software logic	5	11 Functional Evaluation 15 Performance Accuracy 20 Combined Durability	8	0	No further actions required.						
			Excessive cable slack	5	11 Functional Evaluation 15 Performance Accuracy 20 Combined Durability	8	0	No further actions required.						

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3713 1951

Potential
Failure Mode and Effects Analysis
(Design FMEA)

System
X Subsystem
Component Automatic Vehicle Speed Control Subsystem (VSC)

Model Year/Vehicle(s): 1997 / Mustang/SVO

Core Team: Pat Eckert, Larry Lahrey, Don Schmitz, Brooke Stanton, Mark Volkmann

Design Responsibility: Vicinanza Speed Control System Engineering

Key Date:

Item Number:
Page 10 of 46
Prepared by:
Quick Date (orig.): 1997.05.13 Rev.: 1997.10.30

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	Potential Cause(s)/ Mechanism(s) of Failure	O c c	Current Design Controls	D e t	R.P.N.	Recommended Action(s)	Responsibility & Target Completion Date	Action Taken	S e v	O c c	D e t	R.P.N.
Engages the desired Does not engage set speed upon initial command -momentary yes -with set -with coast -coast and release -after initial set -coast and release -tap up -tap down	Loss of speed control Function-1	5	open circuit -electromagnet coil -terminals -connectors -wires -crimped connections -inside large -inner cable	2	1 SYSTEMS Control 3 POWER Control 5 ONOFF Control 11 Functional Evaluation 20 Confirmed Durability 23 Diagnostics	3	30	Establish the specification for this function and enter on the FMEA.	Don Schmitz 10-1-97					
cable and connector -swivel -shrouds body -deflection -broken		7	1 SYSTEMS Control 3 POWER Control 5 ONOFF Control 11 Functional evaluation 20 Confirmed durability 23 Diagnostics	2	30	No further actions required.								
no speed signal		7	1 SYSTEMS Control 3 POWER Control 5 ONOFF Control 11 Functional Evaluation 20 confirmed durability 23 Diagnostics	2	30	No further actions required.								
Inoperative amplifier -no calibration -calibration process -open circuits -shorted circuits -inoperative components -transistors -diodes -ICs -component placement		8	1 SYSTEMS Control 3 POWER Control 5 ONOFF Control 11 Functional Evaluation 20 confirmed Durability 23 Diagnostics	2	30	No further actions required.								
Inoperative servo -damaged valve -open pole piece in the shroud -open power pistons -shroud air gap too large -stripped gears -bearings out of place		7	1 SYSTEMS Control 3 POWER Control 5 ONOFF Control 11 Functional Evaluation 20 Confirmed Durability 23 Diagnostics	2	30	No further actions required.								
Valve Control Does cable or Servo not Disengage Inappropriately		8	1 SYSTEMS Control 3 POWER Control 5 ONOFF Control 11 Functional Evaluation 20 Confirmed Durability 23 Diagnostics 25 Splash Protection 29 Validated Power Dash - On Dash Test	2	32	Ford recommends that the supplier verify that the valve tester FTP and FTP is modified to include an inspection of the cables after valve test.	Application engineers the vsm for the Mobile 6-30-98	Ford's FMEA approved to software and procedure	8	2	3	32
Valve Ingress into the servo (contention) -cap base plate -impeller to actuator seal -cable to actuator connection -motor stator -motor arm seal		8	1 SYSTEMS Control 3 POWER Control 5 ONOFF Control 11 Functional Evaluation 20 Confirmed Durability 23 Diagnostics 25 Splash Protection 29 Validated Power Dash - On Dash Test 31 Corrosion Prevention	2	32	No further actions required.								
not message missing -brake -speed		5	1 SYSTEMS Control 3 POWER Control 5 ONOFF Control 11 Functional Evaluation 20 confirmed Durability 23 Diagnostics	1	5	No further actions required.								

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Potential
Failure Mode and Effects Analysis
(Design FMEA)

Ford

System
X Subsystem
Component: Automatic Cabacity Speed Control Subsystem (ACC)

Model Year/Vehicle(s): 1998 / Premium/Sport

Core Team: Pat Gibson, Larry Lotzar, Sam Dubois, Monte Brooks, Mark Friedlich

Design Responsibility: Vicious Speed Control System Engineering

Key Date:

Page 11 of 69

Prepared by:

FMEA Date (Orig.): 1997.02.12 (Rev.): 1998.10.30

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	Potential Cause(s)/ Mechanism(s) of Failure	O c c	Current Design Controls	D e t	R P N	Recommended Action(s)	Responsibility & Target Completion Date	Action Results: Actions Taken	S e v	O c c	D e t	R P N
Switch functions must be independent of all other electrical functions	Switch functions are not independent of all other electrical functions.	Other electrical functions activated inadvertently -turn blows under circumstances we did not want (switch dependent) -other speed control functions activate inadvertently	9	Inappropriate hose relay	3	11 Functional Evaluation	8	216	Establish the specification for this function and agree on the test.	Sam Dubois 12-1-97					
									Conduct the DOE and develop a formal sealant/testing protocol.	Sam Dubois 12-10-97					
				Inappropriate switch resistance	5	11 Functional Evaluation	8	360	Review the DOE and develop a formal sealant/testing process.	Sam Dubois 12-10-97					
				Harness switch solenoid	5	11 Functional Evaluation	8	360	Review the DOE and develop a formal sealant/testing process.	Sam Dubois 12-10-97					
				Wiring harness LOOSE -short to power wiring -short to ground wiring -non-shielded/grounded wire connections	5	11 Functional Evaluation	8	360	Review the DOE and develop a formal sealant/testing process.	Sam Dubois 12-10-97					
	Switch functions are inconsistently independent of all other electrical functions	Other electrical functions activated inadvertently -turn blows under circumstances we did not want (switch dependent) -other speed control functions activate inadvertently	9	Inappropriate hose relay	3	11 Functional Evaluation	8	216	Review the DOE and develop a formal sealant/testing process.	Sam Dubois 12-10-97					
				Inappropriate switch resistance	5	11 Functional Evaluation	8	360	Review the DOE and develop a formal sealant/testing process.	Sam Dubois 12-10-97					
				Harness switch solenoid	5	11 Functional Evaluation	8	360	Review the DOE and develop a formal sealant/testing process.	Sam Dubois 12-10-97					
				Wiring harness LOOSE -short to power wiring -short to ground wiring -non-shielded/grounded wire connections	5	11 Functional Evaluation	8	360	Review the DOE and develop a formal sealant/testing process.	Sam Dubois 12-10-97					
Disengage the speed control upon driver command	Does not disengage per any driver command.	Unclear environment how of 10-20 confidence in system-10 -persistent safety issue	10	Cable misadjustment on power pedal -worked improperly	2	1 Schematic Examination 11 Specification Refreshing 20 Functional Durability 30 DOE Process Sheet Review 40 DOE Process Approval -white inspection stamps on cable -recently failure inspection 50 End of Line Test (EOL)	4	80	Establish the specification for this function and agree on the DOE.	Sam Dubois 12-1-97					
									Conduct DOE for consistency at the failure mode and sealant readings.	Sam Dubois 1-15-98					
									Implement a longer cable adjustment cable to improve resistance to binding.	Sam Dubois to verify 10-1-98	Implemented June 1997	10	2	4	80
				Vendor misadjustment on throttle body	2	6 Schematic Examination 11 Specification Refreshing 20 Functional Durability 30 DOE Process Sheet Review 40 DOE Process Approval 50 End of Line Test (EOL)	4	80	Based on chosen fastening schematic an assembly analysis of 2 and a determination of 2 appears to be adequate at this time.						

Potential
Failure Mode and Effects Analysis
(Design FMEA)

FMEA Number:
Page 13 of 45
Prepared by:
FMEA Date (Orig.): (Rev.):

System: Subsystem: Component: Automatic Vehicle Speed Control Subsystem (VSC)
Design Responsibility: Vitesse speed control System Engineering
Model Year/Vehicle(s): 1998 / Mondeb/Sport
Key Date:
Core Team: Pat Kabak, Larry Latray, Sam Patwin, Brette Woods, Chet Friedrich

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	C l a s s	Potential Cause(s)/ Mechanism(s) of Failure	O c c u r	Current Design Controls	D e t e c t	R. P. N.	Recommended Action(s)	Responsibility & Target Completion Date	Actions Taken	S e v	O c c u r	D e t e c t	R. P. N.
					VC Cable not routed on the accelerator bracket	3	01 Automatic Examination 13 Examination Methodology 20 Combined Durability 30 ESA Process Check Review 40 ESA Process Approval 60 Customer Production and Unit Installation Changes 67 End of Line Test (EOL)	5	60	Implement the subject cable bracket cover inspection and add to the process chart.	Application Engineers who work for Dan Patwin 8-01-97	Revised routing to a no object feature. Awaiting for implementation starting September 1998.				
					VC Stay positioned backwards	3	01 Automatic Examination 13 Examination Methodology 20 Combined Durability 30 ESA Process Check Review 40 ESA Process Approval 67 End of Line Test (EOL)	3	80	Implement a cableform clip on a longer more slow deformation cable to prevent misinstallation.	Dan Patwin to verify 10-1-97	Implemented Week 1602	10	3	3	90
					VC Cable pinched by bracket	3	01 Automatic Examination 13 Examination Methodology 20 Combined Durability 30 ESA Process Check Review 40 ESA Process Approval 67 End of Line Test (EOL) 80 Component Level Tests	3	80	Implement a new cable specification that includes a bend test on the product.	Dan Kim 7-1-97	Validation testing on going. New completion date (8/15/97)				
					VC Cable manufacturing defects -Frayed core wire -Kinked core wire -Kinked sandwich wire -Loose fitch to armature -Loose clip in bore outside sheath -Inadequate cable lubrication	2	01 Automatic Examination 13 Examination Methodology 20 Combined Durability 30 ESA Process Check Review 40 ESA Process Approval 67 End of Line Test (EOL) 84 Component Level Tests	7	98	Implement a new cable specification for enhanced product validation. Implement a longer stop wire retention cable to improve resistance to sliding.	Dan Kim 7-1-97 Dan Patwin to verify 10-1-97	Validation testing on going. New completion date 12/15/97 Implemented June 1997. Data data still needed to further evaluate results.	10 10	2 2	3 3	60 60
					VC Water ingress into cable at housing connections	3	16 Performance Warranty 20 Combined Durability 30 Accelerated Power Wash - Dry Wash Test	3	54	Dan recommends that the acceptance criteria for the water basin ASS and ASS be modified to include an inspection of the cables after wash.	Application engineers who work for Dan Patwin 8-01-97	Revision 09/98 updated to reflect new procedure	10	3	3	90
										Implement a cable design strategy that assures that water cannot ingress into the cable. -specify cable attributes.	Application engineers that work for Dan Patwin 10-1-97	Part of new cable specification. New completion date, 12/15/97				
										Implement an accelerated power wash test.	Larry Latray 8-15-97	Part of Accelerate Materials test 15-72	10	3	3	90
					VH Water ingress into the service connector -mp base plate -amplifier to actuator seal -cable to actuator connection -motor rivets -motor vee seal	3	01 Automatic Examination 13 Examination Methodology 20 Combined Durability 38 Splash Examination 50 Accelerated Power Wash - Dry Wash Test 63 Corrosion Resistance	4	96	Implement an accelerated power wash test.	Larry Latray 8-15-97	Part of Accelerate Materials test 15-71	10	3	3	90
										Add silicone gel to the mp service.	Chris Thibodeau to verify 9-1-97	Implemented March 1997	10	3	3	90
										Implement a 1000 hour test at both North Penn Test and Allen.	Chris Thibodeau 9-1-97	Partial Completion at North Penn Implemented June 1997	10	3	3	90

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Potential
Failure Mode and Effects Analysis
(Design FMEA)

Item Number:
Page 11 of 46
Prepared by:
FMEA Date (Orig.): 1997.02.10 (Rev.): 1997.10.10

Subsystem
Component: Automatic Vehicle Speed Control Subsystem (PMT)
Design Responsibility: Visteon Speed Control System Engineering
Model Year/Vehicle(s): 1998 / FORD/MAZDA
Key Date:
Core Team: Don Habel, Larry Lorang, Ann Roberts, Dustin Brooks, Mark Friedrich

Item/ Function	Potential Failure Mode	Potential Effect(s) of Failure	S E V	Potential Cause(s)/ Mechanism(s) of Failure	O C C	Current Design Controls	D E T	R P N	Recommended Action(s)	Responsibility & Target Completion Date	Actions Taken	S E V	O C C	D E T	R P N
									Investigate using white epoxy in combination with a sealing system to detect gaps.	Chris Matheson 6-1-97	Implemented July 1997	10	2	1	20
									Investigate adding heights to outer seal strobe.	Dave Dreier 6-1-97	Implemented June 1997	10	2	1	20
									Investigate adding rubber block to locking servo assembly.	Dan Hin 6-10-97	Implement additional oil gel and white epoxy the rubber block	10	2	1	20
				52 Customer misapplication of Host public	3	No controls for this Cause.			This has been determined to be a cause of concern since outside of the control of the speed control design team.						
				52 Exterior Issues -Binding of mechanical components -Sensing errors -Inadequate cooling -Bearing misalignment -Inadequate bearing retainer -pulley not seated on shaft -Incorrect clutch pointer interface	3	3 Automobile Qualification 10 Construction Redundancy 20 Combined Durability 30 ASA Dynamic Shock Series 40 ASA Dynamic Approval 45 End of Line Test (EOLT) 50 Components Level DVPER	3	90	Outside of the low assessment and detection ratings, the team has determined that no further actions are required.						
				52 Open circuit -Processor -connectors -switch	3	1 Anti-GDP Control 2 ABS/TCS/DSC Control 7 Speed/Level Sensor	1	10	Because of the low assessment and detection ratings, the team has determined that no further actions are required.						
Does not disengage with the "off" switch.	Consumer experiences loss of confidence in system-10 -perceived safety issue -Consumer override required	10	52 Cable misadjustment on servo pulley -control improperly	3	0 Shroud Construction 10 Construction Redundancy 20 Combined Durability 30 ASA Dynamic Shock System 40 ASA Dynamic Approval -cable inspection during on cable -assembly fixture inspection 45 End of Line Test (EOLT)	0	00	Continue all the assessments on the Cruise Cable and Attach rankings.	Don Habeck 6-10-97					
									Implement a longer cable trim connection cable to improve resistance to kinking.	Don Habeck to verify 10-1-98	Implemented June 1998. Team does still needed to further evaluate results.	10	2	2	40
				72 Cable misadjustment on throttle body	3	0 Shroud Construction 10 Construction Redundancy 20 Combined Durability 30 ASA Dynamic Shock Series 40 ASA Dynamic Approval 45 End-of Line Test (EOLT)	3	90	Because of the low assessment and detection ratings, the team has determined that no further actions are required.						
				72 Cable not routed on the speedometer bracket	3	0 Shroud Construction 10 Construction Redundancy 20 Combined Durability 30 ASA Dynamic Shock Series 40 ASA Dynamic Approval 50 Fastener Retention and ASA Installation Torque 45 End of Line Test (EOLT)	3	90	Implement the subject cable routing servo disposition and add to the process sheets.	Application Engineers Implement the new Fix for Vehicle 6-10-98	Revised routings to be an subject Systems beginning for implementation starting September 1998.				

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Supplemental to/ Template Date

Potential
Failure Mode and Effects Analysis
(Design FMEA)

FMEA Number:
Page 14 of 40
Prepared by:
FMEA Date (Orig.): 1997.02.07 (Rev.): 1997.10.10

System
X Subsystem
Component: Automatic Vehicle Speed Control Subsystem (ASC)
Model Year/Vehicle(s): 1998 / P098ASC/P098F
Core Team: Pat Delphi, Larry Gerigny, Bob Edwards, Bradley Brandon, Mark Friedrich

Design Responsibility: Vehicle Speed Control System Engineering
Key Date:

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	Class	Potential Cause(s)/ Mechanism(s) of Failure	O c c	Current Design Controls	D e t	R P N	Recommended Action(s)	Responsibility & Target completion Date	Actions Taken / Results	S e v	O c c	D e t	R P N
				SC	Stop position/speed hysteresis	3	01 Control Identification 13 Functionality Verification 20 Combined Durability 24 DFMEA Reviewed 25 DVP Sponsor Approval 23 End of Line Test (EOLT)	4	96	Implement a software step on a longer data which determines vehicle to prevent misidentification.	Jon Schein to verify 10-1-97	Implemented June 1997	10	3	4	96
				SC	Cable stretch in service	3	01 Control Identification 13 Functionality Verification 20 Combined Durability 24 DFMEA Reviewed 25 DVP Sponsor Approval 23 End of Line Test (EOLT) 04 Component Level DVP&R	3	90	Implement a new cable specification that includes a load test on the cable(s).	Jon Sch 7-1-97	Validation testing in going. The completion date 12/15/97				
				SC	Cable manufacturing defects -Jammed cone valve -Jammed vane valve -Jammed crankshaft valve -Broken filament in cruiselight -Cable clamp in lost motion device -Bendgrate cable -Subassembly	2	01 Control Identification 13 Functionality Verification 20 Combined Durability 24 DFMEA Reviewed 25 DVP Sponsor Approval 23 End of Line Test (EOLT) 04 Component Level DVP&R	3	90	Implement a new cable specification. Use optimized gearbox validation. Implement a longer cone valve screwdriver cable to improve resistance to binding.	Jon Sch 7-1-97 Jon Schein to verify 10-1-97	Validation testing in going. The completion date 12/15/97 Implemented June 1997. Stuck cable could needed no further customer concerns.	10	2	3	60
				SC	EMC incompatibility	1	24 Vehicle EMC	1	10	Because of the low occurrence and detection ratings, the team has determined that no further actions are required.						
				SC	"Analog" shorting wheel switch	3	01 ON-OFF Control 02 Electronic Governor 03 Cruise Control 04 Automatic Deactivation 13 Functionality Verification	2	60	It has been determined that this Cause is outside of the control of the speed control design team. However, we will coordinate with the steering wheel design team.						
				SC	Open circuit -Connectors -Connectors -switch	1	01 ON-OFF Control 02 Hot/Switch Control 7 Operational Range	1	10	Because of the low occurrence and detection ratings, the team has determined that no further actions are required.						
				SC	Incorrect voltage drop -Corrosion -Splicing cables -Installation attach-up	1	20 Combined Durability	4	40	Send an amount delivery standards an acceptance grading of 3, and a detection of 4 appear to be adequate at this time.						
				SC	Motor Improper Base cable at Steering Compartment	1	20 Combined Durability 30 Performance Accuracy 39 Unbalanced Power Mode - Car Mode Test	4	80	Team recommends that the acceptance criteria for the motor brake (EM and ECU be modified to include an inspection of the cables after noise test.	Application engineers who work for them Schein 6-30-97	Chassis ECUs updated to cutback new procedure	10	4	3	30

Potential
Failure Mode and Effects Analysis
(Design FMEA)

Ford

System
Subsystem
Component: Automatic Vehicle Speed Control Subsystem (VSC)

Design Responsibility: Vehicle Speed Control System Engineering

Model Year/Vehicle(s): 1998 / C2P/Wagon/LX

Key Date:

Core Team: Jon Doboh, Larry Lorrey, Sam Schmidt, Denise Brooks, Mark Pridgeon

FMEA Number:
Page 10 of 66
Prepared by:
FMEA Date (Orig.): 1997.02.12 (Rev.): 1997.10.20

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	Class	Potential Cause(s)/ Mechanism(s) Failure	O c c	Current Design Controls	D e t	R. P. N.	Recommended Action(s)	Responsibility & Target Completion Date	Action Taken	S e v	O c c	D e t	R. P. N.
										Implement a cable design strategy that ensures there cannot be any damages into the cable. -specify cable routing.	Application engineers (Art Van Schmidt) 04-1-97	(Work on new cable specification. Due completion date 12/31/97)				
										Implement an additional power seat test.	Larry Lorrey 6-15-97	Part of Specification Checksheet Item 10-07	10	1	10	10
					SC Motor degrees into the servo Intermittent -vsp hose pinch -vsp/ECMlec to actuator wire -vsp to actuator connection -motor wires -servo vac seal	7	8 Automobile Specification 11 Constitution Redundancy 20 Combined Durability 30 Splash Immunities 40 Additional power seat - one dash test 60 Corrosion Resistance	6	336							
										Add additional gas to the cap container.	Chris Thielenhaus to supply 6-6-97	Implemented (Month 1997)	10	8	10	80
										Implement a 1000 Dash test on Dash Mark Pass and Fail=n.	Chris Thielenhaus 5-1-97	Digital Acquisition on Dash Data Implemented June 1997	10	1	1	10
										Investigate using water spray in combination with a vibrate system to detect gaps.	Chris Thielenhaus 4-1-97	Implemented (July 1997)	10	8	10	80
										Investigate adding backlite to noise seal study.	Mark Barker 6-1-97	Implemented (June 1997)	10	8	10	80
										Investigate adding rubber boot to shaking servo assembly.	Sam Zahn 6-20-97	Implemented additional gas and seal with epoxy to rubber boot	10	1	10	10
					SC Excessive noises -binding of mechanical components -bearing noises -inadequate stability -bearing misalignment -inadequate bearing retainer -pulley not seated on shaft -excessive clutch coatings interfaces.	3	0 Automobile Specification 13 Constitution Redundancy 20 Combined Durability 30 DVP Reviewed Check Review 40 DVP Specimen Approval 50 End of Line Test (EOLT) 60 Component Level DVPR&R	3	90	Because of the low occurrence and detection rankings, the team has determined that no further evaluation was required.						
Does not disengage with the brake pedal depressed.	Continued engagement even of the conditions is system is -unintended safety issue -unnecessary wearable engines (shows as a potential) Customer Safety Dissatisfaction Liability	10	Fa	Cable misadjustment on servo pulley -cracked improperly	3	0 Automobile Specification 13 Constitution Redundancy 20 Combined Durability 30 DVP Reviewed Check Review 40 DVP Specimen Approval -while Inspection design on cable -assembly Process Augmentation 60 End of Line Test (EOLT)	3	90	Conduct DOT for consistency on the failure mode and effect rankings.	Sam Zahn 6-20-97					
										Implement a longer cable tie retention system to improve performance by display.	Sam Schmidt to supply 10-1-97	Implemented (June 1998). There does still exist the further evaluate question.	10	1	1	10
					SC Cable misadjustment on throttle body	3	0 Automobile Specification 13 Constitution Redundancy 20 Combined Durability 30 DVP Reviewed Check Review 40 DVP Specimen Approval 43 End of Line Test (EOLT)	3	90	Based on current industry standards an assumption making of 3, and a detection of 3 appear to be adequate at this time.						

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Filename:
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Potential
Failure Mode and Effects Analysis
(Design FMEA)

Ford

Option:
X Subsystem
Component: Automatic vehicle Speed Control Subsystem (ASC)

Model Year/Vehicle(s): 1998 / Mustang/SVT

Core Team: Pat Schut, Larry Delany, Dan Pahnke, Brette Brooks, Mark Friedrich

Design Responsibility: Vistron Speed Control System Engineering

Key Date:

Prepared by:

FMEA Date (Orig.): 1997.08.15 (Rev.): 1997.10.10

FMEA Number:

Page 14 of 40

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	Potential Cause(s)/ Mechanism(s) of Failure	O c c	Current Design Controls	D e t	R.P.N.	Recommended Action(s)	Responsibility & Target Completion Date	Action Taken / Revised Values	S e v	O c c	D e t	R.P.N.
				1C Cable not routed on the headlevelver bracket	7	0 Automatic Identification 11 Identification Methodology 20 Combined Durability 31 DFA Process Sheet Review 35 DFA Process Approval 40 Supplier Validation and DFA Installation Verify 51 End of Line Test (EOL)	3	63	Implement the subject cable bracket cover dimension and add to the process sheets.	Application Engineers who work for Dan Pahnke 9-15-97	Revised guidance to A to be added Process inspecting for implementation starting September 1998.				
				2C Stay positioned backwards	2	0 Automatic Identification 11 Identification Methodology 20 Combined Durability 31 DFA Process Sheet Review 35 DFA Process Approval 40 End of Line Test (EOL)	2	80	Implement a guidance slot on a longer core wire retention cable to prevent misinstallation.	Dan Pahnke to verify 10-1-97	Implemented June 1997	10	1	2	20
				3C Cable placed by conduit	2	0 Automatic Identification 11 Identification Methodology 20 Combined Durability 31 DFA Process Sheet Review 35 DFA Process Approval 40 End of Line Test (EOL) 45 Component Level DVP&R	3	60	Implement a new cable specification that includes a load test on the conduit.	Dan Pahnke 9-1-97	Validation testing on going. Due completion date 12/15/97				
				4C Cable overheating defects -frayed core wire -kinked core wire -kinked conduit wire -corrosion finish on castings -cable clog in back motion device -incompatible cable lubrication	3	0 Automatic Identification 11 Identification Methodology 20 Combined Durability 31 DFA Process Sheet Review 35 DFA Process Approval 40 End of Line Test (EOL) 45 Component Level DVP&R	3	60	Implement a new cable specification for enhanced product validation. Implement a longer core wire retention cable to improve resistance to kinking.	Dan Pahnke 9-1-97 Dan Pahnke to verify 10-1-97	Validation testing on going. Due completion date 12/15/97 Implemented June 1997. More data still needed to further evaluate results.	10	2	3	60
				5C ASC susceptibility	1	31 Vehicle ASC	1	10	Because of the low occurrence and detection ratings, the team has determined that no further evaluation is required.						
				6C Customer misapplication of foot pedals	1	No controls for this cause.			This has been determined to be a cause of severity items outside of the control of the speed control design team.						
				7C Suspension amplifier -clamp broken input element	1	1 up-only control 2 up/down control 7 Operational Range	1	10	Implement DOE procedure for calibration checkout. Increase power rating of R26. Delete Servic FET.	Dan Pahnke to verify 10-1-97 Tyson Williams to verify 9-1-97 Tyson Williams to verify 9-1-97	Implemented March 1997 Implemented April 19986 Implemented February 1997	10 10 10	1 1 1	1 2 1	10 20 10
				8C Open circuit -connector -connectors -pedal	1	1 up-and Control 2 up/Down Control 7 Operational Range	1	10	Because of the low occurrence and detection ratings, the team has determined that no further actions are required.						

3713 1998

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Registered to: Philips Ford

Potential
Failure Mode and Effects Analysis
(Design FMEA)

Ford

System:
X Subsystem:
Component: Automatic Vehicle Speed Control Subsystem (VSC)

Design Responsibility: Vehicle Speed Control System Engineering

Model Year/Vehicle(s): 1998 / Mustang/SVO

Key Time

Core Team: Dan Talbot, Larry Lolley, Jon Nelson, Norris Brooks, Mark Friedrich

Item Number:
Page 17 of 91
Prepared by:
FMEA Date (Orig.): 1997.00.10 (Rev.): 1997.00.10

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	C l a s s	Potential Cause(s)/ Mechanism(s) of Failure	O c c u r	Current Design Controls	D e t e c t	R. P. N.	Recommended Action(s)	Responsibility & Target Completion Date	Actions Taken	S e v	O c c u r	D e t e c t	R. P. N.
					[illegible]		01 Accelerated Durability 11 Functional Performance 20 Combined Durability 25 Vehicle ESC 60 End of Line test (EOL)			The assessment of O is base only because no occurrence data exists. Some data is needed before the assessment voting can be finished.						
				DC	Rotor ingests into cable on freezing temperatures	3	15 Performance Severity 20 Combined Durability 30 Combined Power Test - Car Mark Test	8	360	Most recommends that the assignment estimate for the rotor tests P30 and P30 be modified to include an inspection of the cables after rotor test.	Application engineers the work for Don Talbot 6-30-97	Upgrade rotor symbol to reflect new geometries	10	3	8	240
										Implement a cable design standard that ensures that rotor cannot ingress into the cable. - Assembly cable retainers.	Application engineers work with Don Talbot 10-1-97	Work of new cable specification. Due completion date 11/15/97				
										Implement an accelerated power wear test test.	Larry Lolley 9-15-97	Test of Accelerator schedule test 10-97	10	1	8	80
				DC	Rotor ingests into the rotor (corrosion) -High temp plates -Ingestion to radiator seal -Plate to diameter -corrosion. -Rotor sheets -Rotor seal seal.	3	5 Automatic Deactivation 11 Functional Performance 20 Combined Durability 25 Vehicle Dynamics 30 Reinforced Power Test - Car Mark Test 51 Corrosion Resistance	8	360	Implement an accelerated power wear test test.	Larry Lolley 9-15-97	Test of Accelerator schedule test 10-97	10	3	8	240
										Add silicone gel to the cap corridor.	Chris Chisholm to verify 9-1-97	Implemented March 1997	10	3	8	240
										Implement a 1000 hour test of both North Pole and Rotor.	Chris Chisholm 9-1-97	Partial Inspection at North Pole Implemented June 1997	10	3	8	240
										Investigate using cable epoxy to encapsulate cable & rotator system to reduce gaps.	Chris Chisholm 9-1-97	Implemented July 1997	10	3	8	240
										Investigate adding bushing to rotor cap and rotate.	Dave Turner 9-1-97	Implemented June 1997	10	3	8	240
										Investigate cable sealed boot to blocking cable currently.	Don John 9-15-97	Implemented additional oil and seal using epoxy the system test.	10	3	8	240
				DC	Rotator Lever -Binding of rotator) -components -Sensing values -Loadingcable sticking -Sensing misalignment -Loadingcable bearing retainer -pulley not routed on shaft -Incorrect clutch retainer Relevant	3	5 Automatic Deactivation 15 Functional Performance 20 Combined Durability 30 ESA Pressure Shock Service 35 ESA Pressure Approval 60 End of Line Test (EOL) 64 Component Level Server	8	360	Because of the low occurrence and detection ratings, the team has determined that no further actions are required.						

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Filename:
C:\Program Files\FMEA v4.1 DOS

3713 1969

Potential
Failure Mode and Effects Analysis
(Design FMEA)

Item Number:
Page 10 of 60
Prepared by:
FMEA Date (Orig.): 1997.02.12 (Rev.1: 1997.10.10

Item: Speed Subsystem
Component: Automatic Vehicle Speed Control Subsystem (PSC)
Model Year/Vehicle(s): 1998 / Mustang/GT
Core Team: Pat Eshak, Larry Lolley, Dan Palmer, Dustin Brooks, Mark Friedrich

Design Responsibility: Vehicle Speed Control System Engineering
Key Date:

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	Class	Potential Cause(s)/ Mechanism(s) of Failure	O c c	Current Design Controls	D e t	R P N	Recommended Action(s)	Responsibility & Target Completion Date	Action Taken	S e v	O c c	D e t	R P N
	Does not disengage with the brake pedal input (Must override).	Uncontrolled acceleration - loss of cruise/safety (A system-id -prevented safety issue -employer concern) (Note: Failure to only a throttle to also the same method has also failed).	10		Cable misadjustment on servo pulley -control improperly	6	1 Automatic Identification 13 Specification Redundancy 20 Combined Durability 34 DOE Process Check Review 40 DOE Process Approval -Cable inspection system on cable -repeatedly Fixture Inspection 63 End of Line Test (Key	6	360	Embark SOC for concurrence on the failure mode and effect verdicts.	Dan Eshak 9-29-97					
										Implement a longer open slot extension cable to improve resistance to binding.	Dan Eshak to verify 10-1-97	Implemented June 1997. Some data still needed to further evaluate results.	10	2	2	40
					PC Cable misadjustment on throttle body	6	1 Automatic Identification 13 Specification Redundancy 20 Combined Durability 34 DOE Process Check Review 40 DOE Process Approval 63 End of Line Test (Key	2	120	Based on current industry standards an acceptable reading of 2, and a detection of 5 appear to be adequate at this time.						
					PC Cable not routed on the accelerator bracket	2	1 Automatic Identification 13 Specification Redundancy 20 Combined Durability 34 DOE Process Check Review 40 DOE Process Approval 50 Processor Potentiometer and DOE Specification Ranges 63 End of Line Test (Key	3	60	Implement the effort while throttle cable inspection and add on the process sheets.	Application Engineers who work for Dan Eshak 9-30-97	Revised actions to a no effect System supporting for implementation starting September 1997.				
					PC Clip positioned backwards	2	1 Automatic Identification 13 Specification Redundancy 20 Combined Durability 34 DOE Process Check Review 40 DOE Process Approval 63 End of Line Test (Key	4	80	Implement a poka-yoke clip so a longer cone also accommodate to prevent misadjustment.	Dan Eshak to verify 10-1-97	Implemented June 1997	10	2	2	40
					PC Cable pinched in conduit	8	1 Automatic Identification 13 Specification Redundancy 20 Combined Durability 34 DOE Process Check Review 40 DOE Process Approval 63 End of Line Test (Key 64 Component Level Check	3	60	Implement a new cable specification that includes a bend test on the conduit.	Dan Eshak 7-1-97	Validation testing in going. Per specification dtee 11/30/97				
					PC Cable misadjustability Outside -Original cone size -Slotted cone size -Slotted conduit size -Loose fluid to position -Cable clip in fuel system device -Inappropriate cable Lubrication	10	1 Automatic Identification 13 Specification Redundancy 20 Combined Durability 34 DOE Process Check Review 40 DOE Process Approval 63 End of Line Test (Key 64 Component Level Check	3	90	Implement a new cable specification for enhanced process validation.	Dan Eshak 7-1-97	Validation testing in going. New specification date 11/30/97				
										Implement a longer open slot extension cable to improve resistance to binding.	Dan Eshak to verify 10-1-97	Implemented June 1997. Some data still needed to further evaluate results.	10	2	2	40
					PC PSC susceptibility	1	22 Vehicle EMC	3	18	Because of the low occurrence and detection ratings, the team has determined that no further actions are required. This has been determined to be a cause of concern items outside of the control of the speed control design team						
					PC Customer misapplication of fuse puller	2	No controls for this cause.									
					PC Temperature sensitivity -relay shock, input circuit	3	1 Non-DFY Control 2 Benchmark Control 7 Operational Range	1	18	Implement DOE procedure for calibration development.	Dan Eshak to verify 10-1-97	Implemented March 1997	10	1	1	10

3713 1980

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Potential
Failure Mode and Effects Analysis
(Design FMEA)

Item number:
Page 1* of **
Prepared by:
FMEA Date (Orig.): 1997.08.18 (Rev.): 1997.10.16

Item: Automatic Throttle Speed Control Subsystem (TSCS)
Model Year/Vehicle(s): 1998 / ********/Sport
Core Team: Pat Hebert, Larry Lepage, Ann Roberts, Sandra Brooks, Mark Pritchard

Design Responsibility: Throttle Speed Control System Engineering
Key Date

Item/Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	C l a s s	Potential Cause(s)/ Mechanism(s) of Failure	O c c u r	Current Design Controls	D e t.	R. P. N.	Recommended Action(s)	Responsibility & Target Completion Date	Actions Taken	S e v	O c c	D e t	R. P. N.
										Reassess power cooling at Dot.	Steven Williams to verify 6-1-97	Implemented April 1998	10	1*	2	20
										Delete Harris VSC.	Steven Williams to verify 6-1-97	Implemented Wednesday 1997	10	1	1	10
			9		Shorted wiresin -harness -connector -switch	1	1 60-400 manual 2 ABS/Brake Assist 7 Operational Usage	1	10	Because of the low occurrence and detection ratings, the team has determined that no further actions are required.						
			9		Motor impeded from within on Proving Compartment	1	10 Performance Accuracy 20 Accidental Durability 30 Validated Power Unit - Dur Wash Test	5	90	Team recommends that the Development activities that the rubber under TSC and for be validated by testing on Inspection of the rubber after water test.	Application engineers the work Dot Van Pelmin 6-30-97	Records ******** updated to reflect new procedure	10	1	5	50
										Implement a robust design strategy that ensures that water cannot Ingress into the motor. -specify water -strategy.	Application engineers that work Dot Van Pelmin 10-1-97	Meet all and motor specification. The completion date 11/30/97				
										Implement an validated power unit wash test.	Larry Lepage 6-30-97	Part of Performance Standard test 10-97	10	1	5	50
			9		Motor Ingress into the motor Accelerated -amp burn plate -amplifier to connector seal -motor to connector connection -motor rivets -motor end seal	1	10 Automatic Deactivation 13 Overdrive Redundancy 37 Validated Durability 50 Splash Protection 30 Validated Power Unit - Dur Wash Test 67 Connector Protection	1	90	Implement an validated power unit wash test.	Larry Lepage 6-30-97	Part of Performance Standard test 10-97	10	1	5	50
										500 stickers put on the cap reminder.	Steve Hutchinson to verify 6-1-97	Implemented March 1997	10	2	2	40
										Implement a leak test seam to both mouth seam and other.	Steve Hutchinson 6-1-97	Provisit Inspection at Mouth Seam Implemented June 1997	10	2	2	40
										Investigate using white epoxy in combination with a rubber spacer to reduce gaps.	Steve Hutchinson 6-1-97	Implemented July 1997	10	2	2	40
										Investigate adding Loctite to motor box and rivets.	Dave Porter 6-1-97	Implemented June 1997	10	2	2	40
										Investigate adding rubber boot on housing screw assembly.	Don Ohm 8-15-97	Implemented completed all wet and white epoxy Si-rubber boot.	10	2	2	40

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Registered to: [illegible]

Potential
Failure Mode and Effects Analysis
(Design FMEA)

Ford

System
Subsystem
Component: Automotive Vehicle Speed Control Subsystem (VSCS)

Model Year/Vehicle(s): 1992 / Probably Explorer

Core Team: Phil Hubsch, Kerry Lotzog, Sue Hobson, Brooke Brooks, Mark Friedrich

FMEA Number:
Page 00 of 00
Prepared by:
FMEA Date (orig.): 1997.00.10 (rev.): 1997.10.10

Item / Function	Potential Failure Mode	Potential Effects of Failure	S e v	Potential Cause(s)/ Mechanism(s) of Failure	O c c	Current Design Controls	D e t	R.P.N.	Recommended Action(s)	Responsibility & Target Completion Date	Actions Taken	A c t i o n R e s u l t s: S e v	O c c	D e t	R.P.N.
			9	SC Extensive Corrosion -binding of mechanical components -bearing noises -inadequate sizing -bearing misadjustment -inadequate housing retainer -pulley not seated on shaft -inadequate attach retainer interface	3	0 Automatic Qualification 13 Qualification Subsystem 20 Combined Durability 24 HAS Pressure Shock Portion 25 HAS Pressure Approval 63 End of Line Test (EOLT) 64 Component Level QUTCH	2	360	Because of the low occurrence and detection ratings, the team has determined that no further actions are required.					
Runs out of coast with 10 mph below set speed.	Customer experiences loss of confidence in system-10 -possible safety issue -customer overrides required (this failure is only a severity 10 when the ABS and check switch have both failed)		10	SC Cable misposition-ed on servo pulley -cocked improperly	3	0 Automatic Qualification 13 Qualification Subsystem 20 Combined Durability 24 HAS Pressure Shock Portion 25 HAS Pressure Approval -cable inspection steps on cable -assembly fixture inspection 63 End of Line Test (EOLT)	3	90	Control SPC for occurrence on the failure mode and effect verbiage.	Sue Hobson 8-15-97				
									Implement a keyed cable slot connection cable to improve assistance to fitting.	Sue Hobson to verify 10-1-97	Implemented (see FMEA, page xxxx, where xxxx would contain the further evaluation results).	10	2	2	40
				SC Cable misposition-ed on throttle body	3	0 Automatic Qualification 13 Qualification Subsystem 20 Combined Durability 24 HAS Pressure Shock Portion 25 HAS Pressure Approval 63 End of Line Test (EOLT)	2	60	Based on current fastening capabilities occurrence rating of 2, and a detection rating of 3 appears to be adequate at this time.					
				SC Cable not routed on the accelerator Pedestal	6	0 Automatic Qualification 13 Qualification Subsystem 20 Combined Durability 24 HAS Pressure Shock Portion 25 HAS Pressure Approval 60 Customer Submission and QAR Qualification Changes 63 End of Line Test (EOLT)	2	60	Implement the current cable routing assignment and add to the process sheets.	Application Engineers who work Sue Hobson 9-15-97	Control actions to be an adjunct document completing for implementation starting September 1998.			
				SC Cable pinched in conduit	3	0 Automatic Qualification 13 Qualification Subsystem 20 Combined Durability 24 HAS Pressure Shock Portion 25 HAS Pressure Approval 63 End of Line Test (EOLT)	3	90	Implement a conduit slot in a bumper cover where automatic cable to prevent misadjustment.	Sue Hobson to verify 10-1-97	Implemented June 1997	10	1	3	30
				SC Cable pinched in conduit	3	0 Automatic Qualification 13 Qualification Subsystem 20 Combined Durability 24 HAS Pressure Shock Portion 25 HAS Pressure Approval 63 End of Line Test (EOLT) 64 Component Level QUTCH	3	90	Implement a new cable specification that includes a bend test on the conduit.	Sue Hobson 7-1-97	Validation testing on going. New completion date 10/10/97			
				SC Cable manufacturing defects -looped cores wires -kinked cores wires -kinked conduit wire -excess flash in cavities -cores sing in lost cables -broken -inadequate cable lubrication	3	0 Automatic Qualification 13 Qualification Subsystem 20 Combined Durability 24 HAS Pressure Shock Portion 25 HAS Pressure Approval 63 End of Line Test (EOLT) 64 Component Level QUTCH	3	90	Implement a new cable specification for enhanced product validation. Implement a bumper cover where automatic cable to improve assistance to fitting.	Sue Hobson 7-1-97 Sue Hobson to verify 10-1-97	Validation testing on going. New completion date 10/10/97 Implemented June 1997	10	1	3	30
				SC EMC susceptibility	3	00 Vehicle EMC	3	180	Because of the low occurrence and detection ratings, the team has determined that no further actions are required					

3713 1992

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Reviewed by: Gilligan Huey

Potential
Failure Mode and Effects Analysis
(Design FMEA)

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Component: Automatic vehicle speed control subsystem (VSC)

Design Responsibility: Vehicle Speed Control System Engineering

Key Date:

Prepared by:

Core Team: Pat Eshal, Larry Leroy, Jon Schein, Brette Brooks, Mark Friedrich

Item / Function	Potential Failure Mode	Potential Effects of Failure	S e v	C l a s s	Potential Cause/ Mechanism/ Failure	O c c u r	Current Design Controls	D e t	R P N	Recommended Actions	Responsibility & Target Completion Date	Actions Taken	S e v	O c c	D e t	R P N
					TC Inappropriate software logic	3	03 ETC/ECCM Control 11 Functional Evaluation 19 Benchmarking Data 20 Combined Durability 64 Component Level DVP&R	7	168	No further actions required.						
					Tr Water ingress into cable at housing temperatures	3	14 Performance Summary 20 Combined Durability 39 Underhood Power Wash - Car Wash Test	8	336	Ford recommends that the acceptance criteria for the water hoses P39 and P40 be modified to include an inspection of the cables after water test.	Application Engineer implements the work Dan Ben Mahsin 4-30-97	Chassis DVP&R updated to outline new procedure	10	1	3	30
										Implement a cable design strategy that ensures that water cannot ingress into the cable. - quantify cable attributes.	Application engineers that work for Ford Motorcraft 10-1-97	Test of new cable specifications. For completion date 12/15/97				
										Implement an underhood power wash test.	Doug Loring 9-22-97	Test of Performance chemicals test 12-97	10	1	8	80
					Tr Water ingress into the servo connection -cap loss plate -amplifier to actuator seal -cable to actuator connection -servo clevis -servo vee seal	3	6 Submersible Qualification 11 Functional Evaluation 20 Combined Durability 38 Splash Protection 39 Underhood Power Wash - Car Wash Test 63 Corrosion Protection	4	96	Implement an underhood power wash test.	Doug Loring 9-22-97	Test of Performance Chemicals test 12-97	10	1	8	80
										Add silicone gel to the cap cavities.	Chris Tabbutson to verify 8-1-97	Implemented patch 1997	10	1	3	30
										Implement a 1000 hour test at both North Penn and Plant.	Chris Tabbutson 8-1-97	Partial Acceptance at North Penn. Implemented June 1997	10	1	8	80
										Investigate using water spray to test connector with a sliding system to detect gaps.	Chris Tabbutson 8-1-97	Implemented July 1997	10	2	3	60
										Investigate adding sealant to cover gap and cracks.	Jane Turner 8-1-97	Implemented June 1997	10	1	8	80
										Investigate adding rubber boot to covering entire assembly.	Jon Wu 8-15-97	Implemented additional oil gel and white epoxy the rubber boot	10	1	3	30
					TC Actuator Servo -binding of mechanical components -bearing seizure -bearing wipe/rollover -bearing wipe/rollover -bearing retainer rollover -pulley not marked on shaft -improper clutch retainer interface	3	3 Potential Qualification 11 Functional Evaluation 20 Combined Durability 25 DFA Process Sheet Review 26 DFA Process Approval 32 End of Line Test Audit 64 Component Level DVP&R	9	216	Expansion of the low temperature and temperature ranges, also have the determined that no further actions are required.						

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Registered to: Prompter User

Filename:
C:\PROMPT\DATA\VSC 4-1 FMEA

3713 1983

Potential
Failure Mode and Effects Analysis
(Design FMEA)

ST13 1984

Potential
Failure Mode and Effects Analysis
(Design FMEA)

Item:
X Subsystem
Component: Automatic Vehicle Speed Control Subsystem (VSC)

Model Year/Vehicle(s): 1998 / P2000000@@@@

Core Team: Pat Eckel, Larry Lotzy, Dan Nelson, Bruce Brooks, Chuk Grindylo

Design Responsibility: Vehicle Speed Control System Engineering

Key Date:

FMEA Number:
Page 13 of 36
Prepared by:
FMEA Date Orig.(): 1997.02.12 (Rev.): 1997.12.30

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	C l a s s	Potential Cause(s)/ Mechanism(s) of Failure	O c c	Current Design Controls	D e t	R P N	Recommended Action(s)	Responsibility & Target Completion Date	Actions Taken	S e v	O c c	D e t	R P N
										Failure Mode FMEA	Owner Utilizes to verify 6-1-97	Implemented February 1997	9	4	1	36
					Sales Engineer Sets the value in Steering Compensator	1	10 Hardware or Software 20 Hardware or Wiring 30 Hardware Quasi Test - Car Test Test	3	30	Have responsible Sales Engineer check the parameter values for the entire 1998 and 2000 to establish an Analysis to Engineering of the values which cause crash.	Application Engineer who took Key Data Sales 6-30-97	Engineer review Updated to current Key parameters	9	1	3	27
										Implement a cable Pinion shaking Wheel sensor Test Engine Speed Sensor Test the cable. Assembly cable Validate.	Application Engineered Test Test for Sales 30-1-97	Test of new cable specification, Pre-Validation done 12/31/97				
										Implement an Accelerated power and crash test.	Quality Issues 6-30-97	Test of Accelerator Schematic test 30-97	9	1	3	27
					Sales Engineer Sets the Servo Spring Large plate -addition to Software read -cable to actuator -actuator -motor clevis -motor bus rod	3	1 Automobile Construction 10 Transmission Technology 20 Hardware Assembly 30 Hybrid Technology 40 Hardware Power Train - Car Test Test. 45 Conversion Instruction	4	480	Implement an Accelerated power and crash test.	Quality Issues 6-30-97	Test of Accelerator Schematic test 30-97	9	1	3	27
										Add stiffness and to the cap available.	Sales Technician to verify 6-1-97	Implemented March 1997	9	1	3	27
										Implement a 2000 Crash test on both Crash Tests and Sales.	Chuck Eckelman 6-1-97	Physical Inspection on Crash Tests Implemented June 1997	9	2	3	54
										Investigate using cable spring in combination with a stiffer spring to reduce spec.	Chuck Eckelman 6-1-97	Implemented July 1997	9	2	3	54
										Investigate adding bushing to motor gears and clevis.	Dave Wilcox 6-1-97	Implemented June 1997	9	2	3	54
										Investigate adding rubber boot to sticking cover assembly.	Dan Eck 6-30-97	Implemented enforcement pin and seal -Cable spring (1-stiffer) Used	9	2	3	54
	Does not disengage with shock pedal input.	Cruise disarticulation-s -Cost Cannot monitor deactivation switch -engine over-love	9		Cable misadjustment on Accel pedal -routed improperly	2	1 Automobile Construction 10 Transmission Technology 20 Hardware Assembly 30 Hybrid Technology 40 Hardware Power Train - -cable Acquisition stage -to cable -assembly fixtures Inspection 45 End of Line Test Data	4	72	Implement a Inspect cause when actuation cable to improve performance to Sticking.	Dan Nelson to verify 10-1-97	Implemented Date 1997	9	2	3	54
					Cable misadjustment on throttle body	2	1 Automobile Construction 10 Transmission Technology 20 Hardware Assembly 30 Hybrid Technology 40 Hardware Power Train 45 Hybrid Power Approval 45 End of Line Test Data	3	54	No factory solution required.						

3713 1995

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Registered to: FMEAplus User

Potential
Failure Mode and Effects Analysis
(Design FMEA)

System
X Subsystem
Component: Automatic Vehicle Speed Control Subsystem (PMI)

Design Responsibility: Vistron Speed Control System Engineering

Model Year/Vehicle(s): 1998 / Sebastian/Eclipse

Key Date:

Core Team: Pat Patel, Terry Lotray, Dan Peluia, Bonita Dundee, Mark Friedrich

Item Number:

Page 36 of 46

Prepared by:

FMEA Date (Orig.): 1997.09.22 (Rev.): 1997.10.30

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	C l a s s	Potential Cause(s)/ Mechanism(s) of Failure	O c c u r	Current Design Controls	D e t e c t	R.P.N.	Recommended Action(s)	Responsibility & Target Completion Date	Action Results	S e v	O c c u r	D e t e c t	R.P.N.
					Cable not routed on the combustion bracket	3	01 Schematic Examination 12 Construction Technology 22 Combined Durability 24 DFA Process Sheet Review 26 DFA Process Approval 28 Customer Selection and DFA Verification Tests 32 End of Line Test (EOL)	3	54	Implement the attach cable bracket onto Inspection tool and on the process sheets.	Application Engineers who work for Jon Schein 9-15-97	Assembly engineer is no longer involved in assembly for implementation starting September 1998.				
					Sharp positioned bracketwire	3	01 Schematic Examination 12 Construction Technology 22 Combined Durability 24 DFA Process Sheet Review 26 DFA Process Approval 32 End of Line Test (EOL)	4	72	Implement a bracketwire clip on a bracket area with insulation cable to prevent interconnection.	Jon Schein to verify 10-1-97	Implemented June 1997	3	3	3	27
					Cable pinched in bracket	3	01 Schematic Examination 12 Construction Technology 22 Combined Durability 24 DFA Process Sheet Review 26 DFA Process Approval 32 End of Line Test (EOL) 42 Component Level (CLV)	3	54	Implement a new cable specification sheet includes a load test on the conduit.	Jon Shu 7-1-97	Validation testing on going. New completion date 12/31/97				
					Cable manufacturing defects -Ragged cable wire -Kinked cable wire -Kinked conduit wire -Loose fitted to insulator -Cable clog in inner section gasket -Inadequate cable identification	3	01 Schematic Examination 12 Construction Technology 22 Combined Durability 24 DFA Process Sheet Review 26 DFA Process Approval 32 End of Line Test (EOL) 42 Component Level Review	3	54	Implement a new cable specification for combined product validation.	Jon Shu 7-1-97	Validation testing on going. New completion date 12/31/97				
					Wire incompatibility	1	21 Vehicle Use	1	9	Wire Current revision required.	Jon Schein to verify 10-1-97	Implemented June 1997	3	3	3	27
					Consumer abnormal testing of Vist pedals	2	No controls for this cause.			This has been determined to be a result of customer abuse outside of the normal combined design loads.						
					Inappropriate application -wrong brake input circuit	3	1 ES-SAE Control 2 ES/ECCES, Control 7 Functional Tests	3	63	Implement ESD guidelines for application checklist.	Jon Schein to verify 10-1-97	Implemented March 1997	3	3	3	27
										Increase power rating of FET.	Jimmy Williams to verify 9-1-97	Implemented April 1998	3	3	3	27
										Update Vendor DES.	Jimmy Williams to verify 9-1-97	Implemented February 1997	3	3	3	27
					Open circuit -Connector -Terminal -Switch	3	1 Circuit Control 2 Simulation Control 7 Functional Tests	3	63	No further revision required.						
					Wire ingress into the cable or fraying temperature	3	12 Endurance Testing 22 Combined Durability 32 Validated under Vist - Use Test	3	36	Test recommends that the acceptance criteria for the wiring bundle ESD must be modified to include an inspection of the cable after test used.	Application Engineers who work for Jon Schein 9-30-97	Currently ESD updated to current use procedure	3	3	3	27

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Potential
Failure Mode and Effects Analysis
(Design FMEA)

Ford

System
X Subsystem
Component: Automatic Vehicle Speed Control Subsystem (AVSC)
Model Year/Vehicle: 1998 / Contour/Mystique
Core Team: Pat Pshak, Larry Lahey, Tom Roberts, Austin Brooks, Mark Friedrich

Design Responsibility: Vietnam Speed Control System Engineering
Key Date

Prepared by:
Date Date (Orig.): 1997.08.15 (Rev.): 1997.10.30

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	Potential Cause(s)/ Mechanism(s) of Failure	O c c	Current Design Controls	D e t	R. P. N.	Recommended Action(s)	Responsibility & Target completion Date	Action Taken	S e v	O c c	D e t	R. P. N.
				Cable improper into the servo -corrosion -cap loss plate -splitter to actuator cont -cable to actuator connection -other rivets -other non seal	2	1 Actuator Qualification 13 Qualification Procedure 20 Combined Durability 30 Hub Pressure Sheet Review 40 Hub Pressure Approval 42 Corrosion Protection	6	156	Implement a cable design strategy that ensures that water cannot improve into the cable. -quality cable attitude.	Application Engineers that work for the vehicle 10-1-97	Work of new cable specification. New completion date 12/15/97				
									Implement an underhood power over work test.	Larry Lahey 9-15-97	Work of Environmental contents book EE-72	6	3	6	72
									Implement an underhood power over work test.	Larry Lahey 9-15-97	Work of Environmental contents book EE-72	6	10	5	30
									Add evidence put to the cap contact.	Chris Chikeleon to verify 9-1-97	Implemented March 1997	6	3	5	90
									Implement a 1000 hour test at both North York and Other.	Chris Chikeleon 9-1-97	Partial Completion at North York Implemented June 1997	6	3	5	90
									Investigate using cable epoxy in combination with a clutch spacer to prevent gaps.	Chris Chikeleon 9-1-97	Implemented July 1997	6	3	5	90
									Investigate adding Loctite to outer cut and chute.	Dave Parker 9-1-97	Implemented June 1997	6	3	5	90
									Investigate adding rubber boot to prevent water assembly.	Dan Kim 9-10-97	Implemented additional sil out and video epoxy 12+ cannot boot	6	3	5	90
Does not disengage when speed out of operational range.	Customer complaint -observed only by discriminating customer	5	No current actions required at this time.						No further actions required at this time.						
Does not disengage when the transmission is not in the top 2 drive gears.	Customer dissatisfaction-C -must select another -diminution method -engine over-revs	6	Cable misadjustment at servo pulley -normal improperly	2	1 Actuator Qualification 13 Qualification Procedure 20 Combined Durability 30 Hub Pressure Sheet Review 40 Hub Pressure Approval -cable inspection steps on cable -assembly fixture inspection 50 End of Line Test (EOL)	6	216	Implement a inspection when assembly cable to improve resistance to sticking.	Tom Roberts to verify 10-1-97	Implemented June 1997	6	3	6	216
				Cable misadjustment on throttle body	2	1 Actuator Qualification 13 Qualification Procedure 20 Combined Durability 30 Hub Pressure Sheet Review 40 Hub Pressure Approval 50 End of Line Test (EOL)	6	216	No further actions required.						
				Cable not routed to the accelerator bracket	2	1 Actuator Qualification 13 Qualification Procedure 20 Combined Durability 30 Hub Pressure Sheet Review 40 Hub Pressure Approval 45 Pressure Insertion and Hub Installation Torque 50 End of Line Test (EOL)	3	90	Implement the subject cable assembly cover inspection and add to the process sheets	Application Engineers the work for the vehicle 9-15-97	Revised address to a an subject feature regarding for implementation covering September 1998.				

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Potential
Failure Mode and Effects Analysis
(Design FMEA)

Ford

System
Subsystem
Component: Automatic Vehicle Speed Control Subsystem (VSC)
Model Year/Vehicle(s): 1998 / Futura00/Sp00
Core Team: Bob Abbott, Larry Estrup, Ken Roberts, Beatrice Brooks, Hugh Priddybib

Design Responsibility: Vicinity Speed Control System Engineering
Key Date:

FMEA Number:
Page 26 of 64
Prepared by:
FMEA Date (Orig.): 1997.02.13 (Rev.): 1997.10.10

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	Potential Cause(s)/ Mechanism(s) of Failure	O c c	Current Design Controls	D e t	R.P.N.	Recommended Action(s)	Responsibility & Target Completion Date	Action Taken	S e v	O c c	D e t	R.P.N.
				Ring positioned backwards	2	01 Schematic Examination 13 Distribution Embroidery 20 Subsystem Controllity 24 DES Designer Check Review 25 DES Designer Approval 40 End of Line Test (EOL)	4	48	Implement a maintenance sheet on a longer term wire connection cable to prevent misidentification.	Ken Abbott on 10/97 10-1-97	Implemented June 1997	6	2	4	48
				Cable placed in conduit	3	01 Schematic Examination 13 Investigation Embroidery 20 Subsystem Durability 24 DES Designer Check Review 25 DES Designer Approval 40 End of Line Test (EOL) 44 Component Level DVP&R	3	36	Implement a new cable specification sheet Ken Abbott & Brad Lent on the conduit.	Ken Abbott 9-1-97	Validation testing on going. The completion date is 12/15/97				
				Cable specification defects -Ringed core at ex -Kinked core at ex -Kinked conduit wire -Improper flash on cavities -Cables sing in lock motion device -Inadequate cable lubrication	4	01 Schematic Examination 13 Investigation Embroidery 20 Subsystem Durability 24 DES Designer Check Review 25 DES Designer Approval 40 End of Line Test (EOL) 44 Component Level DVP&R	3	36	Implement a new cable specification sheet Ken Abbott & Brad Lent on the conduit validation.	Ken Abbott 9-1-97	Validation testing on going. The completion date is 12/15/97				
									Implement a Design Review sheet submission cable to Support Engineering to Ken Abbott.	Ken Abbott on 10/97 10-1-97	Implemented June 1997	6	2	3	36
				Missing SMD connector -shrink.	3	20 Subsystem Durability 21 Cable DFC 22 Diagnostics	3	54	The consequence of a is here only because no appropriate data exists. Test data is needed before the consequence rating can be reviewed.						
Acceleration at higher set speed based on driver command. -Cause and Result -1 - 1.5 mph per second -120 Up: -2 mph per tap	Does not accelerate to higher set speed when commanded.	Loss of primary obligation	6	Sensor improper data the cable at freezing temperatures	1	01 SDM/ECCM Control 11 Functional Evaluation 13 Investigation Data 20 Subsystem Durability	3	18	The recommended that the acceptance criteria for the sensor tests 230 and 2030 be modified to include an inspection of the cables after sensor test.	Application engineer the work for Ken Abbott 9-30-97	Validation completed.	6	1	3	18
				Sensor improper data the sensor terminated -any loose pins -amplitude to actuator and -cable to actuator -connection -sensor sensor -sensor box seal	2	01 SDM/ECCM Control 11 Functional Evaluation 13 Investigation Data 20 Subsystem Durability 40 Calibration verification 44 Component Level DVP&R	3	36	No further actions required.						
				Connection cable short -cable -bent bracket	3	01 SDM/ECCM Control 11 Functional Evaluation 13 Investigation Data 20 Component Durability 22 Diagnostics	3	54	No further actions required.						
				Improper throttle geometry	3	01 SDM/ECCM Control 11 Functional Evaluation 13 Investigation Data 20 subsystem durability	3	54	No further actions required.						
				Improper supplier calibration	2	01 Subsystem Control 11 Functional Evaluation 13 Investigation Data 20 subsystem durability	3	36	No further actions required.						

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Potential
Failure Mode and Effects Analysis
(Design FMEA)

Ford

System
X Subsystem
Component: Automatic Vehicle Speed Control Subsystem (VSC)

Model Year/Vehicle(s): 1997 / Contour/Mystique

Core Team: Ron Polnik, Larry Lutjen, Tom Hobbins, George Brooks, Mark Pylanski

Design Responsibility: Vehicle Speed Control System Engineering

Key Date:

FMEA Number:
Page 37 of 45
Prepared By:
FMEA Date (Orig.): 1997.02.10 (Rev.): 1999.10.10

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	C l a s s	Potential Cause(s)/ Mechanism(s) of Failure	O c c u r	Current Design Controls	D e t e c t	R P N	Recommended Action(s)	Responsibility & Target Completion Date	Action Results: Actions Taken	S e v	O c c	D e t	R P N
					cable not routed on the accelerator bracket	1	P ant/anomic. Control FE Functional Evaluation DE Accelerator Note DD Outdoor Durability DS Diagnostics	1		No further actions required.						
					cable pinched on bracket	8	P ant/anomic. Control FE Functional Evaluation DE Accelerator Note DD outdoor Durability DS Diagnostics DC Component Level DVPOR	2	16	No further actions required.						
					Cable misadjusting (Effects -Stuck open when -Stuck open when -Stuck cracked when -cannot Clear DTC written -when ring is Not within design -Inadequate cable lubrication	8	P ant/anomic. Control FE Functional Evaluation DE Accelerator Note DD outdoor Durability DC Component Level DVPOR	2	16	No further actions required.						
					Wire incompatibility	4	P ant/anomic. Control FE Functional Evaluation DE Accelerator Note DD outdoor Durability DV Vehicle EMC	1		No further actions required.						
					Actuator Linkage -binding of mechanical components -binding motor -inadequate shaft -binding misadjusted -inadequate bearing retainer -pulley not seated on shaft -inadequate electric connector retainer	1	P ant/anomic. Control FE Functional Evaluation DE Accelerator Note DD Outdoor Durability DS Diagnostics DC Component Level DVPOR	2		No further actions required.						
					Inaccurately reads the speed sensor input	2	P ant/anomic. Control FE Functional Evaluation DE Acceleration Note DD Outdoor Durability	2		No further actions required.						
					Improper speed sensor output	1	P ant/anomic. Control FE Functional Evaluation DE Acceleration Note DD Outdoor Durability	2		No further actions required.						
					Inappropriate software logic	1	P ant/anomic. Control FE Functional Evaluation DE Acceleration Note DD Outdoor Durability DC Component Level DVPOR	2	4	No further actions required.						
					Inadequate vehicle ambient test	10	P ant/anomic. Control FE Functional Evaluation DE Acceleration Note DD Outdoor Durability DS Design Responsibility Module	4	80	It has been determined that this Group is outside of the control of the speed control design team. However, we will interface with the PATS engineering/design team.						

Potential
Failure Mode and Effects Analysis
(Design FMEA)

Item: Speed Subsystem
Component: Automotive Vehicle Speed Control Subsystem (VSC)
Model Year/Vehicle(s): 1998 / XXXXXXXX/XXXXX
Core Team: Dan Schuh, Larry Lolroy, Jan Ochsin, Arnie Brooks, Mark Friedrich

Design Responsibility: Vehicle Speed Control System Engineering
Key Date:

Page: 00 of 00
Prepared by:
FMEA Date (Orig.): 1997.00.00 (Rev.): 1997.00.00

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	C l a s s	Potential Cause(s)/ Mechanism(s) of Failure	O c c u r	Current Design Controls	D e t.	R. P. N.	Recommended Action(s)	Responsibility & Target Completion Date	Actions Taken	Actions Results: S e v	O c c u r	D e t.	R. P. N.
					Inadvertent switch activation/ deactivation		01 Functional Verification 02 Accelerated Life Testing 03 Subsystem Testing 04 Vehicle Testing			Do not have Environmental Test data. Data Covers 2x lifetime of the product of the speed control design. However, we will coordinate with the switch engineering/design team.						
					Intermittent switch function		01 Functional Verification 02 Accelerated Life Testing 03 Subsystem Testing 04 Vehicle Testing			Do not have Environmental Test data. Data Covers 2x lifetime of the product of the speed control design. However, we will coordinate with the switch engineering/design team.						
					Servo wiring and binding		01 Functional Verification 02 Accelerated Life Testing 03 Subsystem Testing			No further actions required.						
					Throttle wiring and binding		01 Functional Verification 02 Accelerated Life Testing 03 Subsystem Testing			No further actions required.						
	Inadvertent or no release of one/more switches when pressure is applied to brake pedal				Improper amplifier calibration		01 Functional Verification 02 Accelerated Life Testing 03 Subsystem Testing			No further actions required.						
					Inadequate throttle opening		01 Functional Verification 02 Steady State Control 03 Accelerated Life Testing 04 Vehicle Speed Loss vs. Grade 05 Performance Stability 06 Subsystem Durability			No further actions required.						
					Servo wiring and binding		01 Functional Verification 02 Accelerated Life Testing 03 Subsystem Testing			No further actions required.						
					Throttle wiring and binding		01 Functional Verification 02 Accelerated Life Testing 03 Subsystem Testing			No further actions required.						

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Potential
Failure Mode and Effects Analysis
(Design FMEA)

FMEA Number:
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Prepared by:
FMEA date (Orig.): 1997.02.12 (Rev.): 1997.10.28

System
Subsystem
Component: Automatic Vehicle Speed Control Subsystem (PWM)
Design Responsibility: Visteon Speed Control System Engineering
Model Year/Vehicle(s): 1998 / Windstar/Sigma
Key Date
Core Team: Pat Nebel, Larry Zeleny, Dan Nebzen, Dennis Dymsza, Mark Griesbach

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	Potential Cause(s)/ Mechanism(s) of Failure	O c c	Current Design Controls	D e t	R. P. N.	Recommended Action(s)	Responsibility & Target Completion Date	Action Results Actions Taken	S e v	O c c	D e t	R. P. N.
				Valve improperly mates the cable to the throttle body		1 EEC/PCM Control 10 Environmental Accuracy 20 Combined Durability 30 Calibrated Power Test - Car Road Test			Have environmental test the acceptance criteria for the valve tests #20 and #30 be modified to include an inspection of the cable/valve retention?	Application engineers the work for Dan Nebzen 1-30-97	Currently under update to reflect new procedure				
									Implement a cable design strategy that ensures that cable cannot slip/pop out of the valve. -specify cable attribute.	Application engineers that work for Dan Nebzen 10-1-97	Part of new cable specification. New completion date 12/15/97				
									Implement an calibrated power pot road test.	Larry Zeleny 9-30-97	Part of Accelerator Pedal's test 12-97	8	2	7	112
	Valve ingests into the servo Connector -cap loss plate -applied to actuator seal -cable to actuator connection -valve rivets -valve vac seal	7			2	1 EEC/PCM Control 2 Actuator Qualification 13 Qualification Redundancy 14 Re/Improve Accuracy 20 Combined Durability 40 Splash Protection 50 Calibrated Power Test - Car Road Test 60 Corrosion Protection		196	No further actions required.						
	Cable pinched by cowling	7			1	1 EEC/PCM Control 2 Manual Qualification 13 Qualification Redundancy 20 Combined Durability 30 DFA Process Sheet Review 40 DFA Process Approval 45 End of Line Test (EOL) 50 Component Level Switch		98	Implement a new cable specification that includes a pinch test on the cowling.	Dan Nie 7-1-97	Validation testing on going. New completion date 12/15/97				
	Cable insufficiently durable -frayed core wire -kinked core wire -kinked conduit wire -improper flash on carriage -core slug to jack screw -broken -inadequate cable lubrication	10			1	1 EEC/PCM Control 2 Actuator Qualification 13 Qualification Redundancy 20 Combined Durability 30 DFA Process Sheet Review 40 DFA Process Approval 45 End of Line Test (EOL) 50 Component Level Switch		10	Implement a new cable specification for additional product validation.	Dan Nie 7-1-97	Validation testing on going. New completion date 12/15/97				
									Implement a longer core wire extension cable to improve resistance to binding.	Dan Nebzen to specify 10-1-97	Implemented June 1997	8	1	1	8
	Not manufacturable	1			1	1 EEC/PCM Control 20 Vehicle Use		10	Because of the low occurrence and detection ratings, the team has determined that no further actions are required.						
	Actuator Issues -binding of mechanical components -bearing noises -inadequate stalling -bearing misalignment -inadequate bearing retainer -pulley not secured on shaft -incorrect stiction resistor tolerance	7			2	1 EEC/PCM Control 2 Actuator Qualification 13 Qualification Redundancy 20 Combined Durability 30 DFA Process Sheet Review 35 DFA Process Approval 45 End of Line Test (EOL) 50 Component Level Switch		98	No further actions required.						

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Potential Failure Mode and Effects Analysis (Design FMEA)

Item Number:
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Prepared by:
FMEA Date (Orig.): 1997.08.01 (Rev.): 1997.08.19

Subsystem
Component: Automatic Vehicle Speed Control Subsystem (AVSC)
Model Year/Vehicle(s): 1998 / Navigator
Key Date: Pat Hahnk, Terry Leipzig, Ken Hahnik, Bernie Brooks, Hank Friedrich

Design Responsibility: Vehicle Speed Control System Engineering

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	S e v	Class	Potential Cause(s)/ Mechanism(s) of Failure	O c c	Current Design Controls	D e t	R.P.N.	Recommended Action(s)	Responsibility & Target Completion Date	Action Results: Actions Taken	S e v	O c c	D e t	R.P.N.
					Incorrectly reads the speed sensor input	3	10 HSM/ECCM Control 9 HSMSM Control 11 Functional Evaluation 12 Accleration Rate 20 Subland Durability	1	330	No further actions required.						
					Improper speed sensor output	3	1 HSM/ECCM Control 9 HSMSM Control 11 Functional Evaluation 12 Accleration Rate 20 Subland Durability	1	330	No further actions required.						
					Inappropriate software logic	3	1 HSM/ECCM Control 9 HSMSM Control 11 Functional Evaluation 12 Accleration Rate 20 Subland Durability 40 Component Level HSMSM	1	330	No further actions required.						
					Inadequate switch tactile feel	3	1 HSM/ECCM Control 9 HSMSM Control 11 Functional Evaluation 12 Accleration Rate 20 Subland Durability 40 Design Compatibility Review	1	330	No further actions required.						
					Inadequate switch audible feedback	3	1 HSM/ECCM Control 9 HSMSM Control 11 Functional Evaluation 12 Accleration Rate 20 Subland Durability 40 Design Compatibility Review	1	330	No further actions required.						
					Intermittent switch function	3	9 HSMSM Control 11 Functional Evaluation 12 Accleration Rate 20 Subland Durability 40 Component Level Switch	1	330	No further actions required.						
	Continues to accelerate beyond the desired set speed.	Increase unpredictable loss of confidence in system-10 -potential safety issue -customer dissatisfaction	10		Electric welding and binding	1	1 HSM/ECCM Control 11 Functional Evaluation 12 Accleration Rate 20 Subland Durability	1	330	Due to the low detection and occurrence ratings, no further actions are required at this time.						
					Servo welding and binding	1	1 HSM/ECCM Control 11 Functional Evaluation 12 Accleration Rate 20 Subland Durability	1	330	Due to the low detection and occurrence ratings, no further actions are required at this time.						
					Cable adjustment not secure fully -worn pulley -worked improperly	1	0 Schematic Verification 13 Specification Engineering 20 Subland Durability 202 DFA Process Sheet Review 30 PPA Process Approval -cable inspection design at cable -assembly fixture inspection 33 End of Line Test (EOL)	4	80	Control DFA for consideration on the failure mode and effect workups.	Ken Hahnik 5-15-97					
										Implement a jiggle test like automatic cable to improve resistance to binding.	Ken Hahnik to verify 05-1-97	Implemented June 1997	10	1	8	80

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Potential
Failure Mode and Effects Analysis
(Design FMEA)

Item: Automatic Vehicle Speed Control Subsystem (PSCS)
Model Year/Vehicle(s): 1993 / FORNEBA/ESPIP
Key Team: Bob Hubak, Larry Lutzey, Jan Hubaim, Yvette Brooks, Mark Friedrich

Design Responsibility: Vision Speed Control System Engineering
Key Date:

FMEA Number:
Page 34 of 48
Prepared by:
FMEA Date (Orig.): 1997.02.13 (Rev.): 1997.10.19

Item / Function	Potential(s) Failure Mode	Potential Effect(s) of Failure	S e v	Potential Cause(s)/ Mechanism(s) of Failure	O c c	Current Design Controls	D e t	R. P. N.	Recommended Action(s)	Responsibility & Target completion Date	Action Taken	S e v	O c c	D e t	R. P. N.
				W/ cable misposition/rout on chassis body	1	01 Automatic Installation 13 Installation Redundancy 20 Combined Durability 30 DVA Process Check Review 35 DVA Process Approval 40 End of Line Test (EOL)	3	120	Due to the low detection and occurrence ratings, no further actions are required at this time.						
				W/ cable not routed on the accelerator bracket	1	01 Automatic Installation 13 Installation Redundancy 20 Combined Durability 30 DVA Process Check Review 35 DVA Process Approval 40 Fastener Retention and DVA Installation Audit 45 End of Line Test (EOL)	1	20	Implement the subject cable routing upon completion and add to the process sheets.	Application Engineer who work for the cable 9-15-97	Routing updated to be as subject drawing requiring the implementation starting September 1997.				
				W/ sharp positioned hardware	3	01 Automatic Installation 13 Installation Redundancy 20 Combined Durability 30 DVA Process Check Review 35 DVA Process Approval 40 End of Line Test (EOL)	4	240	Implement a protective sleeve on a longer dash wire extension cable to prevent misplacement.	Jan Hubaim to verify 10-1-97	Implemented June 1997	10	3	8	240
				W/ Cable pinched in conduit	1	01 Automatic Installation 13 Installation Redundancy 20 Combined Durability 30 Dyn Process Check Review 35 DVA Process Approval 40 End of Line Test (EOL) 01 Engineers Level (ELS)	1	20	Implement a new cable specification that includes a final test on the conduit.	Jan Hub 7-1-97	Validation testing on going. Est completion date 12/15/97				
				W/ Cable overstretching outputs -Looped wire wire -Kinked wire wire -Pinched conduit wire -Loose fluid in conduit -Loose plug in test motion device -Inadequate cable lubrication	3	01 Automatic Installation 13 Installation Redundancy 20 Combined Durability 30 Dyn Process Check Review 35 DVA Process Approval 40 End of Line Test (EOL) 01 Engineers Level (ELS)	3	60	Implement a new cable specification that validated process validation. Implement a longer wire extension cable to improve assistance to driving.	Jan Hub 7-1-97 Jan Hubaim to verify 10-1-97	Validation testing on going. Est completion date 12/30/97 Implemented June 1997	10 10	3 3	8 8	240 240
				W/ Cable Support into cable at Steering Compartment	1	10 Performance Testing 20 Combined Durability 30 Combined Power Test - One Shift Test	8	160	Have engineering check the acceptance criteria for the cables tests 202 and 203 be modified to include an inspection of the cables after testing test.	Application Engineer who work for the Cables 9-30-97	Change to ELS, updated to reflect new procedure	10	1	8	80
									Implement a cable design strategy that reduces that cable cannot [illegible] into the cable. -Quality cable attitude	Application engineers that work for the cables 10-1-97	Part of new cable specification. Est completion date 12/15/97				
									Implement an endurance power and test test.	Larry Lutzey 9-15-97	Part of Accelerator Controls test 10-77	10	1	8	80

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