BATTERY OPEN POST VOLTAGE

To diagnose an electrical problem, you have to begin at the beginning, so let's start at the battery. The first electrical check on any car should be battery open post voltage. To do this correctly you'll need an accurate voltmeter. Your best choice will be to use a digital multimeter. An analog meter might be okay, but a test light is definitely not the tool to use.

The engine must be off and preferable cold. Place the positive lead of your voltmeter to the positive post of the battery. Now do the same for the negative side, negative lead to negative post. Now read your meter. A fully charged battery will read between 12.45 volts and 12.66 volts. A battery that reads 12.24 volts is only 50% of full charge and 11.98 or lower is considered discharged. An analog meter may not pick up two tenths of a volt difference and a test light definitely can't.

If battery voltage is not at least 12.45 volts, then it must be corrected. Maybe the battery needs charging or maybe it's bad. There could be a problem with parasitic loads. In any event, the problem must be corrected before doing the next test.

TIPS ON CHECKING HIGH CURRENT GROUNDS: Use a DVOM set to DC volts, on the 2.0 volt range. This will display the voltage drop measurement in thousandths of a volt,(0.000 volt) for precise indications of how good the ground is. Normal ground connection voltage drop should not exceed 0.100 volts. If the ground voltage drop is above 2.0 volts the DVOM will read out an "over voltage" indication. The next higher range of the DVOM must then be used (20.00 volt range). Before certifying that the voltage drop problem has been corrected check again with the 2.0 volt range. Make sure high current is flowing during the time the voltage drop measurement is made.

In Figure 1-59C note the position of the two DVOM test leads. They are connected directly across the entire ground connection, measuring between the ground wire itself and the metal chassis. This checks the entire ground connection, even where the ground wire is crimped in the ground lug.

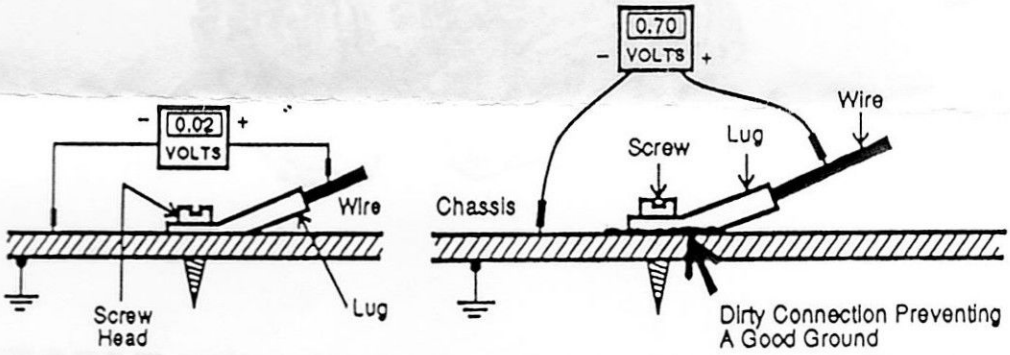

Fig 1-59C

The corroded connection presents a resistance to high circuit current. The resistance can be detected by a voltage drop measured with a DVOM. An ohmmeter may not reveal any resistance being present because the very small ohmmeter test current is able to pass through the corroded connection with no resistance being detected.

Auto Value Parts Stores — North American Honored Heroes

RESERVE

AUTO VALUE BRAINERD
305 NW 4TH ST

BRAINERD, MN 56401
(218)829-2841

DATE	INVOICE #
8/5/2013	RESERVE
ORDER DATE	
7/29/2013	
TIME	REF #
03:28 PM	64245
SELLER	ACCT#
17002	1790014
P.O.#	

Bill To
CHUCK HAWKINSON

Ship To
CHUCK HAWKINSON

SLSMN: SALESM

QTY	MFG	PART NUMBER	DESCRIPTION	CORE	LIST	SELL	EXTENDED	TAX P	TAX C
1	CTR	M60330	MECHANICAL FUEL PUMP	0.00	39.55	28.99	28.99	Y	Y
1	AA1	30-2669	DISTRIBUTOR-RMFD	55.56	93.61	61.99	117.55	Y	Y
1	AA1	30-2669	DISTRIBUTOR-RMFD	-55.56			-55.56	N	Y
		COR CORE RETURN							
6	ATL	45	COPPER CORE SPARK PL	0.00	2.88	1.99	11.94	Y	Y
1	WIX	51515	OIL FILTERS FOR DOME	0.00	9.70	6.39	6.39	Y	Y
1	STI	PS-60T	OIL SWITCH	0.00	18.83	11.99	11.99	Y	Y
1	STA	13009	THERMOSTAT	0.00	8.10	5.49	5.49	Y	Y
1	DOR	42049	PCV VALVE GROMMET	0.00	6.51	4.49	4.49	Y	Y
1	STI	TS-58	SWITCH-TEMPERATURE	0.00	15.35	10.99	10.99	Y	Y
1	STA	10071	OIL CAP	0.00	11.00	7.49	7.49	Y	Y
1	STI	V219	PCV VALVE	0.00	7.23	3.99	3.99	Y	Y
1	STI	FD-148T	DIST ROTOR	0.00	15.93	9.99	9.99	Y	Y
1	STI	FD-110T	DIST ROTOR	0.00	5.78	3.49	3.49	Y	Y
1	PWI	29640	WIRE SET	0.00	23.46	16.99	16.99	Y	Y
6	YEP	BR30	5W30 BREAK IN OIL	0.00	15.44	8.49	50.94	Y	N
1	DOR	42055	PCV VALVE GROMMET	0.00	5.06	3.49	3.49	Y	Y
1	DOR	03099	EXHAUST FLANGE HDWE	0.00	9.41	6.49	6.49	Y	Y
1	AA1	30-2669	DISTRIBUTOR-RMFD	-55.56			-55.56	N	Y
		COR CORE RETURN	ORIG INV 17026212						
1	SPR	1450M	CAMSHAFT BEARING SET	0.00	80.71	53.99	53.99	Y	Y
1	FEL	35067	WATER OUTLET	0.00	2.45	1.59	1.59	Y	Y
1	LB7	42	VALVE JOB	0.00	163.64	90.00	90.00	N	N
12	LB7	14	VALVE GUIDES INSTALL	0.00	10.91	6.00	72.00	N	N
1	LB7	21	CYLINDER HEAD MACHIN	0.00	54.55	30.00	30.00	N	N
1	LB7	23	DEGREASING	0.00	70.91	39.00	39.00	N	N
1	LB7	10	MAGNUFLUX	0.00	81.82	45.00	45.00	N	N
6	LB7	1	HOLE REBORED-HONED	0.00	27.27	15.00	90.00	N	N
1	LB7	3	FROST PLUGS INSTALLE	0.00	21.82	12.00	12.00	N	N
1	LB7	25	CAM BEARINGS INSTALL	0.00	43.64	24.00	24.00	N	N
6	LB7	5	PISTON PINS FITTED	0.00	10.91	6.00	36.00	N	N
6	LB7	8	CONNECTING ROD RECON	0.00	25.45	14.00	84.00	N	N
1	LB7	6	ENGINE BLOCK MACHINE	0.00	72.73	40.00	40.00	N	N
1	LB7	68	MANIFOLD RESURFACING	0.00	54.55	30.00	30.00	N	N
1	LB7	24	ASSEMBLE MOTOR	0.00	636.36	350.00	350.00	N	N
1	LB7	58	WASTE REMOVAL	0.00	45.45	25.00	25.00	N	N
12	XEP	MELMRK-600	ENGINE VALVE	0.00	33.67	18.52	222.24	Y	Y
1	XEP	FK300-03R	FORD 6 4.9L KIT	0.00	902.05	496.13	496.13	Y	Y
1	XEP	MELIS-74	SHAFT-INTERMEDIATE	0.00	20.91	11.50	11.50	Y	Y
1	LBR	300 FORD	4.9 GRD	0.00	227.27	125.00	125.00	N	N
1	XFR	FREIGHT	FREIGHT	0.00	36.36	20.00	20.00	Y	N
1	PLA	228	GRAY ENGINE PRIMER	0.00	12.16	7.99	7.99	Y	Y
		BO SPECIAL ORDER	(BO)						
1	PLA	224	FORD BLUE	0.00	12.16	7.99	7.99	Y	Y
		BO SPECIAL ORDER	(BO)						

FREIGHT 20.00 LABOR 967.00

SO 137290

GO TO WWW.AUTOVALUECARES.COM
SHARE YOUR EXPERIENCE AND
YOU MAY WIN A $100 GIFT CARD

Signature

Subtotal	1201.56
Core	-55.56
Tax	76.77
Total	2209.77
Invoice Payment Type	RESERVE

RESERVE

CONTINUED

RESERVE

AUTO VALUE BRAINERD
305 NW 4TH ST

BRAINERD, MN 56401
(218)829-2841

DATE	INVOICE #
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Bill To
CHUCK HAWKINSON

Ship To
CHUCK HAWKINSON

SLSMN: SALESM

QTY	MFG	PART NUMBER	DESCRIPTION	CORE	LIST	SELL	EXTENDED	P	C
	THIS	TICKET CONTAINS PARTS FOR A:							
	1979	FORD PICKUP F150	1/2 TON TRUCK L6-300CI 4.9L		1 BBL VIN B	ID#1378			
1	AWP	2-494	WATER PUMP	0.00	46.36	29.99	29.99	Y	Y

FREIGHT 20.00 LABOR 967.00

SO 137290

GO TO WWW.AUTOVALUECARES.COM
SHARE YOUR EXPERIENCE AND
YOU MAY WIN A $100 GIFT CARD

Signature

Subtotal	1201.56
Core	-55.56
Tax	76.77
Total	2209.77
Invoice Payment Type	RESERVE

RESERVE

42035

I N V O I C E

BOBS TRANSMISSION
910 6TH AVE. NE

MILACA, MN 56353
320/983-6656

GUN LAKE GRAVEL
42298 320TH PLACE
AITKIN, MN 56431
CHUCK
HOME : 612/384-2731 EXT: CELL
WORK : 218/927-4469
5711

VIN :
0001 808

INVOICE NUMBER : 42035
INVOICE DATE : 06/06/12
YEAR : 1976
MAKE OF VEHICLE: FORD
MODEL : F150
LICENSE :
TIME IN / OUT : 11:15/
DESCRIPTION :
MILEAGE :
ENGINE : 4.9L
TRANSMISSION : C6

* 4 FLYWHEELS & C6 2WD 302 STYLE *
* F868# 16383 TRANS./ F49 CONV./ 1677 COOLER -W- 5/16 COMP. TEE'S *

CLASS	PRODUCT	DESCRIPTION	QTY	UOM	PRICE	TOTAL
PARTS	F207	FLWHEEL FORD 4.9 W/C6 73-	4	EA	38.000	152.00
PARTS	F868	C6 TRANSMISSION 300, 302,	1	EA	800.000	800.00
		SERIAL NUMBER: 16383				
PARTS	F49	CONV C6 TRANS S/PILOT 6CY	1	EA	0.000	0.00
PARTS	1677	HAYDEN TRANSAVER 20,000 G	1	EA	0.000	0.00
PARTS	64X5	5/16 COMPRESSION TEES	2	EA	0.000	0.00

THIS TRANSMISSION HAS A TWELVE (12) MONTH OR
12,000 MILE WARRANTY --- THANK YOU ---

TERMS: CASH OR CREDIT CARD - THANK YOU.
and
or any other cause beyond our control.
I hereby authorize the above repair work to be done with the necessary material and grant permission to operate for purpose of testing and inspection.
An express mechanic's lien is acknowledged to secure the amount of repairs.

X____________________

PARTS TOTAL	:	952.00
LABOR TOTAL	:	0.00
MISC. TOTAL	:	0.00
SUB TOTAL	:	952.00
TAXABLE	:	0.00
SALES TAX	:	0.00
INVOICE TOTAL	:	**952.00**
CASH AMOUNT PAID	:	952.00
BALANCE DUE	:	0.00