

EA02-025

FORD

10/27/03

BOOK 27 OF 61

PART 4 OF 5

BOX 23 OF 28

Sample Information					Resistance Measurement, Ω														
VIN	Sample	MY/Vehicle	Part#/Data Code	Condition	Switch and Connector			Connector Only	Switch				Switch at 180 psi				Function		
					GRN/RD to OR	GRN/RD to Hexport	OR tp Hexport	GRN/RD to OR	Spring Term. to Stat. Term.	Spring Term. to Hexport	Stat. Term. to Hexport	Base to Hexport	Spring Term. to Stat. Term.	Spring Term. to Hexport	Stat. Term. to Hexport	Base to Hexport	Opening Pressure	Closing Pressure	Proof Test at 500psi
	Memphis	1993 TC	F2VC/2056	Partially burned	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
	A	1993 TC	????/2281	Burned	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
	B	1992 TC	F2VC/2114	Burned	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
	C	1992 TC	F2VC/2003	Burned	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
	D	1997 CV	F2AC/????	Apparent leakage	NP	NP	NP	NP	0.4	4.8M	NP	1.1	NP	NP	NP	NP	NP	NP	NP
	E (#11)	TC	F2AC/2137	No leaks or other apparent problems	NP	NP	NP	NP	0.2	Infinity	NP	6.6M	NP	NP	NP	NP	NP	NP	NP

VIN	Connector/Wires				Switch				
	Engagement	Wires	Red Seal	Grey Seal	Hexport, Washer, Converter, Spacer, and Disc	Environmental Seal	Gasket/Kapton Seals	Cup	Base, Switch Cavity, Contacts, Terminals
PY	Could not determine.	Short length (~10 mm) no apparent exterior damage. Oxidation or tarnish beneath insulation.	Could not determine.	Appears intact. White residue in cavity contains elements typically found in dry chemical fire extinguishers.	Black residue containing glycol based material (probably brake fluid) and a metal oxalate. Indicates presence of brake fluid on fluid and switch sides of seals.	Intact. Appears to have had good sealing.	Gasket intact; appears to have had good sealing. All Kapton seals buckled and exhibit brittle cracks which most likely formed a leak path. Damage appears to have initiated in seal closest to washer. Kapton darkened and embrittled by unknown mechanism.	Green deposits on face of cup contain elements from brass contacts, indicating transfer of contact material to cup, possibly as a result of an electrical cell. Glycol based material (probably brake fluid) also present.	Base separated below crimp ring. Transfer pin and movable are contact missing. Movable contact melted back into switch (possibly due to arcing); appears to have occurred in later stages of event. Black deposit on terminal of movable contact appears to be a sulfur compound. Stationary contact exhibits dezincification, loss of material due to corrosion, and stress corrosion cracking. Green deposit on terminal of stationary contact appears to be a sulfur compound.
PY	Missing	Missing	Missing	Missing	Elements from contact material detected at fitting end of hexport. Silicone also detected.	Missing	Gasket missing. Charred fragments of Kapton seals remain.	Deposits on face of cup contain elements from brass contacts, indicating transfer of contact material to cup probably as an oxide, sulfide, or corrosion product.	Base, stationary contact, movable contact, transfer pin, and terminals missing.
NY	Missing	Missing	Missing	Missing	Elements from contact material detected at fitting end of hexport.	Not permitted to disassemble switch.	Not permitted to disassemble switch.	Deposits on face of cup contain elements from brass contacts, indicating transfer of contact material to cup probably as an oxide, sulfide, or corrosion product.	Transfer pin and movable contact missing. Stationary contact exhibits crack in similar location as that in Memphis (Reddick) sample.
NY	Missing	Missing	Missing	Missing	Elements from contact material detected at fitting end of hexport. Black residue in cavity contains traces of hydrocarbon and silicone.	Missing	Gasket appears charred. Kapton seals present, but melted together. Could not evaluate for cracks/seals.	Deposits on face of cup contain elements from brass contacts, indicating transfer of contact material to cup probably as an oxide, sulfide, or corrosion product.	Base, stationary contact, movable contact, transfer pin, and terminals missing.
VZ	Missing	Missing	Missing	Missing	Black residue in hexport cavity, on washer, and converter contain glycol based material (probably brake fluid) and a metal oxalate.	Intact and appears to have had good seal.	Gasket intact and appears to have had good seal. Kapton seals exhibit damage similar to that found in Memphis (Reddick) sample. All three exhibit brittle cracks which probably formed leak path.	Dark green deposits on face of cup contain elements from brass contacts indicating transfer of contact material to cup probably as oxide, sulfide, or corrosion product. Liquid in interior and on face is glycol based (probably brake fluid).	Switch cavity and terminal cavity contain glycol based material (probably brake fluid). Contacts appear intact. Dark green deposits on movable and stationary contact contain elements from brass contact material. Terminals are clean (no apparent deposits or corrosion).
NY	Missing	Missing	Missing	Missing	Black residue in hexport contains glycol based material (probably brake fluid) and a metal oxalate. No apparent fluid on components inside cup.	Intact and appears to have had good seal.	Gasket intact and appears to have had good seal. Kapton seals exhibit deformation and buckling similar to that found in Memphis (Reddick) sample. Cracking on surfaces suggest incipient cracking is occurring.	Face and interior of cup appear clean and dry.	Switch and terminal cavities appear clean and dry. No apparent deposits or corrosion on terminals.

Sample Information

VIN	Sample	MY/Vehicle	Prefix/ Date Code	Condition	Conclusion/Comments	List of Figures	Central Laboratory Report Number
PY6	Memphis	1983 TC	F2VC/2058	Partially burned	Embrittlement and subsequent cracks in Kapton seal formed leak path for brake fluid to enter switch cavity. Transfer of brass contact material to the cup suggests that an electrical cell formed between the hot (+) contacts and the grounded (-) cup. Brake fluid in switch cavity may have acted as electrolyte for the cell. Dezincification and stress corrosion cracking of stationary contact indicates that moisture and other contaminants may have been present with brake fluid.	See Central Laboratory report 9904105	9904105
PY6	A	1983 TC	7777/2281	Burned	Transfer of brass contact material to cup suggests that electrical cell may have occurred. Too badly damaged to determine if Kapton leaked or if brake fluid was present in switch cavity.	Figures 1 through 13 (note: There was a skip in figure numbering, consequently there is no Figure 7)	9900226
NY7	B	1982 TC	F2VC/2114	Burned	Transfer of brass contact material to cup suggests that electrical cell may have occurred. Too badly damaged to determine if Kapton leaked or if brake fluid was present in switch cavity.	Figures 14 through 17	9900226
NY7	C	1982 TC	F2VC/2003	Burned	Transfer of brass contact material to cup suggests that electrical cell may have occurred. Too badly damaged to determine if Kapton leaked or if brake fluid was present in switch cavity.	Figures 18 through 35	9900226
VX1	D	1987 CV	F2AC/7777	Apparent leakage	Embrittlement and subsequent cracks in Kapton seal formed leak path for brake fluid to enter switch cavity. Transfer of brass contact material to the cup suggests that an electrical cell formed between the hot (+) contacts and the grounded (-) cup. Brake fluid in switch cavity may have acted as electrolyte for the cell. Failure mode appears similar to Memphis switch.	Figures 36 through 52	9900226
NX7	E (#11)	TC	F2AC/2197	No leaks or other apparent problems	No apparent problem with switch other than incipient damage to Kapton seals.	Figures 53 through 66	9900226

VIN	Sample Information				Switch and Connector				Switch				Switch at 180 psi				Function		
	Sample	MY/Vehicle	Prefix/ Date Code	Condition	GRN/RD to OR	GRN/RD to Hexport	OR to Hexport	GRN/RD to OR	Spring Term. to Stat. Term.	Spring Term. to Hexport	Stat. Term. to Hexport	Base to Hexport	Spring Term. to Stat. Term.	Spring Term. to Hexport	Stat. Term. to Hexport	Base to Hexport	Opening Pressure	Closing Pressure	Proof Test at 500psi
NY7	F	TC	F2VC/2128	Apparent leakage	NP	NP	NP	NP	NP	2M	NP	NP	NP	NP	NP	NP	NP	NP	NP
PY7	3	TC	3015	No leaks or other apparent problems	NP	NP	NP	NP	0.2	Infinity	Infinity	11.4	Infinity	Infinity	Infinity	Infinity	134	59	No apparent leak
PY8	4	TC	2048	No leaks or other apparent problems	NP	NP	NP	NP	0.3	Infinity	Infinity	1.6M	Infinity	Infinity	Infinity	Infinity	160	88	No apparent leak
PY8	5	TC	2064	No leaks or other apparent problems	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
PY7	8	TC	3025	No leaks or other apparent problems	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
NO7	7	TC	2069	No leaks or other apparent problems	NP	NP	NP	NP	0.2	Infinity	Infinity	7.8M	Infinity	Infinity	Infinity	Infinity	147	70	No apparent leak
PX1	8	TC	3026	No leaks or other apparent problems	NP	NP	NP	NP	0.2	Infinity	Infinity	18.5	Infinity	Infinity	Infinity	Infinity	132	88	No apparent leak
PX8	9	TC	2280	No leaks or other apparent problems	NP	NP	NP	NP	0.2	Infinity	Infinity	7.5M	Infinity	Infinity	Infinity	Infinity	140	112	No apparent leak
PY8	10	TC	2281	No leaks or other apparent problems	NP	NP	NP	NP	2.2	Infinity	Infinity	1.4M	Infinity	Infinity	Infinity	Infinity	137	88	No apparent leak
PY7	11	TC	3028	No leaks or other apparent problems	NP	NP	NP	NP	0.2	Infinity	Infinity	Infinity	Infinity	Infinity	Infinity	Infinity	139	71	No apparent leak

VIN	Connector/Wires				Switch					
	Engagement	Wires	Red Seal	Gray Seal	Hexport, Washer, Converter, Spacer, and Disc	Environmental Seal	Gasket/Kapton Seals	Cup	Base, Switch Cavity, Contacts, Terminals	
NY7	Missing	Missing	Missing	Missing	Black residue in hexport cavity, on washer, and converter contain glycol based material (probably brake fluid) and a metal acetate.	Intact and appears to have had good seal.	Gasket intact and appears to have had good seal. Kapton seals exhibit damage similar to that found in Memphis (Reddick) sample. All three exhibit brittle cracks which probably formed leak path.	Dark green deposits on face of cup contain elements from brass contacts indicating transfer of contact material to cup probably as oxide, sulfide, or corrosion product. Liquid in interior and on face is glycol based (probably brake fluid).	Switch and terminal cavities contain glycol based material (probably brake fluid). Stationary contact intact; shows stress corrosion cracking in progress in same location as Memphis sample. Movable contact separated, apparently due to loss of material	(~50% of thickness). No evidence of heating or arc damage. Dark green deposits on contacts contain elements from brass material, as well as sulfur. Terminals exhibit green deposits that extend in from switch and terminal cavities, but do not meet.
PY7	Missing	Missing	Missing	Missing	NP	NP	NP	NP	NP	
PY8	Missing	Missing	Missing	Missing	NP	NP	NP	NP	NP	
PY8	Missing	Missing	Missing	Missing	NP	NP	NP	NP	NP	
PY7	Missing	Missing	Missing	Missing	NP	NP	NP	NP	NP	
NX7	Missing	Missing	Missing	Missing	NP	NP	NP	NP	NP	
PX1	Missing	Missing	Missing	Missing	NP	NP	NP	NP	NP	
PX6	Missing	Missing	Missing	Missing	NP	NP	NP	NP	NP	
PY6	Missing	Missing	Missing	Missing	NP	NP	NP	NP	NP	
PY7	Missing	Missing	Missing	Missing	NP	NP	NP	NP	NP	

Sample Information

VIN	Sample	MY/Vehicle	Prefix/ Date Code	Condition	Conclusion/Comments	List of Figures	Central Laboratory Report Number
NY	F	TC	F2VG/2126	Apparent leakage	Embrittlement and subsequent cracks in Kapton seal formed leak path for brake fluid to enter switch cavity. Transfer of brass contact material to the cup suggests that an electrical cell formed between the hot (+) contacts and the grounded (-) cup. Brake fluid in switch cavity may have acted as electrolyte for the cell. Stress corrosion cracking of stationary contact indicates that moisture and other corrodants may have been present with brake fluid. Failure mode appears similar to Memphis switch.	Figures 67 through 81	9900229
PY	3	TC	3015	No leaks or other apparent problems	Examination, resistance and functional testing revealed no apparent problem with switch. No further analysis performed.	none	9900607
PY	4	TC	2048	No leaks or other apparent problems	Examination, resistance and functional testing revealed no apparent problem with switch. No further analysis performed.	none	9900607
PY	5	TC	2064	No leaks or other apparent problems	Examination, resistance and functional testing revealed no apparent problem with switch. No further analysis performed.	none	9900607
PY	6	TC	3025	No leaks or other apparent problems	Examination, resistance and functional testing revealed no apparent problem with switch. No further analysis performed.	none	9900607
ND	7	TC	2059	No leaks or other apparent problems	Examination, resistance and functional testing revealed no apparent problem with switch. No further analysis performed.	none	9900607
PX	8	TC	3025	No leaks or other apparent problems	Examination, resistance and functional testing revealed no apparent problem with switch. No further analysis performed.	none	9900607
PX	9	TC	2260	No leaks or other apparent problems	Examination, resistance and functional testing revealed no apparent problem with switch. No further analysis performed.	none	9900607
PY	10	TC	2281	No leaks or other apparent problems	Examination, resistance and functional testing revealed no apparent problem with switch. No further analysis performed.	none	9900607
PY	11	TC	3028	No leaks or other apparent problems	Examination, resistance and functional testing revealed no apparent problem with switch. No further analysis performed.	none	9900607

Sample Information				Switch and Connector			Only	Switch				Switch at 180 psi				Function			
VIN	Sample	MY/Vehicle	Prfx/ Date Code	Condition	GRNRD to OR	GRNRD to Hexport	OR to Hexport	GRNRD to OR	Spring Term. to Stat. Term.	Spring Term. to Hexport	Stat. Term. to Hexport	Base to Hexport	Spring Term. to Stat. Term.	Spring Term. to Hexport	Stat. Term. to Hexport	Base to Hexport	Opening Pressure	Closing Pressure	Proof Test at 500psi
PX1	2	CV-PC	3053	No leaks or other apparent problems	0.4	Infinity	Infinity	Infinity	0.1	Infinity	Infinity	Infinity	0.1	Infinity	Infinity	Infinity	127	62	No apparent leak
FX6	3	GM	3295	No leaks or other apparent problems	0.2	Infinity	Infinity	Infinity	0.2	Infinity	Infinity	17.7K	Infinity	Infinity	Infinity	Infinity	128	64	No apparent leak
PX1	4	CV-PC	3025	No leaks or other apparent problems	NP	NP	NP	NP	0.1	Infinity	Infinity	Infinity	Infinity	Infinity	Infinity	Infinity	133	63	No apparent leak
PY6	5	TC	2063	No leaks or other apparent problems	0.2	Infinity	Infinity	NP	0.2	Infinity	Infinity	160K	Infinity	Infinity	Infinity	Infinity	151	62	No apparent leak
NY7	6	TC	??	Underhood fire.	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
PY7	7	TC	3081	No leaks or other apparent problems	Infinity	Infinity	Infinity	Infinity	0.3	Infinity	Infinity	483K	Infinity	Infinity	Infinity	Infinity	136	66	No apparent leak
NY7	8	TC	2045	Underhood fire.	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP

VIN	Engagement	Connector/Wires			Hexport, Washer, Converter, Spacer, and Disc	Switch			
		Wires	Red Seal	Grey Seal		Environmental Seal	Gasket/Kapton Seals	Cup	Base, Switch Cavity, Contacts, Terminals
PX	GRN/RED side not fully engaged. Fluoroscopy revealed terminals engaged.	TBP	Intact. Impression uneven and offcenter	Intact. Wires and cavity clean below seal except for trace of oil from seal. Seal left impressions in wire insulation.	Black residue in fitting end of hexport. Did not analyze. Apparent rust deposits on converter, washer, and disc, as well as on interior surface of cup.	Environmental seal intact, in place, appears to have good adhesion.	Gasket intact and appears to have had good seal. Kapton seal nearest hexport exhibits delamination and tears in teflon, but no apparent cracks in substrate. Other Kapton seals show no tears, cracks, or delamination. No apparent leak path.	Face of cup covered with rust colored deposits containing iron and zinc (probably corrosion product of cup material). Shown by fluoroscopy prior to disassembly. Transfer pin frozen in place by corrosion product. No evidence of a cell occurring.	Base contains what appears to be moisture (evaporated quickly once exposed to atmosphere). Movable contact discolored, but not heavily corroded near cup. Rest of contacts and their bases appear clean. No apparent deposits or corrosion on terminals.
PX	Fully engaged	TBP	Intact. Impression even and deep all the way around	Intact. Wires and cavity clean below seal except for trace of oil from seal. Seal left impressions in wire insulation.	Black residue in fitting end of hexport. Did not analyze residue. Did not disassemble switch.	Did not disassemble	Did not disassemble	Did not disassemble	Did not disassemble. Terminals clean (no apparent deposits or corrosion).
PX	OR wire side of connector not fully engaged.	TBP	Intact. Impression even and deep all the way around	Intact. Wires and cavity clean below seal except for trace of oil from seal. Seal left impressions in wire insulation.	Black residue with copper or rust colored globules in fitting end of hexport. Did not analyze residue. Did not disassemble switch.	Did not disassemble	Did not disassemble	Did not disassemble	Did not disassemble. Terminals clean (no apparent deposits or corrosion).
PY	Fully engaged	TBP	Intact. Impression even and deep -80% around. Witness mark from damage to edge of switch base.	Intact. Wires and cavity clean below seal except for trace of oil from seal. Seal left impressions in wire insulation.	Rust colored deposit in fitting end of hexport. Did not analyze deposit. Did not disassemble switch.	Did not disassemble	Did not disassemble	Did not disassemble	Did not disassemble. Terminals clean (no apparent deposits or corrosion).
NY	Missing	Missing	Missing	Missing	Black residue in fitting end of hexport; did not analyze.	Missing	Did not disassemble	Exposed face covered with rust and greenish colored deposits; did not analyze.	Missing.
PY	Fully engaged	TBP	Intact. Impression even and deep all the way around	Intact. Wires and cavity clean below seal except for trace of oil from seal. Seal left impressions in wire insulation.	Black residue with copper or rust colored globules in fitting end of hexport. Did not analyze residue. Did not disassemble switch.	Did not disassemble	Did not disassemble	Did not disassemble	Did not disassemble. Terminals clean (no apparent deposits or corrosion).
NY	Missing	Missing	Missing	Missing	Still attached to prop. valve did not disassemble.	Did not disassemble	Did not disassemble	Exposed face covered with rust and greenish colored deposits; did not analyze.	Missing.

Sample Information				Condition	Conclusion/Comments	List of Figures	Central Laboratory Report Number
VIN	Sample	MY/Vehicle	Prefix/ Data Code				
PX	2	CV-PC	3053	No leaks or other apparent problems	Switch did not open when pressurized. Cup appears to have been corroded by water intrusion. Transfer pin frozen in place by corrosion product. No evidence of brake fluid leakage or formation of electrical cell.	Figures 82 through 100	9900607
RX	3	GM	3295	No leaks or other apparent problems	Examination, resistance and functional testing revealed no apparent problem with switch. No further analysis performed.	Figures 101 through 102	9900607
PX	4	CV-PC	3025	No leaks or other apparent problems	Examination, resistance and functional testing revealed no apparent problem with switch. No further analysis performed.	Figures 103 through 105	9900607
PY	5	TC	2083	No leaks or other apparent problems	Examination, resistance and functional testing revealed no apparent problem with switch. No further analysis performed.	Figures 106 through 107	9900607
NY	6	TC	??	Underhood fire.	Severely damaged by fire. No further analyses performed.	Figures 108 through 109	9900607
FY	7	TC	3081	No leaks or other apparent problems	Examination, resistance and functional testing revealed no apparent problem with switch. No further analysis performed.	Figures 110 through 111	9900607
NY	8	TC	2045	Underhood fire.	Severely damaged by fire. No further analyses performed.	Figures 112 through 113	9900607

Sample Information				Switch and Connector			Only	Switch				Switch at 180 psi				Function			
VIN	Sample	MY/Vehicle	Prefix/ Date Code	Condition	GRN/RD to OR	GRN/RD to Hexport	OR to Hexport	GRN/RD to OR	Spring Term. to Stat. Term.	Spring Term. to Hexport	Stat. Term. to Hexport	Base to Hexport	Spring Term. to Stat. Term.	Spring Term. to Hexport	Stat. Term. to Hexport	Base to Hexport	Opening Pressure	Closing Pressure	Proof Test at 500psi
PY	9	TC	3088	No leaks or other apparent problems		26.0M	6.1M	Infinity	1.5	6.3M	6.4M	0.4	0.1	-970K	-970K	Infinity	164	66	No apparent leak
PX	10	CV	2272	No leaks or other apparent problems		0.4	Infinity	Infinity	0.4	Infinity	Infinity	6.8	Infinity	Infinity	Infinity	Infinity	126	106	No apparent leak
NY	11	TC	2115	No leaks or other apparent problems	NP	NP	NP	NP	0.1	Infinity	Infinity	Infinity	Infinity	Infinity	Infinity	Infinity	136	74	No apparent leak
PY	12	TC	3065	No leaks or other apparent problems		0.3	20.2M	21.5M	0.2	34M	39M	63.4K	0.1	Infinity	Infinity	Infinity	148	61	No apparent leak
PY	13	TC	3088	No leaks or other apparent problems		0.3	Infinity	Infinity	0.2	Infinity	Infinity	7.5M	Infinity	Infinity	Infinity	Infinity	150	70	No apparent leak
NY	Oasis	TC	2062	Dealership return, apparent brake fluid leak.	NP	NP	NP	NP	>750K	>250K	>350K	Infinity	>1M	>600K	>400K	Infinity	152	92	No apparent leak

VIN	Engagement	Wires	Red Seal	Gray Seal	Hexport, Washer, Converter, Spacer, and Disc	Environmental Seal	Gasket/Kapton Seals	Cup	Base, Switch Cavity, Contacts, Terminals
PY	Fully engaged	TBP	Intact. Impression even, but not deep or sharp. Not as compressed as in other samples.	Intact. Wires and cavity clean below seal except for trace of oil from seal. Seal left impressions in wire insulation.	Still attached to prop. valve. Black residue in hexport cavity; did not analyze. White deposits on washer, converter, disc, and interior of cup; did not analyze - probably corrosion product of zinc platings.	Intact and appears to have had good seal.	Gasket intact and appears to have had good seal. Kapton seal nearest hexport exhibits delamination and possible tear in teflon, but no apparent cracks in substrate. Other Kapton seals show no tears, cracks, or delamination. No apparent leak path.	Face of cup covered with rust and white colored deposits containing iron and zinc (probably corrosion product of cup material). Transfer pin frozen in place by corrosion product. Appears moist (evaporated quickly). No evidence of a cell occurring.	Movable contact discolored, but not heavily corroded near cup. Rest of contacts and their bases appear clean. Terminals exhibit some corrosion.
PX	Fully engaged	TBP	Intact. Impression even and deep.	Intact. Wires and cavity clean below seal except for trace of oil from seal. Seal left impressions in wire insulation.	Still attached to prop. valve. Did not disassemble.	Did not disassemble	Did not disassemble	Did not disassemble	Did not disassemble. Terminals clean (no apparent deposits or corrosion).
NY	Fully engaged	TBP	Intact. Impression even and deep.	Intact. Wires and cavity clean below seal except for trace of oil from seal. Seal left impressions in wire insulation.	Still attached to prop. valve. Did not disassemble.	Did not disassemble	Did not disassemble	Did not disassemble	Did not disassemble. Terminals clean (no apparent deposits or corrosion).
PY	Fully engaged	TBP	Intact. Impression even and deep.	Intact. Wires and cavity clean below seal except for trace of oil from seal. Seal left impressions in wire insulation.	Black residue in fitting end of hexport; did not analyze at CL. Disassembled and analyzed by SRL.	Disassembled and analyzed by SRL.	Disassembled and analyzed by SRL.	Disassembled and analyzed by SRL.	Disassembled and analyzed by SRL. Terminals have light deposits on them.
PY74	Fully engaged	TBP	Intact. Impression even and deep.	Intact. Wires and cavity clean below seal except for trace of oil from seal. Seal left impressions in wire insulation.	Black residue in fitting end of hexport; did not analyze.	Did not disassemble.	Did not disassemble	Did not disassemble	Did not disassemble. Terminals clean (no apparent deposits or corrosion).
NY	Missing	Missing	Missing	Missing	Black residue in fitting end contains glycol ether based material (probably brake fluid), an oxalate, and other material; possibly a hydrocarbon. No apparent burns on converter, washer, or hexport.	Intact and appears to have had good seal.	Gasket is intact and appears to have had good seal. Kapton seals exhibit circumferential tears in Teflon with radial and circumferential cracking in substrate. Appears to have formed leak path. Damage appears similar to that in Memphis sample.	Face of cup covered with black residue and copper colored globules. Residue contains glycol based material (probably brake fluid) and possibly a hydrocarbon. Additional analyses of residue pending.	Switch cavity of base contains black sludge. Movable contact appears to have been corroded away. Black residue is present in terminal cavity and at bases of terminals. Terminals appear clean otherwise.

Sample Information

VIN	Sample	MY/Vehicle	Prefix/ Date Code	Condition	Conclusion/Comments	List of Figures	Central Laboratory Report Number
PY7	8	TC	3088	No leaks or other apparent problems	Switch did not open when pressurized. Shows current leak path between contacts and ground. Cup has been corroded. Transfer pin frozen in place by corrosion products. Moisture in cavity appears to have formed current leak path. No evidence of material transfer from contacts to cup. No evidence of leak in Kapton seals. Appears to be different failure mode than Memphis switch.	Figures 114 through 121	9900607
PX1	10	CV	2272	No leaks or other apparent problems	Examination, resistance and functional testing revealed no apparent problem with switch. No further analysis performed.	Figures 122 through 123	9900607
NY7	11	TC	2115	No leaks or other apparent problems	Examination, resistance and functional testing revealed no apparent problem with switch. No further analysis performed.	Figures 124 through 126	9900607
PY7	12	TC	3085	No leaks or other apparent problems	Switch did not open when pressurized. Shows current leak path between contacts and ground. Analyzed by SRL.	Figures 127 through 128	9900607
PY74	13	TC	3089	No leaks or other apparent problems	Examination, resistance and functional testing revealed no apparent problem with switch. No further analysis performed.	Figures 129 through 130	9900607
NY7	Osels	TC	2062	Dealership return, apparent brake fluid leak.	Resistance measurements show current leak path between contacts and between contacts and ground. Kapton seals appear to have formed leak path for brake fluid to enter switch cavity. Transfer of contact material to cup suggests electrical cell may have occurred between the hot (+) contacts and the grounded (-) cup. Brake fluid may have acted as electrolyte. Failure mode similar to Memphis switch.	Figures 131 through 140	9900607

VIN	Sample	MY/Vehicle	Prefab/ Date Code	Condition	Switch and Connector			Only	Switch			Switch at 180 psi				Function			
					GRN/RD to OR	GRN/RD to Hexport	OR to Hexport	GRN/RD to OR	Spring Term. to Stat. Term.	Spring Term. to Hexport	Stat. Term. to Hexport	Base to Hexport	Spring Term. to Stat. Term.	Spring Term. to Hexport	Stat. Term. to Hexport	Base to Hexport	Opening Pressure	Closing Pressure	Proof Test at 500psi
PY	Osaka	TC	2128	Dealership return, apparent brake fluid leak.	NP	NP	NP	NP	>130K	>17K	>350K	Infinity	170K	>140K	>15K	Infinity	No sound	No sound	No apparent leak
PY	EAA	TC	2088	Underhood fire.	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
NY	EAA	TC	2080	Underhood fire.	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
NY	EAA	Lincoln	?	Underhood fire.	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
ND	EAA	GM	?	Underhood fire.	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
NY	1	TC	2008	No leaks or other apparent problems	NP	NP	NP	NP	0.3	Infinity	Infinity	3.9	Infinity	Infinity	Infinity	Infinity	122	59	No apparent leak
PY	1	TC	2028	No leaks or other apparent problems	0.3	Infinity	Infinity	Infinity	0.3	Infinity	Infinity	5.5	Infinity	Infinity	Infinity	Infinity	158	68	No apparent leak
K	Jun-96	F150	F3TA/6117	No leaks or other apparent problems	NP	NP	NP	NP	0.04	Infinity	Infinity	Infinity	0.04	Infinity	Infinity	Infinity	CDNO	CDNO	No apparent leak

VIN	Engagement	Wires	Red Seal	Grey Seal	Hexport, Washer, Converter, Spacer, and Disc	Switch			
						Environmental Seal	Gasket/Kapton Seals	Cup	Base, Switch Cavity, Contacts, Terminals
PY6	Missing	Missing	Missing	Missing	Black residue in fitting end of hexport contains glycol based material (probably brake fluid) and an oxalate. Copper colored globules also present. No apparent burns on converter, washer, or hexport.	Intact and appears to have had good seal.	Gasket is intact and appears to have had good seal. Kapton seals exhibit circumferential tears in Teflon with radial and circumferential cracking in substrate. Appears to have formed leak path. Damage appears similar to that in Memphis sample.	Face of cup covered with black residue and copper colored globules. Residue contains glycol based material (probably brake fluid) and possibly a hydrocarbon. Additional analyses of residue pending.	Switch cavity of base contains black sludge with copper colored globules. Movable contact appears to have been corroded away. Black residue is present in terminal cavity and on the terminals.
PY6	Missing	Missing	Missing	Missing	Black residue in fitting end of hexport. Washer, converter, disc, and interior of cup are covered with rust colored deposits.	Missing	Gasket missing. Charred fragments of Kapton seals remain.	Face of cup covered with rust colored deposits. Analysis pending.	Missing.
NY7	Missing	Missing	Missing	Missing	Black residue in fitting end of hexport. Washer, converter, disc, and interior of cup are covered with rust colored deposits.	Missing	Gasket missing. Charred fragments of Kapton seals remain.	Face of cup covered with rust colored deposits. Analysis pending.	Missing.
NY7	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing	Missing.
NO7	Missing	Missing	Missing	Missing	Did not disassemble	Did not disassemble	Did not disassemble	Did not disassemble	Missing.
NO7	Missing	Missing	Missing	Missing	Black residue in fitting end of hexport. Did not analyze.	Did not disassemble	Did not disassemble	Did not disassemble	Did not disassemble. Terminals clean (no apparent deposits or corrosion).
PY6	Fully engaged	NP	Intact. Impression even and deep all the way around	Intact. Wires and cavity clean below seal except for trace of oil from seal. Seal left impressions in wire insulation.	Black residue in fitting end of hexport. Did not analyze.	Did not disassemble	Did not disassemble	Did not disassemble	Did not disassemble. Terminals clean (no apparent deposits or corrosion).
KA	Missing	Missing	Missing	Missing	Fitting end of hexport appears clean.	Did not disassemble	Did not disassemble	Did not disassemble	Base is white or appears faded. Terminals have dark green deposits. Did not disassemble.

VIN	Sample	MY/Vehicle	Prefix/ Date Code	Condition	Conclusion/Comments	List of Figures	Central Laboratory Report Number
PY [REDACTED]	Oasis	TC	2128	Dealership return, apparent brake fluid leak.	Resistance measurements show current leak path between contacts and between contacts and ground. Kapton seals appear to have formed leak path for brake fluid to enter switch cavity. Transfer of contact material to cup suggests electrical cell may occurred between the hot (+) contacts and the grounded (-) cup. Brake fluid may have acted as electrolyte. Failure mode similar to Memphis switch.	Figures 150 through 166	9900607
PY [REDACTED]	EAA	TC	2089	Underhood fire.	No further analysis performed.	Figures 167 through 173	9900607
NY [REDACTED]	EAA	TC	2090	Underhood fire.	No further analysis performed.	Figures 174 through 179	9900607
NY [REDACTED]	EAA	Lincoln	?	Underhood fire.	Brake fluid only. No switch to analyze.		
ND [REDACTED]	EAA	GM	?	Underhood fire.	No further analysis performed.	Figures 180 through 182	9900607
ND [REDACTED]	1	TC	2008	No leaks or other apparent problems	Examination, resistance and functional testing revealed no apparent problem with switch. No further analysis performed.	Figures 183 through 184	9900607
PY [REDACTED]	1	TC	2028	No leaks or other apparent problems	Examination, resistance and functional testing revealed no apparent problem with switch. No further analysis performed.	none	9900607
K [REDACTED]	Jun-86	F150	F3TA/8117	No leaks or other apparent problems	No further analysis performed.	Figures 185 through 188	9901571

VIN	Sample	MY/Vehicle	Part/Date Code	Condition	GRN/RD to OR	GRN/RD to Hexport	OR to Hexport	GRN/RD to OR	Spring Term. to Stat. Term.	Spring Term. to Hexport	Stat. Term. to Hexport	Base to Hexport	Spring Term. to Stat. Term.	Spring Term. to Hexport	Stat. Term. to Hexport	Base to Hexport	Opening Pressure	Closing Pressure	Proof Test at 500psi
TX	?	GM	F2AC/5331	Covered with what appears to be brake fluid. Could not determine if leakage or runout.	NP	NP	NP	NP	0.03	Infinity	Infinity	Infinity	Infinity	Infinity	Infinity	Infinity	125	95	No apparent leak
HI	Apr-86	E250	F8TA/B025	No leaks or other apparent problems	NP	NP	NP	NP	0.03	Infinity	Infinity	Infinity	0.04	Infinity	Infinity	Infinity	255	200	No apparent leak
CA	Nov-86	F150	F8TA/B278B	No leaks or other apparent problems	NP	NP	NP	NP	0.05	Infinity	Infinity	Infinity	0.05	Infinity	Infinity	Infinity	CDNO	CDNO	No apparent leak
PX	83	CV	F2AC/2211	Covered with what appears to be brake fluid which probably drained out. No other apparent problems.	NP	NP	NP	NP	0.02	3.8M	3.0 M	Infinity	0.02	3.0M	2.7M	Infinity	CDNO	CDNO	No apparent leak
NA	May-86	F150	F8TA/B090B	No leaks or other apparent problems	NP	NP	NP	NP	0.02	Infinity	Infinity	Infinity	0.02	Infinity	Infinity	Infinity	246	180	No apparent leak
LA	Oct-86	Exp	F8TA/B278A	Covered with what appears to be brake fluid which probably drained out. No other apparent problems.	NP	NP	NP	NP	0.01	Infinity	Infinity	Infinity	Infinity	Infinity	Infinity	Infinity	244	175	No apparent leak
NA	Mar-87	F150	F8TA/7053	Damp with what appears to be brake fluid which probably drained out. No other apparent problems.	NP	NP	NP	NP	0.02	Infinity	Infinity	Infinity	Infinity	Infinity	Infinity	Infinity	230	165	No apparent leak

NP = Not Performed

VIN	Engagement	Wires	Red Seal	Grey Seal	Converter, Spacer, and Disc	Environmental Seal	Gasket/Kapton Seals	Cup	Base, Switch Cavity, Contacts, Terminals
TX									
H	Fully engaged. Different style connector	NP	Different style connector	Different style connector	Fitting end of hexport appears clean.	Did not disassemble	Did not disassemble	Did not disassemble	Terminals and cavity appear clean and dry. Did not disassemble.
C	Missing	Missing	Missing	Missing	Whitish translucent residue in fitting end of hexport.	Did not disassemble	Did not disassemble	Did not disassemble	Terminals covered with greenish residue. Red base. Did not disassemble.
PX	Missing	Missing	Missing	Missing	Black residue in fitting end of hexport	Did not disassemble	Did not disassemble	Did not disassemble	Terminals covered with light residue. Terminals and cavity dry.
N	Missing	Missing	Missing	Missing	Fitting end of hexport clean.	Did not disassemble	Did not disassemble	Did not disassemble	Terminals clean and dry. Red base.
L	Missing	Missing	Only red seal provided. Intact with shallow even impression.	Missing	Fitting end of hexport clean.	Did not disassemble	Did not disassemble	Did not disassemble	Terminals clean and dry. Red base.
N	Missing	Missing	Missing	Missing	Fitting end of hexport clean.	Did not disassemble	Did not disassemble	Did not disassemble	Terminals clean and dry. Red base.

NP = Not Performed
TC = Town Car
E = Emulsion

3713 7820

GM - Grand Marais

VIN	Sample	MY/Vehicle	Prefix/ Date Code	Condition	Conclusion/Comments	List of Figures	Central Laboratory Report Number
TJ	?	GM	F2AC/5331	Covered with what appears to be brake fluid. Could not determine if leakage or runoff.	No further analysis performed.	Figures 180 through 191	8901571
H	Apr-86	E250	F3TA/8025	No leaks or other apparent problems	No further analysis performed.	Figure 182	8901571
C	Nov-88	F150	F3TA/8278 B	No leaks or other apparent problems	No further analysis performed.	Figures 183 through 184	8901571
PX	Apr-00	CV	F2AC/2211	Covered with what appears to be brake fluid which probably drained out. No other apparent problems.	No further analysis performed.	Figures 185 through 186	8901571
N	May-86	F150	F3TA/8090 B	No leaks or other apparent problems	No further analysis performed.	Figures 187 through 188	8901571
L	Oct-86	Exp	F3TA/8278 A	Covered with what appears to be brake fluid which probably drained out. No other apparent problems.	No further analysis performed.	Figures 189 through 201	8901571
N	Mar-87	F150	F3TA/7063	Damp with what appears to be brake fluid which probably drained out. No other apparent problems.	No further analysis performed.	Figures 202 through 203	8901571

VIN	Sample	MY/Vehicle	Prefix/ Date Code	Condition	GRNRD to OR	GRNRD to Hexport	OR to Hexport	GRNRD to OR	Spring Term. to Stat. Term.	Spring Term. to Hexport	Stat. Term. to Hexport	Base to Hexport	Spring Term. to Stat. Term.	Spring Term. to Hexport	Stat. Term. to Hexport	Base to Hexport	Opening Pressure	Closing Pressure	Proof Test at 500psi
LA	97	Exp	F3TA/0201	No leaks or other apparent problems	NP	NP	NP	NP	0.02	Infinity	Infinity	Infinity	0.02	Infinity	Infinity	Infinity	251	184	No apparent leak
PYZ	83	?	F2VC/2352A	Damp with what appears to be brake fluid which probably drained out. No other apparent problems.	NP	NP	NP	NP	0.02	Infinity	Infinity	Infinity	Infinity	Infinity	Infinity	Infinity	137	68	No apparent leak
LE	97	Exp	F3TA/8024A	No leaks or other apparent problems	NP	NP	NP	NP	0.02	Infinity	Infinity	Infinity	0.01	Infinity	Infinity	Infinity	251	183	No apparent leak
X7	92	CV	F2VC/2059	Wet with what appears to be brake fluid which probably drained out. No other apparent problems.	NP	NP	NP	NP	0.01	Infinity	Infinity	Infinity	Infinity	Infinity	Infinity	Infinity	145	73	No apparent leak
TX8	85	CV	F2AC/5214	Damp with what appears to be brake fluid which probably drained out. No other apparent problems.	NP	NP	NP	NP	0.01	Infinity	Infinity	Infinity	Infinity	Infinity	Infinity	Infinity	125	88	No apparent leak
LA	May-83	Bronco	F3TA/3127	Wet with what appears to be brake fluid which probably drained out. No other apparent problems.	NP	NP	NP	NP	0.03	Infinity	Infinity	Infinity	0.02	Infinity	Infinity	Infinity	275	190	No apparent leak

VIN	Engagement	Wires	Red Seal	Grey Seal	Hexport, Washer, Converter, Spacer, and Die	Environmental Seal	Gasket/Kapton Seals	Cup	Base, Switch Cavity, Contacts, Terminals
LA	Missing	Missing	Missing	Missing	Fitting end of hexport clean.	Did not disassemble	Did not disassemble	Did not disassemble	Terminals clean and dry. Red base.
PY7	Missing	Missing	Missing	Missing	Fitting end of hexport clean.	Did not disassemble	Did not disassemble	Did not disassemble	Terminals clean and dry.
LB	Missing	Missing	Missing	Missing	Fitting end of hexport clean.	Did not disassemble	Did not disassemble	Did not disassemble	Terminals clean and dry. Red base.
X7	Missing	Missing	Missing	Missing	Black residue in fitting end of hexport.	Did not disassemble	Did not disassemble	Did not disassemble	Terminals clean and dry.
TX8	Missing	Missing	Missing	Missing	Fitting end of hexport clean.	Did not disassemble	Did not disassemble	Did not disassemble	Some rundown of what appears to be brake fluid from exterior into cavity. Otherwise cavity appears dry. Light residue on terminals.
LA	Missing	Missing	Missing	Missing	Black residue in fitting end of hexport.	Did not disassemble	Did not disassemble	Did not disassemble	Some rundown of what appears to be brake fluid from exterior into cavity. Otherwise cavity appears dry. Light residue on terminals and cavity.

VIN	Sample	MY/Vehicle	Prefix/ Date Code	Condition	Conclusion/Comments	List of Figures	Central Laboratory Report Number
LA	Apr-00	Exp	F3TA/8201	No leaks or other apparent problems	No further analysis performed.	Figures 208 through 209	9901571
PY7	Apr-00	?	F2VC/2352 A	Damp with what appears to be brake fluid which probably drained out. No other apparent problems.	No further analysis performed.	Figures 210 through 211	9901571
LB	Apr-00	Exp	F3TA/8024 A	No leaks or other apparent problems	No further analysis performed.	Figures 212 through 213	9901571
X7	Apr-00	CV	F2VC/2059	Wet with what appears to be brake fluid which probably drained out. No other apparent problems.	No further analysis performed.	Figures 214 through 215	9901571
TX6	Apr-00	CV	F2AC/5214	Damp with what appears to be brake fluid which probably drained out. No other apparent problems.	No further analysis performed.	Figures 216 through 217	9901571
LA	May-93	Bronco	F3TA/3127	Wet with what appears to be brake fluid which probably drained out. No other apparent problems.	No further analysis performed.	Figures 218 through 219	9901571

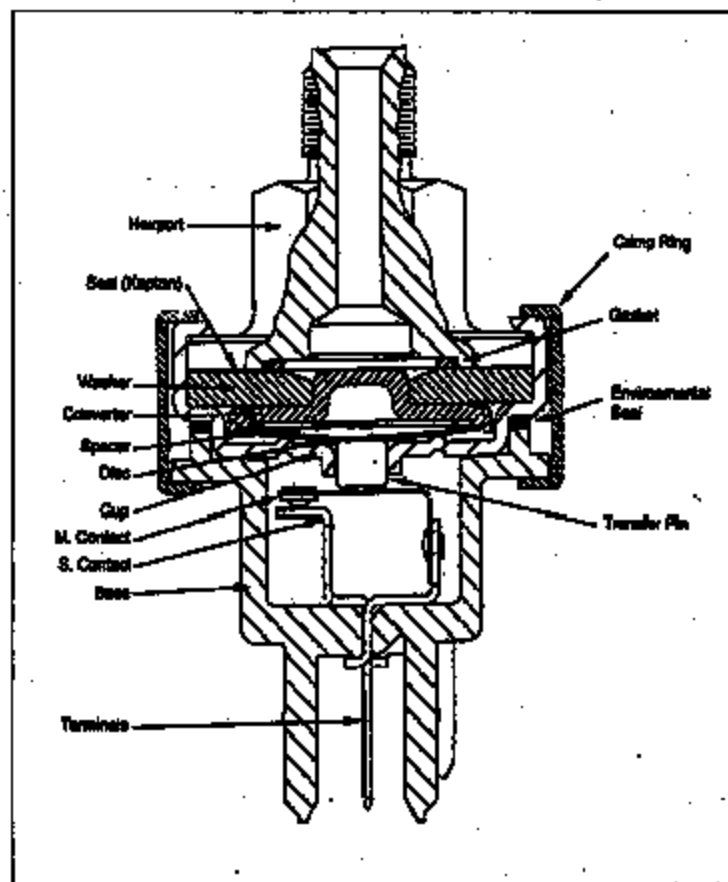
Data Log Brake Pressure Switch

Sw ID	Sw Date Code	Vehicle	VIN	Event	Mileage
Memphis	2058	Town Car	PY	Sw. Fire	
A	2281	Town Car	PY	Underhood Fire	
B	2114	Town Car	NY	Underhood Fire	
C	2003	Town Car	NY	Underhood Fire	
D		Crown Vic Police Car	VY	Cruise Inop	
E	2137	Town Car	NY	Reference	
F	2128	Town Car	NY	Cruise Inop	
1	2006	Town Car	ND	Reference	79184
3	3015	Town Car	PY	Reference	71337
4	2048	Town Car	PY	Reference	66067
5	2054	Town Car	PY	Reference	86349
6	3025	Town Car	PY	Reference	47325
7	2059	Town Car	ND	Reference	80222
8	3025	Town Car	PY	Reference	66614
9	2250	Town Car	PY	Reference	??
10	2251	Town Car	PY	Reference	82224
11	3028	Town Car	PY	Reference	91358
12	2233	Town Car	PY	Reference	66639
13	2080	Town Car	NY	Reference	63237
14	2071	Town Car	PY	Reference	94145
15	3081	Town Car	PY	Reference	??
16	??	Town Car	BY	Reference	97199
17	??	Town Car	PY	Reference	72114
18	3309	Town Car	PY	Reference	
19	??	Town Car	PY	Reference	87549
20	??	Town Car	PY	Reference	42621
21	??	Town Car	PY	Reference	43531
22	2274	??	??	Reference	??
23	??	Town Car	PY	Reference	66302
From TX trip of 2/10 to 2/12, John McInerney Group					
1	2028	Town Car	PY	Reference	
2	3059	Crown Vic Police Car	PY	Reference	198996
3	3095	Grand Marquis	RY	Reference	??
4	3025	Crown Vic	PY	Reference	40642
5	2063	Town Car	PY	Reference	73115
6	??	Town Car	NY	Underhood Fire	??
7	3081	Town Car	PY	Reference	??
8	3045	Town Car	NY	Underhood Fire	106610
9	3008	Town Car	PY	Reference	??
10	2272	Crown Vic	PY	Reference	72814
11	2115	Town Car	NY	Reference	??
12	3086	Town Car	PY	Reference	??
13	3069	Town Car	PY	Reference	105048
OASIS					
Baton Rouge, LA	2062	Town Car	PY	Dealership Return	83003
Memphis, TN	2128	Town Car	PY	Dealership Return	156589
EAA					
Overson, FL	2080	Town Car	NY	Underhood Fire	100000+
Aurora, IL	2088	Town Car	PY	Underhood Fire	?
Naples, FL	?	Lincoln	NY	Underhood Fire	73825
Gibsonton, FL	?	Grand Marquis	ND	Underhood Fire	68 - 60,000

Data Log Brake Pressure Switch

Jun-86	F3TA/8117	F150	K	Reference	?
Apr-86	F3TA/8025	E350	H	Reference	?
Jan-87	F3TA/8855	F150	LE	Reference	?
88	F2AC/2211	Crown Vic	P	Reference	?
May-88	F3TA/3127	Bronco	LA	Reference	?
May-88	F3TA/8080B	F150	N	Reference	?
Nov-88	F3TA/8278B	F150	C	Reference	?
Oct-88	F3TA/8278A	Exp	LA	Reference	?
?	F2AC/5331	Grand Marquis	T	Reference	?
87	F2AC/8011	?	X	Reference	?
Mar-87	F3TA/7053	F150	M	Reference	?
Oct-85	F3TA/8274	Exp	U	Reference	?
88	F2VC/2382A	?	P	Reference	?
87	F3TA/8024A	Exp	LE	Reference	?
87	F3TA/8201	Exp	LA	Reference	?
88	F2VC/2059	Crown Vic	T	Reference	?
85	F2AC/5214	Crown Vic	T	Reference	?

**Diagram Showing
Components of
Switch**



Field Info	1	Log Field into into Switch Log.xls
		Condition
	2	Photograph Switch
	3	Record any unusual external visual observations
	4	Check for O-ring engagement
Switch + Connector Assembly		5-way if appropriate
	5	Wire 1 (LGR) to Wire 2 (ORANGE) Resistance
	6	Wire 1 (LGR) to Harport Resistance
Connector Only	7	Wire 2 (ORANGE) to Harport Resistance
	8	Separate Harness from Switch
Switch External Unpressurized	9	Verify Connector Seal
	10	Wire 1 (LGR) to Wire 2 (ORANGE) resistance
	12	Check for full engagement of connector
	13	Check wire insulation
Switch External Pressurized	14	Check wire gray seals
	15	Put wire insulation in check for separation
	16	Assemble Switch to Calibration Stand
	17	Spring Terminal to Stationary Terminal Resistance
	18	Spring Terminal to Harport Resistance
Switch External Pressurized	19	Stationary Terminal to Harport resistance
	20	None to Harport Resistance
	24	Switch Opening Pressure
Switch External Pressurized	25	Switch Closing Pressure
	26	Proof Test for Leakage
	27	Repeat Steps 17 through 20 at 140 psig
Switch		
	28	Remove electrical wiring ring
	29	Examine recessed surfaces, Photograph
	30	Remove cup
Techniques	31	Examine recessed surfaces, Photograph
	31	SEM-EDX AFTER lens, contacts, terminals
	32	SEM-EDX AFTER cup, harport, wiring seals, etc.
	33	Micrographic analysis of contents
		Look for evidence of corrosion or arcing