

EA02-025

FORD 10/27/03

APPENDIX N

BOOK 23 OF 61

PART 1 OF 5

> would assume the parts are functional. There is no specified
> inductance on
> the clutch, because it varies with gear position (open or
> closed).
> If R
> is important to check functionality of these parts, bring them
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> and I can bench test them for you. Are these parts off vehicles,
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You
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> 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@viateconet.com Phone:
> 313-390-8874

> 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

> > t.y.l.
> > Regards,
> > Wes (W. D.) Boyer Phone: (313)

> 248-8417
> > Viatecon Automotive Systems Fax: (313)
> 322-3529

> > Precision Speed Control - Electronic Design E-mail:
> WBoyer1@viatecon.com

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

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

> > ty
> > > Regards, Fred Kohl, Precision Speed Control (Panther)
> > > PROFS ID: FKOHL Phone TBD Pager (888) 377-8280
> > > IBM Mail(USFMCBJZ)
> > > Mailing Address: ETC C375
> > > *** Forwarding note from SREIMERS--DRBN007 02/16/99 12:38 ***
> > > To: FKOHL -DRBN007

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

> > > Subject: RE: Speed control servo
> > > These are from MY92 and 93. No known failures. Just want to

know

> If
> > there
> > clutch control function has degraded.
> >
> > Steve Reimers building 5 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.H.)
> > SREIMERS--FORDMAIL Reimers, Steve (S.
> >
> > From: Boyer, Wes (W.D.)
> > Subject: RE: Speed control servo
> >
> > I'll send a copy of the complete clutch-dump analysis when I

get

> in on

> > Wednesday.
> >
> > What model year clutches are we talking about? And, Why from
the > > junkyard?

> >
> > Wes
> > w.d.boyer@leea.org
> > ---Original Message---
> > From: Schrody, Thomas (T.P.)
> > To: Boyer, Wes (W.D.)
> > Sent: 2/16/99 10:13 AM
> > Subject: FW: Speed control servo

> >
> > Wes,

> >
> > I don't think you're in today, but if you are... Could you

respond

> to

> > Steve Reimers? I'm busy at NPEF and will return tomorrow.

> >
> > ---Original Message---
> > From: Fred Kohl
> > To: tschrody@visteon.com
> > Cc: dbudzyna@visteon.com; fkoht@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) 377-8280
> > IBM Mail(U9FMCBJZ)
> > Mailing Address: ETC C375
> > *** Forwarding note from SREIMERS--DRBN007 02/16/99 18:14 ***
> > To: FKOHL --DRBN007

> >
> > FROM: Steve Reimers USAET(UTC

-05:00)

> > Subject: Speed control servo
> > What is the inductance and resistance of the clutch? What is

used
 > to
 > > clamp the
 > > flyback voltage? What is the magnitude of the flyback
 voltage?
 > > I have collected at least ten speed servos from junk yards.
 Can
 > you test
 > > them f
 > > or function?
 > >
 > > Steve Reimers building 5 3C043
 > > AVT Chassis E/E System Applications mail drop 5011
 > > 39-03286 SREIMERS sreimers@ford.com fax 39-03286 >

Attachments sent separately:

| Data Type | File Name |
|-----------|-----------------|
| BINARY | CL_82R44.PDF_PC |

Schrody, Thomas (T.P.)

From: Porter, David (D.L.)
 Sent: Friday, February 19, 1999 2:50 PM
 To: Fred Kohl (E-mail)
 Cc: Tom Schrody (E-mail)
 Subject: Vehicle Teardown Data

Here is revised matrix with data on clutch flyback circuit added.



veh matrix.doc

Schrody, Thomas (T.P.)

From: Steve Reimers [SREIMERS.DRBN007@ovvm.gw.ford.com]
 Sent: Friday, February 19, 1999 7:38 AM
 To: JNEME.DRBN005@ovvm.gw.ford.com; slerouch@mail.ford.com; FPORTER.DRBN007@ovvm.gw.ford.com; RENGLIS1.DRBN005@ovvm.gw.ford.com; SSALTER.DRBN005@ovvm.gw.ford.com; NLAPPOINT.DRBN005@ovvm.gw.ford.com; TMASTERS.DRBN005@ovvm.gw.ford.com; JKAFATI.DRBN004@ovvm.gw.ford.com; SREIMERS.DRBN007@ovvm.gw.ford.com; tschrody@viateon.com; FKOHL.DRBN007@ovvm.gw.ford.com; TBAZIL.DRBN005@ovvm.gw.ford.com; JMCINERN.DRBN005@ovvm.gw.ford.com; dbudzyne@viateon.com; patokee@viateon.com; DGOEL.DRBN005@ovvm.gw.ford.com; LBROWN.DRBN005@ovvm.gw.ford.com; SCOLE1.DRBN005@ovvm.gw.ford.com; HWELFERS.DRBN005@ovvm.gw.ford.com; GSTEVEN1.DRBN005@ovvm.gw.ford.com; WABRAMCZ.DRBN005@ovvm.gw.ford.com; MREESE.DRBN005@ovvm.gw.ford.com; arahman@email.mt.com; rsharpe@email.mt.com
 Subject: DOW Rep Meeting



02-23-99.YCS

Requester: Steve Reimers
 Date to be scheduled: 02/23/99

Starting time: 09:00 AM
Ending time: 11:00 AM
Recurrence: Single event

Location: bldg 5 3A017

Subject: DOW Rep Meeting

Purpose: Discuss with DOW the brake pressure switch.
Attend Only if interested in materials questions?

Recurrence: Single event

Schrody, Thomas (T.P.)

From: Fred Kohl [fkohl@gw.ford.com]
Sent: Friday, February 19, 1999 10:40 AM
To: dporter1@visteon.com; tschrody@visteon.com
Cc: cbudzyna@visteon.com; fkohl@gw.ford.com
Subject: Speed control clutches

Can you get parts for TI testing of the brake pressure switch?
Five clutches

Regards, Fred Kohl, Precision Speed Control (Panther)
PROFS ID: FKOHL Phone TBD Pager (888) 377-8280
IBM Mail(USFMCBJZ)
Mailing Address: ETC C375
*** Forwarding note from @REIMERS-DRBN007 02/18/99 17:38 ***
To: FKOHL -DRBN007

FROM: Steve Reimers USAET(UTC -05:00)
Subject: Speed control clutches
I need 5 clutches to send to TI so they have the correct load for there testing
. Of course I really needed them yesterday.

Steve Reimers building 5 3C049
AVT Chassis E/E System Applications mail drop 5011
39-03288 @REIMERS sreimers@ford.com fax 39-03288 >

Schrody, Thomas (T.P.)

From: Fred Kohl [fkohl@gw.ford.com]
Sent: Friday, February 19, 1999 10:38 AM
To: dporter1@visteon.com; tschrody@visteon.com
Cc: cbudzyna@visteon.com; fkohl@gw.ford.com
Subject: Speed control report

Info needed in report for Brake Pressure investigation.

Regards, Fred Kohl, Precision Speed Control (Panther)
PROFS ID: FKOHL Phone TBD Pager (888) 377-8280
IBM Mail(USFMCBJZ)
Mailing Address: ETC C375
*** Forwarding note from @REIMERS-DRBN007 02/18/99 17:48 ***
To: FKOHL -DRBN007

FROM: Steve Reimers USAET(UTC -05:00)
Subject: Speed control report
Please include the functional status of the fly-back circuit in the report of t

has the returned units. ALSO..any FRACAS activity to report?

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

Schrody, Thomas (T.P.)

From: Steve Reimers [sreimers@gw.ford.com]
Sent: Thursday, February 18, 1999 5:46 PM
To: wboyer1@visteon.com
Cc: fkohl@gw.ford.com; tschrody@visteon.com
Subject: RE: Speed control servo

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

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
39-03286 SREIMERS sreimers@ford.com fax 39-03286 >
*** Forwarding note from WBOYER1 --VISTEON 02/17/99 10:58 ***

To: DPORTER1--VISTEON Porter, David (D.L. SREIMERS--FORDMAIL Reimers, Steve (S.
cc: FKOHIL --FORDMAIL Kohl, Fred (F.H.) TSCHRODY--VISTEON Schrody, Thomas (T
DBUDZYSN--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_82n44.pdf>>

Regards,
Wes (W. D.) Boyer Phone: (313) 248-0417
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.)
> 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
> MHL This is measured at 1 KHz and in parallel.

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

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

> From: Steve Reimers [SMTP:sreimers@gw.ford.com]
> Sent: Wednesday, February 17, 1999 8:53 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 mill-Henry as the minimum
> test Induc
> tance for life testing. Is this a good number? Can you measure the
> Inductance
> to establish a minimum and maximum?
>
> Steve Reimers building 5 3C049
> AVT Chassis E/E System Applications mail drop 5011
> 38-03286 SREIMERS reimers@ford.com fax 38-03286 ;>
> *** Forwarding note from DPORTER1-VISTEON 02/17/99 08:18 ***
> To: SREIMERS-FORDMAIL Reimers, Steve (S.
> oc: FKOHL -FORDMAIL Fred Kohl (E-mail) WBOYER1 -VISTEON Wes
> Boyer (E-mail)

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

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> Steve, the clutch resistance should be in the neighborhood of 24
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> Fax
> 313-322-3529

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> > 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
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> > > Sent: Tuesday, February 16, 1999 3:48 PM
> > > To: wboyer1@visteon.com; tachrody@visteon.com

> Subject: RE: Speed control servo
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> tyf
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> Regards, Fred Kohl, Precision Speed Control (Panther)
> PROFS ID: FKOHL Phone TBD Pager (888) 377-8280
> IBM Mail(USFMCBJZ)
> Mailing Address: ETC C375
> *** Forwarding note from SREIMERS-DRBN007 02/16/99 12:38 ***
> To: FKOHL -DRBN007
>
> FROM: Steve Reimers USAET(UTC -05:00)
> Subject: RE: Speed control servo
> These are from MY92 and 93. No known failures. Just want to know
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> clutch control function has degraded.
>
> Steve Reimers building 5 3C043
> AVT Chassis E/E System Applications mail drop 5011
> 99-03288 SREIMERS sreimers@ford.com fax 99-03288 >
> *** 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.H.)
> SREIMERS-FORDMAIL Reimers, Steve (S.
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> From: Boyer, Wes (W.D.)
> Subject: RE: Speed control servo
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> I'll send a copy of the complete clutch-dump analysis when I get
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> Wednesday.
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> w.d.boyer@leas.org
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> From: Schrody, Thomas (T.P.)
> To: Boyer, Wes (W.D.)
> Sent: 2/16/99 10:13 AM
> Subject: FW: Speed control servo
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> -----Original Message-----
> From: Fred Kohl
> To: tschrody@visteon.com
> Cc: dbudzyns@visteon.com; fkohl@gw.ford.com; sreimers@gw.ford.com
> Sent: 2/16/99 7:59 AM
> Subject: Speed control servo
>
> Can you answer Steve questions?
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> Regards, Fred Kohl, Precision Speed Control (Panther)
> PROFS ID: FKOHL Phone TBD Pager (888) 377-8280
> IBM Mail(USFMCBJZ)

> > Mailing Address: ETC C375
 > > *** Forwarding note from SREIMERS--DRBN007 02/15/99 18:14 ***
 > > To: FKOHL -DRBN007
 > >
 > > FROM: Steve Reimers USAET(UTC -05:00)
 > > Subject: Speed control servo
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 > > Steve Reimers building 5 3C049
 > > AVT Chassis E/E System Applications mail drop 6011
 > > 39-03286 SREIMERS sreimers@ford.com fax 39-03286 ;>

Attachments sent separately:

| Data Type | File Name |
|-----------|-----------------|
| BINARY | CL_82R44.PDF_PC |

Schrody, Thomas (T.P.)

From: Boyer, Wes (W.D.)
 Sent: Wednesday, February 17, 1999 10:57 AM
 To: Porter, David (D.L.); Reimers, Steve (S.J.)
 Co: Kohl, Fred (F.H.); Schrody, Thomas (T.P.); Budzynski, Dan (D.J.)
 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@tees.org)

---Original Message---

From: Porter, David (D.L.)
 Sent: Wednesday, February 17, 1999 10:29 AM
 To: Steve Reimers
 Co: 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 6S-112 MH. This is measured at 1 KHz and in parallel.

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

---Original Message---

From: Steve Reimers (SMTP:sreimers@gw.ford.com)
 Sent: Wednesday, February 17, 1999 9:59 AM
 To: dporter1@visteon.com; kohl@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 mill-Henry as the minimum test inductance for life testing. Is this a good number? Can you measure the inductance to establish a minimum and maximum?

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
39-03288 BREIMERS sreimers@ford.com fax 39-03286 >
*** Forwarding note from DPORTER1-VISTEON 02/17/99 08:18 ***
To: BREIMERS-FORDMAIL Reimers, Steve (S.
cc: FKOHL -FORDMAIL Fred Kohl (E-mail) WBOYER1 -VISTEON Wes Boyer (E-mail)

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

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

Dave Porter dporter1@visteon.com Phone: 313-380-8674 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) 248-8417
> 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@lese.org)

>

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

> From: Fred Kohl [SMTP:fkohl@gw.ford.com]
> Sent: Tuesday, February 16, 1999 3:45 PM
> To: wboyer1@visteon.com; techrody@visteon.com
> Subject: RE: Speed control servo

>

> fyi

>

> Regards, Fred Kohl, Precision Speed Control (Panther)
> PROFS ID: FKOHL Phone TBD Pager (888) 377-8280
> IBM Mail(USFMCBJZ)
> Mailing Address: ETC C375
> *** Forwarding note from BREIMERS-DRBN007 02/16/99 12:38 ***
> To: FKOHL -DRBN007

>

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

Schrody, Thomas (T.P.)

From: Fred Kohl [fkohl@gw.ford.com]
Sent: Wednesday, February 17, 1999 9:56 AM
To: dporter1@visteon.com
Cc: fkohl@gw.ford.com; dbudzyns@visteon.com; techrody@visteon.com; wboyer1@visteon.com; sreimers@gw.ford.com
Subject: FW: Speed control servo

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

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

Regards, Fred Kohl, Precision Speed Control (Panther)
PROFS ID: FKOHL Phone TBD Pager (888) 377-6280
IBM Mail(USFMCBJZ)
Mailing Address: ETC C375
*** Forwarding note from DPORTER1-VISTEON 02/17/99 09:18 ***
To: SREIMERS-FORDMAIL Reimers, Steve (S.
cc: FKOHL -FORDMAIL Fred Kohl (E-mail) WBOYER1 -VISTEON Wes Boyer (E-mail)

From: Porter, David (D.L.)
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Dave Porter dporter1@Visteon.com Phone: 313-390-8674 Fax 313-322-3529

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- > w.d.boyer@lae.org)
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- > Sent: Tuesday, February 16, 1999 3:48 PM
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> Subject: RE: Speed control servo
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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 CS75
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 > To: FKOHL --DRBN007
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 > FROM: Steve Reimers USAET(UTC -05:00)
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 > Steve Reimers building 5 3C043
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 > 39-03286 SREIMERS sreimers@ford.com fax 39-03286 >
 > *** Forwarding note from FKOHL --FORDMAIL 02/16/99 10:39 ***
 > To: TSCHRODY--VISTEON Schrody, Thomas (T
 > cc: DBUDZYNS--VISTEON Budzynski, Dan (D. FKOHL --FORDMAIL Kohl, Fred
 > (F.H.)
 > SREIMERS--FORDMAIL Reimers, Steve (S.
 >
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 > Subject: RE: Speed control servo
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 > I'll send a copy of the complete clutch-dump analysis when I get in on
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 >
 > What model year clutches are we talking about? And, Why from the
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 > Wes
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 > ---Original Message---
 > From: Schrody, Thomas (T.P.)
 > To: Boyer, Wes (W.D.)
 > Sent: 2/16/99 10:13 AM
 > Subject: FW: Speed control servo
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 > Wes,
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 > 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.
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 > From: Fred Kohl
 > To: tschrody@visteon.com
 > Cc: dbudzyns@visteon.com; fskohl@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: ETC CS75
 > *** Forwarding note from SREIMERS--DRBN007 02/16/99 18:14 ***
 > To: FKOHL --DRBN007
 >

> FROM: Steve Reimers USAET(UTC -05:00)
> Subject: Speed control servo
> What is the inductance and resistance of the clutch? What is used to
> clamp the
> flyback voltage? What is the magnitude of the flyback voltage?
> I have collected at least ten speed servos from junk yards. Can you test
> them f
> or function?
>
> Steve Reimers building 5 3C043
> AVT Chassis E/E System Applications mail drop 5011
> 39-03286 SREIMERS sreimers@ford.com fax 39-03286 >

----- Part 2

MIME-version: 1.0
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Content-Transfer-Encoding: base64

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Schrody, Thomas (T.P.)

From: Fred Kohl [fkohl@gw.ford.com]
Sent: Monday, February 15, 1999 9:29 AM
To: tschrody@visteon.com
Cc: fkohl@gw.ford.com
Subject: RE: More Questions

Tom, I told Steve that the customer would not know if or internal driver for the clutch output was stuck on. The BCO 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: FK0HL Phone TBD Pager (888) 377-8280
IBM Mail(USFMCBJZ)
Mailing Address: ETC C375
*** Forwarding note from SREIMERS-DRBN007 02/15/99 08:57 ***
To: FK0HL --DRBN007

*** Reply to note of 02/15/99 08:21
FROM: Steve Reimers USAET(UTC -05:00)
Subject: RE: More Questions
If the clutch output driver gets stuck "ON" would the customer be aware of it?
Would the speed control detect this fault? ...light a warning lamp? ...log a fault code? Any action on FRACAS?

Steve Reimers building 6 3C043

AVT Chassis E/E System Applications mail drop 5011
99-03288 SREIMERS sreimers@ford.com fax 99-03288 >

Schrody, Thomas (T.P.)

From: Fred Kohl [fkohl@gw.ford.com]
Sent: Monday, February 15, 1999 8:19 AM
To: sreimers@gw.ford.com
Cc: dbudzyna@viateon.com; tschrody@viateon.com; fkohl@gw.ford.com
Subject: Alternate Deac Switch

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

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

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

Regards, Fred Kohl, Precision Speed Control (Panther)
PROFS ID: FKOHL Phone TBD Pager (888) 377-8280
IBM Mail(USFMCBJZ)
Mailing Address: ETC C375
*** Forwarding note from SREIMERS-DRBN007 02/13/99 16:43 ***
To: FKOHL -DRBN007

FROM: Steve Reimers USAET(UTC -05:00)
Subject: Alternate Deac Switch
Is the brake pedal mounted switch a viable replacement for the Pressure switch as far as the speed control electronics is concerned? Is this switch input compatible with the speed controls in 92 and 93 town cars?

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
99-03288 SREIMERS sreimers@ford.com fax 99-03288 >

Schrody, Thomas (T.P.)

From: Fred Kohl [fkohl@gw.ford.com]
Sent: Friday, February 12, 1999 3:39 PM
To: tschrody@viateon.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 help with the time between BOO signal and when software turns off (de-energize) the clutch circuit. What does the software say?
Also, is the timing different is we get a De-act switch signal?

Regards, Fred Kohl, Precision Speed Control (Panther)
PROFS ID: FKOHL Phone TBD Pager (888) 377-8280
IBM Mail(USFMCBJZ)
Mailing Address: ETC C375
*** Forwarding note from SREIMERS-DRBN007 02/09/99 16:08 ***

To: FKOHL -DRBN007

FROM: Steve Reimers
Subject: More Questions

USAET(UTC -05:00)

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 BCO turns off the clutch drive
output and when the Brake P switch opens?
thanks,

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
39-03288 SREIMERS sreimers@ford.com fax 39-03288 ;>

Schrody, Thomas (T.P.)

From: Steve Reimers [SREIMERS.DRBN007@ovvm.gw.ford.com]
Sent: Thursday, February 11, 1999 10:00 AM
To: JNEME.DRBN005@ovvm.gw.ford.com; slerouch@mail.ford.com; FPORTER.DRBN007
@ovvm.gw.ford.com; RENGLEB1.DRBN005@ovvm.gw.ford.com; SBALTER.DRBN005
@ovvm.gw.ford.com; NLAPPOINT.DRBN005@ovvm.gw.ford.com; TMASTERS.DRBN005
@ovvm.gw.ford.com; JKAFATI.DRBN004@ovvm.gw.ford.com; SREIMERS.DRBN007
@ovvm.gw.ford.com; tschrody@viateon.com; FKOHL.DRBN007@ovvm.gw.ford.com;
TBAZIL.DRBN005@ovvm.gw.ford.com; JMCINERIN.DRBN005@ovvm.gw.ford.com;
doudzyns@viateon.com; polokas@viateon.com; DGOEL.DRBN005@ovvm.gw.ford.com;
LBROWN.DRBN005@ovvm.gw.ford.com; SCOLE1.DRBN005@ovvm.gw.ford.com;
HWELFERS.DRBN008@ovvm.gw.ford.com; GSTEVEN1.DRBN005@ovvm.gw.ford.com;
WABRAMCZ.DRBN005@ovvm.gw.ford.com
Subject: Brake Pressure Switch

02-17-99, 9:02

Requester: Steve Reimers
Date to be scheduled: 02/17/99
Starting time: 02:00 PM
Ending time: 04:00 PM
Recurrence: Single event

Location: building 5 3A039
Subject: Brake Pressure Switch
Purpose: Weekly team meeting.
Recurrence: Single event

Schrody, Thomas (T.P.)

From: Steve Reimers [SREIMERS.DRBN007@ovvm.gw.ford.com]
Sent: Tuesday, February 08, 1999 7:14 AM
To: JNEME.DRBN005@ovvm.gw.ford.com; slarouch@mail.ford.com; FPORTER.DRBN007@ovvm.gw.ford.com; RENGUS1.DRBN005@ovvm.gw.ford.com; SSALTER.DRBN005@ovvm.gw.ford.com; NLAPONT.DRBN005@ovvm.gw.ford.com; TMASTERS.DRBN005@ovvm.gw.ford.com; JKAFATLDRBN004@ovvm.gw.ford.com; BREIMERS.DRBN007@ovvm.gw.ford.com; techrody@visteon.com; FKOHL.DRBN007@ovvm.gw.ford.com; TBAZL.DRBN005@ovvm.gw.ford.com; JMCINERN.DRBN005@ovvm.gw.ford.com; dbudzyns@visteon.com; petakoe@visteon.com; DGOEL.DRBN005@ovvm.gw.ford.com; LBROWN.DRBN005@ovvm.gw.ford.com; SCOLE1.DRBN005@ovvm.gw.ford.com; HWELFERS.DRBN006@ovvm.gw.ford.com; GSTEVEN1.DRBN005@ovvm.gw.ford.com; WABRAMCZ.DRBN005@ovvm.gw.ford.com
Subject: Brake Pressure Switch

19-10-29.VCM

Requester: Steve Reimers
Date to be scheduled: 02/10/99
Starting time: 02:00 PM
Ending time: 03:00 PM
Recurrence: Single event

Location: bldg 5 3A017

Subject: Brake Pressure Switch

Purpose: Review work plan status.
Plan for Tech. Review on Thursday 2/11/99.

Recurrence: Single event

Schrody, Thomas (T.P.)

From: Steve Reimers [sreimers@gw.ford.com]
Sent: Friday, February 05, 1999 4:53 PM
To: jneme@gw.ford.com; slarouch@mail.ford.com; fporter@gw.ford.com; rengle1@gw.ford.com; ssalter@gw.ford.com; nlapoint@gw.ford.com; tmasters@gw.ford.com; jkafat@gw.ford.com; techrody@visteon.com; fkoehl@gw.ford.com; tbazl@gw.ford.com; jmcinern@gw.ford.com; dbudzyns@visteon.com; petakoe@visteon.com; dgoel@gw.ford.com; lbrown@gw.ford.com; scole1@gw.ford.com; hweller3@ecmc1.dearborn.ford.com; gsteven1@gw.ford.com
Subject: PG File(s) sent to you..

This file lists the actions, champion and target date for the Brake Pressure Sw
itch investigation. The next meeting is tentatively set for 2/16/99 afternoon.
A meeting notice will be sent if there is going to be a meeting.

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
39-09288 SREIMERS sreimers@ford.com fax 39-09288 >

Schrody, Thomas (T.P.)

From: sreimers@gw.ford.com
Sent: Friday, February 05, 1999 4:48 PM
To: tschrody@viateon.com
Subject: File BRKPSW.DOC_PC


tschpwr.doc

Schrody, Thomas (T.P.)

From: Stokes, Paul (P.D.)
Sent: Thursday, February 04, 1999 5:00 PM
To: Schrody, Thomas (T.P.)
Cc: Huberts, Garlan (G.J.)
Subject: FW: Brake Pressure Switch

Tom: The reason this meeting notice was sent to you is because at a meeting today (2/4) same subject which Dan Budzynski and I attended, we were asked to volunteer some people from speed control to help with this investigation. You (for module) and Fred (for system) were nominated.

AVT, chassis electronics is leading this effort. I think they will be doing most of the work but they may need some help with some speed control specific items. Note that the speed control is NOT suspected as the root cause of this investigation. However, the brake pressure switch is and we are the sole user of the brake pressure switch.

Yes, I intentionally left out what the investigation is all about. See me for details.

Original Message

From: Steve Reimers [SMTP:SREIMERS.DRBND07@ovm.gw.ford.com]
Sent: Thursday, February 04, 1999 11:48 AM
To: CSTEVEN7.DRBND08@ovm.gw.ford.com; JNENL.DRBND05@ovm.gw.ford.com; elarouch@mail.ford.com; PPORTER.DRBND07@ovm.gw.ford.com; RINGLIB1.DRBND06@ovm.gw.ford.com; SSALTER.DRBND06@ovm.gw.ford.com; NLAPONT.DRBND06@ovm.gw.ford.com; TMASTERS.DRBND06@ovm.gw.ford.com; JKAFATI.DRBND04@ovm.gw.ford.com; SREIMERS.DRBND07@ovm.gw.ford.com; tschrody@viateon.com; FKCHL.DRBND07@ovm.gw.ford.com; TBAZL.DRBND05@ovm.gw.ford.com; JMCINERL.DRBND06@ovm.gw.ford.com; dbudzyna@viateon.com; patokas@viateon.com; DGCCL.DRBND06@ovm.gw.ford.com; LBNOWN.DRBND06@ovm.gw.ford.com; SCOLE1.DRBND06@ovm.gw.ford.com; HWELFERS.DRBND06@ovm.gw.ford.com
Subject: Brake Pressure Switch

Requester: Steve Reimers
Date to be scheduled: 02/05/99
Starting time: 02:00 PM
Ending time: 03:00 PM
Recurrence: Single event

Location: building 5 3A039

Subject: Brake Pressure Switch

Purpose: Develop Work Plan.


02-05-99.vcp

Recurrence: Single event

Schrody, Thomas (T.P.)

From: Brette Brooks [bbrooks1@gw.ford.com]
Sent: Friday, April 23, 1999 3:54 PM
To: tschrody@visteon.com
Cc: [dollnak@gw.ford.com; dial@gw.ford.com]
Subject: PSC DEAC CIRCUIT CURRENT REQUIREMENTS CLARIFICATION

Tom,

Could you please verify the PSC clutch deactivation circuit current carrying requirements? Please break it down by nominal versus max current and how they may or may not affect the PSC KO loads. Might as well list the KO loads also!

Thanks Tom!

Regards,
Brette Brooks
VISTEON LLCVC Speed Control Systems Engineering
Phone (313) 390-7962, Fax 390-6151

Schrody, Thomas (T.P.)

From: Fred Kohl [fkohl@gw.ford.com]
Sent: Thursday, March 25, 1999 4:13 PM
To: bbrooks1@gw.ford.com; amulder1@gw.ford.com; cnguyen2@visteon.com; cpeter13@gw.ford.com; dbudzyna@visteon.com; doufnabe@visteon.com; droemer@visteon.com; ghuberts@visteon.com; jolkalo@visteon.com; jcul@visteon.com; jshahan@visteon.com; jkane2@visteon.com; lboney@gw.ford.com; mikozzykos@visteon.com; mnajlma@visteon.com; rwalliser@visteon.com; rdomino@visteon.com; rhippley@gw.ford.com; rwaldron@visteon.com; arahalm@visteon.com; stangler@gw.ford.com; tschrody@visteon.com
Subject: Speed Control Deact Brake Pressure Switch (Field Fix)

I sent you a Word file: BRKRelay.doc to be reviewed.

There is a issue with the Brake Pressure switch on older Town Cars (1992 & 1993). These switches are failing. Looks like a field fix maybe required. One of the possible solutions is to add a relay to the deact switch circuit (speed control servo clutch circuit).

The attached file shows the current wiring schematic and the proposed schematic.

The actual relay has not been selected. This is a concept at this time. The relay contacts will close when the ignition is turned ON. The contacts will open with actuation of the deact switch or the ignition is turned OFF.

Note: There is a potential for this fix to go on other model years and on other vehicle lines that use/used brake pressure deact switches.

Scott Simpson asked me to send this proposed change to all application / design/ software engineers for comments.

Please send comments to Fred Kohl (FKOHL). If you have any questions, please call me. (313) 32-21801.

Regards,___ Fred Kohl, Precision Speed Control (Panther)

PROFS ID: FKOHL Phone (313) 32-21801 Pager (888) 377-8280
IBM Mail(USFMCBJZ)
Mailing Address: EVB, 1WE06



Schrody, Thomas (T.P.)

From: Fred Kohl [fkohl@gw.ford.com]
Sent: Tuesday, March 09, 1999 2:48 PM
To: sreimers@gw.ford.com; mreeese@gw.ford.com; jkafati@gw.ford.com
Cc: fporter@gw.ford.com; tbazil@gw.ford.com; jevans8@gw.ford.com; dsylves1@f1627.pd2.ford.com; dbudzyna@visteon.com; bpeasa@gw.ford.com; tschrody@visteon.com; fkohl@gw.ford.com
Subject: Brake Desc Switch Re-location

Want to clarify who has D&R for electrical deactivation switch, it is AVT.
The current electrical deact switch is released by AVT, believe Mike Salanta is the engineer; MSALANTA 1-313-8454007

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

Regards, Fred Kohl, Precision Speed Control (Panther)
PROFS ID: FKOHL Phone TBD Pager (888) 377-8280
IBM Mail(USFMCBJZ)
Mailing Address: ETC C378

*** Forwarding note from SREIMERS--DRBN007 03/08/99 18:05 ***
To: FKOHL -DRBN007 TSCHRODY-VISTEON

FROM: Steve Reimers USAET(UTC -05:00)
Subject: Brake Desc Switch Re-location
The D&R is from Visteon. Who do you recommend to do the package review of Mart y's switch relocation design?

Steve Reimers building 5 3E008
AVT Chassis E/E System Applications mail drop 5011
39-08288 SREIMERS sreimers@ford.com fax 39-08288 >
*** Forwarding note from MREESE --DRBN005 03/08/99 15:48 ***
To: SREIMERS--DRBN007
cc: TBAZIL -DRBN006 DSYLVE81--DRBN005
JEVANS8 -DRBN005 BPEASE -DRBN005
AZAPARAC--DRBN005 FPORTER -DRBN007

FROM: M. P. REESE USAET(UTC -06:00)
Subject: Brake Desc Switch Re-location

STEVE, I HAVE NO PROBLEM WITH JOE, BRUCE, OR AL LOOKING AT THE DESIGNER'S TUBE TO SEE THE PACKAGE AVAILABLE AROUND THE 1992/94 TOWN CAR BRAKE PEDAL AND BRACKET ASSEMBLY (-2480-), BUT THEY ARE NOT THE RELEASE ACTIVITY THAT WOULD TRY TO RELEASE AN ELECTRICAL SWITCH INTO THAT ENVIRONMENT. SPEED CONTROL IS THAT RELEASE ACTIVITY.

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

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

- * EARLY PRODUCTION VEHICLES USED A VACUUM DUMP VALVE, ON THE BRAKE PEDAL AND BRACKET ASSEMBLY. PAGE 10-03B-1.
 - * LATE PRODUCTION VEHICLES, LIKE 1983 AND 1984 MODEL TOWN CAR, "THE SYSTEM OPERATES INDEPENDENT OF ENGINE VACUUM, THEREFORE NO VACUUM LINES ARE REQUIRED."
- THIS WAS NOT A JOB #1 CHANGE. THAT HISTORY I DO NOT HAVE.
THIS IS ANOTHER PLACE WHERE THE SPEED CONTROL RELEASE ENGINEER COULD HELP;
THAT IS, EXACTLY WHEN EARLY PRODUCTION STOPPED AND LATE PRODUCTION STARTED
(VIN, DATE, ETC.).

Regards,
M. P. Reese 313-317-7142 (313-621-8875 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from SREIMERS-DRBN007 03/08/99 15:11 ***
To: MREESE -DRBN005
cc: JEVANS -DRBN005 BPEASE -DRBN005
AZAPARIAC-DRBN005 TBAZIL -DRBN005
FPORTER -DRBN007 Porter, F.J. JKAFATI -DRBN004

FROM: Steve Reimers USAET(UTC -05:00)
Subject: Brake Deac Switch Re-location
Please contact Joe Evans, Bruce Pease, and A. Zaprockas when you are ready for the check. These guys should be able to provide a good sanity check.

Steve Reimers building 5 3E006
AVT Chassis E/E System Applications mail drop 5011
39-03288 SREIMERS sreimers@ford.com fax 39-03288 >
*** Forwarding note from MREESE -DRBN005 03/06/99 17:33 ***
To: SREIMERS-DRBN007
cc: TBAZIL -DRBN005 LSMITH9 -DRBN005
DSYLVEST-DRBN006

FROM: M. P. REESE USAET(UTC -05:00)
Subject: Brake Deac Switch Re-location, 1982/1983/1984 TOWN CAR

STEVE, PANTHER SERVICE MANUALS PROVIDE A LITTLE MORE LIGHT:
* 1983 MODEL (ON PAGE 10-03-1, SPEED CONTROL SYSTEM) AND 1984 MODEL (ON PAGE 10-03-1, SPEED CONTROL SYSTEM - ELECTRONIC) MANUALS CONTAIN THIS SENTENCE, "THE SYSTEM OPERATES INDEPENDENT OF ENGINE VACUUM, THEREFORE NO VACUUM LINES ARE REQUIRED."
* I WILL FIND AND CHECK A 1982 MODEL MANUAL.
THIS SOMEWHAT SUPPORTS A SPACE BEING AVAILABLE ON THE TOWN CAR BRAKE PEDAL AND BRACKET ASSEMBLY. I WILL TRY TO BE READY, WHEN SOMEONE COMES TO CHECK.

Regards,
M. P. Reese 313-317-7142 (313-621-8875 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from SREIMERS-DRBN007 03/05/99 17:24 ***
To: JKAFATI -DRBN004
cc: FPORTER -DRBN007 Porter, F.J. MREESE -DRBN005
FKOHL -DRBN007

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

Steve Reimers building 5 3E006
AVT Chassis E/E System Applications mail drop 5011
39-03288 SREIMERS sreimers@ford.com fax 39-03288 >
*** Forwarding note from MREESE -DRBN005 03/05/99 14:27 ***
To: SREIMERS-DRBN007
cc: TBAZIL -DRBN005 LSMITH9 -DRBN005

DSYLVEST-DRBN008

WLIVINGS-DRBN005

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

STEVE, THERE IS A PLACE FOR A SWITCH TO BE LOCATED ON THE 1992/1993/1994 TOWN CAR BRAKE PEDAL ASSEMBLY. IT IS THE "KEYHOLE" IN THE PEDAL ASSEMBLY'S BRACKET, WORKING WITH THE FLAT SURFACE ON THE PLASTIC ADAPTER (ON THE PEDAL ASSEMBLY'S ARM). THESE FEATURES WERE USED TO MOUNT THE VALVE ASSEMBLY - SPEED CONTROL (-9C727-) AND THE CLIP - SPEED CONTROL VACUUM VALVE (-9C888-) ON OTHER MODEL YEAR/CARLINE PANTHER CARS. SWITCH AND WIRING CLEARANCE TO STEERING COLUMN CRUSH ZONE WILL DEPEND ON DIMENSIONS OF SWITCH TO BE USED, AND WIRING ROUTING. (THE 1999 MODEL SWITCH, AT THIS LOCATION, DOES INTERFERE WITH THE CRUSH ZONE.) A DIFFERENT/NEW SWITCH WILL BE NEEDED.

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

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

Regards,
M. P. Reese 313-317-7142 (313-621-8675 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from MREESE -DRBN005 03/01/99 12:24 ***
To: SREIMERS-DRBN007 FPORTER -DRBN007
cc: TBAZIL -DRBN005 JNEME -DRBN005

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

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

Regards,
M. P. Reese 313-317-7142 (313-621-8675 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from SREIMERS-DRBN007 02/27/99 16:19 ***
To: MREESE -DRBN005
cc: FPORTER -DRBN007 Porter, F.J.

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

Steve Reimers building 5 3E006
AVT Chassis E/E System Applications mail drop 5011
99-03288 SREIMERS sreimers@ford.com fax 99-03288 >
*** Forwarding note from MREESE -DRBN005 02/27/99 16:19 ***
To: SREIMERS-DRBN007
cc: TBAZIL -DRBN005 LSMITH9 -DRBN005

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

I AM OPTIMISTIC ABOUT ABILITY TO PACKAGE THE CURRENT PRODUCTION SWITCH ON

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

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

ALWAYS, I MUST CONSIDER EFFECTS ON FMVSS 105. VEHICLE TEST, BRAKE SYSTEM.

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

Regards,
M. P. Reese 313-317-7142 (313-821-8876 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from SREIMERS-DRBN007 02/26/99 15:39 ***
To: MREESE -DRBN005

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

Steve Reimers building 5 3C049
AVT Chassis E/E System Applications mail drop 6011
39-03286 SREIMERS sreimers@ford.com fax 39-03286 >

Schrody, Thomas (T.P.)

From: Fred Kohl [fkohl@gw.ford.com]
Sent: Tuesday, March 09, 1999 8:30 AM
To: sreimers@gw.ford.com
Cc: tschrody@visteon.com; dbudzyns@visteon.com; fkohl@gw.ford.com; mreeese@gw.ford.com
Subject: Brake Desc Switch Re-location

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

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

Regards, Fred Kohl, Precision Speed Control (Panther)
PROFS ID: FKOHL Phone TBD Pager (888) 377-8280
IBM Mail(USPMCBJZ)
Mailing Address: ETC C375
*** Forwarding note from SREIMERS-DRBN007 03/08/99 16:08 ***
To: FKOHL -DRBN007 TSCHRODY-VISTEON

FROM: Steve Reimers USAET(UTC -05:00)
Subject: Brake Desc Switch Re-location
The D&R is from Visteon. Who do you recommend to do the package review of Mart y's switch relocation design?

Steve Reimers building 5 3E008
AVT Chassis E/E System Applications mail drop 5011
39-03286 SREIMERS sreimers@ford.com fax 39-03286 >
*** Forwarding note from MREESE -DRBN005 03/08/99 16:49 ***
To: SREIMERS-DRBN007

cc: TBAZIL -DRBN005
JEVANS8 -DRBN006
AZAPARAC-DRBN005

DSYLVE31-DRBN006
BPEASE -DRBN006
FPORTER -DRBN007

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

STEVE, I HAVE NO PROBLEM WITH JOE, BRUCE, OR AL LOOKING AT THE DESIGNER'S TUBE TO SEE THE PACKAGE AVAILABLE AROUND THE 1992/3/4 TOWN CAR BRAKE PEDAL AND BRACKET ASSEMBLY (-2460-), BUT THEY ARE NOT THE RELEASE ACTIVITY THAT WOULD TRY TO RELEASE AN ELECTRICAL SWITCH INTO THAT ENVIRONMENT. SPEED CONTROL IS THAT RELEASE ACTIVITY.

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

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

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

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

Regards,
M. P. Reese 313-317-7142 (313-621-6675 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from SREIMERS-DRBN007 03/06/99 15:11 ***

To: MREESE -DRBN005
cc: JEVANS8 -DRBN005 BPEASE -DRBN006
AZAPARAC-DRBN005 TBAZIL -DRBN005
FPORTER -DRBN007 Porter, F.J. JKAFATI -DRBN004

FROM: Steve Reimers USAET(UTC -05:00)
Subject: Brake Deac Switch Re-location
Please contact Joe Evans, Bruce Pease, and A. Zaprawka when you are ready for the check. These guys should be able to provide a good sanity check.

Steve Reimers building 5 3E006
AVT Chassis E/E System Applications mail drop 8011
38-06266 SREIMERS areimers@ford.com fax 38-06266 ;>
*** Forwarding note from MREESE -DRBN005 03/06/99 17:33 ***

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

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

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

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

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

FROM: Steve Reimers USAET(UTC -06:00)
Subject: Brake Dec Switch Re-location
Joe, Can you do the checking that Marty is requesting? Do you know who the design and release engineer(s) is for the brake pedal mounted switch and the harness?

Steve Reimers building 5 SE008
AVT Chassis E/E System Applications mail drop 5011
39-03286 SREIMERS sreimers@ford.com fax 39-03286 :>
*** Forwarding note from MREESE -DRBN005 03/05/99 14:27 ***
To: SREIMERS-DRBN007
cc: TBAZIL -DRBN006 LSMITH9 -DRBN005
DSYLVEST-DRBN008 WLIVINGS-DRBN005

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

STEVE, THERE IS A PLACE FOR A SWITCH TO BE LOCATED ON THE 1992/1993/1994 TOWN CAR BRAKE PEDAL ASSEMBLY. IT IS THE "KEYHOLE" IN THE PEDAL ASSEMBLY'S BRACKET, WORKING WITH THE FLAT SURFACE ON THE PLASTIC ADAPTER (ON THE PEDAL ASSEMBLY'S ARM). THESE FEATURES WERE USED TO MOUNT THE VALVE ASSEMBLY - SPEED CONTROL (-9C727-) AND THE CLIP - SPEED CONTROL VACUUM VALVE (-9C968-) ON OTHER MODEL YEAR/CARLINE PANTHER CARS. SWITCH AND WIRING CLEARANCE TO STEERING COLUMN CRUSH ZONE WILL DEPEND ON DIMENSIONS OF SWITCH TO BE USED, AND WIRING ROUTING. (THE 1998 MODEL SWITCH, AT THIS LOCATION, DOES INTERFERE WITH THE CRUSH ZONE.) A DIFFERENT/NEW SWITCH WILL BE NEEDED.

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

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

Regards,
M. P. Reese 313-317-7142 (313-821-6676 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from MREESE -DRBN005 03/01/99 12:24 ***
To: SREIMERS-DRBN007 FPORTER -DRBN007
cc: TBAZIL -DRBN005 JNEME -DRBN005

FROM: M. P. REESE USAET(UTC -06:00)
Subject: Brake Dec Switch Re-location - DESIGN ORDER

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

Regards,
M. P. Reese 313-317-7142 (313-821-6676 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from SREIMERS-DRBN007 02/27/99 16:19 ***
To: MREESE -DRBN005

cc: FPORTER -DRBN007 Porter, F.J.

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

Steve Reimers building 5 3E008
AVT Chassis E/E System Applications mail drop 5011
39-03288 SREIMERS sreimers@ford.com fax 39-03288 >
*** Forwarding note from MREESE -DRBN005 02/27/99 16:13 ***
To: SREIMERS-DRBN007
cc: TBAZIL -DRBN005 LSMITH9 -DRBN005

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

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

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

ALWAYS, I MUST CONSIDER EFFECTS ON FMVSS 105. VEHICLE TEST, BRAKE SYSTEM.

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

Regards,
M. P. Reese 313-317-7142 (313-621-8875 FAX)
OPD LVC - Brakes Mail Drop 1229 BUILDING 2 24M31
*** Forwarding note from SREIMERS-DRBN007 02/25/99 16:39 ***
To: MREESE -DRBN005

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

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
39-03288 SREIMERS sreimers@ford.com fax 39-03288 >

Schrody, Thomas (T.P.)

From: Boyer, Wee (W.D.)
Sent: Monday, March 01, 1999 12:59 PM
To: Schrody, Thomas (T.P.)
Subject: FW: Speed control servo

Tom,
Could you check Trevor Williams' file to answer this question?
I don't have any records except my analyses.
Wee
w.d.boyer@lee.org

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

From: Steve Reimers
To: wboyer1@visteon.com
Cc: fkohl@gw.ford.com; techrody@visteon.com; gdygert@visteon.com; ghuberts@visteon.com; Porter, F.J.
Sent: 2/25/99 4:15 PM
Subject: RE: Speed control servo

Thanks for the technical info. Did the bad R44 NGSC batch include any MY92 or MY 93 Town cars built after 11/1/91? If so, was there any corrective action for the vehicles already delivered? Also, are there other failure modes internal to the NGSC which result in the clutch coil being energized when it should be off?

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
39-03286 SREIMERS sreimers@ford.com fax 39-03286 >
*** Forwarding note from WBOYER1 -VISTEON 02/25/99 15:51 ***
To: SREIMERS--FORDMAIL Reimers, Steve (S.)
cc: FKOHL --FORDMAIL Kohl, Fred (F.H.) TSCHRODY--VISTEON Schrody, Thomas (T)
GDYGERT --VISTEON Dygert, Greg (G.J.) DBUDZYNS--VISTEON Budzynski, Dan (D.)
GHUBERTS--VISTEON Huberts, Garlen (G)

From: Boyer, Wee (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 - Decc node (our J1-9 terminal) when the clutch is engaged and switched off by the external BPS. With the flyback clamping resistor in place, the transient is limited to a relatively clean, exponentially decaying impulse peaking at about -50 volts, with or without the 22 nF capacitor in our module, confirming my description of 2/22/1999.

Without the 82 ohm resistor and diode across the clutch winding, the voltage

is an underdamped oscillation that theoretically peaks at ± 1000 volts and whose envelope decays exponentially. It is very likely that the switch and/or capacitor (rated at 100 volts dc, 200 v pk) would break down at a much lower voltage. The energy stored in the clutch winding could cause the switch to arc. For this to occur the ignition must be ON and speed control must have been "SET" (or #1 fault = shorted MOSFET driver) AND the flyback resistor, R44, is open (fault #2) AND the brake pressure builds up to open the switch. If fault #1 occurs without the switch opening, a continuous current of about 0.6 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, Garlen (G.J.) and/or Dyer, Greg (G.J.) with any reply or response to this message.

Regards,
Wes (W. D.) Boyer Phone: (313) 248-8417
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@lee.org)

> —Original Message—

> From: Steve Reimers [SMTP: sreimers@gw.ford.com]
> Sent: Monday, February 22, 1999 12:18 PM
> To: wboyer1@visteon.com
> Cc: fkoehl@gw.ford.com
> Subject: RE: Speed control servo
>
> Can you model this with the flyback resistor disconnected?
>
> Steve Reimers building 5 8C045
> AVT Chassis E/E System Applications mail drop 5011
> 39-03288 SREIMERS sreimers@ford.com fax 39-03288 >
> *** 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.H.) 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 V_{batt} level,
> "charging" the inductance at zero [the V_{ds(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 I²R drop across the
- > clamping resistor. There will be a small difference in the dynamics
- > due
- > to
- > a capacitor at the BPS-Desc node that doesn't enter the picture when
- > the
- > FET
- > is switched. I will look into that on Wednesday.

- >
- > Wes
- > w.d.boyer@lss.org

- >
- > —Original Message—
- > From: Steve Reimers
- > To: wboyer1@viston.com
- > Cc: fkoehl@gw.ford.com; tschrody@viston.com
- > Sent: 2/18/99 5:46 PM
- > Subject: RE: Speed control servo

- >
- > Please re-run this model with the following condition: No Fly-back and
- > FET always
- > 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 3C049
- > AVT Chassis E/E System Applications mail drop 5011
- > 38-03286 SREIMERS sreimers@ford.com fax 38-03286 >
- > *** Forwarding note from WBOYER1 -VISTEON 02/17/99 10:58 ***
- > To: DPORTER1-VISTEON Porter, David (D.L. SREIMERS-FORDMAIL Reimers,
- > Steve (S.
- > cc: FKOHL -FORDMAIL Kohl, Fred (F.H.) TSCHRODY-VISTEON Schrody,
- > Thomas (T
- > DBUDZYNIS-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.pdb>>

- >
- > Regards,
- > Wes (W. D.) Boyer Phone: (313)
- > 248-9417
- > Visteon Automotive Systems Fax: (313)
- > 322-3529
- > Precision Speed Control - Electronic Design E-mail:
- > WBoyer1@viston.com
- > (Usually at work, Wednesday + Thursday, only; Personal e-mail:
- > w.d.boyer@lss.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
- > 68-112

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

>>
>> Dave Porter dporter1@Visteon.com Phone: 313-390-8874
>> Fax
>> 313-322-3529

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

>> From: Steve Reimers [SMTP:areimers@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 mill-Henry as the
> minimum
>> test Induc

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

>> the
>> inductance
>> to establish a minimum and maximum?

>> Steve Reimers building 5 3C043
>> AVT Chassis E/E System Applications mail drop 6011
>> 39-03286 SREIMERS areimers@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) WBOYER1 -VISTEON

Was
>> Boyer (E-mail)

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

>> Steve, the clutch resistance should be in the neighborhood of
24

>> Ohms. If
>> the clutch winding is intact, and nothing is mechanically
> damaged,
>> etc. I

>> would assume the parts are functional. There is no specified
>> inductance on
>> the clutch, because it varies with gear position (open or
> closed).

>> If it
>> is important to check functionality of these parts, bring them
> to
>> our lab,

>> and I can bench test them for you. Are these parts off
vehicles,

> or
>> just
>> unused parts that have been lying in a corner for a few years?

> You
>> did not
>> mention motor phase inductance or resistance. Generally, the
> motors
>> are OK

>> If they rotate freely, and the three phases all have a

> resistance of
>> about
>> 2.5 Ohms.
>>
>> Dave Porter dporter1@visteon.com Phone:
> 313-390-8674
>> Fax
>> 313-322-3529
>>
>> > —Original Message—
>> > From: Boyer, Wes (W.D.)
>> > Sent: Wednesday, February 17, 1999 8:06 AM
>> > To: Porter, David (D.L.)
>> > Subject: FW: Speed control servo
>> >
>> >
>> > f.y.i.
>> > Regards,
>> > Wes (W. D.) Boyer Phone: (313)
>> 248-8417
>> > 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@lee.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)
>> > PROFS ID: FKOHL Phone TBD Pager (888)
377-8250
>> > IBM Mail(USFMCBJ2)
>> > Mailing Address: ETC C375
>> > *** Forwarding note from SREIMERS--DRBN007 02/16/99 12:38
**
>> > To: FKOHL --DRBN007
>> >
>> > FROM: Steve Reimers USAET(UTC
-05:00)
>> > Subject: RE: Speed control servo
>> > These are from MY92 and 93. No known failures. Just want
to
>> know
>> if
>> > there
>> > clutch control function has degraded.
>> >
>> > Steve Reimers building 5 3C043
>> > AVT Chassis E/E System Applications mail drop 5011
>> > 39-03286 SREIMERS sreimers@ford.com fax 39-03286
**
>> > *** Forwarding note from FKOHL --FORDMAIL 02/16/99 10:33
**
>> > To: TSCHRODY-VISTEON Schrody, Thomas (T

>> > cc: DBUDZYNS-VISTEON Budzynski, Dan (D. FKOHL -FORDMAIL
> Kohl,
>> Fred
>> > (F.H.)
>> > SREIMERS-FORDMAIL Reimers, Steve (S.
>> >
>> > From: Boyer, Wee (W.D.)
>> > Subject: RE: Speed control servo
>> >
>> > I'll send a copy of the complete clutch-dump analysis when
-
> 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.P.)
>> > To: Boyer, Wee (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: dbudzyns@visteon.com; kohl@gw.ford.com;
>> > sreimers@gw.ford.com
>> > Sent: 2/16/99 7:58 AM
>> > Subject: Speed control servo
>> >
>> > Can you answer Steve questions?
>> >
>> > Regards,___ Fred Kohl, Precision Speed Control
(Panther)
>> > PROFS ID: FKOHL Phone TBD Pager (888)
377-8280
>> > IBM Mail(USFMCSJZ)
>> > Mailing Address: ETC C375
>> > *** Forwarding note from SREIMERS-DRBN007 02/16/99 18:14
**
>> > To: FKOHL -DRBN007
>> >
>> > FROM: Steve Reimers USAET(UTC
> -05:00)
>> > Subject: Speed control servo
>> > What is the inductance and resistance of the clutch? What
is
> used
>> to
>> > clamp the
>> > flyback voltage? What is the magnitude of the flyback

> voltage?
>> > I have collected at least ten speed servos from junk yards.
> Can
>> you test
>> > them f
>> > or function?
>> >
>> > Steve Reimers building 5 3C043
>> > AVT Chassis E/E System Applications mail drop 5011
>> > 30-03286 SREIMERS sreimers@ford.com fax 30-03286

>>
>>
>>

> Attachments sent separately:

| <u>Data Type</u> | <u>File Name</u> |
|------------------|------------------|
| BINARY | CL_82R44.PDF_PC |

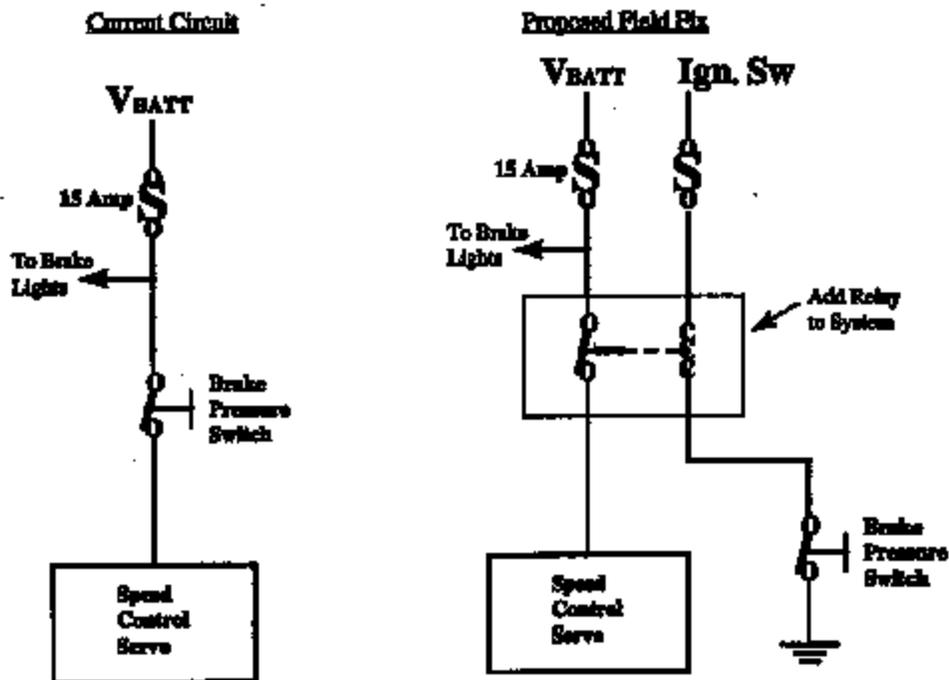
SPEED CONTROL BRAKE PRESSURE DEACTIVATION SWITCH

Below is a proposed wiring / circuit change for the Speed Control Deactivation Switch.

This would be a field fix for 1992 & 1993 Town Cars. The change is proposed to prevent deact switch failures. There is a potential this action could be for additional model years and vehicles lines that use brake pressure deact switches.

Note: brake pedal mounted switches are not affected.

Please review and let me know if you have any issues. Note the Speed Control System functions do not change.



Please send comments to Fred Kohl (FKOHL).

Note: Scott Simpson asked that all Application / Design / Software Engineers review this proposed change.

Brake Pressure Switch Questions:

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

At a minimum the following would be required:

SPEED CONTROL SWHYO:

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. EESSE would need to reply.

SERVICE TEST EQUIPMENT:

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

WIRING 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.

CONCLUSION:

For the above reasons Visteon feels placing the deactivation switch (Brake Pressure) in a ground return circuit is a NOT viable solution.

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

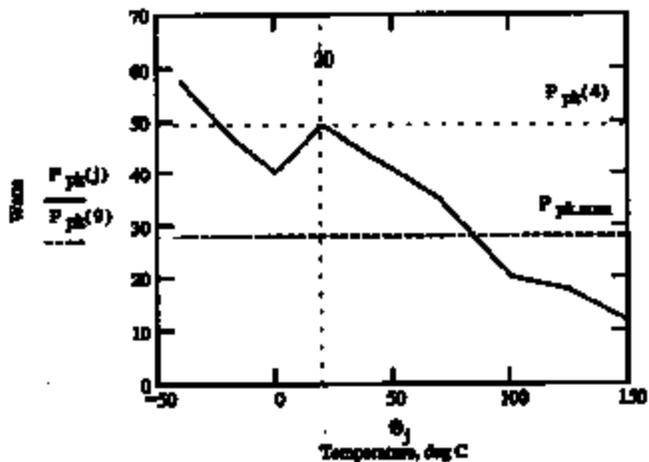
Transient voltage and peak power in single 82 ohm resistor in clutch flyback circuit.

$j := 1..9$ $R_{wj} := \text{MinimumWindingResistance}$ $R_{ext} := 82$
 $I_{pkj} := \text{Envelope_of_Max_Current}$ $L_{clutch} := 0.078$ Total Peak Power, watts Peak Resistor Power, watts
 over worst case test voltage

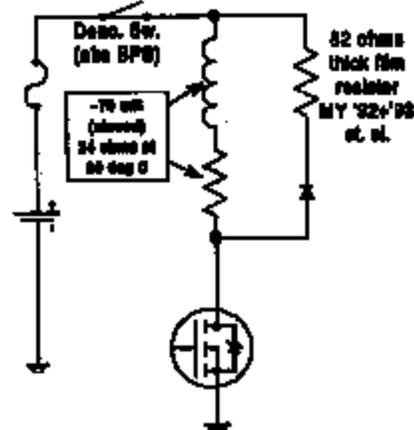
| j | $\theta_j :=$ | $R_{wj} :=$ | $V_{dc}(I_{pkj}) :=$ | $I_{pkj} :=$ | $P_{pk(j)} := (I_{pkj})^2 R_{ext}$ | $R_{tot(j)} := R_{wj} + R_{ext}$ | $P_{pk(j)}$ | $P_{pk(j)}$ | θ_j |
|-----|---------------|-------------|----------------------|--------------|------------------------------------|----------------------------------|-------------|-------------|------------|
| 1 | -40 | 17.5 | 16 | 0.899 | 57.721953 | 57.721522 | 57.721522 | -40 | |
| 2 | -20 | 19.4 | 16 | 0.783 | 47.737858 | 47.737158 | 47.737158 | -20 | |
| 3 | 0 | 21.2 | 16 | 0.701 | 40.294892 | 40.294892 | 40.294892 | 0 | |
| 4 | 20 | 23 | 19 | 0.776 | 49.378432 | 49.378432 | 49.378432 | 20 | |
| 5 | 70 | 27.6 | 19 | 0.653 | 34.941236 | 34.940339 | 34.940339 | 70 | |
| 6 | 100 | 30.3 | 16 | 0.498 | 20.418082 | 20.418082 | 20.418082 | 100 | |
| 7 | 125 | 32.6 | 16 | 0.458 | 17.802722 | 17.802722 | 17.802722 | 125 | |
| 8 | 150 | 34.8 | 14 | 0.581 | 11.928202 | 11.928202 | 11.928202 | 150 | |
| 9 | 20 | 21.9 | 14 | 0.585 | 28.158472 | 28.158472 | 28.158472 | 20 | |

$I_{pk,max} := \frac{14}{23.9}$ $P_{pk,max} := (I_{pk,max})^2 R_{ext}$ $\tau_{clutch,max} := \frac{L_{clutch}}{23.9 + R_{ext}} - 1000$
 $I_{pk,max} = 0.583774$ $P_{pk,max} = 28.158762$ $\tau_{clutch,max} = 0.738544$

$j := 1..8$



← 19 Vdc in @ 20 deg C
(min limit clutch resistance)
 ← 14 Vdc in @ 20 deg C
(nominal clutch resistance)



Original CL: 80544.rpt dated 9/15/88 12:04:42 pm modified CL: 82544.rpt 05/09/97
 Schematic added 18092217

3713 4995

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

RECTANGULAR FLAT CHIP RESISTOR POWER DISSIPATION (generic)

$\theta = 0, 5, 175$

$$Pd_{2512}(\theta) := \begin{cases} \theta < 70, 1000, 1000 - 0.0125 \cdot 1000 \cdot (\theta - 70) \\ \theta \geq 70, 1000 - 0.0125 \cdot 1000 \cdot (\theta - 70) \end{cases}$$

$$Pd_{0805}(\theta) := \begin{cases} \theta < 70, 100, 100 - 0.00932 \cdot 100 \cdot (\theta - 70) \\ \theta \geq 70, 100 - 0.00932 \cdot 100 \cdot (\theta - 70) \end{cases}$$

$$Pd_{2010}(\theta) := \begin{cases} \theta < 70, 500, 500 - 0.0125 \cdot 500 \cdot (\theta - 70) \\ \theta \geq 70, 500 - 0.0125 \cdot 500 \cdot (\theta - 70) \end{cases}$$

$$Pd_{0603}(\theta) := \begin{cases} \theta < 70, 63, 63 - 0.0125 \cdot 63 \cdot (\theta - 70) \\ \theta \geq 70, 63 - 0.0125 \cdot 63 \cdot (\theta - 70) \end{cases}$$

$$Pd_{1210}(\theta) := \begin{cases} \theta < 70, 250, 250 - 0.00932 \cdot 250 \cdot (\theta - 70) \\ \theta \geq 70, 250 - 0.00932 \cdot 250 \cdot (\theta - 70) \end{cases}$$

$$Pd_{0402}(\theta) := \begin{cases} \theta < 70, 63, 63 - 0.01818 \cdot 63 \cdot (\theta - 70) \\ \theta \geq 70, 63 - 0.01818 \cdot 63 \cdot (\theta - 70) \end{cases}$$

$$Pd_{1206}(\theta) := \begin{cases} \theta < 70, 125, 125 - 0.00932 \cdot 125 \cdot (\theta - 70) \\ \theta \geq 70, 125 - 0.00932 \cdot 125 \cdot (\theta - 70) \end{cases}$$

POWER

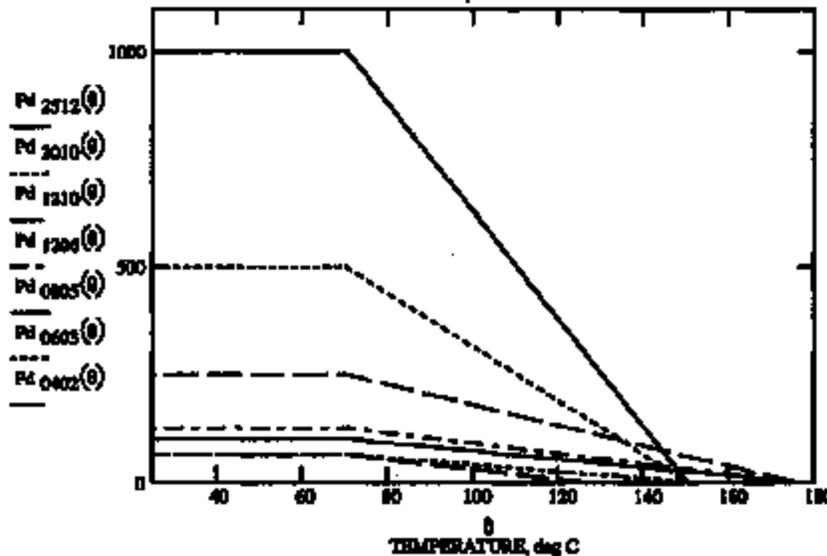


Figure 1.a:

Power derating curves for rectangular flat chip resistors.

POWER, milliwatts

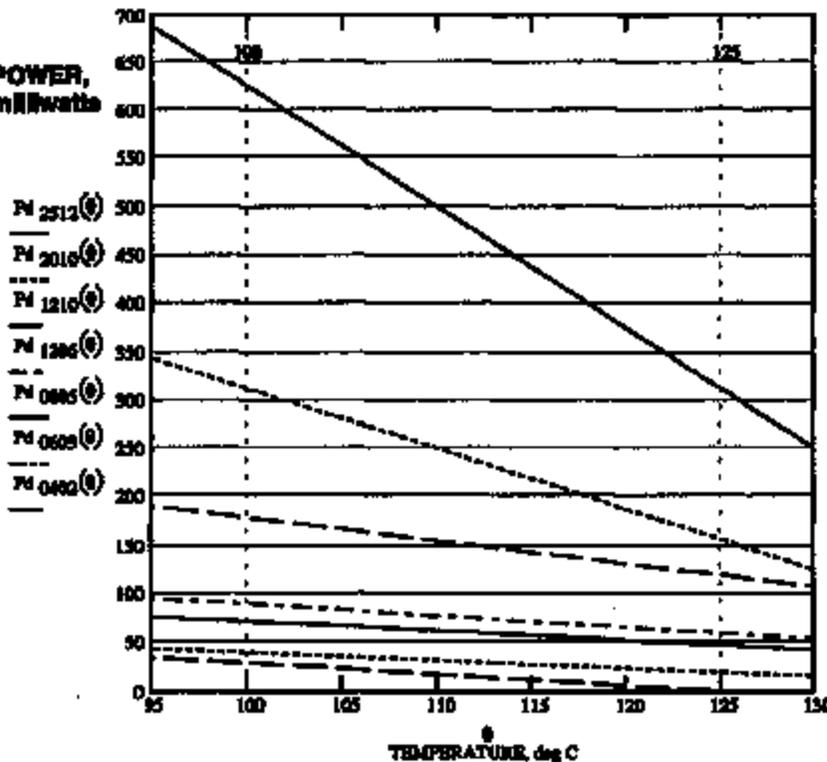


Figure 1.b:

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

$k = 1.7$

$P_{max} =$ Power Capability, mW @ 125 C

| | |
|------|---|
| 2512 | $Pd_{2512}(125) = 912.5$ |
| 2010 | $Pd_{2010}(125) = 156.25$ |
| 1210 | $Pd_{1210}(125) = 119.1$ |
| 1206 | $Pd_{1206}(125) = 39.55$ |
| 0805 | $Pd_{0805}(125) = 47.64$ |
| 0603 | $Pd_{0603}(125) = 19.6875$ |
| 0402 | $Pd_{0402}(125) = 6.3718 \cdot 10^{-3}$ |

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

$$x := 0.02, 0.04, \sqrt{100}$$

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

| | | | | | | |
|----------|------------------------|---------------------------|-------------------------|--|----------------------|-----------------------------------|
| k | 25m_k | Y 0.04_k | Y 10_k | $m_k := \frac{\ln(Y 10_k) - \ln(Y 0.04_k)}{\ln(10) - \ln(0.04)}$ | m_k | Y 0.04_k < 25 |
| 2512 | 2512 | 150 | 30 | | -0.29148 | 31.62278 |
| 2010 | 2010 | 75 | 20 | | -0.24178 | 24.89908 |
| 1210 | 1210 | 40 | 12.5 | | -0.21066 | 20.30045 |
| 1206 | 1206 | 22 | 8 | | -0.16328 | 12.19039 |
| 865 | 865 | 10.5 | 4.4 | | -0.15935 | 4.3238 |
| 603 | 603 | 6 | 2.8 | | -0.13805 | 3.84760 |
| 402 | 402 | 3 | 1.6 | | -0.11382 | 3.07954 |

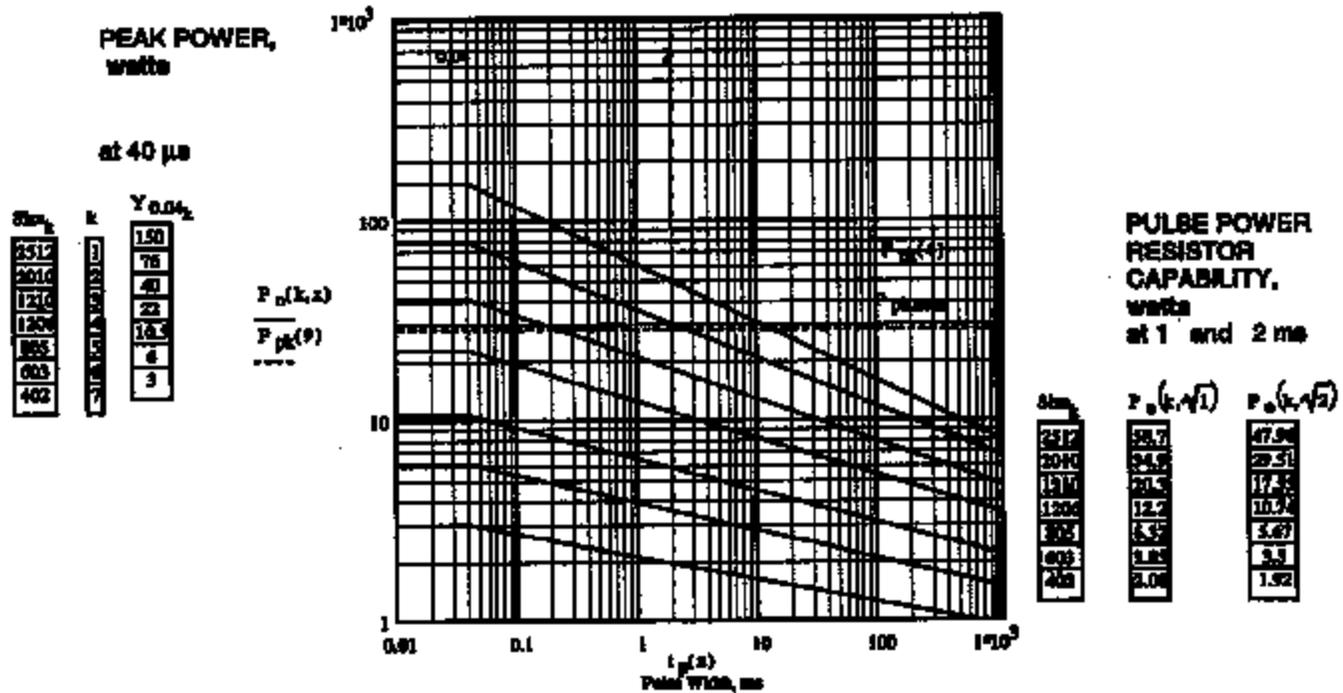
$$\ln(P_p) = \frac{\ln(Y 10_k) - \ln(Y 0.04_k)}{\ln(10) - \ln(0.04)} \cdot (\ln(t_p(x)) - \ln(0.04)) + \ln(Y 0.04_k)^{m_k} \cdot (\ln(t_p(x)) - \ln(0.04)) + \ln(Y 0.04_k)$$

$$\ln(P_p) = m_k \cdot (\ln(t_p(x)) - \ln(0.04)) + \ln(Y 0.04_k) = \left[\frac{\ln(t_p(x))}{0.04} \right]^{m_k} + \ln(Y 0.04_k) = \left[Y 0.04_k \left(\frac{t_p(x)}{0.04} \right)^{m_k} \right]$$

$$P_p = Y 0.04_k (25 t_p(x))^{m_k} \quad P_1(k, x) := \ln\left[\frac{t_p(x) \geq 0.04, Y 0.04_k, \left[Y 0.04_k < 25 \right]^{m_k} t_p(x)^{m_k}}{t_p(x)} \right]$$

$$P_p(k, x) := \begin{cases} t_p(x) < 1000, P_1(k, x) \cdot 10^{-10} \\ \dots \end{cases}$$

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



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

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

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

$R_{wg(j)}$ $t = 0.2, -0.15, 0$ $\tau_{clutch, nom} = \frac{L_{clutch}}{23.9 + R_{ext}} \cdot 1000$

$i_{clutch(j)} = \frac{L_{clutch} \cdot 1000}{R_{ext(j)}} \cdot \frac{1}{\tau_{clutch(j)}} \exp\left(-\frac{t}{\tau_{clutch(j)}}\right)$

ohms @ various temps.

$\tau_{clutch, nom} = 0.736544$

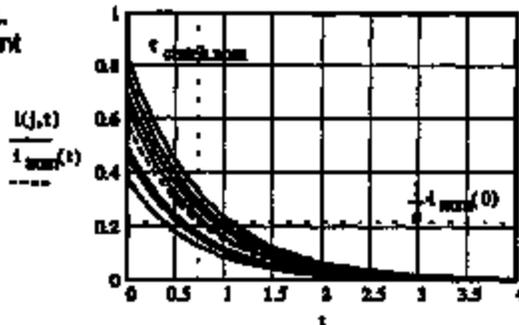
$v_{clutch(j)} = i_{clutch(j)} \cdot R_{ext}$ Plotting limits: $K(j, t) := W(\leq 5.5, i_{clutch(j, t)}, 5000)$

$i_{nom(j)} = \frac{14}{23.9} \exp\left(-\frac{t}{\tau_{clutch, nom}}\right)$

$i_{nom(t)} := W(\leq 5.5, i_{nom(j, t)}, 5000)$ $v(j, t) := W(\leq 5.5, v_{clutch(j, t)}, 5000)$

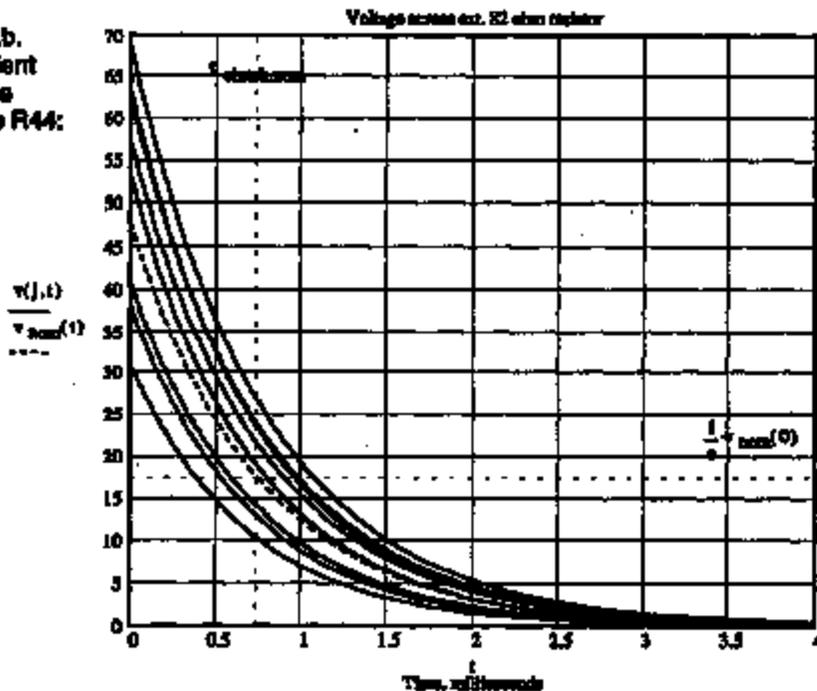
$v_{nom(t)} := W(\leq 5.5, R_{ext} \cdot i_{nom(j, t)}, 5000)$

Fig. 3.a. Transient clutch current



| J | Vdc kg | θj | Rwg(j) | i(j,0) | v(j,0) |
|---|--------|-----|--------|--------|--------|
| 1 | 16 | -40 | 17.5 | 0.839 | 68.798 |
| 2 | 16 | -20 | 18.4 | 0.788 | 62.566 |
| 3 | 16 | 0 | 21.2 | 0.701 | 57.422 |
| 4 | 16 | 20 | 27.6 | 0.776 | 63.632 |
| 5 | 16 | 70 | 30.3 | 0.663 | 54.546 |
| 6 | 16 | 100 | 32.6 | 0.499 | 40.919 |
| 7 | 16 | 125 | 34.6 | 0.466 | 38.312 |
| 8 | 14 | 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 | θj | v(j,0) | Vdc kg |
|---|-----|--------|--------|
| 1 | -40 | 68.798 | 16 |
| 2 | -20 | 62.566 | 16 |
| 3 | 0 | 57.422 | 16 |
| 4 | 20 | 63.632 | 16 |
| 5 | 70 | 54.546 | 16 |
| 6 | 100 | 40.919 | 16 |
| 7 | 125 | 38.312 | 16 |
| 8 | 150 | 31.242 | 14 |

Nominal Peak Voltage:

$v_{nom(0)} = 48.05473$ volts
 $\tau_{clutch, nom} = 0.736544$ millsec.
 $\tau_{clutch(4)} = 0.742837$ millsec.

$P_{pkcl(j,t)} := W(\leq 5.5, i_{clutch(j,t)}^2 \cdot R_{ext})$

$P_{pkcl(j,t)} := W(\leq 5.5, P_{pkcl(j,t)}, 50000)$

$\tau_{pkcl} = \left[\frac{14}{23.9} \exp\left(-\frac{t}{\tau_{clutch, nom}}\right) (23.9 + R_{ext}) \right]^2$

$\frac{P}{R_{ext} \left(\frac{14}{23.9}\right)^2} = \exp\left[-\frac{t}{\tau_{clutch, nom}}\right] (23.9 + R_{ext})^2 = \frac{t}{\tau_x}$

$P_{pknom(t)} := \frac{v_{nom(t)}^2}{R_{ext}}$

$P_{pknom(t)} := W(\leq 5.5, P_{pknom(t)}, 50000)$

$\exp\left[-\frac{t}{\tau_x}\right] = \frac{t}{\tau_x}$

whose solution for τ_x is

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

$$\tau_x = \frac{5000}{(306410 + 0.0128205 \cdot R_{ext})} - 3.141592653589793245 \cdot \frac{1}{(306410 + 0.0128205 \cdot R_{ext})}$$

$\tau_x = \frac{5000}{306410 + 0.0128205 \cdot R_{ext}}$

$\tau_x = 0.968272$

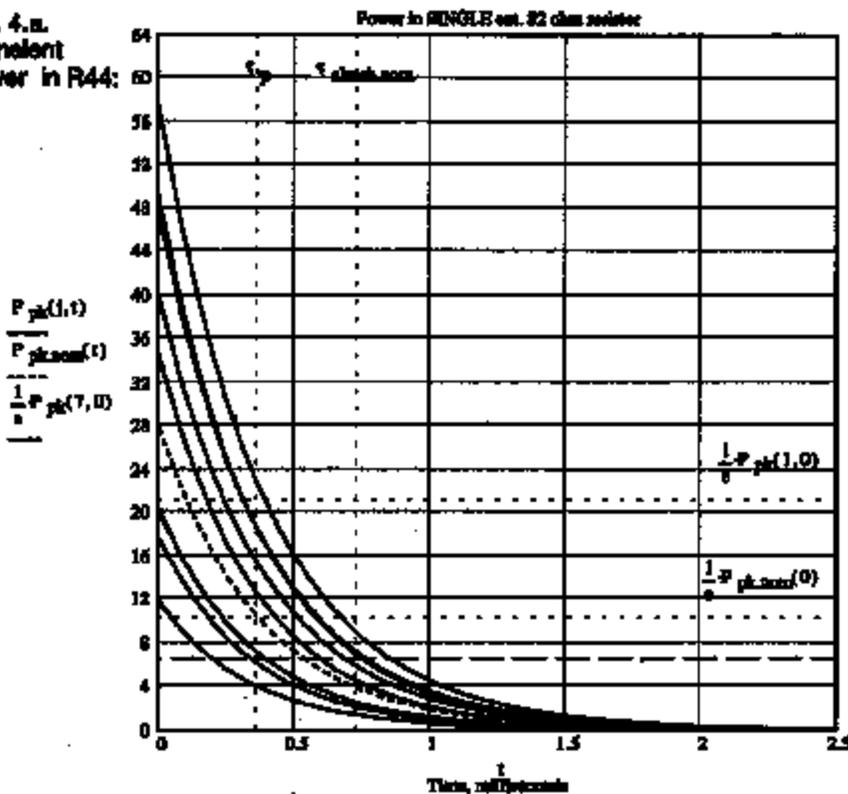
$R_{ext} = 82$

3713 4998

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

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

Fig. 4.a. Transient power in R44:



$\tau_p = 0.356272$

Shown for worst case of resistance and test voltage:

| Vdo, V | θ_c | $v(1,0)$ | $P_{pk}(1,0)$ |
|--------|------------|----------|---------------|
| 16 | -41 | 62.726 | 57.722 |
| 16 | -21 | 62.556 | 47.138 |
| 16 | 0 | 57.462 | 48.285 |
| 16 | 20 | 63.632 | 48.378 |
| 16 | 70 | 53.546 | 34.866 |
| 16 | 100 | 40.918 | 28.419 |
| 14 | 125 | 38.212 | 17.807 |
| 14 | 150 | 31.242 | 11.968 |

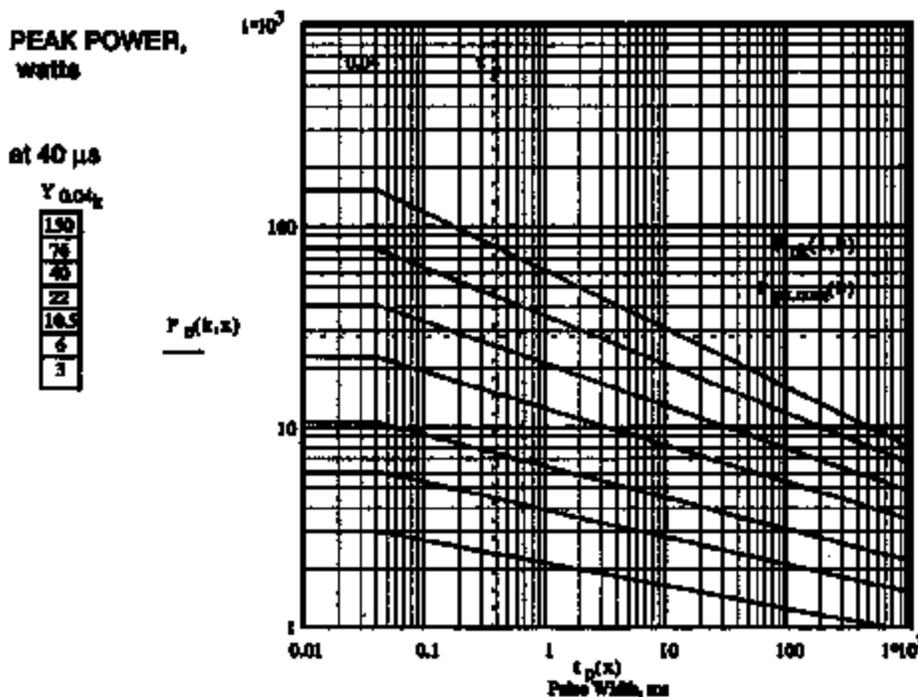
Totals in resistor:

$P_{pk}(1,0) = 57.721322$
worst Case 16 Vdo @: -40 deg C

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

• Vdo.in = 14 volts

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



SINGLE 82Ω resistor

Peak power at time zero & worst case clutch resistance:

$P_{pk}(1,0) = 57.721322$

Peak power at time zero & nominal clutch resistance:

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

PULSE POWER RESISTOR CAPABILITY, watts

at τ_p

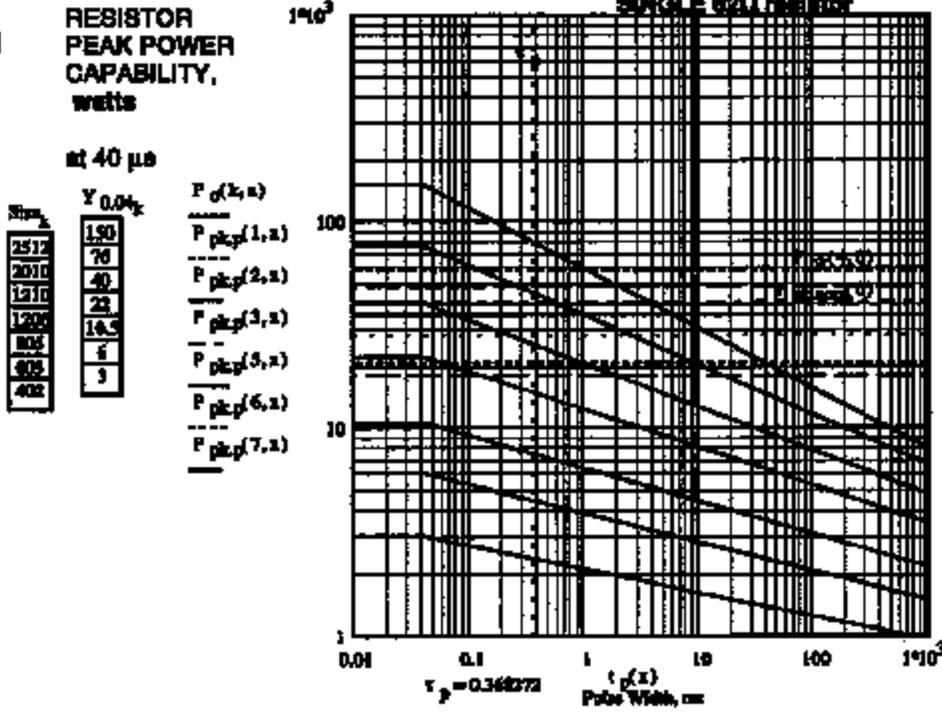
| Std. $P_{pk}(k, \sqrt{\tau_p})$ | Watts |
|---------------------------------|-------|
| 2512 | 78.54 |
| 2016 | 44.43 |
| 1216 | 25.06 |
| 1206 | 14.66 |
| 805 | 7.6 |
| 603 | 4.42 |
| 402 | 2.33 |

$P_{pk,p}(k,x) = \min(P_{pk}(k,x) \times 1036, P_{pk}(k,0), 10^{-10})$ (Units for plotting, only)

3713 4899

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

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



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

| Std. Vdc (V) | P _{pk} (J,0) |
|--------------|-----------------------|
| 0 | 57.722 |
| 16 | 47.736 |
| 20 | 40.255 |
| 20 | 49.378 |
| 70 | 34.966 |
| 100 | 20.418 |
| 125 | 17.867 |
| 150 | 11.968 |
| 20 | 28.136 |

WORST CASE
← 16Vdc @ -40C
← 19Vdc @ 20C
← 14Vdc (nom)
← 16Vdc @ 125C

τ_p = 0.368272

P_{pk}(4,0) = 49.378433
P_{pk}(0) = 28.136763

SINGLE 82Ω resistor
PULSE POWER RESISTOR CAPABILITY, watts
at τ_p = 0.368272

SINGLE 82Ω resistor
PULSE POWER RESISTOR CAPABILITY, watts
at τ_p = 0.368272

| Std. P _{pk} (k,τ _p) | |
|--|-------|
| 2512 | 78.56 |
| 2010 | 44.48 |
| 1210 | 33.08 |
| 1206 | 14.45 |
| 805 | 7.4 |
| 603 | 4.42 |
| 402 | 2.33 |

k=1.4

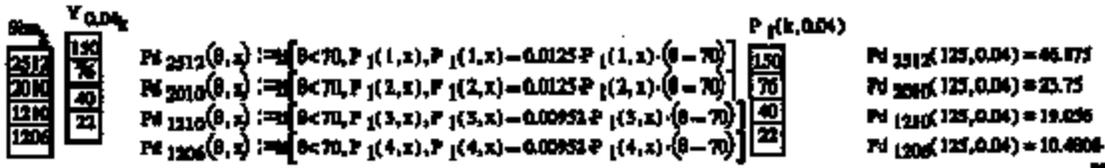
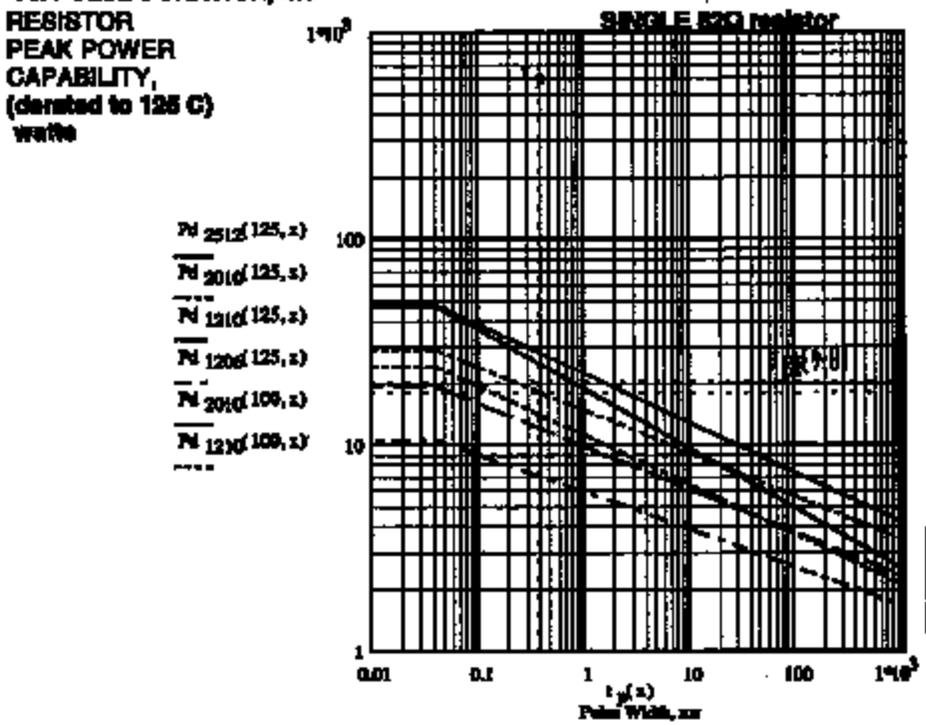


Figure 6.b: SINGLE PULSE PEAK POWER, watts (derated to 125 C) vs. PULSE DURATION, ms

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

| Std. Vdc (V) | P _{pk} (J,0) |
|--------------|-----------------------|
| 0 | 57.722 |
| 16 | 47.736 |
| 20 | 40.255 |
| 20 | 49.378 |
| 70 | 34.966 |
| 100 | 20.418 |
| 125 | 17.867 |
| 150 | 11.968 |
| 20 | 28.136 |



Normal

SINGLE 82Ω resistor
PULSE POWER RESISTOR CAPABILITY, watts
at τ_p = 0.368272

3713 5000

Brake Pressure Switch Questions

Competitive Vehicles

How is switch packaged?

Is it always Powered (HOT_ALL_TIME) ?

Are the contacts opened when pressure applied?

What is fuse limit?

What is being switched?

Is it a redundant switch?

Stewart Salter by 2/16/99

What are descriptions from AWS and CQIS?

Joe Neme/ Bill Abramczyk by 2/16/99

Are the switch materials compatible with brake fluid?

Greg Stevens by 2/16/99

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

Greg Stevens by 2/16/99

Are the switch materials compatible with brake fluid and contaminants?

Greg Stevens by 2/16/99

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

Greg Stevens by 2/16/99

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Fred Kohl/ Dan Budzynski by 2/12/99

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Rob Sharpe by 2/10/99

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Rob Sharpe by 2/10/99

What does Speed control FMEA say about Brake Switch ?

Fred Kohl by 2/9/99

Brake Pressure Switch Questions

- When was non-Pressure actuated switched introduced?**
Steve Reimers by 2/9/99
- Is the Circuit drive hi-side or low-side?** Fred Kohl by 2/8/99
- Results of Central Lab analysis** Steve LaRouch by 2/12/99
- Analysis of harness pig-tails** Joe Kafati by 2/16/99
- If a switch is contaminated can it start the event?**
Fred Porter by 2/16/99
- Flash points for all materials?** Greg Stevens by 2/16/99
- What heat is conducted internally?** By
Don't understand this questions!!!!!!!!!!!!!!
- Provide color photos of Econoline?** Rob Sharpe by 2/8/99
- What is the difference in the base materials that look different?**
Rob Sharpe by 2/16/99
- TI analysis results of the Memphis parts (crease marks in diaphragm, etc) ?**
Rob Sharpe by 2/9/99
- What are the material call-outs for 1992 and 1993?**
Rob Sharpe by 2/9/99
- Results of testing with corrosion simulation?** Fred Porter by 2/16/99
- What does it take to start an event?** Fred Porter by 2/16/99
- How does speed control use this switch?** Fred Kohl by 2/11/99
- Do all Ford applications use switch between fuse and load?** YES
Fred Kohl by complete
- Do all Ford applications have switch connected to HOT-ALL-TIMES?**
Joe Kafati by 2/16/99

Brake Pressure Switch Questions

Why is this switch connected to HOT-ALL-TIMES?

Fred Kohl by Complete

Because the SDS requires it to be connected to the same fuse as the stoplamp.

What is SDS requirement number?

Fred Kohl by 2/16/99

Can the switch act as a fuse?

Team by complete

No.

Is it feasible to disconnect the switch as immediate containment?

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

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

Fred Kohl by 2/16/99

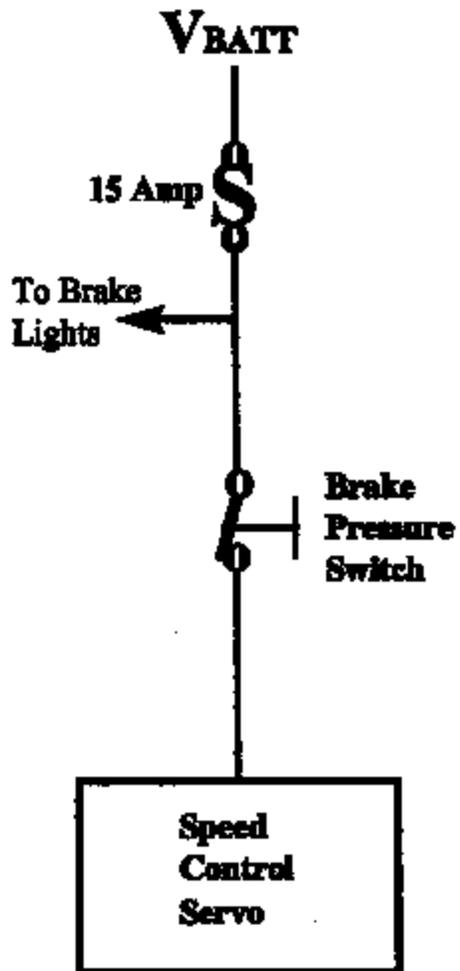
Other recommendations for immediate containment?

All by on-going

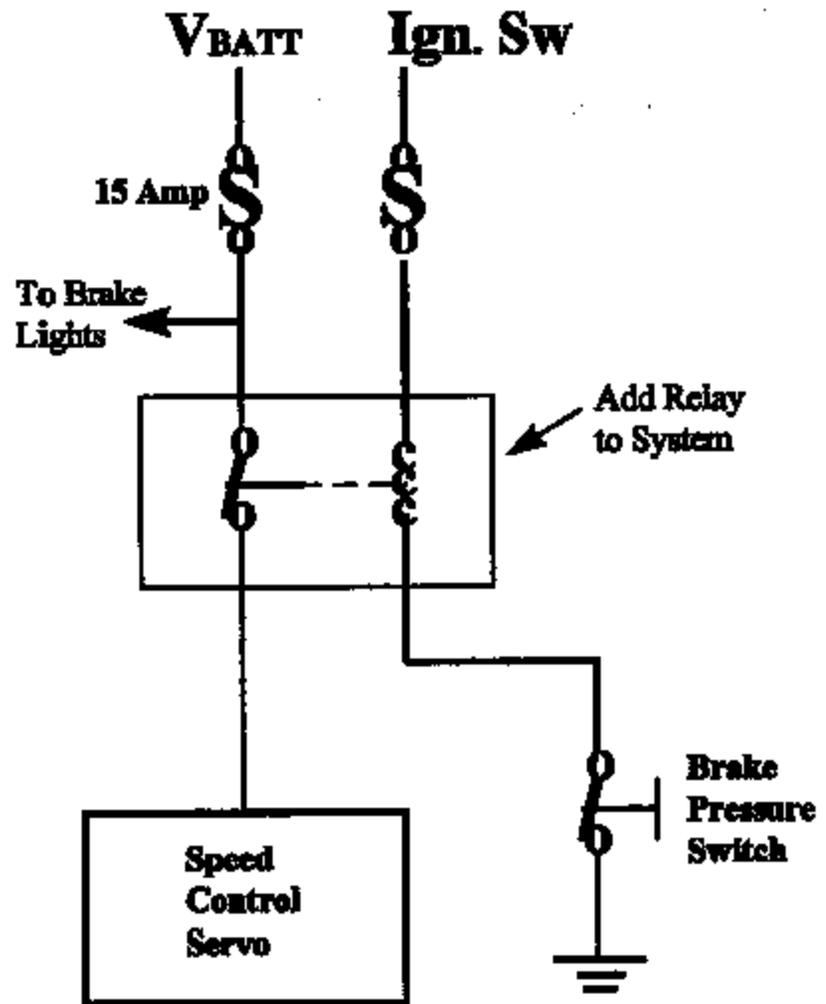
Can Brake Pressure Switch function be removed from power feed circuit and placed in ground return circuit?

Fred Kohl by tbd

Current Circuit



Proposed Field Fix



BRAKE PRESSURE SWITCH FIX

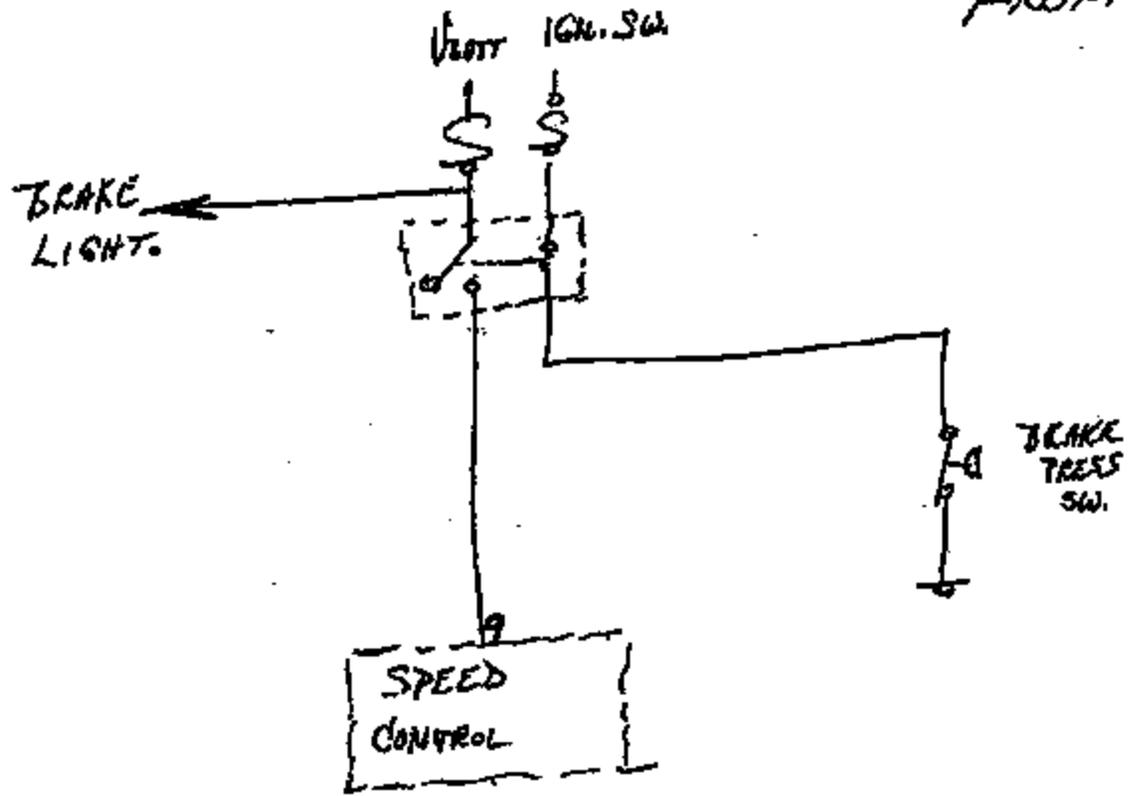
3/1/99

TO: FRED KOHL
FROM: JOE KAFATI

To: Tom Schrodly

~~XXXXXXXXXXXXXXXXXXXX~~

STRONG POSSIBLE FIX



MAR 25 1999 11:52

FROM PROGRAM TIMING

TO 21E30

PAGE.001

9713 5005

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. ESESE 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".

Schrody, Thomas (T.P.)

Subject: Brake Pressure Switch
Location: Bldg 5 3A039

Start: Wed 2/24/99 2:00 PM
End: Wed 2/24/99 4:00 PM

Recurrence: Weekly
Recurrence Pattern: every Wednesday from 2:00 PM to 4:00 PM

Required Attendees: Schrody, Thomas (T.P.)

Requester: Steve Reiners
Date to be scheduled: 02/24/99 - 06/30/99
Starting time: 02:00 PM
Ending time: 04:00 PM
Recurrence: Weekly on Wednesday from 02/24/99 to 06/30/99

Location: Bldg 5 3A039

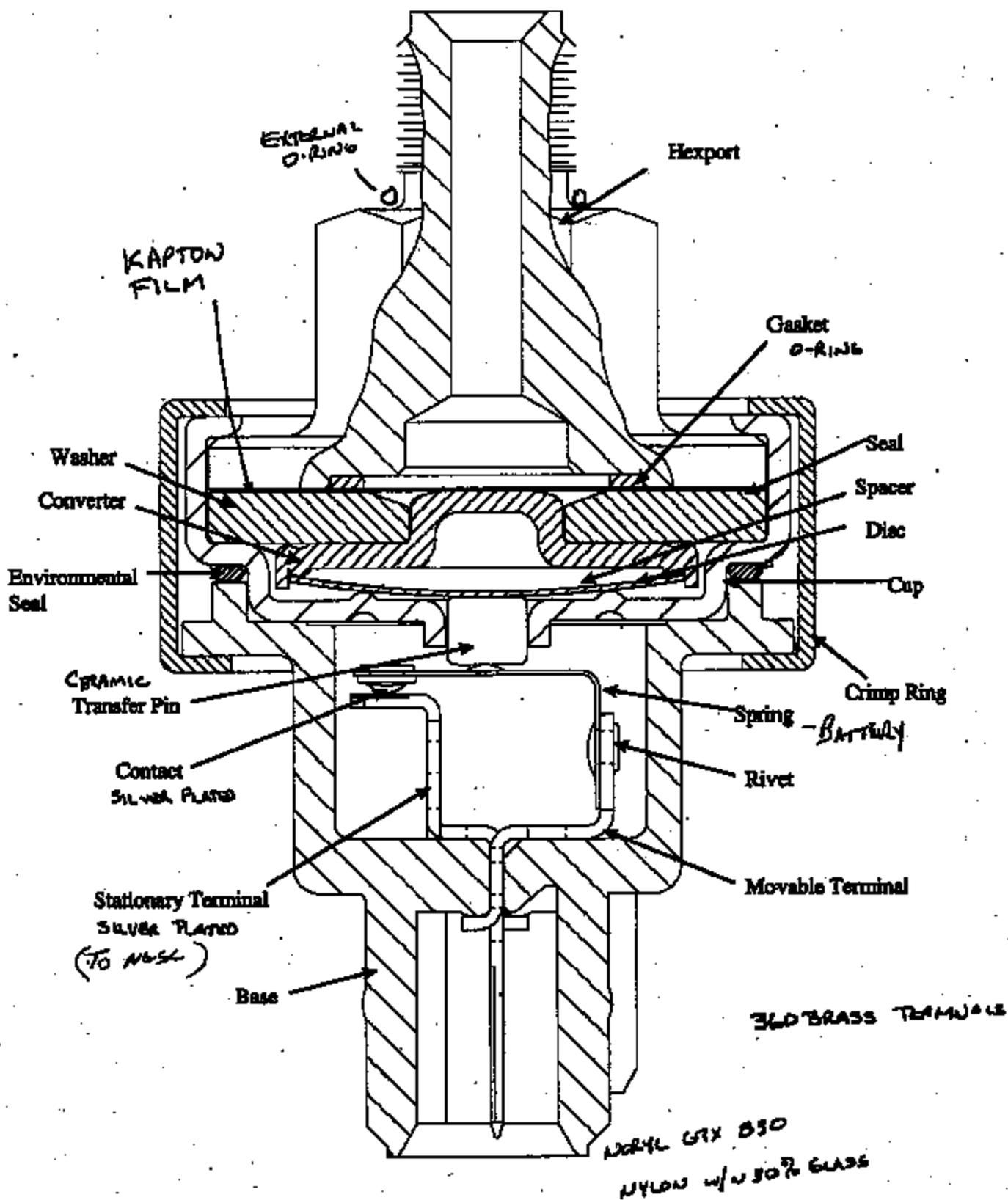
Subject: Brake Pressure Switch

Purpose: Team meeting

19 meetings will be scheduled. The dates are:
02/24/99 03/03/99 03/10/99 03/17/99 03/24/99 03/31/99
04/07/99 04/14/99 04/21/99 04/28/99 05/05/99 05/12/99
05/19/99 05/26/99 06/02/99 06/09/99 06/16/99 06/23/99
06/30/99

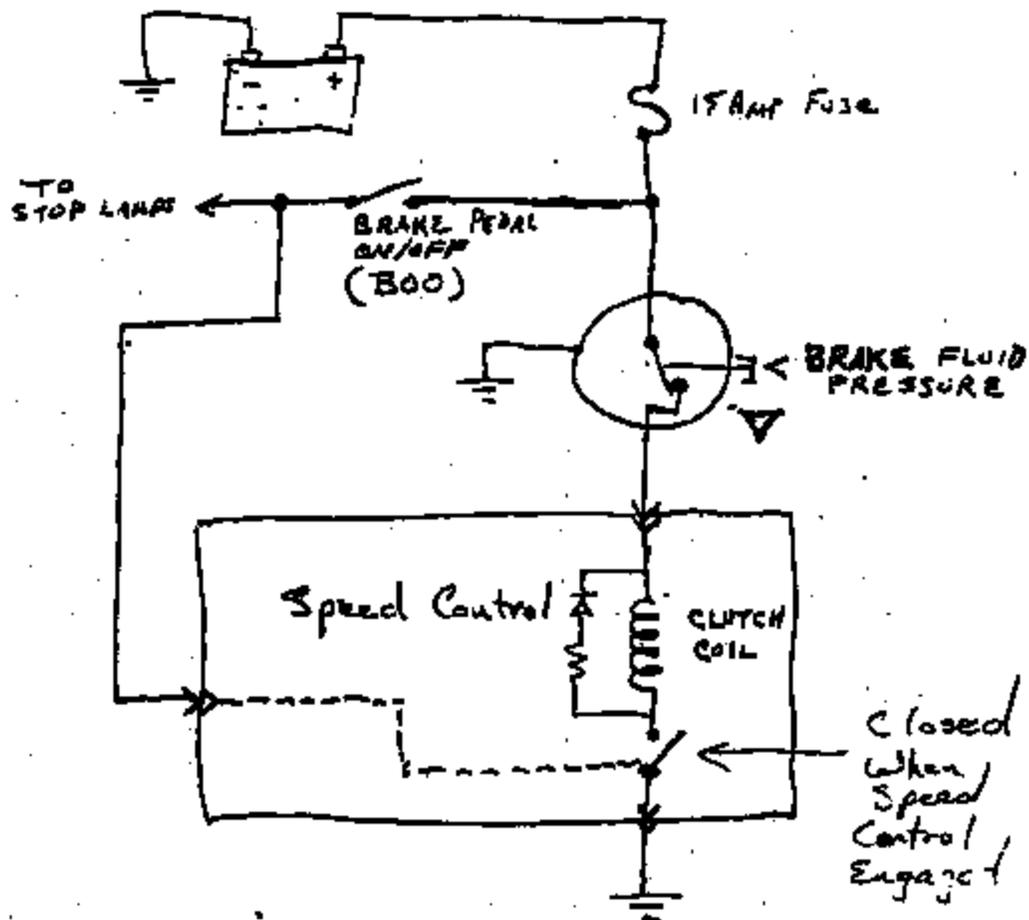
Recurrence: Weekly on Wednesday from 02/24/99 to 06/30/99

Hydraulic Pressure Switch Cross Section



Brake Pressure Switch Function-

- Provide power to Speed Control Clutch circuit.
Clutch engages servo-motor to pull throttle cable.
- Provide redundant sensing of brake application independent of the primary system deactivation mode by disconnecting power to clutch circuit causing servo-motor to release throttle cable.
 - Under Hard Braking only
 - Stop lamp signal is primary (normal braking)

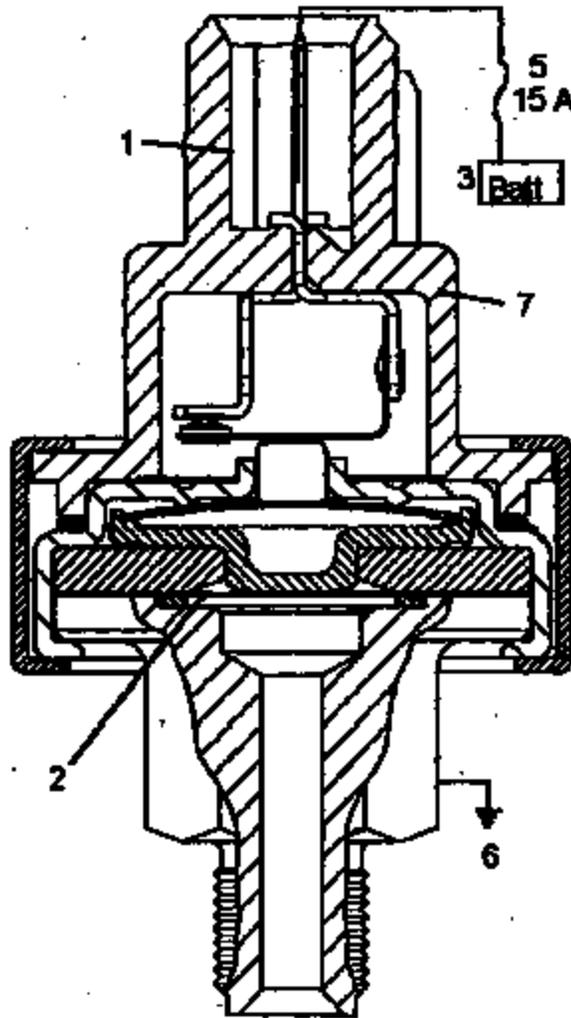


Brake Pressure Switch
FZVC-6F321-AB
Material List for MY 92/93

| | | |
|---------------------|--------------------------------|--|
| | | |
| Gasket | Elastomer Ethylene Propylene | JBL Compound # E-7104-70 |
| Diaphragm | Kapton, Polyimide | Dupont 500 FN131L, 3 Diaphragms per switch |
| Base | PBT, Plastic | Grade Celanex 4800 |
| Crimp Ring | Aluminum | Grade # 5052 |
| Spacer | Kapton, Polyimide | Dupont #200H, Friction Reducer on Disc |
| Rivet | Brass | CDA 260 |
| Transfer Pin | Ceramic | Steatite, L-3 Grade |
| Environmental Seal | Silicone | JBL Compound # 87519 |
| Converter | Cold Rolled Steel | Grade # 1008 |
| Washer | Cold Rolled Steel, Zinc Plated | Grade # 1050 |
| Cup | Cold Rolled Steel | Grade 1010 |
| Spring Arm | Beryllium Copper | Grade # C17200 |
| Movable Contact | Silver Plated Copper | Oxygen Free Cu, Fine Silver |
| Stationary Terminal | Brass + Silver Inlay | CDA 260 |
| Movable Terminal | Brass | CDA 260 |
| Disc | Stainless Steel | Grade 302 |
| Hexport | Cold Rolled Steel, Zinc Plated | C10L10 |
| Thread Cap | LDPE, Plastic | |

3713 8010

Contributing Factors



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

TO: ^{TOM SCHRADY}
~~FRED KOHL~~ (X 21801)

3 pages

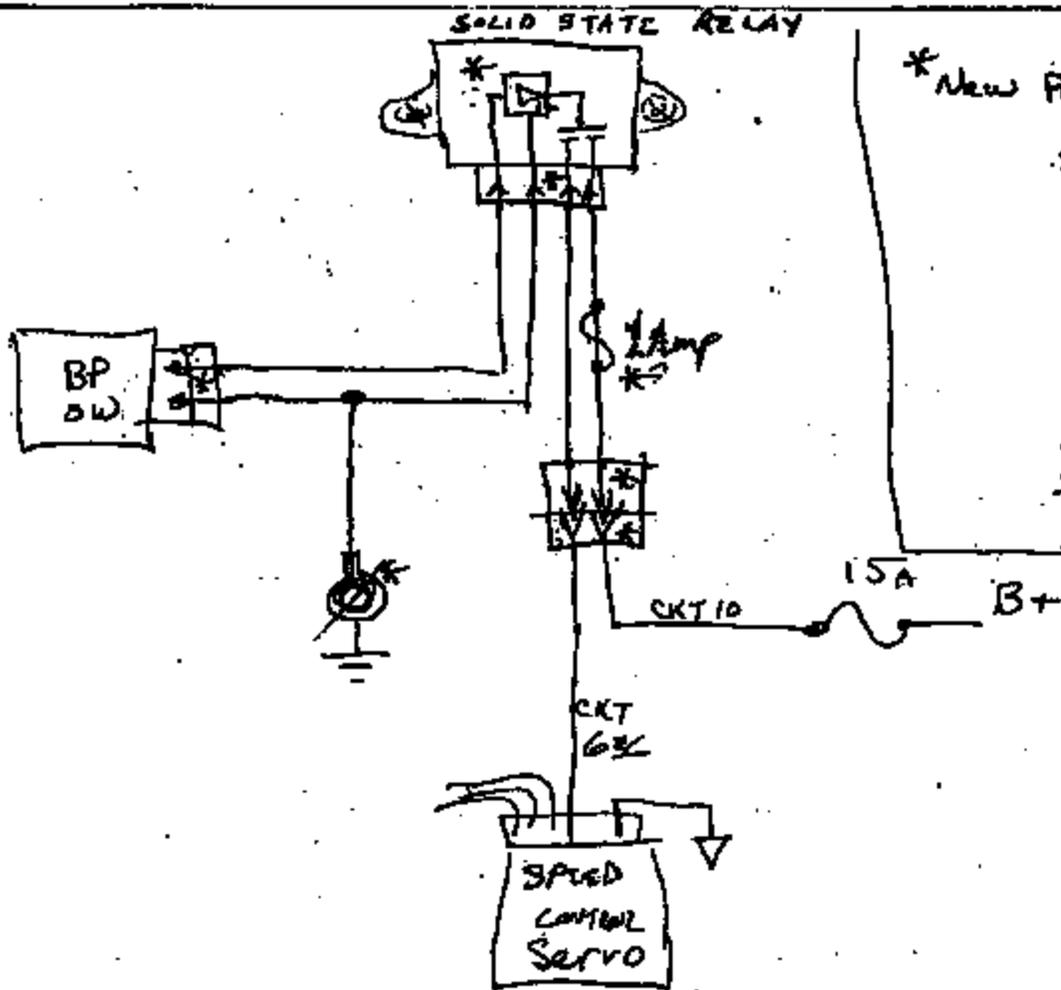
FROM: Steve Reimers, (X 03286)

RE: Brake Pressure Switch Circuits

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

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

Thanks,
Steve



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

3/19/99 SJR

3713 5013



FORM 888 22 02-440 THE UNIVERSITY MICROFILMS INTL SER 94-00 10 212820

Brake Pressure Switch Questions

Competitive Vehicles

How is switch packaged?

Is it always Powered (HOT_ALL_TIME) ?

Are the contacts opened when pressure applied?

What is fuse limit?

What is being switched?

Is it a redundant switch?

Stewart Salter by 2/16/99

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Fred Kohl by complete

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

Brake Pressure Switch Questions

Why is this switch connected to HOT-ALL-TIMES?

Fred Kohl by Complete

Because the SDS requires it to be connected to the same fuse as the stoplamp.

What is SDS requirement number?

Fred Kohl by 2/16/99

Can the switch act as a fuse?

Team by complete

No.

Is it feasible to disconnect the switch as immediate containment?

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

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

Fred Kohl by 2/16/99

Other recommendations for immediate containment?

All by on-going

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

Fred Kohl by tbd

Schrody, Thomas (T.P.)

From: Fred Kohl (fkohl@gw.ford.com)
Sent: Wednesday, February 10, 1999 8:10 AM
To: tschrody@viateon.com
Subject: More Questions

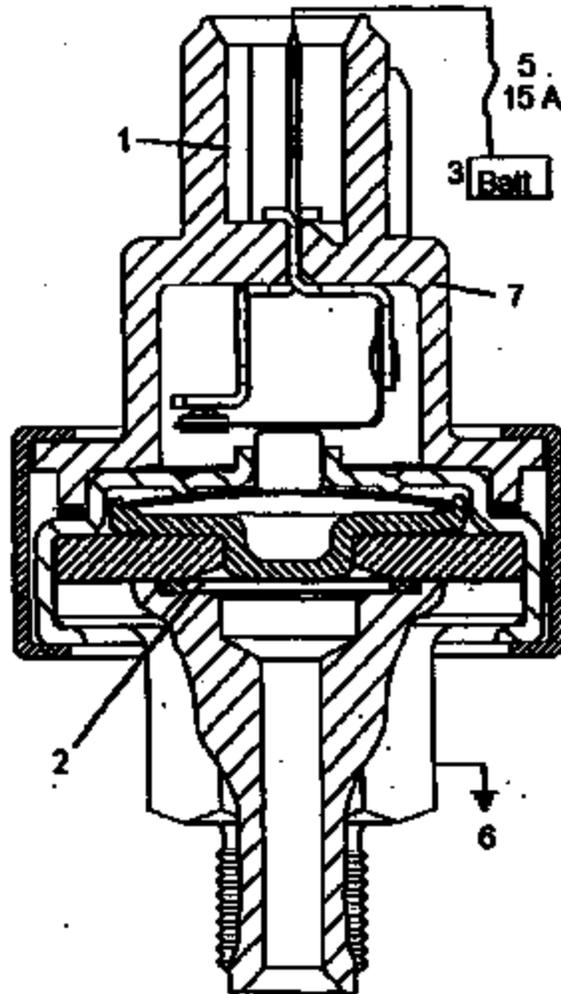
Any thoughts on this?

Regards, Fred Kohl, Precision Speed Control (Panther)
PROFS ID: FKOHL Phone TBD Pager (800) 377-8200
IBM Mail(USFMCEJZ)
Mailing Address: ETC C375
*** Forwarding note from SREIMERS--DRBN007 02/09/99 18:08 ***
To: FKOHL -DRBN007

FROM: Steve Reimers USAET(JTC -08:00)
Subject: More Questions
Would a customer know if the speed control clutch drive output was stuck on?
Is a relay between the the Brake P switch and fuse an feasible fix?
What kind of timing is expected between when the BOO turns off the clutch drive
output and when the Brake P switch opens?
thanks,

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
39-03288 SREIMERS sreimers@ford.com fax 39-03288 >

Contributing Factors



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

Brake Pressure Switch Questions:

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

At a minimum the following would be required:

SPEED CONTROL SERVO

Redesign the speed control electronic

1. New board layout
2. New PROM
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. EESR would need to reply.

SERVICE TEST EQUIPMENT:

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

RISK 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.

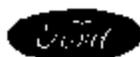
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Can BRAKE PRESSURE SWITCH function be moved to the ground circuit of the speed control servo without any changes?

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".

Brake Switch
Cruise Control

3713 5022

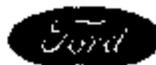


Steve LaFouché

Materials Engineer
Metallurgy Section
Advanced Vehicle Technology

SLAFOUCH

Central Laboratory
15000 Century Drive
Dearborn, MI 48120
Telephone: 313/845-4875
Fax: 313/222-1814



Ford Motor Company

Frederick J. Porter
Supervisor
Security, Safety & Chassis Appl.
E/E Systems Engineering
Advanced Vehicle Technology

20000 Rotunda Drive
Bldg. 5, 3E304, Mail Drop 5030
Dearborn, MI 48121-2003 USA

Tele: 313 845-3722
Fax: 313 390-4145
FPORTER
fporter@ford.com

SHAUN MCCARTHY

From: Shaun McCarthy
Sent: Monday, March 22, 1999 8:50 AM
To: smccart3@gw.ford.com
Subject: Brake Switch Analysis - Junk Yard Part

Regards,
SHAUN McCarthy__SRL Room 1339 Mail Stop 1170
32-21355 FAX 32-31129
*** Forwarding note from FPORTER -DRBN007 03/18/99 17:17 ***
To: SMCCART3-DRBN005
cc: SLAROUCH-FORDNA1 RCARTER -DRBN005
SREIMERS-DRBN007 NLAPPOINT-DRBN005

FROM: F. J. Porter USAET(UTC -06:00)
Subject: Brake Switch Analysis - Junk Yard Part

I would like to meet with you when the "Memphis" material analysis is ready. Please keep me informed.

Thanks.

Regards,
Frad Porter OV - fporter fporter@ford.com
Chassis E/E Systems Applications (313)845-3722
Bldg 5 - Mail Drop 5030 - Cubicle 3E004 fax 390-4145
*** Forwarding note from SMCCART3-DRBN006 03/18/99 16:46 ***
To: FPORTER -DRBN007
cc: SMCCART3-DRBN006 SLAROUCH-FORDNA1
RCARTER -DRBN006

FROM: SHAUN McCarthy USAET(UTC -06:00)
Subject: Brake Switch Analysis - Junk Yard Part
We have disassembled the switch you gave me that showed corrosion inside the switch area. Inorganic analysis of the material has been completed. The reddish material is FeO(OH) and the whitish material is 2ZnCO3-3Zn(OH)2. Extensive photos have been taken through out the disassembly. Our conclusion by examining the path or location of corrosion is that fluid entered through the connector area for this sample. We would be glad to meet with you and show you the photos and discuss our conclusions. Analysis is still underway regarding the material from the "Memphis" switch.

Regards,
SHAUN McCarthy__SRL Room 1339 Mail Stop 1170
32-21355 FAX 32-31129

Shaun McCarthy

From: Shaun McCarthy
Sent: Thursday, March 18, 1999 3:47 PM
To: smccart3@gw.ford.com
Subject: Brake Switch Analysis - Junk Yard Part

Regards,
SHAUN McCarthy__SRL Room 1339 Mail Stop 1170
32-21355 FAX 32-31129

*** Forwarding note from SMCCART3-DRBN005 03/18/99 15:48 ***
To: FPORTER -DRBN007
cc: SMCCART3-DRBN005 SLAROUGH-FORDNA1
RCARTER -DRBN005

FROM: SHAUN McCarthy USAET(UTC -05:00)
Subject: Brake Switch Analysis - Junk Yard Part

We have disassembled the switch you gave me that showed corrosion inside the switch area. Inorganic analysis of the material has been completed. The reddish material is FeO(OH) and the whitish material is $2\text{ZnCO}_3 \cdot 3\text{Zn(OH)}_2$. Extensive photos have been taken through out the disassembly. Our conclusion by examining the path or location of corrosion is that fluid entered through the connector area for this sample. We would be glad to meet with you and show you the photos and discuss our conclusions. Analysis is still underway regarding the material from the "Memphis" switch.

Regards,
SHAUN McCarthy__SRL Room 1339 Mail Stop 1170
32-21355 FAX 32-31129

SECRET

From: Shaun McCarthy
Sent: Monday, March 15, 1999 9:10 AM
To: smccart3@gw.ford.com
Subject: SIT and brake switch overheating

Regards,
SHAUN McCarthy_SRL Room 1339 Mail Stop 1170
32-21355 FAX 32-31129

*** Forwarding note from CSTEPHAN--DRBN005 03/10/99 11:42 ***

To: SREIMERS--DRBN007 FPORTER --DRBN007
SMCCART3--DRBN005 Shaun McCarthy ESICKAFU--DRBN005 Ed Sickafus
JDOSDALL--DRBN005 James Dosedall MFREELA1--DRBN005 Mark Freeland
MSMITH50--DRBN007 KAJELLO --DRBN005 Kelly Ajello
CSTEPHAN--DRBN005 Craig Stephan

FROM: Craig Stephan USAET(UTC -05:00)

Requester: Craig Stephan
Date to be scheduled: 03/11/99
Starting time: 02:00 PM
Ending time: 04:00 PM

Location: SRL-1529 (near Ed Sickafus office)

Subject: SIT and brake switch overheating

Purpose: Following introductory meeting of 3/10/99, this working meeting will use SIT to analyse 3 problems:
1. Improve present switch to prevent brake fluid/water ingress.
2. Find new way to provide redundant speed control deactivation.
3. Prevent corrosion leakage paths from starting a fire (in either present switch or new design).

0
A A 0000 0A0000
.....

SHAUN MCCARTHY

From: Shaun McCarthy
Sent: Monday, March 15, 1999 9:08 AM
To: smccart3@gw.ford.com
Subject: (U) Samples I Left

Regards,
SHAUN McCarthy_SRL Room 1339 Mail Stop 1170
32-21366 FAX 32-31129
*** Forwarding note from FPORTER --DRBN007 03/11/99 08:35 ***
To: SMCCART3--DRBN005 McCarthy, Shaun

FROM: F. J. Porter USAET(UTC -05:00)
Subject: (U) Samples I Left

Shaun,

I left some samples of material taken from the "Memphis" brake switch with Mike. This was the material that was requested 2 weeks ago that you thought could be analyzed for compounds, not just elements.

The samples were collected by TI when they first analyzed the part. The "Memphis" vehicle is the one vehicle that we know the brake pressure switch was ignited. We are trying to identify whether the corrosion was caused by contamination that entered through the connector or a breach in the brake fluid seal.

In addition, we are trying to identify the origin of the oxylate and sulfur that was reported by Steve LaRouche at Central Labs.

Thanks for your help.

Regards,
Fred Porter OV - fporter fporter@ford.com
Chassis E/E Systems Applications (313)845-3722
Bldg 6 - Mail Drop 5030 - Cubicle 3E004 fax 390-4146

3719 5027

Shaun McCarthy

From: Shaun McCarthy
Sent: Tuesday, March 02, 1999 2:50 PM
To: smccar3@gw.ford.com
Subject: NO SUBJECT

Regards,
SHAUN McCarthy__SRL Room 1339 Mail Stop 1170
32-21355 FAX 32-31129

*** Forwarding note from SLAROUCH-FORDNA1 03/02/99 11:56 ***
To: FPORTER-FORDMAIL Porter, Fred (F.J. NLAPOINT-FORDMAIL LaPointe, Norman (SREIMERS-FORDMAIL Reimers, Steve (S. I2060625-EXTERNAL 'A. Rahman'
SMCCART3-FORDMAIL McCarthy, Shaun (S SLAROUCH-FORDNA1 LaRouche, Steve (S

From: LaRouche, Steve (S.)
Subject:

We have found three switches so far (including the one to be analyzed by the Sci Lab), that will not open electrically when disc is heard to snap under application of air pressure. I sectioned one of these switches and found what appears to be water (it evaporated rather quickly at room temp) and corrosion product. I found that the transfer pin has been stuck in place by the corrosion products. What this means, is that even if the disc snaps, the pin will not pull back, and the contacts will not open. None of these switches showed evidence of diaphragm leakage on the test stand.

Steve LaRouche (SLAROUCH)
Metallurgy Section, Central Laboratory, Room N410
(313) 846-4878 (313) 322-1614 FAX

Shaun Mccarthy

From: Shaun Mccarthy *

Sent: Wednesday, February 24, 1999 9:26 AM

To: lsalmesr@pobox.srl.ford.com; pkllgoa@pobox.srl.ford.com

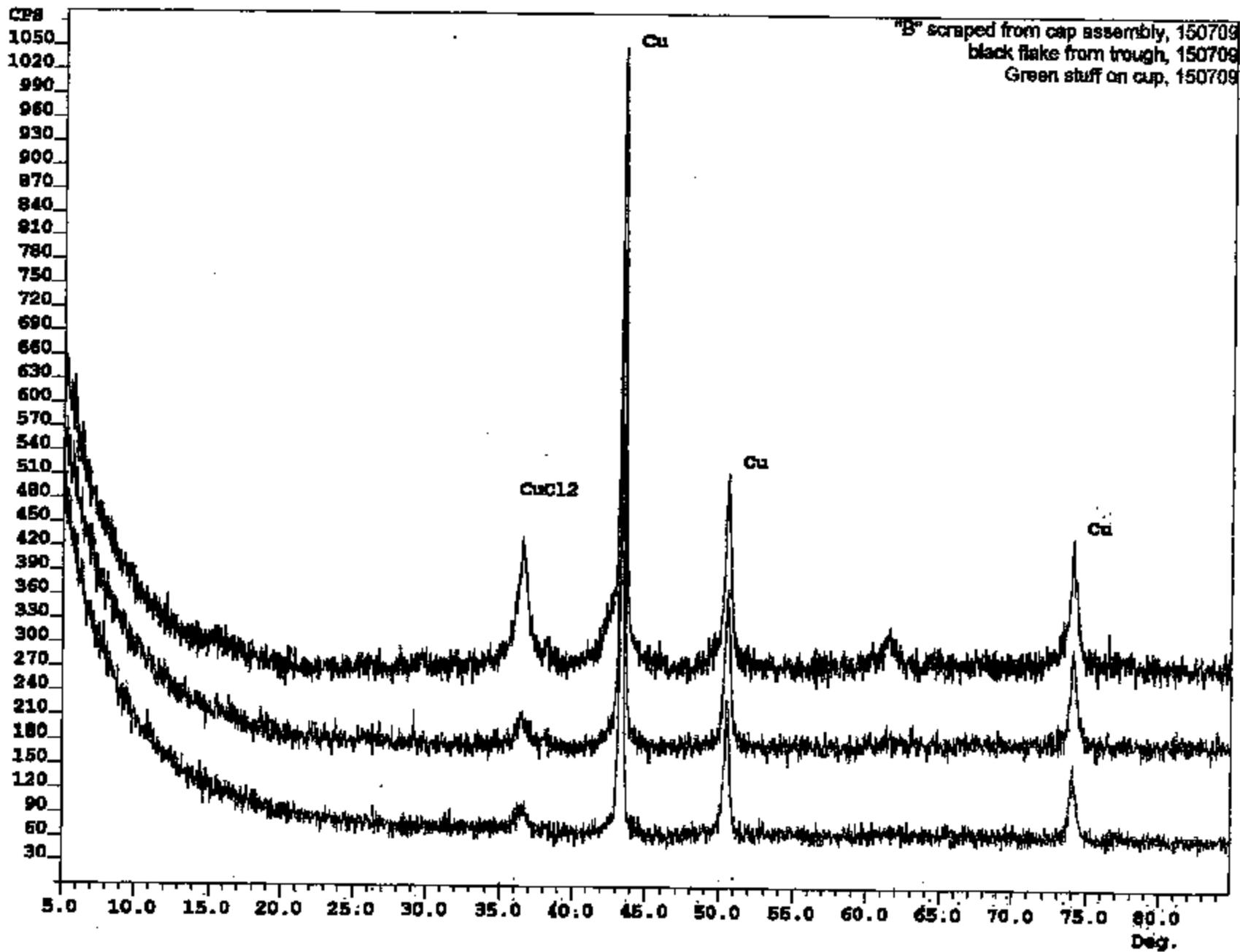
Cc: smccar3@gw.ford.com; wjohnso7@pobox.srl.ford.com

Subject: Brake Switch Issue

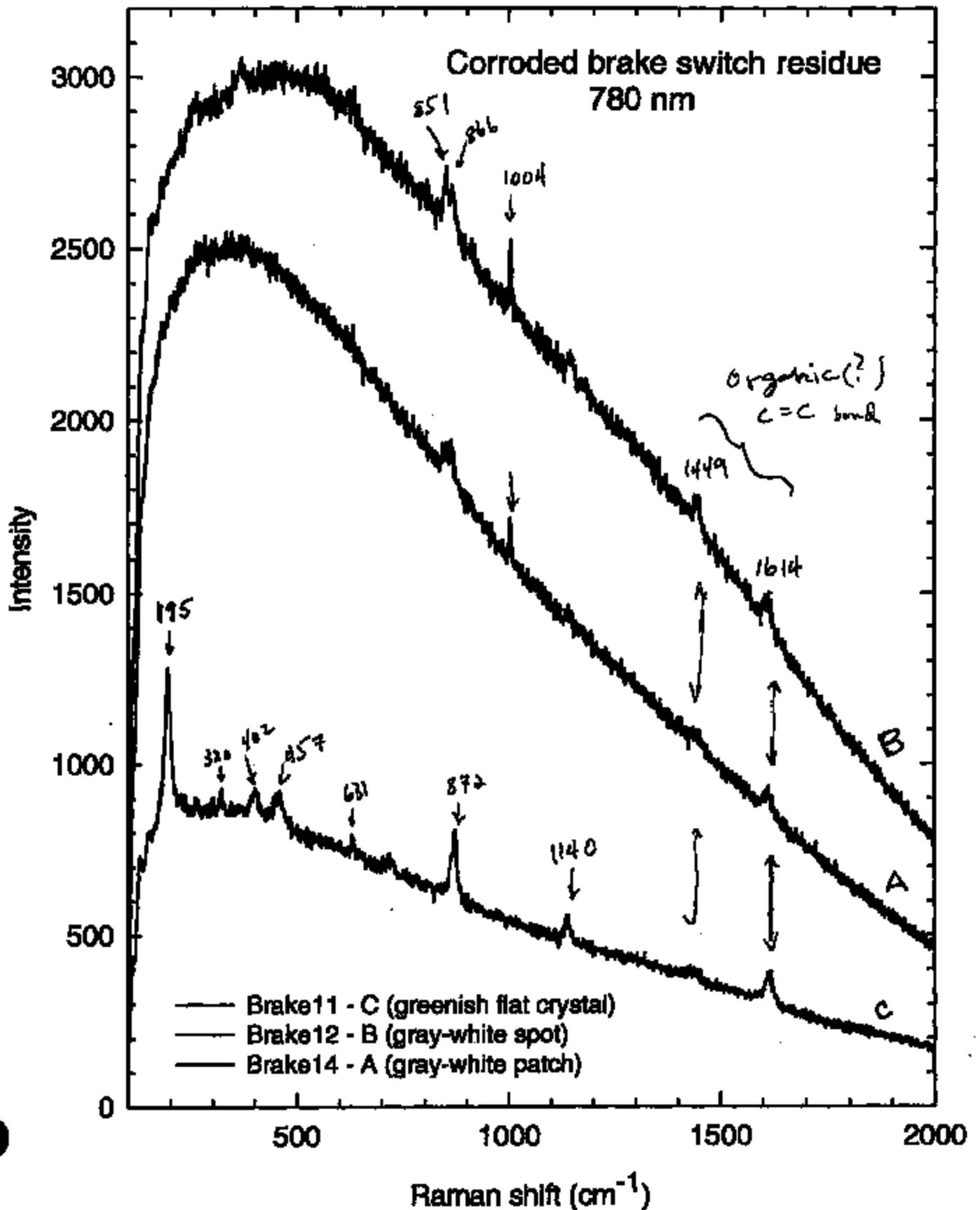
Roo Carter came by this morning and mentioned a DOW brake switch and brake fluid issue. I will attend with him the 2pm meeting today. I called Steve Reimers and introduced myself.

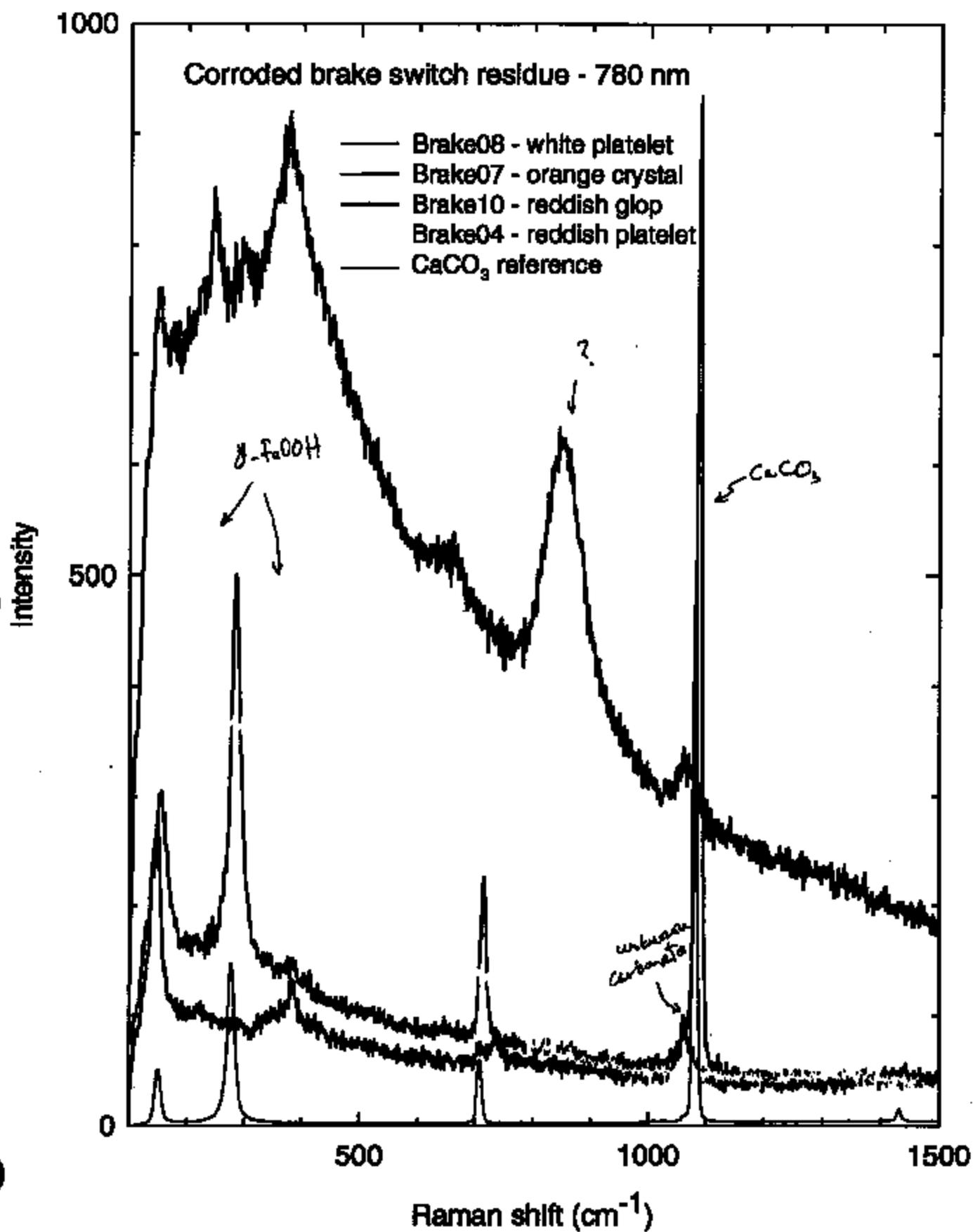
Regards,

SHAUN McCarthy__SRL Room 1339 Mail Stop 1170
32-21365 FAX 32-31129

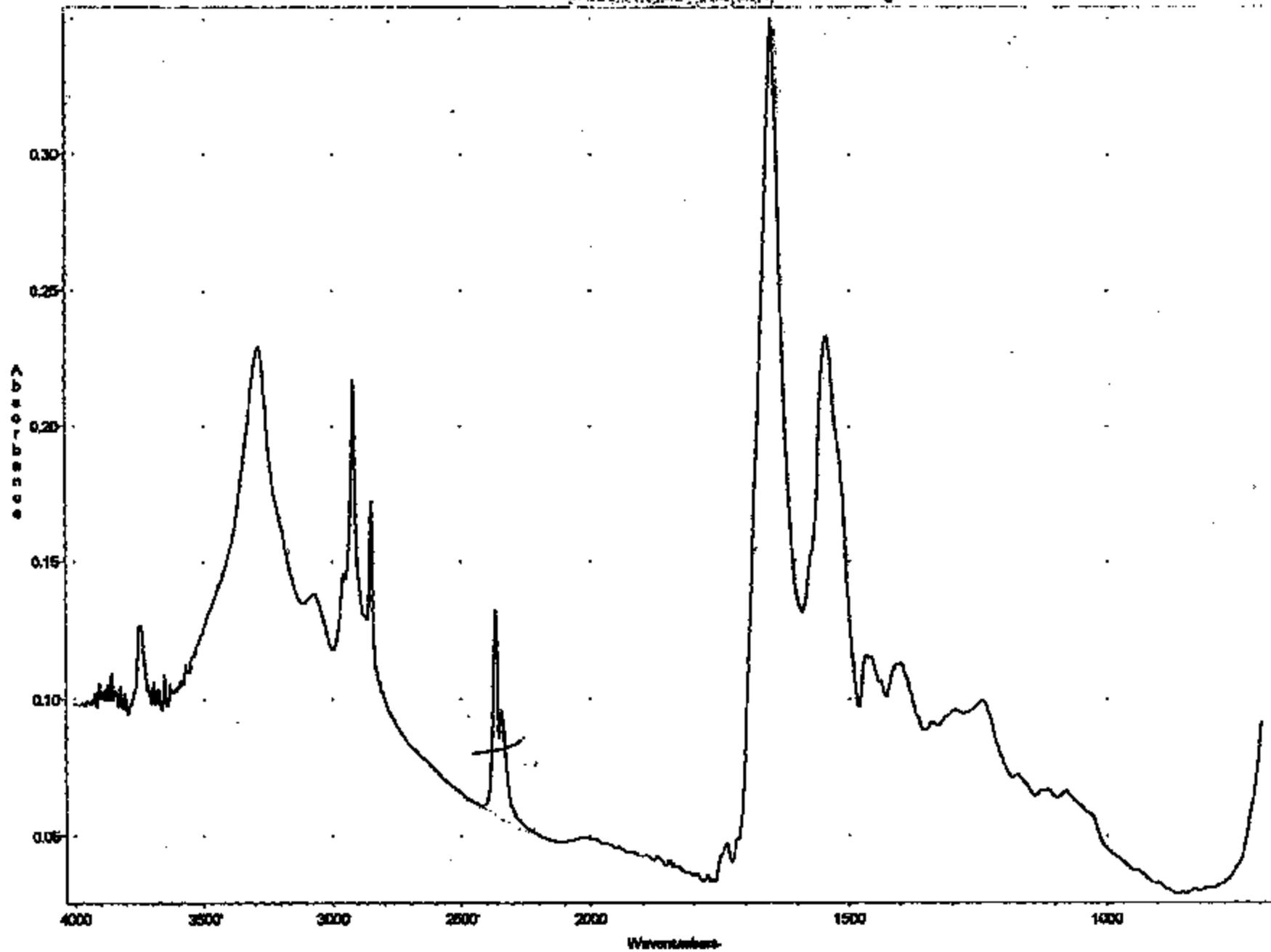


3713 5030

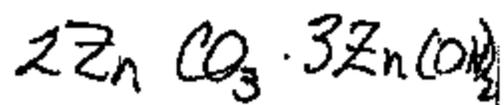




Quinone - long chain carboxylate

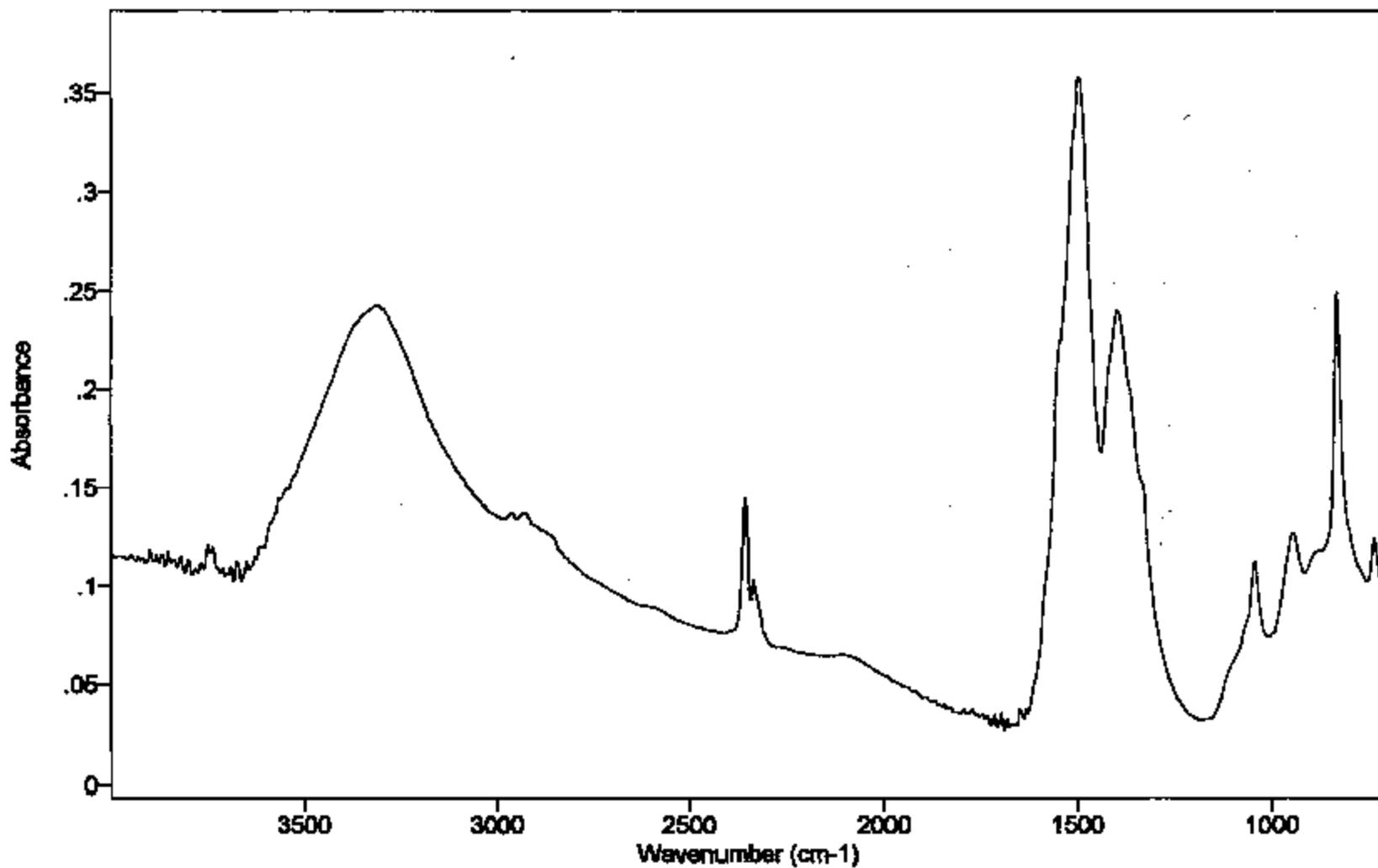


3713 5083



Nyquist
dead weight

FORD Material Science Dept.



3713 8035

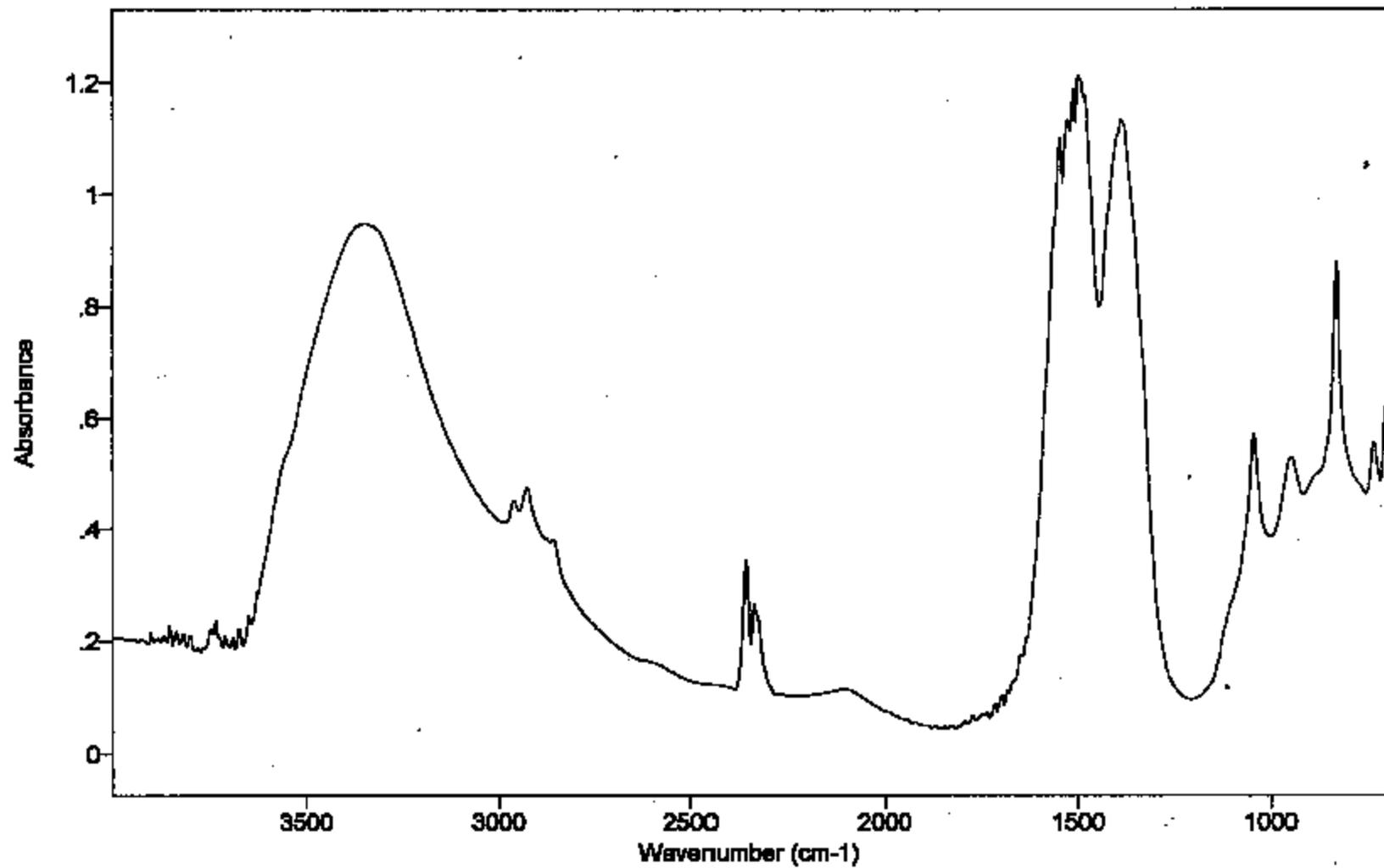
File # 1 : BRAKESWICHWD

Number of Scans: 128

Comment: Brake swich white-4

View Mode: Overlay

FORD Material Science Dept.



3713 5096

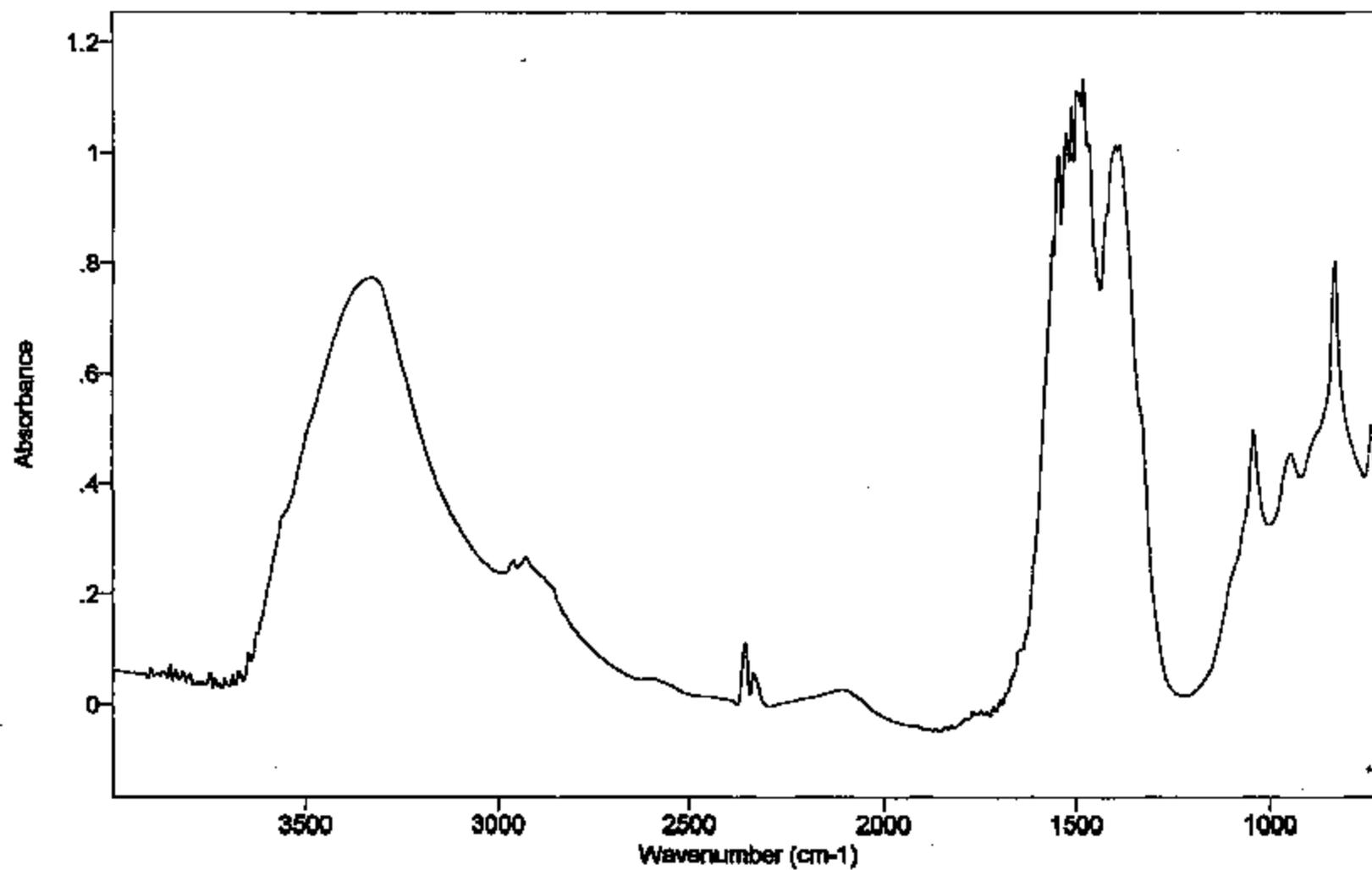
File # 1 : BRAKESWICHRE

Number of Scans: 128

Comment: Brake swich white-5 (red)

View Mode: Overlay

FORD Material Science Dept.



3719 5037

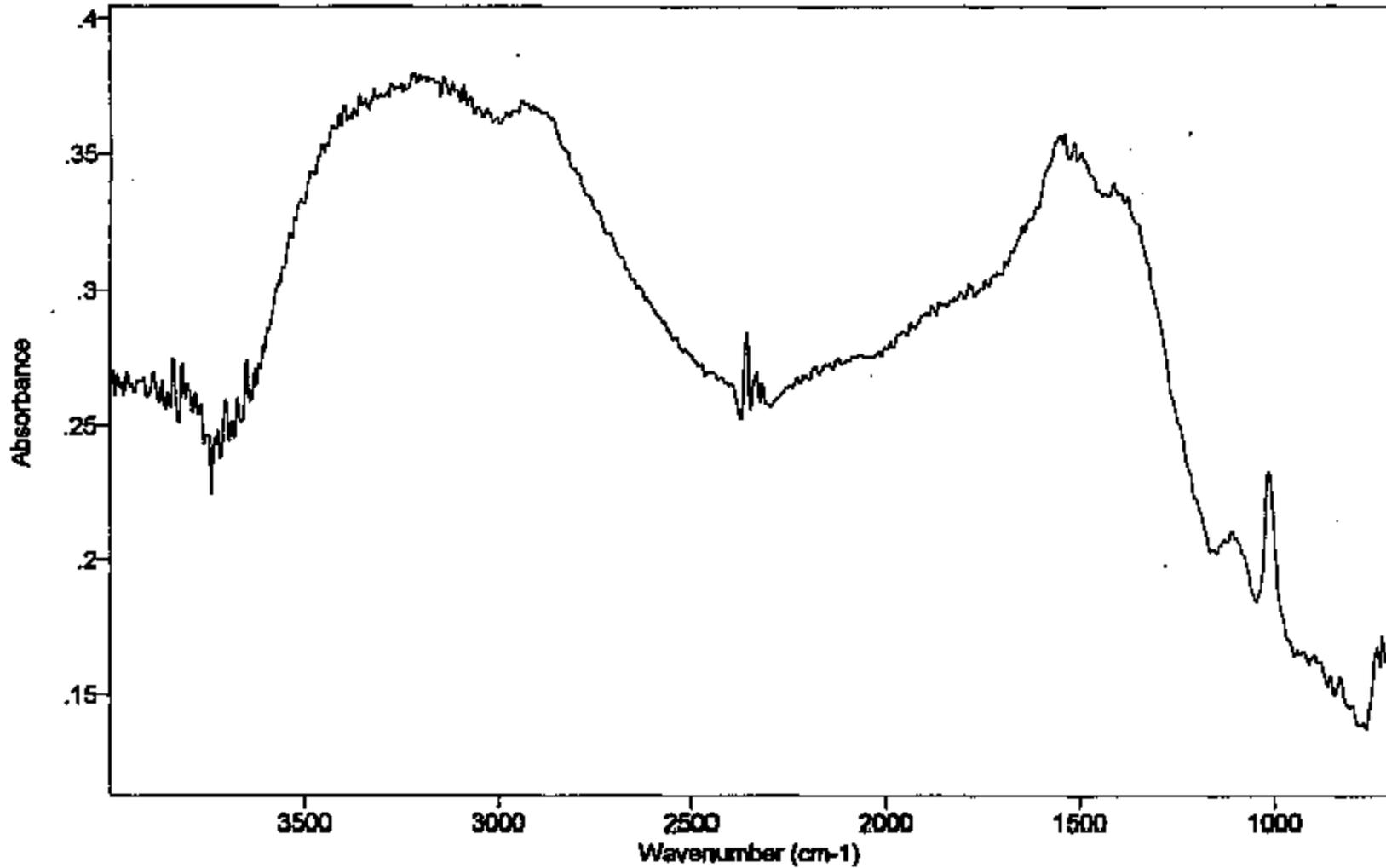
File # 1 : BRAKESWICHWF

Number of Scans: 128

Comment: Brake switch white-6

View Mode: Overlay

FORD Material Science Dept.



3713 6038

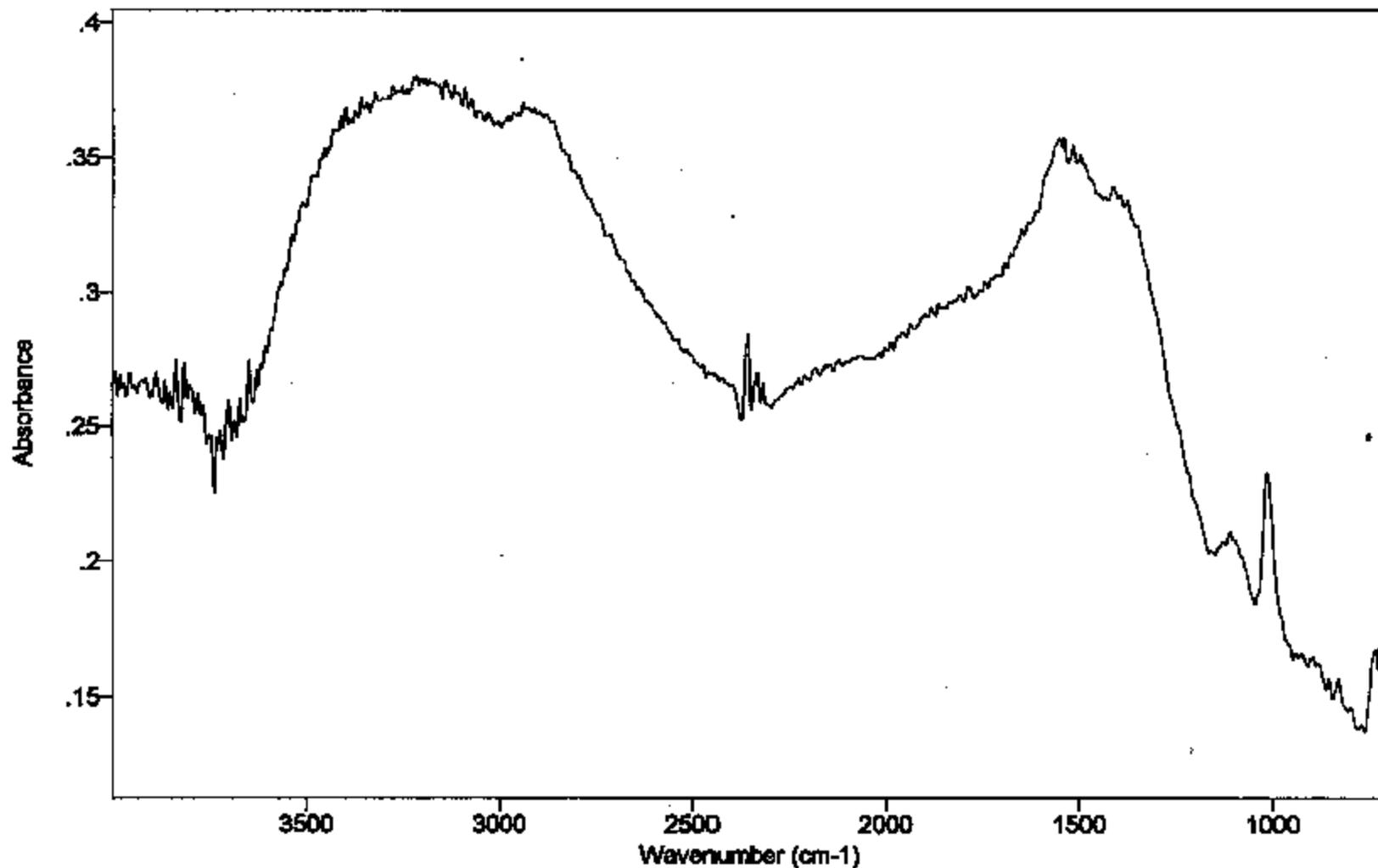
File # 1 : BRAKESWICHWG

Number of Scans: 128

Comment: Brake swich white-7 (rust red)

View Mode: Overlay

FORD Material Science Dept.



3713 5039

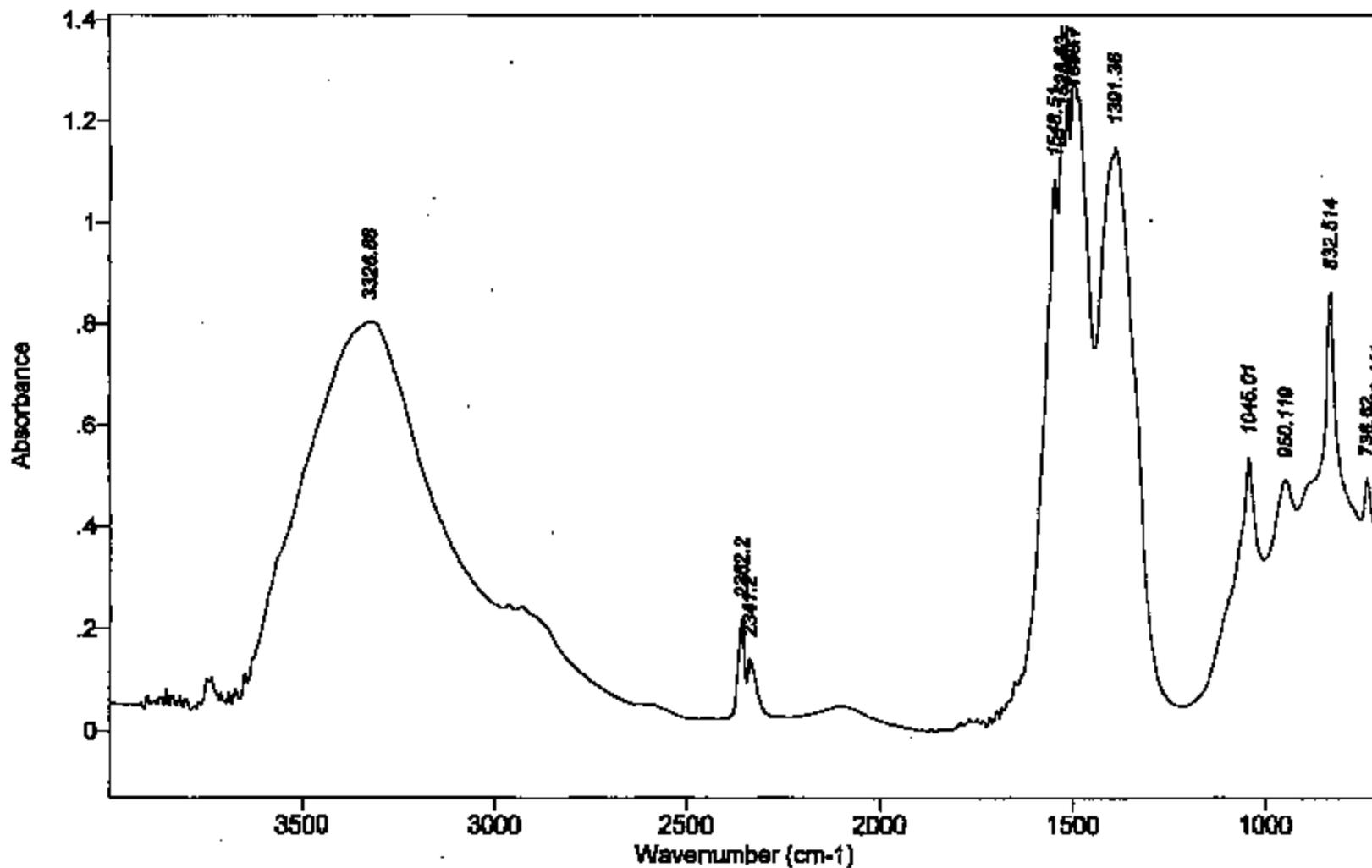
File # 1 : BRAKESWICHWG

Number of Scans: 128

Comment: Brake swich white-7 (rust red)

View Mode: Overlay

FORD Material Science Dept.



3713 6040

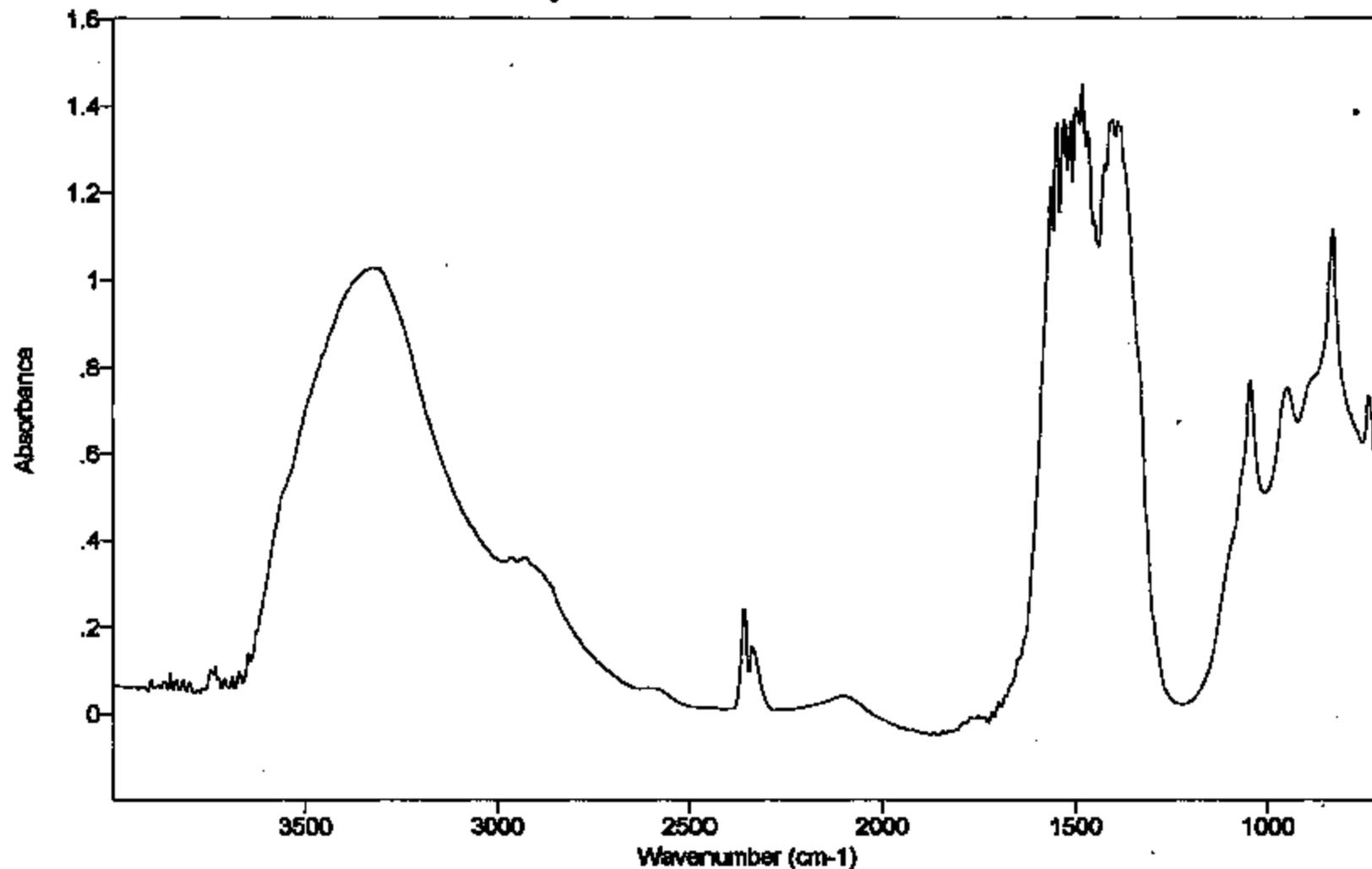
File # 1 : BRAKESWICHWB

Number of Scans: 128

Comment: Brake switch white-2

View Mode: Overlay

FORD Material Science Dept.



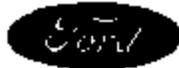
File # 1 : BRAKESWICHWA

Number of Scans: 128

Comment: Brake swich white-1

View Mode: Overlay

3713 5041



Inter Office

Ford Research Laboratory

March 11, 1999

To: Shuan McCarthy
 From: Andy Drews
 Subject: Corroded Brake Switch

CC: Charlotte Lowe-Ma, Roc Carter, Ron Baird, Craig Davis

A partially corroded brake switch was submitted for analysis by x-ray diffraction to determine the corrosion composition. The switch, which normally operates immersed in brake fluid was obviously coated and had a greenish-yellow sheen on the uncorroded surfaces. The top surface of the switch body could roughly be divided into areas with white or red corrosion products. Corrosion was greatest near the top of the switch contact (copper) that protrudes from the body.

X-ray fluorescence on the bottom of the switch body (away from the contact area) was dominated by the presence of iron, with significant quantities of zinc, and much smaller quantities of copper and nickel. The nickel and iron are most likely entirely from the steel body, while the zinc is most likely part of the corrosion protection coating.

X-ray diffraction was used to determine the crystalline phase(s) of the corrosion products. Specimens were scraped from two areas and hand-picked to yield fairly clean representations of the white and red powders. Each was mounted on a Vaseline bed on a zero-background quartz substrate and data were collected using copper radiation. Slits were used to allow a beam divergence of 1.4° , with a 0.2 mm detector slit. Scans were collected from 5° to 90° in steps of 0.03° . After background subtracting each scan, peak locations were compared to entries in the ICDD powder diffraction database.

The XRD scan of the two specimens are shown in Figs 1 and 2. Most of the peaks observed from the brown specimen are associated with Lepidocrocite ($\text{FeO}(\text{OH})$, PDF card #44-1415). In addition, there are several peaks that are, as yet, unidentified. The scan of the white specimen shows mostly broad peaks, with a few very sharp peaks near 22° . The broad peaks in the scan of the white powder most closely matched those of $(\text{Cu}_{0.2}\text{Zn}_{0.8})(\text{CO}_3)_x(\text{OH})_y$, (PDF card #38-154), although significant peaks shifts would be required to fully match the pattern. No structural parameters are known for this phase, although a structure is known for $\text{Zn}_2(\text{CO}_3)_2(\text{OH})_2$ [S. Ghose, *Acta Cryst.* V. 17, p.1051, (1964)]. Using these structural parameters and a revised estimate of the lattice parameters ($a=13.74$, $b=6.35$, $c=5.38$, $\beta=95.6^\circ$), a powder pattern was simulated (assuming no Cu substitution) to verify that the intensities are reasonably consistent with observations. The resulting simulation is overlaid onto the measured scan in Fig. 2. I consider the agreement to be fairly good, and fully consistent with an identification of the major phase as a zinc-basic-carbonate, possibly with some substitution of Cu for Zn. The remaining

discrepancies in intensities are possibly due to incomplete carbonation of the structure (see Ghose).

The second phase (sharp peaks) in the white powder has been tentatively identified as $(\text{NH}_4)_2\text{Zn}(\text{SO}_4)_2 \cdot 6\text{H}_2\text{O}$ (PDF card# 35-767), although this identification will require additional confirmation by an independent technique (such as IR spectroscopy).

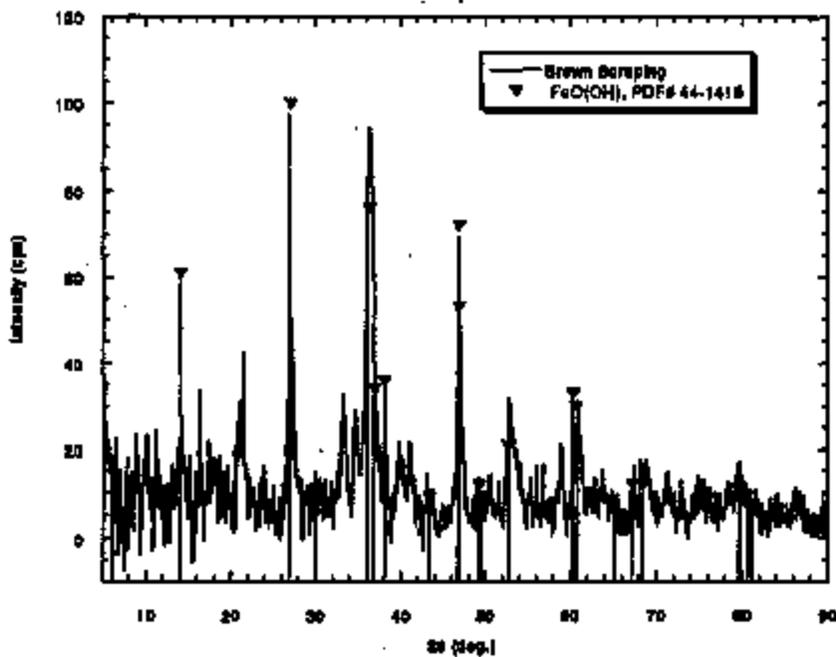


Fig. 1 XRD scan of brown brake switch corrosion. Major peaks are identified with Lepidocrocite (PDF card# 44-1415).

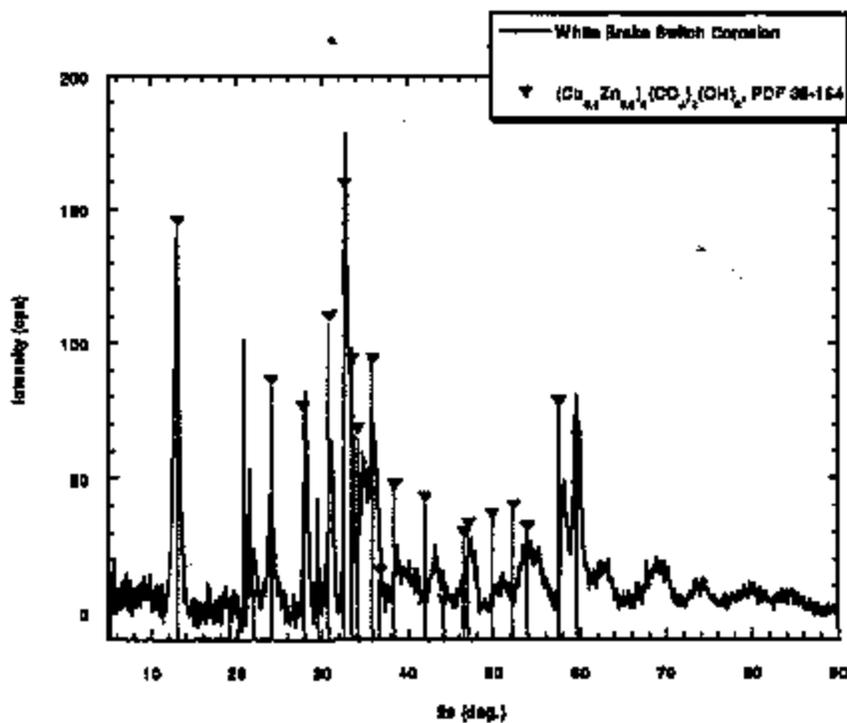


Fig. 2a. XRD scan of the white brake-switch corrosion. Peaks for $(\text{Cu}_{0.5}\text{Zn}_{0.5})(\text{CO}_3)(\text{OH})$ are shown.

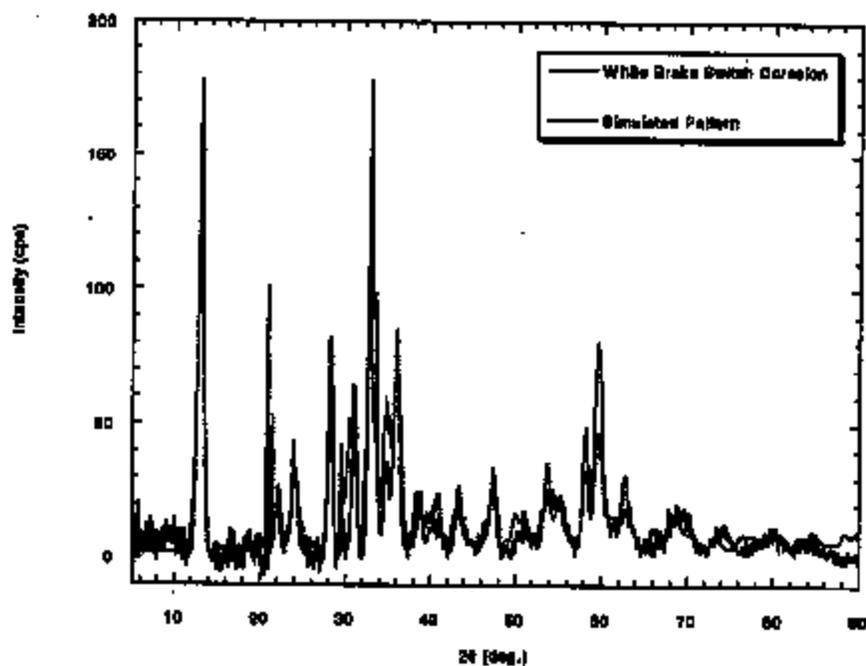
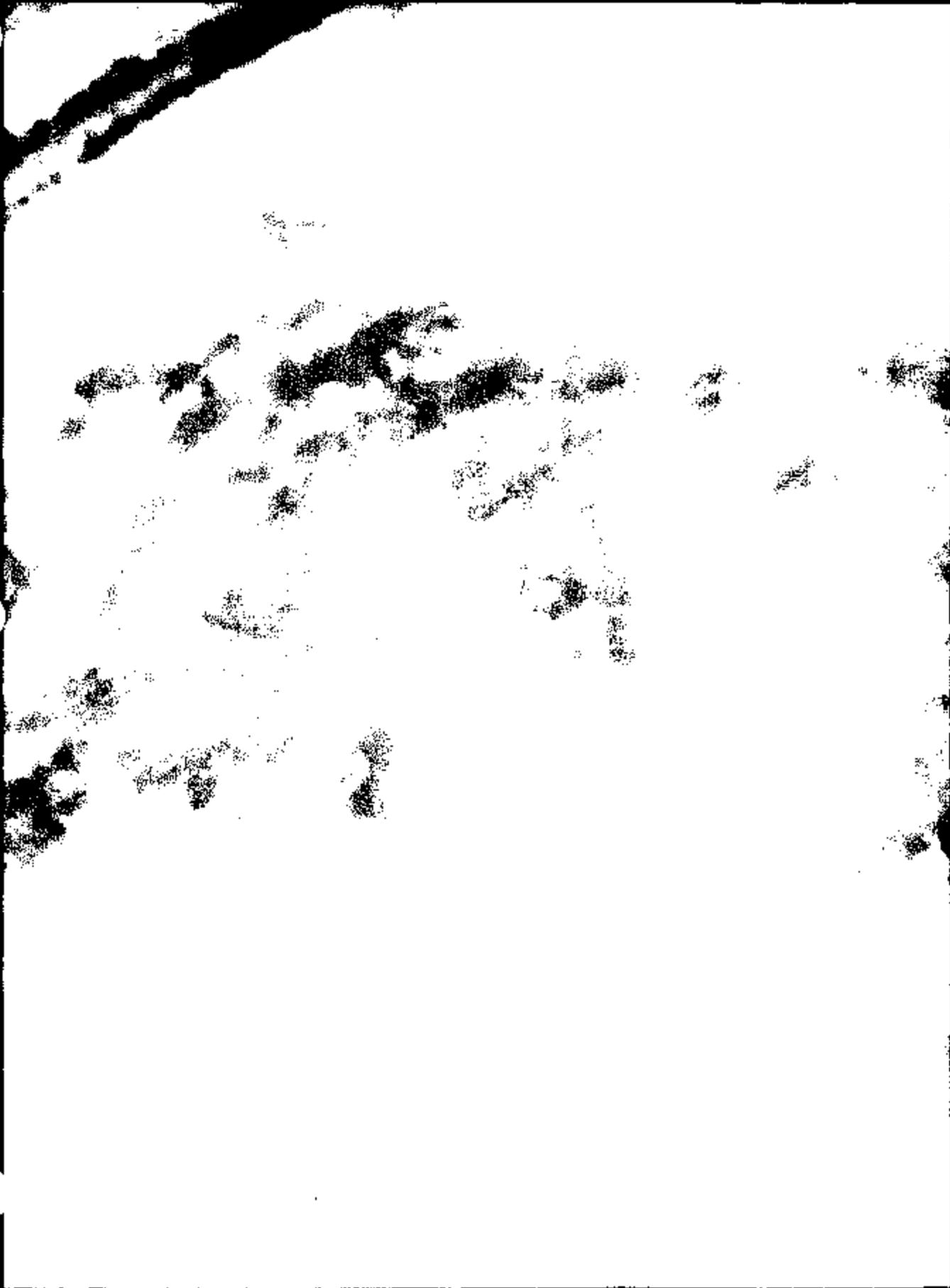


Fig. 2b. XRD scan for the white brake-switch corrosion with a simulated powder pattern for $Zn_5(CO_3)_2(OH)_2$ with modified lattice parameters overlaid. The simulated pattern assumes a particle size broadening term corresponding to $\sim 188\text{\AA}$ particles.



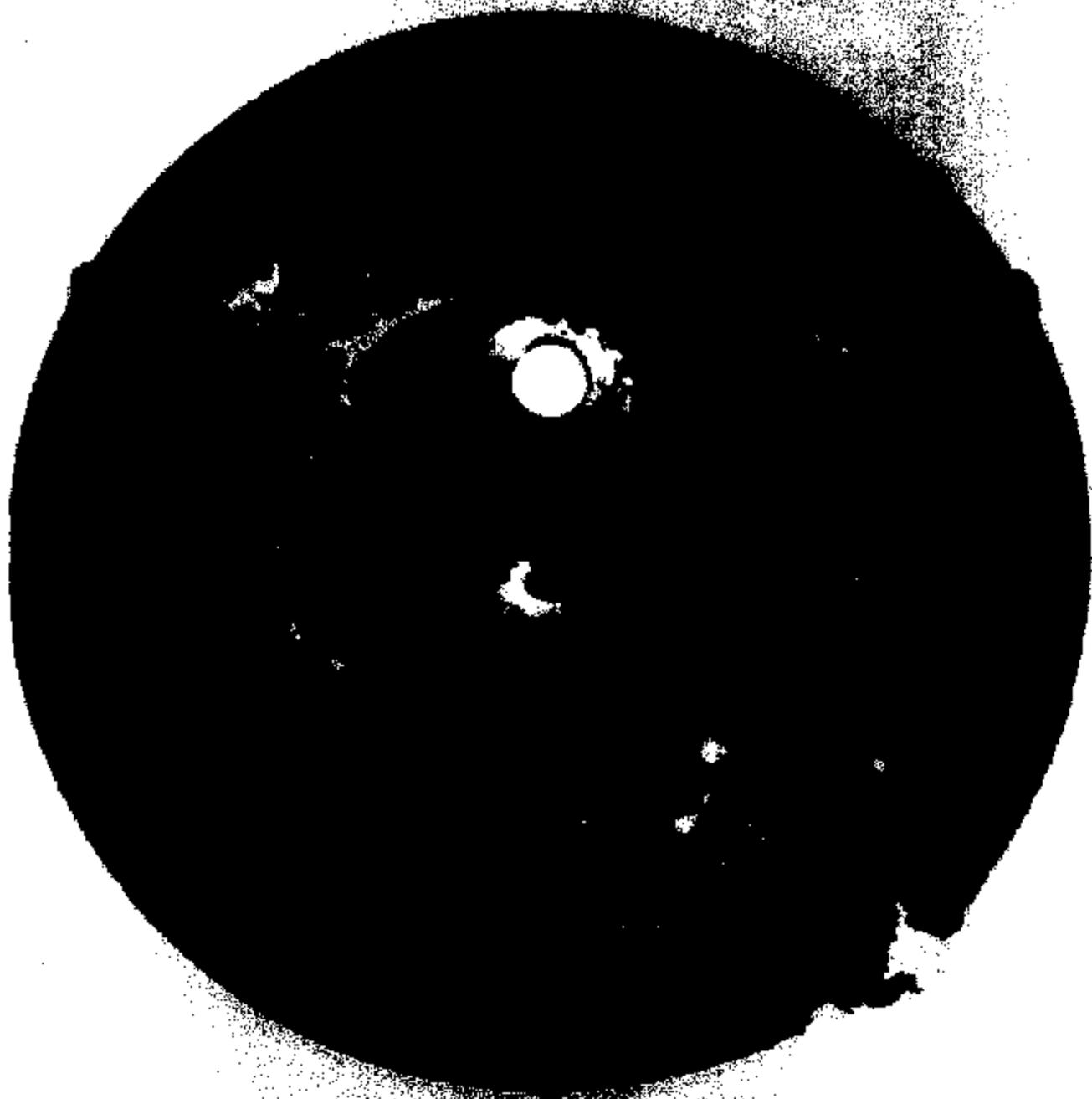
Brake - A

3713 5046



BRASS-2

3713 5047



3713 5048

BRANKS

BRONZE-1 JUNK-YARD PART

3713 5049



From: Irving Salmeen
Sent: Wednesday, February 24, 1999 8:15 AM
To: isalmeen@pobox.srl.ford.com
Subject: DOW Rep Meeting

Regards,
IRVING SALMEEN
*** Forwarding note from SREIMERS-DRBN007 02/22/99 15:32 ***
To: PKILGOA-DRBN005 ISALMEEN-DRBN005

FROM: Steve Reimers USAET(UTC -05:00)
Subject: DOW Rep Meeting
Need a Chemistry or Materials expert to help sort out what is or maybe potential reactions leading to brake fluid ignition inside the switch cavity of the Brake Pressure switch. The main question is given the constraints of battery volt age, 15 amps maximum current, and the combination of brake fluid, copper, zinc, silver, sulfur, and an inductive load induced arc can there be combustion? Also, where does the sulfur come from?

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 8011
38-03288 SREIMERS sreimers@ford.com fax 38-03288 >
*** Forwarding note from SREIMERS-DRBN007 02/19/99 12:37 ***
To: JNEME -DRBN006 FPORTER -DRBN007 Frederick J. Porta
REGLIS1-DRBN006 SSALTER -DRBN005
MLAPOINT-DRBN006 TMASTERS-DRBN005
JKAPATI -DRBN004 SREIMERS-DRBN007 Steve Reimers
FKOHL -DRBN007 Fred Kohl TBAZIL -DRBN005
JMCINERN-DRBN005 DGOEL -DRBN005
LBROWN -DRBN006 SCOLE1 -DRBN005
HWELFERS-DRBN006 GSTEVEN1-DRBN005
WABRANCZ-DRBN006 MREESE -DRBN005
SLAROUCH-FORDNA1 TSCHRODY-VISTEON
DBUDZYNS-VISTEON PSTOKES -VISTEON
I2080625-EXTERNAL OTFWOGYK-EXTERNAL

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

Requester: Steve Reimers
Date to be scheduled: 02/23/99
Starting time: 09:00 AM
Ending time: 11:00 AM

Location: bldg 5 3A017

Subject: DOW Rep Meeting

Purpose: Discuss with DOW the brake pressure switch.
Attend Only if interested in materials questions?

0
A A _b a[UM

ROC
W.H. you please look into this. Thank You

.....
Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
39-03288 SREIMERS sreimers@ford.com fax 39-03288 ;>

From: Irving Salmeen
Sent: Wednesday, February 24, 1999 8:15 AM
To: isalmeen@pobox.art.ford.com
Subject: DOW Rep Meeting

Regards,

IRVING SALMEEN

*** Forwarding note from SREIMERS-DRBN007 02/23/99 11:09 ***

To: PKILLGOA-DRBN005 ISALMEEN-DRBN006
cc: JNEME -DRBN005 FPORTER -DRBN007 Porter, F.J.

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

Subject: DOW Rep Meeting

Meeting has been changed to Wednesday 2/24/99, 2pm in bldg 5 rm 3A03B.
This is supporting a NHTSA investigation of underhood fires. We really need the
right people on this team. Please call me if you have any questions or if you
need further justification to support this effort.
thanks,

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 6011
39-03288 SREIMERS sreimers@ford.com fax 39-03286 :->

*** Forwarding note from SREIMERS-DRBN007 02/22/99 15:32 ***

To: PKILLGOA-DRBN005 ISALMEEN-DRBN006

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

Subject: DOW Rep Meeting

Need a Chemistry or Materials expert to help sort out what is or maybe potential
I reactions leading to brake fluid ignition inside the switch cavity of the Bra
ke Pressure switch. The main question is given the constraints of battery volt
age, 15 amps maximum current, and the combination of brake fluid, copper, zinc,
silver, sulfur, and an inductive load induced arc can there be combustion? Als
o, where does the sulfur come from?

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 6011
39-03288 SREIMERS sreimers@ford.com fax 39-03286 :->

*** Forwarding note from SREIMERS-DRBN007 02/18/99 12:37 ***

To: JNEME -DRBN005 FPORTER -DRBN007 Frederick J. Ports
REINGLIS1-DRBN005 SBALTER -DRBN006
MLAPOINT-DRBN005 TMASTERS-DRBN005
JKAFATI -DRBN004 SREIMERS-DRBN007 Steve Reimers
FKOHL -DRBN007 Fred Kohl TBAZIL -DRBN005
JMCINERN-DRBN005 DGOEL -DRBN005
LBROWN -DRBN005 SCOEL1 -DRBN005
HWELFERS-DRBN006 GSTEVEN1-DRBN005
WABRAMCZ-DRBN005 MREEBE -DRBN005
SLAROUCH-FORDNA1 TSCHRODY-VISTEON
DBUDZYS-VISTEON PSTOKES -VISTEON
I2060625-EXTERNAL OTFW06YK-EXTERNAL

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

Requester: Steve Reimers
Date to be scheduled: 02/23/99
Starting time: 09:00 AM
Ending time: 11:00 AM

Location: bldg 5 3A017

Subject: DOW Rep Meeting

Purpose: Discuss with DOW the brake pressure switch.
Attend Only if interested in materials questions?

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.....

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
38-03288 SREIMERS sreimers@ford.com fax 38-03288 >

SHAUN MCCARTHY

From: Shaun McCarthy
Sent: Monday, March 15, 1999 9:06 AM
To: smccart3@gw.ford.com
Subject: (U) Samples I Left

Regards,
SHAUN McCarthy__SRL Room 1339 Mail Stop 1170
32-21355 FAX 32-31129

*** Forwarding note from FPORTER -DRBN007 03/11/99 08:35 ***
To: SMCCART3-DRBN005 McCarthy, Shaun

FROM: F. J. Porter USAET(UTC -05:00)
Subject: (U) Samples I Left

Shaun,

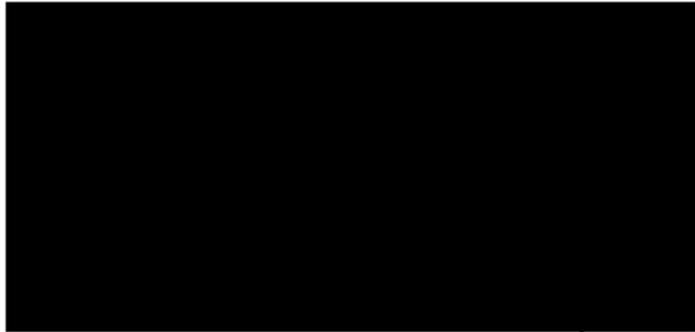
I left some samples of material taken from the "Memphis" brake switch with Mike. This was the material that was requested 2 weeks ago that you thought could be analyzed for compounds, not just elements.

The samples were collected by TI when they first analyzed the part. The "Memphis" vehicle is the one vehicle that we know the brake pressure switch was ignited. We are trying to identify whether the corrosion was caused by contamination that entered through the connector or a breach in the brake fluid seal.

In addition, we are trying to identify the origin of the oxylate and sulfur that was reported by Steve LaRouche at Central Labs.

Thanks for your help.

Regards,
Fred Porter OV - fporter fporter@ford.com
Chassis E/E Systems Applications (313)845-3722
Bldg 5 - Mail Drop 5030 - Cubicle 3E004 fax: 380-4146



A thin vertical line extends downwards from the bottom edge of the redaction box.



Andy McGuirk
ABQ Certified Quality Engineer
Quality Assurance Manager
Asphalt/Stone & Concrete

(505) 238-3888
FAX (505) 238-3745 Fax
(505) 487-3700 Paper Fax # 504-2044
a-ang@ti.com

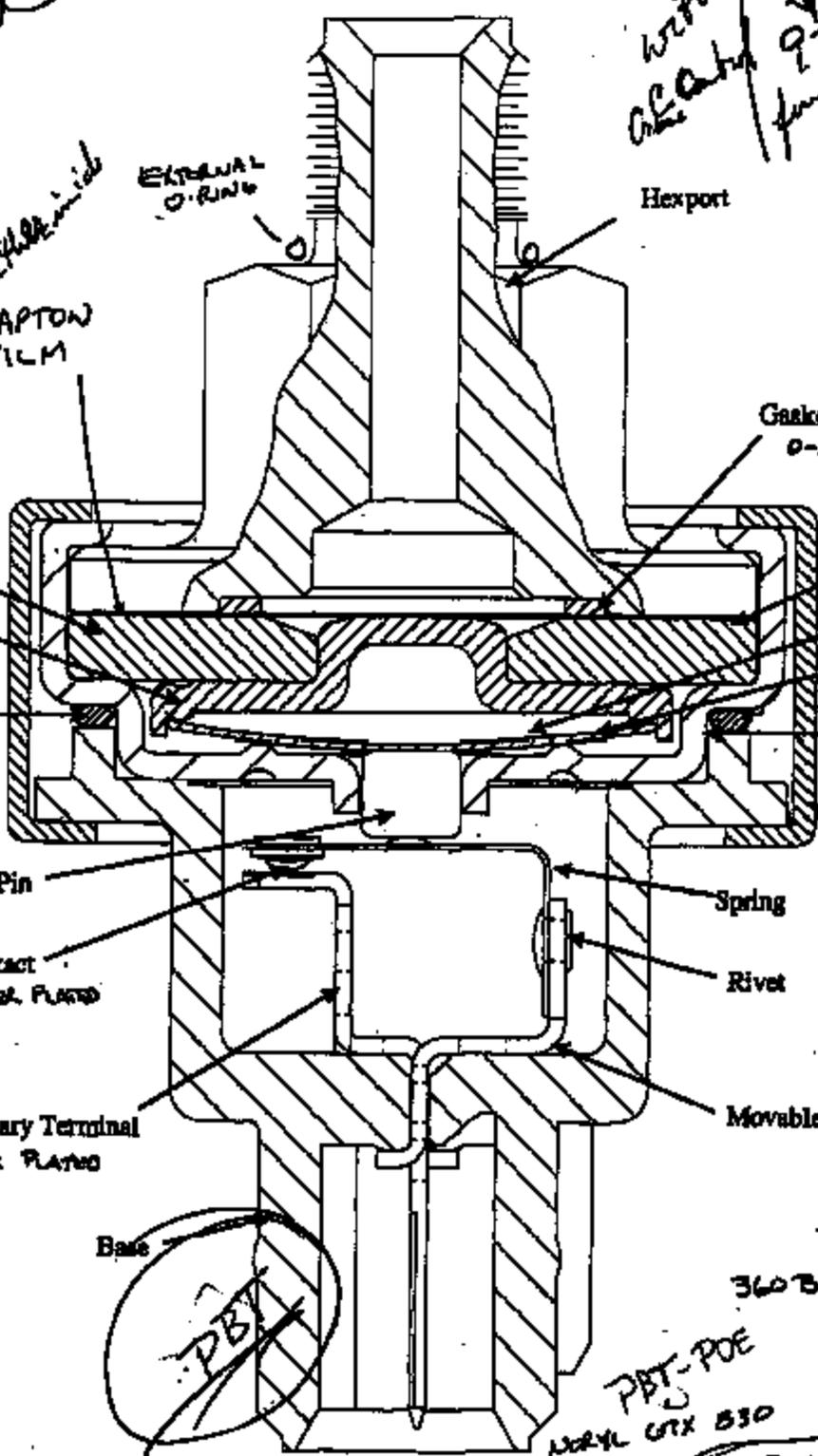
Texas Instruments Incorporated
34 Forest Street, MS 27-05
P.O. Box 2594
Austin, TX 78768-0294

ROC

Hydraulic Pressure Switch Cross Section

*with
external
92
97
con
further
in touch*

with initial
KAPTON
FILM



Zn CRS Washer

CRS Converter

Environmental Silicon Seal

Ceramic Transfer Pin

Contact SILVER PLATED

Stationary Terminal SILVER PLATED

Base

Hexport

Gasket O-RING

Seal

Spacer Kapton

Disc S.S.

Cup CRS

Crimp Ring

Spring

Rivet

Movable Terminal

360 BRASS TERMINALS

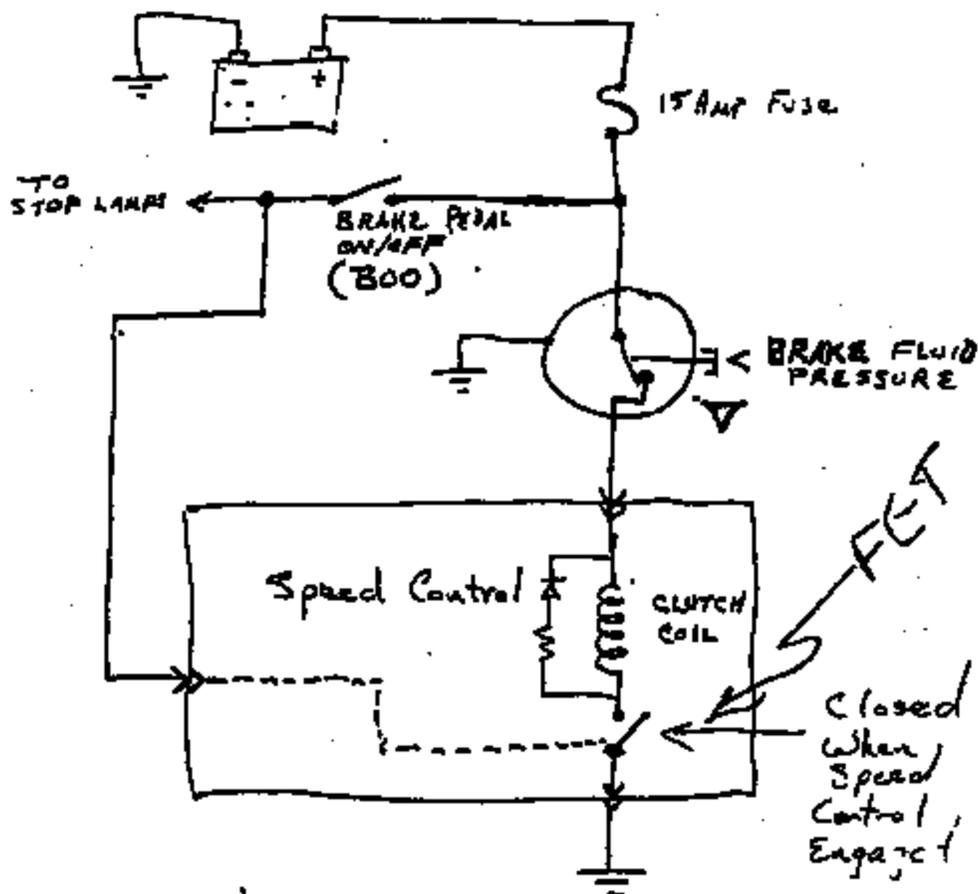
PBT-POE

NYLON OR BK 530

PTCO5 w/ 30% GLASS

Brake Pressure Switch Function-

- Provide power to Speed Control Clutch circuit.
Clutch engages servo-motor to pull throttle cable.
- Provide redundant sensing of brake application independent of the primary system deactivation mode by disconnecting power to clutch circuit causing servo-motor to release throttle cable.
 - Under Hard Braking only
 - Stop lamp signal is primary (normal braking)



Brake Pressure Switch

F2VC-9F824-AB

Material List for MY 92/93

| | | Comment |
|---------------------|--------------------------------|--|
| Gasket | Elastomer Ethylene Propylene | JBL Compound # E-7104-70 |
| Diaphragm | Kapton, Polyimide | Dupont 500 FN131L, 3 Diaphragms per switch |
| Base | PBT, Plastic | Grade Celanex 4300 |
| Crimp Ring | Aluminum | Grade # 5052 |
| Spacer | Kapton, Polyimide | Dupont #200H, Friction Reducer on Disc |
| Rivet | Brass | CDA 260 |
| Transfer Pin | Ceramic | Steatite, L-3 Grade |
| Environmental Seal | Silicone | JBL Compound # S7519 |
| Converter | Cold Rolled Steel | Grade # 1008 |
| Washer | Cold Rolled Steel, Zinc Plated | Grade # 1050 |
| Cup | Cold Rolled Steel | Grade 1010 |
| Spring Arm | Beryllium Copper | Grade # C17200 |
| Movable Contact | Silver Plated Copper | Oxygen Free Cu, Fine Silver |
| Stationary Terminal | Brass + Silver Inlay | CDA 260 |
| Movable Terminal | Brass | CDA 260 |
| Disc | Stainless Steel | Grade 302 |
| Hexport | Cold Rolled Steel, Zinc Plated | C10L10 |
| Thread Cap | LDPE, Plastic | |

3713 5099

From: Irving Salmeen
Sent: Wednesday, February 24, 1999 8:15 AM
To: isalmeen@pobox.ari.ford.com
Subject: DOW Rep Meeting

Regards,
IRVING SALMEEN
*** Forwarding note from BREIMERS-DRBN007 02/22/99 15:32 ***
To: PKILGOA-DRBN005 JSALMEEN-DRBN005

FROM: Steve Reimers USAET(UTC -05:00)
Subject: DOW Rep Meeting

Need a Chemistry or Materials expert to help sort out what is or maybe potential reactions leading to brake fluid ignition inside the switch cavity of the Brake Pressure switch. The main question is given the constraints of battery volt age, 15 amps maximum current, and the combination of brake fluid, copper, zinc, silver, sulfur, and an inductive load induced arc can there be combustion? Also, where does the sulfur come from?

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
39-03286 BREIMERS areimers@ford.com fax 39-03286 >
*** Forwarding note from BREIMERS-DRBN007 02/19/99 12:37 ***
To: JNEME -DRBN005 FPORTER -DRBN007 Frederick J. Porter
RENGLI91-DRBN006 SSALTER -DRBN006
NLAPPOINT-DRBN005 TMASTERS-DRBN006
JKAFATI -DRBN004 BREIMERS-DRBN007 Steve Reimers
FKOHL -DRBN007 Fred Kohl TBAZIL -DRBN006
JMCINERN-DRBN005 DGOEL -DRBN006
LBROWN -DRBN005 SCOLE1 -DRBN006
HWELFER3-DRBN006 GSTEVEN1-DRBN006
WABRAMCZ-DRBN006 MREESE -DRBN006
BLAROUCH-FORDNA1 TBCHRODY-VISTEON
DBUDZYNS-VISTEON PSTOKES -VISTEON
I2060325-EXTERNAL OTFWOGYK-EXTERNAL

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

Requester: Steve Reimers
Date to be scheduled: 02/23/99
Starting time: 09:00 AM
Ending time: 11:00 AM

Location: bldg 6 3A017

Subject: DOW Rep Meeting

Purpose: Discuss with DOW the brake pressure switch.
Attend Only if interested in materials questions?

0
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ROC
W.U. you please look into this. Thank You

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

From: Irving Salmeen
Sent: Wednesday, February 24, 1999 8:15 AM
To: isalmeen@pobox.ari.ford.com
Subject: DOW Rep Meeting

Regards,

IRVING SALMEEN

*** Forwarding note from SREIMERS-DRBN007 02/23/99 11:09 ***

To: PKILGOA-DRBN005 ISALMEEN-DRBN006
cc: JNEME -DRBN005 FPORTER -DRBN007 Porter, F.J.

FROM: Steve Reimers USAET(UTC -08:00)

Subject: DOW Rep Meeting

Meeting has been changed to Wednesday 2/24/99, 2pm in bldg 5 rm 3A03B

This is supporting a NHTSA investigation of underhood fires. We really need the right people on this team. Please call me if you have any questions or if you need further justification to support this effort.

thanks,

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
36-03286 SREIMERS sreimers@ford.com fax 36-03286 >

*** Forwarding note from SREIMERS-DRBN007 02/22/99 16:32 ***

To: PKILGOA-DRBN005 ISALMEEN-DRBN006

FROM: Steve Reimers USAET(UTC -08:00)

Subject: DOW Rep Meeting

Need a Chemistry or Materials expert to help sort out what is or maybe potential reactions leading to brake fluid ignition inside the switch cavity of the Brake Pressure switch. The main question is given the constraints of battery voltage, 15 amp maximum current, and the combination of brake fluid, copper, zinc, silver, sulfur, and an inductive load induced arc can there be combustion? Also, where does the sulfur come from?

Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 5011
36-03286 SREIMERS sreimers@ford.com fax 36-03286 >

*** Forwarding note from SREIMERS-DRBN007 02/19/99 12:37 ***

To: JNEME -DRBN005 FPORTER -DRBN007 Frederick J. Porter
RENGUS1-DRBN006 SSALTER -DRBN006
NLAPOINT-DRBN005 TMASTERS-DRBN006
JKAPATI -DRBN004 SREIMERS-DRBN007 Steve Reimers
FKOHL -DRBN007 Fred Kohl TBAZIL -DRBN006
JMCINERN-DRBN005 DGOEL -DRBN006
LBROWN -DRBN005 SCOLE1 -DRBN006
HWELFER3-DRBN006 GSTEVEN1-DRBN006
WABRAMCZ-DRBN006 MREESE -DRBN006
SLAROUCH-FORDNA1 TSCHRODY-VISTEON
DBUDZYNS-VISTEON PSTOKES -VISTEON
I2080625-EXTERNAL OTFWOGYK-EXTERNAL

FROM: Steve Reimers USAET(UTC -08:00)

Requester: Steve Reimers
Date to be scheduled: 02/23/99
Starting time: 09:00 AM
Ending time: 11:00 AM

Location: bldg 5 3A017

Subject: DOW Rep Meeting

Purpose: Discuss with DOW the brake pressure switch.
Attend Only if interested in materials questions?

0

A A _o of UM

.....
Steve Reimers building 5 3C043
AVT Chassis E/E System Applications mail drop 6011
38-03286 SREIMERS sreimers@ford.com fax 38-03286 ;>